



# RF TEST REPORT

**Applicant** ZTE Coporation  
**FCC ID** SRQ-Z815  
**Product** LTE/WCDMA/GSM Multi-Mode Digital  
Mobile Phone  
**Model** Z815  
**Report No.** RXC1512-0230RF02R2  
**Issue Date** March 15,2016

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2/ FCC CFR 47 Part 24H**. 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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### Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	24.232	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	24.238	PASS
5	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 24.235	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 24.238	PASS
8	Radiates Spurious Emission	2.1053 / 24.238	PASS
Date of Testing: January 8, 2016~ February 5, 2016 and March 8, 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.  
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## 2. General Description of Equipment under Test

### Client Information

<b>Applicant</b>	ZTE Coporation
<b>Applicant address</b>	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District Shenzhen, Guangdong, P.R.China
<b>Manufacturer</b>	ZTE Coporation
<b>Manufacturer address</b>	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District Shenzhen, Guangdong, P.R.China

### General information

Model:	Z815		
Product MEID:	869278020003663		
Hardware Version:	u50A		
Software Version:	Z815V0.0.0B01		
Power Supply:	Battery/AC adapter		
Antenna Type:	Internal Antenna		
Test Mode(s):	GSM1900; WCDMA Band II; LTE Band 2;		
Test Modulation:	(GSM)GMSK,8PSK; (WCDMA)QPSK; (LTE)QPSK,16QAM		
GPRS/EGPRS Multislot Class:	10		
WCDMA Downlink UE Category:	14		
WCDMA Uplink UE Category:	6		
Maximum E.I.R.P.	GSM 1900: 29.27 dBm WCDMA Band II: 22.97dBm LTE Band 2: 22.78dBm		
Rated Power Supply Voltage:	3.84V		
Extreme Voltage:	Minimum: 3.6V Maximum: 4.4V		
Extreme Temperature:	Lowest: -10°C Highest: +60°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850 ~ 1910	1930 ~ 1990
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
EUT Accessory			
Battery	Manufacturer: SCUD(FUJIAN)ELECTRONICS Model: Li3922T44P6h903546 Power Rating: DC 3.84V, Li-ion		
Adapter	Manufacturer: RUIDE Model: STC-A51A-Z		
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 (2014)**

**FCC CFR 47 Part 24H (2014)**

**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 and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

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

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

	Test items	Modes/Modulation	
		GSM 1900	WCDMA Band V
Conducted Test cases	RF power output	GSM /GPRS /EGPRS	RMC HSDPA/ HSUPA DC-HSDPA
	Occupied Bandwidth	GSM /GPRS /EGPRS	HSDPA
	Band Edge Compliance	GSM /GPRS /EGPRS	HSDPA
	Peak-to-Average Power Ratio	GSM /GPRS /EGPRS	HSDPA
	Frequency Stability	GSM /GPRS /EGPRS	HSDPA
	Spurious Emissions at Antenna Terminals	GSM	HSDPA
Radiated Test cases	Effective Radiated Power	GSM /GPRS /EGPRS	HSDPA
	Radiates Spurious Emission	GSM	HSDPA



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

Test items	Bandwidth (MHz)						Modulation		RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	O	O	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	O	O
Occupied Bandwidth	O	O	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	O	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	O	O	O	O	O	O	O	O	-	-	O	-	O	-
Conducted Spurious Emissions	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	O	O	O	O	O	O	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

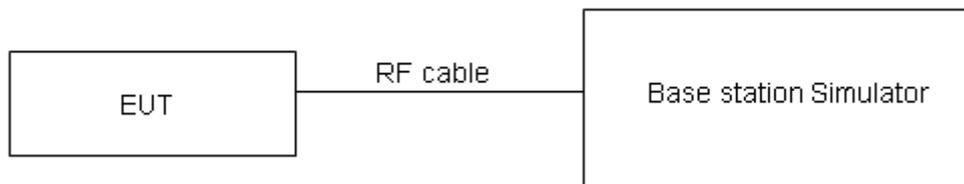
#### Ambient condition

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 1900		Conducted Power(dBm)		
		Channel 512	Channel 661	Channel 810
		1850.2(MHz)	1880(MHz)	1909.8(MHz)
GSM	Results	30.22	30.11	30.26
GPRS (GMSK)	1TXslot	<b>30.01</b>	<b>29.91</b>	<b>30.04</b>
	2TXslots	28.04	27.83	27.96
EGPRS (8PSK)	1TXslot	<b>25.78</b>	<b>25.73</b>	<b>25.76</b>
	2TXslots	25.69	25.64	25.71

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 II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
<b>RMC</b>		23.62	23.74	23.76
<b>HSDPA</b>	Sub - Test 1	23.50	23.62	23.76
	Sub - Test 2	23.58	23.57	23.82
	Sub - Test 3	23.61	23.79	23.76
	Sub - Test 4	<b>23.52</b>	<b>23.85</b>	<b>23.77</b>
<b>HSUPA</b>	Sub - Test 1	22.49	22.71	22.57
	Sub - Test 2	21.17	21.41	21.26
	Sub - Test 3	21.91	22.02	21.74
	Sub - Test 4	21.20	21.48	21.21
	Sub - Test 5	22.55	22.74	22.73
<b>DC-HSDPA</b>	Sub - Test 1	23.43	23.50	23.62
	Sub - Test 2	23.37	23.46	23.57
	Sub - Test 3	23.21	23.27	23.47
	Sub - Test 4	23.24	23.31	23.50
<b>HSDPA+</b>	Sub - Test 1	23.19	23.31	23.44
	Sub - Test 2	23.25	23.24	23.48
	Sub - Test 3	22.93	23.08	23.14
	Sub - Test 4	22.79	23.04	23.03
<b>HSUPA+</b>	Sub - Test 1	22.79	22.79	22.94
	Sub - Test 2	21.17	21.38	21.24
	Sub - Test 3	21.89	21.97	21.72
	Sub - Test 4	21.17	21.52	21.17
	Sub - Test 5	22.52	22.78	22.69

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

LTE FDD Band 2				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	23.73	23.80	23.49
		1	2	23.69	23.90	23.61
		1	5	23.64	23.67	23.77
		3	0	22.61	22.76	22.67
		3	2	22.84	22.66	22.75
		3	3	22.81	22.84	22.53
	16QAM	6	0	22.66	22.64	22.68
		1	0	22.51	22.75	22.37
		1	2	22.77	22.95	22.65
		1	5	22.42	22.94	22.16
		3	0	22.15	22.59	22.15
		3	2	22.03	22.48	22.14
		3	3	22.04	22.31	22.17
		6	0	21.65	22.93	21.64
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	23.65	23.72	23.41
		1	7	23.61	23.82	23.53
		1	14	23.56	23.69	23.69
		8	0	22.62	22.66	22.52
		8	4	22.55	22.46	22.52
		8	7	22.52	22.44	22.53
		15	0	22.58	22.56	22.60
	16QAM	1	0	22.42	22.67	22.29
		1	7	22.68	22.97	22.57
		1	14	22.34	22.86	22.08
		8	0	21.54	22.64	21.54
		8	4	21.41	22.51	21.53
		8	7	21.43	22.43	21.56
		15	0	21.57	22.85	21.56



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	23.66	23.73	23.42
		1	13	23.62	23.83	23.54
		1	24	23.57	23.70	23.70
		12	0	22.63	22.67	22.53
		12	6	22.56	22.47	22.53
		12	13	22.53	22.45	22.54
		25	0	22.59	22.57	22.61
	16QAM	1	0	22.43	22.68	22.30
		1	13	22.69	22.97	22.58
		1	24	22.35	22.87	22.09
		12	0	21.55	22.65	21.55
		12	6	21.42	22.52	21.54
		12	13	21.44	22.44	21.57
		25	0	21.58	22.86	21.57
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.68	23.75	23.44
		1	25	23.64	23.85	23.56
		1	49	23.59	23.72	23.72
		25	0	22.65	22.69	22.55
		25	13	22.58	22.49	22.55
		25	25	22.55	22.47	22.56
		50	0	22.61	22.59	22.63
	16QAM	1	0	22.45	22.70	22.32
		1	25	22.71	22.90	22.60
		1	49	22.37	22.89	22.11
		25	0	21.57	22.67	21.57
		25	13	21.44	22.54	21.56
		25	25	21.46	22.46	21.59
		50	0	21.60	22.88	21.59
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5



15MHz	QPSK	1	0	23.71	23.78	23.47
		1	38	23.67	23.88	23.59
		1	74	23.62	23.75	23.75
		36	0	22.68	22.72	22.58
		36	18	22.61	22.52	22.58
		36	39	22.58	22.50	22.59
		75	0	22.64	22.62	22.66
	16QAM	1	0	22.48	22.73	22.35
		1	38	22.74	22.95	22.63
		1	74	22.40	22.92	22.14
		36	0	21.60	22.70	21.60
		36	18	21.47	22.57	21.59
		36	39	21.49	22.49	21.62
		75	0	21.63	22.91	21.62
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	23.72	23.79	23.48
		1	50	23.68	23.89	23.60
		1	99	23.63	23.76	23.76
		50	0	22.69	22.73	22.59
		50	25	22.62	22.53	22.59
		50	50	22.59	22.51	22.60
		100	0	22.65	22.63	22.67
	16QAM	1	0	22.49	22.74	22.36
		1	50	22.75	22.94	22.64
		1	99	22.41	22.93	22.15
		50	0	21.61	22.71	21.61
		50	25	21.48	22.58	21.60
		50	50	21.50	22.50	21.63
		100	0	21.64	22.92	21.63

Note:

1) The following testing in worst case based on the maximum RF Output Power.

## 5.2. Effective Isotropic Radiated Power

### Ambient condition

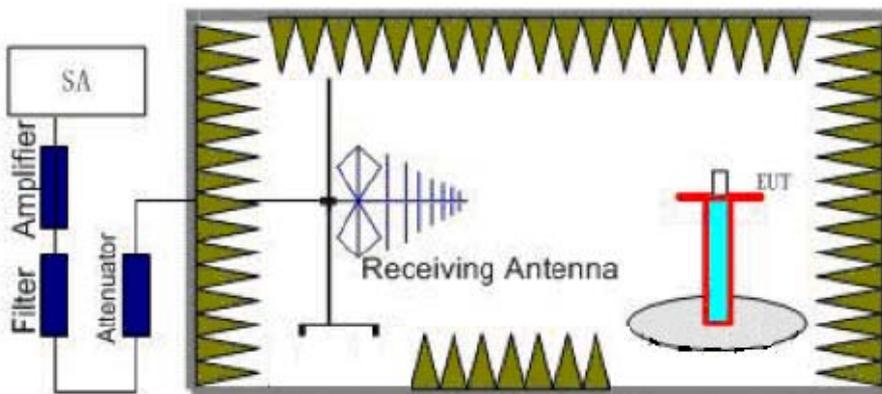
Temperature	Relative humidity
21°C ~25°C	40%~60%

### 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.

### Test Setup



### Limits



Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts EIRP. Peak power" and Rule Part 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage".

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

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



## Test Results:

Mode	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Limit (dBm)	Conclusion
GSM 1900	H	1850.2	-28.08	-55.38	0	1.92	29.22	33	Pass
	H	1880	-28.66	-55.84	0	1.94	29.12	33	Pass
	H	1909.8	-28.41	-55.78	0	1.90	29.27	33	Pass
	V	1850.2	-29.05	-56.18	0	1.92	29.05	33	Pass
	V	1880	-29.52	-56.61	0	1.94	29.03	33	Pass
	V	1909.8	-29.40	-56.64	0	1.90	29.14	33	Pass
GPRS 1900	H	1850.2	-30.90	-55.38	0	1.92	26.40	33	Pass
	H	1880	-30.51	-55.84	0	1.94	27.27	33	Pass
	H	1909.8	-29.83	-55.78	0	1.90	27.85	33	Pass
	V	1850.2	-31.06	-56.18	0	1.92	27.04	33	Pass
	V	1880	-31.28	-56.61	0	1.94	27.27	33	Pass
	V	1909.8	-31.23	-56.64	0	1.90	27.31	33	Pass
EGPRS 1900	H	1850.2	-32.17	-55.38	0	1.92	25.13	33	Pass
	H	1880	-32.74	-55.84	0	1.94	25.04	33	Pass
	H	1909.8	-32.42	-55.78	0	1.90	25.26	33	Pass
	V	1850.2	-33.08	-56.18	0	1.92	25.02	33	Pass
	V	1880	-33.91	-56.61	0	1.94	24.64	33	Pass
	V	1909.8	-34.05	-56.64	0	1.90	24.49	33	Pass
WCDMA Band II	H	1852.4	-34.20	-55.22	0	1.91	22.93	33	Pass
	H	1880	-35.51	-55.84	0	1.94	22.27	33	Pass
	H	1907.6	-36.15	-55.78	0	1.92	21.55	33	Pass
	V	1852.4	-35.13	-56.19	0	1.91	22.97	33	Pass
	V	1880	-36.46	-56.61	0	1.94	22.09	33	Pass
	V	1907.6	-36.97	-56.77	0	1.92	21.72	33	Pass



LTE Band 2									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	H	1850.7	-34.65	-54.89	0	1.90	22.14	33	Pass
	H	1880	-36.29	-56.66	0	1.92	22.29	33	Pass
	H	1909.3	-37.71	-58.09	0	1.91	22.29	33	Pass
	V	1850.7	-34.62	-55.05	0	1.90	22.33	33	Pass
	V	1880	-35.55	-56.41	0	1.92	22.78	33	Pass
	V	1909.3	-37.05	-57.85	0	1.91	22.71	33	Pass
1.4 MHz (16QAM)	H	1850.7	-35.38	-54.89	0	1.90	21.41	33	Pass
	H	1880	-37.43	-56.66	0	1.92	21.15	33	Pass
	H	1909.3	-38.25	-58.09	0	1.91	21.75	33	Pass
	V	1850.7	-35.26	-55.05	0	1.90	21.69	33	Pass
	V	1880	-36.55	-56.41	0	1.92	21.78	33	Pass
	V	1909.3	-38.11	-57.85	0	1.91	21.65	33	Pass
3 MHz (QPSK)	H	1851.5	-34.68	-54.93	0	1.91	22.16	33	Pass
	H	1880	-37.03	-56.66	0	1.94	21.57	33	Pass
	H	1908.5	-38.02	-58.08	0	1.91	21.97	33	Pass
	V	1851.5	-35.14	-55.04	0	1.91	21.81	33	Pass
	V	1880	-36.92	-56.41	0	1.94	21.43	33	Pass
	V	1908.5	-38.59	-57.86	0	1.91	21.18	33	Pass
3 MHz (16QAM)	H	1851.5	-35.72	-54.93	0	1.91	21.12	33	Pass
	H	1880	-38.46	-56.66	0	1.94	20.14	33	Pass
	H	1908.5	-39.75	-58.08	0	1.91	20.24	33	Pass
	V	1851.5	-36.59	-55.04	0	1.91	20.36	33	Pass
	V	1880	-37.78	-56.41	0	1.94	20.57	33	Pass
	V	1908.5	-39.13	-57.86	0	1.91	20.64	33	Pass
5 MHz (QPSK)	H	1852.5	-35.02	-54.98	0	1.92	21.88	33	Pass
	H	1880	-36.74	-56.66	0	1.94	21.86	33	Pass
	H	1907.5	-37.95	-58.05	0	1.90	22.00	33	Pass
	V	1852.5	-34.85	-55.14	0	1.92	22.21	33	Pass
	V	1880	-36.14	-56.41	0	1.94	22.21	33	Pass
	V	1907.5	-37.63	-57.97	0	1.90	22.24	33	Pass
5 MHz (16QAM)	H	1852.5	-36.45	-54.98	0	1.92	20.45	33	Pass
	H	1880	-38.39	-56.66	0	1.94	20.21	33	Pass
	H	1907.5	-39.76	-58.05	0	1.90	20.19	33	Pass
	V	1852.5	-35.32	-55.14	0	1.92	21.74	33	Pass
	V	1880	-36.96	-56.41	0	1.94	21.39	33	Pass
	V	1907.5	-38.31	-57.97	0	1.90	21.56	33	Pass
10 MHz (QPSK)	H	1855	-34.87	-55.09	0	1.91	22.13	33	Pass
	H	1880	-36.56	-56.66	0	1.94	22.04	33	Pass
	H	1905	-37.74	-58.01	0	1.92	22.19	33	Pass



LTE Band 2									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Limit (dBm)	Conclusion
	V	1855	-34.50	-55.08	0	1.91	22.49	33	Pass
	V	1880	-35.92	-56.41	0	1.94	22.43	33	Pass
	V	1905	-37.30	-57.81	0	1.92	22.43	33	Pass
10 MHz (16QAM)	H	1855	-35.55	-55.09	0	1.91	21.45	33	Pass
	H	1880	-37.03	-56.66	0	1.94	21.57	33	Pass
	H	1905	-38.58	-58.01	0	1.92	21.35	33	Pass
	V	1855	-35.31	-55.08	0	1.91	21.68	33	Pass
	V	1880	-37.16	-56.41	0	1.94	21.19	33	Pass
	V	1905	-38.27	-57.81	0	1.92	21.46	33	Pass
15 MHz (QPSK)	H	1857.5	-35.31	-55.23	0	1.93	21.85	33	Pass
	H	1880	-36.66	-56.66	0	1.94	21.94	33	Pass
	H	1902.5	-38.28	-57.95	0	1.92	21.59	33	Pass
	V	1857.5	-35.08	-55.24	0	1.93	22.09	33	Pass
	V	1880	-36.07	-56.41	0	1.94	22.28	33	Pass
	V	1902.5	-36.89	-57.69	0	1.92	22.72	33	Pass
15 MHz (16QAM)	H	1857.5	-37.02	-55.23	0	1.93	20.14	33	Pass
	H	1880	-37.91	-56.66	0	1.94	20.69	33	Pass
	H	1902.5	-39.49	-57.95	0	1.92	20.38	33	Pass
	V	1857.5	-35.85	-55.24	0	1.93	21.32	33	Pass
	V	1880	-36.90	-56.41	0	1.94	21.45	33	Pass
	V	1902.5	-38.37	-57.69	0	1.92	21.24	33	Pass
20 MHz (QPSK)	H	1860	-34.99	-55.35	0	1.93	22.29	33	Pass
	H	1880	-36.67	-56.66	0	1.94	21.93	33	Pass
	H	1900	-37.47	-57.86	0	1.92	22.31	33	Pass
	V	1860	-34.81	-55.31	0	1.93	22.43	33	Pass
	V	1880	-35.91	-56.41	0	1.94	22.44	33	Pass
	V	1900	-37.12	-57.66	0	1.92	22.46	33	Pass
20 MHz (16QAM)	H	1860	-36.13	-55.35	0	1.93	21.15	33	Pass
	H	1880	-38.15	-56.66	0	1.94	20.45	33	Pass
	H	1900	-37.91	-57.86	0	1.92	21.87	33	Pass
	V	1860	-35.59	-55.31	0	1.93	21.65	33	Pass
	V	1880	-36.98	-56.41	0	1.94	21.37	33	Pass
	V	1900	-37.80	-57.66	0	1.92	21.78	33	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 1900,

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

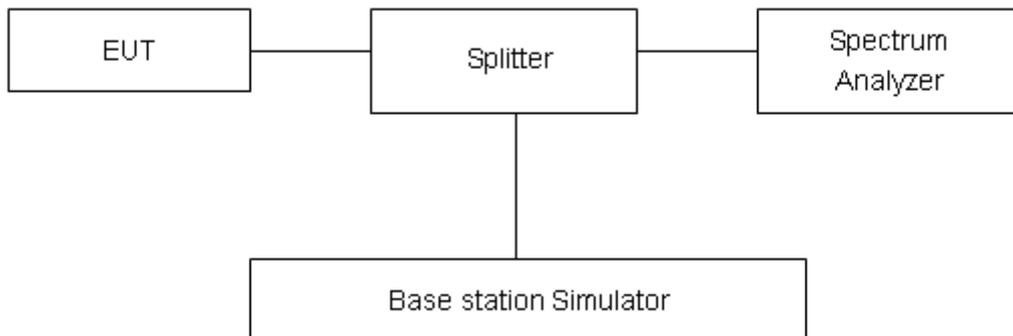
RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2 (1.4MHz),

RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 2 (3MHz/5MHz),

RBW is set to 300kHz,VBW is set to 1MHz for LTE Band 2 (10MHz/15MHz/20MHz).

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

#### Test Setup



#### Limits

No specific occupied bandwidth requirements in part 2.1049.

#### Measurement Uncertainty

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

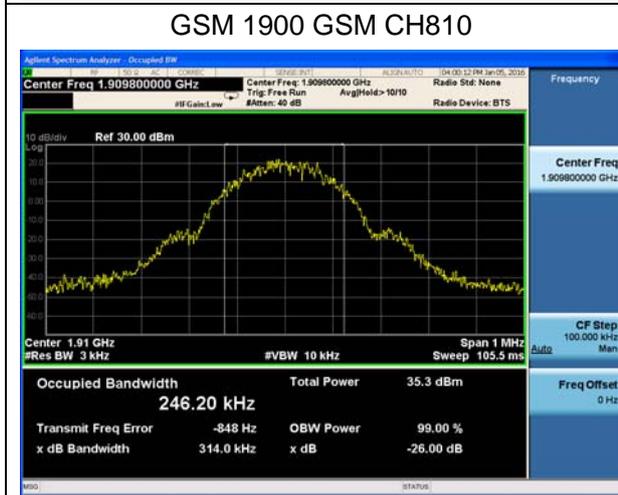
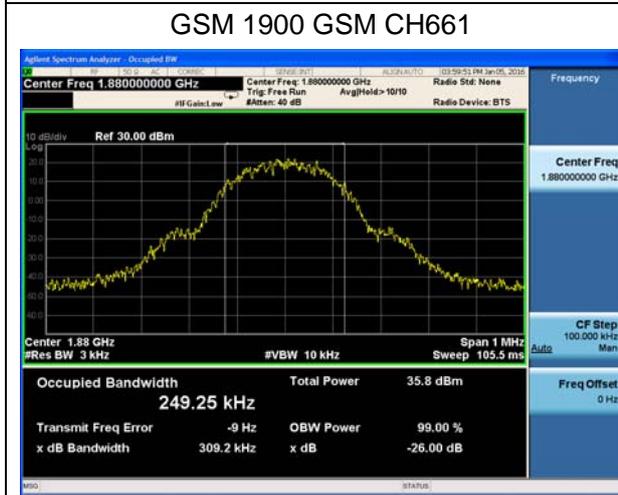
**Test Result**

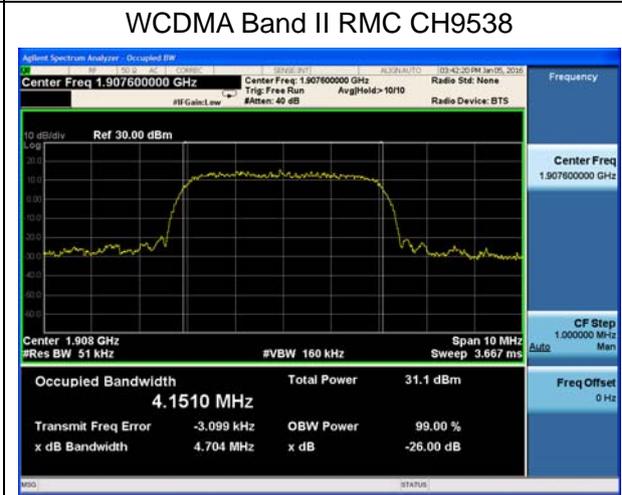
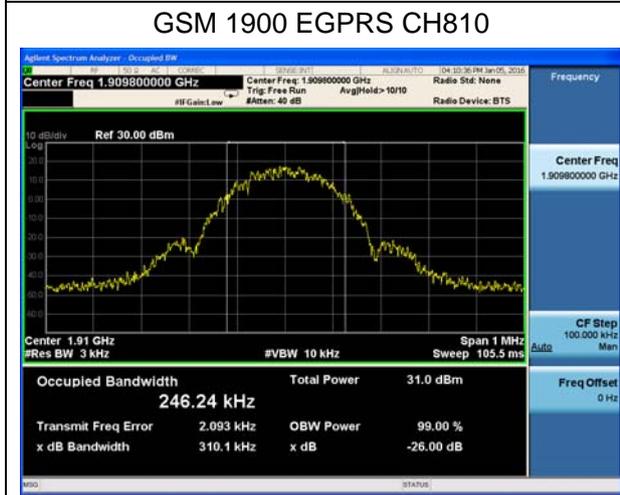
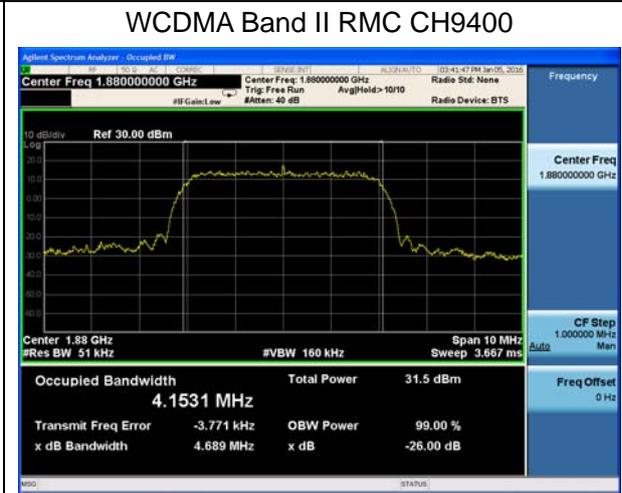
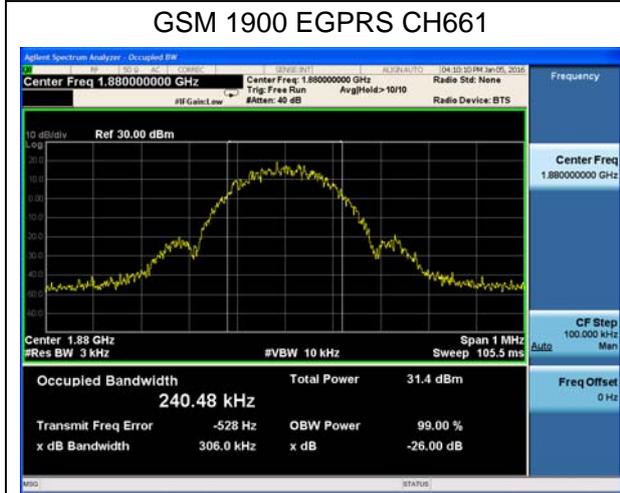
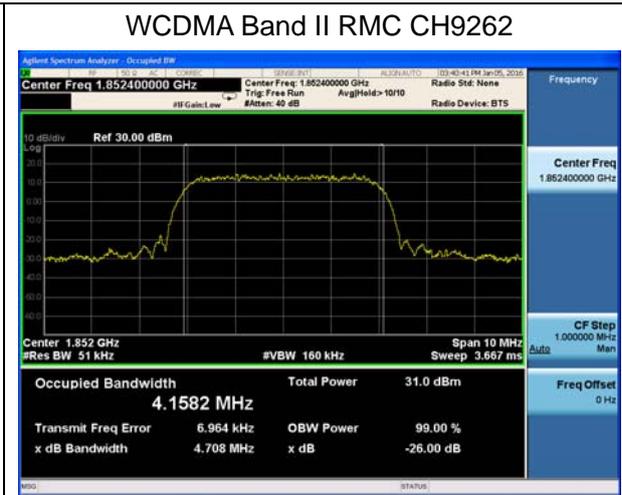
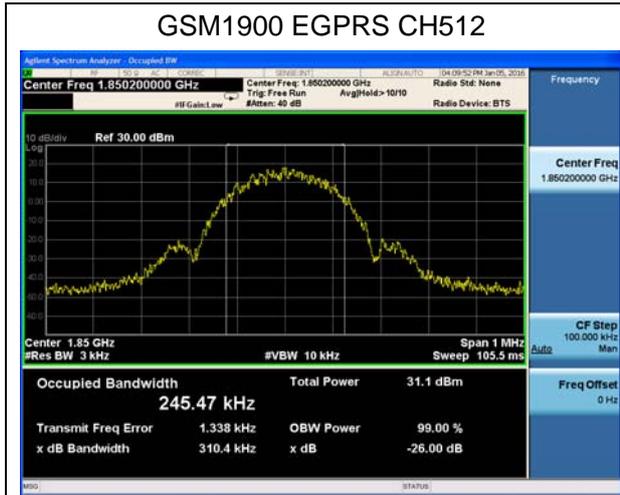
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
<b>GSM 1900 (GSM)</b>	512	1850.2	0.24656	0.3075
	661	1880.0	0.24925	0.3092
	810	1909.8	0.24620	0.3140
<b>GPRS 1900 (GMSK)</b>	512	1850.2	0.24762	0.3125
	661	1880.0	0.25193	0.3113
	810	1909.8	0.24798	0.3156
<b>EGPRS 1900 (8-PSK)</b>	512	1850.2	0.24547	0.3104
	661	1880.0	0.24048	0.3060
	810	1909.8	0.24624	0.3101

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
<b>WCDMA Band II (HSDPA)</b>	9262	1852.4	4.1582	4.708
	9400	1880	4.1531	4.689
	9538	1907.6	4.1510	4.704



LTE Band 2		Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
Bandwidth	Modulation				
1.4MHz	QPSK	18607	1850.7	1.1235	1.361
		18900	1880.0	1.1365	1.360
		19193	1909.3	1.1275	1.352
	16QAM	18607	1850.7	1.1347	1.392
		18900	1880.0	1.1145	1.330
		19193	1909.3	1.1252	1.343
3MHz	QPSK	18615	1851.5	2.7477	3.066
		18900	1880	2.7506	3.079
		19185	1908.5	2.7581	3.070
	16QAM	18615	1851.5	2.7339	3.092
		18900	1880	2.7607	3.024
		19185	1908.5	2.7403	3.060
5MHz	QPSK	18625	1852.5	4.5172	5.028
		18900	1880	4.5293	5.016
		19175	1907.5	4.5464	5.032
	16QAM	18625	1852.5	4.5445	5.057
		18900	1880	4.5137	4.996
		19175	1907.5	4.5215	5.033
10MHz	QPSK	18650	1855	9.0380	10.05
		18900	1880	9.0633	10.11
		19150	1905	9.0502	10.07
	16QAM	18650	1855	9.0399	10.02
		18900	1880	9.0717	10.08
		19150	1905	9.0442	10.09
15MHz	QPSK	18675	1857.5	13.478	14.76
		18900	1880	13.535	14.83
		19125	1902.5	13.502	14.74
	16QAM	18675	1857.5	13.506	14.73
		18900	1880	13.510	14.81
		19125	1902.5	13.485	14.63
20MHz	QPSK	18700	1860	17.868	19.20
		18900	1880	17.953	19.33
		19100	1900	17.911	19.48
	16QAM	18700	1860	17.882	19.45
		18900	1880	18.005	19.21
		19100	1900	17.895	19.27







### LTE Band 2 1.4MHz QPSK CH18607



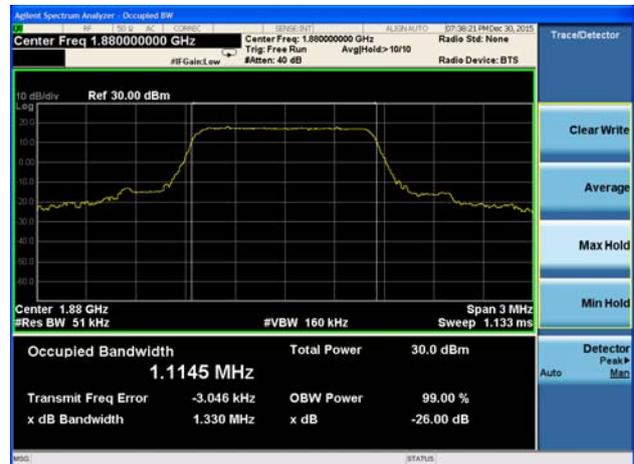
### LTE Band 2 1.4MHz 16QAM CH18607



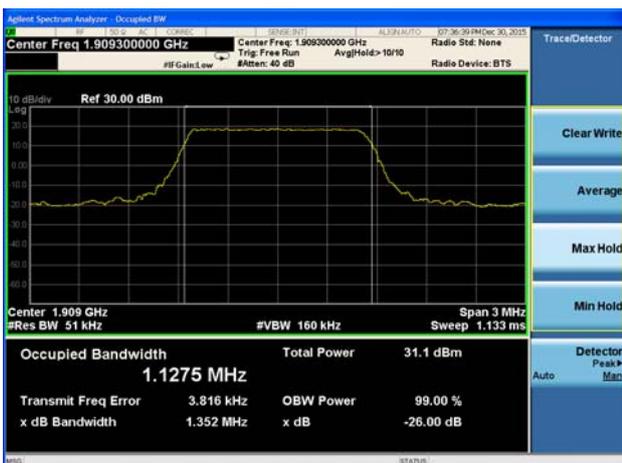
### LTE Band 2 1.4MHz QPSK CH18900



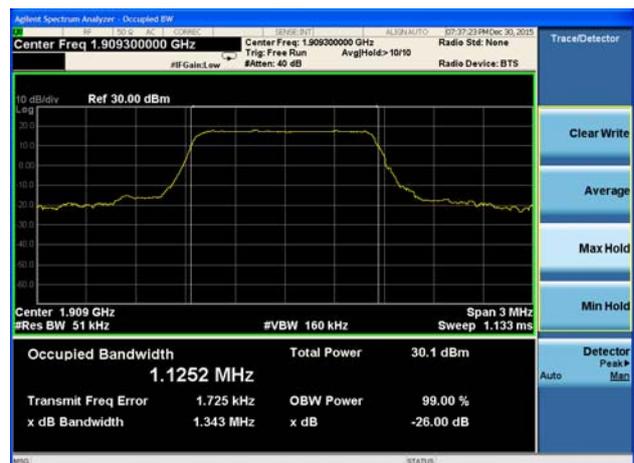
### LTE Band 2 1.4MHz 16QAM CH18900



### LTE Band 2 1.4MHz QPSK CH19193

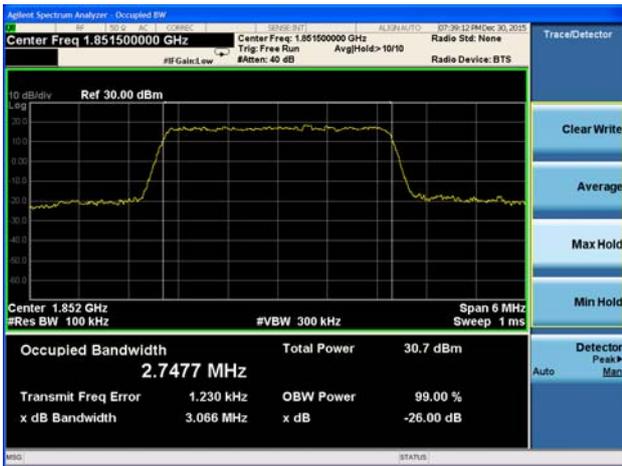


### LTE Band 2 1.4MHz 16QAM CH19193

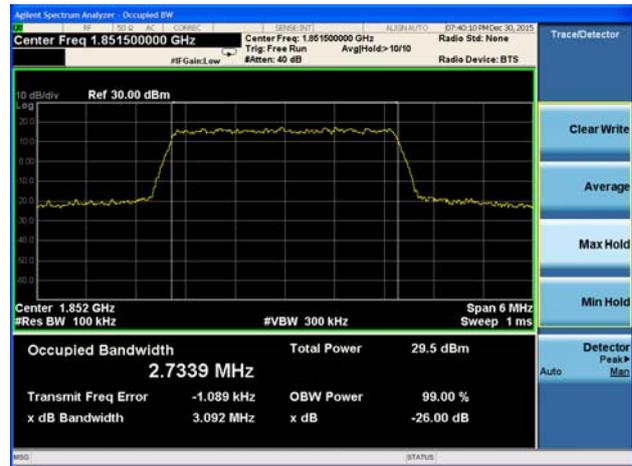




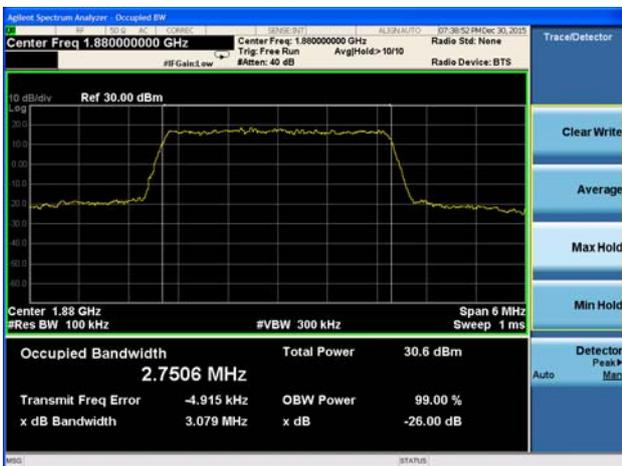
LTE Band 2 3MHz QPSK CH18615



LTE Band 2 3MHz 16QAM CH18615



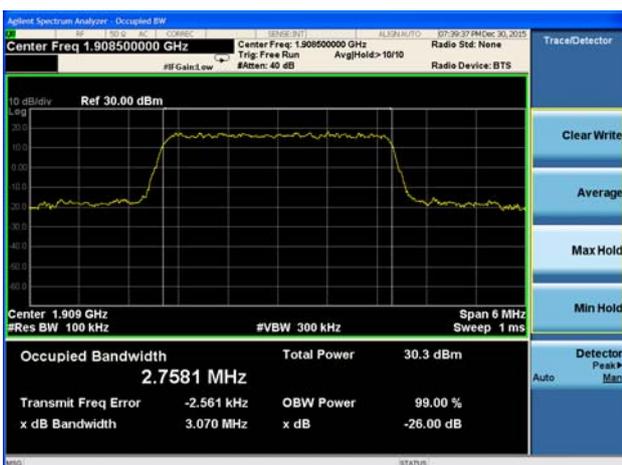
LTE Band 2 3MHz QPSK CH18900



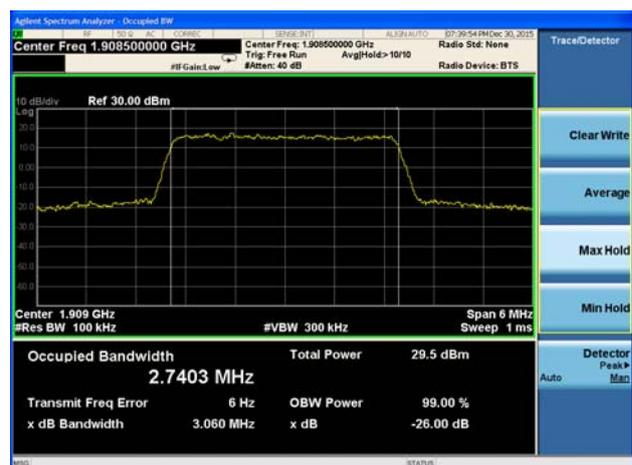
LTE Band 2 3MHz 16QAM CH18900



LTE Band 2 3MHz QPSK CH19185

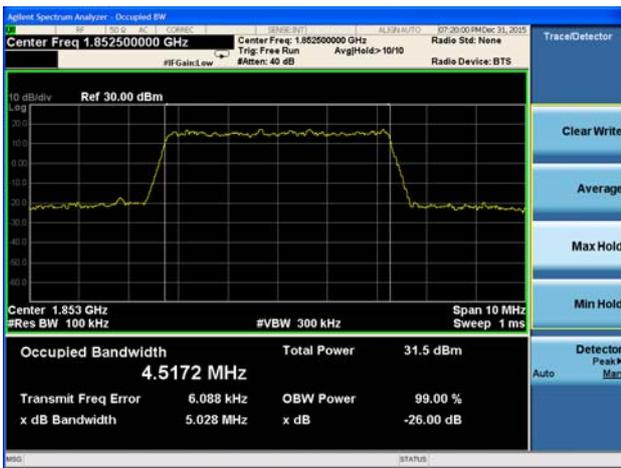


LTE Band 2 3MHz 16QAM CH19185





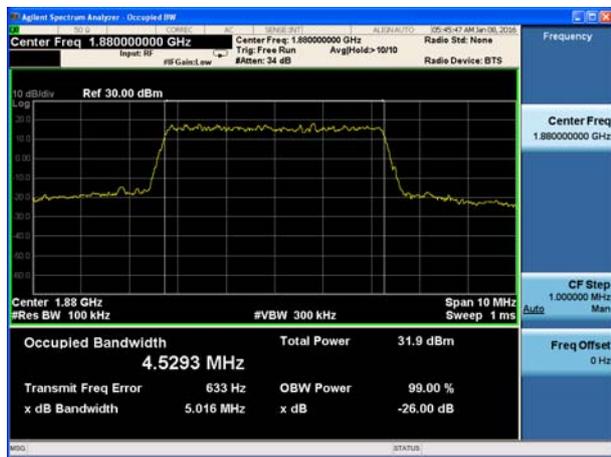
LTE Band 2 5MHz QPSK CH18625



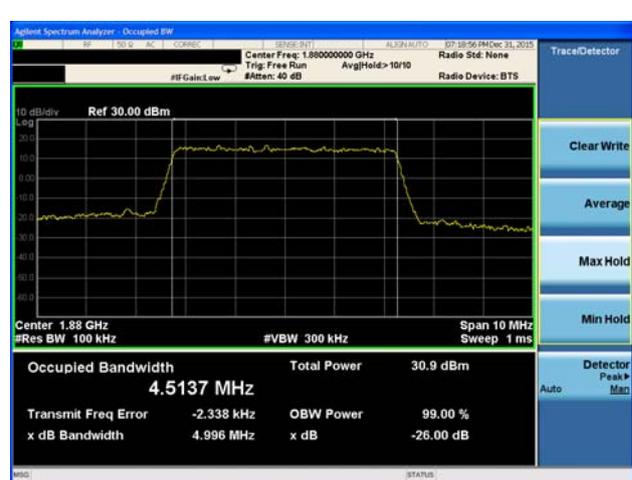
LTE Band 2 5MHz 16QAM CH18625



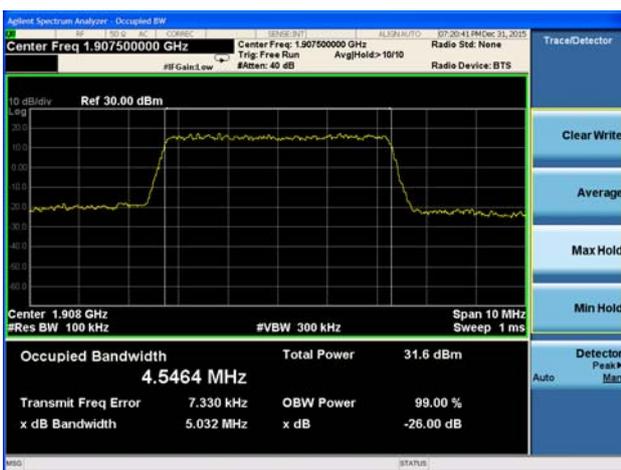
LTE Band 2 5MHz QPSK CH18900



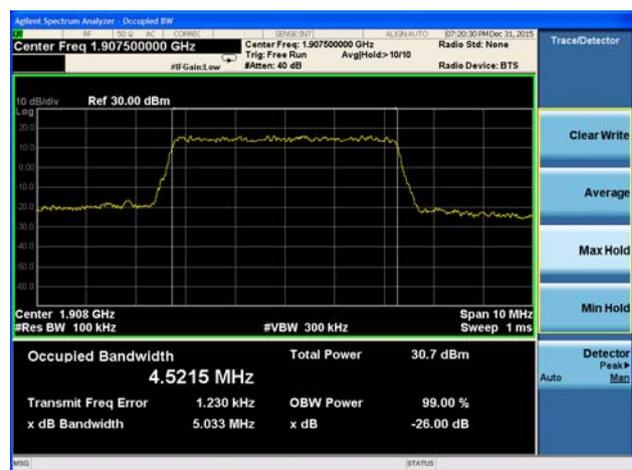
LTE Band 2 5MHz 16QAM CH18900



LTE Band 2 5MHz QPSK CH19175



LTE Band 2 5MHz 16QAM CH19175





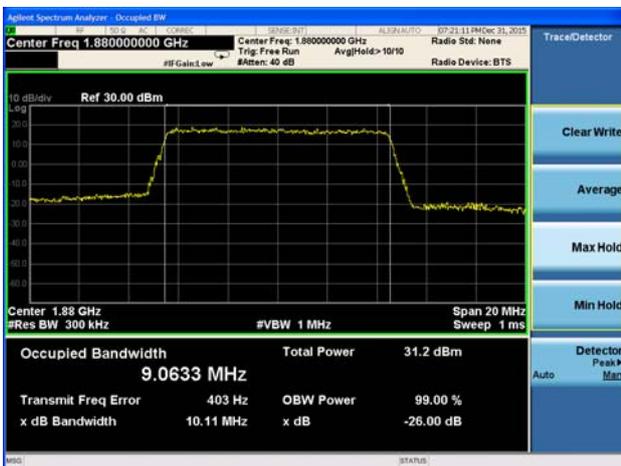
### LTE Band 2 10MHz QPSK CH18650



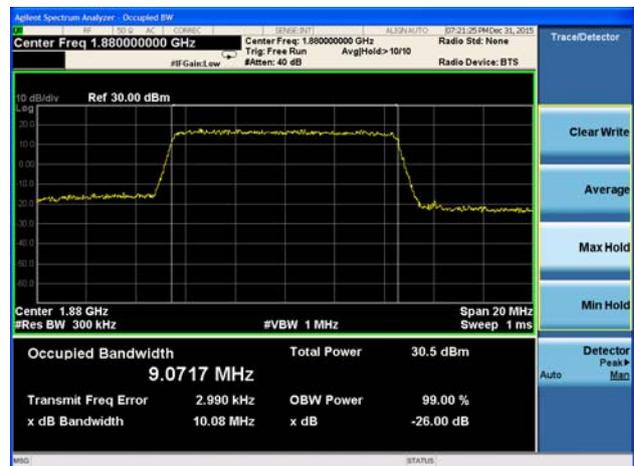
### LTE Band 2 10MHz 16QAM CH18650



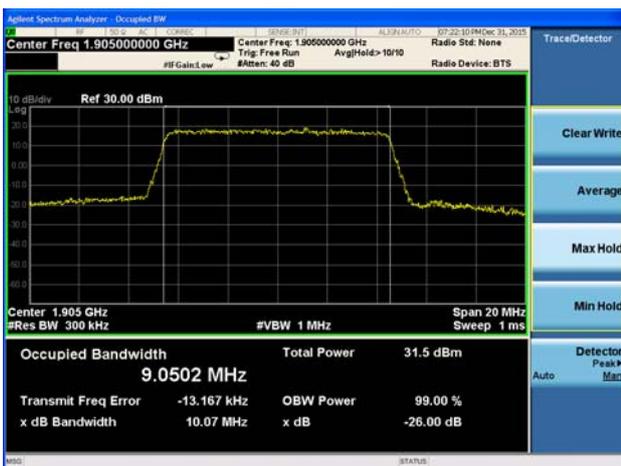
### LTE Band 2 10MHz QPSK CH18900



### LTE Band 2 10MHz 16QAM CH18900



### LTE Band 2 10MHz QPSK CH19150

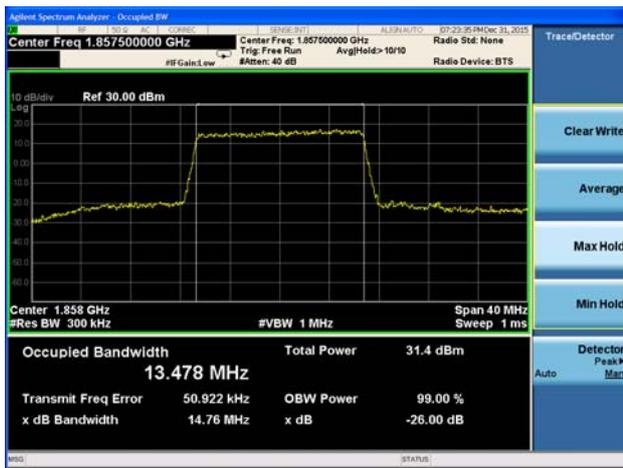


### LTE Band 2 10MHz 16QAM CH19150

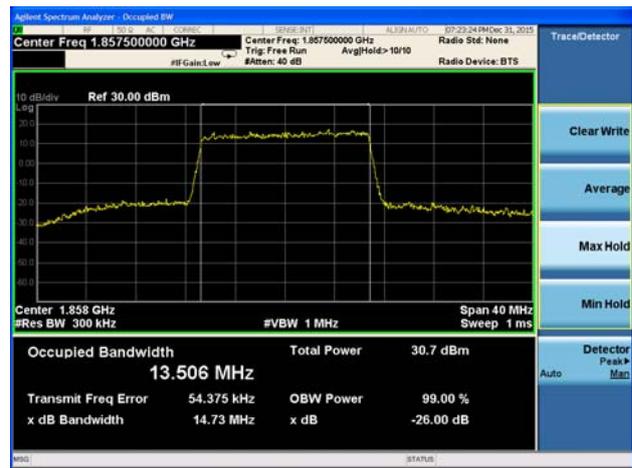




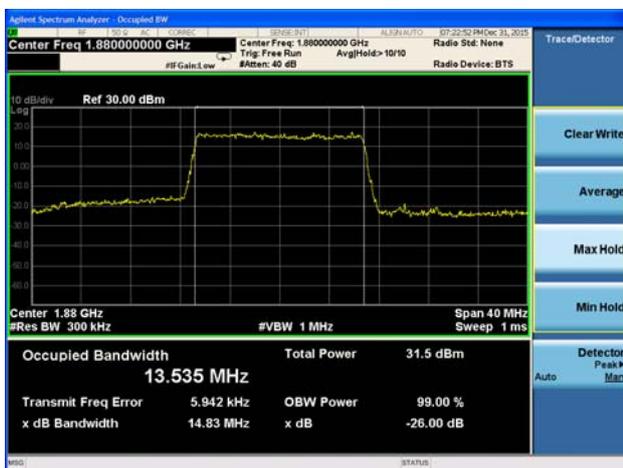
### LTE Band 2 15MHz QPSK CH18675



### LTE Band 2 15MHz 16QAM CH18675



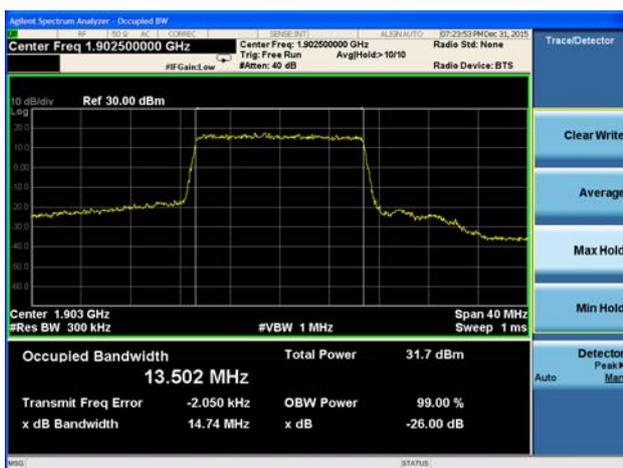
### LTE Band 2 15MHz QPSK CH18900



### LTE Band 2 15MHz 16QAM CH18900



### LTE Band 2 15MHz QPSK CH19125

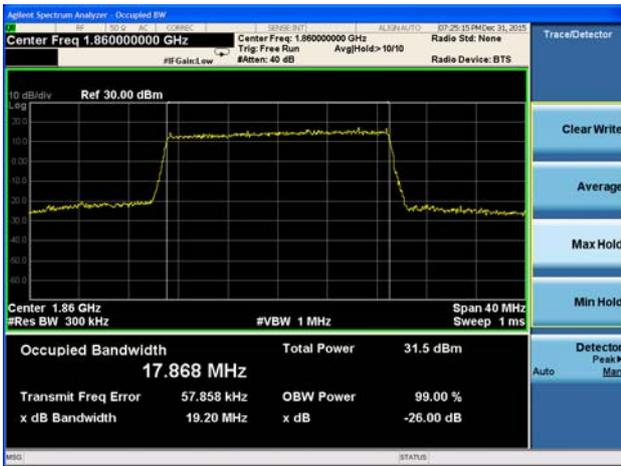


### LTE Band 2 15MHz 16QAM CH19125

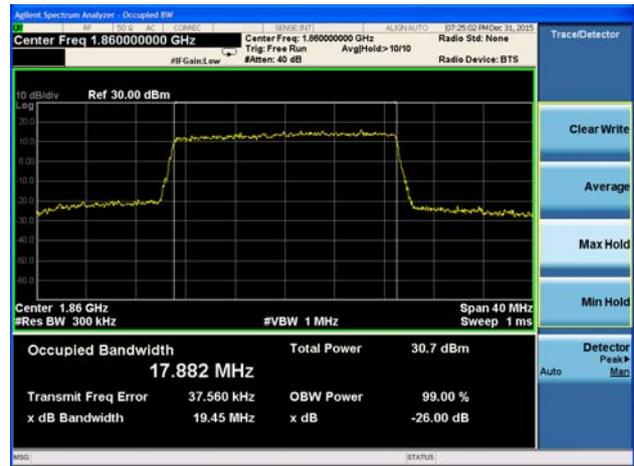




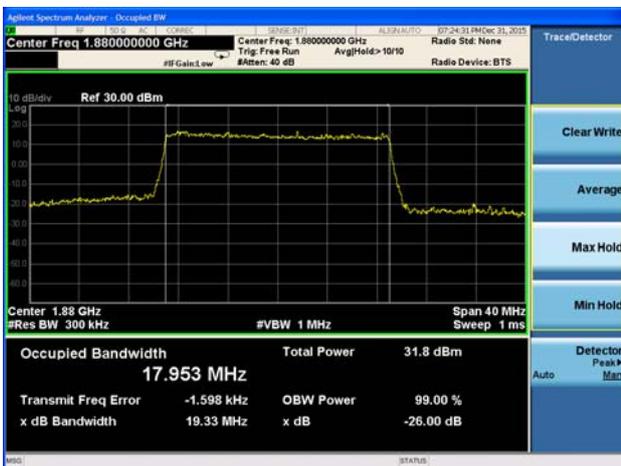
### LTE Band 2 20MHz QPSK CH18700



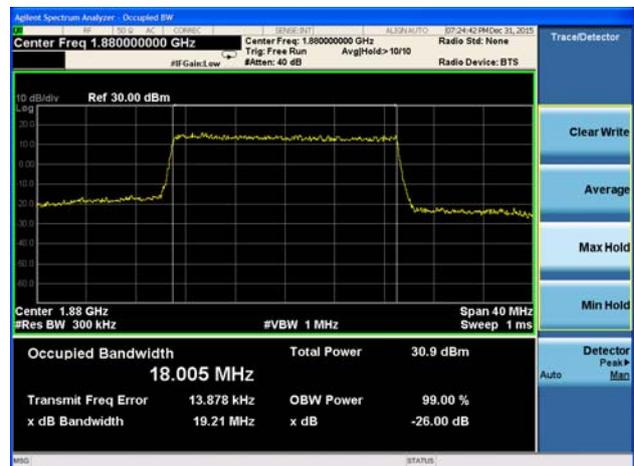
### LTE Band 2 20MHz 16QAM CH18700



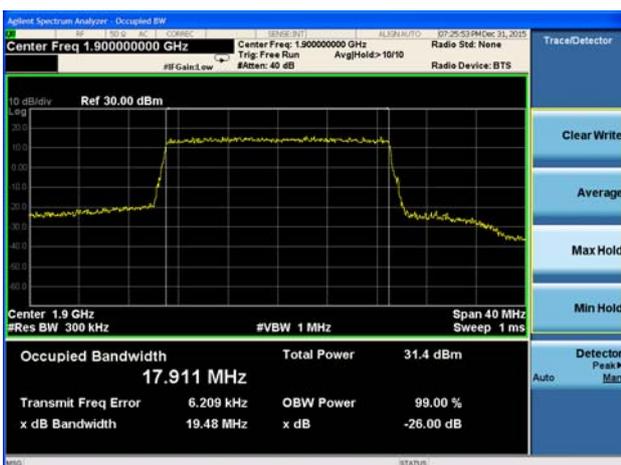
### LTE Band 2 20MHz QPSK CH18900



### LTE Band 2 20MHz 16QAM CH18900



### LTE Band 2 20MHz QPSK CH19100



### LTE Band 2 20MHz 16QAM CH19100



### 5.4. Band Edge Compliance

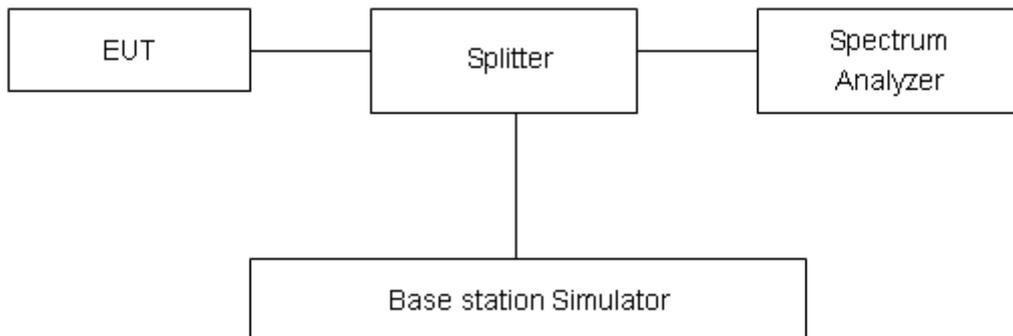
**Ambient condition**

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 and RBW is set to 3kHz, VBW is set to 10kHz for GSM 1900, RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band II, RBW is set to 15kHz, VBW is set to 51kHz for LTE Band 2 (1.4MHz), RBW is set to 30kHz, VBW is set to 100kHz for LTE Band 2 (3MHz), RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2 (5MHz), RBW is set to 100kHz, VBW is set to 300kHz for LTE Band 2 (10MHz), RBW is set to 150kHz, VBW is set to 510kHz for LTE Band 2 (15MHz), RBW is set to 200kHz, VBW is set to 620kHz for LTE Band 2 (20MHz). Spectrum analyzer plots are included on the following pages.

**Test Setup**



**Limits**

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log<sub>10</sub> (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
<b>GSM 1900 (GSM)</b>	1850.0	-31.570	-13	PASS
	1910.0	-32.854	-13	PASS
<b>GPRS 1900 (GMSK)</b>	1850.0	-34.341	-13	PASS
	1910.0	-33.631	-13	PASS
<b>EGPRS 1900 (8-PSK)</b>	1850.0	-42.890	-13	PASS
	1910.0	-38.264	-13	PASS
<b>WCDMA Band II HSDPA</b>	1850	-26.579	-13	PASS
	1910	-25.149	-13	PASS

LTE Band 2		Channel	RB	Reference value (dBm)	Limit (dBm)	Conclusion
Bandwidth	Modulation					
<b>1.4MHz</b>	QPSK	18607	1	-22.150	-13	PASS
			100%	-25.858	-13	PASS
		19193	1	-22.014	-13	PASS
			100%	-29.794	-13	PASS
	16QAM	18607	1	-23.092	-13	PASS
			100%	-25.012	-13	PASS
19193	1	-23.188	-13	PASS		
	100%	-30.278	-13	PASS		
<b>3MHz</b>	QPSK	18615	1	-20.866	-13	PASS
			100%	-25.765	-13	PASS
		19185	1	-20.686	-13	PASS
			100%	-27.413	-13	PASS
	16QAM	18615	1	-19.513	-13	PASS
			100%	-25.724	-13	PASS
19185	1	-20.400	-13	PASS		
	100%	-27.598	-13	PASS		
<b>5MHz</b>	QPSK	18625	1	-22.518	-13	PASS
			100%	-28.589	-13	PASS
		19175	1	-22.826	-13	PASS
			100%	-28.224	-13	PASS
	16QAM	18625	1	-21.326	-13	PASS
			100%	-28.990	-13	PASS
19175	1	-21.819	-13	PASS		
	100%	-28.556	-13	PASS		



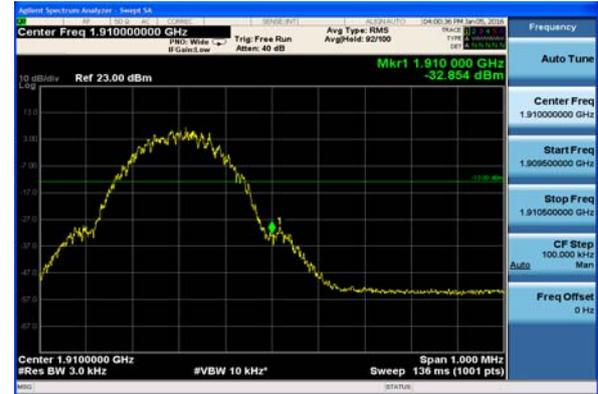
LTE Band 2		Channel	RB	Reference value (dBm)	Limit (dBm)	Conclusion
Bandwidth	Modulation					
10MHz	QPSK	18650	1	-31.146	-13	PASS
			100%	-29.733	-13	PASS
		19150	1	-31.117	-13	PASS
			100%	-31.771	-13	PASS
	16QAM	18650	1	-31.844	-13	PASS
			100%	-29.448	-13	PASS
		19150	1	-31.769	-13	PASS
			100%	-32.068	-13	PASS
15MHz	QPSK	18675	1	-26.905	-13	PASS
			100%	-30.056	-13	PASS
		19125	1	-30.392	-13	PASS
			100%	-31.354	-13	PASS
	16QAM	18675	1	-32.799	-13	PASS
			100%	-29.009	-13	PASS
		19125	1	-26.629	-13	PASS
			100%	-31.094	-13	PASS
20MHz	QPSK	18700	1	-31.743	-13	PASS
			100%	-29.634	-13	PASS
		19100	1	-33.643	-13	PASS
			100%	-33.771	-13	PASS
	16QAM	18700	1	-31.539	-13	PASS
			100%	-29.243	-13	PASS
		19100	1	-35.077	-13	PASS
			100%	-32.945	-13	PASS



GSM1900 GSM CH512



GSM 1900 GSM CH810



GSM1900 GPRS CH512



GSM 1900 GPRS CH810



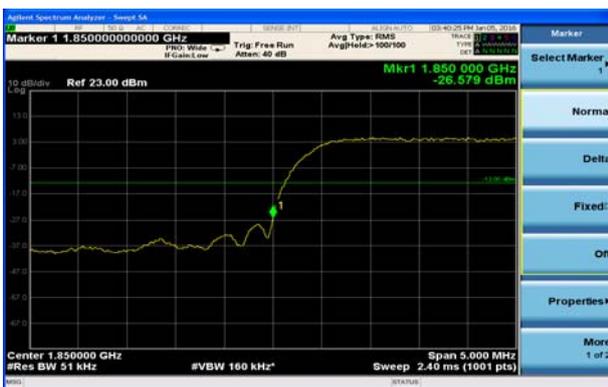
GSM1900 EGPRS CH512



GSM 1900 EGPRS CH810



WCDMA Band II RMC CH9262

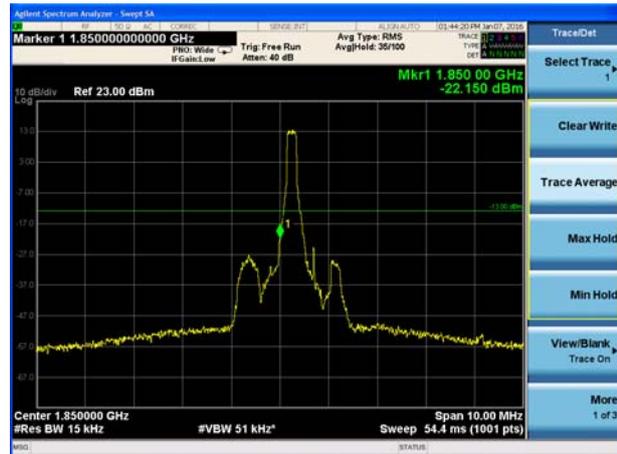


WCDMA Band II RMC CH9538

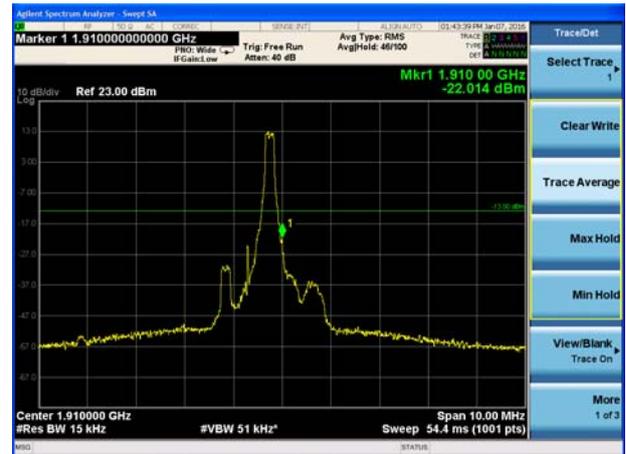




LTE Band II 1.4MHz QPSK 1RB CH18607



LTE Band II 1.4MHz QPSK 1RB CH19193



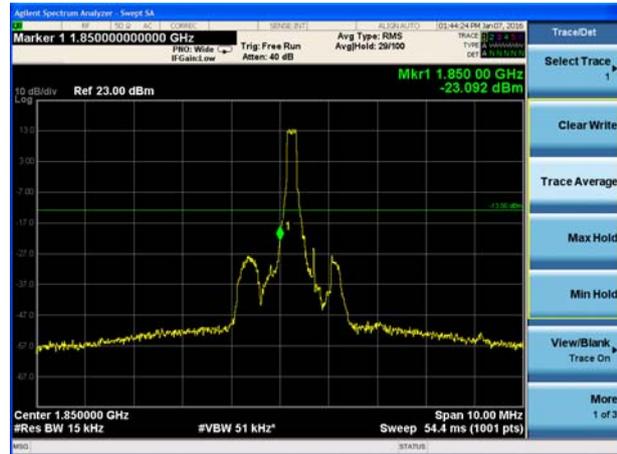
LTE Band II 1.4MHz QPSK 100%RB CH18607



LTE Band II 1.4MHz QPSK 100%RB CH19193



LTE Band II 1.4MHz 16QAM 1RB CH18607



LTE Band II 1.4MHz 16QAM 1RB CH19193





LTE Band II 1.4MHz 16QAM 100%RB CH18607



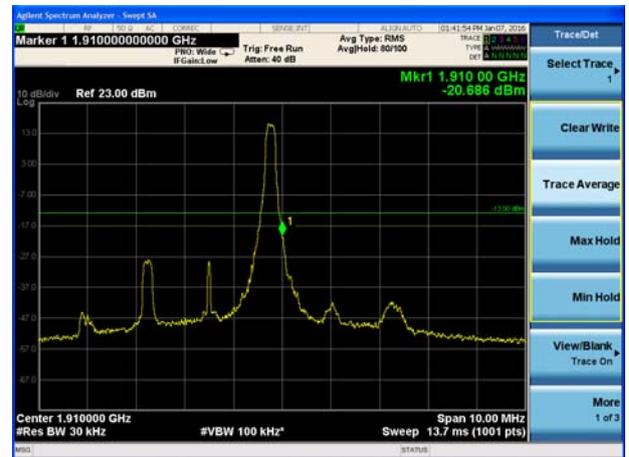
LTE Band II 1.4MHz 16QAM 100%RB CH19193



LTE Band II 3MHz QPSK 1RB CH18615



LTE Band II 3MHz QPSK 1RB CH19185



LTE Band II 3MHz QPSK 100%RB CH18615

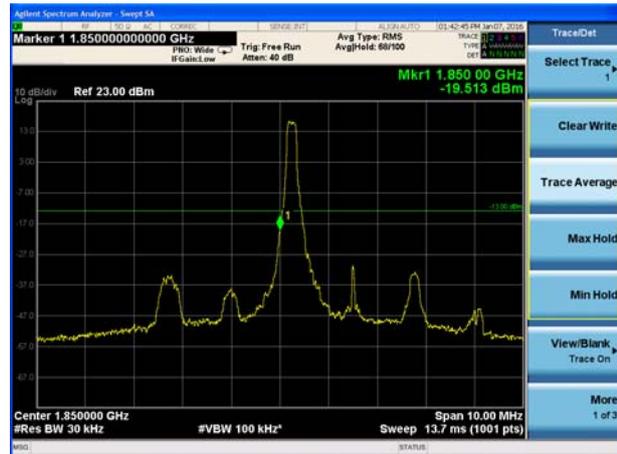


LTE Band II 3MHz QPSK 100%RB CH19185

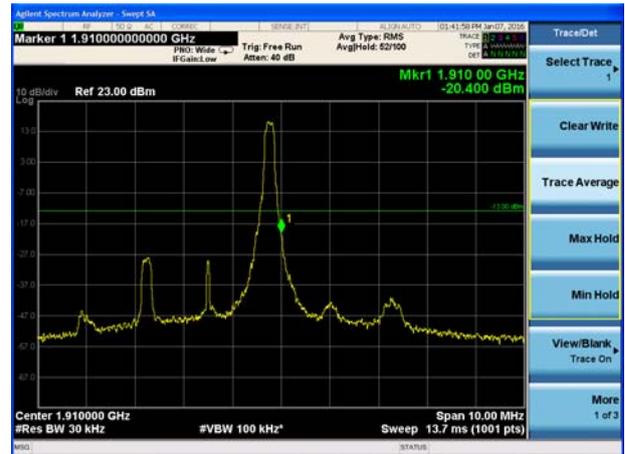




LTE Band II 3MHz 16QAM 1RB CH18615



LTE Band II 3MHz 16QAM 1RB CH19185



LTE Band II 3MHz 16QAM 100%RB CH18615



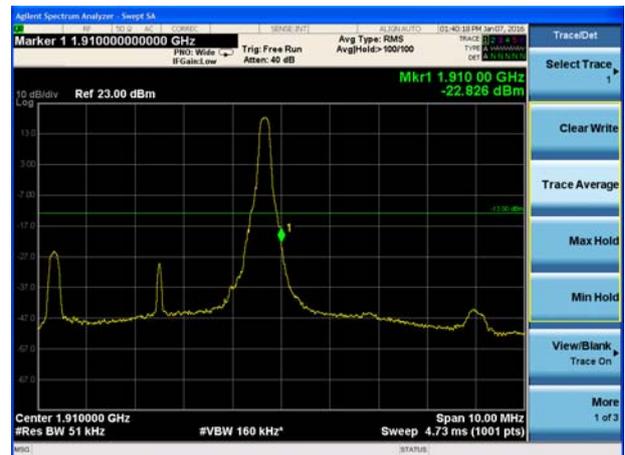
LTE Band II 3MHz 16QAM 100%RB CH19185



LTE Band II 5MHz QPSK 1RB CH18625



LTE Band II 5MHz QPSK 1RB CH19175





LTE Band II 5MHz QPSK 100%RB CH18625



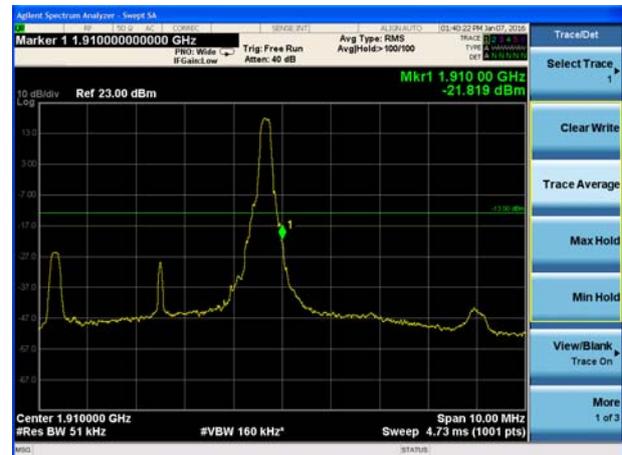
LTE Band II 5MHz QPSK 100%RB CH19175



LTE Band II 5MHz 16QAM 1RB CH18625



LTE Band II 5MHz 16QAM 1RB CH19175



LTE Band II 5MHz 16QAM 100%RB CH18625

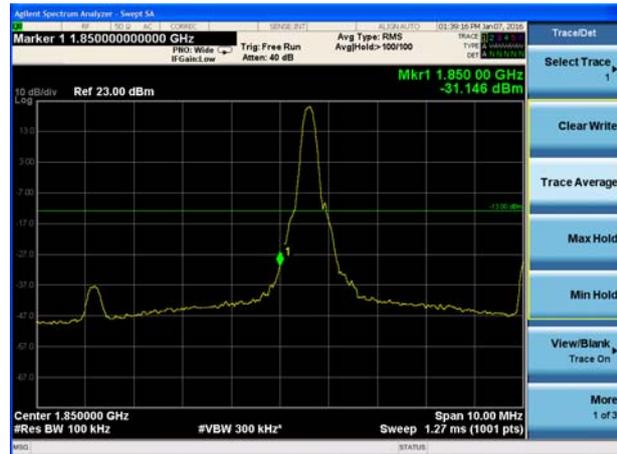


LTE Band II 5MHz 16QAM 100%RB CH19175

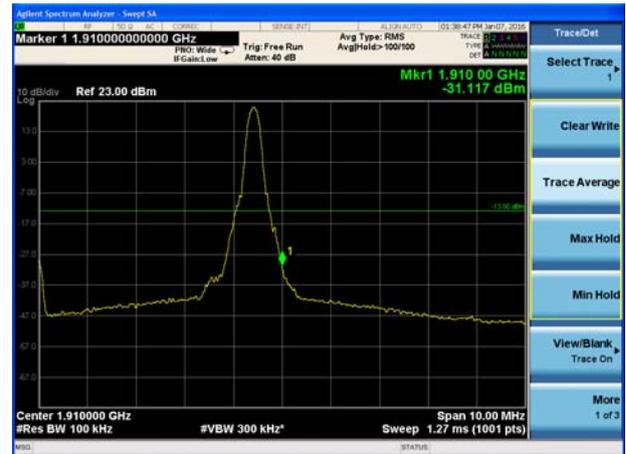




### LTE Band II 10MHz QPSK 1RB CH18650



### LTE Band II 10MHz QPSK 1RB CH19150



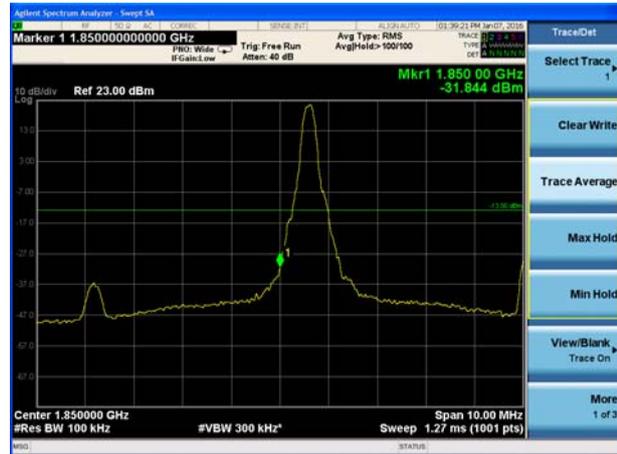
### LTE Band II 10MHz QPSK 100%RB CH18650



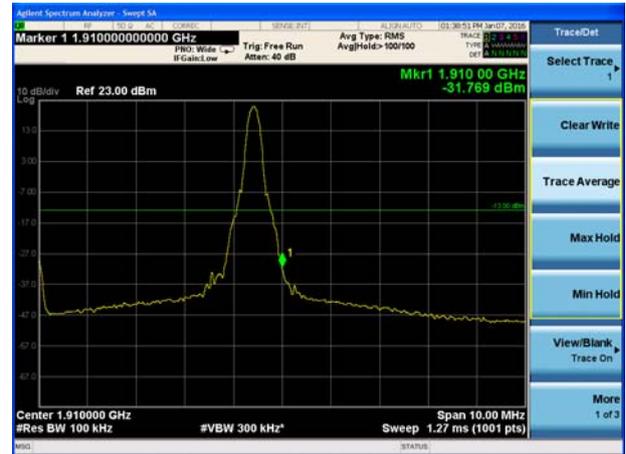
### LTE Band II 10MHz QPSK 100%RB CH19150

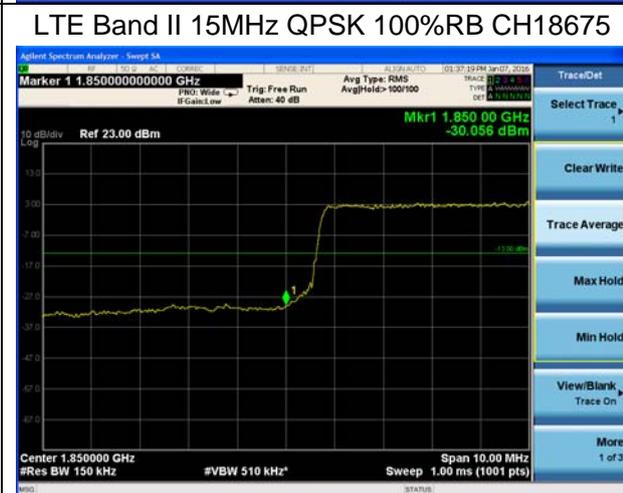
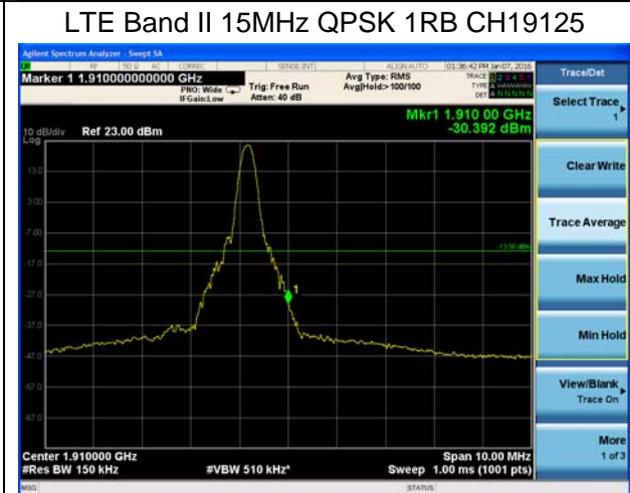
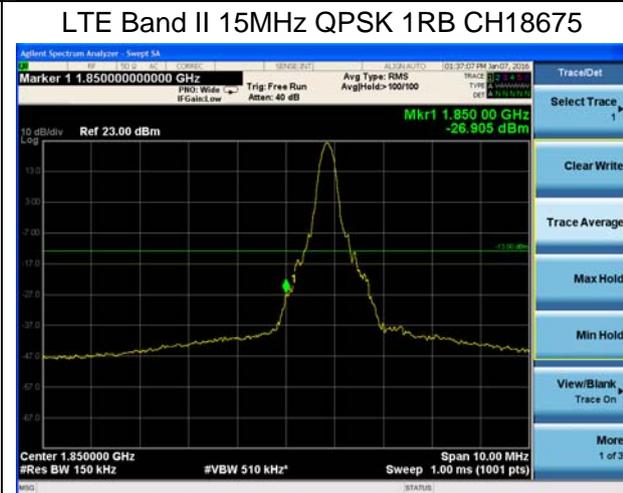
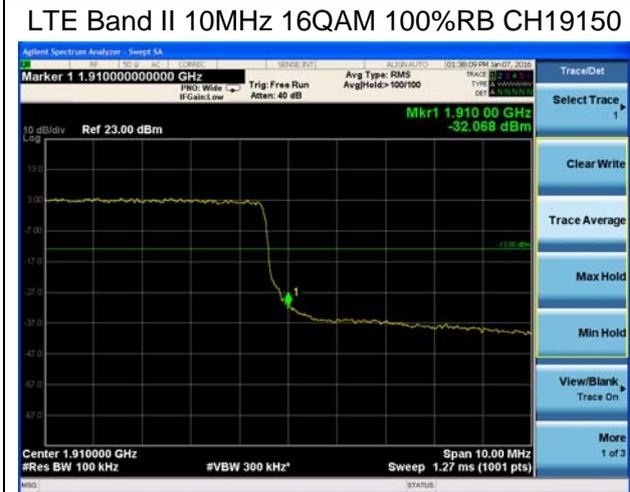
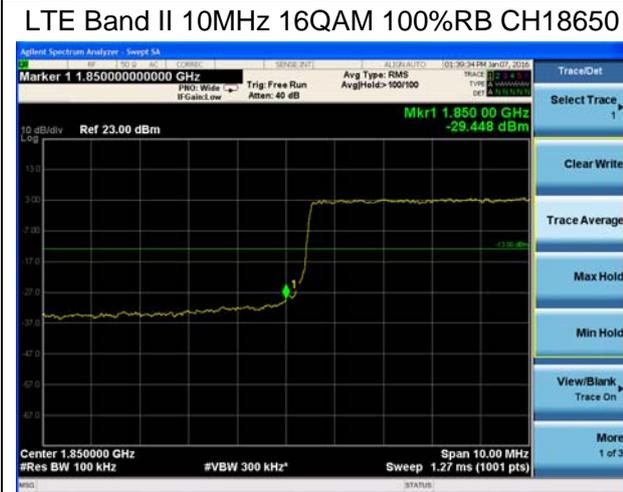


### LTE Band II 10MHz 16QAM 1RB CH18650



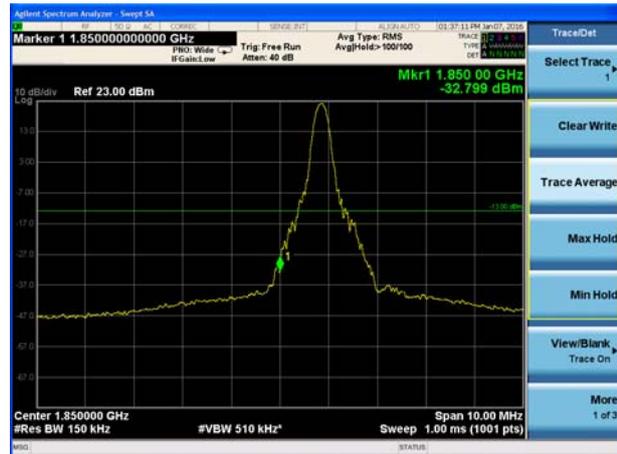
### LTE Band II 10MHz 16QAM 1RB CH19150



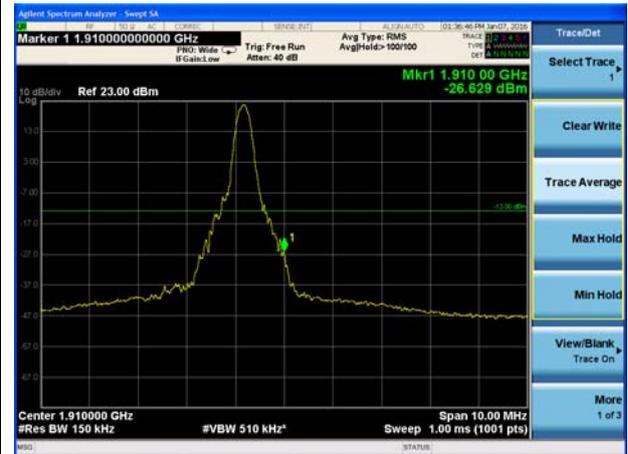




LTE Band II 15MHz 16QAM 1RB CH18675



LTE Band II 15MHz 16QAM 1RB CH19125



LTE Band II 15MHz 16QAM 100%RB CH18675



LTE Band II 15MHz 16QAM 100%RB CH19125



LTE Band II 20MHz QPSK 1RB CH18700



LTE Band II 20MHz QPSK 1RB CH19100





LTE Band II 20MHz QPSK 100%RB CH18700



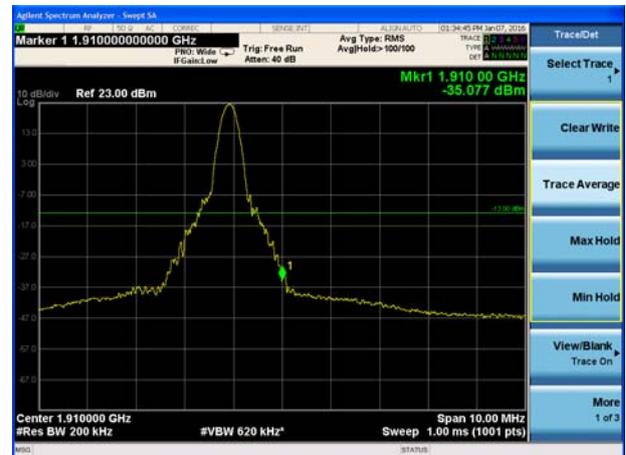
LTE Band II 20MHz QPSK 100%RB CH19100



LTE Band II 20MHz 16QAM 1RB CH18700



LTE Band II 20MHz 16QAM 1RB CH19100



LTE Band II 20MHz 16QAM 100%RB CH18700



LTE Band II 20MHz 16QAM 100%RB CH19100



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

#### Ambient condition

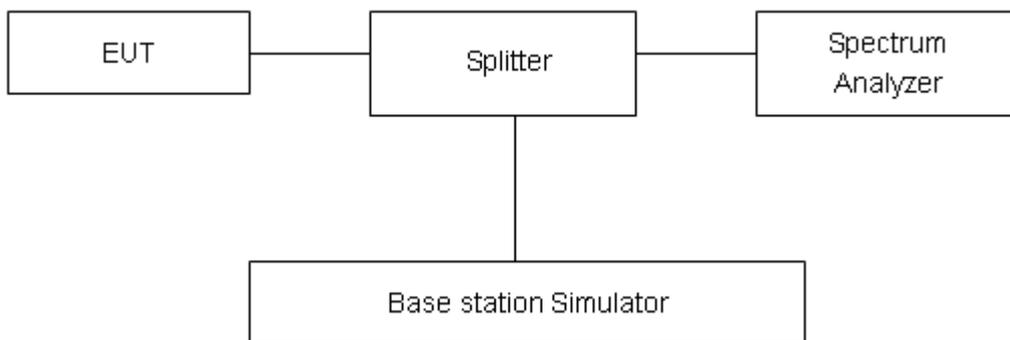
Temperature	Relative humidity
21°C ~25°C	40%~60%

#### Methods of Measurement

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

$$PAPR (dB) = PPK (dBm) - PAvg (dBm).$$

#### Test Setup



#### Limits

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

#### Measurement Uncertainty

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

**Test Results**

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	30.34	30.22	0.123	13	PASS
	661	1880	30.14	30.11	0.028	13	PASS
	810	1909.8	30.28	30.26	0.017	13	PASS
GPRS 1900 (GMSK)	512	1850.2	28.04	28.04	0.004	13	PASS
	661	1880	27.86	27.83	0.033	13	PASS
	810	1909.8	27.97	27.96	0.008	13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	25.73	25.69	0.042	13	PASS
	661	1880	25.67	25.64	0.026	13	PASS
	810	1909.8	25.74	25.71	0.028	13	PASS
WCDMA Band II (HSDPA)	9262	1852.4	26.68	23.52	3.16	13	PASS
	9400	1880	27.05	23.85	3.2	13	PASS
	9538	1907.6	26.78	23.77	3.01	13	PASS



LTE Band 2		Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit(dB)	Conclusion
Modulation	Bandwidth							
1.4MHz	QPSK	18607	1850.7	23.55	22.67	0.88	13	PASS
		18900	1880.0	23.26	22.65	0.61	13	PASS
		19193	1909.3	23.42	22.69	0.73	13	PASS
	16QAM	18607	1850.7	22.47	21.66	0.81	13	PASS
		18900	1880.0	23.78	22.94	0.84	13	PASS
		19193	1909.3	22.77	21.65	1.12	13	PASS
3MHz	QPSK	18615	1851.5	23.23	22.58	0.65	13	PASS
		18900	1880	23.27	22.56	0.71	13	PASS
		19185	1908.5	23.67	22.60	1.07	13	PASS
	16QAM	18615	1851.5	22.29	21.57	0.72	13	PASS
		18900	1880	23.53	22.85	0.68	13	PASS
		19185	1908.5	22.28	21.56	0.72	13	PASS
5MHz	QPSK	18625	1852.5	23.46	22.59	0.87	13	PASS
		18900	1880	23.39	22.57	0.82	13	PASS
		19175	1907.5	23.14	22.61	0.53	13	PASS
	16QAM	18625	1852.5	22.46	21.58	0.88	13	PASS
		18900	1880	23.89	22.86	1.03	13	PASS
		19175	1907.5	22.43	21.57	0.86	13	PASS
10MHz	QPSK	18650	1855	23.77	22.61	1.16	13	PASS
		18900	1880	23.72	22.59	1.13	13	PASS
		19150	1905	23.82	22.63	1.19	13	PASS
	16QAM	18650	1855	22.79	21.60	1.19	13	PASS
		18900	1880	24.22	22.88	1.34	13	PASS
		19150	1905	22.76	21.59	1.17	13	PASS
15MHz	QPSK	18675	1857.5	23.91	22.64	1.27	13	PASS
		18900	1880	23.94	22.62	1.32	13	PASS
		19125	1902.5	23.87	22.66	1.21	13	PASS
	16QAM	18675	1857.5	22.98	21.63	1.35	13	PASS
		18900	1880	24.12	22.91	1.21	13	PASS
		19125	1902.5	22.91	21.62	1.29	13	PASS
20MHz	QPSK	18700	1860	24.01	22.65	1.36	13	PASS
		18900	1880	23.85	22.63	1.22	13	PASS
		19100	1900	23.82	22.67	1.15	13	PASS
	16QAM	18700	1860	22.87	21.64	1.23	13	PASS
		18900	1880	24.12	22.92	1.20	13	PASS
		19100	1900	22.8	21.63	1.17	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.

#### 2. Frequency Stability (Voltage Variation)

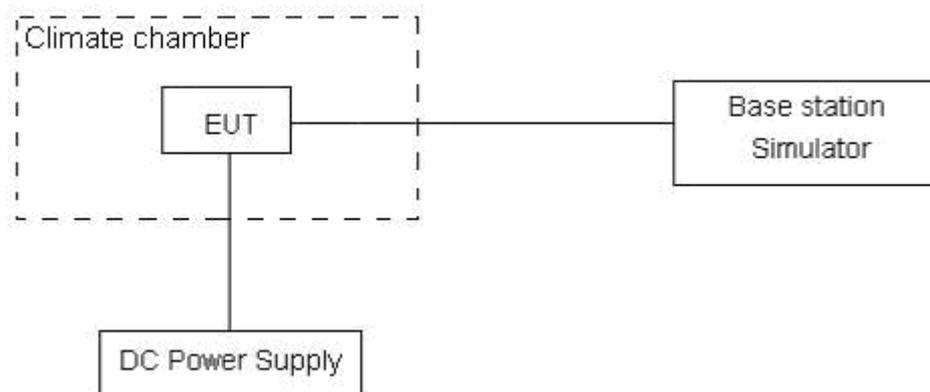
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.6V and 4.35V, with a nominal voltage of 3.84V.

### Test setup



### Limits

No specific frequency stability requirements in part 24.235

**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)			Conclusion
		GSM(GMSK)	GPRS(GMSK)	EGPRS(8PSK)	
GSM 1900 Channel 661	-30°C/3.84 V	-0.00091	0.00074	0.00158	PASS
	-20°C/3.84 V	-0.00336	0.00025	-0.00023	PASS
	-10°C/3.84 V	0.01020	0.00377	-0.00002	PASS
	0°C/3.84 V	0.00530	0.00493	0.00065	PASS
	10°C/3.84 V	-0.00540	0.00473	-0.00131	PASS
	20°C/3.84 V	-0.00310	0.00401	-0.00022	PASS
	30°C/3.84 V	0.00430	0.00488	0.00005	PASS
	40°C/3.84 V	-0.0050	0.00506	-0.00135	PASS
	50°C/3.84 V	0.00420	0.00066	-0.00077	PASS
	20°C/3.6 V	0.00680	0.00451	-0.00113	PASS
	20°C/4.35 V	-0.01050	0.00534	-0.00159	PASS
Mode	Test status	RMC			Conclusion
WCDMA Band II Channel 9400	-30°C/3.84 V	-0.000136			PASS
	-30°C/3.84 V	0.000631			PASS
	-10°C/3.84 V	-0.000807			PASS
	0°C/3.84 V	-0.001062			PASS
	10°C/3.84 V	-0.001363			PASS
	20°C/3.84 V	-0.000813			PASS
	30°C/3.84 V	-0.000979			PASS
	40°C/3.84 V	-0.000779			PASS
	50°C/3.84 V	-0.001214			PASS
	20°C/3.6 V	-0.001268			PASS
	20°C/4.35 V	-0.000547			PASS



Bandwidth	Test status	LTE Band 2 Channel 18900 Test Results (ppm)		Conclusion
		QPSK	16QAM	
1.4MHz	-30°C/3.84 V	0.00128	-0.00383	PASS
	-20°C/3.84 V	-0.00271	0.00101	PASS
	-10°C/3.84 V	-0.00234	-0.00436	PASS
	0°C/3.84 V	0.00500	-0.00521	PASS
	10°C/3.84 V	0.00441	-0.00144	PASS
	20°C/3.84 V	0.00787	-0.00319	PASS
	30°C/3.84 V	-0.00399	-0.00101	PASS
	40°C/3.84 V	0.00548	-0.00197	PASS
	50°C/3.84 V	0.00324	0.00170	PASS
	20°C/3.6 V	0.00468	-0.00367	PASS
	20°C/4.35 V	0.00255	-0.00495	PASS
3MHz	-30°C/3.84 V	0.00351	0.00548	PASS
	-20°C/3.84 V	0.00239	0.00766	PASS
	-10°C/3.84 V	0.00394	-0.00234	PASS
	0°C/3.84 V	0.00266	-0.00138	PASS
	10°C/3.84 V	0.00447	-0.00261	PASS
	20°C/3.84 V	-0.00484	-0.00447	PASS
	30°C/3.84 V	0.00702	-0.00622	PASS
	40°C/3.84 V	0.00580	-0.00505	PASS
	50°C/3.84 V	-0.00184	0.00687	PASS
	20°C/3.6 V	-0.00298	0.00851	PASS
	20°C/4.35 V	0.00617	0.00463	PASS
5MHz	-30°C/3.84 V	0.00351	0.00548	PASS
	-20°C/3.84 V	0.00301	-0.00319	PASS
	-10°C/3.84 V	-0.00271	0.00532	PASS
	0°C/3.84 V	0.00170	0.00319	PASS
	10°C/3.84 V	0.00521	0.00298	PASS
	20°C/3.84 V	-0.00154	0.00564	PASS
	30°C/3.84 V	0.00324	0.00505	PASS
	40°C/3.84 V	0.00245	0.00420	PASS
	50°C/3.84 V	0.00274	-0.00388	PASS
	20°C/3.6 V	0.00351	0.00548	PASS
	20°C/4.35 V	0.00239	0.00766	PASS
10MHz	-30°C/3.84 V	-0.00415	0.00346	PASS
	-20°C/3.84 V	0.00481	-0.00553	PASS
	-10°C/3.84 V	-0.00410	0.00436	PASS



	0°C/3.84 V	-0.00191	0.00755	PASS
	10°C/3.84 V	0.00223	0.00457	PASS
	20°C/3.84 V	0.00122	0.00330	PASS
	30°C/3.84 V	0.00340	0.00511	PASS
	40°C/3.84 V	0.00293	0.00388	PASS
	50°C/3.84 V	0.00423	-0.00148	PASS
	20°C/3.6 V	-0.00612	0.00293	PASS
	20°C/4.35 V	-0.00234	0.00463	PASS
15MHz	-30°C/3.84 V	-0.00585	0.00309	PASS
	-20°C/3.84 V	0.00194	-0.00308	PASS
	-10°C/3.84 V	-0.00537	0.00489	PASS
	0°C/3.84 V	-0.00713	0.00378	PASS
	10°C/3.84 V	-0.00457	0.00410	PASS
	20°C/3.84 V	-0.00585	0.00309	PASS
	30°C/3.84 V	-0.00527	0.00660	PASS
	40°C/3.84 V	-0.00415	0.00346	PASS
	50°C/3.84 V	0.00077	-0.00021	PASS
	20°C/3.6 V	-0.00229	0.00261	PASS
	20°C/4.35 V	-0.00351	0.00479	PASS
20MHz	-30°C/3.84 V	0.00298	0.00330	PASS
	-20°C/3.84 V	0.00391	0.00453	PASS
	-10°C/3.84 V	0.00676	-0.00676	PASS
	0°C/3.84 V	-0.00617	-0.00298	PASS
	10°C/3.84 V	0.00963	-0.00473	PASS
	20°C/3.84 V	0.00574	-0.00255	PASS
	30°C/3.84 V	-0.00324	0.00362	PASS
	40°C/3.84 V	0.00521	-0.00601	PASS
	50°C/3.84 V	0.00114	0.00235	PASS
	20°C/3.6 V	0.00431	-0.00649	PASS
	20°C/4.35 V	0.00410	-0.00590	PASS

### 5.7. Spurious Emissions at Antenna Terminals

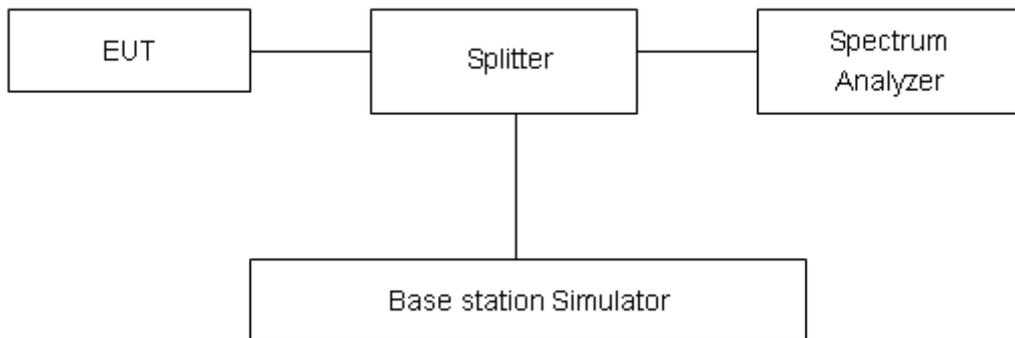
#### Ambient condition

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 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz for the carrier frequency, or RBW and VBW are set to 1MHz (other frequency), Sweep is set to ATUO.

#### Test setup



#### Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log<sub>10</sub> (P) dB.”

Limit	-13 dBm

#### Measurement Uncertainty

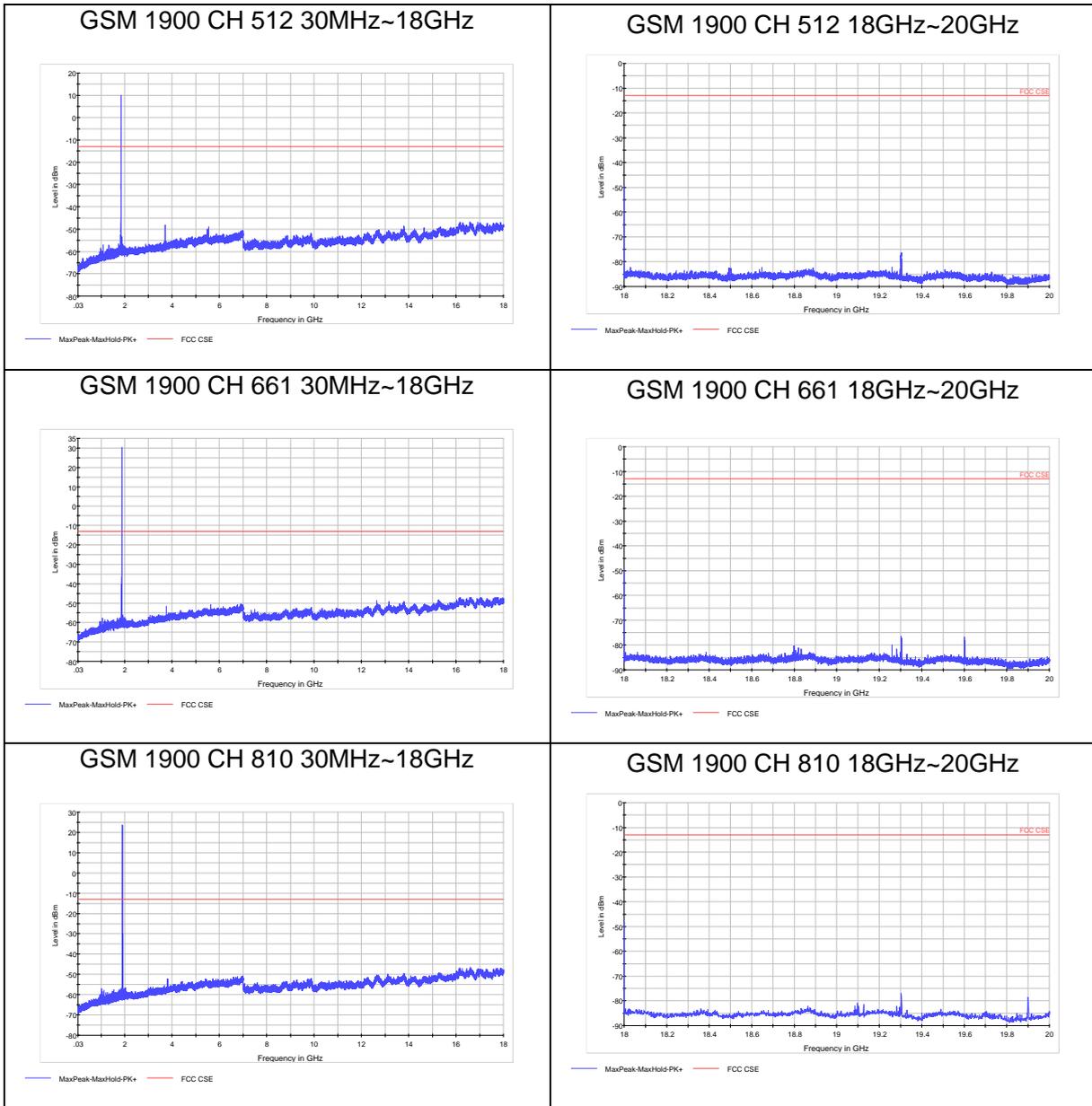
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-18GHz	1.407 dB



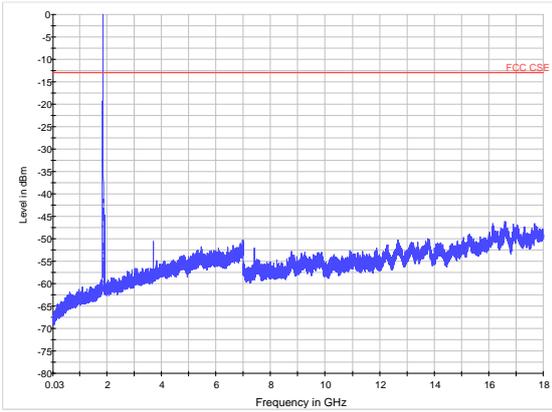
### Test Result

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.



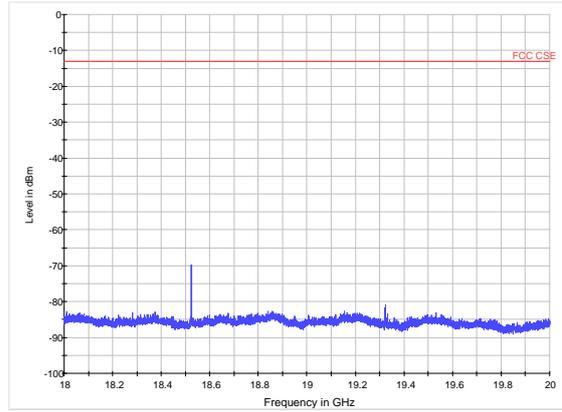


### WCDMA Band II CH9262 30MHz~18GHz



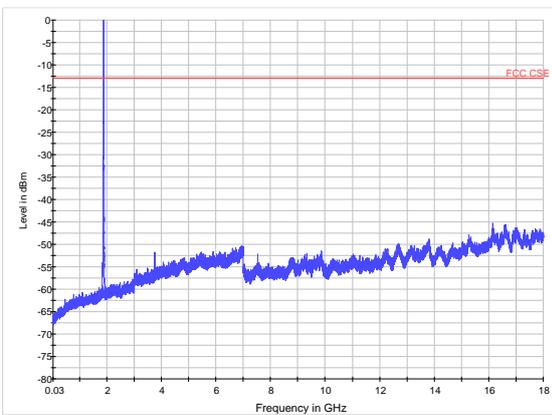
MaxPeak-MaxHold-PK+ FCC CSE

### WCDMA Band II CH9262 18GHz~20GHz



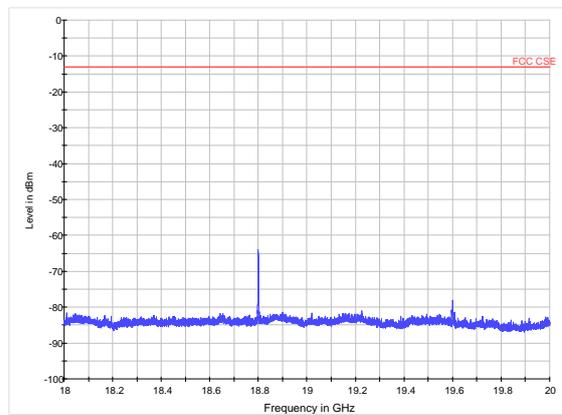
MaxPeak-MaxHold-PK+ FCC CSE

### WCDMA Band II CH9400 30MHz~18GHz



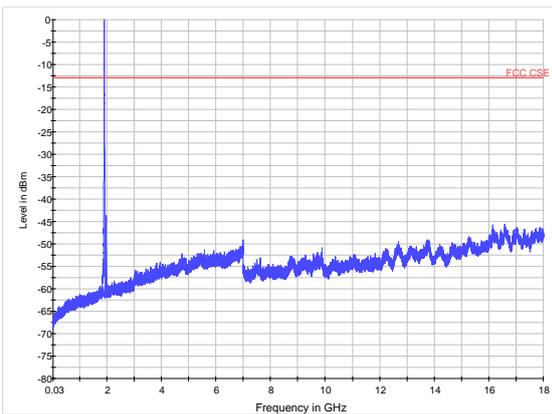
MaxPeak-MaxHold-PK+ FCC CSE

### WCDMA Band II CH9400 18GHz~20GHz



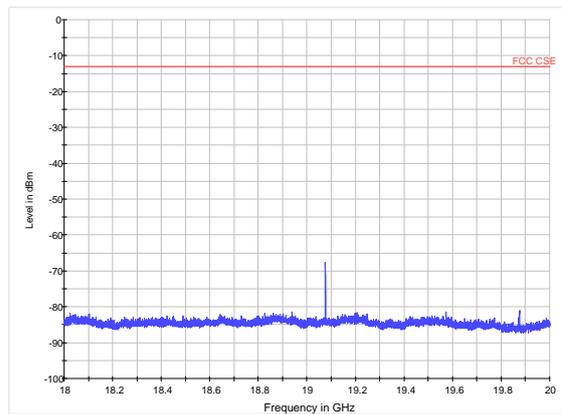
MaxPeak-MaxHold-PK+ FCC CSE

### WCDMA Band II CH9538 30MHz~18GHz



MaxPeak-MaxHold-PK+ FCC CSE

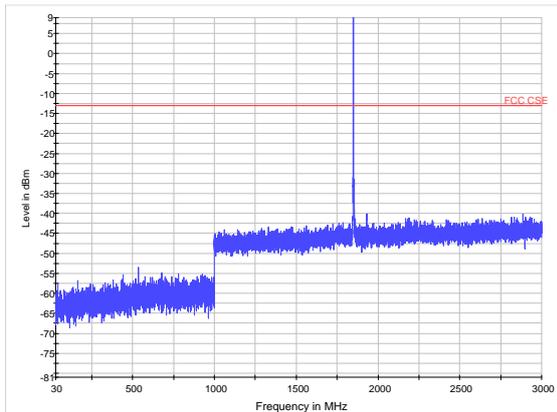
### WCDMA Band II CH9538 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

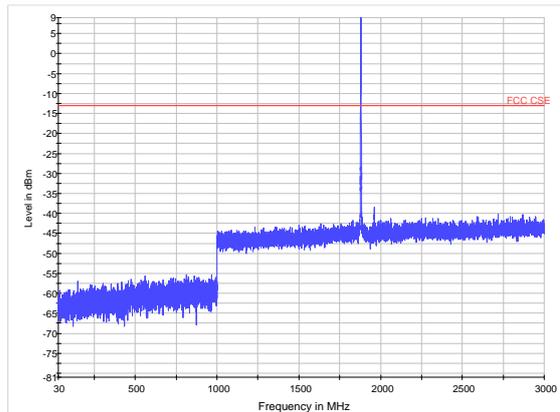


LTE Band 2 1.4MHz CH18607 30MHz~3GHz



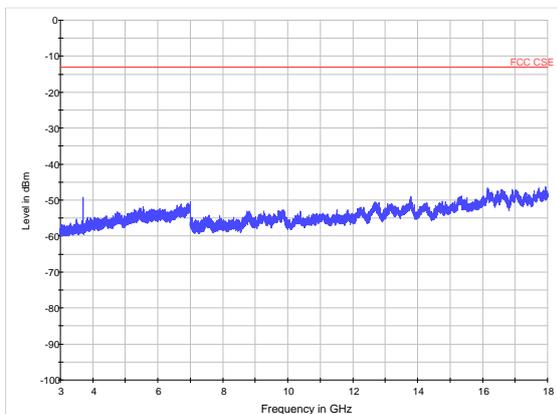
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH18900 30MHz~3GHz



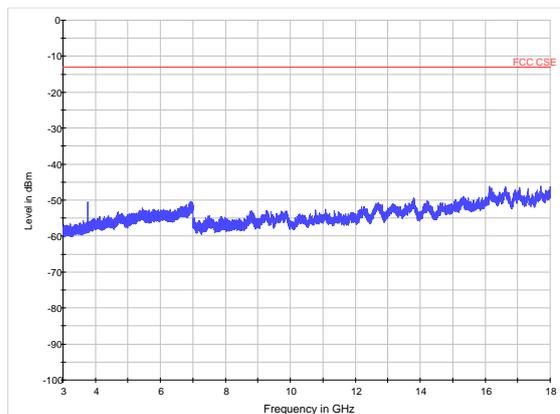
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH18607 3GHz~18GHz



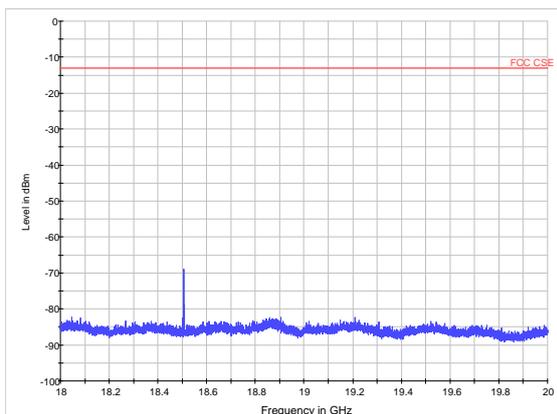
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH18900 3GHz~18GHz



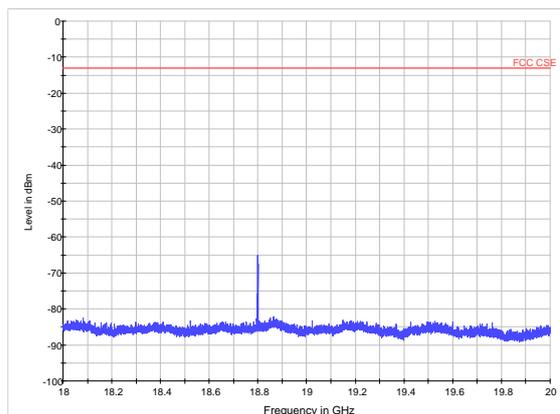
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH18607 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

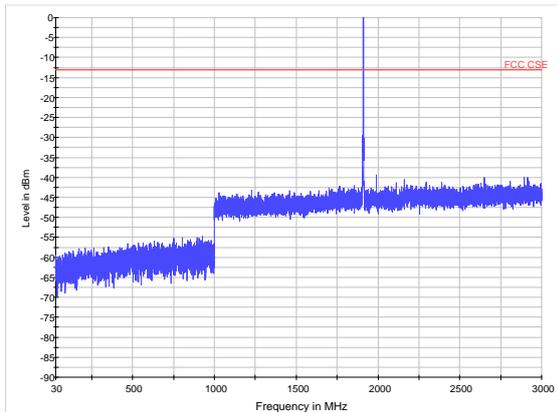
LTE Band 2 1.4MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

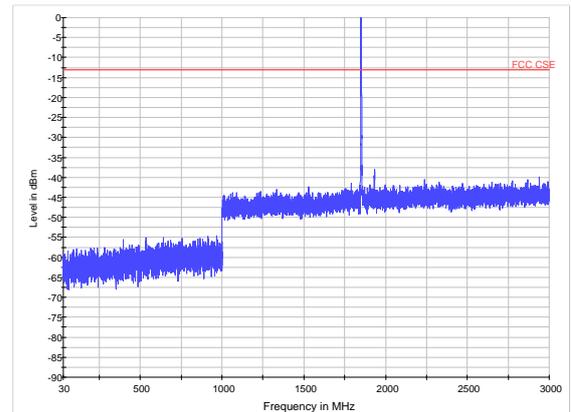


LTE Band 2 1.4MHz CH19193 30MHz~3GHz



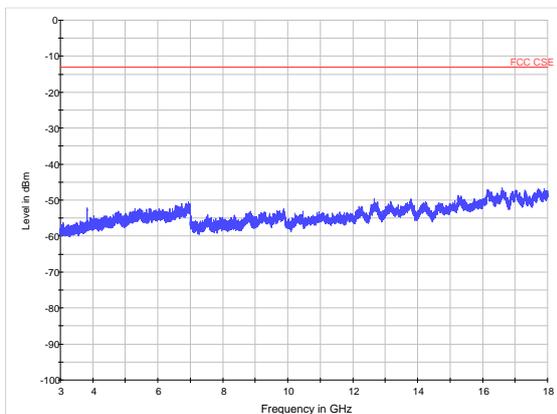
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH18615 30MHz~3GHz



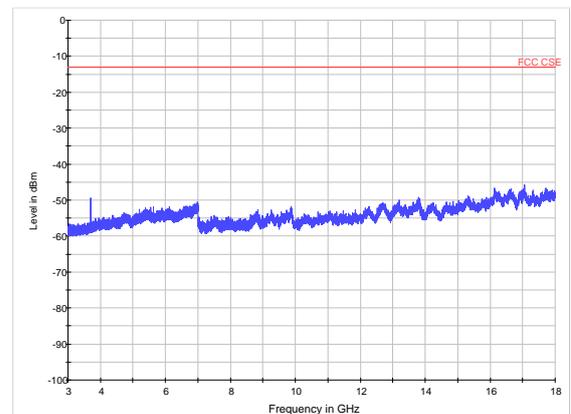
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH19193 3GHz~18GHz



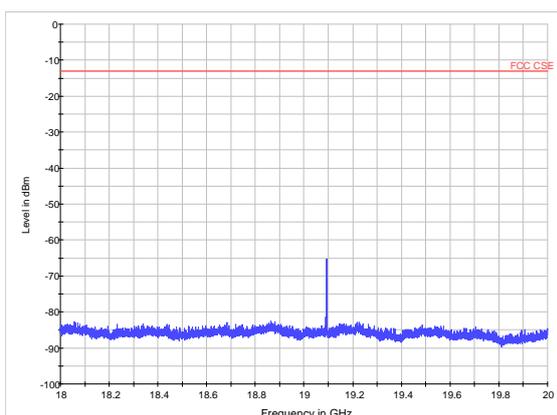
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH18615 3GHz~18GHz



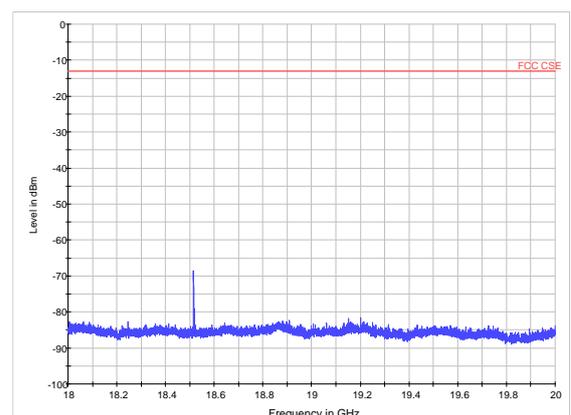
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 1.4MHz CH19193 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

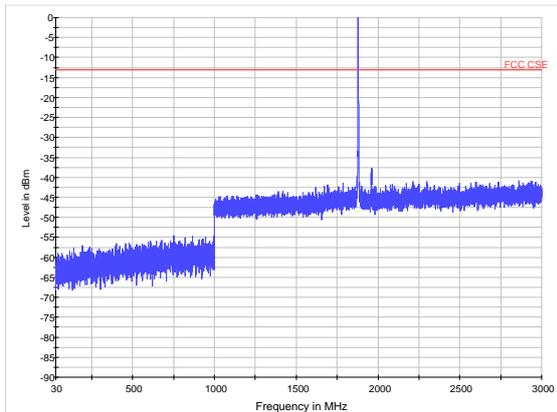
LTE Band 2 3MHz CH18615 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

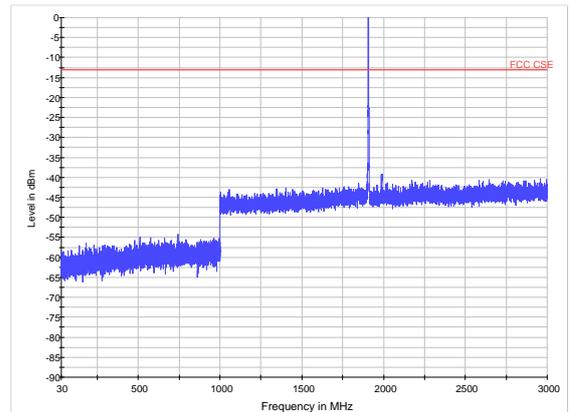


LTE Band 2 3MHz CH18900 30MHz~3GHz



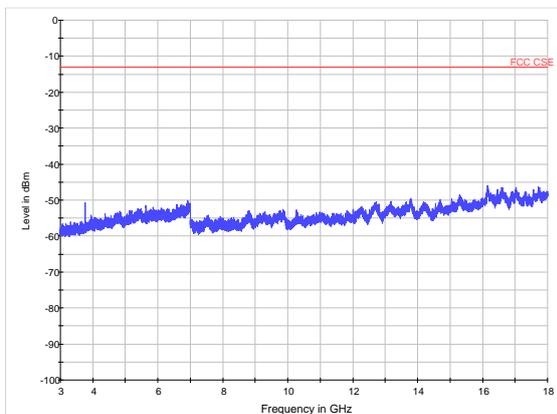
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH19185 30MHz~3GHz



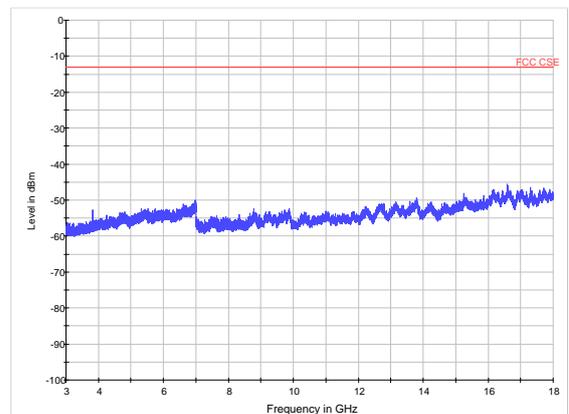
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH18900 3GHz~18GHz



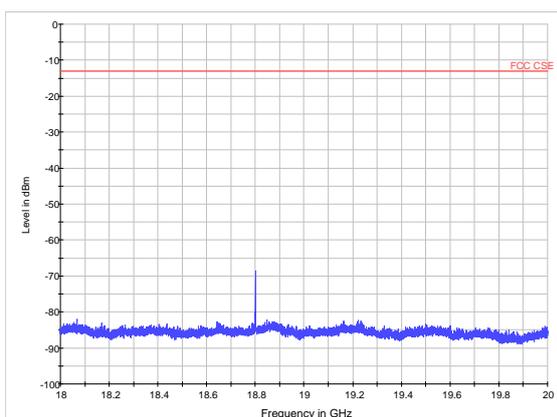
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH19185 3GHz~18GHz



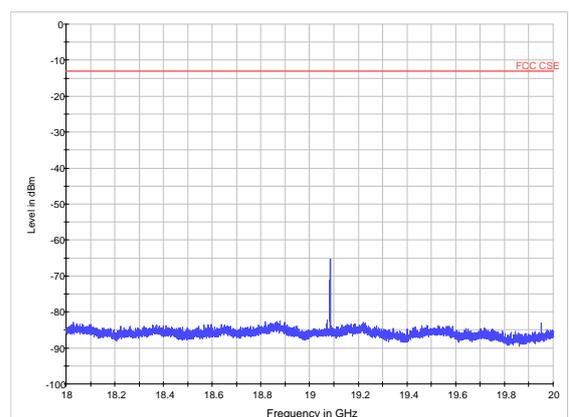
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 3MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

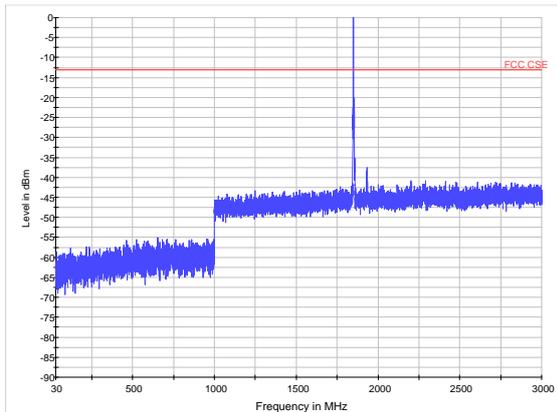
LTE Band 2 3MHz CH19185 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

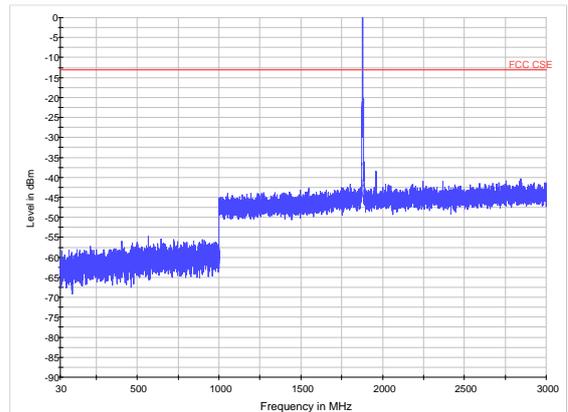


LTE Band 2 5MHz CH18625 30MHz~3GHz



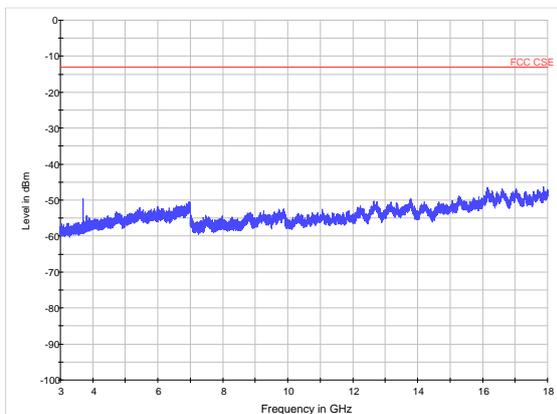
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 5MHz CH18900 30MHz~3GHz



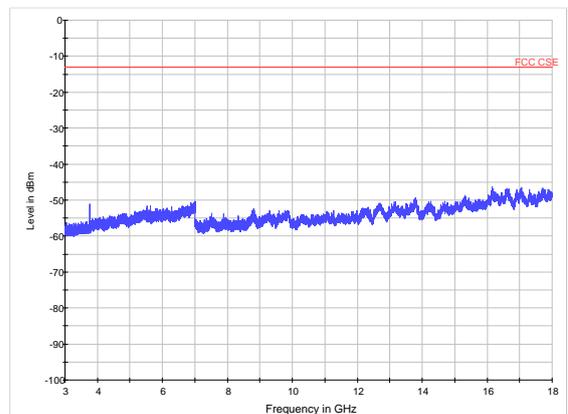
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 5MHz CH18625 3GHz~18GHz



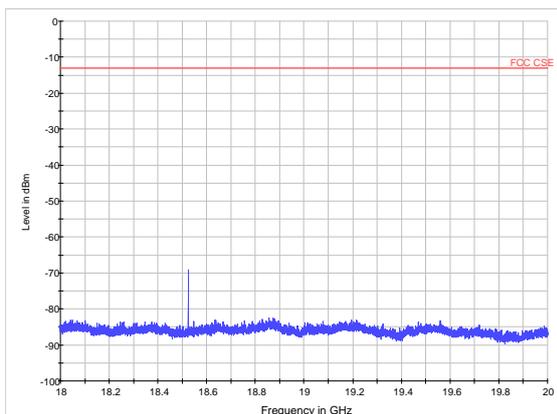
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 5MHz CH18900 3GHz~18GHz



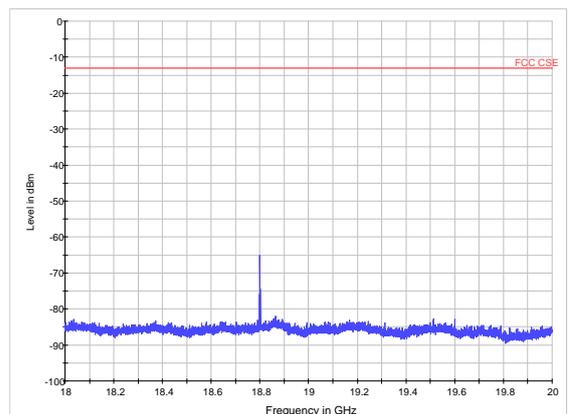
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 5MHz CH18625 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

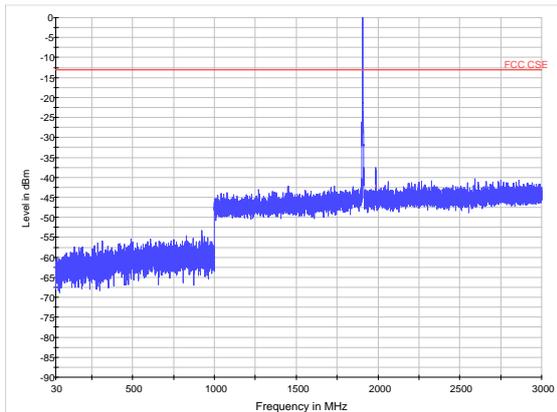
LTE Band 2 5MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

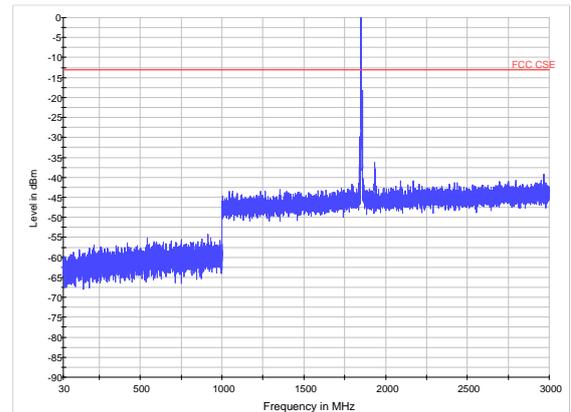


LTE Band 2 5MHz CH19175 30MHz~3GHz



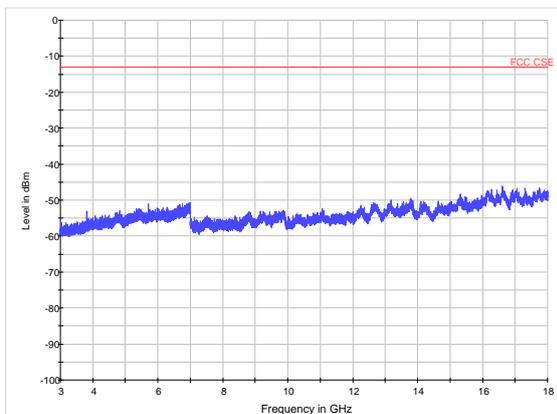
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 10MHz CH18650 30MHz~3GHz



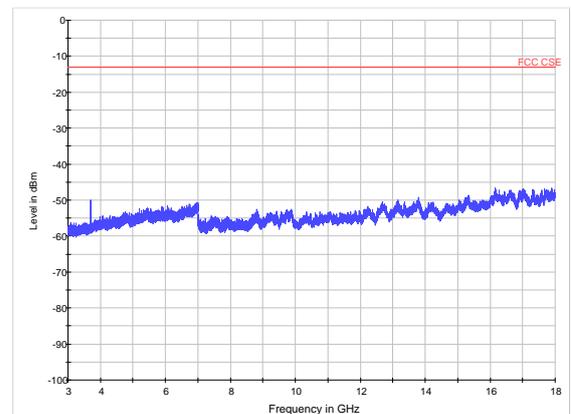
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LTE Band 2 5MHz CH19175 3GHz~18GHz



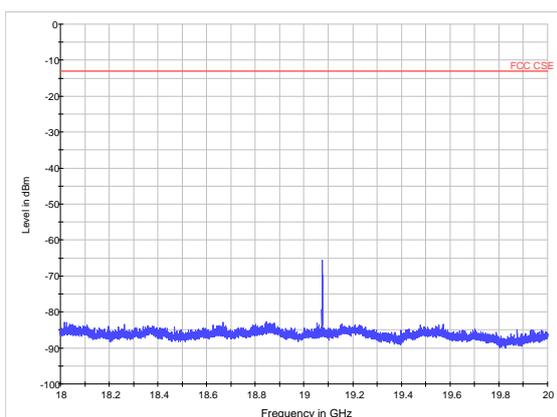
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LTE Band 2 10MHz CH18650 3GHz~18GHz



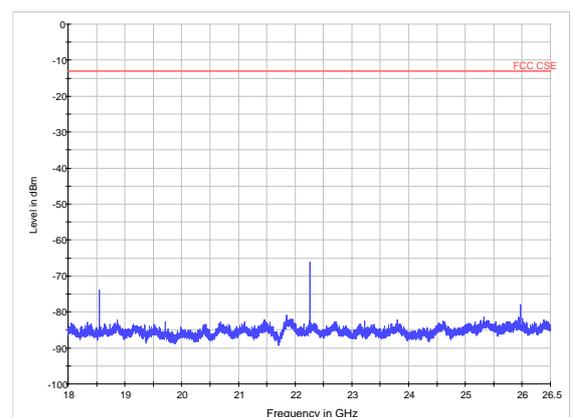
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LTE Band 2 5MHz CH19175 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

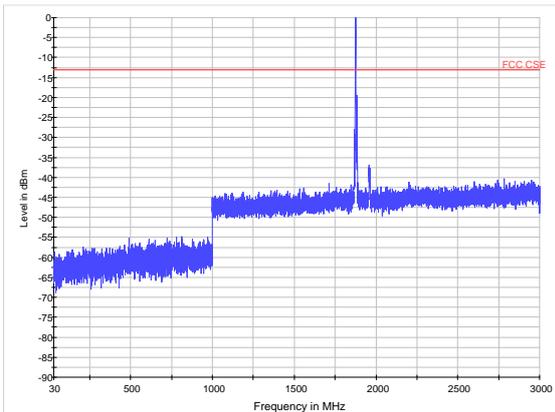
LTE Band 2 10MHz CH18650 18GHz~20GHz



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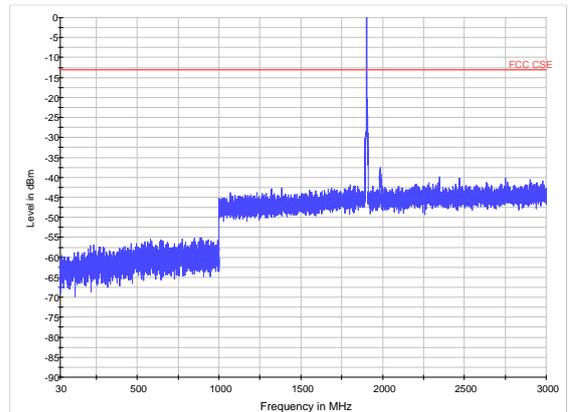


LTE Band 2 10MHz CH18900 30MHz~3GHz



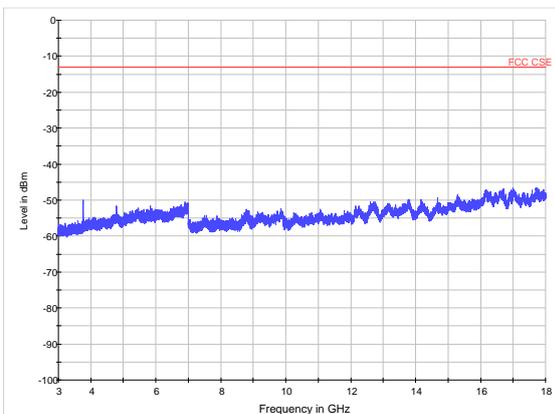
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 10MHz CH19150 30MHz~3GHz



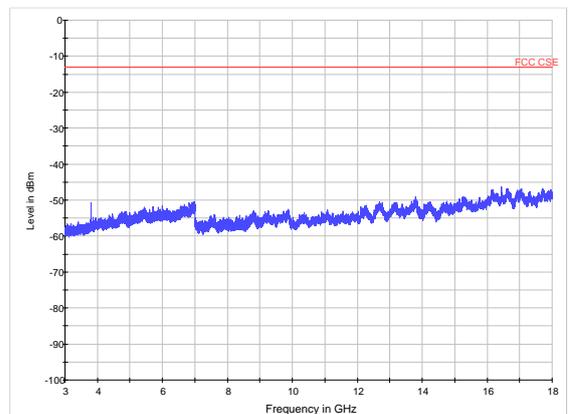
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 10MHz CH18900 3GHz~18GHz



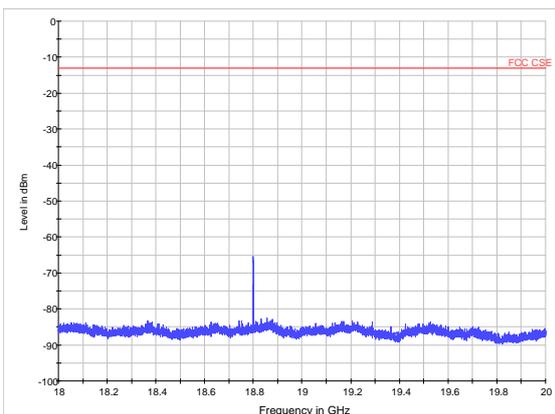
MaxPeak-MaxHold-PK+ FCC CSE

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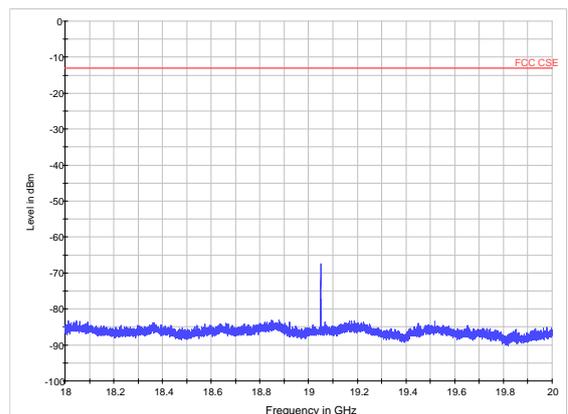
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 10MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

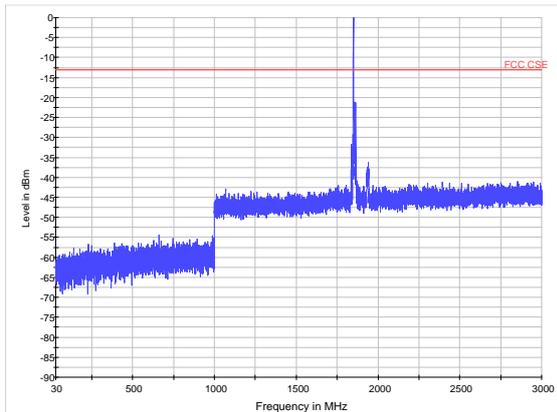
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MaxPeak-MaxHold-PK+ FCC CSE

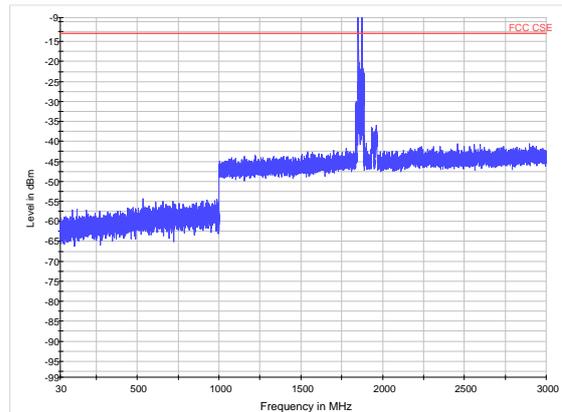


LTE Band 2 15MHz CH18675 30MHz~3GHz



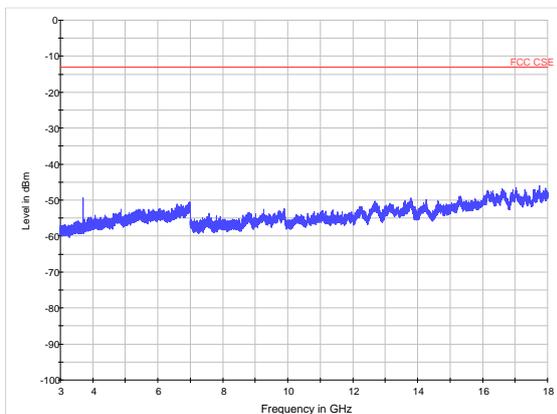
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH18900 30MHz~3GHz



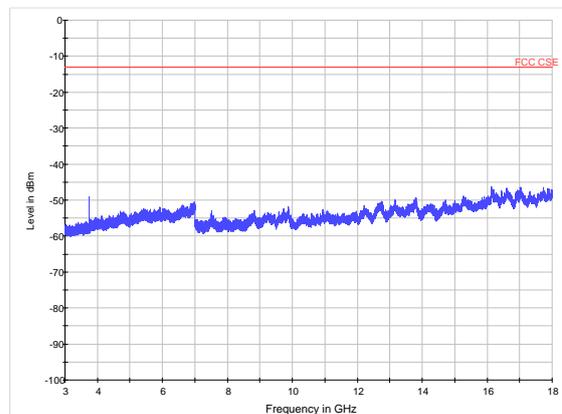
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH18675 3GHz~18GHz



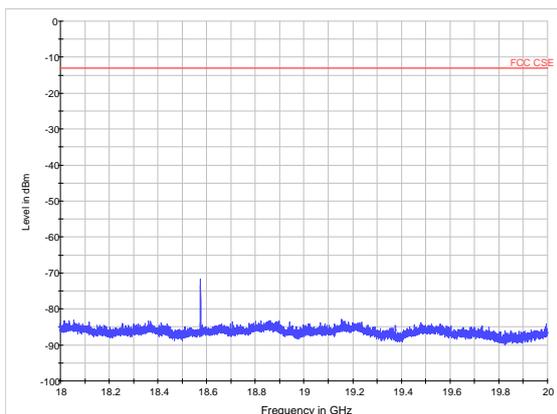
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH18900 3GHz~18GHz



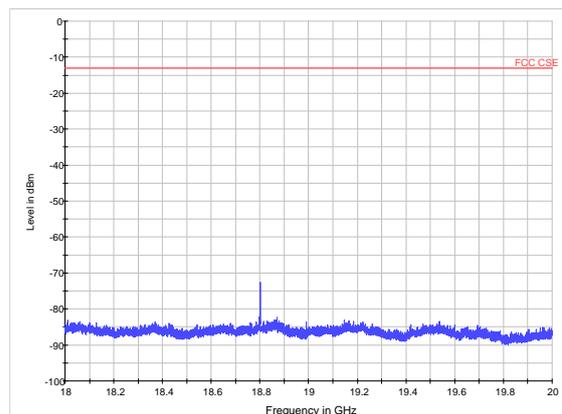
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH18675 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

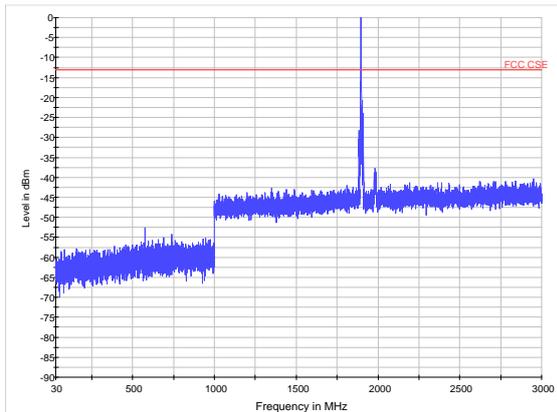
LTE Band 2 15MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

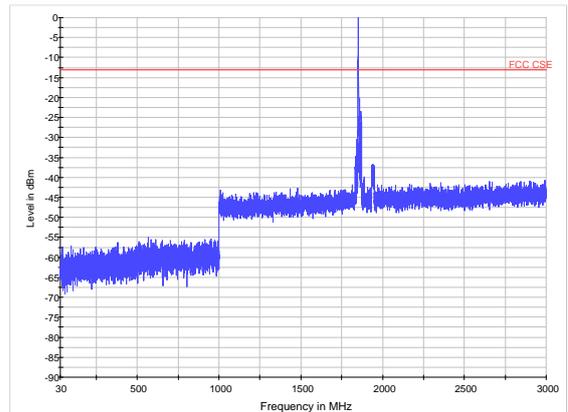


LTE Band 2 15MHz CH19175 30MHz~3GHz



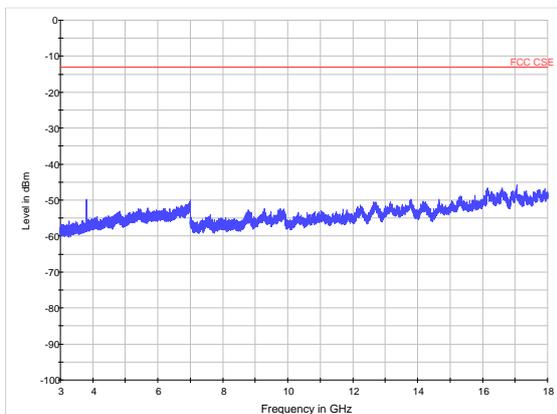
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH18700 30MHz~3GHz



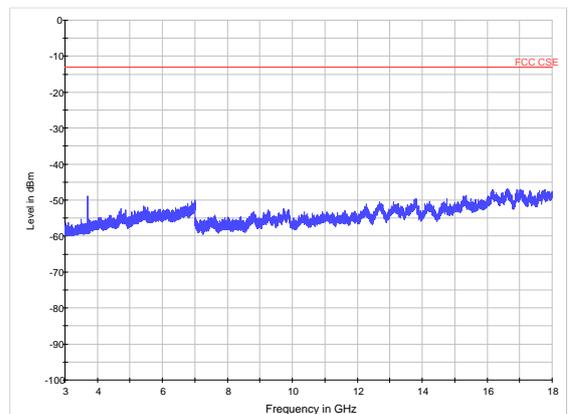
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH19175 3GHz~18GHz



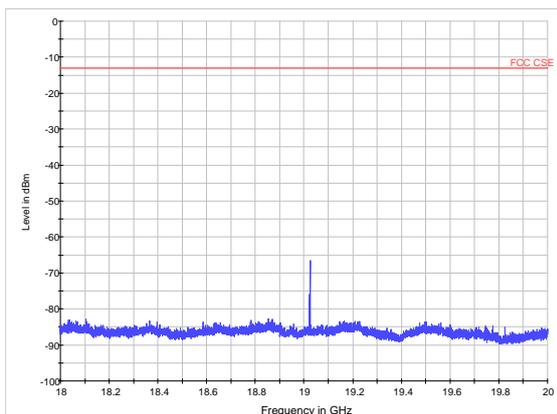
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH18700 3GHz~18GHz



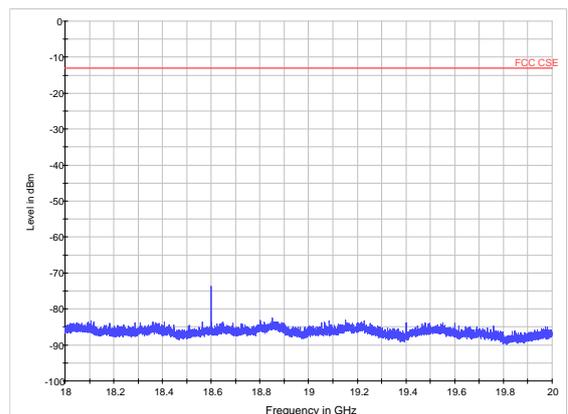
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 15MHz CH19175 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

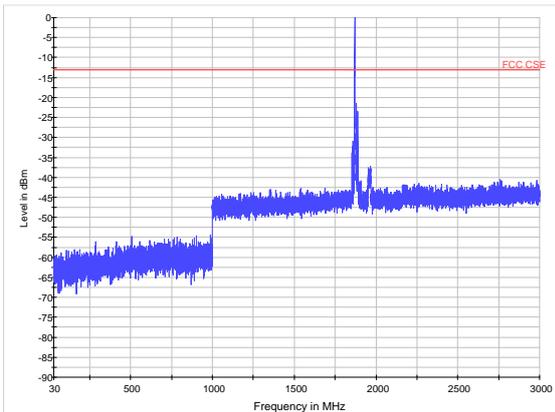
LTE Band 2 20MHz CH18700 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

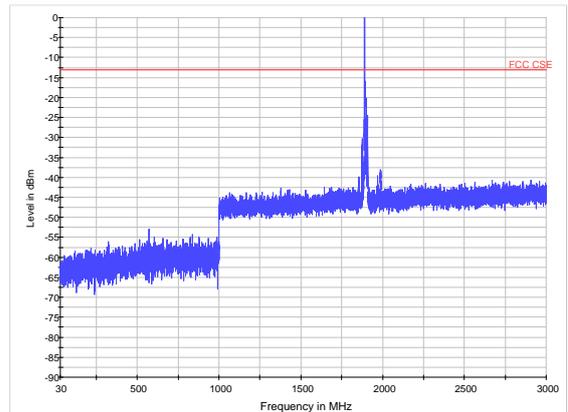


LTE Band 2 20MHz CH18900 30MHz~3GHz



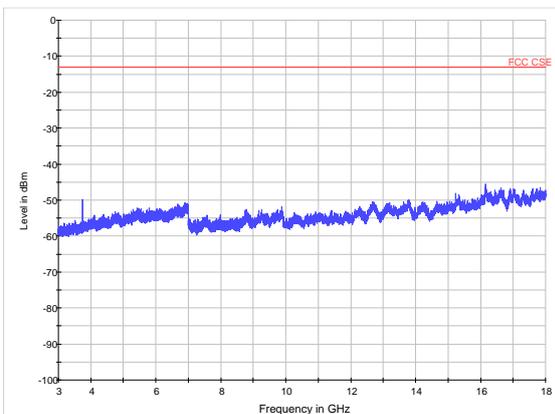
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH19200 30MHz~3GHz



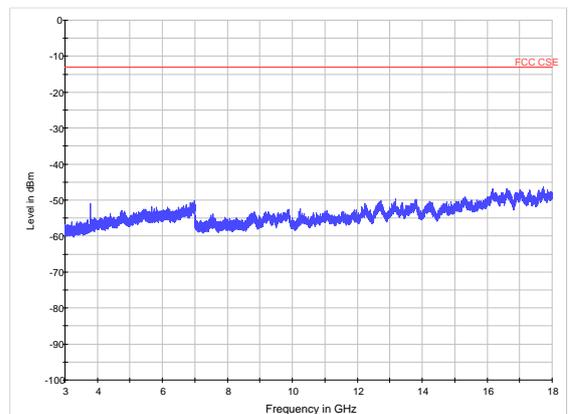
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH18900 3GHz~18GHz



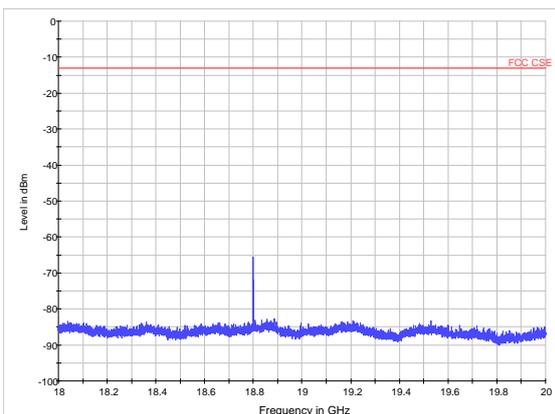
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH19200 3GHz~18GHz



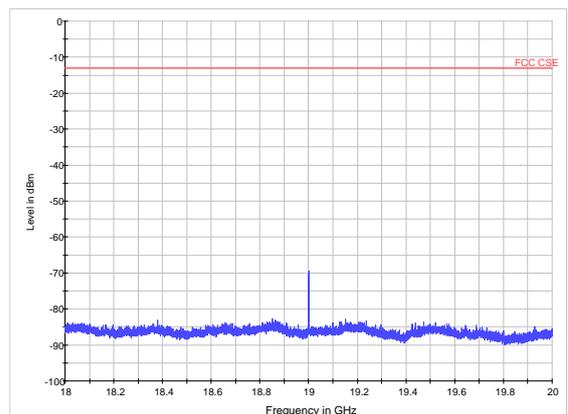
MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH18900 18GHz~20GHz



MaxPeak-MaxHold-PK+ FCC CSE

LTE Band 2 20MHz CH19200 18GHz~20GHz



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## 5.8. Radiates Spurious Emission

### Ambient condition

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

### Method of Measurement

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

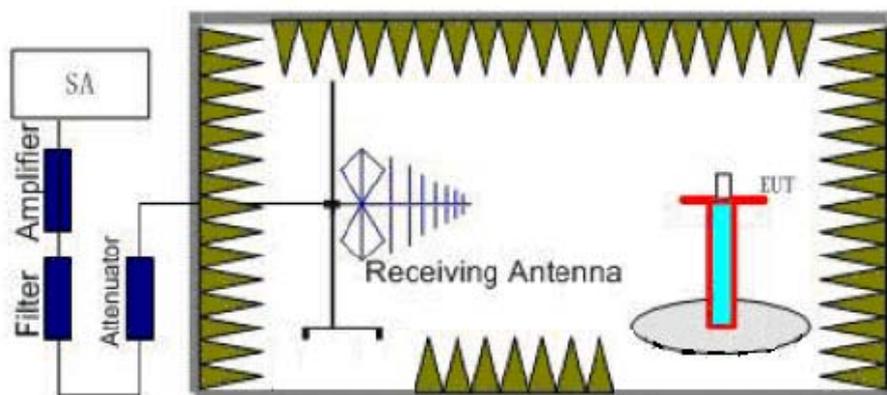
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

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

The procedure of Radiates Spurious Emission is as follows:

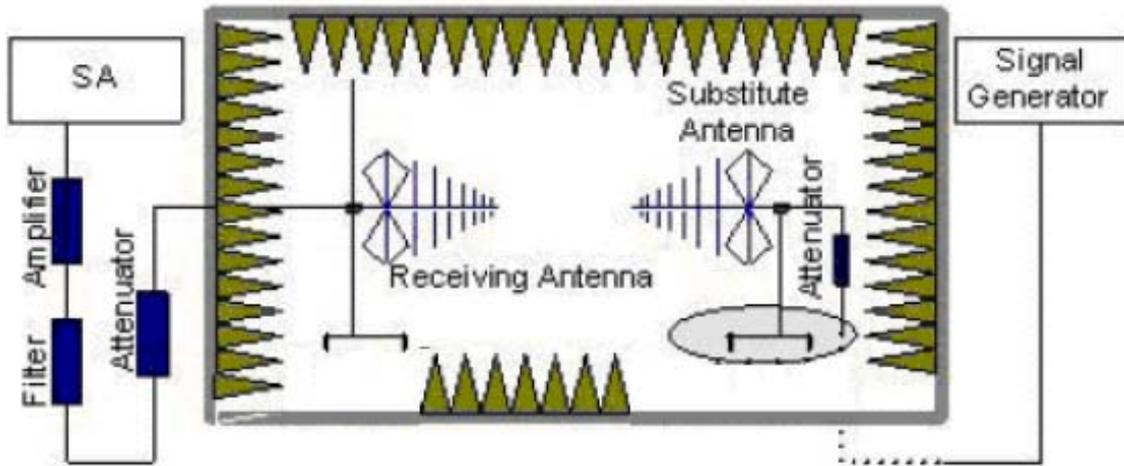
Step 1:

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 3MHz. 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.



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

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

The field strength of spurious emission was measured in the following position: 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.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

**Limits**

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log<sub>10</sub> (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**

## GSM 1900 CH 512

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700	-38.33	5.1	11.05	vertical	-32.38	-13.00	19.38	135
3	5550.8	-47.23	5.42	12.65	vertical	-40.00	-13.00	27.00	90
4	7401	-58.53	6.7	13.85	vertical	-51.38	-13.00	38.38	45
5	9251	-58.00	7.01	14.75	vertical	-50.26	-13.00	37.26	180
6	11101	-58.50	7.48	15.95	vertical	-50.03	-13.00	37.03	90
7	12951	-56.48	7.51	16.55	vertical	-47.44	-13.00	34.44	135
8	14802	-51.31	8.24	15.35	vertical	-44.20	-13.00	31.20	0
9	16652	-48.71	8.41	14.95	vertical	-42.17	-13.00	29.17	45
10	18502	-87.17	8.54	15.45	vertical	-80.26	-13.00	67.26	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.

## GSM 1900 CH 661

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-50.23	5.1	11.05	vertical	-44.28	-13.00	31.28	90
3	5640	-45.80	5.42	12.65	vertical	-38.57	-13.00	25.57	225
4	7520	-59.43	6.7	13.85	vertical	-52.28	-13.00	39.28	270
5	9400	-58.90	7.01	14.75	vertical	-51.16	-13.00	38.16	180
6	11280	-58.70	7.48	15.95	vertical	-50.23	-13.00	37.23	135
7	13160	-57.58	7.51	16.55	vertical	-48.54	-13.00	35.54	270
8	15040	-52.81	8.24	15.35	vertical	-45.70	-13.00	32.70	0
9	16920	-50.11	8.41	14.95	vertical	-43.57	-13.00	30.57	180
10	18800	-84.48	8.54	15.45	vertical	-77.57	-13.00	64.57	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.

GSM 1900 CH 810

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819	-45.57	5.1	11.05	vertical	-39.62	-13.00	26.62	225
3	5730	-52.29	5.42	12.65	vertical	-45.06	-13.00	32.06	270
4	7639	-60.03	6.7	13.85	vertical	-52.88	-13.00	39.88	135
5	9549	-59.36	7.01	14.75	vertical	-51.62	-13.00	38.62	45
6	11459	-60.00	7.48	15.95	vertical	-51.53	-13.00	38.53	180
7	13369	-55.78	7.51	16.55	vertical	-46.74	-13.00	33.74	90
8	15278	-52.31	8.24	15.35	vertical	-45.20	-13.00	32.20	135
9	17188	-50.21	8.41	14.95	vertical	-43.67	-13.00	30.67	0
10	19097.8	-87.42	8.54	15.45	vertical	-80.51	-13.00	67.51	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.

WCDMA Band II CH9662

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3705	-55.34	5.1	11.05	vertical	-49.39	-13.00	36.39	180
3	5557	-56.62	5.42	12.65	vertical	-49.39	-13.00	36.39	90
4	7410	-57.71	6.7	13.85	vertical	-50.56	-13.00	37.56	225
5	9262	-57.19	7.01	14.75	vertical	-49.45	-13.00	36.45	270
6	11114	-58.06	7.48	15.95	vertical	-49.59	-13.00	36.59	180
7	12967	-55.84	7.51	16.55	vertical	-46.8	-13.00	33.80	135
8	14819	-51.22	8.24	15.35	vertical	-44.11	-13.00	31.11	270
9	16672	-48.62	8.41	14.95	vertical	-42.08	-13.00	29.08	0
10	18524	-87.40	8.54	15.45	vertical	-80.49	-13.00	67.49	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.



## WCDMA Band II CH9800

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-55.82	5.1	11.05	vertical	-49.87	-13.00	36.87	0
3	5640	-54.21	5.42	12.65	vertical	-46.98	-13.00	33.98	45
4	7520	-61.04	6.7	13.85	vertical	-53.89	-13.00	40.89	180
5	9400	-61.18	7.01	14.75	vertical	-53.44	-13.00	40.44	90
6	11280	-55.33	7.48	15.95	vertical	-46.86	-13.00	33.86	225
7	13160	-55.08	7.51	16.55	vertical	-46.04	-13.00	33.04	270
8	15040	-52.51	8.24	15.35	vertical	-45.4	-13.00	32.40	180
9	16920	-48.33	8.41	14.95	vertical	-41.79	-13.00	28.79	135
10	18502	-85.23	8.54	15.45	vertical	-78.32	-13.00	65.32	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.

## WCDMA Band II CH9938

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3815	-53.27	5.1	11.05	vertical	-47.32	-13.00	34.32	0
3	5723	-55.43	5.42	12.65	vertical	-48.2	-13.00	35.20	180
4	7630	-55.78	6.7	13.85	vertical	-48.63	-13.00	35.63	90
5	9538	-58.98	7.01	14.75	vertical	-51.24	-13.00	38.24	225
6	11446	-55.44	7.48	15.95	vertical	-46.97	-13.00	33.97	270
7	13353	-55.63	7.51	16.55	vertical	-46.59	-13.00	33.59	135
8	15261	-49.39	8.24	15.35	vertical	-42.28	-13.00	29.28	45
9	17168	-48.02	8.41	14.95	vertical	-41.48	-13.00	28.48	225
10	19076	-88.22	8.54	15.45	vertical	-81.31	-13.00	68.31	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 2 1.4MHz CH607

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3701	-58.84	5.1	11.05	vertical	-52.89	-13.00	39.89	270
3	5552	-58.40	5.42	12.65	vertical	-51.17	-13.00	38.17	45
4	7403	-62.57	6.7	13.85	vertical	-55.42	-13.00	42.42	135
5	9254	-60.69	7.01	14.75	vertical	-52.95	-13.00	39.95	270
6	11104	-70.28	7.48	15.95	vertical	-61.81	-13.00	48.81	0
7	12955	-68.84	7.51	16.55	vertical	-59.8	-13.00	46.80	180
8	14806	-64.52	8.24	15.35	vertical	-57.41	-13.00	44.41	90
9	16656	-61.73	8.41	14.95	vertical	-55.19	-13.00	42.19	225
10	18507	-59.10	8.54	15.45	vertical	-52.19	-13.00	39.19	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 2 1.4MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-60.11	5.10	11.05	vertical	-54.16	-13.00	41.16	0
3	5640	-58.60	5.42	12.65	vertical	-51.37	-13.00	38.37	45
4	7520	-62.37	6.70	13.85	vertical	-55.22	-13.00	42.22	0
5	9400	-60.36	7.01	14.75	vertical	-52.62	-13.00	39.62	135
6	11280	-70.42	7.48	15.95	vertical	-61.95	-13.00	48.95	0
7	13160	-68.94	7.51	16.55	vertical	-59.90	-13.00	46.90	45
8	15040	-63.62	8.24	15.35	vertical	-56.51	-13.00	43.51	180
9	16920	-61.21	8.41	14.95	vertical	-54.67	-13.00	41.67	90
10	18800	-62.11	8.54	15.45	vertical	-55.20	-13.00	42.20	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 2 1.4MHz CH1193

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819	-60.40	5.10	11.05	vertical	-54.45	-13.00	41.45	270
3	5728	-55.30	5.42	12.65	vertical	-48.07	-13.00	35.07	180
4	7637	-60.04	6.70	13.85	vertical	-52.89	-13.00	39.89	135
5	9547	-60.25	7.01	14.75	vertical	-52.51	-13.00	39.51	270
6	11456	-69.25	7.48	15.95	vertical	-60.78	-13.00	47.78	0
7	13365	-67.69	7.51	16.55	vertical	-58.65	-13.00	45.65	180
8	15274	-62.82	8.24	15.35	vertical	-55.71	-13.00	42.71	90
9	17184	-61.02	8.41	14.95	vertical	-54.48	-13.00	41.48	225
10	19093	-59.29	8.54	15.45	vertical	-52.38	-13.00	39.38	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 2 3MHz CH615

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3703	-70.15	5.10	11.05	vertical	-64.2	-13.00	51.20	270
3	5555	-63.52	5.42	12.65	vertical	-56.29	-13.00	43.29	45
4	7406	-70.96	6.70	13.85	vertical	-63.81	-13.00	50.81	0
5	9258	-69.50	7.01	14.75	vertical	-61.76	-13.00	48.76	270
6	11109	-70.83	7.48	15.95	vertical	-62.36	-13.00	49.36	315
7	12961	-67.94	7.51	16.55	vertical	-58.9	-13.00	45.90	225
8	14812	-64.15	8.24	15.35	vertical	-57.04	-13.00	44.04	135
9	16664	-61.36	8.41	14.95	vertical	-54.82	-13.00	41.82	270
10	18515	-60.89	8.54	15.45	vertical	-53.98	-13.00	40.98	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2.The worst emission was found in the antenna is vertical position.



## LTE Band 2 3MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-59.11	5.10	11.05	vertical	-53.16	-13.00	40.16	45
3	5640	-55.22	5.42	12.65	vertical	-47.99	-13.00	34.99	0
4	7520	-63.23	6.70	13.85	vertical	-56.08	-13.00	43.08	135
5	9400	-62.69	7.01	14.75	vertical	-54.95	-13.00	41.95	0
6	11280	-68.06	7.48	15.95	vertical	-59.59	-13.00	46.59	45
7	13160	-68.48	7.51	16.55	vertical	-59.44	-13.00	46.44	180
8	15040	-63.91	8.24	15.35	vertical	-56.8	-13.00	43.80	90
9	16920	-60.32	8.41	14.95	vertical	-53.78	-13.00	40.78	225
10	18800	-59.42	8.54	15.45	vertical	-52.51	-13.00	39.51	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 2 3MHz CH1185

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3817	-60.20	5.10	11.05	vertical	-54.25	-13.00	41.25	90
3	5726	-54.41	5.42	12.65	vertical	-47.18	-13.00	34.18	135
4	7634	-61.74	6.70	13.85	vertical	-54.59	-13.00	41.59	270
5	9543	-64.50	7.01	14.75	vertical	-56.76	-13.00	43.76	0
6	11451	-68.96	7.48	15.95	vertical	-60.49	-13.00	47.49	135
7	13360	-67.54	7.51	16.55	vertical	-58.5	-13.00	45.50	0
8	15268	-63.22	8.24	15.35	vertical	-56.11	-13.00	43.11	45
9	17177	-61.14	8.41	14.95	vertical	-54.6	-13.00	41.60	180
10	19085	-60.11	8.54	15.45	vertical	-53.2	-13.00	40.20	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 2 5MHz CH625

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3705	-59.07	5.10	11.05	vertical	-53.12	-13.00	40.12	225
3	5558	-56.71	5.42	12.65	vertical	-49.48	-13.00	36.48	270
4	7410	-64.17	6.70	13.85	vertical	-57.02	-13.00	44.02	180
5	9263	-63.13	7.01	14.75	vertical	-55.39	-13.00	42.39	135
6	11115	-71.55	7.48	15.95	vertical	-63.08	-13.00	50.08	270
7	12968	-68.54	7.51	16.55	vertical	-59.5	-13.00	46.50	0
8	14820	-64.09	8.24	15.35	vertical	-56.98	-13.00	43.98	180
9	16673	-60.98	8.41	14.95	vertical	-54.44	-13.00	41.44	90
10	18525	-59.74	8.54	15.45	vertical	-52.83	-13.00	39.83	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 2 5MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-61.14	5.10	11.05	vertical	-55.19	-13.00	42.19	90
3	5640	-55.48	5.42	12.65	vertical	-48.25	-13.00	35.25	225
4	7520	-64.17	6.70	13.85	vertical	-57.02	-13.00	44.02	270
5	9400	-60.24	7.01	14.75	vertical	-52.5	-13.00	39.50	135
6	11280	-69.47	7.48	15.95	vertical	-61	-13.00	48.00	45
7	13160	-68.40	7.51	16.55	vertical	-59.36	-13.00	46.36	0
8	15040	-63.07	8.24	15.35	vertical	-55.96	-13.00	42.96	270
9	16920	-61.24	8.41	14.95	vertical	-54.7	-13.00	41.70	315
10	18800	-62.19	8.54	15.45	vertical	-55.28	-13.00	42.28	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 2 5MHz CH1175

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3815	-61.92	5.10	11.05	vertical	-55.97	-13.00	42.97	270
3	5723	-53.53	5.42	12.65	vertical	-46.3	-13.00	33.30	135
4	7630	-62.37	6.70	13.85	vertical	-55.22	-13.00	42.22	45
5	9538	-66.18	7.01	14.75	vertical	-58.44	-13.00	45.44	0
6	11445	-69.54	7.48	15.95	vertical	-61.07	-13.00	48.07	270
7	13353	-67.97	7.51	16.55	vertical	-58.93	-13.00	45.93	315
8	15260	-62.56	8.24	15.35	vertical	-55.45	-13.00	42.45	225
9	17168	-60.90	8.41	14.95	vertical	-54.36	-13.00	41.36	135
10	19075	-64.78	8.54	15.45	vertical	-57.87	-13.00	44.87	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 2 10MHz CH650

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3710	-59.65	5.10	11.05	vertical	-53.70	-13.00	40.70	0
3	5565	-55.62	5.42	12.65	vertical	-48.39	-13.00	35.39	135
4	7420	-63.62	6.70	13.85	vertical	-56.47	-13.00	43.47	0
5	9275	-59.73	7.01	14.75	vertical	-51.99	-13.00	38.99	45
6	11130	-71.03	7.48	15.95	vertical	-62.56	-13.00	49.56	90
7	12985	-67.90	7.51	16.55	vertical	-58.86	-13.00	45.86	225
8	14840	-64.28	8.24	15.35	vertical	-57.17	-13.00	44.17	270
9	16695	-60.86	8.41	14.95	vertical	-54.32	-13.00	41.32	180
10	18550	-62.77	8.54	15.45	vertical	-55.86	-13.00	42.86	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 2 10MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-59.12	5.10	11.05	vertical	-53.17	-13.00	40.17	270
3	5640	-53.80	5.42	12.65	vertical	-46.57	-13.00	33.57	0
4	7520	-64.17	6.70	13.85	vertical	-57.02	-13.00	44.02	180
5	9400	-60.37	7.01	14.75	vertical	-52.63	-13.00	39.63	90
6	11280	-69.82	7.48	15.95	vertical	-61.35	-13.00	48.35	180
7	13160	-68.22	7.51	16.55	vertical	-59.18	-13.00	46.18	90
8	15040	-63.45	8.24	15.35	vertical	-56.34	-13.00	43.34	225
9	16920	-60.44	8.41	14.95	vertical	-53.9	-13.00	40.90	270
10	18800	-61.16	8.54	15.45	vertical	-54.25	-13.00	41.25	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 2 10MHz CH1150

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3810	-58.81	5.10	11.05	vertical	-52.86	-13.00	39.86	45
3	5715	-54.55	5.42	12.65	vertical	-47.32	-13.00	34.32	0
4	7620	-63.44	6.70	13.85	vertical	-56.29	-13.00	43.29	225
5	9525	-66.97	7.01	14.75	vertical	-59.23	-13.00	46.23	135
6	11430	-69.27	7.48	15.95	vertical	-60.8	-13.00	47.80	270
7	13335	-67.77	7.51	16.55	vertical	-58.73	-13.00	45.73	0
8	15240	-62.71	8.24	15.35	vertical	-55.6	-13.00	42.60	135
9	17145	-61.25	8.41	14.95	vertical	-54.71	-13.00	41.71	0
10	19050	-65.14	8.54	15.45	vertical	-58.23	-13.00	45.23	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 2 15MHz CH675

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3715.0	-59.09	5.10	11.05	vertical	-53.14	-13.00	40.14	90
3	5572.5	-56.48	5.42	12.65	vertical	-49.25	-13.00	36.25	225
4	7430.0	-63.98	6.70	13.85	vertical	-56.83	-13.00	43.83	270
5	9287.5	-63.72	7.01	14.75	vertical	-55.98	-13.00	42.98	180
6	11145.0	-69.05	7.48	15.95	vertical	-60.58	-13.00	47.58	135
7	13002.5	-67.78	7.51	16.55	vertical	-58.74	-13.00	45.74	270
8	14860.0	-63.61	8.24	15.35	vertical	-56.5	-13.00	43.50	0
9	16717.5	-61.37	8.41	14.95	vertical	-54.83	-13.00	41.83	90
10	18575.0	-63.20	8.54	15.45	vertical	-56.29	-13.00	43.29	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 2 15MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-59.08	5.10	11.05	vertical	-53.13	-13.00	40.13	90
3	5640.0	-54.27	5.42	12.65	vertical	-47.04	-13.00	34.04	225
4	7520.0	-64.38	6.70	13.85	vertical	-57.23	-13.00	44.23	270
5	9400.0	-61.27	7.01	14.75	vertical	-53.53	-13.00	40.53	135
6	11280.0	-69.20	7.48	15.95	vertical	-60.73	-13.00	47.73	45
7	13160.0	-68.06	7.51	16.55	vertical	-59.02	-13.00	46.02	0
8	15040.0	-63.29	8.24	15.35	vertical	-56.18	-13.00	43.18	225
9	16920.0	-60.44	8.41	14.95	vertical	-53.9	-13.00	40.90	135
10	18800.0	-61.53	8.54	15.45	vertical	-54.62	-13.00	41.62	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 2 15MHz CH1125

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3805.0	-57.18	5.10	11.05	vertical	-51.23	-13.00	38.23	0
3	5707.5	-55.13	5.42	12.65	vertical	-47.9	-13.00	34.90	135
4	7610.0	-63.69	6.70	13.85	vertical	-56.54	-13.00	43.54	0
5	9512.5	-62.35	7.01	14.75	vertical	-54.61	-13.00	41.61	45
6	11415.0	-69.85	7.48	15.95	vertical	-61.38	-13.00	48.38	90
7	13317.5	-68.33	7.51	16.55	vertical	-59.29	-13.00	46.29	135
8	15220.0	-62.75	8.24	15.35	vertical	-55.64	-13.00	42.64	0
9	17122.5	-61.26	8.41	14.95	vertical	-54.72	-13.00	41.72	45
10	19025.0	-65.15	8.54	15.45	vertical	-58.24	-13.00	45.24	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 2 20MHz CH700

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3720.0	-58.97	5.10	11.05	vertical	-53.02	-13.00	40.02	225
3	5580.0	-56.64	5.42	12.65	vertical	-49.41	-13.00	36.41	270
4	7440.0	-63.89	6.70	13.85	vertical	-56.74	-13.00	43.74	180
5	9300.0	-64.76	7.01	14.75	vertical	-57.02	-13.00	44.02	135
6	11160.0	-69.75	7.48	15.95	vertical	-61.28	-13.00	48.28	270
7	13020.0	-68.02	7.51	16.55	vertical	-58.98	-13.00	45.98	0
8	14880.0	-63.74	8.24	15.35	vertical	-56.63	-13.00	43.63	90
9	16740.0	-61.76	8.41	14.95	vertical	-55.22	-13.00	42.22	180
10	18600.0	-60.17	8.54	15.45	vertical	-53.26	-13.00	40.26	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 2 20MHz CH900

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-58.09	5.10	11.05	vertical	-52.14	-13.00	39.14	225
3	5640.0	-54.56	5.42	12.65	vertical	-47.33	-13.00	34.33	270
4	7520.0	-64.29	6.70	13.85	vertical	-57.14	-13.00	44.14	135
5	9400.0	-62.29	7.01	14.75	vertical	-54.55	-13.00	41.55	45
6	11280.0	-68.99	7.48	15.95	vertical	-60.52	-13.00	47.52	135
7	13160.0	-67.67	7.51	16.55	vertical	-58.63	-13.00	45.63	270
8	15040.0	-62.91	8.24	15.35	vertical	-55.8	-13.00	42.80	0
9	16920.0	-60.60	8.41	14.95	vertical	-54.06	-13.00	41.06	135
10	18800.0	-62.60	8.54	15.45	vertical	-55.69	-13.00	42.69	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2.The worst emission was found in the antenna is vertical position.

## LTE Band 2 20MHz CH1100

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3800.0	-57.80	5.10	11.05	vertical	-51.85	-13.00	38.85	45
3	5700.0	-54.96	5.42	12.65	vertical	-47.73	-13.00	34.73	90
4	7600.0	-63.09	6.70	13.85	vertical	-55.94	-13.00	42.94	135
5	9500.0	-61.48	7.01	14.75	vertical	-53.74	-13.00	40.74	0
6	11400.0	-69.44	7.48	15.95	vertical	-60.97	-13.00	47.97	45
7	13300.0	-67.55	7.51	16.55	vertical	-58.51	-13.00	45.51	90
8	15200.0	-63.28	8.24	15.35	vertical	-56.17	-13.00	43.17	225
9	17100.0	-61.94	8.41	14.95	vertical	-55.4	-13.00	42.40	270
10	19000.0	-60.54	8.54	15.45	vertical	-53.63	-13.00	40.63	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.



## 6. Main Test Instruments

Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time
Base Station Simulator	CMU200	R&S	118133	2015-05-22	2016-05-21
Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
Spectrum Analyzer	E4445A	Agilent	MY46181146	2015-05-22	2016-05-21
Spectrum Analyzer	N9010A	Agilent	MY47191109	2015-05-22	2016-05-21
Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2015-05-22	2016-05-21
Signal Analyzer	FSV30	R&S	100815	2015-12-17	2016-12-16
Signal generator	SMB 100A	R&S	102594	2015-05-22	2016-05-21
Signal generator	SMR27	R&S	100365	2015-05-22	2016-05-21
EMI Test Receiver	ESCI	R&S	100948	2015-05-22	2016-05-21
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
Horn Antenna	3160-09	ETS-Lindgren	00102643	2014-12-06	2017-12-05
Horn Antenna	3160-09	ETS-Lindgren	00102644	2014-12-06	2017-12-05
RF Cable	SMA 15cm	Agilent	0001	2016-01-09	2016-03-08

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