

TEST REPORT

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

APPLICANT
JVC KENWOOD Corporation

REPORT NO.
HCT-RF-2209-FI005-R1

DATE OF ISSUE
September 22, 2022

Tested by
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**TEST
REPORT**

W0C-0430

REPORT NO.

HCT-RF-2209-FI005-R1

DATE OF ISSUE

September 22, 2022

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

OFDM

FCC Classification

Unlicensed National Information Infrastructure(NII)

FCC Rule Part(s)

Part 15 subpart E

ISED Rule Part(s)

RSS-247 Issue 2 (February 2017)

RSS-Gen Issue 5_Amendement 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

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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	802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 - 5690
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Antenna Type	Sheet metal Antenna	
Peak Antenna gain	-4.2 dBi	
Straddle channel	Supported	
TDWR Band	FCC : Supported, ISED : 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

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 dated December 14, 2017 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10 (Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’ were used in the measurement.

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 15.407 under the FCC Rules Part 15 Subpart E. / 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

5.1 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).

5.2 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, § 15.407 / RSS-Gen (Issue 5) Section 8:

“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, § 15.407

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

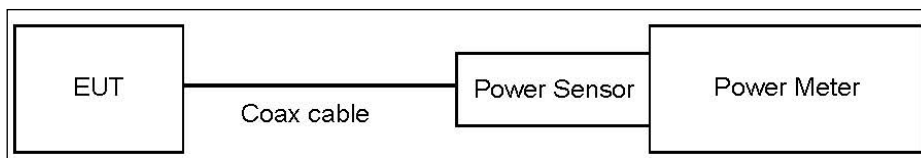
8.1. Output Power Measurement

Limit

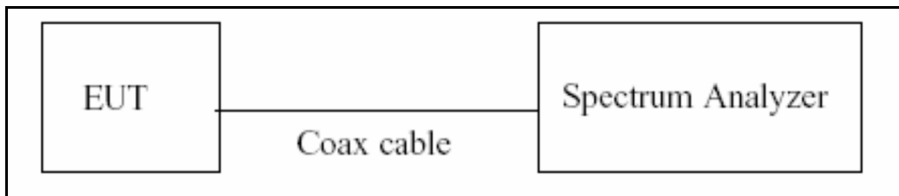
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

We tested according to Procedure E.3.a in KDB 789033 D02 v02r01.

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.

Test Procedure(Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

We use the spectrum analyzer's integrated band power measurement function.

We tested according to Procedure E.2.d) in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW \geq 3 MHz.
5. Number of points in sweep \geq 2 x span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. 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

Total Power(dBm) = Reading Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum reading values are not plot data.

The power results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset = Attenuator loss(20 dB) + Cable loss

3. Actual value of loss for the attenuator and cable combination is below table.

Band	Internal Loss(dB)
UNII 1	11.87
UNII 2A	11.87
UNII 2C	11.87
UNII 3	11.87

8.2. Radiated Test

Limit

1. UNII 1: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

3. UNII 3: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

FCC

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

ISED

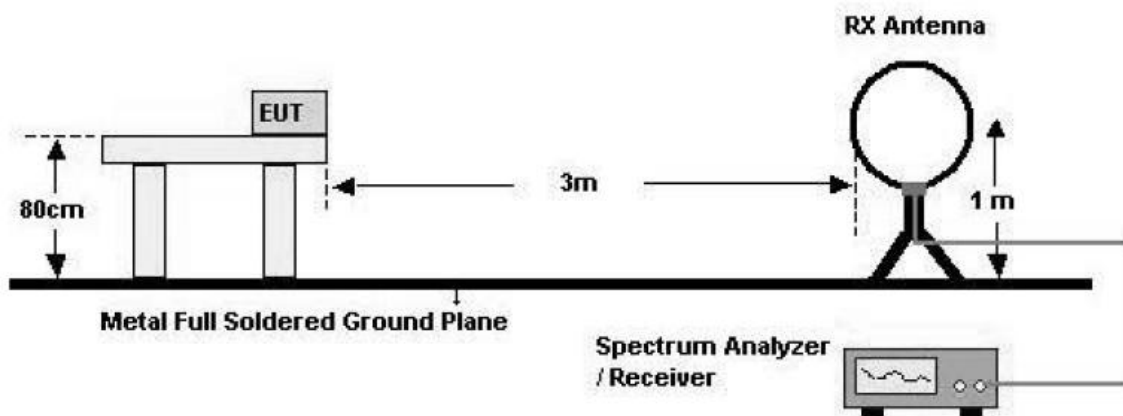
Frequency (MHz)	Field Strength (uA/m)	Measurement Distance (m)
0.009 – 0.490	$6.37/F(\text{kHz})$	300
0.490 – 1.705	$63.7/F(\text{kHz})$	30
1.705 – 30	0.08	30

FCC&ISED

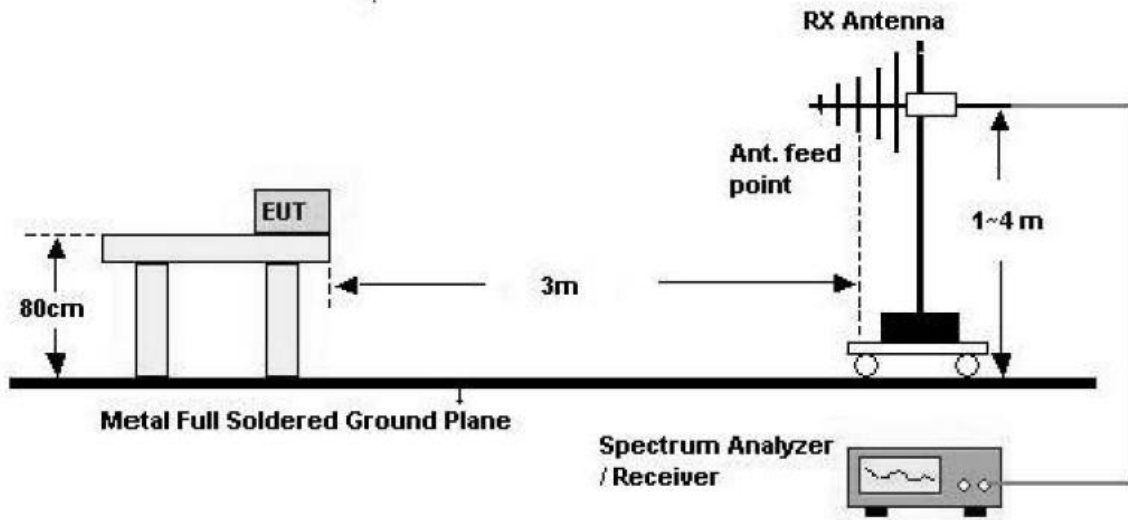
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

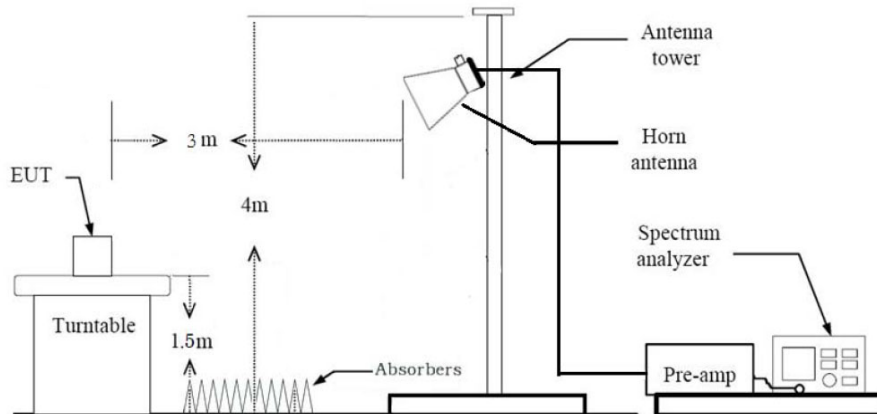
Below 30 MHz



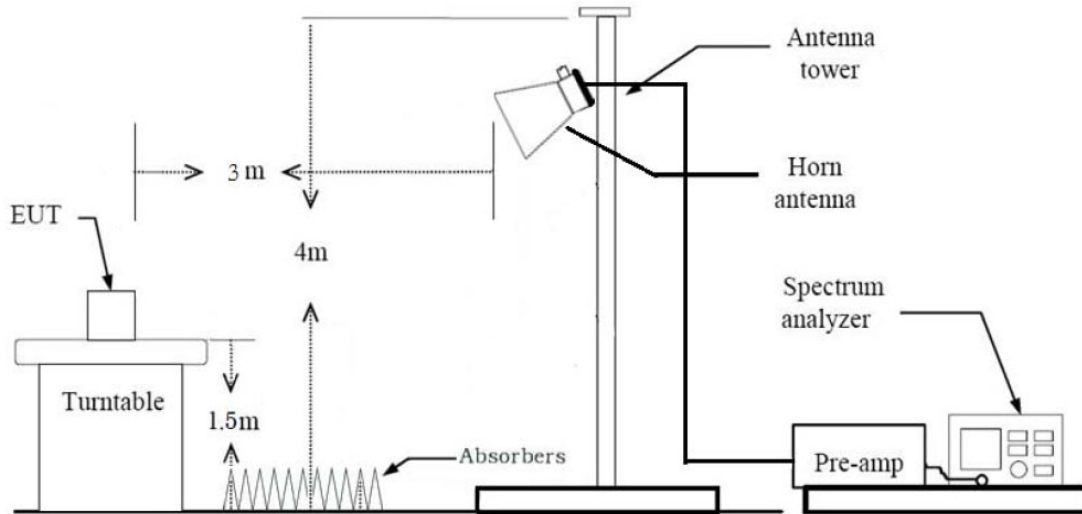
30 MHz - 1 GHz



Above 1 GHz



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) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
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 = 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 \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 = 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

(1) Measurement Type (Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW \geq 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle.

(2) Measurement Type (Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW(Duty cycle \geq 98 percent) = VBW \leq RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is $<$ 98 percent) = VBW \geq $1/T$, where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = max hold.
- Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where x is the duty cycle.

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. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency
11. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
12. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

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, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW \geq 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle.

(2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW(Duty cycle \geq 98 percent) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = $VBW \geq 1/T$, where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = max hold.
- Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where x is the duty cycle.

9. Measured Frequency Range :

- 4 500 MHz ~ 5 150 MHz
- 5 350 MHz ~ 5 460 MHz
- 5 460 MHz ~ 5 470 MHz
- (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
- 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)

10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)

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

8.3. Receiver Spurious Emissions

Limit

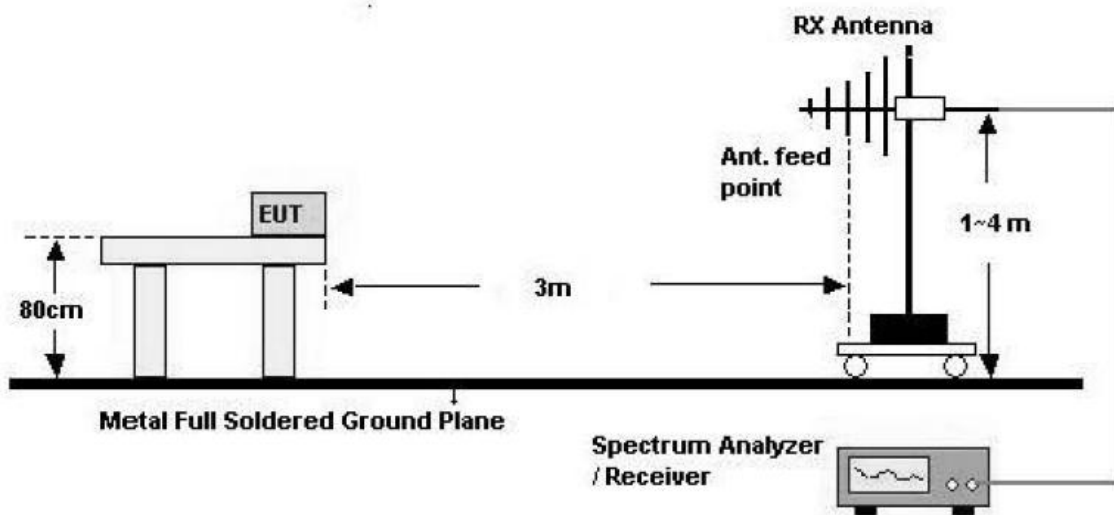
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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):

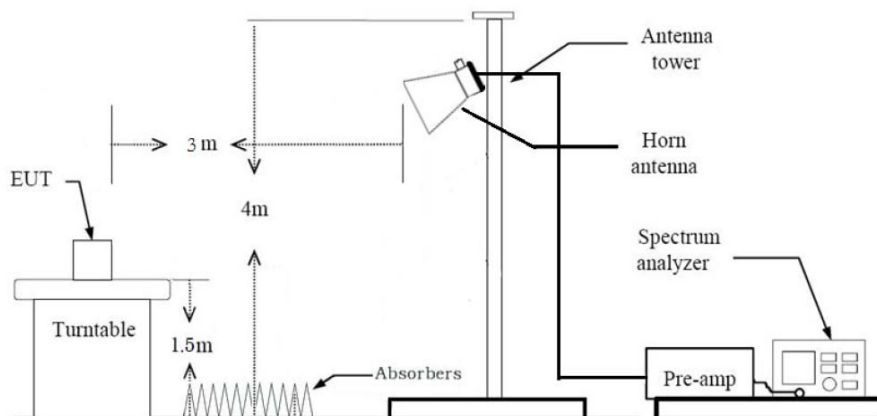
- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(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 $\geq 3 \times$ 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 $\geq 1/\tau$ Hz, where τ = pulse width in seconds

The actual setting value of VBW = 1 kHz

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

8.3. 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 modulation of operation were investigated and the worst case modulation results are reported.
 - 802.11a : 6 Mbps
 - 802.11n(20M, 40M) : MCS 0
 - 802.11ac(20M, 40M, 80M) : MCS 0
7. VP8000-F2, VP8000-F3 were tested and the worst case results are reported.
 - Worst case : VP8000-F2

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. All modulation of operation were investigated and the worst case modulation results are reported.
 - 802.11a : 6 Mbps
 - 802.11n(20M, 40M) : MCS 0
 - 802.11ac(20M, 40M, 80M) : MCS 0

9. SUMMARY OF TEST RESULTS

FCC

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result	Status
Maximum Conducted Output Power	15.407(a)(1),(3)	< 250 mW(5150-5250 MHz) <1 W(5725-5850 MHz)	Conducted	PASS	C ^{Note3}
Undesirable Emissions	15.407(b) (1)(2)(3)(4)	<-27 dBm/MHz EIRP (UNIII1) cf. Section 8.7 (UNII 3)	Radiated	PASS	C ^{Note3}
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9), (10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		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

Test Description	ISED Part Section(s)	Test Limit	Test Condition	Test Result	Status
Maximum Conducted Output Power,	RSS-247, 6.2	< 250 mW or $11+10 \log_{10}$ (BW) dBm (5470-5600, 5650-5725 MHz) Whichever power is less	CONDUCTED	PASS	C ^{Note3}
	RSS-247, 6.2.4 1	<1 W (5725-5850 MHz)			C ^{Note3}
Maximum e.i.r.p	RSS-247, 6.2	< 200 mW or $10+10 \log_{10}$ (BW) dBm (5150-5250 MHz) < 1 W or $17+10 \log_{10}$ (BW) dBm (5250-5350 MHz) < 1 W or $17+10 \log_{10}$ (BW) dBm (5470-5725 MHz) Whichever power is less	CONDUCTED	PASS	NT ^{Note2}
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-Gen, 8.9 RSS-Gen, 8.10	RSS-Gen section 8.9 table 5, 6 section 8.10 table 7	RADIATED	PASS	C ^{Note3}
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.3	RSS-GEN section 7.3 table 3		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 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.

10. TEST RESULT

10.1 Output Power

Mode	Frequency [MHz]	Channel No.	Data rate	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]
802.11a	5180	36	6 Mbps	11.78	0.300	12.08
	5220	44		14.43		14.73
	5240	48		14.14		14.44
	5260	52		14.16		14.46
	5300	60		11.71		12.01
	5320	64		11.70		12.00
	5500	100		11.45		11.75
	5580	116		14.18		14.48
	5720	144		11.35		11.65
	5745	149		11.04		11.34
	5785	157		12.86		13.16
5825	165	10.97	11.27			
802.11n_20MHz	5180	36	MCS0	11.01	0.320	11.33
	5220	44		13.86		14.18
	5240	48		13.84		14.16
	5260	52		13.86		14.18
	5300	60		11.27		11.59
	5320	64		11.48		11.80
	5500	100		11.00		11.32
	5580	116		13.76		14.08
	5720	144		11.00		11.32
	5745	149		10.62		10.94
	5785	157		13.16		13.48
5825	165	10.67	10.99			
802.11ac_20MHz	5180	36	MCS0	11.01	0.318	11.33
	5220	44		13.68		14.00
	5240	48		13.90		14.22
	5260	52		13.51		13.83
	5300	60		11.42		11.74
	5320	64		11.50		11.82
	5500	100		11.02		11.34
	5580	116		13.90		14.22
	5720	144		11.12		11.44
	5745	149		10.61		10.93
	5785	157		13.27		13.59
5825	165	10.70	11.02			
802.11n_40MHz	5190	38	MCS0	8.66	0.621	9.28
	5230	46		12.96		13.58
	5270	54		12.65		13.27
	5310	62		9.03		9.65
	5510	102		8.65		9.27
	5590	118		12.82		13.44
	5710	142		9.06		9.68
5755	151	8.49	9.11			

Mode	Frequency [MHz]	Channel No.	Data rate	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]
	5795	159		8.57		9.19
802.11ac_40MHz	5190	38	MCS0	8.77	0.619	9.39
	5230	46		12.88		13.50
	5270	54		12.87		13.49
	5310	62		8.88		9.50
	5510	102		8.68		9.30
	5590	118		12.89		13.51
	5710	142		8.91		9.53
	5755	151		8.65		9.27
	5795	159		8.56		9.18
802.11ac_80MHz	5210	42	MCS0	8.01	1.170	9.18
	5290	58		8.23		9.40
	5530	106		7.99		9.16
	5610	122		7.90		9.07
	5690	138		8.30		9.47
	5775	155		7.81		8.98

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 = $40\log(\text{specific distance} / \text{test distance})$ (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	[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

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10360	48.05	4.62	V	52.67	68.20	15.53	PK
15540	46.93	5.19	V	52.12	73.98	21.86	PK
15540	32.84	5.19	V	38.03	53.98	15.95	AV
10360	48.24	4.62	H	52.86	68.20	15.34	PK
15540	47.35	5.19	H	52.54	73.98	21.44	PK
15540	33.33	5.19	H	38.52	53.98	15.46	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10400	47.59	4.10	V	51.69	68.20	16.51	PK
15600	47.55	3.72	V	51.27	73.98	22.71	PK
15600	33.68	3.72	V	37.40	53.98	16.58	AV
10400	47.94	4.10	H	52.04	68.20	16.16	PK
15600	47.60	3.72	H	51.32	73.98	22.66	PK
15600	33.90	3.72	H	37.62	53.98	16.36	AV

Band :	<u>UNII 1</u>
Operation Mode:	<u>802.11 a</u>
Transfer Rate:	<u>6 Mbps</u>
Operating Frequency	<u>5240 MHz</u>
Channel No.	<u>48 Ch</u>

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10480	48.41	5.11	V	53.52	68.20	14.68	PK
15720	48.16	3.36	V	51.52	73.98	22.46	PK
15720	33.95	3.36	V	37.31	53.98	16.67	AV
10480	48.43	5.11	H	53.54	68.20	14.66	PK
15720	48.25	3.36	H	51.61	73.98	22.37	PK
15720	34.11	3.36	H	37.47	53.98	16.51	AV

Band :	<u>UNII 2A</u>
Operation Mode:	<u>802.11 a</u>
Transfer Rate:	<u>6 Mbps</u>
Operating Frequency	<u>5260 MHz</u>
Channel No.	<u>52 Ch</u>

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10520	47.15	4.77	V	51.92	68.20	16.28	PK
15780	46.27	3.59	V	49.86	73.98	24.12	PK
15780	32.53	3.59	V	36.12	53.98	17.86	AV
10520	47.44	4.77	H	52.21	68.20	15.99	PK
15780	46.55	3.59	H	50.14	73.98	23.84	PK
15780	32.60	3.59	H	36.19	53.98	17.79	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10600	48.17	4.75	V	52.92	73.98	21.06	PK
10600	33.94	4.75	V	38.69	53.98	15.29	AV
15900	46.27	6.09	V	52.36	73.98	21.62	PK
15900	32.51	6.09	V	38.60	53.98	15.38	AV
10600	48.40	4.75	H	53.15	73.98	20.83	PK
10600	34.16	4.75	H	38.91	53.98	15.07	AV
15900	46.42	6.09	H	52.51	73.98	21.47	PK
15900	32.56	6.09	H	38.65	53.98	15.33	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10640	48.03	5.04	V	53.07	73.98	20.91	PK
10640	34.15	5.04	V	39.19	53.98	14.79	AV
15960	47.69	4.55	V	52.24	73.98	21.74	PK
15960	33.31	4.55	V	37.86	53.98	16.12	AV
10640	48.18	5.04	H	53.22	73.98	20.76	PK
10640	34.32	5.04	H	39.36	53.98	14.62	AV
15960	47.86	4.55	H	52.41	73.98	21.57	PK
15960	33.64	4.55	H	38.19	53.98	15.79	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11000	48.71	5.17	V	53.88	73.98	20.10	PK
11000	35.22	5.17	V	40.39	53.98	13.59	AV
16500	45.63	8.27	V	53.90	68.20	14.30	PK
11000	48.82	5.17	H	53.99	73.98	19.99	PK
11000	35.34	5.17	H	40.51	53.98	13.47	AV
16500	45.85	8.27	H	54.12	68.20	14.08	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11160	47.25	4.25	V	51.50	73.98	22.48	PK
11160	33.68	4.25	V	37.93	53.98	16.05	AV
16740	44.41	7.93	V	52.34	68.20	15.86	PK
11160	47.74	4.25	H	51.99	73.98	21.99	PK
11160	33.91	4.25	H	38.16	53.98	15.82	AV
16740	44.89	7.93	H	52.82	68.20	15.38	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5720 MHz
Channel No.	144 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11440	47.65	4.69	V	52.34	73.98	21.64	PK
11440	33.74	4.69	V	38.43	53.98	15.55	AV
17160	45.26	8.92	V	54.18	68.20	14.02	PK
11440	47.79	4.69	H	52.48	73.98	21.50	PK
11440	33.78	4.69	H	38.47	53.98	15.51	AV
17160	45.57	8.92	H	54.49	68.20	13.71	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11490	47.64	4.55	V	52.19	73.98	21.79	PK
11490	34.00	4.55	V	38.55	53.98	15.43	AV
17235	44.85	10.31	V	55.16	68.20	13.04	PK
11490	47.80	4.55	H	52.35	73.98	21.63	PK
11490	34.26	4.55	H	38.81	53.98	15.17	AV
17235	45.06	10.31	H	55.37	68.20	12.83	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11570	48.01	4.82	V	52.83	73.98	21.15	PK
11570	34.16	4.82	V	38.98	53.98	15.00	AV
17355	44.41	9.73	V	54.14	68.20	14.06	PK
11570	48.21	4.82	H	53.03	73.98	20.95	PK
11570	34.47	4.82	H	39.29	53.98	14.69	AV
17355	44.45	9.73	H	54.18	68.20	14.02	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11650	48.22	4.42	V	52.64	73.98	21.34	PK
11650	34.16	4.42	V	38.58	53.98	15.40	AV
17475	44.98	10.15	V	55.13	68.20	13.07	PK
11650	48.36	4.42	H	52.78	73.98	21.20	PK
11650	34.42	4.42	H	38.84	53.98	15.14	AV
17475	45.02	10.15	H	55.17	68.20	13.03	PK

Note:

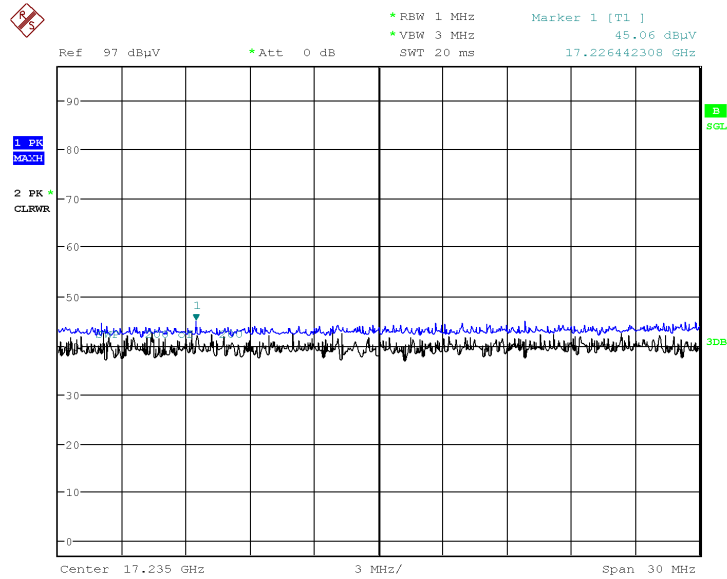
All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

UNII 1, 2A, 2C, 3 : 802.11a

▣ Test Plots

Peak Reading (802.11a, Ch.149 3rd Harmonic, Z-H)



Date: 13.SEP.2022 11:08:45

Note:

Only the worst case plots for Radiated Spurious Emissions.

10.3 RADIATED RESTRICTED BAND EDGE

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	50.14	11.85	H	61.99	73.98	11.99	PK
5150	31.85	11.85	H	43.70	53.98	10.28	AV
5150	50.36	11.85	V	62.21	73.98	11.77	PK
5150	32.18	11.85	V	44.03	53.98	9.95	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	51.86	11.89	H	63.75	73.98	10.23	PK
5350	32.95	11.89	H	44.84	53.98	9.14	AV
5350	52.99	11.89	V	64.88	73.98	9.10	PK
5350	33.19	11.89	V	45.08	53.98	8.90	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5460	47.15	12.31	H	59.46	73.98	14.52	PK
5460	30.46	12.31	H	42.77	53.98	11.21	AV
5470	51.67	12.53	H	64.20	68.20	4.00	PK
5460	45.52	12.31	V	57.83	73.98	16.15	PK
5460	29.85	12.31	V	42.16	53.98	11.82	AV
5470	49.54	12.53	V	62.07	68.20	6.13	PK

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	43.89	11.85	H	55.74	73.98	18.24	PK
5150	31.96	11.85	H	43.81	53.98	10.17	AV
5150	44.86	11.85	V	56.71	73.98	17.27	PK
5150	32.22	11.85	V	44.07	53.98	9.91	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	49.28	11.89	H	61.17	73.98	12.81	PK
5350	31.97	11.89	H	43.86	53.98	10.12	AV
5350	50.60	11.89	V	62.49	73.98	11.49	PK
5350	32.51	11.89	V	44.40	53.98	9.58	AV

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	45.73	12.31	H	58.04	73.98	15.94	PK
5460	30.39	12.31	H	42.70	53.98	11.28	AV
5470	50.16	12.53	H	62.69	68.20	5.51	PK
5460	44.99	12.31	V	57.30	73.98	16.68	PK
5460	29.16	12.31	V	41.47	53.98	12.51	AV
5470	50.01	12.53	V	62.54	68.20	5.66	PK

Band :	UNII 1
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	44.27	11.85	H	56.12	73.98	17.86	PK
5150	31.55	11.85	H	43.40	53.98	10.58	AV
5150	44.49	11.85	V	56.34	73.98	17.64	PK
5150	31.72	11.85	V	43.57	53.98	10.41	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	50.16	11.89	H	62.05	73.98	11.93	PK
5350	32.18	11.89	H	44.07	53.98	9.91	AV
5350	50.72	11.89	V	62.61	73.98	11.37	PK
5350	32.53	11.89	V	44.42	53.98	9.56	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5460	45.20	12.31	H	57.51	73.98	16.47	PK
5460	30.55	12.31	H	42.86	53.98	11.12	AV
5470	50.09	12.53	H	62.62	68.20	5.58	PK
5460	45.01	12.31	V	57.32	73.98	16.66	PK
5460	30.26	12.31	V	42.57	53.98	11.41	AV
5470	49.96	12.53	V	62.49	68.20	5.71	PK

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	44.92	11.85	H	56.77	73.98	17.21	PK
5150	32.52	11.85	H	44.37	53.98	9.61	AV
5150	45.13	11.85	V	56.98	73.98	17.00	PK
5150	32.58	11.85	V	44.43	53.98	9.55	AV

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	49.28	11.89	H	61.17	73.98	12.81	PK
5350	32.54	11.89	H	44.43	53.98	9.55	AV
5350	49.95	11.89	V	61.84	73.98	12.14	PK
5350	32.52	11.89	V	44.41	53.98	9.57	AV

Band : UNII 2C
 Operation Mode: 802.11 n_HT40
 Transfer MCS Index: 0
 Operating Frequency 5510 MHz
 Channel No. 102 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5460	44.85	12.31	H	57.16	73.98	16.82	PK
5460	31.57	12.31	H	43.88	53.98	10.10	AV
5470	48.48	12.53	H	61.01	68.20	7.19	PK
5460	45.12	12.31	V	57.43	73.98	16.55	PK
5460	31.05	12.31	V	43.36	53.98	10.62	AV
5470	47.39	12.53	V	59.92	68.20	8.28	PK

Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	43.85	11.85	H	55.70	73.98	18.28	PK
5150	32.96	11.85	H	44.81	53.98	9.17	AV
5150	44.97	11.85	V	56.82	73.98	17.16	PK
5150	33.50	11.85	V	45.35	53.98	8.63	AV

Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	51.18	11.89	H	63.07	73.98	10.91	PK
5350	35.56	11.89	H	47.45	53.98	6.53	AV
5350	54.06	11.89	V	65.95	73.98	8.03	PK
5350	35.53	11.89	V	47.42	53.98	6.56	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5460	44.70	12.31	H	57.01	73.98	16.97	PK
5460	31.58	12.31	H	43.89	53.98	10.09	AV
5470	48.44	12.53	H	60.97	68.20	7.23	PK
5460	43.46	12.31	V	55.77	73.98	18.21	PK
5460	31.09	12.31	V	43.40	53.98	10.58	AV
5470	47.65	12.53	V	60.18	68.20	8.02	PK

Band : UNII 1
 Operation Mode: 802.11 ac_VHT80
 Transfer MCS Index: 0
 Operating Frequency 5210 MHz
 Channel No. 42 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5150	45.86	11.85	H	57.71	73.98	16.27	PK
5150	35.26	11.85	H	47.11	53.98	6.87	AV
5150	46.12	11.85	V	57.97	73.98	16.01	PK
5150	35.44	11.85	V	47.29	53.98	6.69	AV

Band : UNII 2A
 Operation Mode: 802.11 ac_VHT80
 Transfer MCS Index: 0
 Operating Frequency 5290 MHz
 Channel No. 58 Ch

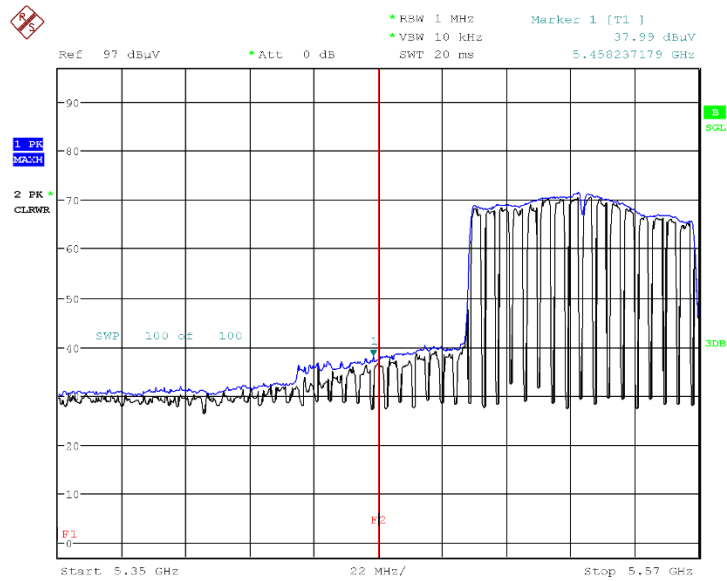
Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5350	47.98	11.89	H	59.87	73.98	14.11	PK
5350	34.41	11.89	H	46.30	53.98	7.68	AV
5350	49.52	11.89	V	61.41	73.98	12.57	PK
5350	34.43	11.89	V	46.32	53.98	7.66	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
5460	50.23	12.31	H	62.54	73.98	11.44	PK
5460	37.99	12.31	H	50.30	53.98	3.68	AV
5470	50.80	12.53	H	63.33	68.20	4.87	PK
5460	47.11	12.31	V	59.42	73.98	14.56	PK
5460	36.40	12.31	V	48.71	53.98	5.27	AV
5470	48.29	12.53	V	60.82	68.20	7.38	PK

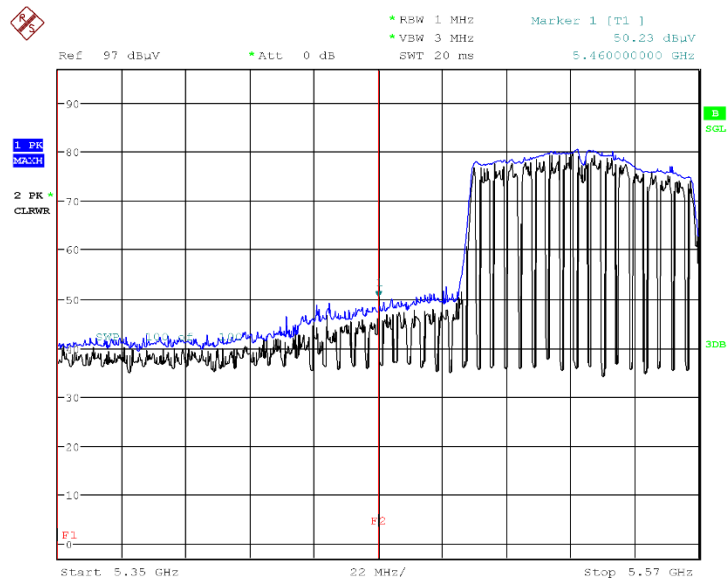
Test Plots(UNII 1, 2A, 2C)

Average Reading (802.11ac(80M), Ch.106, Y-H)



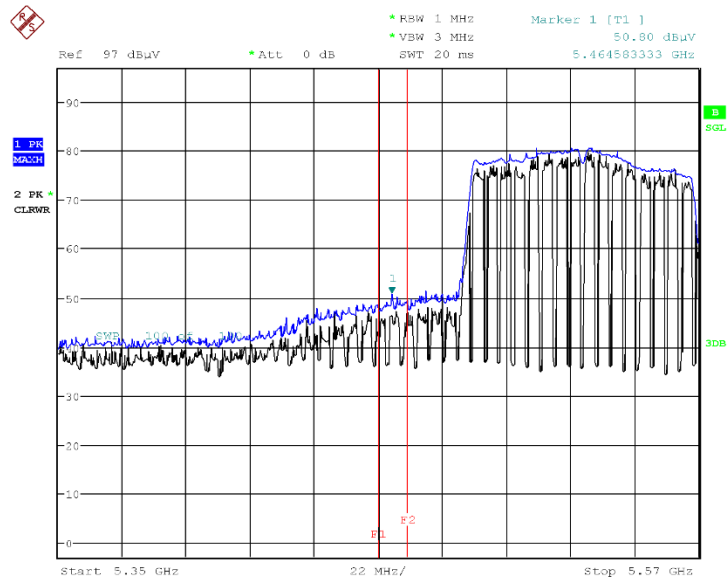
Date: 11.SEP.2022 06:08:34

Peak Reading (802.11ac(80M), Ch.106, Y-H)



Date: 11.SEP.2022 06:08:53

Peak Reading (802.11ac(80M), Ch.106, Y-H)



Date: 11.SEP.2022 06:10:00

Note:

Only the worst case plots for Radiated Restricted Band Edge.

10.4 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

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