
FCC Test Report

Report No.: AGC02294210503FE08

FCC ID : 2AGND-FRSA1
PRODUCT DESIGNATION : Two-way Radio
BRAND NAME : BTECH
MODEL NAME : FRS-A1
APPLICANT : BTECH (BaoFeng Tech)
DATE OF ISSUE : Jul. 27, 2021
STANDARD(S) : FCC Part 15 Rules
REPORT VERSION : V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0 | / | Jul. 27, 2021 | Valid | Initial Release |

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1. VERIFICATION OF COMPLIANCE

| | |
|----------------------------------|---|
| Applicant: | BTECH (BaoFeng Tech) |
| Address: | 702 N Industrial Ave Arlington South Dakota United States 57212 |
| Manufacturer: | PO FUNG ELECTRONIC(HK) INTERNATIOANL GROUP COMPANY |
| Address: | 3/F FULOK BLDG 131-133 WING LOK ST SHEUNG WAN, Hong Kong |
| Factory: | PO FUNG ELECTRONIC(HK) INTERNATIOANL GROUP COMPANY |
| Address: | 3/F FULOK BLDG 131-133 WING LOK ST SHEUNG WAN, Hong Kong |
| Product Designation: | Two-way radio |
| Brand Name: | BTECH |
| Test Model: | FRS-A1 |
| Measurement Procedure: | ANSI C63.4: 2014 |
| Deviation: | No any deviation from the test method. |
| Date of Test: | Jul. 20, 2021~Jul. 26, 2021 |
| Condition of Test Sample: | Normal |
| Test Result: | Pass |
| Report Template: | AGCRT-US-PTT/EMC |

The above equipment was tested by Attestation Of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

Prepared By



Donjon Huang
(Project Engineer)

Jul. 26, 2021

Reviewed By



Calvin Liu
(Reviewer)

Jul. 27, 2021

Approved By



Forrest Lei
Authorized Officer

Jul. 27, 2021

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2. PRODUCT INFORMATION

The EUT is a **Two-way radio** designed for voice communication. It is designed by way of utilizing the F3E modulation achieves the system operating.

A major technical description of EUT is described as following:

| | |
|----------------------------|--|
| Communication Type | Voice / Tone only |
| Modulation | FM |
| RX Frequency Range | 88.1-108MHz(FM Broadcast Receiver) 162.400-162.550MHz(NOAA Wather Radio Receiver) |
| Emission Type | F3E |
| Antenna Designation | Inseparable |
| Antenna Gain | 1.5dBi |
| Hardware Version | BF_T8A_V05 |
| Software Version | BF-T8A V2.0 |
| Power Supply | DC 3.7V by battery, 900mAh |

I/O Port Information (☒Applicable ☐Not Applicable)

| I/O Port of EUT | | | |
|-----------------|------|----------------|-------------|
| I/O Port Type | Q'TY | Cable | Tested with |
| USB Port | 1 | 1.0m Unshielde | 1 |

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3. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

| | |
|-----------------------------------|--|
| Test Site | Attestation of Global Compliance (Shenzhen) Co., Ltd |
| Location | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| Designation Number | CN1259 |
| FCC Test Firm Registration Number | 975832 |
| A2LA Cert. No. | 5054.02 |
| Description | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA |

List of Test Equipment:

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---------------|--------------|---------------------------------|--------|---------------|---------------|
| TEST RECEIVER | R&S | ESPI | 101206 | May 11, 2021 | May 10, 2022 |
| LISN | R&S | ESH2-Z5 | 100086 | Jun. 09, 2021 | Jun. 08, 2022 |
| TEST SOFTWARE | FARA | EZ-EMC (Ver.AGC-C ON03A1) | N/A | N/A | N/A |

TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|------------------------|--------------|----------------------|-------------|---------------|---------------|
| TEST RECEIVER | R&S | ESPI | 101206 | May 11, 2021 | May 10, 2022 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 08, 2021 | Jan. 07, 2023 |
| ANTENNA | SCHWARZBECK | VULB9168 | D69250 | Sep. 20, 2019 | Sep. 19, 2021 |
| Broadband Preamplifier | ETS LINDGREN | 3117PA | 00225134 | Sep. 03, 2020 | Sep. 02, 2022 |
| POSITIONING CONTROLLER | MF | MF-7802 | MF780208285 | -- | -- |
| HORN ANTENNA | ETS LINDGREN | 3117 | 00034609 | Apr. 23, 2021 | Apr. 22, 2023 |
| EXA Signal Analyzer | Agilent | N9020A | MY53300860 | Jun. 09, 2021 | Jun. 08, 2022 |
| TEST SOFTWARE | Tonscend | JS32-RE (Ver.2.5) | -- | -- | -- |

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4. SUPPORT EQUIPMENT LIST

| Device Type | Manufacturer | Model Name | Serial No. | Data Cable | Power Cable |
|-------------|--------------|------------|------------|------------|-----------------|
| Battery | - | BL-FA1 | - | - | - |
| Adapter | YC-2011A | | | | |
| Back clip | - | N/A | - | - | - |
| USB Cable | - | - | - | - | 1.0m Unshielded |

5. SYSTEM DESCRIPTION

EUT TEST PROCEDURE:

1. Connect EUT and peripheral devices.
2. Power on the EUT, the EUT begins to work.
3. Make sure the EUT normal working.

EMC TEST MODE:

| No. | TEST MODES |
|-----|----------------------------|
| 1 | FM Broadcast Receiver Mode |
| 2 | NOAA Wather Radio Receiver |

Note: Only the result of the worst case was recorded in the report.

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6. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ Db

7. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|-----------|---------------------|-----------|
| §15.107 | Conduction Emission | Compliant |
| §15.109 | Radiated Emission | Compliant |

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The diagram illustrates a test setup for radiated emissions of tabletop equipment (Above 1 GHz) within a 9 m x 6 m chamber. The setup includes a PC connected to a Receiver / Spectrum Analyzer and a Multi device Controller. The Receiver / Spectrum Analyzer is connected to a Ground Reference Plane. An Antenna Tower, 1 m to 4 m high, holds a Horn Antenna. A Pre-Amplifier is positioned between the antenna and the Equipment Under Test (EUT). The measurement distance is 3 m. The EUT is placed on a Test table, 0.8 m high. A detailed inset shows the EUT's internal components, including a Nonconductive Table (3 x 1 meter), a PCB, and various electronic components like capacitors and resistors.

Test setup for radiated emissions of tabletop equipment (Above 1 GHz)

During the radiated emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | RBW | Video B/W | IF B/W | Measurment |
|-------------------|---------|-----------|---------|------------|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz | 120 kHz | QP |
| Above 1 GHz | 1MHz | 3 MHz | / | PK |
| | 1MHz | 10 Hz | / | Ave. |

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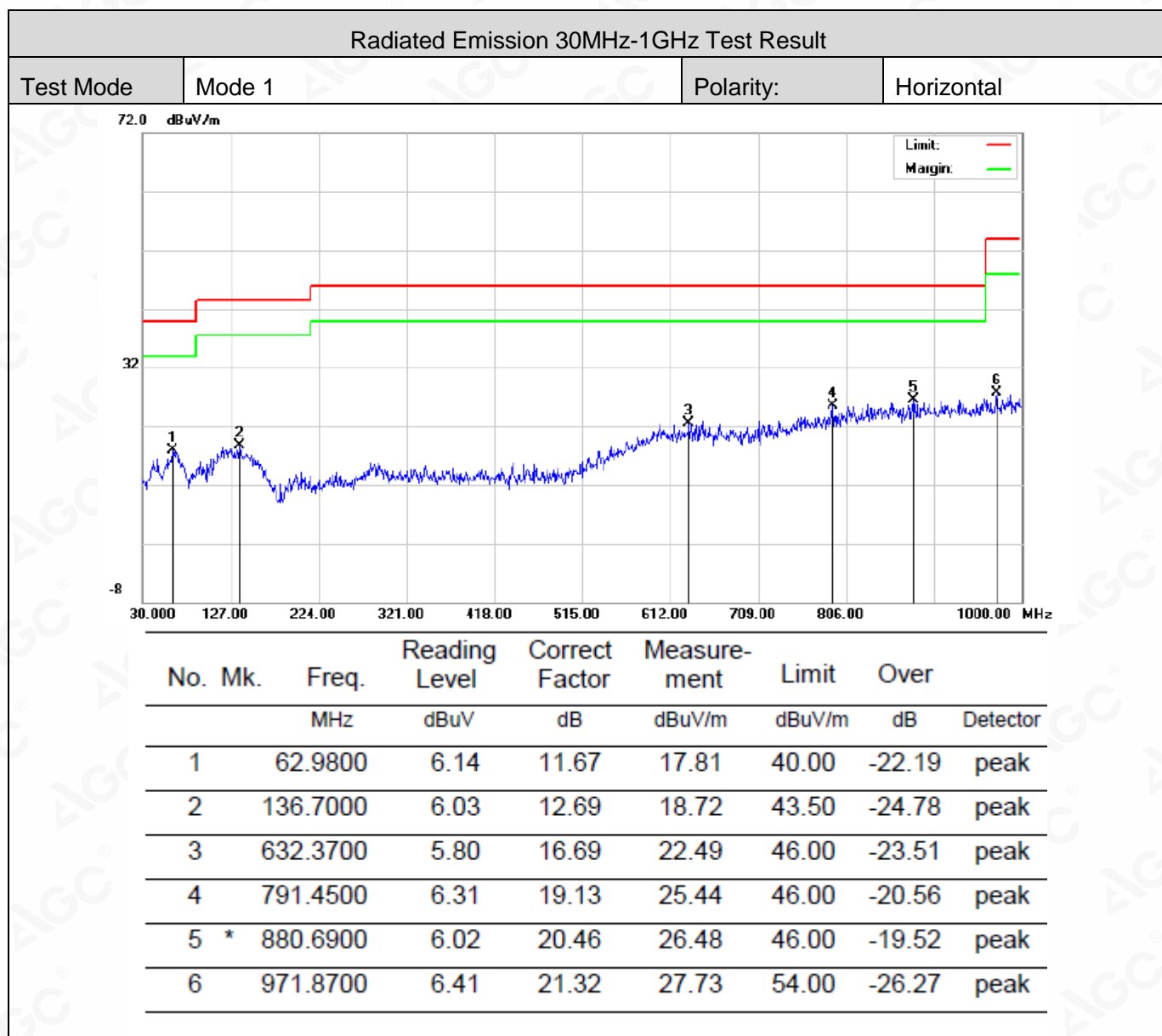
8.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received power by AC 120V/60Hz.
5. The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6. The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7. The test mode(s) were scanned during the test:
8. Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented. For emissions below 1GHz, use 120KHz RBW and VBW \geq 3RBW for QP reading.
9. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
11. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
12. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
13. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
14. The test data of the worst case condition (mode 1) was reported on the following Data page.

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8.4 TEST RESULT



RESULT: PASS

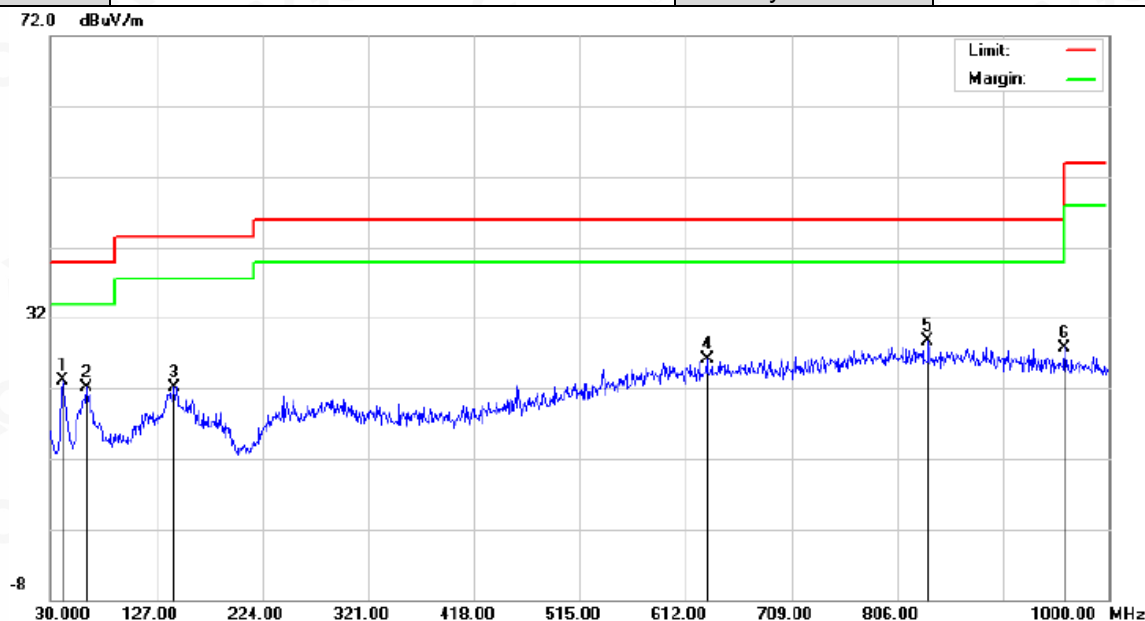
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Radiated Emission 30MHz-1GHz Test Result

Test Mode: Mode 1 Polarity: Vertical



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | * | 40.6699 | 13.08 | 9.97 | 23.05 | 40.00 | -16.95 | peak |
| 2 | | 62.9800 | 8.12 | 14.05 | 22.17 | 40.00 | -17.83 | peak |
| 3 | | 143.4900 | 9.31 | 12.87 | 22.18 | 43.50 | -21.32 | peak |
| 4 | | 631.4000 | 6.05 | 20.01 | 26.06 | 46.00 | -19.94 | peak |
| 5 | | 834.1300 | 6.64 | 22.15 | 28.79 | 46.00 | -17.21 | peak |
| 6 | | 959.2600 | 6.80 | 21.00 | 27.80 | 46.00 | -18.20 | peak |

RESULT: PASS

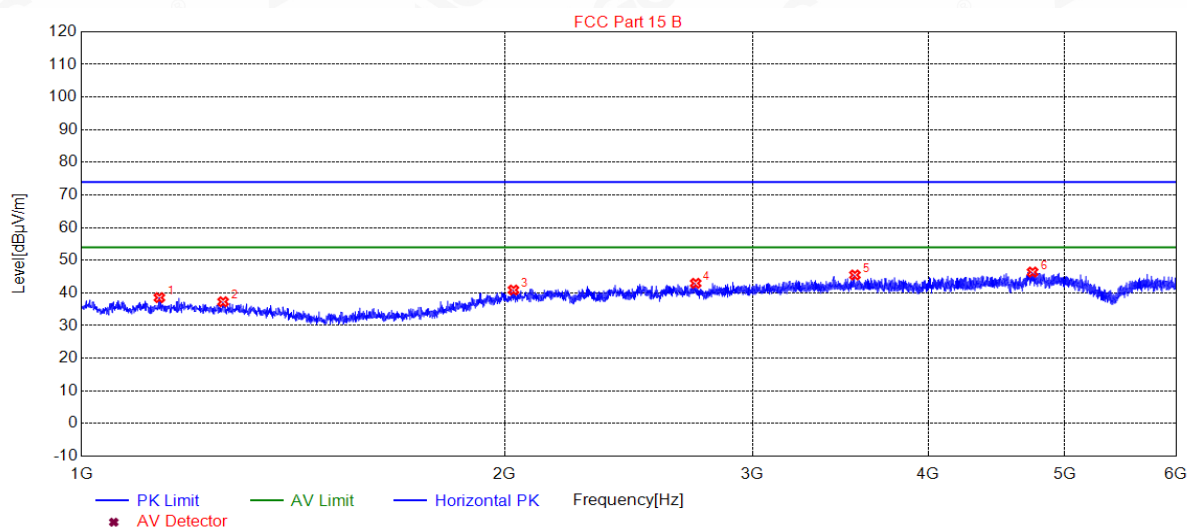
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Radiated Emission Above 1GHz Test Result

| | | | |
|-----------|--------|-----------|------------|
| Test Mode | Mode 1 | Polarity: | Horizontal |
|-----------|--------|-----------|------------|



| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------|-------------|-----------|------------|
| 1 | 1136.0136 | 38.56 | -16.77 | 74.00 | 35.44 | 150 | 360 | Horizontal |
| 2 | 1261.0261 | 37.30 | -16.90 | 74.00 | 36.70 | 150 | 90 | Horizontal |
| 3 | 2028.6029 | 40.90 | -11.70 | 74.00 | 33.10 | 150 | 330 | Horizontal |
| 4 | 2733.6734 | 42.96 | -9.54 | 74.00 | 31.04 | 150 | 340 | Horizontal |
| 5 | 3547.7548 | 45.51 | -7.49 | 74.00 | 28.49 | 150 | 50 | Horizontal |
| 6 | 4745.3745 | 46.39 | -4.96 | 74.00 | 27.61 | 150 | 130 | Horizontal |

RESULT: PASS

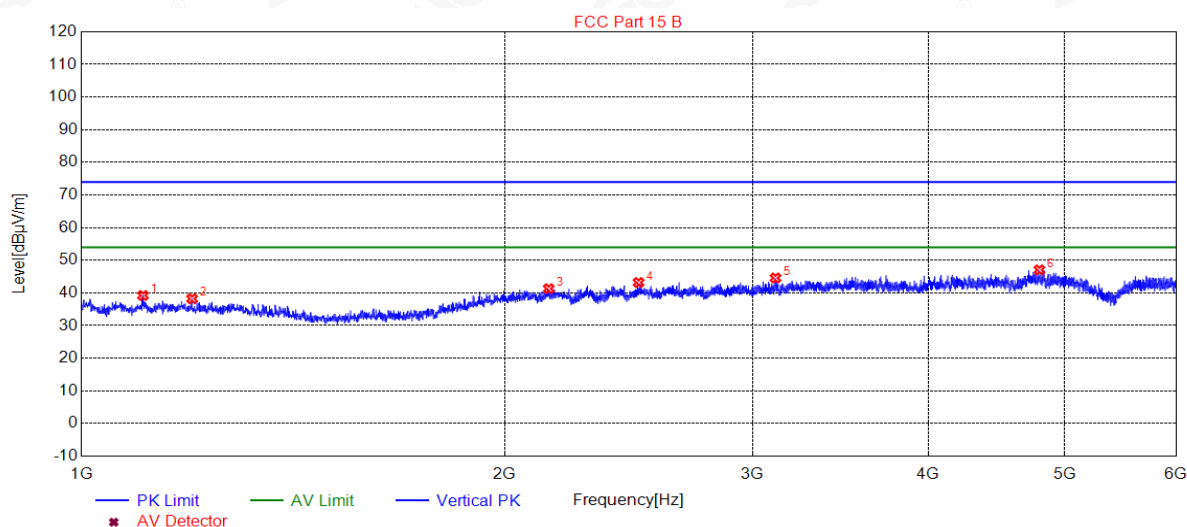
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Radiated Emission Above 1GHz Test Result

| | | | |
|-----------|--------|-----------|----------|
| Test Mode | Mode 1 | Polarity: | Vertical |
|-----------|--------|-----------|----------|



| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 1106.0106 | 39.22 | -16.74 | 74.00 | 34.78 | 150 | 250 | Vertical |
| 2 | 1198.5199 | 38.23 | -16.83 | 74.00 | 35.77 | 150 | 270 | Vertical |
| 3 | 2149.1149 | 41.31 | -11.19 | 74.00 | 32.69 | 150 | 0 | Vertical |
| 4 | 2489.6490 | 43.20 | -9.76 | 74.00 | 30.80 | 150 | 320 | Vertical |
| 5 | 3115.2115 | 44.59 | -8.93 | 74.00 | 29.41 | 150 | 340 | Vertical |
| 6 | 4798.8799 | 47.07 | -4.91 | 74.00 | 26.93 | 150 | 210 | Vertical |

RESULT: PASS

- Note:** 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.
2. The "Factor" value can be calculated automatically by software of measurement system.

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9. FCC CONDUCTED EMISSION TEST

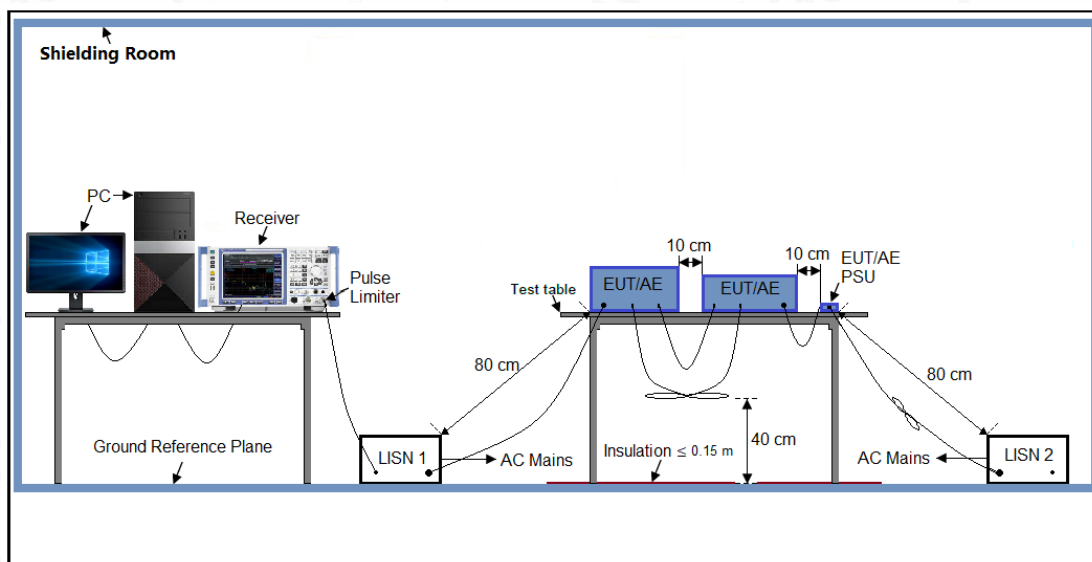
9.1 PROVISIONS APPLICABLE

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

| Frequency of Emission (MHz) | Conducted Limit(dBuV) | |
|-----------------------------|-----------------------|------------|
| | 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.

9.2 TEST SETUP BLOCK DIAGRAM



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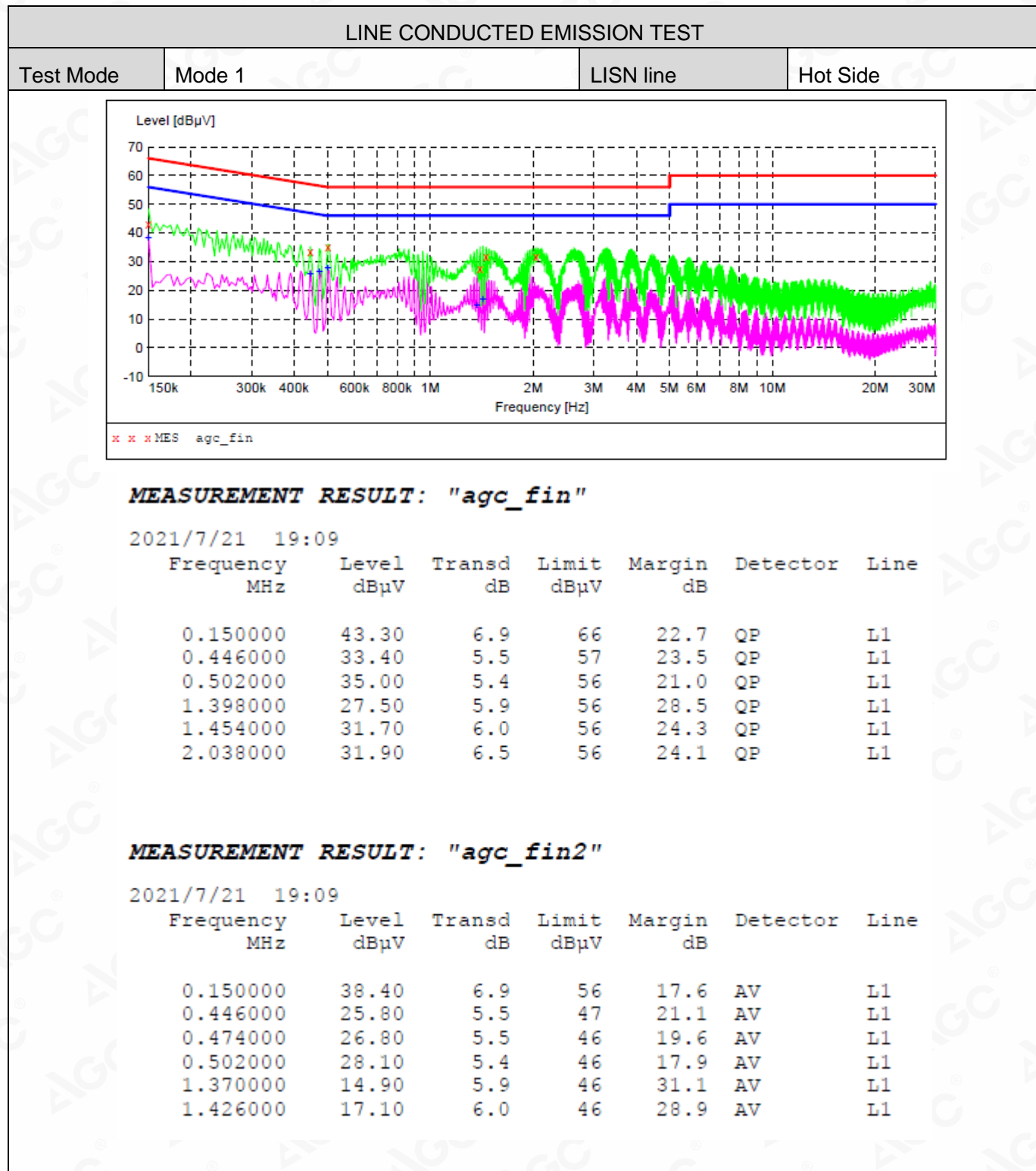
9.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received AC 120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test data of the worst case condition (mode 1) was reported on the following Data page.

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9.4 TEST RESULT

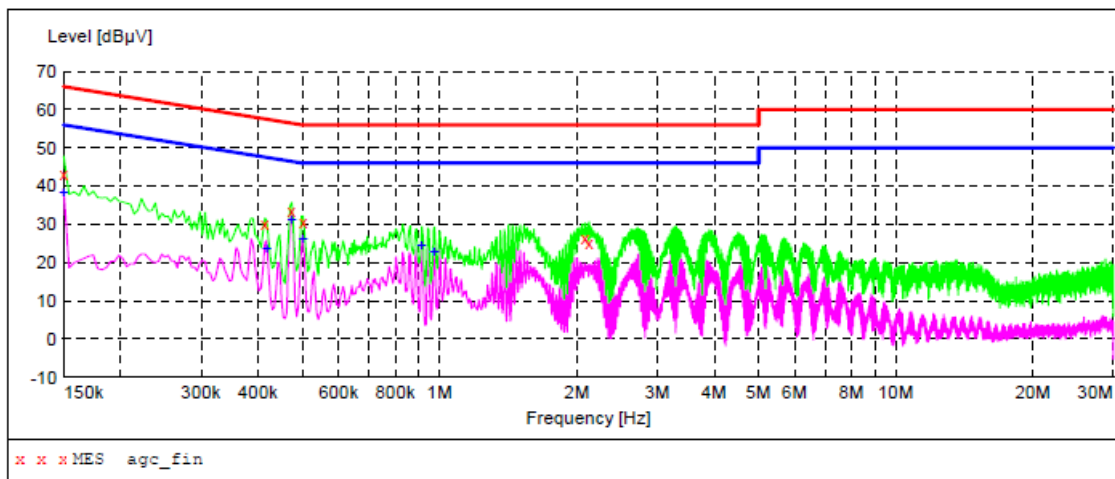


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LINE CONDUCTED EMISSION TEST

| | | | |
|-----------|--------|-----------|--------------|
| Test Mode | Mode 1 | LISN line | Neutral Side |
|-----------|--------|-----------|--------------|



MEASUREMENT RESULT: "agc_fin"

2021/7/21 19:17

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 0.150000 | 43.30 | 6.9 | 66 | 22.7 | QP | N |
| 0.414000 | 30.20 | 5.6 | 58 | 27.4 | QP | N |
| 0.474000 | 33.60 | 5.5 | 56 | 22.8 | QP | N |
| 0.502000 | 30.40 | 5.4 | 56 | 25.6 | QP | N |
| 2.082000 | 26.40 | 6.5 | 56 | 29.6 | QP | N |
| 2.126000 | 25.20 | 6.5 | 56 | 30.8 | QP | N |

MEASUREMENT RESULT: "agc_fin2"

2021/7/21 19:17

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 0.150000 | 38.30 | 6.9 | 56 | 17.7 | AV | N |
| 0.418000 | 24.00 | 5.6 | 48 | 23.5 | AV | N |
| 0.474000 | 31.50 | 5.5 | 46 | 14.9 | AV | N |
| 0.502000 | 26.50 | 5.4 | 46 | 19.5 | AV | N |
| 0.914000 | 24.80 | 5.4 | 46 | 21.2 | AV | N |
| 0.974000 | 22.80 | 5.4 | 46 | 23.2 | AV | N |

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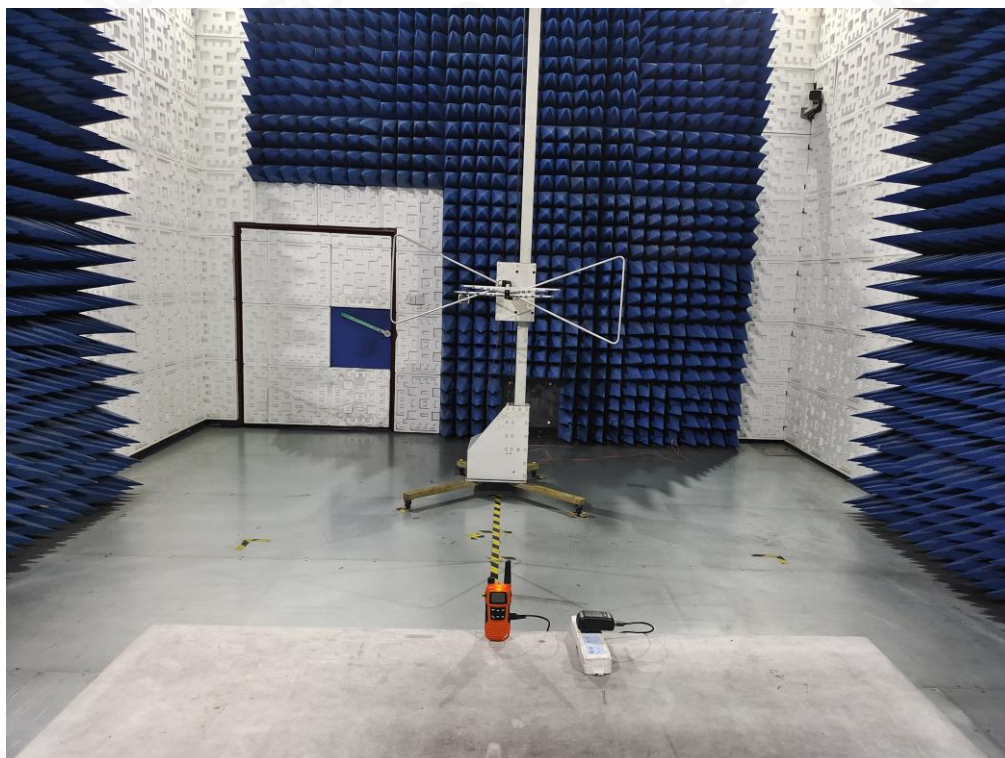


APPENDIX I PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP-BELOW 1GHZ

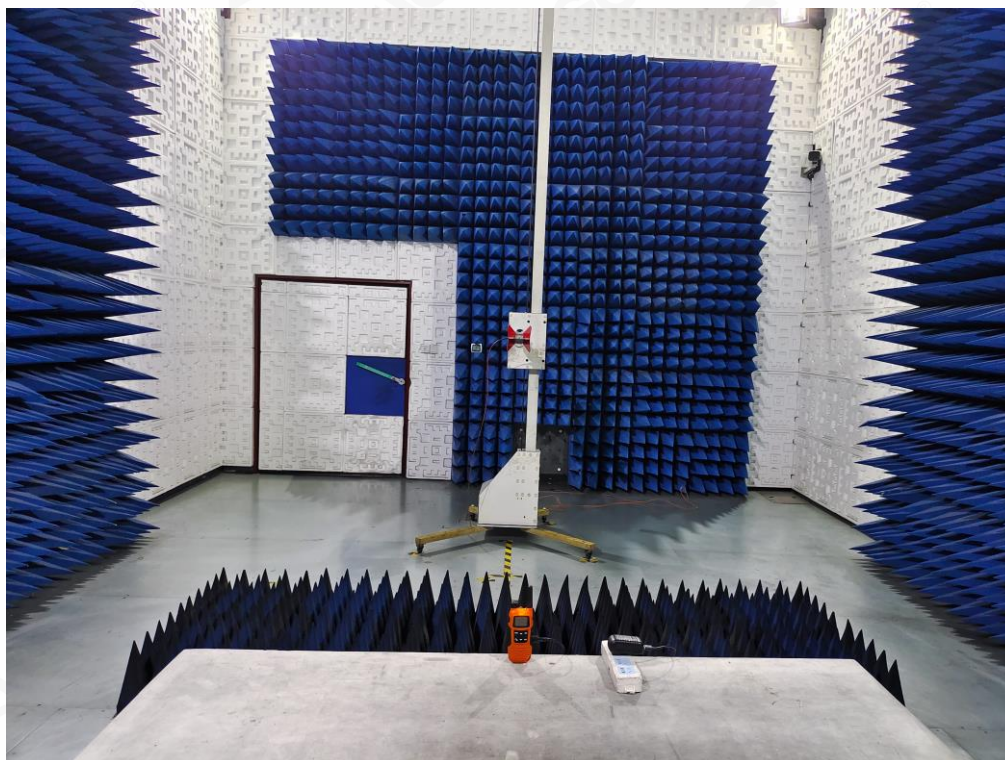


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RADIATED EMISSION TEST SETUP-ABOVE 1GHZ



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APPENDIX II: PHOTOGRAPHS OF Test EUT

Refer to the Report No.: AGC02294210503AP01

-----END OF REPORT-----

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2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.
5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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