



EMC TEST REPORT

Applicant Spireon Inc
FCC ID O9YZAZU
Product BLE Camera
Brand Zazu
Model Zazu-SP; Zazu-CN; Zazu-ST
Report No. R2110A0912-E1V1
Issue Date November 15, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2020)/ 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.

Wei Liu

Prepared by: Wei Liu

Guangchang Fan

Approved by: Guangchang Fan

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000



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| Version | Revision description | Issue Date |
|---------|-----------------------------|-------------------|
| Rev.0 | Initial issue of report. | November 1, 2021 |
| Rev.1 | Update Test Mode in Page 8. | November 15, 2021 |

Note: This revised report (Report No. R2110A0912-E1V1) supersedes and replaces the previously issued report (Report No. R2110A0912-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: October 22, 2021 ~ October 27, 2021 | | | |
| Date of Sample Received: October 19, 2021 | | | |
| Note: All indications of Pass/Fail in this report are opinions expressed by 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 **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)

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)

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

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Fan Guangchang
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: fanguangchang@ta-shanghai.com



2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

| | |
|----------------------|--|
| Applicant | Spireon Inc |
| Applicant address | 9724 Kingston Pike, Suite 800 Knoxville |
| Manufacturer | Asiatelco Technologies Co |
| Manufacturer address | #289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China |

2.2 General information

| EUT Description | | | |
|--|--|---------------|---------------|
| Device Type | Fixed Device | | |
| Model | Zazu-SP; Zazu-CN; Zazu-ST | | |
| Lab internal SN | R2110A0912/S01 | | |
| HW Version | P3.0.0 | | |
| SW Version | 1.0.20 | | |
| Connecting I/O Port(s) | Please refer to the User's Manual. | | |
| Antenna Type | Internal Antenna | | |
| Frequency | Band | Tx (MHz) | Rx (MHz) |
| | Bluetooth LE | 2400 ~ 2483.5 | 2400 ~ 2483.5 |
| Auxiliary test equipment | | | |
| Adapter | Manufacturer: SHENZHEN AOUILSTAR TECHNOLOGY CO., LTD Model: ASSA107A-120100 | | |
| Note: 1. The EUT is sent from the applicant to 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 (2020)

ANSI C63.4 (2014)



2.4 Test Mode

| Test Mode | |
|-----------|-----------------------------------|
| Mode 1 | Adapter +EUT + USB + PC+ Receiver |

3 Test Case Results

3.1 Radiated Emission

Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 15°C~35°C | 30%~60% | 101.5kPa |

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 3 meters. 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

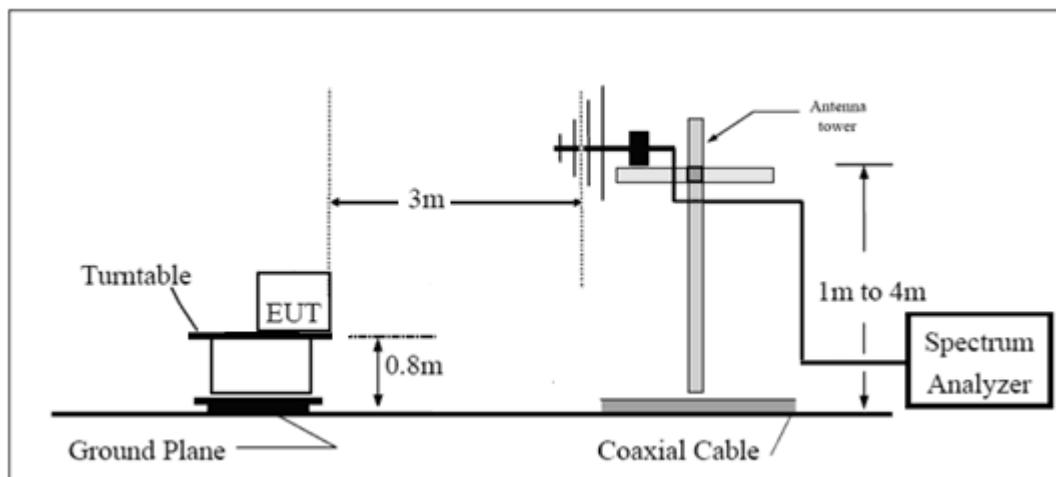
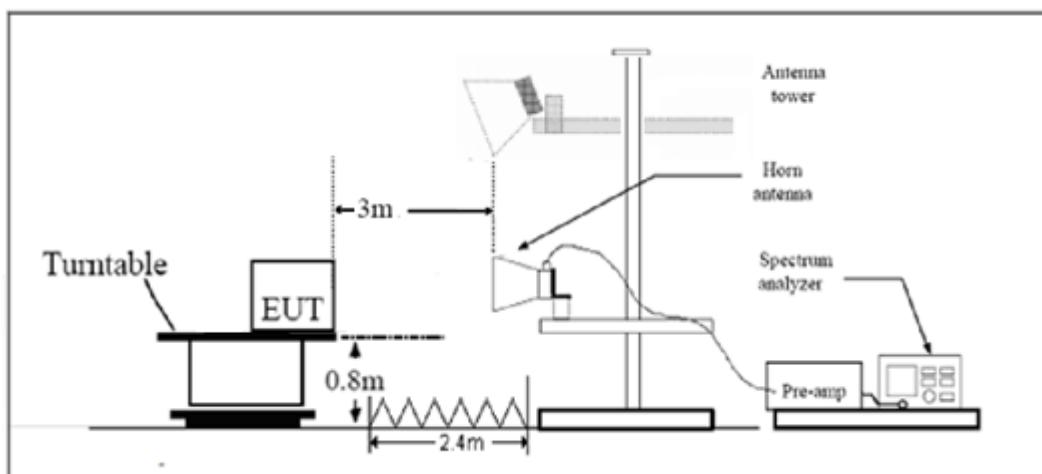
Above 1GHz:

(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.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup**Below 1GHz****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**

| Frequency (MHz) | Field Strength (dB μ V/m) | Detector |
|---|-------------------------------|-----------------|
| 30 -88 | 40.0 | Quasi-peak |
| 88-216 | 43.5 | Quasi-peak |
| 216 – 960 | 46.0 | Quasi-peak |
| 960-1000 | 54.0 | Quasi-peak |
| 1000-5 th harmonic of the highest frequency or 40GHz, which is lower | 54 74 | Average Peak |

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

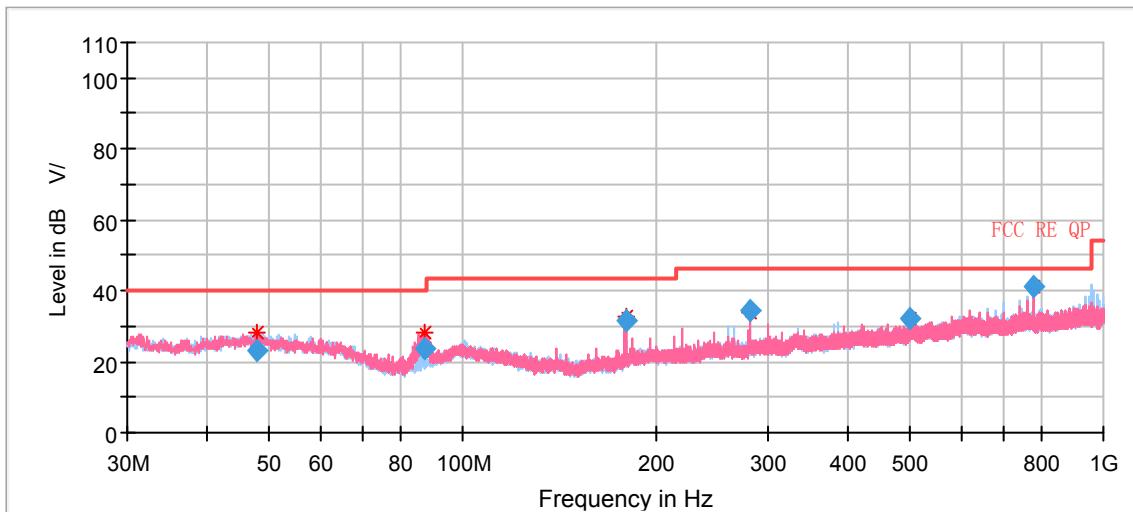
| Frequency | Uncertainty |
|----------------|-------------|
| 30MHz~200MHz | 4.17 dB |
| 200MHz~1000MHz | 4.84 dB |
| 1GHz~18GHz | 4.35 dB |

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 – 26.5GHz is more than 20dB below the limit are not reported.

The following graphs display the maximum values of horizontal and vertical by software. For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

A font (dB $\vee\!/$) in the test plot =(dB μ V/m)

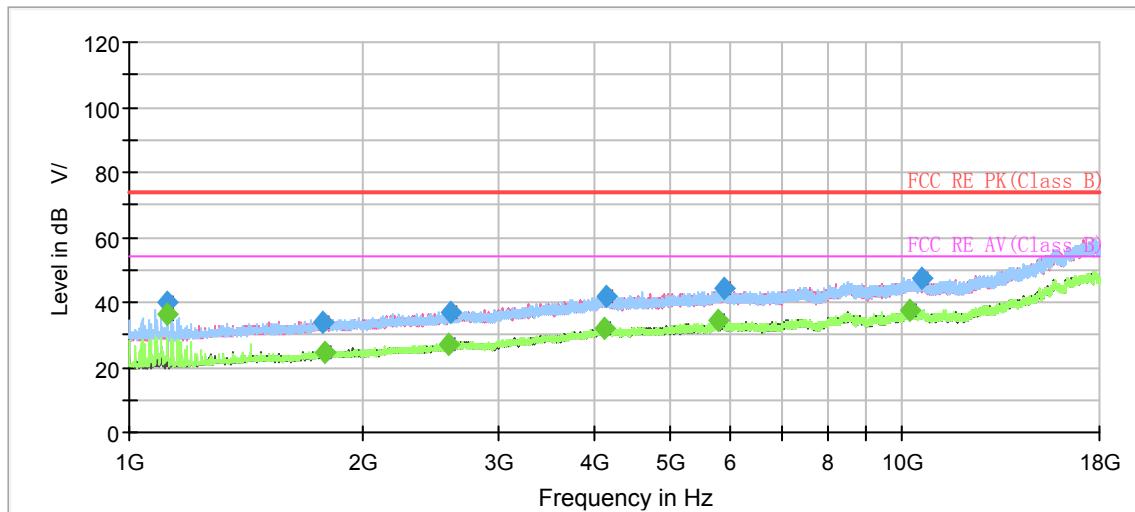


Radiated Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dB μ V/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|---------------------------|-------------|--------------|---------------|---------------------|-------------|----------------------|
| 47.791387 | 22.92 | 208.0 | V | 53.0 | 0 | 17.08 | 40.00 |
| 87.202537 | 23.69 | 125.0 | V | 186.0 | -8 | 16.31 | 40.00 |
| 180.014333 | 31.78 | 100.0 | V | 334.0 | -8 | 11.72 | 43.50 |
| 281.875333 | 34.29 | 100.0 | H | 254.0 | -4 | 11.71 | 46.00 |
| 500.017333 | 31.98 | 184.0 | H | 279.0 | 1 | 14.02 | 46.00 |
| 780.016333 | 41.13 | 100.0 | H | 219.0 | 4 | 4.87 | 46.00 |

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

2. Margin = Limit – Quasi-Peak



Radiated Emission from 1GHz to 18GHz

| Frequency (MHz) | MaxPeak (dB μ V/m) | Average (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------------|------------------------|----------------------|-------------|-------------|-----|---------------|--------------|
| 1119.566667 | --- | 36.04 | 54.00 | 17.96 | 100.0 | H | 231.0 | -18 |
| 1119.566667 | 39.71 | --- | 74.00 | 34.29 | 100.0 | H | 231.0 | -18 |
| 1784.266667 | 33.74 | --- | 74.00 | 40.26 | 200.0 | V | 134.0 | -14 |
| 1785.966667 | --- | 24.36 | 54.00 | 29.64 | 100.0 | H | 334.0 | -14 |
| 2583.833333 | --- | 27.17 | 54.00 | 26.83 | 100.0 | H | 19.0 | -10 |
| 2604.233333 | 37.16 | --- | 74.00 | 36.84 | 200.0 | H | 114.0 | -10 |
| 4110.433333 | --- | 32.18 | 54.00 | 21.82 | 100.0 | V | 129.0 | -3 |
| 4142.733333 | 41.60 | --- | 74.00 | 32.40 | 200.0 | H | 62.0 | -3 |
| 5791.166667 | --- | 34.45 | 54.00 | 19.55 | 100.0 | V | 302.0 | 0 |
| 5880.133333 | 44.47 | --- | 74.00 | 29.53 | 200.0 | V | 84.0 | 0 |
| 10245.733333 | --- | 37.67 | 54.00 | 16.33 | 200.0 | H | 342.0 | 5 |
| 10631.633333 | 47.11 | --- | 74.00 | 26.89 | 100.0 | H | 47.0 | 5 |

3.2 Conducted Emission

Ambient condition

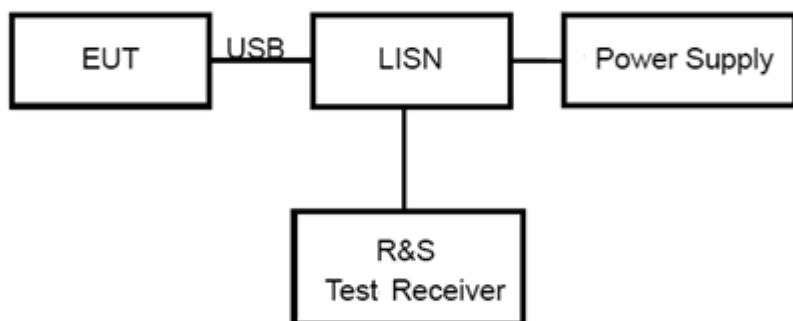
| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 15°C~35°C | 30%~60% | 101.5kPa |

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.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup



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

Limits

| Frequency (MHz) | Conducted Limits(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.

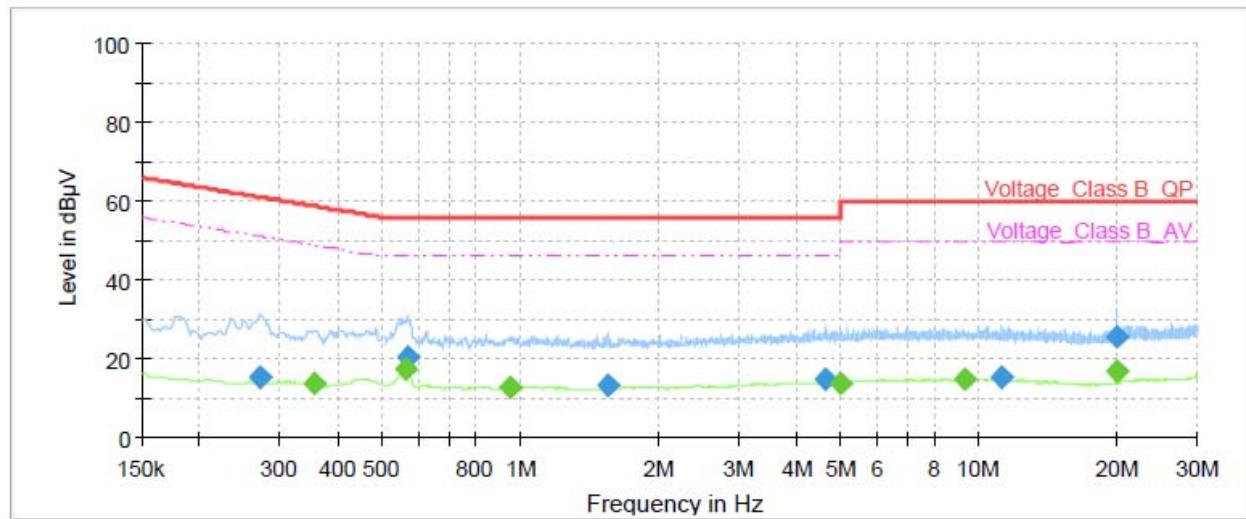


Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.57$ dB.

Test Results

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

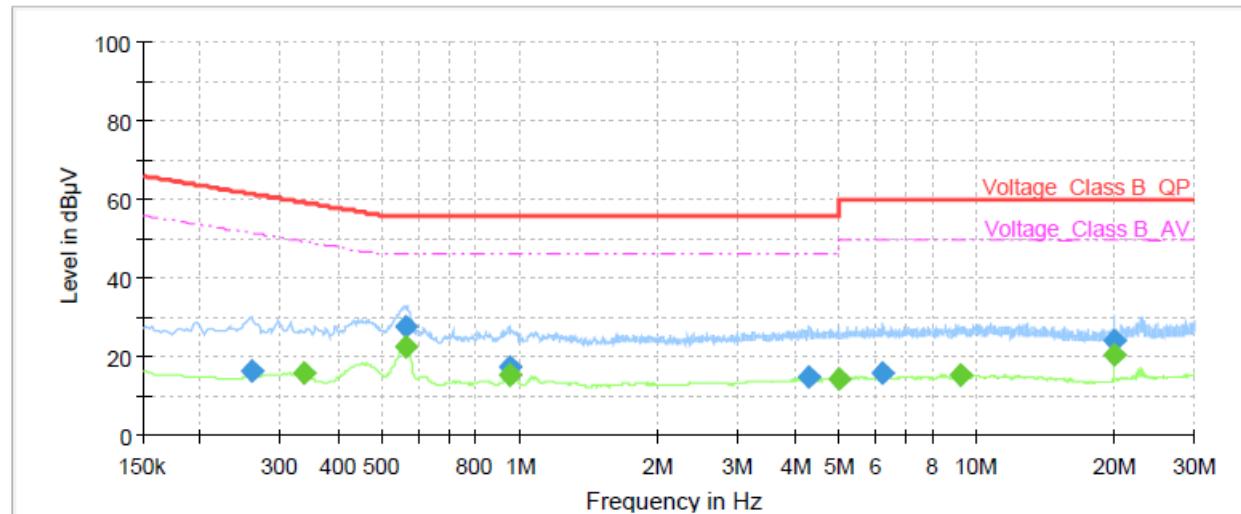


| Frequency (MHz) | QuasiPeak (dB μ V) | Average (dB μ V) | Limit (dB μ V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|------------------------|----------------------|--------------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.27 | 15.35 | --- | 61.14 | 45.79 | 70.0 | 9.000 | L1 | ON | 21 |
| 0.35 | --- | 13.60 | 48.85 | 35.25 | 70.0 | 9.000 | L1 | ON | 21 |
| 0.56 | --- | 17.18 | 46.00 | 28.82 | 70.0 | 9.000 | L1 | ON | 20 |
| 0.57 | 20.76 | --- | 56.00 | 35.24 | 70.0 | 9.000 | L1 | ON | 20 |
| 0.95 | --- | 13.04 | 46.00 | 32.96 | 70.0 | 9.000 | L1 | ON | 20 |
| 1.55 | 13.09 | --- | 56.00 | 42.91 | 70.0 | 9.000 | L1 | ON | 20 |
| 4.66 | 15.06 | --- | 56.00 | 40.94 | 70.0 | 9.000 | L1 | ON | 19 |
| 5.00 | --- | 13.91 | 46.00 | 32.09 | 70.0 | 9.000 | L1 | ON | 19 |
| 9.29 | --- | 14.94 | 50.00 | 35.06 | 70.0 | 9.000 | L1 | ON | 20 |
| 11.18 | 15.33 | --- | 60.00 | 44.67 | 70.0 | 9.000 | L1 | ON | 20 |
| 20.00 | --- | 17.12 | 50.00 | 32.88 | 70.0 | 9.000 | L1 | ON | 20 |
| 20.00 | 25.81 | --- | 60.00 | 34.19 | 70.0 | 9.000 | L1 | ON | 20 |

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 KHz to 30 MHz



| Frequency (MHz) | QuasiPeak (dB μ V) | Average (dB μ V) | Limit (dB μ V) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|------------------------|----------------------|--------------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.26 | 16.39 | --- | 61.50 | 45.11 | 70.0 | 9.000 | N | ON | 21 |
| 0.34 | --- | 15.67 | 49.28 | 33.61 | 70.0 | 9.000 | N | ON | 21 |
| 0.56 | --- | 22.68 | 46.00 | 23.32 | 70.0 | 9.000 | N | ON | 20 |
| 0.56 | 27.76 | --- | 56.00 | 28.24 | 70.0 | 9.000 | N | ON | 20 |
| 0.95 | 17.65 | --- | 56.00 | 38.35 | 70.0 | 9.000 | N | ON | 20 |
| 0.95 | --- | 15.18 | 46.00 | 30.82 | 70.0 | 9.000 | N | ON | 20 |
| 4.31 | 14.79 | --- | 56.00 | 41.21 | 70.0 | 9.000 | N | ON | 19 |
| 4.98 | --- | 14.15 | 46.00 | 31.85 | 70.0 | 9.000 | N | ON | 19 |
| 6.25 | 15.75 | --- | 60.00 | 44.25 | 70.0 | 9.000 | N | ON | 20 |
| 9.26 | --- | 15.25 | 50.00 | 34.75 | 70.0 | 9.000 | N | ON | 20 |
| 20.00 | --- | 20.52 | 50.00 | 29.48 | 70.0 | 9.000 | N | ON | 20 |
| 20.00 | 24.03 | --- | 60.00 | 35.97 | 70.0 | 9.000 | N | ON | 20 |

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz



4 Main Test Instruments

| Name of Equipment | Manufacturer | Type/Model | Serial Number | Calibration Date | Expiration Time |
|--------------------------|--------------|------------|---------------|------------------|-----------------|
| Radiated Emission | | | | | |
| EMI Test Receiver | R&S | ESR | 102389 | 2020-12-13 | 2021-12-12 |
| Signal Analyzer | R&S | FSV40 | 100815 | 2020-12-13 | 2021-12-12 |
| TRILOG Broadband Antenna | SCHWARZBECK | 9163 | 1023 | 2020-05-05 | 2023-05-04 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 430 | 2018-07-07 | 2023-07-06 |
| Software | R&S | EMC32 | 9.26.01 | / | / |
| Conducted Emission | | | | | |
| Artificial main network | R&S | ENV216 | 102191 | 2020-12-13 | 2022-12-12 |
| EMI Test Receiver | R&S | ESR | 101667 | 2021-05-15 | 2022-05-14 |
| Software | R&S | EMC32 | 10.35.10 | / | / |

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



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.