

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



FCC Applicant: Quanta Computer Inc
No.188, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377,
Taiwan (R.O.C)
Product Name: All-in-One PC
Brand Name: HP
Model No.: TPC-Q084-34
Model Difference: N/A
Report Number: E2/2021/40051
FCC ID HFSQTA-NZG
Issue Date: May 20, 2021
Date of Test: April 27, 2021 - May 13, 2021
Date of EUT Received: April 27, 2021

Approved By

Jim Chang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15C.

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Revision History

| Report Number | Revision | Description | Issue Date | Revised By |
|---------------|----------|-------------|--------------|------------|
| E2/2021/40051 | 00 | Original. | May 20, 2021 | Yami Kuo |

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1 GENERAL INFORMATION

1.1 Product Description

| | |
|-------------------|-----------------------------|
| Product Name: | All-in-One PC |
| Brand Name: | HP |
| Model No.: | TPC-Q084-34 |
| Model Difference: | N/A |
| Hardware Version: | N/A |
| Firmware Version: | N/A |
| Power Supply: | 19.5 Vdc from AC/DC Adapter |

1.2 RF Specification

| | |
|---------------------|-------------------------|
| Technology: | Wireless Power Transfer |
| Operating Frequency | 110kHz – 205KHz |
| FCC Transmit Power | < 81.49dBuV/m at 3m. |
| Number of Channels | 1 |
| Antenna Type | Loop Antenna |

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1.3 Test Methodology

FCC Part 15, Subpart C

ANSI C63.10:2013

1.4 Test Facility

| Laboratory | Test Site Address | Test Site Name | FCC Designation number | IC CAB identifier |
|---|---|----------------|------------------------|-------------------|
| SGS Taiwan Ltd. Central RF Lab. (TAF code 3702) | No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan. | SAC 1 | TW0027 | TW3702 |
| | | SAC 3 | | |
| | | Conduction 1 | | |
| | | Conducted 1 | | |
| | | Conducted 2 | | |
| | | Conducted 3 | | |
| | | Conducted 4 | | |
| | | Conducted 5 | | |
| | Conducted 6 | TW0028 | | |
| | Conduction A | | | |
| | SAC C | | | |
| | SAC D | | | |
| | SAC G | | | |
| | Conducted A | | | |
| | Conducted B | | | |
| | Conducted C | | | |
| | Conducted D | | | |
| | Conducted E | | | |
| | Conducted F | | | |
| | Conducted G | | | |

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.5 Special Accessories

There is no special accessory used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 9kHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for radiated emissions, measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Configuration of Tested System

Fig. 2-1 Conduction & Radiated Emission test set up configuration

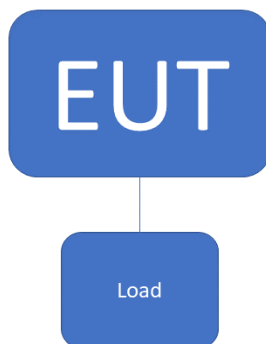


Table 2-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Data Cable | Power Cord |
|------|-------------------|-----------|----------------|------------|------------|------------|
| 1. | WPC Test Software | N/A | N/A | N/A | N/A | N/A |

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3 SUMMARY OF TEST RESULTS

| FCC Rules | Description Of Test | Result |
|-------------|---|-----------|
| §15.207 | AC Power Line Conducted Emission | Compliant |
| §15.209 | Radiated Emission Limits, general requirement | Compliant |
| §15.215 (c) | 20 dB OCCUPIED BANDWIDTH | Compliant |
| §15.203 | Antenna Requirement | Compliant |

4 DESCRIPTION OF TEST MODES

The EUT stay in continuous transmitting mode. The frequency is the default channel to test, where it is the only manipulative channel as this application supports.

The field strength of radiation emission was measured as EUT three orthogonal plans, E1 / E2 / H, are positioned to pre-scan the emission generating the highest one. The worst position is tested, and recorded.

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5 MEASUREMENT UNCERTAINTY

| Test Items | Uncertainty |
|----------------------------------|-------------|
| AC Power Line Conducted Emission | +/- 2.34 dB |
| Frequency Stability | +/- 1.53 Hz |
| Emission Bandwidth | +/- 1.53 Hz |
| Temperature | +/- 0.4 °C |
| Humidity | +/- 3.5 % |
| DC / AC Power Source | +/- 1 % |

| Radiated Spurious Emission Measurement Uncertainty | | | |
|--|-----|---------|-----------------|
| Polarization: Vertical | +/- | 2.64 dB | 9kHz~30MHz |
| | +/- | 4.93 dB | 30MHz - 1000MHz |
| | +/- | 4.81 dB | 1GHz - 18GHz |
| | +/- | 4.52 dB | 18GHz - 40GHz |
| Polarization: Horizontal | +/- | 2.64 dB | 9kHz~30MHz |
| | +/- | 4.45 dB | 30MHz - 1000MHz |
| | +/- | 4.81 dB | 1GHz - 18GHz |
| | +/- | 4.52 dB | 18GHz - 40GHz |

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 CONDUCTED EMISSIONS TEST

6.1 Limitation

According to section 15.207(a) Conducted Emission Limits as following.

| Frequency range MHz | Limits dB (uV) | |
|------------------------|-------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

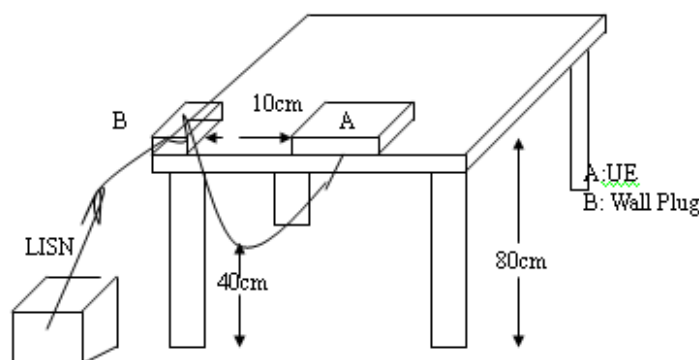
Note

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

6.2 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

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6.5 Measurement Equipment Used:

| Radiated Emission Test Site: Conduction A | | | | | |
|---|-----------------------------|---------------|---------------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Test Software | audix | e3 | Ver. 6.11-20180419c | N.C.R | N.C.R |
| LISN | SCHWARZBECK Mess-Elektronik | NSLK8127 | 973 | 03/25/2021 | 03/24/2022 |
| EMI Test Receiver | R&S | ESCI | 101342 | 04/27/2021 | 04/26/2022 |
| Coaxial Cable | EC Lab | RF-HY-CAB-250 | RF-HY-CAB-250-01 | 03/27/2021 | 03/26/2022 |
| Pulse Limiter | EC Lab | VTSD 9561F-N | 485 | 03/27/2021 | 03/26/2022 |

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6.6 Measurement Result:

Report Number :E2/2021/40051

Test Site :Conduction Room C

Test Mode :WPC

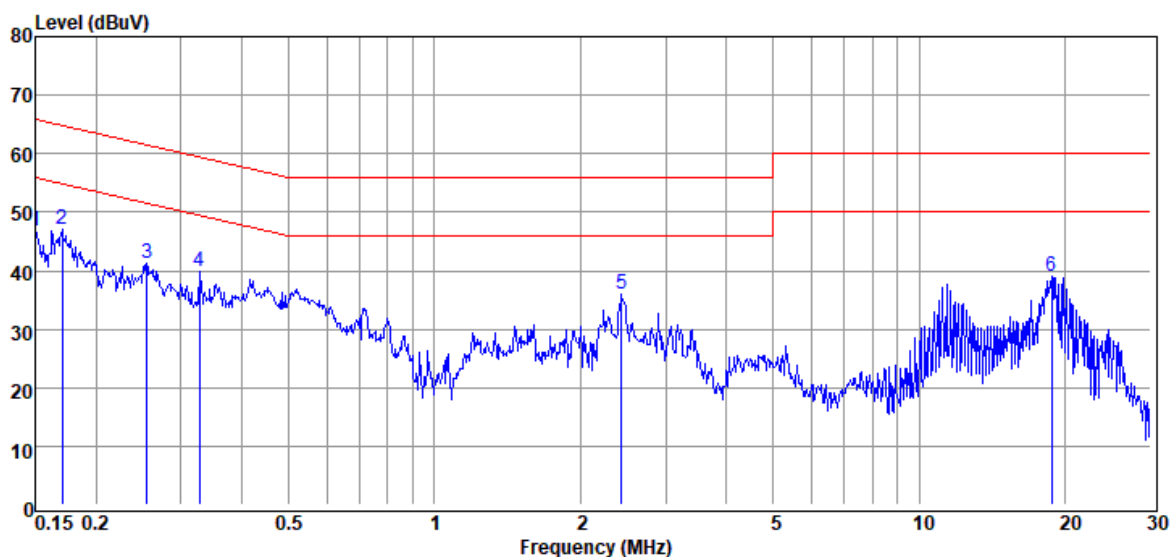
Test Date :2021-05-10

Power :120V/60Hz

Temp./Humi. :23.8/59

Probe :L1

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V | Limit dB μ V | Margin dB |
|--------------|------------------------------|---|--------------|----------------------------|---------------------|--------------|
| 0.15 | Peak | 36.60 | 10.30 | 46.90 | 66.00 | -19.10 |
| 0.17 | Peak | 36.73 | 10.30 | 47.03 | 64.94 | -17.91 |
| 0.25 | Peak | 30.95 | 10.31 | 41.26 | 61.60 | -20.34 |
| 0.33 | Peak | 29.44 | 10.30 | 39.74 | 59.53 | -19.79 |
| 2.44 | Peak | 24.95 | 11.03 | 35.98 | 56.00 | -20.02 |
| 18.72 | Peak | 28.09 | 10.85 | 38.94 | 60.00 | -21.06 |

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Report Number :E2/2021/40051

Test Mode :WPC

Power :120V/60Hz

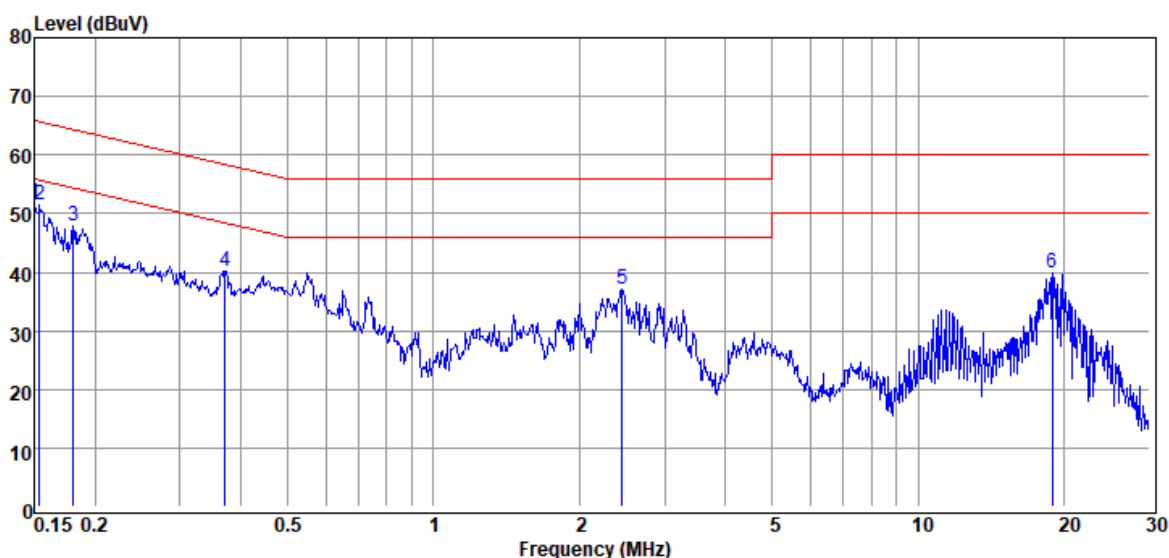
Probe :N

Test Site :Conduction Room C

Test Date :2021-05-10

Temp./Humi. :23.8/59

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V | Limit dB μ V | Margin dB |
|--------------|------------------------------|---|--------------|----------------------------|---------------------|--------------|
| 0.15 | Peak | 41.50 | 10.31 | 51.81 | 66.00 | -14.19 |
| 0.15 | Peak | 41.24 | 10.31 | 51.55 | 65.78 | -14.23 |
| 0.18 | Peak | 37.51 | 10.30 | 47.81 | 64.46 | -16.65 |
| 0.37 | Peak | 29.85 | 10.31 | 40.16 | 58.47 | -18.31 |
| 2.45 | Peak | 26.11 | 11.04 | 37.15 | 56.00 | -18.85 |
| 18.92 | Peak | 28.82 | 10.95 | 39.77 | 60.00 | -20.23 |

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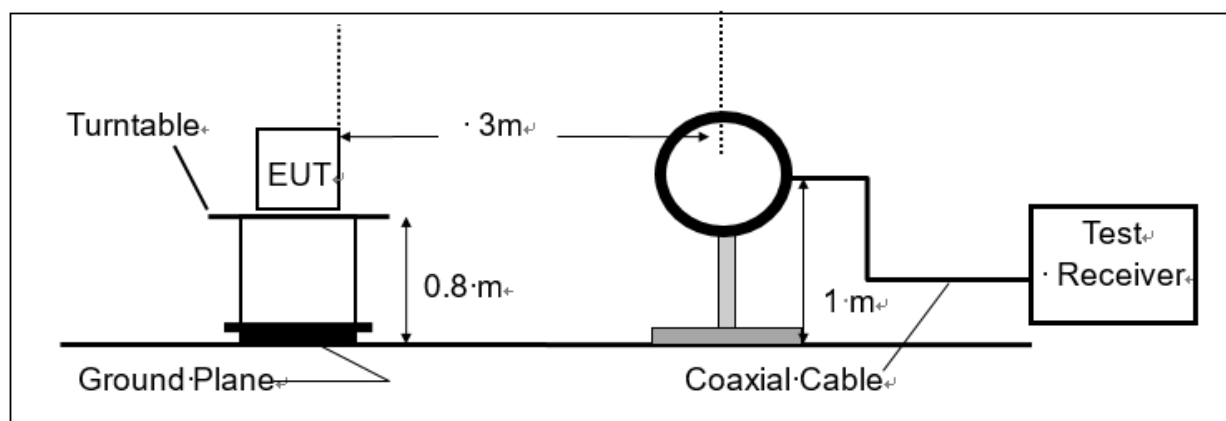
7 RADIATED EMISSION TEST

7.1 Measurement Procedure

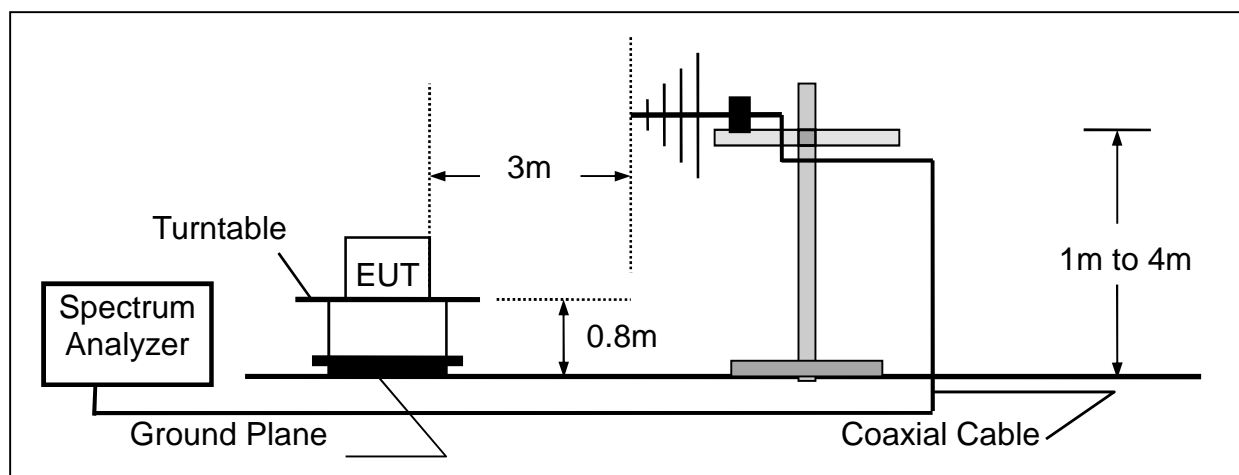
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

7.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-UP, Frequency form 30MHz to 1000MHz



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7.3 Measurement Equipment Used:

| Radiated Emission Test Site: SAC C | | | | | |
|------------------------------------|-----------------|--------------|-----------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Broadband Antenna | TESEQ | CBL 6112D | 35240 | 09/08/2020 | 09/07/2021 |
| Loop Antenna | ETS.LINDGREN | 6502 | 148045 | 10/19/2020 | 10/18/2021 |
| EMI Test Receiver | R&S | ESU 40 | 100363 | 04/28/2021 | 04/27/2022 |
| Pre-Amplifier | EMC Instruments | EMC330 | 980096 | 11/19/2020 | 11/18/2021 |
| Coaxial Cable | Huber Suhner | RG 214/U | W22.03 | 11/19/2020 | 11/18/2021 |
| Test Software | audix | e3 | 20923 sgs Ver.9 | N.C.R | N.C.R |
| DC Power Supply | DHA | DPS-3003 | 9411005787 | 08/19/2020 | 08/18/2021 |

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7.4 FCC Applicable Standard

The field strength of any emissions appearing outside of operation frequency shall not exceed the general radiated emission limits in section 15.209 as below.

| Frequency (MHz) | Field strength (μV/m) | Distance (meters) |
|-----------------|-----------------------|-------------------|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

1. Emission level in dBμV/m = 20 log (μV/m)
2. Distance extrapolation factor = 40 log (required distance/ test distance) (dB)
3. $20 \cdot \log(30 \mu\text{V/m}) + 40\text{dB} = 69.54 \text{ dBuV/m}$
4. The lower limit shall apply at the transition frequencies.
5. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement.
6. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of §15.205.
7. The general radiated emission limits in §15.209 apply for the spurious emission generate from UE, except for the fundamental emission where the respective section specifies otherwise.
8. Actual FS(dBμV/m) = Spectrum. Reading level(dBμV) + Factor(dB)
Factor(dB) = Antenna Factor(dB) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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7.5 FCC Test Result

7.5.1 Field Strength of Fundamental Emission

Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

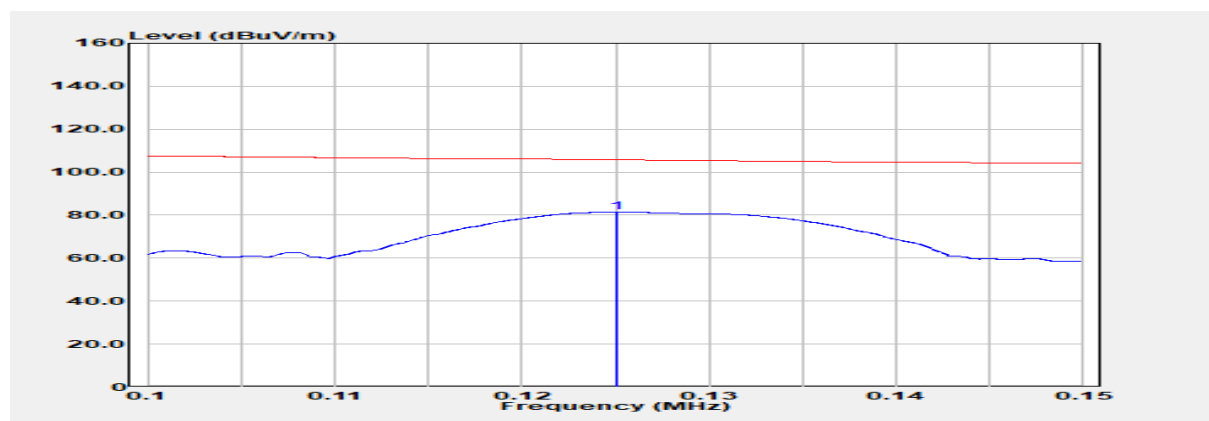
Temp./Humi. :21.5/66

Test Mode :Main

Antenna Pol. :Vertical

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. | Detector | Spectrum | Factor | Actual | Limit | Margin |
|-------|----------|---------------|--------|--------|--------|--------|
| MHz | Mode | Reading Level | | FS | @3m | |
| | PK/QP/AV | dBμV | dB | dBμV/m | dBμV/m | dB |
| 0.125 | Peak | 70.78 | 10.70 | 81.49 | 105.67 | -24.18 |

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Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

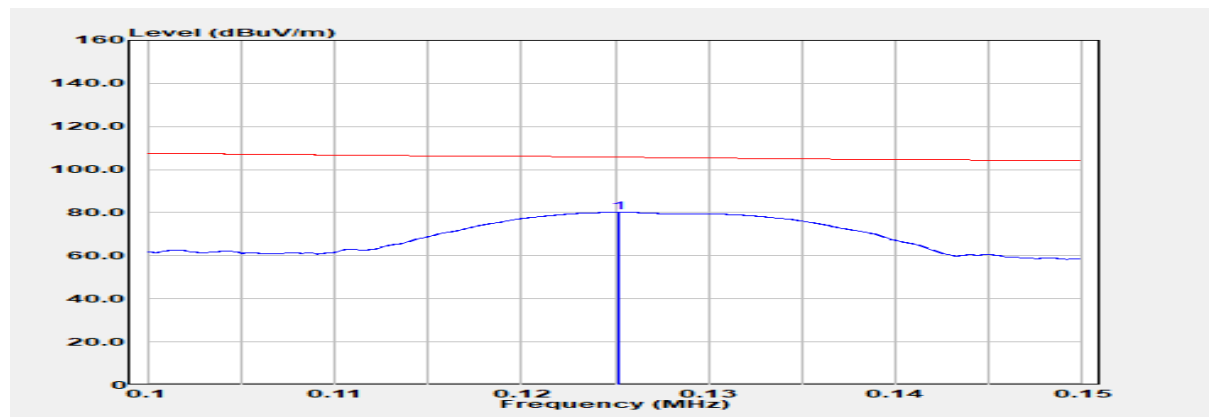
Temp./Humi. :21.5/66

Test Mode :Main

Antenna Pol. :Horizontal

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBUV | Factor dB | Actual FS dBUV/m | Limit @3m dBUV/m | Margin dB |
|--------------|------------------------------|-----------------------------------|--------------|------------------------|------------------------|--------------|
| 0.125 | Peak | 69.44 | 10.70 | 80.14 | 105.66 | -25.52 |

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7.5.2 Below 30 MHz test result

Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

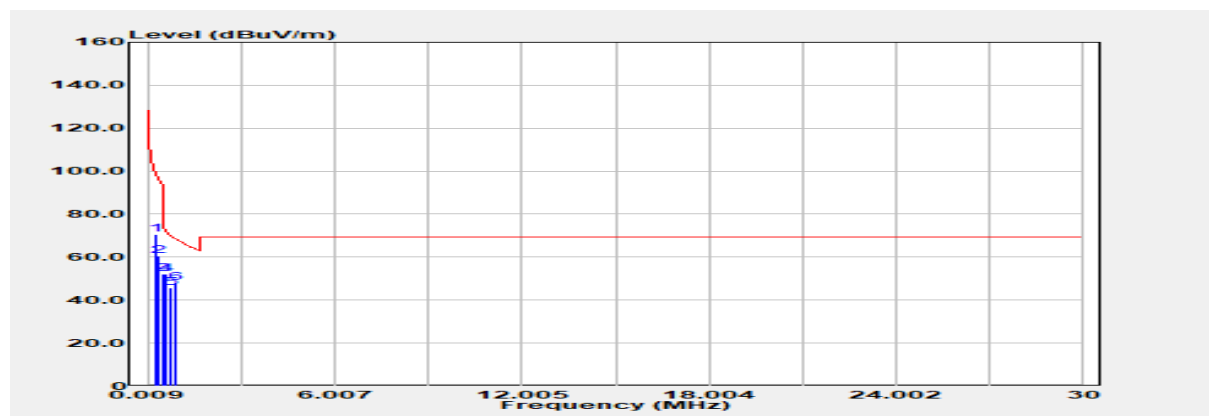
Temp./Humi. :21.5/66

Test Mode :Tx

Antenna Pol. :Vertical

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V/m | Limit @3m dB μ V/m | Margin dB |
|--------------|------------------------------|---|--------------|------------------------------|------------------------------|--------------|
| 0.250 | Peak | 59.65 | 11.12 | 70.77 | 99.65 | -28.88 |
| 0.375 | Peak | 49.44 | 11.24 | 60.68 | 96.12 | -35.44 |
| 0.500 | Peak | 40.68 | 11.26 | 51.93 | 73.62 | -21.69 |
| 0.625 | Peak | 40.88 | 11.24 | 52.12 | 71.70 | -19.58 |
| 0.750 | Peak | 34.41 | 11.22 | 45.63 | 70.10 | -24.47 |
| 0.875 | Peak | 36.75 | 11.21 | 47.96 | 68.77 | -20.81 |

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Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

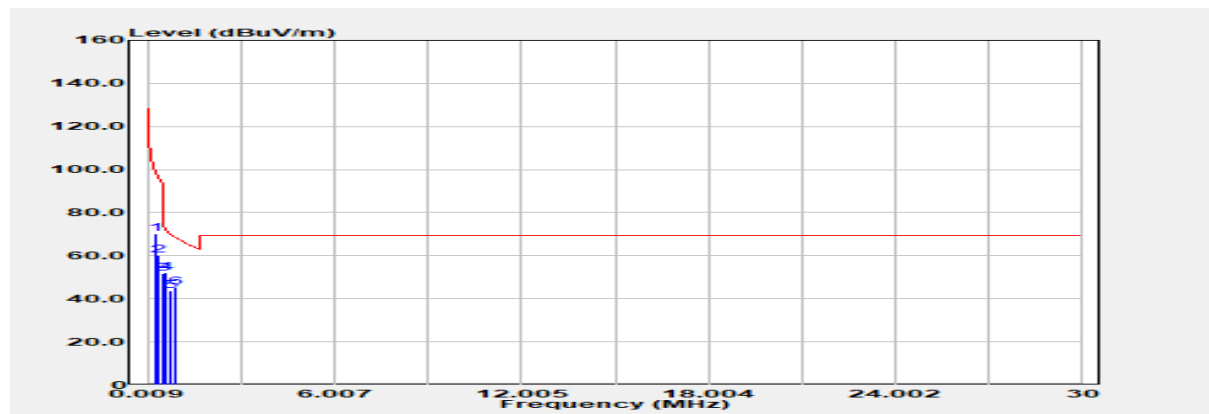
Temp./Humi. :21.5/66

Test Mode :Tx

Antenna Pol. :Horizontal

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V/m | Limit @3m dB μ V/m | Margin dB |
|--------------|------------------------------|---|--------------|------------------------------|------------------------------|--------------|
| 0.250 | Peak | 58.99 | 11.12 | 70.11 | 99.65 | -29.54 |
| 0.375 | Peak | 48.93 | 11.24 | 60.16 | 96.12 | -35.96 |
| 0.500 | Peak | 40.38 | 11.26 | 51.64 | 73.62 | -21.98 |
| 0.625 | Peak | 40.78 | 11.24 | 52.01 | 71.70 | -19.68 |
| 0.750 | Peak | 32.62 | 11.22 | 43.84 | 70.10 | -26.26 |
| 0.875 | Peak | 34.06 | 11.21 | 45.26 | 68.77 | -23.51 |

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7.5.3 FCC Above 30MHz test result

Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

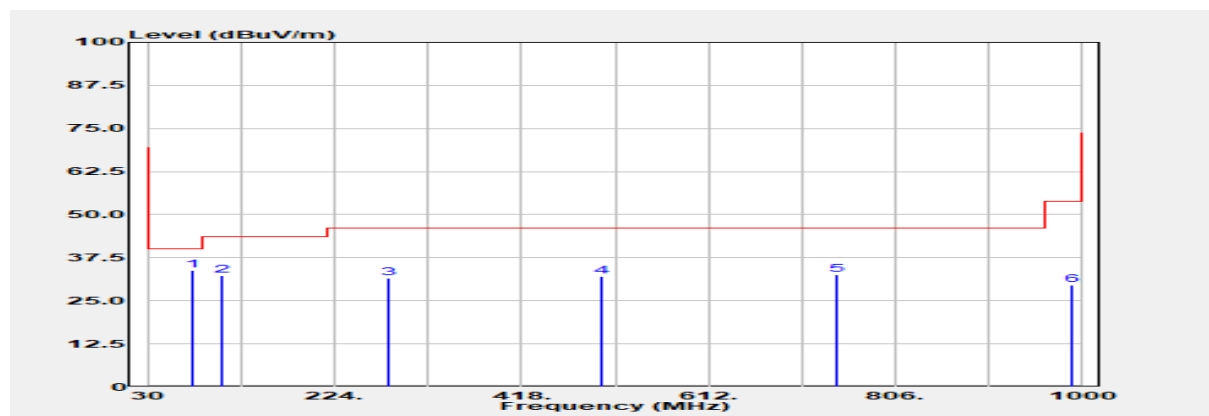
Temp./Humi. :21.4/65

Test Mode :Tx

Antenna Pol. :Vertical

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V/m | Limit @3m dB μ V/m | Margin dB |
|--------------|------------------------------|---|--------------|------------------------------|------------------------------|--------------|
| 76.560 | QP | 55.50 | -21.75 | 33.75 | 40.00 | -6.25 |
| 106.630 | QP | 51.00 | -18.55 | 32.45 | 43.50 | -11.05 |
| 279.290 | Peak | 47.37 | -15.69 | 31.68 | 46.00 | -14.32 |
| 500.450 | Peak | 42.70 | -10.66 | 32.04 | 46.00 | -13.96 |
| 745.860 | Peak | 40.47 | -7.91 | 32.56 | 46.00 | -13.44 |
| 989.330 | Peak | 34.48 | -4.83 | 29.65 | 54.00 | -24.35 |

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Report Number :E2/2021/40051

Test Site :966 Chamber C

Operation Mode :WPC

Test Date :2021-04-29

Test Frequency :125 KHz

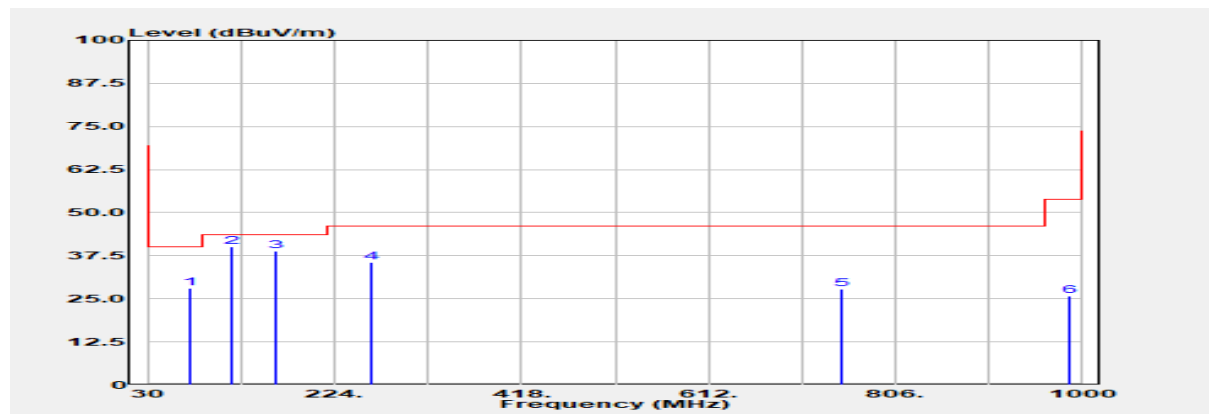
Temp./Humi. :21.4/65

Test Mode :Tx

Antenna Pol. :Horizontal

EUT Pol :H Plane

Engineer :Ashton Chiu



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dB μ V | Factor dB | Actual FS dB μ V/m | Limit @3m dB μ V/m | Margin dB |
|--------------|------------------------------|---|--------------|------------------------------|------------------------------|--------------|
| 74.620 | QP | 50.10 | -21.96 | 28.14 | 40.00 | -11.86 |
| 118.270 | QP | 57.20 | -17.17 | 40.03 | 43.50 | -3.47 |
| 163.860 | QP | 58.32 | -19.49 | 38.83 | 43.50 | -4.67 |
| 261.830 | Peak | 50.77 | -15.11 | 35.66 | 46.00 | -10.34 |
| 750.710 | Peak | 35.11 | -7.35 | 27.76 | 46.00 | -18.24 |
| 987.390 | Peak | 30.83 | -5.01 | 25.82 | 54.00 | -28.18 |

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8 20 dB OCCUPIED BANDWIDTH MEASUREMENT

8.1 Standard Applicable:

§2.1049 & §15.215 (c)

8.2 Limit:

None

8.3 Test Set-up

Refer to section 6.2 in this report

8.4 Measurement Procedure

20dB bandwidth

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
2. 20dB Bandwidth the resolution bandwidth of 200 Hz and the video bandwidth of 1 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

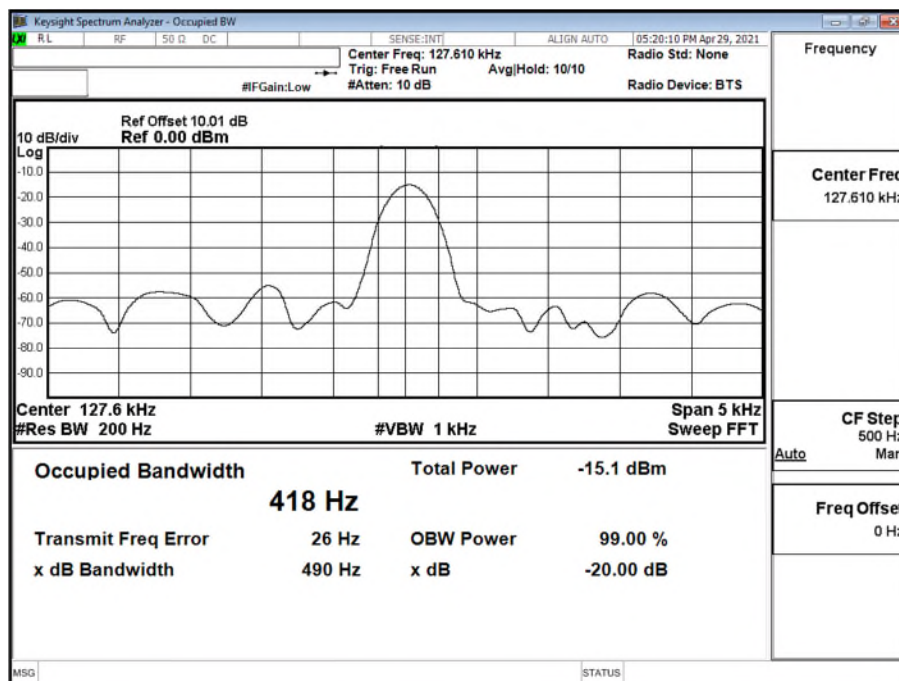
8.5 Measurement Equipment Used:

Refer to section 7.3 in this report

8.6 Measurement Result

-20dB Bandwidth

| |
|----------------|
| 20dB Bandwidth |
| 490 Hz |



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9 ANTENNA REQUIREMENT

9.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

9.2 Antenna Connected Construction:

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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