



RF TEST REPORT

Applicant MeiG Smart Technology Co., Ltd
FCC ID 2APJ4-SLM750VSA
Product SLM750VSA
Brand MEIGLink
Model SLM750VSA
Report No. R2202A0142-R2
Issue Date March 1, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2020)/ FCC CFR 47 Part 24E (2020)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	24.232(c)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 /24.238(a)	PASS
5	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 24.235	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 24.238(a)	PASS
8	Radiates Spurious Emission	2.1053 / 24.238(a)	PASS
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.			
Date of Testing: September 3, 2019 ~ September 24, 2019			

SLM750VSA (Report No.: R2202A0142-R2) is a variant model of SLM750 (Report No.: R1908A0527-R2V1). Changed FCC ID and Product Applicant address and Manufacturer address. Test values partial duplicated from Original for variant. There is no test for variant in this report.

The difference between model SLM750VSA and model SLM750 is show in the below table:

	Model	SLM750VSA (Variant)	SLM750 (Original)
Hardware	PCB	Addsomebands, the related matching circuit wiring has changed	/
Software	Software Version	SLM750-V_4.0.13_EQ101	SLM750-V_2.0.2D_EQ100
RF	RF circuit	Add LTE Band 7/40	/

Notes: The SLM750VSA support LTE Band 2/4/5/7/40;WCDMA B2/5;GSM 850/1900;
 The SLM750 support LTE Band 2/4/5/12/13/17/25/26/B41;WCDMA B2/4/5;GSM 850/1900;
 CDMA BC0, CDMA BC1

The detailed product change description please refers to the *Difference Declaration Letter*.



1. Test Laboratory

1.1. Notes of the test report

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

1.2. Test facility

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
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2. General Description of Equipment under Test

Client Information

Applicant	MeiG Smart Technology Co., Ltd
Applicant address	Floor 2, Office Building No.5, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen
Manufacturer	MeiG Smart Technology Co., Ltd
Manufacturer address	Floor 2, Office Building No.5, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen

General information

EUT Description			
Model	SLM750VSA		
IMEI	863879041726491		
Hardware Version	SLM750-V_MB_V1.00		
Software Version	SLM750-V_4.0.13_EQ101		
Power Supply	External Power Supply		
Antenna Type	PCB Antenna		
Antenna Gain	2.5dBi		
Test Mode(s)	GSM1900; WCDMA Band II; LTE Band 2;		
Test Modulation	(GSM)GMSK; (WCDMA) BPSK, QPSK,16QAM; (LTE)QPSK,16QAM		
HSDPA UE Category	8		
HSUPA UE Category	6		
LTE Category	4		
Maximum E.I.R.P	GSM 1900:	32.48dBm	
	WCDMA Band II:	25.31dBm	
	LTE Band 2:	25.35dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.3V Maximum: 4.2V		
Extreme Temperature	Lowest: -40°C Highest: +85°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850 ~ 1910	1930 ~ 1990
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
Note: 1. The information of the EUT is declared by the manufacturer.			



3. Applied Standards

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

FCC CFR47 Part 2 (2020)

FCC CFR 47 Part 24E (2020)

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

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 (X axis, vertical 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	GSM	RMC HSDPA/HSUPA DC-HSDPA
Effective Isotropic Radiated power	GSM	RMC
Occupied Bandwidth	GSM	RMC
Band Edge Compliance	GSM	RMC
Peak-to-Average Power Ratio	GSM	RMC
Frequency Stability	GSM	RMC
Spurious Emissions at Antenna Terminals	GSM	RMC
Radiates Spurious Emission	GSM	RMC



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	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	O	O	O	O	O	O	O	O	O	O	O	O	O	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.													

5. Test Case Results

5.1.RF Power Output

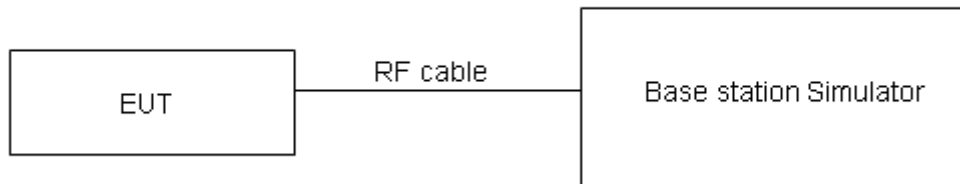
Ambient condition

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.

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.

Measurement Uncertainty

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



Test Results

GSM 1900		Conducted Power(dBm)		
		Channel 512	Channel 661	Channel 810
		1850.2(MHz)	1880(MHz)	1909.8(MHz)
GSM	Results	29.07	29.15	29.20

WCDMA Band II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
RMC		22.80	22.81	22.79
HSDPA	Sub - Test 1	22.26	22.23	22.23
	Sub - Test 2	22.25	22.25	22.20
	Sub - Test 3	21.72	21.75	21.72
	Sub - Test 4	21.73	21.76	21.70
HSUPA	Sub - Test 1	22.22	22.22	22.18
	Sub - Test 2	21.21	21.20	21.17
	Sub - Test 3	21.68	21.68	21.66
	Sub - Test 4	21.14	21.17	21.14
	Sub - Test 5	22.15	22.15	22.12
DC-HSDPA	Sub - Test 1	22.14	22.17	22.13
	Sub - Test 2	22.13	22.16	22.12
	Sub - Test 3	21.71	21.65	21.63
	Sub - Test 4	21.70	21.64	21.62

LTE Band 2				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	22.83	22.31	21.95
		1	2	22.49	22.30	22.31
		1	5	22.62	22.11	22.09
		3	0	21.13	21.11	21.20
		3	2	21.12	21.06	21.12
		3	3	21.20	21.04	20.96
	16QAM	6	0	21.14	21.15	21.10
		1	0	21.16	21.78	21.40
		1	2	21.11	21.82	21.50
		1	5	20.46	21.62	21.49
		3	0	20.05	20.07	20.00



		3	2	20.04	20.08	20.01
		3	3	20.01	20.17	19.96
		6	0	20.16	20.17	20.13
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	22.85	22.35	21.98
		1	7	22.52	22.35	22.35
		1	14	22.65	22.16	22.13
		8	0	21.21	21.21	21.31
		8	4	21.22	21.14	21.22
		8	7	21.28	21.13	21.04
		15	0	21.17	21.19	21.13
	16QAM	1	0	21.19	21.80	21.43
		1	7	21.14	21.87	21.54
		1	14	20.48	21.66	21.52
		8	0	20.14	20.18	20.10
		8	4	20.13	20.19	20.11
		8	7	20.09	20.27	20.07
		15	0	20.19	20.21	20.16
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	22.82	22.33	21.94
		1	13	22.50	22.31	22.32
		1	24	22.62	22.11	22.09
		12	0	21.18	21.16	21.27
		12	6	21.20	21.10	21.17
		12	13	21.26	21.11	21.00
		25	0	21.15	21.18	21.11
	16QAM	1	0	21.16	21.76	21.40
		1	13	21.11	21.85	21.51
		1	24	20.45	21.64	21.48
		12	0	20.12	20.14	20.07
		12	6	20.10	20.14	20.07
		12	13	20.06	20.22	20.03
		25	0	20.17	20.17	20.11
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	22.84	22.34	21.97
		1	25	22.53	22.36	22.36
		1	49	22.64	22.15	22.12



		25	0	21.21	21.21	21.31
		25	13	21.23	21.15	21.21
		25	25	21.28	21.15	21.05
		50	0	21.23	21.20	21.15
	16QAM	1	0	21.18	21.79	21.42
		1	25	21.14	21.89	21.54
		1	49	20.48	21.66	21.51
		25	0	20.15	20.19	20.11
		25	13	20.12	20.18	20.10
		25	25	20.09	20.27	20.07
		50	0	20.20	20.22	20.15
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	22.83	22.30	21.95
		1	38	22.51	22.35	22.33
		1	74	22.61	22.10	22.08
		36	0	21.19	21.17	21.28
		36	18	21.20	21.10	21.17
		36	39	21.25	21.12	21.01
		75	0	21.21	21.16	21.10
	16QAM	1	0	21.13	21.77	21.40
		1	38	21.12	21.86	21.52
		1	74	20.45	21.62	21.48
		36	0	20.12	20.17	20.08
		36	18	20.09	20.13	20.06
		36	39	20.07	20.23	20.04
		75	0	20.17	20.17	20.11
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	22.80	22.26	21.92
		1	50	22.50	22.31	22.31
		1	99	22.59	22.09	22.05
		50	0	21.16	21.12	21.24
		50	25	21.18	21.06	21.14
		50	50	21.22	21.07	20.97
		100	0	21.18	21.11	21.06
	16QAM	1	0	21.11	21.73	21.35
		1	50	21.08	21.84	21.48
		1	99	20.43	21.59	21.46
		50	0	20.09	20.13	20.05



		50	25	20.06	20.11	20.03
		50	50	20.04	20.18	20.00
		100	0	20.15	20.13	20.08

5.2. Effective Isotropic Radiated Power

Ambient condition

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

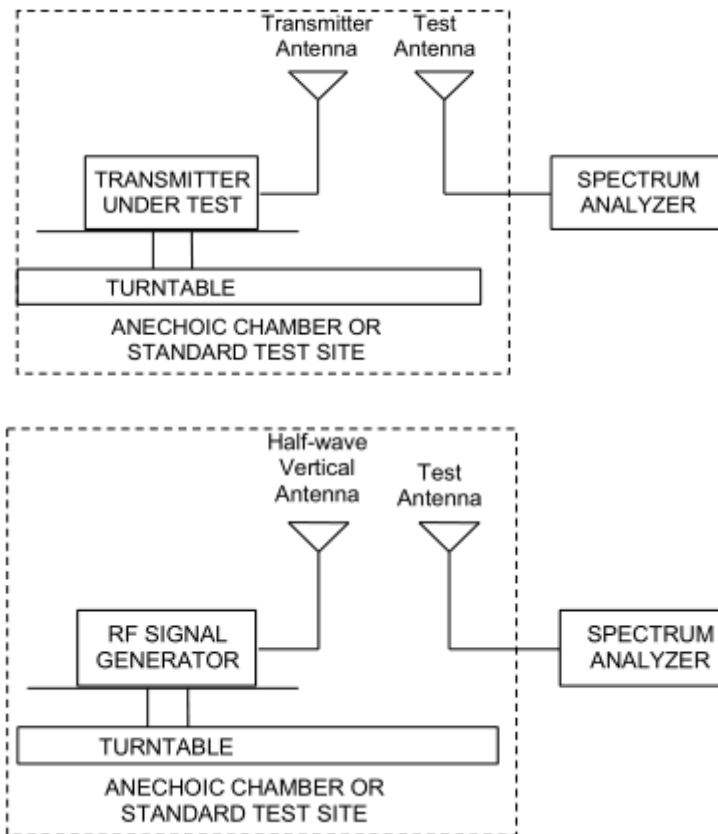
Methods of Measurement

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. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$
- 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:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$
where: dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

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

Test setup



Limits

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	$\leq 2 \text{ W}$ (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 $k = 2$, $U = 1.19 \text{ dB}$

Test Results:

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

GSM 1900		EIRP(dBm)			Limit (dBm)
		Channel 512	Channel 661	Channel 810	
		1850.2(MHz)	1880(MHz)	1909.8(MHz)	
GSM	Results	31.57	31.65	31.70	33

WCDMA Band II		EIRP(dBm)			Limit (dBm)
		Channel 9262	Channel 9400	Channel 9538	
		1852.4(MHz)	1880(MHz)	1907.6(MHz)	
RMC		25.30	25.31	25.29	33
HSDPA	Sub - Test 1	24.76	24.73	24.73	33
	Sub - Test 2	24.75	24.75	24.70	33
	Sub - Test 3	24.22	24.25	24.22	33
	Sub - Test 4	24.23	24.26	24.20	33
HSUPA	Sub - Test 1	24.72	24.72	24.68	33
	Sub - Test 2	23.71	23.70	23.67	33
	Sub - Test 3	24.18	24.18	24.16	33
	Sub - Test 4	23.64	23.67	23.64	33
	Sub - Test 5	24.65	24.65	24.62	33
DC-HSDPA	Sub - Test 1	24.64	24.67	24.63	33
	Sub - Test 2	24.63	24.66	24.62	33
	Sub - Test 3	24.21	24.15	24.13	33
	Sub - Test 4	24.20	24.14	24.12	33



LTE Band 2				EIRP(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	25.33	24.81	24.45
		1	2	24.99	24.80	24.81
		1	5	25.12	24.61	24.59
		3	0	23.63	23.61	23.70
		3	2	23.62	23.56	23.62
		3	3	23.70	23.54	23.46
		6	0	23.64	23.65	23.60
	16QAM	1	0	23.66	24.28	23.90
		1	2	23.61	24.32	24.00
		1	5	22.96	24.12	23.99
		3	0	22.55	22.57	22.50
		3	2	22.54	22.58	22.51
		3	3	22.51	22.67	22.46
		6	0	22.66	22.67	22.63
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	25.35	24.85	24.48
		1	7	25.02	24.85	24.85
		1	14	25.15	24.66	24.63
		8	0	23.71	23.71	23.81
		8	4	23.72	23.64	23.72
		8	7	23.78	23.63	23.54
		15	0	23.67	23.69	23.63
	16QAM	1	0	23.69	24.30	23.93
		1	7	23.64	24.37	24.04
		1	14	22.98	24.16	24.02
		8	0	22.64	22.68	22.60
		8	4	22.63	22.69	22.61
		8	7	22.59	22.77	22.57
		15	0	22.69	22.71	22.66
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	25.32	24.83	24.44
		1	13	25.00	24.81	24.82
		1	24	25.12	24.61	24.59
		12	0	23.68	23.66	23.77



	16QAM	12	6	23.70	23.60	23.67
		12	13	23.76	23.61	23.50
		25	0	23.65	23.68	23.61
		1	0	23.66	24.26	23.90
		1	13	23.61	24.35	24.01
		1	24	22.95	24.14	23.98
		12	0	22.62	22.64	22.57
		12	6	22.60	22.64	22.57
		12	13	22.56	22.72	22.53
		25	0	22.67	22.67	22.61
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	25.34	24.84	24.47
		1	25	25.03	24.86	24.86
		1	49	25.14	24.65	24.62
		25	0	23.71	23.71	23.81
		25	13	23.73	23.65	23.71
		25	25	23.78	23.65	23.55
		50	0	23.73	23.70	23.65
	16QAM	1	0	23.68	24.29	23.92
		1	25	23.64	24.39	24.04
		1	49	22.98	24.16	24.01
		25	0	22.65	22.69	22.61
		25	13	22.62	22.68	22.60
		25	25	22.59	22.77	22.57
		50	0	22.70	22.72	22.65
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	25.33	24.80	24.45
		1	38	25.01	24.85	24.83
		1	74	25.11	24.60	24.58
		36	0	23.69	23.67	23.78
		36	18	23.70	23.60	23.67
		36	39	23.75	23.62	23.51
		75	0	23.71	23.66	23.60
	16QAM	1	0	23.63	24.27	23.90
		1	38	23.62	24.36	24.02
		1	74	22.95	24.12	23.98
		36	0	22.62	22.67	22.58
		36	18	22.59	22.63	22.56



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
		36	39	22.57	22.73	22.54
		75	0	22.67	22.67	22.61
20MHz	QPSK	1	0	25.30	24.76	24.42
		1	50	25.00	24.81	24.81
		1	99	25.09	24.59	24.55
		50	0	23.66	23.62	23.74
		50	25	23.68	23.56	23.64
		50	50	23.72	23.57	23.47
		100	0	23.68	23.61	23.56
	16QAM	1	0	23.61	24.23	23.85
		1	50	23.58	24.34	23.98
		1	99	22.93	24.09	23.96
		50	0	22.59	22.63	22.55
		50	25	22.56	22.61	22.53
		50	50	22.54	22.68	22.50
		100	0	22.65	22.63	22.58

5.3.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 51kHz, VBW is set to 160kHz for WCDMA Band II,

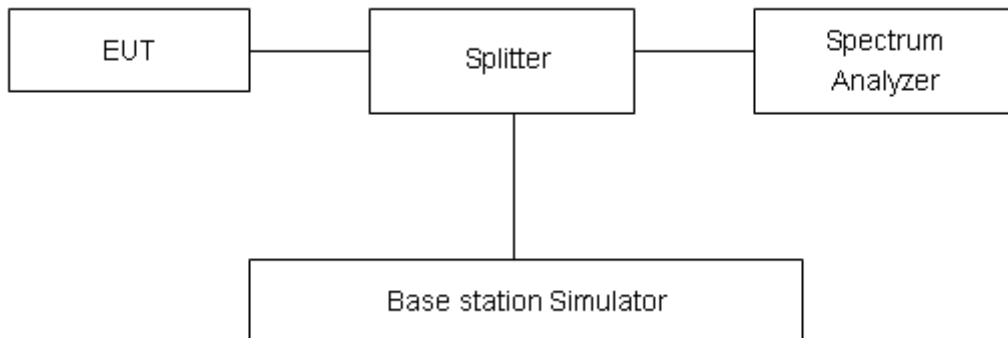
RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2 (1.4MHz),

RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 2 (3MHz/5MHz),

RBW is set to 300kHz,VBW is set to 1MHz for LTE Band 2 (10MHz/15MHz/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 $k = 2$, $U = 624\text{Hz}$.

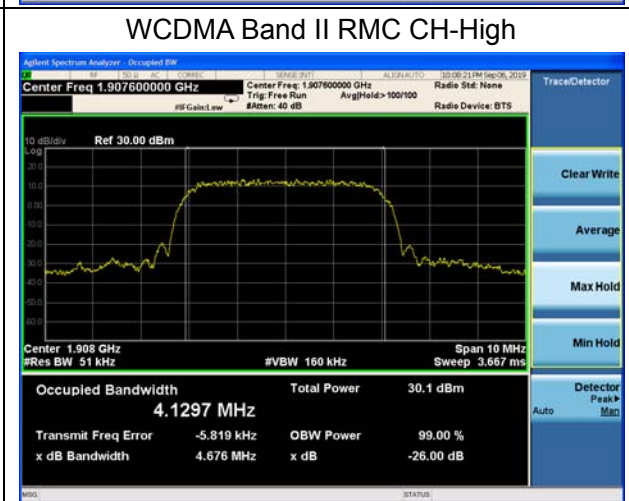
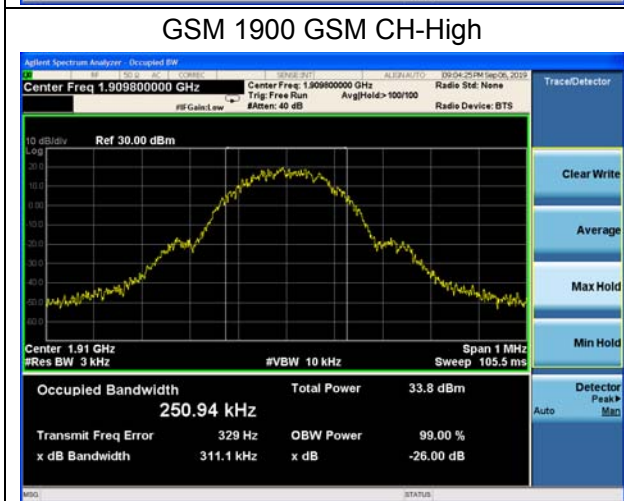
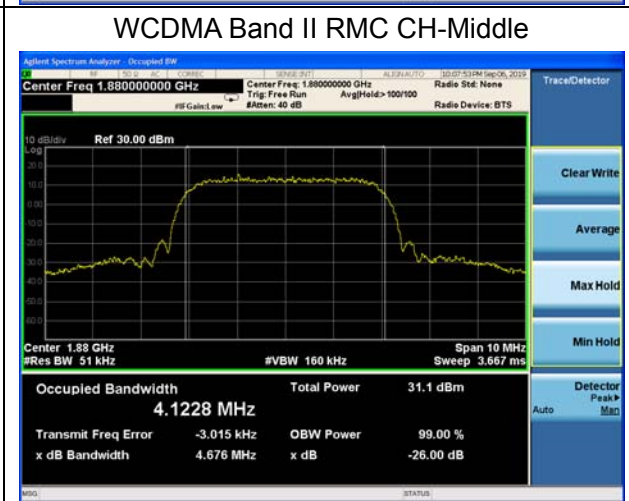
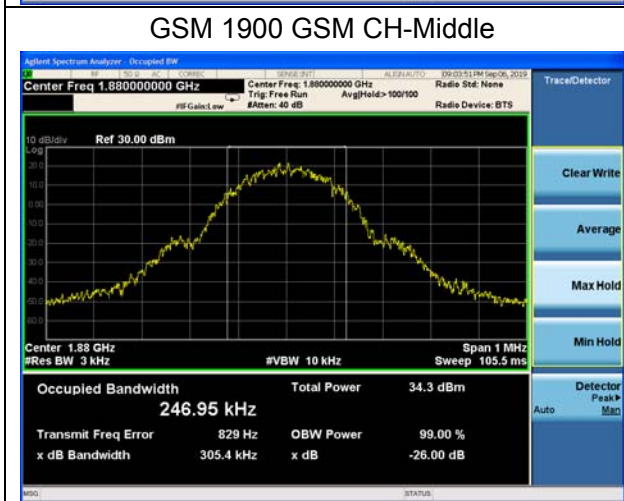
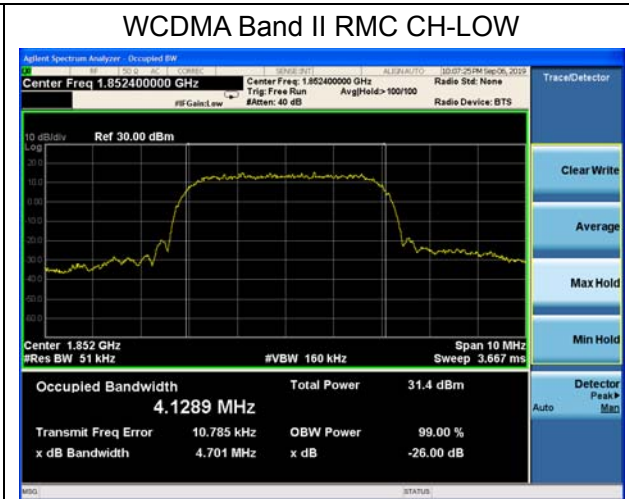
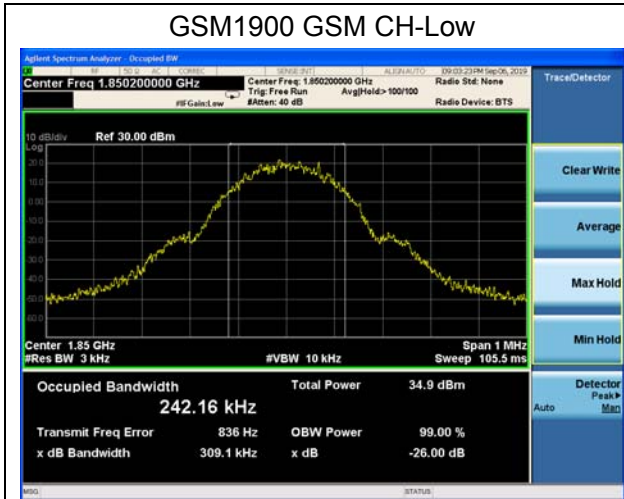
Test Result

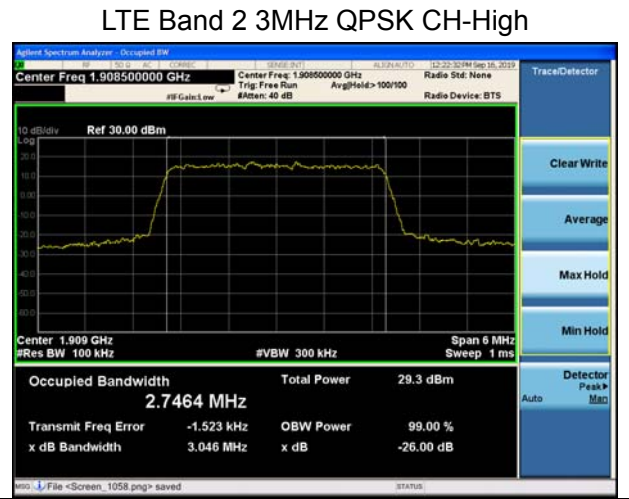
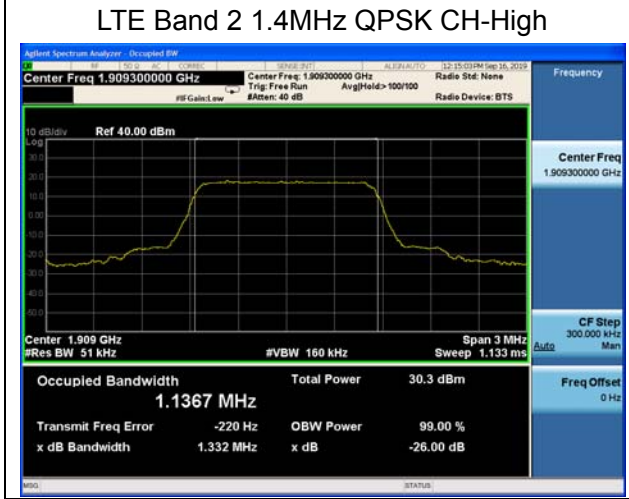
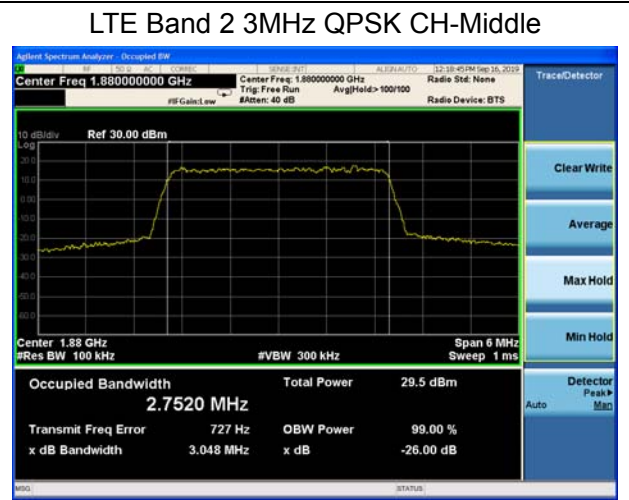
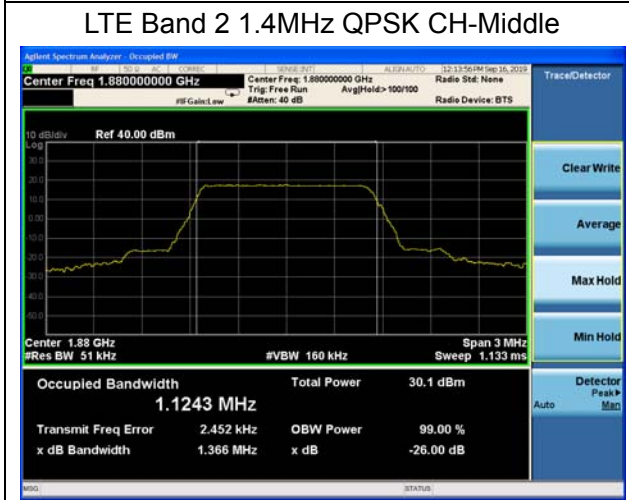
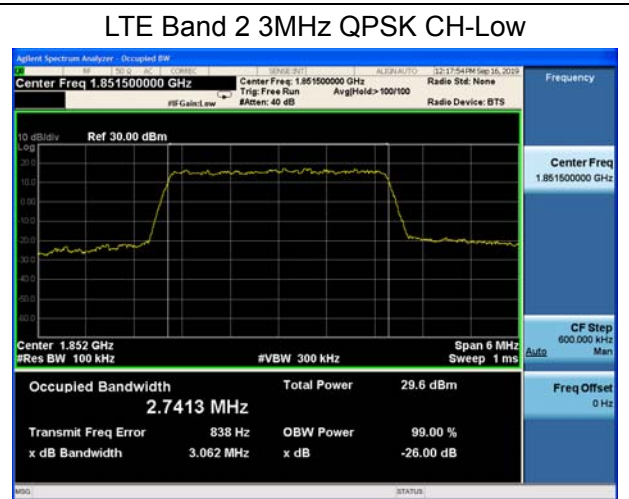
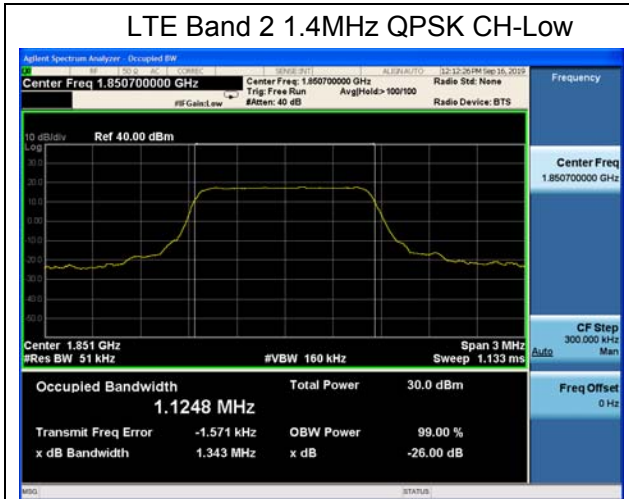
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GSM)	512	1850.2	0.24216	0.3091
	661	1880.0	0.24695	0.3054
	810	1909.8	0.25094	0.3111
WCDMA Band II (RMC)	9262	1852.4	4.1289	4.701
	9400	1880	4.1228	4.676
	9538	1907.6	4.1297	4.676

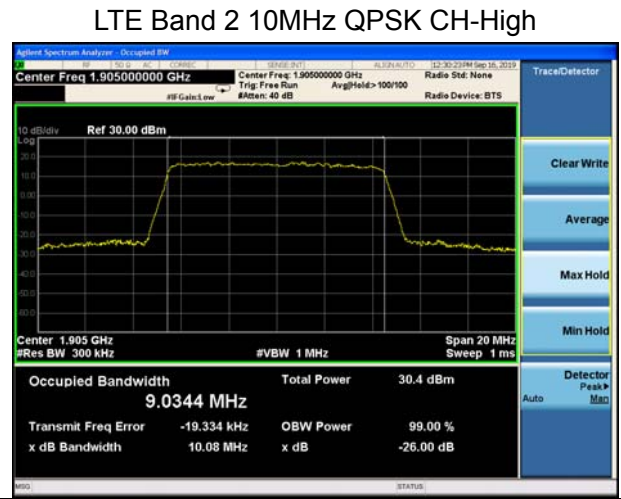
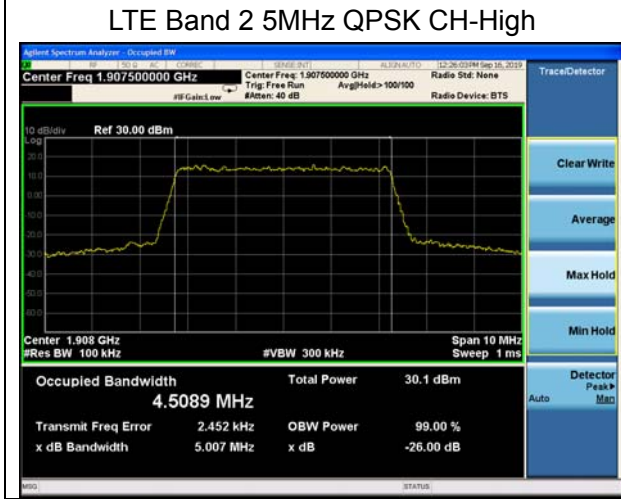
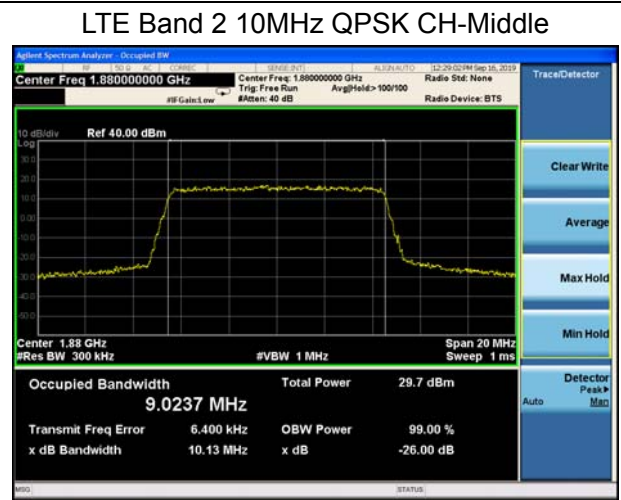
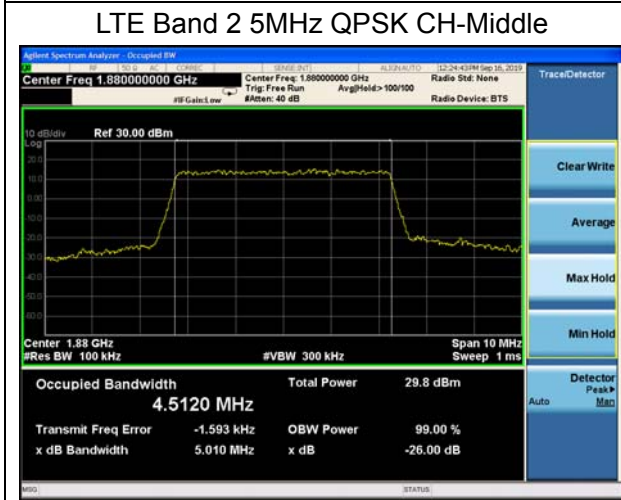
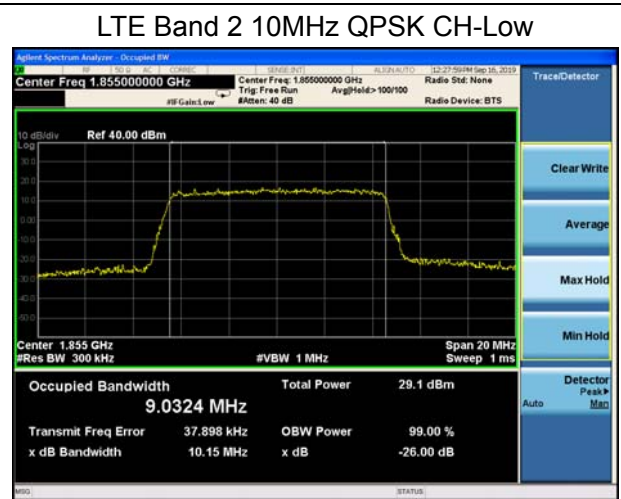
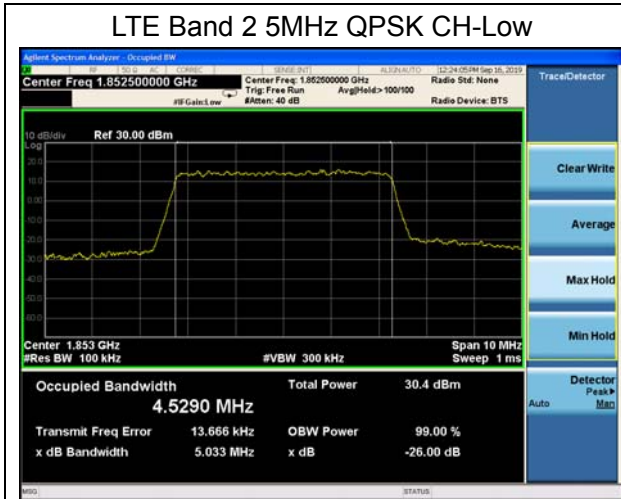
LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1248	1.343
		18900	1880.0	1.1243	1.366
		19193	1909.3	1.1367	1.332
	3	18615	1851.5	2.7413	3.062
		18900	1880	2.7520	3.048
		19185	1908.5	2.7464	3.046
	5	18625	1852.5	4.5290	5.033
		18900	1880	4.5120	5.010
		19175	1907.5	4.5089	5.007
	10	18650	1855	9.0324	10.150
		18900	1880	9.0237	10.130
		19150	1905	9.0344	10.080
	15	18675	1857.5	13.3940	14.600
		18900	1880	13.4230	14.660
		19125	1902.5	13.4230	14.580
20	18700	1860	17.8610	19.200	
	18900	1880	17.8780	19.210	
	19100	1900	17.8010	19.200	
16QAM	1.4	18607	1850.7	1.1229	1.348
		18900	1880.0	1.1292	1.334

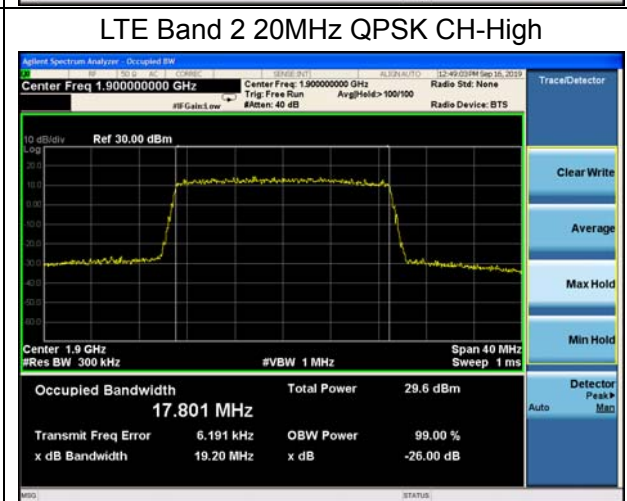
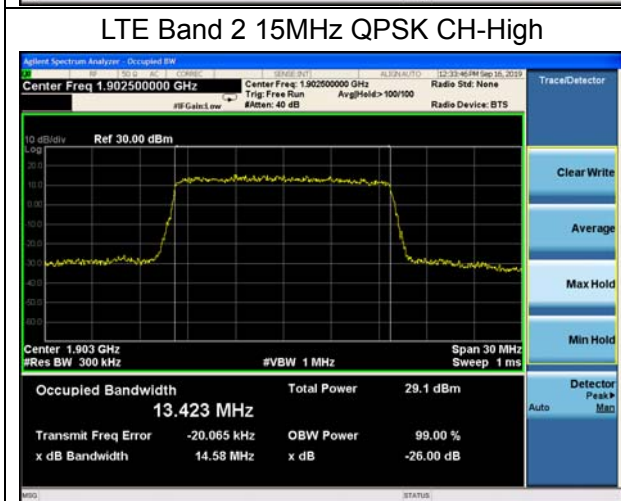
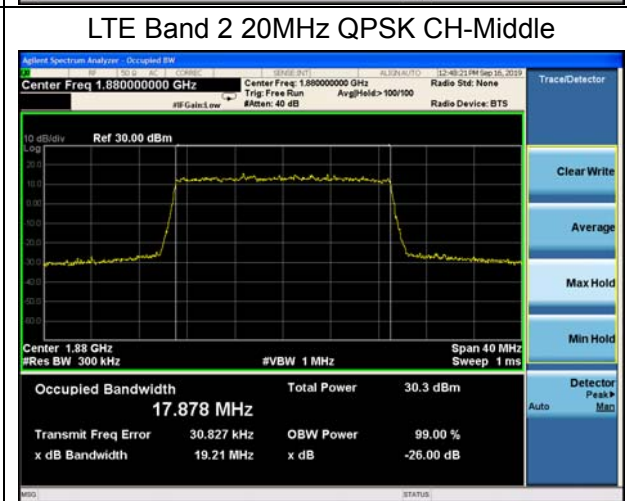
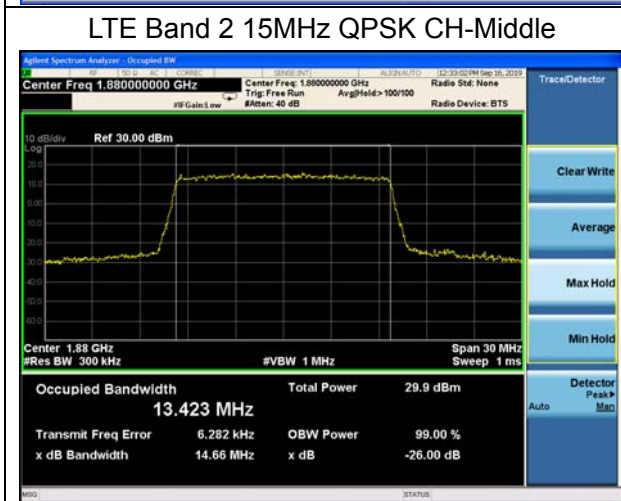
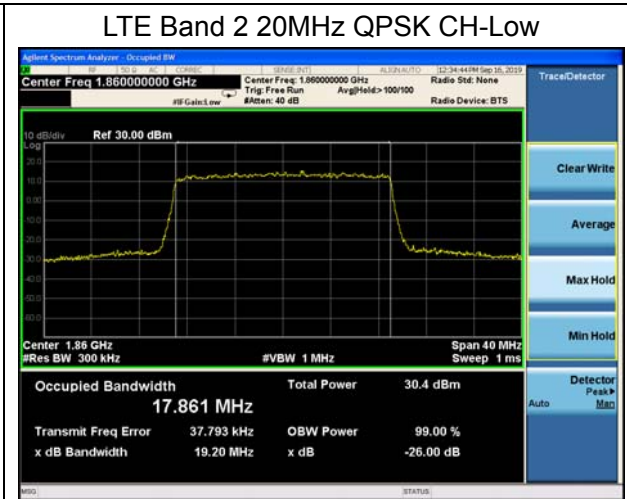
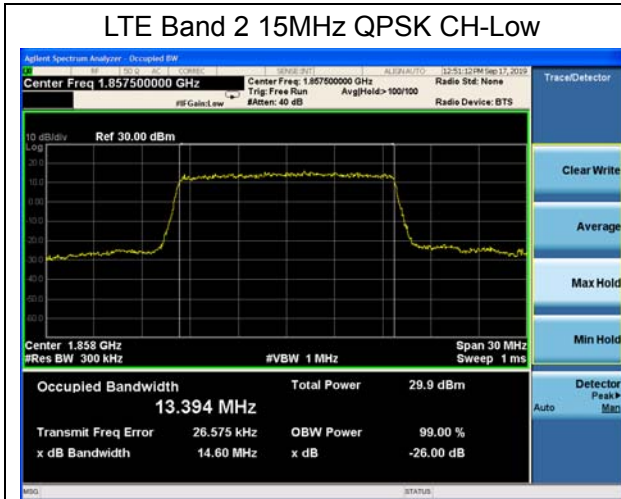


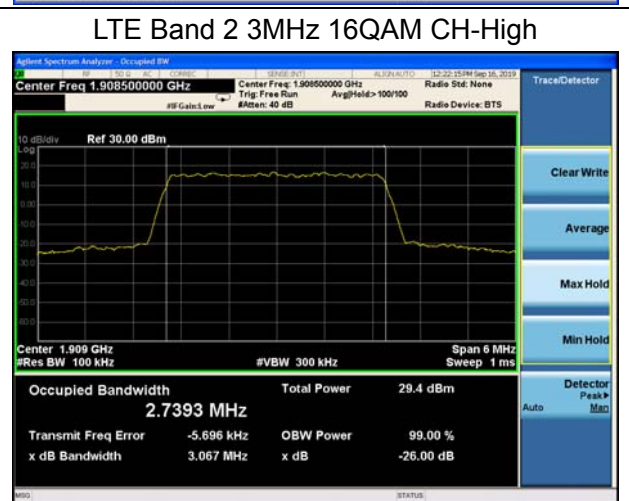
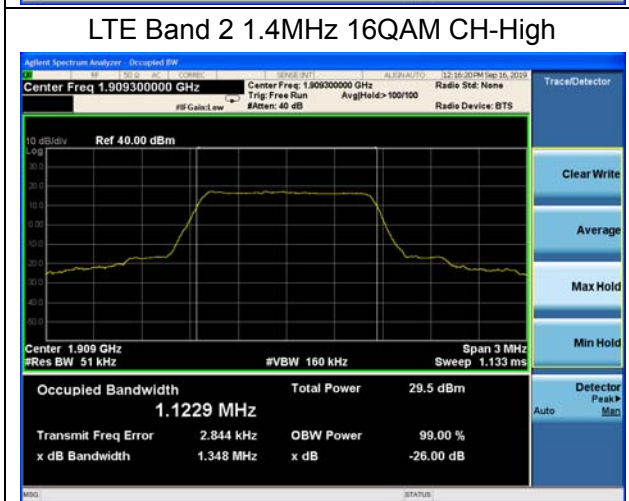
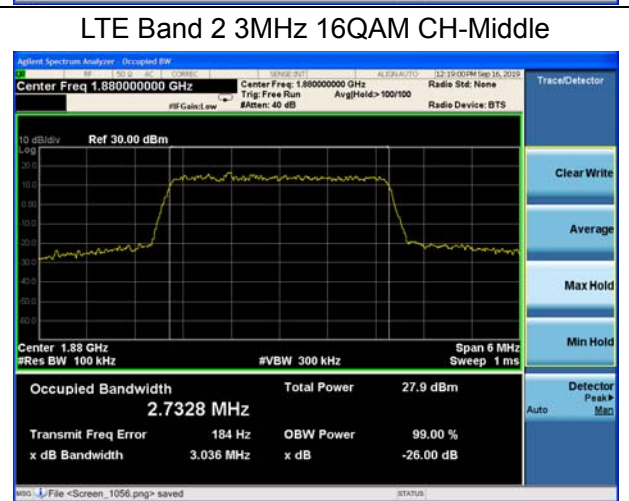
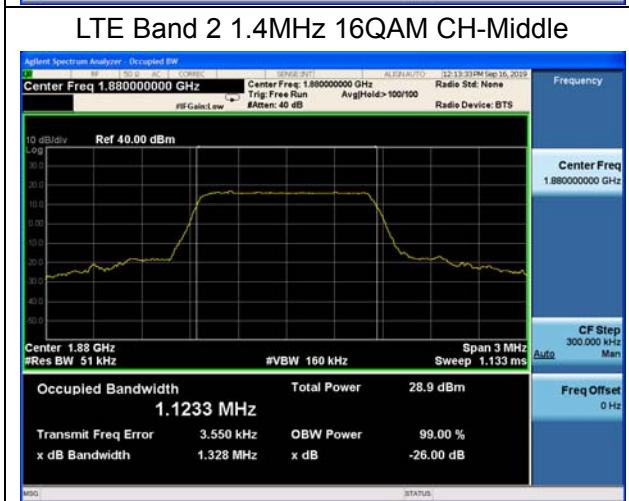
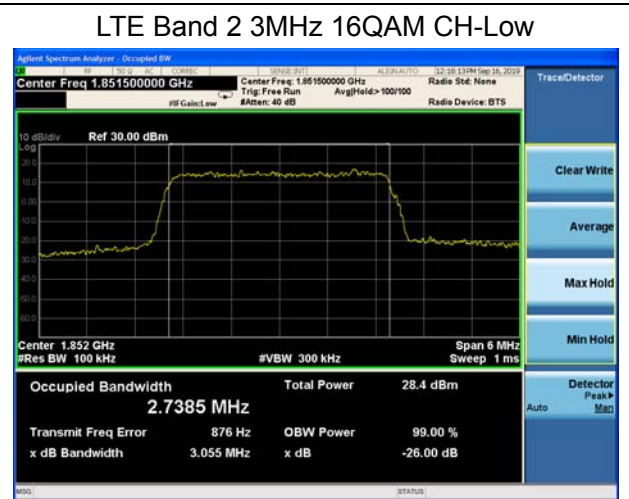
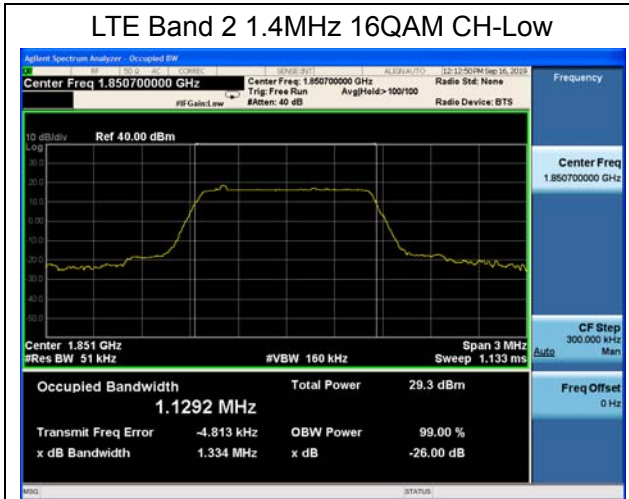
		19193	1909.3	1.1233	1.328
	3	18615	1851.5	2.7385	3.055
		18900	1880	2.7328	3.036
		19185	1908.5	2.7393	3.067
	5	18625	1852.5	4.5025	4.990
		18900	1880	4.5373	5.025
		19175	1907.5	4.5232	5.042
	10	18650	1855	9.0188	9.950
		18900	1880	9.0166	9.999
		19150	1905	9.0128	10.010
	15	18675	1857.5	13.4220	14.690
		18900	1880	13.4620	14.780
		19125	1902.5	13.4190	14.510
	20	18700	1860	17.8100	19.090
		18900	1880	17.8790	19.260
		19100	1900	17.8180	19.020

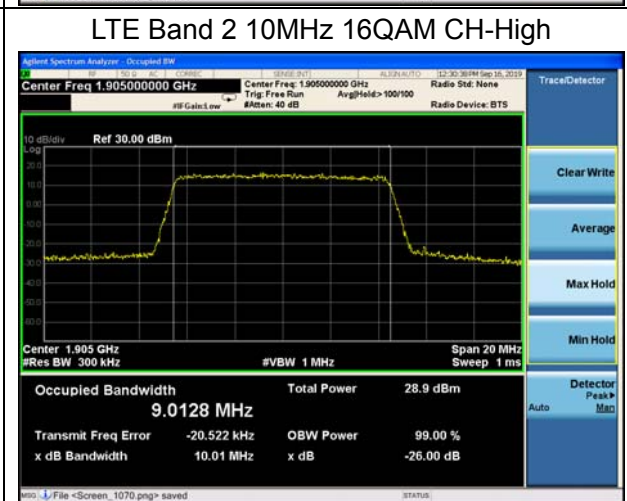
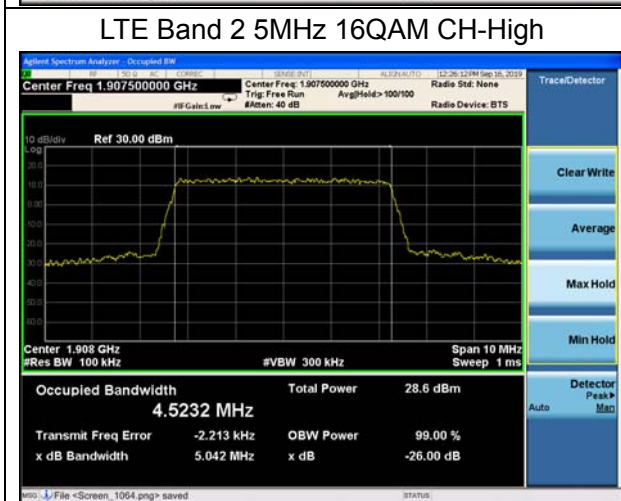
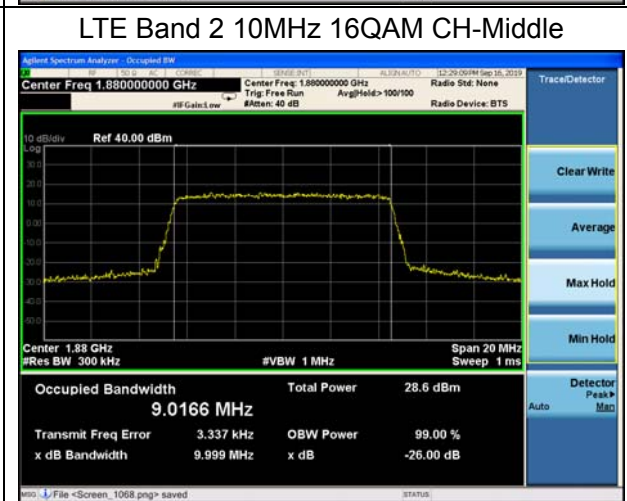
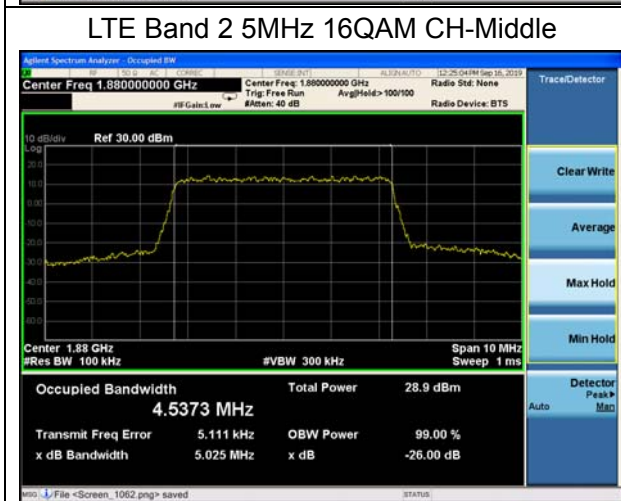
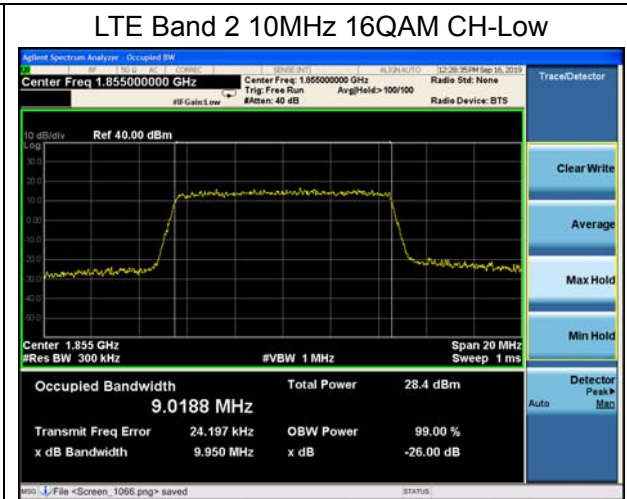
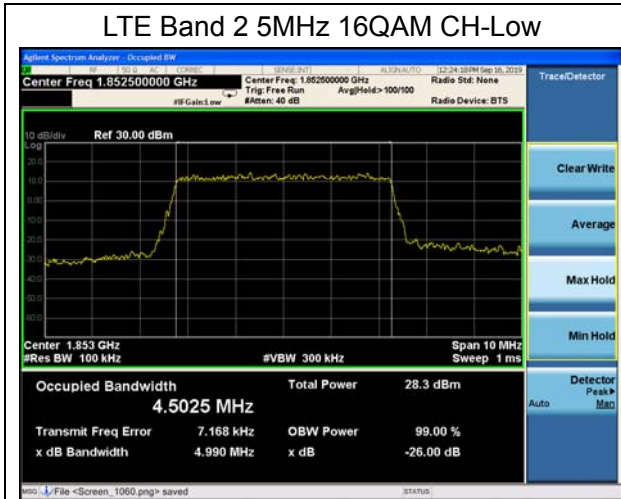


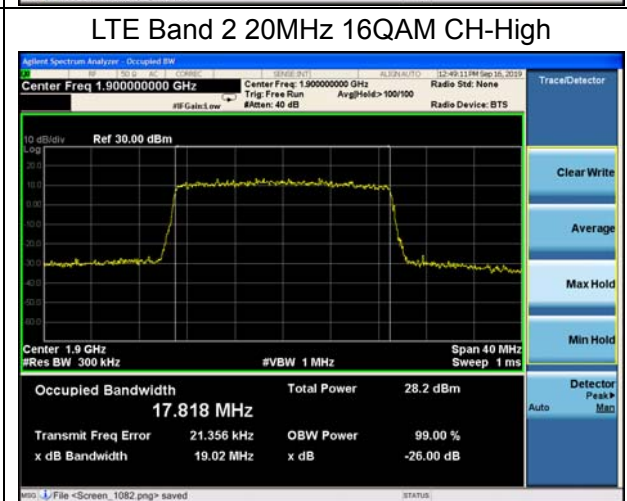
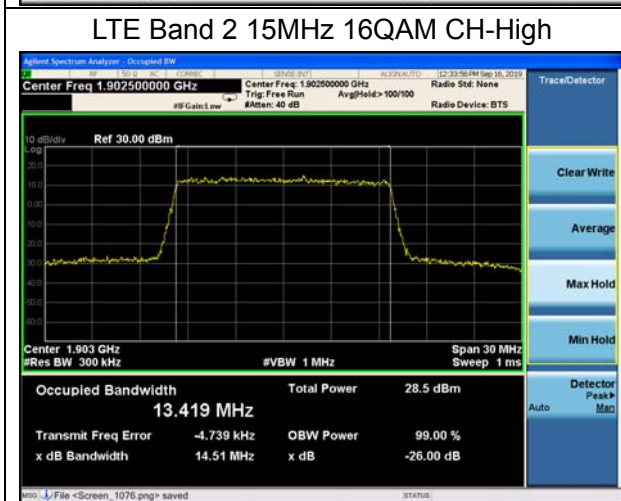
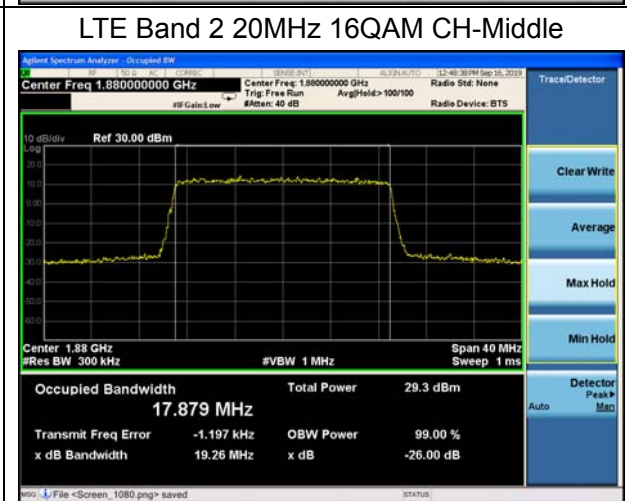
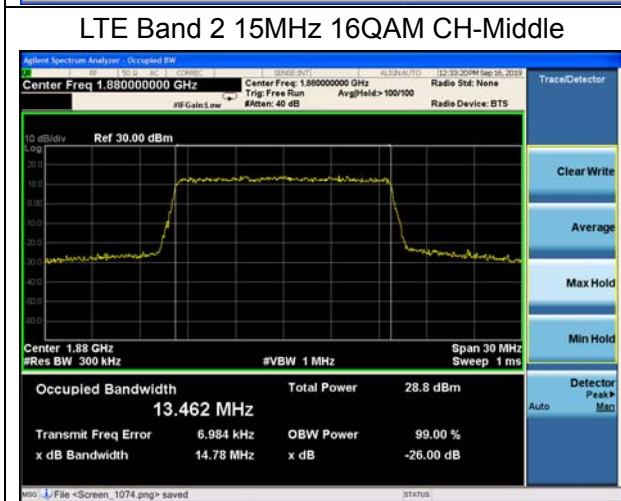
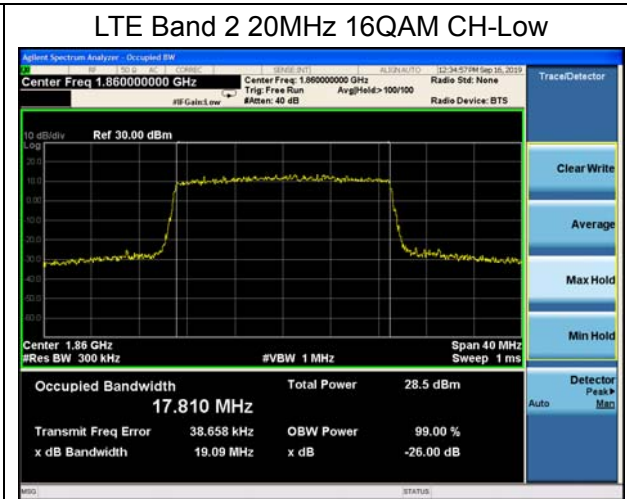
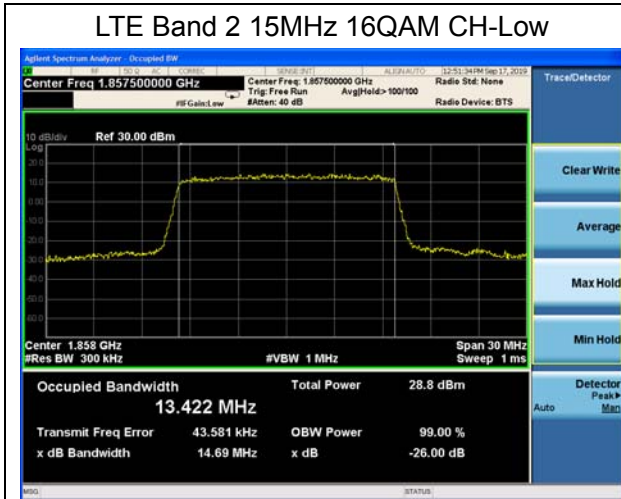












5.4. Band Edge Compliance

Ambient condition

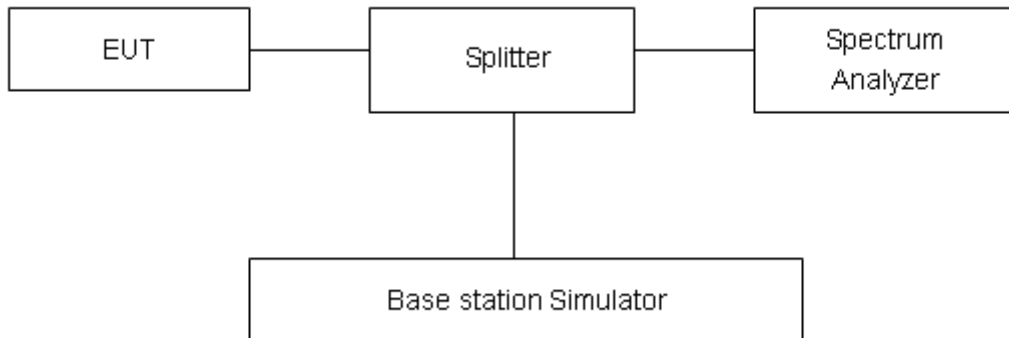
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 51kHz for LTE Band 2 (1.4MHz), RBW is set to 30kHz, VBW is set to 100kHz for LTE Band 2 (3MHz), RBW is set to 51kHz, VBW is set to 160kHz 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 510kHz 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
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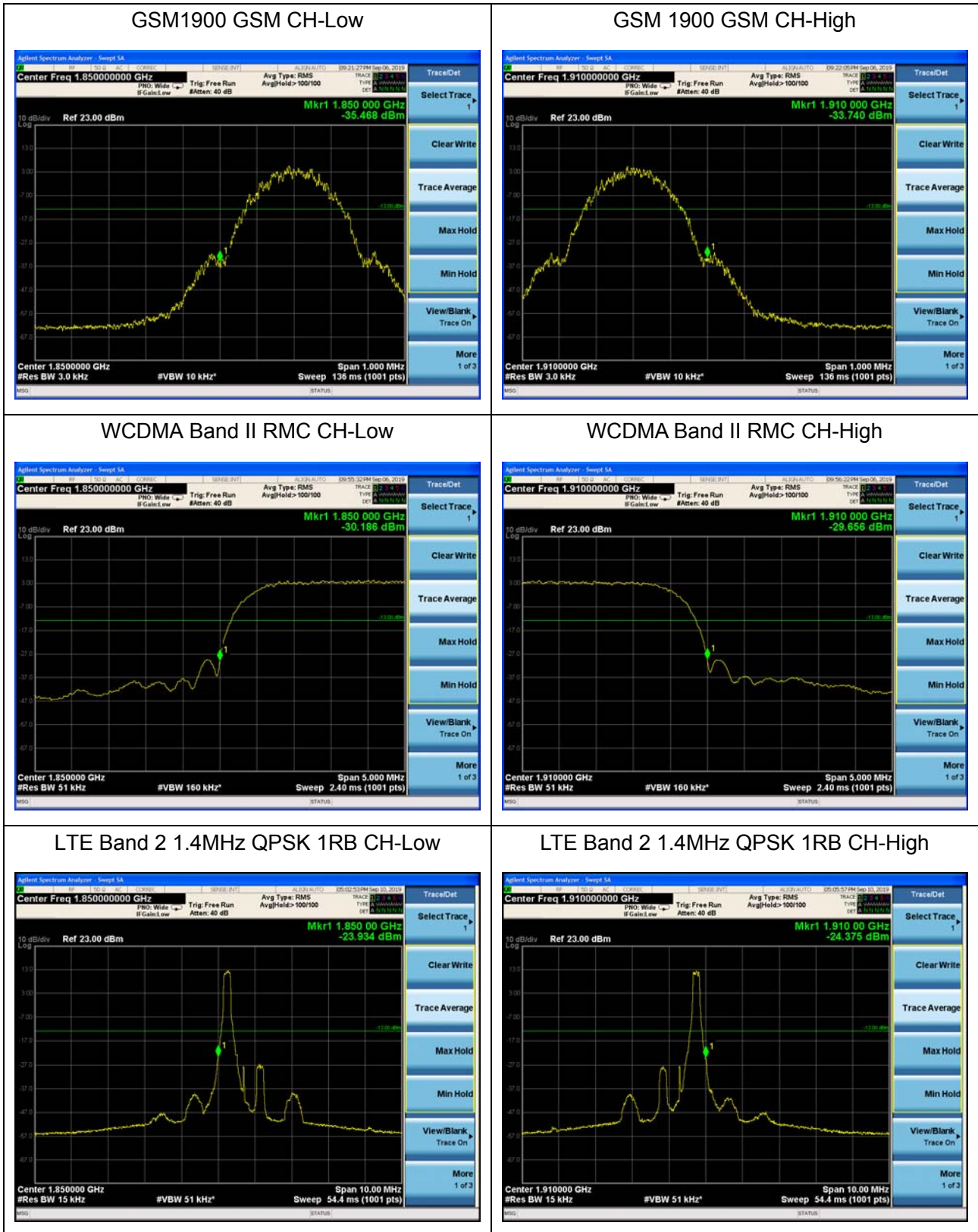
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is



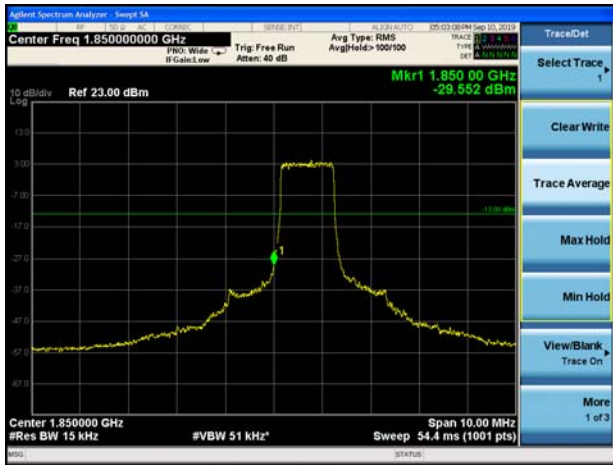
with the coverage factor $k = 1.96$, $U=0.684$ dB.

Test Result:

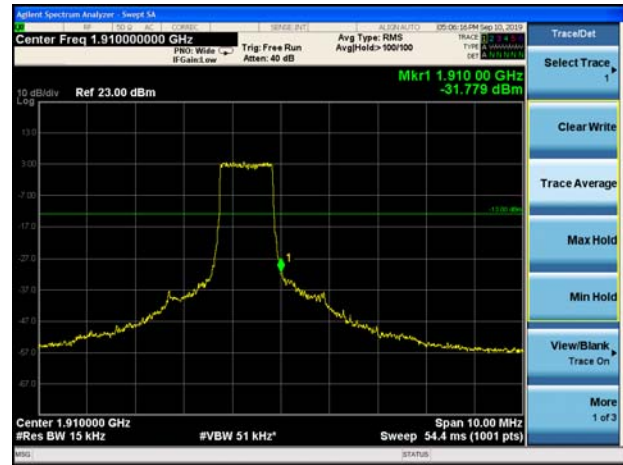




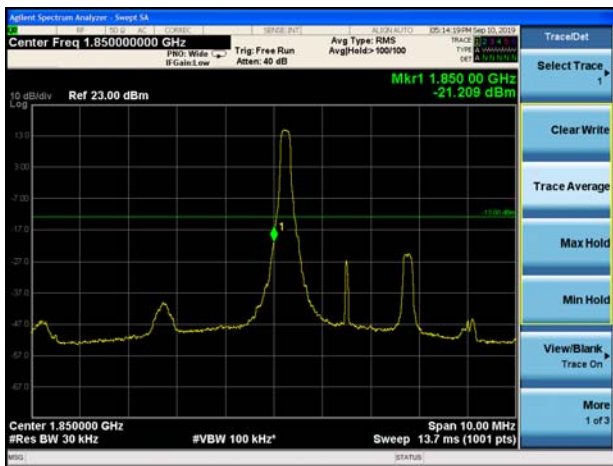
LTE Band 2 1.4MHz QPSK 100%RB CH-Low



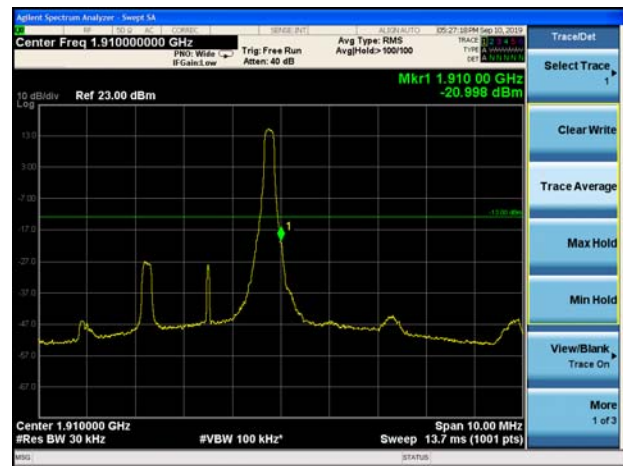
LTE Band 2 1.4MHz QPSK 100%RB CH-High



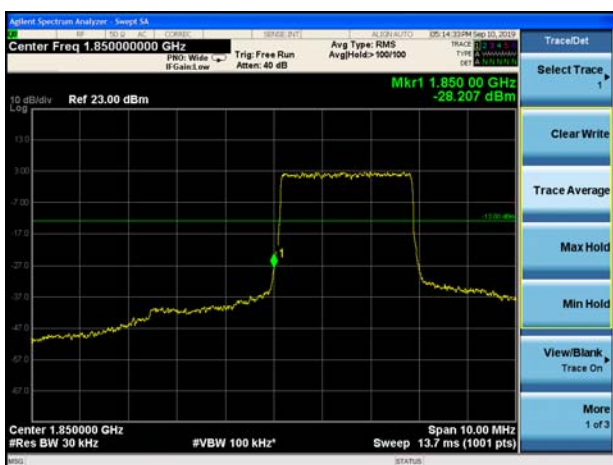
LTE Band 2 3MHz QPSK 1RB CH-Low



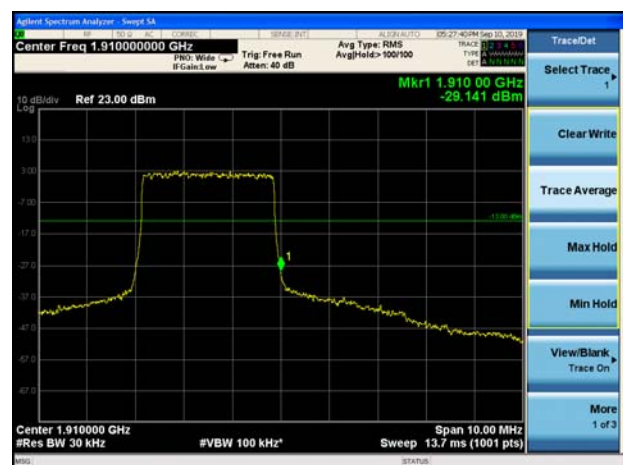
LTE Band 2 3MHz QPSK 1RB CH-High



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

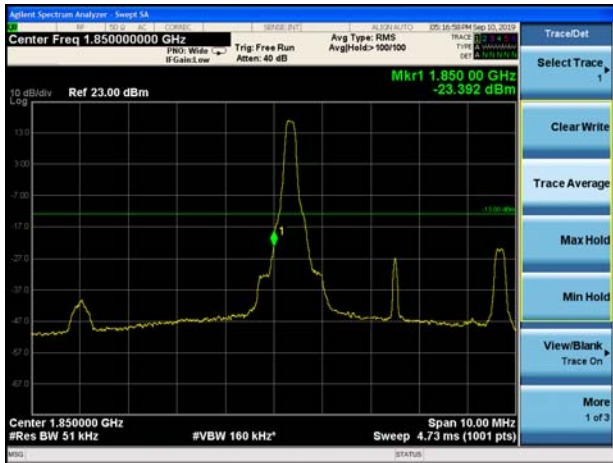


LTE Band 2 3MHz QPSK 100%RB CH-High

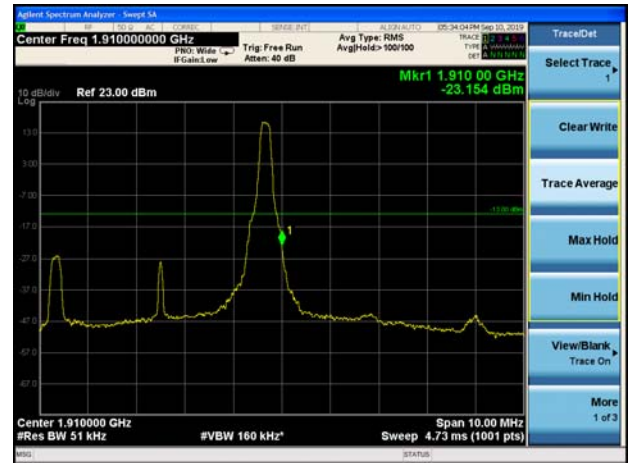




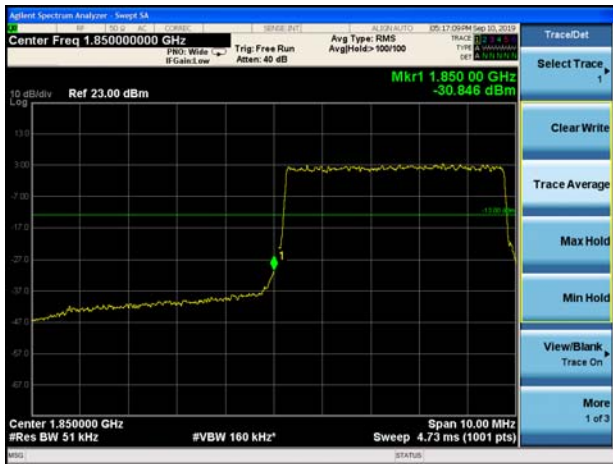
LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High



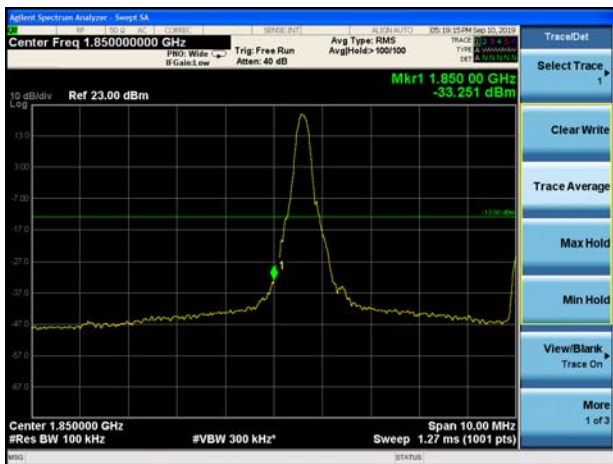
LTE Band 2 5MHz QPSK 100%RB CH-Low



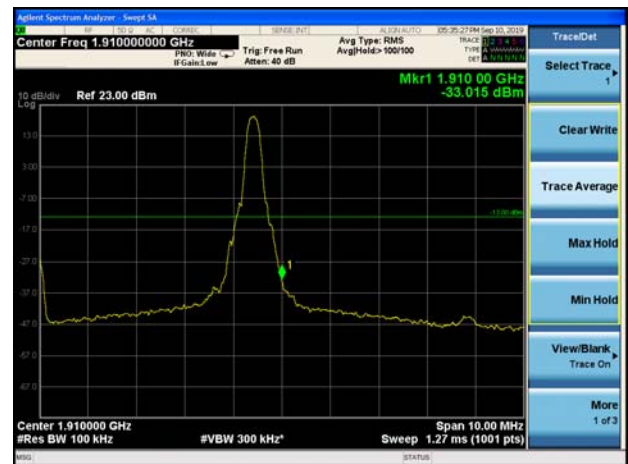
LTE Band 2 5MHz QPSK 100%RB CH-High



LTE Band 2 10MHz QPSK 1RB CH-Low

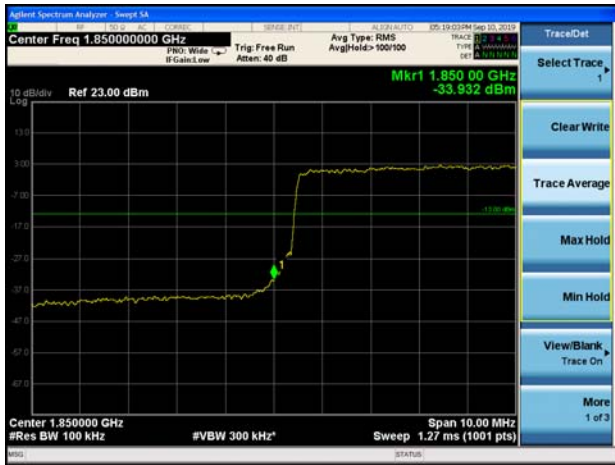


LTE Band 2 10MHz QPSK 1RB CH-High





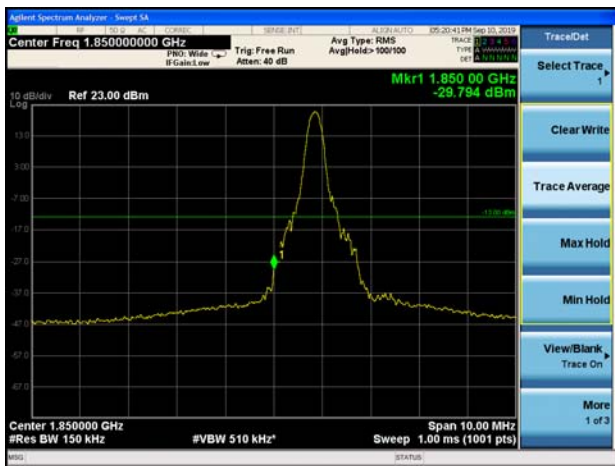
LTE Band 2 10MHz QPSK 100%RB CH-Low



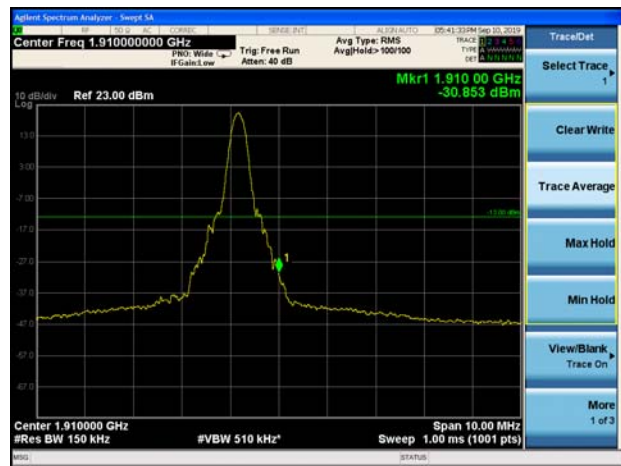
LTE Band 2 10MHz QPSK 100%RB CH-High



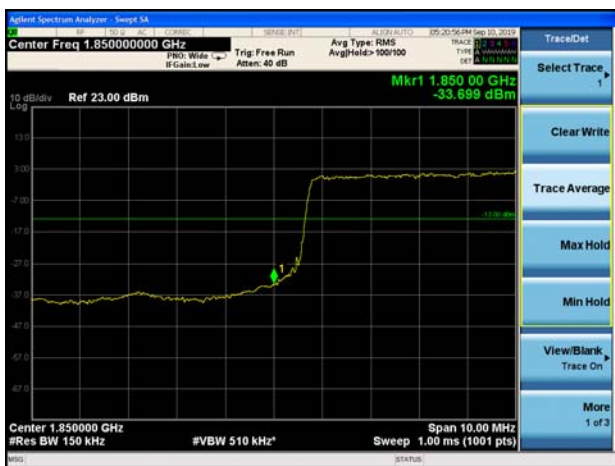
LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High



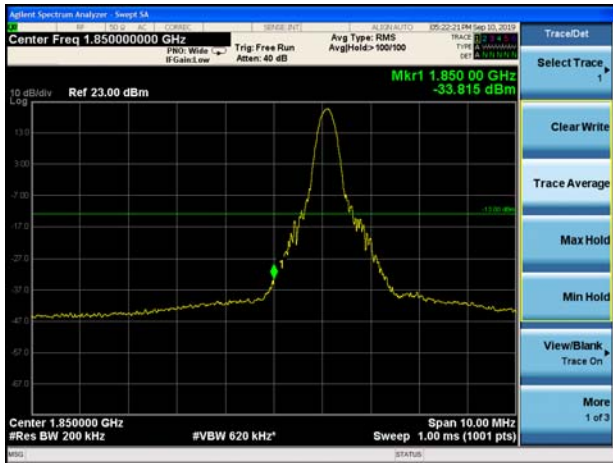
LTE Band 2 15MHz QPSK 100%RB CH-Low



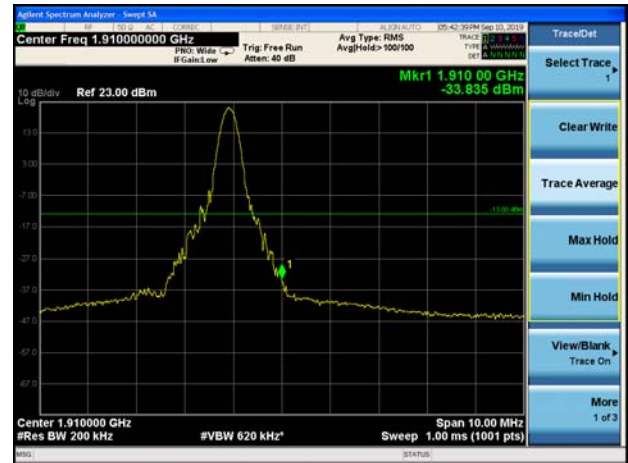
LTE Band 2 15MHz QPSK 100%RB CH-High



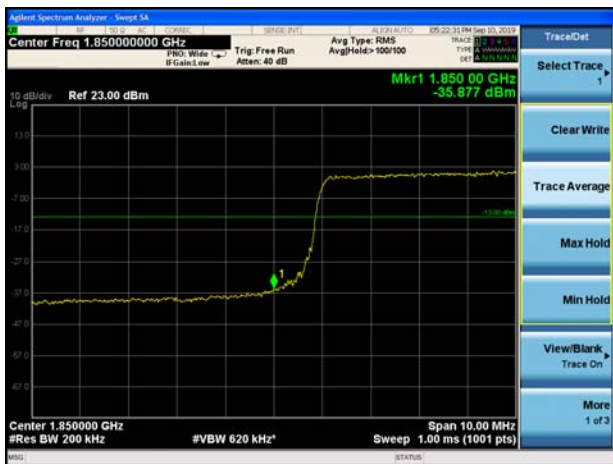
LTE Band 2 20MHz QPSK 1RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High



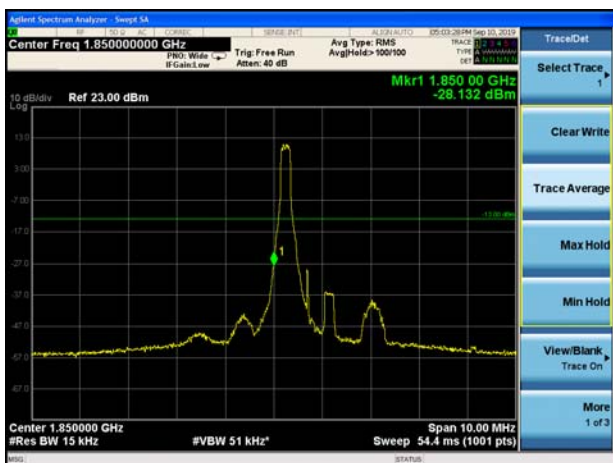
LTE Band 2 20MHz QPSK 100%RB CH-Low



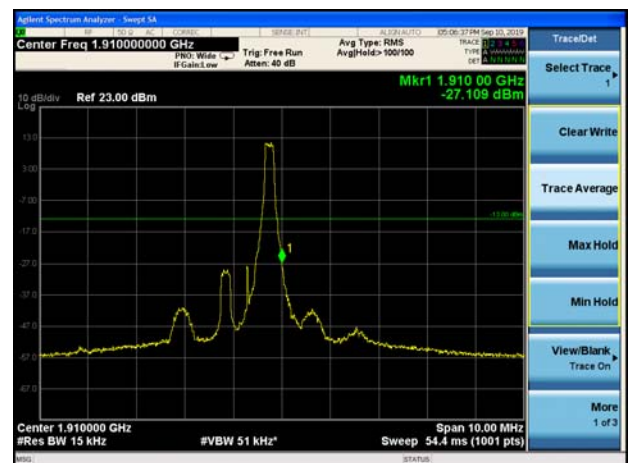
LTE Band 2 20MHz QPSK 100%RB CH-High



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

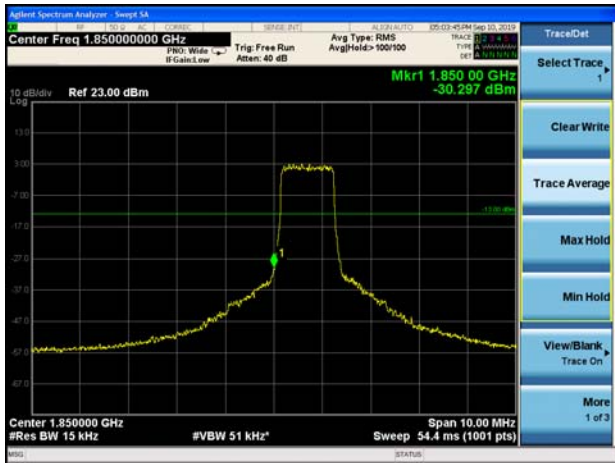


LTE Band 2 1.4MHz 16QAM 1RB CH-High

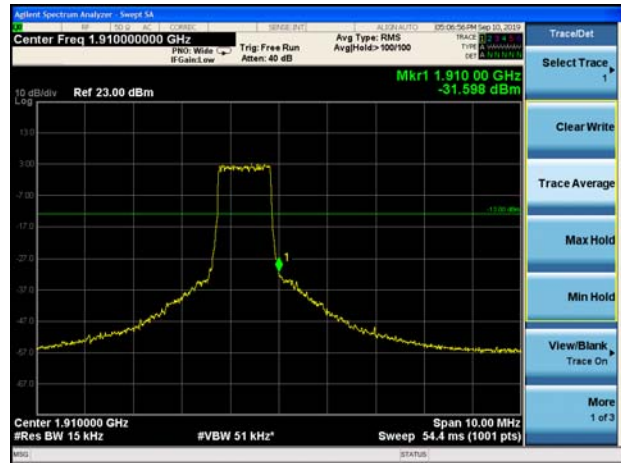




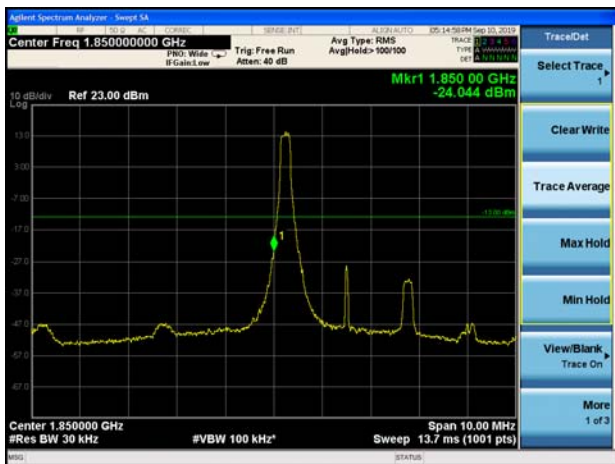
LTE Band 2 1.4MHz 16QAM 100%RB CH-Low



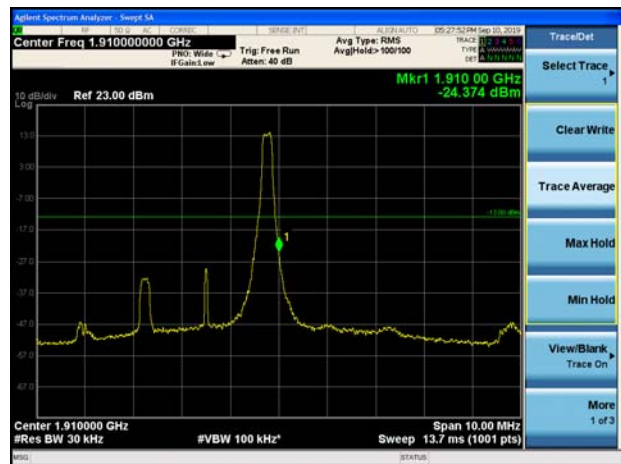
LTE Band 2 1.4MHz 16QAM 100%RB CH-High



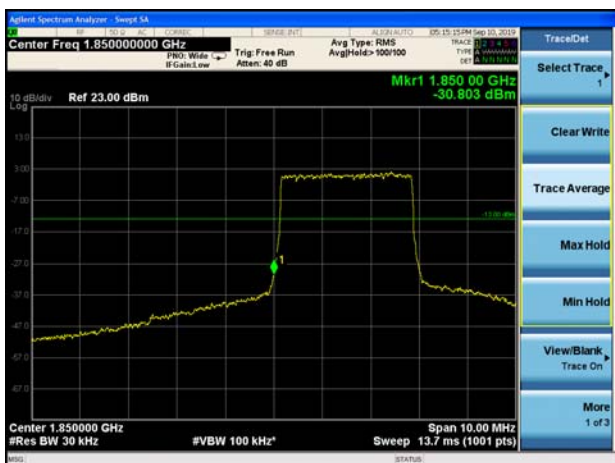
LTE Band 2 3MHz 16QAM 1RB CH-Low



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



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

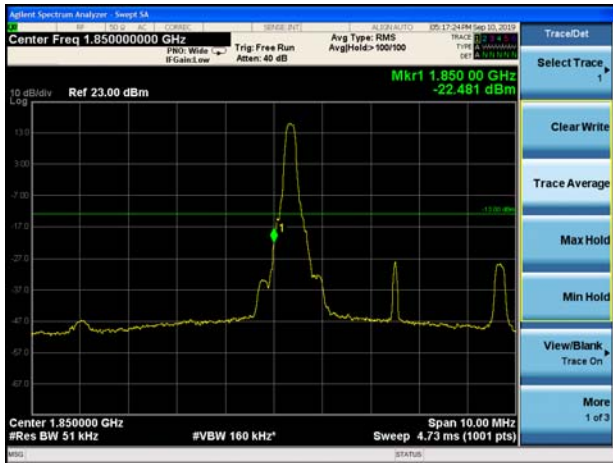


LTE Band 2 3MHz 16QAM 100%RB CH-High

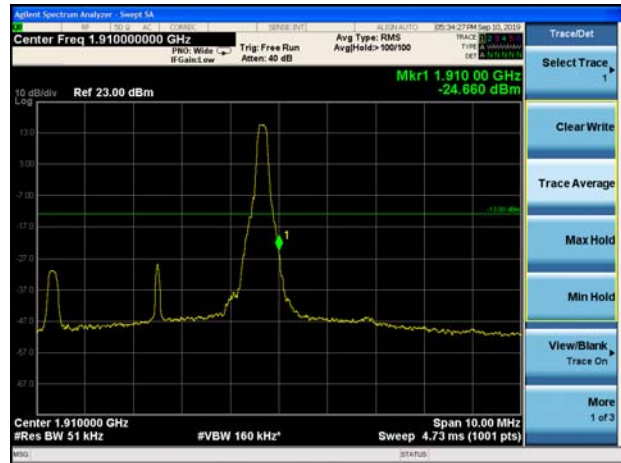




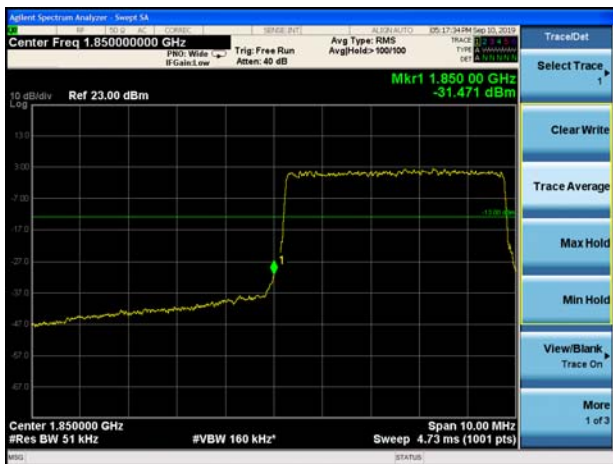
LTE Band 2 5MHz 16QAM 1RB CH-Low



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



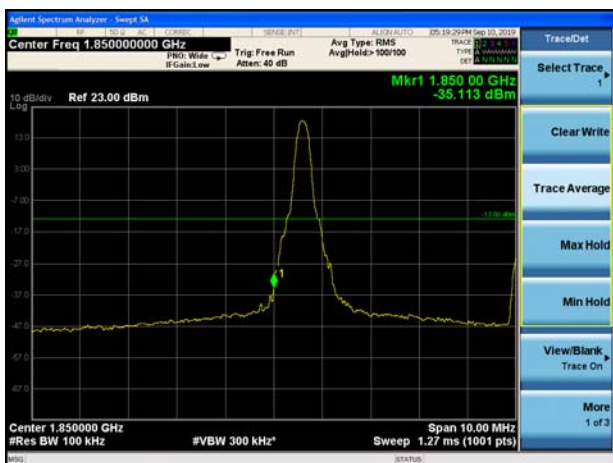
LTE Band 2 5MHz 16QAM 100%RB CH-Low



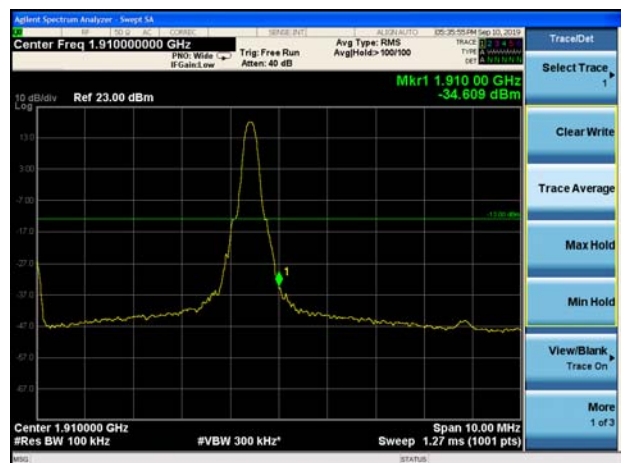
LTE Band 2 5MHz 16QAM 100%RB CH-High



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

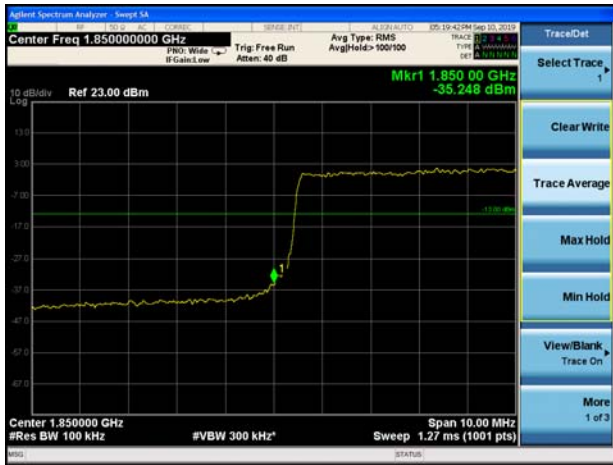


LTE Band 2 10MHz 16QAM 1RB CH-High





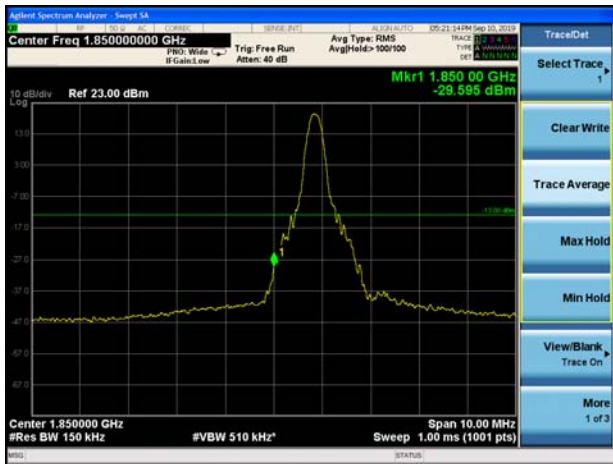
LTE Band 2 10MHz 16QAM 100%RB CH-Low



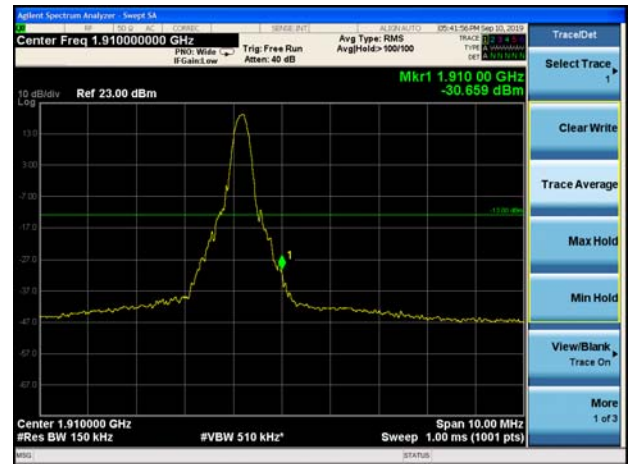
LTE Band 2 10MHz 16QAM 100%RB CH-High



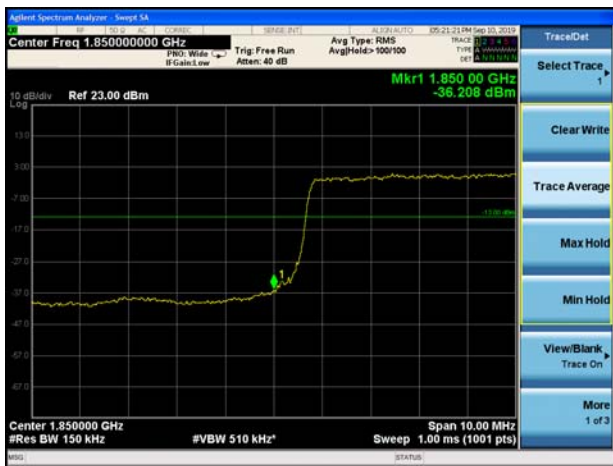
LTE Band 2 15MHz 16QAM 1RB CH-Low



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



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

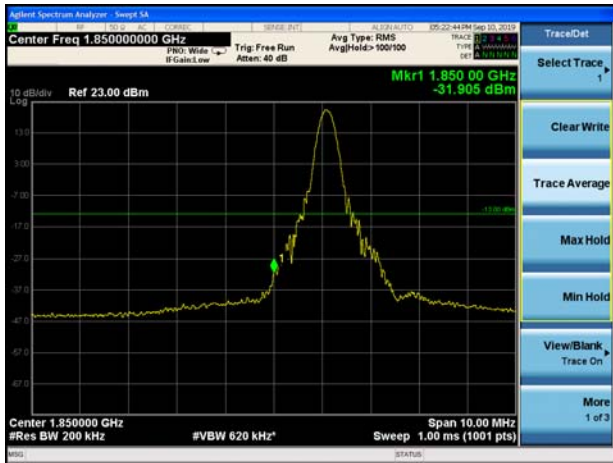


LTE Band 2 15MHz 16QAM 100%RB CH-High

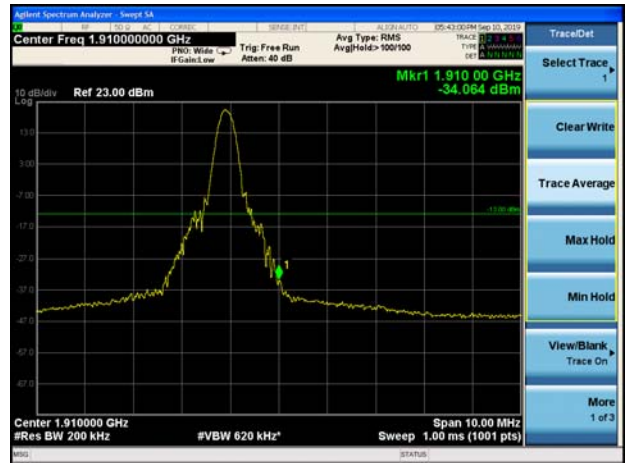




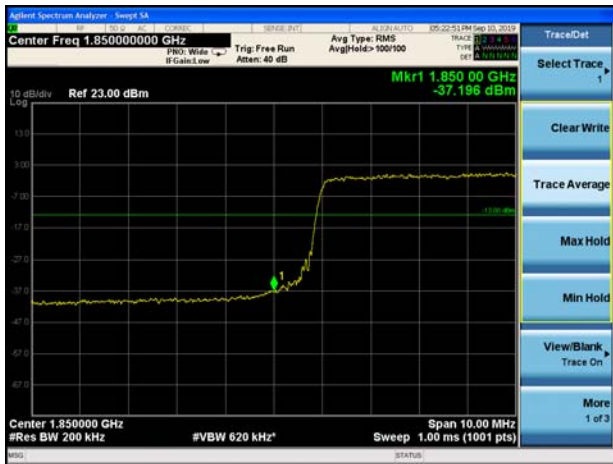
LTE Band 2 20MHz 16QAM 1RB CH-Low



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



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



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



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

Ambient condition

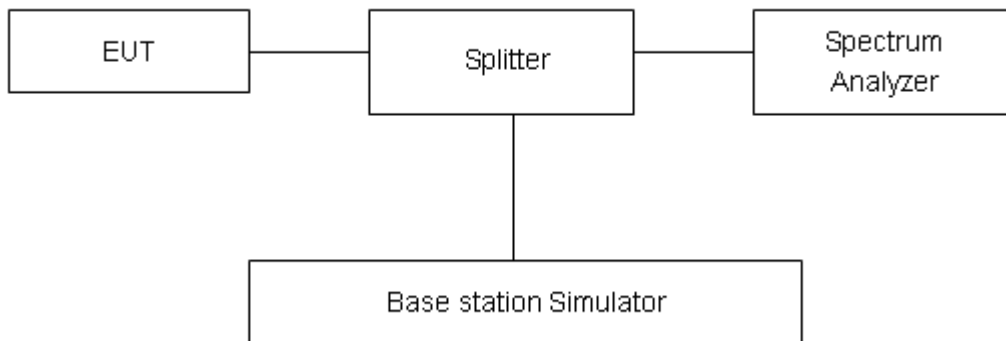
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 peak-to-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.



Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	31.18	29.07	2.11	≤13	PASS
	661	1880	31.23	29.15	2.08	≤13	PASS
	810	1909.8	31.33	29.2	2.13	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	24.83	21.89	2.94	≤13	PASS
	9400	1880	25.34	22.21	3.13	≤13	PASS
	9538	1907.6	24.91	21.91	3.00	≤13	PASS

LTE Band 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	26.20	22.44	3.76	≤13	PASS
		18900	1880.0	26.43	21.96	4.47	≤13	PASS
		19193	1909.3	26.20	22.03	4.17	≤13	PASS
	3	18615	1851.5	25.99	22.12	3.87	≤13	PASS
		18900	1880	26.45	21.99	4.46	≤13	PASS
		19185	1908.5	26.19	22.01	4.18	≤13	PASS
	5	18625	1852.5	25.94	21.86	4.08	≤13	PASS
		18900	1880	26.31	21.86	4.45	≤13	PASS
		19175	1907.5	26.03	21.91	4.12	≤13	PASS
	10	18650	1855	25.82	21.90	3.92	≤13	PASS
		18900	1880	26.32	21.97	4.35	≤13	PASS
		19150	1905	25.95	21.90	4.05	≤13	PASS
	15	18675	1857.5	25.93	22.01	3.92	≤13	PASS
		18900	1880	26.07	21.75	4.32	≤13	PASS
		19125	1902.5	25.92	21.71	4.21	≤13	PASS
	20	18700	1860	25.73	21.67	4.06	≤13	PASS
		18900	1880	26.08	21.87	4.21	≤13	PASS
		19100	1900	26.24	21.94	4.30	≤13	PASS
16QAM	1.4	18607	1850.7	26.19	21.54	4.65	≤13	PASS
		18900	1880.0	26.62	21.29	5.33	≤13	PASS
		19193	1909.3	26.04	20.83	5.21	≤13	PASS
	3	18615	1851.5	25.69	20.80	4.89	≤13	PASS
		18900	1880	26.68	21.39	5.29	≤13	PASS
		19185	1908.5	26.08	20.96	5.12	≤13	PASS
	5	18625	1852.5	25.64	20.63	5.01	≤13	PASS
		18900	1880	26.36	21.13	5.23	≤13	PASS
		19175	1907.5	25.77	20.67	5.10	≤13	PASS
10	18650	1855	25.73	21.82	3.91	≤13	PASS	



		18900	1880	26.65	21.50	5.15	≤13	PASS
		19150	1905	26.04	21.15	4.89	≤13	PASS
	15	18675	1857.5	25.63	20.66	4.97	≤13	PASS
		18900	1880	26.58	21.56	5.02	≤13	PASS
		19125	1902.5	25.72	20.52	5.20	≤13	PASS
	20	18700	1860	25.87	21.05	4.82	≤13	PASS
		18900	1880	25.93	20.74	5.19	≤13	PASS
		19100	1900	26.38	21.21	5.17	≤13	PASS

5.6. 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 -40°C to +85°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 -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

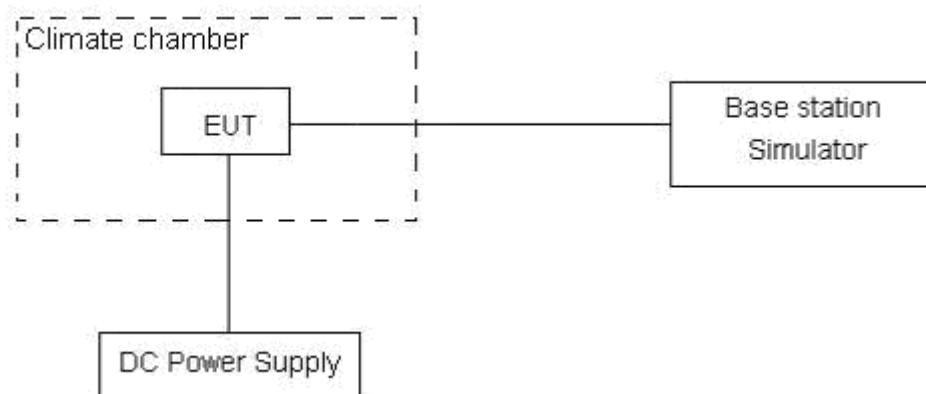
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.3 V and 4.2 V, with a nominal voltage of 3.8V

Test setup



**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 $k = 3$, $U = 0.01\text{ppm}$.



Test Result

GSM1900						
Condition		Freq.Error (Hz)	Frequency Stability (ppm)	Verdict		
Temperature	Voltage	GMSK	GMSK			
Normal (25°C)	Normal	7.90	0.00420	PASS		
Extreme (90°C)		9.82	0.00522	PASS		
Extreme (80°C)		12.06	0.00641	PASS		
Extreme (70°C)		6.90	0.00367	PASS		
Extreme (60°C)		6.03	0.00321	PASS		
Extreme (50°C)		8.62	0.00459	PASS		
Extreme (40°C)		15.92	0.00847	PASS		
Extreme (30°C)		10.47	0.00557	PASS		
Extreme (20°C)		12.01	0.00639	PASS		
Extreme (10°C)		15.96	0.00849	PASS		
Extreme (0°C)		4.14	0.00220	PASS		
Extreme (-10°C)		7.42	0.00394	PASS		
Extreme (-20°C)		15.61	0.00830	PASS		
Extreme (-30°C)		10.38	0.00552	PASS		
Extreme (-40°C)		15.38	0.00818	PASS		
25°C	LV	8.27	0.00440	PASS		
	HV	15.98	0.00850	PASS		

WCDMA Band 2						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal (25°C)	Normal	2.54	5.85	0.00135	0.00311	PASS
Extreme (90°C)		3.08	15.72	0.00164	0.00836	PASS
Extreme (80°C)		17.19	8.59	0.00914	0.00457	PASS
Extreme (70°C)		4.01	3.73	0.00214	0.00198	PASS
Extreme (60°C)		14.99	15.66	0.00798	0.00833	PASS
Extreme (50°C)		9.28	7.91	0.00494	0.00420	PASS
Extreme (40°C)		8.90	10.41	0.00474	0.00554	PASS
Extreme (30°C)		16.52	14.20	0.00879	0.00755	PASS
Extreme (20°C)		16.55	16.63	0.00880	0.00884	PASS



Extreme (10°C)		4.98	4.12	0.00265	0.00219	PASS
Extreme (0°C)		9.53	10.01	0.00507	0.00532	PASS
Extreme (-10°C)		12.84	9.42	0.00683	0.00501	PASS
Extreme (-20°C)		15.74	12.39	0.00837	0.00659	PASS
Extreme (-30°C)		8.96	10.76	0.00477	0.00572	PASS
Extreme (-40°C)		10.41	8.92	0.00554	0.00474	PASS
25°C	LV	2.59	11.22	0.00138	0.00597	PASS
	HV	15.19	15.03	0.00808	0.00799	PASS

LTE Band 2						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25°C)	Normal	13.83	8.58	0.00735	0.00457	PASS
Extreme (90°C)		3.00	13.45	0.00159	0.00715	PASS
Extreme (80°C)		8.81	1.51	0.00469	0.00081	PASS
Extreme (70°C)		8.50	17.44	0.00452	0.00928	PASS
Extreme (60°C)		4.47	16.74	0.00238	0.00890	PASS
Extreme (50°C)		17.22	8.52	0.00916	0.00453	PASS
Extreme (40°C)		10.40	13.42	0.00553	0.00714	PASS
Extreme (30°C)		8.01	15.09	0.00426	0.00803	PASS
Extreme (20°C)		14.59	1.98	0.00776	0.00105	PASS
Extreme (10°C)		2.43	8.04	0.00129	0.00428	PASS
Extreme (0°C)		8.58	17.35	0.00456	0.00923	PASS
Extreme (-10°C)		8.42	4.46	0.00448	0.00237	PASS
Extreme (-20°C)		13.89	11.77	0.00739	0.00626	PASS
Extreme (-30°C)		3.72	12.22	0.00198	0.00650	PASS
Extreme (-40°C)		13.29	2.41	0.00707	0.00128	PASS
25°C	LV	6.03	7.50	0.00321	0.00399	PASS
	HV	8.60	14.63	0.00457	0.00778	PASS

5.7. Spurious Emissions at Antenna Terminals

Ambient condition

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

Method of Measurement

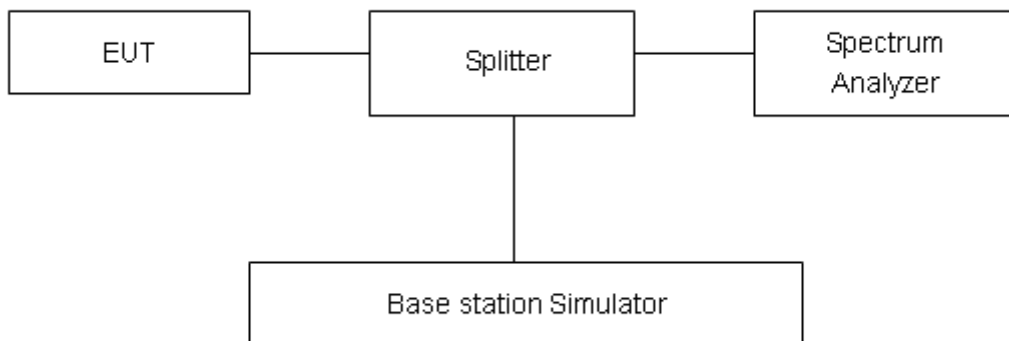
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

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.

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 $43 + 10 \log_{10}(P)$ 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 $k = 1.96$.

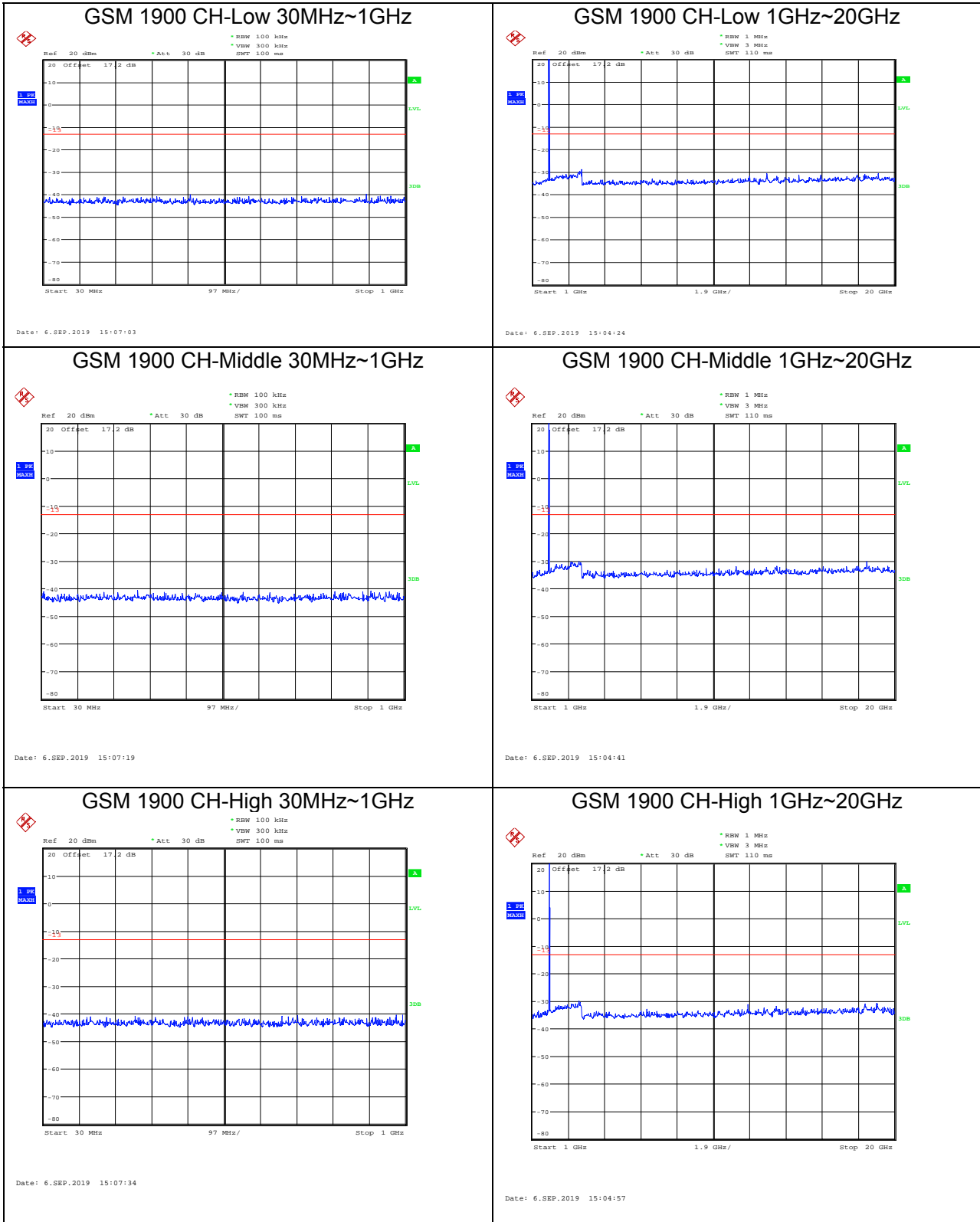
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB



Test Result

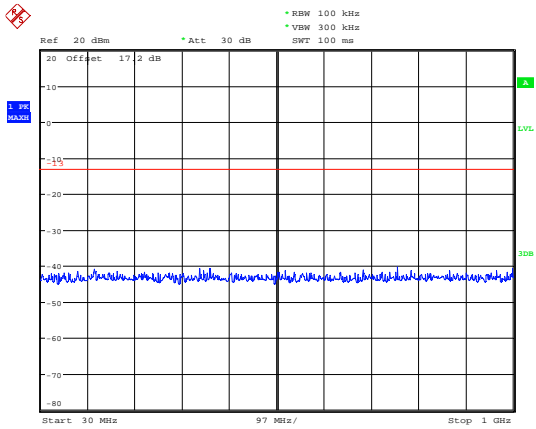
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.



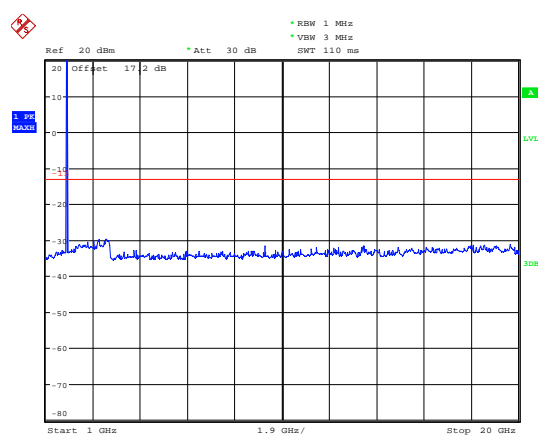


WCDMA Band II CH-Low 30MHz~1GHz



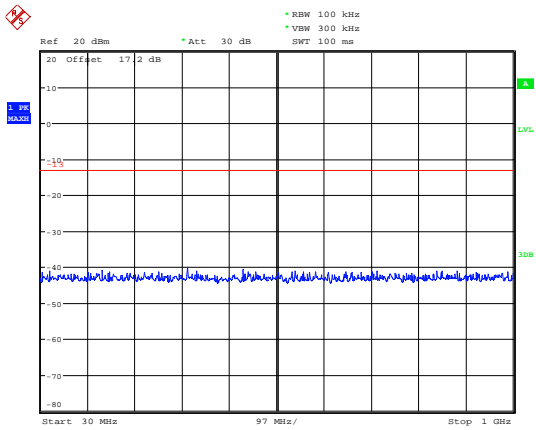
Date: 6.SEP.2019 13:31:41

WCDMA BAND II CH-Low 3GHz~20GHz



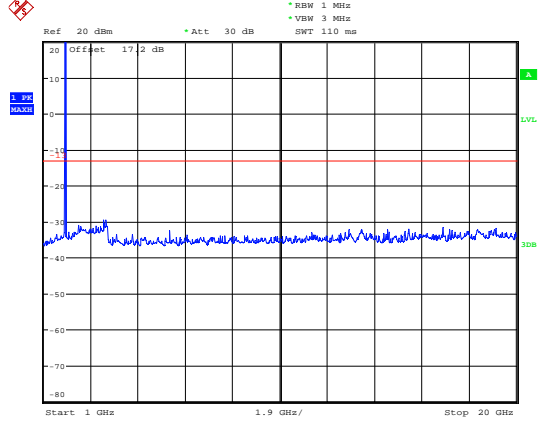
Date: 6.SEP.2019 13:23:15

WCDMA Band II CH- Middle 30MHz~1GHz



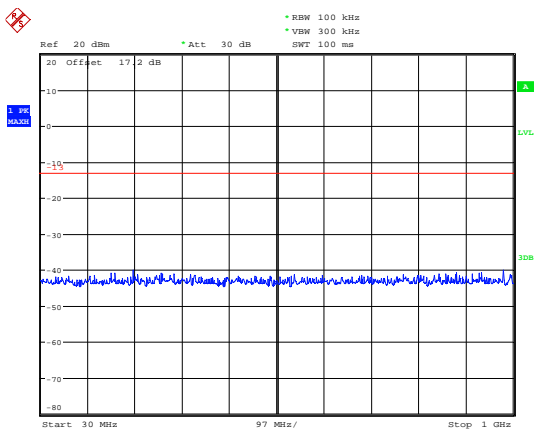
Date: 6.SEP.2019 13:32:03

WCDMA BAND II CH-Middle 1GHz~20GHz



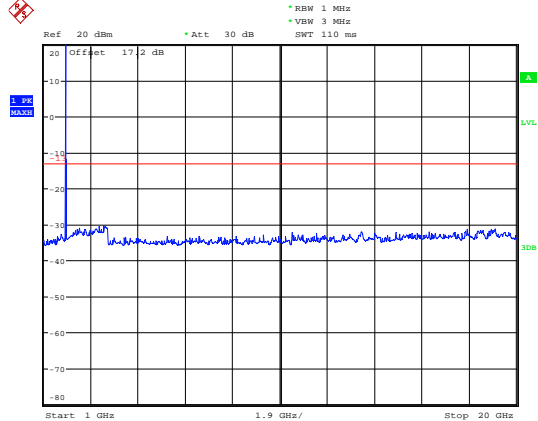
Date: 6.SEP.2019 13:23:38

WCDMA Band II CH- High 30MHz~1GHz



Date: 6.SEP.2019 13:32:24

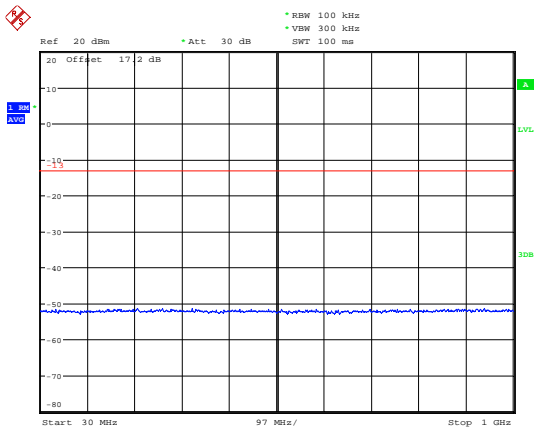
WCDMA BAND II CH-High 1GHz~20GHz



Date: 6.SEP.2019 13:24:03

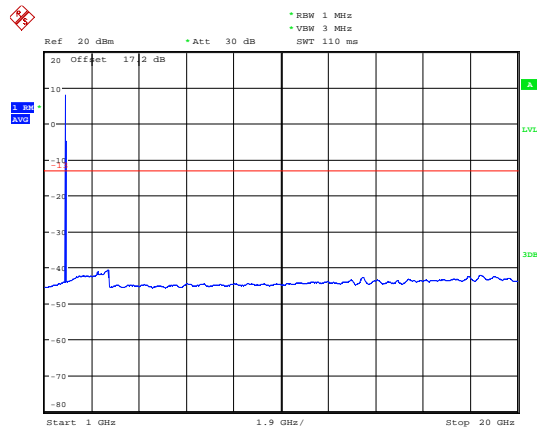


LTE Band 2 1.4MHz CH-Low 30MHz~1GHz



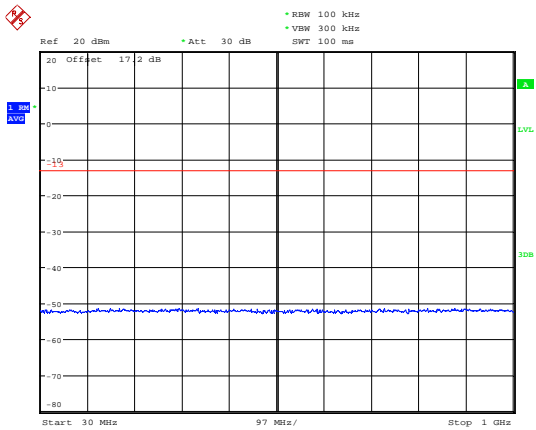
Date: 9.SEP.2019 18:51:57

LTE Band 2 1.4MHz CH-Low 1GHz~20GHz



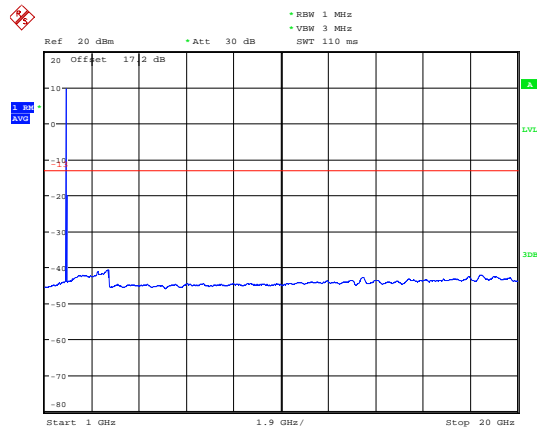
Date: 9.SEP.2019 19:05:14

LTE Band 2 1.4MHz CH-Middle 30MHz~1GHz



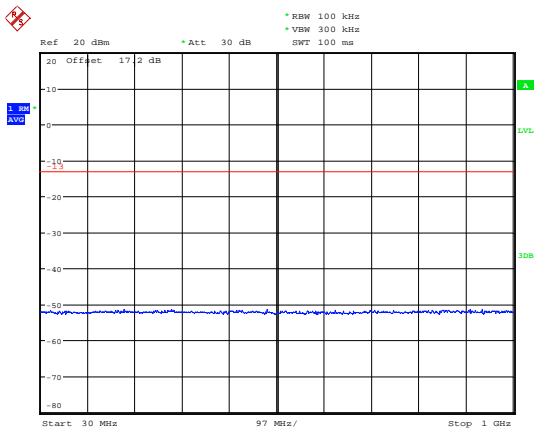
Date: 9.SEP.2019 18:52:17

LTE Band 2 1.4MHz CH-Middle 1GHz~20GHz



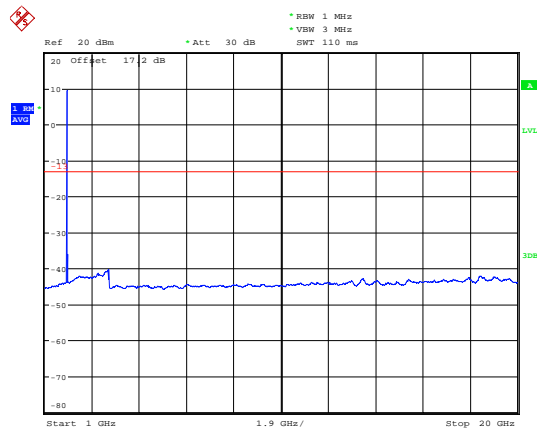
Date: 9.SEP.2019 19:05:32

LTE Band 2 1.4MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:52:23

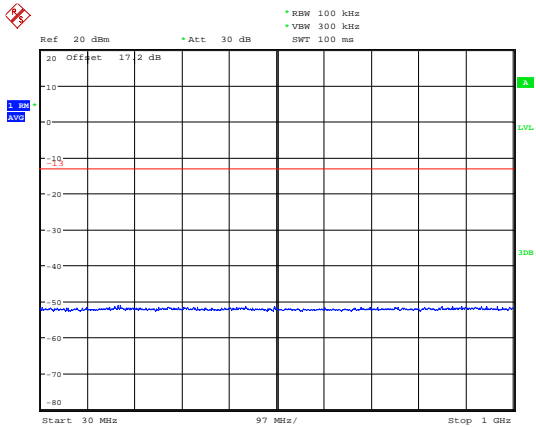
LTE Band 2 1.4MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:05:53

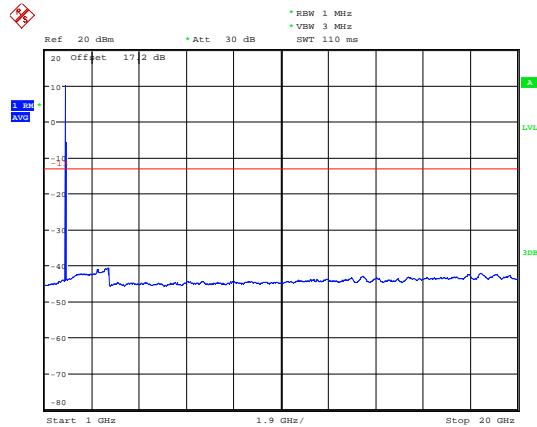


LTE Band 2 3MHz CH-Low 30MHz~1GHz



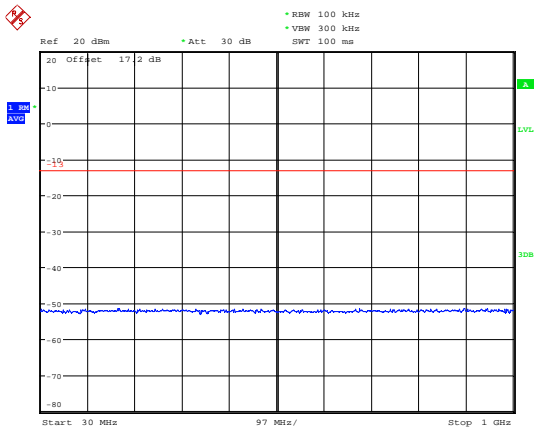
Date: 9.SEP.2019 18:52:50

LTE Band 2 3MHz CH-Low 1GHz~20GHz



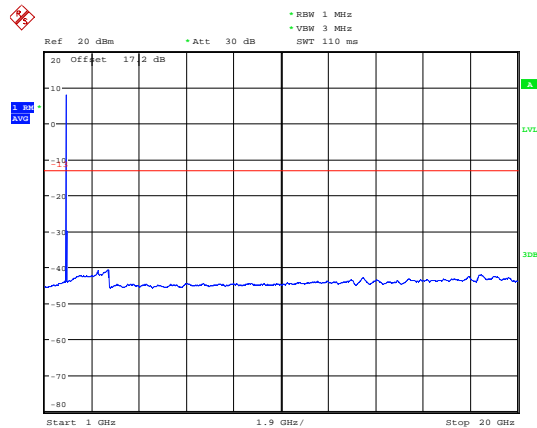
Date: 9.SEP.2019 19:06:15

LTE Band 2 3MHz CH-Middle 30MHz~1GHz



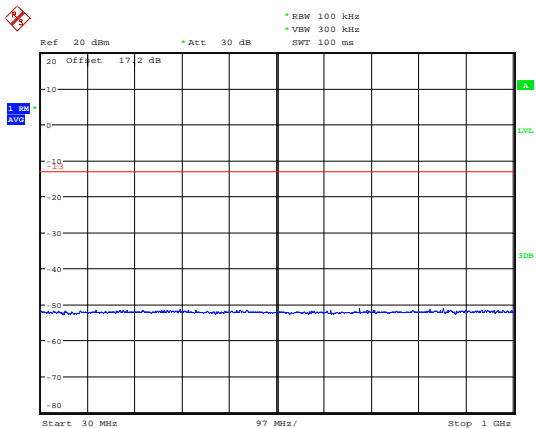
Date: 9.SEP.2019 18:53:01

LTE Band 2 3MHz CH-Middle 1GHz~20GHz



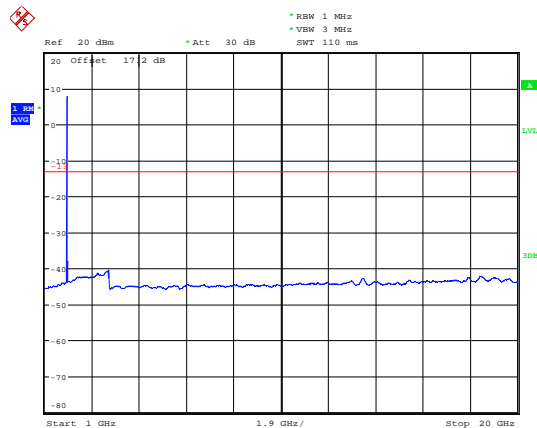
Date: 9.SEP.2019 19:06:35

LTE Band 2 3MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:53:09

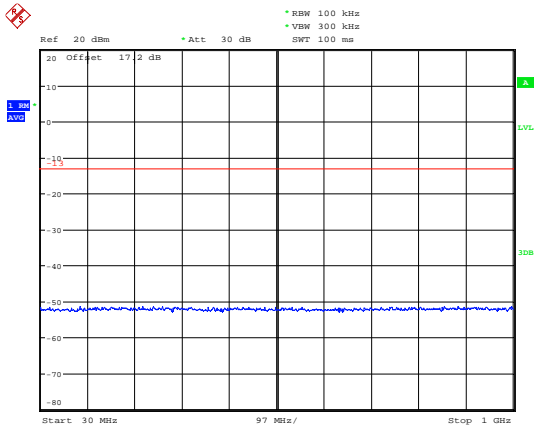
LTE Band 23MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:06:53

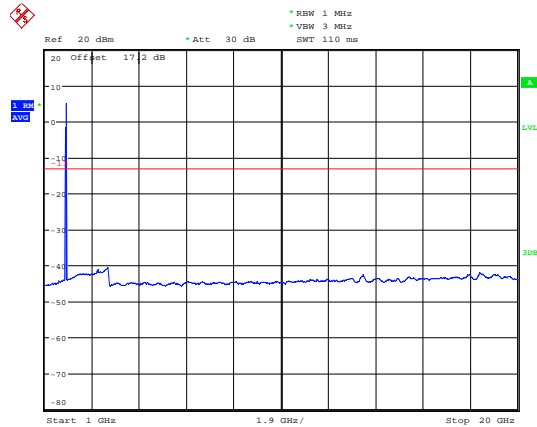


LTE Band 2 5MHz CH-Low 30MHz~1GHz



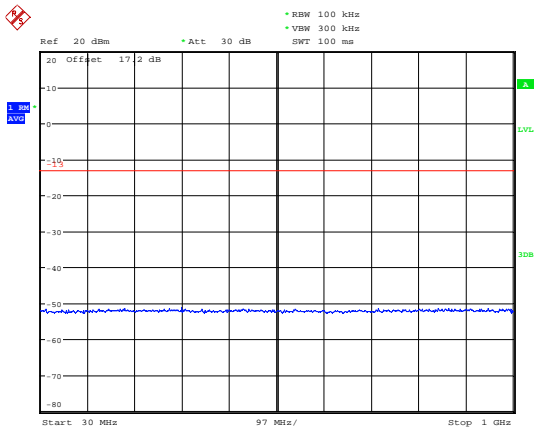
Date: 9.SEP.2019 18:53:26

LTE Band 2 5MHz CH-Low 1GHz~20GHz



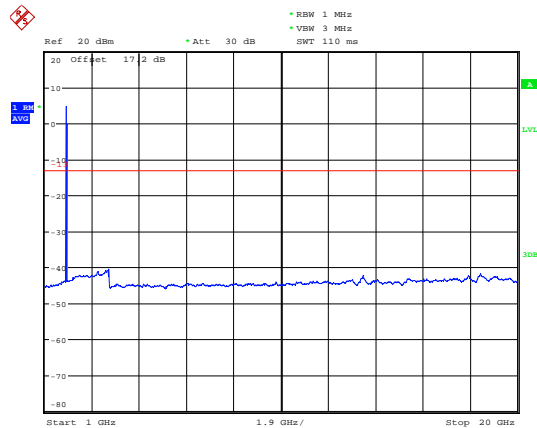
Date: 9.SEP.2019 19:07:11

LTE Band 2 5MHz CH-Middle 30MHz~1GHz



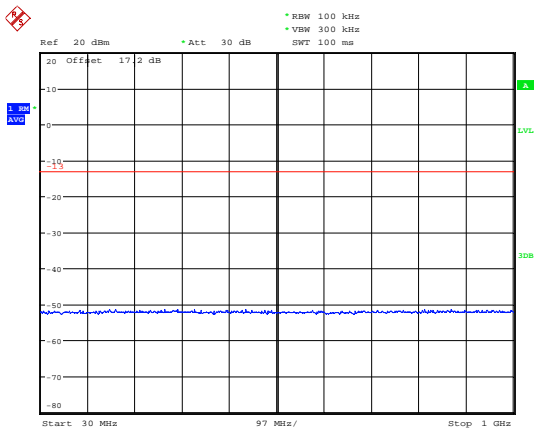
Date: 9.SEP.2019 18:53:34

LTE Band 2 5MHz CH-Middle 1GHz~20GHz



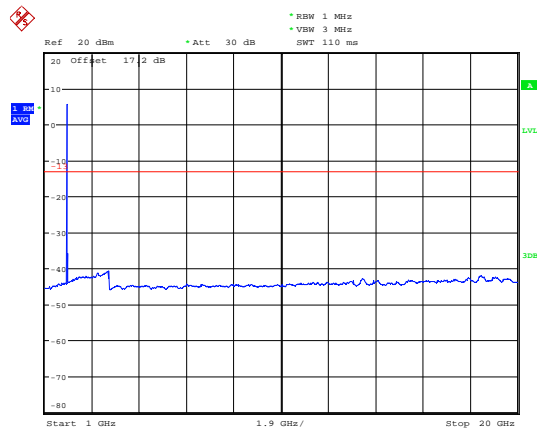
Date: 9.SEP.2019 19:07:29

LTE Band 2 5MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:53:39

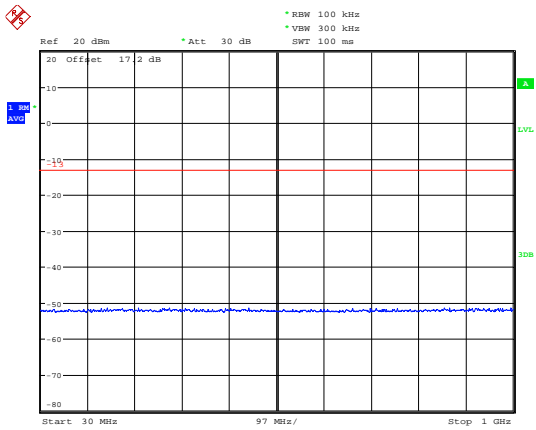
LTE Band 2 5MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:07:42

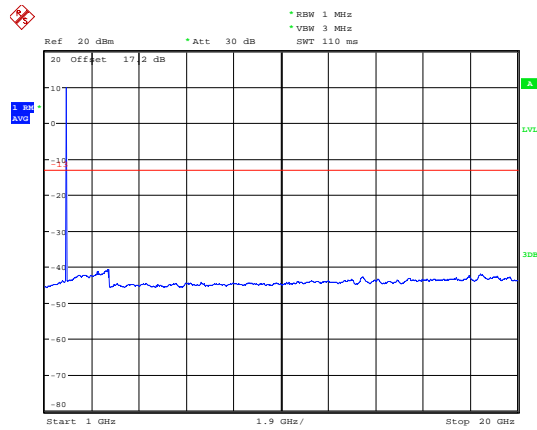


LTE Band 2 10MHz CH-Low 30MHz~1GHz



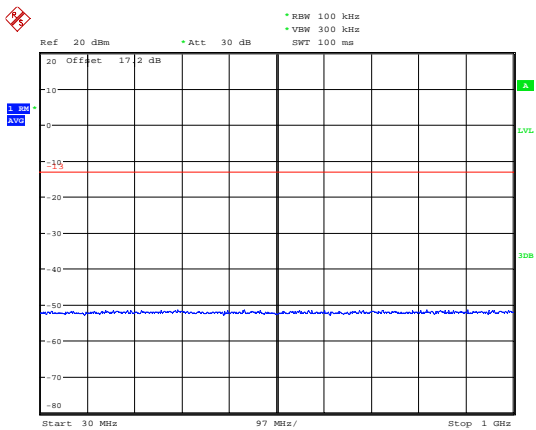
Date: 9.SEP.2019 18:53:56

LTE Band 2 10MHz CH-Low 1GHz~20GHz



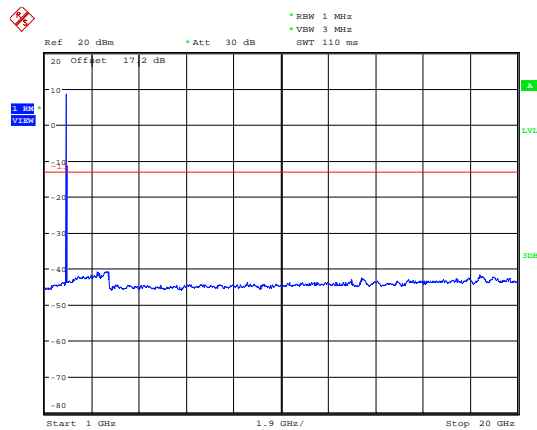
Date: 9.SEP.2019 19:08:02

LTE Band 2 10MHz CH-Middle 30MHz~1GHz



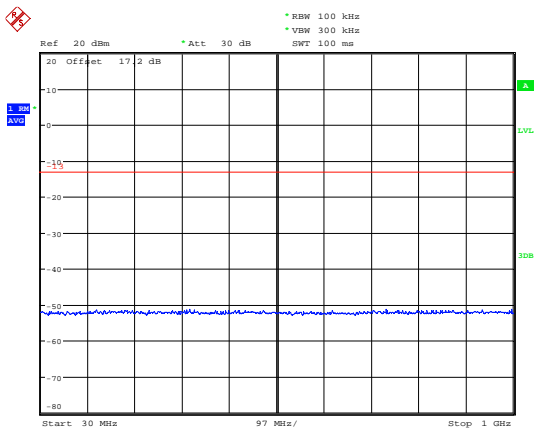
Date: 9.SEP.2019 18:54:03

LTE Band 2 10MHz CH-Middle 1GHz~20GHz



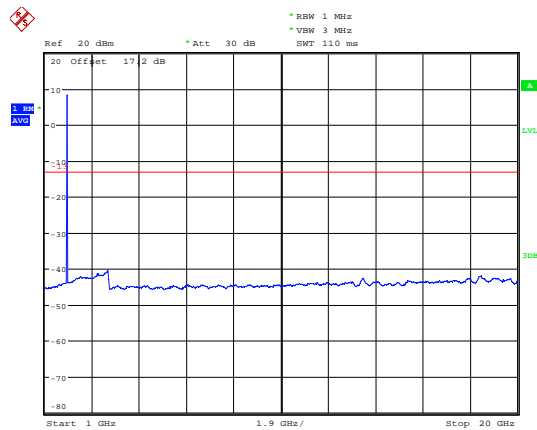
Date: 9.SEP.2019 19:08:19

LTE Band 2 10MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:54:19

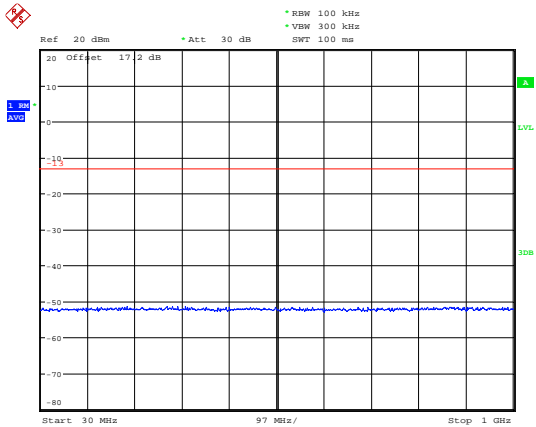
LTE Band 2 10MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:08:34

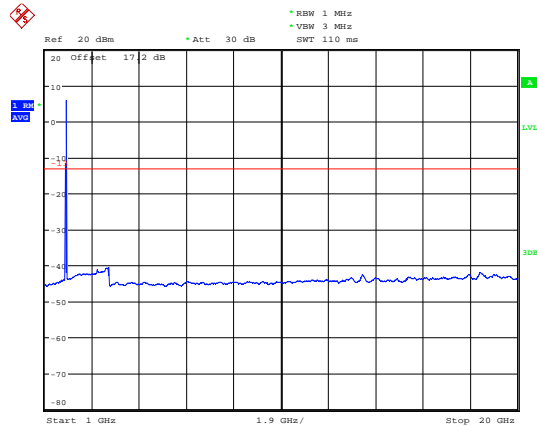


LTE Band 2 15MHz CH-Low 30MHz~1GHz



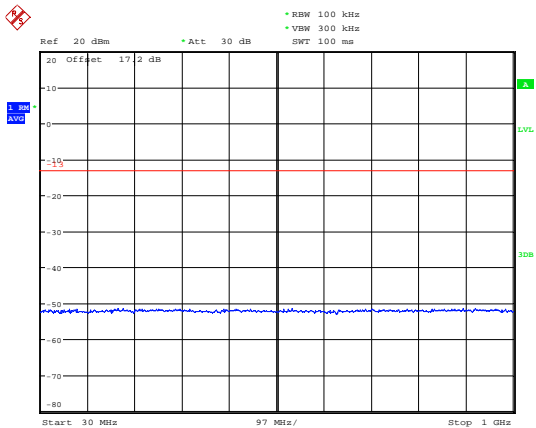
Date: 9.SEP.2019 18:54:51

LTE Band 2 15MHz CH-Low 1GHz~20GHz



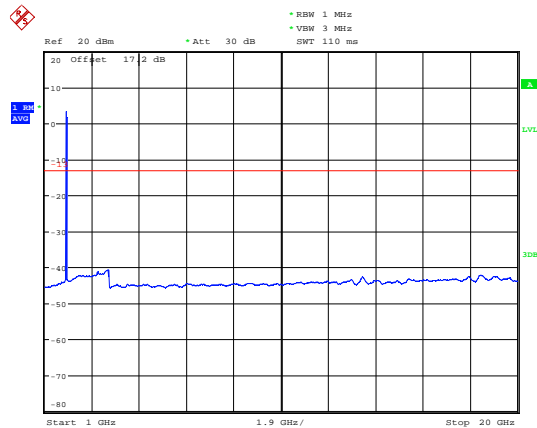
Date: 9.SEP.2019 19:08:58

LTE Band 2 15MHz CH-Middle 30MHz~1GHz



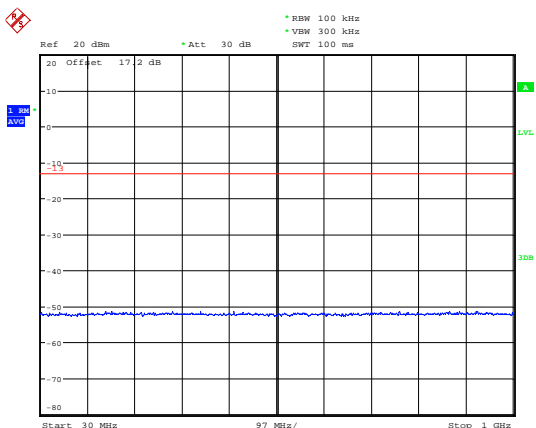
Date: 9.SEP.2019 18:54:59

LTE Band 2 15MHz CH-Middle 1GHz~20GHz



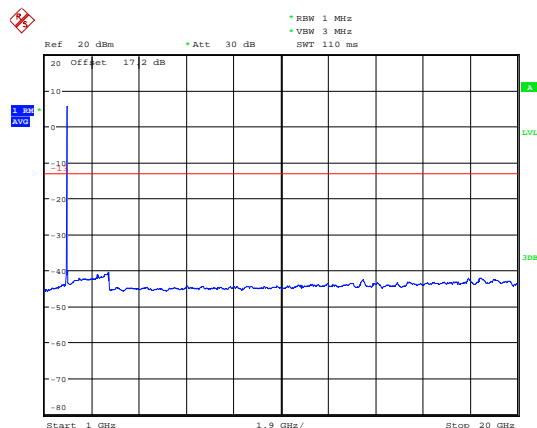
Date: 9.SEP.2019 19:09:15

LTE Band 2 15MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:55:16

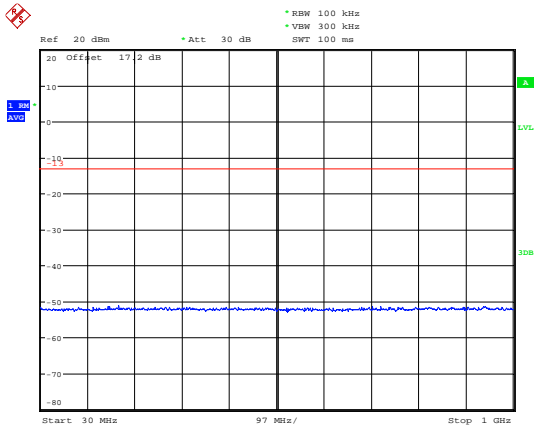
LTE Band 2 15MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:10:09

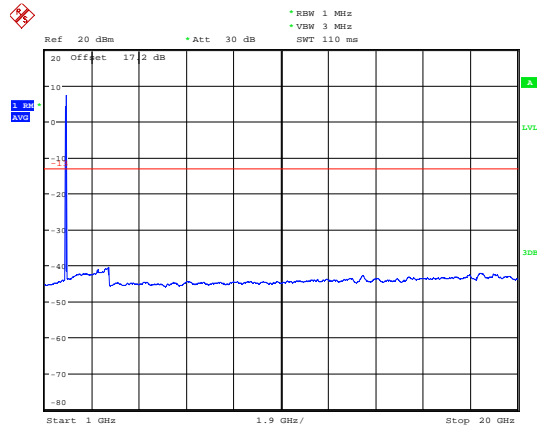


LTE Band 2 20MHz CH-Low 30MHz~1GHz



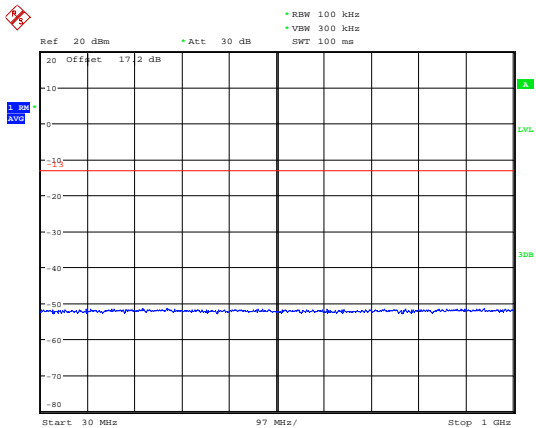
Date: 9.SEP.2019 18:55:29

LTE Band 2 20MHz CH-Low 1GHz~20GHz



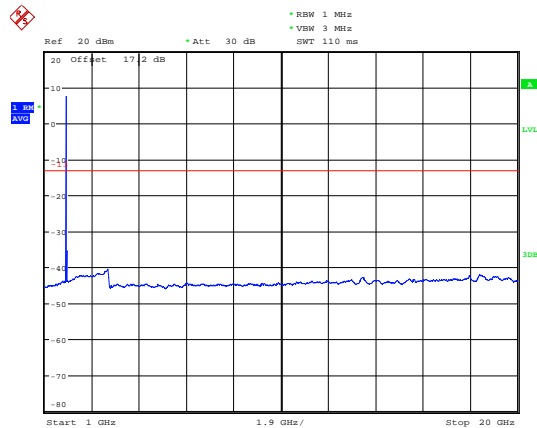
Date: 9.SEP.2019 19:10:28

LTE Band 2 20MHz CH-Middle 30MHz~1GHz



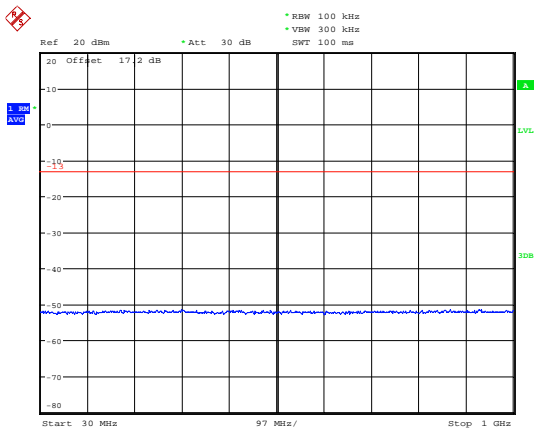
Date: 9.SEP.2019 18:55:36

LTE Band 2 20MHz CH-Middle 1GHz~20GHz



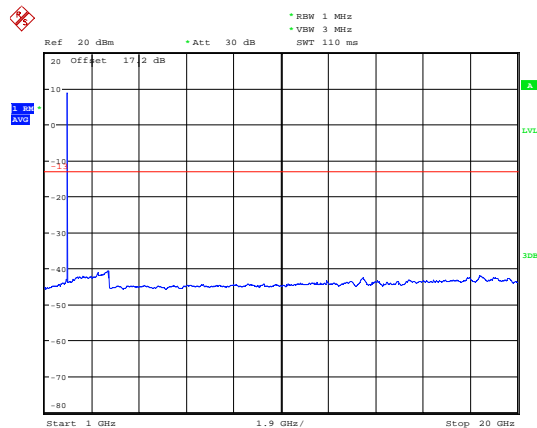
Date: 9.SEP.2019 19:10:43

LTE Band 2 20MHz CH-High 30MHz~1GHz



Date: 9.SEP.2019 18:55:41

LTE Band 2 20MHz CH-High 1GHz~20GHz



Date: 9.SEP.2019 19:10:53

5.8. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

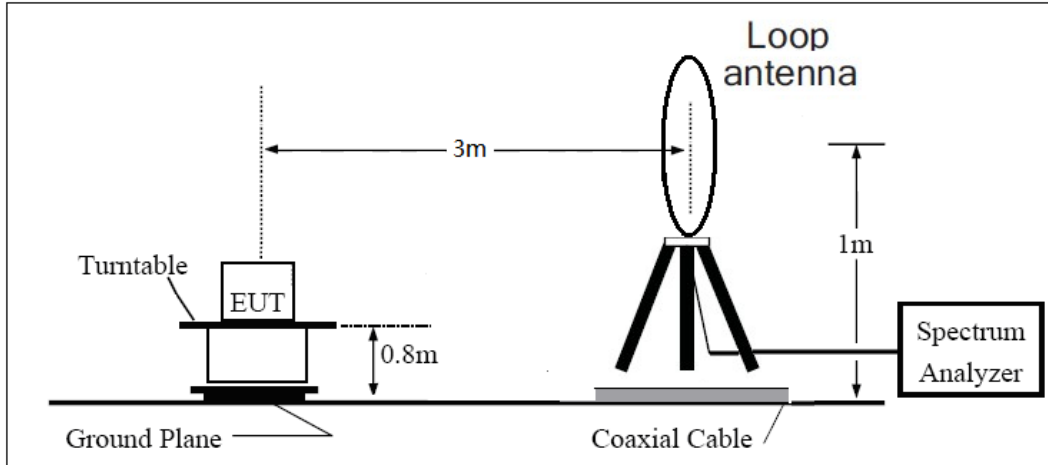
- The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
- Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable 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).
- 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.
- 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).
- 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.
- 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.
- The measurement results are obtained as described below:
 $Power(EIRP)=PMea- PAg - Pcl + Ga$
 The measurement results are amend as described below:
 $Power(EIRP)=PMea- Pcl + Ga$
- This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

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

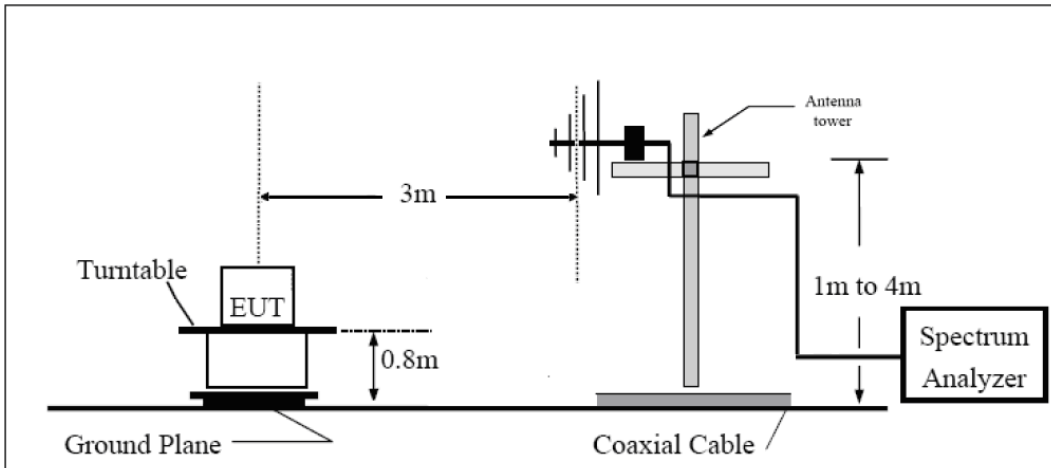
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

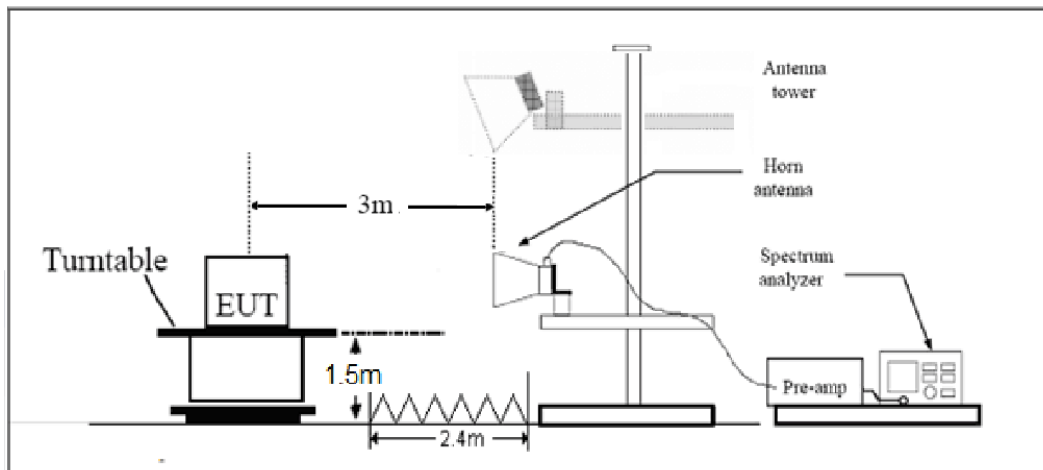
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz





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 $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 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 $k = 1.96$, $U = 3.55$ dB.

**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	3759.9	-48.35	5.10	11.05	Horizontal	-42.40	-13.00	29.40	135
3	5640.2	-56.43	5.42	12.65	Horizontal	-49.20	-13.00	36.20	45
4	7519.5	-53.75	6.70	13.85	Horizontal	-46.60	-13.00	33.60	0
5	9402.8	-53.04	7.01	14.75	Horizontal	-45.30	-13.00	32.30	90
6	11279.3	-51.57	7.48	15.95	Horizontal	-43.10	-13.00	30.10	180
7	13159.1	-50.14	7.51	16.55	Horizontal	-41.10	-13.00	28.10	225
8	15041.3	-48.71	8.24	15.35	Horizontal	-41.60	-13.00	28.60	315
9	16922.3	-43.34	8.41	14.95	Horizontal	-36.80	-13.00	23.80	135
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	-57.45	5.10	11.05	Horizontal	-51.50	-13.00	38.50	45
3	5640.0	-61.37	5.42	12.65	Horizontal	-54.14	-13.00	41.14	90
4	7520.0	-58.04	6.70	13.85	Horizontal	-50.89	-13.00	37.89	0
5	9400.0	-56.42	7.01	14.75	Horizontal	-48.68	-13.00	35.68	180
6	11280.0	-54.58	7.48	15.95	Horizontal	-46.11	-13.00	33.11	225
7	13160.0	-55.24	7.51	16.55	Horizontal	-46.20	-13.00	33.20	315
8	15040.0	-52.98	8.24	15.35	Horizontal	-45.87	-13.00	32.87	270
9	16920.0	-48.95	8.41	14.95	Horizontal	-42.41	-13.00	29.41	0
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 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	3759.0	-56.18	5.10	11.05	Horizontal	-50.23	-13.00	37.23	45
3	5638.9	-58.56	5.42	12.65	Horizontal	-51.33	-13.00	38.33	315
4	7520.0	-55.63	6.70	13.85	Horizontal	-48.48	-13.00	35.48	225
5	9400.0	-54.14	7.01	14.75	Horizontal	-46.40	-13.00	33.40	90
6	11280.0	-54.78	7.48	15.95	Horizontal	-46.31	-13.00	33.31	0
7	13160.0	-55.88	7.51	16.55	Horizontal	-46.84	-13.00	33.84	135
8	15040.0	-52.56	8.24	15.35	Horizontal	-45.45	-13.00	32.45	45
9	16920.0	-56.77	8.41	14.95	Horizontal	-50.23	-13.00	37.23	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.

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	3760.0	-53.49	5.10	11.05	Horizontal	-47.54	-13.00	34.54	225
3	5640.0	-58.17	5.42	12.65	Horizontal	-50.94	-13.00	37.94	45
4	7520.0	-59.57	6.70	13.85	Horizontal	-52.42	-13.00	39.42	315
5	9400.0	-56.49	7.01	14.75	Horizontal	-48.75	-13.00	35.75	90
6	11280.0	-55.25	7.48	15.95	Horizontal	-46.78	-13.00	33.78	45
7	13160.0	-54.08	7.51	16.55	Horizontal	-45.04	-13.00	32.04	180
8	15040.0	-53.08	8.24	15.35	Horizontal	-45.97	-13.00	32.97	45
9	16920.0	-51.11	8.41	14.95	Horizontal	-44.57	-13.00	31.57	135
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 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	3760.0	-55.17	5.10	11.05	Horizontal	-49.22	-13.00	36.22	45
3	5640.0	-56.99	5.42	12.65	Horizontal	-49.76	-13.00	36.76	225
4	7520.0	-58.65	6.70	13.85	Horizontal	-51.50	-13.00	38.50	315
5	9400.0	-57.31	7.01	14.75	Horizontal	-49.57	-13.00	36.57	45
6	11280.0	-55.73	7.48	15.95	Horizontal	-47.26	-13.00	34.26	45
7	13160.0	-55.37	7.51	16.55	Horizontal	-46.33	-13.00	33.33	90
8	15040.0	-53.57	8.24	15.35	Horizontal	-46.46	-13.00	33.46	45
9	16920.0	-49.95	8.41	14.95	Horizontal	-43.41	-13.00	30.41	135
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.



6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2019-05-19	2020-05-18
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preampflier	R&S	SCU18	102327	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-19	2020-05-18
RF Cable	Agilent	SMA 15cm	0001	2019-06-14	2019-09-13
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.



ANNEX C: Product Change Description

The Product Change Description are submitted separately.