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Dates of Tests: Oct 01, 2021 ~ Oct 15, 2021

Test Report S/N: LR500112110I

Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID

**2ATZYSDK-0412**

APPLICANT

**SONIC DUTCH KOREA Co.,Ltd.**

Equipment Class	:	Part 15 Spread Spectrum Transmitter (DSS)
Manufacturing Description	:	Cold Brew Coffe Machine
Manufacturer	:	SONIC DUTCH KOREA Co.,Ltd.
Model name	:	SDK-0412
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C ; ANSI C63.10 - 2013
Frequency Range	:	BDR,EDR (2402 ~ 2480 MHz)
RF power	:	Max 9.643 dBm - Conducted
Data of issue	:	Oct 18, 2021

This test report is issued under the authority of:

The test was supervised by:

Ja-Beom Koo, Manager

Gyeong hun KO, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB Code.: 200723-0

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## 1. General information

### 1-1 Test Performed

Company name : LTA Co., Ltd.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
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 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### 1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2021-09-30	ECT accredited Lab.
	KOREA		-	
RRA	U.S.A	KR0049	2023-04-08	RRA accredited Lab.
	CANADA		2022-10-18	
		C-14948	2023-09-10	
VCCI	JAPAN	T-12416	2023-09-10	VCCI registration
		R-14483	2023-10-15	
		G-10847	2021-12-13	
KOLAS	KOREA	KT551	Updataing	KOLAS accredited Lab.

## 2. Information about test item

### 2-1 Client & Manufacturer

Client Company name : SONIC DUTCH KOREA Co.,Ltd  
 Address : 410, 160, Hyanggyo-ro, Paldal-gu, Suwon-si, Gyeonggi-do, Korea.  
 Tel / Fax : +82-31-247-3999 / +82-31-247-3999  
 Manufacturer : SONIC DUTCH KOREA Co.,Ltd  
 Address : 410, 160, Hyanggyo-ro, Paldal-gu, Suwon-si, Gyeonggi-do, Korea.  
 Tel / Fax : +82-31-247-3999 / +82-31-247-3999

### 2-2 Equipment Under Test (EUT)

Model name : SDK-0412  
 Serial number : Identical prototype  
 Date of receipt : Oct 18, 2021  
 EUT condition : Pre-production, not damaged  
 Antenna type : Pattern Antenna (Max Gain : 2 dBi)  
 Frequency Range : 2402 ~ 2480MHz  
 RF output power : Max 9.643 dBm – Conducted  
 Type of Modulation : GFSK,  $\pi/4$ -DQPSK, 8DPSK  
 Power Source : AC 110 V  
 Firmware Version : V0.1

### 2-3 Tested frequency

Bluetooth	LOW	MID	HIGH
Frequency (MHz) –	2402	2442	2480

### 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	-	MS-1736	MSI

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	$\geq 2/3$ of 20dB BW	Conducted	N/A
15.247(a)	Number of Hopping Frequencies	$\geq 15$ channels		N/A
15.247(a)	20 dB Bandwidth 99% Bandwidth	—		N/A
15.247(a)	Dwell Time	$\leq 0.4$ seconds		N/A
15.247(b)	Transmitter Output Power	$\leq 1\text{W}$ for 1Mbps $\leq 125\text{mW}$ for 2,3Mbps		N/A
15.247(d)	Conducted Spurious emission	$> 20$ dBc		N/A
15.247(d)	Band Edge	$> 20$ dBc		N/A
15.249 / 15.209	Field Strength of Harmonics	$< 54$ dBuV (at 3m)	Radiated	C
15.109	Field Strength	—		C
15.207 / 15.107	AC Conducted Emissions	EN 55022	Line Conducted	C
15.203	Antenna requirement	—	—	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

N/A: The product replaces this test with a certificate using an authenticated module.

#### Note 1: Antenna Requirement

Alien Technology Asia. FCC ID: 2ATZYSDK-0412 unit complies with the requirement of §15.203.

The antenna type is Pattern Antenna

The sample was tested according to the following specification:

\*FCC Parts 15.247; ANSI C-63.4-2014; ANSI C-63.10-2013

\*FCC KDB Publication No. 558074 D01 v03r05

\*FCC TCB Workshop 2012, April

Certified modules : 2ATZY-FSCBT1026

Certified modules application dated : 10/22/2021

## 3.2 Frequency Hopping System Requirements

### 3.2.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

### 3.3 TECHNICAL CHARACTERISTIC TEST

#### 3.3.1 Radiated Spurious Emissions

##### Procedure:

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10. The EUT was placed on a 0.8 m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

- In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 3 m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30 MHz, Bi-Log Test Antenna (30 MHz to 1 GHz) and Horn Test Antenna (above 1 GHz) are used. Test Antenna is 3 m away from the EUT. Test Antenna height is carried from 1 m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 9 kHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30 MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

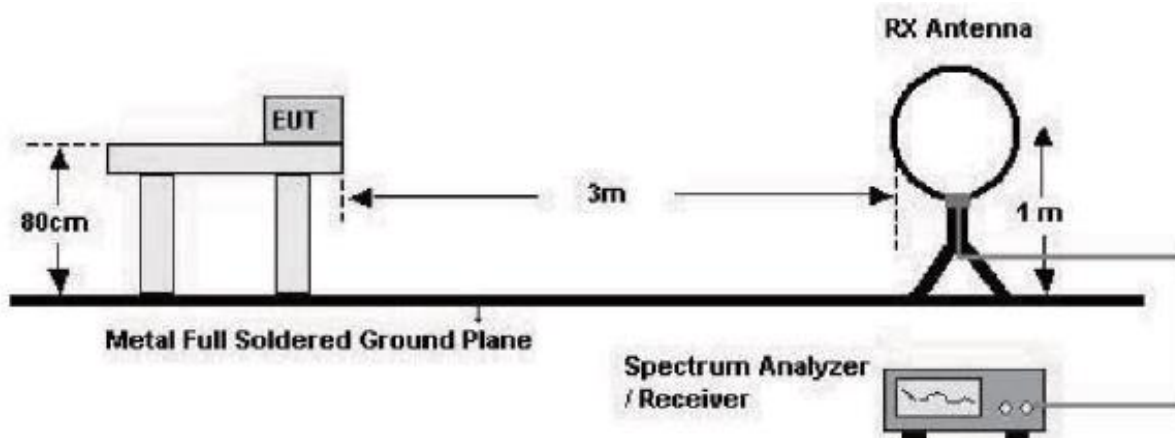
Trace = max hold

VBW  $\geq$  RBW

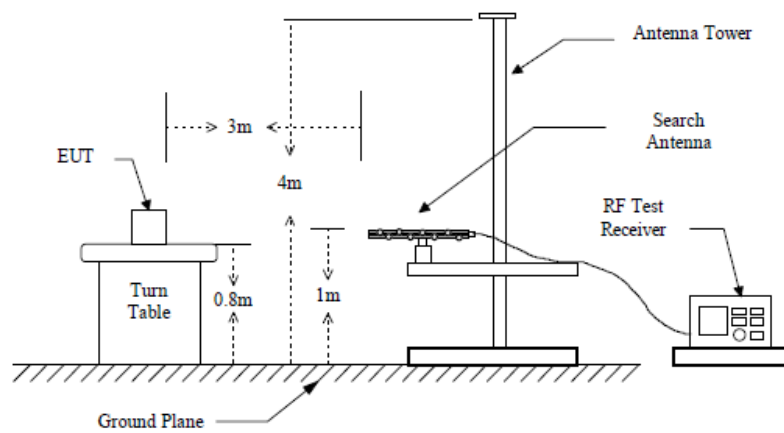
Detector function = peak

Sweep = auto

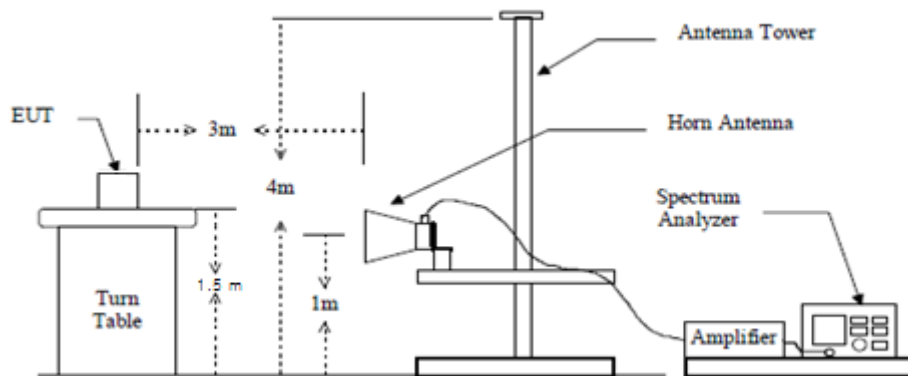
**below 30 MHz**



below 1 GHz (30 MHz to 1 GHz)



above 1 GHz



**Measurement Data: Complies**

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20 dB below limit include from 9 kHz to 30 MHz.
- The test results for the worst of the various operating modes are presented in accordance with 6.3.4 of ANSI C63.10.
- Checked with a red circle is the fundamental frequency.

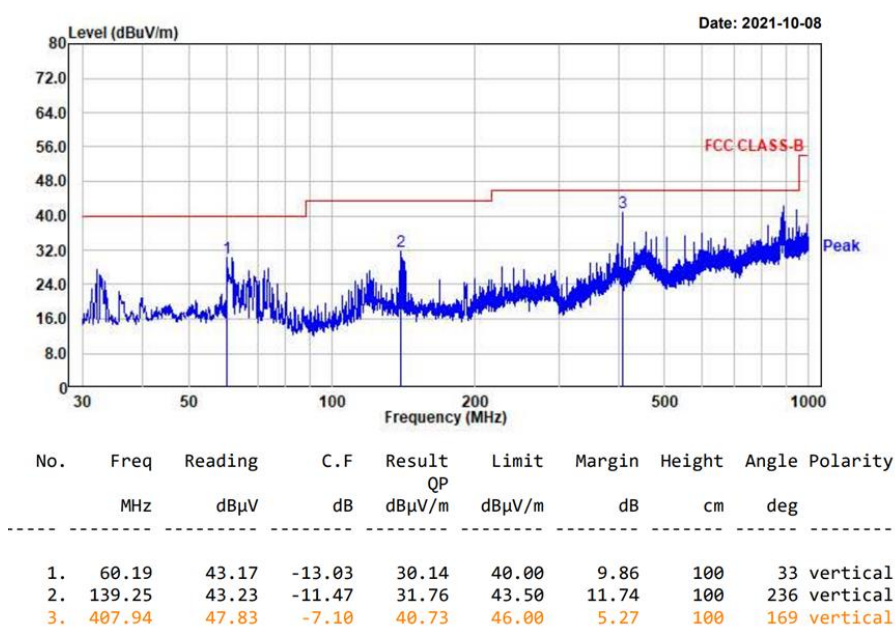
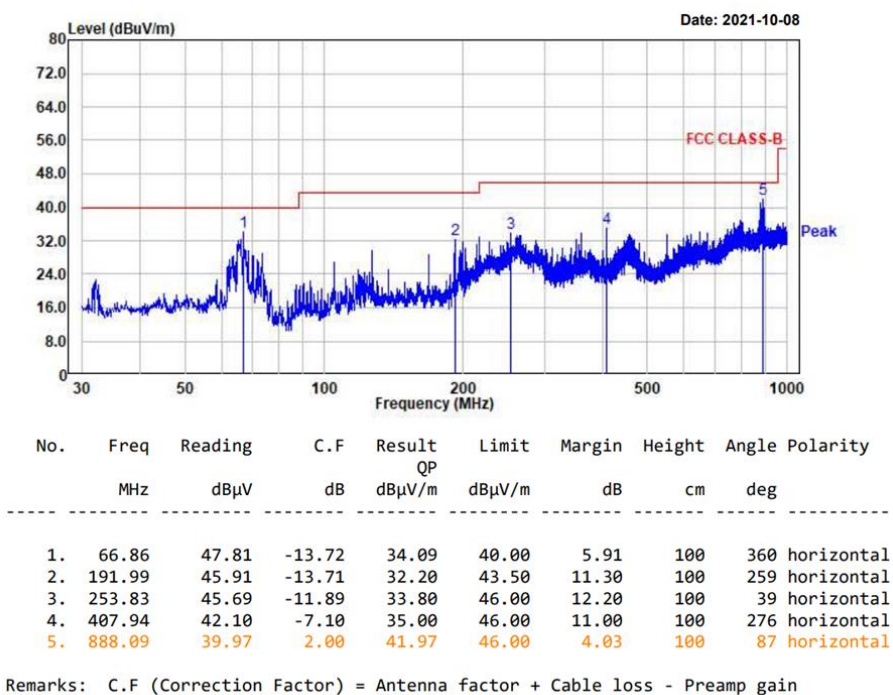


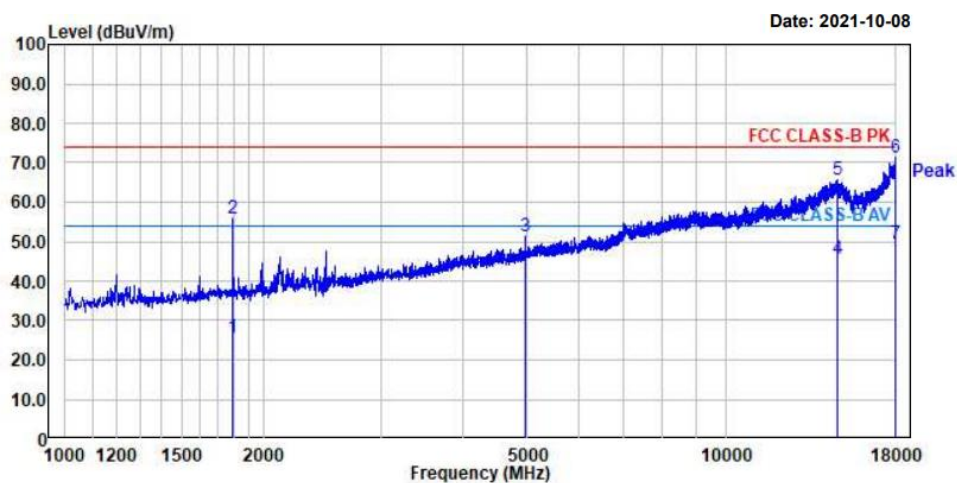
**Minimum Standard: FCC Part 15.209(a)**

<b>Frequency (MHz)</b>	<b>Limit (uV/m) @ 3m</b>
0.009 ~ 0.490	2400/F(kHz) (@ <b>300m</b> )
0.490 ~ 1.705	24000/F(kHz) (@ <b>30m</b> )
1.705 ~ 30	30(@ <b>30m</b> )
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

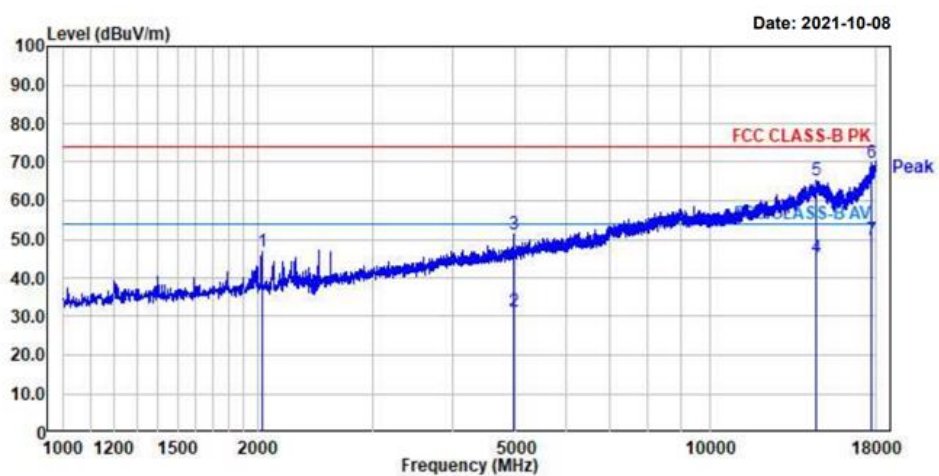
\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

## Radiated Emissions

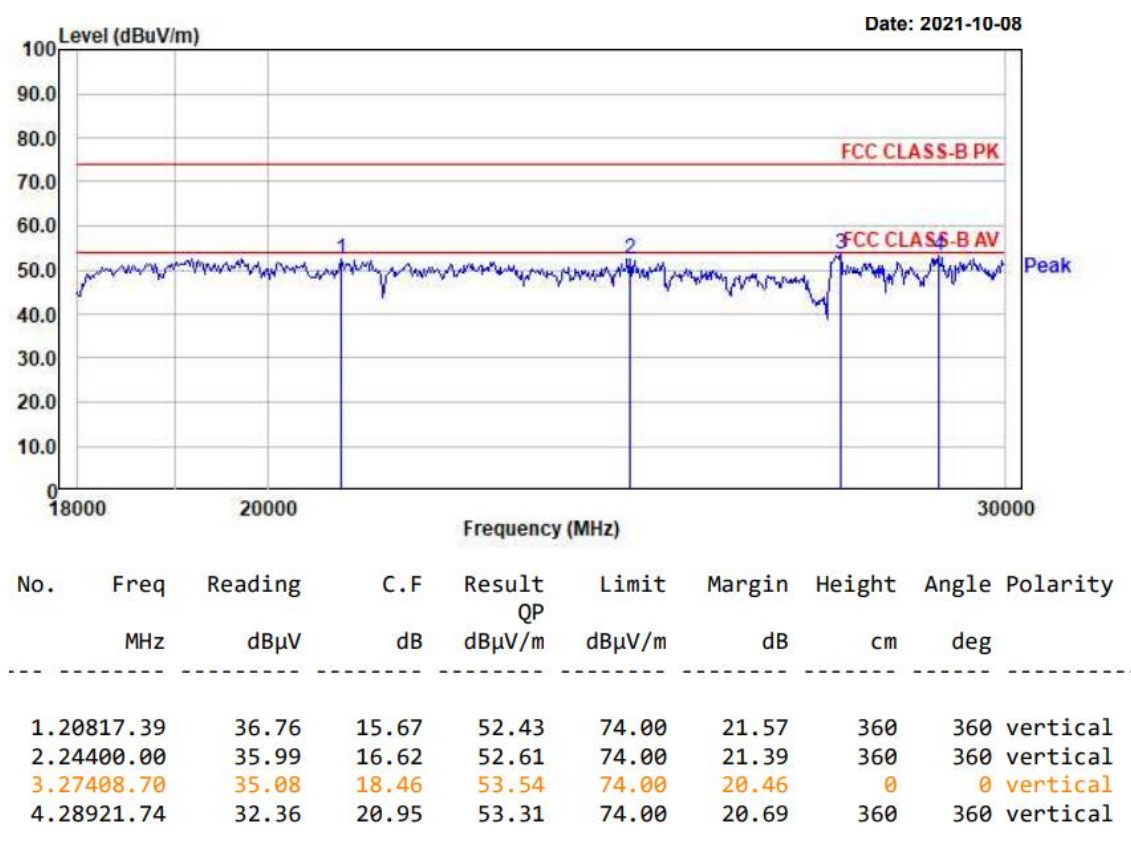
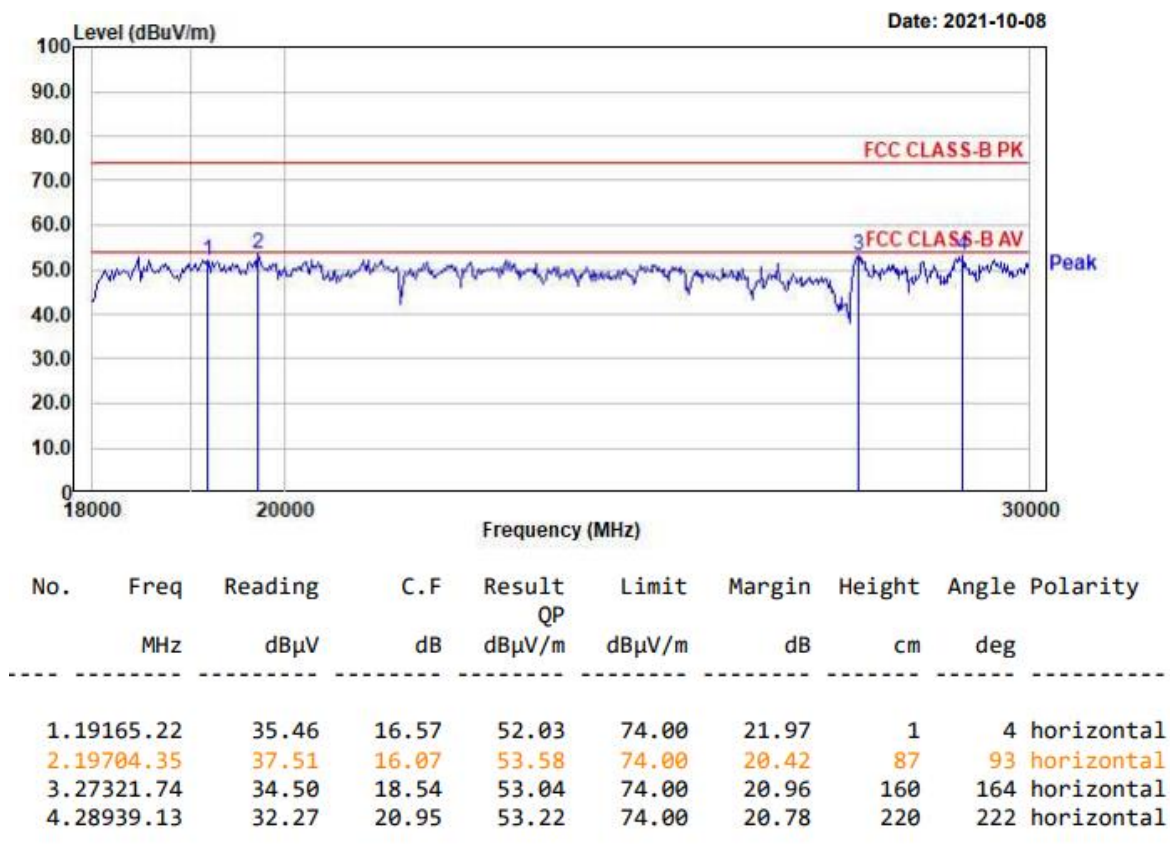




No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	1792.63	30.22	-4.48	25.74	54.00	28.26	162	154	vertical
2.	1792.63	60.35	-4.48	55.87	74.00	18.13	162	154	vertical
3.	4958.88	41.94	9.55	51.49	74.00	22.51	360	360	vertical
4.	14723.25	21.99	23.80	45.79	54.00	8.21	177	170	vertical
5.	14723.25	41.94	23.80	65.74	74.00	8.26	177	170	vertical
6.	17997.88	42.13	29.19	71.32	74.00	2.68	360	360	vertical
7.	17997.88	20.11	29.19	49.30	54.00	4.70	360	360	vertical



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	2026.38	49.48	-2.77	46.71	74.00	27.29	39	44	horizontal
2.	4958.88	21.70	9.55	31.25	54.00	22.75	23	30	horizontal
3.	4958.88	41.70	9.55	51.25	74.00	22.75	23	30	horizontal
4.	14591.50	21.07	24.14	45.21	54.00	8.79	329	338	horizontal
5.	14591.50	41.07	24.14	65.21	74.00	8.79	329	338	horizontal
6.	17704.63	42.27	27.58	69.85	74.00	4.15	231	236	horizontal
7.	17704.63	22.27	27.58	49.85	54.00	4.15	231	236	horizontal



### 3.3.2 AC Conducted Emissions

**Procedure:**

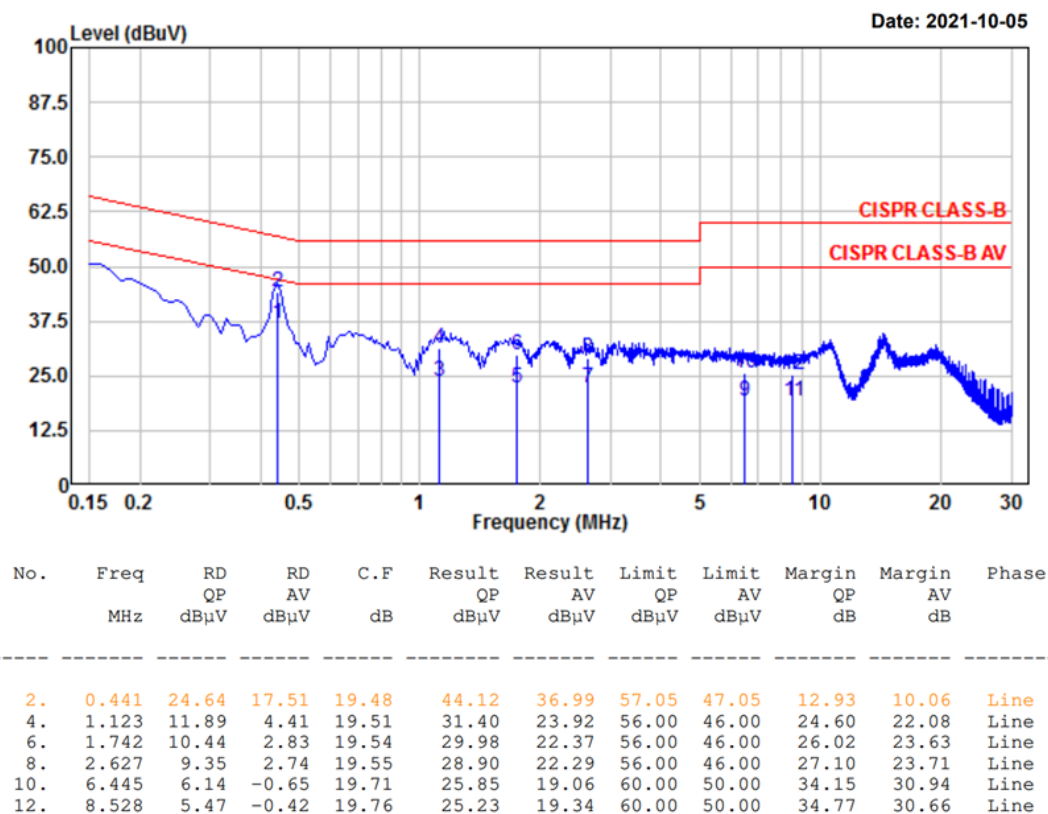
AC power line conducted emissions from the EUT were measured according to the dictates of ANSI C63.4:2003.

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

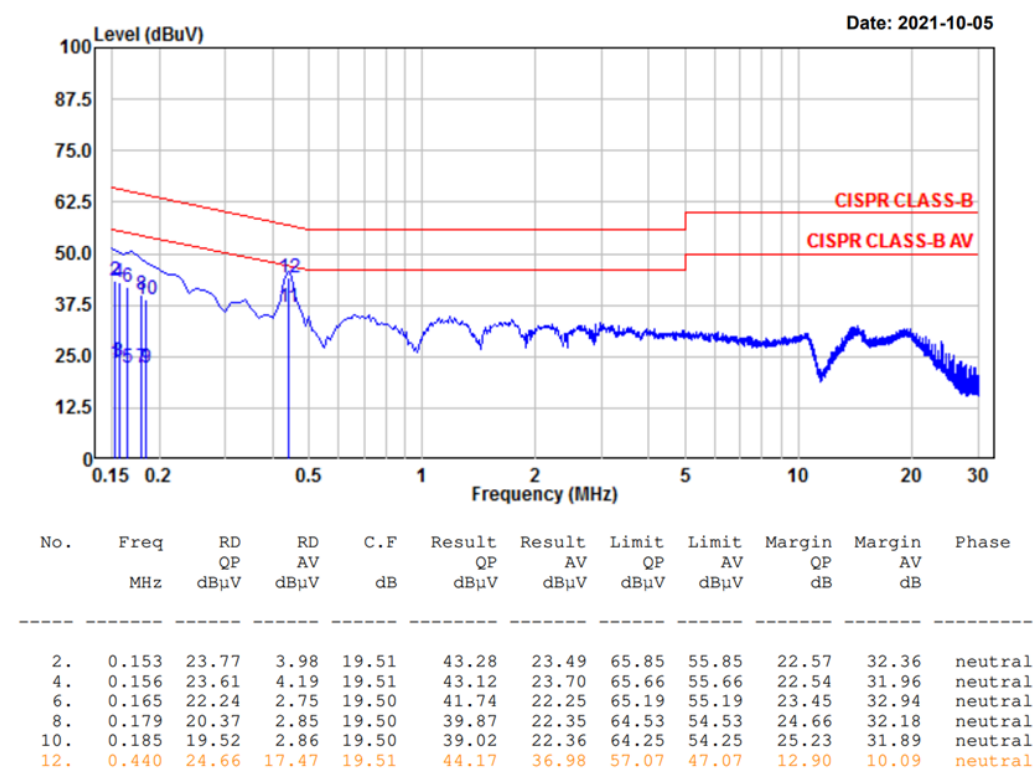
**Measurement Data: : Complies**

**Minimum Standard: FCC Part 15.207(a)/EN 55022**

Frequency Range	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50



Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter





## APPENDIX

## TEST EQUIPMENT USED FOR TESTS

	Use	Description	Model No.	Serial No.	Manufacturer	Interval	Next Cal. Date
1	■	Signal Analyzer (9 kHz ~ 30 GHz)	FSV30	100757	R&S	1 year	2022-09-06
2	■	Signal Generator (~3.2 GHz)	8648C	3623A02597	HP	1 year	2022-03-20
3		SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	1 year	2022-03-20
4		Attenuator (3 dB)	8491A	37822	HP	1 year	2022-09-06
5		Attenuator (10 dB)	8491A	63196	HP	1 year	2022-09-06
6	■	EMI Test Receiver (~7 GHz)	ESC17	100722	R&S	1 year	2022-09-06
7		RF Amplifier (~1.3 GHz)	8447D OPT 010	2944A07684	HP	1 year	2022-09-06
8		RF Amplifier (1~26.5 GHz)	8449B	3008A02126	HP	1 year	2022-03-20
9	■	Horn Antenna (1~18 GHz)	3115	00114105	ETS	2 year	2024-08-04
10		DRG Horn (Small)	3116B	81109	ETS-Lindgren	2 year	2024-03-18
11		DRG Horn (Small)	3116B	133350	ETS-Lindgren	2 year	2024-03-18
12	■	TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBECK	2 year	2023-03-20
13		Temp.Humidity Data Logger	SK-L200TH II A	00801	SATO	1 year	2022-03-20
14		Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
15	■	DC Power Supply	6674A	3637A01657	Agilent	-	-
17	■	Power Meter	EPM-441A	GB32481702	HP	1 year	2022-03-20
18	■	Power Sensor	8481A	3318A94972	HP	1 year	2022-09-06
19		Audio Analyzer	8903B	3729A18901	HP	1 year	2022-09-06
20		Modulation Analyzer	8901B	3749A05878	HP	1 year	2022-09-06
21		TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2022-09-06
22		Stop Watch	HS-3	812Q08R	CASIO	2 year	2023-03-18
23		LISN	KNW-407	8-1430-1	Kyoritsu	1 year	2022-09-06
24		Two-Lime V-Network	ESH3-Z5	893045/017	R&S	1 year	2022-03-18
25		UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	1 year	2022-03-18
26		Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	1 year	2022-03-18
27		Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	1 year	2022-03-18
28		OSP120 BASE UNIT	OSP120	101230	R&S	1 year	2022-03-18
29		Signal Generator(100 kHz ~ 40 GHz)	SMB100A03	177621	R&S	1 year	2022-03-18
30		Signal Analyzer (10 Hz ~ 40 GHz)	FSV40	101367	R&S	1 year	2022-03-18
31	■	Active Loop Antenna	FMZB 1519	1519-031	SCHWARZBECK	2 year	2024-02-26