

CERTIFICATION TEST REPORT

Report Number. : 14523740-E13V3

Applicant : APPLE, INC.
ONE APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A2848

FCC ID : BCG-E8435A

IC : 579C-E8435A

EUT Description : Smartphone

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-216 ISSUE 2
ISED RSS-GEN ISSUE 5 + A1 + A2

Date of Issue:
July 26, 2023

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888



Revision History

Rev.	Issue Date	Revisions	Revised By
V1	7/12/2023	Initial Issue	Chin Pang
V2	7/15/2023	Address TCB Question section 5.2	Chin Pang
V3	7/26/2023	Fixed page 26 on RBW is 9kHz but that is not true below 150kHz where a 200Hz BW	Chin Pang

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. DECISION RULES AND MEASUREMENT UNCERTAINTY	7
4.1. METROLOGICAL TRACEABILITY	7
4.2. DECISION RULES.....	7
4.3. MEASUREMENT UNCERTAINTY.....	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM E-FIELD and H-FIELD	8
5.3. WORST-CASE CONFIGURATION AND MODE.....	8
5.4. DESCRIPTION OF TEST SETUP.....	10
6. TEST AND MEASUREMENT EQUIPMENT	11
7. OCCUPIED BANDWIDTH	12
8. RADIATED EMISSION TEST RESULTS.....	13
8.1. LIMITS AND PROCEDURE	13
8.2. Standby	14
8.2.1. FCC TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)	14
8.2.2. IC/ ICES-001 TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz).....	15
8.2.3. FCC TX SPURIOUS EMISSION (30 - 1000 MHz)	16
8.2.4. IC/ ICES-001 TX SPURIOUS EMISSION (30 - 1000 MHz).....	18
8.3. EUT With Load	20
8.3.1. FCC TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)	20
8.3.2. IC/ ICES-001 TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz).....	21
8.3.3. FCC TX SPURIOUS EMISSION (30 - 1000 MHz)	22
8.3.4. IC/ ICES-001 TX SPURIOUS EMISSION (30 - 1000 MHz).....	24
9. AC POWER LINE CONDUCTED EMISSIONS.....	26
9.1. Standby	27
9.1.1. STANDBY MODE POWERED BY AC/DC ADAPTER.....	27
9.2. EUT With Load	29
9.2.1. OPERATING MODE WITH LOAD POWERED BY AC/DC ADAPTER.....	29
10. SETUP PHOTOS	31

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
ONE APPLE PARK WAY
CUPERTINO, CA 95014

EUT DESCRIPTION: Smartphone

MODEL: A2848

BRAND: APPLE

FCC ID: BCG-E8435A

IC ID: 579C-E8435A

SERIAL NUMBER: GXXWTWJM43

SAMPLE RECEIPT DATE: JUNE 06, 2023

DATE TESTED: JUNE 06-22, 2023

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies
ISED RSS-216 Issue 2	Complies
ISED RSS-GEN Issue 5 + A1 + A2	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. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Prepared By:



Chin Pang
Senior Lab Engineer
Consumer Technology Division
UL Verification Services Inc.

Francisco Guarnero
Senior Test Engineer
Consumer Technology Division
UL Verification Services Inc

2. TEST METHODOLOGY

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 v01r01
- RSS-GEN Issue 5 + A1 + A2
- RSS-216 Issue 2

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
☐	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538 USA			
☐	Building 5: 47670 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	UNCERTAINTY
Occupied Bandwidth	1.2%
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	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC, NB UNII, 802.15.4, 802.15.4ab-NB and MSS technologies. The rechargeable battery is not user accessible.

5.2. MAXIMUM E-FIELD and H-FIELD

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

Fundamental Frequency (KHz)	Mode	E field (300m distance) FCC (dBuV/m)	H field (3m distance) IC (dBuA/m)
360	Standby	-43.57	-9.76
	Operating	-32.46	1.49

5.3. WORST-CASE CONFIGURATION AND MODE

The EUT is a smartphone which connected to the AC/DC adapter via USB-C cable, and the inductive charging coil to charge WPT accessories (Load). For the entire radiated emissions test, the EUT was investigated on the following configuration during the test: 1. At its natural orientation with EUT set at center location on Load, 2. At its natural orientation with EUT including a case set at center location on load. The worst case was natural orientation with EUT including a case set at center location on load.

Mode	Descriptions
Standby	EUT alone with USB-C to USB-C cable powered by AC/DC Adapter.
Operating	EUT with USB-C to USB-C cable powered by AC/DC Adapter & Wireless Charging to Battery Case

For below 30MHz & 1GHz tests EUT was connected to AC power adapter as the worst case, For AC line conducted emission, test was investigated with AC power adapter.

The EUT was tested on standby and operation modes. During operational mode, EUT was tested with load.

For below 30MHz testing, investigation was done on three antenna orientations: RX antenna Face-on, Face-off and horizontal (parallel to ground). The worst-case configurations were determined on RX antenna Face-on and Face-off; therefore, all final tests were performed using these two orientations.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 300 m open area test site. Therefore, sufficient tests

were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT & PERIPHERALS

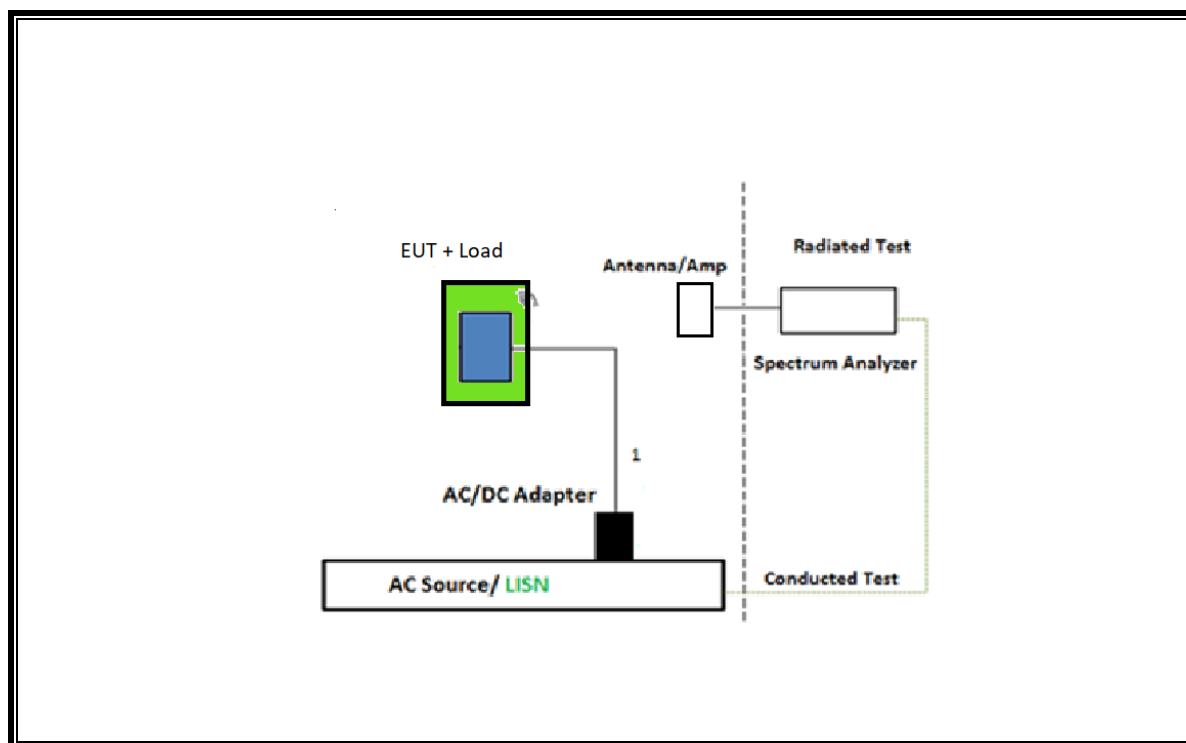
SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC adapter	Apple	A2305	C4H0313063ZPF4FAZ	DoC
Charging Cable	Apple	A2795	FTL851300CQ26GV13	NA
WPT Accessory (Load)	Apple	A2384	DND351202Y50NJM1S	BCGA2384
WPT Accessory	Apple	Clear Case	L12232PR1MA01PZ1034	DoC

I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	USBC	Un-shielded	1	None

TEST SETUP

OPERATING MODE PHONE WITH LOAD



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Passive Loop 30Hz to 1MHz	Electro-Metrics	EM-6871	170014	07/16/2023	07/16/2022
Antenna, Passive Loop 100KHz to 30MHz	Electro-Metrics	EM-6872	170016	07/19/2023	07/19/2022
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB	Sunol Sciences Crop.	JB3	204044	02/29/2024	02/29/2023
Amplifier, 9kHz to 1GHz, 32dB	Sonoma Instrument	310N	222362	08/15/2023	08/15/2022
Sniffer Probes	Electro Metrics	EM-6992	N/A	N/A	N/A
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A-544	85213	01/31/2024	01/31/2023

AC Line Conducted					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	171646	02/29/2024	02/29/2023
LISN for Conducted Emissions	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	175765	01/24/2024	1/24/2023
Transient Limiter	TE	TBFL1	207996	7/15/2023	7/15/2022
UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, 01 May 2022		
Conducted Software	UL	UL EMC	2022.8.16		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, 03 Mar 2022		

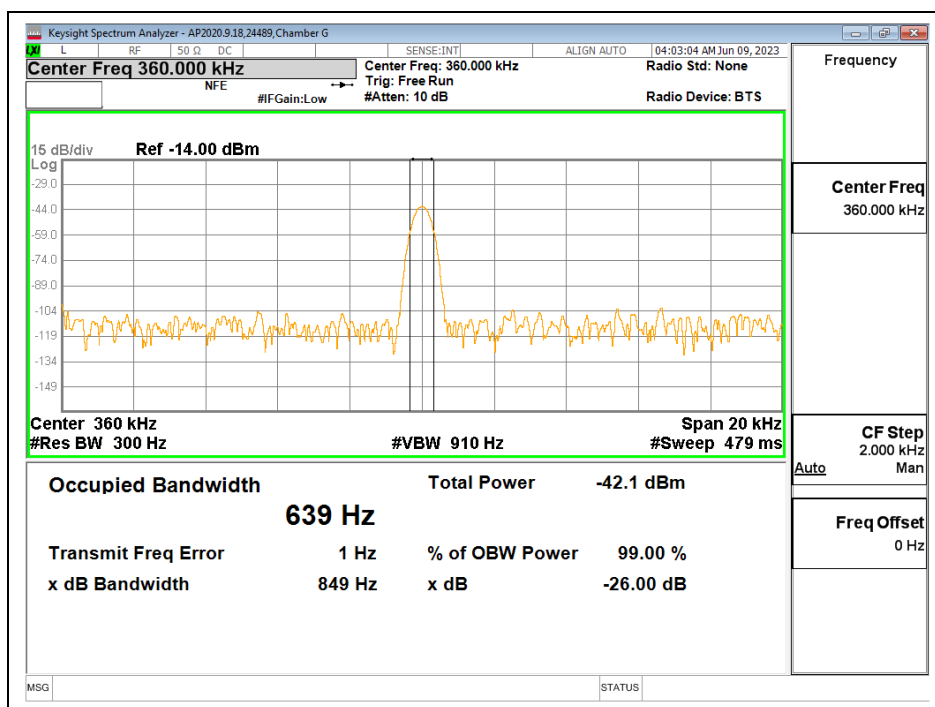
7. OCCUPIED BANDWIDTH

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



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.209 (a)

ICES-001 Section 3.3.4, IC RSS-216 6.2.2, and IC RSS-GEN Sections 8.9 and 8.10.

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.		

ICES-001 Issue 5 Table 2 & Table 4:

Table 2: Magnetic field strength radiated emission limits for induction cooking appliances

Frequency range (MHz)	Quasi-peak, at 3 m distance (dBμA/m)
0.009 – 0.07	69
0.07 – 0.15	69 to 39 *
0.15 – 30	39 to 7 *
* The limit level in dBμA/m decreases linearly with the logarithm of frequency.	

Table 4: Electric field strength radiated emission limits for induction cooking appliances

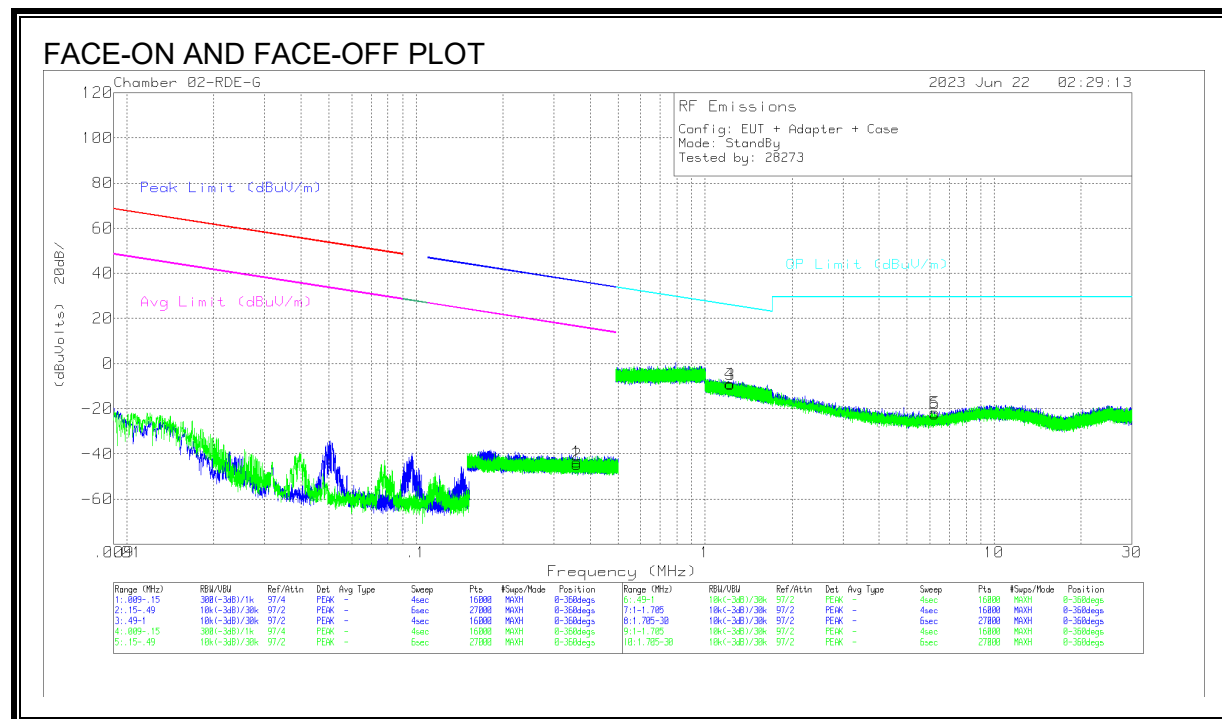
Frequency range (MHz)	OATS or SAC * 10 m measurement distance Quasi-peak (dBμV/m)	OATS or SAC * 3 m measurement distance Quasi-peak (dBμV/m)	FAR * 3 m measurement distance Quasi-peak (dBμV/m)
30 – 230	30	40	42 to 35**
230 – 1000	37	47	42
Note: The more stringent limit applies at the transition frequency. * OATS = open-area test site, SAC = semi-anechoic chamber, FAR = fully-anechoic room (see CSA CISPR 11:19). ** The limit level in dBμV/m decreases linearly with the logarithm of frequency.			

RESULTS

8.2.Standby

8.2.1. FCC TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)

Standby



DATA

Radiated Emissions

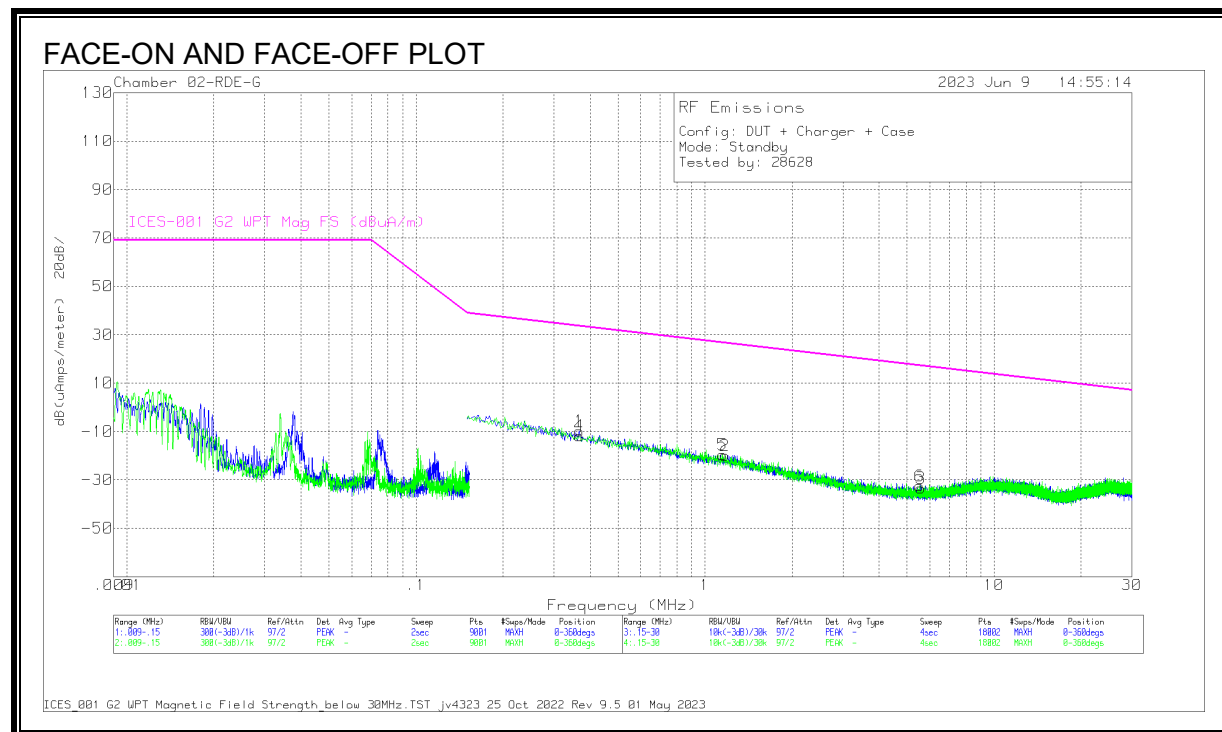
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	Cables/Amp (dB)	Dist Corr 300m (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
1	.3606	12.43	Pk	56	-32	-80	-43.57	36.47	-80.04	16.47	-60.04	0-360	Face-On
2	.3606	11.29	Pk	56	-32	-80	-44.71	36.47	-81.18	16.47	-61.18	0-360	Face-Off

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	Cables/Amp (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
4	1.22	17.39	Pk	45.6	-32	-40	-9.01	25.9	-34.91	0-360	Face-Off
3	1.2259	17.11	Pk	45.6	-32	-40	-9.29	25.86	-35.15	0-360	Face-On
5	6.2376	15.02	Pk	35	-31.7	-40	-21.68	29.5	-51.18	0-360	Face-Off
6	6.2418	14.41	Pk	35	-31.7	-40	-22.29	29.5	-51.79	0-360	Face-On

Pk - Peak detector

8.2.2. IC/ ICES-001 TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)

Standby



DATA

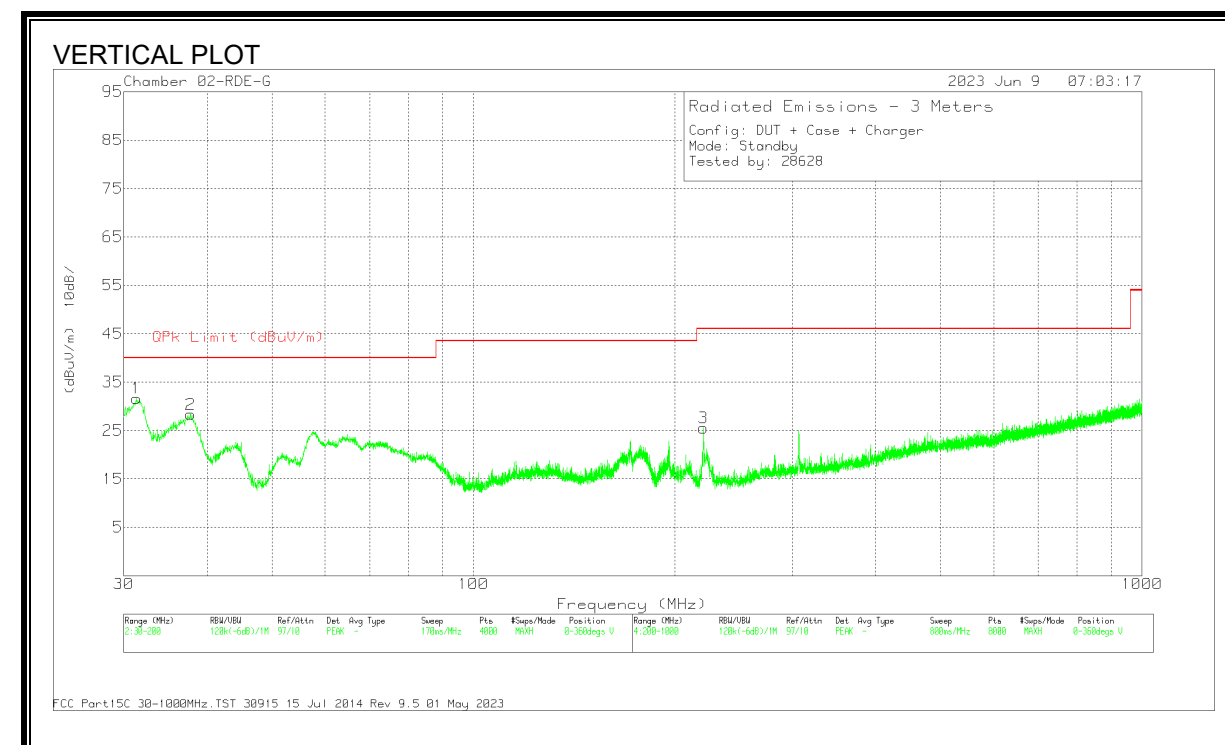
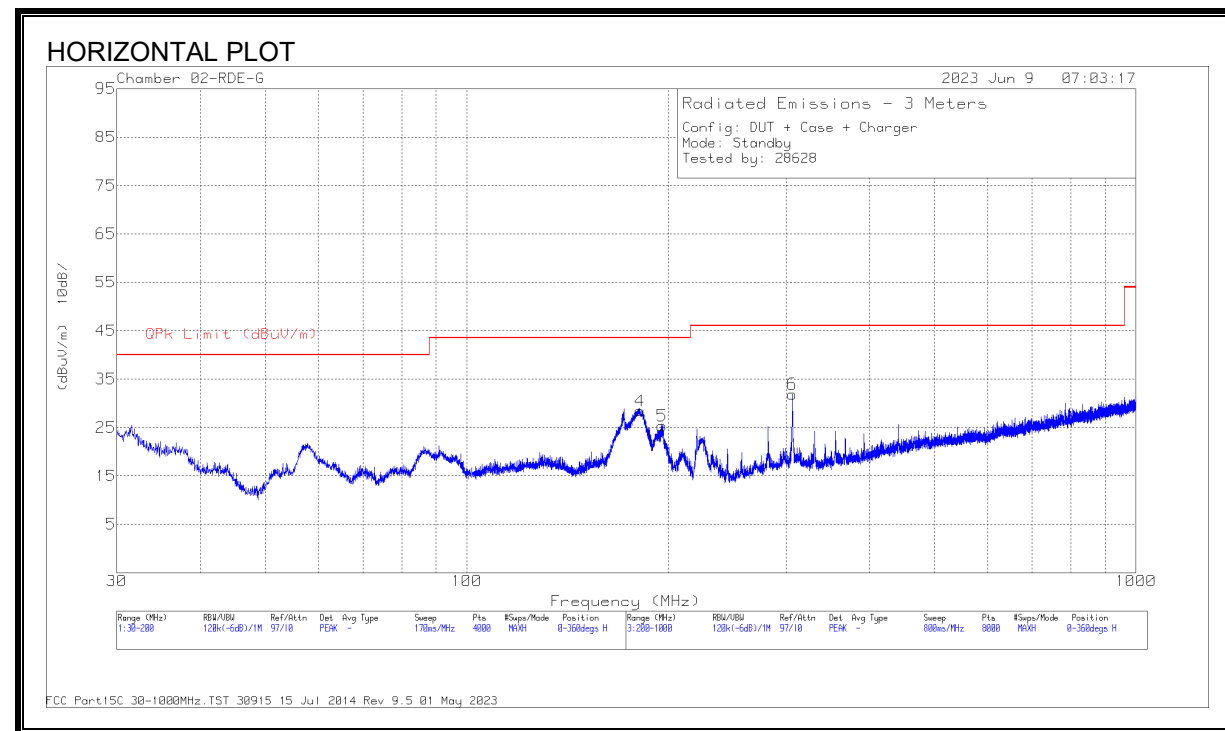
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna H(ACF) (dB/m)	Cables/Am p (dB)	Corrected Reading dB(uAmps/ meter)	ICES-001 G2 WPT Mag FS (dBuA/m)	Margin (dB)	Azimuth (Degs)	Polarity
1	.3672	19.04	Pk	3.2	-32	-9.76	33.59	-43.35	0-360	Face-On
4	.3672	17.06	Pk	3.2	-32	-11.74	33.59	-45.33	0-360	Face-Off
5	1.1481	17.97	Pk	-5.5	-32	-19.53	26.71	-46.24	0-360	Face-Off
2	1.173	17.74	Pk	-5.6	-32	-19.86	26.58	-46.44	0-360	Face-On
6	5.5319	15.26	Pk	-16	-31.7	-32.44	17.21	-49.65	0-360	Face-Off
3	5.5733	14.38	Pk	-16	-31.7	-33.32	17.17	-50.49	0-360	Face-On

Pk - Peak detector

8.2.3. FCC TX SPURIOUS EMISSION (30 - 1000 MHz)

Standby



DATA

Radiated Emissions

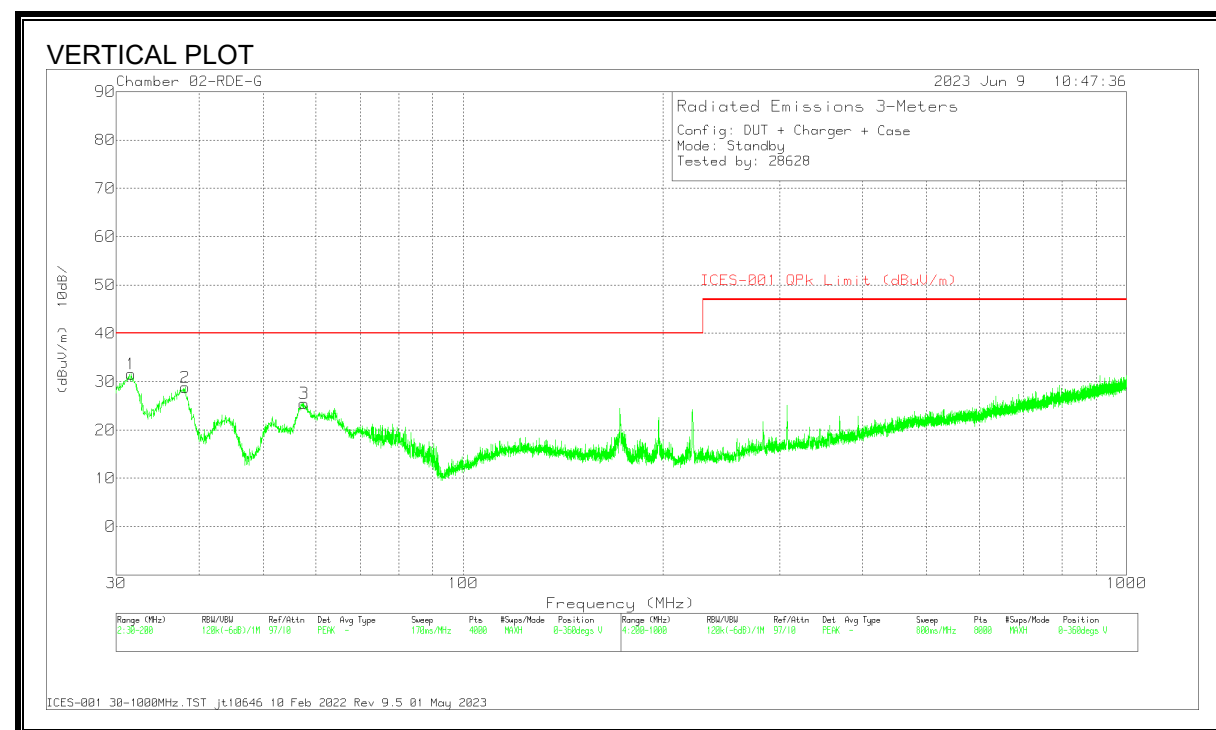
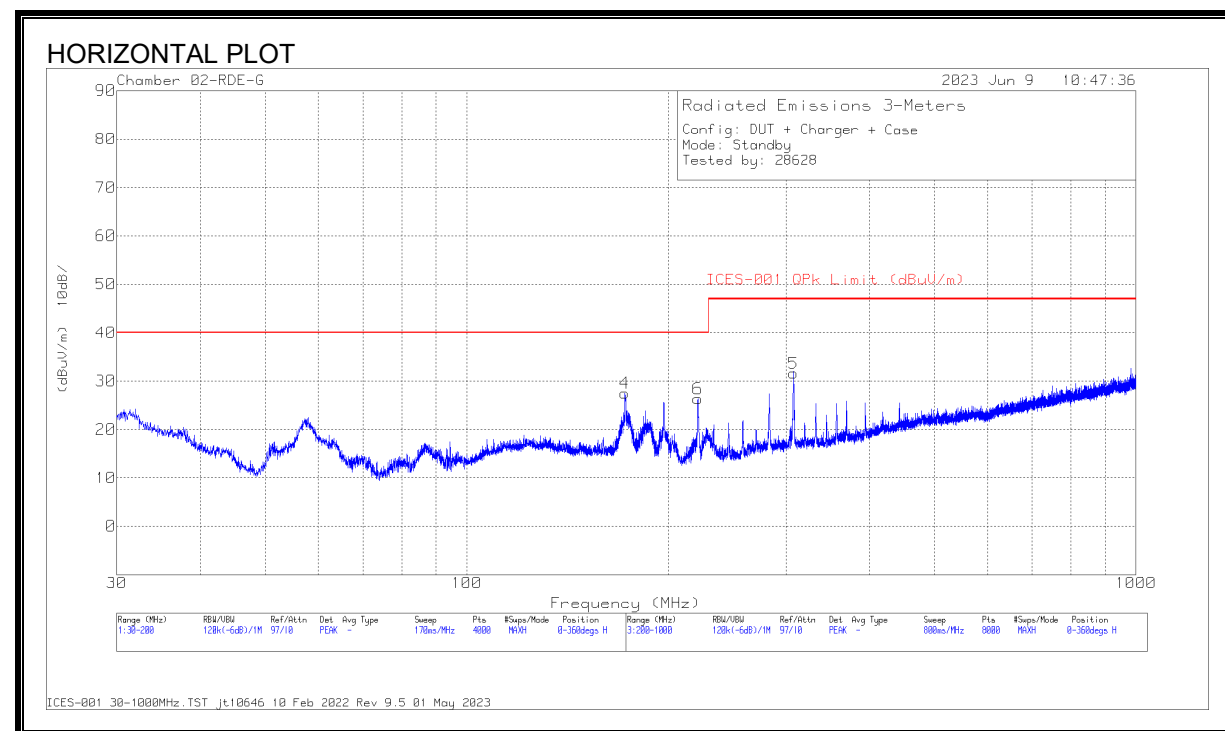
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	227855 ACF (dB) 3m H	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 38.0385	34.53	Qp	21	-31.2	24.33	40	-15.67	6	103	V
2	31.4785	34.01	Qp	25.3	-31.3	28.01	40	-11.99	348	103	V
4	182.447	34.02	Qp	17	-29.9	21.12	43.52	-22.4	119	109	H
5	196.553	36.04	Qp	18	-29.8	24.24	43.52	-19.28	129	168	H
3	221.387	37.95	Qp	16.6	-29.7	24.85	46.02	-21.17	176	198	V
6	307.348	39.9	Qp	19.6	-29.1	30.4	46.02	-15.62	310	108	H

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

Qp - Quasi-Peak detector

8.2.4. IC/ ICES-001 TX SPURIOUS EMISSION (30 - 1000 MHz)

Standby



DATA

Radiated Emissions

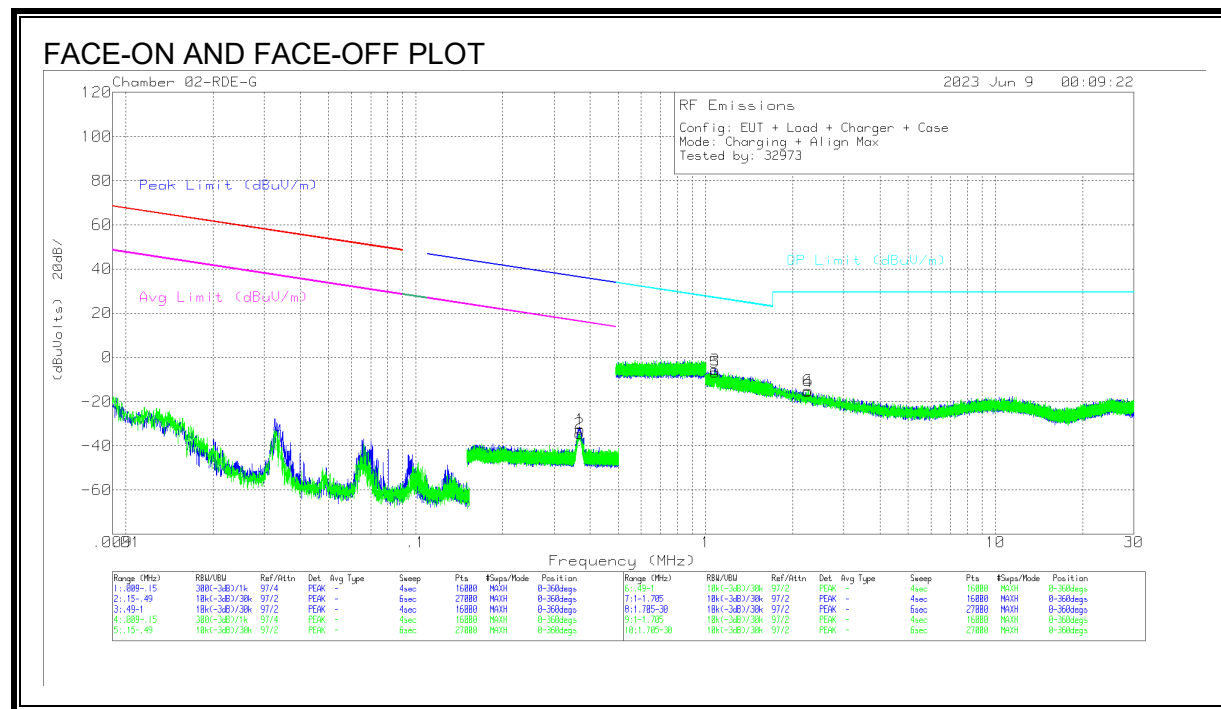
Marker	Frequency (MHz)	Meter Reading (dBUV)	Det	227855 ACF (dB) 3m H	Amp Cbl (dB)	Corrected Reading (dBUV/m)	ICES-001 QPk Limit (dBUV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.4298	31.47	Qp	25.3	-31.3	25.47	40	-14.53	308	163	V
2	37.7244	34.3	Qp	21.2	-31.2	24.3	40	-15.7	329	104	V
3	57.145	39.37	Qp	13.1	-31	21.47	40	-18.53	254	110	V
4	172.318	38.96	Qp	17.6	-30	26.56	40	-13.44	122	133	H
6	221.911	34.52	Qp	16.6	-29.7	21.42	40	-18.58	201	149	H
5	307.734	40.79	Qp	19.6	-29.1	31.29	47	-15.71	300	107	H

Qp - Quasi-Peak detector

8.3.EUT With Load

8.3.1. FCC TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)

OPERATING WITH LOAD



DATA

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	Cables/Amp (dB)	Dist Corr 300m (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
2	.3675	21.58	Pk	56	-32	-80	-34.42	36.3	-70.72	16.3	-50.72	0-360	Face-Off
1	.3694	23.54	Pk	56	-32	-80	-32.46	36.26	-68.72	16.26	-48.72	0-360	Face-On

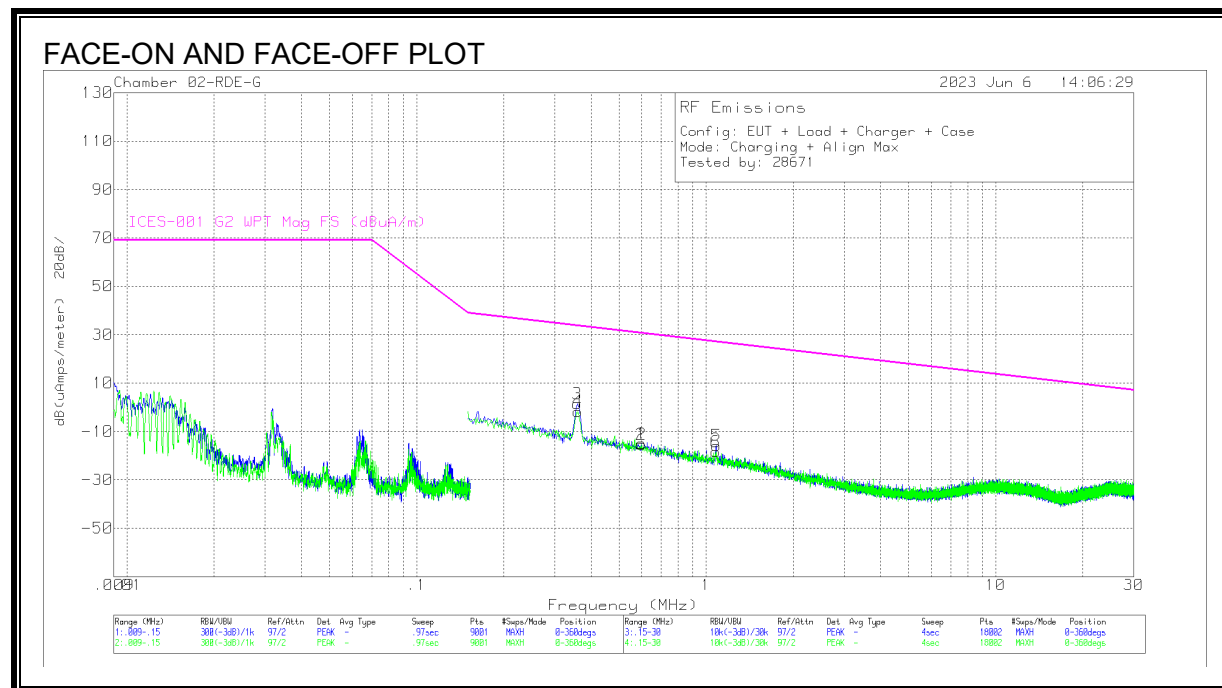
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	Cables/Amp (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
3	1.0783	19.96	Pk	46.4	-32	-40	-5.64	26.97	-32.61	0-360	Face-On
5	1.0786	18.96	Pk	46.4	-32	-40	-6.64	26.97	-33.61	0-360	Face-Off
4	2.2531	15.5	Pk	40.8	-31.9	-40	-15.6	29.5	-45.1	0-360	Face-Off
6	2.2594	16.25	Pk	40.8	-31.9	-40	-14.85	29.5	-44.35	0-360	Face-On

Pk - Peak detector

8.3.2. IC/ ICES-001 TX FUNDAMENTAL & SPURIOUS EMISSIONS (9 kHz - 30 MHz)

OPERATING WITH LOAD



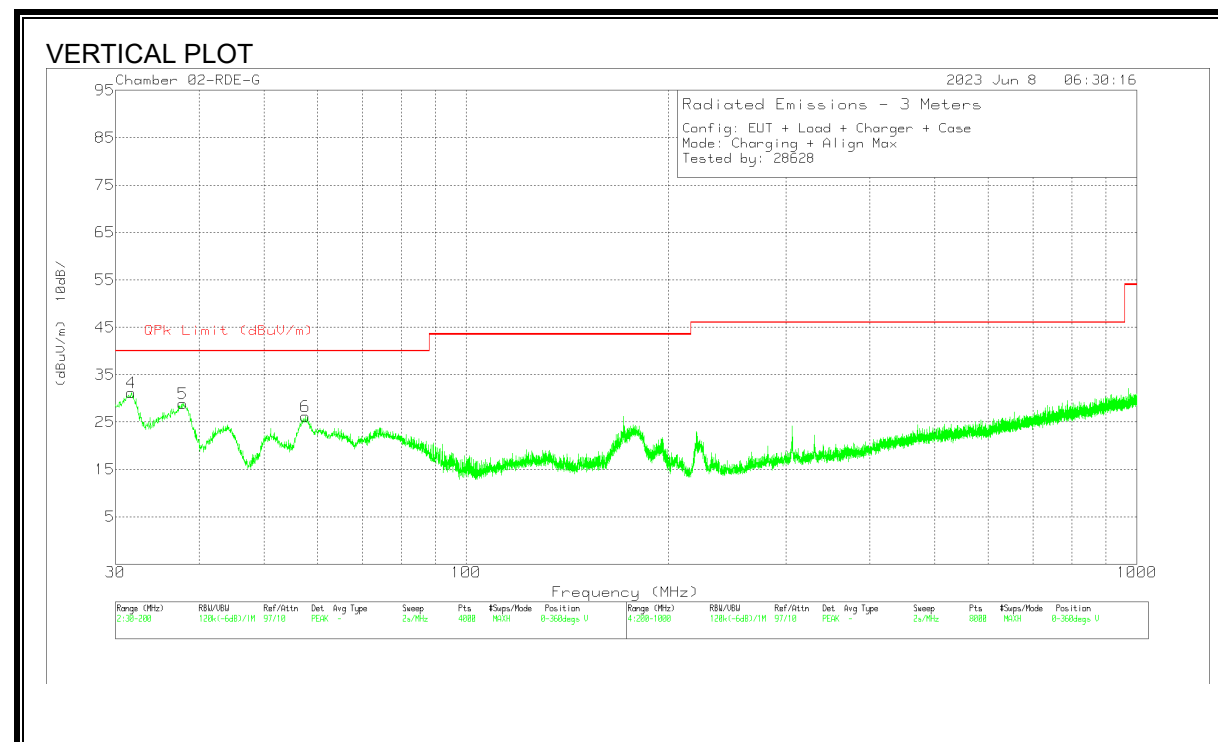
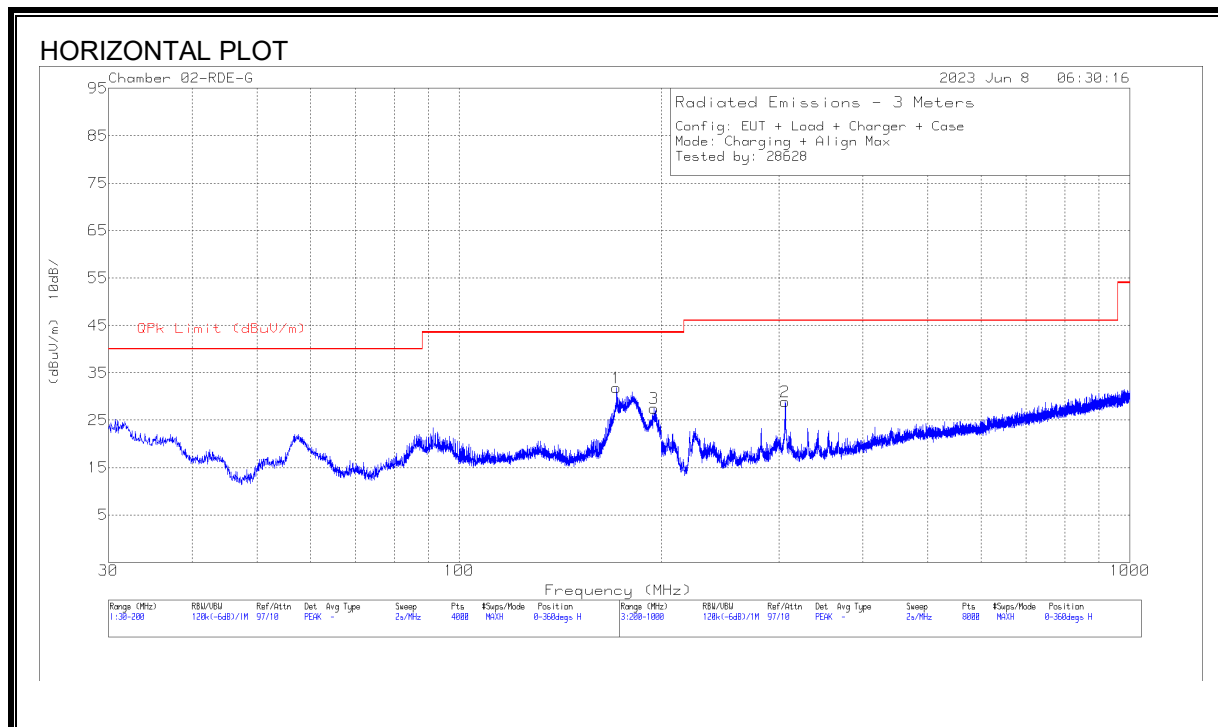
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna H(ACF)	Cables/Amp (dB)	Corrected Reading dB(uAmps/meter)	ICES-001 G2 WPT Mag FS (dBuA/m)	Margin (dB)	Azimuth (Degs)	Polarity
3	.3589	30.09	Pk	3.4	-32	1.49	33.73	-32.24	0-360	Face-On
4	.3606	26.89	Pk	3.4	-32	-1.71	33.7	-35.41	0-360	Face-Off
1	.5977	17.75	Pk	-7	-32	-14.95	30.65	-45.6	0-360	Face-On
2	.5977	17.46	Pk	-7	-32	-15.24	30.65	-45.89	0-360	Face-Off
6	1.0785	18.8	Pk	-5.1	-32	-18.3	27.09	-45.39	0-360	Face-Off
5	1.0835	21.47	Pk	-5.2	-32	-15.73	27.06	-42.79	0-360	Face-On

Pk - Peak detector

8.3.3. FCC TX SPURIOUS EMISSION (30 - 1000 MHz)

OPERATING WITH LOAD



DATA

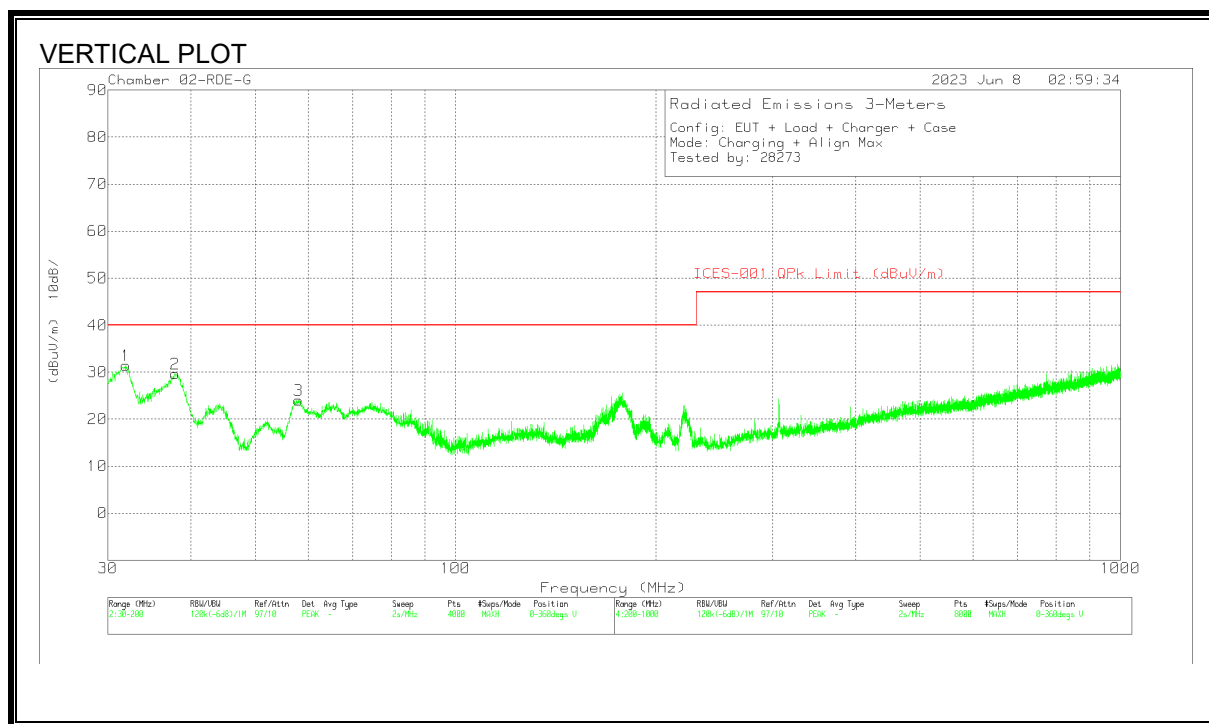
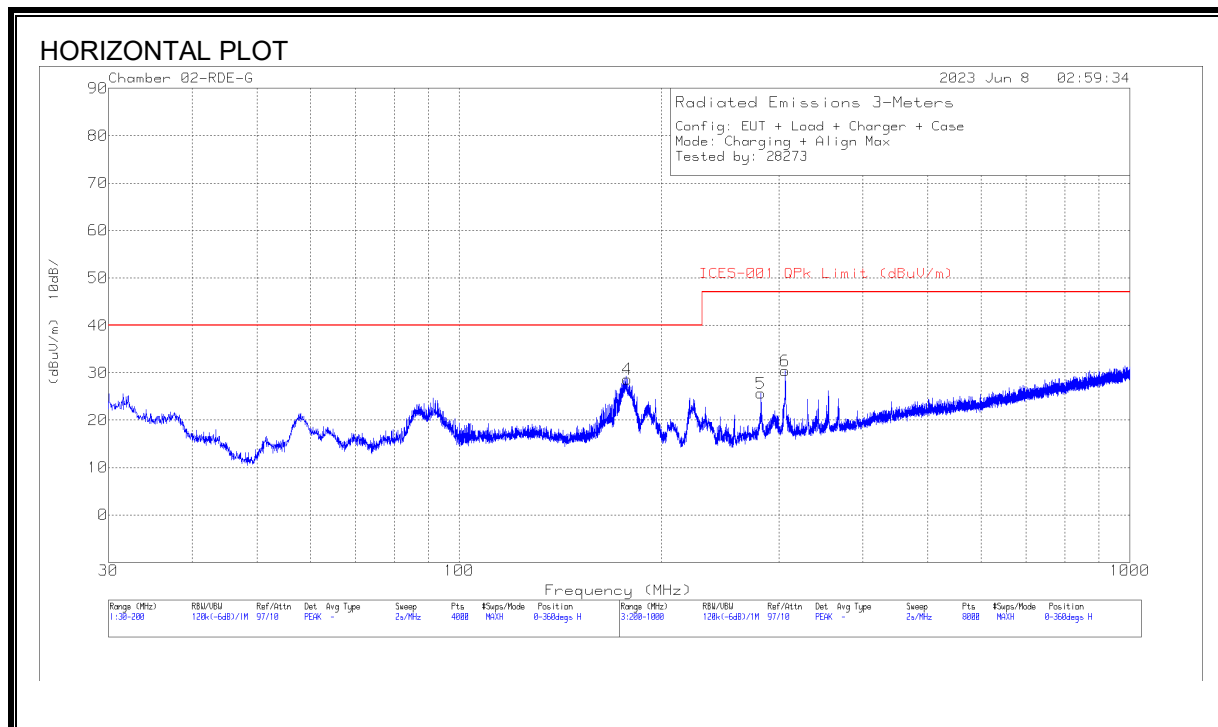
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	227855 ACF (dB/m) 3m H	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 37.8572	34.34	Qp	21.1	-31.2	24.24	40	-15.76	17	110	V
5	31.4329	32.34	Qp	25.3	-31.3	26.34	40	-13.66	288	108	V
6	57.2476	40.32	Qp	13.1	-31	22.42	40	-17.58	63	110	V
1	176.764	41.29	Qp	17.3	-30	28.59	43.52	-14.93	137	141	H
3	196.133	35.85	Qp	18	-29.8	24.05	43.52	-19.47	120	121	H
2	306.354	38.88	Qp	19.5	-29.2	29.18	46.02	-16.84	305	102	H

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

8.3.4. IC/ ICES-001 TX SPURIOUS EMISSION (30 - 1000 MHz)

OPERATING WITH LOAD



DATA

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	227855 ACF (dB/m) 3m H	Amp Cbl (dB)	Corrected Reading (dBuV/m)	ICES-001 QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	32.0753	32.6	Qp	25	-31.3	26.3	40	-13.7	318	138	V
2	37.8081	35.5	Qp	21.1	-31.2	25.4	40	-14.6	17	129	V
3	57.9693	39.27	Qp	13.2	-31	21.47	40	-18.53	268	111	V
4	176.78	39.01	Qp	17.3	-30	26.31	40	-13.69	137	138	H
5	281.971	34.3	Qp	19.2	-29.2	24.3	47	-22.7	311	118	H
6	306.314	39.07	Qp	19.5	-29.2	29.37	47	-17.63	298	113	H

Qp - Quasi-Peak detector

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	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 100 V, without an earth connection Quasi-peak (dB μ V)	Appliances rated 100 V, without an earth connection Average (dB μ V)	All other appliances Quasi-peak (dB μ V)	All other appliances Average (dB μ V)
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 dB μ V 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, from 9KHz to 150KHz, resolution bandwidth of 9KHz from 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.

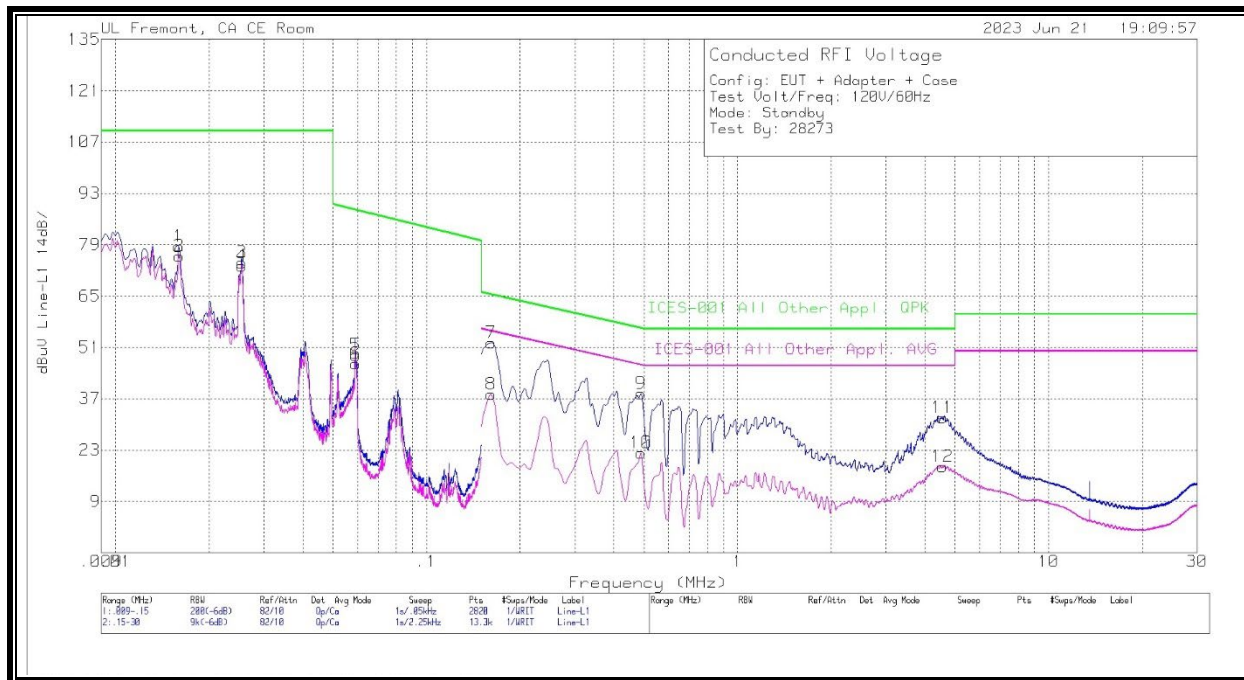
RESULTS

Note: The limits on the plots from 150kHz – 30MHz cover both ICES-001 and FCC Part 15.207.

9.1. Standby

9.1.1. STANDBY MODE POWERED BY AC/DC ADAPTER

LINE 1 RESULTS



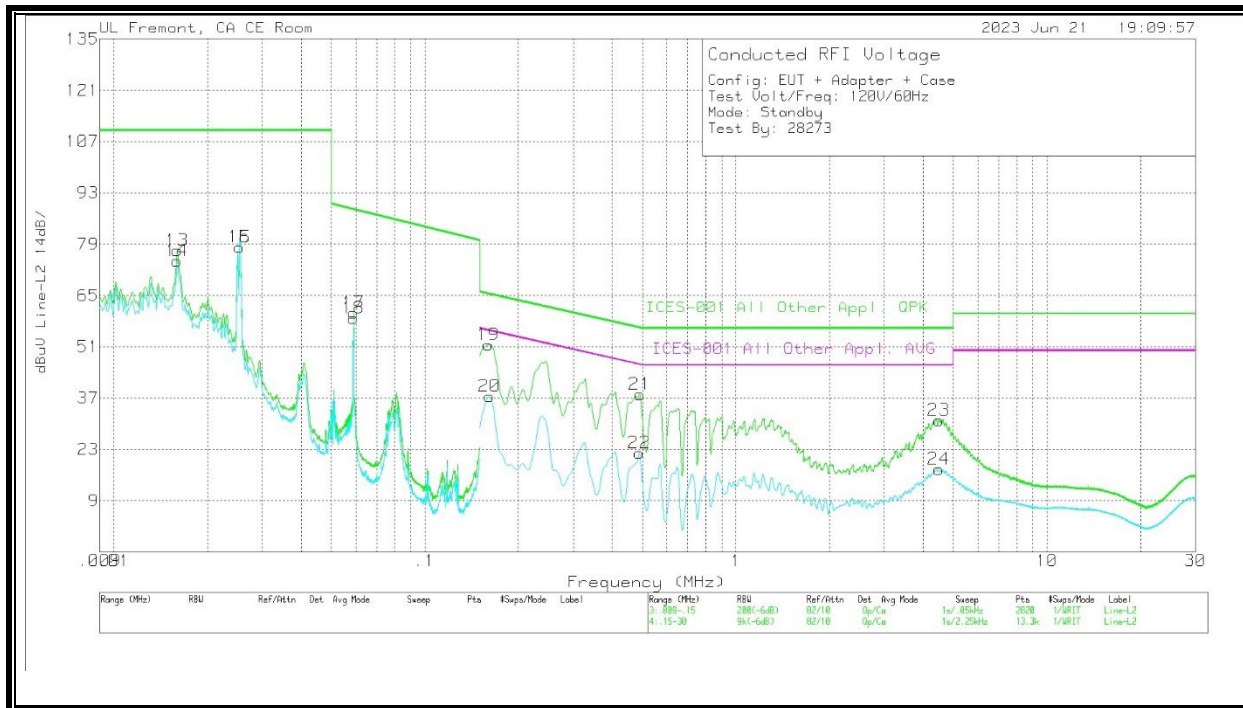
WORST EMISSIONS

Range 1: Line-L1 .009 - .15MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L1_LISN.csv dB	C1&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
2	.016	63.03	Ca	2	0	10.9	75.93	-	-	-	-
4	.0255	61.44	Ca	1	0	10.8	73.24	-	-	-	-
6	.0593	36.83	Ca	0	0	9.8	46.63	-	-	-	-
1	.016	65.61	Qp	2	0	10.9	78.51	110	-31.49	-	-
3	.0255	62.3	Qp	1	0	10.8	74.1	110	-35.9	-	-
5	.0593	39.08	Qp	0	0	9.8	48.88	88.45	-39.57	-	-

Range 2: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L1_LISN.csv dB	C1&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
8	.1613	28.84	Ca	0	0	9.4	38.24	-	-	55.4	-17.16
10	.4898	12.87	Ca	0	.1	9.3	22.27	-	-	46.17	-23.9
12	4.56	9.14	Ca	0	.1	9.3	18.54	-	-	46	-27.46
7	.1613	42.83	Qp	0	0	9.4	52.23	65.4	-13.17	-	-
9	.4898	29.03	Qp	0	.1	9.3	38.43	56.17	-17.74	-	-
11	4.5645	22.44	Qp	0	.1	9.3	31.84	56	-24.16	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

Line 2 Results



WORST EMISSIONS

Range 3: Line-L2 .009 - .15MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L2_LISN dB	C2&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
14	.016	61.42	Ca	2.1	0	10.9	74.42	-	-	-	-
16	.0254	66.35	Ca	1	0	10.8	78.15	-	-	-	-
18	.0589	48.99	Ca	0	0	9.8	58.79	-	-	-	-
13	.016	64.26	Qp	2.1	0	10.9	77.26	110	-32.74	-	-
15	.0254	66.36	Qp	1	0	10.8	78.16	110	-31.84	-	-
17	.0589	50.36	Qp	0	0	9.8	60.16	88.51	-28.35	-	-

Range 4: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L2_LISN dB	C2&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
20	.1613	28.15	Ca	0	0	9.4	37.55	-	-	55.4	-17.85
22	.4898	12.66	Ca	0	.1	9.3	22.06	-	-	46.17	-24.11
24	4.4835	8.15	Ca	0	.1	9.3	17.55	-	-	46	-28.45
19	.1601	42.09	Qp	0	0	9.4	51.49	65.46	-13.97	-	-
21	.492	28.7	Qp	0	.1	9.3	38.1	56.13	-18.03	-	-
23	4.4835	21.51	Qp	0	.1	9.3	30.91	56	-25.09	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

9.2. EUT With Load

9.2.1. OPERATING MODE WITH LOAD POWERED BY AC/DC ADAPTER

LINE 1 RESULTS



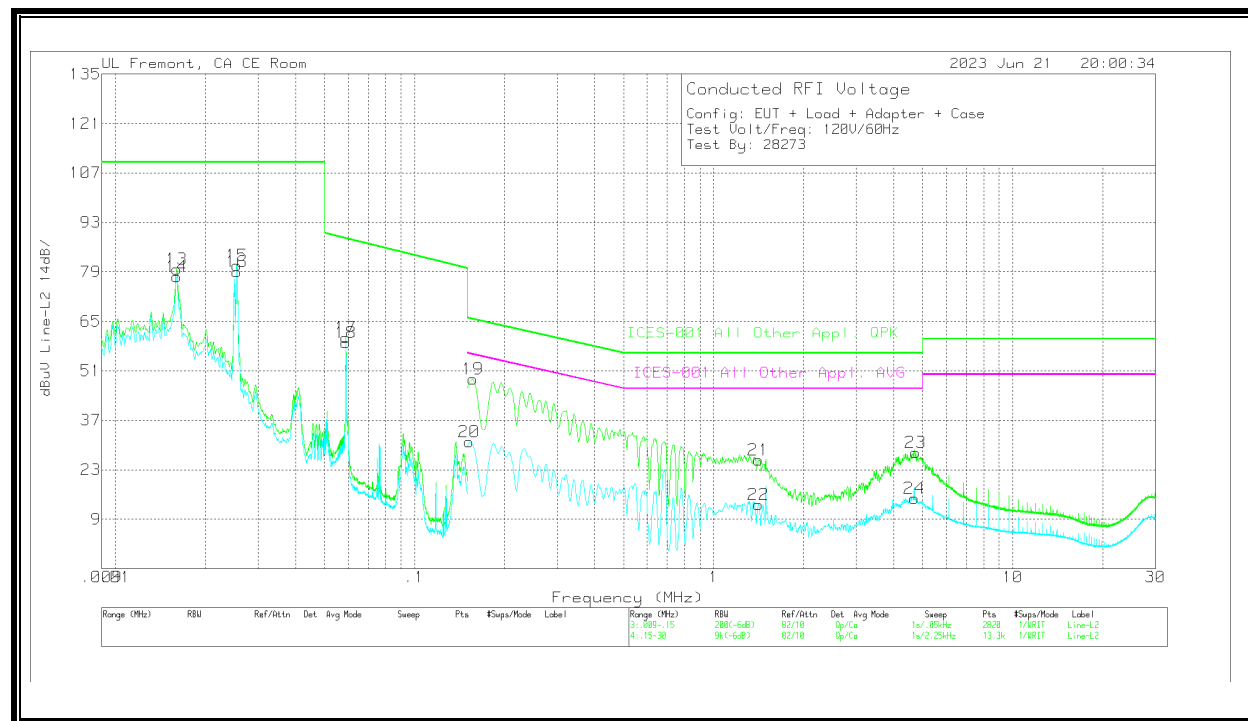
WORST EMISSIONS

Range 1: Line-L1 .009 - .15MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L1_LISN.csv dB	C1&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
2	.0161	65.91	Ca	2	0	10.9	78.81	-	-	-	-
4	.0255	61.95	Ca	1	0	10.8	73.75	-	-	-	-
6	.059	40.86	Ca	0	0	9.8	50.66	-	-	-	-
1	.0161	68.65	Qp	2	0	10.9	81.55	110	-28.45	-	-
3	.0254	63.42	Qp	1	0	10.8	75.22	110	-34.78	-	-
5	.059	42.77	Qp	0	0	9.8	52.57	88.49	-35.92	-	-

Range 2: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L1_LISN.csv dB	C1&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
8	.1838	21.35	Ca	0	0	9.4	30.75	-	-	54.31	-23.56
10	1.4955	10.11	Ca	0	.1	9.3	19.51	-	-	46	-26.49
12	4.722	6.49	Ca	0	.1	9.3	15.89	-	-	46	-30.11
7	.1838	38.74	Qp	0	0	9.4	48.14	64.31	-16.17	-	-
9	1.4955	18.19	Qp	0	.1	9.3	27.59	56	-28.41	-	-
11	4.7288	19.31	Qp	0	.1	9.3	28.71	56	-27.29	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 3: Line-L2 .009 - .15MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L2_LISN dB	C2&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
14	.0161	64.64	Ca	2.1	0	10.9	77.64	-	-	-	-
16	.0255	67.26	Ca	1	0	10.8	79.06	-	-	-	-
18	.0589	49.18	Ca	0	0	9.8	58.98	-	-	-	-
13	.0161	66.82	Qp	2.1	0	10.9	79.82	110	-30.18	-	-
15	.0255	68.99	Qp	1	0	10.8	80.79	110	-29.21	-	-
17	.0589	50.54	Qp	0	0	9.8	60.34	88.51	-28.17	-	-

Range 4: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L2_LISN dB	C2&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
20	.1523	21.47	Ca	0	0	9.4	30.87	-	-	55.88	-25.01
22	1.41	3.81	Ca	0	.1	9.3	13.21	-	-	46	-32.79
24	4.6905	5.54	Ca	0	.1	9.3	14.94	-	-	46	-31.06
19	.1568	39.35	Qp	0	0	9.4	48.75	65.63	-16.88	-	-
21	1.41	16.39	Qp	0	.1	9.3	25.79	56	-30.21	-	-
23	4.731	18.48	Qp	0	.1	9.3	27.88	56	-28.12	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

10. SETUP PHOTOS

Please refer to 14523740-EP1V1 for setup photos

END OF TEST REPORT