



RF TEST REPORT

Applicant	HMD Global Oy
FCC ID	2AJOTTA-1223
Product	mobile phone
Brand	Nokia
Model	TA-1223
Report No.	R2001A0040-R2V1
Issue Date	March 16, 2020

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

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Summary of measurement results

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

Date of Testing: January 16, 2020 ~ February 28, 2020

Note: PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.

All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

Note: This revised report (Report No.: R2001A0040-R2V1) supersedes and replaces the previously issued report (Report No.: R2001A0040-R2). Please discard or destroy the previously issued report and dispose of it accordingly.



1. Test Laboratory

1.1. Notes of the test report

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

1.2. Test facility

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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2. General Description of Equipment under Test

2.3. Applicant and Manufacturer Information

Applicant	HMD Global Oy
Applicant address	Bertel Jungin aukio 9,02600 ESPOO. FINLAND
Manufacturer	HMD Global Oy
Manufacturer address	Bertel Jungin aukio 9,02600 ESPOO. FINLAND

2.4. General information

EUT Description			
Model	TA-1223		
IMEI	IMEI 1:355795100012570 IMEI 2:355795100015342		
Hardware Version	LLDM528		
Software Version	LLDB7749		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Test Mode(s)	GSM1900; WCDMA Band II; LTE Band 2;		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA) BPSK, QPSK; (LTE)QPSK,16QAM 64QAM;		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	24		
HSUPA UE Category	6		
LTE Category	4		
Maximum E.I.R.P	GSM 1900:	30.01dBm	
	WCDMA Band II:	22.67dBm	
	LTE Band 2:	22.59dBm	
Rated Power Supply Voltage	3.8V		
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
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
EUT Accessory			
Adapter 1	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21E		
Adapter 2	Manufacturer: Jiangsu Chenyang Electron Co., Ltd.		



	Model: AD-10WE
Adapter 3	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21U
Adapter 4	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21N
Adapter 5	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21X
Adapter 6	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21A
Adapter 7	Manufacturer: DONGGUAN AOHAI POWER TECHNOLOGY CO., LTD. Model: AD-10WR
Adapter 8	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21B
Battery 1	Manufacturer: Jiade Energy Technology(Zhuhai)Co., Ltd. Model: LC-620U
Battery 2	Manufacturer: Veken Model: LC-620U
Earphone 1	Manufacturer: Huizhou New Leader Industry Co., Ltd. Model: NLD-EM300M-03SF
Earphone 2	Manufacturer: Xiaolin Electronics Model: XL-5178
USB Cable 1	Manufacturer: Xiamen Li Qi Electronics Co., Ltd. Model: LQ03500090
USB Cable 2	Manufacturer: Saibao (Jiangxi) Industrial Co. , Ltd. Model: SLQ-A125A

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

2. There is more than one Adapter, Battery, Earphone and USB Cable, each one should be applied throughout the compliance test respectively, and however, only the worst case (Adapter 1, Battery 1) will be recorded in this report.

Antenna Gain:

Band	Antenna Gain(dBi)		
	Low channel	Middle channel	High channel
GSM 1900	-1.1	-1.0	-1.0
WCDMA Band II	-1.1	-1.0	-1.0
LTE Band 2	-1.1	-1.0	-1.0



3. Applied Standards

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

Test standards:

FCC CFR 47 Part 24E (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

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

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

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

The following testing in GSM/WCDMA/LTE is set based on the maximum RF Output Power.

Test modes are chosen to be reported as the worst case configuration below:

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



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

Test items	Bandwidth (MHz)						Modulation			RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	50%	100%	L	M	H
RF Power Output and Effective Isotropic Radiated Power	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	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	-	O
Peak-to-Average Power Ratio	O	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	O
Conducted Spurious Emissions	O	O	O	O	O	O	O	-	-	O	-	-	O	O	O
Radiates Spurious Emission	O	-	O	-	-	O	O	-	-	O	-	-	-	O	-
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.														

5. Test Case Results

5.1.RF Power Output and Effective Isotropic Radiated Power

Ambient condition

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

Methods of Measurement

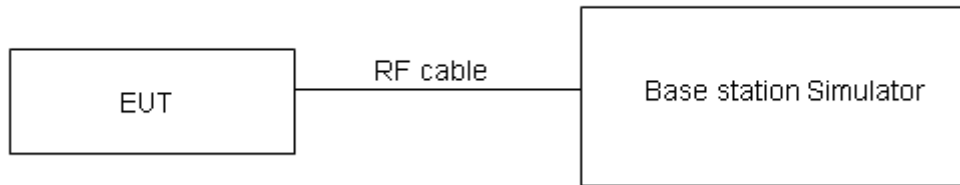
During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

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

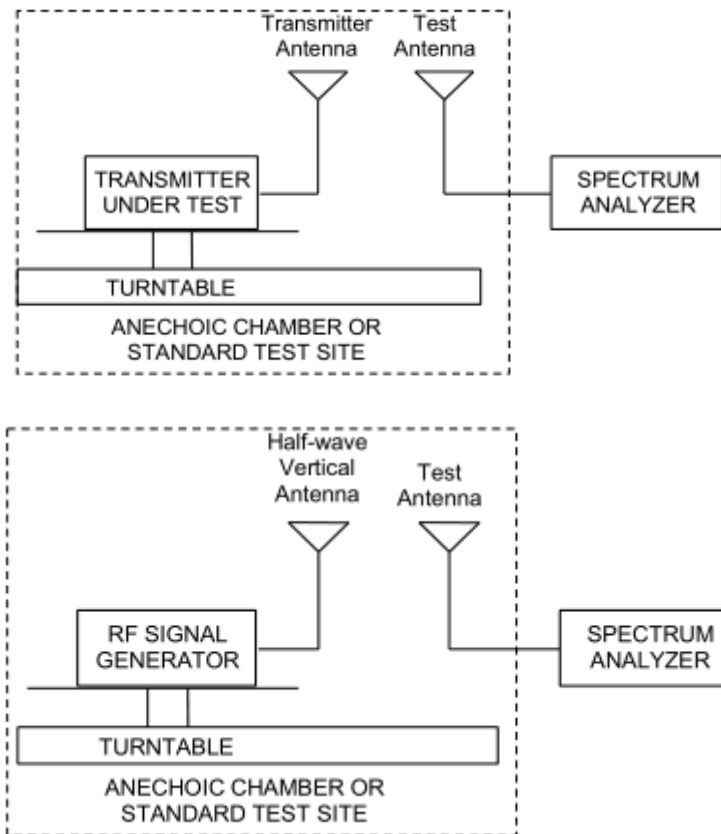
- Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
- Key the transmitter, 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).
- 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.
- Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
- The maximum ERP is the maximum value determined in the preceding step.
- When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$
where:dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

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

Test Setup



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



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 24.232(c) Mobile and portable stations are limited to 2 watts EIRP.

Rule Part 24.232(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Limit	$\leq 2 \text{ W}$ (33 dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB for RF power output, $k = 2$, $U = 1.19$ dB for EIRP.

Test Results

GSM 1900		Conducted Power (dBm)			EIRP (dBm)		
		Channel 512	Channel 661	Channel 810	Channel 512	Channel 661	Channel 810
		1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)	1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)
GSM	Results	30.89	30.85	31.01	29.79	29.85	30.01
GPRS/EGPRS (GMSK)	1TXslot	30.79	30.87	30.84	29.69	29.87	29.84
	2TXslots	30.35	30.25	30.39	29.25	29.25	29.39
	3TXslots	29.59	29.44	29.63	28.49	28.44	28.63
	4TXslots	27.91	27.85	28.04	26.81	26.85	27.04
EGPRS (8PSK)	1TXslot	27.34	27.79	27.51	26.24	26.79	26.51
	2TXslots	27.56	27.63	27.76	26.46	26.63	26.76
	3TXslots	26.62	26.74	26.68	25.52	25.74	25.68
	4TXslots	24.97	24.92	24.74	23.87	23.92	23.74

WCDMA Band II		Conducted Power (dBm)			EIRP (dBm)		
		Channel 9262	Channel 9400	Channel 9538	Channel 9262	Channel 9400	Channel 9538
		1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)	1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)
RMC	12.2k	23.67	23.67	23.62	22.57	22.67	22.62
AMR	12.2k	23.51	23.50	23.47	22.41	22.50	22.47
HSDPA	Sub - Test 1	23.09	23.09	23.04	21.99	22.09	22.04
	Sub - Test 2	23.08	23.08	23.03	21.98	22.08	22.03
	Sub - Test 3	22.57	22.57	22.52	21.47	21.57	21.52
	Sub - Test 4	22.56	22.56	22.51	21.46	21.56	21.51
HSUPA	Sub - Test 1	23.05	23.05	23.00	21.95	22.05	22.00
	Sub - Test 2	22.04	22.04	21.99	20.94	21.04	20.99
	Sub - Test 3	22.52	22.53	22.48	21.42	21.53	21.48
	Sub - Test 4	22.01	22.02	21.97	20.91	21.02	20.97
	Sub - Test 5	23.00	23.01	22.96	21.90	22.01	21.96



LTE Band 2									
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18607/ 1850.7	18900/ 1880	19193/ 1909.3	18607/ 1850.7	18900/ 1880	19193/ 1909.3
1.4MHz	QPSK	1	0	23.42	23.55	23.52	22.32	22.55	22.52
		1	2	23.44	23.55	23.47	22.34	22.55	22.47
		1	5	23.48	23.51	23.38	22.38	22.51	22.38
		3	0	23.36	23.47	23.30	22.26	22.47	22.30
		3	2	23.34	23.43	23.38	22.24	22.43	22.38
		3	3	23.33	23.44	23.27	22.23	22.44	22.27
		6	0	22.49	22.47	22.35	21.39	21.47	21.35
	16QAM	1	0	22.80	22.79	22.64	21.70	21.79	21.64
		1	2	22.78	22.73	22.58	21.68	21.73	21.58
		1	5	22.99	22.81	22.85	21.89	21.81	21.85
		3	0	22.58	22.58	22.53	21.48	21.58	21.53
		3	2	22.51	22.54	22.54	21.41	21.54	21.54
		3	3	22.56	22.57	22.42	21.46	21.57	21.42
		6	0	21.58	21.60	21.63	20.48	20.60	20.63
	64QAM	1	0	22.53	22.58	22.71	21.43	21.58	21.71
		1	2	22.76	22.78	22.66	21.66	21.78	21.66
		1	5	22.78	22.70	22.91	21.68	21.70	21.91
		3	0	22.56	22.54	22.49	21.46	21.54	21.49
		3	2	22.61	22.52	22.56	21.51	21.52	21.56
		3	3	22.54	22.60	22.47	21.44	21.60	21.47
		6	0	21.64	21.65	21.59	20.54	20.65	20.59
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18615/ 1851.5	18900/ 1880	19185/ 1908.5	18615/ 1851.5	18900/ 1880	19185/ 1908.5
3MHz	QPSK	1	0	23.44	23.59	23.55	22.34	22.59	22.55
		1	7	23.42	23.58	23.51	22.32	22.58	22.51
		1	14	23.51	23.56	23.42	22.41	22.56	22.42
		8	0	22.46	22.59	22.43	21.36	21.59	21.43
		8	4	22.46	22.53	22.50	21.36	21.53	21.50
		8	7	22.43	22.55	22.37	21.33	21.55	21.37
		15	0	22.49	22.51	22.38	21.39	21.51	21.38
	16QAM	1	0	22.83	22.81	22.67	21.73	21.81	21.67
		1	7	22.81	22.73	22.62	21.71	21.73	21.62
		1	14	23.01	22.85	22.88	21.91	21.85	21.88
8		0	21.69	21.71	21.65	20.59	20.71	20.65	
8		4	21.62	21.67	21.66	20.52	20.67	20.66	



		8	7	21.66	21.69	21.55	20.56	20.69	20.55
		15	0	21.61	21.64	21.66	20.51	20.64	20.66
	64QAM	1	0	22.56	22.60	22.74	21.46	21.60	21.74
		1	7	22.79	22.78	22.68	21.69	21.78	21.68
		1	14	22.80	22.69	22.94	21.70	21.69	21.94
		8	0	21.67	21.67	21.61	20.57	20.67	20.61
		8	4	21.72	21.65	21.68	20.62	20.65	20.68
		8	7	21.64	21.72	21.60	20.54	20.72	20.60
		15	0	21.67	21.69	21.62	20.57	20.69	20.62
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18625/ 1852.5	18900/ 1880	19175/ 1907.5	18625/ 1852.5	18900/ 1880	19175/ 1907.5
5MHz	QPSK	1	0	23.41	23.57	23.51	22.31	22.57	22.51
		1	13	23.40	23.54	23.48	22.30	22.54	22.48
		1	24	23.48	23.51	23.38	22.38	22.51	22.38
		12	0	22.43	22.54	22.39	21.33	21.54	21.39
		12	6	22.44	22.49	22.45	21.34	21.49	21.45
		12	13	22.41	22.53	22.33	21.31	21.53	21.33
		25	0	22.49	22.50	22.36	21.39	21.50	21.36
	16QAM	1	0	22.80	22.77	22.64	21.70	21.77	21.64
		1	13	22.78	22.71	22.59	21.68	21.71	21.59
		1	24	22.98	22.83	22.84	21.88	21.83	21.84
		12	0	21.67	21.67	21.62	20.57	20.67	20.62
		12	6	21.59	21.62	21.62	20.49	20.62	20.62
		12	13	21.63	21.64	21.51	20.53	20.64	20.51
		25	0	21.59	21.60	21.61	20.49	20.60	20.61
	64QAM	1	0	22.53	22.60	22.71	21.43	21.60	21.71
		1	13	22.76	22.80	22.65	21.66	21.80	21.65
		1	24	22.81	22.67	22.90	21.71	21.67	21.90
		12	0	21.65	21.63	21.62	20.55	20.63	20.62
		12	6	21.69	21.60	21.64	20.59	20.60	20.64
		12	13	21.61	21.67	21.56	20.51	20.67	20.56
		25	0	21.65	21.65	21.57	20.55	20.65	20.57
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18650/ 1855	18900/ 1880	19150/ 1905	18650/ 1855	18900/ 1880	19150/ 1905
10MHz	QPSK	1	0	23.43	23.58	23.54	22.33	22.58	22.54
		1	25	23.43	23.59	23.52	22.33	22.59	22.52
		1	49	23.50	23.55	23.41	22.40	22.55	22.41
		25	0	22.46	22.59	22.43	21.36	21.59	21.43
		25	13	22.47	22.54	22.49	21.37	21.54	21.49



		25	25	22.43	22.57	22.38	21.33	21.57	21.38
		50	0	22.53	22.52	22.40	21.43	21.52	21.40
	16QAM	1	0	22.82	22.80	22.66	21.72	21.80	21.66
		1	25	22.81	22.75	22.62	21.71	21.75	21.62
		1	49	23.01	22.85	22.87	21.91	21.85	21.87
		25	0	21.70	21.72	21.66	20.60	20.72	20.66
		25	13	21.61	21.66	21.65	20.51	20.66	20.65
		25	25	21.66	21.69	21.55	20.56	20.69	20.55
		50	0	21.62	21.65	21.65	20.52	20.65	20.65
		64QAM	1	0	22.55	22.59	22.73	21.45	21.59
	1		25	22.79	22.80	22.68	21.69	21.80	21.68
	1		49	22.80	22.69	22.93	21.70	21.69	21.93
	25		0	21.68	21.68	21.62	20.58	20.68	20.62
	25		13	21.71	21.64	21.67	20.61	20.64	20.67
	25		25	21.64	21.72	21.60	20.54	20.72	20.60
	50		0	21.68	21.70	21.61	20.58	20.70	20.61
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18675/ 1857.5	18900/ 1880	19125/ 1902.5	18675/ 1857.5	18900/ 1880	19125/ 1902.5
15MHz	QPSK	1	0	23.42	23.54	23.52	22.32	22.54	22.52
		1	38	23.41	23.58	23.49	22.31	22.58	22.49
		1	74	23.47	23.50	23.37	22.37	22.50	22.37
		36	0	22.44	22.55	22.40	21.34	21.55	21.40
		36	18	22.44	22.49	22.45	21.34	21.49	21.45
		36	39	22.40	22.54	22.34	21.30	21.54	21.34
		75	0	22.51	22.48	22.35	21.41	21.48	21.35
	16QAM	1	0	22.77	22.78	22.64	21.67	21.78	21.64
		1	38	22.79	22.72	22.60	21.69	21.72	21.60
		1	74	22.98	22.81	22.84	21.88	21.81	21.84
		36	0	21.67	21.70	21.63	20.57	20.70	20.63
		36	18	21.58	21.61	21.61	20.48	20.61	20.61
		36	39	21.64	21.65	21.52	20.54	20.65	20.52
		75	0	21.59	21.60	21.61	20.49	20.60	20.61
	64QAM	1	0	22.50	22.57	22.71	21.40	21.57	21.71
		1	38	22.77	22.77	22.66	21.67	21.77	21.66
		1	74	22.81	22.68	22.94	21.71	21.68	21.94
		36	0	21.67	21.70	21.63	20.57	20.70	20.63
		36	18	21.69	21.61	21.66	20.59	20.61	20.66
		36	39	21.62	21.68	21.57	20.52	20.68	20.57
		75	0	21.65	21.65	21.57	20.55	20.65	20.57
Bandwidth	Modulation	RB allocation	offset	Conducted Power (dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					



				18700/ 1860	18900/ 1880	19100/ 1900	18700/ 1860	18900/ 1880	19100/ 1900
20MHz	QPSK	1	0	23.39	23.50	23.49	22.29	22.50	22.49
		1	50	23.40	23.54	23.47	22.30	22.54	22.47
		1	99	23.45	23.49	23.34	22.35	22.49	22.34
		50	0	22.41	22.50	22.36	21.31	21.50	21.36
		50	25	22.42	22.45	22.42	21.32	21.45	21.42
		50	50	22.37	22.49	22.30	21.27	21.49	21.30
		100	0	22.48	22.43	22.31	21.38	21.43	21.31
	16QAM	1	0	22.84	22.74	22.59	21.74	21.74	21.59
		1	50	22.75	22.70	22.56	21.65	21.70	21.56
		1	99	22.96	22.78	22.82	21.86	21.78	21.82
		50	0	21.64	21.66	21.60	20.54	20.66	20.60
		50	25	21.55	21.59	21.58	20.45	20.59	20.58
		50	50	21.61	21.60	21.48	20.51	20.60	20.48
		100	0	21.57	21.56	21.58	20.47	20.56	20.58
	64QAM	1	0	22.48	22.53	22.66	21.38	21.53	21.66
		1	50	22.73	22.75	22.62	21.63	21.75	21.62
		1	99	22.75	22.62	22.88	21.65	21.62	21.88
		50	0	21.62	21.62	21.56	20.52	20.62	20.56
		50	25	21.65	21.57	21.60	20.55	20.57	20.60
		50	50	21.59	21.63	21.53	20.49	20.63	20.53
		100	0	21.63	21.61	21.54	20.53	20.61	20.54

5.2.Occupied Bandwidth

Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 3kHz, VBW is set to 10kHz for GSM 1900,

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

RBW is set to 30 kHz, VBW is set to 91kHz for LTE Band 2 (1.4MHz),

RBW is set to 62 kHz, VBW is set to 180 kHz for LTE Band 2 (3MHz),

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

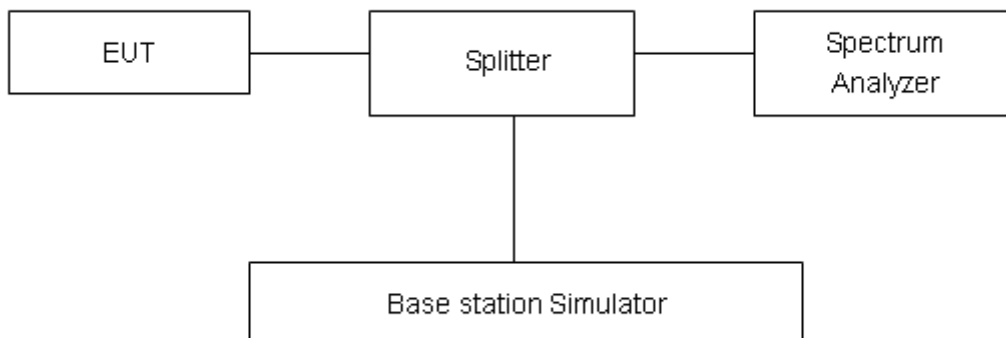
RBW is set to 200 kHz, VBW is set to 620kHz for LTE Band 2 (10MHz),

RBW is set to 300kHz,VBW is set to 910kHz for LTE Band 2 (15MHz).

RBW is set to 430kHz,VBW is set to 1.2MHz for LTE Band 2 (20MHz).

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

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

Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GSM)	512	1850.2	0.24718	0.3135
	661	1880.0	0.24673	0.3097
	810	1909.8	0.24679	0.3126
GPRS 1900 (GMSK)	512	1850.2	0.24141	0.3133
	661	1880.0	0.24457	0.3155
	810	1909.8	0.24327	0.3073
EGPRS 1900 (8-PSK)	512	1850.2	0.24736	0.3076
	661	1880.0	0.24626	0.3035
	810	1909.8	0.24252	0.3015
WCDMA Band II (RMC)	9262	1852.4	4.1255	4.702
	9400	1880	4.1417	4.699
	9538	1907.6	4.1372	4.687

LTE Band 2						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	18607	1850.7	1.0913	1.234
			18900	1880	1.0922	1.239
			19193	1909.3	1.0928	1.241
		3	18615	1851.5	2.7117	3.043
			18900	1880	2.7146	2.979
			19185	1908.5	2.7073	3.032
		5	18625	1852.5	4.5086	4.930
			18900	1880	4.5079	5.005
			19175	1907.5	4.5069	4.968
		10	18650	1855	8.9929	9.715
			18900	1880	8.9765	9.701
			19150	1905	8.9770	9.857
		15	18675	1857.5	13.4460	14.470
			18900	1880	13.4310	14.570
			19125	1902.5	13.4610	14.530



		20	18700	1860	17.8730	19.440
			18900	1880	17.9660	19.420
			19100	1900	17.9400	19.560
	16QAM	1.4	18607	1850.7	1.0912	1.234
			18900	1880	1.0953	1.238
			19193	1909.3	1.0883	1.219
		3	18615	1851.5	2.7002	2.978
			18900	1880	2.7006	3.004
			19185	1908.5	2.7028	3.023
		5	18625	1852.5	4.5006	4.970
			18900	1880	4.5128	4.901
			19175	1907.5	4.5250	4.967
		10	18650	1855	8.9945	9.789
			18900	1880	8.9958	9.690
			19150	1905	9.0109	9.823
		15	18675	1857.5	13.4380	14.480
			18900	1880	13.4880	14.540
			19125	1902.5	13.4840	14.430
		20	18700	1860	17.8330	19.280
			18900	1880	17.9790	19.580
			19100	1900	17.9150	19.260
	64QAM	1.4	18607	1850.7	1.0918	1.234
			18900	1880	1.0945	1.236
			19193	1909.3	1.0871	1.223
		3	18615	1851.5	2.6932	3.006
			18900	1880	2.7082	2.992
			19185	1908.5	2.7052	2.995
		5	18625	1852.5	4.5008	4.972
			18900	1880	4.5394	4.974
			19175	1907.5	4.5075	4.962
		10	18650	1855	8.9965	9.769
			18900	1880	8.9953	9.757
			19150	1905	8.9949	9.740
		15	18675	1857.5	13.4380	14.650
			18900	1880	13.5080	14.640
			19125	1902.5	13.5020	14.450
		20	18700	1860	17.9400	19.120
			18900	1880	17.9850	19.360
			19100	1900	17.9350	19.230

GSM1900 GSM CH-Low



GSM1900 GPRS CH-Low



GSM 1900 GSM CH-Middle



GSM 1900 GPRS CH-Middle



GSM 1900 GSM CH-High



GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



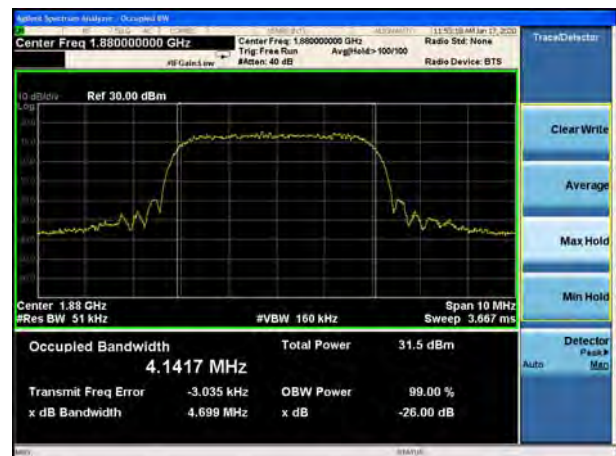
WCDMA Band II RMC CH-LOW



GSM 1900 EGPRS CH-Middle



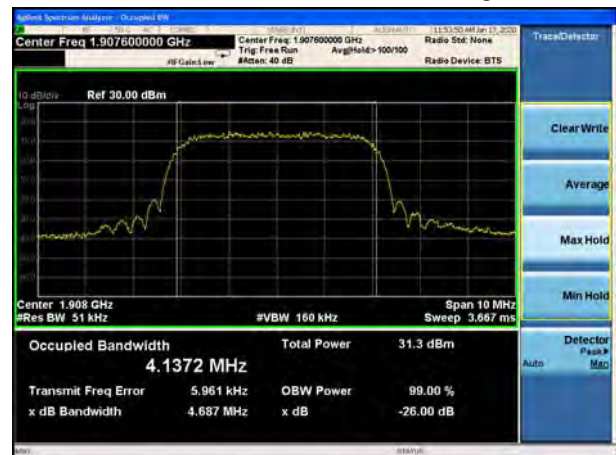
WCDMA Band II RMC CH-Middle



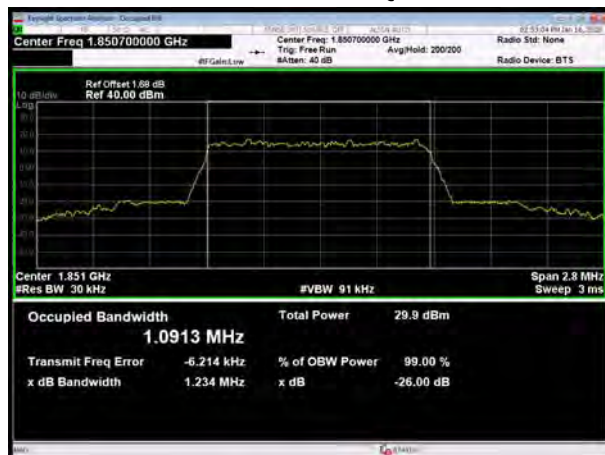
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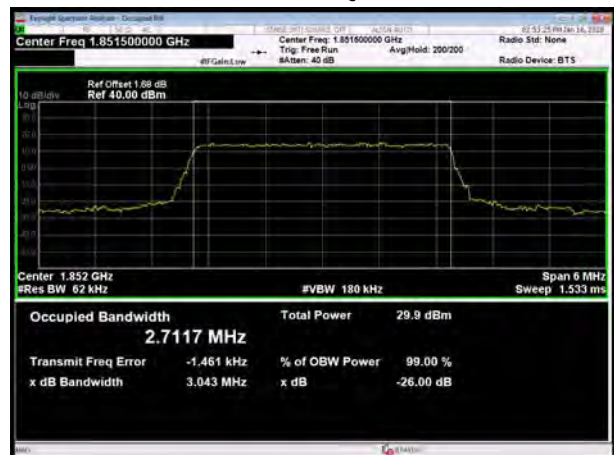
WCDMA Band II RMC CH-High



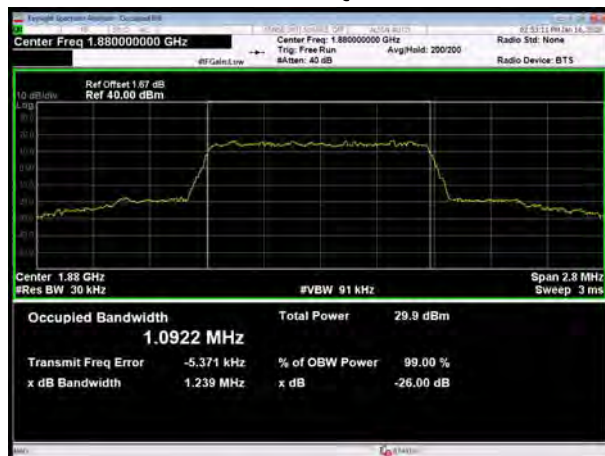
LTE Band 2 1.4MHz QPSK CH-Low



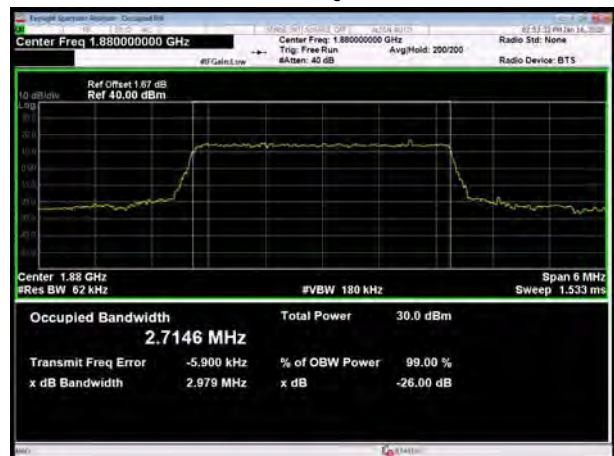
LTE Band 2 3MHz QPSK CH-Low



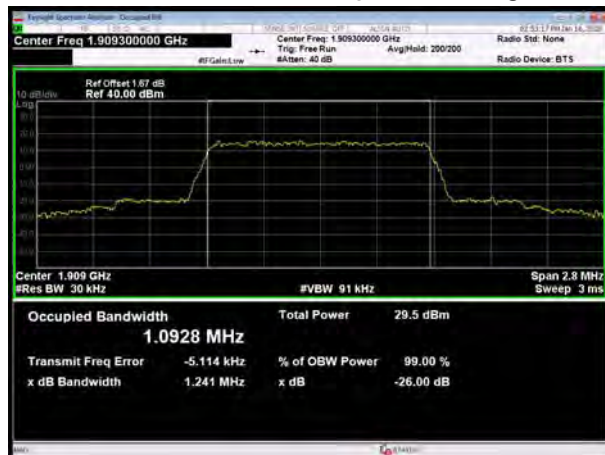
LTE Band 2 1.4MHz QPSK CH-Middle



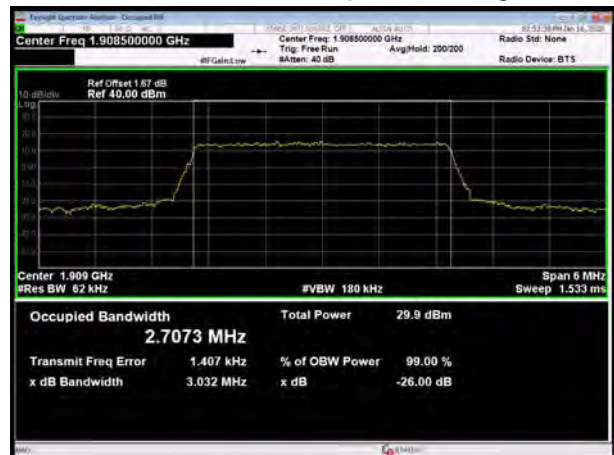
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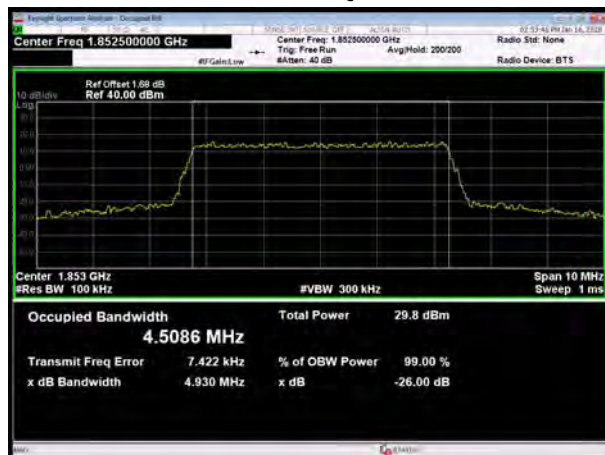
LTE Band 2 1.4MHz QPSK CH-High



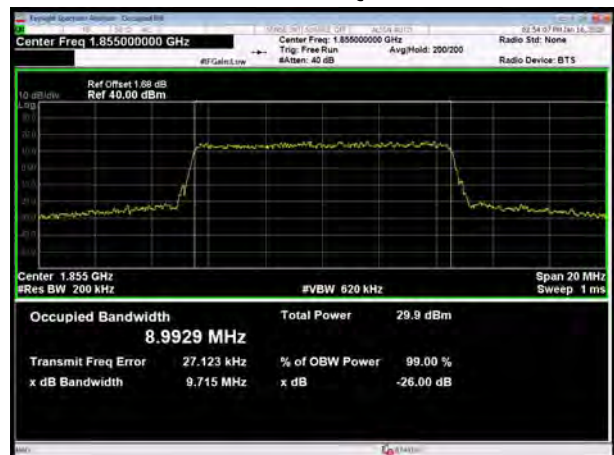
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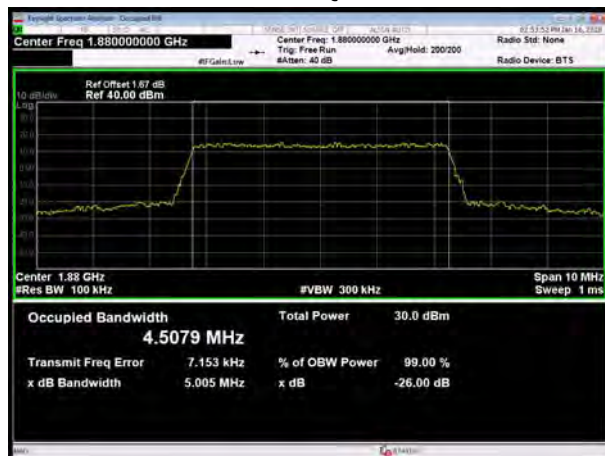
LTE Band 2 5MHz QPSK CH-Low



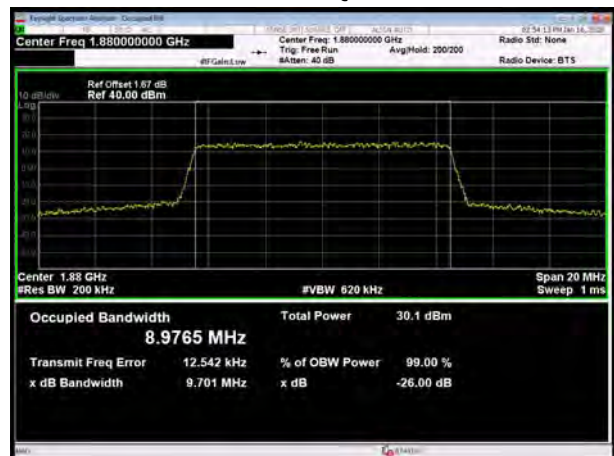
LTE Band 2 10MHz QPSK CH-Low



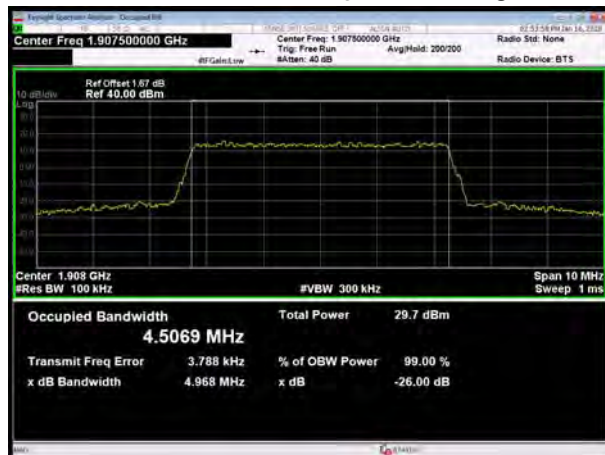
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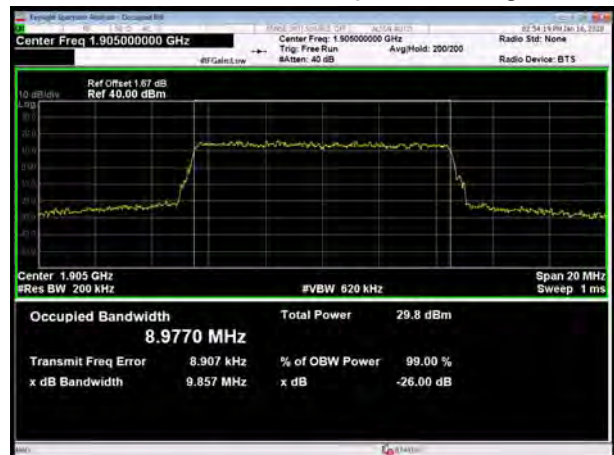
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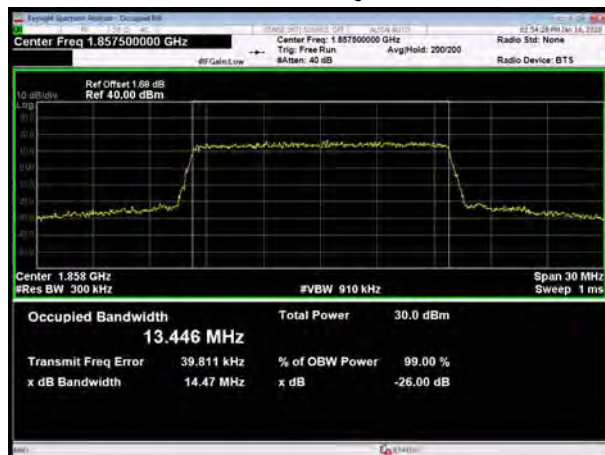
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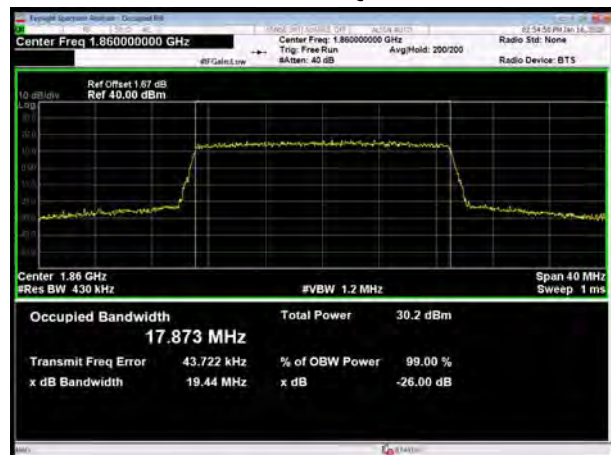
LTE Band 2 10MHz QPSK CH-High



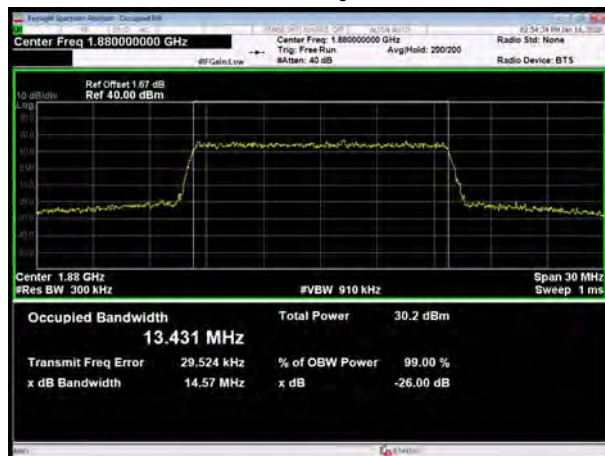
LTE Band 2 15MHz QPSK CH-Low



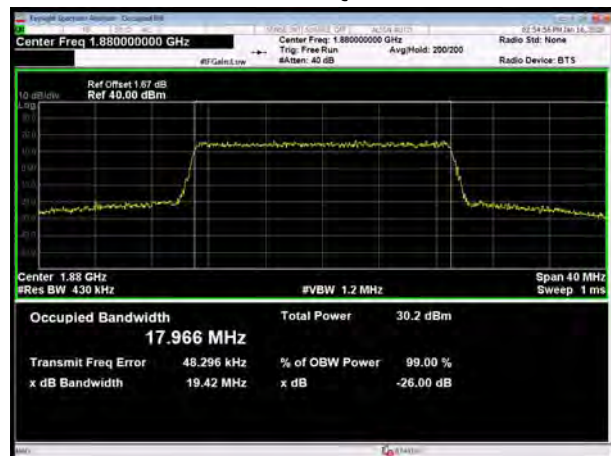
LTE Band 2 20MHz QPSK CH-Low



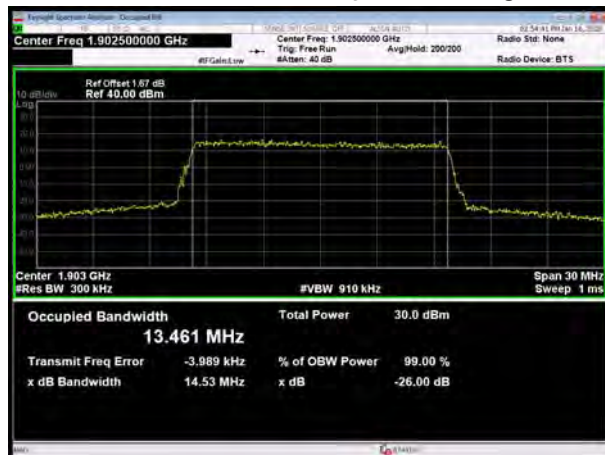
LTE Band 2 15MHz QPSK CH-Middle



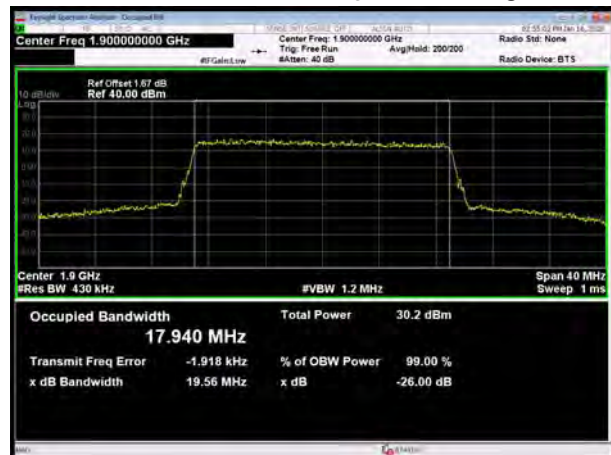
LTE Band 2 20MHz QPSK CH-Middle



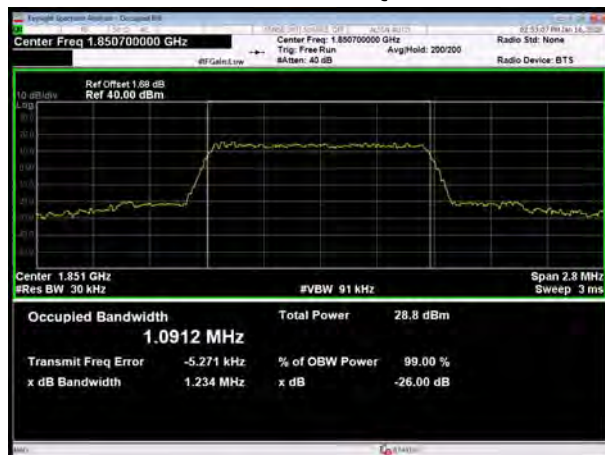
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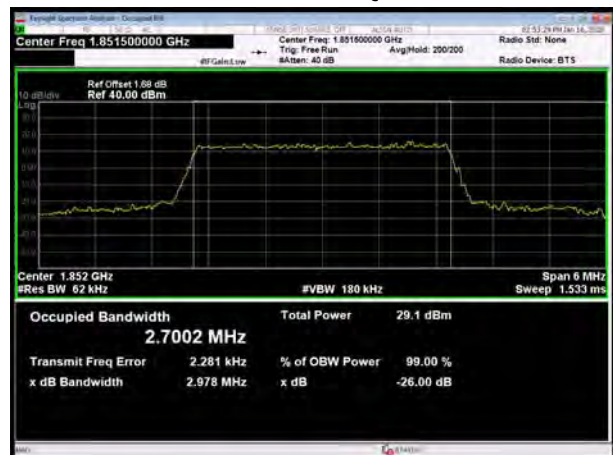
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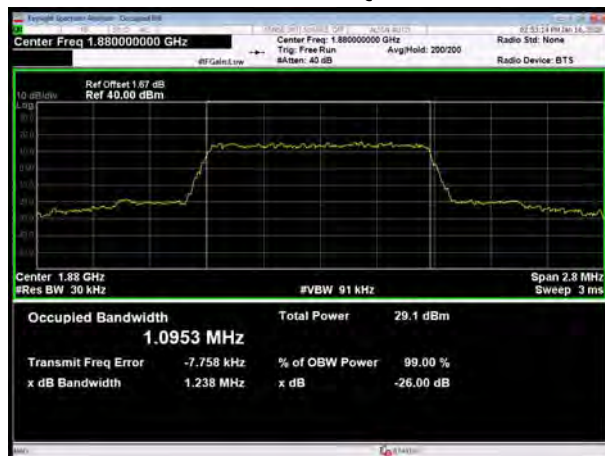
LTE Band 2 1.4MHz 16QAM CH-Low



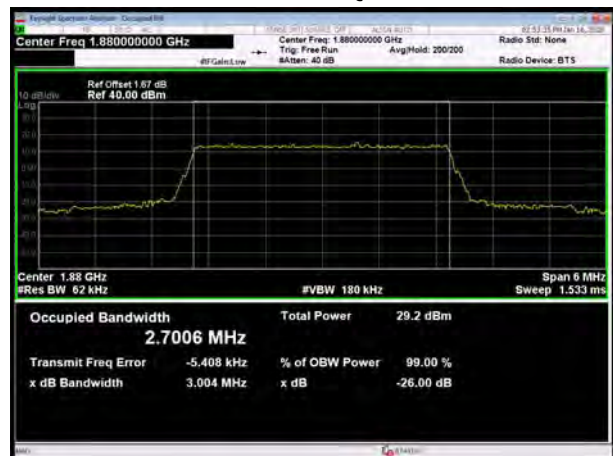
LTE Band 2 3MHz 16QAM CH-Low



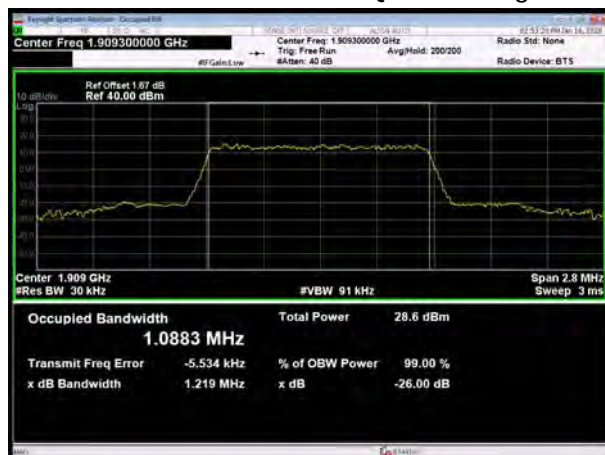
LTE Band 2 1.4MHz 16QAM CH-Middle



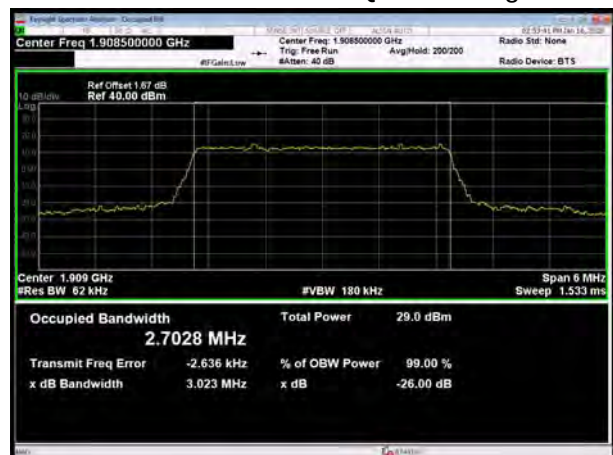
LTE Band 2 3MHz 16QAM CH-Middle



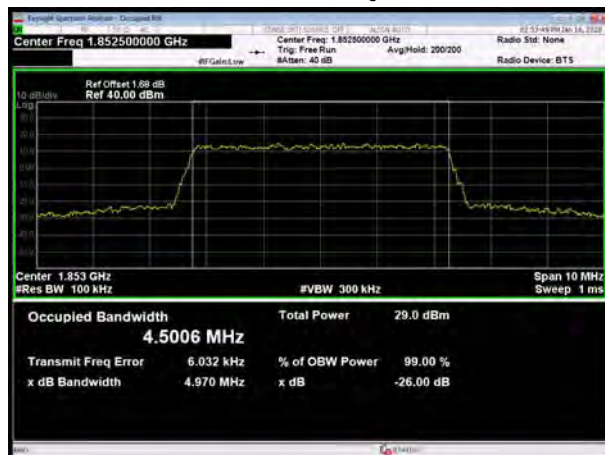
LTE Band 2 1.4MHz 16QAM CH-High



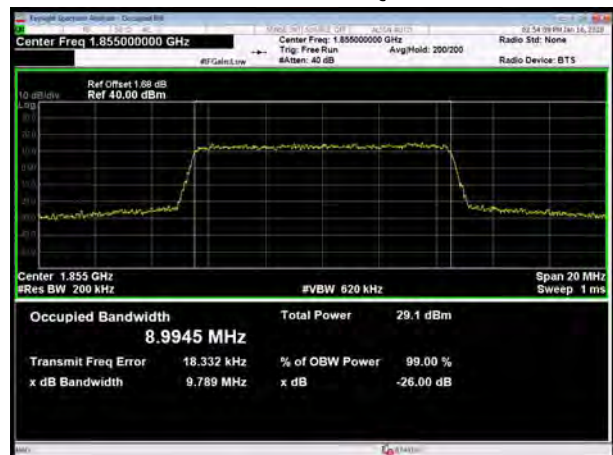
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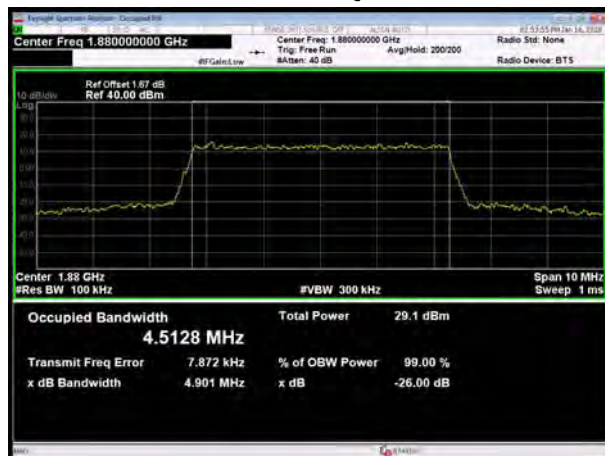
LTE Band 2 5MHz 16QAM CH-Low



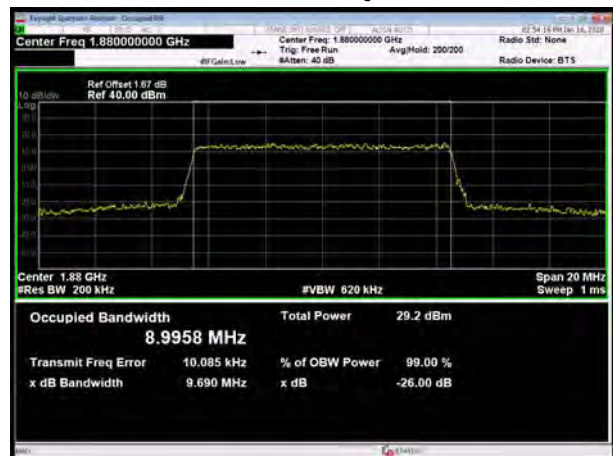
LTE Band 2 10MHz 16QAM CH-Low



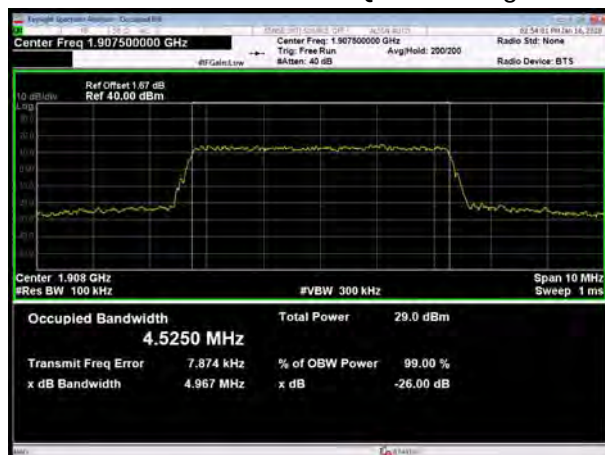
LTE Band 2 5MHz 16QAM CH-Middle



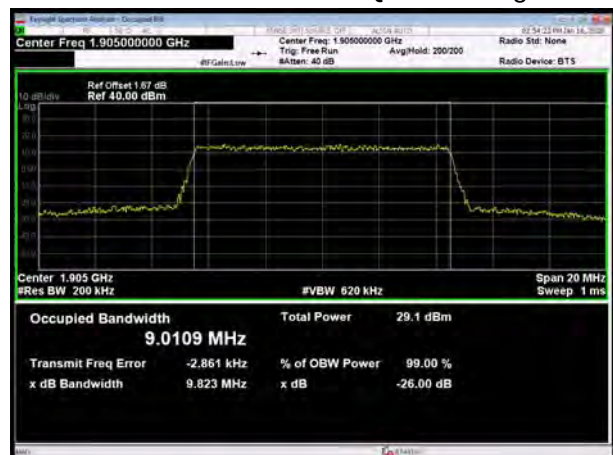
LTE Band 2 10MHz 16QAM CH-Middle



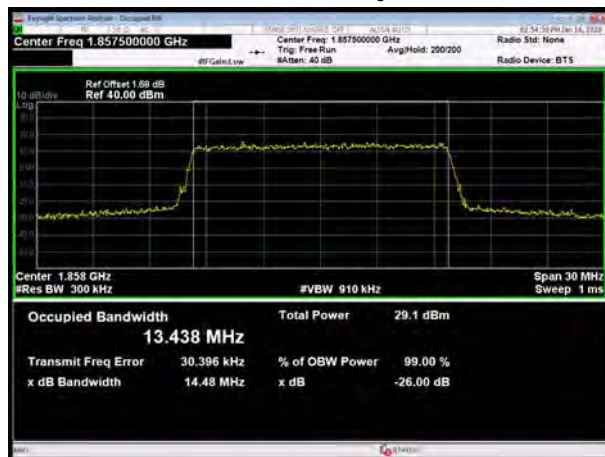
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LTE Band 2 10MHz 16QAM CH-High



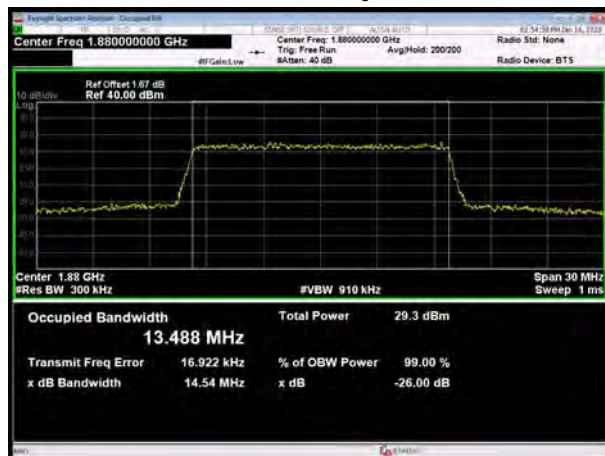
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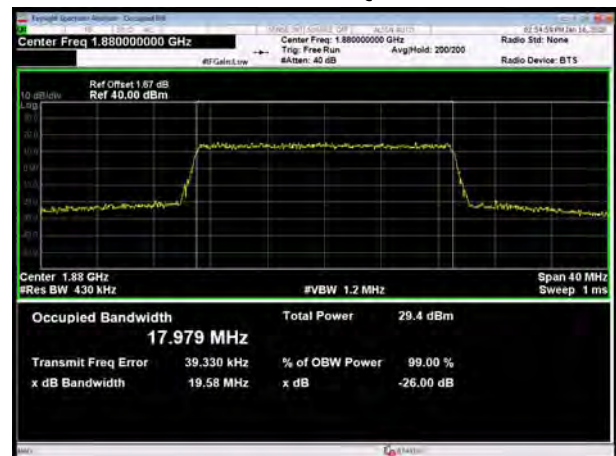
LTE Band 2 20MHz 16QAM CH-Low



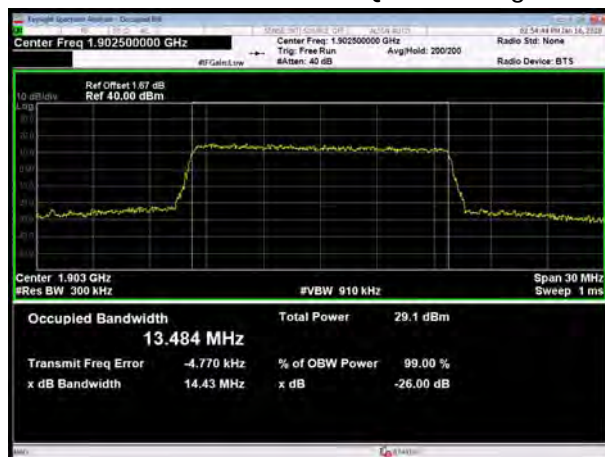
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LTE Band 2 20MHz 16QAM CH-Middle



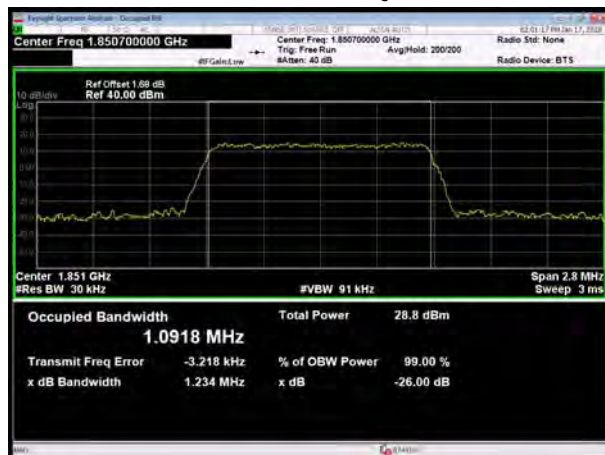
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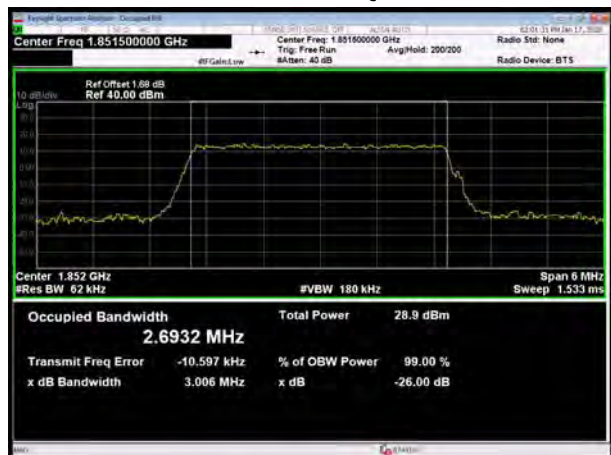
LTE Band 2 20MHz 16QAM CH-High



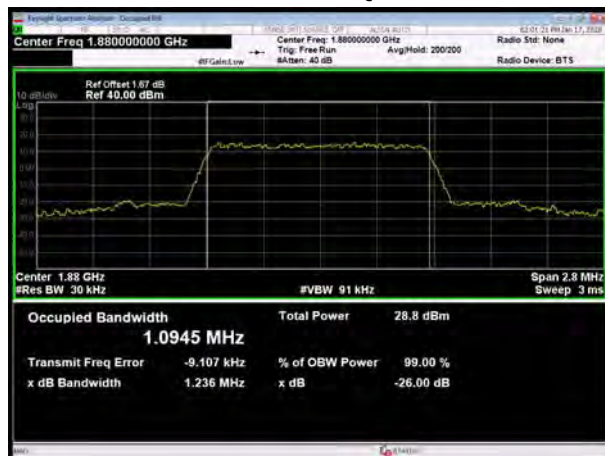
LTE Band 2 1.4MHz 64QAM CH-Low



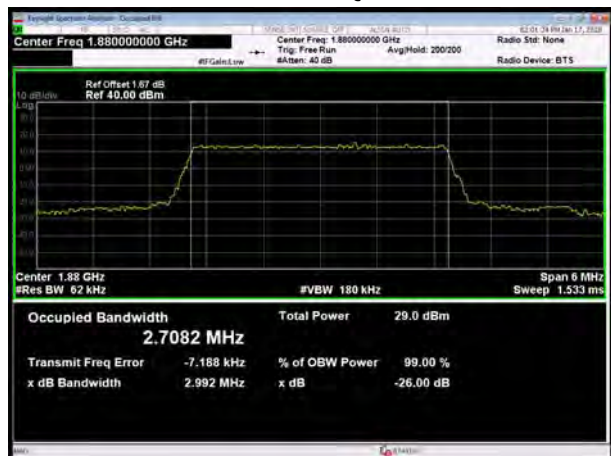
LTE Band 2 3MHz 64QAM CH-Low



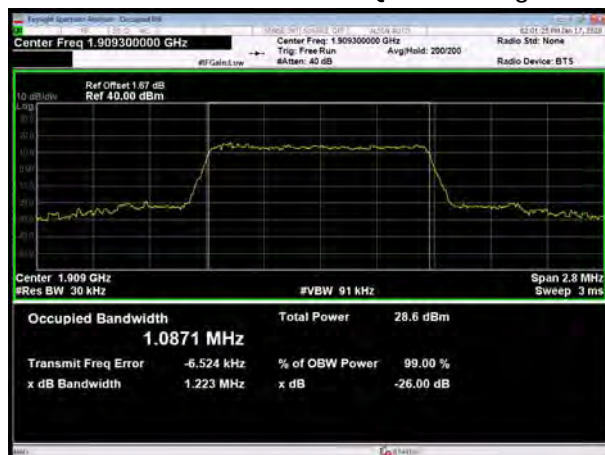
LTE Band 2 1.4MHz 64QAM CH-Middle



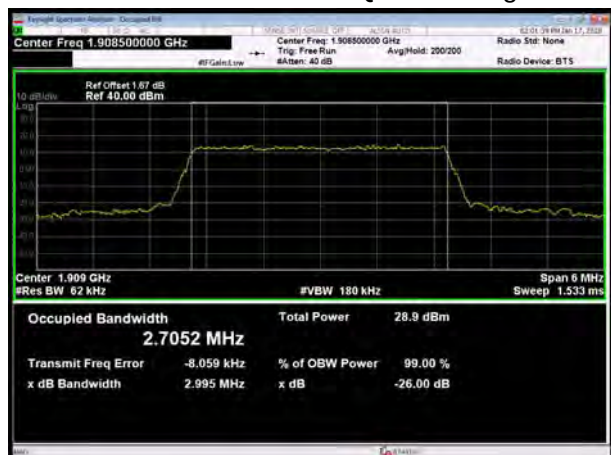
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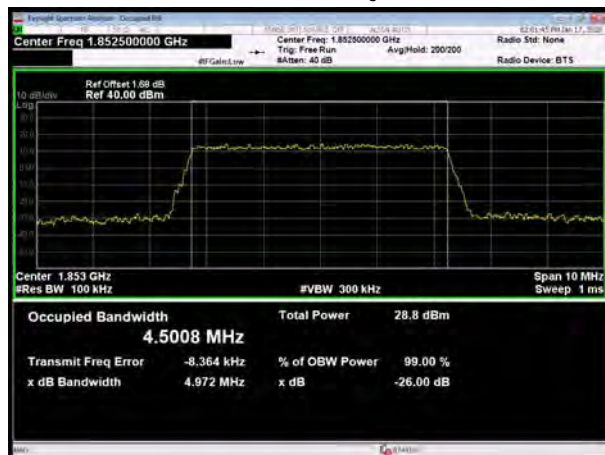
LTE Band 2 1.4MHz 64QAM CH-High



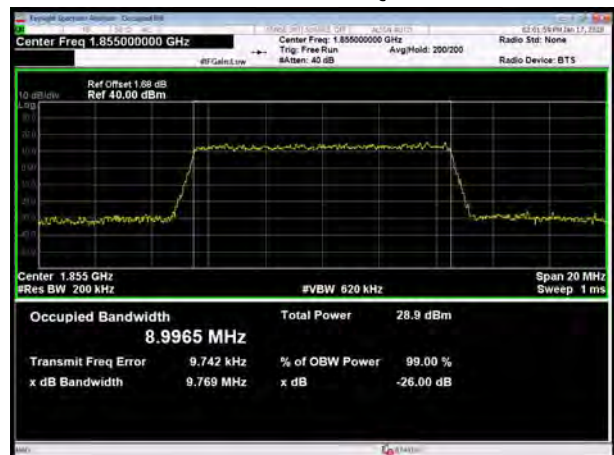
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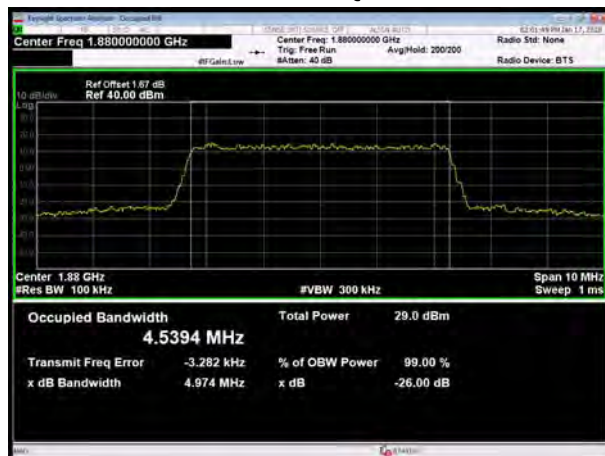
LTE Band 2 5MHz 64QAM CH-Low



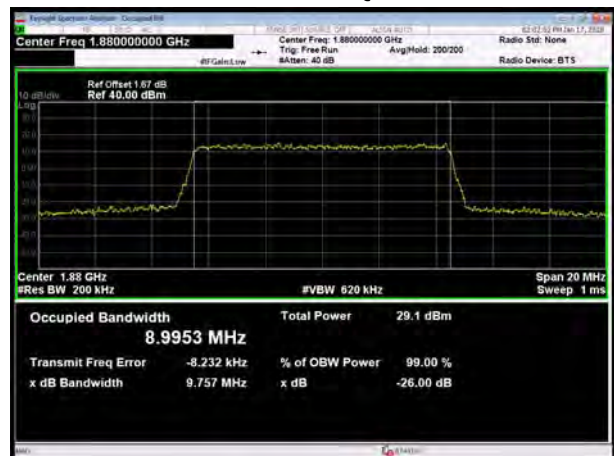
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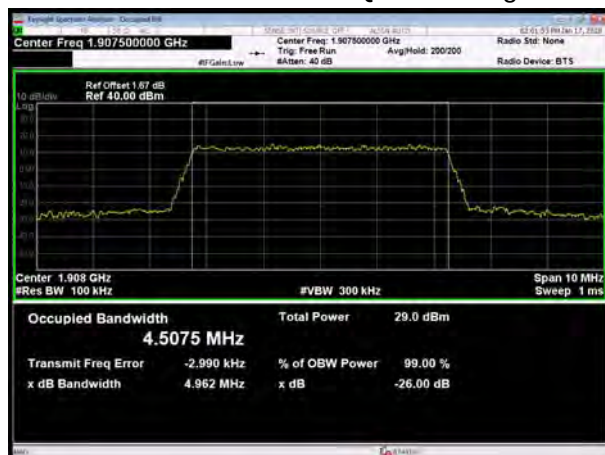
LTE Band 2 5MHz 64QAM CH-Middle



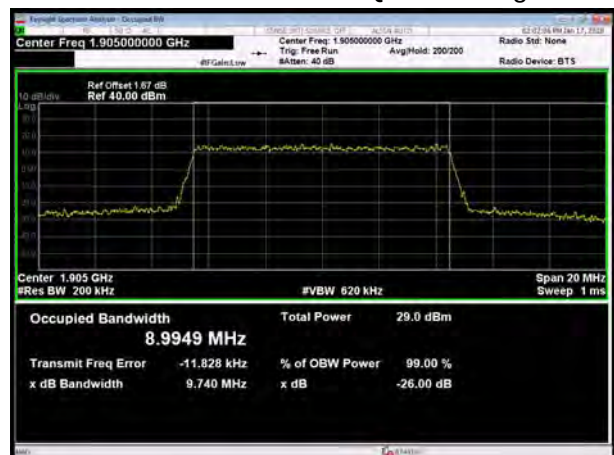
LTE Band 2 10MHz 64QAM CH-Middle



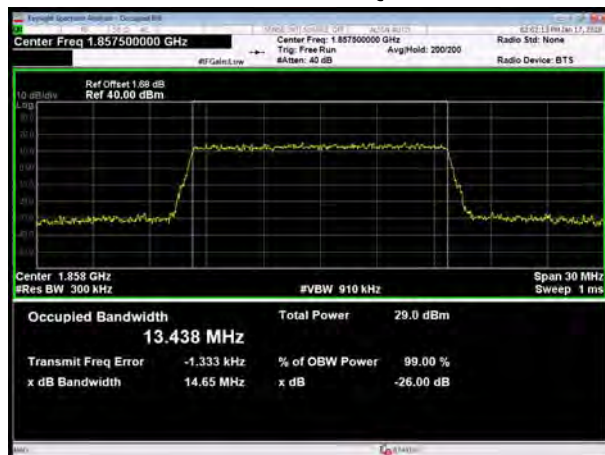
LTE Band 2 5MHz 64QAM CH-High



LTE Band 2 10MHz 64QAM CH-High



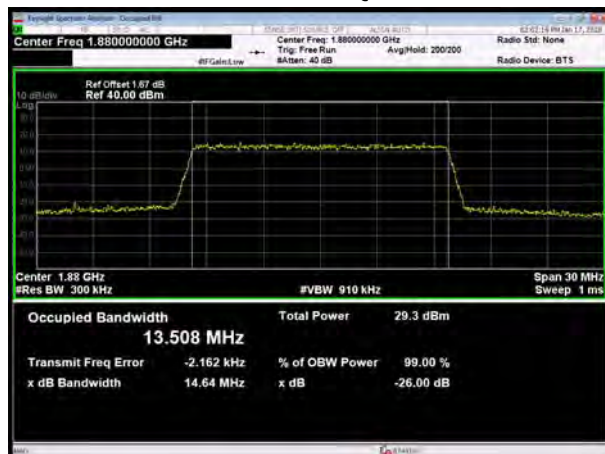
LTE Band 2 15MHz 64QAM CH-Low



LTE Band 2 20MHz 64QAM CH-Low



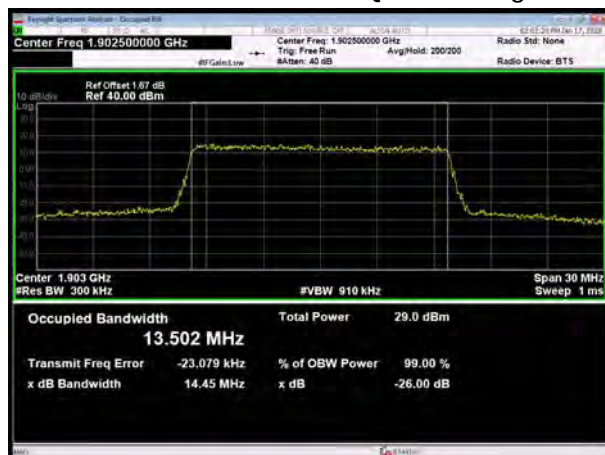
LTE Band 2 15MHz 64QAM CH-Middle



LTE Band 2 20MHz 64QAM CH-Middle



LTE Band 2 15MHz 64QAM CH-High



LTE Band 2 20MHz 64QAM CH-High



5.3.Band Edge Compliance

Ambient condition

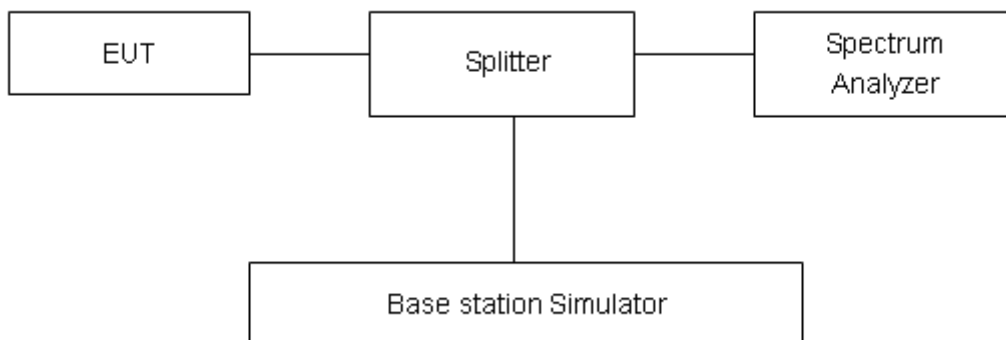
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

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

Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

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

Limit	-13 dBm
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Measurement Uncertainty

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



with the coverage factor $k = 1.96$, $U=0.684\text{dB}$.

Test Result:

GSM1900 GSM CH-Low



GSM 1900 GSM CH-High



GSM1900 GPRS CH-Low



GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



GSM 1900 EGPRS CH-High



WCDMA Band II RMC CH-Low



WCDMA Band II RMC CH-High



LTE Band 2 1.4MHz QPSK 1RB CH-Low



LTE Band 2 1.4MHz QPSK 1RB CH-High



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



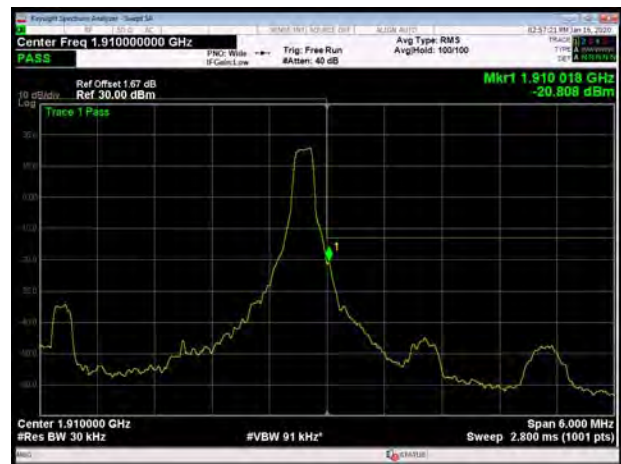
LTE Band 2 1.4MHz QPSK 100%RB CH-High



LTE Band 2 3MHz QPSK 1RB CH-Low



LTE Band 2 3MHz QPSK 1RB CH-High



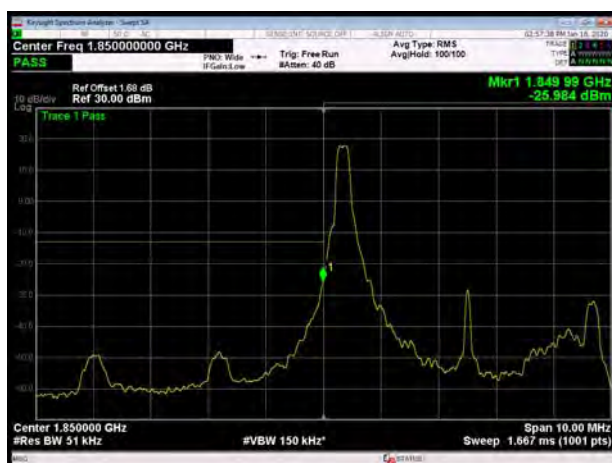
LTE Band 2 3MHz QPSK 100%RB CH-Low



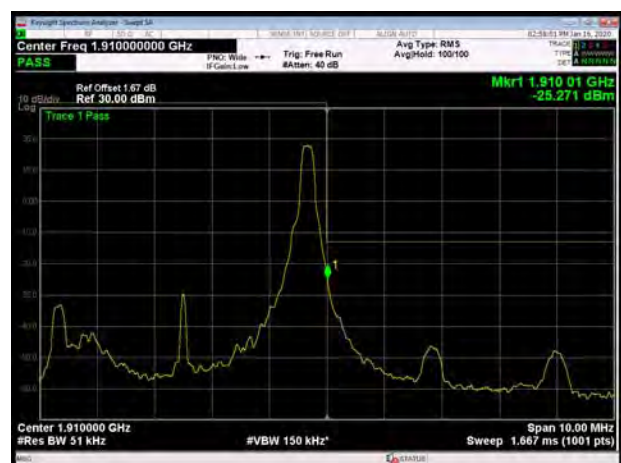
LTE Band 2 3MHz QPSK 100%RB CH-High



LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High



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



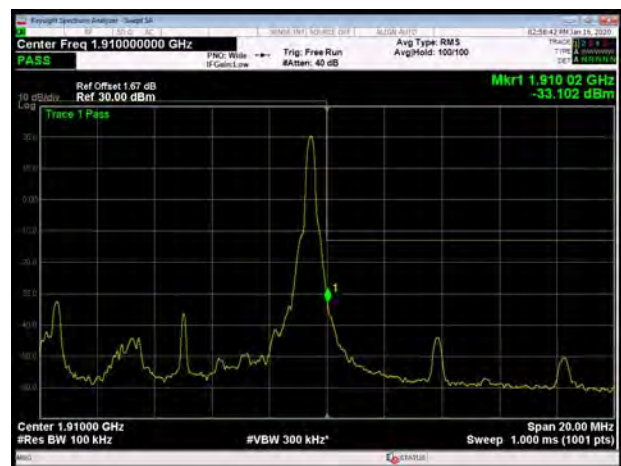
LTE Band 2 5MHz QPSK 100%RB CH-High



LTE Band 2 10MHz QPSK 1RB CH-Low



LTE Band 2 10MHz QPSK 1RB CH-High



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



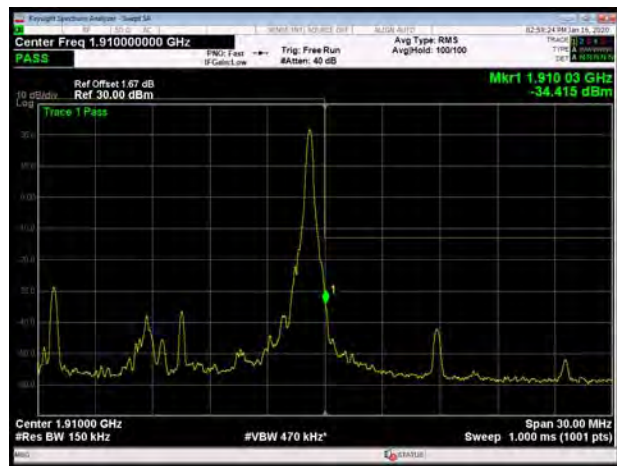
LTE Band 2 10MHz QPSK 100%RB CH-High



LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High



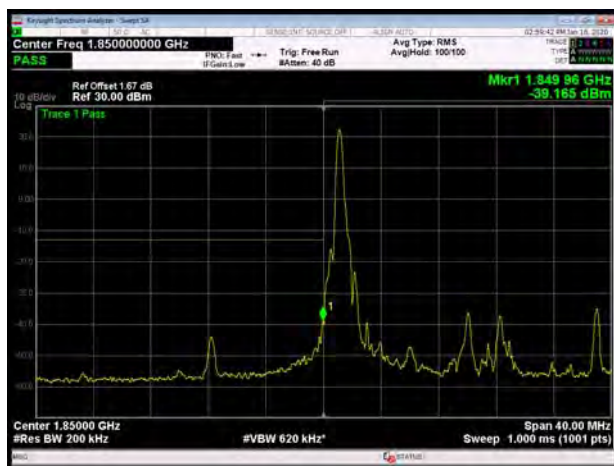
LTE Band 2 15MHz QPSK 100%RB CH-Low



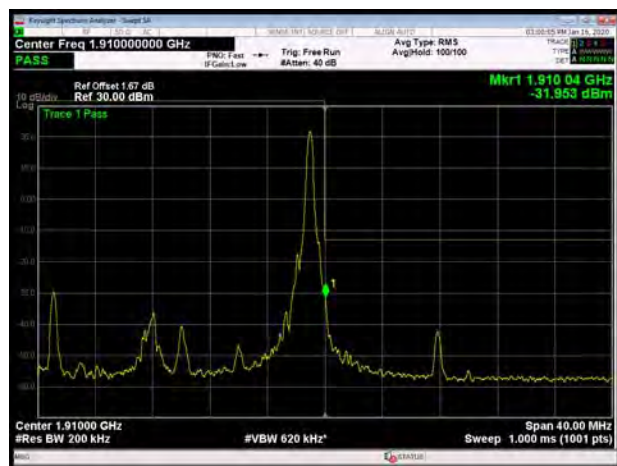
LTE Band 2 15MHz QPSK 100%RB CH-High



LTE Band 2 20MHz QPSK 1RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High



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



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



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



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



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



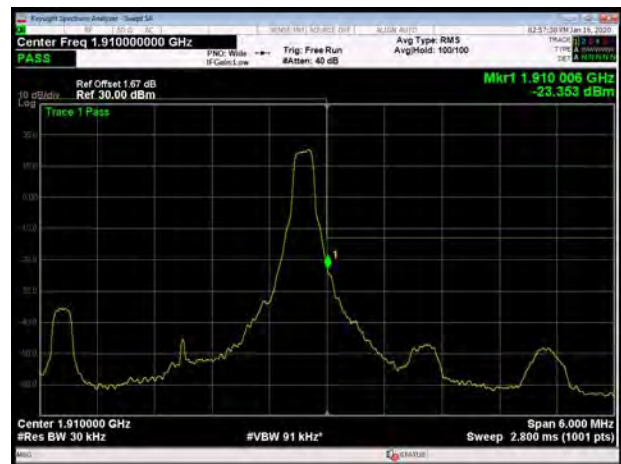
LTE Band 2 1.4MHz 16QAM 100%RB CH-High



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



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



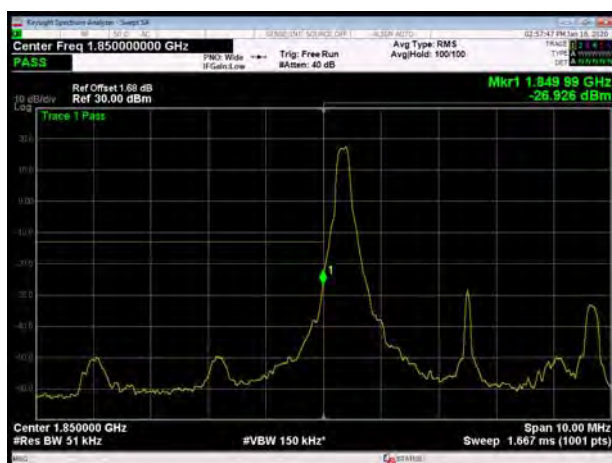
LTE Band 2 3MHz 16QAM 100%RB CH-Low



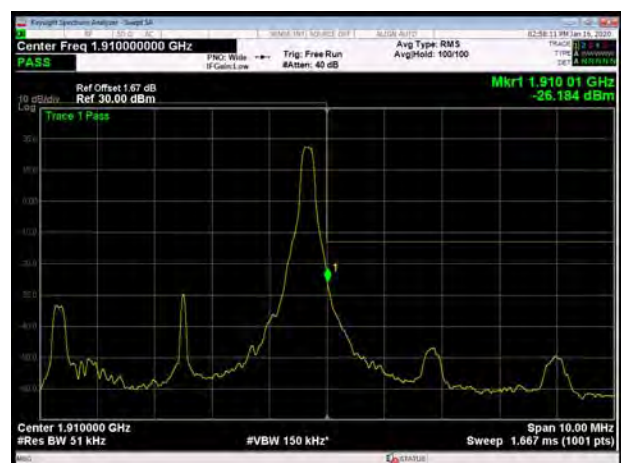
LTE Band 2 3MHz 16QAM 100%RB CH-High



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



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



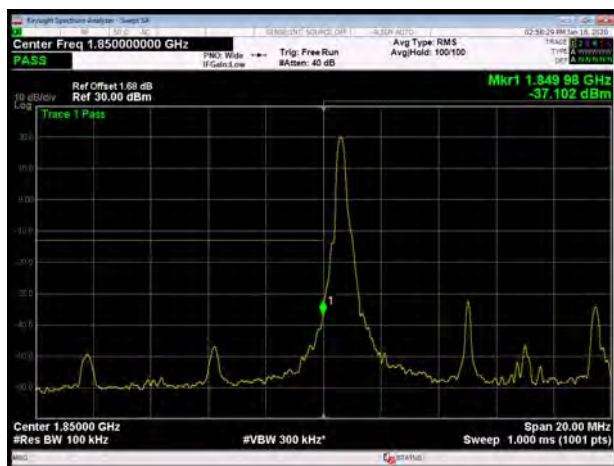
LTE Band 2 5MHz 16QAM 100%RB CH-Low



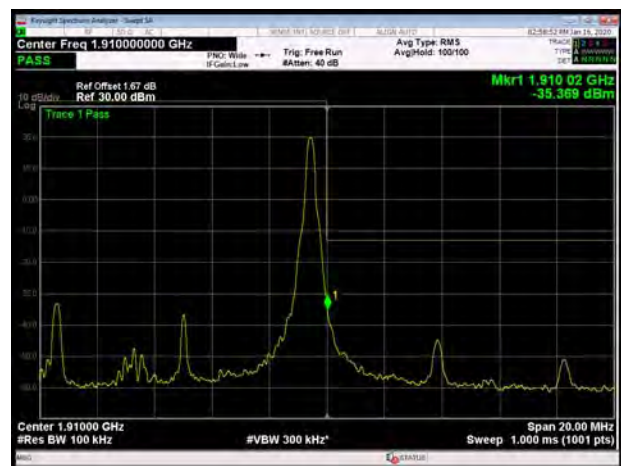
LTE Band 2 5MHz 16QAM 100%RB CH-High



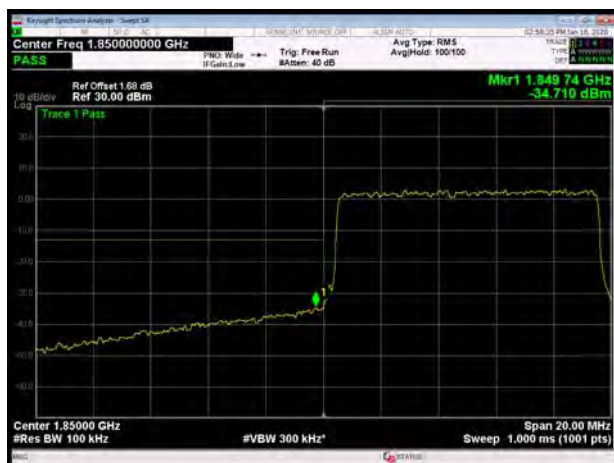
LTE Band 2 10MHz 16QAM 1RB CH-Low



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



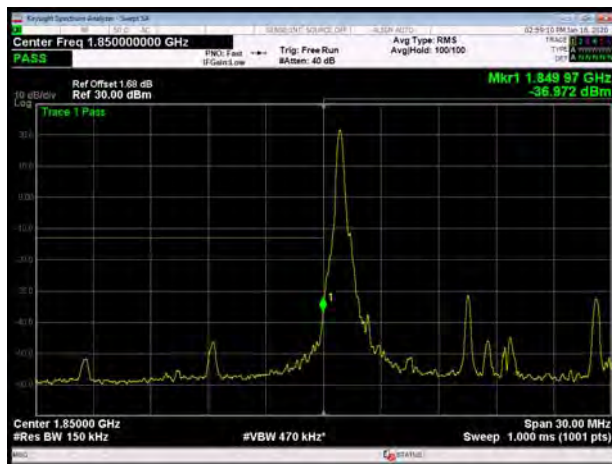
LTE Band 2 10MHz 16QAM 100%RB CH-Low



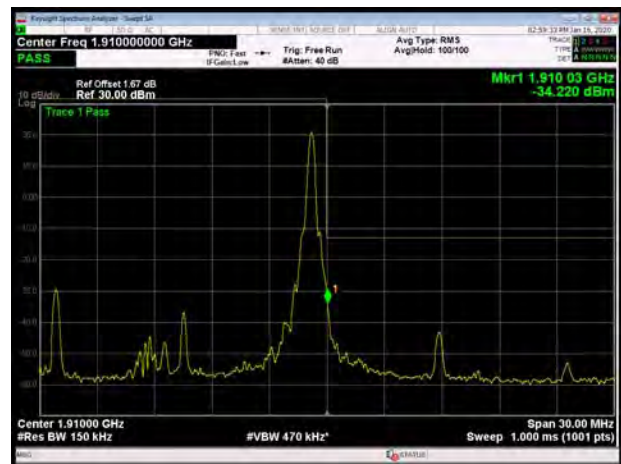
LTE Band 2 10MHz 16QAM 100%RB CH-High



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



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



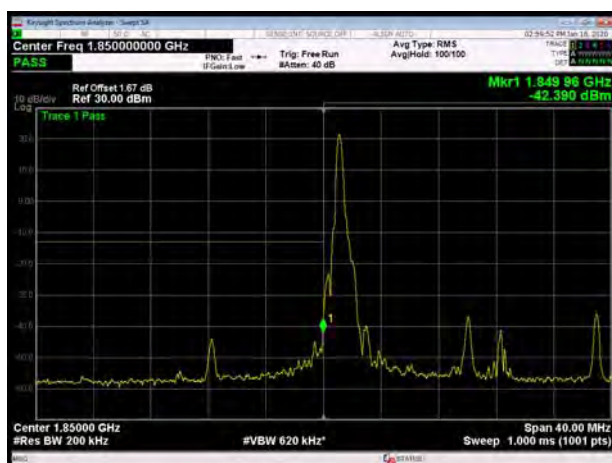
LTE Band 2 15MHz 16QAM 100%RB CH-Low



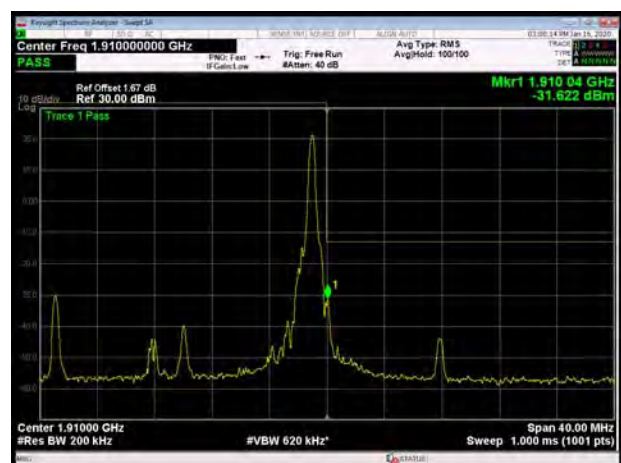
LTE Band 2 15MHz 16QAM 100%RB CH-High



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



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



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



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



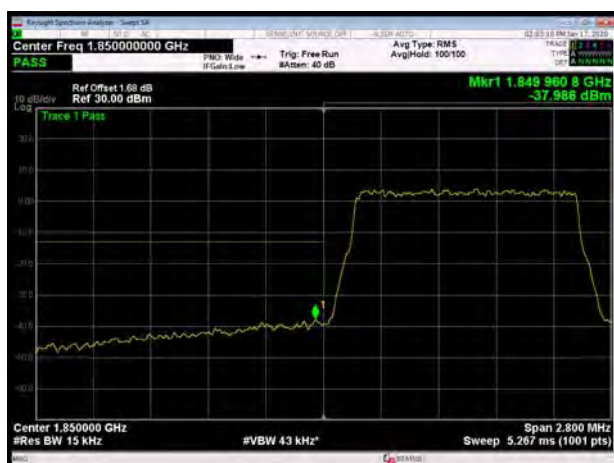
LTE Band 2 1.4MHz 64QAM 1RB CH-Low



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



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



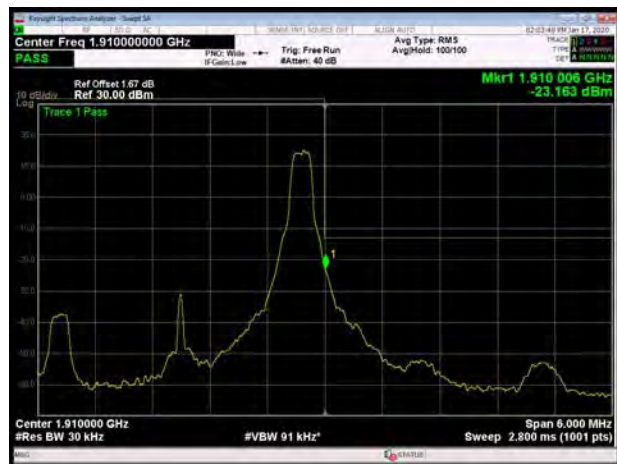
LTE Band 2 1.4MHz 64QAM 100%RB CH-High



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



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



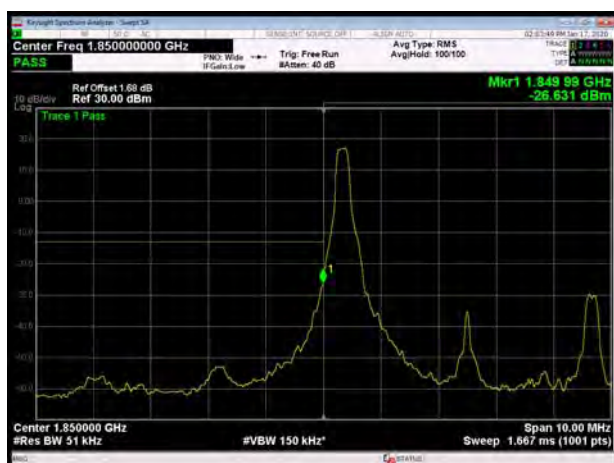
LTE Band 2 3MHz 64QAM 100%RB CH-Low



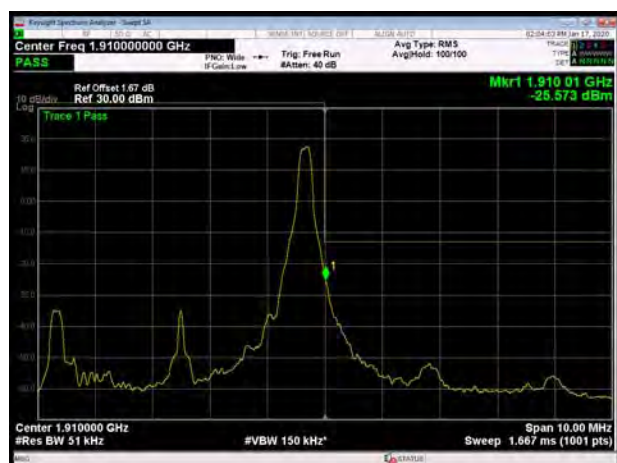
LTE Band 2 3MHz 64QAM 100%RB CH-High



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



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



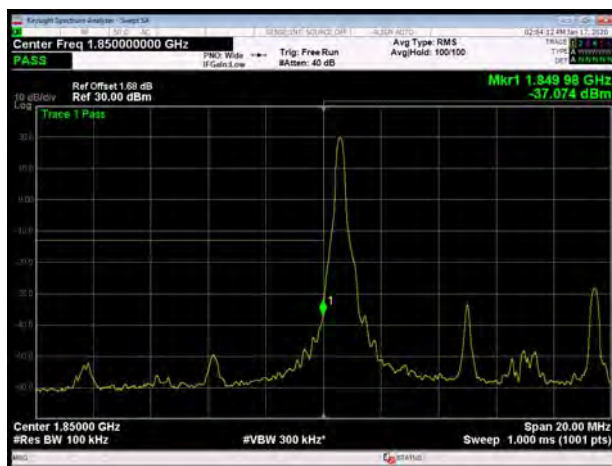
LTE Band 2 5MHz 64QAM 100%RB CH-Low



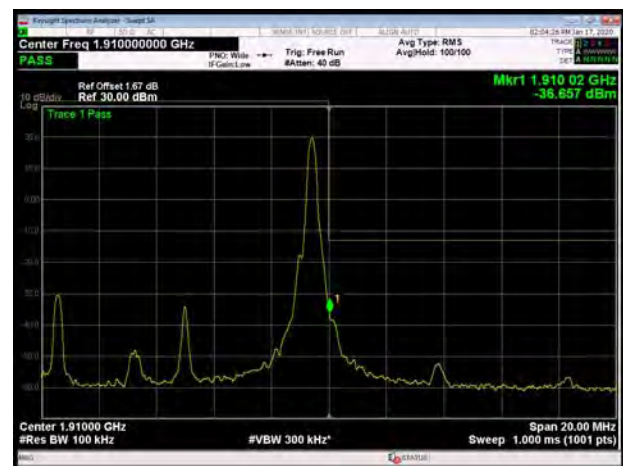
LTE Band 2 5MHz 64QAM 100%RB CH-High



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



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



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



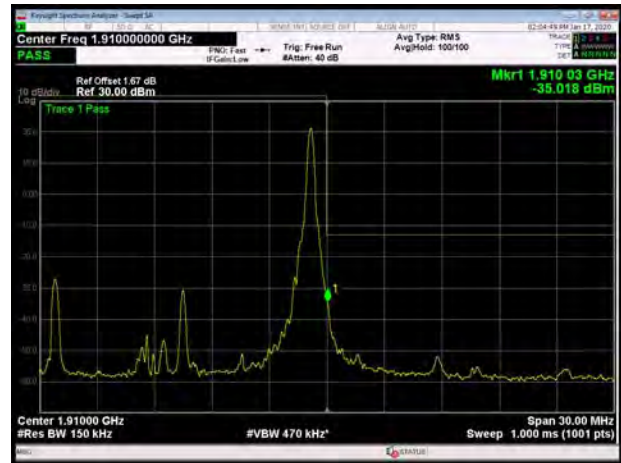
LTE Band 2 10MHz 64QAM 100%RB CH-High



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



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



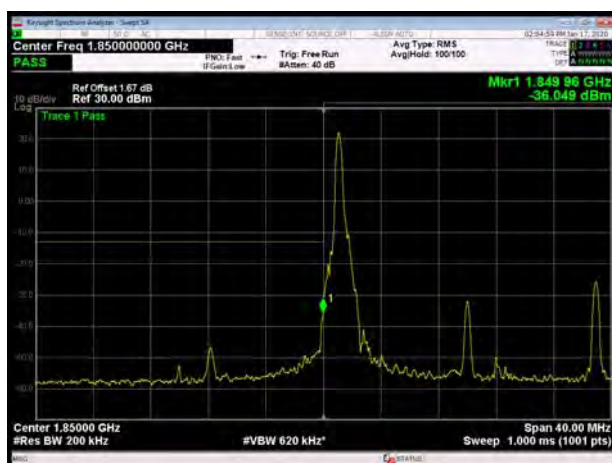
LTE Band 2 15MHz 64QAM 100%RB CH-Low



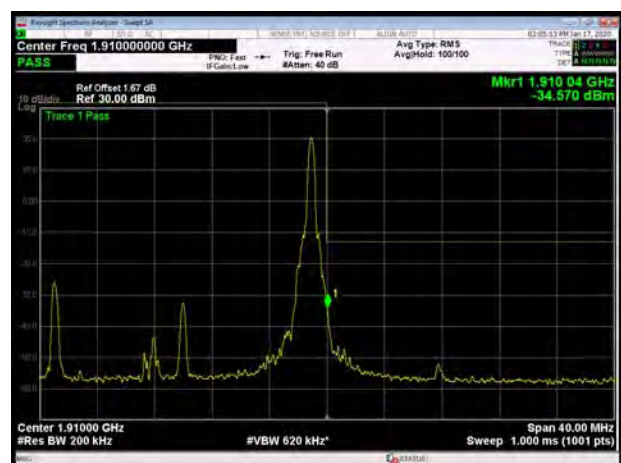
LTE Band 2 15MHz 64QAM 100%RB CH-High



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



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





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



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



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

Ambient condition

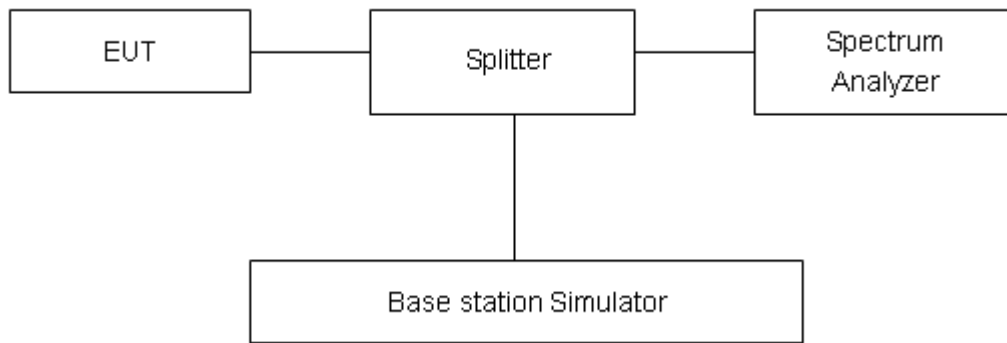
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

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

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

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

Measurement Uncertainty

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



Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	33.01	30.89	2.12	≤13	PASS
	661	1880	32.93	30.85	2.08	≤13	PASS
	810	1909.8	33.14	31.01	2.13	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	32.88	30.79	2.09	≤13	PASS
	661	1880	33.04	30.87	2.17	≤13	PASS
	810	1909.8	32.99	30.84	2.15	≤13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	29.80	27.34	2.46	≤13	PASS
	661	1880	30.32	27.79	2.53	≤13	PASS
	810	1909.8	29.99	27.51	2.48	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	25.62	22.72	2.90	≤13	PASS
	9400	1880	25.72	22.68	3.04	≤13	PASS
	9538	1907.6	25.32	22.30	3.02	≤13	PASS

LTE Band 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	26.90	21.94	4.96	≤13	PASS
		18900	1880.0	27.17	22.08	5.09	≤13	PASS
		19193	1909.3	26.84	21.89	4.95	≤13	PASS
	3	18615	1851.5	26.90	22.05	4.85	≤13	PASS
		18900	1880	27.18	22.25	4.93	≤13	PASS
		19185	1908.5	26.87	22.02	4.85	≤13	PASS
	5	18625	1852.5	27.15	22.11	5.04	≤13	PASS
		18900	1880	27.36	22.25	5.11	≤13	PASS
		19175	1907.5	27.05	22.04	5.01	≤13	PASS
	10	18650	1855	27.14	22.10	5.04	≤13	PASS
		18900	1880	27.37	22.27	5.10	≤13	PASS
		19150	1905	27.00	22.03	4.97	≤13	PASS
	15	18675	1857.5	27.12	22.02	5.10	≤13	PASS
		18900	1880	27.45	22.24	5.21	≤13	PASS
		19125	1902.5	27.11	22.03	5.08	≤13	PASS
	20	18700	1860	27.07	22.29	4.78	≤13	PASS
		18900	1880	27.26	22.26	5.00	≤13	PASS
		19100	1900	27.08	22.21	4.87	≤13	PASS
16QAM	1.4	18607	1850.7	27.10	21.03	6.07	≤13	PASS
		18900	1880.0	27.43	21.25	6.18	≤13	PASS
		19193	1909.3	27.12	20.97	6.15	≤13	PASS



	3	18615	1851.5	27.30	21.21	6.09	≤13	PASS
		18900	1880	27.58	21.36	6.22	≤13	PASS
		19185	1908.5	27.32	21.18	6.14	≤13	PASS
	5	18625	1852.5	27.39	21.24	6.15	≤13	PASS
		18900	1880	27.64	21.43	6.21	≤13	PASS
		19175	1907.5	27.27	21.18	6.09	≤13	PASS
	10	18650	1855	27.43	21.23	6.20	≤13	PASS
		18900	1880	27.67	21.45	6.22	≤13	PASS
		19150	1905	27.22	21.16	6.06	≤13	PASS
	15	18675	1857.5	27.41	21.18	6.23	≤13	PASS
		18900	1880	27.71	21.39	6.32	≤13	PASS
		19125	1902.5	27.29	21.17	6.12	≤13	PASS
	20	18700	1860	27.43	21.42	6.01	≤13	PASS
		18900	1880	27.60	21.42	6.18	≤13	PASS
		19100	1900	27.34	21.30	6.04	≤13	PASS
64QAM	1.4	18607	1850.7	26.68	20.98	5.70	≤13	PASS
		18900	1880.0	27.21	21.18	6.03	≤13	PASS
		19193	1909.3	27.08	20.99	6.09	≤13	PASS
	3	18615	1851.5	26.82	21.12	5.70	≤13	PASS
		18900	1880	27.33	21.30	6.03	≤13	PASS
		19185	1908.5	27.13	21.11	6.02	≤13	PASS
	5	18625	1852.5	26.88	21.12	5.76	≤13	PASS
		18900	1880	27.38	21.33	6.05	≤13	PASS
		19175	1907.5	27.09	21.12	5.97	≤13	PASS
	10	18650	1855	26.91	21.13	5.78	≤13	PASS
		18900	1880	27.43	21.33	6.10	≤13	PASS
		19150	1905	27.10	21.14	5.96	≤13	PASS
	15	18675	1857.5	26.95	21.12	5.83	≤13	PASS
		18900	1880	27.47	21.30	6.17	≤13	PASS
		19125	1902.5	27.16	21.12	6.04	≤13	PASS
	20	18700	1860	27.41	21.34	6.07	≤13	PASS
		18900	1880	27.24	21.24	6.00	≤13	PASS
		19100	1900	26.68	20.98	5.70	≤13	PASS

5.5.Frequency Stability

Ambient condition

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

Method of Measurement

Frequency Stability (Temperature Variation)

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

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

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

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

Frequency Stability (Voltage Variation)

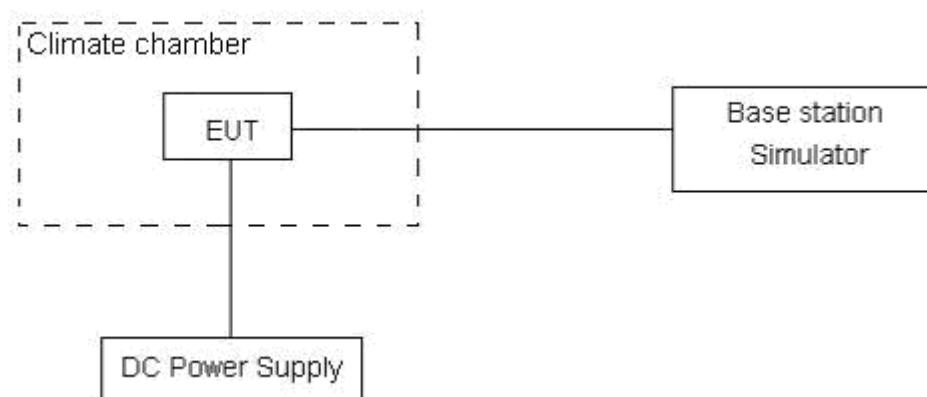
The frequency stability shall be measured with variation of primary supply voltage as follows:

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

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

This transceiver is specified to operate with an input voltage of between 3.6 V and 4.4V, with a nominal voltage of 3.8V.

Test setup



**Limits**

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

Measurement Uncertainty

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

Test Result

GSM1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal(25℃)	Normal	6.77	14.35	0.00360	0.00763	PASS
Extreme(55℃)		16.38	17.81	0.00871	0.00947	PASS
Extreme(50℃)		9.92	6.12	0.00528	0.00325	PASS
Extreme(40℃)		13.53	11.83	0.00720	0.00629	PASS
Extreme(30℃)		2.86	1.33	0.00152	0.00071	PASS
Extreme(20℃)		6.92	10.79	0.00368	0.00574	PASS
Extreme(10℃)		17.03	17.15	0.00906	0.00912	PASS
Extreme(0℃)		13.38	17.19	0.00712	0.00914	PASS
Extreme(-10℃)		7.47	16.10	0.00397	0.00857	PASS
Extreme(-20℃)		7.17	3.55	0.00382	0.00189	PASS
Extreme(-30℃)		12.99	6.26	0.00691	0.00333	PASS
25℃	LV	3.02	1.34	0.00161	0.00071	PASS
	HV	13.19	12.72	0.00701	0.00677	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25℃)	Normal	15.42	17.95	0.00820	0.00955	PASS
Extreme(55℃)		5.62	9.70	0.00299	0.00516	PASS
Extreme(50℃)		16.96	11.29	0.00902	0.00601	PASS
Extreme(40℃)		15.32	6.08	0.00815	0.00323	PASS
Extreme(30℃)		14.49	2.15	0.00771	0.00114	PASS
Extreme(20℃)		10.34	16.48	0.00550	0.00877	PASS
Extreme(10℃)		13.64	10.29	0.00725	0.00547	PASS
Extreme(0℃)		16.26	7.17	0.00865	0.00381	PASS
Extreme(-10℃)		10.45	7.30	0.00556	0.00388	PASS
Extreme(-20℃)		14.10	12.05	0.00750	0.00641	PASS
Extreme(-30℃)		5.63	13.52	0.00299	0.00719	PASS
25℃	LV	8.14	3.55	0.00433	0.00189	PASS
	HV	4.96	15.36	0.00264	0.00817	PASS



LTE Band 2								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal(25℃)	Normal	10.68	7.23	1.21	0.00568	0.00385	0.00065	PASS
Extreme(55℃)		16.06	3.14	6.53	0.00854	0.00167	0.00347	PASS
Extreme(50℃)		10.04	9.88	7.13	0.00534	0.00525	0.00379	PASS
Extreme(40℃)		2.03	5.24	8.21	0.00108	0.00279	0.00437	PASS
Extreme(30℃)		7.79	17.87	4.81	0.00414	0.00950	0.00256	PASS
Extreme(20℃)		10.43	13.19	10.59	0.00555	0.00702	0.00563	PASS
Extreme(10℃)		12.36	13.78	8.40	0.00657	0.00733	0.00447	PASS
Extreme(0℃)		10.55	8.04	14.73	0.00561	0.00427	0.00784	PASS
Extreme(-10℃)		12.58	14.49	17.65	0.00669	0.00771	0.00939	PASS
Extreme(-20℃)		10.75	9.90	10.28	0.00572	0.00527	0.00547	PASS
Extreme(-30℃)		3.18	7.66	11.65	0.00169	0.00407	0.00620	PASS
25℃	LV	1.76	5.22	16.19	0.00094	0.00277	0.00861	PASS
	HV	8.29	14.47	14.44	0.00441	0.00770	0.00768	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal(25℃)	Normal	9.74	8.42	5.66	0.00518	0.00448	0.00301	PASS
Extreme(55℃)		3.06	4.47	4.74	0.00163	0.00238	0.00252	PASS
Extreme(50℃)		7.67	17.32	6.50	0.00408	0.00921	0.00346	PASS
Extreme(40℃)		1.63	8.01	10.43	0.00087	0.00426	0.00555	PASS
Extreme(30℃)		10.53	9.24	4.79	0.00560	0.00492	0.00255	PASS
Extreme(20℃)		7.96	17.86	7.18	0.00423	0.00950	0.00382	PASS
Extreme(10℃)		11.44	12.53	8.81	0.00609	0.00667	0.00469	PASS
Extreme(0℃)		14.00	16.49	8.25	0.00745	0.00877	0.00439	PASS
Extreme(-10℃)		13.22	11.07	1.07	0.00703	0.00589	0.00057	PASS
Extreme(-20℃)		17.60	5.71	14.03	0.00936	0.00304	0.00746	PASS
Extreme(-30℃)		2.86	14.11	12.79	0.00152	0.00750	0.00681	PASS
25℃	LV	16.60	12.78	16.45	0.00883	0.00680	0.00875	PASS
	HV	6.86	9.78	14.57	0.00365	0.00520	0.00775	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	



Normal(25℃)	Normal	11.88	14.16	8.54	0.00632	0.00753	0.00454	PASS
Extreme(55℃)		11.60	6.51	15.01	0.00617	0.00346	0.00798	PASS
Extreme(50℃)		16.58	2.05	4.91	0.00882	0.00109	0.00261	PASS
Extreme(40℃)		16.25	15.60	6.92	0.00865	0.00830	0.00368	PASS
Extreme(30℃)		2.81	10.36	9.10	0.00149	0.00551	0.00484	PASS
Extreme(20℃)		2.24	14.92	16.52	0.00119	0.00794	0.00878	PASS
Extreme(10℃)		12.75	9.35	1.91	0.00678	0.00498	0.00102	PASS
Extreme(0℃)		16.92	11.19	2.34	0.00900	0.00595	0.00124	PASS
Extreme(-10℃)		11.44	15.77	8.42	0.00609	0.00839	0.00448	PASS
Extreme(-20℃)		10.94	16.39	9.26	0.00582	0.00872	0.00492	PASS
Extreme(-30℃)		15.71	17.00	16.95	0.00836	0.00904	0.00901	PASS
25℃	LV	5.78	15.12	13.50	0.00307	0.00804	0.00718	PASS
	HV	4.14	8.66	17.98	0.00220	0.00461	0.00957	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal(25℃)	Normal	7.85	11.61	13.72	0.00418	0.00618	0.00730	PASS
Extreme(55℃)		10.98	14.96	15.19	0.00584	0.00796	0.00808	PASS
Extreme(50℃)		15.75	6.05	6.95	0.00838	0.00322	0.00369	PASS
Extreme(40℃)		2.20	4.52	3.54	0.00117	0.00240	0.00188	PASS
Extreme(30℃)		2.80	14.43	2.60	0.00149	0.00768	0.00138	PASS
Extreme(20℃)		11.55	16.73	2.60	0.00614	0.00890	0.00138	PASS
Extreme(10℃)		3.18	3.63	2.62	0.00169	0.00193	0.00139	PASS
Extreme(0℃)		11.35	10.07	12.47	0.00604	0.00536	0.00663	PASS
Extreme(-10℃)		6.13	13.47	3.02	0.00326	0.00716	0.00161	PASS
Extreme(-20℃)		7.67	12.35	11.63	0.00408	0.00657	0.00619	PASS
Extreme(-30℃)		2.40	1.98	3.48	0.00128	0.00105	0.00185	PASS
25℃	LV	11.65	14.77	3.95	0.00620	0.00786	0.00210	PASS
	HV	3.54	15.42	11.27	0.00188	0.00820	0.00599	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal(25℃)	Normal	2.51	6.48	12.47	0.00133	0.00345	0.00663	PASS
Extreme(55℃)		5.23	11.08	5.61	0.00278	0.00589	0.00299	PASS
Extreme(50℃)		3.30	13.76	4.78	0.00175	0.00732	0.00254	PASS
Extreme(40℃)		6.17	1.32	12.66	0.00328	0.00070	0.00673	PASS
Extreme(30℃)		6.96	2.16	14.63	0.00370	0.00115	0.00778	PASS
Extreme(20℃)		11.51	8.79	8.26	0.00612	0.00467	0.00439	PASS
Extreme(10℃)		15.48	11.63	1.60	0.00824	0.00618	0.00085	PASS



Extreme(0℃)		9.43	11.28	17.30	0.00502	0.00600	0.00920	PASS
Extreme(-10℃)		13.85	2.49	3.18	0.00737	0.00132	0.00169	PASS
Extreme(-20℃)		1.26	1.74	7.81	0.00067	0.00092	0.00416	PASS
Extreme(-30℃)		5.62	9.02	3.51	0.00299	0.00480	0.00187	PASS
25℃	LV	2.26	6.15	14.36	0.00120	0.00327	0.00764	PASS
	HV	6.97	3.67	14.06	0.00371	0.00195	0.00748	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal(25℃)	Normal	2.49	13.56	17.39	0.00133	0.00721	0.00925	PASS
Extreme(55℃)		17.55	16.21	10.68	0.00933	0.00862	0.00568	PASS
Extreme(50℃)		9.08	5.89	11.31	0.00483	0.00313	0.00601	PASS
Extreme(40℃)		12.05	7.91	10.61	0.00641	0.00421	0.00564	PASS
Extreme(30℃)		13.02	4.47	14.06	0.00693	0.00238	0.00748	PASS
Extreme(20℃)		6.28	14.66	13.24	0.00334	0.00780	0.00704	PASS
Extreme(10℃)		1.07	16.29	15.39	0.00057	0.00866	0.00819	PASS
Extreme(0℃)		13.06	6.81	9.62	0.00694	0.00362	0.00512	PASS
Extreme(-10℃)		6.23	9.79	14.37	0.00331	0.00521	0.00764	PASS
Extreme(-20℃)		12.74	16.70	9.72	0.00678	0.00889	0.00517	PASS
Extreme(-30℃)		15.21	17.04	8.02	0.00809	0.00906	0.00427	PASS
25℃	LV	9.37	9.85	2.19	0.00498	0.00524	0.00117	PASS
	HV	16.31	1.63	4.04	0.00867	0.00087	0.00215	PASS

5.6. Spurious Emissions at Antenna Terminals

Ambient condition

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

Method of Measurement

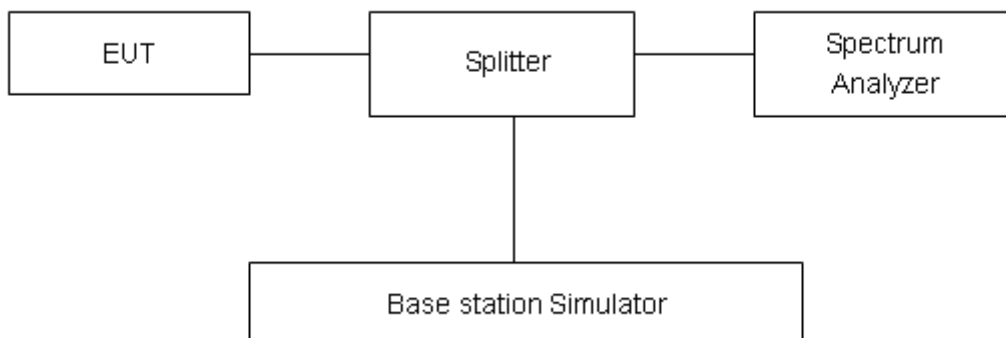
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

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

Test setup



Limits

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

Limit	-13 dBm
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Measurement Uncertainty

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

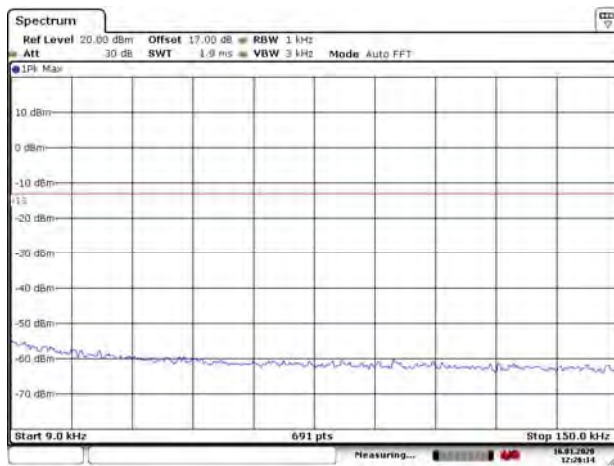
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

Test Result

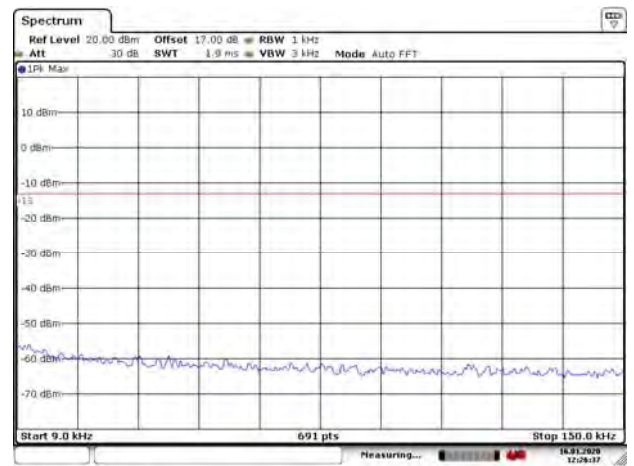
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

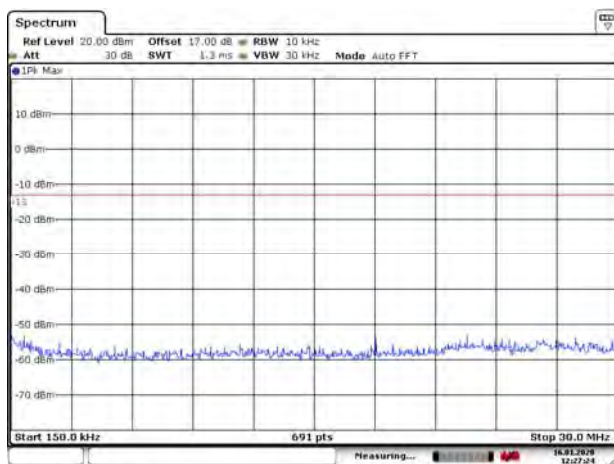
GSM 1900 CH-Low 9kHz ~ 150kHz



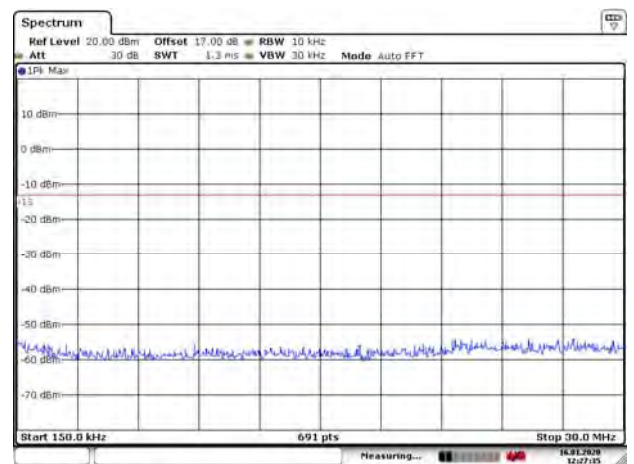
GSM 1900 CH- Middle 9kHz ~ 150kHz



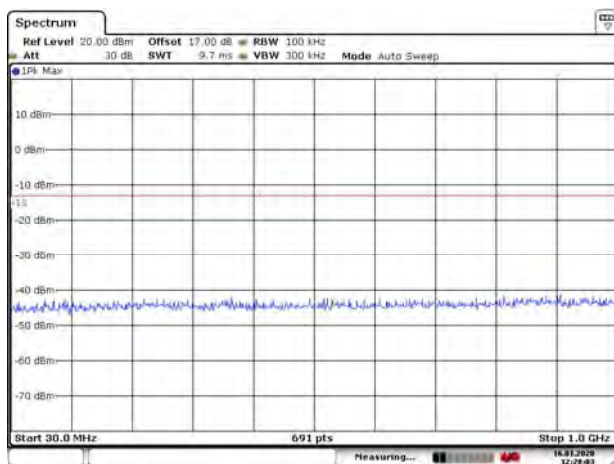
GSM 1900 CH-Low 150kHz ~ 30MHz



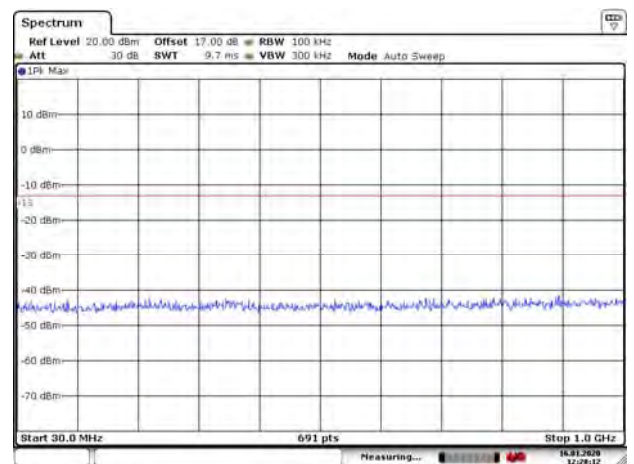
GSM 1900 CH- Middle 150kHz ~ 30MHz



GSM 1900 CH-Low 30MHz ~ 1GHz

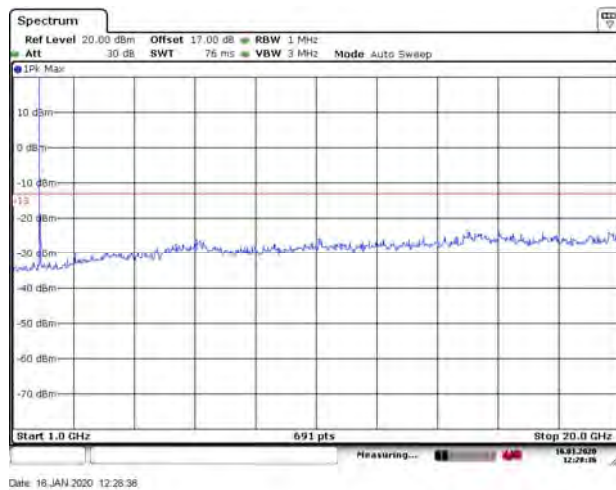


GSM 1900 CH- Middle 30MHz ~ 1GHz

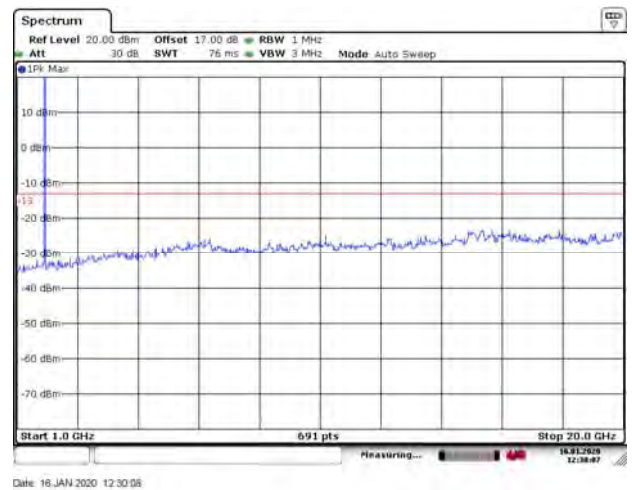




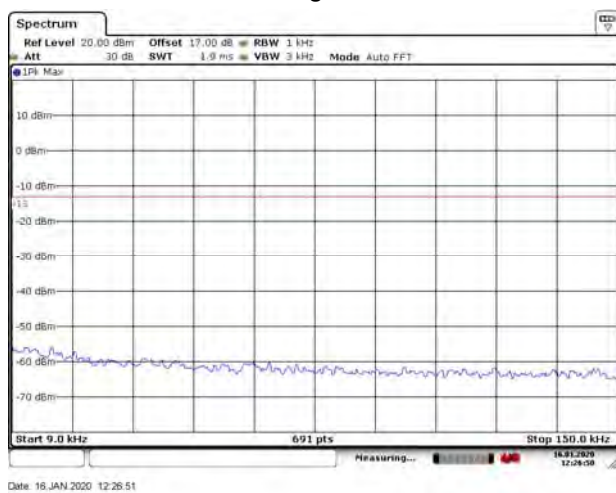
GSM 1900 CH-Low 1GHz ~ 20GHz



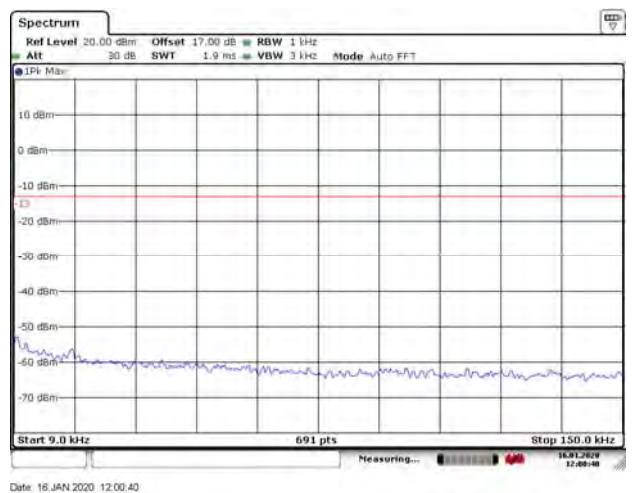
GSM 1900 CH- Middle 1GHz ~ 20GHz



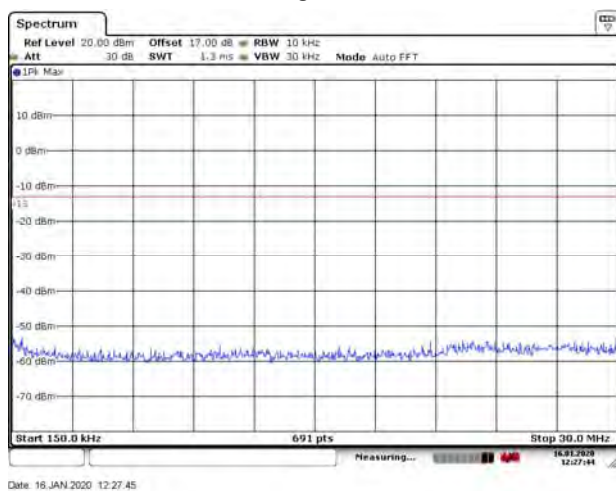
GSM 1900 CH-High 9kHz ~ 150kHz



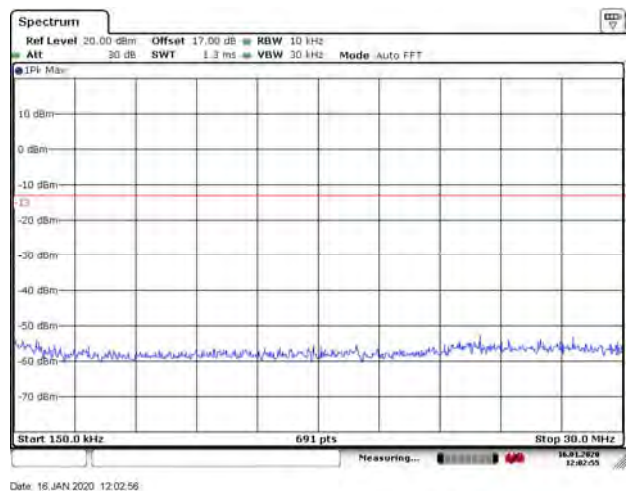
GPRS 1900 CH-Low 9kHz ~ 150kHz



GSM 1900 CH-High 150kHz ~ 30MHz

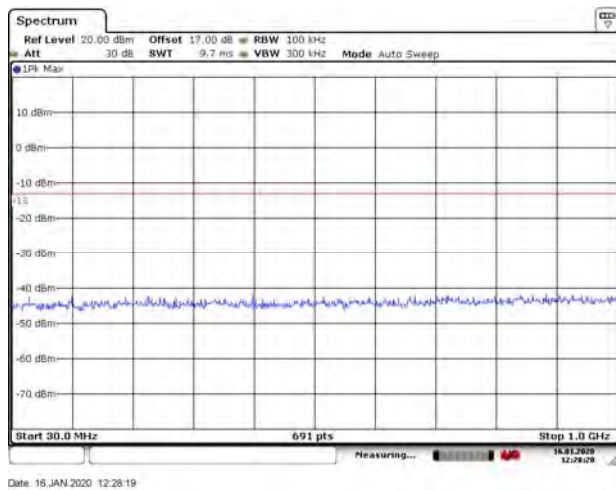


GPRS 1900 CH-Low 150kHz ~ 30MHz

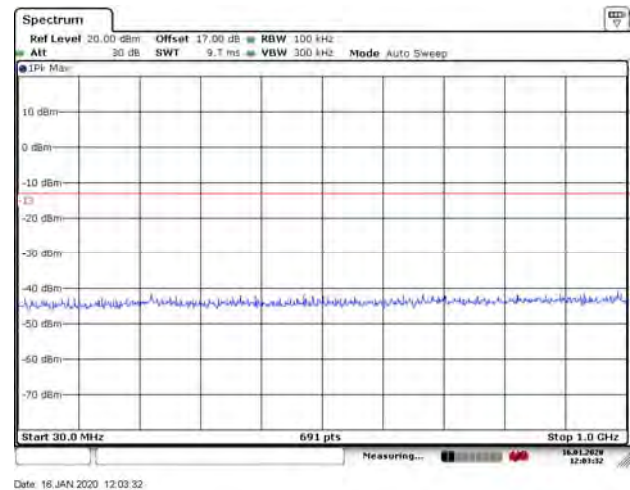




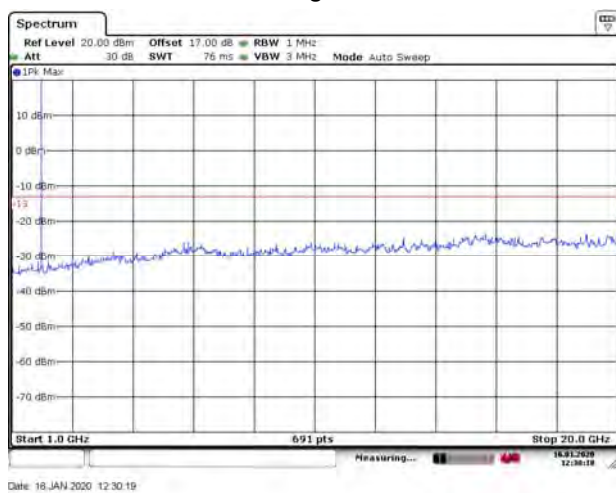
GSM 1900 CH-High 30MHz ~ 1GHz



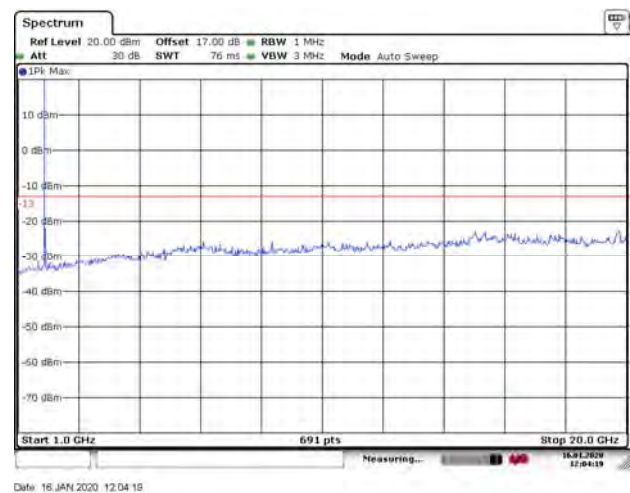
GPRS 1900 CH-Low 30MHz ~ 1GHz



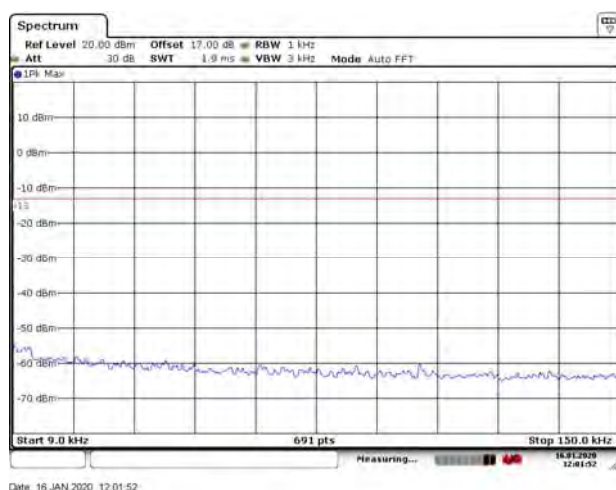
GSM 1900 CH-High 1GHz ~ 20GHz



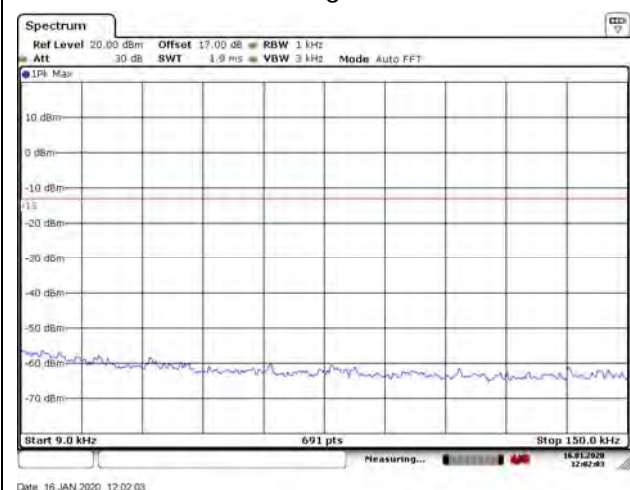
GPRS 1900 CH-Low 1GHz ~ 20GHz



GPRS 1900 CH- Middle 9kHz ~ 150kHz

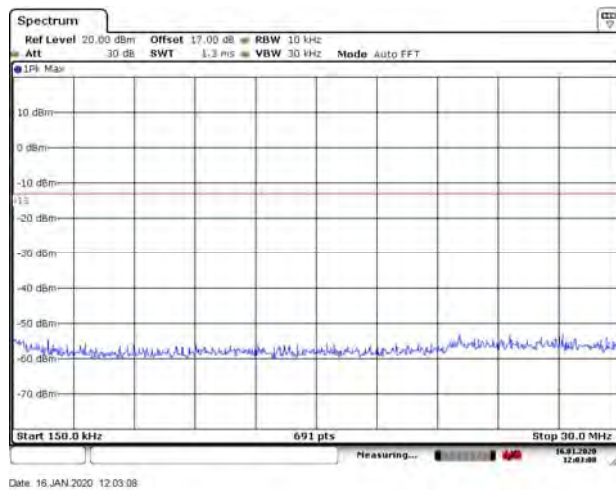


GPRS 1900 CH-High 9kHz ~ 150kHz

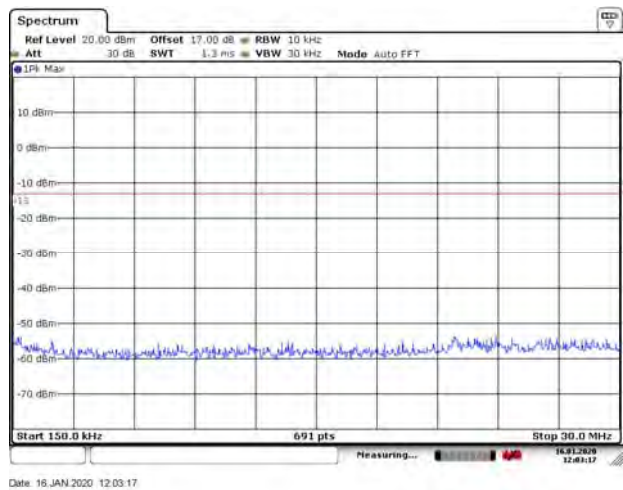




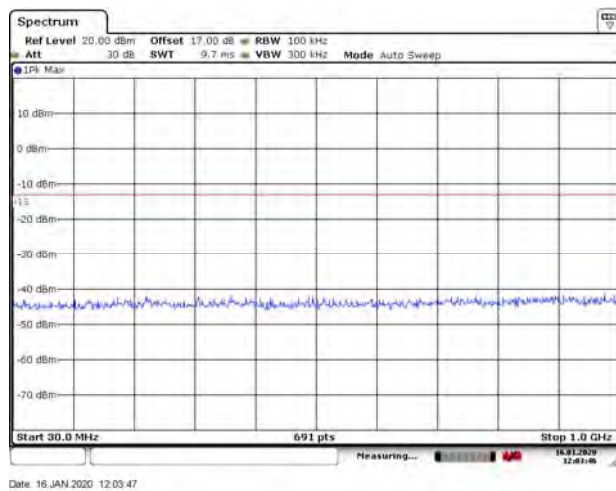
GPRS 1900 CH- Middle 150kHz ~ 30MHz



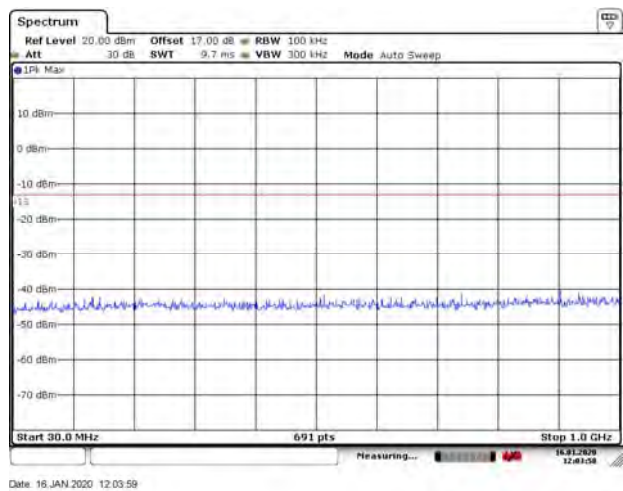
GPRS 1900 CH-High 150kHz ~ 30MHz



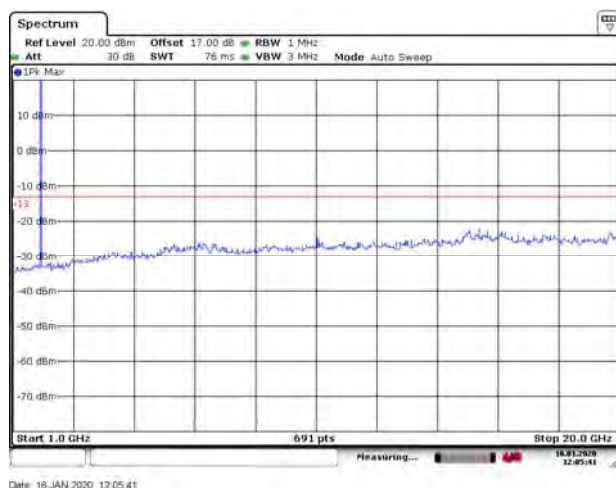
GPRS 1900 CH- Middle 30MHz ~ 1GHz



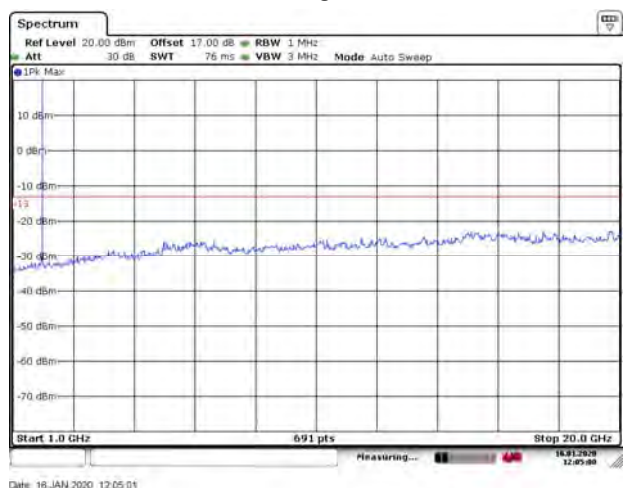
GPRS 1900 CH-High 30MHz ~ 1GHz



GPRS 1900 CH- Middle 1GHz ~ 20GHz

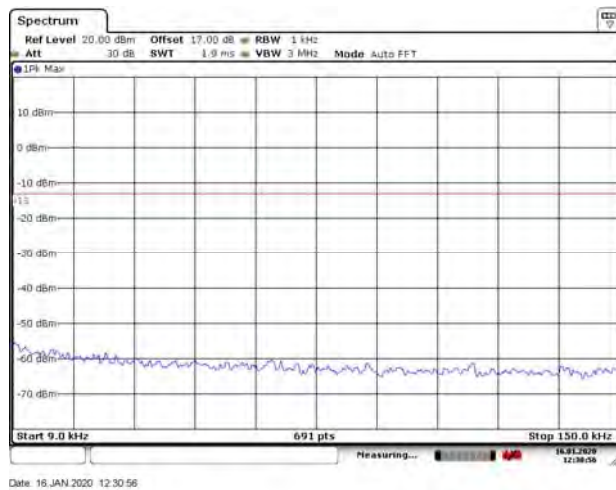


GPRS 1900 CH-High 1GHz ~ 20GHz

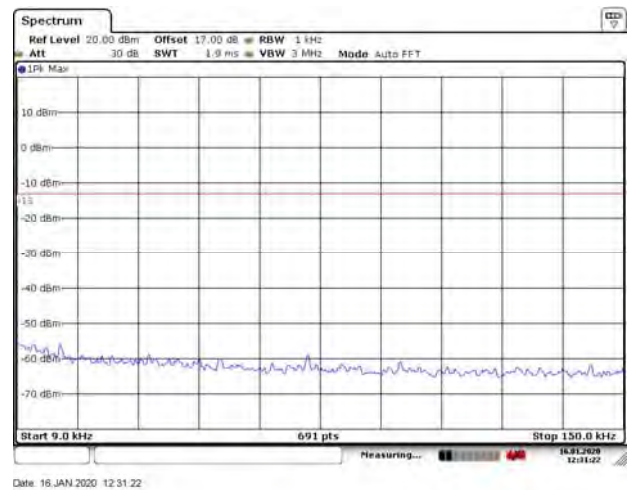




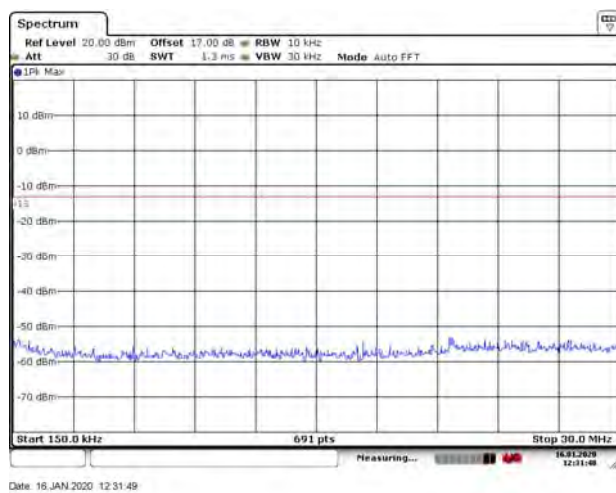
EGPRS 1900 CH-Low 9kHz ~ 150kHz



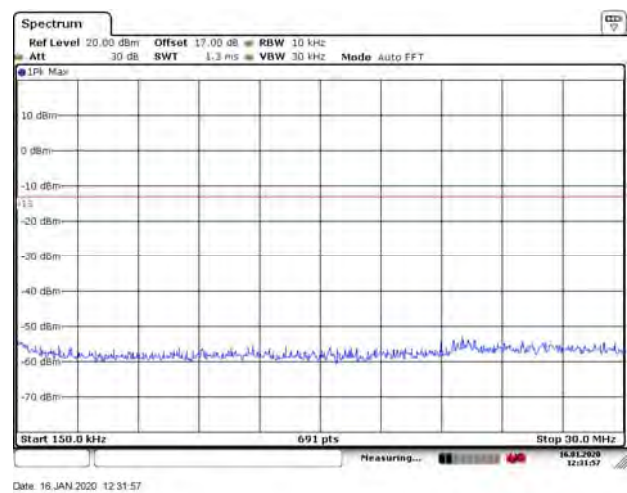
EGPRS 1900 CH- Middle 9kHz ~ 150kHz



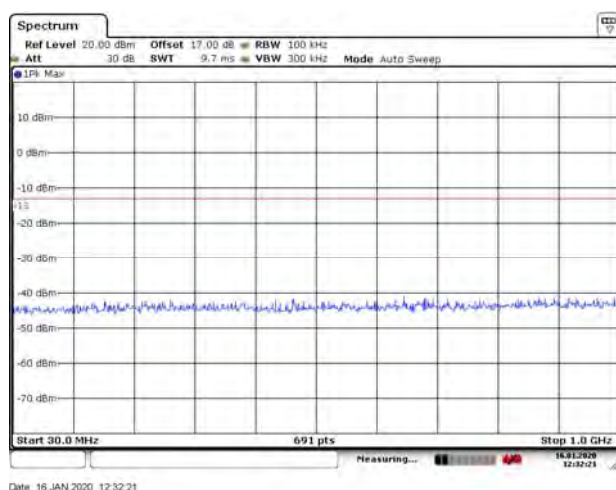
EGPRS 1900 CH-Low 150kHz ~ 30MHz



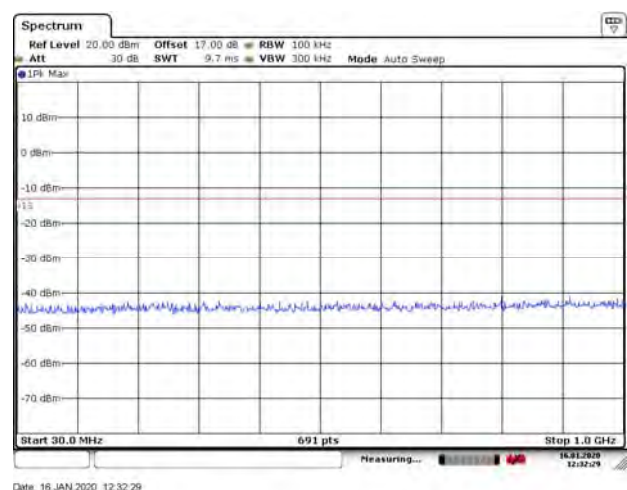
EGPRS 1900 CH- Middle 150kHz ~ 30MHz



EGPRS 1900 CH-Low 30MHz ~ 1GHz

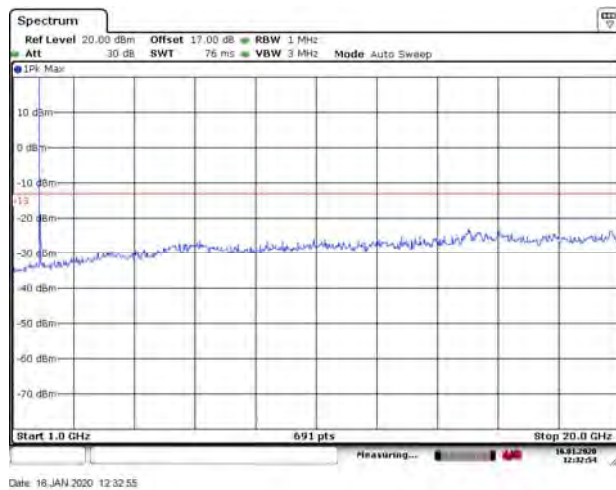


EGPRS 1900 CH- Middle 30MHz ~ 1GHz

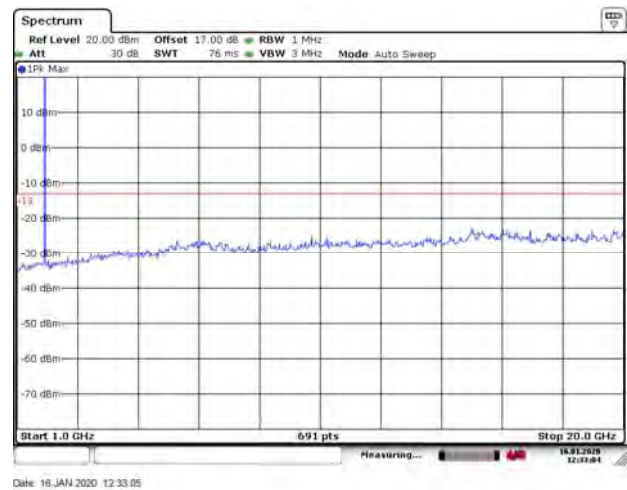




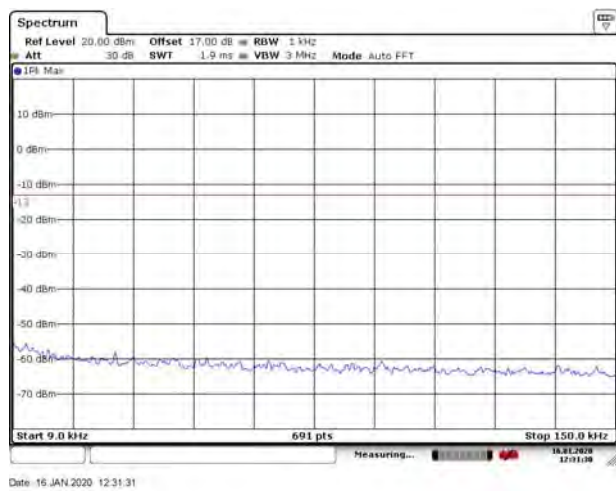
EGPRS 1900 CH-Low 1GHz ~ 20GHz



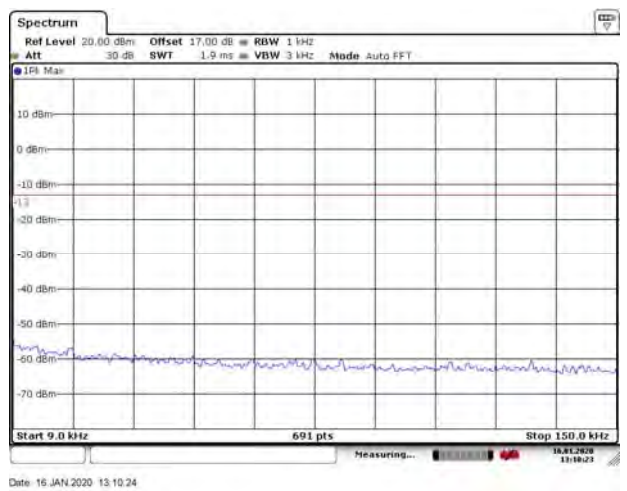
EGPRS 1900 CH- Middle 1GHz ~ 20GHz



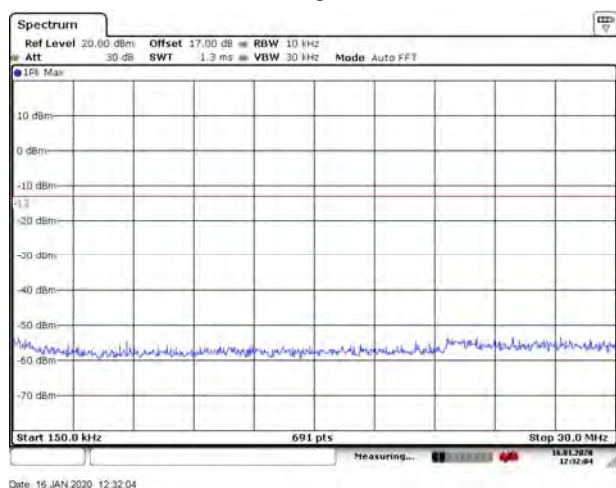
EGPRS 1900 CH-High 9kHz ~ 150kHz



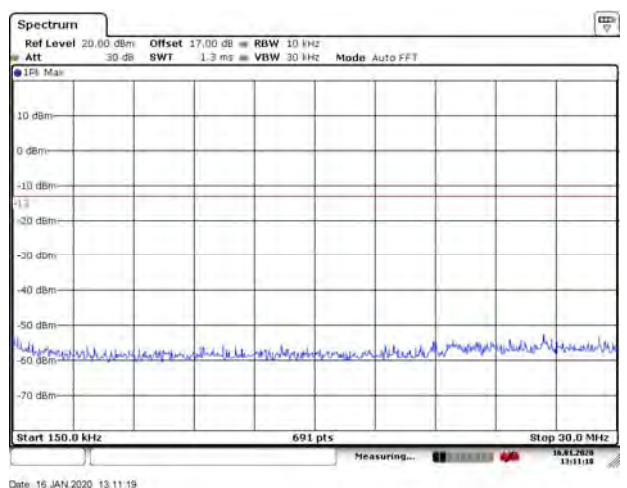
WCDMA BAND II CH-Low 9kHz ~ 150kHz



EGPRS 1900 CH-High 150kHz ~ 30MHz

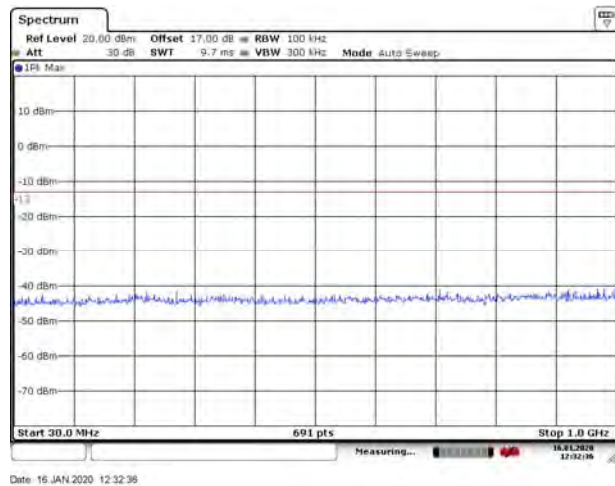


WCDMA BAND II CH-Low 150kHz ~ 30MHz

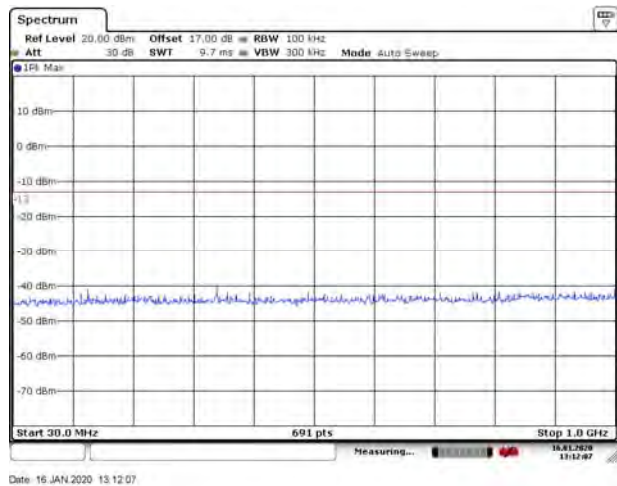




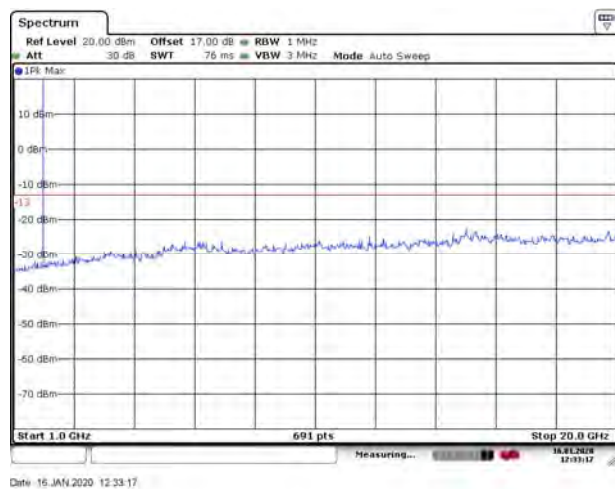
EGPRS 1900 CH-High 30MHz ~ 1GHz



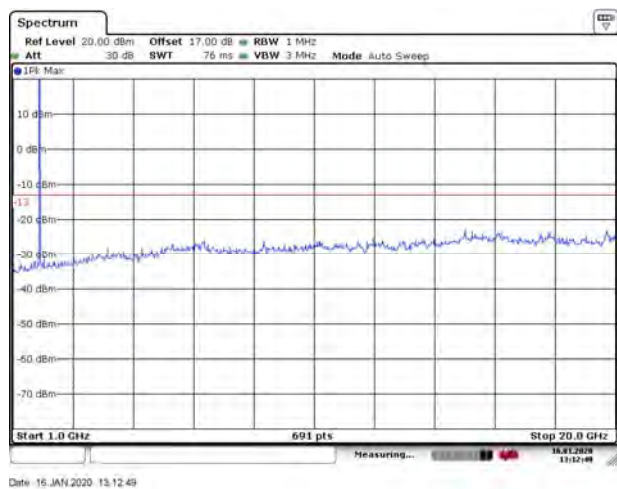
WCDMA BAND II CH-Low 30MHz ~ 1GHz



EGPRS 1900 CH-High 1GHz ~ 20GHz

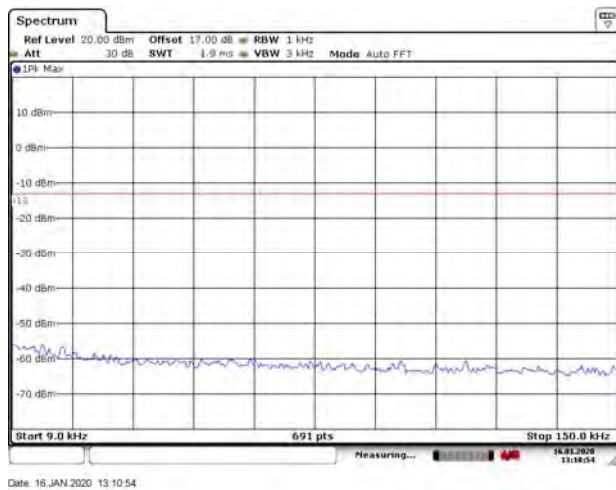


WCDMA BAND II CH-Low 1GHz ~ 20GHz

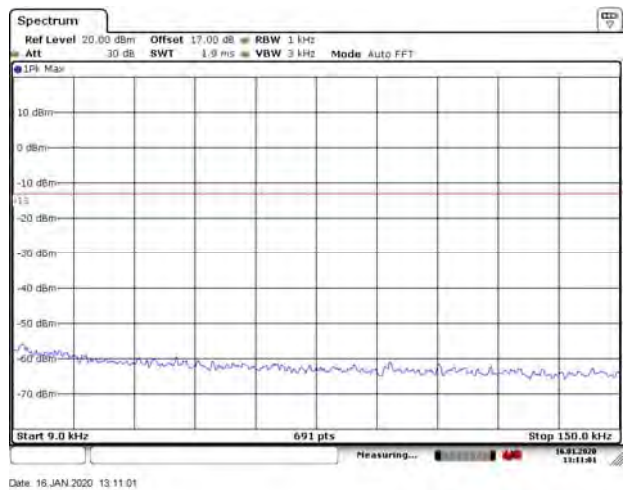




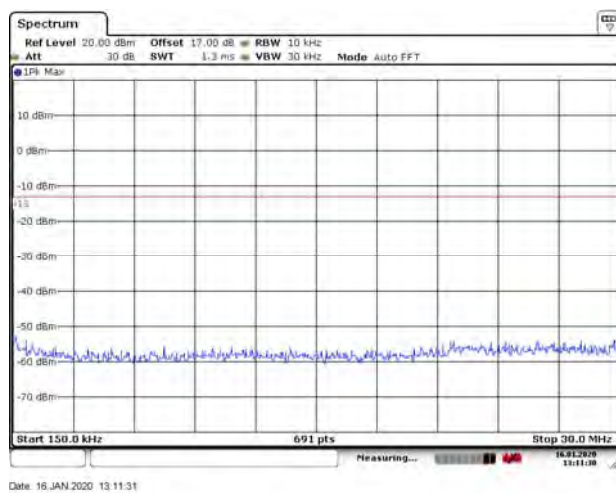
WCDMA BAND II CH- Middle 9kHz ~ 150kHz



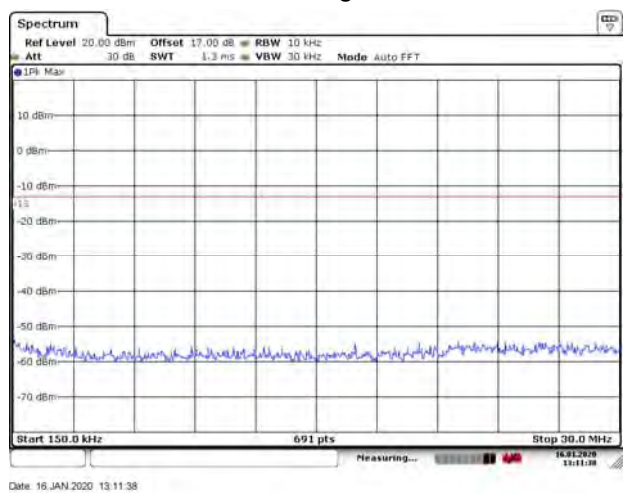
WCDMA BAND II CH-High 9kHz ~ 150kHz



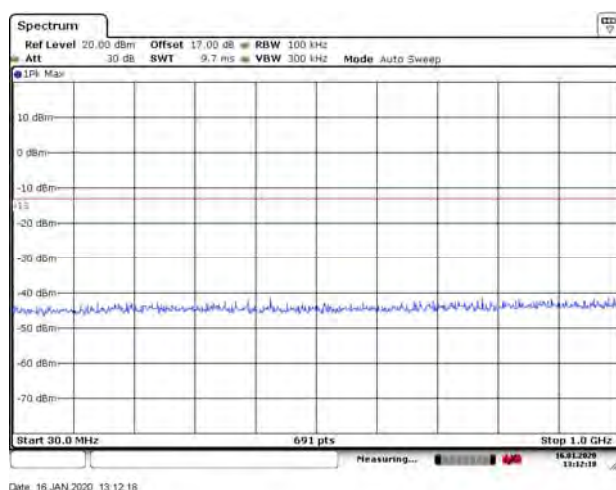
WCDMA BAND II CH- Middle 150kHz ~ 30MHz



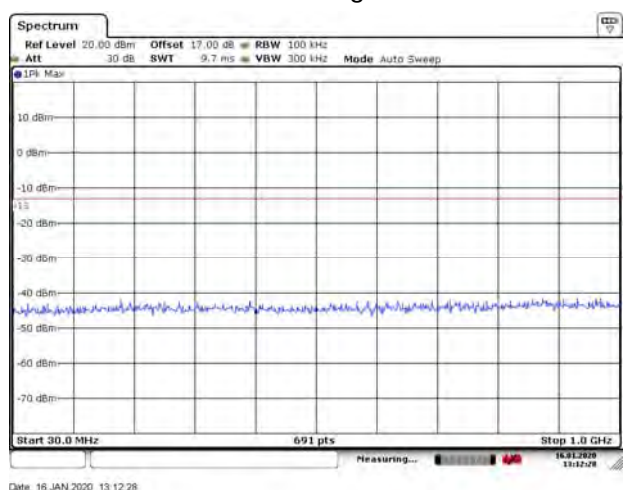
WCDMA BAND II CH-High 150kHz ~ 30MHz



WCDMA BAND II CH- Middle 30MHz ~ 1GHz

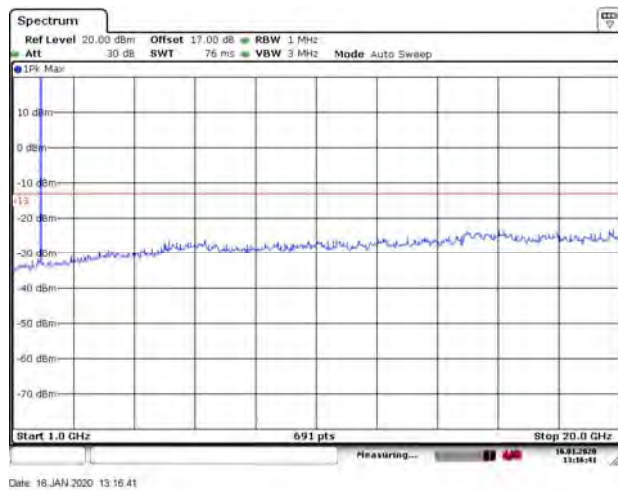


WCDMA BAND II CH-High 30MHz ~ 1GHz

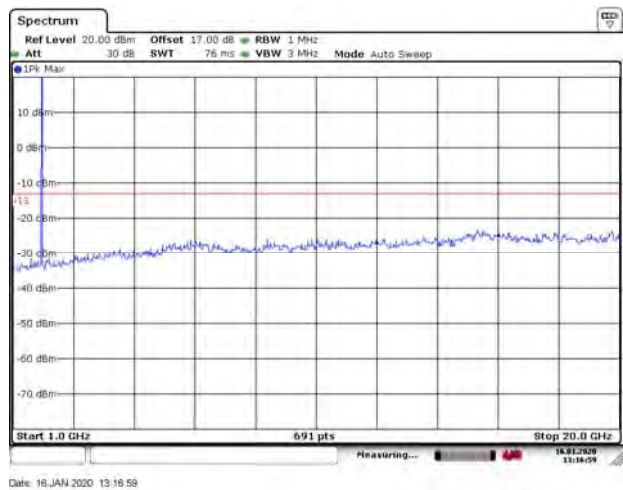




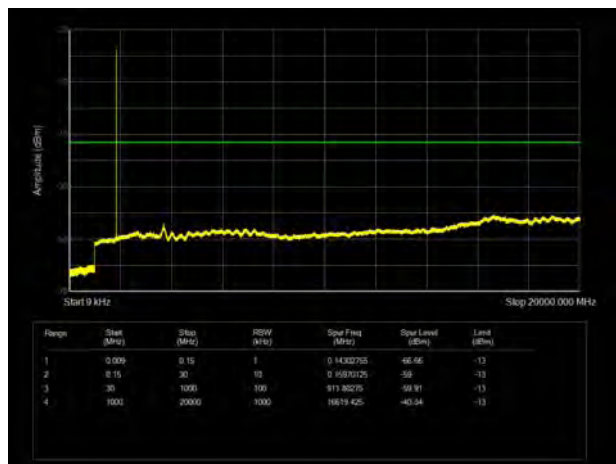
WCDMA BAND II CH- Middle 1GHz ~ 20GHz



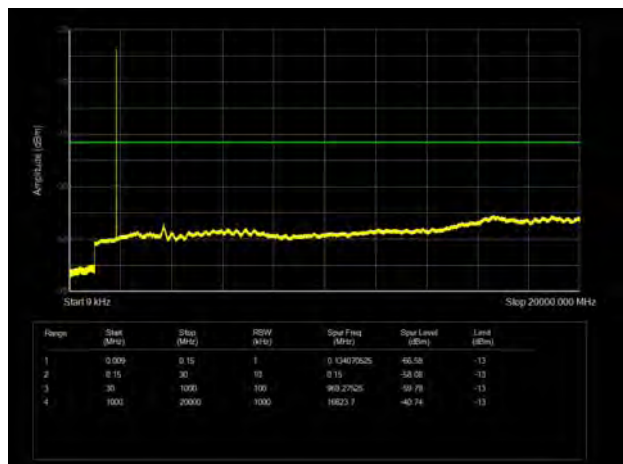
WCDMA BAND II CH-High 1GHz ~ 20GHz



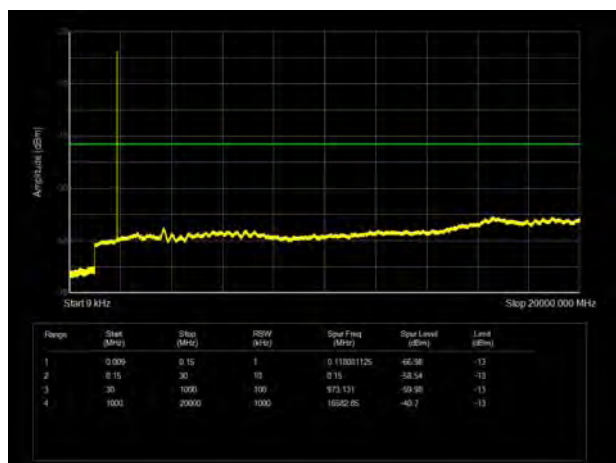
LTE Band 2 1.4MHz CH-Low 9kHz~20GHz



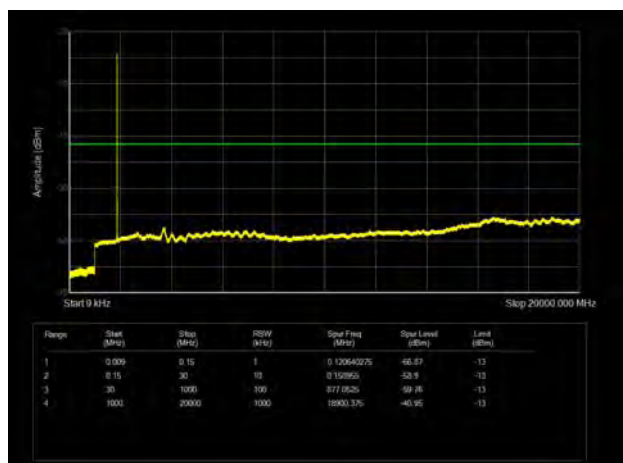
LTE Band 2 3MHz CH-Low 9kHz~20GHz



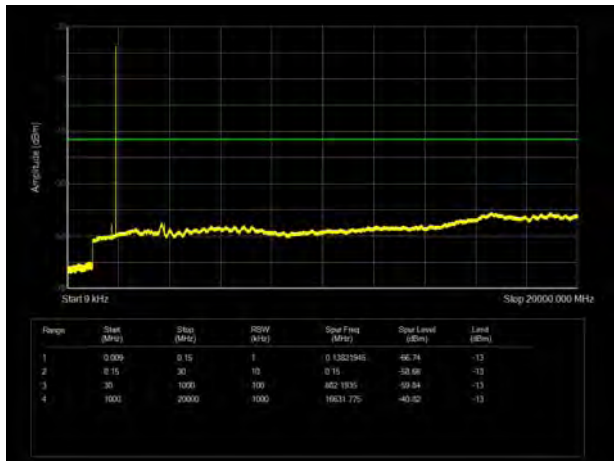
LTE Band 2 1.4MHz CH-Middle 9kHz~20GHz



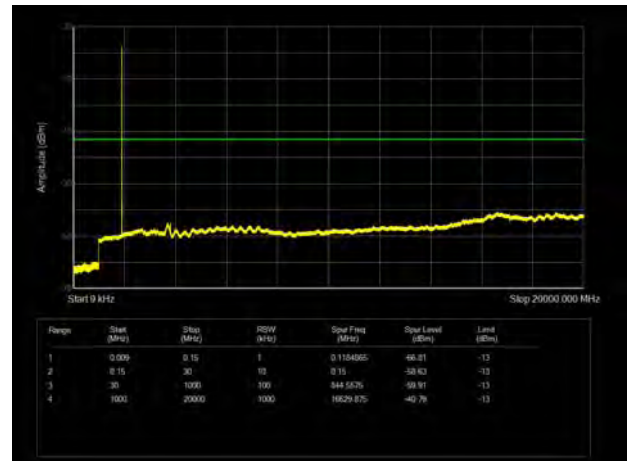
LTE Band 2 3MHz CH-Middle 9kHz~20GHz



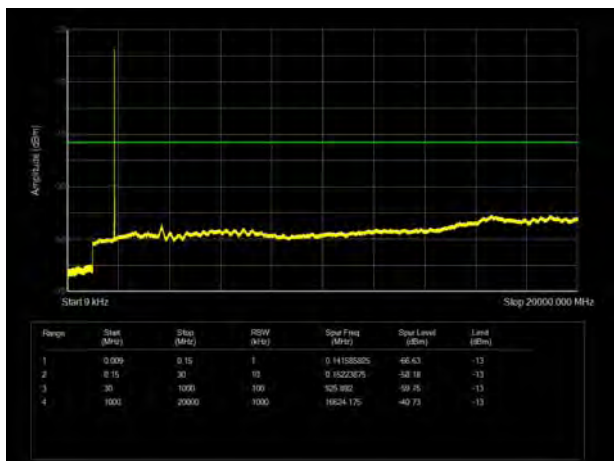
LTE Band 2 1.4MHz CH-High 9kHz~20GHz



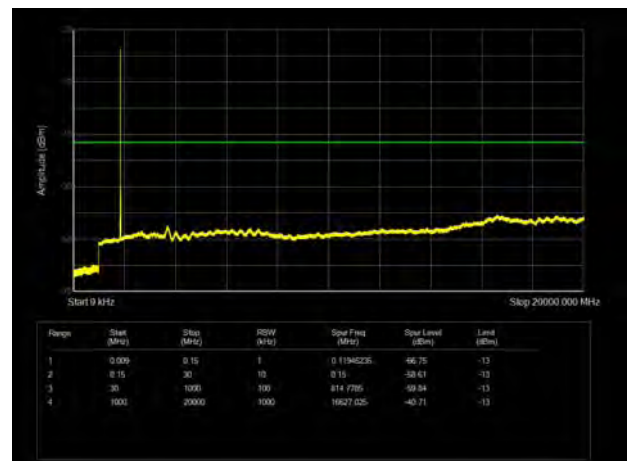
LTE Band 2 3MHz CH-High 9kHz~20GHz



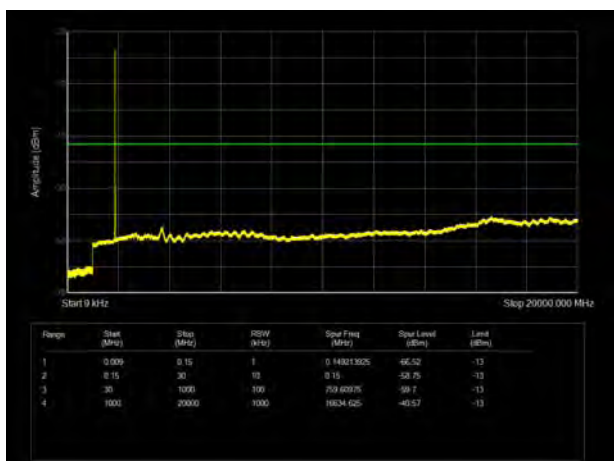
LTE Band 2 5MHz CH-Low 9kHz~20GHz



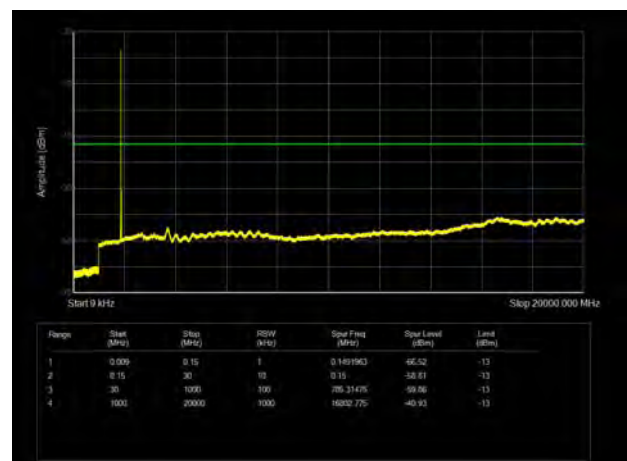
LTE Band 2 10MHz CH-Low 9kHz~20GHz



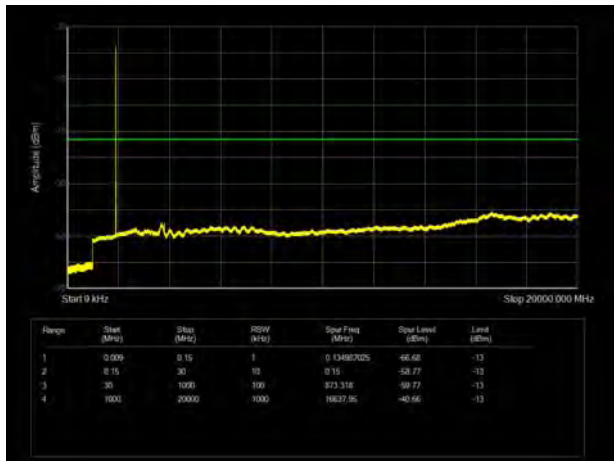
LTE Band 2 5MHz CH-Middle 9kHz~20GHz



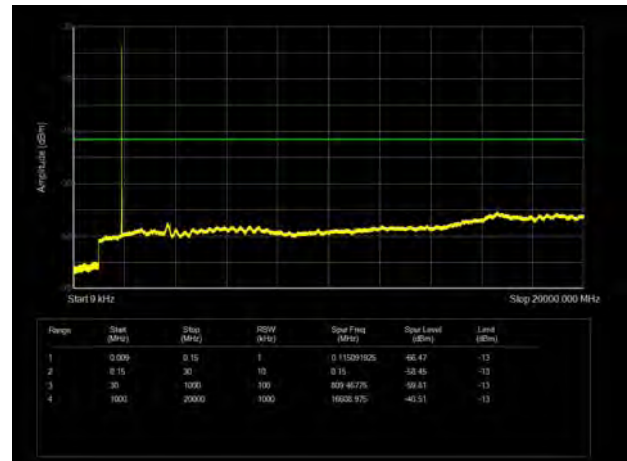
LTE Band 2 10MHz CH-Middle 9kHz~20GHz



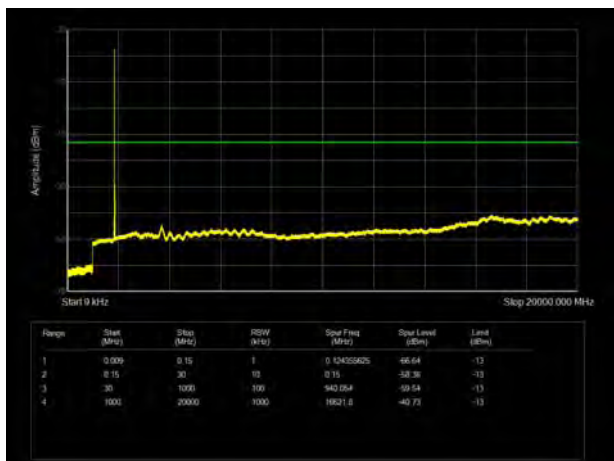
LTE Band 2 5MHz CH-High 9kHz~20GHz



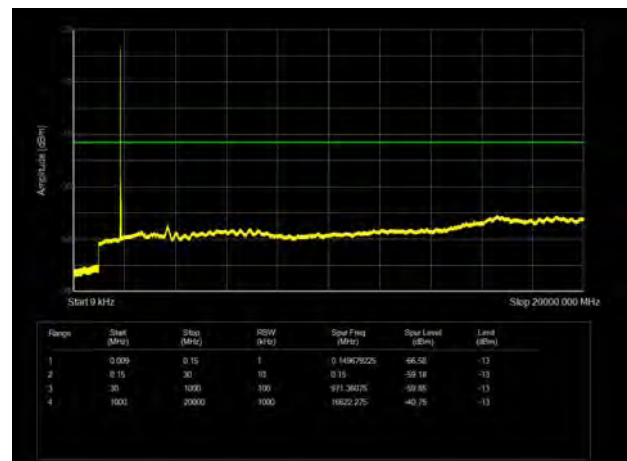
LTE Band 2 10MHz CH-High 9kHz~20GHz



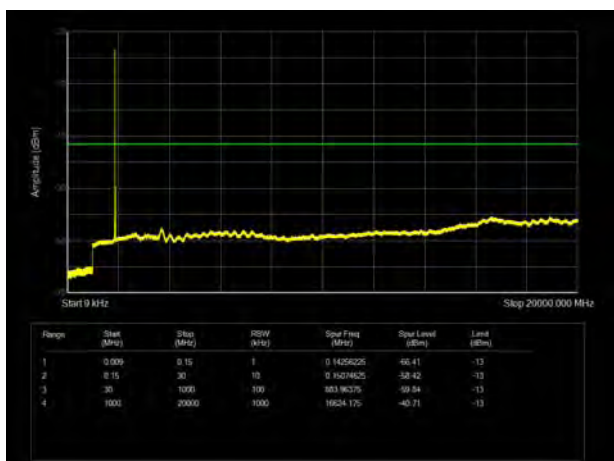
LTE Band 2 15MHz CH-Low 9kHz~20GHz



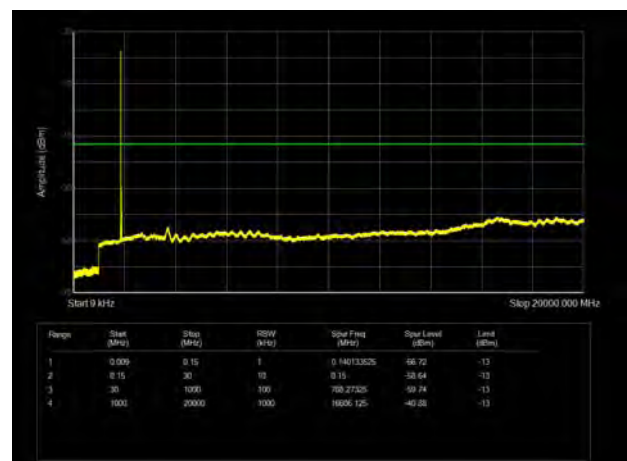
LTE Band 2 20MHz CH-Low 9kHz~20GHz



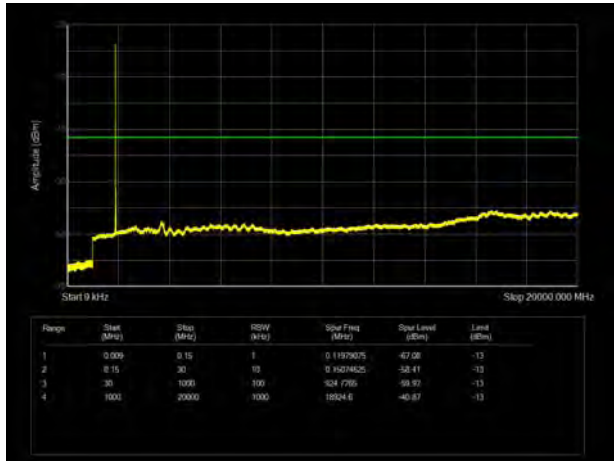
LTE Band 2 15MHz CH-Middle 9kHz~20GHz



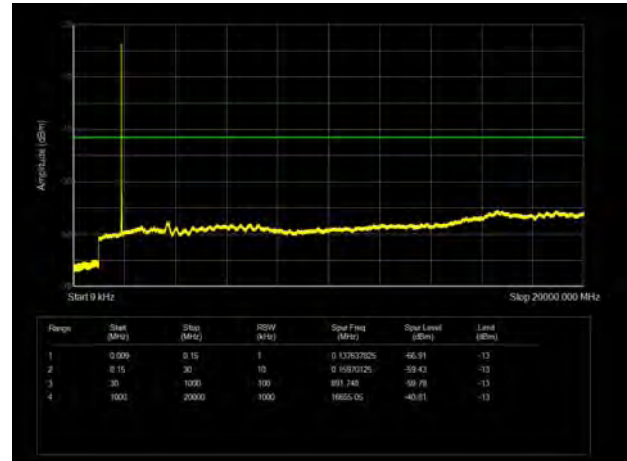
LTE Band 2 20MHz CH-Middle 9kHz~20GHz



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



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



5.7. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

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

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
The measurement results are amend as described below:

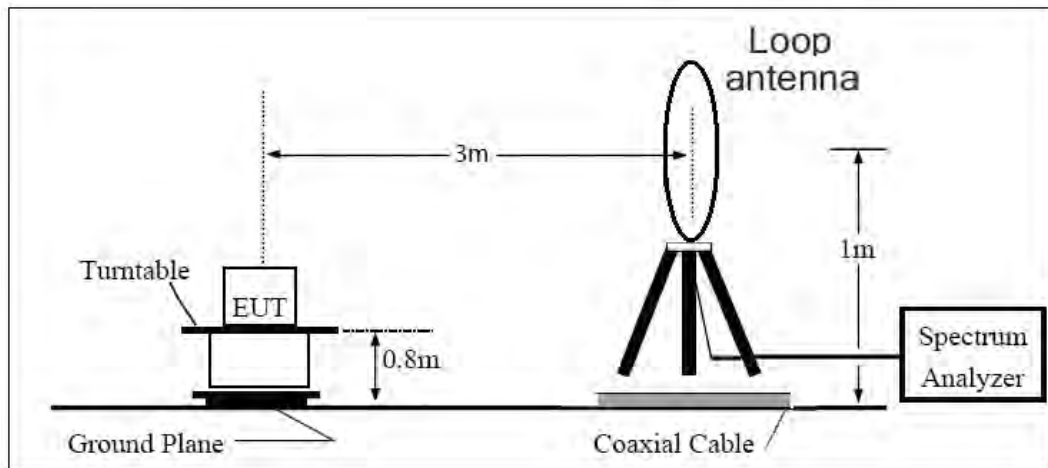
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

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

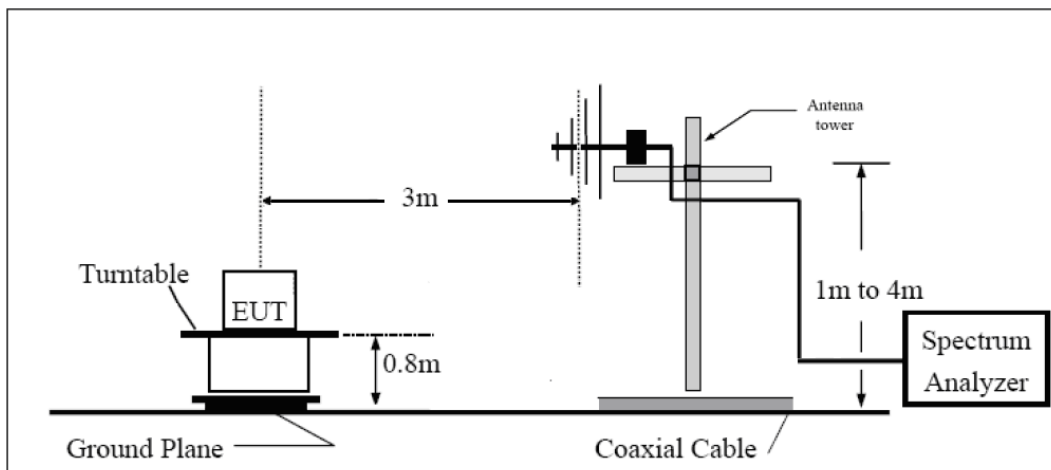
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

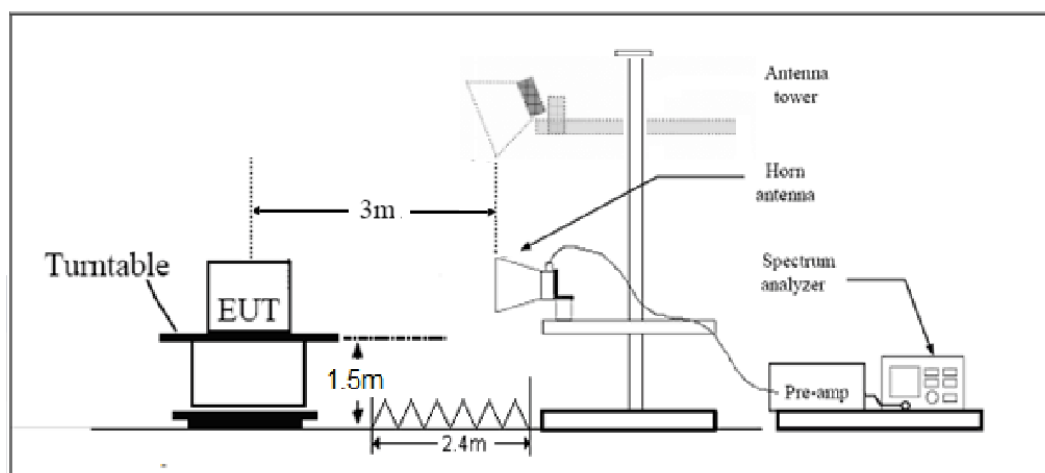
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz





Note: Area side: 2.4mX3.6m

Limits

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

Limit	-13 dBm
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Measurement Uncertainty

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

Test Result

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

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-55.13	5.10	11.05	Horizontal	-49.18	-13.00	36.18	45
3	5640.0	-58.31	5.42	12.65	Horizontal	-51.08	-13.00	38.08	180
4	7520.0	-57.22	6.70	13.85	Horizontal	-50.07	-13.00	37.07	315
5	9400.0	-56.07	7.01	14.75	Horizontal	-48.33	-13.00	35.33	90
6	11280.0	-53.66	7.48	15.95	Horizontal	-45.19	-13.00	32.19	225
7	13160.0	-52.55	7.51	16.55	Horizontal	-43.51	-13.00	30.51	0
8	15040.0	-49.65	8.24	15.35	Horizontal	-42.54	-13.00	29.54	180
9	16920.0	-42.63	8.41	14.95	Horizontal	-36.09	-13.00	23.09	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	-58.95	5.10	11.05	Horizontal	-53.00	-13.00	40.00	45
3	5640.0	-58.24	5.42	12.65	Horizontal	-51.01	-13.00	38.01	180
4	7520.0	-57.74	6.70	13.85	Horizontal	-50.59	-13.00	37.59	225
5	9400.0	-56.02	7.01	14.75	Horizontal	-48.28	-13.00	35.28	90
6	11280.0	-54.26	7.48	15.95	Horizontal	-45.79	-13.00	32.79	315
7	13160.0	-53.22	7.51	16.55	Horizontal	-44.18	-13.00	31.18	270
8	15040.0	-49.71	8.24	15.35	Horizontal	-42.60	-13.00	29.60	45
9	16920.0	-45.78	8.41	14.95	Horizontal	-39.24	-13.00	26.24	135
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									



LTE Band 2 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	-59.76	5.10	11.05	Horizontal	-53.81	-13.00	40.81	45.00
3	5638.9	-52.70	5.42	12.65	Horizontal	-45.47	-13.00	32.47	315.00
4	7520.0	-58.18	6.70	13.85	Horizontal	-51.03	-13.00	38.03	225.00
5	9400.0	-56.66	7.01	14.75	Horizontal	-48.92	-13.00	35.92	180.00
6	11280.0	-53.58	7.48	15.95	Horizontal	-45.11	-13.00	32.11	90.00
7	13160.0	-52.56	7.51	16.55	Horizontal	-43.52	-13.00	30.52	270.00
8	15040.0	-51.61	8.24	15.35	Horizontal	-44.50	-13.00	31.50	135.00
9	16920.0	-46.95	8.41	14.95	Horizontal	-40.41	-13.00	27.41	180.00
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	-56.34	5.10	11.05	Horizontal	-50.39	-13.00	37.39	0.00
3	5633.6	-58.07	5.42	12.65	Horizontal	-50.84	-13.00	37.84	45.00
4	7520.0	-56.61	6.70	13.85	Horizontal	-49.46	-13.00	36.46	135.00
5	9400.0	-55.23	7.01	14.75	Horizontal	-47.49	-13.00	34.49	90.00
6	11280.0	-53.33	7.48	15.95	Horizontal	-44.86	-13.00	31.86	225.00
7	13160.0	-52.42	7.51	16.55	Horizontal	-43.38	-13.00	30.38	0.00
8	15040.0	-49.86	8.24	15.35	Horizontal	-42.75	-13.00	29.75	315.00
9	16920.0	-45.77	8.41	14.95	Horizontal	-39.23	-13.00	26.23	45.00
10	18800.0	-	-	-	-	-	-	-	-

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



LTE Band 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3742.1	-56.81	5.10	11.05	Horizontal	-50.86	-13.00	37.86	0.00
3	5613.4	-58.54	5.42	12.65	Horizontal	-51.31	-13.00	38.31	45.00
4	7484.6	-57.24	6.70	13.85	Horizontal	-50.09	-13.00	37.09	180.00
5	9400.0	-54.05	7.01	14.75	Horizontal	-46.31	-13.00	33.31	225.00
6	11280.0	-53.58	7.48	15.95	Horizontal	-45.11	-13.00	32.11	45.00
7	13160.0	-53.35	7.51	16.55	Horizontal	-44.31	-13.00	31.31	0.00
8	15040.0	-50.11	8.24	15.35	Horizontal	-43.00	-13.00	30.00	315.00
9	16920.0	-45.50	8.41	14.95	Horizontal	-38.96	-13.00	25.96	90.00
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2019-05-19	2020-05-18
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV40	101298	2019-05-19	2020-05-18
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	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
Preamplifier	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	2019-12-13	2020-6-12
Software	R&S	EMC32	9.26.0	/	/

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