Testing Laboratory 1190

FCC RADIO TEST REPORT

FCC ID	:	ZPNUNIVERSALBSD
Equipment	:	Blind Spot Detection System
Brand Name	:	Cub
Model Name	:	VS-95A043、VS-95AXXX、VS-95AXXXX、VS-95AXXXXX、VS-95AXXXXXX、VS-95AXXX-X、VS-95AXXXX-X、VS-95AXXXXX-X、VS-95AXXXXXX-X、VS-95AXXX-XX、VS-95AXXXX-XX、VS-95AXXXXX-XX、VS-95AXXXXXX-XX、VS-95AXXX-XXXX、VS-95AXXXX-XXXX、VS-95AXXXXX-XXXX、VS-95AXXXXXX-XXXX、A001-XXX、A001-XXXX、A001-XXXXXX、A001-XXXXXX-XXX (Refer to section 1.1.5 for more details)
Applicant	:	CUB ELECPARTS INC No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan 506
Manufacturer	:	CUB ELECPARTS INC No.6,Lane 546, Sec. 6, Changlu Road, Fuhsin Township, Changhua County, Taiwan 506
Standard	:	47 CFR FCC Part 95M

The product was received on Dec. 12, 2019, and testing was started from Dec. 12, 2019 and completed on Mar. 18, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR9D1141	01	Initial issue of report	Apr. 14, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.107	AC Power-line Conducted Emissions	N/A	Note
3.1	95.303	Occupied Bandwidth	PASS	-
3.2	95.3367	Radiated E.I.R.P Power	PASS	-
3.3	95.3379	Transmitter Radiated Unwanted Emissions	PASS	-
3.4	95.3379	Frequency Stability	PASS	-

Note:
It was supplied power by DC-Powered(vehicle battery) for EUT; it's not necessary to apply to AC Power-line Conducted Emissions test.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen
Report Producer: Vicky Huang

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (GHz)	**Operating Frequency Range (GHz)**	**Test Frequency (GHz)**	**99% Occupied Bandwidth (MHz)**	**Modulation**
76-81	76.01~76.8	76.40	680.17	FMCW

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Texas Instruments	VS-95A043	PCB Antenna	N/A	10

Note: The above information was declared by manufacturer.

1.1.3 EUT Operational Condition

EUT Power Type	From DC power supply			
Supply Voltage	☐	AC	State AC voltage	-
Supply Voltage	☒	DC	State DC voltage	12V

1.1.4 Test Signal Duty Cycle

Test Signal Duty Cycle
☒ Continuous transmission - 100%
☐ Transmissions occur regularly in time - …%

1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
VS-95A043、VS-95AXXX、VS-95AXXXX、VS-95AXXXXX、VS-95AXXXXXX、VS-95AXXX-X、VS-95AXXXX-X、VS-95AXXXXX-X、VS-95AXXXXXX-X、VS-95AXXX-XX、VS-95AXXXX-XX、VS-95AXXXXX-XX、VS-95AXXXXXX-XX、VS-95AXXX-XXXX、VS-95AXXXX-XXXX、VS-95AXXXXX-XXXX、VS-95AXXXXXX-XXXX、A001-XXX、A001-XXXX、A001-XXXXXX、A001-XXXXXX-XXX	All the models are identical, the difference model served as marketing strategy. (Where X may be any alpha character “a”-“z”, ”A”-“Z”, or numeric character “0”-“9”,or -, (,) , or blank or combination of alpha and numeric characters.)

Note: From the above models, model: VS-95A043 was selected as representative model for the test and its data was recorded in this report.

1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 95M
- ANSI C63.10 - Testing Unlicensed Wireless Devices
- KDB653005 D01 76-81 GHz Radars v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location			
☐	HWA YA	ADD :	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Eddie Weng	23.2~24.7°C / 49~53%	Dec. 12, 2019~Dec. 13, 2019
Radiated (below 1GHz)	03CH06-CB	Stim Sung	21~22.2°C / 46~48%	Mar. 17, 2020~Mar. 18, 2020
Radiated (above 1GHz)	03CH05-CB	KJ Chang	21.6~22.3°C / 51~55%	Dec. 12, 2019~Dec. 13, 2019

Test site Designation No. TW0006 with FCC.
Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 60GHz)	4.6 dB	Confidence levels of 95%
Radiated Emission (60GHz ~ 90GHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (90GHz ~ 200GHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (200GHz ~ 280GHz)	6.7 dB	Confidence levels of 95%
Temperature	1°C	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration
Test Channel Frequencies (GHz)
76.40

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
Occupied Bandwidth	76.40
Radiated E.I.R.P Power	76.40
Transmitter Spurious Emissions (below 1 GHz)	76.40
Transmitter Spurious Emissions (1 GHz-40 GHz)	76.40
Transmitter Spurious Emissions (above 40 GHz)	76.40
Frequency Stability	76.40

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Occupied Bandwidth Radiated E.I.R.P Power Frequency Stability
Test Condition	Radiated measurement
Operating Mode	CTX

The Worst Case Mode for Following Conformance Tests	
Tests Item	Transmitter Radiated Unwanted Emissions
Test Condition	Radiated measurement
Operating Mode < 1GHz	Normal Link
Operating Mode > 1GHz	CTX

Note: The EUT can only be used at X axis position.

2.4 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.5 Accessories

No.	Accessories
1	Car Charger set*1

2.6 Support Equipment

For Transmitter Radiated Unwanted Emissions below 1GHz test:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Power Supply	Advanced	LPS-305	N/A

For other tests:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Battery	YUASA	38B19L-MF	N/A

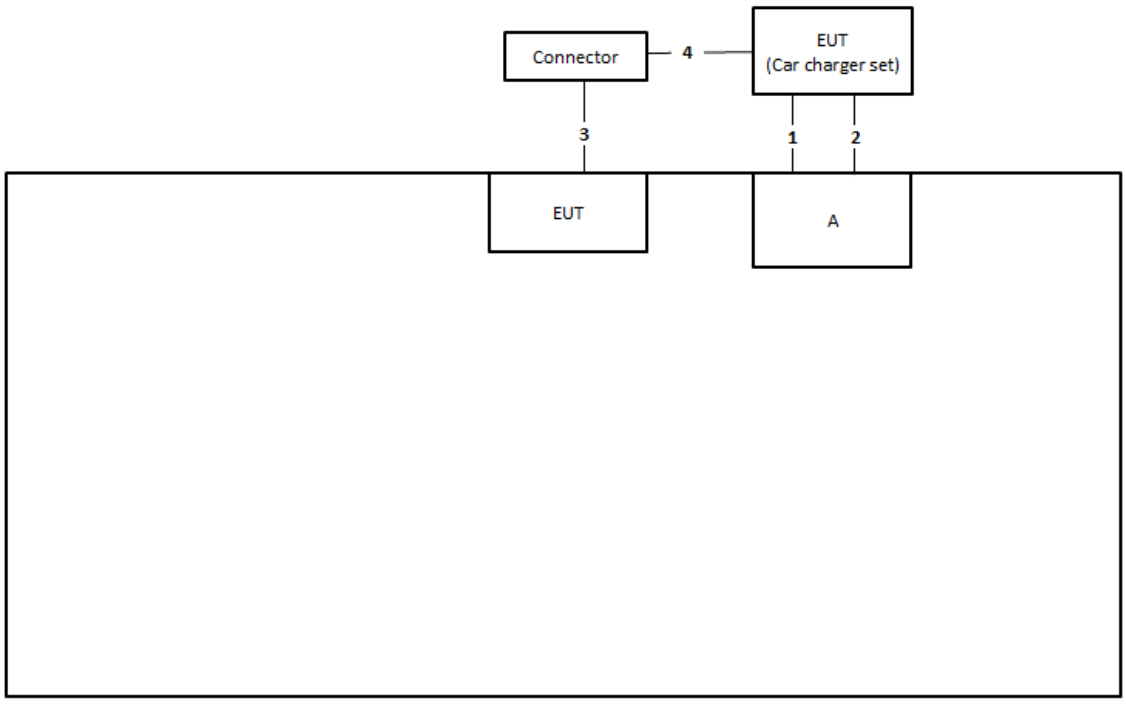
2.7 Far Field Boundary Calculations

The far-field boundary is given as:
far field = (2 * L^2) /λ
where:
L = Largest Antenna Dimension, including the reflector, in meters
λ= wavelength in meters

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
76.40	0.03	0.0039267	0.458	45.84

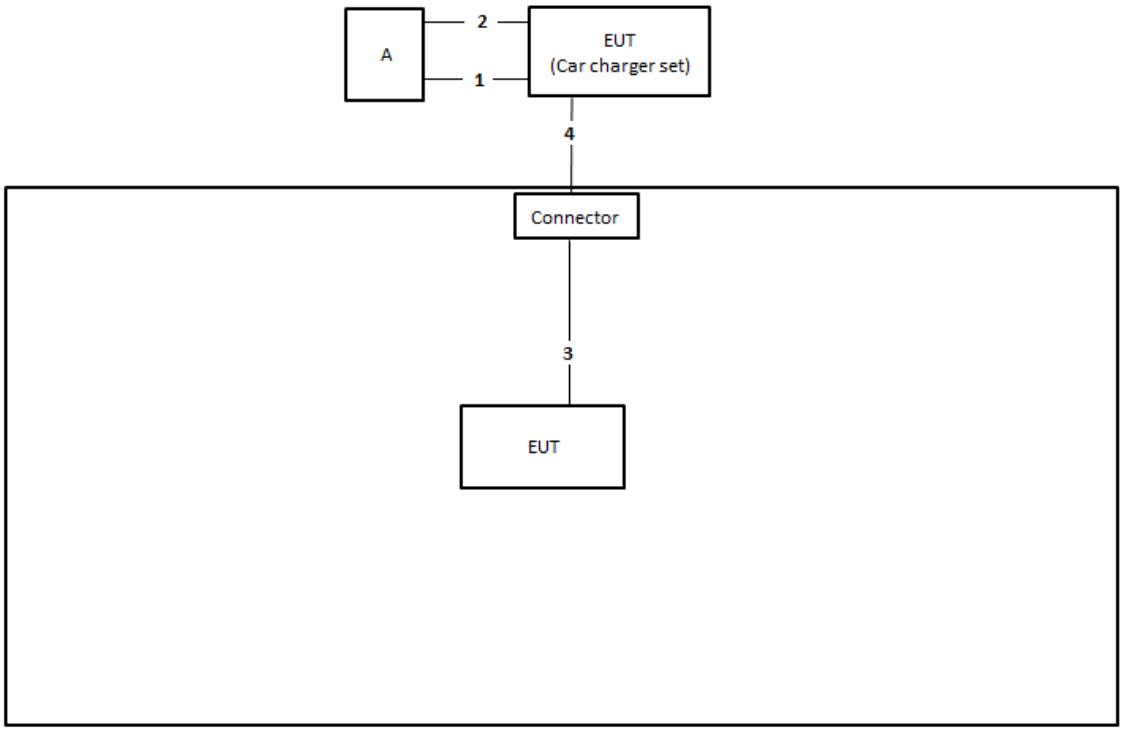
2.8 Test Setup Diagram

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Crocodile clip cable	No	1.5m
2	Crocodile clip cable	No	1.5m
3	Power cable	No	0.5m
4	Car charger cable	No	7.3m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	Crocodile clip cable	No	1.5m
2	Crocodile clip cable	No	1.5m
3	Power cable	No	0.5m
4	Car charger cable	No	7.3m

3 Transmitter Test Result

3.1 Occupied Bandwidth

3.1.1 Occupied Bandwidth (OBW) Limit

Occupied Bandwidth (EBW) Limit
Information only

3.1.2 Measuring Instruments

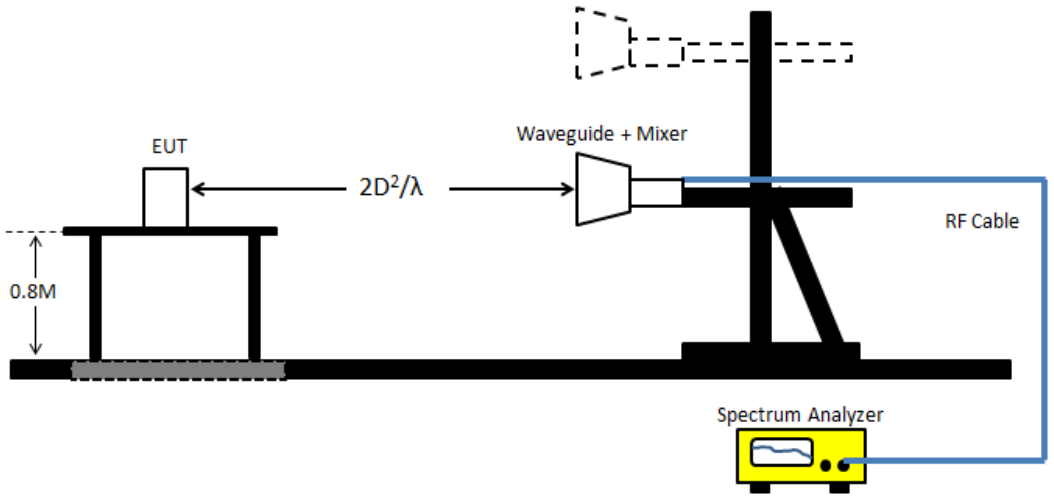
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
☒	For the Occupied bandwidth shall be measured using one of the options below:
☒	Refer as ANSI C63.10, clause 7.8.7 for EBW measurement.
☐	Refer as ANSI C63.10, clause 6.9.2 for occupied bandwidth testing.
☒	Refer as ANSI C63.10, clause 9 for radiated measurement.
☒	Radiated test was conducted at far-field distance. the distance from the radiating element of the EUT to the edge of the far field may be calculated from [$r \geq 2D^2/\lambda$] r is the distance from the radiating element of the EUT to the edge of the far field, in m D is the largest dimension of both the radiating element and the test antenna (horn), in m λ is the wavelength of the emission under investigation [300/f (MHz)], in m

3.1.4 Test Setup

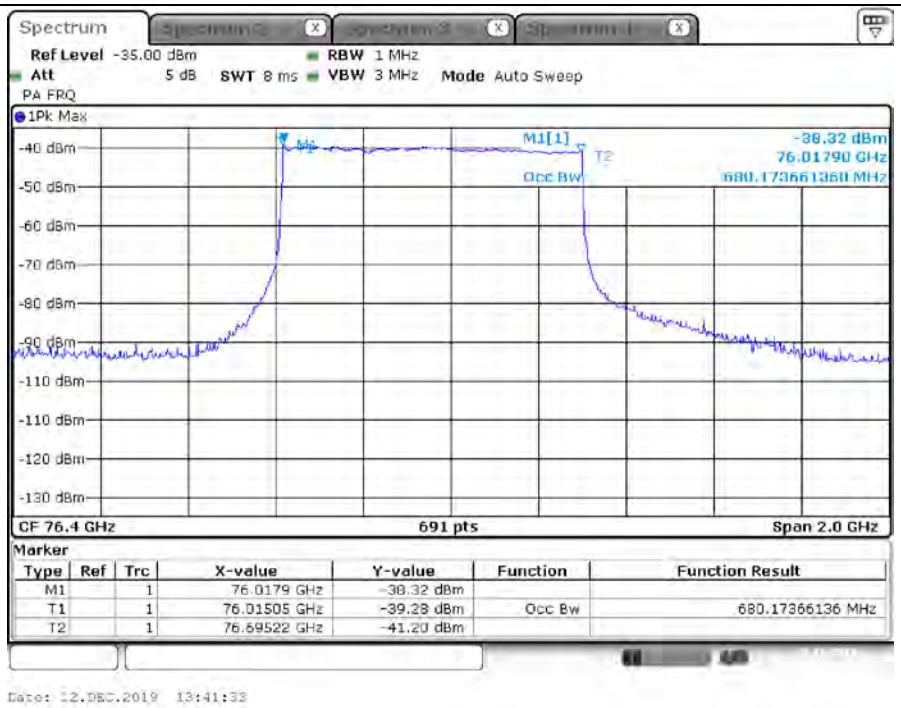
Occupied Bandwidth



3.1.5 Test Result of Occupied Bandwidth

Test Results		
Test Freq. (GHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)
76.40	680.17	N/A

Occupied Bandwidth Plots
Test Frequency: 76.40 GHz



3.2 Radiated E.I.R.P Power

3.2.1 Radiated E.I.R.P Power Limit

Radiated E.I.R.P Power	
☒	76-81 GHz Band:
	☒ Peak: EIRP 55 dBm [279uW/cm^2 at 3m] Average: EIRP 50 dBm [88uW/cm^2 at 3m]

3.2.2 Measuring Instruments

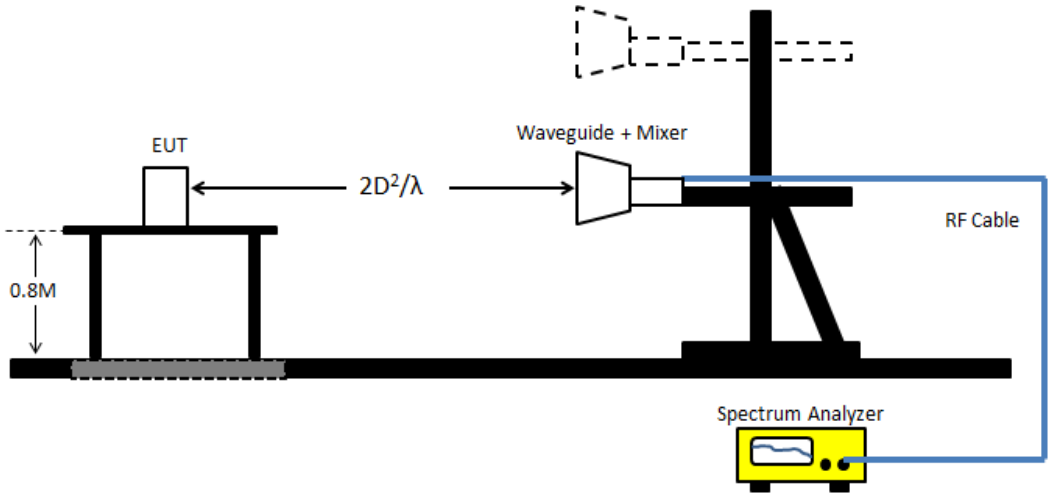
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
☒	For the Occupied bandwidth shall be measured using one of the options below:
☒	Refer as ANSI C63.10, clause 9 for radiated measurement.
	☒ Radiated test was conducted at far-field distance. the distance from the radiating element of the EUT to the edge of the far field may be calculated from [$r \geq 2D^2/\lambda$] r is the distance from the radiating element of the EUT to the edge of the far field, in m D is the largest dimension of both the radiating element and the test antenna (horn), in m λ is the wavelength of the emission under investigation [300/f (MHz)], in m
	☒ The measured power level is converted to EIRP using the Friis equation: E Meas = 126.8 - 20log(λ) + P – G where E is the field strength of the emission at the measurement distance, in dBμV/m P is the power measured at the output of the test antenna, in dBm λ is the wavelength of the emission under investigation [300/fMHz], in m G is the gain of the test antenna, in dBi EIRP = E Meas + 20 log(d Meas) – 104.7 where EIRP : is the equivalent isotropically radiated power, in dBm. E Meas : is the field strength of the emission at the measurement distance, in dBμV/m. d Meas : is the measurement distance, in m.

3.2.4 Test Setup

Radiated E.I.R.P Power



3.2.5 Test Result of Radiated E.I.R.P Power

Freq. (GHz)	Rx Gain (dBi)	P-Peak (dBm)	P-Average (dBm)	E-Meas-Peak (dBuV/m)	E-Meas-Average (dBuV/m)	Distance (m)	EIRP-Peak (dBm)	EIRP-Average (dBm)
76.40	23.0	-12.4	-26.3	139.52	125.62	0.50	28.70	14.80
EIRP Limit							**55**	**50**

3.3 Transmitter Radiated Unwanted Emissions

3.3.1 Transmitter Radiated Unwanted Emissions Limit

Transmitter Radiated Unwanted Emissions Limit (Below 40 GHz)			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960 - 40000	500	54	3

Frequency Range (GHz)	EIRP (dBm)	Power Density (pW/cm^2 @ 3m)
40 - 200	-1.7	600
200 - 231	0.5	1000

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

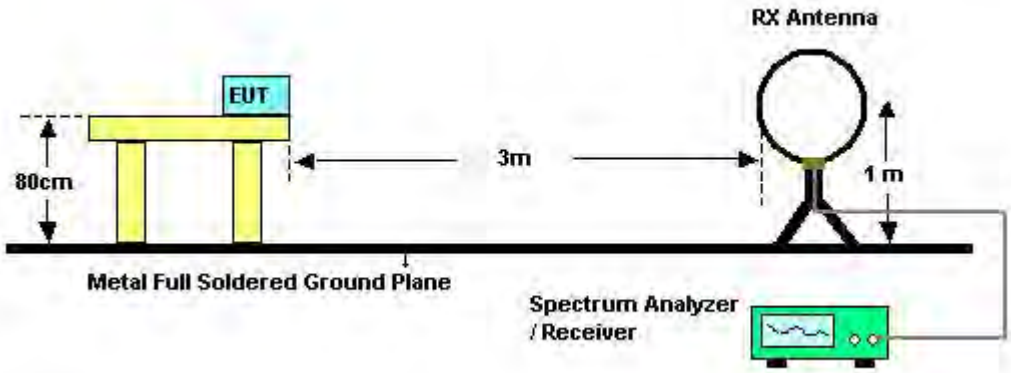
Test Method – General Information		
☒	For the transmitter unwanted emissions shall be measured using following options below:	
	☒	Refer as ANSI C63.10, clause 6.3 for unwanted emissions into non-restricted bands.
	☒	For unwanted emissions below 40GHz bands.
		☒ Radiated emissions below 40 GHz shall not exceed the general limits in LP0002 Section 2.8
		☒ Refer as ANSI C63.10, clause 4.1.4.2.3 (Video Averaging) average measurements using spectrum reduced video bandwidth (VBW≥10Hz) - [duty cycle ≥ 98 or external power trigger].
		☐ Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
		☐ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.

Test Method		
☒	For radiated measurement below 40GHz.	
	☒	Refer as ANSI C63.10, clause 6.3 through 6.6 for radiated emissions from below 40 GHz.
☒	For radiated measurement above 40GHz. Refer as ANSI C63.10, clause 9.12 for radiated measurement.	
	☒	Radiated test was conducted at far-field distance. the distance from the radiating element of the EUT to the edge of the far field may be calculated from [$r \geq 2D^2/\lambda$] r is the distance from the radiating element of the EUT to the edge of the far field, in m D is the largest dimension of both the radiating element and the test antenna (horn), in m λ is the wavelength of the emission under investigation [300/f (MHz)], in m
	☒	The measured power level is converted to EIRP using the Friis equation: E Meas = 126.8 - 20log(λ) + P – G where E is the field strength of the emission at the measurement distance, in dBμV/m P is the power measured at the output of the test antenna, in dBm λ is the wavelength of the emission under investigation [300/fMHz], in m G is the gain of the test antenna, in dBi
		EIRP = E Meas + 20 log(d Meas) – 104.7 where EIRP : is the equivalent isotropically radiated power, in dBm. E Meas : is the field strength of the emission at the measurement distance, in dBμV/m. d Meas : is the measurement distance, in m.
		Equations to calculate power density Calculate the power density at the distance specified by the limit from the EIRP in watts using Equation: $PD = \frac{EIRP_{Linear}}{4\pi d^2}$ where PD is the power density at the distance specified by the limit, in W/m2 EIRPLinear is the equivalent isotropically radiated power, in watts d is the distance at which the power density limit is specified, in m.

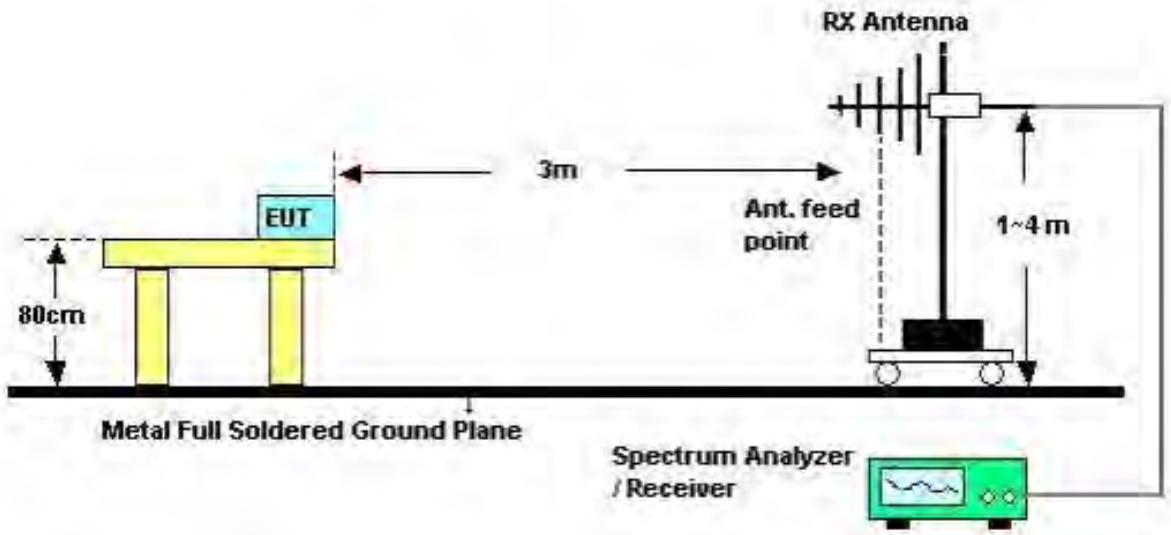
3.3.4 Test Setup

Transmitter Radiated Unwanted Emissions

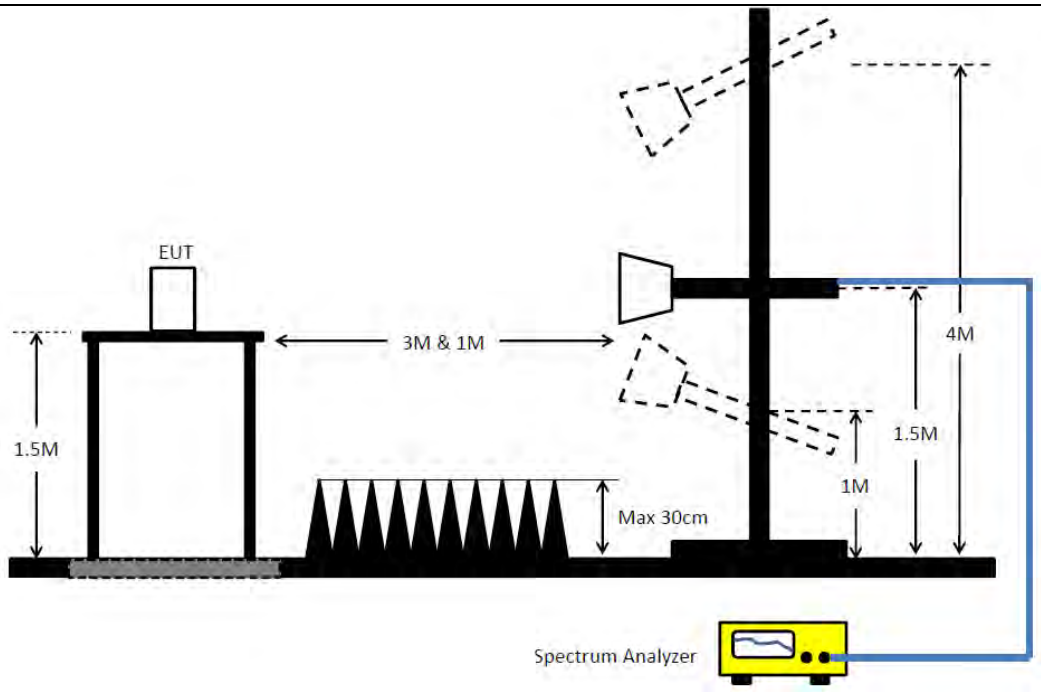
9kHz ~30MHz



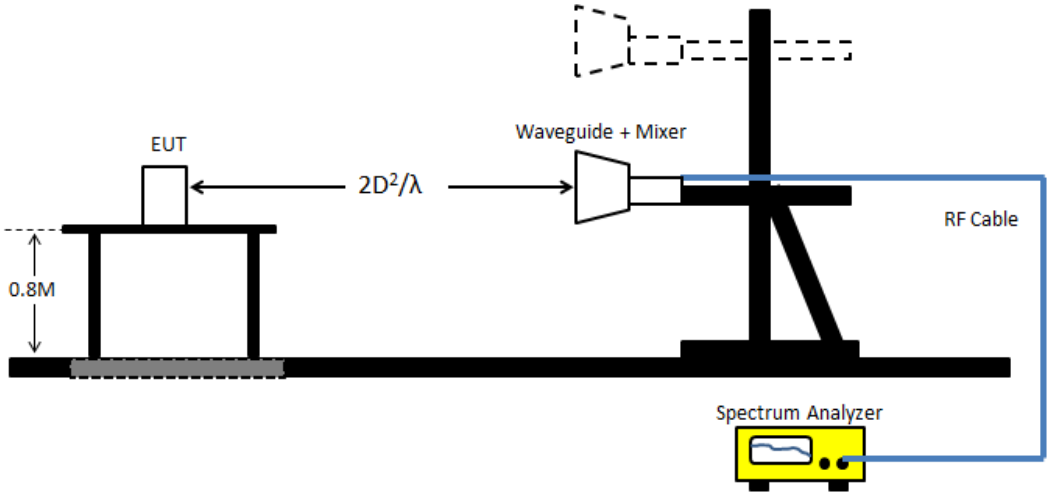
30MHz~1GHz



1GHz ~40GHz



Above 40GHz



3.3.5 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

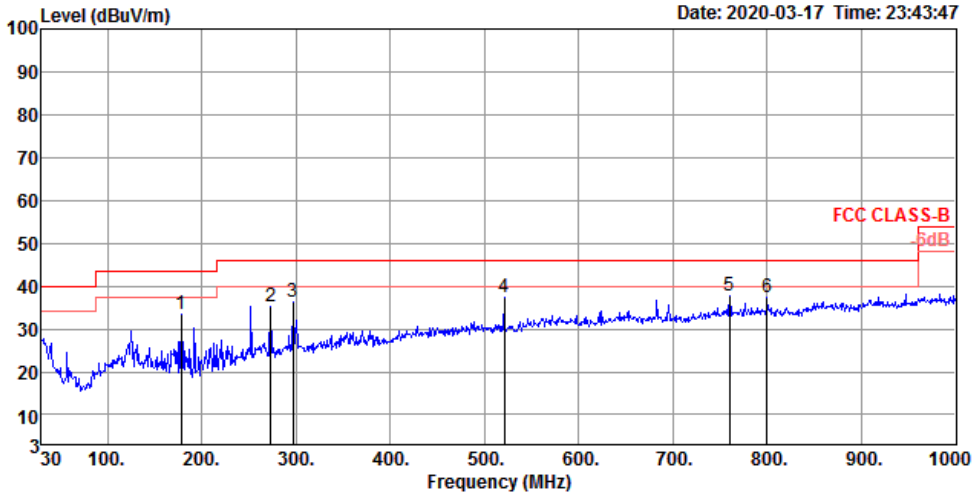
3.3.6 Test Result of Transmitter Radiated Unwanted Emissions (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.3.7 Test Result of Transmitter Radiated Unwanted Emissions (30MHz ~ 1GHz)

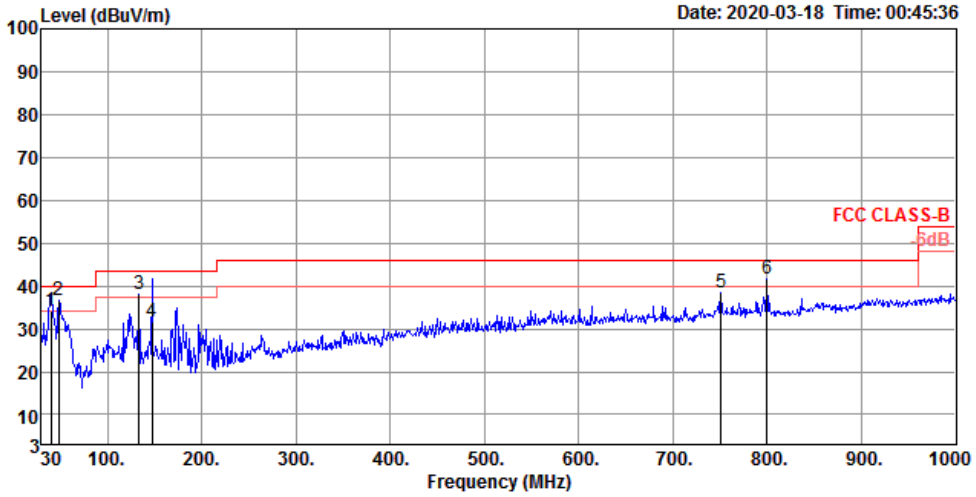
Test Range	30 MHz – 1000 MHz	Test Freq. (GHz)	76.40
Test Distance	3 m		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	178.41	33.39	43.50	-10.11	47.76	2.78	15.14	32.29	200	4	Peak	HORIZONTAL
2	273.47	35.32	46.00	-10.68	45.45	3.39	18.88	32.40	125	5	Peak	HORIZONTAL
3	296.75	36.37	46.00	-9.63	46.07	3.58	19.15	32.43	150	335	Peak	HORIZONTAL
4	520.82	37.51	46.00	-8.49	41.71	4.72	23.40	32.32	100	348	Peak	HORIZONTAL
5	760.41	37.87	46.00	-8.13	38.49	5.80	25.70	32.12	125	260	Peak	HORIZONTAL
6	800.18	37.36	46.00	-8.64	37.99	5.80	25.88	32.31	150	116	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	39.70	34.01	40.00	-5.99	46.04	1.60	18.97	32.60	150	323	QP	VERTICAL
2	48.43	36.82	40.00	-3.18	53.22	1.47	14.85	32.72	125	86	Peak	VERTICAL
3	133.79	38.00	43.50	-5.50	50.53	2.37	17.56	32.46	100	348	Peak	VERTICAL
4	147.37	31.71	43.50	-11.79	45.09	2.48	16.60	32.46	100	348	QP	VERTICAL
5	750.71	38.45	46.00	-7.55	39.09	5.80	25.62	32.06	150	160	Peak	VERTICAL
6	800.18	41.60	46.00	-4.40	42.23	5.80	25.88	32.31	150	200	Peak	VERTICAL

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)

3.3.8 Test Result of Transmitter Radiated Unwanted Emissions (1GHz – 40GHz)

Test Range	1GHz – 18GHz	Test Freq. (GHz)	76.40
Test Distance	1 m		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2399.82	41.45	54.00	-12.55	46.58	3.94	27.60	36.67	167	197	Average	HORIZONTAL
2	2399.84	44.56	74.00	-29.44	49.69	3.94	27.60	36.67	167	197	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2399.76	43.80	74.00	-30.20	48.93	3.94	27.60	36.67	108	352	Peak	VERTICAL
2	2399.83	40.15	54.00	-13.85	45.28	3.94	27.60	36.67	108	352	Average	VERTICAL

Test Range	18GHz – 40GHz	Test Freq. (GHz)	76.40
Test Distance	1 m		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	38002.24	67.87	83.54	-15.67	53.87	20.00	43.40	49.40	150	248	Peak	HORIZONTAL
2	38002.84	53.46	63.54	-10.08	39.46	20.00	43.40	49.40	150	248	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	38002.22	67.77	83.54	-15.77	53.77	20.00	43.40	49.40	150	144	Peak	VERTICAL
2	38002.59	53.02	63.54	-10.52	39.02	20.00	43.40	49.40	150	144	Average	VERTICAL

3.3.9 Test Result of Transmitter Radiated Unwanted Emissions (40GHz – 200GHz)

Test Freq. (GHz)	Rx Gain (dBi)	Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)	EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm^2)	Test Result
76.40	23.0	0.50	76.00	-82.83	-41.79	3	0.0585	PASS
Limit							**600**	-

Note :

EIRP = Read Level - Rx Gain +20*LOG(4*3.14159* Distance / (300/(Test Freq.*1000))).
Power Density = ((10^(EIRP/10)/1000)/(4*3.14159*(Specification Distance *100)^2))*1000000000000.

3.3.10 Test Result of Transmitter Radiated Unwanted Emissions (200GHz – 231GHz)

Test Freq. (GHz)	Rx Gain (dBi)	Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)	EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm^2)	Test Result
76.40	23.0	0.50	201.52	-78.96	-29.45	3	1.0030	PASS
Limit							**1000**	-

Note :

EIRP = Read Level - Rx Gain +20*LOG(4*3.14159* Distance / (300/(Test Freq.*1000))).
Power Density = ((10^(EIRP/10)/1000)/(4*3.14159*(Specification Distance *100)^2))*1000000000000.

3.4 Frequency Stability

3.4.1 Frequency Stability Limit

Frequency Stability Limit
Fundamental emissions must be contained within the frequency bands specified in this 76-81GHz band during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage.

3.4.2 Measuring Instruments

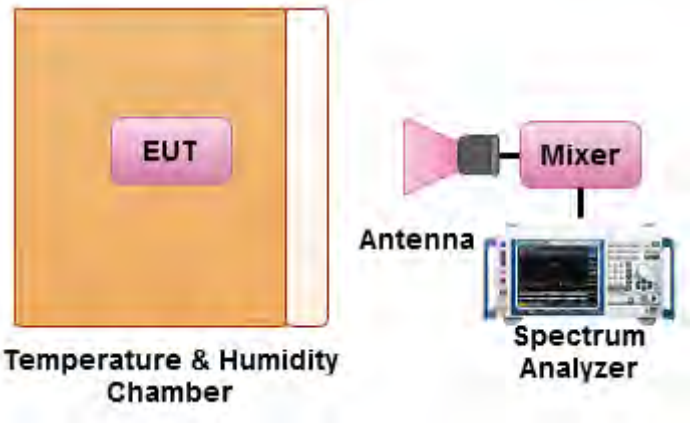
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
☒	For the frequency stability shall be measured using one of the options below:
	☒ Refer as ANSI C63.10, clause 9.14 for frequency stability measurement.
☒	Refer as ANSI C63.10, clause 9 for radiated measurement.
	☒ Radiated test was conducted at far-field distance. the distance from the radiating element of the EUT to the edge of the far field may be calculated from [$r \geq 2D^2/\lambda$] r is the distance from the radiating element of the EUT to the edge of the far field, in m D is the largest dimension of both the radiating element and the test antenna (horn), in m λ is the wavelength of the emission under investigation [300/f (MHz)], in m
	☒ The mixer may be placed outside the chamber in front of the temperature chamber door, and the chamber door opened for each reading.

3.4.4 Test Setup

Frequency Stability



3.4.5 Test Result of Frequency Stability

Test Freq. (GHz): 76.40

Test Temperature: (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
-40	76353.72	-1405	**within band**
-30	76353.8	-1325	**within band**
-20	76353.88	-1245	**within band**
-10	76353.96	-1165	**within band**
0	76354.87	-255	**within band**
10	76354.26	-865	**within band**
20	76355.13	Reference	**within band**
30	76355.78	657	**within band**
40	76358.29	3420	**within band**
50	76359.54	5280	**within band**
60	76359.82	4695	**within band**
70	76358.66	2878	**within band**
80	76357.5	2375	**within band**
85	76356.34	1215	**within band**
Test Voltage: (Vdc)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
10.2	76355.08	-50	**within band**
12	76355.13	Reference	**within band**
13.8	76355.45	320	**within band**

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Aug. 03, 2019	Aug. 02, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	May 07, 2019	May 06, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH06-CB)
RF Cable-low	HUBER+SUHNER	RG402	Low Cable-05+24	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1291	1GHz~18GHz	Oct. 12, 2018	Oct. 11, 2019	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Jan. 31, 2019	Jan. 30, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M03HWD	120320-1	220 ~ 325 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M03RH	120320-A	220 ~ 325 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Temp. and Humidity Chamber	Gaint Force	GTH-408-40-C P-AR	MAA1410-011	-40~100 degree	Sep. 12, 2019	Sep. 11, 2020	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.