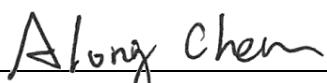


FCC Test Report

FCC ID : 2AIHD2045
Equipment : HW-AG45
Model No. : 010-2045
Brand Name : Samsara
Applicant : Samsara Networks Inc.
Address : 444 De Haro Street, San Francisco, CA 94107,
U.S.A.
Standard : 47 CFR FCC Part 24 Subpart E
Received Date : Nov. 20, 2018
Tested Date : Jan. 08 ~ Jan. 24, 2019

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FG8N2001	Rev. 01	Initial issue	Feb. 25, 2019

Summary of Test Results

FCC Rules	Test Items	Measured	Result
2.1046 / 24.232(c)	Equivalent Isotropically Radiated Power	Power[dBm]: 27.20	Pass
2.1053 / 24.238(a)	Radiated Emissions	Meet the requirement of limit	Pass
2.1051 / 24.238(a)	Conducted Emissions	Meet the requirement of limit	Pass
2.1051 / 24.238(a)	Band Edge	Meet the requirement of limit	Pass
2.1049 / 24.238(b)	Occupied Bandwidth	Meet the requirement of limit	Pass
2.1051 / 24.232(d)	Peak to average ratio	Meet the requirement of limit	Pass
2.1055 / 24.235	Frequency Stability	Meet the requirement of limit	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared values of gain for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of the gain.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	LTE Band 2: Channel Bandwidth: 1.4MHz: 1850.7~1909.3 MHz Channel Bandwidth: 3MHz: 1851.5 MHz ~ 1908.5 MHz Channel Bandwidth: 5MHz: 1852.5 MHz ~ 1907.5 MHz Channel Bandwidth: 10MHz: 1855 MHz ~ 1905 MHz Channel Bandwidth: 15MHz: 1857.5 MHz ~ 1902.5 MHz Channel Bandwidth: 20MHz: 1860 MHz ~ 1900 MHz
Modulation	QPSK, 16QAM (Uplink)
Release Version	13 Cat M1
Duplex Mode	FDD
H/W Version	1.0
S/W Version	2019-01-25-0725-app594-NRF52840-r-310a6223b2-combined.hex

1.1.2 Maximum EIRP and Emission Designator

Mode	Modulation	Maximum EIRP (W)	Emission Designator
LTE Band 2, CB: 1.4MHz	QPSK	0.500	1M10G7D
LTE Band 2, CB: 1.4MHz	16QAM	0.499	1M12W7D
LTE Band 2, CB: 3MHz	QPSK	0.506	1M13G7D
LTE Band 2, CB: 3MHz	16QAM	0.505	1M20W7D
LTE Band 2, CB: 5MHz	QPSK	0.506	1M11G7D
LTE Band 2, CB: 5MHz	16QAM	0.501	1M22W7D
LTE Band 2, CB: 10MHz	QPSK	0.519	1M16G7D
LTE Band 2, CB: 10MHz	16QAM	0.513	1M23W7D
LTE Band 2, CB: 15MHz	QPSK	0.525	1M15G7D
LTE Band 2, CB: 15MHz	16QAM	0.514	1M30W7D
LTE Band 2, CB: 20MHz	QPSK	0.521	1M18G7D
LTE Band 2, CB: 20MHz	16QAM	0.505	1M25W7D

1.1.3 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	PIFA	2.48	No	---

1.1.4 EUT Operational Condition

Supply Voltage	3.6Vdc (AA battery x4)		
Operational Voltage	<input checked="" type="checkbox"/> Vnom (3.6 V)	<input checked="" type="checkbox"/> Vmax (3.7 V)	<input checked="" type="checkbox"/> Vmin (2.45 V)
Operational Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (75°C)	<input checked="" type="checkbox"/> Tmin (-35°C)

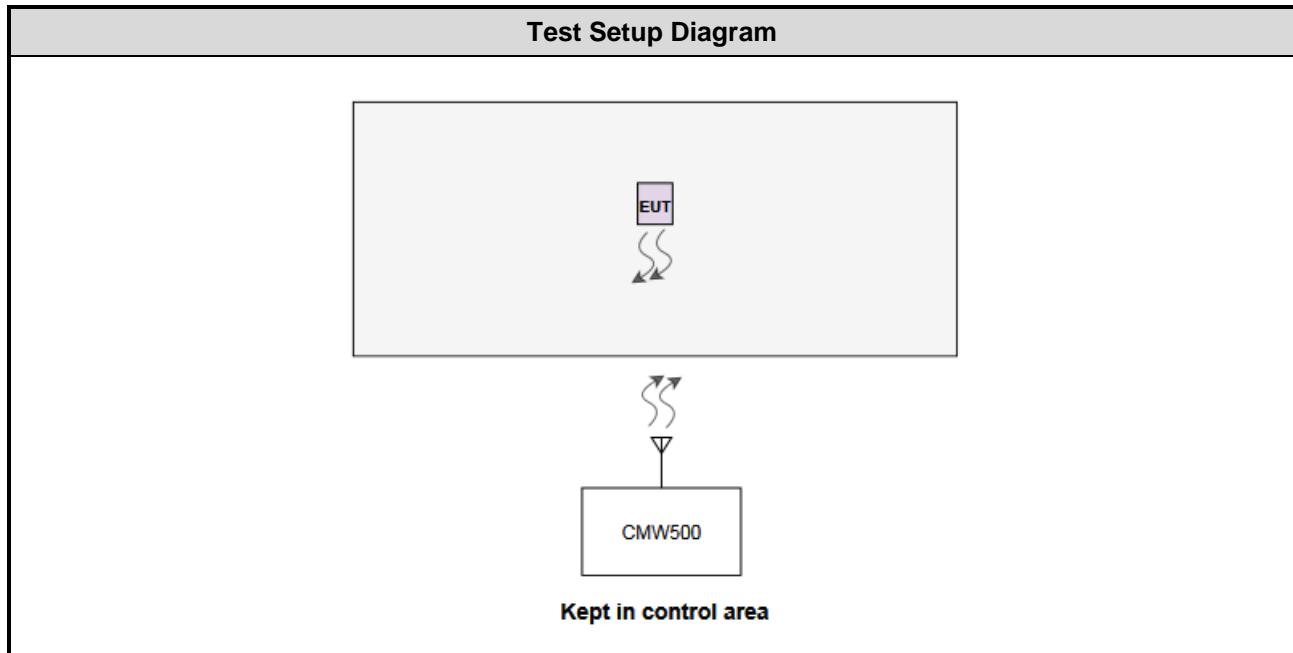
1.1.5 Operating Channel List

LTE Band 2		
Channel Bandwidth (MHz)	Channel	Frequency (MHz)
1.4	18607	1850.7
1.4	18900	1880.0
1.4	19193	1909.3
3	18615	1851.5
3	18900	1880.0
3	19185	1908.5
5	18625	1852.5
5	18900	1880.0
5	19175	1907.5
10	18650	1855.0
10	18900	1880.0
10	19150	1905.0
15	18675	1857.5
15	18900	1880.0
15	19125	1902.5
20	18700	1860.0
20	18900	1880.0
20	19100	1900.0

1.2 Local Support Equipment List

N/A

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Wideband Radio Communication Tester	R&S	CMW500	106070	Feb. 12, 2018	Feb. 11, 2019
Spectrum Analyzer	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 07, 2019	Jan. 06, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Oct. 01, 2018	Sep. 30, 2019
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Oct. 01, 2018	Sep. 30, 2019
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Oct. 01, 2018	Sep. 30, 2019
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Oct. 01, 2018	Sep. 30, 2019
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Oct. 01, 2018	Sep. 30, 2019
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Oct. 01, 2018	Sep. 30, 2019
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Wideband Radio Communication Tester	R&S	CMW500	106070	Feb. 12, 2018	Feb. 11, 2019
Spectrum Analyzer	R&S	FSV40	101063	Apr. 16, 2018	Apr. 15, 2019
Spectrum Analyzer	Keysight	N9010A	MY54510374	Jun. 21, 2018	Jun. 20, 2019
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Dec. 05, 2018	Dec. 04, 2019
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 25, 2018	Oct. 24, 2019
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards.

47 CFR FCC Part 24 Subpart E

ANSI C63.4-2014

ANSI C63.26-2015

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Frequency error	±34.134 Hz
Temperature	±0.6 °C
Conducted emission	±2.670 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition and Location Information

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH03-WS	20°C / 67%	Roger Lu
RF conducted	TH01-WS	22°C / 64%	Roger Lu

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

LTE Band 2			
Test item	Channel Bandwidth	Modulation	Test channel
E.I.R.P	1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz	QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM	18607 / 18900 / 19193 18615 / 18900 / 19185 18625 / 18900 / 19175 18650 / 18900 / 19150 18675 / 18900 / 19125 18700 / 18900 / 19100
Radiated Emission ≤ 1GHz	15 MHz	QPSK	18900
Radiated Emission > 1GHz	15 MHz	QPSK	18675 / 18900 / 19125
Band Edge	1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz	QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM QPSK / 16QAM	18607 / 19193 18615 / 19185 18625 / 19175 18650 / 19150 18675 / 19125 18700 / 19100
Frequency Stability	1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz	QPSK QPSK QPSK QPSK QPSK QPSK	18900 18900 18900 18900 18900 18900

Note:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. The selected bandwidth of Radiated Emission is the maximum power bandwidth.

3 Test Results

3.1 Equivalent Isotropically Radiated Power

3.1.1 Limit of Equivalent Isotropically Radiated Power

Mobile and portable stations are limited to 2 watts EIRP.

3.1.2 Test Procedures

For Conducted power measurement:

1. The EUT links up with simulator and is set to maximum output power level at low / middle / high channel.
2. Measure the output power of low / middle / high channel of the EUT.

For EIRP measurement:

EIPR can be calculated by below formula from KDB 412172 D01.

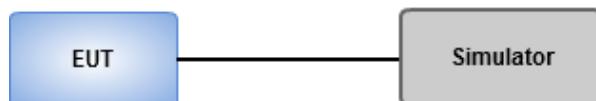
$$EIRP = P_T + G_T - L_C$$

P_T = transmitter output power, in dBm.

G_T = gain of the transmitting antenna, in dBi (EIRP).

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

3.1.3 Test Setup



3.1.4 Test Result of Equivalent Isotropically Radiated Power (dBm)

Mode	LTE Band 2, CB: 1.4MHz								
Modulation	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18607	1850.7	1#0	0	24.39	2.48	26.87	0.486	2
			1#5	0	24.41	2.48	26.89	0.489	2
			6#0	0	24.35	2.48	26.83	0.482	2
	18900	1880.0	1#0	0	24.43	2.48	26.91	0.491	2
			1#5	0	24.51	2.48	26.99	0.500	2
			6#0	0	24.45	2.48	26.93	0.493	2
	19193	1909.3	1#0	0	24.38	2.48	26.86	0.485	2
			1#5	0	24.42	2.48	26.90	0.490	2
			6#0	0	24.39	2.48	26.87	0.486	2
16QAM	18607	1850.7	1#0	0	24.35	2.48	26.83	0.482	2
			1#5	0	24.36	2.48	26.84	0.483	2
			6#0	0	24.34	2.48	26.82	0.481	2
	18900	1880.0	1#0	0	24.40	2.48	26.88	0.488	2
			1#5	0	24.50	2.48	26.98	0.499	2
			6#0	0	24.42	2.48	26.90	0.490	2
	19193	1909.3	1#0	0	24.21	2.48	26.69	0.467	2
			1#5	0	24.35	2.48	26.83	0.482	2
			6#0	0	24.10	2.48	26.58	0.455	2

LTE Band 2, CB: 3MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18615	1851.5	1#0	0	24.35	2.48	26.83	0.482	2
			1#0	1	24.32	2.48	26.80	0.479	2
			1#5	0	24.46	2.48	26.94	0.494	2
			1#5	1	24.38	2.48	26.86	0.485	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	1	24.42	2.48	26.90	0.490	2
			6#0	0	24.30	2.48	26.78	0.476	2
			6#0	1	24.24	2.48	26.72	0.470	2
	18900	1880	1#0	0	24.47	2.48	26.95	0.495	2
			1#0	1	24.49	2.48	26.97	0.498	2
			1#5	0	24.56	2.48	27.04	0.506	2
			1#5	1	24.45	2.48	26.93	0.493	2
			3#0	0	24.48	2.48	26.96	0.497	2
			3#3	1	24.40	2.48	26.88	0.488	2
			6#0	0	24.52	2.48	27.00	0.501	2
			6#0	1	24.43	2.48	26.91	0.491	2
	19185	1908.5	1#0	0	24.36	2.48	26.84	0.483	2
			1#0	1	24.34	2.48	26.82	0.481	2
			1#5	0	24.48	2.48	26.96	0.497	2
			1#5	1	24.45	2.48	26.93	0.493	2
			3#0	0	24.30	2.48	26.78	0.476	2
			3#3	1	24.42	2.48	26.90	0.490	2
			6#0	0	24.38	2.48	26.86	0.485	2
			6#0	1	24.29	2.48	26.77	0.475	2

LTE Band 2, CB: 3MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
16QAM	18615	1851.5	1#0	0	24.33	2.48	26.81	0.480	2
			1#0	1	24.27	2.48	26.75	0.473	2
			1#5	0	24.34	2.48	26.82	0.481	2
			1#5	1	24.29	2.48	26.77	0.475	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	1	24.42	2.48	26.90	0.490	2
			6#0	0	24.28	2.48	26.76	0.474	2
			6#0	1	24.31	2.48	26.79	0.478	2
	18900	1880	1#0	0	24.40	2.48	26.88	0.488	2
			1#0	1	24.43	2.48	26.91	0.491	2
			1#5	0	24.53	2.48	27.01	0.502	2
			1#5	1	24.48	2.48	26.96	0.497	2
			3#0	0	24.55	2.48	27.03	0.505	2
			3#3	1	24.51	2.48	26.99	0.500	2
			6#0	0	24.52	2.48	27.00	0.501	2
			6#0	1	24.42	2.48	26.90	0.490	2
	19185	1908.5	1#0	0	24.27	2.48	26.75	0.473	2
			1#0	1	24.19	2.48	26.67	0.465	2
			1#5	0	24.28	2.48	26.76	0.474	2
			1#5	1	24.15	2.48	26.63	0.460	2
			3#0	0	24.49	2.48	26.97	0.498	2
			3#3	1	24.45	2.48	26.93	0.493	2
			6#0	0	24.32	2.48	26.80	0.479	2
			6#0	1	24.16	2.48	26.64	0.461	2

LTE Band 2, CB: 5MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18625	1852.5	1#0	0	24.43	2.48	26.91	0.491	2
			1#0	1	24.48	2.48	26.96	0.497	2
			1#5	1	24.51	2.48	26.99	0.500	2
			1#5	3	24.43	2.48	26.91	0.491	2
			3#0	0	24.29	2.48	26.77	0.475	2
			3#3	3	24.35	2.48	26.83	0.482	2
			6#0	0	24.25	2.48	26.73	0.471	2
			6#0	3	24.26	2.48	26.74	0.472	2
	18900	1880.0	1#0	0	24.45	2.48	26.93	0.493	2
			1#0	1	24.50	2.48	26.98	0.499	2
			1#5	1	24.56	2.48	27.04	0.506	2
			1#5	3	24.50	2.48	26.98	0.499	2
			3#0	0	24.51	2.48	26.99	0.500	2
			3#3	3	24.53	2.48	27.01	0.502	2
			6#0	0	24.44	2.48	26.92	0.492	2
			6#0	3	24.46	2.48	26.94	0.494	2
	19175	1907.5	1#0	0	24.50	2.48	26.98	0.499	2
			1#0	1	24.51	2.48	26.99	0.500	2
			1#5	1	24.53	2.48	27.01	0.502	2
			1#5	3	24.42	2.48	26.90	0.490	2
			3#0	0	24.43	2.48	26.91	0.491	2
			3#3	3	24.49	2.48	26.97	0.498	2
			6#0	0	24.29	2.48	26.77	0.475	2
			6#0	3	24.35	2.48	26.83	0.482	2

LTE Band 2, CB: 5MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
16QAM	18625	1852.5	1#0	0	24.45	2.48	26.93	0.493	2
			1#0	1	24.42	2.48	26.90	0.490	2
			1#5	1	24.43	2.48	26.91	0.491	2
			1#5	3	24.51	2.48	26.99	0.500	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	3	24.36	2.48	26.84	0.483	2
			6#0	0	24.31	2.48	26.79	0.478	2
			6#0	3	24.32	2.48	26.80	0.479	2
	18900	1880.0	1#0	0	24.41	2.48	26.89	0.489	2
			1#0	1	24.43	2.48	26.91	0.491	2
			1#5	1	24.52	2.48	27.00	0.501	2
			1#5	3	24.48	2.48	26.96	0.497	2
			3#0	0	24.46	2.48	26.94	0.494	2
			3#3	3	24.49	2.48	26.97	0.498	2
			6#0	0	24.42	2.48	26.90	0.490	2
			6#0	3	24.43	2.48	26.91	0.491	2
	19175	1907.5	1#0	0	24.32	2.48	26.80	0.479	2
			1#0	1	24.15	2.48	26.63	0.460	2
			1#5	1	24.22	2.48	26.70	0.468	2
			1#5	3	24.05	2.48	26.53	0.450	2
			3#0	0	24.45	2.48	26.93	0.493	2
			3#3	3	24.48	2.48	26.96	0.497	2
			6#0	0	24.35	2.48	26.83	0.482	2
			6#0	3	24.45	2.48	26.93	0.493	2

LTE Band 2, CB: 10MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18650	1855.0	1#0	0	24.55	2.48	27.03	0.505	2
			1#0	3	24.53	2.48	27.01	0.502	2
			1#5	3	24.59	2.48	27.07	0.509	2
			1#5	7	24.52	2.48	27.00	0.501	2
			3#0	0	24.31	2.48	26.79	0.478	2
			3#3	7	24.39	2.48	26.87	0.486	2
			6#0	0	24.32	2.48	26.80	0.479	2
			6#0	7	24.43	2.48	26.91	0.491	2
	18900	1880.0	1#0	0	24.61	2.48	27.09	0.512	2
			1#0	3	24.58	2.48	27.06	0.508	2
			1#5	3	24.67	2.48	27.15	0.519	2
			1#5	7	24.61	2.48	27.09	0.512	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	7	24.45	2.48	26.93	0.493	2
			6#0	0	24.38	2.48	26.86	0.485	2
			6#0	7	24.39	2.48	26.87	0.486	2
	19150	1905.0	1#0	0	24.54	2.48	27.02	0.504	2
			1#0	3	24.52	2.48	27.00	0.501	2
			1#5	3	24.56	2.48	27.04	0.506	2
			1#5	7	24.52	2.48	27.00	0.501	2
			3#0	0	24.42	2.48	26.90	0.490	2
			3#3	7	24.45	2.48	26.93	0.493	2
			6#0	0	24.42	2.48	26.90	0.490	2
			6#0	7	24.28	2.48	26.76	0.474	2

LTE Band 2, CB: 10MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
16QAM	18650	1855.0	1#0	0	24.22	2.48	26.70	0.468	2
			1#0	3	24.25	2.48	26.73	0.471	2
			1#5	3	24.29	2.48	26.77	0.475	2
			1#5	7	24.27	2.48	26.75	0.473	2
			3#0	0	24.34	2.48	26.82	0.481	2
			3#3	7	24.42	2.48	26.90	0.490	2
			6#0	0	24.32	2.48	26.80	0.479	2
			6#0	7	24.38	2.48	26.86	0.485	2
	18900	1880.0	1#0	0	24.42	2.48	26.90	0.490	2
			1#0	3	24.46	2.48	26.94	0.494	2
			1#5	3	24.50	2.48	26.98	0.499	2
			1#5	7	24.45	2.48	26.93	0.493	2
			3#0	0	24.58	2.48	27.06	0.508	2
			3#3	7	24.62	2.48	27.10	0.513	2
			6#0	0	24.55	2.48	27.03	0.505	2
			6#0	7	24.56	2.48	27.04	0.506	2
	19150	1905.0	1#0	0	24.32	2.48	26.80	0.479	2
			1#0	3	24.35	2.48	26.83	0.482	2
			1#5	3	24.38	2.48	26.86	0.485	2
			1#5	7	24.23	2.48	26.71	0.469	2
			3#0	0	24.53	2.48	27.01	0.502	2
			3#3	7	24.60	2.48	27.08	0.511	2
			6#0	0	24.32	2.48	26.80	0.479	2
			6#0	7	24.52	2.48	27.00	0.501	2

LTE Band 2, CB: 15MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18675	1857.5	1#0	0	24.62	2.48	27.10	0.513	2
			1#0	5	24.56	2.48	27.04	0.506	2
			1#5	5	24.66	2.48	27.14	0.518	2
			1#5	11	24.65	2.48	27.13	0.516	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	11	24.40	2.48	26.88	0.488	2
			6#0	0	24.38	2.48	26.86	0.485	2
			6#0	11	24.41	2.48	26.89	0.489	2
	18900	1880.0	1#0	0	24.62	2.48	27.10	0.513	2
			1#0	5	24.70	2.48	27.18	0.522	2
			1#5	5	24.72	2.48	27.20	0.525	2
			1#5	11	24.65	2.48	27.13	0.516	2
			3#0	0	24.56	2.48	27.04	0.506	2
			3#3	11	24.66	2.48	27.14	0.518	2
			6#0	0	24.50	2.48	26.98	0.499	2
			6#0	11	24.51	2.48	26.99	0.500	2
	19125	1902.5	1#0	0	24.52	2.48	27.00	0.501	2
			1#0	5	24.57	2.48	27.05	0.507	2
			1#5	5	24.61	2.48	27.09	0.512	2
			1#5	11	24.60	2.48	27.08	0.511	2
			3#0	0	24.45	2.48	26.93	0.493	2
			3#3	11	24.46	2.48	26.94	0.494	2
			6#0	0	24.47	2.48	26.95	0.495	2
			6#0	11	24.49	2.48	26.97	0.498	2

LTE Band 2, CB: 15MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
16QAM	18675	1857.5	1#0	0	24.30	2.48	26.78	0.476	2
			1#0	5	24.20	2.48	26.68	0.466	2
			1#5	5	24.26	2.48	26.74	0.472	2
			1#5	11	24.39	2.48	26.87	0.486	2
			3#0	0	24.42	2.48	26.90	0.490	2
			3#3	11	24.46	2.48	26.94	0.494	2
			6#0	0	24.31	2.48	26.79	0.478	2
			6#0	11	24.40	2.48	26.88	0.488	2
	18900	1880.0	1#0	0	24.55	2.48	27.03	0.505	2
			1#0	5	24.62	2.48	27.10	0.513	2
			1#5	5	24.59	2.48	27.07	0.509	2
			1#5	11	24.63	2.48	27.11	0.514	2
			3#0	0	24.58	2.48	27.06	0.508	2
			3#3	11	24.55	2.48	27.03	0.505	2
			6#0	0	24.42	2.48	26.90	0.490	2
			6#0	11	24.45	2.48	26.93	0.493	2
	19125	1902.5	1#0	0	24.40	2.48	26.88	0.488	2
			1#0	5	24.37	2.48	26.85	0.484	2
			1#5	5	24.25	2.48	26.73	0.471	2
			1#5	11	24.12	2.48	26.60	0.457	2
			3#0	0	24.41	2.48	26.89	0.489	2
			3#3	11	24.43	2.48	26.91	0.491	2
			6#0	0	24.39	2.48	26.87	0.486	2
			6#0	11	24.44	2.48	26.92	0.492	2

LTE Band 2, CB: 20MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
QPSK	18700	1860.0	1#0	0	24.45	2.48	26.93	0.493	2
			1#0	7	24.51	2.48	26.99	0.500	2
			1#5	7	24.58	2.48	27.06	0.508	2
			1#5	15	24.57	2.48	27.05	0.507	2
			3#0	0	24.41	2.48	26.89	0.489	2
			3#3	15	24.51	2.48	26.99	0.500	2
			6#0	0	24.33	2.48	26.81	0.480	2
			6#0	15	24.35	2.48	26.83	0.482	2
	18900	1880.0	1#0	0	24.66	2.48	27.14	0.518	2
			1#0	7	24.61	2.48	27.09	0.512	2
			1#5	7	24.69	2.48	27.17	0.521	2
			1#5	15	24.62	2.48	27.10	0.513	2
			3#0	0	24.52	2.48	27.00	0.501	2
			3#3	15	24.65	2.48	27.13	0.516	2
			6#0	0	24.51	2.48	26.99	0.500	2
			6#0	15	24.60	2.48	27.08	0.511	2
	19100	1900.0	1#0	0	24.55	2.48	27.03	0.505	2
			1#0	7	24.63	2.48	27.11	0.514	2
			1#5	7	24.66	2.48	27.14	0.518	2
			1#5	15	24.65	2.48	27.13	0.516	2
			3#0	0	24.41	2.48	26.89	0.489	2
			3#3	15	24.61	2.48	27.09	0.512	2
			6#0	0	24.52	2.48	27.00	0.501	2
			6#0	15	24.53	2.48	27.01	0.502	2

LTE Band 2, CB: 20MHz									
Mode	Channel	Frequency (MHz)	RB size #RB start	RB Index	Conducted Average Power (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)
16QAM	18700	1860.0	1#0	0	24.23	2.48	26.71	0.469	2
			1#0	7	24.28	2.48	26.76	0.474	2
			1#5	7	24.26	2.48	26.74	0.472	2
			1#5	15	24.21	2.48	26.69	0.467	2
			3#0	0	24.35	2.48	26.83	0.482	2
			3#3	15	24.41	2.48	26.89	0.489	2
			6#0	0	24.30	2.48	26.78	0.476	2
			6#0	15	24.29	2.48	26.77	0.475	2
	18900	1880.0	1#0	0	24.35	2.48	26.83	0.482	2
			1#0	7	24.35	2.48	26.83	0.482	2
			1#5	7	24.46	2.48	26.94	0.494	2
			1#5	15	24.41	2.48	26.89	0.489	2
			3#0	0	24.55	2.48	27.03	0.505	2
			3#3	15	24.50	2.48	26.98	0.499	2
			6#0	0	24.35	2.48	26.83	0.482	2
			6#0	15	24.36	2.48	26.84	0.483	2
	19100	1900.0	1#0	0	24.37	2.48	26.85	0.484	2
			1#0	7	24.42	2.48	26.90	0.490	2
			1#5	7	24.43	2.48	26.91	0.491	2
			1#5	15	24.22	2.48	26.70	0.468	2
			3#0	0	24.44	2.48	26.92	0.492	2
			3#3	15	24.49	2.48	26.97	0.498	2
			6#0	0	24.32	2.48	26.80	0.479	2
			6#0	15	24.39	2.48	26.87	0.486	2

3.2 Radiated Emissions

3.2.1 Limit of Radiated Emissions

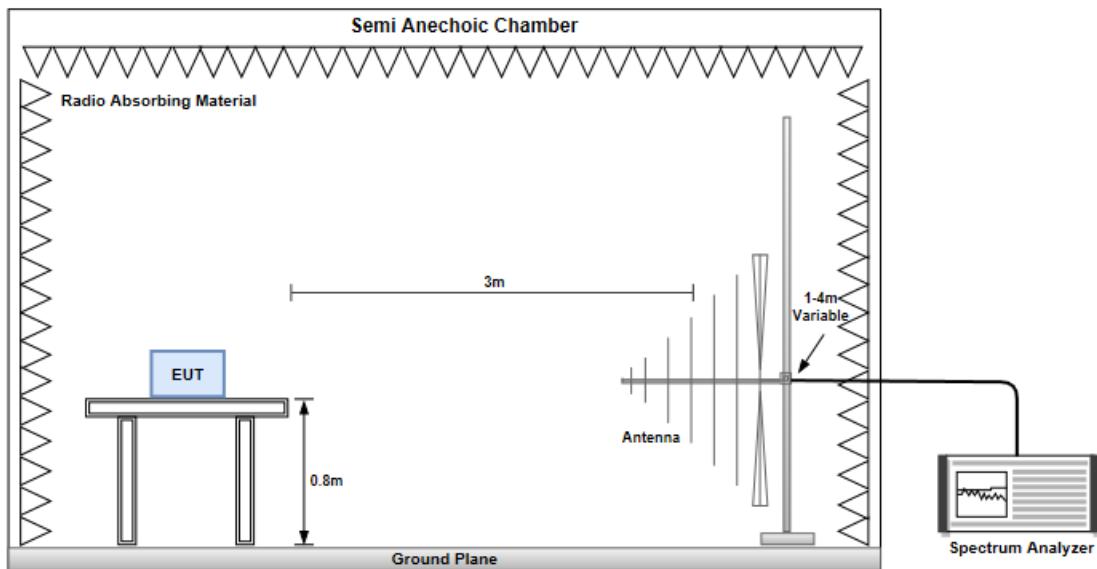
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB equal to -13dBm.

3.2.2 Test Procedures

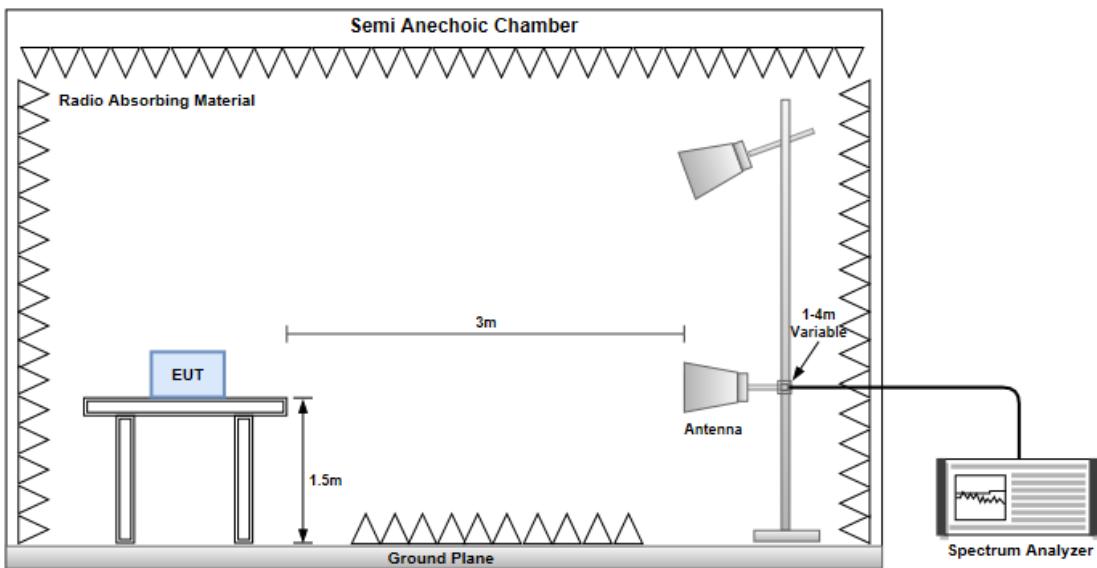
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
4. After finding the max radiated emission, substitution method will be used for getting effective radiated power. EUT will be removed and substitution antenna will be placed at same position. Signal generator will output CW signal to substitution antenna through a RF cable. Rotate turntable and move antenna to find maximum radiated emission. Adjust output power of signal generator to let the maximum radiated emission is same as step 3. Record the output power level.
5. E.I.R.P = output power of step 4 + gain of substitution antenna – cable loss of RF cable.

3.2.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.2.4 Test Result of Radiated Emissions below 1GHz

Mode	LTE Band 2, QPSK, CB:15 MHz, Channel: 18900						
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
35.82	H	-66.93	-13.00	-53.93	-75.94	-48.49	-18.44
86.26	H	-75.96	-13.00	-62.96	-74.13	-70.12	-5.84
156.10	H	-73.84	-13.00	-60.84	-74.42	-67.15	-6.69
326.82	H	-73.92	-13.00	-60.92	-75.12	-72.57	-1.35
446.13	H	-70.72	-13.00	-57.72	-74.96	-69.58	-1.14
624.61	H	-67.47	-13.00	-54.47	-74.10	-65.50	-1.97
48.43	V	-69.61	-13.00	-56.61	-68.55	-53.15	-16.46
92.08	V	-70.61	-13.00	-57.61	-70.13	-65.76	-4.85
140.58	V	-70.54	-13.00	-57.54	-73.72	-63.42	-7.12
304.51	V	-70.43	-13.00	-57.43	-73.19	-69.01	-1.42
498.51	V	-67.84	-13.00	-54.84	-73.62	-66.42	-1.42
639.16	V	-64.48	-13.00	-51.48	-73.96	-62.59	-1.89

Note: EIRP = S.G Power value + Correction factor.

3.2.5 Test Result of Radiated Emissions above 1GHz

Mode	LTE Band 2, CB: 15MHz, QPSK, CB:15 MHz, Channel: 18675						
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
3715.00	H	-39.21	-13.00	-26.21	-54.79	-46.20	6.99
5572.50	H	-41.56	-13.00	-28.56	-60.49	-48.36	6.80
7430.00	H	-38.80	-13.00	-25.80	-60.88	-42.04	3.24
3715.00	V	-39.92	-13.00	-26.92	-55.21	-46.91	6.99
5572.50	V	-41.56	-13.00	-28.56	-60.15	-48.36	6.80
7430.00	V	-37.72	-13.00	-24.72	-60.28	-40.96	3.24

Mode	LTE Band 2, CB: 15MHz, QPSK, CB:15 MHz, Channel: 18900						
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
3760.00	H	-38.57	-13.00	-25.57	-54.56	-45.52	6.95
5640.00	H	-41.48	-13.00	-28.48	-60.51	-48.47	6.99
7520.00	H	-39.12	-13.00	-26.12	-60.51	-42.39	3.27
3760.00	V	-39.31	-13.00	-26.31	-55.01	-46.26	6.95
5640.00	V	-41.75	-13.00	-28.75	-60.41	-48.74	6.99
7520.00	V	-37.31	-13.00	-24.31	-59.08	-40.58	3.27

Mode	LTE Band 2, CB: 15MHz, QPSK, CB:15 MHz, Channel: 19125						
Frequency (MHz)	Antenna Polarity.	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
3805.00	H	-38.53	-13.00	-25.53	-54.87	-45.44	6.91
5707.50	H	-41.20	-13.00	-28.20	-60.21	-47.99	6.79
7610.00	H	-39.57	-13.00	-26.57	-60.42	-43.08	3.51
3805.00	V	-39.19	-13.00	-26.19	-55.23	-46.10	6.91
5707.50	V	-42.10	-13.00	-29.10	-60.56	-48.89	6.79
7610.00	V	-38.06	-13.00	-25.06	-59.21	-41.57	3.51

Note: EIRP = S.G Power value + Correction factor.

3.3 Conducted Emissions & Band Edge

3.3.1 Limit of Conducted Emissions & Band Edge

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 equal to -13dBm.

3.3.2 Test Procedures

Out of Band Emission

1. Lowest, middle and highest operating channels are tested for this item.
2. Scan frequency range is from 30 MHz ~ 20 GHz.
3. Set RBW = 1 MHz, VBW = 3 MHz, detector = Peak, sweep time = auto.
4. Record the max trace value and capture the test plot of each sub frequency band.

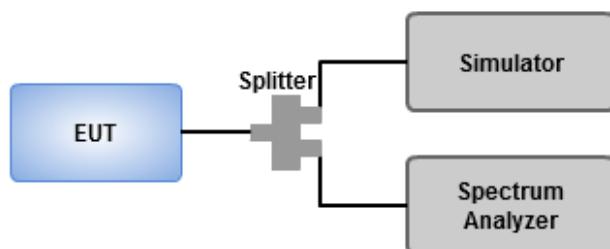
Band Edge - 1MHz band immediately outside the Frequency Band

- 1 Lowest and highest operating channels are tested for this item.
- 2 Set RBW = 22 kHz, VBW = 68 kHz, detector = RMS, sweep time = auto to measure trace.

Band Edge - Other frequency

- 1 Lowest and highest operating channels are tested for this item.
- 2 Set RBW = 22 kHz, VBW = 68 kHz, detector = RMS and use channel power measurement function of spectrum analyze to integrate power over 1MHz.

3.3.3 Test Setup



3.3.4 Test Result of Conducted Emissions & Band Edge

Summary

Mode	Result	F-Start (Hz)	F-Stop (Hz)	RBW (Hz)	VBW (Hz)	Detector	Freq (Hz)	Level (dBm)	Limit (dBm)	Margin (dB)	Port	Remark	Ref.Limit (dB)
Band 2_ LTE-M1_1.4MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1909.3MHz_16QAM_RB 6,#RB 0,NB 0	Pass	1.91G	1.911G	22k	68k	RMS	1.91004G	-13.41	-13	-0.41	1	-	-
Band 2_ LTE-M1_3MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1908.5MHz_16QAM_RB 6,#RB 0,NB 1	Pass	1.91G	1.911G	22k	68k	RMS	1.91G	-13.82	-13	-0.82	1	-	-
Band 2_ LTE-M1_5MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1907.5MHz_16QAM_RB 6,#RB 0,NB 3	Pass	1.91G	1.911G	22k	68k	RMS	1.91002G	-13.28	-13	-0.28	1	-	-
Band 2_ LTE-M1_10MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1905MHz_16QAM_RB 6,#RB 0,NB 7	Pass	1.91G	1.911G	22k	68k	RMS	1.91003G	-18.74	-13	-5.74	1	-	-
Band 2_ LTE-M1_15MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1902.5MHz_16QAM_RB 6,#RB 0,NB 11	Pass	1.91G	1.911G	22k	68k	RMS	1.91G	-23.13	-13	-10.13	1	-	-
Band 2_ LTE-M1_20MHz_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
1900MHz_16QAM_RB 6,#RB 0,NB 15	Pass	1.911G	1.95G	22k	68k	RMS	1.9115G	-26.94	-13	-13.94	1	MBW 1M	-

