

FCC CFR47 PART 22H, 24E, 27, CERTIFICATION TEST REPORT

FCC ID: 2AV3BSP7348

Product: Tablet

Trade Mark: ADVANCE

Model No.: SP7348

Family Model: N/A

Report No.: S23071301801006

Issue Date: Aug 09, 2023

Prepared for

TECHNOSOURCE HK LIMITED
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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : TECHNOSOURCE HK LIMITED

Address : 2F, Building B, Sulandscape Industrial park, Shiyan Town, Bao'an District, Shenzhen China

Manufacturer's Name : TECHNOSOURCE HK LIMITED

Address : 2F, Building B, Sulandscape Industrial park, Shiyan Town, Bao'an District, Shenzhen China

Product name : Tablet

Model and/or type reference : SP7348

Trade Mark : ADVANCE

Family Model : N/A

Test Sample number.....: S230713018001

Standards : FCC CFR 47 Part 22H, Part 24E, Part 27

Test procedure: ANSI C63.26:2015
ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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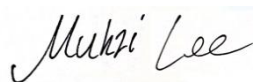
Date of Test

Date (s) of performance of tests Jul 13, 2023 ~ Aug 09, 2023

Date of Issue..... Aug 09, 2023

Test Result..... **Pass**

Testing Engineer :



(Mukzi Lee)

Authorized Signatory :



(Alex Li)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Tablet
Trade Mark	ADVANCE
Model Name	SP7348
Family Model	N/A
Model Difference	N/A
FCC ID:	2AV3BSP7348
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2,4,7
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz;
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 1dBi; Band 4: 1dBi; Band 7: 1dBi;
Adapter	MODEL: B0S050200-01A INPUT: 110-220V~50-60Hz 0.45A OUTPUT: 5V $\overline{\text{---}}$ 2000mA
Battery	DC 3.8V, 4000mAh, 15.2Wh
Power supply	DC 3.8V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.23V to DC 4.37V (Nominal DC 3.8V) (Note 1)
HW Version	T864CT_V1.0X
SW Version	SP7348_v1.0
** Note1: The High Voltage DC 4.37V and Low Voltage 3.23V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AV3BSP7348** filing to comply with the FCC Part 22H&24E&27.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, ,ANSI C63.26:2015.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R.China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.5dB

1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

1.6 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has LTE Bands of: Band 2/4/7

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Tablet	SP7348	FCC ID: 2AV3BSP7348	EUT

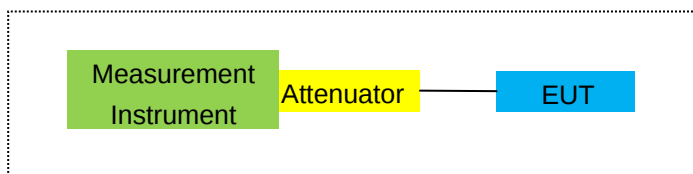
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

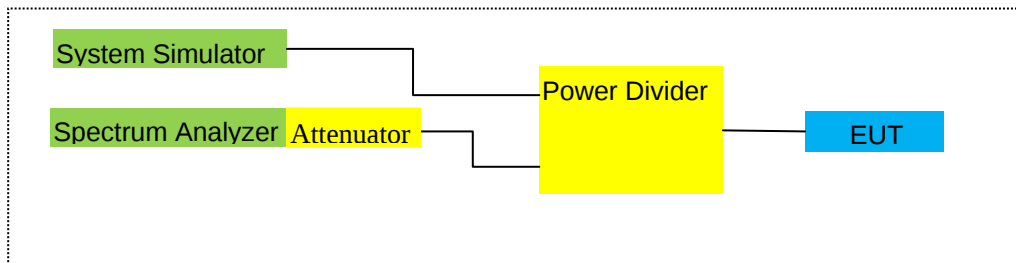
For Radiated Test Cases



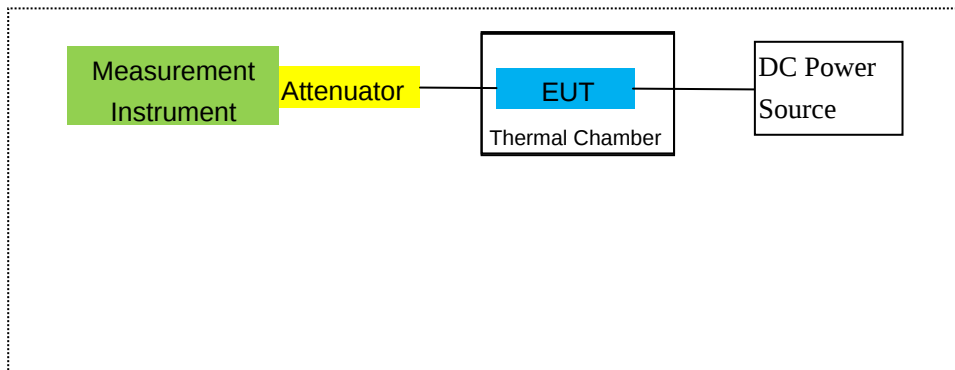
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2023.05.29	2024.05.28	1 year
2	Test Receiver	R&S	ESPI	101318	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.16	2024.03.15	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2025.03.30	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.11.04	2023.11.05	1 year
9	Power Meter	R&S	NRVS	100696	2023.05.29	2024.05.28	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2023.05.29	2024.05.28	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2023.03.27	2024.03.26	1 year
15	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
16	LISN	EMCO	3816/2	00042990	2023.03.27	2024.03.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.03.27	2024.03.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2023.03.27	2024.03.26	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Spectrum Analyzer	agilent	e4440a	us44300399	2023.03.27	2024.03.26	1 year
23	test receiver	R&S	ESCI	a0304218	2023.03.27	2024.03.26	1 year
24	Communication Tester	R&S	CMU200	A0304247	2023.05.29	2024.05.28	1 year
25	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2023.03.27	2024.03.26	1 year

26	DC Power Source	N/A	PS-6005D	2017040292 3	2023.05.06	2026.05.05	3 year
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Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".³

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

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 -26dB bandwidth was also measured and recorded.

MODES TESTED

☐

Band 2/4/7

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53,
FCC: §22.359

LIMITS

FCC: §22.917, §24.238, §27.53

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.

(c)(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

Set a marker to point the corresponding band edge frequency in each test case.

Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

Band 2/4/7

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53

LIMITS

1. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.
2. The Band 7/41 emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $55 + 10 \log (P)$ dB.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- ☐
- ☐ Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

- ☐ Band 2/4/7
- ☐

7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Test data reference attachment.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

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

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

MODES TESTED

Band 2/4/7

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-2.84	3.76	28.24	21.64	145.881	Horizontal	Pass
		1880	-2.65	3.91	28.22	21.66	146.555	Horizontal	Pass
		1909.3	-2.66	3.93	28.20	21.61	144.877	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.83	3.77	28.23	21.63	145.546	Horizontal	Pass
		1880	-2.69	3.91	28.24	21.64	145.881	Horizontal	Pass
		1908.5	-2.77	3.94	28.25	21.54	142.561	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.93	3.77	28.31	21.61	144.877	Horizontal	Pass
		1880	-2.70	3.91	28.22	21.61	144.877	Horizontal	Pass
		1907.5	-2.68	3.94	28.20	21.58	143.880	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.90	3.79	28.33	21.64	145.881	Horizontal	Pass
		1880	-2.68	3.95	28.22	21.59	144.212	Horizontal	Pass
		1905	-2.64	3.97	28.19	21.58	143.880	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.93	3.79	28.34	21.62	145.211	Horizontal	Pass
		1880	-2.73	3.95	28.22	21.54	142.561	Horizontal	Pass
		1902.5	-2.53	3.97	28.18	21.68	147.231	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.89	3.81	28.35	21.65	146.218	Horizontal	Pass
		1880	-2.70	3.96	28.22	21.56	143.219	Horizontal	Pass
		1900	-2.50	4.00	28.16	21.66	146.555	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.83	3.76	28.24	21.65	146.218	Vertical	Pass
		1880	-2.62	3.91	28.22	21.69	147.571	Vertical	Pass
		1909.3	-2.61	3.93	28.20	21.66	146.555	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.91	3.77	28.23	21.55	142.889	Vertical	Pass
		1880	-2.78	3.91	28.24	21.55	142.889	Vertical	Pass
		1908.5	-2.68	3.94	28.25	21.63	145.546	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.86	3.77	28.31	21.68	147.231	Vertical	Pass
		1880	-2.65	3.91	28.22	21.66	146.555	Vertical	Pass
		1907.5	-2.67	3.94	28.20	21.59	144.212	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.85	3.79	28.33	21.69	147.571	Vertical	Pass
		1880	-2.66	3.95	28.22	21.61	144.877	Vertical	Pass
		1905	-2.54	3.97	28.19	21.68	147.231	Vertical	Pass

15.0MHz	1/#Mid	1857.5	-2.94	3.79	28.34	21.61	144.877	Vertical	Pass
Band		1880	-2.72	3.95	28.22	21.55	142.889	Vertical	Pass
QPSK		1902.5	-2.64	3.97	28.18	21.57	143.549	Vertical	Pass
20.0MHz	1/#Mid	1860	-2.82	3.81	28.35	21.72	148.594	Vertical	Pass
Band		1880	-2.53	3.96	28.22	21.73	148.936	Vertical	Pass
QPSK		1900	-2.45	4.00	28.16	21.71	148.252	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz	1/#Mid	1850.7	-3.30	3.76	28.24	21.18	131.220	Horizontal	Pass
Band 16		1880	-3.12	3.91	28.22	21.19	131.522	Horizontal	Pass
QAM		1909.3	-3.05	3.93	28.20	21.22	132.434	Horizontal	Pass
3.0MHz	1/#Mid	1851.5	-3.25	3.77	28.23	21.21	132.130	Horizontal	Pass
Band 16		1880	-3.18	3.91	28.24	21.15	130.317	Horizontal	Pass
QAM		1908.5	-3.13	3.94	28.25	21.18	131.220	Horizontal	Pass
5.0MHz	1/#Mid	1852.5	-3.42	3.77	28.31	21.12	129.420	Horizontal	Pass
Band 16		1880	-3.04	3.91	28.22	21.27	133.968	Horizontal	Pass
QAM		1907.5	-3.12	3.94	28.20	21.14	130.017	Horizontal	Pass
10.0MHz	1/#Mid	1855	-3.38	3.79	28.33	21.16	130.617	Horizontal	Pass
Band 16		1880	-3.02	3.95	28.22	21.25	133.352	Horizontal	Pass
QAM		1905	-2.93	3.97	28.19	21.29	134.586	Horizontal	Pass
15.0MHz	1/#Mid	1857.5	-3.35	3.79	28.34	21.20	131.826	Horizontal	Pass
Band 16		1880	-3.12	3.95	28.22	21.15	130.317	Horizontal	Pass
QAM		1902.5	-3.02	3.97	28.18	21.19	131.522	Horizontal	Pass
20.0MHz	1/#Mid	1860	-3.24	3.81	28.35	21.30	134.896	Horizontal	Pass
Band 16		1880	-3.13	3.96	28.22	21.13	129.718	Horizontal	Pass
QAM		1900	-2.99	4.00	28.16	21.17	130.918	Horizontal	Pass
1.4MHz	1/#Mid	1850.7	-3.24	3.76	28.24	21.24	133.045	Vertical	Pass
Band 16		1880	-3.06	3.91	28.22	21.25	133.352	Vertical	Pass
QAM		1909.3	-3.08	3.93	28.20	21.19	131.522	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-3.32	3.77	28.23	21.14	130.017	Vertical	Pass
Band 16		1880	-3.14	3.91	28.24	21.19	131.522	Vertical	Pass
QAM		1908.5	-3.07	3.94	28.25	21.24	133.045	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-3.38	3.77	28.31	21.16	130.617	Vertical	Pass

Band 16		1880	-3.15	3.91	28.22	21.16	130.617	Vertical	Pass
QAM		1907.5	-3.10	3.94	28.20	21.16	130.617	Vertical	Pass
10.0MHz	1/#Mid	1855	-3.36	3.79	28.33	21.18	131.220	Vertical	Pass
Band 16		1880	-2.99	3.95	28.22	21.28	134.276	Vertical	Pass
QAM		1905	-3.07	3.97	28.19	21.15	130.317	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-3.38	3.79	28.34	21.17	130.918	Vertical	Pass
Band 16		1880	-3.03	3.95	28.22	21.24	133.045	Vertical	Pass
QAM		1902.5	-3.00	3.97	28.18	21.21	132.130	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.19	3.81	28.35	21.35	136.458	Vertical	Pass
Band 16		1880	-2.95	3.96	28.22	21.31	135.207	Vertical	Pass
QAM		1900	-2.81	4.00	28.16	21.35	136.458	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-3.06	3.12	27.58	21.40	138.038	Horizontal	Pass
		1732.5	-2.88	3.27	27.61	21.46	139.959	Horizontal	Pass
		1754.3	-2.97	3.29	27.63	21.37	137.088	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.00	3.13	27.61	21.48	140.605	Horizontal	Pass
		1732.5	-2.89	3.27	27.61	21.45	139.637	Horizontal	Pass
		1753.5	-2.95	3.30	27.62	21.37	137.088	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.17	3.13	27.63	21.33	135.831	Horizontal	Pass
		1732.5	-3.00	3.27	27.61	21.34	136.144	Horizontal	Pass
		1752.5	-2.92	3.30	27.60	21.38	137.404	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.99	3.15	27.64	21.50	141.254	Horizontal	Pass
		1732.5	-2.89	3.31	27.61	21.41	138.357	Horizontal	Pass
		1750	-2.84	3.33	27.59	21.42	138.676	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.06	3.15	27.65	21.44	139.316	Horizontal	Pass
		1732.5	-2.88	3.31	27.61	21.42	138.676	Horizontal	Pass
		1747.5	-2.75	3.33	27.57	21.49	140.929	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.15	3.17	27.66	21.34	136.144	Horizontal	Pass
		1732.5	-2.93	3.32	27.61	21.36	136.773	Horizontal	Pass
		1745	-2.81	3.36	27.56	21.39	137.721	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-3.05	3.12	27.58	21.41	138.357	Vertical	Pass
		1732.5	-2.97	3.27	27.61	21.37	137.088	Vertical	Pass
		1754.3	-2.91	3.29	27.63	21.43	138.995	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.08	3.13	27.61	21.40	138.038	Vertical	Pass
		1732.5	-2.92	3.27	27.61	21.42	138.676	Vertical	Pass
		1753.5	-2.95	3.30	27.62	21.37	137.088	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.09	3.13	27.63	21.41	138.357	Vertical	Pass
		1732.5	-2.91	3.27	27.61	21.43	138.995	Vertical	Pass
		1752.5	-2.88	3.30	27.60	21.42	138.676	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.12	3.15	27.64	21.37	137.088	Vertical	Pass
		1732.5	-2.80	3.31	27.61	21.50	141.254	Vertical	Pass
		1750	-2.84	3.33	27.59	21.42	138.676	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-3.00	3.15	27.65	21.50	141.254	Vertical	Pass
		1732.5	-2.92	3.31	27.61	21.38	137.404	Vertical	Pass
		1747.5	-2.76	3.33	27.57	21.48	140.605	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.96	3.17	27.66	21.53	142.233	Vertical	Pass
		1732.5	-2.77	3.32	27.61	21.52	141.906	Vertical	Pass
		1745	-2.66	3.36	27.56	21.54	142.561	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.40	3.12	27.58	21.06	127.644	Horizontal	Pass
		1732.5	-3.25	3.27	27.61	21.09	128.529	Horizontal	Pass
		1754.3	-3.20	3.29	27.63	21.14	130.017	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.29	3.13	27.61	21.19	131.522	Horizontal	Pass
		1732.5	-3.14	3.27	27.61	21.20	131.826	Horizontal	Pass
		1753.5	-3.27	3.30	27.62	21.05	127.350	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.47	3.13	27.63	21.03	126.765	Horizontal	Pass
		1732.5	-3.21	3.27	27.61	21.13	129.718	Horizontal	Pass
		1752.5	-3.21	3.30	27.60	21.09	128.529	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.35	3.15	27.64	21.14	130.017	Horizontal	Pass
		1732.5	-3.21	3.31	27.61	21.09	128.529	Horizontal	Pass
		1750	-3.19	3.33	27.59	21.07	127.938	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.36	3.15	27.65	21.14	130.017	Horizontal	Pass
		1732.5	-3.13	3.31	27.61	21.17	130.918	Horizontal	Pass
		1747.5	-3.12	3.33	27.57	21.12	129.420	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.43	3.17	27.66	21.06	127.644	Horizontal	Pass
		1732.5	-3.16	3.32	27.61	21.13	129.718	Horizontal	Pass
		1745	-3.07	3.36	27.56	21.13	129.718	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.30	3.12	27.58	21.16	130.617	Vertical	Pass
		1732.5	-3.17	3.27	27.61	21.17	130.918	Vertical	Pass
		1754.3	-3.21	3.29	27.63	21.13	129.718	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.39	3.13	27.61	21.09	128.529	Vertical	Pass
		1732.5	-3.15	3.27	27.61	21.19	131.522	Vertical	Pass
		1753.5	-3.28	3.30	27.62	21.04	127.057	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-3.45	3.13	27.63	21.05	127.350	Vertical	Pass

Band 16 QAM		1732.5	-3.28	3.27	27.61	21.06	127.644	Vertical	Pass
		1752.5	-3.26	3.30	27.60	21.04	127.057	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.31	3.15	27.64	21.18	131.220	Vertical	Pass
		1732.5	-3.19	3.31	27.61	21.11	129.122	Vertical	Pass
		1750	-3.10	3.33	27.59	21.16	130.617	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.43	3.15	27.65	21.07	127.938	Vertical	Pass
		1732.5	-3.25	3.31	27.61	21.05	127.350	Vertical	Pass
		1747.5	-3.08	3.33	27.57	21.16	130.617	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.29	3.17	27.66	21.20	131.826	Vertical	Pass
		1732.5	-3.08	3.32	27.61	21.21	132.130	Vertical	Pass
		1745	-2.97	3.36	27.56	21.23	132.739	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.4 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Factor	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.88	4.54	27.75	21.33	135.831	Horizontal	Pass
		2535	-1.76	4.69	27.72	21.27	133.968	Horizontal	Pass
		2567.5	-1.65	4.71	27.71	21.35	136.458	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.94	4.55	27.76	21.27	133.968	Horizontal	Pass
		2535	-1.67	4.69	27.72	21.36	136.773	Horizontal	Pass
		2565	-1.66	4.72	27.70	21.32	135.519	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.00	4.55	27.77	21.22	132.434	Horizontal	Pass
		2535	-1.67	4.69	27.72	21.36	136.773	Horizontal	Pass
		2562.5	-1.60	4.72	27.69	21.37	137.088	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.89	4.57	27.78	21.32	135.519	Horizontal	Pass
		2535	-1.64	4.73	27.72	21.35	136.458	Horizontal	Pass
		2560	-1.62	4.75	27.68	21.31	135.207	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.91	4.54	27.75	21.30	134.896	Vertical	Pass
		2535	-1.65	4.69	27.72	21.38	137.404	Vertical	Pass
		2567.5	-1.75	4.71	27.71	21.25	133.352	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.90	4.55	27.76	21.31	135.207	Vertical	Pass
		2535	-1.70	4.69	27.72	21.33	135.831	Vertical	Pass
		2565	-1.62	4.72	27.70	21.36	136.773	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.90	4.55	27.77	21.32	135.519	Vertical	Pass
		2535	-1.79	4.69	27.72	21.24	133.045	Vertical	Pass
		2562.5	-1.69	4.72	27.69	21.28	134.276	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.76	4.57	27.78	21.45	139.637	Vertical	Pass
		2535	-1.54	4.73	27.72	21.45	139.637	Vertical	Pass
		2560	-1.52	4.75	27.68	21.41	138.357	Vertical	Pass

Radiated Power (EIRP) for Band 7											
Mode	RB/RB SIZE	Frequency	Result						Conclusion		
			SG Level	Cable Loss	Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP			
						(dBm)	(dBm)			Average	Average
										(dBm)	(mW)
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.43	4.54	27.75	20.78	119.674	Horizontal	Pass		
		2535	-2.24	4.69	27.72	20.79	119.950	Horizontal	Pass		
		2567.5	-2.31	4.71	27.71	20.69	117.220	Horizontal	Pass		
10.0MHz Band 16 QAM	1/#Mid	2505	-2.49	4.55	27.76	20.72	118.032	Horizontal	Pass		
		2535	-2.35	4.69	27.72	20.68	116.950	Horizontal	Pass		
		2565	-2.25	4.72	27.70	20.73	118.304	Horizontal	Pass		
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.53	4.55	27.77	20.69	117.220	Horizontal	Pass		
		2535	-2.24	4.69	27.72	20.79	119.950	Horizontal	Pass		
		2562.5	-2.25	4.72	27.69	20.72	118.032	Horizontal	Pass		
20.0MHz Band 16 QAM	1/#Mid	2510	-2.54	4.57	27.78	20.67	116.681	Horizontal	Pass		
		2535	-2.32	4.73	27.72	20.67	116.681	Horizontal	Pass		
		2560	-2.28	4.75	27.68	20.65	116.145	Horizontal	Pass		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.50	4.54	27.75	20.71	117.761	Vertical	Pass		
		2535	-2.30	4.69	27.72	20.73	118.304	Vertical	Pass		
		2567.5	-2.27	4.71	27.71	20.73	118.304	Vertical	Pass		
10.0MHz Band 16 QAM	1/#Mid	2505	-2.56	4.55	27.76	20.65	116.145	Vertical	Pass		
		2535	-2.34	4.69	27.72	20.69	117.220	Vertical	Pass		
		2565	-2.33	4.72	27.70	20.65	116.145	Vertical	Pass		
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.57	4.55	27.77	20.65	116.145	Vertical	Pass		
		2535	-2.27	4.69	27.72	20.76	119.124	Vertical	Pass		
		2562.5	-2.32	4.72	27.69	20.65	116.145	Vertical	Pass		
20.0MHz Band 16 QAM	1/#Mid	2510	-2.40	4.57	27.78	20.81	120.504	Vertical	Pass		
		2535	-2.14	4.73	27.72	20.85	121.619	Vertical	Pass		
		2560	-2.12	4.75	27.68	20.81	120.504	Vertical	Pass		

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Factor (dB)+ SG Level (dBm)- Cable Loss(dBm)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

LIMIT

§22.917 (e) and §24.238 and §90.691 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

Band 2/4/7

RESULTS

PASS

9.1 LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-46.07	4.04	33.51	-16.60	-13	-3.60	Horizontal
3701.4	-48.13	4.04	33.51	-18.66	-13	-5.66	Vertical
5552.1	-47.00	5.24	35.84	-16.40	-13	-3.40	Vertical
5552.1	-52.26	5.24	35.84	-21.66	-13	-8.66	Horizontal
196.7	-41.42	1.43	16.02	-26.83	-13	-13.83	Vertical
422.2	-39.32	1.30	17.99	-22.63	-13	-9.63	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.01	4.04	33.56	-20.49	-13	-7.49	Horizontal
3760.0	-44.48	4.04	33.56	-14.96	-13	-1.96	Vertical
5640.0	-48.59	5.24	35.91	-17.92	-13	-4.92	Vertical
5640.0	-50.82	5.24	35.91	-20.15	-13	-7.15	Horizontal
176.3	-42.32	1.62	16.97	-26.97	-13	-13.97	Vertical
404.6	-39.96	1.74	15.98	-25.73	-13	-12.73	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.72	4.04	34.00	-22.76	-13	-9.76	Horizontal
3818.6	-46.57	4.04	34.00	-16.61	-13	-3.61	Vertical
5727.9	-49.04	5.24	36.04	-18.24	-13	-5.24	Vertical
5727.9	-49.05	5.24	36.04	-18.25	-13	-5.25	Horizontal
191.8	-39.74	1.42	17.29	-23.87	-13	-10.87	Vertical
402.7	-42.05	1.50	17.90	-25.64	-13	-12.64	Horizontal

QPSK EIRP POWER FOR LTE BAND 2 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-44.44	4.07	33.54	-14.97	-13	-1.97	Horizontal
3720.0	-47.83	4.07	33.54	-18.36	-13	-5.36	Vertical
5580.0	-45.20	5.28	35.86	-14.62	-13	-1.62	Vertical
5580.0	-49.59	5.28	35.86	-19.01	-13	-6.01	Horizontal
202.5	-36.87	1.58	16.89	-21.55	-13	-8.55	Vertical
460.7	-39.45	1.76	17.26	-23.95	-13	-10.95	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.82	4.04	33.56	-21.30	-13	-8.30	Horizontal
3760.0	-49.22	4.04	33.56	-19.70	-13	-6.70	Vertical
5640.0	-46.74	5.24	35.91	-16.07	-13	-3.07	Vertical
5640.0	-50.51	5.24	35.91	-19.84	-13	-6.84	Horizontal
181.5	-40.90	1.46	16.27	-26.09	-13	-13.09	Vertical
332.9	-39.39	1.59	15.15	-25.83	-13	-12.83	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-52.47	4.04	34.00	-22.51	-13	-9.51	Horizontal
3800.0	-50.81	4.04	34.00	-20.85	-13	-7.85	Vertical
5700.0	-47.91	5.24	36.04	-17.11	-13	-4.11	Vertical
5700.0	-51.73	5.24	36.04	-20.93	-13	-7.93	Horizontal
198.8	-42.26	1.36	17.39	-26.22	-13	-13.22	Vertical
364.4	-42.62	1.66	15.39	-28.89	-13	-15.89	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

. Over Limit= : P_{Mea}(dBm)-Limit(dBm)

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-46.31	4.02	29.80	-20.53	-13	-7.53	Horizontal
3421.4	-51.11	4.02	29.80	-25.33	-13	-12.33	Vertical
5132.1	-50.23	5.24	35.84	-19.63	-13	-6.63	Vertical
5132.1	-49.16	5.24	35.84	-18.56	-13	-5.56	Horizontal
199.7	-38.68	1.68	16.04	-24.32	-13	-11.32	Vertical
356.4	-44.18	1.78	17.74	-28.22	-13	-15.22	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.76	4.03	30.00	-19.79	-13	-6.79	Horizontal
3465.0	-53.40	4.03	30.00	-27.43	-13	-14.43	Vertical
5197.5	-51.55	5.25	35.86	-20.94	-13	-7.94	Vertical
5197.5	-50.63	5.25	35.86	-20.02	-13	-7.02	Horizontal
177.5	-36.26	1.72	17.69	-20.29	-13	-7.29	Vertical
259.6	-34.33	1.62	16.02	-19.92	-13	-6.92	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-48.77	4.05	30.01	-22.81	-13	-9.81	Horizontal
3508.6	-44.15	4.05	30.01	-18.19	-13	-5.19	Vertical
5262.9	-47.90	5.26	35.86	-17.30	-13	-4.30	Vertical
5262.9	-49.96	5.26	35.86	-19.36	-13	-6.36	Horizontal
192.0	-38.71	1.80	16.69	-23.82	-13	-10.82	Vertical
424.4	-37.34	1.75	16.66	-22.44	-13	-9.44	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-46.35	4.02	29.80	-20.57	-13	-7.57	Horizontal
3440.0	-52.50	4.02	29.80	-26.72	-13	-13.72	Vertical
5160.0	-47.31	5.24	35.84	-16.71	-13	-3.71	Vertical
5160.0	-53.27	5.24	35.84	-22.67	-13	-9.67	Horizontal
180.2	-35.70	1.57	17.26	-20.01	-13	-7.01	Vertical
235.0	-35.76	1.78	16.35	-21.19	-13	-8.19	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.19	4.03	30.00	-21.22	-13	-8.22	Horizontal
3465.0	-46.11	4.03	30.00	-20.14	-13	-7.14	Vertical
5197.5	-44.76	5.25	35.86	-14.15	-13	-1.15	Vertical
5197.5	-52.55	5.25	35.86	-21.94	-13	-8.94	Horizontal
182.8	-43.47	1.44	17.95	-26.96	-13	-13.96	Vertical
333.9	-35.41	1.65	16.09	-20.97	-13	-7.97	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-52.24	4.05	27.68	-28.61	-13	-15.61	Horizontal
3490.0	-51.57	4.05	27.68	-27.94	-13	-14.94	Vertical
5235.0	-49.57	5.26	35.86	-18.97	-13	-5.97	Vertical
5235.0	-51.95	5.26	35.86	-21.35	-13	-8.35	Horizontal
207.6	-35.82	1.61	16.85	-20.58	-13	-7.58	Vertical
282.0	-38.98	1.61	15.19	-25.40	-13	-12.40	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

. Over Limit= : P_{Mea}(dBm)-Limit(dBm)

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.3 LTE BAND 7

QPSK EIRP POWER FOR LTE BAND 7 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-59.14	5.23	35.81	-28.56	-25	-3.56	Horizontal
5005.0	-61.94	5.23	35.81	-31.36	-25	-6.36	Vertical
7507.5	-64.34	5.67	36.85	-33.16	-25	-8.16	Vertical
7507.5	-60.97	5.67	36.85	-29.79	-25	-4.79	Horizontal
193.8	-54.46	1.73	17.97	-38.22	-25	-13.22	Vertical
399.5	-52.02	1.38	15.11	-38.29	-25	-13.29	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.39	5.23	35.82	-29.80	-25	-4.80	Horizontal
5070.0	-63.10	5.23	35.82	-32.51	-25	-7.51	Vertical
7605.0	-64.16	5.67	36.85	-32.98	-25	-7.98	Vertical
7605.0	-60.11	5.67	36.85	-28.93	-25	-3.93	Horizontal
186.7	-49.96	1.77	16.17	-35.55	-25	-10.55	Vertical
363.3	-53.98	1.63	15.21	-40.40	-25	-15.40	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-59.09	5.24	35.83	-28.50	-25	-3.50	Horizontal
5135.0	-64.08	5.24	35.83	-33.49	-25	-8.49	Vertical
7702.5	-60.02	5.68	36.87	-28.83	-25	-3.83	Vertical
7702.5	-64.88	5.68	36.87	-33.69	-25	-8.69	Horizontal
198.2	-51.44	1.58	17.56	-35.46	-25	-10.46	Vertical
349.2	-45.95	1.45	16.58	-30.82	-25	-5.82	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-60.02	5.23	35.82	-29.43	-25	-4.43	Horizontal
5020.0	-62.25	5.23	35.82	-31.66	-25	-6.66	Vertical
7530.0	-62.38	5.67	36.86	-31.19	-25	-6.19	Vertical
7530.0	-64.02	5.67	36.86	-32.83	-25	-7.83	Horizontal
184.8	-49.02	1.63	15.76	-34.89	-25	-9.89	Vertical
350.6	-50.61	1.71	15.44	-36.88	-25	-11.88	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.78	5.23	35.82	-31.19	-25	-6.19	Horizontal
5070.0	-64.09	5.23	35.82	-33.50	-25	-8.50	Vertical
7605.0	-59.80	5.67	36.85	-28.62	-25	-3.62	Vertical
7605.0	-59.95	5.67	36.85	-28.77	-25	-3.77	Horizontal
200.8	-54.00	1.79	16.84	-38.94	-25	-13.94	Vertical
329.5	-53.57	1.71	17.64	-37.64	-25	-12.64	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.01	5.24	35.83	-32.42	-25	-7.42	Horizontal
5120.0	-64.82	5.24	35.83	-34.23	-25	-9.23	Vertical
7680.0	-63.33	5.70	36.88	-32.15	-25	-7.15	Vertical
7680.0	-64.00	5.70	36.88	-32.82	-25	-7.82	Horizontal
190.5	-46.43	1.79	16.84	-31.37	-25	-6.37	Vertical
284.9	-49.30	1.71	17.64	-33.37	-25	-8.37	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54,

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- ☐ Temp. = -30° to $+50^{\circ}\text{C}$
- ☐ Voltage = low voltage, DC 3.3V, Normal, DC 3.8V and High voltage, DC 4.37V.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to -30°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

LTE Band 2/4/7

RESULTS

See the following pages.

10.1 LTE BAND 2

Band 2 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	1880	13.2	0.006995	2.5
3.8	1880	14.1	0.007496	2.5
4.37	1880	13.3	0.007069	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.7	0.006750	2.5
Extreme (50C)	1880	11.9	0.006355	2.5
Extreme (40C)	1880	14.2	0.007548	2.5
Extreme (30C)	1880	13.8	0.007351	2.5
Extreme (10C)	1880	14.0	0.007470	2.5
Extreme (0C)	1880	12.1	0.006462	2.5
Extreme (-10C)	1880	12.9	0.006866	2.5
Extreme (-20C)	1880	14.2	0.007565	2.5
Extreme (-30C)	1880	15.1	0.008014	2.5

Band 2 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	1880	10.1	0.005366	2.5
3.8	1880	8.9	0.004739	2.5
4.37	1880	8.5	0.004544	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.9	0.005242	2.5
Extreme (50C)	1880	9.3	0.004965	2.5
Extreme (40C)	1880	7.6	0.004060668	2.5
Extreme (30C)	1880	9.4	0.004996989	2.5
Extreme (10C)	1880	8.7	0.004640909	2.5
Extreme (0C)	1880	8.1	0.004282082	2.5
Extreme (-10C)	1880	9.2	0.004890595	2.5
Extreme (-20C)	1880	8.9	0.004753046	2.5
Extreme (-30C)	1880	8.2	0.004351302	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.2 LTE BAND 4

Band 4 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	1732.5	8.3	0.004807	2.5
3.8	1732.5	9.3	0.005342	2.5
4.37	1732.5	8.9	0.005110	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.4	0.004864	2.5
Extreme (50C)	1732.5	8.5	0.004889	2.5
Extreme (40C)	1732.5	7.8	0.004507	2.5
Extreme (30C)	1732.5	5.6	0.003209	2.5
Extreme (10C)	1732.5	7.2	0.004137	2.5
Extreme (0C)	1732.5	9.3	0.005387	2.5
Extreme (-10C)	1732.5	8.5	0.004881	2.5
Extreme (-20C)	1732.5	7.1	0.004126	2.5
Extreme (-30C)	1732.5	8.0	0.004601	2.5

Band 4 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	1732.5	10.0	0.005748	2.5
3.8	1732.5	9.2	0.005311	2.5
4.37	1732.5	8.0	0.004636	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.1	0.005836	2.5
Extreme (50C)	1732.5	9.2	0.005287	2.5
Extreme (40C)	1732.5	8.5	0.004889	2.5
Extreme (30C)	1732.5	9.3	0.005348	2.5
Extreme (10C)	1732.5	8.8	0.005085	2.5
Extreme (0C)	1732.5	7.7	0.004418	2.5
Extreme (-10C)	1732.5	8.6	0.004949	2.5
Extreme (-20C)	1732.5	8.8	0.005067	2.5
Extreme (-30C)	1732.5	8.2	0.004732	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.43 LTE BAND 7

Band 7 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	2535	10.1	0.003989	2.5
3.8	2535	8.5	0.003360	2.5
4.37	2535	8.5	0.003366	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.7	0.003842	2.5
Extreme (50C)	2535	9.0	0.003569	2.5
Extreme (40C)	2535	8.6	0.003411	2.5
Extreme (30C)	2535	8.6	0.003409	2.5
Extreme (10C)	2535	8.6	0.003374	2.5
Extreme (0C)	2535	7.9	0.003121	2.5
Extreme (-10C)	2535	9.9	0.003902	2.5
Extreme (-20C)	2535	8.5	0.003339	2.5
Extreme (-30C)	2535	8.4	0.003317	2.5

Band 7 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.23	2535	6.9	0.002722	2.5
3.8	2535	6.1	0.002396	2.5
4.37	2535	5.4	0.002148	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.8	0.002272	2.5
Extreme (40C)	2535	5.1	0.002005	2.5
Extreme (30C)	2535	6.7	0.002645	2.5
Extreme (10C)	2535	5.6	0.002190	2.5
Extreme (0C)	2535	4.8	0.001893	2.5
Extreme (-10C)	2535	5.7	0.002244	2.5
Extreme (-20C)	2535	5.6	0.002213	2.5
Extreme (-30C)	2535	5.3	0.002090	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

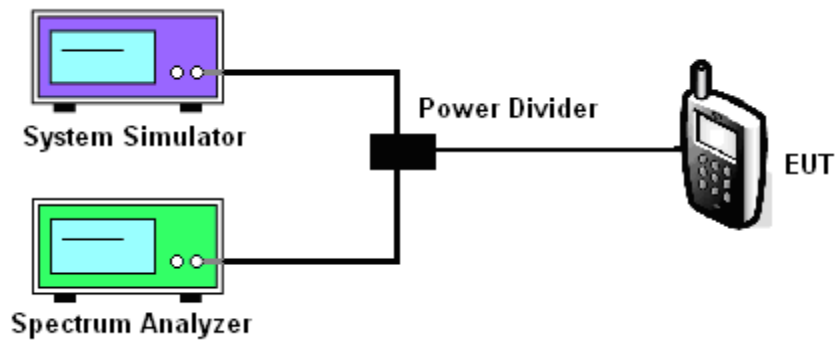
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For LTE operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



MODES TESTED

LTE Band 2/4/7

Test data reference attachment.

-----END OF REPORT-----