RF TEST REPORT

Applicant	Xiaomi Communications Co., Ltd.
FCC ID	2AFZZC3JG
Product	Mobile Phone
Brand	Redmi
Model	M1908C3JG
Report No.	R1907A0357-R2
Issue Date	August 9, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR 47 Part 24E (2018)**. 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

Kai Xu

Approved by: Kai Xu

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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: June 2, 2019 ~July 30, 2019			

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.

IC (recognition number is 8510A)

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

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

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

Client Information

Applicant	Xiaomi Communications Co., Ltd.
Applicant address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China
Manufacturer	Xiaomi Communications Co., Ltd.
Manufacturer address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

General information

EUT Description			
Model	M1908C3JG		
IMEI	IMEI 1:862384040009826 IMEI 2:862384040006616		
Hardware Version	P1.1		
Software Version	MIUI 10		
Power Supply	Battery/AC adapter		
Antenna Type	Fixed Internal Antenna		
Antenna Gain	GSM1900/WCDMA Band II: -1.0dBi LTE Band 2: -0.9dBi		
Test Mode(s)	GSM1900; WCDMA Band II; LTE Band 2;		
Test Modulation	(GSM)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	7		
LTE Category	12		
Maximum E.I.R.P	GSM 1900:	29.02dBm	
	WCDMA Band II:	21.90dBm	
	LTE Band 2:	24.41dBm	
Rated Power Supply Voltage	3.85V		
Extreme Voltage	Minimum: 3.65V 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
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 2	1850 ~ 1910	1930 ~ 1990

EUT Accessory	
Adapter	Manufacturer: Jiangsu Chenyang Electron Co., Ltd. Model: MDY-09-EQ
Battery	Manufacturer: CosMX Model: BN46
USB Cable 1	Manufacturer: LUXSHARE Precision Industry Co., Ltd. Model: L23312 100cm Cable, Shielded
USB Cable 2	Manufacturer: SU ZHOU KELI SCIENCE&TECHNOLOGY DEVELOPMENT CO.,LTD Model: K23312 100cm Cable, Shielded
Note: 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 (2018)

FCC CFR 47 Part 24E (2018)

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, 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	GSM GPRS EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Effective Isotropic Radiated power	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
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

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

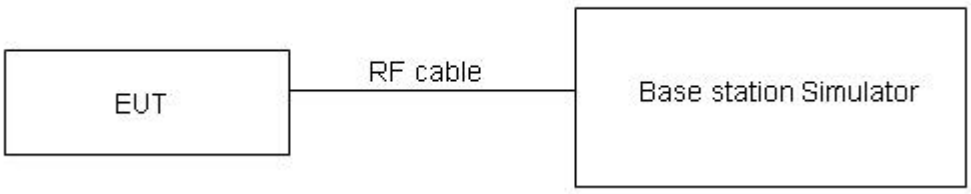
Ambient condition

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	30.47	30.46	30.45
GPRS/EGPRS (GMSK)	1TXslot	30.48	30.43	30.41
	2TXslots	27.84	27.88	27.93
	3TXslots	25.86	25.94	25.83
	4TXslots	24.98	24.89	24.85
EGPRS (8PSK)	1TXslot	26.35	26.53	26.77
	2TXslots	24.28	24.35	24.27
	3TXslots	22.50	22.91	22.83
	4TXslots	21.27	21.57	21.81

WCDMA Band II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
RMC	12.2k	23.60	23.70	23.72
HSDPA	Sub - Test 1	21.98	22.17	22.14
	Sub - Test 2	21.97	22.16	22.13
	Sub - Test 3	21.96	22.15	22.12
	Sub - Test 4	21.95	22.14	22.11
HSUPA	Sub - Test 1	21.94	22.13	22.10
	Sub - Test 2	21.43	21.62	21.59
	Sub - Test 3	21.41	21.61	21.58
	Sub - Test 4	21.40	21.60	21.57
	Sub - Test 5	21.89	22.09	22.06
DC-HSDPA	Sub - Test 1	21.90	22.11	22.06
	Sub - Test 2	21.89	22.10	22.05
	Sub - Test 3	21.97	22.09	22.06
	Sub - Test 4	21.96	22.08	22.05
HSPA+	16QAM	21.09	21.21	21.23

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	23.19	23.18	23.08
		1	2	22.97	22.94	22.87
		1	5	23.22	23.11	22.57
		3	0	22.06	22.04	21.93
		3	2	21.98	22.07	21.92
		3	3	22.03	21.99	21.79
		6	0	22.00	22.07	21.97
	16QAM	1	0	22.59	22.78	22.37
		1	2	22.38	22.54	22.10
		1	5	22.60	22.78	21.93
		3	0	21.11	21.08	21.01
		3	2	21.11	21.06	21.00
		3	3	21.14	21.05	20.86
		6	0	21.11	21.17	20.06
	64QAM	1	0	22.43	22.25	22.55
		1	2	22.14	22.04	22.17
		1	5	22.39	22.16	22.24
		3	0	21.36	21.18	21.17
		3	2	21.41	21.17	21.06
		3	3	21.38	21.20	20.98
		6	0	21.36	21.30	21.24
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	23.21	23.22	23.11
		1	7	23.00	22.99	22.91
		1	14	23.25	23.16	22.61
		8	0	22.14	22.14	22.04
		8	4	22.08	22.15	22.02
		8	7	22.11	22.08	21.87
		15	0	22.03	22.11	22.00
	16QAM	1	0	22.43	22.80	22.40
		1	7	22.41	22.59	22.14
		1	14	22.62	22.82	21.96
		8	0	21.20	21.19	21.11
		8	4	21.20	21.17	21.10
		8	7	21.22	21.15	20.97

		15	0	21.14	21.21	20.09
	64QAM	1	0	22.46	22.27	22.58
		1	7	22.17	22.09	22.21
		1	14	22.41	22.20	22.27
		8	0	21.45	21.29	21.27
		8	4	21.50	21.28	21.16
		8	7	21.46	21.30	21.09
		15	0	21.39	21.34	21.27
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	23.18	23.20	23.07
		1	13	22.98	22.95	22.88
		1	24	23.22	23.11	22.57
		12	0	22.11	22.09	22.00
		12	6	22.06	22.11	21.97
		12	13	22.09	22.06	21.83
		25	0	22.01	22.10	21.98
	16QAM	1	0	22.40	22.76	22.37
		1	13	22.38	22.57	22.11
		1	24	22.59	22.80	21.92
		12	0	21.18	21.15	21.08
		12	6	21.17	21.12	21.06
		12	13	21.19	21.10	20.93
		25	0	21.12	21.17	20.04
	64QAM	1	0	22.43	22.23	22.55
		1	13	22.14	22.07	22.18
		1	24	22.38	22.18	22.23
		12	0	21.43	21.25	21.24
		12	6	21.47	21.23	21.12
		12	13	21.43	21.25	21.05
		25	0	21.37	21.30	21.22
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.20	23.21	23.10
		1	25	23.01	23.00	22.92
		1	49	23.24	23.15	22.60
		25	0	22.14	22.14	22.04
		25	13	22.09	22.16	22.01
		25	25	22.11	22.10	21.88
		50	0	22.09	22.12	22.02

	16QAM	1	0	22.42	22.79	22.39
		1	25	22.41	22.61	22.14
		1	49	22.62	22.82	21.95
		25	0	21.21	21.20	21.12
		25	13	21.19	21.16	21.09
		25	25	21.22	21.15	20.97
		50	0	21.15	21.22	20.08
	64QAM	1	0	22.45	22.26	22.57
		1	25	22.17	22.11	22.21
		1	49	22.41	22.20	22.26
		25	0	21.46	21.30	21.28
		25	13	21.49	21.27	21.15
		25	25	21.46	21.30	21.09
		50	0	21.40	21.35	21.26
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	23.19	23.17	23.08
		1	38	22.99	22.99	22.89
		1	74	23.21	23.10	22.56
		36	0	22.12	22.10	22.01
		36	18	22.06	22.11	21.97
		36	39	22.08	22.07	21.84
		75	0	22.07	22.08	21.97
	16QAM	1	0	22.37	22.77	22.37
		1	38	22.39	22.58	22.12
		1	74	22.59	22.78	21.92
		36	0	21.18	21.18	21.09
		36	18	21.16	21.11	21.05
		36	39	21.20	21.11	20.94
		75	0	21.12	21.17	20.04
	64QAM	1	0	22.40	22.24	22.55
		1	38	22.15	22.08	22.19
		1	74	22.38	22.16	22.23
		36	0	21.43	21.28	21.25
		36	18	21.46	21.22	21.11
		36	39	21.44	21.26	21.06
		75	0	21.37	21.30	21.22
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	23.16	23.13	23.05

		1	50	22.98	22.95	22.87
		1	99	23.19	23.09	22.53
		50	0	22.09	22.05	21.97
		50	25	22.04	22.07	21.94
		50	50	22.05	22.02	21.80
		100	0	22.04	22.03	21.93
	16QAM	1	0	22.54	22.73	22.32
		1	50	22.35	22.56	22.08
		1	99	22.57	22.75	21.90
		50	0	21.15	21.14	21.06
		50	25	21.13	21.09	21.02
		50	50	21.17	21.06	20.90
		100	0	21.10	21.13	20.01
	64QAM	1	0	22.38	22.20	22.50
		1	50	22.11	22.06	22.15
		1	99	22.36	22.13	22.21
		50	0	21.40	21.24	21.22
		50	25	21.43	21.20	21.08
		50	50	21.41	21.21	21.02
		100	0	21.35	21.26	21.19

5.2. Effective Isotropic Radiated Power

Ambient condition

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

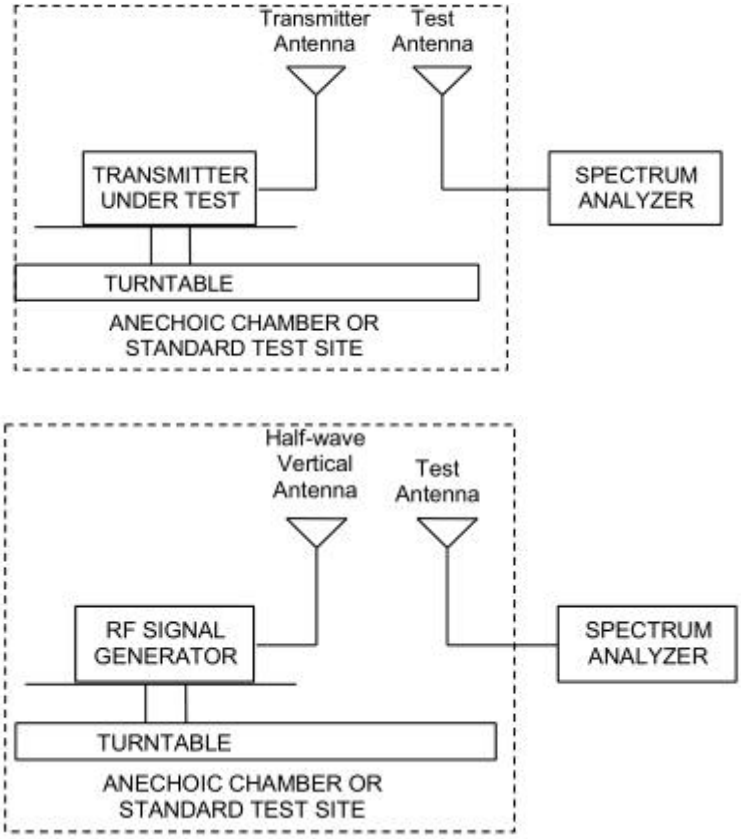
Methods of Measurement

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 = 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.)

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	⩽ 2 W (33 dBm)

Measurement Uncertainty

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

Test Results:

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

Mode	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
GSM 1900	Low	1850.2	Horizontal	28.50	33	Pass
	Mid	1880	Horizontal	28.74	33	Pass
	High	1909.8	Horizontal	28.07	33	Pass
GPRS 1900	Low	1850.2	Horizontal	29.02	33	Pass
	Mid	1880	Horizontal	28.73	33	Pass
	High	1909.8	Horizontal	28.53	33	Pass
EGPRS 1900	Low	1850.2	Horizontal	28.36	33	Pass
	Mid	1880	Horizontal	27.00	33	Pass
	High	1909.8	Horizontal	26.60	33	Pass
WCDMA Band II	Low	1852.4	Horizontal	21.90	33	Pass
	Mid	1880	Horizontal	21.44	33	Pass
	High	1907.6	Horizontal	21.78	33	Pass

LTE Band 2						
bandwidth	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1850.7	Horizontal	23.56	33	Pass
	Mid	1880	Horizontal	23.57	33	Pass
	High	1909.3	Horizontal	22.70	33	Pass
3 MHz (QPSK)	Low	1851.5	Horizontal	24.12	33	Pass
	Mid	1880	Horizontal	24.21	33	Pass
	High	1908.5	Horizontal	23.34	33	Pass
5 MHz (QPSK)	Low	1852.5	Horizontal	24.23	33	Pass
	Mid	1880	Horizontal	24.27	33	Pass
	High	1907.5	Horizontal	23.41	33	Pass
10 MHz (QPSK)	Low	1855	Horizontal	24.34	33	Pass
	Mid	1880	Horizontal	24.38	33	Pass
	High	1905	Horizontal	23.38	33	Pass
15 MHz (QPSK)	Low	1857.5	Horizontal	23.97	33	Pass
	Mid	1880	Horizontal	23.85	33	Pass
	High	1902.5	Horizontal	23.63	33	Pass
20 MHz (QPSK)	Low	1860	Horizontal	24.41	33	Pass
	Mid	1880	Horizontal	23.49	33	Pass
	High	1900	Horizontal	23.61	33	Pass
1.4 MHz (16QAM)	Low	1850.7	Horizontal	23.04	33	Pass
	Mid	1880	Horizontal	23.02	33	Pass
	High	1909.3	Horizontal	22.20	33	Pass
3 MHz (16QAM)	Low	1851.5	Horizontal	23.59	33	Pass
	Mid	1880	Horizontal	23.66	33	Pass
	High	1908.5	Horizontal	22.82	33	Pass
5 MHz (16QAM)	Low	1852.5	Horizontal	23.71	33	Pass
	Mid	1880	Horizontal	23.73	33	Pass
	High	1907.5	Horizontal	22.86	33	Pass
10 MHz (16QAM)	Low	1855	Horizontal	23.77	33	Pass
	Mid	1880	Horizontal	23.84	33	Pass
	High	1905	Horizontal	22.81	33	Pass
15 MHz (16QAM)	Low	1857.5	Horizontal	23.44	33	Pass
	Mid	1880	Horizontal	23.28	33	Pass
	High	1902.5	Horizontal	23.08	33	Pass
20 MHz (16QAM)	Low	1860	Horizontal	23.83	33	Pass
	Mid	1880	Horizontal	22.98	33	Pass
	High	1900	Horizontal	23.01	33	Pass
1.4 MHz (64QAM)	Low	1850.7	Horizontal	22.51	33	Pass
	Mid	1880	Horizontal	22.48	33	Pass
	High	1909.3	Horizontal	21.64	33	Pass

LTE Band 2						
bandwidth	**Channel**	**Frequency (MHz)**	**Polarization**	**EIRP (dBm)**	**Limit (dBm)**	**Conclusion**
3 MHz (64QAM)	Low	1851.5	Horizontal	23.06	33	Pass
	Mid	1880	Horizontal	23.08	33	Pass
	High	1908.5	Horizontal	22.30	33	Pass
5 MHz (64QAM)	Low	1852.5	Horizontal	23.17	33	Pass
	Mid	1880	Horizontal	23.17	33	Pass
	High	1907.5	Horizontal	22.31	33	Pass
10 MHz (64QAM)	Low	1855	Horizontal	23.19	33	Pass
	Mid	1880	Horizontal	23.28	33	Pass
	High	1905	Horizontal	22.25	33	Pass
15 MHz (64QAM)	Low	1857.5	Horizontal	22.87	33	Pass
	Mid	1880	Horizontal	22.72	33	Pass
	High	1902.5	Horizontal	22.53	33	Pass
20 MHz (64QAM)	Low	1860	Horizontal	23.27	33	Pass
	Mid	1880	Horizontal	22.41	33	Pass
	High	1900	Horizontal	22.47	33	Pass

5.3. Occupied Bandwidth

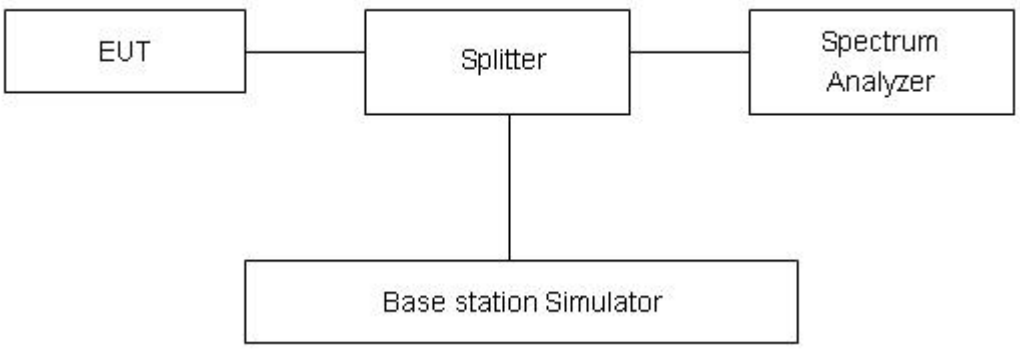
Ambient condition

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= 624Hz.

Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GSM)	512	1850.2	0.2460	0.310
	661	1880.0	0.2438	0.307
	810	1909.8	0.2459	0.322
GPRS 1900 (GMSK)	512	1850.2	0.2487	0.317
	661	1880.0	0.2477	0.312
	810	1909.8	0.2438	0.307
EGPRS 1900 (8-PSK)	512	1850.2	0.2426	0.303
	661	1880.0	0.2389	0.300
	810	1909.8	0.2424	0.305
WCDMA Band II (RMC)	9262	1852.4	4.133	4.712
	9400	1880	4.1611	4.715
	9538	1907.6	4.1443	4.721

LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1144	1.279
		18900	1880	1.1062	1.270
		19193	1909.3	1.1280	1.276
	3	18615	1851.5	2.7417	3.080
		18900	1880	2.7515	3.085
		19185	1908.5	2.7446	3.086
	5	18625	1852.5	4.5328	4.988
		18900	1880	4.5174	4.989
		19175	1907.5	4.5155	4.980
	10	18650	1855	9.0579	10.050
		18900	1880	9.0247	10.010
		19150	1905	9.0391	9.973
	15	18675	1857.5	13.4920	14.710
		18900	1880	13.4280	14.700

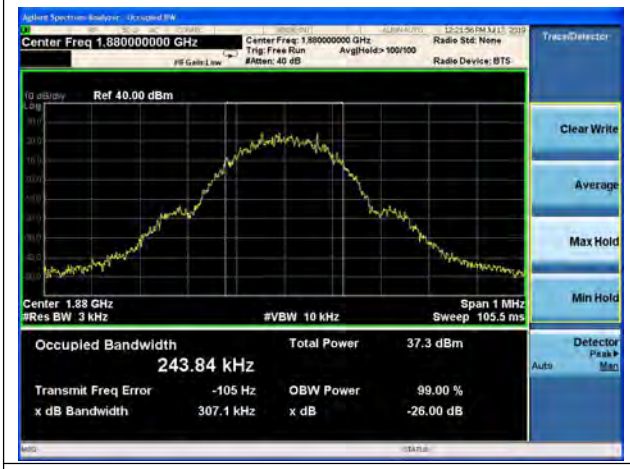
		19125	1902.5	13.4490	14.690
	20	18700	1860	17.8760	19.160
		18900	1880	17.8970	19.260
		19100	1900	17.8850	19.360
16QAM	1.4	18607	1850.7	1.1086	1.281
		18900	1880	1.1124	1.269
		19193	1909.3	1.1126	1.282
	3	18615	1851.5	2.7581	3.037
		18900	1880	2.7388	3.076
		19185	1908.5	2.7385	3.093
	5	18625	1852.5	4.5163	4.973
		18900	1880	4.5327	4.997
		19175	1907.5	4.5379	4.994
	10	18650	1855	9.0569	9.946
		18900	1880	9.0322	9.986
		19150	1905	9.0340	9.952
	15	18675	1857.5	13.4850	14.720
		18900	1880	13.4830	14.660
		19125	1902.5	13.4610	14.630
	20	18700	1860	17.8870	19.320
		18900	1880	17.9130	19.370
		19100	1900	17.8790	19.300
64QAM	1.4	18607	1850.7	1.1189	1.278
		18900	1880	1.1066	1.267
		19193	1909.3	1.1136	1.284
	3	18615	1851.5	2.7425	3.071
		18900	1880	2.7351	3.076
		19185	1908.5	2.7404	3.090
	5	18625	1852.5	4.5122	4.992
		18900	1880	4.5287	4.992
		19175	1907.5	4.5330	4.992
	10	18650	1855	9.0339	9.965
		18900	1880	9.0402	9.994
		19150	1905	9.0279	9.982

	15	18675	1857.5	13.4890	14.700
		18900	1880	13.4800	14.690
		19125	1902.5	13.4420	14.670
	20	18700	1860	17.9350	19.270
		18900	1880	17.9190	19.320
		19100	1900	17.8780	19.270

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

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

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

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

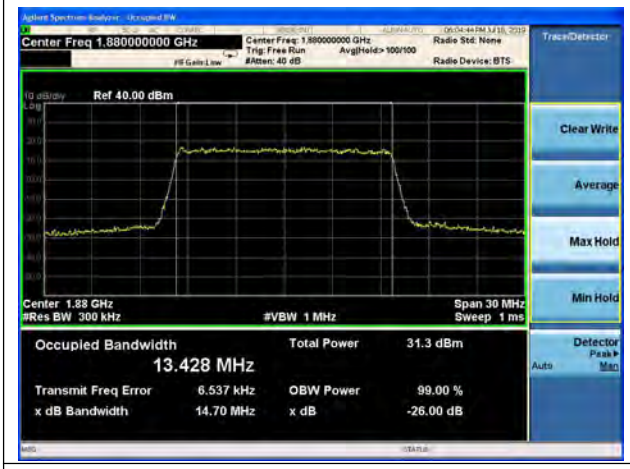
LTE Band 2 5MHz QPSK CH-High

LTE Band 2 10MHz QPSK CH-High

LTE Band 2 15MHz QPSK CH-Low

LTE Band 2 20MHz QPSK CH-Low

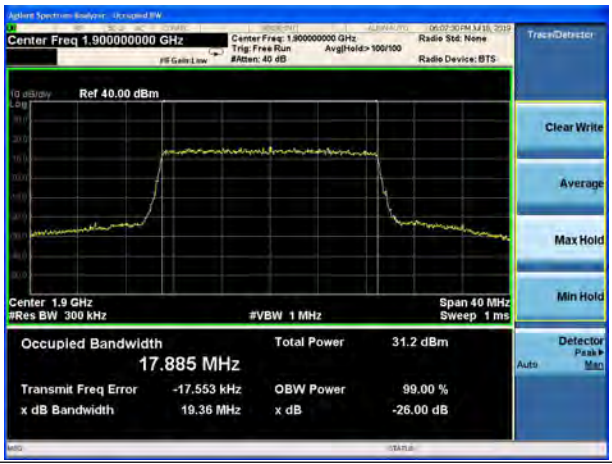
LTE Band 2 15MHz QPSK CH-Middle



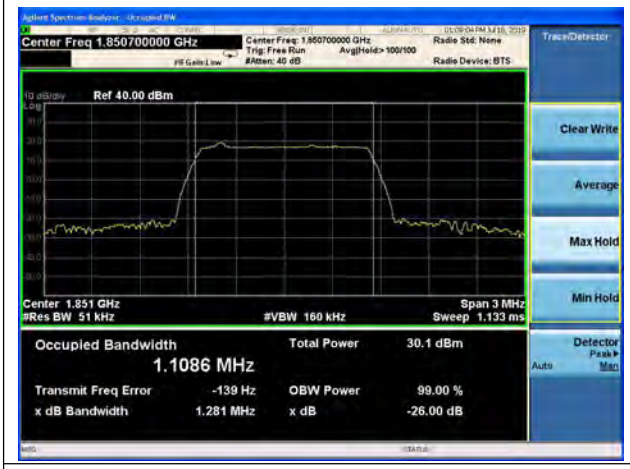
LTE Band 2 20MHz QPSK CH-Middle

LTE Band 2 15MHz QPSK CH-High

LTE Band 2 20MHz QPSK CH-High



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

LTE Band 2 5MHz 16QAM CH-Low

LTE Band 2 10MHz 16QAM CH-Low

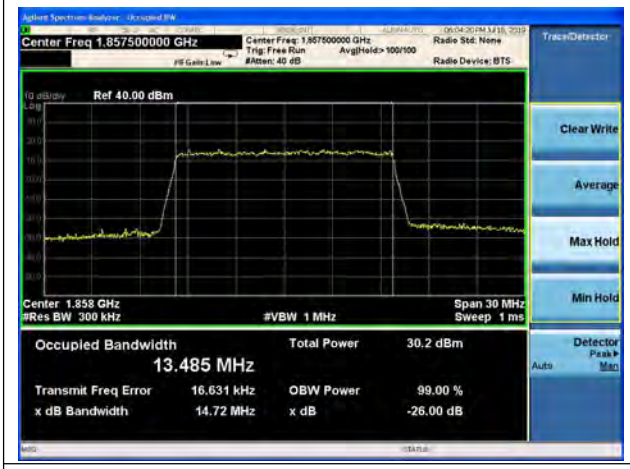
LTE Band 2 5MHz 16QAM CH-Middle

LTE Band 2 10MHz 16QAM CH-Middle

LTE Band 2 5MHz 16QAM CH-High

LTE Band 2 10MHz 16QAM CH-High

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

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

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

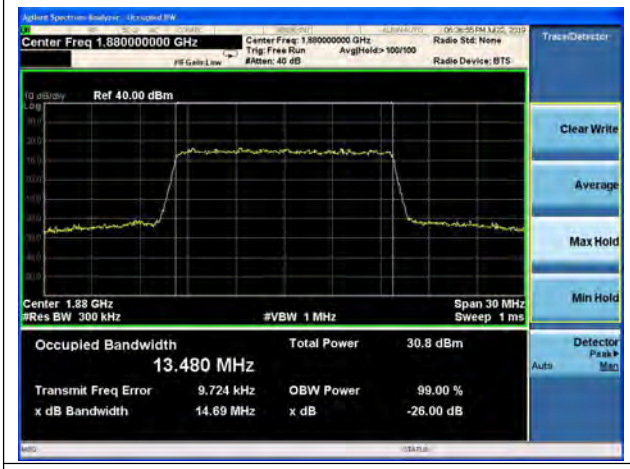
LTE Band 2 5MHz 64QAM CH-High

LTE Band 2 10MHz 64QAM CH-High

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

5.4. Band Edge Compliance

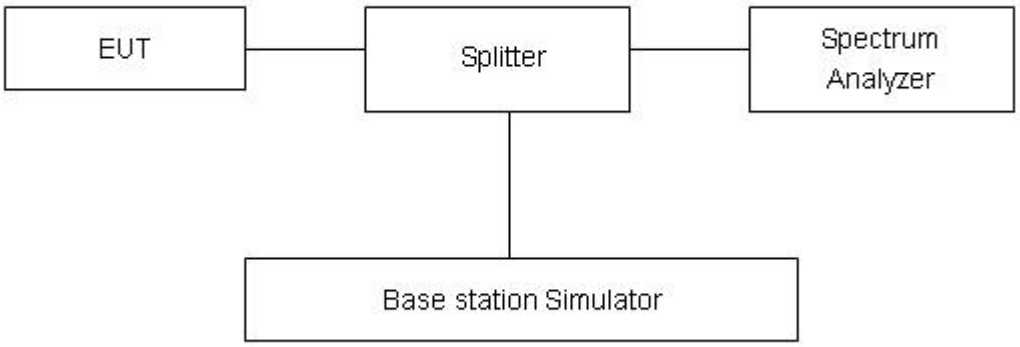
Ambient condition

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

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.

Test Result:

GSM1900 GSM CH-Low

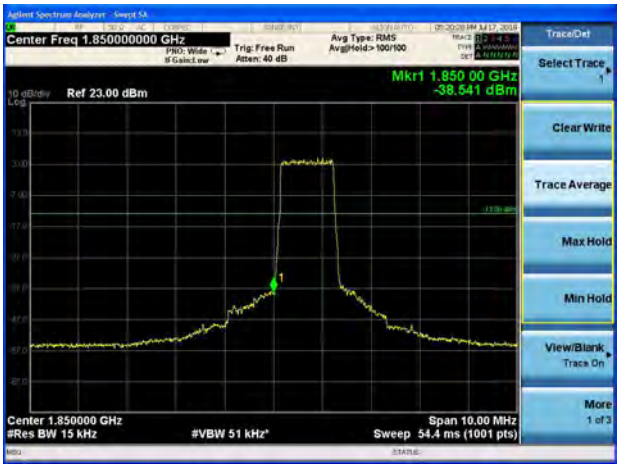
GSM 1900 GSM CH-High

GSM1900 GPRS CH-Low

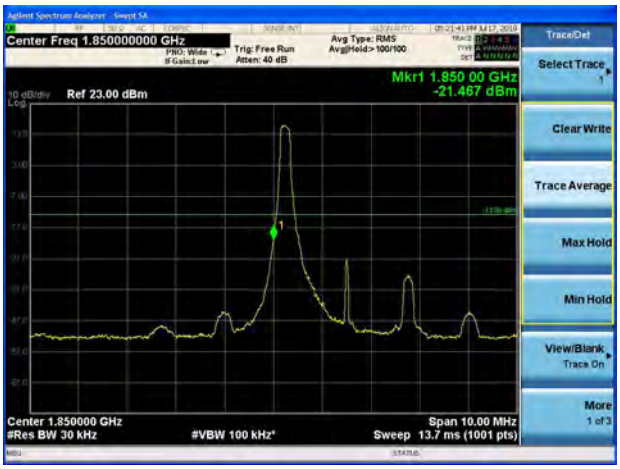
GSM 1900 GPRS CH-High

GSM1900 EGPRS CH-Low

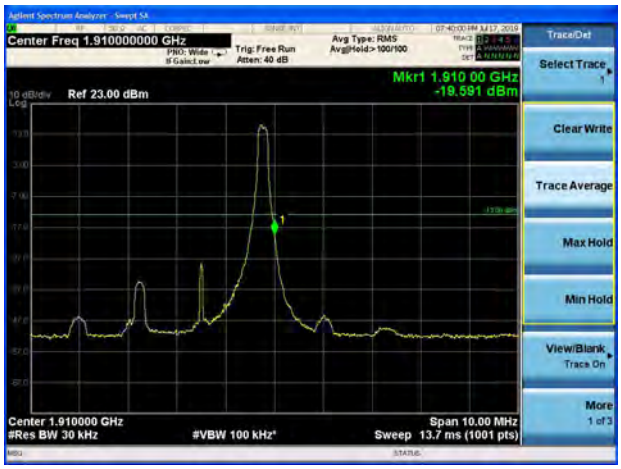
GSM 1900 EGPRS CH-High

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
	

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

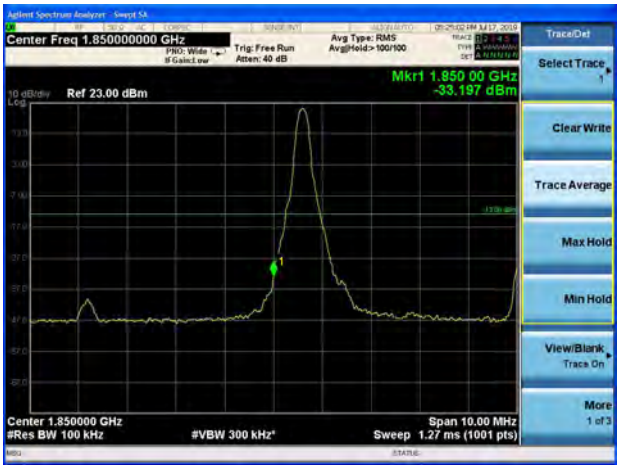
LTE Band 2 5MHz QPSK 1RB CH-Low

LTE Band 2 5MHz QPSK 1RB CH-High

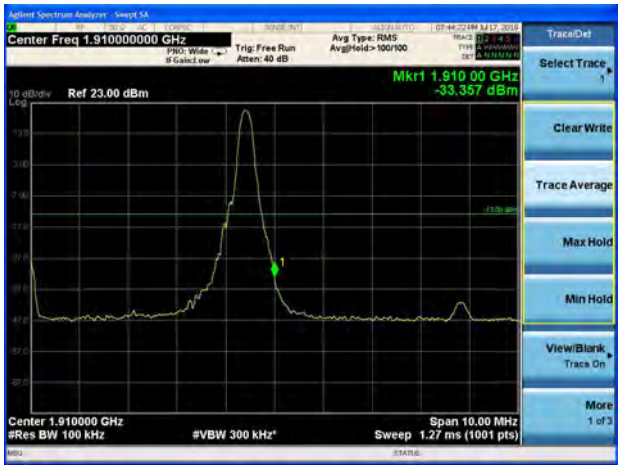
LTE Band 2 5MHz QPSK 100%RB CH-Low

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

LTE Band 2 10MHz QPSK 1RB CH-Low



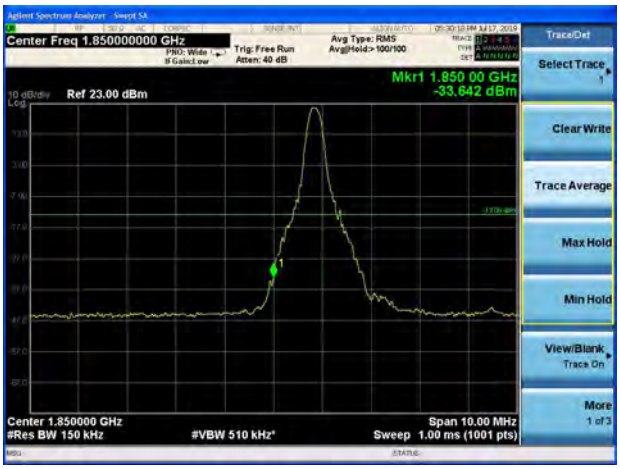
LTE Band 2 10MHz QPSK 1RB CH-High



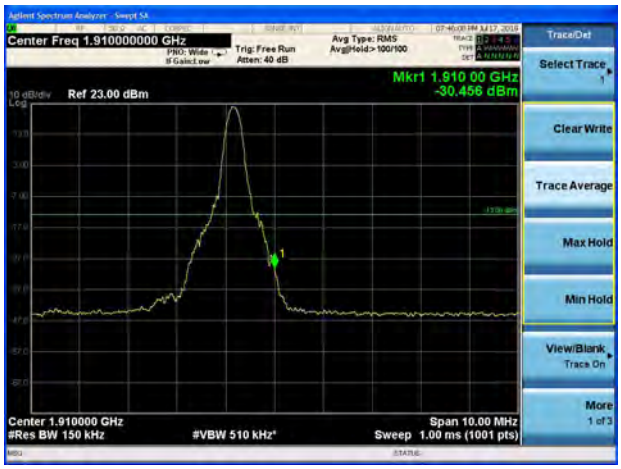
LTE Band 2 10MHz QPSK 100%RB CH-Low

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

LTE Band 2 15MHz QPSK 1RB CH-Low



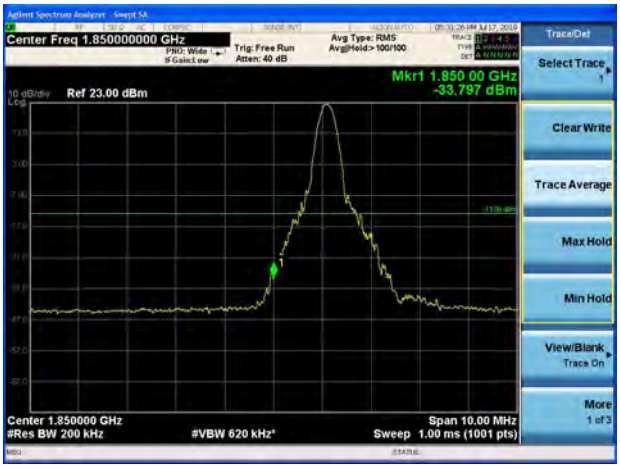
LTE Band 2 15MHz QPSK 1RB CH-High



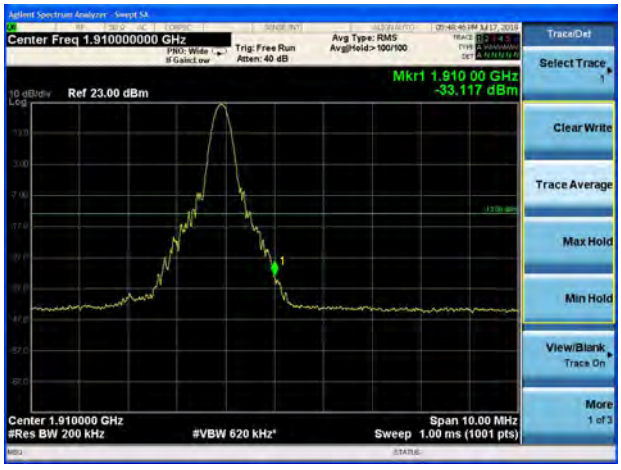
LTE Band 2 15MHz QPSK 100%RB CH-Low

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



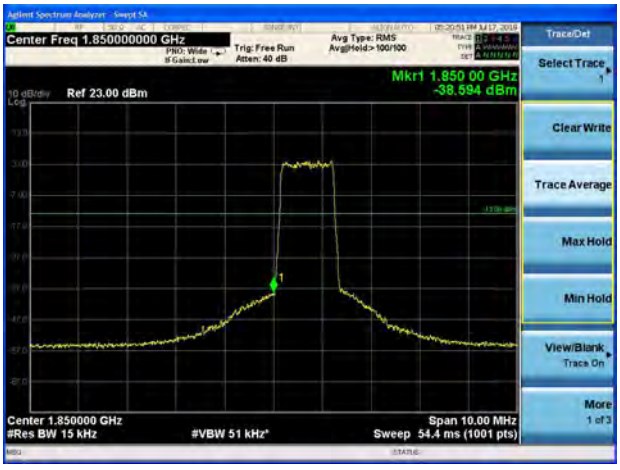
LTE Band 2 20MHz QPSK 100%RB CH-Low

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

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

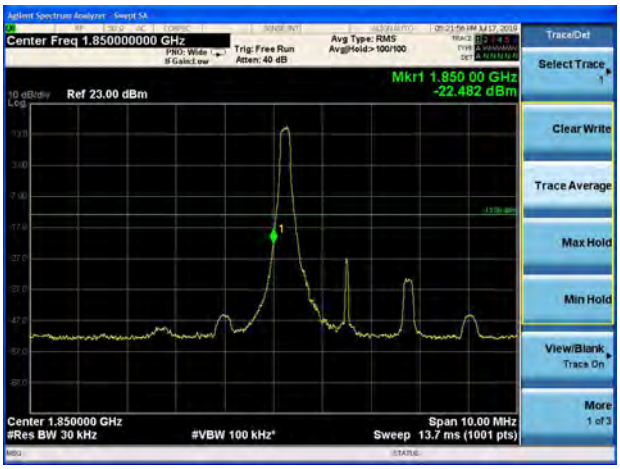
LTE Band 2 1.4MHz 16QAM 1RB CH-High

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

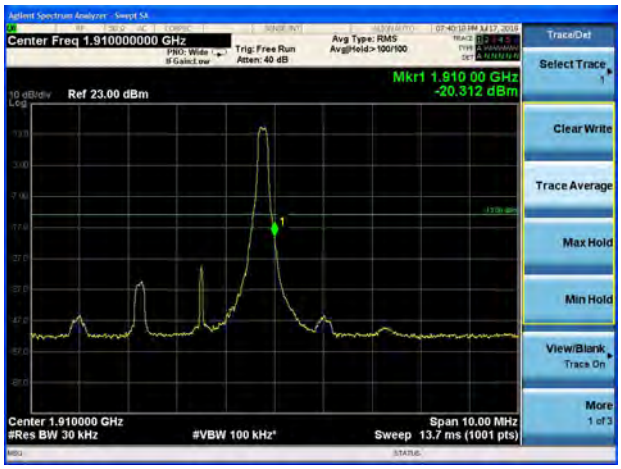


LTE Band 2 1.4MHz 16QAM 100%RB CH-High

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



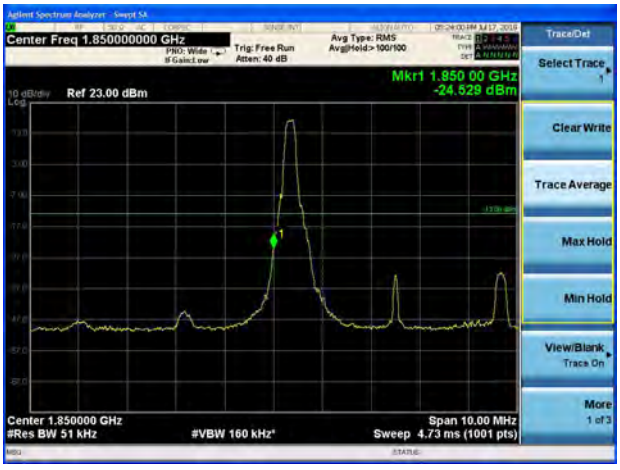
LTE Band 2 3MHz 16QAM 1RB CH-High



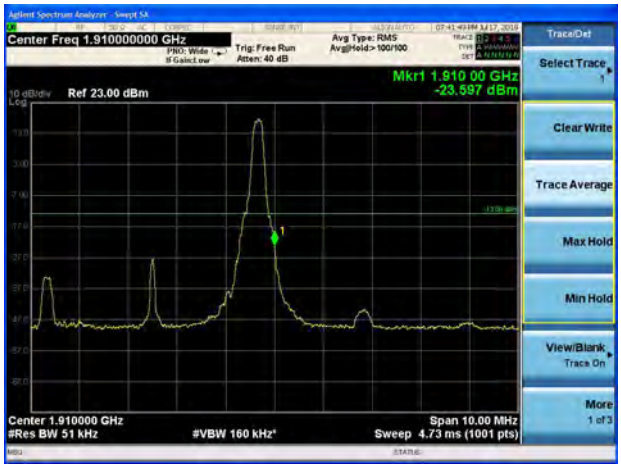
LTE Band 2 3MHz 16QAM 100%RB CH-Low

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

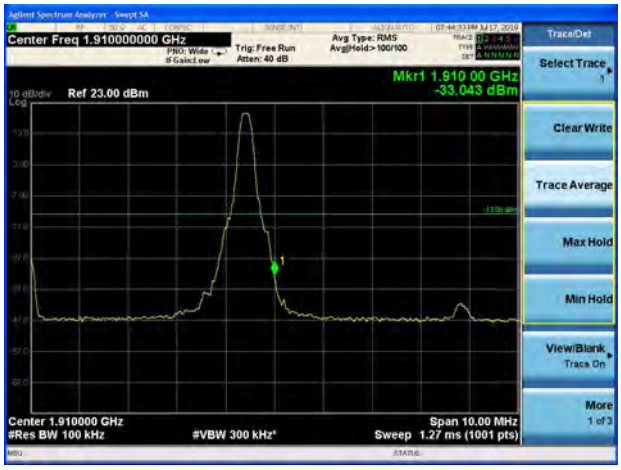


LTE Band 2 5MHz 16QAM 100%RB CH-Low

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

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

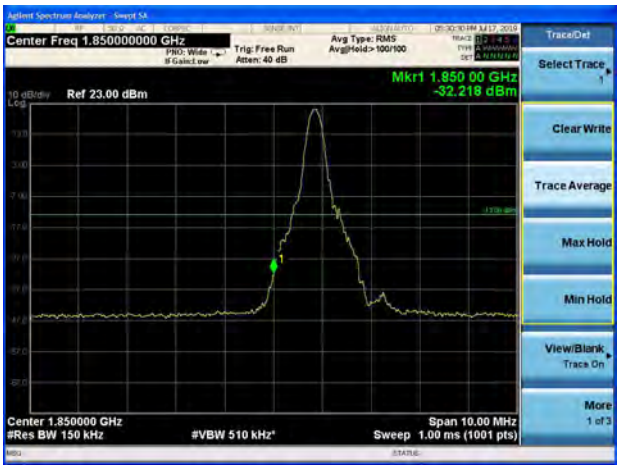
LTE Band 2 10MHz 16QAM 1RB CH-High



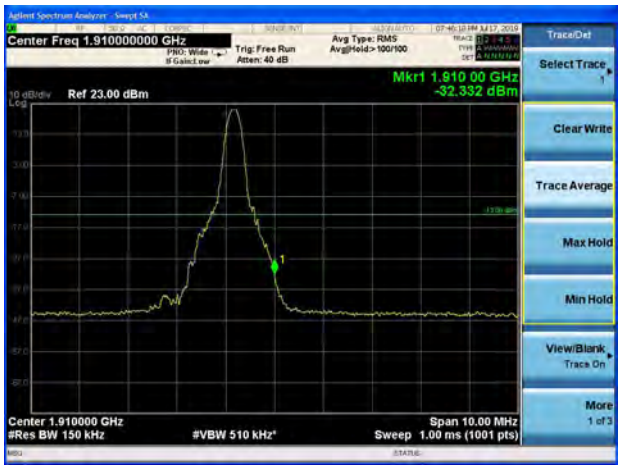
LTE Band 2 10MHz 16QAM 100%RB CH-Low

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

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



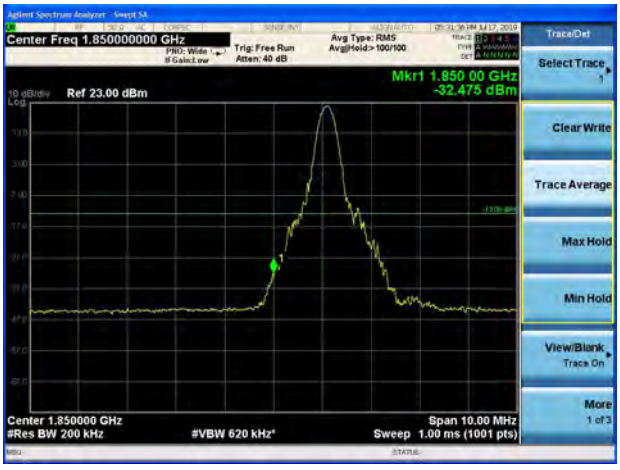
LTE Band 2 15MHz 16QAM 1RB CH-High



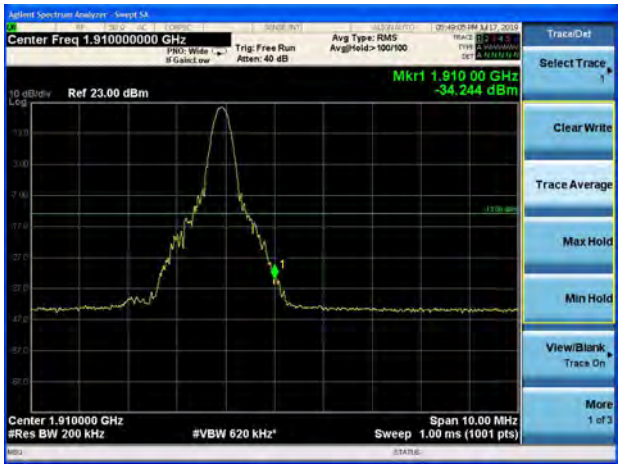
LTE Band 2 15MHz 16QAM 100%RB CH-Low

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



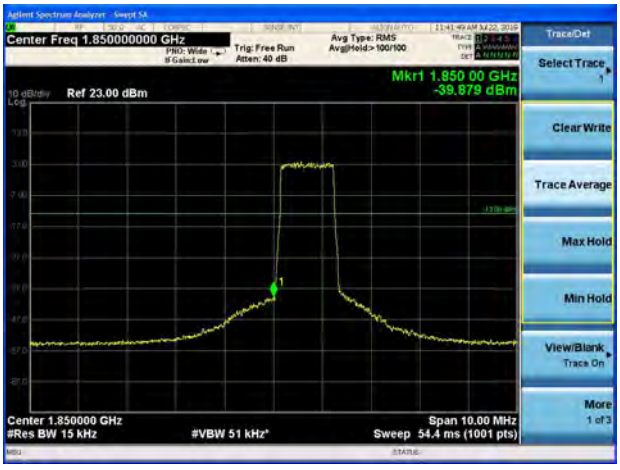
LTE Band 2 20MHz 16QAM 100%RB CH-Low

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

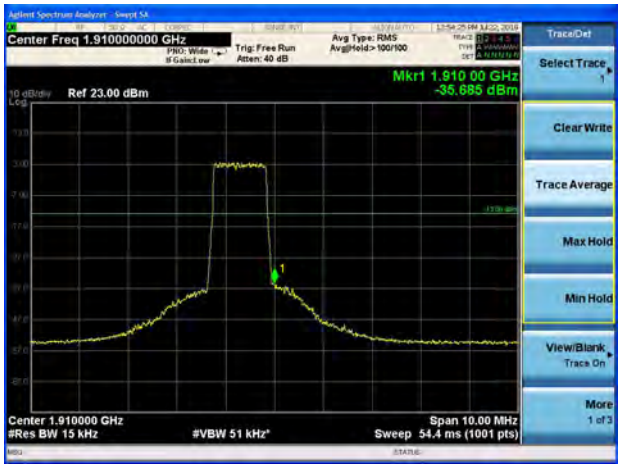
LTE Band 2 1.4MHz 64QAM 1RB CH-Low

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

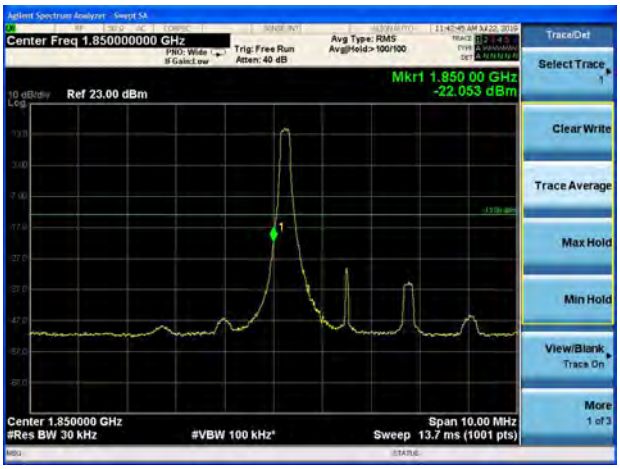
LTE Band 2 1.4MHz 64QAM 100%RB CH-Low



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



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

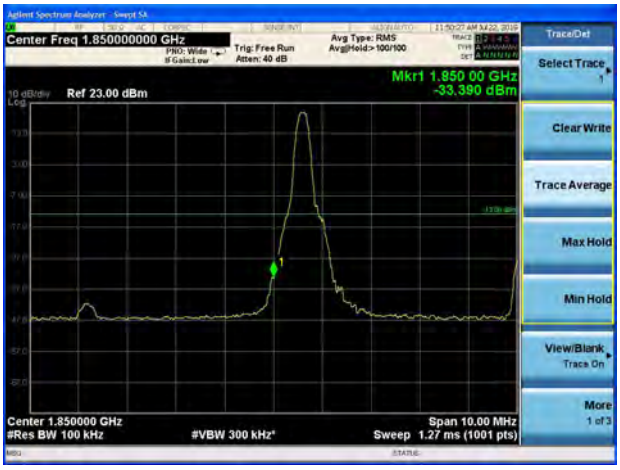
LTE Band 2 5MHz 64QAM 1RB CH-Low

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

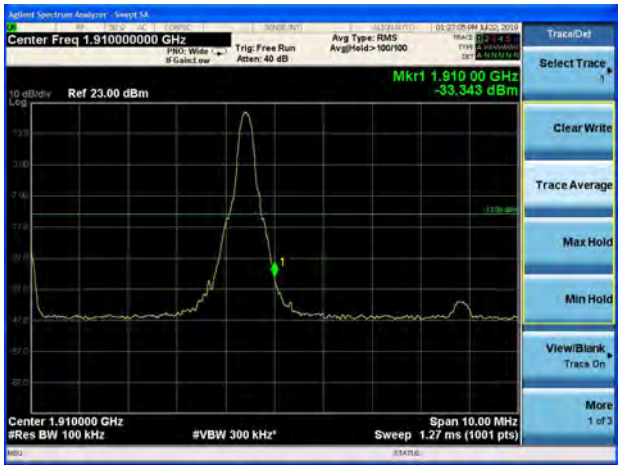
LTE Band 2 5MHz 64QAM 100%RB CH-Low

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

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



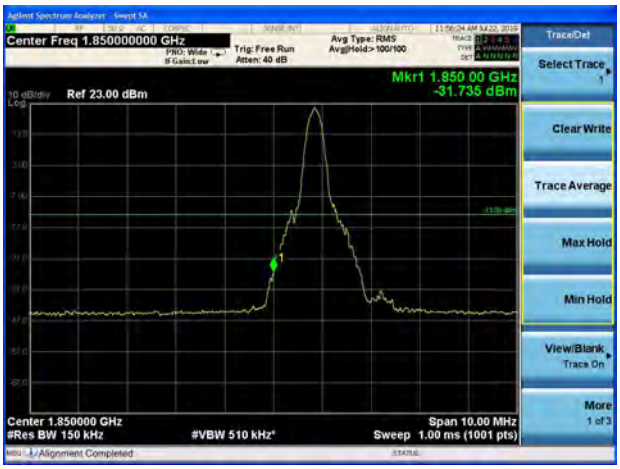
LTE Band 2 10MHz 64QAM 1RB CH-High



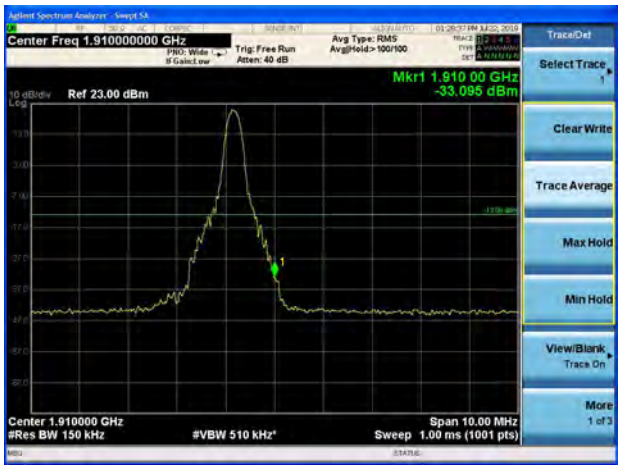
LTE Band 2 10MHz 64QAM 100%RB CH-Low

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

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



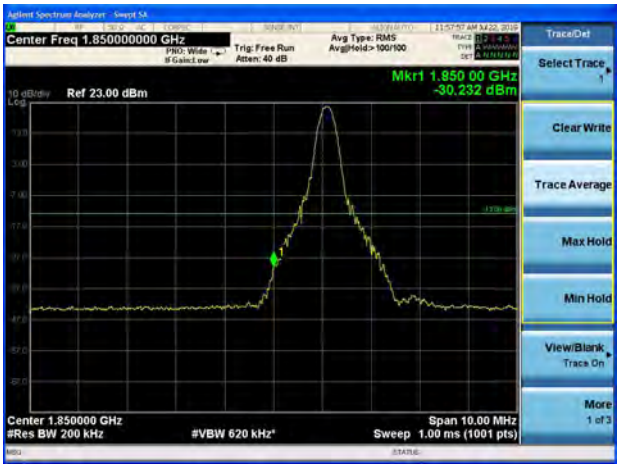
LTE Band 2 15MHz 64QAM 1RB CH-High



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

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

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

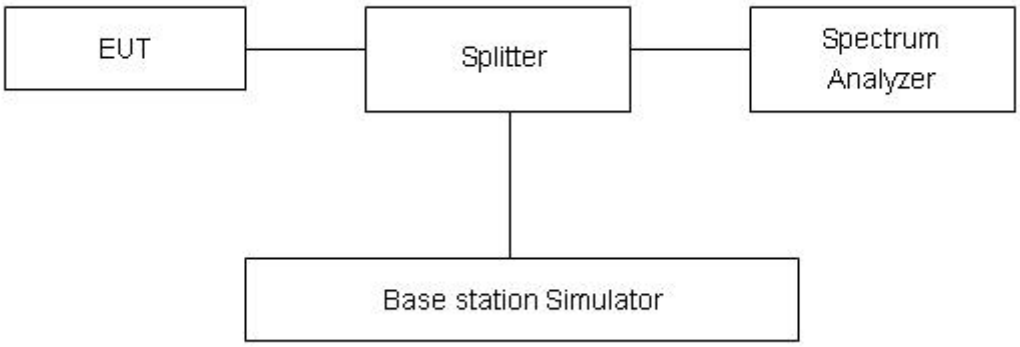
Ambient condition

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 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.

Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	32.63	30.47	2.16	≤13	PASS
	661	1880	32.60	30.46	2.14	≤13	PASS
	810	1909.8	32.56	30.45	2.11	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	32.63	30.48	2.15	≤13	PASS
	661	1880	32.57	30.43	2.14	≤13	PASS
	810	1909.8	32.54	30.41	2.13	≤13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	30.73	26.35	4.38	≤13	PASS
	661	1880	30.87	26.53	4.34	≤13	PASS
	810	1909.8	31.10	26.77	4.33	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	26.70	23.97	2.73	≤13	PASS
	9400	1880	26.66	24.07	2.59	≤13	PASS
	9538	1907.6	26.17	23.58	2.59	≤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	26.66	21.82	4.84	≤13	PASS
		18900	1880.0	27.04	22.39	4.65	≤13	PASS
		19193	1909.3	26.84	22.11	4.73	≤13	PASS
	3	18615	1851.5	26.58	21.90	4.68	≤13	PASS
		18900	1880	26.96	22.44	4.52	≤13	PASS
		19185	1908.5	26.75	22.20	4.55	≤13	PASS
	5	18625	1852.5	26.83	21.96	4.87	≤13	PASS
		18900	1880	27.14	22.42	4.72	≤13	PASS
		19175	1907.5	26.53	21.79	4.74	≤13	PASS
	10	18650	1855	26.31	21.52	4.79	≤13	PASS
		18900	1880	26.63	21.94	4.69	≤13	PASS
		19150	1905	26.42	21.81	4.61	≤13	PASS
	15	18675	1857.5	26.43	21.54	4.89	≤13	PASS
		18900	1880	26.76	21.94	4.82	≤13	PASS
		19125	1902.5	26.47	21.81	4.66	≤13	PASS
	20	18700	1860	26.28	21.56	4.72	≤13	PASS
		18900	1880	26.69	22.01	4.68	≤13	PASS
		19100	1900	26.57	21.96	4.61	≤13	PASS
16QAM	1.4	18607	1850.7	26.88	20.92	5.96	≤13	PASS
		18900	1880.0	27.32	21.51	5.81	≤13	PASS
		19193	1909.3	27.01	21.16	5.85	≤13	PASS
	3	18615	1851.5	26.93	20.96	5.97	≤13	PASS
		18900	1880	27.27	21.46	5.81	≤13	PASS
		19185	1908.5	27.08	21.28	5.80	≤13	PASS
	5	18625	1852.5	26.96	20.97	5.99	≤13	PASS
		18900	1880	27.29	21.47	5.82	≤13	PASS
		19175	1907.5	26.66	20.86	5.80	≤13	PASS
	10	18650	1855	26.51	20.58	5.93	≤13	PASS
		18900	1880	26.84	21.03	5.81	≤13	PASS
		19150	1905	26.56	20.83	5.73	≤13	PASS
	15	18675	1857.5	26.60	20.63	5.97	≤13	PASS
		18900	1880	26.93	21.04	5.89	≤13	PASS
		19125	1902.5	26.63	20.94	5.69	≤13	PASS
	20	18700	1860	26.50	20.63	5.87	≤13	PASS
		18900	1880	26.85	21.02	5.83	≤13	PASS
		19100	1900	26.74	20.99	5.75	≤13	PASS
64QAM	1.4	18607	1850.7	26.74	20.72	6.02	≤13	PASS
		18900	1880.0	27.05	21.22	5.83	≤13	PASS
		19193	1909.3	26.70	20.87	5.83	≤13	PASS

	3	18615	1851.5	26.47	20.84	5.63	≤13	PASS
		18900	1880	26.75	21.35	5.40	≤13	PASS
		19185	1908.5	26.41	20.93	5.48	≤13	PASS
	5	18625	1852.5	26.82	20.82	6.00	≤13	PASS
		18900	1880	27.07	21.23	5.84	≤13	PASS
		19175	1907.5	26.75	20.95	5.80	≤13	PASS
	10	18650	1855	26.91	20.95	5.96	≤13	PASS
		18900	1880	27.10	21.30	5.80	≤13	PASS
		19150	1905	26.72	20.99	5.73	≤13	PASS
	15	18675	1857.5	27.02	21.04	5.98	≤13	PASS
		18900	1880	27.07	21.28	5.79	≤13	PASS
		19125	1902.5	26.78	21.06	5.72	≤13	PASS
	20	18700	1860	26.93	21.07	5.86	≤13	PASS
		18900	1880	27.04	21.30	5.74	≤13	PASS
		19100	1900	26.91	21.15	5.76	≤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 -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)

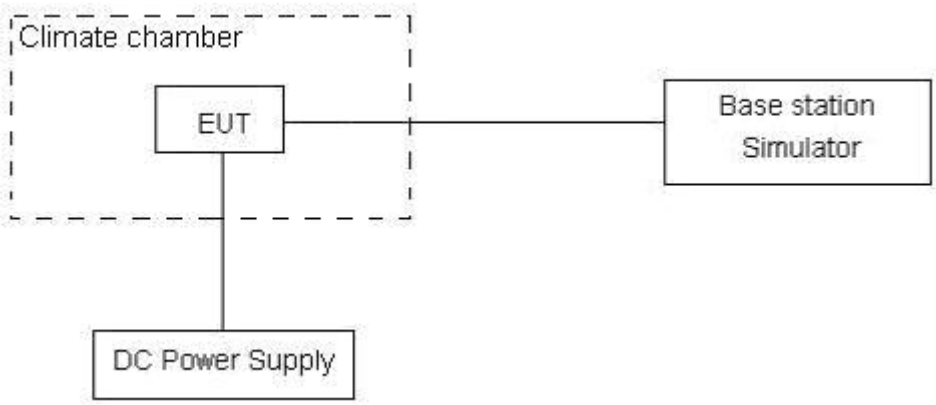
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.65 V and 4.4V, with a nominal voltage of 3.85V.

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= 0.01ppm.

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	11.86	17.91	0.00631	0.00953	PASS
Extreme（55℃）		11.15	17.14	0.00593	0.00911	PASS
Extreme（50℃）		15.07	3.63	0.00802	0.00193	PASS
Extreme（40℃）		2.45	3.85	0.00131	0.00205	PASS
Extreme（30℃）		13.20	13.49	0.00702	0.00718	PASS
Extreme（20℃）		8.01	5.86	0.00426	0.00312	PASS
Extreme（10℃）		7.61	13.07	0.00405	0.00695	PASS
Extreme（0℃）		10.99	4.04	0.00585	0.00215	PASS
Extreme（-10℃）		8.23	3.66	0.00438	0.00195	PASS
Extreme（-20℃）		2.57	16.56	0.00137	0.00881	PASS
Extreme（-30℃）		2.59	5.55	0.00138	0.00295	PASS
25℃	LV	11.48	17.90	0.00611	0.00952	PASS
	HV	5.31	6.72	0.00283	0.00358	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal（25℃）	Normal	3.70	2.79	0.00197	0.00148	PASS
Extreme（55℃）		3.97	8.49	0.00211	0.00451	PASS
Extreme（50℃）		1.76	17.07	0.00094	0.00908	PASS
Extreme（40℃）		13.32	3.07	0.00708	0.00163	PASS
Extreme（30℃）		8.67	6.57	0.00461	0.00350	PASS
Extreme（20℃）		17.78	8.58	0.00946	0.00456	PASS
Extreme（10℃）		13.38	4.97	0.00712	0.00264	PASS
Extreme（0℃）		13.76	11.46	0.00732	0.00610	PASS
Extreme（-10℃）		9.40	2.85	0.00500	0.00152	PASS
Extreme（-20℃）		2.38	17.18	0.00127	0.00914	PASS
Extreme（-30℃）		10.89	16.53	0.00580	0.00879	PASS
25℃	LV	11.30	12.42	0.00601	0.00661	PASS
	HV	7.01	14.52	0.00373	0.00772	PASS

LTE Band 2 (20MHz BANDWIDTH)								
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	2.59	11.70	11.89	0.00138	0.00622	0.00632	PASS
Extreme（55℃）		16.01	10.92	8.68	0.00852	0.00581	0.00462	PASS
Extreme（50℃）		10.86	3.68	15.38	0.00577	0.00196	0.00818	PASS
Extreme（40℃）		16.49	1.30	4.77	0.00877	0.00069	0.00254	PASS
Extreme（30℃）		6.07	12.88	13.43	0.00323	0.00685	0.00714	PASS
Extreme（20℃）		6.67	1.85	3.35	0.00355	0.00099	0.00178	PASS
Extreme（10℃）		8.02	1.75	6.52	0.00427	0.00093	0.00347	PASS
Extreme（0℃）		1.99	8.46	3.98	0.00106	0.00450	0.00212	PASS
Extreme（-10℃）		17.75	11.92	1.92	0.00944	0.00634	0.00102	PASS
Extreme（-20℃）		16.26	4.35	6.84	0.00865	0.00231	0.00364	PASS
Extreme（-30℃）		17.02	3.42	11.87	0.00905	0.00182	0.00631	PASS
25℃	LV	1.70	15.21	6.86	0.00090	0.00809	0.00365	PASS
	HV	11.97	8.39	12.58	0.00637	0.00446	0.00669	PASS

5.7. Spurious Emissions at Antenna Terminals

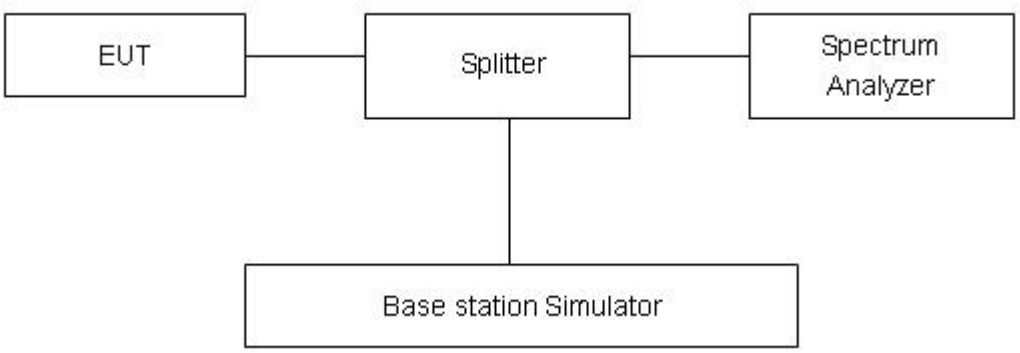
Ambient condition

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 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.

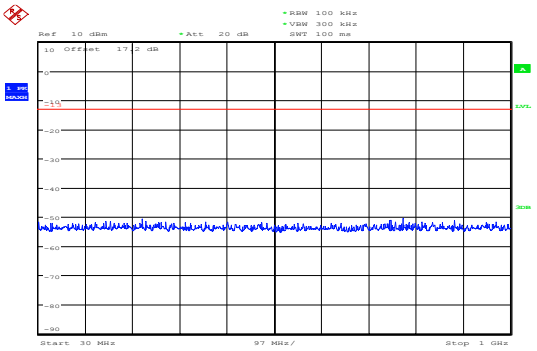
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

Test Result

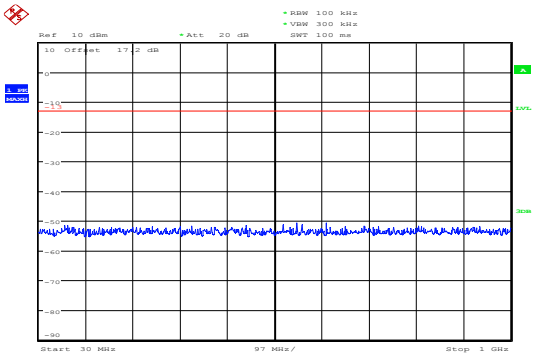
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

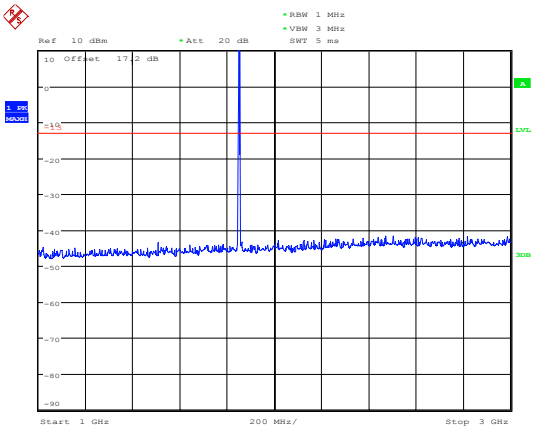
GSM 1900 CH-Low 30MHz~1GHz



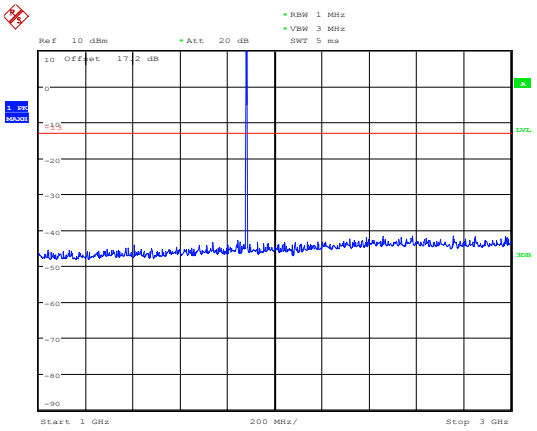
GSM 1900 CH-Middle 30MHz~1GHz



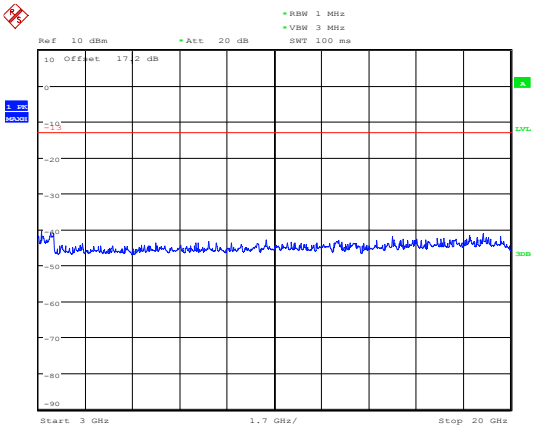
GSM 1900 CH-Low 1GHz~3GHz



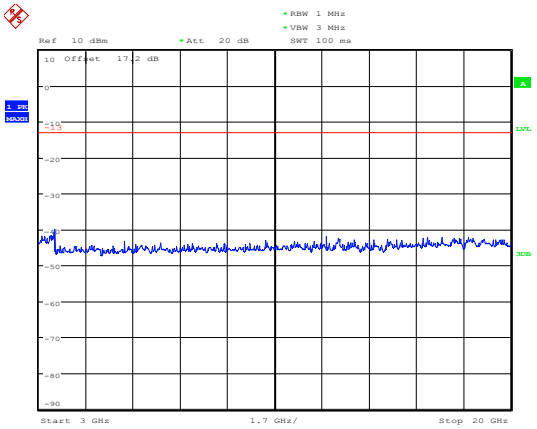
GSM 1900 CH-Middle 1GHz~3GHz



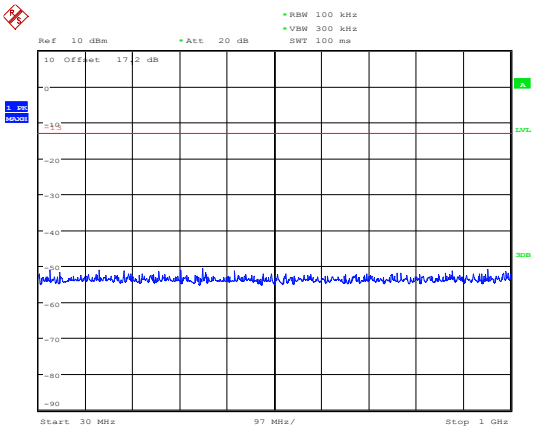
GSM 1900 CH-Low 3GHz~20GHz



GSM 1900 CH-Middle 3GHz~20GHz

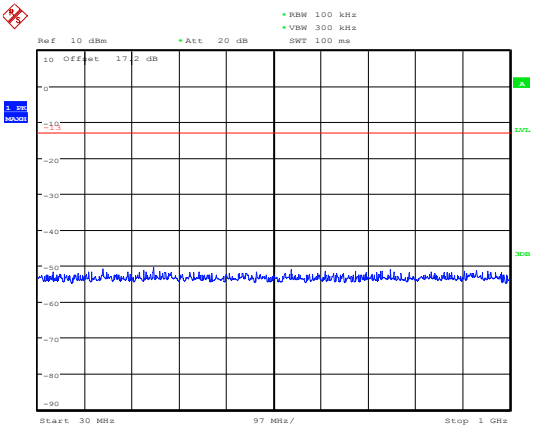


GSM 1900 CH-High 30MHz~1GHz



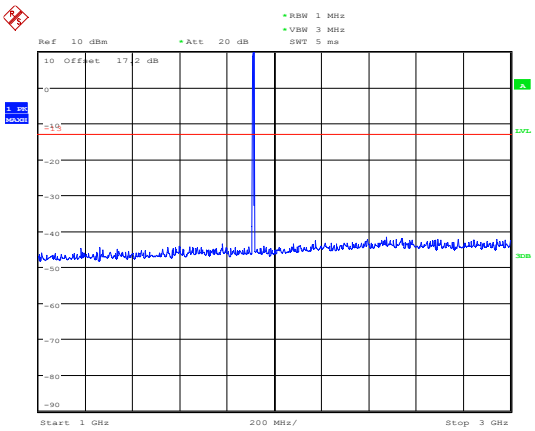
Date: 11.JUL.2019 19:23:33

WCDMA Band II CH-Low 30MHz~1GHz



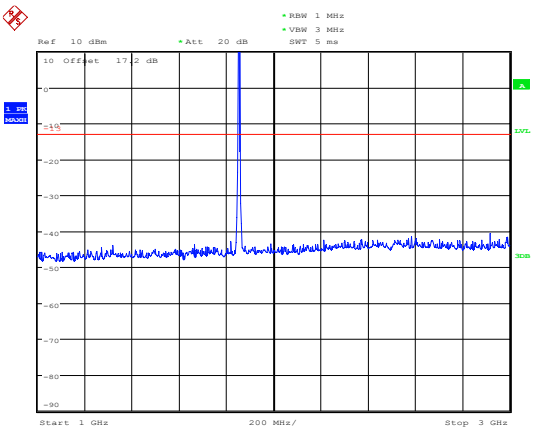
Date: 12.JUL.2019 11:25:20

GSM 1900 CH-High 1GHz~3GHz



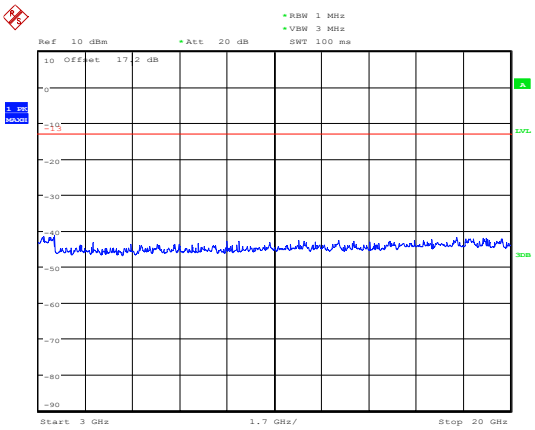
Date: 11.JUL.2019 19:24:18

WCDMA BAND II CH-Low 1GHz~3GHz



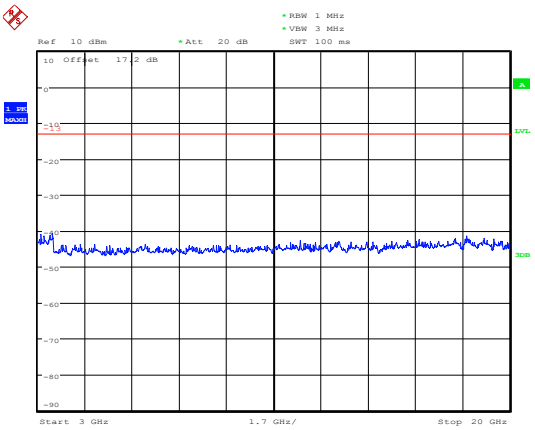
Date: 12.JUL.2019 11:29:49

GSM 1900 CH-High 3GHz~20GHz



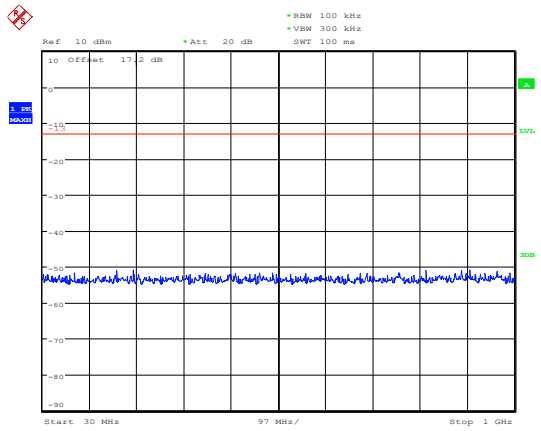
Date: 11.JUL.2019 19:24:38

WCDMA BAND II CH-Low 3GHz~20GHz

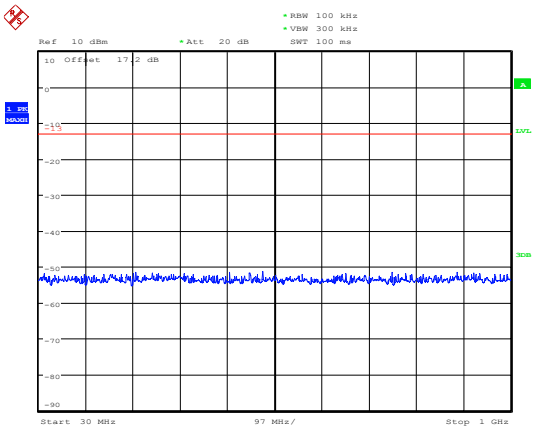


Date: 12.JUL.2019 11:31:18

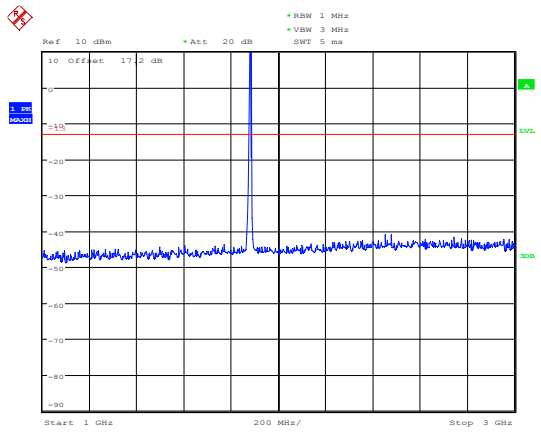
WCDMA Band II CH- Middle 30MHz~1GHz



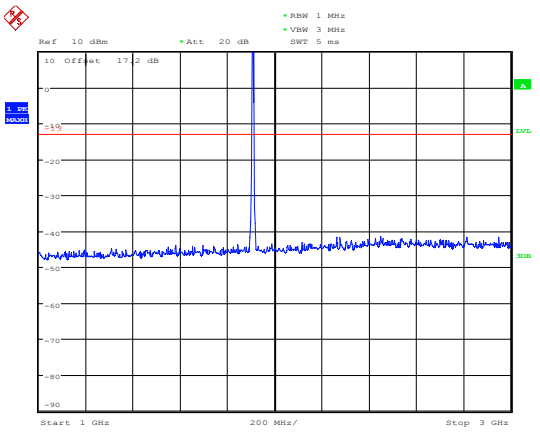
WCDMA Band II CH- High 30MHz~1GHz



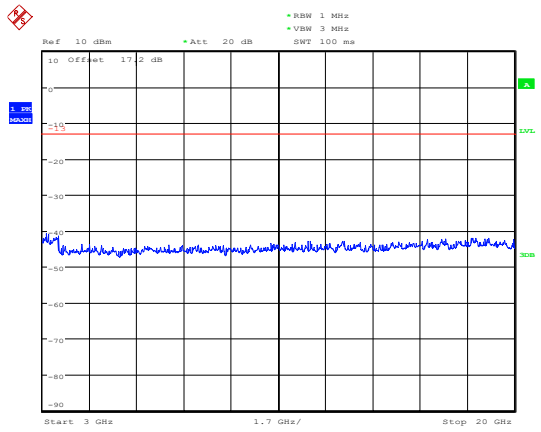
WCDMA BAND II CH-Middle 1GHz~3GHz



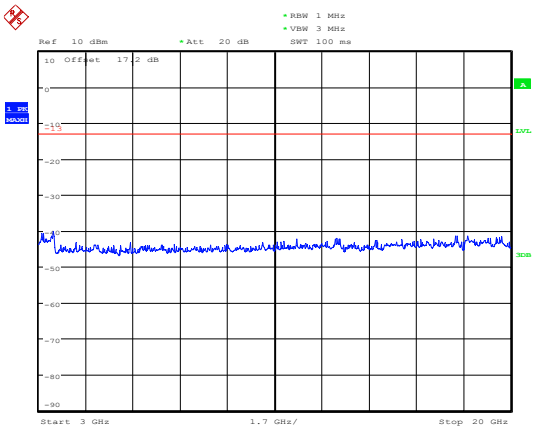
WCDMA BAND II CH-High 1GHz~3GHz



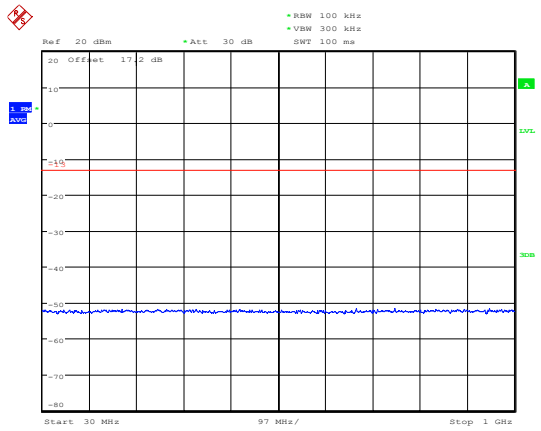
WCDMA BAND II CH-Middle 3GHz~20GHz



WCDMA BAND II CH-High 3GHz~20GHz

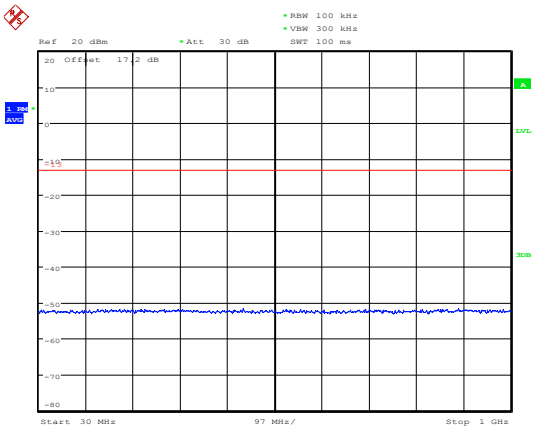


LTE Band 2 1.4MHz CH-Low 30MHz~1GHz



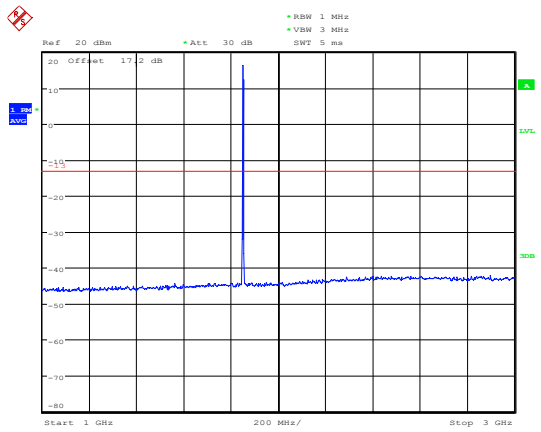
Date: 13.JUL.2019 11:51:53

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



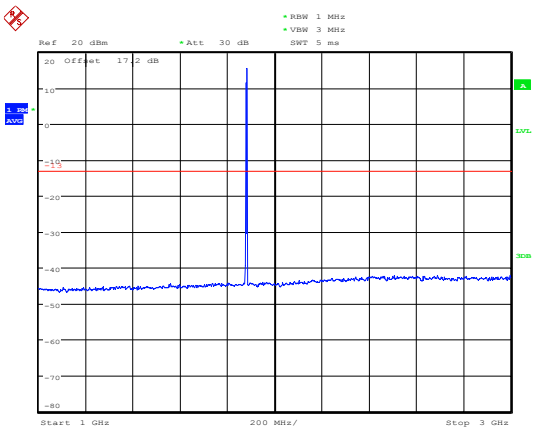
Date: 13.JUL.2019 11:52:08

LTE Band 2 1.4MHz CH-Low 1GHz~3GHz



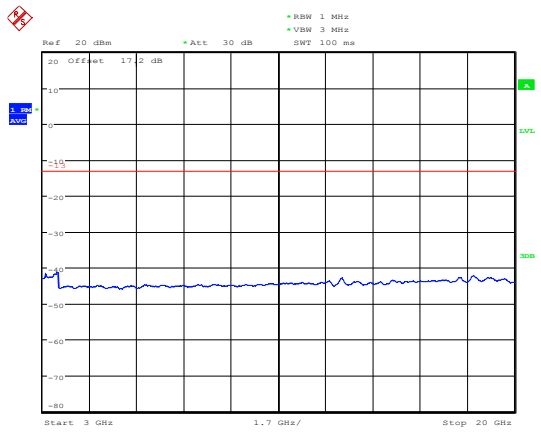
Date: 13.JUL.2019 12:00:42

LTE Band 2 1.4MHz CH-Middle 1GHz~3GHz



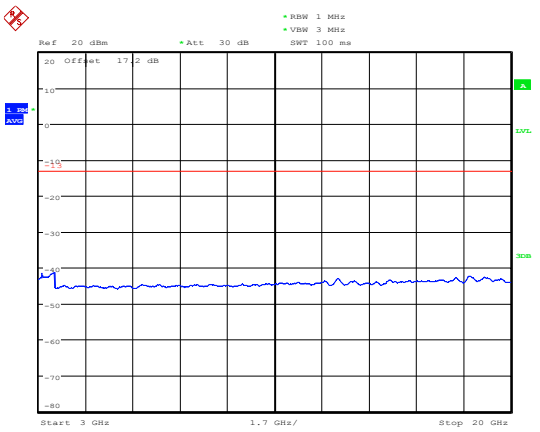
Date: 13.JUL.2019 12:01:04

LTE Band 2 1.4MHz CH-Low 3GHz~20GHz



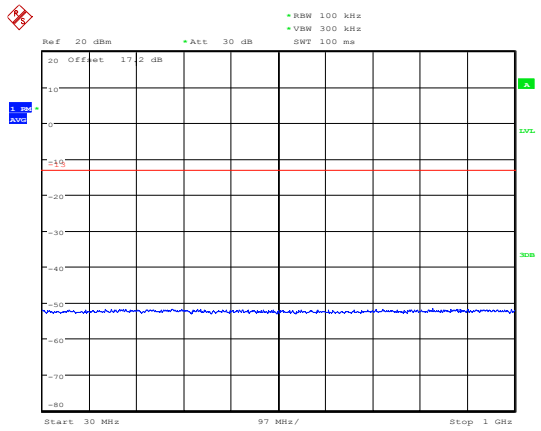
Date: 13.JUL.2019 12:43:04

LTE Band 2 1.4MHz CH-Middle 3GHz~20GHz



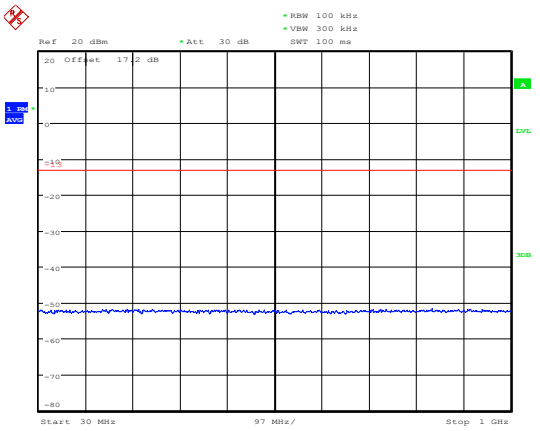
Date: 13.JUL.2019 12:43:17

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



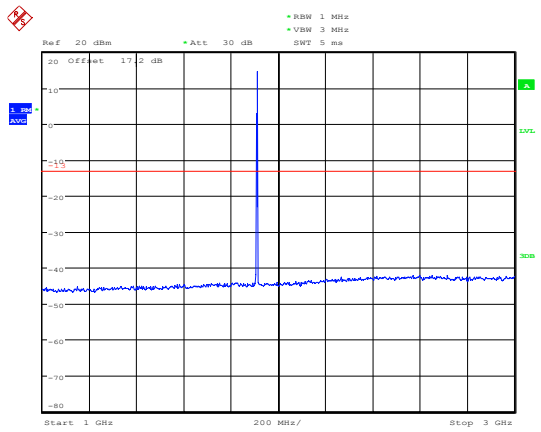
Date: 13.JUL.2019 11:52:24

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



Date: 13.JUL.2019 11:52:49

LTE Band 2 1.4MHz CH-High 1GHz~3GHz



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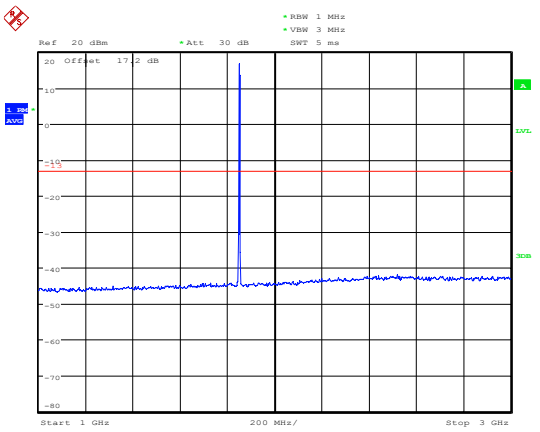
LTE Band 2 3MHz CH-Low 1GHz~3GHz



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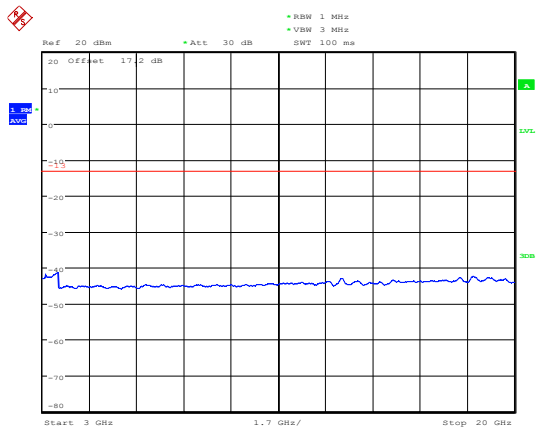
LTE Band 2 1.4MHz CH-High 3GHz~20GHz



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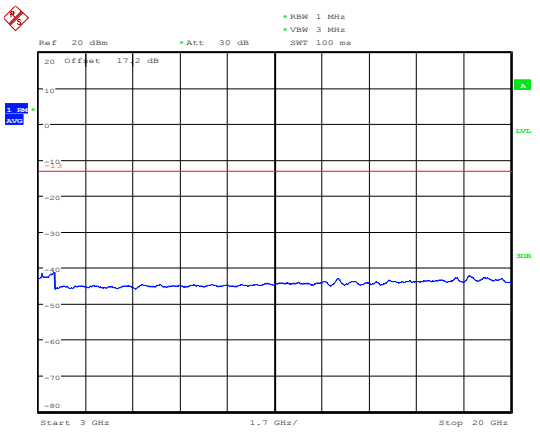
LTE Band 2 3MHz CH-Low 3GHz~20GHz



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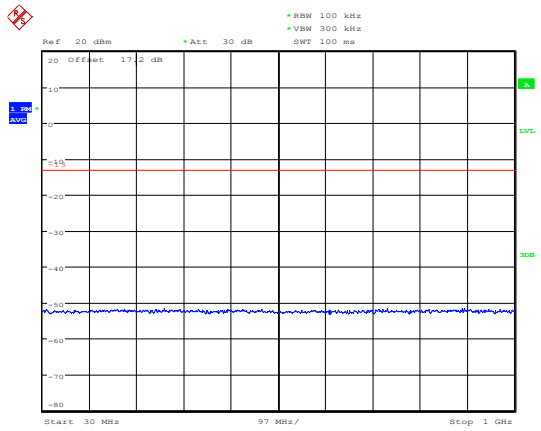
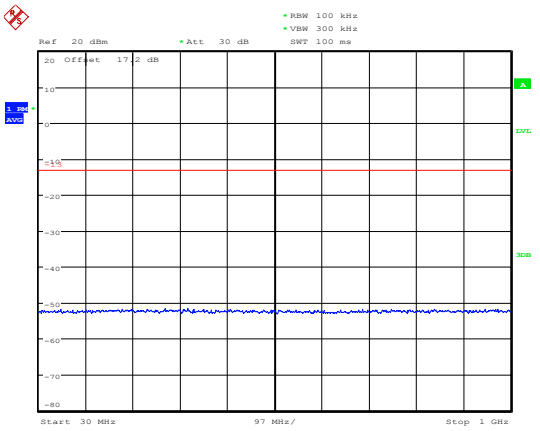
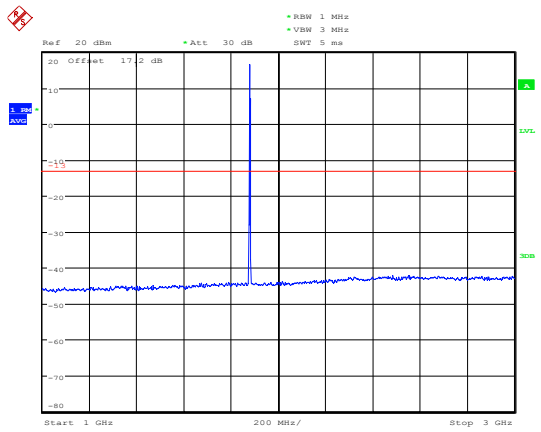
LTE Band 2 3MHz CH-Middle 30MHz~1GHz



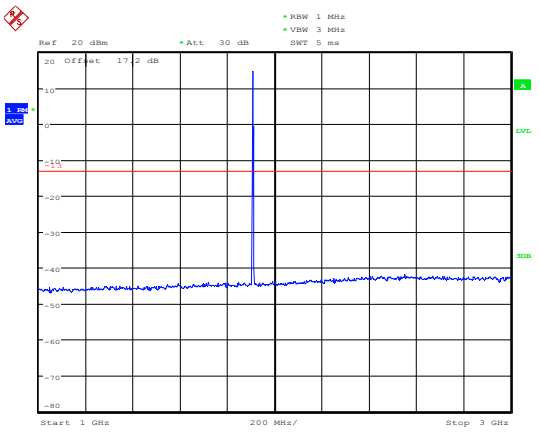
LTE Band 2 3MHz CH-High 30MHz~1GHz



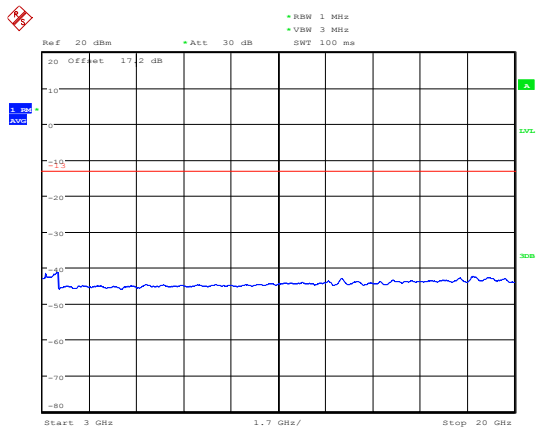
LTE Band 2 3MHz CH-Middle 1GHz~3GHz



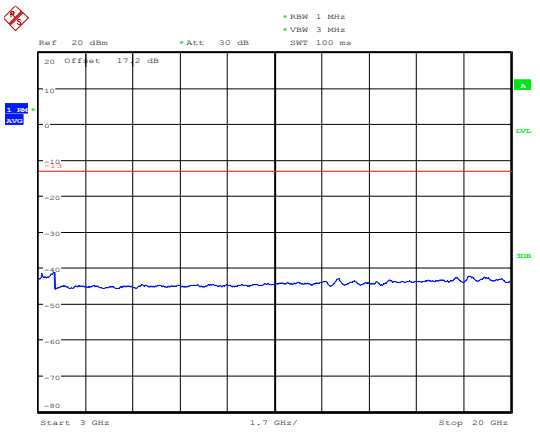
LTE Band 2 3MHz CH-High 1GHz~3GHz



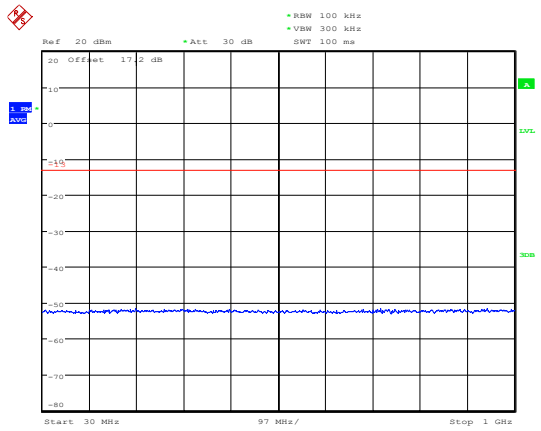
LTE Band 2 3MHz CH-Middle 3GHz~20GHz



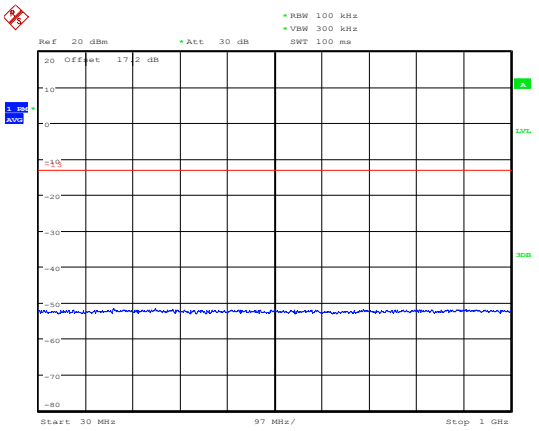
LTE Band 2 3MHz CH-High 3GHz~20GHz



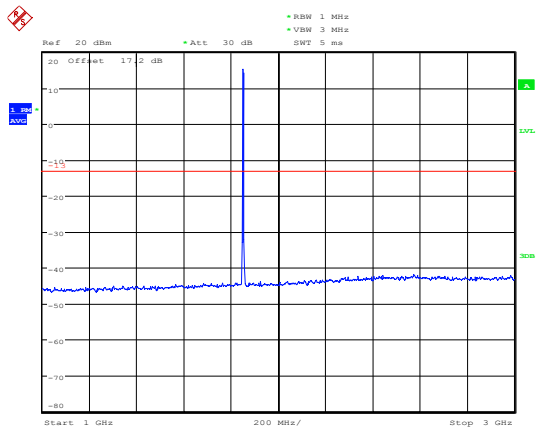
LTE Band 2 5MHz CH-Low 30MHz~1GHz



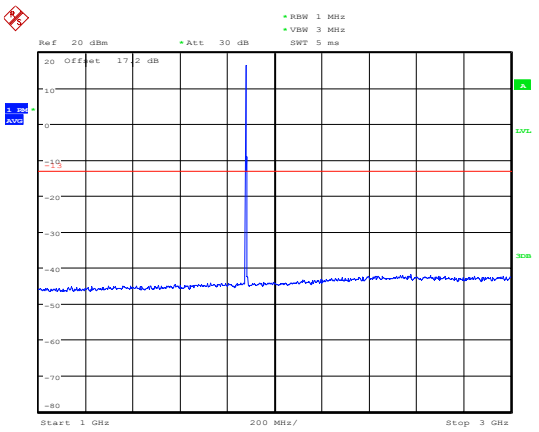
LTE Band 2 5MHz CH-Middle 30MHz~1GHz



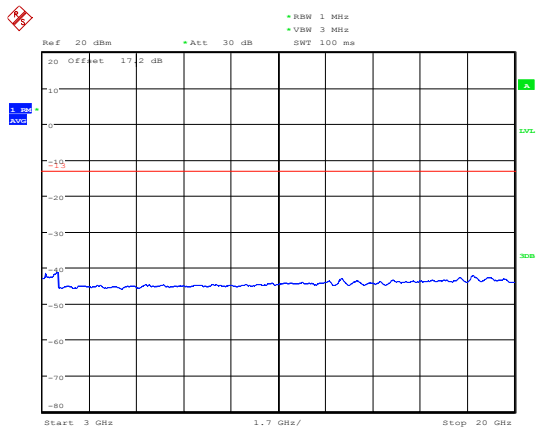
LTE Band 2 5MHz CH-Low 1GHz~3GHz



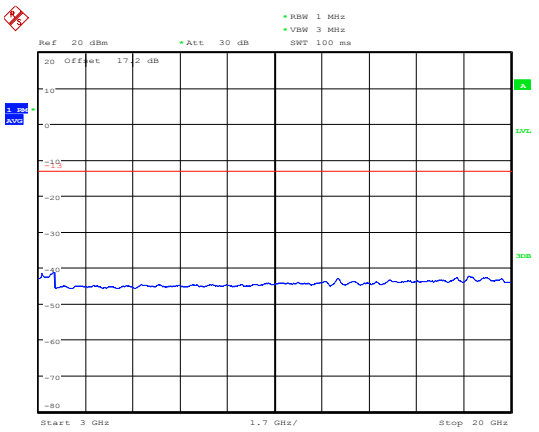
LTE Band 2 5MHz CH-Middle 1GHz~3GHz



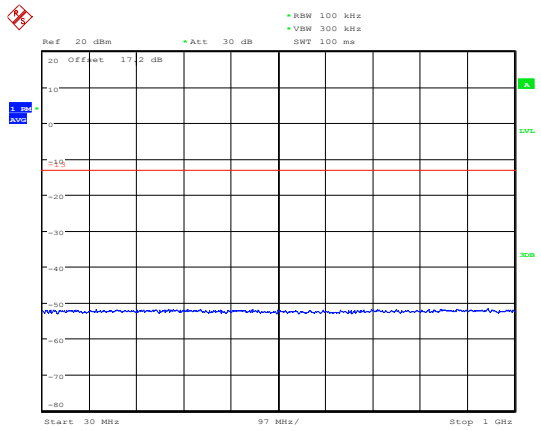
LTE Band 2 5MHz CH-Low 3GHz~20GHz



LTE Band 2 5MHz CH-Middle 3GHz~20GHz



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



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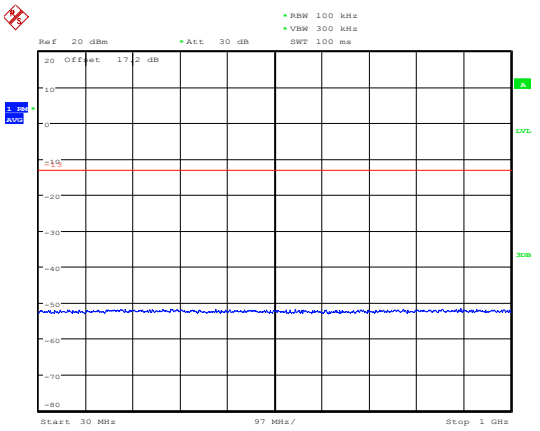
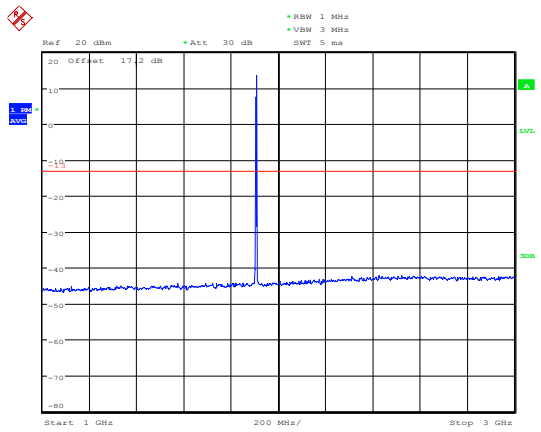
LTE Band 2 10MHz CH-Low 30MHz~1GHz



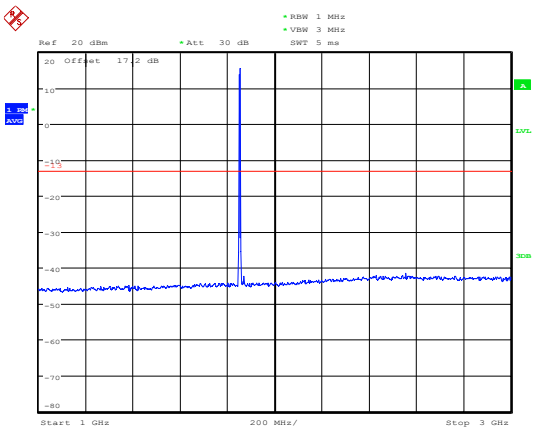
Date: 13.JUL.2019 11:57:18

LTE Band 2 5MHz CH-High 1GHz~3GHz



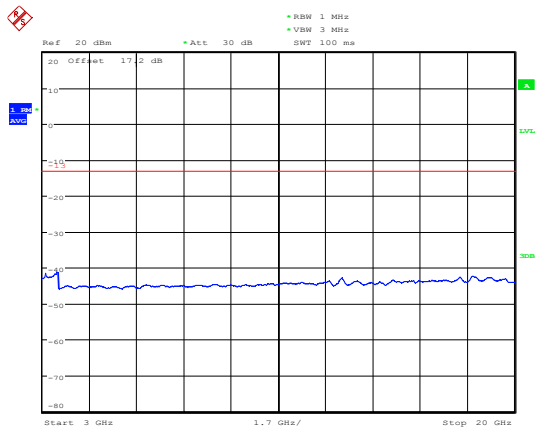
Date: 13.JUL.2019 12:03:25

LTE Band 2 10MHz CH-Low 1GHz~3GHz



Date: 13.JUL.2019 12:03:48

LTE Band 2 5MHz CH-High 3GHz~20GHz



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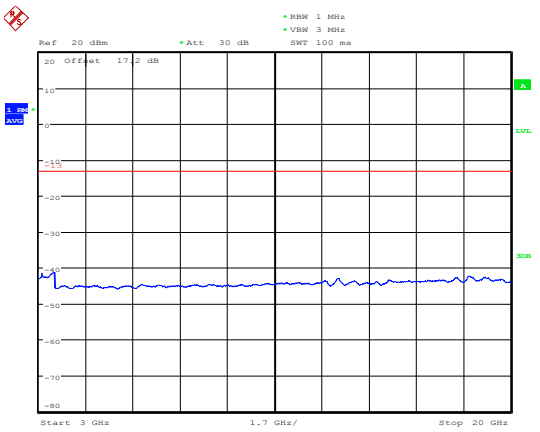
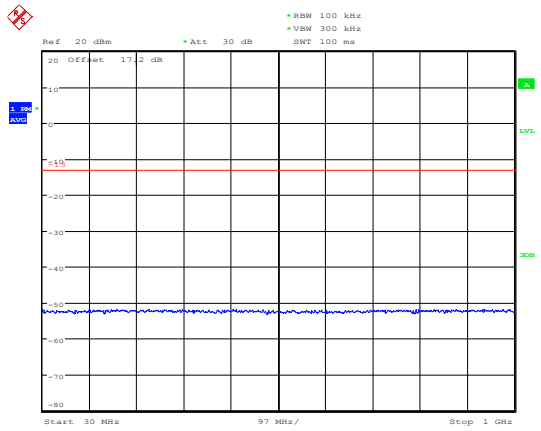
LTE Band 2 10MHz CH-Low 3GHz~20GHz

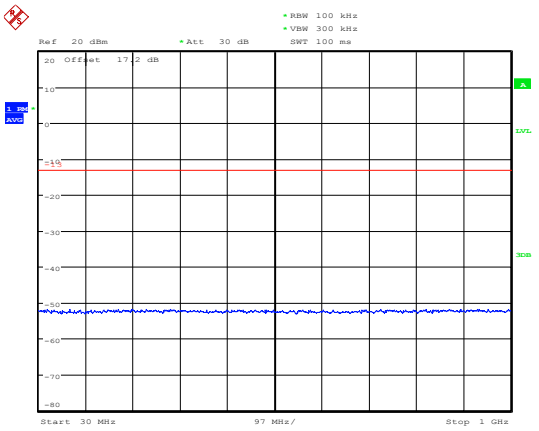


Date: 13.JUL.2019 12:45:53

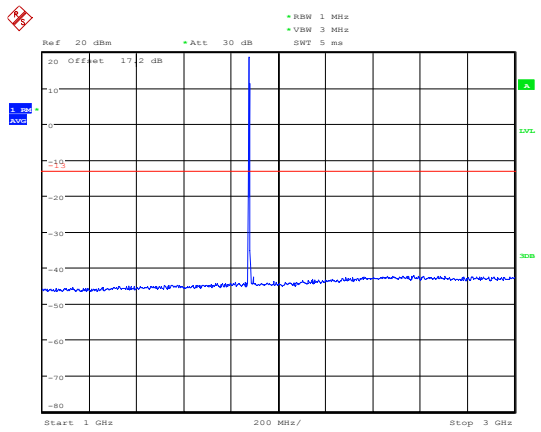
LTE Band 2 10MHz CH-Middle 30MHz~1GHz



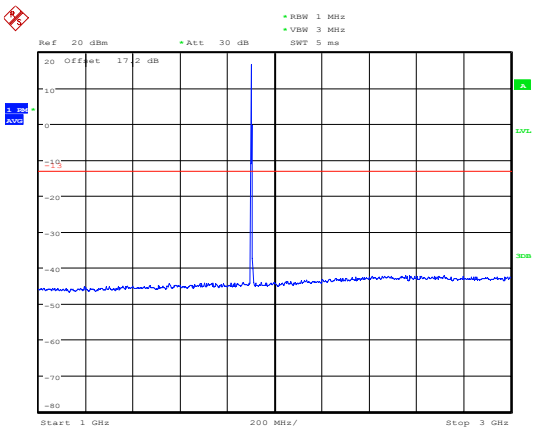
LTE Band 2 10MHz CH-High 30MHz~1GHz



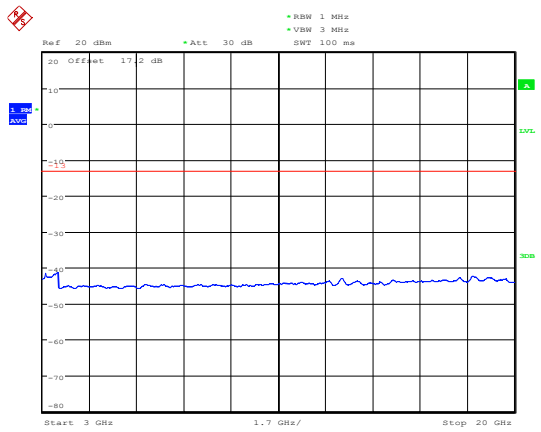
LTE Band 2 10MHz CH-Middle 1GHz~3GHz



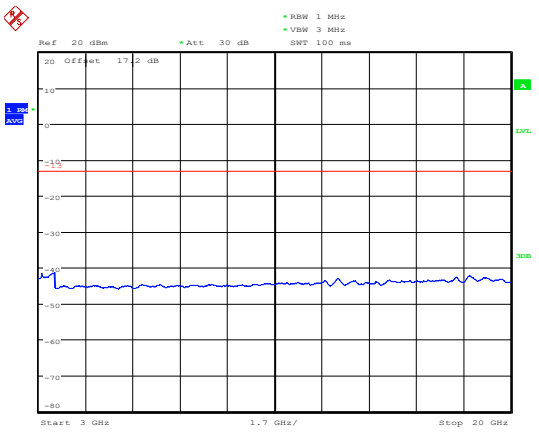
LTE Band 2 10MHz CH-High 1GHz~3GHz



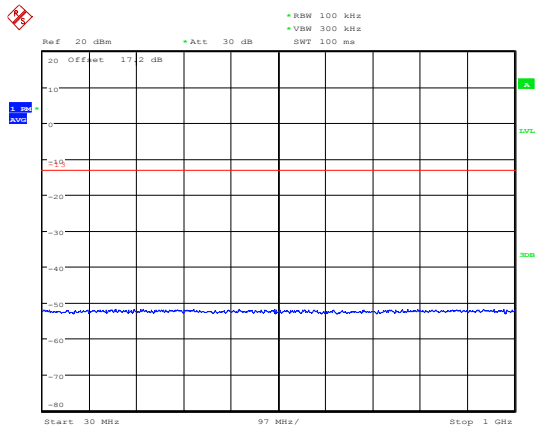
LTE Band 2 10MHz CH-Middle 3GHz~20GHz



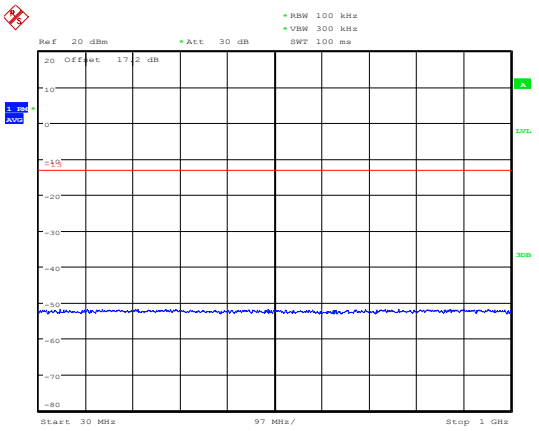
LTE Band 2 10MHz CH-High 3GHz~20GHz



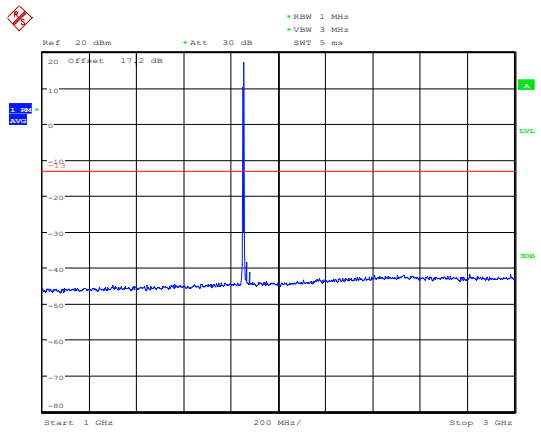
LTE Band 2 15MHz CH-Low 30MHz~1GHz



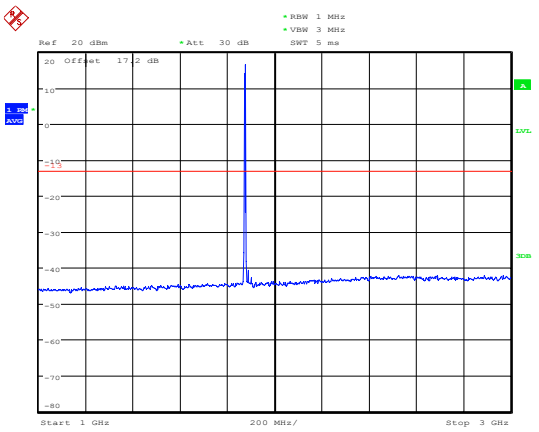
LTE Band 2 15MHz CH-Middle 30MHz~1GHz



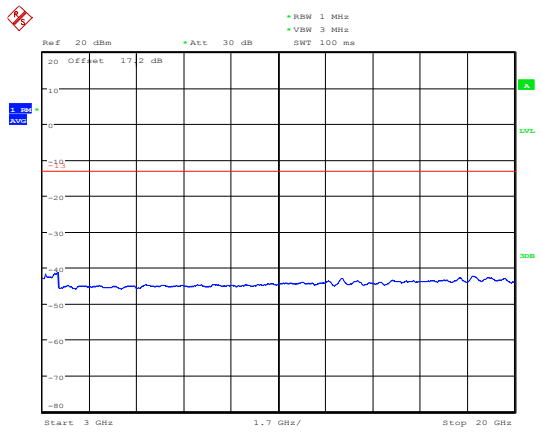
LTE Band 2 15MHz CH-Low 1GHz~3GHz



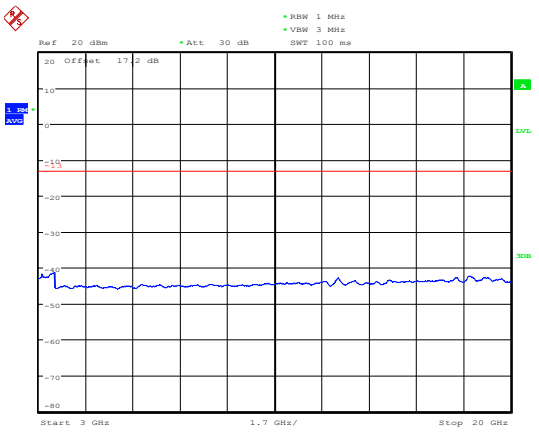
LTE Band 2 15MHz CH-Middle 1GHz~3GHz



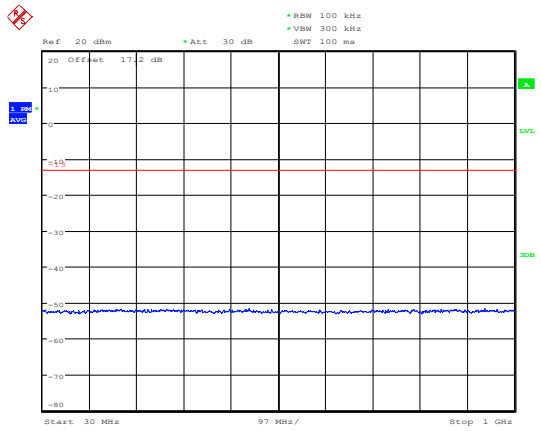
LTE Band 2 15MHz CH-Low 3GHz~20GHz



LTE Band 2 15MHz CH-Middle 3GHz~20GHz



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



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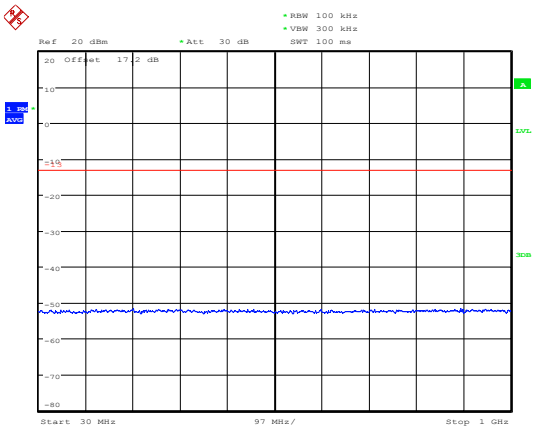
LTE Band 2 20MHz CH-Low 30MHz~1GHz



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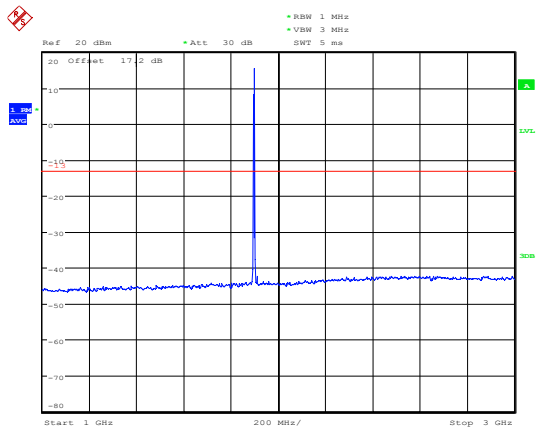
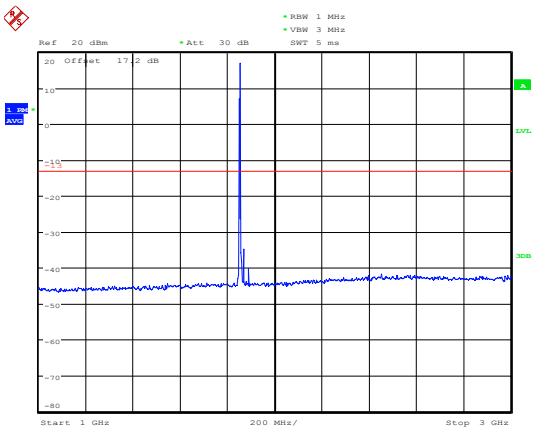
LTE Band 2 15MHz CH-High 1GHz~3GHz



Date: 13.JUL.2019 12:05:18

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



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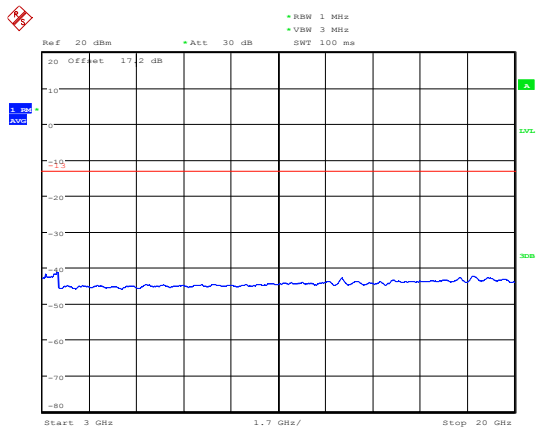
LTE Band 2 15MHz CH-High 3GHz~20GHz



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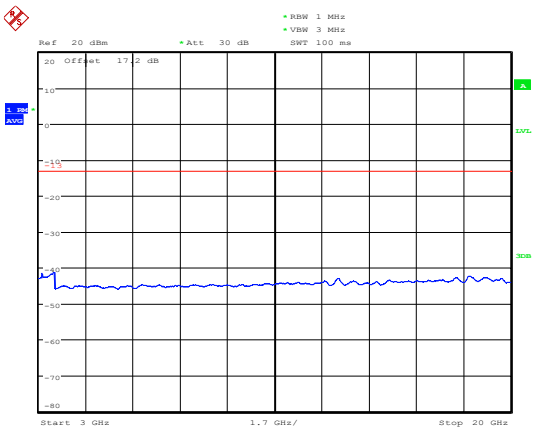
LTE Band 2 20MHz CH-Low 3GHz~20GHz



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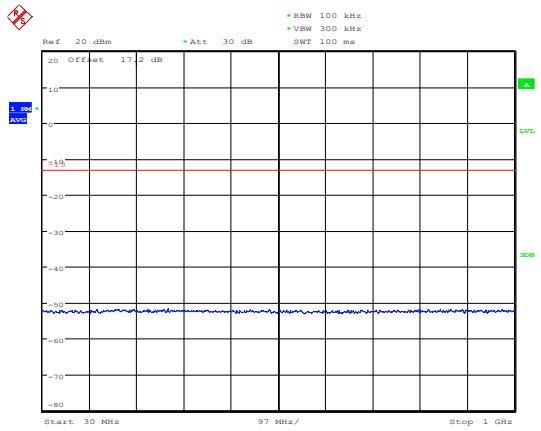
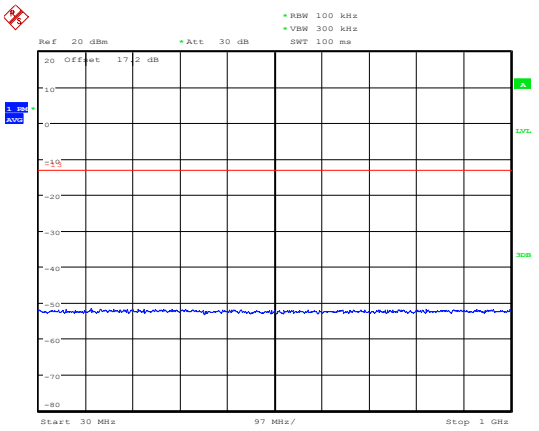
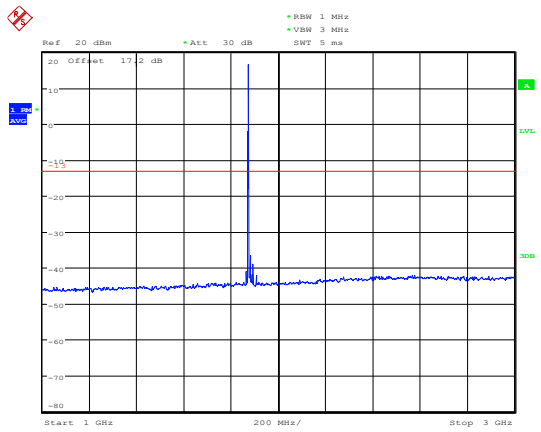
LTE Band 2 20MHz CH-Middle 30MHz~1GHz



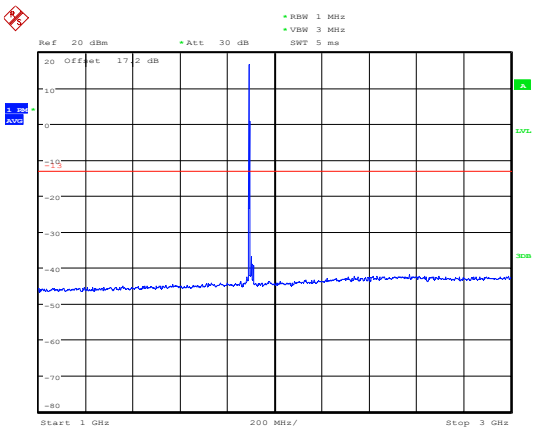
LTE Band 2 20MHz CH-High 30MHz~1GHz



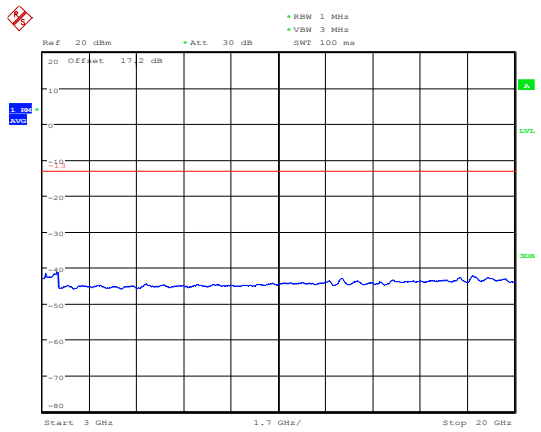
LTE Band 2 20MHz CH-Middle 1GHz~3GHz



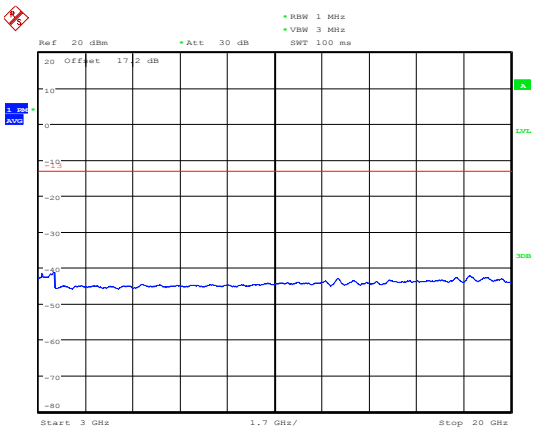
LTE Band 2 20MHz CH-High 1GHz~3GHz



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



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



5.8. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

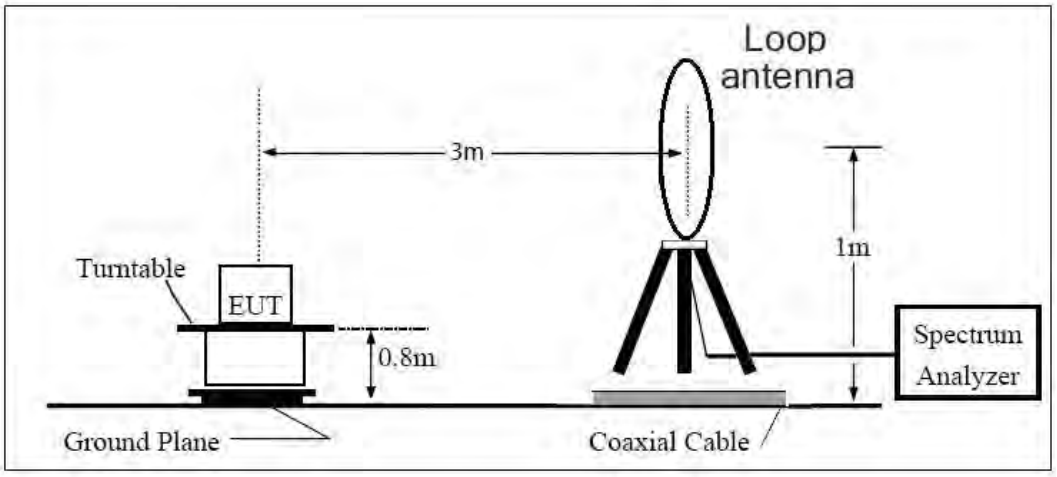
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable 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)

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

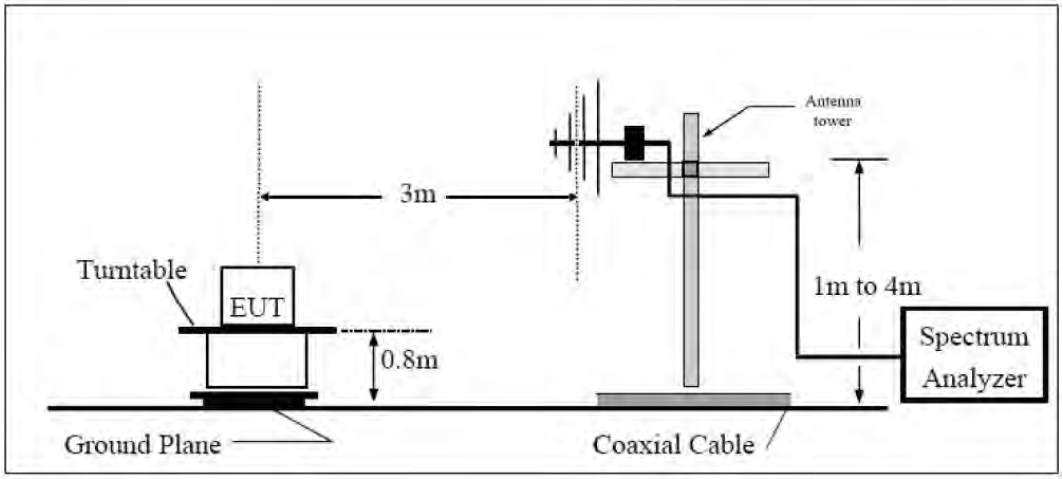
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

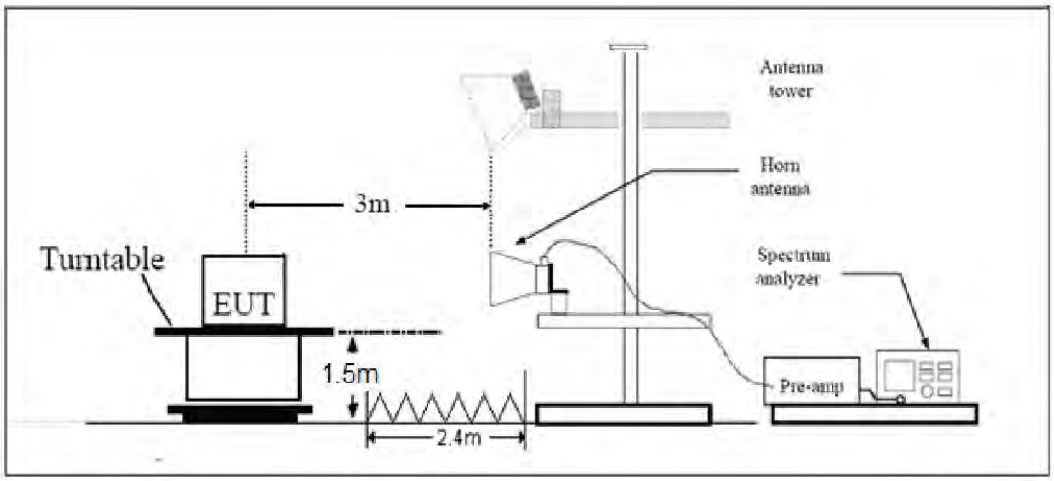
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



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.

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	-46.33	5.10	11.05	Horizontal	-40.38	-13.00	27.38	45
3	5640.2	-53.45	5.42	12.65	Horizontal	-46.22	-13.00	33.22	0
4	7519.5	-53.91	6.70	13.85	Horizontal	-46.76	-13.00	33.76	180
5	9402.8	-51.37	7.01	14.75	Horizontal	-43.63	-13.00	30.63	90
6	11279.3	-49.50	7.48	15.95	Horizontal	-41.03	-13.00	28.03	270
7	13159.1	-50.34	7.51	16.55	Horizontal	-41.30	-13.00	28.30	225
8	15041.3	-48.49	8.24	15.35	Horizontal	-41.38	-13.00	28.38	180
9	16922.3	-42.20	8.41	14.95	Horizontal	-35.66	-13.00	22.66	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	-57.96	5.10	11.05	Horizontal	-52.01	-13.00	39.01	45
3	5640.0	-56.35	5.42	12.65	Horizontal	-49.12	-13.00	36.12	0
4	7520.0	-58.68	6.70	13.85	Horizontal	-51.53	-13.00	38.53	180
5	9400.0	-54.03	7.01	14.75	Horizontal	-46.29	-13.00	33.29	90
6	11280.0	-52.20	7.48	15.95	Horizontal	-43.73	-13.00	30.73	270
7	13160.0	-51.59	7.51	16.55	Horizontal	-42.55	-13.00	29.55	225
8	15040.0	-49.73	8.24	15.35	Horizontal	-42.62	-13.00	29.62	180
9	16920.0	-45.96	8.41	14.95	Horizontal	-39.42	-13.00	26.42	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 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	-62.12	5.10	11.05	Horizontal	-56.17	-13.00	43.17	45
3	5638.9	-60.19	5.42	12.65	Horizontal	-52.96	-13.00	39.96	180
4	7520.0	-52.76	6.70	13.85	Horizontal	-45.61	-13.00	32.61	135
5	9400.0	-54.99	7.01	14.75	Horizontal	-47.25	-13.00	34.25	45
6	11280.0	-55.94	7.48	15.95	Horizontal	-47.47	-13.00	34.47	315
7	13160.0	-55.83	7.51	16.55	Horizontal	-46.79	-13.00	33.79	270
8	15040.0	-52.93	8.24	15.35	Horizontal	-45.82	-13.00	32.82	0
9	16920.0	-51.75	8.41	14.95	Horizontal	-45.21	-13.00	32.21	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	3760.0	-61.30	5.10	11.05	Horizontal	-55.35	-13.00	42.35	45
3	5640.0	-60.08	5.42	12.65	Horizontal	-52.85	-13.00	39.85	135
4	7520.0	-49.69	6.70	13.85	Horizontal	-42.54	-13.00	29.54	45
5	9400.0	-56.47	7.01	14.75	Horizontal	-48.73	-13.00	35.73	225
6	11280.0	-55.67	7.48	15.95	Horizontal	-47.20	-13.00	34.20	270
7	13160.0	-51.96	7.51	16.55	Horizontal	-42.92	-13.00	29.92	315
8	15040.0	-52.43	8.24	15.35	Horizontal	-45.32	-13.00	32.32	45
9	16920.0	-51.48	8.41	14.95	Horizontal	-44.94	-13.00	31.94	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	-63.24	5.10	11.05	Horizontal	-57.29	-13.00	44.29	90
3	5640.0	-59.89	5.42	12.65	Horizontal	-52.66	-13.00	39.66	45
4	7520.0	-49.82	6.70	13.85	Horizontal	-42.67	-13.00	29.67	135
5	9400.0	-55.40	7.01	14.75	Horizontal	-47.66	-13.00	34.66	0
6	11280.0	-54.68	7.48	15.95	Horizontal	-46.21	-13.00	33.21	180
7	13160.0	-51.21	7.51	16.55	Horizontal	-42.17	-13.00	29.17	315
8	15040.0	-53.51	8.24	15.35	Horizontal	-46.40	-13.00	33.40	225
9	16920.0	-50.49	8.41	14.95	Horizontal	-43.95	-13.00	30.95	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.

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 *******