



FCC Part 15B TEST REPORT

Report No.: STS1906093E01

Issued for

Lakeshore Learning Materials

2695 E. Dominguez St. Carson CA ,90895, USA

| | |
|-----------------------|--|
| Product Name: | Wireless Classroom Headphones Set, Extra Wireless Headphones |
| Brand Name: | Lakeshore® |
| Model Name: | DD518 |
| Series Model: | DD519 |
| FCC ID: | 2AGG4DD519A |
| Test Standard: | FCC 47 CFR Part 15: Subpart B ANSI C63.4:2014 |

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TEST RESULT CERTIFICATION

Applicant's Name: Lakeshore Learning Materials
Address.....: 2695 E. Dominguez St. Carson CA ,90895, USA
Manufacture's Name: Lakeshore Learning Materials
Address.....: 2695 E. Dominguez St. Carson CA ,90895, USA

Product Description:
Product Name: Wireless Classroom Headphones Set,
Extra Wireless Headphones
Brand Name.....: Lakeshore
Model Name: DD518
Series Model: DD519

Standards.....: FCC 47 CFR Part 15: Subpart B
Test Procedure.....: ANSI C63.4-2014

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:
Date of Performance of Tests: 24 June. 2019~26 June. 2019
Date of Issue.....: 27 June. 2019
Test Result: Pass

Compiled by : Mickey Deng

(Mickey Deng)

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(Chopin Xiao)

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(Vita Li)





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Revision History

| Rev. | Issue Date | Report No. | Effect Page | Contents |
|------|---------------|---------------|-------------|---------------|
| 00 | 27 June. 2019 | STS1906093E01 | ALL | Initial Issue |
| | | | | |





1. SUMMARY OF THE TEST RESULTS

Test procedures according to the technical standards:

| EMISSION | | | |
|------------------------------|--------------------|--------|--------------------|
| Standard | Item | Result | Remarks |
| FCC 47 CFR Part 15 Subpart B | Conducted Emission | N/A | Meet Class B limit |
| | Radiated Emission | PASS | Meet Class B limit |

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

1.1 TEST FACTORY

| | |
|-------------------|---|
| Company Name: | Shenzhen STS Test Services Co. Ltd. |
| Address: | 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China |
| Telephone: | +86-755 3688 6288 |
| Fax: | +86-755 3688 6277 |
| Registration No.: | FCC test Firm Registration Number: 625569 |
| | A2LA Certificate No.: 4338.01; |

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

| No. | Item | Uncertainty |
|-----|--|---------------|
| 1 | Conducted Emission (9KHz-150KHz) | ± 3.18 dB |
| 2 | Conducted Emission (150KHz-30MHz) | ± 2.70 dB |
| 3 | All emissions, radiated (<1G) 9KHz-30MHz | ± 2.50 dB |
| 4 | All emissions, radiated (<1G) 30MHz-200MHz | ± 3.43 dB |
| 5 | All emissions, radiated (<1G) 200MHz-1000MHz | ± 3.57 dB |
| 6 | All emissions, radiated (>1G) | ± 4.13 dB |



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

| | |
|-------------------------|--|
| Product Name | Wireless Classroom Headphones Set, Extra Wireless Headphones |
| Brand Name | Lakeshore® |
| Model Name | DD518 |
| Series Model | DD519 |
| Product Differences | Model DD518 is a wireless classroom headphone set which was made up of a transmitter and four headphones. Model DD519 is the same headphone that is designed for using with DD518 as an extra headphone(Extra wireless headphone). Model DD519 are electrically, functionally and constructionally identical to DD518(headphone part), only for different marketing requirement. |
| Frequency Bands | 915.5, 916, 916.5MHz |
| Modulation Mode | FM |
| Power Rating | Input: DC3V from battery 2*AAA |
| Hardware Version Number | N/A |
| Software Version Number | N/A |

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

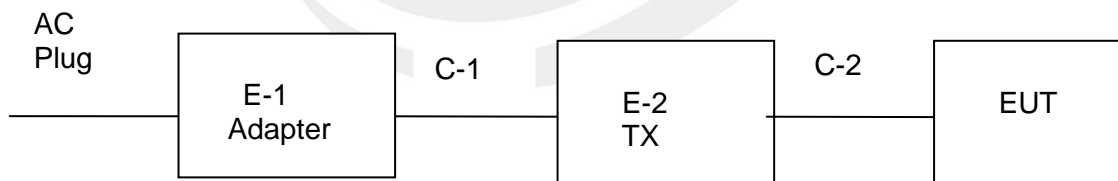
| Pretest Mode | Description |
|--------------|------------------|
| Mode 1 | 915.5MHz RX Mode |
| Mode 2 | 916MHz RX Mode |
| Mode 3 | 916.5MHz RX Mode |

| For Radiated Test | |
|-------------------|------------------|
| Final Test Mode | Description |
| Mode 1 | 915.5MHz RX Mode |

NOTE:

1. The test modes were carried out for all operation modes. Only worst case will be show in this report.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF THE SYSTEM TESTED





2.4 DESCRIPTION OF THE SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Accessories equipment

| Item | Equipment | Mfr/Brand | Model/Type No. |
|------|-----------|-----------|------------------|
| E-1 | Adapter | N/A | GPU350450200WDOO |
| E-2 | TX | N/A | N/A |

Auxiliary equipment

| Item | Equipment | Mfr/Brand | Model/Type No. |
|------|-----------|-----------|----------------|
| N/A | N/A | N/A | N/A |
| | | | |

Cable

| Item | Type | Shielded Type | Ferrite Core | Length |
|------|------|---------------|--------------|--------|
| C-1 | N/A | Unshielded | NO | 130cm |
| C-2 | N/A | Unshielded | NO | 120cm |
| | | | | |
| | | | | |
| | | | | |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 「Length」 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Radiation Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last Calibration | Calibrated Until |
|------------------------------|----------------------------|--------------------|--------------|------------------|------------------|
| EMI Test Receiver | R&S | ESCI | 101427 | 2018.10.13 | 2019.10.12 |
| Bi-log Antenna | TESEQ | CBL6111D | 34678 | 2017.11.02 | 2020.11.01 |
| Horn Antenna | SCHWARZB ECK | BBHA 9120D | 9120D-1343 | 2018.10.19 | 2021.10.18 |
| Pre-amplifier(1G-18 G) | SKET | LNPA-01018G- 45 | SK2018080901 | 2018.10.13 | 2019.10.12 |
| Pre-amplifier(0.1M-3 GHz) | EM | EM330 | 060665 | 2018.10.13 | 2019.10.12 |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | 2018.10.13 | 2019.10.12 |
| RE Cable (9K-1G) | N/A | R01 | N/A | 2018.10.13 | 2019.10.12 |
| RE Cable (1G-18G) | N/A | R02 | N/A | 2018.10.13 | 2019.10.12 |
| Temperature & Humidity | Mieo | HH660 | N/A | 2018.10.11 | 2019.10.10 |
| Horn Antenna(18-40GHz) | A-INFO | LB-180400-KF | J211020657 | 2018.03.11 | 2021.03.10 |
| Testing Software | EZ-EMC(Ver.STSLAB-03A1 RE) | | | | |



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Conducted Emission Limits (dBuV) | | | |
|-----------------|----------------------------------|---------|------------|-----------|
| | Class A | | Class B | |
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

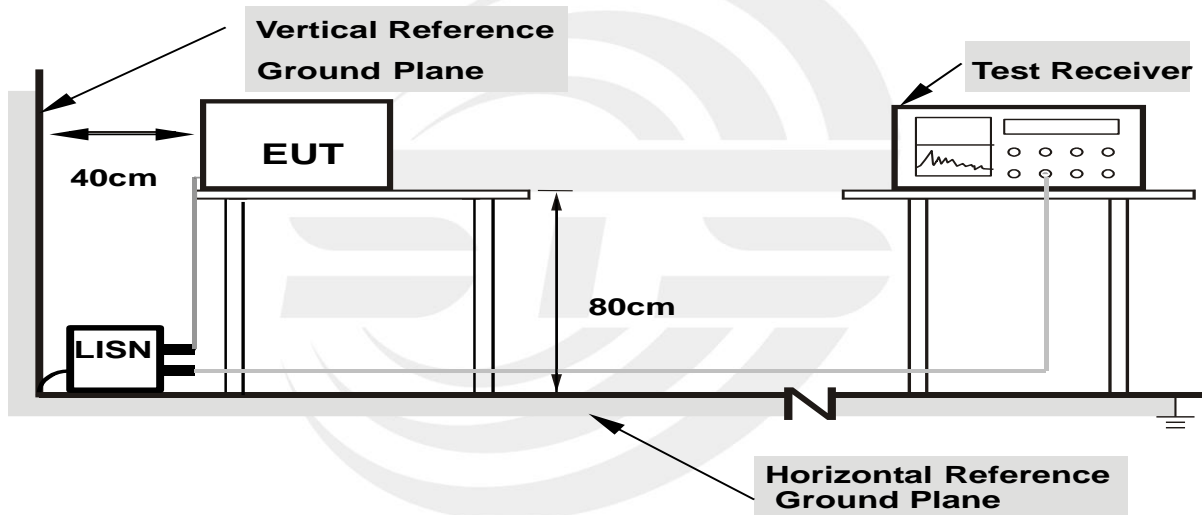
3.1.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



- Note: 1.Support units were connected to second LISN.**
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.6 TEST RESULTS

| | | | |
|---------------|--------------------|--------------------|-----|
| Temperature: | 25.4 °C | Relative Humidity: | 60% |
| Phase: | L/N | Test Mode: | N/A |
| Test Voltage: | DC 3V From Battery | | |

Note: DC 3V test is not applicable in this test report





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 Radiated Emission Limits

In case the emission fall within the restricted band specified on 15.105(a)&109(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

LIMITS OF THE RADIATED EMISSION MEASUREMENT

| FREQUENCY (MHz) | Class A (dBuV/m) (at 3M) | | Class B (dBuV/m) (at 3M) | |
|-----------------|--------------------------|---------|--------------------------|---------|
| | PEAK | AVERAGE | PEAK | AVERAGE |
| Above 1000 | 80 | 60 | 74 | 54 |

Note:

- (1) The limit for radiated test was performed in the following: FCC PART 15B.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m).

FREQUENCY RANGE OF THE RADIATED MEASUREMENT (For unintentional radiators)

| Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz) | 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 |



| Spectrum Parameter | Setting |
|---------------------------------------|---|
| Attenuation | Auto |
| Detector | Peak |
| Start Frequency | 1000 MHz(Peak/AV) |
| Stop Frequency | 5th harmonic (Peak/AV) |
| RB / VB (emission in restricted band) | 30MHz to 1000MHz: 100 KHz / 300 KHz Above 1000MHz: 1 MHz / 3 MHz |

| Receiver Parameter | Setting |
|------------------------|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 30MHz to 1000MHz: 100 KHz / 300 KHz Above 1000MHz: 1 MHz / 3 MHz |

3.2.2 TEST PROCEDURE

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

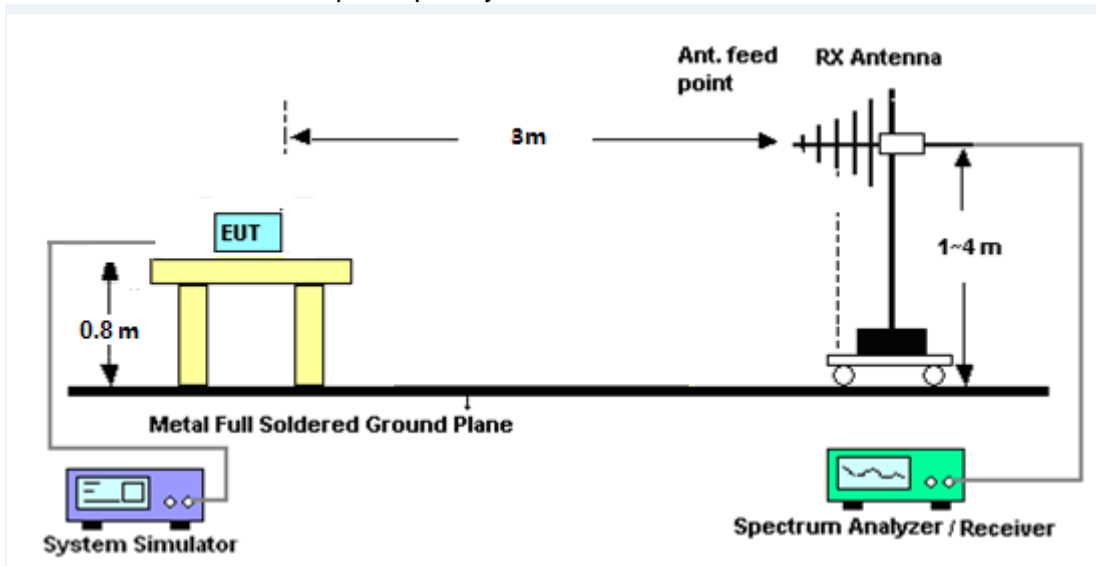
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

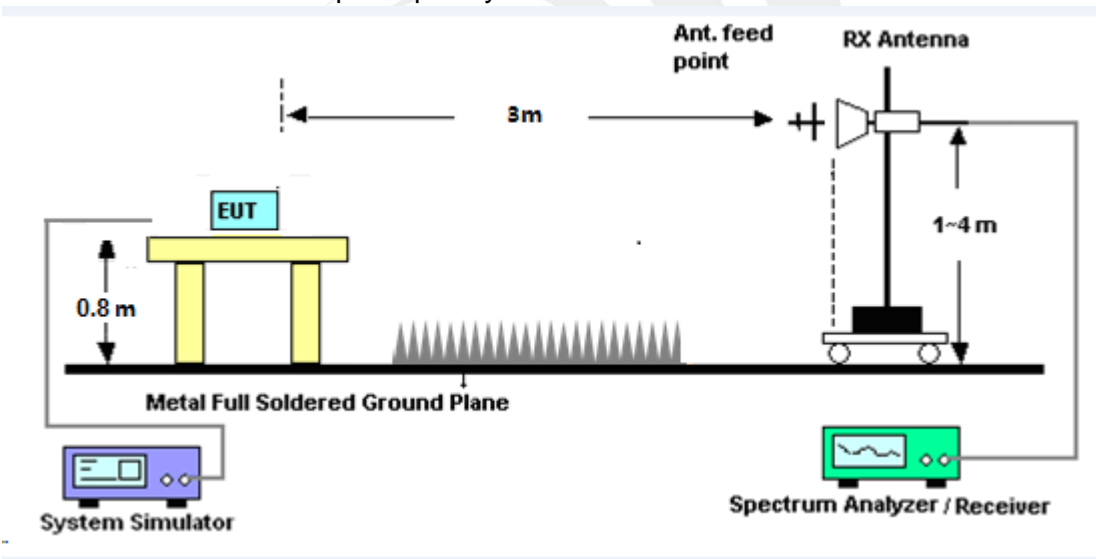
No deviation

3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency 30MHz~1GHz



(B) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the following during the testing.



3.2.6 TEST RESULTS

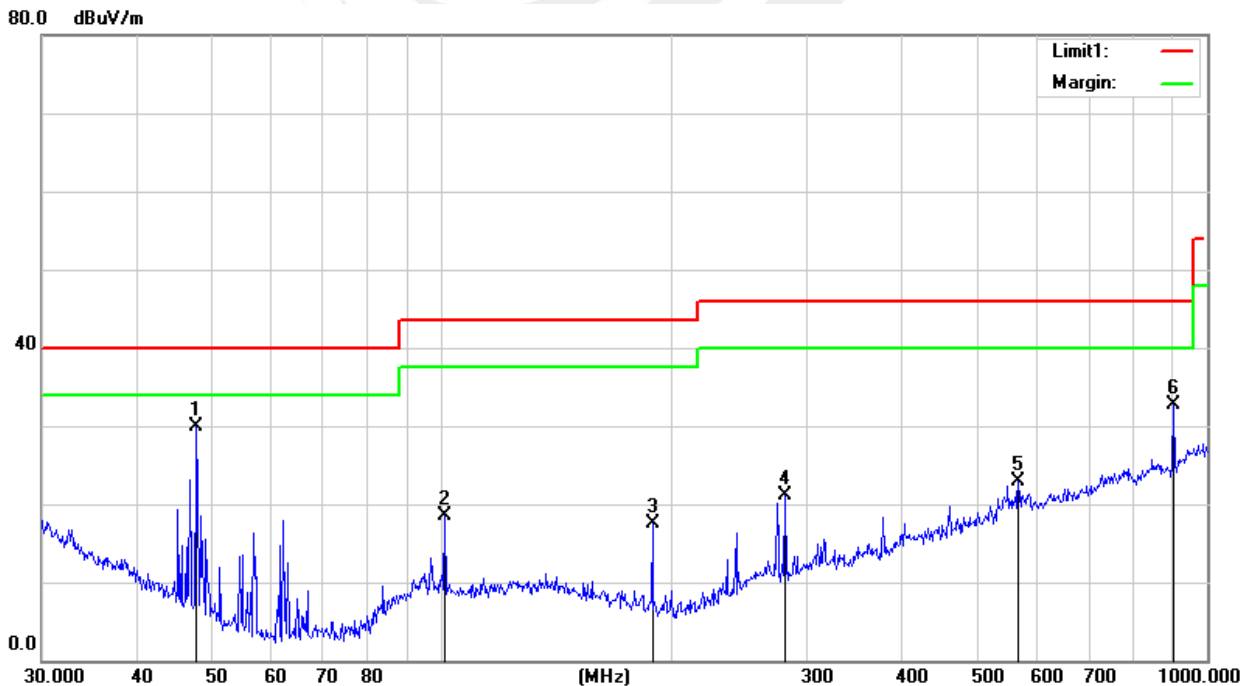
30MHz -1000MHz

| | | | |
|---------------|--------------------|--------------------|--------|
| Temperature: | 25.4 °C | Relative Humidity: | 64% |
| Phase: | Horizontal | Test Mode: | Mode 1 |
| Test Voltage: | DC 3V From Battery | | |

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor (dB) | Results (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------------|------------------|----------------|-------------|----------|
| 1 | 47.8260 | 49.27 | -19.46 | 29.81 | 40.00 | -10.19 | QP |
| 2 | 100.9340 | 36.93 | -18.45 | 18.48 | 43.50 | -25.02 | QP |
| 3 | 188.4125 | 37.82 | -20.24 | 17.58 | 43.50 | -25.92 | QP |
| 4 | 281.0075 | 35.48 | -14.30 | 21.18 | 46.00 | -24.82 | QP |
| 5 | 566.6223 | 28.99 | -6.14 | 22.85 | 46.00 | -23.15 | QP |
| 6 | 903.3094 | 33.65 | -0.94 | 32.71 | 46.00 | -13.29 | QP |

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain





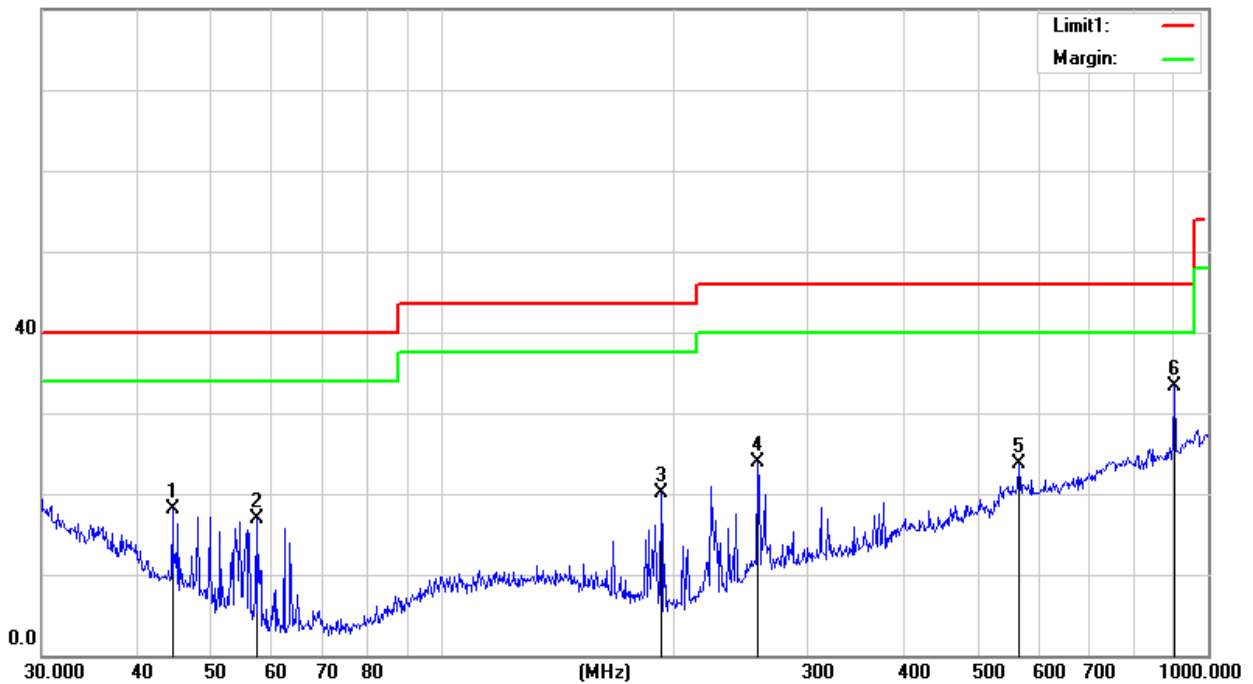
| | | | |
|---------------|--------------------|--------------------|--------|
| Temperature: | 25.4 °C | Relative Humidity: | 64% |
| Phase: | Vertical | Test Mode: | Mode 1 |
| Test Voltage: | DC 3V From Battery | | |

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor (dB) | Results (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------------|------------------|----------------|-------------|----------|
| 1 | 44.4308 | 36.72 | -18.61 | 18.11 | 40.00 | -21.89 | QP |
| 2 | 57.1914 | 40.48 | -23.54 | 16.94 | 40.00 | -23.06 | QP |
| 3 | 193.0945 | 40.40 | -20.22 | 20.18 | 43.50 | -23.32 | QP |
| 4 | 258.3264 | 39.20 | -15.27 | 23.93 | 46.00 | -22.07 | QP |
| 5 | 566.6223 | 30.37 | -6.61 | 23.76 | 46.00 | -22.24 | QP |
| 6 | 903.3094 | 35.43 | -2.14 | 33.29 | 46.00 | -12.71 | QP |

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor = Cable Loss + Antenna Factor - Amplifier Gain

80.0 dBuV/m





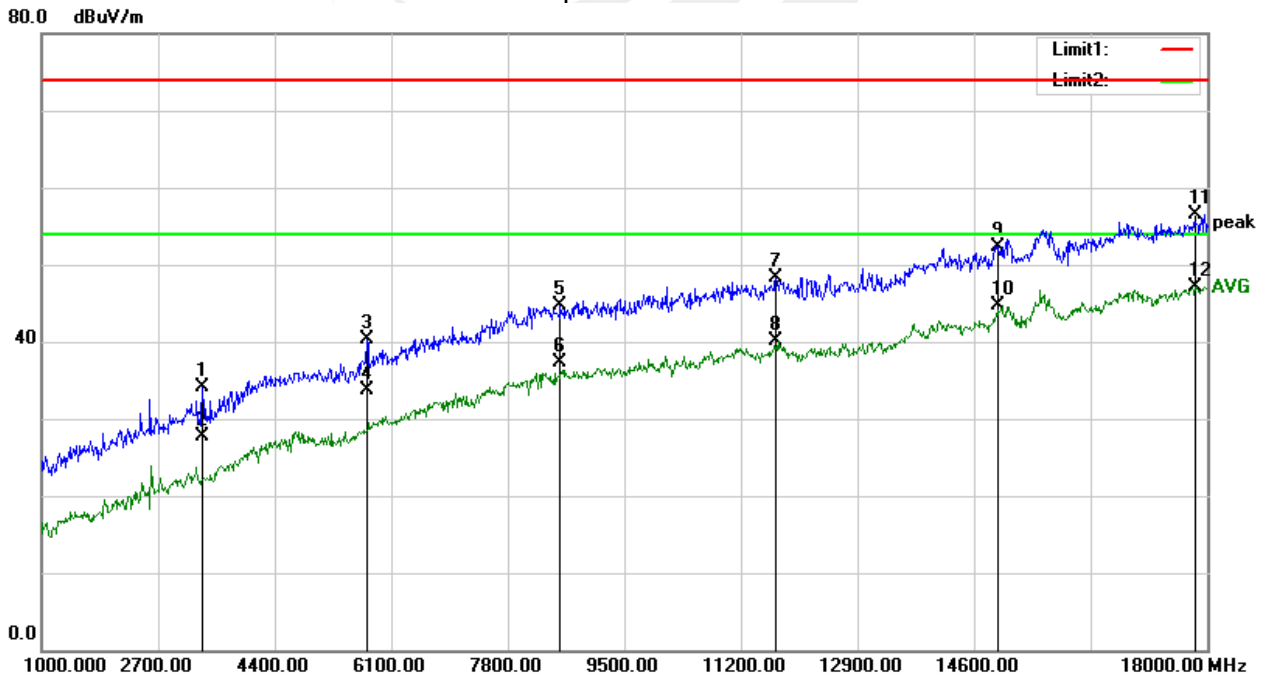
(1 GHz to 18GHz.)

| | | | |
|---------------|--------------------|--------------------|--------|
| Temperature: | 24.8 °C | Relative Humidity: | 65% |
| Phase: | Horizontal | Test Mode: | Mode 1 |
| Test Voltage: | DC 3V From Battery | | |

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|-----------------|----------------|---------------------|---------------|--------------|-------------|--------|
| 1 | 3346.000 | 35.71 | -1.62 | 34.09 | 74.00 | -39.91 | Peak |
| 2 | 3346.000 | 29.41 | -1.62 | 27.79 | 54.00 | -26.21 | AVG |
| 3 | 5743.000 | 34.52 | 5.81 | 40.33 | 74.00 | -33.67 | Peak |
| 4 | 5743.000 | 27.91 | 5.81 | 33.72 | 54.00 | -20.28 | AVG |
| 5 | 8565.000 | 33.00 | 11.78 | 44.78 | 74.00 | -29.22 | Peak |
| 6 | 8565.000 | 25.56 | 11.78 | 37.34 | 54.00 | -16.66 | AVG |
| 7 | 11710.000 | 9.38 | 38.86 | 48.24 | 74.00 | -25.76 | Peak |
| 8 | 11710.000 | 1.33 | 38.86 | 40.19 | 54.00 | -13.81 | AVG |
| 9 | 14957.000 | 12.09 | 40.26 | 52.35 | 74.00 | -21.65 | Peak |
| 10 | 14957.000 | 4.35 | 40.26 | 44.61 | 54.00 | -9.39 | AVG |
| 11 | 17830.000 | 16.04 | 40.38 | 56.42 | 74.00 | -17.58 | Peak |
| 12 | 17830.000 | 6.81 | 40.38 | 47.19 | 54.00 | -6.81 | AVG |

Remark:

1. All readings are Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor = Cable Loss + Antenna Factor - Amplifier Gain





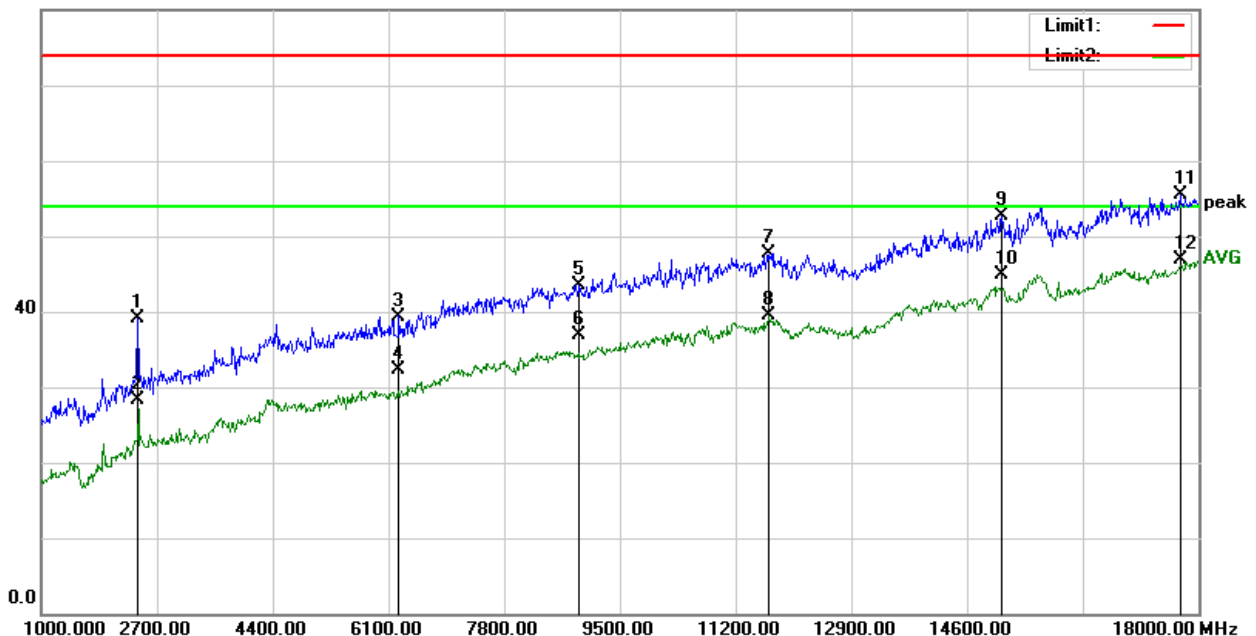
| | | | |
|---------------|--------------------|--------------------|--------|
| Temperature: | 24.8 °C | Relative Humidity: | 65% |
| Phase: | Vertical | Test Mode: | Mode 1 |
| Test Voltage: | DC 3V From Battery | | |

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|-----------------|----------------|---------------------|---------------|--------------|-------------|--------|
| 1 | 2411.000 | 42.75 | -3.65 | 39.10 | 74.00 | -34.90 | Peak |
| 2 | 2411.000 | 31.97 | -3.65 | 28.32 | 54.00 | -25.68 | AVG |
| 3 | 6253.000 | 32.72 | 6.68 | 39.40 | 74.00 | -34.60 | Peak |
| 4 | 6253.000 | 25.62 | 6.68 | 32.30 | 54.00 | -21.70 | AVG |
| 5 | 8888.000 | 31.47 | 12.02 | 43.49 | 74.00 | -30.51 | Peak |
| 6 | 8888.000 | 24.80 | 12.02 | 36.82 | 54.00 | -17.18 | AVG |
| 7 | 11693.000 | 8.86 | 38.88 | 47.74 | 74.00 | -26.26 | Peak |
| 8 | 11693.000 | 0.57 | 38.88 | 39.45 | 54.00 | -14.55 | AVG |
| 9 | 15110.000 | 12.82 | 39.86 | 52.68 | 74.00 | -21.32 | Peak |
| 10 | 15110.000 | 5.03 | 39.86 | 44.89 | 54.00 | -9.11 | AVG |
| 11 | 17728.000 | 15.11 | 40.31 | 55.42 | 74.00 | -18.58 | Peak |
| 12 | 17728.000 | 6.63 | 40.31 | 46.94 | 54.00 | -7.06 | AVG |

Remark:

1. All readings are Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor = Cable Loss + Antenna Factor - Amplifier Gain

80.0 dBuV/m



Notes:

1. Measuring frequencies from 1 GHz to 18GHz.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

END OF THE REPORT