

EVALUATION REPORT

for Certification of Conformity FCC Part 18 (Class II Permissive change)

Applicant: LG Electronics USA, Inc. 111 Sylvan Avenue North Building Englewood Cliffs New Jersey United States 07632, Attn: David Kim / Team leader Date of Issue: Jul. 01, 2024 Order Number: GETEC-C1-24-444 Test Report Number: GETEC-E3-24-094 Test Site: GUMI UNIVERSITY EMC CENTER CAB Designation Number: KR0033

FCC ID. :	BEJA408SW19
Applicant :	LG Electronics USA, Inc.
Rule Part(s)	: FCC Part 18
Test Method	: FCC/OET MP-5
EUT Type	: Household Refrigerator
Equipment Class	: Part 18 Consumer Device(8CC)
Type of Authority	: Certification
Model Name	: URETC1408N
Trade Mark	: LG

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC/OET MP-5 (1986)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the vest of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,

hil

Tak Dong Kim, Associate EngineerGUMI UNIVERSITY EMC CENTER

Reviewed by,

Jung Joo

Sung Joo Park, Technical Manager GUMI UNIVERSITY EMC CENTER

GETEC-QP-16-008 (Rev.01)

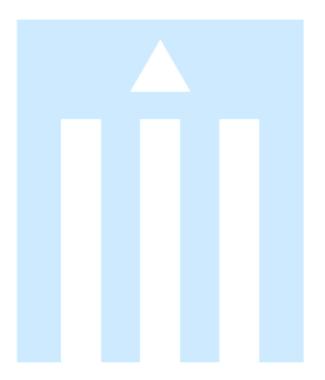
This test report only contains the result of a specific sample supplied by applicant for the testing. It is not allowed to copy this report even partly without the approval of EMC center



Revision History

Test Report No.	Issue Date	Description
GETEC-E3-24-094	Jul. 01, 2024	First Approval Test Report

 $\,\%\,$ This test report is not related to the accredited test result by ISO/IEC 17025 and KOLAS





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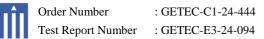


Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.

1. General Information

Applicant: LG Electronics USA, Inc. Applicant Address: 111 Sylvan Avenue North Building Englewood Cliffs New Jersey United States 07632 Manufacturer: LG Electronics Inc. Manufacturer Address: 170, Sungsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51533, Korea Contact Person: David Kim / Team leader Telephone Number: 1-201-266-2443

BEJA408SW19 FCC ID. EUT Type Household Refrigerator URETC1408N **Model Name** FCC Part 18 Rule Part(s) FCC/OET MP-5 **Test Method** Certification **Type of Authority Test Procedure(s)** FCC/OET MP-5 Jun. 24, 2024 ~ Jun. 25, 2024 **Dates of Test Place of Test GUMI UNIVERSITY EMC CENTER** (FCC Test Firm Registration Number: 269701) 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 39213, Republic of Korea. **Test Report Number** GETEC-E4-23-094 **Dates of Issue** Jul. 01, 2024



2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2017) was used in determining radiated and conducted emissions emanating from **Household Refrigerator (Model name: URETC1408N)**.

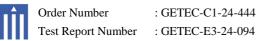
These measurement tests were conducted at GUMI UNIVERSITY EMC CENTER.

The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 39213, Korea

This test site is one of the highest point of GUMI UNIVERSITY at about 200 kilometers away from Seoul city and 40 kilometers away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 (2017)



Fig 1. The map above shows the GUMI UNIVERSITY in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the Household Refrigerator (Model Name: URETC1408N) FCC ID.: BEJA408SW19

Type of Equipment	Household Refrigerator
Model Name	URETC1408N
Serial Number	Prototype
RF Frequency	330 kHz ~ 370 kHz
External connector	DC input 1 EA
Rated Voltage	Input : AC 115 V, 60 Hz (Wireless Power Transmitter input voltage: DC 12 V)
Output Electricity Power	Less than 3W
Size(W x H x T)	35 ^{3/4} (W) x23 ^{7/8} (D) x83 ^{1/2} (H) inch
	(Wireless Power Transmitter module :50 (mm) x 35 (mm) x 1.0 (mm))

3.2 Definition of models

- None





3.3 Support Equipment / Cables used

3.3.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
None	-	-	S/N: - FCC ID.: -

See "Appendix E – Test Setup Photographs" for actual system test set-up

3.3.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
Home wireless power transfer device	LG Electronics Inc.	WRS-207	S/N: - FCC ID.: -
WLAN module	LG Electronics Inc.	PWFSA2	S/N: FCC ID.: BEJ-PWFSA2

3.3.3 Used Cable(s)

Cable Name	Condition	1					Description
Power cable	Connected	l to the EUT	and A	C powe	er		2.30 m Unshielded.

3.4 Modification Item(s)

-. None

4. Description of tests

4.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used.

The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

- Test Voltage / Frequency: AC 115 V, 60 Hz
 (Wireless Power Transfer Device were supplied DC 12 V from main system.)
- Operating condition during the test(s) :
 - This device has been tested in the configurations of Power transmitting mode with WLAN module operating.

Transmitting Curre	nt	Suppor	Comment	
1 000 mA		Refrigerator	Shelf RX module	

4.2 General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 (2017) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which Fixed at 2 m above the ground plane to find out the highest emission.

And also, each emission was to be maximized by the table was turned from 0 degrees to 360 degrees. In order to find out the max emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4 (2017).

5. Summary of Test Results

FCC Part Section(s)	Test Description	Test Result
§18.305	Radiated Emission	Pass
§18.307	Conducted Emission	Pass



6. Conducted Emission

-Test Description

The Line conducted emission test facility is inside a 4 m \times 8 m \times 2.5 m shielded enclosure.

(FCC Test Firm Registration No.: 269701)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN and the support equipment is powered from the Rohde & Schwarz LISN Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with $30 \text{ cm} \sim 40 \text{ cm}$.

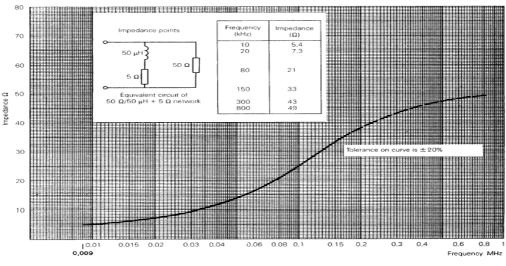
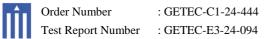


Fig 2. Impedance of LISN



6.1 Operating Environment

Temperature	:	22.3 °C
Relative Humidity	:	61.1 %
Air Pressure	:	100.2 kPa

6.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

The EUT was placed on wooden table, 0.8 m heights above the floor, 0.4 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.

AMN is bonded on horizontal reference ground plane.

The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

6.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	3.69 dB	Confidence level of approximately 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	3.32 dB	Confidence level of approximately 95 % ($k = 2$)

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results



6.<u>4 Limit</u>

RFI Conducted	FCC Limit(dBµV/m)			
Freq. Range	Quasi-Peak	Average		
0.009 MHz ~ 0.05 MHz	110	-		
0.05 MHz ~ 0.15 MHz	90 ~ 80*	-		
0.15 MHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*		
0.5 MHz ~ 5 MHz	56	46		
5 MHz ~ 30 MHz	60	50		
*Limits decreases linearly with the logarithm of frequency.				

6.5 Test Equipment used

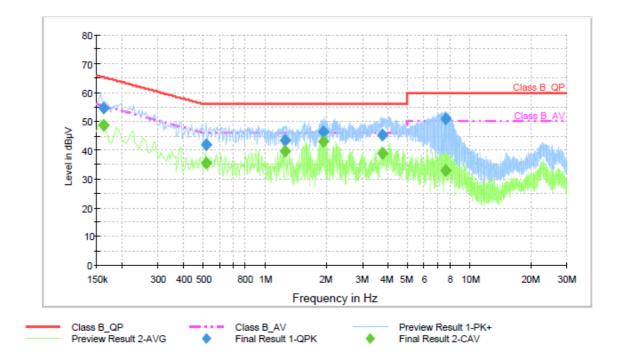
	Model Name	Manufacturer	Description	Serial Number	Calibration Date
■ -	ESCI	Rohde & Schwarz	EMI Test Receiver	100237	Apr. 03, 2024
■ -	ENV216	Rohde & Schwarz	LISN	100173	Apr. 03, 2024
□ -	ENV216	Rohde & Schwarz	LISN	100172	Apr. 03, 2024
□ -	ESH2-Z5	Rohde & Schwarz	LISN	829991/009	Apr. 04, 2024
□ -	VTSD 9561-D	SCHWARZBECK	Pulse Limiter	32	Apr. 04, 2024
-	EMC 32	Rohde & Schwarz	Software	Ver.8.53	N/A

6.6 Test data for Conducted Emission

Test Date	: Jun. 25, 2024
Resolution Bandwidth	: 9 kHz (0.15 MHz ~ 30 MHz)
Frequency Range	: 0.15 MHz ~ 30 MHz
Line	: L1: Live, N: Neutral
Comment	: None



• Operating condition: Continuous Power transmitting mode

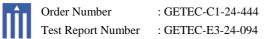


Final Result 1

Frequency	QuasiPeak	Meas. Time	Bandwidth	Filter	Line	Corr.	Margin	Limit	Comment
(MHz)	(dBµV)	(ms)	(kHz)			(dB)	(dB)	(dBµV)	
0.162000	54.7	1000.0	9.000	Off	Ν	9.5	10.7	65.4	
0.515894	42.0	1000.0	9.000	Off	L1	9.5	14.0	56.0	
1.256100	43.3	1000.0	9.000	Off	Ν	9.6	12.7	56.0	
1.931888	46.4	1000.0	9.000	Off	Ν	9.6	9.6	56.0	
3.736500	45.2	1000.0	9.000	Off	Ν	9.7	10.8	56.0	
7.682550	50.9	1000.0	9.000	Off	L1	9.9	9.1	60.0	

Final Result 2

Frequency	CAverage	Meas. Time	Bandwidth	Filter	Line	Corr.	Margin	Limit	Comment
(MHz)	(dBµV)	(ms)	(kHz)			(dB)	(dB)	(dBµV)	
0.162000	48.5	1000.0	9.000	Off	Ν	9.5	6.9	55.4	
0.515894	35.3	1000.0	9.000	Off	L1	9.5	10.7	46.0	
1.256100	39.7	1000.0	9.000	Off	Ν	9.6	6.3	46.0	
1.931888	42.9	1000.0	9.000	Off	Ν	9.6	3.1	46.0	
3.736500	38.7	1000.0	9.000	Off	Ν	9.7	7.3	46.0	
7.682550	32.9	1000.0	9.000	Off	L1	9.9	17.1	50.0	



7. Radiated Emission

7.1 Operating Environment

Temperature	:	20.2 °C
Relative Humidity	:	59.3 %
Air Pressure	:	99.4 kPa

7.2 Test Set-up

The Radiated emission measurements were conducted at the worst test conditions.

The measurements of below 1 GHz were made at 3 m Semi Anechoic Chamber or 10 m Semi Anechoic Chamber (FCC Test Firm Registration No.: 269701) that complies with CISPR 16 / ANSI C63.4.

The frequency range of 9 kHz to 30 MHz, The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane. The turntable with EUT was rotated 360° and the receive antenna was fixed 2.0 m on the ground plane.

The frequency range of 30 MHz to 1 000 MHz, The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane. The turntable with EUT was rotated 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

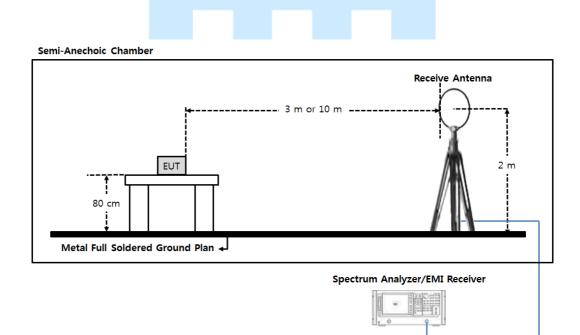


Fig 3. Configurations of Radiated emission test (9 kHz to 30 MHz)



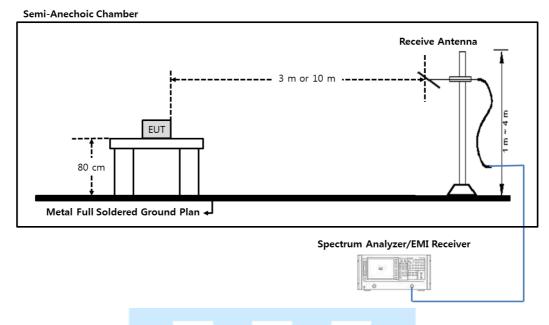


Fig 4. Configurations of Radiated emission test (30 MHz to 1 000 MHz)





7.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement".

The measurement	11m contrintry mice	~~~~~	Truitle o	confidence of 95 %	
The measurement	incentanity was	given	wiina	confidence of 93 %	
The measurement	uncontainty was	Siven	with a	confidence of 55 70	•

Test Items(10 m Anechoic Chamber)	Uncertainty	Remark	
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	4.77 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	4.79 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	4.91 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	4.90 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	4.63 dB	Confidence level of approximately 95 % ($k = 2$)	
Test items (3 m Anechoic Chamber)	Uncertainty	Remark	
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	4.90 dB	Confidence level of approximately 95 % (k = 2)	
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	4.79 dB	Confidence level of approximately 95 % (k = 2)	
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	6.23 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	5.16 dB	Confidence level of approximately 95 % ($k = 2$)	
Radiated emission (1 GHz ~ 6 GHz, 3 m)	4.56 dB	Confidence level of approximately 95 % (k = 2)	
Radiated emission (6 GHz ~ 18 GHz, 3 m)	4.88 dB	Confidence level of approximately 95 % (k = 2)	
Radiated emission (18 GHz ~ 26 GHz, 3 m)	5.16 dB	Confidence level of approximately 95 % (k = 2)	

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results



7.4 Limit

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25×SQRT(power/500)	300 ¹ 300
	Any non-ISM frequency	Below 500 500 or more	15 15×SQRT(power/500)	300 ¹ 300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 (2)	1,600 (2)
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz)× SQRT(power/500)	300 ³ 300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	⁴ 30 ⁴ 30

Note.

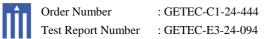
1) Field strength may not exceed 10 μ V/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

- 2) Reduced to the greatest extent possible.
- 3) Field strength may not exceed 10 μ V/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.
- 4) Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

7.5 Test Equipment used

Manufacturer	Description	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	101382	Apr. 03, 2024
Rohde & Schwarz	Loop ANT	100041	Apr. 15, 2024
Innco system GmbH	Position Controller	CO3000/779/330	N/A
		50314/L	
Innco system GmbH	Turntable	1280314	N/A
Innco system GmbH	Antenna Mast	4420314	N/A
Innco system GmbH	Antenna Mast	MA4640/558	N/A
Rohde & Schwarz	Software	Ver.10.40.10	N/A
	Rohde & Schwarz Rohde & Schwarz Innco system GmbH Innco system GmbH Innco system GmbH	Rohde & SchwarzEMI Test ReceiverRohde & SchwarzLoop ANTInnco system GmbHPosition ControllerInnco system GmbHTurntableInnco system GmbHAntenna MastInnco system GmbHAntenna Mast	Rohde & SchwarzEMI Test Receiver101382Rohde & SchwarzLoop ANT100041Innco system GmbHPosition ControllerCO3000/779/33050314/LTurntable1280314Innco system GmbHAntenna Mast4420314Innco system GmbHAntenna MastMA4640/558

All test equipment used is calibrated on a regular basis.



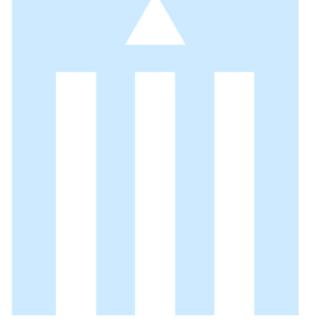
7.6 Test data for Radiated Emission

Test Date	: Jun. 24, 2024
Measurement Distance	: 3 m
Note	: frequency range to be scanned up to 30 MHz, because the frequency band in which the
	EUT operates less than 1.705 MHz

-. Measurement setting

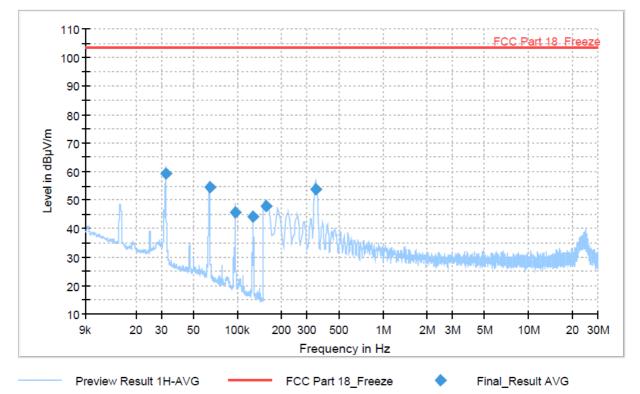
Frequency range	9 kHz ~ 150 kHz	0.15 MHz ~ 30 MHz			
Detector mode Average		Average			
Resolution bandwidth	200 Hz	9 kHz			

-. Measurement Data: Continuous Power transmitting mode (1.2W)





Horizontal

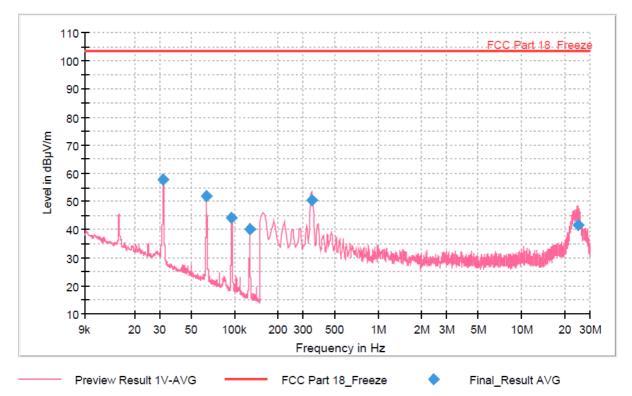


Final Result

Frequency (MHz)	Average (dBµV/m)	D.C.F (dBµV/ m)	Limit (dBµV/ m)	Margin (dB)	Meas. Time (ms)	Band width (kHz)	Pol	Azim uth (deg)	Corr. (dB/ m)
0.032011	59.27	80.00	103.52	44.25	1000.0	0.200	Н	27.0	20.1
0.064131	54.35	80.00	103.52	49.17	1000.0	0.200	Н	20.0	20.0
0.096206	45.51	80.00	103.52	58.01	1000.0	0.200	Н	5.0	20.0
0.128284	44.31	80.00	103.52	59.21	1000.0	0.200	Н	5.0	20.0
0.155970	47.79	80.00	103.52	55.73	1000.0	0.200	Н	27.0	20.0
0.344025	53.82	80.00	103.52	49.70	1000.0	9.000	Н	167.0	20.0



Vertical

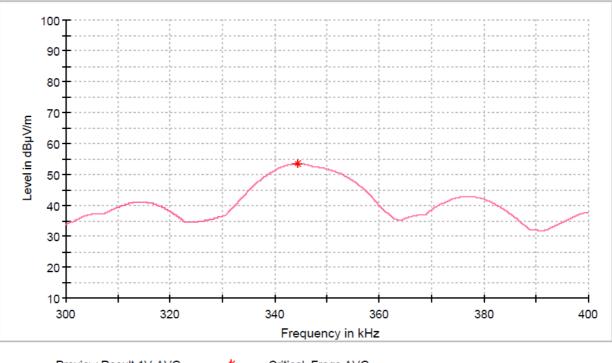


Final Result

Frequency	Average	D.C.F	Limit	Margin	Meas.	Bandwidth	Pol	Azimuth	Corr.
(MHz)	(dBµV/m)	(dBµV/	(dBµV/m)	(dB)	Time	(kHz)		(deg)	(dB/m)
		m)			(ms)				
0.031844	57.64	80.00	103.52	45.88	1000.0	0.200	V	105.0	20.1
0.063781	52.07	80.00	103.52	51.45	1000.0	0.200	V	101.0	20.0
0.095637	44.29	80.00	103.52	59.23	1000.0	0.200	V	105.0	20.0
0.127546	40.26	80.00	103.52	63.26	1000.0	0.200	V	125.0	20.0
0.343025	50.46	80.00	103.52	53.06	1000.0	9.000	V	120.0	20.0
24.945335	41.44	80.00	103.52	62.08	1000.0	9.000	V	185.0	21.1



Fundamental





Critical_Freqs AVG Final_Result AVG

Critical Freqs

Frequency	Average	D.C.F	Limit	Pol	Azimuth	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dBµV/m)		(deg)	(dB/m)
0.344420	53.41	80.00	103.52	V	118.0	20.0

Note.1 The worst case data were reported

And no other spurious and harmonic emissions were reported greater than listed emission above table Note.2 "F"=Fundamental / "S"=Spurious / "*" = Noise Floor

Note.3 All measurements were recorded using a spectrum analyzer employing a peak detector for below 30 MHz

Note.4 Distance Correction Factor (D.C.F.)

For 300 m: 40log(300/3) = 80 dB

Note.5 Sample calculation

Limit = 23.52(300 m) + D.C.F

Margin = Limit – Field Strength

Where, D.C.F = Distance Correction Factor

Note.6 "V1"= Vertical and perpendicular to the centerline / "V2"=vertical and parallel to the centerline

"H" = horizontal (parallel to the ground)

None.7 << The margin is More than 20 dB



8. Sample Calculations

	$dB\mu V = 20 \text{ Log } {}_{10}(\mu V/m)$ $dB\mu V = dBm + 107$ $\mu V = 10^{(dB\mu V/20)}$					
8.1 Example 1 :						
■ 20.3 MHz						
Class B Limit	$= 250 \ \mu V = 48 \ dB \mu V$					
Reading	$= 39.2 \text{ dB}\mu\text{V}$					
$10^{(39.2dB\mu V/20)}$	= 91.2 μV					
Margin	$= 48 \text{ dB}\mu\text{V} - 39.2 \text{ dB}\mu\text{V}$					
	= 8.8 dB					
8.2 Example 2 : ■ 66.7 MHz						
Class B Limit	$= 100 \ \mu V/m = 40.0 \ dB \mu V/m$					
Reading	= 31.0 dBµV					
Antenna Factor + Ca	able Loss = 5.8 dB					
Total	= 36.8 dBµV/m					
Margin	$= 40.0 \text{ dB}\mu\text{V/m} - 36.8 \text{ dB}\mu\text{V/m}$					
	= 3.2 dB					
9 Recommendation & Conc	lucion					

9. Recommendation & Conclusion

The data collected shows that the Household Refrigerator (Model Name: URETC1408N) was complies with § 18.305 and 18.307 of the FCC Rules.

- The end -