



RF TEST REPORT

Applicant Huawei Technologies Co., Ltd.
FCC ID QISLYO-L02
Product Smart Phone
Model HUAWEI LYO-L02
Report No. RHA1606-0039RF01R1
Issue Date June 16, 2016

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2(2015)/ FCC CFR 47 Part 22H (2015)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Reviewed by: Lingling Kang/ Manager

Approved by: Kai Xu/ Director



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检测
TESTING
CNAS L2264

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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	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: June 8, 2016~ June 14, 2016			



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 CNAS or 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
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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

Accessory Equipment Details

Name	Model	Manufacturer	Note
Battery 1	HB4342A1RBC	Sunwoda electronic Co., Ltd	2200mAh
Battery 2	HB4342A1RBC	Scud (Fujian) Electronics Co., Ltd	2200mAh
Adapter 1	HW-050100B01	Huizhou BYD Electronic CO.,LTD	/
Adapter 2	HW-050100E01	Huizhou BYD Electronic CO.,LTD	/
Adapter 3	HW-050100B01	SHENZHEN HUNTKEY ELECTRIC CO., LTD	/
Adapter 4	HW-050100E01	SHENZHEN HUNTKEY ELECTRIC CO., LTD	/
Adapter 5	HW-050100B01	Dongguan Phitek Electronics Co.,Ltd	/
Adapter 6	HW-050100E01	Dongguan Phitek Electronics Co.,Ltd	/

General Information

Model:	HUAWEI LYO-L02
Product IMEI:	869325021672861
Hardware Version:	Ver.A
Software Version:	LYO-L02C000B009
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/ EGPRS Multislot Class:	12
HSDPA UE Category:	14
HSUPA UE Category:	7
DC-HSDPA UE Category:	24
HSPA+ UE Category:	14
Maximum E.R.P.	GSM 850: 28.3 dBm WCDMA Band V:18.71 dBm LTE Band 5: 18.29dBm



Rated Power Supply Voltage:	3.8V		
Extreme Voltage:	Minimum: 3.6V Maximum: 4.3V		
Extreme Temperature:	Lowest: -10°C Highest: +55°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
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 (2015)

FCC CFR 47 Part 22H (2015)

ANSI/TIA-603-D (2010)

KDB 971168 D01 Power Meas License Digital Systems v02r02

4. Test Configuration

There is more than one Battery and adapter, each one should be applied throughout the compliance test respectively, and however, only the worst case (Battery 2/Adapter 3) will be recorded in this report.

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

All mode and data rates and positions were investigated.

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 /EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
	Occupied Bandwidth	GSM /GPRS /EGPRS	RMC
	Band Edge Compliance	GSM /GPRS /EGPRS	RMC
	Frequency Stability	GSM /GPRS /EGPRS	RMC
	Spurious Emissions at Antenna Terminals	GSM	RMC
Radiated Test cases	Effective Radiated Power	GSM /GPRS /EGPRS	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
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

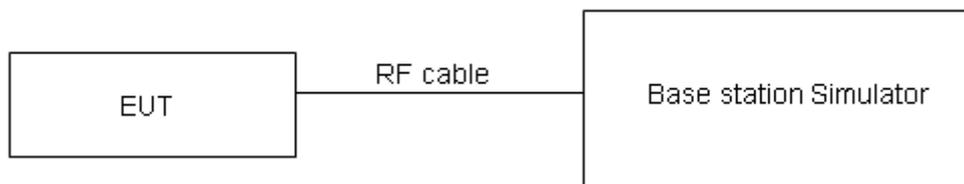
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

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	33.02	33.09	33.03
GPRS (GMSK)	1TXslot	32.81	32.91	32.84
	2TXslots	32.11	32.12	32.01
	3TXslots	30.32	30.27	30.15
	4TXslots	29.18	29.13	28.97
EGPRS (GMSK)	1TXslot	32.81	32.86	32.81
	2TXslots	32.06	32.09	32.00
	3TXslots	30.30	30.25	30.12
	4TXslots	29.15	29.11	28.95
EGPRS (8PSK)	1TXslot	26.35	26.34	26.41
	2TXslots	25.40	25.30	25.31
	3TXslots	23.44	23.42	23.37
	4TXslots	22.43	22.27	22.26

Note: 1) The maximum RF Output Power numbers are marks in bold.
2) The following testing in GPRS/EGPRS is set to 1TXslot based on the maximum RF Output Power.



WCDMA Band V		Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC	12.2 kbs	22.97	22.93	23.01
	64 kbs	22.90	22.79	22.95
	144 kbs	22.89	22.78	22.85
	384 kbs	22.88	22.77	22.84
HSDPA	Sub - Test 1	22.87	22.76	22.85
	Sub - Test 2	22.81	22.77	22.84
	Sub - Test 3	22.30	22.37	22.42
	Sub - Test 4	22.31	22.36	22.44
HSUPA	Sub - Test 1	22.40	22.45	22.43
	Sub - Test 2	20.88	20.84	20.92
	Sub - Test 3	21.87	21.83	21.91
	Sub - Test 4	20.86	20.82	20.90
	Sub - Test 5	22.85	22.81	22.89
DC-HSDPA	Sub - Test 1	22.84	22.80	22.88
	Sub - Test 2	22.93	22.78	22.87
	Sub - Test 3	22.42	22.27	22.36
	Sub - Test 4	22.41	22.26	22.35
HSPA+	16QAM	20.86	20.77	20.87

Note: 1) The maximum RF Output Power numbers are marks in bold.
 2) The following testing in RMC 12.2kbs based on the maximum RF Output Power.

LTE FDD Band 5				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
1.4MHz	QPSK	1	0	23.39	23.16	22.89
		1	2	23.29	22.98	22.89
		1	5	23.24	22.87	22.70
		3	0	23.27	23.11	22.74
		3	2	23.22	23.02	22.71
		3	3	23.25	22.86	22.68
		6	0	22.31	22.10	21.77
	16QAM	1	0	22.40	22.37	22.36
		1	2	22.39	22.30	22.08
		1	5	22.36	22.24	22.24



		3	0	22.28	22.12	21.78
		3	2	22.31	22.01	21.76
		3	3	22.22	21.92	21.68
		6	0	21.37	21.11	20.87
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
3MHz	QPSK	1	0	23.41	23.20	22.92
		1	7	23.32	23.03	22.93
		1	14	23.27	22.92	22.74
		8	0	22.37	22.23	21.87
		8	4	22.34	22.12	21.83
		8	7	22.35	21.97	21.78
	16QAM	15	0	22.34	22.14	21.80
		1	0	22.43	22.39	22.39
		1	7	22.42	22.35	22.12
		1	14	22.38	22.28	22.27
		8	0	21.39	21.25	20.90
		8	4	21.42	21.14	20.88
		8	7	21.32	21.04	20.81
		15	0	21.40	21.15	20.90
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	23.39	23.15	22.89
		1	13	23.31	23.03	22.91
		1	24	23.23	22.86	22.69
		12	0	22.35	22.19	21.84
		12	6	22.32	22.08	21.78
		12	13	22.32	21.96	21.75
		25	0	22.38	22.11	21.77
	16QAM	1	0	22.37	22.36	22.36
		1	13	22.40	22.34	22.10
		1	24	22.35	22.24	22.23
		12	0	21.37	21.24	20.88
		12	6	21.38	21.08	20.83
		12	13	21.30	21.00	20.78
		25	0	21.38	21.11	20.85
BW	Modulation	RB	RB	Channel/Frequency(MHz)		



		size	offset	20450/829	20525/836.5	20600/844
10MHz	QPSK	1	0	23.36	23.11	22.86
		1	25	23.30	22.99	22.89
		1	49	23.21	22.85	22.66
		25	0	22.32	22.14	21.80
		25	13	22.30	22.04	21.75
		25	25	22.29	21.91	21.71
		50	0	22.35	22.06	21.73
	16QAM	1	0	22.35	22.32	22.31
		1	25	22.36	22.32	22.06
		1	49	22.33	22.21	22.21
		25	0	21.34	21.20	20.85
		25	13	21.35	21.06	20.80
		25	25	21.27	20.95	20.74
		50	0	21.36	21.07	20.82

5.2. Effective Radiated Power

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

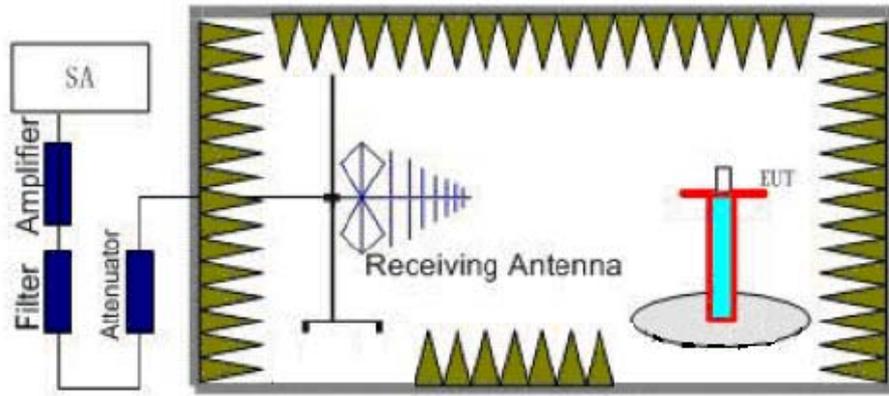
Methods of Measurement

The measurement procedures in TIA- 603-D are used.

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
 2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
 3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;
UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.
 4. The table was rotated 360 degrees to determine the position of the highest radiated power.
 5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
 6. Taking the record of maximum ERP/EIRP.
 7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
 8. The conducted power at the terminal of the dipole antenna is measured.
 9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
 10. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$
- P_s (dBm) : Input power to substitution antenna.
 G_s (dBi or dBd) : Substitution antenna Gain.
 $E_t = R_t + AF$
 $E_s = R_s + AF$
 AF (dB/m) : Receive antenna factor
 R_t : The highest received signal in spectrum analyzer for EUT.
 R_s : The highest received signal in spectrum analyzer for substitution antenna.

$$EIRP = E.R.P + 2.15$$

Test Setup



Limits

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

Limit	$\leq 7 \text{ W}$ (38.45 dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 1.19 \text{ dB}$

**Test Results:**

Mode	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
GSM 850	H	824.2	-18.29	-45.53	0.00	1.06	28.30	38.45	Pass
	H	836.6	-18.52	-45.38	0.00	1.24	28.10	38.45	Pass
	H	848.8	-19.51	-45.37	0.00	1.38	27.24	38.45	Pass
	V	824.2	-34.34	-45.65	0.00	1.06	12.37	38.45	Pass
	V	836.6	-32.42	-45.46	0.00	1.24	14.28	38.45	Pass
	V	848.8	-31.44	-45.49	0.00	1.38	15.43	38.45	Pass
GPRS 850	H	824.2	-20.33	-45.53	0.00	1.06	24.22	38.45	Pass
	H	836.6	-20.73	-45.38	0.00	1.24	24.45	38.45	Pass
	H	848.8	-21.48	-45.37	0.00	1.38	24.65	38.45	Pass
	V	824.2	-36.54	-45.65	0.00	1.06	19.44	38.45	Pass
	V	836.6	-36.91	-45.46	0.00	1.24	20.30	38.45	Pass
	V	848.8	-37.98	-45.49	0.00	1.38	20.76	38.45	Pass
EGPRS 850	H	824.2	-18.64	-45.53	0.00	1.06	15.24	38.45	Pass
	H	836.6	-18.75	-45.38	0.00	1.24	15.70	38.45	Pass
	H	848.8	-19.76	-45.37	0.00	1.38	15.80	38.45	Pass
	V	824.2	-25.62	-45.65	0.00	1.06	0.19	38.45	Pass
	V	836.6	-25.91	-45.46	0.00	1.24	2.26	38.45	Pass
	V	848.8	-26.61	-45.49	0.00	1.38	4.03	38.45	Pass
WCDMA Band V	H	826.4	-27.86	-45.44	0.00	1.13	18.71	38.45	Pass
	H	836.6	-28.32	-45.38	0.00	1.24	18.30	38.45	Pass
	H	846.6	-28.86	-45.38	0.00	1.35	17.87	38.45	Pass
	V	826.4	-42.85	-45.54	0.00	1.13	3.82	38.45	Pass
	V	836.6	-41.84	-45.46	0.00	1.24	4.86	38.45	Pass
	V	846.6	-41.04	-45.49	0.00	1.35	5.80	38.45	Pass



LTE Band 5								
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	ERP (dBm)	Conclusion
1.4 MHz (QPSK)	H	824.7	-24.41	-47.61	0.00	1.06	17.66	Pass
	H	836.5	-25.72	-47.75	0.00	1.24	17.18	Pass
	H	848.3	-26.22	-48.23	0.00	1.38	17.59	Pass
	V	824.7	-29.94	-47.29	0.00	1.06	13.31	Pass
	V	836.5	-30.27	-47.15	0.00	1.24	13.00	Pass
	V	848.3	-30.37	-47.48	0.00	1.38	13.22	Pass
1.4 MHz (16QAM)	H	824.7	-48.67	-47.61	0.00	1.06	17.57	Pass
	H	836.5	-48.99	-47.75	0.00	1.24	17.06	Pass
	H	848.3	-49.61	-48.23	0.00	1.38	17.50	Pass
	V	824.7	-48.36	-47.29	0.00	1.06	13.17	Pass
	V	836.5	-48.39	-47.15	0.00	1.24	12.97	Pass
	V	848.3	-48.86	-47.48	0.00	1.38	13.06	Pass
3 MHz (QPSK)	H	825.5	-24.39	-47.59	0.00	1.06	17.68	Pass
	H	836.5	-25.78	-47.75	0.00	1.24	17.14	Pass
	H	847.5	-26.08	-48.18	0.00	1.38	17.50	Pass
	V	825.5	-29.80	-47.26	0.00	1.06	13.33	Pass
	V	836.5	-30.33	-47.15	0.00	1.24	12.96	Pass
	V	847.5	-30.40	-47.44	0.00	1.38	13.13	Pass
3 MHz (16QAM)	H	825.5	-48.66	-47.59	0.00	1.06	17.61	Pass
	H	836.5	-48.99	-47.75	0.00	1.24	17.03	Pass
	H	847.5	-49.56	-48.18	0.00	1.38	17.39	Pass
	V	825.5	-48.33	-47.26	0.00	1.06	13.22	Pass
	V	836.5	-48.39	-47.15	0.00	1.24	12.89	Pass
	V	847.5	-48.83	-47.44	0.00	1.38	12.99	Pass
5 MHz (QPSK)	H	826.5	-24.87	-47.60	0.00	1.13	17.49	Pass
	H	836.5	-25.94	-47.75	0.00	1.24	16.98	Pass
	H	846.5	-26.83	-48.12	0.00	1.38	17.33	Pass
	V	826.5	-30.13	-47.24	0.00	1.13	13.19	Pass
	V	836.5	-30.54	-47.15	0.00	1.24	12.87	Pass
	V	846.5	-30.57	-47.40	0.00	1.38	12.98	Pass
5 MHz (16QAM)	H	826.5	-48.73	-47.60	0.00	1.13	17.38	Pass
	H	836.5	-48.99	-47.75	0.00	1.24	16.93	Pass
	H	846.5	-49.51	-48.12	0.00	1.38	17.17	Pass
	V	826.5	-48.37	-47.24	0.00	1.13	12.97	Pass
	V	836.5	-48.39	-47.15	0.00	1.24	12.74	Pass
	V	846.5	-48.78	-47.40	0.00	1.38	12.78	Pass
10 MHz (QPSK)	H	829	-24.90	-47.61	0.00	1.13	17.99	Pass
	H	836.5	-25.60	-47.75	0.00	1.24	18.29	Pass
	H	844	-26.32	-48.01	0.00	1.33	16.54	Pass



LTE Band 5								
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	ERP (dBm)	Conclusion
	V	829	-29.96	-47.19	0.00	1.13	14.38	Pass
	V	836.5	-30.56	-47.15	0.00	1.24	14.10	Pass
	V	844	-30.17	-47.29	0.00	1.33	12.22	Pass
10 MHz (16QAM)	H	829	-48.74	-47.61	0.00	1.13	17.43	Pass
	H	836.5	-48.99	-47.75	0.00	1.24	17.64	Pass
	H	844	-49.33	-48.01	0.00	1.33	16.09	Pass
	V	829	-48.32	-47.19	0.00	1.13	13.71	Pass
	V	836.5	-48.39	-47.15	0.00	1.24	13.53	Pass
	V	844	-48.61	-47.29	0.00	1.33	12.06	Pass

5.3. Occupied Bandwidth

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

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,

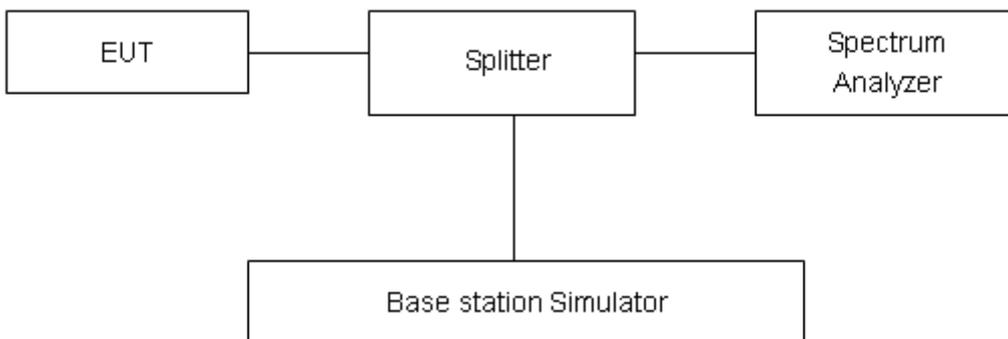
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5 (1.4MHz),

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5 (3MHz/5MHz),

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 5 (10MHz),

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

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

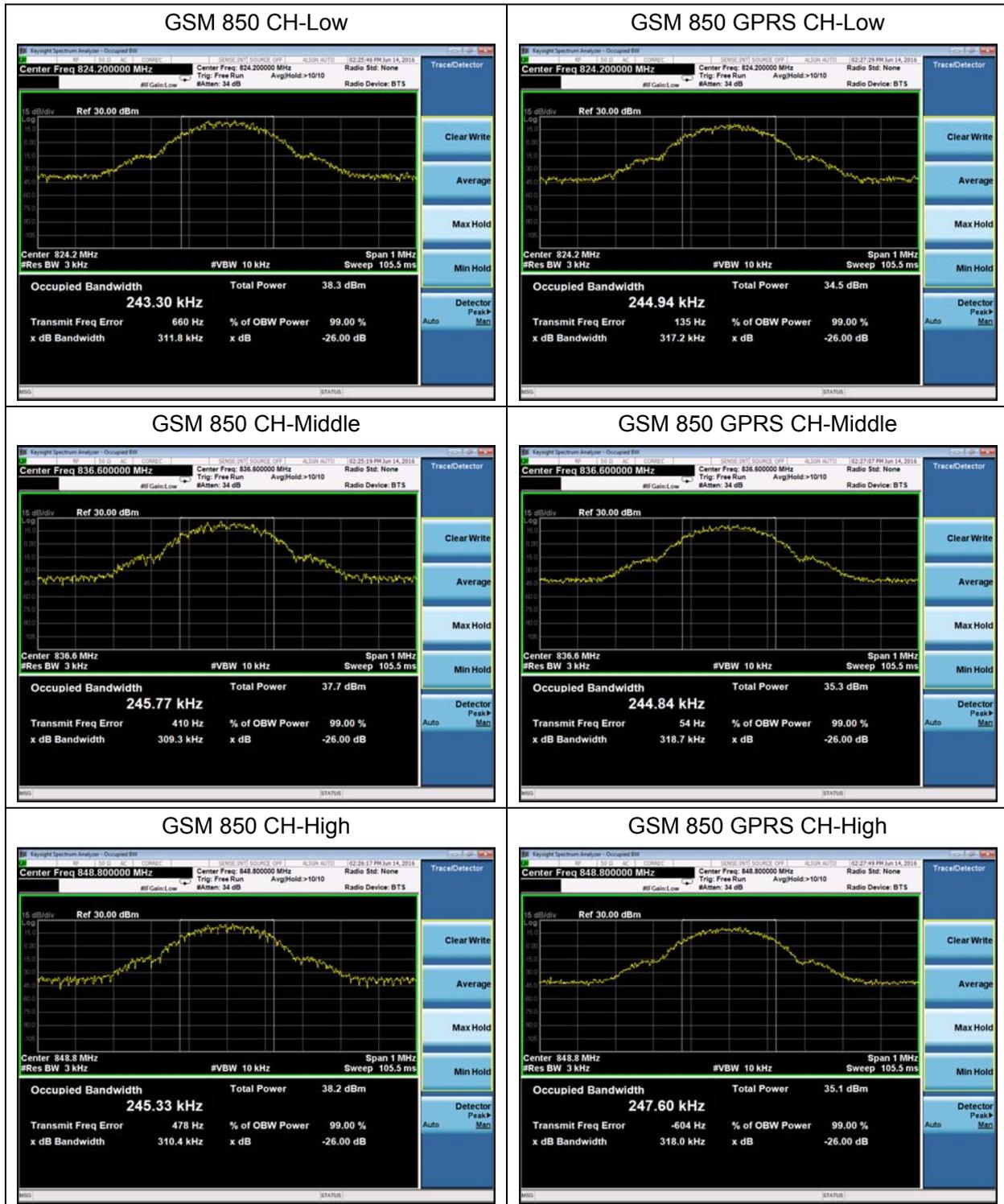
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 624\text{Hz}$.

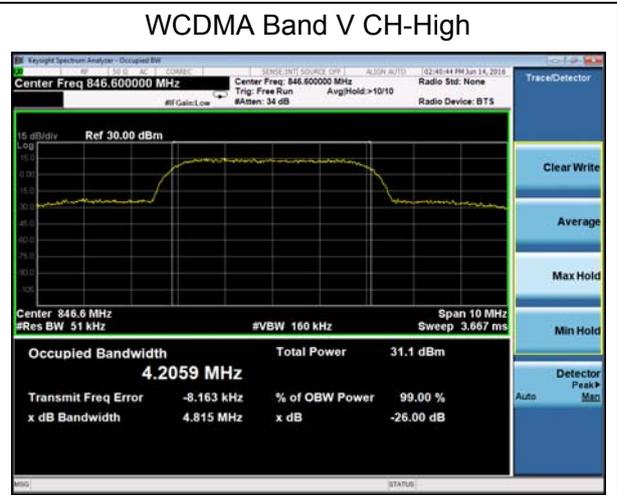
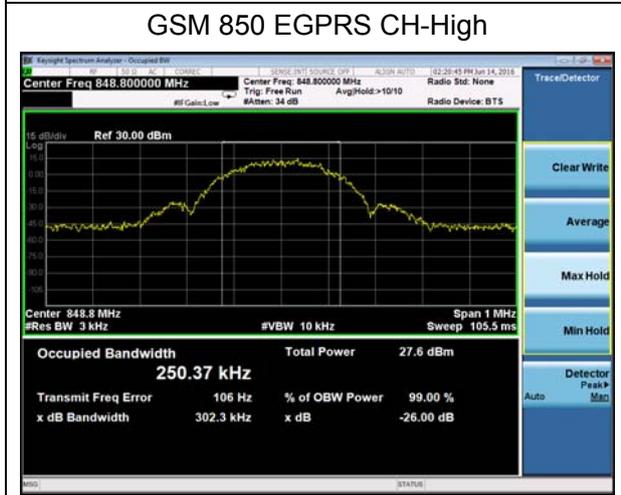
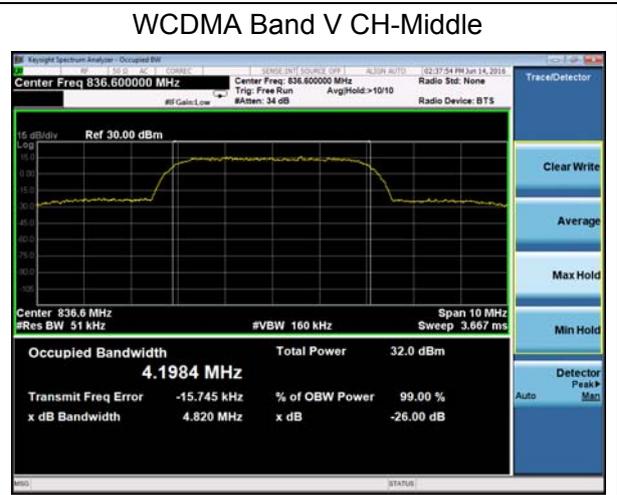
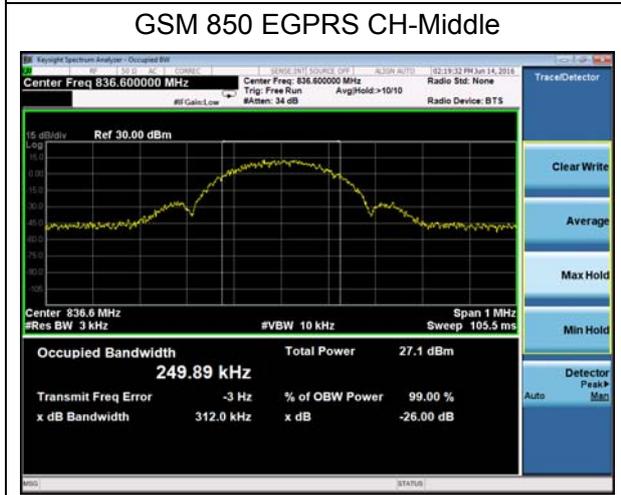
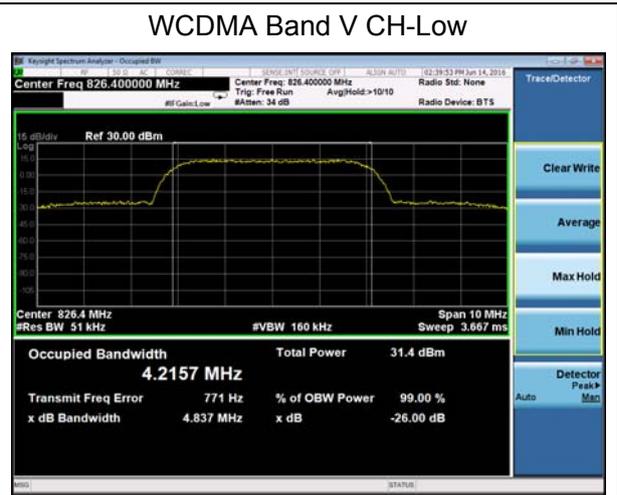
**Test Result**

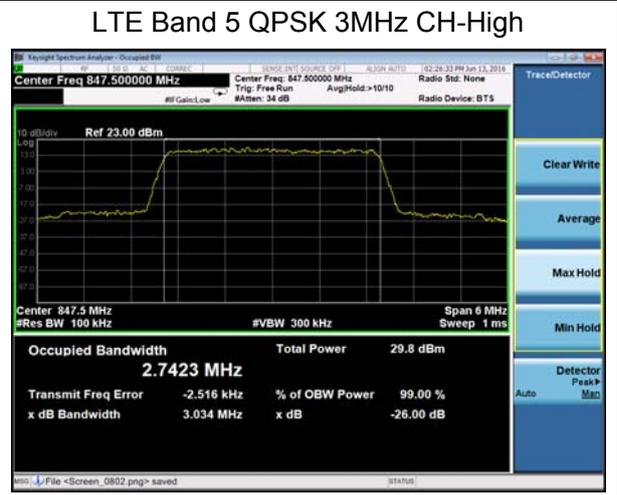
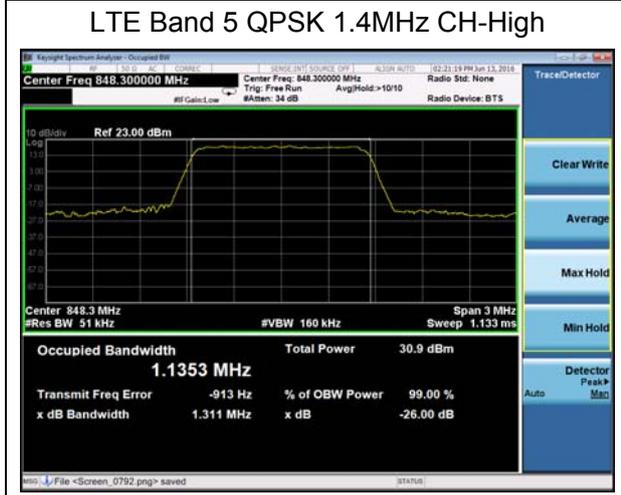
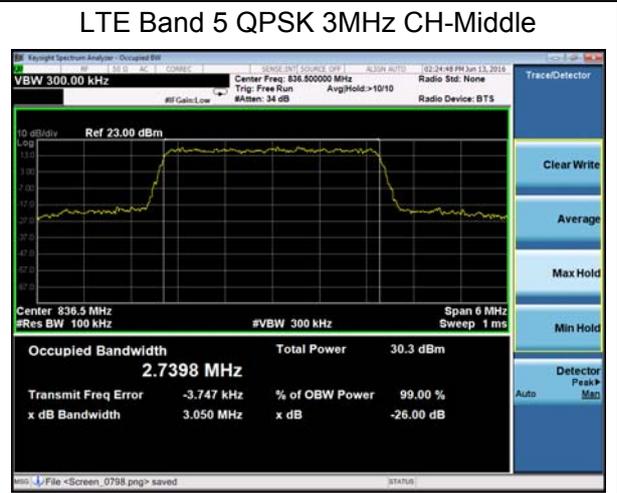
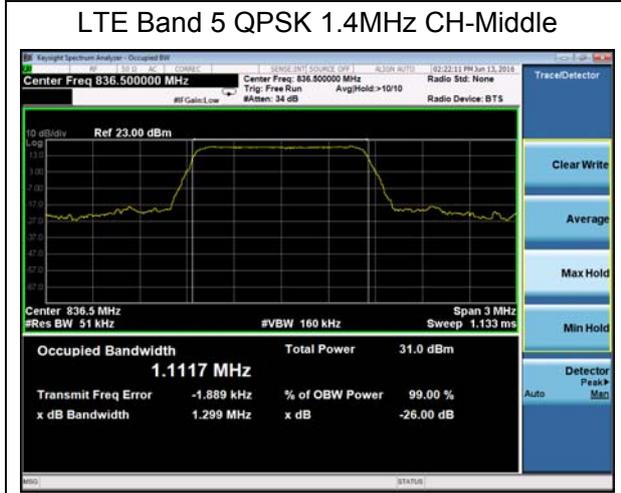
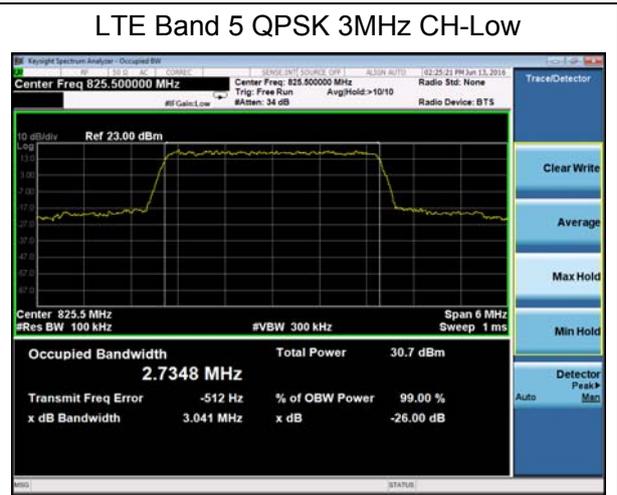
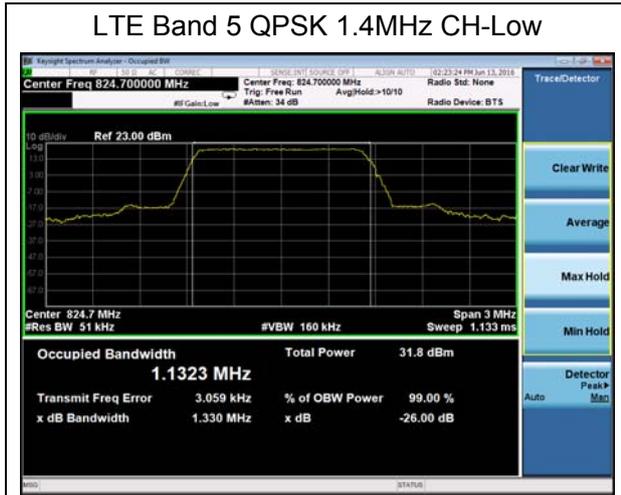
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
GSM 850 (GSM)	128	824.2	243.30	311.8
	190	836.6	245.77	309.3
	251	848.8	245.33	310.4
GPRS 850 (GMSK)	128	824.2	244.94	317.2
	190	836.6	244.84	318.7
	251	848.8	247.60	318.0
EGPRS 850 (8-PSK)	128	824.2	245.98	320.5
	190	836.6	249.89	312.0
	251	848.8	250.37	302.3
WCDMA Band V (RMC)	4132	826.4	4215.7	4837
	4183	836.6	4198.4	4820
	4233	846.6	4205.9	4815

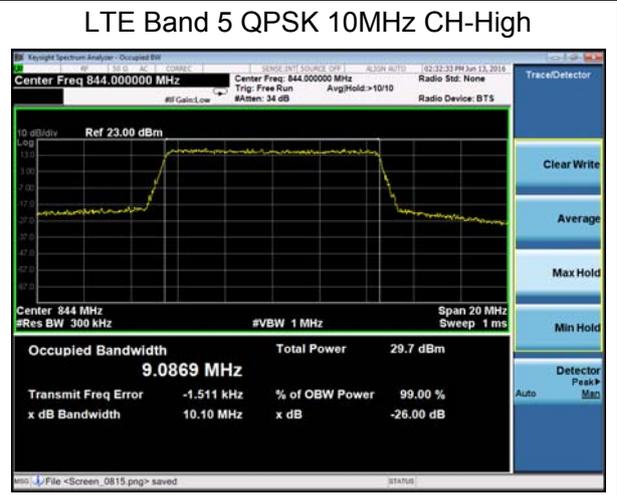
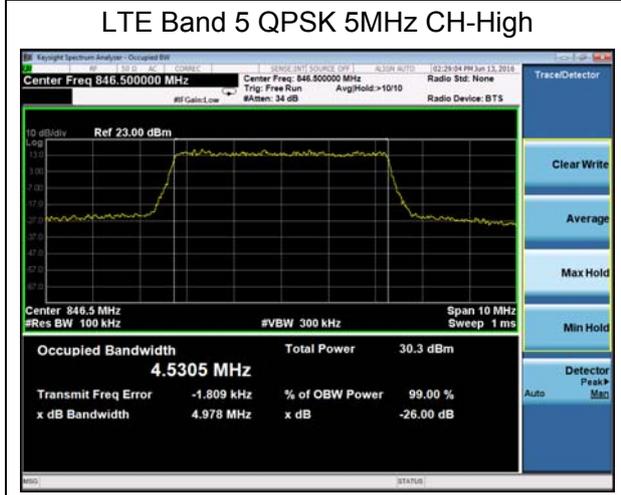
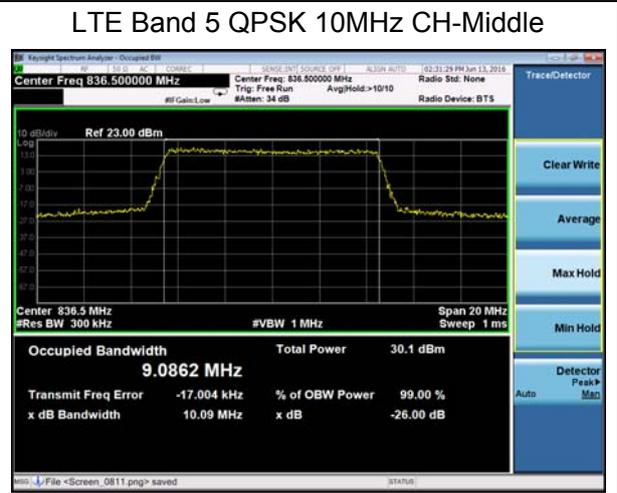
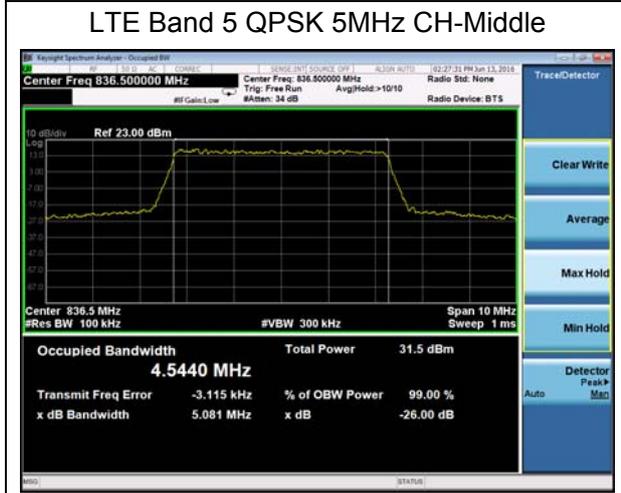
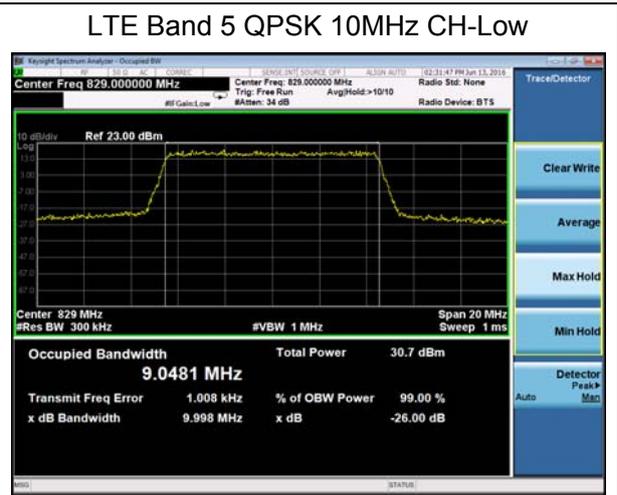
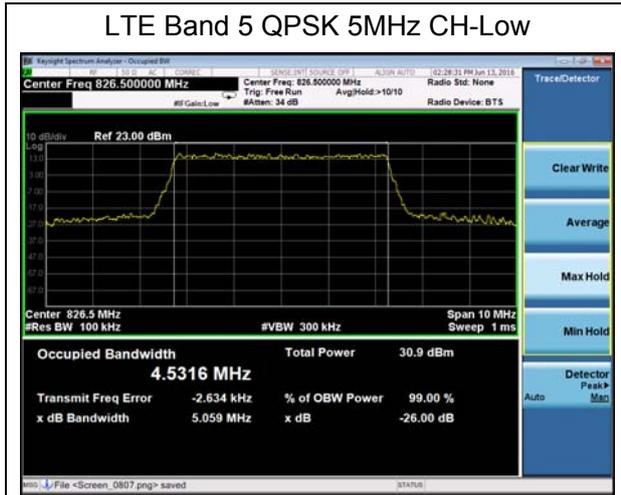


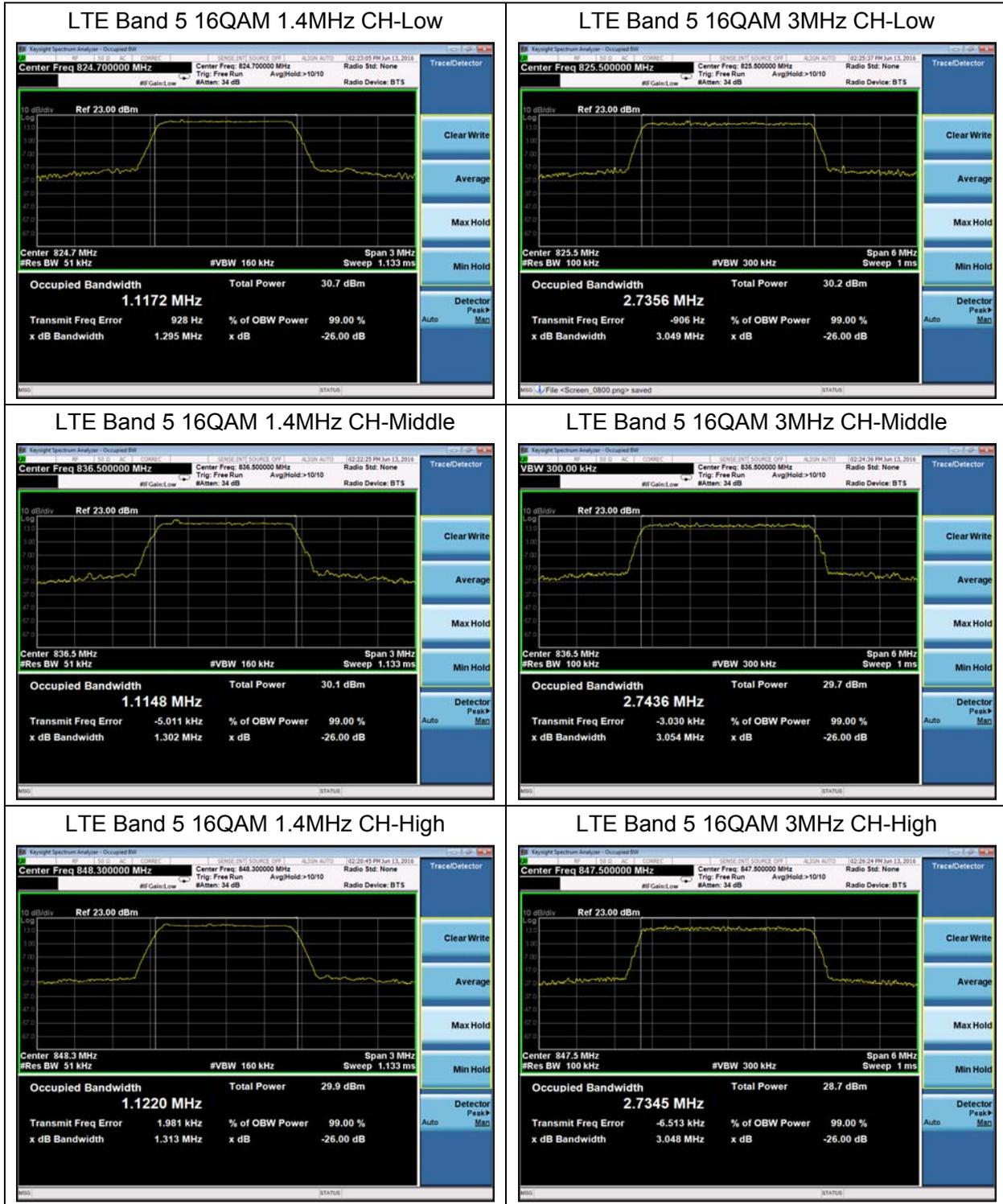
LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100 %	QPSK	1.4	20407	824.7	1.1323	1.330
			20525	836.5	1.1117	1.299
			20643	848.3	1.1353	1.311
		3	20415	825.5	2.7348	3.041
			20525	836.5	2.7398	3.050
			20635	847.5	2.7423	3.034
		5	20425	826.5	4.5316	5.059
			20525	836.5	4.5440	5.081
			20625	846.5	4.5305	4.978
		10	20450	829	9.0481	9.998
			20525	836.5	9.0862	10.09
			20600	844	9.0869	10.10
	16QAM	1.4	20407	824.7	1.1172	1.295
			20525	836.5	1.1148	1.302
			20643	848.3	1.1220	1.313
		3	20415	825.5	2.7356	3.049
			20525	836.5	2.7436	3.054
			20635	847.5	2.7345	3.046
		5	20425	826.5	4.5301	5.107
			20525	836.5	4.5158	5.008
			20625	846.5	4.5451	5.094
		10	20450	829	9.0675	10.08
			20525	836.5	9.0733	10.10
			20600	844	10.042	11.07

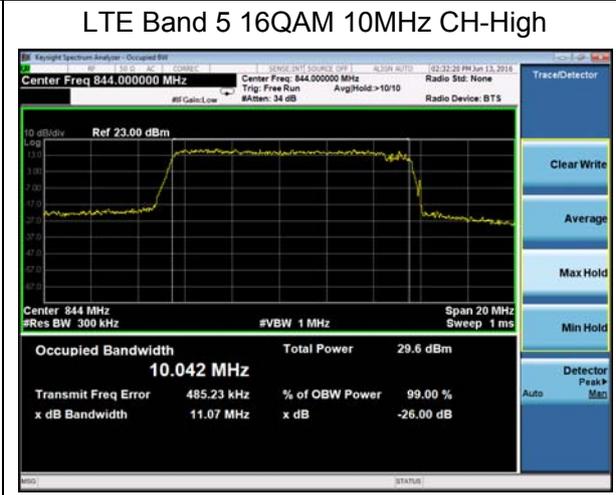
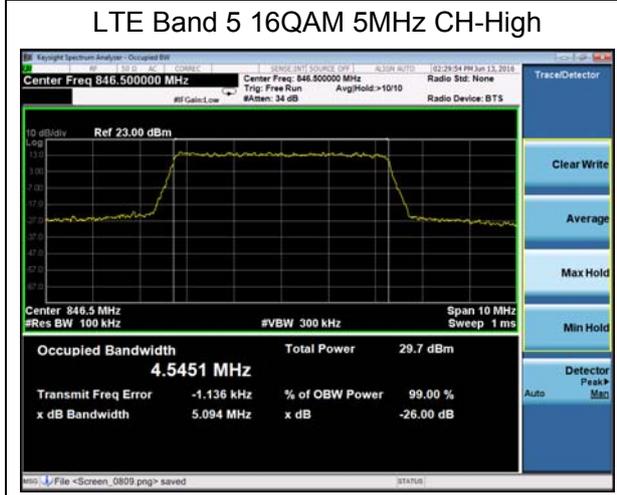
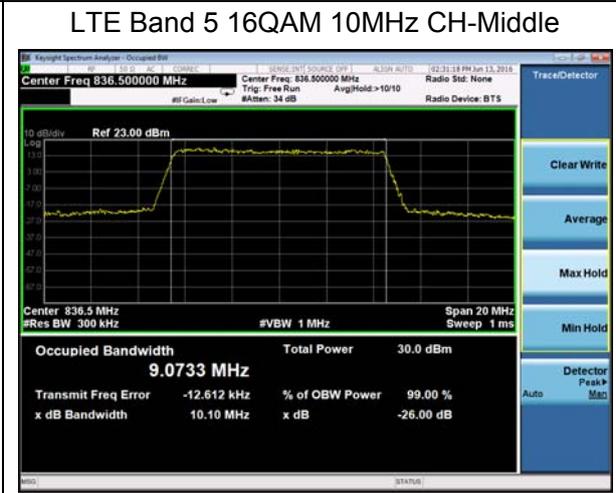
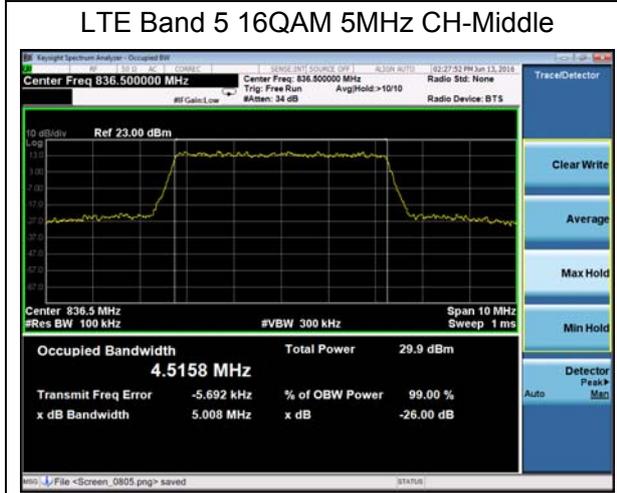
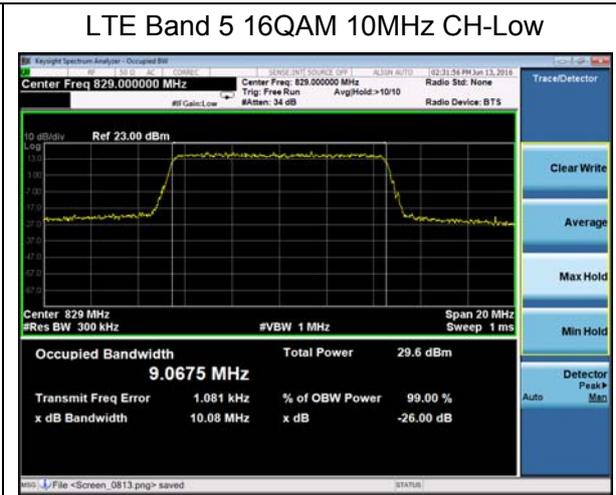
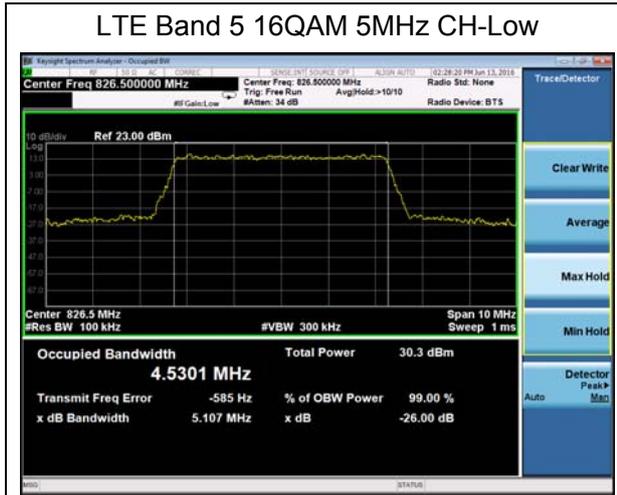












5.4. Band Edge Compliance

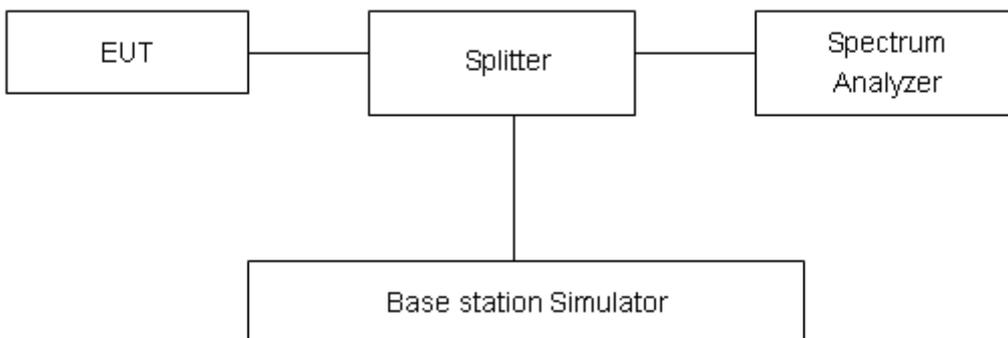
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

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 15 kHz, VBW is set to 51 kHz for LTE Band 5 (1.4MHz), RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 5 (3MHz), 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
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Measurement Uncertainty

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



Test Result:

Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit (dBm)	Conclusion
GSM 850 (GSM)	824.0	-31.973	-13	PASS
	849.0	-29.459	-13	PASS
GPRS 850 (GMSK)	824.0	-31.043	-13	PASS
	849.0	-29.381	-13	PASS
EGPRS 850 (8-PSK)	824.0	-39.528	-13	PASS
	849.0	-41.884	-13	PASS
WCDMA Band V RMC	824.0	-18.884	-13	PASS
	849.0	-20.043	-13	PASS

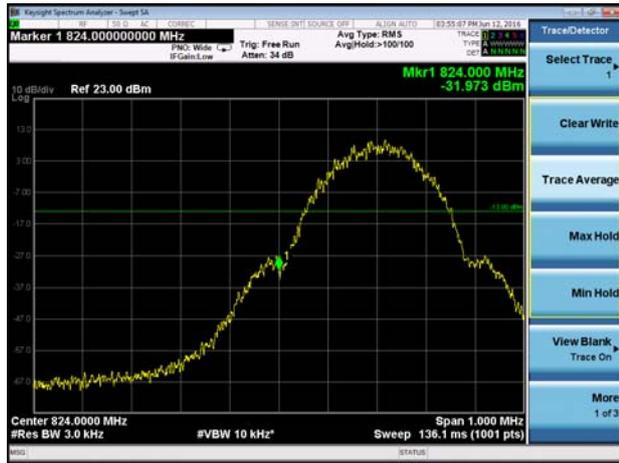
LTE Band 5						
Modulation	Bandwidth	Channel	RB	Reference value (dBm)	Limit (dBm)	Conclusion
QPSK	1.4MHz	20407	1	-28.673	-13	PASS
			100%	-31.919	-13	PASS
		20643	1	-32.060	-13	PASS
			100%	-37.121	-13	PASS
	3MHz	20415	1	-18.309	-13	PASS
			100%	-28.888	-13	PASS
		20635	1	-20.910	-13	PASS
			100%	-30.658	-13	PASS
	5MHz	20425	1	-14.978	-13	PASS
			100%	-27.826	-13	PASS
		20625	1	-17.720	-13	PASS
			100%	-29.039	-13	PASS
	10MHz	20450	1	-18.426	-13	PASS
			100%	-31.809	-13	PASS
		20600	1	-20.325	-13	PASS
			100%	-32.935	-13	PASS
16QAM	1.4MHz	20407	1	-28.839	-13	PASS
			100%	-33.856	-13	PASS
		20643	1	-34.279	-13	PASS
			100%	-39.050	-13	PASS
	3MHz	20415	1	-19.961	-13	PASS



			100%	-30.614	-13	PASS	
		20635	1	-22.720	-13	PASS	
	5MHz	20425	100%	-33.345	-13	PASS	
			1	-15.910	-13	PASS	
		20625	100%	-27.984	-13	PASS	
			1	-17.336	-13	PASS	
		10MHz	20450	100%	-32.301	-13	PASS
				1	-21.452	-13	PASS
	20600		100%	-32.563	-13	PASS	
			1	-20.058	-13	PASS	
			100%	-34.068	-13	PASS	



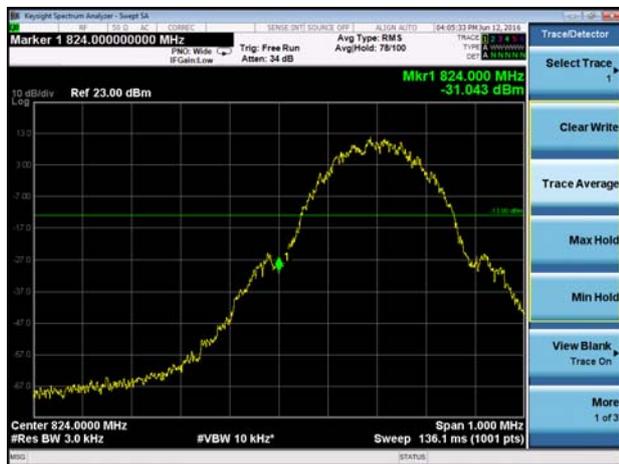
GSM 850 CH-Low



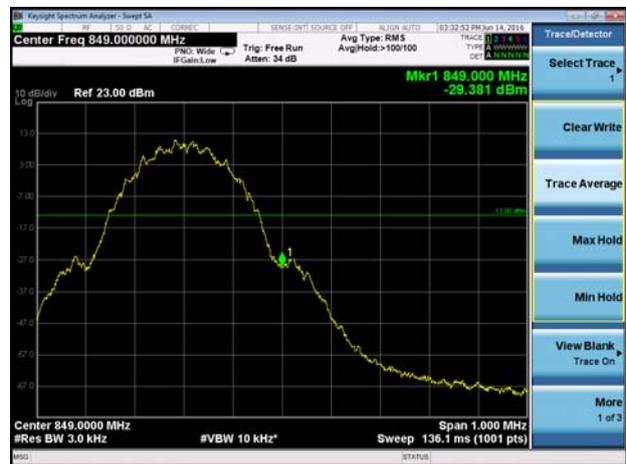
GSM 850 CH-High



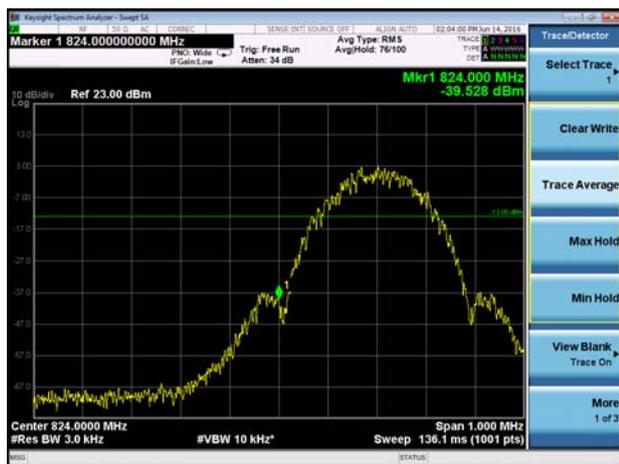
GSM 850 GPRS CH-Low



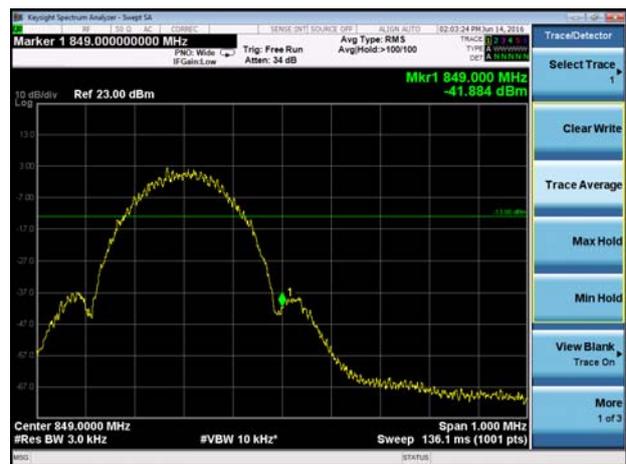
GSM 850 GPRS CH-High



GSM 850 EGPRS CH-Low

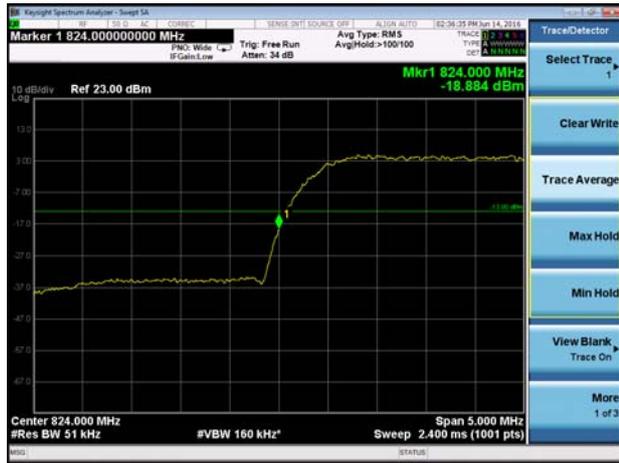


GSM 850 EGPRS CH-High





WCDMA Band V CH-Low



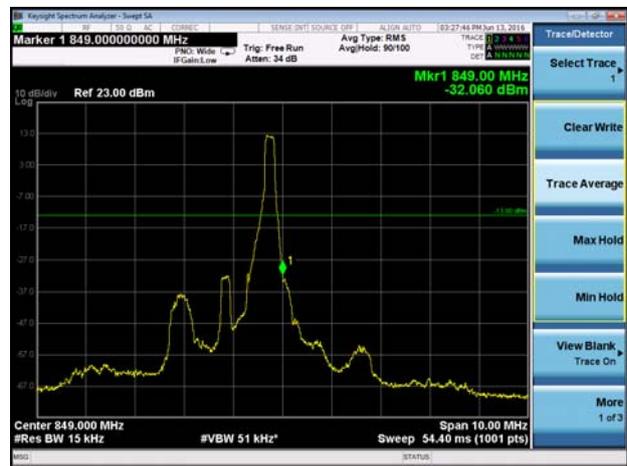
WCDMA Band V CH-High



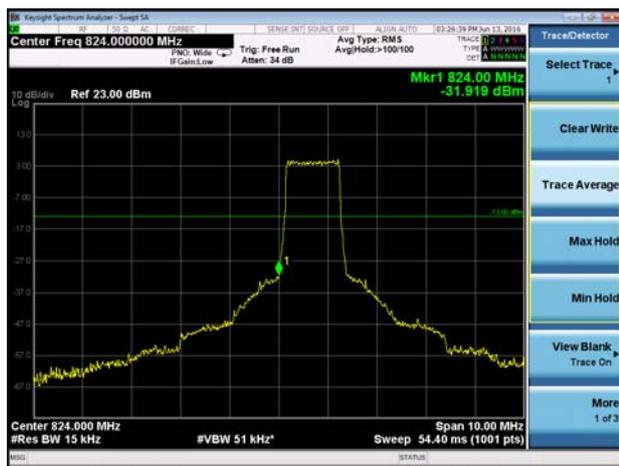
LTE Band 5 QPSK 1.4MHz CH-Low 1RB



LTE Band 5 QPSK 1.4MHz CH-High 1RB



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

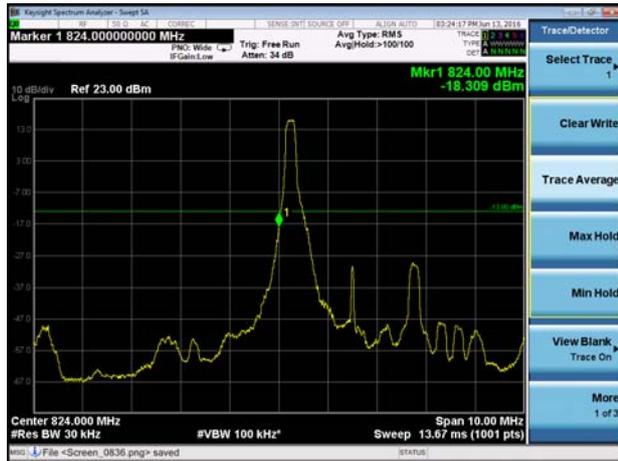


LTE Band 5 QPSK 1.4MHz CH-High 100%RB





LTE Band 5 QPSK 3MHz CH-Low 1RB



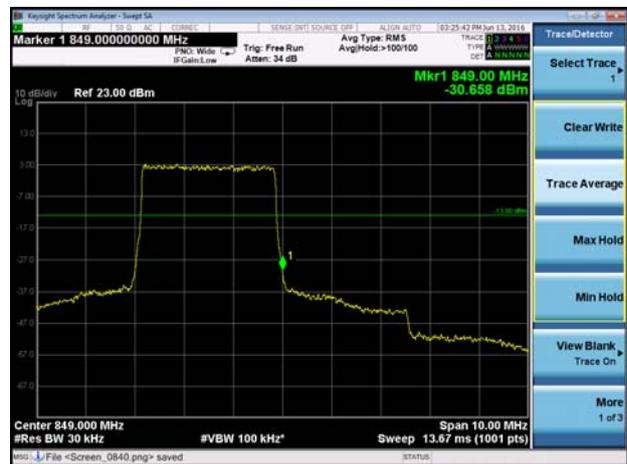
LTE Band 5 QPSK 3MHz CH-High 1RB



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



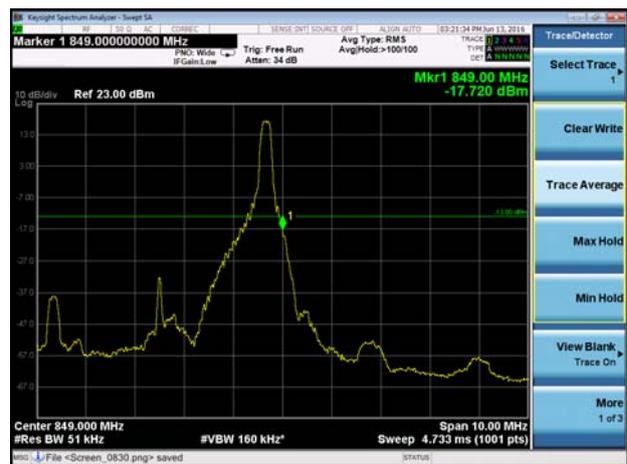
LTE Band 5 QPSK 3MHz CH-High 100%RB



LTE Band 5 QPSK 5MHz CH-Low 1RB

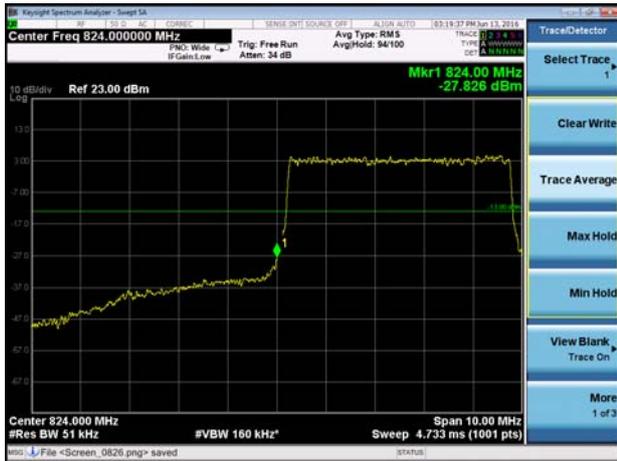


LTE Band 5 QPSK 5MHz CH-High 1RB





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

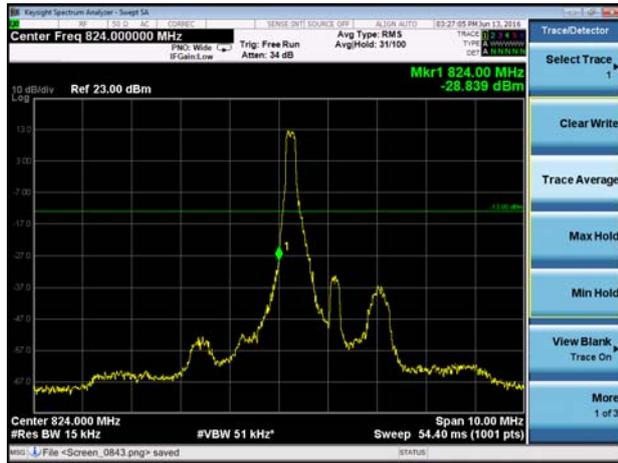


LTE Band 5 QPSK 10MHz CH-High 100%RB





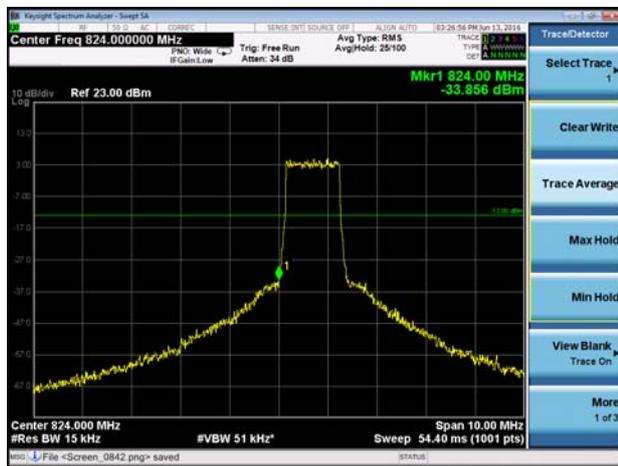
LTE Band 5 16QAM 1.4MHz CH-Low 1RB



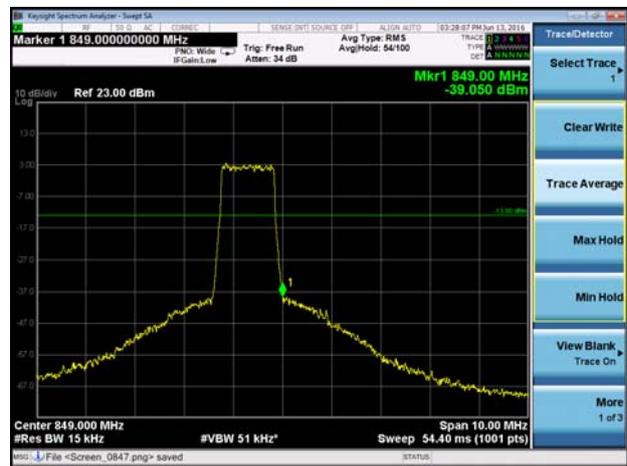
LTE Band 5 16QAM 1.4MHz CH-High 1RB



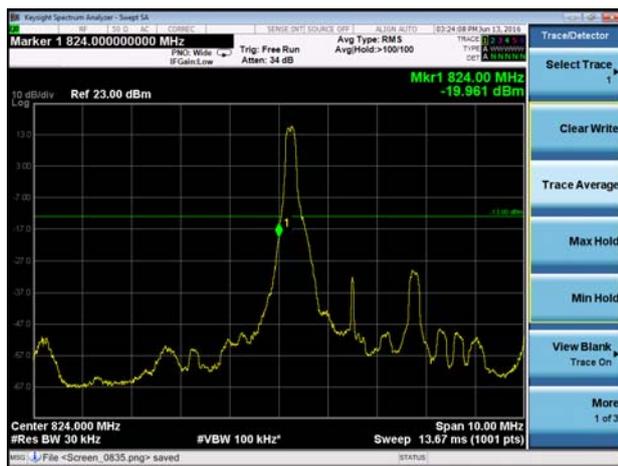
LTE Band 5 16QAM 1.4MHz CH-Low 100%RB



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



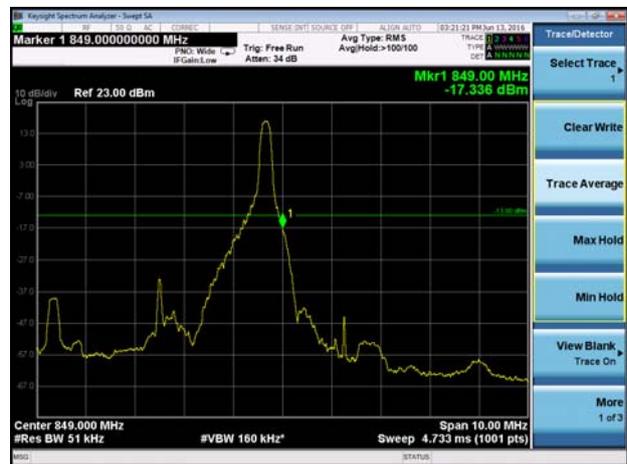
LTE Band 5 16QAM 3MHz CH-High 100%RB



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



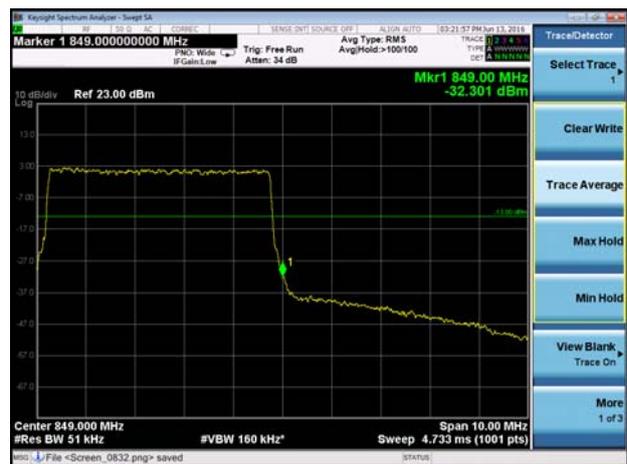
LTE Band 5 16QAM 5MHz CH-High 1RB



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



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





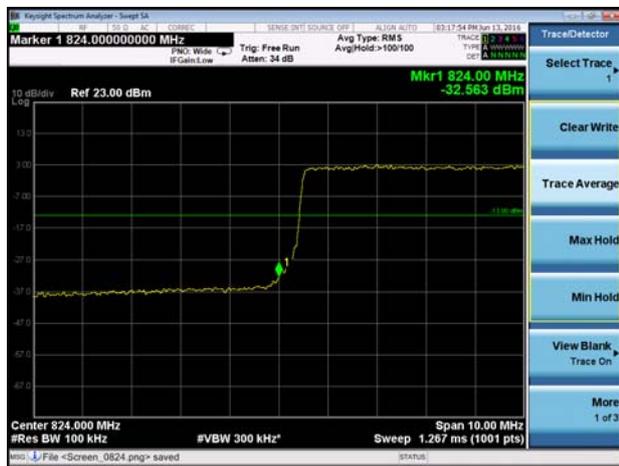
LTE Band 5 16QAM 10MHz CH-Low 1RB



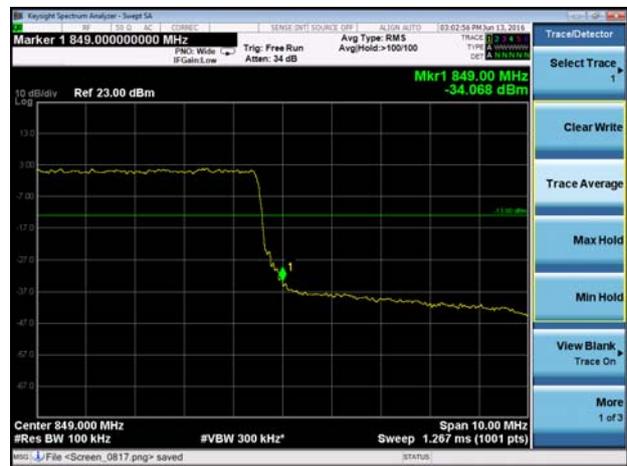
LTE Band 5 16QAM 10MHz CH-High 1RB



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



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



5.5. Frequency Stability

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

1. Frequency Stability (Temperature Variation)

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

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

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

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

2. Frequency Stability (Voltage Variation)

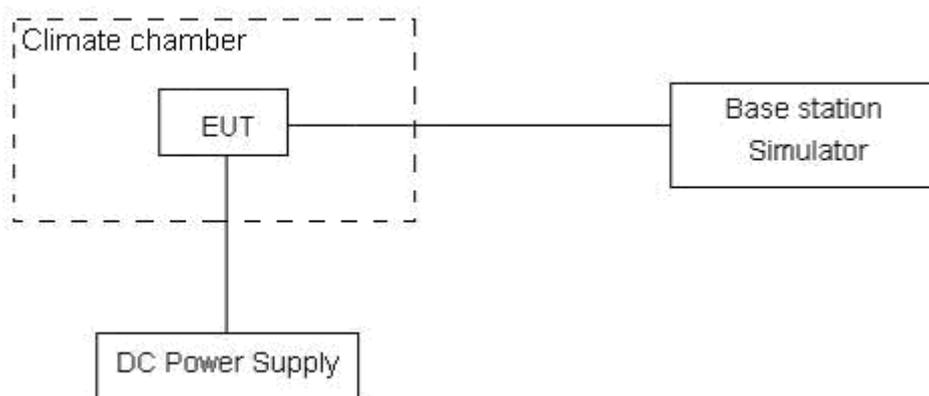
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 4.3 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 $k = 3$, $U = 0.01\text{ppm}$.

Test Result

Mode	Test status	Test Results (ppm)			Limit (ppm)	Conclusion
		GSM (GMSK)	GPRS (GMSK)	EGPRS (8PSK)		
GSM 850 Channel 190	-10°C/3.8 V	-0.0900	0.0103	-0.0051	2.5	PASS
	0°C/3.8 V	0.0157	0.0168	0.0109	2.5	PASS
	10°C/3.8 V	-0.0900	0.0136	0.0061	2.5	PASS
	20°C/3.8 V	0.0152	0.0069	0.0075	2.5	PASS
	30°C/3.8 V	-0.0800	0.0098	-0.0072	2.5	PASS
	40°C/3.8 V	0.0174	0.0104	0.0070	2.5	PASS
	50°C/3.8 V	-0.0900	0.0120	0.0103	2.5	PASS
	55°C/3.8 V	0.0160	0.0083	-0.0086	2.5	PASS
	20°C/3.6 V	-0.0900	0.0102	0.0053	2.5	PASS
	20°C/4.3 V	0.0167	0.0104	-0.0034	2.5	PASS
/	/	RMC			/	/
WCDMA Band V Channel 4183	-10°C/3.8 V	-0.001178			2.5	PASS
	0°C/3.8 V	-0.002718			2.5	PASS
	10°C/3.8 V	-0.001562			2.5	PASS
	20°C/3.8 V	-0.001125			2.5	PASS
	30°C/3.8 V	-0.000112			2.5	PASS
	40°C/3.8 V	-0.000345			2.5	PASS
	50°C/3.8 V	0.000503			2.5	PASS
	55°C/3.8 V	-0.001318			2.5	PASS
	20°C/3.6 V	-0.000364			2.5	PASS
	20°C/4.3 V	-0.001827			2.5	PASS

Bandwidth	Test status	LTE Band 5 Channel 20525 Test Results (ppm)		
		QPSK	16QAM	Conclusion
1.4MHz	-10°C/3.8 V	0.01985	0.01285	PASS
	0°C/3.8 V	0.01980	0.01762	PASS
	10°C/3.8 V	0.01686	0.01484	PASS
	20°C/3.8 V	0.01591	0.02065	PASS
	30°C/3.8 V	0.01970	0.01594	PASS
	40°C/3.8 V	0.01335	0.02116	PASS
	50°C/3.8 V	0.01900	0.01798	PASS
	55°C/3.8 V	0.01652	0.01394	PASS
	20°C/3.6 V	0.01355	0.01461	PASS
	20°C/4.3 V	0.01794	0.01577	PASS
3MHz	-10°C/3.8 V	0.01612	0.01350	PASS
	0°C/3.8 V	0.01927	0.01710	PASS
	10°C/3.8 V	0.01751	0.01737	PASS
	20°C/3.8 V	0.01793	0.01496	PASS
	30°C/3.8 V	0.01657	0.01883	PASS
	40°C/3.8 V	0.01825	0.01617	PASS
	50°C/3.8 V	0.01860	0.01246	PASS
	55°C/3.8 V	0.02234	0.01695	PASS
	20°C/3.6 V	0.01624	0.00836	PASS
	20°C/4.3 V	0.01830	0.00862	PASS
5MHz	-10°C/3.8 V	0.00473	0.00647	PASS
	0°C/3.8 V	0.00918	0.01418	PASS
	10°C/3.8 V	0.01082	0.01868	PASS
	20°C/3.8 V	0.00947	0.00894	PASS
	30°C/3.8 V	0.00653	0.01764	PASS
	40°C/3.8 V	0.00427	0.01428	PASS
	50°C/3.8 V	0.00940	0.01119	PASS
	55°C/3.8 V	0.00782	0.01745	PASS
	20°C/3.6 V	0.00925	0.01107	PASS
	20°C/4.3 V	0.01418	0.00562	PASS
10MHz	-10°C/3.8 V	0.00572	0.01196	PASS
	0°C/3.8 V	0.00863	0.01137	PASS
	10°C/3.8 V	0.00538	0.00967	PASS
	20°C/3.8 V	0.01140	0.00959	PASS
	30°C/3.8 V	0.00776	0.01377	PASS
	40°C/3.8 V	0.01162	0.00816	PASS



	50°C/3.8 V	0.00782	0.00887	PASS
	55°C/3.8 V	0.00583	0.00728	PASS
	20°C/3.6 V	0.00922	0.00767	PASS
	20°C/4.3 V	0.00749	0.00853	PASS

5.6. Spurious Emissions at Antenna Terminals

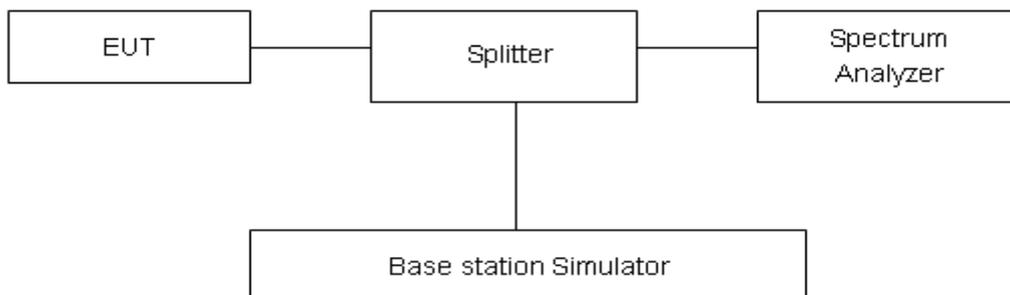
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

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 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz, 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
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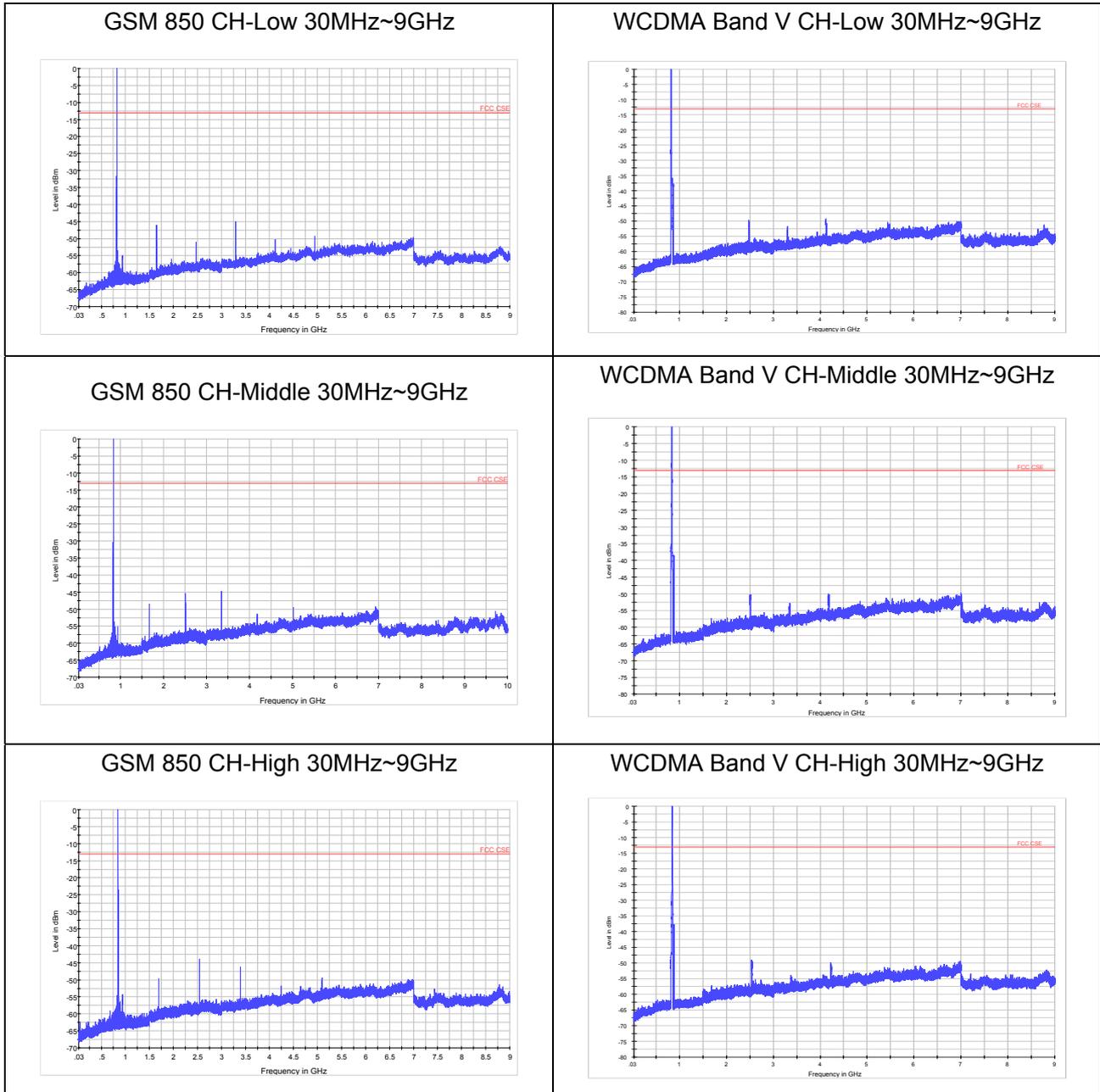
Measurement Uncertainty

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

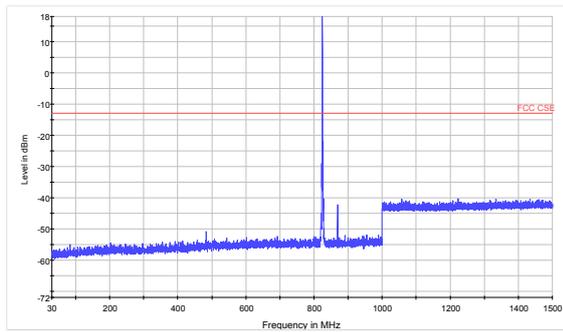
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB

Test Result

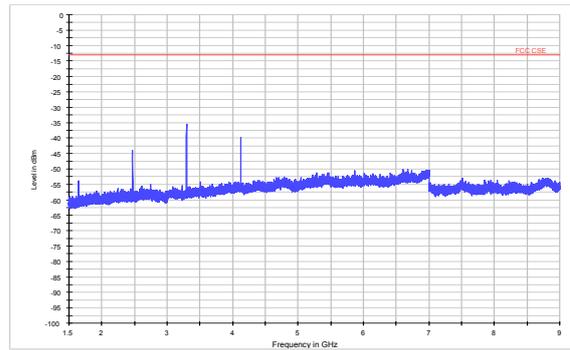
If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.
The signal beyond the limit is carrier.



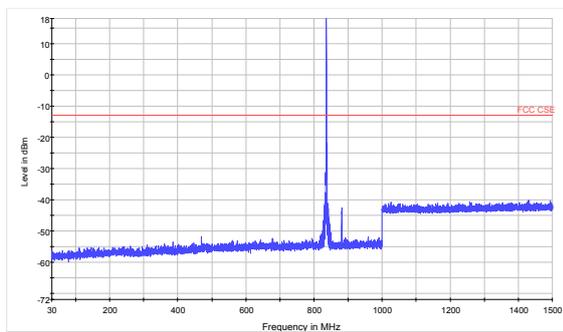
LTE Band 5 1.4MHz CH-Low 30MHz~1.5GHz



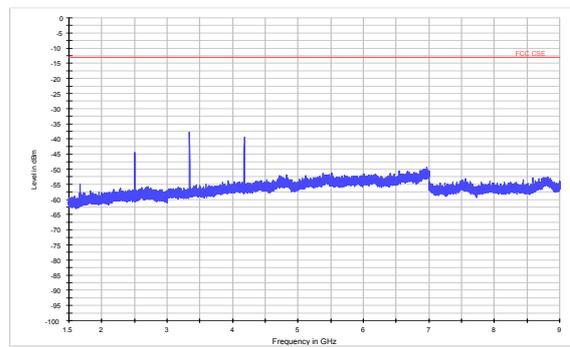
LTE Band 5 1.4MHz CH-Low 1.5GHz~9GHz



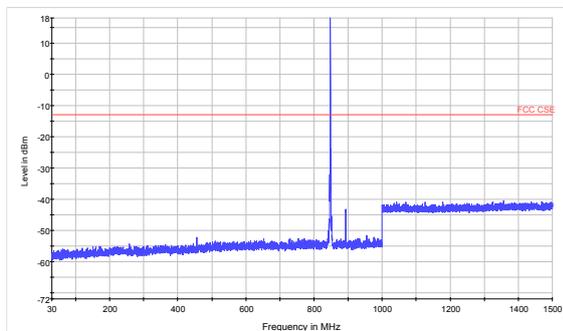
LTE Band 5 1.4MHz CH-Middle 30MHz~1.5GHz



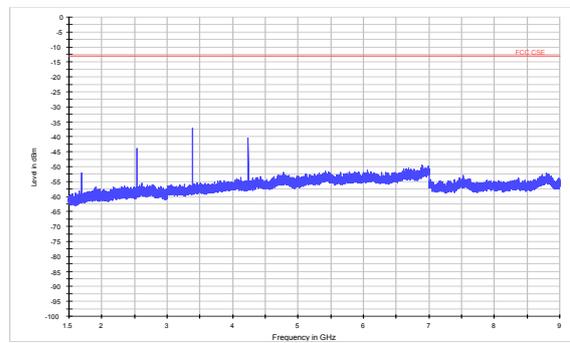
LTE Band 5 1.4MHz CH-Middle 1.5GHz~9GHz



LTE Band 5 1.4MHz CH-High 30MHz~1.5GHz

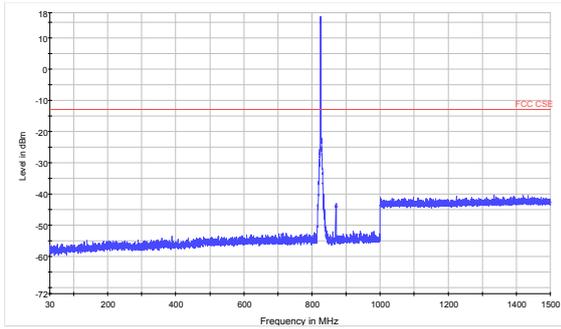


LTE Band 5 1.4MHz CH-High 1.5GHz~9GHz

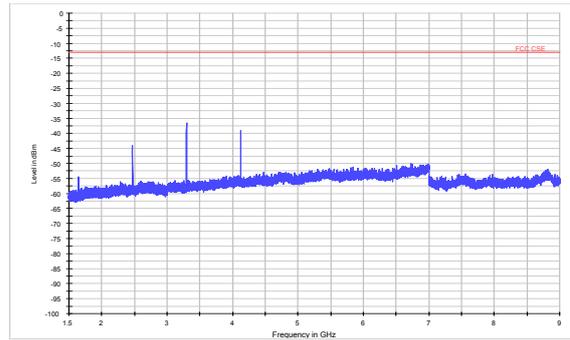




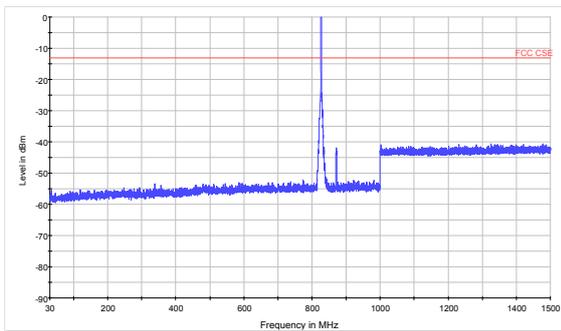
LTE Band 5 3MHz CH-Low 30MHz~1.5GHz



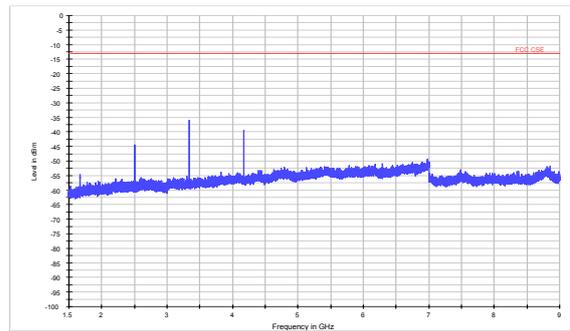
LTE Band 5 3MHz CH-Low 1.5GHz~9GHz



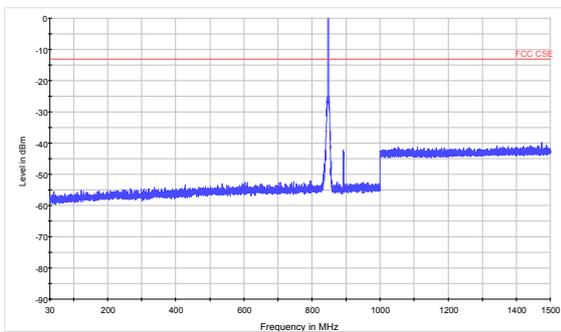
LTE Band 5 3MHz CH-Middle 30MHz~1.5GHz



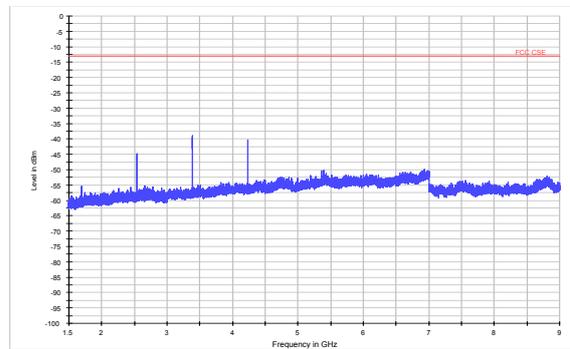
LTE Band 5 3MHz CH-Middle 1.5GHz~9GHz



LTE Band 5 3MHz CH-High 30MHz~1.5GHz

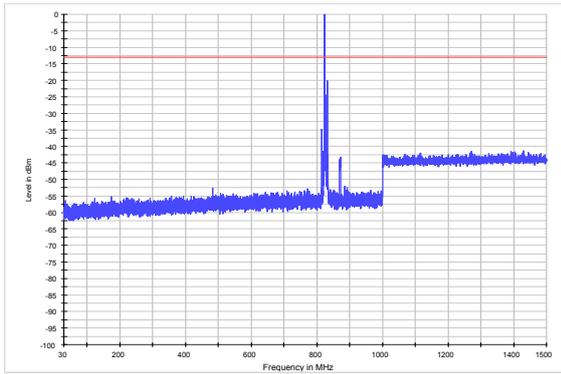


LTE Band 5 3MHz CH-High 1.5GHz~9GHz

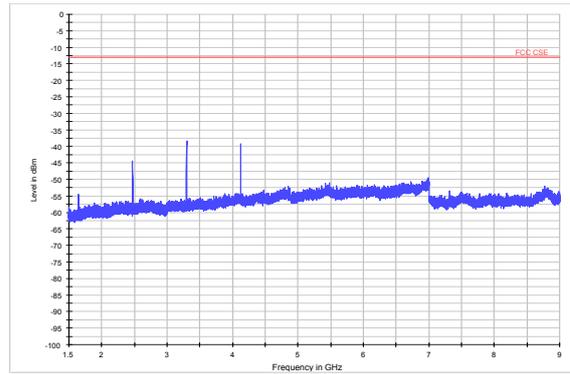




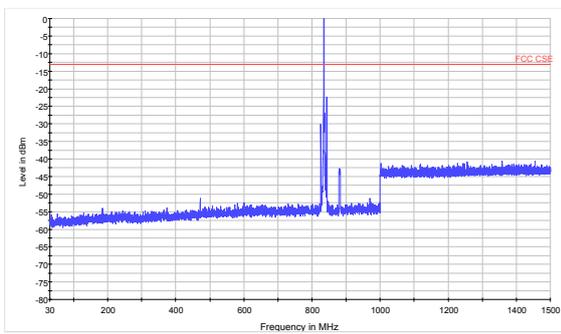
LTE Band 5 5MHz CH-Low 30MHz~1.5GHz



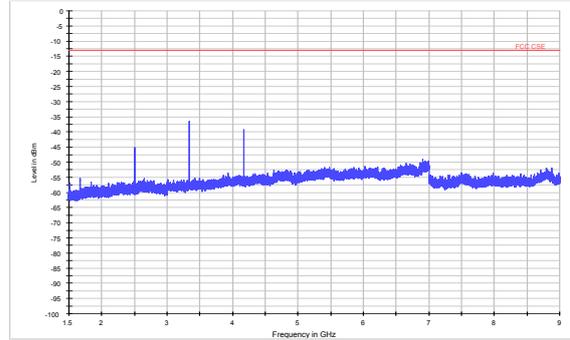
LTE Band 5 5MHz CH-Low 1.5GHz~9GHz



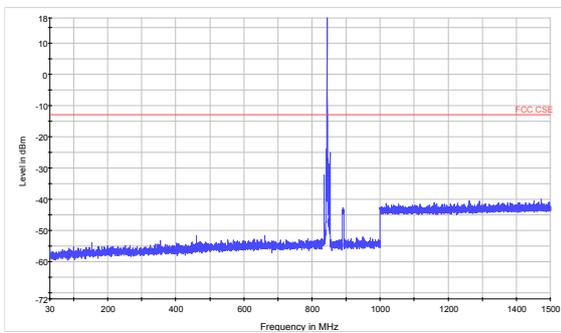
LTE Band 5 5MHz CH-Middle 30MHz~1.5GHz



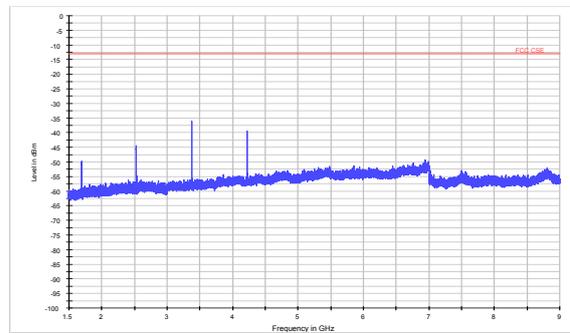
LTE Band 5 5MHz CH-Middle 1.5GHz~9GHz



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

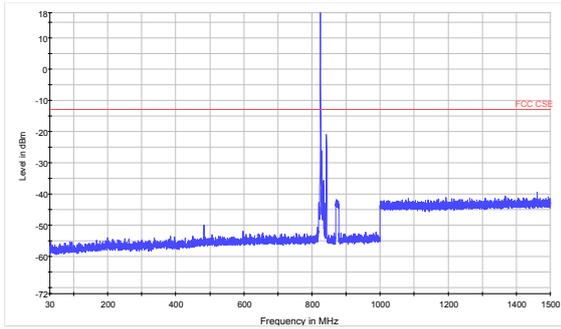


LTE Band 5 5MHz CH-High 1.5GHz~9GHz

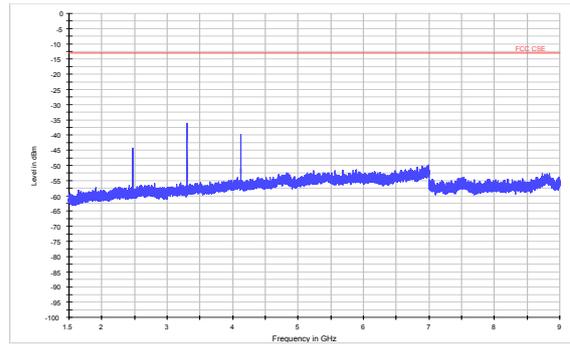




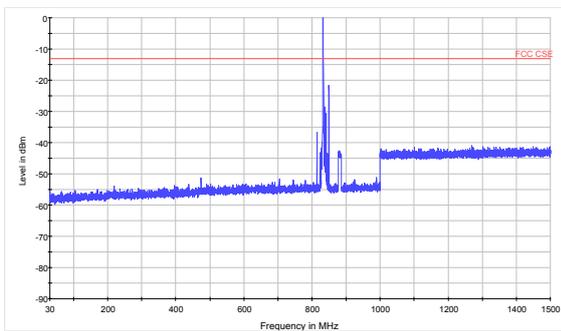
LTE Band 5 10MHz CH-Low 30MHz~1.5GHz



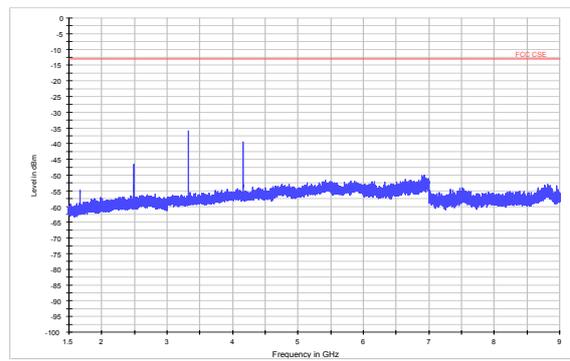
LTE Band 5 10MHz CH-Low 1.5GHz~9GHz



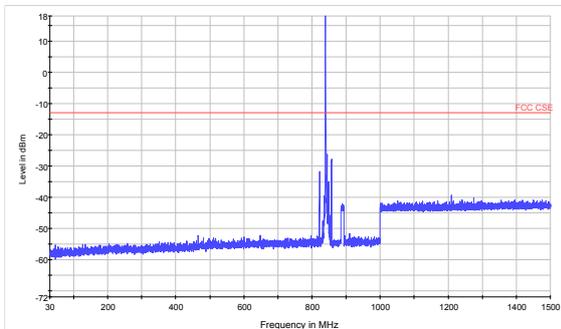
LTE Band 5 10MHz CH-Middle 30MHz~1.5GHz



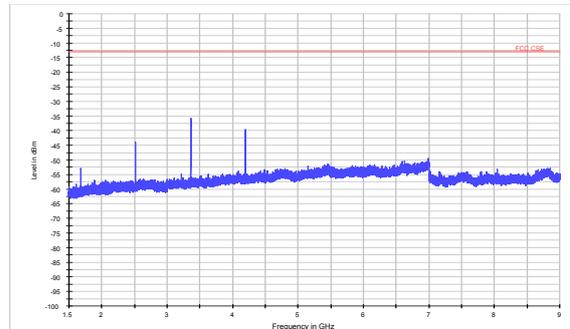
LTE Band 5 10MHz CH-Middle 1.5GHz~9GHz



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



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



5.7. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The measurements procedures in TIA -603-D are used.

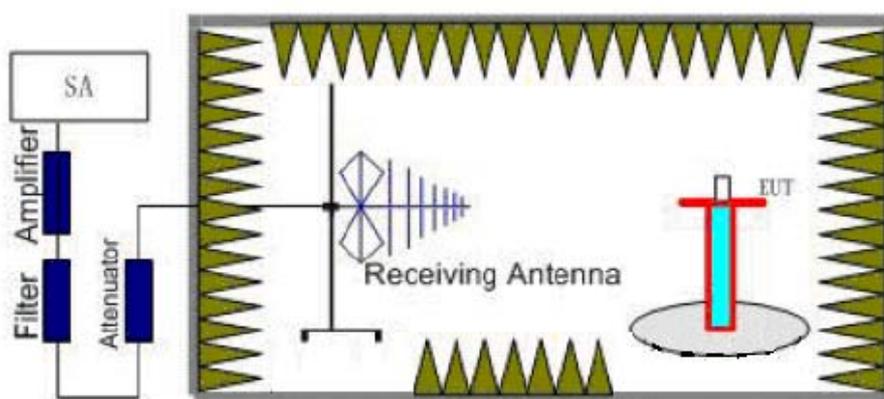
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The emissions less than 20 dB below the permissible value are reported.

The procedure of Radiates Spurious Emission is as follows:

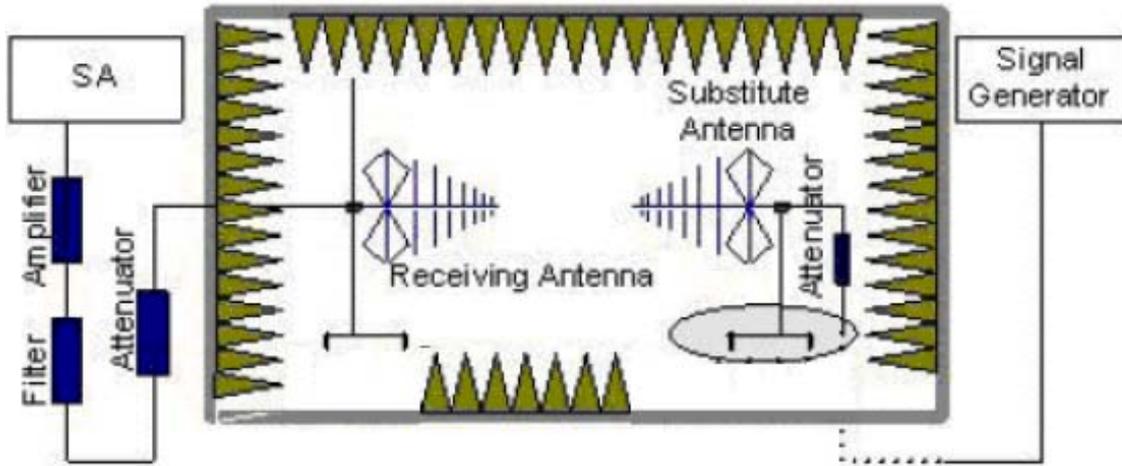
Step 1:

The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 1.5 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 100kHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:

A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL). Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



$$E.R.P \text{ (peak power)} = S.G. - Tx \text{ Cable loss} + \text{Substitution antenna gain} - 2.15.$$

$$EIRP = E.R.P + 2.15$$

Limits

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

Limit	-13 dBm
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Measurement Uncertainty

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

**Test Result**

Receiver antenna polarization (horizontal and vertical), the worst emission was found in vertical polarization, and the worst case in vertical polarization was recorded.

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	-61.73	2	10.15	Vertical	-53.58	-13.00	40.58	0
3	2473	-51.50	2.51	11.35	Vertical	-42.66	-13.00	29.66	225
4	3297	-57.70	4.2	10.85	Vertical	-51.05	-13.00	38.05	225
5	4121	-59.38	5.2	11.35	Vertical	-53.23	-13.00	40.23	45
6	4945	-60.96	5.5	11.95	Vertical	-54.51	-13.00	41.51	180
7	5769	-61.34	5.7	13.55	Vertical	-53.49	-13.00	40.49	90
8	6594	-59.39	6.3	13.75	Vertical	-51.94	-13.00	38.94	225
9	7418	-59.32	6.8	13.85	Vertical	-52.27	-13.00	39.27	270
10	8242	-58.87	6.9	14.25	Vertical	-51.52	-13.00	38.52	180

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

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	-61.15	2	10.75	Vertical	-52.40	-13.00	39.40	90
3	2510	-49.34	2.51	11.05	Vertical	-40.80	-13.00	27.80	225
4	3346	-63.07	4.2	11.15	Vertical	-56.12	-13.00	43.12	135
5	4183	-60.26	5.2	11.15	Vertical	-54.31	-13.00	41.31	0
6	5020	-59.56	5.5	11.95	Vertical	-53.11	-13.00	40.11	45
7	5856	-61.66	5.7	13.55	Vertical	-53.81	-13.00	40.81	90
8	6693	-59.50	6.3	13.75	Vertical	-52.05	-13.00	39.05	180
9	7529	-60.82	6.8	13.85	Vertical	-53.77	-13.00	40.77	90
10	8366	-60.08	6.9	14.25	Vertical	-52.73	-13.00	39.73	225

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



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	1698	-63.77	2	10.15	Vertical	-55.62	-13.00	42.62	315
3	2546	-54.88	2.51	11.05	Vertical	-46.34	-13.00	33.34	315
4	3395	-62.81	4.2	11.15	Vertical	-55.86	-13.00	42.86	270
5	4244	-61.27	5.2	11.15	Vertical	-55.32	-13.00	42.32	0
6	5093	-60.76	5.5	11.95	Vertical	-54.31	-13.00	41.31	180
7	5942	-60.86	5.7	13.55	Vertical	-53.01	-13.00	40.01	90
8	6790	-60.86	6.3	13.75	Vertical	-53.41	-13.00	40.41	225
9	7639	-61.48	6.8	13.85	Vertical	-54.43	-13.00	41.43	270
10	8488	-61.09	6.9	14.25	Vertical	-53.74	-13.00	40.74	135

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	-60.99	2	10.15	Vertical	-52.84	-13.00	39.84	180
3	2479	-56.09	2.51	11.35	Vertical	-47.25	-13.00	34.25	90
4	3306	-61.77	4.2	10.85	Vertical	-55.12	-13.00	42.12	0
5	4132	-61.15	5.2	11.35	Vertical	-55.00	-13.00	42.00	270
6	4958	-61.30	5.5	11.95	Vertical	-54.85	-13.00	41.85	315
7	5785	-61.23	5.7	13.55	Vertical	-53.38	-13.00	40.38	180
8	6611	-59.38	6.3	13.75	Vertical	-51.93	-13.00	38.93	270
9	7438	-59.52	6.8	13.85	Vertical	-52.47	-13.00	39.47	135
10	8786	-56.37	6.9	14.25	Vertical	-49.02	-13.00	36.02	90

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



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	-62.07	2	10.75	Vertical	-53.32	-13.00	40.32	225
3	2507	-61.32	2.51	11.05	Vertical	-52.78	-13.00	39.78	225
4	3346	-63.38	4.2	11.15	Vertical	-56.43	-13.00	43.43	0
5	4183	-59.09	5.2	11.15	Vertical	-53.14	-13.00	40.14	270
6	5020	-61.55	5.5	11.95	Vertical	-55.10	-13.00	42.10	315
7	5856	-61.01	5.7	13.55	Vertical	-53.16	-13.00	40.16	225
8	6693	-59.19	6.3	13.75	Vertical	-51.74	-13.00	38.74	135
9	8366	-61.06	6.8	13.85	Vertical	-54.01	-13.00	41.01	270
10	3346	-63.78	6.9	14.25	Vertical	-56.43	-13.00	43.43	0

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

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	1693	-60.40	2	10.15	Vertical	-52.25	-13.00	39.25	135
3	2544	-60.26	2.51	11.05	Vertical	-51.72	-13.00	38.72	315
4	3386	-60.35	4.2	11.15	Vertical	-53.40	-13.00	40.40	0
5	4233	-61.11	5.2	11.15	Vertical	-55.16	-13.00	42.16	135
6	5080	-60.12	5.5	11.95	Vertical	-53.67	-13.00	40.67	0
7	5926	-61.36	5.7	13.55	Vertical	-53.51	-13.00	40.51	45
8	6773	-60.42	6.3	13.75	Vertical	-52.97	-13.00	39.97	180
9	7619	-58.17	6.8	13.85	Vertical	-51.12	-13.00	38.12	90
10	8466	-60.40	6.9	14.25	Vertical	-53.05	-13.00	40.05	225

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

LTE Band 5 1.4MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1649.4	-68.42	2.00	10.75	vertical	-59.67	-13.00	46.67	225
3	2474.1	-62.24	2.51	11.05	vertical	-53.70	-13.00	40.70	180
4	3297.0	-51.95	4.20	11.15	vertical	-45.00	-13.00	32.00	0
5	4123.5	-63.15	5.20	11.15	vertical	-57.20	-13.00	44.20	90
6	4948.2	-63.09	5.50	11.95	vertical	-56.64	-13.00	43.64	45
7	5772.9	-62.54	5.70	13.55	vertical	-54.69	-13.00	41.69	0
8	6597.6	-60.65	6.30	13.75	vertical	-53.20	-13.00	40.20	135
9	7422.3	-61.43	6.80	13.85	vertical	-54.38	-13.00	41.38	90
10	8247.0	-60.89	6.90	14.25	vertical	-53.54	-13.00	40.54	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 vertical 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	-67.59	2.00	10.75	vertical	-58.84	-13.00	45.84	225
3	2509.5	-62.81	2.51	11.05	vertical	-54.27	-13.00	41.27	180
4	3343.9	-53.11	4.20	11.15	vertical	-46.16	-13.00	33.16	270
5	4182.5	-63.24	5.20	11.15	vertical	-57.29	-13.00	44.29	270
6	5019.0	-62.60	5.50	11.95	vertical	-56.15	-13.00	43.15	45
7	5855.5	-62.99	5.70	13.55	vertical	-55.14	-13.00	42.14	225
8	6692.0	-60.04	6.30	13.75	vertical	-52.59	-13.00	39.59	90
9	7528.5	-62.12	6.80	13.85	vertical	-55.07	-13.00	42.07	135
10	8365.0	-60.91	6.90	14.25	vertical	-53.56	-13.00	40.56	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 1.4MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1696.6	-66.83	2.00	10.75	vertical	-58.08	-13.00	45.08	180
3	2543.3	-62.46	2.51	11.05	vertical	-53.92	-13.00	40.92	270
4	3391.1	-59.86	4.20	11.15	vertical	-52.91	-13.00	39.91	0
5	4241.5	-63.92	5.20	11.15	vertical	-57.97	-13.00	44.97	135
6	5089.8	-63.54	5.50	11.95	vertical	-57.09	-13.00	44.09	225
7	5938.1	-62.14	5.70	13.55	vertical	-54.29	-13.00	41.29	180
8	6786.4	-59.11	6.30	13.75	vertical	-51.66	-13.00	38.66	135
9	7634.7	-62.75	6.80	13.85	vertical	-55.70	-13.00	42.70	315
10	8483.0	-61.46	6.90	14.25	vertical	-54.11	-13.00	41.11	315

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

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

LTE Band 5 3MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1648.3	-52.15	2.00	10.75	vertical	-43.40	-13.00	30.40	45
3	2472.6	-62.78	2.51	11.05	vertical	-54.24	-13.00	41.24	225
4	3297.0	-50.61	4.20	11.15	vertical	-43.66	-13.00	30.66	0
5	4127.5	-63.15	5.20	11.15	vertical	-57.20	-13.00	44.20	135
6	4953.0	-62.75	5.50	11.95	vertical	-56.30	-13.00	43.30	180
7	5778.5	-62.83	5.70	13.55	vertical	-54.98	-13.00	41.98	270
8	6604.0	-59.27	6.30	13.75	vertical	-51.82	-13.00	38.82	270
9	7429.5	-63.32	6.80	13.85	vertical	-56.27	-13.00	43.27	90
10	8255.0	-60.51	6.90	14.25	vertical	-53.16	-13.00	40.16	315

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

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

LTE Band 5 3MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1670.3	-52.54	2.00	10.75	vertical	-43.79	-13.00	30.79	45
3	2509.5	-62.62	2.51	11.05	vertical	-54.08	-13.00	41.08	45
4	3340.5	-55.15	4.20	11.15	vertical	-48.20	-13.00	35.20	270
5	4182.5	-63.85	5.20	11.15	vertical	-57.90	-13.00	44.90	270
6	5019.0	-62.77	5.50	11.95	vertical	-56.32	-13.00	43.32	270
7	5855.5	-63.53	5.70	13.55	vertical	-55.68	-13.00	42.68	90
8	6692.0	-60.10	6.30	13.75	vertical	-52.65	-13.00	39.65	90
9	7528.5	-62.37	6.80	13.85	vertical	-55.32	-13.00	42.32	135
10	8365.0	-59.54	6.90	14.25	vertical	-52.19	-13.00	39.19	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 3MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1692.5	-55.25	2.00	10.75	vertical	-46.50	-13.00	33.50	45
3	2538.8	-60.55	2.51	11.05	vertical	-52.01	-13.00	39.01	270
4	3384.4	-60.78	4.20	11.15	vertical	-53.83	-13.00	40.83	180
5	4237.5	-64.15	5.20	11.15	vertical	-58.20	-13.00	45.20	90
6	5085.0	-62.55	5.50	11.95	vertical	-56.10	-13.00	43.10	90
7	5932.5	-64.08	5.70	13.55	vertical	-56.23	-13.00	43.23	90
8	6780.0	-59.45	6.30	13.75	vertical	-52.00	-13.00	39.00	180
9	7627.5	-62.69	6.80	13.85	vertical	-55.64	-13.00	42.64	90
10	8475.0	-59.26	6.90	14.25	vertical	-51.91	-13.00	38.91	45

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	1649.6	-57.35	2.00	10.75	vertical	-48.60	-13	35.60	90
3	2476.3	-62.18	2.51	11.05	vertical	-53.64	-13.00	40.64	315
4	3297.4	-51.87	4.20	11.15	vertical	-44.92	-13.00	31.92	0
5	4132.5	-64.61	5.20	11.15	vertical	-58.66	-13.00	45.66	135
6	4959.0	-62.49	5.50	11.95	vertical	-56.04	-13.00	43.04	270
7	5785.5	-63.92	5.70	13.55	vertical	-56.07	-13.00	43.07	270
8	6612.0	-58.81	6.30	13.75	vertical	-51.36	-13.00	38.36	45
9	7438.5	-63.45	6.80	13.85	vertical	-56.40	-13.00	43.40	225
10	8265.0	-60.02	6.90	14.25	vertical	-52.67	-13.00	39.67	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-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	-67.97	2.00	10.75	vertical	-59.22	-13.00	46.22	270
3	2509.5	-61.90	2.51	11.05	vertical	-53.36	-13.00	40.36	135
4	3337.1	-54.72	4.20	11.15	vertical	-47.77	-13.00	34.77	45
5	4182.5	-64.57	5.20	11.15	vertical	-58.62	-13.00	45.62	90
6	5019.0	-62.95	5.50	11.95	vertical	-56.50	-13.00	43.50	270
7	5855.5	-64.89	5.70	13.55	vertical	-57.04	-13.00	44.04	135
8	6692.0	-59.74	6.30	13.75	vertical	-52.29	-13.00	39.29	90
9	7528.5	-62.48	6.80	13.85	vertical	-55.43	-13.00	42.43	315
10	8365.0	-60.70	6.90	14.25	vertical	-53.35	-13.00	40.35	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-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	-68.24	2.00	10.75	vertical	-59.49	-13.00	46.49	225
3	2532.8	-61.70	2.51	11.05	vertical	-53.16	-13.00	40.16	270
4	3377.3	-58.46	4.20	11.15	vertical	-51.51	-13.00	38.51	315
5	4232.5	-64.10	5.20	11.15	vertical	-58.15	-13.00	45.15	315
6	5079.0	-62.02	5.50	11.95	vertical	-55.57	-13.00	42.57	270
7	5925.5	-65.20	5.70	13.55	vertical	-57.35	-13.00	44.35	90
8	6772.0	-59.77	6.30	13.75	vertical	-52.32	-13.00	39.32	90
9	7618.5	-62.20	6.80	13.85	vertical	-55.15	-13.00	42.15	135
10	8465.0	-59.76	6.90	14.25	vertical	-52.41	-13.00	39.41	270

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	-54.25	2.00	10.75	vertical	-45.50	-13	32.50	90
3	2473.9	-63.22	2.51	11.05	vertical	-54.68	-13.00	41.68	225
4	3298.1	-52.39	4.20	11.15	vertical	-45.44	-13.00	32.44	0
5	4145.0	-63.80	5.20	11.15	vertical	-57.85	-13.00	44.85	45
6	4974.0	-62.15	5.50	11.95	vertical	-55.70	-13.00	42.70	225
7	5803.0	-64.22	5.70	13.55	vertical	-56.37	-13.00	43.37	90
8	6632.0	-60.75	6.30	13.75	vertical	-53.30	-13.00	40.30	225
9	7461.0	-63.16	6.80	13.85	vertical	-56.11	-13.00	43.11	90
10	8290.0	-59.19	6.90	14.25	vertical	-51.84	-13.00	38.84	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	-50.95	2.00	10.75	vertical	-42.20	-13	29.20	45
3	2509.5	-61.52	2.51	11.05	vertical	-52.98	-13.00	39.98	225
4	3328.1	-56.35	4.20	11.15	vertical	-49.40	-13.00	36.40	45
5	4182.5	-63.63	5.20	11.15	vertical	-57.68	-13.00	44.68	180
6	5019.0	-61.66	5.50	11.95	vertical	-55.21	-13.00	42.21	135
7	5855.5	-63.55	5.70	13.55	vertical	-55.70	-13.00	42.70	135
8	6692.0	-61.02	6.30	13.75	vertical	-53.57	-13.00	40.57	90
9	7528.5	-62.37	6.80	13.85	vertical	-55.32	-13.00	42.32	45
10	8365.0	-58.75	6.90	14.25	vertical	-51.40	-13.00	38.40	270

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	-69.12	2.00	10.75	vertical	-60.37	-13.00	47.37	180
3	2532.0	-61.78	2.51	11.05	vertical	-53.24	-13.00	40.24	270
4	3358.1	-52.87	4.20	11.15	vertical	-45.92	-13.00	32.92	270
5	4220.0	-63.98	5.20	11.15	vertical	-58.03	-13.00	45.03	315
6	5064.0	-61.19	5.50	11.95	vertical	-54.74	-13.00	41.74	270
7	5908.0	-63.81	5.70	13.55	vertical	-55.96	-13.00	42.96	270
8	6752.0	-60.04	6.30	13.75	vertical	-52.59	-13.00	39.59	270
9	7596.0	-62.10	6.80	13.85	vertical	-55.05	-13.00	42.05	90
10	8440.0	-57.77	6.90	14.25	vertical	-50.42	-13.00	37.42	45

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	NA	NA
Spectrum Analyzer	N9010A	Agilent	MY47191109	2016-05-21	2017-05-20
Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2015-12-17	2016-12-16
Signal Analyzer	FSV30	R&S	100815	2015-12-17	2016-12-16
EMI Test Receiver	ESCI	R&S	100948	2016-05-21	2017-05-20
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	2016-05-09	2016-07-08

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