RF TEST REPORT

FCC

APPLICANT

Zipline International, Inc

MODEL NAME

P2 EV2 Zip

FCC ID

2BML6P2EV1-0

REPORT NUMBER

HA241205-ZPL-002-R02

TEST REPORT

Date of Issue
December 19, 2024

Test Site
HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Zipline International, Inc
Applicant Address	333 Corey Way, South San Francisco, CA 94080
FCC ID	2BML6P2EV1-0
Model Name	P2 EV2 Zip
EUT Type	Package Delivery Drone
FCC Classification	Digital Transmission System (DTS) PCS Licensed Transmitter
FCC Rule Part(s)	Part 15.247, Part 2, Part 24(E), Part 27, Part 90(R)
Test Procedure	ANSI C63.10-2013, ANSI C63.26-2015 KDB 558074 D01 v05r02, KDB 662911 D01

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
John Park	Yongsoo Park
Test Engineer	Technical Manager

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REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA241205-ZPL-002-R02	December 19, 2024	Initial Issue

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	P2 EV2 Zip
EUT Type	Package Delivery Drone
Serial Number	EV2-ZIP-225
Power Supply	48 V d.c. (Internal battery)
RF Specification	2xWIFI 2.4 GHz : 802.11b/g/ n(HT20, HT40) 2xLTE : B2, B4, B12, B13, B14, B66, B71
Transmitter Chain	WIFI 2.4 GHz: 2x2 MIMO LTE : 1 TRx, 1 Rx
Operating Environment	Outdoor
Operating Temperature	-31 °C ~ +46 °C

RF SPECIFICATION SUBJECT TO THE REPORT

Max. RF Output Power	WIFI 2.4 GHz	17.50 dBm (56.23 mW)
	LTE	23.22 dBm (209.89 mW)
Modulation Type	WIFI 2.4 GHz	DSSS/CCK : 802.11b OFDM : 802.11g/n (HT20/40)
	LTE	QPSK, 16QAM
Antenna Specification [1)]	ANT(Fore / Aft)	Antenna Type : FPC Antenna Peak Gain : 5 dBi
	ANT(Port / Starboard)	Antenna Type : FPC Antenna Peak Gain : 2.4 dBi
	ANT(Cellular TRx)	Antenna Type : FPC Antenna Peak Gain : 6 dBi
	ANT(Cellular Rx)	Antenna Type : FPC Antenna Peak Gain : 6 dBi
Firmware Version [2)]	Fsw-2024-11-13-rc5	
Hardware Version [2)]	P2 EV2	
Date(s) of Tests	December 10, 2024 ~ December 19, 2024	

Note :
1. Antenna information is based on the document provided.
2. Firmware and Hardware Version are as received by the client.

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2. METHODOLOGY

FCC KDB 558074 D01 DTS Measurement Guidance v05r02 dated April 2nd, 2019 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) 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 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 Section 15.207, 15.209 and 15.247 under the FCC Rule Part 15 Subpart C and the Section 2.1091 under the FCC Rule Part 2.

GENERAL TEST PROCEDURES

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. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emission, the relative positions of this package delivery drone transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested at 2.4 GHz WLAN test mode and LTE mode.

3. 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).

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4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC (Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at 1726 Ringwood Avenue, San Jose, California 95131, USA.
The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

CABID : 25729

ilac-MRA a2LA

Accredited Laboratory

A2LA has accredited

HCT AMERICA, INC.

San Jose, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the A2LA – R256 – Specific Requirements – FDA ASCA Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 17th day of July 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4201.01
Valid to July 31, 2025
Revised July 15, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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.”

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5. 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 antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
(2) The E.U.T Complies with the requirement of §15.203

According to RSS-Gen Issue 5 Amd 2 (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.

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6. 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
Output Power, Conducted	± 0.54 dB
Unwanted Emissions, Conducted	± 0.54 dB
Radiated Emissions (below 1 GHz)	± 5.70 dB
Radiated Emissions (Above 1 GHz)	± 5.25 dB

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7. DESCRIPTION OF TESTS

7.1. RADIATED EMISSIONS

RADIATION EMISSION LIMIT

FCC : 47 CFR § 15.209		
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
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

ISED : RSS-GEN Section 8.9		
Frequency (MHz)	**Field Strength (uV/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
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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RESTRICTED BANDS OF OPERATION

FCC : 47 CFR § 15.205(a)				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 – 0.110	12.29 - 12.293	149.9 - 150.05	1660.0 - 1710.0	8025 - 8500
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.57675 - 12.57725	156.7 - 156.9	2200.0 - 2300.0	9300 - 9500
4.125 - 4.128	13.36 - 13.41	162.0125 - 167.17	2310.0 - 2390.0	10600 - 12700
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500.0	13250 - 13400
4.20725 - 4.20775	16.69475 - 16.69525	240.0 - 285.0	2690.0 - 2900.0	14470 - 14500
6.215 - 6.218	16.80425 - 16.80475	322.0 - 335.4	3260.0 - 3267.0	15350 - 16200
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410.0	3332.0 - 3339.0	17700 - 21400
6.31175 - 6.31225	37.5 - 38.25	608.0 - 614.0	3345.8 - 3358.0	22010 - 23120
8.291 - 8.294	73 - 74.6	960.0 - 1240.0	3600.0 - 4400.0	23600 - 24000
8.362 - 8.366	74.8 - 75.2	1300.0 - 1427.0	4500.0 - 5150.0	31200 - 31800
8.37625 - 8.38675	108 - 121.94	1435.0 - 1626.5	5350.0 - 5460.0	36430 - 36500
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5	7250.0 - 7750.0	Above 38600

ISED : RSS-GEN Section 8.10				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 - 0.110	8.37625 - 8.38675	108 – 138	1660 - 1710	8025 - 8500
0.495 - 0.505	8.41425 - 8.41475	149.9 - 150.05	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.29 - 12.293	156.52475 - 156.52525	2200 - 2300	9300 - 9500
3.020 - 3.026	12.51975 - 12.52025	156.7 - 156.9	2310 - 2390	10600 - 12700
4.125 - 4.128	12.57675 - 12.57725	162.0125 - 167.17	2483.5 - 2500	13250 - 13400
4.17725 - 4.17775	13.36 - 13.41	167.72 - 173.2	2655 - 2900	14470 - 14500
4.20725 - 4.20775	16.42 - 16.423	240 - 285	3260 - 3267	15350 - 16200
5.677 - 5.683	16.69475 - 16.69525	322 - 335.4	3332 - 3339	17700 - 21400
6.215 - 6.218	16.80425 - 16.80475	399.9 - 410	3345.8 - 3358	22010 - 23120
6.26775 - 6.26825	25.5 - 25.67	608 - 614	3500 - 4400	23600 - 24000
6.31175 - 6.31225	37.5 - 38.25	960 - 1427	4500 - 5150	31200 - 31800
8.291 - 8.294	73 - 74.6	1435 - 1626.5	5350 - 5460	36430 - 36500
8.362 - 8.366	74.8 - 75.2	1645.5 - 1646.5	7250 - 7750	Above 38600

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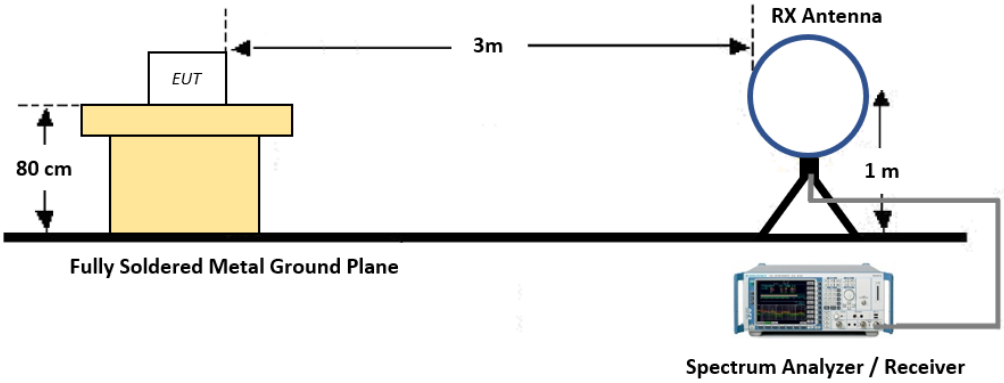
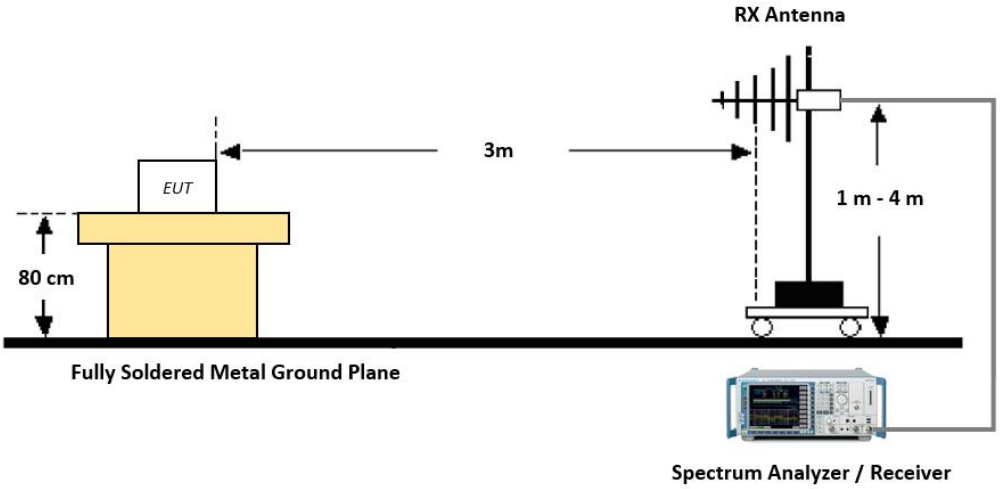
TEST SETUP

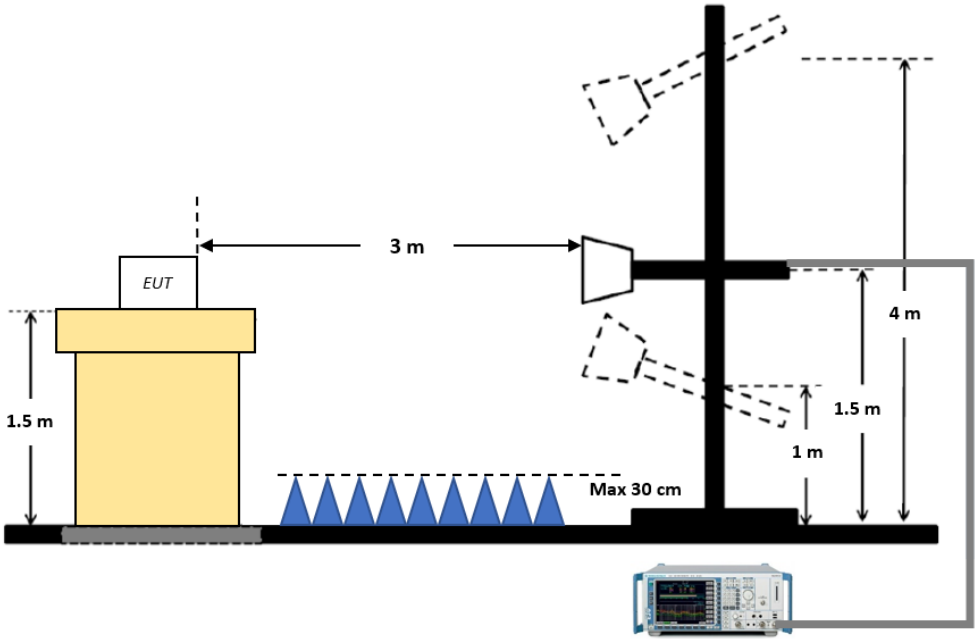
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



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TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (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 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 m/300 m) = - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = 40*log(3 m/30 m) = - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting

   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3*RBW

9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (30 MHz – 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. 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. Spectrum Setting

   (1) Measurement Type (Peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 100 kHz
   - VBW ≥ 3*RBW

   (2) Measurement Type(Quasi-peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Quasi-Peak
   - RBW = 120 kHz

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

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TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (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 ≥ 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 ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW ≥ 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 (i.e.: 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 (or 40 GHz whichever comes first)

11. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

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TEST PROCEDURE OF RADIATED RESTRICTED BAND EDGE

1. Radiated test is performed with hopping off (if there is any)
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. 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 ≥ 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 ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW ≥ 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. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

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8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
Radiated Spurious Emissions	§15.209	cf. Section 7.1	Radiated	PASS

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WORST CASE CONFIGURATION

TEST MODE

Mode	Frequency (MHz)	Channel	Note
802.11b	2412	1	1 Mbps
802.11b	2452	9	1 Mbps
LTE B13	782	23230	QPSK, 5 MHz, 1 RB, 0 Offset
LTE B12	707.5	23095	QPSK, 5 MHz, 1 RB, 0 Offset

Mode	Frequency (MHz)	Channel	Note
802.11b	2412	1	1 Mbps
802.11b	2452	9	1 Mbps
LTE B13	782	23230	QPSK, 5 MHz, 1 RB, 0 Offset
LTE B2	1857.5	26115	QPSK, 3 MHz, 1 RB, 0 Offset

Mode	Frequency (MHz)	Channel	Note
802.11b	2412	1	1 Mbps
802.11b	2452	9	1 Mbps
LTE B4	1745	132322	QPSK, 20 MHz, 1 RB, 49 Offset
LTE B2	1857.5	26115	QPSK, 3 MHz, 1 RB, 0 Offset

RADIATED TEST

1. EUT Axis

All X, Y, and Z positions for horizontal / vertical antenna polarization were investigated to find the worst-case position. Y position was selected as the worst-case for full evaluation.

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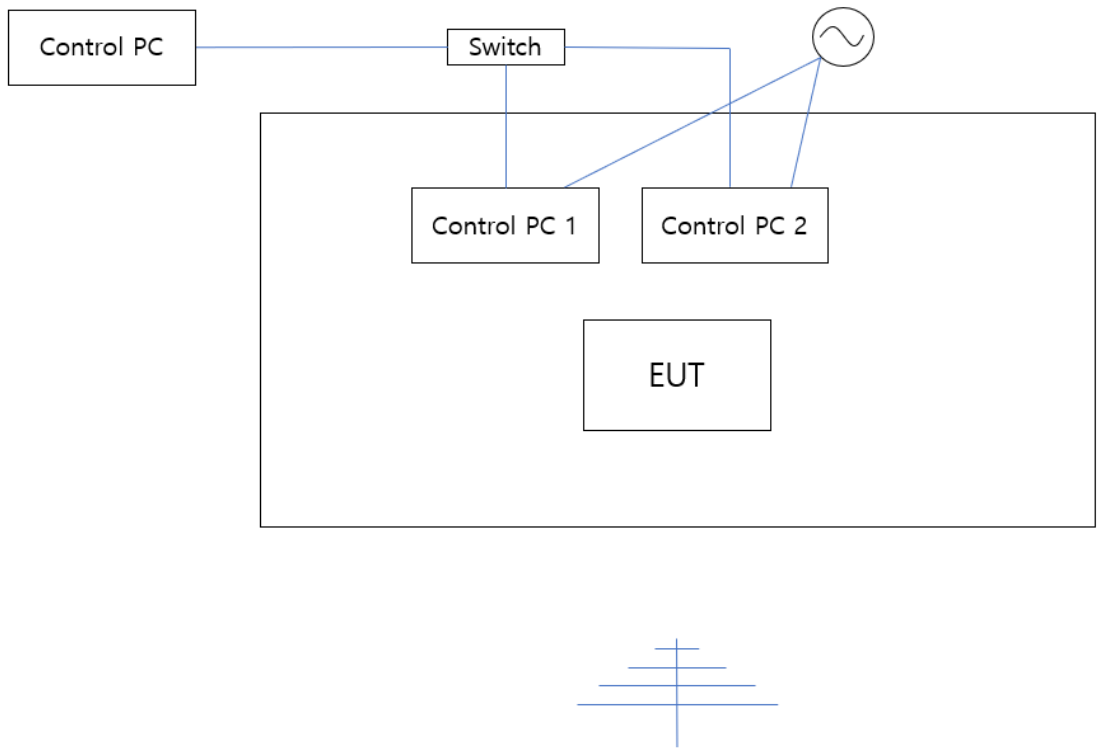
TEST CONFIGURATION

Radiated Emission



LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial No.	Manufacturer	Qty	Note
5-Port Gigabit Desktop Switch	TL-SG105	Y239034000785	Gigabit	1	
AC Adapter	T050060-2B1	-	Gigabit	1	
CPU	12LN	MJ0LVYXG	LENOVO	2	
AC Adapter	T050060-2B1	-	Gigabit	1	

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9. TEST RESULT

9.1 RADIATED SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Test Mode 802.11b + 802.11b + B13 + B12

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 782 MHz (CH23230) + 707.5 MHz (CH23095)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Test Mode 802.11b + 802.11b + B13 + B2

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 782 MHz (CH23230) + 1857.5 MHz (CH26115)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Test Mode 802.11b + 802.11b + B4 + B2

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 1745 MHz (CH132322) + 1857.5 MHz (CH26115)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

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Frequency Range : Above 1 GHz

Test Mode 802.11b + 802.11b + B13 + B12

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 782 MHz (CH23230) + 707.5 MHz (CH23095)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1]	Duty	AV	PK	AV	PK	AV	PK
2122.427[2]	V	-	54.3	3.4	-	-	57.7	-	82.3	-	24.6
2122.531[2]	H	-	55.5	3.4	-	-	58.9	-	82.3	-	23.4
2370.204	H	48.4	55.5	4.3	-	52.7	59.8	54	74	1.3	14.2
2372.800	V	48.7	55.9	4.3	-	53.0	60.2	54	74	1.0	13.8
2493.904	H	44.5	51.9	4.9	-	49.4	56.8	54	74	4.6	17.2
2494.907	V	42.3	50.7	4.9	-	47.2	55.6	54	74	6.8	18.4
3465.447	V	40.0	56.8	-5.4	-	34.6	51.4	54	74	19.4	22.6
3465.751	H	37.9	54.1	-5.4	-	32.5	48.7	54	74	21.5	25.3

Note(s) :
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. Those signals are harmonics of Cellular. The limit is (Transmitting power) – (43 + 10 log(P) dB).
   23.22dBm – (43 + 10log(23.22dBm)) = 82.3dBuV/m

Test Mode 802.11b + 802.11b + B13 + B2

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 782 MHz (CH23230) + 1857.5 MHz (CH26115)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1]	Duty	AV	PK	AV	PK	AV	PK
2336.182	H	30.9	45.3	4.1	-	35.0	49.4	54	74	19.0	24.6
2343.704	V	31.1	45.3	4.1	-	35.2	49.4	54	74	18.8	24.6
2489.753	H	47.8	54.5	4.8	-	52.6	59.3	54	74	1.4	14.7
2492.562	V	48.1	54.7	4.8	-	52.9	59.5	54	74	1.1	14.5
4540.095	V	48.8	58.4	-3.8	-	45.0	54.6	54	74	9.0	19.4
4540.143	H	51.0	60.5	-3.8	-	47.2	56.7	54	74	6.8	17.3
5639.974[2]	H	-	63.0	-0.3	-	-	62.7	-	82.3	-	19.6
5640.387[2]	V	-	63.0	-0.3	-	-	62.7	-	82.3	-	19.6

Note(s) :
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. Those signals are harmonics of Cellular. The limit is (Transmitting power) – (43 + 10 log(P) dB).
   23.22dBm – (43 + 10log(23.22dBm)) = 82.3dBuV/m

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Test Mode 802.11b + 802.11b + B4 + B2

Operating Frequency 2412 MHz (CH 1) + 2452 MHz (CH 9) + 1745 MHz (CH132322) + 1857.5 MHz (CH26115)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1]	Duty	AV	PK	AV	PK	AV	PK
2374.251	H	40.5	50.6	11.3	-	51.8	61.9	54	74	2.2	12.1
2375.043	V	40.6	49.8	11.3	-	51.9	61.1	54	74	2.1	12.9
2490.642	V	37.6	48.2	11.8	-	49.4	60.0	54	74	4.6	14.0
2493.540	H	37.5	49.1	11.8	-	49.3	60.9	54	74	4.7	13.1
5170.580[2]	H	-	54.8	-1.8	-	-	53.0	-	82.3	-	29.3
5170.829[2]	V	-	63.3	-1.8	-	-	61.5	-	82.3	-	20.8
5327.000	V	39.2	53.1	-1.1	-	38.1	52.0	54	74	15.9	22.0
5327.000	H	38.9	52.7	-1.1	-	37.8	51.6	54	74	16.2	22.4
5640.279[2]	H		59.5	-0.3	-	-	59.2	-	82.3	-	23.1
5640.631[2]	V		64.9	-0.3	-	-	64.6	-	82.3	-	17.7
6894.500	V	40.2	51.2	1.9	-	42.1	53.1	54	74	11.9	20.9
6894.500	H	39.1	50.3	1.9	-	41.0	52.2	54	74	13.0	21.8
8617.794[2]	V	-	59.0	5.0	-	-	64.0	-	82.3	-	18.3
8618.185[2]	H	-	57.9	5.0	-	-	62.9	-	82.3	-	19.4

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. Those signals are harmonics of Cellular. The limit is (Transmitting power) – (43 + 10 log(P) dB).
   23.22dBm – (43 + 10log(23.22dBm)) = 82.3dBuV/m

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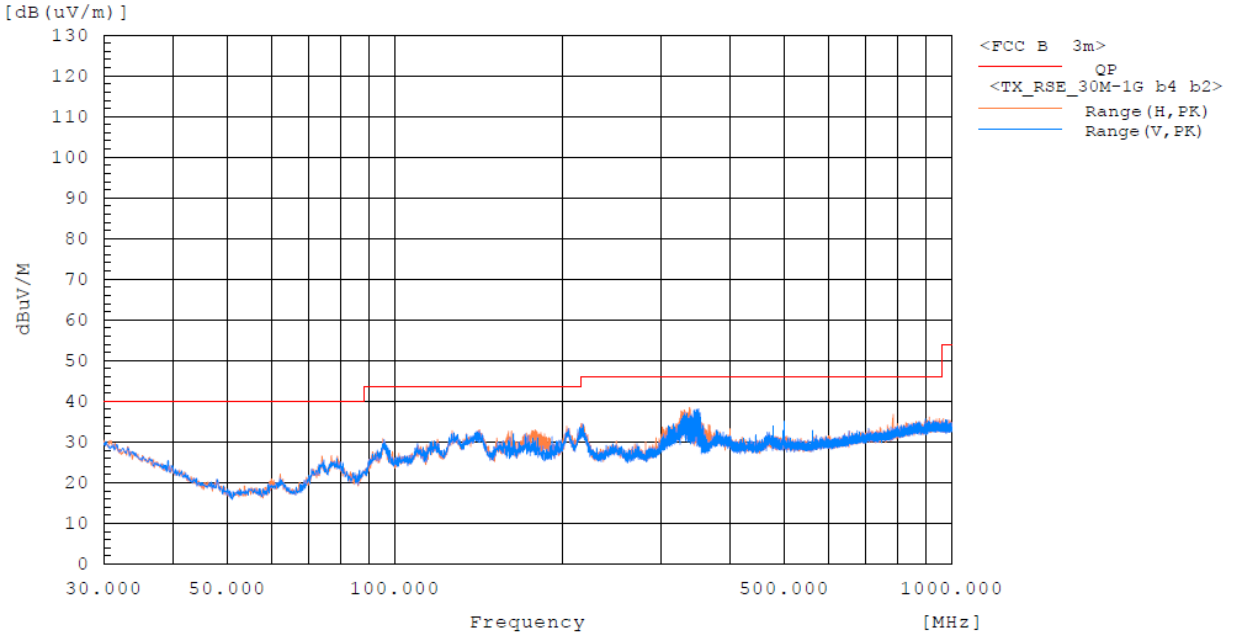
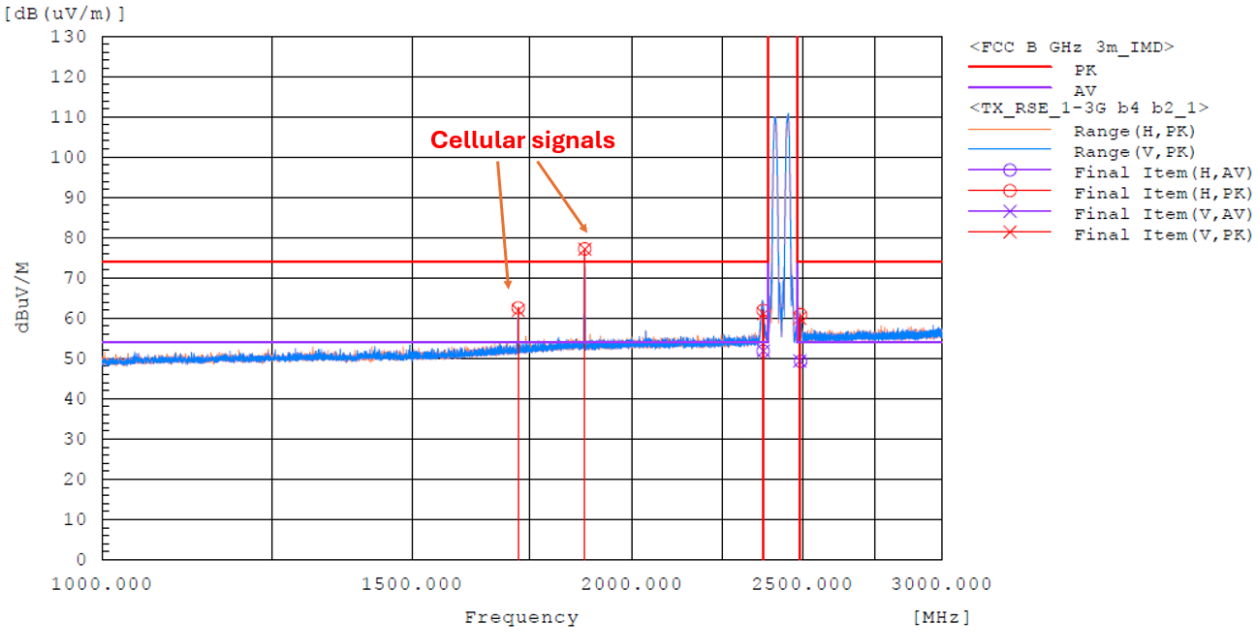
▣ TEST PLOTS

Radiated Spurious Emission 30 MHz – 1 GHz



Radiated Spurious Emission 1 GHz - 3 GHz



Note:

1. The plots include all used factor values for cables, antenna, preamplifier, etc.

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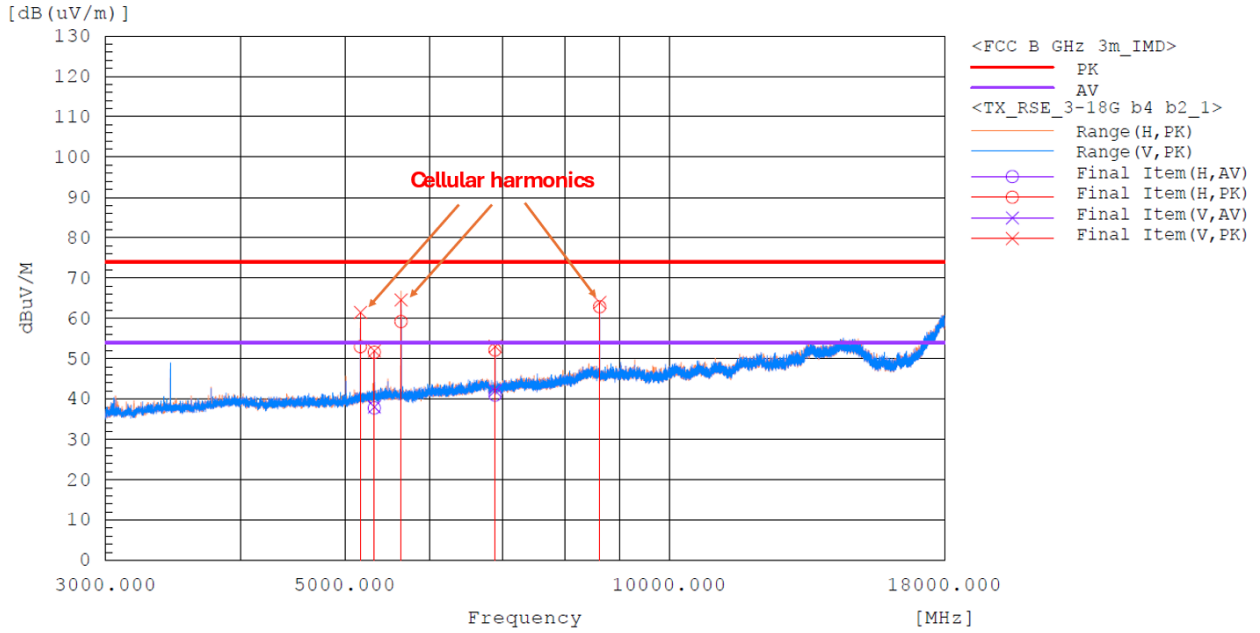
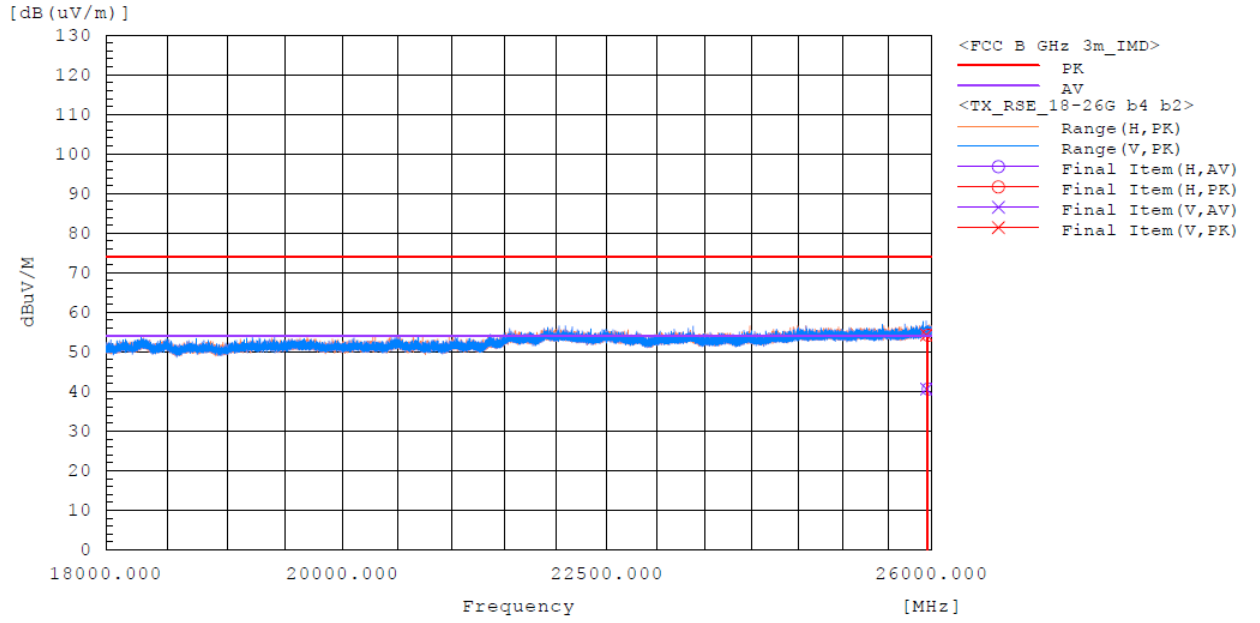
▣ TEST PLOTS (Continued)

Radiated Spurious Emission 3 GHz - 18 GHz



Radiated Spurious Emission 18 GHz - 26 GHz



Note:

1. The plots include all used factor values for cables, antenna, preamplifier, etc.

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10. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Signal Analyzer (1 Hz ~ 40.0 GHz)	ESW44	10/15/2025	Rohde & Schwarz	102015
☒	Attenuator (10 dB, DC ~ 26.5 GHz)	8493C 10 dB	09/04/2025	KEYSIGHT	89576
☒	Attenuator (20 dB, DC ~ 26.5 GHz)	CFADC262002	10/17/2025	Cernex	-
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	03/06/2025	Sunol	A060916
☒	LNA (30 MHz ~ 1GHz)	PAM-103	05/03/2025	Com-Power	18020254
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	01/03/2025	Sunol	A061616
☒	LNA (1 GHz ~ 18 GHz)	PAM-118A	03/13/2025	Com-Power	18040074
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	01/20/2025	Sunol	17121
☒	LNA (18 GHz ~ 40 GHz)	CBL18405045-01	01/05/2025	CERNEX, Inc.	27973
☒	High Pass Filter	WHK10-2520-3000-18000-40EF	10/17/2025	Wainwright	9
☒	High Pass Filter	WHKX12-900-1000-15000-60SS	7/30/2025	Wainwright	23
☒	Band Reject Filter	WRCGV10-1835-1850-1910-1925-50SS	10/15/2025	Wainwright	1
☒	Band Reject Filter	WRCGV10-1690-1710-1785-1805-60SS	08/02/2025	Wainwright	4

Note(s) :

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.

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APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document.

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APPENDIX B. PHOTOGRAPHS OF EUT

B.1. EXTERNAL PHOTOS

The external photos are provided as a separate document.

B.2. INTERNAL PHOTOS

The internal photos are provided as a separate document.

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END OF TEST REPORT

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