RF TEST REPORT

Applicant	Huawei Technologies Co., Ltd.
FCC ID	QISAMN-LX3
Product	Smart Phone
Model	AMN-LX3
Report No.	R1906H0117-R2
Issue Date	July 5, 2019

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

Peng Tao

Performed by: Peng Tao

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Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF power output	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
Date of Testing: June 8, 2019~ June 17, 2019			
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.			

AMN-LX3 (Report No.: R1906H0117-R2) is a variant model of AMN-LX3 (Report No.: R1904H0043-R2V1). All test items tested for variant in this report. The detailed product change description please refers to the ANNEX A.

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1. Test Laboratory

1.1. Notes of the test report

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1.2. Test facility

CNAS (accreditation number: L2264)

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

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

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

IC (recognition number is 8510A)

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

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

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

A2LA (Certificate Number: 3857.01)

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

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1.3. Testing Location

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

Client Information

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

General information

EUT Description			
Model	AMN-LX3		
SN	8TQNU19527100203		
Hardware Version	HL1AMNM		
Software Version	5.0.1.37(C900E20R1P2)		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	GSM1900: 0.57dBi WCDMA Band II: 0.57dBi LTE Band 2: 0.57dBi		
Test Mode(s)	GSM1900; WCDMA Band II; LTE Band 2		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA) BPSK,QPSK,16QAM; (LTE)QPSK,16QAM		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	14		
HSUPA UE Category	7		
DC-HSDPA UE Category	24		
HSPA+ UE Category	7		
LTE Category	4		
Maximum E.I.R.P	GSM 1900:	29.28dBm	
	WCDMA Band II:	24.00dBm	
	LTE Band 2:	22.74dBm	
Rated Power Supply Voltage	3.82V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.4V		
Extreme Temperature	Lowest: -10°C Highest: +55°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850 ~ 1910	1930 ~ 1990
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990

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	LTE Band 2	1850 ~ 1910	1930 ~ 1990
EUT Accessory			
Adapter 1	Manufacturer: HuaweiTechnologies Co., Ltd. (SHENZHEN HUNTKEY ELECTRIC CO., LTD.) Model: HW-050100U01		
Adapter 2	Manufacturer: HuaweiTechnologies Co., Ltd. (HUIZHOU BYD ELECTRONIC CO., LTD.) Model: HW-050100U01		
Adapter 3	Manufacturer: HuaweiTechnologies Co., Ltd. (Dongguan Phitek Electronics Co., Ltd.) Model: HW-050100U01		
Battery 1	Manufacturer: HuaweiTechnologies Co., Ltd. (Sunwoda Electronic Co.,LTD) Model: HB405979ECW		
Battery 2	Manufacturer: HuaweiTechnologies Co., Ltd. (SCUD (Fujian) Electronics Co., LTD.) Model: HB405979ECW		
Battery 3	Manufacturer: HuaweiTechnologies Co., Ltd. (Desay Battery Electronic Co.,LTD) Model: HB405979ECW		
Earphone 1	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD Model: MEND1532B528A02		
Earphone 2	Manufacturer: Boluo County Quancheng Electronic Co.,ltd. Model: 1293-3283-3.5MM-322		
Earphone 3	Manufacturer: FOXCONN INTERCONNECT TECHNOLOGY LIMITED Model: EPAB542-2WH05-DH		
USB Cable 1	Manufacturer: HONGLIN TECHNOLOGY CO.,LTD. Model: 130-26654		
USB Cable 2	Manufacturer: Dongguan Ming Ji Electronics Co.,Ltd. Model: 203-0786-0		
USB Cable 3	Manufacturer: Luxshare Precision industry Co., Ltd. Model: L99U2013-CS-H		
USB Cable 4	Manufacturer: NingBo Broad Telecommunication Co., Ltd. Model: WA0007		
Note: 1. The information of the EUT is declared by the manufacturer. 2. There are more than one Adapter, Battery, Earphone and USB Cable, each one should be applied throughout the compliance test respectively, however, only the worst case (Adapter 2, Battery 2, Earphone 3 and USB Cable 2) will be recorded in this report.			

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3. Applied Standards

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

FCC CFR47 Part 2 (2019)

FCC CFR 47 Part 24E (2019)

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

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4. Test Configuration

There is more than one SIM card slot, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) will be recorded in this report

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

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

Test items	Bandwidth (MHz)						Modulation		RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	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.													

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5. Test Case Results

5.1. RF Power Output

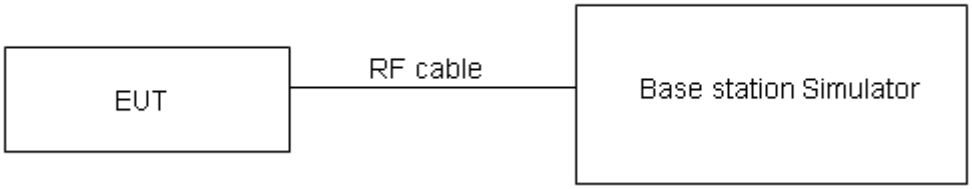
Ambient condition

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.

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Test Results

GSM 1900		Conducted Power(dBm)		
		Channel 512	Channel 661	Channel 810
		1850.2(MHz)	1880(MHz)	1909.8(MHz)
GSM	Results	27.58	27.51	27.44
GPRS/EGPRS (GMSK)	1TXslot	27.56	27.52	27.43
	2TXslots	24.65	24.64	24.55
	3TXslots	22.95	22.92	22.86
	4TXslots	21.63	21.63	21.61
EGPRS (8PSK)	1TXslot	25.71	25.87	25.78
	2TXslots	22.95	22.96	22.98
	3TXslots	21.48	21.44	21.39
	4TXslots	19.59	19.72	19.49

WCDMA Band II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
RMC	12.2k	20.67	20.51	20.57
HSDPA	Sub - Test 1	20.13	19.93	20.01
	Sub - Test 2	20.12	19.95	19.98
	Sub - Test 3	19.59	19.45	19.50
	Sub - Test 4	19.60	19.46	19.48
HSUPA	Sub - Test 1	20.09	19.92	19.96
	Sub - Test 2	19.08	18.90	18.95
	Sub - Test 3	19.55	19.38	19.44
	Sub - Test 4	19.01	18.87	18.92
	Sub - Test 5	20.02	19.85	19.90
DC-HSDPA	Sub - Test 1	20.01	19.87	19.91
	Sub - Test 2	20.00	19.86	19.90
	Sub - Test 3	19.58	19.35	19.41
	Sub - Test 4	19.57	19.34	19.40
HSPA+	16QAM	19.56	19.42	19.47

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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	23.37	23.58	23.35
		1	2	23.68	23.76	23.61
		1	5	23.35	23.33	23.34
		3	0	22.62	22.84	22.72
		3	2	22.71	22.74	22.70
		3	3	22.68	22.70	22.62
		6	0	22.64	22.85	22.69
	16QAM	1	0	22.58	22.73	22.64
		1	2	22.89	22.80	22.86
		1	5	22.74	22.78	22.75
		3	0	21.65	21.75	21.80
		3	2	21.79	21.75	21.72
		3	3	21.71	21.69	21.56
		6	0	21.66	21.80	21.72
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	23.39	23.62	23.38
		1	7	23.71	23.81	23.65
		1	14	23.38	23.38	23.38
		8	0	22.70	22.94	22.83
		8	4	22.81	22.82	22.80
		8	7	22.76	22.79	22.70
		15	0	22.67	22.89	22.72
	16QAM	1	0	22.61	22.75	22.67
		1	7	22.92	22.85	22.90
		1	14	22.76	22.82	22.78
		8	0	21.74	21.86	21.90
		8	4	21.88	21.86	21.82
		8	7	21.79	21.79	21.67
		15	0	21.69	21.84	21.75
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	23.36	23.60	23.34
		1	13	23.69	23.77	23.62
		1	24	23.35	23.33	23.34
		12	0	22.67	22.89	22.79

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		12	6	22.79	22.78	22.75
		12	13	22.74	22.77	22.66
		25	0	22.65	22.88	22.70
	16QAM	1	0	22.58	22.71	22.64
		1	13	22.89	22.83	22.87
		1	24	22.73	22.80	22.74
		12	0	21.72	21.82	21.87
		12	6	21.85	21.81	21.78
		12	13	21.76	21.74	21.63
		25	0	21.67	21.80	21.70
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.38	23.61	23.37
		1	25	23.72	23.82	23.66
		1	49	23.37	23.37	23.37
		25	0	22.70	22.94	22.83
		25	13	22.82	22.83	22.79
		25	25	22.76	22.81	22.71
		50	0	22.73	22.90	22.74
	16QAM	1	0	22.60	22.74	22.66
		1	25	22.92	22.87	22.90
		1	49	22.76	22.82	22.77
		25	0	21.75	21.87	21.91
		25	13	21.87	21.85	21.81
		25	25	21.79	21.79	21.67
		50	0	21.70	21.85	21.74
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	23.37	23.57	23.35
		1	38	23.70	23.81	23.63
		1	74	23.34	23.32	23.33
		36	0	22.68	22.90	22.80
		36	18	22.79	22.78	22.75
		36	39	22.73	22.78	22.67
		75	0	22.71	22.86	22.69
	16QAM	1	0	22.55	22.72	22.64
		1	38	22.90	22.84	22.88
		1	74	22.73	22.78	22.74
		36	0	21.72	21.85	21.88
		36	18	21.84	21.80	21.77

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		36	39	21.77	21.75	21.64
		75	0	21.67	21.80	21.70
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	23.34	23.53	23.32
		1	50	23.69	23.77	23.61
		1	99	23.32	23.31	23.30
		50	0	22.65	22.85	22.76
		50	25	22.77	22.74	22.72
		50	50	22.70	22.73	22.63
		100	0	22.68	22.81	22.65
	16QAM	1	0	22.53	22.68	22.59
		1	50	22.86	22.82	22.84
		1	99	22.71	22.75	22.72
		50	0	21.69	21.81	21.85
		50	25	21.81	21.78	21.74
		50	50	21.74	21.70	21.60
		100	0	21.65	21.76	21.67

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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.

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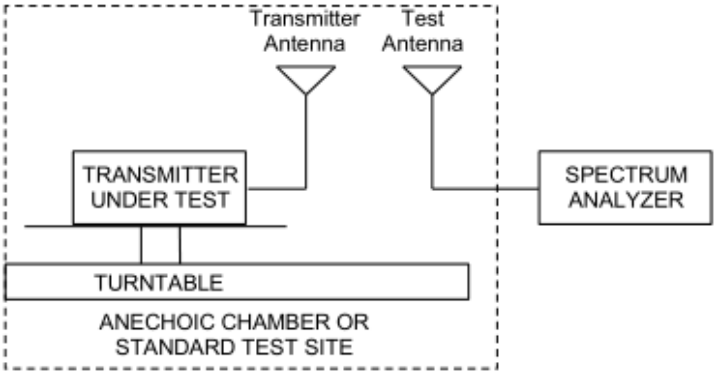
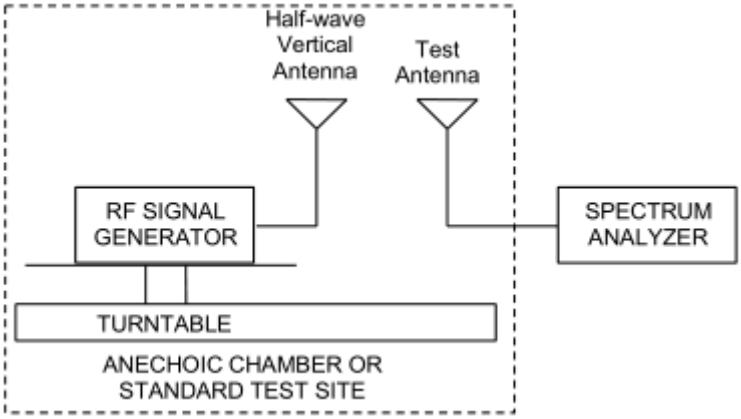
Test setup





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

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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	29.28	33	Pass
	Mid	1880	Horizontal	29.27	33	Pass
	High	1909.8	Horizontal	28.23	33	Pass
GPRS 1900	Low	1850.2	Horizontal	28.87	33	Pass
	Mid	1880	Horizontal	28.46	33	Pass
	High	1909.8	Horizontal	28.68	33	Pass
EGPRS 1900	Low	1850.2	Horizontal	27.35	33	Pass
	Mid	1880	Horizontal	27.29	33	Pass
	High	1909.8	Horizontal	27.43	33	Pass
WCDMA Band II	Low	1852.4	Horizontal	22.89	33	Pass
	Mid	1880	Horizontal	23.57	33	Pass
	High	1907.6	Horizontal	24.00	33	Pass

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LTE Band 2						
bandwidth	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1850.7	Horizontal	22.21	33	Pass
	Mid	1880	Horizontal	22.46	33	Pass
	High	1909.3	Horizontal	22.48	33	Pass
3 MHz (QPSK)	Low	1851.5	Horizontal	22.52	33	Pass
	Mid	1880	Horizontal	22.35	33	Pass
	High	1908.5	Horizontal	22.41	33	Pass
5 MHz (QPSK)	Low	1852.5	Horizontal	22.38	33	Pass
	Mid	1880	Horizontal	22.41	33	Pass
	High	1907.5	Horizontal	22.74	33	Pass
10 MHz (QPSK)	Low	1855	Horizontal	22.33	33	Pass
	Mid	1880	Horizontal	22.63	33	Pass
	High	1905	Horizontal	22.47	33	Pass
15 MHz (QPSK)	Low	1857.5	Horizontal	22.28	33	Pass
	Mid	1880	Horizontal	22.41	33	Pass
	High	1902.5	Horizontal	22.54	33	Pass
20 MHz (QPSK)	Low	1860	Horizontal	22.41	33	Pass
	Mid	1880	Horizontal	22.31	33	Pass
	High	1900	Horizontal	22.68	33	Pass
1.4 MHz (16QAM)	Low	1850.7	Horizontal	21.76	33	Pass
	Mid	1880	Horizontal	21.84	33	Pass
	High	1909.3	Horizontal	21.83	33	Pass
3 MHz (16QAM)	Low	1851.5	Horizontal	21.98	33	Pass
	Mid	1880	Horizontal	21.87	33	Pass
	High	1908.5	Horizontal	21.95	33	Pass
5 MHz (16QAM)	Low	1852.5	Horizontal	21.76	33	Pass
	Mid	1880	Horizontal	21.80	33	Pass
	High	1907.5	Horizontal	22.12	33	Pass
10 MHz (16QAM)	Low	1855	Horizontal	21.84	33	Pass
	Mid	1880	Horizontal	21.64	33	Pass
	High	1905	Horizontal	21.73	33	Pass
15 MHz (16QAM)	Low	1857.5	Horizontal	21.78	33	Pass
	Mid	1880	Horizontal	21.95	33	Pass
	High	1902.5	Horizontal	21.97	33	Pass
20 MHz (16QAM)	Low	1860	Horizontal	21.77	33	Pass
	Mid	1880	Horizontal	21.68	33	Pass
	High	1900	Horizontal	22.10	33	Pass

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5.3. Occupied Bandwidth

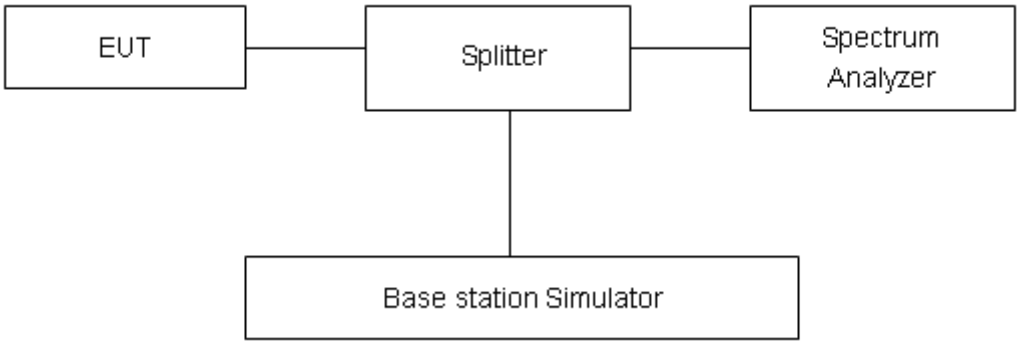
Ambient condition

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.

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Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GSM)	512	1850.2	0.246	0.312
	661	1880.0	0.246	0.314
	810	1909.8	0.247	0.317
GPRS 1900 (GMSK)	512	1850.2	0.248	0.312
	661	1880.0	0.247	0.310
	810	1909.8	0.249	0.312
EGPRS 1900 (8-PSK)	512	1850.2	0.248	0.308
	661	1880.0	0.243	0.314
	810	1909.8	0.247	0.311
WCDMA Band II (RMC)	9262	1852.4	4.1650	4.673
	9400	1880	4.1580	4.686
	9538	1907.6	4.1656	4.661

LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1159	1.324
		18900	1880.0	1.1134	1.341
		19193	1909.3	1.1289	1.331
	3	18615	1851.5	2.7267	3.017
		18900	1880	2.7254	2.997
		19185	1908.5	2.7252	3.005
	5	18625	1852.5	4.5106	4.960
		18900	1880	4.5049	4.926
		19175	1907.5	4.5120	5.409
	10	18650	1855	9.0442	10.010
		18900	1880	9.0382	9.949
		19150	1905	9.0466	9.917
	15	18675	1857.5	13.4800	14.690

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		18900	1880	13.4360	14.570
		19125	1902.5	13.4570	14.740
	20	18700	1860	17.9160	19.220
		18900	1880	17.9560	19.210
		19100	1900	17.9050	19.080
16QAM	1.4	18607	1850.7	1.1287	1.342
		18900	1880.0	1.1113	1.323
		19193	1909.3	1.1163	1.346
	3	18615	1851.5	2.7212	2.991
		18900	1880	2.7211	2.990
		19185	1908.5	2.7121	2.997
	5	18625	1852.5	4.4964	4.911
		18900	1880	4.5355	5.832
		19175	1907.5	4.5250	4.953
	10	18650	1855	9.0533	9.924
		18900	1880	9.0484	10.420
		19150	1905	9.0390	9.962
	15	18675	1857.5	13.4820	14.580
		18900	1880	13.5090	14.790
		19125	1902.5	13.4650	14.570
	20	18700	1860	17.9560	19.090
		18900	1880	17.9140	19.260
		19100	1900	17.9240	19.150

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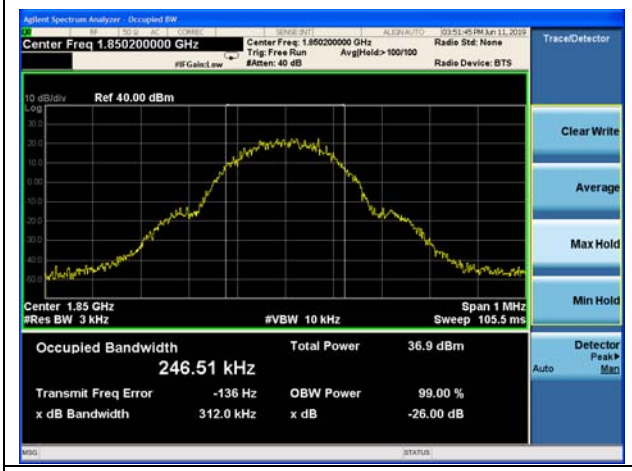
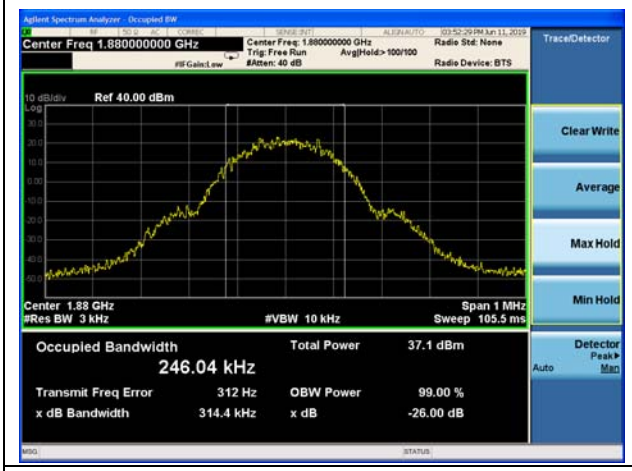
GSM1900 GSM CH-Low



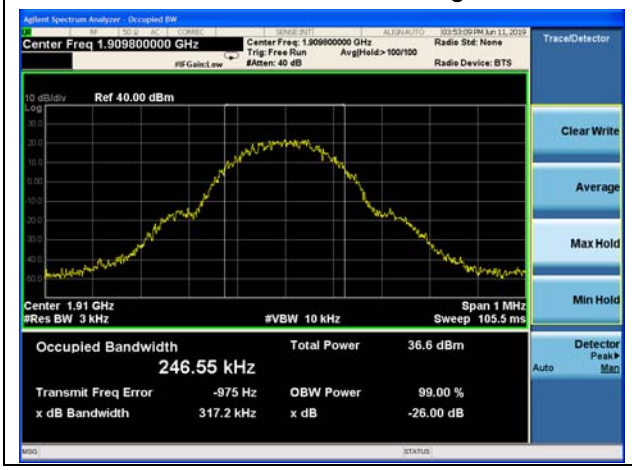
GSM1900 GPRS CH-Low

GSM 1900 GSM CH-Middle



GSM 1900 GPRS CH-Middle

GSM 1900 GSM CH-High



GSM 1900 GPRS CH-High

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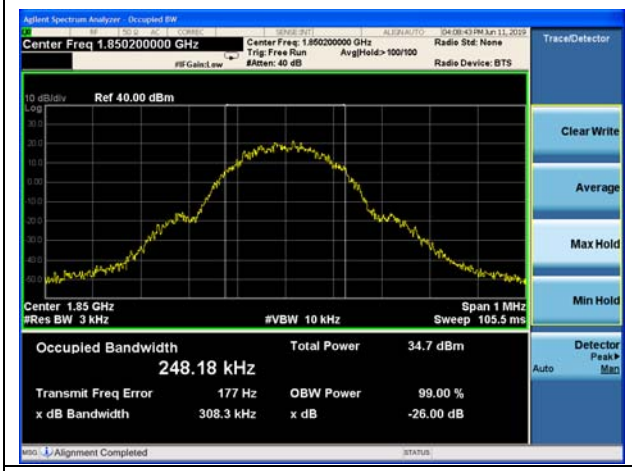
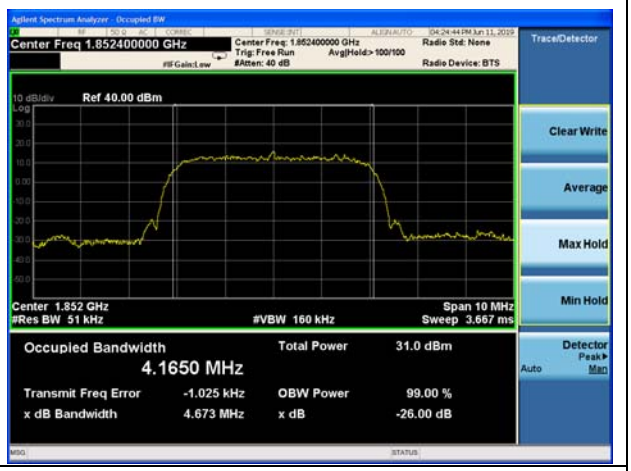
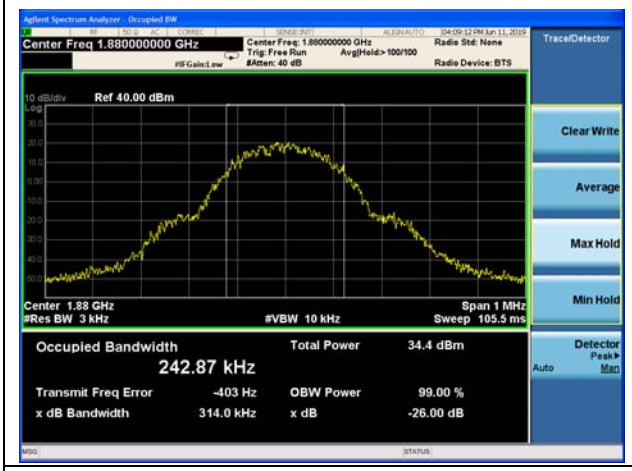
GSM1900 EGPRS CH-Low



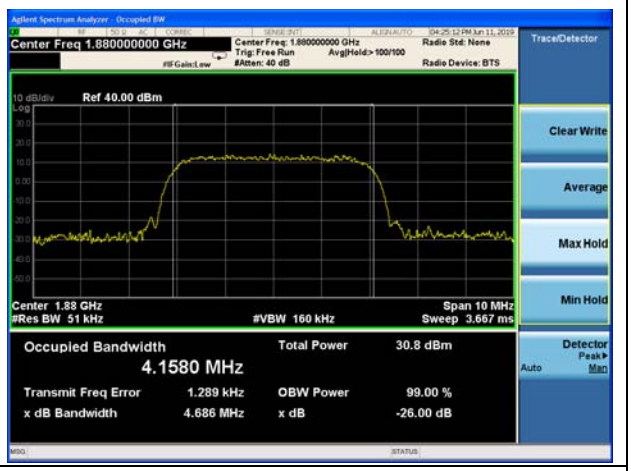
WCDMA Band II RMC CH-LOW



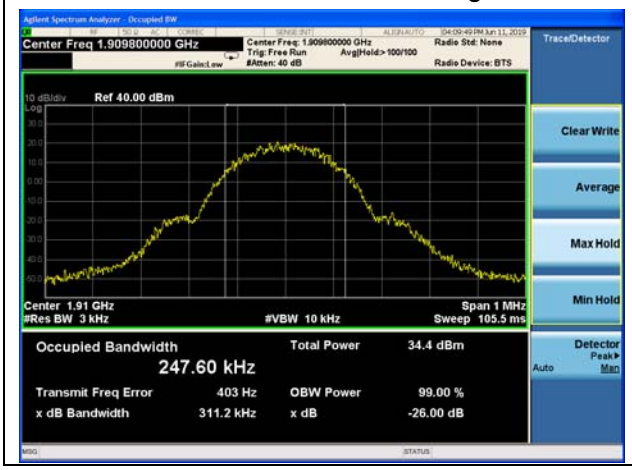
GSM 1900 EGPRS CH-Middle



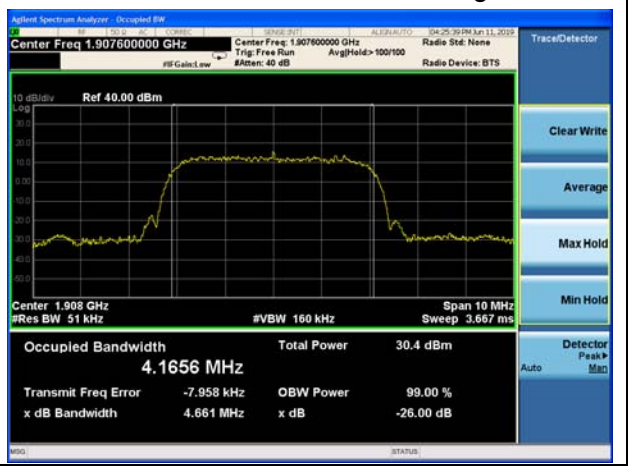
WCDMA Band II RMC CH-Middle



GSM 1900 EGPRS CH-High



WCDMA Band II RMC CH-High



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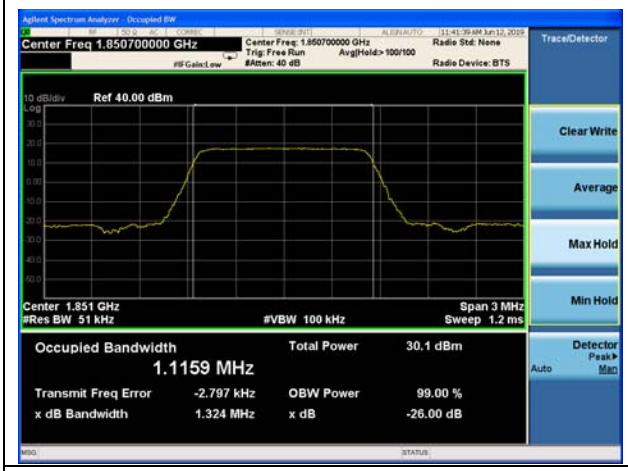
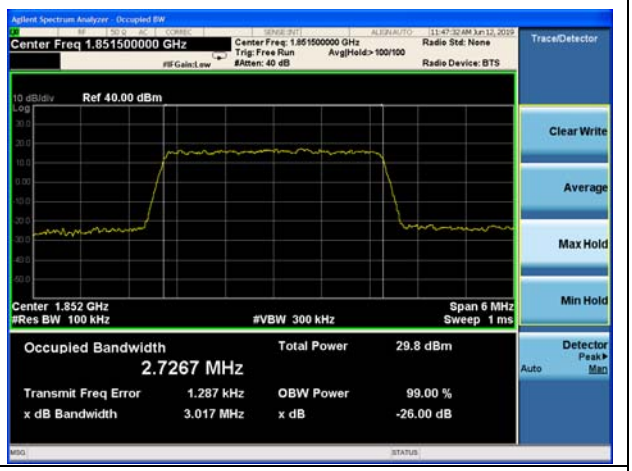
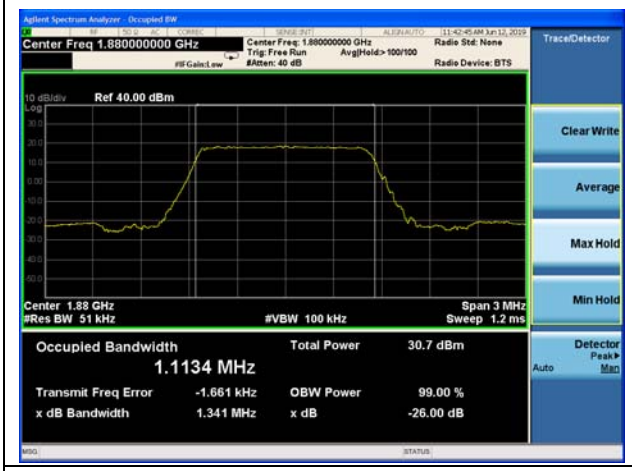
LTE Band 2 1.4MHz QPSK CH-Low



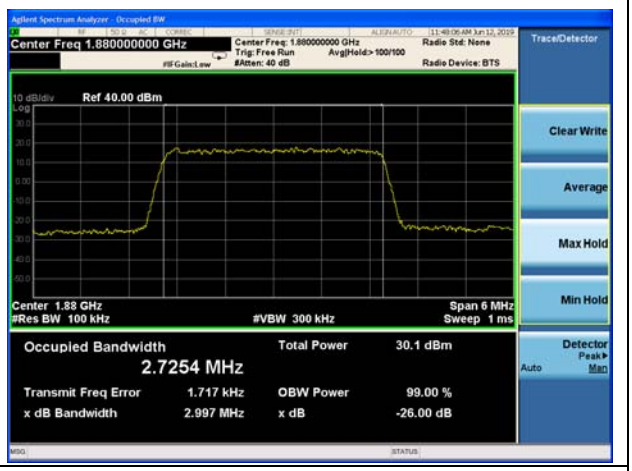
LTE Band 2 3MHz QPSK CH-Low



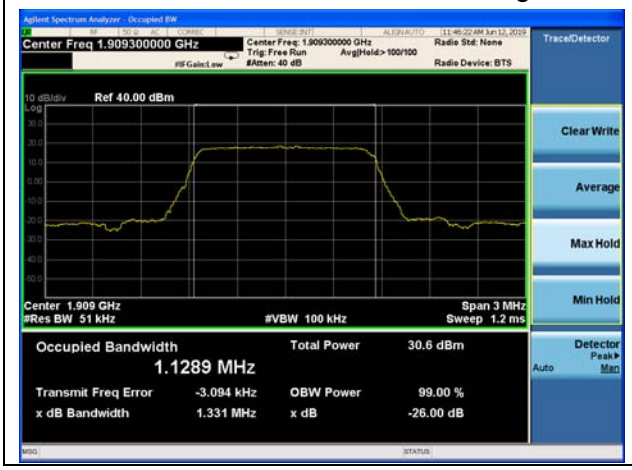
LTE Band 2 1.4MHz QPSK CH-Middle



LTE Band 2 3MHz QPSK CH-Middle



LTE Band 2 1.4MHz QPSK CH-High



LTE Band 2 3MHz QPSK CH-High

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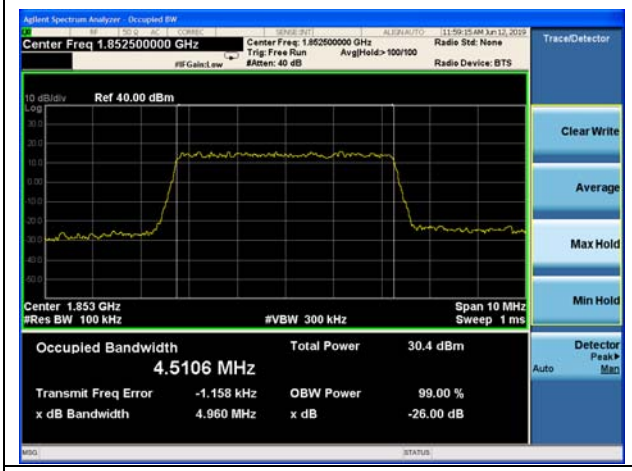
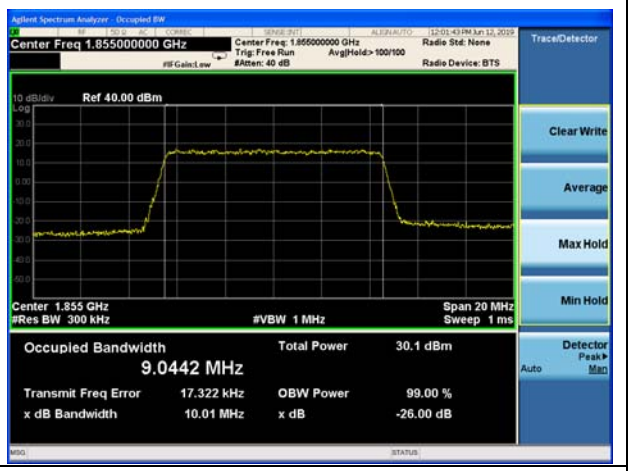
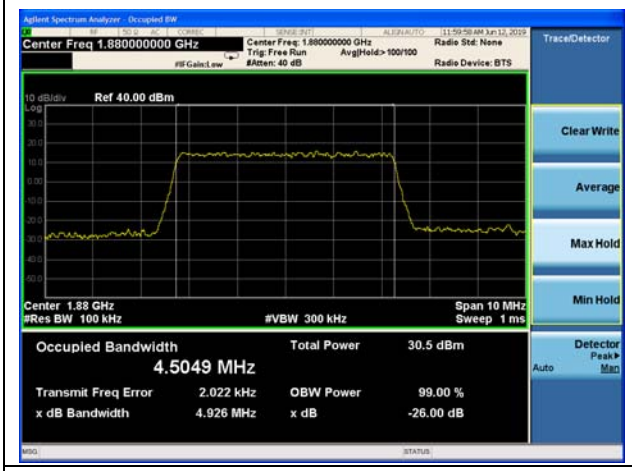
LTE Band 2 5MHz QPSK CH-Low



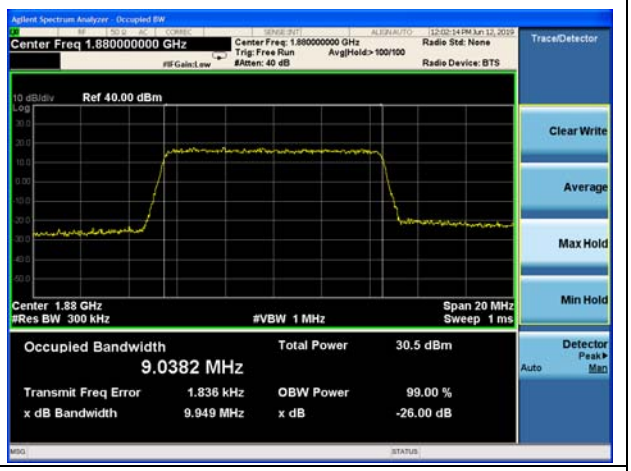
LTE Band 2 10MHz QPSK CH-Low



LTE Band 2 5MHz QPSK CH-Middle



LTE Band 2 10MHz QPSK CH-Middle



LTE Band 2 5MHz QPSK CH-High

LTE Band 2 10MHz QPSK CH-High

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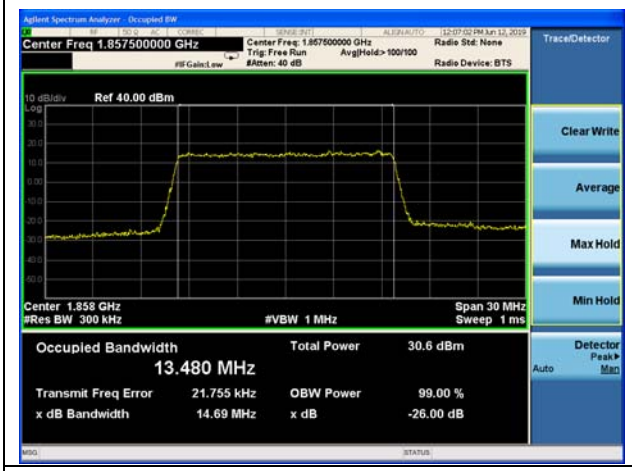
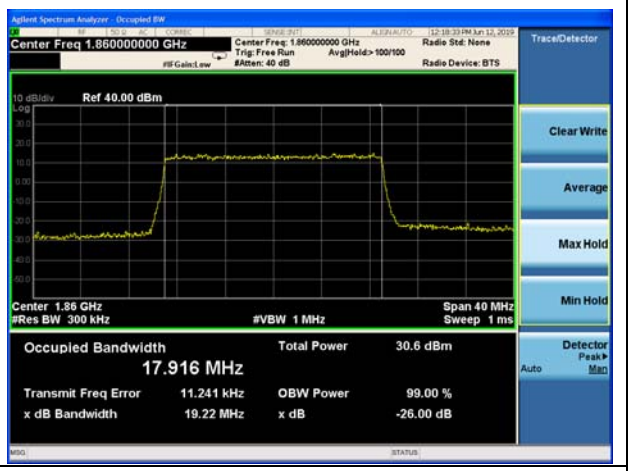
LTE Band 2 15MHz QPSK CH-Low

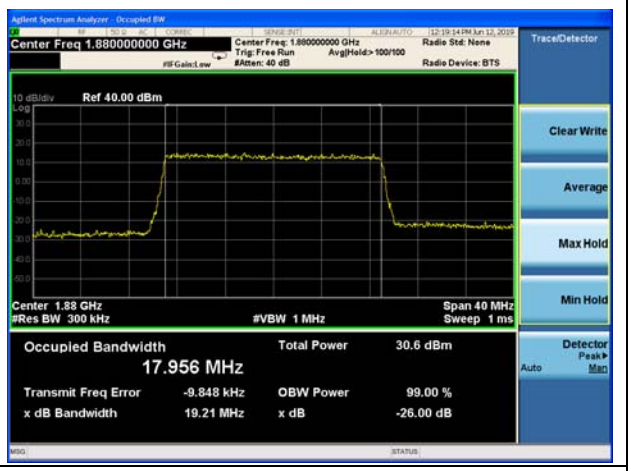


LTE Band 2 20MHz QPSK CH-Low

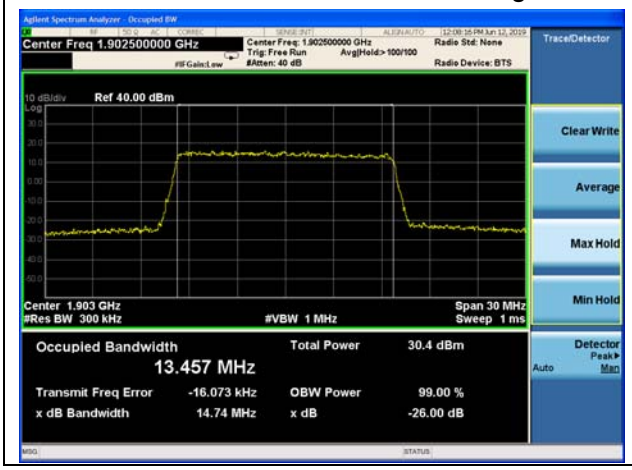


LTE Band 2 15MHz QPSK CH-Middle

LTE Band 2 20MHz QPSK CH-Middle



LTE Band 2 15MHz QPSK CH-High



LTE Band 2 20MHz QPSK CH-High

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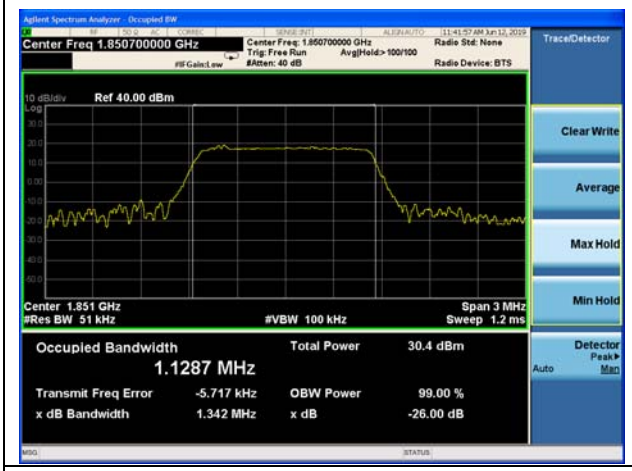
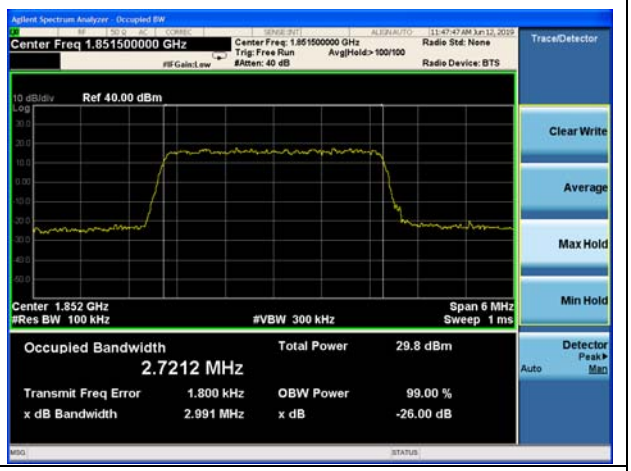
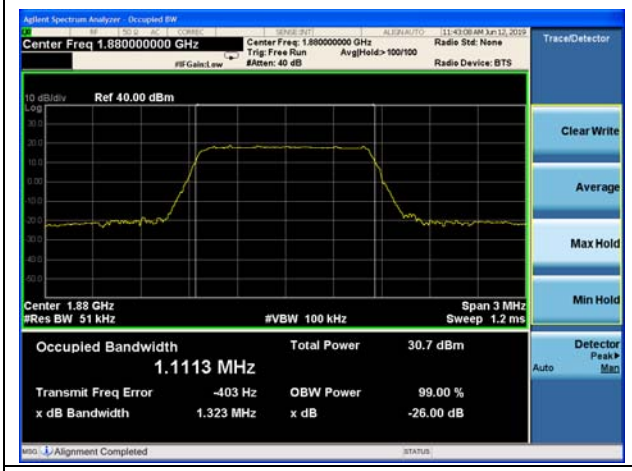
LTE Band 2 1.4MHz 16QAM CH-Low



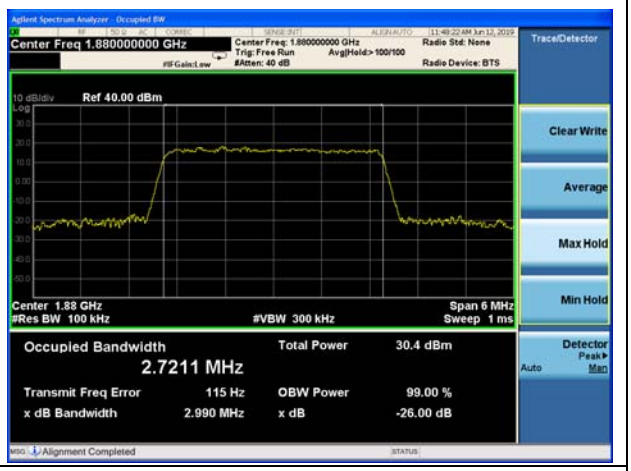
LTE Band 2 3MHz 16QAM CH-Low



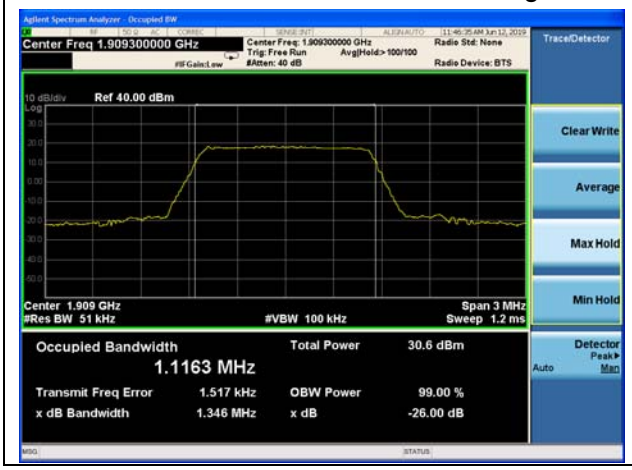
LTE Band 2 1.4MHz 16QAM CH-Middle



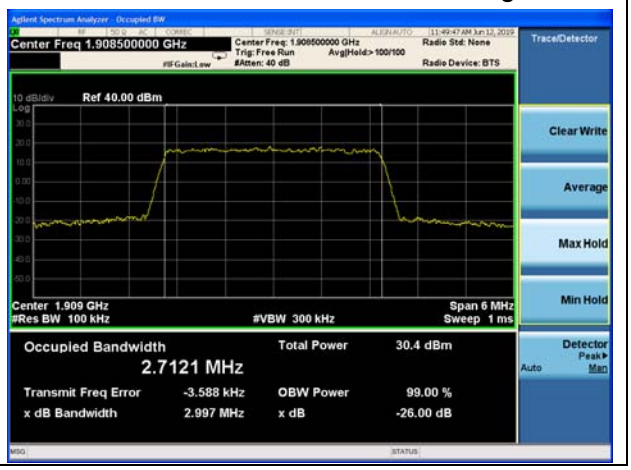
LTE Band 2 3MHz 16QAM CH-Middle



LTE Band 2 1.4MHz 16QAM CH-High



LTE Band 2 3MHz 16QAM CH-High



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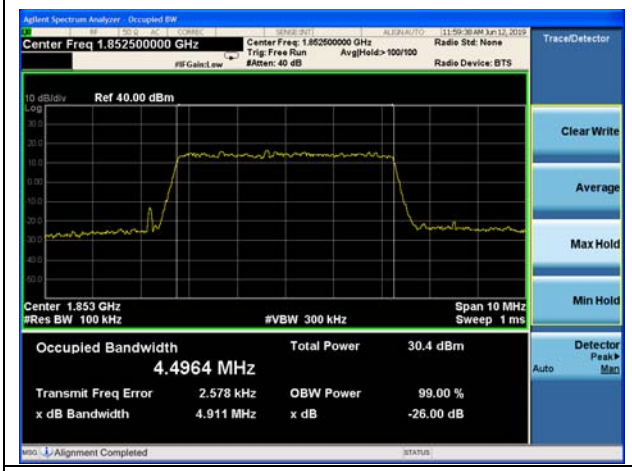
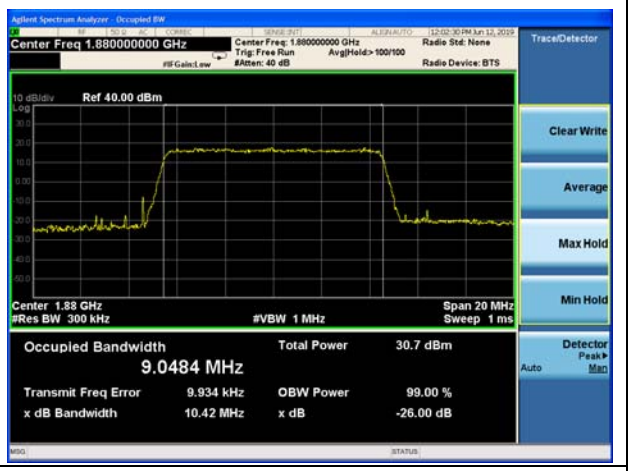
LTE Band 2 5MHz 16QAM CH-Low



LTE Band 2 10MHz 16QAM CH-Low

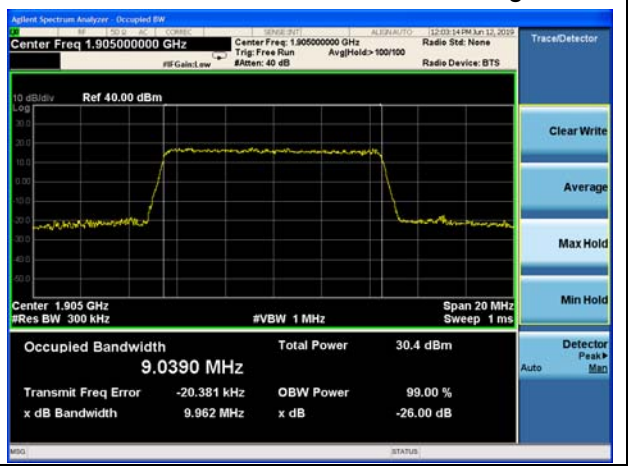
LTE Band 2 5MHz 16QAM CH-Middle

LTE Band 2 10MHz 16QAM CH-Middle



LTE Band 2 5MHz 16QAM CH-High

LTE Band 2 10MHz 16QAM CH-High



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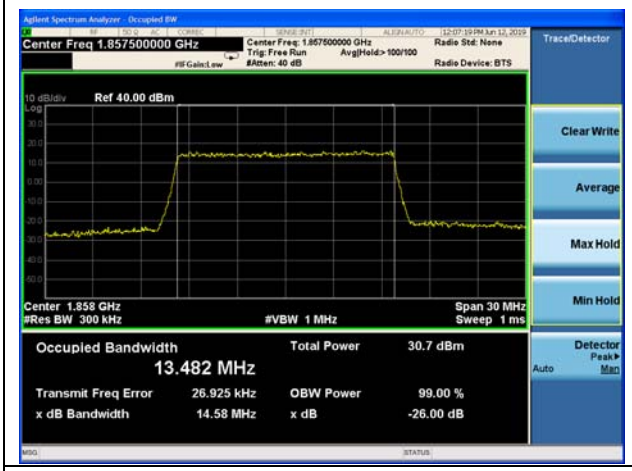
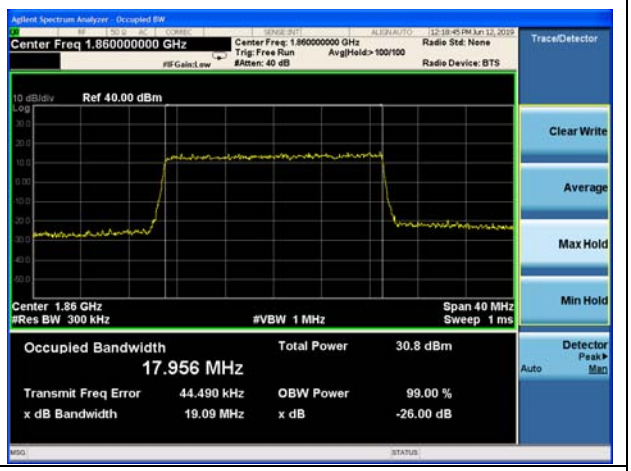
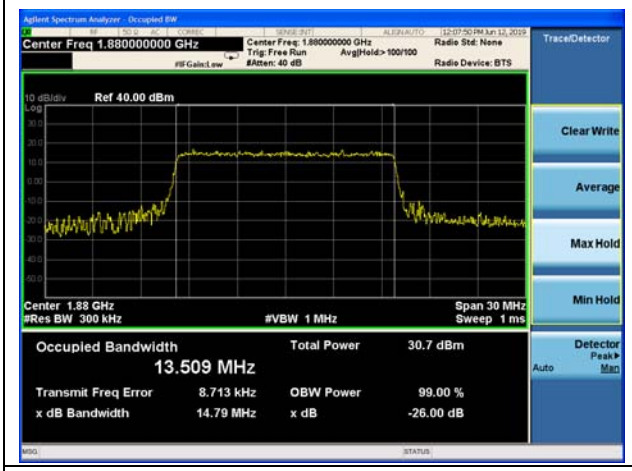
LTE Band 2 15MHz 16QAM CH-Low



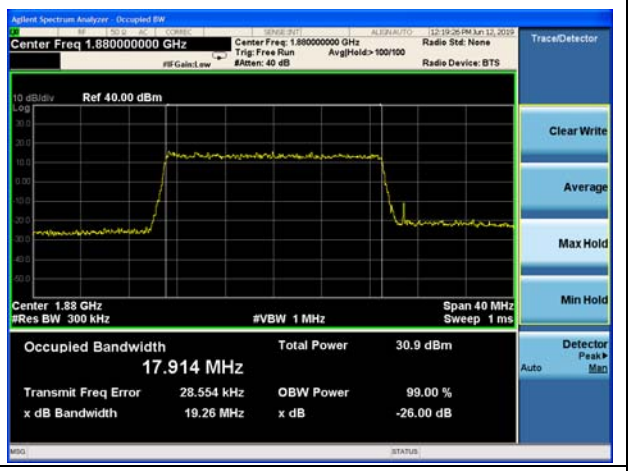
LTE Band 2 20MHz 16QAM CH-Low



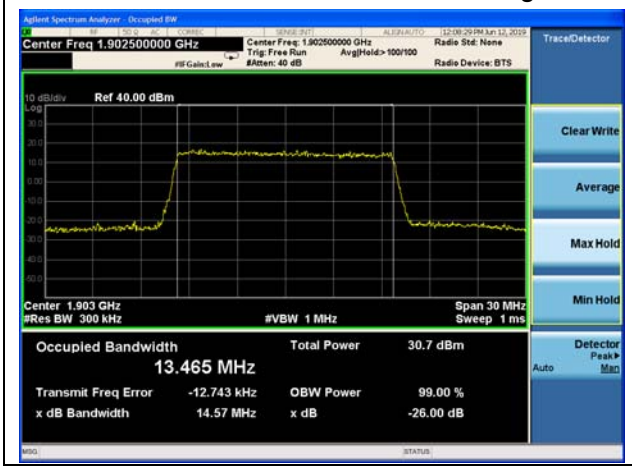
LTE Band 2 15MHz 16QAM CH-Middle



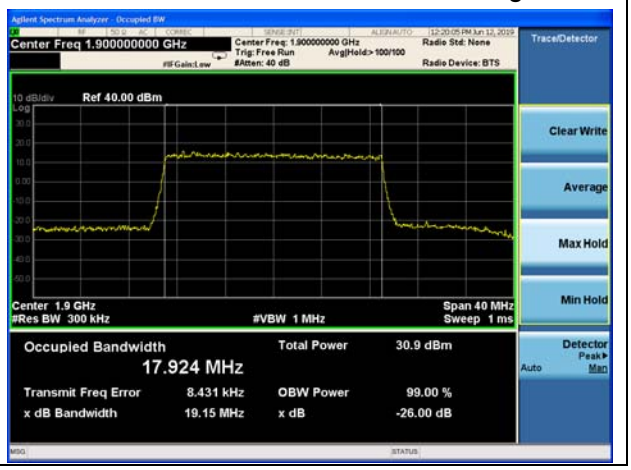
LTE Band 2 20MHz 16QAM CH-Middle



LTE Band 2 15MHz 16QAM CH-High



LTE Band 2 20MHz 16QAM CH-High



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5.4. Band Edge Compliance

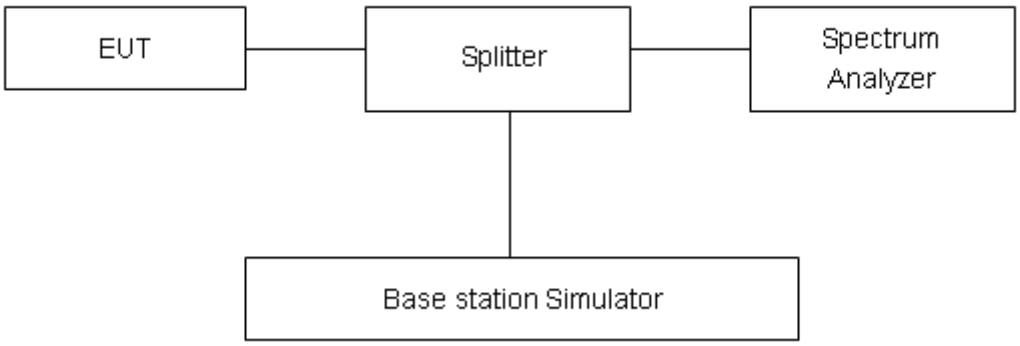
Ambient condition

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.

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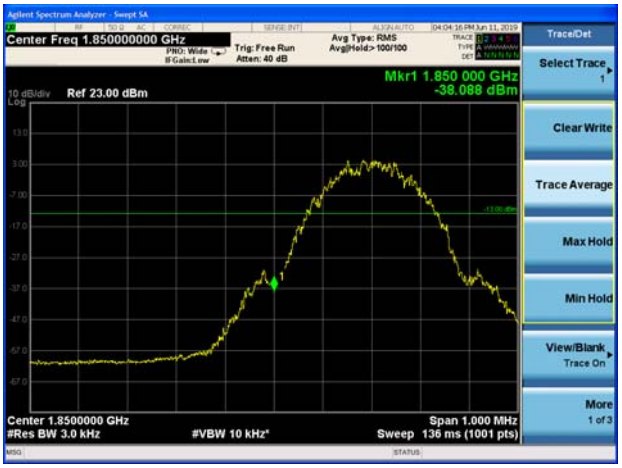
Test Result:

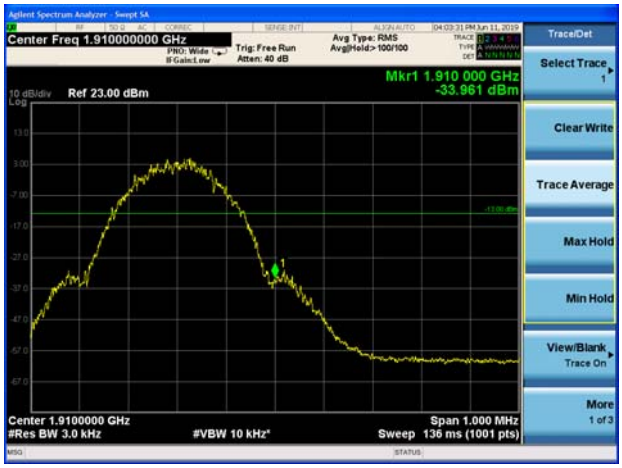
GSM1900 GSM CH-Low

GSM 1900 GSM CH-High

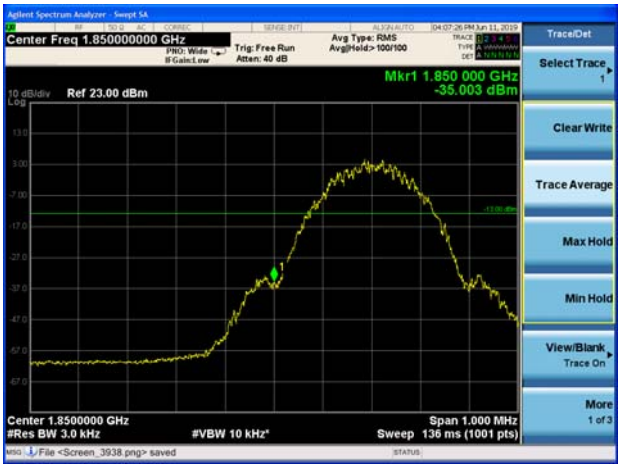
GSM1900 GPRS CH-Low



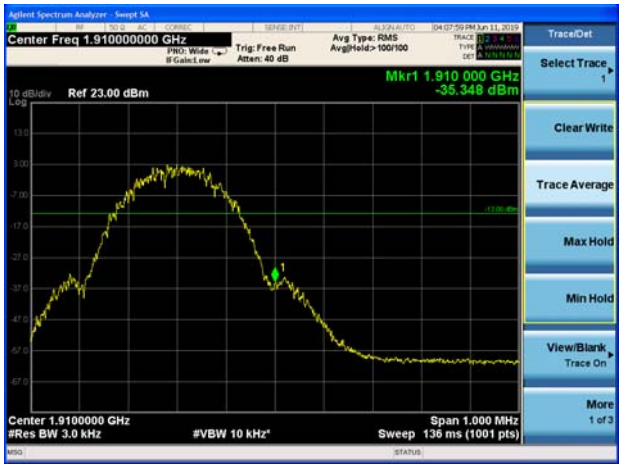
GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



GSM 1900 EGPRS CH-High



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WCDMA Band II RMC CH-Low	WCDMA Band II RMC CH-High

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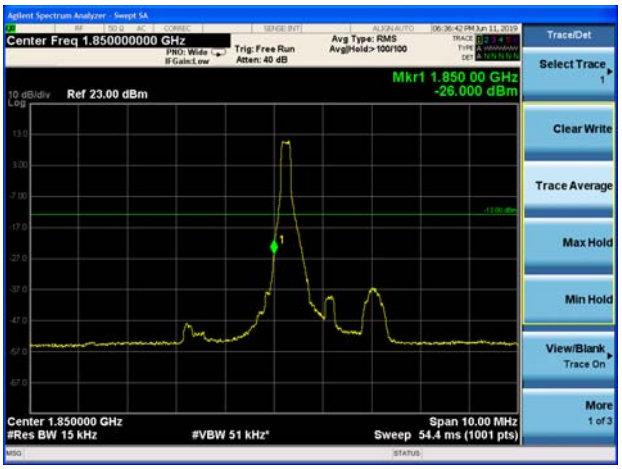
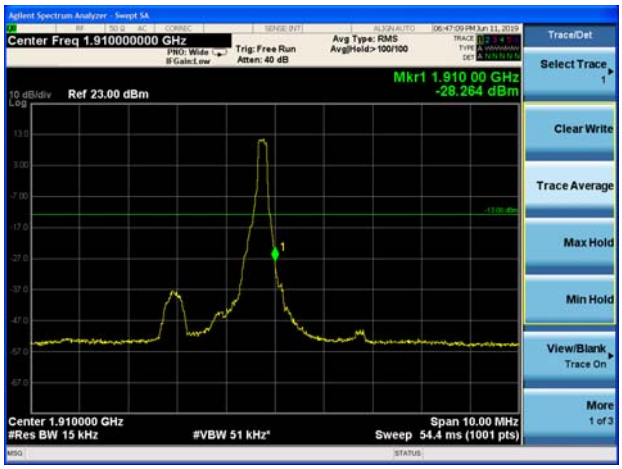
LTE Band 2 1.4MHz QPSK 1RB CH-Low



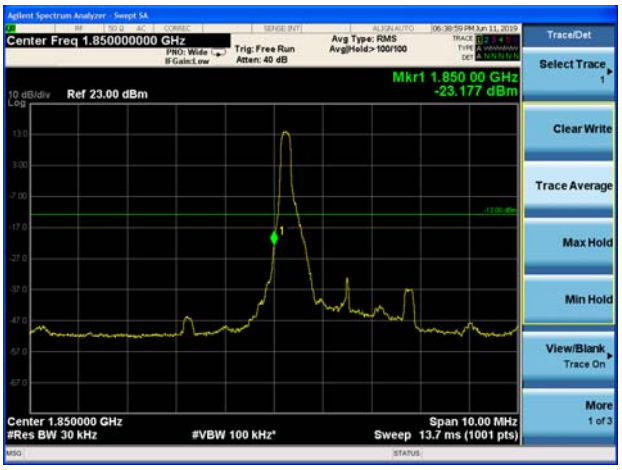
LTE Band 2 1.4MHz QPSK 1RB CH-High



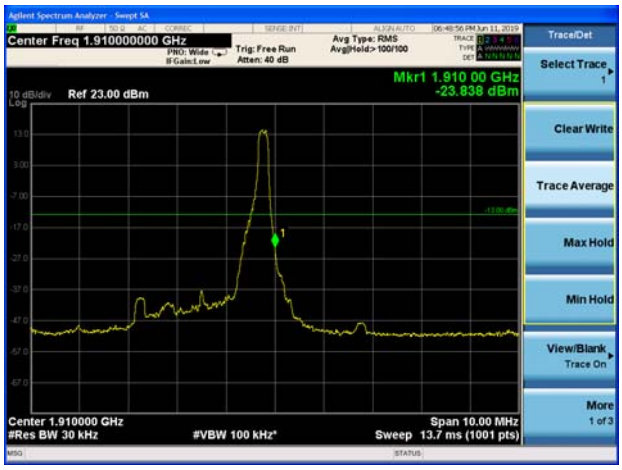
LTE Band 2 1.4MHz QPSK 100%RB CH-Low

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



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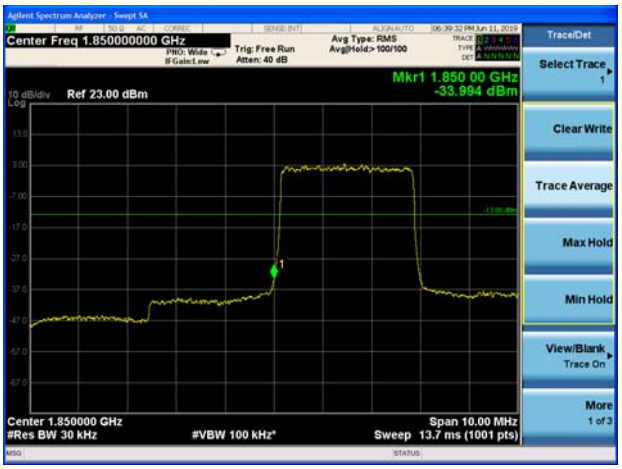
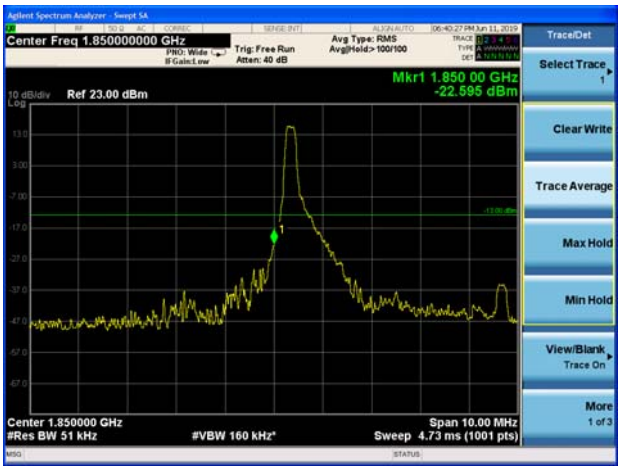
LTE Band 2 3MHz QPSK 100%RB CH-Low

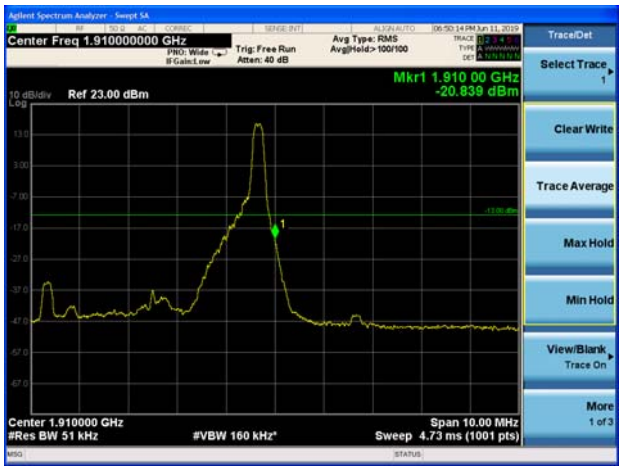


LTE Band 2 3MHz QPSK 100%RB CH-High

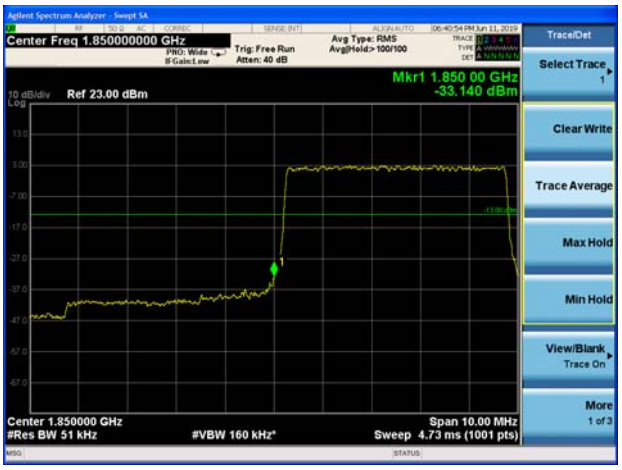
LTE Band 2 5MHz QPSK 1RB CH-Low



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

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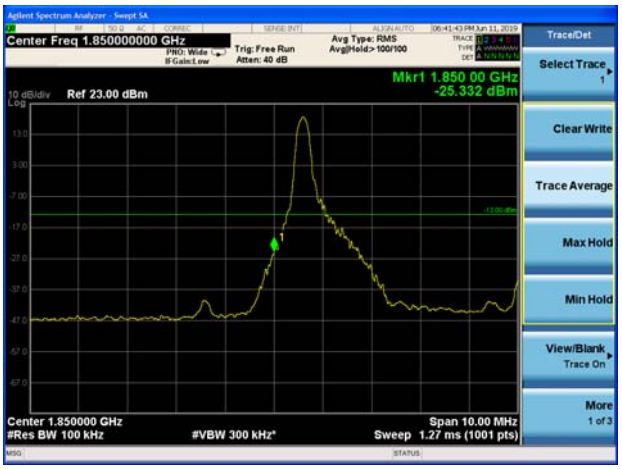
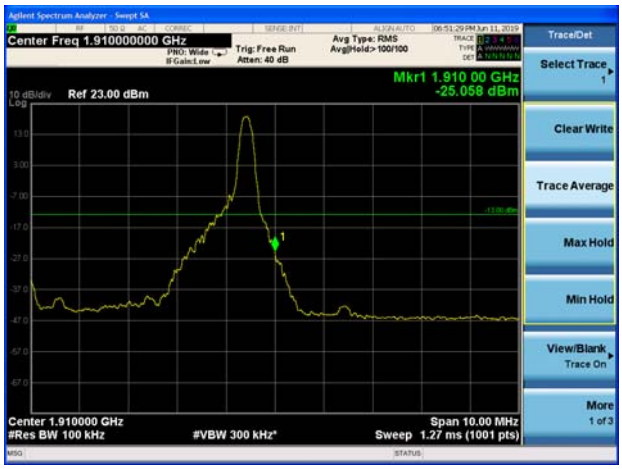
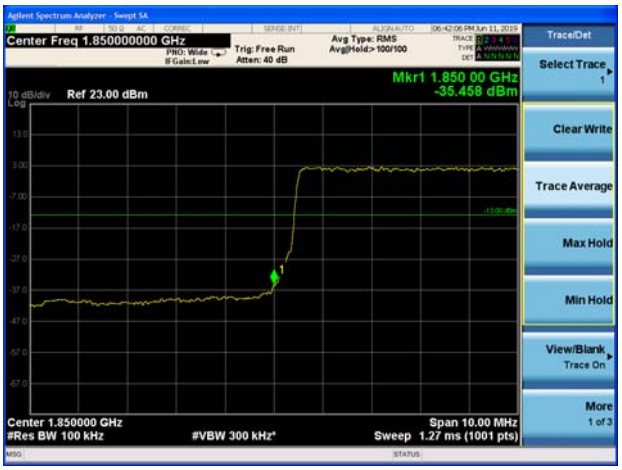
LTE Band 2 10MHz QPSK 1RB CH-Low



LTE Band 2 10MHz QPSK 1RB CH-High

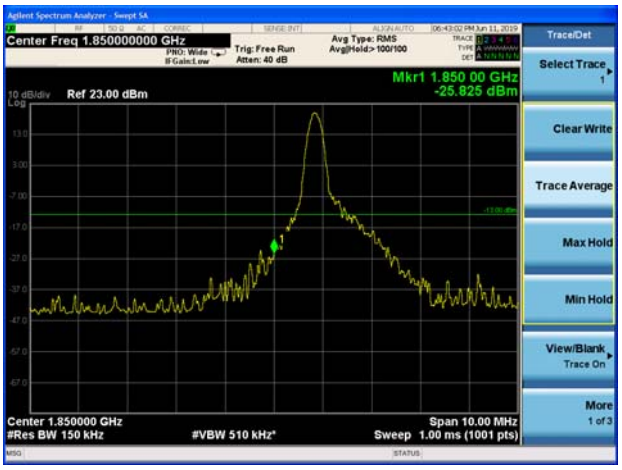


LTE Band 2 10MHz QPSK 100%RB CH-Low

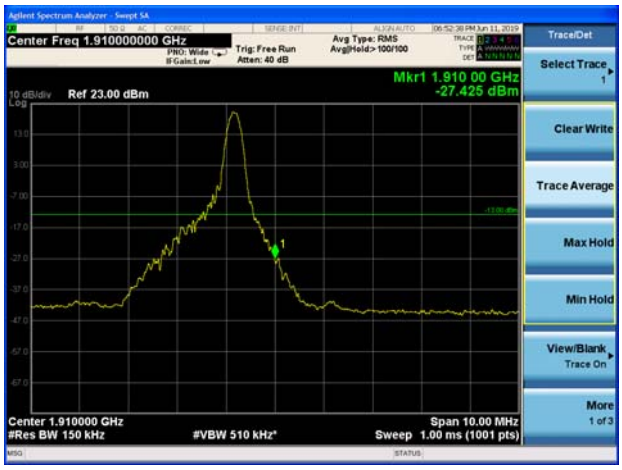


LTE Band 2 10MHz QPSK 100%RB CH-High

LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High



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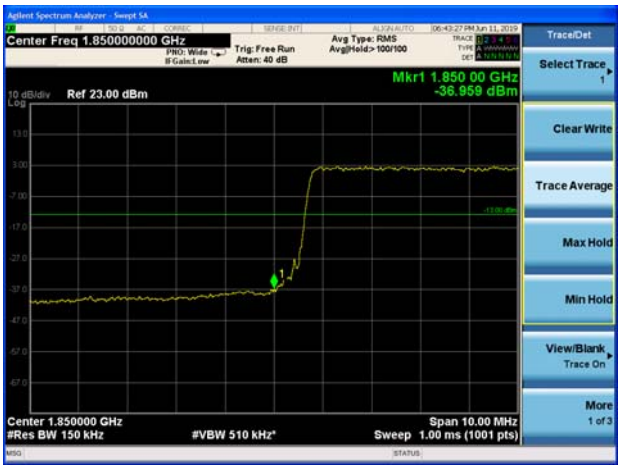
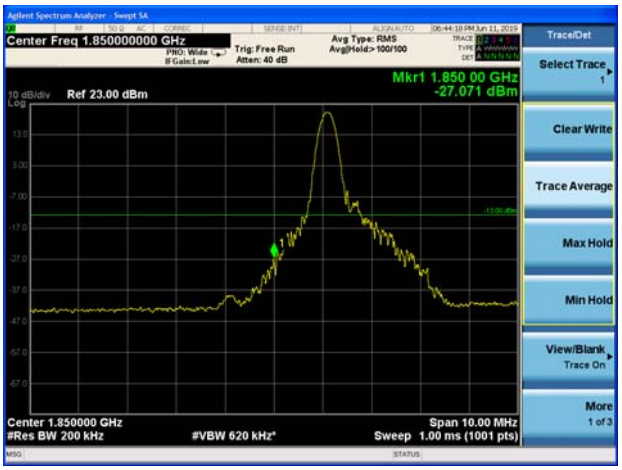
LTE Band 2 15MHz QPSK 100%RB CH-Low

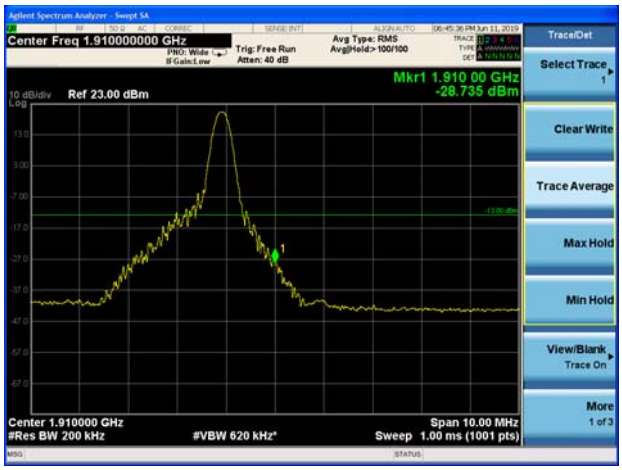


LTE Band 2 15MHz QPSK 100%RB CH-High

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

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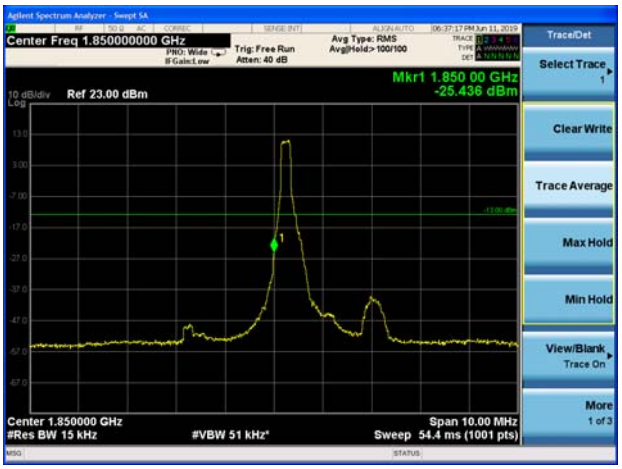
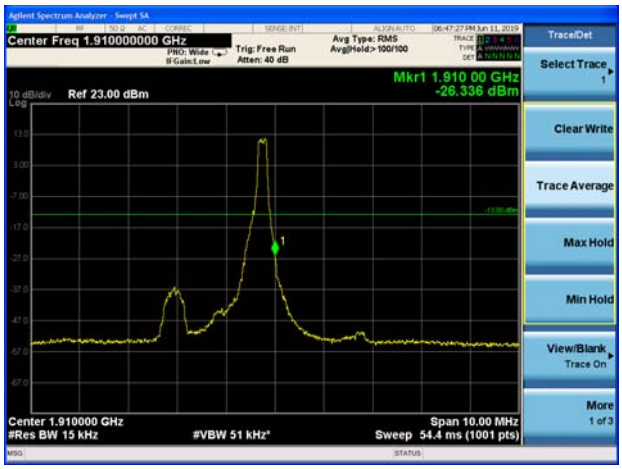
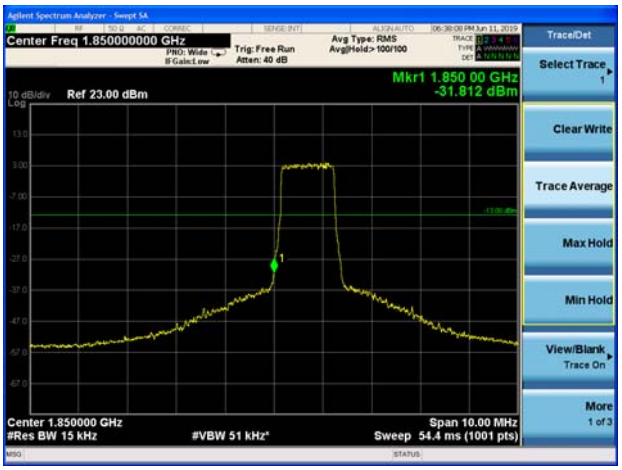
LTE Band 2 1.4MHz 16QAM 1RB CH-Low



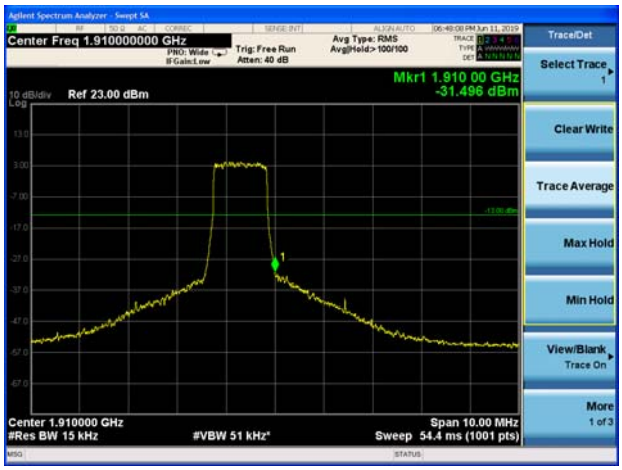
LTE Band 2 1.4MHz 16QAM 1RB CH-High



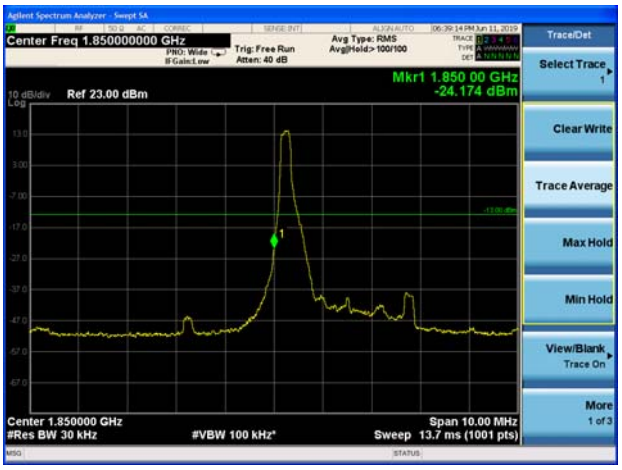
LTE Band 2 1.4MHz 16QAM 100%RB CH-Low



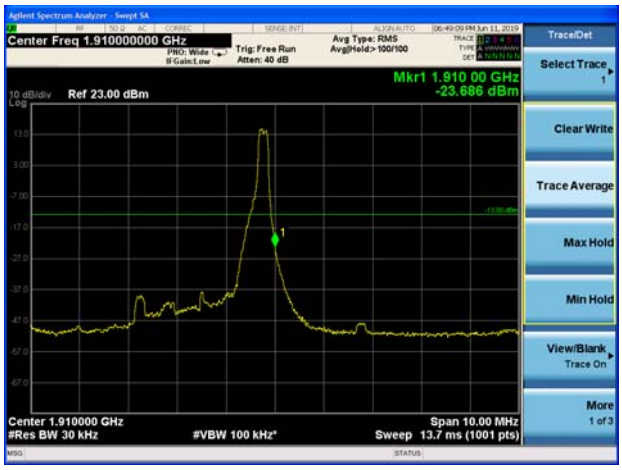
LTE Band 2 1.4MHz 16QAM 100%RB CH-High



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



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



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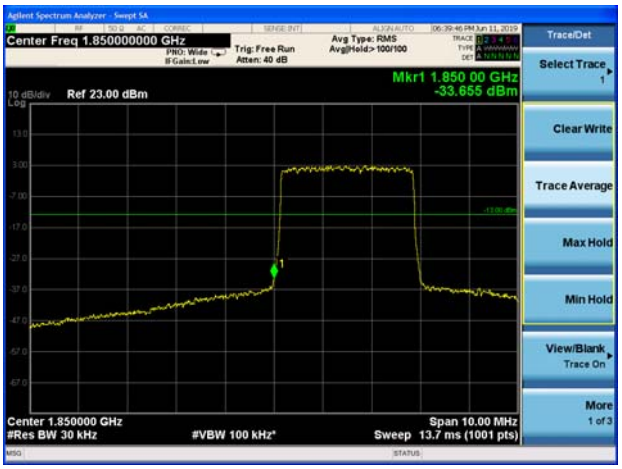
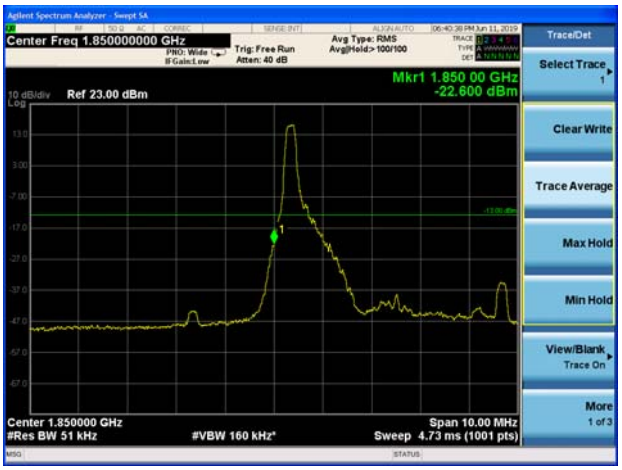
LTE Band 2 3MHz 16QAM 100%RB CH-Low

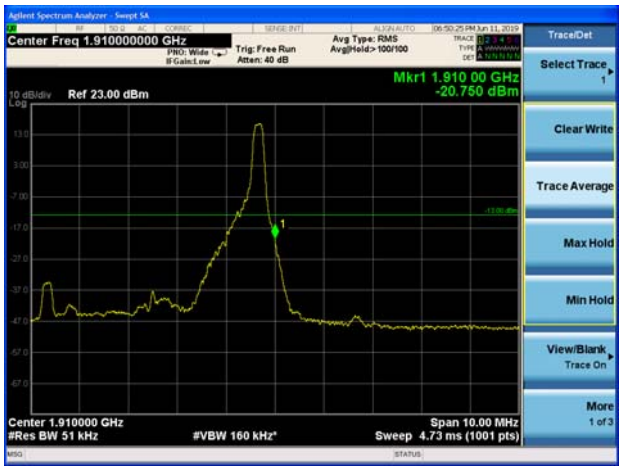


LTE Band 2 3MHz 16QAM 100%RB CH-High

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

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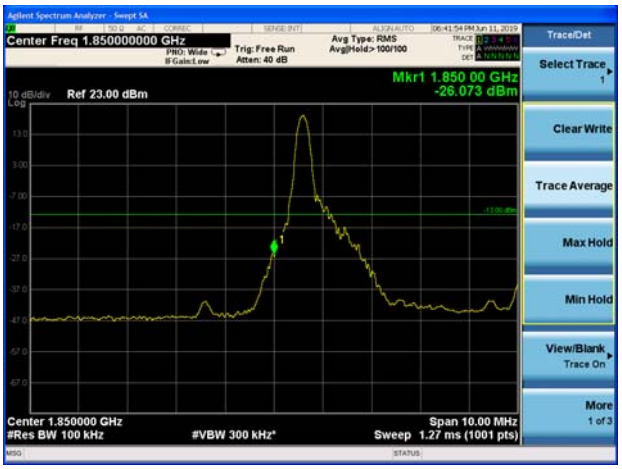
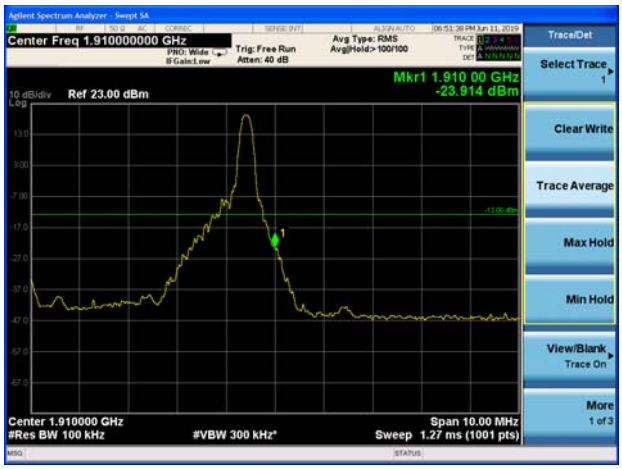
LTE Band 2 10MHz 16QAM 1RB CH-Low

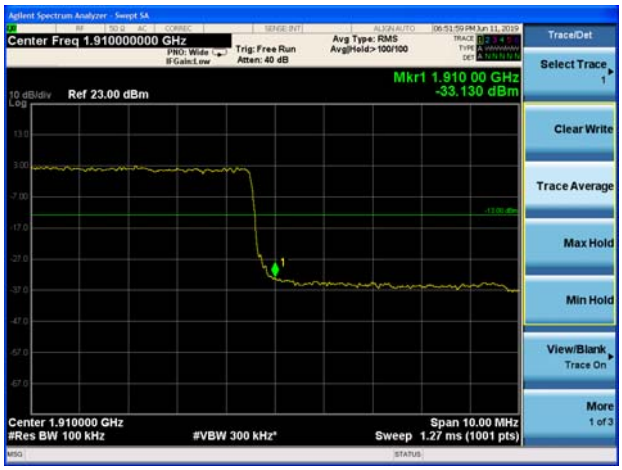


LTE Band 2 10MHz 16QAM 1RB CH-High

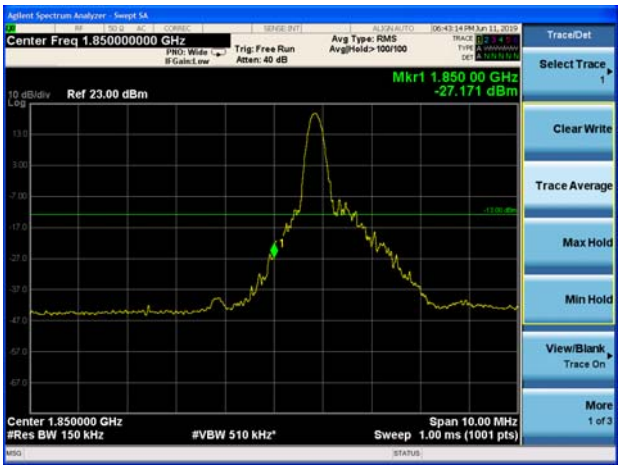


LTE Band 2 10MHz 16QAM 100%RB CH-Low

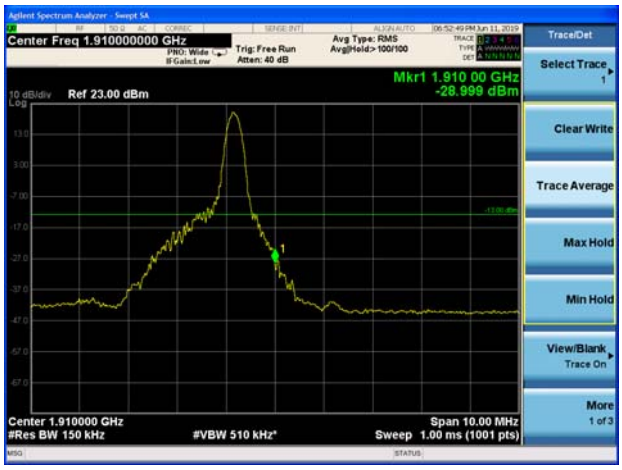
LTE Band 2 10MHz 16QAM 100%RB CH-High



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



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



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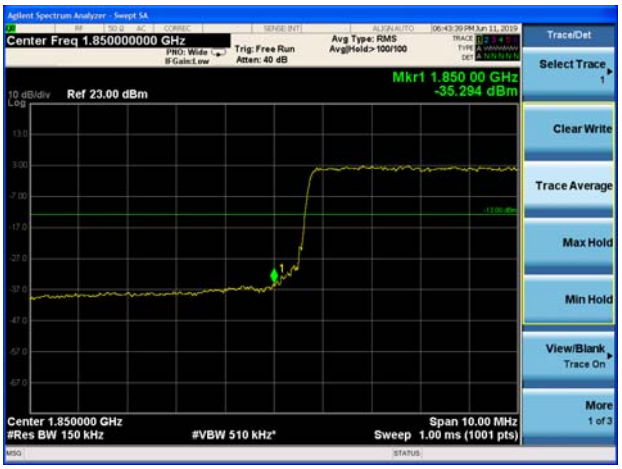
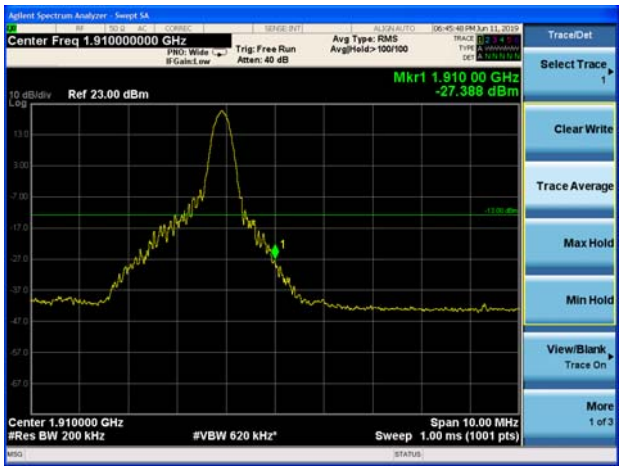
LTE Band 2 15MHz 16QAM 100%RB CH-Low



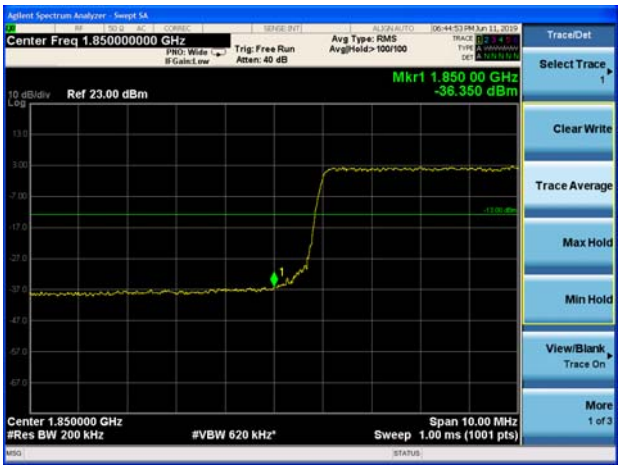
LTE Band 2 15MHz 16QAM 100%RB CH-High

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

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

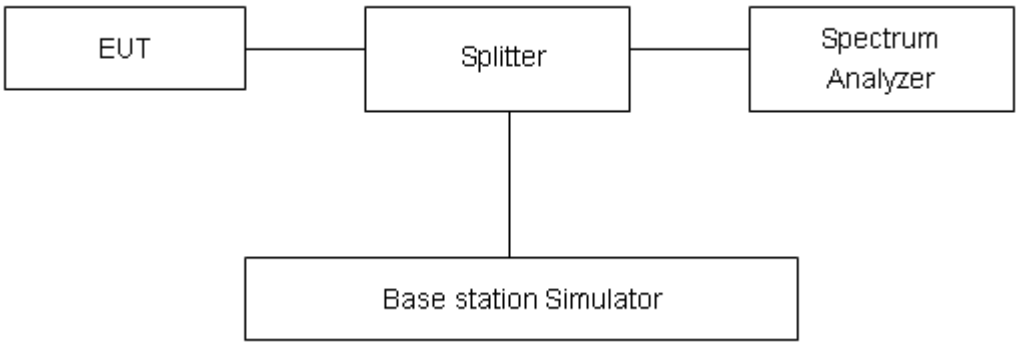
Ambient condition

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.

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Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	30.59	29.56	1.03	≤13	PASS
	661	1880	30.57	29.52	1.05	≤13	PASS
	810	1909.8	30.67	29.66	1.01	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	29.69	27.56	2.13	≤13	PASS
	661	1880	29.60	27.53	2.07	≤13	PASS
	810	1909.8	29.83	27.67	2.16	≤13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	29.86	25.74	4.12	≤13	PASS
	661	1880	30.33	26.08	4.25	≤13	PASS
	810	1909.8	29.95	25.78	4.17	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	24.74	21.62	3.12	≤13	PASS
	9400	1880	24.82	21.66	3.16	≤13	PASS
	9538	1907.6	24.50	21.32	3.18	≤13	PASS

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LTE Band 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	26.82	21.15	5.67	≤13	PASS
		18900	1880.0	27.24	21.68	5.56	≤13	PASS
		19193	1909.3	27.26	21.49	5.77	≤13	PASS
	3	18615	1851.5	26.92	21.16	5.76	≤13	PASS
		18900	1880	27.22	21.61	5.61	≤13	PASS
		19185	1908.5	27.20	21.50	5.70	≤13	PASS
	5	18625	1852.5	26.96	21.25	5.71	≤13	PASS
		18900	1880	27.35	21.62	5.73	≤13	PASS
		19175	1907.5	27.40	21.57	5.83	≤13	PASS
	10	18650	1855	27.17	21.39	5.78	≤13	PASS
		18900	1880	27.37	21.66	5.71	≤13	PASS
		19150	1905	27.25	21.58	5.67	≤13	PASS
	15	18675	1857.5	27.58	21.47	6.11	≤13	PASS
		18900	1880	27.70	21.64	6.06	≤13	PASS
		19125	1902.5	27.54	21.54	6.00	≤13	PASS
	20	18700	1860	27.29	21.55	5.74	≤13	PASS
		18900	1880	27.47	21.68	5.79	≤13	PASS
		19100	1900	27.25	21.49	5.76	≤13	PASS
16QAM	1.4	18607	1850.7	27.51	21.21	6.30	≤13	PASS
		18900	1880.0	27.88	21.71	6.17	≤13	PASS
		19193	1909.3	27.79	21.50	6.29	≤13	PASS
	3	18615	1851.5	27.65	21.18	6.47	≤13	PASS
		18900	1880	27.90	21.63	6.27	≤13	PASS
		19185	1908.5	27.92	21.56	6.36	≤13	PASS
	5	18625	1852.5	27.73	21.32	6.41	≤13	PASS
		18900	1880	27.99	21.67	6.32	≤13	PASS
		19175	1907.5	27.93	21.63	6.30	≤13	PASS
	10	18650	1855	27.90	21.46	6.44	≤13	PASS
		18900	1880	28.08	21.71	6.37	≤13	PASS
		19150	1905	27.93	21.64	6.29	≤13	PASS
	15	18675	1857.5	28.00	21.48	6.52	≤13	PASS
		18900	1880	28.13	21.68	6.45	≤13	PASS
		19125	1902.5	27.94	21.56	6.38	≤13	PASS
	20	18700	1860	27.97	21.56	6.41	≤13	PASS
		18900	1880	28.09	21.69	6.40	≤13	PASS
		19100	1900	27.91	21.54	6.37	≤13	PASS

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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)

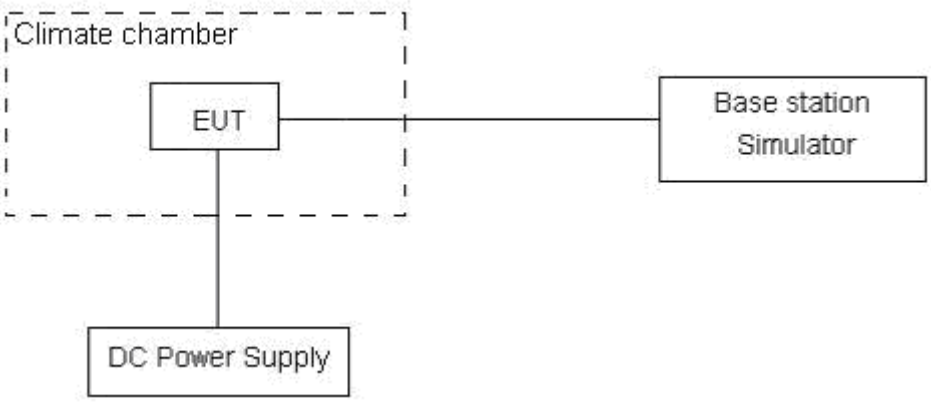
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.6 V and 4.4 V, with a nominal voltage of 3.82V.

Test setup



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Limits

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

Measurement Uncertainty

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

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Test Result

GSM1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal（25℃）	Normal	2.30	14.90	0.00122	0.00793	PASS
Extreme（55℃）		6.84	5.00	0.00364	0.00266	PASS
Extreme（50℃）		16.74	15.80	0.00891	0.00840	PASS
Extreme（40℃）		5.16	10.43	0.00275	0.00555	PASS
Extreme（30℃）		17.35	1.40	0.00923	0.00075	PASS
Extreme（20℃）		2.19	9.88	0.00116	0.00525	PASS
Extreme（10℃）		6.02	6.64	0.00320	0.00353	PASS
Extreme（0℃）		2.25	3.09	0.00120	0.00165	PASS
Extreme（-10℃）		13.51	15.67	0.00718	0.00833	PASS
Extreme（-20℃）		10.71	16.13	0.00570	0.00858	PASS
Extreme（-30℃）		3.95	11.21	0.00210	0.00596	PASS
25℃	LV	7.43	11.72	0.00395	0.00623	PASS
	HV	11.51	3.85	0.00612	0.00205	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
Temperature	Voltage	QPSK	BPSK	QPSK	BPSK	
Normal（25℃）	Normal	11.44	14.16	0.00609	0.00753	PASS
Extreme（55℃）		14.57	6.29	0.00775	0.00334	PASS
Extreme（50℃）		9.82	10.92	0.00522	0.00581	PASS
Extreme（40℃）		3.80	5.56	0.00202	0.00296	PASS
Extreme（30℃）		17.88	11.32	0.00951	0.00602	PASS
Extreme（20℃）		8.80	12.91	0.00468	0.00687	PASS
Extreme（10℃）		8.98	16.63	0.00478	0.00884	PASS
Extreme（0℃）		9.33	12.41	0.00496	0.00660	PASS
Extreme（-10℃）		1.99	16.10	0.00106	0.00857	PASS
Extreme（-20℃）		13.69	3.86	0.00728	0.00205	PASS
Extreme（-30℃）		11.72	17.70	0.00623	0.00942	PASS
25℃	LV	7.15	2.26	0.00380	0.00120	PASS
	HV	6.33	10.06	0.00336	0.00535	PASS

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LTE Band 2, BANDWIDTH 1.4MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	1.4MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	10.72	3.64	0.00570	0.00193	PASS
Extreme（55℃）		4.77	13.98	0.00254	0.00744	PASS
Extreme（50℃）		9.37	12.13	0.00499	0.00645	PASS
Extreme（40℃）		10.61	11.98	0.00564	0.00637	PASS
Extreme（30℃）		14.98	7.18	0.00797	0.00382	PASS
Extreme（20℃）		16.83	6.64	0.00895	0.00353	PASS
Extreme（10℃）		2.95	2.89	0.00157	0.00153	PASS
Extreme（0℃）		7.09	3.75	0.00377	0.00199	PASS
Extreme（-10℃）		4.27	14.52	0.00227	0.00773	PASS
Extreme（-20℃）		12.34	13.49	0.00656	0.00718	PASS
Extreme（-30℃）		2.49	1.40	0.00133	0.00075	PASS
25℃	LV	11.31	15.95	0.00601	0.00849	PASS
	HV	1.20	6.84	0.00064	0.00364	PASS

LTE Band 2, BANDWIDTH 3MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	3MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	2.68	5.20	0.00142	0.00276	PASS
Extreme（55℃）		7.36	16.87	0.00391	0.00897	PASS
Extreme（50℃）		2.98	14.14	0.00158	0.00752	PASS
Extreme（40℃）		1.06	2.84	0.00056	0.00151	PASS
Extreme（30℃）		7.98	2.10	0.00425	0.00112	PASS
Extreme（20℃）		5.39	6.31	0.00287	0.00336	PASS
Extreme（10℃）		10.16	3.01	0.00540	0.00160	PASS
Extreme（0℃）		14.60	3.39	0.00777	0.00180	PASS
Extreme（-10℃）		5.60	5.24	0.00298	0.00279	PASS
Extreme（-20℃）		5.91	14.89	0.00314	0.00792	PASS
Extreme（-30℃）		16.89	16.98	0.00899	0.00903	PASS
25℃	LV	9.81	6.13	0.00522	0.00326	PASS
	HV	14.22	10.68	0.00757	0.00568	PASS

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LTE Band 2, BANDWIDTH 5MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	5MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	14.27	2.64	0.00759	0.00141	PASS
Extreme（55℃）		1.20	14.02	0.00064	0.00746	PASS
Extreme（50℃）		3.64	15.58	0.00194	0.00829	PASS
Extreme（40℃）		9.09	15.61	0.00484	0.00830	PASS
Extreme（30℃）		5.68	3.03	0.00302	0.00161	PASS
Extreme（20℃）		2.53	4.86	0.00135	0.00259	PASS
Extreme（10℃）		6.40	17.54	0.00340	0.00933	PASS
Extreme（0℃）		17.17	17.68	0.00913	0.00940	PASS
Extreme（-10℃）		8.08	6.61	0.00430	0.00351	PASS
Extreme（-20℃）		5.16	15.50	0.00275	0.00825	PASS
Extreme（-30℃）		2.20	7.73	0.00117	0.00411	PASS
25℃	LV	10.21	12.78	0.00543	0.00680	PASS
	HV	5.47	12.90	0.00291	0.00686	PASS

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LTE Band 2, BANDWIDTH 10MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	10MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	13.08	9.89	0.00696	0.00526	PASS
Extreme（55℃）		17.61	11.93	0.00937	0.00634	PASS
Extreme（50℃）		6.07	9.29	0.00323	0.00494	PASS
Extreme（40℃）		8.33	4.07	0.00443	0.00217	PASS
Extreme（30℃）		16.13	15.50	0.00858	0.00824	PASS
Extreme（20℃）		1.39	15.03	0.00074	0.00799	PASS
Extreme（10℃）		9.68	8.58	0.00515	0.00456	PASS
Extreme（0℃）		5.59	13.59	0.00297	0.00723	PASS
Extreme（-10℃）		12.59	10.35	0.00670	0.00550	PASS
Extreme（-20℃）		1.43	15.45	0.00076	0.00822	PASS
Extreme（-30℃）		2.46	13.71	0.00131	0.00729	PASS
25℃	LV	3.80	9.99	0.00202	0.00532	PASS
	HV	8.80	1.40	0.00468	0.00075	PASS

LTE Band 2, BANDWIDTH 15MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	15MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	3.68	7.36	0.00196	0.00392	PASS
Extreme（55℃）		11.31	16.27	0.00602	0.00865	PASS
Extreme（50℃）		16.52	4.55	0.00879	0.00242	PASS
Extreme（40℃）		1.15	11.25	0.00061	0.00598	PASS
Extreme（30℃）		1.93	12.15	0.00103	0.00646	PASS
Extreme（20℃）		9.41	12.12	0.00501	0.00645	PASS
Extreme（10℃）		17.82	4.50	0.00948	0.00239	PASS
Extreme（0℃）		5.77	7.89	0.00307	0.00420	PASS
Extreme（-10℃）		13.90	14.88	0.00740	0.00791	PASS
Extreme（-20℃）		9.55	9.59	0.00508	0.00510	PASS
Extreme（-30℃）		15.46	11.34	0.00822	0.00603	PASS
25℃	LV	5.44	17.13	0.00289	0.00911	PASS
	HV	4.72	15.07	0.00251	0.00802	PASS

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LTE Band 2, BANDWIDTH 20MHz						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
BANDWIDTH	20MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	13.47	10.49	0.00717	0.00558	PASS
Extreme（55℃）		10.83	5.96	0.00576	0.00317	PASS
Extreme（50℃）		12.53	10.71	0.00666	0.00569	PASS
Extreme（40℃）		16.76	3.64	0.00891	0.00193	PASS
Extreme（30℃）		14.83	6.50	0.00789	0.00346	PASS
Extreme（20℃）		11.98	5.29	0.00637	0.00282	PASS
Extreme（10℃）		17.43	10.68	0.00927	0.00568	PASS
Extreme（0℃）		2.02	2.77	0.00107	0.00148	PASS
Extreme（-10℃）		5.27	7.68	0.00280	0.00408	PASS
Extreme（-20℃）		2.60	5.47	0.00138	0.00291	PASS
Extreme（-30℃）		2.92	2.93	0.00155	0.00156	PASS
25℃	LV	12.40	7.69	0.00659	0.00409	PASS
	HV	13.19	16.50	0.00701	0.00878	PASS

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5.7. Spurious Emissions at Antenna Terminals

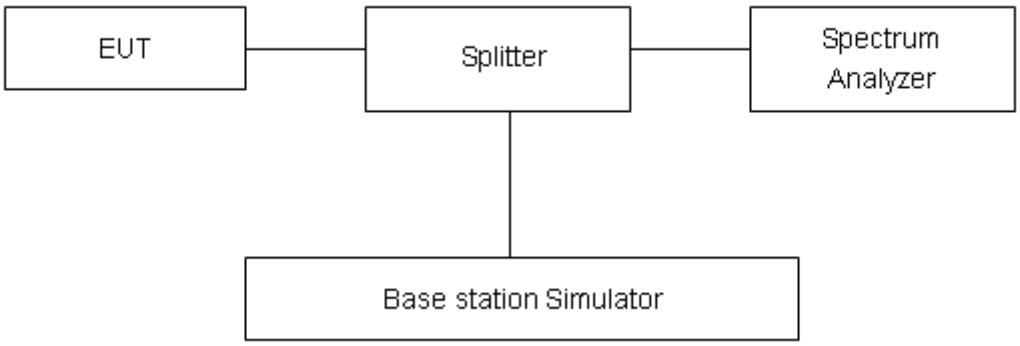
Ambient condition

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

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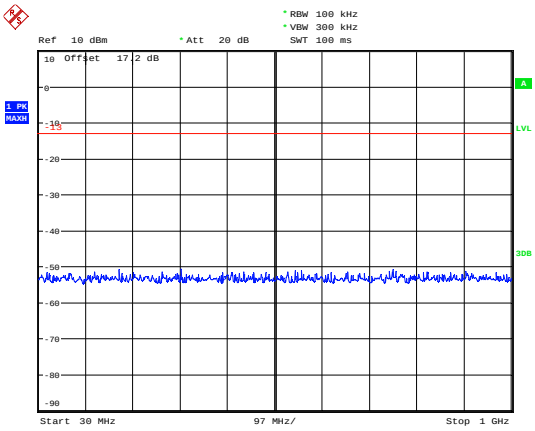
Test Result

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

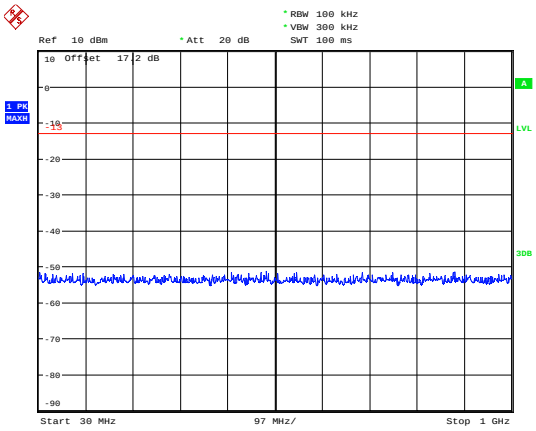
The signal beyond the limit is carrier.

GSM 1900 CH-Low 30MHz~1GHz



Date: 11.JUN.2019 16:21:17

GSM 1900 CH-Middle 30MHz~1GHz



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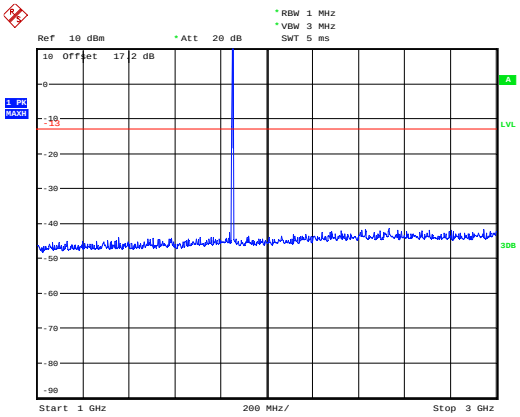
GSM 1900 CH-Low 1GHz~3GHz



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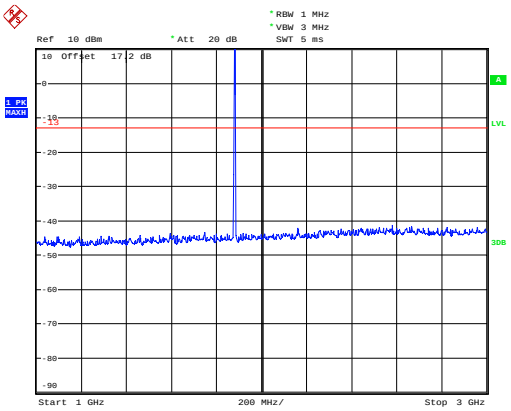
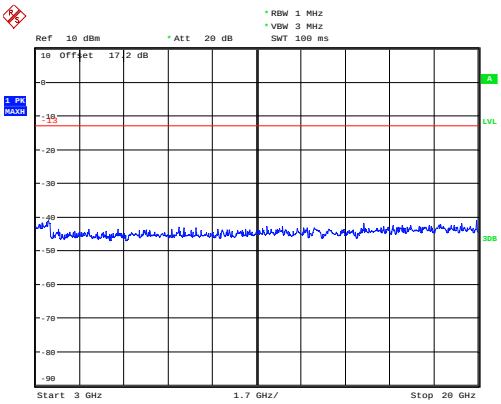
GSM 1900 CH-Middle 1GHz~3GHz



Date: 11.JUN.2019 16:22:29

GSM 1900 CH-Low 3GHz~20GHz



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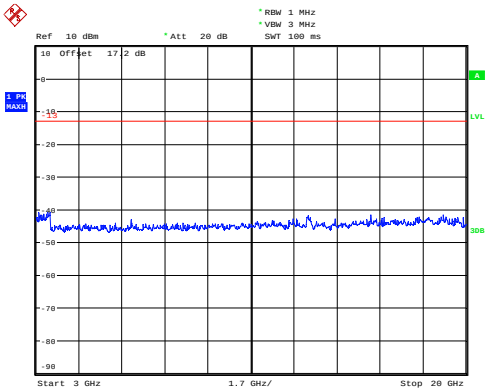
GSM 1900 CH-Middle 3GHz~20GHz



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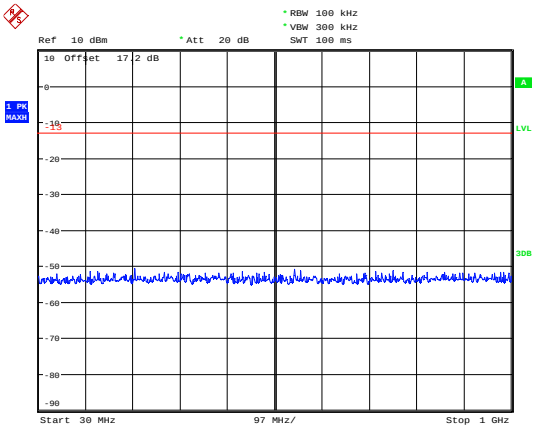
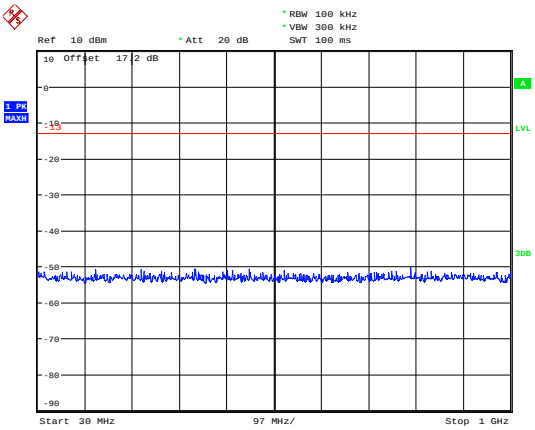
GSM 1900 CH-High 30MHz~1GHz



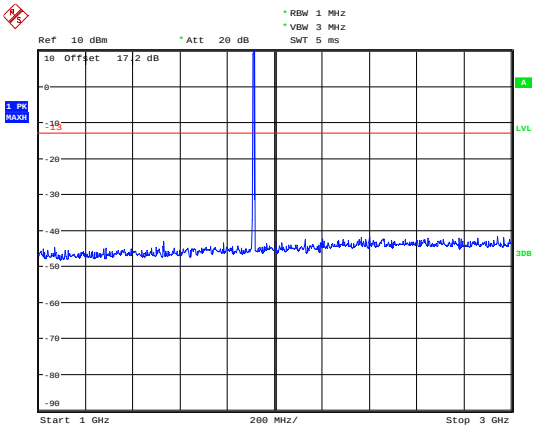
Date: 11.JUN.2019 16:21:45

WCDMA Band II CH-Low 30MHz~1GHz



Date: 11.JUN.2019 16:45:40

GSM 1900 CH-High 1GHz~3GHz



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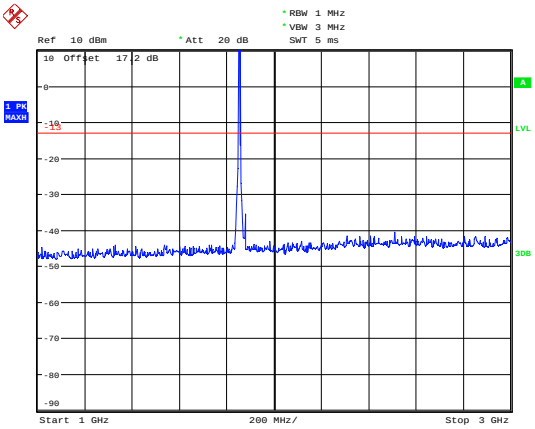
WCDMA BAND II CH-Low 1GHz~3GHz



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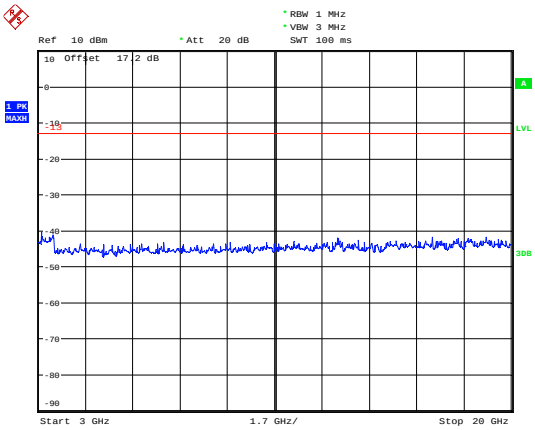
GSM 1900 CH-High 3GHz~20GHz



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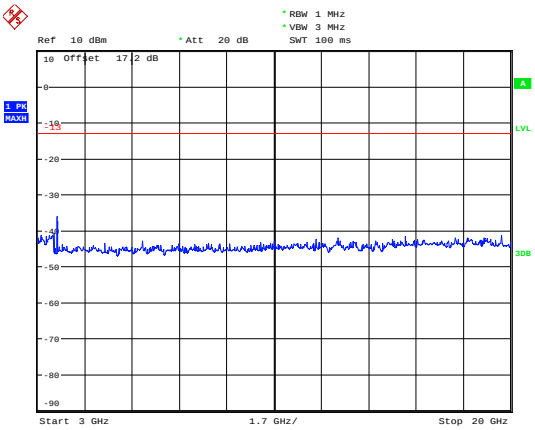
WCDMA BAND II CH-Low 3GHz~20GHz



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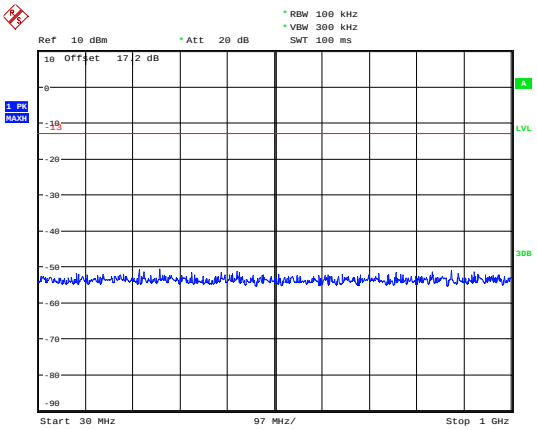
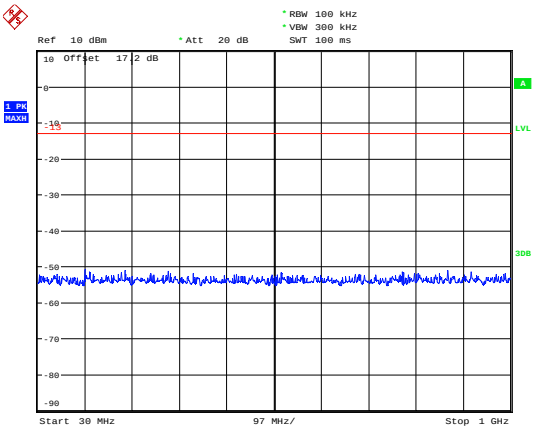
WCDMA Band II CH- Middle 30MHz~1GHz



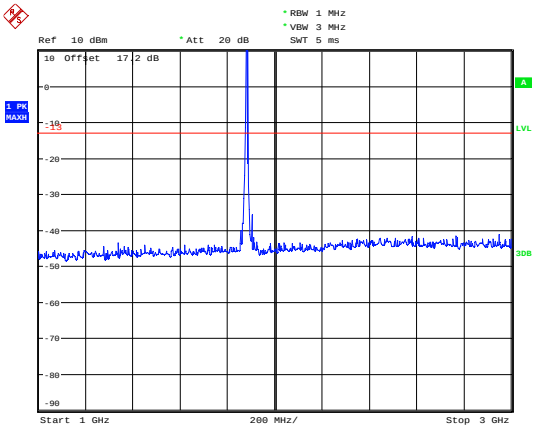
Date: 11.JUN.2019 16:45:57

WCDMA Band II CH- High 30MHz~1GHz



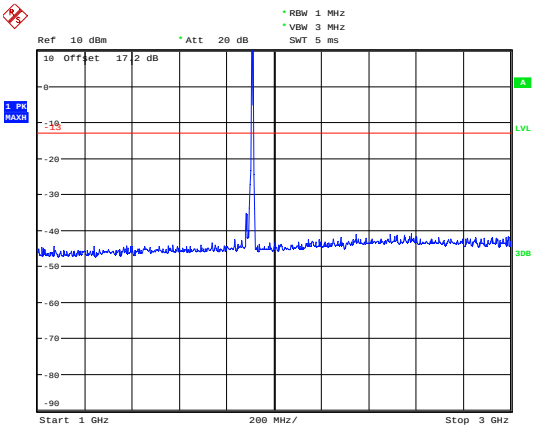
Date: 11.JUN.2019 16:46:15

WCDMA BAND II CH-Middle 1GHz~3GHz



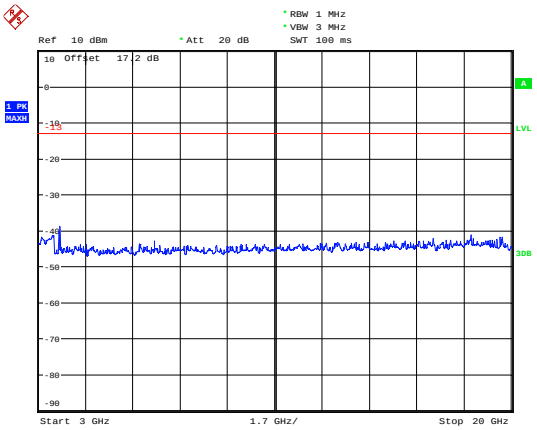
Date: 11.JUN.2019 16:45:07

WCDMA BAND II CH-High 1GHz~3GHz



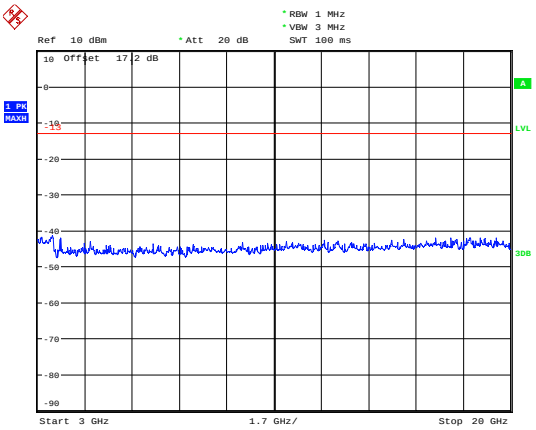
Date: 11.JUN.2019 16:44:55

WCDMA BAND II CH-Middle 3GHz~20GHz



Date: 11.JUN.2019 16:44:22

WCDMA BAND II CH-High 3GHz~20GHz



Date: 11.JUN.2019 16:44:37

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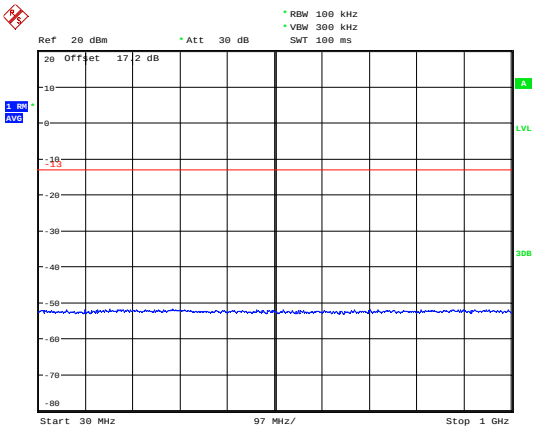
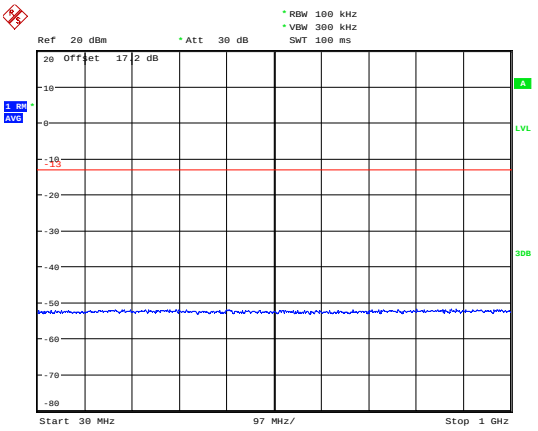
LTE Band 2 1.4MHz CH-Low 30MHz~1GHz



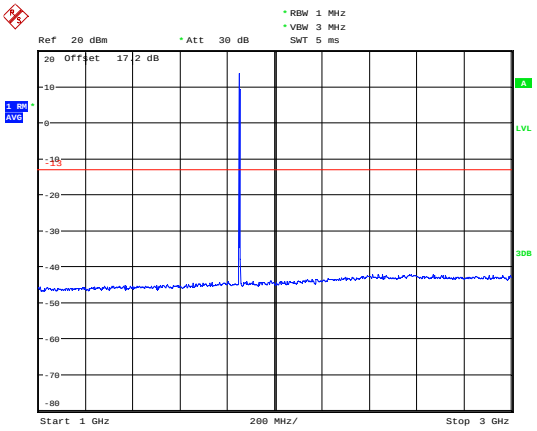
Date: 12.JUN.2019 18:58:58

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



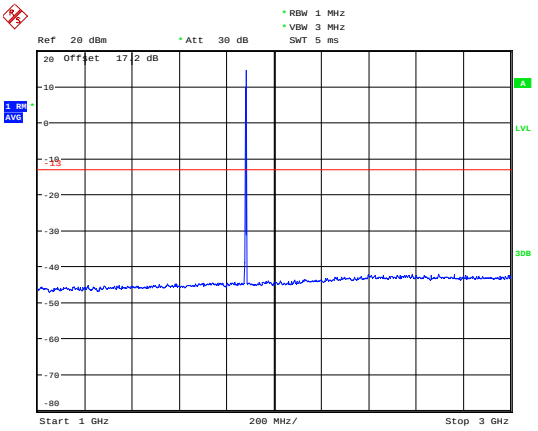
Date: 12.JUN.2019 18:59:11

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



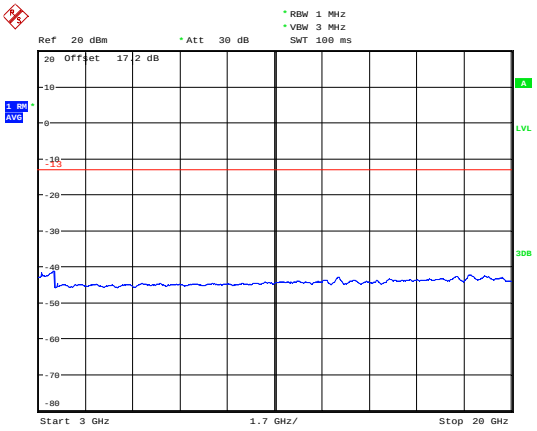
Date: 13.JUN.2019 11:17:31

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



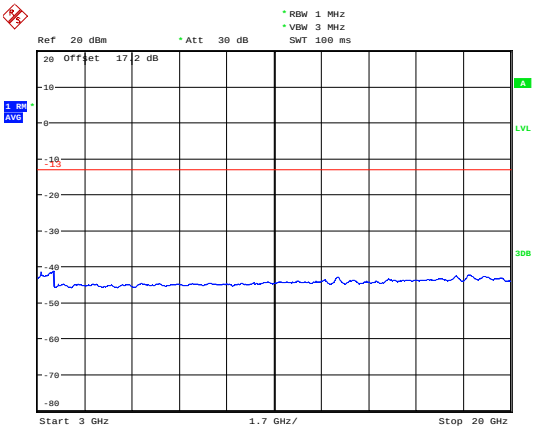
Date: 13.JUN.2019 11:17:44

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



Date: 13.JUN.2019 11:44:12

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



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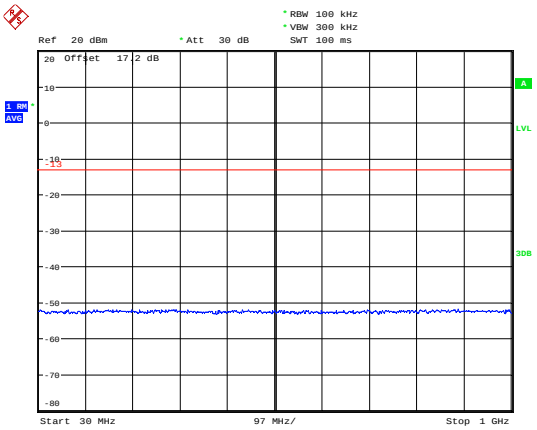
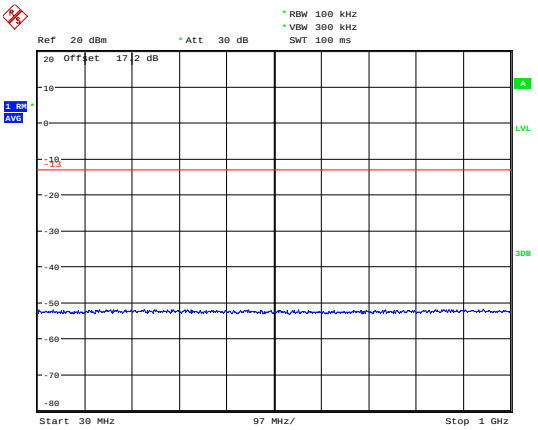
LTE Band 2 1.4MHz CH-High 30MHz~1GHz



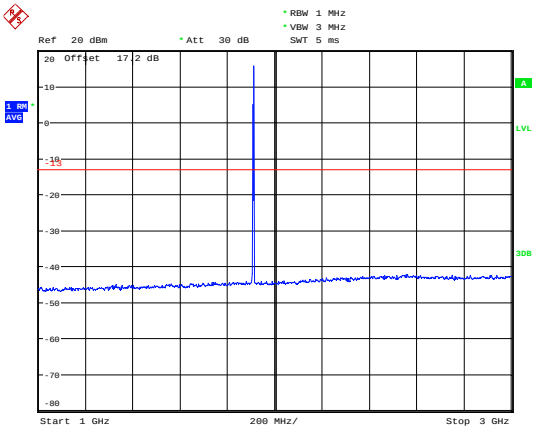
Date: 12.JUN.2019 18:59:24

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



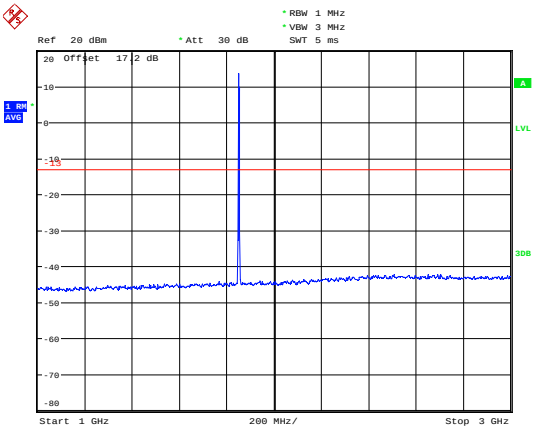
Date: 12.JUN.2019 19:27:05

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



Date: 13.JUN.2019 11:17:59

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



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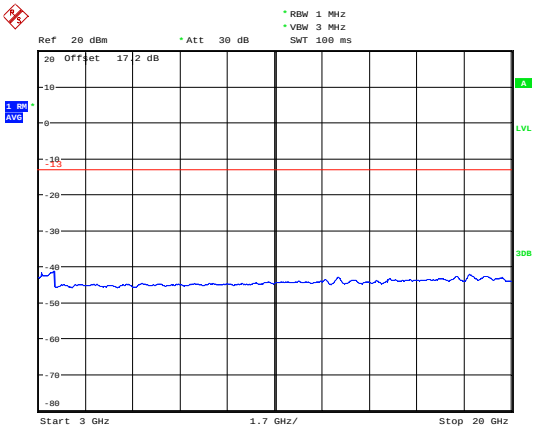
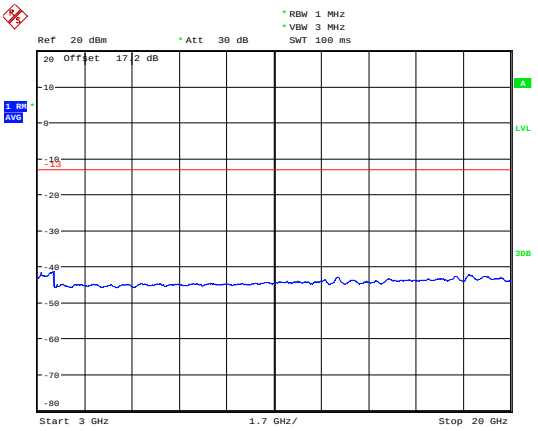
LTE Band 2 1.4MHz CH-High 3GHz~20GHz



Date: 13.JUN.2019 11:44:57

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



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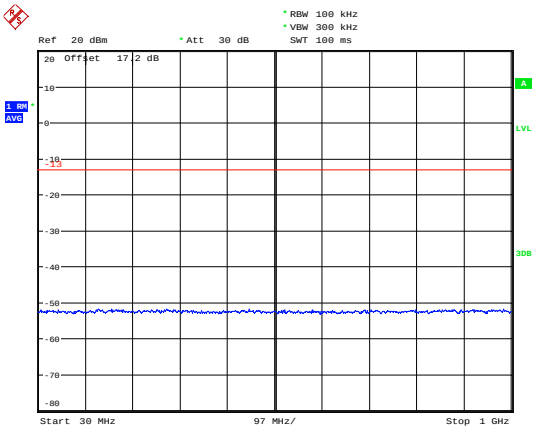
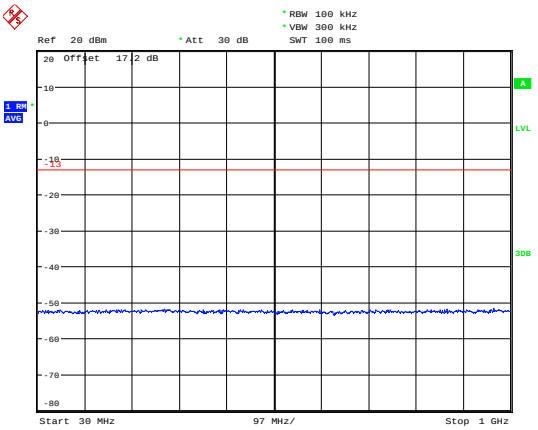
LTE Band 2 3MHz CH-Middle 30MHz~1GHz



Date: 12.JUN.2019 19:27:17

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



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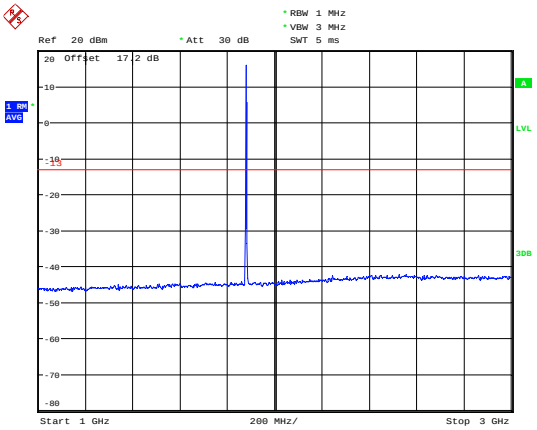
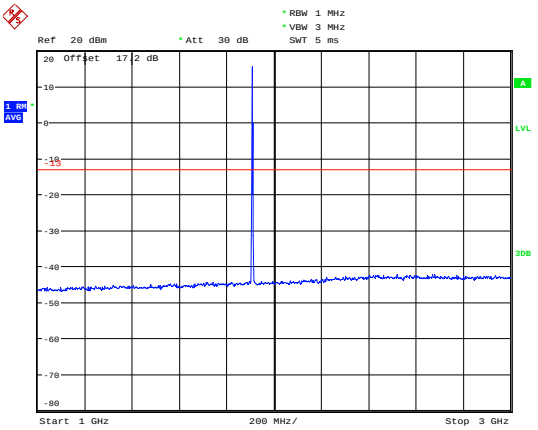
LTE Band 2 3MHz CH-Middle 1GHz~3GHz



Date: 13.JUN.2019 11:24:01

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



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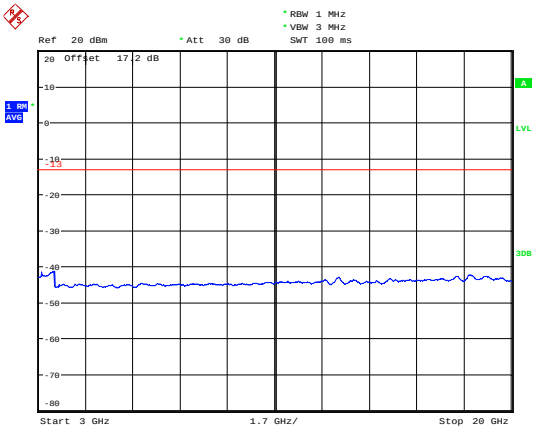
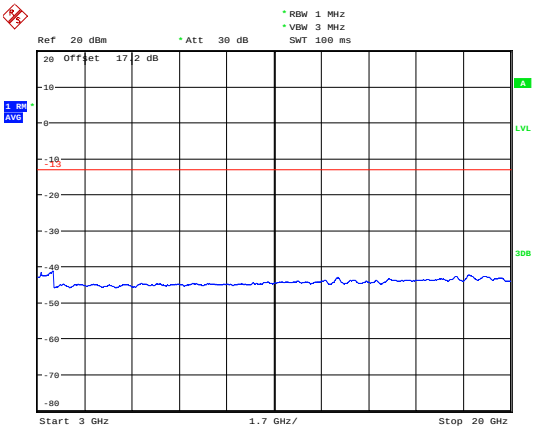
LTE Band 2 3MHz CH-Middle 3GHz~20GHz



Date: 13.JUN.2019 11:48:50

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



Date: 13.JUN.2019 11:49:06

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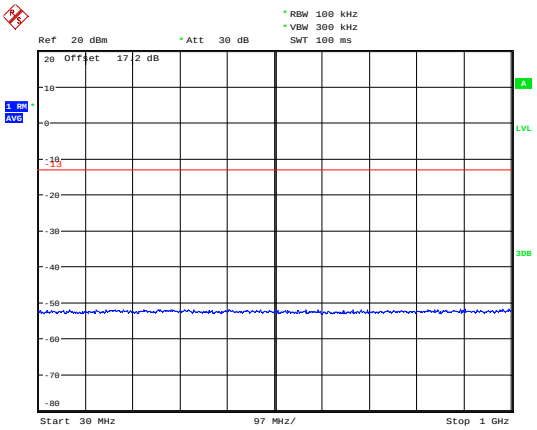
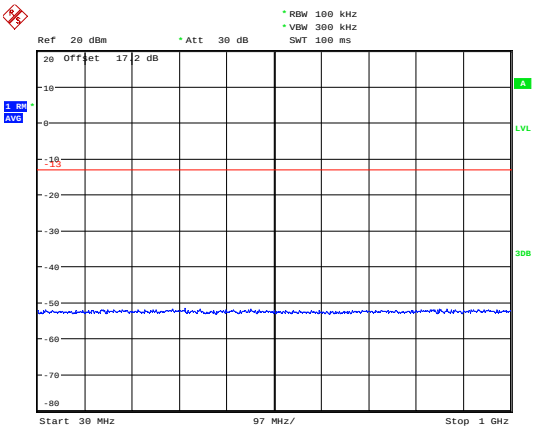
LTE Band 2 5MHz CH-Low 30MHz~1GHz



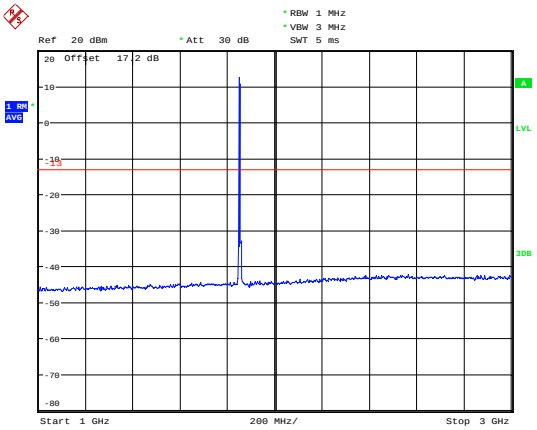
Date: 13.JUN.2019 10:50:06

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



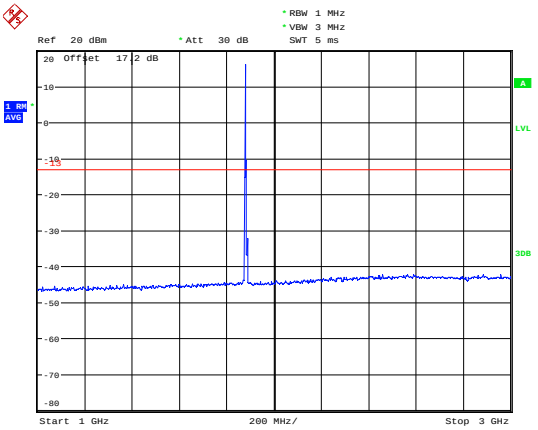
Date: 13.JUN.2019 10:50:19

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



Date: 13.JUN.2019 11:26:00

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



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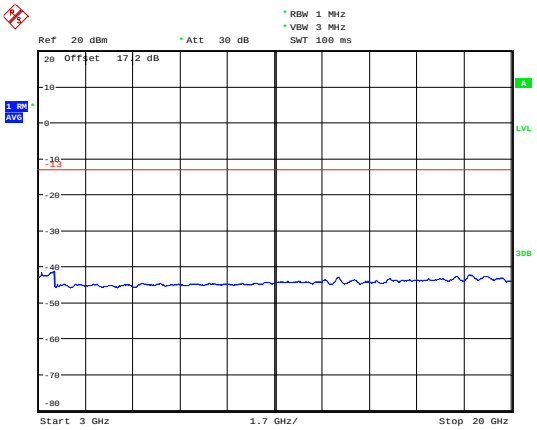
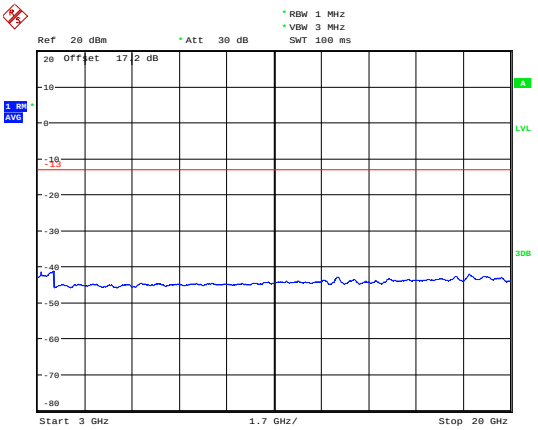
LTE Band 2 5MHz CH-Low 3GHz~20GHz



Date: 13.JUN.2019 11:49:31

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



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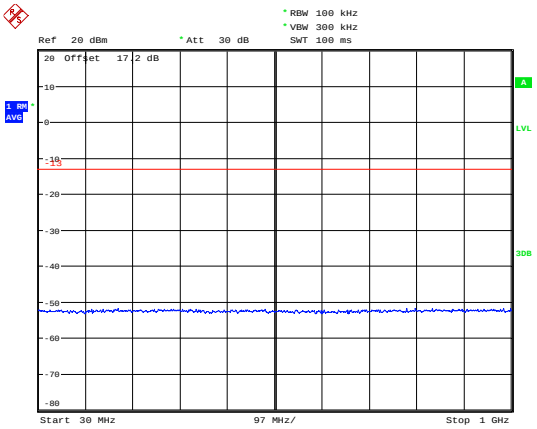
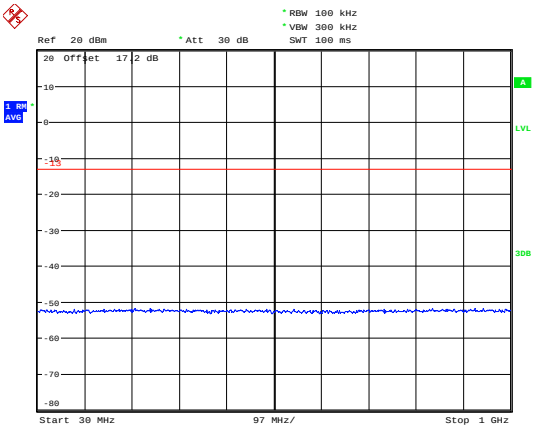
LTE Band 2 5MHz CH-High 30MHz~1GHz



Date: 13.JUN.2019 10:50:31

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



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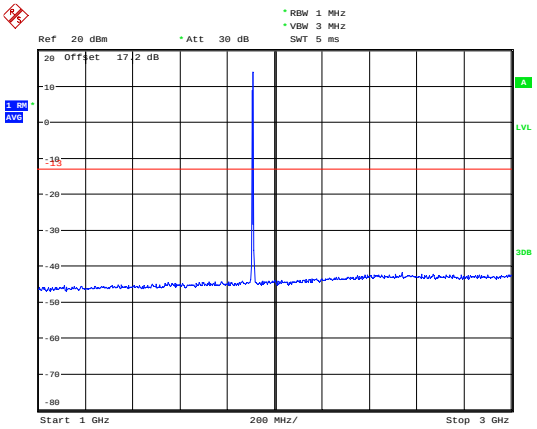
LTE Band 2 5MHz CH-High 1GHz~3GHz



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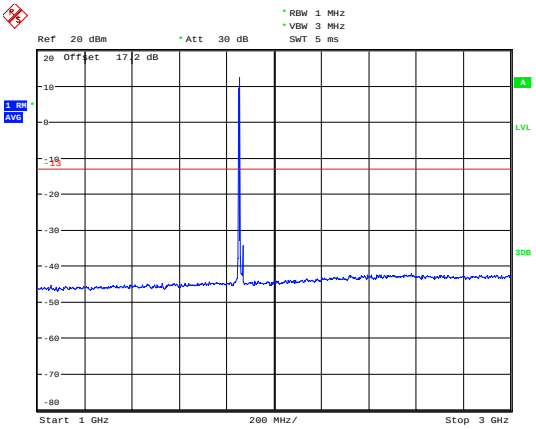
LTE Band 2 10MHz CH-Low 1GHz~3GHz



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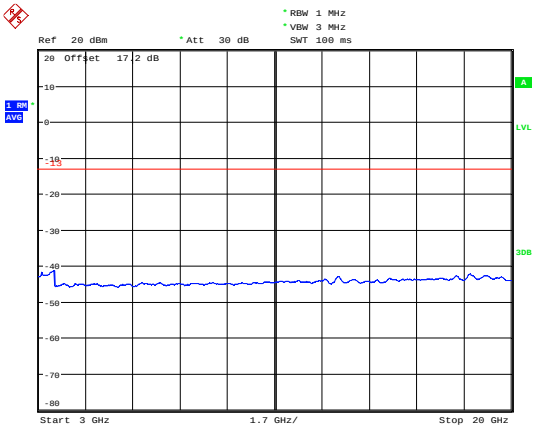
LTE Band 2 5MHz CH-High 3GHz~20GHz



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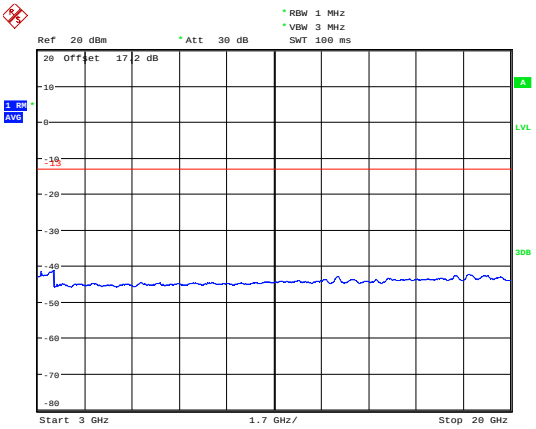
LTE Band 2 10MHz CH-Low 3GHz~20GHz



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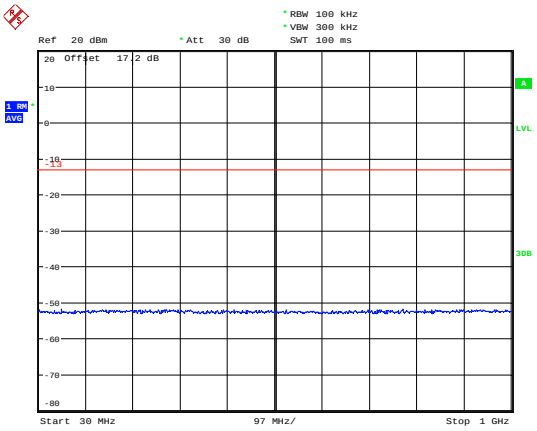
LTE Band 2 10MHz CH-Middle 30MHz~1GHz



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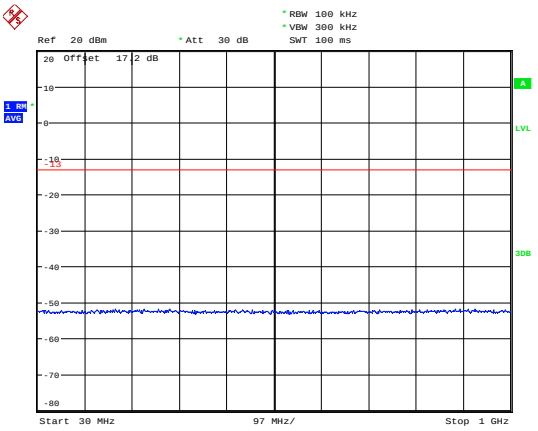
LTE Band 2 10MHz CH-High 30MHz~1GHz



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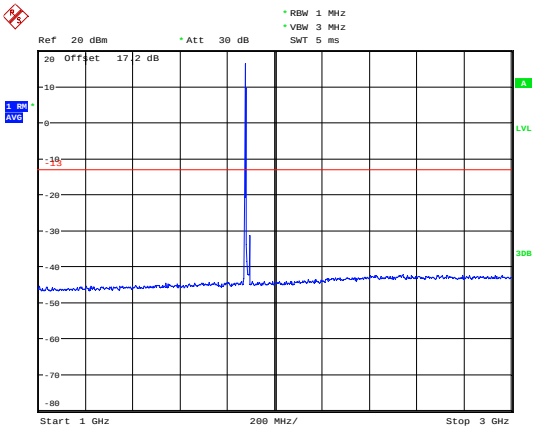
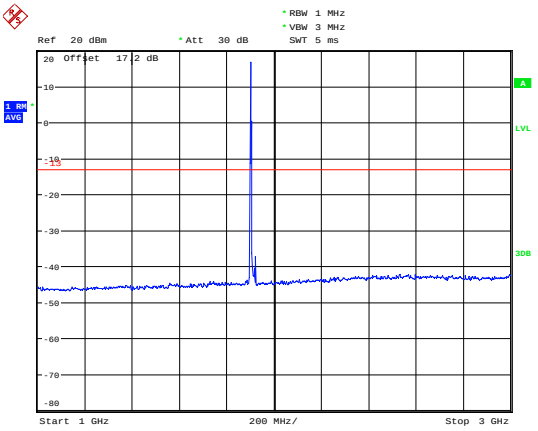
LTE Band 2 10MHz CH-Middle 1GHz~3GHz



Date: 13.JUN.2019 11:30:22

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



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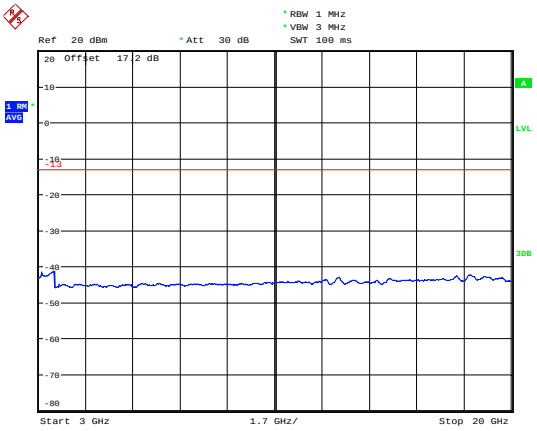
LTE Band 2 10MHz CH-Middle 3GHz~20GHz



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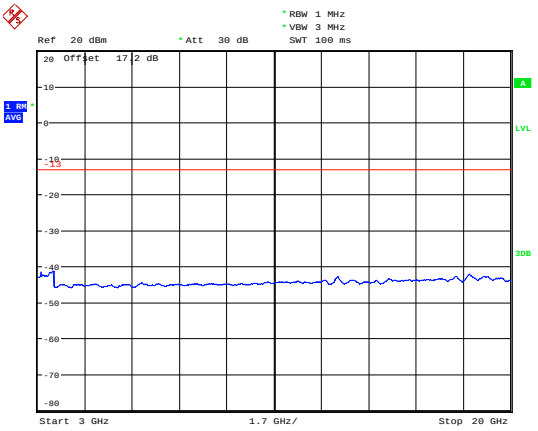
LTE Band 2 10MHz CH-High 3GHz~20GHz



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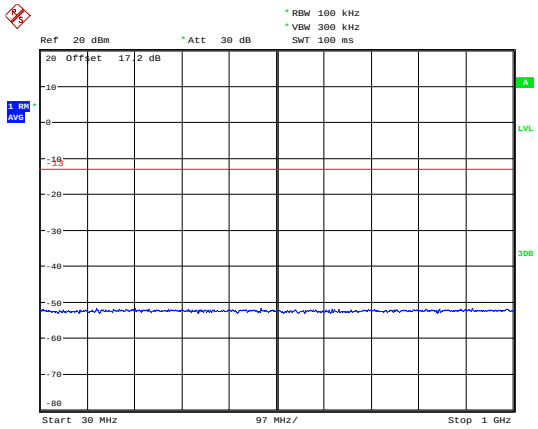
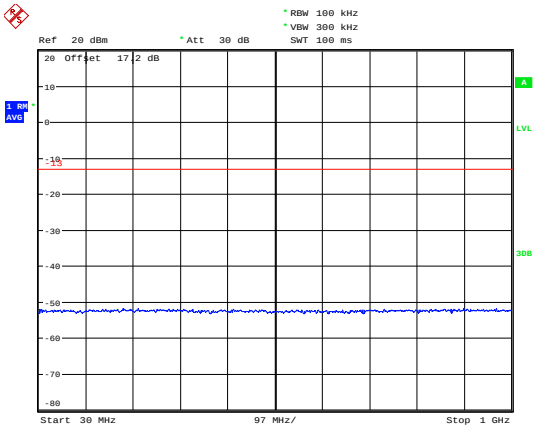
LTE Band 2 15MHz CH-Low 30MHz~1GHz



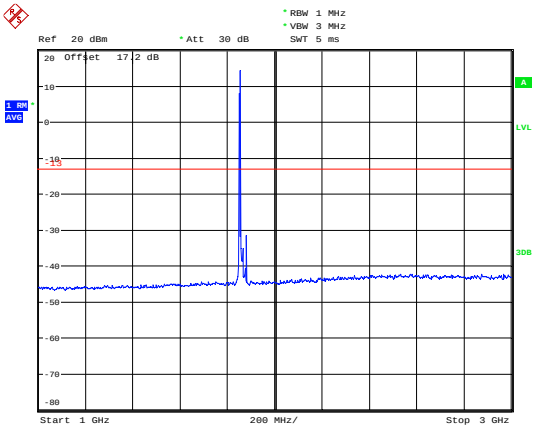
Date: 13.JUN.2019 11:02:36

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



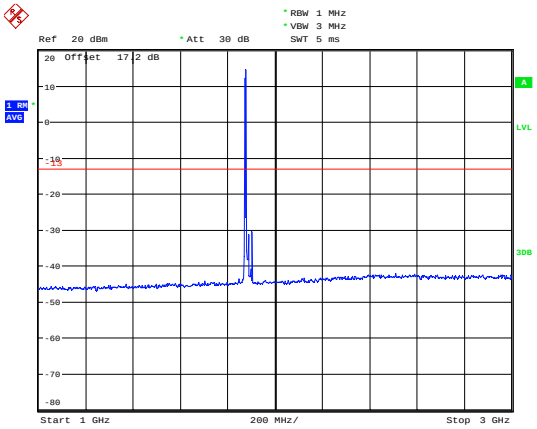
Date: 13.JUN.2019 11:02:55

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



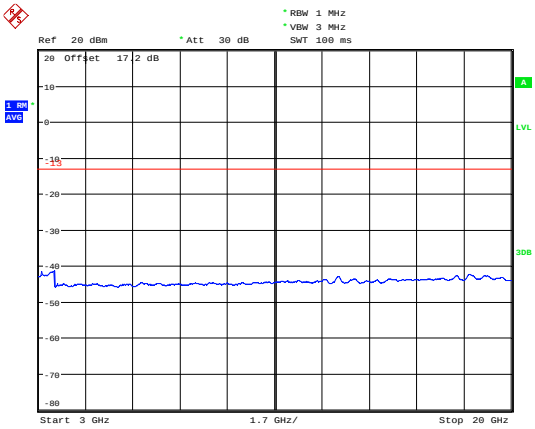
Date: 13.JUN.2019 11:31:17

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



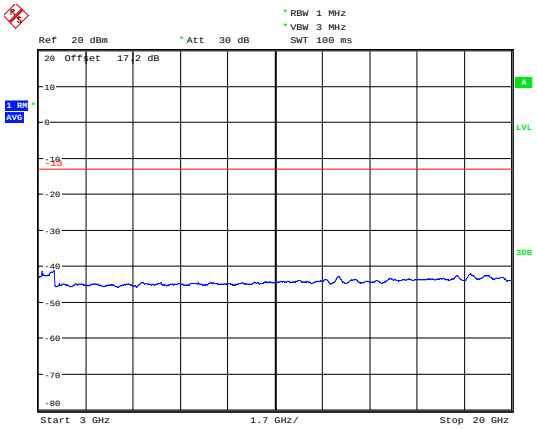
Date: 13.JUN.2019 11:31:25

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



Date: 13.JUN.2019 11:36:47

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



Date: 13.JUN.2019 11:36:33

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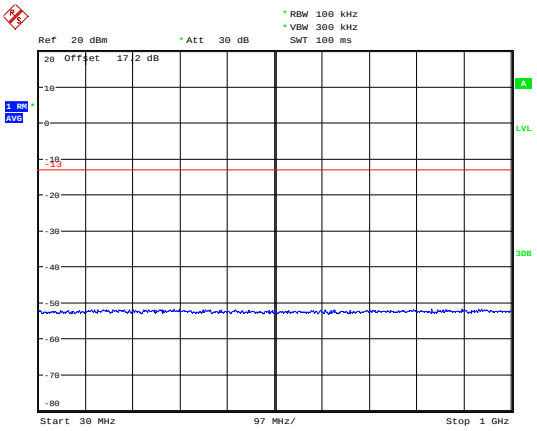
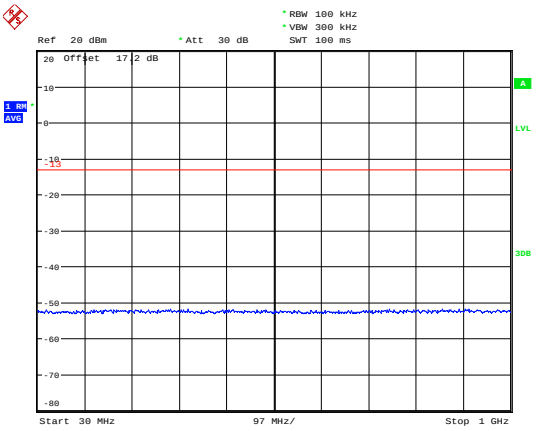
LTE Band 2 15MHz CH-High 30MHz~1GHz



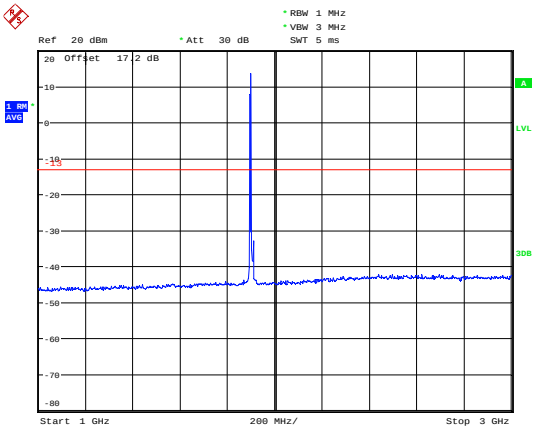
Date: 13.JUN.2019 11:03:07

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



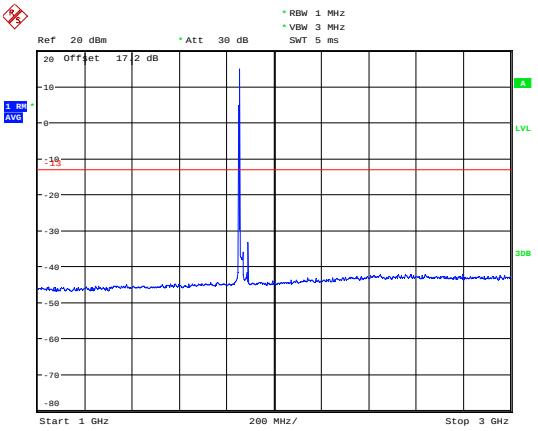
Date: 13.JUN.2019 11:03:56

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



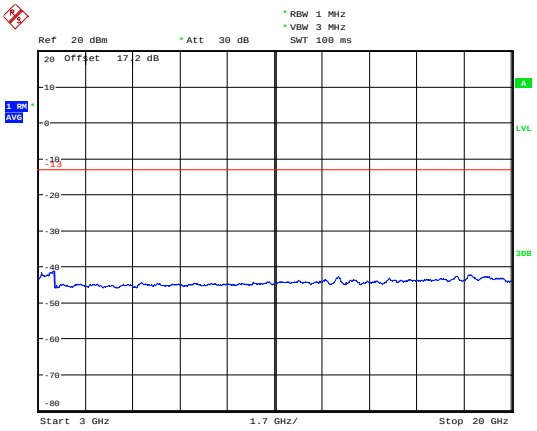
Date: 13.JUN.2019 11:31:38

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



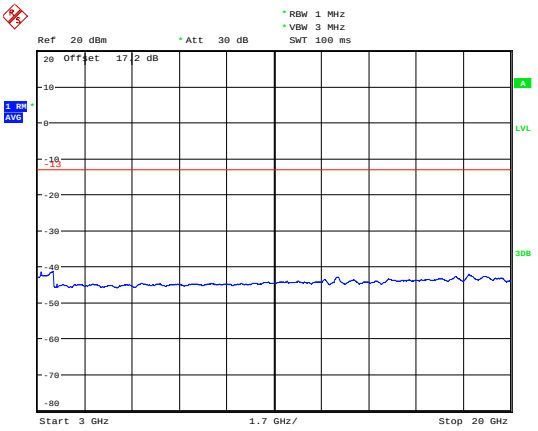
Date: 13.JUN.2019 11:14:05

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



Date: 13.JUN.2019 11:36:19

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



Date: 13.JUN.2019 11:43:07

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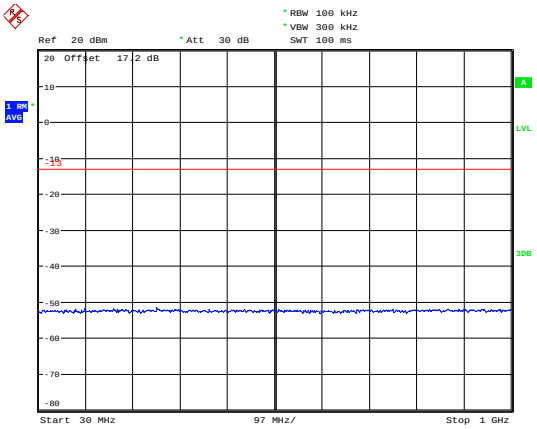
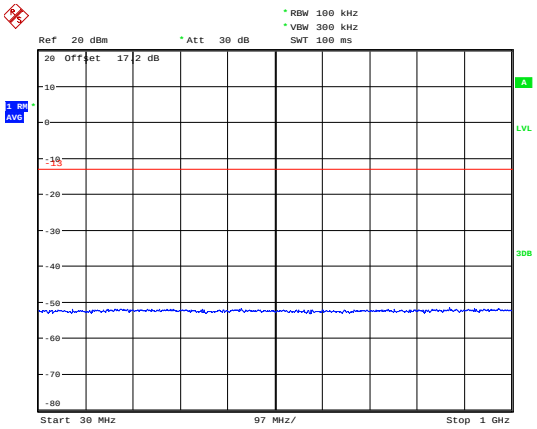
LTE Band 2 20MHz CH-Middle 30MHz~1GHz



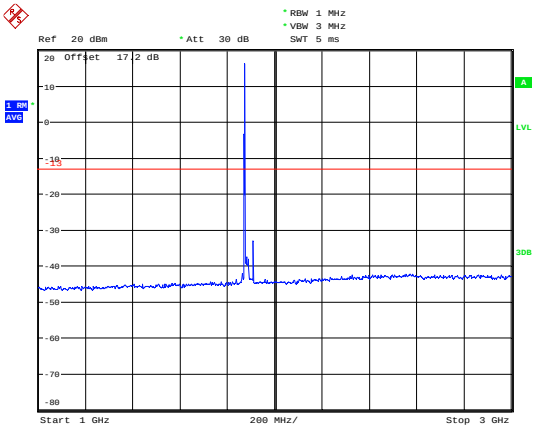
Date: 13.JUN.2019 11:04:07

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



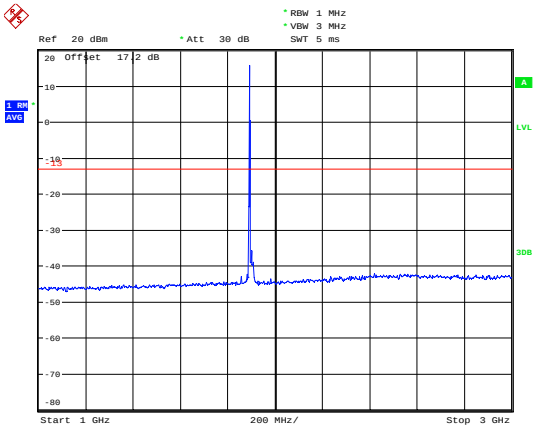
Date: 13.JUN.2019 11:04:24

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



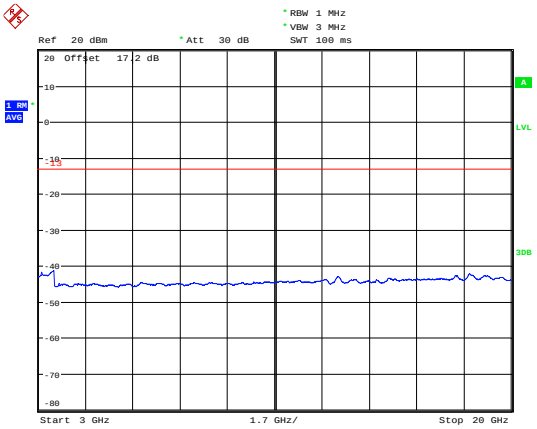
Date: 13.JUN.2019 11:11:19

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



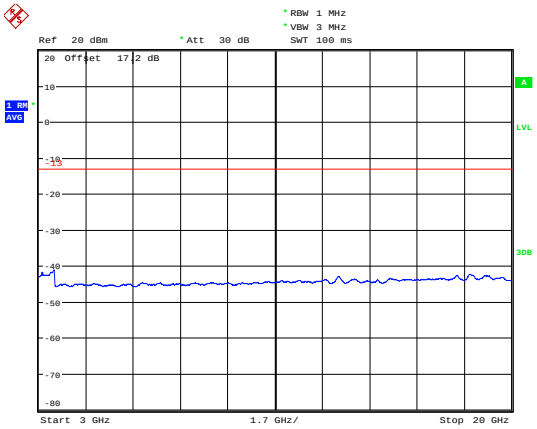
Date: 13.JUN.2019 11:09:59

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



Date: 13.JUN.2019 11:43:26

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



Date: 13.JUN.2019 11:43:46

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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)

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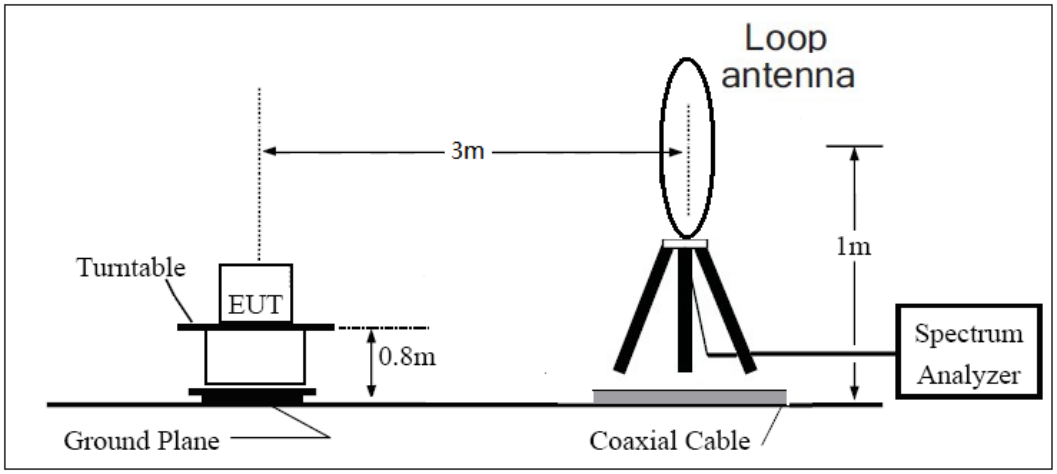
and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

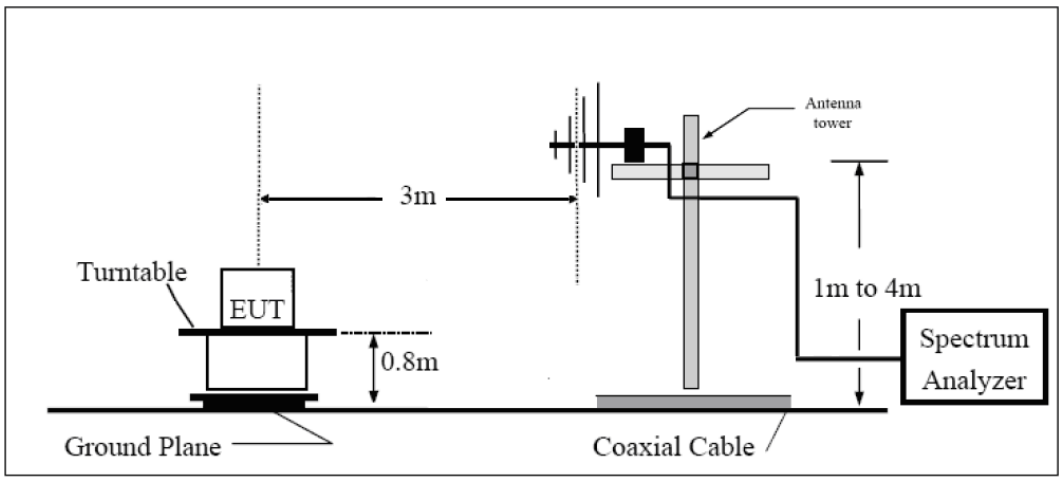
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

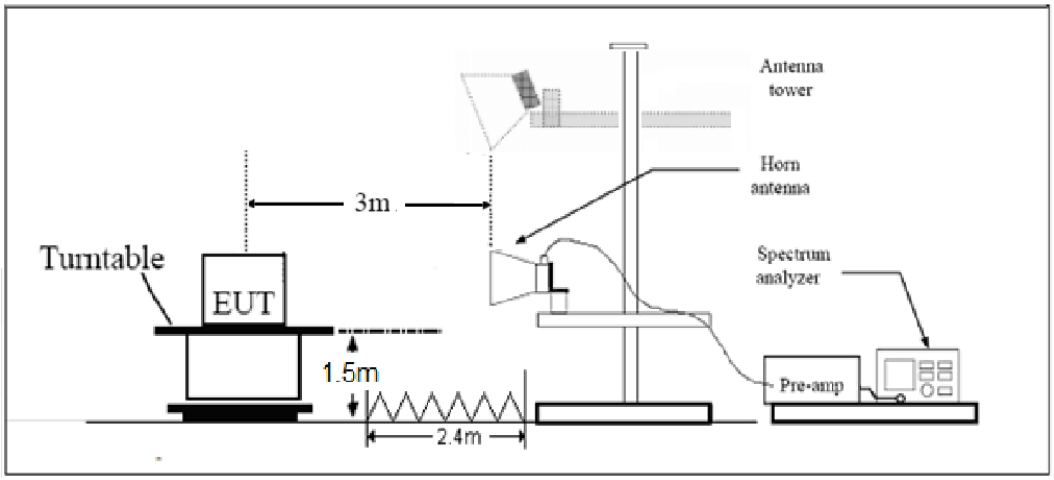
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



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Note: Area side: 2.4mX3.6m

Limits

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

Limit	-13 dBm

Measurement Uncertainty

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

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Test Result

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

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-61.76	5.10	11.05	Horizontal	-55.81	-13.00	42.81	90
3	5640.0	-61.85	5.42	12.65	Horizontal	-54.62	-13.00	41.62	135
4	7520.0	-57.65	6.70	13.85	Horizontal	-50.50	-13.00	37.50	270
5	9400.0	-54.83	7.01	14.75	Horizontal	-47.09	-13.00	34.09	135
6	11280.0	-55.08	7.48	15.95	Horizontal	-46.61	-13.00	33.61	270
7	13160.0	-53.86	7.51	16.55	Horizontal	-44.82	-13.00	31.82	135
8	15040.0	-52.36	8.24	15.35	Horizontal	-45.25	-13.00	32.25	90
9	16920.0	-48.90	8.41	14.95	Horizontal	-42.36	-13.00	29.36	270
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	-47.37	5.10	11.05	Horizontal	-41.42	-13.00	28.42	45
3	5640.0	-62.34	5.42	12.65	Horizontal	-55.11	-13.00	42.11	0
4	7520.0	-57.85	6.70	13.85	Horizontal	-50.70	-13.00	37.70	90
5	9400.0	-56.26	7.01	14.75	Horizontal	-48.52	-13.00	35.52	135
6	11280.0	-54.86	7.48	15.95	Horizontal	-46.39	-13.00	33.39	270
7	13160.0	-53.84	7.51	16.55	Horizontal	-44.80	-13.00	31.80	135
8	15040.0	-53.84	8.24	15.35	Horizontal	-46.73	-13.00	33.73	90
9	16920.0	-49.74	8.41	14.95	Horizontal	-43.20	-13.00	30.20	270
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.0	-46.06	5.10	11.05	Horizontal	-40.11	-13.00	27.11	225
3	5638.9	-62.02	5.42	12.65	Horizontal	-54.79	-13.00	41.79	135
4	7520.0	-57.54	6.70	13.85	Horizontal	-50.39	-13.00	37.39	90
5	9400.0	-54.97	7.01	14.75	Horizontal	-47.23	-13.00	34.23	135
6	11280.0	-54.54	7.48	15.95	Horizontal	-46.07	-13.00	33.07	270
7	13160.0	-53.82	7.51	16.55	Horizontal	-44.78	-13.00	31.78	135
8	15040.0	-52.19	8.24	15.35	Horizontal	-45.08	-13.00	32.08	90
9	16920.0	-49.55	8.41	14.95	Horizontal	-43.01	-13.00	30.01	270
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	3755.6	-47.56	5.10	11.05	Horizontal	-41.61	-13.00	28.61	90
3	5633.6	-61.96	5.42	12.65	Horizontal	-54.73	-13.00	41.73	135
4	7520.0	-58.23	6.70	13.85	Horizontal	-51.08	-13.00	38.08	270
5	9400.0	-54.61	7.01	14.75	Horizontal	-46.87	-13.00	33.87	135
6	11280.0	-54.19	7.48	15.95	Horizontal	-45.72	-13.00	32.72	90
7	13160.0	-54.69	7.51	16.55	Horizontal	-45.65	-13.00	32.65	270
8	15040.0	-53.23	8.24	15.35	Horizontal	-46.12	-13.00	33.12	90
9	16920.0	-48.23	8.41	14.95	Horizontal	-41.69	-13.00	28.69	180
10	18800.0	-	-	-	-	-	-	-	-

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

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LTE Band 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3742.1	-49.12	5.10	11.05	Horizontal	-43.17	-13.00	30.17	270
3	5613.4	-61.28	5.42	12.65	Horizontal	-54.05	-13.00	41.05	135
4	7484.6	-57.63	6.70	13.85	Horizontal	-50.48	-13.00	37.48	90
5	9400.0	-55.60	7.01	14.75	Horizontal	-47.86	-13.00	34.86	270
6	11280.0	-54.54	7.48	15.95	Horizontal	-46.07	-13.00	33.07	135
7	13160.0	-54.05	7.51	16.55	Horizontal	-45.01	-13.00	32.01	45
8	15040.0	-52.93	8.24	15.35	Horizontal	-45.82	-13.00	32.82	135
9	16920.0	-49.50	8.41	14.95	Horizontal	-42.96	-13.00	29.96	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.

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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	/	/

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ANNEX A: Product Change Description

Huawei Technologies Co., Ltd.

Difference Declaration Letter

Article 1: Difference description:

The difference of model AMN-LX3 is show in the below table:

	Model	**AMN-LX3**	**AMN-LX3**
		Origin	**modified**
Licensed Frequency	LTE BAND	the same	LTE B2/B4/B7/B28 duplexer Changed
	UMTS BAND	the same	WCDMA B2/B4 duplexer Changed
	GSM	the same	GSM B2 duplexer Changed
	IC	the same	the same
	Antenna	the same	the same
	Antenna tuner 4SPST	47140285	47140338
	RF conducted power	the same	the same
Unlicensed Frequency	Bluetooth	the same	the same
	2.4G Wi-Fi	the same	the same
	IC	the same	the same
	Antenna	the same	the same
Hardware	Ram / Rom	the same	the same
	Camera	the same	the same
	PCB	the same	the same
	USB Port	the same	the same
	SIM	the same	the same
Appearance	Dimension	the same	the same
	Color	the same	the same
Accessory	Battery	the same	the same
	Charger	the same	the same
	USB label	the same	the same
	Earphone	22040150	22040322

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