

Partial FCC Test Report

Report No.: RF191205C07

FCC ID: J9C-QCNFA524

Test Model: QCNFA524

Received Date: Dec. 31, 2019

Test Date: Feb. 11 ~ Feb. 26, 2020

Issued Date: Mar. 05, 2020

Applicant: Qualcomm Technologies, Inc.

Address: 5775 Morehouse Drive, San Diego, CA 92121-1714

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location (1): No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

Test Location (2): B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231,
Taiwan

FCC Registration / 788550 / TW0003

Designation Number: 427177 / TW0011



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

| | |
|---|-----------|
| Release Control Record | 3 |
| 1 Certificate of Conformity | 4 |
| 2 Summary of Test Results..... | 5 |
| 2.1 Measurement Uncertainty..... | 6 |
| 2.2 Modification Record | 6 |
| 3 General Information | 7 |
| 3.1 General Description of EUT | 7 |
| 3.2 Description of Test Modes..... | 9 |
| 3.2.1 Test Mode Applicability and Tested Channel Detail..... | 10 |
| 3.3 Description of Support Units | 12 |
| 3.3.1 Configuration of System under Test | 12 |
| 3.4 General Description of Applied Standards and References | 13 |
| 4 Test Types and Results | 14 |
| 4.1 Radiated Emission and Bandedge Measurement | 14 |
| 4.1.1 Limits of Radiated Emission and Bandedge Measurement | 14 |
| 4.1.2 Test Instruments | 15 |
| 4.1.3 Test Procedures..... | 16 |
| 4.1.4 Deviation from Test Standard | 16 |
| 4.1.5 Test Set Up | 17 |
| 4.1.6 EUT Operating Conditions..... | 18 |
| 4.1.7 Test Results | 19 |
| 4.2 Conducted Emission Measurement..... | 27 |
| 4.2.1 Limits of Conducted Emission Measurement | 27 |
| 4.2.2 Test Instruments | 27 |
| 4.2.3 Test Procedures..... | 28 |
| 4.2.4 Deviation from Test Standard | 28 |
| 4.2.5 Test Setup..... | 28 |
| 4.2.6 EUT Operating Condition | 28 |
| 4.2.7 Test Results | 29 |
| 4.3 Maximum Output Power | 31 |
| 4.3.1 Limits of Maximum Output Power Measurement | 31 |
| 4.3.2 Test Setup..... | 31 |
| 4.3.3 Test Instruments | 31 |
| 4.3.4 Test Procedure | 31 |
| 4.3.5 Deviation from Test Standard | 31 |
| 4.3.6 EUT Operating Condition | 31 |
| 4.3.7 Test Results | 32 |
| 5 Pictures of Test Arrangements..... | 33 |
| Appendix – Information of the Testing Laboratories | 34 |

Release Control Record

| Issue No. | Description | Date Issued |
|-------------|------------------|---------------|
| RF191205C07 | Original Release | Mar. 05, 2020 |

1 Certificate of Conformity

Product: Wi-Fi 6 + BT 5.1 M.2 1216 Module

Brand: Qualcomm

Test Model: QCNFA524

Sample Status: Engineering Sample


Applicant: Qualcomm Technologies, Inc.

Test Date: Feb. 11 ~ Feb. 26, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.


Prepared by : _____, **Date:** Mar. 05, 2020
Lena Wang / Specialist


Approved by : _____, **Date:** Mar. 05, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (Section 15.247) | | | |
|--|---|--------|--|
| FCC Clause | Test Item | Result | Remarks |
| 15.207 | AC Power Conducted Emission | Pass | Meet the requirement of limit. Minimum passing margin is -5.77 dB at 0.15000 MHz. |
| 15.247(a)(1)(iii) | Number of Hopping Frequency Used | N/A | Refer to Note |
| 15.247(a)(1)(iii) | Dwell Time on Each Channel | N/A | Refer to Note |
| 15.247(a)(1) | 1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | N/A | Refer to Note |
| 15.247(a)(1) | Maximum Peak Output Power | Pass | Meet the requirement of limit. |
| --- | Occupied Bandwidth Measurement | N/A | Refer to Note |
| 15.205 & 209 | Radiated Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -7.13 dB at 33.78 MHz. |
| 15.247(d) | Band Edge Measurement | N/A | Refer to Note |
| 15.247(d) | Antenna Port Emission | N/A | Refer to Note |
| 15.203 | Antenna Requirement | N/A | Refer to Note |

Note:

1. This is a partial report. Only test item of AC Power Conducted Emission, Maximum Peak Output Power and Radiated Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RF190716E01-2 for module (Brand: Qualcomm, Model: QCNFA524)
2. If the Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125 mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of hopping channel whichever is greater.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (\pm) |
|------------------------------------|--------------------|---|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz | 3.04 dB |
| | 30 MHz ~ 200 MHz | 2.0153 dB |
| | 200 MHz ~ 1000 MHz | 2.0224 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 1.0121 dB |
| | 18 GHz ~ 40 GHz | 1.1508 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|----------------------------|----------------------------------|
| Product | Wi-Fi 6 + BT 5.1 M.2 1216 Module |
| Brand | Qualcomm |
| Test Model | QCNFA524 |
| Status of EUT | Engineering Sample |
| Power Supply Rating | 3.3 Vdc (host equipment) |
| Modulation Type | GFSK, $\pi/4$ -DQPSK, 8DPSK |
| Transfer Rate | 1/2/3 Mbps |
| Operating Frequency | 2402 ~ 2480 MHz |
| Number of Channel | 79 |
| Output Power | 22.284 mW |
| Antenna Type | Refer to Note as below |
| Antenna Connector | N/A |
| Accessory Device | Refer to Note as below |
| Data Cable Supplied | Refer to Note as below |

Note:

1. The EUT is authorized for use in specific End-product. Please refer to below table for further details.

| Product Name | Brand Name | Model | Description |
|-------------------|------------|-------|-------------|
| Portable Computer | DELL | P91F | -- |

2. The antenna information is listed as below.

| Color | Antenna Type | Antenna Mode | Manufacturer | Parts Number | Antenna Gain (dBi) | | | |
|-------|--------------|--------------|---------------------------|--|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| | | | | | BT / WLAN 2.4 GHz | WLAN 5.15~5.35 GHz | WLAN 5.47~5.72 5 GHz | WLAN 5.725~5.8 5 GHz |
| Black | Slot | 0 | Speedwire | Main Antenna: F.0G.FH-6101-004-00 (DC33002CW3L) Aux. Antenna: F.0G.FH-6101-003-00 (DC33002CW2L) | Main: -3.46 Aux.: -2.31 | Main: 2.38 Aux.: -2.47 | Main: 0.35 Aux.: -3.33 | Main: -2.01 Aux.: -3.24 |
| | | 1 | | | Main: -3.53 Aux.: -2.41 | Main: 0.11 Aux.: -1.31 | Main: -1.56 Aux.: -1.61 | Main: -1.56 Aux.: -2.78 |
| White | Slot | 0 | Speedwire | Main Antenna: F.0G.FH-6101-008-00 (DC33002CW7L) Aux. Antenna: F.0G.FH-6101-007-00 (DC33002CW6L) | Main: -2.78 Aux.: -1.56 | Main: 2.77 Aux.: -1.86 | Main: 1.32 Aux.: -2.68 | Main: -1.36 Aux.: -2.68 |
| | | 1 | | | Main: -2.97 Aux.: -1.88 | Main: 0.96 Aux.: -0.70 | Main: -0.61 Aux.: -0.97 | Main: -0.61 Aux.: -1.95 |
| Black | Slot | 0 | Wistron Neweb Corporation | Main Antenna: 81ELAS15.G34 (DC33002CV3L) Aux. Antenna: 81ELAS15.G33 (DC33002CV2L) | Main: -3.46 Aux.: -2.31 | Main: 2.38 Aux.: -2.47 | Main: 2.21 Aux.: -3.33 | Main: -2.01 Aux.: -3.24 |
| | | 1 | | | Main: -3.53 Aux.: -2.41 | Main: 0.11 Aux.: -1.31 | Main: -1.56 Aux.: -1.61 | Main: -1.56 Aux.: -2.78 |
| White | Slot | 0 | Wistron Neweb Corporation | Main Antenna: 81ELAS15.G69 (DC33002CV7L) Aux. Antenna: 81ELAS15.G70 (DC33002CV6L) | Main: -5.12 Aux.: -1.78 | Main: -3.01 Aux.: 2.26 | Main: -4.82 Aux.: -0.47 | Main: -4.82 Aux.: -4.31 |
| | | 1 | | | Main: -2.47 Aux.: -1.69 | Main: -0.61 Aux.: 0.91 | Main: -4.87 Aux.: -2.96 | Main: -5.17 Aux.: -5.07 |

3. The End-product contains following accessory devices.

| Product | Brand | Model | Description |
|-----------|-------|------------|--|
| Adapter | DELL | HA130PM170 | I/P: 100-240Vac, 50-60Hz, 1.8A O/P: 20Vdc, 6.5A or 5Vdc, 1A |
| Battery 1 | DELL | 8FCTC | 11.4Vdc, 4650mAh, 56Wh |
| Battery 2 | DELL | 69KF2 | 11.4Vdc, 7167mAh, 86Wh |

4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

3.2 Description of Test Modes

79 channels are provided to this EUT:

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| 0 | 2402 | 20 | 2422 | 40 | 2442 | 60 | 2462 |
| 1 | 2403 | 21 | 2423 | 41 | 2443 | 61 | 2463 |
| 2 | 2404 | 22 | 2424 | 42 | 2444 | 62 | 2464 |
| 3 | 2405 | 23 | 2425 | 43 | 2445 | 63 | 2465 |
| 4 | 2406 | 24 | 2426 | 44 | 2446 | 64 | 2466 |
| 5 | 2407 | 25 | 2427 | 45 | 2447 | 65 | 2467 |
| 6 | 2408 | 26 | 2428 | 46 | 2448 | 66 | 2468 |
| 7 | 2409 | 27 | 2429 | 47 | 2449 | 67 | 2469 |
| 8 | 2410 | 28 | 2430 | 48 | 2450 | 68 | 2470 |
| 9 | 2411 | 29 | 2431 | 49 | 2451 | 69 | 2471 |
| 10 | 2412 | 30 | 2432 | 50 | 2452 | 70 | 2472 |
| 11 | 2413 | 31 | 2433 | 51 | 2453 | 71 | 2473 |
| 12 | 2414 | 32 | 2434 | 52 | 2454 | 72 | 2474 |
| 13 | 2415 | 33 | 2435 | 53 | 2455 | 73 | 2475 |
| 14 | 2416 | 34 | 2436 | 54 | 2456 | 74 | 2476 |
| 15 | 2417 | 35 | 2437 | 55 | 2457 | 75 | 2477 |
| 16 | 2418 | 36 | 2438 | 56 | 2458 | 76 | 2478 |
| 17 | 2419 | 37 | 2439 | 57 | 2459 | 77 | 2479 |
| 18 | 2420 | 38 | 2440 | 58 | 2460 | 78 | 2480 |
| 19 | 2421 | 39 | 2441 | 59 | 2461 | | |

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | | | Description |
|--------------------|---------------|-------|-----|------|-------------|
| | RE \geq 1G | RE<1G | PLC | APCM | |
| - | √ | √ | √ | √ | - |

Where **RE \geq 1G**: Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note:

1. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| - | 0 to 78 | 0, 39, 78 | FHSS | GFSK | DH5 |
| | 0 to 78 | 0, 39, 78 | FHSS | 8DPSK | 3DH5 |

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| - | 0 to 78 | 39 | FHSS | GFSK | DH5 |

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| - | 0 to 78 | 39 | FHSS | GFSK | DH5 |

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| - | 0 to 78 | 0, 39, 78 | FHSS | GFSK | DH5 |
| - | 0 to 78 | 0, 39, 78 | FHSS | 8DPSK | 3DH5 |

Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|----------------|-------------|
| RE \geq 1G | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Karl Lee |
| RE<1G | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Karl Lee |
| PLC | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Jones Chang |
| APCM | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Wayne Lin |

3.3 Description of Support Units

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

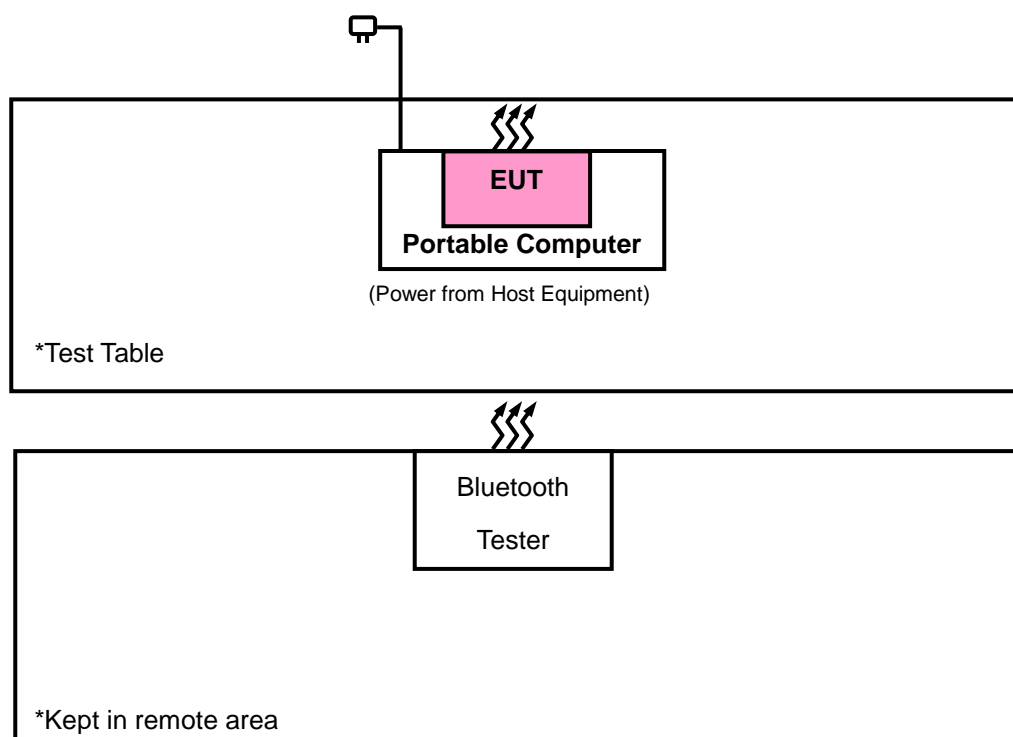
| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|-----|-------------------|-------|------------|------------|------------------|
| 1. | Bluetooth Tester | R&S | CBT | 100980 | N/A |
| 2. | Adapter | DELL | HA130PM170 | NA | NA |
| 3. | Portable Computer | DELL | P91F | NA | FCC DoC Approved |

| No. | Signal Cable Description Of The Above Support Units |
|-----|---|
| 1. | Type C cable: 0.85m |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 2, 3 was provided by client

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

| 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 |

Note:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|--|-----------------|---|---------------------|-------------------------|
| Test Receiver Agilent Technologies | N9038A | MY52260177 | Aug. 26, 2019 | Aug. 25, 2020 |
| HORN Antenna ETS-Lindgren | 3117 | 00143293 | Nov. 24, 2019 | Nov. 23, 2020 |
| BILOG Antenna SCHWARZBECK | VULB 9168 | 9168-616 | Nov. 12, 2019 | Nov. 11, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170-480 | Nov. 24, 2019 | Nov. 23, 2020 |
| Fixed Attenuator Mini-Circuits | MDCS18N-10 | MDCS18N-10-01 | Apr. 15, 2019 | Apr. 14, 2020 |
| Bluetooth Tester | CBT | 100980 | Jul. 14, 2019 | Jul. 13, 2020 |
| Loop Antenna | EM-6879 | 269 | Sep. 16, 2019 | Sep. 15, 2020 |
| Preamplifier Agilent | 310N | 187226 | Jun. 18, 2019 | Jun. 17, 2020 |
| Preamplifier Agilent | 83017A | MY39501357 | Jun. 18, 2019 | Jun. 17, 2020 |
| Power Meter Anritsu | ML2495A | 1012010 | Sep. 04, 2019 | Sep. 03, 2020 |
| Power Meter Anritsu | MA2411B | 1315050 | Sep. 04, 2019 | Sep. 03, 2020 |
| RF signal cable ETS-LINDGREN | 5D-FB | Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400) | Jun. 18, 2019 | Jun. 17, 2020 |
| RF signal cable ETS-LINDGREN | 8D-FB | Cable-CH1-02(RFC-SMS-100-SMS-24) | Jun. 18, 2019 | Jun. 17, 2020 |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| Software BV ADT | E3 8.130425b | NA | NA | NA |
| Antenna Tower MF | NA | NA | NA | NA |
| Turn Table MF | NA | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | MF-7802 | NA | NA | NA |

- Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- 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. Parallel, perpendicular, and ground-parallel orientations 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 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 detected 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:

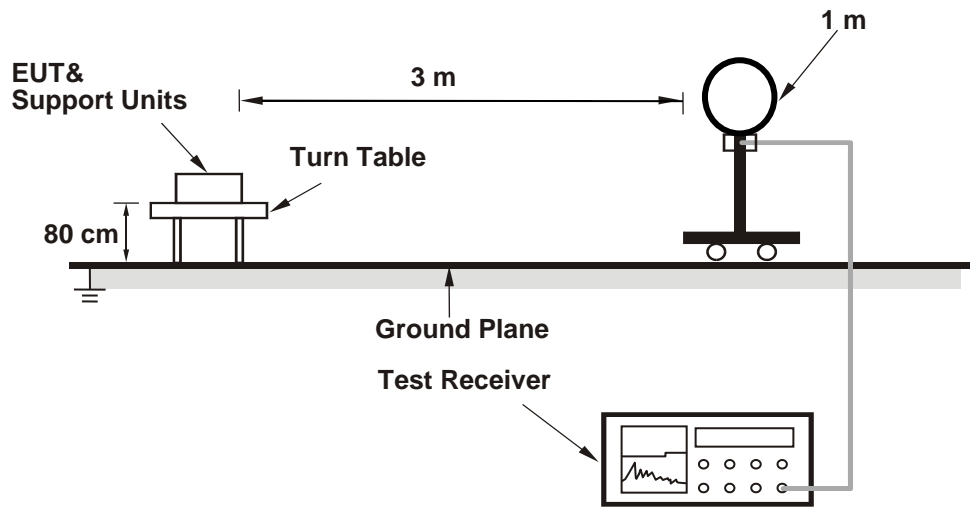
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

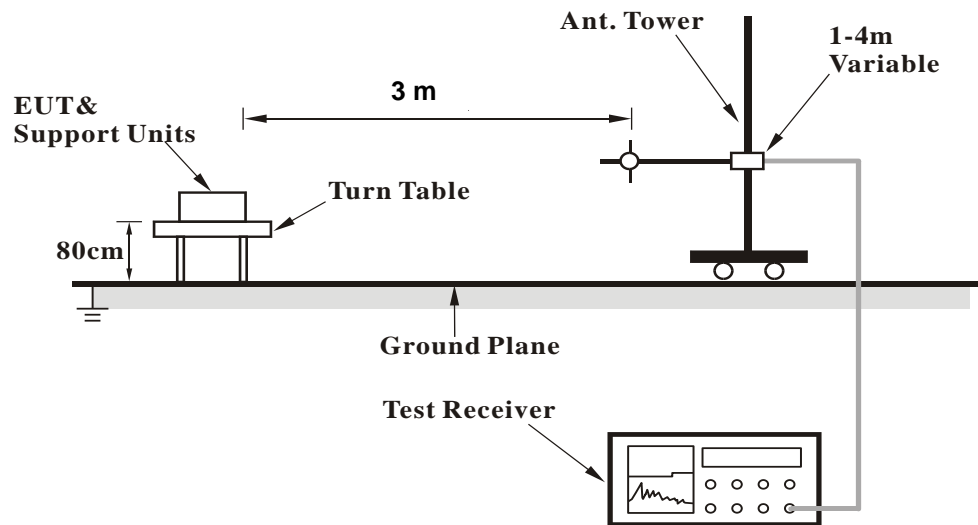
No deviation.

4.1.5 Test Set Up

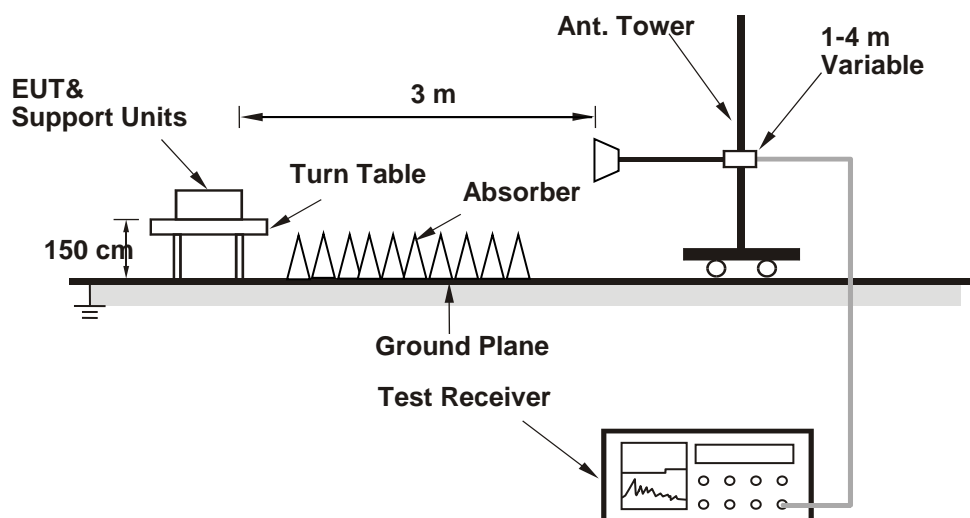
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data: GFSK

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 0 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2380.02 | 41.14 | 36.67 | 4.47 | 54 | -12.86 | 362 | 356 | Average |
| 2380.02 | 50.84 | 46.37 | 4.47 | 74 | -23.16 | 362 | 356 | Peak |
| 2402 | 96 | 91.48 | 4.52 | | | 362 | 356 | Average |
| 2402 | 96.38 | 91.86 | 4.52 | | | 362 | 356 | Peak |
| 4804 | 42.11 | 31.76 | 10.35 | 54 | -11.89 | 162 | 23 | Average |
| 4804 | 48.64 | 38.29 | 10.35 | 74 | -25.36 | 162 | 23 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2386.95 | 41.36 | 36.87 | 4.49 | 54 | -12.64 | 287 | 294 | Average |
| 2386.95 | 51.53 | 47.04 | 4.49 | 74 | -22.47 | 287 | 294 | Peak |
| 2402 | 103.07 | 98.55 | 4.52 | | | 287 | 294 | Average |
| 2402 | 103.38 | 98.86 | 4.52 | | | 287 | 294 | Peak |
| 4804 | 43.21 | 32.86 | 10.35 | 54 | -10.79 | 132 | 178 | Average |
| 4804 | 49.53 | 39.18 | 10.35 | 74 | -24.47 | 132 | 178 | Peak |

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 39 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2354.82 | 41.2 | 36.8 | 4.4 | 54 | -12.8 | 362 | 356 | Average |
| 2354.82 | 50.94 | 46.54 | 4.4 | 74 | -23.06 | 362 | 356 | Peak |
| 2360.67 | 41.14 | 36.72 | 4.42 | 54 | -12.86 | 362 | 356 | Average |
| 2360.67 | 51.16 | 46.74 | 4.42 | 74 | -22.84 | 362 | 356 | Peak |
| 2441 | 96.48 | 91.9 | 4.58 | | | 362 | 356 | Average |
| 2441 | 96.96 | 92.38 | 4.58 | | | 362 | 356 | Peak |
| 4882 | 41.03 | 30.82 | 10.21 | 54 | -12.97 | 107 | 214 | Average |
| 4882 | 47.38 | 37.17 | 10.21 | 74 | -26.62 | 107 | 214 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2345.1 | 45.51 | 41.13 | 4.38 | 54 | -8.49 | 287 | 294 | Average |
| 2345.1 | 52.39 | 48.01 | 4.38 | 74 | -21.61 | 287 | 294 | Peak |
| 2441 | 103.55 | 98.97 | 4.58 | | | 287 | 294 | Average |
| 2441 | 103.95 | 99.37 | 4.58 | | | 287 | 294 | Peak |
| 2487.04 | 41.47 | 36.81 | 4.66 | 54 | -12.53 | 287 | 294 | Average |
| 2487.04 | 52.14 | 47.48 | 4.66 | 74 | -21.86 | 287 | 294 | Peak |
| 4882 | 41.53 | 31.32 | 10.21 | 54 | -12.47 | 154 | 171 | Average |
| 4882 | 47.84 | 37.63 | 10.21 | 74 | -26.16 | 154 | 171 | Peak |

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 78 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2480 | 96.93 | 92.29 | 4.64 | | | 362 | 356 | Average |
| 2480 | 97.33 | 92.69 | 4.64 | | | 362 | 356 | Peak |
| 2493.76 | 41.46 | 36.79 | 4.67 | 54 | -12.54 | 362 | 356 | Average |
| 2493.76 | 52.57 | 47.9 | 4.67 | 74 | -21.43 | 362 | 356 | Peak |
| 4960 | 43.17 | 32.81 | 10.36 | 54 | -10.83 | 136 | 295 | Average |
| 4960 | 49.61 | 39.25 | 10.36 | 74 | -24.39 | 136 | 295 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2480 | 103.79 | 99.15 | 4.64 | | | 287 | 294 | Average |
| 2480 | 104.17 | 99.53 | 4.64 | | | 287 | 294 | Peak |
| 2483.56 | 41.67 | 37.01 | 4.66 | 54 | -12.33 | 287 | 294 | Average |
| 2483.56 | 52.92 | 48.26 | 4.66 | 74 | -21.08 | 287 | 294 | Peak |
| 4960 | 41.26 | 30.9 | 10.36 | 54 | -12.74 | 172 | 134 | Average |
| 4960 | 48.1 | 37.74 | 10.36 | 74 | -25.9 | 172 | 134 | Peak |

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

8DPSK

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 0 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2384.79 | 41.07 | 36.6 | 4.47 | 54 | -12.93 | 362 | 356 | Average |
| 2384.79 | 50.92 | 46.45 | 4.47 | 74 | -23.08 | 362 | 356 | Peak |
| 2402 | 94.23 | 89.71 | 4.52 | | | 362 | 356 | Average |
| 2402 | 96.54 | 92.02 | 4.52 | | | 362 | 356 | Peak |
| 4804 | 41.74 | 31.39 | 10.35 | 54 | -12.26 | 168 | 49 | Average |
| 4804 | 47.91 | 37.56 | 10.35 | 74 | -26.09 | 168 | 49 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2381.19 | 41.21 | 36.74 | 4.47 | 54 | -12.79 | 287 | 294 | Average |
| 2381.19 | 51.7 | 47.23 | 4.47 | 74 | -22.3 | 287 | 294 | Peak |
| 2402 | 101.01 | 96.49 | 4.52 | | | 287 | 294 | Average |
| 2402 | 103.25 | 98.73 | 4.52 | | | 287 | 294 | Peak |
| 4804 | 40.39 | 30.04 | 10.35 | 54 | -13.61 | 146 | 217 | Average |
| 4804 | 46.59 | 36.24 | 10.35 | 74 | -27.41 | 146 | 217 | Peak |

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 39 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2370.66 | 41.12 | 36.67 | 4.45 | 54 | -12.88 | 362 | 356 | Average |
| 2370.66 | 51.64 | 47.19 | 4.45 | 74 | -22.36 | 362 | 356 | Peak |
| 2441 | 94.17 | 89.59 | 4.58 | | | 362 | 356 | Average |
| 2441 | 96.68 | 92.1 | 4.58 | | | 362 | 356 | Peak |
| 2485.44 | 41.79 | 37.13 | 4.66 | 54 | -12.21 | 362 | 356 | Average |
| 2485.44 | 51.82 | 47.16 | 4.66 | 74 | -22.18 | 362 | 356 | Peak |
| 4882 | 42.03 | 31.82 | 10.21 | 54 | -11.97 | 125 | 78 | Average |
| 4882 | 48.26 | 38.05 | 10.21 | 74 | -25.74 | 125 | 78 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2344.92 | 43.37 | 38.99 | 4.38 | 54 | -10.63 | 287 | 294 | Average |
| 2344.92 | 51.73 | 47.35 | 4.38 | 74 | -22.27 | 287 | 294 | Peak |
| 2441 | 101.54 | 96.96 | 4.58 | | | 287 | 294 | Average |
| 2441 | 103.97 | 99.39 | 4.58 | | | 287 | 294 | Peak |
| 2486.6 | 42.22 | 37.56 | 4.66 | 54 | -11.78 | 287 | 294 | Average |
| 2486.6 | 51.73 | 47.07 | 4.66 | 74 | -22.27 | 287 | 294 | Peak |
| 4882 | 41.07 | 30.86 | 10.21 | 54 | -12.93 | 136 | 296 | Average |
| 4882 | 47.32 | 37.11 | 10.21 | 74 | -26.68 | 136 | 296 | Peak |

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 78 | Frequency Range | 1 GHz ~ 25 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2480 | 94.5 | 89.86 | 4.64 | | | 362 | 356 | Average |
| 2480 | 97.1 | 92.46 | 4.64 | | | 362 | 356 | Peak |
| 2484.12 | 41.46 | 36.8 | 4.66 | 54 | -12.54 | 362 | 356 | Average |
| 2484.12 | 51.57 | 46.91 | 4.66 | 74 | -22.43 | 362 | 356 | Peak |
| 4960 | 41.28 | 30.92 | 10.36 | 54 | -12.72 | 127 | 46 | Average |
| 4960 | 47.53 | 37.17 | 10.36 | 74 | -26.47 | 127 | 46 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 2480 | 101.67 | 97.03 | 4.64 | | | 287 | 294 | Average |
| 2480 | 104.13 | 99.49 | 4.64 | | | 287 | 294 | Peak |
| 2483.68 | 41.66 | 37 | 4.66 | 54 | -12.34 | 287 | 294 | Average |
| 2483.68 | 51.69 | 47.03 | 4.66 | 74 | -22.31 | 287 | 294 | Peak |
| 4960 | 40.86 | 30.5 | 10.36 | 54 | -13.14 | 145 | 182 | Average |
| 4960 | 47.07 | 36.71 | 10.36 | 74 | -26.93 | 145 | 182 | Peak |

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

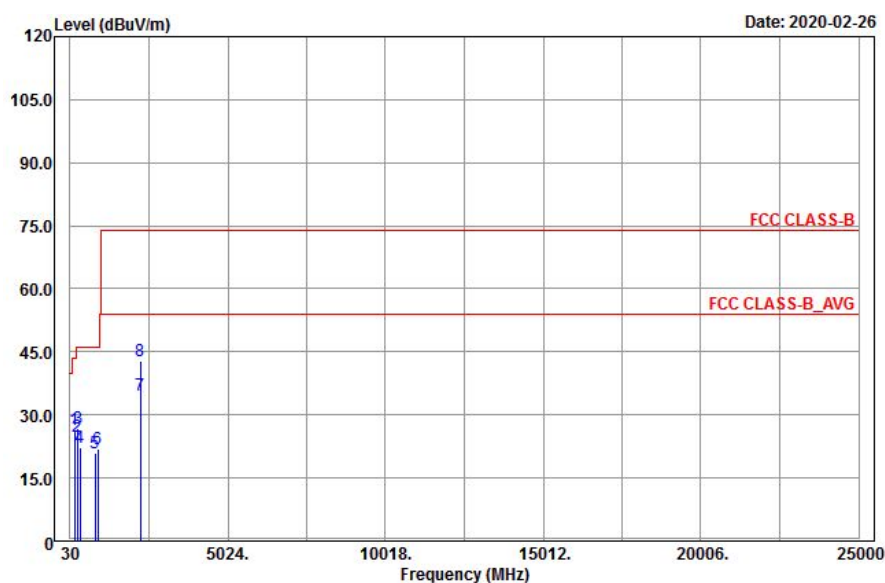
9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

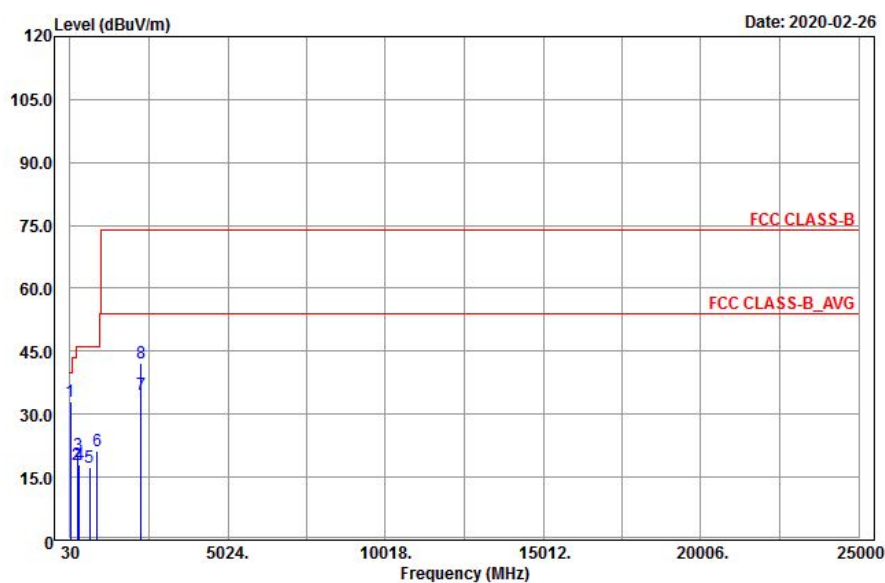
30 MHz ~ 1 GHz Worst-Case Data:

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel | Channel 39 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Quasi-peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Karl Lee |

Horizontal



Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | |
|---|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 163.11 | 26.54 | 48.43 | -21.89 | 43.5 | -16.96 | 188 | 258 | Peak |
| 260.58 | 24.97 | 42.63 | -17.66 | 46 | -21.03 | 162 | 60 | Peak |
| 288.93 | 26.94 | 44.19 | -17.25 | 46 | -19.06 | 157 | 91 | Peak |
| 343.4 | 22.09 | 37.86 | -15.77 | 46 | -23.91 | 134 | 275 | Peak |
| 825 | 20.85 | 28.68 | -7.83 | 46 | -25.15 | 149 | 355 | Peak |
| 917.4 | 21.88 | 28.15 | -6.27 | 46 | -24.12 | 117 | 174 | Peak |
| 2248 | 34.53 | 32.99 | 1.54 | 54 | -19.47 | 119 | 145 | Average |
| 2248 | 42.99 | 41.45 | 1.54 | 74 | -31.01 | 119 | 145 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 33.78 | 32.87 | 52.54 | -19.67 | 40 | -7.13 | 163 | 266 | Peak |
| 258.15 | 17.87 | 35.57 | -17.7 | 46 | -28.13 | 178 | 198 | Peak |
| 283.53 | 20.41 | 37.72 | -17.31 | 46 | -25.59 | 127 | 203 | Peak |
| 332.2 | 17.91 | 33.95 | -16.04 | 46 | -28.09 | 147 | 77 | Peak |
| 644.4 | 17.28 | 28.09 | -10.81 | 46 | -28.72 | 153 | 285 | Peak |
| 890.1 | 21.26 | 27.91 | -6.65 | 46 | -24.74 | 198 | 111 | Peak |
| 2272 | 34.5 | 32.87 | 1.63 | 54 | -19.5 | 128 | 227 | Average |
| 2272 | 42.28 | 40.65 | 1.63 | 74 | -31.72 | 128 | 227 | Peak |

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit.

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) | |
|-----------------|------------------------|---------|
| | Quasi-Peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

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

4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|--------------------------|----------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESCI | 100613 | Dec. 11, 2019 | Dec. 10, 2020 |
| RF signal cable Woken | 5D-FB | Cable-cond1-01 | Sep. 05, 2019 | Sep. 04, 2020 |
| LISN ROHDE & SCHWARZ (EUT) | ENV216 | 101826 | Feb. 20, 2020 | Feb. 19, 2021 |
| LISN ROHDE & SCHWARZ (Peripheral) | ESH3-Z5 | 100311 | Aug. 22, 2019 | Aug. 21, 2020 |
| Software ADT | BV ADT_Cond_ V7.3.7.4 | NA | NA | NA |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

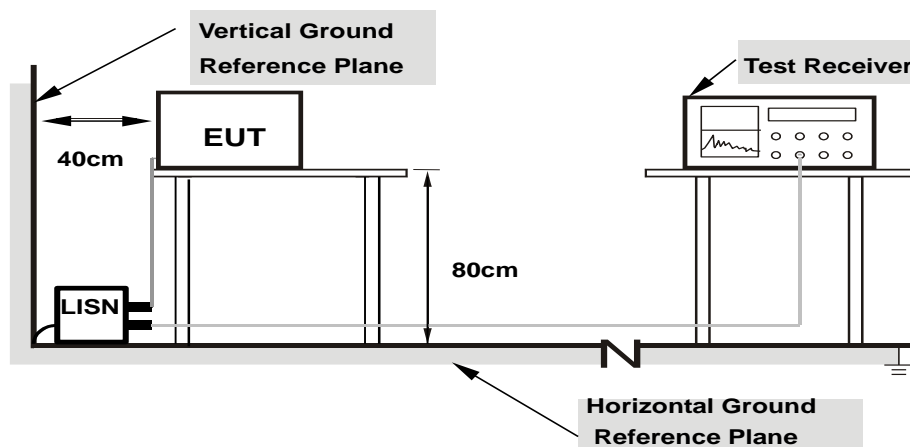
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

Set the EUT under transmission condition continuously at specific channel frequency.

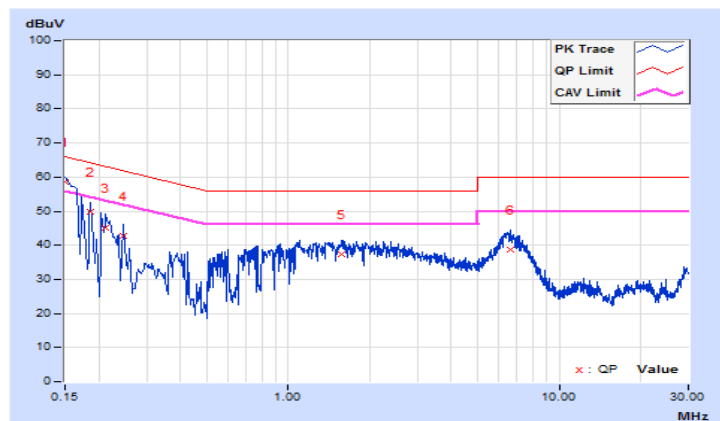
4.2.7 Test Results

| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Jones Chang | Test Date | 2020/2/26 |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.63 | 48.83 | 40.60 | 58.46 | 50.23 | 66.00 | 56.00 | -7.54 | -5.77 |
| 2 | 0.18519 | 9.62 | 40.35 | 19.94 | 49.97 | 29.56 | 64.25 | 54.25 | -14.28 | -24.69 |
| 3 | 0.21256 | 9.62 | 35.66 | 17.79 | 45.28 | 27.41 | 63.10 | 53.10 | -17.82 | -25.69 |
| 4 | 0.24775 | 9.63 | 33.08 | 21.09 | 42.71 | 30.72 | 61.83 | 51.83 | -19.12 | -21.11 |
| 5 | 1.57715 | 9.71 | 27.57 | 15.22 | 37.28 | 24.93 | 56.00 | 46.00 | -18.72 | -21.07 |
| 6 | 6.58586 | 9.82 | 28.97 | 22.34 | 38.79 | 32.16 | 60.00 | 50.00 | -21.21 | -17.84 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

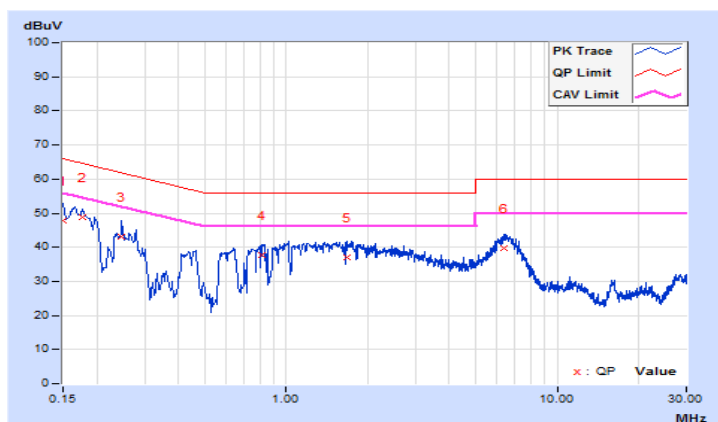


| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Jones Chang | Test Date | 2020/2/26 |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.66 | 37.99 | 17.65 | 47.65 | 27.31 | 66.00 | 56.00 | -18.35 | -28.69 |
| 2 | 0.17737 | 9.65 | 39.01 | 29.14 | 48.66 | 38.79 | 64.61 | 54.61 | -15.95 | -15.82 |
| 3 | 0.24775 | 9.65 | 33.45 | 21.58 | 43.10 | 31.23 | 61.83 | 51.83 | -18.73 | -20.60 |
| 4 | 0.81079 | 9.69 | 27.92 | 13.64 | 37.61 | 23.33 | 56.00 | 46.00 | -18.39 | -22.67 |
| 5 | 1.67061 | 9.74 | 27.31 | 16.50 | 37.05 | 26.24 | 56.00 | 46.00 | -18.95 | -19.76 |
| 6 | 6.39036 | 9.86 | 29.72 | 23.54 | 39.58 | 33.40 | 60.00 | 50.00 | -20.42 | -16.60 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

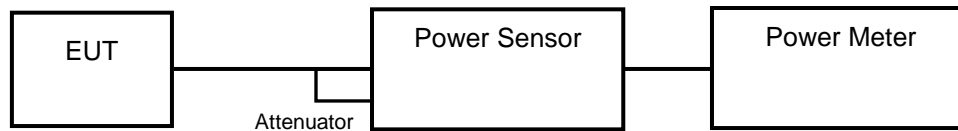


4.3 Maximum Output Power

4.3.1 Limits of Maximum Output Power Measurement

Refer to Regulation 15.247 (a)(1), the Maximum Output Power Measurement is 125 mW.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

Peak Power

<GFSK>

| Channel | Freq. (MHz) | Peak Power (mW) | Peak Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|-----------------|------------------|------------------|-------------|
| 0 | 2402 | 5.212 | 7.17 | 125 | Pass |
| 39 | 2441 | 4.932 | 6.93 | 125 | Pass |
| 78 | 2480 | 4.498 | 6.53 | 125 | Pass |

<8DPSK>

| Channel | Freq. (MHz) | Peak Power (mW) | Peak Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|-----------------|------------------|------------------|-------------|
| 0 | 2402 | 19.543 | 12.91 | 125 | Pass |
| 39 | 2441 | 21.979 | 13.42 | 125 | Pass |
| 78 | 2480 | 22.284 | 13.48 | 125 | Pass |

Average Power

<GFSK>

| Channel | Freq. (MHz) | Average Power (mW) | Average Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|--------------------|---------------------|------------------|-------------|
| 0 | 2402 | 4.667 | 6.69 | 125 | Pass |
| 39 | 2441 | 4.385 | 6.42 | 125 | Pass |
| 78 | 2480 | 4.853 | 6.86 | 125 | Pass |

<8DPSK>

| Channel | Freq. (MHz) | Average Power (mW) | Average Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|--------------------|---------------------|------------------|-------------|
| 0 | 2402 | 9.750 | 9.89 | 125 | Pass |
| 39 | 2441 | 11.143 | 10.47 | 125 | Pass |
| 78 | 2480 | 11.588 | 10.64 | 125 | Pass |

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---