中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **8devices**

Address: Antakalnio 17 - 6 Vilnius Lithuania

FCC ID: **Z9W-TNA-302**

Product Name: **60GHz PTP and PTMP fixed wireless device**

Standard(s): **47 CFR Part 15, Subpart C(15.255)**
ANSI C63.10-2013

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR221259877-00A**

Date Of Issue: **2023/3/3**

Reviewed By: **Sun Zhong**

Sun Zhong

Title: Manager

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR221259877-00A	Original Report	2023/3/3

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	60GHz PTP and PTMP fixed wireless device
EUT Model:	TNA-302
Operation Frequency Range:	58.32-69.12 GHz
Modulation Type:	π/2-BPSK, π/2-QPSK, π/2-16QAM
Rated Input Voltage:	DC 48V
Serial Number:	1UDT
EUT Received Date:	2022/12/12
EUT Received Status:	Good

Operation Frequency Detail:

Channel	Frequency (GHz)	Channel	Frequency (GHz)
1	58.32	4	64.80
2	60.48	5	66.96
3	62.64	6	69.12

Per section 15.31(m), the below frequencies were performed the test as below:

Test Channel	Frequency (GHz)
Lowest	58.32
Middle	64.80
Highest	69.12

Antenna Information Detail▲:

Antenna Type	input impedance (Ohm)	Antenna Gain	Frequency Range
Integrated ceramic patch LGA antenna module	50	23 dBi	57~71GHz

The Method of §15.203 Compliance:

☒Antenna must be permanently attached to the unit.

☐Antenna must use a unique type of connector to attach to the EUT.

☐Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Accessory Information:

Accessory Description	Manufacturer	Model
Adapter	unknown	LZD201-24W-48V-G

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer.
Equipment Modifications:	No
EUT Exercise Software:	No
Engineering Mode was provided by manufacturer▲. The maximum power was configured default setting.	

1.2.2 Support Equipment List and Details

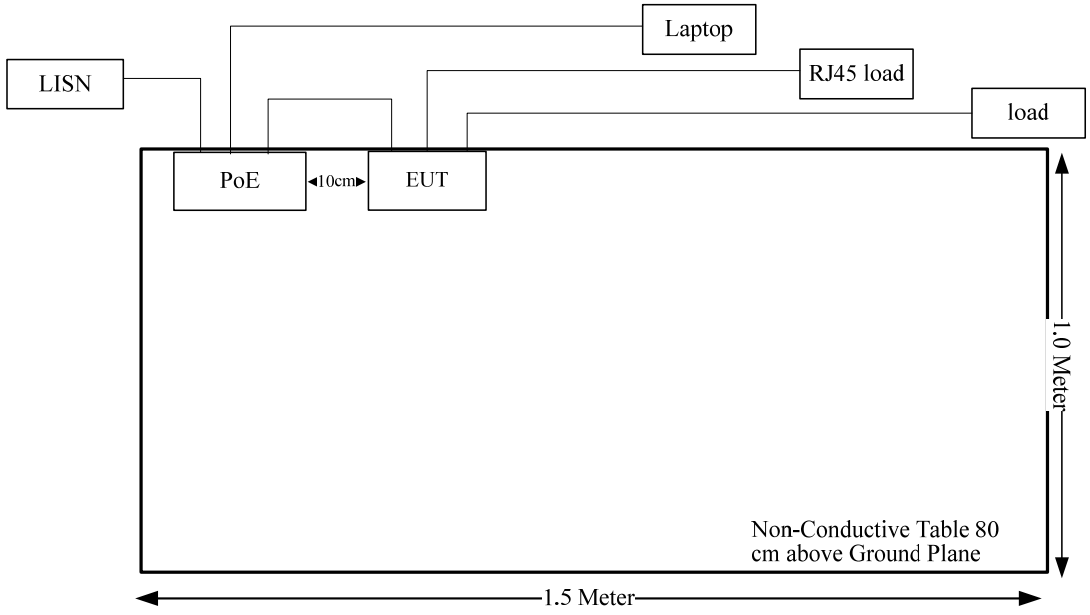
Manufacturer	Description	Model	Serial Number
DELL	Laptop	E6410	GYXJ3 A00 JSD2
Unknown	RJ45 Load	R100W	RL02
Unknown	Load	100W	L06
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386

1.2.3 Support Cable List and Details

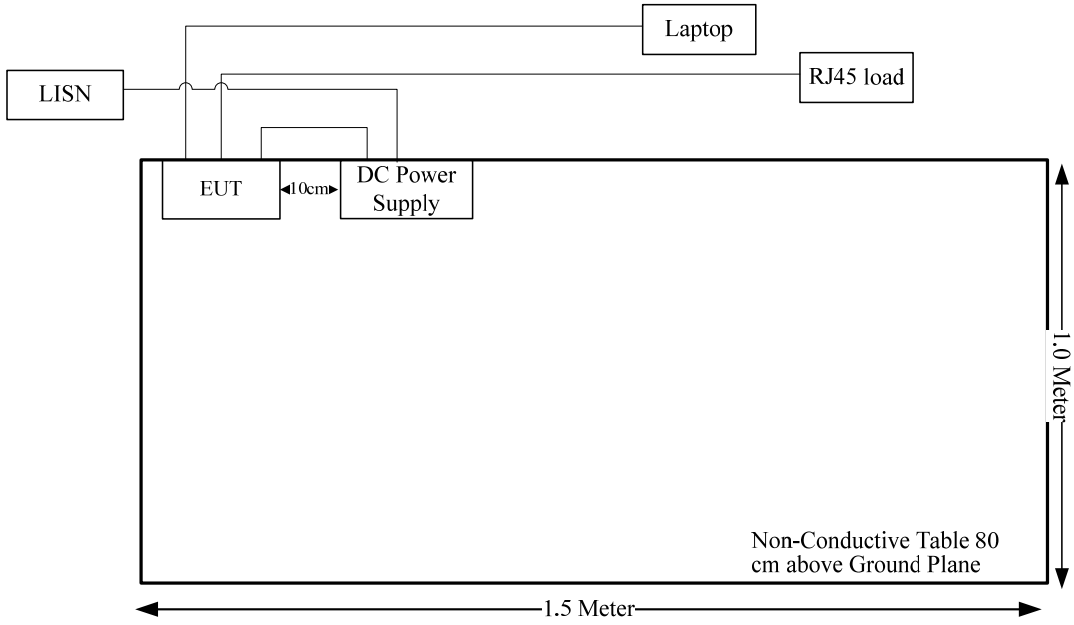
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	No	No	1	POE	EUT
RJ45 Cable	No	Yes	3	POE	Laptop
RJ45 Cable	No	Yes	3	EUT	Laptop
RJ45 Cable	No	No	3	EUT	RJ45 Load
Power Cable	No	No	1.5	EUT	DC Power Supply
Power Cable	No	No	1.2	LISN	DC Power Supply

1.2.4 Block Diagram of Test Setup

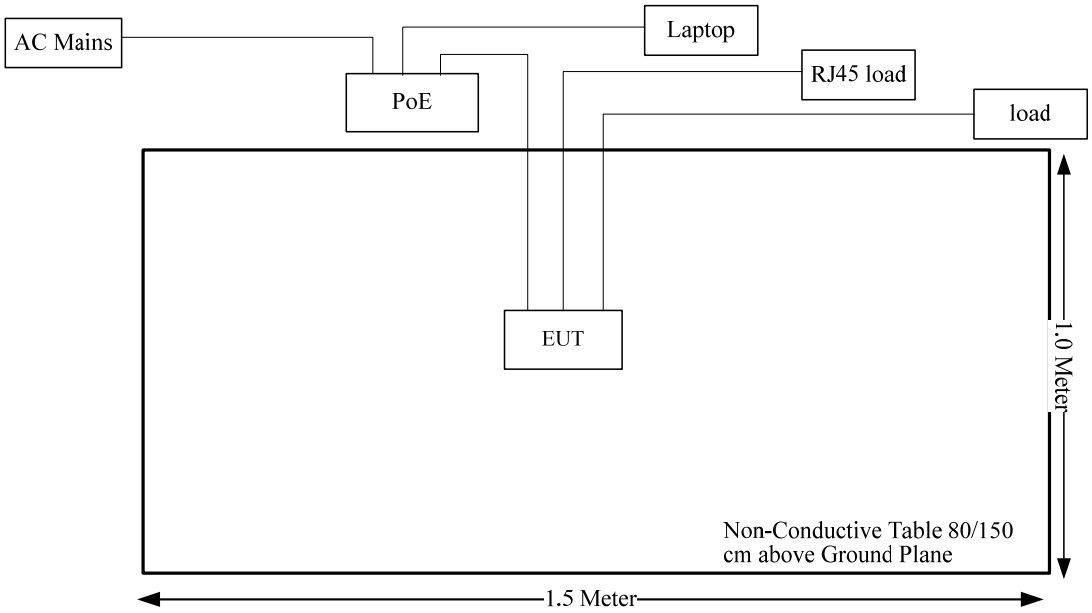
Conducted emissions:
POE:



DC Power:



Radiated emissions:
POE:



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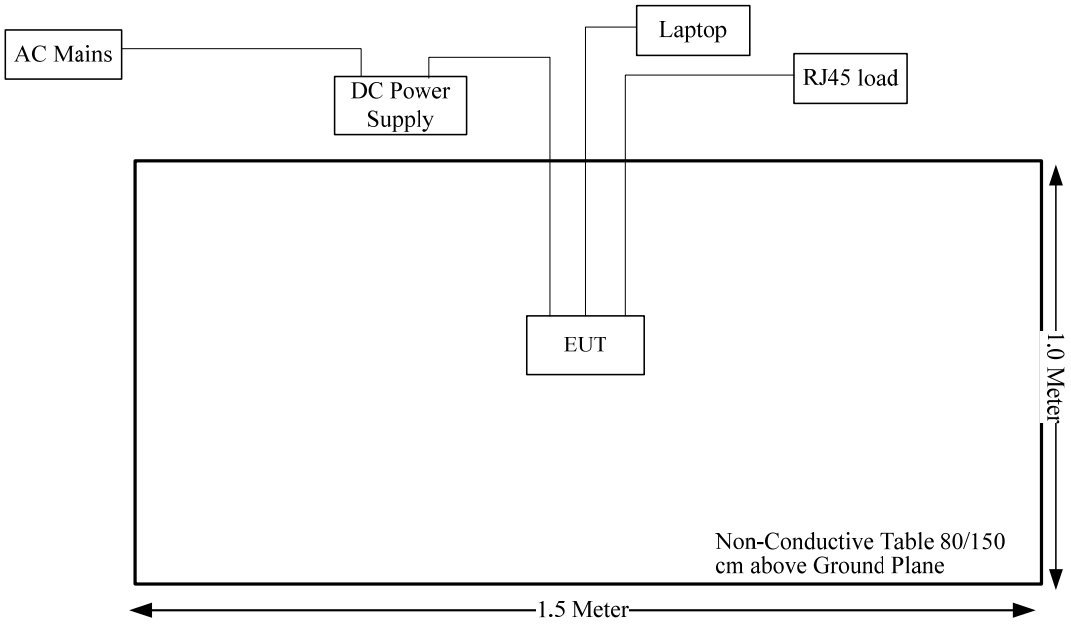


1.3 FAR Field Boundary Calculations

The far-field boundary is given in ANSI C63.10-2013:

$$R_m = 2D^2 / \lambda$$

Where:

D is the largest dimension of the antenna aperture in m and

λ is the free-space wavelength in m at the frequency of measurement.

The minimum test distance for the frequency range 40GHz-200GHz determine as below:

Model	Frequency Range (GHz)	Largest Dimension of the Horn Antenna (mm)	Minimum Test Distance R_m (m)
M19RH	40-60	46.3	0.57
861V/385	50-75	43.7	0.64
M12RH	60-90	30.02	0.36
M08RH	90-140	19.7	0.23
M05RH	140-220	12.5	0.30

Note: The test distances used were 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz, it can be seen that the EUT was always in the Far-field of the Receive Antenna during all Radiated Emissions Tests.

1.4 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB, 26.5G~40G:5.63 dB 40~60G: 4.83dB, 60G~90G: 4.94dB, 90G-140G: 5.46dB, 140G-220G: 6.00dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

Standard(s)/Rule(s)	Description of Test	Result
§15.207(a)	Conduction Emissions	Compliant
§15.205, §15.209, §15.255(d)	Radiated Emissions	Compliant
§15.215, §15.255 (e)	Emission Bandwidth	Compliant
§15.255(c)	Equivalent Isotropically Radiated Power (EIRP)	Compliant
§15.255(e)	Peak Conducted Output Power	Compliant
§15.255 (f)	Frequency Stability	Compliant
§15.255 (a)(h)	Operation Restriction And Group Installation	Compliant
§15.203	Antenna Requirement	Compliant
§15.255(g), §1.1310, §2.1091	Maximum Permissible Exposure (MPE)	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

	Conducted limit (dBμV)	
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

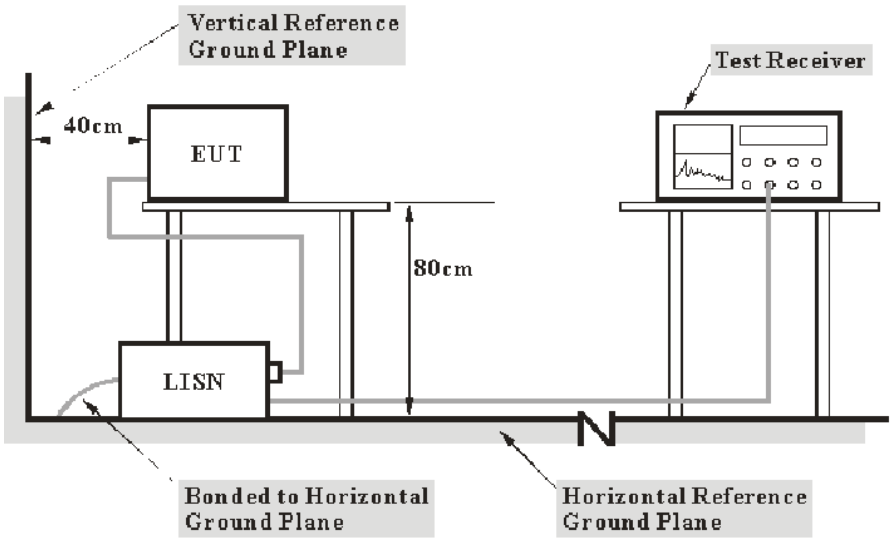
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

3.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.4 Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the first LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiated Emissions

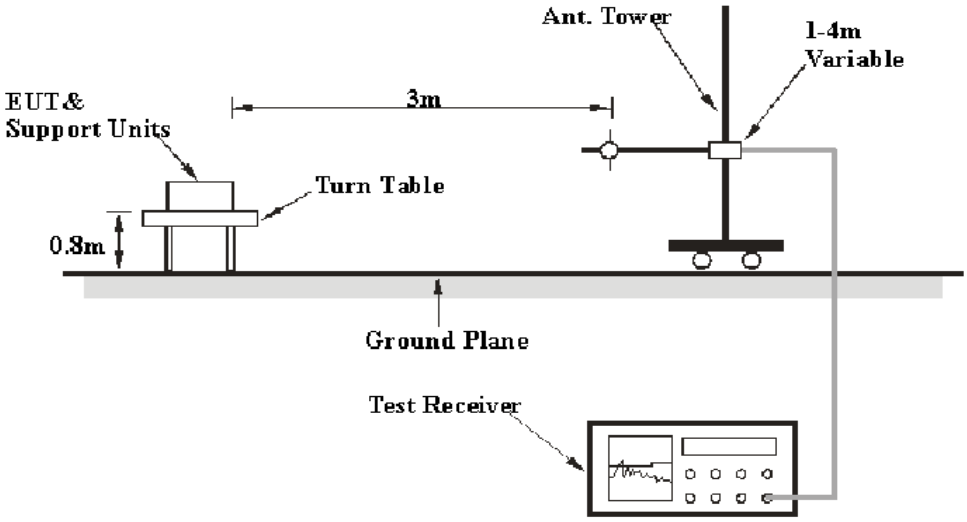
3.2.1 Applicable Standard

FCC §15.255

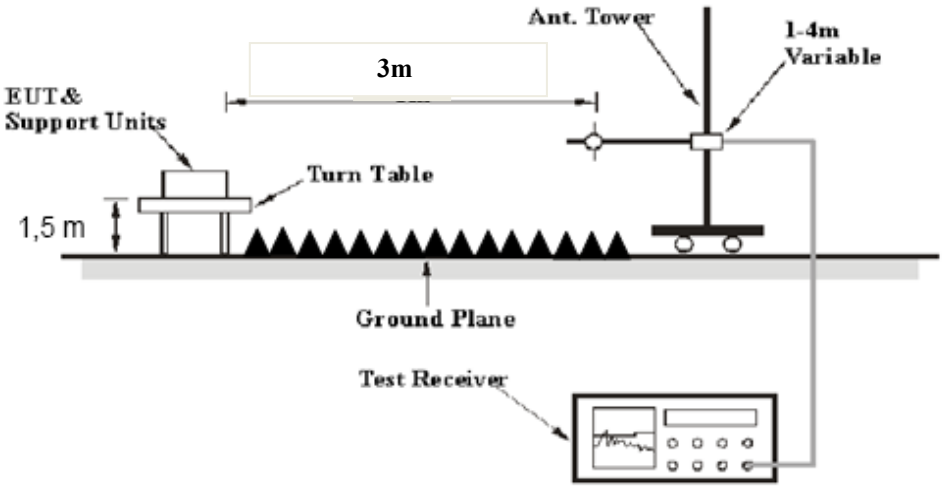
(d) Limits on spurious emissions:
(1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.
(2) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.
(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.
(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

3.2.2 EUT Setup

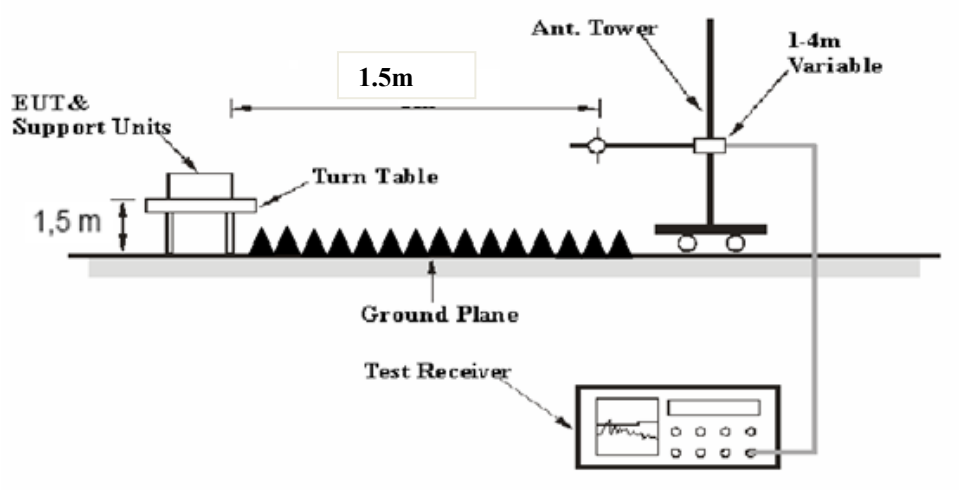
Below 1GHz:



1-26.5 GHz:



26.5-40 GHz:



Above 40GHz:

The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at the distance of 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz.

The radiated emission and out of band emission tests were performed in the 3 meters chamber test site A, using the setup accordance with the ANSI C63.10-2013 The specification used was the FCC 15.209/15.205 and FCC 15.255 limits.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 200 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
1-40 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave
40 GHz – 200 GHz	1MHz	3 MHz	/	PK

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.4 Test Procedure

Refer to ANSI C63.10-2013 Clauses 9.9, 9.12, and 9.13.

A Maximizing procedure was performed to ensure that the highest emissions from the EUT were actually measured in all of the Test Arrangements of the EUT and Local Support Equipment.

In accordance with FCC Rules Part 15 Subpart A Section 15.35, from 30 MHz to 1 GHz all radiated emissions measurements were made using a Quasi-peak Detector, and from 1 GHz to 40 GHz, all radiated emissions measurements were made using a Peak Detector and CISPR Average Detector. In accordance with FCC Rules Part 15 Subpart C Section 15.255, from 40 GHz to 200 GHz, all radiated emissions measurements were made using a Peak Detector.

According to C63.10, the 26.5-40GHz test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

For 30MHz-1GHz:
Result = Reading + Factor

For 1GHz-40GHz
Result = Reading + Factor-Distance extrapolation Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.3 Emission Bandwidth:

3.3.1 Applicable Standard

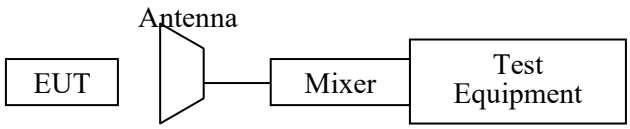
FCC §15.255 (e)

(1) Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

FCC §15.215

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.3.2 EUT Setup



3.3.3 Test Procedure

According to ANSI C63.10-2013 Section 9.3.

3.4 Equivalent Isotropically Radiated Power (EIRP)

3.4.1 Applicable Standard

FCC §15.255(c)

(1) Products other than fixed field disturbance sensors and short-range devices for interactive motion sensing shall comply with one of the following emission limits, as measured during the transmit interval:

(i) The average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm;

3.4.2 Test Procedure

Refer to ANSI C63.10-2013 Clause 9.11

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

3.5 Peak Conducted Output Power

3.5.1 Applicable Standard

FCC §15.255(e)

(e) Except as specified paragraph (e)(1) of this section, the peak transmitter conducted output power shall not exceed 500 mW. Depending on the gain of the antenna, it may be necessary to operate the intentional radiator using a lower peak transmitter output power in order to comply with the EIRP limits specified in paragraph (b) of this section.

3.5.2 Test Procedure

Refer to ANSI C63.10-2013 Clause 9.7: equation to calculate power output.

3.6 Frequency Stability

3.6.1 Applicable Standard

FCC §15.255(f)

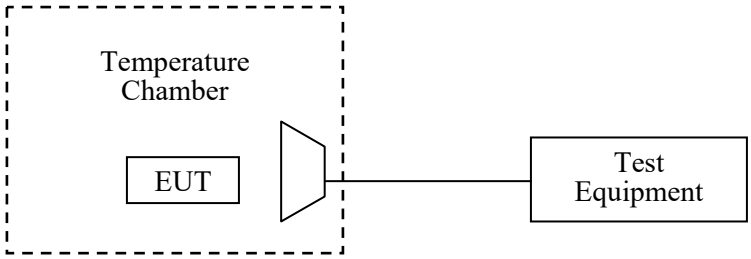
(f) Frequency stability. Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

3.6.2 Test Procedure

Frequency Stability vs. Temperature: The adapter of the equipment under test was connected to an AC power source. The EUT was placed inside the temperature chamber. Place the Horn antenna inside the temperature chamber. Place the EUT antenna toward the Horn antenna.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable AC power supply was connected to the equipment under test. The voltage was set from 85% to 115% of the nominal value. The output frequency was recorded for each voltage.



3.7 Operation Restriction and Group Installtion

3.7.1 Applicable Standard

§15.255 (a) Operation under the provisions of this section is not permitted for the following products:
(1) Equipment used on aircraft or satellites.
(2) Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. For the purposes of this section, the reference to fixed operation includes field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.

§15.255 (h) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

3.7.2 Result of Operation Restriction

The Manufacturer declared that the EUT will not be advertised or sold for use on aircraft or satellites. The user manual includes a statement that cautions users that it is not permitted to use the product on aircraft or satellites.

3.7.3 Result of Group installation

The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array

3.8 Antenna Requirement

3.8.1 Applicable Standard

FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

3.8.2 Judgment

Please refer to the Antenna Information detail in Section 1.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	1UDT	Test Date:	2022/12/21
Test Site:	CE	Test Mode:	Transmitting(π/2-QPSK middle channel was the worst)
Tester:	Vic Du	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	20.5	Relative Humidity: (%)	46	ATM Pressure: (kPa)	101.2

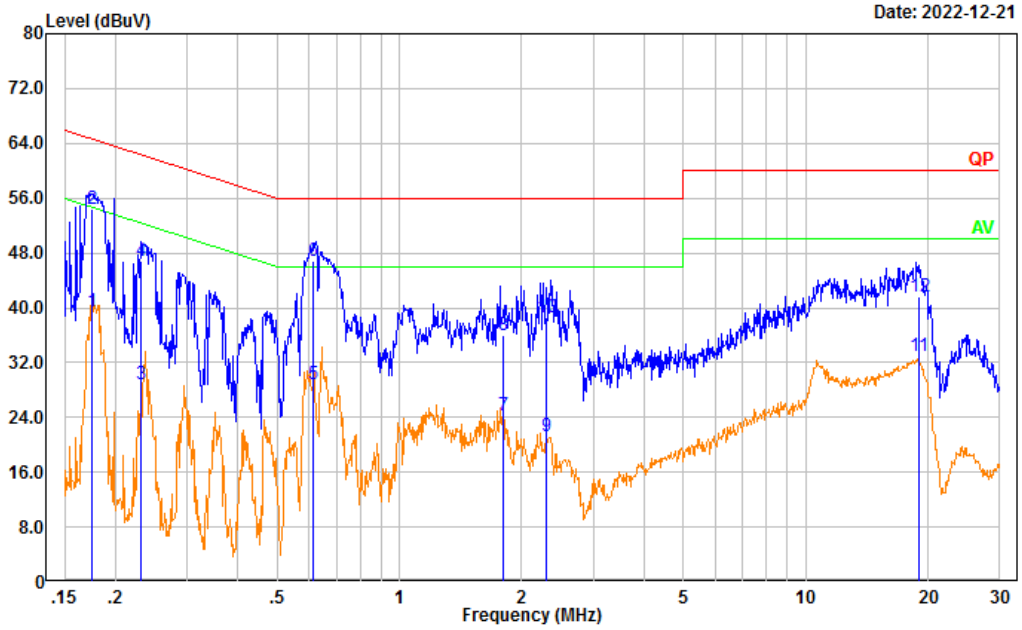
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2022/04/01	2023/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

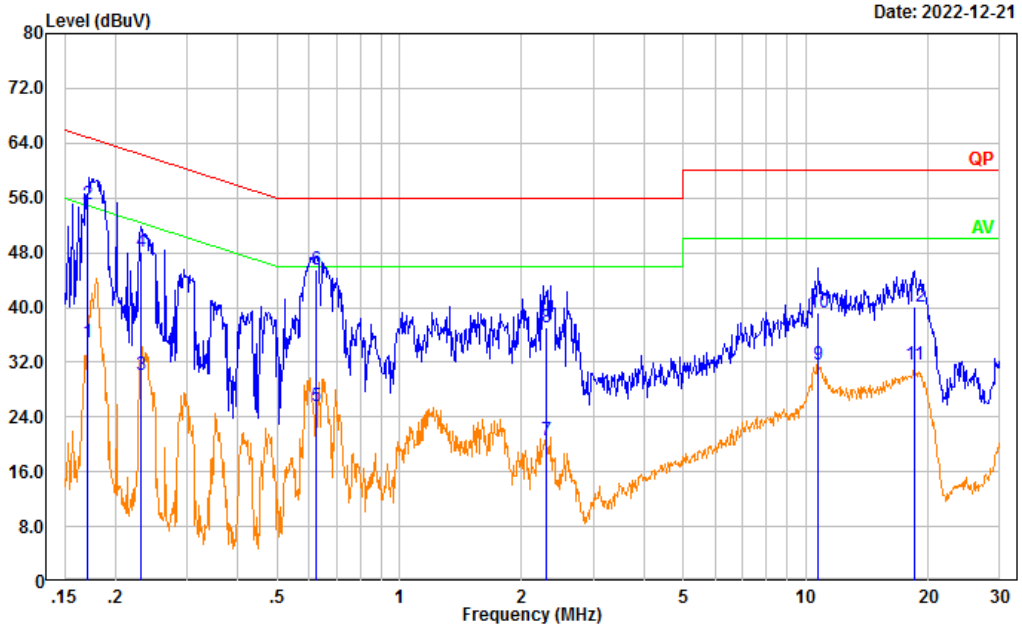
POE:

Test Mode: Transmitting
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.176	29.95	9.61	39.56	54.69	15.13	Average
2	0.176	44.73	9.61	54.34	64.69	10.35	QP
3	0.232	19.13	9.61	28.74	52.38	23.64	Average
4	0.232	37.24	9.61	46.85	62.38	15.53	QP
5	0.615	19.22	9.62	28.84	46.00	17.16	Average
6	0.615	37.27	9.62	46.89	56.00	9.11	QP
7	1.794	14.58	9.63	24.21	46.00	21.79	Average
8	1.794	26.27	9.63	35.90	56.00	20.10	QP
9	2.306	11.66	9.64	21.30	46.00	24.70	Average
10	2.306	28.89	9.64	38.53	56.00	17.47	QP
11	18.917	23.16	9.77	32.93	50.00	17.07	Average
12	18.917	31.77	9.77	41.54	60.00	18.46	QP

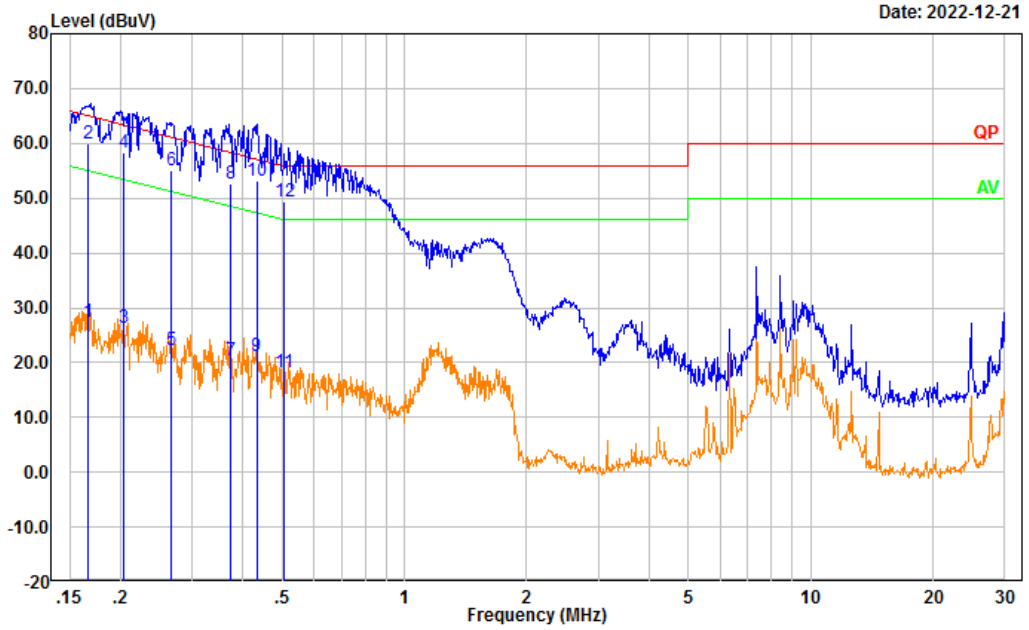
Test Mode: Transmitting
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.171	25.38	9.61	34.99	54.91	19.92	Average
2	0.171	45.39	9.61	55.00	64.91	9.91	QP
3	0.231	20.49	9.61	30.10	52.41	22.31	Average
4	0.231	38.55	9.61	48.16	62.41	14.25	QP
5	0.622	16.03	9.62	25.65	46.00	20.35	Average
6	0.622	35.96	9.62	45.58	56.00	10.42	QP
7	2.296	11.04	9.64	20.68	46.00	25.32	Average
8	2.296	27.53	9.64	37.17	56.00	18.83	QP
9	10.752	21.92	9.67	31.59	50.00	18.41	Average
10	10.752	29.66	9.67	39.33	60.00	20.67	QP
11	18.469	21.96	9.69	31.65	50.00	18.35	Average
12	18.469	30.46	9.69	40.15	60.00	19.85	QP

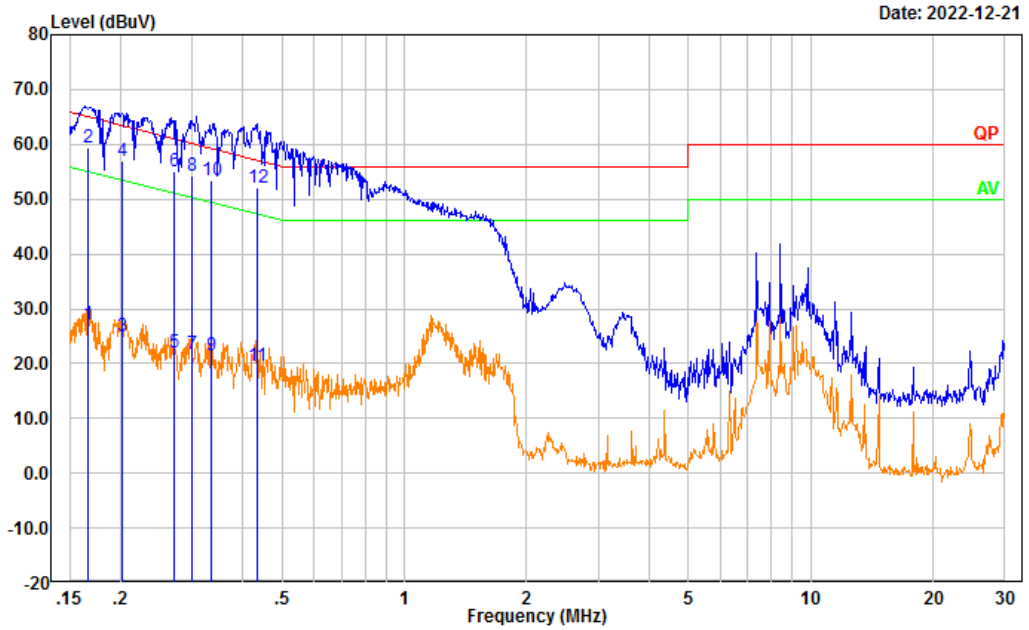
DC Power:

Test Mode: Transmitting
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.167	17.84	9.61	27.45	55.10	27.65	Average
2	0.167	50.21	9.61	59.82	65.10	5.28	QP
3	0.203	16.84	9.61	26.45	53.47	27.02	Average
4	0.203	48.72	9.61	58.33	63.47	5.14	QP
5	0.267	12.78	9.61	22.39	51.21	28.82	Average
6	0.267	45.50	9.61	55.11	61.21	6.10	QP
7	0.374	10.72	9.61	20.33	48.42	28.09	Average
8	0.374	42.90	9.61	52.51	58.42	5.91	QP
9	0.433	11.62	9.61	21.23	47.20	25.97	Average
10	0.433	43.63	9.61	53.24	57.20	3.96	QP
11	0.504	8.54	9.61	18.15	46.00	27.85	Average
12	0.504	39.84	9.61	49.45	56.00	6.55	QP

Test Mode: Transmitting
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.167	17.41	9.61	27.02	55.10	28.08	Average
2	0.167	49.66	9.61	59.27	65.10	5.83	QP
3	0.202	15.47	9.61	25.08	53.53	28.45	Average
4	0.202	47.43	9.61	57.04	63.53	6.49	QP
5	0.272	12.34	9.61	21.95	51.06	29.11	Average
6	0.272	45.34	9.61	54.95	61.06	6.11	QP
7	0.300	12.25	9.61	21.86	50.24	28.38	Average
8	0.300	44.78	9.61	54.39	60.24	5.85	QP
9	0.336	11.81	9.61	21.42	49.30	27.88	Average
10	0.336	43.91	9.61	53.52	59.30	5.78	QP
11	0.434	9.99	9.61	19.60	47.18	27.58	Average
12	0.434	42.45	9.61	52.06	57.18	5.12	QP

4.2 Radiation Spurious Emissions

Serial Number:	1UDT	Test Date:	2022/12/22 ~2023/02/07
Test Site:	966-2, 966-1	Test Mode:	Transmitting
Tester:	coco Tian, Carl Xue	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.6~22.9	Relative Humidity: (%)	40~70	ATM Pressure: (kPa)	100.5~101.5

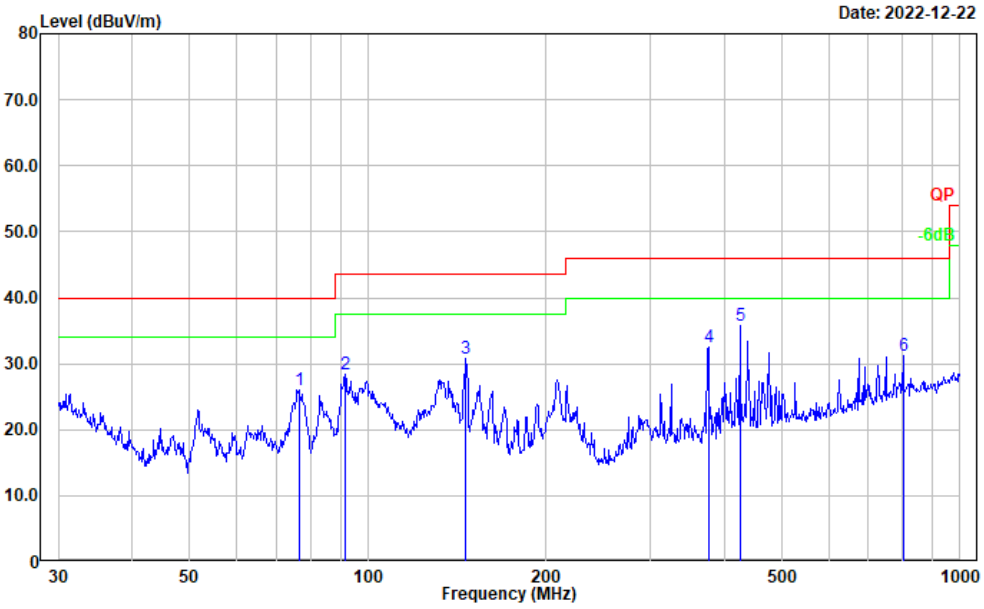
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2022/07/17	2023/07/16
Sonoma	Amplifier	310N	186165	2022/07/17	2023/07/16
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020/10/13	2023/10/12
R&S	Spectrum Analyzer	FSV40	101591	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2022/08/07	2023/08/06
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2022/08/07	2023/08/06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/09	2023/11/08
Audix	Test Software	E3	201021 (V9)	N/A	N/A
PASTERNACK	Horn Antenna	PE9852/2F-20	112002	2021/02/05	2024/02/04
AH	Preamplifier	PAM-1840VH	190	2022/11/09	2023/11/08
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2022/08/07	2023/08/06
PASTERNACK	Horn Antenna	PE9850/2F-20	072001	2021/02/05	2024/02/04
OML	Harmonic Mixer	WR19/M19HWD	U60314-1	2020/10/16	2023/10/15
OML	Horn Antenna	M19RH	11648-03	2020/10/16	2023/10/15
OML	Harmonic Mixer	WR12/M12HWD	E60119-1	2020/10/17	2023/10/16
OML	Horn Antenna	M12RH	E60119-2	2020/10/18	2023/10/17
OML	Harmonic Mixer	WR08/M08HWD	F60315-1	2020/10/22	2023/10/21
OML	Horn Antenna	M08RH	F60315-2	2020/10/24	2023/10/23
OML	Harmonic Mixer	WR05/M05HWD	G60107-1	2020/10/25	2023/10/24
OML	Horn Antenna	M05RH	G60107-2	2020/10/26	2023/10/25

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

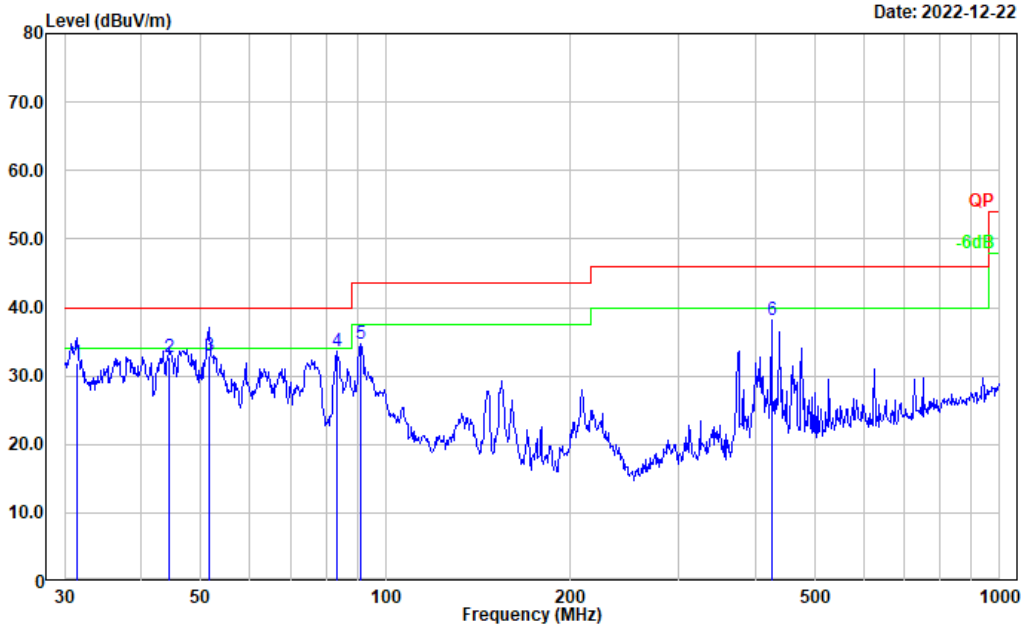
1) 30MHz-1GHz(π/2-QPSK middle channel was the worst):
POE:

Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	76.512	43.21	-17.09	26.12	40.00	13.88	Peak
2	91.495	44.87	-16.57	28.30	43.50	15.20	Peak
3	146.374	42.80	-11.98	30.82	43.50	12.68	Peak
4	375.939	41.85	-9.29	32.56	46.00	13.44	Peak
5	425.028	43.42	-7.71	35.71	46.00	10.29	Peak
6	801.786	33.34	-2.14	31.20	46.00	14.80	Peak

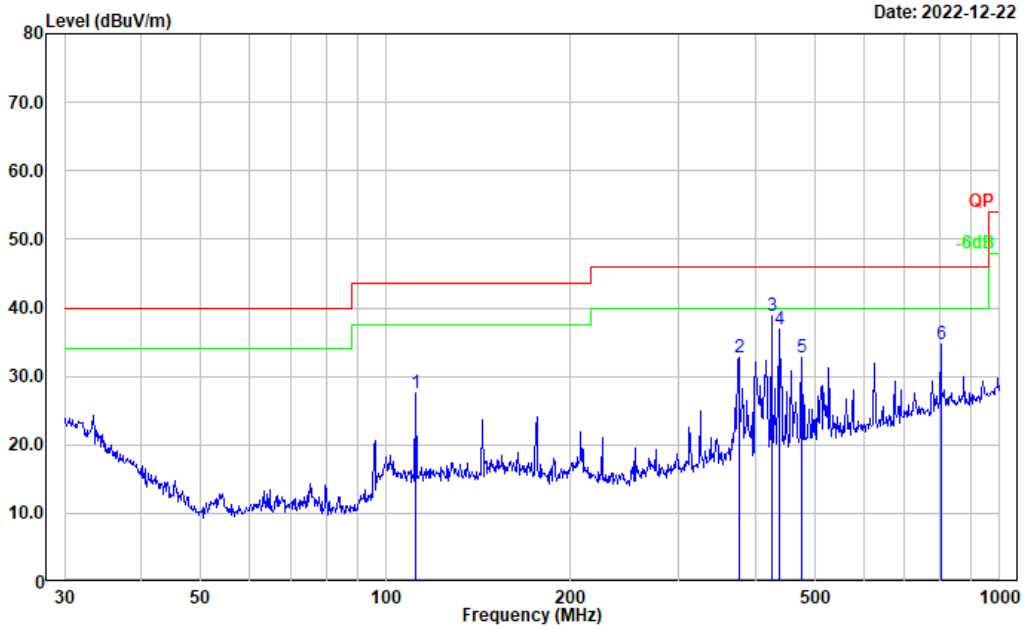
Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	31.448	36.53	-4.71	31.82	40.00	8.18	QP
2	44.431	46.56	-13.90	32.66	40.00	7.34	QP
3	51.695	50.19	-17.20	32.99	40.00	7.01	QP
4	83.230	50.85	-17.23	33.62	40.00	6.38	Peak
5	90.855	51.48	-16.72	34.76	43.50	8.74	Peak
6	425.028	45.85	-7.71	38.14	46.00	7.86	Peak

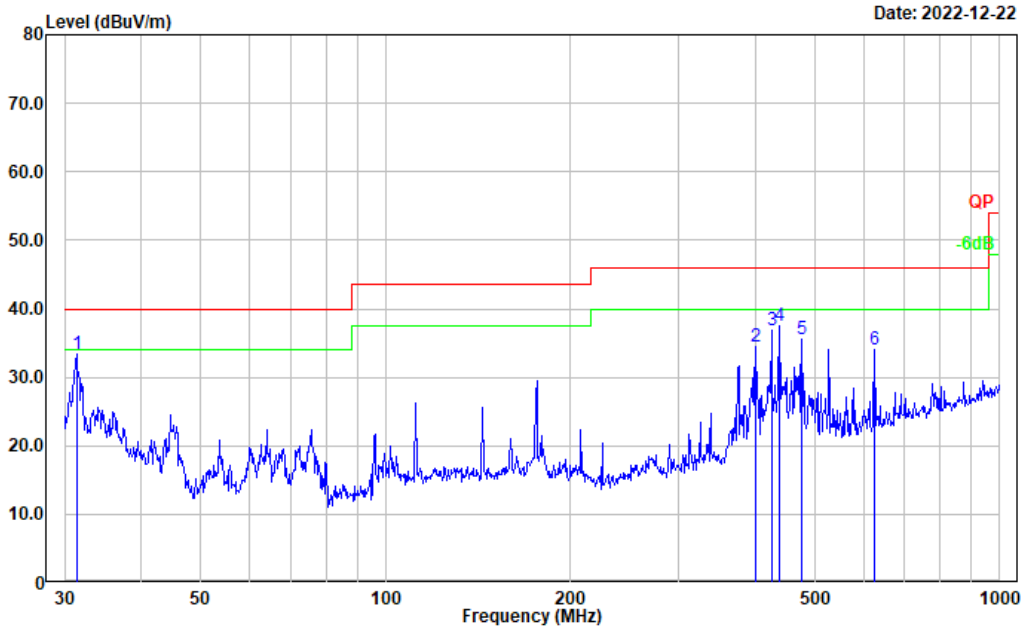
DC Power:

Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	112.131	39.66	-12.15	27.51	43.50	15.99	Peak
2	375.939	41.92	-9.29	32.63	46.00	13.37	Peak
3	425.028	46.52	-7.71	38.81	46.00	7.19	Peak
4	438.655	44.16	-7.31	36.85	46.00	9.15	Peak
5	475.499	39.06	-6.28	32.78	46.00	13.22	Peak
6	801.786	36.73	-2.14	34.59	46.00	11.41	Peak

Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	31.399	38.07	-4.67	33.40	40.00	6.60	Peak
2	400.432	43.26	-8.74	34.52	46.00	11.48	Peak
3	425.028	44.65	-7.71	36.94	46.00	9.06	Peak
4	438.655	44.84	-7.31	37.53	46.00	8.47	Peak
5	475.499	41.77	-6.28	35.49	46.00	10.51	Peak
6	625.078	38.73	-4.60	34.13	46.00	11.87	Peak

2) 1GHz-40GHz(POE was the worst):

***π*/2-BPSK:**

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
1846.77	41.19	PK	H	1.51	42.70	74.00	31.30
1846.77	28.63	AV	H	1.51	30.14	54.00	23.86
1859.52	40.43	PK	V	1.60	42.03	74.00	31.97
1859.52	27.66	AV	V	1.60	29.26	54.00	24.74
2130.46	51.44	PK	H	2.74	54.18	74.00	19.82
2130.46	38.61	AV	H	2.74	41.35	54.00	12.65
20337.17	51.94	PK	V	5.66	57.60	74.00	16.40
20337.17	29.01	AV	V	5.66	34.67	54.00	19.33
33081.21	49.26	PK	H	15.87	59.11	74.00	14.89
33081.21	36.33	AV	H	15.87	46.18	54.00	7.82
32948.90	49.46	PK	V	15.81	59.25	74.00	14.75
32948.90	36.56	AV	V	15.81	46.35	54.00	7.65
Middle Channel: 64.8 GHz							
1598.52	42.02	PK	H	0.22	42.24	74.00	31.76
1598.52	39.67	AV	H	0.22	39.89	54.00	14.11
1737.98	40.67	PK	V	0.91	41.58	74.00	32.42
1737.98	27.64	AV	V	0.91	28.55	54.00	25.45
21288.46	51.61	PK	H	5.29	56.90	74.00	17.10
21288.46	38.55	AV	H	5.29	43.84	54.00	10.16
20839.57	51.89	PK	V	5.67	57.56	74.00	16.44
20839.57	38.64	AV	V	5.67	44.31	54.00	9.69
29829.77	50.88	PK	H	12.44	57.30	74.00	16.70
29829.77	37.77	AV	H	12.44	44.19	54.00	9.81
37515.50	51.40	PK	V	16.13	61.51	74.00	12.49
37515.50	28.83	AV	V	16.13	38.94	54.00	15.06
High Channel: 69.12 GHz							
1598.52	42.01	PK	H	0.22	42.23	74.00	31.77
1598.52	29.11	AV	H	0.22	29.33	54.00	24.67
4985.60	38.00	PK	V	11.20	49.20	74.00	24.80
4985.60	25.05	AV	V	11.20	36.25	54.00	17.75
18477.80	51.86	PK	H	5.05	56.91	74.00	17.09
18477.80	38.88	AV	H	5.05	43.93	54.00	10.07
21200.10	51.93	PK	V	5.39	57.32	74.00	16.68
21200.10	39.01	AV	V	5.39	44.40	54.00	9.60
39322.16	52.79	PK	H	16.33	63.10	74.00	10.90
39322.16	29.88	AV	H	16.33	40.19	54.00	13.81
32673.44	50.67	PK	V	15.03	59.68	74.00	14.32
32673.44	37.78	AV	V	15.03	46.79	54.00	7.21

π/2-QPSK:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
1748.15	43.16	PK	H	0.96	44.12	74.00	29.88
1748.15	30.22	AV	H	0.96	31.18	54.00	22.82
6033.00	35.06	PK	V	13.49	48.55	74.00	25.45
6033.00	32.11	AV	V	13.49	45.60	54.00	8.40
20819.16	51.44	PK	H	5.67	57.11	74.00	16.89
20819.16	38.44	AV	H	5.67	44.11	54.00	9.89
21684.24	52.03	PK	V	5.10	57.13	74.00	16.87
21684.24	29.10	AV	V	5.10	34.20	54.00	19.80
3306.14	48.74	PK	H	7.03	55.77	74.00	18.23
3306.14	35.88	AV	H	7.03	42.91	54.00	11.09
3309.72	49.26	PK	V	7.04	56.30	74.00	17.70
3309.72	36.33	AV	V	7.04	43.37	54.00	10.63
Middle Channel: 64.8 GHz							
2023.00	51.34	PK	H	2.40	53.74	74.00	20.26
2023.00	38.12	AV	H	2.40	40.52	54.00	13.48
4999.20	37.90	PK	V	11.19	49.09	74.00	24.91
4999.20	24.88	AV	V	11.19	36.07	54.00	17.93
21793.46	51.44	PK	H	5.13	56.57	74.00	17.43
21793.46	38.55	AV	H	5.13	43.68	54.00	10.32
21808.76	51.39	PK	V	5.14	56.53	74.00	17.47
21808.76	38.44	AV	V	5.14	43.58	54.00	10.42
32152.26	50.40	PK	H	13.16	57.54	74.00	16.46
32152.26	37.50	AV	H	13.16	44.64	54.00	9.36
32017.20	51.17	PK	V	12.62	57.77	74.00	16.23
32017.20	38.38	AV	V	12.62	44.98	54.00	9.02
High Channel: 69.12 GHz							
1751.55	43.07	PK	H	0.98	44.05	74.00	29.95
1751.55	30.13	AV	H	0.98	31.11	54.00	22.89
1734.54	42.10	PK	V	0.89	42.99	74.00	31.01
1734.54	29.22	AV	V	0.89	30.11	54.00	23.89
21808.76	51.39	PK	H	5.14	56.53	74.00	17.47
21808.76	38.44	AV	H	5.14	43.58	54.00	10.42
22152.23	51.26	PK	V	5.44	56.70	74.00	17.30
22152.23	34.33	AV	V	5.44	39.77	54.00	14.23
32079.32	50.77	PK	H	12.87	57.62	74.00	16.38
32079.32	37.88	AV	H	12.87	44.73	54.00	9.27
35608.92	53.02	PK	V	12.38	59.38	74.00	14.62
35608.92	40.13	AV	V	12.38	46.49	54.00	7.51

π/2-16-QAM:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
1644.02	42.99	PK	H	0.43	43.42	74.00	30.58
1644.02	40.64	AV	H	0.43	41.07	54.00	12.93
5928.87	41.64	PK	V	13.21	54.85	74.00	19.15
5928.87	28.61	AV	V	13.21	41.82	54.00	12.18
20715.03	52.58	PK	H	5.71	58.29	74.00	15.71
20715.03	39.52	AV	H	5.71	45.23	54.00	8.77
21580.11	52.86	PK	V	5.07	57.93	74.00	16.07
21580.11	39.61	AV	V	5.07	44.68	54.00	9.32
3202.01	51.85	PK	H	6.77	58.62	74.00	15.38
3202.01	38.74	AV	H	6.77	45.51	54.00	8.49
3205.59	52.37	PK	V	6.78	59.15	74.00	14.85
3205.59	29.80	AV	V	6.78	36.58	54.00	17.42
Middle Channel: 64.8 GHz							
1793.48	42.40	PK	H	1.25	43.65	74.00	30.35
1793.48	29.46	AV	H	1.25	30.71	54.00	23.29
1806.23	41.43	PK	V	1.32	42.75	74.00	31.25
1806.23	28.55	AV	V	1.32	29.87	54.00	24.13
2077.17	50.72	PK	H	2.58	53.30	74.00	20.70
2077.17	37.77	AV	H	2.58	40.35	54.00	13.65
20283.88	50.59	PK	V	5.62	56.21	74.00	17.79
20283.88	33.66	AV	V	5.62	39.28	54.00	14.72
33027.92	50.10	PK	H	15.93	60.01	74.00	13.99
33027.92	37.21	AV	H	15.93	47.12	54.00	6.88
32895.61	48.35	PK	V	15.66	57.99	74.00	16.01
32895.61	35.46	AV	V	15.66	45.10	54.00	8.90
High Channel: 69.12 GHz							
1888.95	42.98	PK	H	1.80	44.78	74.00	29.22
1888.95	30.04	AV	H	1.80	31.84	54.00	22.16
1901.70	34.88	PK	V	1.89	36.77	74.00	37.23
1901.70	31.93	AV	V	1.89	33.82	54.00	20.18
2172.64	51.26	PK	H	2.86	54.12	74.00	19.88
2172.64	38.26	AV	H	2.86	41.12	54.00	12.88
20379.35	51.85	PK	V	5.69	57.54	74.00	16.46
20379.35	28.92	AV	V	5.69	34.61	54.00	19.39
33123.39	48.56	PK	H	15.82	58.36	74.00	15.64
33123.39	35.70	AV	H	15.82	45.50	54.00	8.50
32991.08	49.08	PK	V	15.93	58.99	74.00	15.01
32991.08	36.15	AV	V	15.93	46.06	54.00	7.94

Result = Reading + Factor- Distance extrapolation Factor
For 1-26.5GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [3m]) dB= 0 dB
For 26.5-40GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

3) 40GHz-200GHz(POE was the worst):

***π*/2-BPSK:**

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Field Strength (dBμV/m)	Power Density (pW/cm^2)	Limit (pW/cm^2)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
56.320	45.85	PK	H	41.34	77.65	15.44	90.00
55.490	46.32	PK	V	41.21	77.99	16.70	90.00
68.290	46.55	PK	H	43.20	80.21	27.84	90.00
67.540	46.98	PK	V	43.09	80.53	29.97	90.00
91.240	50.32	PK	H	45.26	80.02	26.65	90.00
90.880	51.24	PK	V	45.21	80.89	32.56	90.00
192.340	46.85	PK	H	51.18	82.47	46.84	90.00
191.580	46.57	PK	V	51.15	82.16	43.62	90.00
Middle Channel: 64.8 GHz							
56.410	45.62	PK	H	41.35	77.43	14.68	90.00
55.350	45.78	PK	V	41.18	77.42	14.64	90.00
69.650	46.25	PK	H	43.42	80.13	27.33	90.00
68.250	47.25	PK	V	43.20	80.91	32.71	90.00
90.350	46.92	PK	H	45.15	76.51	11.88	90.00
91.470	46.57	PK	V	45.29	76.30	11.32	90.00
190.740	47.21	PK	H	51.11	82.76	50.08	90.00
192.350	46.92	PK	V	51.18	82.54	47.61	90.00
High Channel: 69.12 GHz							
55.100	46.32	PK	H	41.15	77.93	16.47	90.00
56.290	46.21	PK	V	41.33	78.00	16.74	90.00
66.740	47.59	PK	H	42.96	81.01	33.47	90.00
67.350	46.29	PK	V	43.06	79.81	25.39	90.00
90.350	46.22	PK	H	45.15	75.81	10.11	90.00
91.520	47.59	PK	V	45.29	77.32	14.31	90.00
192.340	46.35	PK	H	51.18	81.97	41.76	90.00
190.470	46.95	PK	V	51.10	82.49	47.06	90.00

π/2-QPSK:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Field Strength (dBμV/m)	Power Density (pW/cm^2)	Limit (pW/cm^2)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
56.320	46.35	PK	H	41.34	78.15	17.32	90.00
55.470	45.85	PK	V	41.20	77.51	14.95	90.00
65.320	46.18	PK	H	42.74	79.38	23.00	90.00
66.490	46.28	PK	V	42.92	79.66	24.53	90.00
92.350	46.95	PK	H	45.40	76.79	12.67	90.00
91.350	47.85	PK	V	45.27	77.56	15.12	90.00
192.460	46.87	PK	H	51.19	82.50	47.17	90.00
191.470	46.82	PK	V	51.15	82.41	46.20	90.00
Middle Channel: 64.8 GHz							
56.150	46.57	PK	H	41.31	78.34	18.10	90.00
55.320	46.36	PK	V	41.18	78.00	16.73	90.00
64.290	47.58	PK	H	42.58	80.62	30.60	90.00
65.290	46.92	PK	V	42.74	80.12	27.27	90.00
91.640	46.33	PK	H	45.31	76.08	10.76	90.00
91.490	47.84	PK	V	45.29	77.57	15.16	90.00
192.340	46.98	PK	H	51.18	82.60	48.27	90.00
190.470	46.87	PK	V	51.10	82.41	46.20	90.00
High Channel: 69.12 GHz							
56.740	47.59	PK	H	41.40	79.45	23.37	90.00
55.490	47.90	PK	V	41.21	79.57	24.02	90.00
65.320	46.91	PK	H	42.74	80.11	27.21	90.00
64.590	46.81	PK	V	42.63	79.90	25.92	90.00
92.380	46.30	PK	H	45.40	76.14	10.91	90.00
91.470	47.34	PK	V	45.29	77.07	13.51	90.00
190.640	47.19	PK	H	51.11	82.74	49.85	90.00
191.680	48.06	PK	V	51.15	83.65	61.47	90.00

π/2-16-QAM:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Field Strength (dBμV/m)	Power Density (pW/cm^2)	Limit (pW/cm^2)
	Reading (dBμV)	Detector					
Low Channel: 58.32 GHz							
56.020	48.52	PK	H	41.29	80.27	28.23	90.00
55.840	46.95	PK	V	41.26	78.67	19.53	90.00
64.350	47.58	PK	H	42.59	80.63	30.67	90.00
65.240	48.19	PK	V	42.73	81.38	36.45	90.00
91.540	47.44	PK	H	45.30	77.18	13.86	90.00
92.030	48.59	PK	V	45.36	78.39	18.31	90.00
191.410	47.59	PK	H	51.14	83.17	55.04	90.00
192.380	46.95	PK	V	51.19	82.58	48.05	90.00
Middle Channel: 64.8 GHz							
56.100	47.52	PK	H	41.30	79.28	22.47	90.00
55.470	48.16	PK	V	41.20	79.82	25.45	90.00
63.500	46.25	PK	H	42.46	79.17	21.91	90.00
64.740	47.18	PK	V	42.65	80.29	28.36	90.00
90.680	48.25	PK	H	45.19	77.88	16.28	90.00
91.220	49.35	PK	V	45.26	79.05	21.31	90.00
192.050	48.25	PK	H	51.17	83.86	64.51	90.00
191.040	47.16	PK	V	51.13	82.73	49.73	90.00
High Channel: 69.12 GHz							
55.740	47.65	PK	H	41.25	79.36	22.89	90.00
56.920	48.19	PK	V	41.43	80.08	27.02	90.00
64.390	46.95	PK	H	42.59	80.00	26.53	90.00
65.280	47.28	PK	V	42.73	80.47	29.56	90.00
91.350	46.95	PK	H	45.27	76.66	12.29	90.00
92.440	47.28	PK	V	45.41	77.13	13.70	90.00
191.480	48.29	PK	H	51.15	83.88	64.81	90.00
192.340	48.21	PK	V	51.18	83.83	64.07	90.00

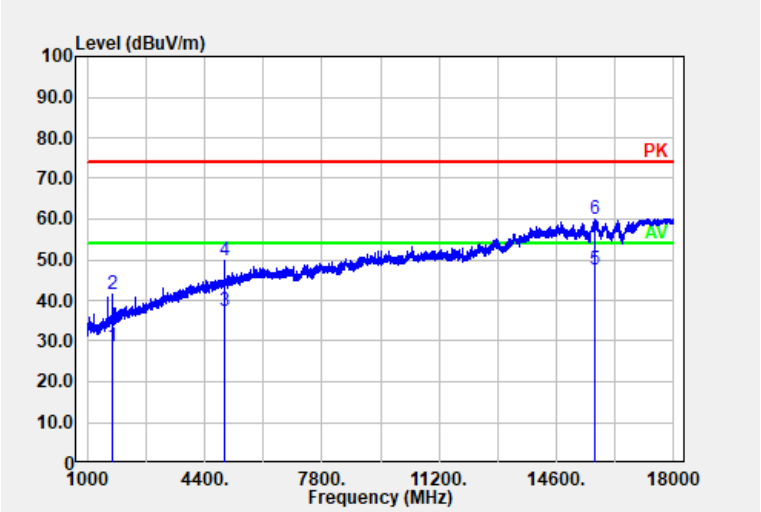
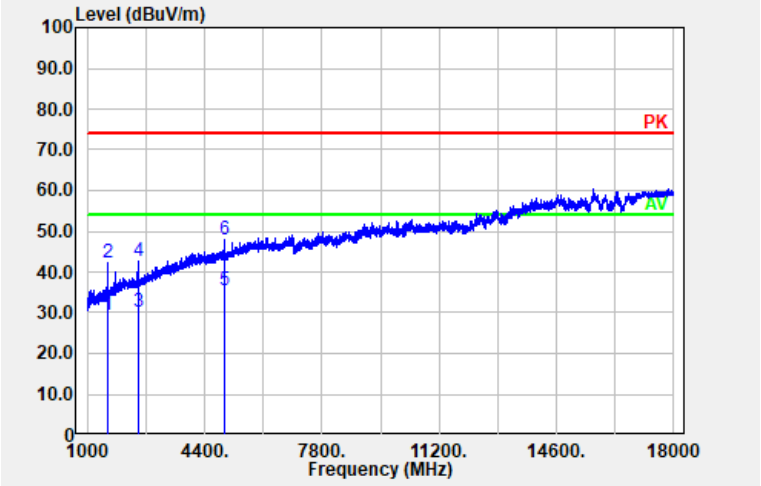
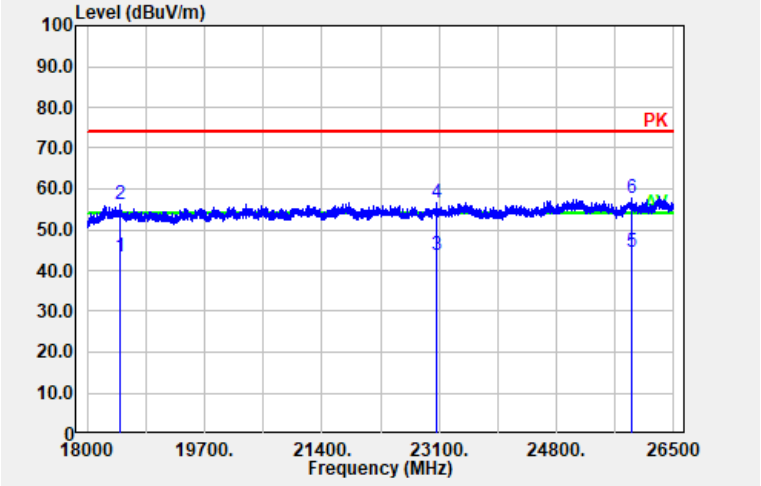
Note:
Factor = Antenna Factor
Field Strength = Reading + Factor + 20log($d_{Meas}/d_{SpecLimit}$)
d_{Meas} is the measurement distance, in m
$d_{SpecLimit}$ is the distance specified by the limit, in m

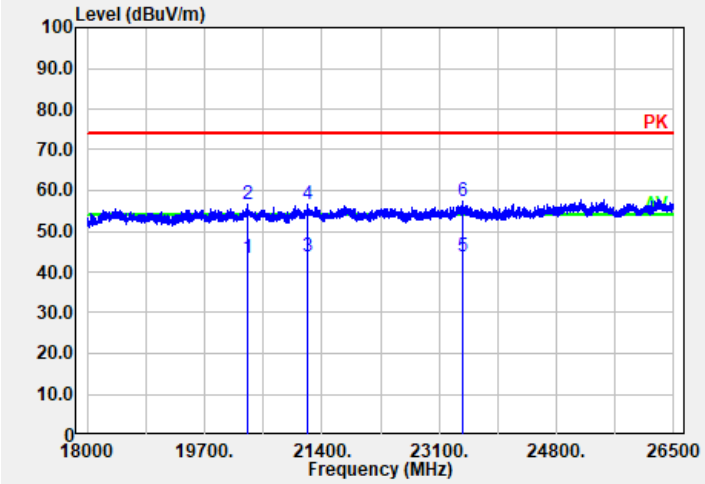
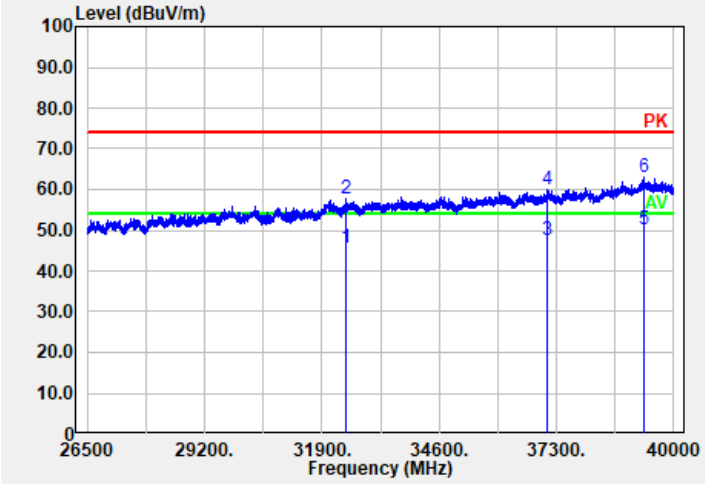
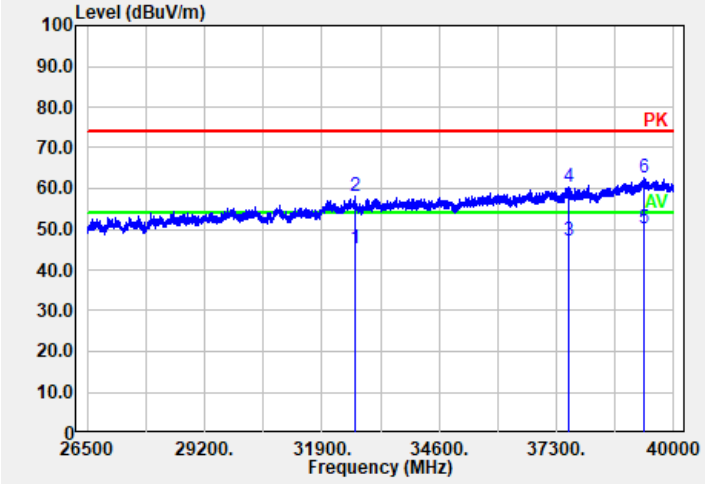
$$PD = \frac{E_{SpecLimit}^2}{377}$$

where

PD is the power density at the distance specified by the limit, in W/m^2
$E_{SpecLimit}$ is the field strength at the distance specified by the limit, in V/m

The Specified distance is 3m.

Test Plots(π/2-BPSK high Channel)	
1GHz-18GHz Horizontal	
1GHz-18GHz Vertical	
18GHz-26.5GHz Horizontal	

18GHz-26.5GHz Vertical	
26.5GHz-40GHz Horizontal	
26.5GHz-40GHz Vertical	

4.3 Emission Bandwidth:

Serial Number:	1UDT	Test Date:	2023/01/13~2023/03/02
Test Site:	966-1	Test Mode:	Transmitting
Tester:	coco Tian	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	22.2~22.9	Relative Humidity: (%)	66~70	ATM Pressure: (kPa)	100.5~101.5

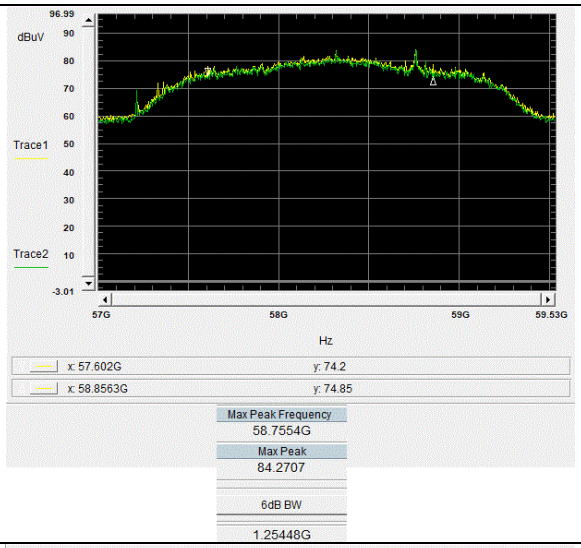
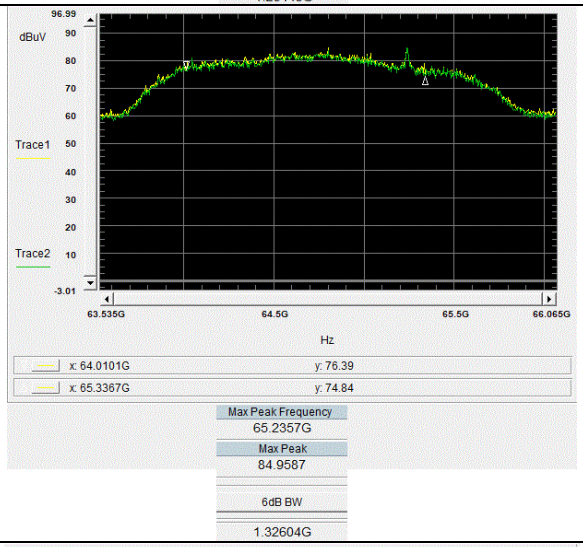
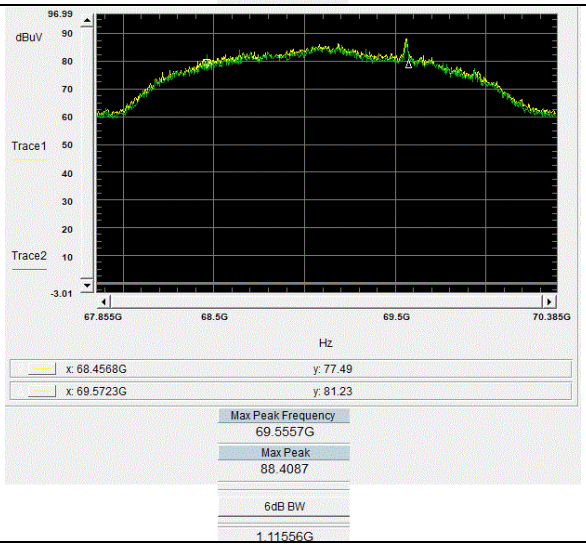
Test Equipment List and Details:

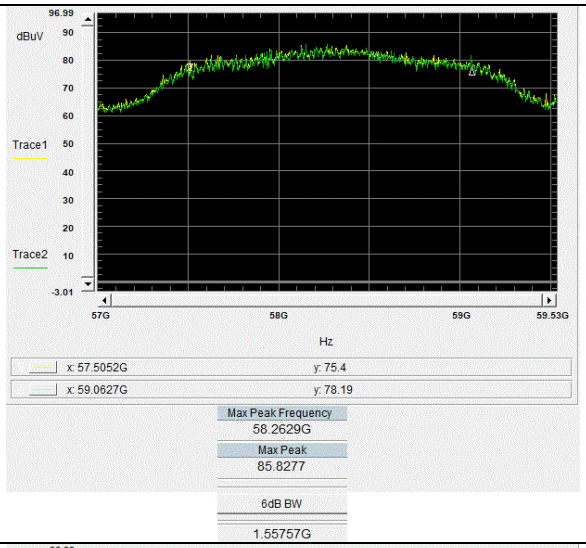
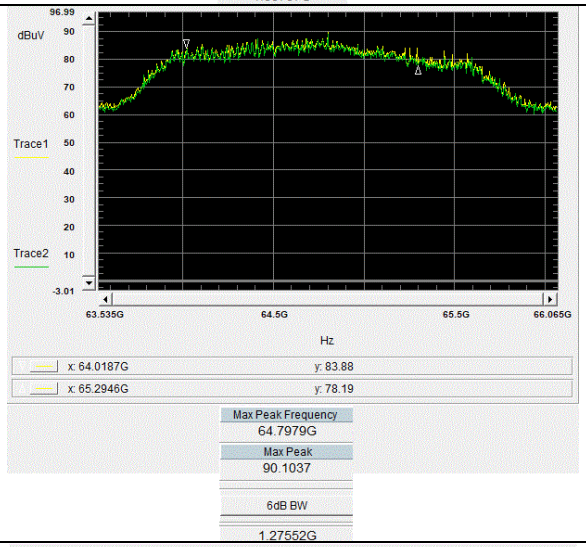
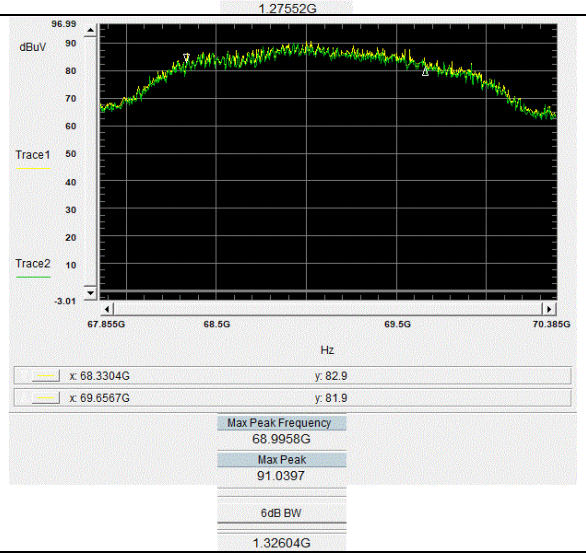
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	E4440A	MY44303354	2022/07/15	2023/07/14
Agilent	Harmonic Mixer	Agilent 11970V	2521A01768	2020/11/08	2023/11/07
Flann Micowave	Horn Antenna	861V/385	738	2020/11/08	2023/11/07
BACL	Test Software	E4440A	V1.1	N/A	N/A

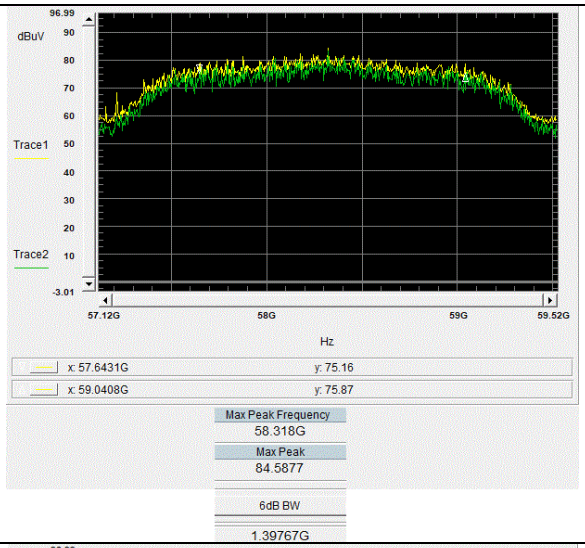
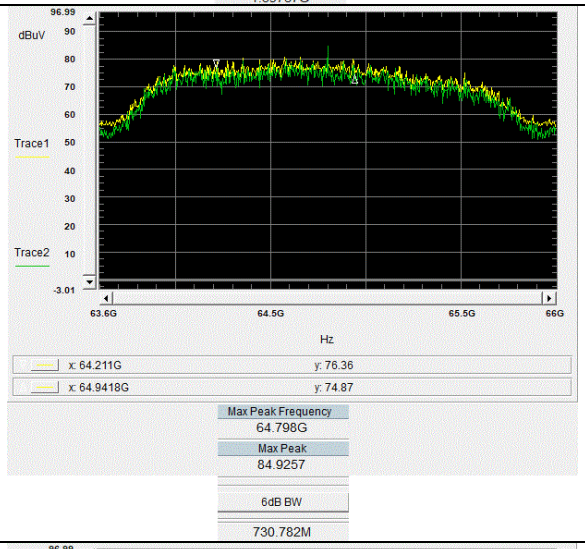
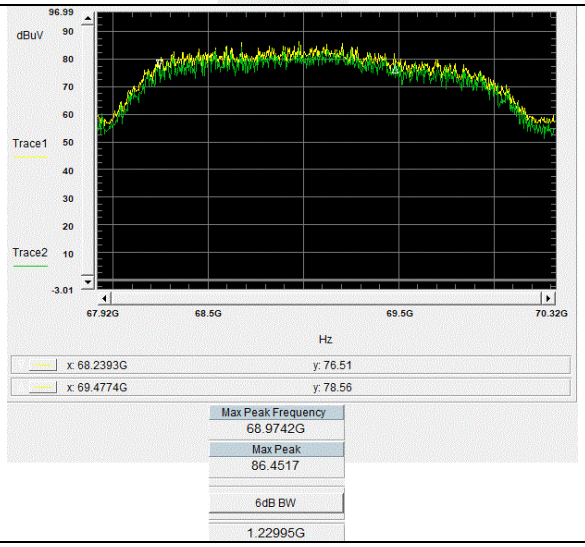
**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

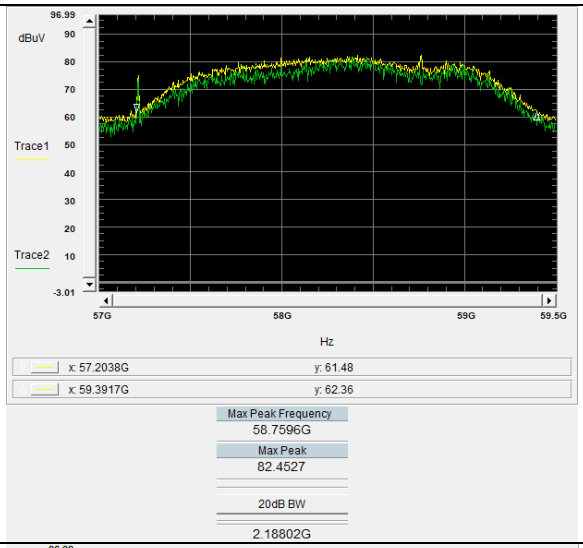
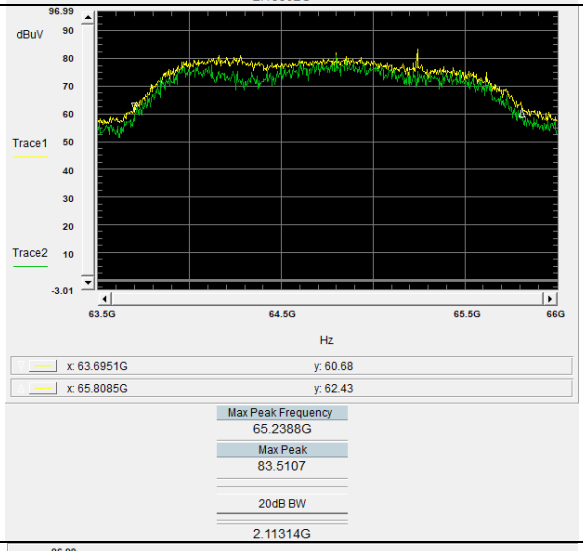
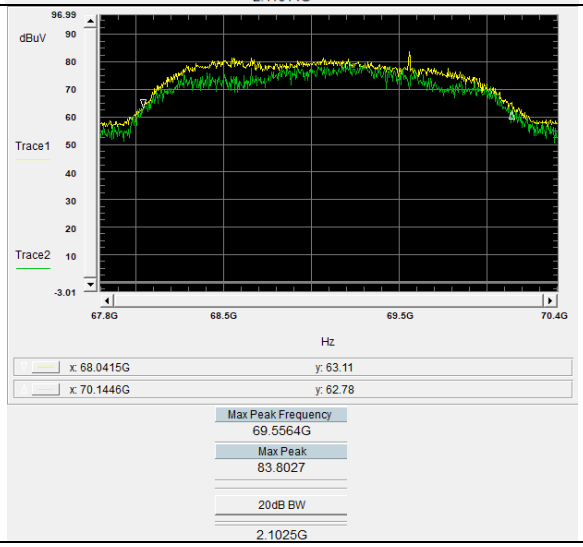
Test Data:

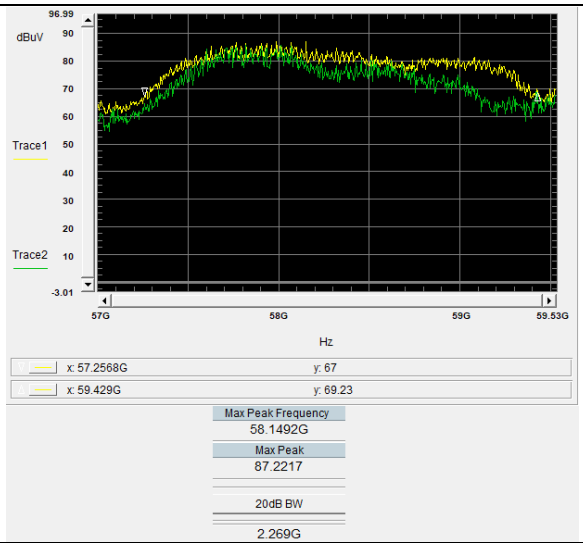
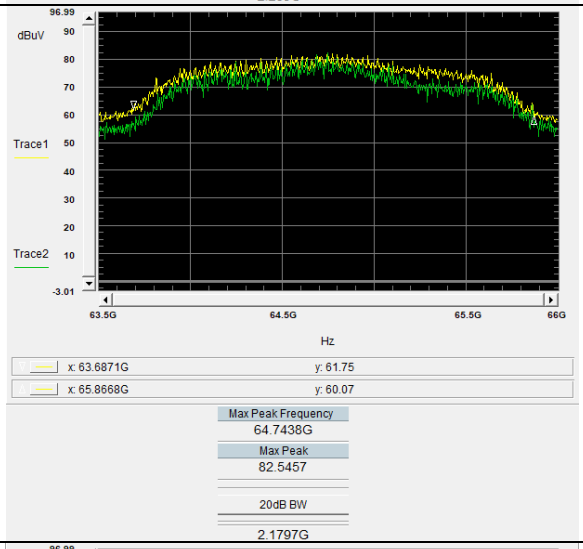
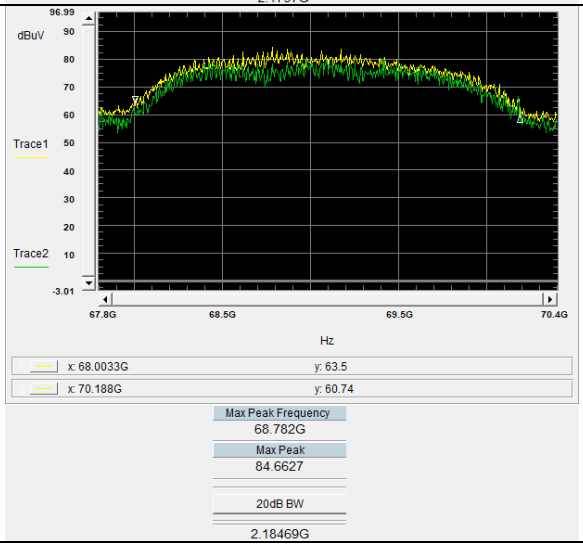
Test Modes	Test Frequency (GHz)	6 dB Emission Bandwidth (GHz)	20 dB Emission Bandwidth (GHz)
π/2-BPSK	58.32	1.255	2.188
	64.80	1.326	2.113
	69.12	1.116	2.103
π/2-QPSK	58.32	1.557	2.269
	64.80	1.276	2.180
	69.12	1.326	2.185
π/2-16QAM	58.32	1.398	2.075
	64.80	0.731	1.993
	69.12	1.230	2.112

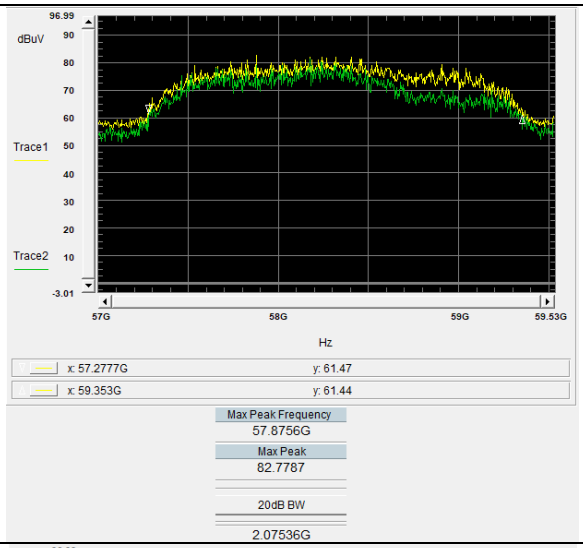
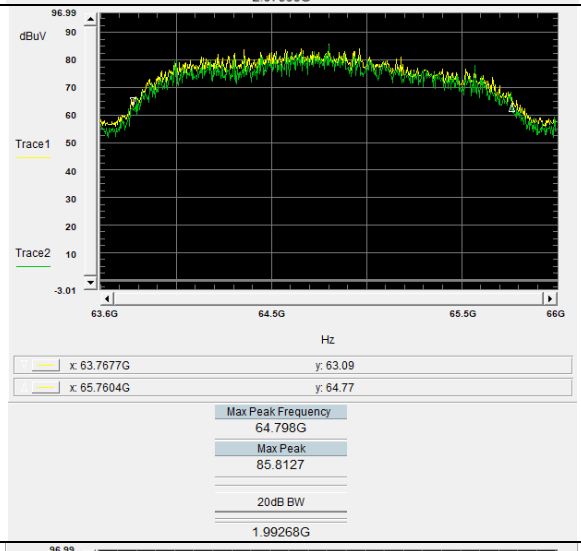
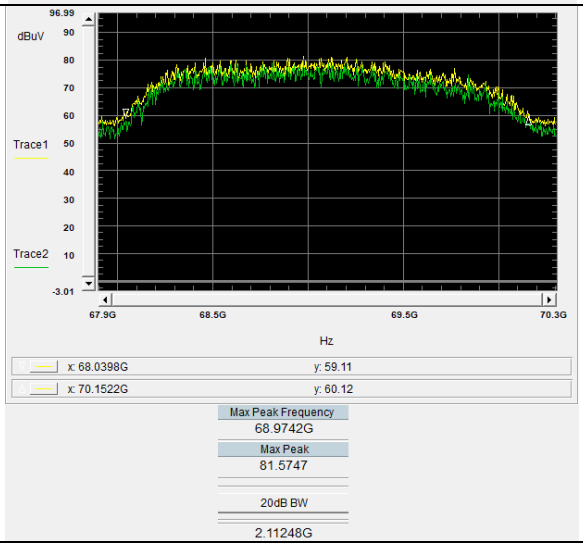
6 dB Emission Bandwidth	
π/2-BPSK Low Channel	
π/2-BPSK Middle Channel	
π/2-BPSK High Channel:	

6 dB Emission Bandwidth	
π/2-QPSK Low Channel	
π/2-QPSK Middle Channel	
π/2-QPSK High Channel:	

6 dB Emission Bandwidth	
π/2-16QAM Low Channel	
π/2-16QAM Middle Channel	
π/2-16QAM High Channel:	

20 dB Emission Bandwidth	
π/2-BPSK Lowest Channel	
π/2-BPSK Middle Channel	
π/2-BPSK Highest Channel	

20 dB Emission Bandwidth	
π/2-QPSK Lowest Channel	
π/2-QPSK Middle Channel	
π/2-QPSK Highest Channel	

20 dB Emission Bandwidth	
π/2-16QAM Lowest Channel	
π/2-16QAM Middle Channel	
π/2-16QAM Highest Channel	

4.5 Equivalent Isotropically Radiated Power (EIRP):

Serial Number:	1UDT	Test Date:	2023/01/13~2023/02/07
Test Site:	966-1	Test Mode:	Transmitting
Tester:	coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	22.2~22.9	Relative Humidity: (%)	66~70	ATM Pressure: (kPa)	100.5~101.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Flann Micowave	Horn Antenna	861V/385	738	2020/11/08	2023/11/07
millitech	RF Detector	DET-15-RPFW0	A18521	2022/12/14	2025/12/13
Tektronix	Digital Phosphor Oscilloscope	TDS 3054	B015264	2022/11/18	2023/11/17
Agilent	Signal Generator	E8247C	MY43321352	2022/04/01	2023/03/31
Agilent	mm-Wave Source Modules	83557A	3942A00697	2022/04/01	2023/03/31

**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

π/2-BPSK:

Frequency (GHz)	DSO		Polar (H/V)	Substituted Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
	Reading (mV)	Detector					
58.32	81.00	PK	V	-12.86	24.00	31.01	43
58.32	72.00	AV	V	-13.37	24.00	30.50	40
64.80	75.00	PK	V	-13.71	24.00	31.08	43
64.80	65.00	AV	V	-14.33	24.00	30.46	40
69.12	73.00	PK	V	-14.91	24.00	30.44	43
69.12	62.00	AV	V	-15.62	24.00	29.73	40

π/2-QPSK:

Frequency (GHz)	DSO		Polar (H/V)	Substituted Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
	Reading (mV)	Detector					
58.32	83.00	PK	V	-12.76	24.00	31.11	43
58.32	72.00	AV	V	-13.37	24.00	30.50	40
64.80	76.00	PK	V	-13.65	24.00	31.14	43
64.80	66.00	AV	V	-14.26	24.00	30.53	40
69.12	75.00	PK	V	-14.79	24.00	30.56	43
69.12	66.00	AV	V	-15.35	24.00	30.00	40

π/2-16QAM:

Frequency (GHz)	DSO		Polar (H/V)	Substituted Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
	Reading (mV)	Detector					
58.32	18.00	PK	V	-19.40	24.00	24.47	43
58.32	14.20	AV	V	-20.43	24.00	23.44	40
64.80	10.90	PK	V	-22.09	24.00	22.70	43
64.80	8.02	AV	V	-23.42	24.00	21.37	40
69.12	10.20	PK	V	-23.46	24.00	21.89	43
69.12	7.96	AV	V	-24.54	24.00	20.81	40

EIRP = E_{meas}+ 20log(Measurement distance) - 104.7
E_{meas} = 126.8 - 20log(λ) + Substitued level - Antenna Gain
Measurement distance = 1m

4.6 Peak Conducted Output Power:

Serial Number:	1UDT	Test Date:	2023/01/13~2023/02/07
Test Site:	966-1	Test Mode:	Transmitting
Tester:	coco Tian	Test Result:	Pass

Environmental Conditions:

Temperature: (℃)	22.2~22.9	Relative Humidity: (%)	66~70	ATM Pressure: (kPa)	100.5~101.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Flann Micowave	Horn Antenna	861V/385	738	2020/11/08	2023/11/07
millitech	RF Detector	DET-15-RPFW0	A18521	2022/12/14	2025/12/13
Tektronix	Digital Phosphor Oscilloscope	TDS 3054	B015264	2022/11/18	2023/11/17
Agilent	Signal Generator	E8247C	MY43321352	2022/04/01	2023/03/31
Agilent	mm-Wave Source Modules	83557A	3942A00697	2022/04/01	2023/03/31

**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

π/2-BPSK:

Frequency (GHz)	Peak EIPR Power (dBm)	Antenna Gain (dBi)	Peak Conducted Power (dBm)	Limit (dBm)	Margin (dB)
58.32	31.01	23.00	8.01	27	18.99
64.80	31.08	23.00	8.08	27	18.92
69.12	30.44	23.00	7.44	27	19.56

π/2-QPSK:

Frequency (GHz)	Peak EIPR Power (dBm)	Antenna Gain (dBi)	Peak Conducted Power (dBm)	Limit (dBm)	Margin (dB)
58.32	31.11	23.00	8.11	27	18.89
64.80	31.14	23.00	8.14	27	18.86
69.12	30.56	23.00	7.56	27	19.44

π/2-16QAM:

Frequency (GHz)	Peak EIPR Power (dBm)	Antenna Gain (dBi)	Peak Conducted Power (dBm)	Limit (dBm)	Margin (dB)
58.32	31.09	23.00	8.09	27	18.91
64.80	31.15	23.00	8.15	27	18.85
69.12	30.64	23.00	7.64	27	19.36

Note:
For radiated emissions measurements, calculated transmitter conducted output power P(con)
P(con)=EIRP-Antenna gain(dBi)

4.7 Frequency Stability:

Serial Number:	1UDT	Test Date:	2023/01/13~2023/02/07
Test Site:	RF	Test Mode:	Transmitting
Tester:	coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	23.2~24.3	Relative Humidity: (%)	61~65	ATM Pressure: (kPa)	100.5~101.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	E4440A	MY44303354	2022/07/15	2023/07/14
Agilent	Harmonic Mixer	Agilent 11970V	2521A01768	2020/11/08	2023/11/07
Flann Micowave	Horn Antenna	861V/385	738	2020/11/08	2023/11/07
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022/04/06	2023/04/05
UNI-T	Multimeter	UT39A+	C210582554	2022/09/29	2023/09/28
BACL	Test Software	E4440A	V1.1	N/A	N/A

**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

π/2-BPSK

Temperature	Voltage	Frequency (GHz)			
℃	V_{DC}	f_L	f_H	f_L Limit	f_H Limit
-20	48	57.32840	70.05660	57	71
-10	48	57.32860	70.05650	57	71
0	48	57.32890	70.05680	57	71
10	48	57.32830	70.05660	57	71
20	48	57.32870	70.05640	57	71
30	48	57.32850	70.05630	57	71
40	48	57.32830	70.05670	57	71
50	48	57.32810	70.05620	57	71
20	42	57.32820	70.05650	57	71
20	54	57.32880	70.05680	57	71

π/2-QPSK

Temperature	Voltage	Frequency (GHz)			
℃	V_{DC}	f_L	f_H	f_L Limit	f_H Limit
-20	48	57.32410	70.03980	57	71
-10	48	57.32420	70.03900	57	71
0	48	57.32430	70.03920	57	71
10	48	57.32440	70.03910	57	71
20	48	57.32480	70.03960	57	71
30	48	57.32410	70.03950	57	71
40	48	57.32460	70.03990	57	71
50	48	57.32450	70.03980	57	71
20	42	57.32420	70.03970	57	71
20	54	57.32490	70.03950	57	71

π/2-16QAM

Temperature	Voltage	Frequency (GHz)			
℃	V_{DC}	f_L	f_H	f_L Limit	f_H Limit
-20	48	57.35590	69.99300	57	71
-10	48	57.35580	69.99250	57	71
0	48	57.35580	69.99260	57	71
10	48	57.35590	69.99220	57	71
20	48	57.35560	69.99250	57	71
30	48	57.35590	69.99290	57	71
40	48	57.35610	69.99260	57	71
50	48	57.35520	69.99210	57	71
20	42	57.35610	69.99240	57	71
20	54	57.35610	69.99260	57	71

5. RF EXPOSURE EVALUATION

5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

FCC §15.255(g) & §1.1310 & §2.1091

Regardless of the power density levels permitted under this subpart, devices operating under the provisions of this subpart are subject to the radiofrequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.1.2 Procedure

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

5.2 Measurement Result

Frequency (GHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
58.32-69.12	23.00	199.53	9	7.94	20	0.3152	1

Note:
The Value of Maximum Conducted Power including Tune-up Tolerance was declared by the customer.

Result: The device meet FCC MPE at 20 cm distance.

===== END OF REPORT =====