EMC TEST REPORT

Applicant	Alliedstar Medical Equipment Co., Ltd.
FCC ID	2A8SG-S300W
Product	Intraoral Scanner
Brand	AlliedStar
Model	S300W
Report No.	R2403A0226-E1V1
Issue Date	October 14, 2024

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2023)/ ANSI C63.4-2014**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Liu Wei

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Fan Guangchang

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Version	Revision Description	Issue Date
Rev.0	Initial issue of report.	August 28, 2024
Rev.1	Updated information.	October 14, 2024
Note: This revised report (Report No.: R2403A0226-E1V1) supersedes and replaces the previously issued report (Report No.: R2403A0226-E1). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	FCC Part15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	FCC Part15.107, ANSI C63.4-2014	PASS
Date of Testing: March 25, 2024 ~ June 28, 2024 Date of Sample Received: March 11, 2024			
Note: 1. All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test Facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company:	Eurofins TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City:	Shanghai
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2 General Description of Equipment Under Test

2.1 Applicant and Manufacturer Information

Applicant	Alliedstar Medical Equipment Co., Ltd.
Applicant address	No.222, West Section 3, Waihuan Rd, Yanjiang District, Ziyang, P.R. China
Manufacturer	Alliedstar Medical Equipment Co., Ltd.
Manufacturer address	No.222, West Section 3, Waihuan Rd, Yanjiang District, Ziyang, P.R. China

2.2 General Information

EUT Description			
Device Type	Portable Device		
Model	S300W		
Lab internal SN	R2403A0226/S01		
HW Version	C		
SW Version	1.0		
Power Rating	DC 3.6V from battery or DC 12V from Adapter.		
Connecting I/O Port(s)	Please refer to the User's Manual.		
Antenna Type	Internal Antenna		
Frequency	Band	Tx (MHz)	Rx (MHz)
	Wi-Fi 5G (U-NII-1)	5150 ~ 5250	5150 ~ 5250
	Wi-Fi 5G (U-NII-3)	5725 ~ 5850	5725 ~ 5850
EUT Accessory			
Adapter	Manufacturer: DONGGUAN SHILONG FUHUA ELECTRONIC CO., LTD. Model: UES24LCP-120200SPA Input: 100-240V~50/60Hz 500mA Output: 12.0V ⎓ 2.0A 24.0W		
Battery	Manufacturer: Shenzhen Ryder Electronics Co., Ltd. Model: Li-18650-3.6V 3400mAh -PCM-NTC DC 3.6V, 3400mAh		
Auxiliary Test Equipment			
PC	PC Manufacturer: DELL Model: 0000053 (SN: 7ZX7R93)		
Note: 1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.			

2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards
FCC Code CFR47 Part15B (2023)
ANSI C63.4-2014

2.4 Test Mode

Test Mode	
Mode 1	Adapter +Charging base+ EUT+WLAN Receive
Mode 2	Battery Powered + EUT+ Wireless Module with PC Power Supply+ WLAN Receive

Test Type	Test Mode	Worst Mode
Radiated Emission	Mode 1, 2	Mode 2
Conducted Emission	Mode 1	/
During the test, the preliminary test was performed in all modes, the test data of the worst-case condition was recorded in this report.		

3 Test Case Results

3.1 Radiated Emission

Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	30% ~ 60%

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 10 meters below 1GHz; 3 meters for above 1GHz. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.
The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.
Set the spectrum analyzer in the following:

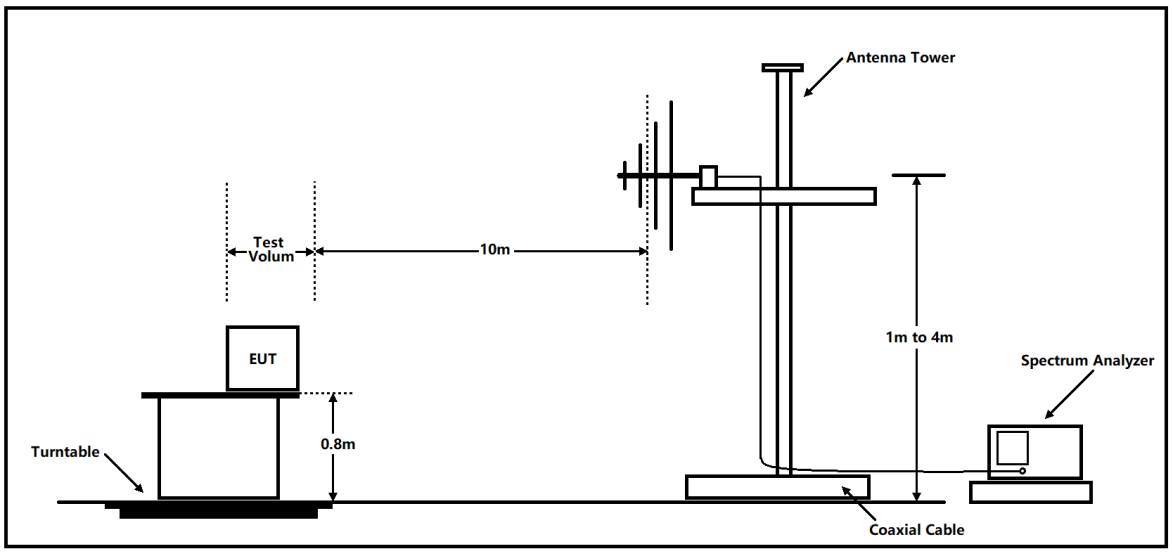
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO
(b) AVERAGE Detector: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

Test Setup

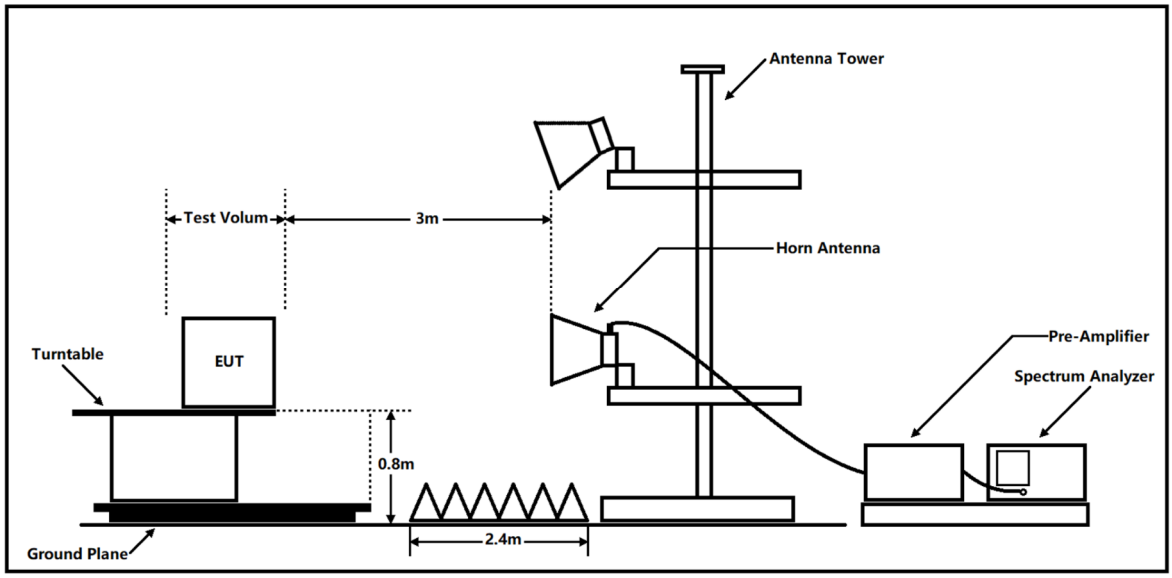
Below 1GHz

Distance 10m



Note: Area side: 21m x 12m

Above 1GHz



Note: Area side: 2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Class B

Frequency (MHz)	Field Strength (dBμV/m)	Detector
30 -88	30.0	Quasi-peak
88-216	33.5	Quasi-peak
216 – 960	36.0	Quasi-peak
960-1000	44.0	Quasi-peak
1000-5th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

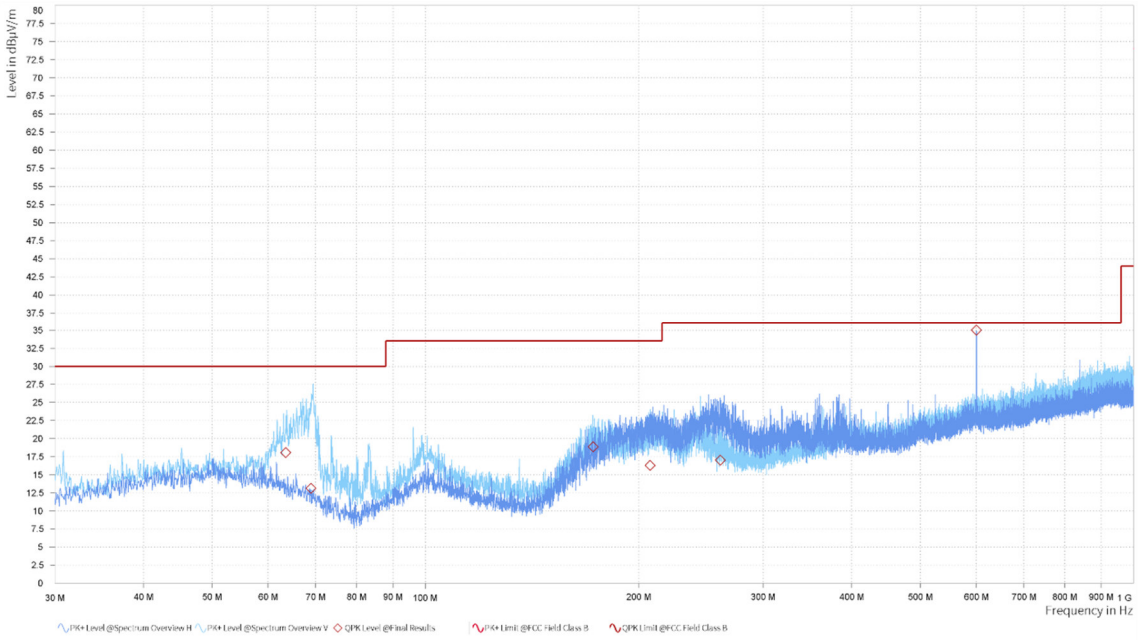
Frequency range of radiated measurements

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. The Emissions in the frequency band 18GHz – 40GHz is more than 20dB below the limit are not reported.

The following graphs display the maximum values of horizontal and vertical by software.

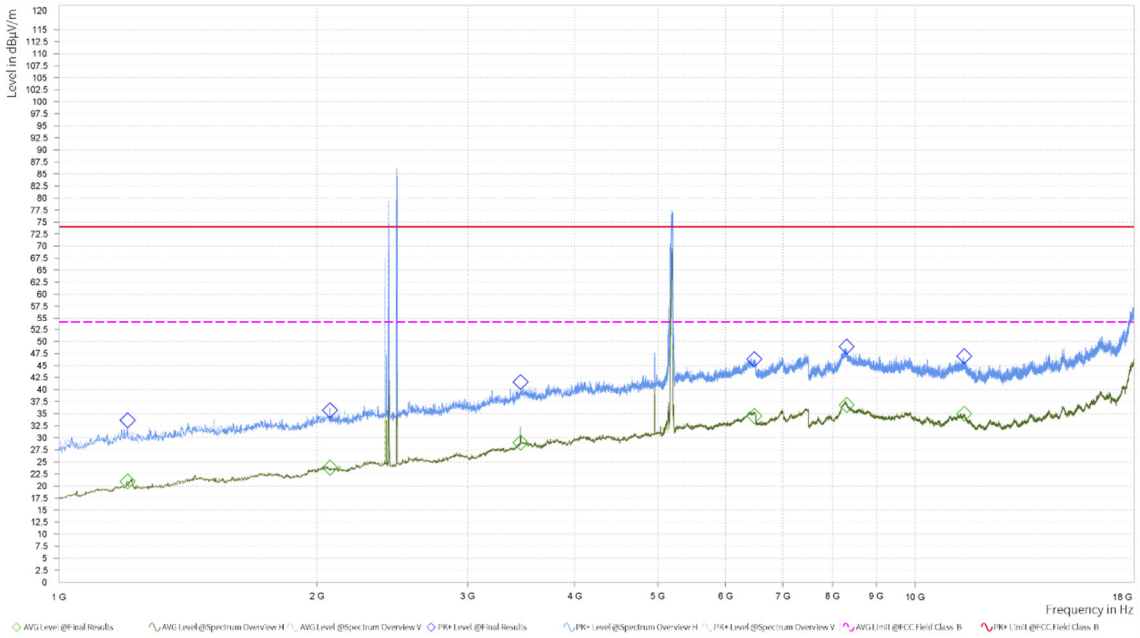


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (m)	Polarization	Azimuth (deg)	Correct Factor (dB)
260.998	17.02	36.00	18.98	4.00	H	96.8	-8.83
599.983	35.00	36.00	1.00	1.16	H	71.2	-1.58
63.508	18.07	30.00	11.93	2.12	V	98.8	-10.61
68.973	13.10	30.00	16.90	1.86	V	323	-12.20
172.608	18.85	33.50	14.65	3.96	V	351.9	-12.00
207.653	16.29	33.50	17.21	1.05	V	170.3	-9.69

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss+amplifier gain)

2. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (s)	Height (m)	Pol	Azimuth (deg)	Corr. (dB/m)
1,201.875	33.62	--	74.00	40.38	1.000	1.00	H	236.8	-14.59
2,071.000	35.70	--	74.00	38.30	1.000	1.00	H	107	-9.07
3,458.625	41.54	--	74.00	32.46	1.000	1.00	H	152.9	-3.61
6,482.500	46.28	--	74.00	27.72	1.000	1.00	H	328.8	2.88
8,307.875	48.90	--	74.00	25.10	1.000	1.00	H	68.5	7.57
11,404.000	46.90	--	74.00	27.10	1.000	1.00	H	357	5.70
1,201.875	--	20.93	54.00	33.07	1.000	1.00	H	236.8	-14.59
2,071.000	--	23.78	54.00	30.22	1.000	1.00	H	107	-9.07
3,458.625	--	28.98	54.00	25.02	1.000	1.00	H	152.9	-3.61
6,482.500	--	34.50	54.00	19.50	1.000	1.00	H	328.8	2.88
8,307.875	--	36.80	54.00	17.20	1.000	1.00	H	68.5	7.57
11,404.000	--	34.95	54.00	19.05	1.000	1.00	H	357	5.70

Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)
2. Margin = Limit – MaxPeak / Average

3.2 Conducted Emission

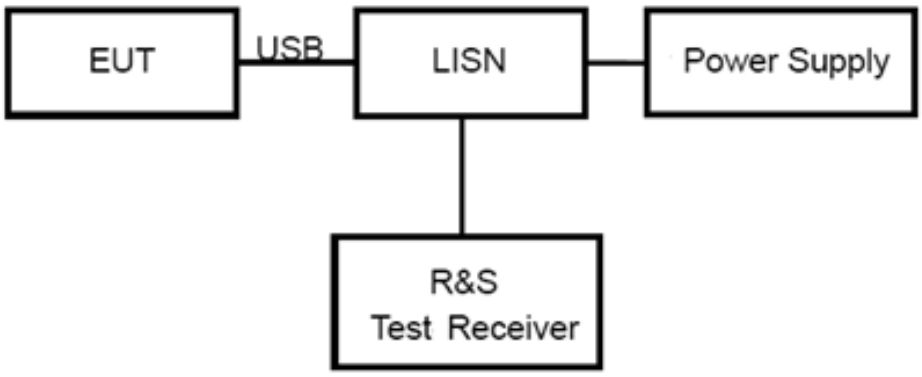
Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	30% ~ 60%

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

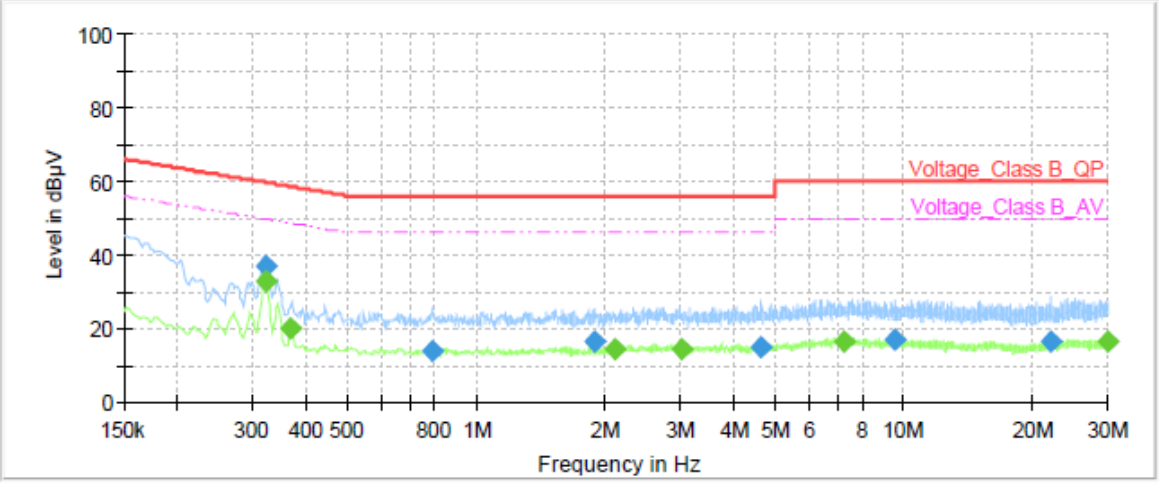
Limits

Frequency (MHz)	Class A (dBµV)		Class B (dBµV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 to 56 *	56 to 46*
0.5 - 5	73	60	56	46
5 - 30	73	60	60	50
*: Decreases with the logarithm of the frequency.				

Note: The EUT should meet CLASS B limit.

Test Results

Following plots, Blue trace uses the peak detection; Green trace uses the average detection.

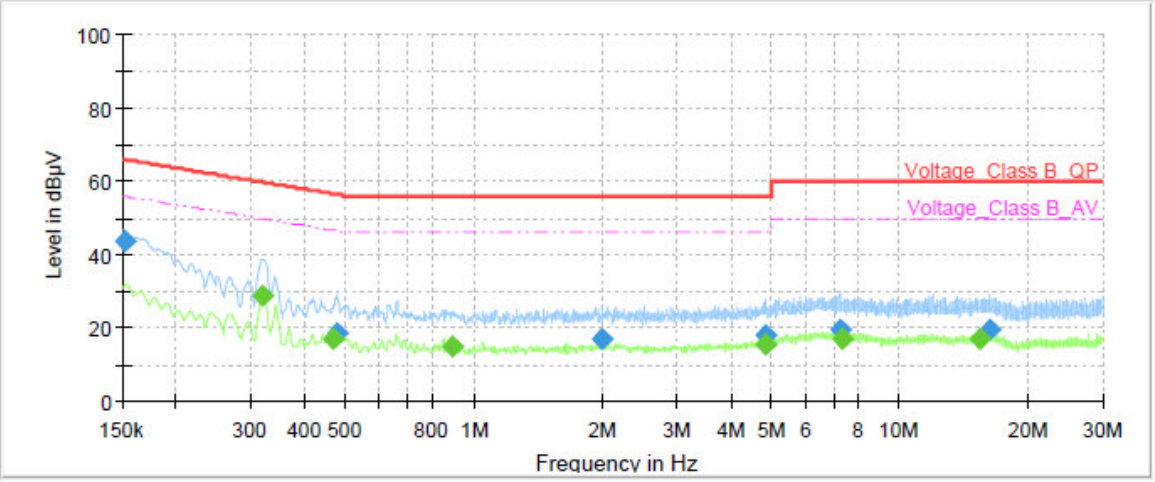


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.32	---	32.97	49.68	16.71	1000.0	9.000	L1	ON	21.0
0.32	36.67	---	59.68	23.01	1000.0	9.000	L1	ON	21.0
0.37	---	19.83	48.54	28.71	1000.0	9.000	L1	ON	21.0
0.79	13.78	---	56.00	42.22	1000.0	9.000	L1	ON	20.4
1.88	16.16	---	56.00	39.84	1000.0	9.000	L1	ON	19.7
2.10	---	14.15	46.00	31.85	1000.0	9.000	L1	ON	19.7
3.04	---	14.55	46.00	31.45	1000.0	9.000	L1	ON	19.6
4.66	15.05	---	56.00	40.95	1000.0	9.000	L1	ON	19.5
7.22	---	16.33	50.00	33.67	1000.0	9.000	L1	ON	19.5
9.52	17.08	---	60.00	42.92	1000.0	9.000	L1	ON	19.5
22.19	16.40	---	60.00	43.60	1000.0	9.000	L1	ON	19.7
29.89	---	16.24	50.00	33.76	1000.0	9.000	L1	ON	19.7

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 kHz to 30 MHz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	43.43	---	65.88	22.45	1000.0	9.000	N	ON	21.0
0.32	---	28.90	49.74	20.84	1000.0	9.000	N	ON	21.0
0.47	---	16.68	46.56	29.88	1000.0	9.000	N	ON	20.9
0.48	18.67	---	56.40	37.73	1000.0	9.000	N	ON	20.9
0.89	---	14.67	46.00	31.33	1000.0	9.000	N	ON	20.3
2.00	16.75	---	56.00	39.25	1000.0	9.000	N	ON	19.7
4.84	---	15.52	46.00	30.48	1000.0	9.000	N	ON	19.5
4.84	17.89	---	56.00	38.11	1000.0	9.000	N	ON	19.5
7.21	19.58	---	60.00	40.42	1000.0	9.000	N	ON	19.5
7.34	---	16.83	50.00	33.17	1000.0	9.000	N	ON	19.5
15.40	---	16.68	50.00	33.32	1000.0	9.000	N	ON	19.7
16.20	19.56	---	60.00	40.44	1000.0	9.000	N	ON	19.7

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 kHz to 30 MHz

4 Uncertainty Measurement

Case	Uncertainty	Factor k
Radiated Emission 30MHz – 200MHz	3.39 dB	1.96
Radiated Emission 200MHz – 1GHz	3.82 dB	1.96
Conducted Emission	2.57 dB	2

5 Main Test Instruments

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Date	Expiration Time
Radiated Emission					
EMI Test Receiver	R&S	ESR	102720	2023-09-19	2024-09-18
EMI Test Receiver	R&S	ESR	102721	2023-09-19	2024-09-18
Signal Analyzer	R&S	FSV3044	103495	2023-09-19	2024-09-18
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01614	2023-09-13	2026-09-12
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01615	2023-10-19	2026-10-18
Horn Antenna	R&S	BBHA9120D	02728	2023-09-19	2026-09-18
Software	R&S	ELEKTRA	5.00.2	/	/
Conducted Emission					
Artificial main network	R&S	ENV216	102191	2022-12-10	2024-12-09
EMI Test Receiver	R&S	ESR	101667	2023-05-12	2024-05-11
				2024-05-07	2025-05-06
Software	R&S	EMC32	10.35.10	/	/

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

****** END OF REPORT ******