

FCC Test Report

Report No.: AGC05803240312FR01

FCC ID : ZBC-WD290B

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Wireless charger

BRAND NAME : DNS

MODEL NAME : WD-290B

APPLICANT : SHENZHEN DNS INDUSTRIES CO., LTD.

DATE OF ISSUE : May 11, 2024

STANDARD(S) : FCC Part 15 Subpart C

REPORT VERSION : V1.0

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 | / | May 11, 2024 | Valid | Initial Release |

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1. General Information

| | |
|------------------------------|--|
| Applicant | SHENZHEN DNS INDUSTRIES CO., LTD. |
| Address | 23/F Building A, Shenzhen International Innovation Center, No. 1006 Shennan Road, Futian, Shenzhen, 518026, China |
| Manufacturer | SHENZHEN DNS INDUSTRIES CO., LTD. |
| Address | 23/F Building A, Shenzhen International Innovation Center, No. 1006 Shennan Road, Futian, Shenzhen, 518026, China |
| Factory 1 | HUIZHOU DNS TECHNOLOGY CO., LTD. |
| Address 1 | 5 Dongshun South Road, Dongjiang Hi-tech Industrial Park, Zhongkai Hi-tech Zone, Huizhou City, Guangdong, China |
| Factory 2 | D AND S INDUSTRIES (PHILIPPINES) CORPORATION |
| Address 2 | 1 to 5 Orient Goldcrest Suntrust Ecotown Building 2, Lot 8 Block 8, Sahud Ulan, Suntrust Ecotown Tanza, Region IV-A, Cavite, Philippines |
| Product Designation | Wireless charger |
| Brand Name | DNS |
| Test Model | WD-290B |
| Series Model(s) | N/A |
| Difference Description | N/A |
| Date of receipt of test item | Mar. 27, 2024 |
| Date of Test | Mar. 27, 2024 to May 11, 2024 |
| Deviation from Standard | No any deviation from the test method |
| Condition of Test Sample | Normal |
| Test Result | Pass |
| Test Report Form No | AGCER -FCC-WPT-V1 |

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By



Cici Li
(Project Engineer)

May 11, 2024

Reviewed By



Calvin Liu
(Reviewer)

May 11, 2024

Approved By



Max Zhang
Authorized Officer

May 11, 2024

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2. Product Information

2.1 Product Technical Description

| | |
|-------------------------------|---|
| Equipment Type | WPT System |
| Operation Frequency Band | WPT_1: 110.5kHz-205kHz or 360kHz-365kHz WPT_2: 110.5kHz-205kHz |
| Test Frequency | 128.1kHz, 360.0kHz, 175.4kHz |
| Hardware Version | V2.3 |
| Software Version | V1.0 |
| Modulation Type | WPT_1: ASK or FSK WPT_2: ASK |
| Number of channels | 3 |
| Field Strength of Fundamental | 63.30dBuV/m (Max)@3m |
| Antenna Designation | Coil Antenna |
| Antenna Gain | 0dBi |
| Power Supply | Input(PD):5V \approx 3A,9V \approx 3A Output 1:5W/7.5W/15W(for iPhone) Output 2:5W(for AirPods) Total Output: 20W(max) |

2.2 Test Frequency List

WPT_1 For iPhone(Output:5W/7.5W):

| Frequency Band | Channel Number | Frequency |
|----------------|----------------|-----------|
| 110.5~205kHz | 01 | 128.1kHz |

WPT_1 For iPhone(Output:15W):

| Frequency Band | Channel Number | Frequency |
|----------------|----------------|-----------|
| 360~365kHz | 01 | 360.0kHz |

WPT_2 For AirPods:

| Frequency Band | Channel Number | Frequency |
|----------------|----------------|-----------|
| 110.5~205kHz | 01 | 175.4kHz |

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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: ZBC-WD290B, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

| No. | Identity | Document Title |
|-----|--------------------|---|
| 1 | FCC 47 CFR Part 2 | Frequency allocations and radio treaty matters; general rules and regulations |
| 2 | FCC 47 CFR Part 15 | Radio Frequency Devices |
| 3 | ANSI C63.10-2013 | American National Standard for Testing Unlicensed Wireless Devices |

2.5 Special Accessories

Not available for this EUT intended for grant.

2.6 Equipment Modifications

Not available for this EUT intended for grant.

2.7 Antenna Requirement

| Standard Requirement |
|--|
| 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. |
| EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 0 dBi. |

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to FOLLOW CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

3.3 Environmental Conditions

| | Normal Conditions |
|-------------------------|-------------------|
| Temperature range (°C) | 15 - 35 |
| Relative humidity range | 20% - 75% |
| Pressure range (kPa) | 86 - 106 |

3.4 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%.

| Item | Measurement Uncertainty |
|---|----------------------------|
| Uncertainty of Conducted Emission for AC Port | $U_c = \pm 2.9 \text{ dB}$ |
| Uncertainty of Radiated Emission below 150kHz | $U_c = \pm 4.2 \text{ dB}$ |
| Uncertainty of Radiated Emission below 30MHz | $U_c = \pm 3.8 \text{ dB}$ |
| Uncertainty of Radiated Emission below 1GHz | $U_c = \pm 3.9 \text{ dB}$ |
| Uncertainty of Occupied Channel Bandwidth | $U_c = \pm 2 \%$ |

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3.5 List of Equipment Used

| ● RF Conducted Test System | | | | | | | |
|-------------------------------------|---------------|---------------------|--------------|-----------|------------|---------------------------|---------------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-ER-E036 | Spectrum Analyzer | Agilent | N9020A | MY49100060 | 2023-06-01 | 2024-05-31 |
| <input checked="" type="checkbox"/> | N/A | RF Connection Cable | N/A | 2# | N/A | Each time | N/A |

| ● Radiated Spurious Emission | | | | | | | |
|-------------------------------------|---------------|-------------------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input type="checkbox"/> | AGC-EM-E046 | EMI Test Receiver | R&S | ESCI | 10096 | 2024-02-01 | 2025-01-31 |
| <input checked="" type="checkbox"/> | AGC-EM-E116 | EMI Test Receiver | R&S | ESCI | 100034 | 2024-02-01 | 2025-01-31 |
| <input checked="" type="checkbox"/> | AGC-EM-E061 | Spectrum Analyzer | Agilent | N9010A | MY53470504 | 2023-06-01 | 2024-05-31 |
| <input checked="" type="checkbox"/> | AGC-EM-E086 | Loop Antenna | ZHINAN | ZN30900C | 18051 | 2022-03-12 | 2024-03-11 |
| <input checked="" type="checkbox"/> | AGC-EM-E001 | Wideband Antenna | SCHWARZBECK | VULB9168 | D69250 | 2023-05-11 | 2025-05-10 |
| <input type="checkbox"/> | AGC-EM-E029 | Broadband Ridged Horn Antenna | ETS | 3117 | 00034609 | 2023-03-23 | 2024-03-22 |
| <input type="checkbox"/> | AGC-EM-E082 | Horn Antenna | SCHWARZBECK | BBHA 9170 | #768 | 2021-10-31 | 2023-10-30 |
| <input type="checkbox"/> | AGC-EM-E146 | Pre-amplifier | ETS | 3117-PA | 00246148 | 2022-08-04 | 2024-08-03 |
| <input type="checkbox"/> | AGC-EM-A119 | 2.4G Filter | SongYi | N/A | N/A | 2023-06-01 | 2024-05-31 |
| <input checked="" type="checkbox"/> | AGC-EM-A138 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2024-06-08 |
| <input type="checkbox"/> | AGC-EM-A139 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2024-06-08 |

| ● AC Power Line Conducted Emission | | | | | | | |
|-------------------------------------|---------------|-------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-EM-E045 | EMI Test Receiver | R&S | ESPI | 101206 | 2023-06-03 | 2024-06-02 |
| <input checked="" type="checkbox"/> | AGC-EM-E023 | AMN | R&S | 100086 | ESH2-Z5 | 2023-06-03 | 2024-06-02 |
| <input checked="" type="checkbox"/> | AGC-EM-A130 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | DC-6GZ | 2023-06-09 | 2024-06-08 |

| ● Test Software | | | | | |
|-------------------------------------|---------------|---------------------|--------------|----------------------|---------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Version Information |
| <input checked="" type="checkbox"/> | AGC-EM-S001 | CE Test System | R&S | ES-K1 | V1.71 |
| <input checked="" type="checkbox"/> | AGC-EM-S003 | RE Test System | FARA | EZ-EMC | VRA-03A |
| <input type="checkbox"/> | AGC-ER-S012 | BT/WIFI Test System | Tonscend | JS1120-2 | 2.6 |
| <input type="checkbox"/> | AGC-EM-S011 | RSE Test System | Tonscend | TS+-Ver2.1(JS36-RSE) | 4.0.0.0 |

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4. System Test Configuration

4.1 EUT Configuration

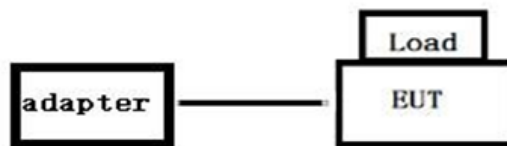
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

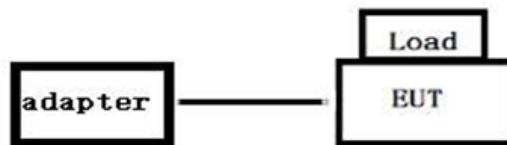
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System

Radiated Emission Configure:



Conducted Emission Configure:



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

| No. | Equipment | Model No. | Manufacturer | Specification Information | Cable |
|-----|----------------|-----------|--------------|---------------------------|-------|
| 1 | Iphone13 Phone | -- | Apple | -- | -- |
| 2 | Earphone | EF1160 | final | -- | -- |
| 3 | Iphone 8 Phone | Apple | -- | -- | -- |

☒ Test Accessories Come From The Manufacturer

| No. | Equipment | Model No. | Manufacturer | Specification Information | Cable |
|-----|----------------|-----------|--------------|---------------------------|-------|
| 1 | Adapter | AQ031AD | UL | -- | -- |
| 2 | Charging cable | -- | -- | 1.83m unshielded | -- |

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4.5 Summary of Test Results

| Item | FCC Rules | Description Of Test | Result |
|------|---------------|----------------------------------|--------|
| 1 | §15.203 | Antenna Equipment | Pass |
| 2 | §15.209(a)(f) | Radiated Spurious Emission | Pass |
| 3 | §15.215(c) | 20dB Bandwidth | Pass |
| 4 | §15.205(a) | Restricted Bands of Operation | Pass |
| 5 | §15.207 | AC Power Line Conducted Emission | Pass |

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5. Description of Test Modes

| Summary table of Test Cases | |
|--------------------------------|--|
| Test Item | Equipment type / Modulation |
| | WPT_(TX:128.1kHz, 360.0kHz,175.4kHz)/ ASK or FSK |
| Radiated &Conducted Test Cases | Mode 1: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <1%) Mode 2: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <50%) Mode 3: AC/DC Adapter + EUT + Mobile Phone (Battery Status: 100%) Mode 4: AC/DC Adapter + EUT + Earphone (Battery Status: <1%) Mode 5: AC/DC Adapter + EUT + Earphone (Battery Status: <50%) Mode 6: AC/DC Adapter + EUT + Earphone (Battery Status: 100%) Mode 7: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <1%) Mode 8: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <50%) Mode 9: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <100%) |
| AC Conducted Emission | Mode 1: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <1%) Mode 2: AC/DC Adapter + EUT + Mobile Phone (Battery Status: <50%) Mode 3: AC/DC Adapter + EUT + Mobile Phone (Battery Status: 100%) Mode 4: AC/DC Adapter + EUT + Earphone (Battery Status: <1%) Mode 5: AC/DC Adapter + EUT + Earphone (Battery Status: <50%) Mode 6: AC/DC Adapter + EUT + Earphone (Battery Status: 100%) Mode 7: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <1%) Mode 8: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <50%) Mode 9: AC/DC Adapter + EUT +Mobile Phone+ Earphone (Battery Status: <100%) |

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. The Laboratory provides wireless charging equipment for testing and evaluation (Apple Phone and Earphone).
4. For WPT1, When the output is 15W, the working frequency is 360kHz and When the output is less than 15W, the working frequency is 110.5-205kHz.

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6. Field Strength of Fundamental

6.1 Measurement Limits

| | | | | | |
|-----------------------|-----------------------------|------------|--------|--------|------------|
| Test Requirement: | FCC Part15 C Section 15.209 | | | | |
| Test Method: | ANSI C63.10:2013 | | | | |
| Test Frequency Range: | 9kHz to 1GHz | | | | |
| Test site: | Measurement Distance: 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Value |
| | 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| | 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| | 30MHz-1GHz | Quasi-peak | 100kHz | 300kHz | Quasi-peak |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | | Peak | 1MHz | 10Hz | Average |

Limits for frequency below 30MHz

| Frequency | Limit (μV /m) | Measurement Distance(m) | Remark |
|-------------|---------------|-------------------------|------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 | Quasi-peak Value |
| 0.490-1.705 | 24000/F(kHz) | 30 | Quasi-peak Value |
| 1.705-30 | 30 | 30 | Quasi-peak Value |

Limits for frequency Above 30MHz

| Frequency | Limit (dBμV/m @3m) | Remark |
|---------------|--------------------|------------------|
| 30MHz-88MHz | 40.00 | Quasi-peak Value |
| 88MHz-216MHz | 43.50 | Quasi-peak Value |
| 216MHz-960MHz | 46.00 | Quasi-peak Value |
| 960MHz-1GHz | 54.00 | Quasi-peak Value |
| Above 1GHz | 54.00 | Average Value |
| | 74.00 | Peak Value |

Remark: (1) Emission level dBμV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance Is The Distance In Meters Between The Measuring Instrument, Antenna And The Closest Point Of Any Part Of The Device Or System.

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6.2 Measurement 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 C63.10 (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. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. 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.
8. 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.
9. 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.
10. 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.

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6.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where FS = Field Strength in dB μ V/m
RA = Receiver Amplitude (including preamplifier) in dB μ V
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB/m
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where FS = Field Strength in dB μ V/m
RR = RA - AG - AV in dB μ V
LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m.

This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 52.0 \text{ dB}\mu\text{V/m} \\ AF &= 7.4 \text{ dB/m} & RR &= 18.0 \text{ dB}\mu\text{V} \\ CF &= 1.6 \text{ dB} & LF &= 9.0 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ AV &= 5.0 \text{ dB} \\ FS &= RR + LF \\ FS &= 18 + 9 = 27 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

Magnetic field strength calculation (9 kHz – 30 MHz)

When the limit is in terms of magnetic field, the following equation applies:

$$H[\text{dB}(\mu\text{A/m})] = V[\text{dB}(\mu\text{V})] + LC [\text{dB}] - GPA [\text{dB}] + AFH [\text{dB(S/m)}]$$

Where,

H is the magnetic field strength (to be compared with the limit),

V is the voltage level measured by the receiver or spectrum analyzer,

LC is the cable loss,

GPA is the gain of the preamplifier (if used), and

AFH is the magnetic antenna factor.

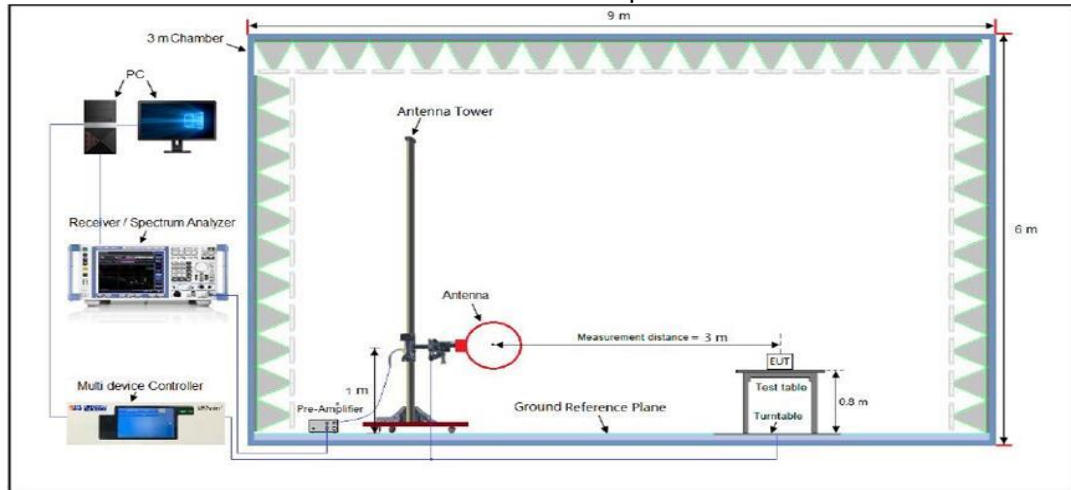
If the “electrical” antenna factor is used instead, the above equation becomes:

$$H[\text{dB}(\mu\text{A/m})] = V[\text{dB}(\mu\text{V})] + LC [\text{dB}] - GPA [\text{dB}] + AFE [\text{dB(m-1)}] - 51.5 [\text{dB}\Omega]$$

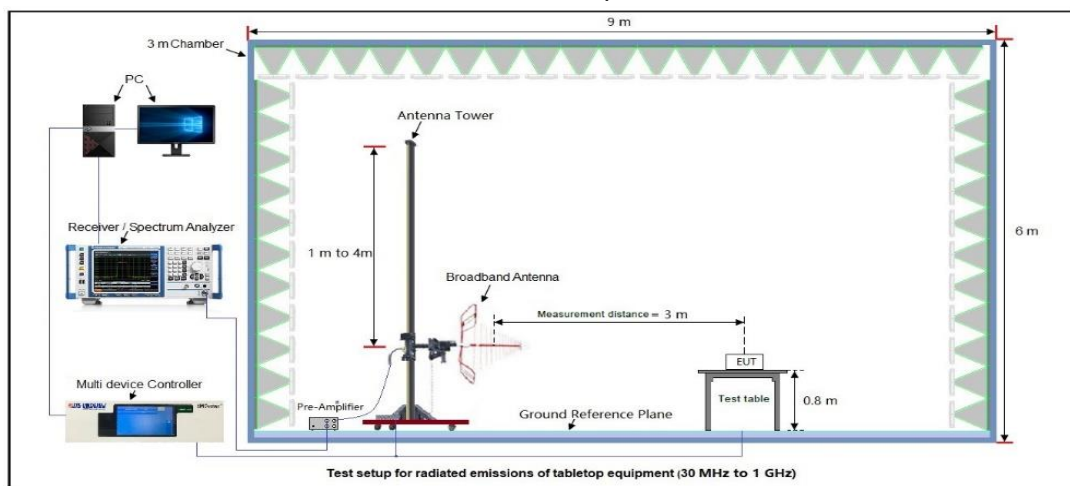
where AFE is the “electric” antenna factor, as provided by the antenna calibration laboratory.

6.4 Measurement Setup

Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



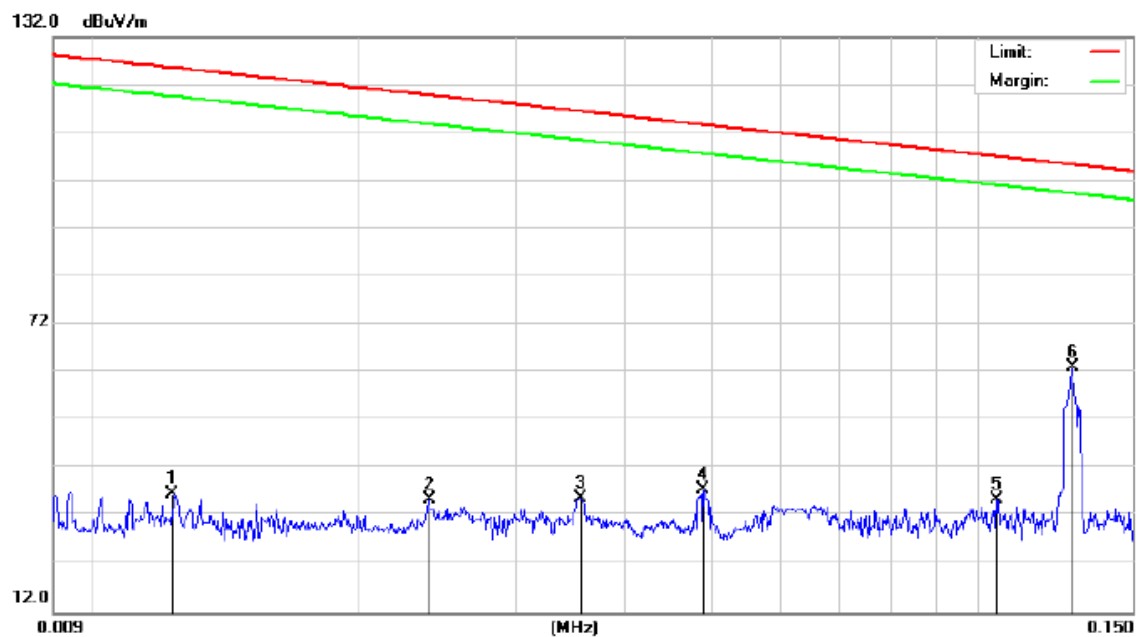
The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

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6.5 Measurement Result

Electric Field Test in The Frequency Range 9kHz-150kHz

| | | | |
|--------------------|--------------------------|--------------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:7.5W) | Antenna | Face |



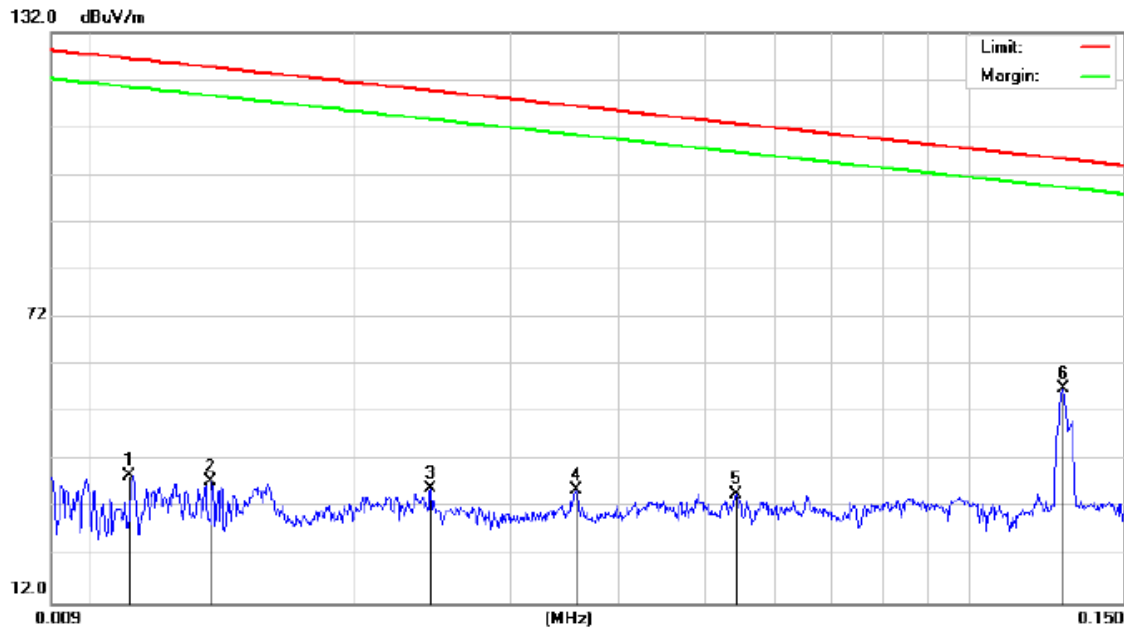
| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over |
|-----|-----|--------|---------------|----------------|--------------|--------|-------------|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB Detector |
| 1 | | 0.0123 | -0.71 | 37.40 | 36.69 | 125.6 | -88.92 peak |
| 2 | | 0.0240 | 0.66 | 34.87 | 35.53 | 119.8 | -84.31 peak |
| 3 | | 0.0355 | 3.38 | 32.57 | 35.95 | 116.4 | -80.51 peak |
| 4 | | 0.0490 | 7.45 | 30.08 | 37.53 | 113.6 | -76.15 peak |
| 5 | | 0.1052 | 7.53 | 27.93 | 35.46 | 107.0 | -71.62 peak |
| 6 | * | 0.1281 | 35.68 | 27.62 | 63.30 | 105.3 | -42.08 peak |

Result: Pass

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Electric Field Test in The Frequency Range 9kHz-150kHz

| | | | |
|-------------|--------------------------|-------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:7.5W) | Antenna | Side |



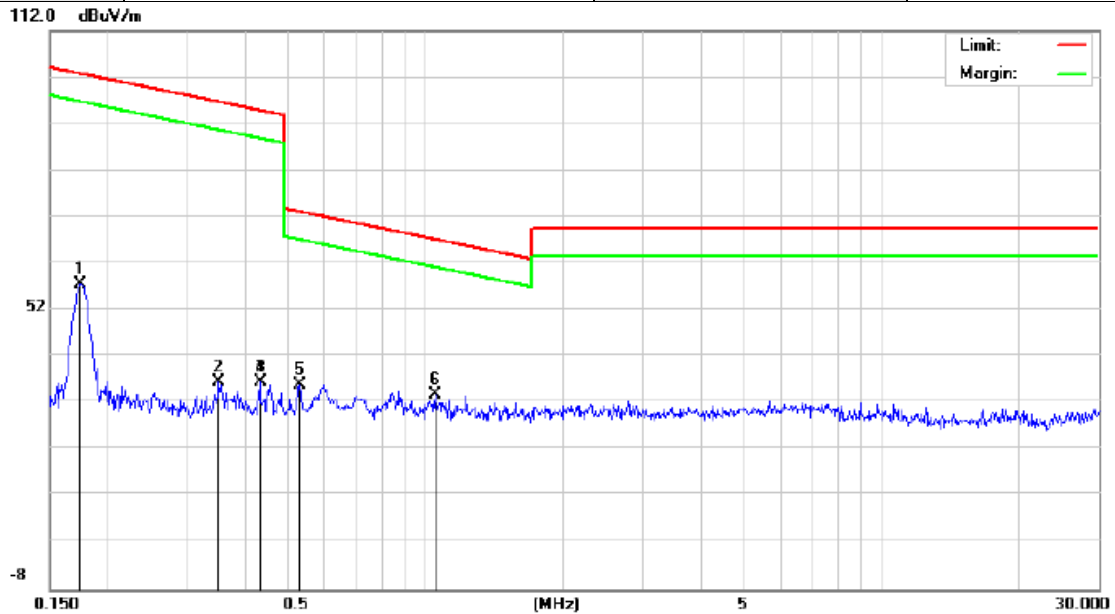
| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.0111 | 1.25 | 37.66 | 38.91 | 126.5 | -87.59 | peak |
| 2 | | 0.0137 | 0.43 | 37.10 | 37.53 | 124.6 | -87.15 | peak |
| 3 | | 0.0244 | 1.41 | 34.79 | 36.20 | 119.7 | -83.50 | peak |
| 4 | | 0.0357 | 3.20 | 32.53 | 35.73 | 116.4 | -80.68 | peak |
| 5 | | 0.0543 | 5.31 | 29.57 | 34.88 | 112.7 | -77.91 | peak |
| 6 | * | 0.1281 | 29.61 | 27.62 | 57.23 | 105.3 | -48.15 | peak |

Result: Pass

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Electric Field Test in The Frequency Range 150kHz-30MHz

| | | | |
|-------------|--------------------------|-------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:7.5W) | Antenna | Face |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.1754 | 30.57 | 26.99 | 57.56 | 102.7 | -45.16 | peak |
| 2 | | 0.3520 | 11.26 | 25.33 | 36.59 | 96.66 | -60.07 | peak |
| 3 | | 0.4328 | 11.24 | 25.37 | 36.61 | 94.87 | -58.26 | peak |
| 4 | | 0.4328 | 11.24 | 25.37 | 36.61 | 94.87 | -58.26 | peak |
| 5 | | 0.5293 | 10.55 | 25.39 | 35.94 | 73.13 | -37.19 | peak |
| 6 | * | 1.0485 | 8.65 | 25.18 | 33.83 | 67.19 | -33.36 | peak |

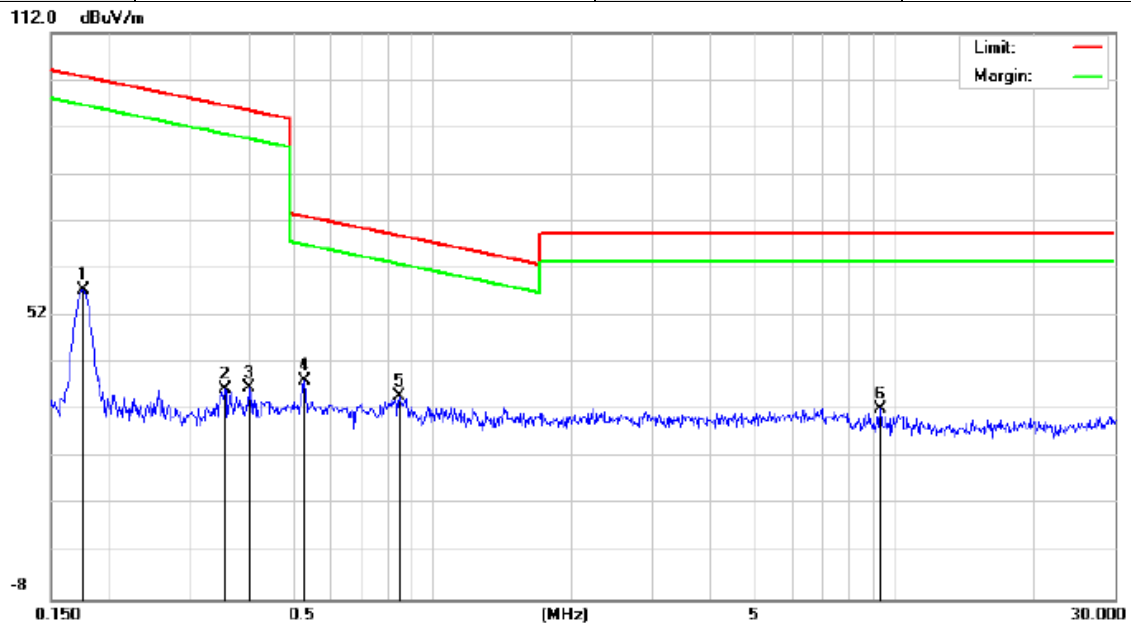
Result: Pass

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Electric Field Test in The Frequency Range 150kHz-30MHz

| | | | |
|--------------------|--------------------------|--------------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:7.5W) | Antenna | Side |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.1754 | 30.51 | 26.98 | 57.49 | 102.6 | -45.16 | peak |
| 2 | | 0.3558 | 11.28 | 25.33 | 36.61 | 96.56 | -59.95 | peak |
| 3 | | 0.4018 | 11.57 | 25.35 | 36.92 | 95.51 | -58.59 | peak |
| 4 | | 0.5292 | 12.89 | 25.39 | 38.28 | 73.13 | -34.85 | peak |
| 5 | * | 0.8483 | 9.91 | 25.28 | 35.19 | 69.03 | -33.84 | peak |
| 6 | | 9.3024 | 9.03 | 23.47 | 32.50 | 69.54 | -37.04 | peak |

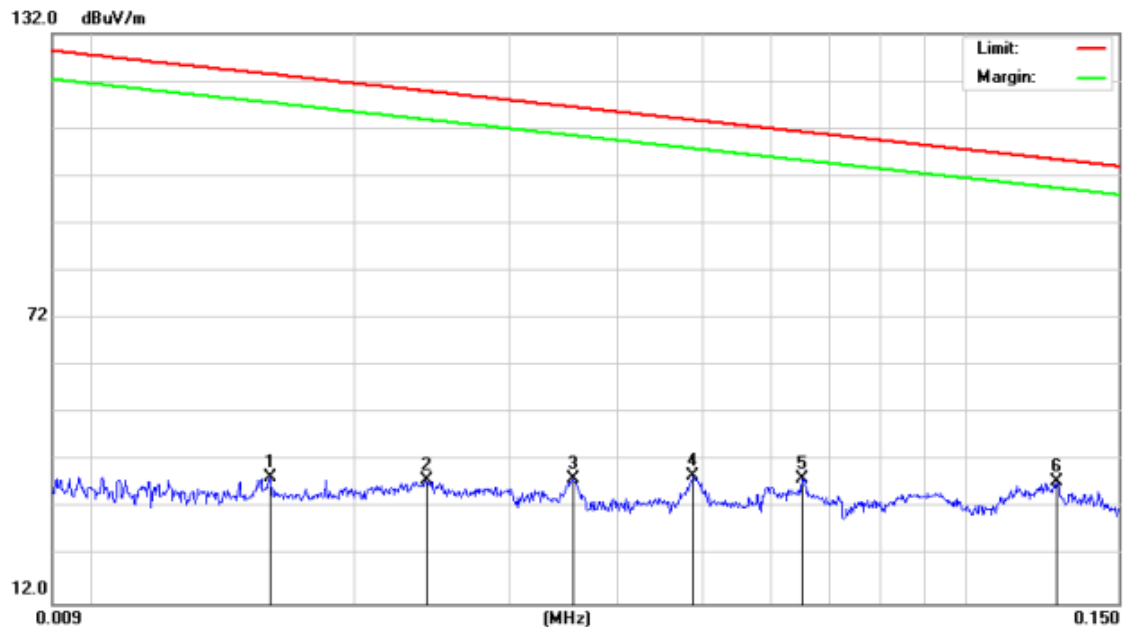
Result: Pass

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Electric Field Test in The Frequency Range 9kHz-150kHz

| | | | |
|-------------|-------------------------|-------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:15W) | Antenna | Face |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.1749 | 27.98 | 26.99 | 54.97 | 102.6 | -47.72 | peak |
| 2 | | 0.3558 | 26.56 | 25.33 | 51.89 | 96.56 | -44.67 | peak |
| 3 | | 0.5264 | 10.58 | 25.39 | 35.97 | 73.18 | -37.21 | peak |
| 4 | * | 0.8757 | 10.55 | 25.26 | 35.81 | 68.76 | -32.95 | peak |
| 5 | | 2.1667 | 7.79 | 24.70 | 32.49 | 69.54 | -37.05 | peak |
| 6 | | 7.1374 | 8.91 | 23.53 | 32.44 | 69.54 | -37.10 | peak |

Result: Pass

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Electric Field Test in The Frequency Range 9kHz-150kHz

| | | | |
|--------------------|-------------------------|--------------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:15W) | Antenna | Side |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.0111 | 3.63 | 37.66 | 41.29 | 126.5 | -85.30 | peak |
| 2 | | 0.0234 | 1.79 | 35.00 | 36.79 | 120.1 | -83.34 | peak |
| 3 | | 0.0323 | 1.61 | 33.16 | 34.77 | 117.3 | -82.57 | peak |
| 4 | | 0.0468 | 4.51 | 30.49 | 35.00 | 114.1 | -79.13 | peak |
| 5 | | 0.0724 | 6.44 | 28.18 | 34.62 | 110.3 | -75.73 | peak |
| 6 | * | 0.0981 | 6.68 | 27.96 | 34.64 | 107.7 | -73.08 | peak |

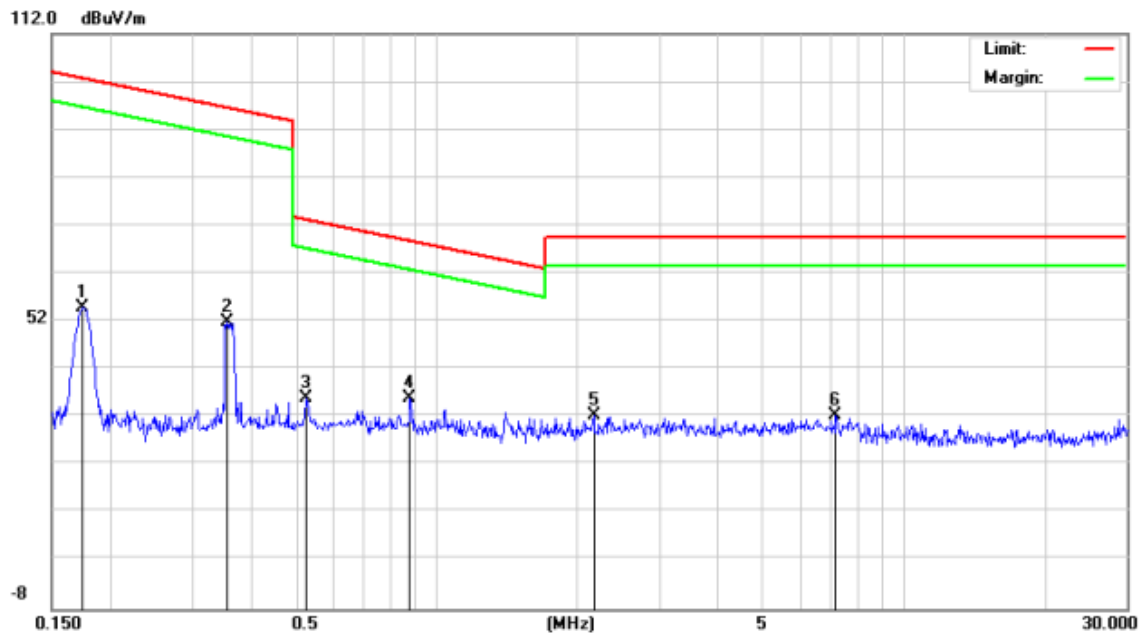
Result: Pass

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Electric Field Test in The Frequency Range 150kHz-30MHz

| | | | |
|--------------------|-------------------------|--------------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:15W) | Antenna | Face |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.1749 | 27.98 | 26.99 | 54.97 | 102.6 | -47.72 | peak |
| 2 | | 0.3558 | 26.56 | 25.33 | 51.89 | 96.56 | -44.67 | peak |
| 3 | | 0.5264 | 10.58 | 25.39 | 35.97 | 73.18 | -37.21 | peak |
| 4 | * | 0.8757 | 10.55 | 25.26 | 35.81 | 68.76 | -32.95 | peak |
| 5 | | 2.1667 | 7.79 | 24.70 | 32.49 | 69.54 | -37.05 | peak |
| 6 | | 7.1374 | 8.91 | 23.53 | 32.44 | 69.54 | -37.10 | peak |

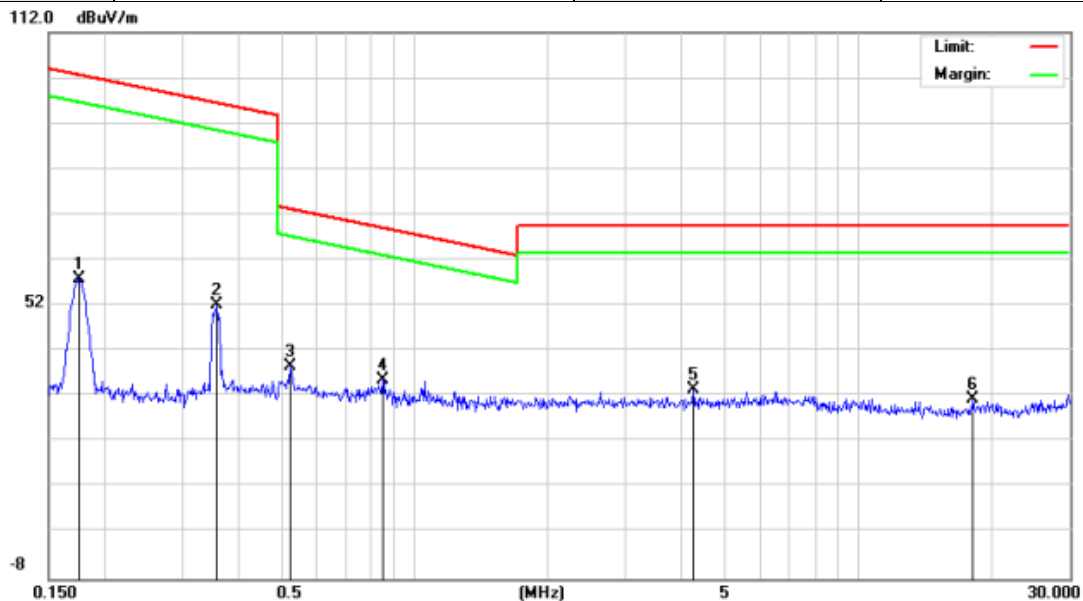
Result: Pass

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Electric Field Test in The Frequency Range 150kHz-30MHz

| | | | |
|--------------------|-------------------------|--------------------------|---------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7(WPT1 Output:15W) | Antenna | Side |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 0.1758 | 30.78 | 26.98 | 57.76 | 102.6 | -44.89 | peak |
| 2 | | 0.3595 | 26.81 | 25.33 | 52.14 | 96.47 | -44.33 | peak |
| 3 | | 0.5237 | 13.20 | 25.39 | 38.59 | 73.22 | -34.63 | peak |
| 4 | * | 0.8483 | 10.49 | 25.28 | 35.77 | 69.03 | -33.26 | peak |
| 5 | | 4.2466 | 9.90 | 23.61 | 33.51 | 69.54 | -36.03 | peak |
| 6 | | 18.1352 | 7.36 | 24.11 | 31.47 | 69.54 | -38.07 | peak |

Result: Pass

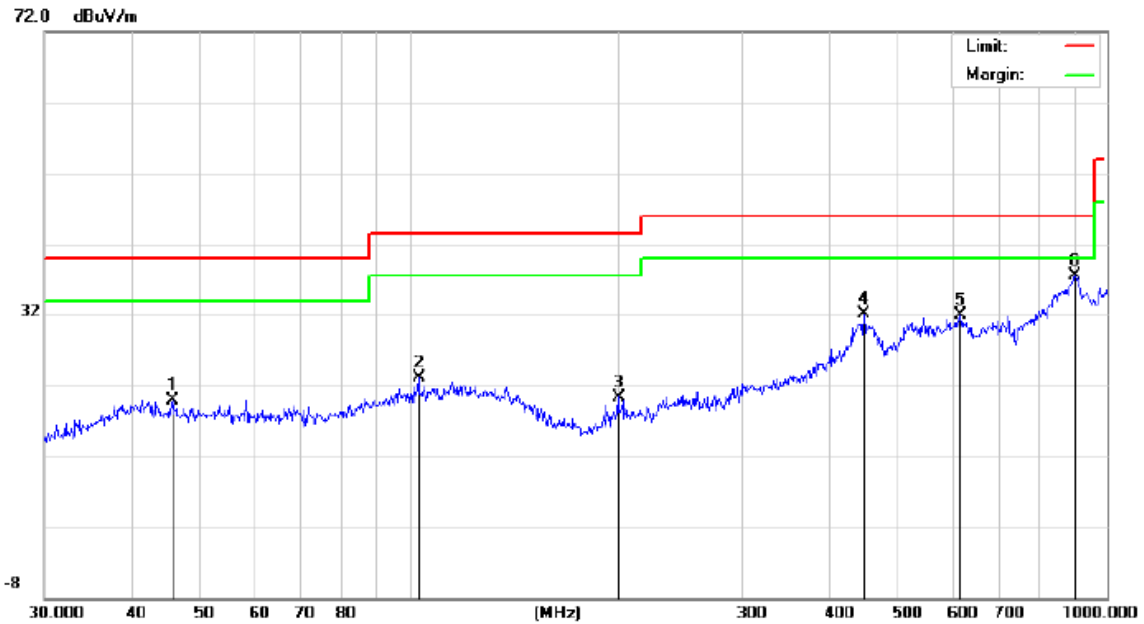
Notes:

1. Quasi-Peak detector is used for frequency below 30MHz.
2. Negative value in the margin column shows emission below limit.
3. All measurements were made with 0.6m loop antenna at 3m distance. All emissions are below the QP limit.
4. Corr. Factor= Antenna Factor (dB/m) + Cable Loss (dB)
5. Loop antenna is used for the emission under 30MHz.

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Radiated Emission at 30MHz-1000MHz Test Result

| | | | |
|-------------|------------------|-------------------|------------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7 | Antenna | Horizontal |



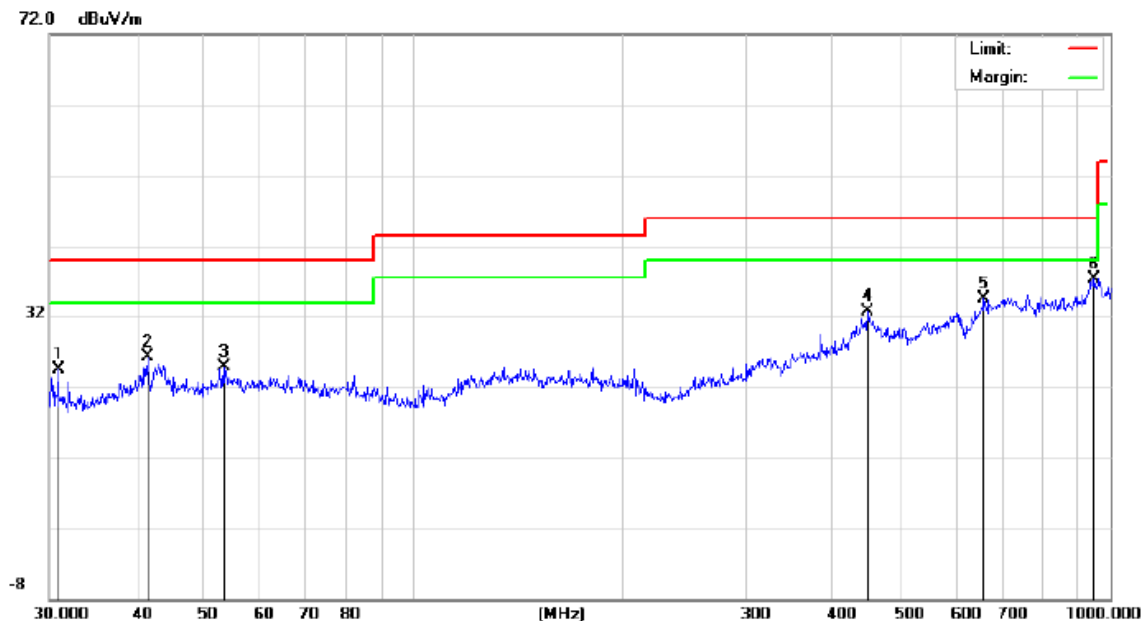
| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 45.8553 | 6.35 | 13.49 | 19.84 | 40.00 | -20.16 | peak |
| 2 | | 103.0800 | 6.97 | 16.23 | 23.20 | 43.50 | -20.30 | peak |
| 3 | | 199.2855 | 5.98 | 14.42 | 20.40 | 43.50 | -23.10 | peak |
| 4 | | 447.9822 | 7.22 | 24.82 | 32.04 | 46.00 | -13.96 | peak |
| 5 | | 616.3718 | 6.72 | 25.18 | 31.90 | 46.00 | -14.10 | peak |
| 6 | * | 900.1474 | 5.81 | 31.78 | 37.59 | 46.00 | -8.41 | peak |

Result: Pass

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Radiated Emission at 30MHz-1000MHz Test Result

| | | | |
|-------------|------------------|-------------------|----------|
| EUT Name | Wireless charger | Model Name | WD-290B |
| Temperature | 23.2°C | Relative Humidity | 59.8% |
| Pressure | 960hPa | Test Voltage | DC 9V |
| Test Mode | Mode 7 | Antenna | Vertical |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 30.8535 | 10.66 | 13.88 | 24.54 | 40.00 | -15.46 | peak |
| 2 | | 41.4215 | 9.34 | 16.91 | 26.25 | 40.00 | -13.75 | peak |
| 3 | | 53.3179 | 7.96 | 17.03 | 24.99 | 40.00 | -15.01 | peak |
| 4 | | 447.9822 | 7.02 | 25.74 | 32.76 | 46.00 | -13.24 | peak |
| 5 | | 658.8362 | 7.16 | 27.42 | 34.58 | 46.00 | -11.42 | peak |
| 6 | * | 948.7610 | 6.73 | 30.65 | 37.38 | 46.00 | -8.62 | peak |

Result: Pass

Note: 1. Factor=Antenna Factor + Cable loss, Over=Measurement-Limit.

- All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.
- The "Factor" value can be calculated automatically by software of measurement system.

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7. 20 dB Bandwidth Measurement

7.1 Provisions Applicable

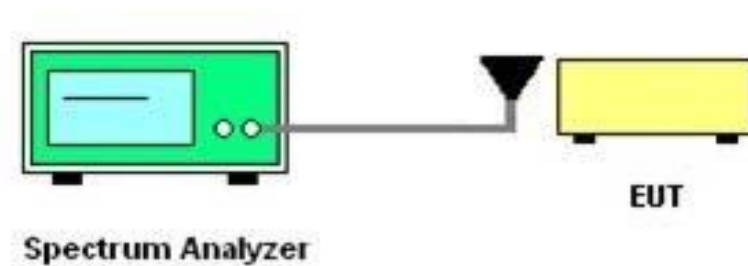
N/A

7.2 Measurement Procedure

Set the parameters of SPA as below:

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
2. Centre frequency = Operation Frequency
3. The resolution bandwidth of 300 Hz and the video bandwidth of 1 kHz were used.
4. Span: 3kHz, Sweep time: Auto
5. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
6. Measured the spectrum width with power higher than 20dB below carrier.
7. Measured the 99% OBW.
8. Record the plots and Reported.

7.3 Measurement Setup

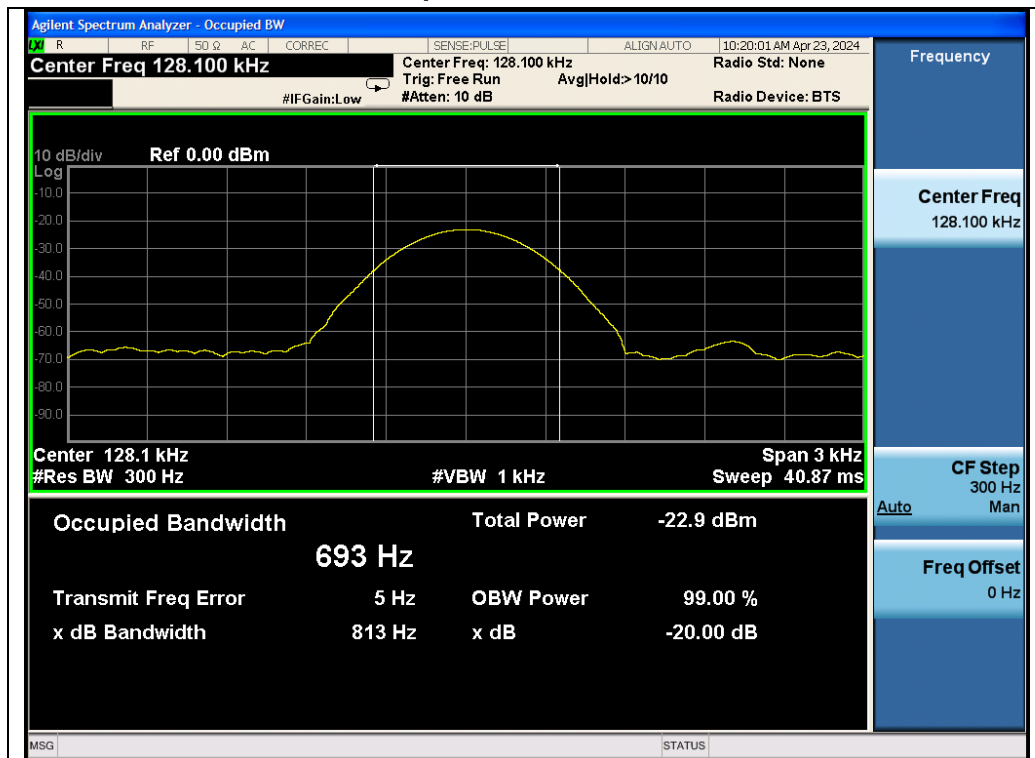


7.4 Measurement Result

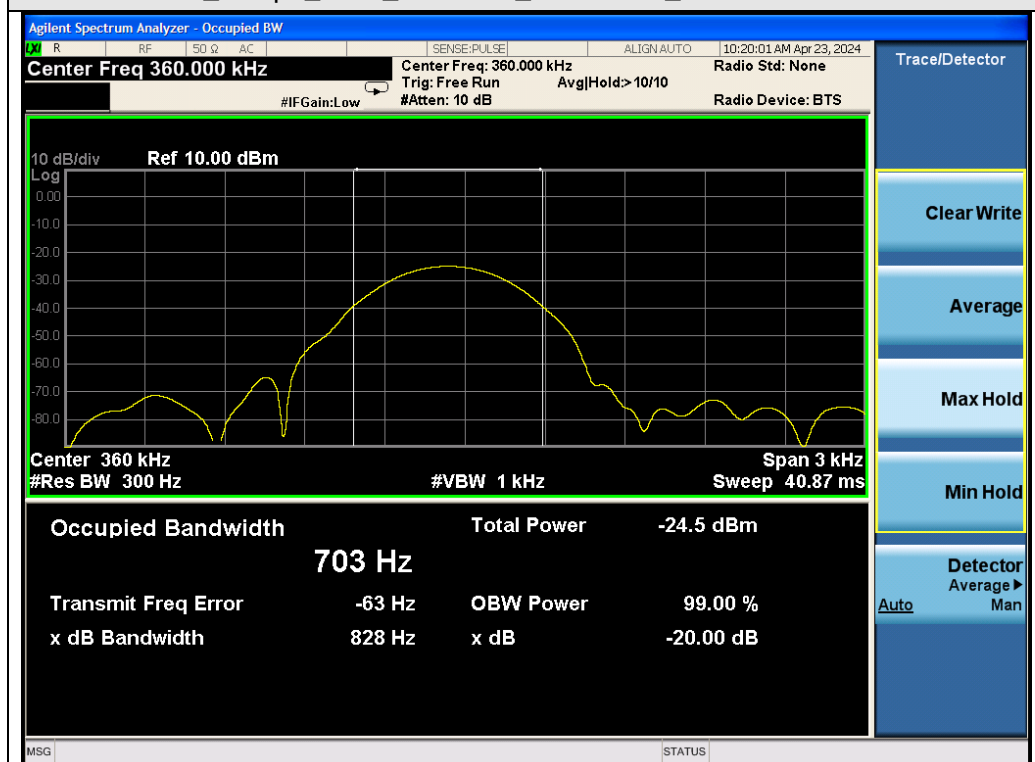
| Test Data of Occupied Bandwidth and -20dB Bandwidth | | | | | |
|---|--------------------|------------------------------|-----------------------|--------------|--------------|
| Test Mode | Test Channel (kHz) | 99% Occupied Bandwidth (kHz) | -20dB Bandwidth (kHz) | Limits (kHz) | Pass or Fail |
| ASK | 128.1 | 0.693 | 0.813 | N/A | Pass |
| FSK | 360.0 | 0.703 | 0.828 | N/A | Pass |
| ASK | 175.4 | 1.282 | 0.823 | N/A | Pass |

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Test Graphs of -20dB Bandwidth

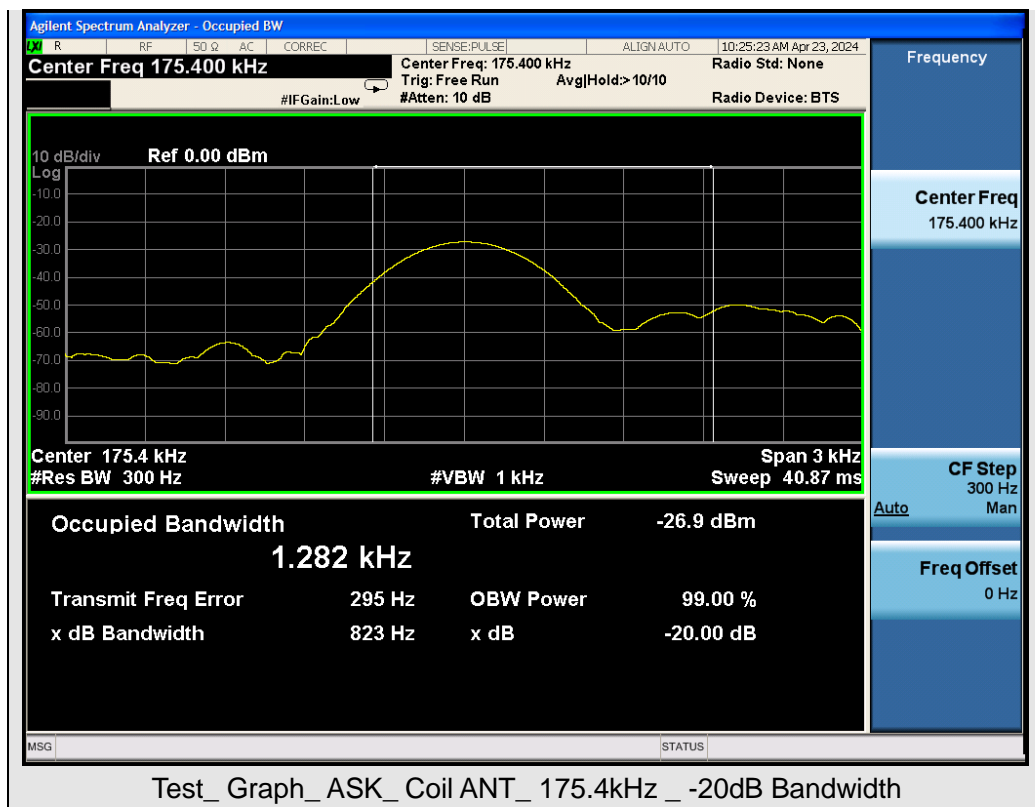


Test_Graph_ASK_Coil ANT_ 128.1kHz _ -20dB Bandwidth



Test_Graph_FSK_Coil ANT_ 360.0kHz _ -20dB Bandwidth

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8. AC Power Line Conducted Emission Test

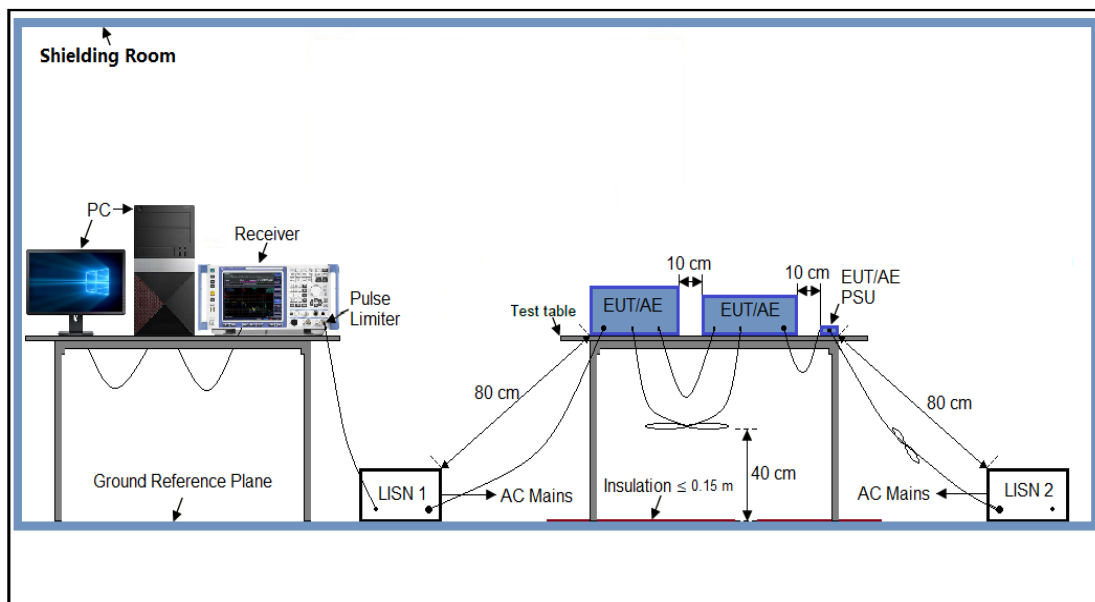
8.1 Measurement Limits

| Frequency Range | Maximum RF Line Voltage | |
|-----------------|-------------------------|----------------|
| | Q.P. (dBμV) | Average (dBμV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

8.2 Measurement Setup



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8.3 Preliminary Procedure of Line Conducted Emission Test

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 C63.10 (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 C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V or DC 9V power from adapter which received AC120V/60Hz power from a LISN.
6. The 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 50ohm 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 mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

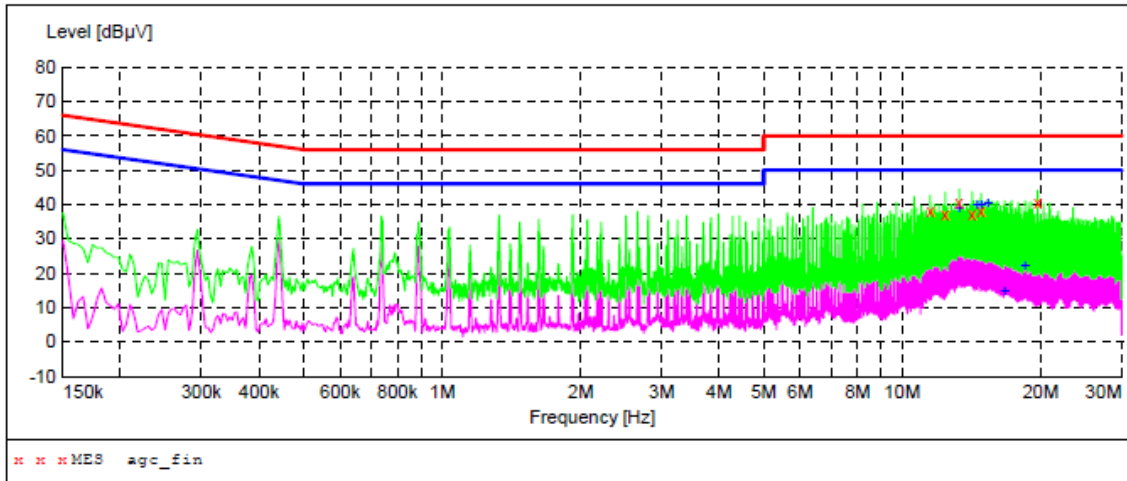
8.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

8.5 Measurement Result

AC Power Line Conducted Emission Test

| Test Mode | Mode 7 | LISN Line | Hot Side |
|-----------|--------|-----------|----------|
|-----------|--------|-----------|----------|



MEASUREMENT RESULT: "agc_fin"

2024/4/7 13:47

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 11.506000 | 38.20 | 6.7 | 60 | 21.8 | QP | L1 |
| 12.402000 | 37.20 | 6.8 | 60 | 22.8 | QP | L1 |
| 13.298000 | 40.40 | 6.8 | 60 | 19.6 | QP | L1 |
| 14.194000 | 37.20 | 6.8 | 60 | 22.8 | QP | L1 |
| 14.834000 | 38.20 | 6.8 | 60 | 21.8 | QP | L1 |
| 19.690000 | 40.60 | 7.1 | 60 | 19.4 | QP | L1 |

MEASUREMENT RESULT: "agc_fin2"

2024/4/7 13:47

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 13.298000 | 38.90 | 6.8 | 50 | 11.1 | AV | L1 |
| 14.574000 | 40.10 | 6.8 | 50 | 9.9 | AV | L1 |
| 14.830000 | 40.30 | 6.8 | 50 | 9.7 | AV | L1 |
| 15.342000 | 40.40 | 6.9 | 50 | 9.6 | AV | L1 |
| 16.686000 | 14.90 | 6.9 | 50 | 35.1 | AV | L1 |
| 18.490000 | 22.60 | 7.0 | 50 | 27.4 | AV | L1 |

Result: Pass

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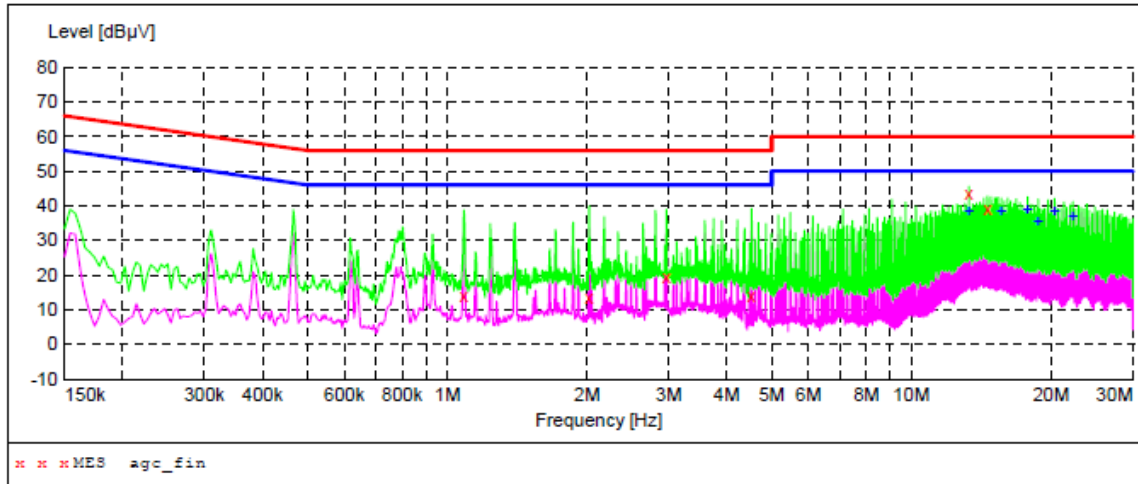
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AC Power Line Conducted Emission Test

| | | | |
|-----------|--------|-----------|--------------|
| Test Mode | Mode 7 | LISN Line | Neutral Side |
|-----------|--------|-----------|--------------|



MEASUREMENT RESULT: "agc_fin"

2024/4/7 13:50

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 1.086000 | 13.80 | 6.2 | 56 | 42.2 | QP | N |
| 2.022000 | 13.60 | 6.2 | 56 | 42.4 | QP | N |
| 2.966000 | 19.40 | 6.3 | 56 | 36.6 | QP | N |
| 4.526000 | 14.00 | 6.3 | 56 | 42.0 | QP | N |
| 13.298000 | 43.30 | 6.8 | 60 | 16.7 | QP | N |
| 14.578000 | 39.30 | 6.8 | 60 | 20.7 | QP | N |

MEASUREMENT RESULT: "agc_fin2"

2024/4/7 13:50

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line |
|------------------|---------------|--------------|---------------|--------------|----------|------|
| 13.298000 | 38.50 | 6.8 | 50 | 11.5 | AV | N |
| 15.598000 | 38.50 | 6.9 | 50 | 11.5 | AV | N |
| 17.786000 | 39.10 | 7.0 | 50 | 10.9 | AV | N |
| 18.750000 | 35.50 | 7.0 | 50 | 14.5 | AV | N |
| 20.350000 | 38.80 | 7.1 | 50 | 11.2 | AV | N |
| 22.274000 | 37.00 | 7.5 | 50 | 13.0 | AV | N |

Result: Pass

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Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC05803240312AP02

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC05803240312AP03

-----End of Report-----

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