FCC TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	Bmobile
Model No.:	AX1073+
Add. Model No.:	AX1077+
Report Number:	190128005RFM-1
Test Standards:	FCC 47 CFR Part 22 Subpart H FCC 47 CFR Part 24 Subpart E FCC 47 CFR Part 27 FCC 47 CFR Part 2
FCC ID:	ZSW-30-083
Test Result:	PASS
Date of Issue:	March 13, 2019

Prepared for:

b mobile HK Limited
Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong, China

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Tested by: Henry Lu, Project Engineer

Reviewed by: Kevin Liang, Assistant Manager

Approved by: Billy Li, Technical Director

Date: March 13, 2019

Version

Version No.	Date	Description
V1.0	March 13, 2019	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	b mobile HK Limited
Address of Applicant:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong, China
Manufacturer:	b mobile HK Limited
Address of Manufacturer:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone	
Model No.:	AX1073+	
Add. Model No.:	AX1077+	
Trade Mark:	Bmobile	
DUT Stage:	Identical Prototype	
EUT Supports Function:	GSM Bands:	GSM850/1900
	UTRA Bands:	Band II/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7
	2.4 GHz ISM Band:	IEEE 802.11b/g/n
		Bluetooth V4.0
Sample Received Date:	January 29, 2019	
Sample Tested Date:	January 29, 2019 to March 1, 2019	
Note: The additional model AX1077+ is identical with the test model AX1073+ except the model number for marketing purpose.		

1.2.2 Description of Accessories

Adapter	
Input:	100-240 V~50/60 Hz 0.2 A
Output:	5.0 V ⎓ 1A
DC Cable:	1.0 Meter, Unshielded without ferrite

Battery	
Model No.:	T5025AL
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.8 Vdc
Rated Capacity:	2000 mAh

Cable	
Description:	USB Micro-B Plug Cable
Cable Type:	Unshielded without ferrite
Length:	1.0 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, LTE	
Type of Modulation:	GSM/GPRS:	GMSK
	EDGE:	GMSK, 8PSK
	WCDMA	BPSK
	HSDPA:	QPSK
	HSUPA:	QPSK
	LTE	QPSK, 16QAM
Frequency Range:	GSM/GPRS/EDGE 850:	824.2-848.8 MHz
	GSM/GPRS/EDGE 1900:	1850.2-1909.8 MHz
	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
	LTE Band 2 (Channel Bandwidth: 1.4 MHz):	1850.7-1909.3 MHz
	LTE Band 2 (Channel Bandwidth: 3 MHz):	1851.5-1908.5 MHz
	LTE Band 2 (Channel Bandwidth: 5 MHz):	1852.5-1907.5 MHz
	LTE Band 2 (Channel Bandwidth: 10 MHz):	1855.0-1905.0 MHz
	LTE Band 2 (Channel Bandwidth: 15 MHz):	1857.5-1902.5 MHz
	LTE Band 2 (Channel Bandwidth: 20 MHz):	1860.0-1900.0 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz):	1710.7-1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz):	1711.5-1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz):	1712.5-1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz):	1715-1750 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz):	1717.5-1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz):	1720-1745 MHz
	LTE Band 5 (Channel Bandwidth: 1.4 MHz):	824.7-848.3 MHz
	LTE Band 5 (Channel Bandwidth: 3 MHz):	825.5-847.5MHz
	LTE Band 5 (Channel Bandwidth: 5 MHz):	826.5-846.5 MHz
	LTE Band 5 (Channel Bandwidth: 10 MHz):	829-844 MHz
	LTE Band 7 (Channel Bandwidth: 5 MHz):	2502.5-2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz):	2505-2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz):	2507.5-2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz):	2510-2560 MHz
Max RF Output Power:	GSM/GPRS 850:	33.18dBm
	EDGE 850:	33.16dBm
	GSM/GPRS 1900:	29.24dBm
	EDGE 1900:	29.24dBm
	WCDMA Band II:	23.32dBm
	WCDMA Band V:	22.85dBm
	LTE:	See Note 1
Type of Emission:	GSM/GPRS 850:	248KGXW
	EDGE 850:	245KG7W
	GSM/GPRS 1900:	244KGXW
	EDGE 1900:	245KG7W
	WCDMA Band II:	4M18F9W
	WCDMA Band V:	4M17F9W
	LTE:	See Note 1

IEMI:	Radiation: 362523404237088,362523404237089	
	Conducted: 359982079972344,362523404167024	
Antenna Type:	FPCB Antenna	
Antenna Gain:	GSM 850:	-1.5 dBi
	GSM 1900:	-0.7 dBi
	WCDMA Band II:	-0.7 dBi
	WCDMA Band V:	-1.5 dBi
	LTE Band 2:	-0.7 dBi
	LTE Band 4:	-0.5 dBi
	LTE Band 5:	-1.5 dBi
	LTE Band 7:	-0.5 dBi
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	3.6 to 4.35Vdc	
Extreme Test Temperature:	-30 °C to +55 °C	

Note 1:

LTE Summary of Results:							
Band	**BW (MHz)**	**Frequency Range (MHz)**	**Max RF Output Power (dBm)**		**Type of Emission**		
			Conducted (Average)	**ERP/EIRP (Average)**	**QPSK**	**16QAM**	**64QAM**
LTE Band 2	1.4	1850.7-1909.3	23.02	22.32	1M10G7D	1M10W7D	N/A
	3	1851.5-1908.5	23.10	22.40	2M69G7D	2M69W7D	N/A
	5	1852.5-1907.5	22.95	22.25	4M53G7D	4M52W7D	N/A
	10	1855.0-1905.0	23.06	22.36	9M06G7D	9M00W7D	N/A
	15	1857.5-1902.5	22.92	22.22	13M6G7D	13M5W7D	N/A
	20	1860.0-1900.0	23.12	22.42	18M0G7D	18M0W7D	N/A
LTE Band 4	1.4	1710.7-1754.3	22.30	21.80	1M09G7D	1M10W7D	N/A
	3	1711.5-1753.5	22.28	21.78	2M68G7D	2M68W7D	N/A
	5	1712.5-1752.5	22.25	21.75	4M51G7D	4M51W7D	N/A
	10	1715-1750	22.27	21.77	9M03G7D	8M98W7D	N/A
	15	1717.5-1747.5	22.35	21.85	13M5G7D	13M5W7D	N/A
	20	1720-1745	22.38	21.88	18M0G7D	18M0W7D	N/A
LTE Band 5	1.4	824.7-848.3	23.04	19.39	1M10G7D	1M10W7D	N/A
	3	825.5-847.5	22.81	19.16	2M70G7D	2M69W7D	N/A
	5	826.5-846.5	22.85	19.20	4M54G7D	4M55W7D	N/A
	10	829-844	22.91	19.26	9M04G7D	9M02W7D	N/A
LTE Band 7	5	2502.5-2567.5	20.81	20.31	4M54G7D	4M55W7D	N/A
	10	2505-2565	20.88	20.38	9M02G7D	9M02W7D	N/A
	15	2507.5-2562.5	20.86	20.36	13M5G7D	13M5W7D	N/A
	20	2510-2560	20.97	20.47	18M0G7D	18M0W7D	N/A

1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
-	-	-	-	-

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.6 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1
The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.7 DEVIATION FROM STANDARDS

None.

1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.10 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 22 Subpart H Test Cases (GSM 850/WCDMA Band V/LTE Band 5)			
Test Item	**Test Requirement**	**Test Method**	**Result**
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 22.913(a)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 24 Subpart E Test Cases (GSM 1900/WCDMA Band II/LTE Band 2)			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 24.232(d)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 4)			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) FCC 47 CFR Part 27.53(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 22 Subpart H Test Cases (LTE Band 7)			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(h)(2)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(h)(2)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(m)(4)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(m)(4)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(m)(4)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☒	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 19, 2018	May 19, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
☒	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
☒	Horn Antenna	ETS-LINDGREN	3116C	00200180	May 20, 2018	May 20, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Highpass Filter (1.2GHz~18GHz)	Micro-Tronics	HPM50108	G552	Nov. 29, 2018	Nov. 29, 2019
☒	Highpass Filter (3GHz~18GHz)	Micro-Tronics	HPM50117	G005	Nov. 29, 2018	Nov. 29, 2019
☒	Test Software	Audix	e3	Software Version: 9.160333		

RF Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Nov. 24, 2018	Nov. 24, 2019
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
☒	Wideband Radio Communication Tester	R&S	CMW500	116254	Jun. 07, 2018	Jun. 07, 2019
☒	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2018	Sep. 18, 2019
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290 020	Jun. 05, 2018	Jun. 05, 2020

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.8	20 to 75
TL/VL	-30	3.6	20 to 75
TH/VL	+55	3.6	20 to 75
TL/VH	-30	4.35	20 to 75
TH/VH	+55	4.35	20 to 75

Remark:

1) The EUT just work in such extreme temperature of -30 °C to +55 °C and the extreme voltage of 3.6 V to 4.35 V, so here the EUT is tested in the temperature of -30 °C to +55 °C and the voltage of 3.6 V to 4.35 V.
2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

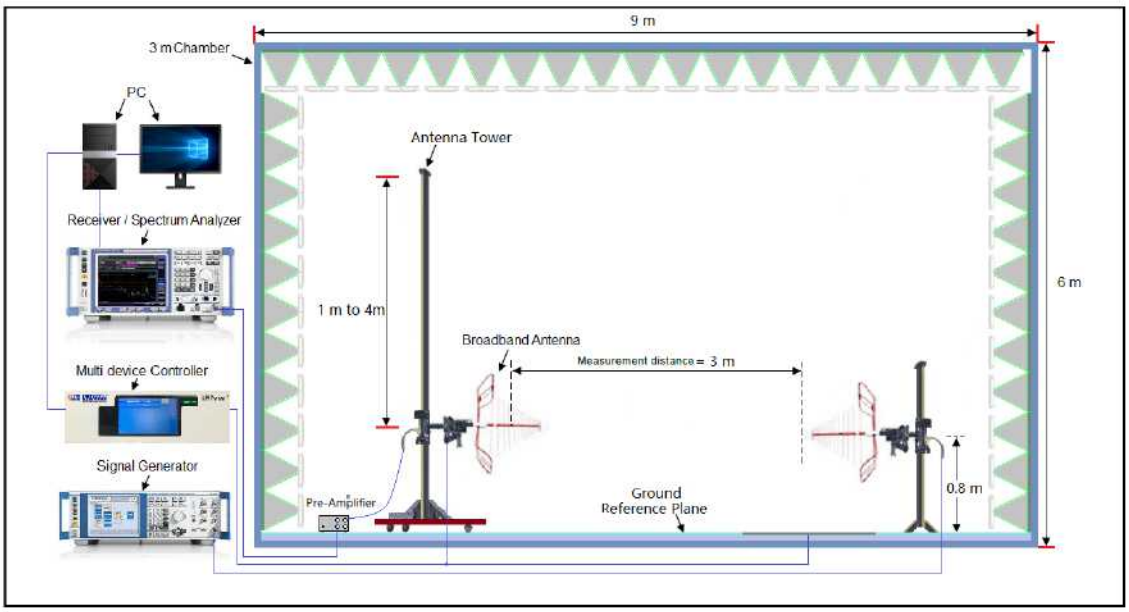
4.1.2 Record of Normal Environment

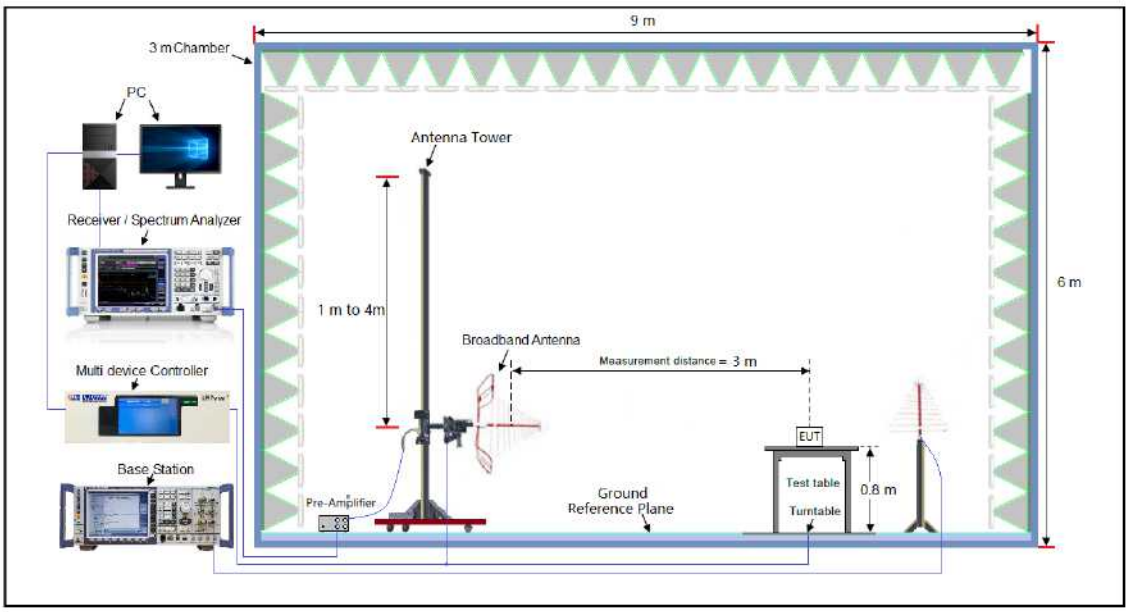
Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Equivalent Isotropic Radiated Power (EIRP)	23.6	51	99.80	Terence Chen
Conducted Output Power	23.6	51	99.80	Terence Chen
Peak-to-average ratio	23.6	51	99.80	Terence Chen
99%&26dB Bandwidth	23.6	51	99.80	Terence Chen
Band Edge at antenna terminals	23.6	51	99.80	Terence Chen
Spurious emissions at antenna terminals	23.6	51	99.80	Terence Chen
Field strength of spurious radiation	24.5	51	100.02	Andy Lin
Frequency stability	23.6	51	99.80	Terence Chen

4.2 TEST SETUP

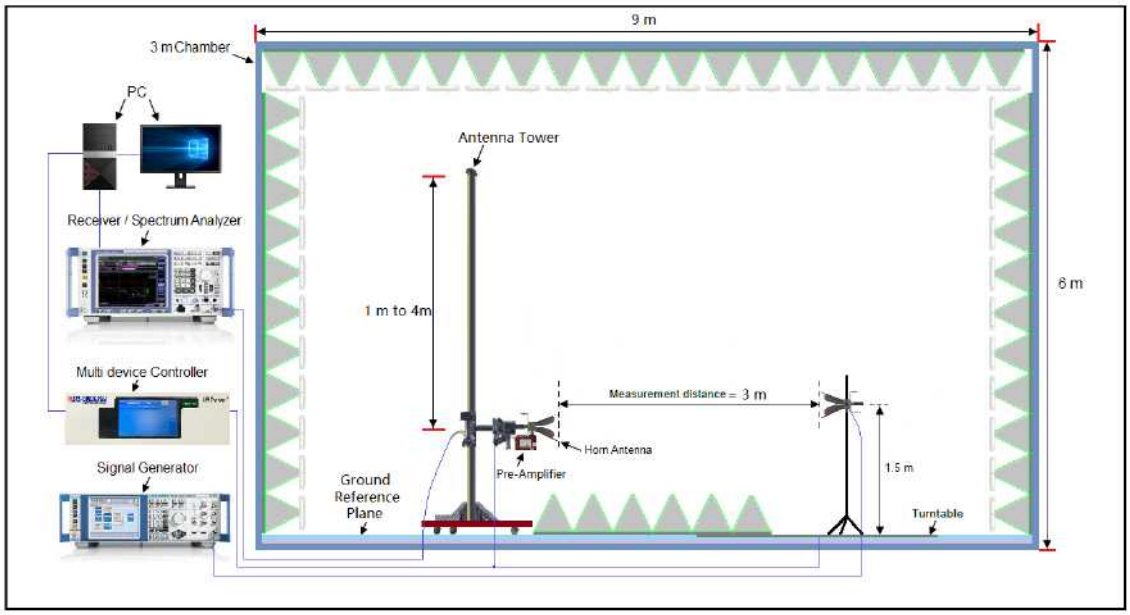
4.2.1 For Radiated Emissions test setup

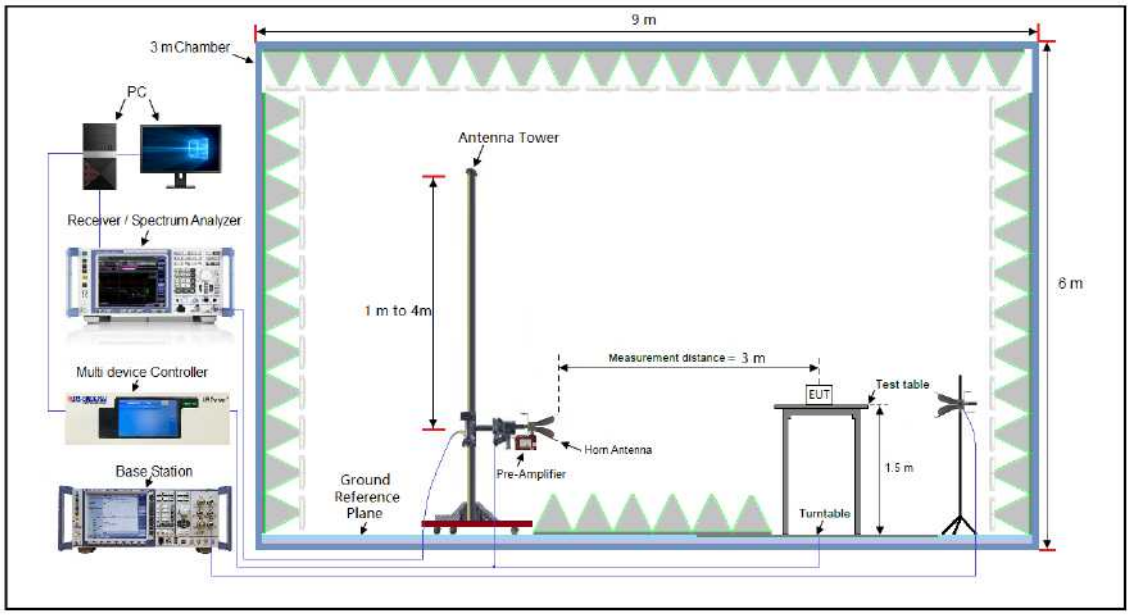
Setup - 1_ERP Test setup



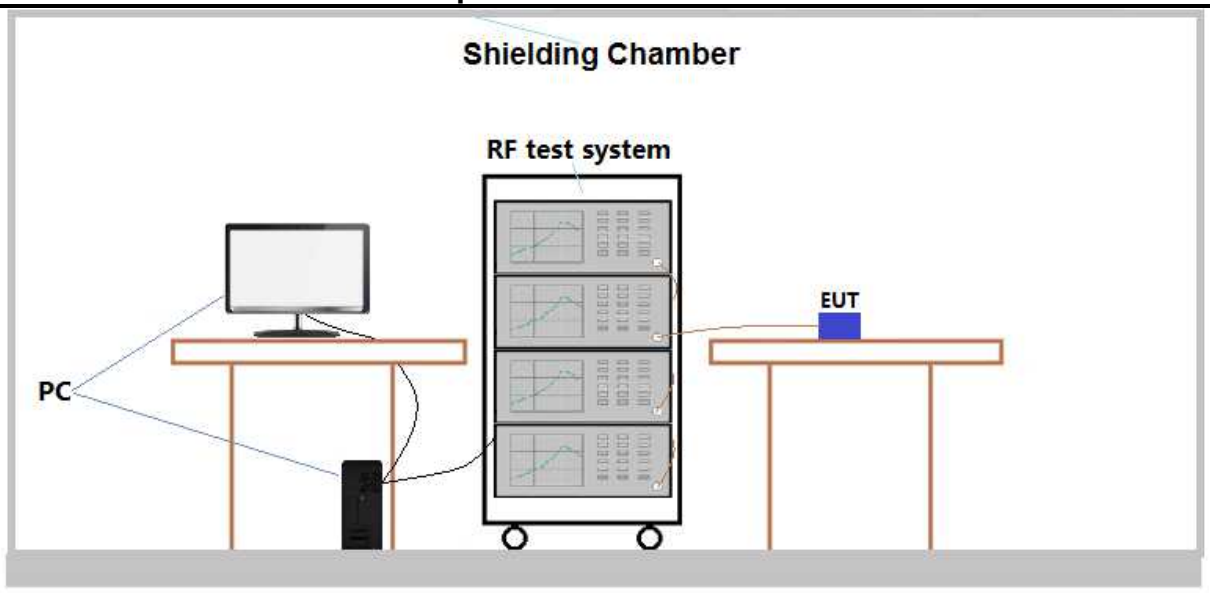


Setup - 2_EIRP Test setup

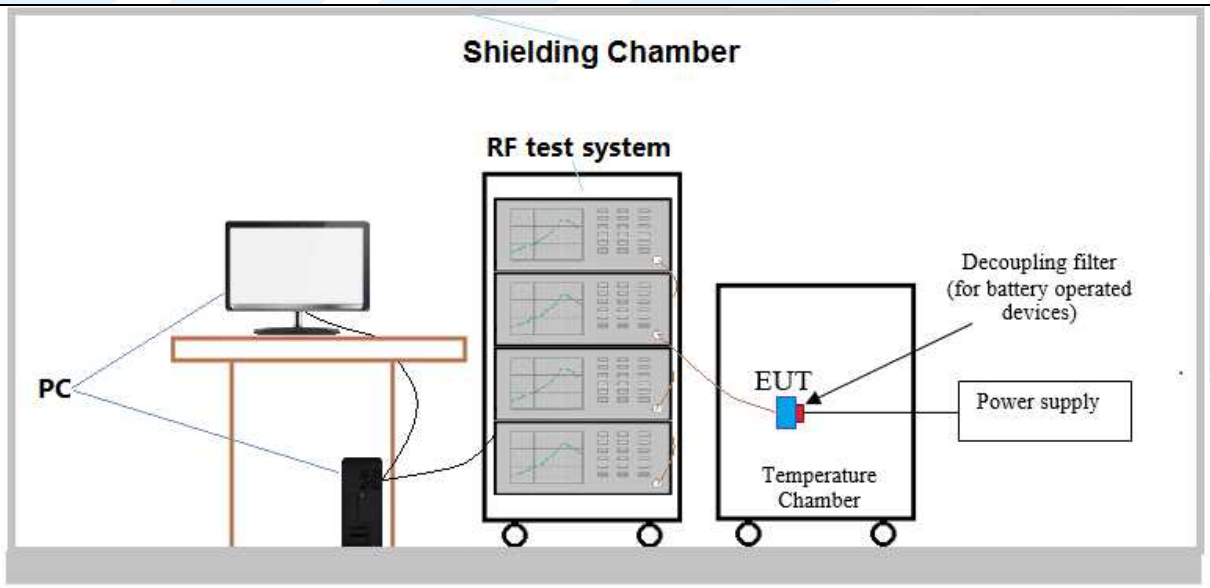




4.2.2 For Conducted RF test setup



Normal Environment



Extreme Environment

4.3 TEST CHANNELS

Band	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS/ EDGE850	Tx (824 MHz ~ 849 MHz)	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
WCDMA band V	Tx (824 MHz ~ 849 MHz)	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz

Band	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS/ EDGE1900	Tx (1850 MHz-1910 MHz)	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
WCDMA Band II	Tx (1850 MHz-1910 MHz)	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz

Band	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink (MHz)
LTE Band 2 TX: 1850-1910MHz	Low Range	1.4	18607	1850.7
		3	18615	1851.5
		5	18625	1852.5
		10	18650	1855
		15	18675	1857.5
		20	18700	1860
	Middle Range	1.4/3/5/10/15/20	18900	1880
	High Range	1.4	19193	1909.3
		3	19185	1908.5
		5	19175	1907.5
		10	19150	1905
		15	19125	1902.5
		20	19100	1900
LTE Band 4 TX:1710-1755MHz	Low Range	1.4	19957	1710.7
		3	19965	1711.5
		5	19975	1712.5
		10	20000	1715
		15	20025	1717.5
		20	20050	1720
	Middle Range	1.4/3/5/10/ 15/20	20175	1732.5
	High Range	1.4	20393	1754.3
		3	20385	1753.5
		5	20375	1752.5
		10	20350	1750
		15	20325	1747.5
		20	20300	1745
LTE band 5 TX:824–849 MHz	Low Range	1.4	20407	824.7
		3	20415	825.5
		5	20425	826.5
		10	20450	829

	Middle Range	1.4/3/5/10	20525	836.5
	High Range	1.4	20643	848.3
		3	20635	847.5
		5	20625	846.5
		10	20600	844
LTE Band 7 TX:2500-2570MHz	Low Range	5	20775	2502.5
		10	20800	2505
		15	20825	2507.5
		20	20850	2510
	Middle Range	5/10/15/20	21100	2535
	High Range	5	21425	2567.5
		10	21400	2565
		15	21375	2562.5
		20	21350	2560

4.4 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.8Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.
The worst case was found when positioned as the table below.

Band	Mode	Antenna Port	Worst-case axis positioning
GSM 850	1TX	Chain 0	Y axis
GSM 1900	1TX	Chain 0	Y axis
WCDMA Band II	1TX	Chain 0	Y axis
WCDMA Band V	1TX	Chain 0	Y axis
LTE Band 2	1TX	Chain 0	Y axis
LTE Band 4	1TX	Chain 0	Y axis
LTE Band 5	1TX	Chain 0	Y axis
LTE Band 7	1TX	Chain 0	Y axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.5 PRE-SCAN

Pre-scan under all rate at lowest middle and highest channel, find the transmitter power as below:

GSM 850 Maximum Average Power (dBm)			
Channel	**128**	**190**	**251**
Frequency(MHz)	**824.2 MHz**	**836.6 MHz**	**848.8 MHz**
GSM (GMSK, 1Tx-slot)	33.03	33.13	33.18
GPRS (GMSK, 1Tx-slot)	32.91	33.04	33.11
GPRS (GMSK, 2Tx-slot)	32.07	32.16	32.19
GPRS (GMSK, 3Tx-slot)	29.80	29.89	29.91
GPRS (GMSK, 4Tx-slot)	28.73	28.18	28.79
EDGE (8PSK, 1Tx-slot)	33.04	33.15	33.16
EDGE (8PSK, 2Tx-slot)	32.02	32.09	32.14
EDGE (8PSK, 3Tx-slot)	29.92	30.00	30.04
EDGE (8PSK, 4Tx-slot)	28.85	28.89	28.88

GSM 1900 Maximum Average Power (dBm)			
Channel	**512**	**661**	**810**
Frequency(MHz)	**1850.2 MHz**	**1880.0 MHz**	**1909.8 MHz**
GSM (GMSK, 1Tx-slot)	29.24	29.01	28.43
GPRS (GMSK, 1Tx-slot)	29.30	29.05	28.28
GPRS (GMSK, 2Tx-slot)	28.15	27.91	27.49
GPRS (GMSK, 3Tx-slot)	26.48	26.21	25.85
GPRS (GMSK, 4Tx-slot)	25.25	25.03	24.66
EDGE (8PSK, 1Tx-slot)	29.24	29.00	28.40
EDGE (8PSK, 2Tx-slot)	28.07	27.82	27.39
EDGE (8PSK, 3Tx-slot)	26.39	26.15	25.80
EDGE (8PSK, 4Tx-slot)	25.24	25.02	24.63

WCDMA Band II Maximum Average Power (dBm)			
Channel	**9262**	**9400**	**9538**
Frequency(MHz)	**1852.4 MHz**	**1880.0 MHz**	**1907.6 MHz**
RMC 12.2K	**23.32**	23.15	23.11
HSDPA Subtest-1	22.31	22.18	22.12
HSDPA Subtest-2	22.29	22.13	22.06
HSDPA Subtest-3	21.81	21.63	21.58
HSDPA Subtest-4	21.85	21.69	21.66
HSUPA Subtest-1	20.33	20.17	20.13
HSUPA Subtest-2	20.39	20.23	20.16
HSUPA Subtest-3	21.31	20.21	21.05
HSUPA Subtest-4	19.86	19.85	19.75
HSUPA Subtest-5	21.81	21.67	21.68

WCDMA Band V Maximum Average Power (dBm)			
Channel	**4132**	**4182**	**4233**
Frequency(MHz)	**826.4 MHz**	**836.4 MHz**	**846.6 MHz**
RMC 12.2K	**22.85**	22.64	22.67
HSDPA Subtest-1	21.82	21.64	21.68
HSDPA Subtest-2	21.83	21.68	21.69
HSDPA Subtest-3	21.31	21.15	21.17
HSDPA Subtest-4	21.33	21.14	21.23
HSUPA Subtest-1	19.92	19.77	19.78
HSUPA Subtest-2	20.05	19.98	19.91
HSUPA Subtest-3	20.91	20.86	20.84
HSUPA Subtest-4	19.67	19.55	19.51
HSUPA Subtest-5	21.41	21.23	21.22

LTE Band 2 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
Channel Bandwidth: 1.4 MHz						Channel Bandwidth: 3 MHz				
QPSK	1	0	22.72	22.47	22.24	1	0	22.70	22.45	22.31
	1	2	**23.02**	22.71	22.60	1	7	**23.10**	22.64	22.52
	1	5	22.56	22.18	21.89	1	14	22.59	22.07	21.96
	3	0	22.81	22.55	22.21	8	0	21.80	21.55	21.17
	3	1	22.87	22.76	22.19	8	3	21.92	21.79	21.20
	3	3	22.78	22.67	22.23	8	7	21.77	21.67	21.32
	6	0	21.71	21.75	21.21	15	0	21.78	21.83	21.22
16QAM	1	0	21.47	21.58	21.28	1	0	21.52	21.58	21.40
	1	2	**21.90**	21.83	21.44	1	7	**21.79**	21.73	21.35
	1	5	21.41	21.35	21.07	1	14	21.27	21.52	21.06
	3	0	21.72	21.76	21.04	8	0	20.59	20.61	20.15
	3	1	21.81	21.70	21.38	8	3	20.84	20.63	20.52
	3	3	21.64	21.63	21.21	8	7	20.73	20.63	20.19
	6	0	20.68	20.59	20.59	15	0	20.61	20.64	20.53
Channel Bandwidth: 5 MHz						Channel Bandwidth: 10 MHz				
QPSK	1	0	22.76	22.48	22.33	1	0	22.82	22.36	22.31
	1	12	**22.95**	22.70	22.53	1	24	**23.06**	22.81	22.61
	1	24	22.66	22.15	22.01	1	49	22.58	22.19	21.96
	12	0	21.75	21.64	21.13	25	0	21.79	21.65	21.29
	12	6	21.79	21.77	21.34	25	12	21.92	21.76	21.26
	12	13	21.89	21.69	21.31	25	25	21.75	21.53	21.18
	25	0	21.79	21.78	21.35	50	0	21.78	21.76	21.34
16QAM	1	0	21.61	21.51	21.23	1	0	21.62	21.55	21.40
	1	12	**21.95**	21.90	21.37	1	24	**21.86**	21.71	21.32
	1	24	21.31	21.46	20.98	1	49	21.41	21.46	20.96
	12	0	20.60	20.73	20.11	25	0	20.60	20.60	20.14
	12	6	20.71	20.78	20.54	25	12	20.70	20.62	20.49
	12	13	20.60	20.71	20.32	25	25	20.65	20.65	20.16
	25	0	20.59	20.76	20.62	50	0	20.65	20.62	20.50

LTE Band 2 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
	Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
QPSK	1	0	22.84	22.34	22.33	1	0	22.87	22.48	22.38
	1	37	**22.92**	22.77	22.44	1	50	**23.12**	22.82	22.63
	1	74	22.65	22.10	21.98	1	99	22.72	22.25	22.05
	37	0	21.81	21.62	21.18	50	0	21.85	21.70	21.31
	37	19	21.91	21.77	21.32	50	25	21.97	21.93	21.38
	37	39	21.85	21.65	21.28	50	50	21.92	21.70	21.33
	75	0	21.75	21.74	21.23	100	0	21.85	21.85	21.39
16QAM	1	0	21.57	21.53	21.32	1	0	21.64	21.62	21.42
	1	37	**21.94**	21.90	21.38	1	50	**21.95**	21.91	21.50
	1	74	21.38	21.41	21.09	1	99	21.46	21.55	21.15
	37	0	20.55	20.73	20.12	50	0	20.73	20.78	20.20
	37	19	20.83	20.73	20.48	50	25	20.85	20.82	20.55
	37	39	20.71	20.67	20.31	50	50	20.75	20.74	20.33
	75	0	20.54	20.69	20.49	100	0	20.70	20.77	20.63

LTE Band 4 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
	Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
QPSK	1	0	22.11	21.69	21.77	1	0	22.07	21.78	21.90
	1	2	22.13	22.05	22.27	1	7	22.25	21.99	**22.28**
	1	5	21.61	21.84	22.08	1	14	21.60	21.75	21.97
	3	0	22.03	21.91	22.28	8	0	21.11	20.93	21.22
	3	1	22.12	22.16	22.24	8	3	21.05	21.18	21.38
	3	3	22.12	21.97	**22.30**	8	7	21.02	20.99	21.25
	6	0	21.06	21.03	21.25	15	0	21.15	20.97	21.23
16QAM	1	0	21.00	20.87	20.89	1	0	21.07	20.96	20.91
	1	2	21.26	21.15	**21.33**	1	7	21.38	21.02	**21.40**
	1	5	20.79	20.92	21.12	1	14	20.75	20.93	21.11
	3	0	21.05	20.81	21.08	8	0	19.99	19.81	20.08
	3	1	21.03	20.93	21.17	8	3	20.04	19.90	20.28
	3	3	21.00	20.92	21.07	8	7	19.98	19.91	20.18
	6	0	19.95	19.91	20.21	15	0	20.11	19.94	20.24

LTE Band 4 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
Channel Bandwidth: 5 MHz						Channel Bandwidth: 10 MHz				
QPSK	1	0	22.11	21.66	21.82	1	0	22.11	21.66	21.79
	1	12	22.23	21.99	**22.25**	1	24	22.14	22.03	**22.27**
	1	24	21.65	21.91	22.07	1	49	21.65	21.74	21.99
	12	0	21.22	20.88	21.21	25	0	21.09	20.90	21.35
	12	6	21.00	21.12	21.35	25	12	21.00	21.07	21.36
	12	13	21.03	21.15	21.21	25	25	21.13	21.01	21.19
	25	0	21.11	20.97	21.30	50	0	21.06	20.89	21.26
16QAM	1	0	21.11	20.96	20.88	1	0	21.09	20.91	20.95
	1	12	21.22	21.20	**21.34**	1	24	21.25	21.05	**21.46**
	1	24	20.82	20.95	21.12	1	49	20.69	20.85	21.06
	12	0	20.01	19.88	20.23	25	0	20.05	19.86	20.22
	12	6	19.93	19.96	20.20	25	12	19.88	19.92	20.28
	12	13	19.98	19.96	20.21	25	25	19.98	19.96	20.16
	25	0	20.11	19.88	20.27	50	0	20.08	19.90	20.24
Channel Bandwidth: 15 MHz						Channel Bandwidth: 20 MHz				
QPSK	1	0	22.15	21.77	21.76	1	0	22.19	21.82	21.93
	1	37	22.08	22.10	**22.34**	1	50	22.25	22.15	**22.38**
	1	74	21.47	21.86	22.12	1	99	21.67	21.93	22.14
	37	0	21.04	20.84	21.32	50	0	21.22	21.02	21.35
	37	19	21.11	21.18	21.37	50	25	21.18	21.19	21.38
	37	39	21.00	21.06	21.28	50	50	21.14	21.16	21.31
	75	0	21.08	20.95	21.27	100	0	21.17	21.08	21.32
16QAM	1	0	20.99	20.93	20.91	1	0	21.16	20.97	21.01
	1	37	**21.40**	21.05	21.39	1	50	21.40	21.20	**21.51**
	1	74	20.78	20.84	21.21	1	99	20.86	20.98	21.24
	37	0	20.13	19.81	20.10	50	0	20.14	19.94	20.26
	37	19	19.93	19.89	20.28	50	25	20.08	20.07	20.33
	37	39	19.87	19.98	20.08	50	50	20.06	20.04	20.22
	75	0	19.93	19.99	20.11	100	0	20.12	20.00	20.27

LTE Band 5 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
Channel Bandwidth: 1.4 MHz						Channel Bandwidth: 3 MHz				
QPSK	1	0	22.64	22.62	22.37	1	0	22.65	22.65	22.42
	1	2	22.74	22.67	22.40	1	7	22.73	**22.81**	22.45
	1	5	22.47	22.34	22.22	1	14	22.64	22.43	22.08
	3	0	**23.04**	22.69	22.54	8	0	22.06	21.85	21.53
	3	1	22.94	22.69	22.43	8	3	21.88	21.70	21.46
	3	3	22.70	22.73	22.35	8	7	21.77	21.77	21.43
	6	0	21.72	21.64	21.50	15	0	21.76	21.71	21.50
16QAM	1	0	21.87	21.87	21.65	1	0	21.78	21.79	21.62
	1	2	21.99	22.03	21.74	1	7	22.10	21.95	21.66
	1	5	21.80	21.63	21.24	1	14	21.77	21.61	21.41
	3	0	22.00	21.69	21.51	8	0	20.97	20.70	20.56
	3	1	21.88	21.76	21.47	8	3	20.89	20.72	20.50
	3	3	21.80	21.72	21.17	8	7	20.80	20.71	20.26
	6	0	20.87	20.68	20.48	15	0	20.83	20.63	20.47
Channel Bandwidth: 5 MHz						Channel Bandwidth: 10 MHz				
QPSK	1	0	22.71	22.61	22.45	1	0	22.75	22.75	22.53
	1	12	22.72	**22.85**	22.53	1	24	**22.91**	22.86	22.56
	1	24	22.46	22.47	22.17	1	49	22.66	22.49	22.24
	12	0	21.94	21.74	21.53	25	0	22.08	21.85	21.54
	12	6	21.84	21.64	21.41	25	12	21.97	21.84	21.58
	12	13	21.76	21.73	21.39	25	25	21.87	21.82	21.43
	25	0	21.83	21.75	21.46	50	0	21.86	21.83	21.56
16QAM	1	0	21.78	21.93	21.57	1	0	21.90	21.96	21.75
	1	12	21.92	21.89	21.73	1	24	22.10	22.04	21.78
	1	24	21.87	21.60	21.37	1	49	21.93	21.66	21.44
	12	0	20.96	20.71	20.50	25	0	21.04	20.78	20.65
	12	6	20.80	20.65	20.42	25	12	20.93	20.79	20.55
	12	13	20.80	20.73	20.28	25	25	20.82	20.79	20.36
	25	0	20.79	20.69	20.35	50	0	20.94	20.76	20.50

LTE Band 7 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
Channel Bandwidth: 5 MHz						Channel Bandwidth: 10 MHz				
QPSK	1	0	19.92	19.73	20.60	1	0	20.02	19.89	20.67
	1	12	20.47	20.25	**20.81**	1	24	20.46	20.13	**20.88**
	1	24	20.09	19.84	20.44	1	49	19.98	19.94	20.36
	12	0	19.25	19.02	19.96	25	0	19.20	19.09	20.04
	12	6	19.48	19.13	19.86	25	12	19.51	19.13	19.95
	12	13	19.44	19.05	19.82	25	25	19.41	19.16	19.87
	25	0	19.36	19.10	19.95	50	0	19.43	19.07	20.04
16QAM	1	0	19.36	19.08	19.99	1	0	19.20	19.06	20.07
	1	12	19.82	19.60	**20.20**	1	24	19.79	19.57	**20.16**
	1	24	19.49	19.42	19.45	1	49	19.54	19.24	19.45
	12	0	18.22	18.15	18.93	25	0	18.30	18.06	18.90
	12	6	18.39	18.30	18.85	25	12	18.35	18.24	18.90
	12	13	18.34	18.03	18.95	25	25	18.38	18.17	18.87
	25	0	18.43	18.03	18.86	50	0	18.37	18.05	18.89
Channel Bandwidth: 15 MHz						Channel Bandwidth: 20 MHz				
QPSK	1	0	20.01	19.78	20.55	1	0	20.05	19.91	20.75
	1	37	20.33	20.30	**20.86**	1	50	20.51	20.31	**20.97**
	1	74	20.10	19.97	20.47	1	99	20.16	20.02	20.48
	37	0	19.31	19.09	19.89	50	0	19.38	19.22	20.08
	37	19	19.53	19.21	19.92	50	25	19.55	19.31	20.01
	37	39	19.39	19.11	19.94	50	50	19.51	19.19	19.99
	75	0	19.42	19.03	20.05	100	0	19.46	19.20	20.06
16QAM	1	0	19.27	19.21	19.99	1	0	19.39	19.21	20.15
	1	37	19.81	19.46	**20.30**	1	50	19.92	19.64	**20.33**
	1	74	19.46	19.31	19.40	1	99	19.58	19.43	19.46
	37	0	18.28	18.17	18.98	50	0	18.38	18.23	19.08
	37	19	18.40	18.22	18.84	50	25	18.54	18.32	19.00
	37	39	18.47	18.04	18.90	50	50	18.53	18.19	18.98
	75	0	18.48	18.10	18.94	100	0	18.48	18.23	18.99

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the worse mode applicability and tested channel detail as below:

Band	Radiated	Conducted
GSM/GPRS/ EDGE 850/1900	1) GSM (GMSK, 1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link	1) GSM (GMSK,1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link
WCDMA Band II/V	RMC 12.2Kbps Link	RMC 12.2Kbps Link

Item	Band	Bandwidth(MHz)						Modulation			RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
ERP/EIRP	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☒	☐	☐	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒
Conducted output power	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☒	☒	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
99%&26dB Bandwidth	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☐	☐	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒
peak-to-average ratio	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☒	☐	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒
Band Edge at antenna terminals	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☐	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☐	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☒	☐	☒	☒	☐	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☐	☒
Spurious emissions at antenna terminals	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	5	☒	☒	☒	☒	-	-	☒	☒	☐	☒	☐	☐	☒	☒	☒

	7	-	-	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒
Field strength of spurious radiation	2	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐
	4	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐
	5	☒	☒	☒	☒	-	-	☒	☐	☐	☒	☐	☐	☐	☒	☐
	7	-	-	☒	☒	☒	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐
Frequency stability	2	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐
	4	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐
	5	☒	☒	☒	☒	-	-	☒	☐	☐	☐	☐	☒	☐	☒	☐
	7	-	-	☒	☒	☒	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐
Remark: The mark "☒" means is chosen for testing; The mark "☐" means is not chosen for testing; The mark "-" means is not supported bandwidth																

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2 Subpart J	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 22 Subpart H	Cellular Radiotelephone Service
3	FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
4	FCC 47 CFR Part 24 Subpart E	PART 24 – PERSONAL COMMUNICATIONS SERVICES Subpart E – Broadband PCS
5	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
6	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 ERP OR EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a),
GSM 850 & WCDMA Band V & LTE Band 5: FCC 47 CFR Part 22.913(a),
GSM 1900 & WCDMA Band II & LTE Band 2: FCC 47 CFR Part 24.232(c),
LTE Band 4: FCC 47 CFR Part 27.50(d)(4),
LTE Band 7: FCC 47 CFR Part 27.50(h)(2)

Test Method: KDB 971168 D01v03r01& ANSI/TIA-603-E-2016

Limit:

FCC 47 CFR Part 22.913(a)
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
FCC 47 CFR Part 24.232(c)
Mobile and portable stations are limited to 2 watts EIRP.
FCC 47 CFR Part 27.50(d)(4)
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.
FCC 47 CFR Part 27.50(h)(2): Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure:

Test procedure as below:

1) The EUT was powered ON and placed on a 0.8/1.5m high table at a 3 meter semi/fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7) were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:

ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
EIRP=ERP+2.15dB

where:
Pg is the generator output power into the substitution antenna.

10) Test the EUT in the lowest channel, the middle channel the Highest channel

11) The radiation measurements are performed in X, Y, Z axis positioning for EUT operation mode, and found the Y axis positioning which it is worse case.
12) Repeat above procedures until all frequencies measured was complete.

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Peak	100kHz	300kHz	Peak
Above 1GHz	Peak	1MHz	3MHz	Peak

Test Setup: Refer to section 4.2.1 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Link mode
Test Results: Pass
Test Data: See table below

Maximum ERP (dBm)					
Channel	**GSM 850 1Tx-slot**	**EDGE 850 1Tx-slot**	**WCDMA Band V RMC 12.2Kbps**	**Limit (dBm)**	**Result**
Lowest	29.38	29.39	19.20	38.45	Pass
Middle	29.48	29.50	18.99	38.45	Pass
Highest	29.53	29.51	19.02	38.45	Pass

Maximum EIRP (dBm)					
Channel	**GSM 1900 1Tx-slot**	**EDGE 1900 1Tx-slot**	**WCDMA Band II RMC 12.2Kbps**	**Limit (dBm)**	**Result**
Lowest	28.54	28.54	22.62	33.01	Pass
Middle	28.31	28.30	22.45	33.01	Pass
Highest	27.73	27.70	22.41	33.01	Pass

LTE Band 2 Maximum EIRP (dBm)					
Channel	**QPSK; RB:1**	**16QAM; RB:1**	**64QAM; RB:1**	**Limit (dBm)**	**Result**
Channel Bandwidth: 1.4MHz					
Lowest	22.32	21.20	N/A	33.01	Pass
Middle	22.01	21.13	N/A	33.01	Pass
Highest	21.90	20.74	N/A	33.01	Pass
Channel Bandwidth: 3MHz					
Lowest	22.40	21.09	N/A	33.01	Pass
Middle	21.94	21.03	N/A	33.01	Pass
Highest	21.82	20.65	N/A	33.01	Pass
Channel Bandwidth: 5MHz					
Lowest	22.25	21.25	N/A	33.01	Pass
Middle	22.00	21.20	N/A	33.01	Pass
Highest	21.83	20.67	N/A	33.01	Pass
Channel Bandwidth: 10MHz					
Lowest	22.36	21.16	N/A	33.01	Pass
Middle	22.11	21.01	N/A	33.01	Pass
Highest	21.91	20.62	N/A	33.01	Pass
Channel Bandwidth: 15MHz					
Lowest	22.22	21.24	N/A	33.01	Pass
Middle	22.07	21.20	N/A	33.01	Pass
Highest	21.74	20.68	N/A	33.01	Pass

Channel Bandwidth: 20MHz					
Lowest	22.42	21.25	N/A	33.01	Pass
Middle	22.12	21.21	N/A	33.01	Pass
Highest	21.93	20.80	N/A	33.01	Pass

LTE Band 4 Maximum EIRP (dBm)					
Channel	**QPSK; RB:1**	**16QAM; RB:1**	**64QAM; RB:1**	**Limit (dBm)**	**Result**
Channel Bandwidth: 1.4MHz					
Lowest	21.63	20.76	N/A	30.00	Pass
Middle	21.55	20.65	N/A	30.00	Pass
Highest	21.77	20.83	N/A	30.00	Pass
Channel Bandwidth: 3MHz					
Lowest	21.75	20.88	N/A	30.00	Pass
Middle	21.49	20.52	N/A	30.00	Pass
Highest	21.78	20.90	N/A	30.00	Pass
Channel Bandwidth: 5MHz					
Lowest	21.73	20.72	N/A	30.00	Pass
Middle	21.49	20.70	N/A	30.00	Pass
Highest	21.75	20.84	N/A	30.00	Pass
Channel Bandwidth: 10MHz					
Lowest	21.64	20.75	N/A	30.00	Pass
Middle	21.53	20.55	N/A	30.00	Pass
Highest	21.77	20.96	N/A	30.00	Pass
Channel Bandwidth: 15MHz					
Lowest	21.58	20.90	N/A	30.00	Pass
Middle	21.60	20.55	N/A	30.00	Pass
Highest	21.84	20.89	N/A	30.00	Pass
Channel Bandwidth: 20MHz					
Lowest	21.75	20.90	N/A	30.00	Pass
Middle	21.65	20.70	N/A	30.00	Pass
Highest	21.88	21.01	N/A	30.00	Pass

LTE Band 5 Maximum ERP (dBm)					
Channel	**QPSK; RB:1**	**16QAM; RB:1**	**64QAM; RB:1**	**Limit (dBm)**	**Result**
Channel Bandwidth: 1.4MHz					
Lowest	19.09	18.34	N/A	38.45	Pass
Middle	19.02	18.38	N/A	38.45	Pass
Highest	18.75	18.09	N/A	38.45	Pass
Channel Bandwidth: 3MHz					
Lowest	19.08	18.45	N/A	38.45	Pass
Middle	19.16	18.30	N/A	38.45	Pass
Highest	18.80	18.01	N/A	38.45	Pass
Channel Bandwidth: 5MHz					
Lowest	19.07	18.13	N/A	38.45	Pass
Middle	19.20	18.28	N/A	38.45	Pass

Highest	18.88	17.92	N/A	38.45	Pass
Channel Bandwidth: 10MHz					
Lowest	19.26	18.45	N/A	38.45	Pass
Middle	19.21	18.39	N/A	38.45	Pass
Highest	18.91	18.13	N/A	38.45	Pass

LTE Band 7 Maximum EIRP (dBm)					
Channel	**QPSK; RB:1**	**16QAM; RB:1**	**64QAM; RB:1**	**Limit (dBm)**	**Result**
Channel Bandwidth: 5MHz					
Lowest	19.97	19.32	N/A	33.01	Pass
Middle	19.75	19.10	N/A	33.01	Pass
Highest	20.31	19.70	N/A	33.01	Pass
Channel Bandwidth: 10MHz					
Lowest	19.96	19.29	N/A	33.01	Pass
Middle	19.63	19.07	N/A	33.01	Pass
Highest	20.38	19.66	N/A	33.01	Pass
Channel Bandwidth: 15MHz					
Lowest	19.83	19.31	N/A	33.01	Pass
Middle	19.80	18.96	N/A	33.01	Pass
Highest	20.36	19.80	N/A	33.01	Pass
Channel Bandwidth: 20MHz					
Lowest	20.01	19.42	N/A	33.01	Pass
Middle	19.81	19.14	N/A	33.01	Pass
Highest	20.47	19.83	N/A	33.01	Pass

5.3 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 2.1046(a),
GSM 850 & WCDMA Band V & LTE Band 5: FCC 47 CFR Part 22.913(a),
GSM 1900 & WCDMA Band II & LTE Band 2: FCC 47 CFR Part 24.232(c),
LTE Band 4: FCC 47 CFR Part 27.50(d)(4),
LTE Band 7: FCC 47 CFR Part 27.50(h)(2)

Test Method: ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 22.913(a)
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
FCC 47 CFR Part 24.232(c)
Mobile and portable stations are limited to 2 watts EIRP.
FCC 47 CFR Part 27.50(d)(4)
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.
FCC 47 CFR Part 27.50(h)(2):
Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA2000, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: The full result refer to section 4.5 for details.

5.4 PEAK-TO-AVERAGE RATIO

Test Requirement: **GSM 850 & WCDMA Band V & LTE Band 5:** FCC 47 CFR Part 22.913(a),
GSM 1900 & WCDMA Band II & LTE Band 2: FCC 47 CFR Part 24.232(c),
LTE Band 4: FCC 47 CFR Part 27.50(d)(5),
LTE Band 7: FCC 47 CFR Part 27.50(d)(5)

Test Method: KDB 971168 D01v03r01

Limit: 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

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

a) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth
b) Set the number of counts to a value that stabilizes the measured CCDF curve
c) Record the maximum PAPR level associated with a probability of 0.1 %

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

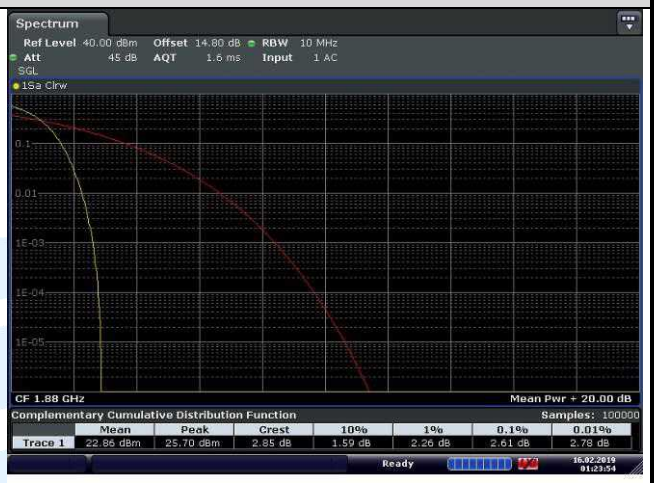
Test Results: Pass

Test Data: See table below

Peak-to-average ratio (dB)					
Channel	**GSM 1900 1Tx-slot**	**EDGE 1900 1Tx-slot**	**WCDMA Band II RMC 12.2Kbps**	**Limit (dBm)**	**Result**
Lowest	0.43	0.55	2.67	13	Pass
Middle	0.83	0.47	2.61	13	Pass
Highest	0.77	1.14	2.20	13	Pass

The test plots as follows:

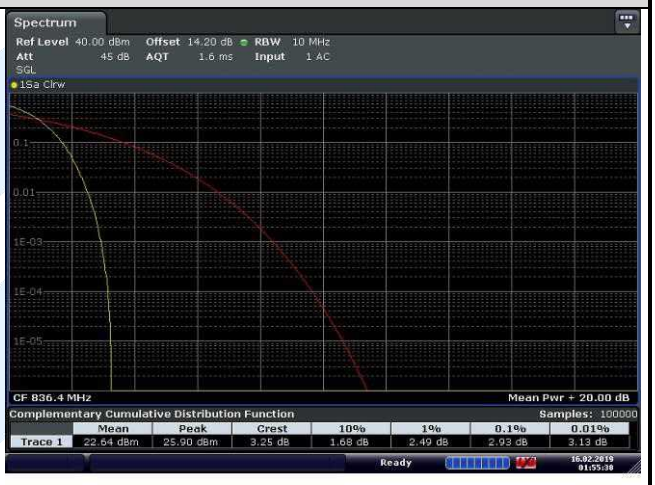
GSM 1Tx-slot	EDGE 1Tx-slot
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

WCDMA RMC 12.2Kbps	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	N/A

Peak-to-average ratio (dB)					
Channel	GSM 850 1Tx-slot	EDGE 850 1Tx-slot	WCDMA Band V RMC 12.2Kbps	Limit (dBm)	Result
Lowest	1.83	0.53	2.87	13	Pass
Middle	1.54	1.33	2.93	13	Pass
Highest	1.35	2.01	2.64	13	Pass

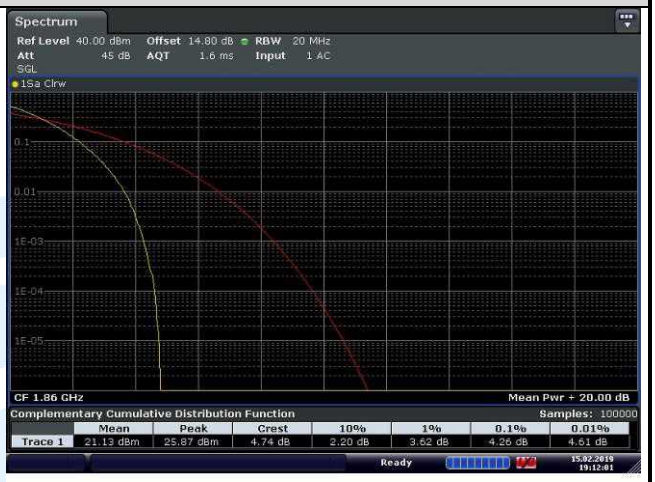
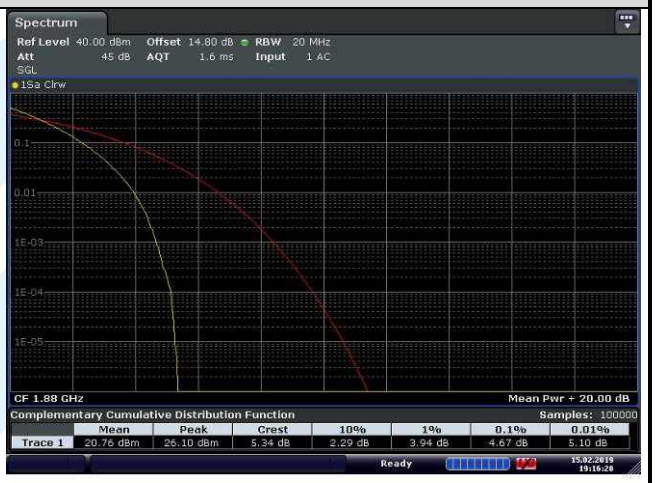
The test plots as follows:

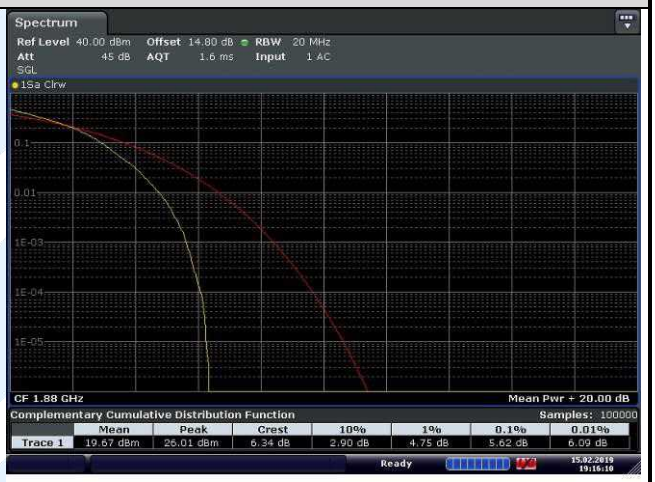
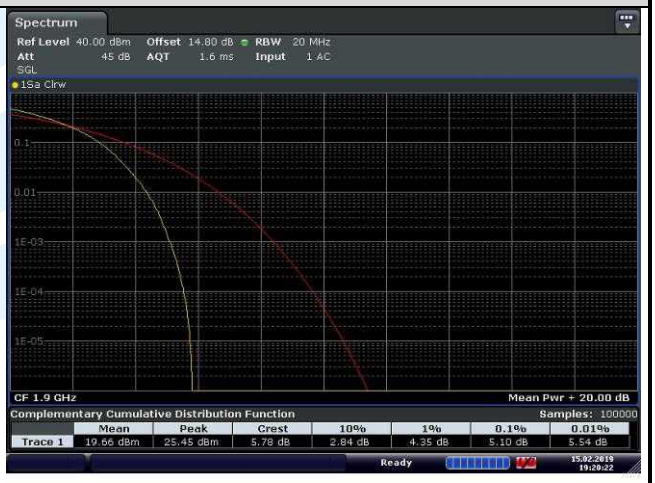
GSM 1Tx-slot	EDGE 1Tx-slot
Lowest Channel	
	
Middle Channel	
	
Highest Channel	

WCDMA RMC 12.2Kbps	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	N/A

LTE Band 2

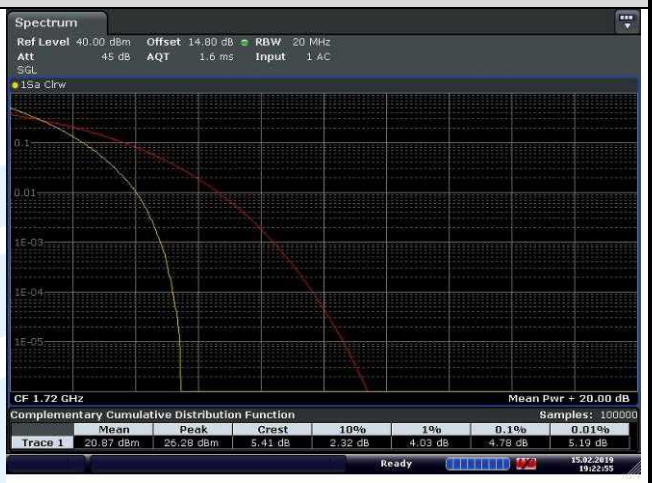
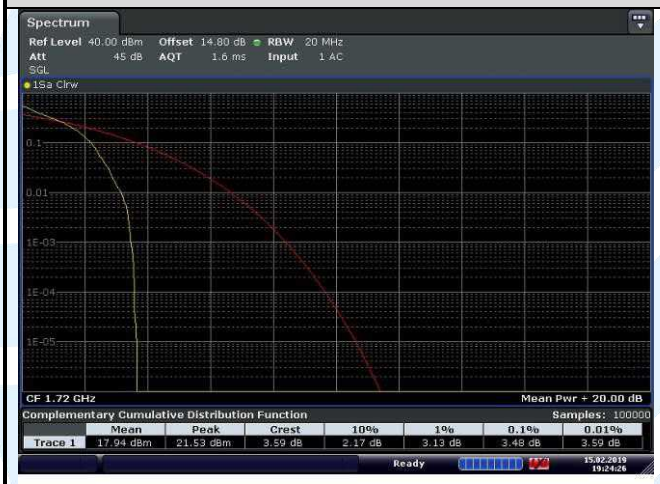
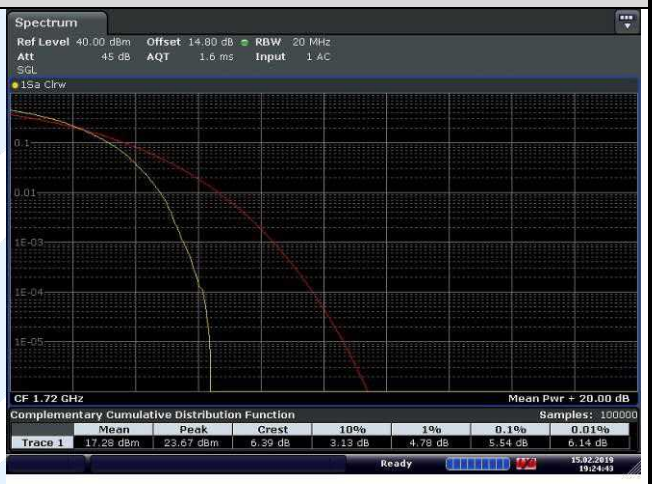
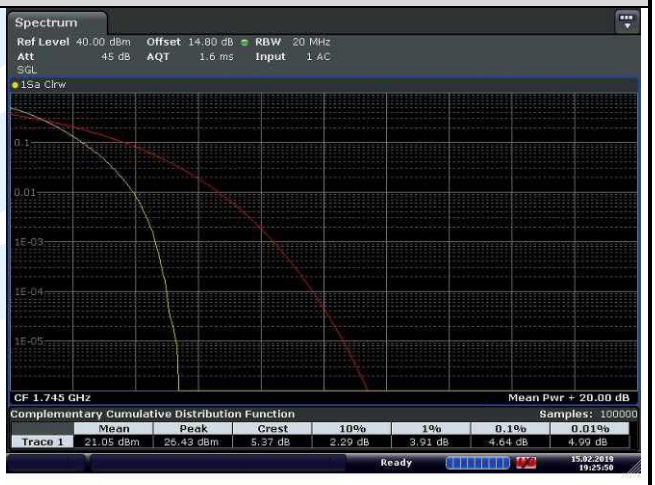
Peak-to-average ratio (dB)						
Channel	RB Configuration	Channel Bandwidth: 20 MHz			Limit (dB)	Result
		QPSK	16QAM	64QAM		
Lowest	1 RB	3.19	4.23	N/A	13	Pass
	Full RB	4.26	5.33	N/A	13	Pass
Middle	1 RB	3.68	4.38	N/A	13	Pass
	Full RB	4.67	5.62	N/A	13	Pass
Highest	1 RB	2.23	3.01	N/A	13	Pass
	Full RB	4.20	5.10	N/A	13	Pass

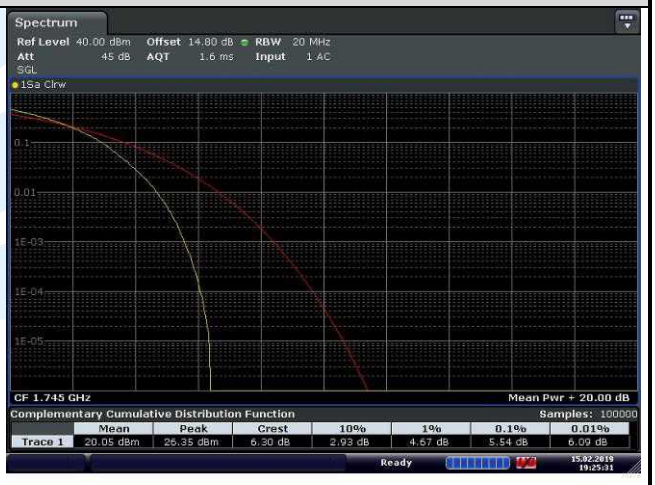
LTE Band 2 / 20MHz / QPSK	
1 RB	Full RB
Lowest Channel	
 Date: 15.FEB.2019 19:14:45	 Date: 15.FEB.2019 19:12:01
Middle Channel	
 Date: 15.FEB.2019 19:16:53	 Date: 15.FEB.2019 19:16:29
Highest Channel	
 Date: 15.FEB.2019 19:19:19	 Date: 15.FEB.2019 19:19:57

LTE Band 2 / 20MHz / 16QAM	
1 RB	Full RB
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 4

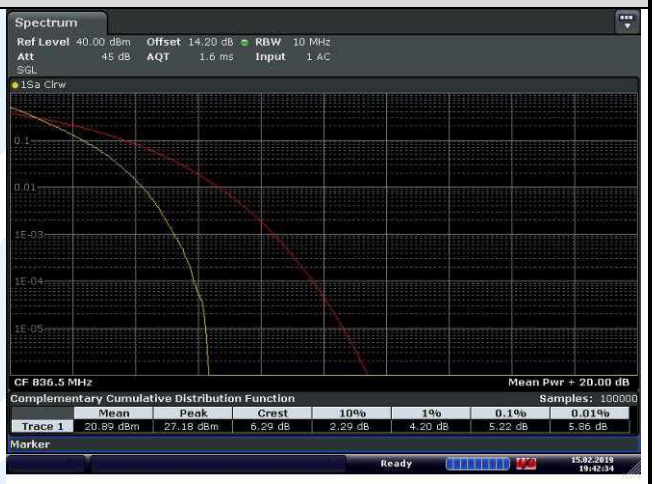
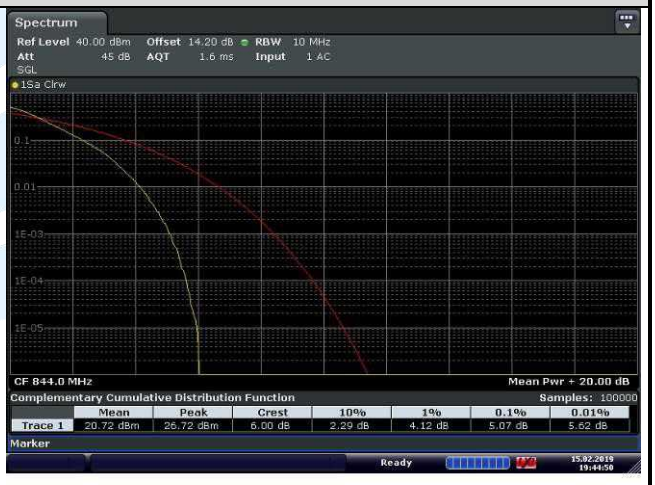
Peak-to-average ratio (dB)						
Channel	RB Configuration	Channel Bandwidth: 20 MHz			Limit (dB)	Result
		QPSK	16QAM	64QAM		
Lowest	1 RB	4.20	5.25	N/A	13	Pass
	Full RB	4.78	5.80	N/A	13	Pass
Middle	1 RB	3.48	4.29	N/A	13	Pass
	Full RB	5.54	6.41	N/A	13	Pass
Highest	1 RB	3.65	4.35	N/A	13	Pass
	Full RB	4.64	5.54	N/A	13	Pass

LTE Band 4 / 20MHz / QPSK	
1 RB	**Full RB**
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 4 / 20MHz / 16QAM	
1 RB	Full RB
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 5

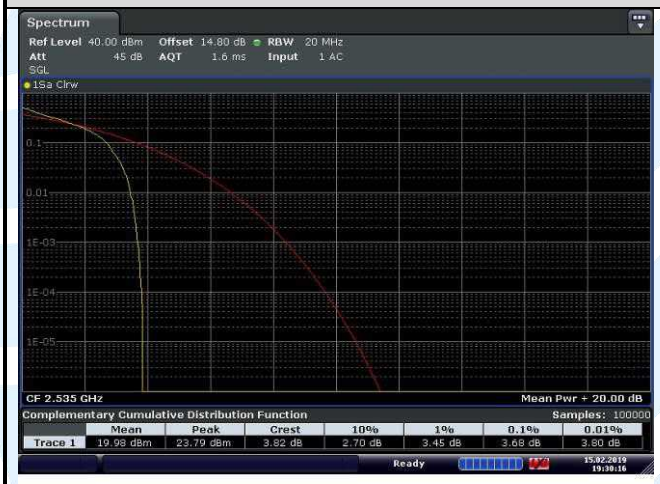
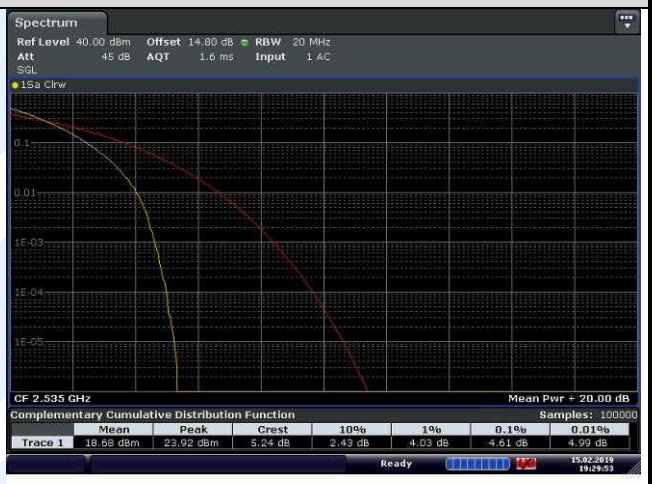
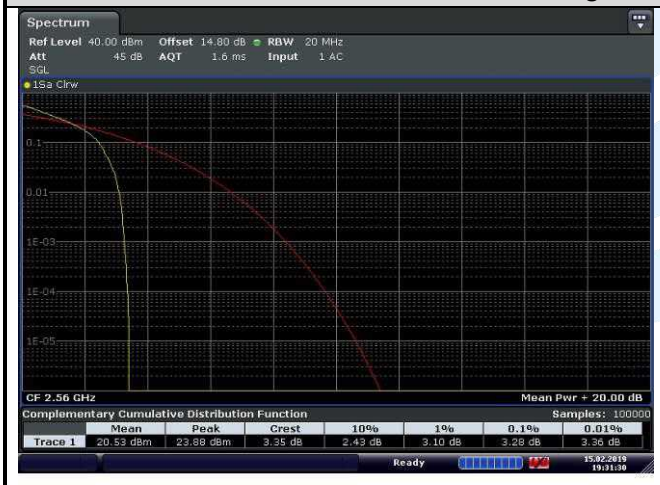
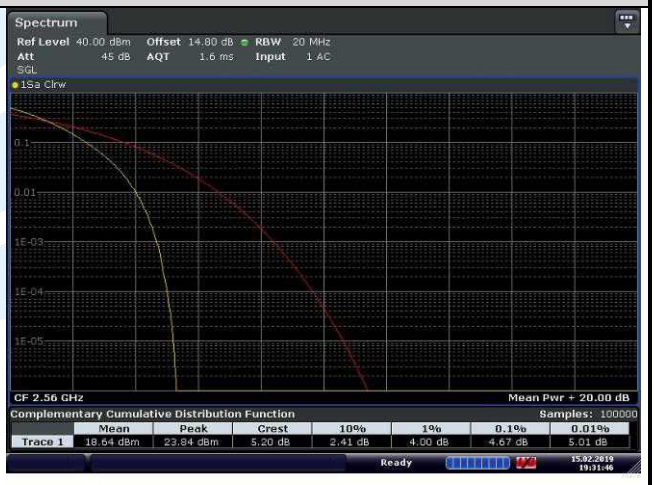
Peak-to-average ratio (dB)						
Channel	RB Configuration	Channel Bandwidth: 10 MHz			Limit (dB)	Result
		QPSK	16QAM	64QAM		
Lowest	1 RB	4.99	5.68	N/A	13	Pass
	Full RB	5.22	6.17	N/A	13	Pass
Middle	1 RB	4.87	5.94	N/A	13	Pass
	Full RB	5.22	6.14	N/A	13	Pass
Highest	1 RB	4.61	5.51	N/A	13	Pass
	Full RB	5.07	6.00	N/A	13	Pass

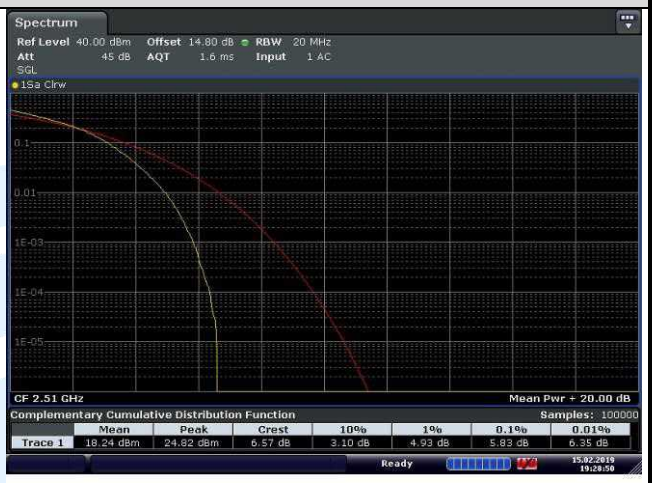
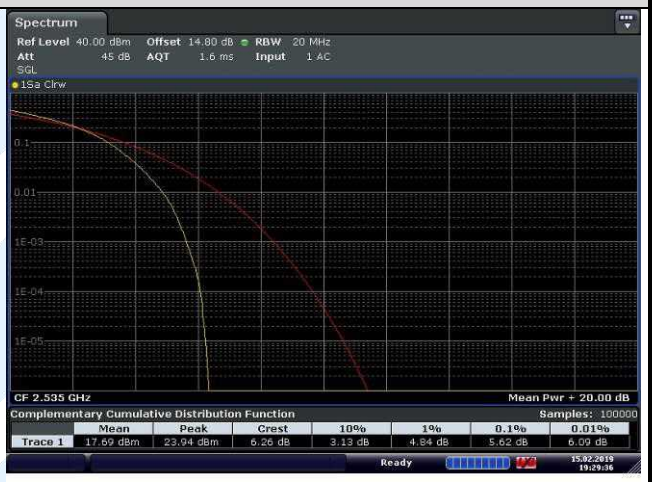
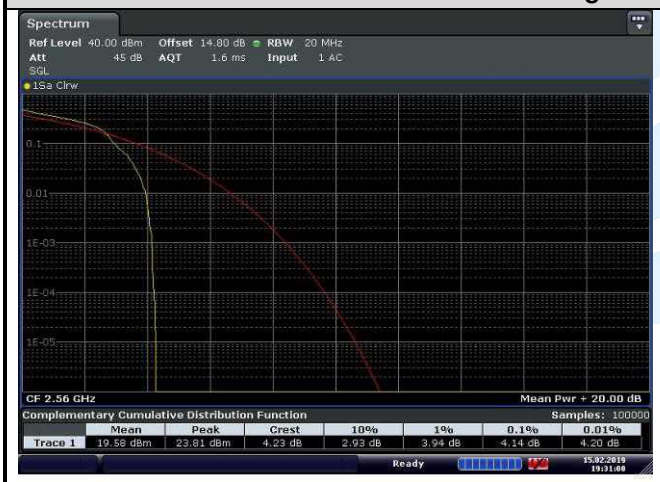
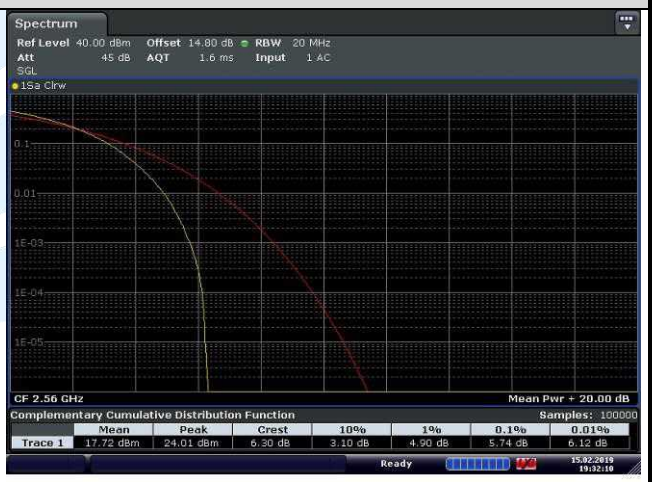
LTE Band 5 / 10MHz / QPSK	
1 RB	Full RB
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 5 / 10MHz / 16QAM	
1 RB	Full RB
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 7

Peak-to-average ratio (dB)						
Channel	RB Configuration	Channel Bandwidth: 20 MHz			Limit (dB)	Result
		QPSK	16QAM	64QAM		
Lowest	1 RB	4.17	4.93	N/A	13	Pass
	Full RB	4.87	5.83	N/A	13	Pass
Middle	1 RB	3.68	4.20	N/A	13	Pass
	Full RB	4.61	5.62	N/A	13	Pass
Highest	1 RB	3.28	4.14	N/A	13	Pass
	Full RB	4.67	5.74	N/A	13	Pass

LTE Band 7 / 20MHz / QPSK	
1 RB	**Full RB**
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 7 / 20MHz / 16QAM	
1 RB	Full RB
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

5.5 99%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h),
GSM 850 & WCDMA Band V & LTE Band 5: FCC 47 CFR Part 22.917(b),
GSM 1900 & WCDMA Band II & LTE Band 2: FCC 47 CFR Part 24.238(b),
LTE Band 4: FCC 47 CFR Part 27.53(h),
LTE Band 7: FCC 47 CFR Part 27.50(a)

Test Method: ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01

Limit: No Limit

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

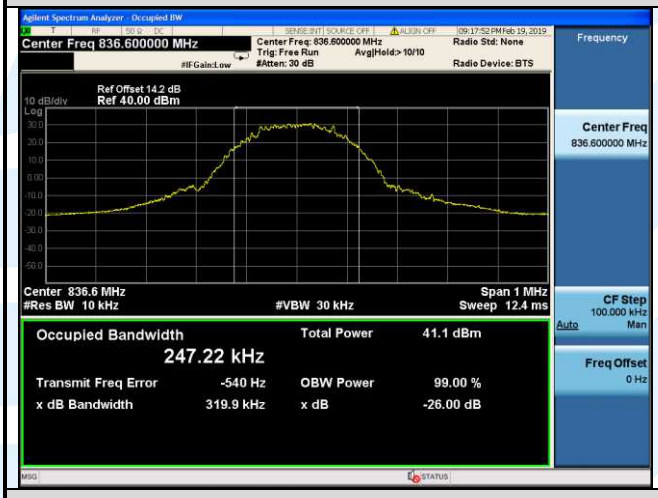
Test Results: Pass

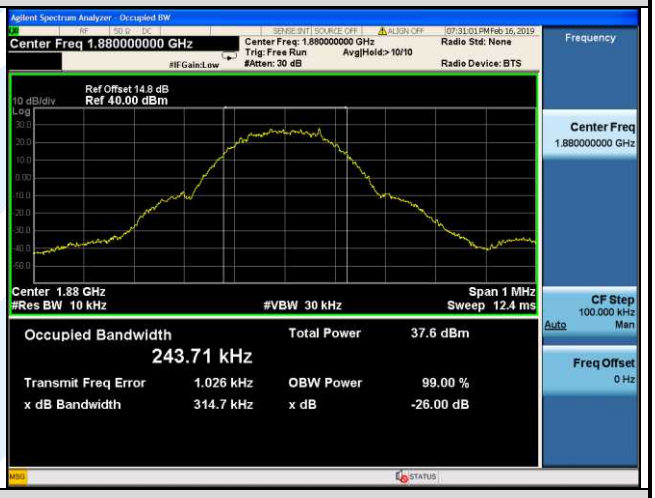
Test Data: See table below

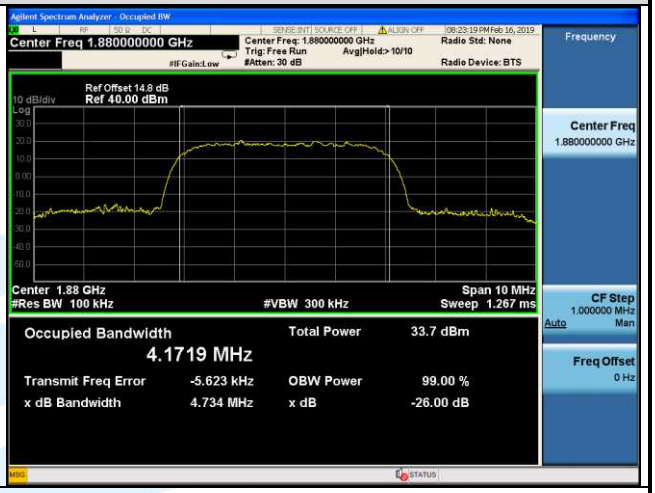
99% & 26 dB Bandwidth				
Test Mode	**Channel**	**Frequency (MHz)**	**26 dB BW (kHz)**	**99% BW (kHz)**
GSM 850 1Tx-slot	128	824.2	319.2	248.40
	190	836.6	319.9	247.22
	251	848.8	313.4	247.11
EDGE 850 1Tx-slot	128	824.2	318.3	244.92
	190	836.6	321.0	244.66
	251	848.8	317.3	244.33
GSM 1900 1Tx-slot	512	1850.2	317.2	243.58
	661	1880.0	320.4	242.61
	810	1909.8	316.1	242.15
EDGE 1900 1Tx-slot	512	1850.2	319.9	244.62
	661	1880.0	314.7	243.71
	810	1909.8	320.3	245.17

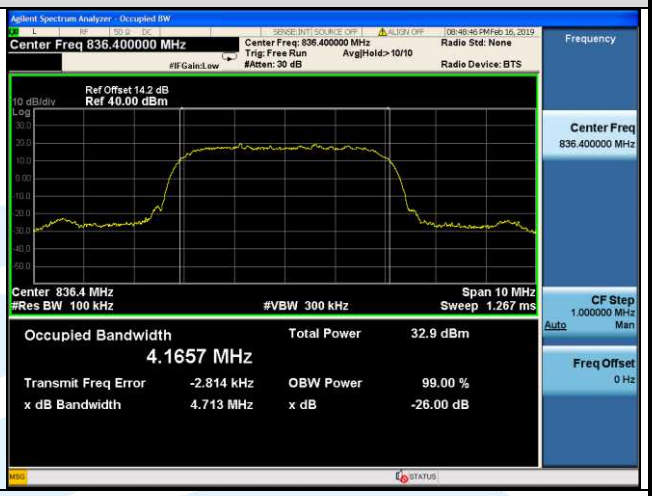
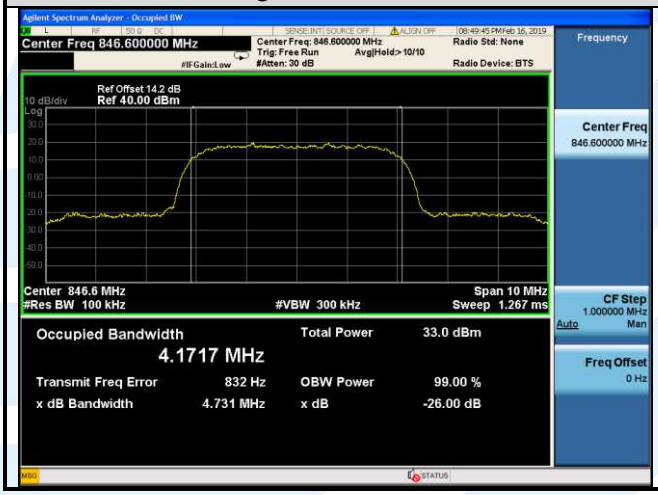
99% & 26 dB Bandwidth				
Test Mode	**Channel**	**Frequency (MHz)**	**26 dB BW (MHz)**	**99% BW (MHz)**
WCDMA Band II RMC 12.2Kbps	9262	1852.4	4.728	4.1650
	9400	1880.0	4.734	4.1719
	9538	1907.6	4.764	4.1835
WCDMA Band V RMC 12.2Kbps	4132	826.4	1.710	4.1680
	4182	836.4	4.713	4.1657
	4233	846.6	4.731	4.1717

The test plots as follows:

GSM 850	EDGE 850
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

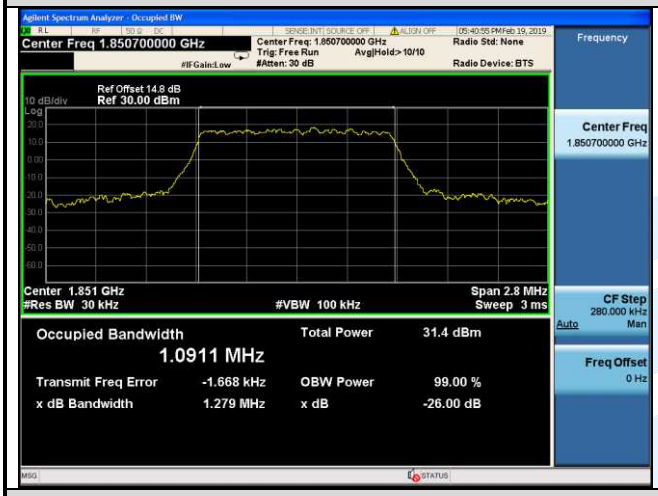
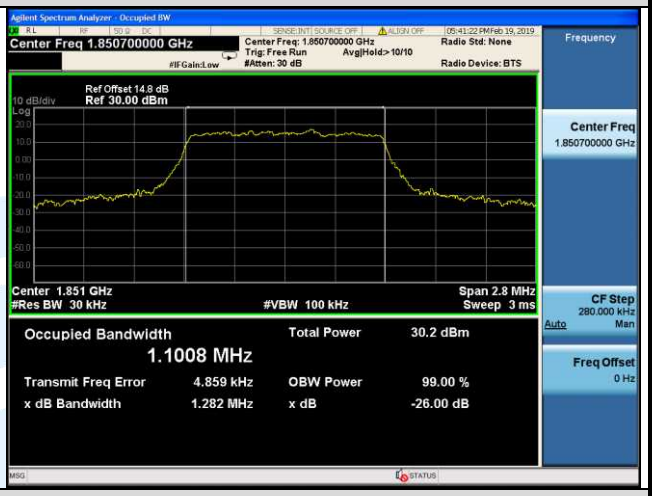
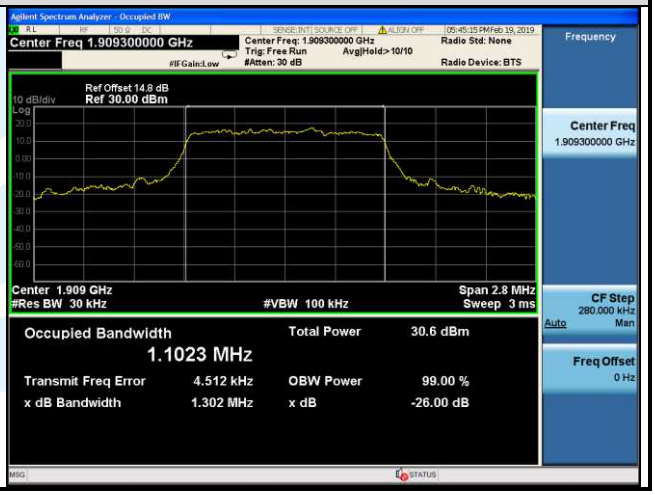
GSM 1900	EDGE 1900
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

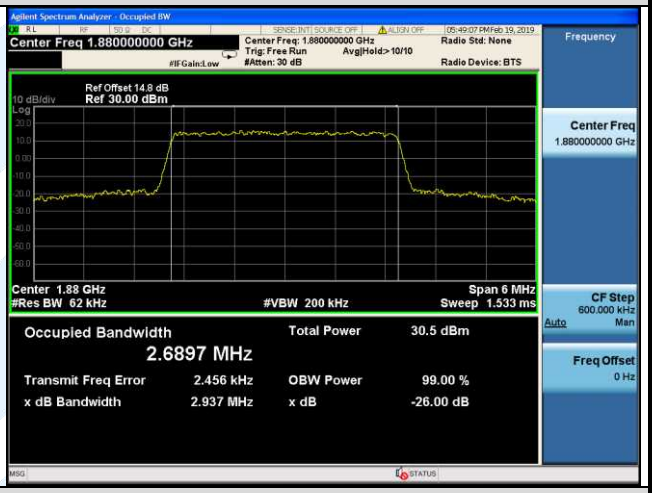
WCDMA Band II	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	N/A

WCDMA Band V	
Lowest Channel	Middle Channel
	
Highest Channel	
	N/A

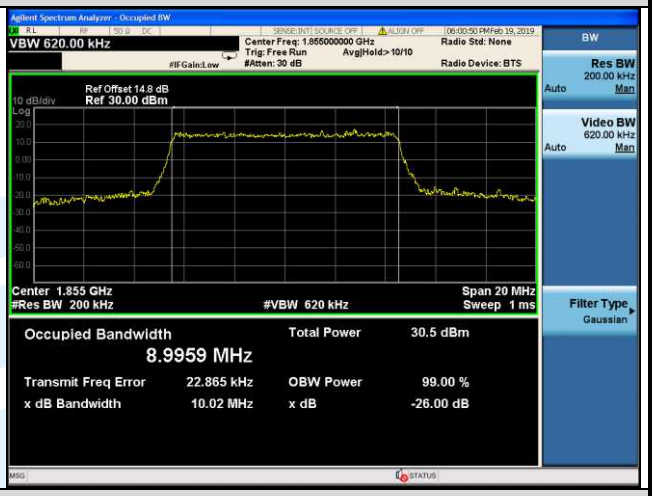
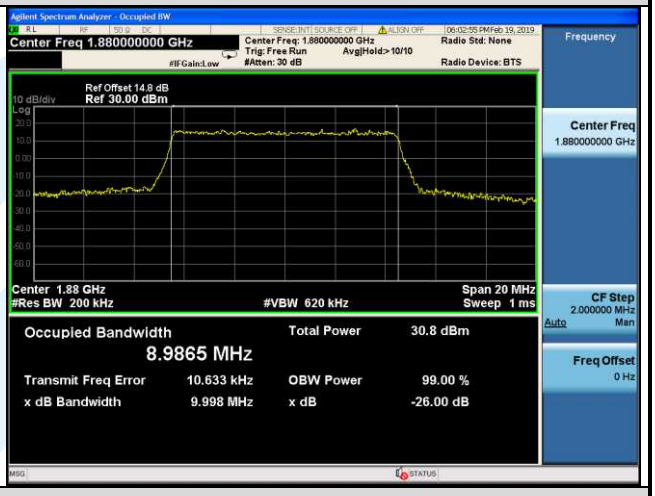
Band 2

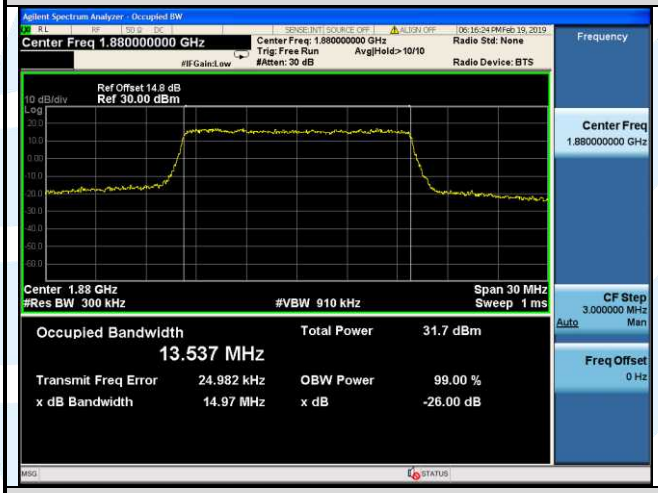
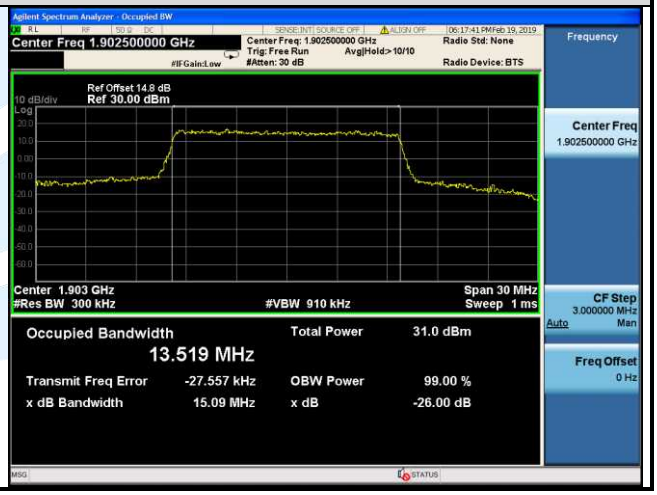
LTE Band 2								
Channel	RB Configuration		26 dB BW (MHz)			99% BW (MHz)		
	Size	Offset	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Channel Bandwidth: 1.4 MHz								
Lowest	6	0	1.279	1.282	N/A	1.0911	1.1008	N/A
Middle	6	0	1.277	1.291	N/A	1.0948	1.0997	N/A
Highest	6	0	1.266	1.302	N/A	1.0962	1.1023	N/A
Channel Bandwidth: 3 MHz								
Lowest	15	0	2.925	2.930	N/A	2.6868	2.6922	N/A
Middle	15	0	2.921	2.937	N/A	2.6862	2.6897	N/A
Highest	15	0	2.931	2.931	N/A	2.6920	2.6932	N/A
Channel Bandwidth: 5 MHz								
Lowest	25	0	5.185	5.176	N/A	4.5120	4.5169	N/A
Middle	25	0	5.197	5.175	N/A	4.5205	4.5128	N/A
Highest	25	0	5.330	5.240	N/A	4.5321	4.5228	N/A
Channel Bandwidth: 10 MHz								
Lowest	50	0	10.20	10.02	N/A	9.0499	8.9959	N/A
Middle	50	0	10.17	9.998	N/A	9.0243	8.9865	N/A
Highest	50	0	12.42	11.44	N/A	9.0589	8.9994	N/A
Channel Bandwidth: 15 MHz								
Lowest	75	0	15.16	15.10	N/A	13.517	13.498	N/A
Middle	75	0	14.97	15.21	N/A	13.537	13.539	N/A
Highest	75	0	17.24	15.09	N/A	13.562	13.519	N/A
Channel Bandwidth: 20 MHz								
Lowest	100	0	19.83	19.62	N/A	17.971	17.948	N/A
Middle	100	0	19.77	19.81	N/A	17.991	17.982	N/A
Highest	100	0	19.91	19.69	N/A	17.967	17.999	N/A

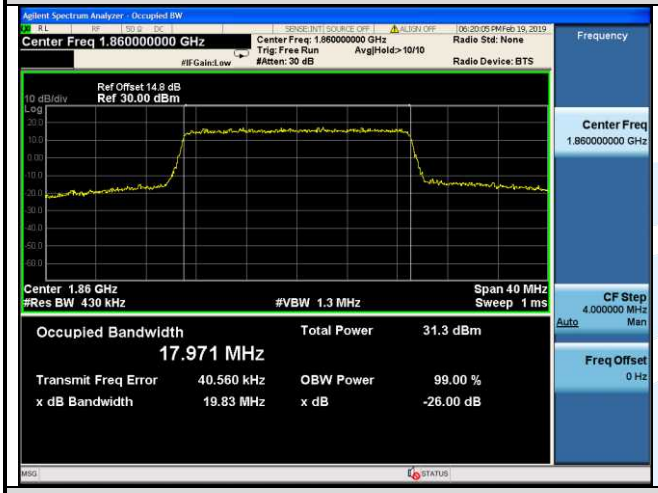
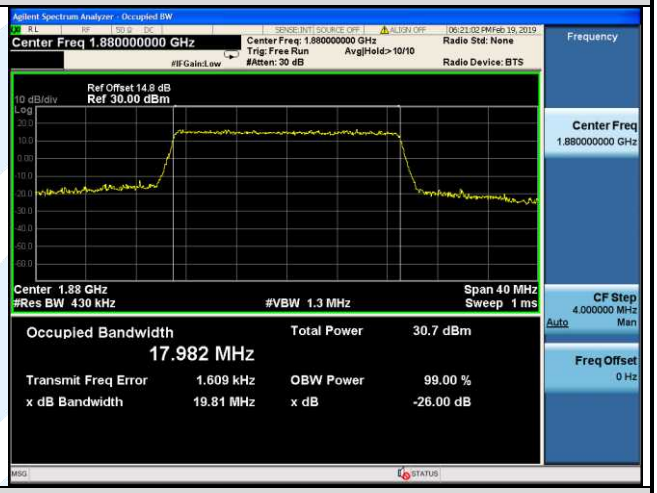
LTE Band 2_ Channel Bandwidth: 1.4 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 2_ Channel Bandwidth: 3 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 2_ Channel Bandwidth: 5 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 2_ Channel Bandwidth: 10 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 2_ Channel Bandwidth: 15 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 2_ Channel Bandwidth: 20 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel