RF TEST REPORT

Applicant	ZTE Corporation
FCC ID	SRQ-MF293N
Product	CPE
Model	MF293N
Report No.	R2109A0830-R1
Issue Date	December 21, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2020)/ FCC CFR 47 Part 22H (2020)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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TABLE OF CONTENT

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: September 30, 2021~ November 18, 2021 Date of Sample Received: September 27, 2021			
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.			

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.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
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2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	ZTE Corporation
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
Manufacturer	ZTE Corporation
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

2.2. General Information

EUT Description			
Model	MF293N		
IMEI	863397050104476		
Hardware Version	MF293N_HW1.0		
Software Version	EN_ZTE_LMMF293NV1.0.0B01		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	0.6dBi		
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		
DC-HSDPA UE Category	14		
DC-HSUPA Category	6		
HSPA+ UE Category	14		
LTE Category	4		
Maximum E.R.P.	GSM 850:	30.47dBm	
	WCDMA Band V:	21.18dBm	
	LTE Band 5:	23.09dBm	
Rated Power Supply Voltage	12V		
Operating Voltage	Minimum: 10.8V Maximum: 13.2V		
Operating Temperature	Lowest: -30°C Highest: +75°C		
Testing Temperature	Lowest: -30°C Highest: +50°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			
Adapter 1	Manufacturer: baijunda Model: STC-A1215C55A-Z		
Adapter 2	Manufacturer: KLEC Model: KL-WA120150-M		
Adapter 3	Manufacturer: KLEC Model: KL-WE120150-F		
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.			

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 (2020)

FCC CFR47 Part 2 (2020)

Reference standard:
ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

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

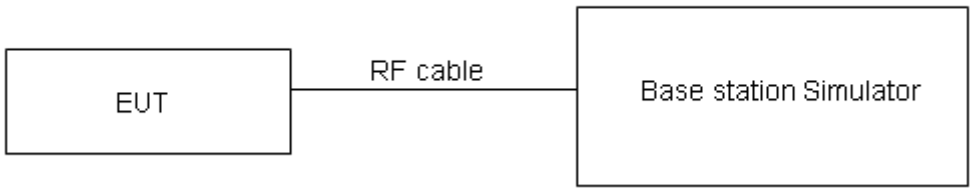
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBi)
where:dBd refers to gain relative to an ideal dipole.
EIRP (dBm) = ERP (dBm) + 2.15 (dB).

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	≤ 7 W (38.45 dBm)

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 ERP.

Test Results

GSM 850		Maximum Output Power (dBm)			ERP (dBm)		
		Channel 128	Channel 190	Channel 251	Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)	824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GSM(GMSK)	Results	31.84	31.93	32.02	30.29	30.38	30.47
GPRS (GMSK)	1TXslot	31.88	31.87	31.96	30.33	30.32	30.41
	2TXslots	29.22	29.24	29.34	27.67	27.69	27.79
	3TXslots	28.95	29.01	29.06	27.40	27.46	27.51
	4TXslots	26.92	26.93	26.98	25.37	25.38	25.43
EGPRS	1TXslot	26.01	26.05	26.81	24.46	24.50	25.26
	2TXslots	22.97	22.12	22.36	21.42	20.57	20.81
	3TXslots	21.61	21.23	21.84	20.06	19.68	20.29
	4TXslots	19.52	19.54	19.81	17.97	17.99	18.26

WCDMA Band V		Maximum Output Power (dBm)			ERP (dBm)		
		Channel 4132	Channel 4183	Channel 4233	Channel 4132	Channel 4183	Channel 4233
		826.4 (MHz)	836.6 (MHz)	846.6 (MHz)	826.4 (MHz)	836.6 (MHz)	846.6 (MHz)
RMC		22.52	22.73	22.64	20.97	21.18	21.09
HSDPA	Sub - Test 1	21.98	22.15	22.08	20.43	20.60	20.53
	Sub - Test 2	21.97	22.17	22.05	20.42	20.62	20.50
	Sub - Test 3	21.44	21.67	21.57	19.89	20.12	20.02
	Sub - Test 4	21.45	21.68	21.55	19.90	20.13	20.00
HSUPA	Sub - Test 1	21.94	22.14	22.03	20.39	20.59	20.48
	Sub - Test 2	20.93	21.12	21.02	19.38	19.57	19.47
	Sub - Test 3	21.40	21.60	21.51	19.85	20.05	19.96
	Sub - Test 4	20.86	21.09	20.99	19.31	19.54	19.44
	Sub - Test 5	21.87	22.07	21.97	20.32	20.52	20.42
DC-HSDPA	Sub - Test 1	21.86	22.09	21.98	20.31	20.54	20.43
	Sub - Test 2	21.85	22.08	21.97	20.30	20.53	20.42
	Sub - Test 3	21.43	21.57	21.48	19.88	20.02	19.93
	Sub - Test 4	21.42	21.56	21.47	19.87	20.01	19.92
HSPA+	16QAM	21.41	21.64	21.54	19.86	20.09	19.99

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	ERP (dBm)	Verdict
LTE Band 5	1.4	20407	1	#0	QPSK	23.98	22.43	PASS
LTE Band 5	1.4	20407	1	#Mid	QPSK	23.84	22.29	PASS
LTE Band 5	1.4	20407	1	#Max	QPSK	23.96	22.41	PASS
LTE Band 5	1.4	20407	3	#0	QPSK	23.91	22.36	PASS
LTE Band 5	1.4	20407	3	#Mid	QPSK	23.91	22.36	PASS
LTE Band 5	1.4	20407	3	#Max	QPSK	23.91	22.36	PASS
LTE Band 5	1.4	20407	6	#0	QPSK	22.99	21.44	PASS
LTE Band 5	1.4	20407	1	#0	QAM16	22.60	21.05	PASS
LTE Band 5	1.4	20407	1	#Mid	QAM16	22.47	20.92	PASS
LTE Band 5	1.4	20407	1	#Max	QAM16	22.86	21.31	PASS
LTE Band 5	1.4	20407	3	#0	QAM16	22.60	21.05	PASS
LTE Band 5	1.4	20407	3	#Mid	QAM16	22.61	21.06	PASS
LTE Band 5	1.4	20407	3	#Max	QAM16	22.72	21.17	PASS
LTE Band 5	1.4	20407	6	#0	QAM16	21.60	20.05	PASS
LTE Band 5	1.4	20525	1	#0	QPSK	23.70	22.15	PASS
LTE Band 5	1.4	20525	1	#Mid	QPSK	23.60	22.05	PASS
LTE Band 5	1.4	20525	1	#Max	QPSK	23.83	22.28	PASS
LTE Band 5	1.4	20525	3	#0	QPSK	23.71	22.16	PASS
LTE Band 5	1.4	20525	3	#Mid	QPSK	23.70	22.15	PASS
LTE Band 5	1.4	20525	3	#Max	QPSK	23.74	22.19	PASS
LTE Band 5	1.4	20525	6	#0	QPSK	22.77	21.22	PASS
LTE Band 5	1.4	20525	1	#0	QAM16	22.60	21.05	PASS
LTE Band 5	1.4	20525	1	#Mid	QAM16	22.55	21.00	PASS
LTE Band 5	1.4	20525	1	#Max	QAM16	22.78	21.23	PASS
LTE Band 5	1.4	20525	3	#0	QAM16	22.49	20.94	PASS
LTE Band 5	1.4	20525	3	#Mid	QAM16	22.44	20.89	PASS
LTE Band 5	1.4	20525	3	#Max	QAM16	22.58	21.03	PASS
LTE Band 5	1.4	20525	6	#0	QAM16	21.58	20.03	PASS
LTE Band 5	1.4	20643	1	#0	QPSK	23.16	21.61	PASS
LTE Band 5	1.4	20643	1	#Mid	QPSK	22.98	21.43	PASS
LTE Band 5	1.4	20643	1	#Max	QPSK	23.09	21.54	PASS
LTE Band 5	1.4	20643	3	#0	QPSK	23.03	21.48	PASS
LTE Band 5	1.4	20643	3	#Mid	QPSK	23.02	21.47	PASS
LTE Band 5	1.4	20643	3	#Max	QPSK	22.99	21.44	PASS
LTE Band 5	1.4	20643	6	#0	QPSK	22.04	20.49	PASS
LTE Band 5	1.4	20643	1	#0	QAM16	21.98	20.43	PASS
LTE Band 5	1.4	20643	1	#Mid	QAM16	21.77	20.22	PASS
LTE Band 5	1.4	20643	1	#Max	QAM16	21.79	20.24	PASS
LTE Band 5	1.4	20643	3	#0	QAM16	21.79	20.24	PASS
LTE Band 5	1.4	20643	3	#Mid	QAM16	21.79	20.24	PASS

LTE Band 5	1.4	20643	3	#Max	QAM16	21.75	20.20	PASS
LTE Band 5	1.4	20643	6	#0	QAM16	20.77	19.22	PASS
LTE Band 5	3	20415	1	#0	QPSK	23.83	22.28	PASS
LTE Band 5	3	20415	1	#Mid	QPSK	23.19	21.64	PASS
LTE Band 5	3	20415	1	#Max	QPSK	23.57	22.02	PASS
LTE Band 5	3	20415	8	#0	QPSK	22.68	21.13	PASS
LTE Band 5	3	20415	8	#Mid	QPSK	22.70	21.15	PASS
LTE Band 5	3	20415	8	#Max	QPSK	22.59	21.04	PASS
LTE Band 5	3	20415	15	#0	QPSK	22.58	21.03	PASS
LTE Band 5	3	20415	1	#0	QAM16	22.82	21.27	PASS
LTE Band 5	3	20415	1	#Mid	QAM16	22.13	20.58	PASS
LTE Band 5	3	20415	1	#Max	QAM16	22.61	21.06	PASS
LTE Band 5	3	20415	8	#0	QAM16	21.26	19.71	PASS
LTE Band 5	3	20415	8	#Mid	QAM16	21.29	19.74	PASS
LTE Band 5	3	20415	8	#Max	QAM16	21.20	19.65	PASS
LTE Band 5	3	20415	15	#0	QAM16	21.30	19.75	PASS
LTE Band 5	3	20525	1	#0	QPSK	23.54	21.99	PASS
LTE Band 5	3	20525	1	#Mid	QPSK	23.14	21.59	PASS
LTE Band 5	3	20525	1	#Max	QPSK	23.91	22.36	PASS
LTE Band 5	3	20525	8	#0	QPSK	22.35	20.80	PASS
LTE Band 5	3	20525	8	#Mid	QPSK	22.34	20.79	PASS
LTE Band 5	3	20525	8	#Max	QPSK	22.58	21.03	PASS
LTE Band 5	3	20525	15	#0	QPSK	22.41	20.86	PASS
LTE Band 5	3	20525	1	#0	QAM16	22.25	20.70	PASS
LTE Band 5	3	20525	1	#Mid	QAM16	21.87	20.32	PASS
LTE Band 5	3	20525	1	#Max	QAM16	22.74	21.19	PASS
LTE Band 5	3	20525	8	#0	QAM16	21.14	19.59	PASS
LTE Band 5	3	20525	8	#Mid	QAM16	21.15	19.60	PASS
LTE Band 5	3	20525	8	#Max	QAM16	21.35	19.80	PASS
LTE Band 5	3	20525	15	#0	QAM16	21.25	19.70	PASS
LTE Band 5	3	20635	1	#0	QPSK	23.31	21.76	PASS
LTE Band 5	3	20635	1	#Mid	QPSK	22.55	21.00	PASS
LTE Band 5	3	20635	1	#Max	QPSK	23.06	21.51	PASS
LTE Band 5	3	20635	8	#0	QPSK	21.85	20.30	PASS
LTE Band 5	3	20635	8	#Mid	QPSK	21.85	20.30	PASS
LTE Band 5	3	20635	8	#Max	QPSK	21.75	20.20	PASS
LTE Band 5	3	20635	15	#0	QPSK	21.73	20.18	PASS
LTE Band 5	3	20635	1	#0	QAM16	22.14	20.59	PASS
LTE Band 5	3	20635	1	#Mid	QAM16	21.08	19.53	PASS
LTE Band 5	3	20635	1	#Max	QAM16	21.73	20.18	PASS
LTE Band 5	3	20635	8	#0	QAM16	20.58	19.03	PASS
LTE Band 5	3	20635	8	#Mid	QAM16	20.59	19.04	PASS
LTE Band 5	3	20635	8	#Max	QAM16	20.48	18.93	PASS

LTE Band 5	3	20635	15	#0	QAM16	20.62	19.07	PASS
LTE Band 5	5	20425	1	#0	QPSK	23.84	22.29	PASS
LTE Band 5	5	20425	1	#Mid	QPSK	23.19	21.64	PASS
LTE Band 5	5	20425	1	#Max	QPSK	23.21	21.66	PASS
LTE Band 5	5	20425	12	#0	QPSK	22.70	21.15	PASS
LTE Band 5	5	20425	12	#Mid	QPSK	22.73	21.18	PASS
LTE Band 5	5	20425	12	#Max	QPSK	22.31	20.76	PASS
LTE Band 5	5	20425	25	#0	QPSK	22.53	20.98	PASS
LTE Band 5	5	20425	1	#0	QAM16	22.61	21.06	PASS
LTE Band 5	5	20425	1	#Mid	QAM16	21.97	20.42	PASS
LTE Band 5	5	20425	1	#Max	QAM16	22.01	20.46	PASS
LTE Band 5	5	20425	12	#0	QAM16	21.33	19.78	PASS
LTE Band 5	5	20425	12	#Mid	QAM16	21.35	19.80	PASS
LTE Band 5	5	20425	12	#Max	QAM16	20.99	19.44	PASS
LTE Band 5	5	20425	25	#0	QAM16	21.27	19.72	PASS
LTE Band 5	5	20525	1	#0	QPSK	23.59	22.04	PASS
LTE Band 5	5	20525	1	#Mid	QPSK	23.30	21.75	PASS
LTE Band 5	5	20525	1	#Max	QPSK	24.07	22.52	PASS
LTE Band 5	5	20525	12	#0	QPSK	22.30	20.75	PASS
LTE Band 5	5	20525	12	#Mid	QPSK	22.28	20.73	PASS
LTE Band 5	5	20525	12	#Max	QPSK	22.73	21.18	PASS
LTE Band 5	5	20525	25	#0	QPSK	22.54	20.99	PASS
LTE Band 5	5	20525	1	#0	QAM16	22.33	20.78	PASS
LTE Band 5	5	20525	1	#Mid	QAM16	22.06	20.51	PASS
LTE Band 5	5	20525	1	#Max	QAM16	22.86	21.31	PASS
LTE Band 5	5	20525	12	#0	QAM16	21.06	19.51	PASS
LTE Band 5	5	20525	12	#Mid	QAM16	21.05	19.50	PASS
LTE Band 5	5	20525	12	#Max	QAM16	21.50	19.95	PASS
LTE Band 5	5	20525	25	#0	QAM16	21.30	19.75	PASS
LTE Band 5	5	20625	1	#0	QPSK	23.53	21.98	PASS
LTE Band 5	5	20625	1	#Mid	QPSK	22.67	21.12	PASS
LTE Band 5	5	20625	1	#Max	QPSK	22.93	21.38	PASS
LTE Band 5	5	20625	12	#0	QPSK	22.12	20.57	PASS
LTE Band 5	5	20625	12	#Mid	QPSK	22.13	20.58	PASS
LTE Band 5	5	20625	12	#Max	QPSK	21.83	20.28	PASS
LTE Band 5	5	20625	25	#0	QPSK	21.99	20.44	PASS
LTE Band 5	5	20625	1	#0	QAM16	22.25	20.70	PASS
LTE Band 5	5	20625	1	#Mid	QAM16	21.48	19.93	PASS
LTE Band 5	5	20625	1	#Max	QAM16	21.75	20.20	PASS
LTE Band 5	5	20625	12	#0	QAM16	20.91	19.36	PASS
LTE Band 5	5	20625	12	#Mid	QAM16	20.94	19.39	PASS
LTE Band 5	5	20625	12	#Max	QAM16	20.65	19.10	PASS
LTE Band 5	5	20625	25	#0	QAM16	20.89	19.34	PASS

LTE Band 5	10	20450	1	#0	QPSK	24.27	22.72	PASS
LTE Band 5	10	20450	1	#Mid	QPSK	22.46	20.91	PASS
LTE Band 5	10	20450	1	#Max	QPSK	23.99	22.44	PASS
LTE Band 5	10	20450	25	#0	QPSK	22.44	20.89	PASS
LTE Band 5	10	20450	25	#Mid	QPSK	22.47	20.92	PASS
LTE Band 5	10	20450	25	#Max	QPSK	22.20	20.65	PASS
LTE Band 5	10	20450	50	#0	QPSK	22.21	20.66	PASS
LTE Band 5	10	20450	1	#0	QAM16	23.42	21.87	PASS
LTE Band 5	10	20450	1	#Mid	QAM16	21.57	20.02	PASS
LTE Band 5	10	20450	1	#Max	QAM16	23.10	21.55	PASS
LTE Band 5	10	20450	25	#0	QAM16	21.07	19.52	PASS
LTE Band 5	10	20450	25	#Mid	QAM16	21.09	19.54	PASS
LTE Band 5	10	20450	25	#Max	QAM16	20.86	19.31	PASS
LTE Band 5	10	20450	50	#0	QAM16	20.93	19.38	PASS
LTE Band 5	10	20525	1	#0	QPSK	23.84	22.29	PASS
LTE Band 5	10	20525	1	#Mid	QPSK	23.06	21.51	PASS
LTE Band 5	10	20525	1	#Max	QPSK	24.56	23.01	PASS
LTE Band 5	10	20525	25	#0	QPSK	22.41	20.86	PASS
LTE Band 5	10	20525	25	#Mid	QPSK	22.39	20.84	PASS
LTE Band 5	10	20525	25	#Max	QPSK	22.83	21.28	PASS
LTE Band 5	10	20525	50	#0	QPSK	22.58	21.03	PASS
LTE Band 5	10	20525	1	#0	QAM16	22.55	21.00	PASS
LTE Band 5	10	20525	1	#Mid	QAM16	21.80	20.25	PASS
LTE Band 5	10	20525	1	#Max	QAM16	23.34	21.79	PASS
LTE Band 5	10	20525	25	#0	QAM16	21.05	19.50	PASS
LTE Band 5	10	20525	25	#Mid	QAM16	21.05	19.50	PASS
LTE Band 5	10	20525	25	#Max	QAM16	21.60	20.05	PASS
LTE Band 5	10	20525	50	#0	QAM16	21.33	19.78	PASS
LTE Band 5	10	20600	1	#0	QPSK	24.64	23.09	PASS
LTE Band 5	10	20600	1	#Mid	QPSK	23.07	21.52	PASS
LTE Band 5	10	20600	1	#Max	QPSK	23.55	22.00	PASS
LTE Band 5	10	20600	25	#0	QPSK	22.80	21.25	PASS
LTE Band 5	10	20600	25	#Mid	QPSK	22.83	21.28	PASS
LTE Band 5	10	20600	25	#Max	QPSK	22.04	20.49	PASS
LTE Band 5	10	20600	50	#0	QPSK	22.51	20.96	PASS
LTE Band 5	10	20600	1	#0	QAM16	23.30	21.75	PASS
LTE Band 5	10	20600	1	#Mid	QAM16	21.63	20.08	PASS
LTE Band 5	10	20600	1	#Max	QAM16	22.20	20.65	PASS
LTE Band 5	10	20600	25	#0	QAM16	21.54	19.99	PASS
LTE Band 5	10	20600	25	#Mid	QAM16	21.58	20.03	PASS
LTE Band 5	10	20600	25	#Max	QAM16	20.82	19.27	PASS
LTE Band 5	10	20600	50	#0	QAM16	21.24	19.69	PASS

5.2. Occupied Bandwidth

Ambient condition

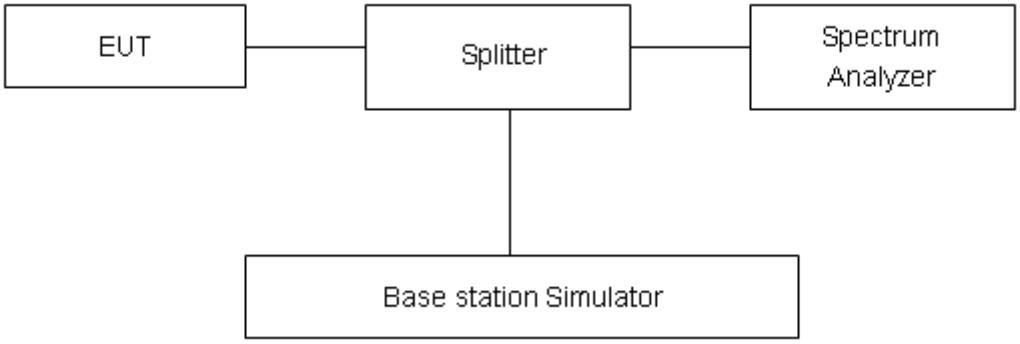
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 ≥1%EBW, VBW is set to 3x RBW.

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

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

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

Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 850 (GMSK)	128	824.2	0.2455	0.3116
	190	836.6	0.2425	0.3105
	251	848.8	0.2474	0.3137
GPRS 850 (GMSK)	128	824.2	0.2476	0.3040
	190	836.6	0.2464	0.3192
	251	848.8	0.2464	0.3066
EGPRS 850 (8PSK)	128	824.2	0.2452	0.3118
	190	836.6	0.2481	0.3134
	251	848.8	0.2420	0.3085
WCDMA Band V (RMC)	4132	826.4	4.1631	4.6600
	4183	836.6	4.1555	4.6510
	4233	846.6	4.1721	4.6500

LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20407	824.7	1.107	1.429
			20525	836.5	1.118	1.454
			20643	848.3	1.116	1.464
		3	20415	825.5	2.699	2.995
			20525	836.5	2.701	3.008
			20635	847.5	2.717	3.013
		5	20425	826.5	4.513	5.141
			20525	836.5	4.530	5.078
			20625	846.5	4.546	5.168
		10	20450	829	9.019	10.371
			20525	836.5	9.022	10.212
			20600	844	9.031	10.235
	16QAM	1.4	20407	824.7	1.114	1.469
			20525	836.5	1.118	1.452
			20643	848.3	1.114	1.465

		3	20415	825.5	2.705	3.014
			20525	836.5	2.720	3.036
			20635	847.5	2.708	3.022
		5	20425	826.5	4.530	4.988
			20525	836.5	4.545	5.117
			20625	846.5	4.520	5.103
		10	20450	829	9.042	10.391
			20525	836.5	9.023	10.228
			20600	844	9.042	10.227

GSM 850 CH-Low

GSM 850 GPRS CH-Low

GSM 850 CH-Middle

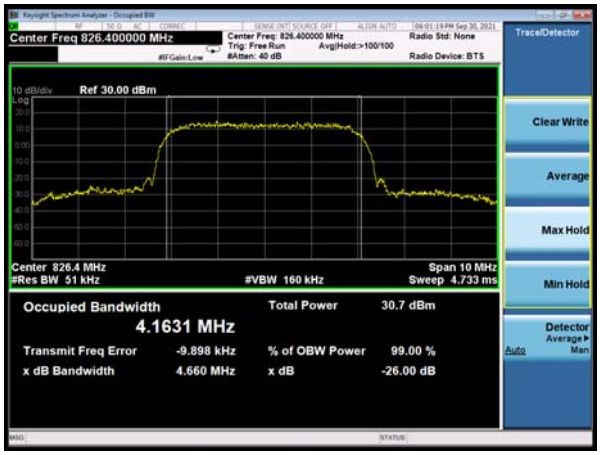
GSM 850 GPRS CH-Middle

GSM 850 CH-High

GSM 850 GPRS CH-High

GSM 850 EGPRS CH-Low

WCDMA Band V CH-Low



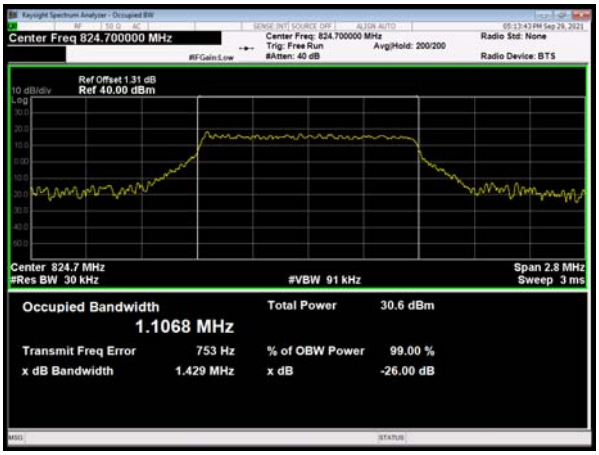
GSM 850 EGPRS CH-Middle

WCDMA Band V CH-Middle

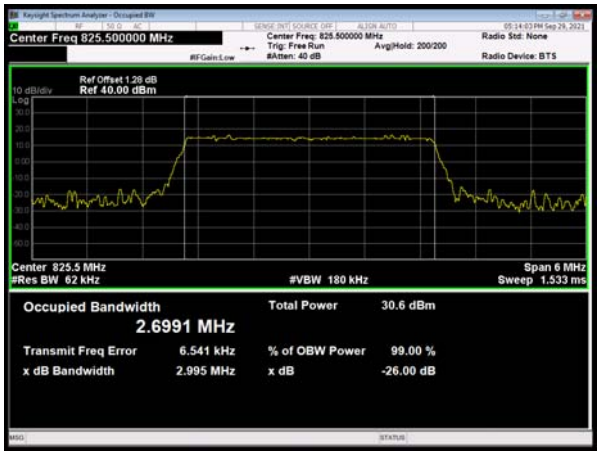
GSM 850 EGPRS CH-High

WCDMA Band V CH-High

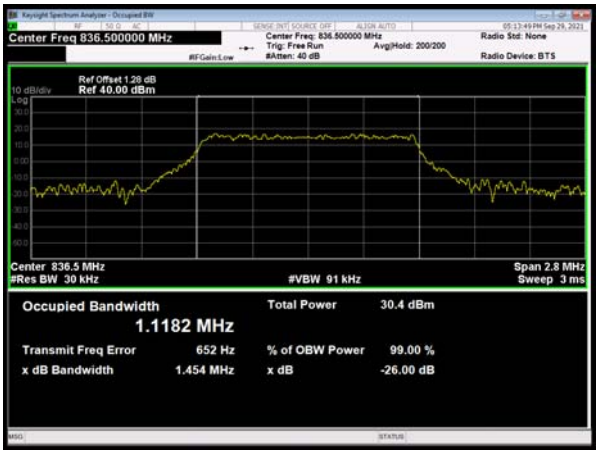
LTE Band 5 QPSK 1.4MHz CH-Low



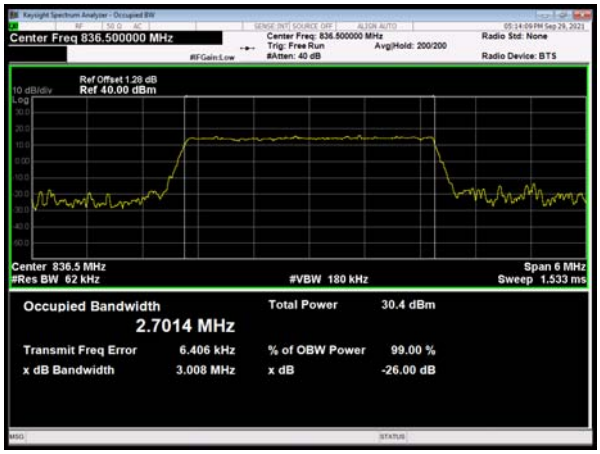
LTE Band 5 QPSK 3MHz CH-Low



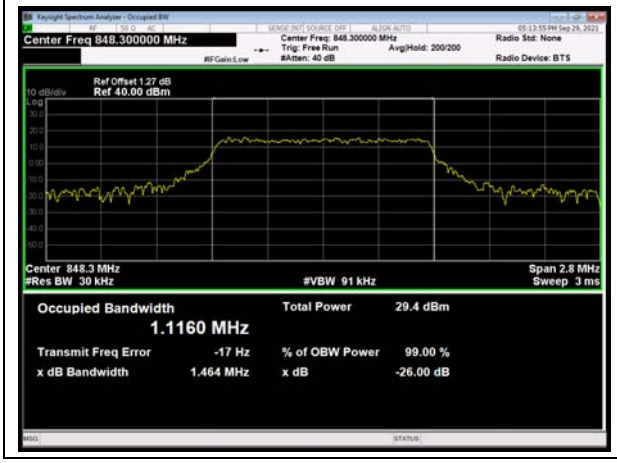
LTE Band 5 QPSK 1.4MHz CH-Middle



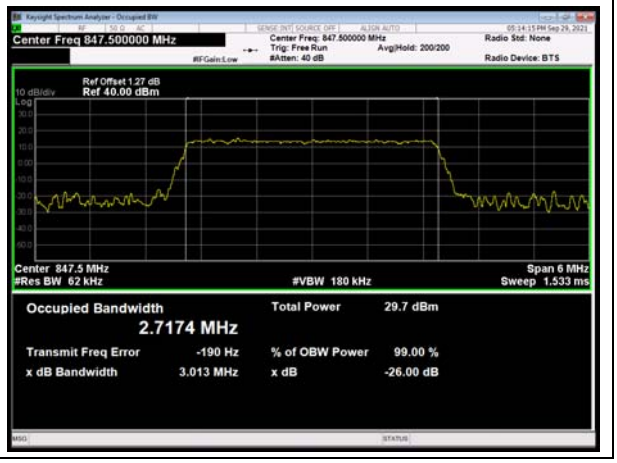
LTE Band 5 QPSK 3MHz CH-Middle



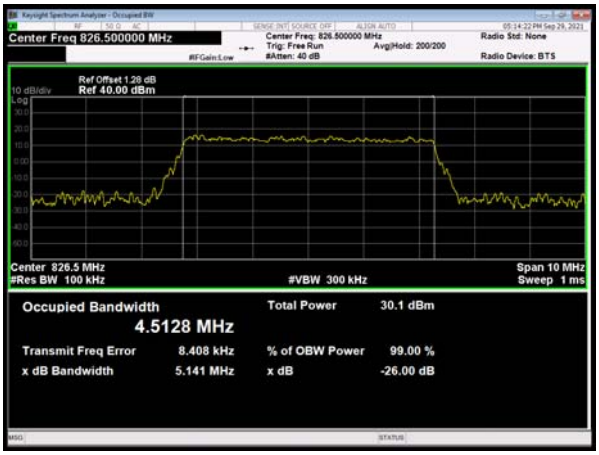
LTE Band 5 QPSK 1.4MHz CH-High



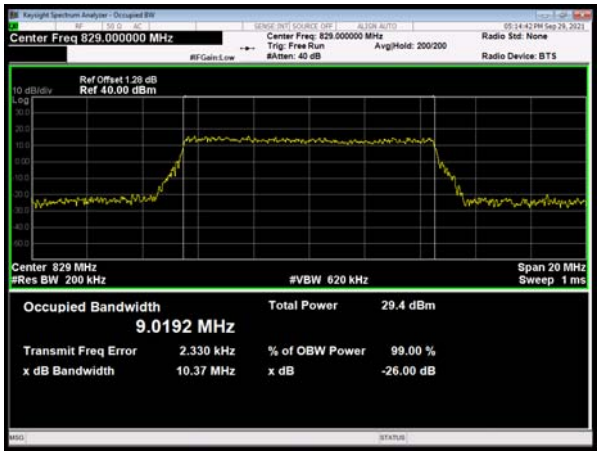
LTE Band 5 QPSK 3MHz CH-High



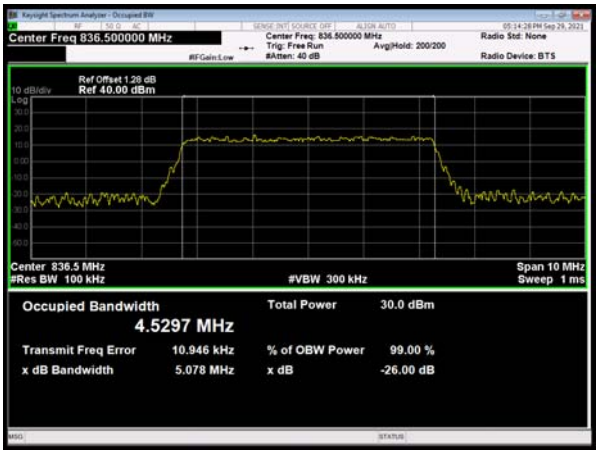
LTE Band 5 QPSK 5MHz CH-Low



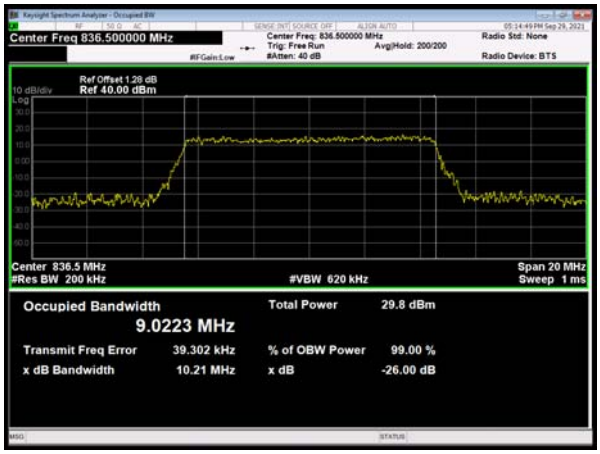
LTE Band 5 QPSK 10MHz CH-Low



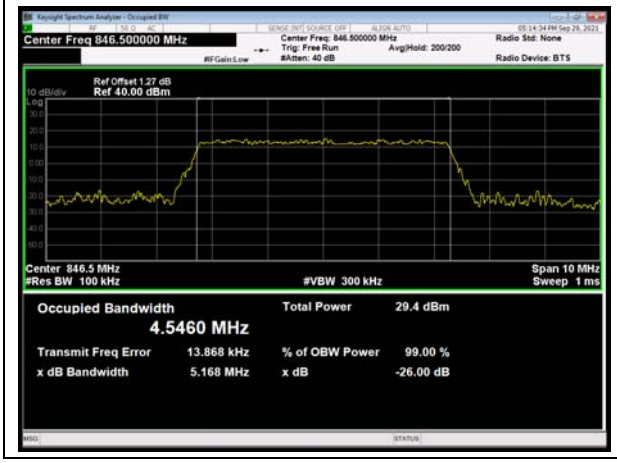
LTE Band 5 QPSK 5MHz CH-Middle



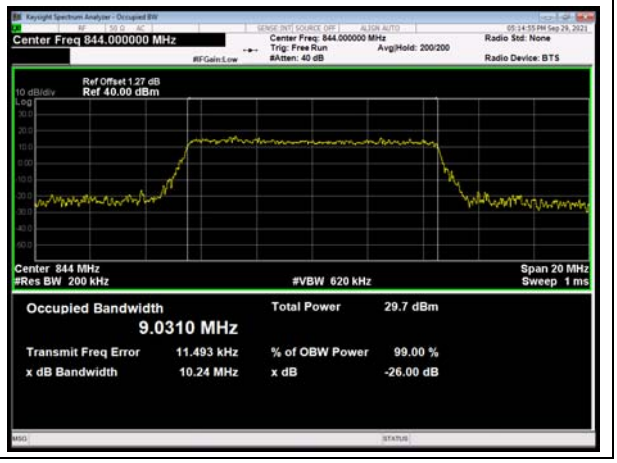
LTE Band 5 QPSK 10MHz CH-Middle



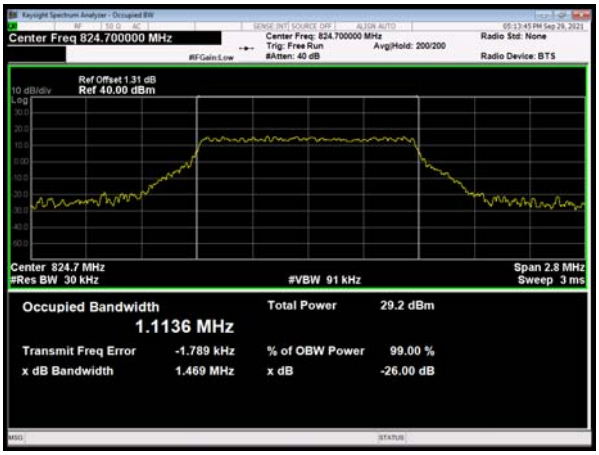
LTE Band 5 QPSK 5MHz CH-High



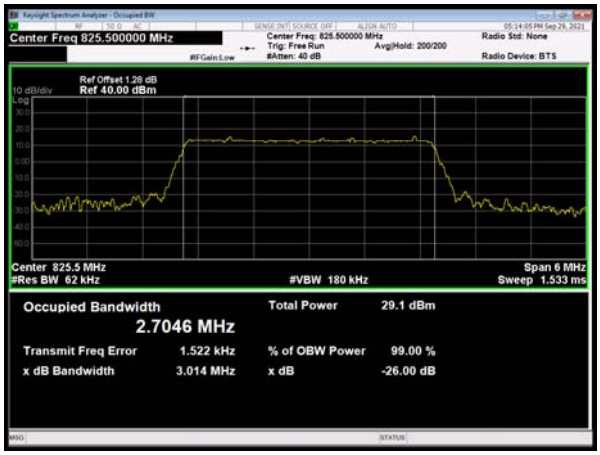
LTE Band 5 QPSK 10MHz CH-High



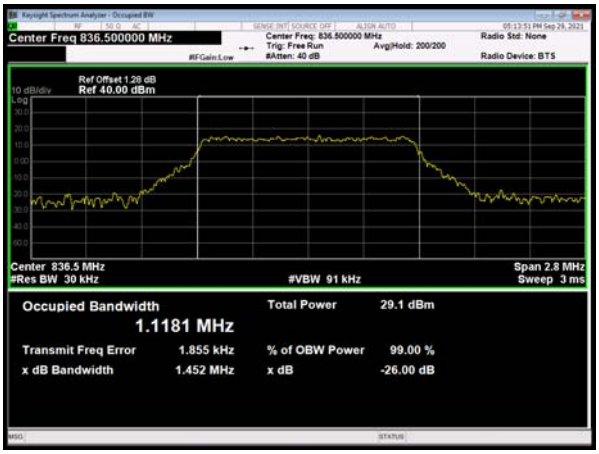
LTE Band 5 16QAM 1.4MHz CH-Low



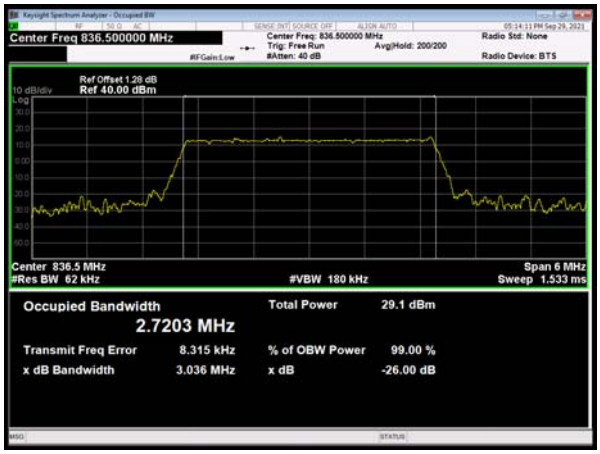
LTE Band 5 16QAM 3MHz CH-Low



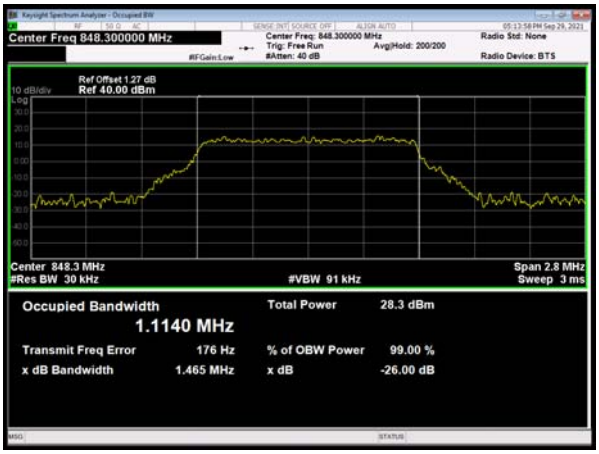
LTE Band 5 16QAM 1.4MHz CH-Middle



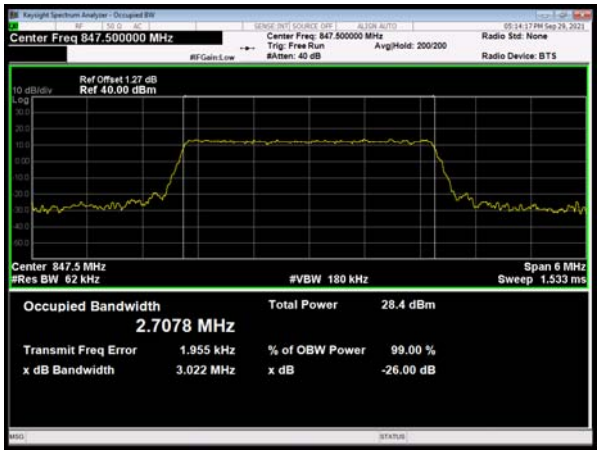
LTE Band 5 16QAM 3MHz CH-Middle



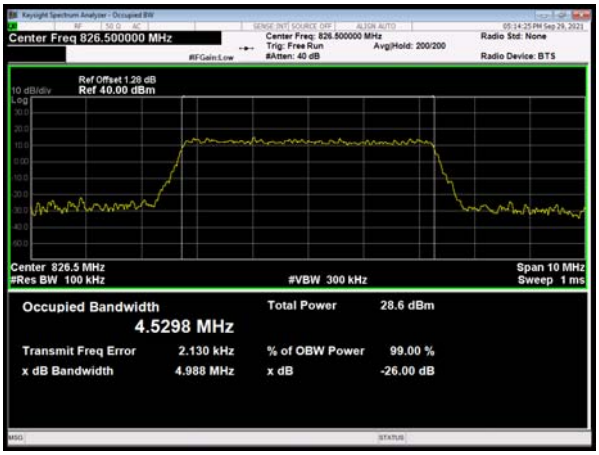
LTE Band 5 16QAM 1.4MHz CH-High



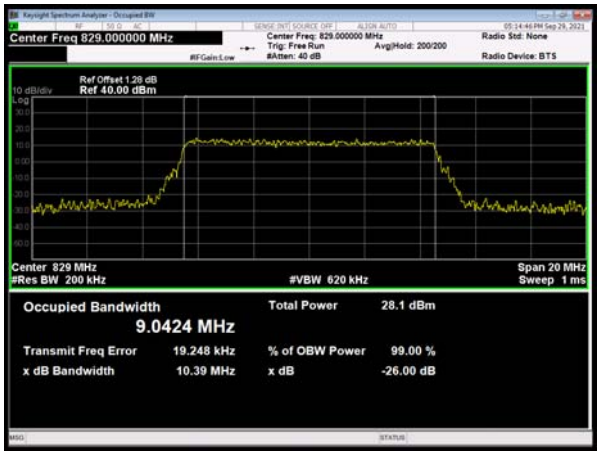
LTE Band 5 16QAM 3MHz CH-High



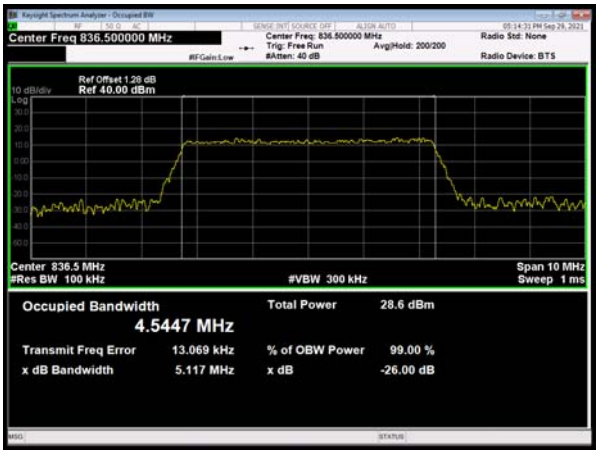
LTE Band 5 16QAM 5MHz CH-Low



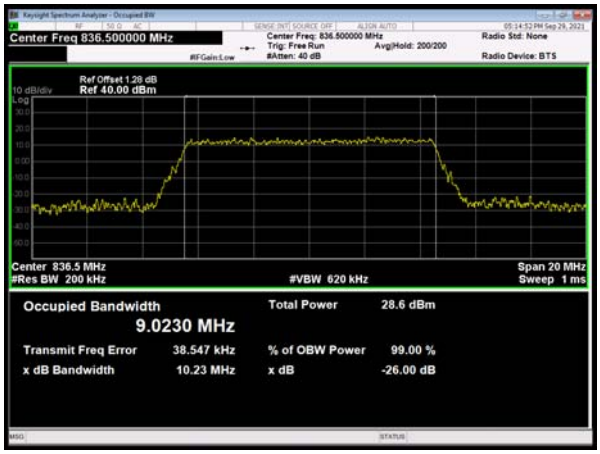
LTE Band 5 16QAM 10MHz CH-Low



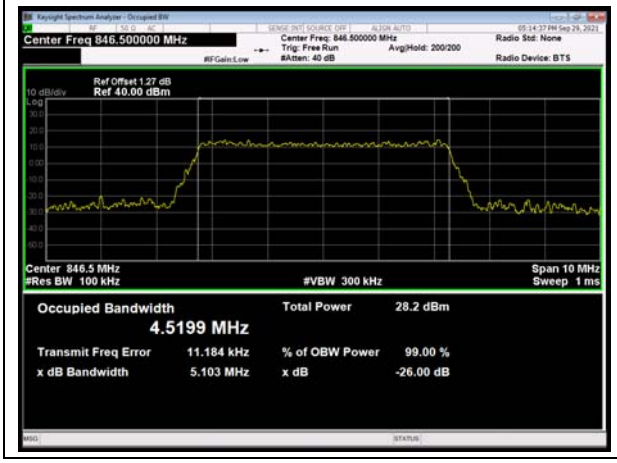
LTE Band 5 16QAM 5MHz CH-Middle



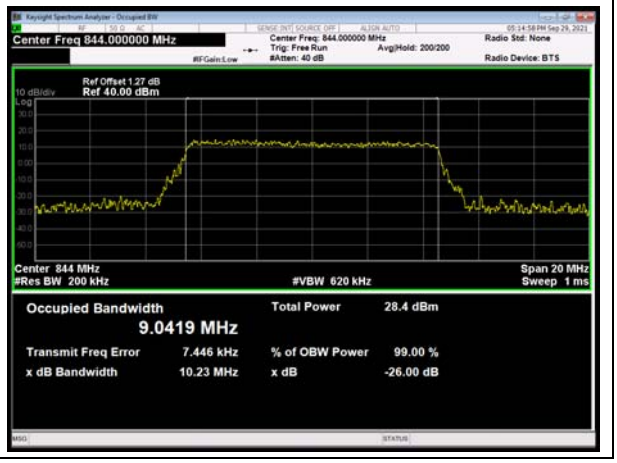
LTE Band 5 16QAM 10MHz CH-Middle



LTE Band 5 16QAM 5MHz CH-High



LTE Band 5 16QAM 10MHz CH-High



5.3. Band Edge Compliance

Ambient condition

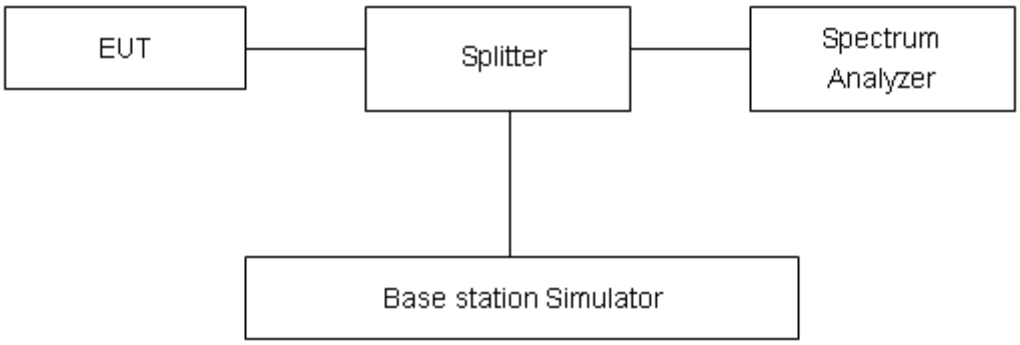
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 ≥1%EBW, VBW is set to 3x RBW.

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

Measurement Uncertainty

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

Test Result

GSM 850 CH-Low

GSM 850 CH-High

GSM 850 GPRS CH-Low

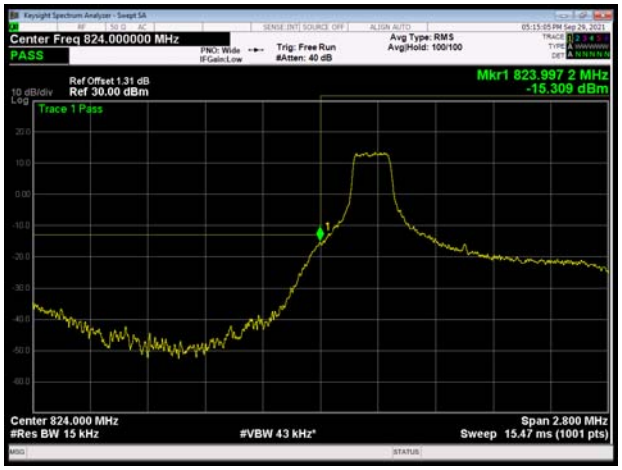
GSM 850 GPRS CH-High

GSM 850 EGPRS CH-Low

GSM 850 EGPRS CH-High

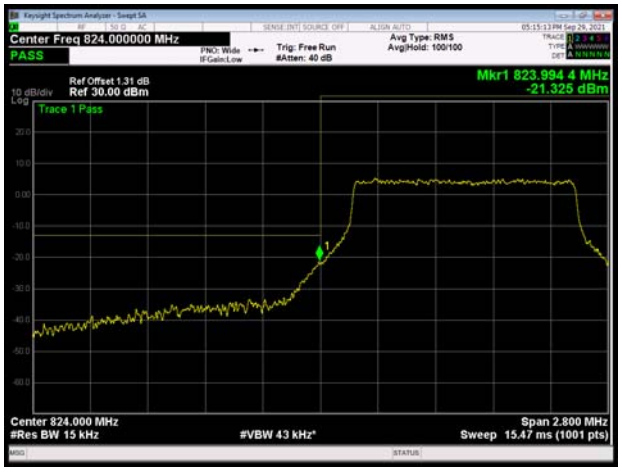
WCDMA Band V CH-Low	WCDMA Band V CH-High
	

LTE Band 5 QPSK 1.4MHz CH-Low 1RB



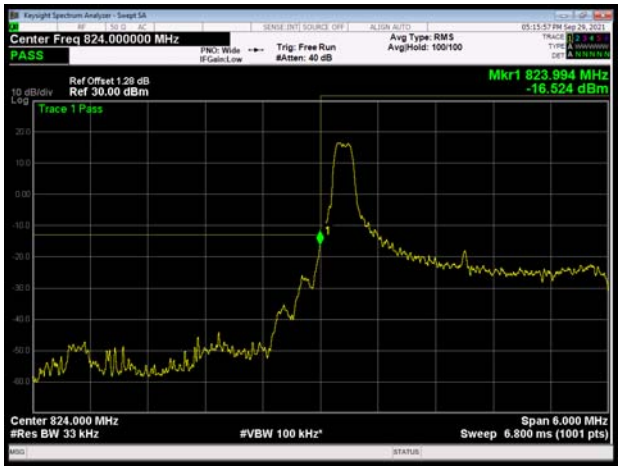
LTE Band 5 QPSK 1.4MHz CH-High 1RB

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

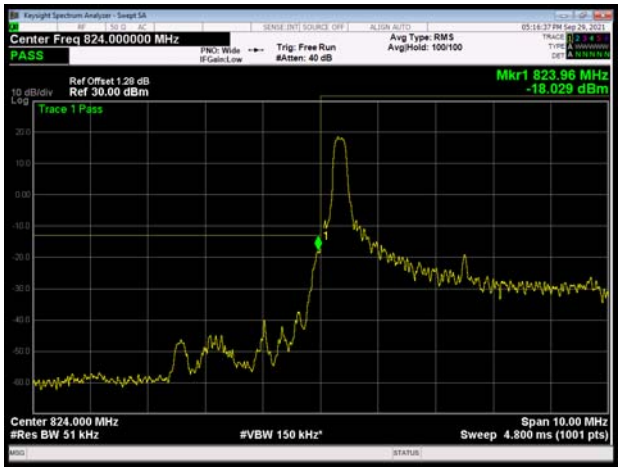


LTE Band 5 QPSK 3MHz CH-High 1RB

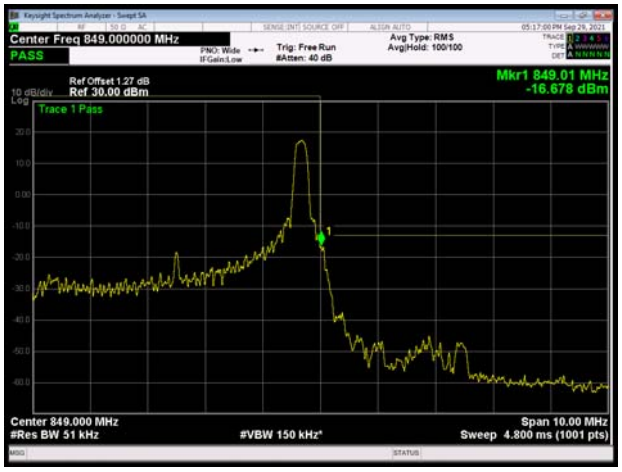
LTE Band 5 QPSK 3MHz CH-Low 100%RB

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

LTE Band 5 QPSK 5MHz CH-Low 1RB



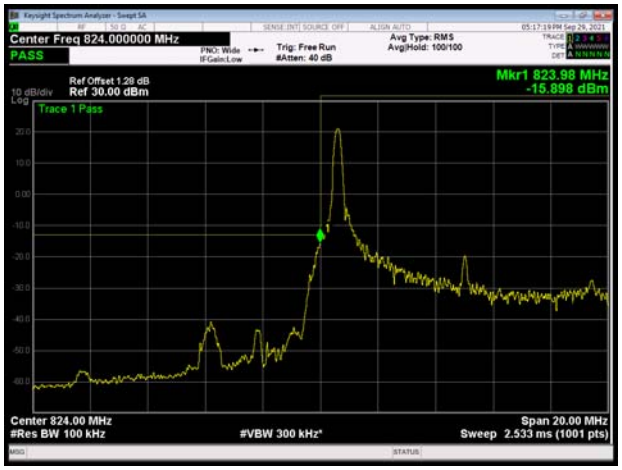
LTE Band 5 QPSK 5MHz CH-High 1RB



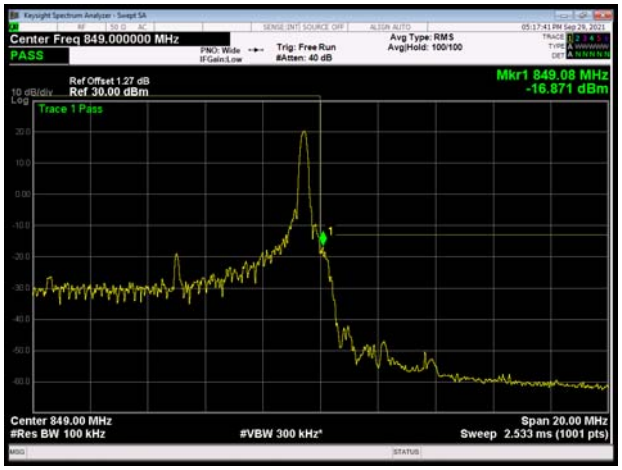
LTE Band 5 QPSK 5MHz CH-Low 100%RB

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

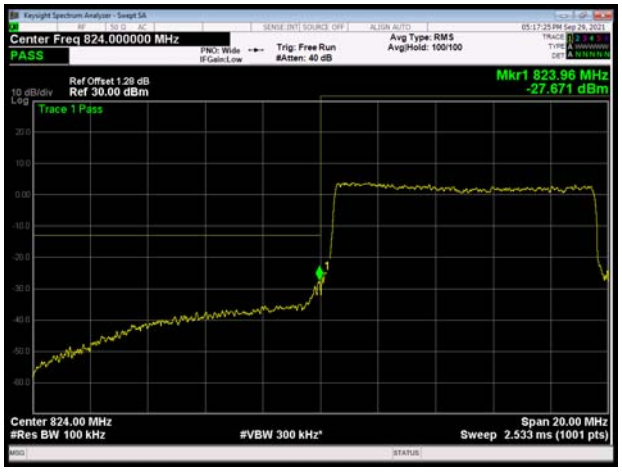
LTE Band 5 QPSK 10MHz CH-Low 1RB



LTE Band 5 QPSK 10MHz CH-High 1RB

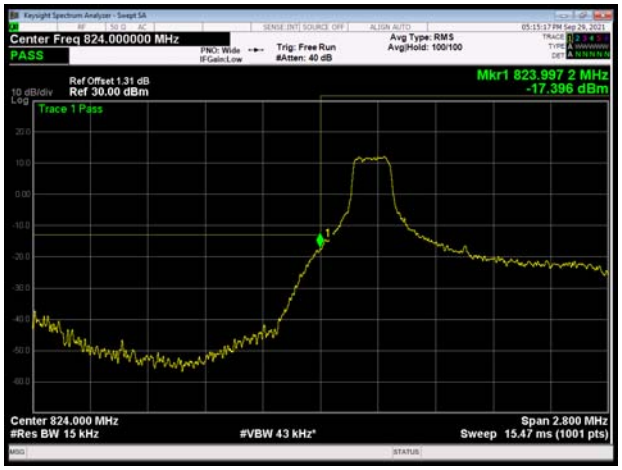


LTE Band 5 QPSK 10MHz CH-Low 100%RB

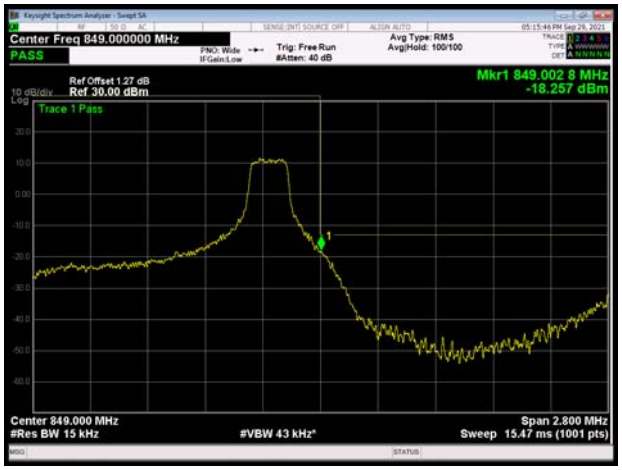


LTE Band 5 QPSK 10MHz CH-High 100%RB

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



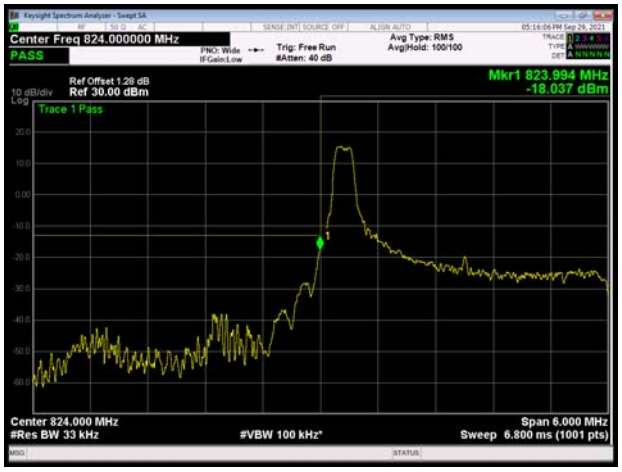
LTE Band 5 16QAM 1.4MHz CH-High 1RB



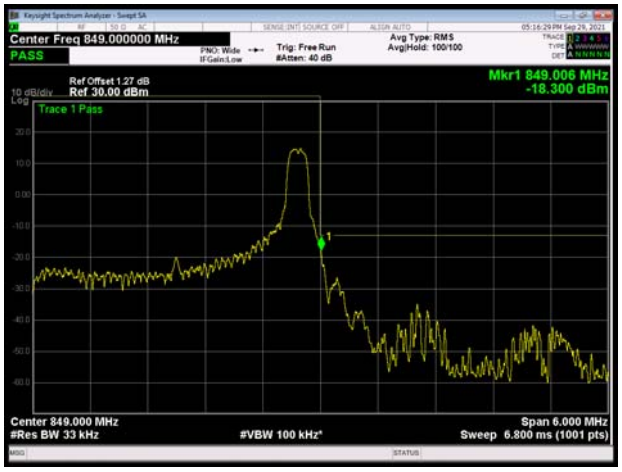
LTE Band 5 16QAM 1.4MHz CH-Low 100%RB

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

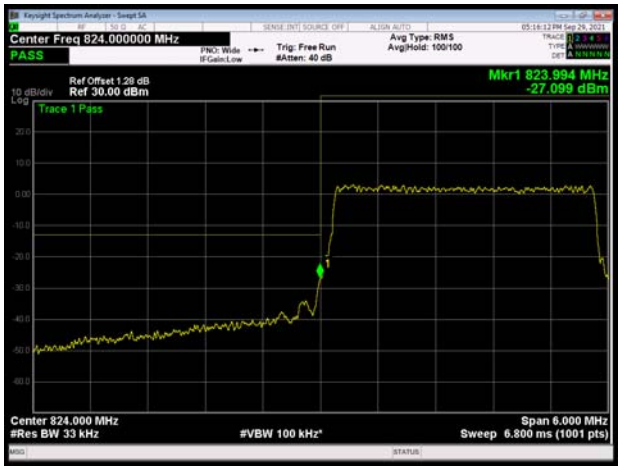
LTE Band 5 16QAM 3MHz CH-Low 1RB



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

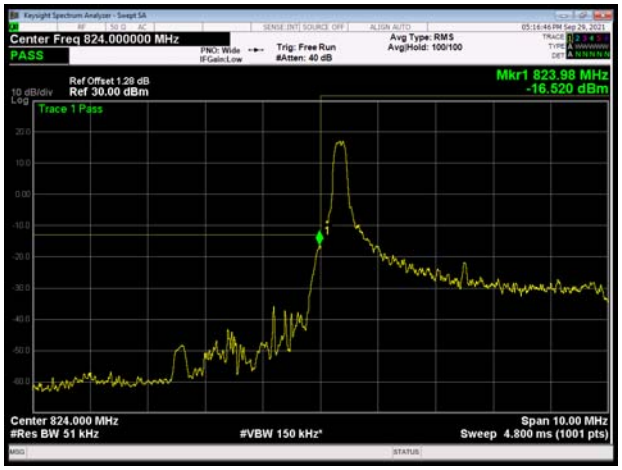


LTE Band 5 16QAM 3MHz CH-Low 100%RB

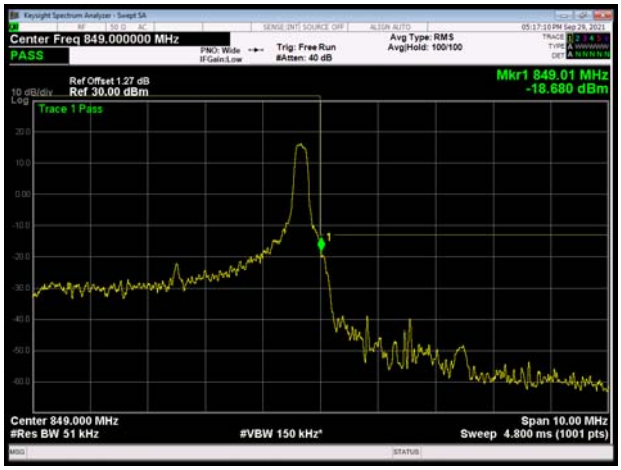


LTE Band 5 16QAM 3MHz CH-High 100%RB

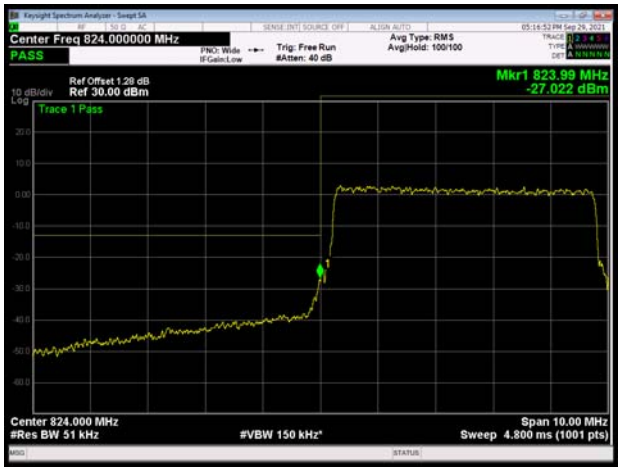
LTE Band 5 16QAM 5MHz CH-Low 1RB



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



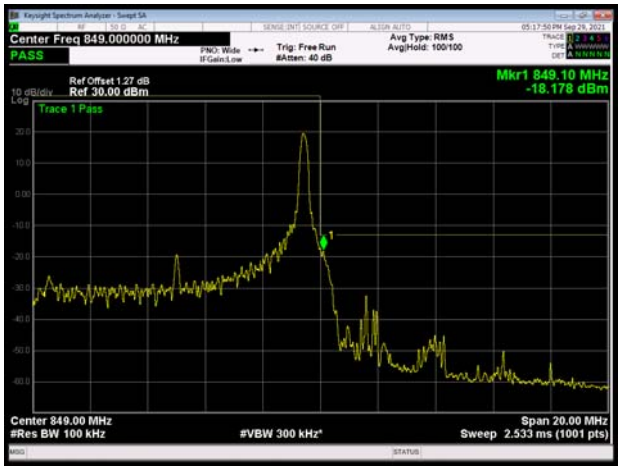
LTE Band 5 16QAM 5MHz CH-Low 100%RB



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)

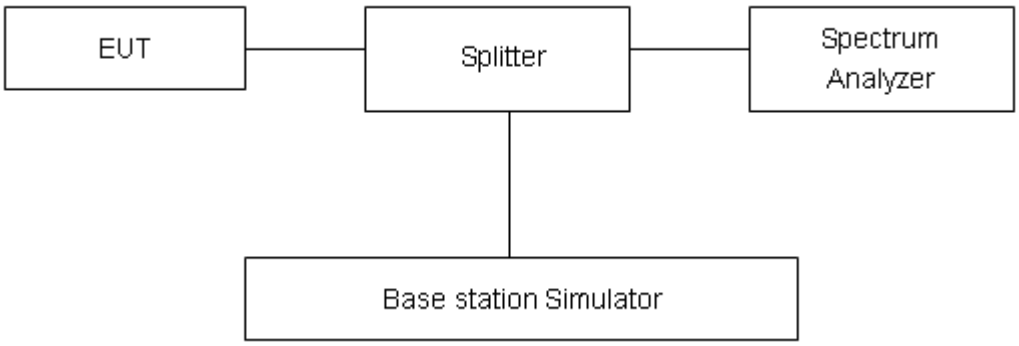
Ambient condition

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	32.12	29.40	2.72	≤13	PASS
	190	836.6	32.17	29.44	2.73	≤13	PASS
	251	848.8	32.31	29.56	2.75	≤13	PASS
GPRS 850 (GMSK)	128	824.2	32.32	29.56	2.76	≤13	PASS
	190	836.6	32.25	29.51	2.74	≤13	PASS
	251	848.8	32.18	29.44	2.74	≤13	PASS
EGPRS 850 (8PSK)	128	824.2	29.39	23.47	5.92	≤13	PASS
	190	836.6	29.57	23.69	5.88	≤13	PASS
	251	848.8	29.75	23.63	6.12	≤13	PASS
WCDMA Band V (RMC)	4132	826.4	26.25	23.10	3.15	≤13	PASS
	4183	836.6	26.15	23.01	3.14	≤13	PASS
	4233	846.6	26.03	22.88	3.15	≤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	27.54	22.46	5.08	≤13	PASS
		20525	836.5	27.87	22.18	5.69	≤13	PASS
		20643	848.3	27.27	21.43	5.84	≤13	PASS
	3	20415	825.5	27.33	21.99	5.34	≤13	PASS
		20525	836.5	27.48	21.77	5.71	≤13	PASS
		20635	847.5	26.83	21.10	5.73	≤13	PASS
	5	20425	826.5	27.41	21.94	5.47	≤13	PASS
		20525	836.5	27.44	21.90	5.54	≤13	PASS
		20625	846.5	27.05	21.35	5.70	≤13	PASS
	10	20450	829	27.35	21.63	5.72	≤13	PASS
		20525	836.5	27.47	21.93	5.54	≤13	PASS
		20600	844	27.44	21.85	5.59	≤13	PASS
16QAM	1.4	20407	824.7	26.66	21.02	5.64	≤13	PASS
		20525	836.5	27.07	20.89	6.18	≤13	PASS
		20643	848.3	26.76	20.13	6.63	≤13	PASS
	3	20415	825.5	26.57	20.53	6.04	≤13	PASS
		20525	836.5	26.82	20.48	6.34	≤13	PASS
		20635	847.5	26.33	19.80	6.53	≤13	PASS
	5	20425	826.5	26.72	20.49	6.23	≤13	PASS
		20525	836.5	26.82	20.60	6.22	≤13	PASS
		20625	846.5	26.48	20.05	6.43	≤13	PASS
	10	20450	829	26.63	20.17	6.46	≤13	PASS
		20525	836.5	26.89	20.62	6.27	≤13	PASS
		20600	844	26.80	20.53	6.27	≤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 10.8 V and 13.2 V, with a nominal voltage of 12V.

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

Measurement Uncertainty

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

Test Result

GSM850						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal（25℃）	Normal	6.43	1.78	0.00768	0.00212	PASS
Extreme（50℃）		16.22	11.80	0.01939	0.01410	PASS
Extreme（40℃）		8.48	10.41	0.01014	0.01244	PASS
Extreme（30℃）		7.15	4.97	0.00854	0.00594	PASS
Extreme（20℃）		2.35	14.20	0.00281	0.01697	PASS
Extreme（10℃）		10.49	17.19	0.01253	0.02055	PASS
Extreme（0℃）		5.75	4.80	0.00687	0.00574	PASS
Extreme（-10℃）		3.94	9.53	0.00471	0.01140	PASS
Extreme（-20℃）		3.77	4.10	0.00450	0.00491	PASS
Extreme（-30℃）		17.37	11.76	0.02077	0.01406	PASS
25℃	LV	13.43	15.91	0.01606	0.01901	PASS
	HV	13.58	7.58	0.01623	0.00906	PASS

WCDMA B5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal（25℃）	Normal	14.02	1.86	0.01675	0.00222	PASS
Extreme（50℃）		9.84	10.15	0.01176	0.01214	PASS
Extreme（40℃）		10.47	7.63	0.01251	0.00912	PASS
Extreme（30℃）		11.29	11.37	0.01350	0.01359	PASS
Extreme（20℃）		13.25	10.04	0.01584	0.01200	PASS
Extreme（10℃）		6.09	10.03	0.00728	0.01199	PASS
Extreme（0℃）		12.84	5.30	0.01534	0.00634	PASS
Extreme（-10℃）		15.96	3.12	0.01907	0.00373	PASS
Extreme（-20℃）		4.74	13.77	0.00567	0.01646	PASS
Extreme（-30℃）		1.07	15.04	0.00128	0.01797	PASS
25℃	LV	13.53	16.64	0.01617	0.01989	PASS
	HV	1.46	13.69	0.00174	0.01637	PASS

LTE Band 5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
BANDWIDTH	1.4MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	6.80	12.79	0.00813	0.01530	PASS
Extreme（50℃）		6.84	11.93	0.00817	0.01426	PASS
Extreme（40℃）		2.01	13.42	0.00240	0.01605	PASS
Extreme（30℃）		4.25	3.98	0.00508	0.00476	PASS
Extreme（20℃）		17.51	4.22	0.02093	0.00505	PASS
Extreme（10℃）		11.68	17.39	0.01396	0.02078	PASS
Extreme（0℃）		8.89	4.00	0.01063	0.00478	PASS
Extreme（-10℃）		10.60	10.94	0.01267	0.01308	PASS
Extreme（-20℃）		3.82	14.20	0.00457	0.01698	PASS
Extreme（-30℃）		5.94	8.99	0.00710	0.01075	PASS
25℃	LV	5.02	9.53	0.00601	0.01139	PASS
	HV	9.13	4.44	0.01091	0.00530	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
BANDWIDTH	3MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	13.90	15.10	0.01662	0.01805	PASS
Extreme（50℃）		13.34	10.21	0.01595	0.01221	PASS
Extreme（40℃）		6.91	17.74	0.00826	0.02120	PASS
Extreme（30℃）		17.20	4.68	0.02056	0.00559	PASS
Extreme（20℃）		5.56	3.69	0.00664	0.00441	PASS
Extreme（10℃）		3.80	17.96	0.00454	0.02147	PASS
Extreme（0℃）		7.64	9.18	0.00913	0.01098	PASS
Extreme（-10℃）		1.43	10.51	0.00171	0.01256	PASS
Extreme（-20℃）		3.13	13.41	0.00374	0.01603	PASS
Extreme（-30℃）		12.62	5.02	0.01509	0.00600	PASS
25℃	LV	13.41	10.93	0.01603	0.01307	PASS
	HV	11.98	13.12	0.01432	0.01569	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability （ppm）	Frequency Stability （ppm）	Verdict
BANDWIDTH	5MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal（25℃）	Normal	6.74	11.65	0.00806	0.01393	PASS

Extreme（50℃）		1.99	17.19	0.00237	0.02055	PASS
Extreme（40℃）		17.54	12.19	0.02097	0.01457	PASS
Extreme（30℃）		9.43	11.78	0.01127	0.01408	PASS
Extreme（20℃）		5.74	16.08	0.00687	0.01922	PASS
Extreme（10℃）		9.97	13.30	0.01192	0.01590	PASS
Extreme（0℃）		6.51	4.32	0.00779	0.00517	PASS
Extreme（-10℃）		16.91	5.31	0.02021	0.00635	PASS
Extreme（-20℃）		17.48	10.52	0.02090	0.01257	PASS
Extreme（-30℃）		6.11	7.09	0.00731	0.00847	PASS
25℃	LV	12.87	2.63	0.01539	0.00314	PASS
	HV	12.80	9.09	0.01530	0.01087	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	11.40	2.56	0.01363	0.00306	PASS
Extreme（50℃）		11.84	14.17	0.01416	0.01694	PASS
Extreme（40℃）		6.56	17.41	0.00784	0.02081	PASS
Extreme（30℃）		13.39	2.00	0.01601	0.00239	PASS
Extreme（20℃）		4.61	13.26	0.00551	0.01585	PASS
Extreme（10℃）		2.00	15.30	0.00239	0.01829	PASS
Extreme（0℃）		15.47	3.49	0.01850	0.00417	PASS
Extreme（-10℃）		6.04	6.51	0.00722	0.00778	PASS
Extreme（-20℃）		17.32	9.35	0.02071	0.01118	PASS
Extreme（-30℃）		6.98	11.79	0.00834	0.01409	PASS
25℃	LV	5.24	3.86	0.00627	0.00461	PASS
	HV	9.13	5.05	0.01091	0.00604	PASS

5.6. Spurious Emissions at Antenna Terminals

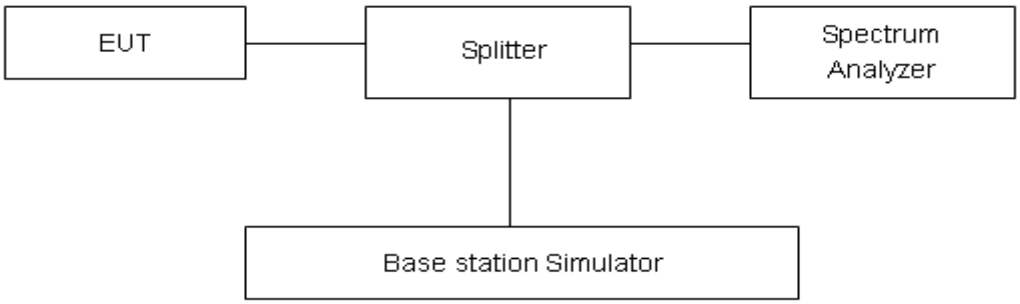
Ambient condition

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 are set to 100 kHz and VBW are set to 300 kHz for below 1G, RBW are set to 1MHz and VBW are set to 3MHz for above 1G, Sweep is set to ATUO.
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)
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

Measurement Uncertainty

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

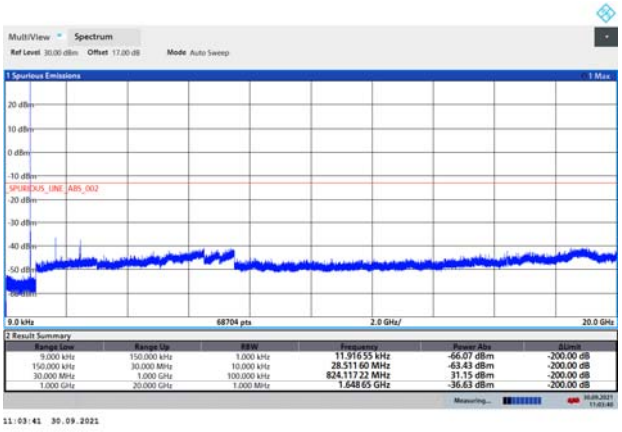
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-18GHz	1.407 dB

Test Result

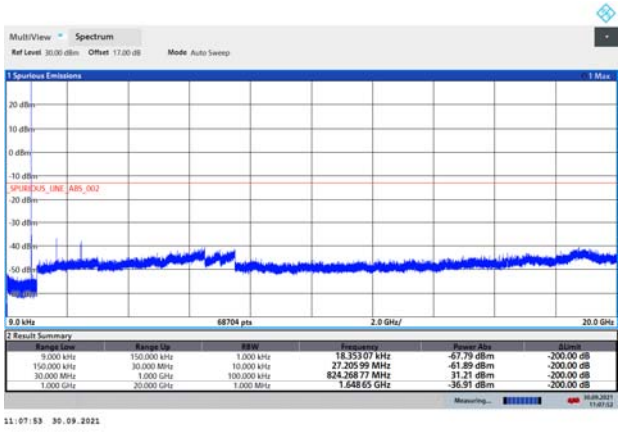
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

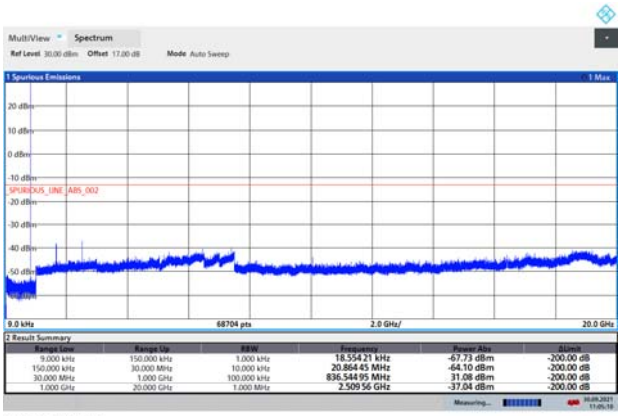
GSM 850 CH-Low 9kHz ~ 20GHz



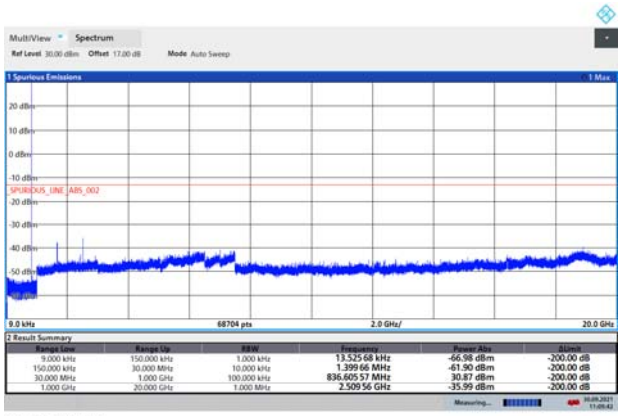
GPRS 850 CH-Low 9kHz ~ 20GHz



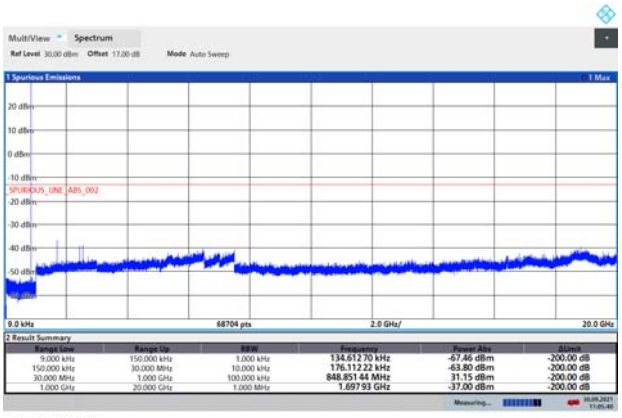
GSM 850 CH-Middle 9kHz ~ 20GHz



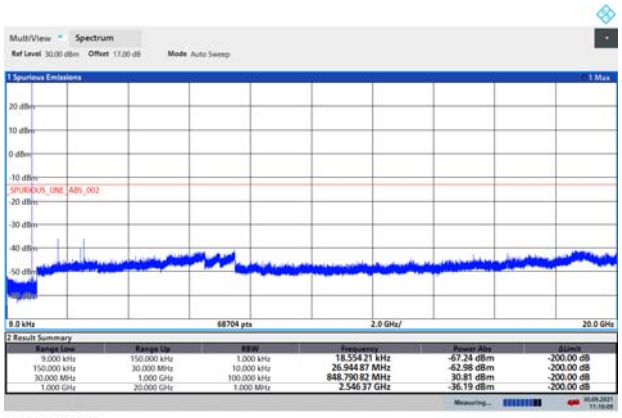
GPRS 850 CH-Middle 9kHz ~ 20GHz



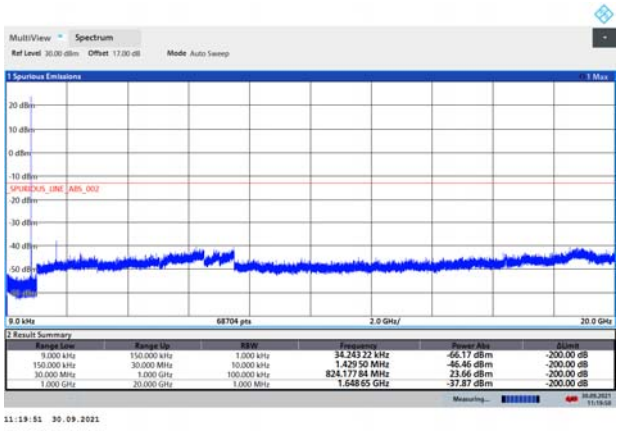
GSM 850 CH-High 9kHz ~ 20GHz



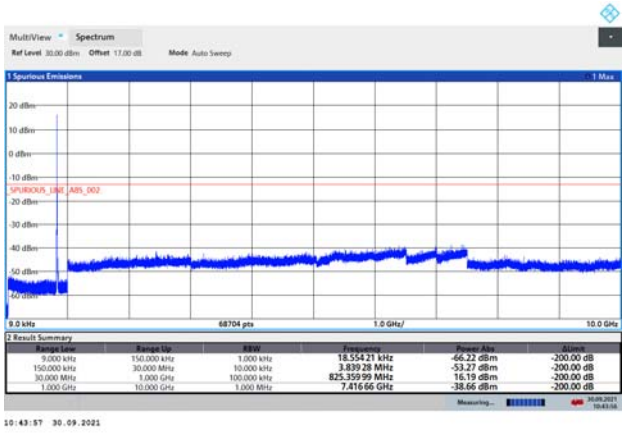
GPRS 850 CH-High 9kHz ~ 20GHz



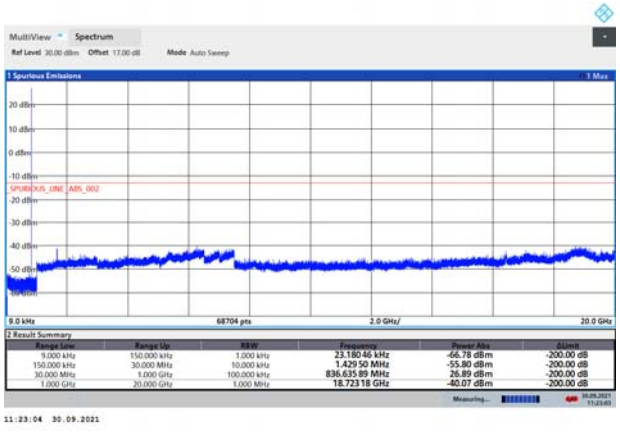
EGPRS 850 CH-Low 9kHz ~ 20GHz



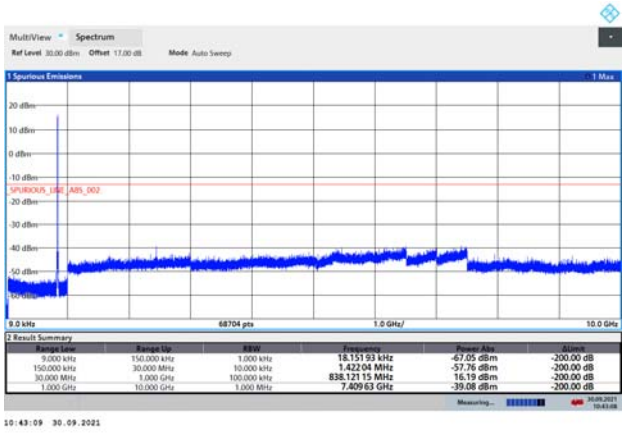
WCDMA BAND V CH-Low 9kHz ~ 10GHz



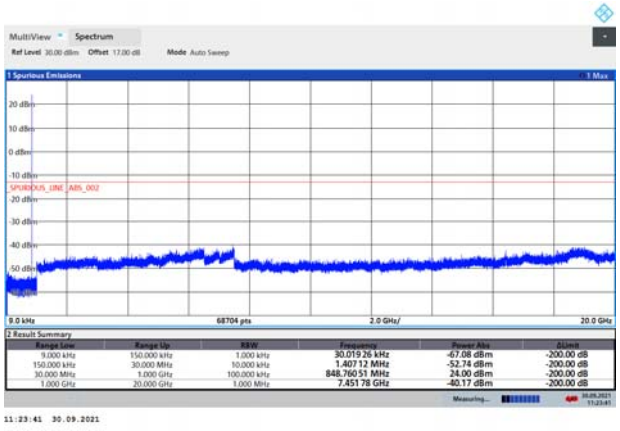
EGPRS 850 CH-Middle 9kHz ~ 20GHz



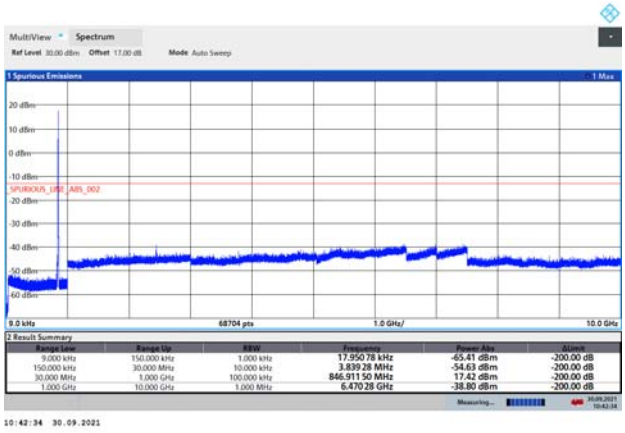
WCDMA BAND V CH-Middle 9kHz ~ 10GHz



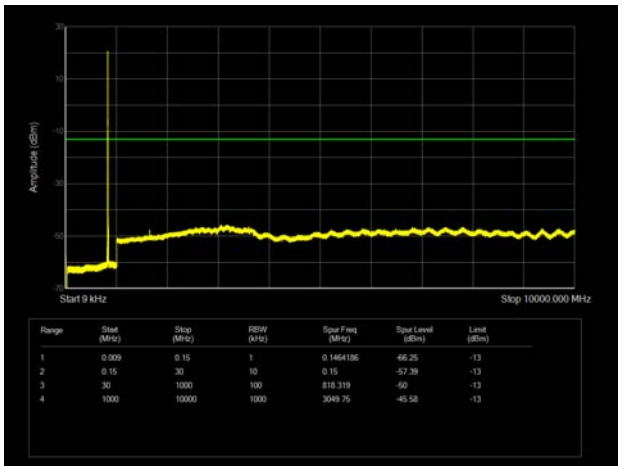
EGPRS 850 CH-High 9kHz ~ 20GHz



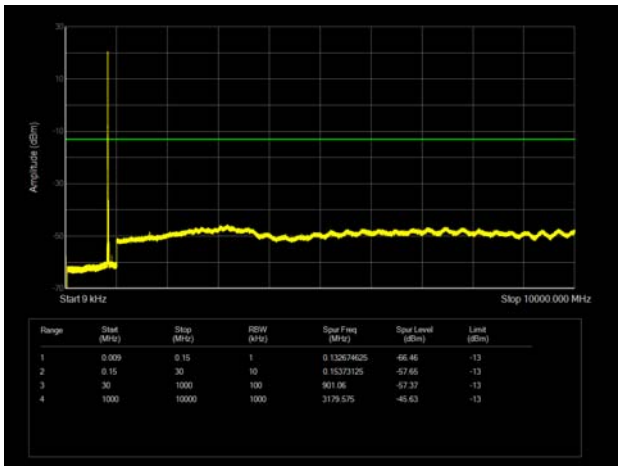
WCDMA BAND V CH-High 9kHz ~ 10GHz



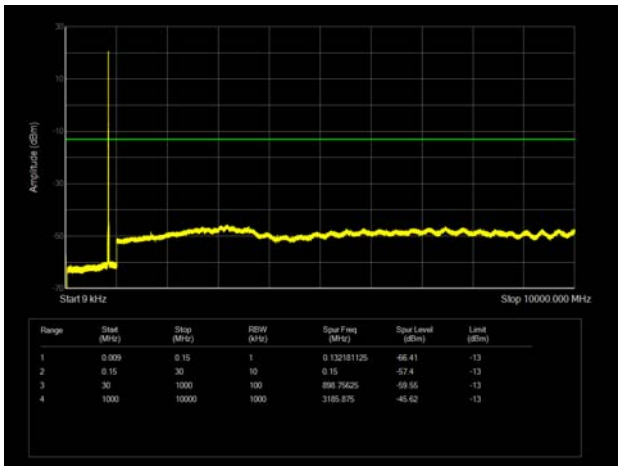
LTE Band 5 1.4MHz CH-Low 9kHz~10GHz



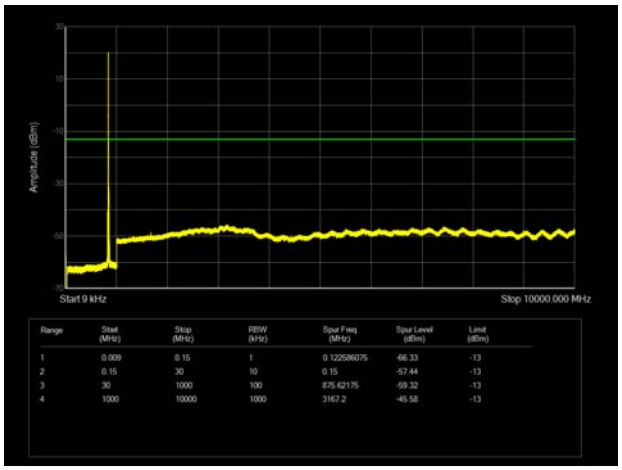
LTE Band 5 3MHz CH-Low 9kHz~10GHz



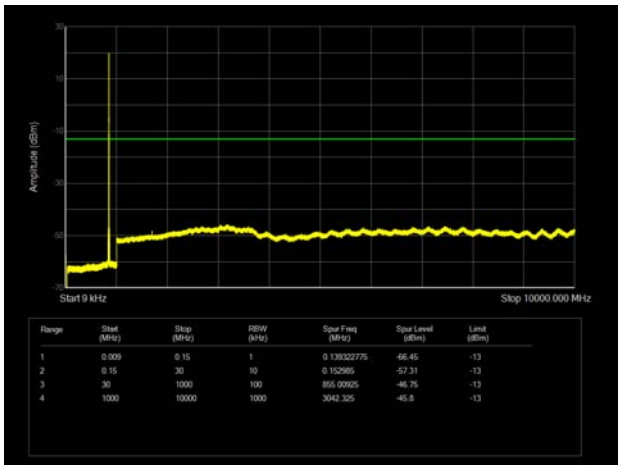
LTE Band 5 1.4MHz CH-Middle 9kHz~10GHz



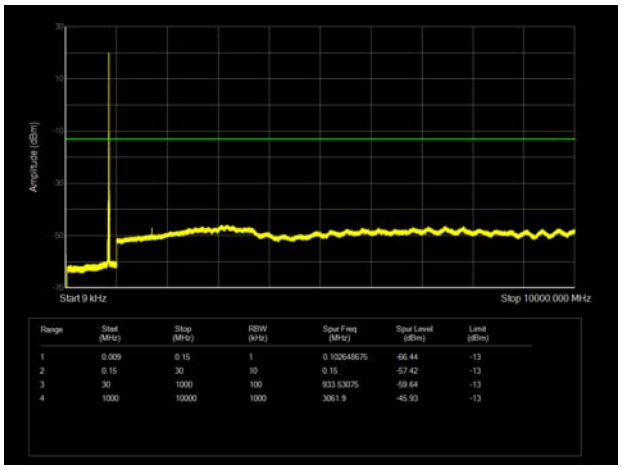
LTE Band 5 3MHz CH-Middle 9kHz~10GHz



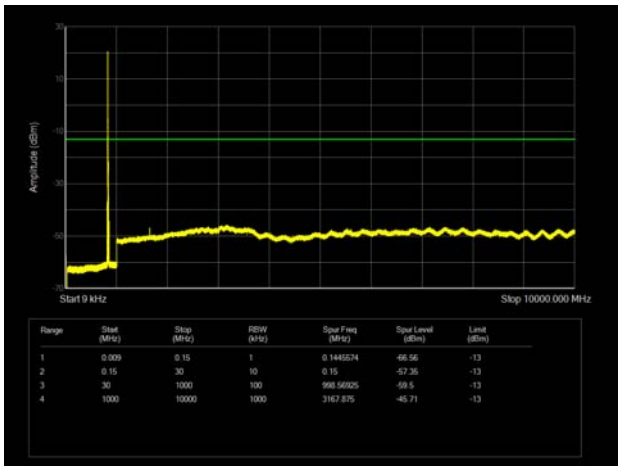
LTE Band 5 1.4MHz CH-High 9kHz~10GHz



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

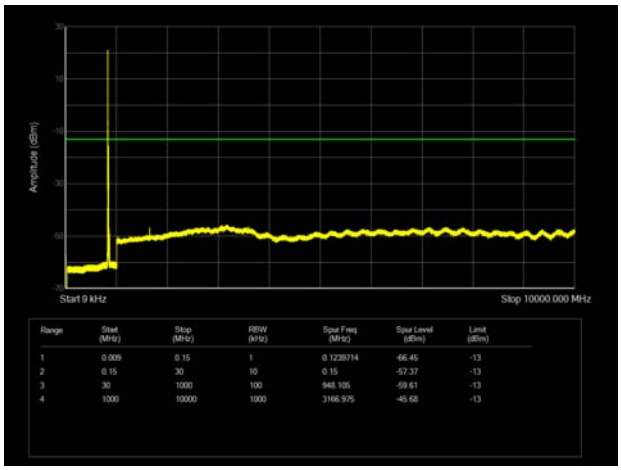


LTE Band 5 5MHz CH-Low 9kHz~10GHz



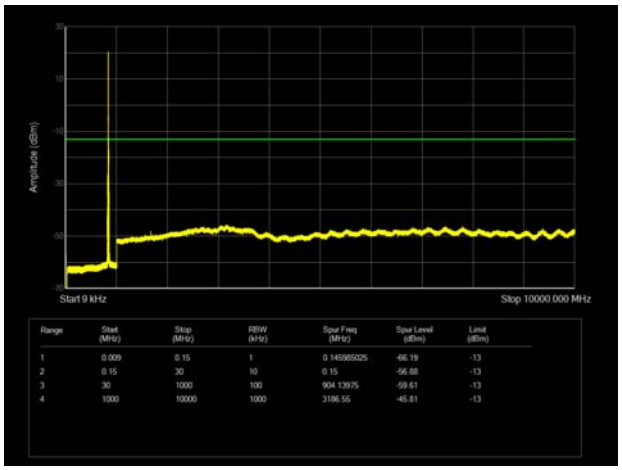
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.1445574	-66.56	-13
2	0.15	30	10	0.15	-57.35	-13
3	30	1000	100	998.56925	-59.5	-13
4	1000	10000	1000	3167.875	-45.71	-13

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



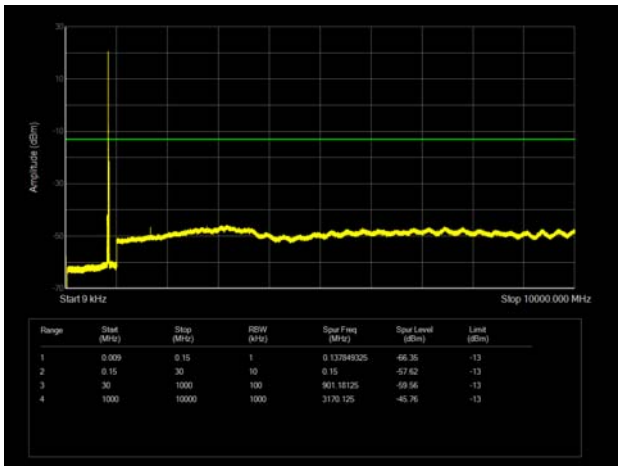
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.1239714	-66.45	-13
2	0.15	30	10	0.15	-57.37	-13
3	30	1000	100	948.105	-59.61	-13
4	1000	10000	1000	3166.975	-45.68	-13

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



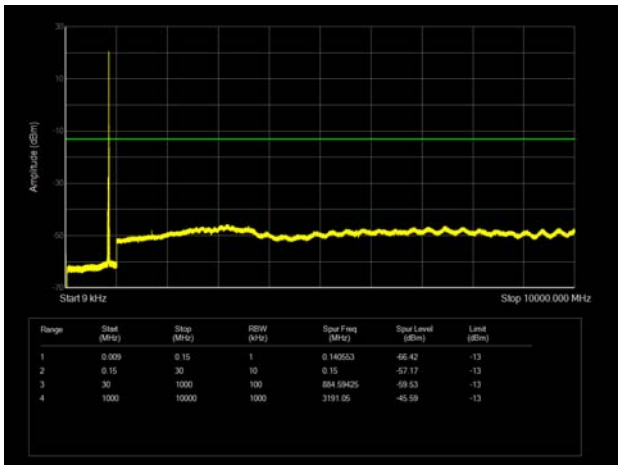
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.145985025	-66.19	-13
2	0.15	30	10	0.15	-56.88	-13
3	30	1000	100	904.13975	-59.61	-13
4	1000	10000	1000	3186.55	-45.81	-13

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



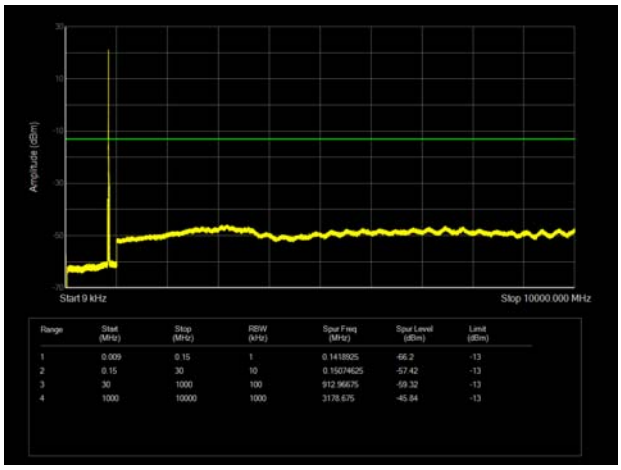
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.137849325	-66.35	-13
2	0.15	30	10	0.15	-57.62	-13
3	30	1000	100	901.18125	-59.56	-13
4	1000	10000	1000	3170.125	-45.76	-13

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



Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.140553	-66.42	-13
2	0.15	30	10	0.15	-57.17	-13
3	30	1000	100	884.59425	-59.53	-13
4	1000	10000	1000	3191.05	-45.59	-13

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



Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.1418925	-66.2	-13
2	0.15	30	10	0.15074625	-57.42	-13
3	30	1000	100	912.96675	-59.32	-13
4	1000	10000	1000	3178.675	-45.84	-13

5.7. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

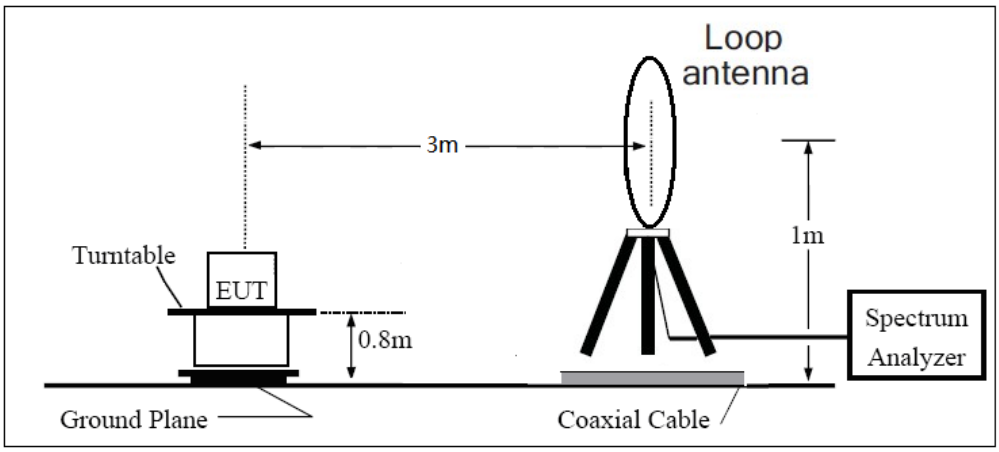
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable 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=100kHz,VBW=300kHz, and the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

= EIRP-2.15dB.

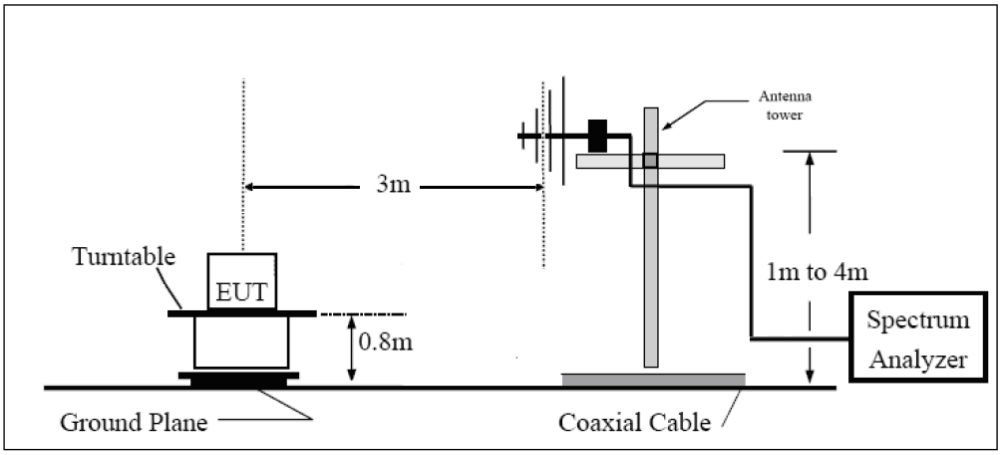
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

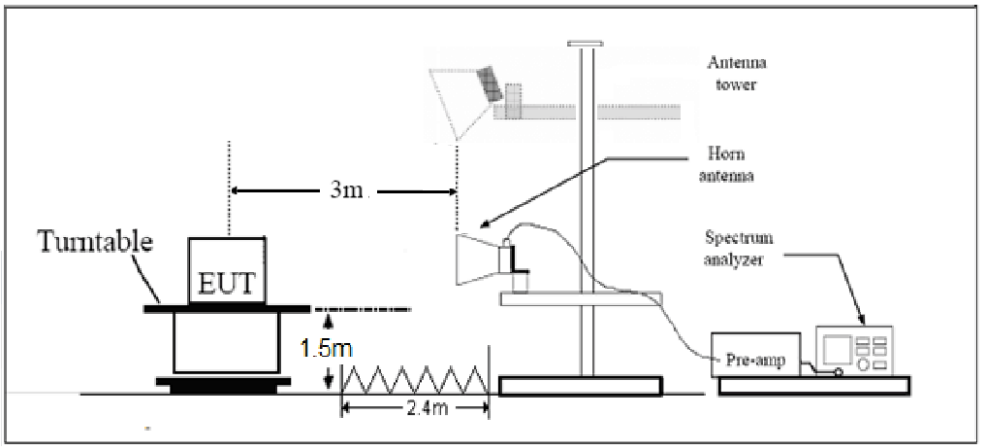
9KHz ~ 30MHz



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

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 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	1673.06	-53.54	1.70	8.70	Horizontal	-48.69	-13.00	35.69	270
3	2509.69	-57.81	2.30	12.00	Horizontal	-50.26	-13.00	37.26	90
4	3346.40	-64.79	2.70	12.70	Horizontal	-56.94	-13.00	43.94	135
5	4183.00	-63.19	3.00	12.50	Horizontal	-55.84	-13.00	42.84	90
6	5019.60	-58.93	3.40	12.50	Horizontal	-51.98	-13.00	38.98	270
7	5856.20	-59.73	3.40	12.80	Horizontal	-52.48	-13.00	39.48	90
8	6692.80	-58.66	4.10	11.50	Horizontal	-53.41	-13.00	40.41	45
9	7529.40	-54.48	4.20	12.20	Horizontal	-48.63	-13.00	35.63	90
10	8366.00	-56.07	4.30	12.50	Horizontal	-50.02	-13.00	37.02	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 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	-67.48	1.70	8.70	Horizontal	-62.63	-13.00	49.63	315
3	2509.80	-70.18	2.30	12.00	Horizontal	-62.63	-13.00	49.63	45
4	3346.40	-64.75	2.70	12.70	Horizontal	-56.90	-13.00	43.90	315
5	4183.00	-63.28	3.00	12.50	Horizontal	-55.93	-13.00	42.93	270
6	5019.60	-57.88	3.40	12.50	Horizontal	-50.93	-13.00	37.93	180
7	5856.20	-59.49	3.40	12.80	Horizontal	-52.24	-13.00	39.24	0
8	6692.80	-56.73	4.10	11.50	Horizontal	-51.48	-13.00	38.48	45
9	7529.40	-55.10	4.20	12.20	Horizontal	-49.25	-13.00	36.25	90
10	8366.00	-54.06	4.30	12.50	Horizontal	-48.01	-13.00	35.01	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 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	1673.0	-60.16	1.70	8.70	Horizontal	-55.31	-13.00	42.31	90
3	2509.5	-62.60	2.30	12.00	Horizontal	-55.05	-13.00	42.05	45
4	3346.00	-64.53	2.70	12.70	Horizontal	-56.68	-13.00	43.68	0
5	4182.50	-62.06	3.00	12.50	Horizontal	-54.71	-13.00	41.71	45
6	5019.00	-59.31	3.40	12.50	Horizontal	-52.36	-13.00	39.36	135
7	5855.50	-59.03	3.40	12.80	Horizontal	-51.78	-13.00	38.78	180
8	6692.00	-56.68	4.10	11.50	Horizontal	-51.43	-13.00	38.43	225
9	7528.50	-53.48	4.20	12.20	Horizontal	-47.63	-13.00	34.63	90
10	8365.00	-54.07	4.30	12.50	Horizontal	-48.02	-13.00	35.02	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	-55.75	1.70	8.70	Horizontal	-50.90	-13.00	37.90	270
3	2503.30	-63.47	2.30	12.00	Horizontal	-55.92	-13.00	42.92	90
4	3466.20	-63.96	2.70	12.70	Horizontal	-56.11	-13.00	43.11	90
5	4215.90	-61.83	3.00	12.50	Horizontal	-54.48	-13.00	41.48	225
6	5165.60	-59.17	3.40	12.50	Horizontal	-52.22	-13.00	39.22	45
7	5815.30	-60.02	3.40	12.80	Horizontal	-52.77	-13.00	39.77	90
8	6765.00	-57.59	4.10	11.50	Horizontal	-52.34	-13.00	39.34	180
9	7614.70	-55.45	4.20	12.20	Horizontal	-49.60	-13.00	36.60	45
10	8464.40	-52.45	4.30	12.50	Horizontal	-46.40	-13.00	33.40	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	-56.71	1.70	8.70	Horizontal	-51.86	-13.00	38.86	45
3	2496.60	-62.94	2.30	12.00	Horizontal	-55.39	-13.00	42.39	90
4	3346.00	-62.28	2.70	12.70	Horizontal	-54.43	-13.00	41.43	45
5	4182.50	-61.62	3.00	12.50	Horizontal	-54.27	-13.00	41.27	135
6	5019.00	-59.19	3.40	12.50	Horizontal	-52.24	-13.00	39.24	90
7	5855.50	-58.52	3.40	12.80	Horizontal	-51.27	-13.00	38.27	135
8	6692.00	-56.88	4.10	11.50	Horizontal	-51.63	-13.00	38.63	45
9	7528.50	-53.41	4.20	12.20	Horizontal	-47.56	-13.00	34.56	90
10	8365.00	-54.81	4.30	12.50	Horizontal	-48.76	-13.00	35.76	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.

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	150415	2021-05-15	2022-05-14
Climate Chamber	Weiss	VT4002	582261194500 10	2021-05-15	2022-05-14
Universal Radio Communication Tester	Agilent	E5515C	GB44400275	2021-05-15	2022-05-14
Signal Analyzer	R&S	FSV3030	101411	2020-12-13	2021-12-12
Spectrum Analyzer	R&S	FSV30	104028	2021-05-15	2022-05-14
Horn Antenna	Schwarzbeck	BBHA 9120D	1594	2020-12-17	2021-12-16
Software	R&S	EMC32	10.35.10	/	/

********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.