TEST REPORT

Applicant Name:	Shenzhen Gotron Electronic CO.,LTD.
Address:	7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China
Report Number:	2501S51531E-RFG
FCC ID:	2AOWK-5020
IC:	12564A-5020

Test Standard (s)

FCC PART 15.225

RSS-GEN ISSUE 5, FEBRUARY 2021 AMENDMENT 2; RSS-210, ISSUE 11, JUNE 25, 2024

Sample Description

Product Type:	Smart Phone
Model No.:	FCC/IC: Armor X16 Pro
Multiple Model(s) No.: (for FCC only)	FCC: GQ5020, Armor X16 Ultra, Armor X16E, Armor X16S, Armor X16 Lite, Armor X16s, Armor X16s Pro
Trade Mark:	ulefone
Date Received:	2025-04-03
Issue Date:	2025-05-30
Test Result:	Pass▲

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

Prepared and Checked By:

Jim Cheng

RF Engineer

Approved By:

Nancy Wang

RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2501S51531E-RFG	Original Report	2025-05-30

GENERALINFORMATION

Product Description for Equipment under Test (EUT)

HVIN	GQ5020
FVIN	N/A
Product	Smart Phone
Tested Model	FCC/IC: Armor X16 Pro
Multiple Model(s) (for FCC only)	FCC: GQ5020, Armor X16 Ultra, Armor X16E, Armor X16S, Armor X16 Lite, Armor X16s, Armor X16s Pro
Frequency Range	13.56 MHz
E-field Strength	68.15dBuV/m@3m
Modulation Technique	ASK
Voltage Range	DC 3.87V from battery or DC 5V/9V from adapter
Sample serial number	30VS-2 (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model: UF82PD3303 Input: AC 100-240V, 50/60Hz, 0.8A PD Output: DC 5.0V, 3.0A 15.0W or 9.0V, 3.0A 27.0W or 12.0V, 2.5A 30.0W or 15.0V, 2.0A 30.0W or 20.0V, 1.5A 30.0W PPS: DC 5.0-11.0V, 3.0A or 5.0-16.0V, 2.0A 33.0W Max
Note 1: The Multiple models are electrically identical with the test model except for model name and sales channel. Please refer to the declaration letter# for more detail, which was provided by manufacturer. Note 2: Only the worst case (tested with a representative tag) was recorded in the report.	

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, RSS-GEN Issue 5, February 2021 Amendment 2 and RSS-210, Issue 11, June 25, 2024 of the Innovation, Science and Economic Development Canada.

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 and RSS-Gen, February 2021 AMENDMENT 2, General Requirements for Compliance of Radio Apparatus.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
RF Frequency		56.6Hz(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.63dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.66dB(k=2, 95% level of confidence)
Radiated Emissions	0.009MHz~30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
Temperature		±1℃
Humidity		±1%
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 Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, 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. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

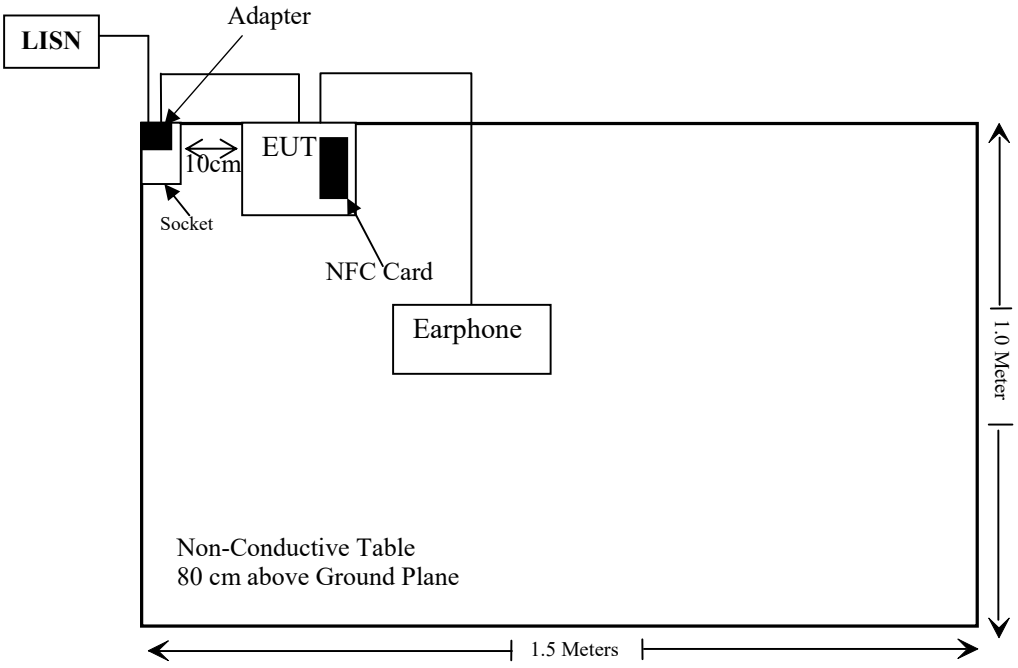
Manufacturer	Description	Model	Serial Number
Unknown	Socket	Unknown	Unknown
Unknown	Card	Unknown	Unknown
Unknown	Earphone	Unknown	Unknown

External I/O Cable

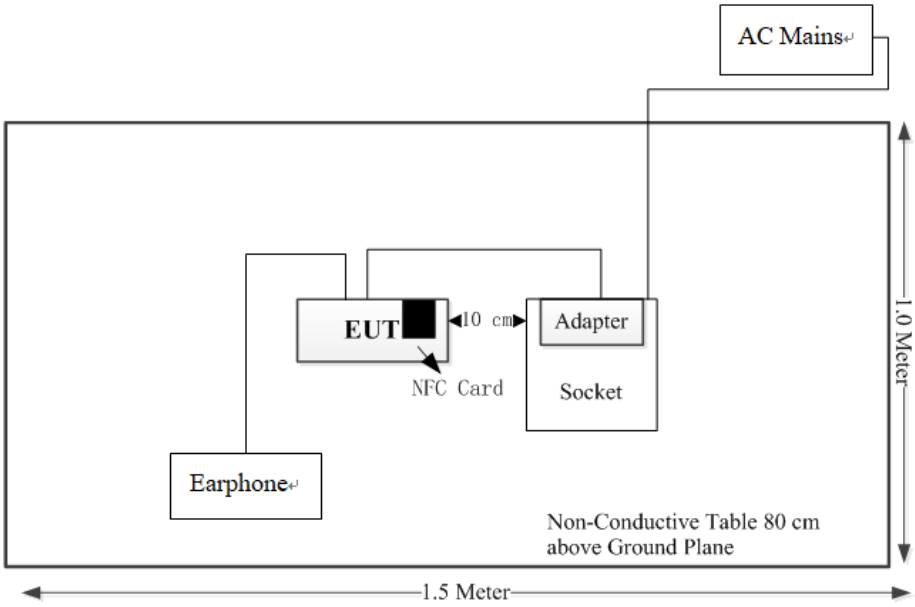
Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	0.8	EUT	Adapter
Shielded Un-detachable AC Cable	1.5	Socket	LISN/AC Main
Un-shielding Detachable Audio Cable	1.2	EUT	Earphone

Block Diagram of Test Setup

For Conducted Emission:



For Radiated Emissions:



SUMMARY OF TEST RESULTS

FCC Rules	RSS Rules	Description of Test	Result
§15.203	RSS-Gen §6.8	Antenna Requirement	Compliant
§1.1310 & §2.1093	/	RF Exposure	Compliant
/	RSS-102 § 6.3	SAR Exemption Limits	Compliant
§15.207	RSS-Gen §8.8	AC Line Conducted Emission	Compliant
§15.225, §15.209, §15.205	RSS-Gen §8.9& RSS-210 §B.6(a)	Radiated Emission Test	Compliant
§15.225(e)	RSS-210 §B.6(b)	Frequency Stability	Compliant
§15.215(c)	/	20dB Emission Bandwidth	Compliant
/	RSS-Gen §6.7	99% Occupied Bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/12/04	2025/12/03
Rohde & Schwarz	LISN	ENV216	101613	2024/12/04	2025/12/03
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2024/05/21	2025/05/20
Unknown	CE Cable	Unknown	UF A210B-1-0720-504504	2024/05/21	2025/05/20
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Frequency Stability					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
BACL	Temperature & Humidity Chamber	BTH-150-40	30144	2024/12/06	2025/12/05
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2024/05/21	2025/05/20

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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& RSS-GEN CLAUSE 6.8 - ANTENNA REQUIREMENT

Applicable Standard

According to 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 use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

According to RSS-Gen §6.8, The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below). When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.
The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

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.

	Type	input impedance (Ohm)	Frequency Range
Antenna	FPC	50	13.56MHz

Result: Compliant.

FCC§1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to KDB447498 D01 General RF Exposure Guidance v06: 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/$f_{(MHz)}$)]

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 ½

3) SAR measurement procedures are not established below 100 MHz

Measurement Result

For NFC, the power of EUT: E Field@3m is 68.15dBuV/m = -27.05dBm (0.002mW)
Note: E[dBμV/m] = EIRP[dBm] + 95.2 for d = 3 m.

SAR test exclusion threshold for NFC(13.56MHz) separation distance < 50mm

=[474*(1 + log(100/$f_{(MHz)}$))]/2

= 443mW

>0.002mW

Result: Compliant.

RSS-102 § 6.3 –SAR EXEMPTION LIMITS

Applicable Standard

According to RSS-102 Issue 6 § (6.3), Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

The exemption limits in table 11 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 50 mm from a flat phantom, which provides a SAR value of approximately 0.4 W/kg for 1 g of tissue.

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 5.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed. For example, in case of a 7 mm separation distance, either use the exception value for a 5 mm separation distance or interpolate between the limits corresponding to 5 mm and 10 mm separation distances.

For implanted medical devices, the exemption limit for routine SAR evaluation is set at an output power of 1 mW, regardless of frequency.

The SAR levels from exempted transmitters shall be included in the compliance assessment and the determination of the TER. Detailed guidance is included in sections 7.1.8 and 8.2.2.1.

Test Result:

For NFC, the power of EUT: E Field@3m is 68.15dBuV/m = -27.05dBm (0.002mW)

Note: E[dBμV/m] = EIRP[dBm] + 95.2 for d = 3 m.

SAR test exclusion threshold for NFC(13.56MHz) separation distance ≤ 5mm

E.I.R.P= -27.05dBm (0.002mW) <<45mW

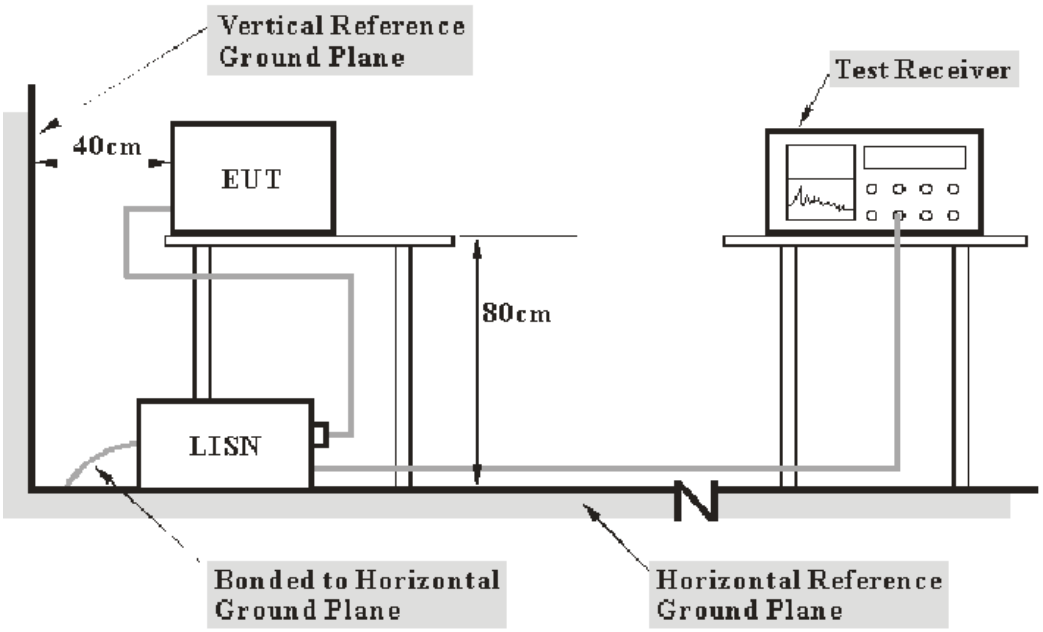
So the stand-alone SAR test is not required.

FCC §15.207& RSS-GEN CLAUSE 8.8 - AC LINE CONDUCTED EMISSION

Applicable Standard

FCC§15.207 and RSS-Gen§8.8.

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 C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 and RSS-Gen limits..

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	RBW
150 kHz – 30MHz	9 kHz

Test Procedure

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.

Factor & Over Limit Calculation

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

Factor = LISN VDF + 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 -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

Test Data

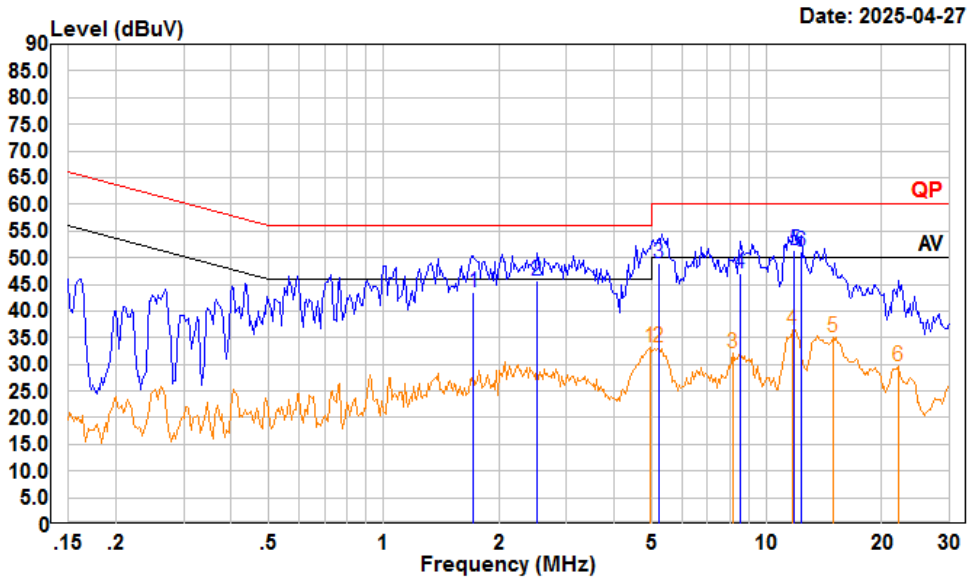
Environmental Conditions

Temperature:	25.9 ℃
Relative Humidity:	46 %
ATM Pressure:	100.5 kPa

The testing was performed by Macy Shi on 2025-04-27.

Test mode: Transmitting

AC 120 V/60 Hz, Line



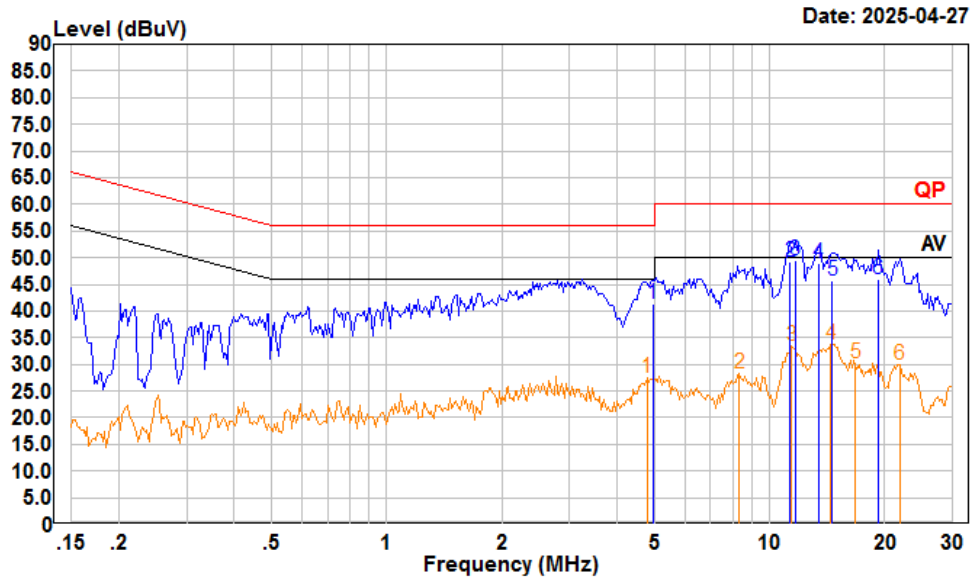
Trace: 1

Condition: Line
Project : 2501S51531E-RF
tester : Macy.shi Note:NFC Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	1.716	22.30	43.46	10.99	10.17	56.00	-12.54	QP
2	2.513	24.60	45.80	11.03	10.17	56.00	-10.20	QP
3	5.221	28.10	49.04	10.76	10.18	60.00	-10.96	QP
4	8.501	26.40	47.04	10.44	10.20	60.00	-12.96	QP
5	11.807	30.80	51.31	10.30	10.21	60.00	-8.69	QP
6	12.318	30.52	51.03	10.30	10.21	60.00	-8.97	QP

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	4.952	12.10	33.07	10.79	10.18	46.00	-12.93	Average
2	5.221	12.30	33.24	10.76	10.18	50.00	-16.76	Average
3	8.148	11.34	32.01	10.47	10.20	50.00	-17.99	Average
4	11.683	16.03	36.54	10.30	10.21	50.00	-13.46	Average
5	14.907	14.60	35.12	10.30	10.22	50.00	-14.88	Average
6	22.063	8.64	29.70	10.88	10.18	50.00	-20.30	Average

AC 120V/ 60 Hz, Neutral



Trace: 1

Condition: Neutral
Project : 2501S51531E-RF
tester : Macy.shi Note:NFC Transmitting
Setting : RBW:9kHz

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	4.952	20.30	41.33	10.85	10.18	56.00	-14.67	QP
2	11.317	28.50	49.15	10.44	10.21	60.00	-10.85	QP
3	11.683	28.91	49.54	10.42	10.21	60.00	-10.46	QP
4	13.408	28.25	48.83	10.36	10.22	60.00	-11.17	QP
5	14.594	25.20	45.73	10.31	10.22	60.00	-14.27	QP
6	19.224	24.90	46.07	10.99	10.18	60.00	-13.93	QP

	Freq	Read Level	LISN Level	Cable Factor	Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	4.797	6.45	27.51	10.87	10.19	46.00	-18.49	Average
2	8.323	7.54	28.29	10.55	10.20	50.00	-21.71	Average
3	11.438	12.88	33.52	10.43	10.21	50.00	-16.48	Average
4	14.440	13.17	33.71	10.32	10.22	50.00	-16.29	Average
5	16.750	9.51	30.32	10.61	10.20	50.00	-19.68	Average
6	21.830	8.71	29.90	11.01	10.18	50.00	-20.10	Average

FCC§15.225, §15.205& §15.209& RSS-GEN§8.9 & RSS-210 ANNEX B.6(a) - 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.

According to RSS-210 Annex B.6(a).

The field strength of any emission shall not exceed the following limits:

a. 15.848 mV/m (84dBµV/m) at 30 m, within the band 13.553-13.567 MHz;

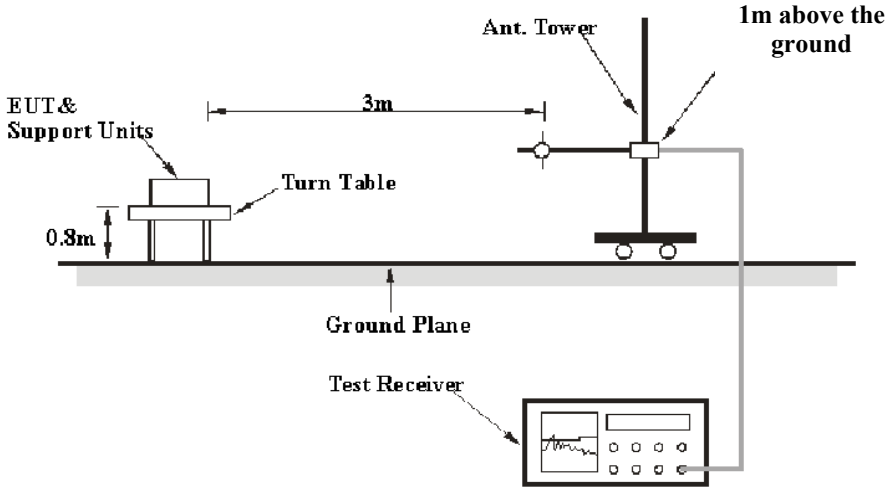
b. 334 µV/m (50.47dBµV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz;

c. 106 µV/m (40.51dBµV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz;

d. RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

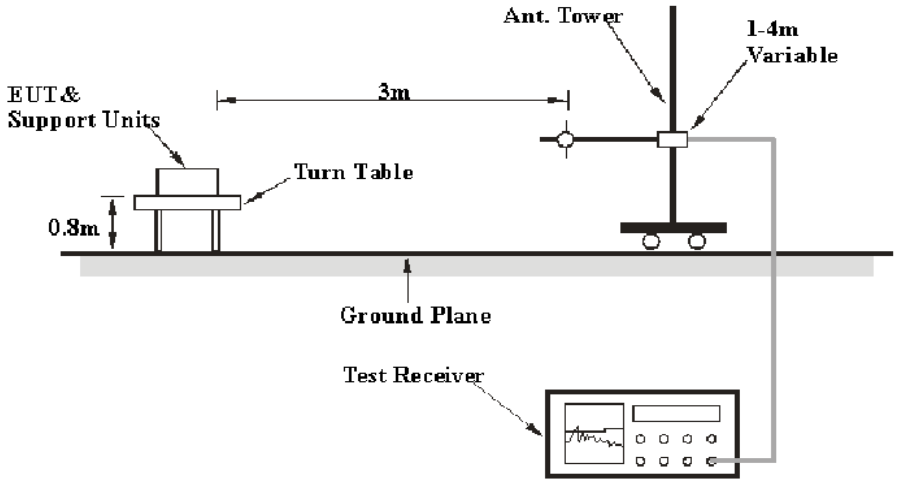
EUT Setup

9 kHz-30MHz:



Note: Antenna is set up at 1m during test for below 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 15.225, 15.209, 15.205, RSS-210 and RSS-Gen limits.

EMI Test Receiver Setup

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	Measurement	Detector
9 kHz – 150 kHz	/	/	200 Hz	QP	QP
	300 Hz	1 kHz	/	PK	Peak
150 kHz – 30 MHz	/	/	9 kHz	QP	QP
	10 kHz	30 kHz	/	PK	Peak
30 MHz – 1000 MHz	/	/	120 kHz	QP	QP
	100 kHz	300 kHz	/	PK	Peak

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz.

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

Factor & Over Limit/Margin Calculation

The Level 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:

Factor = Antenna Factor + Cable Loss- Amplifier Gain
Level= Read Level + Factor

The "**Over Limit**" 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:

Over Limit = Level – Limit

Test Data

Environmental Conditions

Temperature:	26.1 ℃
Relative Humidity:	52 %
ATM Pressure:	100.8 kPa

The testing was performed by Alex Yan on 2025-04-29.

Test mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case of Y-axis orientation were recorded)

Note:
1. For the spurious emission below 30MHz, the unit of final result on the test plots are dBμV/m, so the limit should be added by 51,5 dB from dBμA/m to dBμV/m.

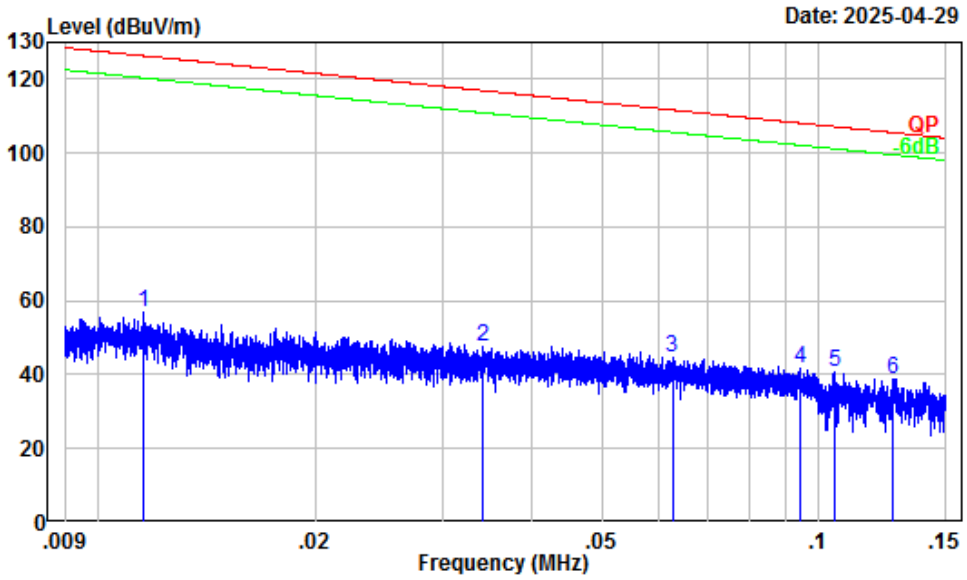
2. When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

1) Spurious Emissions (9 kHz~30 MHz):

Part 15 Section 15.31(f)(2) and RSS-GEN Section 6.5,
Limit @ 3m=Limit @ 300m-40*log(3(m)/300(m))
Limit @ 3m=Limit @ 30m-40*log(3(m)/30(m))

Ground-parallel

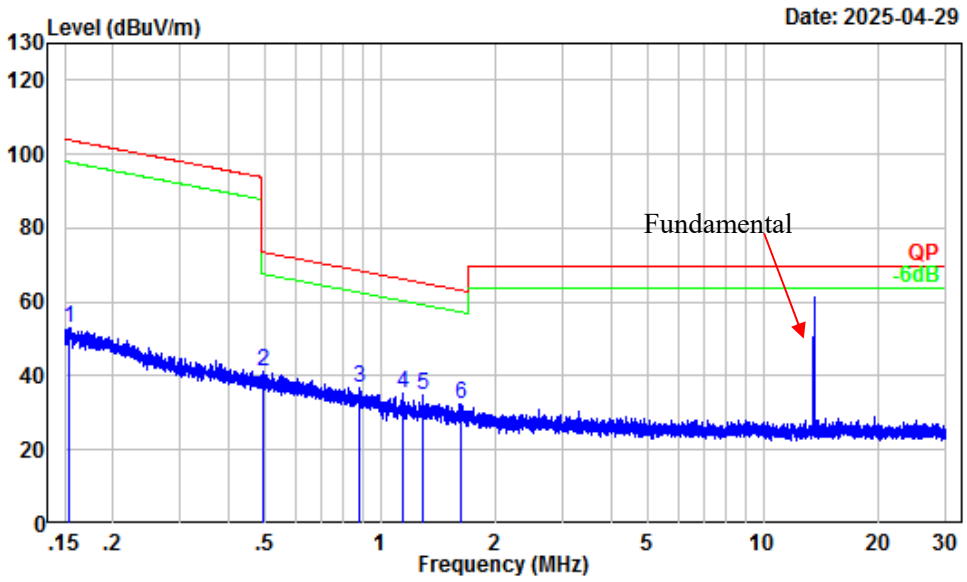
9 kHz~150 kHz



Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Ground-Parallel
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.012	32.00	24.88	56.88	126.35	-69.47	Peak
2	0.034	28.07	19.57	47.64	116.95	-69.31	Peak
3	0.063	25.14	19.35	44.49	111.67	-67.18	Peak
4	0.094	22.39	19.17	41.56	108.11	-66.55	Peak
5	0.105	21.69	18.97	40.66	107.16	-66.50	Peak
6	0.126	20.44	18.51	38.95	105.57	-66.62	Peak

150 kHz~30 MHz

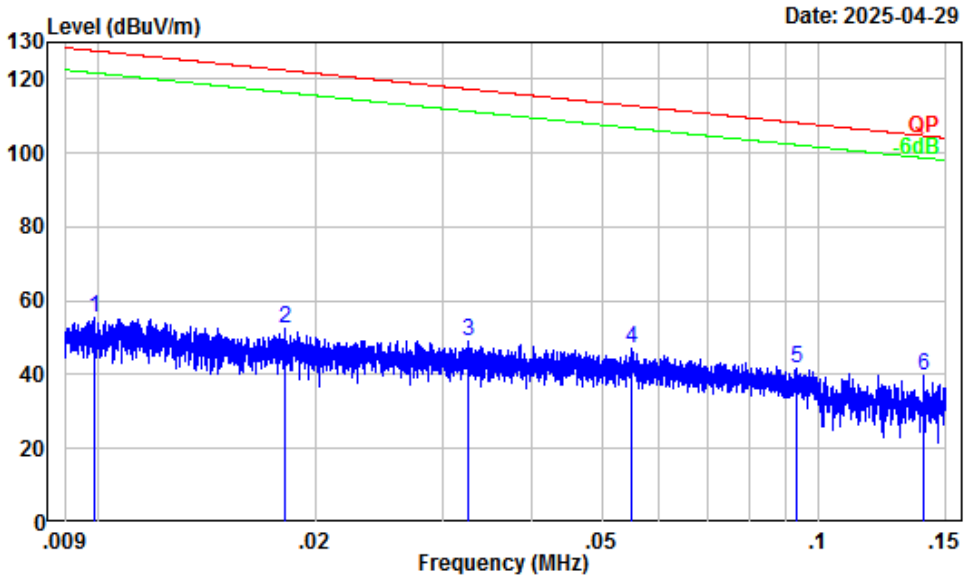


Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Ground-Parallel
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.154	18.82	34.19	53.01	103.86	-50.85	Peak
2	0.493	6.52	34.51	41.03	73.74	-32.71	Peak
3	0.884	2.07	34.74	36.81	68.57	-31.76	Peak
4	1.140	0.81	34.56	35.37	66.31	-30.94	Peak
5	1.289	0.39	34.28	34.67	65.22	-30.55	Peak
6	1.616	-0.52	32.78	32.26	63.22	-30.96	Peak

Perpendicular

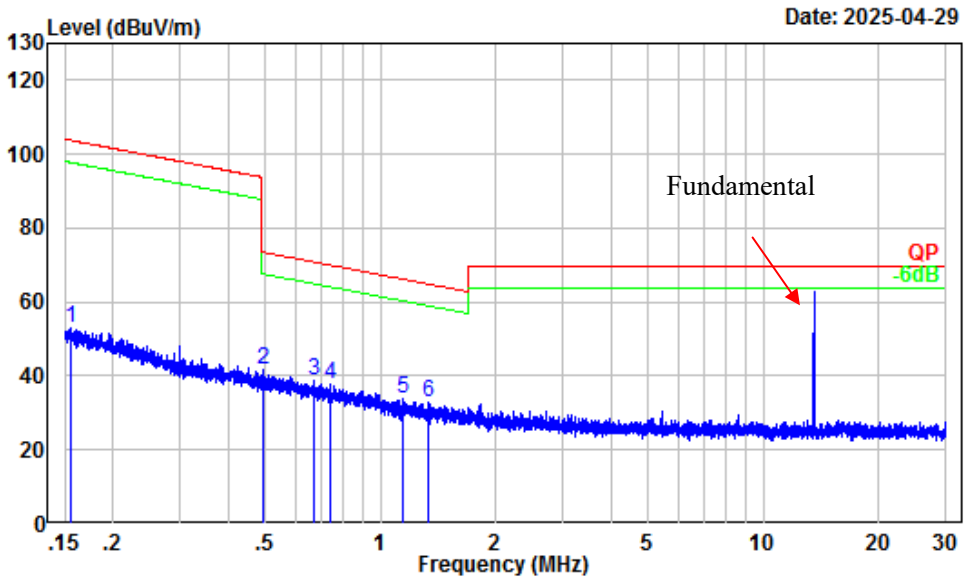
9 kHz~150 kHz



Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Perpendicular
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.010	32.33	23.04	55.37	127.72	-72.35	Peak
2	0.018	30.74	21.64	52.38	122.40	-70.02	Peak
3	0.033	28.23	21.02	49.25	117.34	-68.09	Peak
4	0.055	25.91	21.02	46.93	112.81	-65.88	Peak
5	0.093	22.50	19.44	41.94	108.25	-66.31	Peak
6	0.139	19.67	20.00	39.67	104.72	-65.05	Peak

150 kHz~30 MHz

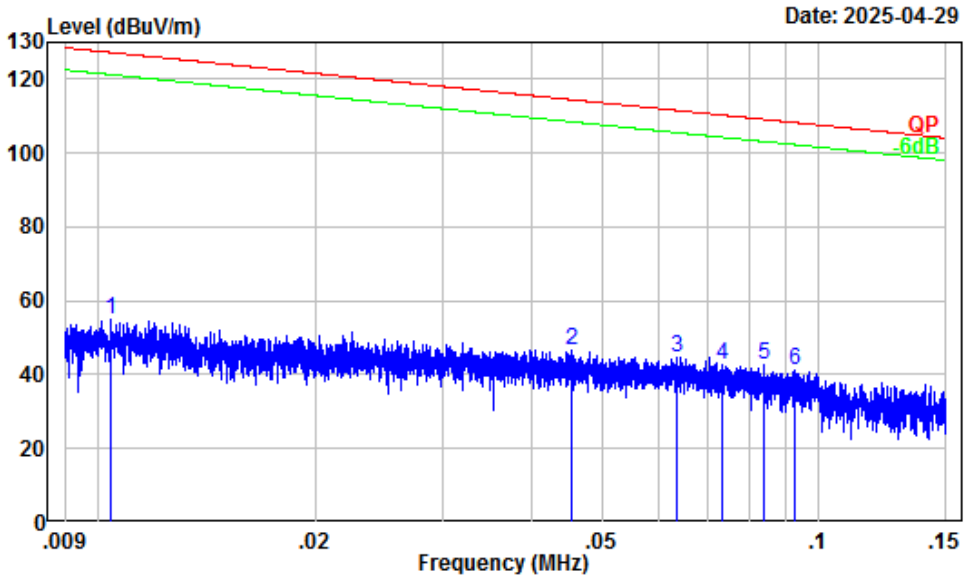


Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Perpendicular
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.156	18.72	34.10	52.82	103.77	-50.95	Peak
2	0.496	6.47	35.17	41.64	73.68	-32.04	Peak
3	0.670	4.30	34.23	38.53	71.02	-32.49	Peak
4	0.741	3.43	34.36	37.79	70.14	-32.35	Peak
5	1.143	0.80	32.95	33.75	66.29	-32.54	Peak
6	1.333	0.27	32.38	32.65	64.93	-32.28	Peak

Parallel

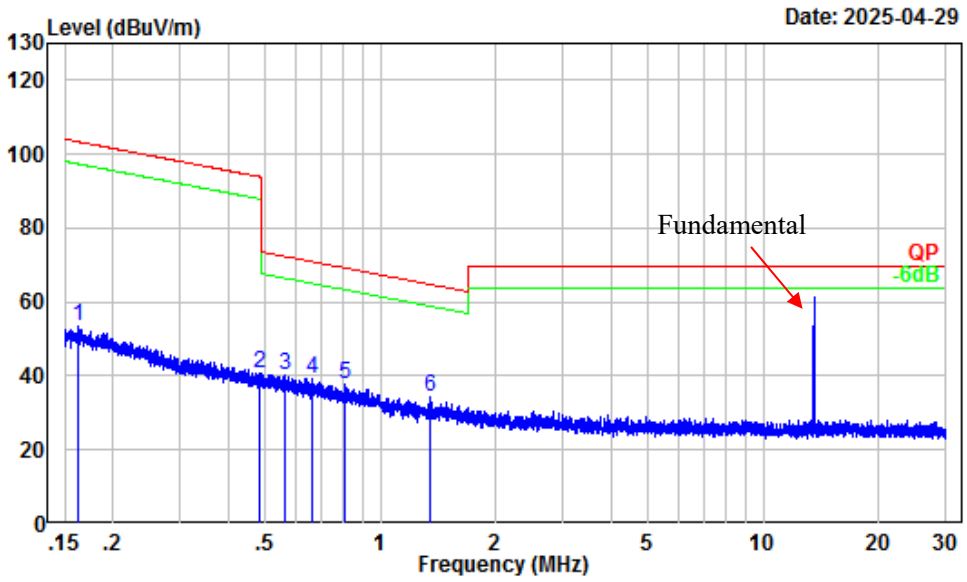
9 kHz~150 kHz



Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Parallel
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.010	32.22	22.58	54.80	127.23	-72.43	Peak
2	0.045	26.88	19.92	46.80	114.45	-67.65	Peak
3	0.064	25.05	19.71	44.76	111.55	-66.79	Peak
4	0.074	24.04	18.77	42.81	110.27	-67.46	Peak
5	0.084	23.12	19.48	42.60	109.11	-66.51	Peak
6	0.093	22.51	18.58	41.09	108.26	-67.17	Peak

150 kHz~30 MHz

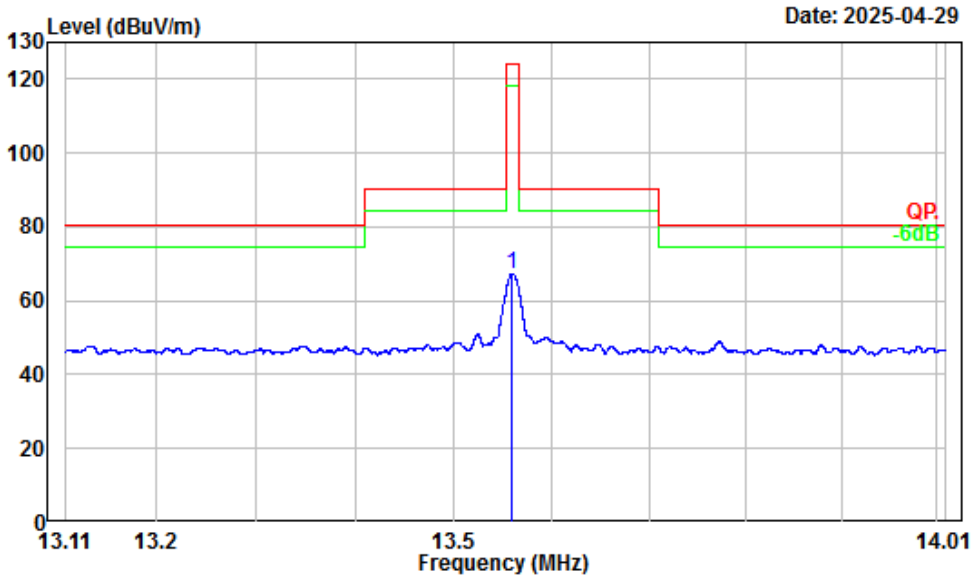


Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Parallel
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.163	18.27	35.17	53.44	103.35	-49.91	Peak
2	0.482	6.75	34.10	40.85	93.95	-53.10	Peak
3	0.561	5.64	34.46	40.10	72.59	-32.49	Peak
4	0.664	4.38	35.00	39.38	71.11	-31.73	Peak
5	0.804	2.67	35.20	37.87	69.41	-31.54	Peak
6	1.355	0.21	34.09	34.30	64.78	-30.48	Peak

2) Emission Mask & Fundamental:

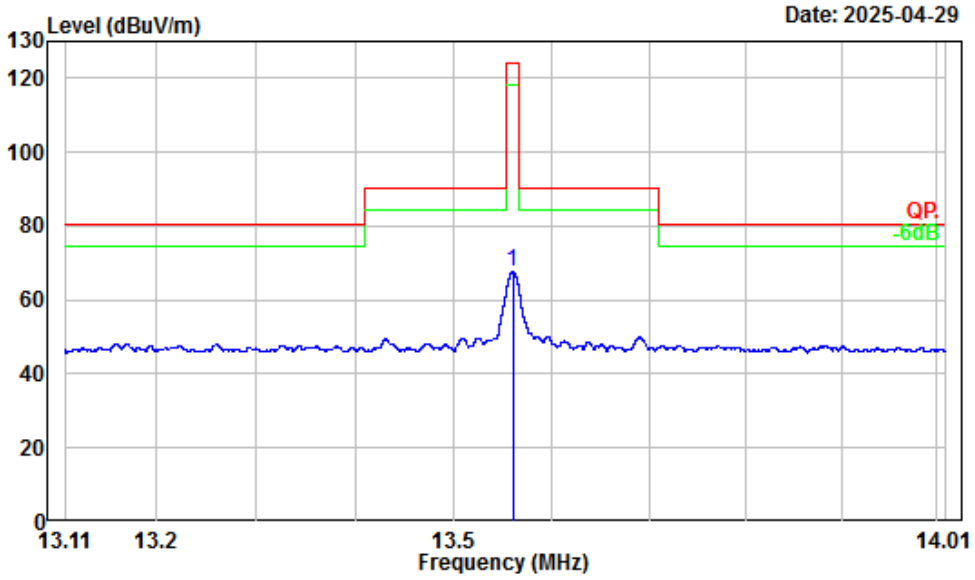
Ground-parallel



Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Ground-Parallel
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-2.72	70.17	67.45	124.00	-56.55	Peak

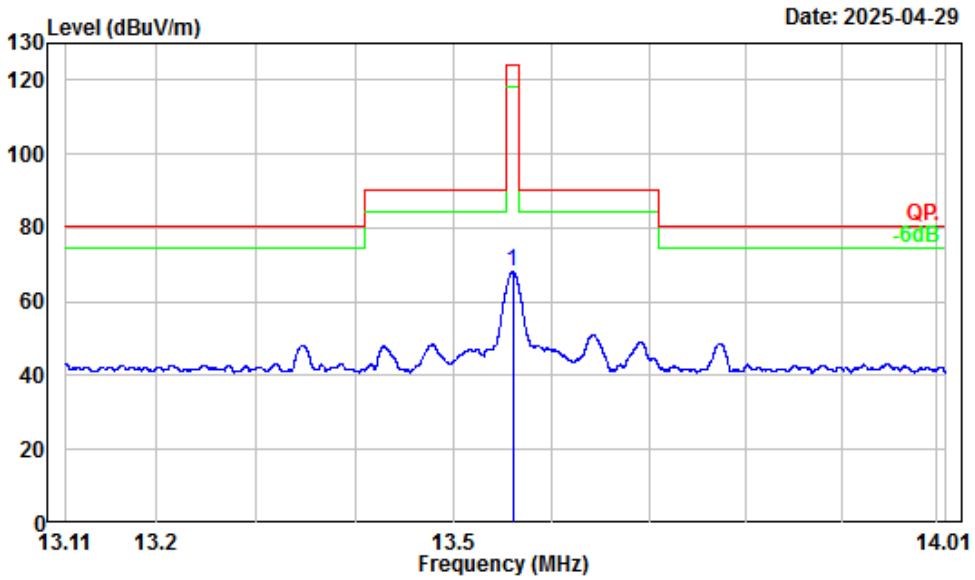
Perpendicular



Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Perpendicular
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-2.72	70.27	67.55	124.00	-56.45	Peak

Parallel

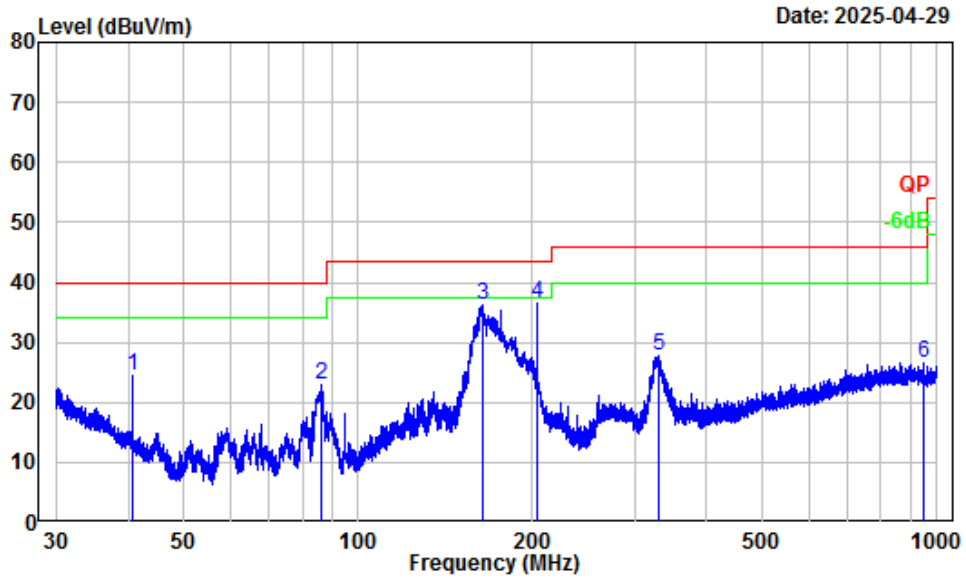


Site : Chamber A
Condition : 3m
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Note : Parallel
Detector: Peak RBW/VBW: 10/30kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.560	-2.72	70.87	68.15	124.00	-55.85	Peak

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

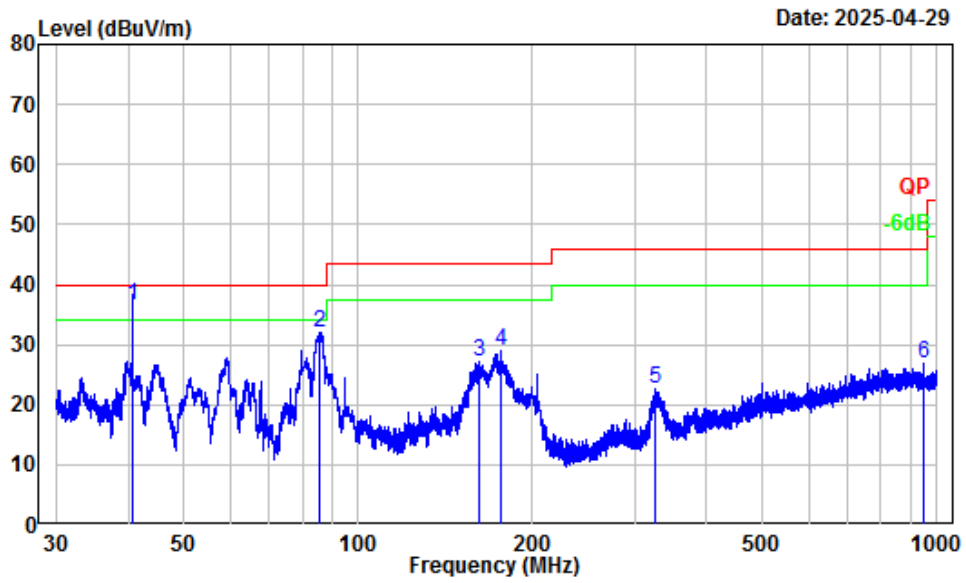
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.684	-12.85	37.38	24.53	40.00	-15.47	Peak
2	86.541	-18.08	40.90	22.82	40.00	-17.18	Peak
3	163.612	-12.81	48.90	36.09	43.50	-7.41	Peak
4	203.434	-13.32	49.78	36.46	43.50	-7.04	Peak
5	329.617	-10.66	38.38	27.72	46.00	-18.28	Peak
6	946.684	-1.03	27.63	26.60	46.00	-19.40	Peak

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number : 2501S51531E-RF
Test Mode : NFC Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Alex Yan

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.666	-12.84	49.40	36.56	40.00	-3.44	QP
2	85.448	-18.08	49.95	31.87	40.00	-8.13	Peak
3	161.758	-12.72	39.93	27.21	43.50	-16.29	Peak
4	176.269	-13.46	42.37	28.91	43.50	-14.59	Peak
5	326.310	-10.68	33.22	22.54	46.00	-23.46	Peak
6	946.684	-1.03	28.02	26.99	46.00	-19.01	Peak

FCC§15.225(e)& RSS-210 §B.6 (b) - FREQUENCY STABILITY

Applicable Standard

According to FCC§15.225(e), 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.

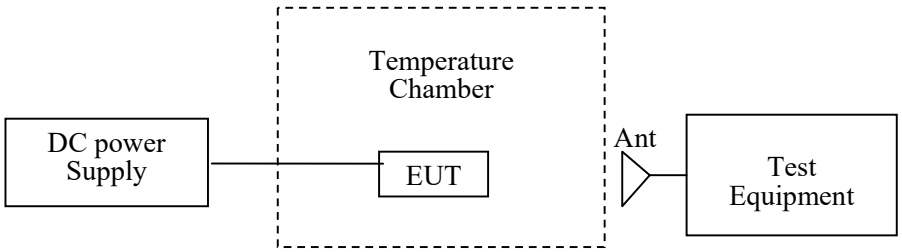
According to RSS-210, Issue 10 §B.6(b), The carrier frequency stability shall not exceed ±100 ppm.

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:	25.1 ℃
Relative Humidity:	52 %
ATM Pressure:	100.8 kPa

The testing was performed by Alex Yan on 2025-04-29.

Test Mode: Transmitting

Test Result: Pass

Voltage Supply (V_{DC})	Temperature (℃)	Measured Frequency (MHz)	Frequency Error		Part 15.225 Limit (%)	RSS-210 Limit (ppm)
			(%)	(ppm)		
3.87	-20	13.55999	-0.0001	-0.7375	±0.01	±100
	-10	13.56000	0.0000	0.0000	±0.01	±100
	0	13.55999	-0.0001	-0.7375	±0.01	±100
	10	13.55999	-0.0001	-0.7375	±0.01	±100
	20	13.55998	-0.0001	-1.4749	±0.01	±100
	30	13.56000	0.0000	0.0000	±0.01	±100
	40	13.56005	0.0004	3.6873	±0.01	±100
	50	13.56000	0.0000	0.0000	±0.01	±100
3.25	20	13.56003	0.0002	2.2124	±0.01	±100
4.45	20	13.56003	0.0002	2.2124	±0.01	±100

Note: the extreme voltage was declared by the applicant.

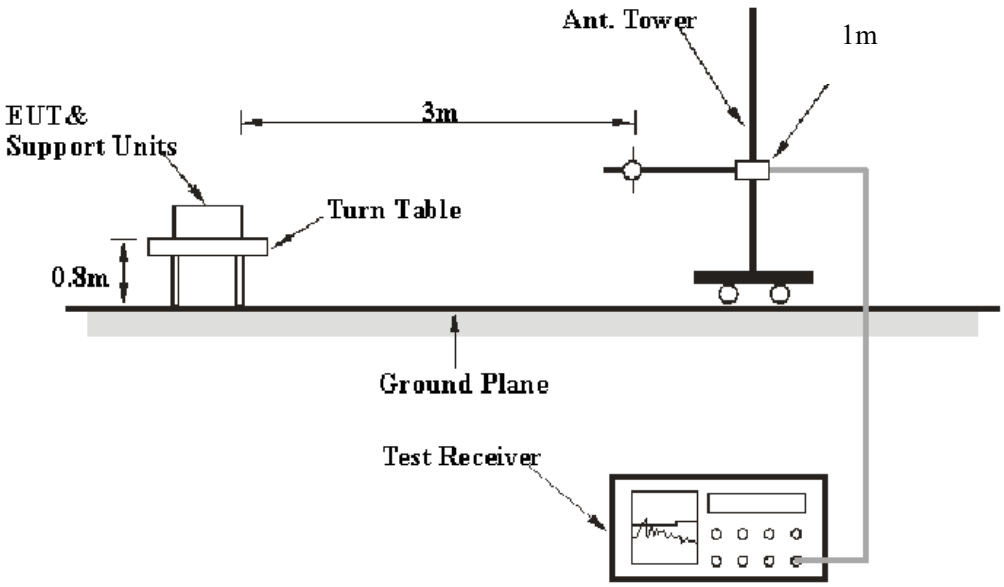
FCC§15.215(c) - 20dB EMISSION BANDWIDTH

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:	25.1 ℃
Relative Humidity:	52 %
ATM Pressure:	100.8 kPa

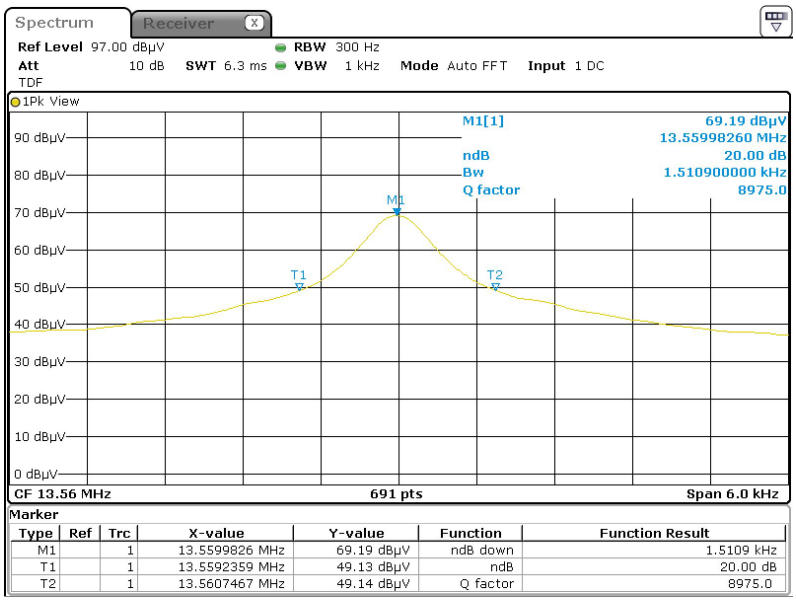
The testing was performed by Alex Yan on 2025-04-29.

Test Mode: Transmitting

Test Result: Pass

Test Frequency (MHz)	20dB Bandwidth (kHz)
13.56	1.5109

20 dB Emission Bandwidth



RSS-GEN CLAUSE 6.7 - 99% OCCUPIED BANDWIDTH

Applicable Standard

According to RSS-Gen §6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.
In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.
The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:
The Microphone shall be operated at its maximum carrier power measured under normal test conditions.
The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.
For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth)

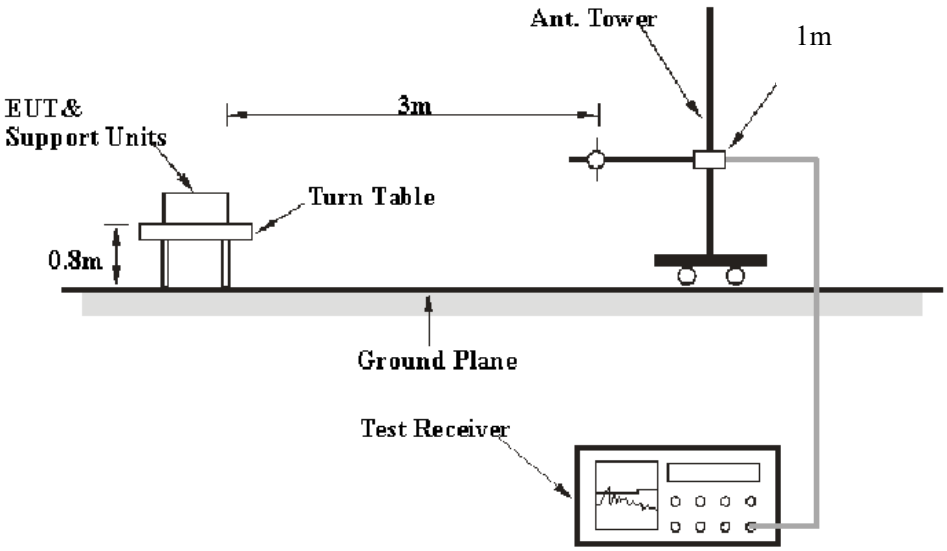
Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. 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.

3. Use 99% OBW test function to test the 99% OBW bandwidth.

4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	25.1 ℃
Relative Humidity:	52 %
ATM Pressure:	100.8 kPa

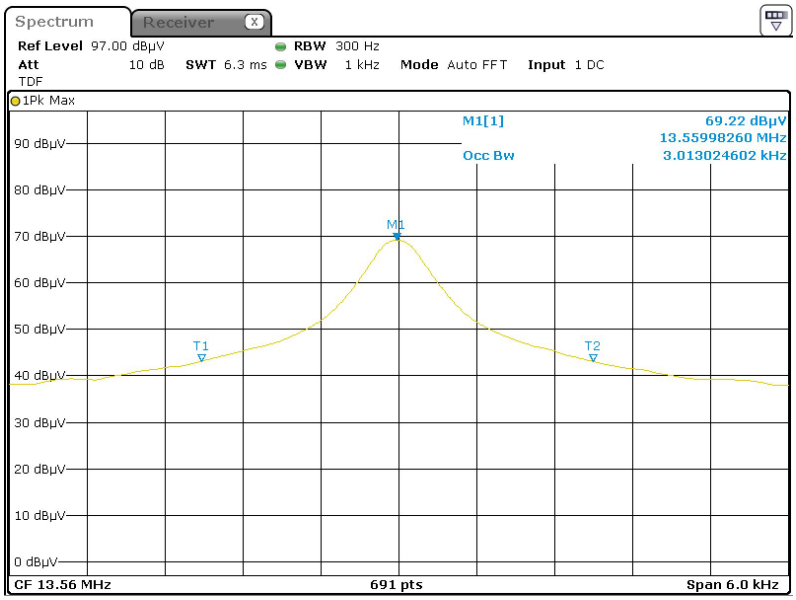
The testing was performed by Alex Yan on 2025-04-29.

Test Mode: Transmitting

Test Result: Pass

Test Frequency (MHz)	OBW (kHz)
13.56	3.013

Occupied Bandwidth



ProjectNo.:2501S51531E-RF Tester:Alex Yan
Date: 29.APR.2025 15:23:04

EUT PHOTOGRAPHS

Please refer to the attachment 2501S51531E-RF External photo and 2501S51531E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501S51531E-RFD Test Setup photo.

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