FCC Radio Test Report

FCC ID: XMR202005SC200RNA

This report concerns: Original Grant

Project No.	:	2005H018
Equipment	:	Multi-mode Smart LTE Module
Brand Name	:	Quectel
Test Model	:	SC200R-NA
Series Model	:	N/A
Applicant	:	Quectel Wireless Solutions Co., Ltd.
Address	:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.
Manufacturer	:	Quectel Wireless Solutions Co., Ltd.
Address	:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.
Date of Receipt	:	May 08, 2020
Date of Test	:	May 08, 2020 ~ Jun. 05, 2020
Issued Date	:	Aug. 10, 2020
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH2020050840, SH2020050840-1
Standard(s)	:	47 CFR FCC Part 90 Subpart S 47 CFR FCC Part 2 ANSI/TIA/EIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Krain. Wu

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Certificate # 5123. 03

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 10, 2020

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 90 Subpart S & Part 2			
Standard(s) Section	**Test Item**	**Judgment**	**Remark**
2.1046 & 90.635 (b)	Effective Radiated Power	PASS	------
2.1049 & 90.209	Occupied Bandwidth	PASS	------
2.1053 & 90.669	Conducted Spurious Emissions	PASS	------
2.1053 & 90.669	Radiated Spurious Emissions	PASS	------
2.1053 & 90.691	Mask Measurements	PASS	------
-	Peak To Average Ratio	PASS	Record Only
2.1055 & 90.213	Frequency Stability	PASS	------

Note:

(1) “N/A” denotes test is not applicable in this test report.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210, China.
BTL's Test Firm Registration Number for FCC: 476765
BTL's Designation Number for FCC: CN1241

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
SH-CB01	CISPR	1GHz ~ 6GHz	4.40
		6GHz ~ 18GHz	4.86

Test Site	Method	Measurement Frequency Range	U,(dB)
SH-CB01	CISPR	18 ~ 26.5 GHz	3.64
		26.5 ~ 40 GHz	3.78

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	23°C	60%	DC 3.8V	Forest Li
Occupied Bandwidth	23°C	60%	DC 3.8V	Forest Li
Conducted Spurious Emissions	23°C	60%	DC 3.8V	Forest Li
Radiated Spurious Emissions	23°C	46%	DC 3.8V	Forest Li
Mask	23°C	60%	DC 3.8V	Forest Li
Peak to Average Ratio	23°C	60%	DC 3.8V	Forest Li
Frequency Stability	Normal and Extreme			Forest Li

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Multi-mode Smart LTE Module			
Brand Name	Quectel			
Test Model	SC200R-NA			
Series Model	N/A			
Model Difference(s)	N/A			
Hardware Version	R1.0			
Software Version	SC200RNANAR04A01			
Power Source	DC power supply.			
Power Rating	DC 3.8V			
Antenna Type	Dipole			
Antenna Gain	LTE Band 26：2.53 dBi			
Modulation Type	LTE	UL: QPSK,16QAM, 64QAM DL: QPSK,16QAM, 64QAM		
Max. ERP	LTE	Channel Bandwidth (MHz)	QPSK (dBm)	16QAM (dBm)
	Band 26	1.4	24.56	23.96
		3	24.72	23.88
		5	24.59	23.01
		10	24.38	23.04

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

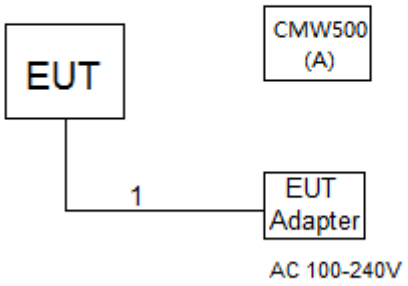
LTE Band 26					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	26697	814.7	8697	859.7
	3	26705	815.5	8705	860.5
	5	26715	816.5	8715	861.5
Mid Range	1.4/3/5/10	26740	819	8740	864
High Range	1.4	26783	823.3	8783	868.3
	3	26775	822.5	8775	867.5
	5	26765	821.5	8765	866.5

2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

LTE BAND 26 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & ERP	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK, 16QAM, 64QAM	1RB/3RB/6RB
	26705 to 26775	26705, 26740, 26775	3MHz	QPSK, 16QAM, 64QAM	1RB/8RB/15RB
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK, 16QAM, 64QAM	1RB/12RB/25RB
	26740	26740	10MHz	QPSK, 16QAM, 64QAM	1RB/25RB/50RB
Occupied Bandwidth	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK, 16QAM, 64QAM	6RB
	26705 to 26775	26705, 26740, 26775	3MHz	QPSK, 16QAM, 64QAM	15RB
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK, 16QAM, 64QAM	25RB
	26740	26740	10MHz	QPSK, 16QAM, 64QAM	1RB/25RB/50RB
Conducted Spurious Emissions	26697 to 26783	26740	1.4MHz	QPSK	1RB
	26705 to 26775	26740	5MHz	QPSK	1RB
	26715 to 26765	26740	10MHz	QPSK	1RB
Radiated Spurious Emissions	26697 to 26783	26740	1.4MHz	QPSK	1RB
	26705 to 26775	26740	5MHz	QPSK	1RB
	26715 to 26765	26740	10MHz	QPSK	1RB
Mask	26697 to 26783	26697, 26783	1.4MHz	QPSK	1RB
					6RB
	26705 to 26775	26705, 26775	3MHz	QPSK	1RB
					15RB
	26715 to 26765	26715, 26765	5MHz	QPSK	1RB
					25RB
	26740	26740	10MHz	QPSK	1RB
					50RB
Peak To Average Ratio	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK, 16QAM, 64QAM	1RB
	26705 to 26775	26705, 26740, 26775	3MHz	QPSK, 16QAM, 64QAM	1RB
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK, 16QAM, 64QAM	1RB
	26740	26740	10MHz	QPSK, 16QAM, 64QAM	1RB
Frequency Stability	26697 to 26783	26740	1.4MHz	QPSK	1RB
	26705 to 26775	26740	3MHz	QPSK	1RB
	26715 to 26765	26740	5MHz	QPSK	1RB
	26740	26740	10MHz	QPSK	1RB

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATIONOFSYSTEMTESTED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
-	CMW500	N/A	N/A	131463

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	N/A	N/A	1.5m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Mobile / Portable station are limited to 100 watts e.r.p.

3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.0.

ERP:

EIRP= Output Power + Antenan gain
ERP = EIPR - 2.15dBi.

Output Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TESTSETUP LAYOUT

Output Power Measurement

3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

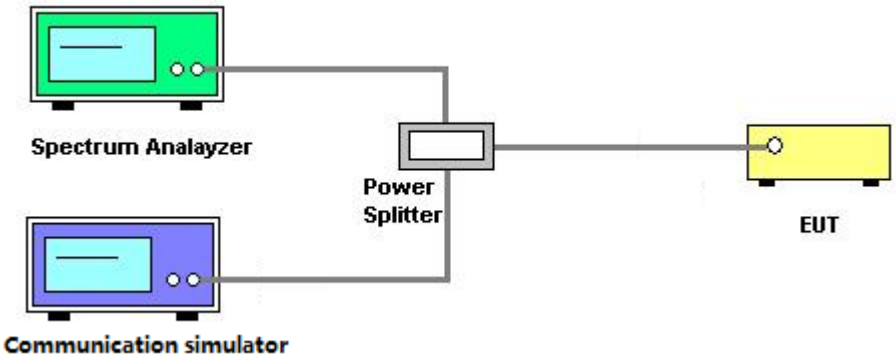
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.0.

1. The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. RBW=(1% ~ 5%)*EBW
   VBW⩾3* RBW
4. Set spectrum analyzer with RMS detector.

3.2.2 TEST SETUP LAYOUT



3.2.3 TEST DEVIATION

No deviation

3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

3.3.1 LIMIT

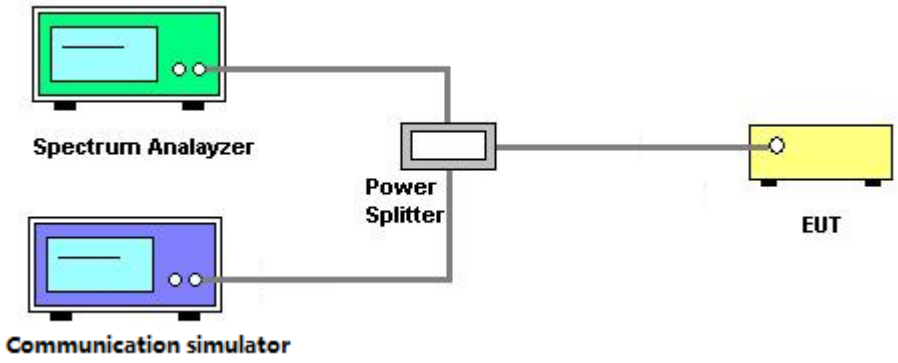
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

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

3.3.3 TESTSETUP LAYOUT



3.3.4 TESTDEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

3.4.1 LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

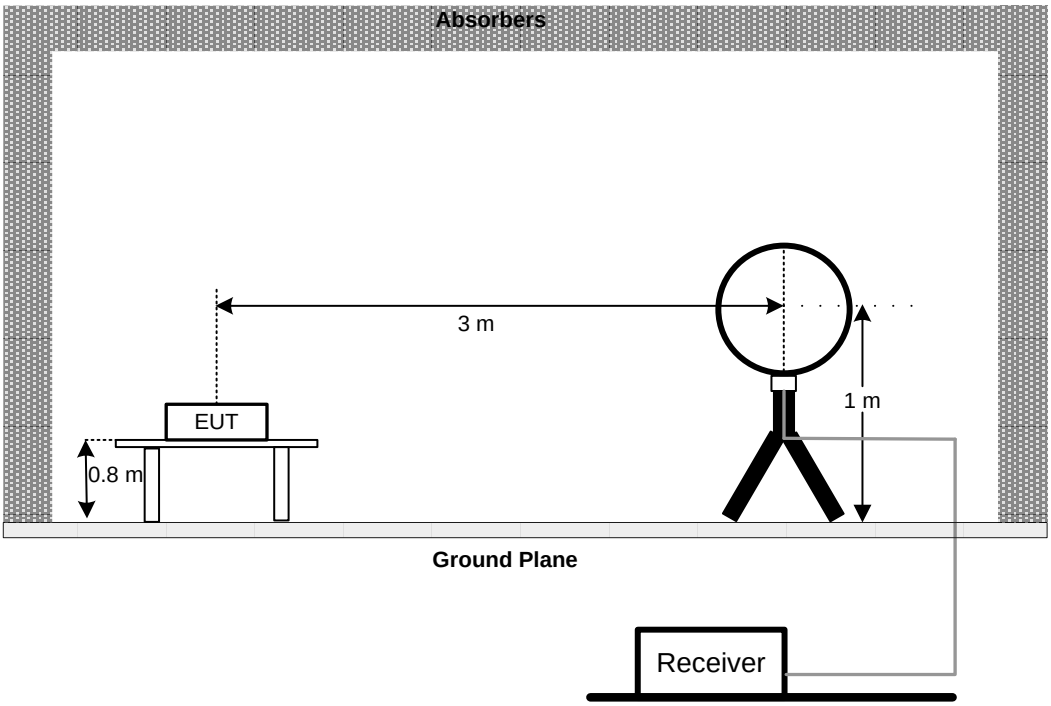
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.8.

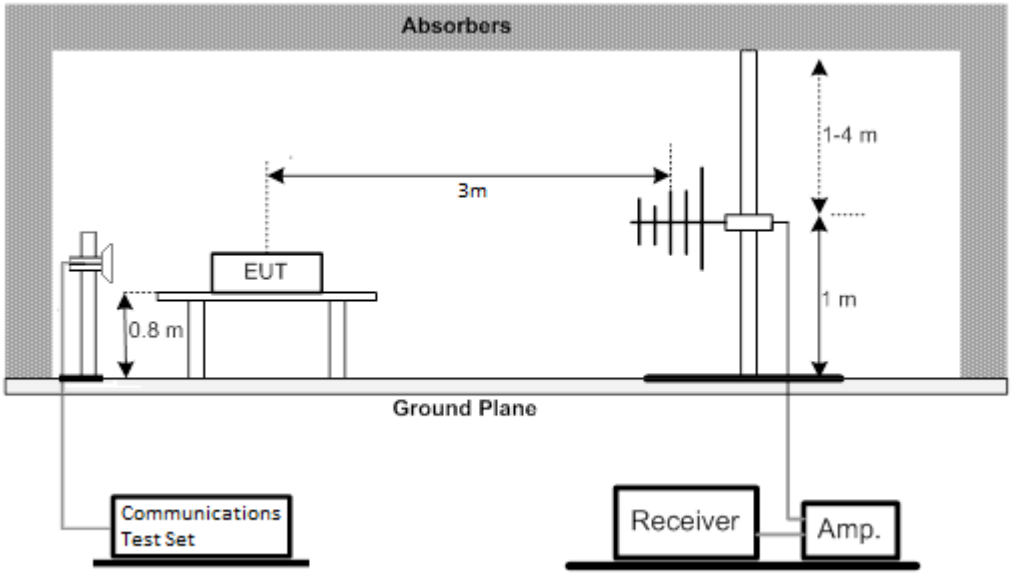
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.4.3 TEST SETUP LAYOUT

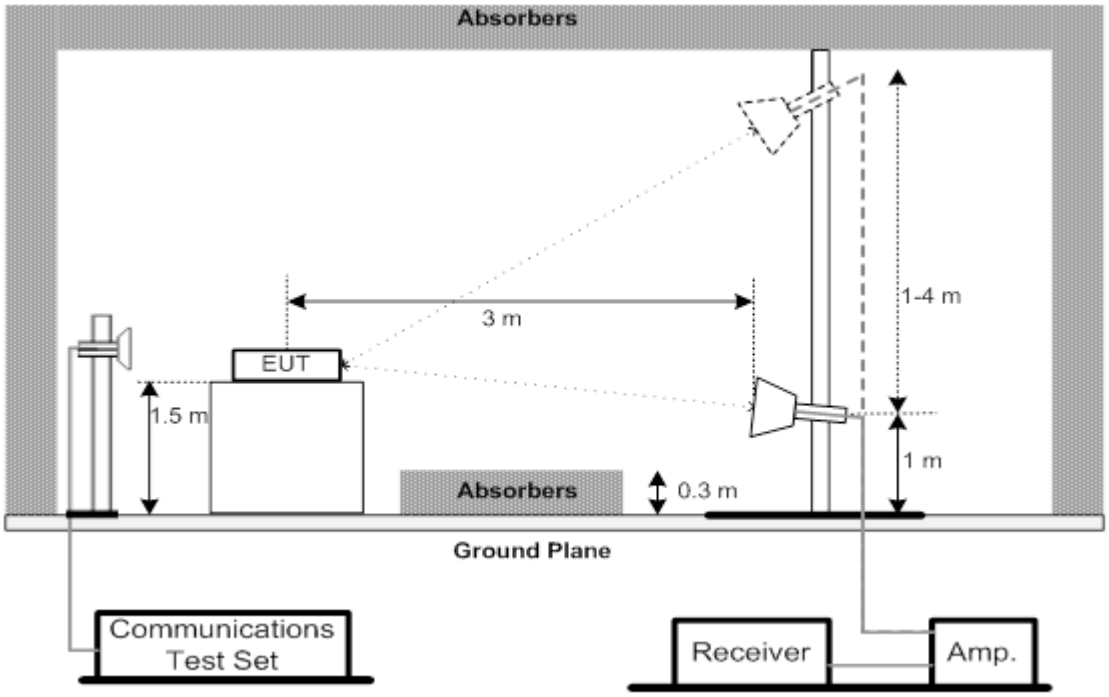
Below 30MHz



30MHz to 1000MHz



Above 1GHz



3.4.4 TESTDEVIATION

No deviation

3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

3.5 MASK MEASUREMENTS

3.5.1 LIMIT

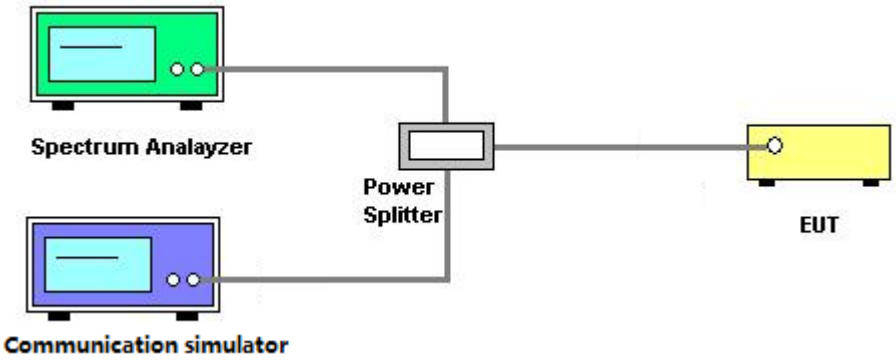
According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50+10Log10(P) 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. 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 + 10Log10(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

The testing follows FCC KDB 971168 v03r01 Section 6.0.

1. All measurements were done at low and high operational frequency range.
2. Set RBW=1% of 26dBc bandwidth, VBW=3 X RBW, detector=RMS, Sweep time = Auto.
   For Section 90.691(a) compliance testing, use RBW = 300 Hz for offsets less than 37.5 kHz from a cha nnel edge; RBW = 100 kHz for offsets greater than 37.5 kHz is allowed.
3. Record the max trace plot into the test report.

3.5.3 TESTSETUP LAYOUT



3.5.4 TESTDEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

3.6 PEAK TO AVERAGE RATIO MEASUREMENT

3.6.1 LIMIT

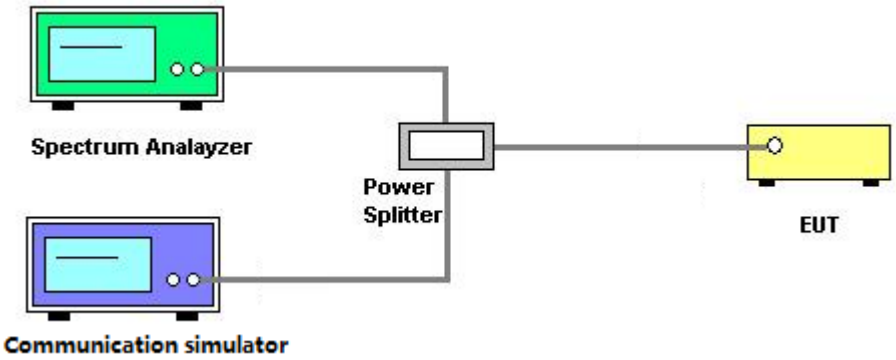
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.6.3 TEST SETUP LAYOUT



3.6.4 TEST DEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

3.7 FREQUENCY STABILITY MEASUREMENT

3.7.1 LIMIT

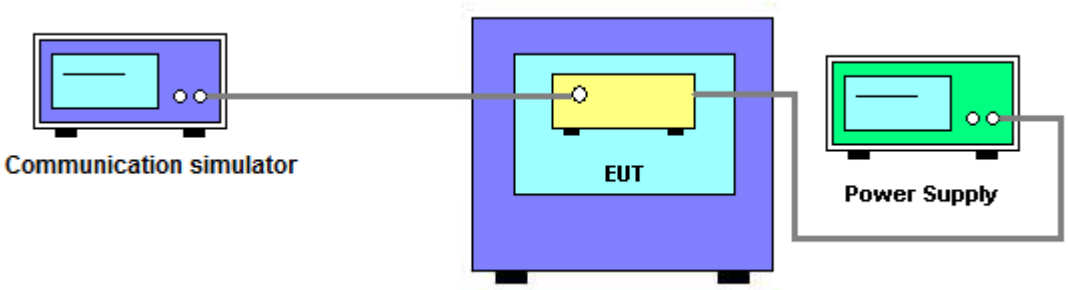
±1.5 ppm is for base and fixed station. ±2.5 ppm is for mobile station.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.0.

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5°C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

3.7.3 TESTSETUP LAYOUT



3.7.4 TESTDEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

5. LIST OF MEASUREMENT EQUIPMENTS

Radiated Emission Measurement(30M-1G)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Apr. 02, 2021
2	Pre-Amplifier	emci	EMC9135	980400	Mar. 21, 2021
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 21, 2021
4	Test Cable	emci	EMC104-SM-SM-7000	170330	Apr. 13, 2021
5	Test Cable	emci	EMC104-SM-SM-1000	170331	Apr. 13, 2021
6	Test Cable	emci	EMC104-SM-NM-3500	170621	Apr. 13, 2021
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	Apr. 13, 2021
8	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020

Radiated Emission Measurement(1G-18G)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pre-Amplifier	emci	EMC184045SE	980409	Apr. 02, 2021
2	Pre-Amplifier	emci	EMC012645SE	980421	May. 11, 2021
3	Pre-Amplifier	emci	EMC9135	980400	Mar. 21, 2021
4	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1787	Apr. 13, 2021
5	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00203919	Apr. 13, 2021
6	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Apr. 13, 2021
7	Cable	N/A	EMC102-SM-SM-6000	170336	N/A
8	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020

Conducted Emission & Band Edge & Occupied Bandwidth Measurement					
	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	8960 SERIES 10 WIRELESS COMMUNICATIONS TEST SET	Agilent	E5515C	GB45070942	Sep. 01, 2020
2	Spectrum Analyzer	R&S	FSP40	100626	May. 06, 2021
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 21, 2021
4	Power Divider	JUK	PD-2SF-2060	N/A	N/A

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	8960 SERIES 10 WIRELESS COMMUNICATIONS TEST SET	Agilent	E5515C	GB45070942	Sep. 01, 2020
2	Spectrum Analyzer	R&S	FSP40	100626	May. 06, 2021
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 21, 2021
4	Power Divider	JUK	PD-2SF-2060	N/A	N/A
5	Temperature And Humidity Box	Blue pand	BPHS-120B	170616454	Sep. 01, 2020

Remark: ”N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

APPENDIX A - OUTPUT POWER

Output Power (dBm):

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26697CH	26740CH	26783CH
				814.7MHz	819MHz	823.3MHz
26 / 1.4M	QPSK	1	0	24.01	23.82	23.70
		1	2	24.17	23.82	23.82
		1	5	24.18	23.56	23.68
		3	0	23.98	23.72	23.77
		3	1	24.07	23.71	23.86
		3	2	23.96	23.71	23.76
		6	0	22.95	22.60	22.91
	16QAM	1	0	23.03	22.56	23.12
		1	2	23.25	22.65	23.08
		1	5	22.94	22.44	22.60
		3	0	23.55	22.77	22.88
		3	1	23.55	22.71	22.81
		3	2	23.58	22.54	22.90
		6	0	22.40	21.87	21.80

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26705CH	26740CH	26775CH
				815.5MHz	819MHz	822.5MHz
26 / 3M	QPSK	1	0	24.03	23.58	23.75
		1	7	24.16	23.67	23.47
		1	14	24.34	23.55	23.69
		8	0	22.89	22.65	22.72
		8	4	23.07	22.80	22.78
		8	7	22.96	22.71	22.68
		15	0	22.90	22.72	22.75
	16QAM	1	0	23.05	22.81	22.80
		1	7	23.50	23.07	22.88
		1	14	23.18	23.13	22.82
		8	0	22.39	21.75	21.81
		8	4	22.11	21.97	21.80
		8	7	22.17	21.76	21.64
		15	0	22.10	21.84	21.79

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26715CH	26740CH	26765CH
				816.5MHz	819MHz	821.5MHz
26 / 5M	QPSK	1	0	24.06	23.67	23.54
		1	13	24.11	23.69	23.83
		1	24	24.21	23.52	23.49
		12	0	23.08	22.79	22.91
		12	6	23.14	22.82	22.76
		12	11	23.17	22.94	22.80
		25	0	23.08	22.77	22.81
	16QAM	1	0	22.59	22.42	22.62
		1	13	22.61	22.36	22.51
		1	24	22.63	22.17	22.50
		12	0	21.97	21.75	21.74
		12	6	21.96	21.64	21.91
		12	11	21.92	21.53	21.93
		25	0	22.21	21.76	21.73

LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				26740CH
				819MHz
26 / 10M	QPSK	1	0	23.55
		1	25	23.61
		1	49	24.00
		25	0	22.77
		25	13	22.75
		25	25	22.79
		50	0	22.77
	16QAM	1	0	22.27
		1	25	22.52
		1	49	22.66
		25	0	22.02
		25	13	21.93
		25	25	21.70
		50	0	22.02

ERP (dBm):

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26697CH	26740CH	26783CH
				814.7MHz	819MHz	823.3MHz
26 / 1.4M	QPSK	1	0	24.39	24.20	24.08
		1	2	24.55	24.20	24.20
		1	5	24.56	23.94	24.06
		3	0	24.36	24.10	24.15
		3	1	24.45	24.09	24.24
		3	2	24.34	24.09	24.14
		6	0	23.33	22.98	23.29
	16QAM	1	0	23.41	22.94	23.50
		1	2	23.63	23.03	23.46
		1	5	23.32	22.82	22.98
		3	0	23.93	23.15	23.26
		3	1	23.93	23.09	23.19
		3	2	23.96	22.92	23.28
		6	0	22.78	22.25	22.18

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26705CH	26740CH	26775CH
				815.5MHz	819MHz	822.5MHz
26 / 3M	QPSK	1	0	24.41	23.96	24.13
		1	7	24.54	24.05	23.85
		1	14	24.72	23.93	24.07
		8	0	23.27	23.03	23.10
		8	4	23.45	23.18	23.16
		8	7	23.34	23.09	23.06
		15	0	23.28	23.10	23.13
	16QAM	1	0	23.43	23.19	23.18
		1	7	23.88	23.45	23.26
		1	14	23.56	23.51	23.20
		8	0	22.77	22.13	22.19
		8	4	22.49	22.35	22.18
		8	7	22.55	22.14	22.02
		15	0	22.48	22.22	22.17

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26715CH	26740CH	26765CH
				816.5MHz	819MHz	821.5MHz
26 / 5M	QPSK	1	0	24.44	24.05	23.92
		1	13	24.49	24.07	24.21
		1	24	24.59	23.90	23.87
		12	0	23.46	23.17	23.29
		12	6	23.52	23.20	23.14
		12	11	23.55	23.32	23.18
		25	0	23.46	23.15	23.19
	16QAM	1	0	22.97	22.80	23.00
		1	13	22.99	22.74	22.89
		1	24	23.01	22.55	22.88
		12	0	22.35	22.13	22.12
		12	6	22.34	22.02	22.29
		12	11	22.30	21.91	22.31
		25	0	22.59	22.14	22.11

LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				26740CH
				819MHz
26 / 10M	QPSK	1	0	23.93
		1	25	23.99
		1	49	24.38
		25	0	23.15
		25	13	23.13
		25	25	23.17
		50	0	23.15
	16QAM	1	0	22.65
		1	25	22.90
		1	49	23.04
		25	0	22.40
		25	13	22.31
		25	25	22.08
		50	0	22.40

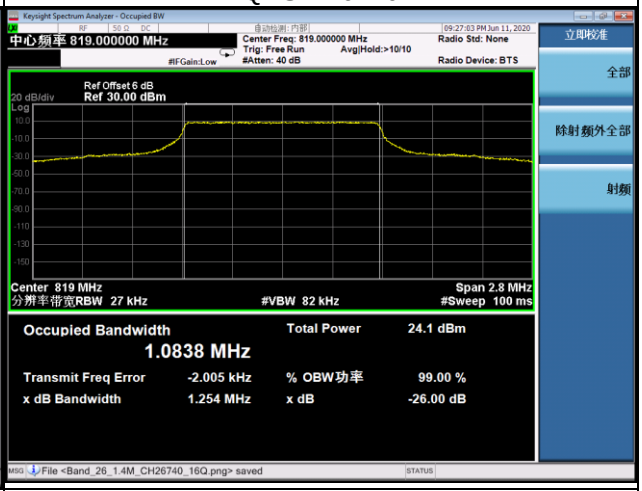
APPENDIX B - OCCUPIED BANDWIDTH

LTE Band 26_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26697	814.7	1.0826	26697	814.7	1.2370
26740	819	1.0838	26740	819	1.2540
26783	823.3	1.0830	26783	823.3	1.2470
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26697	814.7	1.0821	26697	814.7	1.2310
26740	819	1.0813	26740	819	1.2540
26783	823.3	1.0824	26783	823.3	1.2420

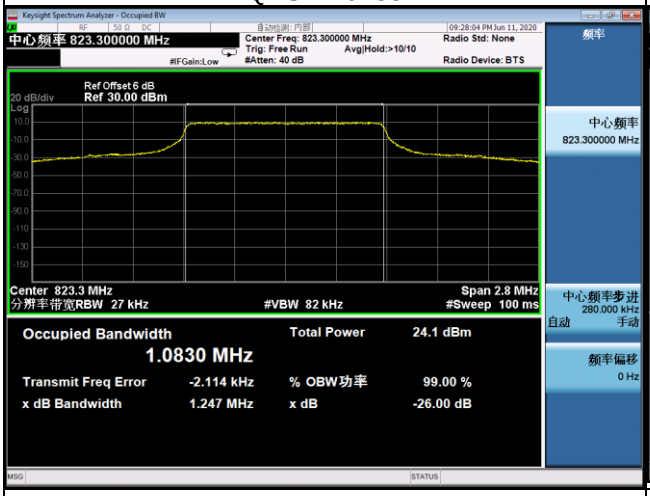
Spectrum Plot

QPSK-26697

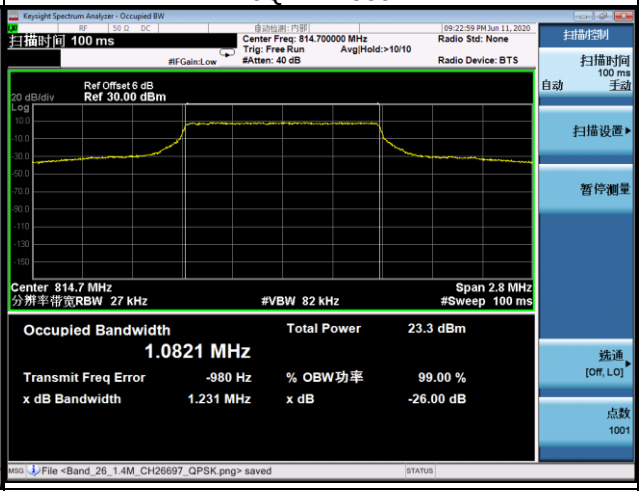
QPSK-26740



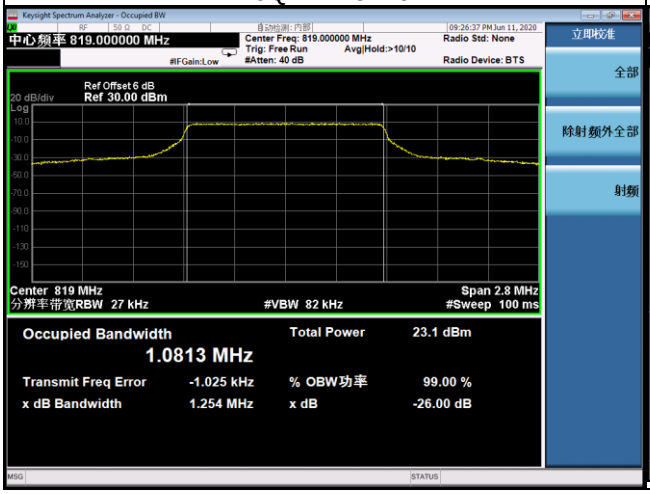
QPSK-26783



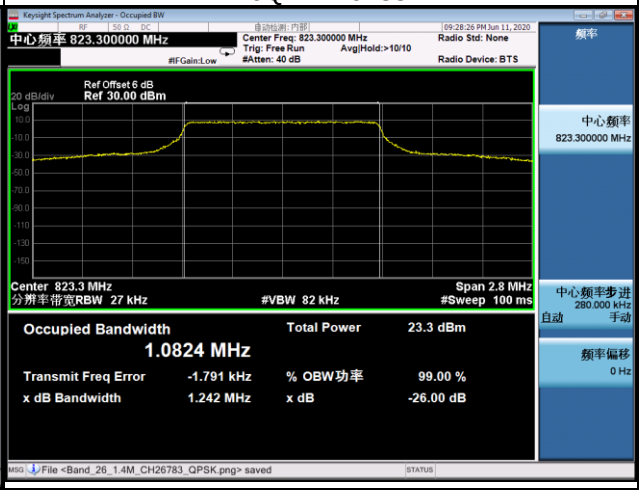
16QAM-26697



16QAM-26740



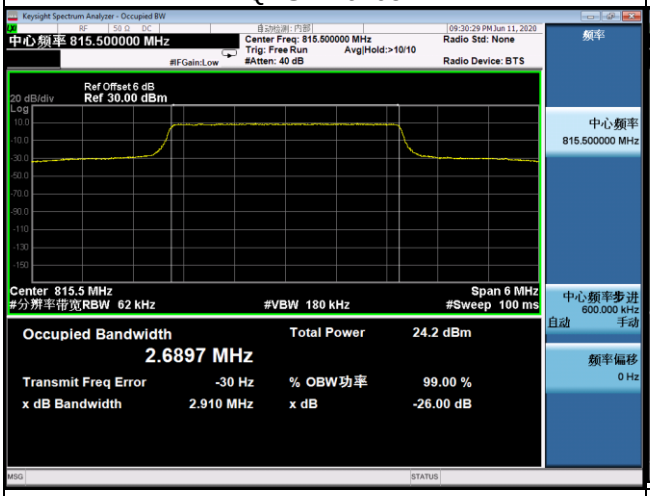
16QAM-26783



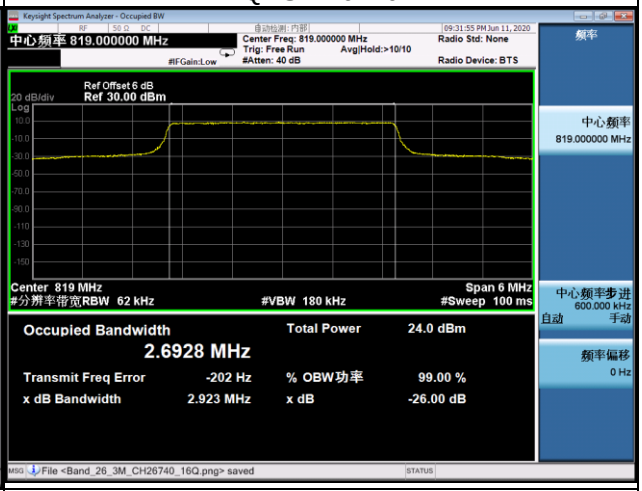
LTE Band 26_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26705	815.5	2.6897	26705	815.5	2.9100
26740	819	2.6928	26740	819	2.9230
26775	822.5	2.6910	26775	822.5	2.9220
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26705	815.5	2.6908	26705	815.5	2.9060
26740	819	2.6889	26740	819	2.9190
26775	822.5	2.6908	26775	822.5	2.9040

Spectrum Plot

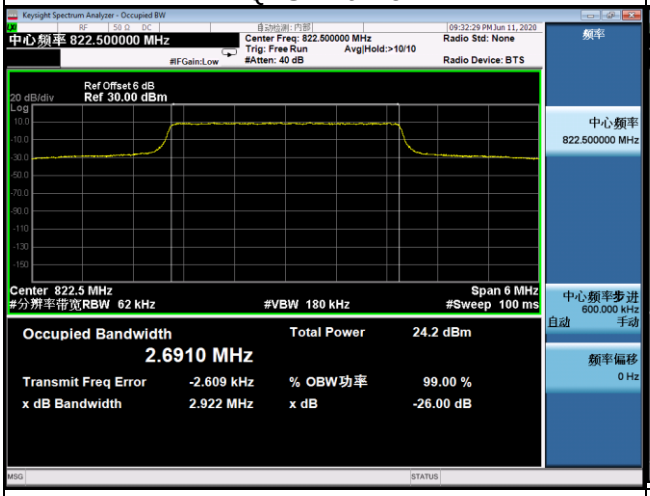
QPSK-26705



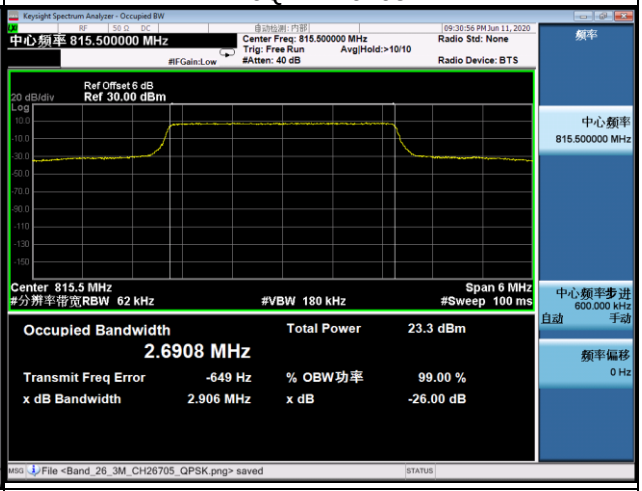
QPSK-26740



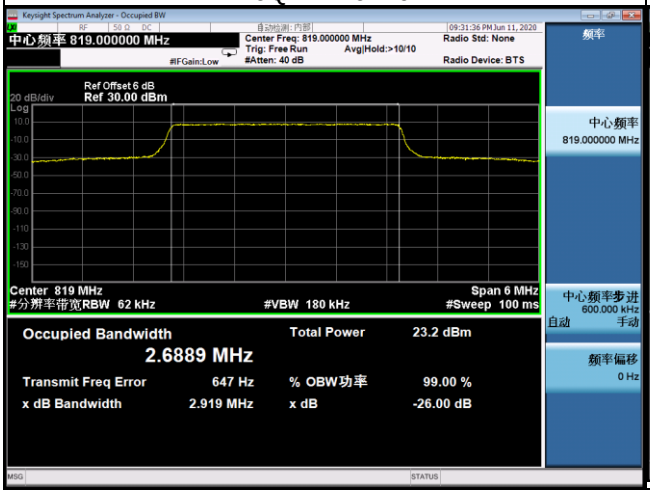
QPSK-26775



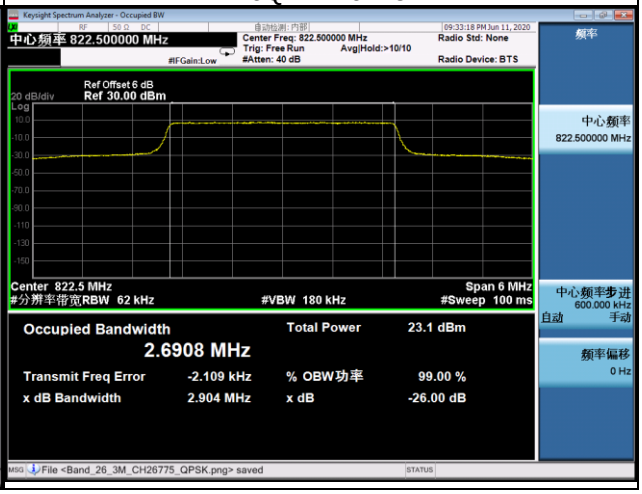
16QAM-26705



16QAM-26740



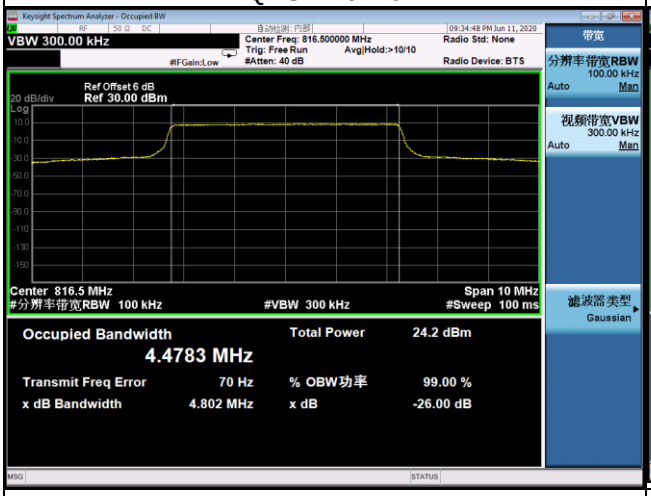
16QAM-26775



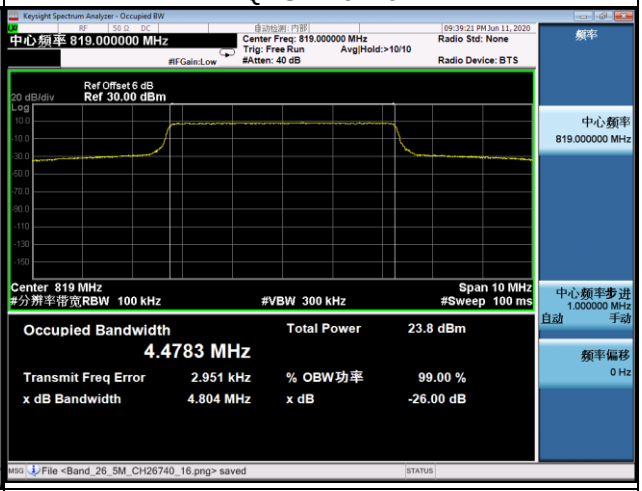
LTE Band 26_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26715	816.5	4.4783	26715	816.5	4.8020
26740	819	4.4783	26740	819	4.8040
26765	821.5	4.4814	26765	821.5	4.8120
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26715	816.5	4.4828	26715	816.5	4.7950
26740	819	4.4772	26740	819	4.8010
26765	821.5	4.4815	26765	821.5	4.8070

Spectrum Plot

QPSK-26715

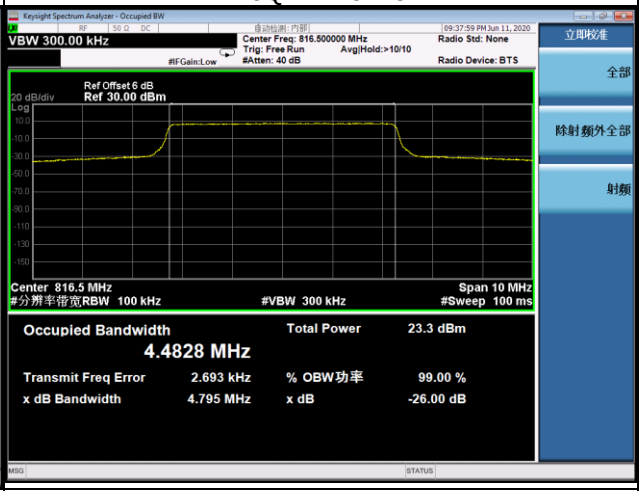


QPSK-26740

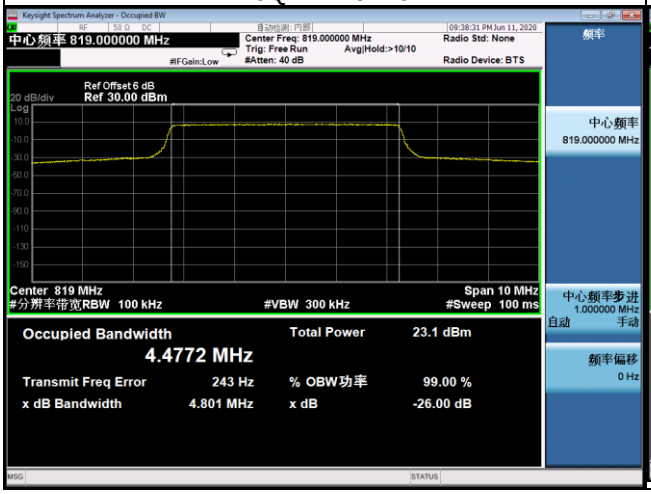


QPSK-26765

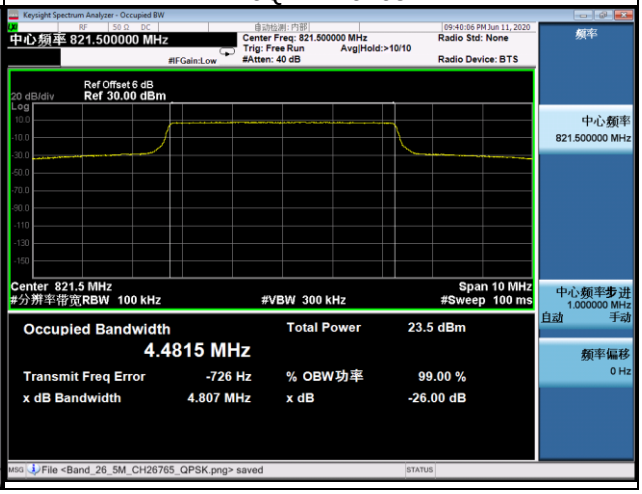
16QAM-26715



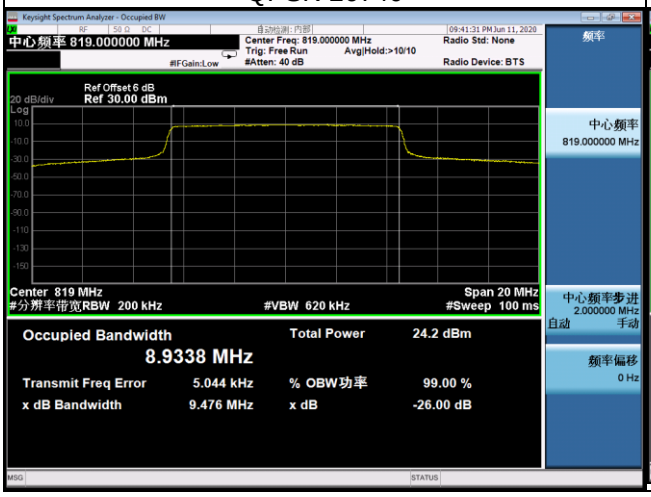
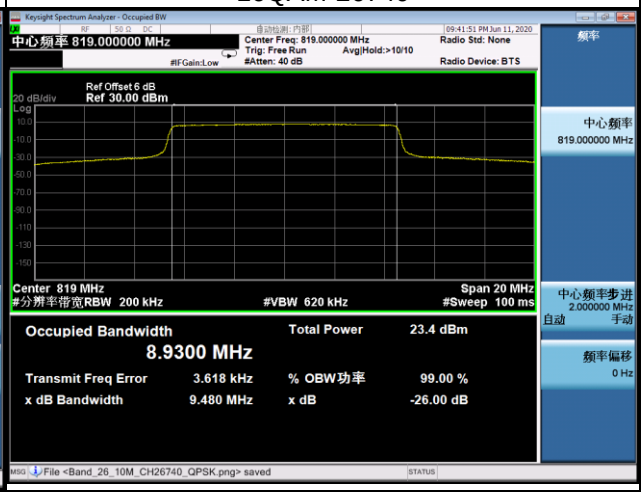
16QAM-26740



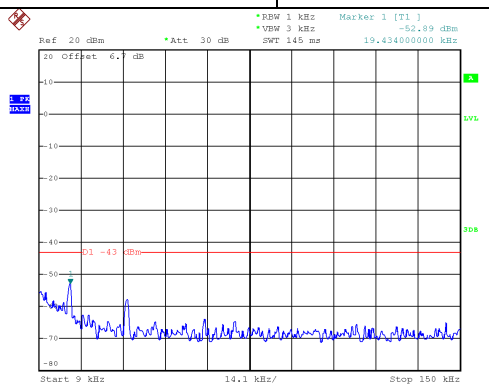
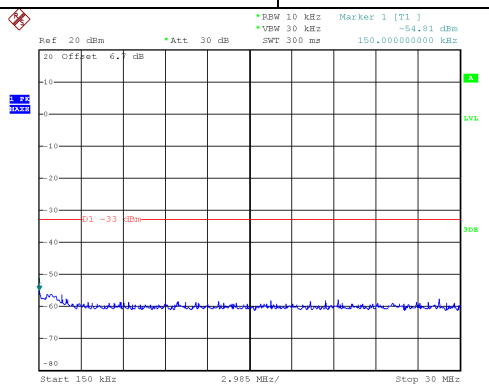
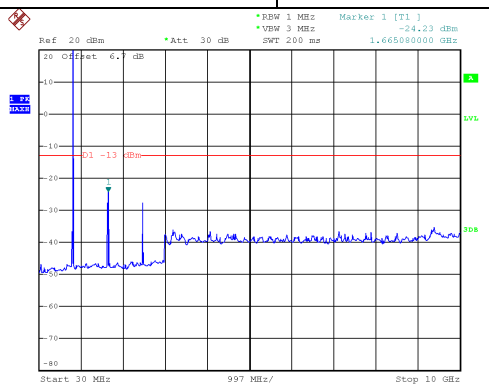
16QAM-26765

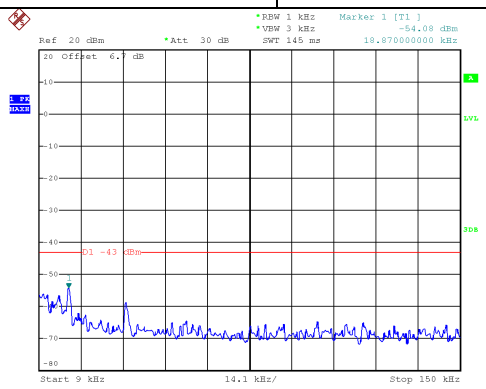
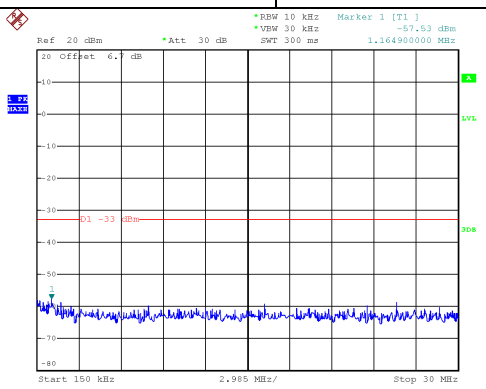
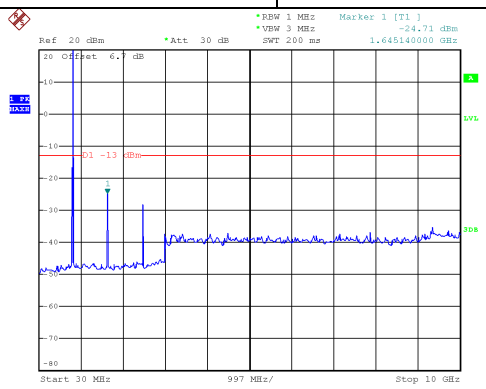


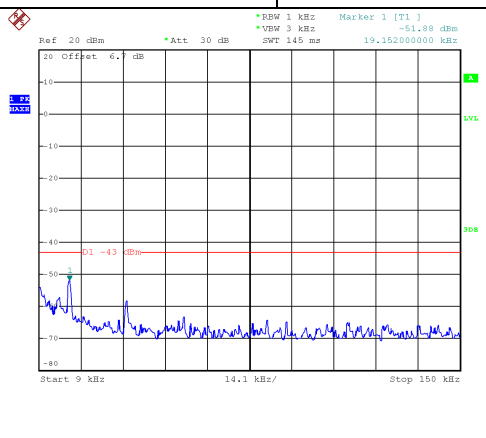
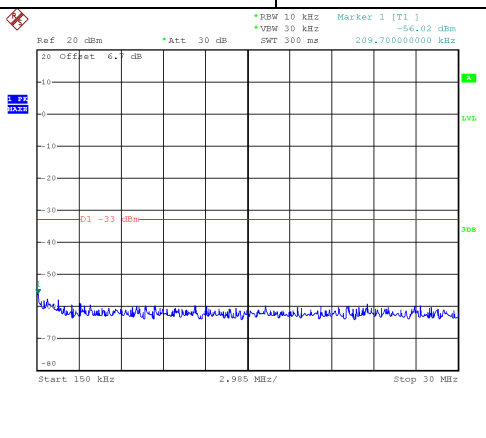
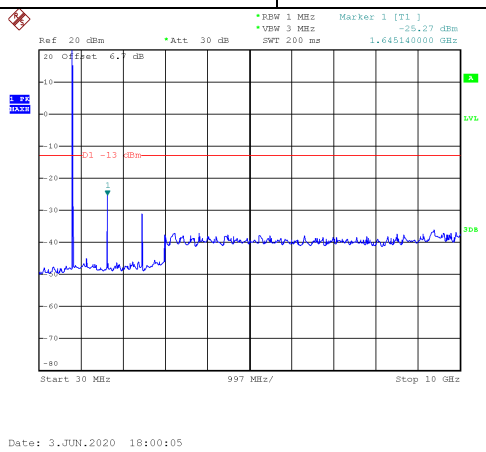
LTE Band 26_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26740	819	8.9338	26740	819	9.4760
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26740	819	8.9300	26740	819	9.4800

Spectrum Plot	
QPSK-26740	16QAM-26740
	

APPENDIX C - CONDUCTED SPURIOUS EMISSIONS

LTE Band 26_1.4M Spectrum Plot			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
26740	819	26740	819
			
Channel	Frequency(MHz)	-	-
26740	819	-	-
		-	

LTE Band 26_5M Spectrum Plot			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
26740	819	26740	819
			
Channel	Frequency(MHz)	-	-
26740	819	-	-
		-	

LTE Band 26_10M Spectrum Plot			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
26740	819	26740	819
			
Channel	Frequency(MHz)	-	-
26740	819	-	-
		-	

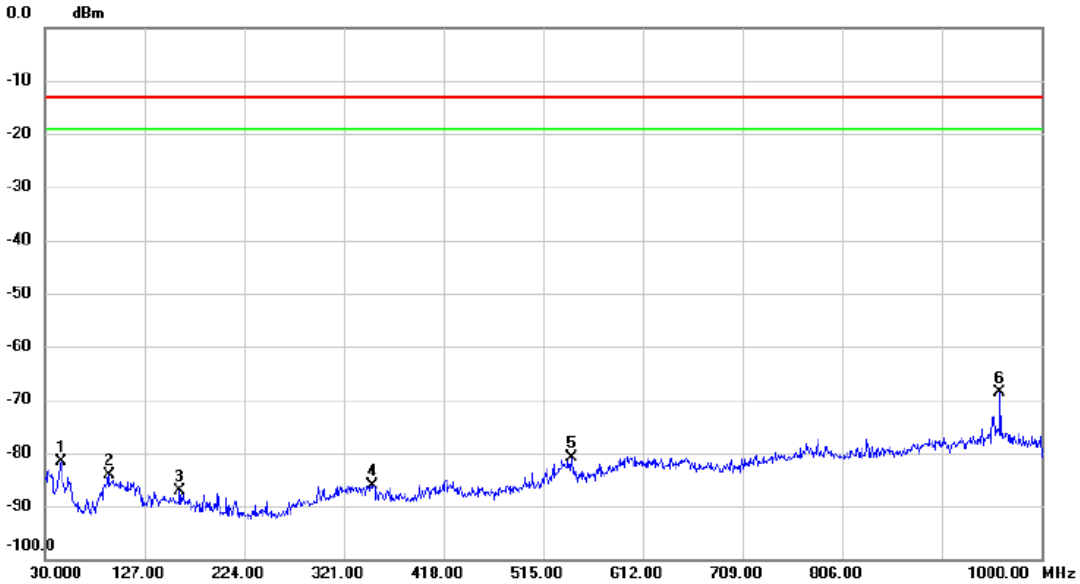
APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)

Note: Below 30MHz, The measured value have enough margin over 20dB than the limit, therefore they are not reported

APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)

Test Mode	LTE Band 26_TX CH26740_1.4M

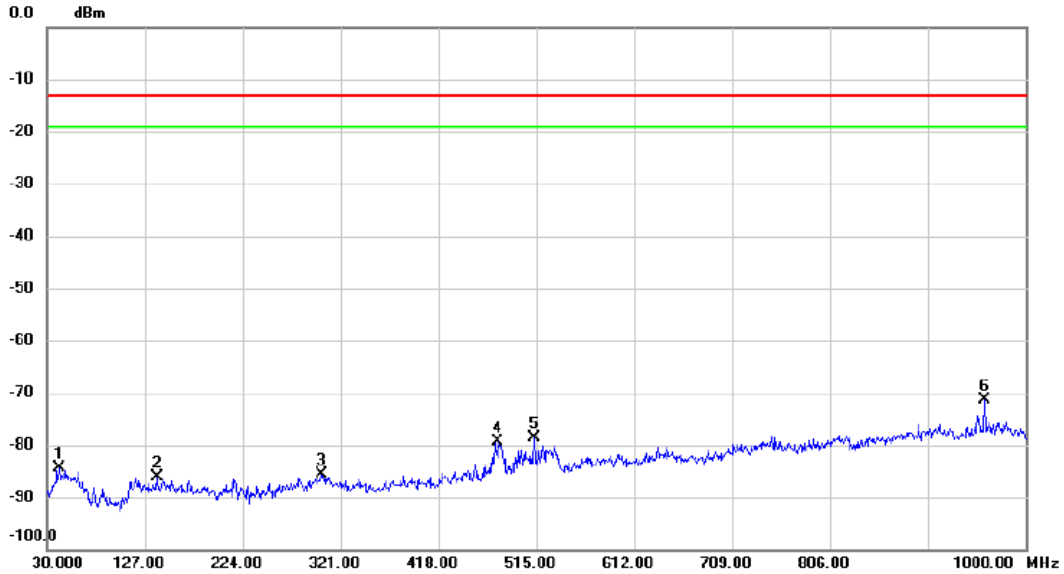
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		45.5200	-64.66	-16.95	-81.61	-13.00	-68.61	peak	
2		92.5650	-63.76	-20.39	-84.15	-13.00	-71.15	peak	
3		161.7260	-71.88	-15.36	-87.24	-13.00	-74.24	peak	
4		349.3240	-72.32	-13.72	-86.04	-13.00	-73.04	peak	
5		543.0330	-69.47	-11.44	-80.91	-13.00	-67.91	peak	
6	*	959.6480	-63.55	-5.09	-68.64	-13.00	-55.64	peak	

Test Mode	LTE Band 26_TX CH26740_1.4M

Horizontal

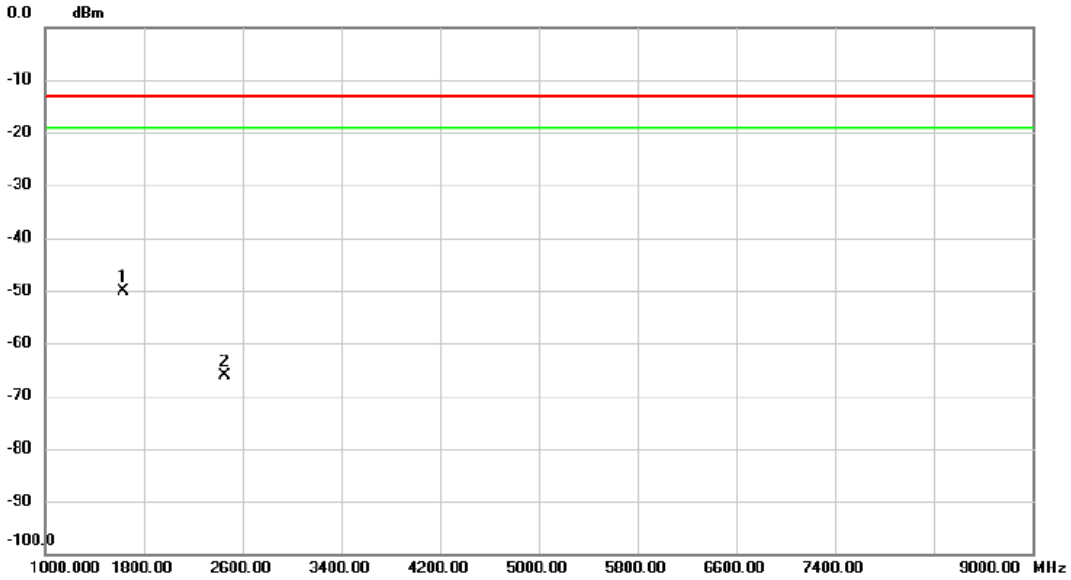


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		42.2220	-67.91	-16.51	-84.42	-13.00	-71.42	peak	
2		138.7370	-70.21	-15.84	-86.05	-13.00	-73.05	peak	
3		301.8910	-71.42	-14.28	-85.70	-13.00	-72.70	peak	
4		477.2670	-66.60	-12.83	-79.43	-13.00	-66.43	peak	
5		513.1570	-66.38	-12.27	-78.65	-13.00	-65.65	peak	
6	*	959.6480	-66.25	-5.09	-71.34	-13.00	-58.34	peak	

APPENDIX F - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)

Test Mode	LTE Band 26_TX CH26740_1.4M

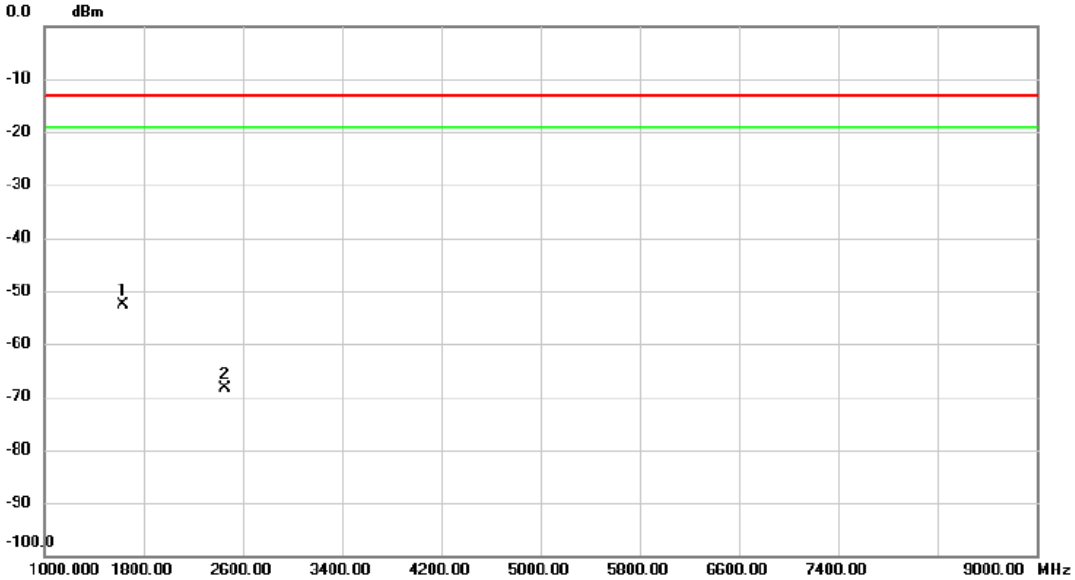
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1636.800	-32.16	-18.08	-50.24	-13.00	-37.24	peak	
2		2456.000	-50.97	-15.08	-66.05	-13.00	-53.05	peak	

Test Mode	LTE Band 26_TX CH26740_1.4M

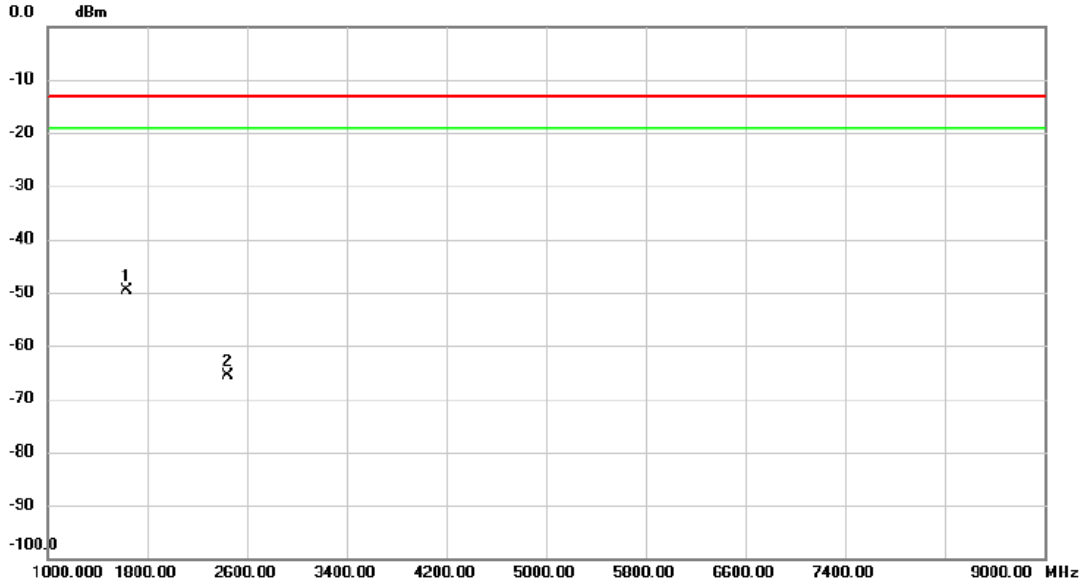
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1637.600	-34.49	-18.08	-52.57	-13.00	-39.57	peak	
2		2456.000	-53.40	-15.08	-68.48	-13.00	-55.48	peak	

Test Mode	LTE Band 26_TX CH26740_5M

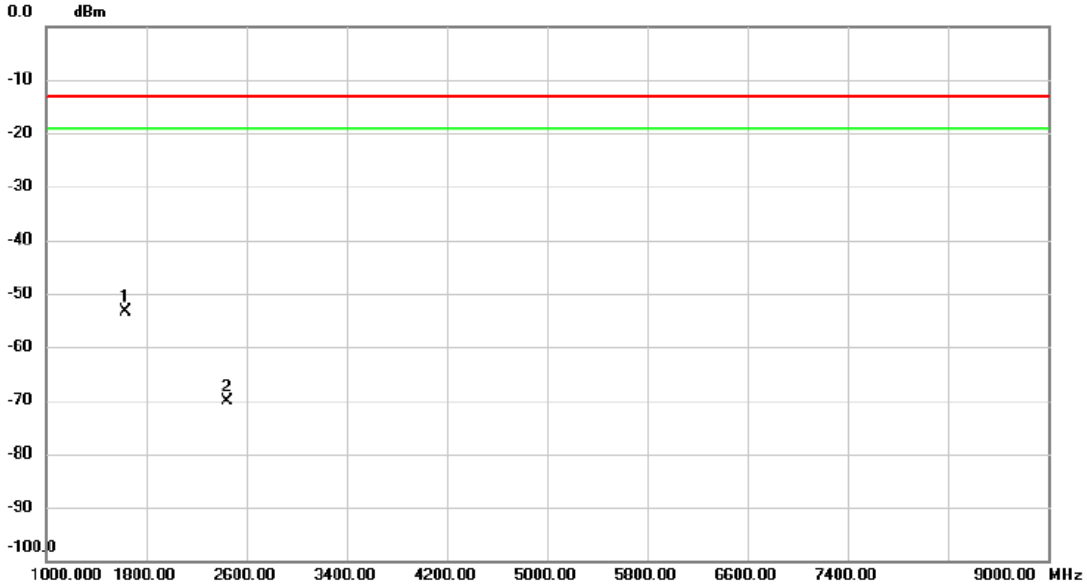
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1633.600	-31.45	-18.10	-49.55	-13.00	-36.55	peak	
2		2450.400	-50.56	-15.11	-65.67	-13.00	-52.67	peak	

Test Mode	LTE Band 26_TX CH26740_5M

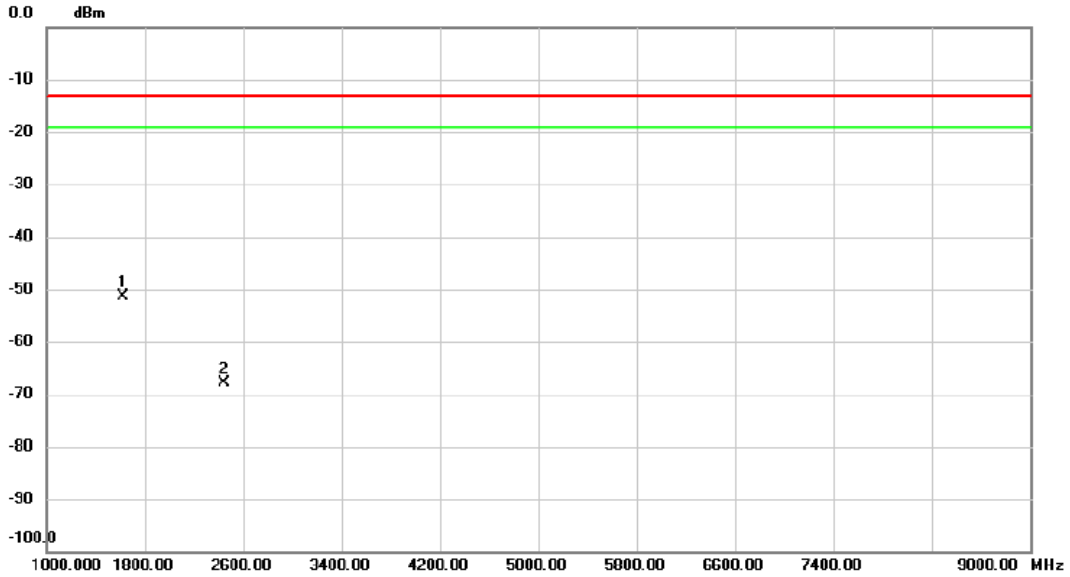
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1633.600	-35.35	-18.10	-53.45	-13.00	-40.45	peak	
2		2450.000	-54.90	-15.11	-70.01	-13.00	-57.01	peak	

Test Mode	LTE Band 26_TX CH26740_10M

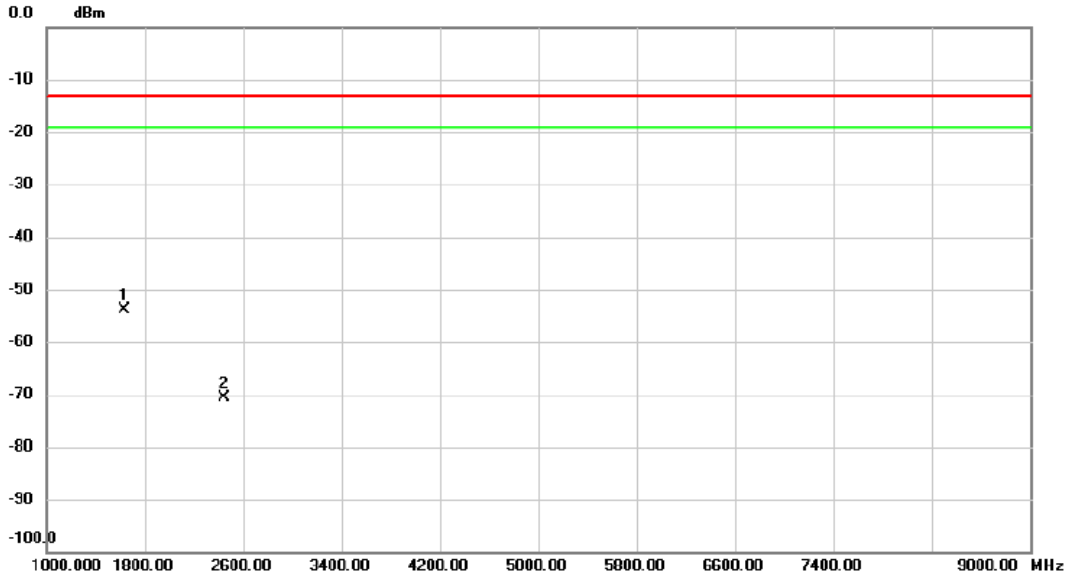
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1628.800	-33.38	-18.11	-51.49	-13.00	-38.49	peak	
2		2444.000	-52.75	-15.14	-67.89	-13.00	-54.89	peak	

Test Mode	LTE Band 26_TX CH26740_10M

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1629.600	-35.73	-18.10	-53.83	-13.00	-40.83	peak	
2		2444.000	-55.38	-15.14	-70.52	-13.00	-57.52	peak	

APPENDIX G - MASK