

TEST REPORT

FCC/ISED BT LE Test for W0C-0430
Class II Permissive Change

APPLICANT
JVC KENWOOD Corporation

REPORT NO.
HCT-RF-2209-FI007-R1

DATE OF ISSUE
September 22, 2022

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|--|---|
| <h1 style="margin: 0;">TEST REPORT</h1> <p style="margin: 0;">W0C-0430</p> | <p>REPORT NO. HCT-RF-2209-FI007-R1</p> <p>DATE OF ISSUE September 22, 2022</p> <p>Additional Model -</p> |
|--|---|

Applicant JVC KENWOOD Corporation
1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 JAPAN

| | |
|--------------------------------|--|
| Eut Type Model Name | Communication Module W0C-0430 |
| Modulation type | GFSK |
| FCC Classification | Digital Transmission System(DTS) |
| FCC Rule Part(s) | Part 15 subpart C |
| ISED Rule Part(s) | RSS-247 Issue 2 (February 2017) RSS-Gen Issue 5_Amendment 2 (February 2021) |

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

| Revision No. | Date of Issue | Description |
|--------------|--------------------|--------------------------|
| 0 | September 20, 2022 | Initial Release |
| 1 | September 22, 2022 | EUT information revised. |

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC / ISED Rules under normal use and maintenance.

KOLAS Statement:

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (KOLAS Accreditation No. KT197)

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

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1. GENERAL INFORMATION

| | |
|-------------------|--|
| Manufacturer: | JVC KENWOOD Corporation |
| Address: | 3-12, Moriyacho, Kanagawa-ku, Yokohama-shi, Knagawa, 221-0022 JAPAN |
| FCC ID: | K44515050 |
| IC: | 282F-515050 |
| EUT Type: | Communication Module |
| Date(s) of Tests: | September 06, 2022 ~ September 20, 2022 |
| Place of Tests: | HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Korea |

2. EUT DESCRIPTION

| | |
|-----------------------------|---|
| EUT Type | Communication Module |
| FCC Model Name | W0C-0430 |
| ISED Model Name | W0C-0430 |
| Power Supply Voltage | DC 7.5 V |
| Modulation Type | GFSK |
| Frequency Range (MHz) | 2 402 MHz – 2 480 MHz |
| Antenna Type | Sheet metal Antenna |
| Peak Antenna gain | -1.3 dBi |
| Straddle channel | Supported |
| TDWR Band | Not Supported |
| Dynamic Frequency Selection | Slave without radar detection |
| Battery type | <ul style="list-style-type: none"> - KNB-L2: 2600mAh Li-ion Battery - KNB-L3: 3400mAh Li-ion Battery - KNB-LS5: 2000mAh Li-ion Battery - KNB-LS7: 3800mAh Li-ion Battery - KNB-L11: 4000mAh Li-ion Battery - KPB-8: AAx12 Battery |
| PMN | W0C-0430 |
| HVIN | W0C-0430 |
| FVIN | N/A |
| HMN | VP8000-F2, VP8000-F3 |
| Host EUT description | This transmitter module has tested in the specific host devices , VP8000-F2 and VP8000-F3 as non-stand-alone configuration. |
| EUT serial numbers | VP8000-F2: 00000042 VP8000-F3: 00000038 |

3. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

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

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C. / RSS-Gen issue 5, RSS-247 issue 2.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil,

Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

For ISED, test facility was accepted dated February 14, 2019 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of § 15.203

According to RSS-GEN(Issue 5) Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Parameter | Expanded Uncertainty (dB) |
|--|---|
| Conducted Disturbance (150 kHz ~ 30 MHz) | 2.00 (Confidence level about 95 %, $k=2$) |
| Radiated Disturbance (9 kHz ~ 30 MHz) | 4.40 (Confidence level about 95 %, $k=2$) |
| Radiated Disturbance (30 MHz ~ 1 GHz) | 5.74 (Confidence level about 95 %, $k=2$) |
| Radiated Disturbance (1 GHz ~ 18 GHz) | 5.51 (Confidence level about 95 %, $k=2$) |
| Radiated Disturbance (18 GHz ~ 40 GHz) | 5.92 (Confidence level about 95 %, $k=2$) |
| Radiated Disturbance (Above 40 GHz) | 5.48 (Confidence level about 95 %, $k=2$) |

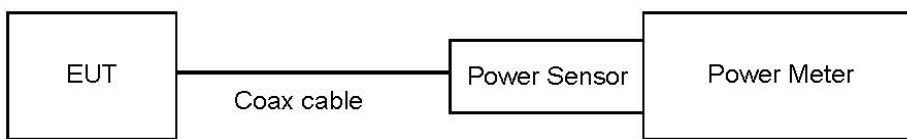
8. DESCRIPTION OF TESTS

8.1. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

- Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)
: Measure the peak power of the transmitter.

- Average Power (Procedure 8.3.2.3 in KDB 558074 v05r02, Procedure 11.9.2.3 in ANSI 63.10-2013)
 - 1) Measure the duty cycle.
 - 2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 - 3) Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

- Conducted Output Power(Peak) = Measured Level + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Level + ATT loss + Cable loss + Duty Cycle Factor

8.2. Radiated Test

Limit

FCC

| Frequency (MHz) | Field Strength ($\mu\text{V}/\text{m}$) | Measurement Distance (m) |
|-----------------|---|--------------------------|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30 | 30 | 30 |

ISED

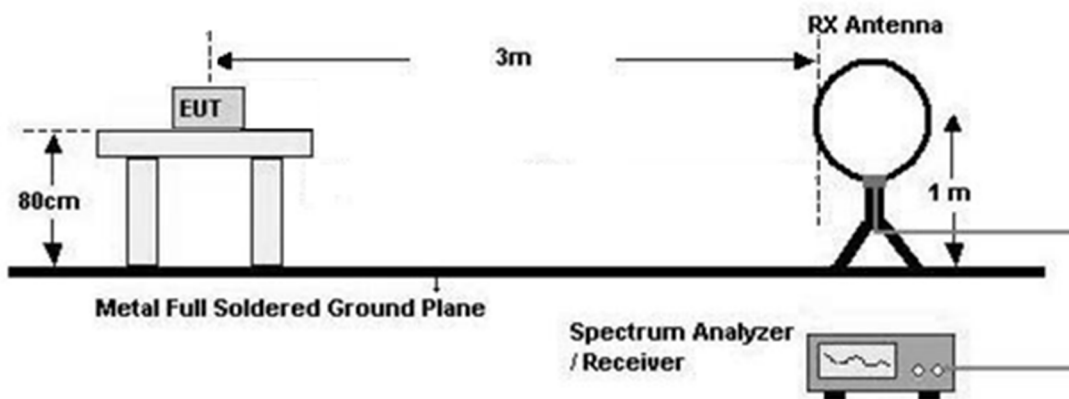
| Frequency (MHz) | Field Strength ($\mu\text{A}/\text{m}$) | Measurement Distance (m) |
|-----------------|---|--------------------------|
| 0.009 – 0.490 | 6.37/F(kHz) | 300 |
| 0.490 – 1.705 | 63.7/F(kHz) | 30 |
| 1.705 – 30 | 0.08 | 30 |

FCC&ISED

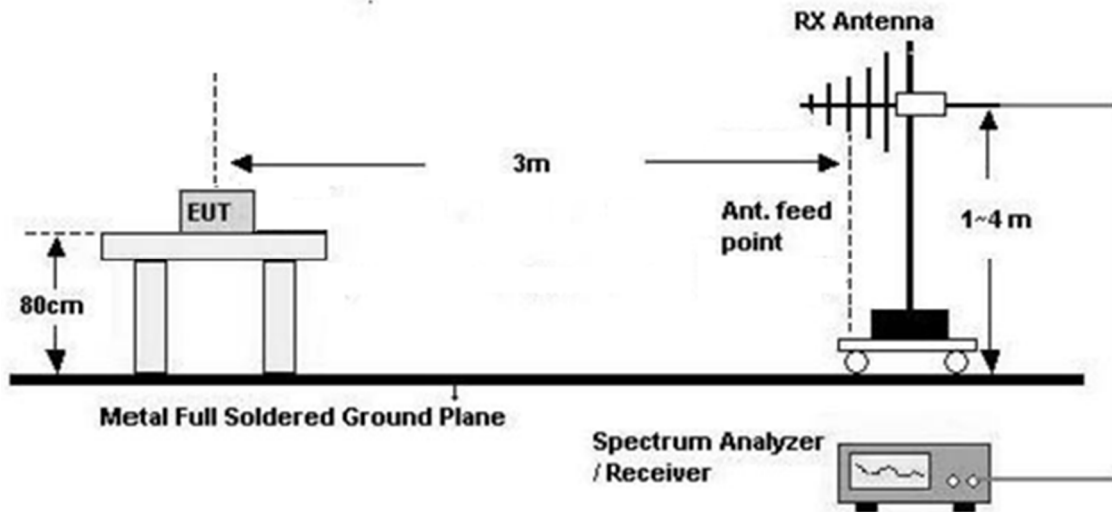
| Frequency (MHz) | Field Strength ($\mu\text{V}/\text{m}$) | Measurement Distance (m) |
|-----------------|---|--------------------------|
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Test Configuration

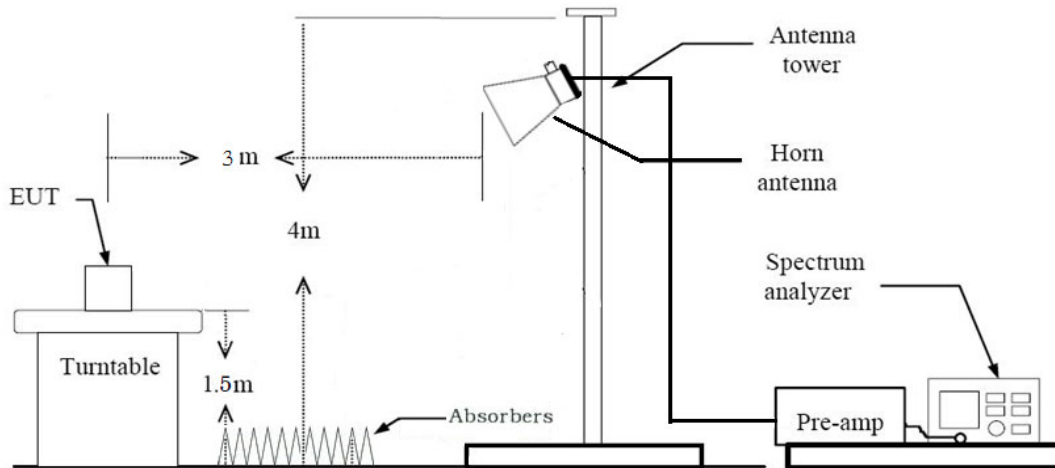
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHz

※In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. Radiated test is performed with hopping off.
 2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
 3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
 5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
 6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
 7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
 8. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range 1 GHz – 10th Harmonics
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average):
 - Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - Sweep time = auto.
 9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
 11. Total (Measurement Type : Peak)
 - = Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
 - Total (Measurement Type : Average)
 - = Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
- The duty cycle factor was the maximum supported by the protocol , then we measured average with no correction.

Test Procedure of Radiated Restricted Band Edge

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz – 10th Harmonics
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average):
 - Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$
 - Measured Frequency Range : 1 GHz – 10th Harmonics
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
8. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
9. Total(Measurement Type : Peak)
 - = Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
 Total(Measurement Type : Average)
 - = Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
 - The duty cycle factor was the maximum supported by the protocol , then we measured average with no correction.
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

8.3. Receiver Spurious Emissions

Limit

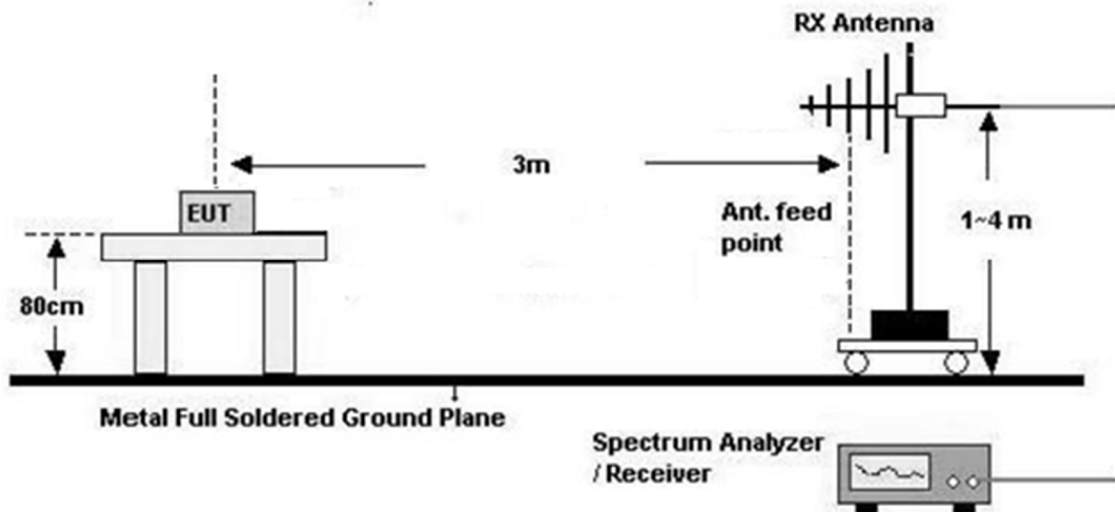
| Frequency (MHz) | Field Strength ($\mu\text{V}/\text{m}$) | Measurement Distance (m) |
|-----------------|---|--------------------------|
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 metres.

Test Configuration

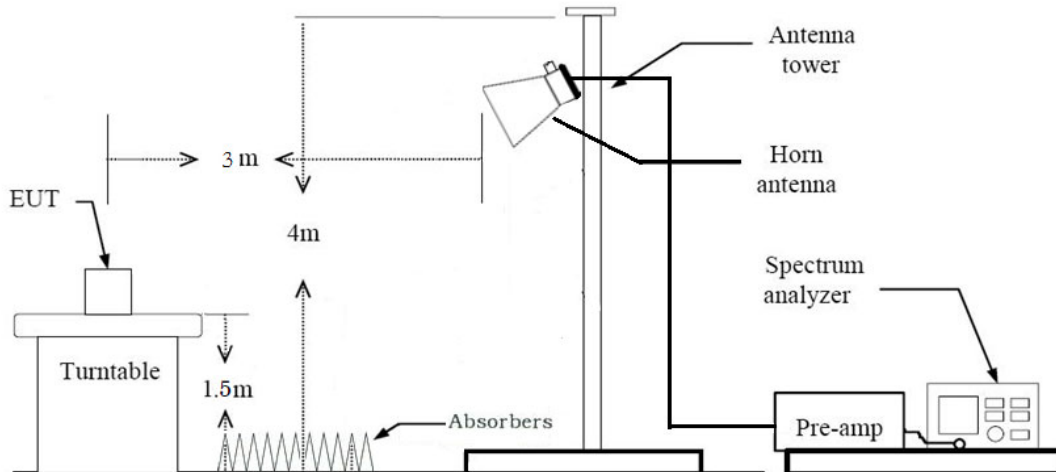
30 MHz - 1 GHz



Test Procedure of Receiver Spurious Emissions (Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHz
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)

Above 1 GHz



Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average):
 - We performed using a reduced video BW method was done with the analyzer in linear mode
 - Measured Frequency Range : 1 GHz – 10th Harmonics

- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds

The actual setting value of VBW = 10 kHz

8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

8.4. Worst case configuration and mode

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone
 - Worstcase : Stand alone
2. EUT Axis:
 - Radiated Spurious Emissions : Y
 - Radiated Restricted Band Edge : Z
3. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane
4. All Battery were investigated and the worst case configuration results are reported.
 - Worst case Battery type : KNB-L11
5. All datarate of operation were investigated and the worst case configuration results are reported.
6. VP8000-F2, VP8000-F3 were tested and the worst case results are reported.
 - Worst case : VP8000-F2

Conducted test

1. The EUT was configured with packet length of highest power.
 - ALL supported mode tested.
 - Worst Results refer to Notes for each test item



9. SUMMARY TEST OF RESULTS

| Test Description | FCC Part Section(s) | Test Limit | Test Condition | Test Result | Status |
|--------------------------------|-----------------------------------|-----------------|----------------|-------------|--------------------|
| Conducted Maximum Output Power | § 15.247(b)(3) | < 1 Watt | Conducted | PASS | C ^{Note4} |
| Radiated Spurious Emissions | § 15.247(d), 15.205, 15.209 | cf. Section 7.6 | Radiated | PASS | C ^{Note3} |
| Radiated Restricted Band Edge | § 15.247(d), 15.205, 15.209 | cf. Section 7.6 | | PASS | C ^{Note3} |

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C2PC model is electrically identical to the Original model.
The Product Equality Declaration includes detailed information about the changes between the devices.
3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 10
4. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions and band edge to confirm that the proposed changes to the digital circuitry had not adversely affected the previously reported values in the original filing.



ISED Part

| Test Description | ISED Part Section(s) | Test Limit | Test Condition | Test Result | Status |
|---|-------------------------------|-------------------------------|----------------|-------------|--------------------|
| Conducted Maximum Peak Output Power And e.i.r.p. | RSS-247, 5.4.(d) | < 1 Watt <4 Watt(e.i.r.p.) | Conducted | PASS | C ^{Note4} |
| Radiated Spurious Emissions | RSS-GEN, 8.9 | cf. Section 7.6 | Radiated | PASS | C ^{Note3} |
| Receiver Spurious Emissions | RSS-GEN, 5 RSS-GEN, 7.3 | cf. Section 7.8 | | PASS | C ^{Note3} |
| Radiated Restricted Band Edge | RSS-GEN, 8.9 RSS-GEN, 8.10 | cf. Section 7.6 | | PASS | C ^{Note3} |

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C2PC model is electrically identical to the Original model.
The Product Equality Declaration includes detailed information about the changes between the devices.
3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 10
4. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions and band edge to confirm that the proposed changes to the digital circuitry had not adversely affected the previously reported values in the original filing.

10. TEST RESULT

10.1 Conducted Output Power

Peak Power

| Mode | Frequency [MHz] | Channel No. | Peak Power [dBm] | Limit (dBm) |
|--------|-----------------|-------------|------------------|-------------|
| 1M Bit | 2402 | 0 | 3.04 | 30 |
| | 2440 | 19 | 3.74 | |
| | 2480 | 39 | 2.61 | |

Average Power

| Mode | Frequency [MHz] | Channel No. | Measured Power [dBm] | Duty Cycle Factor | Total Power [dBm] | Limit (dBm) |
|--------|-----------------|-------------|----------------------|-------------------|-------------------|-------------|
| 1M Bit | 2402 | 0 | -5.99 | 8.22 | 2.23 | 30 |
| | 2440 | 19 | -5.59 | | 2.63 | |
| | 2480 | 39 | -6.02 | | 2.20 | |

10.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

| Frequency | Measured Value | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|----------------|-------------|------------|----------|----------------|----------------|--------|
| MHz | [dB μ V/m] | dBm/m | dBm | (H/V) | [dB μ V/m] | [dB μ V/m] | dB |
| No Critical peaks found | | | | | | | |

Note:

1. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. Radiated test is performed with hopping off.

Frequency Range : Below 1 GHz

| Frequency | Measured Value | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|----------------|-------------|------------|----------|----------------|----------------|--------|
| MHz | [dB μ V/m] | dBm/m | dBm | (H/V) | [dB μ V/m] | [dB μ V/m] | dB |
| No Critical peaks found | | | | | | | |

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

Mode : 1M Bit/s

Operation Mode: CH Low

| Frequency | Measured Value | Duty Cycle Factor | AF+CL+DF-AG | Ant. Pol. | Total | Limit | Margin | Measurement |
|-----------|----------------|-------------------|-------------|-----------|----------------|----------------|--------|-------------|
| [MHz] | [dB μ V/m] | [dB] | [dB] | [H/V] | [dB μ V/m] | [dB μ V/m] | [dB] | Type |
| 4804 | 44.21 | 0.00 | 2.56 | V | 46.77 | 73.98 | 27.21 | PK |
| 4804 | 31.68 | 8.22 | 2.56 | V | 42.46 | 53.98 | 11.52 | AV |
| 7206 | 40.67 | 0.00 | 8.81 | V | 49.48 | 73.98 | 24.50 | PK |
| 7206 | 27.66 | 8.22 | 8.81 | V | 44.69 | 53.98 | 9.29 | AV |
| 4804 | 44.28 | 0.00 | 2.56 | H | 46.84 | 73.98 | 27.14 | PK |
| 4804 | 31.89 | 8.22 | 2.56 | H | 42.67 | 53.98 | 11.31 | AV |
| 7206 | 40.75 | 0.00 | 8.81 | H | 49.56 | 73.98 | 24.42 | PK |
| 7206 | 27.87 | 8.22 | 8.81 | H | 44.90 | 53.98 | 9.08 | AV |

Operation Mode: CH Mid

| Frequency | Measured Value | Duty Cycle Factor | AF+CL+DF-AG | Ant. Pol. | Total | Limit | Margin | Measurement |
|-----------|----------------|-------------------|-------------|-----------|----------------|----------------|--------|-------------|
| [MHz] | [dB μ V/m] | [dB] | [dB] | [H/V] | [dB μ V/m] | [dB μ V/m] | [dB] | Type |
| 4880 | 42.51 | 0.00 | 2.72 | V | 45.23 | 73.98 | 28.75 | PK |
| 4880 | 30.59 | 8.22 | 2.72 | V | 41.53 | 53.98 | 12.45 | AV |
| 7320 | 41.09 | 0.00 | 9.10 | V | 50.19 | 73.98 | 23.79 | PK |
| 7320 | 28.76 | 8.22 | 9.10 | V | 46.08 | 53.98 | 7.90 | AV |
| 4880 | 42.60 | 0.00 | 2.72 | H | 45.32 | 73.98 | 28.66 | PK |
| 4880 | 30.64 | 8.22 | 2.72 | H | 41.58 | 53.98 | 12.40 | AV |
| 7320 | 41.28 | 0.00 | 9.10 | H | 50.38 | 73.98 | 23.60 | PK |
| 7320 | 28.82 | 8.22 | 9.10 | H | 46.14 | 53.98 | 7.84 | AV |



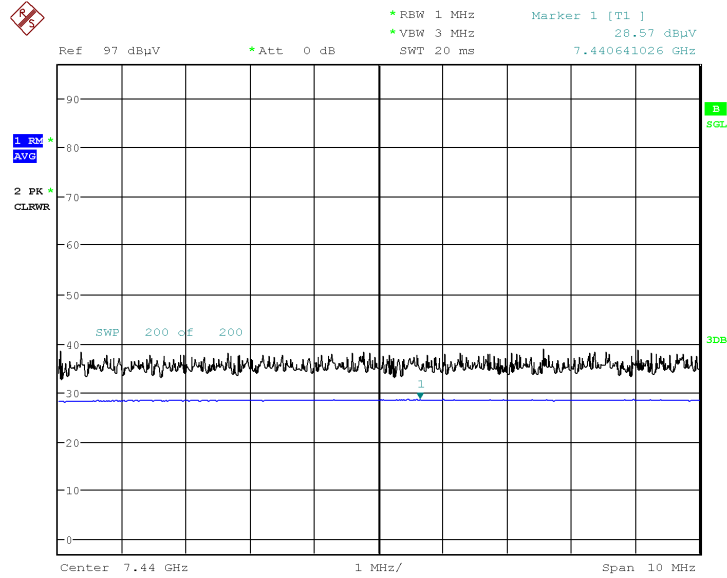
Operation Mode: CH High

| Frequency | Measured Value | Duty Cycle Factor | AF+CL+DF-AG | Ant. Pol. | Total | Limit | Margin | Measurement Type |
|-----------|----------------|-------------------|-------------|-----------|----------|----------|--------|------------------|
| [MHz] | [dBμV/m] | [dB] | [dB] | [H/V] | [dBμV/m] | [dBμV/m] | [dB] | |
| 4960 | 41.98 | 0.00 | 2.31 | V | 44.29 | 73.98 | 29.69 | PK |
| 4960 | 29.76 | 8.22 | 2.31 | V | 40.29 | 53.98 | 13.69 | AV |
| 7440 | 40.28 | 0.00 | 10.21 | V | 50.49 | 73.98 | 23.49 | PK |
| 7440 | 28.49 | 8.22 | 10.21 | V | 46.92 | 53.98 | 7.06 | AV |
| 4960 | 42.00 | 0.00 | 2.31 | H | 44.31 | 73.98 | 29.67 | PK |
| 4960 | 29.82 | 8.22 | 2.31 | H | 40.35 | 53.98 | 13.63 | AV |
| 7440 | 40.57 | 0.00 | 10.21 | H | 50.78 | 73.98 | 23.20 | PK |
| 7440 | 28.57 | 8.22 | 10.21 | H | 47.00 | 53.98 | 6.98 | AV |



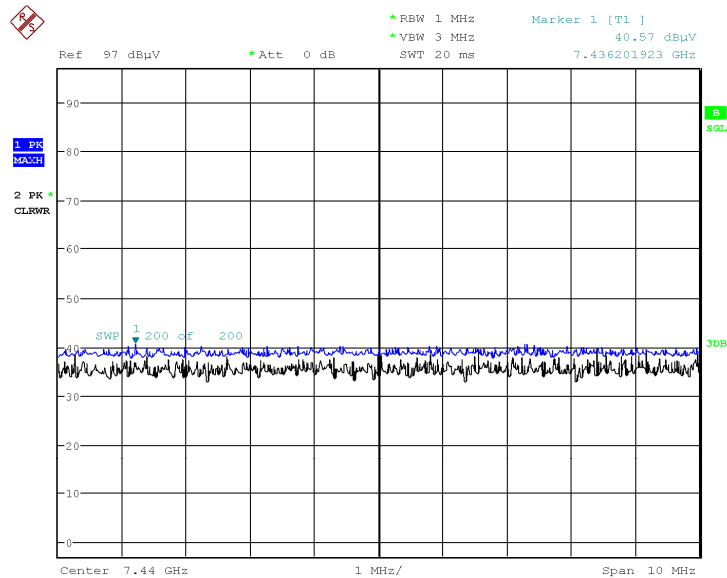
1M Bit/s Test Plots (Worst case : H)

Radiated Spurious Emissions plot – Average Reading (Ch.39 3rd Harmonic)



Date: 6.SEP.2022 14:12:56

Radiated Spurious Emissions plot – Peak Reading (Ch.39 3rd Harmonic)



Date: 6.SEP.2022 14:13:07

Note:

Plot of worst case are only reported.

10.3 RADIATED RESTRICTED BAND EDGES

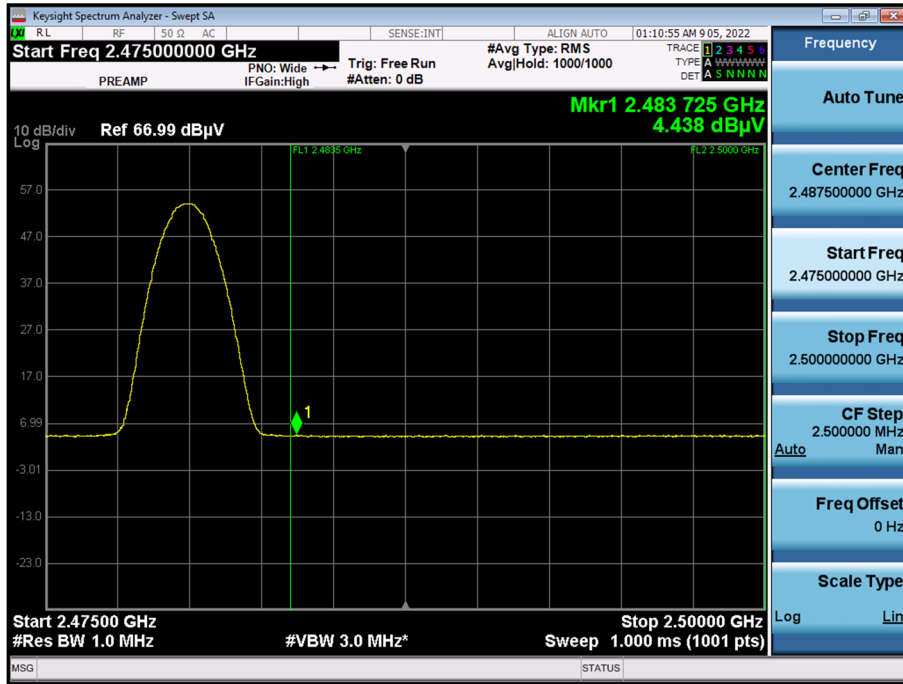
Mode : 1M Bit/s

| | |
|---------------------|---------------------|
| Operating Frequency | 2402 MHz & 2480 MHz |
| Channel No. | 0 & 39 |

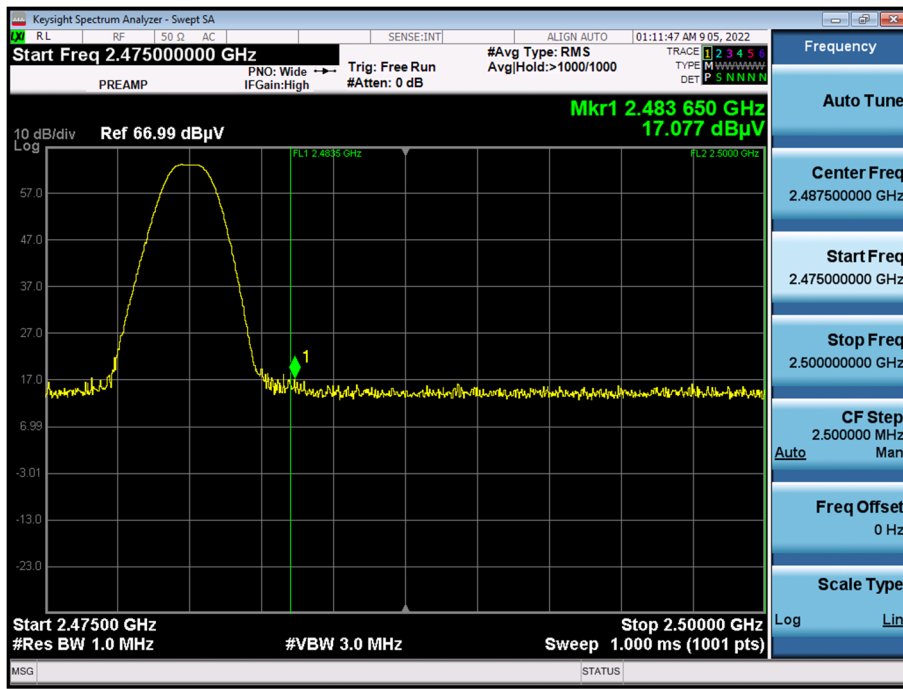
| Frequency | Measured Value | Duty Cycle Factor | AF+CL+DF-AG | Ant. Pol. | Total | Limit | Margin | Measurement Type |
|-----------|----------------|-------------------|-------------|-----------|----------------|----------------|--------|------------------|
| [MHz] | [dB μ V/m] | [dB] | [dB] | [H/V] | [dB μ V/m] | [dB μ V/m] | [dB] | |
| 2390.0 | 16.02 | 0.00 | 35.43 | H | 51.45 | 73.98 | 22.53 | PK |
| 2390.0 | 4.43 | 8.22 | 35.43 | H | 48.07 | 53.98 | 5.91 | AV |
| 2390.0 | 16.09 | 0.00 | 35.43 | V | 51.51 | 73.98 | 22.47 | PK |
| 2390.0 | 4.44 | 8.22 | 35.43 | V | 48.09 | 53.98 | 5.89 | AV |
| 2483.5 | 17.08 | 0.00 | 35.57 | H | 52.64 | 73.98 | 21.34 | PK |
| 2483.5 | 4.44 | 8.22 | 35.57 | H | 48.22 | 53.98 | 5.76 | AV |
| 2483.5 | 15.89 | 0.00 | 35.57 | V | 51.46 | 73.98 | 22.52 | PK |
| 2483.5 | 4.42 | 8.22 | 35.57 | V | 48.20 | 53.98 | 5.78 | AV |

Mode : 1M Bit/s Test Plots

Radiated Restricted Band Edges plot – Average Reading (Ch.39, H)



Radiated Restricted Band Edges plot – Peak Reading (Ch.39, H)



Note:

Plot of worst case are only reported.

10.4 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

| Frequency | Measured Value | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|----------------|-------------|------------|----------|----------------|----------------|--------|
| MHz | [dB μ V/m] | dBm/m | dBm | (H/V) | [dB μ V/m] | [dB μ V/m] | dB |
| No Critical peaks found | | | | | | | |

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

| Frequency | Measured Value | Ant. factor | Cable loss | Ant. POL | Total | Limit | Margin |
|-------------------------|----------------|-------------|------------|----------|----------------|----------------|--------|
| MHz | [dB μ V/m] | dBm/m | dBm | (H/V) | [dB μ V/m] | [dB μ V/m] | dB |
| No Critical peaks found | | | | | | | |

11. LIST OF TEST EQUIPMENT

Conducted Test

| Equipment | Model | Manufacturer | Serial No. | Due to Calibration | Calibration Interval |
|---|-----------|-----------------|------------|--------------------|----------------------|
| LISN | ENV216 | Rohde & Schwarz | 102245 | 08/22/2023 | Annual |
| EMI Test Receiver | ESR | Rohde & Schwarz | 101910 | 06/07/2023 | Annual |
| Temperature Chamber | SU-642 | ESPEC | 0093008124 | 03/04/2023 | Annual |
| Signal Analyzer | N9030A | Keysight | MY55410508 | 09/06/2023 | Annual |
| Power Meter | N1911A | Agilent | MY45100523 | 03/24/2023 | Annual |
| Power Sensor | N1921A | Agilent | MY57820067 | 03/24/2023 | Annual |
| Directional Coupler | 87300B | Agilent | 3116A03621 | 11/02/2022 | Annual |
| Power Splitter | 11667B | Hewlett Packard | 10545 | 02/03/2023 | Annual |
| DC Power Supply | E3646A | Agilent | MY40002937 | 12/14/2022 | Annual |
| Attenuator(10 dB) (DC-26.5 GHz) | 8493C-010 | Agilent | 08285 | 06/21/2023 | Annual |
| Attenuator(20 dB) | 18N-20dB | Rohde & Schwarz | 8 | 03/07/2023 | Annual |
| Software | EMC32 | Rohde & Schwarz | N/A | N/A | N/A |
| FCC WLAN&BT&BLE Conducted Test Software v3.0 | N/A | HCT CO., LTD. | N/A | N/A | N/A |

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

| Equipment | Model | Manufacturer | Serial No. | Due to Calibration | Calibration Interval |
|--|--|---------------------------|-------------|--------------------|----------------------|
| Controller(Antenna mast) | CO3000 | Innco system | CO3000-4p | N/A | N/A |
| Antenna Position Tower | MA4640/800-XP-EP | Innco system | N/A | N/A | N/A |
| Controller | EM2090 | Emco | 060520 | N/A | N/A |
| Turn Table | N/A | Ets | N/A | N/A | N/A |
| Loop Antenna | FMZB 1513 | Rohde & Schwarz | 1513-333 | 03/17/2024 | Biennial |
| Hybrid Antenna | VULB 9168 | Schwarzbeck | 9168-0895 | 08/16/2024 | Biennial |
| Horn Antenna | BBHA 9120D | Schwarzbeck | 9120D-1191 | 11/18/2023 | Biennial |
| Horn Antenna (15 GHz ~ 40 GHz) | BBHA9170 | Schwarzbeck | BBHA9170124 | 04/12/2023 | Biennial |
| Amp & Filter Bank Switch Controller | FBSM-01A | TNM system | 0 | N/A | N/A |
| Band Reject Filter | WRCJV2400/2483.5- 2370/2520-60/12SS | Wainwright Instruments | 2 | 01/06/2023 | Annual |
| Band Reject Filter | WRCJV12-4900-5100- 5900-6100-50SS | Wainwright Instruments | 5 | 06/13/2023 | Annual |
| Band Reject Filter | WRCJV12-4900-5100- 5900-6100-50SS | Wainwright Instruments | 6 | 06/13/2023 | Annual |
| Band Reject Filter | WRCJV5100/5850- 40/50-8EEK | Wainwright Instruments | 1 | 02/07/2023 | Annual |
| ATT(3 dB) + LNA2(6~18 GHz) | 18B-03, CBL06185030 | WEINSCHEL CERNEX | N/A | 12/22/2022 | Annual |
| ATT(10 dB) + LNA1(0.1~18 GHz) | 56-10, CBLU1183540B-01 | Api tech, CERNEX | N/A | 12/22/2022 | Annual |
| High Pass Filter | WHKX10-2700-3000- 18000-40SS | Wainwright Instruments | N/A | 12/22/2022 | Annual |
| High Pass Filter | WHKX8-6090-7000- 18000-40SS | Wainwright Instruments | N/A | 12/22/2022 | Annual |
| Thru | COAXIAL ATTENUATOR | T&M SYSTEM | N/A | 12/22/2022 | Annual |
| Power Amplifier | CBL18265035 | CERNEX | 22966 | 12/02/2022 | Annual |
| Power Amplifier | CBL26405040 | CERNEX | 25956 | 03/11/2023 | Annual |
| Bluetooth Tester | TC-3000C | TESCOM | 3000C000175 | 04/05/2023 | Annual |
| Spectrum Analyzer | FSP(9 kHz ~ 30 GHz) | Rohde & Schwarz | 836650/016 | 09/06/2023 | Annual |
| Spectrum Analyzer | FSV40-N(9 kHz ~ 30 GHz) | Rohde & Schwarz | 101068-SZ | 09/07/2023 | Annual |

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).