FCC PART 15.225

TEST REPORT

For

AKUVOX (XIAMEN) NETWORKS CO., LTD.

10/F, No.56 Guanri Road, Software Park II, Xiamen 361009, China

FCC ID: 2AHCR-S532V1

Report Type:	**Product Name:**
Original Report	Door Phone

Report Number:	2407T77479E-RF-01
Report Date:	2024-12-13
Reviewed By:	Ash Lin
Approved By:	Miles Chen
Prepared By:	Bay Area Compliance Laboratories Corp. (Xiamen) Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen Tel: +86-592-3200111 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	2407T77479E-RF-01	R1V1	2024-12-13	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	AKUVOX (XIAMEN) NETWORKS CO., LTD.
Tested Model:	S532
Product Name:	Door Phone
Firmware version:	V1.00
Software version:	532.30.1.19
Power Supply:	DC 12V from Adapter or DC 48V from PoE
RF Function:	NFC
Operating Band/Frequency:	13.56 MHz
Antenna Type:	FPC Antenna
EUT Received Status:	Good
Note: *1. All measurement and test data in this report was gathered from production sample serial number: 2LWH-1. (Assigned by the BACL(Xiamen). The EUT supplied by the applicant was received on 2024-05-23)*	

Objective

This Type approval report is prepared for *AKUVOX (XIAMEN) NETWORKS CO., LTD.* in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commission's rules.

The objective is to determine the Compliance of the EUT with FCC rules, sec 15.203, 15.205, 15.207, 15.209, 15.215 and 15.225.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Measurement Uncertainty

Item		U_{lab}
Conducted Emission	150kHz-30MHz	2.33 dB
Radiated Disturbance	9kHz~30MHz	2.59 dB
	30MHz~200MHz	4.38dB
	200MHz~1GHz	4.50dB
Occupied Bandwidth		0.053kHz
Frequency Error(RF Frequency)		0.082×10^{6}
Temperature		1℃
Humidity		5%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Xiamen) to collect test data is located on the Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen.

Bay Area Compliance Laboratories Corp. (Xiamen) Lab is accredited to ISO/IEC 17025 by A2LA (Certificate Number: 7134.01) and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN1384.

SYSTEM TEST CONFIGURATION

Test Mode and Voltage

The system was configured for testing in a typical mode (as normally used by a typical user).	
Test mode:	NFC Transmitting
Test voltage:	DC 12V from adapter(AC 120V/60Hz) or DC 48V from PoE(AC 120V/60Hz)
Remark:	During all emission tests, the EUT was configured to measure its highest possible emission level and the worst case's test data was presented in this test report.

Note: Power from adapter and PoE were evaluated in the 2407T77479E-RF-02 report for the 9kHz~30MHz Radiation Spurious Emissions Test. The report showed that adapter had worse emissions in 9kHz~30MHz Radiation Spurious Emissions Test. Therefore, only the test results with worst case adapter are reflected in this report.

Justification

The system was configured in testing mode which was provided by manufacturer.

EUT Exercise Software

The EUT is tested in the engineering mode.

Equipment Modifications

No modification on the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
NETGEAR	POE	MSIP-REN-NGR-GS108Ev3	3UJD1756006EB
SWITCHING ADAPTER	Adapter	FJ-SW126K1201000DU	Unknown
Router	Router	WS831	W6E7S15B09001200
BACL	Relay Load	Unknown	Unknown
BACL	RS 485 Load	Unknown	Unknown
BACL	Relay Load	Unknown	Unknown
Unknown	Exit Button	Unknown	Unknown
Unknown	Exit Button	Unknown	Unknown
Unknown	Exit Button	Unknown	Unknown
Unknown	Exit Button	Unknown	Unknown

External I/O Cable

For Adapter

Cable Description	Length (m)	From Port	To
Power cable	2	EUT	Adapter
Load cable	10	EUT	Relay Load
Load cable	10	EUT	RS 485 Load
Load cable	10	EUT	Relay Load
Network cable	10	EUT	Router
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button

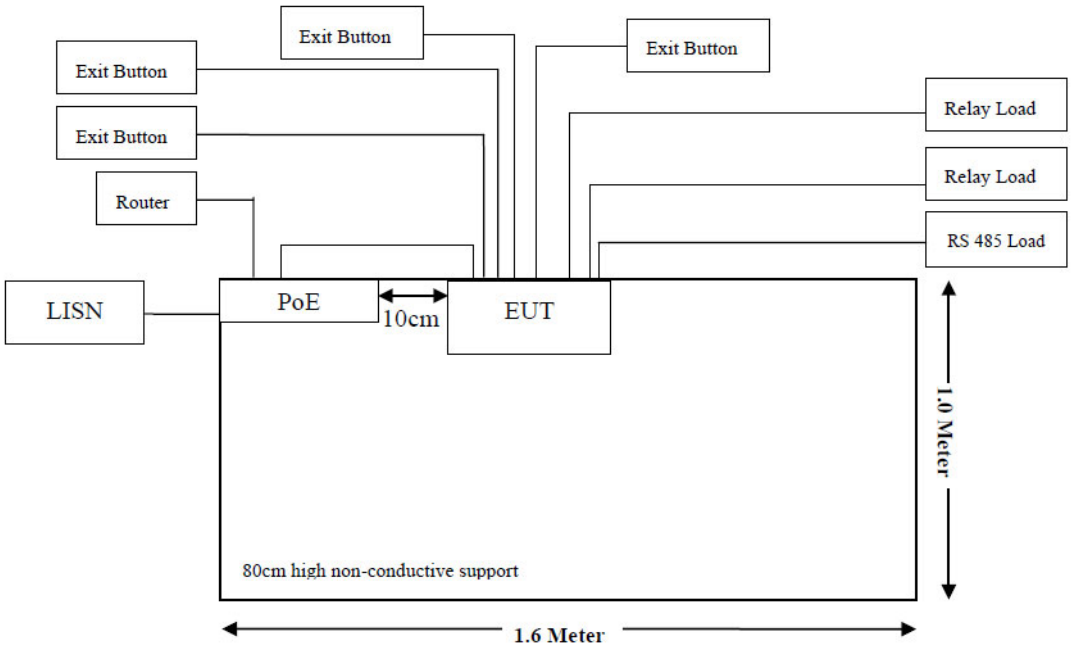
For PoE

Cable Description	Length (m)	From Port	To
Network cable	1	EUT	POE
Load cable	10	EUT	Relay Load
Load cable	10	EUT	RS 485 Load
Load cable	10	EUT	Relay Load
Network cable	10	POE	Router
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button
Load cable	10	EUT	Exit Button

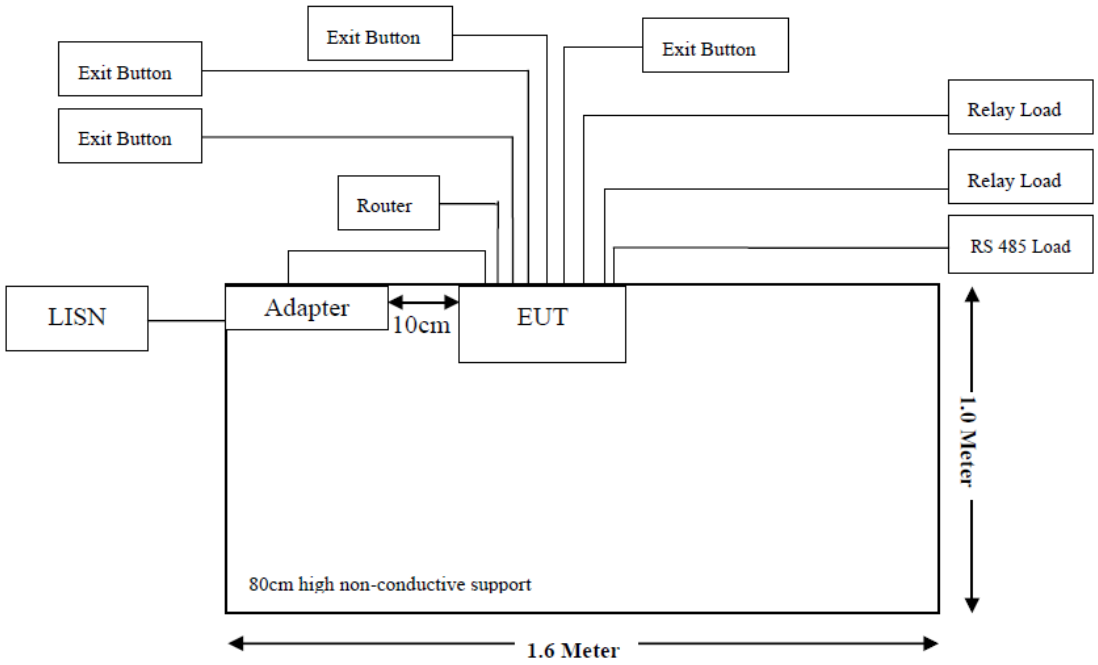
Block Diagram of Test Setup

Conducted Emission:

Powered by PoE

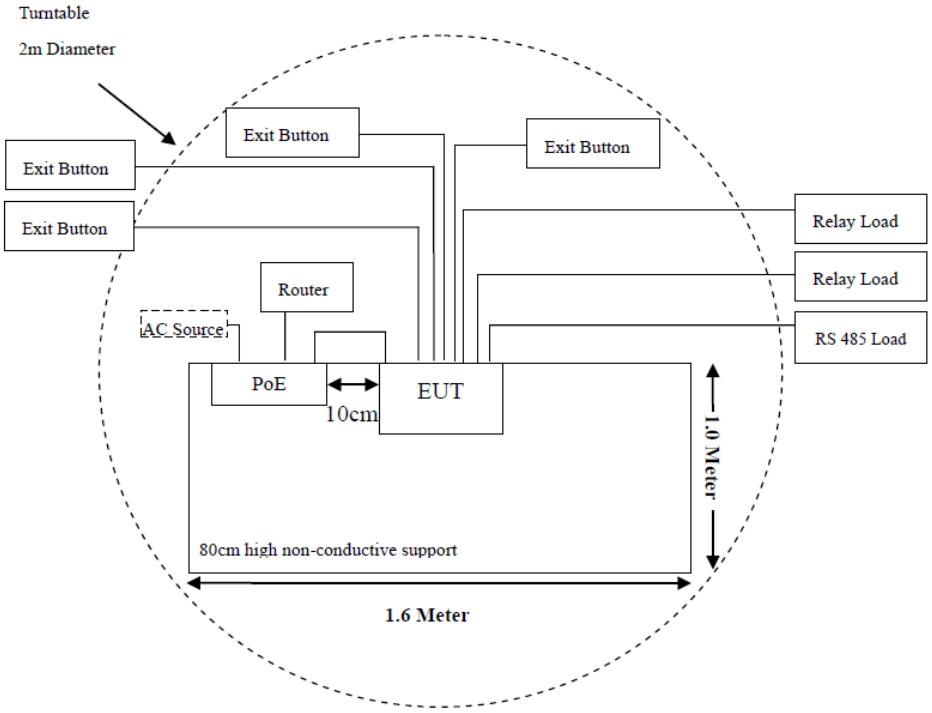


Powered by Adapter

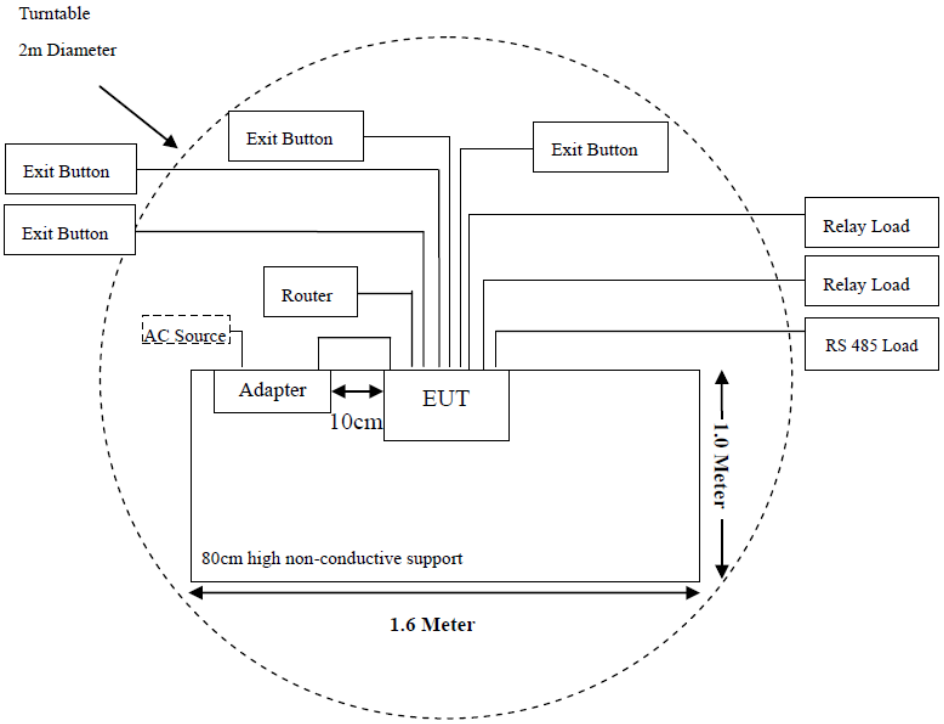


Radiated Emission (Below 1GHz)

Powered by PoE



Powered by Adapter



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.225 §15.209 §15.205	Radiated Emission Test	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.215(c)	20dB Bandwidth Testing	Compliant

TEST EQUIPMENT LIST

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
EMI Test Receiver	Rohde & Schwarz	ESR3	103103	2024/03/29	2025/03/28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/001	2023/07/27	2026/07/26
Antenna	Sunol Sciences	JB6	A122022-5	2023/07/27	2026/07/26
Amplifier	Sonoma	310B	120903	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC002	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-2M	CC006	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-12M	CC007	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2024/03/29	2025/03/28
Test Software	Audix	E3	18621a	N/A	N/A
Conducted Emission Test					
EMI Test Receiver	Rohde & Schwarz	ESR3	103105	2024/03/29	2025/03/28
LISN	Rohde & Schwarz	ENV216	100129	2024/03/29	2025/03/28
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC001	2024/03/29	2025/03/28
Test Software	Audix	E3	18621a	N/A	N/A
Frequency Stability					
EMI Test Receiver	Rohde & Schwarz	ESR3	103103	2024/03/29	2025/03/28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/001	2023/07/27	2026/07/26
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2024/03/29	2025/03/28
Constant temperature and humidity testing machine	BACL	BTH-150	30211	2024/03/29	2025/03/28
AC power source	WACP	ES-CPF-SD45-600	EO20230629001	2024/03/29	2025/03/28
20dB Bandwidth test					
EMI Test Receiver	Rohde & Schwarz	ESR3	103103	2024/03/29	2025/03/28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/001	2023/07/27	2026/07/26
Coaxial Cable	XINHANGWEIBO	HFH2-CC	335.3609	2024/03/29	2025/03/28

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Xiamen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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.

Antenna Connected Construction

The EUT has one FPC antenna for NFC, the antenna was permanently attached, fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

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:

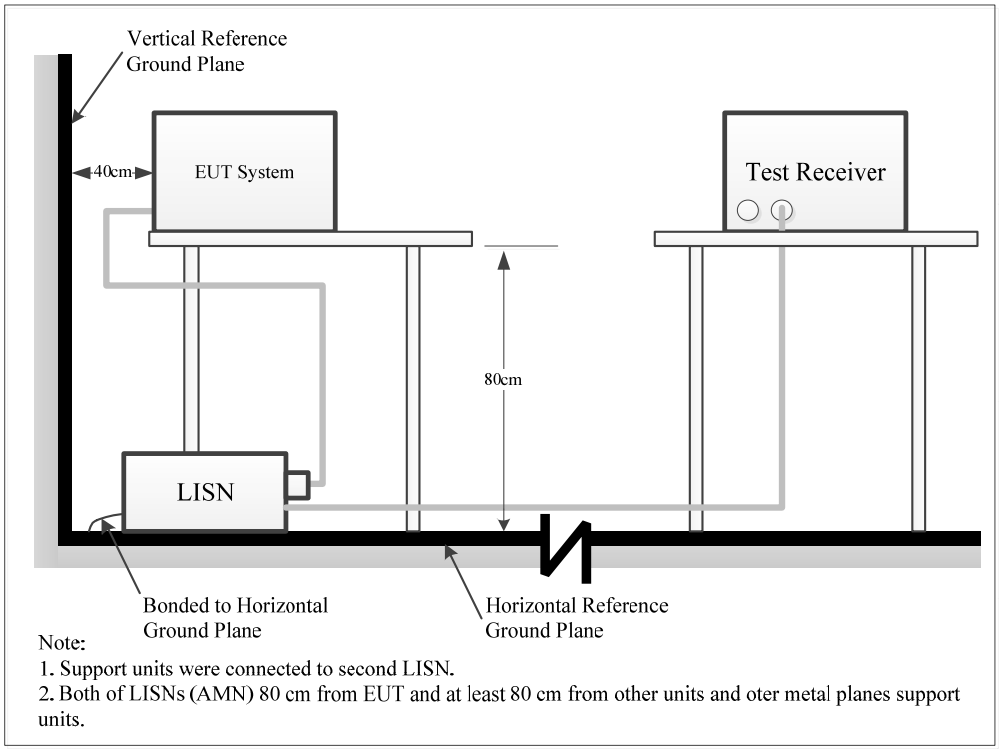
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(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, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Test System Setup



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

The setup of EUT is according with per ANSI C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

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	RBW	VBW	Detector
150 kHz - 30 MHz	9 kHz	30 kHz	AV/QP

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the 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.

According FCC publication number 174176,for a device with a permanent antenna operating at or below 30 MHz, the measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

Result &Margin Calculation

The Result is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
Result (dBμV) = Reading (dBμV) + Factor (dB)

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

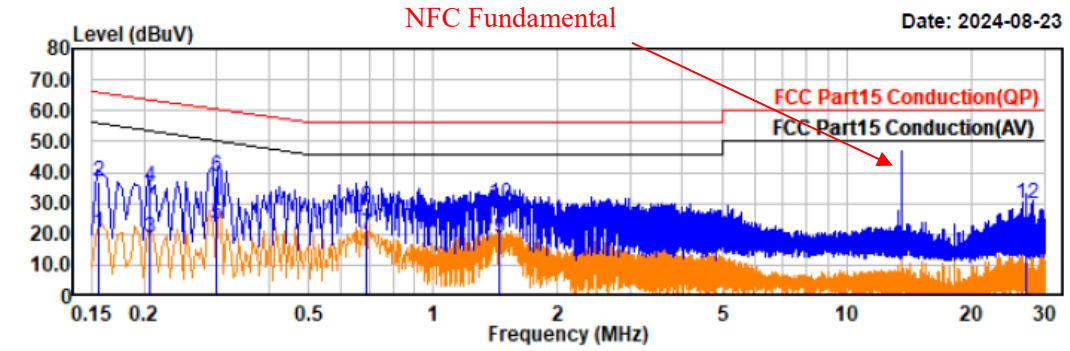
Margin (dB) = Limit (dBμV) –Result (dBμV)

Test Data

Test Frequency:	150kHz~30MHz
Temperature:	23.7℃
Relative Humidity:	57%
ATM Pressure:	100.1kPa
Test Date:	2024-08-23
Test Engineer:	Spike Gao

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532

Temp/Humi/ATM: 23.7℃/57%/100.1kPa
Tested by: Spike Gao
Power Source: DC 12V from Adapter

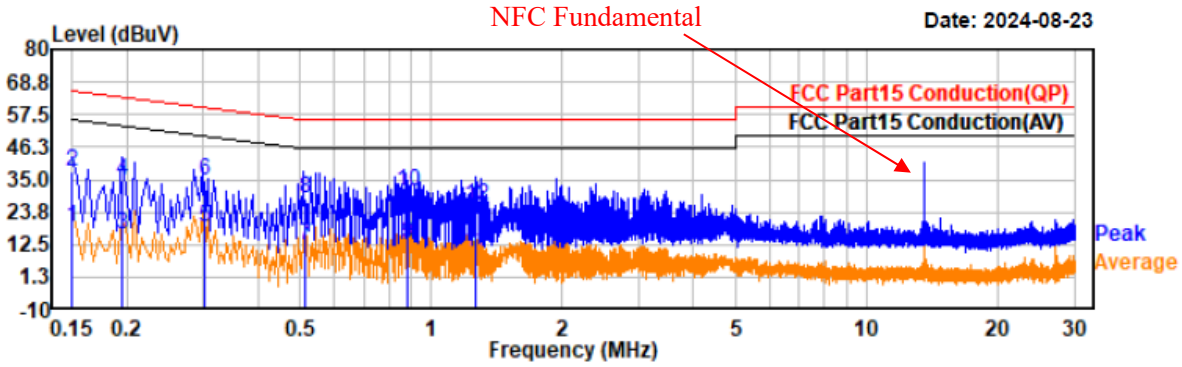


Trace: 1

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.15	-0.51	21.06	20.55	55.73	35.18	Line	Average
0.15	15.88	21.06	36.94	65.73	28.79	Line	QP
0.21	-2.52	21.24	18.72	53.37	34.65	Line	Average
0.21	14.22	21.24	35.46	63.37	27.91	Line	QP
0.30	2.26	20.84	23.10	50.23	27.13	Line	Average
0.30	18.02	20.84	38.86	60.23	21.37	Line	QP
0.69	-0.62	20.60	19.98	46.00	26.02	Line	Average
0.69	8.22	20.60	28.82	56.00	27.18	Line	QP
1.44	-2.29	20.83	18.54	46.00	27.46	Line	Average
1.44	8.85	20.83	29.68	56.00	26.32	Line	QP
27.12	-7.25	21.21	13.96	50.00	36.04	Line	Average
27.12	8.62	21.21	29.83	60.00	30.17	Line	QP

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532

Temp/Humi/ATM: 23.7℃/57%/100.1kPa
Tested by: Spike Gao
Power Source: DC 12V from Adapter

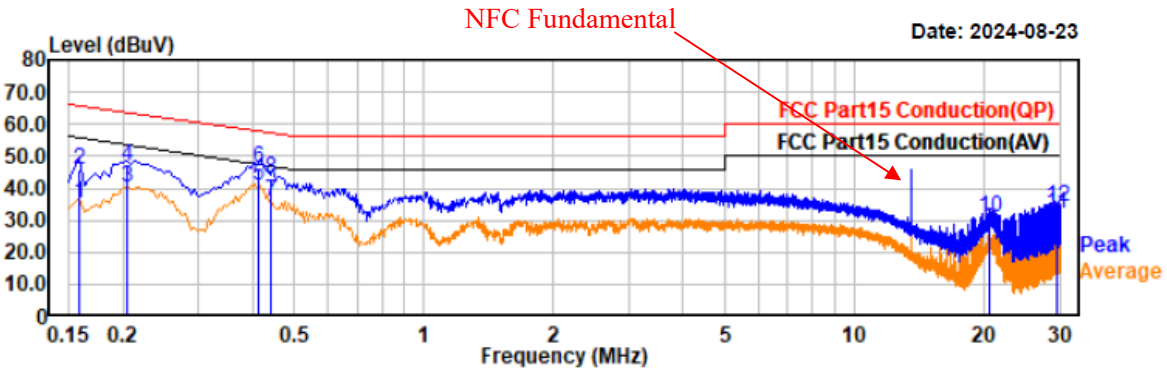


Trace: 1

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.15	-2.47	20.83	18.36	55.99	37.63	Neutral	Average
0.15	16.86	20.83	37.69	65.99	28.30	Neutral	QP
0.20	-5.05	21.05	16.00	53.77	37.77	Neutral	Average
0.20	13.71	21.05	34.76	63.77	29.01	Neutral	QP
0.30	-2.22	20.72	18.50	50.22	31.72	Neutral	Average
0.30	13.80	20.72	34.52	60.22	25.70	Neutral	QP
0.51	-8.17	20.30	12.13	46.00	33.87	Neutral	Average
0.51	8.27	20.30	28.57	56.00	27.43	Neutral	QP
0.88	-7.50	20.61	13.11	46.00	32.89	Neutral	Average
0.88	10.09	20.61	30.70	56.00	25.30	Neutral	QP
1.27	-10.81	20.86	10.05	46.00	35.95	Neutral	Average
1.27	5.30	20.86	26.16	56.00	29.84	Neutral	QP

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532

Temp/Humi/ATM: 23.7℃/57%/100.1kPa
Tested by: Spike Gao
Power Source: DC 48V from PoE

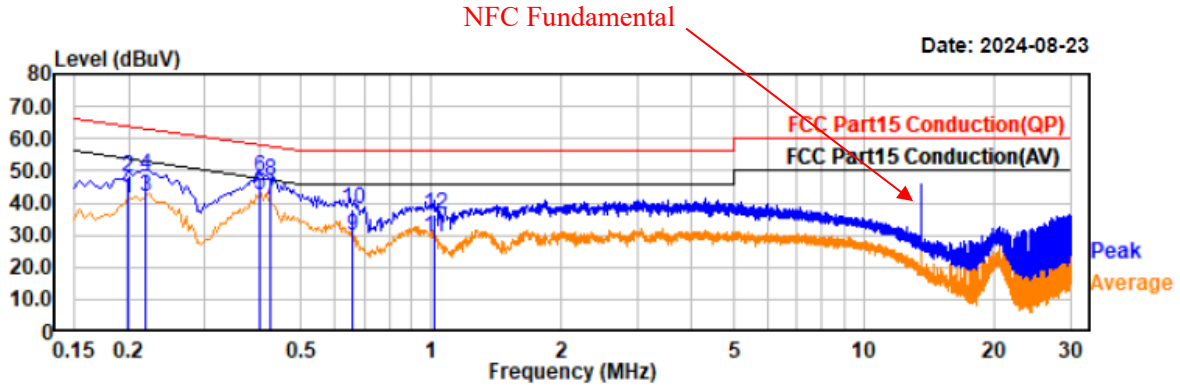


Trace: 1

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.16	14.37	21.09	35.46	55.52	20.06	Line	Average
0.16	24.95	21.09	46.04	65.52	19.48	Line	QP
0.21	18.79	21.24	40.03	53.39	13.36	Line	Average
0.21	25.87	21.24	47.11	63.39	16.28	Line	QP
0.41	20.48	20.50	40.98	47.58	6.60	Line	Average
0.41	25.86	20.50	46.36	57.58	11.22	Line	QP
0.44	15.46	20.42	35.88	47.01	11.13	Line	Average
0.44	22.41	20.42	42.83	57.01	14.18	Line	QP
20.62	5.68	21.12	26.80	50.00	23.20	Line	Average
20.62	9.94	21.12	31.06	60.00	28.94	Line	QP
29.46	11.04	20.94	31.98	50.00	18.02	Line	Average
29.46	13.26	20.94	34.20	60.00	25.80	Line	QP

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532

Temp/Humi/ATM: 23.7℃/57%/100.1kPa
Tested by: Spike Gao
Power Source: DC 48V from PoE



Trace: 1

Freq MHz	Reading dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dB	Phase	Remark
0.20	20.22	21.07	41.29	53.65	12.36	Neutral	Average
0.20	27.13	21.07	48.20	63.65	15.45	Neutral	QP
0.22	21.09	20.99	42.08	52.84	10.76	Neutral	Average
0.22	27.62	20.99	48.61	62.84	14.23	Neutral	QP
0.40	22.01	20.48	42.49	47.83	5.34	Neutral	Average
0.40	27.48	20.48	47.96	57.83	9.87	Neutral	QP
0.42	20.32	20.43	40.75	47.35	6.60	Neutral	Average
0.42	26.26	20.43	46.69	57.35	10.66	Neutral	QP
0.66	9.48	20.38	29.86	46.00	16.14	Neutral	Average
0.66	17.68	20.38	38.06	56.00	17.94	Neutral	QP
1.02	8.56	20.73	29.29	46.00	16.71	Neutral	Average
1.02	15.74	20.73	36.47	56.00	19.53	Neutral	QP

FCC§15.225, §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

As per FCC Part 15.225

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{limit} = FS_{max} - 40\log\left(\frac{d_{limit}}{d_{measure}}\right)$$

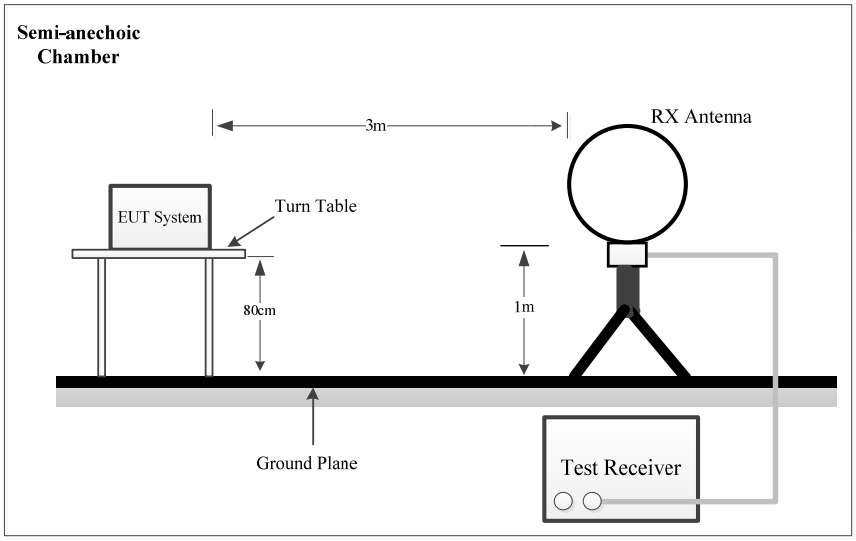
where

FS_{limit}	is the calculation of field strength at the limit distance, expressed in dBμV/m
FS_{max}	is the measured field strength, expressed in dBμV/m
$d_{near\ field}$	is the $\lambda/2\pi$ distance
$d_{measure}$	is the distance of the measurement point from the EUT
d_{limit}	is the reference distance or the distance of the $\lambda/2\pi$ point

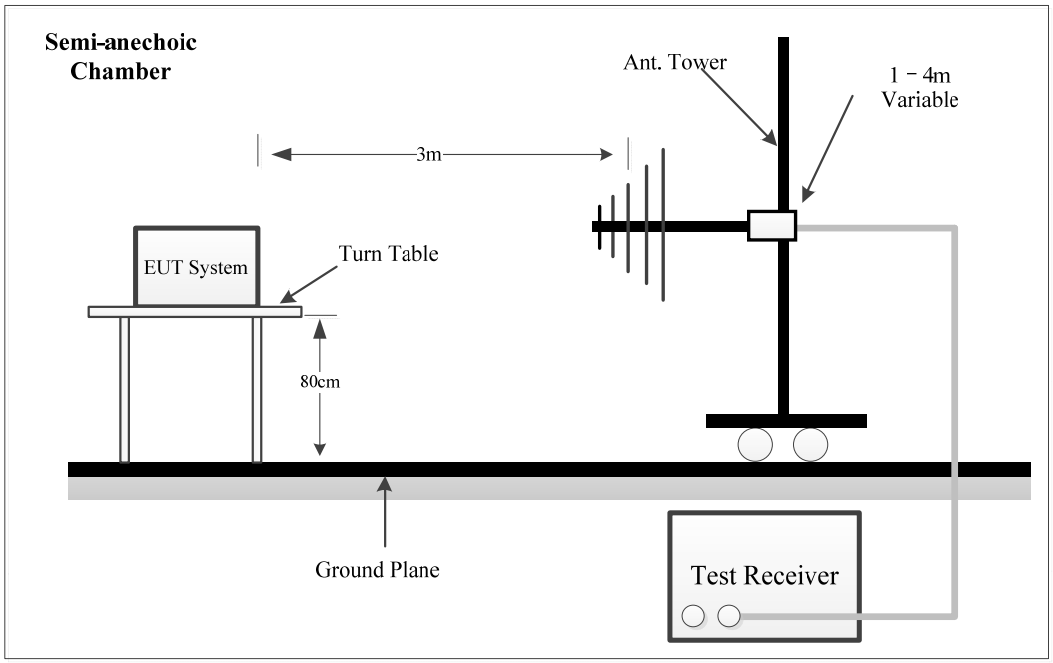
Note: dBμV/m=20 log(μV/m)

Test System Setup

9 kHz-30MHz:



30MHz-1GHz:



The radiated emission tests were performed in the 3 meter chamber a test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	VBW	Measurement
9 kHz – 150 kHz	200Hz	1 kHz	PK
	200Hz	/	QP
150 kHz – 30 MHz	10 kHz	30 kHz	PK
	9kHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	PK
	120kHz	/	QP

4.2.4 Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9-90 kHz, 110-490 kHz, employing an average detector, peak and Average detection modes for frequencies above 1 GHz.

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

Result & Margin Calculation

The Result is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Result (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Result (dBμV/m)

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209, 15.205, 15.225.

Test Data

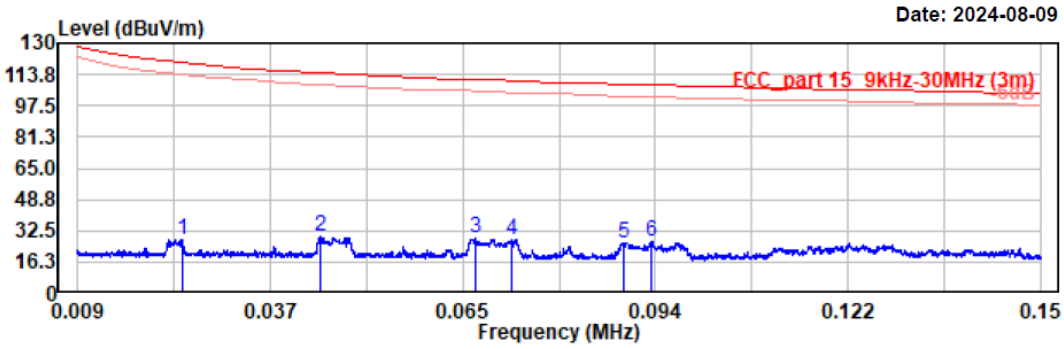
Frequency Range:	9kHz~30MHz	30MHz~1GHz
Temperature:	23.6℃	23.5℃
Relative Humidity:	56 %	55%
ATM Pressure:	100.1 kPa	100.1 kPa
Test Date:	2024-08-09	2024-07-19
Test Engineer:	Wlif Wu	Wlif Wu

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.

1) 9 kHz~150 kHz:

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Parallel)
EUT Model: S532
Test distance: 3m

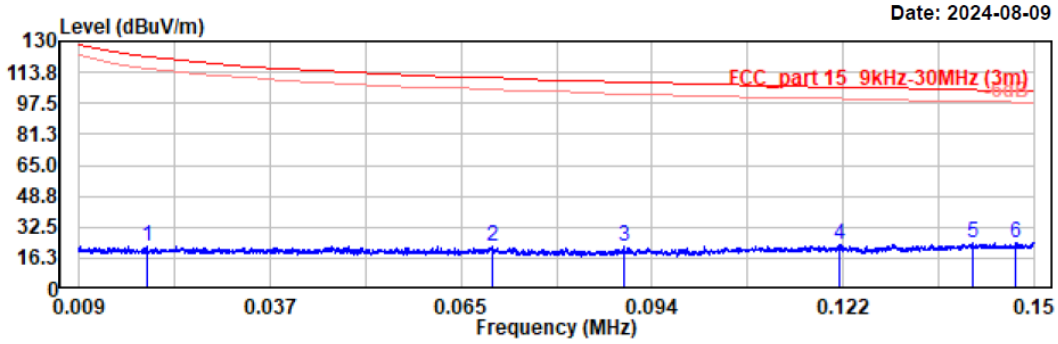
Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.024	8.17	19.85	28.02	119.92	91.90	Peak
0.045	9.51	19.91	29.42	114.63	85.21	Peak
0.067	8.45	19.84	28.29	111.06	82.77	Peak
0.073	8.27	19.78	28.05	110.39	82.34	Peak
0.089	6.49	19.80	26.29	108.63	82.34	Peak
0.093	6.70	19.79	26.49	108.23	81.74	Peak

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Perpendicular)
EUT Model: S532
Test distance: 3m

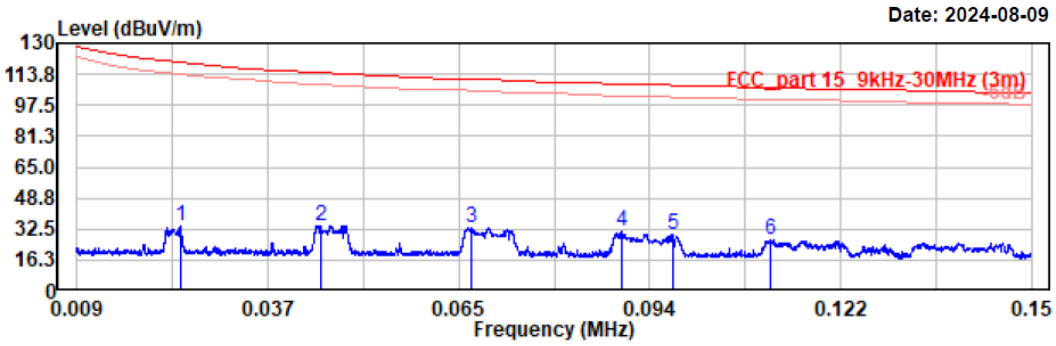
Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.019	2.68	19.78	22.46	122.01	99.55	Peak
0.070	2.66	19.81	22.47	110.69	88.22	Peak
0.089	2.80	19.80	22.60	108.57	85.97	Peak
0.121	3.74	19.73	23.47	105.92	82.45	Peak
0.141	4.08	19.73	23.81	104.63	80.82	Peak
0.147	4.13	19.73	23.86	104.24	80.38	Peak

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Ground-parallel)
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter

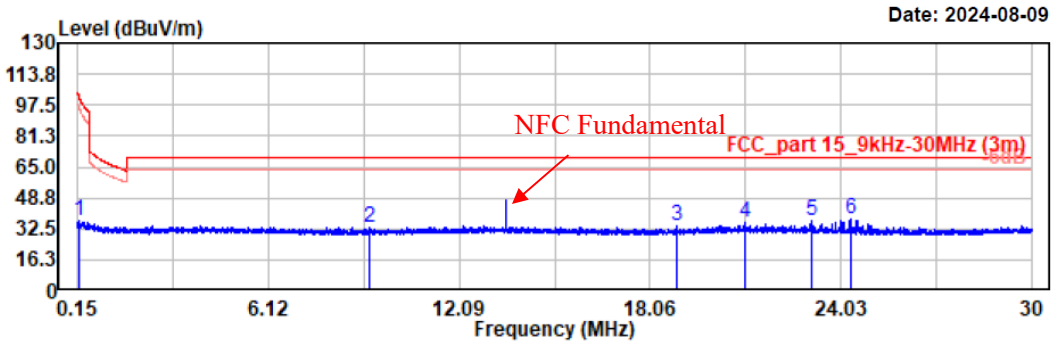


Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.024	13.78	19.85	33.63	119.91	86.28	Peak
0.045	14.40	19.91	34.31	114.56	80.25	Peak
0.067	13.32	19.84	33.16	111.06	77.90	Peak
0.089	11.16	19.80	30.96	108.57	77.61	Peak
0.097	9.98	19.75	29.73	107.88	78.15	Peak
0.112	6.98	19.73	26.71	106.66	79.95	Peak

2) 150 kHz ~30MHz

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Parallel)
EUT Model: S532
Test distance: 3m

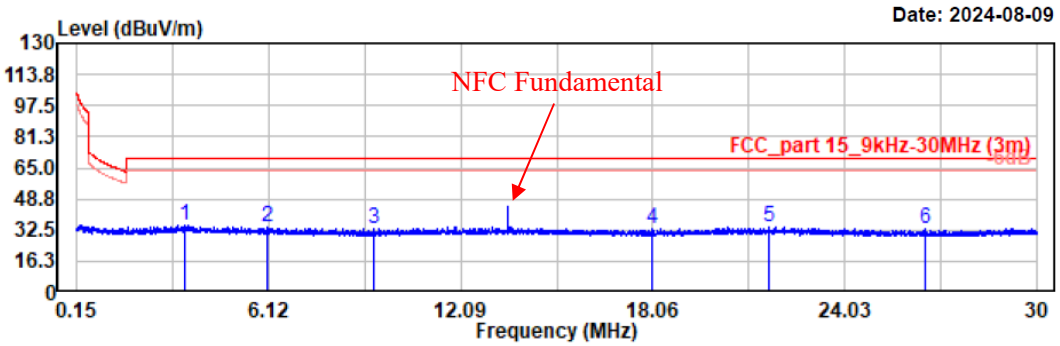
Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
0.198	16.98	19.72	36.70	101.68	64.98	Peak
9.257	13.65	19.70	33.35	69.54	36.19	Peak
18.878	13.85	20.01	33.86	69.54	35.68	Peak
21.051	15.60	20.12	35.72	69.54	33.82	Peak
23.129	16.97	20.17	37.14	69.54	32.40	Peak
24.349	17.47	20.21	37.68	69.54	31.86	Peak

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Perpendicular)
EUT Model: S532
Test distance: 3m

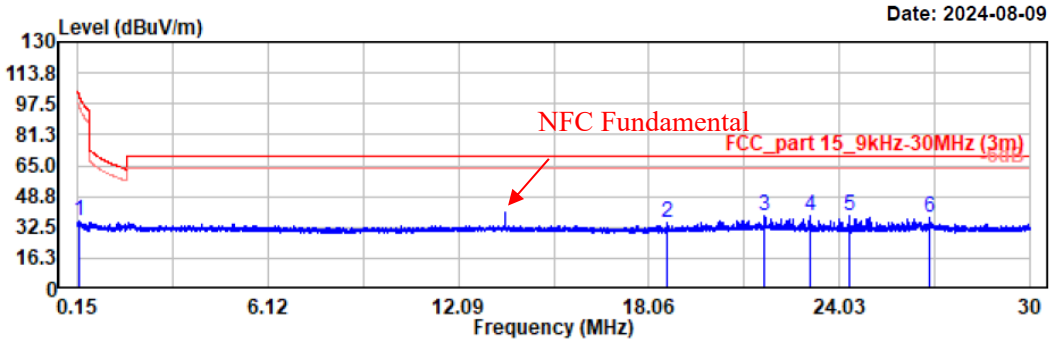
Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
3.520	14.95	19.81	34.76	69.54	34.78	Peak
6.078	14.14	19.80	33.94	69.54	35.60	Peak
9.404	13.83	19.70	33.53	69.54	36.01	Peak
18.036	13.54	19.96	33.50	69.54	36.04	Peak
21.666	14.04	20.13	34.17	69.54	35.37	Peak
26.549	12.93	20.14	33.07	69.54	36.47	Peak

Project No.: 2407T77479E-RF
Test Mode: Transmitting(Ground-parallel)
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter

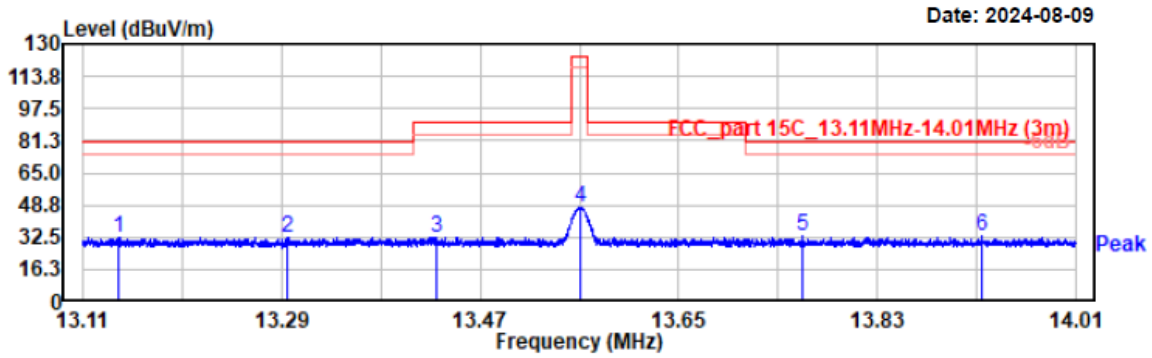


Freq	Reading	Factor	Result	Limit	Margin	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
0.195	16.33	19.72	36.05	101.81	65.76	Peak
18.624	15.41	20.00	35.41	69.54	34.13	Peak
21.666	18.69	20.13	38.82	69.54	30.72	Peak
23.129	18.51	20.17	38.68	69.54	30.86	Peak
24.352	17.95	20.21	38.16	69.54	31.38	Peak
26.857	17.49	20.12	37.61	69.54	31.93	Peak

3) 13.11MHz-14.01MHz

Project No.: 2407T77479E-RF
Test Mode: Transmitting (Parallel)
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter

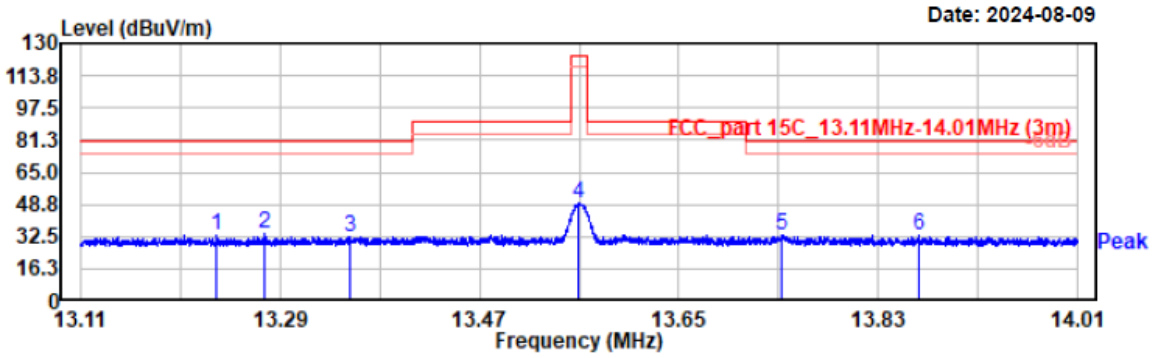


Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
13.14	12.73	19.74	32.47	80.51	48.04	Peak
13.30	12.75	19.74	32.49	80.51	48.02	Peak
13.43	12.97	19.74	32.71	90.47	57.76	Peak
13.56*	27.65	19.74	47.39	124.00	76.61	Peak
13.76	13.00	19.75	32.75	80.51	47.76	Peak
13.92	13.00	19.75	32.75	80.51	47.76	Peak

*: Fundamental

Project No.: 2407T77479E-RF
Test Mode: Transmitting (Perpendicular)
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter

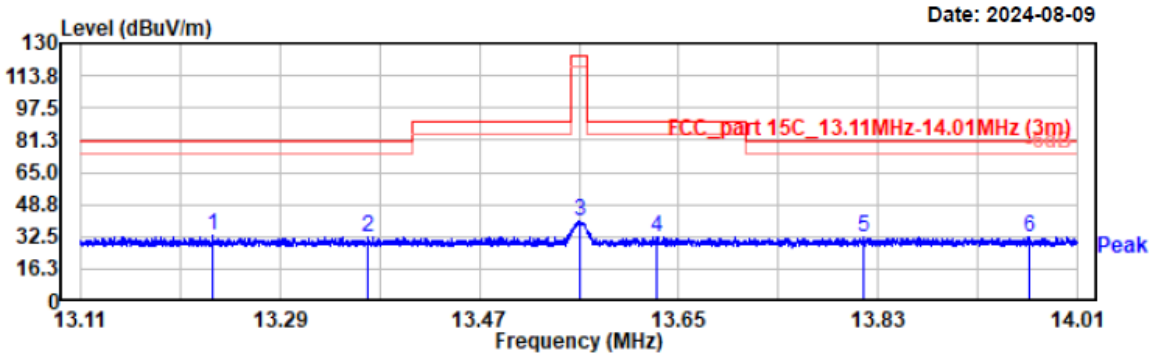


Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
13.23	13.22	19.74	32.96	80.51	47.55	Peak
13.28	14.27	19.74	34.01	80.51	46.50	Peak
13.35	12.72	19.74	32.46	80.51	48.05	Peak
13.56*	29.51	19.74	49.25	124.00	74.75	Peak
13.74	13.68	19.74	33.42	80.51	47.09	Peak
13.87	13.04	19.75	32.79	80.51	47.72	Peak

*: Fundamental

Project No.: 2407T77479E-RF
Test Mode: Transmitting (Ground-parallel)
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.6℃/56%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from adapter



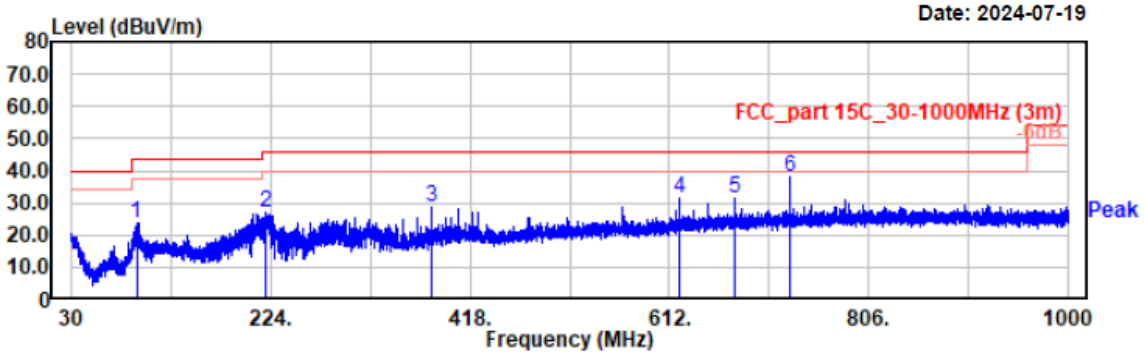
Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark
13.23	13.13	19.74	32.87	80.51	47.64	Peak
13.37	12.47	19.74	32.21	80.51	48.30	Peak
13.56*	20.56	19.74	40.30	124.00	83.70	Peak
13.63	12.93	19.74	32.67	90.47	57.80	Peak
13.82	12.95	19.75	32.70	80.51	47.81	Peak
13.97	12.32	19.75	32.07	80.51	48.44	Peak

*: Fundamental

4) 30MHz-1GHz

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532
Test distance: 3m

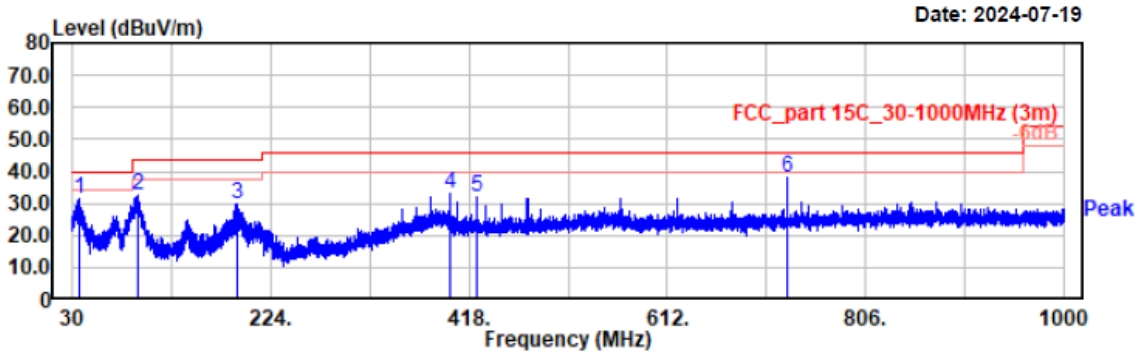
Temp/Humi/ATM: 23.5℃/55%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 48V from PoE



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
93.15	40.48	-16.64	23.84	43.50	19.66	Horizontal	Peak
219.05	39.45	-12.65	26.80	46.00	19.20	Horizontal	Peak
379.78	35.67	-7.12	28.55	46.00	17.45	Horizontal	Peak
621.02	32.99	-1.57	31.42	46.00	14.58	Horizontal	Peak
675.05	32.08	-0.61	31.47	46.00	14.53	Horizontal	Peak
729.08	37.76	0.09	37.85	46.00	8.15	Horizontal	Peak

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532
Test distance: 3m

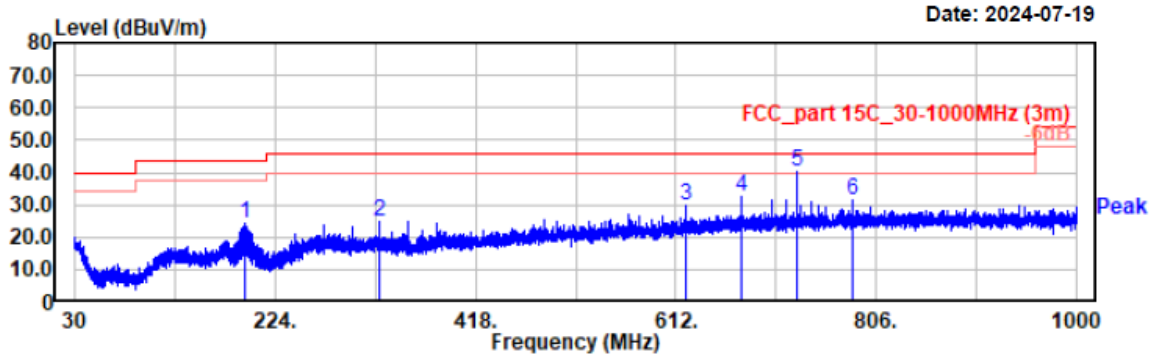
Temp/Humi/ATM: 23.5℃/55%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 48V from PoE



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
36.01	40.41	-8.74	31.67	40.00	8.33	Vertical	Peak
94.21	49.33	-16.58	32.75	43.50	10.75	Vertical	Peak
191.80	41.78	-12.17	29.61	43.50	13.89	Vertical	Peak
400.06	39.26	-6.39	32.87	46.00	13.13	Vertical	Peak
425.08	37.43	-5.50	31.93	46.00	14.07	Vertical	Peak
729.08	37.92	0.09	38.01	46.00	7.99	Vertical	Peak

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532
Test distance: 3m

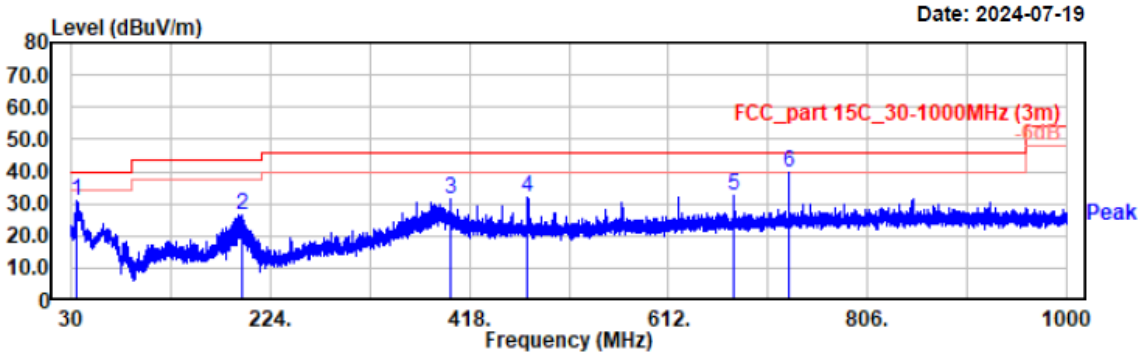
Temp/Humi/ATM: 23.5℃/55%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from Adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
194.61	36.02	-12.00	24.02	43.50	19.48	Horizontal	Peak
325.46	33.72	-8.64	25.08	46.00	20.92	Horizontal	Peak
621.12	31.50	-1.57	29.93	46.00	16.07	Horizontal	Peak
675.05	33.21	-0.61	32.60	46.00	13.40	Horizontal	Peak
729.04	39.92	0.09	40.01	46.00	5.99	Horizontal	QP
783.11	30.34	1.08	31.42	46.00	14.58	Horizontal	Peak

Project No.: 2407T77479E-RF
Test Mode: NFC Transmitting
EUT Model: S532
Test distance: 3m

Temp/Humi/ATM: 23.5℃/55%/100.1kPa
Tested by: Wlif Wu
Power Source: DC 12V from Adapter



Freq MHz	Reading dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Polarity	Remark
34.66	38.50	-7.86	30.64	40.00	9.36	Vertical	Peak
195.87	38.22	-11.95	26.27	43.50	17.23	Vertical	Peak
400.06	38.05	-6.39	31.66	46.00	14.34	Vertical	Peak
475.04	35.91	-4.06	31.85	46.00	14.15	Vertical	Peak
675.15	32.95	-0.61	32.34	46.00	13.66	Vertical	Peak
729.08	39.48	0.09	39.57	46.00	6.43	Vertical	Peak

FCC§15.225(e) - FREQUENCY STABILITY

Applicable Standard

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Procedure

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.
NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

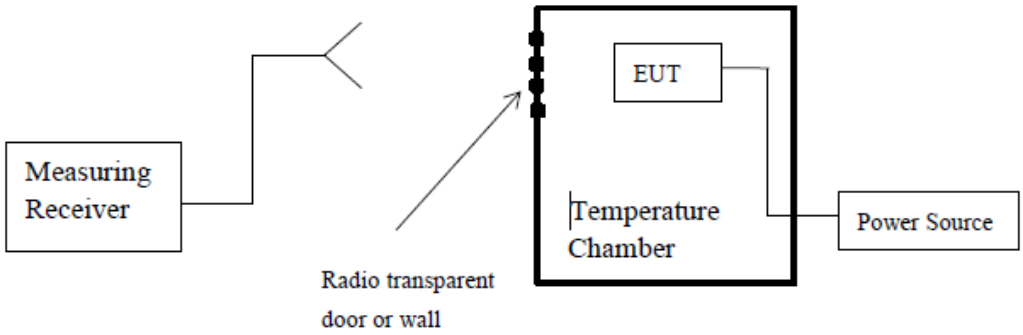
g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more that 10 °C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

Test Setup Block diagram



Test Data

Test Mode:	Transmitting	Test Engineer:	Wlif Wu
Test Date:	2024-08-10	Environment:	Temp.: 23.8℃ Humi.: 56% Atm:100.8kPa

Test Result: Compliant

Note: Test voltage is DC 48V from PoE(AC 120V/60Hz)

F_0=13.56MHz					
Test Item	**Temperature (℃)**	**Voltage (Vac)**	**Measured Frequency (MHz)**	**Frequency Error (%)**	**Limit (%)**
Frequency Stability vs. Temperature	-20	120	13.560146	0.0011	0.01
	-10	120	13.560268	0.0020	0.01
	0	120	13.560354	0.0026	0.01
	10	120	13.560453	0.0033	0.01
	20	120	13.560608	0.0045	0.01
	30	120	13.560712	0.0053	0.01
	40	120	13.560881	0.0065	0.01
	50	120	13.560912	0.0067	0.01
Frequency Stability vs. Voltage	20	108	13.560514	0.0038	0.01
	20	132	13.560435	0.0032	0.01

Note: Test voltage is DC 12V from Adapter (AC 120V/60Hz)

F_0 =13.56MHz					
Test Item	**Temperature (°C)**	**Voltage (Vac)**	**Measured Frequency (MHz)**	**Frequency Error (%)**	**Limit (%)**
Frequency Stability vs. Temperature	-20	120	13.559746	-0.0019	0.01
	-10	120	13.559846	-0.0011	0.01
	0	120	13.559873	-0.0009	0.01
	10	120	13.559905	-0.0007	0.01
	20	120	13.560101	0.0007	0.01
	30	120	13.560187	0.0014	0.01
	40	120	13.560238	0.0018	0.01
	50	120	13.560301	0.0022	0.01
Frequency Stability vs. Voltage	20	108	13.560105	0.0008	0.01
	20	132	13.560254	0.0019	0.01

§15.215(c) - 20dB EMISSION BANDWIDTH TESTING

Requirement

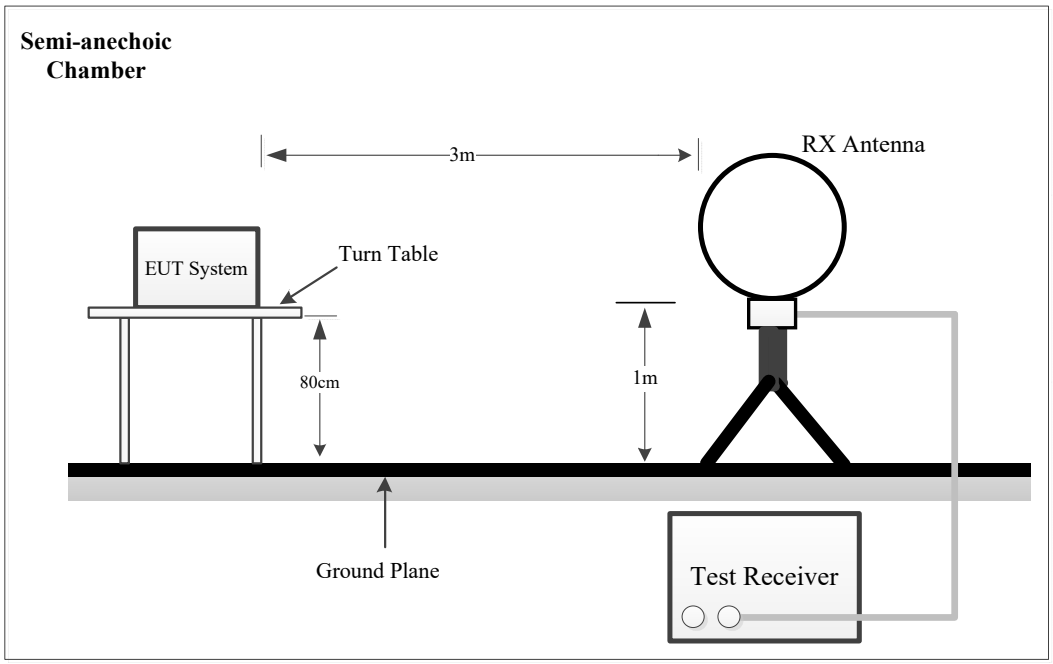
Per 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified 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. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Procedure

1. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

2. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Setup Block diagram



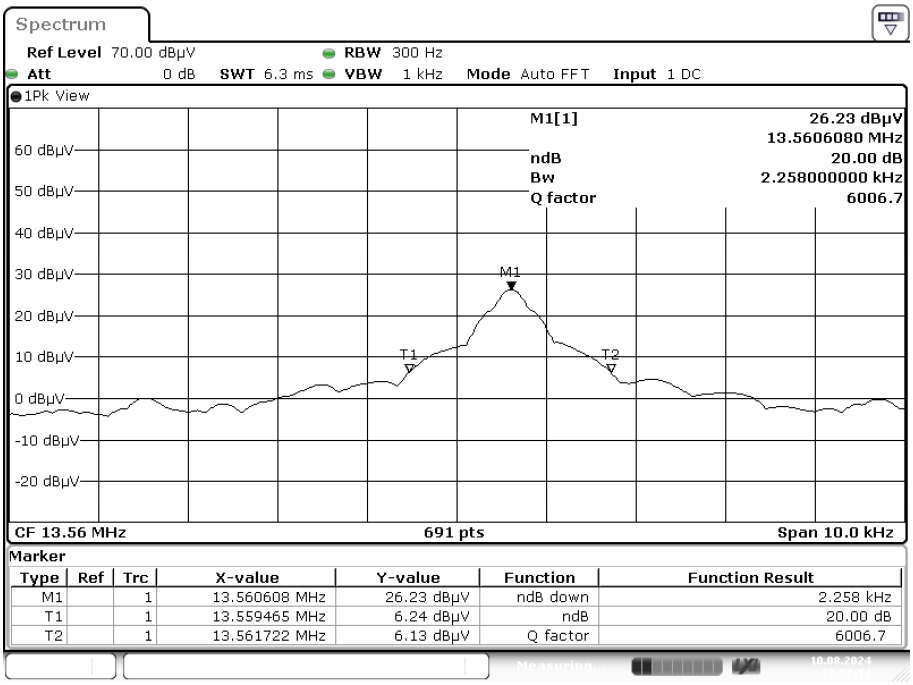
Test Data

Test Mode:	Transmitting	Test Engineer:	Wlif Wu
Test Date:	2024-08-10	Environment:	Temp.: 23.8°C Humi.: 56% Atm:100.8kPa

Test Result: Compliant

Frequency (MHz)	20 dB Bandwidth (kHz)
13.56	2.258

20 dB Emission Bandwidth-13.56MHz



Project No.:2407T77479E-RF Tester:Wlif Wu

Date: 10.AUG.2024 12:58:14

EUT PHOTOGRAPHS

Please refer to the attachment 2407T77479E-RF-EXP_EUT EXTERNAL PHOTOGRAPHS and 2407T77479E-RF-INP _EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2407T77479E-RF-TSP-02_TEST SETUP PHOTOGRAPHS.

Declarations

1. Bay Area Compliance Laboratories Corp. (Xiamen) is not responsible for authenticity of any information provided by the applicant. Information from the applicant that may affect test results are marked with an asterisk "★".

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

3. Unless required by the rule provided by the applicant or product regulations, then decision rule in this report did not consider the uncertainty.

4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

5. This report cannot be reproduced except in full, without prior written approval of Bay Area Compliance Laboratories Corp. (Xiamen).

6. This report is valid only with a valid digital signature. The digital signature may be available only under the adobe software above version 7.0.

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******* END OF REPORT *******