RF TEST REPORT

Applicant	Huawei Technologies Co., Ltd.
FCC ID	QISR227H
Product	Mobile WiFi
Brand	HUAWEI
Model	R227h
Report No.	RHA1705-0046RF01R1
Issue Date	June 8, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR 47 Part 22H (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Jiangpeng Lan *Approved by: Kai Xu*

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

TABLE OF CONTENT

Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 / 22.917(a)	PASS
5	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 22.355	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
8	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS
Date of Testing: May 9, 2017~ May 18, 2017			
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.			

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. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

1.2. Test facility

CNAS (accreditation number: L2264)

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

FCC (recognition number is 428261)

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

IC (recognition number is 8510A)

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

VCCI (recognition number is C-4595, T-2154, R-4113, G-766)

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

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

General Information

EUT Description			
Model:	R227h		
SN:	/		
Hardware Version	CL1E5785SM06		
Software Version	21.130.00.00.00		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Test Mode(s)	GSM 850: WCDMA Band V;LTE Band 5		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA)QPSK; (LTE)QPSK 16QAM;		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	10		
HSUPA UE Category	6		
DC-HSDPA UE Category	24		
HSPA+ UE Category	14		
Maximum E.R.P.	GSM 850:	30.40 dBm	
	WCDMA Band V:	20.15 dBm	
	LTE Band 5:	21.44 dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.2V		
Extreme 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			
Adapter 1	Manufacturer: Huizhou BYD Electronic Co., Ltd		

	Model: HW-050200E01
Adapter 2	Manufacturer: Shenzhen Huntkey Electronic Co., Ltd Model: HW-050200E01
Adapter 3	Manufacturer: Huizhou BYD Electronic Co., Ltd Model: HW-050200U01
Adapter 4	Manufacturer: Shenzhen Huntkey Electronic Co., Ltd Model: HW-050200U01
Adapter 5	Manufacturer: Dongguan Phitek Electronic Co., Ltd Model: HW-050200U01
Adapter 6	Manufacturer: Huizhou BYD Electronic Co., Ltd Model: HW-050200B01
Adapter 7	Manufacturer: Shenzhen Huntkey Electronic Co., Ltd Model: HW-050200B01
Adapter 8	Manufacturer: Dongguan Phitek Electronic Co., Ltd Model: HW-050200B01
Adapter 9	Manufacturer: Huizhou BYD Electronic Co., Ltd Model: HW-050200A01
Adapter 10	Manufacturer: Shenzhen Huntkey Electronic Co., Ltd Model: HW-050200A01
Adapter 11	Manufacturer: Dongguan Phitek Electronic Co., Ltd Model: HW-050200A01
Battery	Manufacturer: Huawei Technologies Co., Ltd. Model: HB824666RBC Power Rating: DC 3.8V, 3000mAh, Li-ion
USB Extend Cable	100m Cable, Shielded
Note: The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.	

3. Applied Standards

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

FCC CFR47 Part 2 (2017)

FCC CFR 47 Part 22H (2017)

ANSI/TIA-603-D (2010)

KDB 971168 D01 Power Meas License Digital Systems v02r02

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, vertical polarization) and the worst case was recorded.

All mode and data rates and positions were investigated. Subsequently, only the worst case emissions are reported.
The following testing in GSMWCDMA/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
Conducted Test cases	RF power output	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	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
Radiated Test cases	Effective Radiated Power	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	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	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	O	O	O	O	O	O	O	-	-	O	O	O
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	-	-	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.											

5. Test Case Results

5.1. RF Power Output

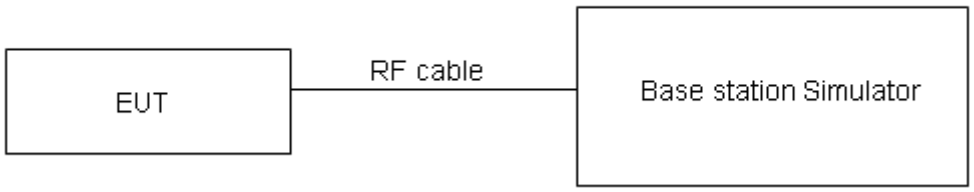
Ambient condition

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

Methods of Measurement

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

Test Setup



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

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

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

Test Results

GSM 850		Conducted Power(dBm)		
		Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GSM	Results	31.86	32.02	32.04
GPRS (GMSK)	1TXslot	31.84	31.95	31.98
	2TXslots	29.82	29.75	29.67
	3TXslots	27.76	27.83	27.80
	4TXslots	25.85	25.97	25.90
EGPRS (8PSK)	1TXslot	25.62	25.59	25.54
	2TXslots	23.63	23.70	23.19
	3TXslots	21.36	21.30	21.21
	4TXslots	19.55	19.43	19.41

WCDMA Band V		Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC		21.82	21.94	21.81
HSDPA	Sub - Test 1	21.72	21.77	21.65
	Sub - Test 2	21.66	21.78	21.64
	Sub - Test 3	21.15	21.38	21.22
	Sub - Test 4	21.16	21.37	21.24
HSUPA	Sub - Test 1	21.65	21.86	21.73
	Sub - Test 2	19.90	20.02	19.89
	Sub - Test 3	20.72	20.84	20.71
	Sub - Test 4	19.91	20.03	19.90
	Sub - Test 5	21.70	21.82	21.69
DC-HSDPA	Sub - Test 1	21.69	21.81	21.68
	Sub - Test 2	21.78	21.79	21.67
	Sub - Test 3	21.27	21.28	21.16
	Sub - Test 4	21.26	21.27	21.15

LTE Band 5				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	23.10	23.36	23.27
		1	13	22.93	22.98	22.85
		1	24	22.89	22.62	22.84
		12	0	21.87	22.10	21.83
		12	6	21.80	22.12	21.95
		12	13	22.05	22.10	22.07
		25	0	21.92	21.84	22.22
	16QAM	1	0	22.27	22.47	22.73
		1	13	22.03	22.28	22.19
		1	24	21.90	21.70	22.03
		12	0	21.78	22.33	21.88
		12	6	21.77	22.20	21.95
		12	13	21.92	21.97	21.96
		25	0	21.55	21.93	22.00
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20450/829	20525/836.5	20600/844
10MHz	QPSK	1	0	23.07	23.32	23.24
		1	25	22.92	22.94	22.83
		1	49	22.87	22.61	22.81
		25	0	21.84	22.05	21.79
		25	13	21.78	22.08	21.92
		25	25	22.02	22.05	22.03
		50	0	21.89	21.79	22.18
	16QAM	1	0	22.25	22.43	22.68
		1	25	21.99	22.26	22.15
		1	49	21.88	21.67	22.01
		25	0	21.75	22.29	21.85
		25	13	21.74	22.18	21.92
		25	25	21.89	21.92	21.92
		50	0	21.53	21.89	21.97

5.2. Effective Radiated Power

Ambient condition

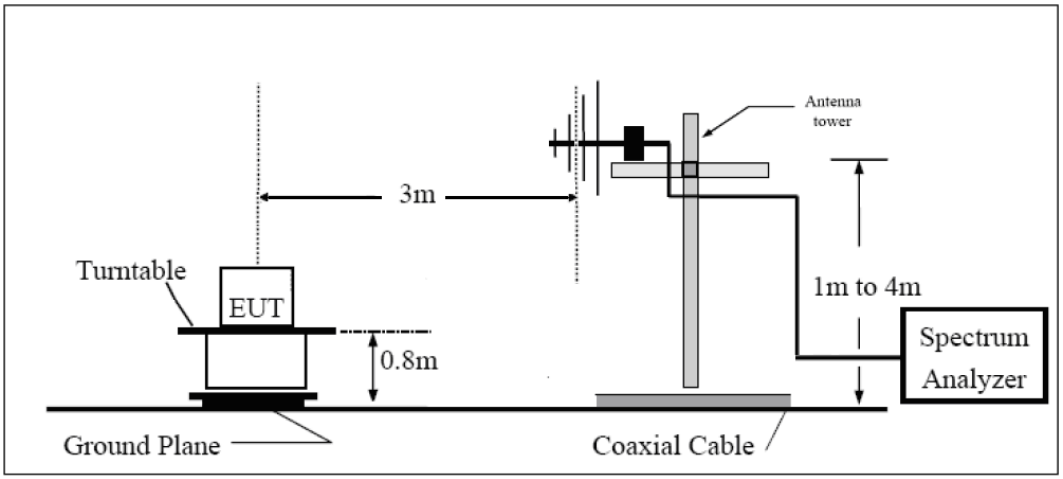
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

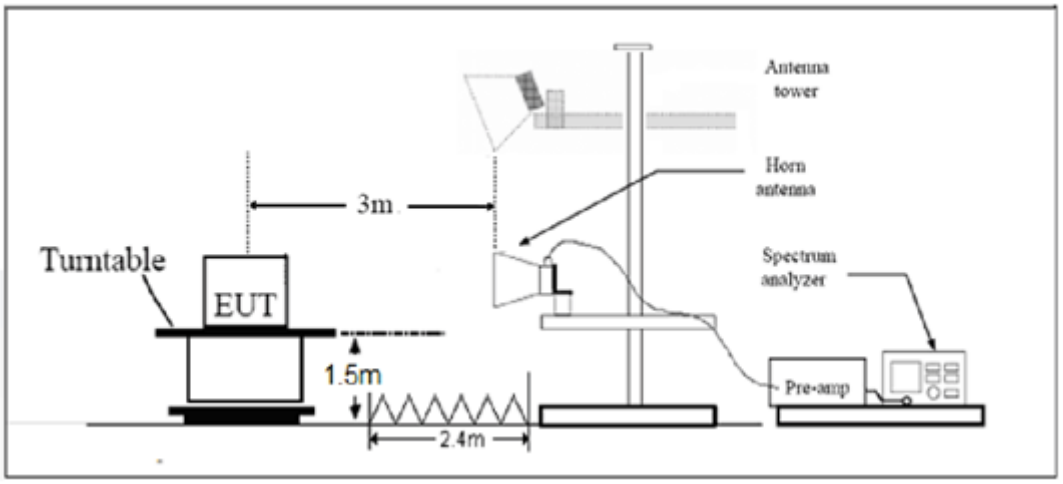
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna beteen 1.0m and 4.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
3. A log-periodic antenna or double-ridged waveguide 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=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

Test configuration

Below 1GHz:



Above 1GHz:



Limits

Rule Part 22.913(a) 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= 1.19 dB

Test Results:

Mode	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
GSM 850	H	824.2	-16.19	-45.53	0.00	1.06	30.40	38.45	Pass
	H	836.6	-16.30	-45.38	0.00	1.24	30.32	38.45	Pass
	H	848.8	-16.65	-45.37	0.00	1.38	30.10	38.45	Pass
	V	824.2	-29.91	-45.65	0.00	1.06	16.80	38.45	Pass
	V	836.6	-29.87	-45.46	0.00	1.24	16.83	38.45	Pass
	V	848.8	-30.14	-45.49	0.00	1.38	16.73	38.45	Pass
GPRS 850	H	824.2	-27.76	-53.21	0.00	1.92	27.37	38.45	Pass
	H	836.6	-27.93	-53.42	0.00	1.94	27.43	38.45	Pass
	H	848.8	-28.33	-53.67	0.00	1.90	27.24	38.45	Pass
	V	824.2	-33.46	-53.70	0.00	1.92	22.16	38.45	Pass
	V	836.6	-32.60	-53.91	0.00	1.94	23.25	38.45	Pass
	V	848.8	-32.77	-54.55	0.00	1.90	23.68	38.45	Pass
EGPRS 850	H	824.2	-22.08	-45.53	0.00	1.06	24.51	38.45	Pass
	H	836.6	-22.51	-45.38	0.00	1.24	24.11	38.45	Pass
	H	848.8	-23.03	-45.37	0.00	1.38	23.72	38.45	Pass
	V	824.2	-35.60	-45.65	0.00	1.06	11.11	38.45	Pass
	V	836.6	-36.29	-45.46	0.00	1.24	10.41	38.45	Pass
	V	848.8	-36.61	-45.49	0.00	1.38	10.26	38.45	Pass
WCDMA Band V	H	826.4	-26.99	-45.44	0.00	1.13	19.58	38.45	Pass
	H	836.6	-26.63	-45.38	0.00	1.24	19.99	38.45	Pass
	H	846.6	-26.58	-45.38	0.00	1.35	20.15	38.45	Pass
	V	826.4	-40.28	-45.54	0.00	1.13	6.39	38.45	Pass
	V	836.6	-40.36	-45.46	0.00	1.24	6.34	38.45	Pass
	V	846.6	-40.28	-45.49	0.00	1.35	6.56	38.45	Pass

LTE Band 5									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
5 MHz (QPSK)	H	826.5	-28.69	-47.60	0.00	1.13	20.04	38.45	Pass
	H	836.5	-28.21	-47.75	0.00	1.24	20.78	38.45	Pass
	H	846.5	-28.45	-48.12	0.00	1.38	21.06	38.45	Pass
	V	826.5	-40.52	-47.24	0.00	1.13	7.85	38.45	Pass
	V	836.5	-39.27	-47.15	0.00	1.24	9.12	38.45	Pass
	V	846.5	-39.21	-47.40	0.00	1.38	9.57	38.45	Pass
5 MHz (16QAM)	H	826.5	-29.03	-47.60	0.00	1.13	19.70	38.45	Pass
	H	836.5	-28.52	-47.75	0.00	1.24	20.47	38.45	Pass
	H	846.5	-28.76	-48.12	0.00	1.38	20.75	38.45	Pass
	V	826.5	-40.82	-47.24	0.00	1.13	7.55	38.45	Pass
	V	836.5	-40.56	-47.15	0.00	1.24	7.83	38.45	Pass
	V	846.5	-39.52	-47.40	0.00	1.38	9.26	38.45	Pass
10 MHz (QPSK)	H	829	-28.45	-47.61	0.00	1.13	20.29	38.45	Pass
	H	836.5	-27.55	-47.75	0.00	1.24	21.44	38.45	Pass
	H	844	-28.79	-48.01	0.00	1.33	20.54	38.45	Pass
	V	829	-40.45	-47.19	0.00	1.13	7.87	38.45	Pass
	V	836.5	-39.27	-47.15	0.00	1.24	9.12	38.45	Pass
	V	844	-40.10	-47.29	0.00	1.33	8.51	38.45	Pass
10 MHz (16QAM)	H	829	-28.75	-47.61	0.00	1.13	19.99	38.45	Pass
	H	836.5	-27.86	-47.75	0.00	1.24	21.13	38.45	Pass
	H	844	-29.09	-48.01	0.00	1.33	20.24	38.45	Pass
	V	829	-40.76	-47.19	0.00	1.13	7.56	38.45	Pass
	V	836.5	-39.59	-47.15	0.00	1.24	8.80	38.45	Pass
	V	844	-40.41	-47.29	0.00	1.33	8.20	38.45	Pass

5.3. Occupied Bandwidth

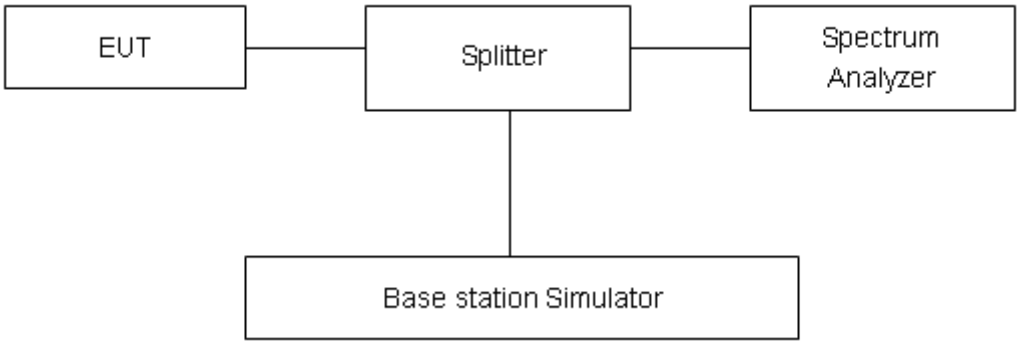
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 3kHz, VBW is set to 10kHz for GSM 850,
RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band V,
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5 (5MHz/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

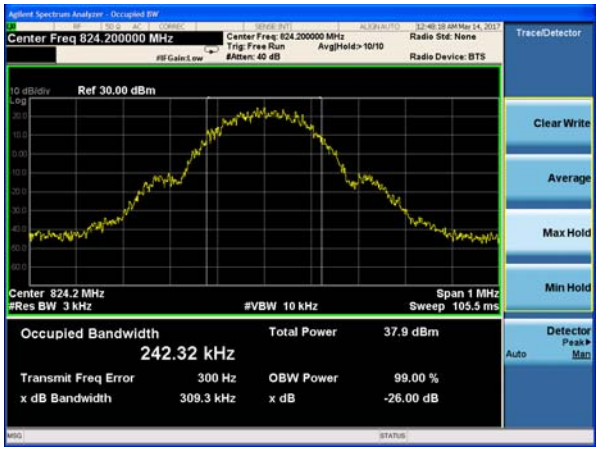
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 624Hz.

Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
GSM 850 (GSM)	128	824.2	242.32	309.3
	190	836.6	246.69	305.4
	251	848.8	242.75	310.6
GPRS 850 (GMSK)	128	824.2	243.19	309.9
	190	836.6	243.46	306.6
	251	848.8	246.42	308.9
EGPRS 850 (8-PSK)	128	824.2	250.04	312.1
	190	836.6	250.68	313.6
	251	848.8	246.96	318.4
WCDMA Band V (RMC)	4132	826.4	4147.2	4659
	4183	836.6	4138.5	4665
	4233	846.6	4154.8	4676

LTE Band 5						
RB	**Modulation**	**Bandwidth (MHz)**	**Channel**	**Frequency (MHz)**	**99% Power Bandwidth(MHz)**	**-26dBc Bandwidth(MHz)**
100%	QPSK	5	20425	826.5	4.5264	4.996
			20525	836.5	4.5285	4.988
			20625	846.5	4.5424	4.993
		10	20450	829	9.1093	10.07
			20525	836.5	9.0736	10.06
			20600	844	9.0804	9.999
	16QAM	5	20425	826.5	4.5353	4.989
			20525	836.5	4.5273	4.963
			20625	846.5	4.5212	4.969
		10	20450	829	9.1057	10.05
			20525	836.5	9.0425	10.04
			20600	844	9.1098	10.04

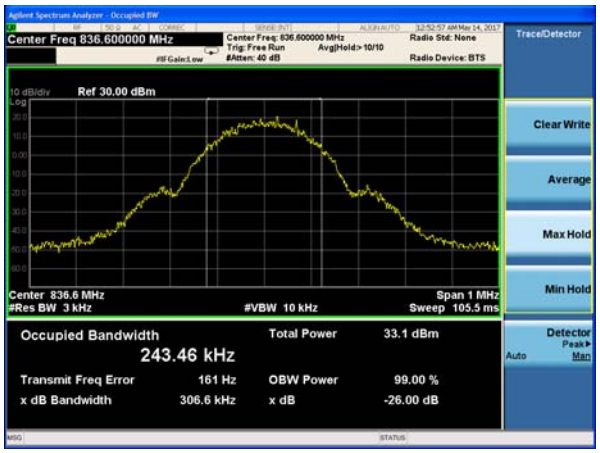
GSM 850 CH-Low



GSM 850 GPRS CH-Low

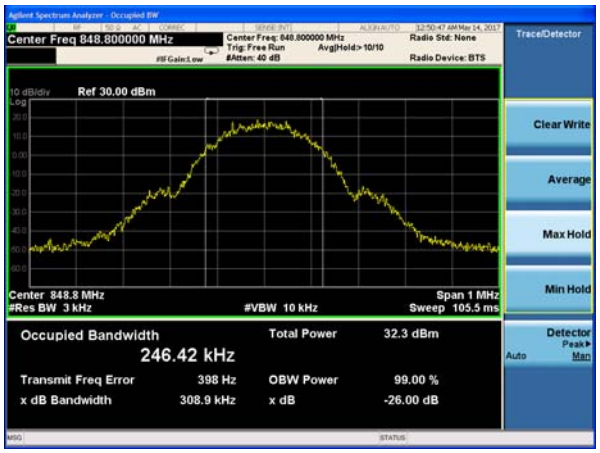
GSM 850 CH-Middle

GSM 850 GPRS CH-Middle

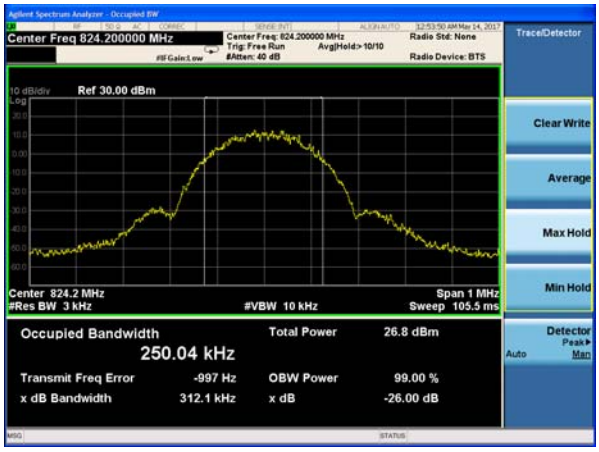


GSM 850 CH-High

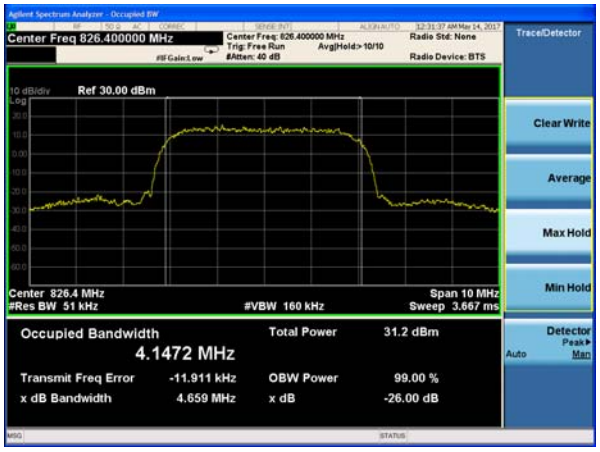
GSM 850 GPRS CH-High



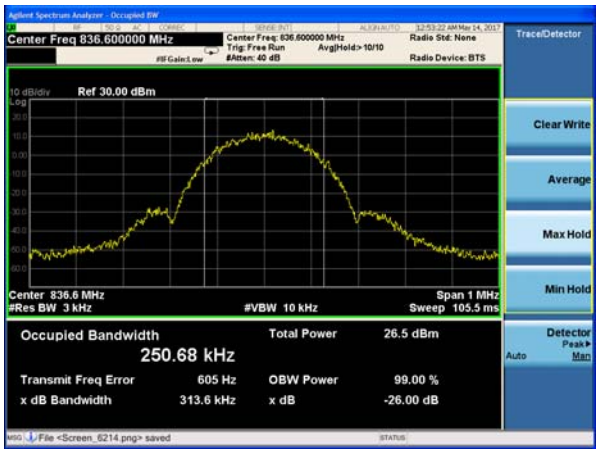
GSM 850 EGPRS CH-Low



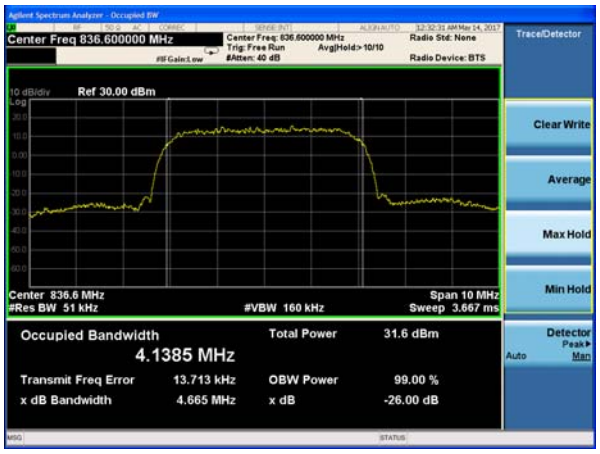
WCDMA Band V CH-Low



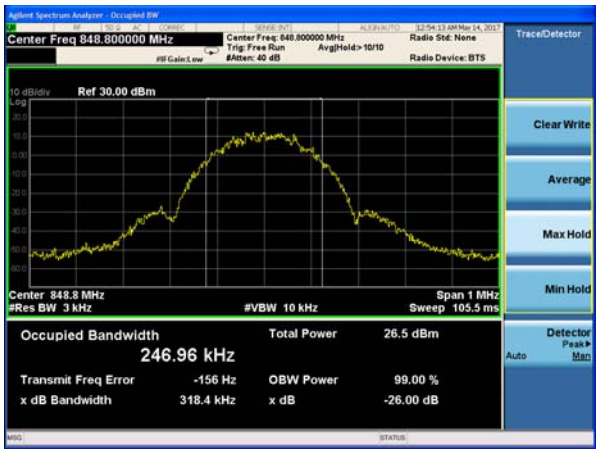
GSM 850 EGPRS CH-Middle



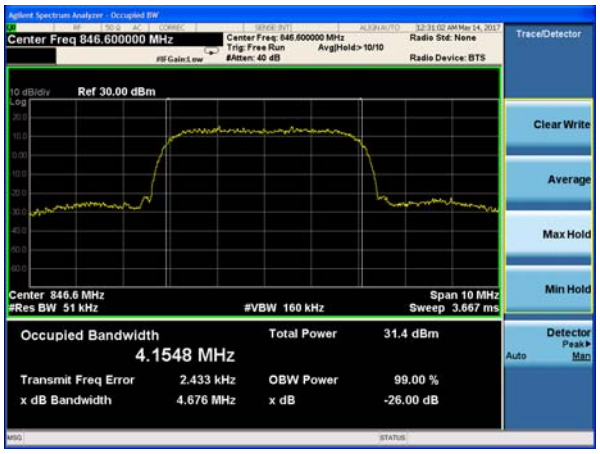
WCDMA Band V CH-Middle



GSM 850 EGPRS CH-High



WCDMA Band V CH-High

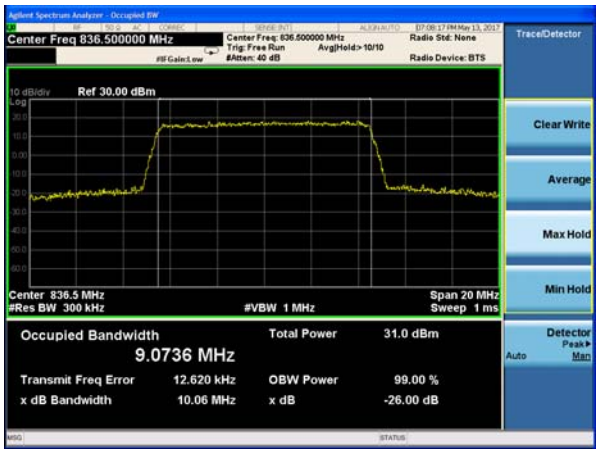


LTE Band 5 QPSK 5MHz CH-Low

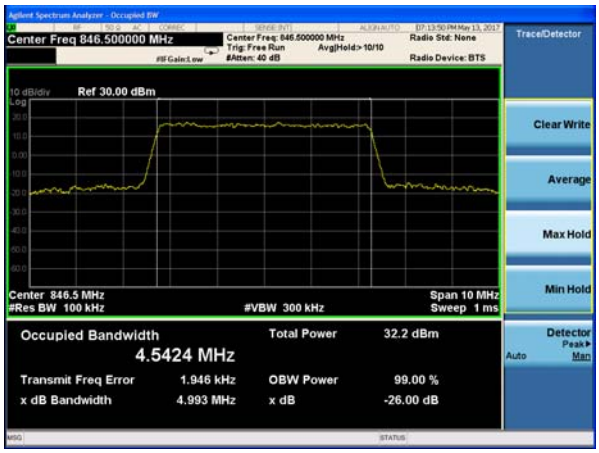
LTE Band 5 QPSK 10MHz CH-Low

LTE Band 5 QPSK 5MHz CH-Middle

LTE Band 5 QPSK 10MHz CH-Middle



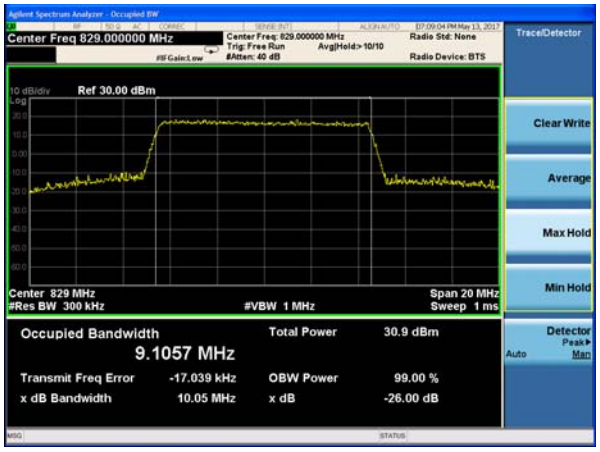
LTE Band 5 QPSK 5MHz CH-High



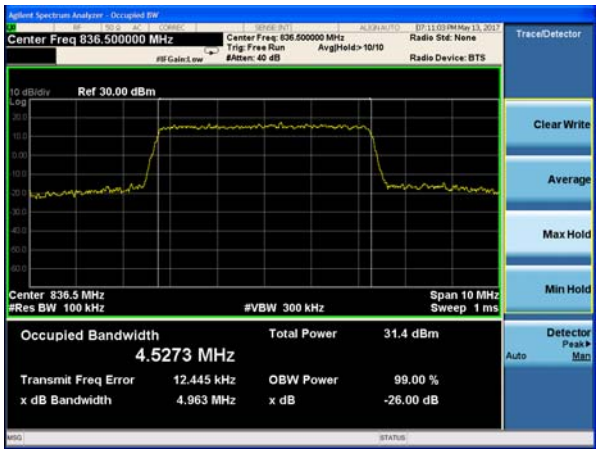
LTE Band 5 QPSK 10MHz CH-High

LTE Band 5 16QAM 5MHz CH-Low

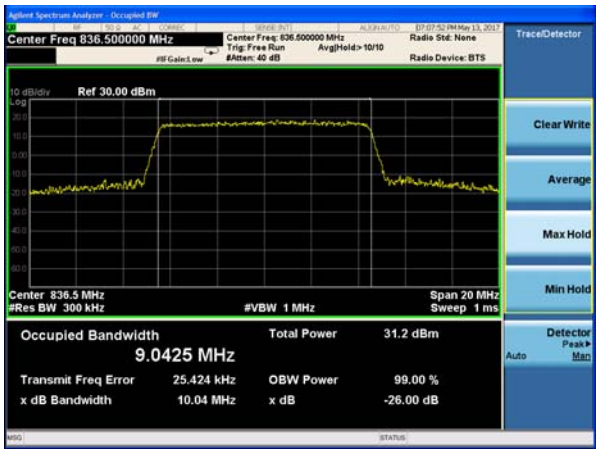
LTE Band 5 16QAM 10MHz CH-Low



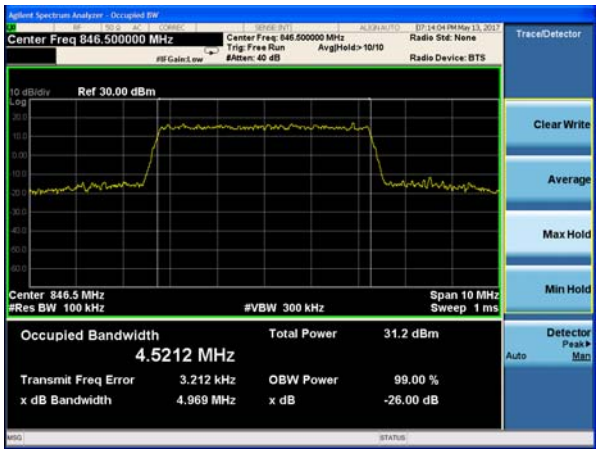
LTE Band 5 16QAM 5MHz CH-Middle



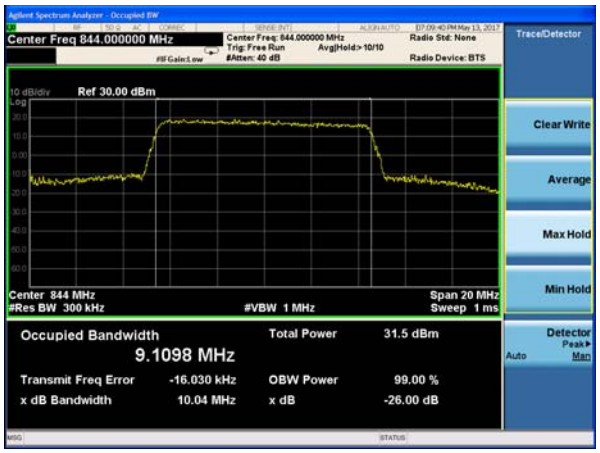
LTE Band 5 16QAM 10MHz CH-Middle



LTE Band 5 16QAM 5MHz CH-High



LTE Band 5 16QAM 10MHz CH-High



5.4. Band Edge Compliance

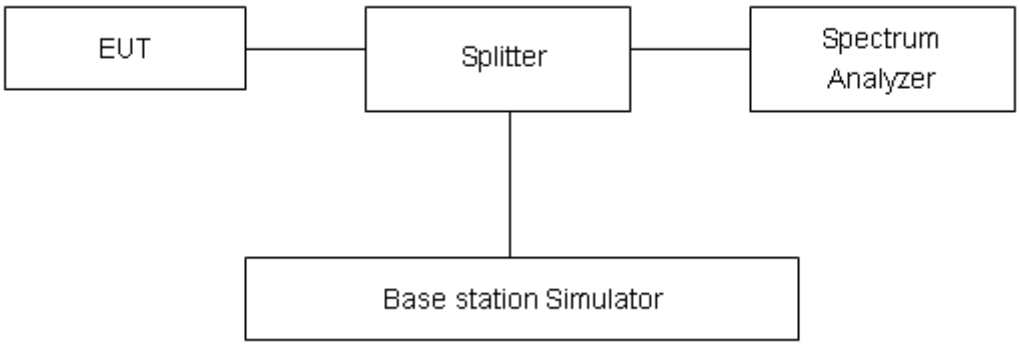
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used.
RBW is set to 3kHz,VBW is set to 10kHz for GSM 850,
RBW is set to 51kHz,VBW is set to 160kHz for WCDMA Band V,
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5 (5MHz),
RBW is set to 100 kHz, VBW is set to 300 kHz 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

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:

Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit (dBm)	Conclusion
GSM 850 (GSM)	824.0	-31.702	-13	PASS
	849.0	-30.313	-13	PASS
GPRS 850 (GMSK)	824.0	-30.949	-13	PASS
	849.0	-29.841	-13	PASS
EGPRS 850 (8-PSK)	824.0	-42.769	-13	PASS
	849.0	-43.656	-13	PASS
WCDMA Band V RMC	824.0	-30.267	-13	PASS
	849.0	-29.046	-13	PASS

LTE Band 5						
Modulation	Bandwidth	Channel	RB	Reference value (dBm)	Limit (dBm)	Conclusion
QPSK	5MHz	20425	1	-22.060	-13	PASS
			100%	-27.495	-13	PASS
		20625	1	-17.784	-13	PASS
			100%	-29.777	-13	PASS
	10MHz	20450	1	-23.385	-13	PASS
			100%	-29.195	-13	PASS
		20600	1	-24.354	-13	PASS
			100%	-30.691	-13	PASS
16QAM	5MHz	20425	1	-22.576	-13	PASS
			100%	-28.139	-13	PASS
		20625	1	-21.086	-13	PASS
			100%	-28.050	-13	PASS
	10MHz	20450	1	-25.279	-13	PASS
			100%	-29.063	-13	PASS
		20600	1	-25.478	-13	PASS
			100%	-29.820	-13	PASS

GSM 850 CH-Low

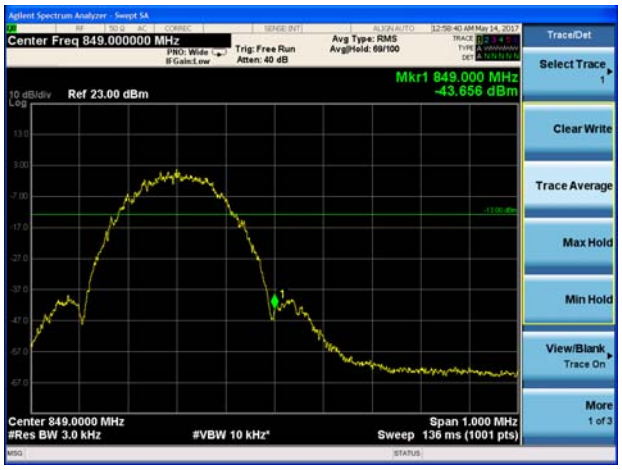
GSM 850 CH-High

GSM 850 GPRS CH-Low

GSM 850 GPRS CH-High

GSM 850 EGPRS CH-Low

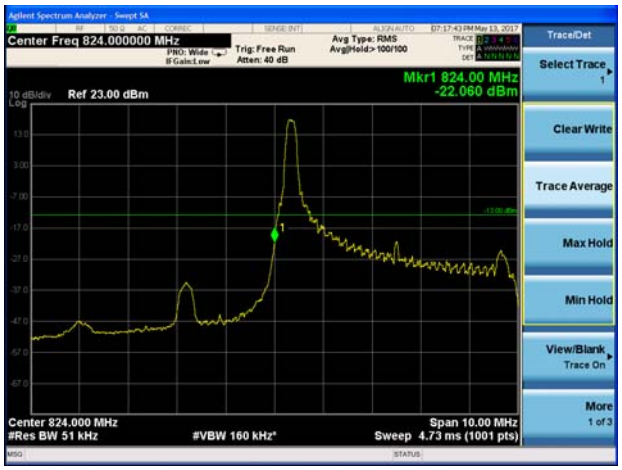
GSM 850 EGPRS CH-High



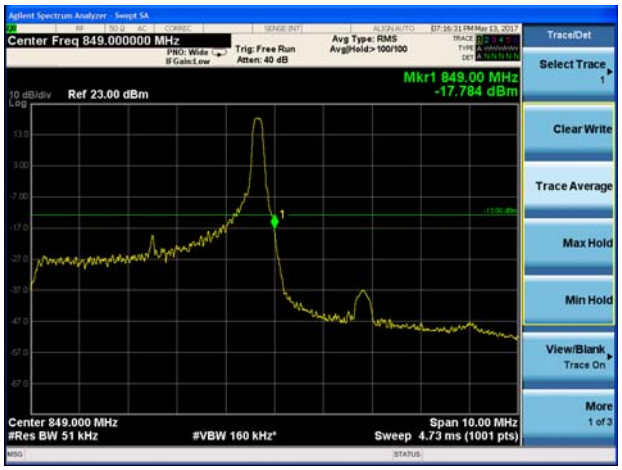
WCDMA Band V CH-Low

WCDMA Band V CH-High

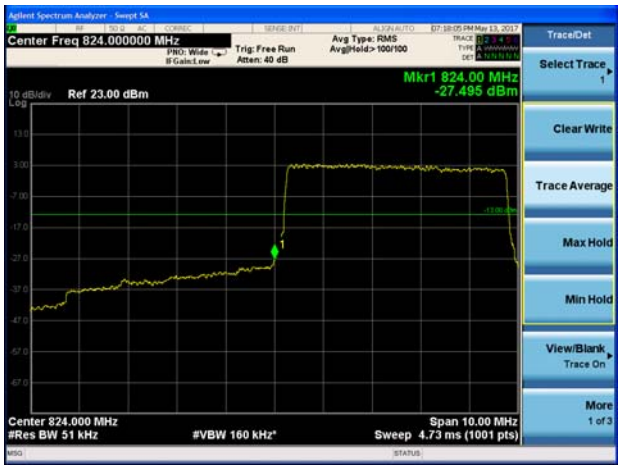
LTE Band 5 QPSK 5MHz CH-Low 1RB



LTE Band 5 QPSK 5MHz CH-High 1RB

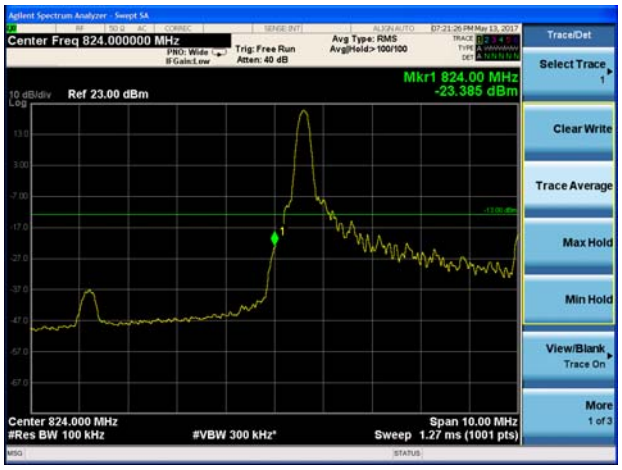


LTE Band 5 QPSK 5MHz CH-Low 100%RB

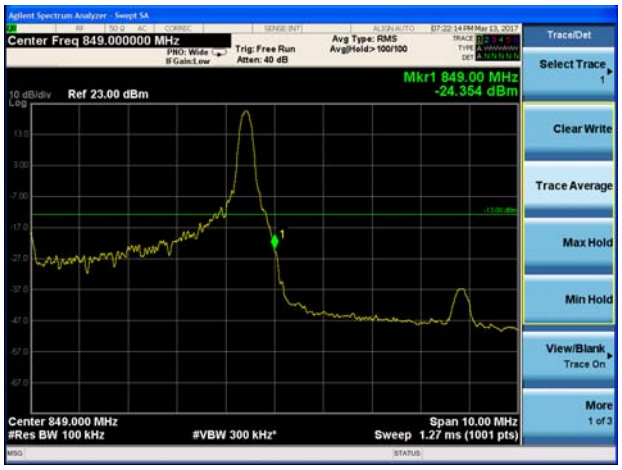


LTE Band 5 QPSK 5MHz CH-High 100%RB

LTE Band 5 QPSK 10MHz CH-Low 1RB



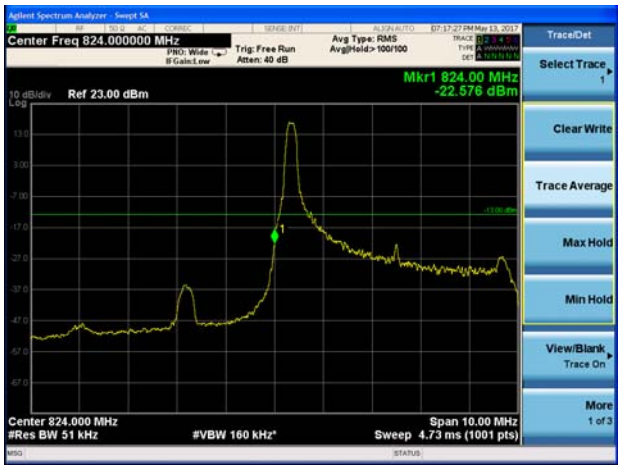
LTE Band 5 QPSK 10MHz CH-High 1RB



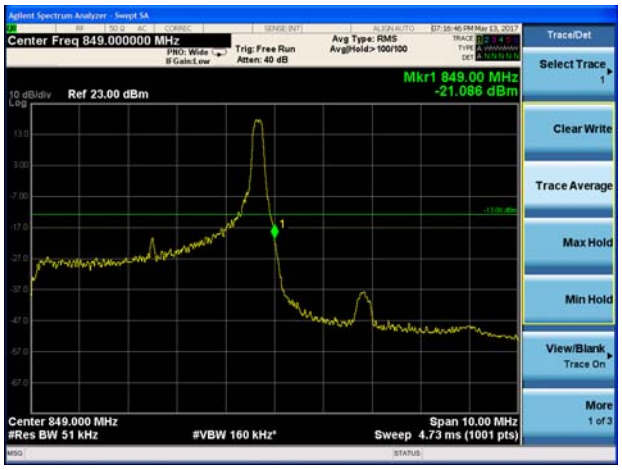
LTE Band 5 QPSK 10MHz CH-Low 100%RB

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

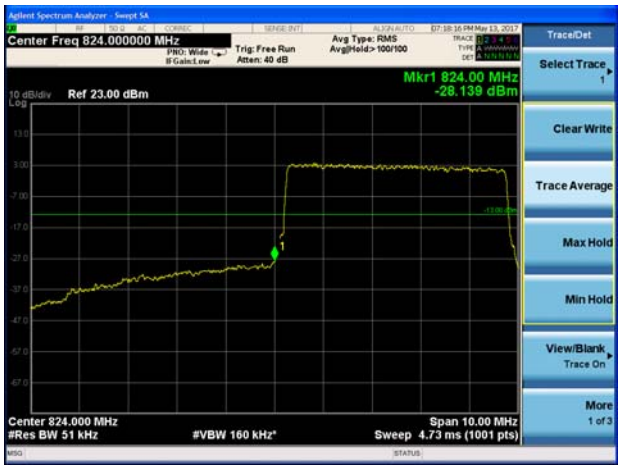
LTE Band 5 16QAM 5MHz CH-Low 1RB



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

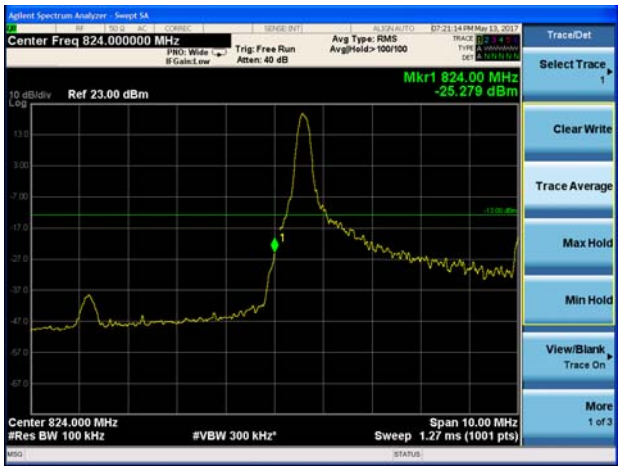


LTE Band 5 16QAM 5MHz CH-Low 100%RB

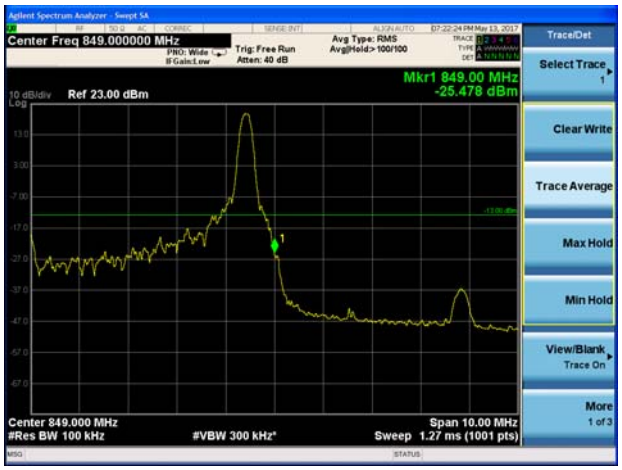


LTE Band 5 16QAM 5MHz CH-High 100%RB

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

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

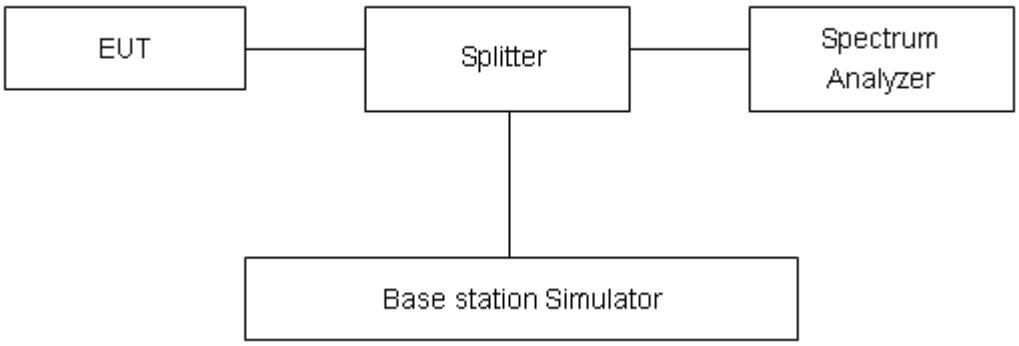
Ambient condition

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

Methods of Measurement

Measure the total peak power and record as 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 (GSM)	128	824.2	33.14	31.86	1.28	≤13	PASS
	190	836.6	33.14	32.02	1.12	≤13	PASS
	251	848.8	33.58	32.04	1.54	≤13	PASS
GPRS 850 (GMSK)	128	824.2	26.81	25.85	0.96	≤13	PASS
	190	836.6	26.86	25.97	0.89	≤13	PASS
	251	848.8	26.92	25.90	1.02	≤13	PASS
EGPRS 850 (8-PSK)	128	824.2	20.67	19.55	1.12	≤13	PASS
	190	836.6	20.60	19.43	1.17	≤13	PASS
	251	848.8	20.56	19.41	1.15	≤13	PASS
WCDMA Band V (RMC)	4132	826.4	25.03	21.82	3.21	≤13	PASS
	4183	836.6	25.14	21.94	3.2	≤13	PASS
	4233	846.6	24.95	21.81	3.14	≤13	PASS

LTE Band 5								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	20425	826.5	27.51	21.92	5.59	≤13	PASS
		20525	836.5	27.25	21.84	5.41	≤13	PASS
		20625	846.5	27.50	22.22	5.28	≤13	PASS
	10	20450	829	27.53	21.89	5.64	≤13	PASS
		20525	836.5	27.29	21.79	5.50	≤13	PASS
		20600	844	27.52	22.18	5.34	≤13	PASS
16QAM	5	20425	826.5	27.54	21.55	5.99	≤13	PASS
		20525	836.5	27.74	21.93	5.81	≤13	PASS
		20625	846.5	27.62	22.00	5.62	≤13	PASS
	10	20450	829	27.54	21.53	6.01	≤13	PASS
		20525	836.5	27.79	21.89	5.90	≤13	PASS
		20600	844	27.65	21.97	5.68	≤13	PASS

5.6. Frequency Stability

Ambient condition

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

Method of Measurement

1. 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)

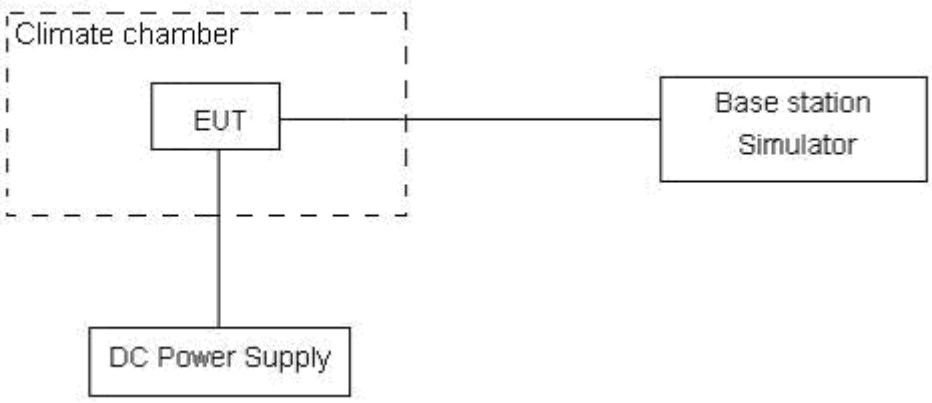
The frequency stability shall be measured with variation of primary supply voltage as follows:

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

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

This transceiver is specified to operate with an input voltage of between 3.6 V and 4.2 V, with a nominal voltage of 3.8V.

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

Mode	Test status	Test Results (ppm)			Limit (ppm)	Conclusion
		GSM (GMSK)	GPRS (GMSK)	EGPRS (8PSK)		
GSM 850 Middle Channel	-30°C/Normal Voltage	-0.0095	0.0112	0.0213	2.5	PASS
	-20°C/Normal Voltage	-0.0151	0.0114	0.0177	2.5	PASS
	-10°C/Normal Voltage	-0.0199	0.0119	0.0226	2.5	PASS
	0°C/Normal Voltage	-0.0147	0.0111	0.0275	2.5	PASS
	10°C/Normal Voltage	-0.0174	0.0126	0.0354	2.5	PASS
	20°C/Normal Voltage	-0.0169	0.0137	0.0293	2.5	PASS
	30°C/Normal Voltage	-0.0147	0.0147	0.0226	2.5	PASS
	40°C/Normal Voltage	-0.0204	0.0141	0.0176	2.5	PASS
	50°C/Normal Voltage	-0.0143	0.0164	0.0178	2.5	PASS
	20°C/Minimum Voltage	0.0077	0.0306	0.031	2.5	PASS
	20°C/Maximum Voltage	0.0073	0.029	0.0305	2.5	PASS
/	/	RMC			/	/
WCDMA Band V Middle Channel	-30°C/Normal Voltage	0.004756			2.5	PASS
	-20°C/Normal Voltage	0.000782			2.5	PASS
	-10°C/Normal Voltage	-0.00584			2.5	PASS
	0°C/Normal Voltage	-0.00172			2.5	PASS
	10°C/Normal Voltage	0.017389			2.5	PASS
	20°C/Normal Voltage	-0.00282			2.5	PASS
	30°C/Normal Voltage	-0.01285			2.5	PASS
	40°C/Normal Voltage	-0.00155			2.5	PASS
	50°C/Normal Voltage	0.007859			2.5	PASS
	20°C/Minimum Voltage	-0.00382			2.5	PASS
	20°C/Maximum Voltage	-0.01076			2.5	PASS

Bandwidth	Test status	LTE Band 5 Middle Channel Test Results (ppm)			
		QPSK	16QAM	Limit (ppm)	Conclusion
5MHz	-30°C/Normal Voltage	0.00012	0.00017	2.5	PASS
	-20°C/Normal Voltage	0.00059	0.00010	2.5	PASS
	-10°C/Normal Voltage	-0.00031	-0.00065	2.5	PASS
	0°C/Normal Voltage	-0.00067	-0.00116	2.5	PASS
	10°C/Normal Voltage	-0.00049	-0.00045	2.5	PASS
	20°C/Normal Voltage	-0.00104	0.00022	2.5	PASS
	30°C/Normal Voltage	-0.00050	0.00025	2.5	PASS
	40°C/Normal Voltage	0.00075	0.00019	2.5	PASS
	50°C/Normal Voltage	-0.00053	0.00035	2.5	PASS
	20°C/Minimum Voltage	0.00065	0.00008	2.5	PASS
	20°C/Maximum Voltage	0.00073	0.00023	2.5	PASS
10MHz	-30°C/Normal Voltage	0.00132	-0.00079	2.5	PASS
	-20°C/Normal Voltage	0.00179	0.00031	2.5	PASS
	-10°C/Normal Voltage	0.00104	0.00018	2.5	PASS
	0°C/Normal Voltage	0.00065	-0.00059	2.5	PASS
	10°C/Normal Voltage	0.00123	0.00038	2.5	PASS
	20°C/Normal Voltage	0.00051	-0.00039	2.5	PASS
	30°C/Normal Voltage	-0.00054	0.00074	2.5	PASS
	40°C/Normal Voltage	-0.00234	-0.00102	2.5	PASS
	50°C/Normal Voltage	-0.00036	0.00031	2.5	PASS
	20°C/Minimum Voltage	0.00354	0.00018	2.5	PASS
	20°C/Maximum Voltage	0.00020	0.00110	2.5	PASS

5.7. Spurious Emissions at Antenna Terminals

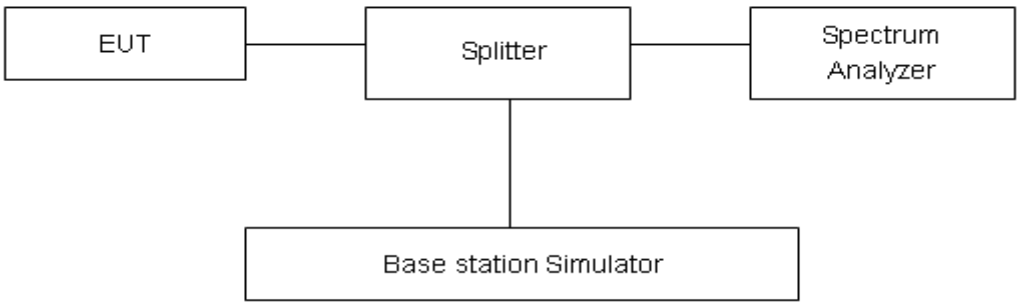
Ambient condition

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

Method of Measurement

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

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

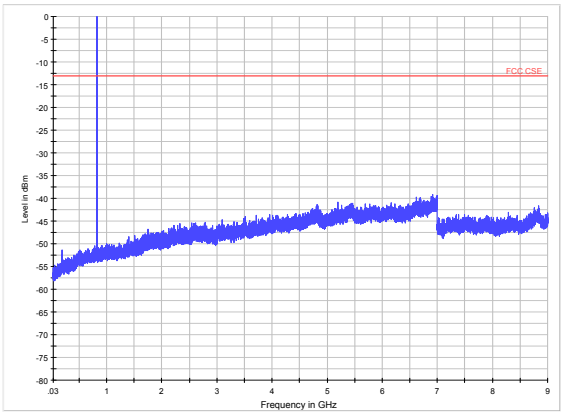
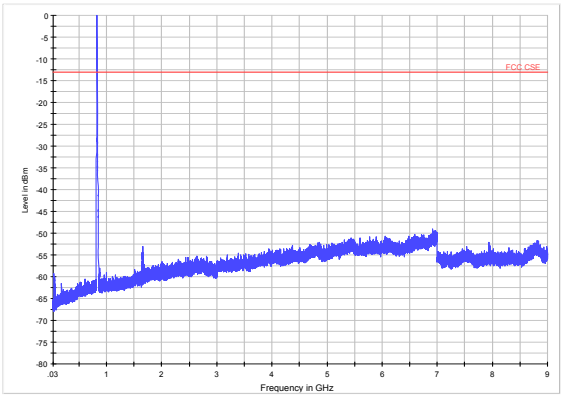
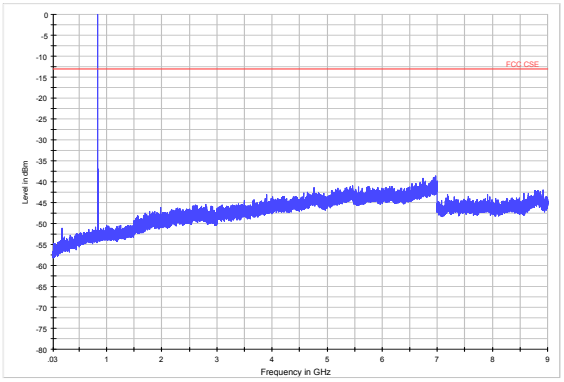
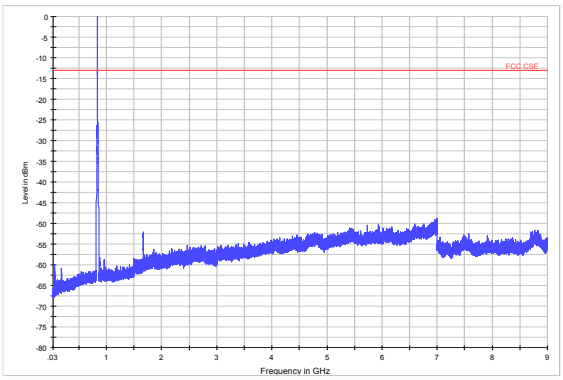
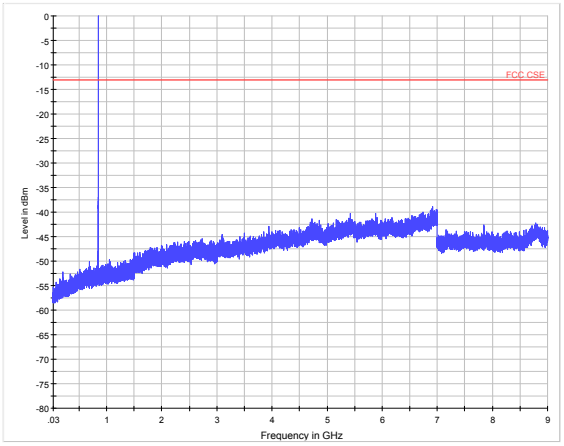
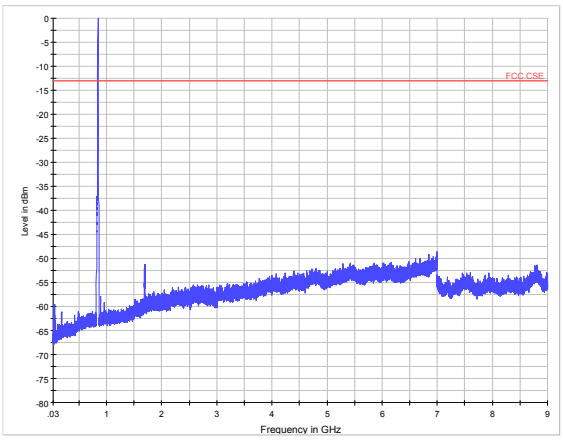
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB

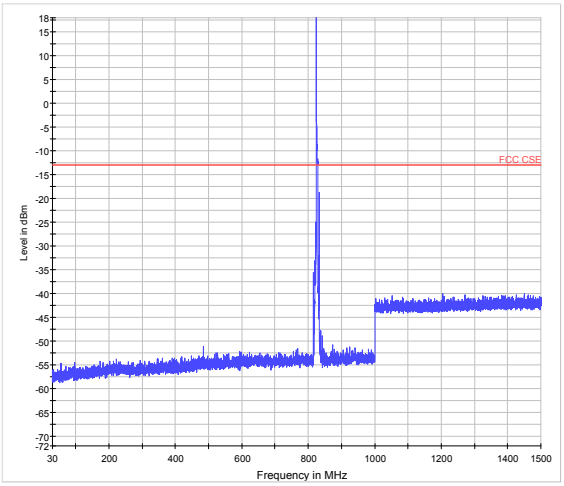
Test Result

Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

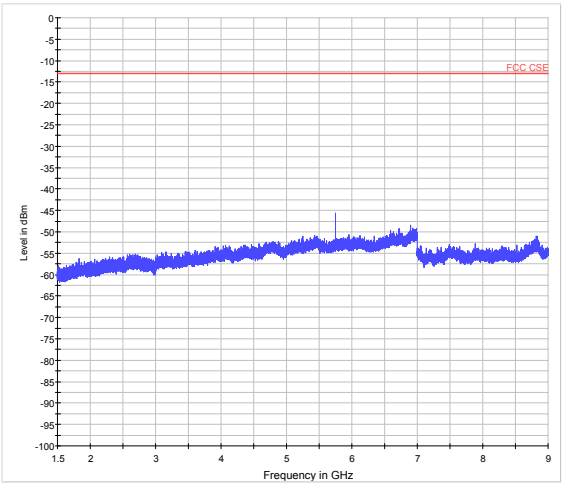
If disturbances were found more than 20dB below limit line, the mark is not required for the EUT. The signal beyond the limit is carrier.

GSM 850 CH-Low 30MHz~9GHz	WCDMA Band V CH-Low 30MHz~9GHz
	
GSM 850 CH-Middle 30MHz~9GHz	WCDMA Band V CH-Middle 30MHz~9 GHz
	
GSM 850 CH-High 30MHz~9GHz	WCDMA Band V CH-High 30MHz~9GHz
	

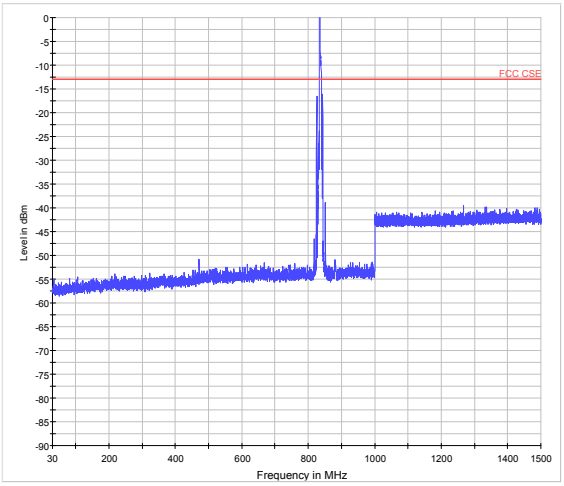
LTE Band 5 5MHz CH-Low 30MHz~1.5GHz



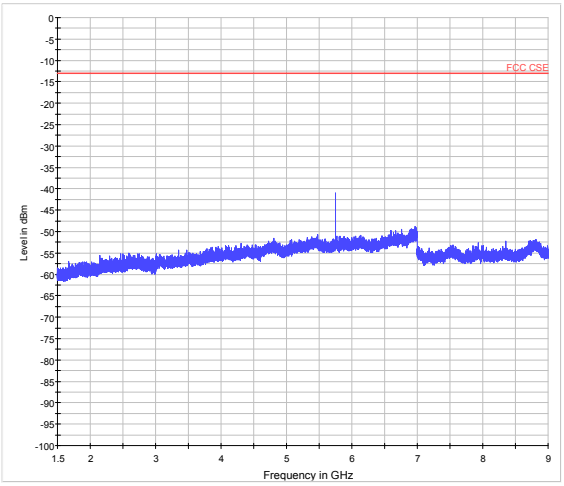
LTE Band 5 5MHz CH-Low 1.5GHz~9GHz



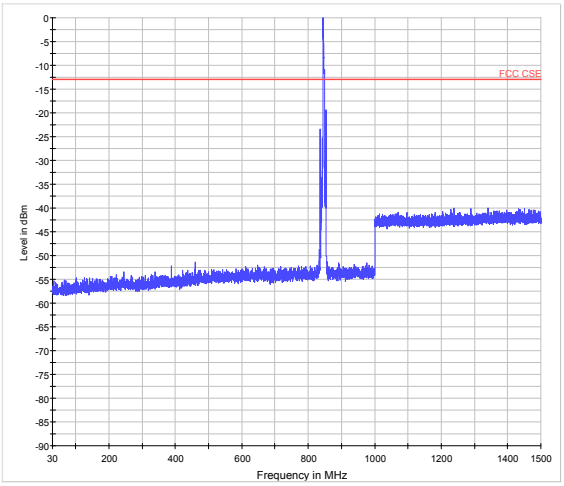
LTE Band 5 5MHz CH-Middle 30MHz~1.5GHz



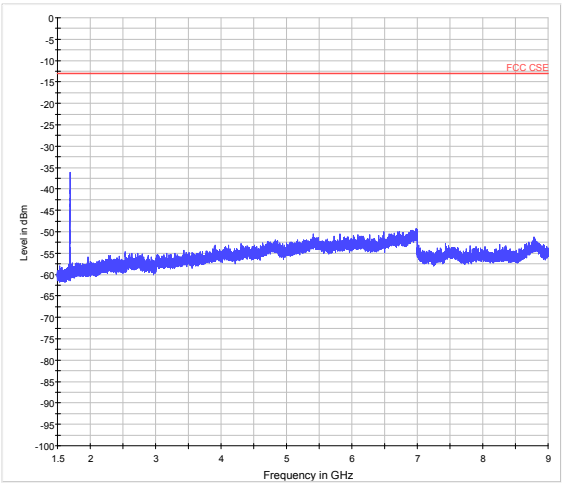
LTE Band 5 5MHz CH-Middle 1.5GHz~9GHz



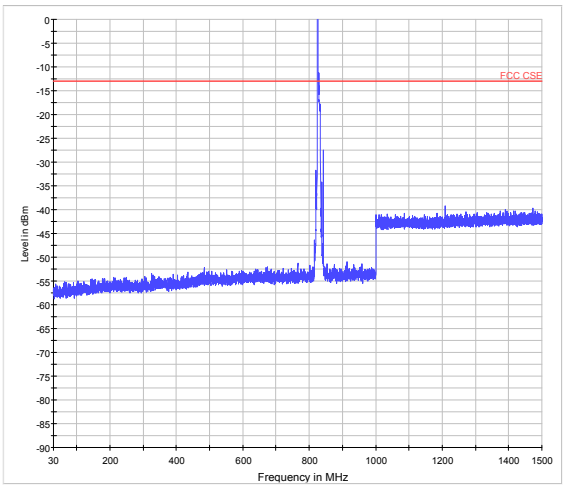
LTE Band 5 5MHz CH-High 30MHz~1.5GHz



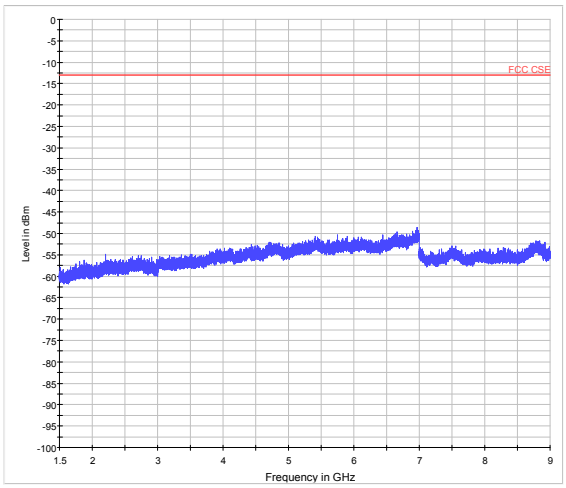
LTE Band 5 5MHz CH-High 1.5GHz~9GHz



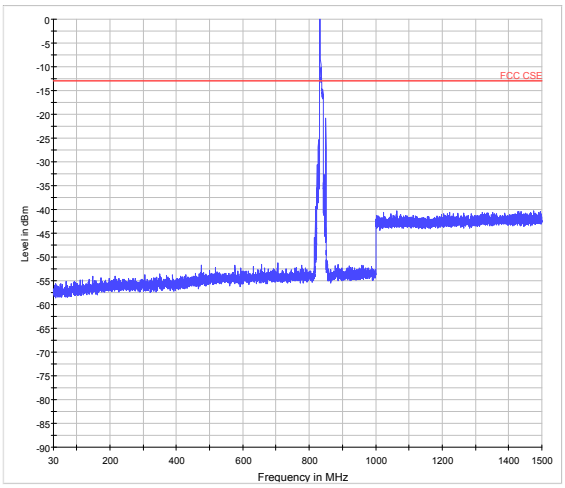
LTE Band 5 10MHz CH-Low 30MHz~1.5GHz



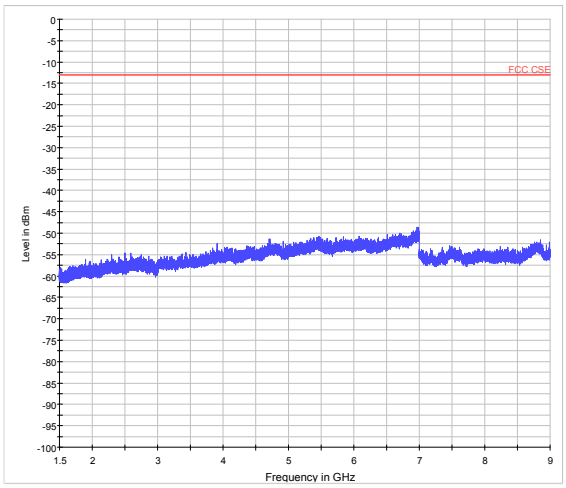
LTE Band 5 10MHz CH-Low 1.5GHz~9GHz



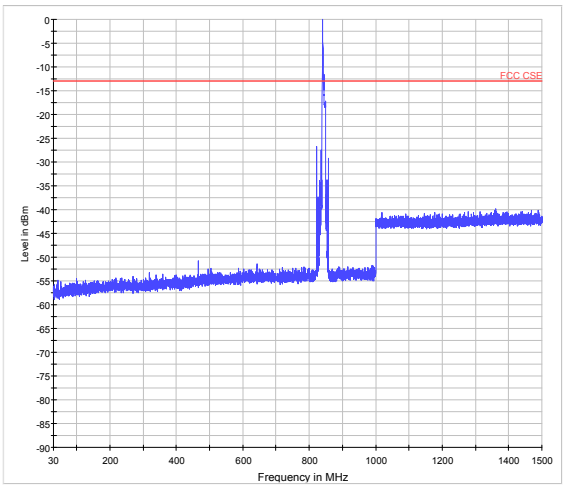
LTE Band 5 10MHz CH-Middle 30MHz~1.5GHz



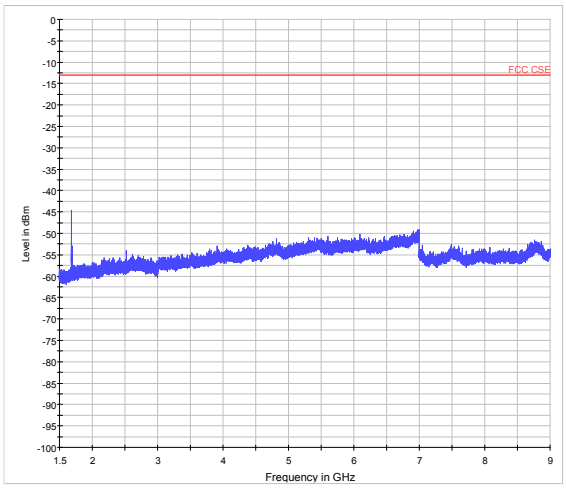
LTE Band 5 10MHz CH-Middle 1.5GHz~9GHz



LTE Band 5 10MHz CH-High 30MHz~1.5GHz



LTE Band 5 10MHz CH-High 1.5GHz~9GHz



5.8. Radiates Spurious Emission

Ambient condition

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

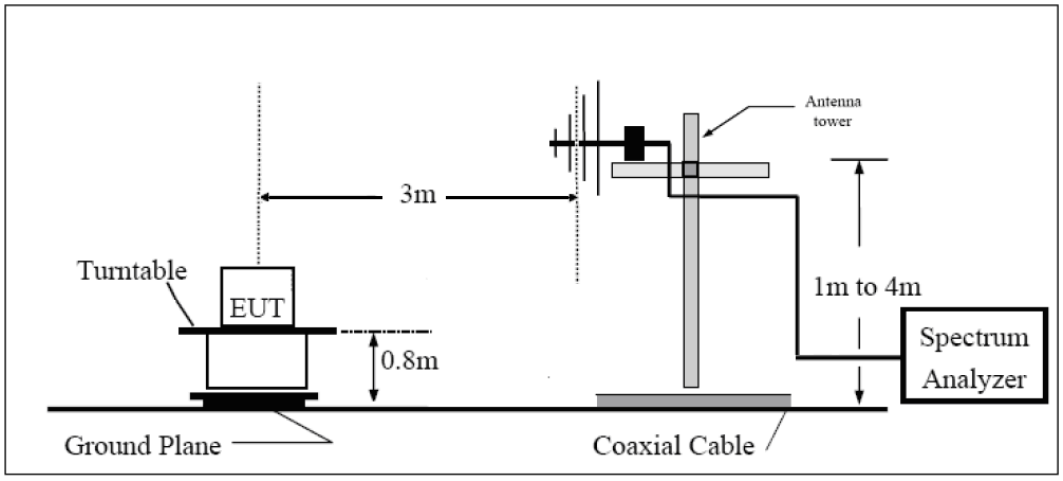
Method of Measurement

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. Above 30MHz：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 log-periodic antenna or double-ridged waveguide 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=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga

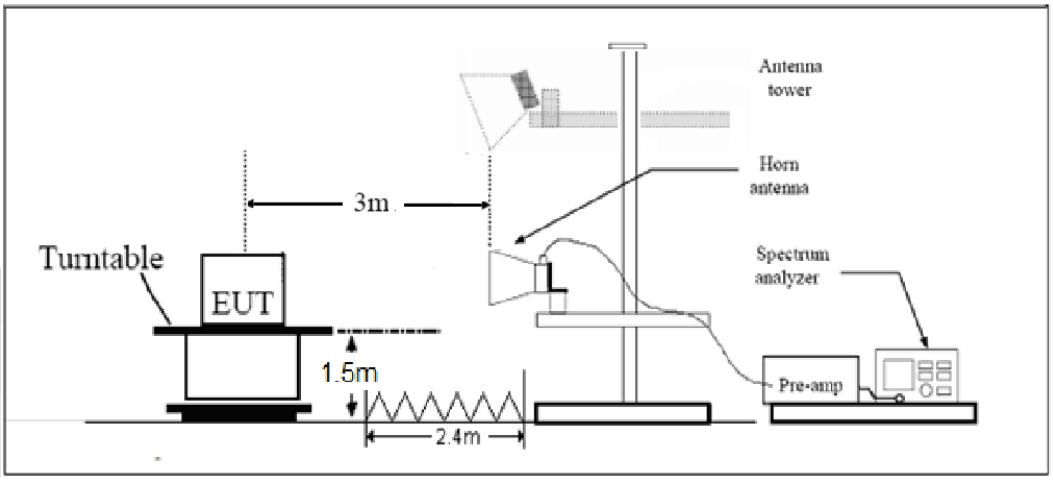
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

Test setup

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

GSM 850 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1648.5	-52.1	2	10.15	Vertical	-46.1	-13	33.1	90
3	2472.7	-57.19	2.51	11.35	Vertical	-50.5	-13	37.5	135
4	3296.8	-56.4	4.2	10.85	Vertical	-51.9	-13	38.9	270
5	4121.0	-54.8	5.2	11.35	Vertical	-50.8	-13	37.8	225
6	4945.2	-51.5	5.5	11.95	Vertical	-47.2	-13	34.2	180
7	5769.4	-52.7	5.7	13.55	Vertical	-47.0	-13	34.0	45
8	6593.6	-49.4	6.3	13.75	Vertical	-44.1	-13	31.1	90
9	7417.8	-47.5	6.8	13.85	Vertical	-42.6	-13	29.6	225
10	8242.0	-46.8	6.9	14.25	Vertical	-41.6	-13	28.6	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 vertical position.									

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	1672.9	-49.9	2	10.75	Vertical	-43.3	-13	30.3	90
3	2509.9	-54.49	2.51	11.05	Vertical	-48.1	-13	35.1	135
4	3346.4	-57.6	4.2	11.15	Vertical	-52.8	-13	39.8	270
5	4183.0	-52.2	5.2	11.15	Vertical	-48.4	-13	35.4	225
6	5019.6	-51.1	5.5	11.95	Vertical	-46.8	-13	33.8	180
7	5856.2	-51.2	5.7	13.55	Vertical	-45.5	-13	32.5	45
8	6692.8	-48.9	6.3	13.75	Vertical	-43.6	-13	30.6	90
9	7529.4	-47.9	6.8	13.85	Vertical	-43.0	-13	30.0	225
10	8366.0	-46.5	6.9	14.25	Vertical	-41.3	-13	28.3	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 vertical position.									

GSM 850 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1697.3	-50.4	2	10.15	Vertical	-44.4	-13	31.4	90
3	2546.6	-56.59	2.51	11.05	Vertical	-50.2	-13	37.2	135
4	3395.2	-57	4.2	11.15	Vertical	-52.2	-13	39.2	90
5	4244.0	-53.3	5.2	11.15	Vertical	-49.5	-13	36.5	135
6	5092.8	-51.2	5.5	11.95	Vertical	-46.9	-13	33.9	270
7	5941.6	-50.9	5.7	13.55	Vertical	-45.2	-13	32.2	225
8	6790.4	-50.6	6.3	13.75	Vertical	-45.3	-13	32.3	180
9	7639.2	-48.1	6.8	13.85	Vertical	-43.2	-13	30.2	45
10	8488.0	-47.7	6.9	14.25	Vertical	-42.5	-13	29.5	90

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

WCDMA Band V CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1653.8	-61.1	2	10.15	Vertical	-55.1	-13	42.1	135
3	2479.6	-59.19	2.51	11.35	Vertical	-52.5	-13	39.5	90
4	3305.6	-56.8	4.2	10.85	Vertical	-52.3	-13	39.3	90
5	4132.0	-54.6	5.2	11.35	Vertical	-50.6	-13	37.6	135
6	4958.4	-51.4	5.5	11.95	Vertical	-47.1	-13	34.1	270
7	5784.8	-52.9	5.7	13.55	Vertical	-47.2	-13	34.2	225
8	6611.2	-48.9	6.3	13.75	Vertical	-43.6	-13	30.6	180
9	7437.6	-46	6.8	13.85	Vertical	-41.1	-13	28.1	45
10	8264.0	-46.1	6.9	14.25	Vertical	-40.9	-13	27.9	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 vertical 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	1675.1	-61.7	2	10.75	Vertical	-55.1	-13	42.1	225
3	2509.6	-58.09	2.51	11.05	Vertical	-51.7	-13	38.7	135
4	3346.4	-55.5	4.2	11.15	Vertical	-50.7	-13	37.7	90
5	4183.0	-52.2	5.2	11.15	Vertical	-48.4	-13	35.4	135
6	5019.6	-51.1	5.5	11.95	Vertical	-46.8	-13	33.8	270
7	5856.2	-51.2	5.7	13.55	Vertical	-45.5	-13	32.5	225
8	6692.8	-47.2	6.3	13.75	Vertical	-41.9	-13	28.9	180
9	7529.4	-43.5	6.8	13.85	Vertical	-38.6	-13	25.6	45
10	8366.0	-43.3	6.9	14.25	Vertical	-38.1	-13	25.1	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 vertical position.

WCDMA Band V CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1694.4	-59.2	2	10.15	Vertical	-53.2	-13	40.2	225
3	2539.8	-56.99	2.51	11.05	Vertical	-50.6	-13	37.6	180
4	3386.4	-56.5	4.2	11.15	Vertical	-51.7	-13	38.7	45
5	4233.0	-52.7	5.2	11.15	Vertical	-48.9	-13	35.9	90
6	5079.6	-51	5.5	11.95	Vertical	-46.7	-13	33.7	225
7	5926.2	-52.3	5.7	13.55	Vertical	-46.6	-13	33.6	135
8	6772.8	-50	6.3	13.75	Vertical	-44.7	-13	31.7	90
9	7619.4	-46.3	6.8	13.85	Vertical	-41.4	-13	28.4	90
10	8466.0	-45	6.9	14.25	Vertical	-39.8	-13	26.8	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 vertical position.

LTE Band 5 5MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1653.0	-63.3	2.00	10.75	vertical	-56.7	-13	43.7	45
3	2479.5	-59.39	2.51	11.05	vertical	-53.0	-13	40.0	90
4	3306.0	-55.7	4.20	11.15	vertical	-50.9	-13	37.9	225
5	4132.5	-54	5.20	11.15	vertical	-50.2	-13	37.2	135
6	4959.0	-52	5.50	11.95	vertical	-47.7	-13	34.7	90
7	5785.5	-51.8	5.70	13.55	vertical	-46.1	-13	33.1	135
8	6612.0	-49.4	6.30	13.75	vertical	-44.1	-13	31.1	270
9	7438.5	-46.9	6.80	13.85	vertical	-42.0	-13	29.0	225
10	8265.0	-45.1	6.90	14.25	vertical	-39.9	-13	26.9	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 vertical 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	1673.0	-62.7	2.00	10.75	vertical	-56.1	-13	43.1	45
3	2509.5	-59.79	2.51	11.05	vertical	-53.4	-13	40.4	90
4	3346.0	-57.1	4.20	11.15	vertical	-52.3	-13	39.3	225
5	4182.5	-53.3	5.20	11.15	vertical	-49.5	-13	36.5	180
6	5019.0	-51.1	5.50	11.95	vertical	-46.8	-13	33.8	45
7	5855.5	-51.6	5.70	13.55	vertical	-45.9	-13	32.9	90
8	6692.0	-49.8	6.30	13.75	vertical	-44.5	-13	31.5	225
9	7528.5	-47.4	6.80	13.85	vertical	-42.5	-13	29.5	135
10	8365.0	-45.7	6.90	14.25	vertical	-40.5	-13	27.5	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 vertical position.

LTE Band 5 5MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1693.0	-48.3	2.00	10.75	vertical	-41.7	-13	28.7	135
3	2539.5	-59.89	2.51	11.05	vertical	-53.5	-13	40.5	270
4	3386.0	-55.9	4.20	11.15	vertical	-51.1	-13	38.1	225
5	4232.5	-52.9	5.20	11.15	vertical	-49.1	-13	36.1	180
6	5079.0	-50.6	5.50	11.95	vertical	-46.3	-13	33.3	45
7	5925.5	-51.9	5.70	13.55	vertical	-46.2	-13	33.2	90
8	6772.0	-49	6.30	13.75	vertical	-43.7	-13	30.7	225
9	7618.5	-47.9	6.80	13.85	vertical	-43.0	-13	30.0	135
10	8465.0	-47.1	6.90	14.25	vertical	-41.9	-13	28.9	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 vertical position.

LTE Band 5 10MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1658.0	-62.9	2.00	10.75	vertical	-56.3	-13	43.3	90
3	2487.0	-58.99	2.51	11.05	vertical	-52.6	-13	39.6	135
4	3316.0	-57	4.20	11.15	vertical	-52.2	-13	39.2	270
5	4145.0	-53.5	5.20	11.15	vertical	-49.7	-13	36.7	225
6	4974.0	-52.2	5.50	11.95	vertical	-47.9	-13	34.9	180
7	5803.0	-51.6	5.70	13.55	vertical	-45.9	-13	32.9	45
8	6632.0	-49.5	6.30	13.75	vertical	-44.2	-13	31.2	90
9	7461.0	-45.9	6.80	13.85	vertical	-41.0	-13	28.0	225
10	8290.0	-46.6	6.90	14.25	vertical	-41.4	-13	28.4	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 vertical 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	1673.0	-62.5	2.00	10.75	vertical	-55.9	-13	42.9	90
3	2509.5	-58.69	2.51	11.05	vertical	-52.3	-13	39.3	90
4	3346.0	-55.8	4.20	11.15	vertical	-51.0	-13	38.0	135
5	4182.5	-53.8	5.20	11.15	vertical	-50.0	-13	37.0	270
6	5019.0	-50.8	5.50	11.95	vertical	-46.5	-13	33.5	225
7	5855.5	-52.1	5.70	13.55	vertical	-46.4	-13	33.4	180
8	6692.0	-49.4	6.30	13.75	vertical	-44.1	-13	31.1	45
9	7528.5	-47.4	6.80	13.85	vertical	-42.5	-13	29.5	90
10	8365.0	-46.8	6.90	14.25	vertical	-41.6	-13	28.6	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 vertical position.

LTE Band 5 10MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1688.0	-60.7	2.00	10.75	vertical	-54.1	-13	41.1	270
3	2532.0	-59.19	2.51	11.05	vertical	-52.8	-13	39.8	225
4	3376.0	-55.9	4.20	11.15	vertical	-51.1	-13	38.1	180
5	4220.0	-53.6	5.20	11.15	vertical	-49.8	-13	36.8	45
6	5064.0	-51.2	5.50	11.95	vertical	-46.9	-13	33.9	90
7	5908.0	-50.3	5.70	13.55	vertical	-44.6	-13	31.6	225
8	6752.0	-48.6	6.30	13.75	vertical	-43.3	-13	30.3	135
9	7596.0	-48.1	6.80	13.85	vertical	-43.2	-13	30.2	90
10	8440.0	-47.2	6.90	14.25	vertical	-42.0	-13	29.0	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 vertical position.

6. Main Test Instruments

Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time
Base Station Simulator	CMW500	R&S	113645	2016-05-21	2017-05-20
Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	2016-05-21	2017-05-20
Spectrum Analyzer	N9010A	Agilent	MY47191109	2016-05-21	2017-05-20
Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2016-05-21	2017-05-20
Signal Analyzer	FSV30	R&S	100815	2016-12-16	2017-12-15
Signal generator	SMB 100A	R&S	102594	2016-05-22	2017-05-21
Signal generator	SMR27	R&S	100365	2016-05-22	2017-05-21
EMI Test Receiver	ESCI	R&S	100948	2016-06-01	2017-05-31
Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-201	2014-12-06	2017-12-05
Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-391	2014-12-06	2017-12-05
Horn Antenna	HF907	R&S	100126	2014-12-06	2017-12-05
Horn Antenna	HF907	R&S	100125	2014-12-06	2017-12-05
Climatic Chamber	PT-30B	Re Ce	20101891	2015-07-18	2018-07-17
RF Cable	SMA 15cm	Agilent	0001	2017-02-06	2017-08-05

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