RF TEST REPORT

Applicant	Huawei Technologies Co., Ltd.
FCC ID	QISPAR-LX9
Product	Smart Phone
Model	PAR-LX9
Report No.	R1806H0074-R2V1
Issue Date	July 23, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR 47 Part 90S (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Zhengqiang Zhou

Approved by: Kai Xu

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Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046/90.635(b)	PASS
2	Effective Radiated Power	90.635(b)	PASS
3	Occupied Bandwidth	2.1049/ 90.209	PASS
4	Emission Masks	2.1051 / 90.691	PASS
5	Peak-to-Average Power Ratio	KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 90.213	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 90.691	PASS
8	Radiates Spurious Emission	2.1053 /90.691	PASS
Date of Testing: June 29, 2018~ July 9, 2018			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

1. Test Laboratory

1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

CNAS (accreditation number:L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
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2. General Description of Equipment under Test

Client Information

Applicant	Huawei Technologies Co., Ltd.
Applicant address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.
Manufacturer	Huawei Technologies Co., Ltd.
Manufacturer address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.

General Information

EUT Description			
Model	PAR-LX9		
Product IMEI	SIM1: 869592030011783 SIM2: 869592030012781		
Hardware Version	HL2PARLM		
Software Version	PAR-LX9 8.2.0.120(C900)		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Test Mode(s)	LTE Band 26;		
Test Modulation	QPSK, 16QAM, 64QAM;		
LTE category	5		
Maximum E.R.P.	LTE Band 26:	23.78dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.35V		
Extreme Temperature	Lowest: 0°C Highest: +35°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	LTE Band 26	814 ~ 824	859 ~ 869

EUT Accessory	
Adapter 1	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: Salcomp) Model: HW-059200EHQ SN:K68304J3T03348
Adapter 2	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: BYD) Model: HW-059200EHQ SN:B68331J4E00880
Adapter 3	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: Salcomp) Model: HW-059200UHQ SN: K76520J4H09868

Adapter 4	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: BYD) Model: HW-059200UHQ SN: B76549J4C22420
Adapter 5	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: Salcomp) Model: HW-090200EH0 SN:K98814J2100215
Adapter 6	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: HUNTKEY) Model: HW-090200EH0 SN:H988K7J3D00176
Adapter 7	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: Salcomp) Model: HW-090200UH0 SN: K99201J3Y00029
Adapter 8	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: HUNTKEY) Model: HW-090200UH0 SN: H992K5J3X00029
Battery 1	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: SCUD) Model: HB386589ECW
Battery 2	Manufacturer: Huawei Technologies Co., Ltd. (Manufacturer: Desay) Model: HB386589ECW
Earphone 1	Manufacturer: Merry Electronics Co., Ltd Model: EMC309-001
Earphone 2	Manufacturer: Boluo County Quancheng Electronic Co., Ltd. Model: 1311-3291-3.5mm-229
Earphone 3	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co., LTD. Model: MEMD1632B580C00
USB Cable 1	Manufacturer: Ningbo Broad Telecommunication Co., Ltd Model: WA0002
USB Cable 2	Manufacturer: LUXSHARE Precision Industry Co., Ltd. Model: L99UC093-CS-H
USB Cable 3	Manufacturer: HUIZHOU DEHONG TECHNOLOGY CO.,LTD Model: 330-50362
Note: The information of the EUT is declared by the manufacturer. 2. There is more than one Adapter, Battery, Earphone and USB Cable, each one should be applied throughout the compliance test respectively, and however, only the worst case (Adapter 1, Battery 2, Earphone 2 and USB Cable 1) will be recorded in this report.	

3. Applied Standards

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

FCC CFR47 Part 2 (2017)

FCC CFR 47 Part 90S (2017)

ANSI/TIA-603-E (2016)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

The device has two SIM card slot, and two 2G/3G/4G TX antennas (Main Antenna and Secondary Antenna). Main antenna (Ant1) and Secondary antenna (Ant 2) can't transmit simultaneously which will be chosen based on the RSSI. Only one antenna can be used for 2G/3G/4G transmission at a time.
For SIM card slot and TX antennas RF test, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) and Main antenna (Ant1) will be recorded in this report.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions were investigated.
The following testing in LTE is set based on the maximum RF Output Power.
Test modes are chosen as the worst case configuration below for LTE Band 26

Test items	Bandwidth (MHz)				Modulation			RB			Test Channel		
	1.4	3	5	10	QPSK	16QAM	64QAM	1	50%	100%	L	M	H
RF power output	O	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	O	-	-	O	O	O	O
Emission Mask	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	O	O	O	O	O	O	O	-	-	O	O	-	O
Spurious Emissions at Antenna Terminals	O	O	O	O	O	O	O	O	O	O	O	O	O
Radiates Spurious Emission	O	-	O	O	O	O	O	O	O	O	-	O	-
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.												

5. Test Case Results

5.1. RF Power Output

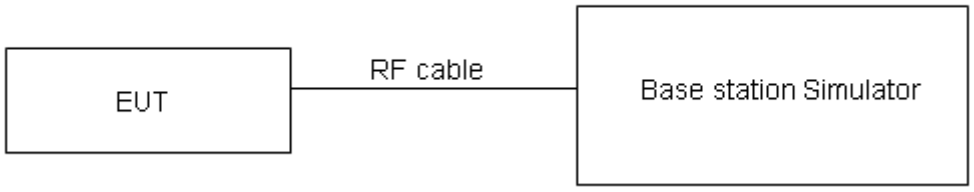
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

Part 90.635 (b) the maximum output power of the transmitter for mobile stations is 100 watts.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

LTE Band 26				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26697/814.7	26740/819	26783/823.3
1.4MHz	QPSK	1	0	23.71	23.77	23.76
		1	2	23.78	23.71	23.69
		1	5	23.75	23.70	23.69
		3	0	22.77	22.78	22.75
		3	2	22.74	22.77	22.71
		3	3	22.72	22.78	22.74
		6	0	22.70	22.73	22.71
	16QAM	1	0	22.82	22.75	22.72
		1	2	22.78	22.72	22.76
		1	5	22.70	22.69	22.72
		3	0	21.72	21.61	21.70
		3	2	21.69	21.58	21.69
		3	3	21.66	21.63	21.64
		6	0	21.66	21.62	21.74
	64QAM	1	0	21.50	21.49	21.39
		1	2	21.42	21.33	21.37
		1	5	21.41	21.60	21.35
		3	0	20.71	20.69	20.75
		3	2	20.82	20.72	20.69
		3	3	20.70	20.78	20.76
		6	0	19.72	19.83	19.76
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26705/815.5	26740/819	26775/822.5
3MHz	QPSK	1	0	23.70	23.73	23.74
		1	13	23.76	23.70	23.66
		1	24	23.72	23.65	23.65
		12	0	22.75	22.74	22.72
		12	6	22.71	22.72	22.67
		12	13	22.69	22.75	22.70

		25	0	22.68	22.69	22.66
	16QAM	1	0	22.77	22.73	22.70
		1	13	22.76	22.69	22.74
		1	24	22.67	22.65	22.69
		12	0	21.69	21.59	21.67
		12	6	21.66	21.53	21.65
		12	13	21.64	21.59	21.61
		25	0	21.63	21.57	21.70
	64QAM	1	0	21.53	21.51	21.42
		1	13	21.45	21.38	21.41
		1	24	21.43	21.64	21.38
		12	0	19.82	19.82	19.87
		12	6	19.93	19.85	19.81
		12	13	19.80	19.90	19.89
		25	0	19.75	19.87	19.79
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26715/816.5	26740/819	26765/822.5
5MHz	QPSK	1	0	23.67	23.69	23.71
		1	13	23.75	23.66	23.64
		1	24	23.70	23.64	23.62
		12	0	22.72	22.69	22.68
		12	6	22.69	22.68	22.64
		12	13	22.66	22.70	22.66
		25	0	22.65	22.64	22.62
	16QAM	1	0	22.75	22.69	22.65
		1	13	22.72	22.67	22.70
		1	24	22.65	22.62	22.67
		12	0	21.66	21.55	21.64
		12	6	21.63	21.51	21.62
		12	13	21.61	21.54	21.57
		25	0	21.61	21.53	21.67
	64QAM	1	0	21.45	21.44	21.34
		1	13	21.39	21.35	21.35
		1	24	21.38	21.57	21.32

		12	0	19.77	19.77	19.82
		12	6	19.86	19.77	19.73
		12	13	19.75	19.81	19.82
		25	0	19.71	19.79	19.71
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				/	26740/819	/
10MHz	QPSK	1	0	/	23.73	/
		1	25	/	23.30	/
		1	49	/	23.68	/
		25	0	/	22.57	/
		25	13	/	22.52	/
		25	25	/	22.49	/
		50	0	/	22.52	/
	16QAM	1	0	/	22.72	/
		1	25	/	22.32	/
		1	49	/	22.79	/
		25	0	/	21.56	/
		25	13	/	21.53	/
		25	25	/	21.56	/
		50	0	/	21.55	/
	64QAM	1	0	/	21.49	/
		1	25	/	21.44	/
		1	49	/	21.57	/
		25	0	/	19.84	/
		25	13	/	19.78	/
		25	25	/	19.77	/
		50	0	/	19.83	/

5.2. Effective Radiated Power

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

ERP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBd)

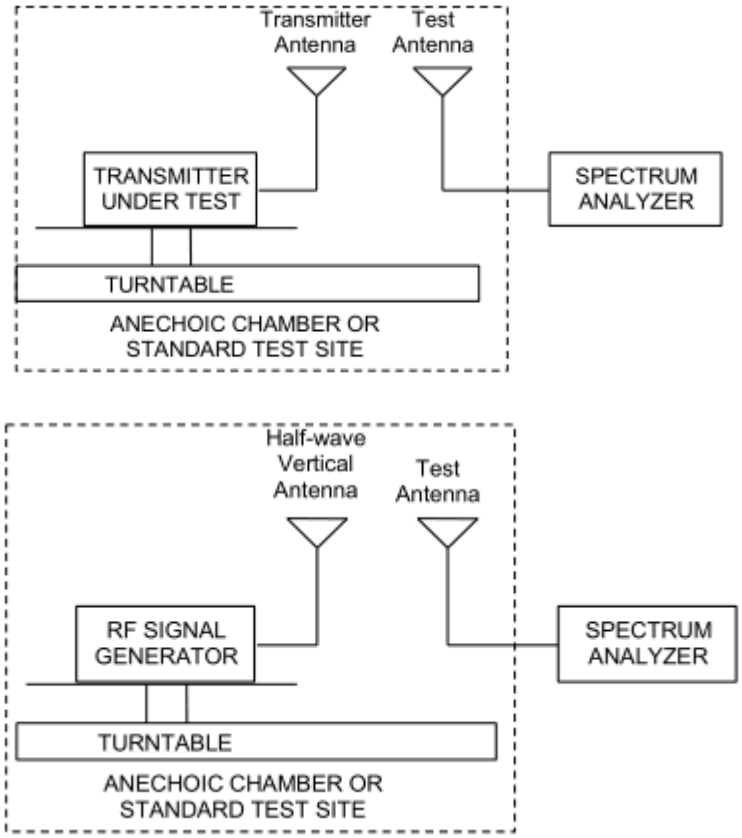
where:dBd refers to gain relative to an ideal dipole.

EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

The RB allocation refers to section 5.1, using the maximum output power configuration.

Test configuration

Below 1GHz:



Limits

Rule Part 90.635(b) specifies that “The maximum output power of the transmitter for mobile stations is 100 watts”.

Limit	≤ 100 W (50 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 1.19 dB

Test Results:

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

LTE Band 26						
bandwidth	**Channel**	**Frequency (MHz)**	**Polarization**	**ERP (dBm)**	**Limit (dBm)**	**Conclusion**
1.4 MHz (QPSK)	Low	814.7	Horizontal	15.46	50	Pass
	Mid	819	Horizontal	15.54	50	Pass
	High	823.3	Horizontal	16.08	50	Pass
3 MHz (QPSK)	Low	814.7	Horizontal	15.39	50	Pass
	Mid	819	Horizontal	15.46	50	Pass
	High	823.3	Horizontal	15.95	50	Pass
5 MHz (QPSK)	Low	815.5	Horizontal	15.34	50	Pass
	Mid	819	Horizontal	15.27	50	Pass
	High	822.5	Horizontal	15.61	50	Pass
10 MHz (QPSK)	Mid	819	Horizontal	15.25	50	Pass
1.4 MHz (16QAM)	Low	814.7	Horizontal	14.99	50	Pass
	Mid	819	Horizontal	15.06	50	Pass
	High	823.3	Horizontal	15.40	50	Pass
3 MHz (16QAM)	Low	814.7	Horizontal	14.99	50	Pass
	Mid	819	Horizontal	15.23	50	Pass
	High	823.3	Horizontal	15.59	50	Pass
5 MHz (16QAM)	Low	815.5	Horizontal	14.92	50	Pass
	Mid	819	Horizontal	14.94	50	Pass
	High	822.5	Horizontal	15.19	50	Pass
10 MHz (16QAM)	Mid	819	Horizontal	14.78	50	Pass
1.4 MHz (64QAM)	Low	814.7	Horizontal	13.63	50	Pass
	Mid	819	Horizontal	13.81	50	Pass
	High	823.3	Horizontal	13.88	50	Pass
3 MHz (64QAM)	Low	814.7	Horizontal	13.90	50	Pass
	Mid	819	Horizontal	14.07	50	Pass
	High	823.3	Horizontal	14.08	50	Pass
5 MHz (64QAM)	Low	815.5	Horizontal	13.49	50	Pass
	Mid	819	Horizontal	13.63	50	Pass
	High	822.5	Horizontal	13.83	50	Pass
10 MHz (64QAM)	Mid	819	Horizontal	13.30	50	Pass

5.3. Occupied Bandwidth

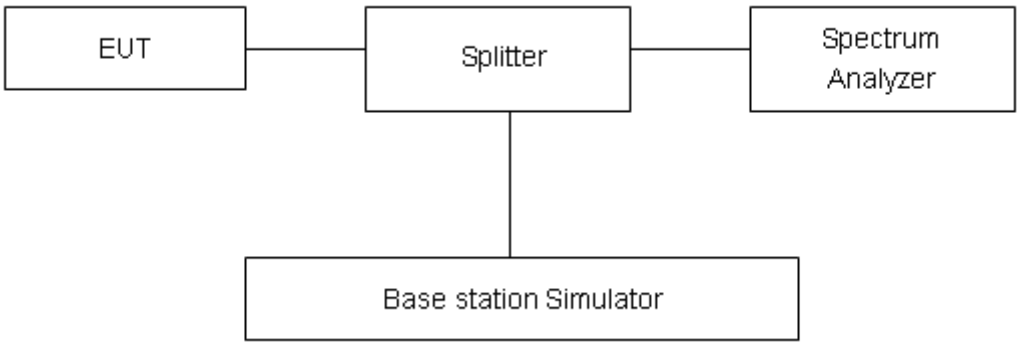
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 26 (1.4MHz),
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 26 (3MHz/5MHz).
RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 26 (10MHz).
99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.
Part 90.209 (a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where part 2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.

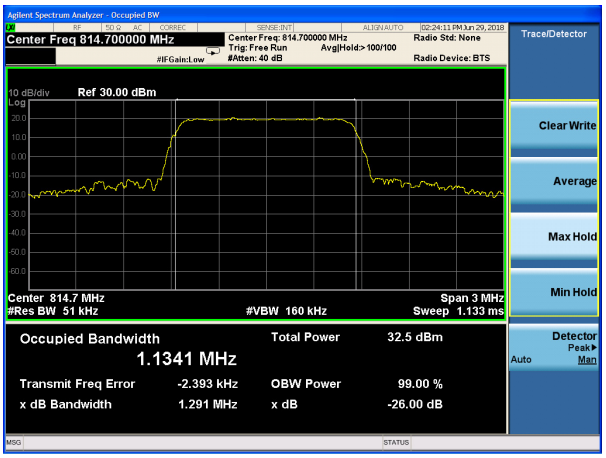
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 624Hz.

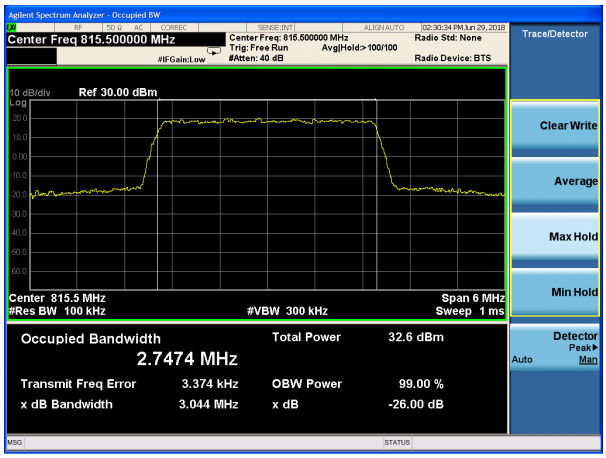
Test Result

LTE Band 26						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	26697	814.7	1.1341	1.291
			26740	819	1.1303	1.288
			26783	823.3	1.1231	1.289
		3	26705	815.5	2.7474	3.044
			26740	819	2.7401	3.045
			26775	822.5	2.7530	3.052
		5	26715	816.5	4.5256	4.979
			26740	819	4.5358	4.997
			26765	821.5	4.5203	4.970
		10	26740	819	9.0725	10.050
	16QAM	1.4	26697	814.7	1.1288	1.290
			26740	819	1.1260	1.287
			26783	823.3	1.1336	1.284
		3	26705	815.5	2.7515	3.055
			26740	819	2.7441	3.035
			26775	822.5	2.7454	3.046
		5	26715	816.5	4.5241	4.971
			26740	819	4.5151	4.994
			26765	821.5	4.5428	4.989
		10	26740	819	9.0522	10.030
	64QAM	1.4	26697	814.7	1.1272	1.287
			26740	819	1.1278	1.292
			26783	823.3	1.1293	1.289
		3	26705	815.5	2.7609	3.043
			26740	819	2.7411	3.052
			26775	822.5	2.7384	3.049
		5	26715	816.5	4.5195	4.983
			26740	819	4.544	4.995
			26765	821.5	4.5305	4.999
		10	26740	819	9.0643	10.060

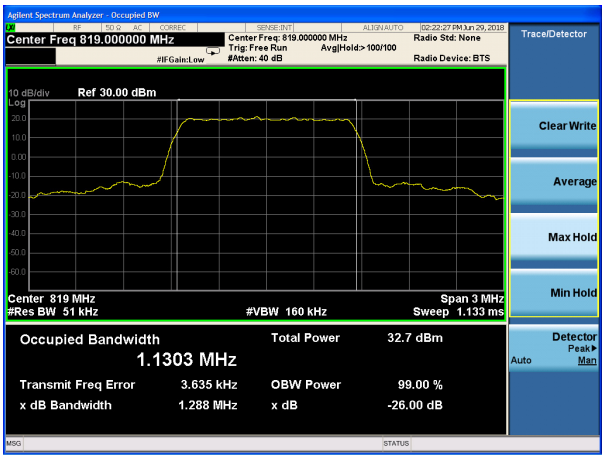
LTE Band 26 QPSK 1.4MHz CH26697



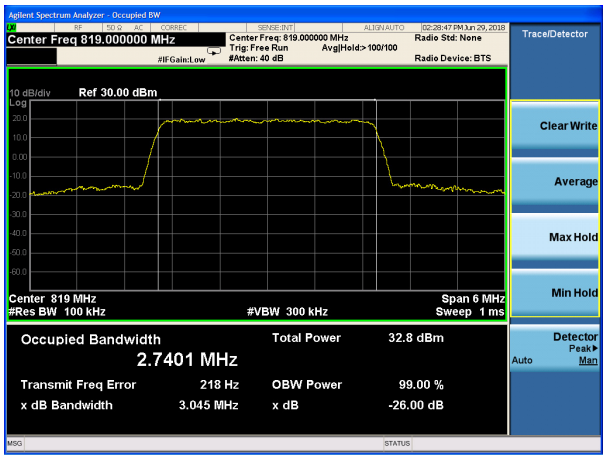
LTE Band 26 QPSK 3MHz CH26705



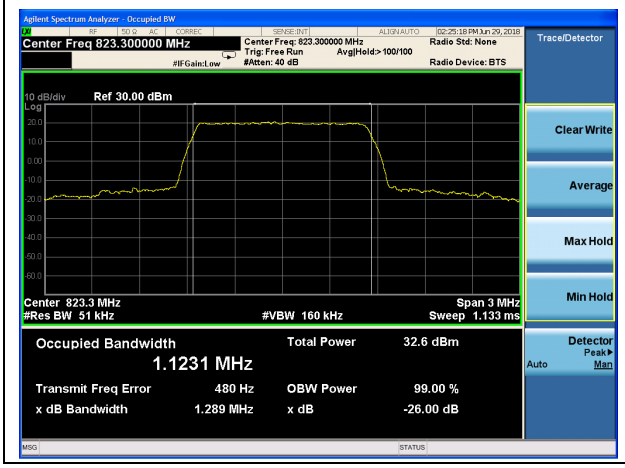
LTE Band 26 QPSK 1.4MHz CH26740



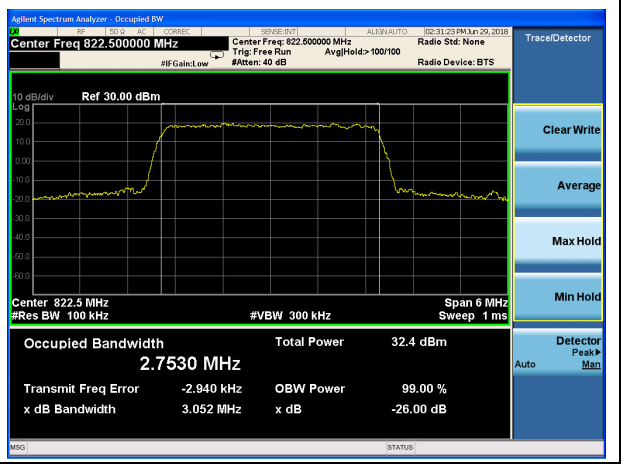
LTE Band 26 QPSK 3MHz CH26740



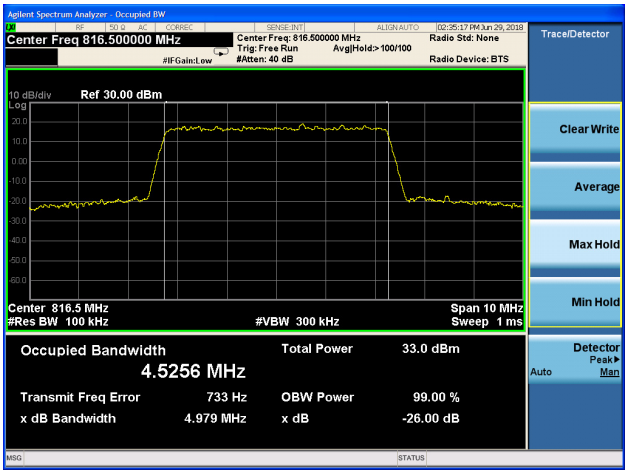
LTE Band 26 QPSK 1.4MHz CH26783



LTE Band 26 QPSK 3MHz CH26775

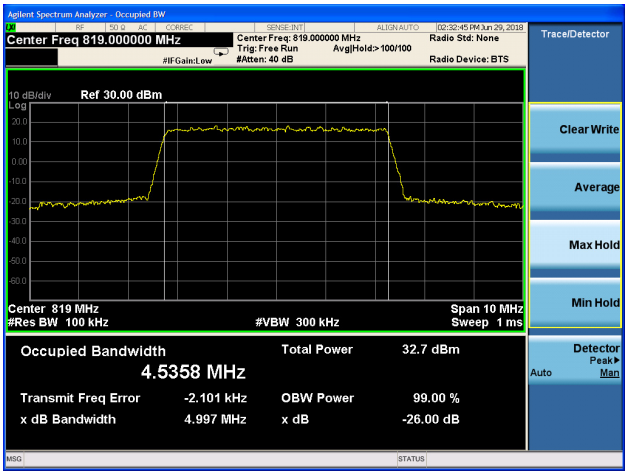


LTE Band 26 QPSK 5MHz CH26715

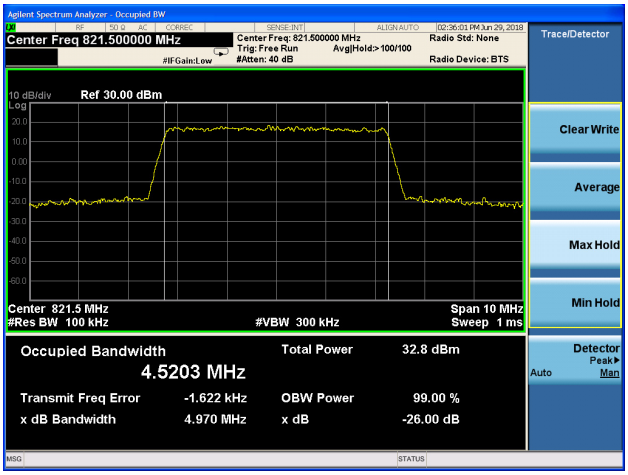


LTE Band 26 QPSK 10MHz CH26740

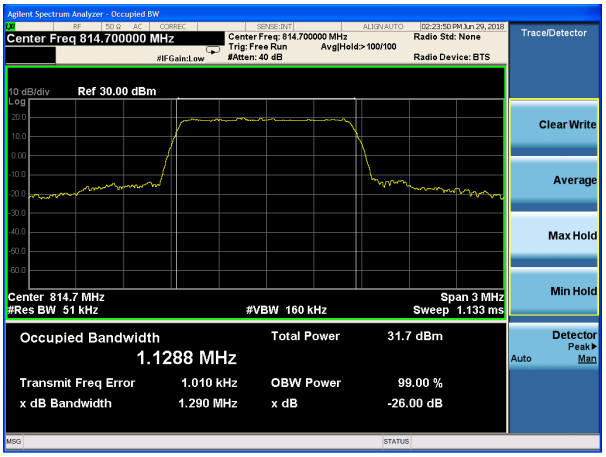
LTE Band 26 QPSK 5MHz CH26740



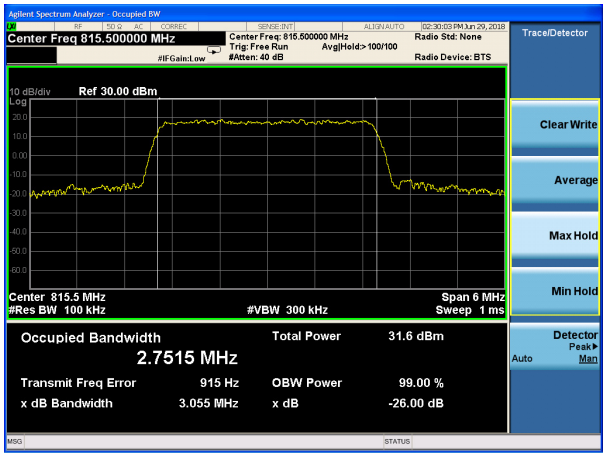
LTE Band 26 QPSK 5MHz CH26765



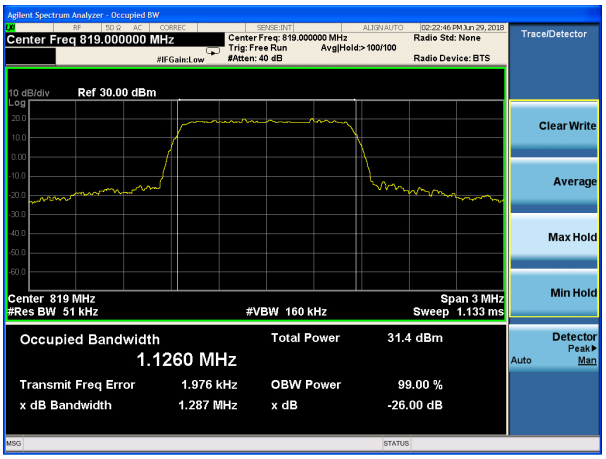
LTE Band 26 16QAM 1.4MHz CH26697



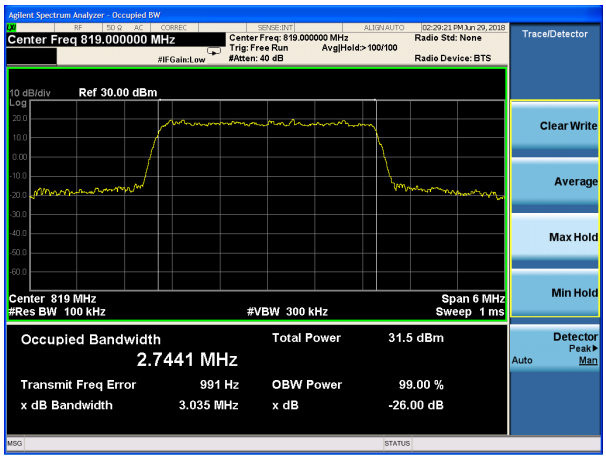
LTE Band 26 16QAM 3MHz CH26705



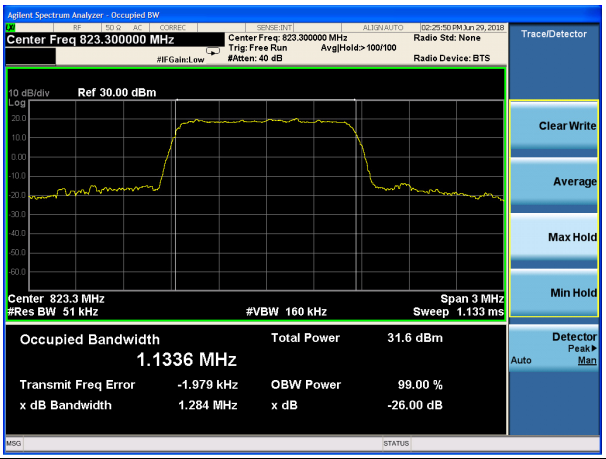
LTE Band 26 16QAM 1.4MHz CH26740



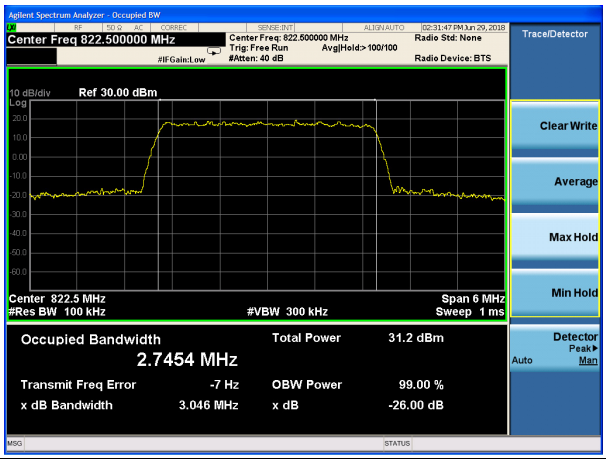
LTE Band 26 16QAM 3MHz CH26740



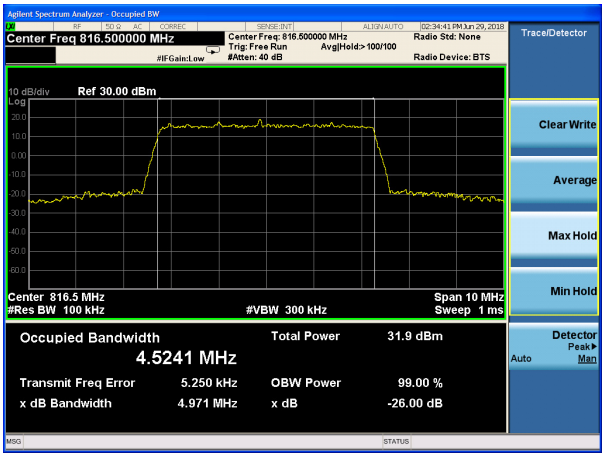
LTE Band 26 16QAM 1.4MHz CH26783



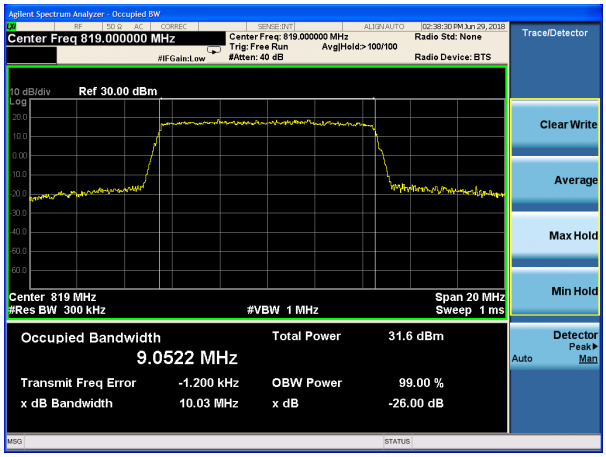
LTE Band 26 16QAM 3MHz CH26775



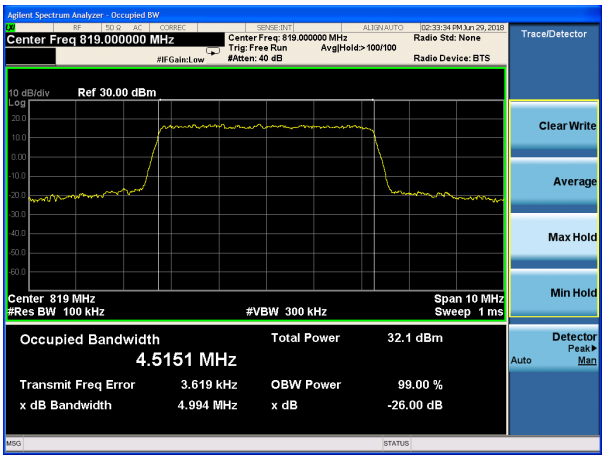
LTE Band 26 16QAM 5MHz CH26715



LTE Band 26 16QAM 10MHz CH26740



LTE Band 26 16QAM 5MHz CH26740



LTE Band 26 16QAM 5MHz CH26765