

# **TEST REPORT**

**Report Number:** 15107858-E15V2

**Applicant :** Google LLC  
1600 Amphitheatre Parkway  
Mountain View, CA 94043 U.S.A.

**Model :** GGX8B

**FCC ID :** A4RGGX8B

**EUT Description :** Phone

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**

2024-04-22

**Prepared by:**

UL Verification Services Inc.  
47173 Benicia Street  
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-04-16	Initial Issue	---
V12	2024-04-22	Updated WPT frequency range. Revised Section 8.1 and 8.2 and radiated table units.	Tina Chu

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Google LLC  
1600 Amphitheatre Parkway  
Mountain View, CA 94043 U.S.A.

**EUT DESCRIPTION:** Phone

**MODEL NUMBER:** GGX8B

**SERIAL NUMBER:** 41031FDAS0002Q

**SAMPLE RECEIPT DATE:** 2024-03-12

**DATE TESTED:** 2024-03-13 TO 2024-03-14

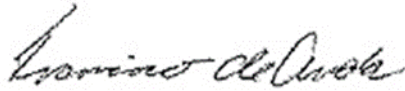
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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.

Approved & Released For  
UL Verification Services Inc. By:



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Francisco de Anda  
Staff Engineer  
Consumer Technology Division  
UL Verification Services Inc.

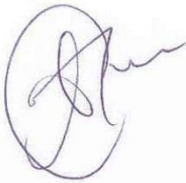
Prepared By:



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Gerardo Abrego  
Senior Test Engineer  
Consumer Technology Division  
UL Verification Services Inc.

Reviewed By:



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Tina Chu  
Senior Project Engineer  
Consumer Technology Division  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

The tests documented in this report were performed in accordance with:

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- ANSI C63.10-2013
- KDB 414788 D01 Radiated Test Site

## 3. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
<input type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U <sub>Lab</sub>
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	2.75%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz (E-field)	2.84 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz (H-field)	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Time Domain Measurements	3.39%
Temperature	0.57°C
Humidity	3.39%

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a phone.

### 5.2. MAXIMUM E-FIELD AND H-FIELD STRENGTH

The transmitter has maximum peak radiated electric field strength as follows:

Fundamental Frequency (kHz)	E field (300m distance) FCC (dBuV/m)
110kHz to 148.5kHz	-6.42

### 5.3. WORST-CASE CONFIGURATION

Phone (client) is placed at the maximum power position during the testing. Testing is performed with the EUT set at natural orientation only.

For the entire radiated emissions test, the client device was charging between a 20% to 50% state of charge.

Investigation was performed with/without adapter. Worst-case is when the EUT is powered by the adapter.

Testing on the following configurations was performed and only configuration 2 is reported in this report as worse case.

Config	Descriptions	Frequency (kHz)	EUT orientation	Client and worst-case orientation
1	EUT stand alone, standby, powered by AC/DC adapter.	110 to 148.5	X-orientation (Flatbed)	None. Standby.
2	EUT is powered by AC/DC adapter. Direct contact during charging/operating between the EUT & WPT Client.			Phone: landscape where USB-C of the client facing at 3 o'clock

## 6. TEST AND MEASUREMENT EQUIPMENT

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

Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	219908	2024-09-30	2023-09-13
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	219910	2024-05-31	2023-05-31
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	80293	2024-04-30	2023-04-11
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230547	2025-02-28	2024-02-11
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	213877	2024-12-31	2023-12-27
<b>AC MAINS LINE CONDUCTED EMISSIONS TEST EQUIPMENT LIST</b>					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
LISN	Fischer Custom Communications, Inc`	FCC-LISN-50/250-25-2-01-480V	175765	2025-01-31	2024-01-26
EMI TEST RECEIVER	Rohde & Schwarz	ESR	171646	2024-08-31	2023-08-10
Transient Limiter	TE	TBFL1	207996	2024-08-31	2023-08-10
<b>UL AUTOMATION SOFTWARE</b>					
Radiated Software	UL	UL EMC	Rev 9.5, 2023-01-05		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 2023-03-03		

## 7. OCCUPIED BANDWIDTH

### TEST PROCEDURE

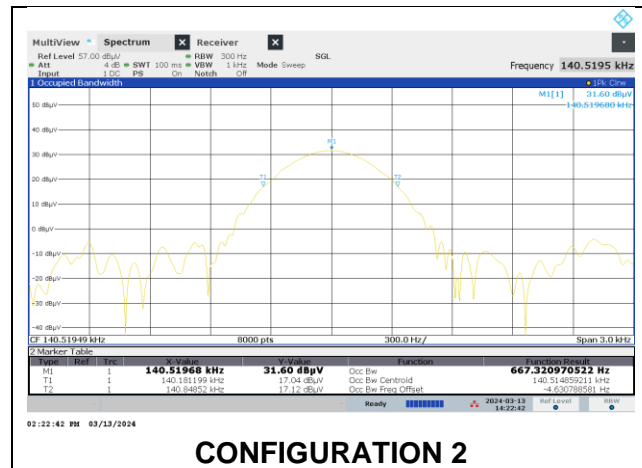
The transmitter output is connected to the spectrum analyzer. The RBW is set to 300Hz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

### RESULTS

Test Engineer:	28199 JM
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Configuration	Frequency (kHz)	99% Bandwidth (Hz)
2	140.519	667.32



**CONFIGURATION 2**

## 8. RADIATED EMISSION TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMIT

FCC §15.209 (a)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960 MHz	500	3
Note: The lower limit shall apply at the transition frequency.		

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the resolution bandwidth 9kHz to 150kHz is set to 300Hz, video bandwidth is set to 1kHz. 150kHz to 30MHz, the resolution bandwidth is set to 10kHz, video bandwidth is set to 30kHz.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

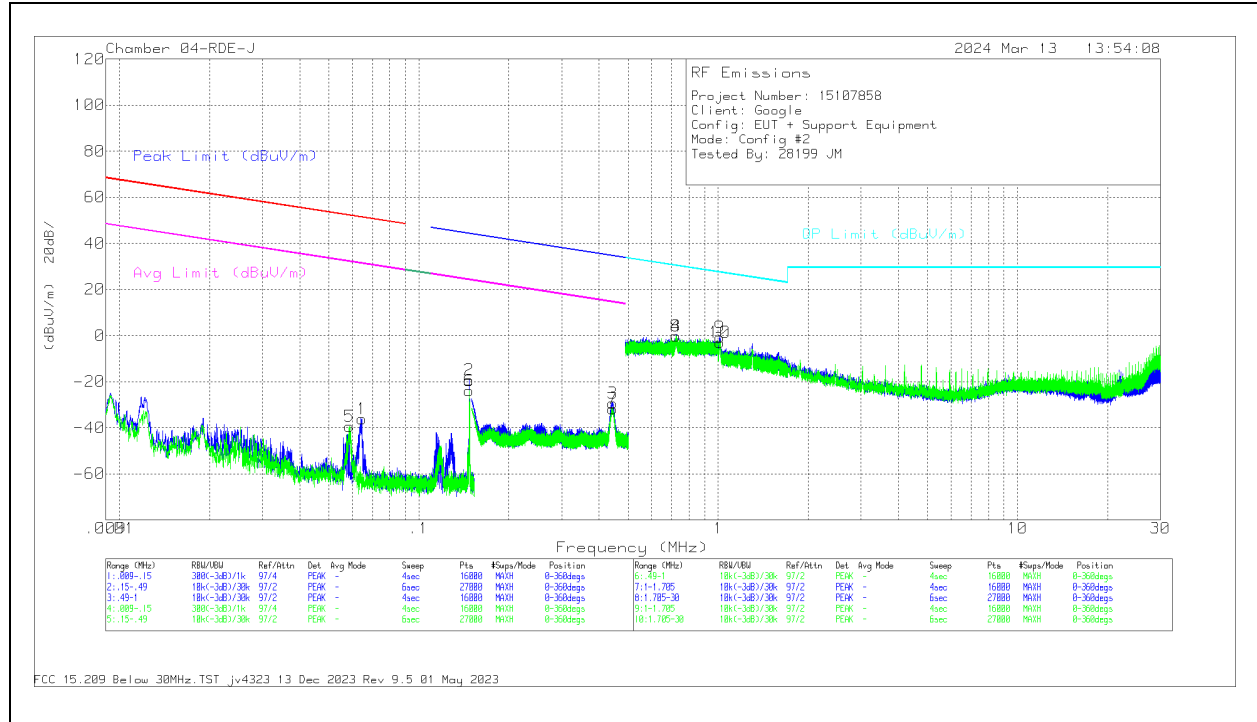
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only. Blue color trace on plots: Parallel orientation (face on). Green color trace on plots: Perpendicular orientation (face off).

#### KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

**RESULTS****8.2. FCC TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz****8.2.1. CONFIGURATION 2: OPERATING MODE****DATA**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna H(ACF) (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Antenna orientation
1	.0645	20.18	Pk	56.1	-32.4	-80	-36.12	51.4	-87.52	31.4	-67.52	-	-	-	-	0-360
5	.0585	16.23	Pk	56.3	-32	-80	-39.47	52.24	-91.71	32.24	-71.71	-	-	-	-	0-360
2	.1446	49.88	Pk	55.9	-32.2	-80	-6.42	-	-	-	-	44.42	-50.84	24.42	-30.84	270
6	.1446	45.38	Pk	55.9	-32.2	-80	-10.92	-	-	-	-	44.42	-55.34	24.42	-35.34	172
3	.4447	26.9	Pk	56.2	-32.4	-80	-29.3	-	-	-	-	34.64	-63.94	14.64	-43.94	0-360
7	.4441	24.46	Pk	56.2	-32.4	-80	-31.74	-	-	-	-	34.66	-66.4	14.66	-46.4	0-360

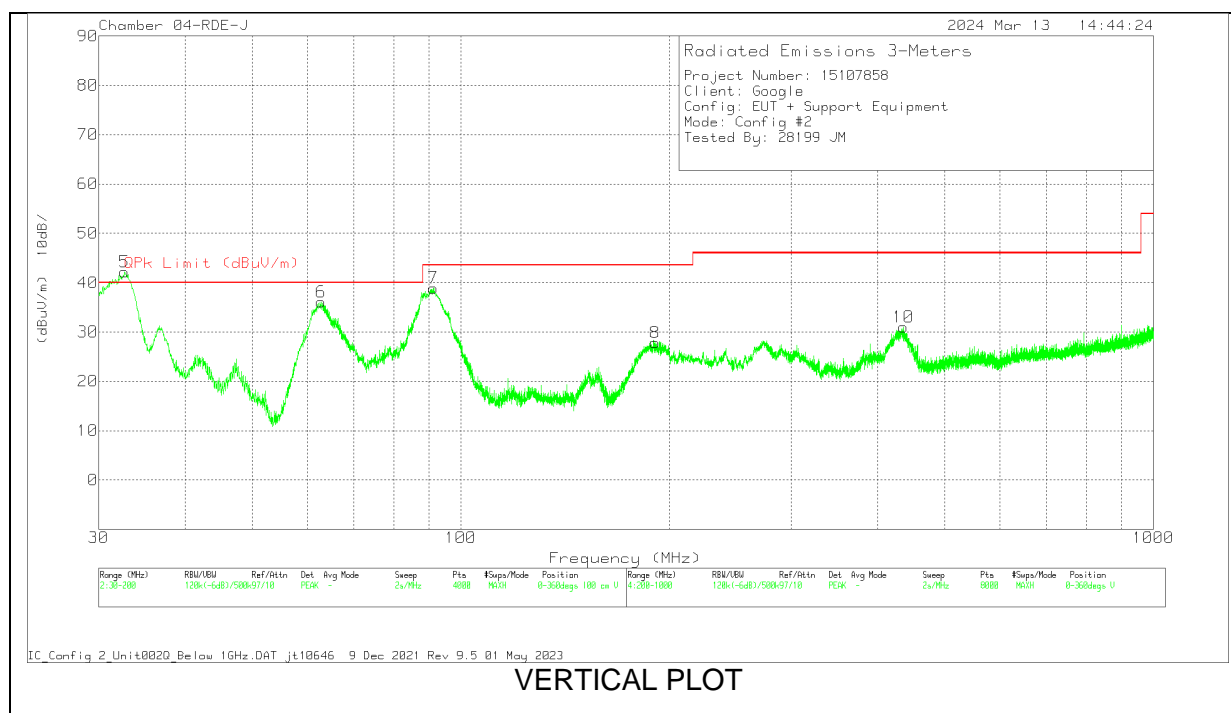
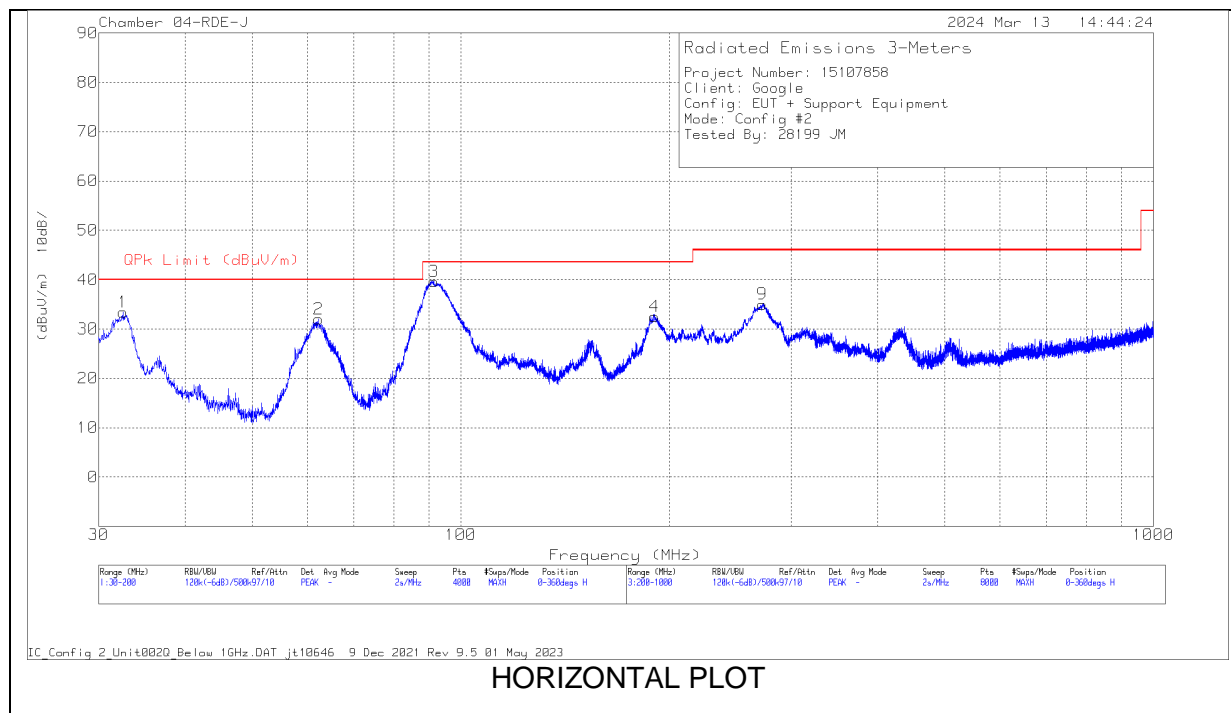
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna H(ACF) (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Antenna orientation
4	.7227	15.89	Pk	56.4	-32.4	-40	-1.1	30.43	-30.54	0-360
8	.7231	15.84	Pk	56.4	-32.4	-40	-1.6	30.43	-30.59	0-360

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E(ACF) (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Antenna orientation
9	1.0146	24.82	Pk	46.7	-32.4	-40	-2.88	27.5	-28.38	0-360
10	1.013	22.75	Pk	46.7	-32.4	-40	-2.95	27.51	-30.46	0-360

Pk - Peak detector

### 8.3. FCC TX SPURIOUS EMISSION 30 TO 1000 MHz

#### 8.3.1. CONFIGURATION 2: OPERATING MODE



**DATA**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80293 ACF (dB/m)	CBL/AMP (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	32.5082	40.01	Pk	25	-31.6	33.41	40	-6.59	0-360	299	H
2	62.2659	49.79	Pk	13.5	-31.3	31.99	40	-8.01	0-360	199	H
3	90.4184	54.49	Qp	13.9	-31	37.39	43.52	-6.13	334	285	H
4	190.437	45.67	Pk	17.2	-30.3	32.57	43.52	-10.95	0-360	99	H
5	32.4944	45.41	Qp	25	-31.6	38.81	40	-1.19	240	124	V
6	63.1985	51.01	Qp	13.6	-31.5	33.11	40	-6.89	71	115	V
7	89.3227	53.65	Qp	13.7	-30.9	36.45	43.52	-7.07	128	105	V
8	190.862	40.98	Pk	17.3	-30.4	27.88	43.52	-15.64	0-360	100	V
9	272.709	46.11	Pk	19.1	-30.2	35.01	46.02	-11.01	0-360	99	H
10	435.031	38.11	Pk	22.5	-29.6	31.01	46.02	-15.01	0-360	98	V

Pk - Peak detector

Qp - Quasi-Peak detector

## 9. AC MAINS LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

ICES-001 Issue 5 Table 1

Table 1: Conducted emission limits for induction cooking appliances (AC mains terminals)				
Frequency range (MHz)	Appliances rated 120 V, without an earth connection	Appliances rated 120 V, without an earth connection	All other appliances	All other appliances
	Quasi-peak (dBµV)	Average (dBµV)	Quasi-peak (dBµV)	Average (dBµV)
0.009 – 0.05	122	—	110	—
0.05 – 0.15	102 to 92 *	—	90 to 80 *	—
0.15 – 0.5	72 to 62 *	62 to 52 *	66 to 56 *	56 to 46 *
0.5 – 5	56	46	56	46
5 – 30	60	50	60	50

Note: The more stringent limit applies at transition frequencies.  
 \*The limit level in dBµV decreases linearly with the logarithm of frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 200Hz for below 150kHz, 9kHz for 150kHz to 30MHz. Peak detection is used unless otherwise noted as quasi-peak or average.

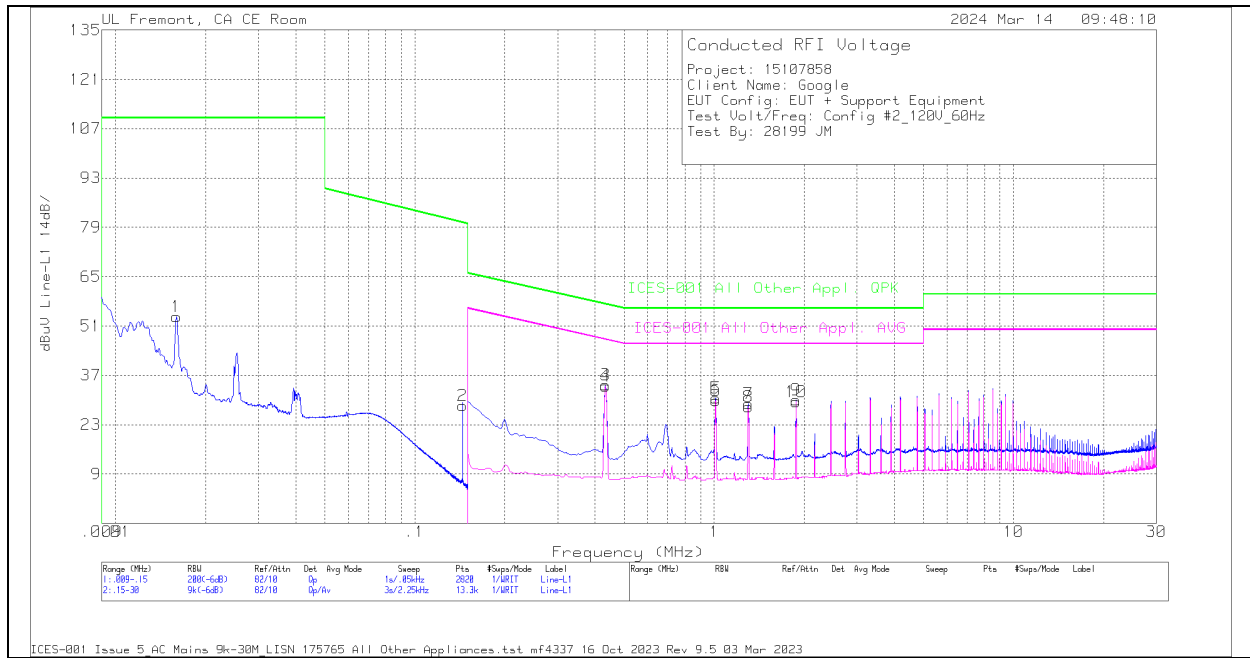
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

Testing range from 9kHz to 30MHz using ICES-001 Issue Table 1 “All other appliances” limit to cover both FCC and ISSED frequency range.

## 9.1. CONFIGURATION 2: OPERATING MODE

### LINE 1 RESULTS



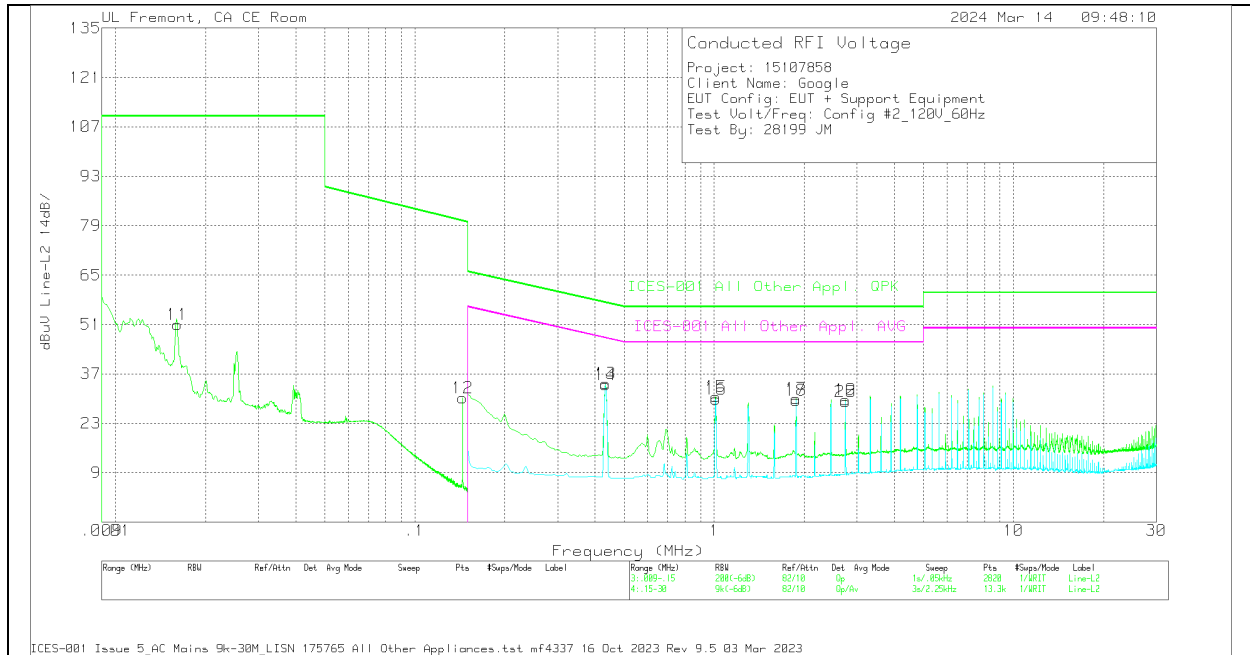
### WORST EMISSIONS

Range 1: Line-L1 .009 - .15MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	10dB Atten (dB)	Corrected Reading (dBuV)	ICES-001 All Other Appl. QPK Limit(dBuV)	Margin (dB)	ICES-001 All Other Appl. AVG Limit (dBuV)	Margin (dB)
1	.016	30.24	Qp	2	-.1	11.5	10	53.64	110	-56.36	-	-
2	.1444	8.92	Qp	0	0	9.5	10	28.42	80.35	-51.93	-	-

Range 2: Line-L1 .15 - 30MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	10dB Atten (dB)	Corrected Reading (dBuV)	ICES-001 All Other Appl. QPK Limit	Margin (dB)	ICES-001 All Other Appl. AVG Limit(dBuV)	Margin (dB)
4	.4335	14.62	Av	0	.1	9.3	10	34.02	-	-	47.19	-13.17
6	1.0118	10.48	Av	0	0	9.4	10	29.88	-	-	46	-16.12
8	1.2998	8.73	Av	0	0	9.4	10	28.13	-	-	46	-17.87
10	1.878	10.17	Av	0	0	9.3	10	29.47	-	-	46	-16.53
3	.4335	14.96	Qp	0	.1	9.3	10	34.36	57.19	-22.83	-	-
5	1.0118	11.13	Qp	0	0	9.4	10	30.53	56	-25.47	-	-
7	1.2998	9.56	Qp	0	0	9.4	10	28.96	56	-27.04	-	-
9	1.878	10.71	Qp	0	0	9.3	10	30.01	56	-25.99	-	-

Qp - Quasi-Peak detector

Av - Average detection

**LINE 2 RESULTS****WORST EMISSIONS**

Range 3: Line-L2 .009 - .15MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	10dB Atten (dB)	Corrected Reading (dBuV)	ICES-001 All Other Appl. QPK Limit (dBuV)	Margin (dB)	ICES-001 All Other Appl. AVG Limit (dBuV)	Margin (dB)
11	.0161	27.35	Qp	2.1	0	11.5	10	50.95	110	-59.05	-	-
12	.1444	10.66	Qp	0	0	9.5	10	30.16	80.35	-50.19	-	-

Range 4: Line-L2 .15 - 30MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	10dB Atten (dB)	Corrected Reading (dBuV)	ICES-001 All Other Appl. QPK Limit (dBuV)	Margin (dB)	ICES-001 All Other Appl. AVG Limit (dBuV)	Margin (dB)
14	.4335	14.6	Av	0	0	9.3	10	33.9	-	-	47.19	-13.29
16	1.0118	10.45	Av	0	0	9.4	10	29.85	-	-	46	-16.15
18	1.878	10.06	Av	0	.1	9.3	10	29.46	-	-	46	-16.54
20	2.7443	9.58	Av	0	.1	9.4	10	29.08	-	-	46	-16.92
13	.4335	14.92	Qp	0	0	9.3	10	34.22	57.19	-22.97	-	-
15	1.0118	11.1	Qp	0	0	9.4	10	30.5	56	-25.5	-	-
17	1.878	10.62	Qp	0	.1	9.3	10	30.02	56	-25.98	-	-
19	2.7443	10.19	Qp	0	.1	9.4	10	29.69	56	-26.31	-	-

Qp - Quasi-Peak detector

Av - Average detection

## 10. DESCRIPTION OF TEST SETUP AND SETUP PHOTOS

Please refer to 15107858-EP1 for description of test up and setup photo.

### END OF TEST REPORT