



TESTREPORT

Applicant Name : Invengo Information Technology Co., Ltd.
Address : 27th and 28th Floor,Hi-Tech Zone Union Tower, NO.63, Gaoxin
South 10th Road, Nanshan District, Shenzhen,China
Report Number: SZNS1220914-41680E-RF-00G
FCC ID: TQ4-XC2908

Test Standard (s)

FCC PART 15.225

Sample Description

Product Type: Portable reader
Model No.: XC2908
Multiple Model(s) No.: XC2908-A,XC2908-B,XC2908-C,XC2908-D,XC2908-E,
XC2908-F,XC2908-G,XC2908-H,XC2908-I,XC2908-J,
XC2908-K,XC2908-L,XC2908-M,XC2908-N,XC2908-BM,
XC-BM500,XC-RH500,AT908, XC2002,XC2005,XC9915
Trade Mark: N/A
Date Received: 2022/09/14
Report Date: 2023/01/15

Test Result:	Pass*
--------------	-------

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:

Andy Yu
EMC Engineer

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. 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 an asterisk "**". Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. 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.

Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86 755-26503290 Fax: +86 755-26503396 Web: www.atc-lab.com

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	3
GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE	4
TEST METHODOLOGY	4
MEASUREMENT UNCERTAINTY.....	5
SYSTEM TEST CONFIGURATION.....	6
JUSTIFICATION	6
EUT EXERCISE SOFTWARE	6
EQUIPMENT MODIFICATIONS	6
SUPPORT EQUIPMENT LIST AND DETAILS	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS	8
TEST EQUIPMENT LIST	9
FCC §1.1310 & §2.1093 - RF EXPOSURE INFORMATION.....	10
FCC§15.203 - ANTENNA REQUIREMENT.....	11
APPLICABLE STANDARD	11
ANTENNA CONNECTED CONSTRUCTION	11
FCC §15.207 – AC LINE CONDUCTED EMISSION.....	12
APPLICABLE STANDARD	12
EUT SETUP	12
EMI TEST RECEIVER SETUP.....	12
TEST PROCEDURE	13
TRANSF FACTOR & MARGIN CALCULATION.....	13
TEST DATA	13
FCC§15.225, §15.205& §15.209 - RADIATED EMISSIONS TEST	16
APPLICABLE STANDARD	16
EUT SETUP	16
EMI TEST RECEIVER SETUP.....	17
FACTOR& MARGIN CALCULATION	17
TEST DATA	17
FCC§15.225(E) - FREQUENCY STABILITY.....	29
APPLICABLE STANDARD	29
TEST PROCEDURE	29
TEST DATA	29
FCC§15.215(C) -20DBEMISSION BANDWIDTH	31
REQUIREMENT	31
TEST PROCEDURE	31
TEST DATA	32

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZNS1220914-41680E-RF-00G	Original Report	2023/01/15

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Portable reader
Tested Model	XC2908
Multiple Models	XC2908-A, XC2908-B, XC2908-C, XC2908-D, XC2908-E, XC2908-F, XC2908-G, XC2908-H, XC2908-I, XC2908-J, XC2908-K, XC2908-L, XC2908-M, XC2908-N, XC2908-BM, XC-BM500, XC-RH500, AT908, XC2002, XC2005, XC9915 (model difference see product declaration letter of similarity)
Frequency Range	13.56 MHz
Modulation Technique	ASK
Maximum E-field strength	56.96dVuV/m@3m
Voltage Range	3.7V from battery or DC 5V from adapter
Sample serial number	SZNS1220914-41680E-RF-S1 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: ICP20-050-3000B Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 5.0V, 3.0A, 15.0W
Note: the series models are electrical identical, they may have slight difference in appearance, detail please refer to the DOS letter and External photo, the model XC2908 was selected to test.	

Objective

This Type approval report is in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules, section 15.203, 15.205, 15.207, 15.209 and 15.225.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz- 18GHz	4.98dB
	18GHz-26.5GHz	5.06dB
	26.5GHz-40GHz	4.72dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

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

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No Exercise Software was used.

Equipment Modifications

No modification on the EUT.

Support Equipment List and Details

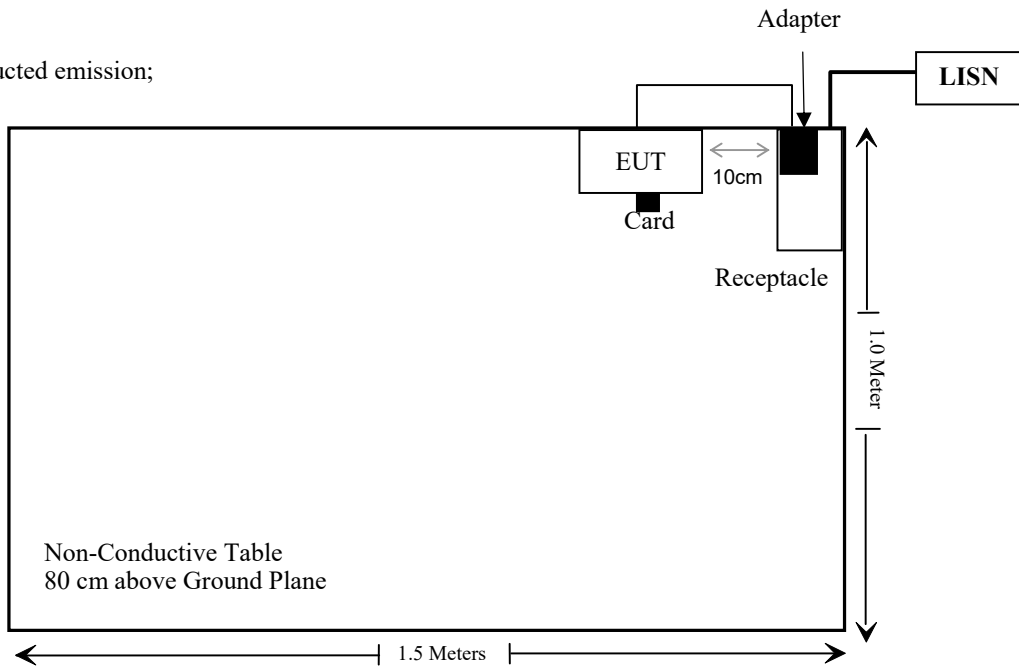
Manufacturer	Description	Model	Serial Number
Unknown	Card	Unknown	Unknown

External I/O Cable

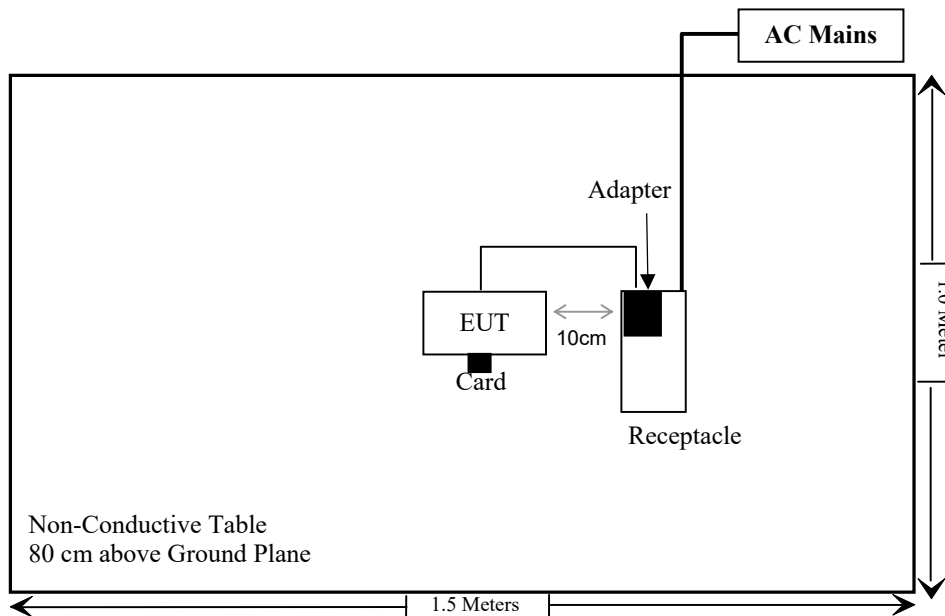
Cable Description	Length (m)	From Port	To
Un-shielded Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For conducted emission;



For Radiated Emissions:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§2.1093	RF EXPOSURE	Compliant
§15.203	Antenna Requirement	Compliant
§15.207	AC Line Conducted Emission	Compliant
§15.225 §15.209§15.205	Radiated Emission Test	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.215(c)	20dB Emission Bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24
Rohde & Schwarz	L.I.S.N.	ESH3-Z5	100305	2022/12/01	2023/11/30
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
SCHWARZBECK	LOOP ANTENNA	FMZB1516	1516131	2021/12/22	2024/12/21
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Frequency Stability					
REALE	Temp. & Humid. Chamber	RHP-800BT	R20170318310	2022/11/23	2023/11/22
Fluke	Multi Meter	45	7664009	2022/12/14	2023/12/13
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
SCHWARZBECK	LOOP ANTENNA	FMZB1516	1516131	2021/12/22	2024/12/21

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

According to KDB 447498 D01 General RF Exposure Guidance v06, clause 4.3. General SAR test exclusion guidance:

- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):
- 1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$
 - 2) For test separation distances ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
 - 3) SAR measurement procedures are not established below 100 MHz.

Test Result

$$P_{th} = [474 * (1 + \log(100/f_{(\text{MHz})}))] / 2 = 443 \text{ mW.}$$

$$E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$$

$$E[\text{dB}\mu\text{V}/\text{m}] = 56.96 \text{ dB}\mu\text{V}/\text{m}@3\text{m},$$

The antenna gain is 0dBi

$$\text{EIRP} = 56.96 \text{ dB}\mu\text{V}/\text{m} - 95.2 = -38.24 \text{ dBm} = 0.00015 \text{ mW} < 443 \text{ mW}$$

So the NFC SAR evaluation can be compliance.

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 internal antenna arrangement for NFC which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

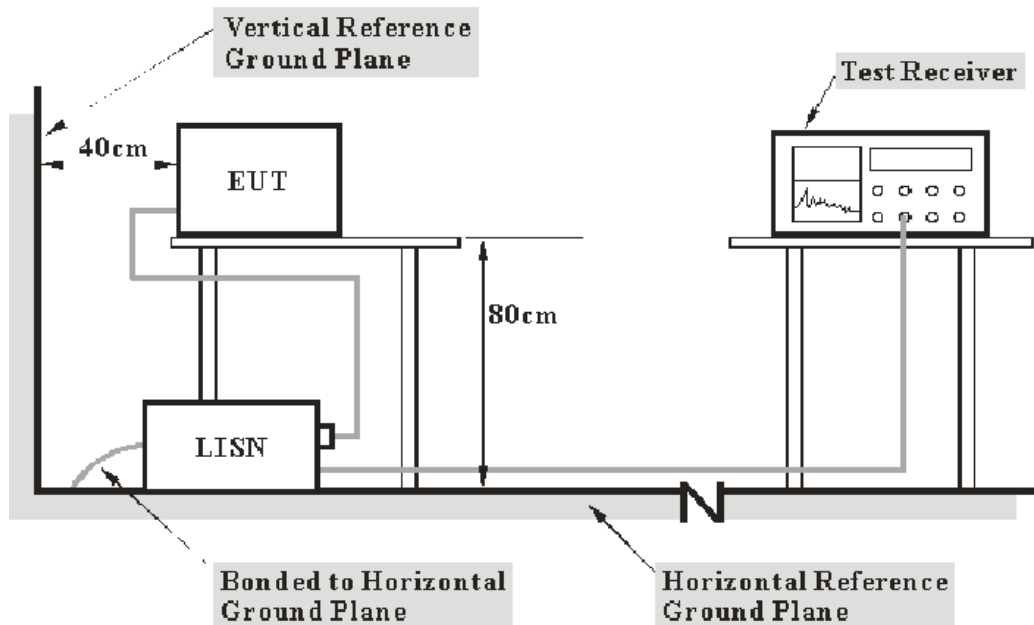
Result: Compliant.

FCC §15.207 – AC LINE CONDUCTED EMISSION

Applicable Standard

FCC§15.207

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 30 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.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

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

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

Test Procedure

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

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Transd Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Transd Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Over limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

$$\begin{aligned} \text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data

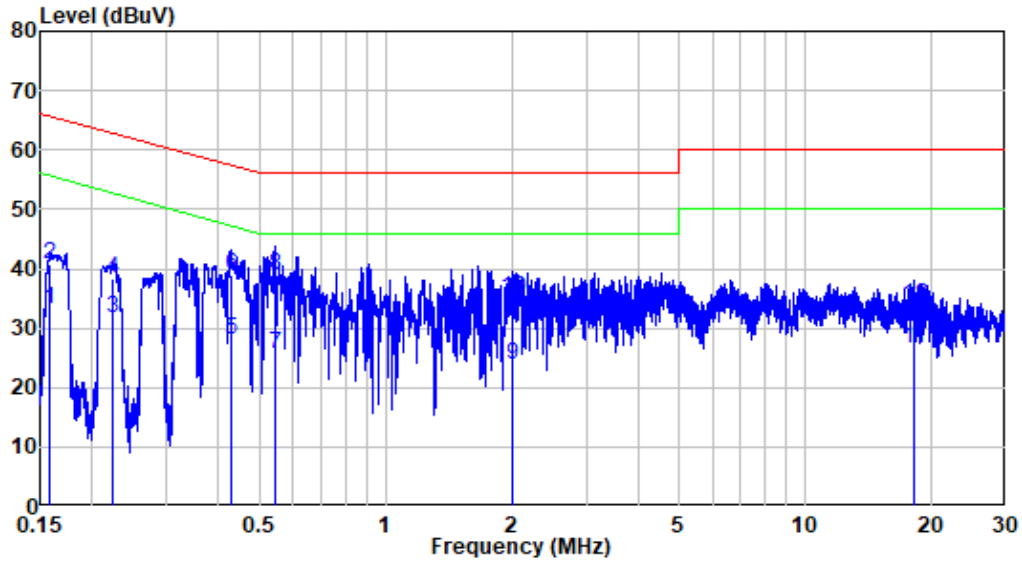
Environmental Conditions

Temperature:	23°C
Relative Humidity:	56%
ATM Pressure:	101.0 kPa

The testing was performed by Jason Liu on 2023-01-06.

Test mode: Transmitting

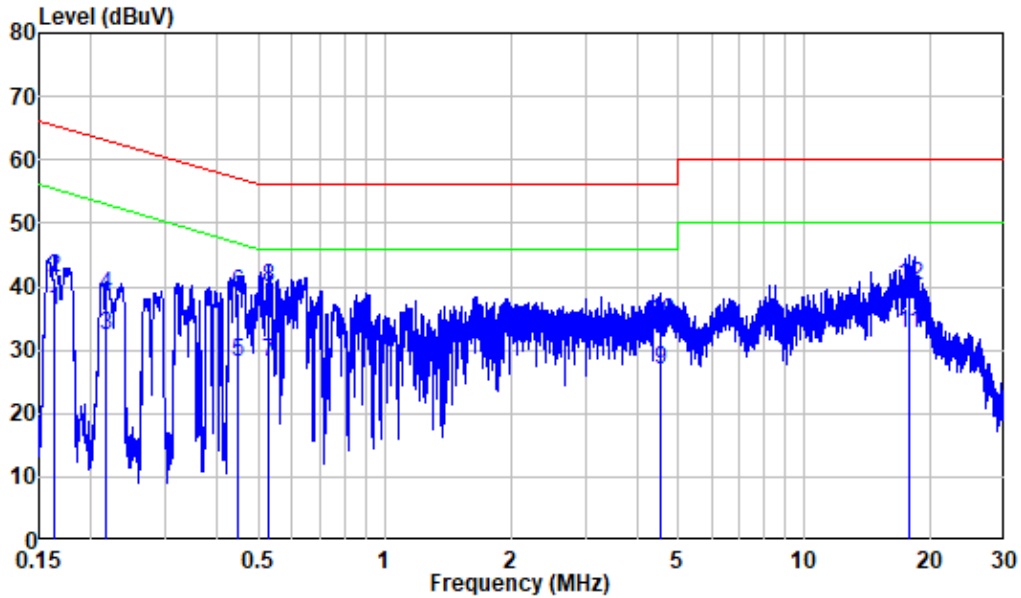
AC 120 V/60 Hz, Line:



Site : Shielding Room
 Condition: Line
 Job No. : SZNS1220914-41680E-RF
 Mode : NFC
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.159	9.80	23.33	33.13	55.53	-22.40	Average
2	0.159	9.80	30.91	40.71	65.53	-24.82	QP
3	0.223	9.80	22.03	31.83	52.69	-20.86	Average
4	0.223	9.80	28.61	38.41	62.69	-24.28	QP
5	0.429	9.80	18.39	28.19	47.28	-19.09	Average
6	0.429	9.80	29.22	39.02	57.28	-18.26	QP
7	0.546	9.81	15.84	25.65	46.00	-20.35	Average
8	0.546	9.81	29.08	38.89	56.00	-17.11	QP
9	2.008	9.82	13.90	23.72	46.00	-22.28	Average
10	2.008	9.82	25.12	34.94	56.00	-21.06	QP
11	18.075	9.98	16.51	26.49	50.00	-23.51	Average
12	18.075	9.98	23.76	33.74	60.00	-26.26	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
 Condition: Neutral
 Job No. : SZNS1220914-41680E-RF
 Mode : NFC
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.164	9.80	26.53	36.33	55.28	-18.95	Average
2	0.164	9.80	31.41	41.21	65.28	-24.07	QP
3	0.218	9.80	22.65	32.45	52.91	-20.46	Average
4	0.218	9.80	28.84	38.64	62.91	-24.27	QP
5	0.446	9.80	18.17	27.97	46.95	-18.98	Average
6	0.446	9.80	29.14	38.94	56.95	-18.01	QP
7	0.527	9.81	18.27	28.08	46.00	-17.92	Average
8	0.527	9.81	29.90	39.71	56.00	-16.29	QP
9	4.546	9.87	17.14	27.01	46.00	-18.99	Average
10	4.546	9.87	24.66	34.53	56.00	-21.47	QP
11	17.755	10.08	22.43	32.51	50.00	-17.49	Average
12	17.755	10.08	30.07	40.15	60.00	-19.85	QP

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

Applicable Standard

As per FCC Part 15.225

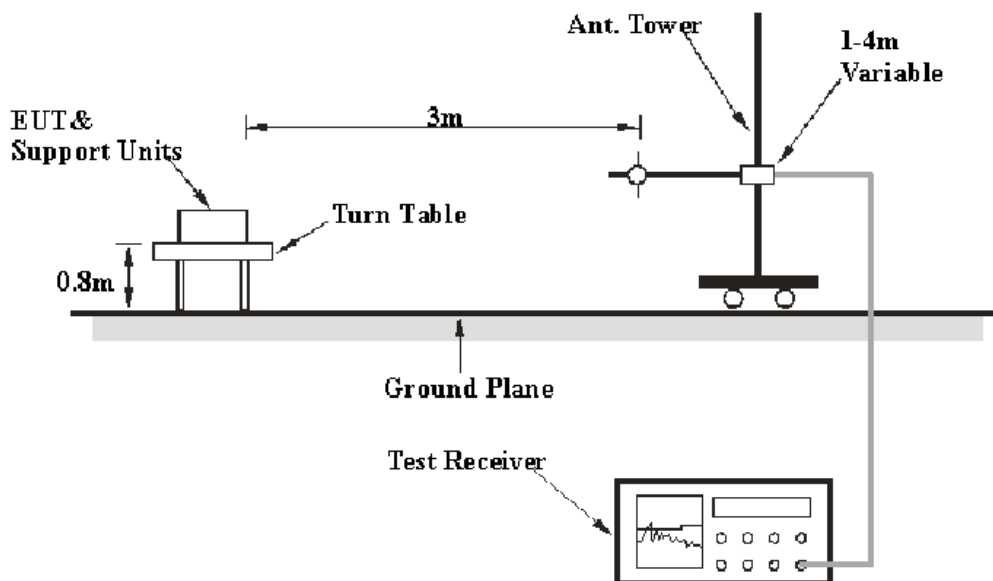
(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(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.

EUT Setup



Note: Antenna is set up at 1m during test for below 30MHz.

The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

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	Video B/W	IF B/W	Detector
9 kHz – 150 kHz	300 Hz	1kHz	/	QP
150 kHz –30MHz	10 kHz	30 kHz	/	QP
30MHz – 1000 MHz	100 kHz	300 kHz	/	QP

Factor& Margin Calculation

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

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level} / \text{Corrected Amplitude} - \text{Limit} \\ \text{Level} / \text{Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data

Environmental Conditions

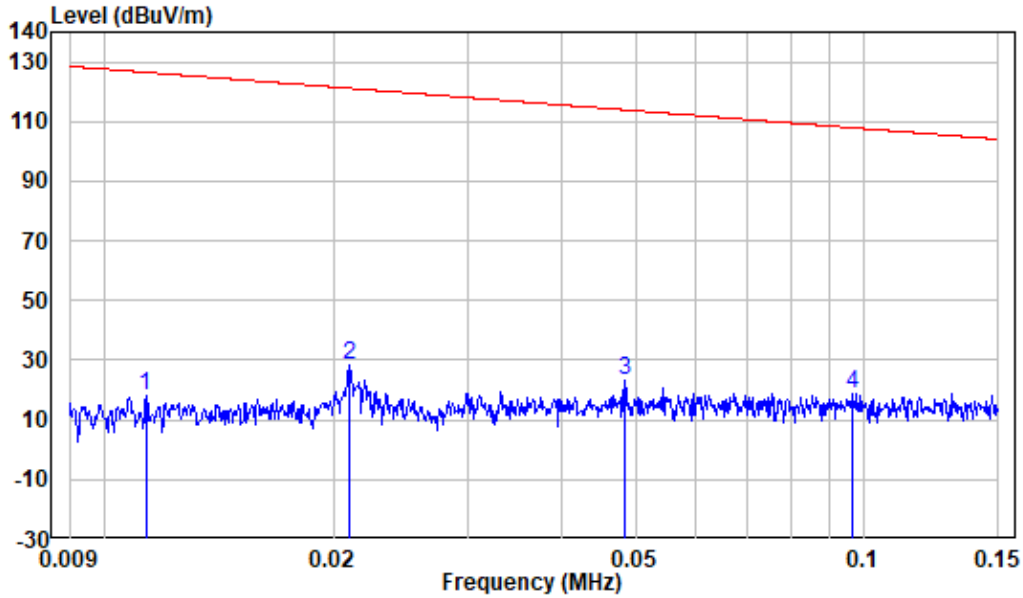
Temperature:	24°C
Relative Humidity:	55~60%
ATM Pressure:	101.0 kPa

The testing was performed by Jimi on 2023-01-06.

Test mode: Transmitting

Ground-parallel:

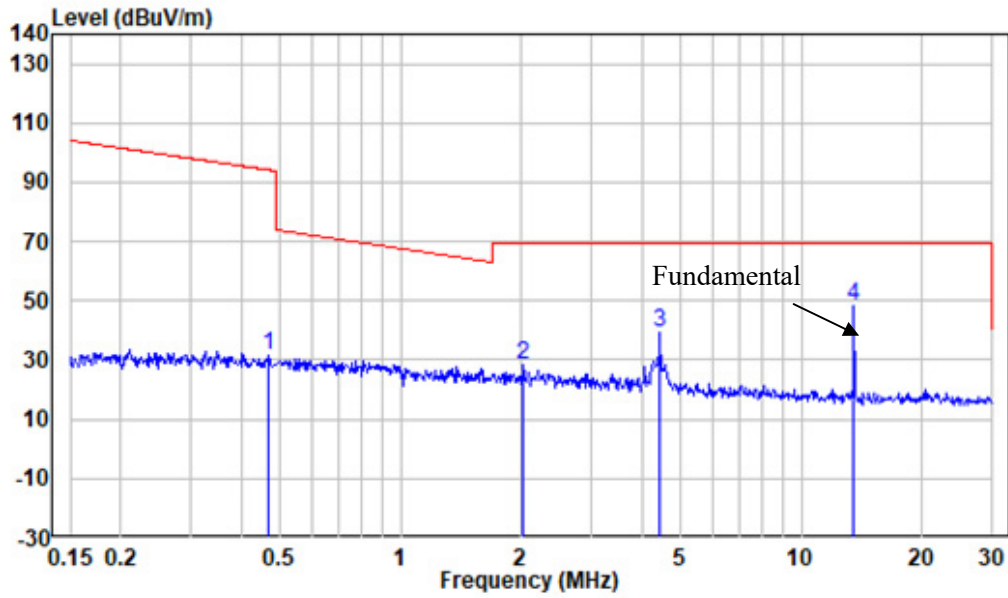
9 kHz~150 kHz:



Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Ground-parallel

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.011	-11.40	29.38	17.98	126.52	-108.54	Peak
2	0.021	-11.69	39.99	28.30	121.16	-92.86	Peak
3	0.048	-11.54	34.49	22.95	113.91	-90.96	Peak
4	0.096	-11.56	30.41	18.85	107.92	-89.07	Peak

150 kHz~30MHz:

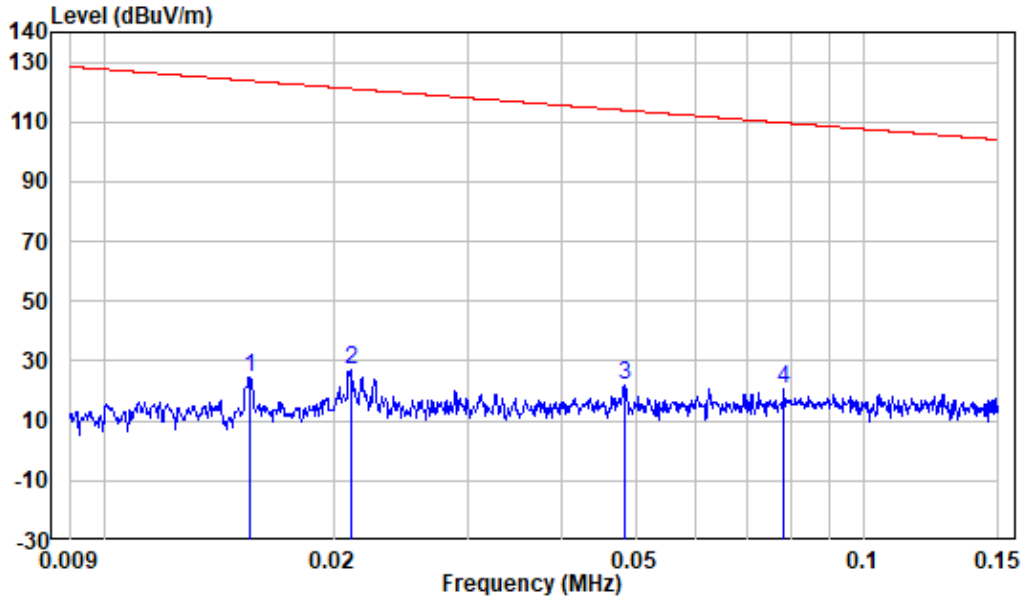


Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Ground-parallel

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.469	-11.62	43.00	31.38	94.19	-62.81	Peak
2	2.023	-11.33	39.61	28.28	69.54	-41.26	Peak
3	4.430	-11.69	50.99	39.30	69.54	-30.24	Peak

Perpendicular:

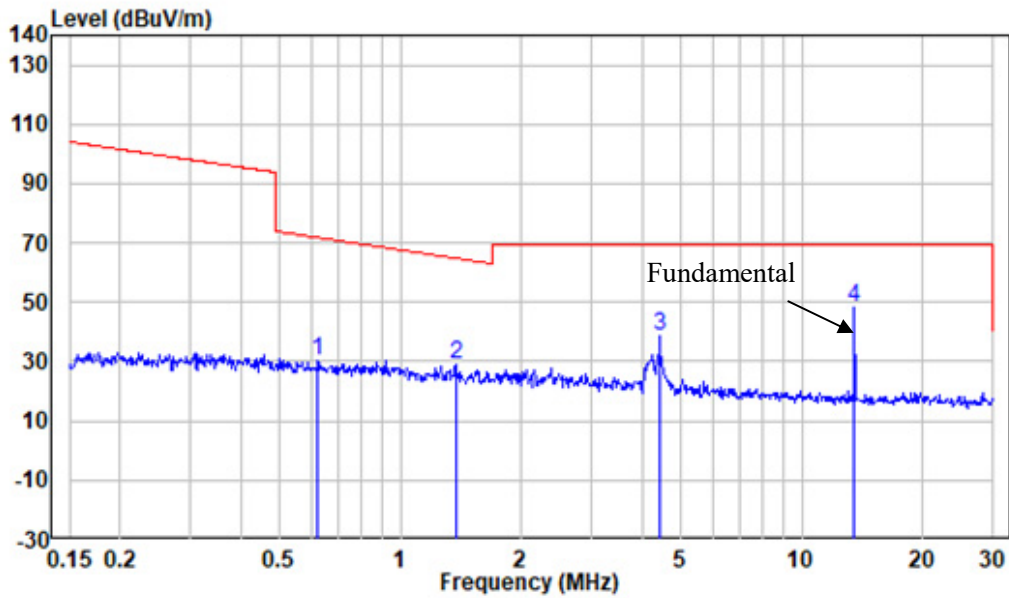
9 kHz~150 kHz:



Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Perpendicular

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.016	-11.54	36.32	24.78	123.78	-99.00	Peak
2	0.021	-11.69	39.01	27.32	121.12	-93.80	Peak
3	0.048	-11.54	33.27	21.73	113.93	-92.20	Peak
4	0.078	-11.58	32.24	20.66	109.73	-89.07	Peak

150 kHz~30MHz:

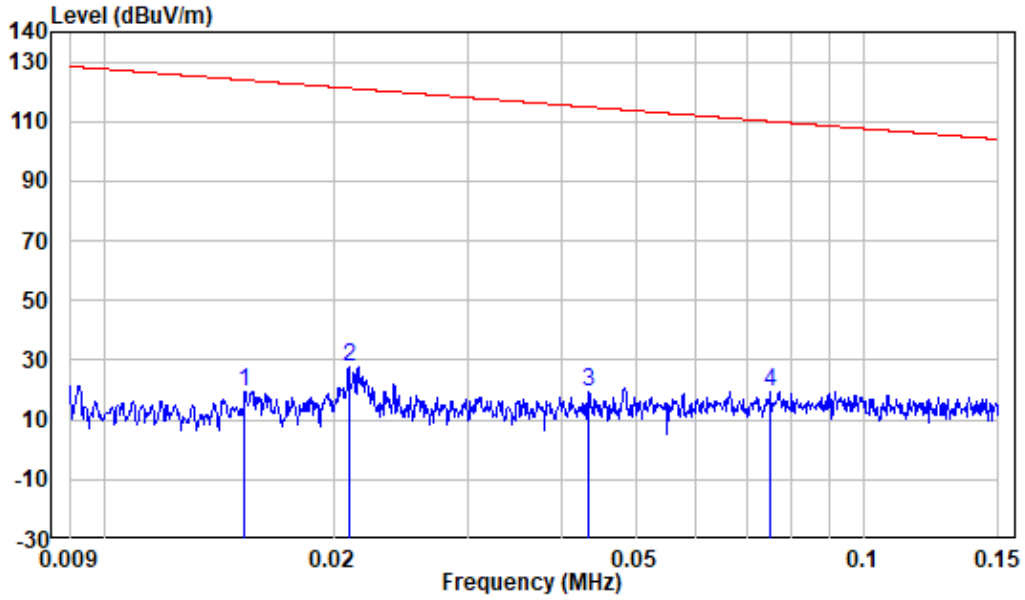


Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Perpendicular

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.624	-11.75	42.05	30.30	71.66	-41.36	Peak
2	1.374	-11.49	40.76	29.27	64.66	-35.39	Peak
3	4.430	-11.69	50.49	38.80	69.54	-30.74	Peak

Parallel:

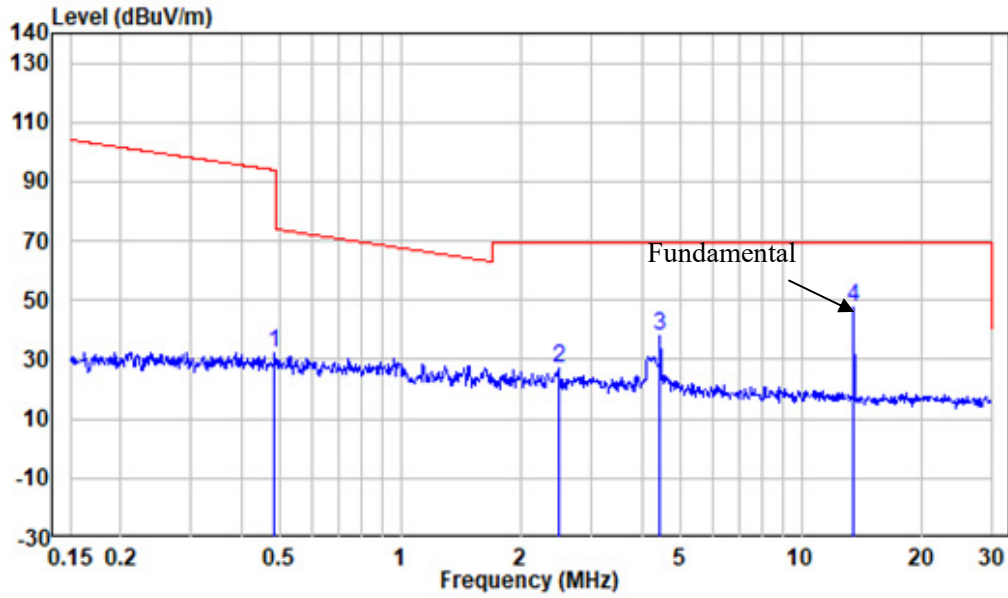
9 kHz~150 kHz:



Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Parallel

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.015	-11.53	30.65	19.12	123.90	-104.78	Peak
2	0.021	-11.69	39.33	27.64	121.16	-93.52	Peak
3	0.043	-11.57	31.09	19.52	114.86	-95.34	Peak
4	0.075	-11.59	31.28	19.69	110.07	-90.38	Peak

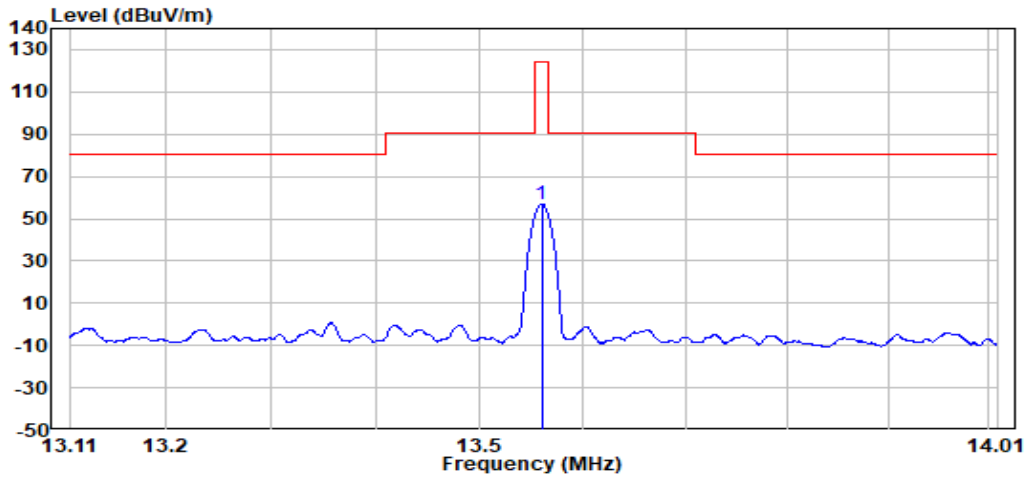
150 kHz~30MHz:



Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Parallel

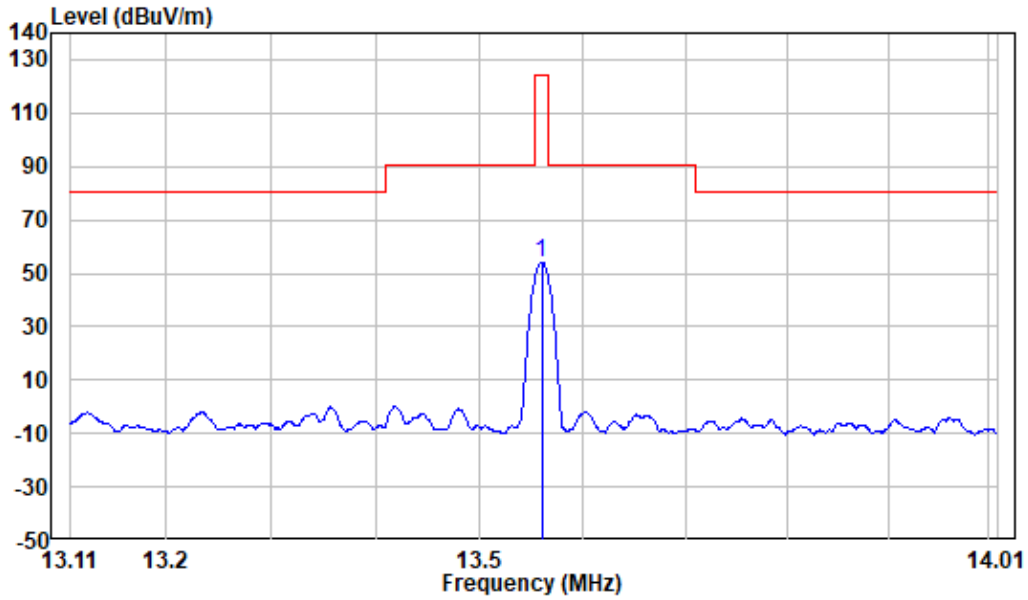
	Read	Limit	Over			
Freq	Factor	Level	Level	Line	Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.484	-11.60	43.59	31.99	93.91	-61.92 Peak
2	2.474	-11.59	38.43	26.84	69.54	-42.70 Peak
3	4.430	-11.69	49.93	38.24	69.54	-31.30 Peak

2) Emission Mask & Fundamental:



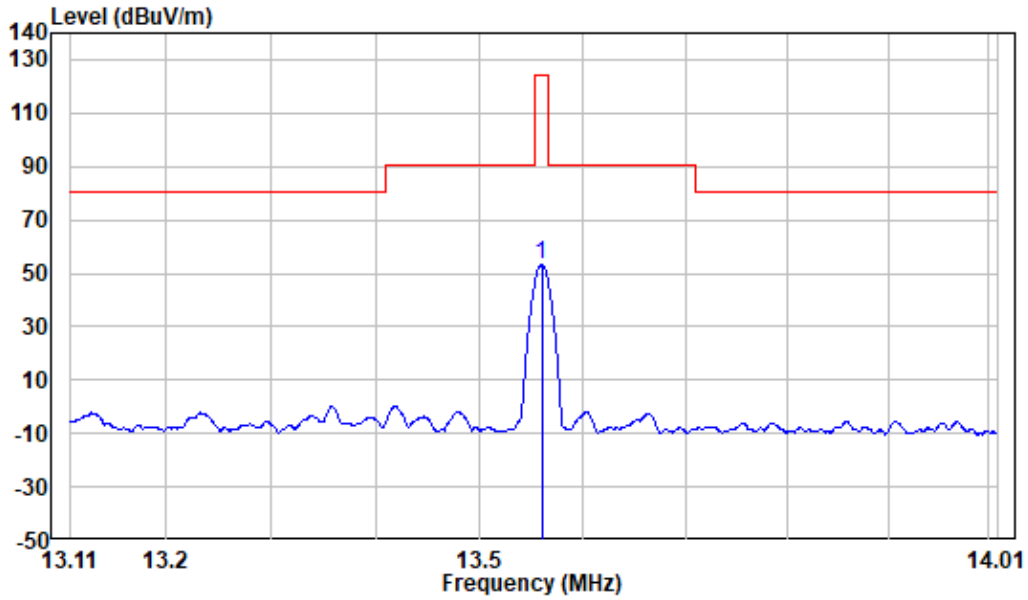
Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Ground-parallel

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-10.92	67.88	56.96	124.00	-67.04	Peak



Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Perpendicular

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-10.92	64.97	54.05	124.00	-69.95	Peak

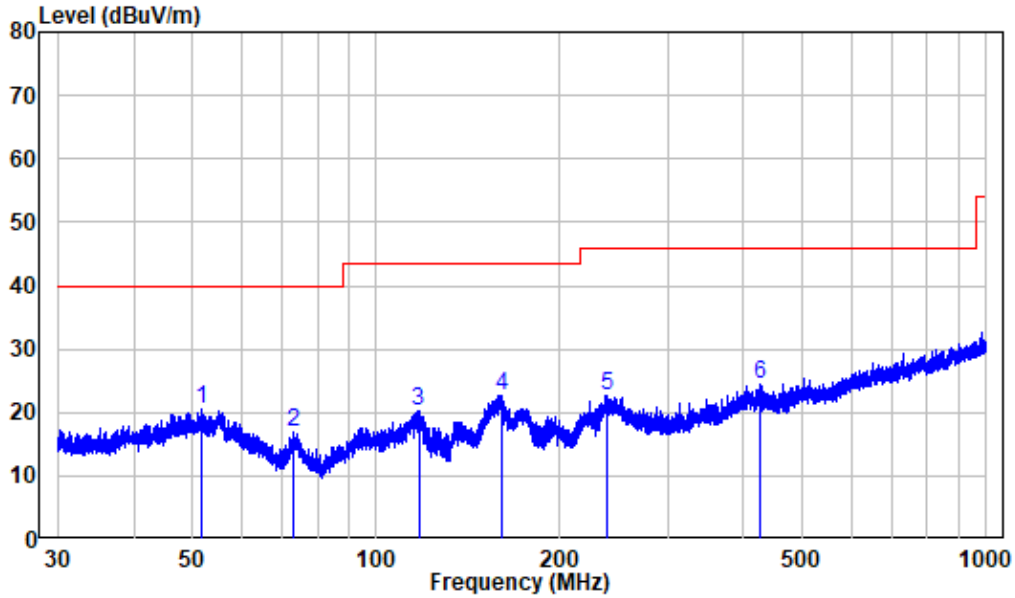


Site : chamber
 Condition: 3m
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC
 Note : Parallel

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-10.92	64.16	53.24	124.00	-70.76	Peak

3) Spurious Emissions (30 MHz~1GHz):

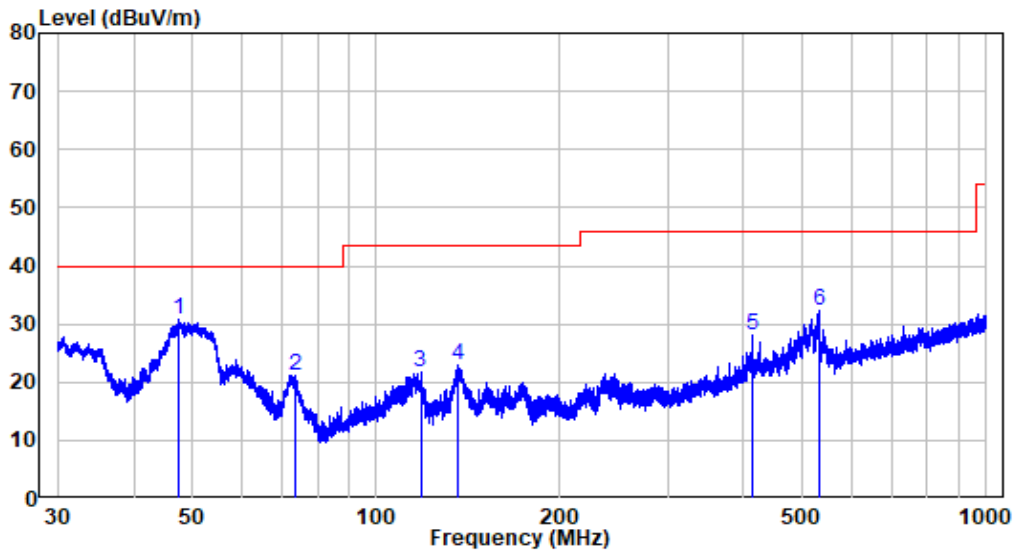
Horizontal:



Site : chamber
 Condition: 3m Horizontal
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	51.752	-9.97	30.54	20.57	40.00	-19.43	Peak
2	73.135	-15.87	32.67	16.80	40.00	-23.20	Peak
3	117.309	-13.03	33.15	20.12	43.50	-23.38	Peak
4	161.121	-14.24	36.88	22.64	43.50	-20.86	Peak
5	238.728	-10.93	33.55	22.62	46.00	-23.38	Peak
6	426.521	-5.84	30.40	24.56	46.00	-21.44	Peak

Vertical:



Site : chamber
 Condition: 3m VERTICAL
 Job No. : SZNS1220914-41680E-RF
 Test Mode: NFC

	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	47.471	-10.00	40.66	30.66	40.00	-9.34	Peak
2	73.488	-15.95	37.15	21.20	40.00	-18.80	Peak
3	118.134	-13.19	34.85	21.66	43.50	-21.84	Peak
4	136.400	-15.13	38.22	23.09	43.50	-20.41	Peak
5	412.909	-6.27	34.35	28.08	46.00	-17.92	Peak
6	530.799	-4.52	36.92	32.40	46.00	-13.60	Peak

FCC§15.225(e) - FREQUENCY STABILITY

Applicable Standard

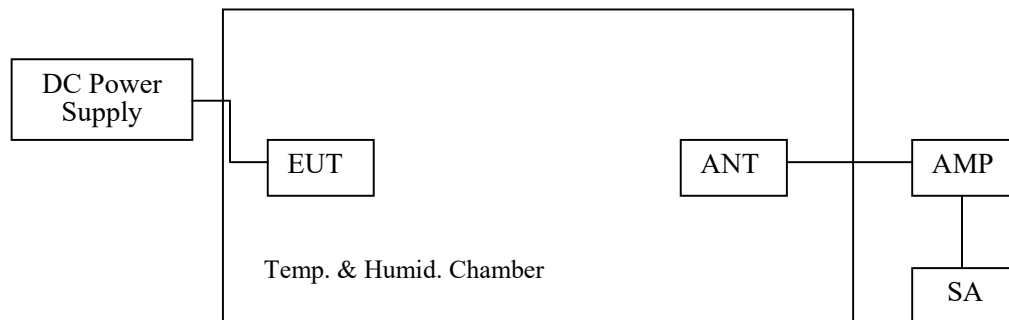
The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a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

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and inductive antenna was connected to a Spectrum Analyzer. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.



Test Data

Environmental Conditions

Temperature:	24°C
Relative Humidity:	55%
ATM Pressure:	101.0 kPa

The testing was performed by jimi on 2023-01-06.

Test Mode: Transmitting

Test Result: Pass

Voltage Supply (V _{DC})	Temperature (°C)	Measured Frequency (MHz)	Frequency Error (%)	Part 15.225 Limit (%)
3.7	-20	13.560613	0.004520	±0.01
	-10	13.560591	0.004358	±0.01
	0	13.560423	0.003119	±0.01
	10	13.560367	0.002706	±0.01
	20	13.560592	0.004366	±0.01
	30	13.560169	0.001246	±0.01
	40	13.560075	0.000553	±0.01
	50	13.560564	0.004159	±0.01
3.45	20	13.560399	0.002942	±0.01
4.2	20	13.560515	0.003798	±0.01

Note: the extreme voltage was declared by the applicant.

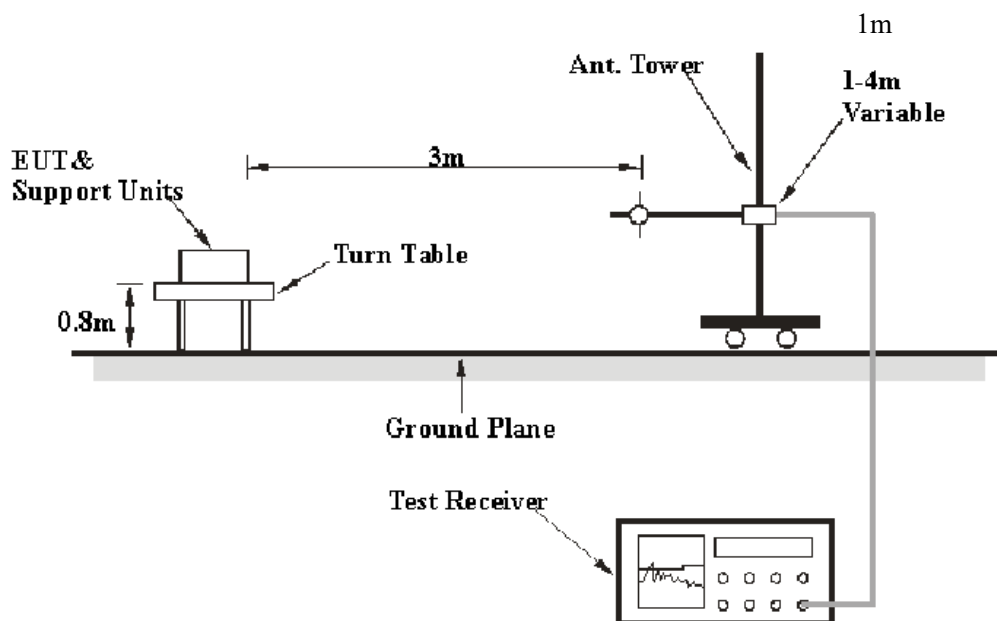
FCC§15.215(c) -20dBEMISSION BANDWIDTH

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

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 Data

Environmental Conditions

Temperature:	24°C
Relative Humidity:	55%
ATM Pressure:	101.0 kPa

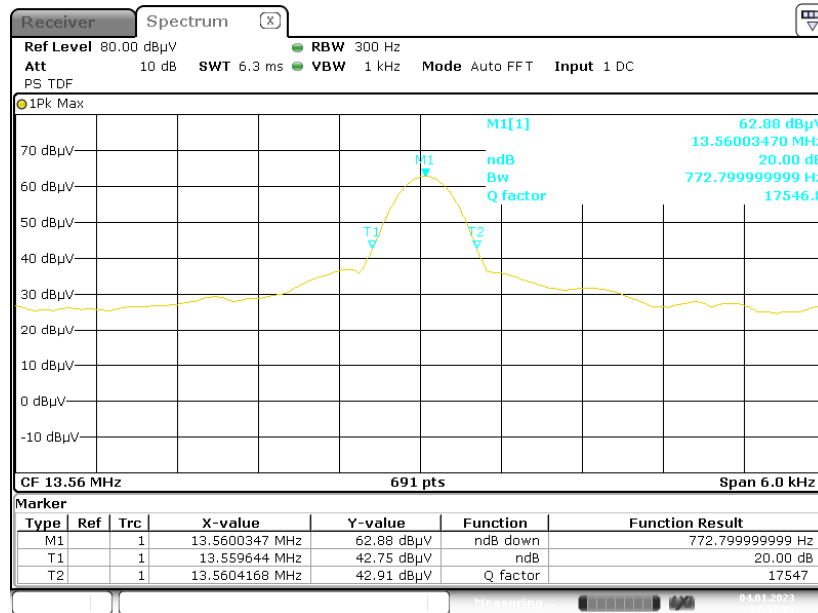
The testing was performed by jimi on 2023-01-04.

Test Mode: Transmitting

Test Result: Pass

Test Frequency (MHz)	20dB Bandwidth (kHz)
13.56	0.773

20 dB Emission Bandwidth



Date: 4.JAN.2023 17:47:21

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