

Oracle America, Inc

RF TEST REPORT

Report Type:

FCC Part 15.225 & RSS-210 RF report

Model:

7 Inch CFD

REPORT NUMBER:

220801344SHA-006

ISSUE DATE:

Oct 2, 2022

DOCUMENT CONTROL NUMBER:

TTRFFCCPART15C_V1 © 2018 Intertek



Applicant : Oracle America, Inc
500 Oracle Parkway Redwood City, CA 94065 US

Manufacturer : Oracle America, Inc
500 Oracle Parkway Redwood City, CA 94065 US

Factory : GES Manufacturing Services (M) SDN BHD
Plo 34 Fasa 2, Kawasan Perindustrian, Senai 81400, Johor, Malaysia

FCC ID : A4H7CFD
IC : 9870A-7CFD

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2020): Radio Frequency Devices (Subpart C)

RSS-210 (Issue 9): Licence-Exempt Radio Apparatus: Category I Equipment

RSS-Gen (Issue 5): General Requirements for Compliance of Radio Apparatus

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY: **REVIEWED BY:**



Project Engineer
Stephanie Zhang

Reviewer
Wakeyou Wang

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT

Content

REVISION HISTORY..... 5

MEASUREMENT RESULT SUMMARY 6

1 GENERAL INFORMATION 7

1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) 7

1.2 TECHNICAL SPECIFICATION 7

1.3 DESCRIPTION OF TEST FACILITY 8

2 TEST SPECIFICATIONS..... 9

2.1 STANDARDS OR SPECIFICATION 9

2.2 MODE OF OPERATION DURING THE TEST..... 9

2.3 TEST SOFTWARE LIST 10

2.4 TEST PERIPHERALS LIST 10

2.5 TEST ENVIRONMENT CONDITION:..... 10

2.6 INSTRUMENT LIST 11

2.7 MEASUREMENT UNCERTAINTY 13

3 FUNDAMENTAL EMISSION 14

3.1 LIMIT 14

3.2 MEASUREMENT PROCEDURE 14

3.3 TEST CONFIGURATION 15

3.4 TEST RESULTS OF FUNDAMENTAL EMISSIONS 16

4 SPURIOUS EMISSION 17

4.1 LIMIT 17

4.2 MEASUREMENT PROCEDURE 17

4.3 TEST CONFIGURATION 18

4.4 TEST RESULTS OF RADIATED EMISSIONS 20

5 FREQUENCY STABILITY (TEMPERATURE VARIATION) 28

5.1 TEST LIMIT 28

5.2 TEST CONFIGURATION 28

5.3 TEST PROCEDURE AND TEST SETUP 28

5.4 TEST PROTOCOL 29

6 FREQUENCY STABILITY (VOLTAGE VARIATION) 30

6.1 TEST LIMIT 30

6.2 TEST CONFIGURATION 30

6.3 TEST PROCEDURE AND TEST SETUP 30

6.4 TEST PROTOCOL 31

7 CONDUCTED EMISSIONS 32

7.1 LIMIT 32

7.2 TEST CONFIGURATION 32

7.3 MEASUREMENT PROCEDURE 33

7.4 TEST RESULTS OF CONDUCTED EMISSIONS..... 34

8 99% AND 20DB BANDWIDTH 36

8.1 LIMIT..... 36

8.2 TEST CONFIGURATION 36

8.3 TEST PROCEDURE AND TEST SET UP 37

8.4 TEST PROTOCOL 38

TEST REPORT

9 ANTENNA REQUIREMENT..... 39

Revision History

| Report No. | Version | Description | Issued Date |
|------------------|---------|-------------------------|-------------|
| 220801344SHA-006 | Rev. 01 | Initial issue of report | Oct 2, 2022 |
| | | | |

Measurement result summary

| TEST ITEM | FCC REFERANCE | IC REFERANCE | RESULT |
|------------------------|-------------------|------------------------------|--------|
| Fundamental emission | 15.225(a) (b) (c) | RSS-210 Annex B.6(a) (b) (c) | Pass |
| Spurious emission | 15.225(d) | RSS-210 Annex B.6(d) | Pass |
| Frequency stability | 15.225(e) | RSS-210 Annex B.6(e) | Pass |
| Conducted emissions | 15.207 | RSS-GEN Clause 8.8 | Pass |
| 99% and 20dB Bandwidth | 15.215(c) | RSS-GEN Clause 6.7 | Pass |
| Antenna requirement | 15.203 | - | Pass |

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

| | |
|-----------------------|---|
| Product name: | Customer Display |
| Type/Model: | 7 Inch CFD |
| Description of EUT: | There is one model only. The RF function is assessed in this report. The device supports RFID dual bands (125kHz as well 13.56MHz). Among this report only 13.56MHz RFID was assessed. |
| Rating: | DC 5V, 2A |
| Category of EUT: | Class A |
| EUT type: | <input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing |
| Software Version: | / |
| Hardware Version: | / |
| Sample received date: | Sep 10, 2022 |
| Date of test: | Sep 10, 2022 – Sep 29, 2022 |

1.2 Technical Specification

| | |
|------------------|----------------------|
| Frequency Range: | 13.56MHz ~ 13.56 MHz |
|------------------|----------------------|

TEST REPORT

1.3 Description of Test Facility

| | |
|------------|--|
| Name: | Intertek Testing Services Shanghai |
| Address: | Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China |
| Telephone: | 86 21 61278200 |
| Telefax: | 86 21 54262353 |

| | |
|---|--|
| The test facility is recognized, certified, or accredited by these organizations: | CNAS Accreditation Lab Registration No. CNAS L0139 |
| | FCC Accredited Lab Designation Number: CN1175 |
| | IC Registration Lab Registration code No.: 2042B-1 |
| | VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252 |
| | NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0 |
| | A2LA Accreditation Lab Certificate Number: 3309.02 |

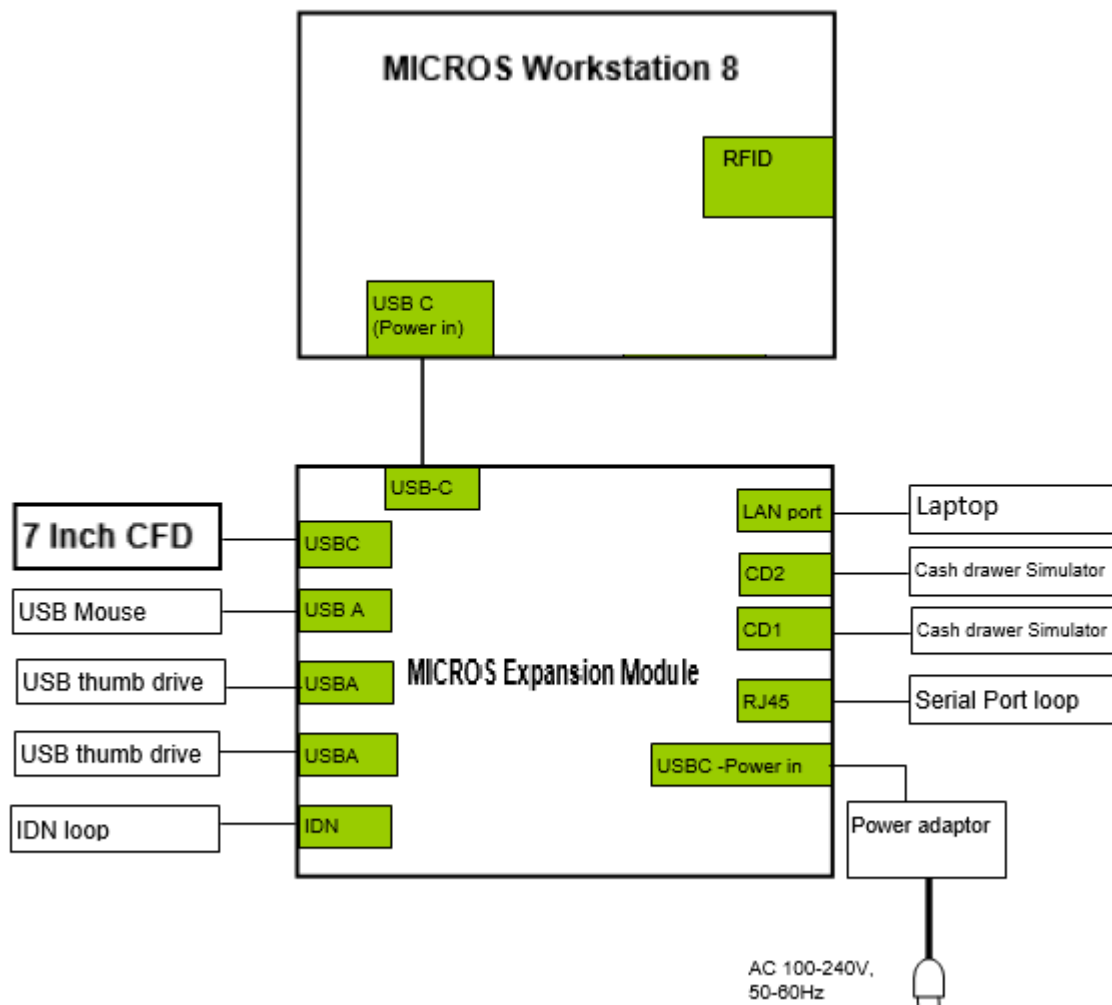
2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2020)
 RSS-210 (Issue 9)
 RSS-Gen (Issue 5)
 ANSI C63.10 (2013)

2.2 Mode of operation during the test

While testing, the internal modulation and continuously transmission was applied.
 The test was conducted with test setup as below.



TEST REPORT

2.3 Test software list

| Test Items | Software | Manufacturer | Version |
|--------------------|----------|--------------|---------|
| Conducted emission | ESxS-K1 | R&S | V2.1.0 |
| Radiated emission | ES-K1 | R&S | V1.71 |

2.4 Test peripherals list

| Item No | Description | Band and Model | Others |
|---------|-----------------------|----------------------------------|--|
| 1 | Workstation | Oracle / MICROS Workstation 8 | / |
| 2 | I/O Hub | Oracle / MICROS Expansion Module | / |
| 3 | Cash driver simulator | / | / |
| 4 | USB mouse | DELL / MS116p | / |
| 5 | USB drive | SanDisk / BL201126210Z | / |
| 6 | Laptop | DELL / Latitude E5470 | / |
| 7 | AC/DC adapter | FSP / FSP065-A1BR3 | Power input: 100-240VAC, 1.7A, 50-60Hz |

2.5 Test environment condition:

| Test items | Temperature | Humidity |
|-------------------------------|-------------|----------|
| Radiated emission | 20°C | 54% RH |
| Power line conducted emission | 20°C | 54% RH |

TEST REPORT

2.6 Instrument list

| Conducted Emission/Disturbance Power/Tri-loop Test/CDN method | | | | | |
|---|--------------------------------------|--------------|-------------|--------------|------------|
| Used | Equipment | Manufacturer | Type | Internal no. | Due date |
| <input checked="" type="checkbox"/> | Test Receiver | R&S | ESR7 | EC 6194 | 2022-12-9 |
| <input type="checkbox"/> | Attenuator | Hua Xiang | Ts5-10db-6g | EC 6194-1 | 2022-12-9 |
| <input checked="" type="checkbox"/> | A.M.N. | R&S | ESH2-Z5 | EC 3119 | 2022-11-9 |
| Radiated Emission | | | | | |
| Used | Equipment | Manufacturer | Type | Internal no. | Due date |
| <input checked="" type="checkbox"/> | Test Receiver | R&S | ESIB 26 | EC 3045 | 2022-10-19 |
| <input checked="" type="checkbox"/> | TRILOG broadband Antenna | Schwarzbeck | VULB9168 | EC6402 | 2023-1-17 |
| <input checked="" type="checkbox"/> | Pre-amplifier | tonscend | tap01018050 | EC 6432-1 | 2022-12-26 |
| <input checked="" type="checkbox"/> | Horn antenna | tonscend | bha9120d | EC 6432-2 | 2023-1-9 |
| <input checked="" type="checkbox"/> | Horn antenna | TOYO | HAP18-26W | EC 4792-3 | 2023-07-08 |
| <input checked="" type="checkbox"/> | Active loop antenna | Schwarzbeck | FMZB1519 | EC 5345 | 2023-04-23 |
| RF test | | | | | |
| Used | Equipment | Manufacturer | Type | Internal no. | Due date |
| <input checked="" type="checkbox"/> | PXA Signal Analyzer | Keysight | N9030A | EC 5338 | 2023-03-14 |
| <input type="checkbox"/> | Power sensor | Agilent | U2021XA | EC 5338-1 | 2023-03-14 |
| <input type="checkbox"/> | Vector Signal Generator | Agilent | N5182B | EC 5175 | 2023-03-14 |
| <input type="checkbox"/> | Universal Radio Communication Tester | R&S | CMW500 | EC5944 | 2023-1-20 |
| <input type="checkbox"/> | MXG Analog Signal Generator | Agilent | N5181A | EC 5338-2 | 2023-03-14 |
| <input type="checkbox"/> | Mobile Test System | Litepoint | lqxel | EC 5176 | 2023-01-11 |
| <input type="checkbox"/> | Test Receiver | R&S | ESCI 7 | EC 4501 | 2022-12-9 |
| <input checked="" type="checkbox"/> | Climate chamber | GWS | MT3065 | EC 6021 | 2023-03-06 |
| <input type="checkbox"/> | Universal Radio Communication Tester | R&S | CMW500 | Ec6209 | 2023-1-20 |
| Tet Site | | | | | |
| Used | Equipment | Manufacturer | Type | Internal no. | Due date |
| <input checked="" type="checkbox"/> | Shielded room | Zhongyu | - | EC 2838 | 2023-01-11 |
| <input type="checkbox"/> | Shielded room | Zhongyu | - | EC 2839 | 2023-01-11 |

TEST REPORT

| | | | | | |
|-------------------------------------|-----------------------|-------------------|-----------------|--------------|------------|
| <input checked="" type="checkbox"/> | Semi-anechoic chamber | Albatross project | - | EC 3048 | 2023-08-22 |
| Additional instrument | | | | | |
| Used | Equipment | Manufacturer | Type | Internal no. | Due date |
| <input checked="" type="checkbox"/> | Thermo-Hygrograph | ZJ1-2A | S.M.I.F. | EC 3783 | 2023-03-24 |
| <input type="checkbox"/> | Thermo-Hygrograph | ZJ1-2A | S.M.I.F. | EC 5198 | 2023-03-08 |
| <input checked="" type="checkbox"/> | Thermo-Hygrograph | ZJ1-2A | S.M.I.F. | EC 3442 | 2023-01-03 |
| <input type="checkbox"/> | Thermo-Hygrograph | ZJ1-2A | S.M.I.F. | EC 5844 | 2023-03-8 |
| <input checked="" type="checkbox"/> | Pressure meter | YM3 | Shanghai Mengde | EC 3320 | 2023-07-21 |

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Measurement | Frequency | Expanded Uncertainty (k=2) |
|-----------------------------------|----------------|----------------------------|
| Conducted emission at mains ports | 9kHz ~ 150kHz | 3.52 dB |
| | 150kHz ~ 30MHz | 3.19 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 1GHz | 4.90 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 6GHz | 5.02 dB |
| | 6GHz ~ 18GHz | 5.28 dB |

TEST REPORT

3 Fundamental Emission

Test result: Pass

3.1 Limit

| Frequencies (MHz) | Limit at 30m (dBuV/m) | Limit at 3m (dBuV/m) |
|-------------------|-----------------------|----------------------|
| 13.110 – 13.410 | 40.50 | 80.50 |
| 13.410 – 13.553 | 50.50 | 90.50 |
| 13.553 – 13.567 | 84.00 | 124.00 |
| 13.567 – 13.710 | 50.50 | 90.50 |
| 13.710 – 14.010 | 40.50 | 80.50 |

3.2 Measurement Procedure

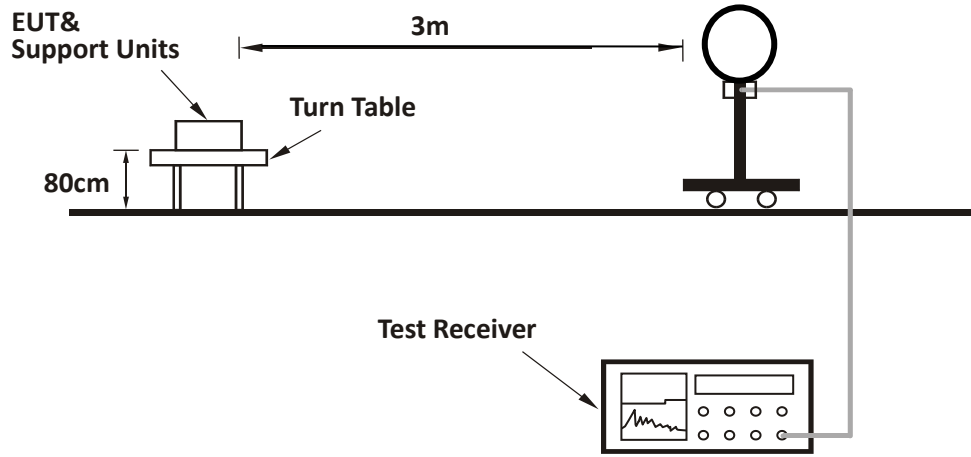
- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) Both X and Y axes of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to PK Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

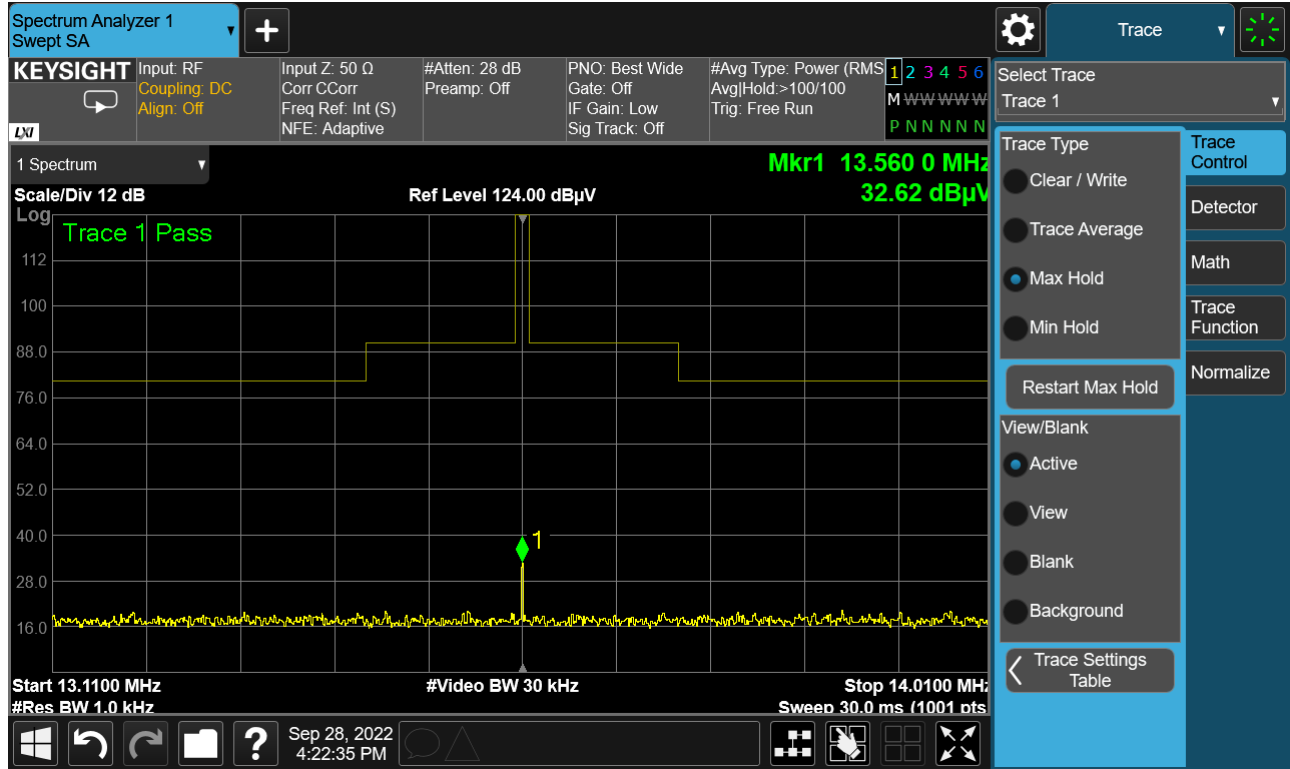
TEST REPORT

3.3 Test Configuration



TEST REPORT

3.4 Test Results of Fundamental Emissions



| Antenna Polarization | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin | Detector |
|----------------------|-----------------|----------------------------|-----------------------|----------------|--------|----------|
| X | 13.56 | 32.60 | 11.20 | 124.00 | 91.40 | PK |
| Y | 13.56 | 30.80 | 11.20 | 124.00 | 93.20 | PK |
| Z | 13.56 | 28.40 | 11.20 | 124.00 | 95.60 | PK |

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB, Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, Limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
 Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
 Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

4 Spurious Emission

Test result: Pass

4.1 Limit

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

4.2 Measurement Procedure

For Radiated emission below 30MHz:

- f) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- g) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- h) Both X and Y axes of the antenna are set to make the measurement.
- i) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- j) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the

TEST REPORT

maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

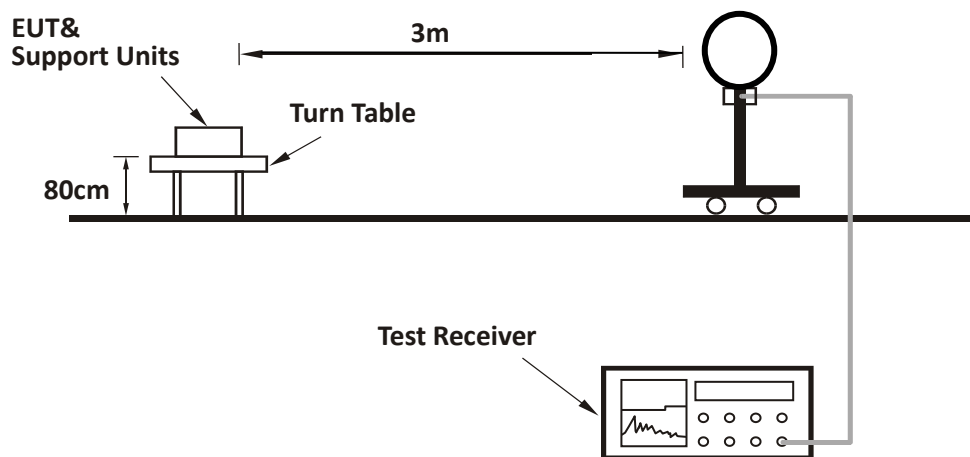
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

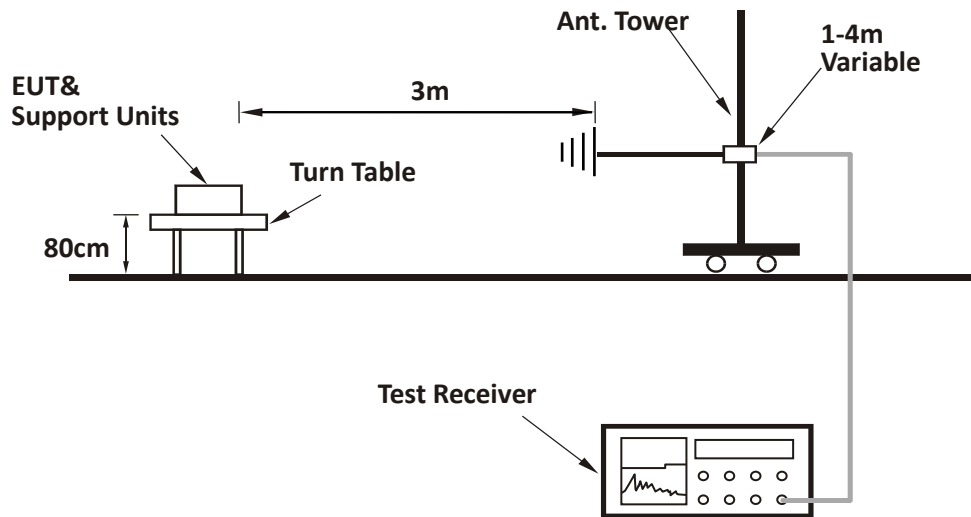
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. All modes of operation were evaluated and the worst-case emissions were reported

4.3 Test Configuration

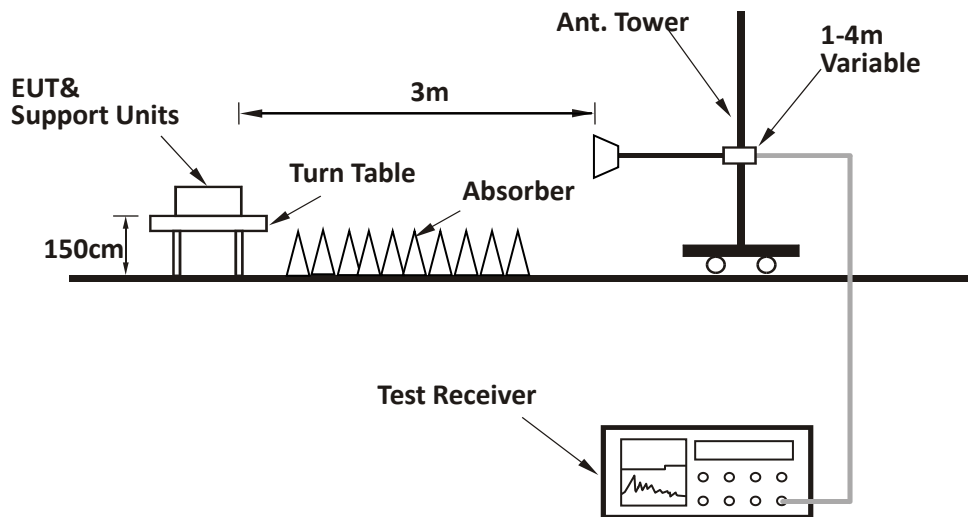
For Radiated emission below 30MHz:



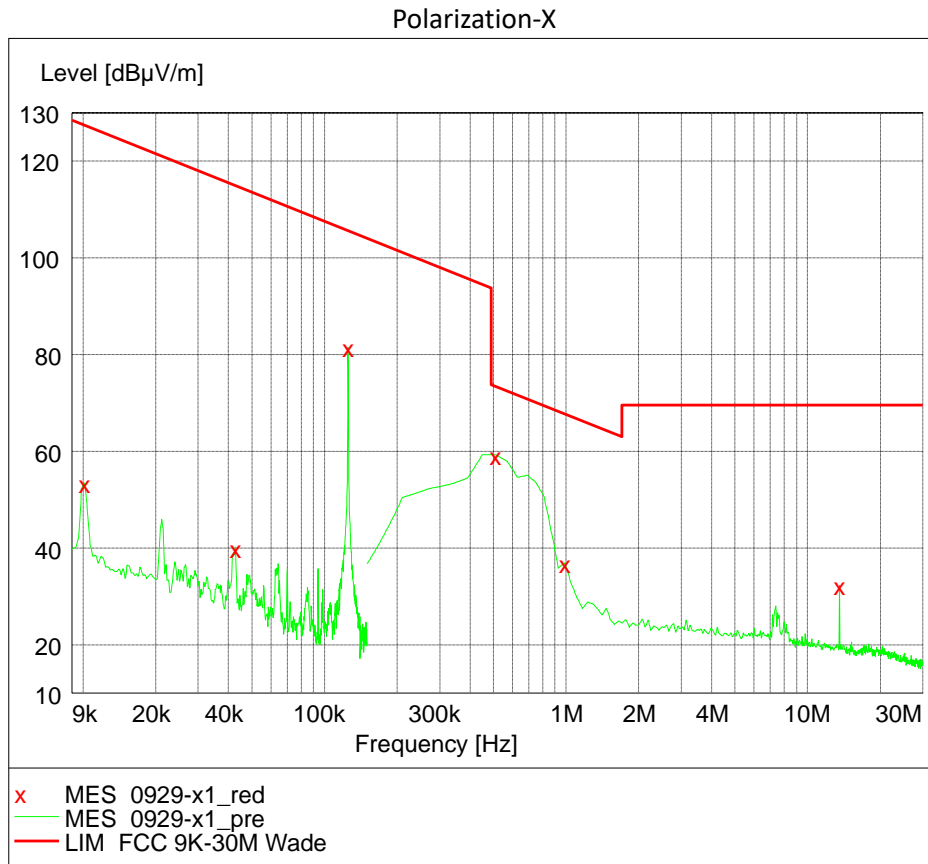
For Radiated emission 30MHz to 1GHz:



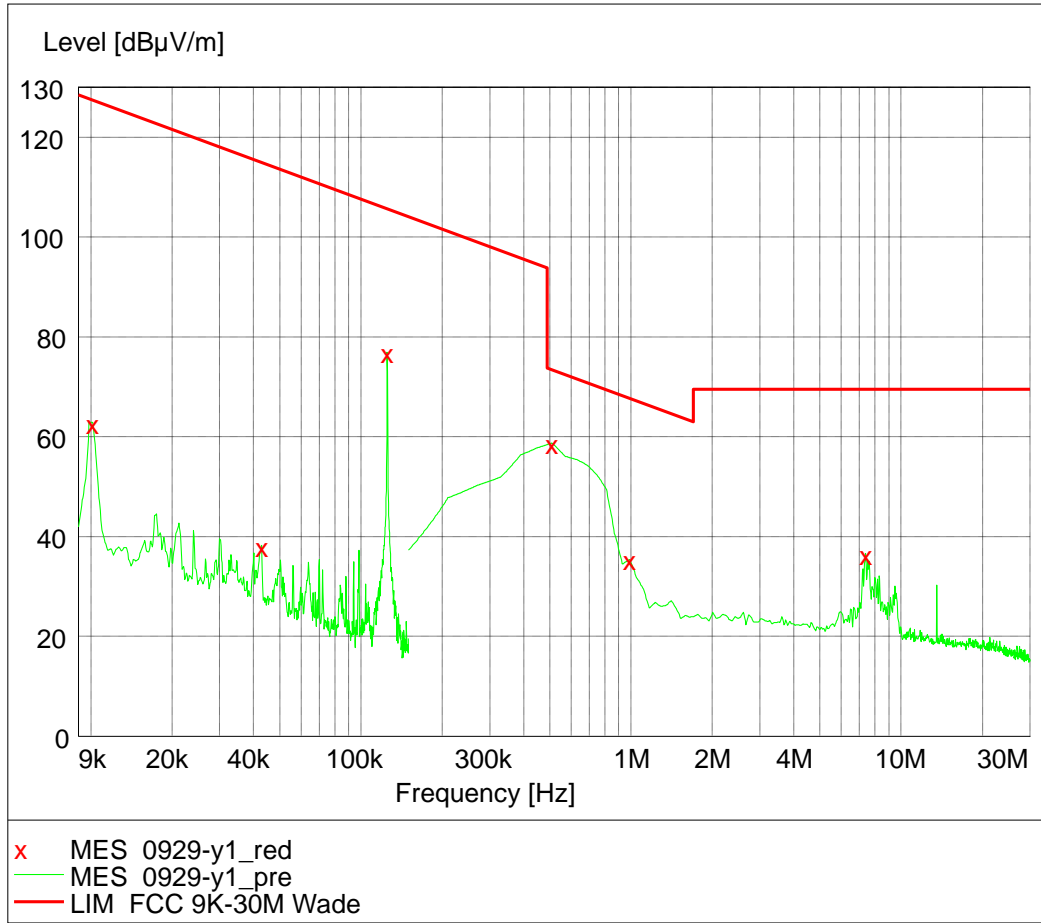
For Radiated emission above 1GHz:



4.4 Test Results of Radiated Emissions

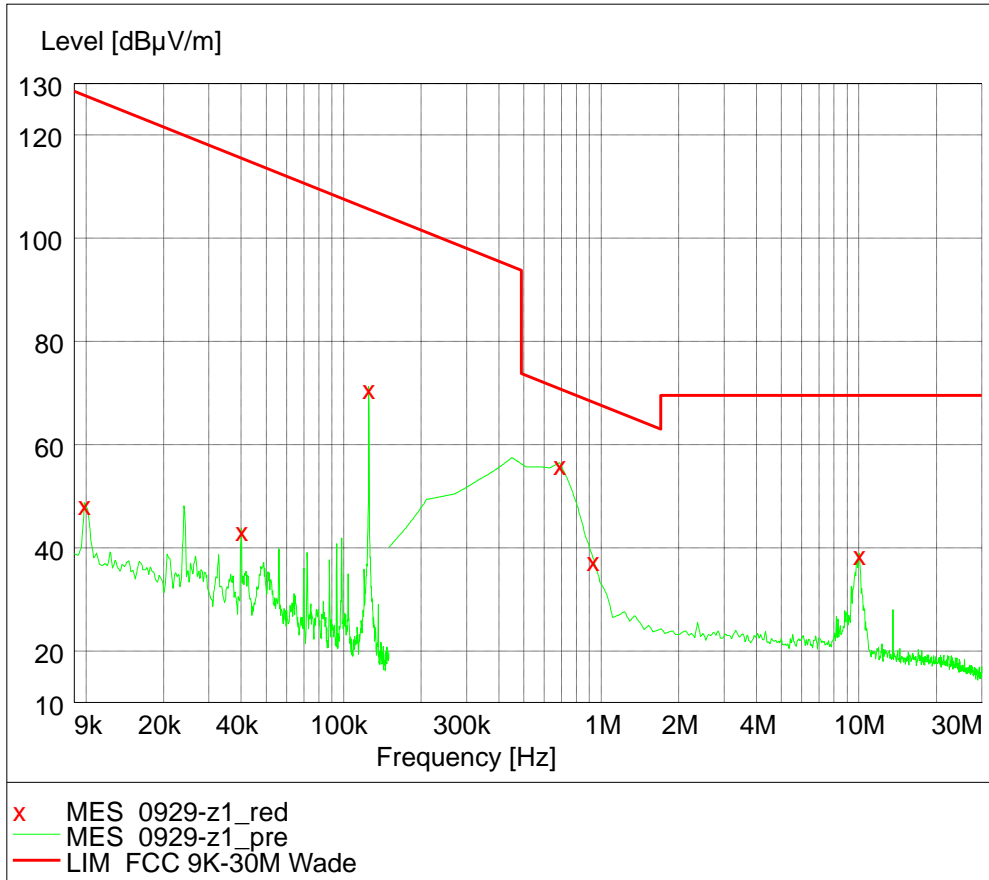


Polarization-Y



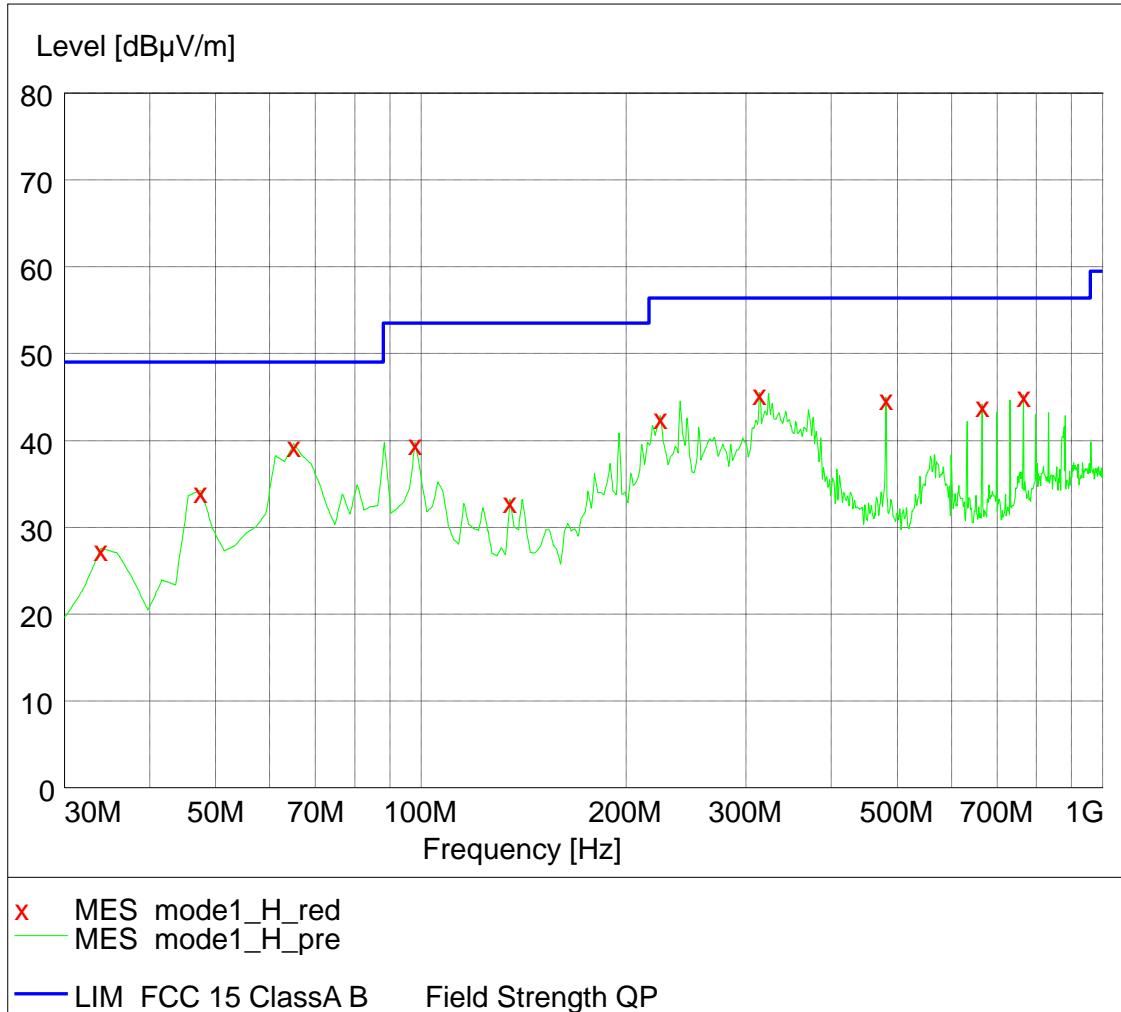
TEST REPORT

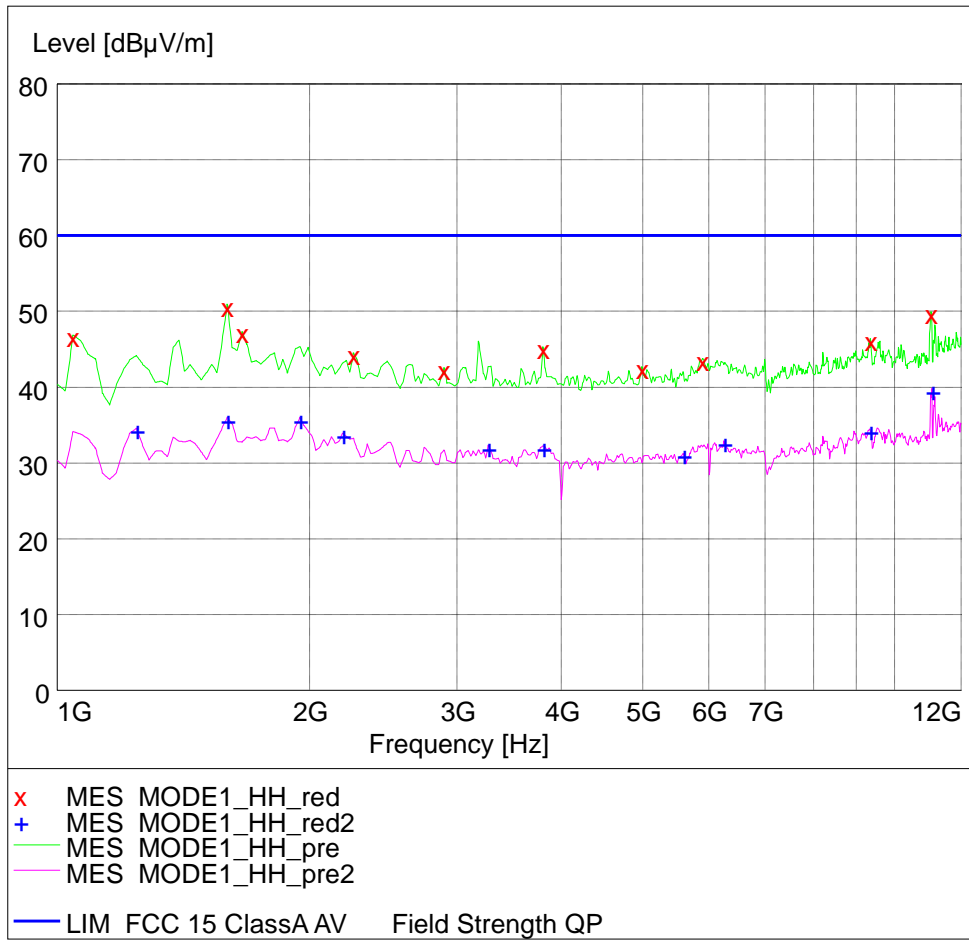
Polarization-Z



TEST REPORT

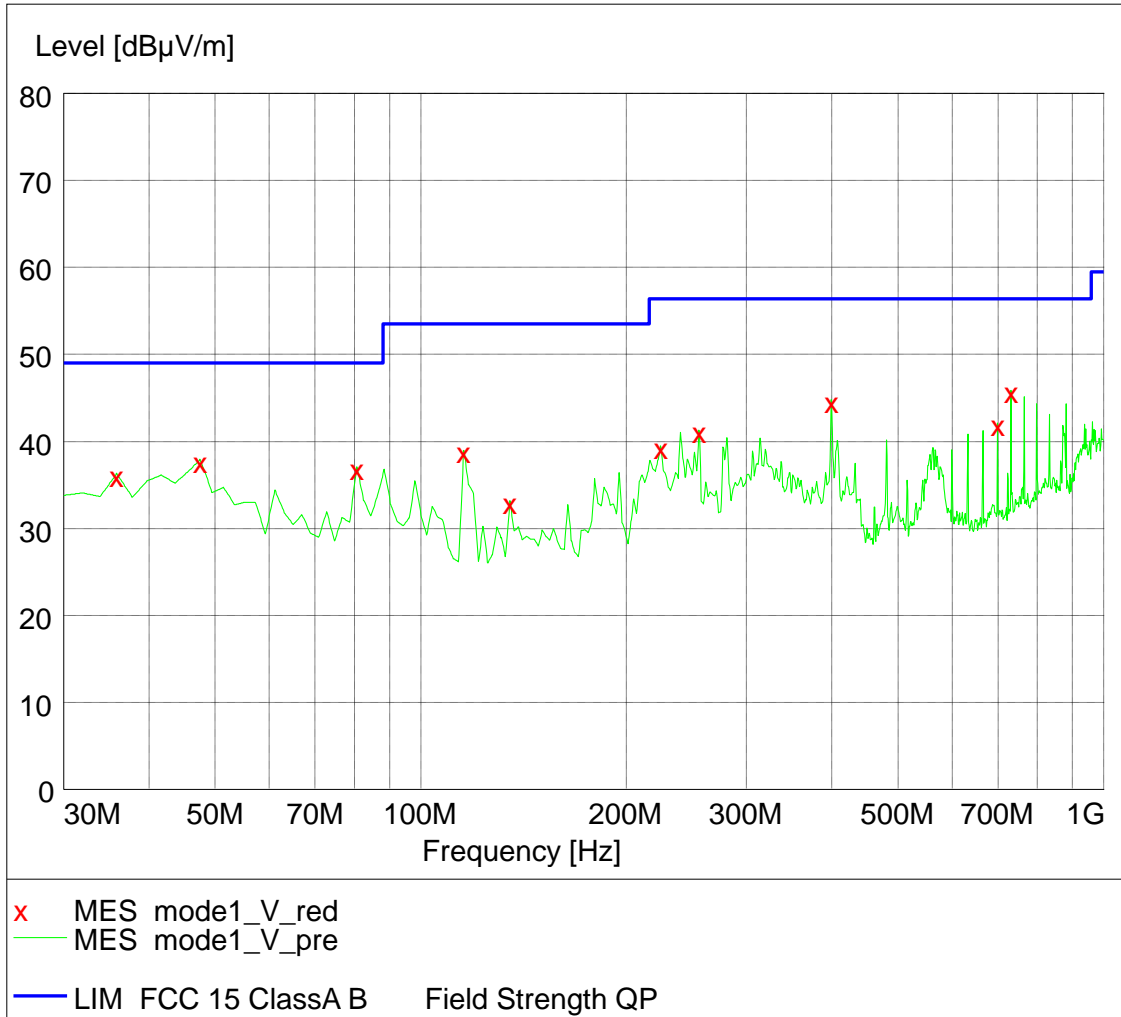
Polarization-H



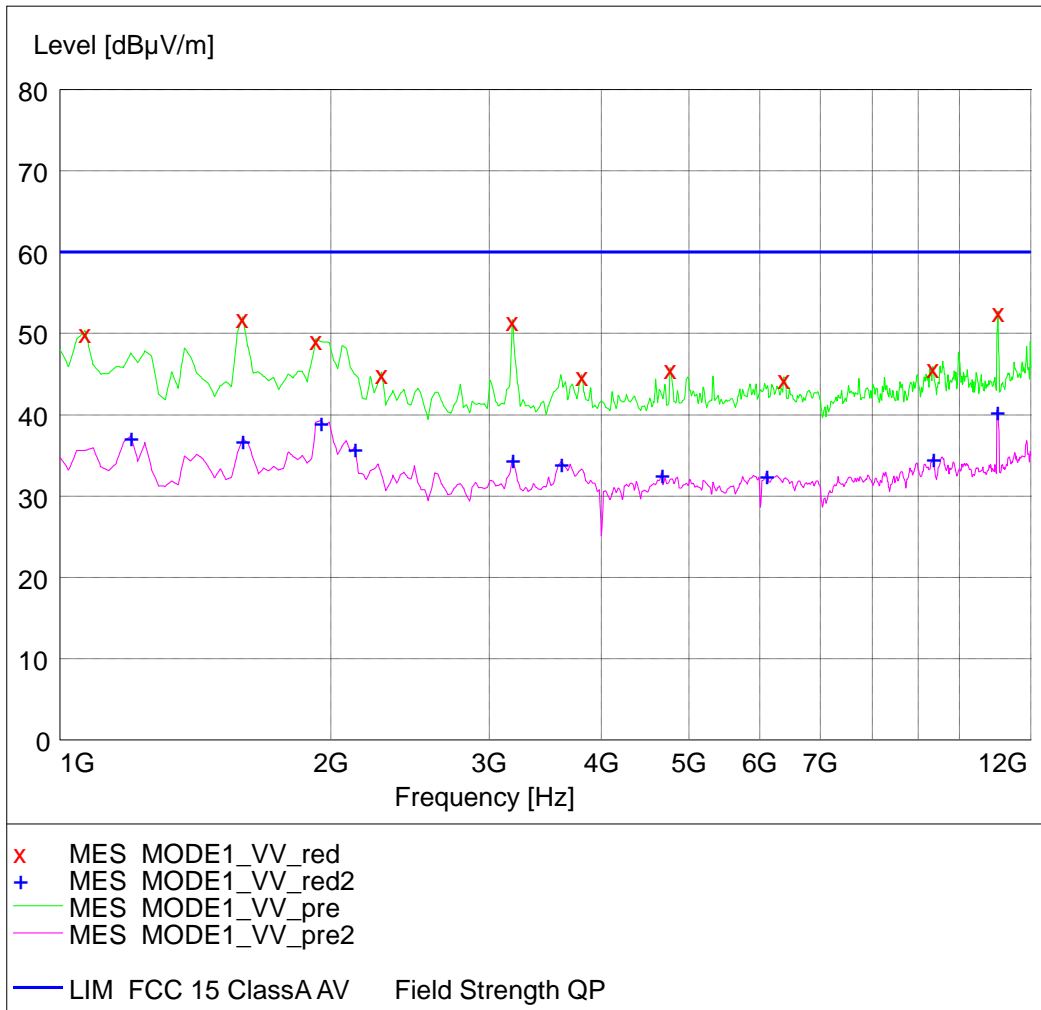


TEST REPORT

Polarization-V



TEST REPORT



TEST REPORT

Test data below 30MHz (RFID 125kHz and 13.56MHz transmit simultaneously, while the fundamental emission of 125kHz was not assessed in this report):

| Antenna Polarization | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin | Detector | Remark |
|----------------------|-----------------|----------------------------|-----------------------|----------------|--------|----------|----------|
| X | 0.508 | 59.30 | 10.60 | 73.50 | 14.20 | PK | Spurious |
| Z | 0.688 | 56.50 | 10.60 | 70.90 | 14.40 | PK | Spurious |
| Y | 7.388 | 36.60 | 11.60 | 69.50 | 32.90 | PK | Spurious |
| Z | 10.02 | 39.00 | 11.90 | 69.50 | 30.50 | PK | Spurious |

Test data higher than 30MHz:

| Antenna Polarization | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin | Detector |
|----------------------|-----------------|----------------------------|-----------------------|----------------|--------|----------|
| H | 313.81 | 45.50 | 15.50 | 56.40 | 10.90 | PK |
| H | 480.98 | 45.00 | 19.70 | 56.40 | 11.40 | PK |
| H | 665.65 | 44.20 | 23.10 | 56.40 | 12.20 | PK |
| H | 764.79 | 45.30 | 24.80 | 56.40 | 11.10 | PK |
| H | 1595.19 | 50.90 | -6.80 | 79.50 | 28.60 | PK |
| H | 1595.19 | 36.00 | -6.80 | 59.50 | 23.50 | AV |
| V | 399.34 | 44.80 | 17.50 | 56.40 | 11.60 | PK |
| V | 731.74 | 45.90 | 24.20 | 56.40 | 10.50 | PK |
| V | 3182.36 | 51.70 | -0.50 | 79.50 | 27.80 | PK |
| V | 3182.36 | 34.70 | -0.50 | 59.50 | 24.80 | AV |
| V | 11030.06 | 52.80 | 13.30 | 79.50 | 26.70 | PK |
| V | 11030.06 | 40.60 | 13.30 | 59.50 | 18.90 | AV |

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.

2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = Limit - Corrected Reading

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB, Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, Limit = 40.00dBuV/m.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;

Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;

Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

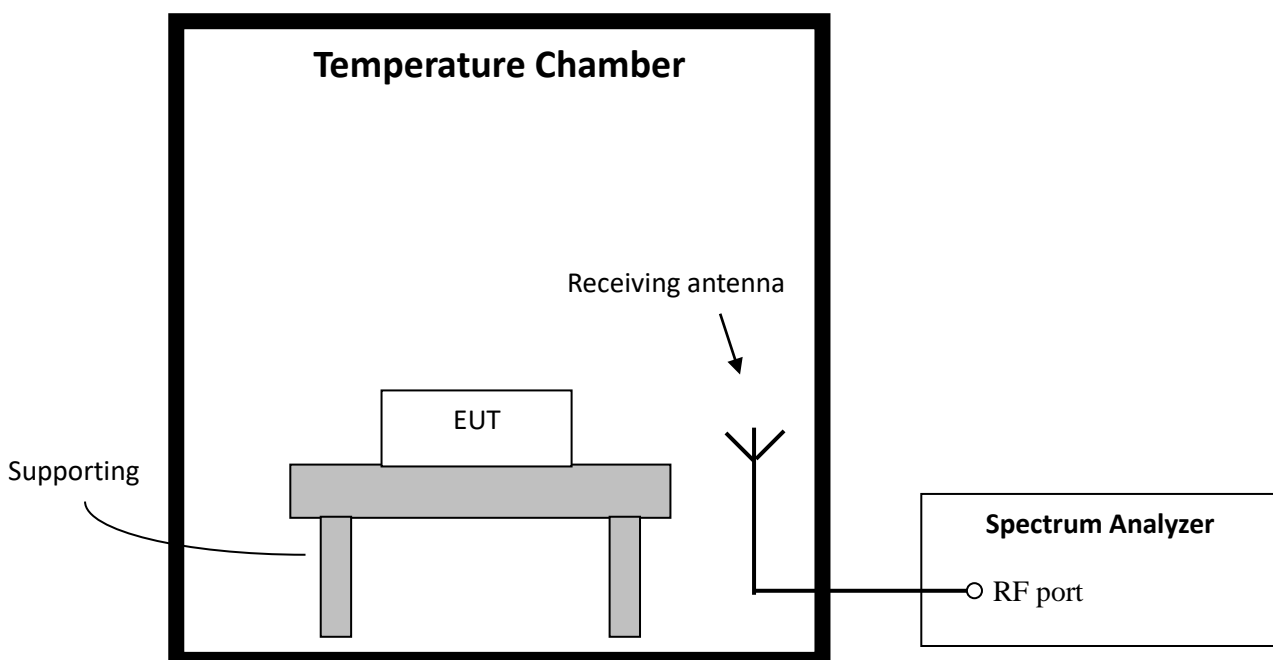
5 Frequency Stability (Temperature Variation)

Test result: **PASS**

5.1 Test limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage.

5.2 Test Configuration



5.3 Test procedure and test setup

Test Procedure as per ANSI 63.10 clause 6.8.1.

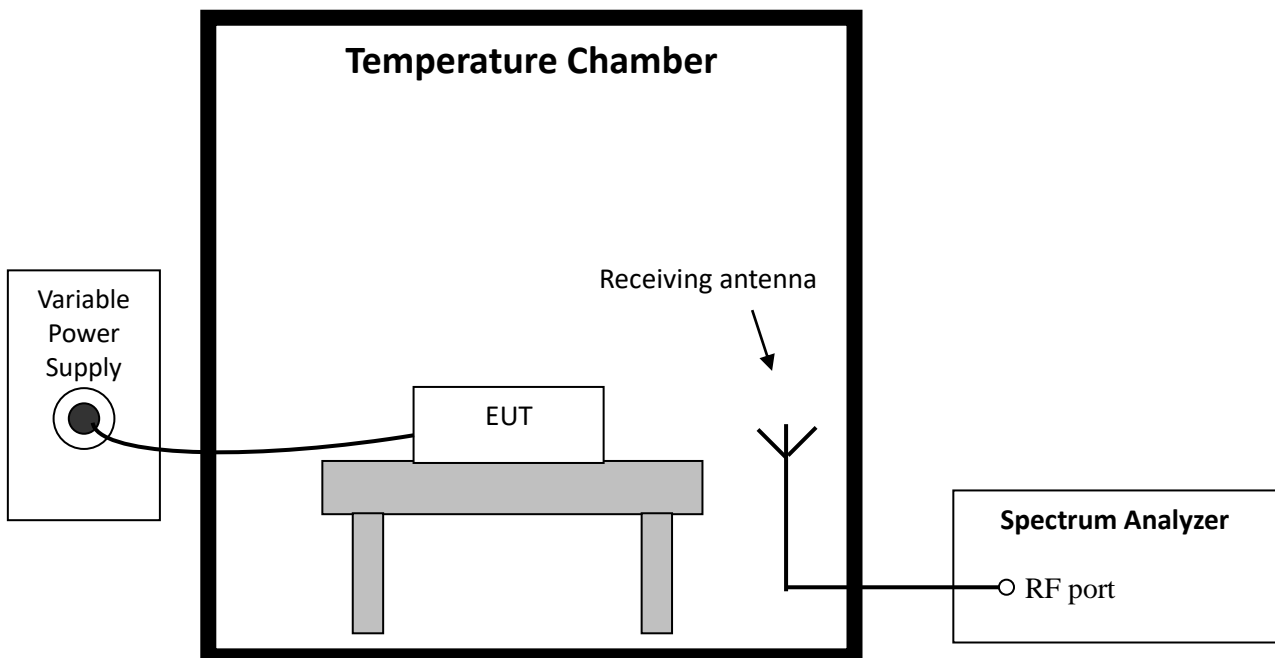
TEST REPORT

5.4 Test protocol

| Voltage (V) | Temp (°C) | Freq measured (MHz) | Freq nominal (MHz) | Tolerance (%) | Limit (%) |
|-------------|-----------|---------------------|--------------------|---------------|-----------|
| 5 | -20 | 13.560 | 13.560 | 0 | 0.01 |
| | -10 | 13.560 | | 0 | |
| | 0 | 13.560 | | 0 | |
| | 10 | 13.560 | | 0 | |
| | 20 | 13.560 | | 0 | |
| | 30 | 13.560 | | 0 | |
| | 40 | 13.560 | | 0 | |
| | 50 | 13.559 | | 0.007 | |

TEST REPORT**6 Frequency Stability (Voltage Variation)****Test result: PASS****6.1 Test limit**

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.2 Test Configuration**6.3 Test procedure and test setup**

Test Procedure as per ANSI 63.10 clause 6.8.2.

TEST REPORT

6.4 Test protocol

| Temp (°C) | Voltage (V) | Freq Measured (MHz) | Freq nominal (MHz) | Tolerance (%) | Limit (%) |
|---|-------------|---------------------|--------------------|---------------|-----------|
| 20 | 120 | 13.560 | 13.560 | 0 | 0.01 |
| | 102 | 13.560 | | 0 | |
| | 138 | 13.560 | | 0 | |
| Note: here the voltage is on the input port of the AC/DC Adapter. | | | | | |

7 Conducted emissions

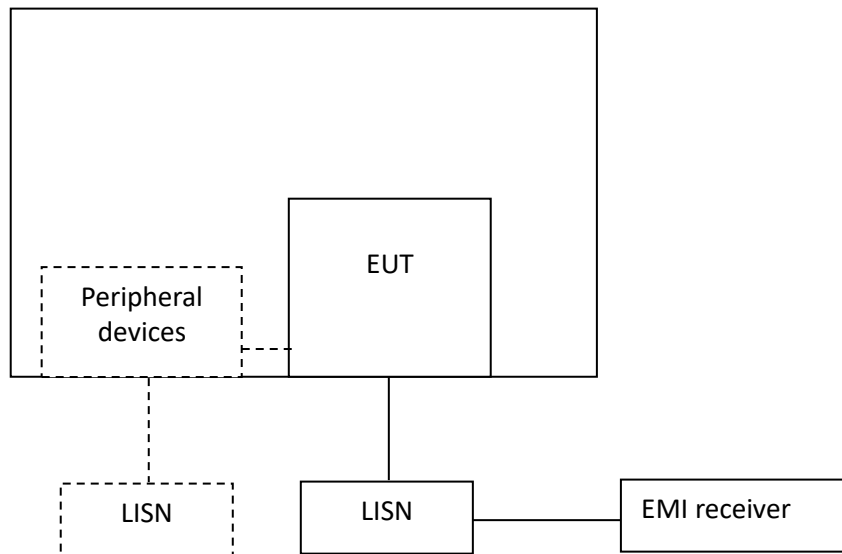
Test result: Pass

7.1 Limit

| Frequency of Emission (MHz) | Conducted Emissions Limit (dBuV) | |
|-----------------------------|----------------------------------|----|
| | QP | AV |
| 0.15 ~ 0.5 | 79 | 66 |
| 0.5 ~ 30 | 73 | 60 |

* Decreases with the logarithm of the frequency.

7.2 Test Configuration



TEST REPORT**7.3 Measurement Procedure**

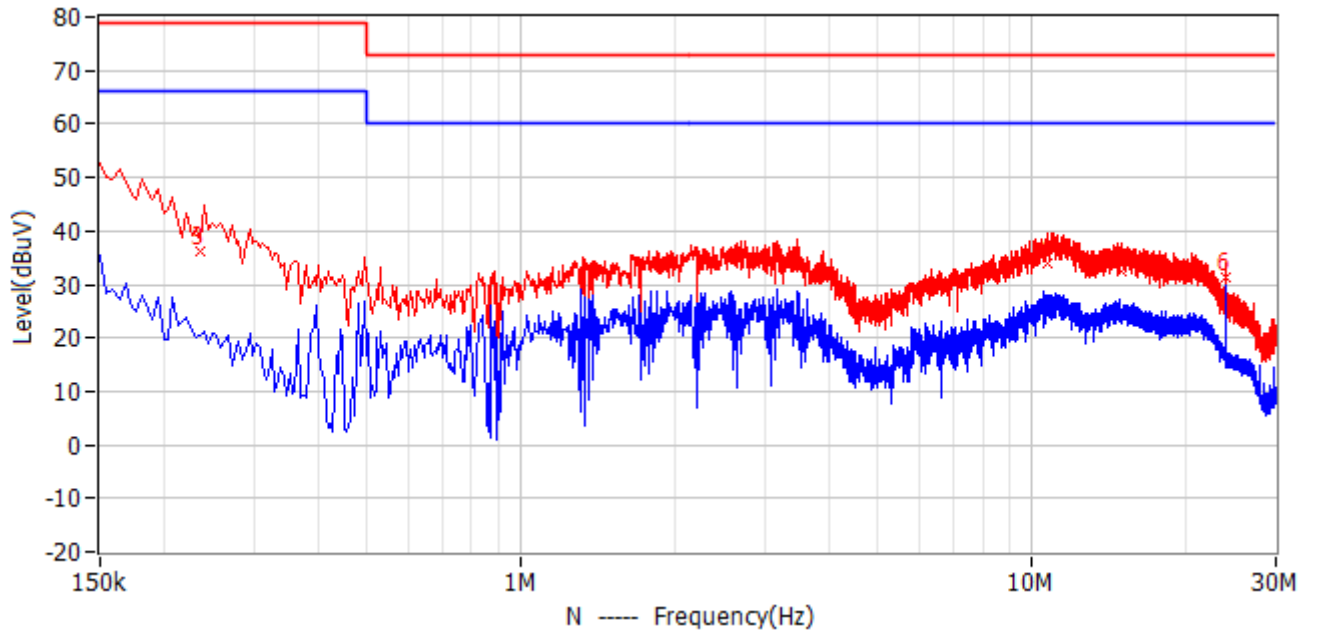
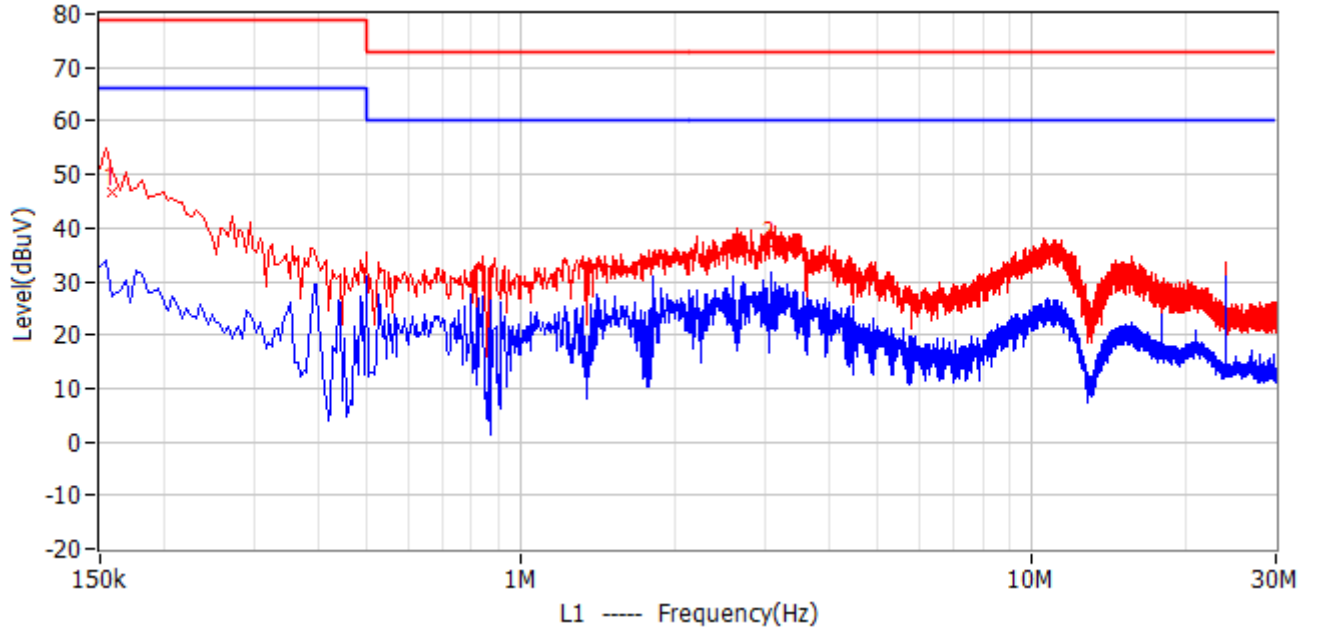
Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

TEST REPORT

7.4 Test Results of Conducted Emissions



TEST REPORT

| No. | Frequency | Limit dBuV | Level dBuV | Delta dB | Reading dBuV | Factor dB | Detector | Phase |
|-----|------------|------------|------------|----------|--------------|-----------|----------|-------|
| 1 | 159.000kHz | 79.0 | 46.6 | -32.4 | 40.4 | 6.2 | QP | L1 |
| 2 | 3.089MHz | 73.0 | 36.5 | -36.5 | 30.3 | 6.2 | QP | L1 |
| 3 | 235.500kHz | 79.0 | 36.3 | -42.7 | 30.1 | 6.2 | QP | N |
| 4 | 10.752MHz | 73.0 | 34.0 | -39.0 | 27.6 | 6.4 | QP | N |
| 5 | 14.978MHz | 73.0 | 32.5 | -40.5 | 26.0 | 6.5 | QP | N |
| 6 | 23.843MHz | 73.0 | 31.4 | -41.6 | 24.9 | 6.5 | QP | N |

Remark: 1. Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Level = Reading + Factor

3. QP = Level - Limit

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

TEST REPORT

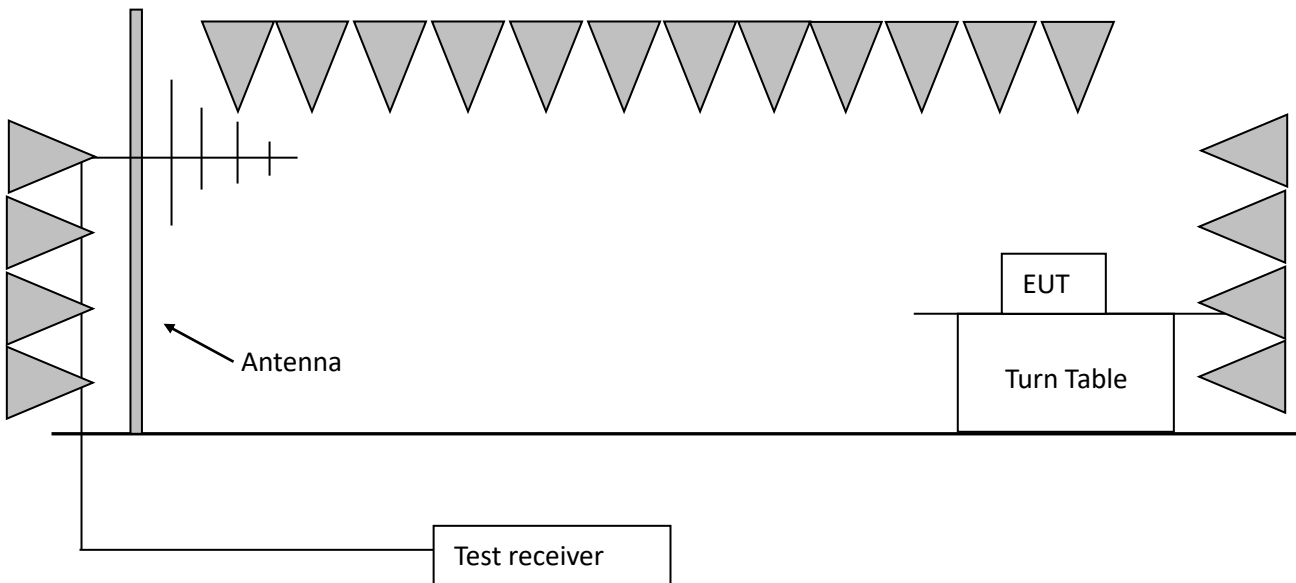
8 99% and 20dB Bandwidth

Test result: Pass

8.1 Limit

The 20dB bandwidth should be fallen in the allocated operating frequency range.
No limit for 99% bandwidth.

8.2 Test configuration



TEST REPORT**8.3 Test procedure and test set up**

The measurement was applied in a 3m semi-anechoic chamber.

The center of the loop antenna shall be 1 m above the horizontal metal ground plane.

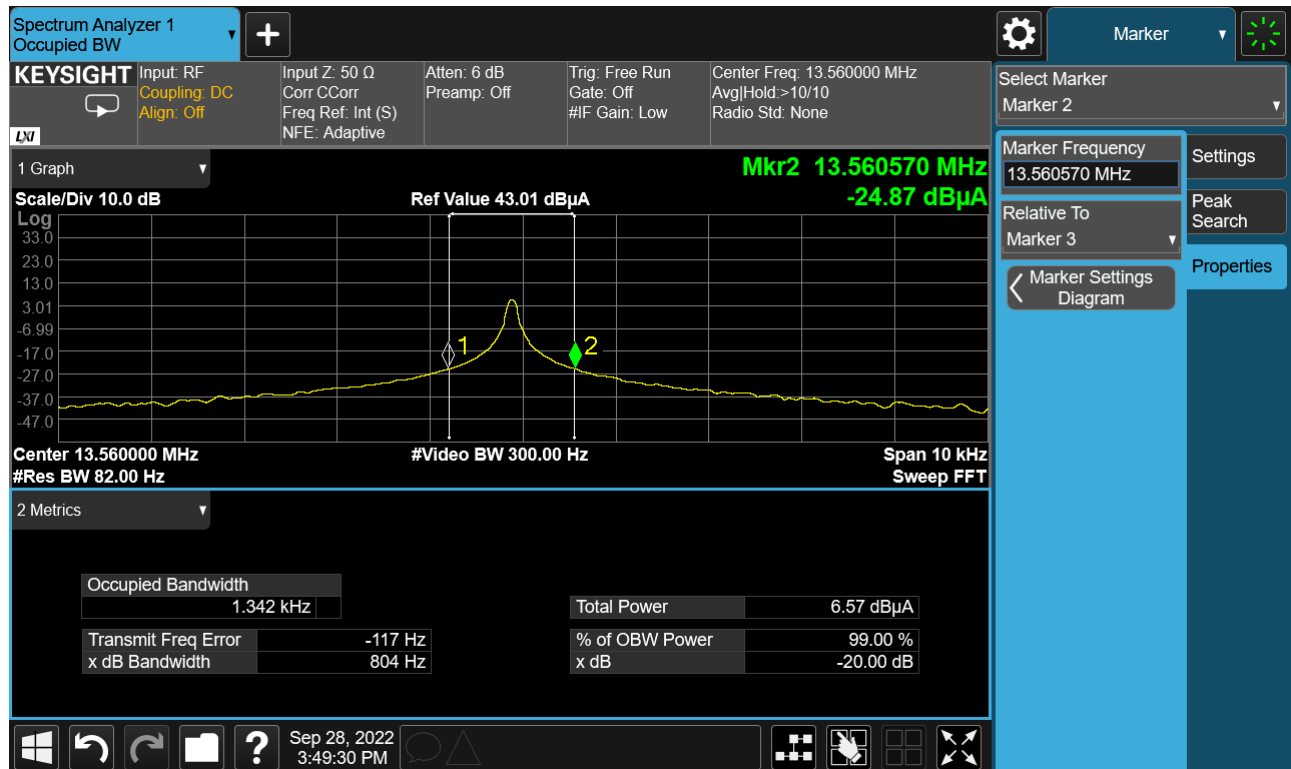
The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set RBW = 1 % to 5 % of the OBW
3. Set VBW $\geq 3 \cdot$ RBW
4. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
5. Use the 99 % power bandwidth function of the instrument (if available).
6. the 20dB bandwidth is also measured with the same setting.

TEST REPORT

8.4 Test protocol

| | Lower point (MHz) | Higher point (MHz) | Bandwidth (kHz) | Allocated bandwidth (MHz) |
|----------------|-------------------|--------------------|-----------------|---------------------------|
| 99% Bandwidth | 13.5593 | 13.5606 | 1.342 | / |
| 20dB Bandwidth | 13.5595 | 13.5604 | 0.804 | 13.553 ~ 13.567 |



TEST REPORT

9 Antenna requirement

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 shall be considered sufficient to comply with the provisions of this section.

Result:

EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

***** END *****