

CERTIFICATION TEST REPORT

Report Number. : 14523778-E9V2

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

Model : A2847 (Parent Model)
A3093, A3094, A3096 (Variant Models)

FCC ID : BCG-E8431A (Parent Model)
BCG-E8432A, BCG-E8433A, BCG-E8434A (Variant Models)

IC : 579C-E8431A (Parent Model)
579C-E8432A, 579C-E8433A, 579C-E8434A (Variant Models)

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:
August 10, 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	7/28/2023	Initial Issue	Chin Pang
V2	8/10/2023	Address TCB question section 1	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. <i>METROLOGICAL TRACEABILITY</i>	7
4.2. <i>DECISION RULES</i>	7
4.3. <i>MEASUREMENT UNCERTAINTY</i>	7
5. EQUIPMENT UNDER TEST	8
5.1. <i>DESCRIPTION OF EUT</i>	8
5.2. <i>MAXIMUM E-FIELD and H-FIELD</i>	8
5.3. <i>WORST-CASE CONFIGURATION AND MODE</i>	8
5.4. <i>DESCRIPTION OF TEST SETUP</i>	10
6. TEST AND MEASUREMENT EQUIPMENT	11
7. OCCUPIED BANDWIDTH	12
8. RADIATED EMISSION TEST RESULTS.....	13
8.1. <i>LIMITS AND PROCEDURE</i>	13
8.2. <i>Standby</i>	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. <i>EUT With Load</i>	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. <i>Standby</i>	27
9.1.1. STANDBY MODE POWERED BY AC/DC ADAPTER.....	27
9.2. <i>EUT With Load</i>	29
9.2.1. OPERATING MODE WITH LOAD POWERED BY AC/DC ADAPTER	29
SETUP PHOTOS.....	31

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Smartphone

MODEL: A2847 (Parent Model)
A3093, A3094, A3096 (Variant Models)

BRAND: APPLE

FCC ID: BCG-E8431A (Parent Model)
BCG-E8432A, BCG-E8433A, BCG-E8434A (Variant Models)

IC ID: 579C-E8431A (Parent Model)
579C-E8432A, 579C-E8433A, 579C-E8434A (Variant Models)

SERIAL NUMBER: HH409X7FCM

SAMPLE RECEIPT DATE: JUNE 22, 2023

DATE TESTED: JUNE 30 – JULY 06, 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:



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

Prepared By:



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
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
<input checked="" type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
<input type="checkbox"/>	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
<input type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538 USA			
<input type="checkbox"/>	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, 802.15.4ab-NB and MSS technologies. The rechargeable battery is not user accessible.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC and by ISED-Canada.

The Model and FCC/IC ID covered by this report includes:

Parent Model: A2847, FCC ID: BCG-E8431A, IC ID: 579C-E8431A

Variant Models: A3093; FCC ID: BCG-E8432A, IC ID: 579C-E8432A
 A3094; FCC ID: BCG-E8433A, IC ID: 579C-E8433A
 A3096; FCC ID: BCG-E8434A, IC ID: 579C-E8434A

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 Operating	-43.89 -25.15	-11.58 2.49

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

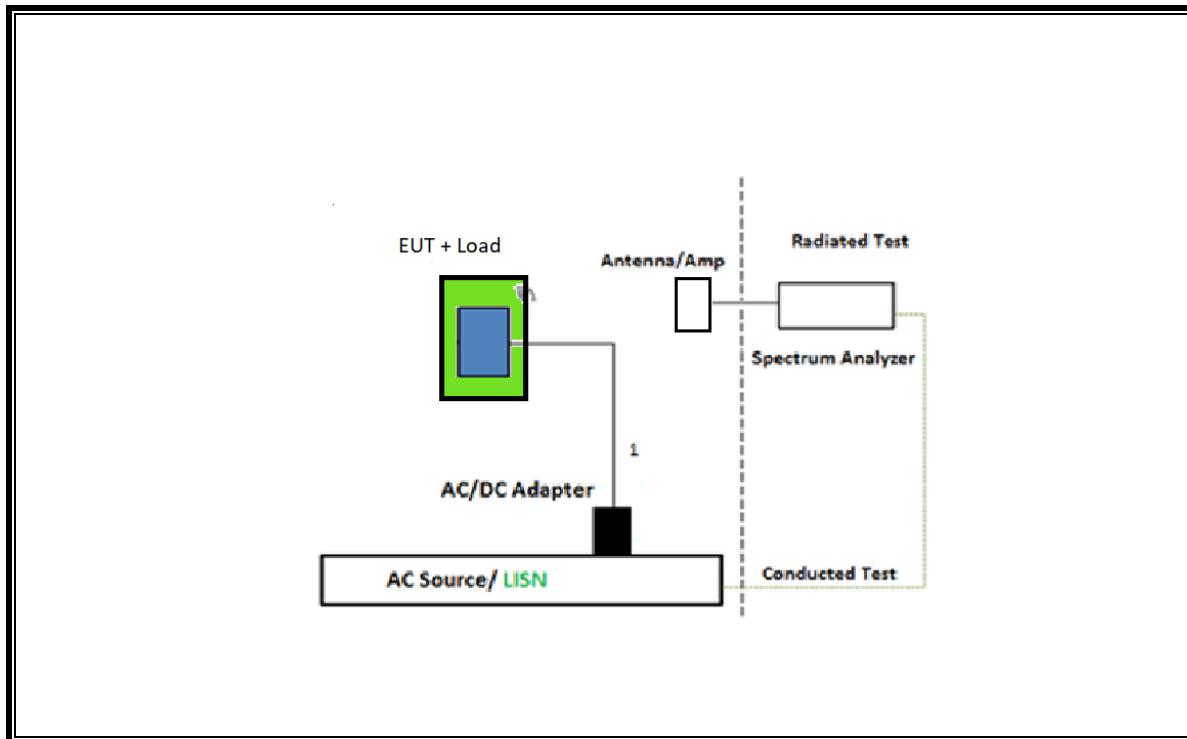
SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC adapter	Apple	A2305	C4H0313063ZPF4FAZ	DoC
Charging Cable	Apple	A2795	FTL851300CQ26GV13	NA
WPT Accessory (Load)	Apple	A2384	DND351202Y50NJM1S	BCGA2384
WPT Accessory	Apple	Clear Case	L12292PR1MA01PY1199	DoC

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 100KHz to 30MHz	ETS-Lindgren	EM-6872	170015	07/28/2023	07/28/2022
*Antenna, Passive Loop 30Hz to 1MHz	Electro-Metrics	EM-6871	170013	07/28/2023	07/28/2022
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	01/24/2023
*Transient Limiter	TE	TBFL1	207996	07/15/2023	07/15/2022
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		

*Testing is completed before equipment expiration date.

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 (dB μ A/m)
0.009 – 0.07	69
0.07 – 0.15	69 to 39 *
0.15 – 30	39 to 7 *
*	The limit level in dB μ A/m decreases linearly with the logarithm of frequency.

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

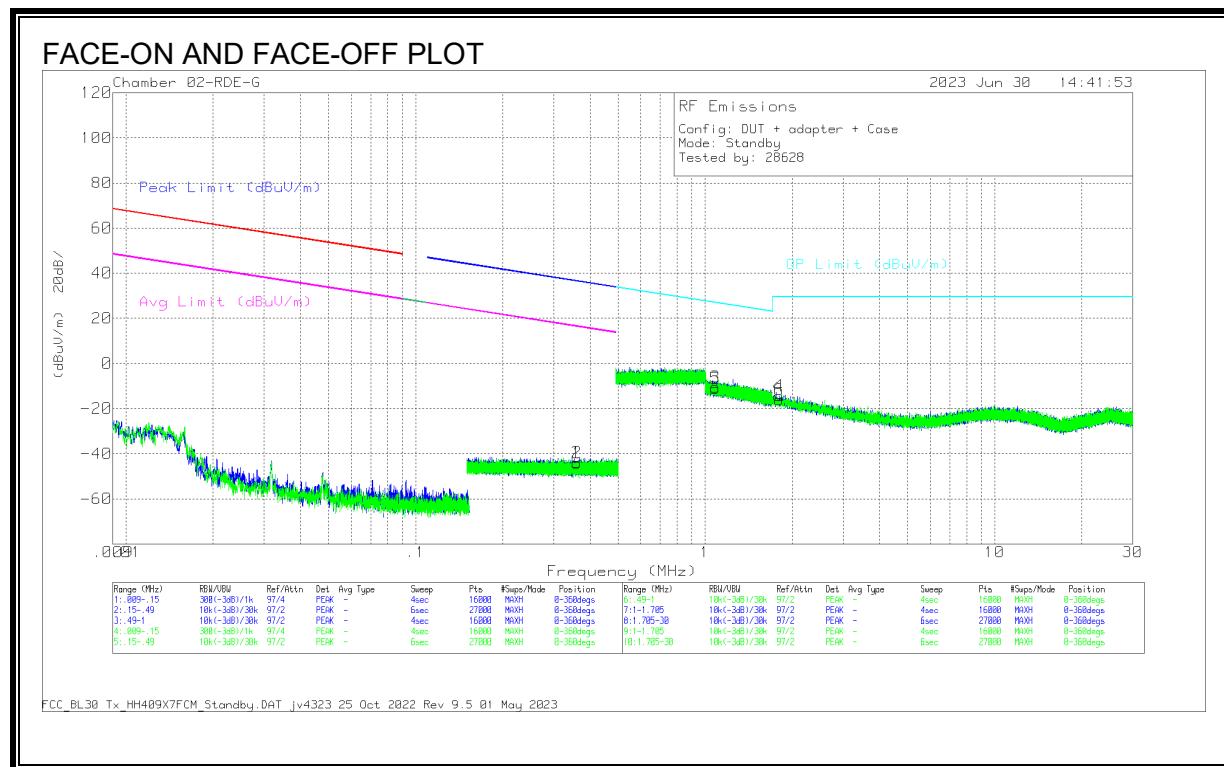
Frequency range (MHz)	OATS or SAC *	OATS or SAC *	FAR *
	10 m measurement distance Quasi-peak (dB μ V/m)	3 m measurement distance Quasi-peak (dB μ V/m)	3 m measurement distance Quasi-peak (dB μ V/m)
30 – 230	30	40	42 to 35**
230 – 1000	37	47	42
<p>Note: The more stringent limit applies at the transition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

RESULTS

8.2. Standby

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

Standby



DATA

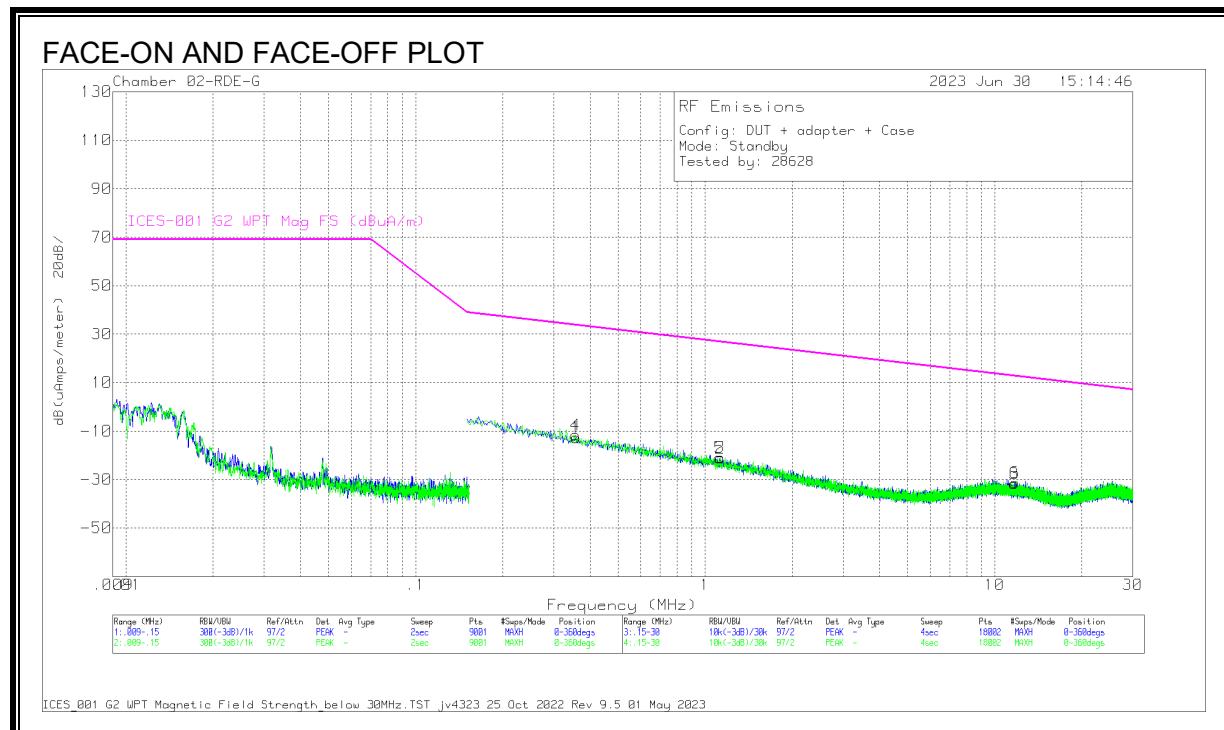
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) dB/m	Cables/Amp (dB)	Dist Corr 300m dB	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
2	.3605	12.11	Pk	56	-32	-80	-43.89	36.47	-80.36	16.47	-60.36	0-360	Face-On
1	.3606	11.92	Pk	56	-32	-80	-44.08	36.47	-80.55	16.47	-60.55	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
5	1.0848	14.67	Pk	46.3	-32	-40	-11.03	26.92	-37.95	0-360	Face-Off
3	1.0849	15.27	Pk	46.3	-32	-40	-10.43	26.92	-37.35	0-360	Face-On
4	1.7983	15.03	Pk	42.6	-31.9	-40	-14.27	29.5	-43.77	0-360	Face-On
6	1.8025	13.22	Pk	42.6	-31.9	-40	-16.08	29.5	-45.58	0-360	Face-Off

Pk - Peak detector

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

Standby



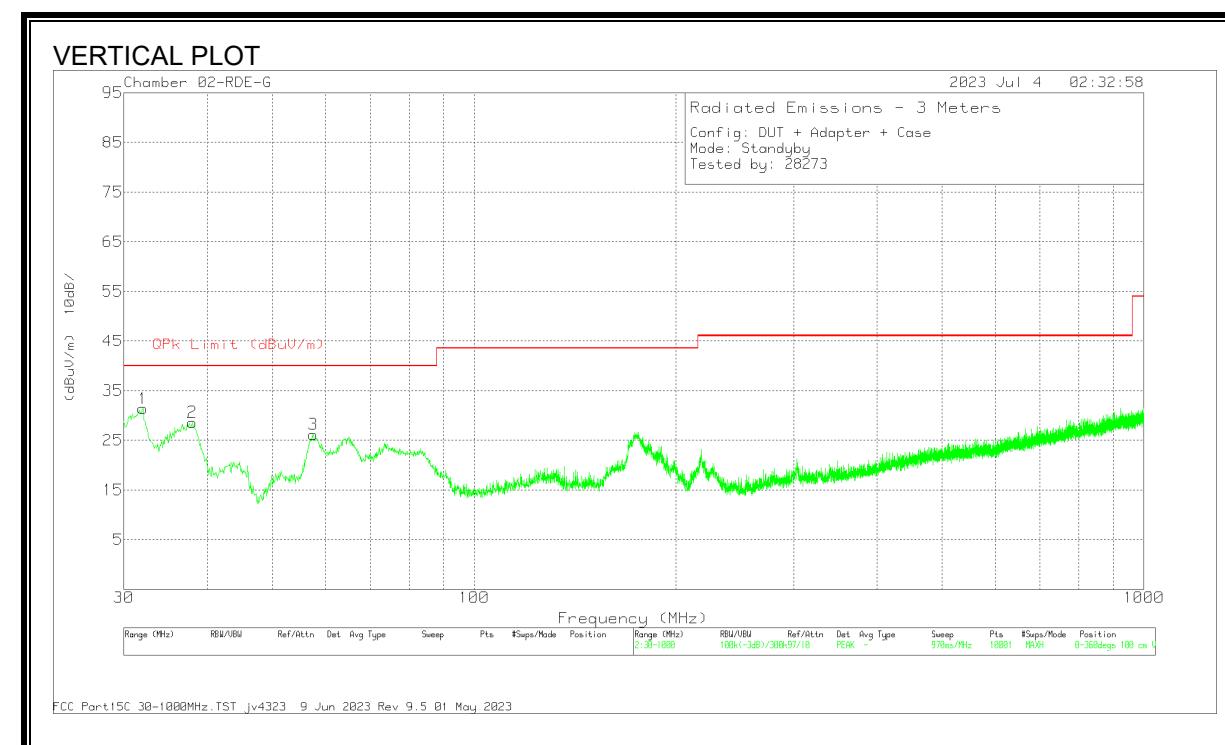
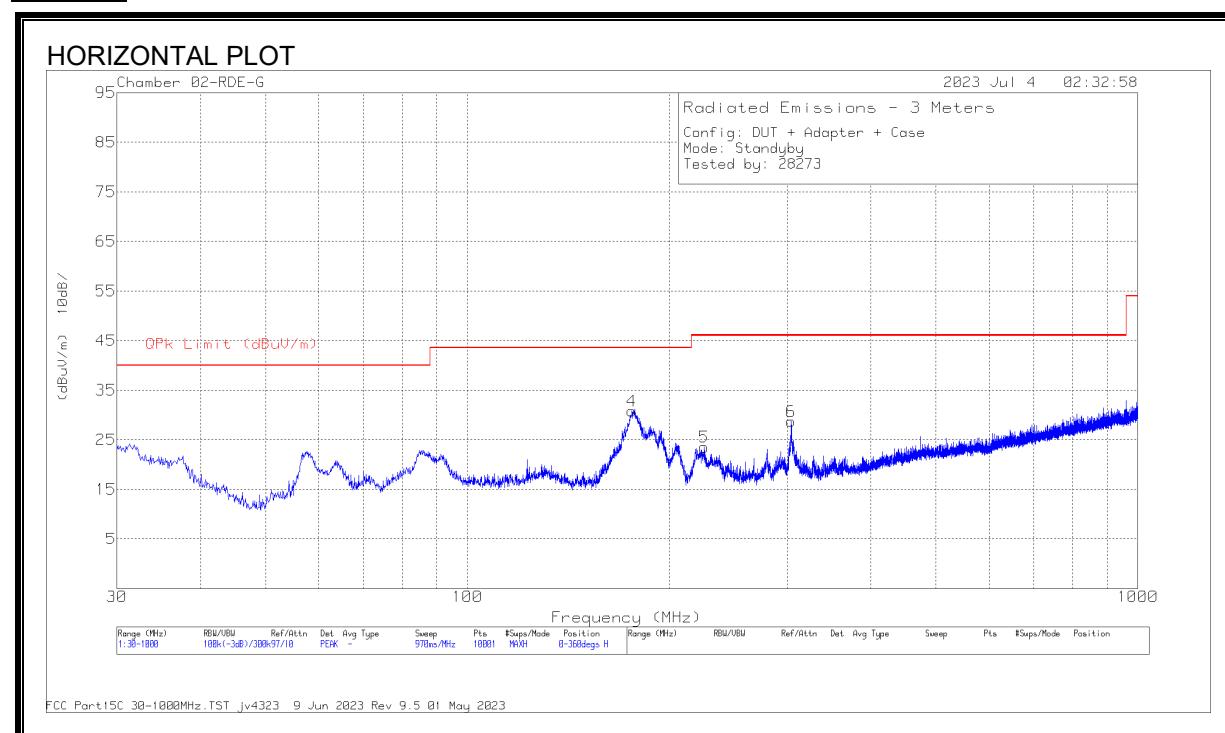
DATA

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
4	3573	17.02	Pk	3.4	-32	-11.58	33.76	-45.34	0-360	Face-Off
1	3589	15.93	Pk	3.4	-32	-12.67	33.73	-46.4	0-360	Face-On
5	1.1249	16.52	Pk	-5.4	-32	-20.88	26.83	-47.71	0-360	Face-Off
2	1.1282	16.35	Pk	-5.4	-32	-21.05	26.81	-47.86	0-360	Face-On
3	11.698	16.92	Pk	-17	-31.6	-31.68	12.69	-44.37	0-360	Face-Off
6	11.7394	17.3	Pk	-17	-31.6	-31.3	12.67	-43.97	0-360	Face-On

Pk - Peak detector

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

Standby



DATA

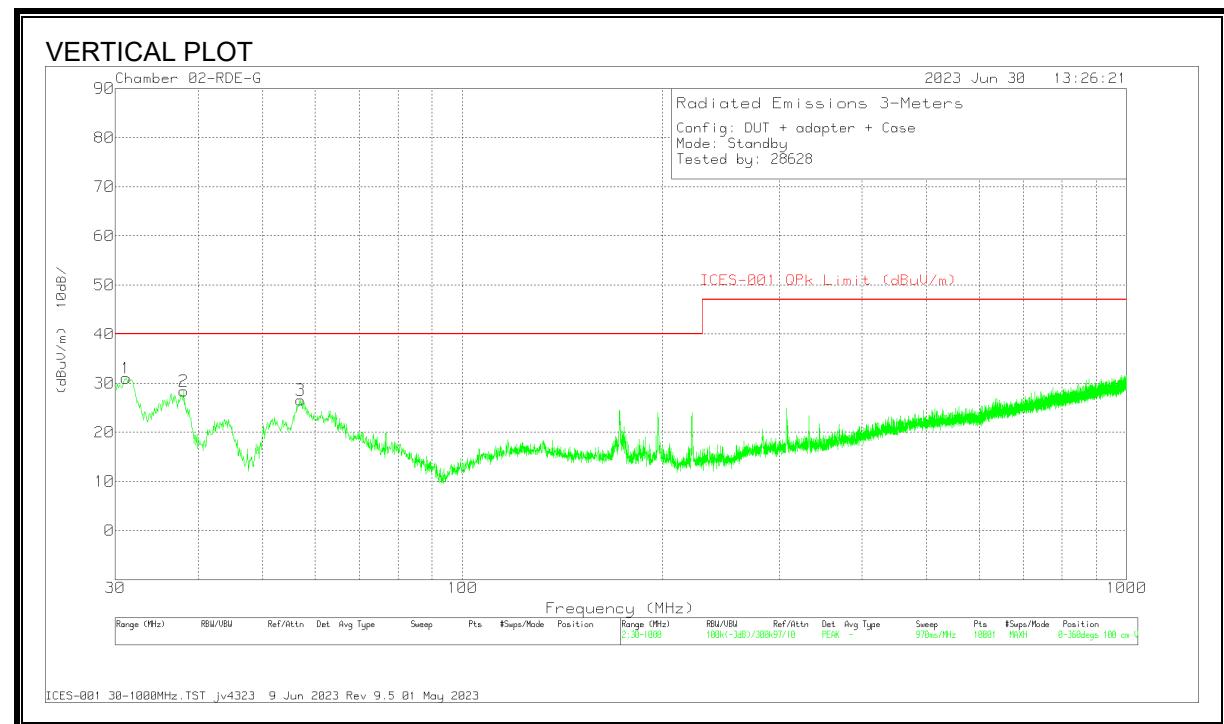
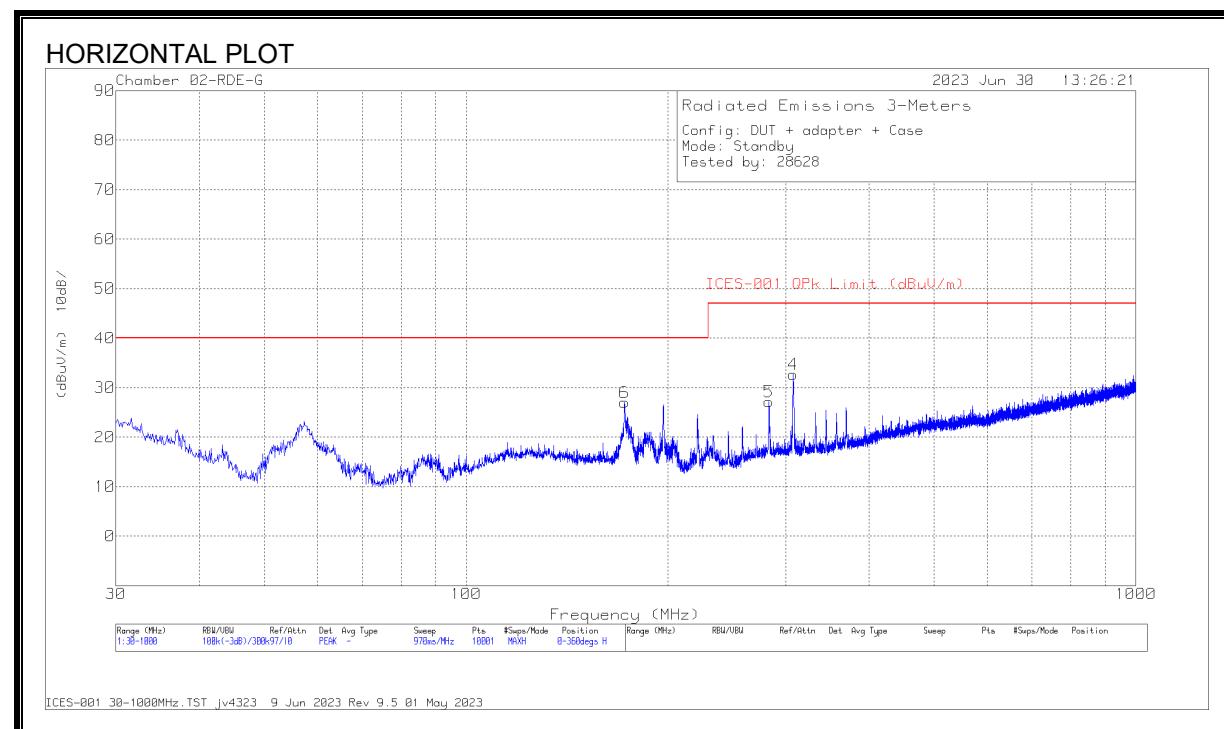
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	227855 ACF (dB) 3m H	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 38.018	35.13	Qp	21	-31.2	24.93	40	-15.07	297	100	V
2	31.6577	34.14	Qp	25.2	-31.3	28.04	40	-11.96	313	106	V
3	57.5475	38.63	Qp	13.2	-31	20.83	40	-19.17	272	102	V
4	174.585	40.01	Qp	17.4	-30	27.41	43.52	-16.11	141	136	H
5	224.689	32.32	Qp	16.8	-29.6	19.52	46.02	-26.5	118	111	H
6	304.399	35.17	Qp	19.5	-29.2	25.47	46.02	-20.55	148	111	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

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	31.6198	30.93	Qp	25.2	-31.3	24.83	40	-15.17	357	185	V
2	37.4734	32.08	Qp	21.4	-31.2	22.28	40	-17.72	25	160	V
3	57.1998	39.98	Qp	13.1	-31	22.08	40	-17.92	274	117	V
6	172.482	39.13	Qp	17.6	-30	26.73	40	-13.27	135	145	H
5	283.223	34.42	Qp	19.2	-29.2	24.42	47	-22.58	169	119	H
4	307.721	40.35	Qp	19.6	-29.1	30.85	47	-16.15	147	109	H

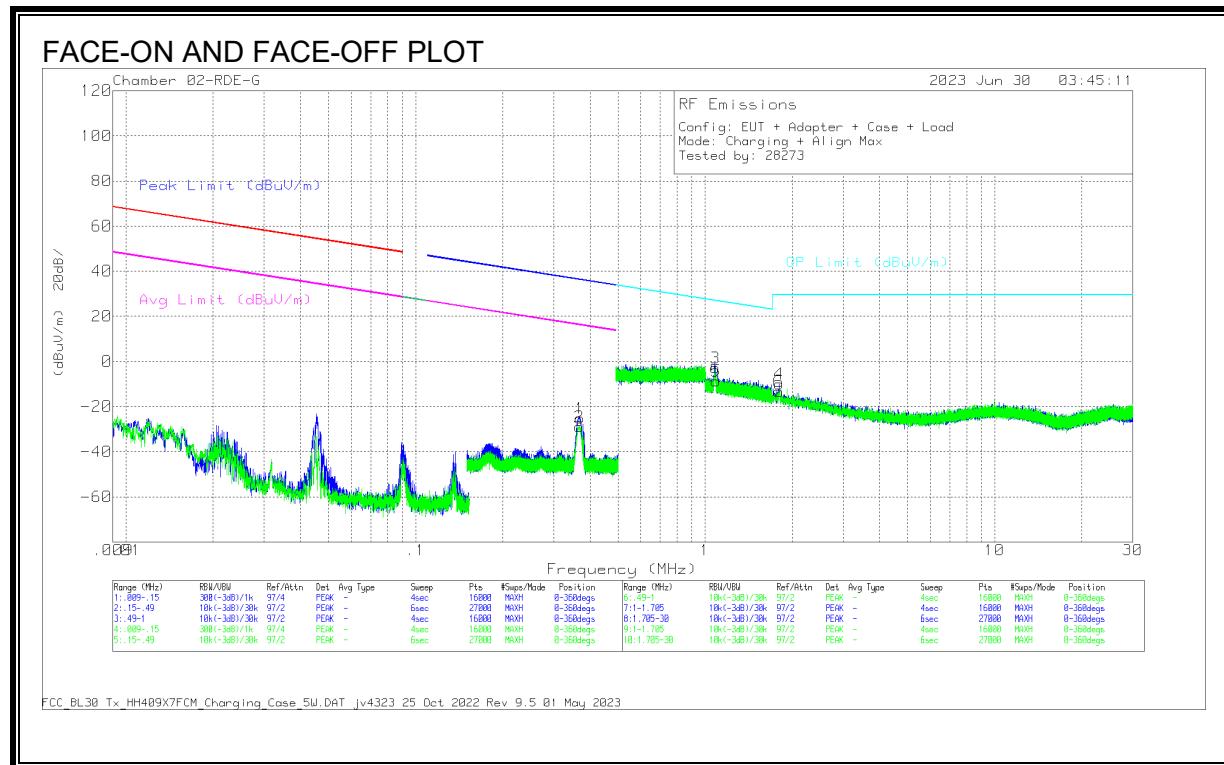
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

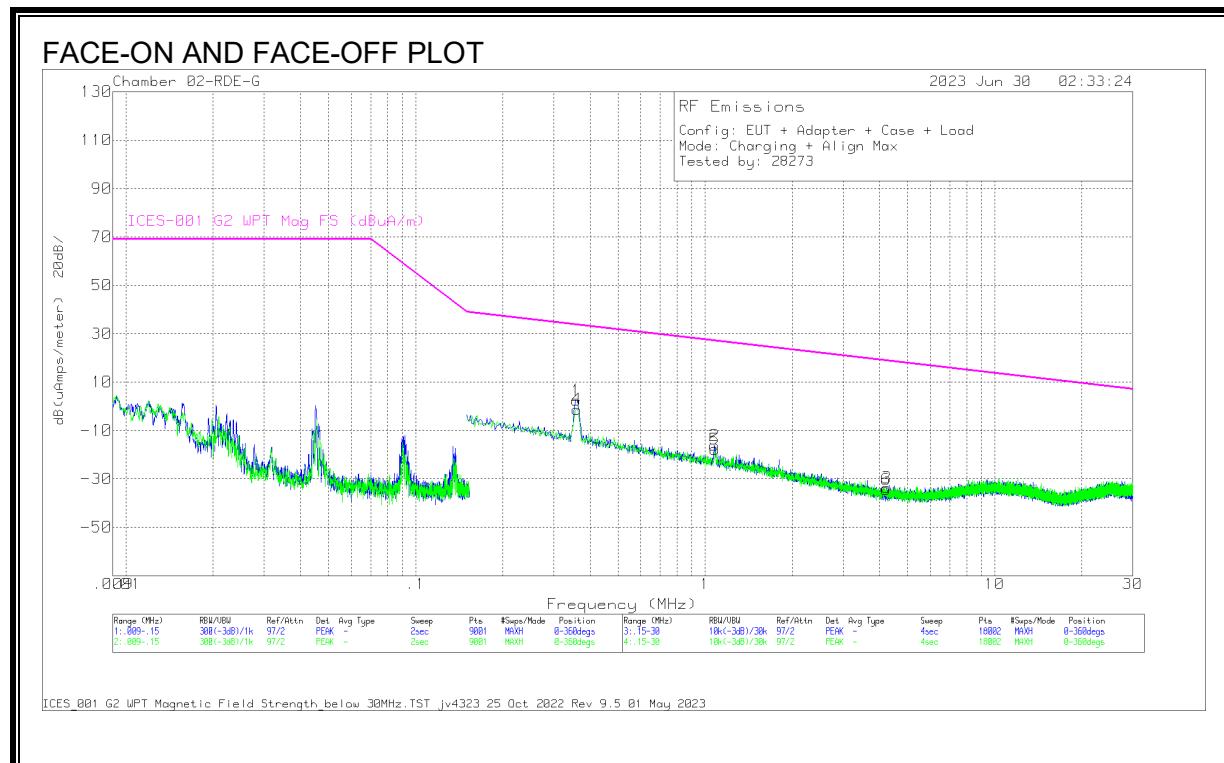
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) dB/m	Cables /Amp (dB)	Dist Corr 300m dB	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
2	.3675	27.09	Pk	56	-32	-80	-28.91	36.3	-65.21	16.3	-45.21	0-360	Face-Off
1	.3691	30.85	Pk	56	-32	-80	-25.15	36.27	-61.42	16.27	-41.42	0-360	Face-On

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	1.0846	22.91	Pk	46.3	-32	-40	-2.79	26.92	-29.71	0-360	Face-On
4	1.8004	19.34	Pk	42.6	-31.9	-40	-9.96	29.5	-39.46	0-360	Face-Off
5	1.0898	17.06	Pk	46.3	-32	-40	-8.64	26.88	-35.52	0-360	Face-On
6	1.7972	16.06	Pk	42.6	-31.9	-40	-13.24	29.5	-42.74	0-360	Face-Off

Pk - Peak detector

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

OPERATING WITH LOAD



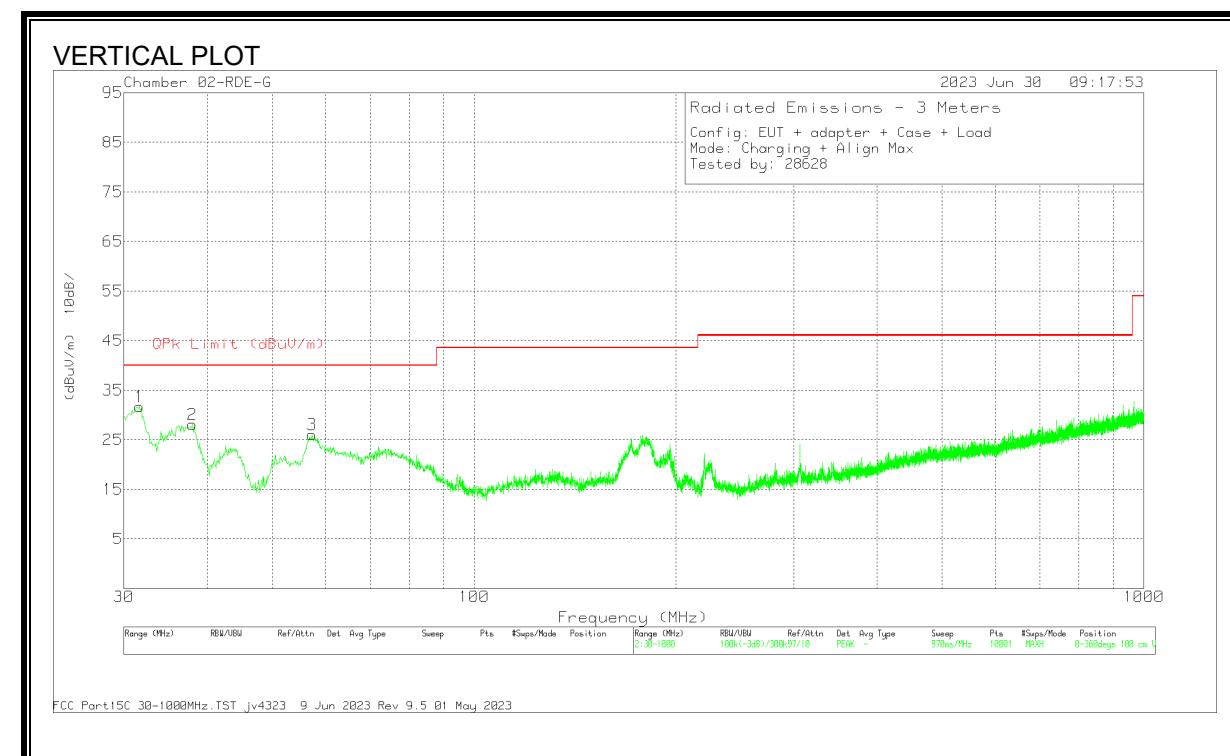
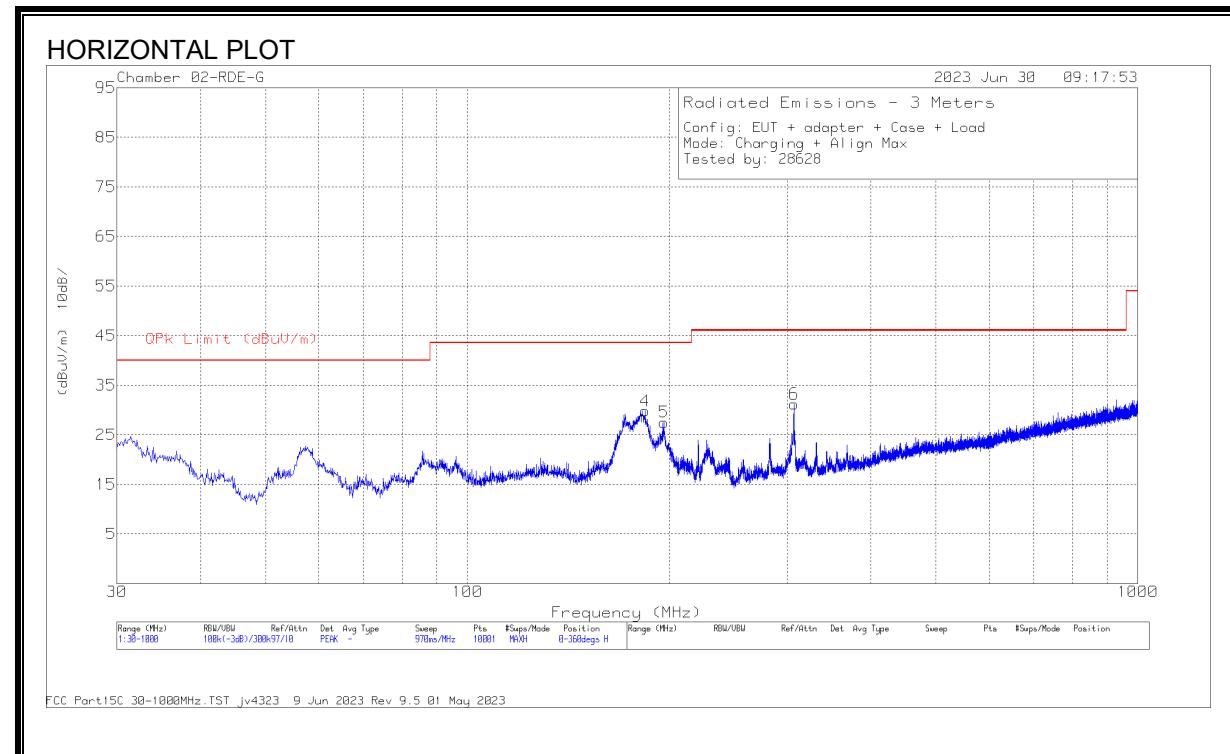
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna H(ACF)	Cables/Am p (dB)	Corrected Reading dB(uAmps/meter)	ICES-001 G2 WPT Mag FS (dBuA/m)	Margin (dB)	Azimuth (Degs)	Polarity
1	.3589	31.09	Pk	3.4	-32	2.49	33.07	-30.58	0-360	Face-On
4	.3606	27.44	Pk	3.4	-32	-1.16	33.04	-34.2	0-360	Face-Off
2	1.0768	21	Pk	-5.1	-32	-16.1	25.61	-41.71	0-360	Face-On
5	1.0801	19.4	Pk	-5.1	-32	-17.7	25.59	-43.29	0-360	Face-Off
6	4.2237	12.16	Pk	-14.6	-31.8	-34.24	16.32	-50.56	0-360	Face-Off
3	4.2337	12.78	Pk	-14.6	-31.8	-33.62	16.3	-49.92	0-360	Face-On

Pk - Peak detector

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

OPERATING WITH LOAD



DATA

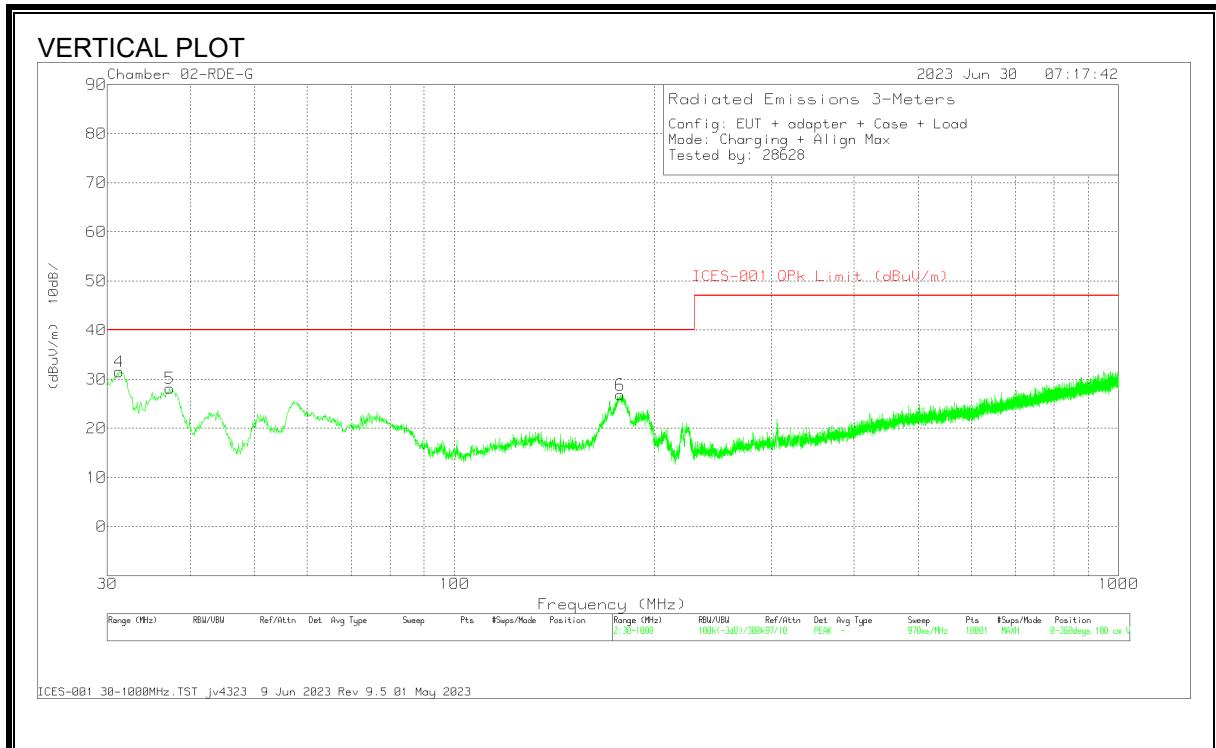
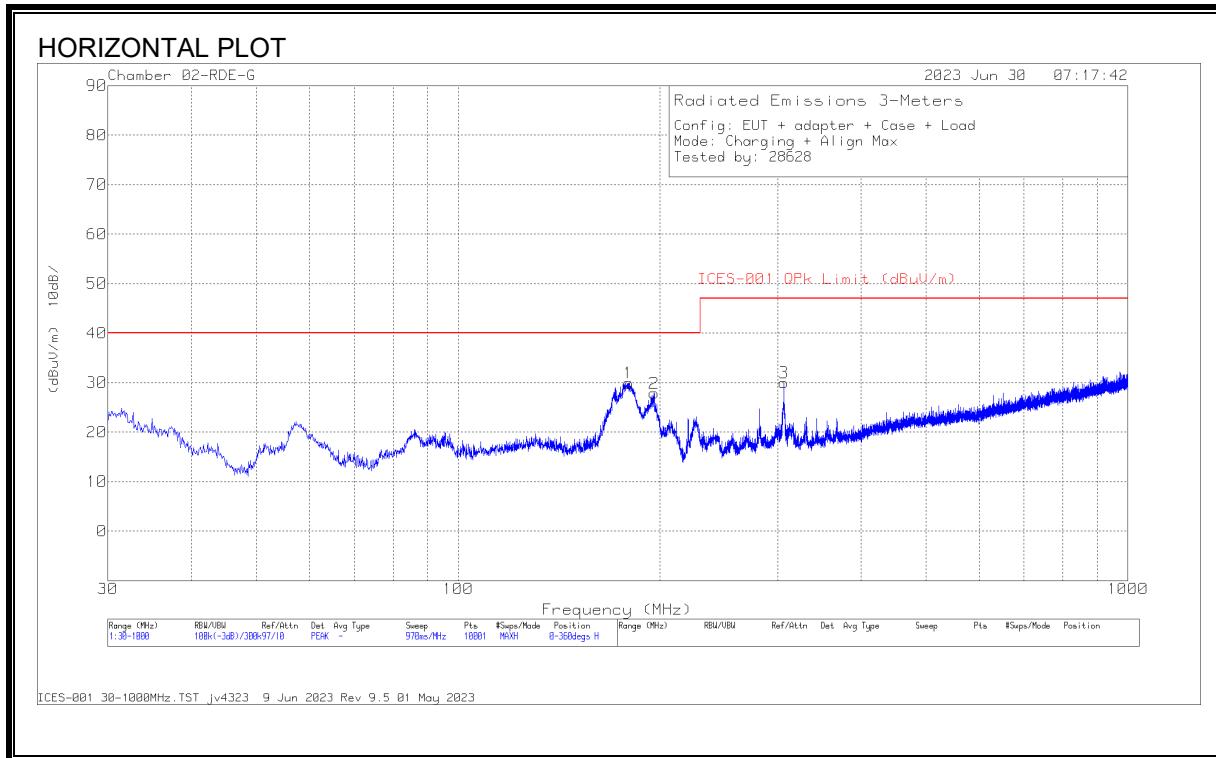
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	227855 ACF (dB) 3m H	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 171.566	39.34	Qp	17.6	-30	26.94	43.52	-16.58	143	146	H
2	* 37.6025	34.12	Qp	21.3	-31.2	24.22	40	-15.78	335	100	V
1	31.2806	32.74	Qp	25.4	-31.3	26.84	40	-13.16	344	132	V
3	57.599	40.54	Qp	13.2	-31	22.74	40	-17.26	251	102	V
5	189.847	36.11	Qp	17.3	-29.8	23.61	43.52	-19.91	135	115	H
6	306.05	37.27	Qp	19.5	-29.2	27.57	46.02	-18.45	147	116	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



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
4	31.3465	32.45	Qp	25.3	-31.3	26.45	40	-13.55	10	130	V
5	37.5858	33.29	Qp	21.3	-31.2	23.39	40	-16.61	4	133	V
1	176.045	40.4	Qp	17.4	-30	27.8	40	-12.2	131	115	H
6	176.368	35.33	Qp	17.4	-30	22.73	40	-17.27	149	159	V
2	180.892	38.69	Qp	17.1	-29.9	25.89	40	-14.11	129	115	H
3	305.598	35.81	Qp	19.5	-29.2	26.11	47	-20.89	152	120	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	Appliances rated 100 V, without an earth connection	All other appliances	All other appliances
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	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.

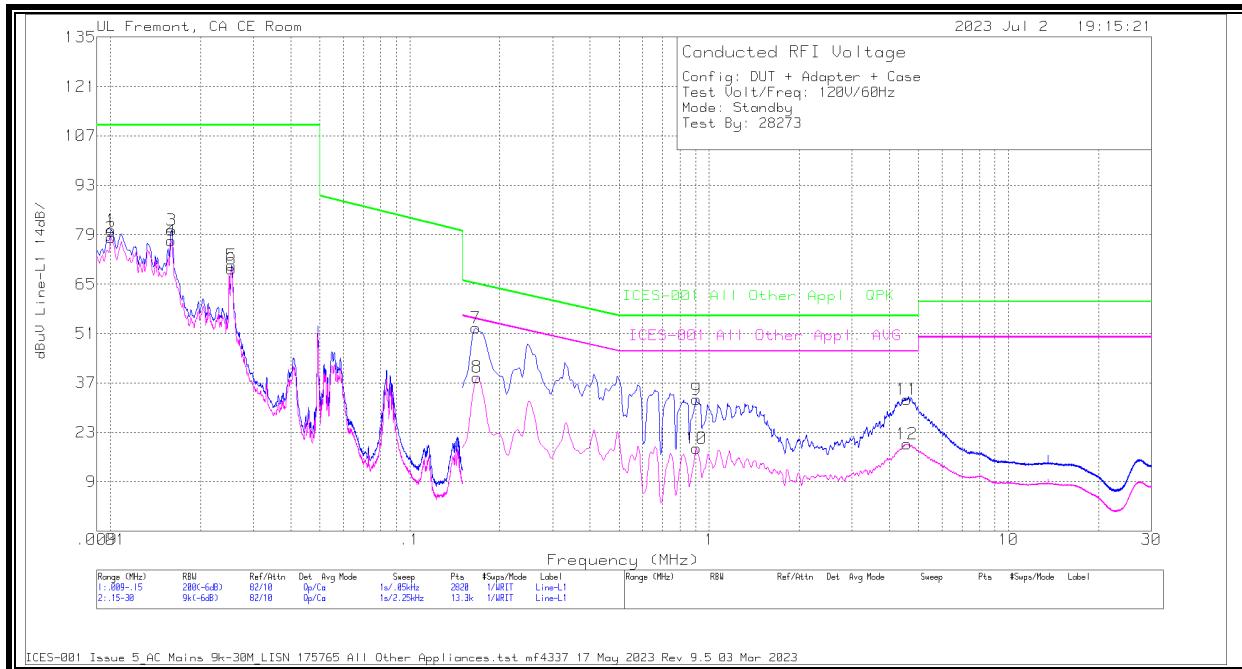
RESULTS

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

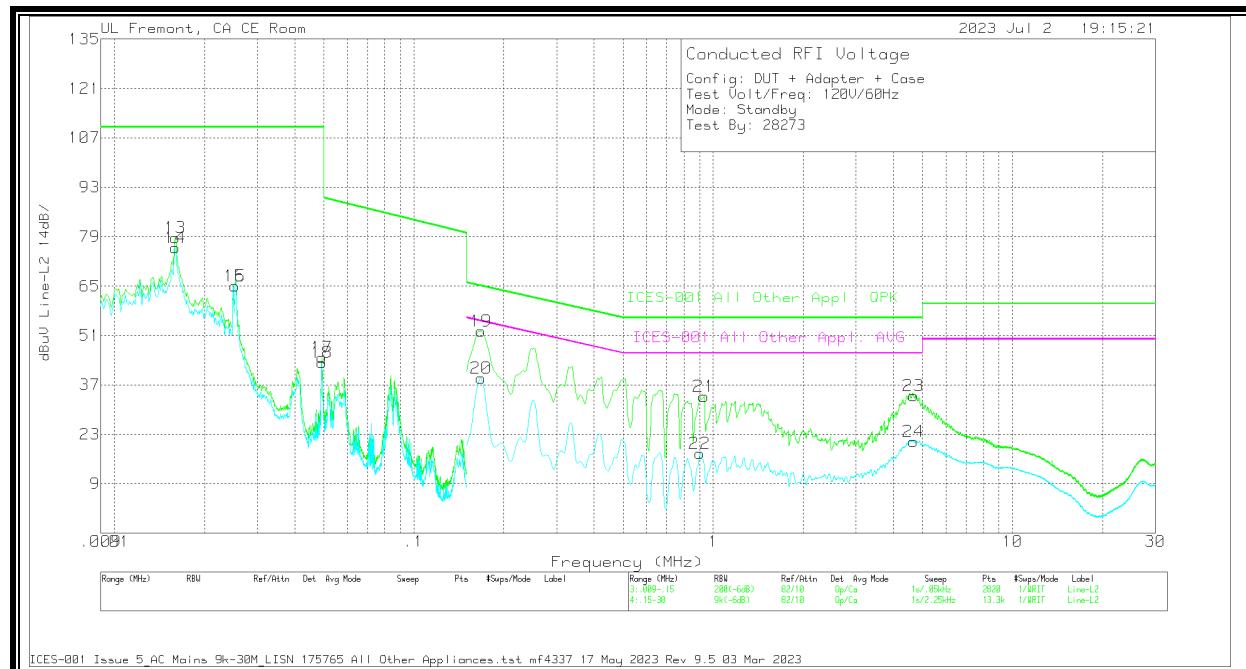


WORST EMISSIONS

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	.0101	61.41	Ca	4.4	0	12.3	78.11	-	-	-	-
4	.016	64.4	Ca	2	0	10.9	77.3	-	-	-	-
6	.0253	57.48	Ca	1	0	10.8	69.28	-	-	-	-
1	.0101	63.58	Qp	4.4	0	12.3	80.28	110	-29.72	-	-
3	.016	67.36	Qp	2	0	10.9	80.26	110	-29.74	-	-
5	.0254	58.56	Qp	1	0	10.8	70.36	110	-39.64	-	-

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	.168	29.24	Ca	0	0	9.4	38.64	-	-	55.06	-16.42
10	.906	9.13	Ca	0	.1	9.3	18.53	-	-	46	-27.47
12	4.587	10.25	Ca	0	.1	9.3	19.65	-	-	46	-26.35
7	.1658	43.25	Qp	0	0	9.4	52.65	65.17	-12.52	-	-
9	.9049	22.96	Qp	0	.1	9.3	32.36	56	-23.64	-	-
11	4.578	22.98	Qp	0	.1	9.3	32.38	56	-23.62	-	-

Line 2 Results



WORST EMISSIONS

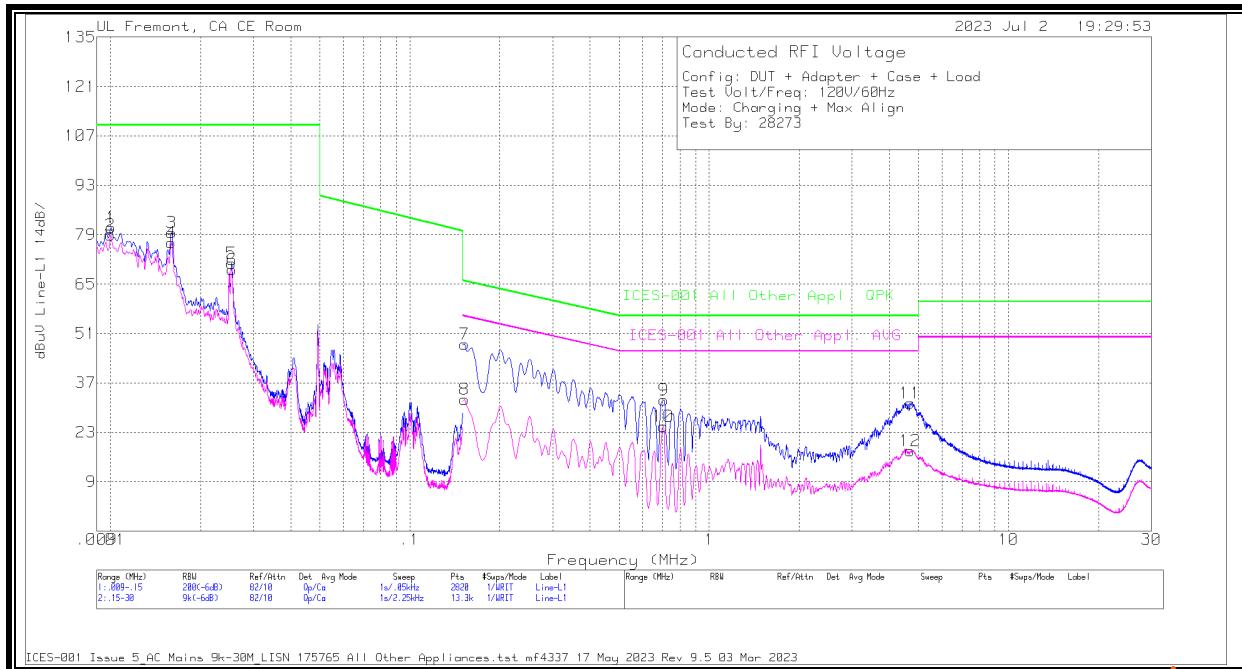
Range 3: Line-L2 .009 -.15MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	L2_LISN dB	C2&C3 cable path loss dB	207996 Limiter with short cabl dB	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
14	.016	62.93	Ca	2.1	0	10.9	75.93	-	-	-	-
16	.0253	53.18	Ca	1	0	10.8	64.98	-	-	-	-
18	.0493	33.42	Ca	0	0	9.9	43.32	-	-	-	-
13	.016	65.75	Qp	2.1	0	10.9	78.75	110	-31.25	-	-
15	.0253	53.31	Qp	1	0	10.8	65.11	110	-44.89	-	-
17	.0493	34.79	Qp	0	0	10	44.79	110	-65.21	-	-

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	Corrected Reading dBuV	ICES-001 All Other Appl. QPK dBuV	Margin (dB)	ICES-001 All Other Appl. AVG dBuV	Margin (dB)
20	.168	29.54	Ca	0	0	9.4	38.94	-	-	55.06	-16.12
22	.9038	8.24	Ca	0	.1	9.3	17.64	-	-	46	-28.36
24	4.6748	11.57	Ca	0	.1	9.3	20.97	-	-	46	-25.03
19	.168	42.83	Qp	0	0	9.4	52.23	65.06	-12.83	-	-
21	.9308	24.43	Qp	0	.1	9.3	33.83	56	-22.17	-	-
23	4.6725	24.52	Qp	0	.1	9.3	33.92	56	-22.08	-	-

9.2. EUT With Load

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

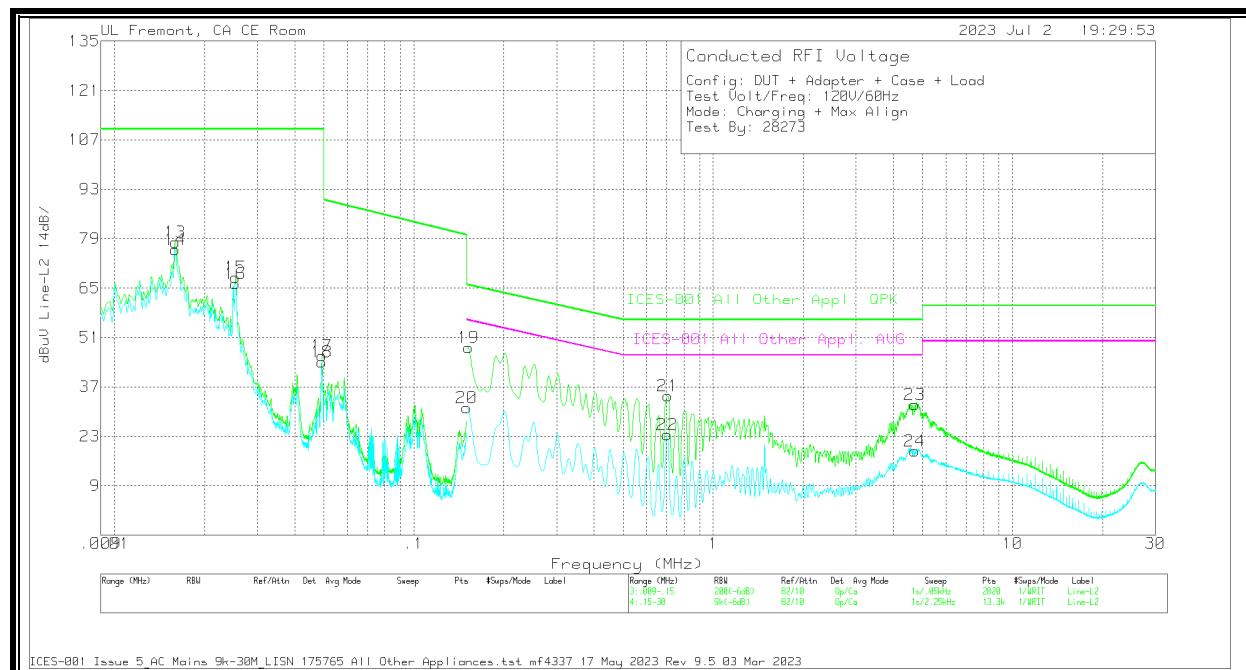
LINE 1 RESULTS



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	.01	62.06	Ca	4.4	0	12.4	78.86	-	-	-	-
4	.016	63.79	Ca	2	0	10.9	76.69	-	-	-	-
6	.0255	57.31	Ca	1	0	10.8	69.11	-	-	-	-
1	.0101	64.37	Qp	4.4	0	12.3	81.07	110	-28.93	-	-
3	.016	66.71	Qp	2	0	10.9	79.61	110	-30.39	-	-
5	.0254	59.02	Qp	1	0	10.8	70.82	110	-39.18	-	-

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	.1523	22.9	Ca	0	0	9.4	32.3	-	-	55.88	-23.58
10	.7035	15.23	Ca	0	.1	9.3	24.63	-	-	46	-21.37
12	4.6905	8.39	Ca	0	.1	9.3	17.79	-	-	46	-28.21
7	.1523	38.52	Qp	0	0	9.4	47.92	65.88	-17.96	-	-
9	.7058	22.8	Qp	0	.1	9.3	32.2	56	-23.8	-	-
11	4.6815	21.81	Qp	0	.1	9.3	31.21	56	-24.79	-	-

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	62.8	Ca	2.1	0	10.9	75.8	-	-	-	-
16	.0254	54.5	Ca	1	0	10.8	66.3	-	-	-	-
18	.0494	34.22	Ca	0	0	9.9	44.12	-	-	-	-
13	.016	65.01	Qp	2.1	0	10.9	78.01	110	-31.99	-	-
15	.0254	56.26	Qp	1	0	10.8	68.06	110	-41.94	-	-
17	.0493	35.94	Qp	0	0	9.9	45.84	110	-64.16	-	-

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	.15	21.76	Ca	0	0	9.4	31.16	-	-	56	-24.84
22	.7013	13.98	Ca	0	.1	9.3	23.38	-	-	46	-22.62
24	4.7198	9.41	Ca	0	.1	9.3	18.81	-	-	46	-27.19
19	.1523	38.79	Qp	0	0	9.4	48.19	65.88	-17.69	-	-
21	.7058	25.02	Qp	0	.1	9.3	34.42	56	-21.58	-	-
23	4.7209	22.52	Qp	0	.1	9.3	31.92	56	-24.08	-	-

SETUP PHOTOS

Please refer to 14523778-EP1V1 for setup photos

END OF TEST REPORT