

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID:2AOKUHYPER7PRO

Product: Smartphone

Trade Mark: HOTWAV

Model Number: Hyper 7 Pro

Family Model: Hyper 7S, Hyper 7E, Hyper 7, Hyper 7 Plus,
Hyper 7 Pro+, Hyper 7 Ultra, Hyper 8S, Hyper
8E, Hyper 8, Hyper 8 Plus, Hyper 8 Pro+,
Hyper 8 Ultra

Report No.: S24042202607006

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name..... : SHENZHEN TUGAO INTELLIGENT CO.,LTD
Address : 8th Floor, Bldg A, Jinggang Science&Technology Park, Fuyong,
 Bao'an District, Shenzhen, China
Manufacturer's Name..... : SHENZHEN TUGAO INTELLIGENT CO.,LTD
Address : 8th Floor, Bldg A, Jinggang Science&Technology Park, Fuyong,
 Bao'an District, Shenzhen, China
Product name : Smartphone
Model and/or type reference : Hyper 7 Pro
Family Model: Hyper 7S, Hyper 7E, Hyper 7, Hyper 7 Plus, Hyper 7 Pro+, Hyper 7
 Ultra, Hyper 8S, Hyper 8E, Hyper 8, Hyper 8 Plus, Hyper 8 Pro+,
 Hyper 8 Ultra
Test sample number : S240422026007
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 May 13, 2024 ~ Jun 12, 2024

Date of Issue Jun 12, 2024

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

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smartphone
Trade Mark	HOTWAV
Model Name	Hyper 7 Pro
Family Model	Hyper 7S, Hyper 7E, Hyper 7, Hyper 7 Plus, Hyper 7 Pro+, Hyper 7 Ultra, Hyper 8S, Hyper 8E, Hyper 8, Hyper 8 Plus, Hyper 8 Pro+, Hyper 8 Ultra
Model Difference	All the model are the same circuit and RF module, except the model names.
FCC ID:	2AOKUHYPER7PRO
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 7, 66
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 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz;; LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM
Antenna:	LDS Antenna
Antenna gain:	Band2:1.65 dBi; Band4:1.88 dBi; Band5:-0.65 dBi; Band7:2.57 dBi; Band66:2.2dBi;
Adapter	Model: HJ-C6-33-US Input:100-240V~50/60Hz 0.8A Output:(PD) 5.0V--- 3.0A 15.0W or 9.0V---3.0A 27.0W or 12.0V---2.5A 30.0W or 15.0V--- 2.0A 30.0W or 20.0V---1.5A 30.0W (PPS)3.3V-11.0V---3.0A(33.0W MAX)
Battery	DC 3.87V, 10800mAh, 41.796Wh
Power supply	DC 3.87V from battery or DC 5V from adapter
Extreme Vol. Limits:	DC 3.29V to DC 4.45V (Nominal DC 3.87V) (Note 1)
HW Version	N/A

SW Version	N/A
** Note1: The High Voltage 4.45V and Low Voltage 3.29V 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: 2AOKUHYPER7PRO** 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,

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% ($U = 2Uc(y)$)	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, Band 4, Band 5, Band 7, Band 66

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

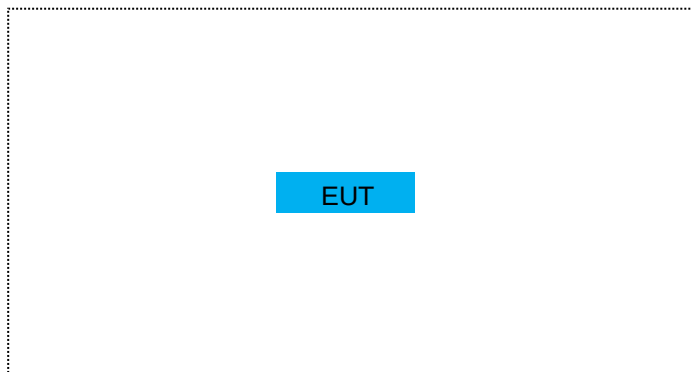
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smartphone	Hyper 7 Pro	FCC ID: 2AOKUHYPER7PRO	EUT

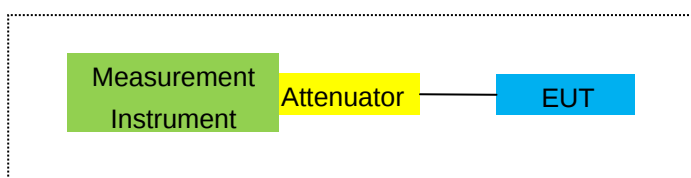
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

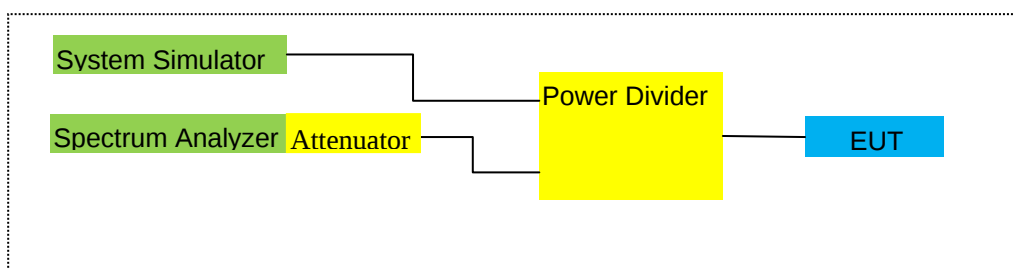
For Radiated Test Cases



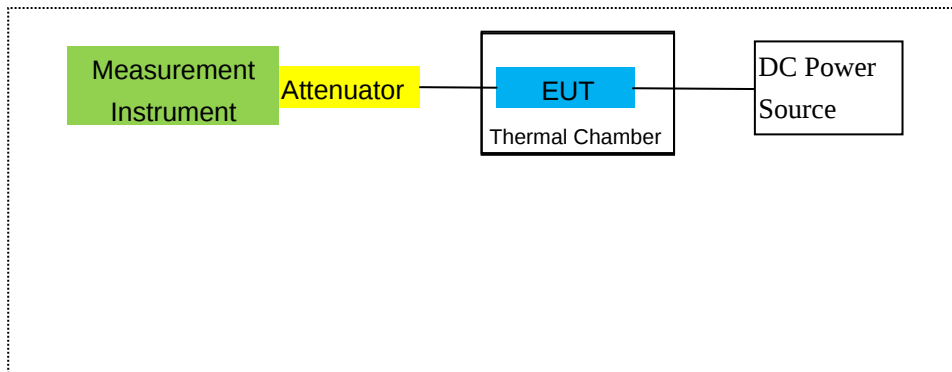
For Conducted Output Power



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	2024.04.26	2025.04.25	1 year
2	Test Receiver	R&S	ESPI	101318	2024.03.12	2025.03.11	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	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	2024.05.12	2027.05.11	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2024.04.26	2025.04.25	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2024.04.26	2025.04.25	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.03.12	2025.03.11	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	2024.03.12	2025.03.11	1 year
15	LISN	R&S	ENV216	101313	2024.03.12	2025.03.11	1 year
16	LISN	EMCO	3816/2	00042990	2024.03.12	2025.03.11	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	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	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2023.05.06	2026.05.05	3 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2024.04.25	2025.04.24	1 year
29	Communication Tester	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year

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

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

FCC: §2.1046, §22.913, §24.232

LIMITS

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

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 display line

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

MODES TESTED

- ☐ LTE Band2/4/5/7/66

RESULTS

Test data reference attachment.

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

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

LIMITS

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

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

MODES TESTED

- ☐ LTE Band 2/4/5/7/66

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.

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

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913(a)(2), §24.232(c) and §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.

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 in the 2500–2570 MHz and 2620–2690 MHz bands. 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

☐ LTE Band 2/4/5/7/66

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)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.81	3.76	28.24	20.67	116.681	Horizontal	Pass
		1880	-3.62	3.91	28.22	20.69	117.220	Horizontal	Pass
		1909.3	-3.53	3.93	28.20	20.74	118.577	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.87	3.77	28.23	20.59	114.551	Horizontal	Pass
		1880	-3.72	3.91	28.24	20.61	115.080	Horizontal	Pass
		1908.5	-3.59	3.94	28.25	20.72	118.032	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.76	3.77	28.31	20.78	119.674	Horizontal	Pass
		1880	-3.38	3.91	28.22	20.93	123.880	Horizontal	Pass
		1907.5	-3.31	3.94	28.20	20.95	124.451	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-3.62	3.79	28.33	20.92	123.595	Horizontal	Pass
		1880	-3.32	3.95	28.22	20.95	124.451	Horizontal	Pass
		1905	-3.21	3.97	28.19	21.01	126.183	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-3.58	3.79	28.34	20.97	125.026	Horizontal	Pass
		1880	-3.37	3.95	28.22	20.90	123.027	Horizontal	Pass
		1902.5	-3.23	3.97	28.18	20.98	125.314	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-3.57	3.81	28.35	20.97	125.026	Horizontal	Pass
		1880	-3.24	3.96	28.22	21.02	126.474	Horizontal	Pass
		1900	-3.18	4.00	28.16	20.98	125.314	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-5.04	3.76	28.24	19.44	87.902	Vertical	Pass
		1880	-4.68	3.91	28.22	19.63	91.833	Vertical	Pass
		1909.3	-4.06	3.93	28.20	20.21	104.954	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-4.17	3.77	28.23	20.29	106.905	Vertical	Pass
		1880	-4.65	3.91	28.24	19.68	92.897	Vertical	Pass
		1908.5	-4.43	3.94	28.25	19.88	97.275	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-5.05	3.77	28.31	19.49	88.920	Vertical	Pass
		1880	-4.61	3.91	28.22	19.70	93.325	Vertical	Pass
		1907.5	-3.95	3.94	28.20	20.31	107.399	Vertical	Pass
10.0MHz Band	1/#Mid	1855	-4.47	3.79	28.33	20.07	101.625	Vertical	Pass
		1880	-4.31	3.95	28.22	19.96	99.083	Vertical	Pass

QPSK		1905	-4.11	3.97	28.19	20.11	102.565	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-5.15	3.79	28.34	19.40	87.096	Vertical	Pass
Band		1880	-4.09	3.95	28.22	20.18	104.232	Vertical	Pass
QPSK		1902.5	-3.91	3.97	28.18	20.30	107.152	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.24	3.81	28.35	20.30	107.152	Vertical	Pass
Band		1880	-4.83	3.96	28.22	19.43	87.700	Vertical	Pass
QPSK		1900	-4.40	4.00	28.16	19.76	94.624	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.93	3.76	28.24	19.55	90.157	Horizontal	Pass
		1880	-4.40	3.91	28.22	19.91	97.949	Horizontal	Pass
		1909.3	-4.33	3.93	28.20	19.94	98.628	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.43	3.77	28.23	20.03	100.693	Horizontal	Pass
		1880	-4.51	3.91	28.24	19.82	95.940	Horizontal	Pass
		1908.5	-4.72	3.94	28.25	19.59	90.991	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.37	3.77	28.31	20.17	103.992	Horizontal	Pass
		1880	-4.28	3.91	28.22	20.03	100.693	Horizontal	Pass
		1907.5	-3.96	3.94	28.20	20.30	107.152	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.42	3.79	28.33	20.12	102.802	Horizontal	Pass
		1880	-4.41	3.95	28.22	19.86	96.828	Horizontal	Pass
		1905	-3.88	3.97	28.19	20.34	108.143	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.40	3.79	28.34	20.15	103.514	Horizontal	Pass
		1880	-4.19	3.95	28.22	20.08	101.859	Horizontal	Pass
		1902.5	-4.15	3.97	28.18	20.06	101.391	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-4.29	3.81	28.35	20.25	105.925	Horizontal	Pass
		1880	-3.99	3.96	28.22	20.27	106.414	Horizontal	Pass
		1900	-3.81	4.00	28.16	20.35	108.393	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-5.42	3.76	28.24	19.06	80.538	Vertical	Pass
		1880	-5.62	3.91	28.22	18.69	73.961	Vertical	Pass
		1909.3	-4.89	3.93	28.20	19.38	86.696	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-6.06	3.77	28.23	18.40	69.183	Vertical	Pass
		1880	-5.90	3.91	28.24	18.43	69.663	Vertical	Pass
		1908.5	-5.62	3.94	28.25	18.69	73.961	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-5.21	3.77	28.31	19.33	85.704	Vertical	Pass
		1880	-5.14	3.91	28.22	19.17	82.604	Vertical	Pass
		1907.5	-5.09	3.94	28.20	19.17	82.604	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-6.05	3.79	28.33	18.49	70.632	Vertical	Pass
		1880	-5.35	3.95	28.22	18.92	77.983	Vertical	Pass
		1905	-5.31	3.97	28.19	18.91	77.804	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-5.19	3.79	28.34	19.36	86.298	Vertical	Pass
		1880	-5.65	3.95	28.22	18.62	72.778	Vertical	Pass
		1902.5	-5.64	3.97	28.18	18.57	71.945	Vertical	Pass

20.0MHz	1/#Mid	1860	-5.41	3.81	28.35	19.13	81.846	Vertical	Pass
Band 16		1880	-5.79	3.96	28.22	18.47	70.307	Vertical	Pass
QAM		1900	-5.17	4.00	28.16	18.99	79.250	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-3.72	3.12	27.58	20.74	118.577	Horizontal	Pass
		1732.5	-3.71	3.27	27.61	20.63	115.611	Horizontal	Pass
		1754.3	-3.69	3.29	27.63	20.65	116.145	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.89	3.13	27.61	20.59	114.551	Horizontal	Pass
		1732.5	-3.81	3.27	27.61	20.53	112.980	Horizontal	Pass
		1753.5	-3.73	3.30	27.62	20.59	114.551	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.66	3.13	27.63	20.84	121.339	Horizontal	Pass
		1732.5	-3.56	3.27	27.61	20.78	119.674	Horizontal	Pass
		1752.5	-3.44	3.30	27.60	20.86	121.899	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.60	3.15	27.64	20.89	122.744	Horizontal	Pass
		1732.5	-3.37	3.31	27.61	20.93	123.880	Horizontal	Pass
		1750	-3.39	3.33	27.59	20.87	122.180	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.61	3.15	27.65	20.89	122.744	Horizontal	Pass
		1732.5	-3.45	3.31	27.61	20.85	121.619	Horizontal	Pass
		1747.5	-3.39	3.33	27.57	20.85	121.619	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.55	3.17	27.66	20.94	124.165	Horizontal	Pass
		1732.5	-3.38	3.32	27.61	20.91	123.310	Horizontal	Pass
		1745	-3.32	3.36	27.56	20.88	122.462	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.69	3.12	27.58	19.77	94.842	Vertical	Pass
		1732.5	-3.96	3.27	27.61	20.38	109.144	Vertical	Pass
		1754.3	-4.70	3.29	27.63	19.64	92.045	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.49	3.13	27.61	19.99	99.770	Vertical	Pass
		1732.5	-4.68	3.27	27.61	19.66	92.470	Vertical	Pass
		1753.5	-4.58	3.30	27.62	19.74	94.189	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.91	3.13	27.63	19.59	90.991	Vertical	Pass
		1732.5	-3.96	3.27	27.61	20.38	109.144	Vertical	Pass
		1752.5	-4.43	3.30	27.60	19.87	97.051	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.99	3.15	27.64	19.50	89.125	Vertical	Pass
		1732.5	-4.17	3.31	27.61	20.13	103.039	Vertical	Pass
		1750	-4.60	3.33	27.59	19.66	92.470	Vertical	Pass

15.0MHz	Band QPSK	1/#Mid	1717.5	-4.62	3.15	27.65	19.88	97.275	Vertical	Pass
			1732.5	-4.74	3.31	27.61	19.56	90.365	Vertical	Pass
			1747.5	-4.28	3.33	27.57	19.96	99.083	Vertical	Pass
20.0MHz	Band QPSK	1/#Mid	1720	-4.70	3.17	27.66	19.79	95.280	Vertical	Pass
			1732.5	-4.18	3.32	27.61	20.11	102.565	Vertical	Pass
			1745	-4.39	3.36	27.56	19.81	95.719	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.53	3.12	27.58	19.93	98.401	Horizontal	Pass
		1732.5	-4.38	3.27	27.61	19.96	99.083	Horizontal	Pass
		1754.3	-4.38	3.29	27.63	19.96	99.083	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.47	3.13	27.61	20.01	100.231	Horizontal	Pass
		1732.5	-4.60	3.27	27.61	19.74	94.189	Horizontal	Pass
		1753.5	-4.82	3.30	27.62	19.50	89.125	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.30	3.13	27.63	20.20	104.713	Horizontal	Pass
		1732.5	-4.26	3.27	27.61	20.08	101.859	Horizontal	Pass
		1752.5	-3.95	3.30	27.60	20.35	108.393	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.37	3.15	27.64	20.12	102.802	Horizontal	Pass
		1732.5	-4.56	3.31	27.61	19.74	94.189	Horizontal	Pass
		1750	-3.94	3.33	27.59	20.32	107.647	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.17	3.15	27.65	20.33	107.895	Horizontal	Pass
		1732.5	-4.23	3.31	27.61	20.07	101.625	Horizontal	Pass
		1747.5	-4.25	3.33	27.57	19.99	99.770	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-4.12	3.17	27.66	20.37	108.893	Horizontal	Pass
		1732.5	-4.13	3.32	27.61	20.16	103.753	Horizontal	Pass
		1745	-3.94	3.36	27.56	20.26	106.170	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.36	3.12	27.58	19.10	81.283	Vertical	Pass
		1732.5	-5.48	3.27	27.61	18.86	76.913	Vertical	Pass
		1754.3	-5.85	3.29	27.63	18.49	70.632	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.91	3.13	27.61	18.57	71.945	Vertical	Pass
		1732.5	-5.07	3.27	27.61	19.27	84.528	Vertical	Pass
		1753.5	-5.75	3.30	27.62	18.57	71.945	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.21	3.13	27.63	19.29	84.918	Vertical	Pass
		1732.5	-5.27	3.27	27.61	19.07	80.724	Vertical	Pass
		1752.5	-5.46	3.30	27.60	18.84	76.560	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.70	3.15	27.64	18.79	75.683	Vertical	Pass
		1732.5	-5.83	3.31	27.61	18.47	70.307	Vertical	Pass
		1750	-5.24	3.33	27.59	19.02	79.799	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-5.72	3.15	27.65	18.78	75.509	Vertical	Pass
		1732.5	-5.79	3.31	27.61	18.51	70.958	Vertical	Pass
		1747.5	-5.32	3.33	27.57	18.92	77.983	Vertical	Pass

20.0MHz	1/#Mid	1720	-5.33	3.17	27.66	19.16	82.414	Vertical	Pass
Band 16		1732.5	-5.78	3.32	27.61	18.51	70.958	Vertical	Pass
QAM		1745	-5.49	3.36	27.56	18.71	74.302	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	Correction	Average	Average	ERP	
						(dB)	(dBm)	(mW)		
1.4MHz Band QPSK	3/#Mid	824.7	5.58	2.01	19.68	2.15	21.10	128.825	Horizontal	Pass
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass
		848.3	5.26	2.02	19.82	2.15	20.91	123.310	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	5.35	2.01	19.70	2.15	20.89	122.744	Horizontal	Pass
		836.5	5.25	2.01	19.77	2.15	20.86	121.899	Horizontal	Pass
		847.5	5.12	2.02	19.81	2.15	20.76	119.124	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	5.63	2.01	19.71	2.15	21.18	131.220	Horizontal	Pass
		836.5	5.51	2.01	19.77	2.15	21.12	129.420	Horizontal	Pass
		846.5	5.35	2.02	19.79	2.15	20.97	125.026	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	5.65	2.01	19.73	2.15	21.22	132.434	Horizontal	Pass
		836.5	5.60	2.01	19.77	2.15	21.21	132.130	Horizontal	Pass
		844	5.50	2.02	19.78	2.15	21.11	129.122	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	4.08	2.01	19.68	2.15	19.60	91.201	Vertical	Pass
		836.5	4.19	2.01	19.77	2.15	19.80	95.499	Vertical	Pass
		848.3	4.37	2.02	19.82	2.15	20.02	100.462	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	3.93	2.01	19.70	2.15	19.47	88.512	Vertical	Pass
		836.5	4.35	2.01	19.77	2.15	19.96	99.083	Vertical	Pass
		847.5	3.83	2.02	19.81	2.15	19.47	88.512	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	4.46	2.01	19.71	2.15	20.01	100.231	Vertical	Pass
		836.5	4.38	2.01	19.77	2.15	19.99	99.770	Vertical	Pass
		846.5	3.78	2.02	19.79	2.15	19.40	87.096	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	4.56	2.01	19.73	2.15	20.13	103.039	Vertical	Pass
		836.5	4.43	2.01	19.77	2.15	20.04	100.925	Vertical	Pass
		844	4.04	2.02	19.78	2.15	19.65	92.257	Vertical	Pass

Radiated Power (ERP) for Band 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Factor	Correction	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
							(dBm)	(mW)		
1.4MHz Band 16 QAM	3/#Mid	824.7	4.73	2.01	19.68	2.15	20.25	105.925	Horizontal	Pass
		836.5	4.66	2.01	19.77	2.15	20.27	106.414	Horizontal	Pass
		848.3	4.50	2.02	19.82	2.15	20.15	103.514	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	4.81	2.01	19.70	2.15	20.35	108.393	Horizontal	Pass
		836.5	4.52	2.01	19.77	2.15	20.13	103.039	Horizontal	Pass
		847.5	4.00	2.02	19.81	2.15	19.64	92.045	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.13	2.01	19.71	2.15	20.68	116.950	Horizontal	Pass
		836.5	4.90	2.01	19.77	2.15	20.51	112.460	Horizontal	Pass
		846.5	4.65	2.02	19.79	2.15	20.27	106.414	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.13	2.01	19.73	2.15	20.70	117.490	Horizontal	Pass
		836.5	4.85	2.01	19.77	2.15	20.46	111.173	Horizontal	Pass
		844	4.39	2.02	19.78	2.15	20.00	100.000	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	4.41	2.01	19.68	2.15	19.93	98.401	Vertical	Pass
		836.5	2.94	2.01	19.77	2.15	18.55	71.614	Vertical	Pass
		848.3	2.83	2.02	19.82	2.15	18.48	70.469	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	4.50	2.01	19.70	2.15	20.04	100.925	Vertical	Pass
		836.5	4.17	2.01	19.77	2.15	19.78	95.060	Vertical	Pass
		847.5	4.53	2.02	19.81	2.15	20.17	103.992	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	4.76	2.01	19.71	2.15	20.31	107.399	Vertical	Pass
		836.5	3.11	2.01	19.77	2.15	18.72	74.473	Vertical	Pass
		846.5	3.31	2.02	19.79	2.15	18.93	78.163	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	3.38	2.01	19.73	2.15	18.95	78.524	Vertical	Pass
		836.5	3.19	2.01	19.77	2.15	18.80	75.858	Vertical	Pass
		844	4.45	2.02	19.78	2.15	20.06	101.391	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-2.00	4.54	27.75	21.21	132.130	Horizontal	Pass
		2535	-1.83	4.69	27.72	21.20	131.826	Horizontal	Pass
		2567.5	-1.76	4.71	27.71	21.24	133.045	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.93	4.55	27.76	21.28	134.276	Horizontal	Pass
		2535	-1.74	4.69	27.72	21.29	134.586	Horizontal	Pass
		2565	-1.66	4.72	27.70	21.32	135.519	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.94	4.55	27.77	21.28	134.276	Horizontal	Pass
		2535	-1.80	4.69	27.72	21.23	132.739	Horizontal	Pass
		2562.5	-1.70	4.72	27.69	21.27	133.968	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.88	4.57	27.78	21.33	135.831	Horizontal	Pass
		2535	-1.70	4.73	27.72	21.29	134.586	Horizontal	Pass
		2560	-1.66	4.75	27.68	21.27	133.968	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-3.00	4.54	27.75	20.21	104.954	Vertical	Pass
		2535	-3.53	4.69	27.72	19.50	89.125	Vertical	Pass
		2567.5	-3.45	4.71	27.71	19.55	90.157	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-3.10	4.55	27.76	20.11	102.565	Vertical	Pass
		2535	-3.18	4.69	27.72	19.85	96.605	Vertical	Pass
		2565	-3.34	4.72	27.70	19.64	92.045	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-3.39	4.55	27.77	19.83	96.161	Vertical	Pass
		2535	-3.54	4.69	27.72	19.49	88.920	Vertical	Pass
		2562.5	-3.31	4.72	27.69	19.66	92.470	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-3.54	4.57	27.78	19.67	92.683	Vertical	Pass
		2535	-2.76	4.73	27.72	20.23	105.439	Vertical	Pass
		2560	-2.57	4.75	27.68	20.36	108.643	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.69	4.54	27.75	20.52	112.720	Horizontal	Pass
		2535	-2.38	4.69	27.72	20.65	116.145	Horizontal	Pass
		2567.5	-2.46	4.71	27.71	20.54	113.240	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.58	4.55	27.76	20.63	115.611	Horizontal	Pass
		2535	-2.59	4.69	27.72	20.44	110.662	Horizontal	Pass
		2565	-2.86	4.72	27.70	20.12	102.802	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.76	4.55	27.77	20.46	111.173	Horizontal	Pass
		2535	-2.73	4.69	27.72	20.30	107.152	Horizontal	Pass
		2562.5	-2.34	4.72	27.69	20.63	115.611	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.64	4.57	27.78	20.57	114.025	Horizontal	Pass
		2535	-2.31	4.73	27.72	20.68	116.950	Horizontal	Pass
		2560	-2.41	4.75	27.68	20.52	112.720	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-3.32	4.54	27.75	19.89	97.499	Vertical	Pass
		2535	-3.83	4.69	27.72	19.20	83.176	Vertical	Pass
		2567.5	-3.93	4.71	27.71	19.07	80.724	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-3.14	4.55	27.76	20.07	101.625	Vertical	Pass
		2535	-3.24	4.69	27.72	19.79	95.280	Vertical	Pass
		2565	-3.19	4.72	27.70	19.79	95.280	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-4.05	4.55	27.77	19.17	82.604	Vertical	Pass
		2535	-3.17	4.69	27.72	19.86	96.828	Vertical	Pass
		2562.5	-2.95	4.72	27.69	20.02	100.462	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-4.05	4.57	27.78	19.16	82.414	Vertical	Pass
		2535	-4.42	4.73	27.72	18.57	71.945	Vertical	Pass
		2560	-2.56	4.75	27.68	20.37	108.893	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.6 LTE BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max.	Max.	Polarization Of Max. ERP	
						EIRP	EIRP		
						Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-4.11	3.76	28.24	20.37	108.893	Horizontal	Pass
		1745	-3.97	3.91	28.22	20.34	108.143	Horizontal	Pass
		1779.3	-3.84	3.93	28.2	20.43	110.408	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.17	3.77	28.23	20.29	106.905	Horizontal	Pass
		1745	-4.08	3.91	28.24	20.25	105.925	Horizontal	Pass
		1778.5	-4.10	3.94	28.25	20.21	104.954	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.07	3.77	28.31	20.47	111.429	Horizontal	Pass
		1745	-3.75	3.91	28.22	20.56	113.763	Horizontal	Pass
		1777.5	-3.81	3.94	28.2	20.45	110.917	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.96	3.79	28.33	20.58	114.288	Horizontal	Pass
		1745	-3.69	3.95	28.22	20.58	114.288	Horizontal	Pass
		1775	-3.70	3.97	28.19	20.52	112.720	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.98	3.79	28.34	20.57	114.025	Horizontal	Pass
		1745	-3.79	3.95	28.22	20.48	111.686	Horizontal	Pass
		1772.5	-3.74	3.97	28.18	20.47	111.429	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.95	3.81	28.35	20.59	114.551	Horizontal	Pass
		1745	-3.69	3.96	28.22	20.57	114.025	Horizontal	Pass
		1770	-3.71	4	28.16	20.45	110.917	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-5.55	3.76	28.24	18.93	78.163	Vertical	Pass
		1745	-4.54	3.91	28.22	19.77	94.842	Vertical	Pass
		1779.3	-5.36	3.93	28.2	18.91	77.804	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.79	3.77	28.23	19.67	92.683	Vertical	Pass
		1745	-5.21	3.91	28.24	19.12	81.658	Vertical	Pass
		1778.5	-5.26	3.94	28.25	19.05	80.353	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-5.02	3.77	28.31	19.52	89.536	Vertical	Pass
		1745	-4.59	3.91	28.22	19.72	93.756	Vertical	Pass
		1777.5	-5.33	3.94	28.2	18.93	78.163	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-5.40	3.79	28.34	19.15	82.224	Vertical	Pass
		1745	-5.15	3.95	28.22	19.12	81.658	Vertical	Pass
		1775	-4.61	3.97	28.18	19.60	91.201	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-5.47	3.81	28.35	19.07	80.724	Vertical	Pass

Band QPSK		1745	-4.75	3.96	28.22	19.51	89.331	Vertical	Pass
		1772.5	-5.10	4	28.16	19.06	80.538	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.83	3.79	28.34	19.72	93.756	Vertical	Pass
Band		1745	-5.00	3.95	28.22	19.27	84.528	Vertical	Pass
QPSK		1770	-4.76	3.97	28.18	19.45	88.105	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.94	3.76	28.24	19.54	89.950	Horizontal	Pass
		1745	-4.55	3.91	28.22	19.76	94.624	Horizontal	Pass
		1779.3	-4.73	3.93	28.2	19.54	89.950	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.33	3.77	28.23	19.13	81.846	Horizontal	Pass
		1745	-4.58	3.91	28.24	19.75	94.406	Horizontal	Pass
		1778.5	-4.87	3.94	28.25	19.44	87.902	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.75	3.77	28.31	19.79	95.280	Horizontal	Pass
		1745	-4.81	3.91	28.22	19.50	89.125	Horizontal	Pass
		1777.5	-4.48	3.94	28.2	19.78	95.060	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.80	3.79	28.33	19.74	94.189	Horizontal	Pass
		1745	-4.46	3.95	28.22	19.81	95.719	Horizontal	Pass
		1775	-4.78	3.97	28.19	19.44	87.902	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.79	3.79	28.34	19.76	94.624	Horizontal	Pass
		1745	-4.61	3.95	28.22	19.66	92.470	Horizontal	Pass
		1772.5	-4.40	3.97	28.18	19.81	95.719	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-4.62	3.81	28.35	19.92	98.175	Horizontal	Pass
		1745	-4.40	3.96	28.22	19.86	96.828	Horizontal	Pass
		1770	-4.34	4	28.16	19.82	95.940	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.76	3.76	28.24	18.72	74.473	Vertical	Pass
		1745	-4.49	3.91	28.22	19.82	95.940	Vertical	Pass
		1779.3	-5.56	3.93	28.2	18.71	74.302	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.15	3.77	28.23	19.31	85.310	Vertical	Pass
		1745	-5.70	3.91	28.24	18.63	72.946	Vertical	Pass
		1778.5	-5.13	3.94	28.25	19.18	82.794	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-6.20	3.77	28.31	18.34	68.234	Vertical	Pass
		1745	-6.34	3.91	28.22	17.97	62.661	Vertical	Pass
		1777.5	-5.63	3.94	28.2	18.63	72.946	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-6.13	3.79	28.34	18.42	69.502	Vertical	Pass
		1745	-4.95	3.95	28.22	19.32	85.507	Vertical	Pass
		1775	-5.14	3.97	28.18	19.07	80.724	Vertical	Pass
15.0MHz Band 16	1/#Mid	1717.5	-6.10	3.81	28.35	18.44	69.823	Vertical	Pass
		1745	-5.75	3.96	28.22	18.51	70.958	Vertical	Pass

QAM		1772.5	-5.78	4	28.16	18.38	68.865	Vertical	Pass
20.0MHz	1/#Mid	1720	-5.30	3.79	28.34	19.25	84.140	Vertical	Pass
Band 16		1745	-5.58	3.95	28.22	18.69	73.961	Vertical	Pass
QAM		1770	-6.02	3.97	28.18	18.19	65.917	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)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is $55 + \log_{10}(P)$ [Watts].

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P)$ [Watts], where P is the transmitter power in Watts.

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

- ☐ LTE Band 2/4/5/7/66

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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-53.95	4.04	33.51	-24.48	-13	-11.48	Horizontal
3701.4	-53.76	4.04	33.51	-24.29	-13	-11.29	Vertical
5552.1	-45.74	5.24	35.84	-15.14	-13	-2.14	Vertical
5552.1	-49.77	5.24	35.84	-19.17	-13	-6.17	Horizontal
203.4	-42.45	1.43	16.02	-27.86	-13	-14.86	Vertical
326.5	-40.88	1.30	17.99	-24.19	-13	-11.19	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.41	4.04	33.56	-17.89	-13	-4.89	Horizontal
3760.0	-46.39	4.04	33.56	-16.87	-13	-3.87	Vertical
5640.0	-47.49	5.24	35.91	-16.82	-13	-3.82	Vertical
5640.0	-49.96	5.24	35.91	-19.29	-13	-6.29	Horizontal
200.4	-35.89	1.62	16.97	-20.54	-13	-7.54	Vertical
259.7	-38.20	1.74	15.98	-23.97	-13	-10.97	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.71	4.04	34.00	-21.75	-13	-8.75	Horizontal
3818.6	-48.86	4.04	34.00	-18.90	-13	-5.90	Vertical
5727.9	-45.65	5.24	36.04	-14.85	-13	-1.85	Vertical
5727.9	-49.22	5.24	36.04	-18.42	-13	-5.42	Horizontal
180.9	-42.24	1.42	17.29	-26.37	-13	-13.37	Vertical
359.7	-41.45	1.50	17.90	-25.04	-13	-12.04	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-51.50	4.07	33.54	-22.03	-13	-9.03	Horizontal
3720.0	-53.90	4.07	33.54	-24.43	-13	-11.43	Vertical
5580.0	-52.72	5.28	35.86	-22.14	-13	-9.14	Vertical
5580.0	-52.68	5.28	35.86	-22.10	-13	-9.10	Horizontal
186.9	-44.80	1.58	16.89	-29.48	-13	-16.48	Vertical
427.2	-36.27	1.76	17.26	-20.77	-13	-7.77	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.16	4.04	33.56	-19.64	-13	-6.64	Horizontal
3760.0	-44.28	4.04	33.56	-14.76	-13	-1.76	Vertical
5640.0	-50.05	5.24	35.91	-19.38	-13	-6.38	Vertical
5640.0	-50.97	5.24	35.91	-20.30	-13	-7.30	Horizontal
205.2	-41.65	1.46	16.27	-26.84	-13	-13.84	Vertical
435.4	-40.97	1.59	15.15	-27.41	-13	-14.41	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-52.95	4.04	34.00	-22.99	-13	-9.99	Horizontal
3800.0	-52.02	4.04	34.00	-22.06	-13	-9.06	Vertical
5700.0	-52.19	5.24	36.04	-21.39	-13	-8.39	Vertical
5700.0	-51.73	5.24	36.04	-20.93	-13	-7.93	Horizontal
196.3	-39.29	1.36	17.39	-23.25	-13	-10.25	Vertical
243.2	-43.01	1.66	15.39	-29.28	-13	-16.28	Horizontal

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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-52.46	4.02	29.80	-26.68	-13	-13.68	Horizontal
3421.4	-47.77	4.02	29.80	-21.99	-13	-8.99	Vertical
5132.1	-52.87	5.24	35.84	-22.27	-13	-9.27	Vertical
5132.1	-50.62	5.24	35.84	-20.02	-13	-7.02	Horizontal
179.1	-43.43	1.68	16.04	-29.07	-13	-16.07	Vertical
284.1	-41.37	1.78	17.74	-25.41	-13	-12.41	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.77	4.03	30.00	-24.80	-13	-11.80	Horizontal
3465.0	-48.78	4.03	30.00	-22.81	-13	-9.81	Vertical
5197.5	-45.44	5.25	35.86	-14.83	-13	-1.83	Vertical
5197.5	-49.35	5.25	35.86	-18.74	-13	-5.74	Horizontal
196.5	-39.49	1.72	17.69	-23.52	-13	-10.52	Vertical
361.8	-41.10	1.62	16.02	-26.69	-13	-13.69	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-50.16	4.05	30.01	-24.20	-13	-11.20	Horizontal
3508.6	-52.27	4.05	30.01	-26.31	-13	-13.31	Vertical
5262.9	-52.15	5.26	35.86	-21.55	-13	-8.55	Vertical
5262.9	-50.95	5.26	35.86	-20.35	-13	-7.35	Horizontal
209.3	-43.12	1.80	16.69	-28.23	-13	-15.23	Vertical
469.8	-44.99	1.75	16.66	-30.09	-13	-17.09	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-49.50	4.02	29.80	-23.72	-13	-10.72	Horizontal
3440.0	-50.35	4.02	29.80	-24.57	-13	-11.57	Vertical
5160.0	-48.33	5.24	35.84	-17.73	-13	-4.73	Vertical
5160.0	-49.92	5.24	35.84	-19.32	-13	-6.32	Horizontal
196.8	-36.51	1.57	17.26	-20.82	-13	-7.82	Vertical
241.4	-42.47	1.78	16.35	-27.90	-13	-14.90	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-44.74	4.03	30.00	-18.77	-13	-5.77	Horizontal
3465.0	-47.54	4.03	30.00	-21.57	-13	-8.57	Vertical
5197.5	-45.22	5.25	35.86	-14.61	-13	-1.61	Vertical
5197.5	-51.41	5.25	35.86	-20.80	-13	-7.80	Horizontal
178.5	-39.84	1.44	17.95	-23.33	-13	-10.33	Vertical
364.3	-41.81	1.65	16.09	-27.37	-13	-14.37	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-48.54	2.91	27.68	-23.77	-13	-10.77	Horizontal
3490.0	-50.49	2.91	27.68	-25.72	-13	-12.72	Vertical
5235.0	-47.10	5.26	35.86	-16.50	-13	-3.50	Vertical
5235.0	-49.06	5.26	35.86	-18.46	-13	-5.46	Horizontal
196.4	-35.30	1.61	16.85	-20.06	-13	-7.06	Vertical
319.5	-34.80	1.61	15.19	-21.22	-13	-8.22	Horizontal

9.3 LTE BAND 5

QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-50.64	2.78	27.50	-25.92	-13	-12.92	Horizontal
1649.4	-47.66	2.78	27.50	-22.94	-13	-9.94	Vertical
2474.1	-46.62	2.90	27.80	-21.72	-13	-8.72	Vertical
2474.1	-51.54	2.90	27.80	-26.64	-13	-13.64	Horizontal
208.4	-37.34	1.76	17.59	-21.51	-13	-8.51	Vertical
442.7	-40.72	1.63	15.87	-26.48	-13	-13.48	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.45	2.80	27.48	-26.77	-13	-13.77	Horizontal
1673.0	-53.02	2.80	27.48	-28.34	-13	-15.34	Vertical
2509.5	-49.25	2.91	27.70	-24.46	-13	-11.46	Vertical
2509.5	-51.82	2.91	27.70	-27.03	-13	-14.03	Horizontal
183.1	-34.07	1.61	15.68	-20.00	-13	-7.00	Vertical
258.1	-39.11	1.59	17.52	-23.19	-13	-10.19	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-46.09	2.82	27.43	-21.48	-13	-8.48	Horizontal
1696.6	-47.83	2.82	27.43	-23.22	-13	-10.22	Vertical
2544.9	-45.78	2.92	27.74	-20.96	-13	-7.96	Vertical
2544.9	-50.90	2.92	27.74	-26.08	-13	-13.08	Horizontal
181.5	-40.10	1.69	16.67	-25.11	-13	-12.11	Vertical
447.2	-43.89	1.70	17.18	-28.41	-13	-15.41	Horizontal

QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-51.98	2.78	27.50	-27.26	-13	-14.26	Horizontal
1658.0	-52.19	2.78	27.50	-27.47	-13	-14.47	Vertical
2487.0	-53.96	2.90	27.80	-29.06	-13	-16.06	Vertical
2487.0	-51.25	2.90	27.80	-26.35	-13	-13.35	Horizontal
202.8	-36.60	1.71	15.57	-22.74	-13	-9.74	Vertical
361.9	-40.38	1.34	16.40	-25.32	-13	-12.32	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-50.73	2.80	27.48	-26.05	-13	-13.05	Horizontal
1673.0	-44.65	2.80	27.48	-19.97	-13	-6.97	Vertical
2509.5	-45.59	2.91	27.70	-20.80	-13	-7.80	Vertical
2509.5	-53.15	2.91	27.70	-28.36	-13	-15.36	Horizontal
198.5	-34.41	1.44	17.04	-18.81	-13	-5.81	Vertical
434.0	-44.88	1.76	17.62	-29.02	-13	-16.02	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.22	2.82	27.43	-22.61	-13	-9.61	Horizontal
1688.0	-46.88	2.82	27.43	-22.27	-13	-9.27	Vertical
2532.0	-51.51	2.92	27.74	-26.69	-13	-13.69	Vertical
2532.0	-53.27	2.92	27.74	-28.45	-13	-15.45	Horizontal
175.6	-37.65	1.74	17.70	-21.69	-13	-8.69	Vertical
353.1	-35.25	1.41	17.46	-19.19	-13	-6.19	Horizontal

9.4 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	-60.65	5.23	35.81	-30.07	-25	-5.07	Horizontal
5005.0	-60.97	5.23	35.81	-30.39	-25	-5.39	Vertical
7507.5	-62.04	5.67	36.85	-30.86	-25	-5.86	Vertical
7507.5	-60.16	5.67	36.85	-28.98	-25	-3.98	Horizontal
176.7	-47.34	1.73	17.97	-31.10	-25	-6.10	Vertical
395.1	-45.18	1.38	15.11	-31.45	-25	-6.45	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.97	5.23	35.82	-34.38	-25	-9.38	Horizontal
5070.0	-64.35	5.23	35.82	-33.76	-25	-8.76	Vertical
7605.0	-61.28	5.67	36.85	-30.10	-25	-5.10	Vertical
7605.0	-62.93	5.67	36.85	-31.75	-25	-6.75	Horizontal
185.6	-50.40	1.77	16.17	-35.99	-25	-10.99	Vertical
447.6	-47.24	1.63	15.21	-33.66	-25	-8.66	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.54	5.24	35.83	-33.95	-25	-8.95	Horizontal
5135.0	-59.17	5.24	35.83	-28.58	-25	-3.58	Vertical
7702.5	-60.31	5.68	36.87	-29.12	-25	-4.12	Vertical
7702.5	-60.34	5.68	36.87	-29.15	-25	-4.15	Horizontal
193.7	-45.70	1.58	17.56	-29.72	-25	-4.72	Vertical
454.1	-50.55	1.45	16.58	-35.42	-25	-10.42	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	-60.77	5.23	35.82	-30.18	-25	-5.18	Horizontal
5020.0	-62.24	5.23	35.82	-31.65	-25	-6.65	Vertical
7530.0	-59.89	5.67	36.86	-28.70	-25	-3.70	Vertical
7530.0	-64.66	5.67	36.86	-33.47	-25	-8.47	Horizontal
190.4	-49.16	1.63	15.76	-35.03	-25	-10.03	Vertical
388.2	-46.70	1.71	15.44	-32.97	-25	-7.97	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.20	5.23	35.82	-29.61	-25	-4.61	Horizontal
5070.0	-64.80	5.23	35.82	-34.21	-25	-9.21	Vertical
7605.0	-61.68	5.67	36.85	-30.50	-25	-5.50	Vertical
7605.0	-63.15	5.67	36.85	-31.97	-25	-6.97	Horizontal
203.0	-49.19	1.79	16.84	-34.13	-25	-9.13	Vertical
412.7	-48.42	1.71	17.64	-32.49	-25	-7.49	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-60.48	5.24	35.83	-29.89	-25	-4.89	Horizontal
5120.0	-62.08	5.24	35.83	-31.49	-25	-6.49	Vertical
7680.0	-63.52	5.70	36.88	-32.34	-25	-7.34	Vertical
7680.0	-63.44	5.70	36.88	-32.26	-25	-7.26	Horizontal
212.2	-49.46	1.79	16.84	-34.40	-25	-9.40	Vertical
276.9	-49.17	1.71	17.64	-33.24	-25	-8.24	Horizontal

9.5 LTE BAND 66

QPSK EIRP POWER FOR LTE BAND 66 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-48.17	4.02	29.80	-22.39	-13	-9.39	Horizontal
3421.4	-46.83	4.02	29.80	-21.05	-13	-8.05	Vertical
5132.1	-49.99	5.24	35.84	-19.39	-13	-6.39	Vertical
5132.1	-47.09	5.24	35.84	-16.49	-13	-3.49	Horizontal
112.6	-47.55	1.52	15.57	-33.50	-13	-20.50	Vertical
220.5	-46.20	1.33	17.14	-30.39	-13	-17.39	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-50.35	4.03	30.00	-24.38	-13	-11.38	Horizontal
3490.0	-52.32	4.03	30.00	-26.35	-13	-13.35	Vertical
5235.0	-54.11	5.25	35.86	-23.50	-13	-10.50	Vertical
5235.0	-51.47	5.25	35.86	-20.86	-13	-7.86	Horizontal
157.3	-54.06	1.53	17.13	-38.46	-13	-25.46	Vertical
213.1	-49.72	1.41	15.95	-35.18	-13	-22.18	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-50.78	4.05	30.01	-24.82	-13	-11.82	Horizontal
3558.6	-47.21	4.05	30.01	-21.25	-13	-8.25	Vertical
5337.9	-53.89	5.26	35.86	-23.29	-13	-10.29	Vertical
5337.9	-53.34	5.26	35.86	-22.74	-13	-9.74	Horizontal
170.6	-44.07	1.44	15.51	-30.00	-13	-17.00	Vertical
169.0	-53.14	1.78	15.76	-39.16	-13	-26.16	Horizontal

QPSK EIRP POWER FOR LTE BAND 66 (20MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-54.27	4.02	29.80	-28.49	-13	-15.49	Horizontal
3440.0	-50.80	4.02	29.80	-25.02	-13	-12.02	Vertical
5160.0	-49.61	5.24	35.84	-19.01	-13	-6.01	Vertical
5160.0	-52.59	5.24	35.84	-21.99	-13	-8.99	Horizontal
268.8	-49.49	1.62	17.02	-34.09	-13	-21.09	Vertical
161.4	-45.73	1.32	17.31	-29.74	-13	-16.74	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-51.67	4.03	30.00	-25.70	-13	-12.70	Horizontal
3490.0	-48.27	4.03	30.00	-22.30	-13	-9.30	Vertical
5235.0	-49.35	5.25	35.86	-18.74	-13	-5.74	Vertical
5235.0	-47.30	5.25	35.86	-16.69	-13	-3.69	Horizontal
159.9	-47.73	1.45	15.17	-34.01	-13	-21.01	Vertical
172.1	-49.45	1.48	17.82	-33.11	-13	-20.11	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-49.14	2.91	27.68	-24.37	-13	-11.37	Horizontal
3540.0	-46.68	2.91	27.68	-21.91	-13	-8.91	Vertical
5310.0	-53.81	5.26	35.86	-23.21	-13	-10.21	Vertical
5310.0	-47.12	5.26	35.86	-16.52	-13	-3.52	Horizontal
197.3	-50.75	1.76	16.38	-36.13	-13	-23.13	Vertical
158.5	-50.02	1.43	17.13	-34.32	-13	-21.32	Horizontal

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

Over Limit = $P_{Meas}(dBm) - Limit(dBm)$

We test both H direction and V direction, recorded worst case direction.

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 3.29V, Normal, DC 3.87V and High voltage, DC 4.45V.

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 2/4/5/7/66

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1880	12.7	0.006746	2.5
3.87	1880	13.6	0.007255	2.5
4.45	1880	13.4	0.007125	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	13.2	0.007015	2.5
Extreme (50C)	1880	11.3	0.006020	2.5
Extreme (40C)	1880	14.0	0.007440	2.5
Extreme (30C)	1880	13.3	0.007054	2.5
Extreme (10C)	1880	14.0	0.007424	2.5
Extreme (0C)	1880	12.0	0.006386	2.5
Extreme (-10C)	1880	13.4	0.007134	2.5
Extreme (-20C)	1880	14.0	0.007447	2.5
Extreme (-30C)	1880	14.4	0.007664	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1880	9.4	0.005024	2.5
3.87	1880	8.7	0.004640	2.5
4.45	1880	8.1	0.004329	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	9.4	0.005023	2.5
Extreme (50C)	1880	9.3	0.004957	2.5
Extreme (40C)	1880	7.6	0.004043	2.5
Extreme (30C)	1880	9.3	0.004955	2.5
Extreme (10C)	1880	8.5	0.004521	2.5
Extreme (0C)	1880	8.1	0.004288	2.5
Extreme (-10C)	1880	9.3	0.004933	2.5
Extreme (-20C)	1880	9.0	0.004788	2.5
Extreme (-30C)	1880	8.6	0.004551	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1732.5	9.3	0.005366	2.5
3.87	1732.5	9.4	0.005416	2.5
4.45	1732.5	8.0	0.004632	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	8.2	0.004750	2.5
Extreme (50C)	1732.5	9.3	0.005395	2.5
Extreme (40C)	1732.5	7.3	0.004201	2.5
Extreme (30C)	1732.5	6.2	0.003587	2.5
Extreme (10C)	1732.5	6.7	0.003895	2.5
Extreme (0C)	1732.5	9.8	0.005671	2.5
Extreme (-10C)	1732.5	8.7	0.005044	2.5
Extreme (-20C)	1732.5	7.2	0.004169	2.5
Extreme (-30C)	1732.5	8.7	0.005023	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1732.5	9.9	0.005727	2.5
3.87	1732.5	8.9	0.005144	2.5
4.45	1732.5	8.6	0.004942	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.8	0.005668	2.5
Extreme (50C)	1732.5	8.5	0.004894	2.5
Extreme (40C)	1732.5	7.9	0.004564	2.5
Extreme (30C)	1732.5	9.2	0.005339	2.5
Extreme (10C)	1732.5	8.8	0.005064	2.5
Extreme (0C)	1732.5	8.4	0.004864	2.5
Extreme (-10C)	1732.5	8.7	0.005002	2.5
Extreme (-20C)	1732.5	9.0	0.005201	2.5
Extreme (-30C)	1732.5	7.9	0.004570	2.5

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

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.29	836.5	6.2	0.007358	2.5
3.87	836.5	6.6	0.007887	2.5
4.45	836.5	5.3	0.006305	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.0	0.007201	2.5
Extreme (50C)	836.5	6.2	0.007447	2.5
Extreme (40C)	836.5	6.0	0.007221	2.5
Extreme (30C)	836.5	6.3	0.007502	2.5
Extreme (10C)	836.5	5.3	0.006279	2.5
Extreme (0C)	836.5	5.3	0.006333	2.5
Extreme (-10C)	836.5	5.5	0.006544	2.5
Extreme (-20C)	836.5	6.3	0.007581	2.5
Extreme (-30C)	836.5	5.9	0.007065	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.29	836.5	5.6	0.006651	2.5
3.87	836.5	6.6	0.007892	2.5
4.45	836.5	4.7	0.005629	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.6	0.007872	2.5
Extreme (50C)	836.5	6.0	0.007122	2.5
Extreme (40C)	836.5	5.7	0.006772	2.5
Extreme (30C)	836.5	6.8	0.008090	2.5
Extreme (10C)	836.5	5.2	0.006227	2.5
Extreme (0C)	836.5	5.7	0.006842	2.5
Extreme (-10C)	836.5	5.5	0.006523	2.5
Extreme (-20C)	836.5	6.0	0.007183	2.5
Extreme (-30C)	836.5	6.0	0.007219	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	2535	10.1	0.004003	2.5
3.87	2535	8.9	0.003517	2.5
4.45	2535	8.4	0.003305	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	9.5	0.003741	2.5
Extreme (50C)	2535	8.5	0.003357	2.5
Extreme (40C)	2535	8.0	0.003155	2.5
Extreme (30C)	2535	9.3	0.003688	2.5
Extreme (10C)	2535	7.9	0.003107	2.5
Extreme (0C)	2535	8.8	0.003472	2.5
Extreme (-10C)	2535	9.1	0.003580	2.5
Extreme (-20C)	2535	8.8	0.003480	2.5
Extreme (-30C)	2535	8.7	0.003445	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	2535	6.5	0.002548	2.5
3.87	2535	6.4	0.002539	2.5
4.45	2535	5.9	0.002333	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.4	0.002528	2.5
Extreme (50C)	2535	5.8	0.002273	2.5
Extreme (40C)	2535	5.3	0.002071	2.5
Extreme (30C)	2535	6.9	0.002703	2.5
Extreme (10C)	2535	5.5	0.002172	2.5
Extreme (0C)	2535	5.4	0.002144	2.5
Extreme (-10C)	2535	5.2	0.002047	2.5
Extreme (-20C)	2535	5.4	0.002140	2.5
Extreme (-30C)	2535	5.2	0.002062	2.5

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

10.5 LTE BAND 66

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1745	12.3	0.00703	2.5
3.87	1745	13.4	0.00769	2.5
4.45	1745	13.7	0.00787	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	7.0	0.004004	2.5
Extreme (50C)	1745	4.9	0.002811	2.5
Extreme (40C)	1745	5.4	0.003115	2.5
Extreme (30C)	1745	5.1	0.002951	2.5
Extreme (10C)	1745	6.8	0.003908	2.5
Extreme (0C)	1745	4.7	0.002717	2.5
Extreme (-10C)	1745	9.6	0.005485	2.5
Extreme (-20C)	1745	10.6	0.006097	2.5
Extreme (-30C)	1745	6.3	0.003600	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.29	1745	12.8	0.007361	2.5
3.87	1745	14.1	0.008059	2.5
4.45	1745	13.3	0.007627	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	7.4	0.004233	2.5
Extreme (50C)	1745	4.5	0.002603	2.5
Extreme (40C)	1745	5.0	0.002847	2.5
Extreme (30C)	1745	4.3	0.002481	2.5
Extreme (10C)	1745	6.0	0.003416	2.5
Extreme (0C)	1745	5.1	0.002914	2.5
Extreme (-10C)	1745	10.0	0.005743	2.5
Extreme (-20C)	1745	11.2	0.006422	2.5
Extreme (-30C)	1745	6.1	0.003489	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.

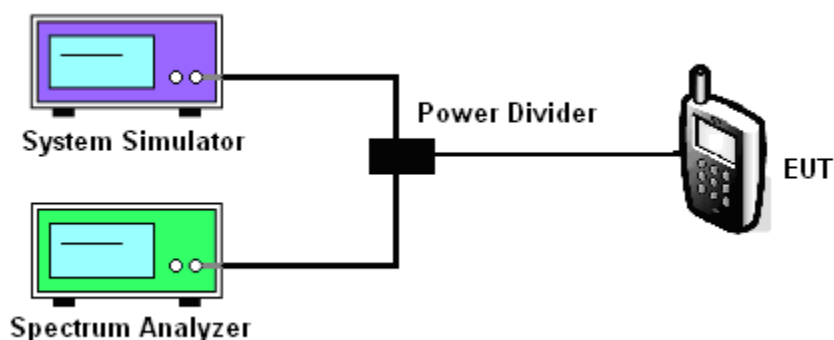
11.2 Measuring Instruments

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 GSM/EGPRS operating modes:
 - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
 - b. Set EUT in maximum power output, and triggered the burst signal.
 - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS 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 2/4/5/7/66
- ☐

Test data reference attachment.

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