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TEST REPORT

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

APPLICANT
JVC KENWOOD Corporation

REPORT NO.
HCT-RF-2209-FI006-R1

DATE OF ISSUE
September 22, 2022

Tested by
Kyung Jun Woo

Technical Manager
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TEST REPORT
W0C-0430

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Additional Model
-

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	CCK/DSSS/OFDM
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

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

CONTENTS

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	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n
Frequency Range (MHz)	2 412 MHz – 2 462 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	- 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 purpse 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 30MHz 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 1GHz. Above 1GHz with 1.5m 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)

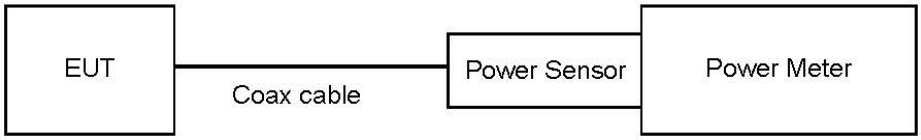
8. DESCRIPTION OF TESTS

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 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) = Reading Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

8.2. Radiated Test

FCC

Frequency (MHz)	Field Strength (uV/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

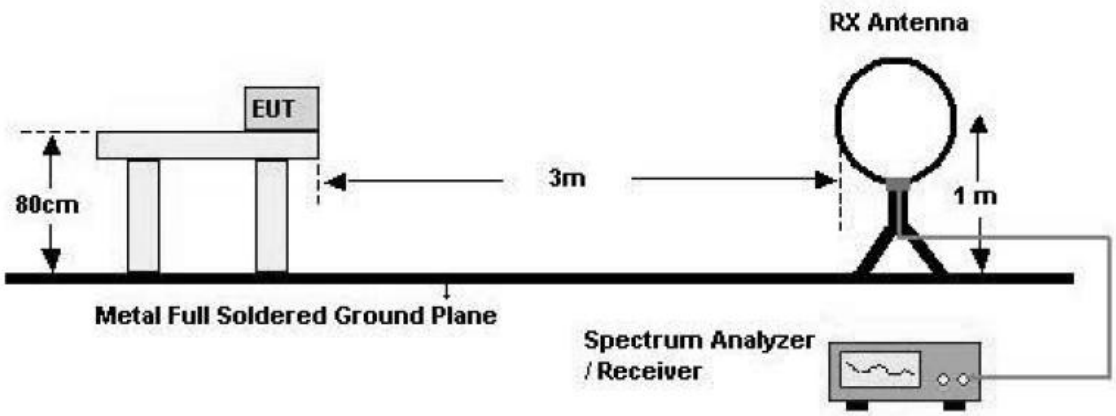
Frequency (MHz)	Field Strength (uA/m)	Measurement Distance (m)
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30

FCC&ISED

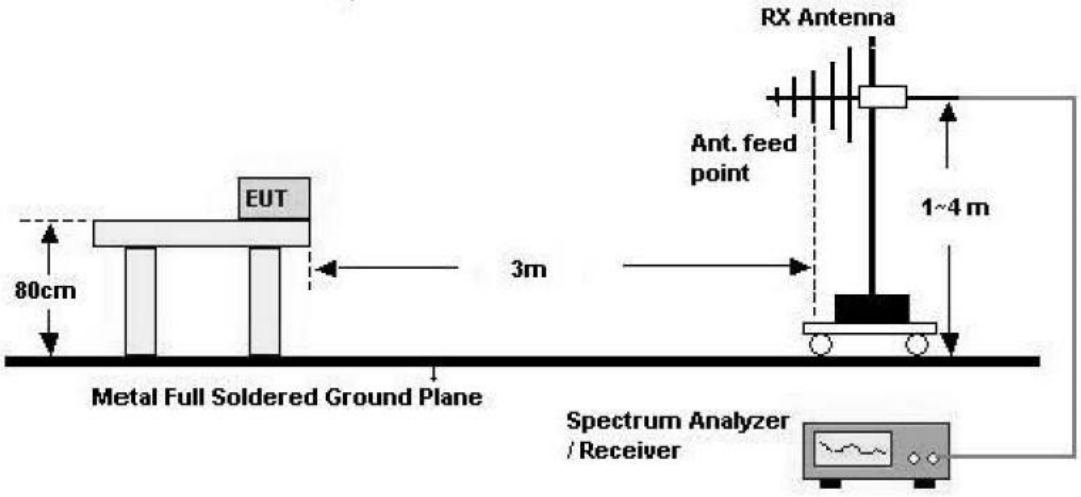
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

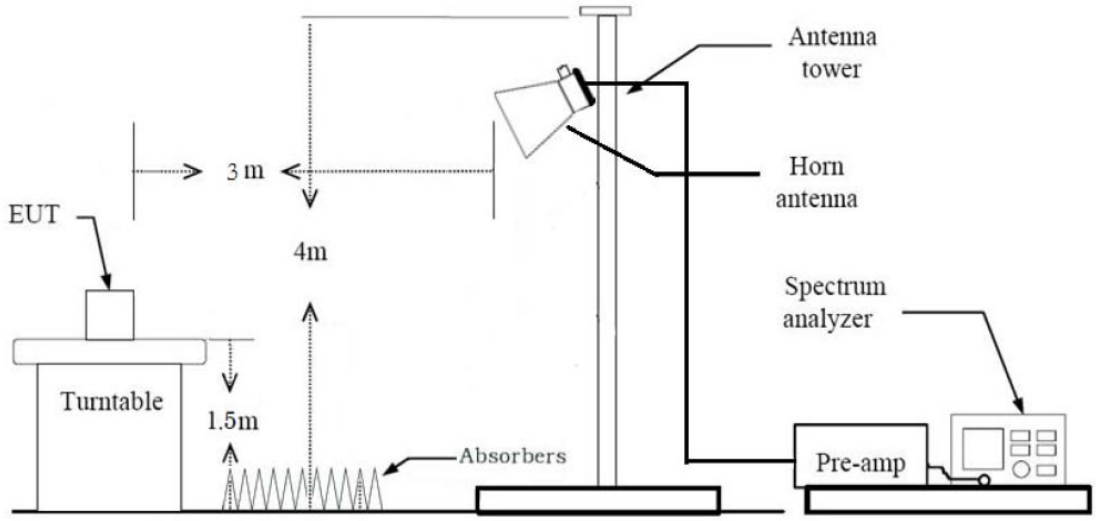
Below 30 MHz



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 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m 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) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading 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 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 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m 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 ≥ 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 = Reading 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. 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. The unit was tested with its standard battery.

8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)

(1) Measurement Type(Peak):

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

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 = 20log (test distance / specific distance) (dB)

11. Total(Measurement Type : Peak)

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

Total(Measurement Type : Average, Duty cycle ≥ 98%)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle < 98%)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
+ Duty Cycle Factor

Test Procedure of Radiated Restricted Band Edge

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. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average): Duty cycle ≥ 98%,
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).
   (3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz

- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

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 = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle ≥ 98%)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle < 98%)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
+ Duty Cycle Factor

8.3. Receiver Spurious Emissions

Limit

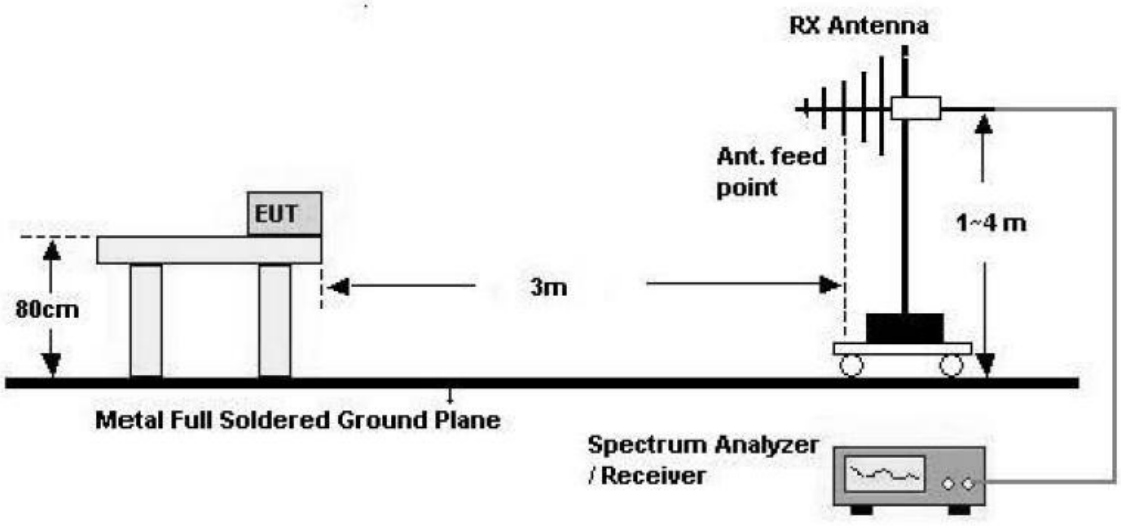
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

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

Test Configuration

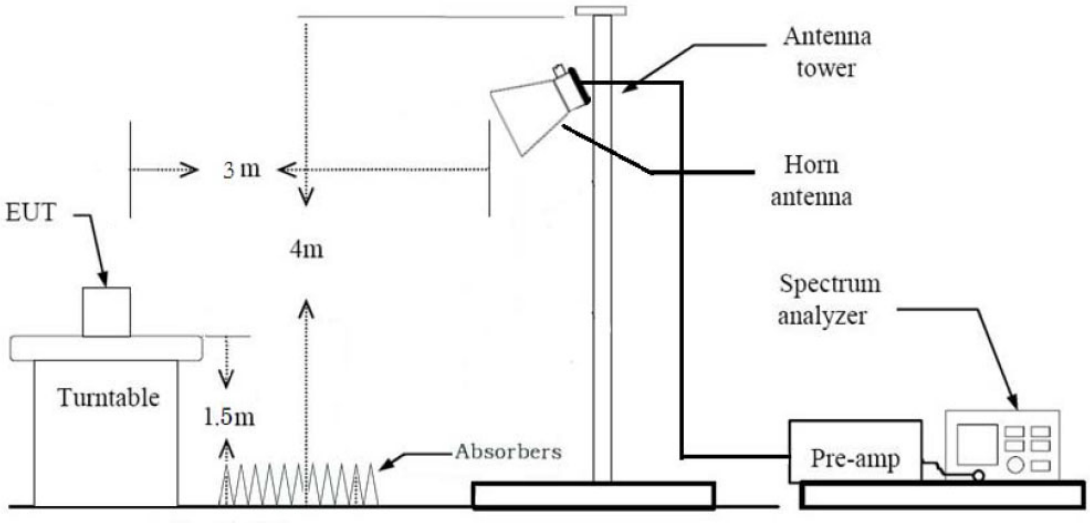
30 MHz - 1 GHz



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 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m 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 ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz
7. Total = Reading 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. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 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 – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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.
11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

8.4. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
2. All configurations of antenna were investigated and the worst case configuration results are reported.
3. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : Z
4. 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

5. All Battery were investigated and the worst case configuration results are reported.

- Worst case Battery type : KNB-L11

6. All data rate of operation were investigated and the test results are worst case in lowest Data Rate of each mode.
   - 802.11b : 11 Mbps
   - 802.11g : 6 Mbps
   - 802.11n : MCS 0
7. 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 data rate of highest power.
2. All data rate of operation were investigated and the test results are worst case in lowest Data Rate of each mode.
   - 802.11b : 11 Mbps
   - 802.11g : 6 Mbps
   - 802.11n : MCS 0

8. SUMMARY TEST OF RESULTS

FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
Conducted Maximum Output Power	15.247(b)(3)	< 1 Watt	Conducted	C[Note5]
Radiated Spurious Emissions	15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	C[Note3]
Radiated Restricted Band Edge	15.247(d), 15.205, 15.209	cf. Section 7.6		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 9.
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
Conducted Maximum Peak Output Power And e.i.r.p.	RSS-247, 5.4.	< 1 Watt <4 Watt(e.i.r.p.)	Conducted	C Note5
Radiated Spurious Emissions	RSS-GEN, 8.9	cf. Section 7.6	Radiated	C Note3
Receiver Spurious Emissions	RSS-GEN, 7	cf. Section 7.8		C Note3
Radiated Restricted Band Edge	RSS-GEN, 8.10	cf. Section 7.6		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.

9. TEST RESULT

9.1 Conducted Output Power

Peak Power

Mode	Frequency [MHz]	Channel No.	Datarate [M/bps]	Peak Power [dBm]	Limit [dBm]
802.11b	2412	1	11 Mbps	19.62	30
	2437	6		19.85	
	2462	11		19.77	
802.11g	2412	1	6 Mbps	21.70	
	2437	6		23.79	
	2462	11		21.51	
802.11n	2412	1	MCS 0	21.43	
	2437	6		23.04	
	2462	11		21.74	

Average Power

Mode	Frequency [MHz]	Channel No.	Datarate [M/bps]	Measured Power [dBm]	Duty Cycle Factor[dB]	Total Power [dBm]	Limit [dBm]
802.11b	2412	1	11 Mbps	16.06	0.461	16.52	30
	2437	6		16.22		16.68	
	2462	11		16.21		16.67	
802.11g	2412	1	6 Mbps	11.43	0.308	11.74	
	2437	6		15.42		15.73	
	2462	11		11.55		11.86	
802.11n	2412	1	MCS 0	10.91	0.319	11.23	
	2437	6		12.99		13.31	
	2462	11		11.05		11.37	

9.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

Frequency	Measured Value	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dBμV/m]	dBm/m	dBm	(H/V)	[dBμV/m]	[dBμV/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

Frequency Range : Below 1 GHz

Frequency	Measured Value	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dBμV/m]	dBm/m	dBm	(H/V)	[dBμV/m]	[dBμV/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

Operation Mode:	802.11b
Transfer Rate:	11 Mbps
Operating Frequency	2 412 MHz
Channel No.	01 Ch

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]	
4 824	44.55	0.00	3.54	V	48.09	73.98	25.89	PK
4 824	32.92	0.46	3.54	V	36.92	53.98	17.06	AV
7 236	40.06	0.00	8.25	V	48.31	73.98	25.67	PK
7 236	27.81	0.46	8.25	V	36.52	53.98	17.46	AV
4 824	45.57	0.00	3.54	H	49.11	73.98	24.87	PK
4 824	34.47	0.46	3.54	H	38.47	53.98	15.51	AV
7 236	40.24	0.00	8.25	H	48.49	73.98	25.49	PK
7 236	27.88	0.46	8.25	H	36.59	53.98	17.39	AV

Operation Mode:	802.11b
Transfer Rate:	11 Mbps
Operating Frequency	2 437 MHz
Channel No.	06 Ch

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]	
4 874	46.28	0.00	2.70	V	48.98	73.98	25.00	PK
4 874	34.96	0.46	2.70	V	38.12	53.98	15.86	AV
7 311	41.03	0.00	9.28	V	50.31	73.98	23.67	PK
7 311	28.77	0.46	9.28	V	38.51	53.98	15.47	AV
4 874	46.77	0.00	2.70	H	49.47	73.98	24.51	PK
4 874	35.13	0.46	2.70	H	38.29	53.98	15.69	AV
7 311	41.24	0.00	9.28	H	50.52	73.98	23.46	PK
7 311	28.90	0.46	9.28	H	38.64	53.98	15.34	AV

Operation Mode:	802.11b
Transfer MCS Index:	11 Mbps
Operating Frequency	2 462 MHz
Channel No.	11 Ch

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]	
4 924	46.55	0.00	2.21	V	48.76	73.98	25.22	PK
4 924	35.21	0.46	2.21	V	37.88	53.98	16.10	AV
7 386	40.52	0.00	9.95	V	50.47	73.98	23.51	PK
7 386	28.56	0.46	9.95	V	38.97	53.98	15.01	AV
4 924	47.01	0.00	2.21	H	49.22	73.98	24.76	PK
4 924	35.54	0.46	2.21	H	38.21	53.98	15.77	AV
7 386	41.14	0.00	9.95	H	51.09	73.98	22.89	PK
7 386	28.85	0.46	9.95	H	39.26	53.98	14.72	AV

Note:

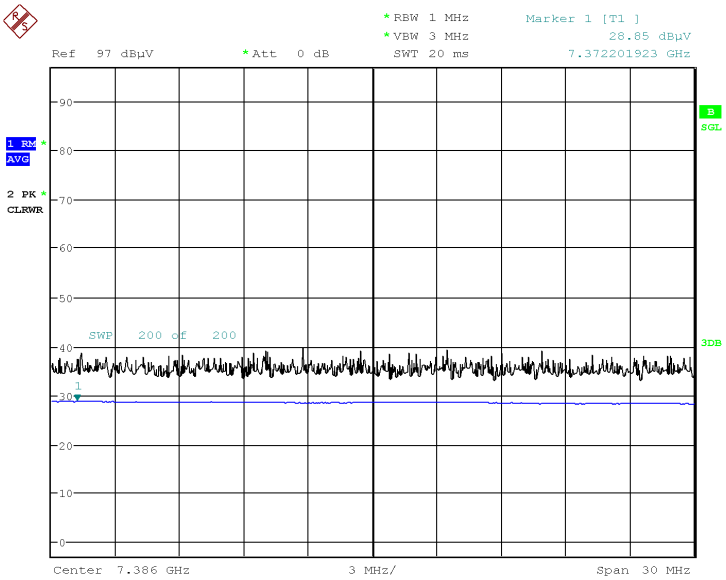
All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

- Worstcase : 802.11b

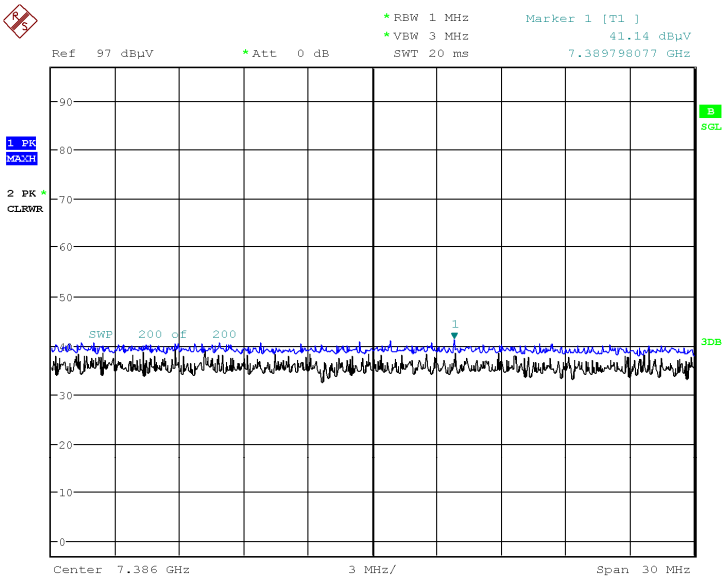
▣ Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.11 3rd Harmonic)



Date: 14.SEP.2022 16:00:01

Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.11 3rd Harmonic)



Date: 14.SEP.2022 16:00:28

Note:

Plot of worst case are only reported.

9.3 RADIATED RESTRICTED BAND EDGES

Operation Mode:	802.11b
Transfer Rate:	11 Mbps
Operating Frequency	2 412 MHz, 2 462 MHz
Channel No.	01 Ch, 11 Ch

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]	
2310.0~2390.0	51.87	0.00	1.01	H	52.88	73.98	21.10	PK
2310.0~2390.0	38.74	0.46	1.01	H	40.21	53.98	13.77	AV
2310.0~2390.0	51.36	0.00	1.01	V	52.37	73.98	21.61	PK
2310.0~2390.0	38.49	0.46	1.01	V	39.96	53.98	14.02	AV
2483.5~2500.0	53.89	0.00	1.49	H	55.38	73.98	18.60	PK
2483.5~2500.0	40.37	0.46	1.49	H	42.32	53.98	11.66	AV
2483.5~2500.0	52.76	0.00	1.49	V	54.25	73.98	19.73	PK
2483.5~2500.0	39.85	0.46	1.49	V	41.80	53.98	12.18	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2 412 MHz, 2 462 MHz
Channel No.	01 Ch, 11 Ch

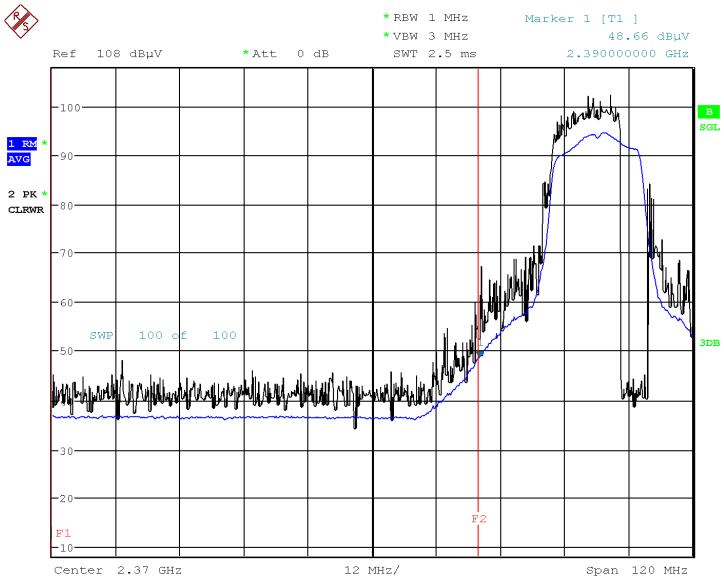
Frequency	Measured Value	Duty Cycle Factor	AF+CL+DF-AG	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV/m]	[dB]	[dB]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
2310.0~2390.0	67.39	0.00	1.01	H	68.40	73.98	5.58	PK
2310.0~2390.0	48.66	0.31	1.01	H	49.98	53.98	4.00	AV
2310.0~2390.0	66.24	0.00	1.01	V	67.25	73.98	6.73	PK
2310.0~2390.0	47.33	0.31	1.01	V	48.65	53.98	5.33	AV
2483.5~2500.0	65.19	0.00	1.49	H	66.68	73.98	7.30	PK
2483.5~2500.0	48.01	0.31	1.49	H	49.81	53.98	4.17	AV
2483.5~2500.0	64.84	0.00	1.49	V	66.33	73.98	7.65	PK
2483.5~2500.0	47.45	0.31	1.49	V	49.25	53.98	4.73	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	MCS 0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

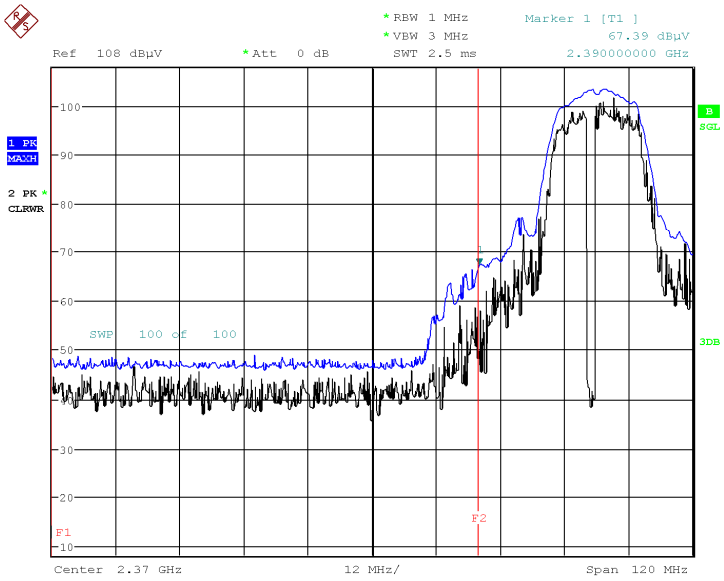
Frequency	Measured Value	Duty Cycle Factor	AF+CL+DF-AG	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV/m]	[dB]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2310.0~2390.0	63.97	0.00	1.01	H	64.98	73.98	9.00	PK
2310.0~2390.0	45.76	0.32	1.01	H	47.09	53.98	6.89	AV
2310.0~2390.0	62.14	0.00	1.01	V	63.15	73.98	10.83	PK
2310.0~2390.0	44.48	0.32	1.01	V	45.81	53.98	8.17	AV
2483.5~2500.0	65.53	0.00	1.49	H	67.02	73.98	6.96	PK
2483.5~2500.0	47.68	0.32	1.49	H	49.49	53.98	4.49	AV
2483.5~2500.0	66.16	0.00	1.49	V	67.65	73.98	6.33	PK
2483.5~2500.0	47.20	0.32	1.49	V	49.01	53.98	4.97	AV

▣ Test Plots

Radiated Restricted Band Edges plot – Average Reading (802.11g Ch.1, Z-H)



Radiated Restricted Band Edges plot –Peak Reading (802.11g Ch.1, Z-H)



Note:

Plot of worst case are only reported.

9.4 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

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

10. 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).