RF TEST REPORT

Applicant	Xiaomi Communications Co., Ltd.
FCC ID	2AFZZJ20CG
Product	Mobile Phone
Brand	POCO
Model	M2007J20CG, M2007J20CT
Report No.	R2007A0451-R2
Issue Date	August 14, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2019)/ FCC CFR 47 Part 24E (2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Peng Tao

Performed by: Peng Tao

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Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Isotropic Radiated Power	2.1046 24.232(c)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 /24.238(a)	PASS
4	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 24.235	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 24.238(a)	PASS
7	Radiates Spurious Emission	2.1053 / 24.238(a)	PASS
Date of Testing: July13, 2020 ~ August 10, 2020			
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. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

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1. Test Laboratory

1.1. Notes of the test report

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1.2. Test facility

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.

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

2.3. Applicant and Manufacturer Information

Applicant	Xiaomi Communications Co., Ltd.
Applicant address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer	Xiaomi Communications Co., Ltd.
Manufacturer address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

2.4. General information

EUT Description			
Model	M2007J20CG, M2007J20CT		
IMEI	IMEI 1:869236050030824 IMEI 2:869236050030832		
Hardware Version	P2		
Software Version	MIUI 12		
Power Supply	Battery/AC adapter		
Antenna Type	PIFA Antenna		
Antenna Gain	Frequency (MHz)	Gain(dBi)	
	1850	-0.5	
	1880	-0.8	
	1909	-1.4	
Test Mode(s)	GSM1900; WCDMA Band II; LTE Band 2;		
Test Modulation	(GSM/GPRS)GMSK, (EGPRS) GMSK/ 8PSK; (WCDMA) BPSK, QPSK,16QAM; (LTE)QPSK 16QAM, 64QAM		
GPRS Multislot Class	33		
EGPRS Multislot Class	33		
HSDPA UE Category	24		
HSUPA UE Category	6		
LTE Category	12		
Maximum E.I.R.P	GSM 1900:	29.51dBm	
	WCDMA Band II:	22.51dBm	
	LTE Band 2:	22.82dBm	
Rated Power Supply Voltage	3.87V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.4V		
Extreme Temperature	Lowest: 0°C Highest: +40°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850 ~ 1910	1930 ~ 1990

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	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
EUT Accessory			
Adapter	Manufacturer: Xiaomi Communications Co., Ltd. Model: MDY-12-EA		
Battery	Manufacturer: NVT Model: BN57		
Earphone	Manufacturer: Tiinlab Acoustic Technology Model: EM023		
USB Cable	Manufacturer: LUXSHARE Precision Industry Co., Ltd. Model: L63312		
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.			

Item	M2007J20CG	M2007J20CT
LTE Band 41	Support	Not Support
Note: Customer declaration, two models are the same, except for the model. There are more than one Model, each one should be applied throughout the compliance test respectively, however, only the worst case (M2007J20CG) will be recorded in this report.		

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3. Applied Standards

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

Test standards:

FCC CFR 47 Part 24E (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

KDB 971168 D01 Power Meas License Digital Systems v03r01

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4. Test Configuration

There is more than one SIM card slot, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) 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 and RB size and modulations were investigated.
Subsequently, only the worst case emissions are reported.
The following testing in GSM/WCDMA/LTE is set based on the maximum RF Output Power.
Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation	
	GSM 1900	WCDMA Band II
RF Power Output and Effective Isotropic Radiated Power	GSM GPRS EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Occupied Bandwidth	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GSM	RMC
Radiates Spurious Emission	GSM	RMC

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Test modes are chosen to be reported as the worst case configuration below for LTE Band 2:

Test items	Bandwidth (MHz)						Modulation		RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF Power Output and Effective Isotropic Radiated Power	O	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	O
Band Edge Compliance	O	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	O
Frequency Stability	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Conducted Spurious Emissions	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	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.													

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5. Test Case Results

5.1. RF Power Output and Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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.

The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).

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:
EIRP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBi)
where:dBd refers to gain relative to an ideal dipole.
EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

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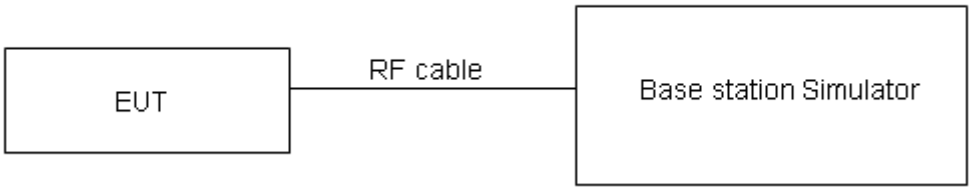
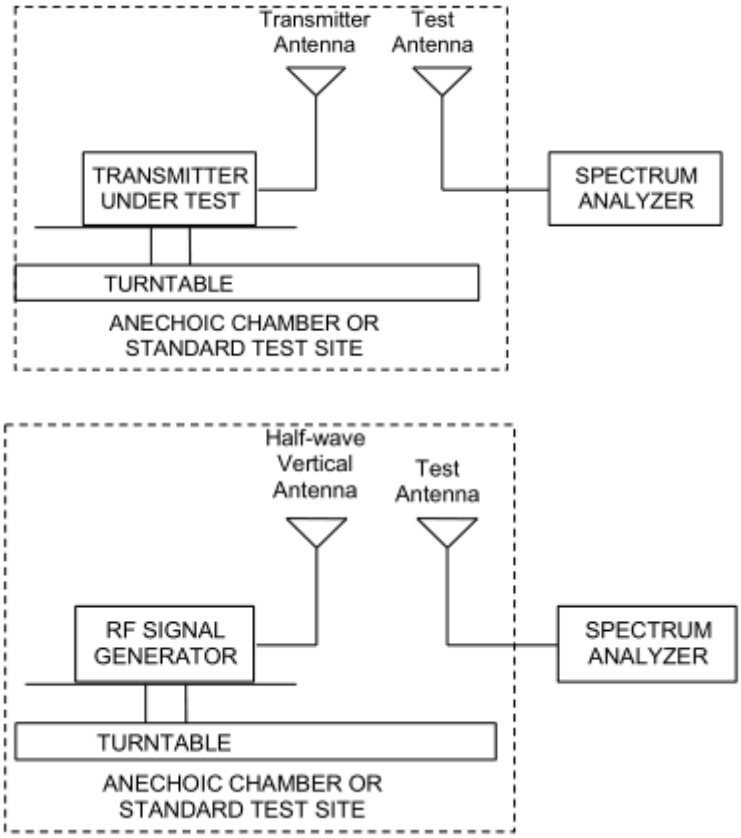
The RB allocation refers to section 5.1, using the maximum output power configuration.

Test Setup



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



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 24.232(c) Mobile and portable stations are limited to 2 watts EIRP.
Rule Part 24.232(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Limit	⩽ 2 W (33 dBm)

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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 for RF power output, k = 2, U= 1.19 dB for EIRP.

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Test Results

GSM 1900		Conducted Power (dBm)			EIRP (dBm)		
		Channel 512	Channel 661	Channel 810	Channel 512	Channel 661	Channel 810
		1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)	1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)
GSM(GMSK)	Results	30.00	29.74	29.70	29.51	28.34	28.30
GPRS (GMSK)	1TXslot	29.94	29.74	29.67	26.61	28.34	28.27
	2TXslots	26.98	26.78	26.72	23.96	25.38	25.32
	3TXslots	25.19	24.98	24.91	21.38	23.58	23.51
	4TXslots	23.87	23.65	23.57	20.27	22.25	22.17
EGPRS (8PSK)	1TXslot	25.01	25.07	24.93	24.88	23.67	23.53
	2TXslots	21.75	21.77	21.62	22.68	20.37	20.22
	3TXslots	19.37	19.50	19.32	21.16	18.10	17.92
	4TXslots	17.73	17.86	17.60	19.88	16.46	16.20

WCDMA Band II		Conducted Power (dBm)			EIRP (dBm)		
		Channel 9262	Channel 9400	Channel 9538	Channel 9262	Channel 9400	Channel 9538
		1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)	1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)
RMC		23.01	22.95	22.94	22.51	21.55	21.54
HSDPA	Sub - Test 1	22.47	22.37	22.38	21.97	20.97	20.98
	Sub - Test 2	22.46	22.39	22.35	21.96	20.99	20.95
	Sub - Test 3	21.93	21.89	21.87	21.43	20.49	20.47
	Sub - Test 4	21.94	21.90	21.85	21.44	20.50	20.45
HSUPA	Sub - Test 1	22.43	22.36	22.33	21.93	20.96	20.93
	Sub - Test 2	21.42	21.34	21.32	20.92	19.94	19.92
	Sub - Test 3	21.89	21.82	21.81	21.39	20.42	20.41
	Sub - Test 4	21.35	21.31	21.29	20.85	19.91	19.89
	Sub - Test 5	22.36	22.29	22.27	21.86	20.89	20.87
DC-HSDPA	Sub - Test 1	22.35	22.31	22.28	21.85	20.91	20.88
	Sub - Test 2	22.34	22.30	22.27	21.84	20.90	20.87
	Sub - Test 3	21.92	21.79	21.78	21.42	20.39	20.38
	Sub - Test 4	21.91	21.78	21.77	21.41	20.38	20.37
HSPA+	16QAM	21.90	21.86	21.84	21.40	20.46	20.44

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Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	EIRP (dBm)	Verdict
LTE Band2	1.4	18607	1	#0	QPSK	23.29	22.79	PASS
LTE Band2	1.4	18607	1	#Mid	QPSK	23.29	22.79	PASS
LTE Band2	1.4	18607	1	#Max	QPSK	23.20	22.70	PASS
LTE Band2	1.4	18607	3	#0	QPSK	23.14	22.64	PASS
LTE Band2	1.4	18607	3	#Mid	QPSK	23.12	22.62	PASS
LTE Band2	1.4	18607	3	#Max	QPSK	23.08	22.58	PASS
LTE Band2	1.4	18607	6	#0	QPSK	22.16	21.66	PASS
LTE Band2	1.4	18607	1	#0	QAM16	22.14	21.64	PASS
LTE Band2	1.4	18607	1	#Mid	QAM16	22.19	21.69	PASS
LTE Band2	1.4	18607	1	#Max	QAM16	22.13	21.63	PASS
LTE Band2	1.4	18607	3	#0	QAM16	22.18	21.68	PASS
LTE Band2	1.4	18607	3	#Mid	QAM16	22.17	21.67	PASS
LTE Band2	1.4	18607	3	#Max	QAM16	22.16	21.66	PASS
LTE Band2	1.4	18607	6	#0	QAM16	21.23	20.73	PASS
LTE Band2	1.4	18607	1	#0	QAM64	22.14	21.64	PASS
LTE Band2	1.4	18607	1	#Mid	QAM64	22.18	21.68	PASS
LTE Band2	1.4	18607	1	#Max	QAM64	22.10	21.60	PASS
LTE Band2	1.4	18607	3	#0	QAM64	22.16	21.66	PASS
LTE Band2	1.4	18607	3	#Mid	QAM64	22.18	21.68	PASS
LTE Band2	1.4	18607	3	#Max	QAM64	22.15	21.65	PASS
LTE Band2	1.4	18607	6	#0	QAM64	21.24	20.74	PASS
LTE Band2	1.4	18900	1	#0	QPSK	23.10	21.70	PASS
LTE Band2	1.4	18900	1	#Mid	QPSK	23.20	21.80	PASS
LTE Band2	1.4	18900	1	#Max	QPSK	23.10	21.70	PASS
LTE Band2	1.4	18900	3	#0	QPSK	23.03	21.63	PASS
LTE Band2	1.4	18900	3	#Mid	QPSK	23.03	21.63	PASS
LTE Band2	1.4	18900	3	#Max	QPSK	23.01	21.61	PASS
LTE Band2	1.4	18900	6	#0	QPSK	22.11	20.71	PASS
LTE Band2	1.4	18900	1	#0	QAM16	22.11	20.71	PASS
LTE Band2	1.4	18900	1	#Mid	QAM16	22.20	20.80	PASS
LTE Band2	1.4	18900	1	#Max	QAM16	22.10	20.70	PASS
LTE Band2	1.4	18900	3	#0	QAM16	22.19	20.79	PASS
LTE Band2	1.4	18900	3	#Mid	QAM16	22.20	20.80	PASS
LTE Band2	1.4	18900	3	#Max	QAM16	22.20	20.80	PASS
LTE Band2	1.4	18900	6	#0	QAM16	21.18	19.78	PASS
LTE Band2	1.4	18900	1	#0	QAM64	22.10	20.70	PASS
LTE Band2	1.4	18900	1	#Mid	QAM64	22.20	20.80	PASS
LTE Band2	1.4	18900	1	#Max	QAM64	22.14	20.74	PASS
LTE Band2	1.4	18900	3	#0	QAM64	22.20	20.80	PASS
LTE Band2	1.4	18900	3	#Mid	QAM64	22.18	20.78	PASS

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LTE Band2	1.4	18900	3	#Max	QAM64	22.17	20.77	PASS
LTE Band2	1.4	18900	6	#0	QAM64	21.18	19.78	PASS
LTE Band2	1.4	19193	1	#0	QPSK	22.95	21.55	PASS
LTE Band2	1.4	19193	1	#Mid	QPSK	23.02	21.62	PASS
LTE Band2	1.4	19193	1	#Max	QPSK	22.95	21.55	PASS
LTE Band2	1.4	19193	3	#0	QPSK	22.94	21.54	PASS
LTE Band2	1.4	19193	3	#Mid	QPSK	22.92	21.52	PASS
LTE Band2	1.4	19193	3	#Max	QPSK	22.92	21.52	PASS
LTE Band2	1.4	19193	6	#0	QPSK	22.05	20.65	PASS
LTE Band2	1.4	19193	1	#0	QAM16	22.16	20.76	PASS
LTE Band2	1.4	19193	1	#Mid	QAM16	22.24	20.84	PASS
LTE Band2	1.4	19193	1	#Max	QAM16	22.15	20.75	PASS
LTE Band2	1.4	19193	3	#0	QAM16	22.01	20.61	PASS
LTE Band2	1.4	19193	3	#Mid	QAM16	21.99	20.59	PASS
LTE Band2	1.4	19193	3	#Max	QAM16	22.03	20.63	PASS
LTE Band2	1.4	19193	6	#0	QAM16	21.04	19.64	PASS
LTE Band2	1.4	19193	1	#0	QAM64	22.16	20.76	PASS
LTE Band2	1.4	19193	1	#Mid	QAM64	22.25	20.85	PASS
LTE Band2	1.4	19193	1	#Max	QAM64	22.15	20.75	PASS
LTE Band2	1.4	19193	3	#0	QAM64	22.01	20.61	PASS
LTE Band2	1.4	19193	3	#Mid	QAM64	22.01	20.61	PASS
LTE Band2	1.4	19193	3	#Max	QAM64	22.01	20.61	PASS
LTE Band2	1.4	19193	6	#0	QAM64	21.04	19.64	PASS
LTE Band2	3	18615	1	#0	QPSK	23.15	22.65	PASS
LTE Band2	3	18615	1	#Mid	QPSK	23.20	22.70	PASS
LTE Band2	3	18615	1	#Max	QPSK	23.11	22.61	PASS
LTE Band2	3	18615	8	#0	QPSK	22.21	21.71	PASS
LTE Band2	3	18615	8	#Mid	QPSK	22.21	21.71	PASS
LTE Band2	3	18615	8	#Max	QPSK	22.18	21.68	PASS
LTE Band2	3	18615	15	#0	QPSK	22.25	21.75	PASS
LTE Band2	3	18615	1	#0	QAM16	22.45	21.95	PASS
LTE Band2	3	18615	1	#Mid	QAM16	22.47	21.97	PASS
LTE Band2	3	18615	1	#Max	QAM16	22.42	21.92	PASS
LTE Band2	3	18615	8	#0	QAM16	21.32	20.82	PASS
LTE Band2	3	18615	8	#Mid	QAM16	21.33	20.83	PASS
LTE Band2	3	18615	8	#Max	QAM16	21.30	20.80	PASS
LTE Band2	3	18615	15	#0	QAM16	21.26	20.76	PASS
LTE Band2	3	18615	1	#0	QAM64	22.45	21.95	PASS
LTE Band2	3	18615	1	#Mid	QAM64	22.47	21.97	PASS
LTE Band2	3	18615	1	#Max	QAM64	22.42	21.92	PASS
LTE Band2	3	18615	8	#0	QAM64	21.34	20.84	PASS
LTE Band2	3	18615	8	#Mid	QAM64	21.34	20.84	PASS
LTE Band2	3	18615	8	#Max	QAM64	21.27	20.77	PASS

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LTE Band2	3	18615	15	#0	QAM64	21.24	20.74	PASS
LTE Band2	3	18900	1	#0	QPSK	23.05	21.65	PASS
LTE Band2	3	18900	1	#Mid	QPSK	22.95	21.55	PASS
LTE Band2	3	18900	1	#Max	QPSK	23.03	21.63	PASS
LTE Band2	3	18900	8	#0	QPSK	22.11	20.71	PASS
LTE Band2	3	18900	8	#Mid	QPSK	22.10	20.70	PASS
LTE Band2	3	18900	8	#Max	QPSK	22.10	20.70	PASS
LTE Band2	3	18900	15	#0	QPSK	22.07	20.67	PASS
LTE Band2	3	18900	1	#0	QAM16	22.29	20.89	PASS
LTE Band2	3	18900	1	#Mid	QAM16	22.32	20.92	PASS
LTE Band2	3	18900	1	#Max	QAM16	22.22	20.82	PASS
LTE Band2	3	18900	8	#0	QAM16	21.16	19.76	PASS
LTE Band2	3	18900	8	#Mid	QAM16	21.16	19.76	PASS
LTE Band2	3	18900	8	#Max	QAM16	21.16	19.76	PASS
LTE Band2	3	18900	15	#0	QAM16	21.03	19.63	PASS
LTE Band2	3	18900	1	#0	QAM64	22.29	20.89	PASS
LTE Band2	3	18900	1	#Mid	QAM64	22.32	20.92	PASS
LTE Band2	3	18900	1	#Max	QAM64	22.24	20.84	PASS
LTE Band2	3	18900	8	#0	QAM64	21.17	19.77	PASS
LTE Band2	3	18900	8	#Mid	QAM64	21.17	19.77	PASS
LTE Band2	3	18900	8	#Max	QAM64	21.13	19.73	PASS
LTE Band2	3	18900	15	#0	QAM64	21.03	19.63	PASS
LTE Band2	3	19185	1	#0	QPSK	23.15	21.75	PASS
LTE Band2	3	19185	1	#Mid	QPSK	23.17	21.77	PASS
LTE Band2	3	19185	1	#Max	QPSK	23.12	21.72	PASS
LTE Band2	3	19185	8	#0	QPSK	22.12	20.72	PASS
LTE Band2	3	19185	8	#Mid	QPSK	22.13	20.73	PASS
LTE Band2	3	19185	8	#Max	QPSK	22.08	20.68	PASS
LTE Band2	3	19185	15	#0	QPSK	22.10	20.70	PASS
LTE Band2	3	19185	1	#0	QAM16	22.03	20.63	PASS
LTE Band2	3	19185	1	#Mid	QAM16	22.06	20.66	PASS
LTE Band2	3	19185	1	#Max	QAM16	22.02	20.62	PASS
LTE Band2	3	19185	8	#0	QAM16	21.17	19.77	PASS
LTE Band2	3	19185	8	#Mid	QAM16	21.16	19.76	PASS
LTE Band2	3	19185	8	#Max	QAM16	21.15	19.75	PASS
LTE Band2	3	19185	15	#0	QAM16	21.17	19.77	PASS
LTE Band2	3	19185	1	#0	QAM64	22.05	20.65	PASS
LTE Band2	3	19185	1	#Mid	QAM64	22.02	20.62	PASS
LTE Band2	3	19185	1	#Max	QAM64	22.02	20.62	PASS
LTE Band2	3	19185	8	#0	QAM64	21.17	19.77	PASS
LTE Band2	3	19185	8	#Mid	QAM64	21.17	19.77	PASS
LTE Band2	3	19185	8	#Max	QAM64	21.14	19.74	PASS
LTE Band2	3	19185	15	#0	QAM64	21.16	19.76	PASS

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LTE Band2	5	18625	1	#0	QPSK	23.24	22.74	PASS
LTE Band2	5	18625	1	#Mid	QPSK	23.32	22.82	PASS
LTE Band2	5	18625	1	#Max	QPSK	23.16	22.66	PASS
LTE Band2	5	18625	12	#0	QPSK	22.27	21.77	PASS
LTE Band2	5	18625	12	#Mid	QPSK	22.24	21.74	PASS
LTE Band2	5	18625	12	#Max	QPSK	22.23	21.73	PASS
LTE Band2	5	18625	25	#0	QPSK	22.26	21.76	PASS
LTE Band2	5	18625	1	#0	QAM16	22.51	22.01	PASS
LTE Band2	5	18625	1	#Mid	QAM16	22.59	22.09	PASS
LTE Band2	5	18625	1	#Max	QAM16	22.51	22.01	PASS
LTE Band2	5	18625	12	#0	QAM16	21.28	20.78	PASS
LTE Band2	5	18625	12	#Mid	QAM16	21.28	20.78	PASS
LTE Band2	5	18625	12	#Max	QAM16	21.26	20.76	PASS
LTE Band2	5	18625	25	#0	QAM16	21.30	20.80	PASS
LTE Band2	5	18625	1	#0	QAM64	22.52	22.02	PASS
LTE Band2	5	18625	1	#Mid	QAM64	22.60	22.10	PASS
LTE Band2	5	18625	1	#Max	QAM64	22.51	22.01	PASS
LTE Band2	5	18625	12	#0	QAM64	21.29	20.79	PASS
LTE Band2	5	18625	12	#Mid	QAM64	21.29	20.79	PASS
LTE Band2	5	18625	12	#Max	QAM64	21.28	20.78	PASS
LTE Band2	5	18625	25	#0	QAM64	21.30	20.80	PASS
LTE Band2	5	18900	1	#0	QPSK	23.16	21.76	PASS
LTE Band2	5	18900	1	#Mid	QPSK	23.24	21.84	PASS
LTE Band2	5	18900	1	#Max	QPSK	23.13	21.73	PASS
LTE Band2	5	18900	12	#0	QPSK	22.16	20.76	PASS
LTE Band2	5	18900	12	#Mid	QPSK	22.15	20.75	PASS
LTE Band2	5	18900	12	#Max	QPSK	22.13	20.73	PASS
LTE Band2	5	18900	25	#0	QPSK	22.09	20.69	PASS
LTE Band2	5	18900	1	#0	QAM16	22.34	20.94	PASS
LTE Band2	5	18900	1	#Mid	QAM16	22.41	21.01	PASS
LTE Band2	5	18900	1	#Max	QAM16	22.31	20.91	PASS
LTE Band2	5	18900	12	#0	QAM16	21.20	19.80	PASS
LTE Band2	5	18900	12	#Mid	QAM16	21.17	19.77	PASS
LTE Band2	5	18900	12	#Max	QAM16	21.14	19.74	PASS
LTE Band2	5	18900	25	#0	QAM16	21.12	19.72	PASS
LTE Band2	5	18900	1	#0	QAM64	22.34	20.94	PASS
LTE Band2	5	18900	1	#Mid	QAM64	22.41	21.01	PASS
LTE Band2	5	18900	1	#Max	QAM64	22.34	20.94	PASS
LTE Band2	5	18900	12	#0	QAM64	21.17	19.77	PASS
LTE Band2	5	18900	12	#Mid	QAM64	21.19	19.79	PASS
LTE Band2	5	18900	12	#Max	QAM64	21.13	19.73	PASS
LTE Band2	5	18900	25	#0	QAM64	21.13	19.73	PASS
LTE Band2	5	19175	1	#0	QPSK	23.07	21.67	PASS

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LTE Band2	5	19175	1	#Mid	QPSK	23.12	21.72	PASS
LTE Band2	5	19175	1	#Max	QPSK	23.00	21.60	PASS
LTE Band2	5	19175	12	#0	QPSK	22.08	20.68	PASS
LTE Band2	5	19175	12	#Mid	QPSK	22.09	20.69	PASS
LTE Band2	5	19175	12	#Max	QPSK	22.03	20.63	PASS
LTE Band2	5	19175	25	#0	QPSK	22.11	20.71	PASS
LTE Band2	5	19175	1	#0	QAM16	22.32	20.92	PASS
LTE Band2	5	19175	1	#Mid	QAM16	22.44	21.04	PASS
LTE Band2	5	19175	1	#Max	QAM16	22.31	20.91	PASS
LTE Band2	5	19175	12	#0	QAM16	21.19	19.79	PASS
LTE Band2	5	19175	12	#Mid	QAM16	21.20	19.80	PASS
LTE Band2	5	19175	12	#Max	QAM16	21.20	19.80	PASS
LTE Band2	5	19175	25	#0	QAM16	21.19	19.79	PASS
LTE Band2	5	19175	1	#0	QAM64	22.36	20.96	PASS
LTE Band2	5	19175	1	#Mid	QAM64	22.44	21.04	PASS
LTE Band2	5	19175	1	#Max	QAM64	22.35	20.95	PASS
LTE Band2	5	19175	12	#0	QAM64	21.20	19.80	PASS
LTE Band2	5	19175	12	#Mid	QAM64	21.19	19.79	PASS
LTE Band2	5	19175	12	#Max	QAM64	21.21	19.81	PASS
LTE Band2	5	19175	25	#0	QAM64	21.16	19.76	PASS
LTE Band2	10	18650	1	#0	QPSK	23.31	22.81	PASS
LTE Band2	10	18650	1	#Mid	QPSK	23.20	22.70	PASS
LTE Band2	10	18650	1	#Max	QPSK	23.17	22.67	PASS
LTE Band2	10	18650	25	#0	QPSK	22.24	21.74	PASS
LTE Band2	10	18650	25	#Mid	QPSK	22.24	21.74	PASS
LTE Band2	10	18650	25	#Max	QPSK	22.22	21.72	PASS
LTE Band2	10	18650	50	#0	QPSK	22.25	21.75	PASS
LTE Band2	10	18650	1	#0	QAM16	22.61	22.11	PASS
LTE Band2	10	18650	1	#Mid	QAM16	22.55	22.05	PASS
LTE Band2	10	18650	1	#Max	QAM16	22.55	22.05	PASS
LTE Band2	10	18650	25	#0	QAM16	21.39	20.89	PASS
LTE Band2	10	18650	25	#Mid	QAM16	21.40	20.90	PASS
LTE Band2	10	18650	25	#Max	QAM16	21.35	20.85	PASS
LTE Band2	10	18650	50	#0	QAM16	21.28	20.78	PASS
LTE Band2	10	18650	1	#0	QAM64	22.59	22.09	PASS
LTE Band2	10	18650	1	#Mid	QAM64	22.53	22.03	PASS
LTE Band2	10	18650	1	#Max	QAM64	22.55	22.05	PASS
LTE Band2	10	18650	25	#0	QAM64	21.38	20.88	PASS
LTE Band2	10	18650	25	#Mid	QAM64	21.38	20.88	PASS
LTE Band2	10	18650	25	#Max	QAM64	21.37	20.87	PASS
LTE Band2	10	18650	50	#0	QAM64	21.30	20.80	PASS
LTE Band2	10	18900	1	#0	QPSK	23.26	21.86	PASS
LTE Band2	10	18900	1	#Mid	QPSK	23.15	21.75	PASS

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LTE Band2	10	18900	1	#Max	QPSK	23.15	21.75	PASS
LTE Band2	10	18900	25	#0	QPSK	22.14	20.74	PASS
LTE Band2	10	18900	25	#Mid	QPSK	22.14	20.74	PASS
LTE Band2	10	18900	25	#Max	QPSK	22.13	20.73	PASS
LTE Band2	10	18900	50	#0	QPSK	22.13	20.73	PASS
LTE Band2	10	18900	1	#0	QAM16	22.46	21.06	PASS
LTE Band2	10	18900	1	#Mid	QAM16	22.33	20.93	PASS
LTE Band2	10	18900	1	#Max	QAM16	22.34	20.94	PASS
LTE Band2	10	18900	25	#0	QAM16	21.23	19.83	PASS
LTE Band2	10	18900	25	#Mid	QAM16	21.23	19.83	PASS
LTE Band2	10	18900	25	#Max	QAM16	21.16	19.76	PASS
LTE Band2	10	18900	50	#0	QAM16	21.13	19.73	PASS
LTE Band2	10	18900	1	#0	QAM64	22.46	21.06	PASS
LTE Band2	10	18900	1	#Mid	QAM64	22.36	20.96	PASS
LTE Band2	10	18900	1	#Max	QAM64	22.36	20.96	PASS
LTE Band2	10	18900	25	#0	QAM64	21.22	19.82	PASS
LTE Band2	10	18900	25	#Mid	QAM64	21.21	19.81	PASS
LTE Band2	10	18900	25	#Max	QAM64	21.15	19.75	PASS
LTE Band2	10	18900	50	#0	QAM64	21.13	19.73	PASS
LTE Band2	10	19150	1	#0	QPSK	23.20	21.80	PASS
LTE Band2	10	19150	1	#Mid	QPSK	23.21	21.81	PASS
LTE Band2	10	19150	1	#Max	QPSK	23.14	21.74	PASS
LTE Band2	10	19150	25	#0	QPSK	22.10	20.70	PASS
LTE Band2	10	19150	25	#Mid	QPSK	22.11	20.71	PASS
LTE Band2	10	19150	25	#Max	QPSK	22.04	20.64	PASS
LTE Band2	10	19150	50	#0	QPSK	22.12	20.72	PASS
LTE Band2	10	19150	1	#0	QAM16	22.07	20.67	PASS
LTE Band2	10	19150	1	#Mid	QAM16	22.05	20.65	PASS
LTE Band2	10	19150	1	#Max	QAM16	22.01	20.61	PASS
LTE Band2	10	19150	25	#0	QAM16	21.16	19.76	PASS
LTE Band2	10	19150	25	#Mid	QAM16	21.17	19.77	PASS
LTE Band2	10	19150	25	#Max	QAM16	21.12	19.72	PASS
LTE Band2	10	19150	50	#0	QAM16	21.17	19.77	PASS
LTE Band2	10	19150	1	#0	QAM64	22.06	20.66	PASS
LTE Band2	10	19150	1	#Mid	QAM64	22.05	20.65	PASS
LTE Band2	10	19150	1	#Max	QAM64	22.01	20.61	PASS
LTE Band2	10	19150	25	#0	QAM64	21.16	19.76	PASS
LTE Band2	10	19150	25	#Mid	QAM64	21.17	19.77	PASS
LTE Band2	10	19150	25	#Max	QAM64	21.16	19.76	PASS
LTE Band2	10	19150	50	#0	QAM64	21.17	19.77	PASS
LTE Band2	15	18675	1	#0	QPSK	23.12	22.62	PASS
LTE Band2	15	18675	1	#Mid	QPSK	23.17	22.67	PASS
LTE Band2	15	18675	1	#Max	QPSK	23.09	22.59	PASS

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LTE Band2	15	18675	36	#0	QPSK	22.16	21.66	PASS
LTE Band2	15	18675	36	#Mid	QPSK	22.18	21.68	PASS
LTE Band2	15	18675	36	#Max	QPSK	22.21	21.71	PASS
LTE Band2	15	18675	75	#0	QPSK	22.18	21.68	PASS
LTE Band2	15	18675	1	#0	QAM16	22.46	21.96	PASS
LTE Band2	15	18675	1	#Mid	QAM16	22.53	22.03	PASS
LTE Band2	15	18675	1	#Max	QAM16	22.47	21.97	PASS
LTE Band2	15	18675	36	#0	QAM16	21.31	20.81	PASS
LTE Band2	15	18675	36	#Mid	QAM16	21.32	20.82	PASS
LTE Band2	15	18675	36	#Max	QAM16	21.29	20.79	PASS
LTE Band2	15	18675	75	#0	QAM16	21.34	20.84	PASS
LTE Band2	15	18675	1	#0	QAM64	22.46	21.96	PASS
LTE Band2	15	18675	1	#Mid	QAM64	22.53	22.03	PASS
LTE Band2	15	18675	1	#Max	QAM64	22.47	21.97	PASS
LTE Band2	15	18675	36	#0	QAM64	21.31	20.81	PASS
LTE Band2	15	18675	36	#Mid	QAM64	21.32	20.82	PASS
LTE Band2	15	18675	36	#Max	QAM64	21.28	20.78	PASS
LTE Band2	15	18675	75	#0	QAM64	21.34	20.84	PASS
LTE Band2	15	18900	1	#0	QPSK	23.05	22.55	PASS
LTE Band2	15	18900	1	#Mid	QPSK	23.09	21.69	PASS
LTE Band2	15	18900	1	#Max	QPSK	23.03	21.63	PASS
LTE Band2	15	18900	36	#0	QPSK	22.11	20.71	PASS
LTE Band2	15	18900	36	#Mid	QPSK	22.11	20.71	PASS
LTE Band2	15	18900	36	#Max	QPSK	22.13	20.73	PASS
LTE Band2	15	18900	75	#0	QPSK	22.08	20.68	PASS
LTE Band2	15	18900	1	#0	QAM16	22.27	20.87	PASS
LTE Band2	15	18900	1	#Mid	QAM16	22.34	20.94	PASS
LTE Band2	15	18900	1	#Max	QAM16	22.27	20.87	PASS
LTE Band2	15	18900	36	#0	QAM16	21.19	19.79	PASS
LTE Band2	15	18900	36	#Mid	QAM16	21.19	19.79	PASS
LTE Band2	15	18900	36	#Max	QAM16	21.22	19.82	PASS
LTE Band2	15	18900	75	#0	QAM16	21.17	19.77	PASS
LTE Band2	15	18900	1	#0	QAM64	22.28	20.88	PASS
LTE Band2	15	18900	1	#Mid	QAM64	22.34	20.94	PASS
LTE Band2	15	18900	1	#Max	QAM64	22.24	20.84	PASS
LTE Band2	15	18900	36	#0	QAM64	21.20	19.80	PASS
LTE Band2	15	18900	36	#Mid	QAM64	21.20	19.80	PASS
LTE Band2	15	18900	36	#Max	QAM64	21.23	19.83	PASS
LTE Band2	15	18900	75	#0	QAM64	21.17	19.77	PASS
LTE Band2	15	19125	1	#0	QPSK	23.17	21.77	PASS
LTE Band2	15	19125	1	#Mid	QPSK	23.17	21.77	PASS
LTE Band2	15	19125	1	#Max	QPSK	23.11	21.71	PASS
LTE Band2	15	19125	36	#0	QPSK	22.10	20.70	PASS

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LTE Band2	15	19125	36	#Mid	QPSK	22.09	20.69	PASS
LTE Band2	15	19125	36	#Max	QPSK	22.08	20.68	PASS
LTE Band2	15	19125	75	#0	QPSK	22.11	20.71	PASS
LTE Band2	15	19125	1	#0	QAM16	22.19	20.79	PASS
LTE Band2	15	19125	1	#Mid	QAM16	22.15	20.75	PASS
LTE Band2	15	19125	1	#Max	QAM16	22.13	20.73	PASS
LTE Band2	15	19125	36	#0	QAM16	21.22	19.82	PASS
LTE Band2	15	19125	36	#Mid	QAM16	21.20	19.80	PASS
LTE Band2	15	19125	36	#Max	QAM16	21.16	19.76	PASS
LTE Band2	15	19125	75	#0	QAM16	21.18	19.78	PASS
LTE Band2	15	19125	1	#0	QAM64	22.20	20.80	PASS
LTE Band2	15	19125	1	#Mid	QAM64	22.15	20.75	PASS
LTE Band2	15	19125	1	#Max	QAM64	22.09	20.69	PASS
LTE Band2	15	19125	36	#0	QAM64	21.21	19.81	PASS
LTE Band2	15	19125	36	#Mid	QAM64	21.20	19.80	PASS
LTE Band2	15	19125	36	#Max	QAM64	21.15	19.75	PASS
LTE Band2	15	19125	75	#0	QAM64	21.18	19.78	PASS
LTE Band2	20	18700	1	#0	QPSK	23.21	22.41	PASS
LTE Band2	20	18700	1	#Mid	QPSK	23.20	22.40	PASS
LTE Band2	20	18700	1	#Max	QPSK	23.18	22.38	PASS
LTE Band2	20	18700	50	#0	QPSK	22.21	21.41	PASS
LTE Band2	20	18700	50	#Mid	QPSK	22.20	21.40	PASS
LTE Band2	20	18700	50	#Max	QPSK	22.22	21.42	PASS
LTE Band2	20	18700	100	#0	QPSK	22.21	21.41	PASS
LTE Band2	20	18700	1	#0	QAM16	22.42	21.62	PASS
LTE Band2	20	18700	1	#Mid	QAM16	22.46	21.66	PASS
LTE Band2	20	18700	1	#Max	QAM16	22.40	21.60	PASS
LTE Band2	20	18700	50	#0	QAM16	21.31	20.51	PASS
LTE Band2	20	18700	50	#Mid	QAM16	21.31	20.51	PASS
LTE Band2	20	18700	50	#Max	QAM16	21.25	20.45	PASS
LTE Band2	20	18700	100	#0	QAM16	21.27	20.47	PASS
LTE Band2	20	18700	1	#0	QAM64	22.42	21.62	PASS
LTE Band2	20	18700	1	#Mid	QAM64	22.45	21.65	PASS
LTE Band2	20	18700	1	#Max	QAM64	22.41	21.61	PASS
LTE Band2	20	18700	50	#0	QAM64	21.32	20.52	PASS
LTE Band2	20	18700	50	#Mid	QAM64	21.31	20.51	PASS
LTE Band2	20	18700	50	#Max	QAM64	21.25	20.45	PASS
LTE Band2	20	18700	100	#0	QAM64	21.31	20.51	PASS
LTE Band2	20	18900	1	#0	QPSK	23.20	21.80	PASS
LTE Band2	20	18900	1	#Mid	QPSK	23.21	21.81	PASS
LTE Band2	20	18900	1	#Max	QPSK	23.14	21.74	PASS
LTE Band2	20	18900	50	#0	QPSK	22.12	20.72	PASS
LTE Band2	20	18900	50	#Mid	QPSK	22.12	20.72	PASS

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LTE Band2	20	18900	50	#Max	QPSK	22.08	20.68	PASS
LTE Band2	20	18900	100	#0	QPSK	22.13	20.73	PASS
LTE Band2	20	18900	1	#0	QAM16	22.09	20.69	PASS
LTE Band2	20	18900	1	#Mid	QAM16	22.08	20.68	PASS
LTE Band2	20	18900	1	#Max	QAM16	22.02	20.62	PASS
LTE Band2	20	18900	50	#0	QAM16	21.14	19.74	PASS
LTE Band2	20	18900	50	#Mid	QAM16	21.14	19.74	PASS
LTE Band2	20	18900	50	#Max	QAM16	21.11	19.71	PASS
LTE Band2	20	18900	100	#0	QAM16	21.16	19.76	PASS
LTE Band2	20	18900	1	#0	QAM64	22.08	20.68	PASS
LTE Band2	20	18900	1	#Mid	QAM64	22.04	20.64	PASS
LTE Band2	20	18900	1	#Max	QAM64	22.00	20.60	PASS
LTE Band2	20	18900	50	#0	QAM64	21.14	19.74	PASS
LTE Band2	20	18900	50	#Mid	QAM64	21.15	19.75	PASS
LTE Band2	20	18900	50	#Max	QAM64	21.11	19.71	PASS
LTE Band2	20	18900	100	#0	QAM64	21.13	19.73	PASS
LTE Band2	20	19100	1	#0	QPSK	22.98	21.58	PASS
LTE Band2	20	19100	1	#Mid	QPSK	23.10	21.70	PASS
LTE Band2	20	19100	1	#Max	QPSK	23.01	21.61	PASS
LTE Band2	20	19100	50	#0	QPSK	22.05	20.65	PASS
LTE Band2	20	19100	50	#Mid	QPSK	22.05	20.65	PASS
LTE Band2	20	19100	50	#Max	QPSK	22.12	20.72	PASS
LTE Band2	20	19100	100	#0	QPSK	22.00	20.60	PASS
LTE Band2	20	19100	1	#0	QAM16	21.80	20.40	PASS
LTE Band2	20	19100	1	#Mid	QAM16	21.94	20.54	PASS
LTE Band2	20	19100	1	#Max	QAM16	21.80	20.40	PASS
LTE Band2	20	19100	50	#0	QAM16	21.11	19.71	PASS
LTE Band2	20	19100	50	#Mid	QAM16	21.12	19.72	PASS
LTE Band2	20	19100	50	#Max	QAM16	21.15	19.75	PASS
LTE Band2	20	19100	100	#0	QAM16	21.07	19.67	PASS
LTE Band2	20	19100	1	#0	QAM64	21.80	20.40	PASS
LTE Band2	20	19100	1	#Mid	QAM64	21.95	20.55	PASS
LTE Band2	20	19100	1	#Max	QAM64	21.80	20.40	PASS
LTE Band2	20	19100	50	#0	QAM64	21.12	19.72	PASS
LTE Band2	20	19100	50	#Mid	QAM64	21.10	19.70	PASS
LTE Band2	20	19100	50	#Max	QAM64	21.14	19.74	PASS
LTE Band2	20	19100	100	#0	QAM64	21.07	19.67	PASS

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5.2. Occupied Bandwidth

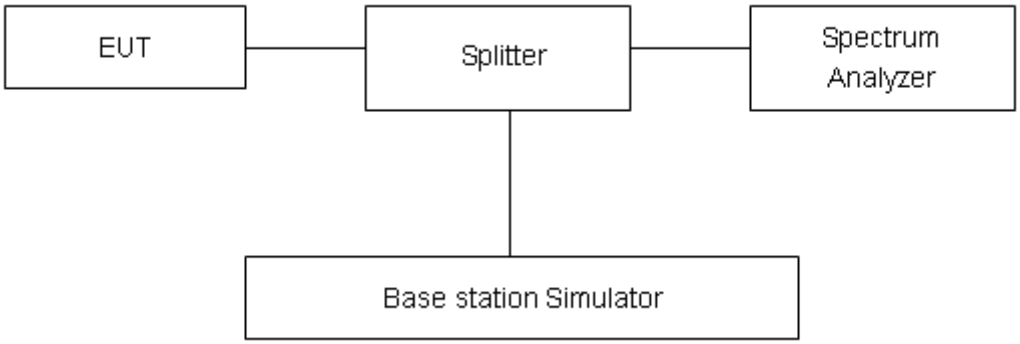
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 3kHz, VBW is set to 10kHz for GSM 1900,
RBW is set to 51 kHz, VBW is set to 160kHz for WCDMA Band II,
RBW is set to 30 kHz, VBW is set to 91kHz for LTE Band 2(1.4MHz),
RBW is set to 62 kHz, VBW is set to 180 kHz for LTE Band 2(3MHz),
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 2(5MHz),
RBW is set to 200 kHz, VBW is set to 620kHz for LTE Band 2(10MHz),
RBW is set to 300kHz,VBW is set to 910kHz for LTE Band 2(15MHz).
RBW is set to 430kHz,VBW is set to 1.2MHz for LTE Band 2 (20MHz).
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.

Measurement Uncertainty

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

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Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GMSK)	512	1850.2	0.24435	0.3136
	661	1880.0	0.24532	0.3071
	810	1909.8	0.24431	0.3119
GPRS 1900 (GMSK)	512	1850.2	0.24733	0.3099
	661	1880.0	0.24915	0.3132
	810	1909.8	0.24841	0.313
EGPRS 1900 (8PSK)	512	1850.2	0.24754	0.3066
	661	1880.0	0.24471	0.3014
	810	1909.8	0.24374	0.3021
WCDMA Band II (RMC)	9262	1852.4	4.1320	4.695
	9400	1880	4.1356	4.709
	9538	1907.6	4.1344	4.727

LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.089	1.252
		18900	1880.0	1.091	1.240
		19193	1909.3	1.092	1.235
	3	18615	1851.5	2.692	3.019
		18900	1880	2.706	3.019
		19185	1908.5	2.707	3.002
	5	18625	1852.5	4.515	4.977
		18900	1880	4.528	4.997
		19175	1907.5	4.502	4.896
	10	18650	1855	8.975	9.876
		18900	1880	8.967	9.806
		19150	1905	8.961	9.767
	15	18675	1857.5	13.457	14.750
		18900	1880	13.455	14.640

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		19125	1902.5	13.433	14.510
	20	18700	1860	17.985	19.240
		18900	1880	17.916	19.470
		19100	1900	17.888	19.570
16QAM	1.4	18607	1850.7	1.097	1.247
		18900	1880.0	1.091	1.223
		19193	1909.3	1.095	1.232
	3	18615	1851.5	2.708	2.982
		18900	1880	2.697	3.005
		19185	1908.5	2.697	3.015
	5	18625	1852.5	4.502	4.987
		18900	1880	4.519	4.970
		19175	1907.5	4.517	4.972
	10	18650	1855	8.994	9.806
		18900	1880	8.990	9.694
		19150	1905	8.992	9.840
	15	18675	1857.5	13.493	14.520
		18900	1880	13.474	14.550
		19125	1902.5	13.432	14.570
	20	18700	1860	17.927	19.430
		18900	1880	17.920	19.390
		19100	1900	17.912	19.430
64QAM	1.4	18607	1850.7	1.096	1.236
		18900	1880.0	1.091	1.227
		19193	1909.3	1.095	1.238
	3	18615	1851.5	2.690	2.980
		18900	1880	2.697	2.964
		19185	1908.5	2.702	3.030
	5	18625	1852.5	4.525	4.937
		18900	1880	4.516	4.933
		19175	1907.5	4.507	4.970
	10	18650	1855	8.977	9.772
		18900	1880	8.967	9.786
		19150	1905	8.989	9.675

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	15	18675	1857.5	13.468	14.680
		18900	1880	13.445	14.580
		19125	1902.5	13.439	14.470
	20	18700	1860	17.947	19.420
		18900	1880	17.931	19.350
		19100	1900	17.929	19.340

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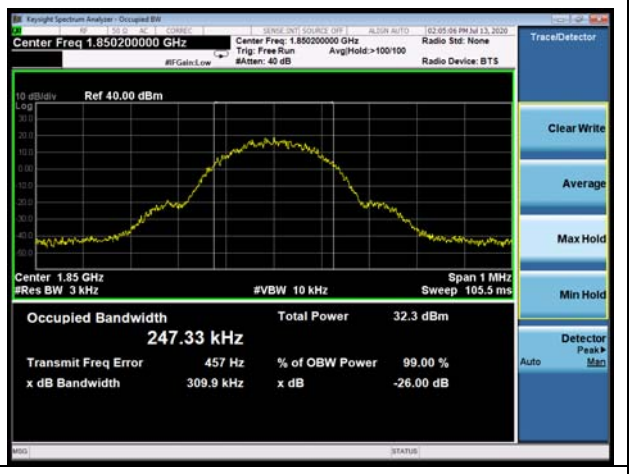
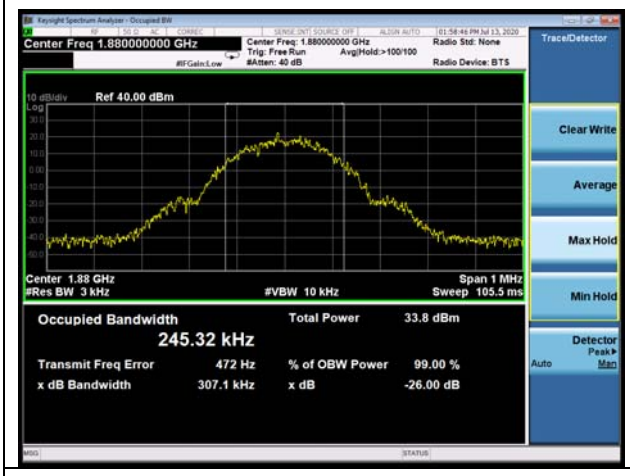
GSM1900 GSM CH-Low

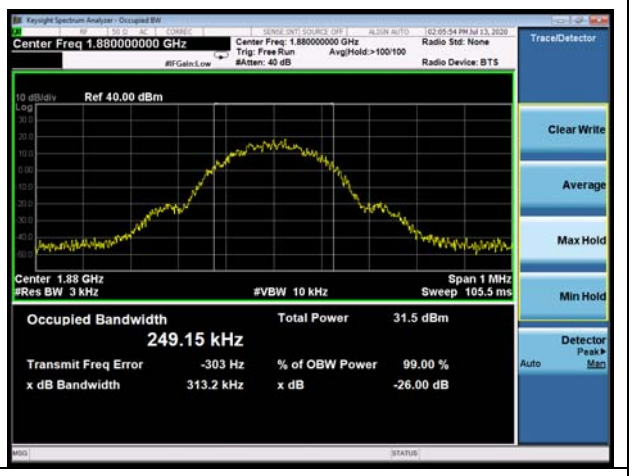
GSM1900 GPRS CH-Low



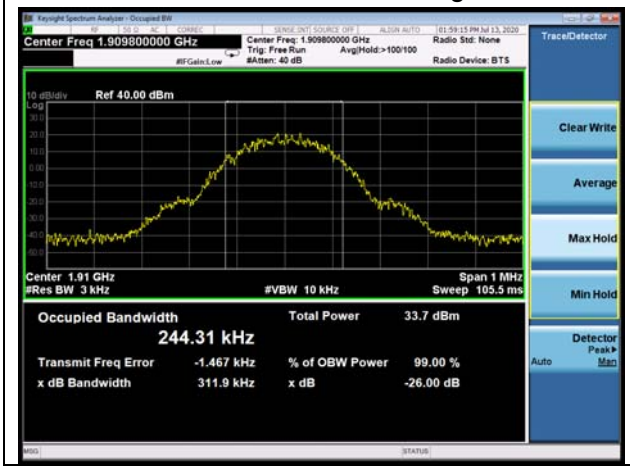
GSM 1900 GSM CH-Middle



GSM 1900 GPRS CH-Middle



GSM 1900 GSM CH-High



GSM 1900 GPRS CH-High

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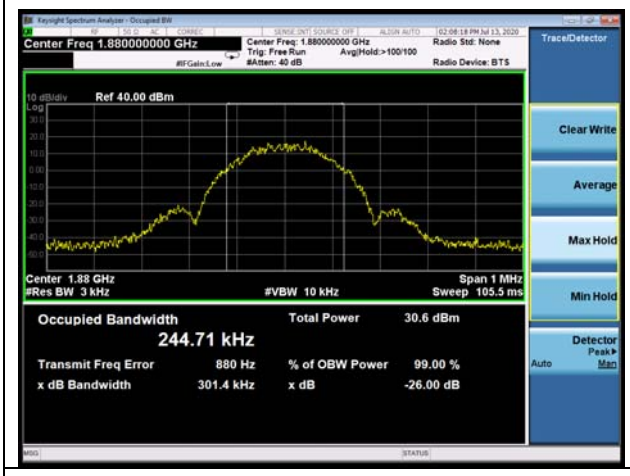
GSM1900 EGPRS CH-Low

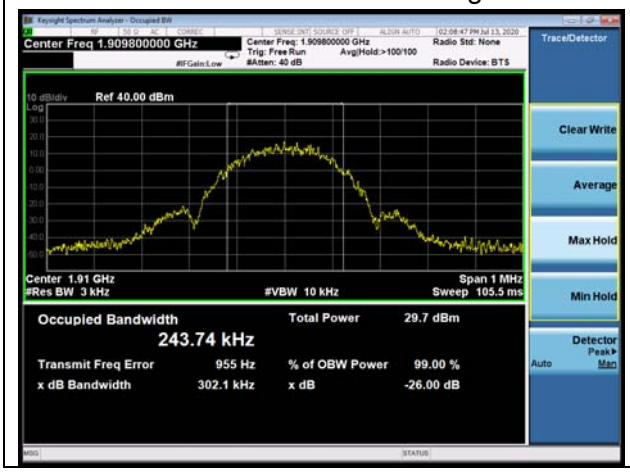
WCDMA Band II RMC CH-LOW

GSM 1900 EGPRS CH-Middle



WCDMA Band II RMC CH-Middle

GSM 1900 EGPRS CH-High



WCDMA Band II RMC CH-High

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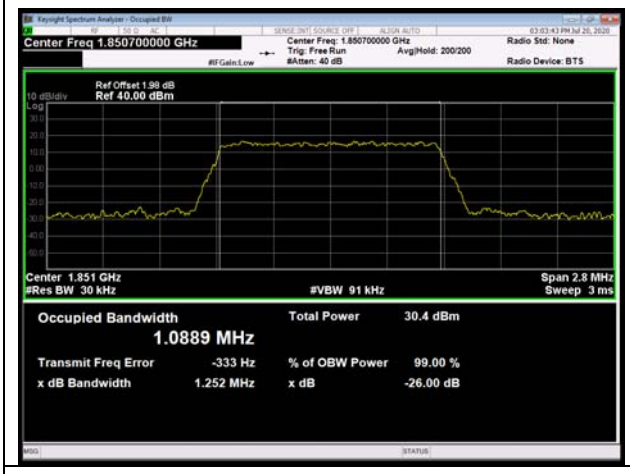
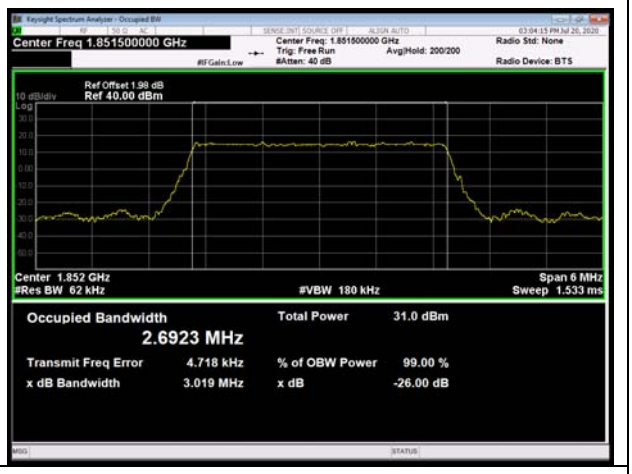
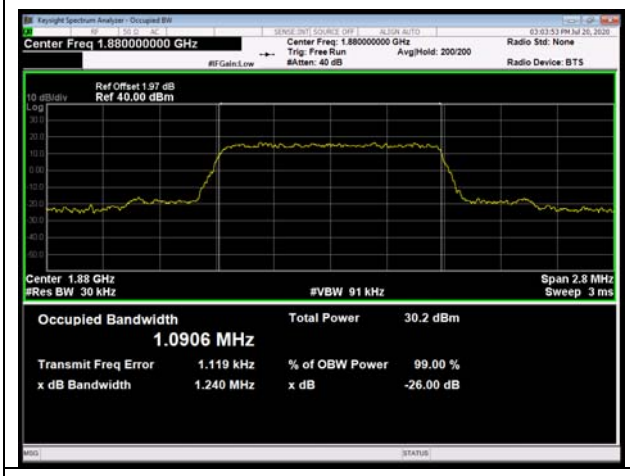
LTE Band 2 1.4MHz QPSK CH-Low



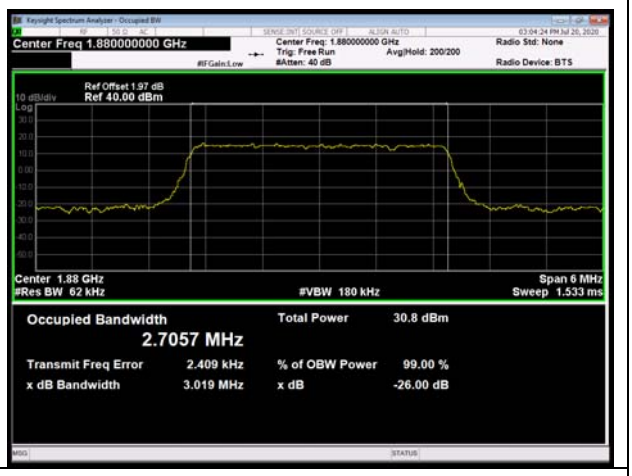
LTE Band 2 3MHz QPSK CH-Low



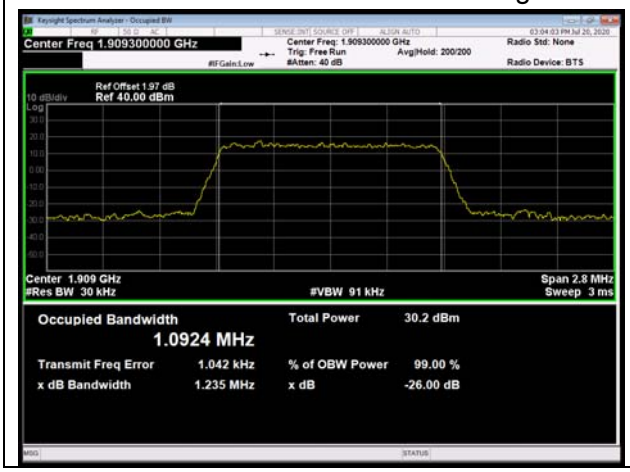
LTE Band 2 1.4MHz QPSK CH-Middle



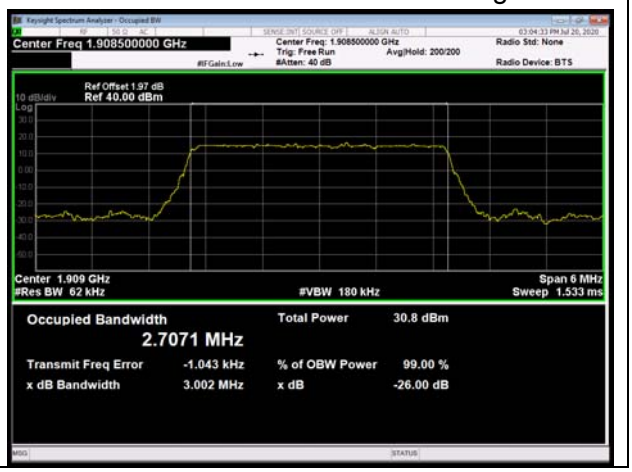
LTE Band 2 3MHz QPSK CH-Middle



LTE Band 2 1.4MHz QPSK CH-High



LTE Band 2 3MHz QPSK CH-High



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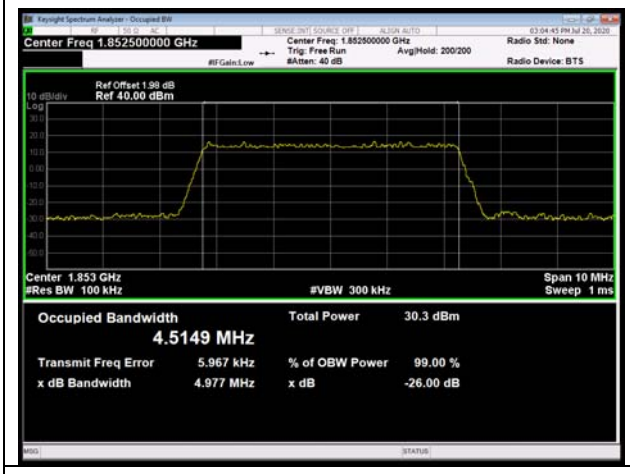
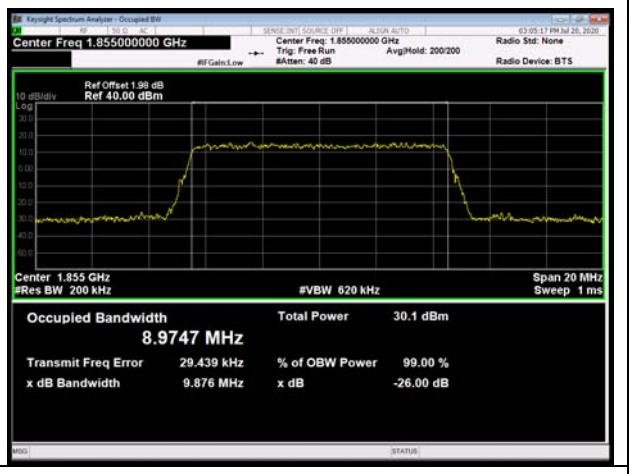
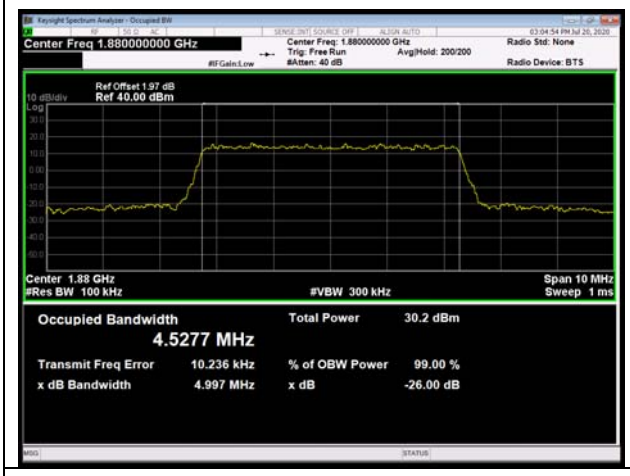
LTE Band 2 5MHz QPSK CH-Low



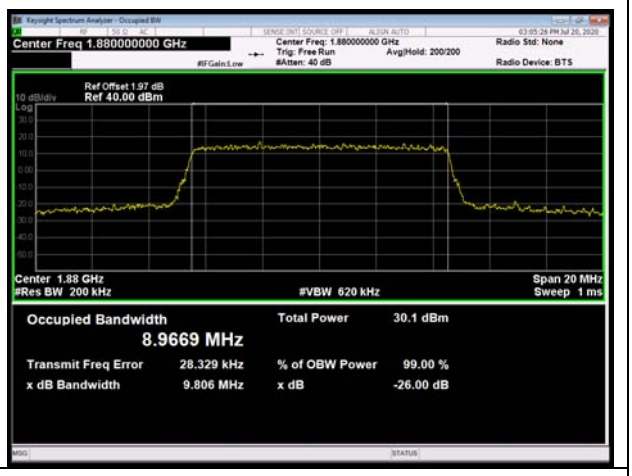
LTE Band 2 10MHz QPSK CH-Low



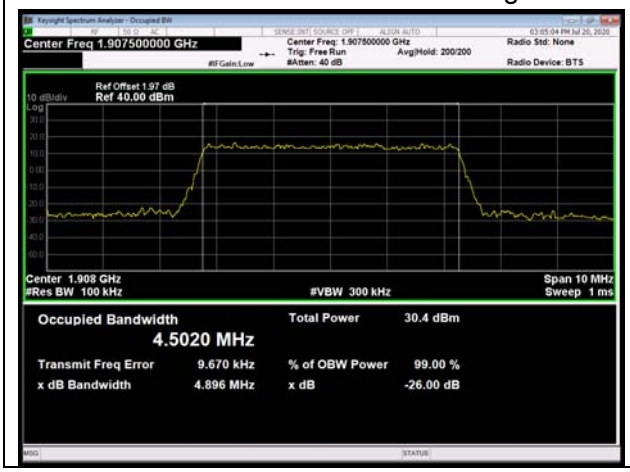
LTE Band 2 5MHz QPSK CH-Middle



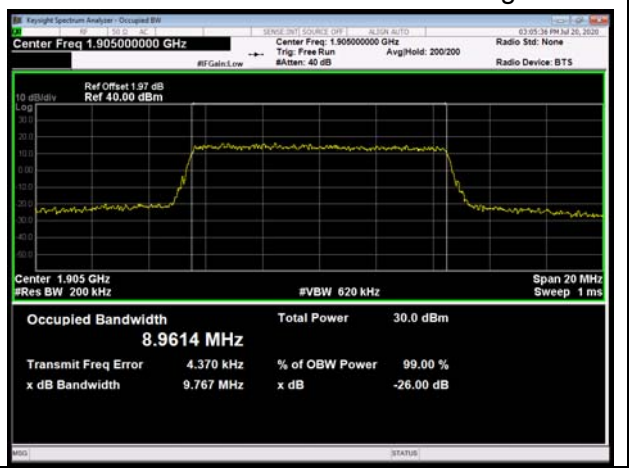
LTE Band 2 10MHz QPSK CH-Middle



LTE Band 2 5MHz QPSK CH-High



LTE Band 2 10MHz QPSK CH-High



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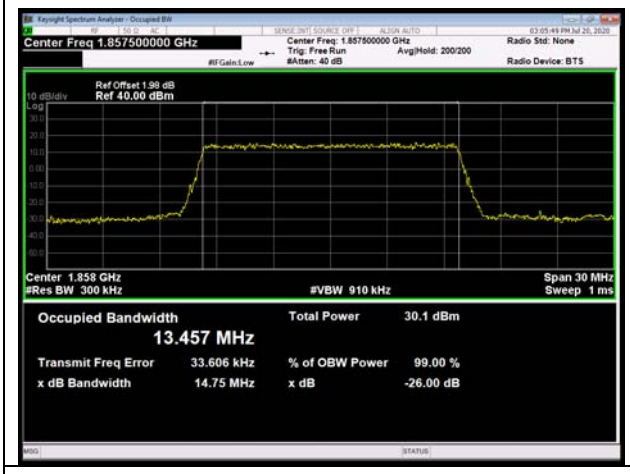
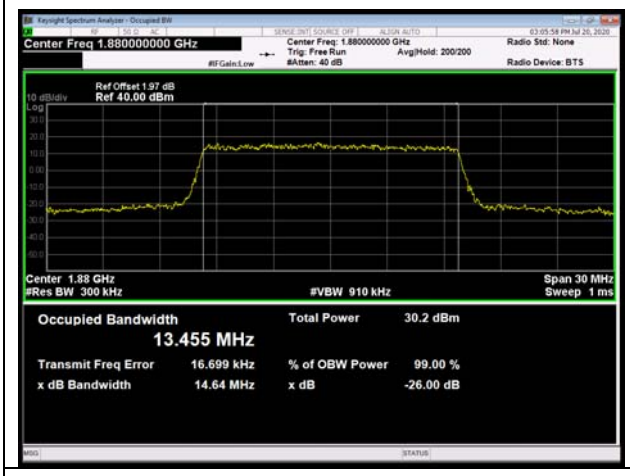
LTE Band 2 15MHz QPSK CH-Low

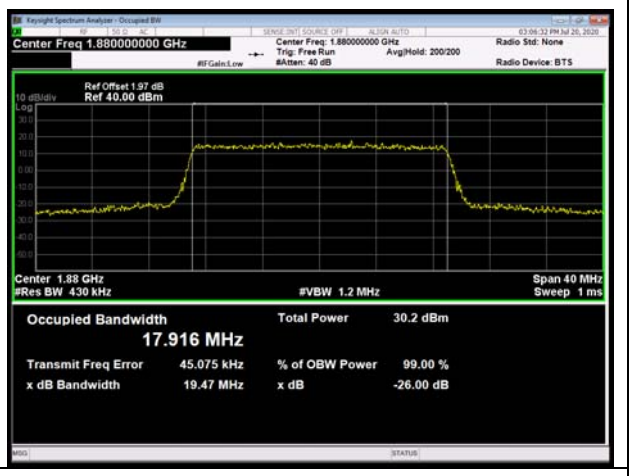


LTE Band 2 20MHz QPSK CH-Low

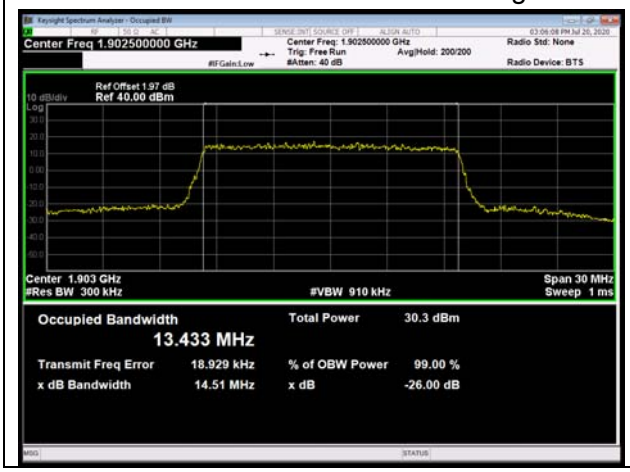
LTE Band 2 15MHz QPSK CH-Middle



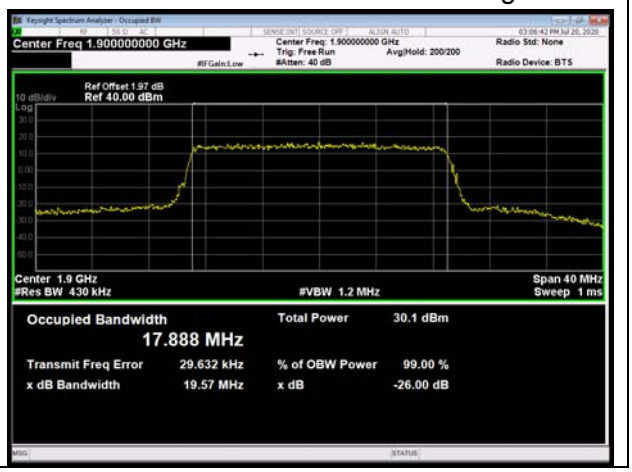
LTE Band 2 20MHz QPSK CH-Middle



LTE Band 2 15MHz QPSK CH-High



LTE Band 2 20MHz QPSK CH-High



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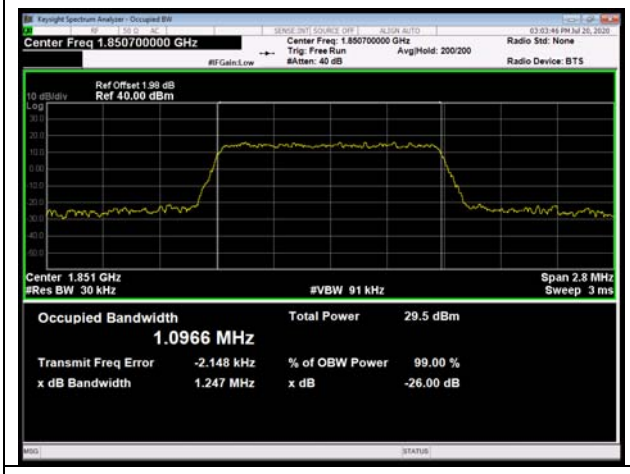
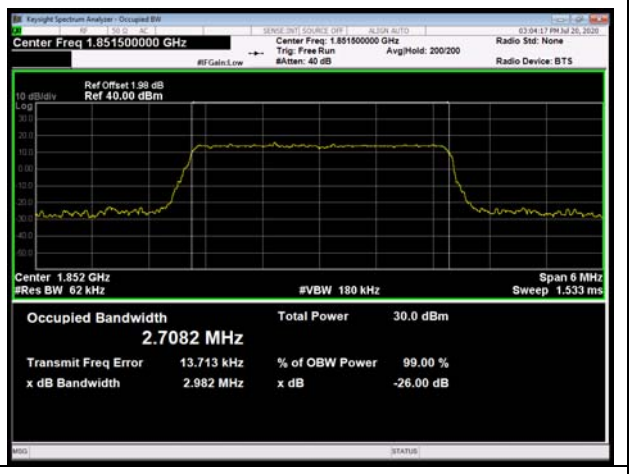
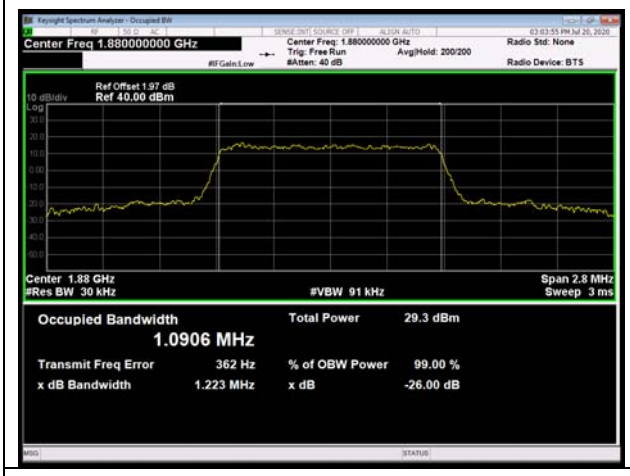
LTE Band 2 1.4MHz 16QAM CH-Low



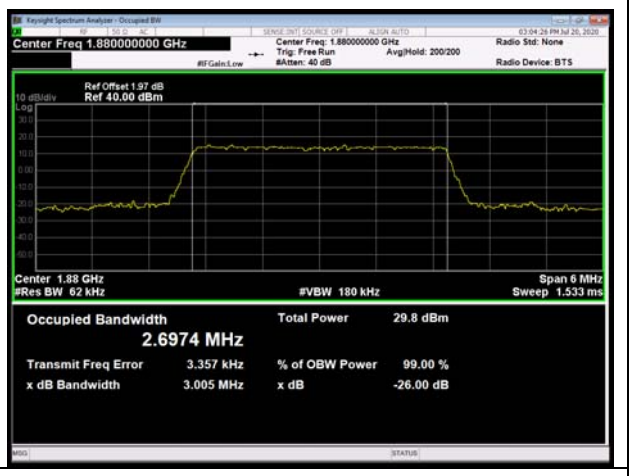
LTE Band 2 3MHz 16QAM CH-Low



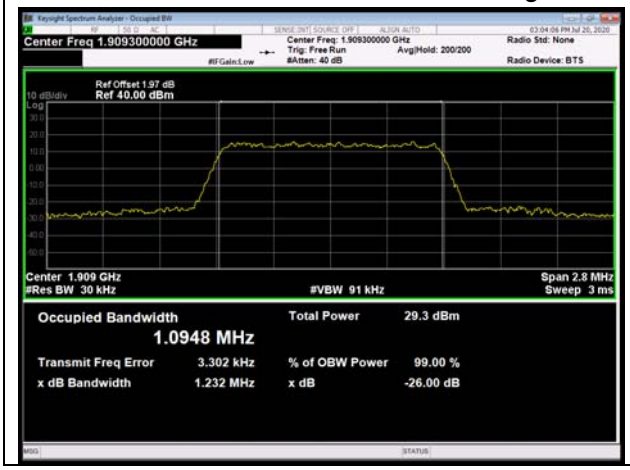
LTE Band 2 1.4MHz 16QAM CH-Middle



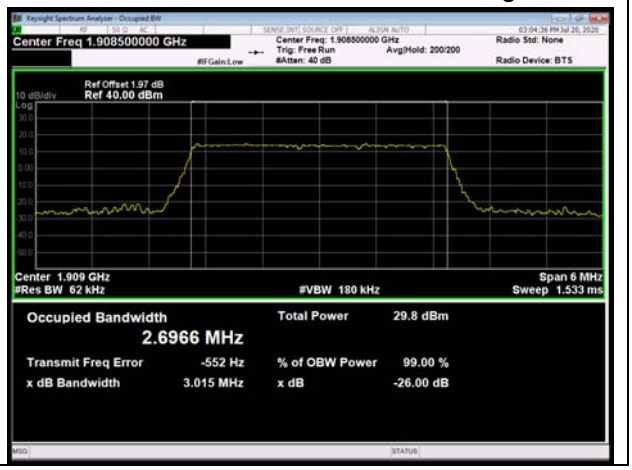
LTE Band 2 3MHz 16QAM CH-Middle



LTE Band 2 1.4MHz 16QAM CH-High



LTE Band 2 3MHz 16QAM CH-High



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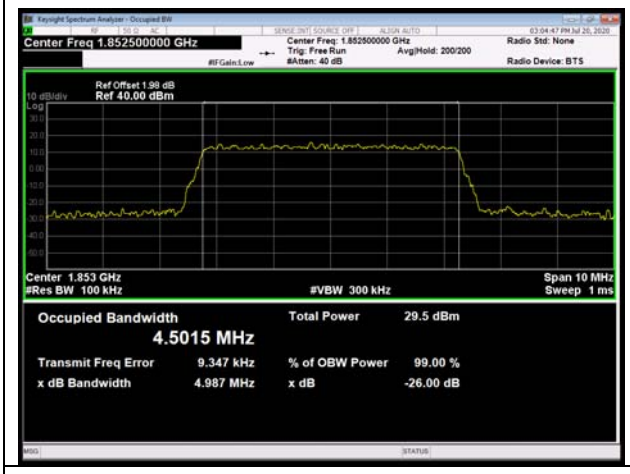
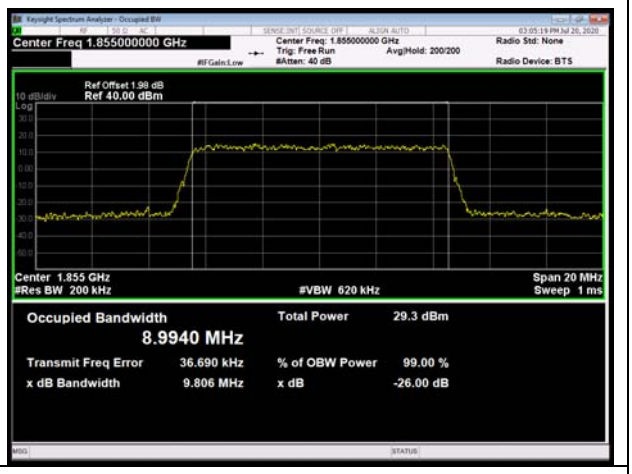
LTE Band 2 5MHz 16QAM CH-Low

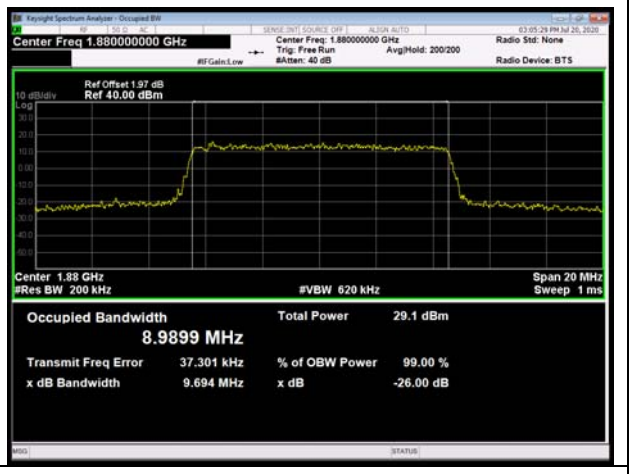


LTE Band 2 10MHz 16QAM CH-Low

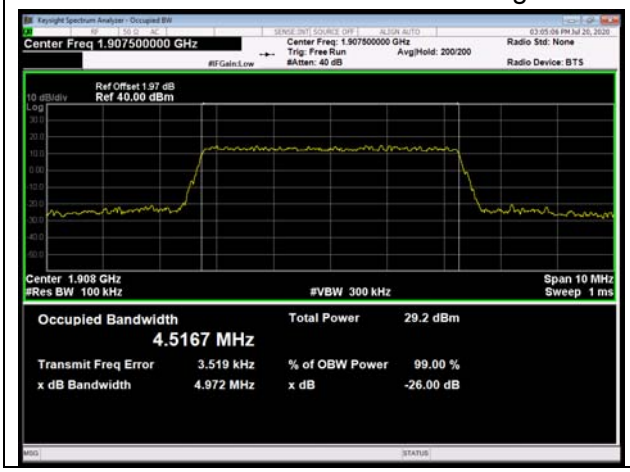


LTE Band 2 5MHz 16QAM CH-Middle

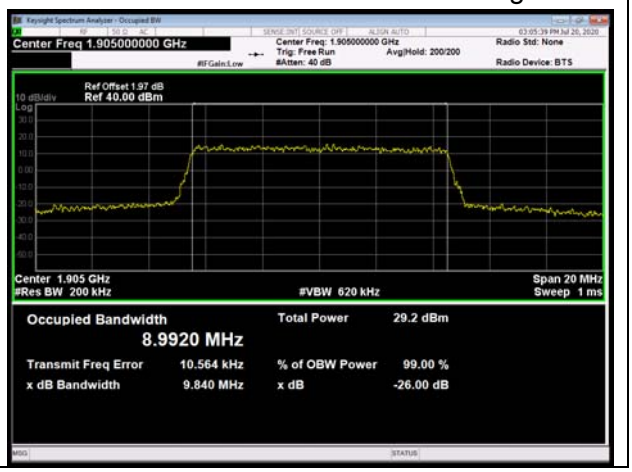
LTE Band 2 10MHz 16QAM CH-Middle



LTE Band 2 5MHz 16QAM CH-High



LTE Band 2 10MHz 16QAM CH-High



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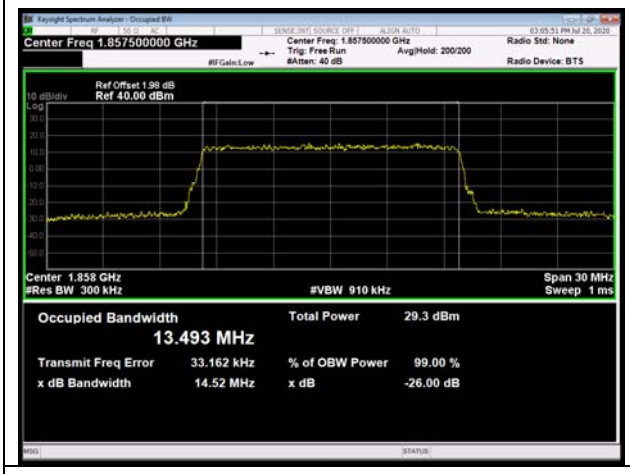
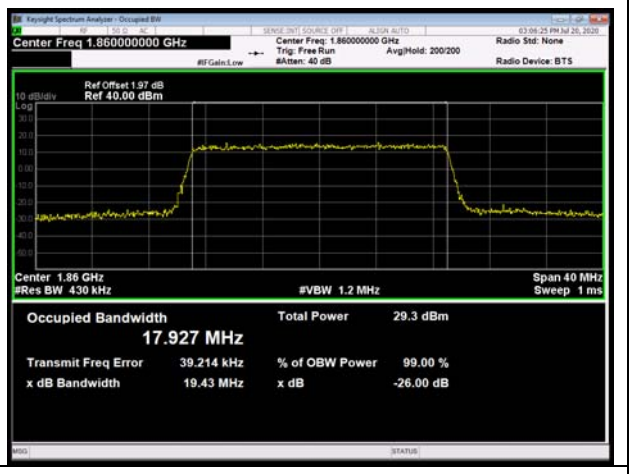
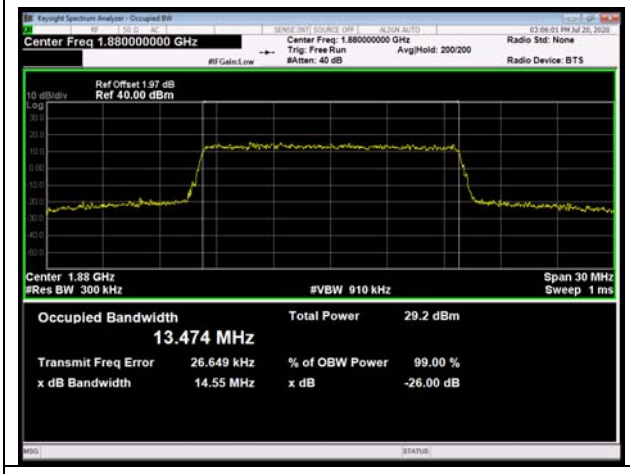
LTE Band 2 15MHz 16QAM CH-Low



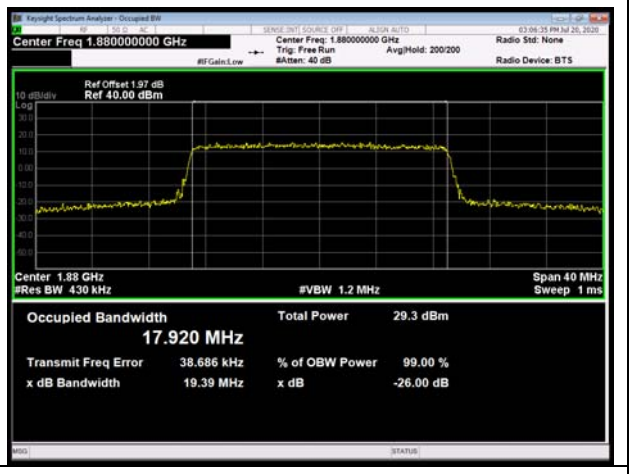
LTE Band 2 20MHz 16QAM CH-Low



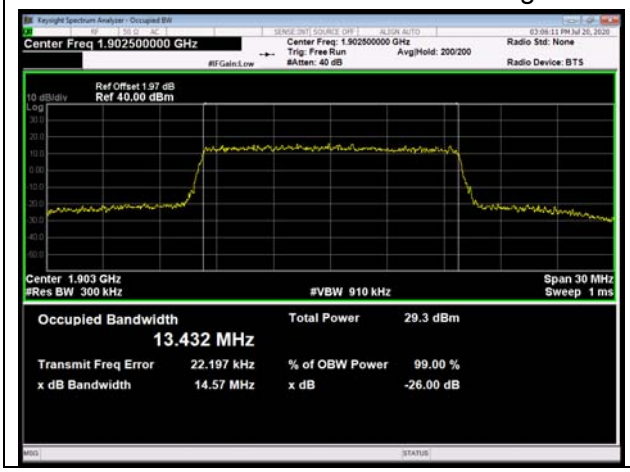
LTE Band 2 15MHz 16QAM CH-Middle



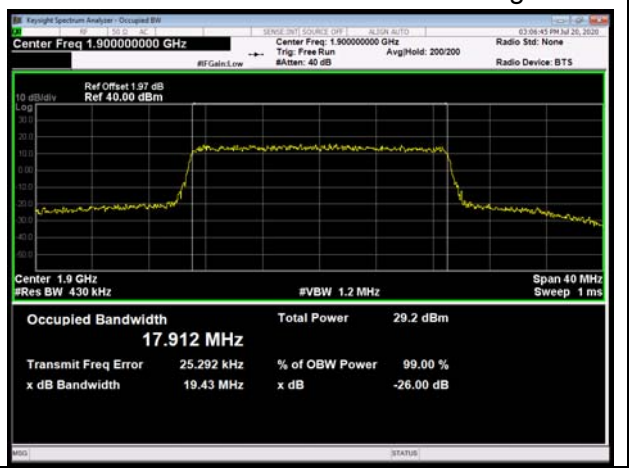
LTE Band 2 20MHz 16QAM CH-Middle



LTE Band 2 15MHz 16QAM CH-High



LTE Band 2 20MHz 16QAM CH-High



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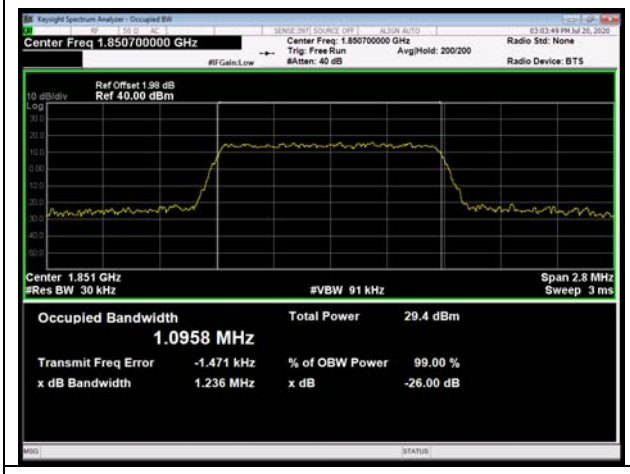
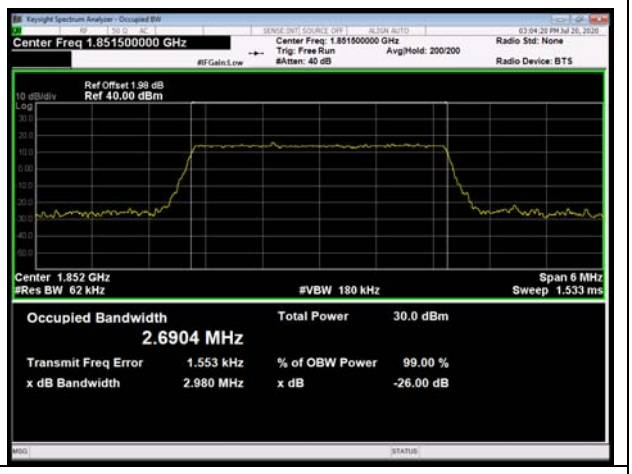
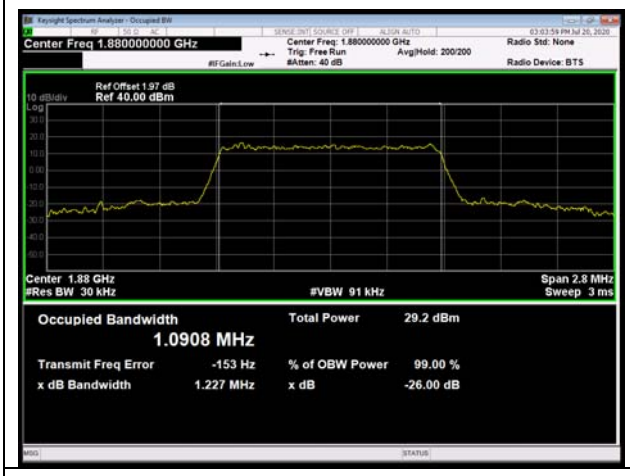
LTE Band 2 1.4MHz 64QAM CH-Low



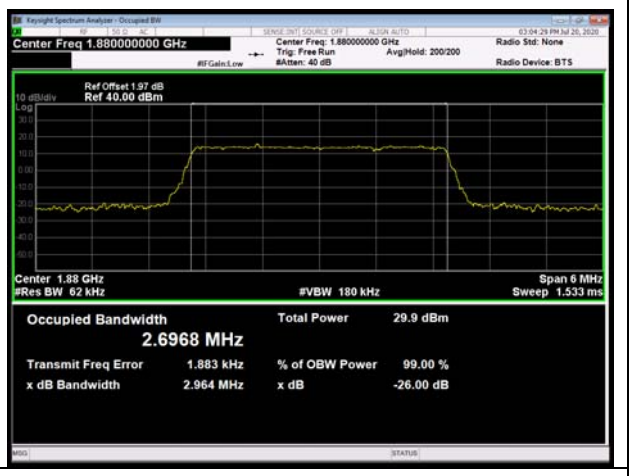
LTE Band 2 3MHz 64QAM CH-Low



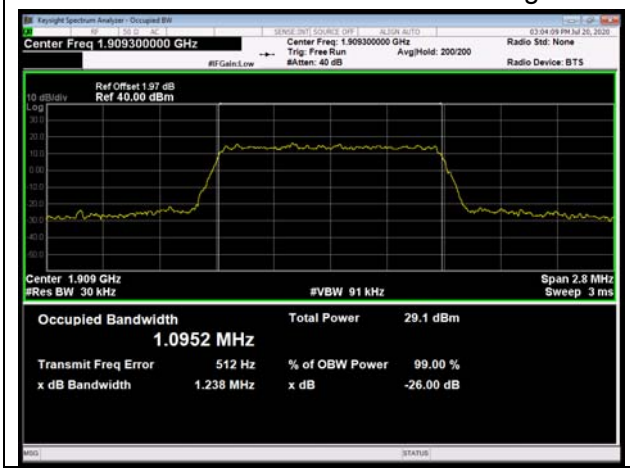
LTE Band 2 1.4MHz 64QAM CH-Middle



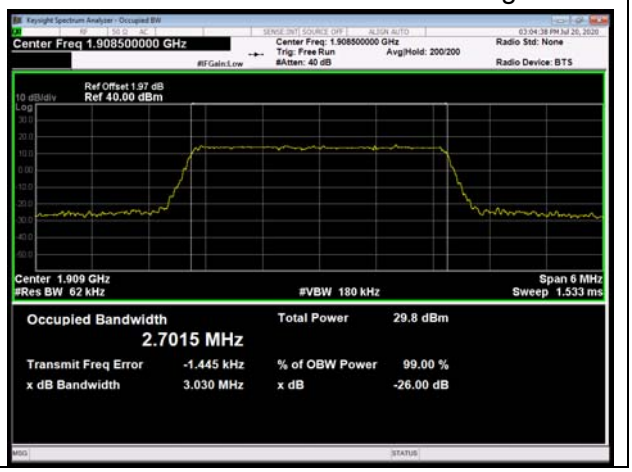
LTE Band 2 3MHz 64QAM CH-Middle



LTE Band 2 1.4MHz 64QAM CH-High



LTE Band 2 3MHz 64QAM CH-High



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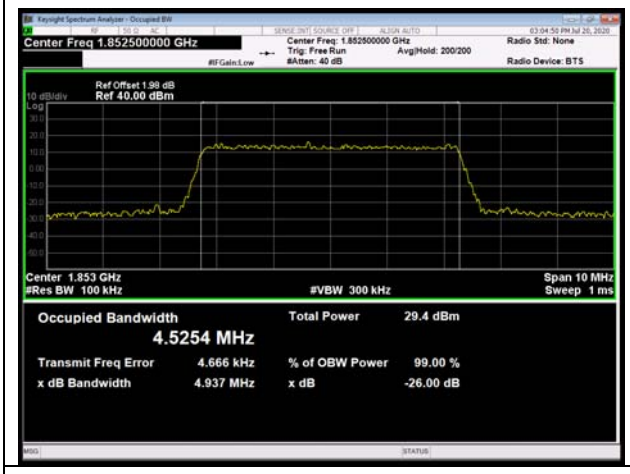
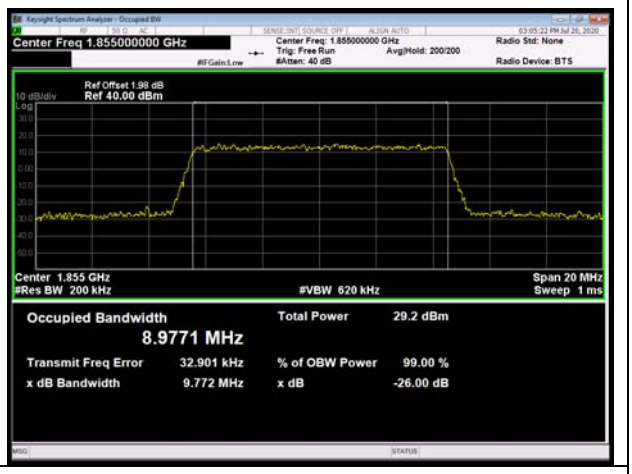
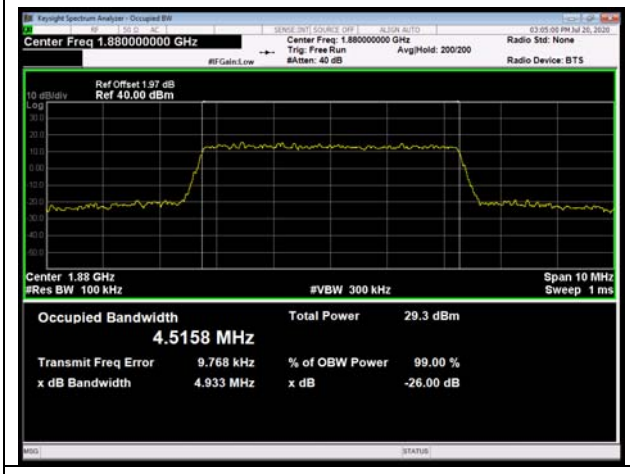
LTE Band 2 5MHz 64QAM CH-Low



LTE Band 2 10MHz 64QAM CH-Low

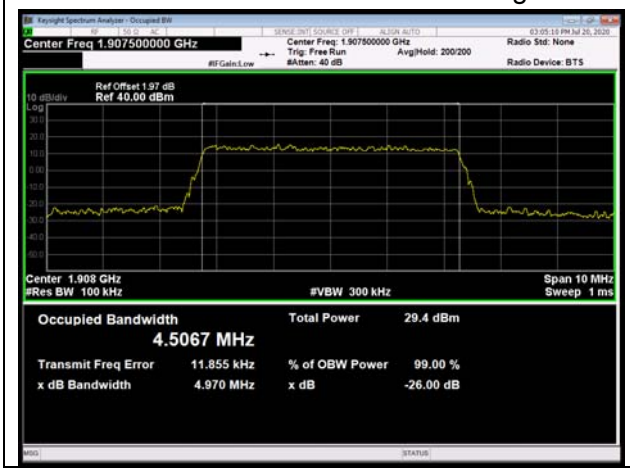


LTE Band 2 5MHz 64QAM CH-Middle

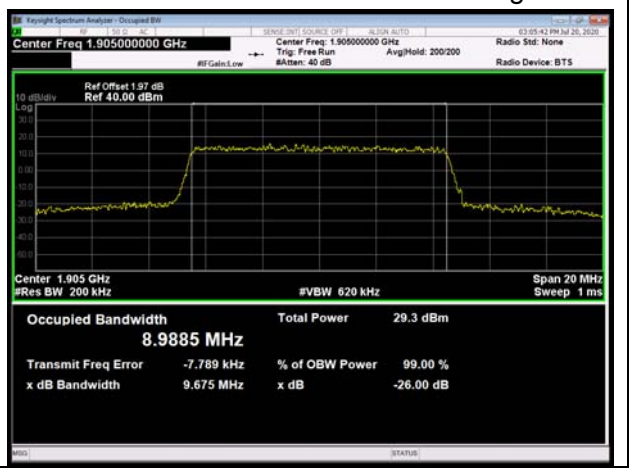


LTE Band 2 10MHz 64QAM CH-Middle

LTE Band 2 5MHz 64QAM CH-High



LTE Band 2 10MHz 64QAM CH-High



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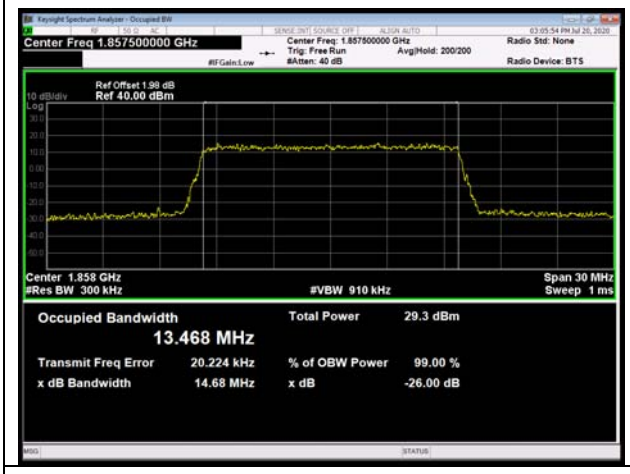
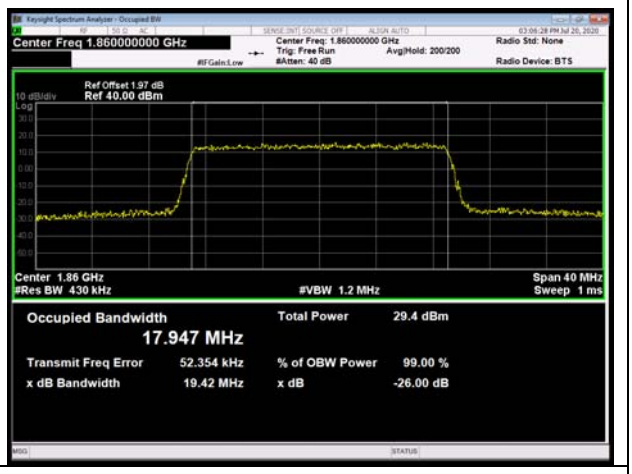
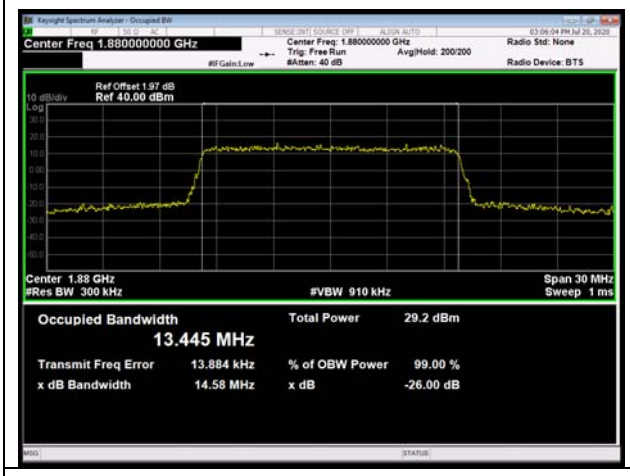
LTE Band 2 15MHz 64QAM CH-Low



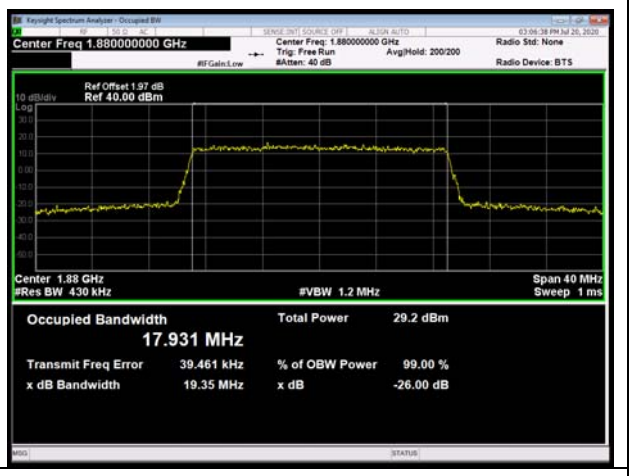
LTE Band 2 20MHz 64QAM CH-Low



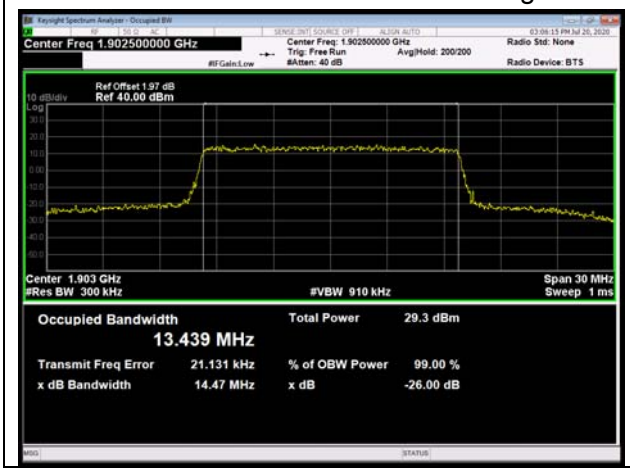
LTE Band 2 15MHz 64QAM CH-Middle



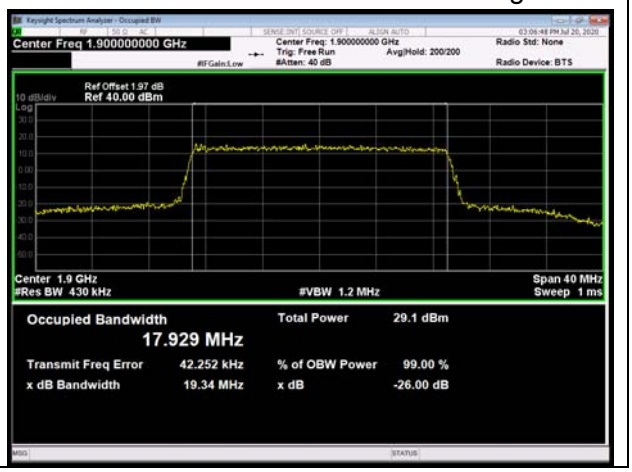
LTE Band 2 20MHz 64QAM CH-Middle



LTE Band 2 15MHz 64QAM CH-High



LTE Band 2 20MHz 64QAM CH-High



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5.3. Band Edge Compliance

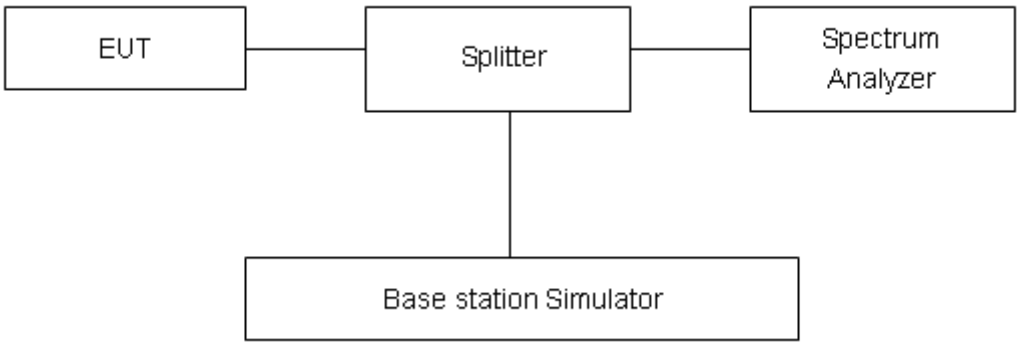
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The Average detector is used and
RBW is set to 3kHz, VBW is set to 10kHz for GSM 1900,
RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band II,
RBW is set to 15kHz, VBW is set to 43kHz for LTE Band 2(1.4MHz),
RBW is set to 30kHz,VBW is set to 91kHz for LTE Band 2(3MHz),
RBW is set to 51kHz,VBW is set to 150kHz for LTE Band 2(5MHz),
RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 2(10MHz),
RBW is set to 150kHz,VBW is set to 470kHz for LTE Band 2(15MHz),
RBW is set to 200kHz,VBW is set to 620kHz for LTE Band 2(20MHz).
Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U=0.684dB.

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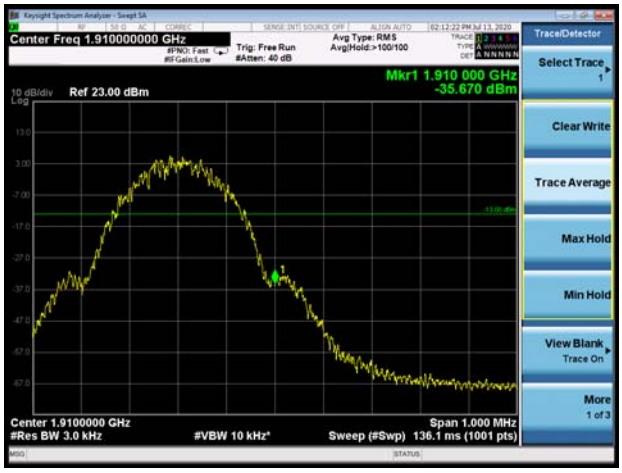
Test Result:

GSM1900 GSM CH-Low

GSM 1900 GSM CH-High



GSM1900 GPRS CH-Low

GSM 1900 GPRS CH-High

GSM1900 EGPRS CH-Low

GSM 1900 EGPRS CH-High

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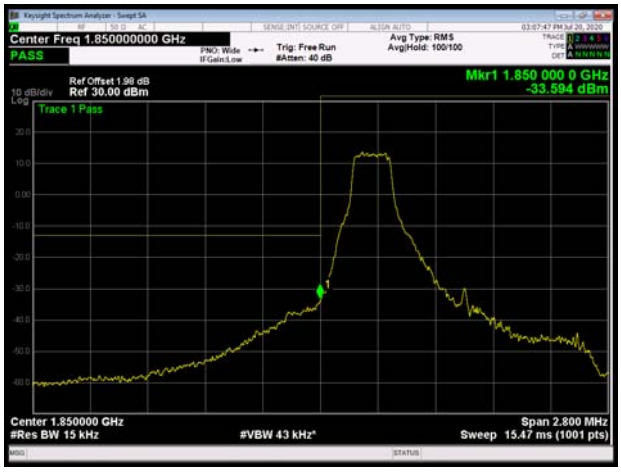
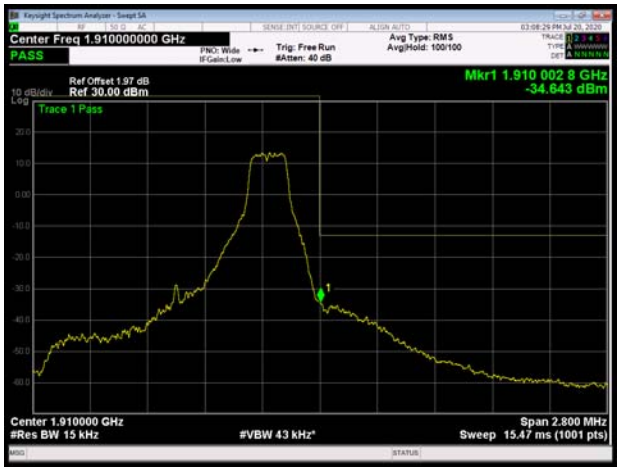
WCDMA Band II RMC CH-Low

WCDMA Band II RMC CH-High

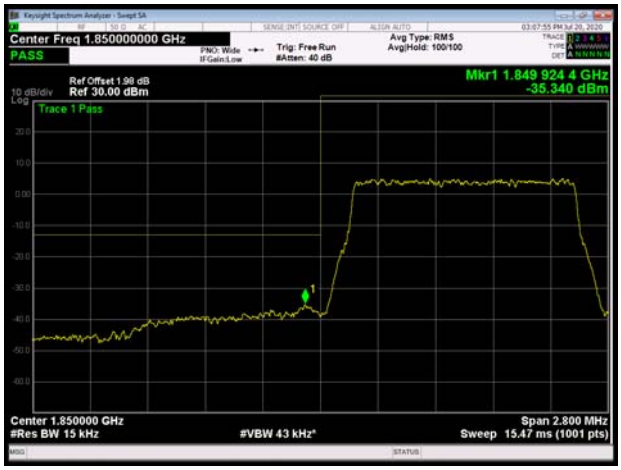
LTE Band 2 1.4MHz QPSK 1RB CH-Low



LTE Band 2 1.4MHz QPSK 1RB CH-High



LTE Band 2 1.4MHz QPSK 100%RB CH-Low



LTE Band 2 1.4MHz QPSK 100%RB CH-High

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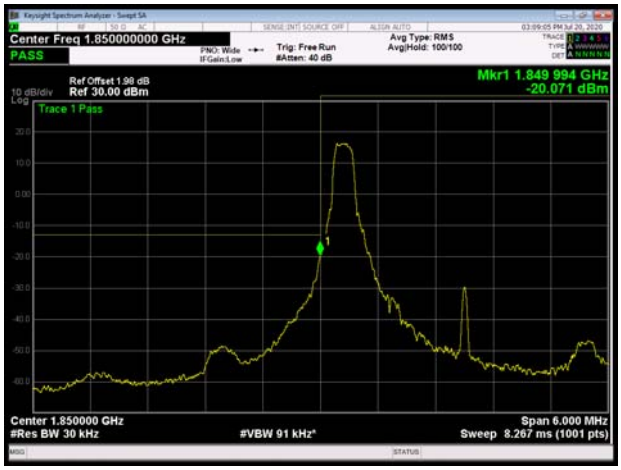
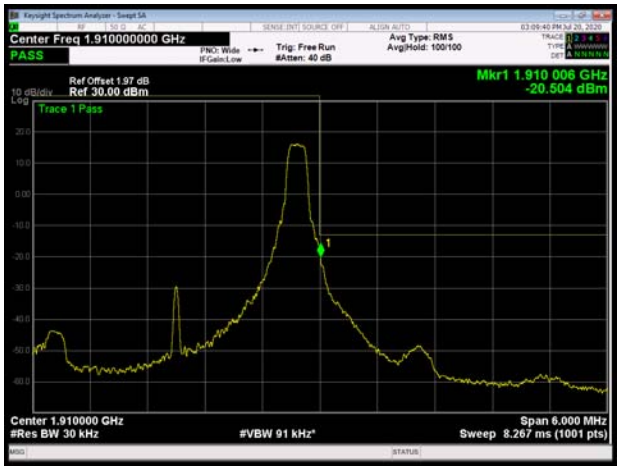
LTE Band 2 3MHz QPSK 1RB CH-Low



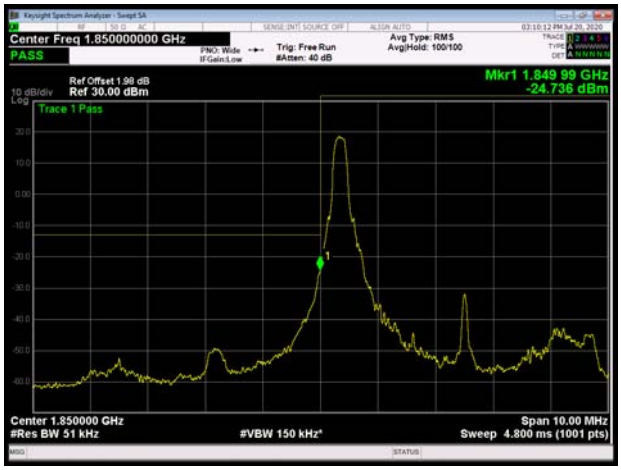
LTE Band 2 3MHz QPSK 1RB CH-High



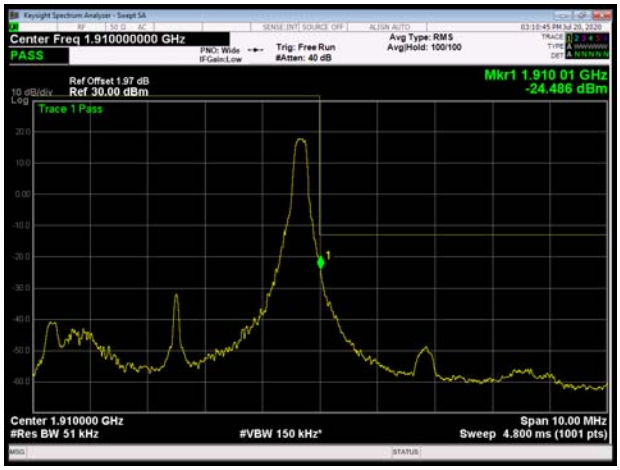
LTE Band 2 3MHz QPSK 100%RB CH-Low

LTE Band 2 3MHz QPSK 100%RB CH-High

LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High



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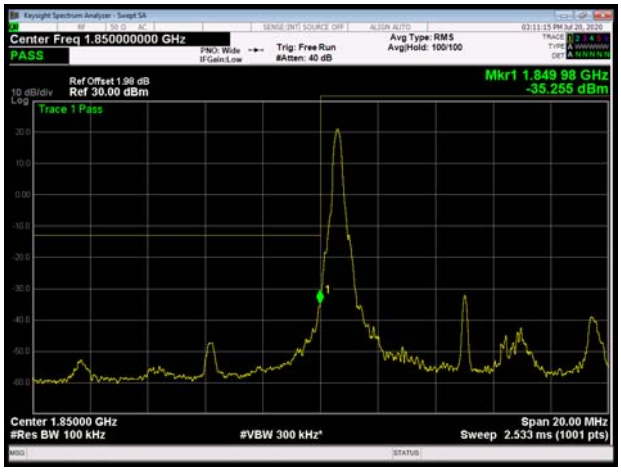
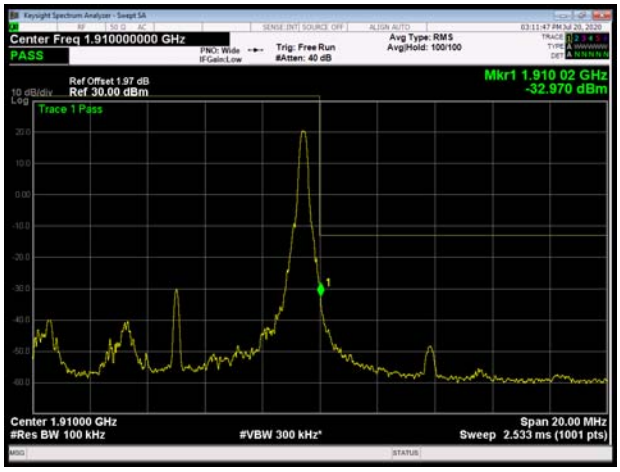
LTE Band 2 5MHz QPSK 100%RB CH-Low

LTE Band 2 5MHz QPSK 100%RB CH-High

LTE Band 2 10MHz QPSK 1RB CH-Low



LTE Band 2 10MHz QPSK 1RB CH-High



LTE Band 2 10MHz QPSK 100%RB CH-Low

LTE Band 2 10MHz QPSK 100%RB CH-High

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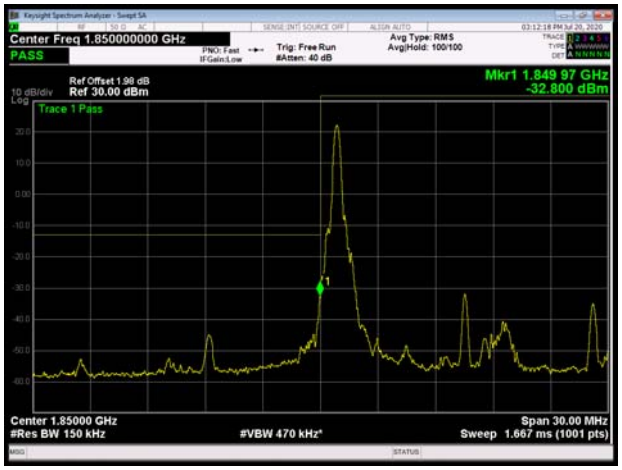
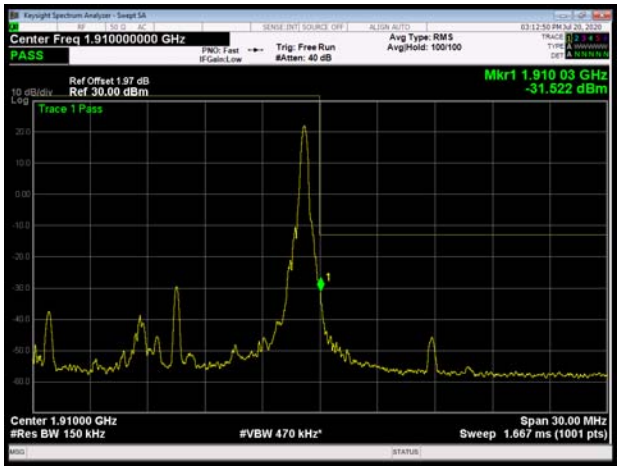
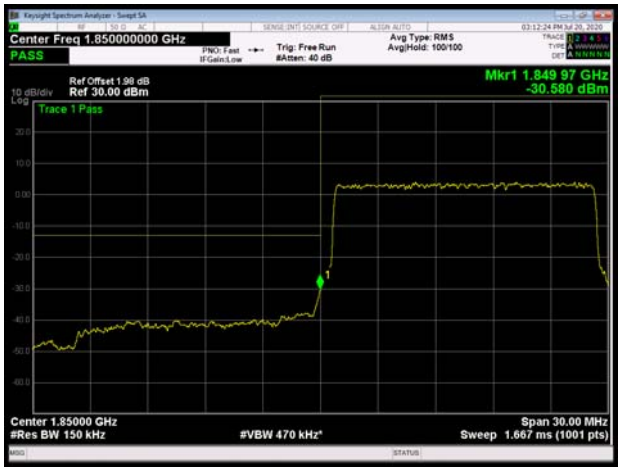
LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High

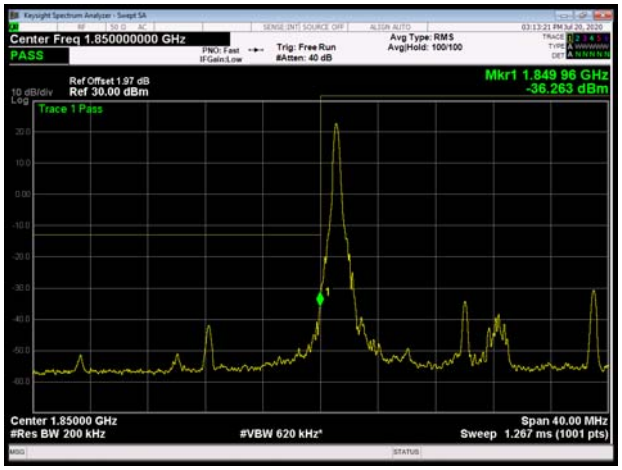


LTE Band 2 15MHz QPSK 100%RB CH-Low

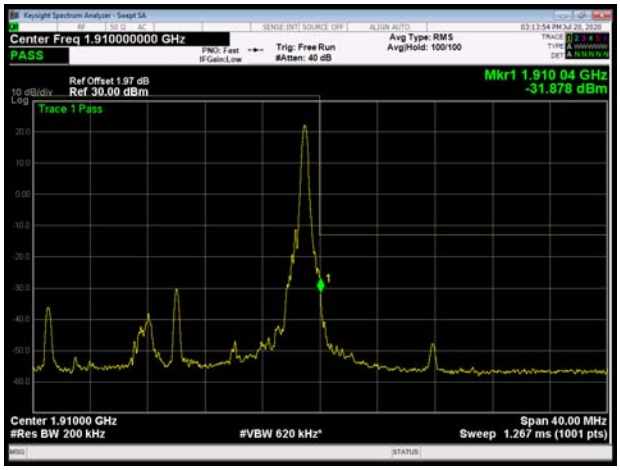


LTE Band 2 15MHz QPSK 100%RB CH-High

LTE Band 2 20MHz QPSK 1RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High



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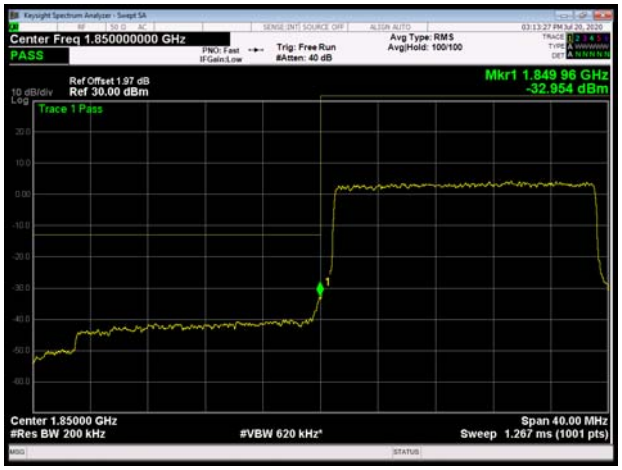
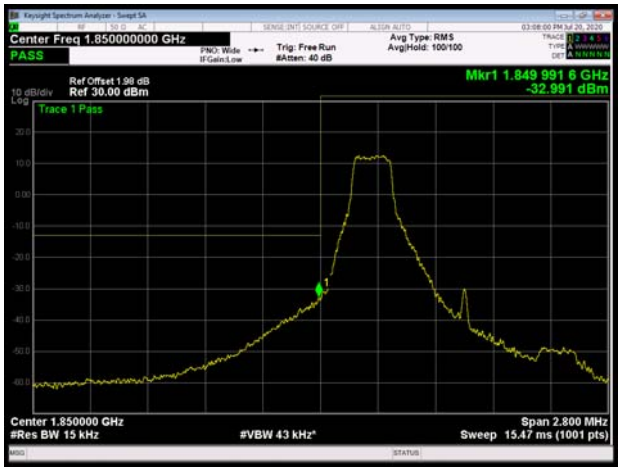
LTE Band 2 20MHz QPSK 100%RB CH-Low

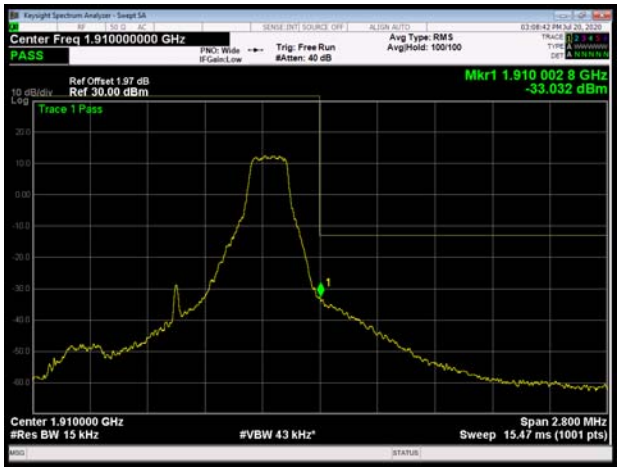


LTE Band 2 20MHz QPSK 100%RB CH-High

LTE Band 2 1.4MHz 16QAM 1RB CH-Low



LTE Band 2 1.4MHz 16QAM 1RB CH-High



LTE Band 2 1.4MHz 16QAM 100%RB CH-Low

LTE Band 2 1.4MHz 16QAM 100%RB CH-High

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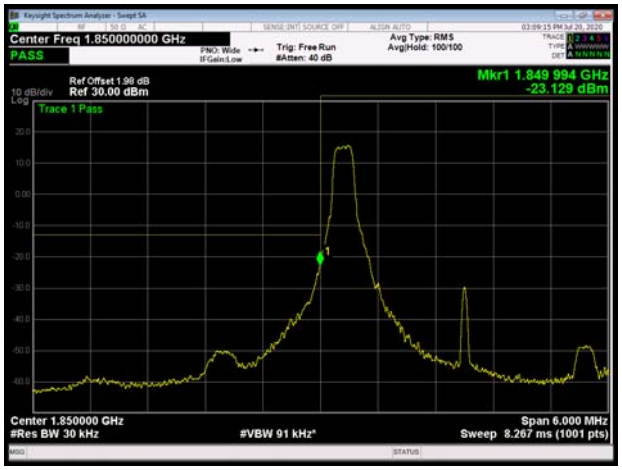
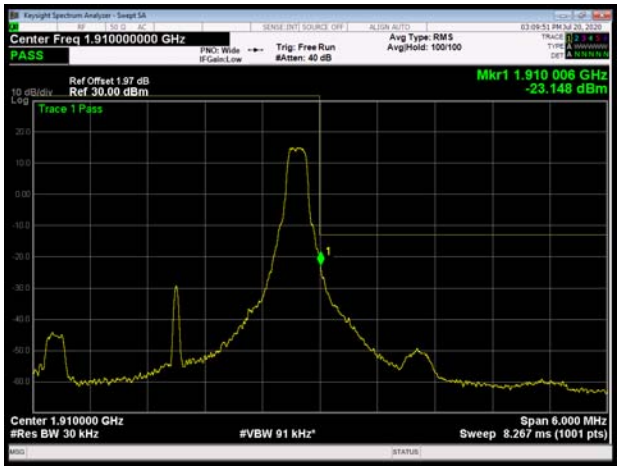
LTE Band 2 3MHz 16QAM 1RB CH-Low

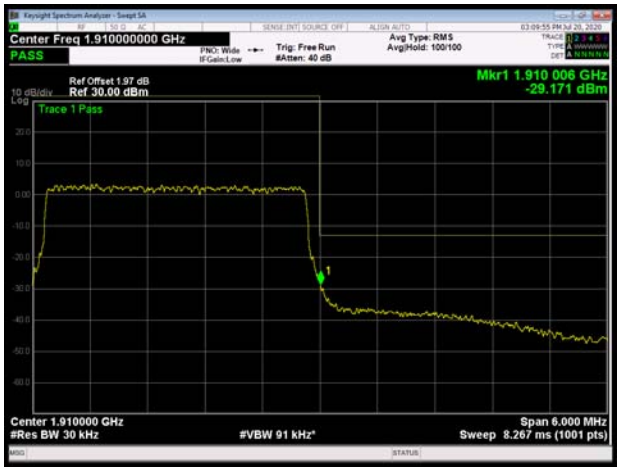


LTE Band 2 3MHz 16QAM 1RB CH-High

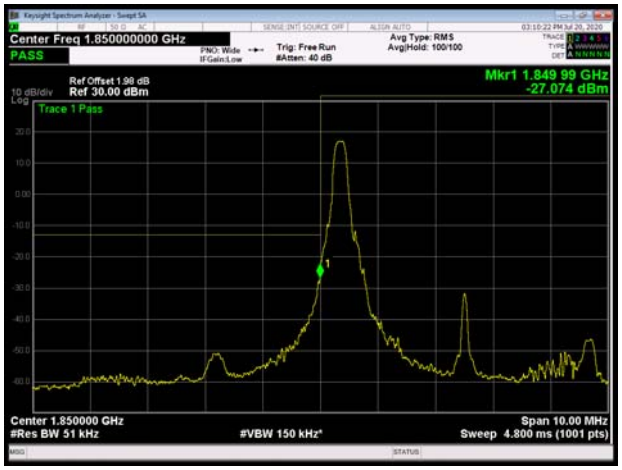


LTE Band 2 3MHz 16QAM 100%RB CH-Low

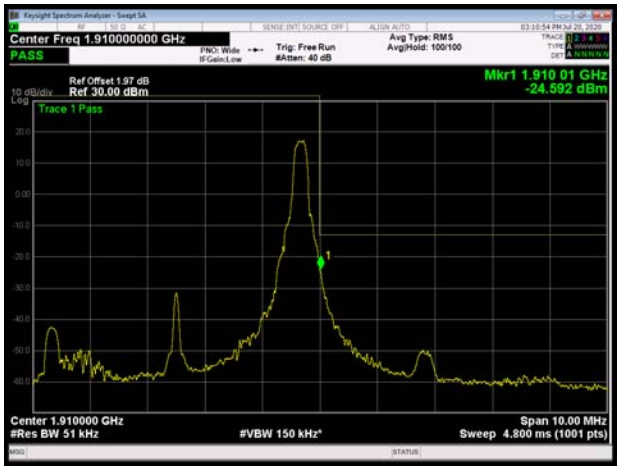
LTE Band 2 3MHz 16QAM 100%RB CH-High



LTE Band 2 5MHz 16QAM 1RB CH-Low



LTE Band 2 5MHz 16QAM 1RB CH-High



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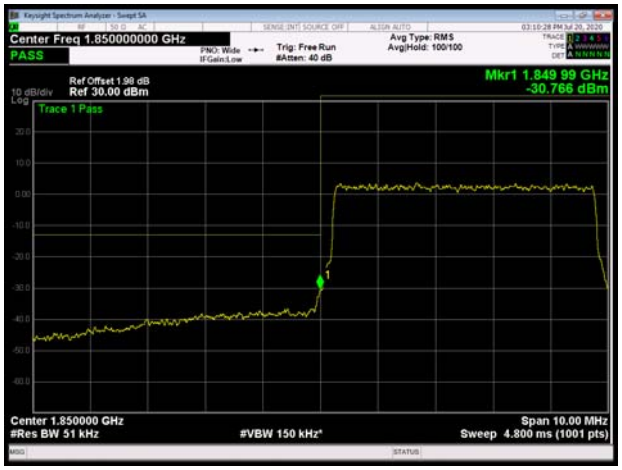
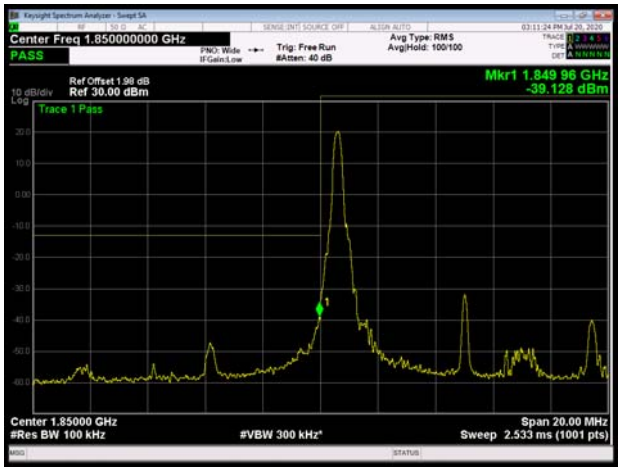
LTE Band 2 5MHz 16QAM 100%RB CH-Low

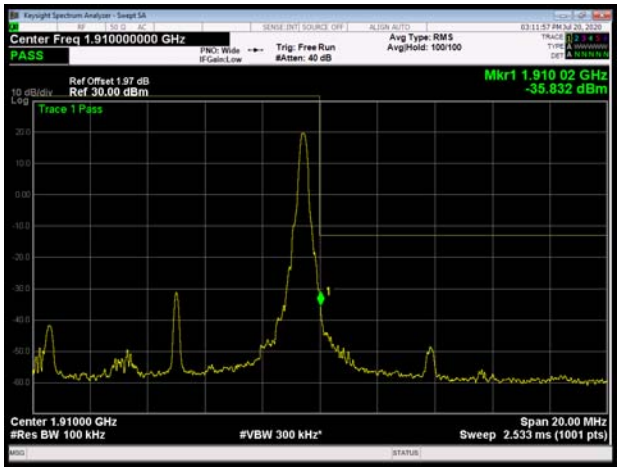


LTE Band 2 5MHz 16QAM 100%RB CH-High

LTE Band 2 10MHz 16QAM 1RB CH-Low



LTE Band 2 10MHz 16QAM 1RB CH-High



LTE Band 2 10MHz 16QAM 100%RB CH-Low

LTE Band 2 10MHz 16QAM 100%RB CH-High

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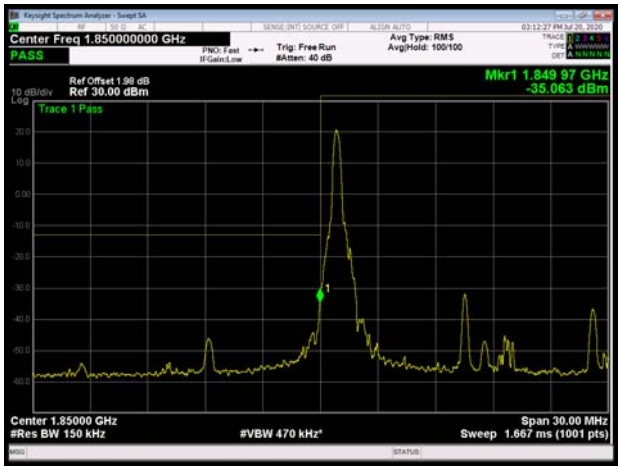
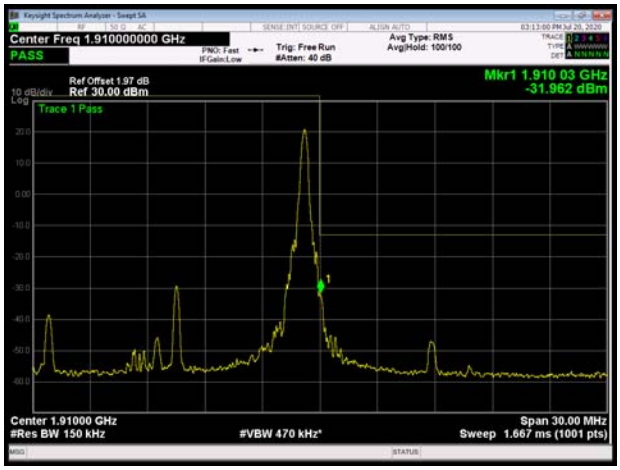
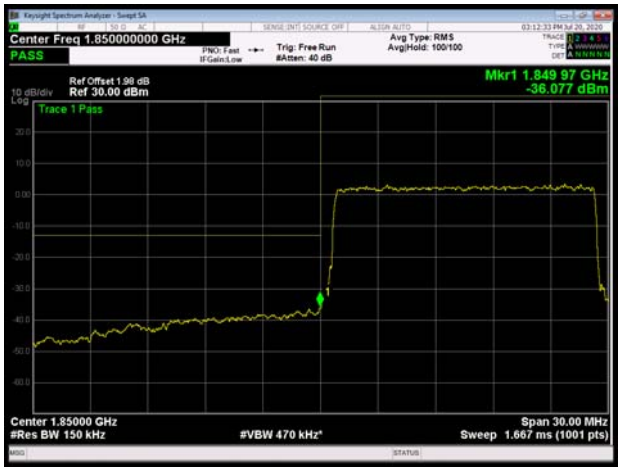
LTE Band 2 15MHz 16QAM 1RB CH-Low



LTE Band 2 15MHz 16QAM 1RB CH-High

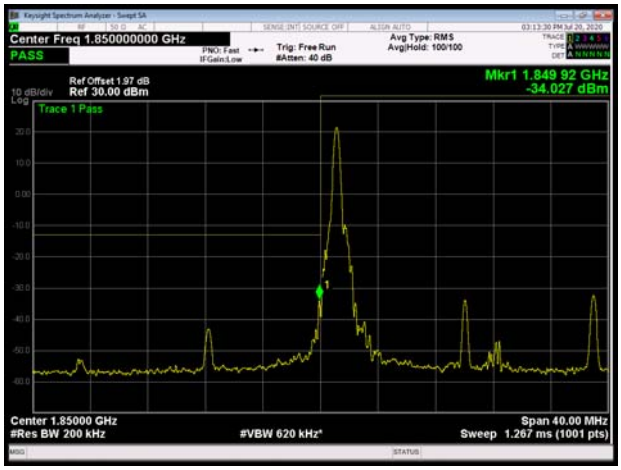


LTE Band 2 15MHz 16QAM 100%RB CH-Low

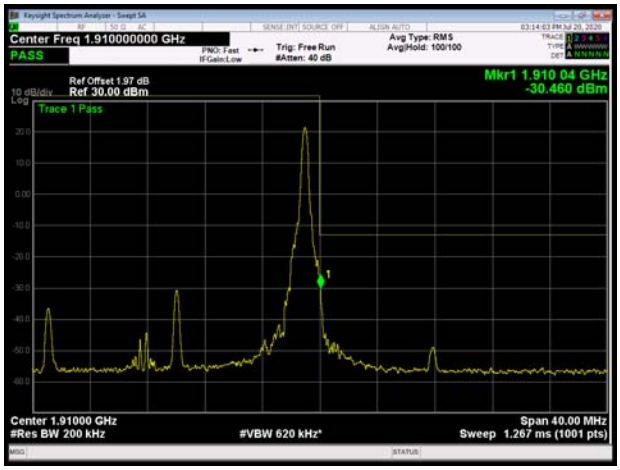


LTE Band 2 15MHz 16QAM 100%RB CH-High

LTE Band 2 20MHz 16QAM 1RB CH-Low



LTE Band 2 20MHz 16QAM 1RB CH-High



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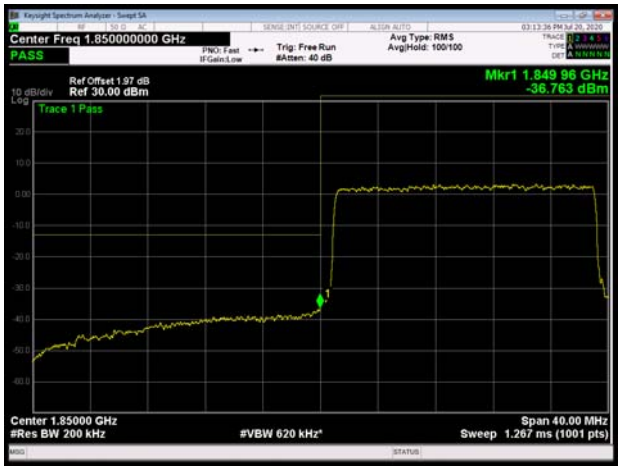
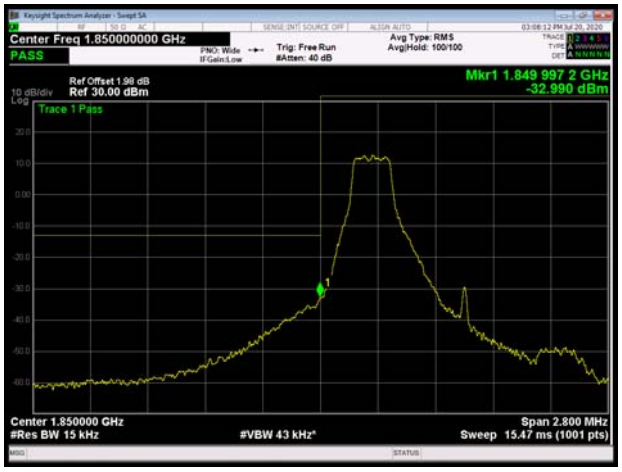
LTE Band 2 20MHz 16QAM 100%RB CH-Low

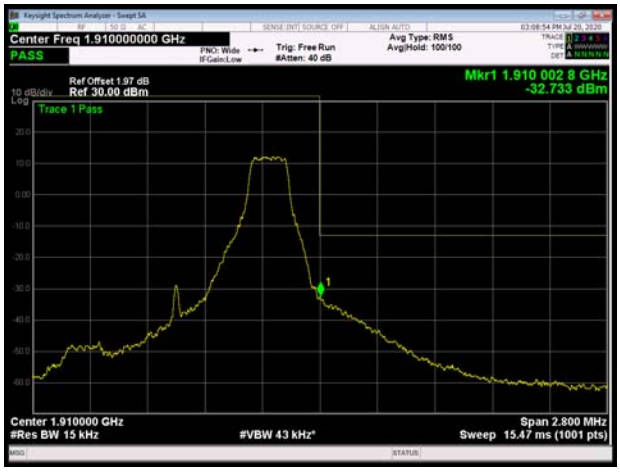


LTE Band 2 20MHz 16QAM 100%RB CH-High

LTE Band 2 1.4MHz 64QAM 1RB CH-Low



LTE Band 2 1.4MHz 64QAM 1RB CH-High



LTE Band 2 1.4MHz 64QAM 100%RB CH-Low

LTE Band 2 1.4MHz 64QAM 100%RB CH-High

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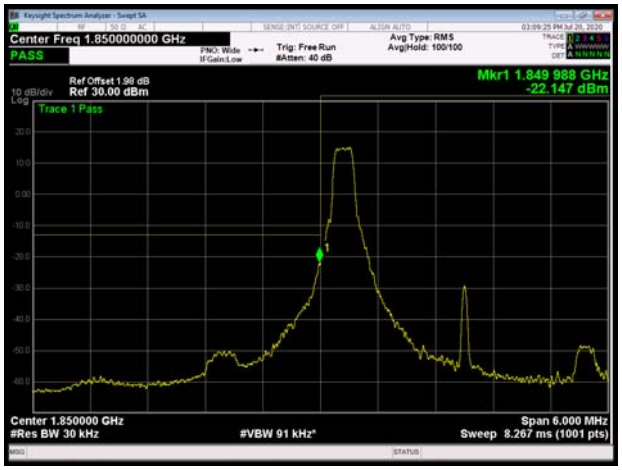
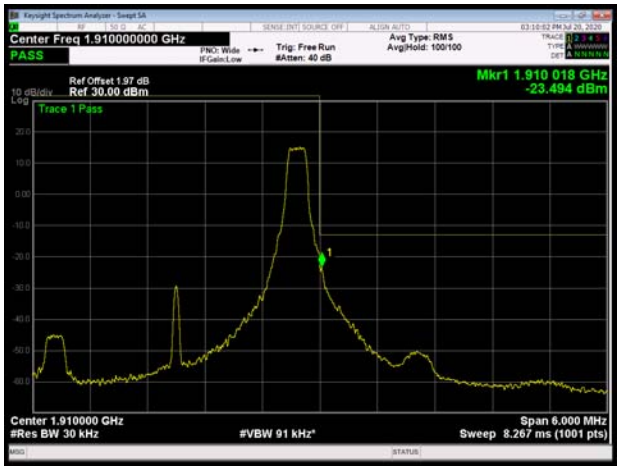
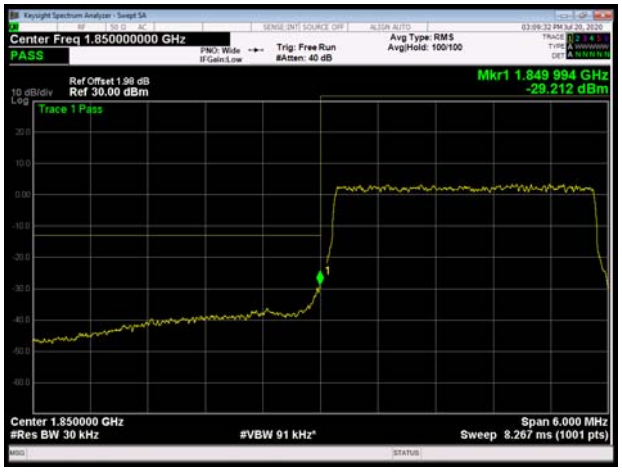
LTE Band 2 3MHz 64QAM 1RB CH-Low



LTE Band 2 3MHz 64QAM 1RB CH-High

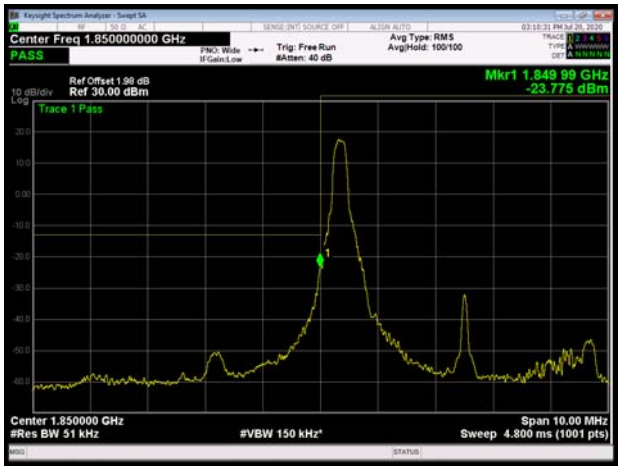


LTE Band 2 3MHz 64QAM 100%RB CH-Low



LTE Band 2 3MHz 64QAM 100%RB CH-High

LTE Band 2 5MHz 64QAM 1RB CH-Low



LTE Band 2 5MHz 64QAM 1RB CH-High

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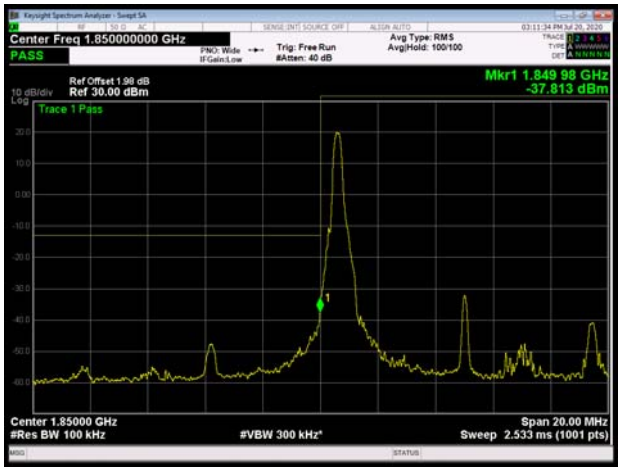
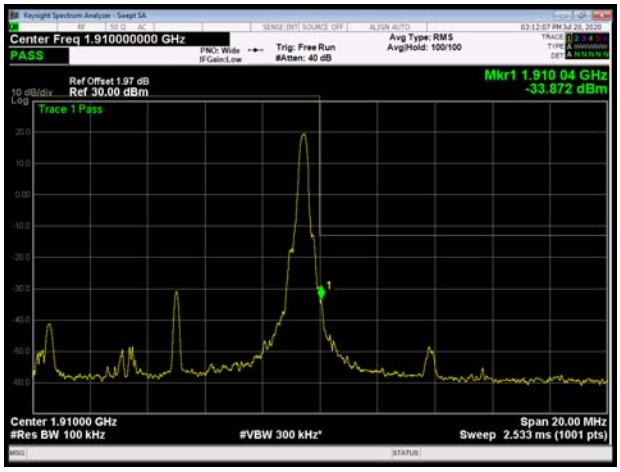
LTE Band 2 5MHz 64QAM 100%RB CH-Low

LTE Band 2 5MHz 64QAM 100%RB CH-High

LTE Band 2 10MHz 64QAM 1RB CH-Low



LTE Band 2 10MHz 64QAM 1RB CH-High



LTE Band 2 10MHz 64QAM 100%RB CH-Low

LTE Band 2 10MHz 64QAM 100%RB CH-High

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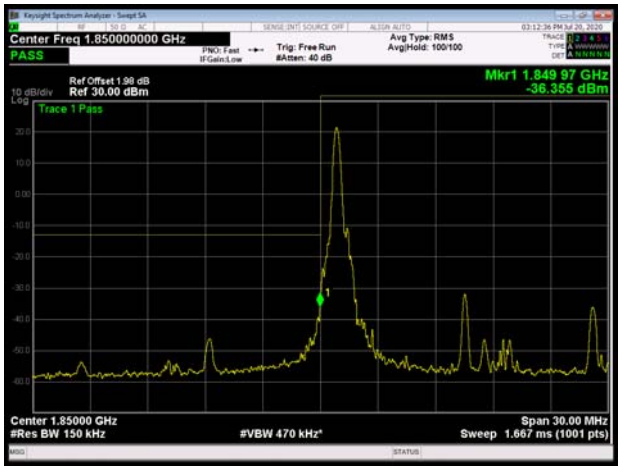
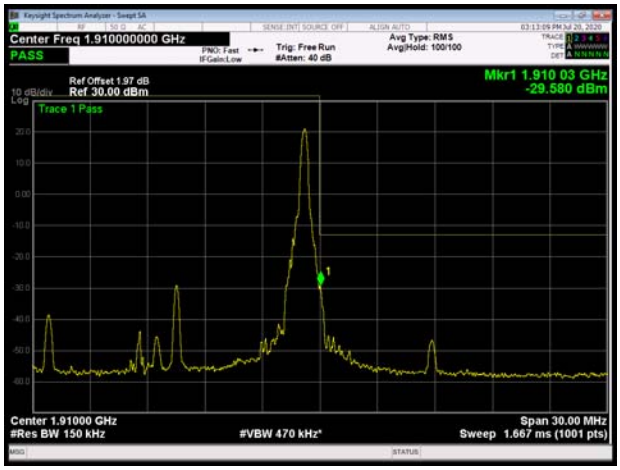
LTE Band 2 15MHz 64QAM 1RB CH-Low



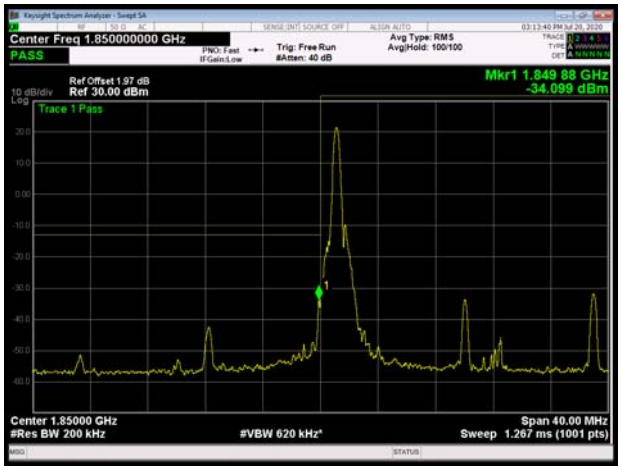
LTE Band 2 15MHz 64QAM 1RB CH-High



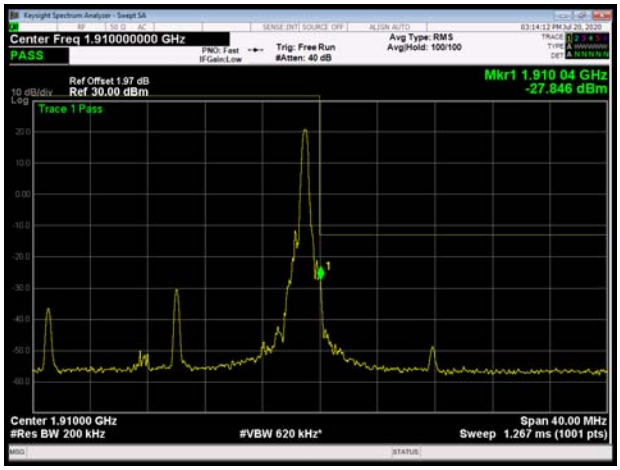
LTE Band 2 15MHz 64QAM 100%RB CH-Low

LTE Band 2 15MHz 64QAM 100%RB CH-High

LTE Band 2 20MHz 64QAM 1RB CH-Low



LTE Band 2 20MHz 64QAM 1RB CH-High



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LTE Band 2 20MHz 64QAM 100%RB CH-Low	LTE Band 2 20MHz 64QAM 100%RB CH-High

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5.4. Peak-to-Average Power Ratio (PAPR)

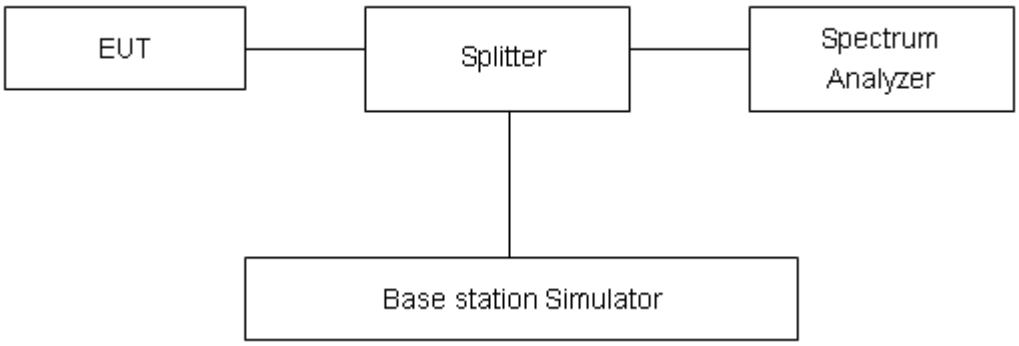
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (*e.g.*, dBm). Determine the PAPR from:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

Test Setup



Limits

In measuring transmissions in this band using an average power technique, the peakto-average ratio (PAR) of the transmission may not exceed 13 dB in 24.232(d).

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.

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Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GMSK)	512	1850.2	31.53	30.01	1.52	≤13	PASS
	661	1880	31.57	29.98	1.59	≤13	PASS
	810	1909.8	31.45	29.92	1.53	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	28.59	27.11	1.48	≤13	PASS
	661	1880	28.55	27.04	1.51	≤13	PASS
	810	1909.8	28.76	27.19	1.57	≤13	PASS
EGPRS 1900 (8PSK)	512	1850.2	27.41	25.38	2.03	≤13	PASS
	661	1880	27.42	25.28	2.14	≤13	PASS
	810	1909.8	27.60	25.51	2.09	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	25.08	22.20	2.88	≤13	PASS
	9400	1880	25.21	22.46	2.75	≤13	PASS
	9538	1907.6	24.76	22.00	2.76	≤13	PASS

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LTE Band 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	26.66	22.28	4.38	≤13	PASS
		18900	1880.0	26.49	22.27	4.22	≤13	PASS
		19193	1909.3	26.62	22.15	4.47	≤13	PASS
	3	18615	1851.5	26.62	22.32	4.30	≤13	PASS
		18900	1880	26.36	22.25	4.11	≤13	PASS
		19185	1908.5	26.52	22.24	4.28	≤13	PASS
	5	18625	1852.5	26.82	22.33	4.49	≤13	PASS
		18900	1880	26.53	22.26	4.27	≤13	PASS
		19175	1907.5	26.67	22.23	4.44	≤13	PASS
	10	18650	1855	26.96	22.34	4.62	≤13	PASS
		18900	1880	26.50	22.26	4.24	≤13	PASS
		19150	1905	26.49	22.25	4.24	≤13	PASS
	15	18675	1857.5	27.10	22.26	4.84	≤13	PASS
		18900	1880	26.66	22.20	4.46	≤13	PASS
		19125	1902.5	26.75	22.26	4.49	≤13	PASS
	20	18700	1860	26.99	22.29	4.70	≤13	PASS
		18900	1880	26.64	22.20	4.44	≤13	PASS
		19100	1900	26.64	22.18	4.46	≤13	PASS
16QAM	1.4	18607	1850.7	26.77	21.36	5.41	≤13	PASS
		18900	1880.0	26.65	21.32	5.33	≤13	PASS
		19193	1909.3	26.76	21.24	5.52	≤13	PASS
	3	18615	1851.5	26.87	21.38	5.49	≤13	PASS
		18900	1880	26.58	21.28	5.30	≤13	PASS
		19185	1908.5	26.77	21.31	5.46	≤13	PASS
	5	18625	1852.5	26.92	21.40	5.52	≤13	PASS
		18900	1880	26.58	21.28	5.30	≤13	PASS
		19175	1907.5	26.74	21.30	5.44	≤13	PASS
	10	18650	1855	27.10	21.43	5.67	≤13	PASS
		18900	1880	26.60	21.29	5.31	≤13	PASS
		19150	1905	26.59	21.29	5.30	≤13	PASS
	15	18675	1857.5	27.25	21.38	5.87	≤13	PASS
		18900	1880	26.76	21.30	5.46	≤13	PASS
		19125	1902.5	26.78	21.32	5.46	≤13	PASS
	20	18700	1860	27.16	21.33	5.83	≤13	PASS
		18900	1880	26.75	21.24	5.51	≤13	PASS
		19100	1900	26.77	21.19	5.58	≤13	PASS
64QAM	1.4	18607	1850.7	26.81	21.37	5.44	≤13	PASS
		18900	1880.0	26.66	21.35	5.31	≤13	PASS
		19193	1909.3	26.77	21.23	5.54	≤13	PASS

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	3	18615	1851.5	26.86	21.38	5.48	≤13	PASS
		18900	1880	26.57	21.27	5.30	≤13	PASS
		19185	1908.5	26.77	21.31	5.46	≤13	PASS
	5	18625	1852.5	26.94	21.41	5.53	≤13	PASS
		18900	1880	26.59	21.26	5.33	≤13	PASS
		19175	1907.5	26.73	21.30	5.43	≤13	PASS
	10	18650	1855	27.06	21.39	5.67	≤13	PASS
		18900	1880	26.59	21.28	5.31	≤13	PASS
		19150	1905	26.60	21.29	5.31	≤13	PASS
	15	18675	1857.5	27.28	21.38	5.90	≤13	PASS
		18900	1880	26.76	21.28	5.48	≤13	PASS
		19125	1902.5	26.80	21.32	5.48	≤13	PASS
	20	18700	1860	27.16	21.35	5.81	≤13	PASS
		18900	1880	26.76	21.25	5.51	≤13	PASS
		19100	1900	26.75	21.17	5.58	≤13	PASS

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5.5. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +55°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -30°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

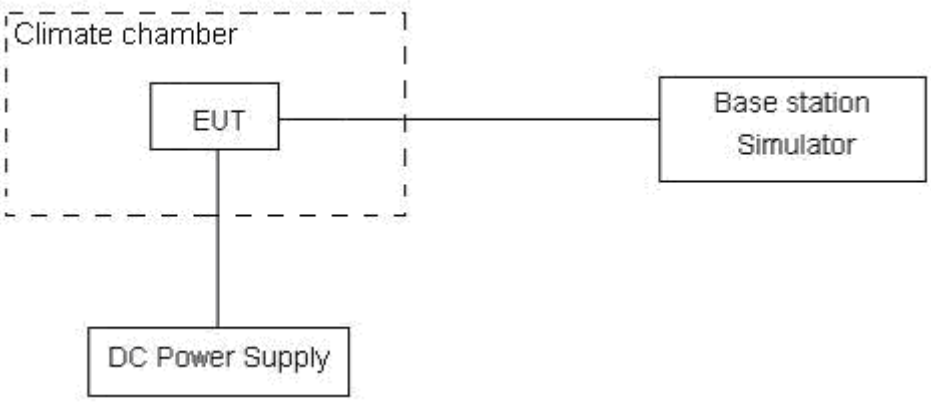
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.6 V and 4.4 V, with a nominal voltage of 3.87V.

Test setup



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Limits

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

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 3, U= 0.01ppm.

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Test Result

GSM1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal（25℃）	Normal	11.00	17.98	0.00585	0.00956	PASS
Extreme（55℃）		1.36	5.50	0.00073	0.00293	PASS
Extreme（50℃）		14.50	8.49	0.00771	0.00452	PASS
Extreme（40℃）		2.80	17.61	0.00149	0.00937	PASS
Extreme（30℃）		8.41	12.65	0.00447	0.00673	PASS
Extreme（20℃）		7.65	17.28	0.00407	0.00919	PASS
Extreme（10℃）		12.88	11.38	0.00685	0.00605	PASS
Extreme（0℃）		1.28	8.92	0.00068	0.00474	PASS
Extreme（-10℃）		8.79	14.34	0.00468	0.00763	PASS
Extreme（-20℃）		13.28	10.99	0.00706	0.00584	PASS
Extreme（-30℃）		13.12	13.73	0.00698	0.00731	PASS
25℃	LV	10.27	7.60	0.00546	0.00404	PASS
	HV	10.60	9.18	0.00564	0.00488	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal（25℃）	Normal	8.06	13.50	0.00429	0.00718	PASS
Extreme（55℃）		10.58	6.29	0.00563	0.00335	PASS
Extreme（50℃）		17.83	16.41	0.00948	0.00873	PASS
Extreme（40℃）		4.52	16.90	0.00240	0.00899	PASS
Extreme（30℃）		1.08	2.36	0.00058	0.00126	PASS
Extreme（20℃）		11.38	15.94	0.00605	0.00848	PASS
Extreme（10℃）		6.01	9.51	0.00320	0.00506	PASS
Extreme（0℃）		14.90	8.88	0.00793	0.00472	PASS
Extreme（-10℃）		7.39	6.11	0.00393	0.00325	PASS
Extreme（-20℃）		10.85	11.94	0.00577	0.00635	PASS
Extreme（-30℃）		16.86	3.45	0.00897	0.00183	PASS
25℃	LV	13.19	6.02	0.00702	0.00320	PASS
	HV	17.26	14.62	0.00918	0.00778	PASS

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LTE Band 2								
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	11.95	14.50	12.21	0.00636	0.00771	0.00650	PASS
Extreme（55℃）		9.47	15.76	1.04	0.00504	0.00838	0.00055	PASS
Extreme（50℃）		1.07	12.92	4.77	0.00057	0.00687	0.00254	PASS
Extreme（40℃）		15.12	17.02	3.45	0.00804	0.00905	0.00184	PASS
Extreme（30℃）		12.38	10.19	13.90	0.00658	0.00542	0.00739	PASS
Extreme（20℃）		12.86	15.43	3.39	0.00684	0.00821	0.00180	PASS
Extreme（10℃）		7.41	13.77	6.24	0.00394	0.00733	0.00332	PASS
Extreme（0℃）		1.20	3.61	13.49	0.00064	0.00192	0.00718	PASS
Extreme（-10℃）		1.39	14.80	4.49	0.00074	0.00787	0.00239	PASS
Extreme（-20℃）		5.75	14.02	7.17	0.00306	0.00746	0.00382	PASS
Extreme（-30℃）		14.51	11.71	8.76	0.00772	0.00623	0.00466	PASS
25℃	LV	15.98	16.68	13.98	0.00850	0.00887	0.00743	PASS
	HV	4.69	7.24	4.73	0.00250	0.00385	0.00252	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	14.18	16.24	12.51	0.00754	0.00864	0.00666	PASS
Extreme（55℃）		11.57	13.47	6.87	0.00615	0.00716	0.00365	PASS
Extreme（50℃）		10.28	1.96	5.98	0.00547	0.00104	0.00318	PASS
Extreme（40℃）		14.47	10.29	3.52	0.00770	0.00547	0.00187	PASS
Extreme（30℃）		9.11	14.63	7.99	0.00484	0.00778	0.00425	PASS
Extreme（20℃）		11.39	7.41	2.53	0.00606	0.00394	0.00135	PASS
Extreme（10℃）		6.93	14.92	16.96	0.00368	0.00793	0.00902	PASS
Extreme（0℃）		3.17	9.44	5.28	0.00169	0.00502	0.00281	PASS
Extreme（-10℃）		9.22	12.31	1.36	0.00490	0.00655	0.00072	PASS
Extreme（-20℃）		15.57	15.49	12.47	0.00828	0.00824	0.00663	PASS
Extreme（-30℃）		4.51	14.37	5.80	0.00240	0.00764	0.00309	PASS
25℃	LV	1.26	14.02	14.05	0.00067	0.00745	0.00748	PASS
	HV	13.24	9.67	15.13	0.00704	0.00514	0.00805	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	

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Normal（25℃）	Normal	17.05	11.93	16.75	0.00907	0.00634	0.00891	PASS
Extreme（55℃）		9.51	2.36	4.95	0.00506	0.00126	0.00263	PASS
Extreme（50℃）		2.02	2.20	3.99	0.00108	0.00117	0.00212	PASS
Extreme（40℃）		10.54	9.98	6.68	0.00560	0.00531	0.00356	PASS
Extreme（30℃）		12.02	6.74	15.88	0.00640	0.00359	0.00844	PASS
Extreme（20℃）		10.64	15.01	6.84	0.00566	0.00798	0.00364	PASS
Extreme（10℃）		4.77	17.46	6.70	0.00254	0.00929	0.00356	PASS
Extreme（0℃）		9.35	13.51	15.75	0.00497	0.00718	0.00838	PASS
Extreme（-10℃）		8.76	17.32	9.13	0.00466	0.00921	0.00486	PASS
Extreme（-20℃）		11.77	7.58	7.66	0.00626	0.00403	0.00408	PASS
Extreme（-30℃）		11.41	6.22	9.44	0.00607	0.00331	0.00502	PASS
25℃	LV	11.69	9.74	4.31	0.00622	0.00518	0.00229	PASS
	HV	9.05	2.24	10.75	0.00481	0.00119	0.00572	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	14.29	7.82	13.42	0.00760	0.00416	0.00714	PASS
Extreme（55℃）		3.73	9.94	4.08	0.00199	0.00529	0.00217	PASS
Extreme（50℃）		15.98	10.87	4.74	0.00850	0.00578	0.00252	PASS
Extreme（40℃）		7.24	12.74	1.76	0.00385	0.00678	0.00094	PASS
Extreme（30℃）		1.29	8.16	17.09	0.00068	0.00434	0.00909	PASS
Extreme（20℃）		16.87	6.20	8.04	0.00897	0.00330	0.00428	PASS
Extreme（10℃）		1.53	10.10	3.36	0.00082	0.00537	0.00178	PASS
Extreme（0℃）		12.60	13.07	12.90	0.00670	0.00695	0.00686	PASS
Extreme（-10℃）		1.28	2.73	1.72	0.00068	0.00145	0.00091	PASS
Extreme（-20℃）		9.71	6.51	11.13	0.00517	0.00346	0.00592	PASS
Extreme（-30℃）		16.68	11.86	8.19	0.00887	0.00631	0.00436	PASS
25℃	LV	6.75	1.27	17.68	0.00359	0.00068	0.00941	PASS
	HV	8.83	5.54	6.81	0.00470	0.00294	0.00362	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	10.64	11.63	12.76	0.00566	0.00618	0.00678	PASS
Extreme（55℃）		8.67	9.33	7.15	0.00461	0.00496	0.00380	PASS
Extreme（50℃）		10.17	7.22	2.25	0.00541	0.00384	0.00119	PASS
Extreme（40℃）		6.30	9.62	17.48	0.00335	0.00512	0.00930	PASS
Extreme（30℃）		6.12	2.59	10.11	0.00326	0.00138	0.00538	PASS
Extreme（20℃）		8.99	11.92	9.44	0.00478	0.00634	0.00502	PASS
Extreme（10℃）		14.18	2.49	3.34	0.00754	0.00132	0.00177	PASS

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Extreme（0℃）		14.31	1.14	7.36	0.00761	0.00060	0.00391	PASS
Extreme（-10℃）		6.67	4.11	8.24	0.00355	0.00218	0.00438	PASS
Extreme（-20℃）		1.10	1.95	4.24	0.00059	0.00103	0.00225	PASS
Extreme（-30℃）		16.89	12.47	8.58	0.00898	0.00663	0.00456	PASS
25℃	LV	17.98	7.70	9.92	0.00956	0.00409	0.00528	PASS
	HV	10.85	12.69	8.28	0.00577	0.00675	0.00440	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	5.60	2.54	13.01	0.00298	0.00135	0.00692	PASS
Extreme（55℃）		3.56	14.32	1.94	0.00189	0.00762	0.00103	PASS
Extreme（50℃）		13.91	16.97	6.57	0.00740	0.00903	0.00349	PASS
Extreme（40℃）		11.68	3.97	14.66	0.00621	0.00211	0.00780	PASS
Extreme（30℃）		2.05	15.42	15.98	0.00109	0.00820	0.00850	PASS
Extreme（20℃）		1.21	11.03	7.39	0.00065	0.00587	0.00393	PASS
Extreme（10℃）		3.49	9.82	13.91	0.00185	0.00523	0.00740	PASS
Extreme（0℃）		6.52	2.32	12.31	0.00347	0.00123	0.00655	PASS
Extreme（-10℃）		13.70	2.24	1.98	0.00729	0.00119	0.00105	PASS
Extreme（-20℃）		8.80	2.80	1.75	0.00468	0.00149	0.00093	PASS
Extreme（-30℃）		17.26	1.71	14.42	0.00918	0.00091	0.00767	PASS
25℃	LV	3.32	5.85	2.57	0.00176	0.00311	0.00137	PASS
	HV	12.27	8.32	2.76	0.00653	0.00442	0.00147	PASS

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5.6. Spurious Emissions at Antenna Terminals

Ambient condition

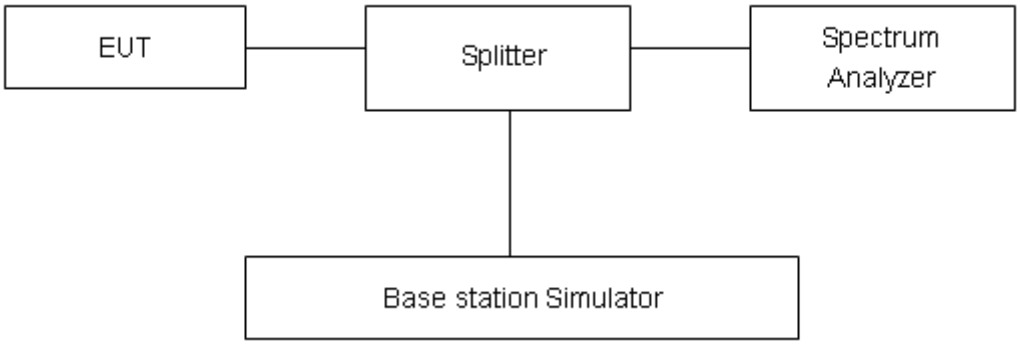
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.
RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz
RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.
RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),
RBW is set to 10 kHz (0.15 MHz~ 30 MHz)
RBW is set to 100 kHz (30MHz~1000 MHz)
RBW is set to 1000 kHz (above 1000MHz)

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 1.96.

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Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

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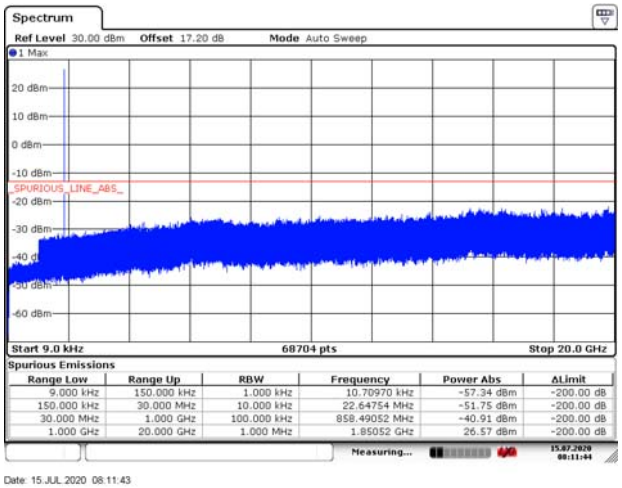
Test Result

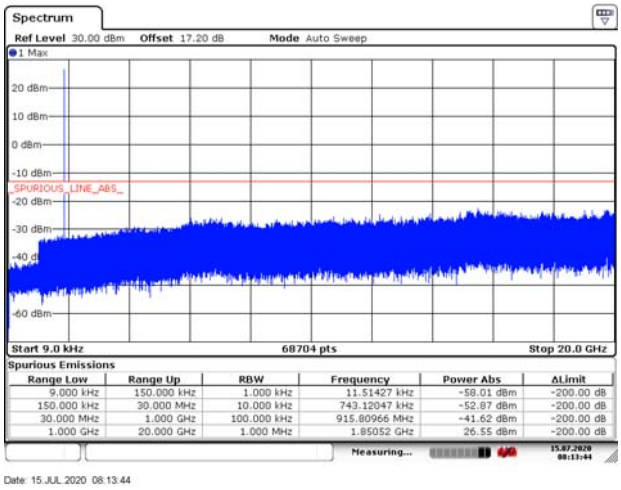
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

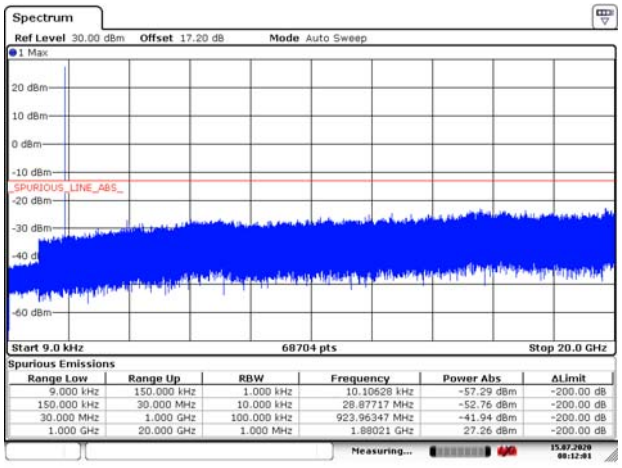
GSM 1900 CH-Low 9kHz ~ 20GHz



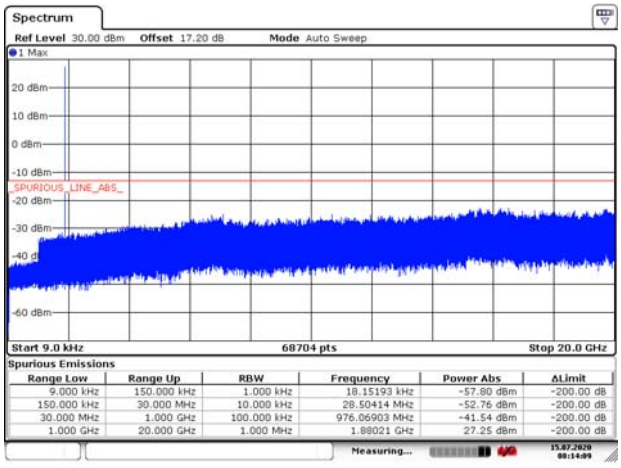
GPRS 1900 CH-Low 9kHz ~ 20GHz



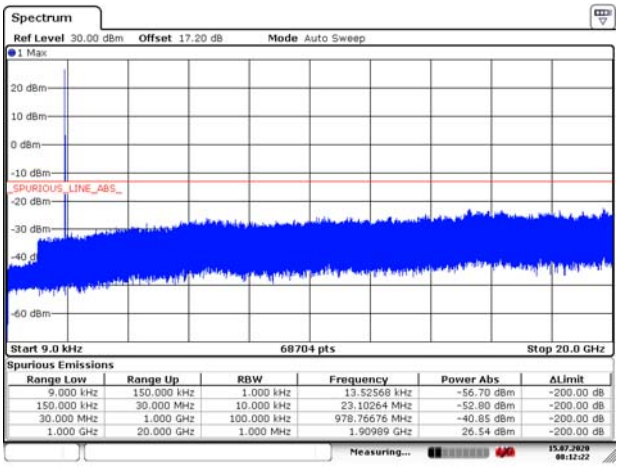
GSM 1900 CH- Middle 9kHz ~ 20GHz



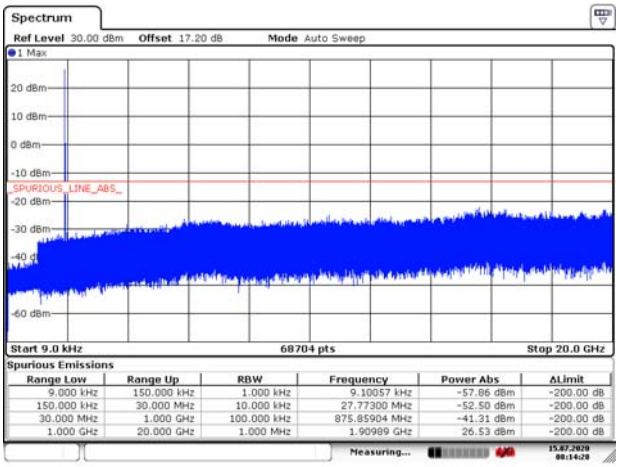
GPRS 1900 CH- Middle 9kHz ~ 20GHz



GSM 1900 CH-High 9kHz ~ 20GHz



GPRS 1900 CH-High 9kHz ~ 20GHz



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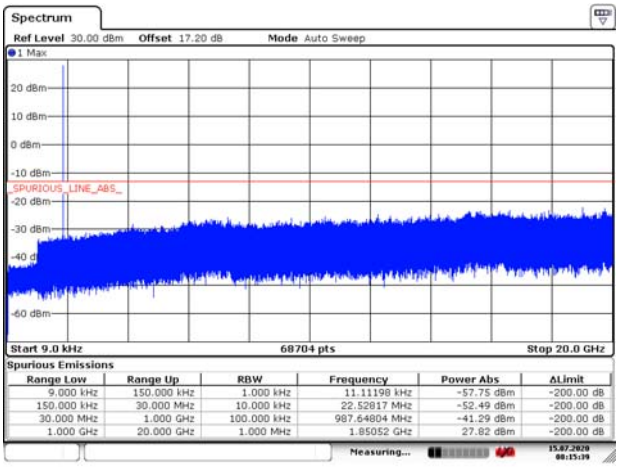
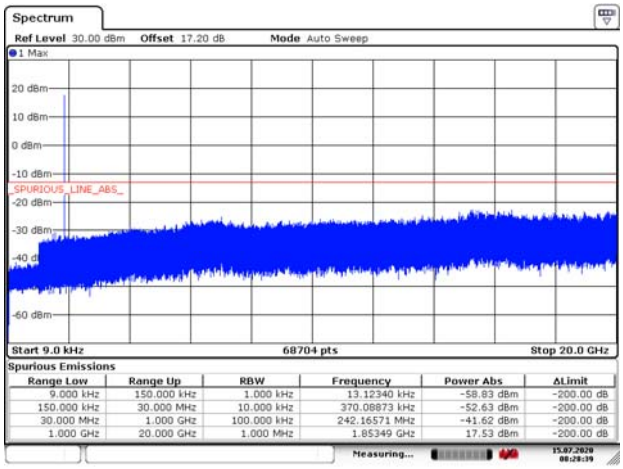
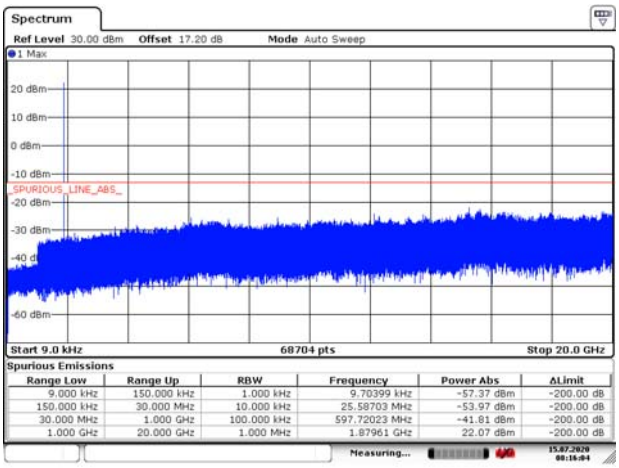
EGPRS 1900 CH-Low 9kHz ~ 20GHz



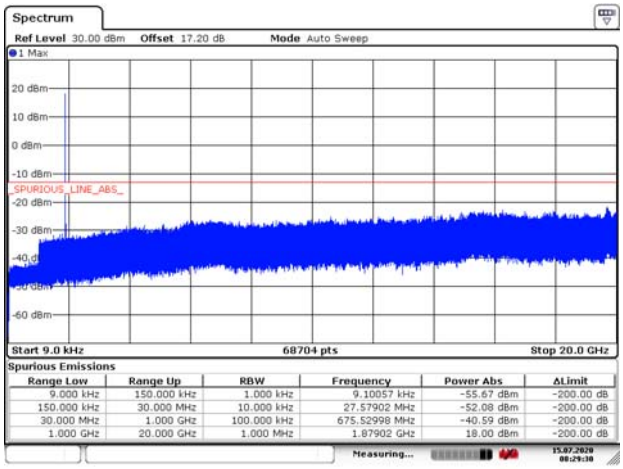
WCDMA BAND II CH-Low 9kHz ~ 20GHz



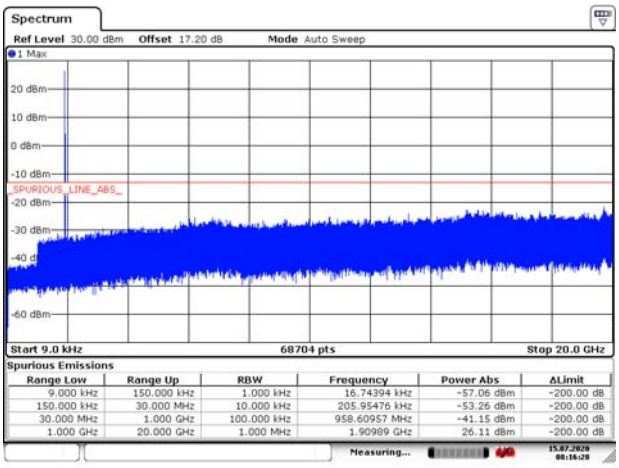
EGPRS 1900 CH- Middle 9kHz ~ 20GHz



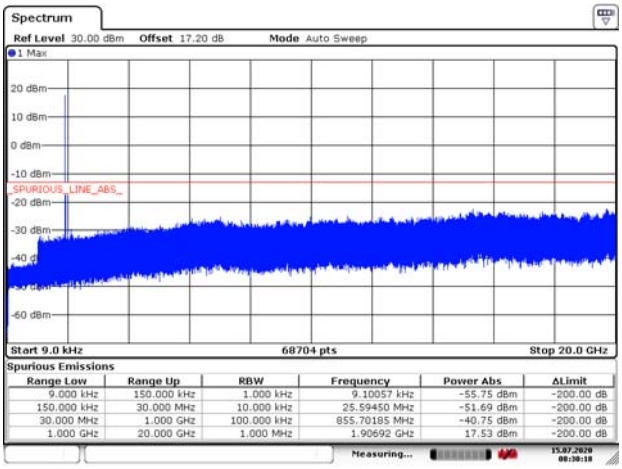
WCDMA BAND II CH- Middle 9kHz ~ 20GHz



EGPRS 1900 CH-High 9kHz ~ 20GHz



WCDMA BAND II CH-High 9kHz ~ 20GHz



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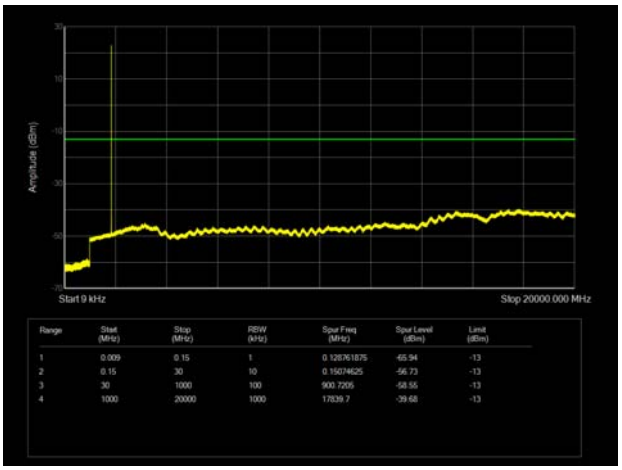
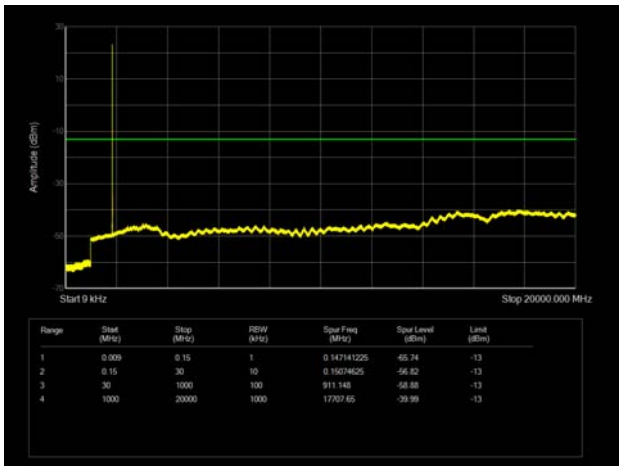
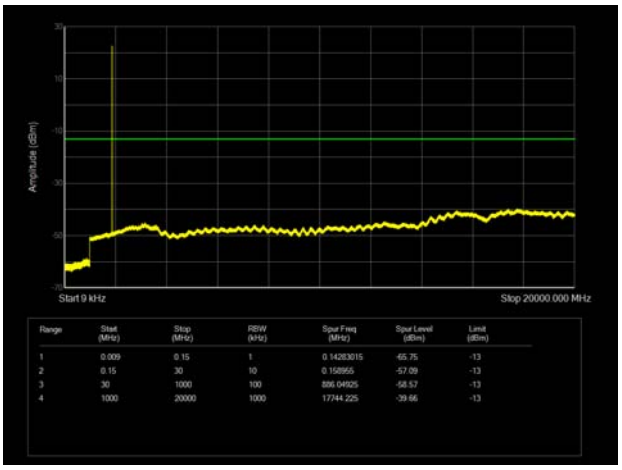
LTE Band 2 1.4MHz CH-Low 9kHz~20GHz



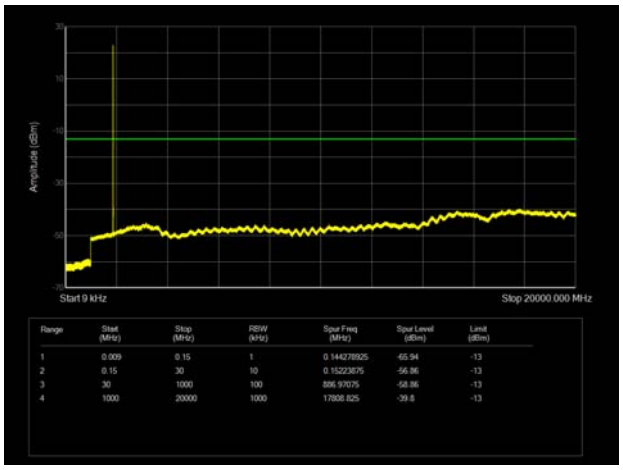
LTE Band 2 3MHz CH-Low 9kHz~20GHz



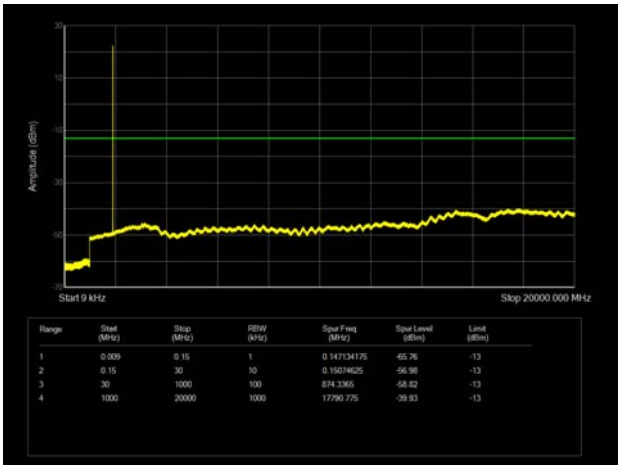
LTE Band 2 1.4MHz CH-Middle 9kHz~20GHz



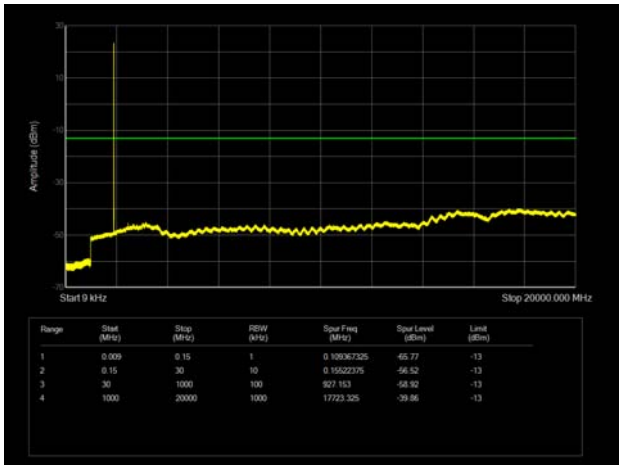
LTE Band 2 3MHz CH-Middle 9kHz~20GHz



LTE Band 2 1.4MHz CH-High 9kHz~20GHz



LTE Band 2 3MHz CH-High 9kHz~20GHz



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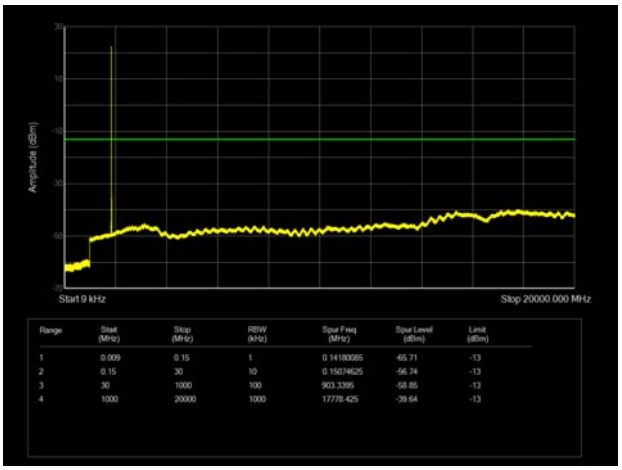
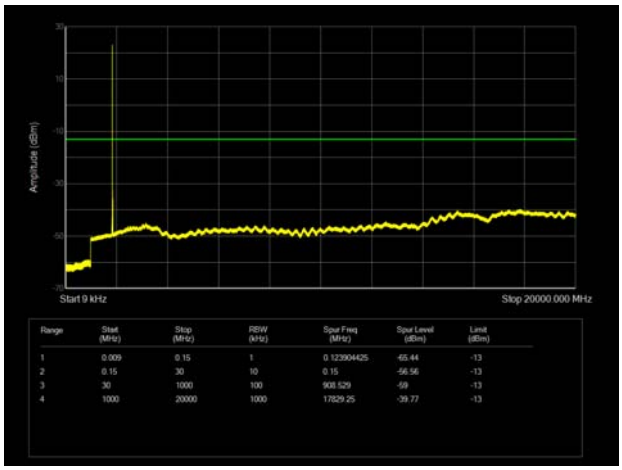
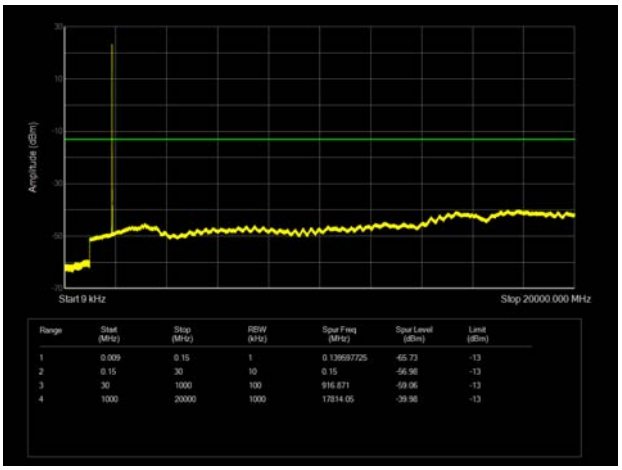
LTE Band 2 5MHz CH-Low 9kHz~20GHz



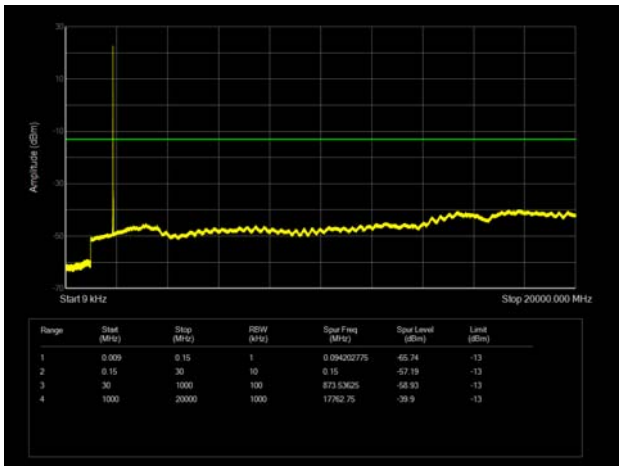
LTE Band 2 10MHz CH-Low 9kHz~20GHz



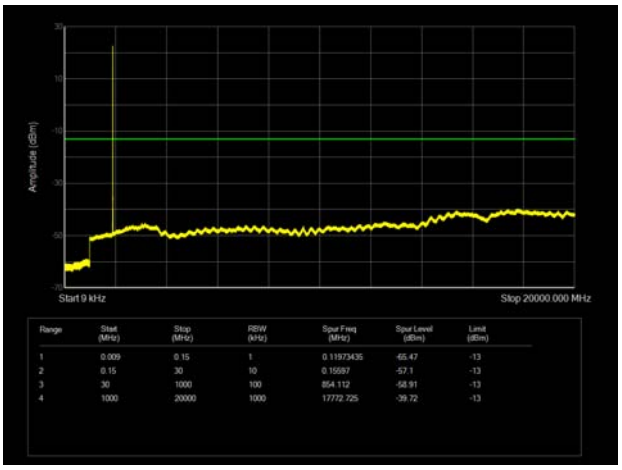
LTE Band 2 5MHz CH-Middle 9kHz~20GHz



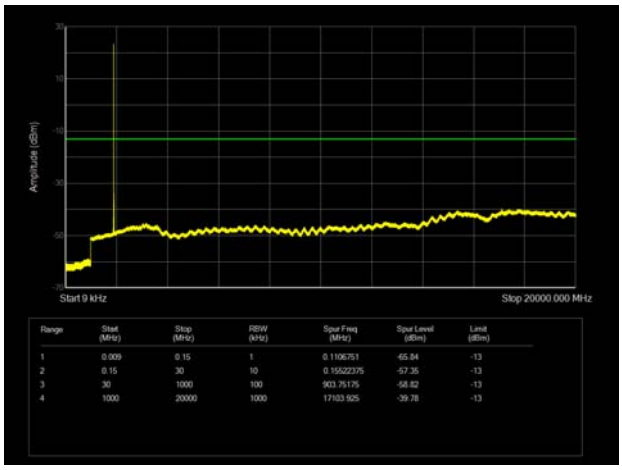
LTE Band 2 10MHz CH-Middle 9kHz~20GHz



LTE Band 2 5MHz CH-High 9kHz~20GHz



LTE Band 2 10MHz CH-High 9kHz~20GHz



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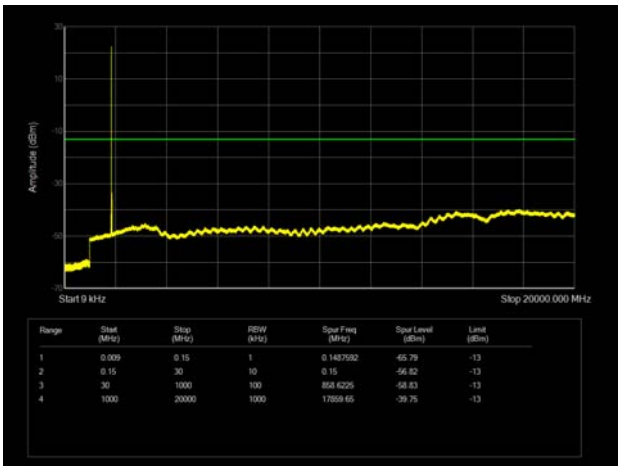
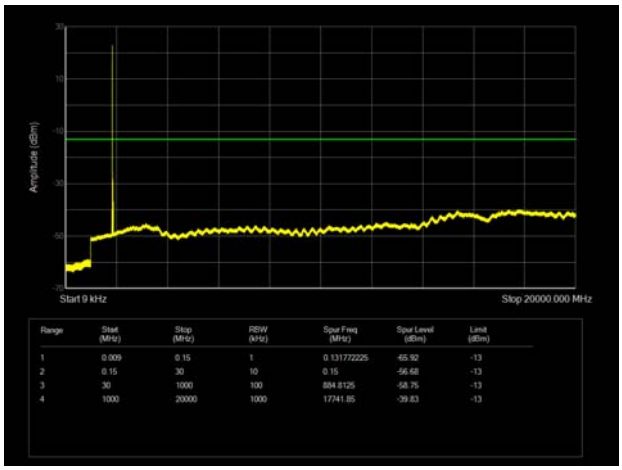
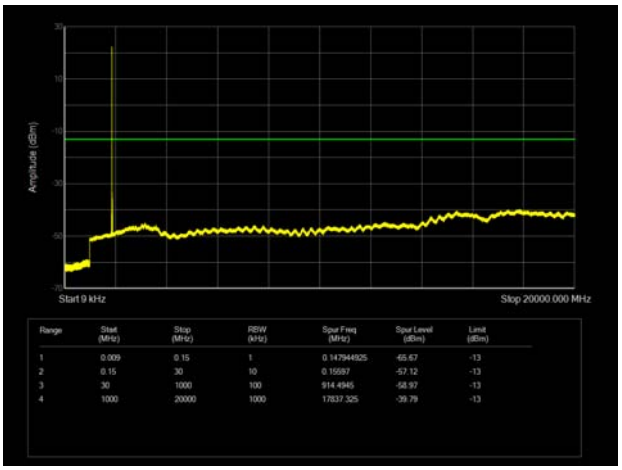
LTE Band 2 15MHz CH-Low 9kHz~20GHz



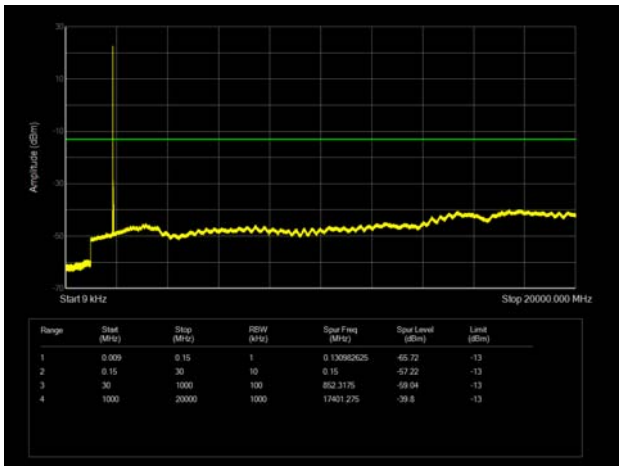
LTE Band 2 20MHz CH-Low 9kHz~20GHz



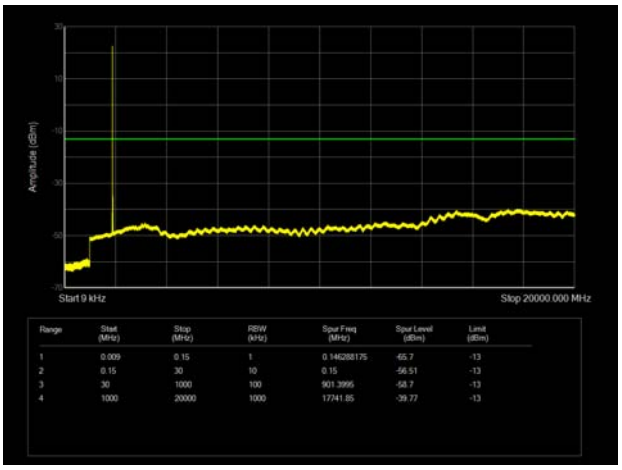
LTE Band 2 15MHz CH-Middle 9kHz~20GHz



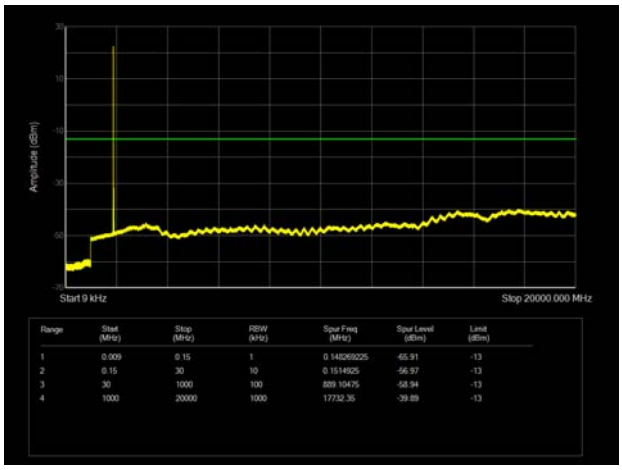
LTE Band 2 20MHz CH-Middle 9kHz~20GHz



LTE Band 2 15MHz CH-High 9kHz~20GHz



LTE Band 2 20MHz CH-High 9kHz~20GHz



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5.7. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

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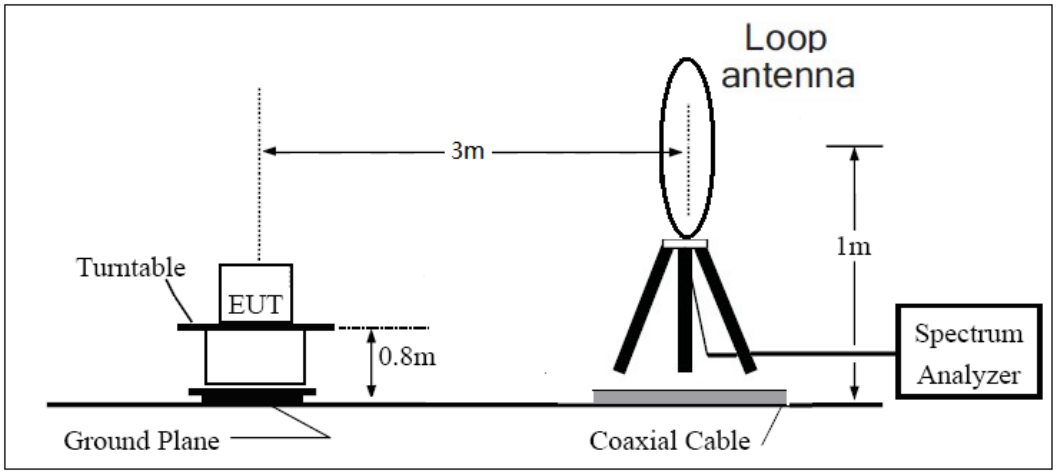
and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

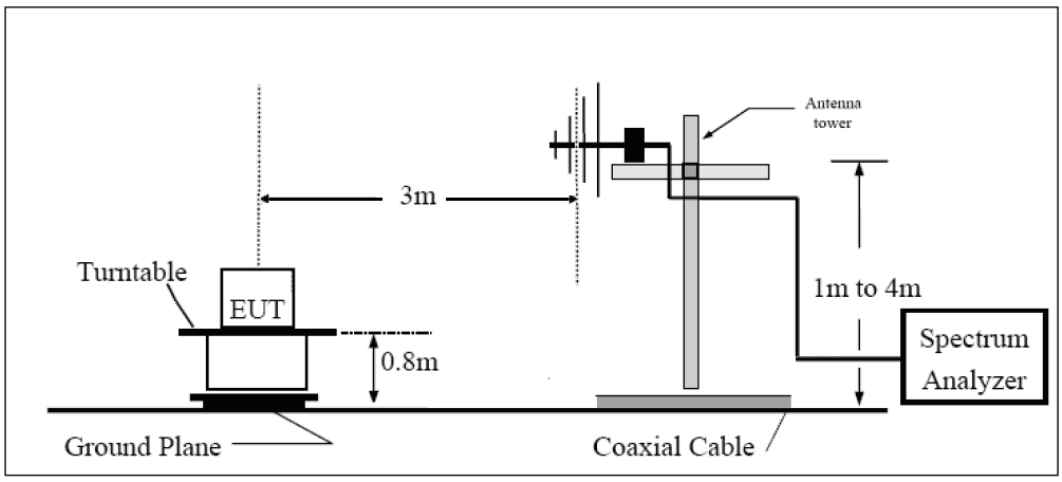
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

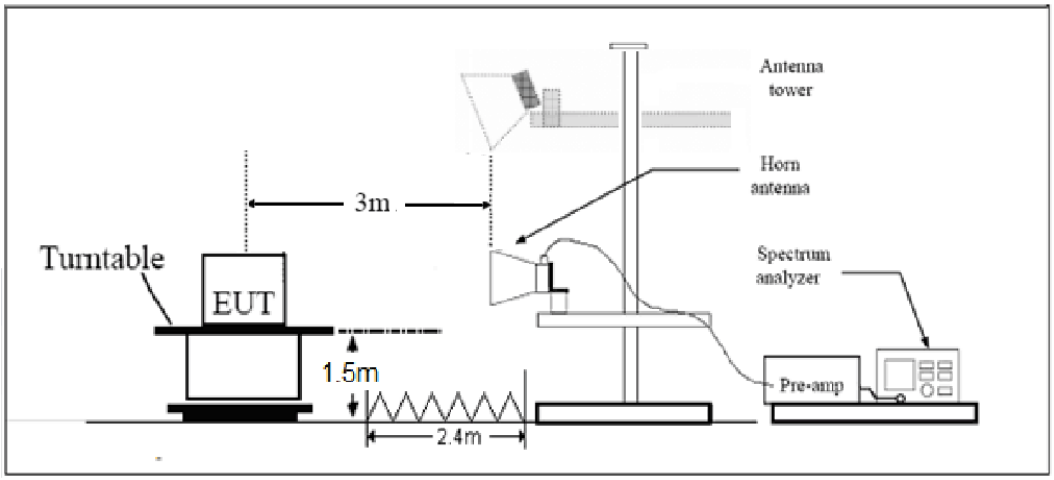
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



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Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor *k* = 1.96, *U*= 3.55 dB.

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Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-57.92	5.10	11.05	Horizontal	-51.97	-13.0	38.97	0
3	5640.0	-52.24	5.42	12.65	Horizontal	-45.01	-13.0	32.01	135
4	7520.0	-56.57	6.70	13.85	Horizontal	-49.42	-13.0	36.42	135
5	9400.0	-54.23	7.01	14.75	Horizontal	-46.49	-13.0	33.49	45
6	11280.0	-53.00	7.48	15.95	Horizontal	-44.53	-13.0	31.53	45
7	13160.0	-50.85	7.51	16.55	Horizontal	-41.81	-13.0	28.81	270
8	15040.0	-49.37	8.24	15.35	Horizontal	-42.26	-13.0	29.26	180
9	16920.0	-45.24	8.41	14.95	Horizontal	-38.70	-13.0	25.70	90
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

WCDMA Band II CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-58.59	5.10	11.05	Horizontal	-52.64	-13.00	39.64	90
3	5640.0	-58.19	5.42	12.65	Horizontal	-50.96	-13.00	37.96	45
4	7520.0	-56.63	6.70	13.85	Horizontal	-49.48	-13.00	36.48	315
5	9400.0	-53.97	7.01	14.75	Horizontal	-46.23	-13.00	33.23	270
6	11280.0	-53.61	7.48	15.95	Horizontal	-45.14	-13.00	32.14	135
7	13160.0	-53.37	7.51	16.55	Horizontal	-44.33	-13.00	31.33	45
8	15040.0	-50.60	8.24	15.35	Horizontal	-43.49	-13.00	30.49	270
9	16920.0	-47.69	8.41	14.95	Horizontal	-41.15	-13.00	28.15	45
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.1	-58.34	5.10	11.05	Horizontal	-52.39	-13.00	39.39	135
3	5638.9	-57.88	5.42	12.65	Horizontal	-50.65	-13.00	37.65	45
4	7520.0	-55.80	6.70	13.85	Horizontal	-48.65	-13.00	35.65	315
5	9400.0	-54.67	7.01	14.75	Horizontal	-46.93	-13.00	33.93	135
6	11280.0	-53.67	7.48	15.95	Horizontal	-45.20	-13.00	32.20	270
7	13160.0	-51.67	7.51	16.55	Horizontal	-42.63	-13.00	29.63	315
8	15040.0	-48.96	8.24	15.35	Horizontal	-41.85	-13.00	28.85	45
9	16920.0	-46.07	8.41	14.95	Horizontal	-39.53	-13.00	26.53	90
10	18800.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 2 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.1	-58.29	5.10	11.05	Horizontal	-52.34	-13.00	39.34	135
3	5633.6	-58.14	5.42	12.65	Horizontal	-50.91	-13.00	37.91	90
4	7520.0	-56.23	6.70	13.85	Horizontal	-49.08	-13.00	36.08	45
5	9400.0	-53.82	7.01	14.75	Horizontal	-46.08	-13.00	33.08	315
6	11280.0	-53.38	7.48	15.95	Horizontal	-44.91	-13.00	31.91	135
7	13160.0	-51.06	7.51	16.55	Horizontal	-42.02	-13.00	29.02	45
8	15040.0	-50.25	8.24	15.35	Horizontal	-43.14	-13.00	30.14	270
9	16920.0	-47.39	8.41	14.95	Horizontal	-40.85	-13.00	27.85	90
10	18800.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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LTE Band 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3742.1	-57.90	5.10	11.05	Horizontal	-51.95	-13.00	38.95	45
3	5613.4	-57.60	5.42	12.65	Horizontal	-50.37	-13.00	37.37	180
4	7484.6	-56.16	6.70	13.85	Horizontal	-49.01	-13.00	36.01	90
5	9400.0	-55.33	7.01	14.75	Horizontal	-47.59	-13.00	34.59	315
6	11280.0	-52.20	7.48	15.95	Horizontal	-43.73	-13.00	30.73	135
7	13160.0	-51.34	7.51	16.55	Horizontal	-42.30	-13.00	29.30	270
8	15040.0	-49.25	8.24	15.35	Horizontal	-42.14	-13.00	29.14	45
9	16920.0	-46.26	8.41	14.95	Horizontal	-39.72	-13.00	26.72	45
10	18800.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2020-05-17	2021-05-16
Base Station Simulator	R&S	CMW500	113824	2020-05-18	2021-05-17
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2020-05-18	2021-05-17
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2020-05-27	2021-05-26
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2021-06-19
Signal generator	R&S	SMB 100A	102594	2020-05-18	2021-05-17
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preampflier	R&S	SCU18	102327	2020-05-18	2021-05-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2020-05-18	2021-05-17
RF Cable	Agilent	SMA 15cm	0001	2020-06-12	2020-12-11
Software	R&S	EMC32	9.26.0	/	/

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