



RF TEST REPORT

Applicant Honor Device Co., Ltd.

FCC ID 2AYGCNZA-LX9N

Product Smart Phone

Model NZA-LX9N

Report No. R2101A0067-R1

Issue Date February 5, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2019)/ FCC CFR 47 Part 22H (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 Radiated Power	2.1046 22.913(a)(5)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 / 22.917(a)	PASS
4	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS
Date of Testing: January 20, 2021 ~ January 28, 2021			
Date of Sample Received: January 18, 2021			
Note: 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.			



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 measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform 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	Honor Device Co., Ltd.
Applicant address	Suite 3401, Unit A, Building 6, Shum Yip Sky Park, No. 8089, Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, Guangdong 518040, People's Republic of China
Manufacturer	Honor Device Co., Ltd.
Manufacturer address	Suite 3401, Unit A, Building 6, Shum Yip Sky Park, No. 8089, Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, Guangdong 518040, People's Republic of China

2.4. General Information

EUT Description		
Model	NZA-LX9N	
SN	L4H0120C21000132	
Hardware Version	HL1WKGM	
Software Version	5.0.0.76	
Power Supply	Battery/AC Adapter	
Antenna Type	Internal Antenna	
Antenna Gain	Main Antenna(dBi)	Second Antenna(dBi)
	-2.5	-1.8
Test Mode(s)	GSM 850; WCDMA Band V; LTE Band 5;	
Test Modulation	(GSM/GPRS)GMSK, (EGPRS) 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.R.P.	GSM 850:	29.34dBm
	WCDMA Band V:	20.50dBm
	LTE Band 5:	20.47dBm
Rated Power Supply Voltage	3.85V	
Extreme Voltage	Minimum: 3.27V Maximum: 4.43V	
Extreme Temperature	Lowest: -30°C Highest: +50°C	



Operating Voltage	Minimum: 3.6V Maximum: 4.43V		
Operating Temperature	Lowest: 0°C Highest: +35°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	WCDMA Band V	824 ~ 849	869 ~ 894
	LTE Band 5	824 ~ 849	869 ~ 894
EUT Accessory			
Accessory	Model	Manufacture	No.
Adapter	HW-100225E00	Honor Device Co., Ltd. (Manufacturer: BYD)	1
		Honor Device Co., Ltd. (Manufacturer: Phitek)	2
		Honor Device Co., Ltd. (Manufacturer: HUNTKEY)	3
	HW-100225B00	Honor Device Co., Ltd. (Manufacturer: BYD)	4
		Honor Device Co., Ltd. (Manufacturer: HUNTKEY)	5
	HW-100225U00	Honor Device Co., Ltd. (Manufacturer: BYD)	6
		Honor Device Co., Ltd. (Manufacturer: HUNTKEY)	7
	HW-100225A00	Honor Device Co., Ltd. (Manufacturer: BYD)	8
		Honor Device Co., Ltd. (Manufacturer: HUNTKEY)	9
Battery	HB526488EEW	Honor Device Co., Ltd. (Manufacturer: Sunwoda)	1
		Honor Device Co., Ltd. (Manufacturer: Desay)	2
		Honor Device Co., Ltd. (Manufacturer: NVT)	3
	HB536488EEW	Honor Device Co., Ltd. (Manufacturer: Sunwoda)	4
		Honor Device Co., Ltd. (Manufacturer: Desay)	5
		Honor Device Co., Ltd. (Manufacturer: NVT)	6
Earphone	MEND1532B528A11	Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD.	1
	1293-3283-3.5mm-339	Boluo County Quancheng Electronic Co.,Ltd.	2
	EPAB542-2WH05-DH	FOXCONN INTERCONNECT TECHNOLOGY LIMITED	3
USB Cable	18-93C2CHO-001HF	Freeport resources Enterprises Corp.	1
	WA0020	NingBo Broad Telecommunication Co., Ltd.	2
	L99UC131-CS-H	Luxshare Precision industry Co., Ltd.	3
	203-1572-0	MING JI ELECTRONICS CO., LTD.	4
	CUDU01B-HC295-EH	FOXCONN INTERCONNECT TECHNOLOGY LIMITED	5
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 / USB cable/ Battery and Earphone,each one should be applied throughout the compliance test respectively, and however, only the worst case (Adapter 6/ USB cable 3/ Battery 2 and Earphone 3) will be recorded in this report.			



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 22H (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 (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 850	WCDMA Band V
RF Power Output and Effective Radiated power	GSM GPRS EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Occupied Bandwidth	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GSM	RMC
Radiates Spurious Emission	GSM	RMC

Test modes are chosen as the worst case configuration below for LTE Band 5.

Test items	Bandwidth (MHz)				Modulation		RB			Test Channel		
	1.4	3	5	10	QPSK	16QAM	1	50%	100%	L	M	H
RF power output and Effective Radiated power	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	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
Frequency Stability	O	O	O	O	O	O	O	-	-	-	O	-
Spurious Emissions at Antenna Terminals	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 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 was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

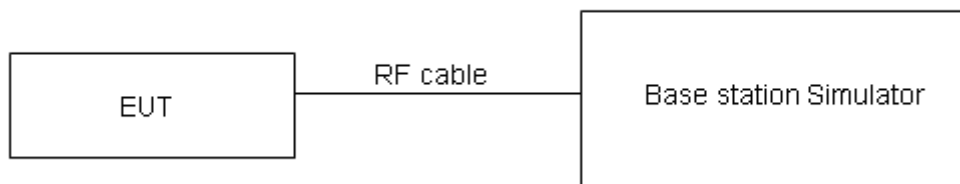
ERP can then be calculated as follows:

$EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$

where:dBd refers to gain relative to an ideal dipole.

$EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB)}$.

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 22.913(a)(5) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	$\leq 7 \text{ W}$ (38.45 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 $k = 2$, $U = 0.4 \text{ dB}$ for RF power output, $k = 2$, $U = 1.19 \text{ dB}$ for ERP.



Test Results

GSM 850		Maximum Output Power (dBm)			Main Antenna ERP (dBm)			Second Antenna ERP (dBm)		
		Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
		128/ 824.2	190/ 836.6	251/ 848.8	128/ 824.2	190/ 836.6	251/ 848.8	128/ 824.2	190/ 836.6	251/ 848.8
GSM	CS	33.29	33.27	33.28	28.64	28.62	28.63	29.34	29.32	29.33
GPRS/EGPRS (GMSK)	1 Tx Slot	33.24	33.27	33.22	28.59	28.62	28.57	29.29	29.32	29.27
	2 Tx Slots	30.51	30.48	30.47	25.86	25.83	25.82	26.56	26.53	26.52
	3 Tx Slots	28.68	28.71	28.70	24.03	24.06	24.05	24.73	24.76	24.75
	4 Tx Slots	27.34	27.38	27.36	22.69	22.73	22.71	23.39	23.43	23.41
EGPRS (8PSK)	1 Tx Slot	27.13	27.15	27.20	22.48	22.50	22.55	23.18	23.20	23.25
	2 Tx Slots	23.90	23.95	24.00	19.25	19.30	19.35	19.95	20.00	20.05
	3 Tx Slots	22.05	21.83	22.01	17.40	17.18	17.36	18.10	17.88	18.06
	4 Tx Slots	20.28	20.25	20.32	15.63	15.60	15.67	16.33	16.30	16.37

WCDMA Band V		Maximum Output Power (dBm)			Main Antenna ERP (dBm)			Second Antenna ERP (dBm)		
		Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
		4132/ 826.4	4183/ 836.6	4233/ 846.6	4132/ 826.4	4183/ 836.6	4233/ 846.6	4132/ 826.4	4183/ 836.6	4233/ 846.6
RMC	12.2k	24.45	24.42	24.43	19.80	19.77	19.78	20.50	20.47	20.48
HSDPA	Subtest 1	23.51	23.52	23.55	18.86	18.87	18.90	19.56	19.57	19.60
	Subtest 2	23.43	23.52	23.35	18.78	18.87	18.70	19.48	19.57	19.40
	Subtest 3	23.05	23.00	22.81	18.40	18.35	18.16	19.10	19.05	18.86
	Subtest 4	22.79	22.98	22.89	18.14	18.33	18.24	18.84	19.03	18.94
HSUPA	Subtest 1	21.41	21.58	21.41	16.76	16.93	16.76	17.46	17.63	17.46
	Subtest 2	21.59	21.26	21.29	16.94	16.61	16.64	17.64	17.31	17.34
	Subtest 3	22.53	22.56	22.59	17.88	17.91	17.94	18.58	18.61	18.64
	Subtest 4	20.79	20.88	20.81	16.14	16.23	16.16	16.84	16.93	16.86
	Subtest 5	22.35	22.58	22.35	17.70	17.93	17.70	18.40	18.63	18.40
DC-HSDPA	Subtest 1	23.35	23.50	23.47	18.70	18.85	18.82	19.40	19.55	19.52
	Subtest 2	23.43	23.46	23.55	18.78	18.81	18.90	19.48	19.51	19.60
	Subtest 3	22.81	22.80	22.97	18.16	18.15	18.32	18.86	18.85	19.02
	Subtest 4	22.83	22.82	22.85	18.18	18.17	18.20	18.88	18.87	18.90
HSPA+	16QAM	23.34	23.33	23.33	18.69	18.68	18.68	19.39	19.38	19.38



LTE Band 5				Maximum Output Power (dBm)			Main Antenna ERP (dBm)			Second Antenna ERP (dBm)		
Band width	Modu lation	RB Alloc ation	Off set	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
				20407 /824.7	20525 /836.5	20643 /848.3	20407/ 824.7	20525 /836.5	20643 /848.3	20407 /824.7	20525 /836.5	20643 /848.3
1.4MHz	QPSK	1	0	22.78	22.76	22.65	18.13	18.11	18.00	18.83	18.81	18.70
		1	2	24.17	24.13	24.06	19.52	19.48	19.41	20.22	20.18	20.11
		3	0	24.40	24.22	24.31	19.75	19.57	19.66	20.45	20.27	20.36
		3	2	24.11	24.25	24.12	19.46	19.60	19.47	20.16	20.30	20.17
		3	3	23.68	23.72	23.67	19.03	19.07	19.02	19.73	19.77	19.72
		6	0	23.38	23.36	23.33	18.73	18.71	18.68	19.43	19.41	19.38
	16QAM	1	0	23.40	23.34	23.30	18.75	18.69	18.65	19.45	19.39	19.35
		1	2	23.37	23.31	23.27	18.72	18.66	18.62	19.42	19.36	19.32
		1	5	23.35	23.41	23.29	18.70	18.76	18.64	19.40	19.46	19.34
		3	0	22.28	22.23	21.93	17.63	17.58	17.28	18.33	18.28	17.98
		3	2	23.24	23.21	23.42	18.59	18.56	18.77	19.29	19.26	19.47
		3	3	23.68	23.48	23.59	19.03	18.83	18.94	19.73	19.53	19.64
		6	0	22.27	22.29	22.22	17.62	17.64	17.57	18.32	18.34	18.27
Band width	Modu lation	RB Alloc ation	Off set	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
				20415 /825.5	20525 /836.5	20635 /847.5	20415 /825.5	20525 /836.5	20635 /847.5	20415 /825.5	20525 /836.5	20635 /847.5
3MHz	QPSK	1	0	22.80	22.77	22.68	18.15	18.12	18.03	18.85	18.82	18.73
		1	4	24.20	24.18	24.10	19.55	19.53	19.45	20.25	20.23	20.15
		1	7	24.42	24.26	24.34	19.77	19.61	19.69	20.47	20.31	20.39
		1	11	24.14	24.30	24.16	19.49	19.65	19.51	20.19	20.35	20.21
		1	14	23.71	23.77	23.71	19.06	19.12	19.06	19.76	19.82	19.76
		8	0	23.40	23.40	23.38	18.75	18.75	18.73	19.45	19.45	19.43
		8	4	23.44	23.36	23.34	18.79	18.71	18.69	19.49	19.41	19.39
		8	7	23.39	23.34	23.29	18.74	18.69	18.64	19.44	19.39	19.34
		15	0	23.38	23.45	23.32	18.73	18.80	18.67	19.43	19.50	19.37
	16QAM	1	0	22.31	22.25	21.96	17.66	17.60	17.31	18.36	18.30	18.01
		1	4	23.27	23.26	23.46	18.62	18.61	18.81	19.32	19.31	19.51
		1	7	23.70	23.52	23.62	19.05	18.87	18.97	19.75	19.57	19.67
		1	11	23.30	23.34	23.26	18.65	18.69	18.61	19.35	19.39	19.31
		1	14	22.09	22.01	22.17	17.44	17.36	17.52	18.14	18.06	18.22
		8	0	22.37	22.38	22.45	17.72	17.73	17.80	18.42	18.43	18.50
		8	4	22.38	22.26	22.30	17.73	17.61	17.65	18.43	18.31	18.35
		8	7	22.38	22.30	22.25	17.73	17.65	17.60	18.43	18.35	18.30
		15	0	22.29	22.36	22.34	17.64	17.71	17.69	18.34	18.41	18.39
Band width	Modu lation	RB Alloc ation	Off set	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
				20425 /826.5	20525 /836.5	20625 /846.5	20425 /826.5	20525 /836.5	20625 /846.5	20425 /826.5	20525 /836.5	20625 /846.5



5MHz	QPSK	1	0	22.79	22.73	22.66	18.14	18.08	18.01	18.84	18.78	18.71
		1	6	24.18	24.17	24.07	19.53	19.52	19.42	20.23	20.22	20.12
		1	13	24.39	24.21	24.30	19.74	19.56	19.65	20.44	20.26	20.35
		1	18	24.12	24.26	24.13	19.47	19.61	19.48	20.17	20.31	20.18
		1	24	23.68	23.72	23.67	19.03	19.07	19.02	19.73	19.77	19.72
		12	0	23.37	23.37	23.34	18.72	18.72	18.69	19.42	19.42	19.39
		12	6	23.42	23.32	23.29	18.77	18.67	18.64	19.47	19.37	19.34
		12	13	23.34	23.32	23.27	18.69	18.67	18.62	19.39	19.37	19.32
		25	0	23.36	23.42	23.30	18.71	18.77	18.65	19.41	19.47	19.35
	QPSK	1	0	22.28	22.21	21.93	17.63	17.56	17.28	18.33	18.26	17.98
		1	6	23.24	23.24	23.43	18.59	18.59	18.78	19.29	19.29	19.48
		1	13	23.67	23.47	23.58	19.02	18.82	18.93	19.72	19.52	19.63
		1	18	23.28	23.30	23.23	18.63	18.65	18.58	19.33	19.35	19.28
		1	24	22.06	21.96	22.13	17.41	17.31	17.48	18.11	18.01	18.18
		12	0	22.32	22.36	22.43	17.67	17.71	17.78	18.37	18.41	18.48
		12	6	22.36	22.23	22.28	17.71	17.58	17.63	18.41	18.28	18.33
		12	13	22.39	22.29	22.26	17.74	17.64	17.61	18.44	18.34	18.31
		25	0	22.28	22.38	22.35	17.63	17.73	17.70	18.33	18.43	18.40
Band width	Modulation	RB Allocation	Off set	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)		
				20450 /829	20525 /836.5	20600 /844	20450 /829	20525 /836.5	20600 /844	20450 /829	20525 /836.5	20600 /844
10MHz	QPSK	1	0	22.76	22.69	22.63	18.11	18.04	17.98	18.81	18.74	18.68
		1	1	24.17	24.13	24.05	19.52	19.48	19.40	20.22	20.18	20.10
		1	25	24.37	24.20	24.27	19.72	19.55	19.62	20.42	20.25	20.32
		1	48	24.09	24.21	24.09	19.44	19.56	19.44	20.14	20.26	20.14
		1	49	22.66	22.68	22.64	18.01	18.03	17.99	18.71	18.73	18.69
		25	0	23.34	23.32	23.30	18.69	18.67	18.65	19.39	19.37	19.35
		25	13	23.39	23.27	23.25	18.74	18.62	18.60	19.44	19.32	19.30
		25	25	23.38	23.28	23.22	18.73	18.63	18.57	19.43	19.33	19.27
		50	0	23.32	23.40	23.26	18.67	18.75	18.61	19.37	19.45	19.31
	16QAM	1	0	22.26	22.18	21.91	17.61	17.53	17.26	18.31	18.23	17.96
		1	0	23.21	23.20	23.40	18.56	18.55	18.75	19.26	19.25	19.45
		1	25	23.64	23.45	23.55	18.99	18.80	18.90	19.69	19.50	19.60
		1	48	23.25	23.25	23.19	18.60	18.60	18.54	19.30	19.30	19.24
		1	49	22.04	21.92	22.10	17.39	17.27	17.45	18.09	17.97	18.15
		25	0	22.30	22.32	22.38	17.65	17.67	17.73	18.35	18.37	18.43
		25	13	22.32	22.21	22.24	17.67	17.56	17.59	18.37	18.26	18.29
		25	25	22.33	22.23	22.20	17.68	17.58	17.55	18.38	18.28	18.25
		50	0	22.23	22.30	22.28	17.58	17.65	17.63	18.28	18.35	18.33

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 6.2kHz, VBW is set to 18kHz for GSM 850,

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

RBW is set to 30 kHz, VBW is set to 91kHz for LTE Band 5 (1.4MHz),

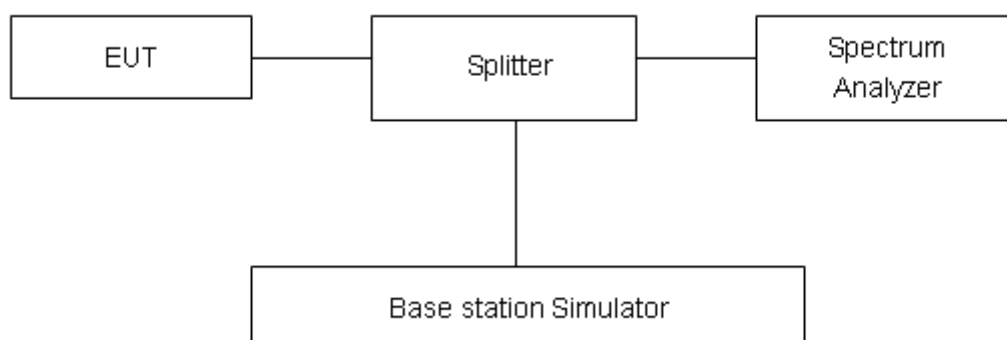
RBW is set to 62 kHz, VBW is set to 180kHz for LTE Band 5 (3MHz),

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

RBW is set to 200 kHz, VBW is set to 620kHz for LTE Band 5 (10MHz),

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 850 (GMSK)	128	824.2	0.25010	0.3136
	190	836.6	0.24410	0.3100
	251	848.8	0.24846	0.3158
GPRS 850 (GMSK)	128	824.2	0.24370	0.3144
	190	836.6	0.24448	0.3198
	251	848.8	0.24478	0.3023
EGPRS 850 (8PSK)	128	824.2	0.25474	0.3263
	190	836.6	0.25445	0.3084
	251	848.8	0.25136	0.3146
WCDMA Band V (RMC)	4132	826.4	4.1503	4.6920
	4183	836.6	4.1722	4.6850
	4233	846.6	4.1587	4.6840



LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20407	824.7	1.0912	1.257
			20525	836.5	1.0908	1.276
			20643	848.3	1.0917	1.276
		3	20415	825.5	2.6883	2.932
			20525	836.5	2.6848	2.898
			20635	847.5	2.6947	2.906
		5	20425	826.5	4.5177	4.877
			20525	836.5	4.5055	4.903
			20625	846.5	4.4982	4.936
		10	20450	829	8.9703	9.659
			20525	836.5	8.9886	9.683
			20600	844	8.9963	9.717
	16QAM	1.4	20407	824.7	1.0941	1.290
			20525	836.5	1.0967	1.297
			20643	848.3	1.0912	1.256
		3	20415	825.5	2.6848	2.955
			20525	836.5	2.6878	2.913
			20635	847.5	2.6883	2.917
		5	20425	826.5	4.5013	4.916
			20525	836.5	4.5022	4.883
			20625	846.5	4.5074	4.922
		10	20450	829	8.9562	9.664
			20525	836.5	8.9844	9.678
			20600	844	8.9986	9.544



GSM 850 EGPRS CH-Low



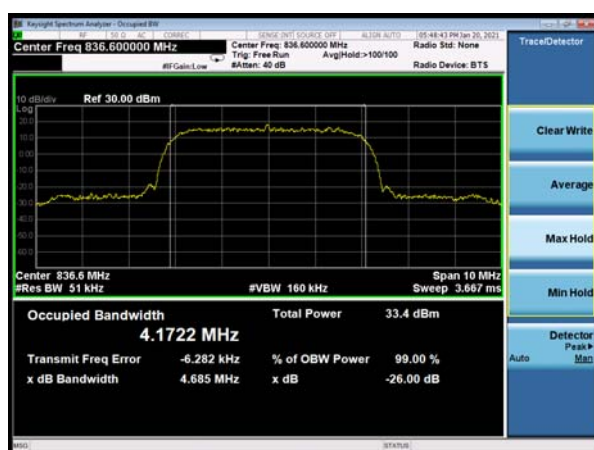
WCDMA Band V CH-Low



GSM 850 EGPRS CH-Middle



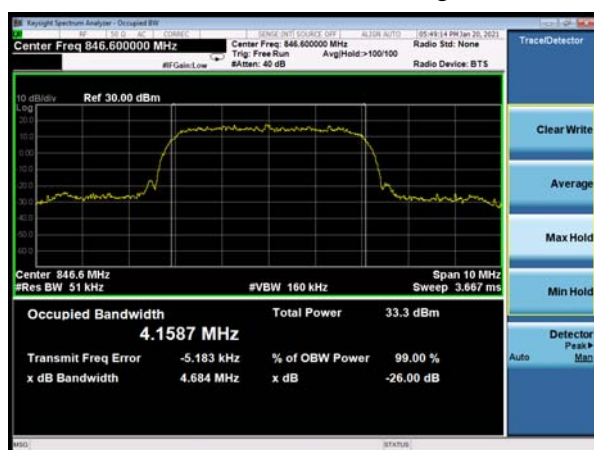
WCDMA Band V CH-Middle



GSM 850 EGPRS CH-High



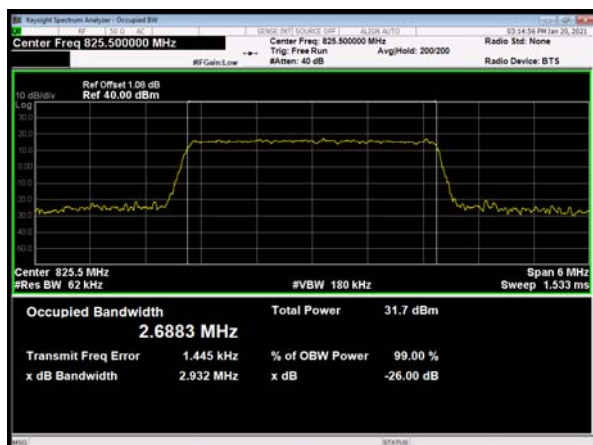
WCDMA Band V CH-High



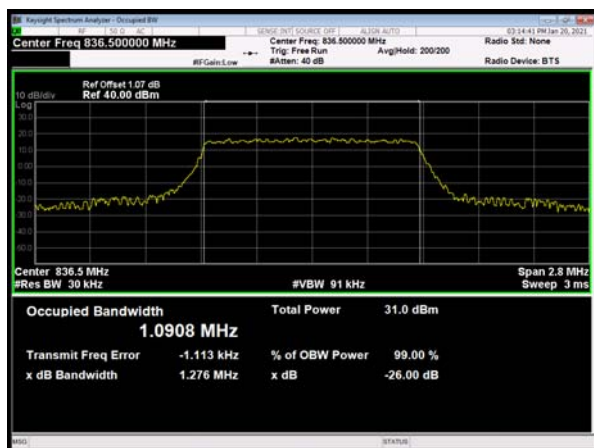
LTE Band 5 QPSK 1.4MHz CH-Low



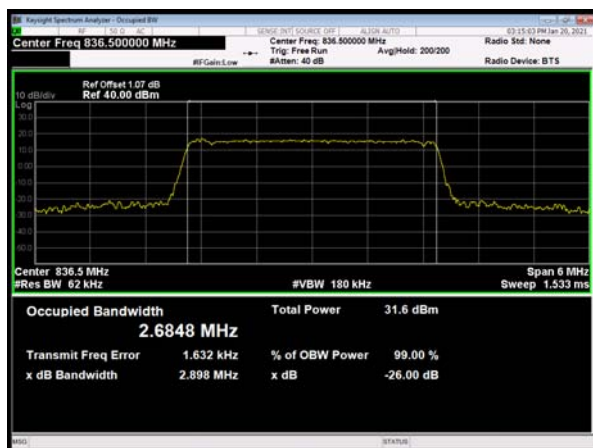
LTE Band 5 QPSK 3MHz CH-Low



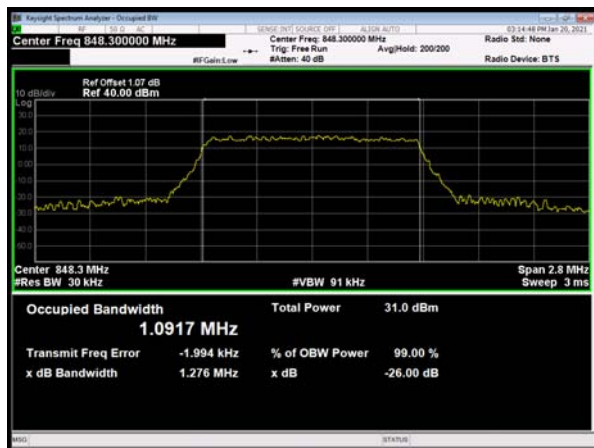
LTE Band 5 QPSK 1.4MHz CH-Middle



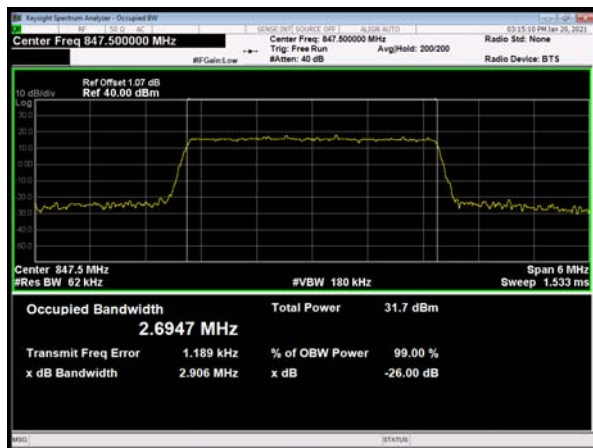
LTE Band 5 QPSK 3MHz CH-Middle



LTE Band 5 QPSK 1.4MHz CH-High

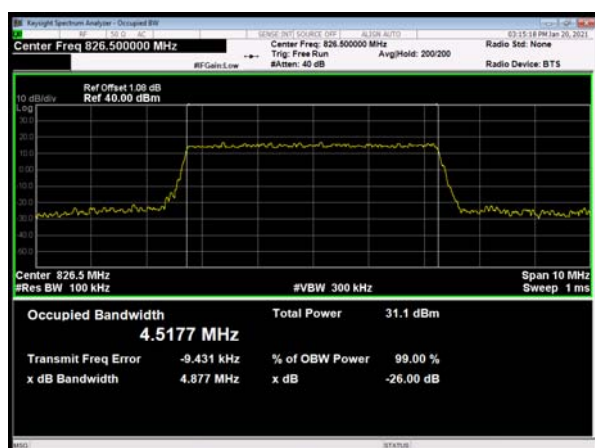


LTE Band 5 QPSK 3MHz CH-High

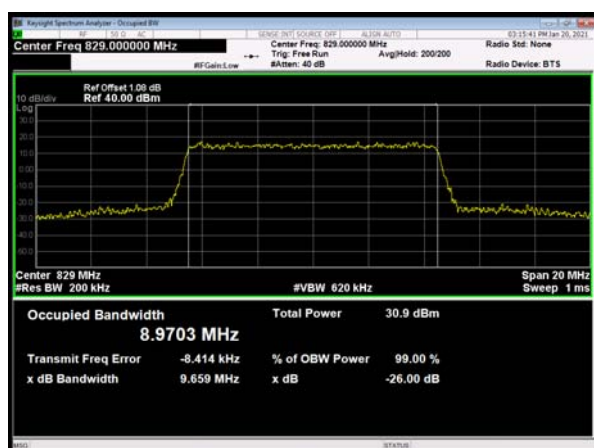




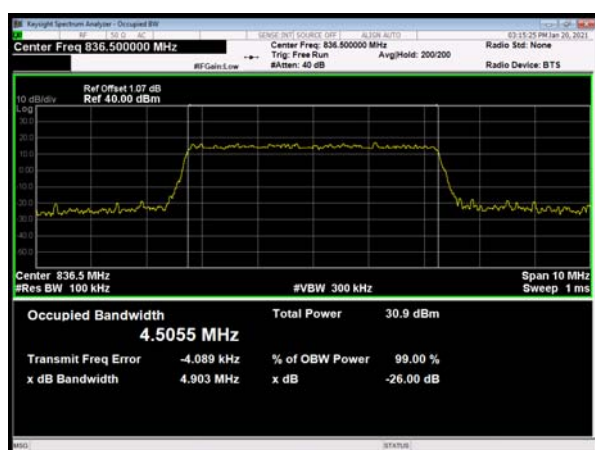
LTE Band 5 QPSK 5MHz CH-Low



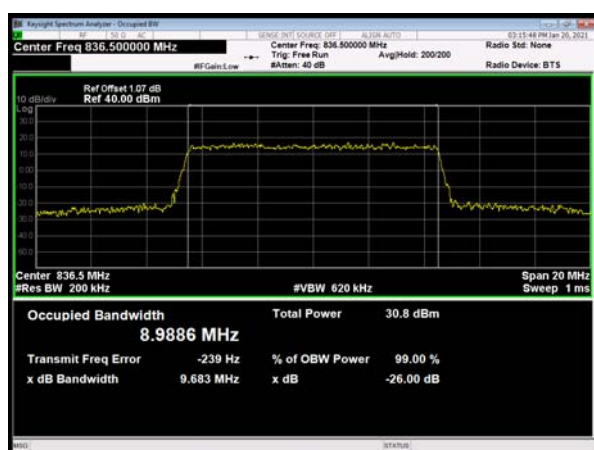
LTE Band 5 QPSK 10MHz CH-Low



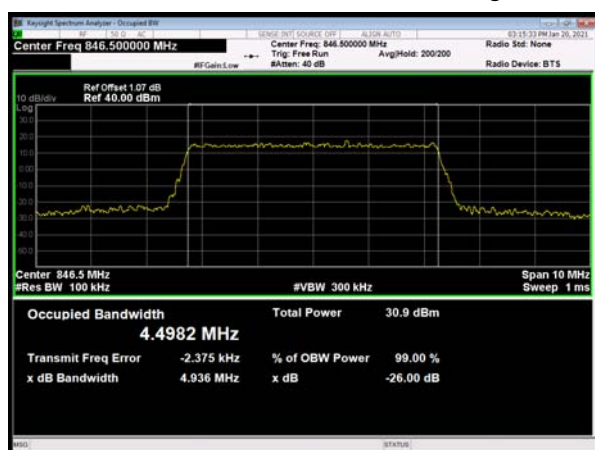
LTE Band 5 QPSK 5MHz CH-Middle



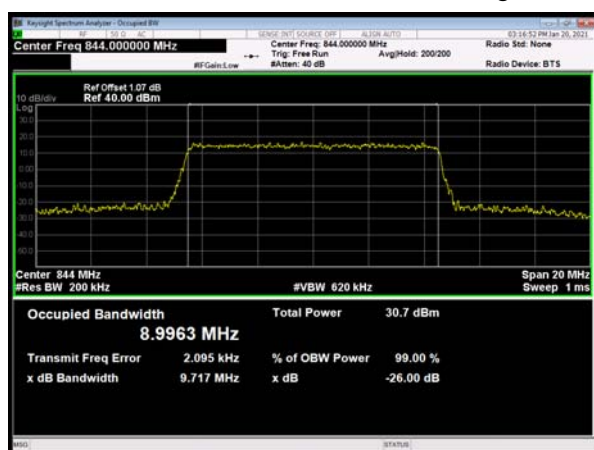
LTE Band 5 QPSK 10MHz CH-Middle



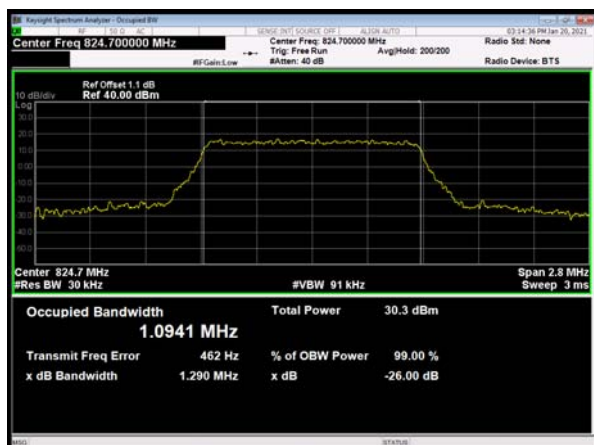
LTE Band 5 QPSK 5MHz CH-High



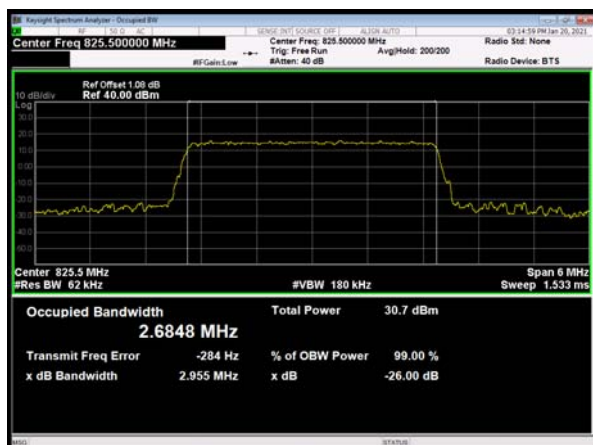
LTE Band 5 QPSK 10MHz CH-High



LTE Band 5 16QAM 1.4MHz CH-Low



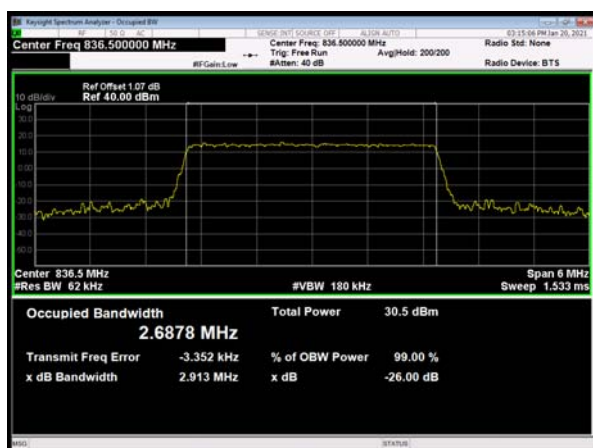
LTE Band 5 16QAM 3MHz CH-Low



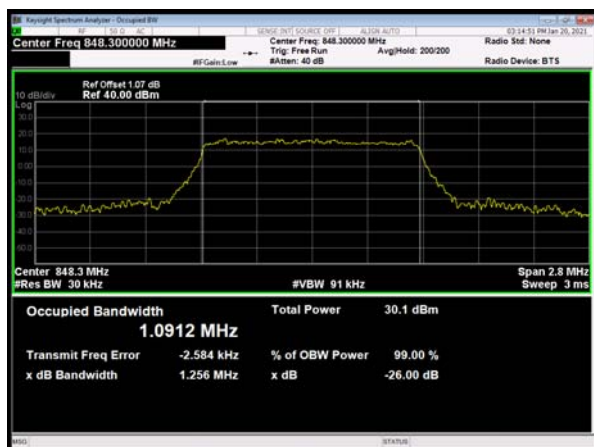
LTE Band 5 16QAM 1.4MHz CH-Middle



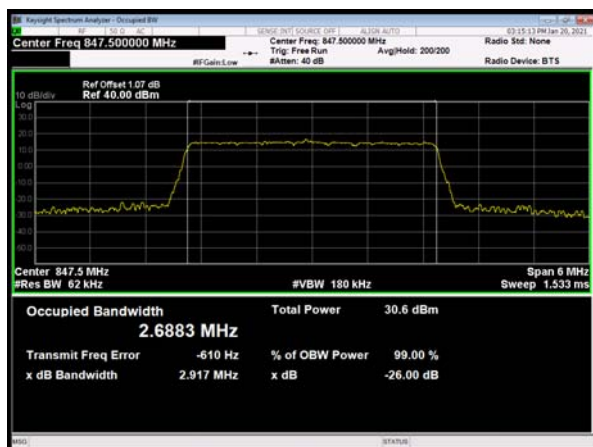
LTE Band 5 16QAM 3MHz CH-Middle



LTE Band 5 16QAM 1.4MHz CH-High

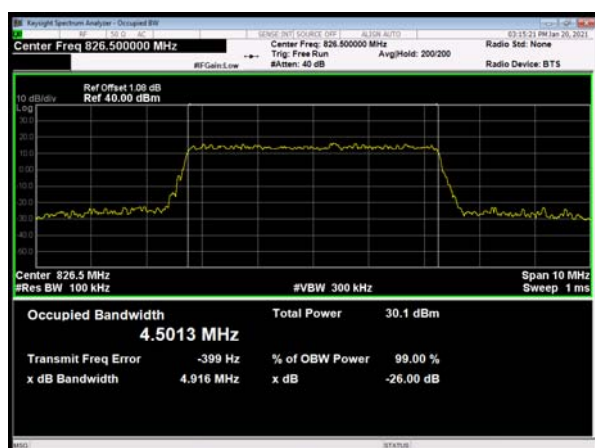


LTE Band 5 16QAM 3MHz CH-High

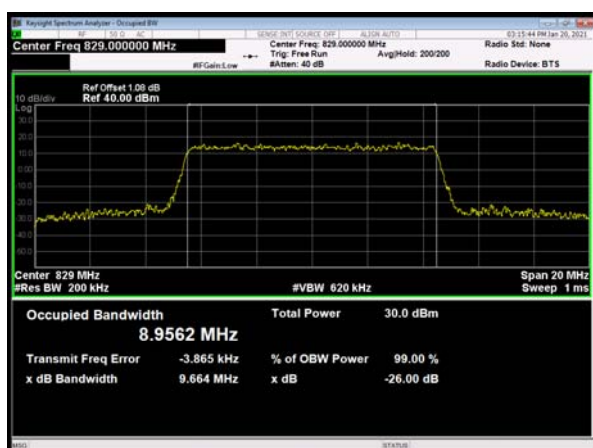




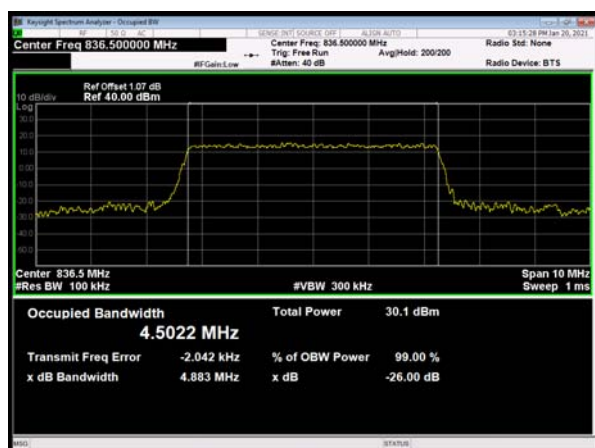
LTE Band 5 16QAM 5MHz CH-Low



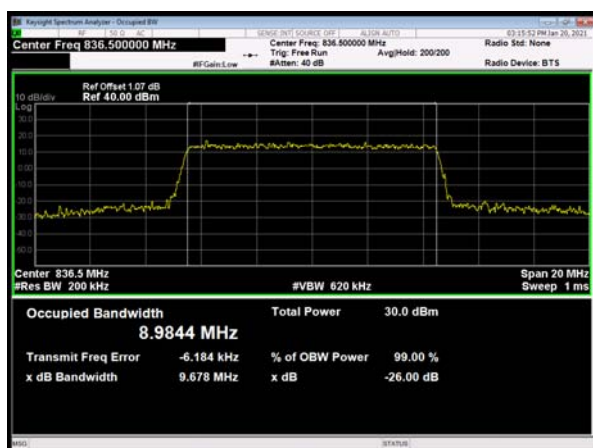
LTE Band 5 16QAM 10MHz CH-Low



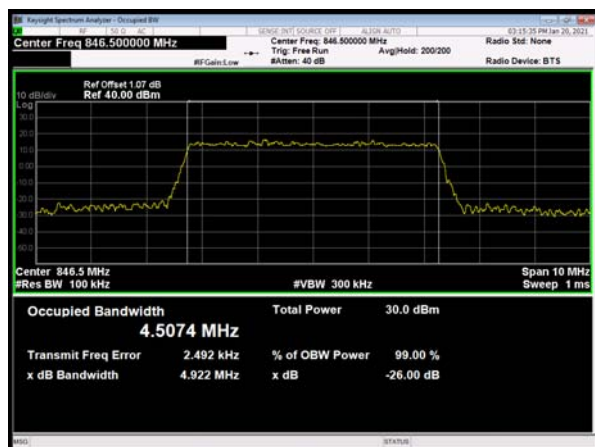
LTE Band 5 16QAM 5MHz CH-Middle



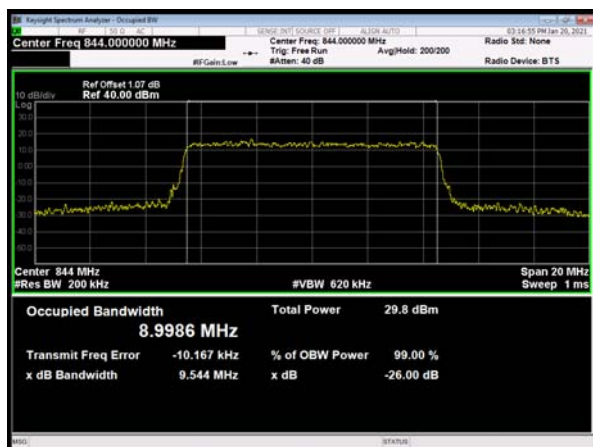
LTE Band 5 16QAM 10MHz CH-Middle



LTE Band 5 16QAM 5MHz CH-High



LTE Band 5 16QAM 10MHz 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.

RBW is set to 6.2kHz,VBW is set to 18kHz for GSM 850,

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

RBW is set to 15kHz, VBW is set to 43kHz for LTE Band 5 (1.4MHz),

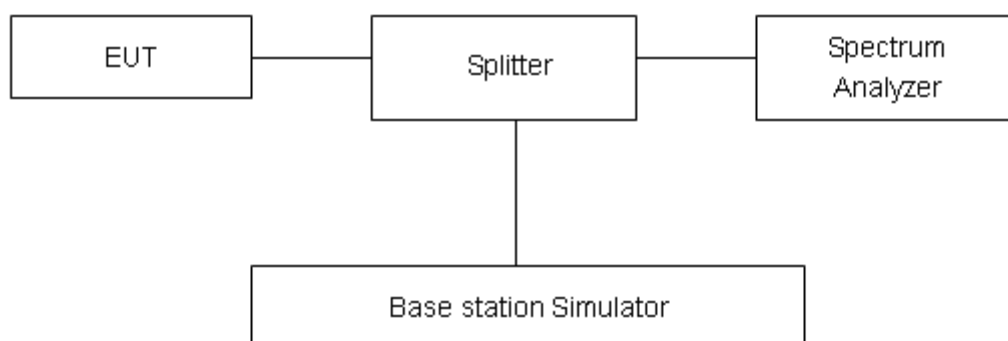
RBW is set to 30kHz,VBW is set to 91kHz for LTE Band 5 (3MHz),

RBW is set to 51kHz,VBW is set to 150kHz for LTE Band 5 (5MHz),

RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 5 (10MHz),

Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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



Test Result:

GSM 850 CH-Low



GSM 850 CH-High



GSM 850 GPRS CH-Low



GSM 850 GPRS CH-High



GSM 850 EGPRS CH-Low



GSM 850 EGPRS CH-High





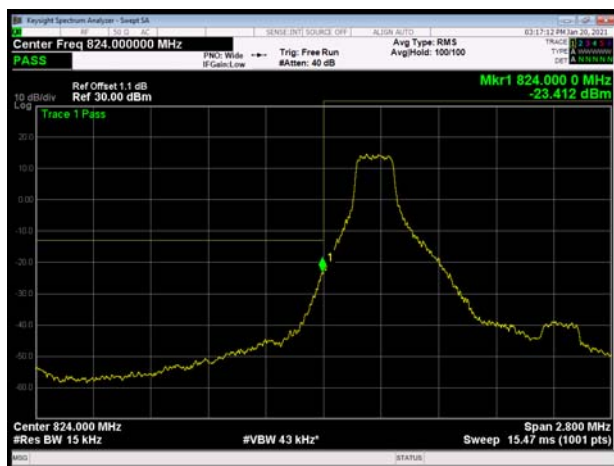
WCDMA Band V CH-Low



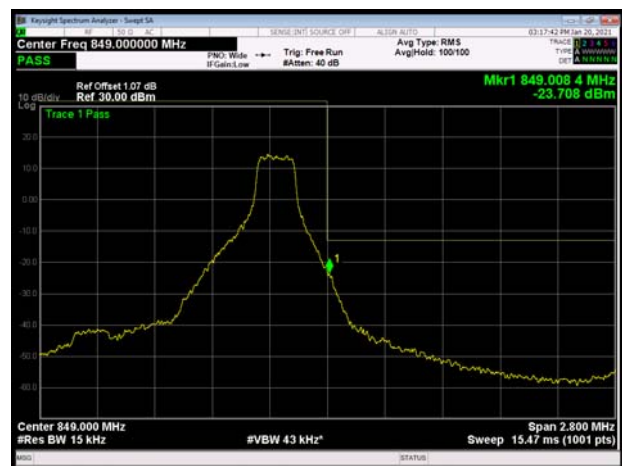
WCDMA Band V CH-High



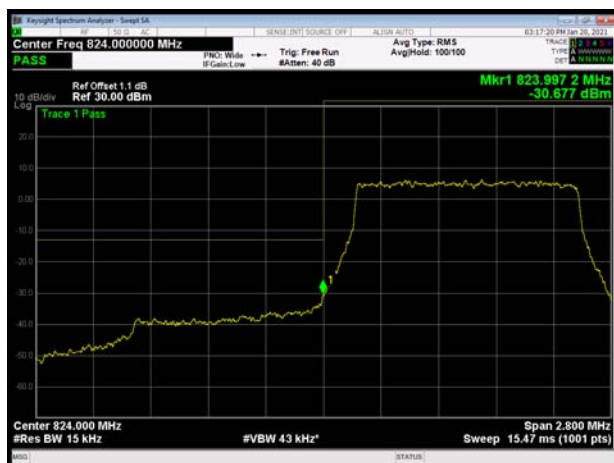
LTE Band 5 QPSK 1.4MHz CH-Low 1RB



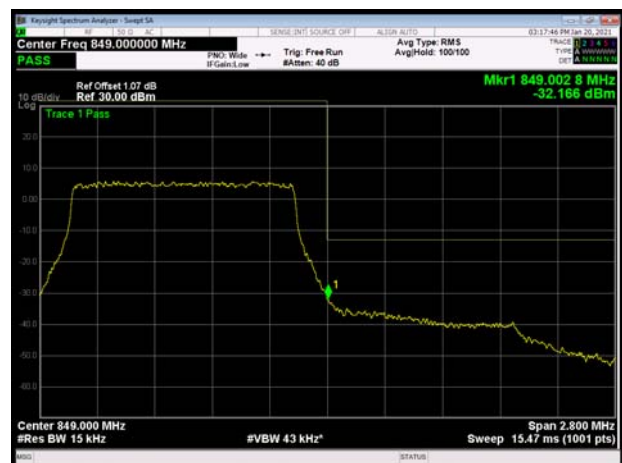
LTE Band 5 QPSK 1.4MHz CH-High 1RB



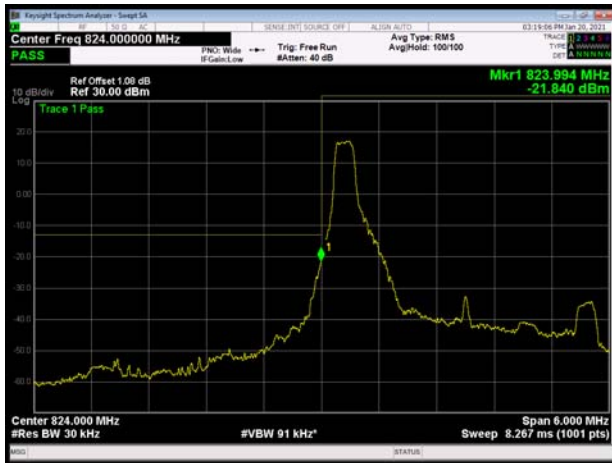
LTE Band 5 QPSK 1.4MHz CH-Low 100%RB



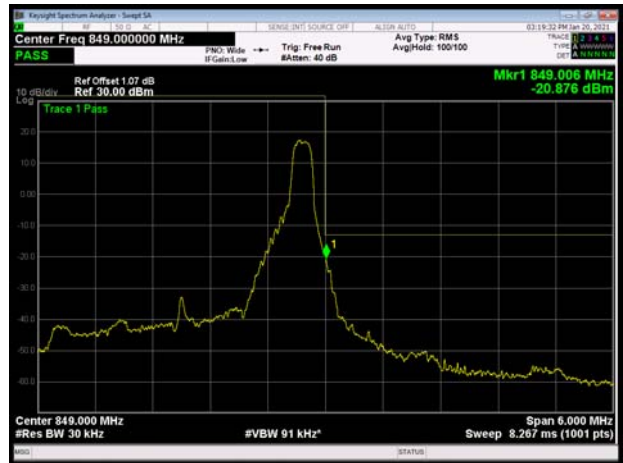
LTE Band 5 QPSK 1.4MHz CH-High 100%RB



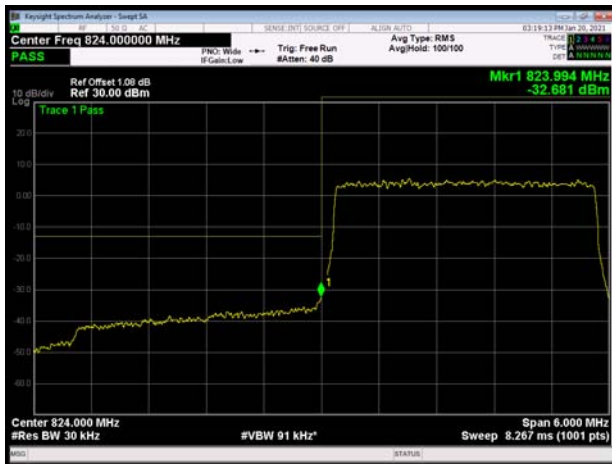
LTE Band 5 QPSK 3MHz CH-Low 1RB



LTE Band 5 QPSK 3MHz CH-High 1RB



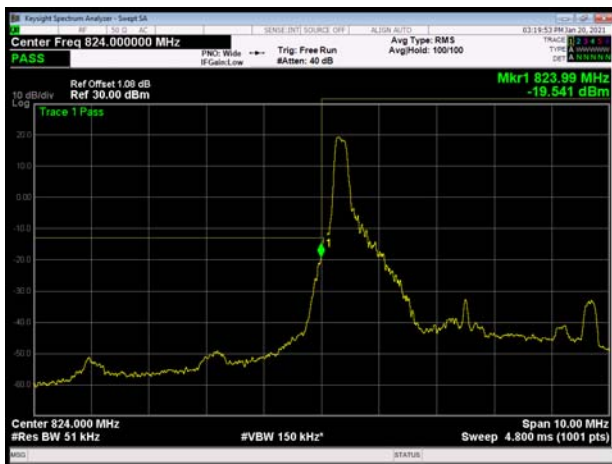
LTE Band 5 QPSK 3MHz CH-Low 100%RB



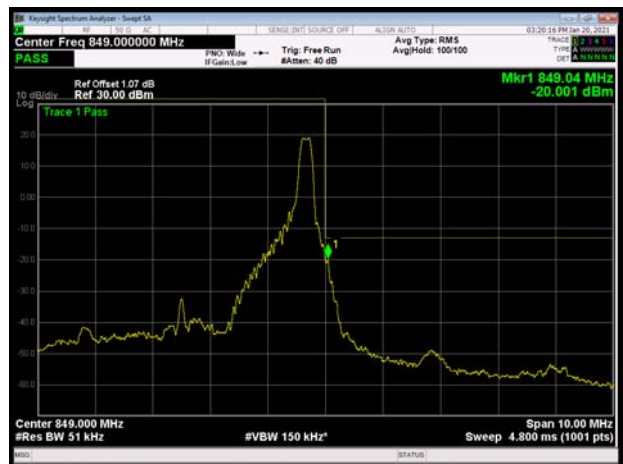
LTE Band 5 QPSK 3MHz CH-High 100%RB



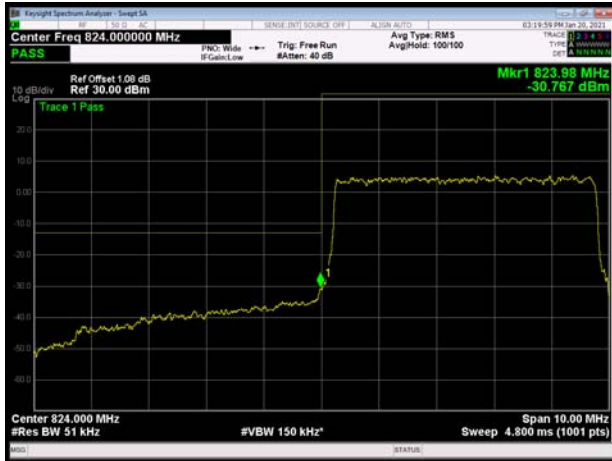
LTE Band 5 QPSK 5MHz CH-Low 1RB



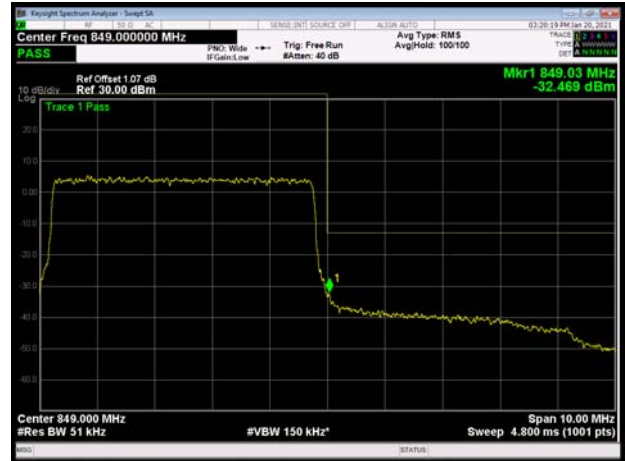
LTE Band 5 QPSK 5MHz CH-High 1RB



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



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



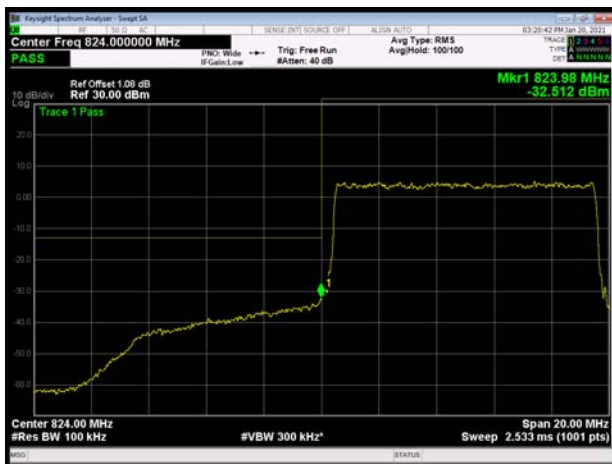
LTE Band 5 QPSK 10MHz CH-Low 1RB



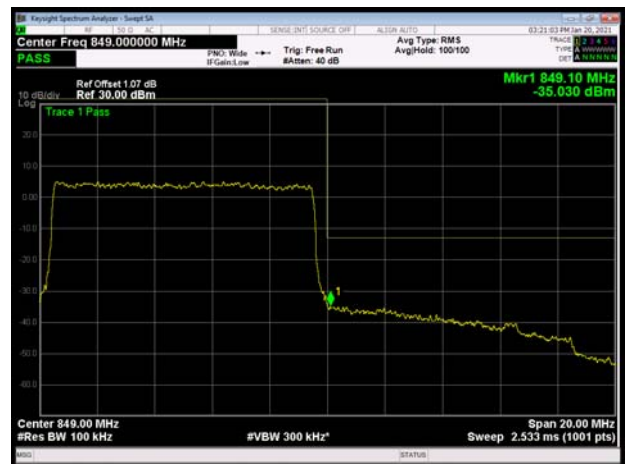
LTE Band 5 QPSK 10MHz CH-High 1RB



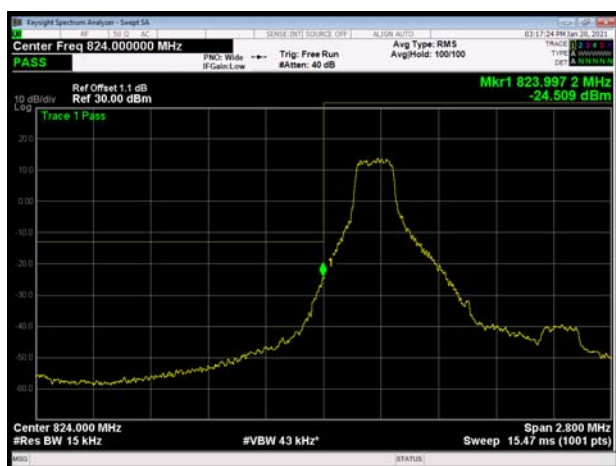
LTE Band 5 QPSK 10MHz CH-Low 100%RB



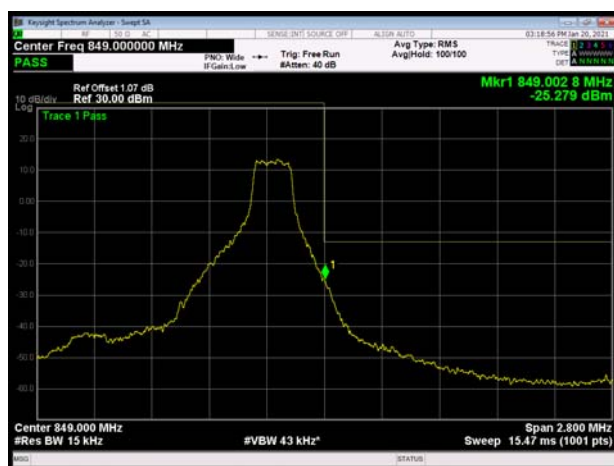
LTE Band 5 QPSK 10MHz CH-High 100%RB



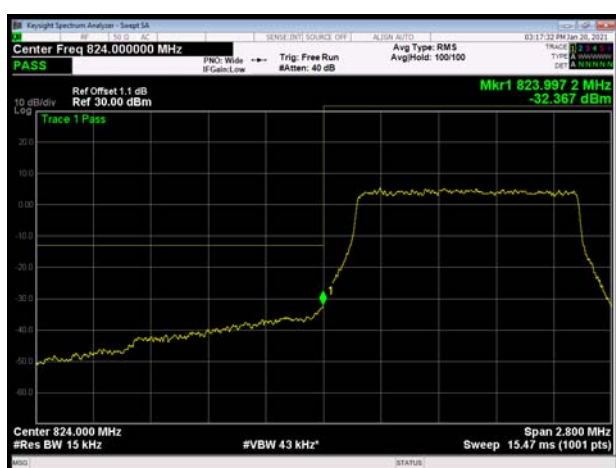
LTE Band 5 16QAM 1.4MHz CH-Low 1RB



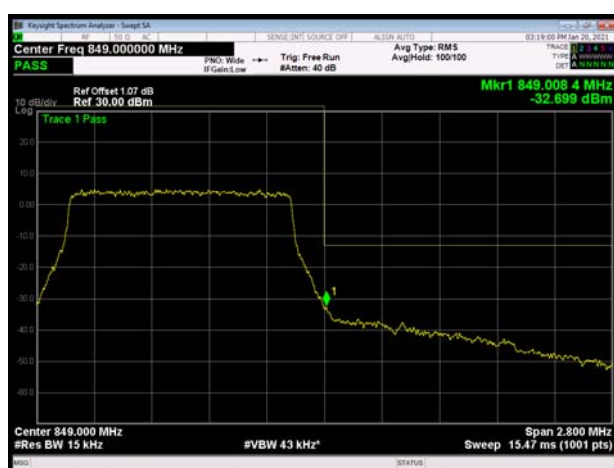
LTE Band 5 16QAM 1.4MHz CH-High 1RB



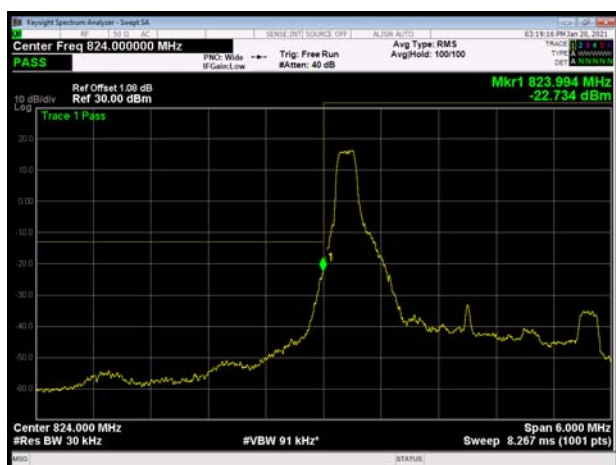
LTE Band 5 16QAM 1.4MHz CH-Low 100%RB



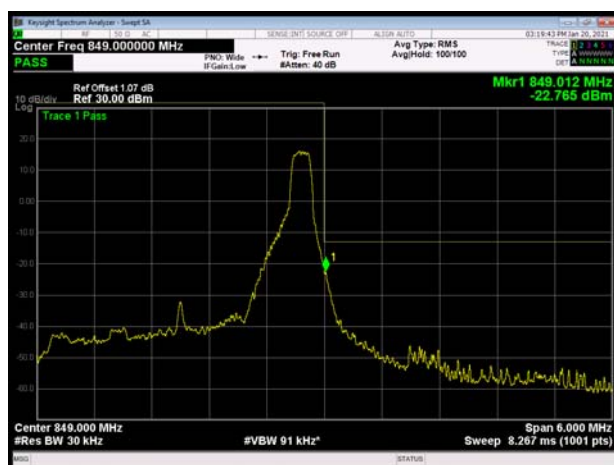
LTE Band 5 16QAM 1.4MHz CH-High 100%RB



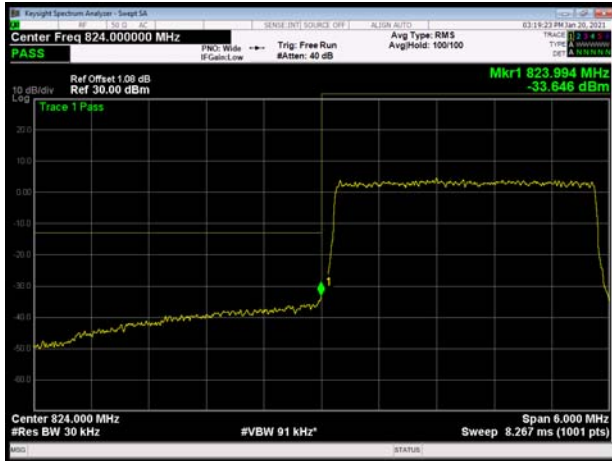
LTE Band 5 16QAM 3MHz CH-Low 1RB



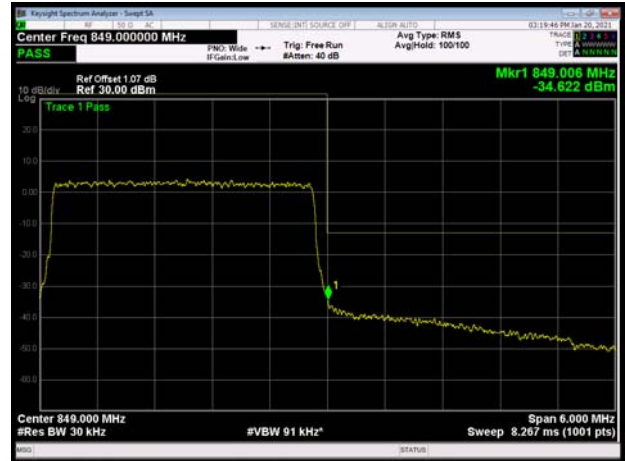
LTE Band 5 16QAM 3MHz CH-High 1RB



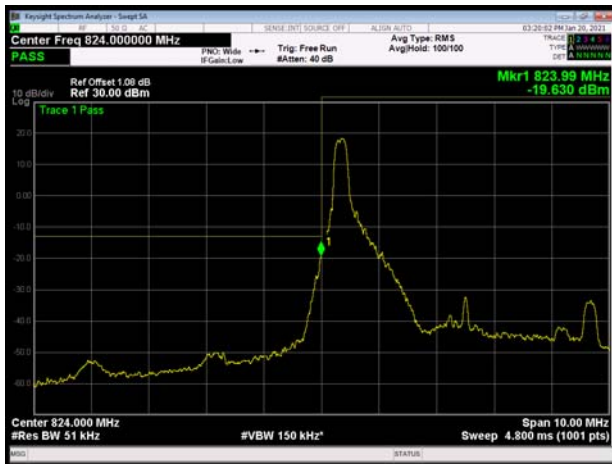
LTE Band 5 16QAM 3MHz CH-Low 100%RB



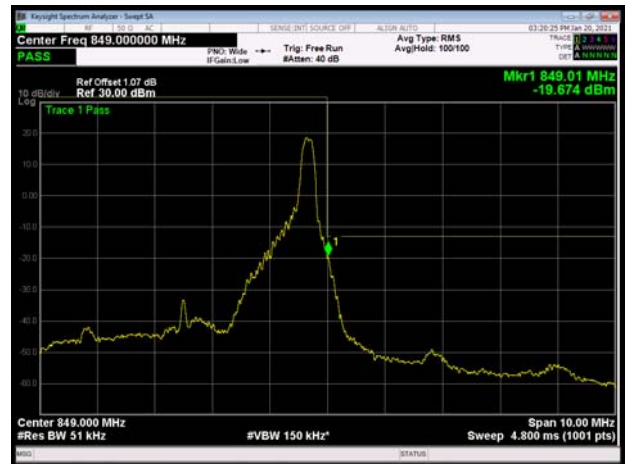
LTE Band 5 16QAM 3MHz CH-High 100%RB



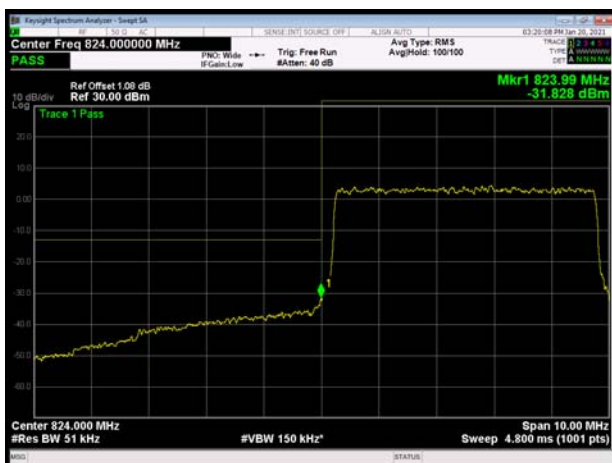
LTE Band 5 16QAM 5MHz CH-Low 1RB



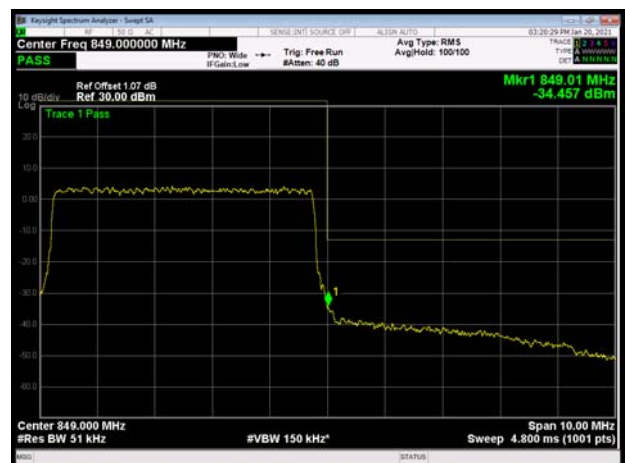
LTE Band 5 16QAM 5MHz CH-High 1RB



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

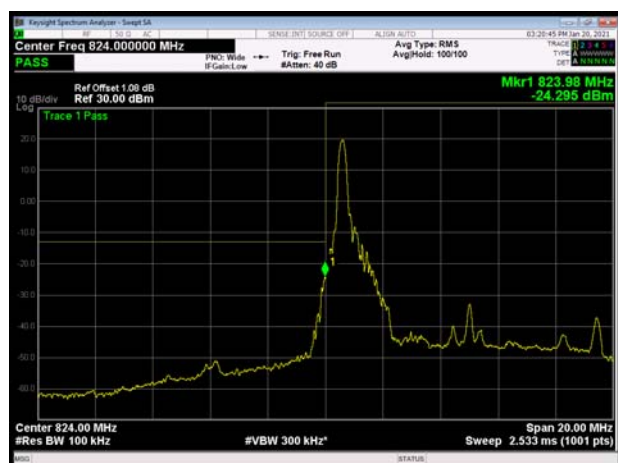


LTE Band 5 16QAM 5MHz CH-High 100%RB

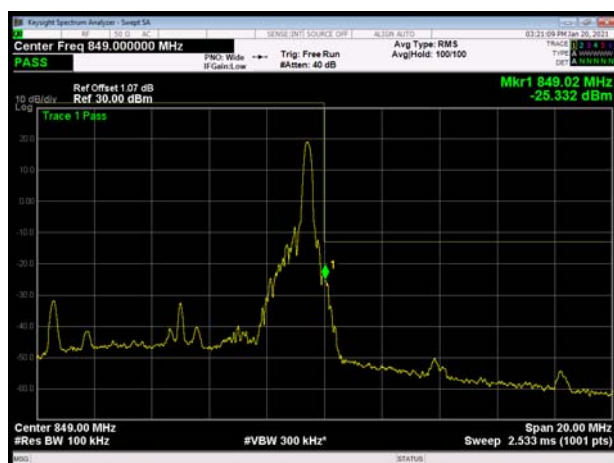




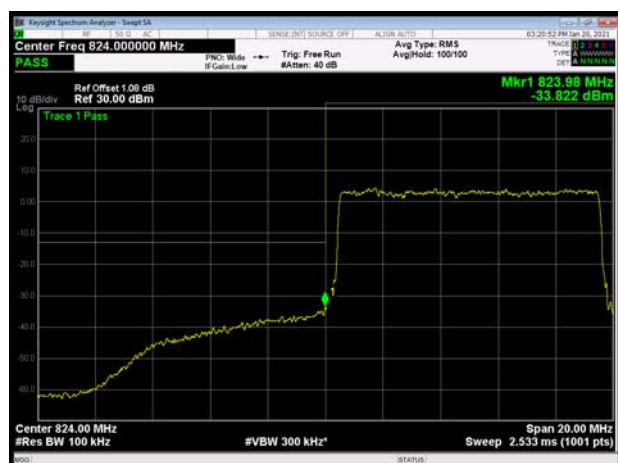
LTE Band 5 16QAM 10MHz CH-Low 1RB



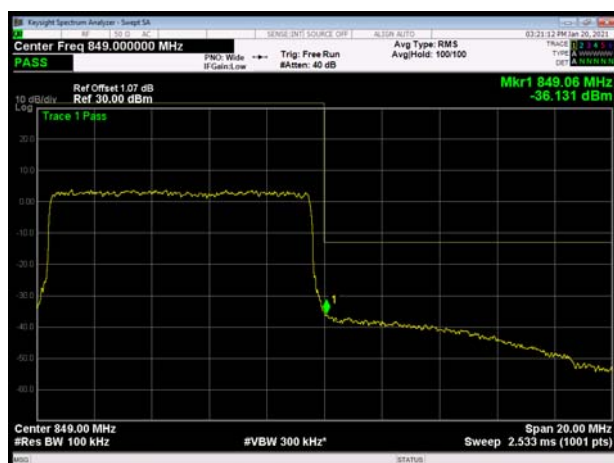
LTE Band 5 16QAM 10MHz CH-High 1RB



LTE Band 5 16QAM 10MHz CH-Low 100%RB



LTE Band 5 16QAM 10MHz CH-High 100%RB



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

Ambient condition

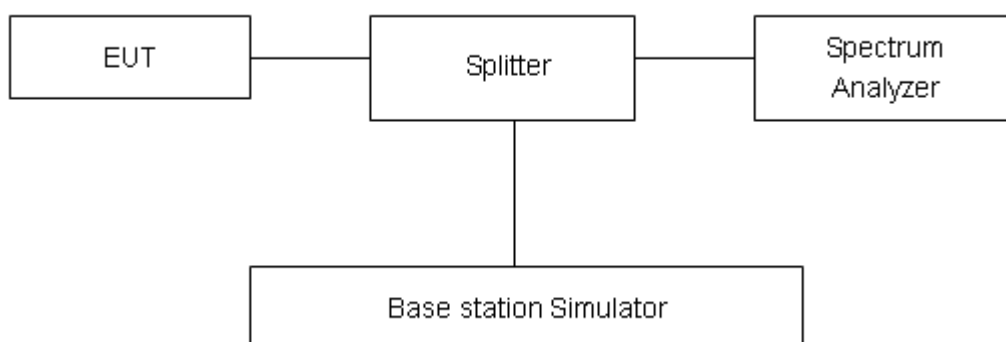
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

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

$$PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).$$

Test Setup



Limits

According to the Sec. 22.913(d), The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

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 850 (GMSK)	128	824.2	35.15	33.29	1.86	≤13	PASS
	190	836.6	35.02	33.27	1.75	≤13	PASS
	251	848.8	35.10	33.28	1.82	≤13	PASS
GPRS 850 (GMSK)	128	824.2	35.18	33.24	1.94	≤13	PASS
	190	836.6	35.12	33.27	1.85	≤13	PASS
	251	848.8	35.09	33.22	1.87	≤13	PASS
EGPRS 850 (8PSK)	128	824.2	29.77	27.13	2.64	≤13	PASS
	190	836.6	29.73	27.15	2.58	≤13	PASS
	251	848.8	29.81	27.20	2.61	≤13	PASS
WCDMA Band V (RMC)	4132	826.4	27.33	24.35	2.98	≤13	PASS
	4183	836.6	27.18	24.29	2.89	≤13	PASS
	4233	846.6	27.25	24.28	2.97	≤13	PASS

LTE Band 5								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	20407	824.7	28.28	23.22	5.06	≤13	PASS
		20525	836.5	27.96	23.06	4.90	≤13	PASS
		20643	848.3	28.11	23.06	5.05	≤13	PASS
	3	20415	825.5	28.31	23.10	5.21	≤13	PASS
		20525	836.5	27.94	23.01	4.93	≤13	PASS
		20635	847.5	28.14	23.02	5.12	≤13	PASS
	5	20425	826.5	28.39	23.09	5.30	≤13	PASS
		20525	836.5	28.01	23.00	5.01	≤13	PASS
		20625	846.5	28.20	23.01	5.19	≤13	PASS
	10	20450	829	28.42	23.11	5.31	≤13	PASS
		20525	836.5	28.06	23.03	5.03	≤13	PASS
		20600	844	28.12	23.02	5.10	≤13	PASS
16QAM	1.4	20407	824.7	28.19	22.22	5.97	≤13	PASS
		20525	836.5	27.72	21.99	5.73	≤13	PASS
		20643	848.3	27.90	22.03	5.87	≤13	PASS
	3	20415	825.5	28.12	22.11	6.01	≤13	PASS
		20525	836.5	27.80	21.99	5.81	≤13	PASS
		20635	847.5	28.02	22.02	6.00	≤13	PASS
	5	20425	826.5	28.09	22.11	5.98	≤13	PASS
		20525	836.5	27.81	22.00	5.81	≤13	PASS
		20625	846.5	27.97	22.00	5.97	≤13	PASS
	10	20450	829	28.13	22.09	6.04	≤13	PASS
		20525	836.5	27.93	22.01	5.92	≤13	PASS
		20600	844	27.94	22.03	5.91	≤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 +50°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.

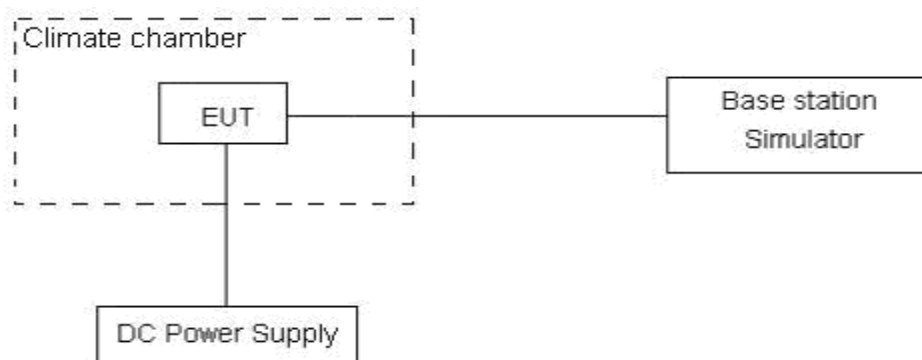
(3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements. Frequency Stability (Voltage Variation)

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

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced 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 3.27 V and 4.43 V, with a nominal voltage of 3.85V.

Test setup



Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency for mobile stations.

Limits	≤ 2.5 ppm
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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 $k = 3$, $U = 0.01\text{ppm}$.



Test Result

GSM850						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal (25℃)	Normal	8.53	14.33	0.00454	0.00762	PASS
Extreme (50℃)		2.12	1.12	0.00113	0.00059	PASS
Extreme (40℃)		7.64	9.70	0.00406	0.00516	PASS
Extreme (30℃)		9.82	10.10	0.00522	0.00537	PASS
Extreme (20℃)		14.38	16.45	0.00765	0.00875	PASS
Extreme (10℃)		9.03	15.11	0.00480	0.00804	PASS
Extreme (0℃)		15.23	3.97	0.00810	0.00211	PASS
Extreme (-10℃)		4.37	8.61	0.00233	0.00458	PASS
Extreme (-20℃)		17.53	3.36	0.00932	0.00179	PASS
Extreme (-30℃)		6.97	9.01	0.00371	0.00479	PASS
25℃	LV	14.47	4.25	0.00770	0.00226	PASS
	HV	7.52	15.54	0.00400	0.00826	PASS

WCDMA Band5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal (25℃)	Normal	5.66	8.05	0.00301	0.00428	PASS
Extreme (50℃)		7.67	13.76	0.00408	0.00732	PASS
Extreme (40℃)		9.87	13.67	0.00525	0.00727	PASS
Extreme (30℃)		5.60	2.90	0.00298	0.00154	PASS
Extreme (20℃)		1.87	6.53	0.00099	0.00347	PASS
Extreme (10℃)		15.10	5.10	0.00803	0.00271	PASS
Extreme (0℃)		15.78	12.86	0.00839	0.00684	PASS
Extreme (-10℃)		9.82	5.45	0.00522	0.00290	PASS
Extreme (-20℃)		12.10	16.30	0.00643	0.00867	PASS
Extreme (-30℃)		2.30	17.98	0.00122	0.00956	PASS
25℃	LV	11.38	17.71	0.00605	0.00942	PASS
	HV	3.76	9.86	0.00200	0.00524	PASS



LTE Band 5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz	16QAM	QPSK	16QAM	QPSK	
Temperature	Voltage					
Normal (25℃)	Normal	16.63	2.30	0.00885	0.00122	PASS
Extreme (50℃)		12.68	2.25	0.00674	0.00120	PASS
Extreme (40℃)		10.64	2.73	0.00566	0.00145	PASS
Extreme (30℃)		9.81	12.31	0.00522	0.00655	PASS
Extreme (20℃)		4.66	10.13	0.00248	0.00539	PASS
Extreme (10℃)		12.42	2.39	0.00660	0.00127	PASS
Extreme (0℃)		8.30	10.24	0.00441	0.00545	PASS
Extreme (-10℃)		9.68	1.20	0.00515	0.00064	PASS
Extreme (-20℃)		12.09	10.41	0.00643	0.00554	PASS
Extreme (-30℃)		13.10	8.99	0.00697	0.00478	PASS
25℃	LV	13.88	8.73	0.00738	0.00464	PASS
	HV	9.91	6.49	0.00527	0.00345	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz	16QAM	QPSK	16QAM	QPSK	
Temperature	Voltage					
Normal (25℃)	Normal	7.14	12.43	0.00380	0.00661	PASS
Extreme (50℃)		4.09	11.99	0.00217	0.00638	PASS
Extreme (40℃)		6.86	12.27	0.00365	0.00653	PASS
Extreme (30℃)		12.86	9.15	0.00684	0.00487	PASS
Extreme (20℃)		8.24	10.50	0.00438	0.00558	PASS
Extreme (10℃)		3.48	6.21	0.00185	0.00330	PASS
Extreme (0℃)		12.12	1.15	0.00645	0.00061	PASS
Extreme (-10℃)		14.24	9.01	0.00757	0.00479	PASS
Extreme (-20℃)		4.77	16.18	0.00253	0.00860	PASS
Extreme (-30℃)		1.53	7.51	0.00081	0.00400	PASS
25℃	LV	8.13	17.22	0.00432	0.00916	PASS
	HV	16.12	2.59	0.00857	0.00138	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz	16QAM	QPSK	16QAM	QPSK	
Temperature	Voltage					
Normal (25℃)	Normal	6.27	11.34	0.00333	0.00603	PASS
Extreme (50℃)		5.63	1.90	0.00299	0.00101	PASS



Extreme (40℃)		17.44	16.45	0.00928	0.00875	PASS
Extreme (30℃)		12.86	12.41	0.00684	0.00660	PASS
Extreme (20℃)		3.48	1.16	0.00185	0.00062	PASS
Extreme (10℃)		8.58	9.82	0.00457	0.00522	PASS
Extreme (0℃)		10.62	16.53	0.00565	0.00879	PASS
Extreme (-10℃)		10.16	6.38	0.00540	0.00340	PASS
Extreme (-20℃)		16.08	7.99	0.00855	0.00425	PASS
Extreme (-30℃)		13.06	7.27	0.00695	0.00387	PASS
25℃	LV	9.48	7.67	0.00504	0.00408	PASS
	HV	6.97	12.36	0.00371	0.00658	PASS
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	10.44	2.75	0.00556	0.00146	PASS
Extreme (50℃)		12.63	7.23	0.00672	0.00384	PASS
Extreme (40℃)		7.61	14.47	0.00405	0.00770	PASS
Extreme (30℃)		6.13	9.48	0.00326	0.00504	PASS
Extreme (20℃)		13.58	6.69	0.00722	0.00356	PASS
Extreme (10℃)		9.23	8.27	0.00491	0.00440	PASS
Extreme (0℃)		15.21	2.26	0.00809	0.00120	PASS
Extreme (-10℃)		1.72	15.05	0.00091	0.00800	PASS
Extreme (-20℃)		1.45	3.14	0.00077	0.00167	PASS
Extreme (-30℃)		1.64	8.50	0.00087	0.00452	PASS
25℃	LV	7.42	4.00	0.00395	0.00213	PASS
	HV	17.27	4.78	0.00919	0.00254	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 1 kHz (0.009MHz~ 0.15 MHz),

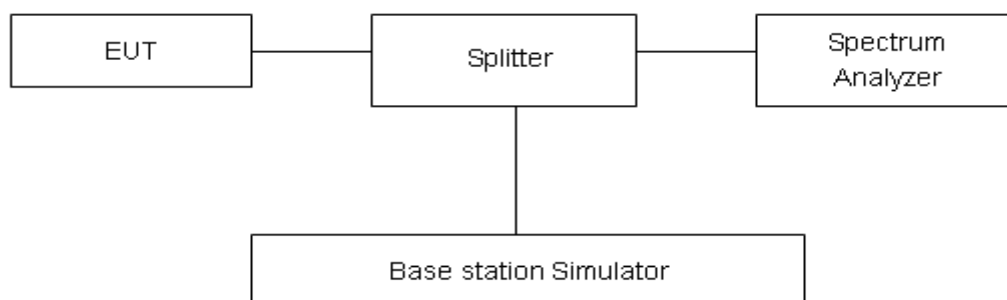
RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

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 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ 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-18GHz	1.407 dB

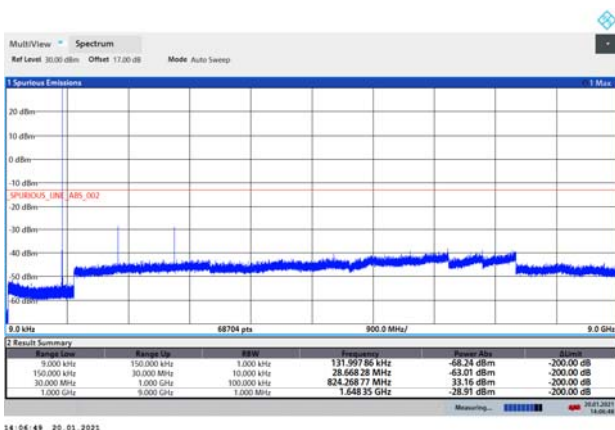


Test Result

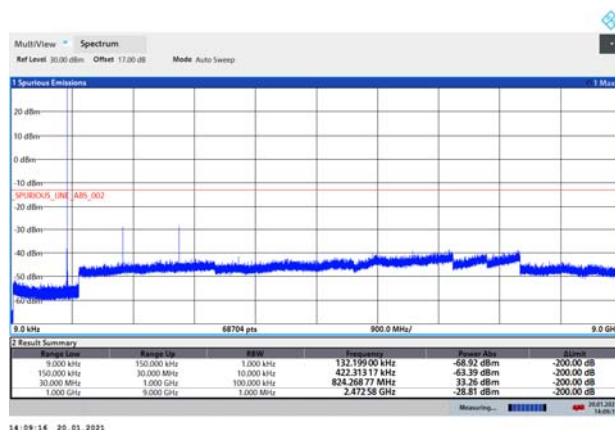
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

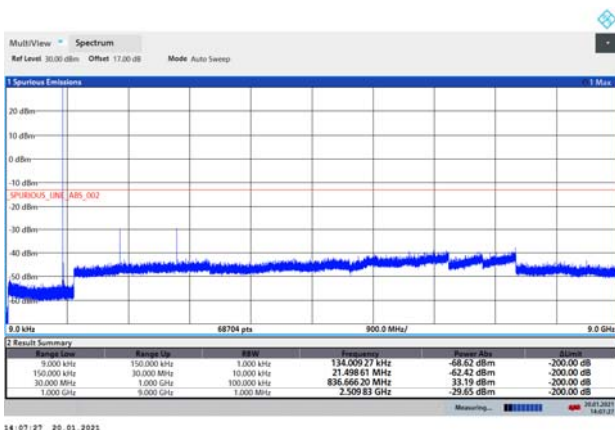
GSM 850 CH-Low 9kHz ~ 9GHz



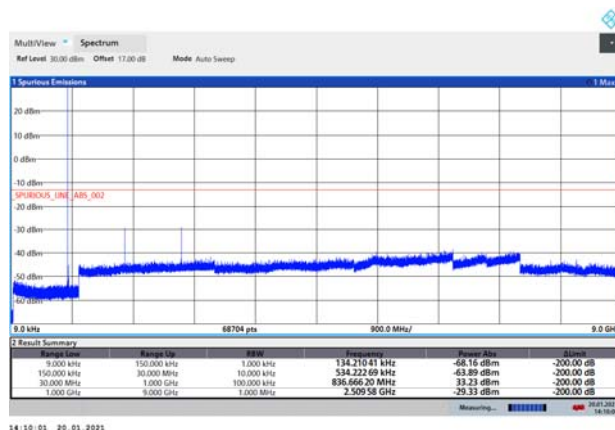
GPRS 850 CH-Low 9kHz ~ 9GHz



GSM 850 CH-Middle 9kHz ~ 9GHz



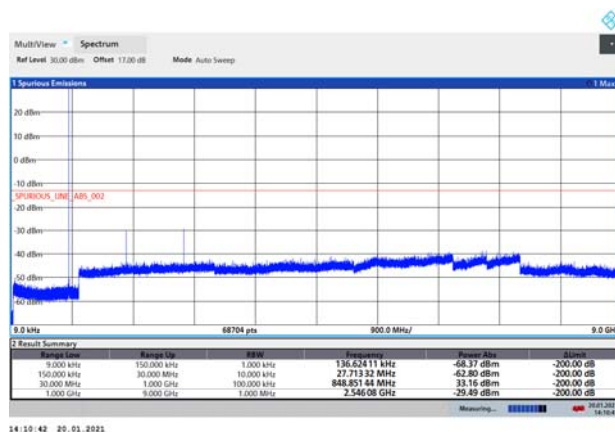
GPRS 850 CH-Middle 9kHz ~ 9GHz



GSM 850 CH-High 9kHz ~ 9GHz

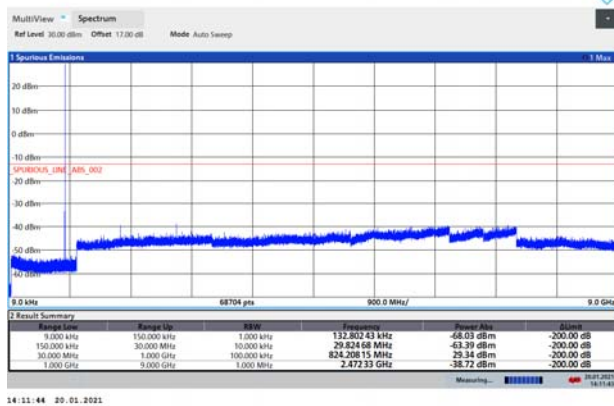


GPRS 850 CH-High 9kHz ~ 9GHz



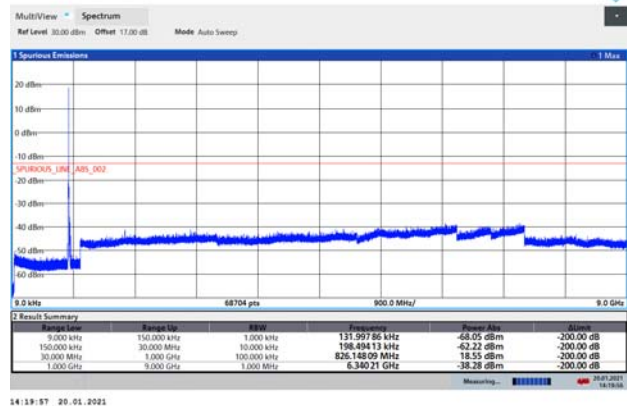


EGPRS 850 CH-Low 9kHz ~ 9GHz



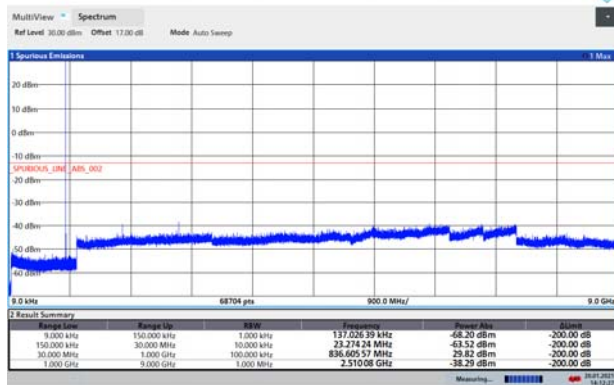
14:11:44 20.01.2021

WCDMA BAND V CH-Low 9kHz ~ 9GHz



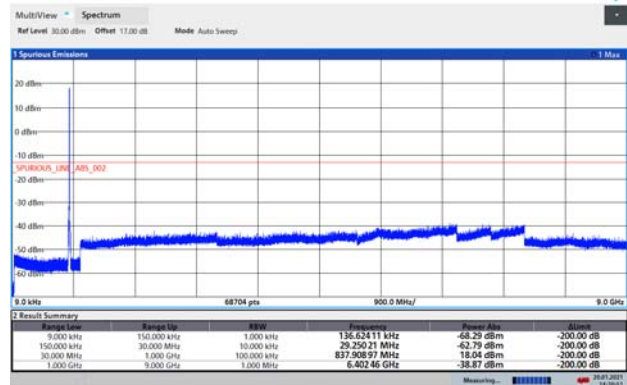
14:19:57 20.01.2021

EGPRS 850 CH-Middle 9kHz ~ 9GHz



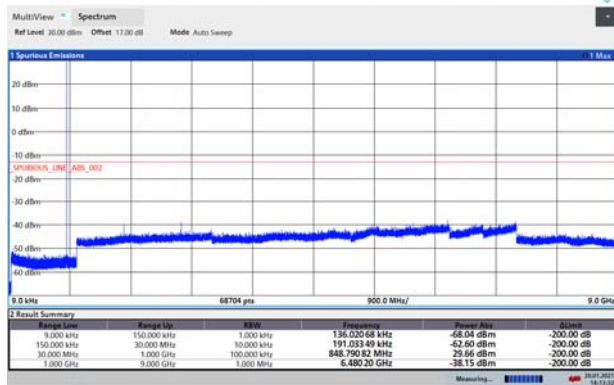
14:12:28 20.01.2021

WCDMA BAND V CH-Middle 9kHz ~ 9GHz



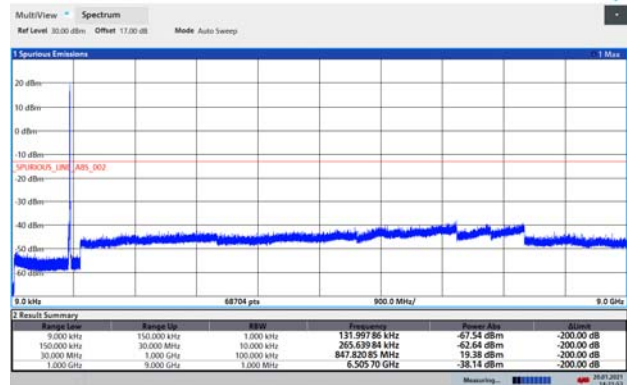
14:19:52 20.01.2021

EGPRS 850 CH-High 9kHz ~ 9GHz



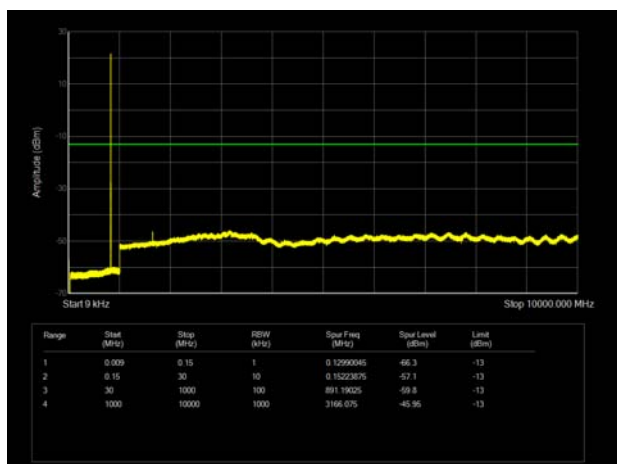
14:13:33 20.01.2021

WCDMA BAND V CH-High 9kHz ~ 9GHz

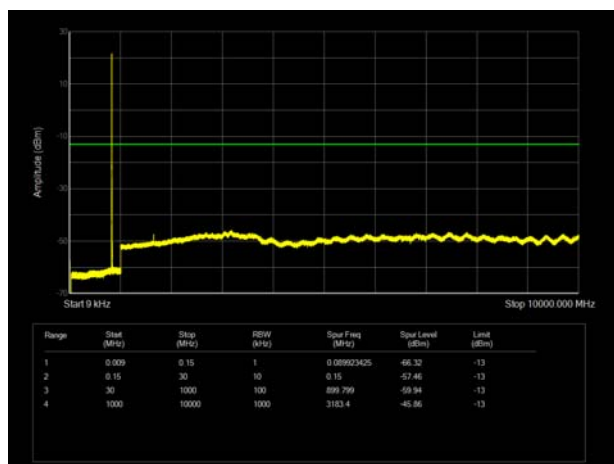


14:21:53 20.01.2021

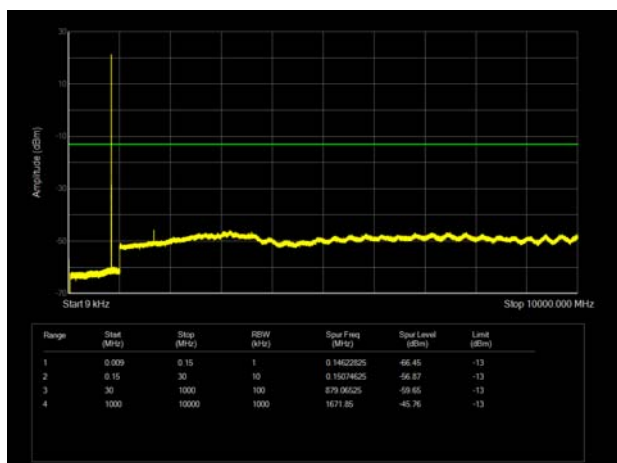
LTE Band 5 1.4MHz CH-Low 9kHz~10GHz



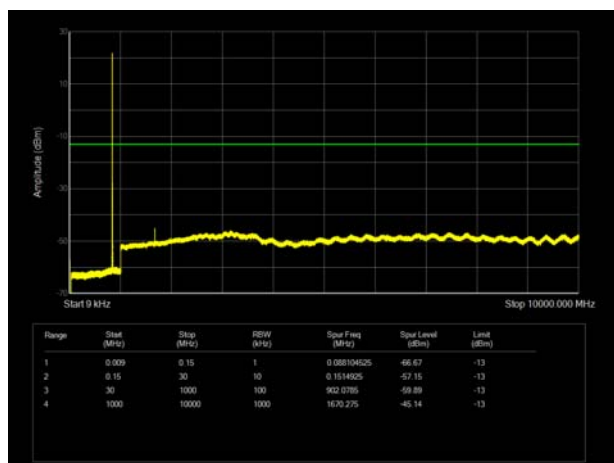
LTE Band 5 3MHz CH-Low 9kHz~10GHz



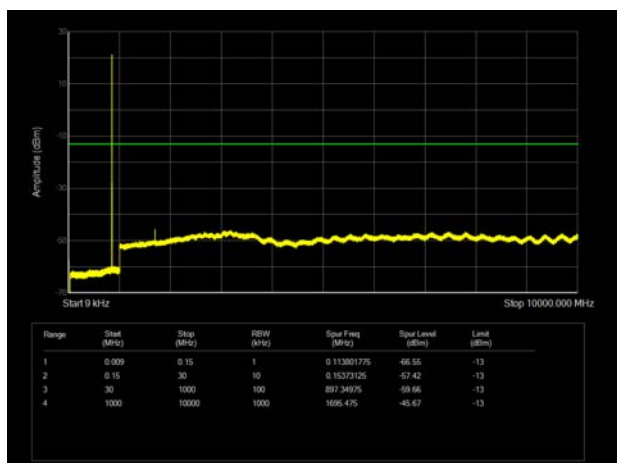
LTE Band 5 1.4MHz CH-Middle 9kHz~10GHz



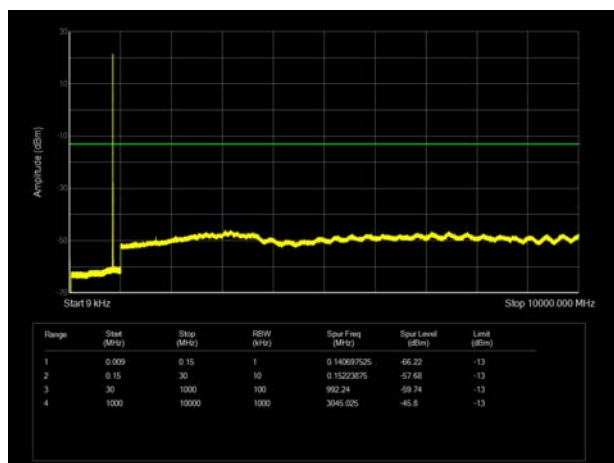
LTE Band 5 3MHz CH-Middle 9kHz~10GHz



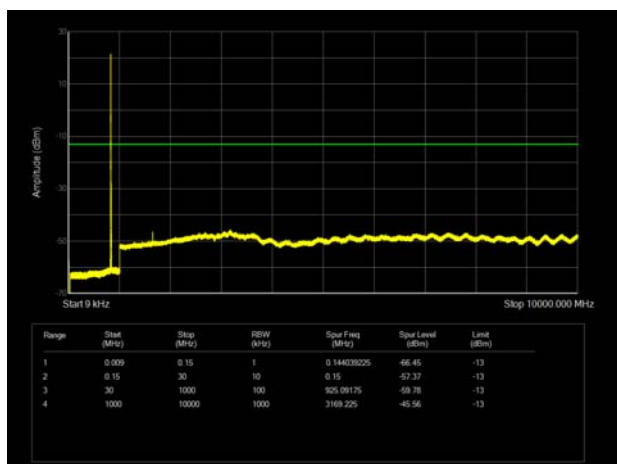
LTE Band 5 1.4MHz CH-High 9kHz~10GHz



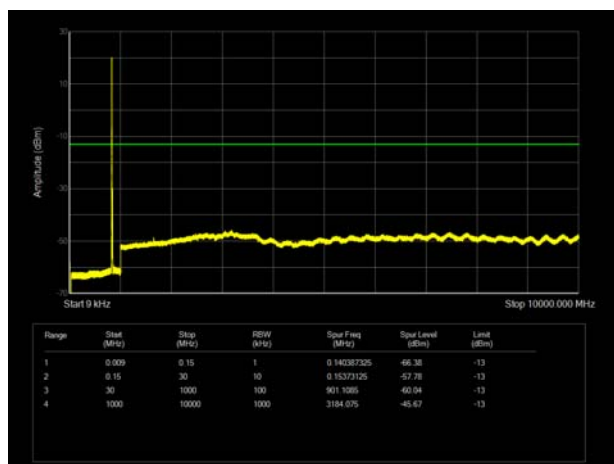
LTE Band 5 3MHz CH-High 9kHz~10GHz



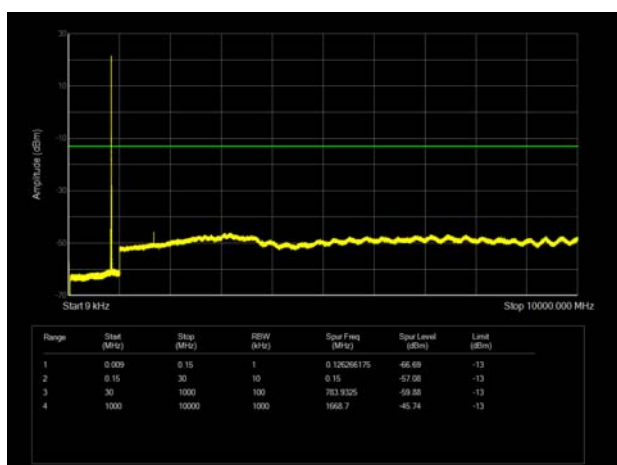
LTE Band 5 5MHz CH-Low 9kHz~10GHz



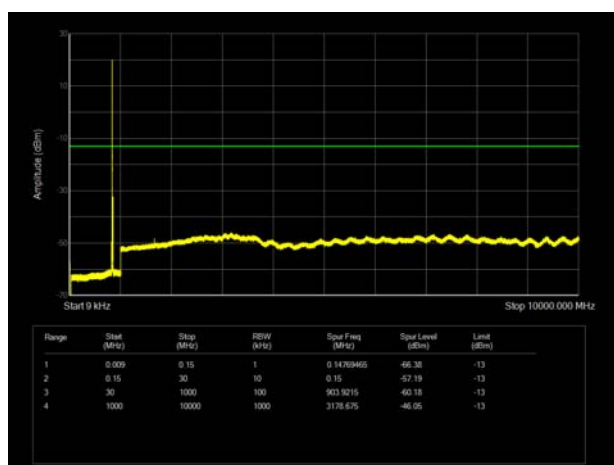
LTE Band 5 10MHz CH-Low 9kHz~10GHz



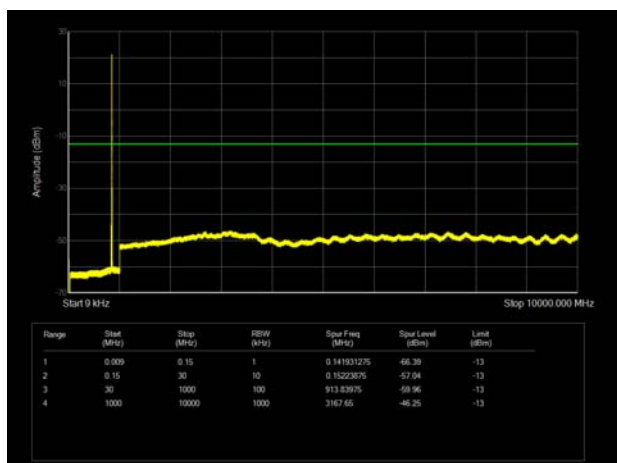
LTE Band 5 5MHz CH-Middle 9kHz~10GHz



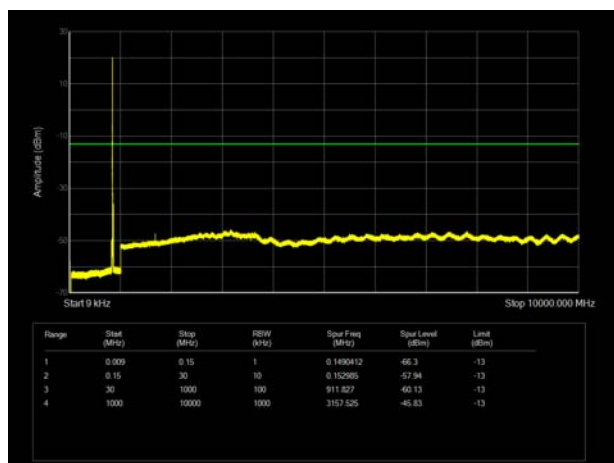
LTE Band 5 10MHz CH-Middle 9kHz~10GHz



LTE Band 5 5MHz CH-High 9kHz~10GHz



LTE Band 5 10MHz CH-High 9kHz~10GHz



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 9kHz-150kHz , 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:

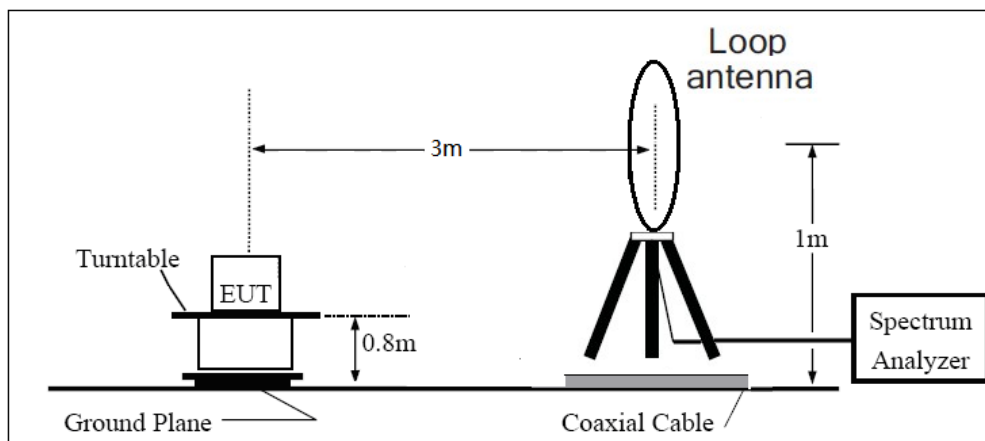
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

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

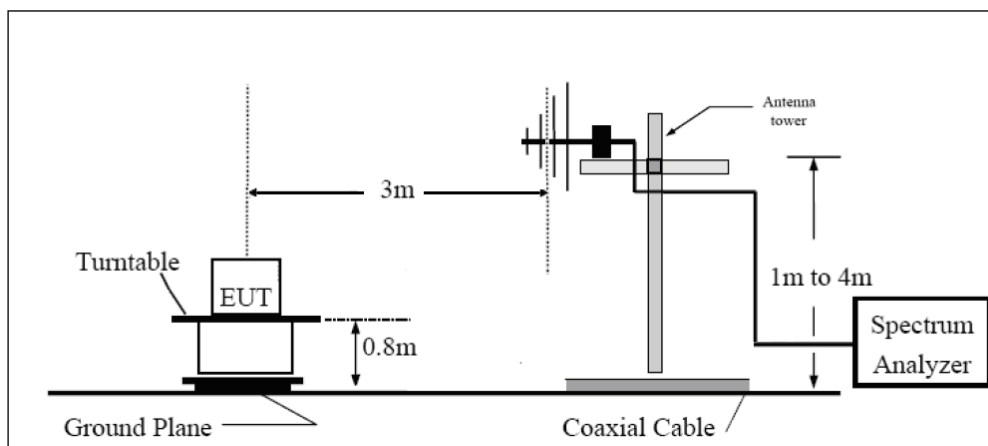
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

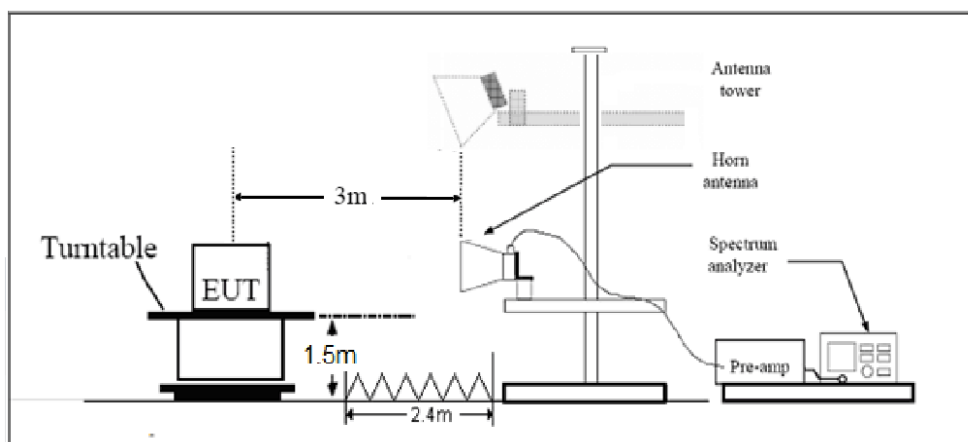
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ 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.

Main Antenna

GSM 850 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.20	-48.85	2.00	10.75	Horizontal	-42.25	-13.00	29.25	180
3	2509.50	-64.01	2.51	11.05	Horizontal	-57.62	-13.00	44.62	225
4	3346.40	-62.15	4.20	11.15	Horizontal	-57.35	-13.00	44.35	90
5	4183.00	-58.78	5.20	11.15	Horizontal	-54.98	-13.00	41.98	135
6	5019.60	-58.24	5.50	11.95	Horizontal	-53.94	-13.00	40.94	45
7	5856.20	-59.93	5.70	13.55	Horizontal	-54.23	-13.00	41.23	225
8	6692.80	-56.20	6.30	13.75	Horizontal	-50.90	-13.00	37.90	180
9	7529.40	-54.36	6.80	13.85	Horizontal	-49.46	-13.00	36.46	90
10	8366.00	-53.63	6.90	14.25	Horizontal	-48.43	-13.00	35.43	315

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 V CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.20	-62.40	2.00	10.75	Horizontal	-55.80	-13.00	42.80	90
3	2509.80	-65.65	2.51	11.05	Horizontal	-59.26	-13.00	46.26	135
4	3346.40	-63.59	4.20	11.15	Horizontal	-58.79	-13.00	45.79	45
5	4183.00	-60.15	5.20	11.15	Horizontal	-56.35	-13.00	43.35	315
6	5019.60	-58.54	5.50	11.95	Horizontal	-54.24	-13.00	41.24	180
7	5856.20	-59.60	5.70	13.55	Horizontal	-53.90	-13.00	40.90	270
8	6692.80	-57.15	6.30	13.75	Horizontal	-51.85	-13.00	38.85	45
9	7529.40	-54.02	6.80	13.85	Horizontal	-49.12	-13.00	36.12	45
10	8366.00	-53.07	6.90	14.25	Horizontal	-47.87	-13.00	34.87	180

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 5 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.00	-62.59	2.00	10.75	Horizontal	-55.99	-13.00	42.99	90
3	2509.50	-64.26	2.51	11.05	Horizontal	-57.87	-13.00	44.87	315
4	3346.00	-63.71	4.20	11.15	Horizontal	-58.91	-13.00	45.91	0
5	4182.50	-60.91	5.20	11.15	Horizontal	-57.11	-13.00	44.11	315
6	5019.00	-58.65	5.50	11.95	Horizontal	-54.35	-13.00	41.35	0
7	5855.50	-59.88	5.70	13.55	Horizontal	-54.18	-13.00	41.18	45
8	6692.00	-54.90	6.30	13.75	Horizontal	-49.60	-13.00	36.60	270
9	7528.50	-53.92	6.80	13.85	Horizontal	-49.02	-13.00	36.02	180
10	8365.00	-53.58	6.90	14.25	Horizontal	-48.38	-13.00	35.38	90

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 5 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1668.60	-61.92	2.00	10.75	Horizontal	-55.32	-13.00	42.32	90
3	2503.30	-65.32	2.51	11.05	Horizontal	-58.93	-13.00	45.93	45
4	3466.20	-63.76	4.20	11.15	Horizontal	-58.96	-13.00	45.96	90
5	4215.90	-60.72	5.20	11.15	Horizontal	-56.92	-13.00	43.92	0
6	5165.60	-58.33	5.50	11.95	Horizontal	-54.03	-13.00	41.03	45
7	5815.30	-59.89	5.70	13.55	Horizontal	-54.19	-13.00	41.19	90
8	6765.00	-57.03	6.30	13.75	Horizontal	-51.73	-13.00	38.73	270
9	7614.70	-54.63	6.80	13.85	Horizontal	-49.73	-13.00	36.73	45
10	8464.40	-53.76	6.90	14.25	Horizontal	-48.56	-13.00	35.56	225

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 5 10MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1664.40	-64.16	2.00	10.75	Horizontal	-57.56	-13.00	44.56	135
3	2496.60	-65.66	2.51	11.05	Horizontal	-59.27	-13.00	46.27	225
4	3328.00	-63.95	4.20	11.15	Horizontal	-59.15	-13.00	46.15	0
5	4160.00	-60.79	5.20	11.15	Horizontal	-56.99	-13.00	43.99	270
6	4992.00	-59.61	5.50	11.95	Horizontal	-55.31	-13.00	42.31	315
7	5824.00	-59.44	5.70	13.55	Horizontal	-53.74	-13.00	40.74	90
8	6656.00	-57.10	6.30	13.75	Horizontal	-51.80	-13.00	38.80	0
9	7488.00	-54.05	6.80	13.85	Horizontal	-49.15	-13.00	36.15	45
10	8320.00	-54.84	6.90	14.25	Horizontal	-49.64	-13.00	36.64	225

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.

Second Antenna

GSM 850 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.20	-55.26	2.00	10.75	Horizontal	-48.66	-13.00	35.66	180
3	2509.50	-51.56	2.51	11.05	Horizontal	-45.17	-13.00	32.17	225
4	3346.40	-61.93	4.20	11.15	Horizontal	-57.13	-13.00	44.13	90
5	4183.00	-57.04	5.20	11.15	Horizontal	-53.24	-13.00	40.24	270
6	5019.60	-55.24	5.50	11.95	Horizontal	-50.94	-13.00	37.94	315
7	5856.20	-57.50	5.70	13.55	Horizontal	-51.80	-13.00	38.80	45
8	6692.80	-56.67	6.30	13.75	Horizontal	-51.37	-13.00	38.37	180
9	7529.40	-52.60	6.80	13.85	Horizontal	-47.70	-13.00	34.70	225
10	8366.00	-51.97	6.90	14.25	Horizontal	-46.77	-13.00	33.77	135

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 V CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.20	-63.33	2.00	10.75	Horizontal	-56.73	-13.00	43.73	180
3	2509.80	-61.08	2.51	11.05	Horizontal	-54.69	-13.00	41.69	90
4	3346.40	-62.75	4.20	11.15	Horizontal	-57.95	-13.00	44.95	225
5	4183.00	-58.35	5.20	11.15	Horizontal	-54.55	-13.00	41.55	45
6	5019.60	-56.54	5.50	11.95	Horizontal	-52.24	-13.00	39.24	315
7	5856.20	-57.02	5.70	13.55	Horizontal	-51.32	-13.00	38.32	0
8	6692.80	-58.51	6.30	13.75	Horizontal	-53.21	-13.00	40.21	135
9	7529.40	-52.95	6.80	13.85	Horizontal	-48.05	-13.00	35.05	225
10	8366.00	-53.28	6.90	14.25	Horizontal	-48.08	-13.00	35.08	135

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 5 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.00	-61.80	2.00	10.75	Horizontal	-55.20	-13.00	42.20	180
3	2509.50	-54.81	2.51	11.05	Horizontal	-48.42	-13.00	35.42	225
4	3346.00	-62.73	4.20	11.15	Horizontal	-57.93	-13.00	44.93	225
5	4182.50	-59.17	5.20	11.15	Horizontal	-55.37	-13.00	42.37	45
6	5019.00	-55.92	5.50	11.95	Horizontal	-51.62	-13.00	38.62	90
7	5855.50	-58.16	5.70	13.55	Horizontal	-52.46	-13.00	39.46	225
8	6692.00	-58.53	6.30	13.75	Horizontal	-53.23	-13.00	40.23	45
9	7528.50	-53.84	6.80	13.85	Horizontal	-48.94	-13.00	35.94	135
10	8365.00	-52.29	6.90	14.25	Horizontal	-47.09	-13.00	34.09	90

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 5 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1668.60	-59.55	2.00	10.75	Horizontal	-52.95	-13.00	39.95	90
3	2503.30	-51.84	2.51	11.05	Horizontal	-45.45	-13.00	32.45	180
4	3466.20	-62.38	4.20	11.15	Horizontal	-57.58	-13.00	44.58	135
5	4215.90	-59.40	5.20	11.15	Horizontal	-55.60	-13.00	42.60	0
6	5165.60	-55.04	5.50	11.95	Horizontal	-50.74	-13.00	37.74	45
7	5815.30	-60.09	5.70	13.55	Horizontal	-54.39	-13.00	41.39	315
8	6765.00	-57.17	6.30	13.75	Horizontal	-51.87	-13.00	38.87	225
9	7614.70	-53.44	6.80	13.85	Horizontal	-48.54	-13.00	35.54	135
10	8464.40	-52.67	6.90	14.25	Horizontal	-47.47	-13.00	34.47	90

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 5 10MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1664.40	-62.95	2.00	10.75	Horizontal	-56.35	-13.00	43.35	45
3	2496.60	-56.12	2.51	11.05	Horizontal	-49.73	-13.00	36.73	90
4	3328.00	-62.35	4.20	11.15	Horizontal	-57.55	-13.00	44.55	225
5	4160.00	-59.03	5.20	11.15	Horizontal	-55.23	-13.00	42.23	90
6	4992.00	-56.74	5.50	11.95	Horizontal	-52.44	-13.00	39.44	180
7	5824.00	-58.50	5.70	13.55	Horizontal	-52.80	-13.00	39.80	315
8	6656.00	-56.81	6.30	13.75	Horizontal	-51.51	-13.00	38.51	45
9	7488.00	-53.48	6.80	13.85	Horizontal	-48.58	-13.00	35.58	90
10	8320.00	-54.61	6.90	14.25	Horizontal	-49.41	-13.00	36.41	225

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	CMW500	113824	2020-05-18	2021-05-17
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2020-05-18	2021-05-17
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2020-05-27	2021-05-26
Signal Analyzer	R&S	FSV30	100815	2020-12-13	2021-12-12
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2021-12-15
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2021-06-19
Signal generator	R&S	SMB 100A	102594	2020-05-18	2021-05-17
Climatic Chamber	ESPEC	SU-242	93000506	2020-12-13	2021-12-12
Preamplifier	R&S	SCU18	102327	2020-05-18	2021-05-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2020-05-18	2021-05-17
RF Cable	Agilent	SMA 15cm	0001	2020-12-10	2021-06-09
Software	R&S	EMC32	9.26.0	/	/

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



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.