



CERTIFICATION TEST REPORT

Report Number: 13573888-E6V2

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

Model : A2675

FCC ID : BCGA2675

IC : 579C-A2675

EUT Description : MAGNETIC CHARGER

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 23, 2021

Prepared by:
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	8/20/2021	Initial Issue	Chin Pang
V2	8/23/2021	Address TCB's Questions on page 19 and 43	Chin Pang

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: MAGNETIC CHARGER

MODEL: A2675

BRAND: APPLE

SERIAL NUMBER: DLC127700AQ19G22Y

SAMPLE RECEIPT DATE: AUGUST 05, 2021

DATE TESTED: AUGUST 11 - 19, 2021

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies
ISED RSS-216 Issue 2, Annex B	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 Engineer
Consumer Technology Division
UL Verification Services Inc.

Kyle Lo
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	US0104	2324A	208313
<input checked="" type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538	US0104	22541	208313
<input type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538	US0104	2324B	208313

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

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable} \\ &\text{Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Final Voltage (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \\ &\text{LISN Insertion Loss.} \\ 36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} &= 46.6 \text{ dBuV} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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 EUT is a magnetic charging bracelet which has a single inductive charging coil to charge for Apple Watch. The charging frequencies are 1.778MHz and 326.5 kHz, and the maximum power consumption is 5W in charging status.

5.2. MAXIMUM OUTPUT POWER

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)
326.5	Standby (Config 1)	-24.12	3.6
326.5	Operating (Config 2)	-25.8	3.72

Fundamental Frequency (KHz)	Mode	E field (30m distance) FCC (dBuV/m)	H field (3m distance) IC (dBuA/m)
1778	Operating (Config 3)	6.81	-3.59

5.3. SOFTWARE AND FIRMWARE

The firmware version installed in the EUT during testing was 1.8.5.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT is a dual frequency magnetic charger enclosed in an aluminum case. For the entire radiated emissions test, the EUT was investigated on the following configuration during the test at its natural orientation.

Config	Mode	Descriptions
1	Standby	EUT Alone
2	Operating	EUT and Watch operating at 326.5kHz
3	Operating	EUT and Watch operating at 1.778MHz

AC power line conducted emissions were also investigated on the following configurations.

Config	Mode	Descriptions
1	Standby	EUT Alone
2	Operating	EUT and Watch operating at 326.5kHz
3	Operating	EUT and Watch operating at 1.778MHz

The EUT was tested as standby and operation modes. During operational mode, EUT was tested with two different sizes of watches, small and big of having similar mechanical structure.

For all radiated emissions tests, both small and big watches were investigated and no significant different in reading was found between both watches; the big watch was chosen to test as the worst case condition since it has max load overall, hence all final data for operational mode represents EUT with the big watch. During the charging process, the watch actively indicates the status of the charging process. Device being charged was at a state of 20 – 50% charged.

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 result that correlate with the ones of tests made in an open field based on KDB 414788 D01.

5.5. DESCRIPTION OF TEST SETUP

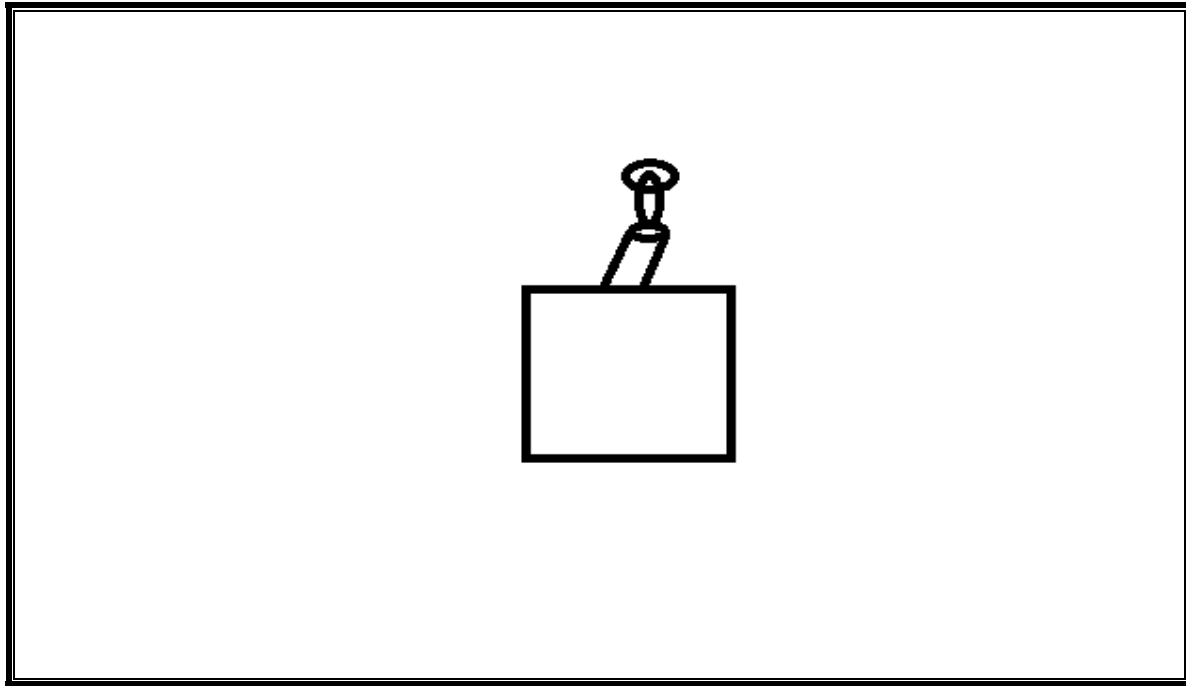
SUPPORT EQUIPMENT & PERIPHERALS

SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Watch	Apple	A2477	FP4T9VJLQP	BCGA2477
Watch	Apple	A2376	GY6D202Z03P1	BCGA2376
MTI Stand	Mobile Technology Inc.	NA	NA	NA

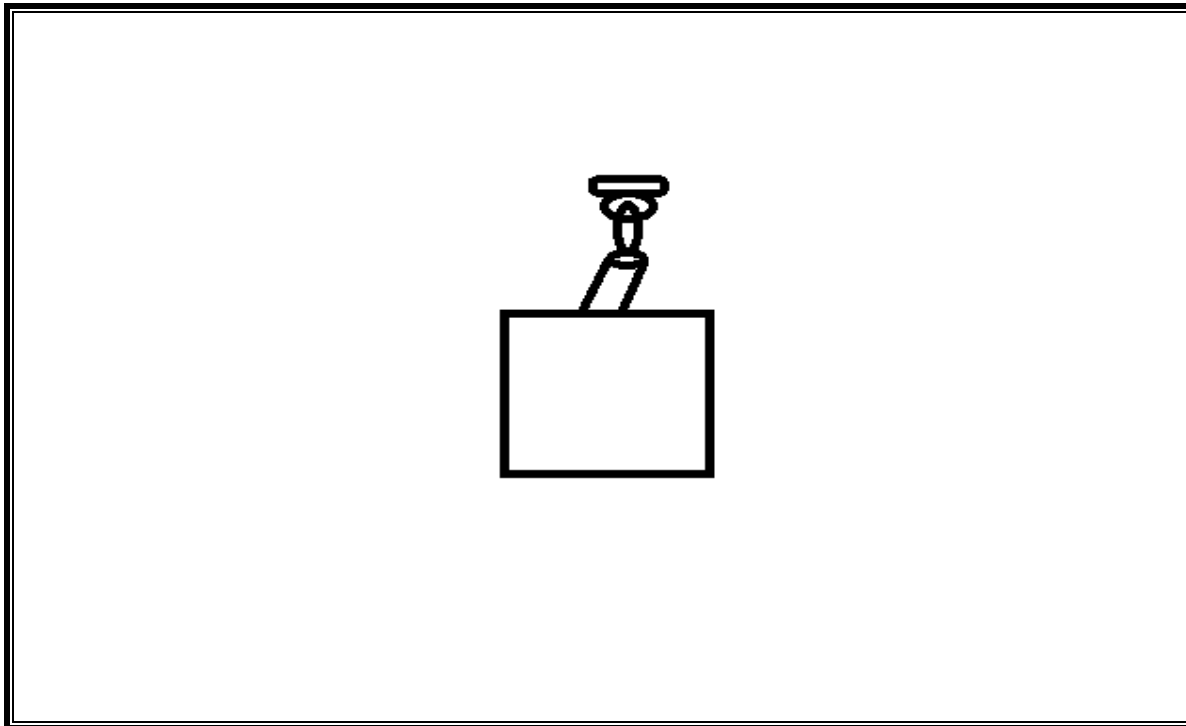
TEST SETUP

Please see the following configurations for the test setups. Configurations 1, 2 and 3 indicate that the EUT setup.

CONFIGURATION 1: STANDBY MODE



CONFIGURATION 2/3: OPERATING MODE WITH WATCH



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	ID Num	Cal Due
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1616	12/02/2021
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB	Sunol Sciences Crop.	JB1	T243	05/18/2022
Amplifier, 10kHz to 1GHz, 32dB	Sonoma Instrument	310N	T835	01/27/2022
Sniffer Probes	Electro Metrics	EM-6992	N/A	N/A
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A-544	T1113	12/17/2021

AC Line Conducted				
EMI Test Receiver 9KHz-7GHz	Rohde & Schwarz	ESCI7	T1436	02/19/2022
Power Cable, Line Conducted Emissions	UL	PR1	T861	11/27/2021
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	PRE0186446	01/20/2022
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, March 06, 2020	
Conducted Software	UL	UL EMC	Ver 17.0, September 18, 2020	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, July 07, 2020	

7. OCCUPIED BANDWIDTH

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 300Hz at 326.5kHz signal and 5.1kHz at 1.778MHz signal. 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.

Note that when the EUT was in standby mode the only signal that comes out from the EUT was the intentional charging signal of 326.5kHz. On the other hand, when the EUT was in operational mode there were two signals. One of the intentional charging signal of 326.5kHz and the other intentional charging signal is 1.778MHz.

EUT SETUP

Configuration 1: Low Frequency Charger in standby mode, transmitting low duty cycle CW signal at 326.5kHz test.

Configuration 2: Low Frequency Charger in pairing mode with FSK modulation which occurs over a very short period of time as soon as the watch is placed on the charger.

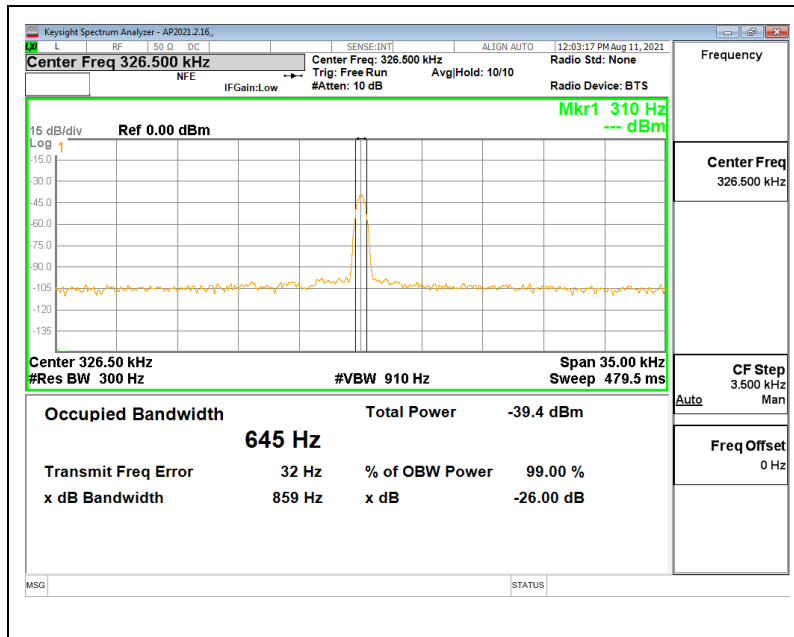
Configuration 3: Low Frequency Charger in charging mode with signal transmitting at 326.5kHz.

Configuration 4: High Frequency Charger in pairing mode with FSK modulation which occurs over a very short period of time as soon as the watch is placed on the charger.

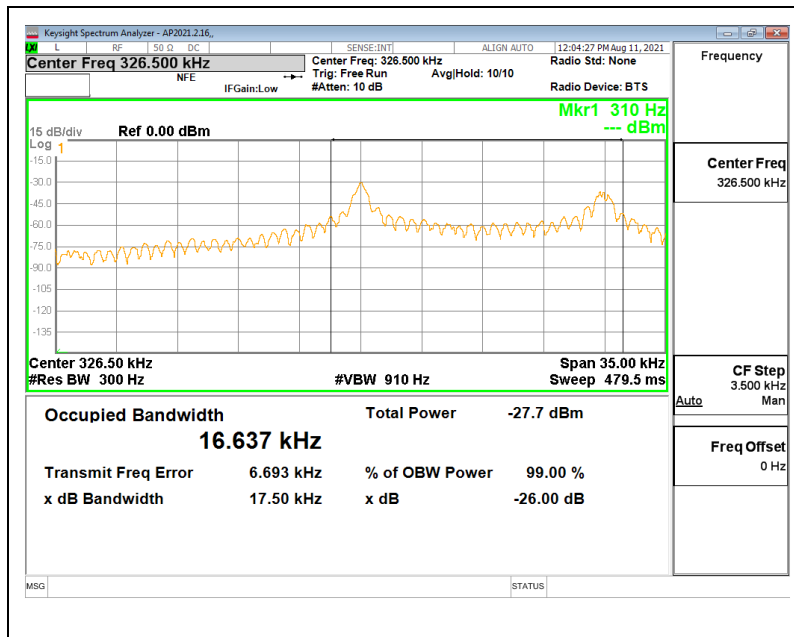
Configuration 5: High Frequency Charger in charging mode with signal transmitting at 1.778MHz.

RESULTS

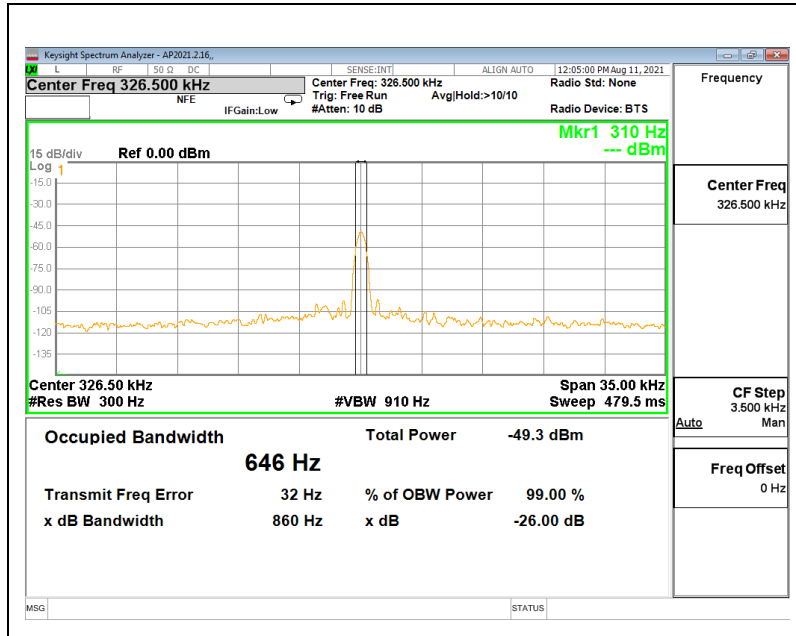
7.1.1. CONFIG 1



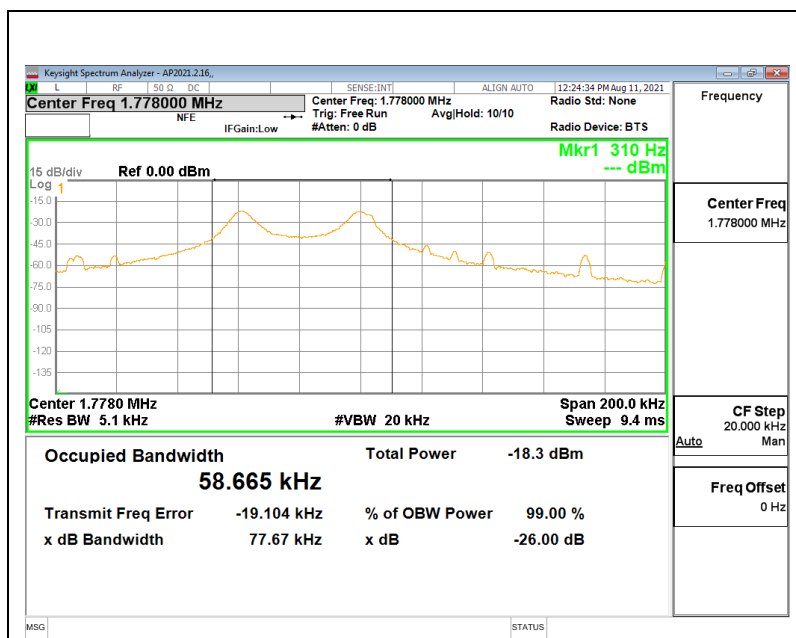
7.1.2. CONFIG 2



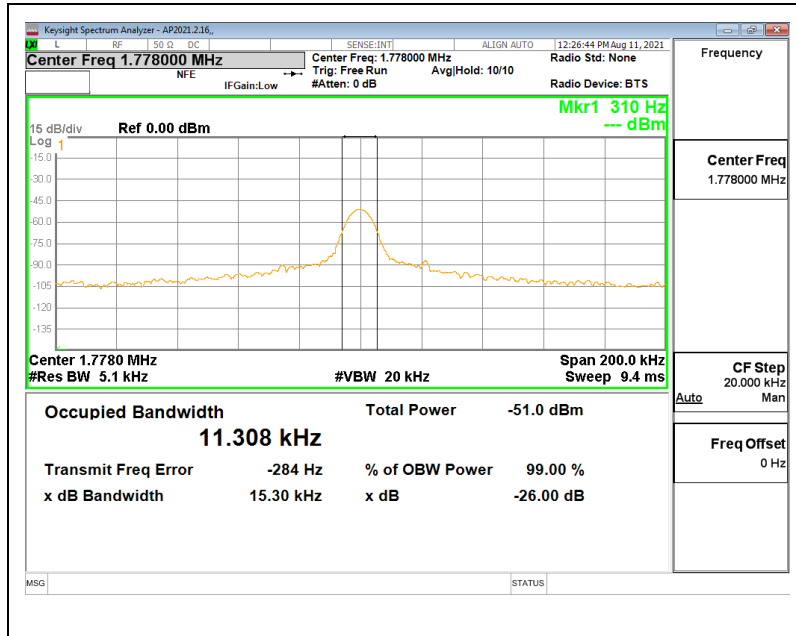
7.1.3. CONFIG 3



7.1.4. CONFIG 4



7.1.5. CONFIG 5



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.209 (a)

ICES-001 Section 6.2, 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.	

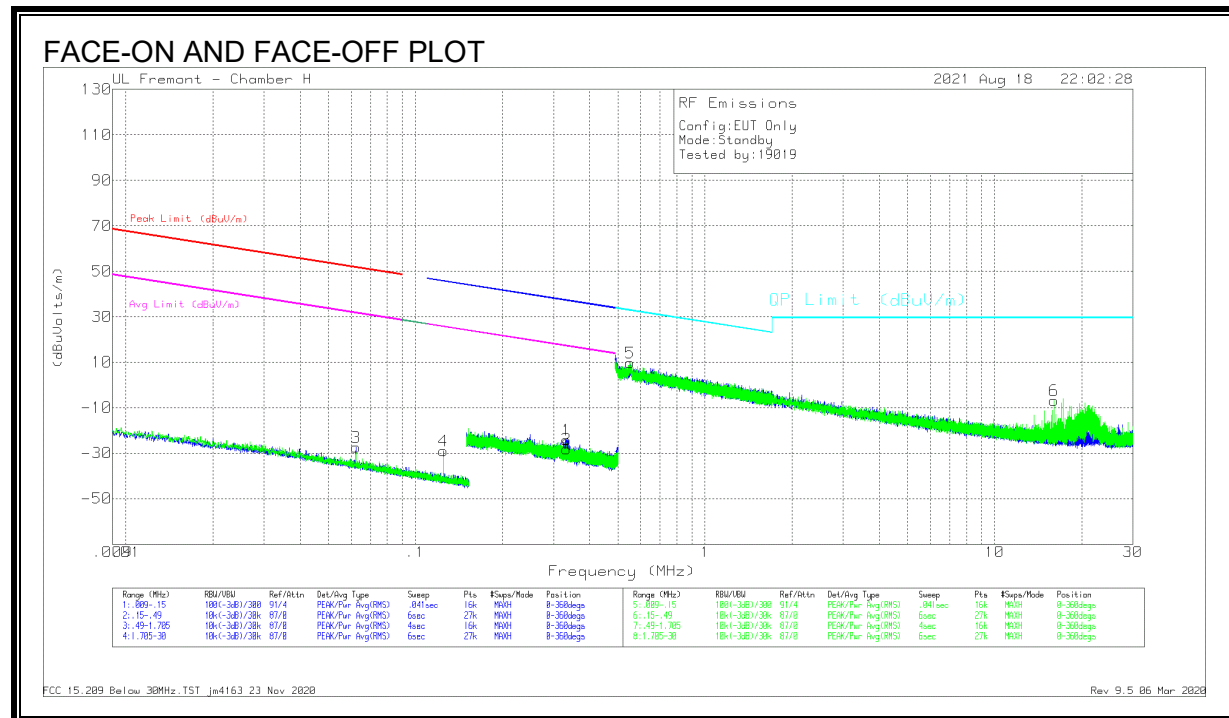
Table 4: Electric field strength radiated emission limits for induction cooking appliances

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 C15.19). ** The limit level in dBμV/m decreases linearly with the logarithm of frequency.			

RESULTS

8.1.1. FCC TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

STANDBY CONFIGURATION (326.5kHz Frequency)



DATA

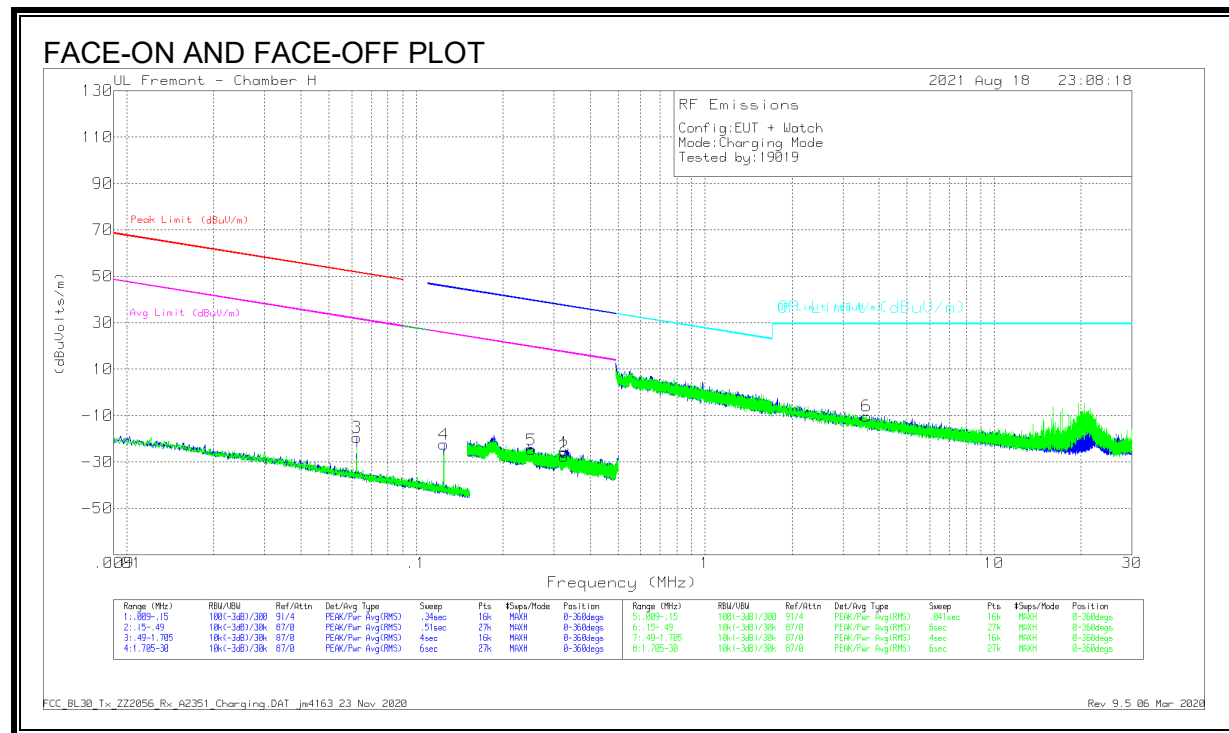
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
3	.06233	40.48	Pk	12.1	.1	-80	-27.32	51.69	-79.01	31.69	-59.01	0-360	Face-On
4	.12487	39.54	Pk	11.4	.1	-80	-28.96	45.7	-74.66	25.7	-54.66	0-360	Face-On
1	.33186	44.88	Pk	10.9	.1	-80	-24.12	37.19	-61.31	17.19	-41.31	0-360	Face-On
2	.33197	40.71	Pk	10.9	.1	-80	-28.29	37.19	-65.48	17.19	-45.48	0-360	Face-Off

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
5	.55194	38.87	Pk	10.8	.1	-40	9.77	32.77	-23	0-360	Face-Off
6	16.02697	22.41	Pk	10.1	.6	-40	-6.89	29.5	-36.39	0-360	Face-Off

Pk - Peak detector

Note: Frequencies on Marker 3 and 4 are not from EUT, confirmed from investigation Marker 3 & 4 are emitted from the Stand which was not part of EUT.

OPERATING WITH WATCH at 326.5kHz Frequency



DATA

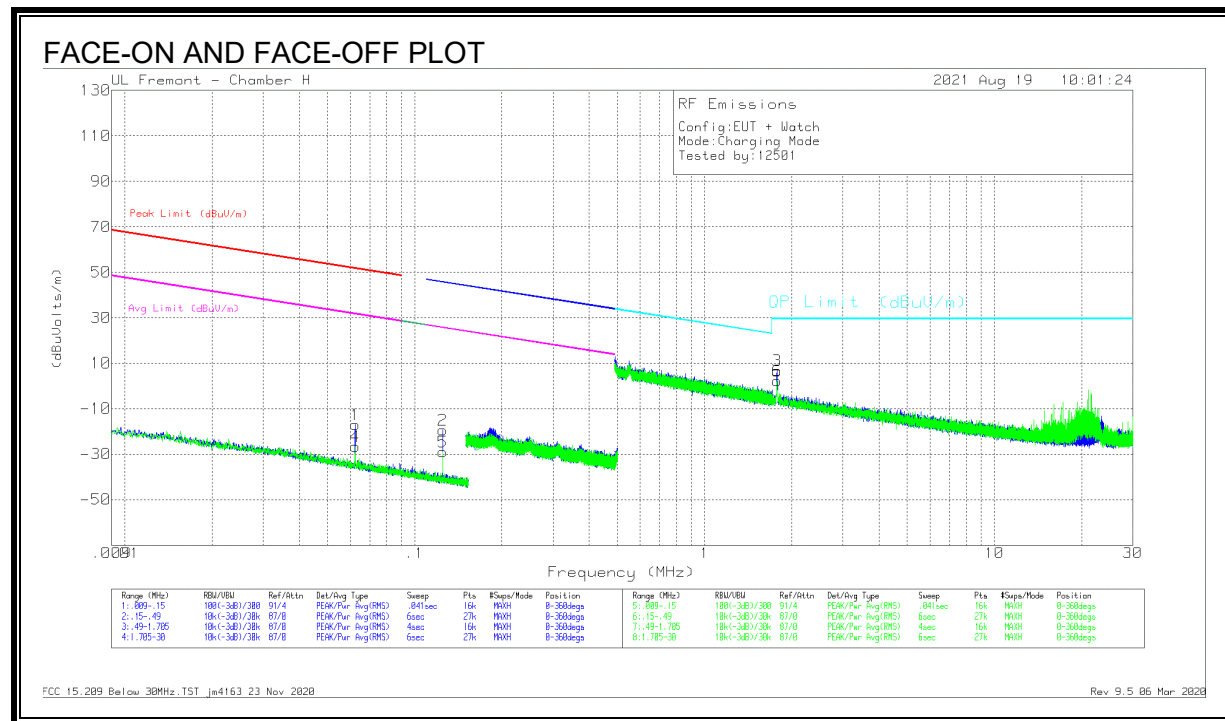
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
3	.06234	48.41	Pk	12.1	.1	-80	-19.39	51.69	-71.08	31.69	-51.08	0-360	Face-on
4	.12488	46.11	Pk	11.4	.1	-80	-22.39	45.7	-68.09	25.7	-48.09	0-360	Face-on
5	.25105	44.12	Pk	11	.1	-80	-24.78	39.62	-64.4	19.62	-44.4	0-360	Face-Off
2	.32557	41.46	Pk	10.9	.1	-80	-27.54	37.36	-64.9	17.36	-44.9	0-360	Face-Off
1	.32766	43.2	Pk	10.9	.1	-80	-25.8	37.3	-63.1	17.3	-43.1	0-360	Face-On

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
6	3.6197	18.6	Pk	10.9	.3	-40	-10.2	29.5	-39.7	0-360	Face-Off

Pk - Peak detector

Note: Frequencies on Marker 3 and 4 are not from EUT, confirmed from investigation Marker 3 & 4 are emitted from the Stand which was not part of EUT.

OPERATING WITH WATCH at 1.778MHz Frequency



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
1	.06234	49.91	Pk	13.1	.1	-80	-16.89	51.69	-68.58	31.69	-48.58	0-360	Face-On
4	.06235	40.12	Pk	13.1	.1	-80	-26.68	51.69	-78.37	31.69	-58.37	0-360	Face-Off
2	.12488	48.07	Pk	12.4	.1	-80	-19.43	45.7	-65.13	25.7	-45.13	0-360	Face-On
5	.12491	38.56	Pk	12.4	.1	-80	-28.94	45.69	-74.63	25.69	-54.63	0-360	Face-Off

Pk - Peak detector

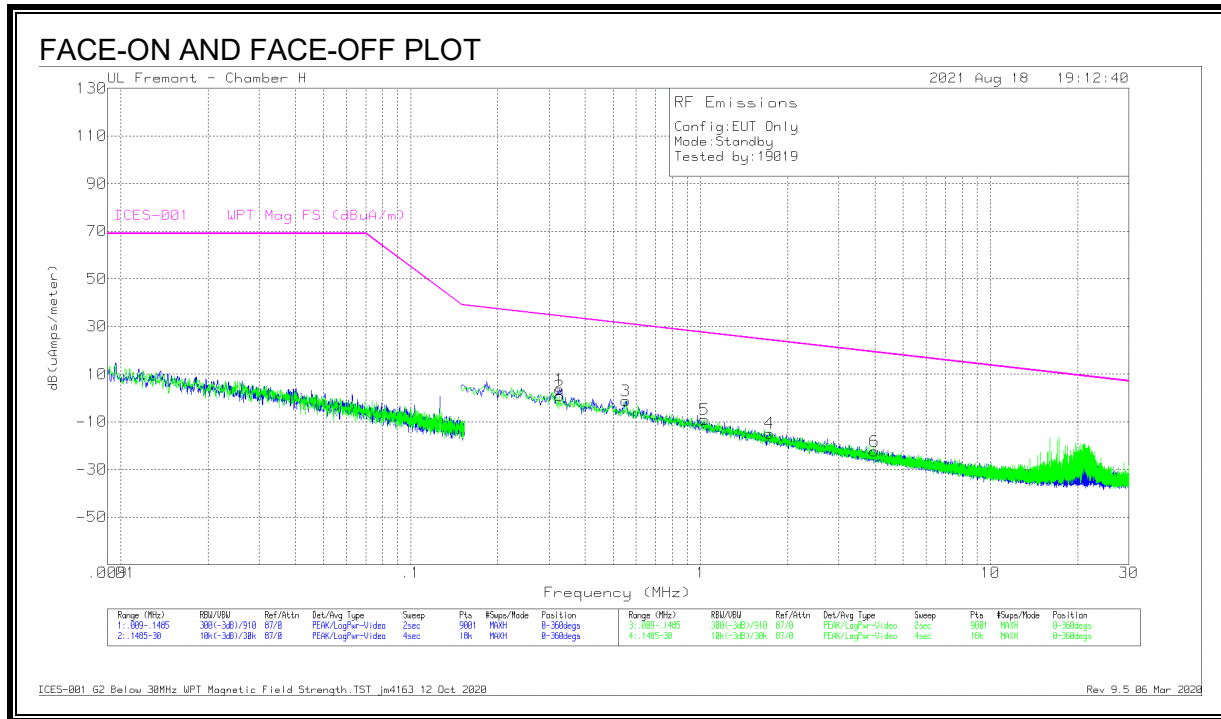
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
6	1.77731	30.43	Pk	11.7	.2	-40	2.33	29.5	-27.17	0-360	Face-Off
3	1.77836	34.91	Pk	11.7	.2	-40	6.81	29.5	-22.69	0-360	Face-On

Pk - Peak detector

Note: Frequencies on Marker 1, 2, 4 & 5 and 4 are not from EUT, confirmed from investigation Marker 1, 2, 4 & 5 are emitted from the Stand which was not part of EUT.

8.1.2. IC / ICES-001 TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

STANDBY CONFIGURATION at 326.5kHz Frequency

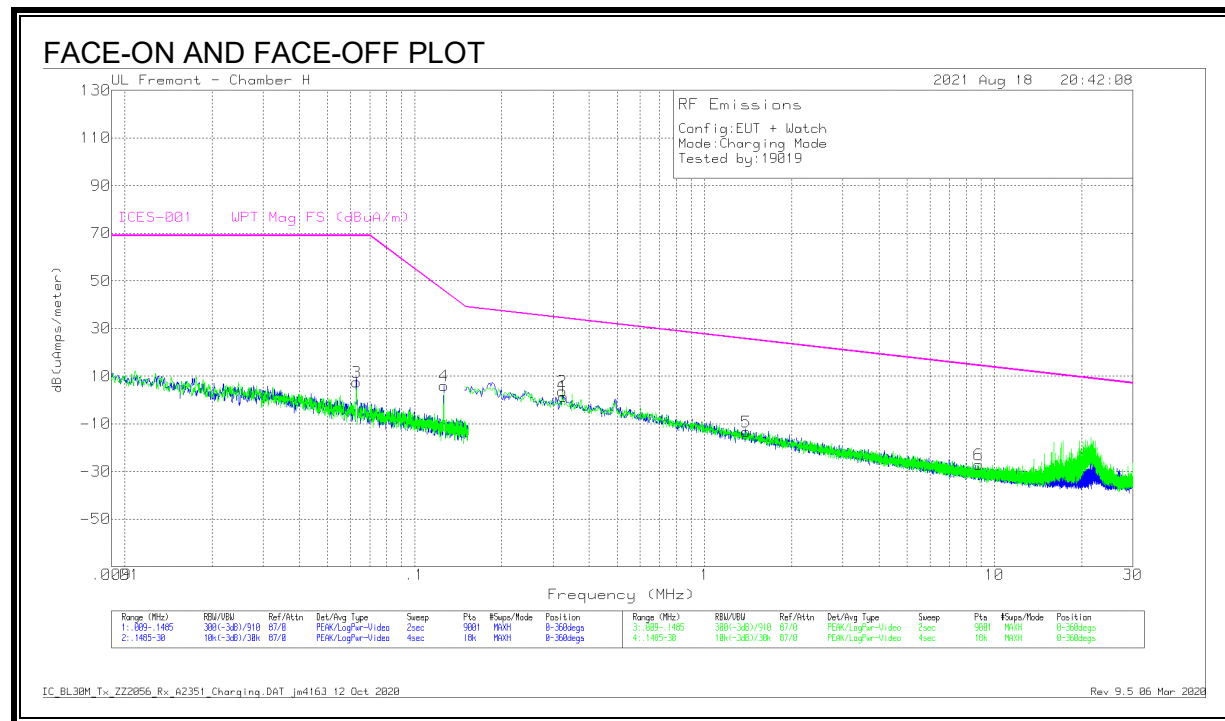


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Corrected Reading dB(uAmps/meter)	ICES-001 G2 WPT Mag FS (dBA/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
1	.32591	43.7	Pk	-40.2	.1	3.6	34.31	-30.71	0-360	Face-On
2	.32591	40.87	Pk	-40.2	.1	.77	34.31	-33.54	0-360	Face-Off
3	.55139	38.93	Pk	-40.2	.1	-1.17	31.14	-32.31	0-360	Face-On
5	1.03387	30.84	Pk	-40	.1	-9.06	27.34	-36.4	0-360	Face-Off
4	1.73023	25.08	Pk	-40.1	.2	-14.82	24.23	-39.05	0-360	Face-On
6	3.97516	17.44	Pk	-40	.3	-22.26	19.21	-41.47	0-360	Face-Off

Pk - Peak detector

OPERATING WITH WATCH at 326.5kHz Frequency



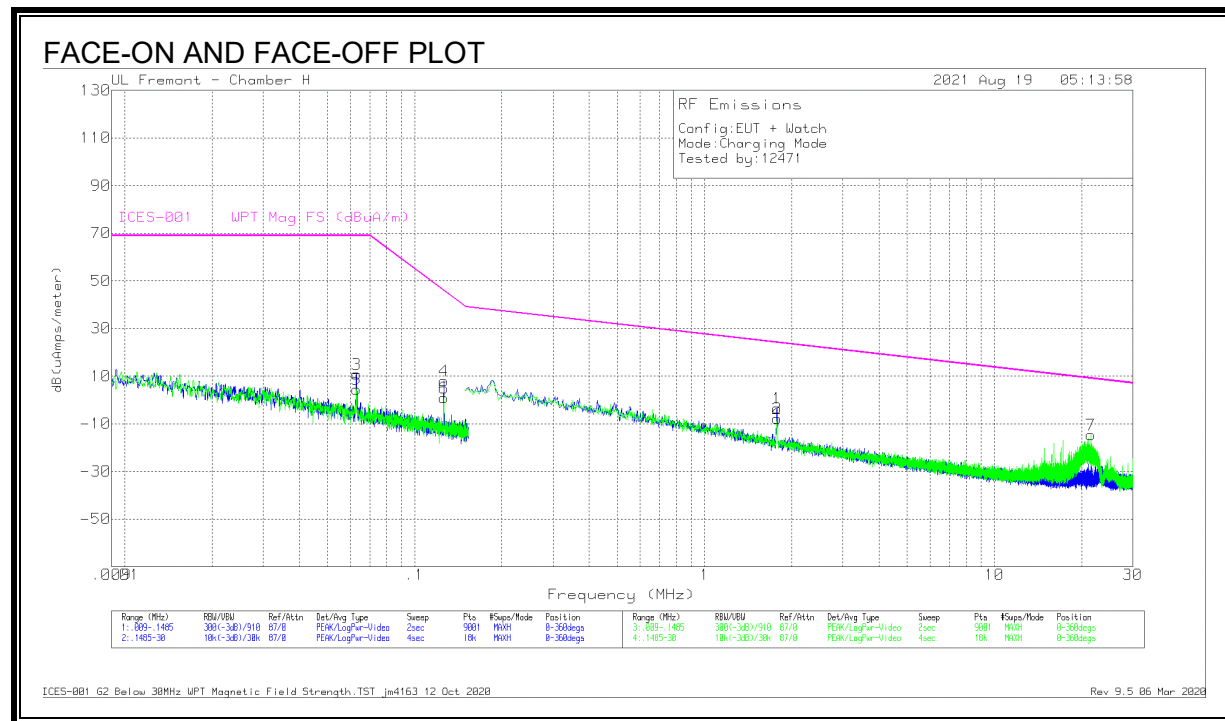
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Corrected Reading dB(uAmps/meter)	ICES-001 G2 WPT Mag FS (dBuA/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
3	.06305	46.07	Pk	-38.8	.1	7.37	69	-61.63	0-360	Face-On
4	.12613	45.67	Pk	-39.8	.1	5.97	45.82	-39.85	0-360	Face-On
2	.32259	43.82	Pk	-40.2	.1	3.72	34.38	-30.66	0-360	Face-Off
1	.32591	41.55	Pk	-40.2	.1	1.45	34.31	-32.86	0-360	Face-On
5	1.39366	26.48	Pk	-40	.2	-13.32	25.54	-38.86	0-360	Face-Off
6	8.82647	13.1	Pk	-40.7	.4	-27.2	14.39	-41.59	0-360	Face-Off

Pk - Peak detector

Note: Frequencies on Marker 3 and 4 are not from EUT, confirmed from investigation Marker 3 & 4 are emitted from the Stand which was not part of EUT.

OPERATING WITH WATCH at 1.778MHz Frequency



DATA

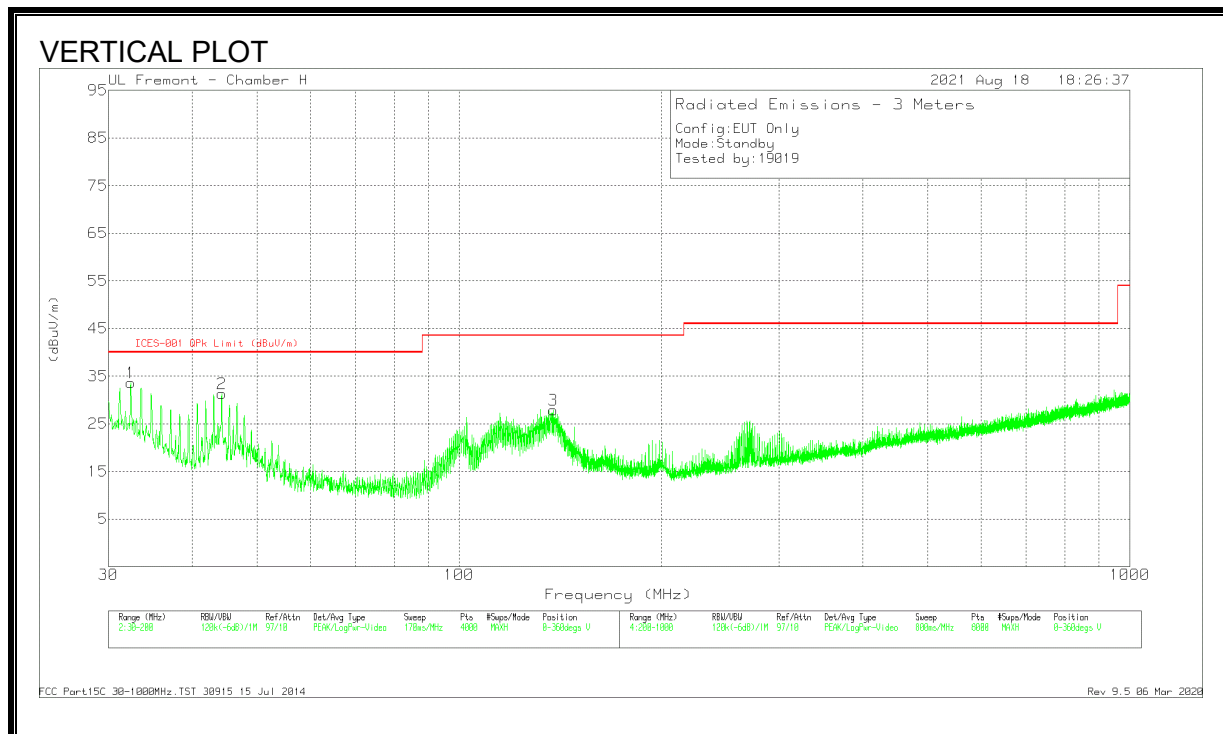
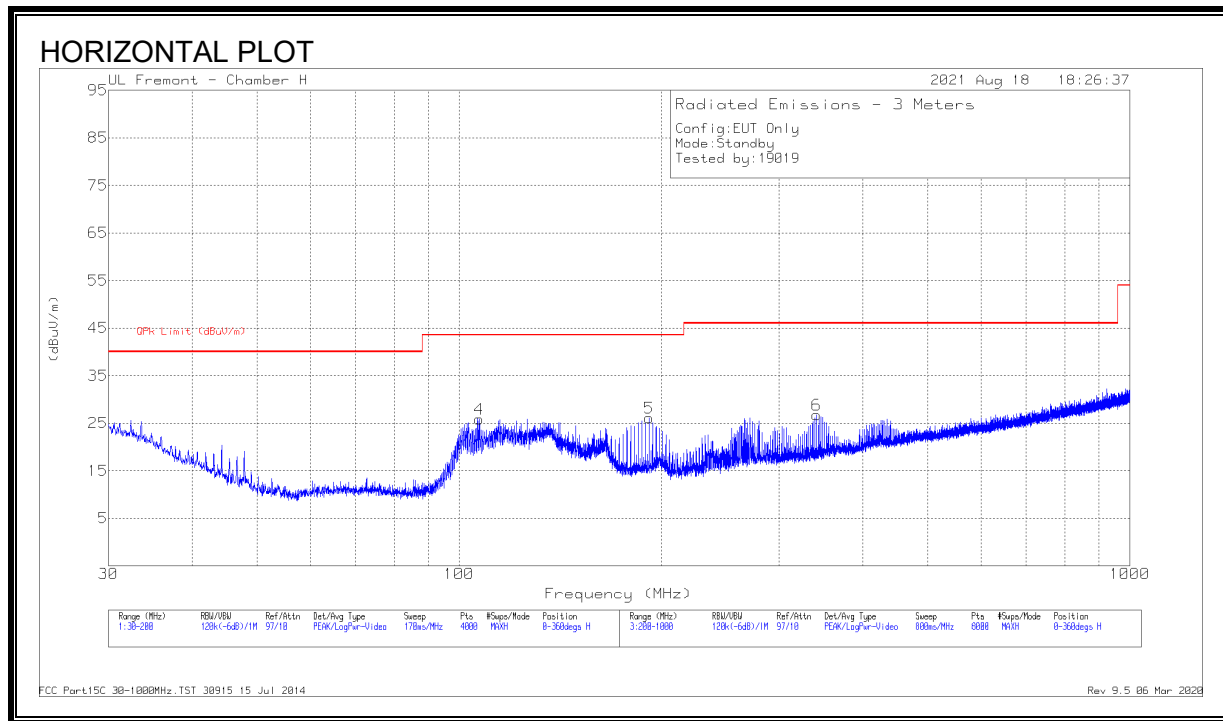
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Corrected Reading dB(uAmps/meter)	ICES-001 G2 WPT Mag FS (dBuA/m)	Margin (dB)	Azimuth (Degs)	Antenna Orientation
3	.06292	49.38	Pk	-38.8	.1	10.68	69	-58.32	0-360	Face On
5	.06298	43.1	Pk	-38.8	.1	4.4	69	-64.6	0-360	Face Off
4	.12617	47.77	Pk	-39.8	.1	8.07	45.81	-37.74	0-360	Face On
6	.1262	40.64	Pk	-39.8	.1	.94	45.8	-44.86	0-360	Face Off
1	1.77831	36.31	Pk	-40.1	.2	-3.59	24.07	-27.66	0-360	Face On
2	1.77831	32.13	Pk	-40.1	.2	-7.77	24.07	-31.84	0-360	Face Off
7	21.55162	26.13	Pk	-41.5	.7	-14.67	9	-23.67	0-360	Face Off

Pk - Peak detector

Note: Frequencies on Marker 3, 4, 5 & 6 are not from EUT, confirmed from investigation Marker 3,4, 5 & 6 are emitted from the Stand which was not part of EUT.

8.1.3. FCC TX SPURIOUS EMISSION 30 TO 1000 MHz

STANDBY CONFIGURATION at 326.5kHz Frequency

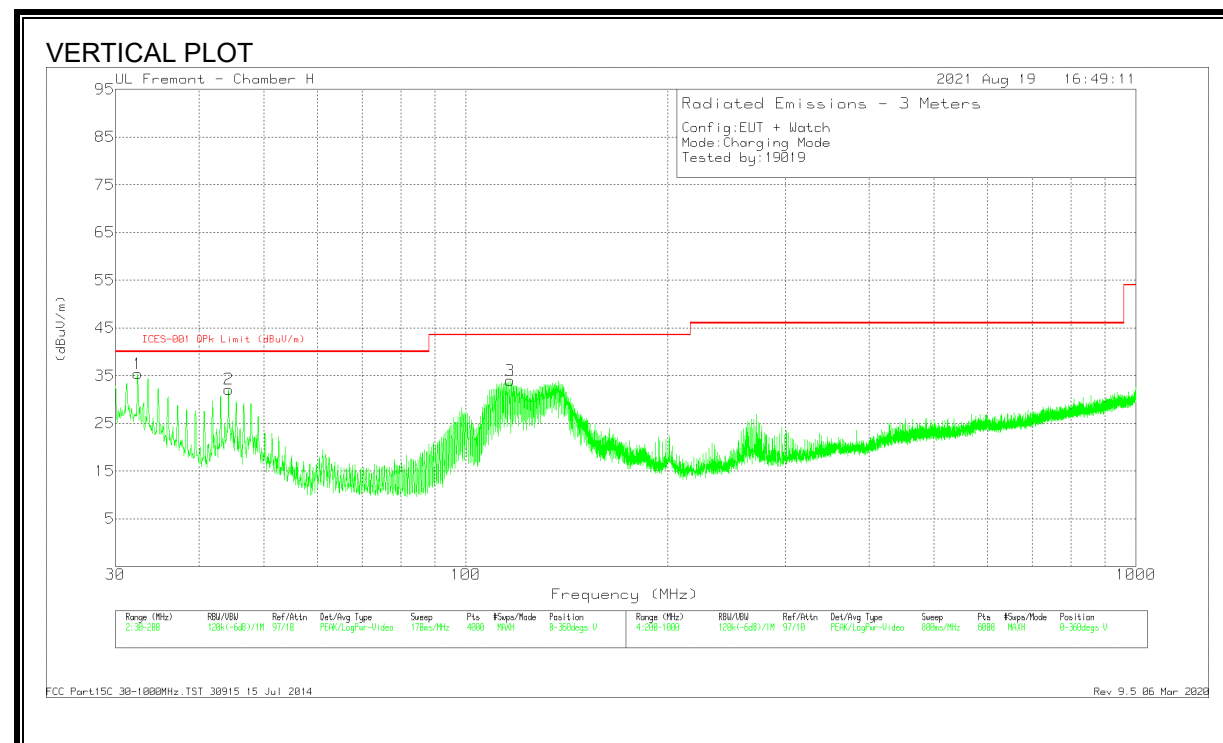
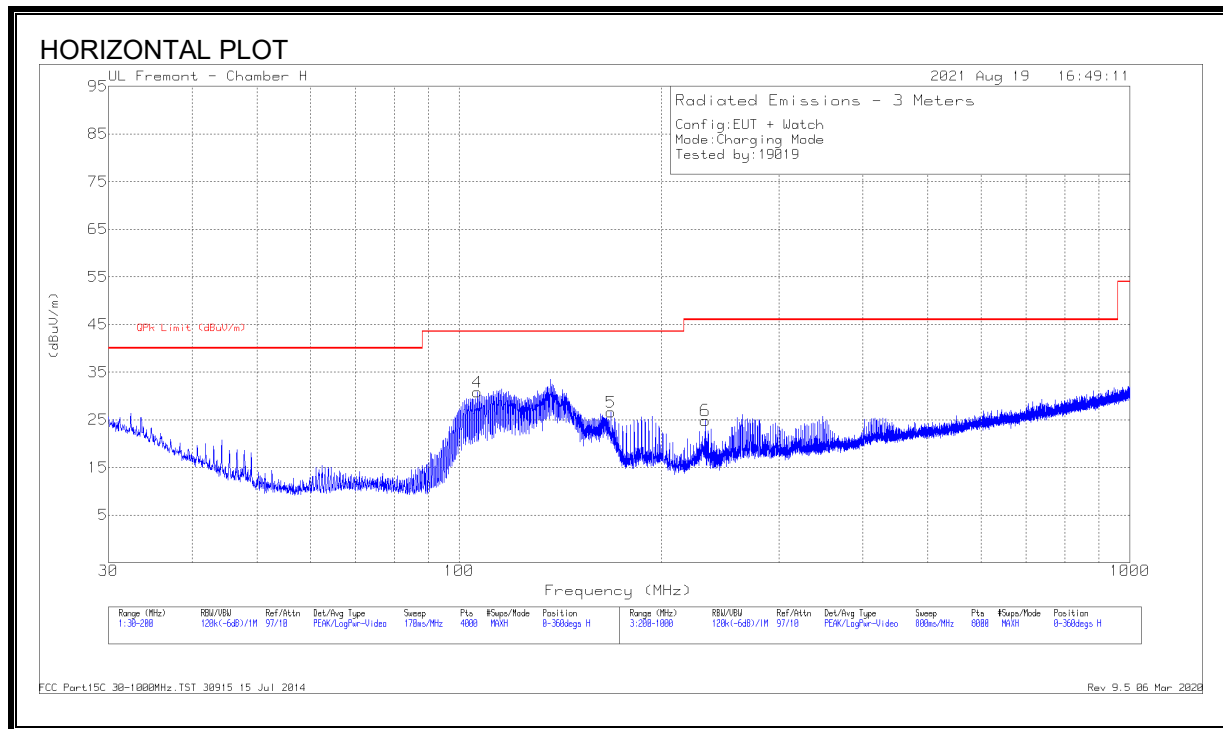


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 136.9415	34.24	Qp	19.5	-30.4	23.34	43.52	-20.18	234	102	V
1	32.3896	38.46	Qp	26.2	-31.3	33.36	40	-6.64	213	102	V
2	45.3972	43.93	Qp	16.5	-31.2	29.23	40	-10.77	349	101	V
4	102.84	31.74	Qp	17.1	-30.7	18.14	43.52	-25.38	331	318	H
5	184.641	36.84	Qp	17.5	-30	24.34	43.52	-19.18	98	162	H
6	345.6934	34.68	Qp	20.7	-29.3	26.08	46.02	-19.94	153	107	H

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

OPERATING WITH WATCH at 326.5kHz Frequency

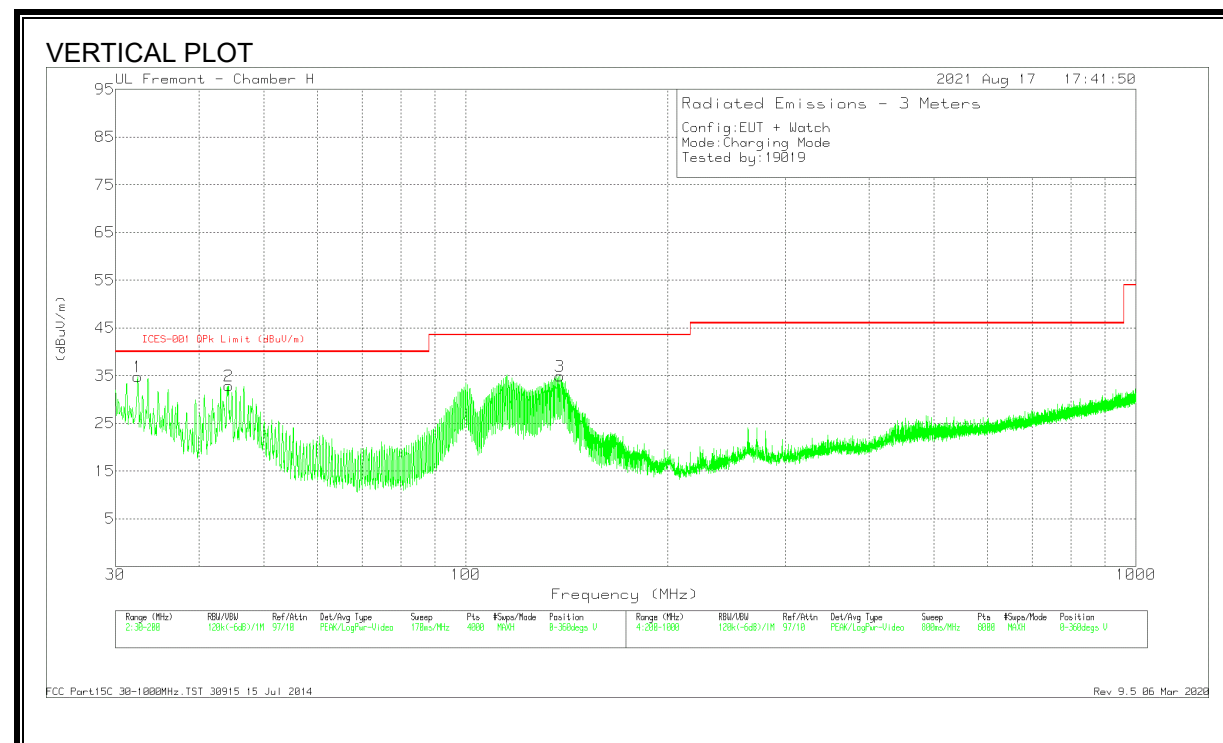
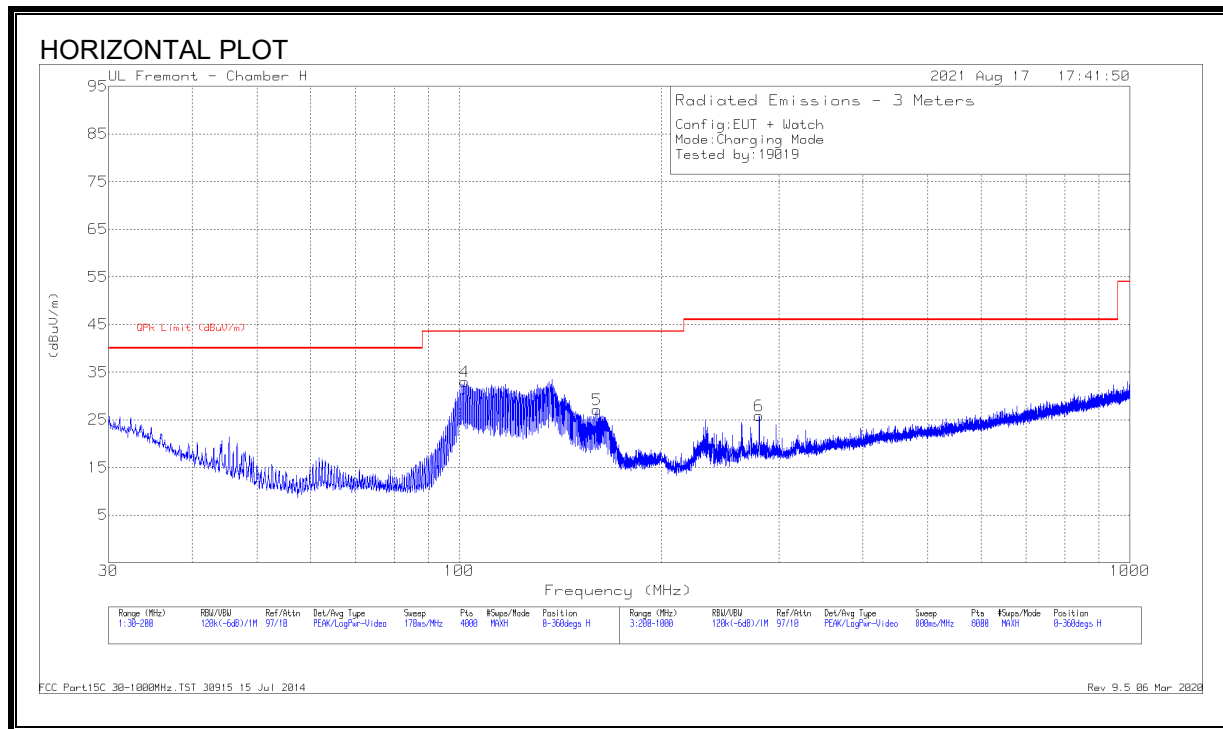


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 166.4213	37.62	Qp	18.1	-30.2	25.52	43.52	-18	168	185	H
3	* 113.8064	42.98	Qp	19.3	-30.6	31.68	43.52	-11.84	232	103	V
1	32.3686	39.72	Qp	26.2	-31.3	34.62	40	-5.38	217	101	V
2	44.2732	43.74	Qp	17.2	-31.2	29.74	40	-10.26	22	115	V
4	102.5823	40.9	Qp	17	-30.7	27.2	43.52	-16.32	7	300	H
6	230.8263	33.77	Qp	17.6	-29.8	21.57	46.02	-24.45	163	108	H

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

OPERATING WITH WATCH at 1.778MHz Frequency



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 279.6504	33.17	Qp	19.6	-29.6	23.17	46.02	-22.85	259	101	H
1	33.5506	40.56	Qp	25.4	-31.3	34.66	40	-5.34	105	104	V
1	33.5686	42.3	Pk	25.3	-31.3	36.3	40	-3.7	105	104	V
2	45.4172	46.9	Qp	16.4	-31.2	32.1	40	-7.9	316	129	V
2	45.4256	48.12	Pk	16.4	-31.2	33.32	40	-6.68	316	129	V
4	101.3211	43.8	Qp	16.6	-30.7	29.7	43.52	-13.82	31	317	H
3	138.759	42.88	Qp	19.4	-30.3	31.98	43.52	-11.54	99	101	V
5	160.4448	36.92	Qp	18.4	-30.2	25.12	43.52	-18.4	243	155	H

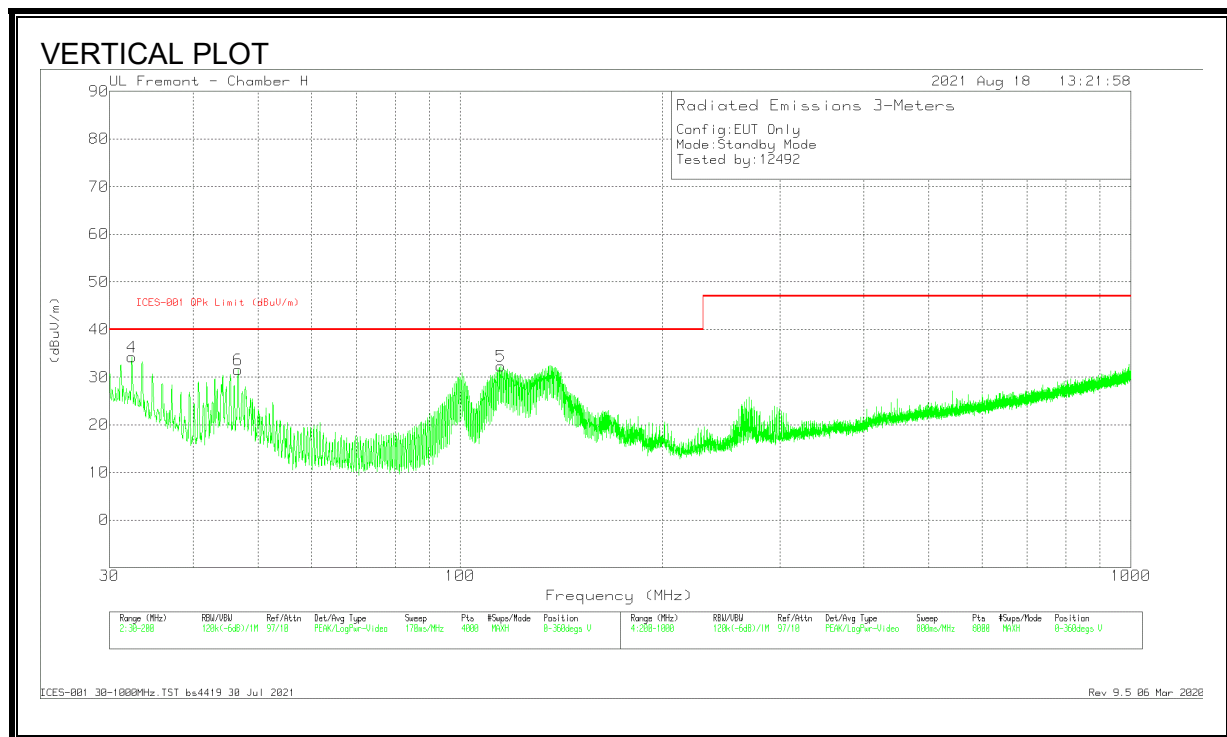
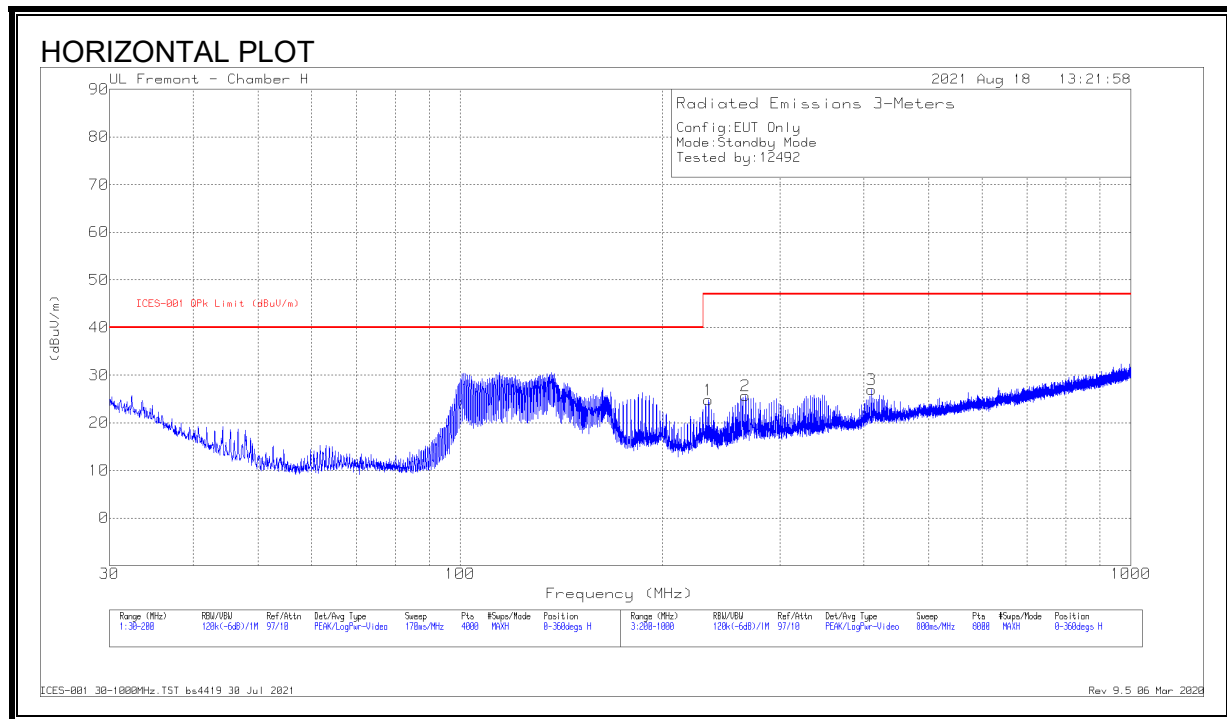
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

8.1.4. IC / ICES-001 TX SPURIOUS EMISSION 30 TO 1000 MHz

STANDBY CONFIGURATION at 326.5kHz Frequency

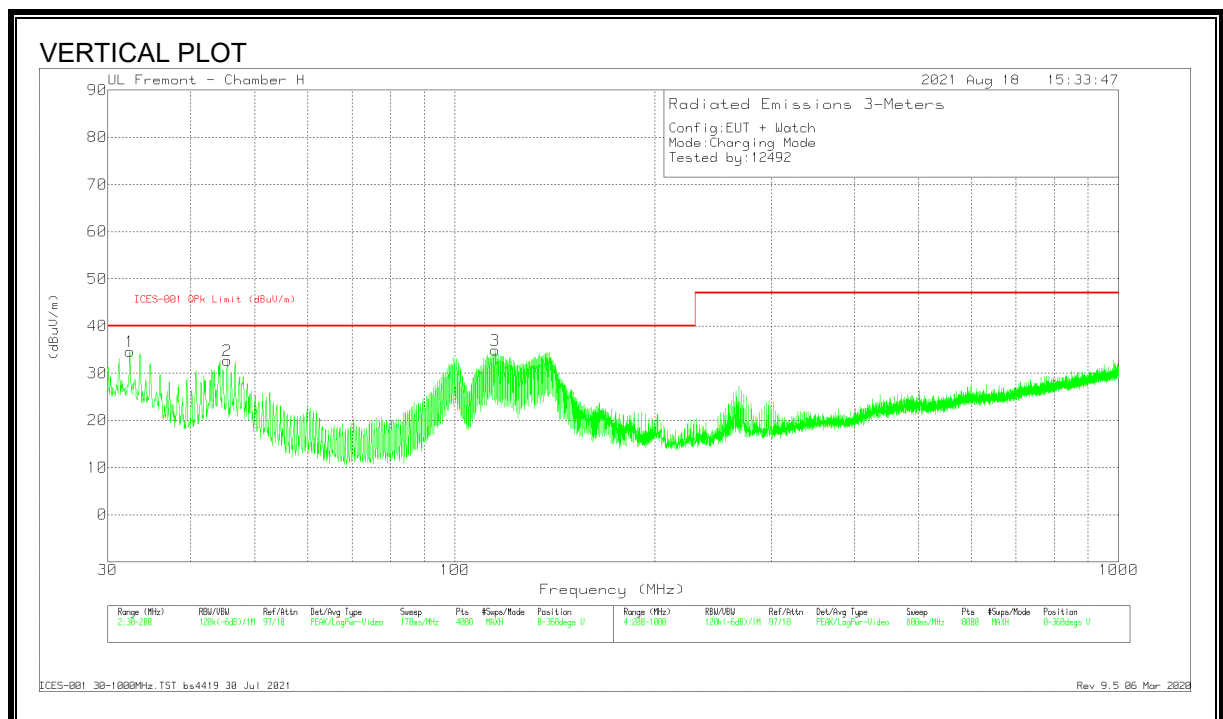
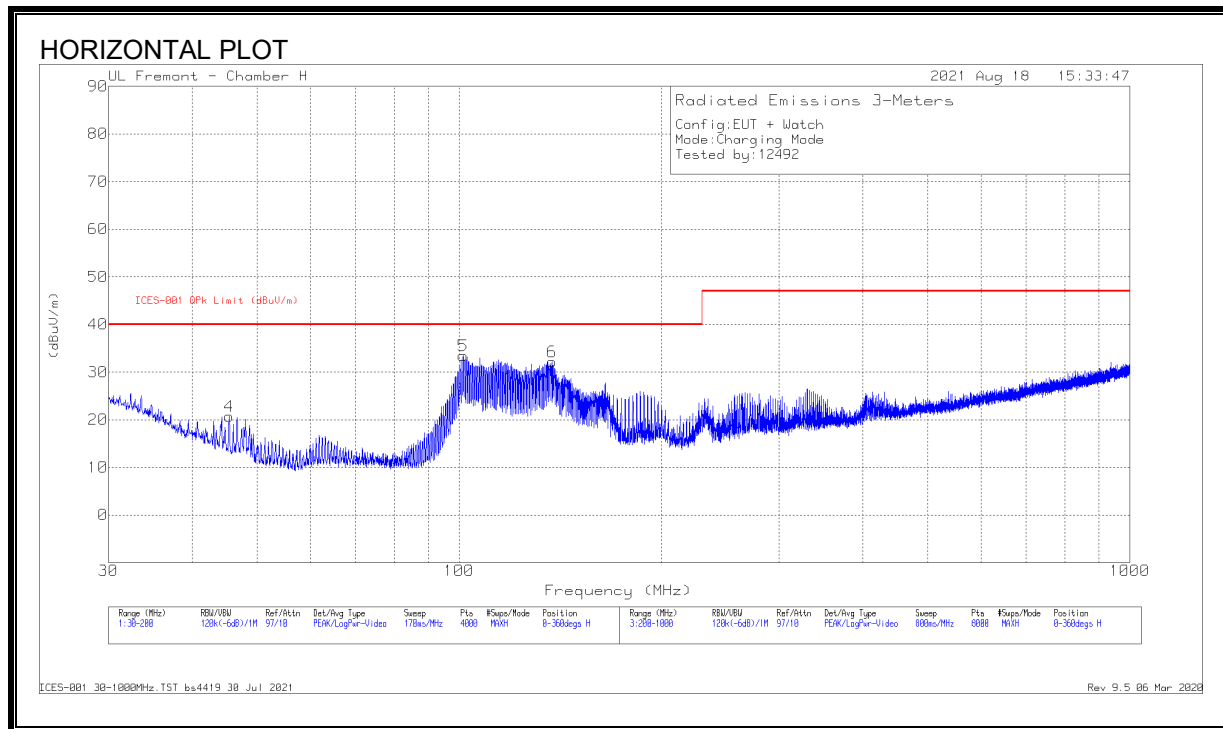


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	ICES-001 QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	32.394	38.65	Qp	26.2	-31.3	33.55	40	-6.45	103	103	V
6	46.6355	44.02	Qp	15.8	-31.2	28.62	40	-11.38	305	107	V
5	115.119	34.58	Qp	19.4	-30.6	23.38	40	-16.62	96	106	V
1	234.6035	35.3	Qp	17.8	-29.8	23.3	47	-23.7	17	107	H
2	266.0216	35.24	Qp	19.2	-29.7	24.74	47	-22.26	342	105	H
3	410.5994	29.63	Qp	22.4	-29	23.03	47	-23.97	205	234	H

Qp - Quasi-Peak detector

OPERATING WITH WATCH at 326.5kHz Frequency

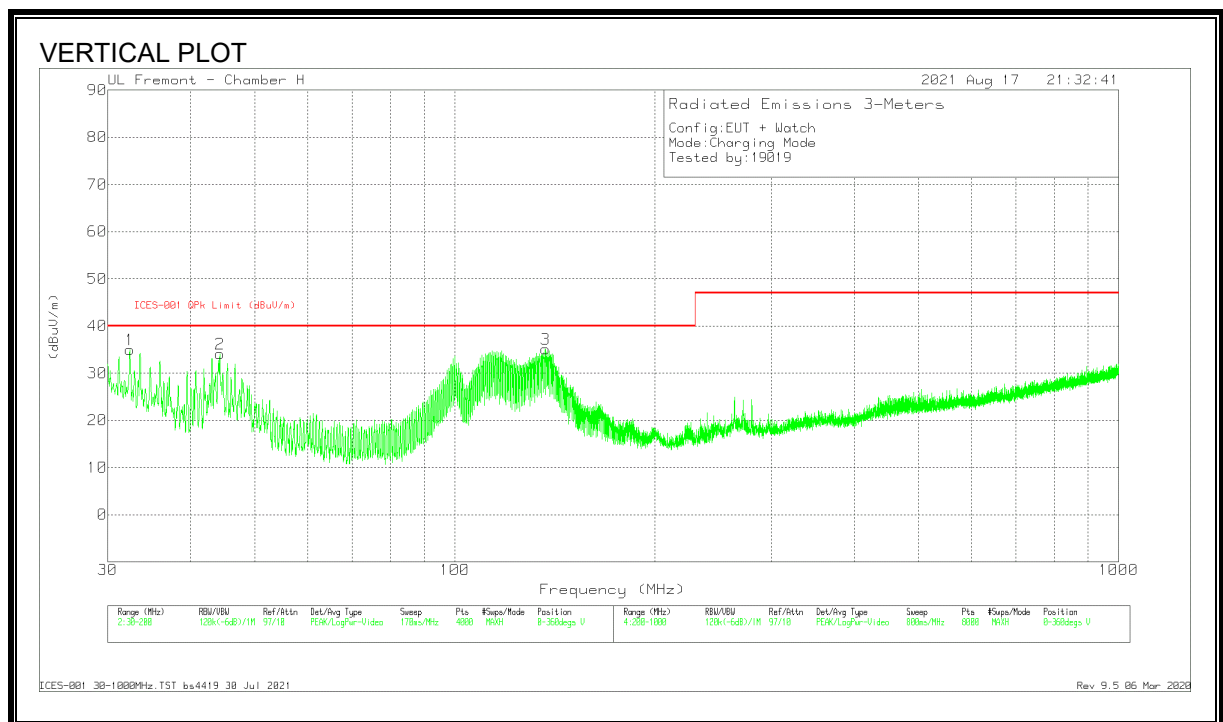
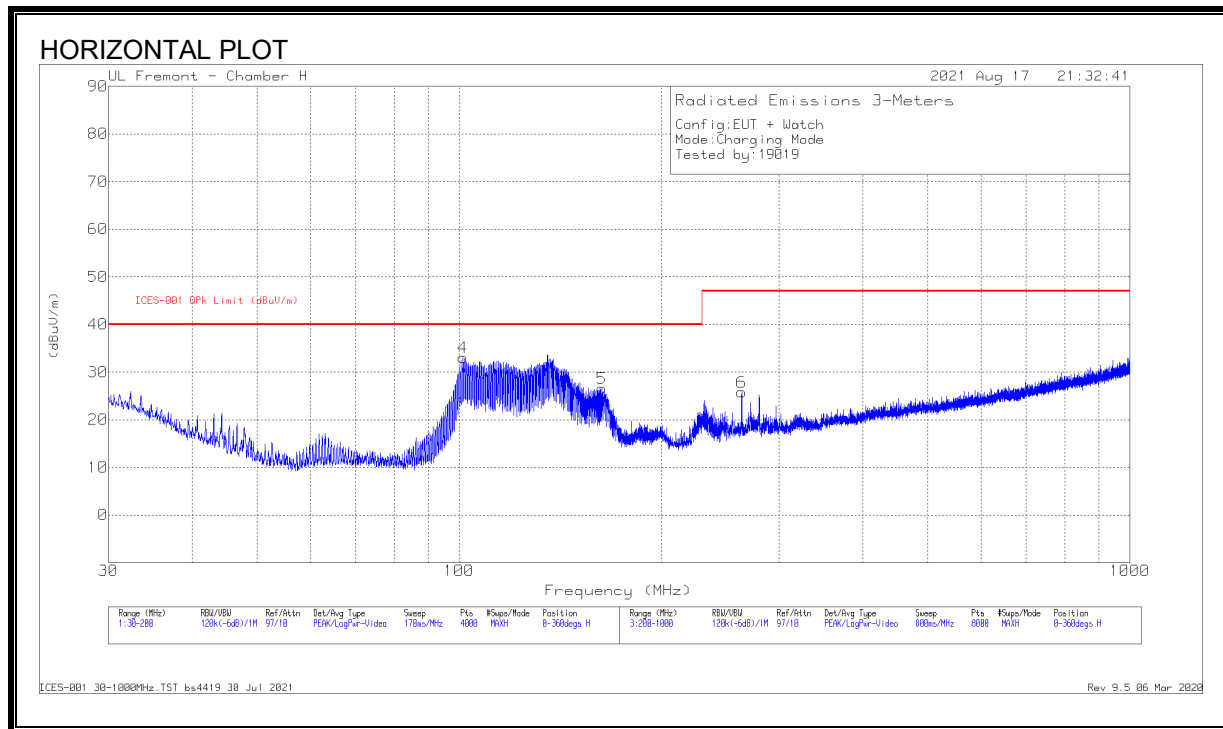


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	ICES-001 QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	32.3866	39.06	Qp	26.2	-31.3	33.96	40	-6.04	153	102	V
2	45.417	44.95	Qp	16.4	-31.2	30.15	40	-9.85	7	102	V
4	45.4475	32	Qp	16.4	-31.2	17.2	40	-22.8	58	386	H
5	101.254	43.61	Qp	16.6	-30.7	29.51	40	-10.49	258	309	H
3	115.095	43.22	Qp	19.4	-30.6	32.02	40	-7.98	147	100	V
6	137.4288	40.6	Qp	19.5	-30.4	29.7	40	-10.3	292	245	H

Qp - Quasi-Peak detector

OPERATING WITH WATCH at 1.778MHz Frequency



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	ICES-001 QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	33.5626	40.01	Qp	25.3	-31.3	34.01	40	-5.99	241	100	V
2	44.2692	45.37	Qp	17.2	-31.2	31.37	40	-8.63	58	107	V
4	100.6309	43.39	Qp	16.4	-30.7	29.09	40	-10.91	132	313	H
3	138.7577	42.3	Qp	19.4	-30.3	31.4	40	-8.6	190	110	V
5	159.7845	36.06	Qp	18.4	-30.2	24.26	40	-15.74	140	140	H
6	263.1843	34.5	Qp	18.9	-29.6	23.8	47	-23.2	128	109	H

Qp - Quasi-Peak detector

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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 100 V, without an earth connection Quasi-peak (dBµV)	Appliances rated 100 V, without an earth connection Average (dBµV)	All other appliances Quasi-peak (dBµV)	All other appliances 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.

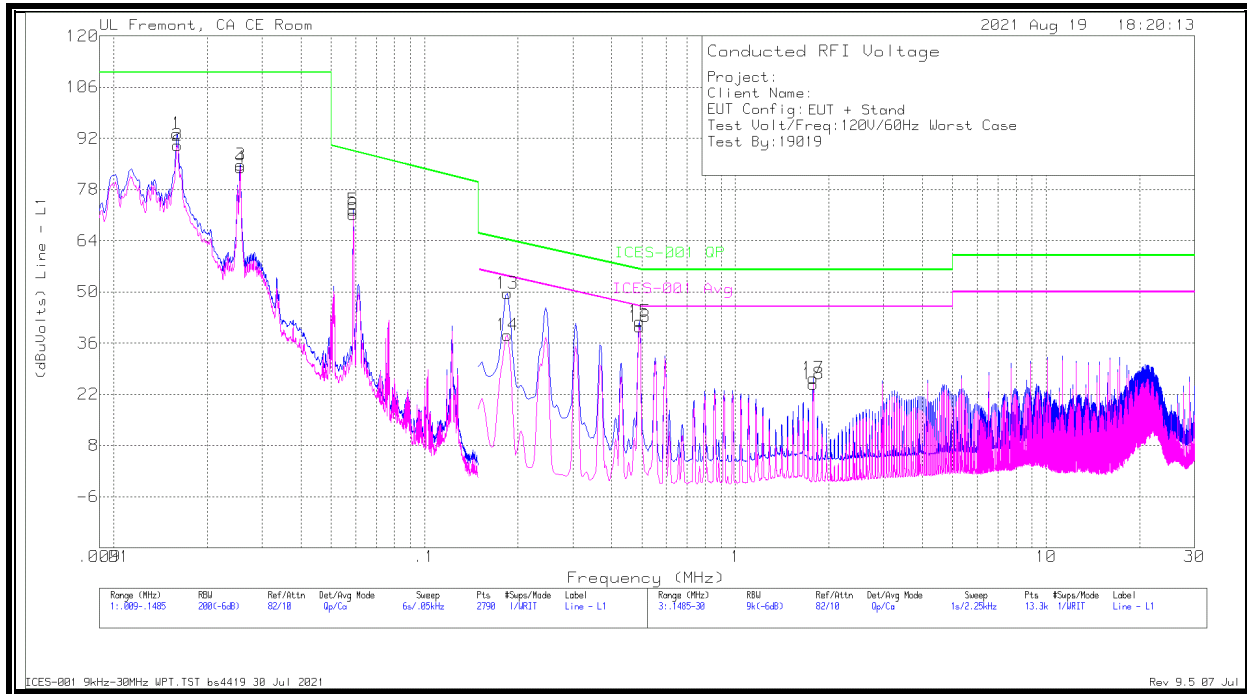
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

9.1.1. STANDBY MODE

LINE 1 RESULTS



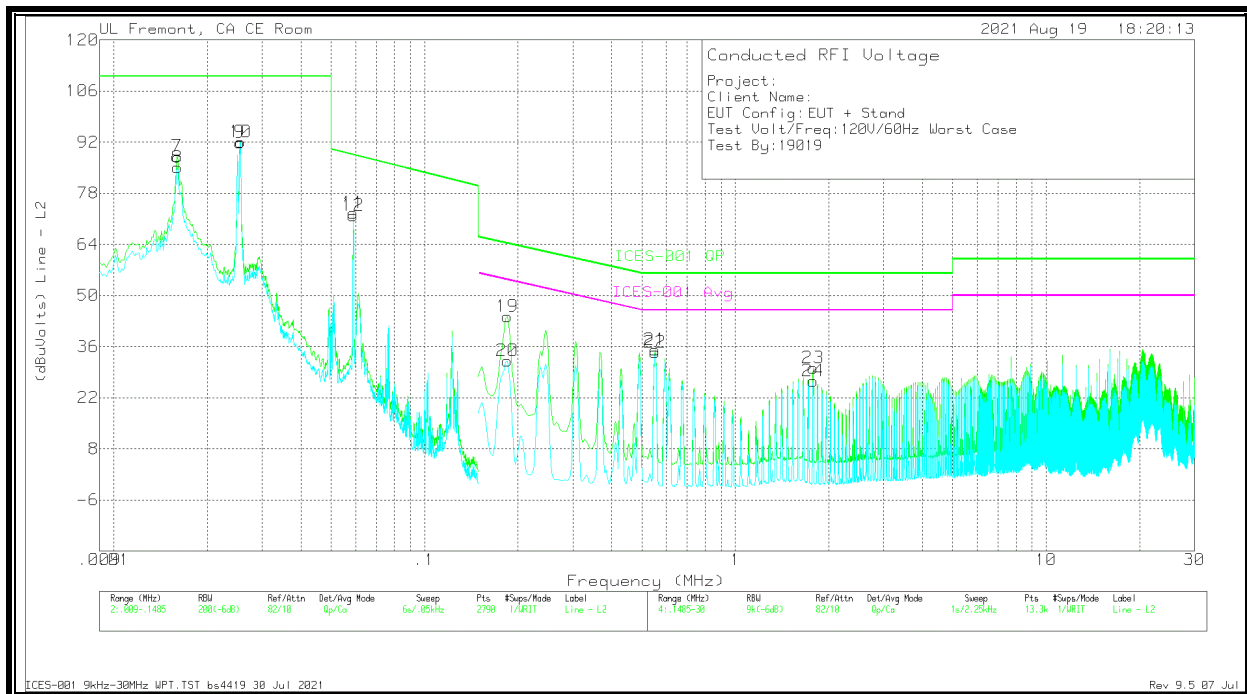
WORST EMISSIONS

Range 1: Line - L1 .009 - .1485MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
2	.01605	75.4	Ca	2.3	0	12.3	90	-	-	-	-
4	.02555	70.96	Ca	1.1	0	12	84.06	-	-	-	-
6	.05895	59.91	Ca	.2	0	11	71.11	-	-	-	-
1	.016	78.52	Qp	2.4	0	12.3	93.22	110	-16.78	-	-
3	.02555	71.57	Qp	1.1	0	12	84.67	110	-25.33	-	-
5	.05895	61.26	Qp	.2	0	11	72.46	88.49	-16.03	-	-

Range 3: Line - L1 .1485 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
14	.1845	28.83	Ca	0	0	9.4	38.23	-	-	54.28	-16.05
16	.4905	31.22	Ca	0	0	9.3	40.52	-	-	46.16	-5.64
18	1.77975	15.41	Ca	0	.1	9.3	24.81	-	-	46	-21.19
13	.1845	40.15	Qp	0	0	9.4	49.55	64.21	-14.66	-	-
15	.4905	32.67	Qp	0	0	9.3	41.97	56.16	-14.19	-	-
17	1.77975	16.99	Qp	0	.1	9.3	26.39	56	-29.61	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

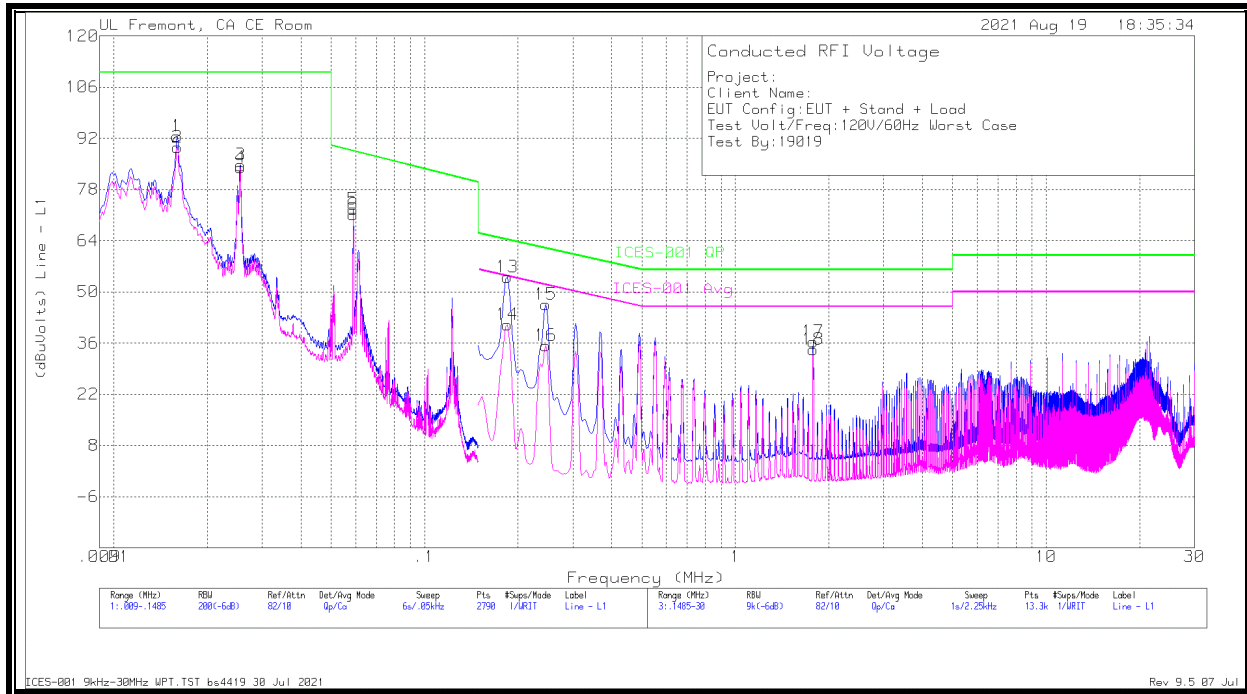
Range 2: Line - L2 .009 - .1485MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
8	.01605	70.49	Ca	2.3	0	12.3	85.09	-	-	-	-
10	.02555	79.02	Ca	1.1	0	12	92.12	-	-	-	-
12	.05895	60.76	Ca	.2	0	11	71.96	-	-	-	-
7	.016	73.4	Qp	2.4	0	12.3	88.1	110	-21.9	-	-
9	.0255	78.85	Qp	1.1	0	12	91.95	110	-18.05	-	-
11	.05895	61.37	Qp	.2	0	11	72.57	88.49	-15.92	-	-

Range 4: Line - L2 .1485 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
20	.1845	22.73	Ca	0	0	9.4	32.13	-	-	54.28	-22.15
22	.55125	25.18	Ca	0	0	9.3	34.48	-	-	46	-11.52
24	1.7775	17.13	Ca	0	.1	9.3	26.53	-	-	46	-19.47
19	.1845	34.81	Qp	0	0	9.4	44.21	64.21	-20	-	-
21	.55125	25.87	Qp	0	0	9.3	35.17	56	-20.83	-	-
23	1.7775	20.71	Qp	0	.1	9.3	30.11	56	-25.89	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

9.1.2. OPERATING MODE (1.778MHz) WITH WATCH

LINE 1 RESULTS



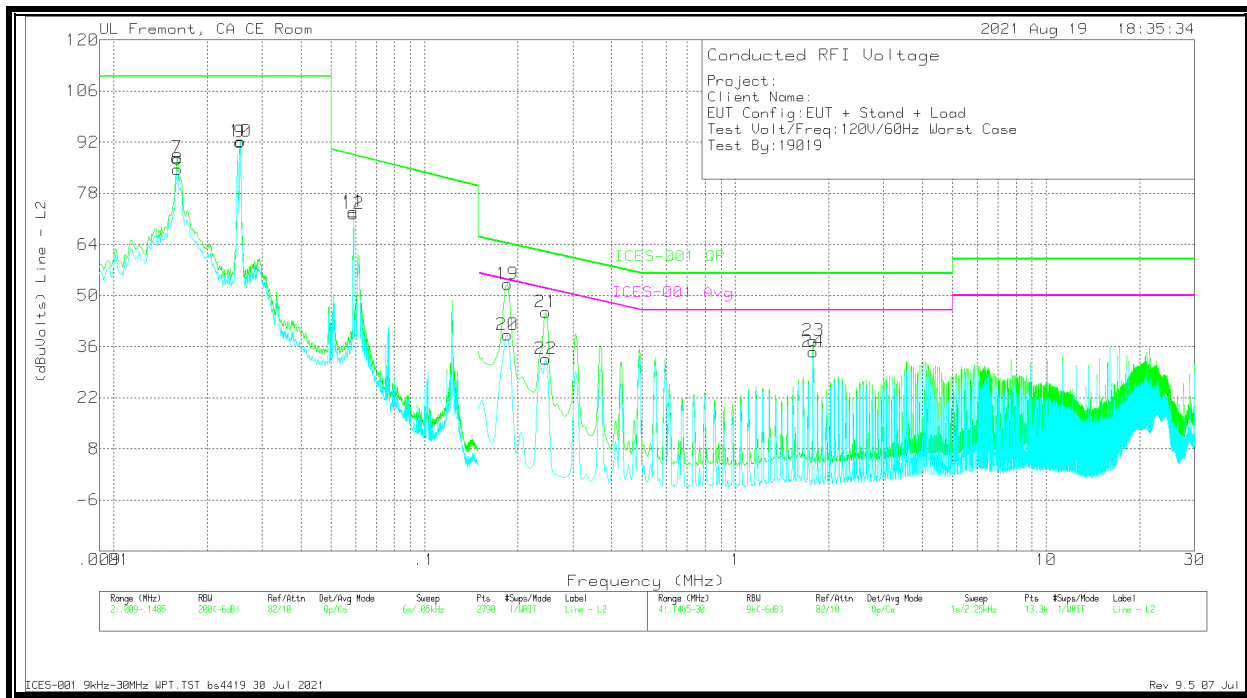
WORST EMISSIONS

Range 1: Line - L1 .009 - .1485MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
2	.01605	75.01	Ca	2.3	0	12.3	89.61	-	-	-	-
4	.02555	70.99	Ca	1.1	0	12	84.09	-	-	-	-
6	.05895	60.04	Ca	.2	0	11	71.24	-	-	-	-
1	.016	77.9	Qp	2.4	0	12.3	92.6	110	-17.4	-	-
3	.02555	71.54	Qp	1.1	0	12	84.64	110	-25.36	-	-
5	.05895	61.34	Qp	.2	0	11	72.54	88.49	-15.95	-	-
Range 3: Line - L1 .1485 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
14	.1845	31.58	Ca	0	0	9.4	40.98	-	-	54.28	-13.3
16	.24525	26.07	Ca	0	0	9.3	35.37	-	-	51.92	-16.55
18	1.7775	24.84	Ca	0	.1	9.3	34.24	-	-	46	-11.76
13	.1845	44.62	Qp	0	0	9.4	54.02	64.21	-10.19	-	-
15	.24525	37.23	Qp	0	0	9.3	46.53	61.87	-15.34	-	-
17	1.7775	26.94	Qp	0	.1	9.3	36.34	56	-19.66	-	-

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line - L2 .009 - .1485MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
8	.01605	69.96	Ca	2.3	0	12.3	84.56	-	-	-	-
10	.02555	79.1	Ca	1.1	0	12	92.2	-	-	-	-
12	.05895	61.22	Ca	.2	0	11	72.42	-	-	-	-
7	.016	73.07	Qp	2.4	0	12.3	87.77	110	-22.23	-	-
9	.0255	78.94	Qp	1.1	0	12	92.04	110	-17.96	-	-
11	.05895	61.78	Qp	.2	0	11	72.98	88.49	-15.51	-	-

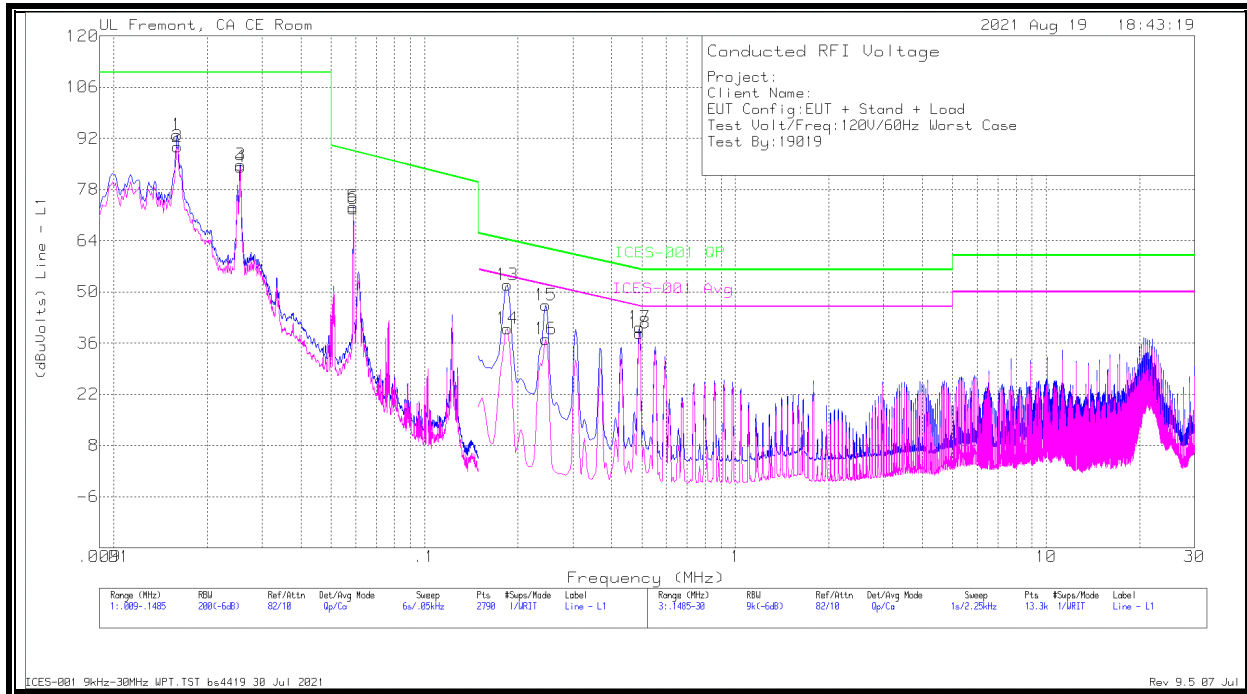
Range 4: Line - L2 .1485 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
20	.1845	29.86	Ca	0	0	9.4	39.26	-	-	54.28	-15.02
22	.24525	23.3	Ca	0	0	9.3	32.6	-	-	51.92	-19.32
24	1.7775	25.12	Ca	0	.1	9.3	34.52	-	-	46	-11.48
19	.1845	43.73	Qp	0	0	9.4	53.13	64.21	-11.08	-	-
21	.24525	36.17	Qp	0	0	9.3	45.47	61.87	-16.4	-	-
23	1.7775	28.25	Qp	0	.1	9.3	37.65	56	-18.35	-	-

Qp - Quasi-Peak detector

Ca - CISPR average detection

9.1.3. OPERATING MODE (326.5kHz) WITH WATCH

LINE 1 RESULTS



Range 1: Line - L1 .009 - .1485MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
2	.01605	75.09	Ca	2.3	0	12.3	89.69	-	-	-	-
4	.02555	71.02	Ca	1.1	0	12	84.12	-	-	-	-
6	.059	61.56	Ca	.2	0	11	72.76	-	-	-	-
1	.016	78.17	Qp	2.4	0	12.3	92.87	110	-17.13	-	-
3	.02555	71.59	Qp	1.1	0	12	84.69	110	-25.31	-	-
5	.05895	62.08	Qp	.2	0	11	73.28	88.49	-15.21	-	-

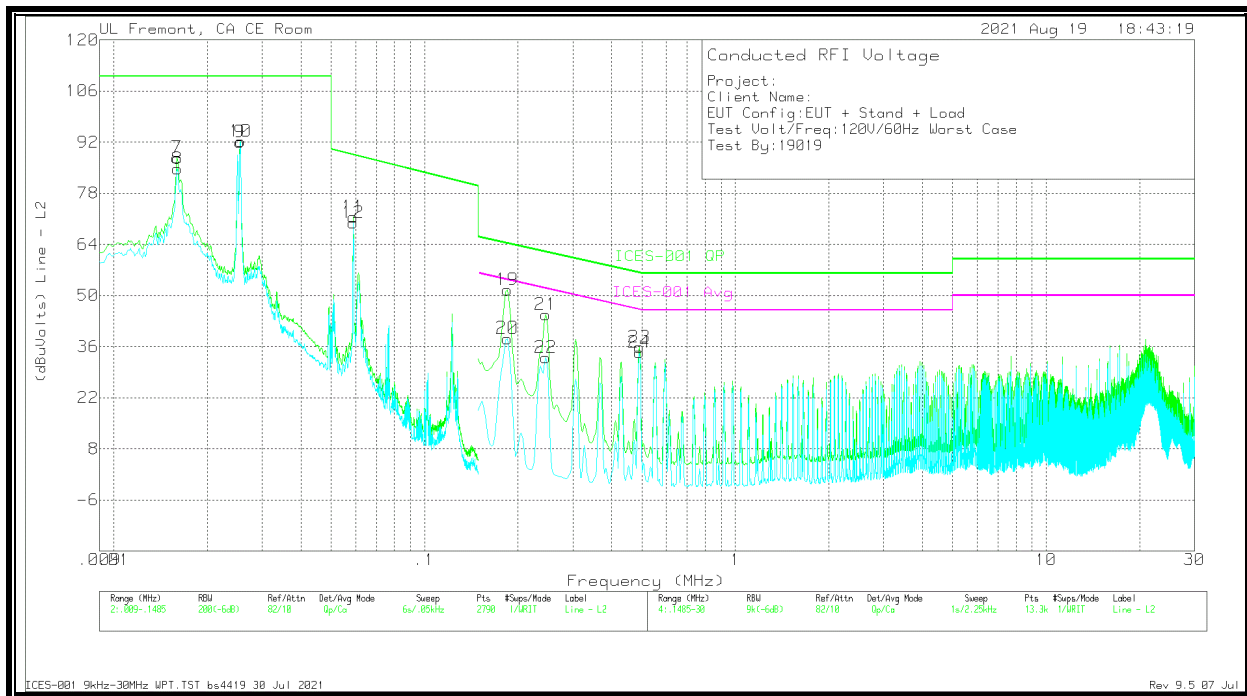
Range 3: Line - L1 .1485 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN09(IL L1)_r	LC Cables C1&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
14	.1845	30.54	Ca	0	0	9.4	39.94	-	-	54.28	-14.34
16	.24525	27.73	Ca	0	0	9.3	37.03	-	-	51.92	-14.89
18	.4905	29.42	Ca	0	0	9.3	38.72	-	-	46.16	-7.44
13	.1845	42.5	Qp	0	0	9.4	51.9	64.21	-12.31	-	-
15	.24525	37.05	Qp	0	0	9.3	46.35	61.87	-15.52	-	-
17	.4905	31.03	Qp	0	0	9.3	40.33	56.16	-15.83	-	-

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line - L2 .009 - .1485MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
8	.01605	70.05	Ca	2.3	0	12.3	84.65	-	-	-	-
10	.02555	79.09	Ca	1.1	0	12	92.19	-	-	-	-
12	.05895	58.76	Ca	.2	0	11	69.96	-	-	-	-
7	.016	73.05	Qp	2.4	0	12.3	87.75	110	-22.25	-	-
9	.02553	78.92	Qp	1.1	0	12	92.02	110	-17.98	-	-
11	.05895	60.25	Qp	.2	0	11	71.45	88.49	-17.04	-	-

Range 4: Line - L2 .1485 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 LISN10(IL L2)_r	LC Cables C2&C3 dB	TekBox Limiter TBFL1 Model 207	Corrected Reading (dBuVolts)	ICES-001 QP	Margin (dB)	ICES-001 Avg	Margin (dB)
20	.1845	28.85	Ca	0	0	9.4	38.25	-	-	54.28	-16.03
22	.24525	23.66	Ca	0	0	9.3	32.96	-	-	51.92	-18.96
24	.4905	25.14	Ca	0	0	9.3	34.44	-	-	46.16	-11.72
19	.1845	42.14	Qp	0	0	9.4	51.54	64.21	-12.67	-	-
21	.24525	35.5	Qp	0	0	9.3	44.8	61.87	-17.07	-	-
23	.4905	26.62	Qp	0	0	9.3	35.92	56.16	-20.24	-	-

Qp - Quasi-Peak detector

Ca - CISPR average detection

10. SETUP PHOTO

Please refer to 13573888-EP2V1 for setup photos

END OF TEST REPORT