



中国认可
国际互认
检测
TESTING
CNAS L2264

RF TEST REPORT

Applicant	ZTE CORPORATION
FCC ID	SRQ-ZTEBLADEA520
Product	LTE/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone
Brand	ZTE
Model	ZTE BLADE A520; BLADE A520
Report No.	RXA1612-0277RF02
Issue Date	January 13, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2016)/ FCC CFR 47 Part 24H (2016)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Xianqing Li

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

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

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

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

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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: December 12, 2016 ~ December 25, 2016			



1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

1.2. Test facility

CNAS (accreditation number: L2264)

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

FCC (recognition number is 428261)

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

IC (recognition number is 8510A)

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

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

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

A2LA (Certificate Number: 3857.01)

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



1.3. Testing Location

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

2. General Description of Equipment under Test

Client Information

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

General information

EUT Description			
Model:	ZTE BLADE A520; BLADE A520		
Product IMEI:	862974030021581		
Hardware Version:	u3gA		
Software Version:	ZTE_BLADE_A520V1.0.0B01		
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:	12		
HSDPA UE Category:	24		
HSUPA UE Category:	7		
Maximum E.I.R.P.	GSM 1900: 27.10 dBm WCDMA Band II: 21.65 dBm LTE Band 2: 19.71 dBm		
Rated Power Supply Voltage:	3.7V		
Extreme Voltage:	Minimum: 3.5V Maximum: 4.20V		
Extreme Temperature:	Lowest: -10°C Highest: +55°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	Model: Li3824T44P4h716043		
Adapter	Manufacturer: AOHA Model: STC-A51A-Z		



Earphone	Manufacturer: FDC Model: DEM-53
USB Cable	70cm
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 (2016)

FCC CFR 47 Part 24H (2016)

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 for GSM 1900 and WCDMA Band II:

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

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

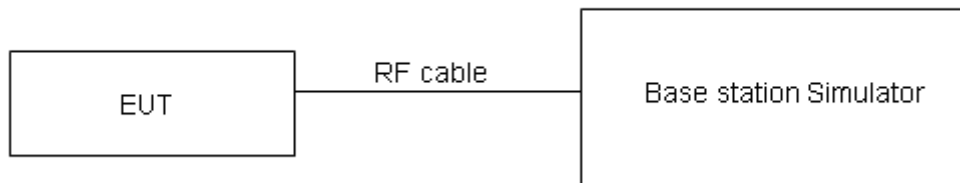
Ambient condition

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	29.36	29.46	29.56
GPRS (GMSK)	1TXslot	29.35	29.44	29.57
	2TXslots	28.31	28.44	28.63
	3TXslots	26.16	26.37	26.55
	4TXslots	25.06	25.25	25.47
EGPRS (8PSK)	1TXslot	25.04	25.13	25.26
	2TXslots	24.22	24.35	24.54
	3TXslots	22.42	22.63	22.81
	4TXslots	21.53	21.72	21.94

Note: 1) The maximum RF Output Power numbers are marks in bold.

2) The following testing in GPRS 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)
RMC		22.56	22.51	22.76
HSDPA	Sub - Test 1	22.39	22.34	22.42
	Sub - Test 2	22.46	22.42	22.46
	Sub - Test 3	21.96	21.91	21.94
	Sub - Test 4	21.95	21.90	21.90
HSUPA	Sub - Test 1	22.44	22.29	22.34
	Sub - Test 2	20.63	20.58	20.83
	Sub - Test 3	21.36	21.31	21.72
	Sub - Test 4	20.58	20.53	20.81
	Sub - Test 5	20.50	20.45	20.70
DC-HSDPA	Sub - Test 1	22.49	22.40	22.35
	Sub - Test 2	22.48	22.39	22.44
	Sub - Test 3	21.97	21.88	22.13
	Sub - Test 4	21.96	21.97	22.11
HSPA+	16QAM	22.22	22.16	22.41

Note:1) The maximum RF Output Power numbers are marks in bold.

2) The following testing in RMC 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	21.57	21.62	21.50
		1	2	21.41	21.37	21.45
		1	5	21.41	21.43	21.56
		3	0	21.45	21.56	21.47
		3	2	21.35	21.40	21.45
		3	3	21.41	21.38	21.48
		6	0	20.44	20.50	20.55
	16QAM	1	0	21.36	21.39	21.29
		1	2	21.24	21.15	21.26
		1	5	21.22	21.25	21.36
		3	0	21.24	21.31	21.26
		3	2	21.09	21.07	21.15
		3	3	21.08	21.08	21.13
		6	0	20.21	20.22	20.28
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	21.59	21.66	21.53
		1	7	21.44	21.42	21.49
		1	14	21.44	21.48	21.60
		8	0	20.55	20.68	20.60
		8	4	20.47	20.50	20.57
		8	7	20.51	20.49	20.58
		15	0	20.47	20.54	20.58
	16QAM	1	0	21.39	21.41	21.32
		1	7	21.27	21.20	21.30
		1	14	21.24	21.29	21.39
		8	0	20.35	20.44	20.38
		8	4	20.20	20.20	20.27
		8	7	20.18	20.20	20.26
		15	0	20.24	20.26	20.31
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	21.56	21.64	21.49
		1	13	21.42	21.38	21.46
		1	24	21.41	21.43	21.56
		12	0	20.52	20.63	20.56



		12	6	20.45	20.46	20.52
		12	13	20.49	20.47	20.54
		25	0	20.45	20.53	20.56
	16QAM	1	0	21.36	21.37	21.29
		1	13	21.24	21.18	21.27
		1	24	21.21	21.27	21.35
		12	0	20.33	20.40	20.35
		12	6	20.17	20.15	20.23
		12	13	20.15	20.15	20.22
		25	0	20.22	20.22	20.26
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	21.58	21.65	21.52
		1	25	21.45	21.43	21.50
		1	49	21.43	21.47	21.59
		25	0	20.55	20.68	20.60
		25	13	20.48	20.51	20.56
		25	25	20.51	20.51	20.59
		50	0	20.53	20.55	20.60
	16QAM	1	0	21.38	21.40	21.31
		1	25	21.27	21.22	21.30
		1	49	21.24	21.29	21.38
		25	0	20.36	20.45	20.39
		25	13	20.19	20.19	20.26
		25	25	20.18	20.20	20.26
		50	0	20.25	20.27	20.30
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	21.57	21.61	21.50
		1	38	21.43	21.42	21.47
		1	74	21.40	21.42	21.55
		36	0	20.53	20.64	20.57
		36	18	20.45	20.46	20.52
		36	39	20.48	20.48	20.55
		75	0	20.51	20.51	20.55
	16QAM	1	0	21.33	21.38	21.29
		1	38	21.25	21.19	21.28
		1	74	21.21	21.25	21.35
		36	0	20.33	20.43	20.36
		36	18	20.16	20.14	20.22



		36	39	20.16	20.16	20.23
		75	0	20.22	20.22	20.26
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	21.54	21.57	21.47
		1	50	21.42	21.38	21.45
		1	99	21.38	21.41	21.52
		50	0	20.50	20.59	20.53
		50	25	20.43	20.42	20.49
		50	50	20.45	20.43	20.41
		100	0	20.38	20.26	20.41
	16QAM	1	0	21.31	21.34	21.24
		1	50	21.21	21.17	21.24
		1	99	21.19	21.22	21.33
		50	0	20.30	20.39	20.33
		50	25	20.13	20.12	20.19
		50	50	20.13	20.11	20.19
		100	0	20.20	20.18	20.23

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.

$E_t = R_t + AF$

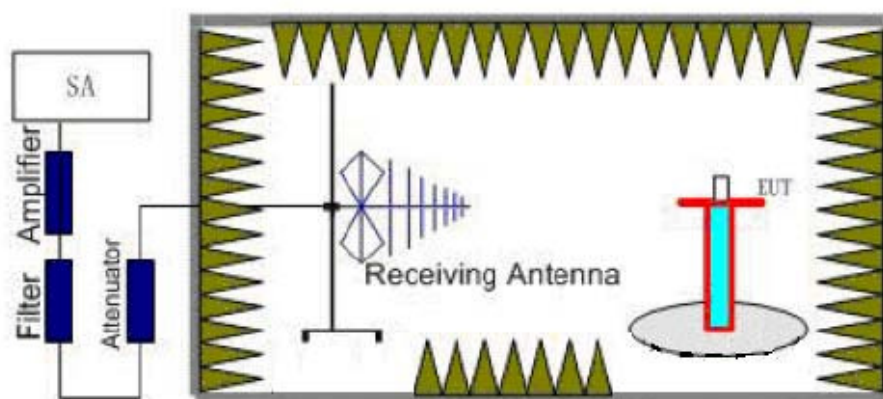
$E_s = R_s + AF$

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	-28.80	-53.21	0.00	1.92	26.33	33	Pass
	H	1880	-29.41	-53.42	0.00	1.94	25.95	33	Pass
	H	1909.8	-30.22	-53.67	0.00	1.90	25.35	33	Pass
	V	1850.2	-28.52	-53.70	0.00	1.92	27.10	33	Pass
	V	1880	-29.23	-53.91	0.00	1.94	26.62	33	Pass
	V	1909.8	-30.58	-54.55	0.00	1.90	25.87	33	Pass
GPRS 1900	H	1850.2	-32.71	-53.17	0.00	1.44	21.90	33	Pass
	H	1880	-33.78	-52.88	0.00	1.66	20.76	33	Pass
	H	1909.8	-34.11	-52.72	0.00	1.79	20.40	33	Pass
	V	1850.2	-31.40	-54.45	0.00	1.44	24.49	33	Pass
	V	1880	-32.22	-54.02	0.00	1.66	23.46	33	Pass
	V	1909.8	-33.28	-53.68	0.00	1.79	22.19	33	Pass
EGPRS 1900	H	1850.2	-31.19	-53.17	0.00	1.44	23.42	33	Pass
	H	1880	-32.42	-52.88	0.00	1.66	22.12	33	Pass
	H	1909.8	-33.70	-52.72	0.00	1.79	20.81	33	Pass
	V	1850.2	-31.66	-54.45	0.00	1.44	24.23	33	Pass
	V	1880	-32.80	-54.02	0.00	1.66	22.88	33	Pass
	V	1909.8	-34.02	-53.68	0.00	1.79	21.45	33	Pass
WCDMA Band II	H	1852.4	-34.74	-53.19	0.00	1.92	20.37	33	Pass
	H	1880	-35.13	-53.42	0.00	1.94	20.23	33	Pass
	H	1907.6	-35.83	-53.66	0.00	1.92	19.75	33	Pass
	V	1852.4	-33.96	-53.69	0.00	1.92	21.65	33	Pass
	V	1880	-34.72	-53.91	0.00	1.94	21.13	33	Pass
	V	1907.6	-36.00	-54.54	0.00	1.92	20.46	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	-40.38	-54.89	0.00	1.90	16.41	33	Pass
	H	1880	-42.84	-56.66	0.00	1.92	15.74	33	Pass
	H	1909.3	-43.34	-58.09	0.00	1.91	16.66	33	Pass
	V	1850.7	-37.63	-55.05	0.00	1.90	19.32	33	Pass
	V	1880	-39.75	-56.41	0.00	1.92	18.58	33	Pass
	V	1909.3	-42.38	-57.85	0.00	1.91	17.38	33	Pass
1.4 MHz (16QAM)	H	1850.7	-40.98	-54.89	0.00	1.90	15.81	33	Pass
	H	1880	-43.54	-56.66	0.00	1.92	15.04	33	Pass
	H	1909.3	-43.99	-58.09	0.00	1.91	16.01	33	Pass
	V	1850.7	-37.89	-55.05	0.00	1.90	19.06	33	Pass
	V	1880	-39.87	-56.41	0.00	1.92	18.46	33	Pass
	V	1909.3	-42.85	-57.85	0.00	1.91	16.91	33	Pass
3 MHz (QPSK)	H	1851.5	-40.37	-54.93	0.00	1.91	16.47	33	Pass
	H	1880	-42.92	-56.66	0.00	1.94	15.68	33	Pass
	H	1908.5	-43.38	-58.08	0.00	1.91	16.61	33	Pass
	V	1851.5	-37.55	-55.04	0.00	1.91	19.40	33	Pass
	V	1880	-39.77	-56.41	0.00	1.94	18.58	33	Pass
	V	1908.5	-42.38	-57.86	0.00	1.91	17.39	33	Pass
3 MHz (16QAM)	H	1851.5	-41.80	-54.93	0.00	1.91	15.04	33	Pass
	H	1880	-44.59	-56.66	0.00	1.94	14.01	33	Pass
	H	1908.5	-45.12	-58.08	0.00	1.91	14.87	33	Pass
	V	1851.5	-38.56	-55.04	0.00	1.91	18.39	33	Pass
	V	1880	-40.76	-56.41	0.00	1.94	17.59	33	Pass
	V	1908.5	-43.02	-57.86	0.00	1.91	16.75	33	Pass
5 MHz (QPSK)	H	1852.5	-40.32	-54.98	0.00	1.92	16.58	33	Pass
	H	1880	-42.77	-56.66	0.00	1.94	15.83	33	Pass
	H	1907.5	-43.37	-58.05	0.00	1.90	16.58	33	Pass
	V	1852.5	-37.56	-55.14	0.00	1.92	19.50	33	Pass
	V	1880	-39.53	-56.41	0.00	1.94	18.82	33	Pass
	V	1907.5	-40.38	-57.97	0.00	1.90	19.49	33	Pass
5 MHz (16QAM)	H	1852.5	-40.38	-54.89	0.00	1.90	16.41	33	Pass
	H	1880	-42.84	-56.66	0.00	1.92	15.74	33	Pass
	H	1907.5	-43.34	-58.09	0.00	1.91	16.66	33	Pass
	V	1852.5	-37.63	-55.05	0.00	1.90	19.32	33	Pass
	V	1880	-39.75	-56.41	0.00	1.92	18.58	33	Pass
	V	1907.5	-42.38	-57.85	0.00	1.91	17.38	33	Pass
10 MHz (QPSK)	H	1855	-40.84	-54.98	0.00	1.92	16.06	33	Pass
	H	1880	-43.24	-56.66	0.00	1.94	15.36	33	Pass
	H	1905	-43.83	-58.05	0.00	1.90	16.12	33	Pass



LTE Band 2									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Limit (dBm)	Conclusion
	V	1855	-37.97	-55.14	0.00	1.92	19.09	33	Pass
	V	1880	-39.92	-56.41	0.00	1.94	18.43	33	Pass
	V	1905	-40.55	-57.97	0.00	1.90	19.32	33	Pass
10 MHz (16QAM)	H	1855	-40.37	-55.09	0.00	1.91	16.63	33	Pass
	H	1880	-42.94	-56.66	0.00	1.94	15.66	33	Pass
	H	1905	-42.74	-58.01	0.00	1.92	17.19	33	Pass
	V	1855	-37.45	-55.08	0.00	1.91	19.54	33	Pass
	V	1880	-39.44	-56.41	0.00	1.94	18.91	33	Pass
	V	1905	-41.41	-57.81	0.00	1.92	18.32	33	Pass
15 MHz (QPSK)	H	1857.5	-41.70	-55.09	0.00	1.91	15.30	33	Pass
	H	1880	-44.51	-56.66	0.00	1.94	14.09	33	Pass
	H	1902.5	-44.38	-58.01	0.00	1.92	15.55	33	Pass
	V	1857.5	-38.36	-55.08	0.00	1.91	18.63	33	Pass
	V	1880	-40.33	-56.41	0.00	1.94	18.02	33	Pass
	V	1902.5	-41.95	-57.81	0.00	1.92	17.78	33	Pass
15 MHz (16QAM)	H	1857.5	-40.50	-55.23	0.00	1.93	16.66	33	Pass
	H	1880	-41.77	-56.66	0.00	1.94	16.83	33	Pass
	H	1902.5	-42.70	-57.95	0.00	1.92	17.17	33	Pass
	V	1857.5	-37.46	-55.24	0.00	1.93	19.71	33	Pass
	V	1880	-39.19	-56.41	0.00	1.94	19.16	33	Pass
	V	1902.5	-41.11	-57.69	0.00	1.92	18.50	33	Pass
20 MHz (QPSK)	H	1860	-40.94	-55.23	0.00	1.93	16.22	33	Pass
	H	1880	-42.16	-56.66	0.00	1.94	16.44	33	Pass
	H	1900	-43.08	-57.95	0.00	1.92	16.79	33	Pass
	V	1860	-37.79	-55.24	0.00	1.93	19.38	33	Pass
	V	1880	-39.50	-56.41	0.00	1.94	18.85	33	Pass
	V	1900	-41.20	-57.69	0.00	1.92	18.41	33	Pass
20 MHz (16QAM)	H	1860	-40.50	-55.35	0.00	1.93	16.78	33	Pass
	H	1880	-41.84	-56.66	0.00	1.94	16.76	33	Pass
	H	1900	-42.73	-57.86	0.00	1.92	17.05	33	Pass
	V	1860	-37.89	-55.31	0.00	1.93	19.35	33	Pass
	V	1880	-38.73	-56.41	0.00	1.94	19.62	33	Pass
	V	1900	-40.91	-57.66	0.00	1.92	18.67	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,

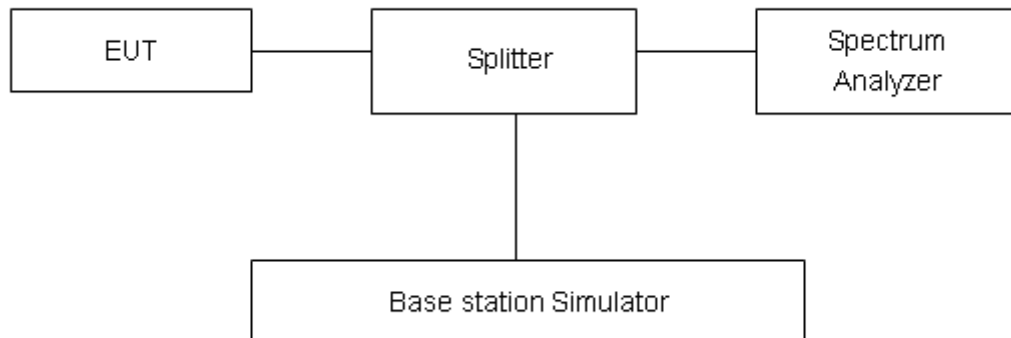
RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2 (1.4MHz),

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)
GSM 1900 (GSM)	512	1850.2	0.24721	0.3088
	661	1880.0	0.24606	0.3091
	810	1909.8	0.24619	0.3155
GPRS 1900 (GMSK)	512	1850.2	0.24700	0.3182
	661	1880.0	0.24920	0.3157
	810	1909.8	0.24364	0.3134
EGPRS 1900 (8-PSK)	512	1850.2	0.24767	0.3234
	661	1880.0	0.24993	0.3063
	810	1909.8	0.24718	0.3152
WCDMA Band II	9262	1852.4	4.22440	4.8770
	9400	1880	4.20720	4.8410
	9538	1907.6	4.20280	4.8500

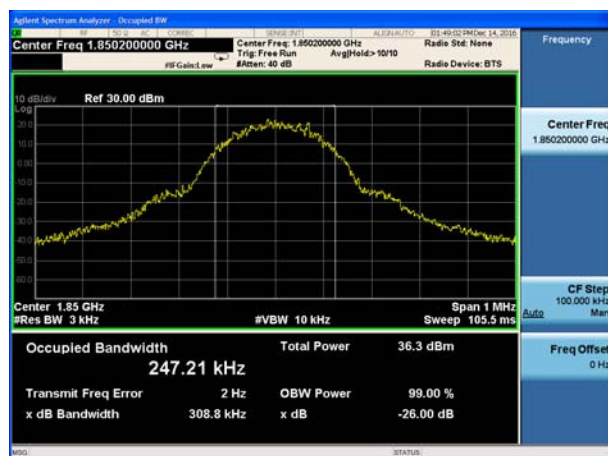
LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1255	1.342
		18900	1880.0	1.1225	1.327
		19193	1909.3	1.1329	1.321
	3	18615	1851.5	2.7421	3.048
		18900	1880	2.7368	3.057
		19185	1908.5	2.7434	3.040
	5	18625	1852.5	4.5243	5.098
		18900	1880	4.5396	5.093
		19175	1907.5	4.5176	5.093
	10	18650	1855	9.0436	10.040
		18900	1880	9.0696	10.110
		19150	1905	9.0724	10.170
	15	18675	1857.5	13.4720	14.900
		18900	1880	13.5220	15.000
		19125	1902.5	13.5160	14.990
	20	18700	1860	17.9350	19.430
		18900	1880	17.9410	19.390
		19100	1900	17.9650	19.530
16QAM	1.4	18607	1850.7	1.1193	1.304
		18900	1880.0	1.1299	1.321
		19193	1909.3	1.1222	1.324
	3	18615	1851.5	2.7351	3.025
		18900	1880	2.7348	3.058
		19185	1908.5	2.7389	3.048
	5	18625	1852.5	4.5534	5.076
		18900	1880	4.5262	5.042
		19175	1907.5	4.5476	5.115
	10	18650	1855	9.0569	10.090
		18900	1880	9.0700	10.120
		19150	1905	9.0603	10.070
	15	18675	1857.5	13.4990	14.860



		18900	1880	13.5150	14.810
		19125	1902.5	13.4970	14.850
	20	18700	1860	17.9500	19.500
		18900	1880	17.9090	19.450
		19100	1900	17.9610	19.560



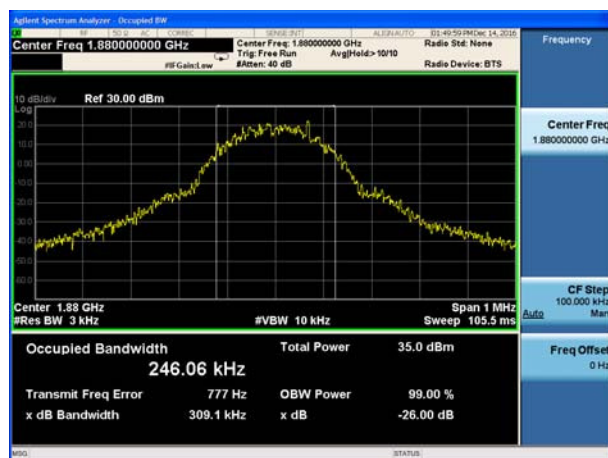
GSM1900 GSM CH-Low



GSM1900 GPRS CH-Low



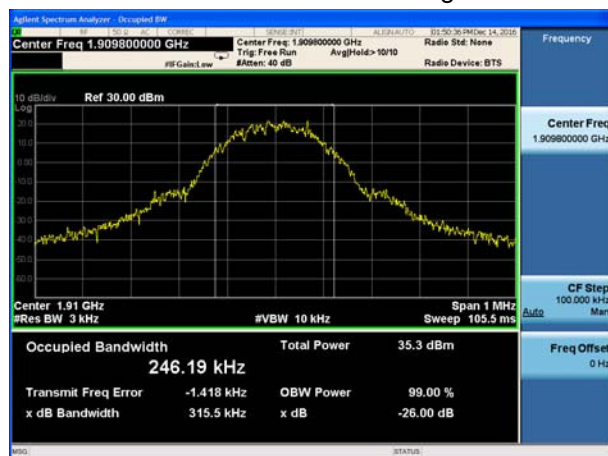
GSM 1900 GSM CH-Middle



GSM 1900 GPRS CH-Middle



GSM 1900 GSM CH-High

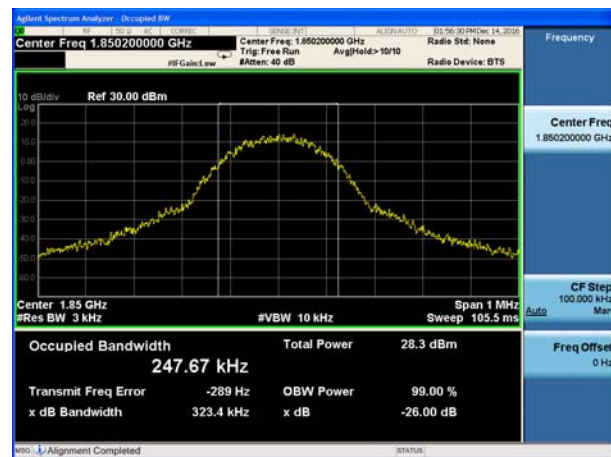


GSM 1900 GPRS CH-High





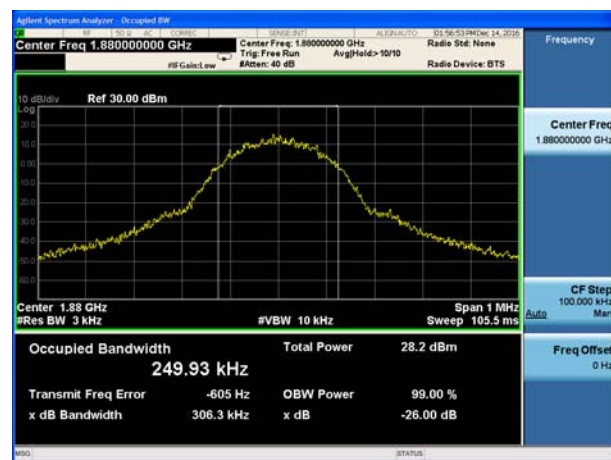
GSM1900 EGPRS CH-Low



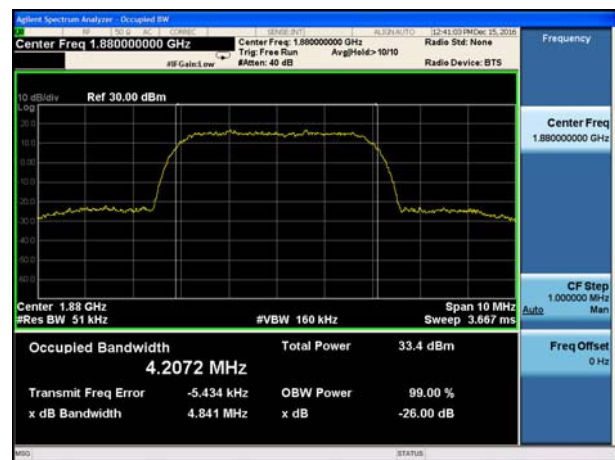
WCDMA Band II RMC CH-Low



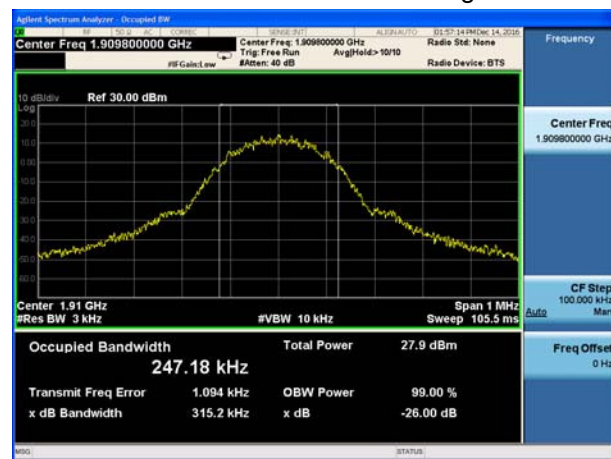
GSM 1900 EGPRS CH-Middle



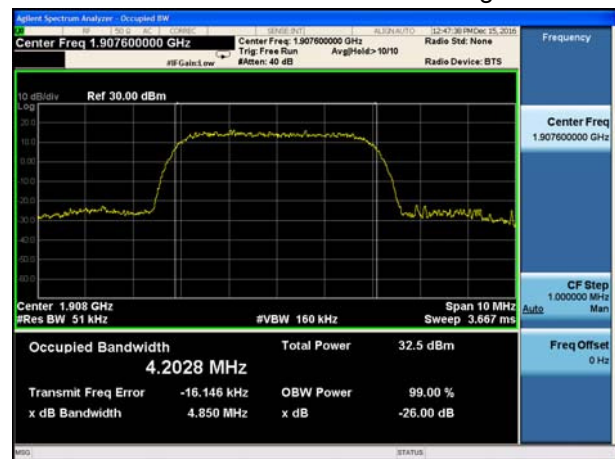
WCDMA Band II RMC CH-Middle



GSM 1900 EGPRS CH-High

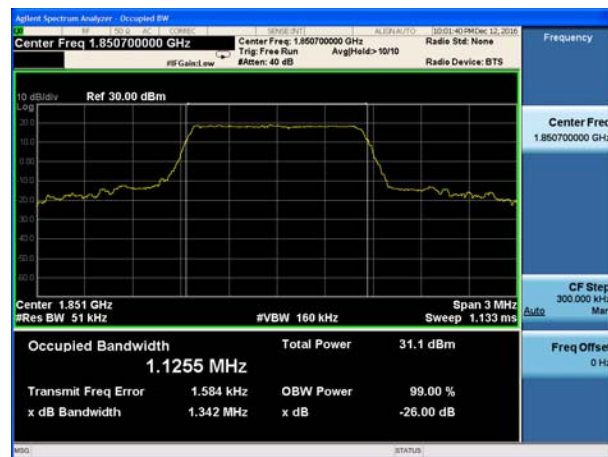


WCDMA Band II RMC CH-High

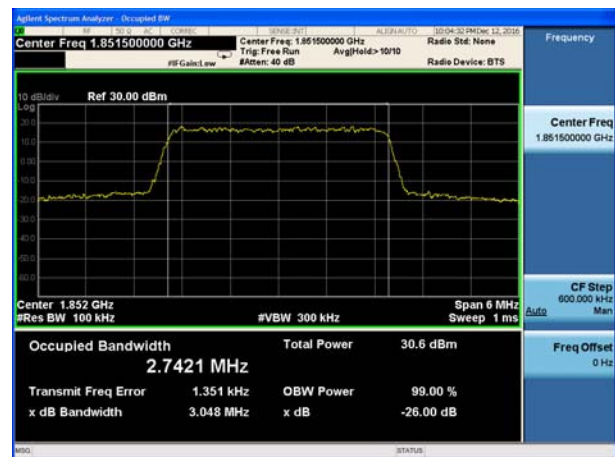




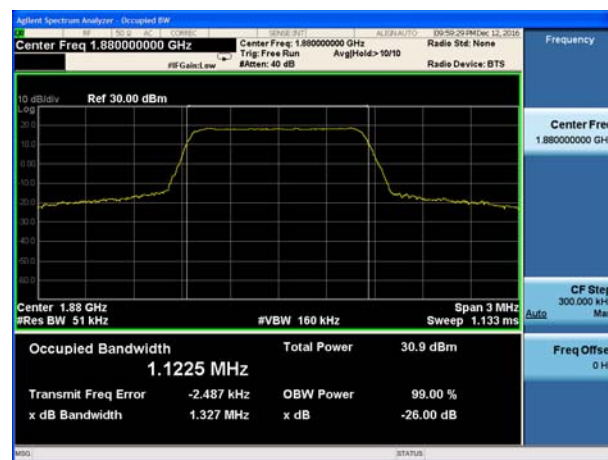
LTE Band 2 1.4MHz QPSK CH-Low



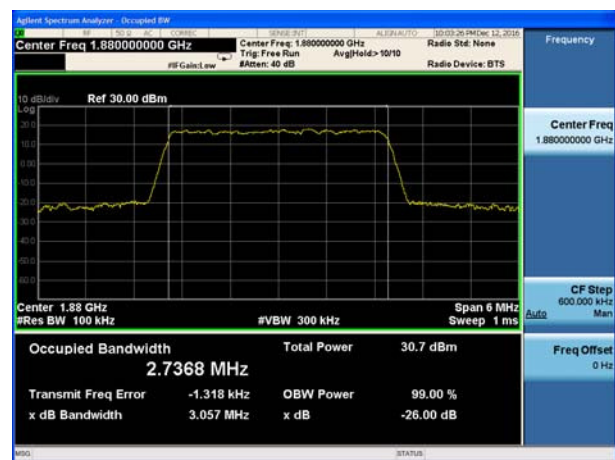
LTE Band 2 3MHz QPSK CH-Low



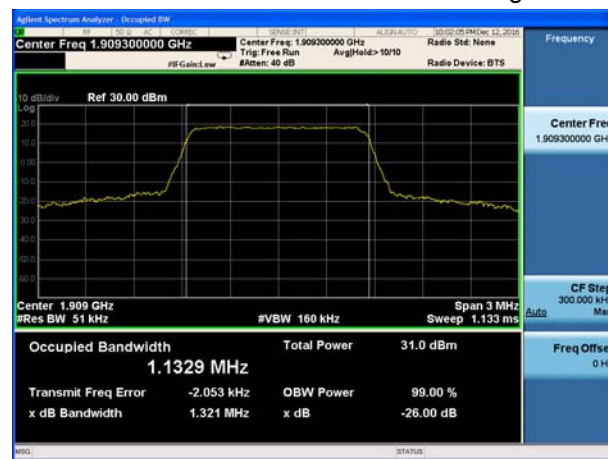
LTE Band 2 1.4MHz QPSK CH-Middle



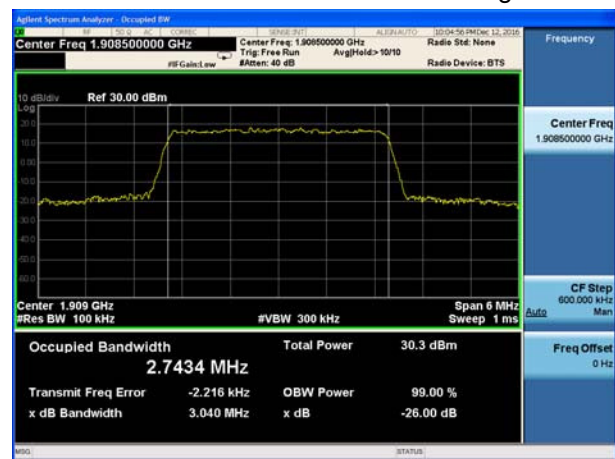
LTE Band 2 3MHz QPSK CH-Middle



LTE Band 2 1.4MHz QPSK CH-High



LTE Band 2 3MHz QPSK CH-High





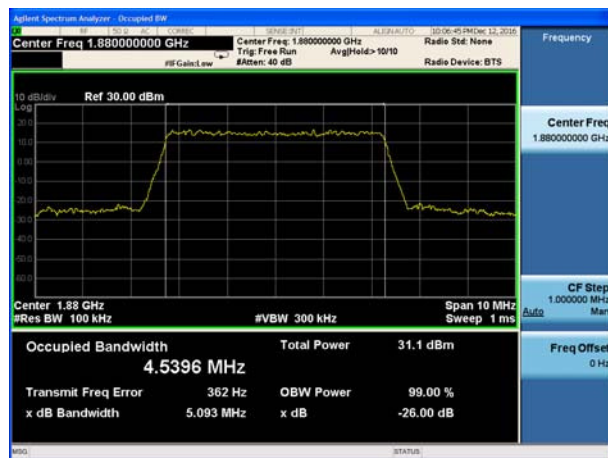
LTE Band 2 5MHz QPSK CH-Low



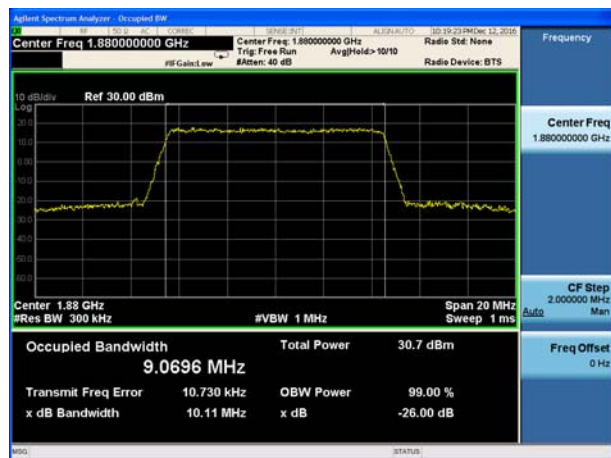
LTE Band 2 10MHz QPSK CH-Low



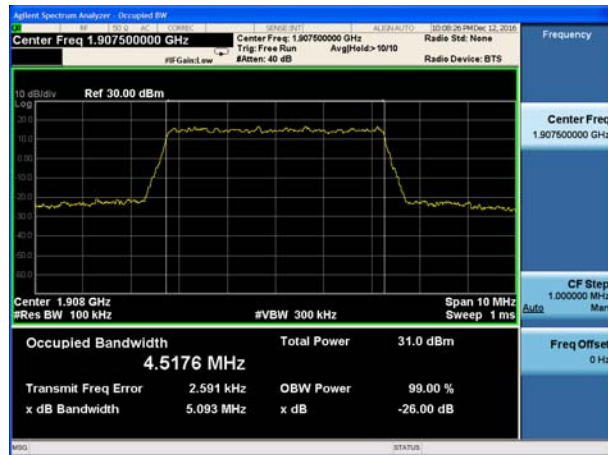
LTE Band 2 5MHz QPSK CH-Middle



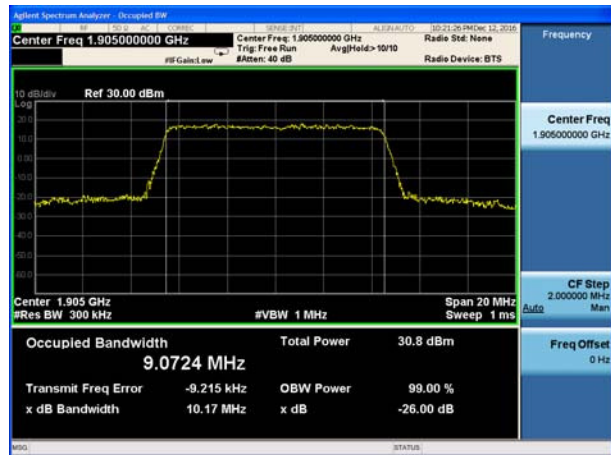
LTE Band 2 10MHz QPSK CH-Middle



LTE Band 2 5MHz QPSK CH-High

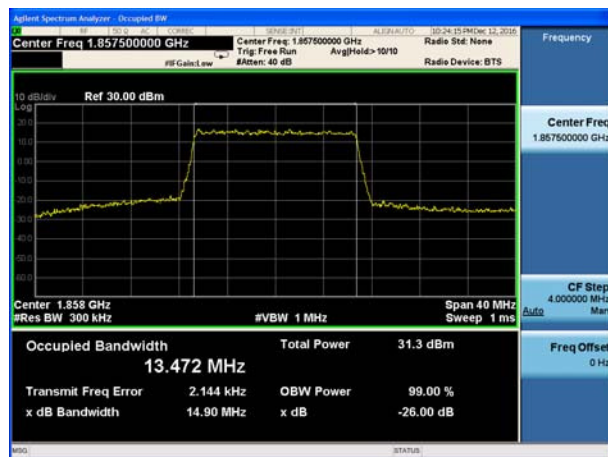


LTE Band 2 10MHz QPSK CH-High

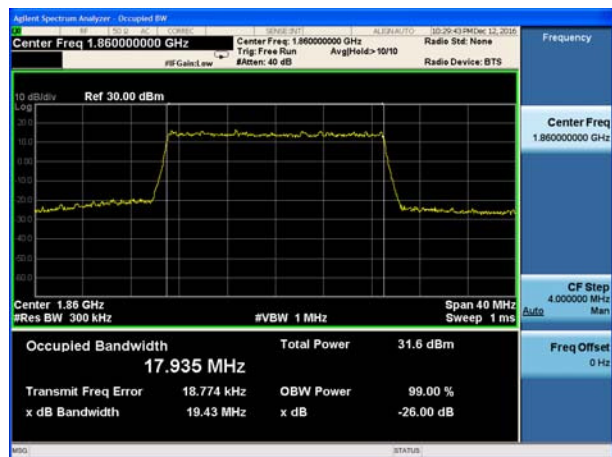




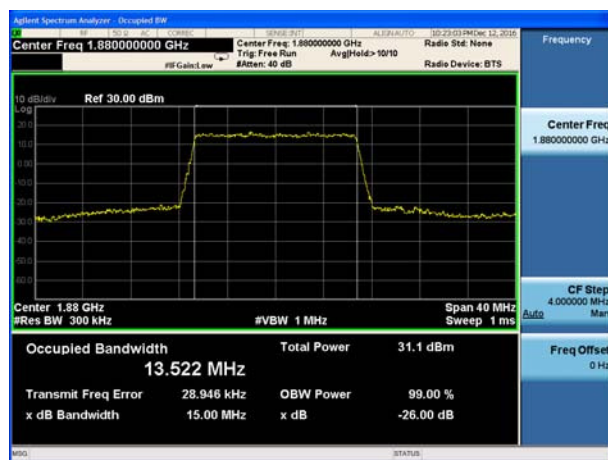
LTE Band 2 15MHz QPSK CH-Low



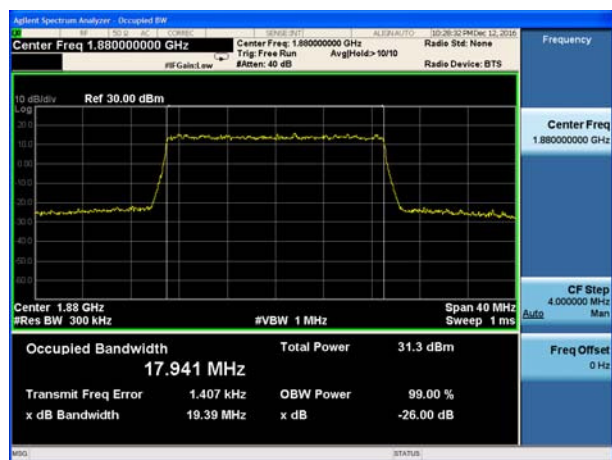
LTE Band 2 20MHz QPSK CH-Low



LTE Band 2 15MHz QPSK CH-Middle



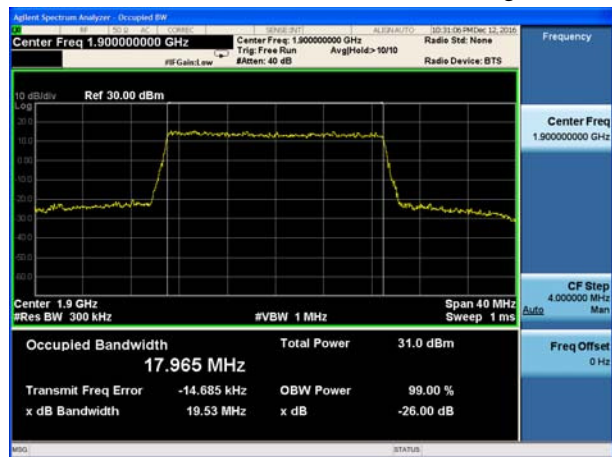
LTE Band 2 20MHz QPSK CH-Middle



LTE Band 2 15MHz QPSK CH-High

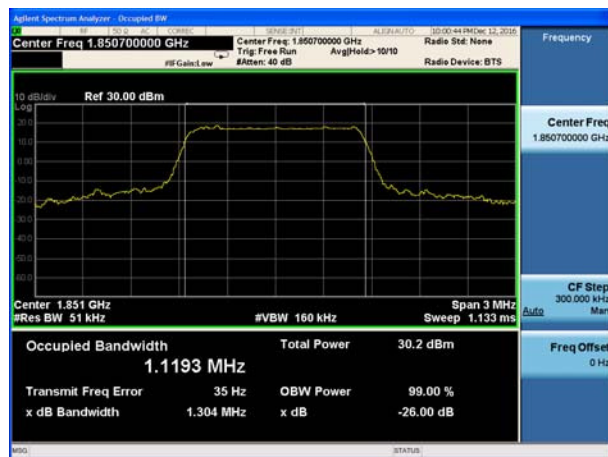


LTE Band 2 20MHz QPSK CH-High

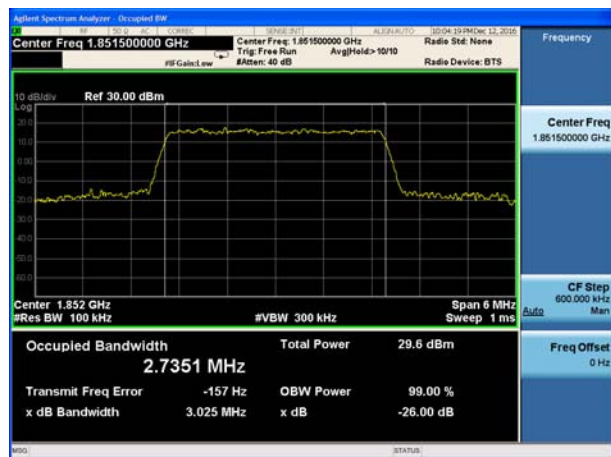




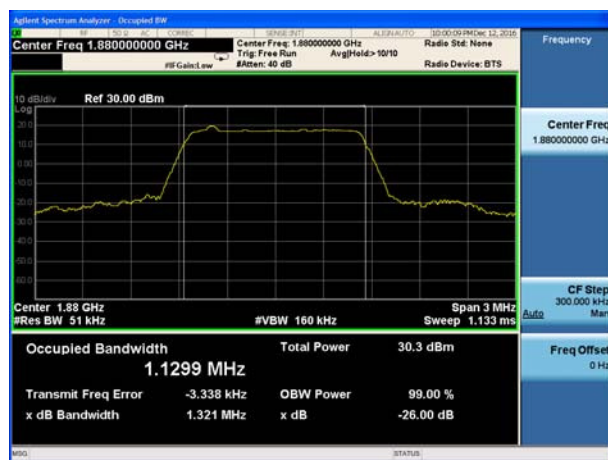
LTE Band 2 1.4MHz 16QAM CH-Low



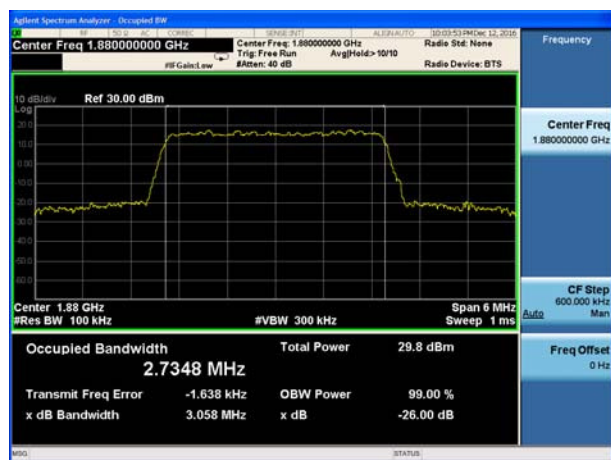
LTE Band 2 3MHz 16QAM CH-Low



LTE Band 2 1.4MHz 16QAM CH-Middle



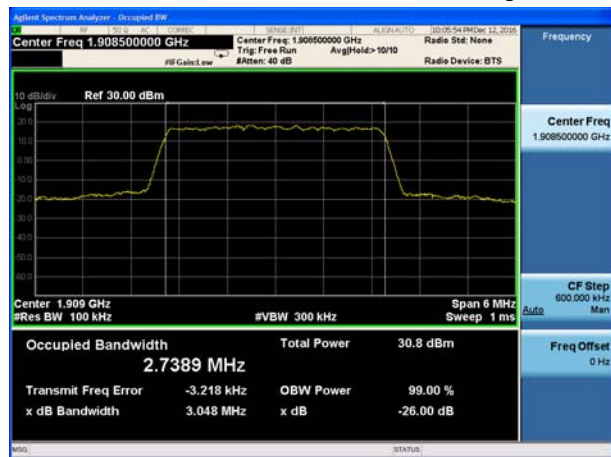
LTE Band 2 3MHz 16QAM CH-Middle



LTE Band 2 1.4MHz 16QAM CH-High



LTE Band 2 3MHz 16QAM CH-High





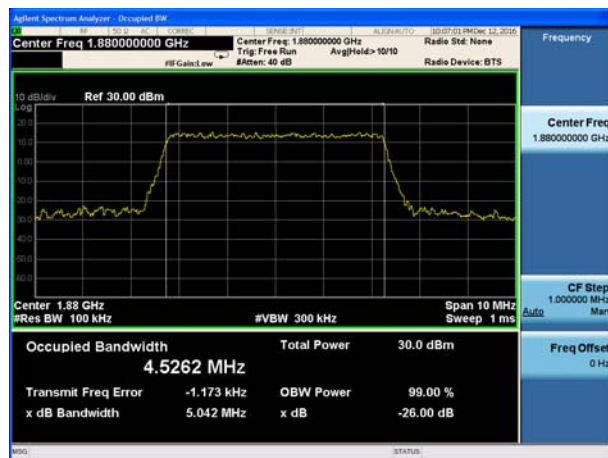
LTE Band 2 5MHz 16QAM CH-Low



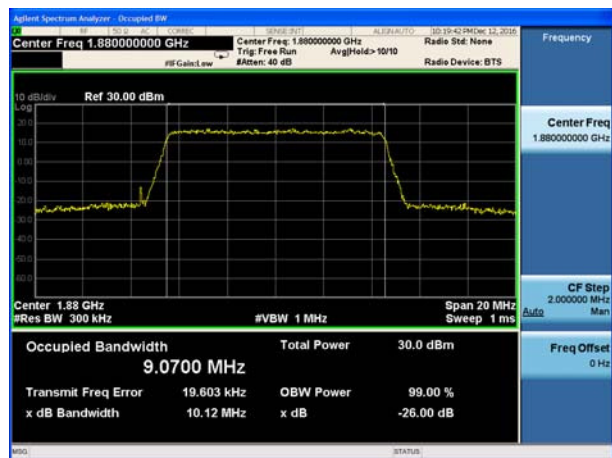
LTE Band 2 10MHz 16QAM CH-Low



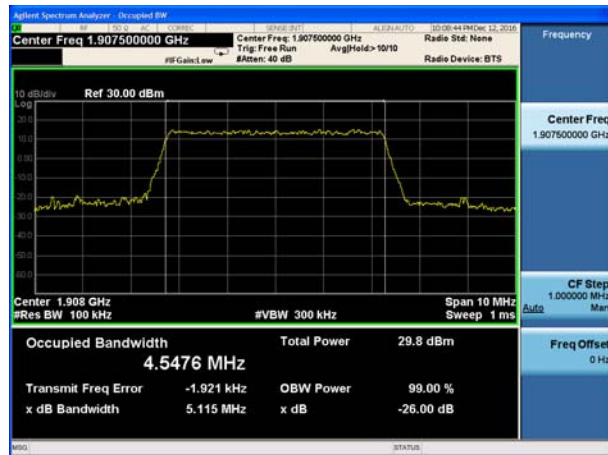
LTE Band 2 5MHz 16QAM CH-Middle



LTE Band 2 10MHz 16QAM CH-Middle



LTE Band 2 5MHz 16QAM CH-High

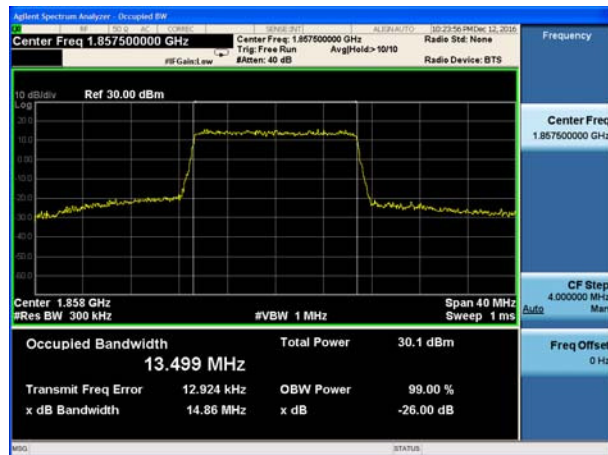


LTE Band 2 10MHz 16QAM CH-High





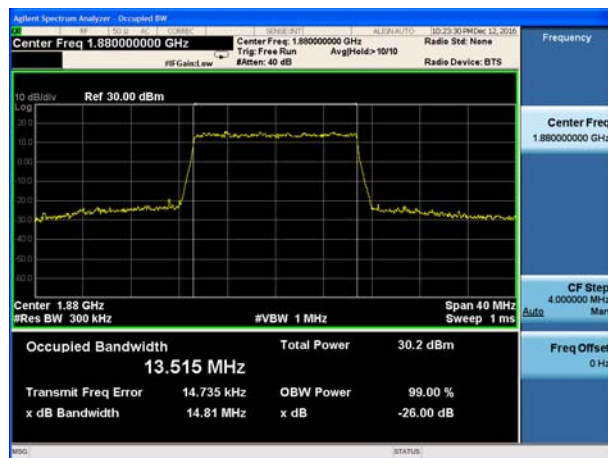
LTE Band 2 15MHz 16QAM CH-Low



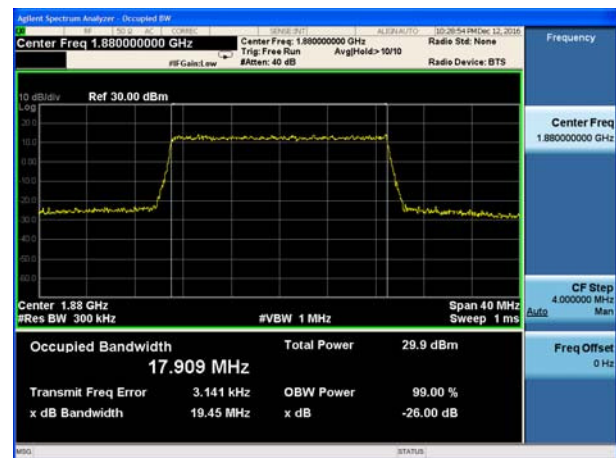
LTE Band 2 20MHz 16QAM CH-Low



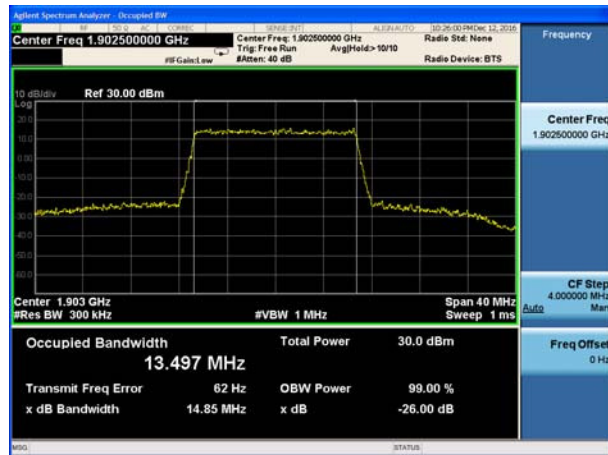
LTE Band 2 15MHz 16QAM CH-Middle



LTE Band 2 20MHz 16QAM CH-Middle



LTE Band 2 15MHz 16QAM CH-High



LTE Band 2 20MHz 16QAM CH-High



5.4. Band Edge Compliance

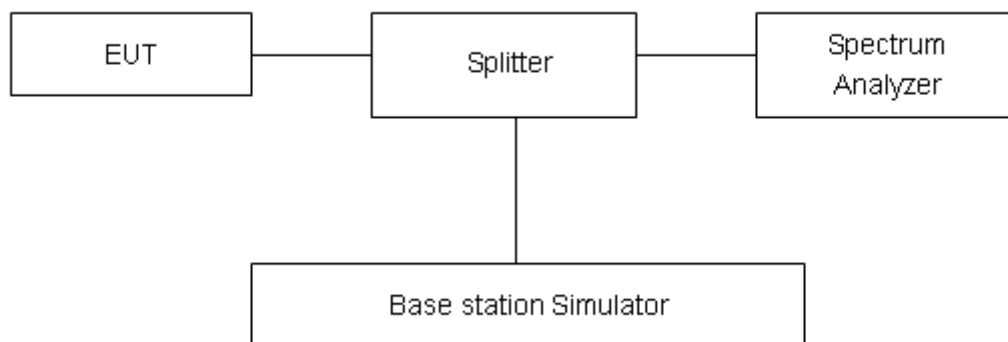
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The Average detector is used 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 $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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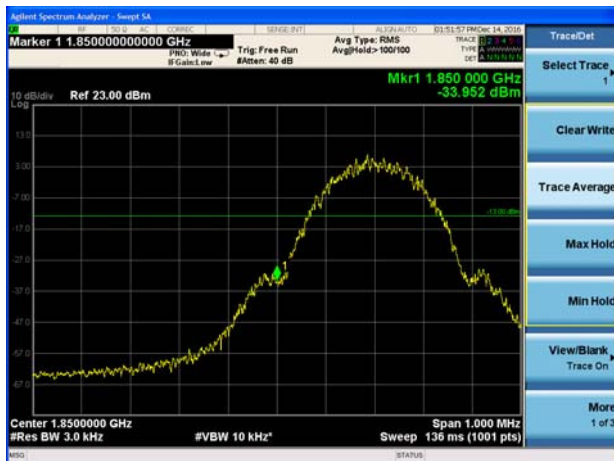
Measurement Uncertainty

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.

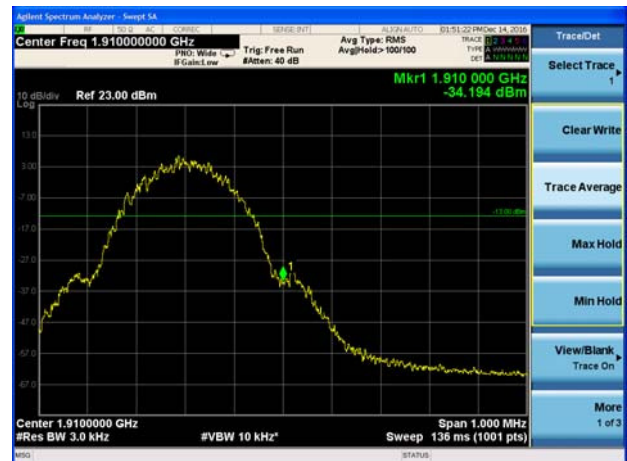


Test Result:

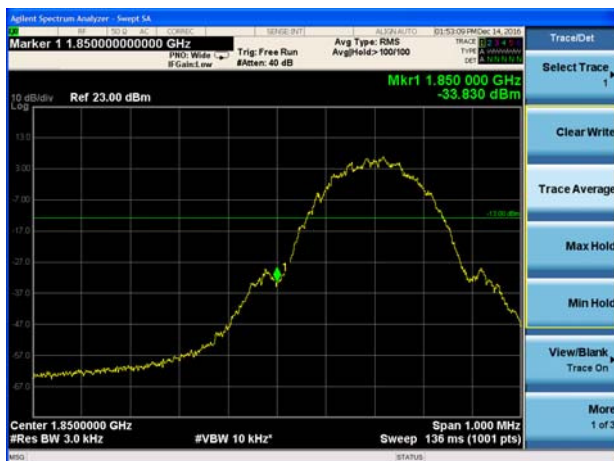
GSM1900 GSM CH-Low



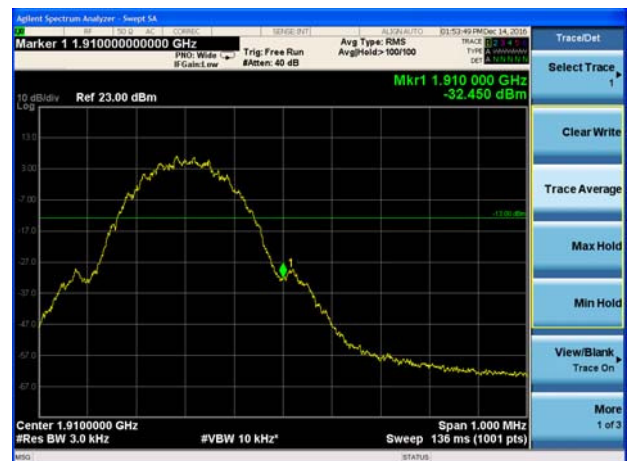
GSM 1900 GSM CH-High



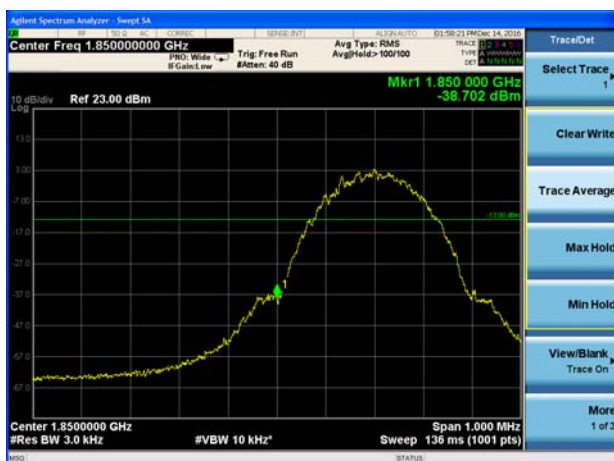
GSM1900 GPRS CH-Low



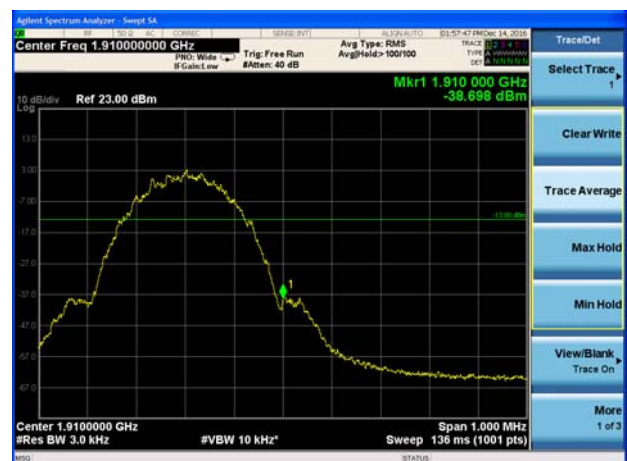
GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



GSM 1900 EGPRS CH-High





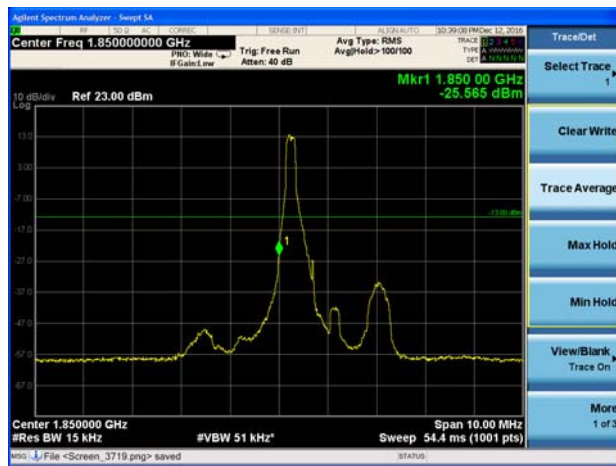
WCDMA Band II RMC CH-Low



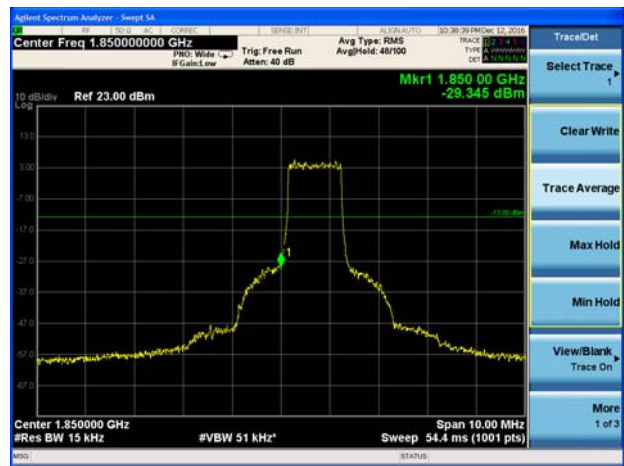
WCDMA Band II RMC CH-High



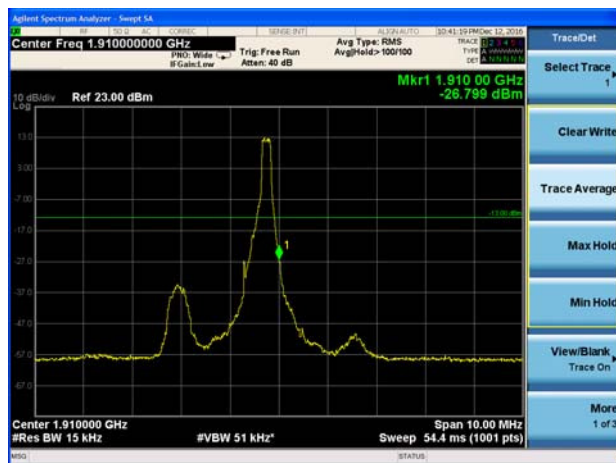
LTE Band 2 1.4MHz QPSK 1RB CH-Low



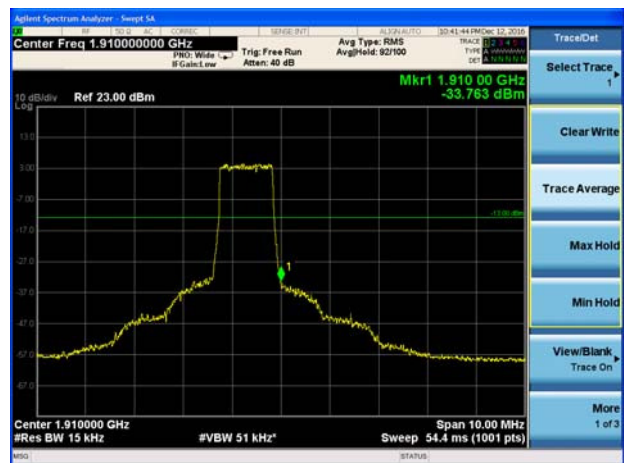
LTE Band 2 1.4MHz QPSK 100%RB CH-Low



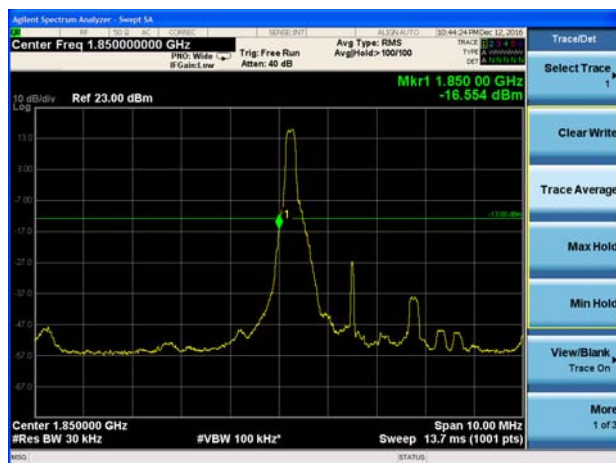
LTE Band 2 1.4MHz QPSK 1RB CH-High



LTE Band 2 1.4MHz QPSK 100%RB CH-High



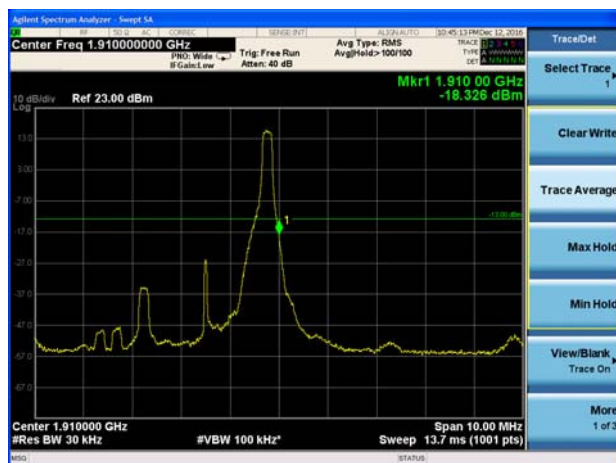
LTE Band 2 3MHz QPSK 1RB CH-Low



LTE Band 2 3MHz QPSK 100%RB CH-Low



LTE Band 2 3MHz QPSK 1RB CH-High



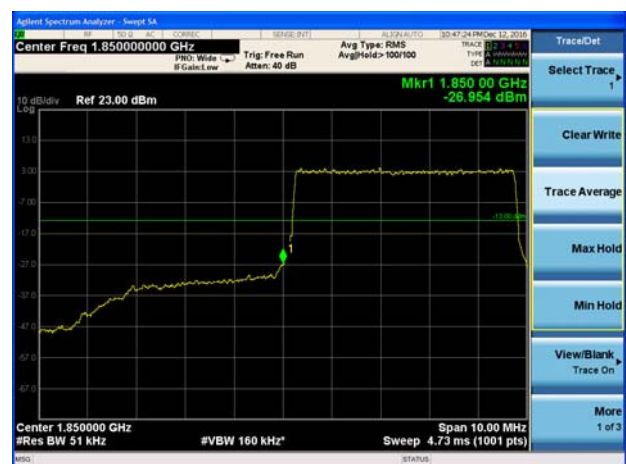
LTE Band 2 3MHz QPSK 100%RB CH-High



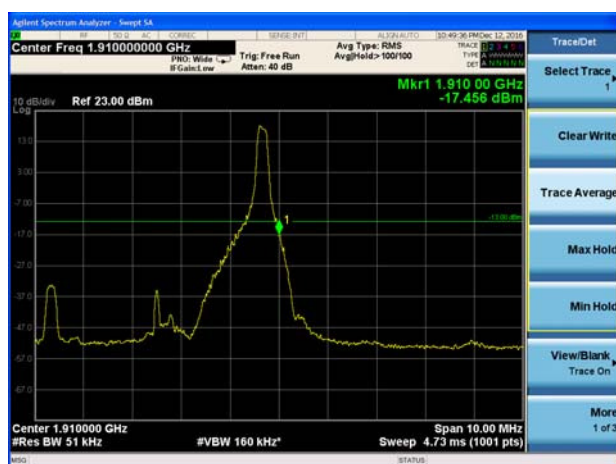
LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 100%RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High

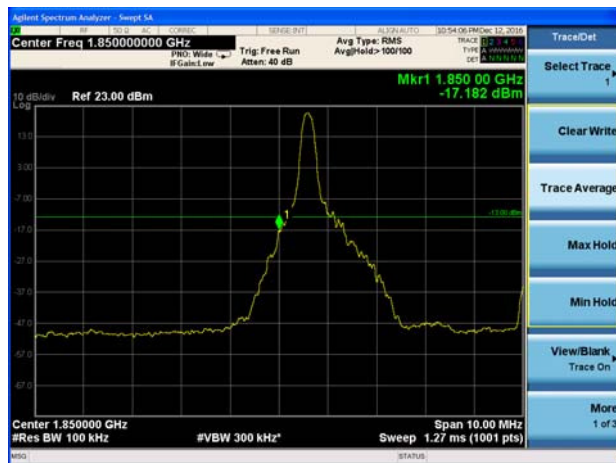


LTE Band 2 5MHz QPSK 100%RB CH-High

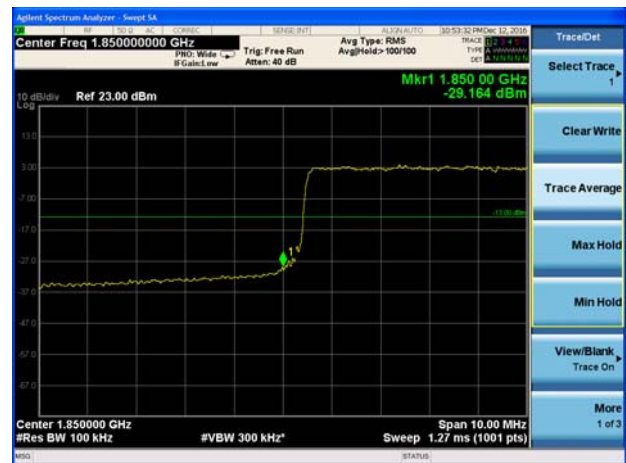




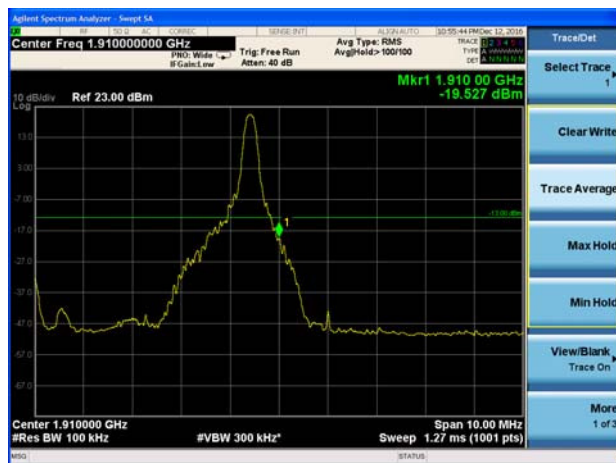
LTE Band 2 10MHz QPSK 1RB CH-Low



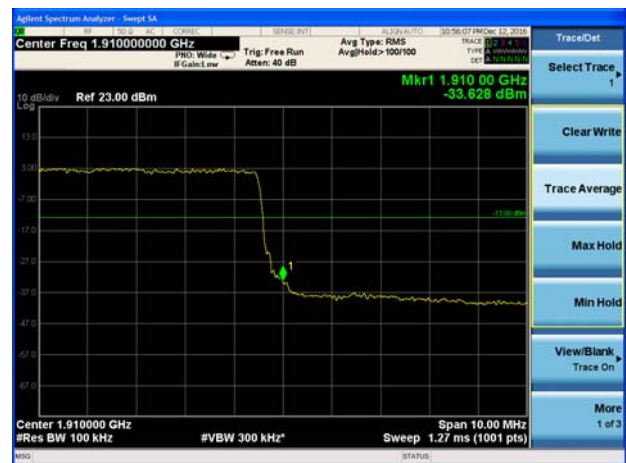
LTE Band 2 10MHz QPSK 100%RB CH-Low



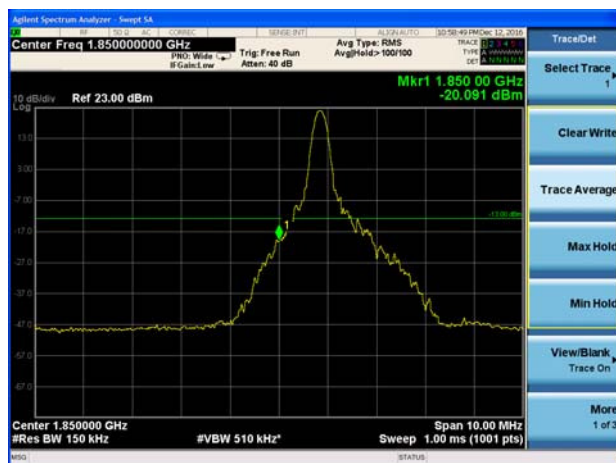
LTE Band 2 10MHz QPSK 1RB CH-High



LTE Band 2 10MHz QPSK 100%RB CH-High



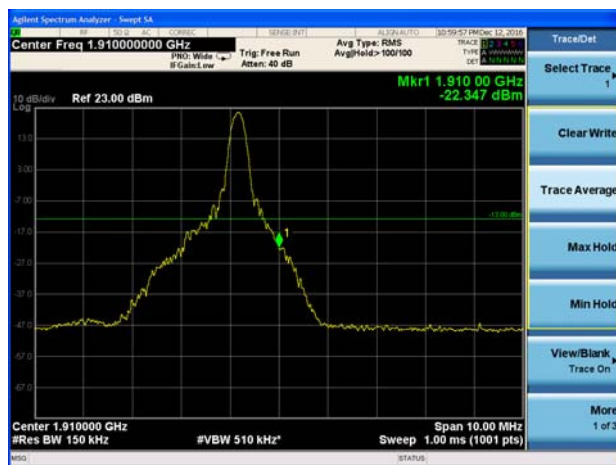
LTE Band 2 15MHz QPSK 1RB CH-Low



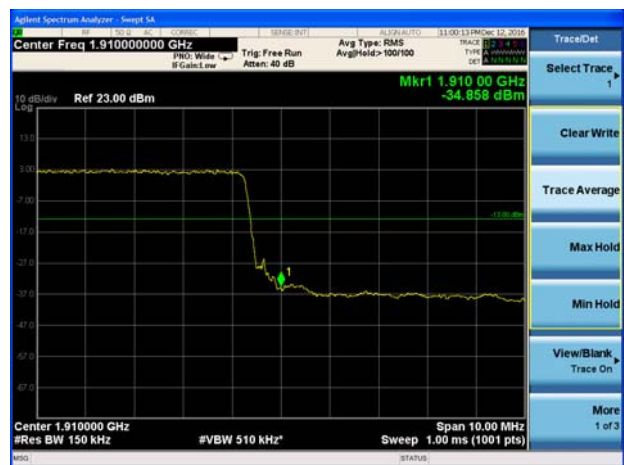
LTE Band 2 15MHz QPSK 100%RB CH-Low



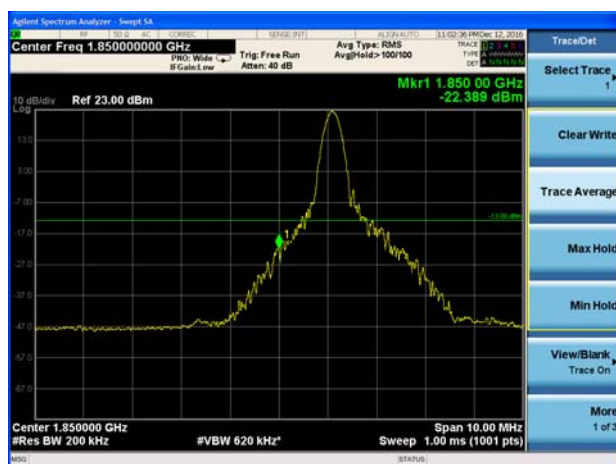
LTE Band 2 15MHz QPSK 1RB CH-High



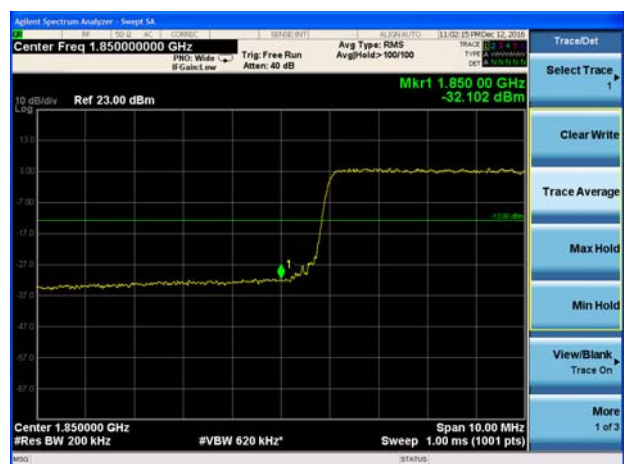
LTE Band 2 15MHz QPSK 100%RB CH-High



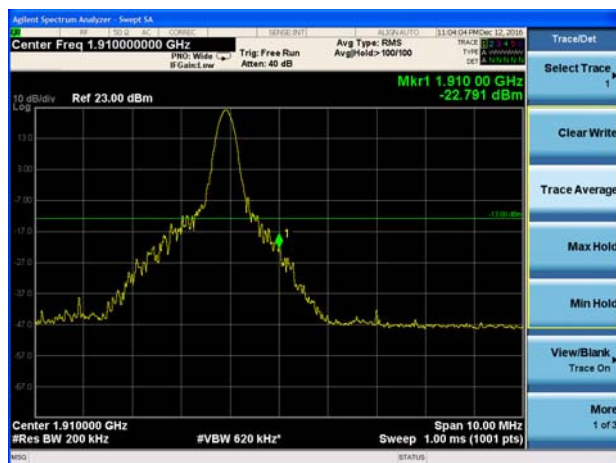
LTE Band 2 20MHz QPSK 1RB CH-Low



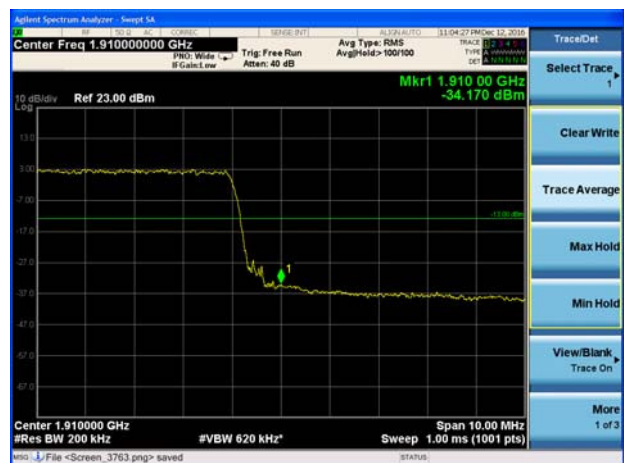
LTE Band 2 20MHz QPSK 100%RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High

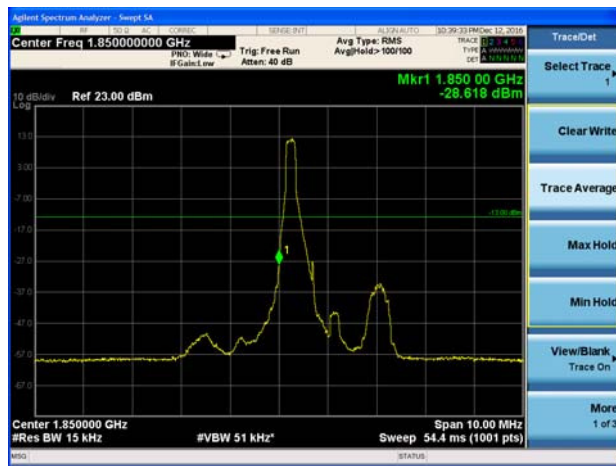


LTE Band 2 20MHz QPSK 100%RB CH-High

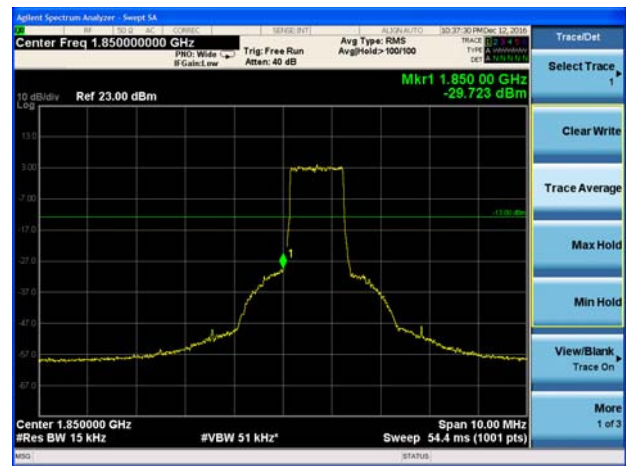




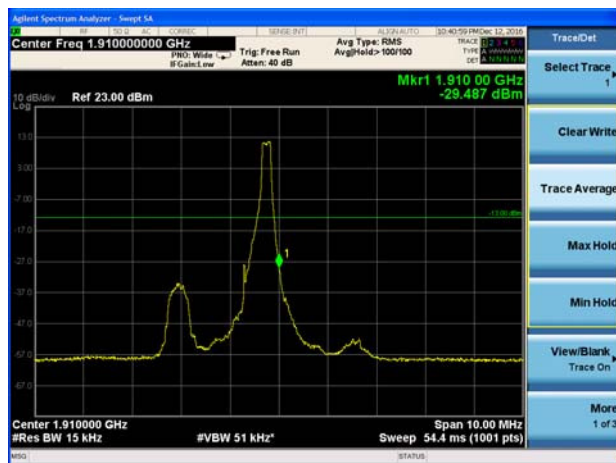
LTE Band 2 1.4MHz 16QAM 1RB CH-Low



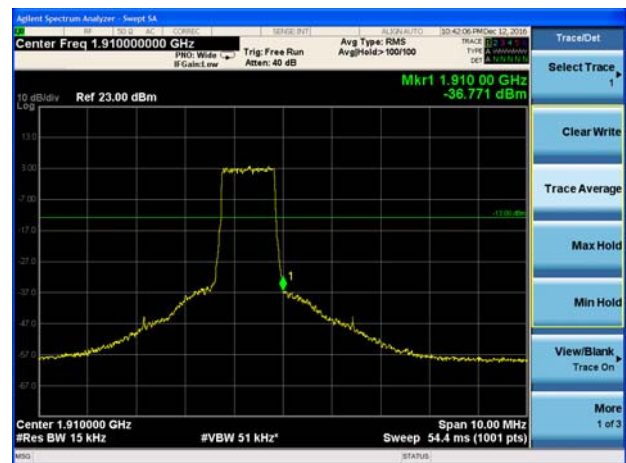
LTE Band 2 1.4MHz 16QAM 100%RB CH-Low



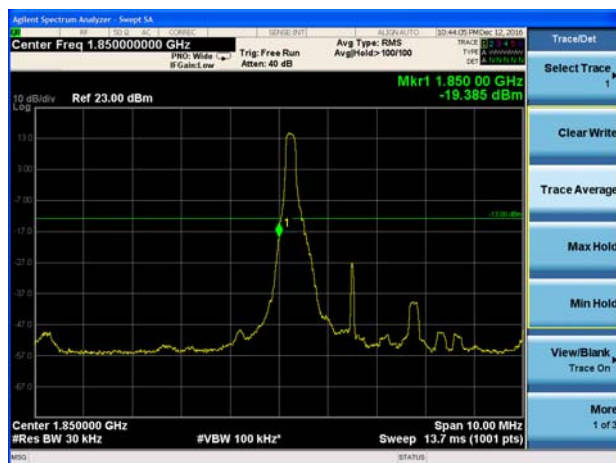
LTE Band 2 1.4MHz 16QAM 1RB CH-High



LTE Band 2 1.4MHz 16QAM 100%RB CH-High



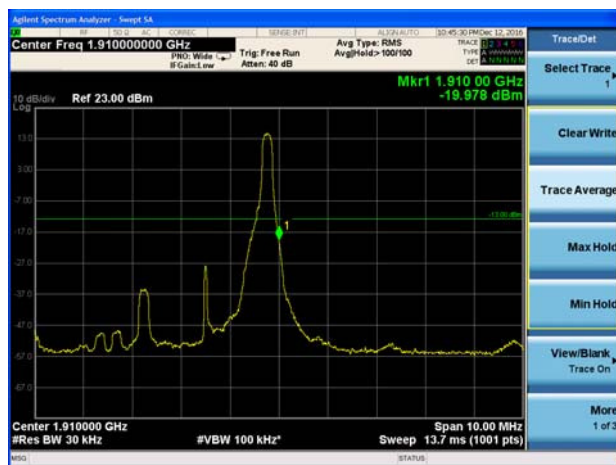
LTE Band 2 3MHz 16QAM 1RB CH-Low



LTE Band 2 3MHz 16QAM 100%RB CH-Low



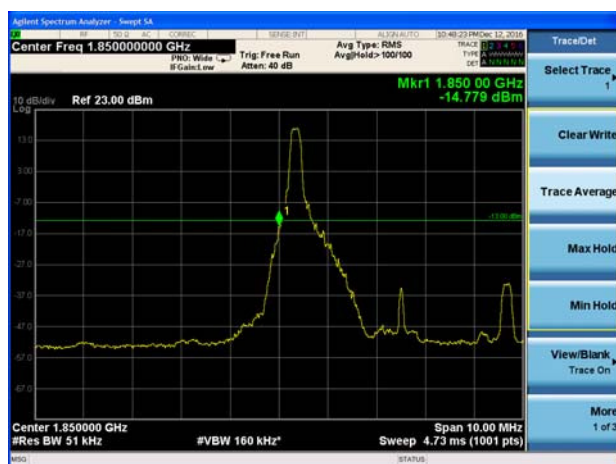
LTE Band 2 3MHz 16QAM 1RB CH-High



LTE Band 2 3MHz 16QAM 100%RB CH-High



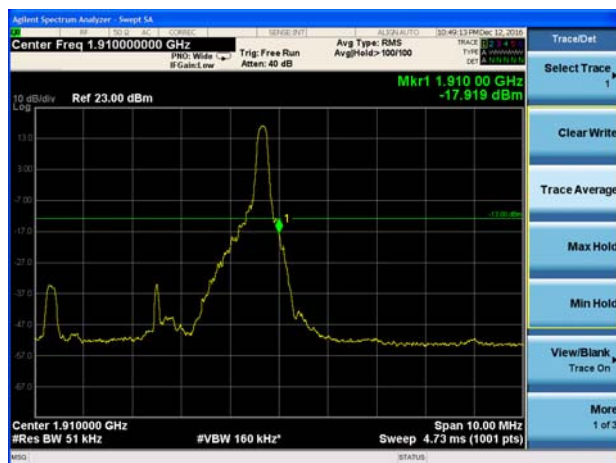
LTE Band 2 5MHz 16QAM 1RB CH-Low



LTE Band 2 5MHz 16QAM 100%RB CH-Low



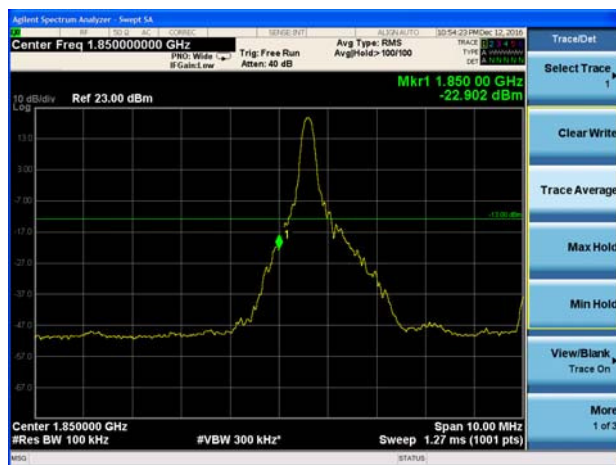
LTE Band 2 5MHz 16QAM 1RB CH-High



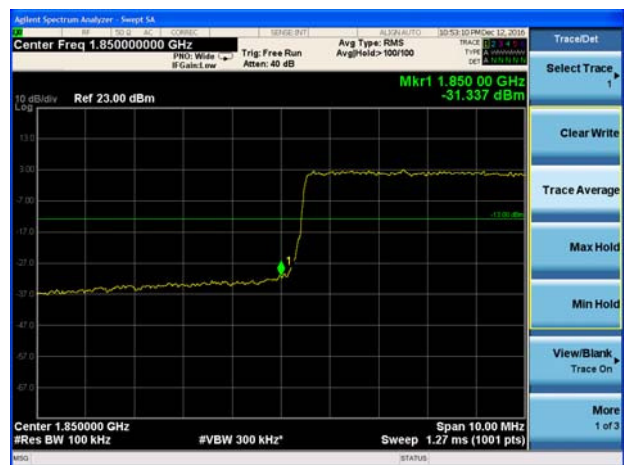
LTE Band 2 5MHz 16QAM 100%RB CH-High



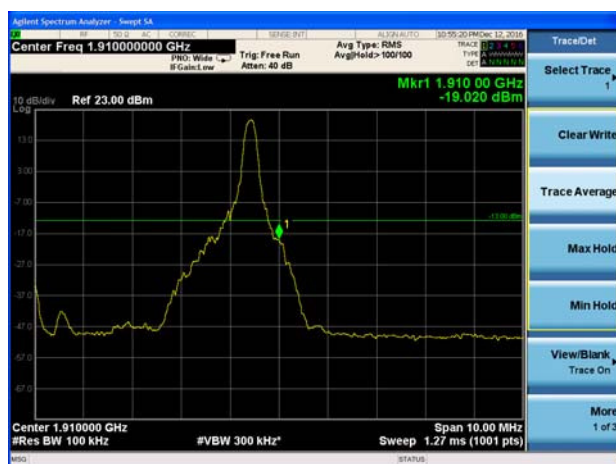
LTE Band 2 10MHz 16QAM 1RB CH-Low



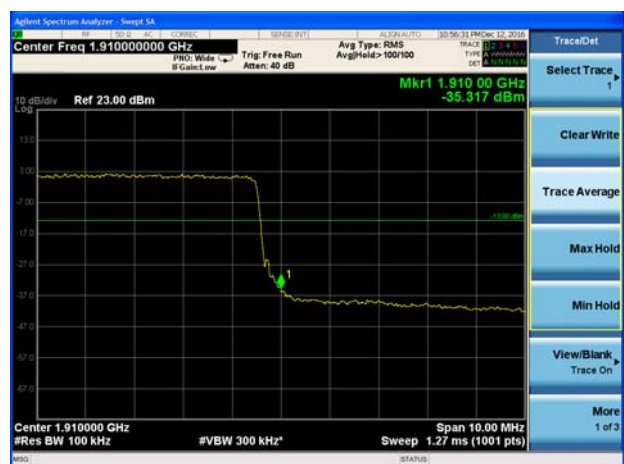
LTE Band 2 10MHz 16QAM 100%RB CH-Low



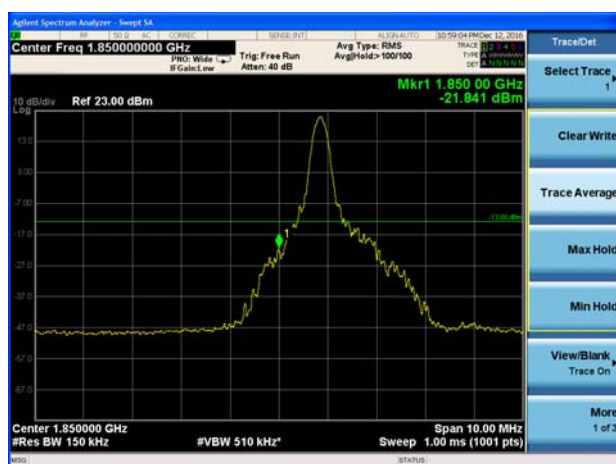
LTE Band 2 10MHz 16QAM 1RB CH-High



LTE Band 2 10MHz 16QAM 100%RB CH-High



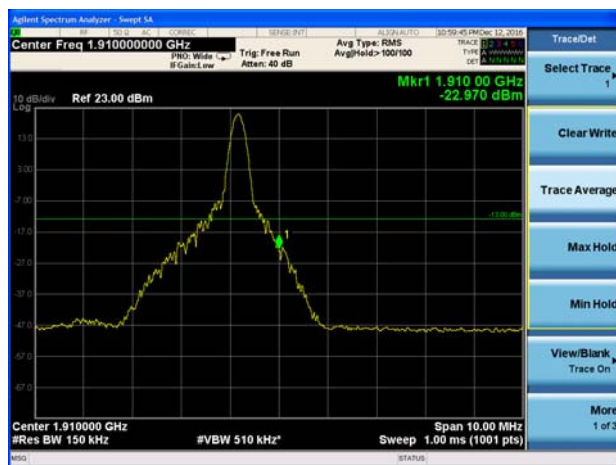
LTE Band 2 15MHz 16QAM 1RB CH-Low



LTE Band 2 15MHz 16QAM 100%RB CH-Low



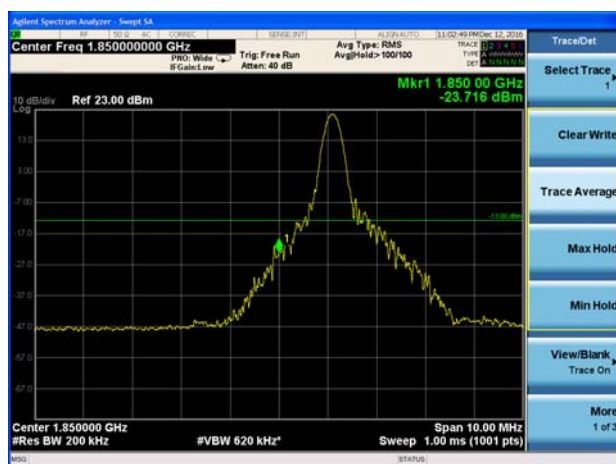
LTE Band 2 15MHz 16QAM 1RB CH-High



LTE Band 2 15MHz 16QAM 100%RB CH-High



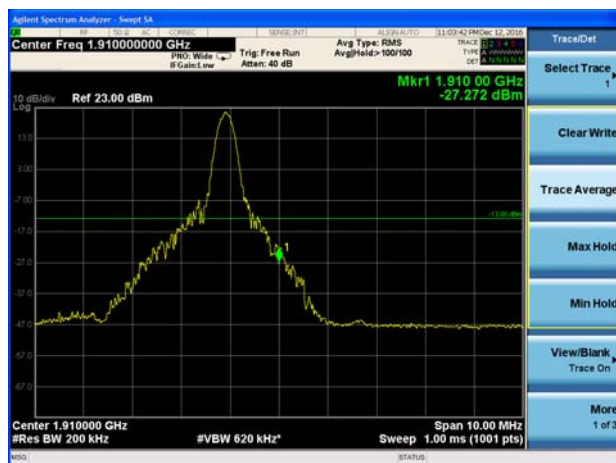
LTE Band 2 20MHz 16QAM 1RB CH-Low



LTE Band 2 20MHz 16QAM 100%RB CH-Low



LTE Band 2 20MHz 16QAM 1RB CH-High



LTE Band 2 20MHz 16QAM 100%RB CH-High



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

Ambient condition

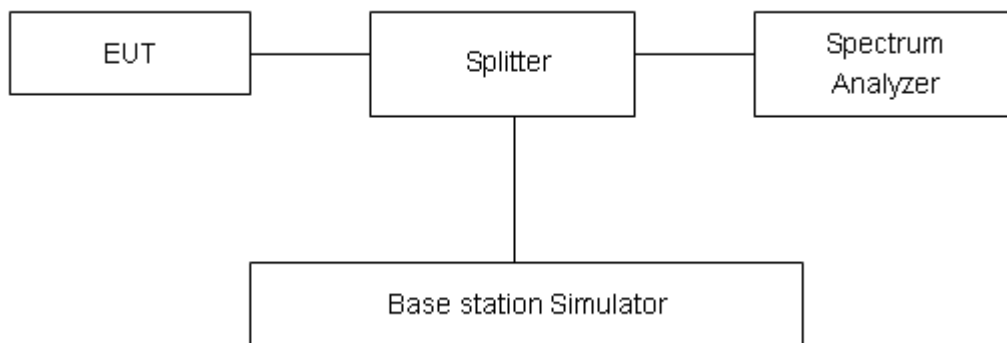
Temperature	Relative humidity
21°C ~25°C	40%~60%

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:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

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	30.22	29.36	0.86	13	PASS
	661	1880	30.58	29.46	1.12	13	PASS
	810	1909.8	30.63	29.56	1.07	13	PASS
GPRS 1900 (GMSK)	512	1850.2	26.07	25.06	1.01	13	PASS
	661	1880	26.33	25.25	1.08	13	PASS
	810	1909.8	26.56	25.47	1.09	13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	22.57	21.53	1.04	13	PASS
	661	1880	22.69	21.72	0.97	13	PASS
	810	1909.8	22.98	21.94	1.04	13	PASS
WCDMA Band II (RMC)	9262	1852.4	25.14	22.4	2.74	13	PASS
	9400	1880	25.43	22.35	3.08	13	PASS
	9538	1907.6	25.47	22.46	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	25.55	20.44	5.11	13	PASS
		18900	1880.0	26.23	20.50	5.73	13	PASS
		19193	1909.3	25.90	20.55	5.35	13	PASS
	16QAM	18607	1850.7	26.10	20.21	5.89	13	PASS
		18900	1880.0	26.58	20.22	6.36	13	PASS
		19193	1909.3	26.34	20.28	6.06	13	PASS
3MHz	QPSK	18615	1851.5	25.74	20.47	5.27	13	PASS
		18900	1880	26.34	20.54	5.80	13	PASS
		19185	1908.5	26.04	20.58	5.46	13	PASS
	16QAM	18615	1851.5	26.26	20.24	6.02	13	PASS
		18900	1880	26.80	20.26	6.54	13	PASS
		19185	1908.5	26.54	20.31	6.23	13	PASS
5MHz	QPSK	18625	1852.5	25.86	20.45	5.41	13	PASS
		18900	1880	26.40	20.53	5.87	13	PASS
		19175	1907.5	26.12	20.56	5.56	13	PASS
	16QAM	18625	1852.5	26.14	20.22	5.92	13	PASS
		18900	1880	26.71	20.22	6.49	13	PASS
		19175	1907.5	26.50	20.26	6.24	13	PASS
10MHz	QPSK	18650	1855	25.95	20.53	5.42	13	PASS
		18900	1880	26.52	20.55	5.97	13	PASS
		19150	1905	26.13	20.60	5.53	13	PASS
	16QAM	18650	1855	26.40	20.25	6.15	13	PASS
		18900	1880	26.74	20.27	6.47	13	PASS
		19150	1905	26.64	20.30	6.34	13	PASS
15MHz	QPSK	18675	1857.5	26.52	20.51	6.01	13	PASS
		18900	1880	26.59	20.51	6.08	13	PASS
		19125	1902.5	26.35	20.55	5.80	13	PASS
	16QAM	18675	1857.5	26.46	20.22	6.24	13	PASS
		18900	1880	26.80	20.22	6.58	13	PASS
		19125	1902.5	27.22	20.26	6.96	13	PASS
20MHz	QPSK	18700	1860	25.99	20.38	5.61	13	PASS
		18900	1880	26.00	20.26	5.74	13	PASS
		19100	1900	26.10	20.41	5.69	13	PASS
	16QAM	18700	1860	26.51	20.20	6.31	13	PASS
		18900	1880	26.68	20.18	6.50	13	PASS
		19100	1900	26.63	20.23	6.40	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 +55°C in 10°C step size,

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

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

(3) Repeat the above measurements at 10°C increments from -30°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

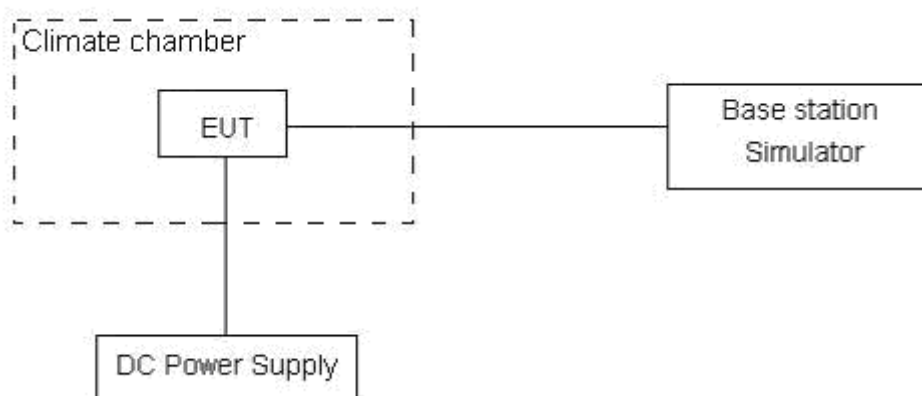
The frequency stability shall be measured with variation of primary supply voltage as follows:

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

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

This transceiver is specified to operate with an input voltage of between 3.5 V and 4.20 V, with a nominal voltage of 3.7V.

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/3.7 V	0.0048	0.0057	0.0054	2.5
	-20°C/3.7 V	0.0072	0.0067	0.0070	2.5
	-10°C/3.7 V	0.0042	-0.0049	0.0064	2.5
	0°C/3.7 V	-0.0042	-0.0060	0.0072	2.5
	10°C/3.7 V	0.0042	0.0065	0.0075	2.5
	20°C/3.7 V	-0.0046	0.0061	0.0079	2.5
	30°C/3.7 V	-0.0048	0.0105	0.0074	2.5
	40°C/3.7 V	-0.0022	0.0033	0.0051	2.5
	50°C/3.7 V	-0.0050	0.0089	0.0072	2.5
	55°C/3.7 V	-0.0049	0.0043	0.0083	2.5
	20°C/3.5 V	-0.0084	0.0038	0.0098	2.5
	20°C/4.20 V	0.0016	0.0024	0.0048	2.5
/	/	RMC			/
WCDMA Band II Channel 9400	-30°C/3.7 V	0.000561			2.5
	-20°C/3.7 V	0.000845			2.5
	-10°C/3.7 V	-0.000354			2.5
	0°C/3.7 V	-0.000681			2.5
	10°C/3.7 V	0.000784			2.5
	20°C/3.7 V	0.000687			2.5
	30°C/3.7 V	0.000547			2.5
	40°C/3.7 V	0.000713			2.5
	50°C/3.7 V	-0.000927			2.5
	55°C/3.7 V	-0.000787			2.5
	20°C/3.5 V	0.000684			2.5
	20°C/4.20 V	-0.000478			2.5



Bandwidth	Test status	LTE Band 2 Channel 18900 Test Results (ppm)		Conclusion
		QPSK	16QAM	
1.4MHz	-30°C/3.7 V	-0.00573	-0.00685	PASS
	-20°C/3.7 V	0.00325	-0.00516	PASS
	-10°C/3.7 V	-0.00632	-0.00345	PASS
	0°C/3.7 V	-0.00149	-0.00554	PASS
	10°C/3.7 V	0.00126	0.00003	PASS
	20°C/3.7 V	0.00100	0.00722	PASS
	30°C/3.7 V	-0.00297	0.00008	PASS
	40°C/3.7 V	0.00395	-0.00339	PASS
	50°C/3.7 V	-0.00003	-0.00763	PASS
	20°C/3.5 V	-0.00562	0.02118	PASS
	20°C/4.20 V	-0.00322	0.01627	PASS
3MHz	-30°C/3.7 V	-0.00603	-0.00350	PASS
	-20°C/3.7 V	-0.00480	-0.00487	PASS
	-10°C/3.7 V	-0.00520	-0.00492	PASS
	0°C/3.7 V	0.00072	-0.00858	PASS
	10°C/3.7 V	-0.00752	-0.00398	PASS
	20°C/3.7 V	-0.00240	0.00040	PASS
	30°C/3.7 V	-0.00953	-0.00337	PASS
	40°C/3.7 V	-0.00343	-0.00506	PASS
	50°C/3.7 V	-0.00752	-0.00682	PASS
	20°C/3.5 V	-0.00316	-0.00228	PASS
	20°C/4.20 V	-0.00034	-0.00242	PASS
5MHz	-30°C/3.7 V	-0.00360	-0.00209	PASS
	-20°C/3.7 V	-0.00330	0.00207	PASS
	-10°C/3.7 V	-0.00100	0.00009	PASS
	0°C/3.7 V	-0.00429	-0.00328	PASS
	10°C/3.7 V	-0.00190	-0.00202	PASS
	20°C/3.7 V	0.00008	0.00110	PASS
	30°C/3.7 V	-0.00140	-0.00129	PASS
	40°C/3.7 V	-0.00431	0.00351	PASS
	50°C/3.7 V	0.00391	-0.00228	PASS
	20°C/3.5 V	0.00320	-0.00248	PASS
	20°C/4.20 V	-0.00517	0.00350	PASS
10MHz	-30°C/3.7 V	0.00229	-0.00403	PASS
	-20°C/3.7 V	-0.00244	-0.00110	PASS
	-10°C/3.7 V	0.00313	0.00308	PASS
	0°C/3.7 V	0.00186	0.00273	PASS



	10°C/3.7 V	-0.00093	0.00251	PASS
	20°C/3.7 V	0.00498	0.00237	PASS
	30°C/3.7 V	0.00234	0.00304	PASS
	40°C/3.7 V	0.00304	0.00021	PASS
	50°C/3.7 V	0.00017	0.00268	PASS
	20°C/3.5 V	0.00433	-0.00663	PASS
	20°C/4.20 V	-0.00143	-0.00269	PASS
15MHz	-30°C/3.7 V	0.00028	0.00013	PASS
	-20°C/3.7 V	0.00013	0.00017	PASS
	-10°C/3.7 V	0.00017	0.00001	PASS
	0°C/3.7 V	0.00001	0.00015	PASS
	10°C/3.7 V	0.00009	-0.00013	PASS
	20°C/3.7 V	-0.00008	-0.00015	PASS
	30°C/3.7 V	0.00013	-0.00023	PASS
	40°C/3.7 V	-0.00014	-0.00006	PASS
	50°C/3.7 V	0.00018	0.00017	PASS
	20°C/3.5 V	0.00010	0.00015	PASS
	20°C/4.20 V	-0.00005	0.00014	PASS
20MHz	-30°C/3.7 V	0.00015	-0.00026	PASS
	-20°C/3.7 V	-0.00016	-0.00007	PASS
	-10°C/3.7 V	0.00020	0.00020	PASS
	0°C/3.7 V	0.00012	0.00018	PASS
	10°C/3.7 V	-0.00006	0.00016	PASS
	20°C/3.7 V	0.00032	0.00015	PASS
	30°C/3.7 V	0.00015	0.00020	PASS
	40°C/3.7 V	0.00020	0.00001	PASS
	50°C/3.7 V	0.00001	0.00017	PASS
	20°C/3.5 V	0.00497	-0.00763	PASS
	20°C/4.20 V	-0.00009	-0.00017	PASS

5.7. Spurious Emissions at Antenna Terminals

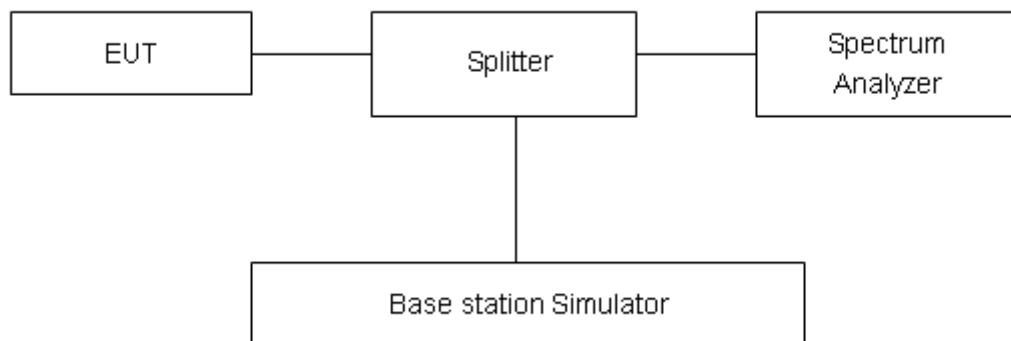
Ambient condition

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 $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

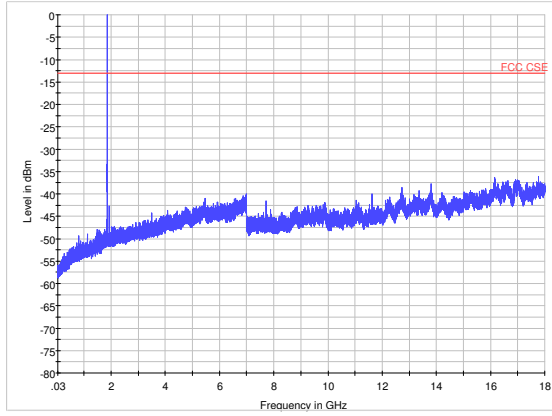
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

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

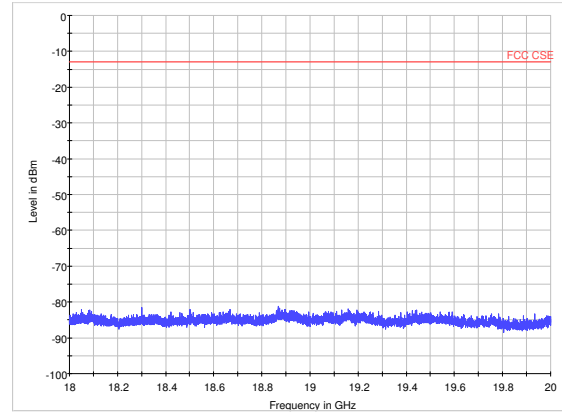
Test Result

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.

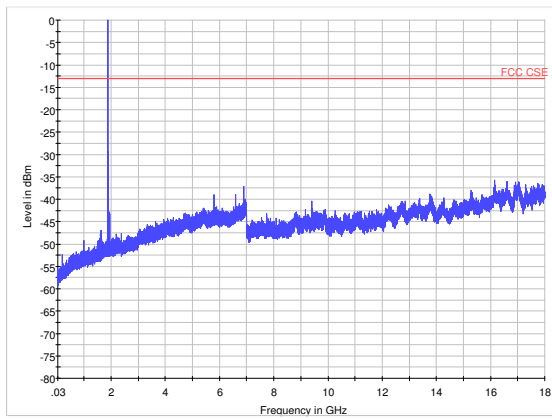
GSM 1900 CH-Low 30MHz~18GHz



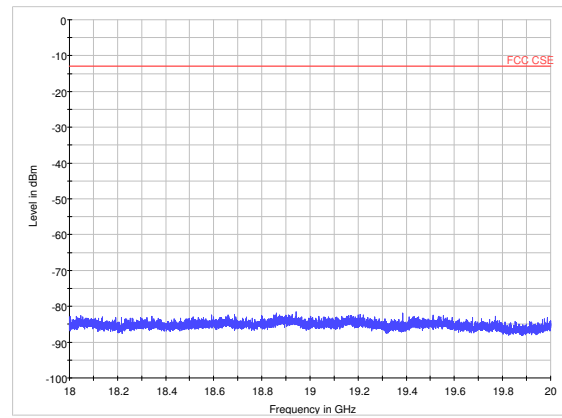
GSM 1900 CH-Low 18GHz~20GHz



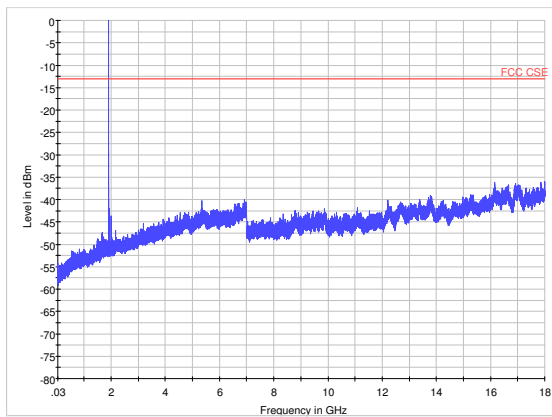
GSM 1900 CH-Middle 30MHz~18GHz



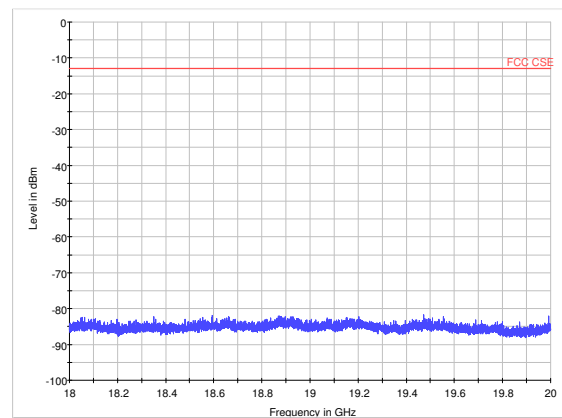
GSM 1900 CH-Middle 18GHz~20GHz



GSM 1900 CH-High 30MHz~18GHz

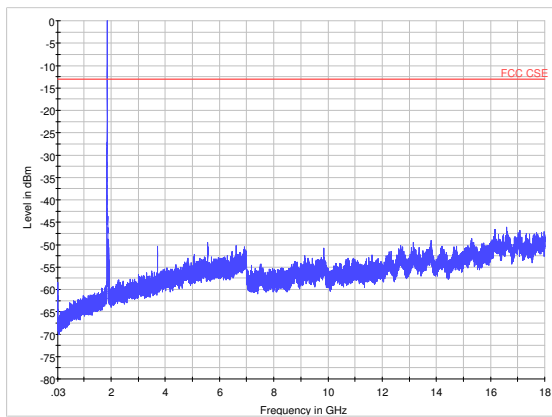


GSM 1900 CH-High 18GHz~20GHz

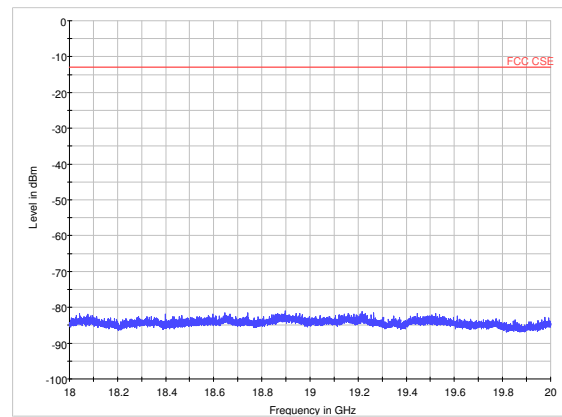




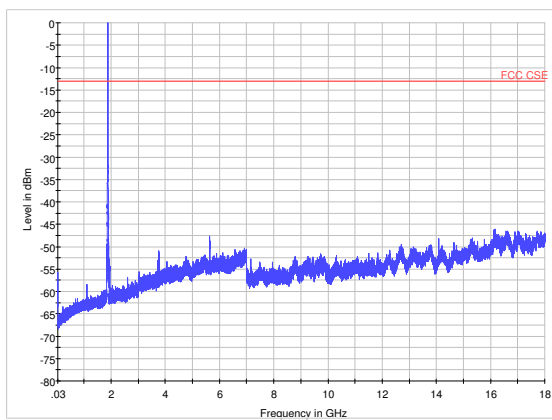
WCDMA Band II CH-Low 30MHz~18GHz



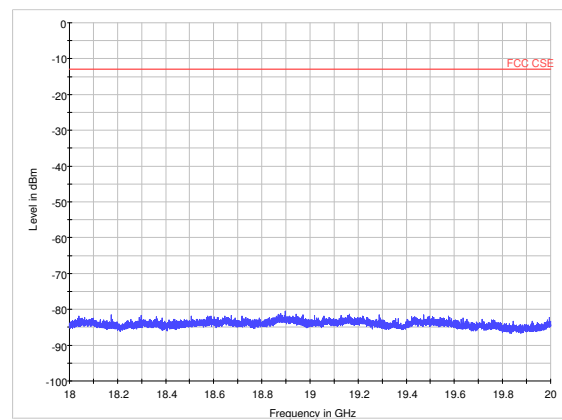
WCDMA Band II CH-Low 18GHz~20GHz



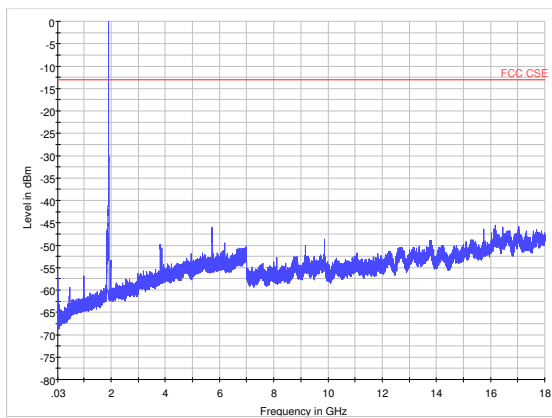
WCDMA Band II CH-Middle 30MHz~18GHz



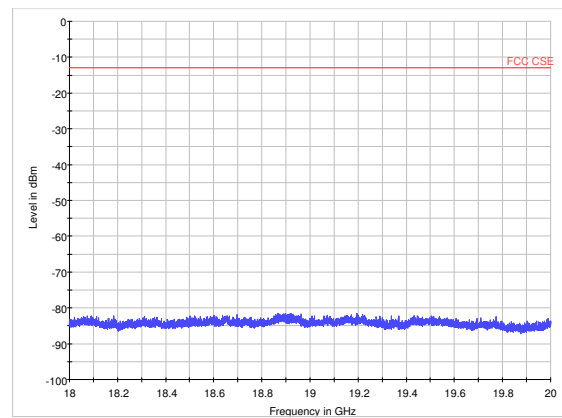
WCDMA Band II CH-Middle 18GHz~20GHz



WCDMA Band II CH-High 30MHz~18GHz

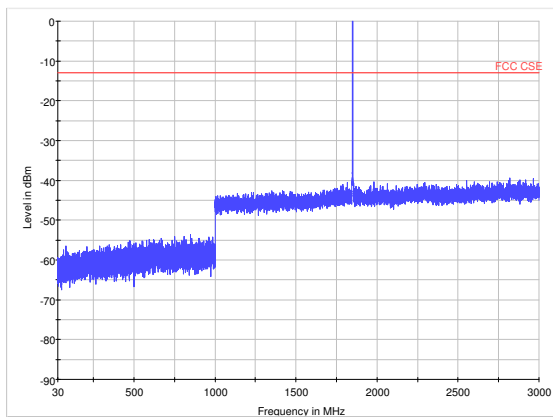


WCDMA Band II CH-High 18GHz~20GHz

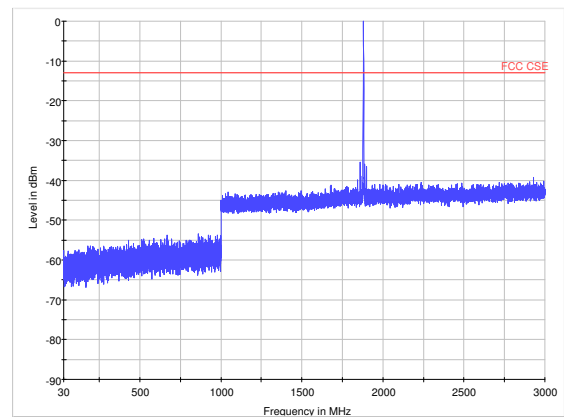




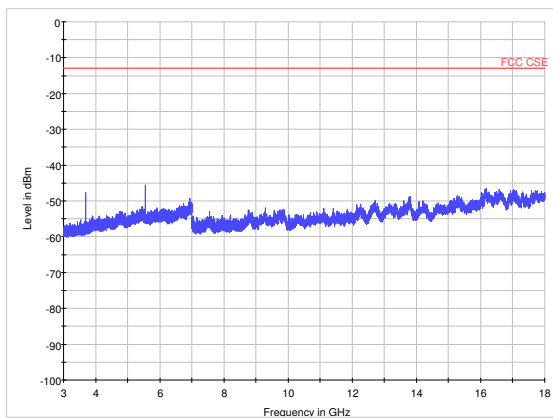
LTE Band 2 1.4MHz CH-Low 30MHz~3GHz



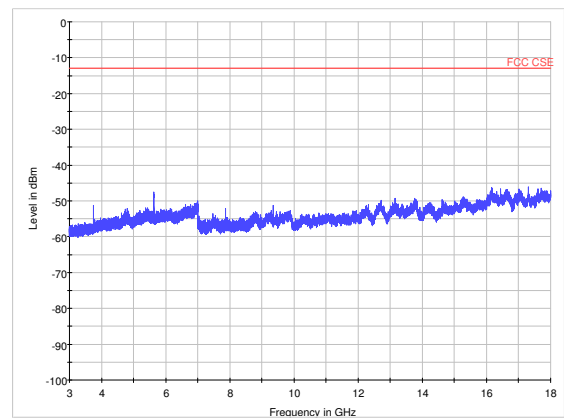
LTE Band 2 1.4MHz CH-Middle 30MHz~3GHz



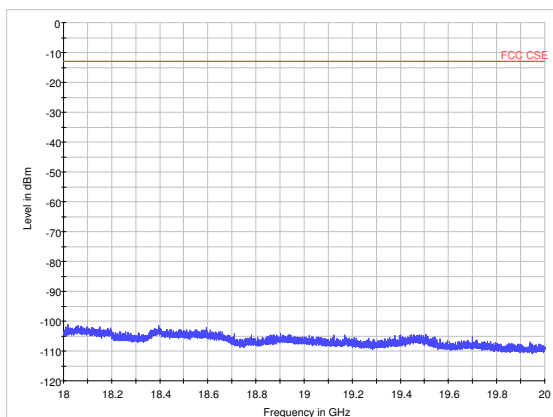
LTE Band 2 1.4MHz CH-Low 3GHz~18GHz



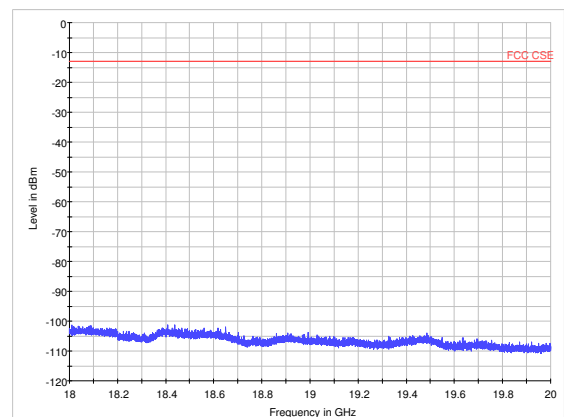
LTE Band 2 1.4MHz CH-Middle 3GHz~18GHz



LTE Band 2 1.4MHz CH-Low 18GHz~20GHz

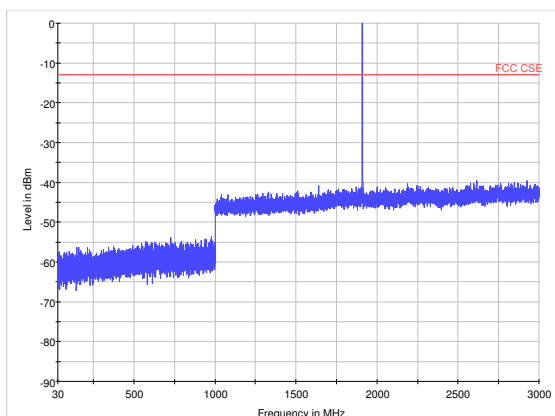


LTE Band 2 1.4MHz CH-Middle 18GHz~20GHz

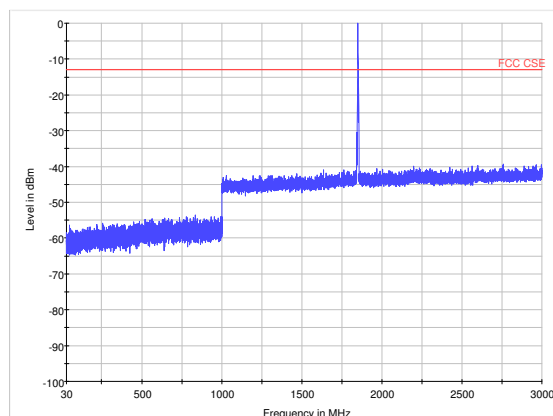




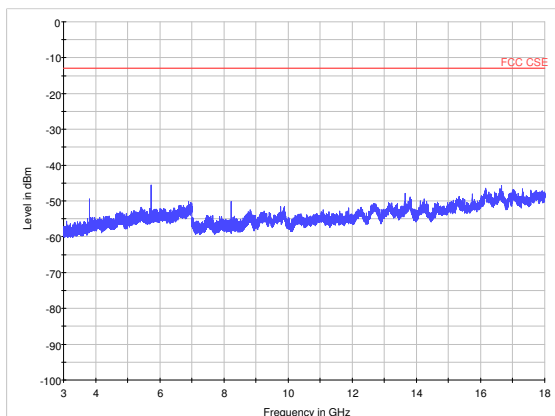
LTE Band 2 1.4MHz CH-High 30MHz~3GHz



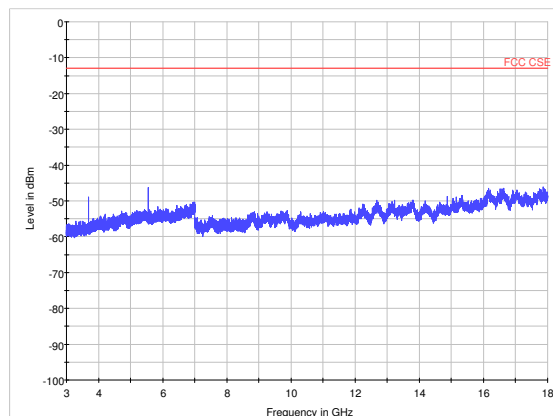
LTE Band 2 3MHz CH-Low 30MHz~3GHz



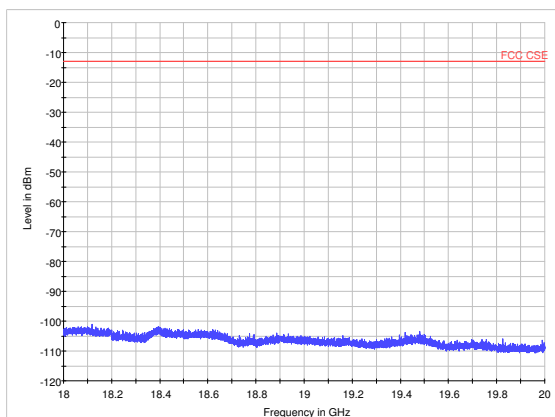
LTE Band 2 1.4MHz CH-High 3GHz~18GHz



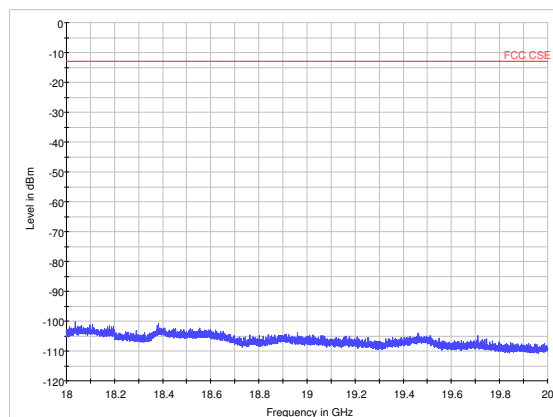
LTE Band 2 3MHz CH-Low 3GHz~18GHz



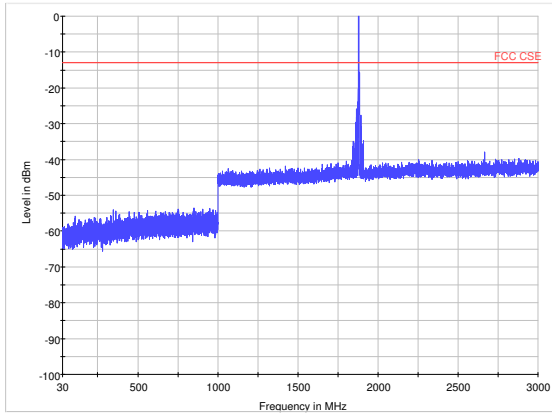
LTE Band 2 1.4MHz CH-High 18GHz~20GHz



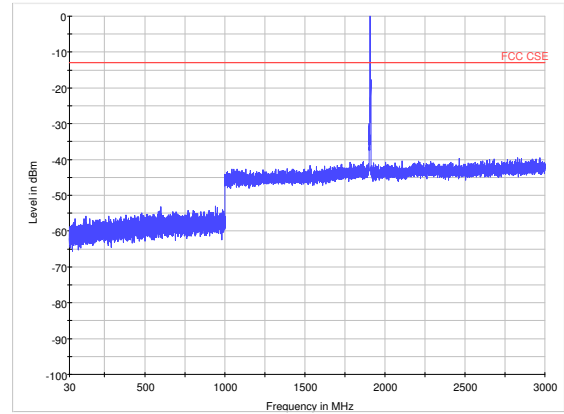
LTE Band 2 3MHz CH-Low 18GHz~20GHz



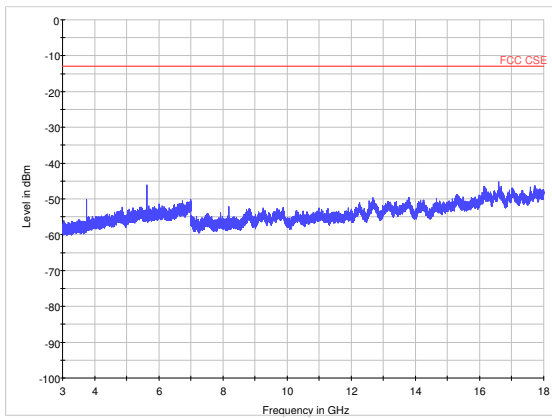
LTE Band 2 3MHz CH-Middle 30MHz~3GHz



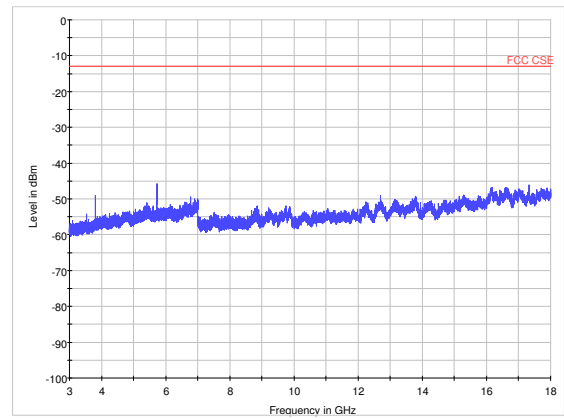
LTE Band 2 3MHz CH-High 30MHz~3GHz



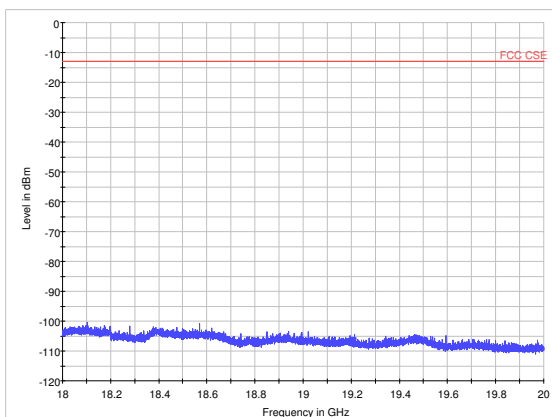
LTE Band 2 3MHz CH-Middle 3GHz~18GHz



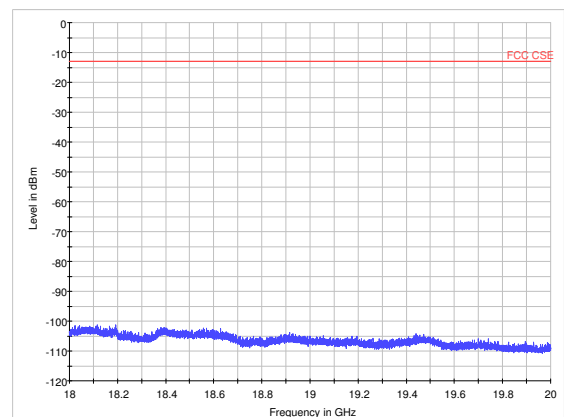
LTE Band 2 3MHz CH-High 3GHz~18GHz



LTE Band 2 3MHz CH-Middle 18GHz~20GHz

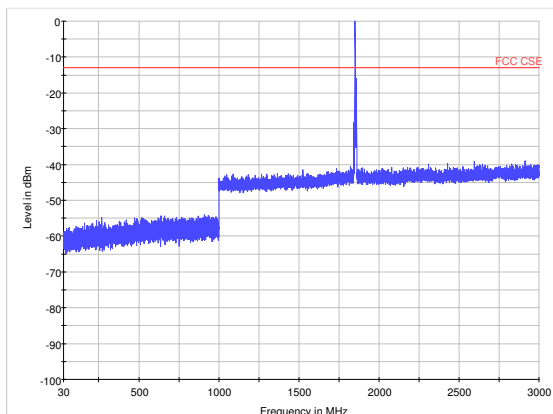


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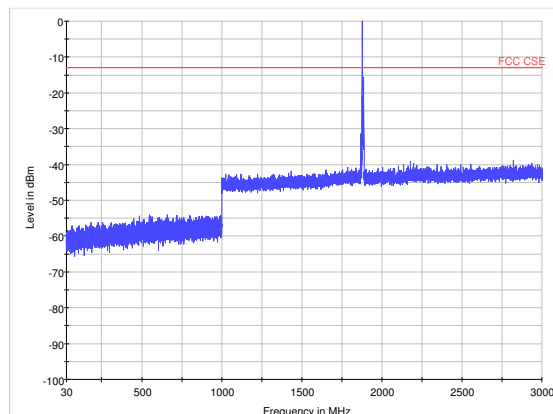




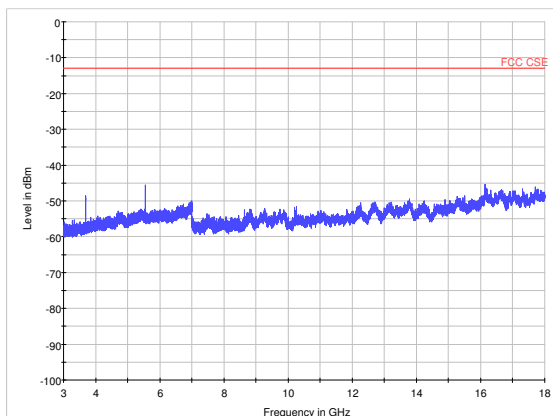
LTE Band 2 5MHz CH-Low 30MHz~3GHz



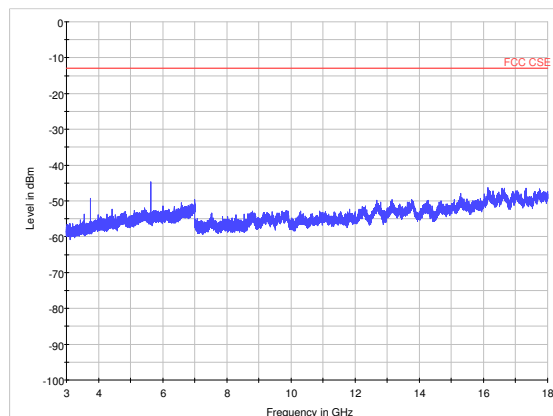
LTE Band 2 5MHz CH-Middle 30MHz~3GHz



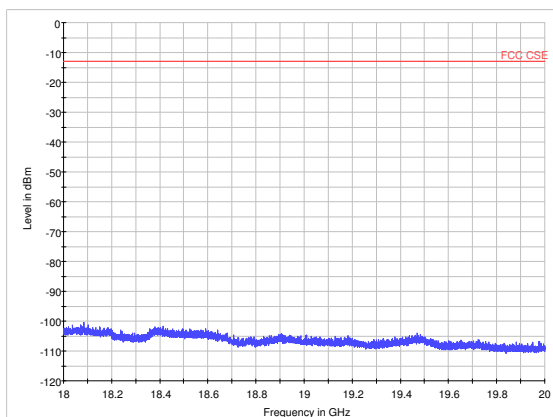
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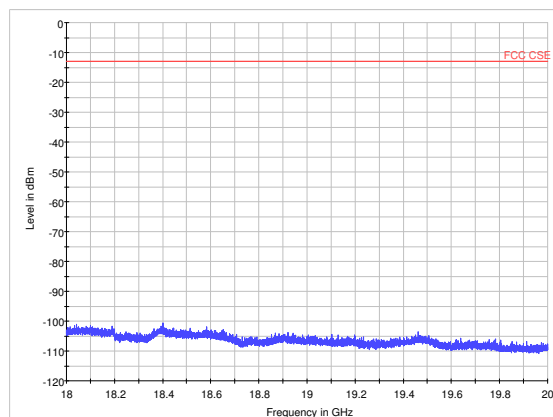
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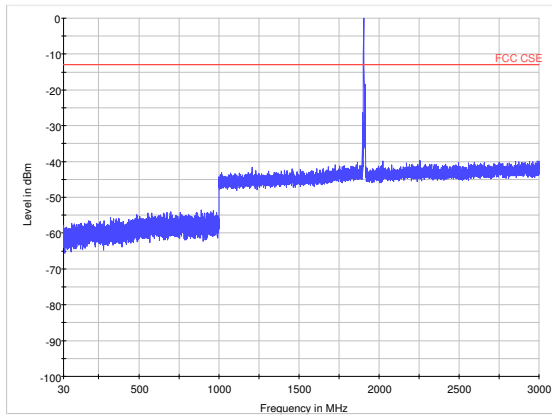
LTE Band 2 5MHz CH-Low 18GHz~20GHz



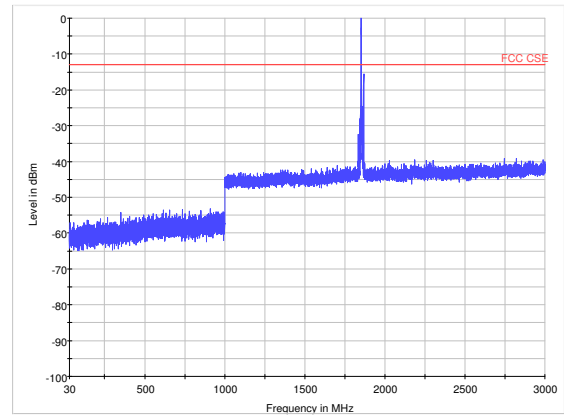
LTE Band 2 5MHz CH-Middle 18GHz~20GHz



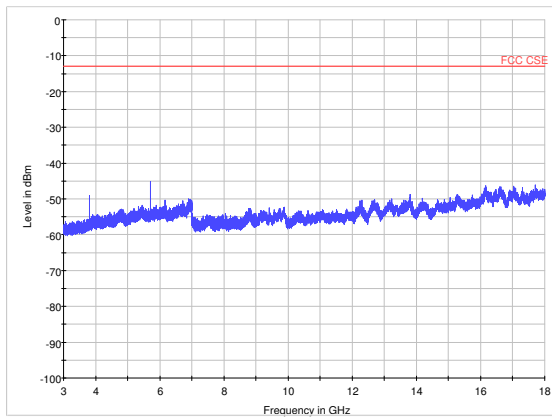
LTE Band 2 5MHz CH-High 30MHz~3GHz



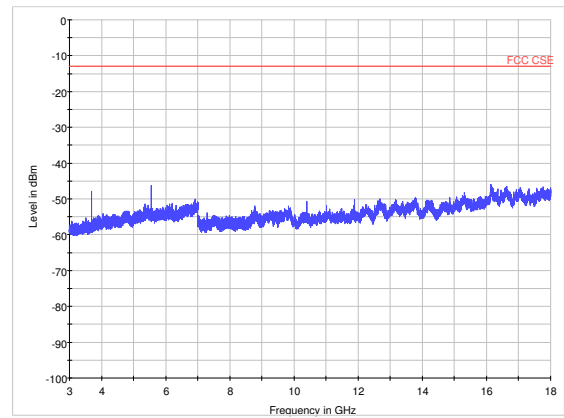
LTE Band 2 10MHz CH-Low 30MHz~3GHz



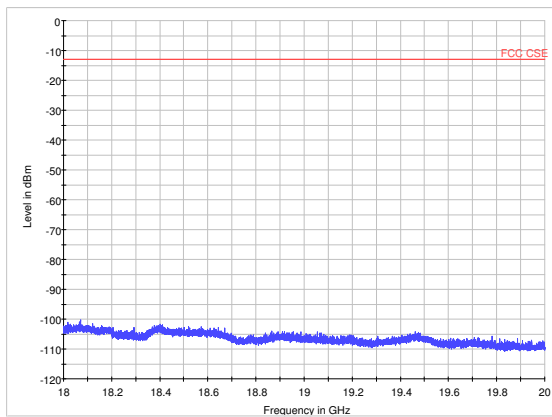
LTE Band 2 5MHz CH-High 3GHz~18GHz



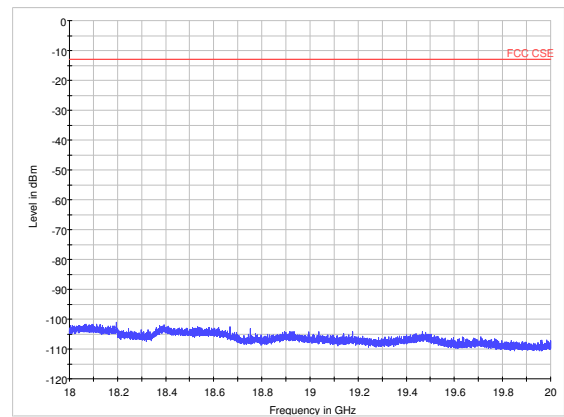
LTE Band 2 10MHz CH-Low 3GHz~18GHz



LTE Band 2 5MHz CH-High 18GHz~20GHz

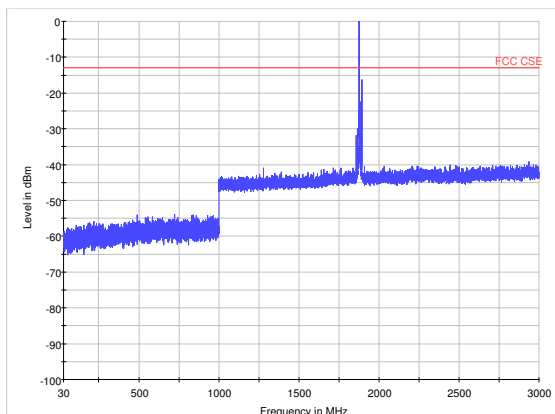


LTE Band 2 10MHz CH-Low 18GHz~20GHz

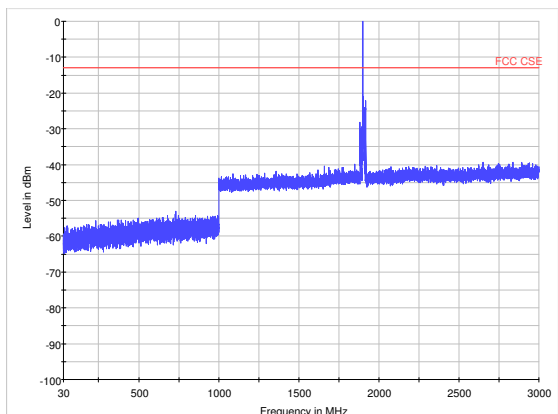




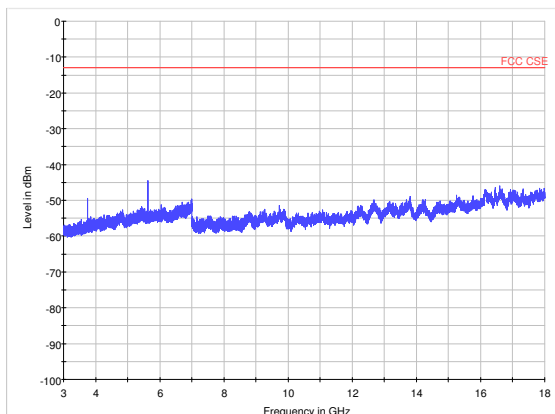
LTE Band 2 10MHz CH-Middle 30MHz~3GHz



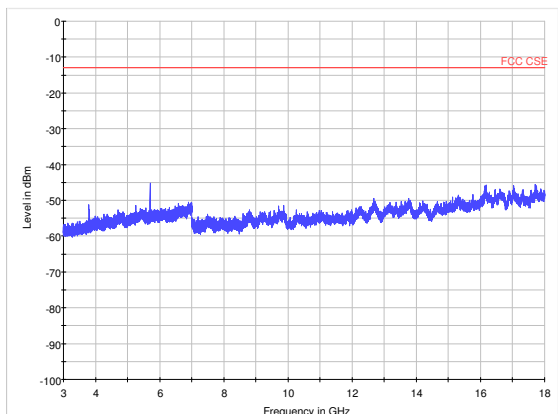
LTE Band 2 10MHz CH-High 30MHz~3GHz



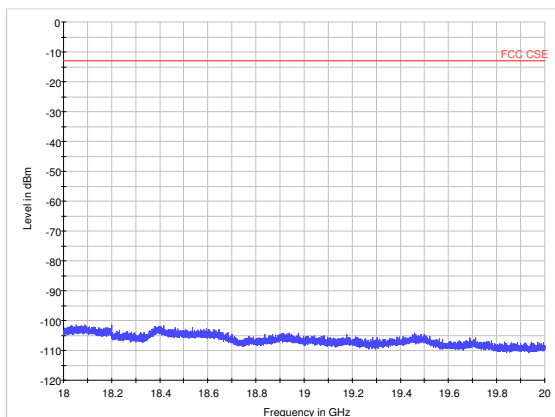
LTE Band 2 10MHz CH-Middle 3GHz~18GHz



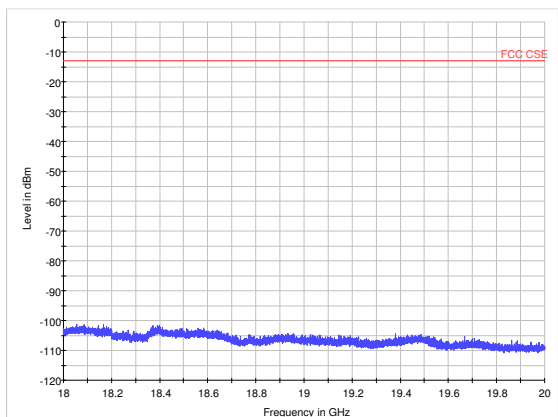
LTE Band 2 10MHz CH-High 3GHz~18GHz



LTE Band 2 10MHz CH-Middle 18GHz~20GHz

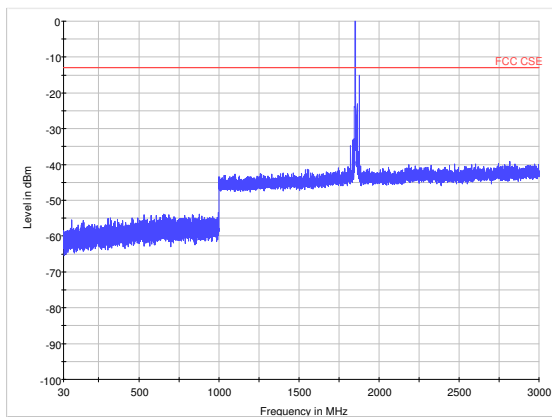


LTE Band 2 10MHz CH-High 18GHz~20GHz

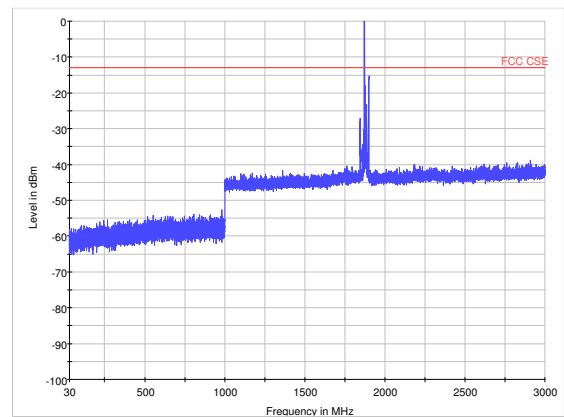




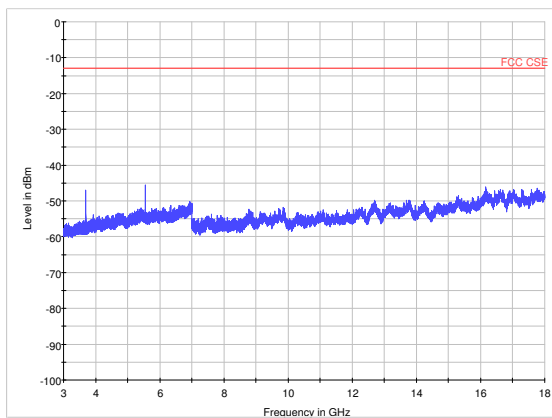
LTE Band 2 15MHz CH-Low 30MHz~3GHz



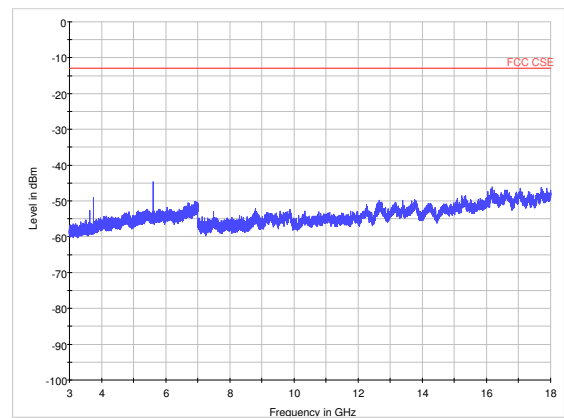
LTE Band 2 15MHz CH-Middle 30MHz~3GHz



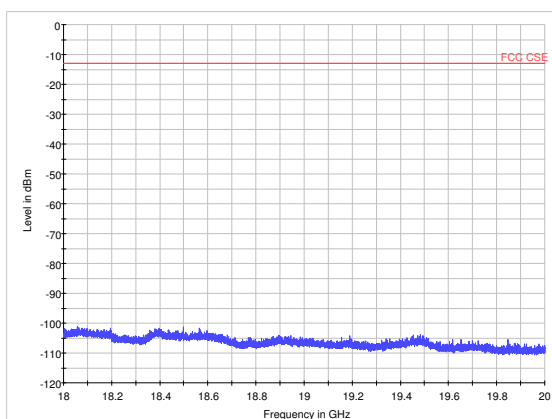
LTE Band 2 15MHz CH-Low 3GHz~18GHz



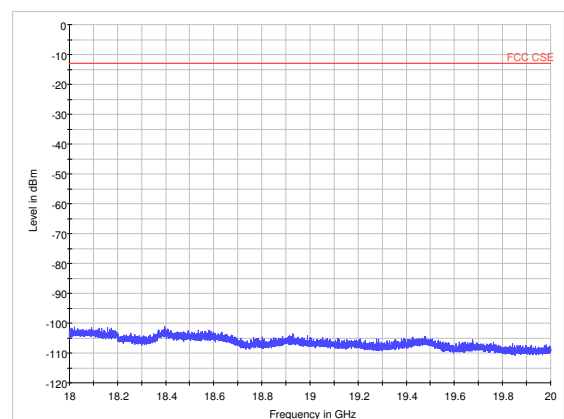
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LTE Band 2 15MHz CH-Low 18GHz~20GHz

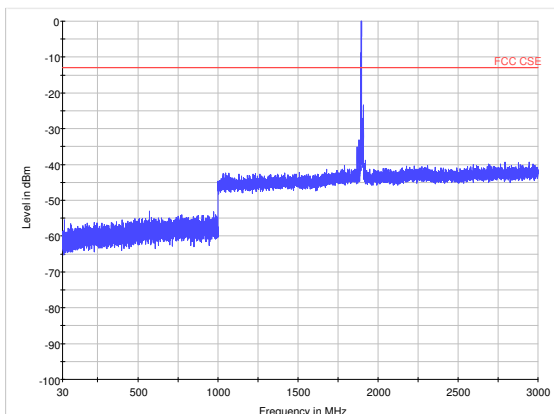


LTE Band 2 15MHz CH-Middle 18GHz~20GHz

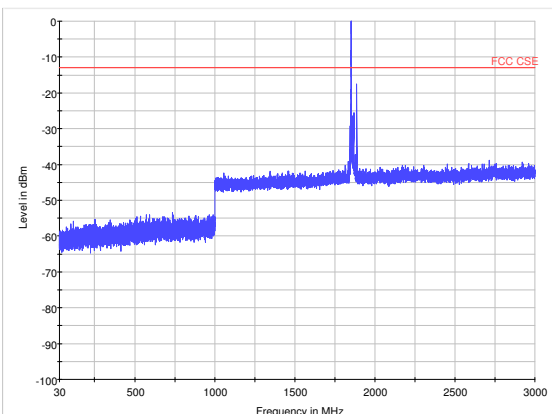




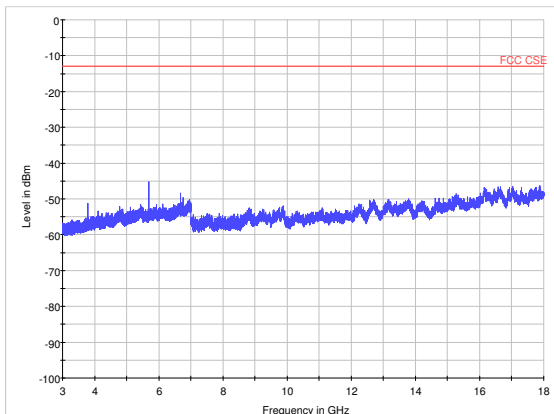
LTE Band 2 15MHz CH-High 30MHz~3GHz



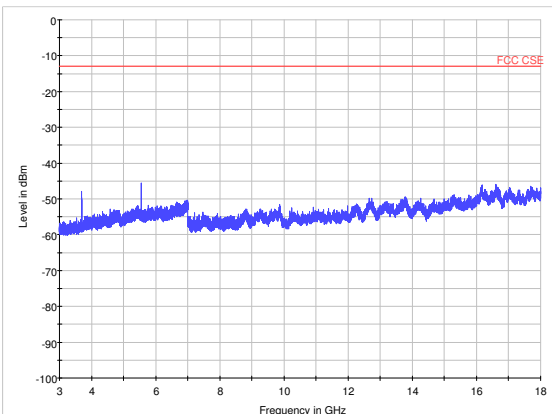
LTE Band 2 20MHz CH-Low 30MHz~3GHz



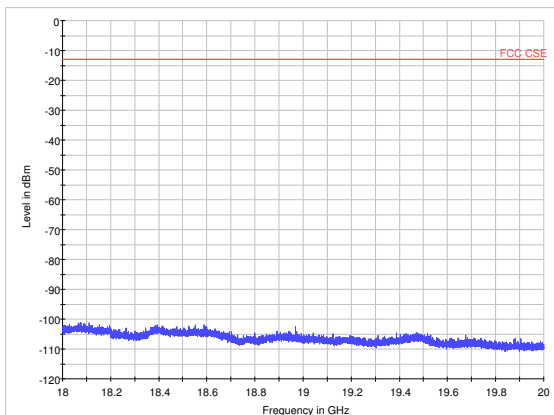
LTE Band 2 15MHz CH-High 3GHz~18GHz



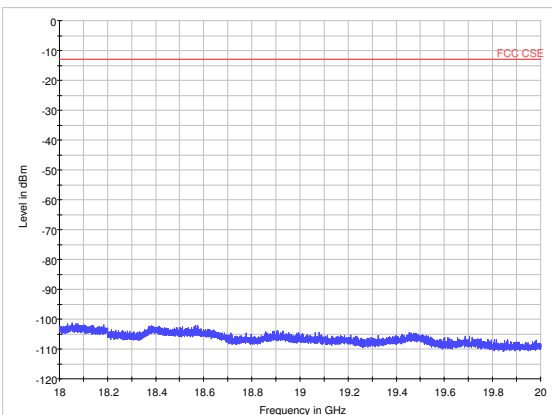
LTE Band 2 20MHz CH-Low 3GHz~18GHz



LTE Band 2 15MHz CH-High 18GHz~20GHz

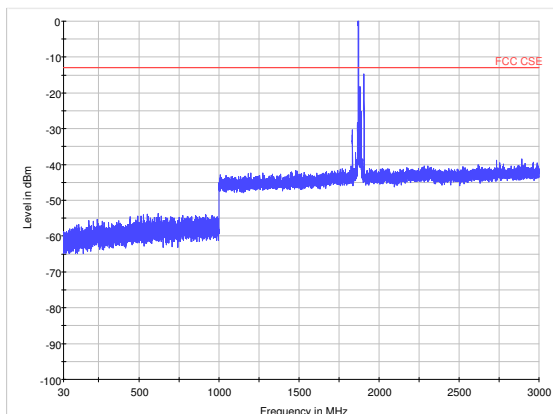


LTE Band 2 20MHz CH-Low 18GHz~20GHz

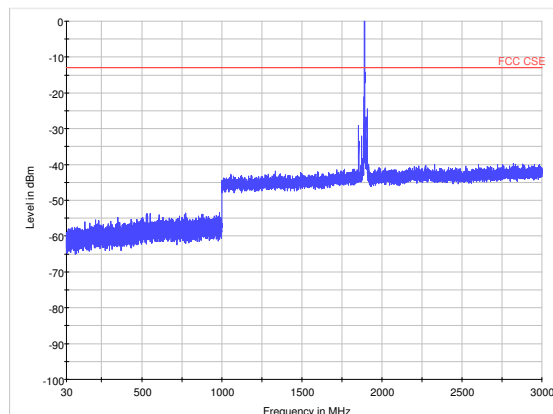




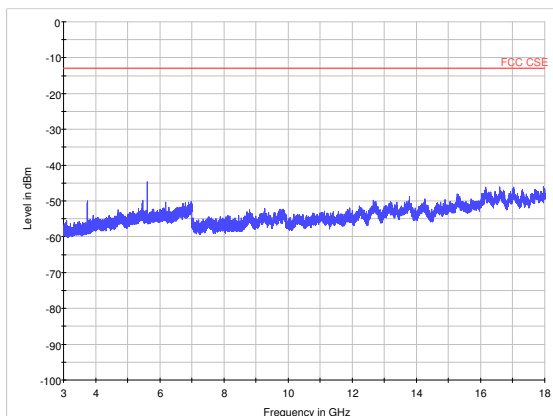
LTE Band 2 20MHz CH-Middle 30MHz~3GHz



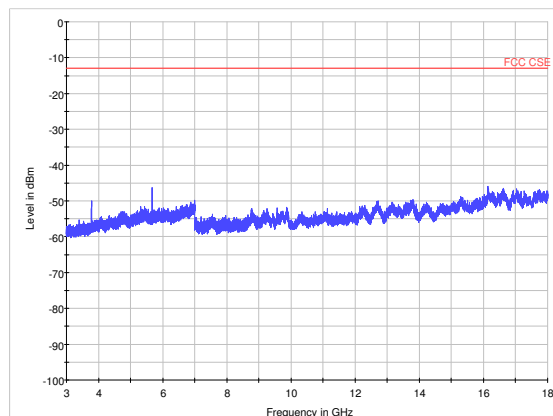
LTE Band 2 20MHz CH-High 30MHz~3GHz



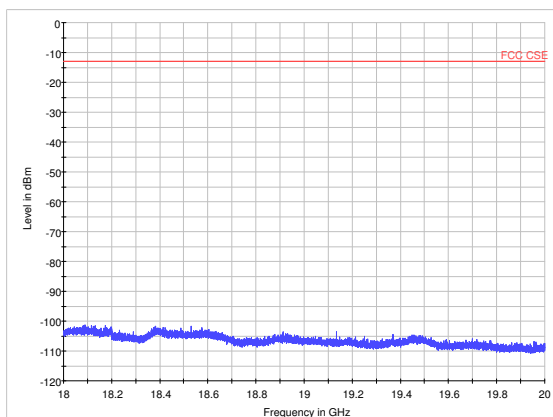
LTE Band 2 20MHz CH-Middle 3GHz~18GHz



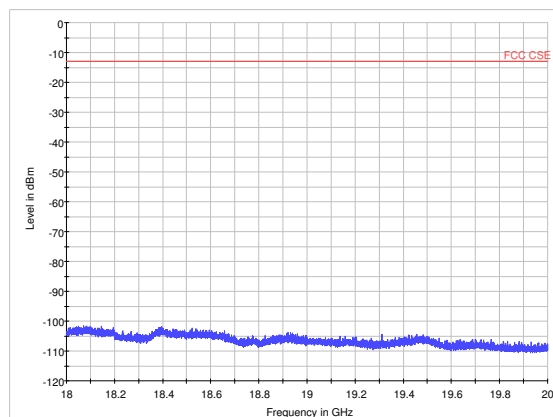
LTE Band 2 20MHz CH-High 3GHz~18GHz



LTE Band 2 20MHz CH-Middle 18GHz~20GHz



LTE Band 2 20MHz CH-High 18GHz~20GHz



5.8. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. Above 30MHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$

The measurement results are amend as described below:

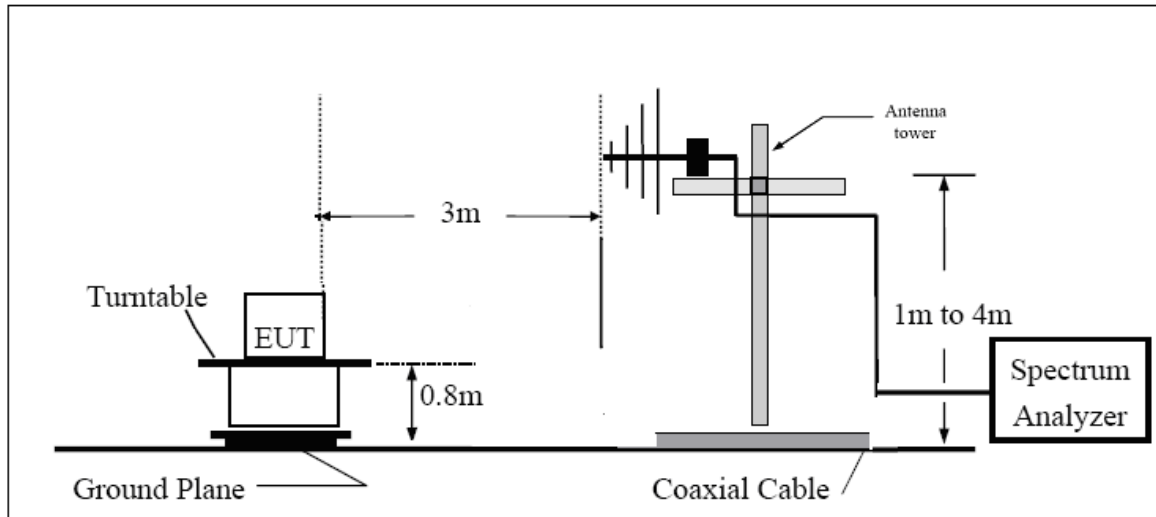
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$

7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

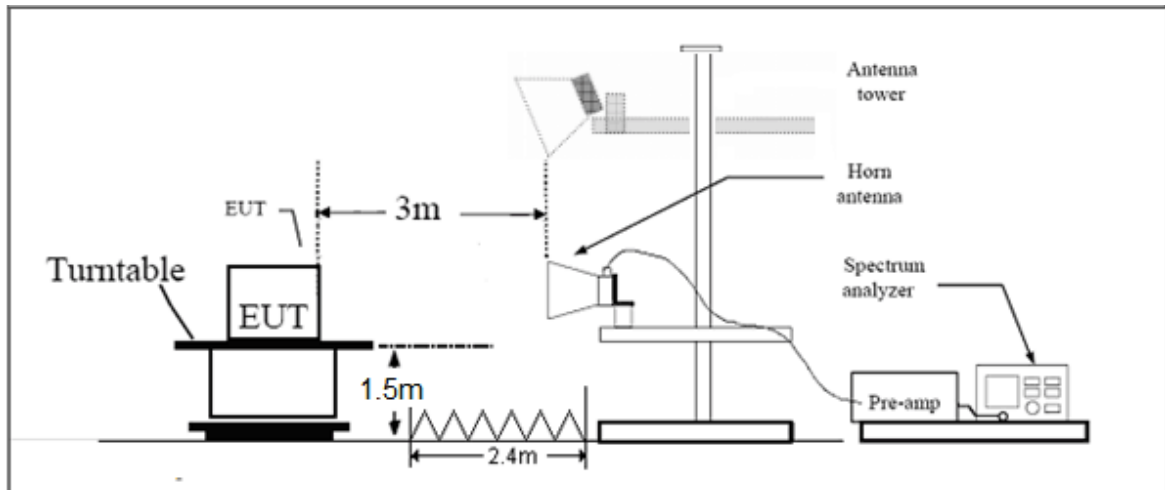
and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

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 $43 + 10 \log_{10}(P)$ 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-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.4	-27.15	5.1	11.05	vertical	-21.2	-13.00	8.20	135
3	5550.6	-35.33	5.42	12.65	vertical	-28.1	-13.00	15.10	225
4	7400.8	-48.75	6.7	13.85	vertical	-41.6	-13.00	28.60	225
5	9251.0	-49.64	7.01	14.75	vertical	-41.9	-13.00	28.90	90
6	11101.2	-47.07	7.48	15.95	vertical	-38.6	-13.00	25.60	45
7	12951.4	-50.44	7.51	16.55	vertical	-41.4	-13.00	28.40	225
8	14801.6	-45.01	8.24	15.35	vertical	-37.9	-13.00	24.90	90
9	16651.8	-43.44	8.41	14.95	vertical	-36.9	-13.00	23.90	45
10	18502.0	-42.11	8.54	15.45	vertical	-35.2	-13.00	22.20	135

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

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

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.8	-27.95	5.1	11.05	vertical	-22.0	-13.00	9.00	225
3	5640.4	-37.63	5.42	12.65	vertical	-30.4	-13.00	17.40	135
4	7519.5	-41.55	6.7	13.85	vertical	-34.4	-13.00	21.40	225
5	9400.0	-48.24	7.01	14.75	vertical	-40.5	-13.00	27.50	135
6	11280.0	-46.57	7.48	15.95	vertical	-38.1	-13.00	25.10	0
7	13160.0	-49.34	7.51	16.55	vertical	-40.3	-13.00	27.30	45
8	15040.0	-44.91	8.24	15.35	vertical	-37.8	-13.00	24.80	90
9	16920.0	-43.24	8.41	14.95	vertical	-36.7	-13.00	23.70	225
10	18800.0	-42.31	8.54	15.45	vertical	-35.4	-13.00	22.40	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-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819.4	-28.75	5.1	11.05	vertical	-22.8	-13.00	9.80	45
3	5729.3	-38.33	5.42	12.65	vertical	-31.1	-13.00	18.10	135
4	7638.8	-42.75	6.7	13.85	vertical	-35.6	-13.00	22.60	225
5	9549.0	-50.54	7.01	14.75	vertical	-42.8	-13.00	29.80	135
6	11458.8	-45.97	7.48	15.95	vertical	-37.5	-13.00	24.50	225
7	13368.6	-47.14	7.51	16.55	vertical	-38.1	-13.00	25.10	135
8	15278.4	-44.81	8.24	15.35	vertical	-37.7	-13.00	24.70	0
9	17188.2	-43.64	8.41	14.95	vertical	-37.1	-13.00	24.10	45
10	19098.0	-46.01	8.54	15.45	vertical	-39.1	-13.00	26.10	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 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3702.4	-36.05	5.1	11.05	vertical	-30.1	-13.00	17.10	225
3	5553.8	-45.43	5.42	12.65	vertical	-38.2	-13.00	25.20	90
4	7409.6	-50.65	6.7	13.85	vertical	-43.5	-13.00	30.50	45
5	9262.0	-48.24	7.01	14.75	vertical	-40.5	-13.00	27.50	135
6	11114.4	-47.67	7.48	15.95	vertical	-39.2	-13.00	26.20	225
7	12966.8	-47.94	7.51	16.55	vertical	-38.9	-13.00	25.90	135
8	14819.2	-43.21	8.24	15.35	vertical	-36.1	-13.00	23.10	225
9	16671.6	-43.64	8.41	14.95	vertical	-37.1	-13.00	24.10	135
10	18524.0	-45.21	8.54	15.45	vertical	-38.3	-13.00	25.30	90

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



WCDMA Band II CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3757.1	-37.85	5.1	11.05	vertical	-31.9	-13.00	18.90	45
3	5636.3	-45.03	5.42	12.65	vertical	-37.8	-13.00	24.80	225
4	7520.0	-46.55	6.7	13.85	vertical	-39.4	-13.00	26.40	90
5	9400.0	-48.04	7.01	14.75	vertical	-40.3	-13.00	27.30	45
6	11280.0	-45.87	7.48	15.95	vertical	-37.4	-13.00	24.40	135
7	13160.0	-46.94	7.51	16.55	vertical	-37.9	-13.00	24.90	225
8	15040.0	-44.11	8.24	15.35	vertical	-37.0	-13.00	24.00	135
9	16920.0	-44.54	8.41	14.95	vertical	-38.0	-13.00	25.00	225
10	18800.0	-45.01	8.54	15.45	vertical	-38.1	-13.00	25.10	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 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3812.6	-46.15	5.1	11.05	vertical	-40.2	-13.00	27.20	0
3	5718.8	-45.13	5.42	12.65	vertical	-37.9	-13.00	24.90	225
4	7630.4	-50.15	6.7	13.85	vertical	-43.0	-13.00	30.00	90
5	9538.0	-49.74	7.01	14.75	vertical	-42.0	-13.00	29.00	135
6	11445.6	-46.57	7.48	15.95	vertical	-38.1	-13.00	25.10	270
7	13353.2	-46.34	7.51	16.55	vertical	-37.3	-13.00	24.30	225
8	15260.8	-44.01	8.24	15.35	vertical	-36.9	-13.00	23.90	180
9	17168.4	-43.34	8.41	14.95	vertical	-36.8	-13.00	23.80	45
10	19076.0	-43.61	8.54	15.45	vertical	-36.7	-13.00	23.70	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 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3701.3	-36.55	5.1	11.05	vertical	-30.6	-13.00	17.60	270
3	5551.9	-43.33	5.42	12.65	vertical	-36.1	-13.00	23.10	315
4	7402.8	-50.35	6.7	13.85	vertical	-43.2	-13.00	30.20	135
5	9253.5	-49.24	7.01	14.75	vertical	-41.5	-13.00	28.50	180
6	11104.3	-47.87	7.48	15.95	vertical	-39.4	-13.00	26.40	135
7	12955.0	-47.84	7.51	16.55	vertical	-38.8	-13.00	25.80	0
8	14805.7	-42.71	8.24	15.35	vertical	-35.6	-13.00	22.60	45
9	16656.4	-42.94	8.41	14.95	vertical	-36.4	-13.00	23.40	90
10	18507.1	-43.21	8.54	15.45	vertical	-36.3	-13.00	23.30	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 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.8	-33.65	5.10	11.05	vertical	-27.7	-13.00	14.70	270
3	5639.6	-42.73	5.42	12.65	vertical	-35.5	-13.00	22.50	225
4	7520.0	-48.45	6.70	13.85	vertical	-41.3	-13.00	28.30	135
5	9400.0	-48.64	7.01	14.75	vertical	-40.9	-13.00	27.90	225
6	11280.0	-46.27	7.48	15.95	vertical	-37.8	-13.00	24.80	135
7	13160.0	-47.74	7.51	16.55	vertical	-38.7	-13.00	25.70	0
8	15040.0	-44.91	8.24	15.35	vertical	-37.8	-13.00	24.80	45
9	16920.0	-43.04	8.41	14.95	vertical	-36.5	-13.00	23.50	90
10	18800.0	-43.61	8.54	15.45	vertical	-36.7	-13.00	23.70	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 1.4MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3818.6	-47.05	5.10	11.05	vertical	-41.1	-13.00	28.10	225
3	5728.1	-43.73	5.42	12.65	vertical	-36.5	-13.00	23.50	90
4	7637.2	-49.45	6.70	13.85	vertical	-42.3	-13.00	29.30	135
5	9546.5	-49.54	7.01	14.75	vertical	-41.8	-13.00	28.80	225
6	11455.8	-44.67	7.48	15.95	vertical	-36.2	-13.00	23.20	225
7	13665.1	-45.34	7.51	16.55	vertical	-36.3	-13.00	23.30	90
8	15274.4	-44.41	8.24	15.35	vertical	-37.3	-13.00	24.30	45
9	17312.3	-43.04	8.41	14.95	vertical	-36.5	-13.00	23.50	225
10	19093.0	-43.51	8.54	15.45	vertical	-36.6	-13.00	23.60	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 3MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.5	-36.85	5.10	11.05	vertical	-30.9	-13.00	17.90	0
3	5550.8	-43.33	5.42	12.65	vertical	-36.1	-13.00	23.10	90
4	7400.6	-45.55	6.70	13.85	vertical	-38.4	-13.00	25.40	45
5	9257.5	-49.44	7.01	14.75	vertical	-41.7	-13.00	28.70	0
6	11109.0	-47.27	7.48	15.95	vertical	-38.8	-13.00	25.80	225
7	12960.5	-45.44	7.51	16.55	vertical	-36.4	-13.00	23.40	45
8	14812.0	-42.31	8.24	15.35	vertical	-35.2	-13.00	22.20	135
9	16663.5	-43.34	8.41	14.95	vertical	-36.8	-13.00	23.80	45
10	18515.0	-43.01	8.54	15.45	vertical	-36.1	-13.00	23.10	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 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3757.5	-30.35	5.10	11.05	vertical	-24.4	-13.00	11.40	225
3	5636.3	-42.53	5.42	12.65	vertical	-35.3	-13.00	22.30	135
4	7515.0	-46.15	6.70	13.85	vertical	-39.0	-13.00	26.00	225
5	9400.0	-47.94	7.01	14.75	vertical	-40.2	-13.00	27.20	135
6	11280.0	-46.97	7.48	15.95	vertical	-38.5	-13.00	25.50	0
7	13160.0	-48.04	7.51	16.55	vertical	-39.0	-13.00	26.00	45
8	15040.0	-45.31	8.24	15.35	vertical	-38.2	-13.00	25.20	225
9	16920.0	-43.24	8.41	14.95	vertical	-36.7	-13.00	23.70	90
10	18800.0	-42.81	8.54	15.45	vertical	-35.9	-13.00	22.90	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 3MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3814.5	-43.85	5.10	11.05	vertical	-37.9	-13.00	24.90	90
3	5722.1	-41.43	5.42	12.65	vertical	-34.2	-13.00	21.20	135
4	7634.0	-48.25	6.70	13.85	vertical	-41.1	-13.00	28.10	225
5	9542.5	-49.14	7.01	14.75	vertical	-41.4	-13.00	28.40	90
6	11451.0	-46.87	7.48	15.95	vertical	-38.4	-13.00	25.40	225
7	13359.5	-46.34	7.51	16.55	vertical	-37.3	-13.00	24.30	90
8	15268.0	-44.71	8.24	15.35	vertical	-37.6	-13.00	24.60	45
9	17176.5	-42.14	8.41	14.95	vertical	-35.6	-13.00	22.60	135
10	19085.0	-42.71	8.54	15.45	vertical	-35.8	-13.00	22.80	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 5MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.5	-36.95	5.10	11.05	vertical	-31.0	-13.00	18.00	90
3	5551.1	-43.13	5.42	12.65	vertical	-35.9	-13.00	22.90	135
4	7401.1	-46.65	6.70	13.85	vertical	-39.5	-13.00	26.50	270
5	9262.5	-48.04	7.01	14.75	vertical	-40.3	-13.00	27.30	225
6	11115.0	-47.57	7.48	15.95	vertical	-39.1	-13.00	26.10	135
7	12967.5	-47.24	7.51	16.55	vertical	-38.2	-13.00	25.20	225
8	14820.0	-42.91	8.24	15.35	vertical	-35.8	-13.00	22.80	90
9	16672.5	-42.24	8.41	14.95	vertical	-35.7	-13.00	22.70	135
10	18525.0	-43.01	8.54	15.45	vertical	-36.1	-13.00	23.10	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 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.8	-38.15	5.10	11.05	vertical	-32.2	-13.00	19.20	45
3	5639.6	-43.43	5.42	12.65	vertical	-36.2	-13.00	23.20	90
4	7520.0	-45.95	6.70	13.85	vertical	-38.8	-13.00	25.80	225
5	9400.0	-46.94	7.01	14.75	vertical	-39.2	-13.00	26.20	90
6	11280.0	-47.67	7.48	15.95	vertical	-39.2	-13.00	26.20	135
7	13160.0	-45.64	7.51	16.55	vertical	-36.6	-13.00	23.60	225
8	15040.0	-43.41	8.24	15.35	vertical	-36.3	-13.00	23.30	225
9	16920.0	-41.74	8.41	14.95	vertical	-35.2	-13.00	22.20	90
10	18800.0	-42.71	8.54	15.45	vertical	-35.8	-13.00	22.80	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 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3810.8	-41.25	5.10	11.05	vertical	-35.3	-13.00	22.30	45
3	5716.1	-42.53	5.42	12.65	vertical	-35.3	-13.00	22.30	135
4	7621.1	-47.35	6.70	13.85	vertical	-40.2	-13.00	27.20	0
5	9537.5	-49.74	7.01	14.75	vertical	-42.0	-13.00	29.00	90
6	11445.0	-45.27	7.48	15.95	vertical	-36.8	-13.00	23.80	135
7	13352.5	-46.34	7.51	16.55	vertical	-37.3	-13.00	24.30	270
8	15260.0	-45.11	8.24	15.35	vertical	-38.0	-13.00	25.00	225
9	17167.5	-41.44	8.41	14.95	vertical	-34.9	-13.00	21.90	180
10	19075.0	-42.51	8.54	15.45	vertical	-35.6	-13.00	22.60	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 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3701.3	-35.55	5.10	11.05	vertical	-29.6	-13.00	16.60	225
3	5551.9	-43.93	5.42	12.65	vertical	-36.7	-13.00	23.70	135
4	7420.0	-49.15	6.70	13.85	vertical	-42.0	-13.00	29.00	0
5	9275.0	-48.04	7.01	14.75	vertical	-40.3	-13.00	27.30	45
6	11130.0	-47.17	7.48	15.95	vertical	-38.7	-13.00	25.70	90
7	12985.0	-45.94	7.51	16.55	vertical	-36.9	-13.00	23.90	225
8	14840.0	-43.21	8.24	15.35	vertical	-36.1	-13.00	23.10	315
9	16695.0	-43.24	8.41	14.95	vertical	-36.7	-13.00	23.70	90
10	18550.0	-44.11	8.54	15.45	vertical	-37.2	-13.00	24.20	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 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3751.5	-32.55	5.10	11.05	vertical	-26.6	-13.00	13.60	225
3	5626.9	-40.43	5.42	12.65	vertical	-33.2	-13.00	20.20	225
4	7502.6	-46.55	6.70	13.85	vertical	-39.4	-13.00	26.40	90
5	9400.0	-47.94	7.01	14.75	vertical	-40.2	-13.00	27.20	45
6	11280.0	-45.87	7.48	15.95	vertical	-37.4	-13.00	24.40	180
7	13160.0	-47.74	7.51	16.55	vertical	-38.7	-13.00	25.70	135
8	15040.0	-44.01	8.24	15.35	vertical	-36.9	-13.00	23.90	0
9	16920.0	-42.74	8.41	14.95	vertical	-36.2	-13.00	23.20	90
10	18800.0	-43.31	8.54	15.45	vertical	-36.4	-13.00	23.40	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 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3801.0	-35.45	5.10	11.05	vertical	-29.5	-13.00	16.50	270
3	5701.9	-40.93	5.42	12.65	vertical	-33.7	-13.00	20.70	225
4	7620.0	-49.95	6.70	13.85	vertical	-42.8	-13.00	29.80	135
5	9525.0	-50.14	7.01	14.75	vertical	-42.4	-13.00	29.40	45
6	11430.0	-45.37	7.48	15.95	vertical	-36.9	-13.00	23.90	225
7	13335.0	-45.64	7.51	16.55	vertical	-36.6	-13.00	23.60	135
8	15240.0	-43.91	8.24	15.35	vertical	-36.8	-13.00	23.80	0
9	17145.0	-42.04	8.41	14.95	vertical	-35.5	-13.00	22.50	45
10	19050.0	-42.61	8.54	15.45	vertical	-35.7	-13.00	22.70	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 15MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3701.6	-35.45	5.10	11.05	vertical	-29.5	-13.00	16.50	225
3	5552.3	-45.03	5.42	12.65	vertical	-37.8	-13.00	24.80	90
4	7430.0	-50.25	6.70	13.85	vertical	-43.1	-13.00	30.10	135
5	9287.5	-47.24	7.01	14.75	vertical	-39.5	-13.00	26.50	225
6	11145.0	-47.47	7.48	15.95	vertical	-39.0	-13.00	26.00	225
7	13002.5	-46.94	7.51	16.55	vertical	-37.9	-13.00	24.90	90
8	14860.0	-43.91	8.24	15.35	vertical	-36.8	-13.00	23.80	45
9	16717.5	-42.84	8.41	14.95	vertical	-36.3	-13.00	23.30	135
10	18575.0	-43.51	8.54	15.45	vertical	-36.6	-13.00	23.60	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 15MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3746.3	-31.75	5.10	11.05	vertical	-25.8	-13.00	12.80	0
3	5619.8	-38.83	5.42	12.65	vertical	-31.6	-13.00	18.60	90
4	7493.3	-46.15	6.70	13.85	vertical	-39.0	-13.00	26.00	135
5	9400.0	-48.34	7.01	14.75	vertical	-40.6	-13.00	27.60	180
6	11280.0	-46.57	7.48	15.95	vertical	-38.1	-13.00	25.10	270
7	13160.0	-48.34	7.51	16.55	vertical	-39.3	-13.00	26.30	225
8	15040.0	-44.01	8.24	15.35	vertical	-36.9	-13.00	23.90	135
9	16920.0	-43.64	8.41	14.95	vertical	-37.1	-13.00	24.10	225
10	18800.0	-44.21	8.54	15.45	vertical	-37.3	-13.00	24.30	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 15MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3792.0	-30.55	5.10	11.05	vertical	-24.6	-13.00	11.60	0
3	5687.6	-40.63	5.42	12.65	vertical	-33.4	-13.00	20.40	45
4	7583.3	-46.10	6.70	13.85	vertical	-38.95	-13.00	25.95	180
5	9512.5	-49.89	7.01	14.75	vertical	-42.15	-13.00	29.15	225
6	11415.0	-45.17	7.48	15.95	vertical	-36.7	-13.00	23.70	45
7	13317.5	-45.54	7.51	16.55	vertical	-36.5	-13.00	23.50	90
8	15220.0	-43.91	8.24	15.35	vertical	-36.8	-13.00	23.80	225
9	17122.5	-41.84	8.41	14.95	vertical	-35.3	-13.00	22.30	90
10	19025.0	-43.81	8.54	15.45	vertical	-36.9	-13.00	23.90	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 20MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3720.0	-40.25	5.10	11.05	vertical	-34.3	-13.00	21.30	225
3	5580.0	-47.03	5.42	12.65	vertical	-39.8	-13.00	26.80	225
4	7440.0	-47.35	6.70	13.85	vertical	-40.2	-13.00	27.20	90
5	9300.0	-47.94	7.01	14.75	vertical	-40.2	-13.00	27.20	315
6	11160.0	-47.97	7.48	15.95	vertical	-39.5	-13.00	26.50	45
7	13020.0	-46.54	7.51	16.55	vertical	-37.5	-13.00	24.50	225
8	14880.0	-43.71	8.24	15.35	vertical	-36.6	-13.00	23.60	90
9	16740.0	-42.54	8.41	14.95	vertical	-36.0	-13.00	23.00	45
10	18600.0	-43.51	8.54	15.45	vertical	-36.6	-13.00	23.60	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 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-35.95	5.10	11.05	vertical	-30.0	-13.00	17.00	0
3	5640.0	-42.23	5.42	12.65	vertical	-35.0	-13.00	22.00	90
4	7520.0	-47.05	6.70	13.85	vertical	-39.9	-13.00	26.90	135
5	9400.0	-48.44	7.01	14.75	vertical	-40.7	-13.00	27.70	45
6	11280.0	-46.07	7.48	15.95	vertical	-37.6	-13.00	24.60	270
7	13160.0	-48.24	7.51	16.55	vertical	-39.2	-13.00	26.20	225
8	15040.0	-43.61	8.24	15.35	vertical	-36.5	-13.00	23.50	135
9	16920.0	-43.54	8.41	14.95	vertical	-37.0	-13.00	24.00	225
10	18800.0	-44.01	8.54	15.45	vertical	-37.1	-13.00	24.10	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 20MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3800.0	-37.15	5.10	11.05	vertical	-31.2	-13.00	18.20	0
3	5700.0	-44.13	5.42	12.65	vertical	-36.9	-13.00	23.90	45
4	7600.0	-47.45	6.70	13.85	vertical	-40.3	-13.00	27.30	90
5	9500.0	-48.84	7.01	14.75	vertical	-41.1	-13.00	28.10	180
6	11400.0	-44.47	7.48	15.95	vertical	-36.0	-13.00	23.00	225
7	13300.0	-45.64	7.51	16.55	vertical	-36.6	-13.00	23.60	90
8	15200.0	-43.41	8.24	15.35	vertical	-36.3	-13.00	23.30	135
9	17100.0	-41.54	8.41	14.95	vertical	-35.0	-13.00	22.00	225
10	19000.0	-43.61	8.54	15.45	vertical	-36.7	-13.00	23.70	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.

6. Main Test Instruments

Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time
Base Station Simulator	CMU200	R&S	118133	2016-05-21	2017-05-20
Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
Spectrum Analyzer	N9010A	Agilent	MY47191109	2016-05-21	2017-05-20
Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2016-05-21	2017-05-20
Signal Analyzer	FSV30	R&S	100815	2015-12-17	2016-12-16
Signal Analyzer	FSV30	R&S	100815	2016-12-16	2017-12-15
Signal generator	SMB 100A	R&S	102594	2016-05-22	2017-05-21
Signal generator	SMR27	R&S	100365	2016-05-21	2017-05-20
EMI Test Receiver	ESCI	R&S	100948	2016-06-01	2017-05-31
Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-201	2014-12-06	2017-12-05
Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-391	2014-12-06	2017-12-05
Horn Antenna	HF907	R&S	100126	2014-12-06	2017-12-05
Horn Antenna	HF907	R&S	100125	2014-12-06	2017-12-05
Climatic Chamber	PT-30B	Re Ce	20101891	2016-07-17	2017-07-16
Horn Antenna	3160-09	ETS-Lindgren	00102644	2015-01-30	2018-01-29
RF Cable	SMA 15cm	Agilent	0001	2016-12-06	2017-01-05

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

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Front Side

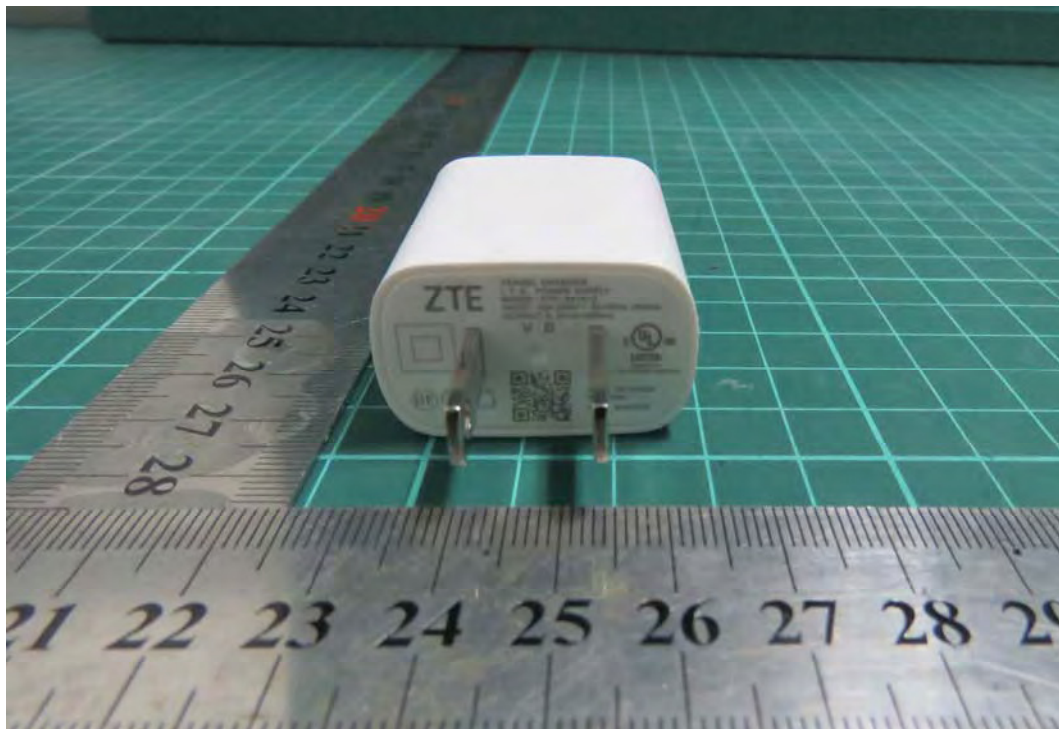


Back Side

a: EUT



b: Battery



c: Adapter



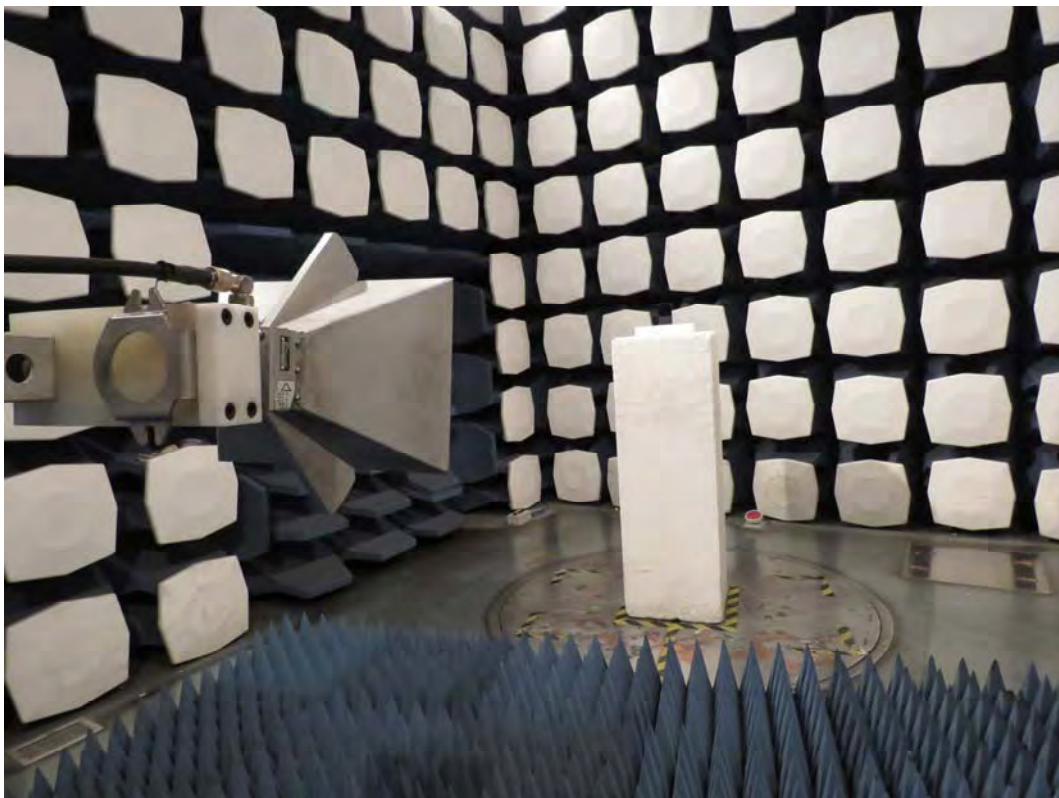
d: USB Cable



e: Earphone

Picture 1 EUT and Accessory

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup