

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

FCC ID: 2ATH4-C5

Product: SMART PHONE

Trade Mark: N/A

Model Number: Stratus_C5

Family Model: N/A

Report No.: STR190723001007E

Prepared for

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TABLE OF CONTENTS

1.1 PRODUCT DESCRIPTION	5
1.2 RELATED SUBMITTAL(S) / GRANT (S)	6
1.3 TEST METHODOLOGY	6
1.4 TEST FACILITY	6
MEASUREMENT UNCERTAINTY	6
1.5 SPECIAL ACCESSORIES.....	6
1.6 WORST-CASE CONFIGURATION AND MODE.....	6
2. SYSTEM TEST CONFIGURATION	7
2.1 EUT CONFIGURATION.....	7
2.2 EUT EXERCISE	7
2.3 CONFIGURATION OF EUT SYSTEM.....	7
2.4 TEST SETUP	8
3.TEST AND MEASUREMENT EQUIPMENT	9
4. OUTPUT POWER.....	10
4.1 OUTPUT POWER MEASUREMENT	10
6. BANDEDGE AND EMISSION MASK.....	13
7. OUT OF BAND EMISSIONS	14
7.1 MEASUREMENT METHOD	14
8. RADIATED MEASUREMENT	15
8.1. RADIATED POWER (ERP & EIRP).....	15
8.2 LTE BAND 2.....	16
8.3 LTE BAND 4.....	20
8.4 LTE BAND 5.....	24
8.5 LTE BAND 7.....	26
8.6 LTE BAND 12	28
8.7 LTE BAND 17	30

9. SPURIOUS RADIATION EMISSION	32
9.1 LTE BAND 2.....	34
9.2 LTE BAND 4.....	35
9.3 LTE BAND 5.....	36
9.4 LTE BAND 7.....	38
9.5 LTE BAND 12	39
9.6 LTE BAND 17	41
10. FREQUENCY STABILITY	43
10.1 LTE BAND 2	44
10.2 LTE BAND 4	46
10.3 LTE BAND 5	48
10.4 LTE BAND 7	50
10.5 LTE BAND 12	52
10.6 LTE BAND 17	54
11. PEAK-TO-AVERAGE RATIO.....	56
11.1 Description of the PAR Measurement.....	56
11.2 Measuring Instruments	56
11.3 Test Procedures.....	56
11.4 Test Setup.....	56

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	SMART PHONE
Trade Mark	N/A
Model Name	Stratus_C5
Family Model	N/A
Model Difference	N/A
FCC ID:	2ATH4-C5
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2,4,5,7,12,17
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 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz;
Type of Modulation:	QPSK/16QAM
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 3.1dBi, Band 4: 2.9dBi, Band 5: 2.6dBi, Band 7: 2.1dBi, Band 12: 2.7dBi, Band 17: 2.7dBi
Power Supply:	DC 3.8V/2200mAh from Battery or DC 5V from USB Port.
Adapter:	Model: JML-0500100NZ-LW Input: 100-240V~50/60Hz 0.3A Output: 5V---1.0A
Extreme Vol. Limits:	DC 3.6V to DC 4.4V (Nominal DC 3.8V) _(Note 1)
HW Version	AL_A16_MB_V11
SW Version	Stratus_C5_v1.1_20190719_1750
** Note1: The High Voltage DC 4.4V and Low Voltage 3.6V 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: 2ATH4-C5** 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, Band 4, Band 5, Band 7, Band 12, Band 17.

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

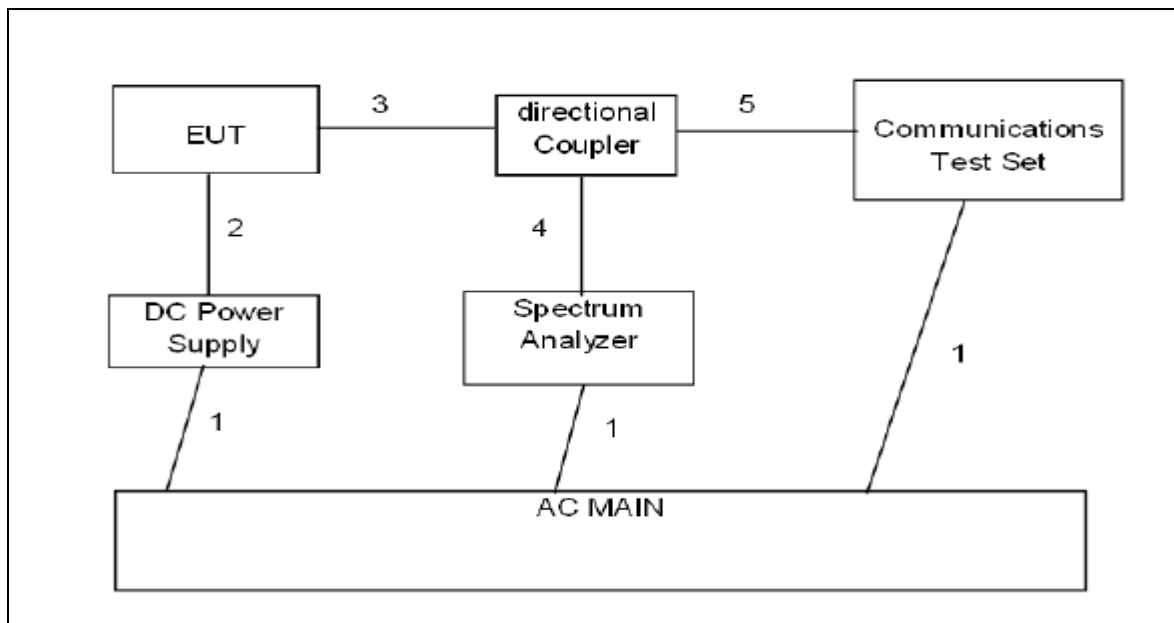
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	SMART PHONE	Stratus_C5	FCC ID: 2ATH4-C5	EUT

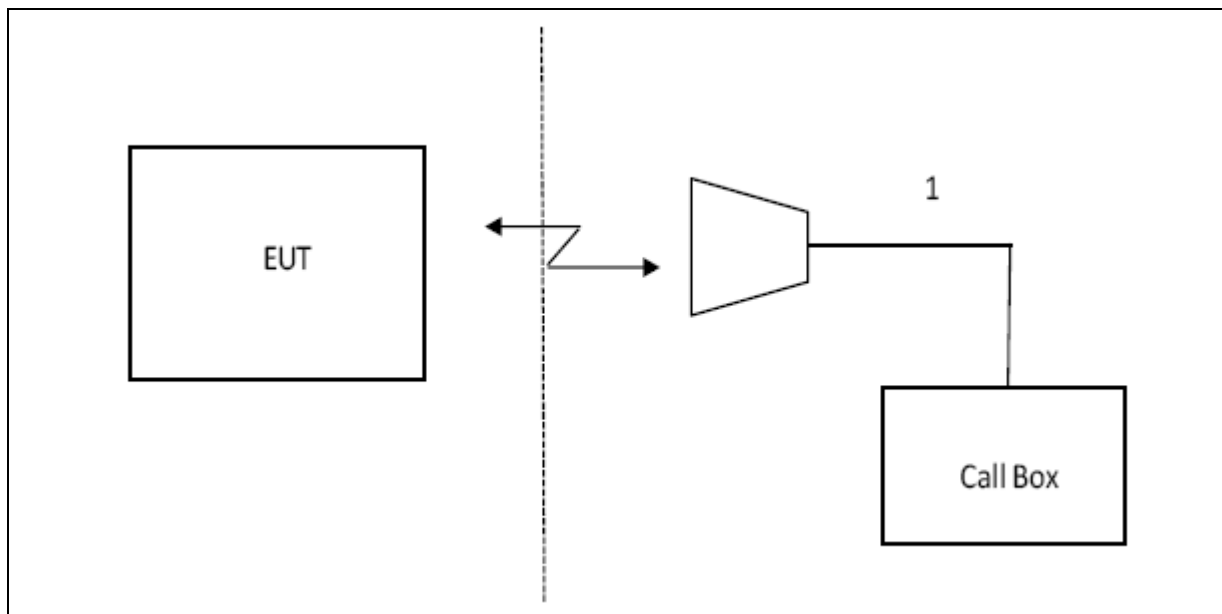
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

CONDUCTED SETUP DIAGRAM FOR TESTS



RADIATED SETUP DIAGRAM FOR TESTS



3.TEST AND MEASUREMENT EQUIPMENT

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

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2019.10.07
TEST RECEIVER	R&S	ESCI	101318	2020.05.12
COMMUNICATION TESTER	R&S	CMU200	117858	2020.05.12
COMMUNICATION TESTER	R&S	CMW500	148500	2020.05.12
TEST RECEIVER	R&S	FCKL1528	A0304230	2020.05.12
LISN	SCHWARZBECK	NSLK8127	A0304233	2020.05.12
CLIMATE CHAMBER	ALBATROSS	--	--	2020.05.12
Loop Antenna	Daze	ZN30900N	SEL0097	2020.05.12
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	2020.05.12
Horn Antenna	EM	EM-AH-10180	2011071402	2020.05.12
DC Power Source	N/A	PS-6005D	20170402923	2020.05.12

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 12
- LTE Band 17

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, and §90.691

FCC: §22.359

LIMITS

FCC: §22.359, §24.238,

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.

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 (704, 716, 824, 849, 1710 and 1755, 1850 and 1910 MHz)

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

Set display line at -13 dBm

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

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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.

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 at -13 dBm
- ☐ 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
- LTE Band 4
- ☐ LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

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 and §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.

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
- LTE Band 4
- ☐ LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Freque ncy	Result						Conclusio n
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-0.88	3.76	28.24	23.60	229.270	Horizontal	Pass
		1880	-0.50	3.91	28.22	23.81	240.695	Horizontal	Pass
		1909.3	-0.59	3.93	28.20	23.68	233.201	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-0.89	3.77	28.23	23.57	227.288	Horizontal	Pass
		1880	-0.72	3.91	28.24	23.61	229.558	Horizontal	Pass
		1908.5	-0.62	3.94	28.25	23.69	234.134	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.95	3.77	28.31	23.59	228.745	Horizontal	Pass
		1880	-0.65	3.91	28.22	23.66	232.341	Horizontal	Pass
		1907.5	-0.85	3.94	28.20	23.41	219.363	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1855	-0.89	3.79	28.33	23.65	231.850	Horizontal	Pass
		1880	-0.52	3.95	28.22	23.75	237.271	Horizontal	Pass
		1905	-0.39	3.97	28.19	23.83	241.299	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1857.5	-0.71	3.79	28.34	23.84	241.874	Horizontal	Pass
		1880	-0.36	3.95	28.22	23.91	246.001	Horizontal	Pass
		1902.5	-0.37	3.97	28.18	23.84	242.171	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1860	-0.95	3.81	28.35	23.59	228.338	Horizontal	Pass
		1880	-0.65	3.96	28.22	23.61	229.374	Horizontal	Pass
		1900	-0.29	4.00	28.16	23.87	244.061	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-0.91	3.76	28.24	23.57	227.501	Vertical	Pass
		1880	-0.61	3.91	28.22	23.70	234.682	Vertical	Pass
		1909.3	-0.70	3.93	28.20	23.57	227.710	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-0.73	3.77	28.23	23.73	236.261	Vertical	Pass
		1880	-0.50	3.91	28.24	23.83	241.599	Vertical	Pass
		1908.5	-0.50	3.94	28.25	23.81	240.651	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.94	3.77	28.31	23.60	229.174	Vertical	Pass
		1880	-0.55	3.91	28.22	23.76	237.522	Vertical	Pass
		1907.5	-0.73	3.94	28.20	23.53	225.354	Vertical	Pass
10.0MH z Band	1/#Mid	1855	-0.85	3.79	28.33	23.69	234.107	Vertical	Pass
		1880	-0.61	3.95	28.22	23.66	232.327	Vertical	Pass

QPSK		1905	-0.71	3.97	28.19	23.51	224.376	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-0.82	3.79	28.34	23.73	236.001	Vertical	Pass
		1880	-0.59	3.95	28.22	23.68	233.371	Vertical	Pass
		1902.5	-0.28	3.97	28.18	23.93	247.447	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1860	-0.84	3.81	28.35	23.70	234.525	Vertical	Pass
		1880	-0.70	3.96	28.22	23.56	226.910	Vertical	Pass
		1900	-0.16	4.00	28.16	24.00	251.284	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequen cy	Result						Conclusio n
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-1.76	3.76	28.24	22.72	187.051	Horizontal	Pass
		1880	-1.51	3.91	28.22	22.80	190.568	Horizontal	Pass
		1909.3	-1.41	3.93	28.20	22.86	193.036	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.68	3.77	28.23	22.78	189.642	Horizontal	Pass
		1880	-1.65	3.91	28.24	22.68	185.233	Horizontal	Pass
		1908.5	-1.56	3.94	28.25	22.75	188.526	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.78	3.77	28.31	22.76	188.779	Horizontal	Pass
		1880	-1.41	3.91	28.22	22.90	195.028	Horizontal	Pass
		1907.5	-1.56	3.94	28.20	22.70	186.258	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.75	3.79	28.33	22.79	189.967	Horizontal	Pass
		1880	-1.50	3.95	28.22	22.77	189.394	Horizontal	Pass
		1905	-1.44	3.97	28.19	22.78	189.615	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.80	3.79	28.34	22.75	188.543	Horizontal	Pass
		1880	-1.53	3.95	28.22	22.74	187.720	Horizontal	Pass
		1902.5	-1.46	3.97	28.18	22.75	188.509	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.86	3.81	28.35	22.68	185.499	Horizontal	Pass
		1880	-1.35	3.96	28.22	22.91	195.394	Horizontal	Pass
		1900	-1.53	4.00	28.16	22.63	183.276	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-1.73	3.76	28.24	22.75	188.261	Vertical	Pass
		1880	-1.63	3.91	28.22	22.68	185.463	Vertical	Pass
		1909.3	-1.47	3.93	28.20	22.80	190.656	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.72	3.77	28.23	22.74	187.802	Vertical	Pass
		1880	-1.62	3.91	28.24	22.71	186.627	Vertical	Pass
		1908.5	-1.51	3.94	28.25	22.80	190.580	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.79	3.77	28.31	22.75	188.498	Vertical	Pass
		1880	-1.59	3.91	28.22	22.72	187.270	Vertical	Pass
		1907.5	-1.43	3.94	28.20	22.83	191.876	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.96	3.79	28.33	22.58	181.137	Vertical	Pass
		1880	-1.66	3.95	28.22	22.61	182.212	Vertical	Pass
		1905	-1.73	3.97	28.19	22.49	177.255	Vertical	Pass
15.0MHz Band	1/#Mid	1857.5	-1.96	3.79	28.34	22.59	181.375	Vertical	Pass
		1880	-1.59	3.95	28.22	22.68	185.387	Vertical	Pass

16 QAM		1902.5	-1.60	3.97	28.18	22.61	182.564	Vertical	Pass
20.0MHz Band	1/#Mid	1860	-1.78	3.81	28.35	22.76	188.618	Vertical	Pass
z Band		1880	-1.29	3.96	28.22	22.97	198.159	Vertical	Pass
16 QAM		1900	-1.41	4.00	28.16	22.75	188.211	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Freque ncy	Result						Conclusio n
			SG	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP	Max. EIRP	Polarizatio n Of Max. ERP	
			Level			Averag e	Averag e		
			(dBm)			(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	1.24	3.12	27.58	25.70	371.511	Horizontal	Pass
		1732.5	1.12	3.27	27.61	25.46	351.898	Horizontal	Pass
		1754.3	1.44	3.29	27.63	25.78	378.400	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	1.07	3.13	27.61	25.55	358.679	Horizontal	Pass
		1732.5	1.32	3.27	27.61	25.66	368.009	Horizontal	Pass
		1753.5	1.39	3.30	27.62	25.71	372.307	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	1.38	3.13	27.63	25.88	387.654	Horizontal	Pass
		1732.5	0.77	3.27	27.61	25.11	323.975	Horizontal	Pass
		1752.5	1.61	3.30	27.60	25.91	390.333	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1715	1.34	3.15	27.64	25.83	383.068	Horizontal	Pass
		1732.5	1.45	3.31	27.61	25.75	375.872	Horizontal	Pass
		1750	1.51	3.33	27.59	25.77	377.647	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1717.5	1.12	3.15	27.65	25.62	364.988	Horizontal	Pass
		1732.5	1.59	3.31	27.61	25.89	388.093	Horizontal	Pass
		1747.5	1.43	3.33	27.57	25.67	368.894	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1720	1.22	3.17	27.66	25.71	372.336	Horizontal	Pass
		1732.5	1.45	3.32	27.61	25.74	375.209	Horizontal	Pass
		1745	1.32	3.36	27.56	25.52	356.446	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	1.23	3.12	27.58	25.69	371.100	Vertical	Pass
		1732.5	1.40	3.27	27.61	25.74	374.808	Vertical	Pass
		1754.3	1.40	3.29	27.63	25.74	374.926	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	1.27	3.13	27.61	25.75	376.257	Vertical	Pass
		1732.5	1.49	3.27	27.61	25.83	383.003	Vertical	Pass
		1753.5	1.34	3.30	27.62	25.66	367.838	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	0.53	3.13	27.63	25.03	318.611	Vertical	Pass
		1732.5	0.72	3.27	27.61	25.06	320.576	Vertical	Pass
		1752.5	0.74	3.30	27.60	25.04	318.849	Vertical	Pass
10.0MH z Band QPSK	1/#Mid	1715	1.27	3.15	27.64	25.76	376.609	Vertical	Pass
		1732.5	1.41	3.31	27.61	25.71	372.369	Vertical	Pass
		1750	1.56	3.33	27.59	25.82	381.910	Vertical	Pass

15.0MH z Band QPSK	1/#Mid	1717.5	1.17	3.15	27.65	25.67	368.570	Vertical	Pass
		1732.5	1.59	3.31	27.61	25.89	387.806	Vertical	Pass
		1747.5	1.62	3.33	27.57	25.86	385.632	Vertical	Pass
20.0MH z Band QPSK	1/#Mid	1720	1.49	3.17	27.66	25.98	396.628	Vertical	Pass
		1732.5	1.53	3.32	27.61	25.82	382.002	Vertical	Pass
		1745	1.46	3.36	27.56	25.66	368.358	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	0.34	3.12	27.58	24.80	301.664	Horizontal	Pass
		1732.5	0.53	3.27	27.61	24.87	306.741	Horizontal	Pass
		1754.3	0.34	3.29	27.63	24.68	293.590	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.44	3.13	27.61	24.04	253.340	Horizontal	Pass
		1732.5	-0.22	3.27	27.61	24.12	258.482	Horizontal	Pass
		1753.5	-0.14	3.30	27.62	24.18	261.606	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-0.54	3.13	27.63	23.96	249.142	Horizontal	Pass
		1732.5	-0.37	3.27	27.61	23.97	249.240	Horizontal	Pass
		1752.5	0.56	3.30	27.60	24.86	306.519	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	0.26	3.15	27.64	24.75	298.259	Horizontal	Pass
		1732.5	0.53	3.31	27.61	24.83	304.296	Horizontal	Pass
		1750	0.25	3.33	27.59	24.51	282.214	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	0.46	3.15	27.65	24.96	313.022	Horizontal	Pass
		1732.5	0.62	3.31	27.61	24.92	310.693	Horizontal	Pass
		1747.5	0.60	3.33	27.57	24.84	304.721	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	0.20	3.17	27.66	24.69	294.198	Horizontal	Pass
		1732.5	0.41	3.32	27.61	24.70	294.788	Horizontal	Pass
		1745	0.56	3.36	27.56	24.76	299.362	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	0.41	3.12	27.58	24.87	306.697	Vertical	Pass
		1732.5	0.43	3.27	27.61	24.77	299.970	Vertical	Pass
		1754.3	0.52	3.29	27.63	24.86	305.925	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.32	3.13	27.61	24.16	260.621	Vertical	Pass
		1732.5	-0.19	3.27	27.61	24.15	259.776	Vertical	Pass
		1753.5	-0.11	3.30	27.62	24.21	263.425	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-0.50	3.13	27.63	24.00	251.034	Vertical	Pass
		1732.5	-0.24	3.27	27.61	24.10	257.115	Vertical	Pass
		1752.5	-0.39	3.30	27.60	23.91	245.925	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	0.41	3.15	27.64	24.90	309.224	Vertical	Pass
		1732.5	0.60	3.31	27.61	24.90	309.199	Vertical	Pass
		1750	0.38	3.33	27.59	24.64	291.342	Vertical	Pass
15.0MHz Band	1/#Mid	1717.5	0.16	3.15	27.65	24.66	292.516	Vertical	Pass
		1732.5	0.33	3.31	27.61	24.63	290.475	Vertical	Pass

16 QAM		1747.5	0.28	3.33	27.57	24.52	283.178	Vertical	Pass
20.0MH	1/#Mid	1720	0.34	3.17	27.66	24.83	304.397	Vertical	Pass
z Band		1732.5	0.41	3.32	27.61	24.70	295.117	Vertical	Pass
16 QAM		1745	0.79	3.36	27.56	24.99	315.219	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Max. ERP	
							(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	824.7	9.08	2.01	19.68	2.15	24.60	288.127	Horizontal	Pass
		836.5	9.07	2.01	19.77	2.15	24.68	294.034	Horizontal	Pass
		848.3	8.92	2.02	19.82	2.15	24.57	286.256	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	9.15	2.01	19.70	2.15	24.69	294.278	Horizontal	Pass
		836.5	9.00	2.01	19.77	2.15	24.61	288.747	Horizontal	Pass
		847.5	9.01	2.02	19.81	2.15	24.65	291.805	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	8.96	2.01	19.71	2.15	24.51	282.360	Horizontal	Pass
		836.5	8.82	2.01	19.77	2.15	24.43	277.540	Horizontal	Pass
		846.5	8.86	2.02	19.79	2.15	24.48	280.729	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	8.85	2.01	19.73	2.15	24.42	276.714	Horizontal	Pass
		836.5	8.78	2.01	19.77	2.15	24.39	274.967	Horizontal	Pass
		844	8.93	2.02	19.78	2.15	24.54	284.507	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	9.14	2.01	19.68	2.15	24.66	292.173	Vertical	Pass
		836.5	9.03	2.01	19.77	2.15	24.64	290.935	Vertical	Pass
		848.3	8.97	2.02	19.82	2.15	24.62	289.962	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	9.18	2.01	19.70	2.15	24.72	296.733	Vertical	Pass
		836.5	8.91	2.01	19.77	2.15	24.52	283.040	Vertical	Pass
		847.5	8.97	2.02	19.81	2.15	24.61	288.921	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	8.87	2.01	19.71	2.15	24.42	276.486	Vertical	Pass
		836.5	8.73	2.01	19.77	2.15	24.34	271.421	Vertical	Pass
		846.5	8.93	2.02	19.79	2.15	24.55	285.006	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	9.02	2.01	19.73	2.15	24.59	287.812	Vertical	Pass
		836.5	8.87	2.01	19.77	2.15	24.48	280.550	Vertical	Pass
		844	9.22	2.02	19.78	2.15	24.83	303.952	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Max. ERP	
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	824.7	7.95	2.01	19.68	2.15	23.47	222.329	Horizontal	Pass
		836.5	8.02	2.01	19.77	2.15	23.63	230.668	Horizontal	Pass
		848.3	7.95	2.02	19.82	2.15	23.60	229.015	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	8.20	2.01	19.70	2.15	23.74	236.467	Horizontal	Pass
		836.5	8.11	2.01	19.77	2.15	23.72	235.505	Horizontal	Pass
		847.5	7.92	2.02	19.81	2.15	23.56	227.038	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	8.05	2.01	19.71	2.15	23.60	228.959	Horizontal	Pass
		836.5	8.00	2.01	19.77	2.15	23.61	229.817	Horizontal	Pass
		846.5	8.01	2.02	19.79	2.15	23.63	230.670	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	8.24	2.01	19.73	2.15	23.81	240.384	Horizontal	Pass
		836.5	8.06	2.01	19.77	2.15	23.67	232.823	Horizontal	Pass
		844	8.06	2.02	19.78	2.15	23.67	232.609	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	8.08	2.01	19.68	2.15	23.60	229.172	Vertical	Pass
		836.5	7.95	2.01	19.77	2.15	23.56	226.882	Vertical	Pass
		848.3	8.03	2.02	19.82	2.15	23.68	233.113	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	8.10	2.01	19.70	2.15	23.64	231.275	Vertical	Pass
		836.5	7.98	2.01	19.77	2.15	23.59	228.451	Vertical	Pass
		847.5	7.83	2.02	19.81	2.15	23.47	222.454	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	8.10	2.01	19.71	2.15	23.65	231.815	Vertical	Pass
		836.5	8.03	2.01	19.77	2.15	23.64	231.141	Vertical	Pass
		846.5	7.95	2.02	19.79	2.15	23.57	227.313	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	8.20	2.01	19.73	2.15	23.77	238.241	Vertical	Pass
		836.5	8.21	2.01	19.77	2.15	23.82	240.881	Vertical	Pass
		844	8.15	2.02	19.78	2.15	23.76	237.596	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	0.54	4.54	27.75	23.75	237.322	Vertical	Pass
		2535	0.66	4.69	27.72	23.69	233.871	Vertical	Pass
		2567.5	0.79	4.71	27.71	23.79	239.384	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	0.57	4.55	27.76	23.78	238.760	Vertical	Pass
		2535	0.72	4.69	27.72	23.75	237.205	Vertical	Pass
		2567.5	0.81	4.72	27.70	23.79	239.074	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.54	4.55	27.77	23.76	237.455	Vertical	Pass
		2535	0.71	4.69	27.72	23.74	236.740	Vertical	Pass
		2565	0.83	4.72	27.69	23.80	239.898	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	0.41	4.57	27.78	23.62	230.390	Vertical	Pass
		2535	0.33	4.73	27.72	23.32	214.624	Vertical	Pass
		2565	0.67	4.75	27.68	23.60	229.314	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.35	4.54	27.75	23.56	227.201	Vertical	Pass
		2535	0.78	4.69	27.72	23.81	240.250	Vertical	Pass
		2562.5	0.66	4.71	27.71	23.66	232.116	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	0.19	4.55	27.76	23.40	218.854	Vertical	Pass
		2535	0.79	4.69	27.72	23.82	241.076	Vertical	Pass
		2562.5	0.56	4.72	27.70	23.54	225.749	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.49	4.55	27.77	23.71	234.779	Vertical	Pass
		2535	0.76	4.69	27.72	23.79	239.574	Vertical	Pass
		2560	0.83	4.72	27.69	23.80	239.675	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	0.67	4.57	27.78	23.88	244.075	Vertical	Pass
		2535	0.86	4.73	27.72	23.85	242.862	Vertical	Pass
		2560	0.98	4.75	27.68	23.91	245.767	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 7									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusion
			SG	Cabl e	Antenn a Gain	Max. EIRP	Max. EIRP	Polarizati on Of	
			Level	Loss	(dB)	Averag e	Averag e	Max. ERP	
			(dBm)	(dBm)					
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.41	4.54	27.75	22.80	190.509	Horizontal	Pass
		2535	-0.29	4.69	27.72	22.74	187.835	Horizontal	Pass
		2567.5	-0.26	4.71	27.71	22.74	187.959	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.33	4.55	27.76	22.88	194.188	Horizontal	Pass
		2535	-0.21	4.69	27.72	22.82	191.540	Horizontal	Pass
		2567.5	-0.12	4.72	27.70	22.86	193.053	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	2505	-0.30	4.55	27.77	22.92	196.043	Horizontal	Pass
		2535	-0.22	4.69	27.72	22.81	190.967	Horizontal	Pass
		2565	-0.20	4.72	27.69	22.77	189.137	Horizontal	Pass
10.0MH z Band 16 QAM	1/#Mid	2505	-0.55	4.57	27.78	22.66	184.626	Horizontal	Pass
		2535	-0.27	4.73	27.72	22.72	186.931	Horizontal	Pass
		2565	-0.36	4.75	27.68	22.57	180.594	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	2507.5	-0.59	4.54	27.75	22.62	182.636	Horizontal	Pass
		2535	-0.40	4.69	27.72	22.63	183.399	Horizontal	Pass
		2562.5	-0.34	4.71	27.71	22.66	184.306	Horizontal	Pass
15.0MH z Band 16 QAM	1/#Mid	2507.5	-0.33	4.55	27.76	22.88	194.265	Horizontal	Pass
		2535	-0.18	4.69	27.72	22.85	192.861	Horizontal	Pass
		2562.5	-0.14	4.72	27.70	22.84	192.309	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	2510	-0.59	4.55	27.77	22.63	183.335	Horizontal	Pass
		2535	-0.43	4.69	27.72	22.60	181.901	Horizontal	Pass
		2560	-0.45	4.72	27.69	22.52	178.839	Horizontal	Pass
20.0MH z Band 16 QAM	1/#Mid	2510	-0.28	4.57	27.78	22.93	196.478	Horizontal	Pass
		2535	-0.04	4.73	27.72	22.95	197.357	Horizontal	Pass
		2560	-0.04	4.75	27.68	22.89	194.749	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Max. ERP	
							(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	9.36	1.91	19.21	2.15	24.51	282.221	Vertical	Pass
		707.5	9.30	1.91	19.26	2.15	24.50	282.150	Vertical	Pass
		715.3	9.13	1.93	19.34	2.15	24.39	274.692	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	9.03	1.91	19.21	2.15	24.18	261.622	Vertical	Pass
		707.5	9.13	1.91	19.26	2.15	24.33	270.771	Vertical	Pass
		714.5	9.14	1.93	19.34	2.15	24.40	275.184	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	9.40	1.91	19.23	2.15	24.57	286.203	Vertical	Pass
		707.5	9.35	1.91	19.26	2.15	24.55	285.208	Vertical	Pass
		713.5	9.10	1.92	19.33	2.15	24.36	273.061	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	9.15	1.91	19.25	2.15	24.34	271.365	Vertical	Pass
		707.5	9.00	1.91	19.26	2.15	24.20	262.757	Vertical	Pass
		711	9.31	1.92	19.32	2.15	24.56	285.612	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	9.34	1.91	19.21	2.15	24.49	281.069	Horizontal	Pass
		707.5	9.28	1.91	19.26	2.15	24.48	280.324	Horizontal	Pass
		715.3	9.34	1.93	19.34	2.15	24.60	288.500	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	9.35	1.91	19.21	2.15	24.50	281.850	Horizontal	Pass
		707.5	9.10	1.91	19.26	2.15	24.30	269.403	Horizontal	Pass
		714.5	9.41	1.93	19.34	2.15	24.67	293.113	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	9.53	1.91	19.23	2.15	24.70	295.456	Horizontal	Pass
		707.5	9.44	1.91	19.26	2.15	24.64	291.305	Horizontal	Pass
		713.5	9.03	1.92	19.33	2.15	24.29	268.325	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	9.29	1.91	19.25	2.15	24.48	280.759	Horizontal	Pass
		707.5	9.30	1.91	19.26	2.15	24.50	282.021	Horizontal	Pass
		711	9.51	1.92	19.32	2.15	24.76	299.183	Horizontal	Pass

Radiated Power (EIRP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	8.07	1.91	19.21	2.15	23.22	209.791	Vertical	Pass
		707.5	7.89	1.91	19.26	2.15	23.09	203.907	Vertical	Pass
		715.3	7.85	1.93	19.34	2.15	23.11	204.414	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	8.29	1.91	19.21	2.15	23.44	220.657	Vertical	Pass
		707.5	8.26	1.91	19.26	2.15	23.46	221.843	Vertical	Pass
		714.5	8.32	1.93	19.34	2.15	23.58	227.854	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	8.24	1.91	19.23	2.15	23.41	219.248	Vertical	Pass
		707.5	8.44	1.91	19.26	2.15	23.64	230.944	Vertical	Pass
		713.5	8.26	1.92	19.33	2.15	23.52	224.902	Vertical	Pass
10.0MHz z Band 16 QAM	1/#Mid	704	8.53	1.91	19.25	2.15	23.72	235.571	Vertical	Pass
		707.5	8.37	1.91	19.26	2.15	23.57	227.650	Vertical	Pass
		711	8.47	1.92	19.32	2.15	23.72	235.295	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	8.17	1.91	19.21	2.15	23.32	214.593	Horizontal	Pass
		707.5	8.18	1.91	19.26	2.15	23.38	217.569	Horizontal	Pass
		715.3	7.91	1.93	19.34	2.15	23.17	207.275	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	8.43	1.91	19.21	2.15	23.58	228.244	Horizontal	Pass
		707.5	8.31	1.91	19.26	2.15	23.51	224.333	Horizontal	Pass
		714.5	8.37	1.93	19.34	2.15	23.63	230.419	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	8.32	1.91	19.23	2.15	23.49	223.354	Horizontal	Pass
		707.5	8.45	1.91	19.26	2.15	23.65	231.528	Horizontal	Pass
		713.5	8.38	1.92	19.33	2.15	23.64	231.279	Horizontal	Pass
10.0MHz z Band 16 QAM	1/#Mid	704	8.54	1.91	19.25	2.15	23.73	236.035	Horizontal	Pass
		707.5	8.33	1.91	19.26	2.15	23.53	225.581	Horizontal	Pass
		711	8.51	1.92	19.32	2.15	23.76	237.921	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.7 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Max. ERP	
							(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	9.72	1.91	19.23	2.15	24.89	308.351	Vertical	Pass
		710	9.58	1.91	19.26	2.15	24.78	300.654	Vertical	Pass
		713.5	9.41	1.92	19.33	2.15	24.67	293.247	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	8.92	1.91	19.25	2.15	24.11	257.381	Vertical	Pass
		710	8.89	1.91	19.26	2.15	24.09	256.440	Vertical	Pass
		711	9.57	1.92	19.32	2.15	24.82	303.604	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	8.90	1.91	19.23	2.15	24.07	255.289	Horizontal	Pass
		710	9.62	1.91	19.26	2.15	24.82	303.336	Horizontal	Pass
		713.5	8.74	1.92	19.33	2.15	24.00	250.905	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	8.83	1.91	19.25	2.15	24.02	252.187	Horizontal	Pass
		710	9.66	1.91	19.26	2.15	24.86	306.361	Horizontal	Pass
		711	9.64	1.92	19.32	2.15	24.89	308.583	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequ enc y	Result							Conclu sion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP	Max. ERP	Polarizati on Of Max. ERP	
							Averag e	Averag e		
							(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	8.27	1.91	19.23	2.15	23.44	220.903	Vertical	Pass
		710	8.38	1.91	19.26	2.15	23.58	227.910	Vertical	Pass
		713.5	8.30	1.92	19.33	2.15	23.56	227.084	Vertical	Pass
10.0MH z Band 16 QAM	1/#Mid	709	8.29	1.91	19.25	2.15	23.48	222.690	Vertical	Pass
		710	8.11	1.91	19.26	2.15	23.31	214.317	Vertical	Pass
		711	8.10	1.92	19.32	2.15	23.35	216.204	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	8.24	1.91	19.23	2.15	23.41	219.294	Horizontal	Pass
		710	8.29	1.91	19.26	2.15	23.49	223.138	Horizontal	Pass
		713.5	8.30	1.92	19.33	2.15	23.56	227.183	Horizontal	Pass
10.0MH z Band 16 QAM	1/#Mid	709	8.23	1.91	19.25	2.15	23.42	219.784	Horizontal	Pass
		710	8.40	1.91	19.26	2.15	23.60	229.027	Horizontal	Pass
		711	8.15	1.92	19.32	2.15	23.40	218.875	Horizontal	Pass

Note:

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

§22.917 (e) and §24.238 (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

- ☐ LTE Band 2
LTE Band 4
- ☐ LTE Band 5
LTE Band 7
LTE Band 12
LTE Band 17

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	-52.77	4.04	33.51	-23.30	-13	-10.30	Horizontal
3701.4	-52.13	4.04	33.51	-22.66	-13	-9.66	Vertical
5552.1	-53.82	5.24	35.84	-23.22	-13	-10.22	Vertical
5552.1	-50.74	5.24	35.84	-20.14	-13	-7.14	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-51.13	4.04	33.56	-21.61	-13	-8.61	Horizontal
3760	-52.51	4.04	33.56	-22.99	-13	-9.99	Vertical
5640	-58.73	5.24	35.91	-28.06	-13	-15.06	Vertical
5640	-54.29	5.24	35.91	-23.62	-13	-10.62	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-48.21	4.04	34.00	-18.25	-13	-5.25	Horizontal
3818.6	-53.73	4.04	34.00	-23.77	-13	-10.77	Vertical
5727.9	-49.09	5.24	36.04	-18.29	-13	-5.29	Vertical
5727.9	-59.42	5.24	36.04	-28.62	-13	-15.62	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	-49.00	4.07	33.54	-19.53	-13	-6.53	Horizontal
3720	-52.99	4.07	33.54	-23.52	-13	-10.52	Vertical
5580	-53.00	5.28	35.86	-22.42	-13	-9.42	Vertical
5580	-53.73	5.28	35.86	-23.15	-13	-10.15	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-47.11	4.04	33.56	-17.59	-13	-4.59	Horizontal
3760	-56.13	4.04	33.56	-26.61	-13	-13.61	Vertical
5640	-51.82	5.24	35.91	-21.15	-13	-8.15	Vertical
5640	-55.75	5.24	35.91	-25.08	-13	-12.08	Horizontal
Test Results for High Channel 1900MHz							
3800	-49.81	4.04	34.00	-19.85	-13	-6.85	Horizontal
3800	-48.24	4.04	34.00	-18.28	-13	-5.28	Vertical
5700	-48.33	5.24	36.04	-17.53	-13	-4.53	Vertical
5700	-54.70	5.24	36.04	-23.90	-13	-10.90	Horizontal

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

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

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

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	-52.02	4.02	29.80	-26.24	-13	-13.24	Horizontal
3421.4	-54.55	4.02	29.80	-28.77	-13	-15.77	Vertical
5132.1	-49.78	5.24	35.84	-19.18	-13	-6.18	Vertical
5132.1	-50.60	5.24	35.84	-20.00	-13	-7.00	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-45.84	4.03	30.00	-19.87	-13	-6.87	Horizontal
3465	-47.28	4.03	30.00	-21.31	-13	-8.31	Vertical
5197.5	-51.84	5.25	35.86	-21.23	-13	-8.23	Vertical
5197.5	-48.46	5.25	35.86	-17.85	-13	-4.85	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-52.97	4.05	30.01	-27.01	-13	-14.01	Horizontal
3508.6	-49.08	4.05	30.01	-23.12	-13	-10.12	Vertical
5262.9	-54.41	5.26	35.86	-23.81	-13	-10.81	Vertical
5262.9	-54.82	5.26	35.86	-24.22	-13	-11.22	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	-53.10	4.02	29.80	-27.32	-13	-14.32	Horizontal
3440	-52.31	4.02	29.80	-26.53	-13	-13.53	Vertical
5160	-49.12	5.24	35.84	-18.52	-13	-5.52	Vertical
5160	-51.43	5.24	35.84	-20.83	-13	-7.83	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-54.77	4.03	30.00	-28.80	-13	-15.80	Horizontal
3465	-54.96	4.03	30.00	-28.99	-13	-15.99	Vertical
5197.5	-51.79	5.25	35.86	-21.18	-13	-8.18	Vertical
5197.5	-54.51	5.25	35.86	-23.90	-13	-10.90	Horizontal
Test Results for High Channel 1745MHz							
3490	-48.58	2.91	27.68	-23.81	-13	-10.81	Horizontal
3490	-55.76	2.91	27.68	-30.99	-13	-17.99	Vertical
5235	-55.77	5.26	35.86	-25.17	-13	-12.17	Vertical
5235	-50.25	5.26	35.86	-19.65	-13	-6.65	Horizontal

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

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

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

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-47.04	2.78	27.50	-22.32	-13	-9.32	Horizontal
1649.4	-45.50	2.78	27.50	-20.78	-13	-7.78	Vertical
2474.1	-52.42	2.90	27.80	-27.52	-13	-14.52	Vertical
2474.1	-48.23	2.90	27.80	-23.33	-13	-10.33	Horizontal
117.7	-68.46	1.41	17.79	-52.09	-13	-39.09	Vertical
182.9	-66.26	1.37	16.63	-50.99	-13	-37.99	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.37	2.80	27.48	-24.69	-13	-11.69	Horizontal
1673.0	-47.50	2.80	27.48	-22.82	-13	-9.82	Vertical
2509.5	-47.79	2.91	27.70	-23.00	-13	-10.00	Vertical
2509.5	-53.52	2.91	27.70	-28.73	-13	-15.73	Horizontal
195.3	-68.97	1.34	15.18	-55.12	-13	-42.12	Vertical
153.5	-52.99	1.40	16.14	-38.25	-13	-25.25	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-54.89	2.82	27.43	-30.28	-13	-17.28	Horizontal
1696.6	-53.62	2.82	27.43	-29.01	-13	-16.01	Vertical
2544.9	-56.38	2.92	27.74	-31.56	-13	-18.56	Vertical
2544.9	-54.04	2.92	27.74	-29.22	-13	-16.22	Horizontal
87.0	-64.97	1.49	17.58	-48.88	-13	-35.88	Vertical
155.2	-54.31	1.69	15.70	-40.29	-13	-27.29	Horizontal

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

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-51.40	2.78	27.50	-26.68	-13	-13.68	Horizontal
1658.0	-51.55	2.78	27.50	-26.83	-13	-13.83	Vertical
2487.0	-51.03	2.90	27.80	-26.13	-13	-13.13	Vertical
2487.0	-48.14	2.90	27.80	-23.24	-13	-10.24	Horizontal
82.4	-61.60	1.43	16.93	-46.10	-13	-33.10	Vertical
167.7	-65.66	1.53	16.76	-50.43	-13	-37.43	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.10	2.80	27.48	-24.42	-13	-11.42	Horizontal
1673.0	-52.61	2.80	27.48	-27.93	-13	-14.93	Vertical
2509.5	-52.25	2.91	27.70	-27.46	-13	-14.46	Vertical
2509.5	-57.16	2.91	27.70	-32.37	-13	-19.37	Horizontal
270.9	-59.33	1.49	17.88	-42.94	-13	-29.94	Vertical
277.5	-68.74	1.40	16.10	-54.05	-13	-41.05	Horizontal
Test Results for High Channel 844MHz							
1688.0	-54.83	2.82	27.43	-30.22	-13	-17.22	Horizontal
1688.0	-54.92	2.82	27.43	-30.31	-13	-17.31	Vertical
2532.0	-55.96	2.92	27.74	-31.14	-13	-18.14	Vertical
2532.0	-56.80	2.92	27.74	-31.98	-13	-18.98	Horizontal
162.1	-56.87	1.55	16.71	-41.71	-13	-28.71	Vertical
245.6	-58.65	1.37	15.22	-44.81	-13	-31.81	Horizontal

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

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

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

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005	-64.00	5.23	35.81	-33.42	-25	-8.42	Horizontal
5005	-65.53	5.23	35.81	-34.95	-25	-9.95	Vertical
7507.5	-67.36	5.67	36.85	-36.18	-25	-11.18	Vertical
7507.5	-67.92	5.67	36.85	-36.74	-25	-11.74	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-62.96	5.23	35.82	-32.37	-25	-7.37	Horizontal
5070	-69.72	5.23	35.82	-39.13	-25	-14.13	Vertical
7605	-64.33	5.67	36.85	-33.15	-25	-8.15	Vertical
7605	-71.88	5.67	36.85	-40.70	-25	-15.70	Horizontal
Test Results for High Channel 2567.5MHz							
5135	-67.10	5.24	35.83	-36.51	-25	-11.51	Horizontal
5135	-69.76	5.24	35.83	-39.17	-25	-14.17	Vertical
7702.5	-72.19	5.68	36.87	-41.00	-25	-16.00	Vertical
7702.5	-69.47	5.68	36.87	-38.28	-25	-13.28	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020	-64.90	5.23	35.82	-34.31	-25	-9.31	Horizontal
5020	-68.14	5.23	35.82	-37.55	-25	-12.55	Vertical
7530	-63.89	5.67	36.86	-32.70	-25	-7.70	Vertical
7530	-64.65	5.67	36.86	-33.46	-25	-8.46	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-71.40	5.23	35.82	-40.81	-25	-15.81	Horizontal
5070	-66.70	5.23	35.82	-36.11	-25	-11.11	Vertical
7605	-63.42	5.67	36.85	-32.24	-25	-7.24	Vertical
7605	-67.91	5.67	36.85	-36.73	-25	-11.73	Horizontal
Test Results for High Channel 2560MHz							
5120	-72.70	5.24	35.83	-42.11	-25	-17.11	Horizontal
5120	-68.79	5.24	35.83	-38.20	-25	-13.20	Vertical
7680	-68.68	5.70	36.88	-37.50	-25	-12.50	Vertical
7680	-72.75	5.70	36.88	-41.57	-25	-16.57	Horizontal

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

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

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

9.5 LTE BAND 12

QPSK EIRP POWER FOR LTE BAND 12 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-53.84	2.60	27.20	-29.24	-13	-16.24	Horizontal
1399.4	-55.38	2.60	27.20	-30.78	-13	-17.78	Vertical
2099.1	-55.07	2.85	27.54	-30.38	-13	-17.38	Vertical
2099.1	-50.06	2.85	27.54	-25.37	-13	-12.37	Horizontal
82.5	-68.93	1.47	16.07	-54.33	-13	-41.33	Vertical
214.5	-58.03	1.78	15.94	-43.88	-13	-30.88	Horizontal
Test Results For Mid Channel 707.5MHz							
1415	-52.09	2.61	27.28	-27.42	-13	-14.42	Horizontal
1415	-47.64	2.61	27.28	-22.97	-13	-9.97	Vertical
2122.5	-52.19	2.87	27.59	-27.47	-13	-14.47	Vertical
2122.5	-58.12	2.87	27.59	-33.40	-13	-20.40	Horizontal
197.5	-69.10	1.57	16.28	-54.40	-13	-41.40	Vertical
112.5	-57.94	1.46	15.72	-43.68	-13	-30.68	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-49.95	2.63	27.28	-25.30	-13	-12.30	Horizontal
1430.6	-51.02	2.63	27.28	-26.37	-13	-13.37	Vertical
2145.9	-51.36	2.88	27.60	-26.64	-13	-13.64	Vertical
2145.9	-51.49	2.88	27.60	-26.77	-13	-13.77	Horizontal
240.3	-50.93	1.34	17.07	-35.20	-13	-22.20	Vertical
181.2	-58.05	1.76	17.97	-41.84	-13	-28.84	Horizontal

QPSK EIRP POWER FOR LTE BAND 12 (10MHZ BANDWIDTH)

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408	-53.28	2.61	27.26	-28.63	-13	-15.63	Horizontal
1408	-52.68	2.61	27.26	-28.03	-13	-15.03	Vertical
2112	-50.07	2.87	27.58	-25.36	-13	-12.36	Vertical
2112	-51.79	2.87	27.58	-27.08	-13	-14.08	Horizontal
104.7	-68.73	1.75	17.21	-53.27	-13	-40.27	Vertical
98.6	-49.79	1.30	17.50	-33.59	-13	-20.59	Horizontal
Test Results for Mid Channel 707.5MHz							
1415	-53.54	2.61	27.28	-28.87	-13	-15.87	Horizontal
1415	-53.25	2.61	27.28	-28.58	-13	-15.58	Vertical
2122.5	-49.14	2.87	27.59	-24.42	-13	-11.42	Vertical
2122.5	-54.38	2.87	27.59	-29.66	-13	-16.66	Horizontal
103.5	-69.15	1.38	15.38	-55.15	-13	-42.15	Vertical
278.9	-59.41	1.69	17.25	-43.85	-13	-30.85	Horizontal
Test Results for High Channel 711MHz							
1422	-50.62	2.62	27.28	-25.96	-13	-12.96	Horizontal
1422	-53.33	2.62	27.28	-28.67	-13	-15.67	Vertical
2133	-56.71	2.87	27.60	-31.98	-13	-18.98	Vertical
2133	-55.41	2.87	27.60	-30.68	-13	-17.68	Horizontal
187.8	-49.81	1.72	17.31	-34.22	-13	-21.22	Vertical
186.5	-60.93	1.78	17.82	-44.89	-13	-31.89	Horizontal

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

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

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

9.6 LTE BAND 17

QPSK EIRP POWER FOR LTE BAND 17 (5MHZ BANDWIDTH)

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413	-59.50	2.61	27.28	-34.83	-13	-21.83	Horizontal
1413	-56.49	2.61	27.28	-31.82	-13	-18.82	Vertical
2119.5	-55.69	2.87	27.59	-30.97	-13	-17.97	Vertical
2119.5	-55.41	2.87	27.59	-30.69	-13	-17.69	Horizontal
87.5	-68.35	1.42	15.39	-54.37	-13	-41.37	Vertical
233.8	-67.55	1.62	16.70	-52.47	-13	-39.47	Horizontal
Test Results For Mid Channel 710MHz							
1420	-50.72	2.62	27.30	-26.04	-13	-13.04	Horizontal
1420	-50.74	2.62	27.30	-26.06	-13	-13.06	Vertical
2130	-55.50	2.87	27.62	-30.75	-13	-17.75	Vertical
2130	-54.35	2.87	27.62	-29.60	-13	-16.60	Horizontal
98.0	-58.54	1.53	17.81	-42.26	-13	-29.26	Vertical
224.4	-59.89	1.61	16.11	-45.40	-13	-32.40	Horizontal
Test Results for High Channel 713.5MHz							
1427	-53.73	2.66	27.28	-29.11	-13	-16.11	Horizontal
1427	-56.04	2.66	27.28	-31.42	-13	-18.42	Vertical
2140.5	-56.82	2.88	27.60	-32.10	-13	-19.10	Vertical
2140.5	-55.18	2.88	27.60	-30.46	-13	-17.46	Horizontal
230.2	-53.50	1.45	17.08	-37.88	-13	-24.88	Vertical
90.2	-57.41	1.68	16.43	-42.66	-13	-29.66	Horizontal

QPSK EIRP POWER FOR LTE BAND 17 (10MHZ BANDWIDTH)

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418	-45.73	2.62	27.30	-21.05	-13	-8.05	Horizontal
1418	-49.95	2.62	27.30	-25.27	-13	-12.27	Vertical
2127	-47.69	2.87	27.62	-22.94	-13	-9.94	Vertical
2127	-48.71	2.87	27.62	-23.96	-13	-10.96	Horizontal
178.4	-69.63	1.74	16.78	-54.59	-13	-41.59	Vertical
268.6	-70.16	1.53	15.77	-55.92	-13	-42.92	Horizontal
Test Results for Mid Channel 710MHz							
1420	-42.93	2.62	27.30	-18.25	-13	-5.25	Horizontal
1420	-52.59	2.62	27.30	-27.91	-13	-14.91	Vertical
2130	-44.19	2.87	27.62	-19.44	-13	-6.44	Vertical
2130	-48.31	2.87	27.62	-23.56	-13	-10.56	Horizontal
202.2	-69.21	1.53	16.81	-53.92	-13	-40.92	Vertical
245.7	-63.29	1.59	17.18	-47.70	-13	-34.70	Horizontal
Test Results for High Channel 711MHz							
1422	-55.51	2.62	27.30	-30.83	-13	-17.83	Horizontal
1422	-48.39	2.62	27.30	-23.71	-13	-10.71	Vertical
2133	-53.50	2.87	27.62	-28.75	-13	-15.75	Vertical
2133	-49.71	2.87	27.62	-24.96	-13	-11.96	Horizontal
270.4	-67.84	1.32	15.07	-54.09	-13	-41.09	Vertical
146.0	-56.38	1.69	16.03	-42.04	-13	-29.04	Horizontal

Note: $P_{Mea}(dBm) = Power(dBm) + ARpl(dBm)$

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

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

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 3.6V, Normal, DC 3.8V and High voltage, DC 4.4V.

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
LTE Band 4
- ☐ LTE Band 5
LTE Band 7
LTE Band 12
LTE Band 17

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)				
3.6	1880	-9.5	-0.005053	2.5
3.8	1880	-7.8	-0.004149	2.5
4.4	1880	-8.3	-0.004415	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	-9.7	-0.005160	2.5
Extreme (50C)	1880	-7.6	-0.004043	2.5
Extreme (40C)	1880	-7.7	-0.004096	2.5
Extreme (30C)	1880	-8.7	-0.004628	2.5
Extreme (10C)	1880	-7.3	-0.003883	2.5
Extreme (0C)	1880	-9.2	-0.004894	2.5
Extreme (-10C)	1880	-6.9	-0.003670	2.5
Extreme (-20C)	1880	-7.1	-0.003777	2.5
Extreme (-30C)	1880	-6.8	-0.003617	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)				
3.6	1880	-3.2	-0.001702	2.5
3.8	1880	-2.1	-0.001117	2.5
4.4	1880	-2.9	-0.001543	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	-3.9	-0.002074	2.5
Extreme (50C)	1880	-1.1	-0.000585	2.5
Extreme (40C)	1880	-1.7	-0.000904	2.5
Extreme (30C)	1880	-2.9	-0.001543	2.5
Extreme (10C)	1880	-3.8	-0.002021	2.5
Extreme (0C)	1880	-1.7	-0.000904	2.5
Extreme (-10C)	1880	-2.1	-0.001117	2.5
Extreme (-20C)	1880	-1.9	-0.001011	2.5
Extreme (-30C)	1880	-3.2	-0.001702	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)				
3.6	1732.5	-9.4	-0.005426	2.5
3.8	1732.5	-8.3	-0.004791	2.5
4.4	1732.5	-10.4	-0.006003	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	-9.4	-0.005426	2.5
Extreme (50C)	1732.5	-10.1	-0.005830	2.5
Extreme (40C)	1732.5	-9.8	-0.005657	2.5
Extreme (30C)	1732.5	-8.8	-0.005079	2.5
Extreme (10C)	1732.5	-10.1	-0.005830	2.5
Extreme (0C)	1732.5	-10.3	-0.005945	2.5
Extreme (-10C)	1732.5	-10.6	-0.006118	2.5
Extreme (-20C)	1732.5	-9.8	-0.005657	2.5
Extreme (-30C)	1732.5	-10.2	-0.005887	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)				
3.6	1732.5	-6.7	-0.003867	2.5
3.8	1732.5	-6.9	-0.003983	2.5
4.4	1732.5	-6.7	-0.003867	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	-6.8	-0.003925	2.5
Extreme (50C)	1732.5	-8.6	-0.004964	2.5
Extreme (40C)	1732.5	-6.3	-0.003636	2.5
Extreme (30C)	1732.5	-7.6	-0.004387	2.5
Extreme (10C)	1732.5	-6.2	-0.003579	2.5
Extreme (0C)	1732.5	-5.9	-0.003405	2.5
Extreme (-10C)	1732.5	-6.1	-0.003521	2.5
Extreme (-20C)	1732.5	-7.7	-0.004444	2.5
Extreme (-30C)	1732.5	-6.6	-0.003810	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)				
3.6	836.5	-4.3	-0.005140	2.5
3.8	836.5	-4.2	-0.005021	2.5
4.4	836.5	-5.1	-0.006097	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	-3.6	-0.004304	2.5
Extreme (50C)	836.5	-4.6	-0.005499	2.5
Extreme (40C)	836.5	-2.1	-0.002510	2.5
Extreme (30C)	836.5	-3.9	-0.004662	2.5
Extreme (10C)	836.5	-3.8	-0.004543	2.5
Extreme (0C)	836.5	-2.7	-0.003228	2.5
Extreme (-10C)	836.5	-4.3	-0.005140	2.5
Extreme (-20C)	836.5	-4.1	-0.004901	2.5
Extreme (-30C)	836.5	-3.3	-0.003945	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)				
3.6	836.5	-7.2	-0.008607	2.5
3.8	836.5	-6.5	-0.007770	2.5
4.4	836.5	-6.9	-0.008249	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	-6.8	-0.008129	2.5
Extreme (50C)	836.5	-5.9	-0.007053	2.5
Extreme (40C)	836.5	-6.9	-0.008249	2.5
Extreme (30C)	836.5	-7.1	-0.008488	2.5
Extreme (10C)	836.5	-7.3	-0.008727	2.5
Extreme (0C)	836.5	-6.3	-0.007531	2.5
Extreme (-10C)	836.5	-7.1	-0.008488	2.5
Extreme (-20C)	836.5	-5.9	-0.007053	2.5
Extreme (-30C)	836.5	-6.8	-0.008129	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)				
3.6	2535	-3.9	-0.001538	2.5
3.8	2535	-4.1	-0.001621	2.5
4.4	2535	-4.4	-0.001736	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	-4.31	-0.001700	2.5
Extreme (50C)	2535	-4.13	-0.001629	2.5
Extreme (40C)	2535	-6.23	-0.002458	2.5
Extreme (30C)	2535	-5.29	-0.002087	2.5
Extreme (10C)	2535	-3.83	-0.001511	2.5
Extreme (0C)	2535	-3.94	-0.001554	2.5
Extreme (-10C)	2535	-3.15	-0.001243	2.5
Extreme (-20C)	2535	-4.63	-0.001826	2.5
Extreme (-30C)	2535	-4.77	-0.001882	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)				
3.6	2535	0.1	0.000020	2.5
3.8	2535	0.9	0.000367	2.5
4.4	2535	0.6	0.000217	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	1.0	0.000394	2.5
Extreme (50C)	2535	1.2	0.000473	2.5
Extreme (40C)	2535	1.3	0.000521	2.5
Extreme (30C)	2535	-0.1	-0.000039	2.5
Extreme (10C)	2535	-0.5	-0.000197	2.5
Extreme (0C)	2535	1.1	0.000434	2.5
Extreme (-10C)	2535	1.2	0.000469	2.5
Extreme (-20C)	2535	0.8	0.000316	2.5
Extreme (-30C)	2535	0.3	0.000118	2.5

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

10.5 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	707.5	-3.8	-0.005385	2.5
3.8	707.5	-3.8	-0.005385	2.5
4.4	707.5	-3.6	-0.005046	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-3.6	-0.005088	2.5
Extreme (50C)	707.5	-2.4	-0.003392	2.5
Extreme (40C)	707.5	-5.9	-0.008339	2.5
Extreme (30C)	707.5	-2.7	-0.003816	2.5
Extreme (10C)	707.5	-6.1	-0.008622	2.5
Extreme (0C)	707.5	-3.5	-0.004947	2.5
Extreme (-10C)	707.5	-5.9	-0.008339	2.5
Extreme (-20C)	707.5	-5.5	-0.007774	2.5
Extreme (-30C)	707.5	-6.2	-0.008763	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	707.5	-1.6	-0.002261	2.5
3.8	707.5	-1.0	-0.001413	2.5
4.4	707.5	-1.2	-0.001696	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-1.9	-0.002686	2.5
Extreme (50C)	707.5	-1.7	-0.002403	2.5
Extreme (40C)	707.5	-1.1	-0.001555	2.5
Extreme (30C)	707.5	-0.4	-0.000594	2.5
Extreme (10C)	707.5	-5.4	-0.007675	2.5
Extreme (0C)	707.5	-3.8	-0.005385	2.5
Extreme (-10C)	707.5	-1.7	-0.002403	2.5
Extreme (-20C)	707.5	-3.8	-0.005385	2.5
Extreme (-30C)	707.5	-0.4	-0.000594	2.5

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

10.6 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	710.0	-3.6	-0.005113	2.5
3.8	710.0	-2.0	-0.002873	2.5
4.4	710.0	-3.8	-0.005296	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	-7.0	-0.009831	2.5
Extreme (50C)	710.0	-6.4	-0.009000	2.5
Extreme (40C)	710.0	-3.7	-0.005254	2.5
Extreme (30C)	710.0	-5.7	-0.008028	2.5
Extreme (10C)	710.0	-6.1	-0.008592	2.5
Extreme (0C)	710.0	-3.7	-0.005211	2.5
Extreme (-10C)	710.0	-2.8	-0.003944	2.5
Extreme (-20C)	710.0	-10.3	-0.014507	2.5
Extreme (-30C)	710.0	-7.2	-0.010141	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	710.0	-4.7	-0.006620	2.5
3.8	710.0	-5.0	-0.007042	2.5
4.4	710.0	-4.5	-0.006338	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	-4.5	-0.006338	2.5
Extreme (50C)	710.0	-5.6	-0.007887	2.5
Extreme (40C)	710.0	-5.1	-0.007183	2.5
Extreme (30C)	710.0	-4.6	-0.006479	2.5
Extreme (10C)	710.0	-4.7	-0.006620	2.5
Extreme (0C)	710.0	-5.1	-0.007183	2.5
Extreme (-10C)	710.0	-5.4	-0.007606	2.5
Extreme (-20C)	710.0	-4.9	-0.006901	2.5
Extreme (-30C)	710.0	-5.3	-0.007465	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.

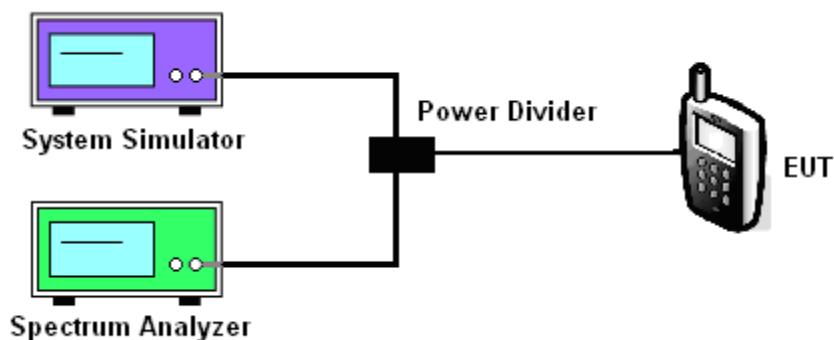
11.2 Measuring Instruments

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 Band2
- LTE Band 4
- ☐ LTE Band5
- LTE Band 7
- LTE Band 12
- LTE Band 17

Test data reference attachment.

----END OF REPORT----