

Partial FCC Test Report

(Spot Check)

Report No.: RF200428C03E-2

FCC ID: PZWBHTM80QW

Test Model: BHT-M80-QW

Received Date: Aug. 25, 2020

Test Date: Sep. 05 ~ Oct. 24, 2020

Issued Date: Oct. 27, 2020

Applicant: DENSO WAVE INCORPORATED

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

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33383, TAIWAN

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

| Issue No. | Description | Date Issued |
|----------------|------------------|---------------|
| RF200428C03E-2 | Original release | Oct. 27, 2020 |

1 Certificate of Conformity

Product: 2D Code Handy Terminal

Brand: DENSO

Test Model: BHT-M80-QW

Sample Status: Engineering sample

Applicant: DENSO WAVE INCORPORATED

Test Date: Sep. 05 ~ Oct. 24, 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:** Oct. 27, 2020
Polly Chien / Specialist

Approved by : , **Date:** Oct. 27, 2020
Bruce Chen / 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 -14.50dB at 0.40024MHz. |
| 15.247(a)(1)(iii) | Number of Hopping Frequency Used | N/A | Refer to note 1 |
| 15.247(a)(1)(iii) | Dwell Time on Each Channel | N/A | Refer to note 1 |
| 15.247(a)(1) | 1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | N/A | Refer to note 1 |
| 15.247(b) | Maximum Peak Output Power | Pass | Meet the requirement of limit. |
| 15.205 / 15.209 / 15.247(d) | Radiated Emissions and Band Edge Measurement | Pass | Meet the requirement of limit. Minimum passing margin is -0.2dB at 730.38MHz. |
| 15.247(d) | Antenna Port Emission | N/A | Refer to note 1 |
| 15.203 | Antenna Requirement | Pass | Antenna connector is spring not a standard connector. |

Note:

1. This report is a partial report. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. Other testing data please refer to the original BV CPS report no.: RF200428C03-6.
2. If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.
3. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
4. 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) (±) |
|------------------------------------|------------------|--------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz | 3.04 dB |
| | 30MHz ~ 200MHz | 3.59 dB |
| | 200MHz ~ 1000MHz | 3.60 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 2.29 dB |
| | 18GHz ~ 40GHz | 2.29 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|-----------------------|---|
| Product | 2D Code Handy Terminal |
| Brand | DENSO |
| Test Model | BHT-M80-QW |
| Sample Status | Engineering sample |
| Power Supply Rating | 3.85Vdc (Battery) 5.0Vdc / 9.0Vdc / 12.0Vdc (from adapter) |
| Modulation Type | GFSK, $\pi/4$ -DQPSK, 8DPSK |
| Modulation Technology | FHSS |
| Transfer Rate | 1/2/3Mbps |
| Operating Frequency | 2402~2480MHz |
| Number of Channel | 79 |
| Output Power | 1.250mW |
| Antenna Type | Refer to note |
| Antenna Connector | Refer to note |
| Accessory Device | Refer to note |
| Cable Supplied | Refer to note |

Note:

1. This report is a supplementary report to the original BV CPS report no.: RF200428C03-6. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel.
2. The EUT contains following accessory devices.

| | |
|-----------|---------------------------|
| Battery 1 | |
| Brand | DENSO |
| Model | BT1 |
| Rating | 3.85Vdc, 4020mAh, 15.47Wh |

| | |
|-----------|---------------------------|
| Battery 2 | |
| Brand | DENSO |
| Model | BT1S |
| Rating | 3.85Vdc, 2900mAh, 11.16Wh |

| | |
|--------------|---|
| Adapter | |
| Brand | CHANNEL WELL TECHNOLOGY |
| Model | 2ACP0183C |
| Input Power | 100-240Vac~0.5A , 50/60Hz |
| Output Power | 5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W |
| Data Cable | 1.45 m shielded USB cable without core |

| | |
|---|---|
| Cradle 1: QC3.0 charge single Cradle (Option) | |
| Brand | DENSO |
| Model | CU-M80UQ |
| Adapter | |
| Brand | CHANNEL WELL TECHNOLOGY |
| Model | 2ACP0183C |
| Input Power | 100-240Vac, 50/60Hz, 0.5A |
| Output Power | 5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W |
| Data Cable | 1.45 m shielded USB cable without core |

| | |
|---|--|
| Cradle 2: USB Cradle with spare battery charge (Option) | |
| Brand | DENSO |
| Model | CU-M80U |
| Adapter | |
| Brand | Sunny |
| Model | SYS1548-5012-T3 |
| Input Power | 100-240Vac, 1.5A MAX, 50-60Hz |
| Output Power | +12.0Vdc, 4.16A |
| Power cable | DC: 1.16m cable with one core AC: 1.71m non-shielded cable without core |
| Data Cable | 1.45 m shielded USB cable without core |

3. The EUT uses the following antennas.

| | | | | | | | | | | | | | | |
|-----------------|--------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Ant. Type | PIFA | | | | | | | | | | | | | |
| Ant. Connector | Spring | | | | | | | | | | | | | |
| Ant. 1 (WLAN) | | | | | | | | | | | | | | |
| Frequency (MHz) | 2412 | 2442 | 2484 | 5170 | 5180 | 5220 | 5320 | 5420 | 5520 | 5620 | 5720 | 5825 | 5835 | |
| Peak Gain (dBi) | 0.81 | 1.36 | 1.05 | 3.34 | 2.97 | 2.96 | 2.78 | 2.88 | 3.28 | 3.24 | 3.45 | 3.18 | 3.39 | |
| Ant. 1 (BT) | | | | | | | | | | | | | | |
| Frequency (MHz) | 2402 | | | 2412 | | | 2442 | | | 2480 | | | | |
| Peak Gain (dBi) | -0.11 | | | 0.81 | | | 1.36 | | | 1.36 | | | | |
| Ant. 2 (WLAN) | | | | | | | | | | | | | | |
| Frequency (MHz) | 2412 | 2442 | 2484 | 5170 | 5180 | 5220 | 5320 | 5420 | 5520 | 5620 | 5720 | 5825 | 5835 | |
| Peak Gain (dBi) | 1.33 | 1.47 | 0.29 | 3.80 | 3.78 | 3.65 | 3.51 | 2.98 | 2.99 | 3.09 | 3.49 | 3.53 | 3.44 | |

* The max. gain was chosen for final tests.

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

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 | P | |
| A | √ | √ | √ | √ | EUT with adapter |
| B | - | √ | √ | - | EUT with Cradle 1 |
| C | - | √ | √ | - | EUT with Cradle 2 |

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 P: Conducted Output Power Measurement

- Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** for mode A.
- "-" means no effect.

Radiated Emission Test (Above 1GHz):

- 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 | Pakcet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A | 0 to 78 | 78 | FHSS | GFSK | DH5 |

Radiated Emission Test (Below 1GHz):

- 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 | Pakcet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A, B, C | 0 to 78 | 78 | 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 | Pakcet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A, B, C | 0 to 78 | 78 | FHSS | GFSK | DH5 |

Conducted Output Power 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.

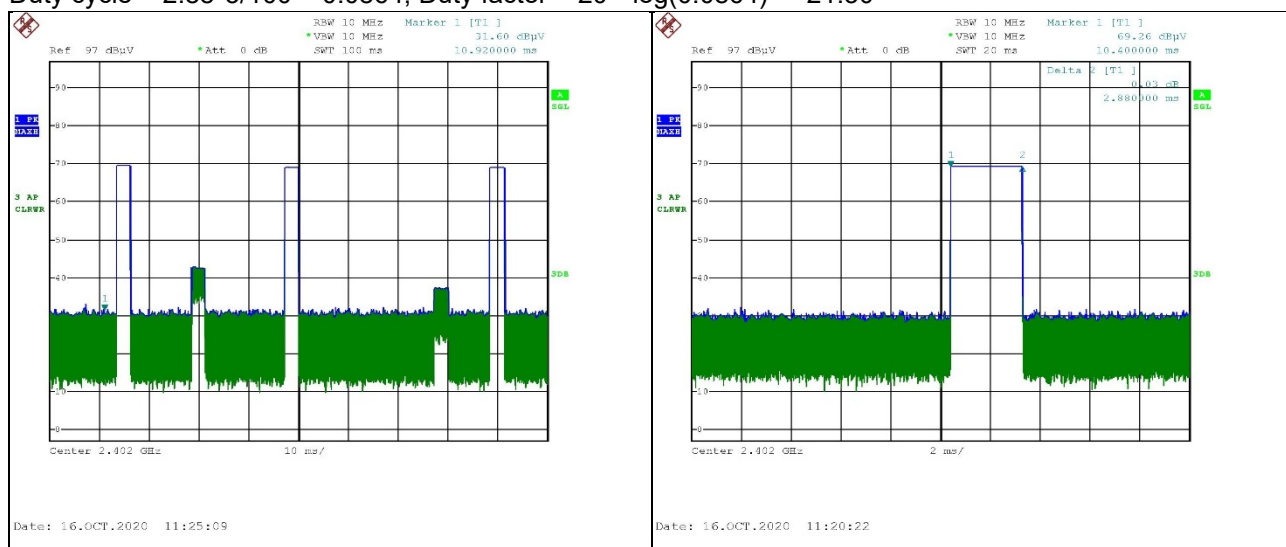
| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Pakcet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A | 0 to 78 | 0, 39, 78 | FHSS | GFSK | DH5 |
| A | 0 to 78 | 0, 39,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

Test Condition:

| Applicable to | Environmental Conditions | Input Power | Tested by |
|---------------|--|--------------|--------------------------|
| RE \geq 1G | 22 deg. C, 66% RH | 120Vac, 60Hz | Greg Lin |
| RE<1G | 22 deg. C, 66% RH 25 deg. C, 70% RH | 120Vac, 60Hz | Greg Lin, Noah Chang |
| PLC | 25 deg. C, 75% RH 26 deg. C, 69% RH | 120Vac, 60Hz | Greg Lin, Willy Cheng |
| P | 25 deg. C, 60% RH | 120Vac, 60Hz | Ivan Tseng |

3.3 Duty Cycle of Test Signal

Duty cycle = $2.88 \times 3 / 100 = 0.0864$, Duty factor = $20 \times \log(0.0864) = -21.30$



3.4 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.

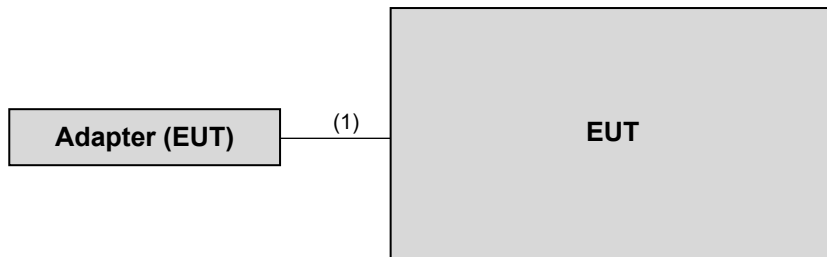
| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------|-------------------------|-----------------|------------|--------|--------------------------|
| A. | Cradle 1 | DENSO | CU-M80UQ | NA | NA | Provided by manufacturer |
| B. | Adapter | CHANNEL WELL TECHNOLOGY | 2ACP0183C | NA | NA | Provided by manufacturer |
| C. | Cradle 2 | DENSO | CU-M80U | NA | NA | Provided by manufacturer |
| D. | Adapter | Sunny | SYS1548-5012-T3 | NA | NA | Provided by manufacturer |

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------|------|------------|--------------------|--------------|--------------------------|
| 1. | USB cable | 1 | 1.45 | Y | 0 | Accessory of EUT |
| 2. | USB cable | 1 | 1.45 | Y | 0 | Provided by manufacturer |
| 3. | USB cable | 1 | 1.45 | Y | 0 | Provided by manufacturer |
| 4. | Power cable | 1 | 1.16 | - | 1 | Provided by manufacturer |

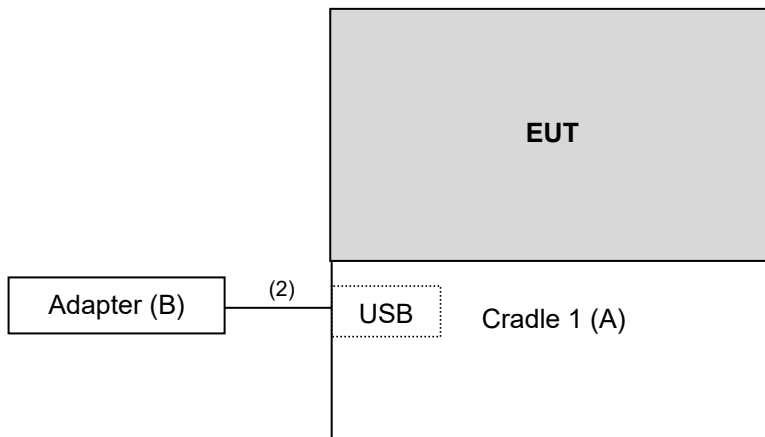
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

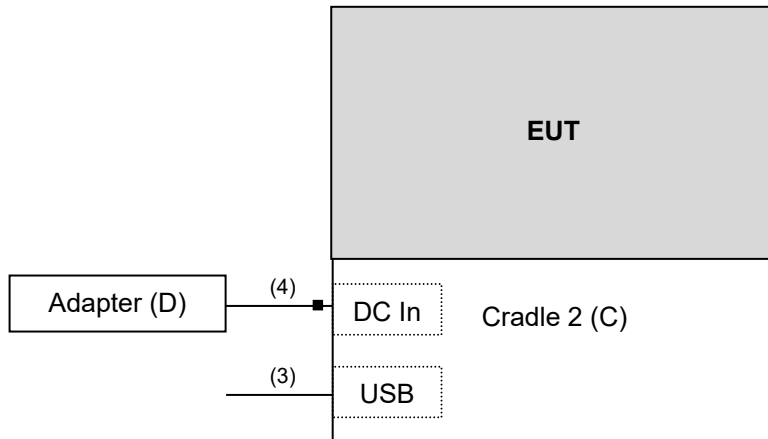
Mode A



Mode B



Mode C



3.5 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 20dB 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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, 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 20dB under any condition of modulation.

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|--|---|---------------|---------------|
| Test Receiver KEYSIGHT | N9038A | MY55420137 | Apr. 16, 2020 | Apr. 15, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100039 | Jun. 12, 2020 | Jun. 11, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSV40 | 100979 | Mar. 18, 2020 | Mar. 17, 2021 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-160 | Nov. 07, 2019 | Nov. 06, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-1169 | Nov. 24, 2019 | Nov. 23, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 24, 2019 | Nov. 23, 2020 |
| Loop Antenna TESEQ | HLA 6121 | 45745 | Jul. 06, 2020 | Jul. 05, 2021 |
| Preamplifier Agilent (Below 1GHz) | 8447D | 2944A10638 | Jun. 08, 2020 | Jun. 07, 2021 |
| Preamplifier Agilent (Above 1GHz) | 8449B | 3008A02367 | Feb. 18, 2020 | Feb. 17, 2021 |
| RF signal cable HUBER+SUHNER&EMCI | SUCOFLEX 104 & EMC104-SM-SM800 0 | CABLE-CH9-02 (248780+171006) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | CABLE-CH9-(250795/ 4) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable Woken | 8D-FB | Cable-CH9-01 | Jun. 08, 2020 | Jun. 07, 2021 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn BV ADT | AT100 | AT93021705 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021705 | NA | NA |
| Turn Table Controller BV ADT | SC100 | SC93021705 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| USB Wideband Power Sensor KEYSIGHT | U2021XA | MY55050005/MY5519 0004/MY55190007/MY 55210005 | Jul. 13, 2020 | Jul. 12, 2021 |

- 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 Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- 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 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 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:

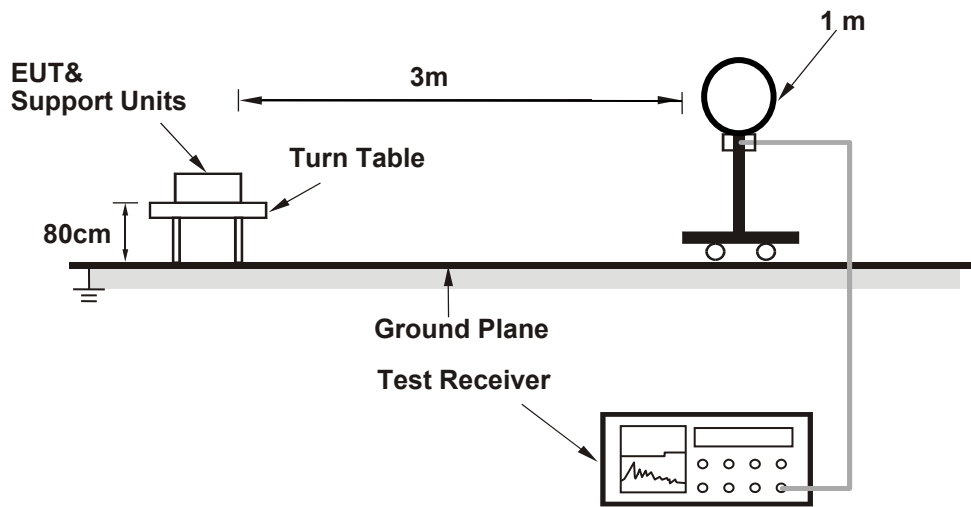
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz. According to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. The duty cycle correction factor refer to Chapter 3.3 of this report.
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

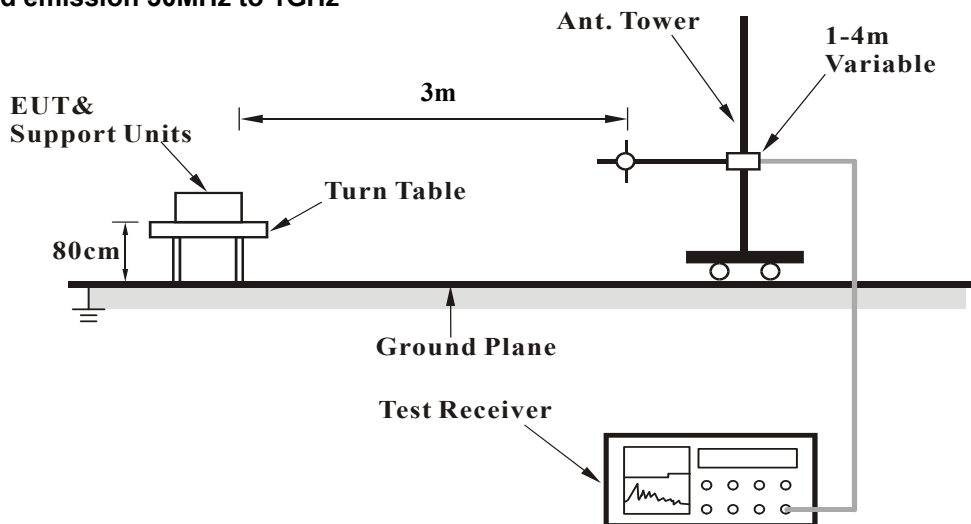
No deviation.

4.1.5 Test Setup

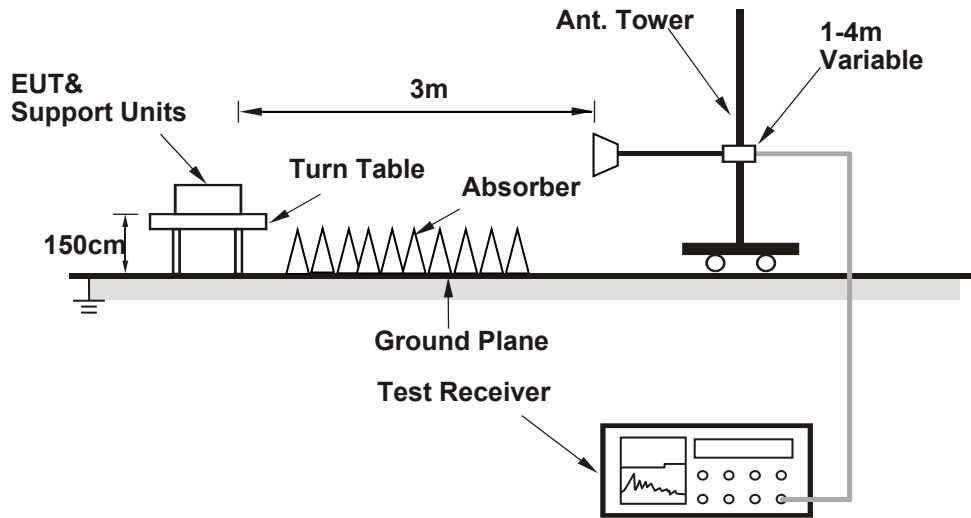
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- The EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

GFSK

| | | | |
|-----------------|---------------|----------------------|--------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz | | Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2480.00 | 101.4 PK | | | 1.00 H | 179 | 70.3 | 31.1 |
| 2 | *2480.00 | 80.1 AV | | | 1.00 H | 179 | 49.0 | 31.1 |
| 3 | 2483.50 | 55.6 PK | 74.0 | -18.4 | 1.00 H | 179 | 24.4 | 31.2 |
| 4 | 2483.50 | 34.3 AV | 54.0 | -19.7 | 1.00 H | 179 | 3.1 | 31.2 |
| 5 | 4960.00 | 42.9 PK | 74.0 | -31.1 | 2.68 H | 311 | 40.6 | 2.3 |
| 6 | 4960.00 | 21.6 AV | 54.0 | -32.4 | 2.68 H | 311 | 19.3 | 2.3 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2480.00 | 102.8 PK | | | 1.87 V | 3 | 71.7 | 31.1 |
| 2 | *2480.00 | 81.5 AV | | | 1.87 V | 3 | 50.4 | 31.1 |
| 3 | 2483.50 | 56.4 PK | 74.0 | -17.6 | 1.87 V | 3 | 25.2 | 31.2 |
| 4 | 2483.50 | 35.1 AV | 54.0 | -18.9 | 1.87 V | 3 | 3.9 | 31.2 |
| 5 | 4960.00 | 44.1 PK | 74.0 | -29.9 | 2.68 V | 131 | 41.8 | 2.3 |
| 6 | 4960.00 | 22.8 AV | 54.0 | -31.2 | 2.68 V | 131 | 20.5 | 2.3 |

Remarks:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- for Fundamental frequency and bandedge & harmonic:
The average value of fundamental frequency is :average value = peak value + 20log(Duty cycle)
where the duty factor is calculated from following formula:
 $20\text{Log}(\text{Duty cycle}) = 20 \log (2.88\text{ms} \cdot 3/100) = -21.30\text{dB}$ please refer to the plotted duty (see section 3.3)

Below 1GHz worst-case data:

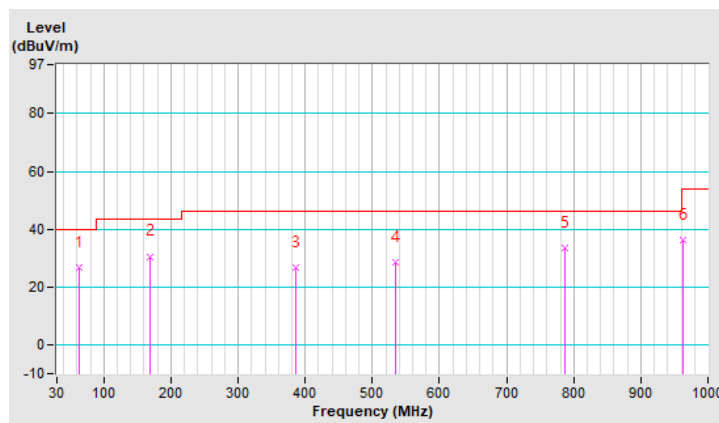
GFSK

| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | A |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 63.95 | 26.6 QP | 40.0 | -13.4 | 1.00 H | 18 | 36.5 | -9.9 |
| 2 | 169.68 | 30.6 QP | 43.5 | -12.9 | 1.00 H | 263 | 39.6 | -9.0 |
| 3 | 385.02 | 26.7 QP | 46.0 | -19.3 | 1.25 H | 268 | 31.8 | -5.1 |
| 4 | 534.40 | 28.7 QP | 46.0 | -17.3 | 1.25 H | 78 | 31.1 | -2.4 |
| 5 | 787.57 | 33.6 QP | 46.0 | -12.4 | 1.00 H | 52 | 30.8 | 2.8 |
| 6 | 963.14 | 36.3 QP | 54.0 | -17.7 | 1.00 H | 189 | 30.6 | 5.7 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

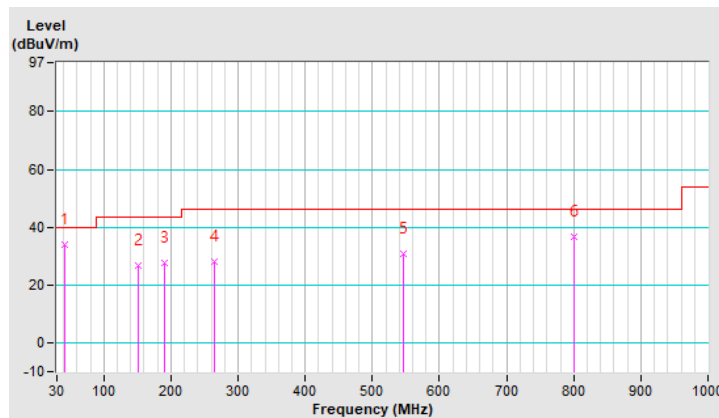


| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | A |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 41.64 | 34.0 QP | 40.0 | -6.0 | 1.00 V | 145 | 43.7 | -9.7 |
| 2 | 152.22 | 26.9 QP | 43.5 | -16.6 | 1.50 V | 61 | 35.6 | -8.7 |
| 3 | 190.05 | 27.5 QP | 43.5 | -16.0 | 1.00 V | 317 | 38.7 | -11.2 |
| 4 | 263.77 | 28.2 QP | 46.0 | -17.8 | 1.00 V | 118 | 36.5 | -8.3 |
| 5 | 547.01 | 30.7 QP | 46.0 | -15.3 | 1.25 V | 37 | 32.9 | -2.2 |
| 6 | 800.18 | 36.8 QP | 46.0 | -9.2 | 1.00 V | 291 | 34.0 | 2.8 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

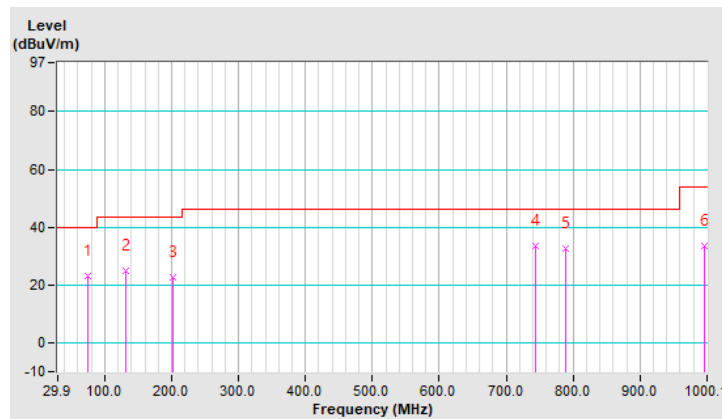


| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | B |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 74.53 | 23.1 QP | 40.0 | -16.9 | 1.00 H | 308 | 34.6 | -11.5 |
| 2 | 130.98 | 24.9 QP | 43.5 | -18.6 | 2.00 H | 252 | 34.9 | -10.0 |
| 3 | 202.60 | 22.7 QP | 43.5 | -20.8 | 1.51 H | 80 | 34.3 | -11.6 |
| 4 | 743.97 | 33.3 QP | 46.0 | -12.7 | 1.51 H | 346 | 30.7 | 2.6 |
| 5 | 788.60 | 32.7 QP | 46.0 | -13.3 | 1.00 H | 163 | 28.8 | 3.9 |
| 6 | 996.22 | 33.7 QP | 54.0 | -20.3 | 1.51 H | 317 | 25.8 | 7.9 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

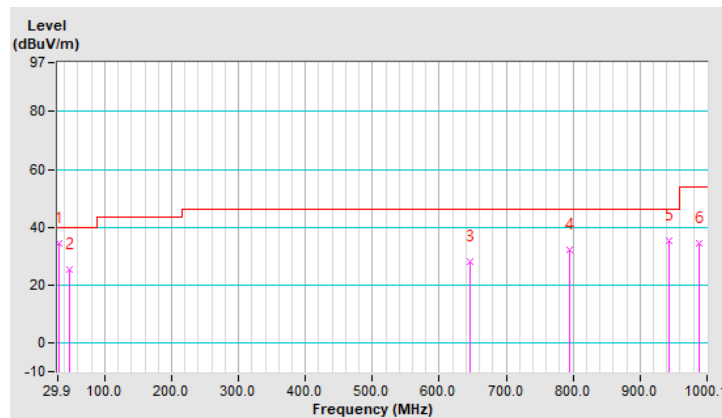


| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | B |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 30.90 | 34.4 QP | 40.0 | -5.6 | 2.00 V | 205 | 44.8 | -10.4 |
| 2 | 47.36 | 25.3 QP | 40.0 | -14.7 | 1.01 V | 7 | 34.1 | -8.8 |
| 3 | 646.95 | 27.9 QP | 46.0 | -18.1 | 1.50 V | 13 | 28.0 | -0.1 |
| 4 | 794.42 | 32.2 QP | 46.0 | -13.8 | 2.00 V | 282 | 28.4 | 3.8 |
| 5 | 943.83 | 35.5 QP | 46.0 | -10.5 | 1.50 V | 17 | 28.1 | 7.4 |
| 6 | 988.46 | 34.6 QP | 54.0 | -19.4 | 2.00 V | 6 | 26.8 | 7.8 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

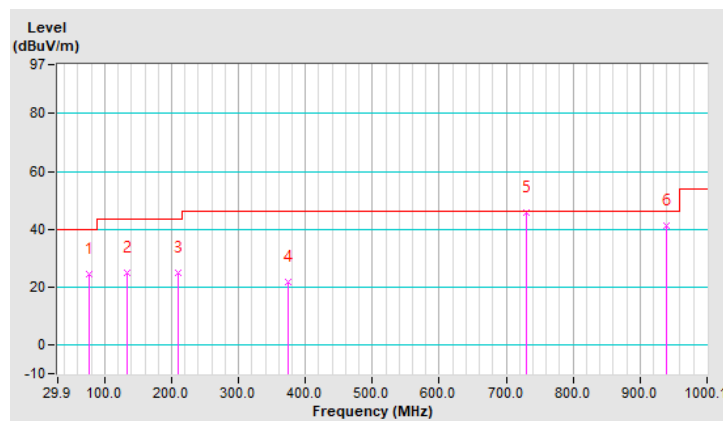


| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | C |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 76.47 | 24.4 QP | 40.0 | -15.6 | 1.00 H | 308 | 36.5 | -12.1 |
| 2 | 132.74 | 25.0 QP | 43.5 | -18.5 | 2.00 H | 263 | 34.8 | -9.8 |
| 3 | 210.36 | 25.1 QP | 43.5 | -18.4 | 1.51 H | 90 | 36.6 | -11.5 |
| 4 | 373.35 | 21.9 QP | 46.0 | -24.1 | 2.00 H | 7 | 28.0 | -6.1 |
| 5 | 730.38 | 45.8 QP | 46.0 | -0.2 | 1.51 H | 340 | 43.8 | 2.0 |
| 6 | 939.95 | 41.2 QP | 46.0 | -4.8 | 2.00 H | 7 | 34.0 | 7.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

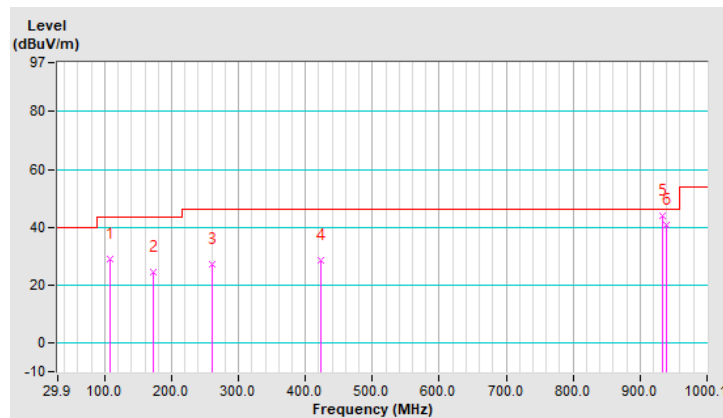


| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 9kHz ~ 1GHz | TEST MODE | C |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 107.52 | 28.8 QP | 43.5 | -14.7 | 1.01 V | 109 | 41.0 | -12.2 |
| 2 | 173.49 | 24.3 QP | 43.5 | -19.2 | 1.50 V | 90 | 33.8 | -9.5 |
| 3 | 260.81 | 27.2 QP | 46.0 | -18.8 | 1.50 V | 90 | 36.4 | -9.2 |
| 4 | 423.80 | 28.4 QP | 46.0 | -17.6 | 1.50 V | 6 | 33.8 | -5.4 |
| 5 | 934.13 | 44.1 QP | 46.0 | -1.9 | 1.99 V | 122 | 37.1 | 7.0 |
| 6 | 939.95 | 40.8 QP | 46.0 | -5.2 | 1.99 V | 7 | 33.6 | 7.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.



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 |

4.2.2 Test Instruments

Tested date: Sep. 05 ~ Oct. 24, 2020

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|--------------------------|----------------|---------------|---------------|
| Test Receiver ROHDE & SCHWARZ | ESCI | 100613 | Dec. 11, 2019 | Dec. 10, 2020 |
| RF signal cable Woken | 5D-FB | Cable-cond1-01 | Sep. 04, 2020 | Sep. 03, 2021 |
| LISN ROHDE & SCHWARZ (EUT) | ENV216 | 101826 | Feb. 20, 2020 | Feb. 19, 2021 |
| V-LISN ROHDE & SCHWARZ (Peripheral) | NNBL 8226-2 | 8226-142 | Jul. 31, 2020 | Jul. 30, 2021 |
| 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 (Conduction 1).
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

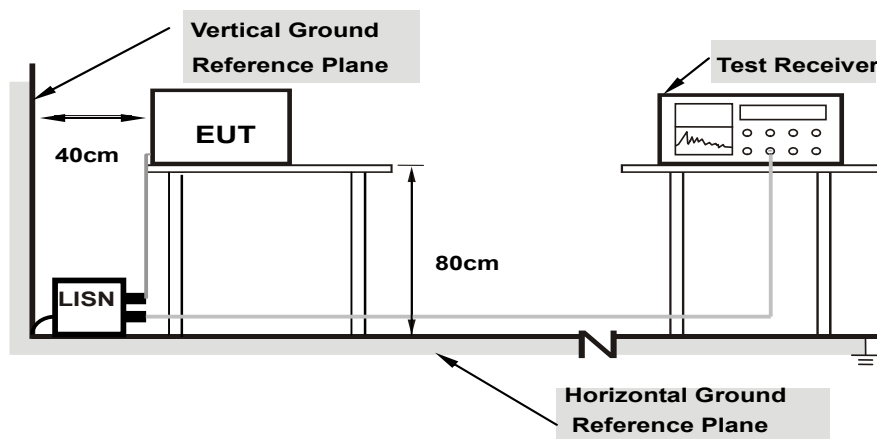
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. 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.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

Worst-case data:

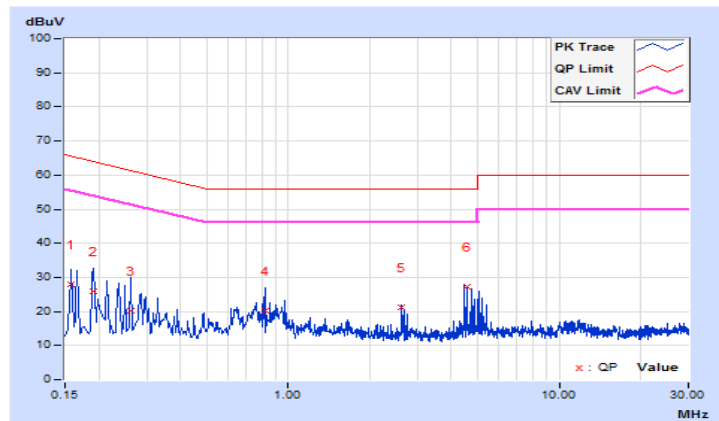
GFSK

| | | | |
|-----------|----------|-------------------|--------------------------------|
| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | A | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|----------------------|----------------------------|---------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.15800 | 9.65 | 18.34 | 10.68 | 27.99 | 20.33 | 65.57 |
| 2 | 0.19000 | 9.66 | 16.39 | 10.24 | 26.05 | 19.90 | 64.04 | 54.04 | -37.99 | -34.14 |
| 3 | 0.26200 | 9.66 | 10.61 | 3.18 | 20.27 | 12.84 | 61.37 | 51.37 | -41.10 | -38.53 |
| 4 | 0.81800 | 9.67 | 10.67 | 3.84 | 20.34 | 13.51 | 56.00 | 46.00 | -35.66 | -32.49 |
| 5 | 2.62600 | 9.71 | 11.43 | 4.51 | 21.14 | 14.22 | 56.00 | 46.00 | -34.86 | -31.78 |
| 6 | 4.57400 | 9.74 | 17.43 | 10.92 | 27.17 | 20.66 | 56.00 | 46.00 | -28.83 | -25.34 |

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.

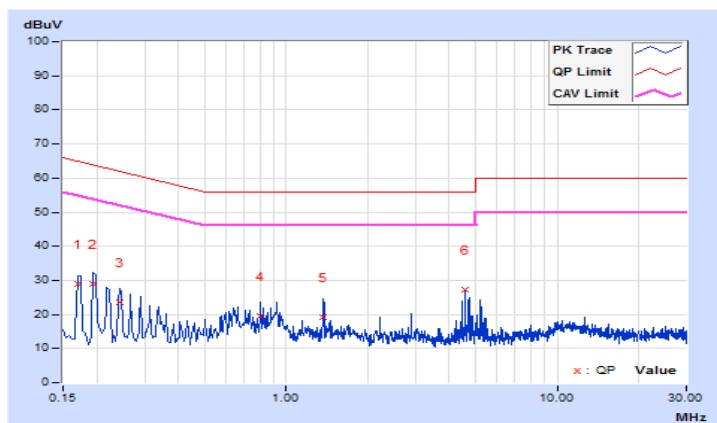


| | | | |
|-----------|-------------|-------------------|--------------------------------|
| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | A | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|----------------------|----------------------------|---------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.17022 | 9.68 | 19.25 | 5.62 | 28.93 | 15.30 | 64.95 |
| 2 | 0.19400 | 9.68 | 19.34 | 5.64 | 29.02 | 15.32 | 63.86 | 53.86 | -34.84 | -38.54 |
| 3 | 0.24200 | 9.68 | 13.81 | 2.13 | 23.49 | 11.81 | 62.03 | 52.03 | -38.54 | -40.22 |
| 4 | 0.80200 | 9.69 | 9.91 | 1.21 | 19.60 | 10.90 | 56.00 | 46.00 | -36.40 | -35.10 |
| 5 | 1.36600 | 9.70 | 9.43 | 1.56 | 19.13 | 11.26 | 56.00 | 46.00 | -36.87 | -34.74 |
| 6 | 4.57400 | 9.78 | 17.44 | 2.39 | 27.22 | 12.17 | 56.00 | 46.00 | -28.78 | -33.83 |

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.

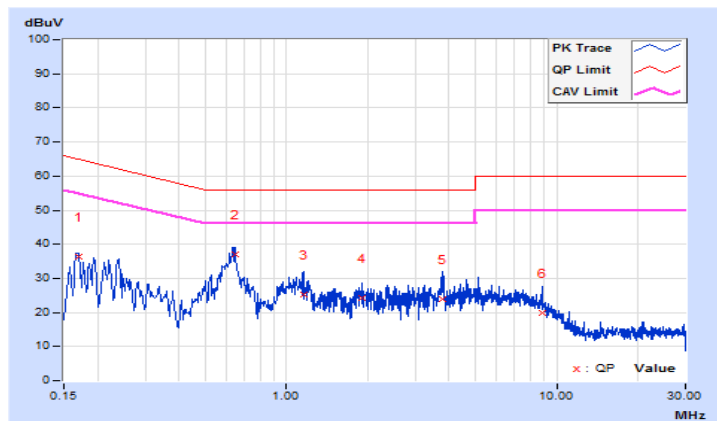


| | | | |
|-----------|----------|-------------------|--------------------------------|
| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | B | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|----------------------|----------------------------|---------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.16955 | 9.65 | 26.59 | 12.97 | 36.24 | 22.62 | 64.98 |
| 2 | 0.64266 | 9.66 | 27.24 | 19.93 | 36.90 | 29.59 | 56.00 | 46.00 | -19.10 | -16.41 |
| 3 | 1.16269 | 9.67 | 15.54 | 8.20 | 25.21 | 17.87 | 56.00 | 46.00 | -30.79 | -28.13 |
| 4 | 1.91341 | 9.70 | 14.70 | 8.73 | 24.40 | 18.43 | 56.00 | 46.00 | -31.60 | -27.57 |
| 5 | 3.77457 | 9.74 | 14.04 | 6.26 | 23.78 | 16.00 | 56.00 | 46.00 | -32.22 | -30.00 |
| 6 | 8.88885 | 9.78 | 10.09 | 3.44 | 19.87 | 13.22 | 60.00 | 50.00 | -40.13 | -36.78 |

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.

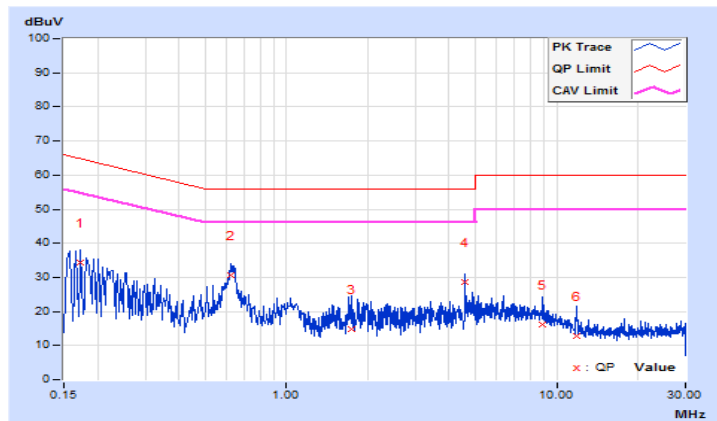


| | | | |
|-----------|-------------|-------------------|--------------------------------|
| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | B | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|----------------------|----------------------------|---------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.17346 | 9.68 | 24.66 | 10.28 | 34.34 | 19.96 | 64.79 |
| 2 | 0.62311 | 9.68 | 21.06 | 11.43 | 30.74 | 21.11 | 56.00 | 46.00 | -25.26 | -24.89 |
| 3 | 1.75310 | 9.72 | 5.25 | 1.17 | 14.97 | 10.89 | 56.00 | 46.00 | -41.03 | -35.11 |
| 4 | 4.55266 | 9.78 | 18.86 | 4.30 | 28.64 | 14.08 | 56.00 | 46.00 | -27.36 | -31.92 |
| 5 | 8.89276 | 9.82 | 6.36 | 0.23 | 16.18 | 10.05 | 60.00 | 50.00 | -43.82 | -39.95 |
| 6 | 11.87218 | 9.87 | 2.96 | 0.11 | 12.83 | 9.98 | 60.00 | 50.00 | -47.17 | -40.02 |

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.

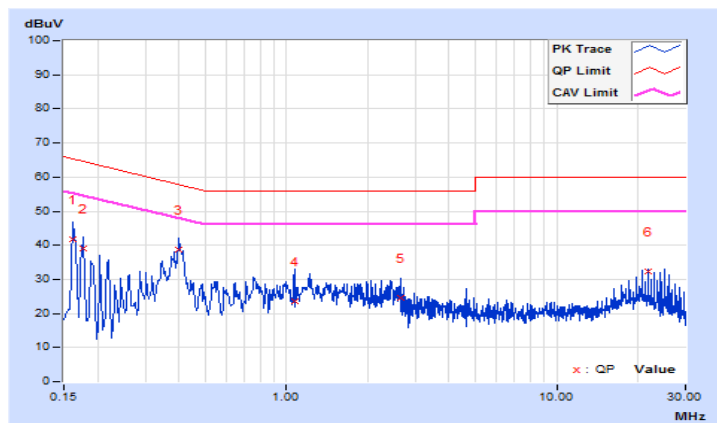


| | | | |
|-----------|----------|-------------------|--------------------------------|
| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | C | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----------|----------------|----------------------|----------------------------|--------------|-----------------------------|--------------|--------------------|--------------|----------------|---------------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.16173 | 9.58 | 32.02 | 14.11 | 41.60 | 23.69 | 65.37 |
| 2 | 0.17737 | 9.59 | 29.46 | 12.60 | 39.05 | 22.19 | 64.61 | 54.61 | -25.56 | -32.42 |
| 3 | 0.40024 | 9.58 | 29.07 | 23.77 | 38.65 | 33.35 | 57.85 | 47.85 | -19.20 | -14.50 |
| 4 | 1.07276 | 9.60 | 14.04 | 6.64 | 23.64 | 16.24 | 56.00 | 46.00 | -32.36 | -29.76 |
| 5 | 2.63676 | 9.64 | 15.04 | 5.06 | 24.68 | 14.70 | 56.00 | 46.00 | -31.32 | -31.30 |
| 6 | 21.84268 | 9.77 | 22.46 | 21.60 | 32.23 | 31.37 | 60.00 | 50.00 | -27.77 | -18.63 |

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.

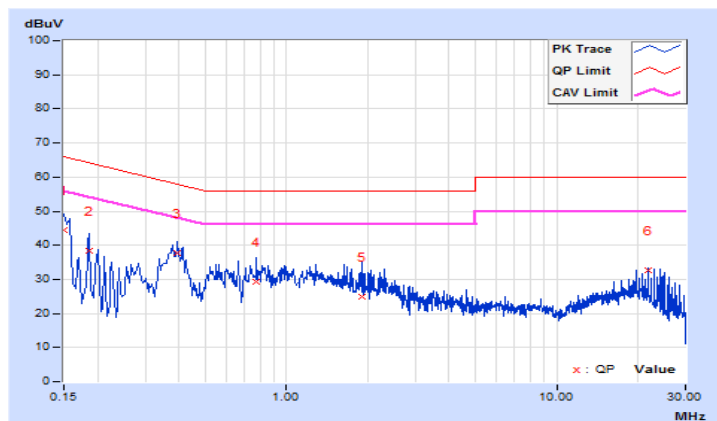


| | | | |
|-----------|-------------|-------------------|--------------------------------|
| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
| Test Mode | C | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|----------------|----------------------|----------------------------|---------|-----------------------------|-------|--------------------|-------|----------------|--------|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| | | | 1 | 0.15000 | 9.56 | 34.84 | 18.87 | 44.40 | 28.43 | 66.00 |
| 2 | 0.18519 | 9.57 | 28.65 | 13.59 | 38.22 | 23.16 | 64.25 | 54.25 | -26.03 | -31.09 |
| 3 | 0.39633 | 9.56 | 28.24 | 23.28 | 37.80 | 32.84 | 57.93 | 47.93 | -20.13 | -15.09 |
| 4 | 0.77169 | 9.57 | 19.88 | 13.61 | 29.45 | 23.18 | 56.00 | 46.00 | -26.55 | -22.82 |
| 5 | 1.89386 | 9.60 | 15.29 | 9.21 | 24.89 | 18.81 | 56.00 | 46.00 | -31.11 | -27.19 |
| 6 | 21.84659 | 9.83 | 22.97 | 22.04 | 32.80 | 31.87 | 60.00 | 50.00 | -27.20 | -18.13 |

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.



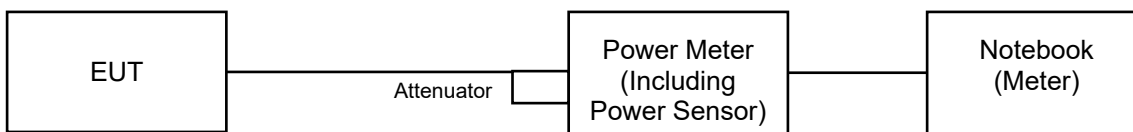
4.3 Maximum Output Power

4.3.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

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

For Peak Power

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.

For Average Power

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

For Peak Power

| Channel | Frequency (MHz) | Peak Power (mW) | | Peak Power (dBm) | | Power Limit (mW) | Pass / Fail |
|---------|-----------------|-----------------|-------|------------------|-------|----------------------------|-------------|
| | | GFSK | 8DPSK | GFSK | 8DPSK | | |
| 0 | 2402 | 1.089 | 0.968 | 0.37 | -0.14 | 125 / 1000 ^{Note} | Pass |
| 39 | 2441 | 1.250 | 1.074 | 0.97 | 0.31 | 125 / 1000 ^{Note} | Pass |
| 78 | 2480 | 1.138 | 1.028 | 0.56 | 0.12 | 125 / 1000 ^{Note} | Pass |

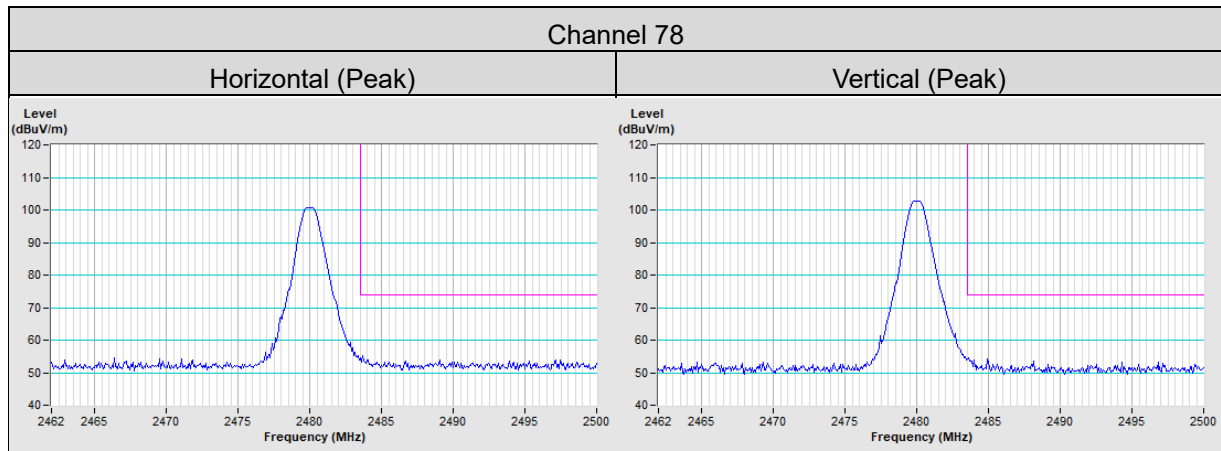
Note: RF Output Power limit depends on the operating channel numbers, please refer to section 3.2 of the results.

For Average Power

| Channel | Frequency (MHz) | Average Power (mW) | | Average Power (dBm) | |
|---------|-----------------|--------------------|-------|---------------------|-------|
| | | GFSK | 8DPSK | GFSK | 8DPSK |
| 0 | 2402 | 1.052 | 0.504 | 0.22 | -2.98 |
| 39 | 2441 | 1.205 | 0.533 | 0.81 | -2.73 |
| 78 | 2480 | 1.104 | 0.520 | 0.43 | -2.84 |

Annex A- Band Edge Measurement

GFSK



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 and approved according to ISO/IEC 17025.

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

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

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