TEST REPORT

Report No.: 12356722-E4V1

Applicant	:	LOGITECH INC. 770 GATEWAY BLVD NEWARK, CA 94560 US
Model	:	F-00005
Brand Name	:	LOGI
FCC ID	:	DZLF00005
EUT Description	:	POWERED WIRELESS CHARGING STAND
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART B

Date Of Issue:
JULY 9, 2018

Prepared by:
UL Verification Services Inc.
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/09/2018	Initial Issue	-

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LOGITECH INC.

EUT DESCRIPTION: POWERED WIRELESS CHARGING STAND

MODEL NUMBER: F-00005

SERIAL NUMBER: 1821LZN0NCG8

DATE TESTED: JUNE 19 – 20, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 47 CFR PART 15 SUBPART B	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2014.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A (IC:2324B-1)	☐ Chamber D (IC: 22541-1)
☒ Chamber B (IC:2324B-2)	☐ Chamber E (IC: 22541-2)
☐ Chamber C (IC:2324B-3)	☐ Chamber F (IC: 22541-3)
	☐ Chamber G (IC: 22541-4)
	☐ Chamber H (IC: 22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance,1000 to 18000 MHz	4.32 dB
Radiated Disturbance,18000 to 26000 MHz	4.45 dB
Radiated Disturbance,26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless charging stand capable to charge cell phone batteries at 7.5 watt power transfer.

GENERAL INFORMATION

Power Requirements	16.1 VDC
Clock frequencies, digital device frequencies, and operational frequencies generated or use by the EUT.	Crystals: 100MHz

5.2. TEST CONFIGURATIONS

The following configurations were tested:

EUT Configuration	Description
Typical	Standalone Powered by AC/DC adapter

5.3. MODE(S) OF OPERATION

Config	Mode	Descriptions
1	Standby	EUT Alone powered by AC/DC adapter
2	Operating	EUT and smart phone powered by AC/DC adapter (Phone 7.5W)

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Version 2.7.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

SUPPORT EQUIPMENT & PERIPHERALS LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
Phone	Apple	iPhone 8 Plus	C39VQVJYJCM2
Phone	Apple	iPhone 8 Plus	F2LVCLV2JCLY
Phone	Apple	iPhone 8 Plus	F2LW24TAJCM3
AC Adapter	PI Electronics (H.K.) Ltd.	AD2119X20	N/A

NOTE: Cell Phones were exchanged to ensure the EUT is at the maximum power transfer during testing.

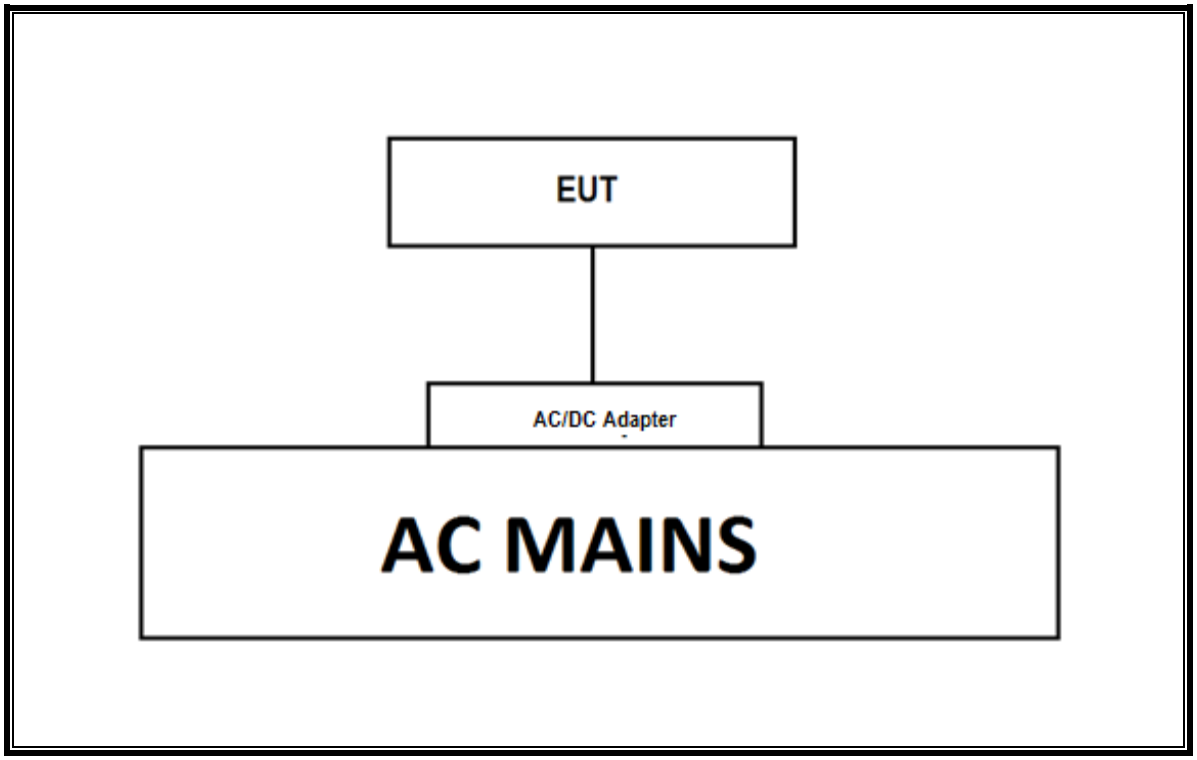
I/O CABLES

N/A

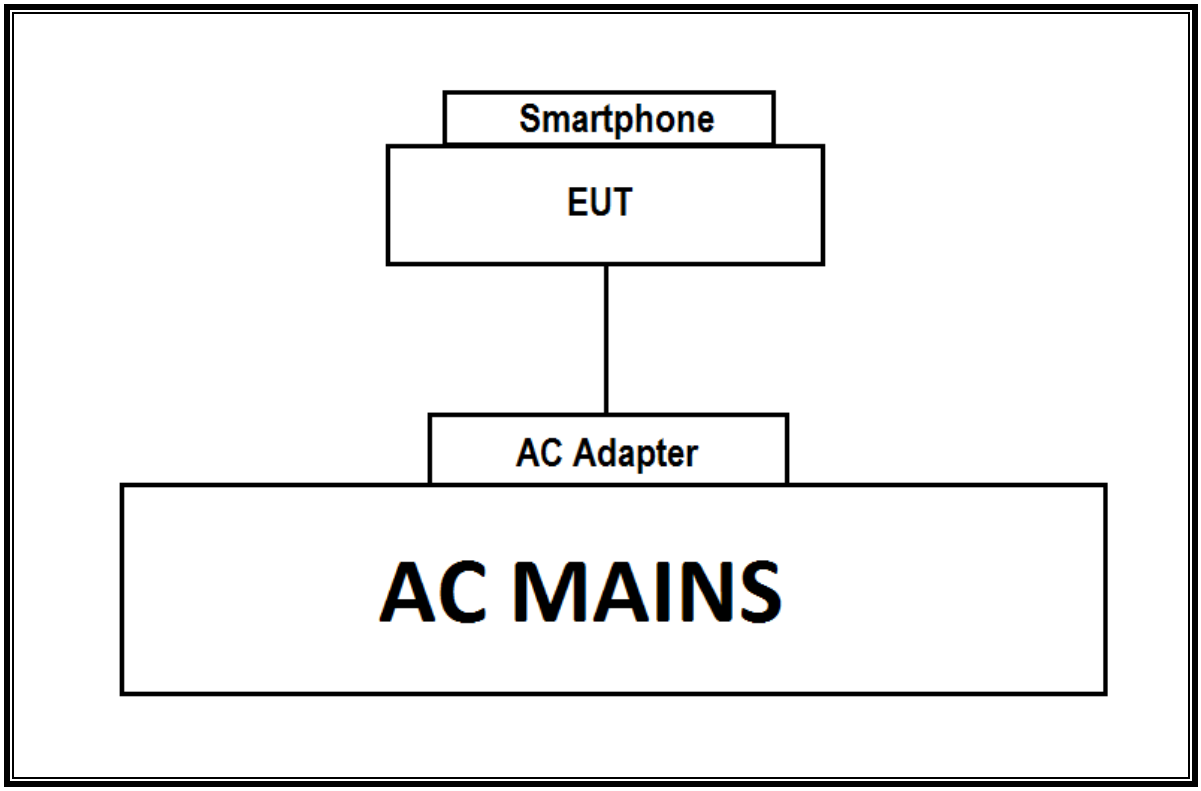
TEST SETUP

The EUT is a Standalone Device. The customer provided test software to exercise the EUT during test. Refer to the following diagram.

CONFIGURATION 1: STANDBY MODE



CONFIGURATION 2: CHARGING MODE With iPhone



6. MEASUREMENT EQUIPMENT

Radiated Emissions

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T899	06/15/2019
Amplifier, 10KHz to 1.3GHz, 25dB	HP	8447D	T10	02/14/2019
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	T866	12/13/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019
Radiated Software	UL	UL EMC	Ver 9.5, April 26, 2016	

Line Conducted Emissions

Test Equipment List					
Description	**Manufacturer**	**Model**	**Local ID (T No.)**	**Cal Date**	**Cal Due**
EMI Test Receiver, 9KHz to 7GHz	Rohde & Schwarz	ESR	T1436	01/25/2018	01/25/2019
LIT-930 Transient Limiter	COM-POWER	-	T1457	03/01/2018	03/01/2019
LISN	Fischer Custom Communications, Inc	50/250-25-2-01-CISPR16	T1310	01/02/2018	01/31/2019
Conducted Software	UL	UL EMC	Ver 9.5, May 26 2015		

7. RADIATED EMISSIONS LIMITS AND RESULTS

LIMIT

FCC Part 15 Subpart B

§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dBµV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT was 127.7 kHz. Therefore, the frequency range was investigated from 30 MHz to 1 GHz based on the following table.

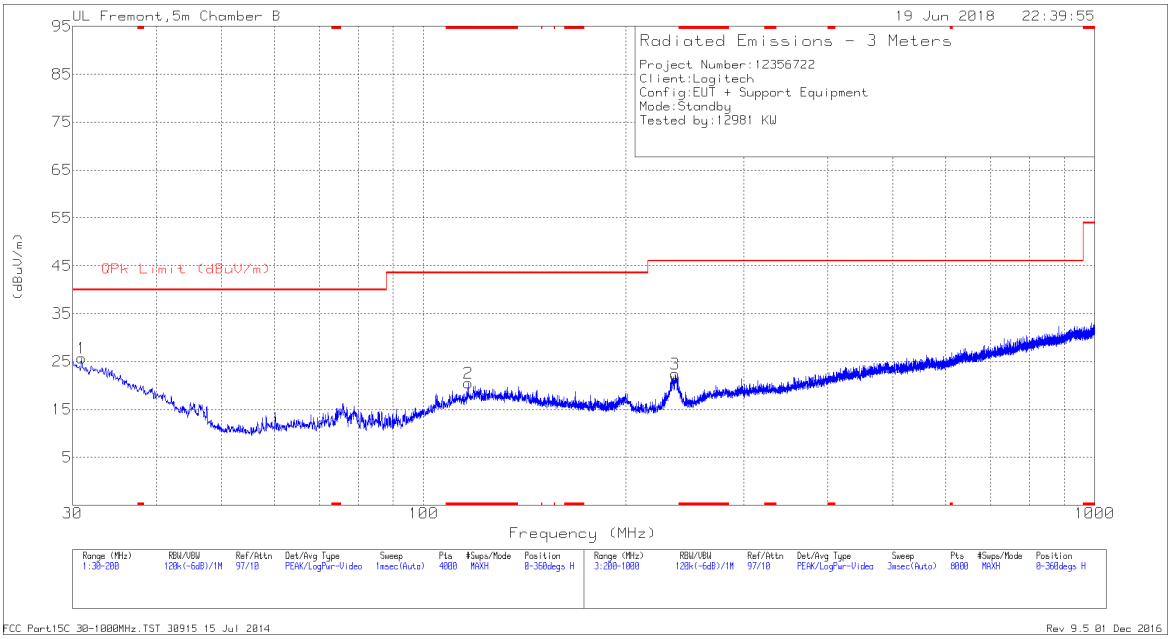
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	**Upper frequency of measurement range** (MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower for FCC/IC, or 6 GHz for EU and others

RESULTS

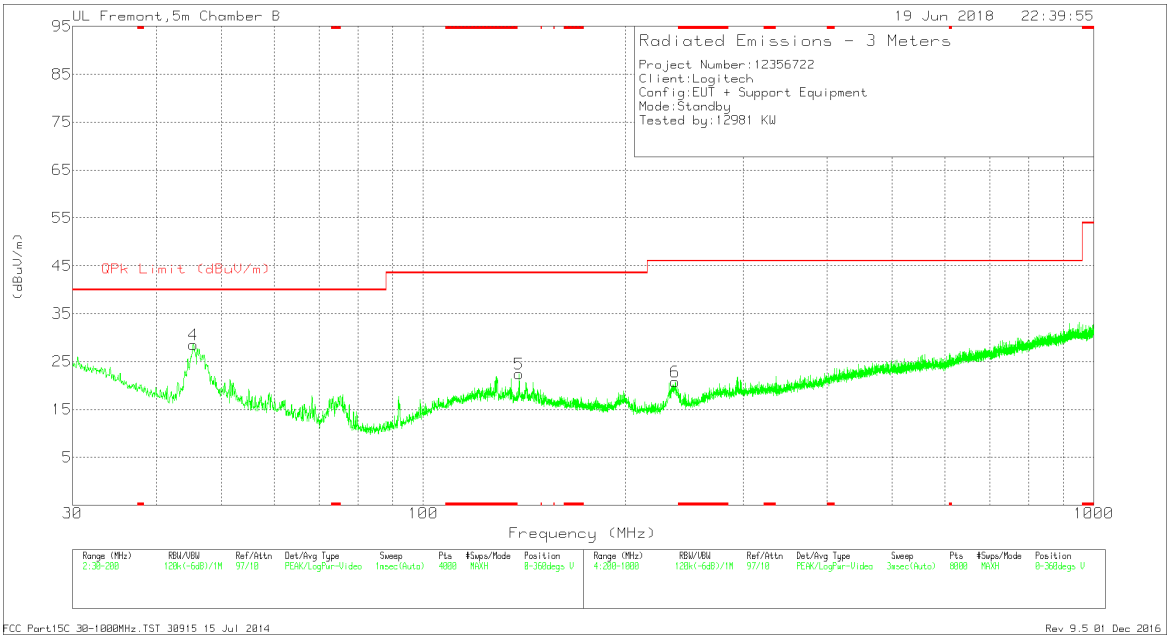
7.1. RADIATED EMISSIONS 30 TO 1000 MHz

7.1.1. STANDBY CONFIGURATION

HORIZONTAL PLOT



VERTICAL PLOT



DATA

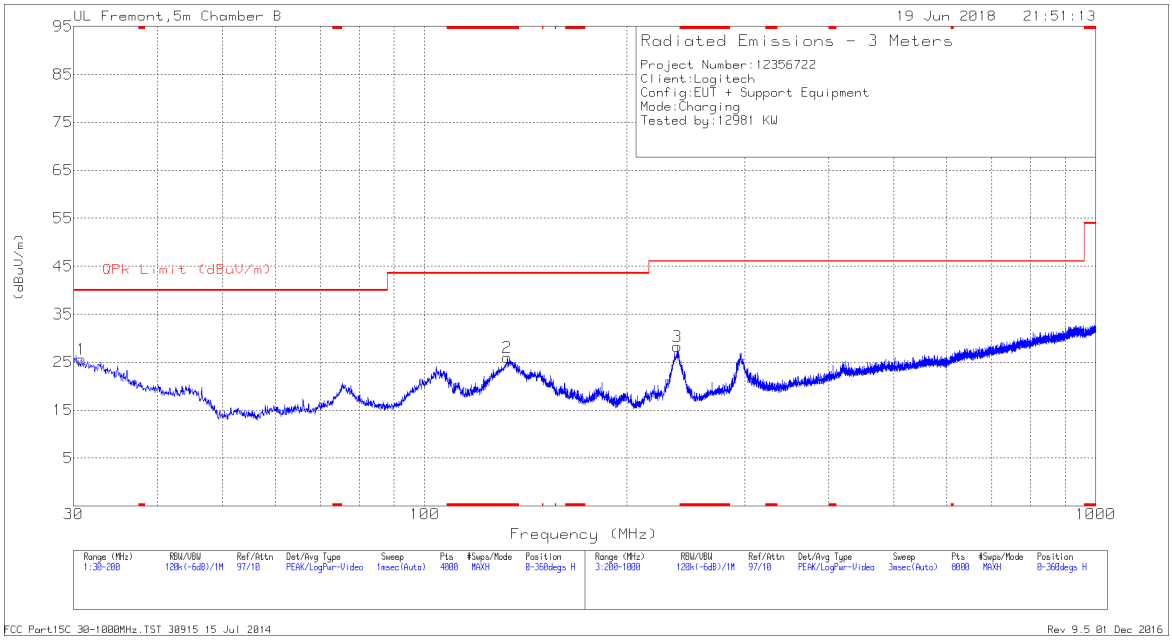
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 116.5949	30.77	Pk	17.5	-27.8	20.47	43.52	-23.05	0-360	200	H
1	30.9352	29.71	Pk	24.8	-28.8	25.71	40	-14.29	0-360	200	H
4	45.389	28.68	Pk	14	-28.6	14.08	40	-25.92	0-360	100	V
5	138.9982	32.65	Pk	17.2	-27.4	22.45	43.52	-21.07	0-360	100	V
3	237.1048	33.55	Pk	15.3	-26.4	22.45	46.02	-23.57	0-360	100	H
6	237.4049	31.87	Pk	15.3	-26.4	20.77	46.02	-25.25	0-360	200	V

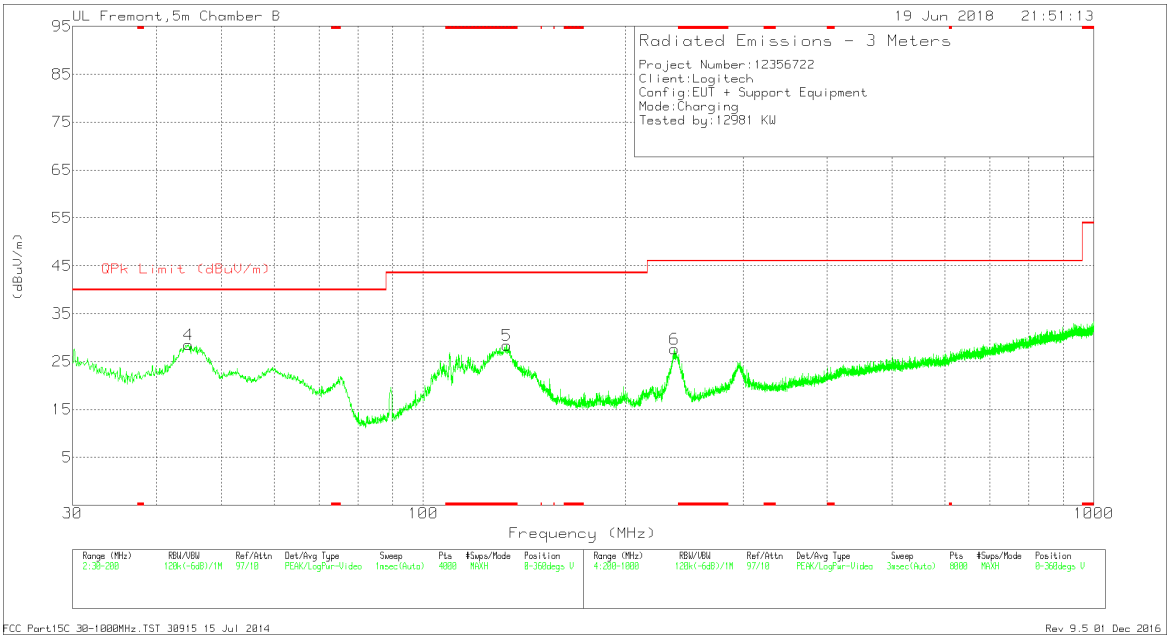
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

7.1.2. OPERATING WITH PHONE

HORIZONTAL PLOT



VERTICAL PLOT



DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 132.7916	35.97	Pk	17.5	-27.5	25.97	43.52	-17.55	0-360	200	H
5	* 133.1742	38.41	Pk	17.5	-27.5	28.41	43.52	-15.11	0-360	100	V
1	30.8077	29.49	Pk	24.9	-28.8	25.59	40	-14.41	0-360	100	H
4	44.6663	42.57	Pk	14.6	-28.6	28.57	40	-11.43	0-360	100	V
6	236.9048	38.74	Pk	15.3	-26.4	27.64	46.02	-18.38	0-360	100	V
3	237.9049	39.31	Pk	15.3	-26.4	28.21	46.02	-17.81	0-360	100	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector
Qp - Quasi-Peak detector

8. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2014

LIMIT

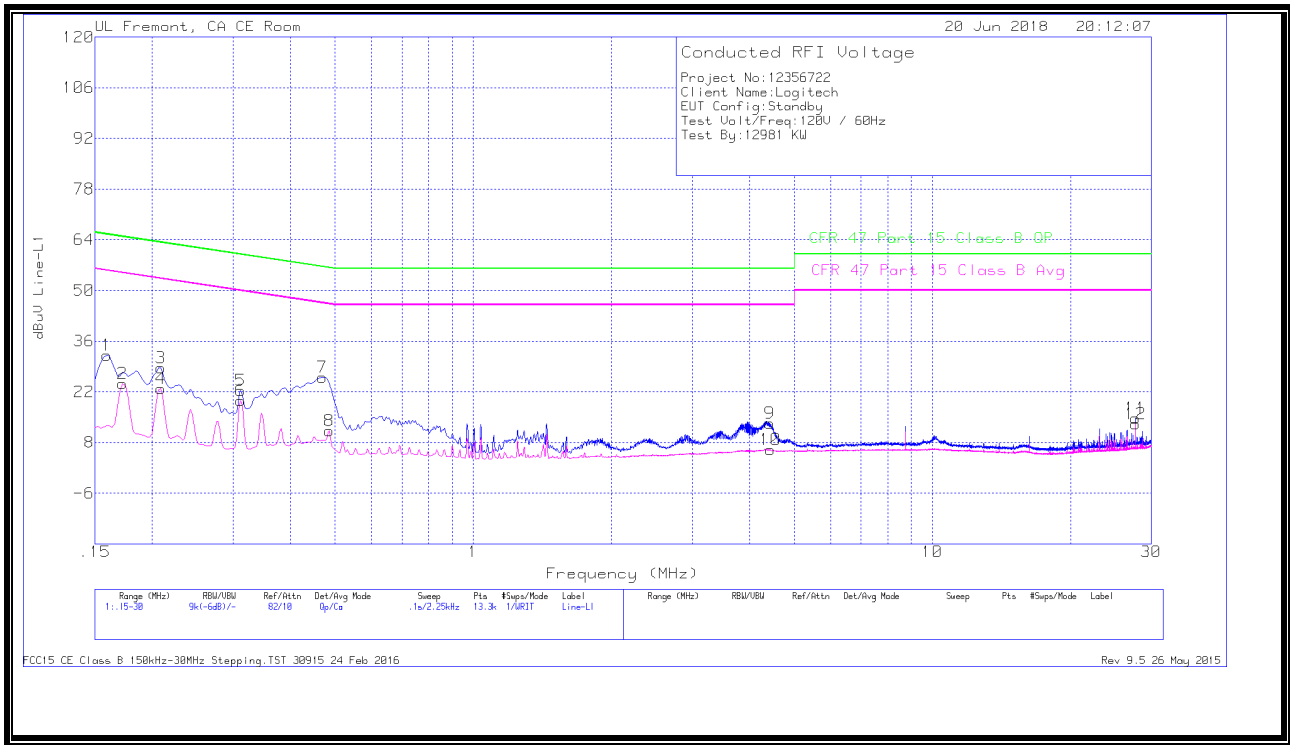
§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

RESULTS:

8.1. STANDBY MODE

LINE 1 RESULTS



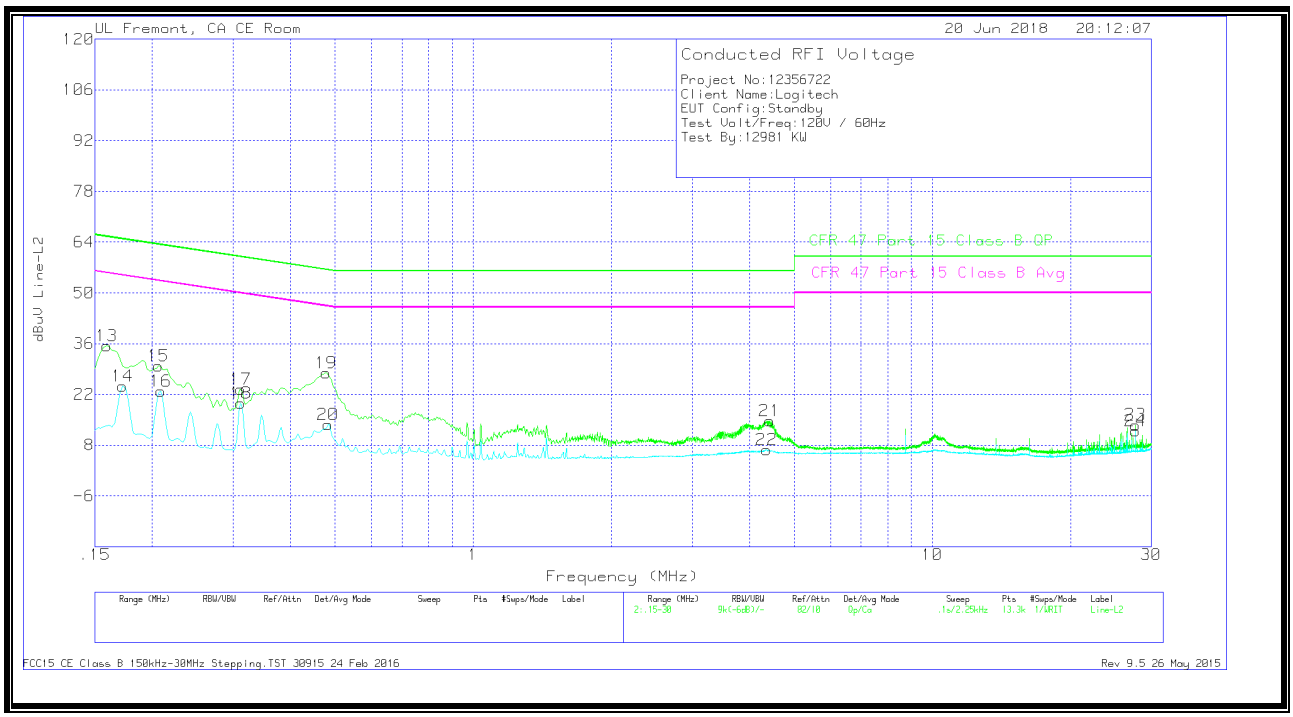
WORST EMISSIONS

Trace Markers

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.159	21.3	Qp	.7	0	10.1	32.1	65.52	-33.42	-	-
2	.1725	13.42	Ca	.7	0	10.1	24.22	-	-	54.84	-30.62
3	.2085	17.9	Qp	.6	0	10.1	28.6	63.26	-34.66	-	-
4	.2085	12.24	Ca	.6	0	10.1	22.94	-	-	53.26	-30.32
5	.312	11.92	Qp	.4	0	10.1	22.42	59.92	-37.5	-	-
6	.312	9.11	Ca	.4	0	10.1	19.61	-	-	49.92	-30.31
7	.4695	15.82	Qp	.1	0	10.1	26.02	56.52	-30.5	-	-
8	.48525	.96	Ca	.1	0	10.1	11.16	-	-	46.25	-35.09
9	4.4295	2.97	Qp	.1	.1	10.1	13.27	56	-42.73	-	-
10	4.43625	-4.35	Ca	.1	.1	10.1	5.95	-	-	46	-40.05
11	27.69225	3.85	Qp	0	.4	10.5	14.75	60	-45.25	-	-
12	27.69225	2.28	Ca	0	.4	10.5	13.18	-	-	50	-36.82

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

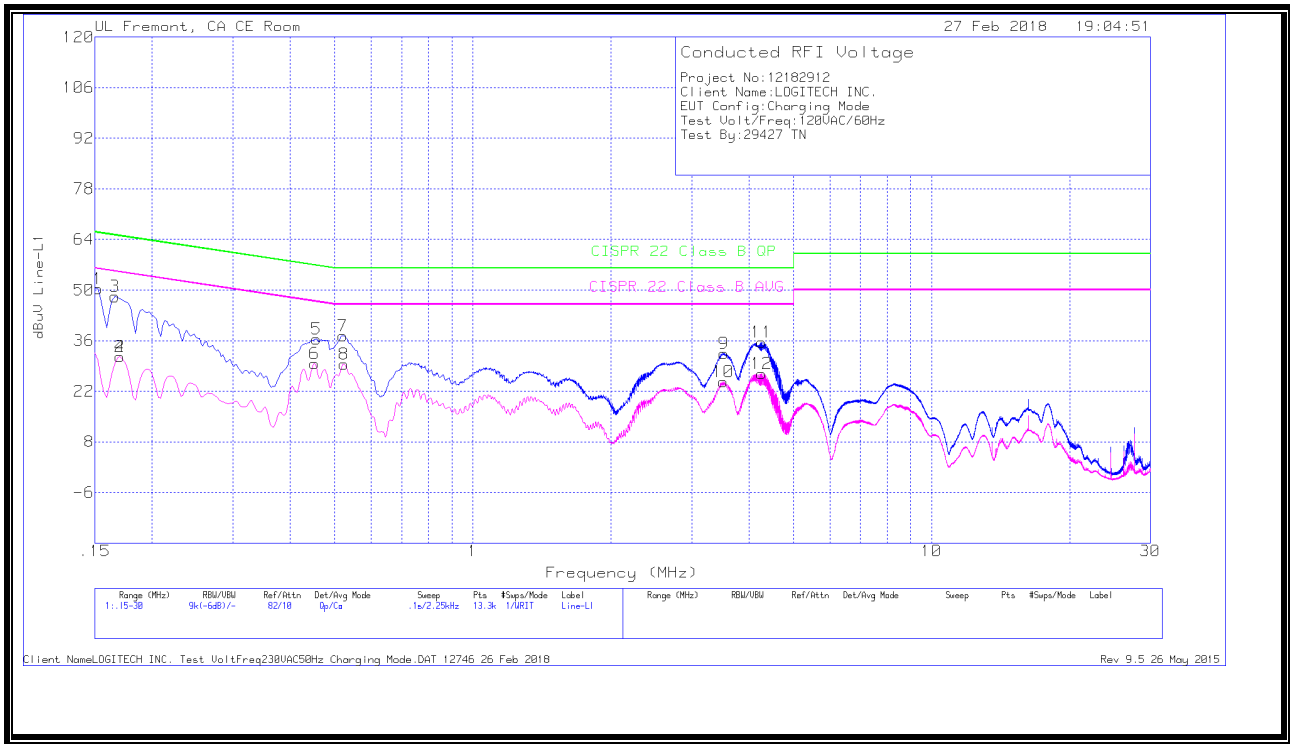
Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.159	25.12	Qp	.1	0	10.1	35.32	65.52	-30.2	-	-
14	.1725	14.12	Ca	.1	0	10.1	24.32	-	-	54.84	-30.52
15	.20625	19.58	Qp	.1	0	10.1	29.78	63.35	-33.57	-	-
16	.2085	12.63	Ca	.1	0	10.1	22.83	-	-	53.26	-30.43
17	.312	13.27	Qp	.1	0	10.1	23.47	59.92	-36.45	-	-
18	.312	9.36	Ca	.1	0	10.1	19.56	-	-	49.92	-30.36
19	.4785	17.78	Qp	.1	0	10.1	27.98	56.37	-28.39	-	-
20	.483	3.44	Ca	.1	0	10.1	13.64	-	-	46.29	-32.65
21	4.4295	4.52	Qp	0	.1	10.1	14.72	56	-41.28	-	-
22	4.35863	-3.44	Ca	0	.1	10.1	6.76	-	-	46	-39.24
23	27.69225	2.68	Qp	0	.4	10.5	13.58	60	-46.42	-	-
24	27.69225	1.11	Ca	0	.4	10.5	12.01	-	-	50	-37.99

Qp - Quasi-Peak detector
Ca - CISPR average detection

8.2. OPERATING MODE WITH PHONE

LINE 1 RESULTS

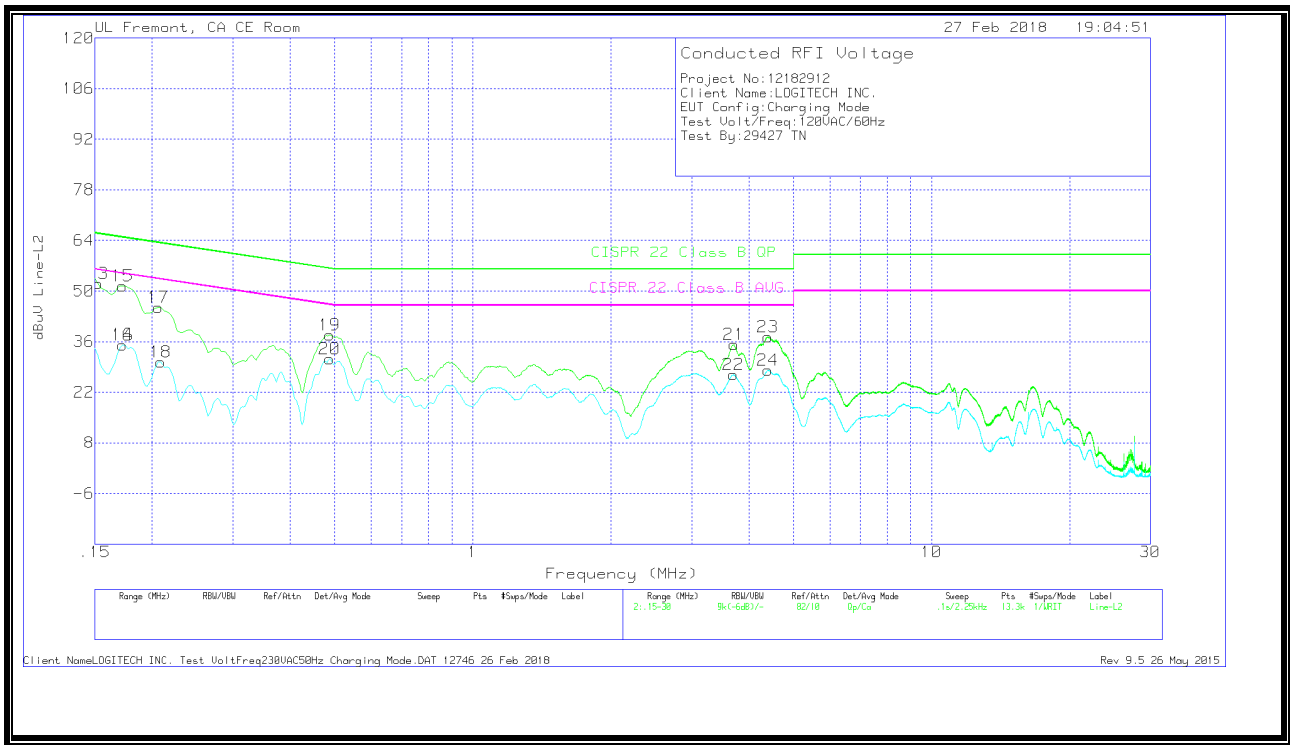


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B AVG	Margin (dB)
1	.15225	50.19	Qp	.1	0	50.29	65.88	-15.59	-	-
2	.17025	31.6	Ca	0	0	31.6	-	-	54.95	-23.35
3	.16575	48.08	Qp	.1	0	48.18	65.17	-16.99	-	-
4	.17025	31.6	Ca	0	0	31.6	-	-	54.95	-23.35
5	.456	36.51	Qp	0	0	36.51	56.77	-20.26	-	-
6	.4515	29.65	Ca	0	0	29.65	-	-	46.85	-17.2
7	.52125	37.36	Qp	0	0	37.36	56	-18.64	-	-
8	.5235	29.54	Ca	0	0	29.54	-	-	46	-16.46
9	3.52725	32.42	Qp	0	.1	32.52	56	-23.48	-	-
10	3.51375	24.55	Ca	0	.1	24.65	-	-	46	-21.35
11	4.26525	35.49	Qp	0	.1	35.59	56	-20.41	-	-
12	4.26525	26.8	Ca	0	.1	26.9	-	-	46	-19.1

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B AVG	Margin (dB)
13	.15225	52.1	Qp	0	0	52.1	65.88	-13.78	-	-
14	.1725	35.13	Ca	0	0	35.13	-	-	54.84	-19.71
15	.1725	51.45	Qp	0	0	51.45	64.84	-13.39	-	-
16	.1725	35.13	Ca	0	0	35.13	-	-	54.84	-19.71
17	.20625	45.45	Qp	0	0	45.45	63.35	-17.9	-	-
18	.2085	30.43	Ca	0	0	30.43	-	-	53.26	-22.83
19	.4875	37.76	Qp	0	0	37.76	56.21	-18.45	-	-
20	.4875	31.24	Ca	0	0	31.24	-	-	46.21	-14.97
21	3.7095	35.08	Qp	0	.1	35.18	56	-20.82	-	-
22	3.7005	26.76	Ca	0	.1	26.86	-	-	46	-19.14
23	4.4025	37.26	Qp	0	.1	37.36	56	-18.64	-	-
24	4.40025	28.02	Ca	0	.1	28.12	-	-	46	-17.88

Qp - Quasi-Peak detector
Ca - CISPR average detection

Client NameLOGITECH INC. Test VoltFreq230VAC50Hz Charging Mode.DAT 12746 26 Feb 2018

Rev 9.5 26 May 2015