



TEST REPORT

Applicant Name : Huangshan Goldenland Electronics Inc.
Address : North Industrial Park, HuiZhou District, Huangshan, Anhui
Province P.R. China
Report Number : RA230509-24950E-RF-00
FCC ID: 2AI3URCHO50XF

Test Standard (s)

FCC Part 15C

Sample Description

Product Type: Transmitter
Model No.: ECHO50XF
Multiple Model(s) No.: N/A
Trade Mark: UM
Date Received: 2023/05/09
Report Date: 2023/06/15

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:

Roger Ling

Candy Li

Roger Ling
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 "★".

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230509-24950E-RF-00	Original Report	2023/06/15

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	9925Hz~41375Hz
Antenna Type	Coil
Input Voltage	DC 3.7 from Battery
E-field Strength	78.81dBuV/m@3m
Modulation type	BPSK
Sample serial number	25L7_1 (Assigned by ATC)
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules.

The objective is to determine the compliance of EUT with FCC rules, section 15.203, 15.205, 15.209 and 15.215.

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}
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
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 Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, 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.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a test mode

10 operational frequencies(Hz) was used:

9925, 11725, 15875, 18875, 21575, 24925, 27925, 30875, 35925, 41375

According to FCC part 15.31 required, 21575Hz was selected to test.

EUT Exercise Software

No software used in test.

Local Support Equipment

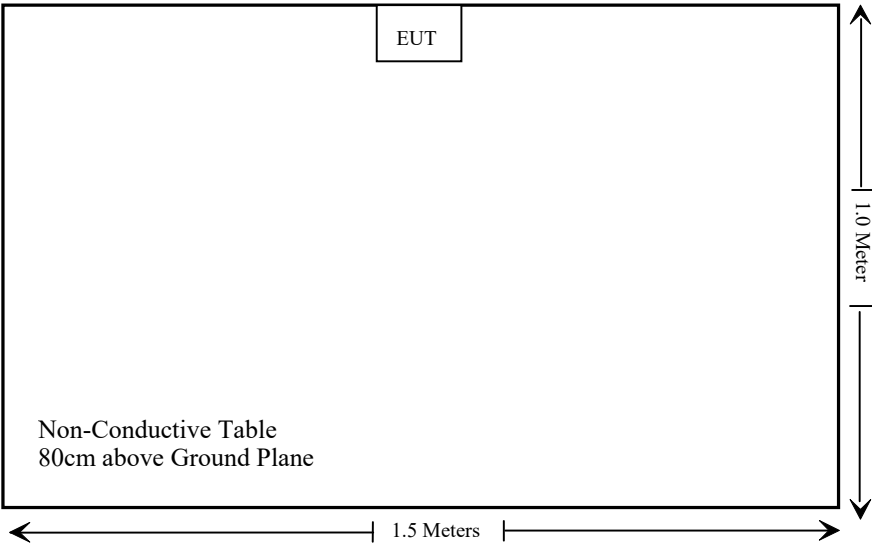
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emission



Note: the support table edge was flush with the center of turntable

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§1.1307(b) & §2.1091	RF EXPOSURE	Compliant
FCC§15.203	Antenna Requirement	Compliant
FCC§15.207	AC Line Conducted Emission	Not Applicable
§15.209 §15.205	Radiated Emission Test	Compliant
§ 15.215 (c)	20 dB Bandwidth	Compliant

Not Applicable: the device was powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Radiated 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
TESEQ	LOOP ANTENNA	HLA6120	33561	2023-02-03	2026-02-02
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Radiated Emission Test Software:e3 191218 (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

* **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).

§1.1307 (B) (3) & §2.1091- MPE-BASED EXEMPTION

Applicable Standard

According to FCC §2.1093 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Appendix C for SAR test exclusion thresholds for $< 100\text{MHz}$ and < 200 mm

Result

Mode	Frequency (MHz)	Max tune-up conducted power (dBm)	Max tune-up conducted power (mW)	Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
BT/BLE	2402-2480	1.0	1.26	5	0.4	3.0	Yes

Note: 1. The device contains a certified Bluetooth module, FCC ID: 2AWMOFSC-BT986, the output power and antenna gain was refer to the module report.

2. $0\text{dBd} = 2.15\text{dBi}$

3. for the SRD, the field strength is $78.81\text{ dBuV/m}@3\text{m}$, which less than -16dBm . And according to KDB 447498 D01 Appendix C, the SAR test exclusion thresholds is $1019\text{ mW}(30\text{dBm})@0.05\text{MHz}$, so, the SRD power less than the thresholds.

Result: Compliant.

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

Result: Compliant.

FCC §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

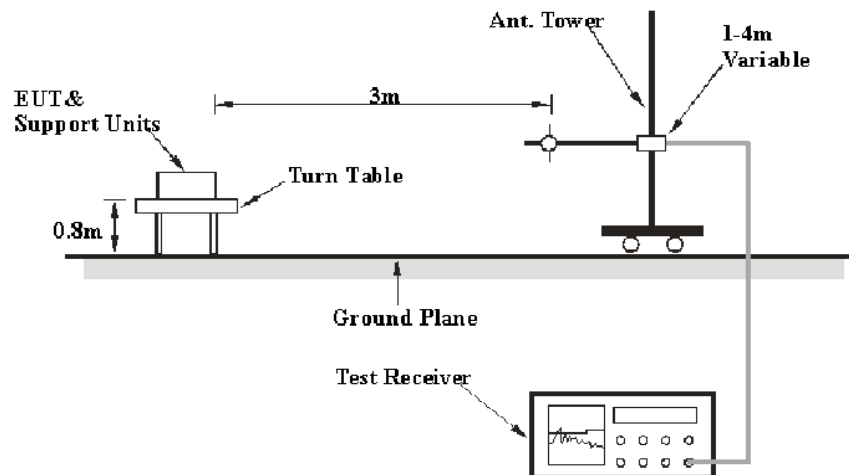
As per FCC Part 15.209

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

EUT Setup



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

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

Frequency Range	RBW	Video B/W	Measurement
9 kHz – 150 kHz	300 Hz	1 kHz	PK
150 kHz – 30 MHz	10 kHz	30 kHz	PK
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP/Average measurement

Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\begin{aligned}\text{Over Limit/Margin} &= \text{Level/Result} - \text{Limit.} \\ \text{Level/Result} &= \text{Reading level} + \text{Factor}\end{aligned}$$

Test Data

Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

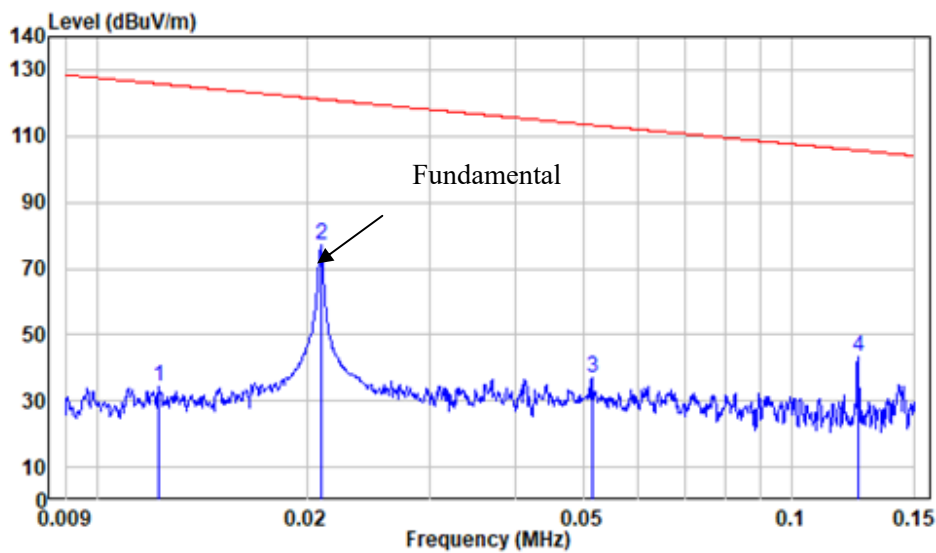
The testing was performed by Jason Liu on 2023-05-25.

Test Mode: Transmitting

Note: Pre-scan EUT in x-axis, y-axis, z-axis, the worst case is x-axis as below.

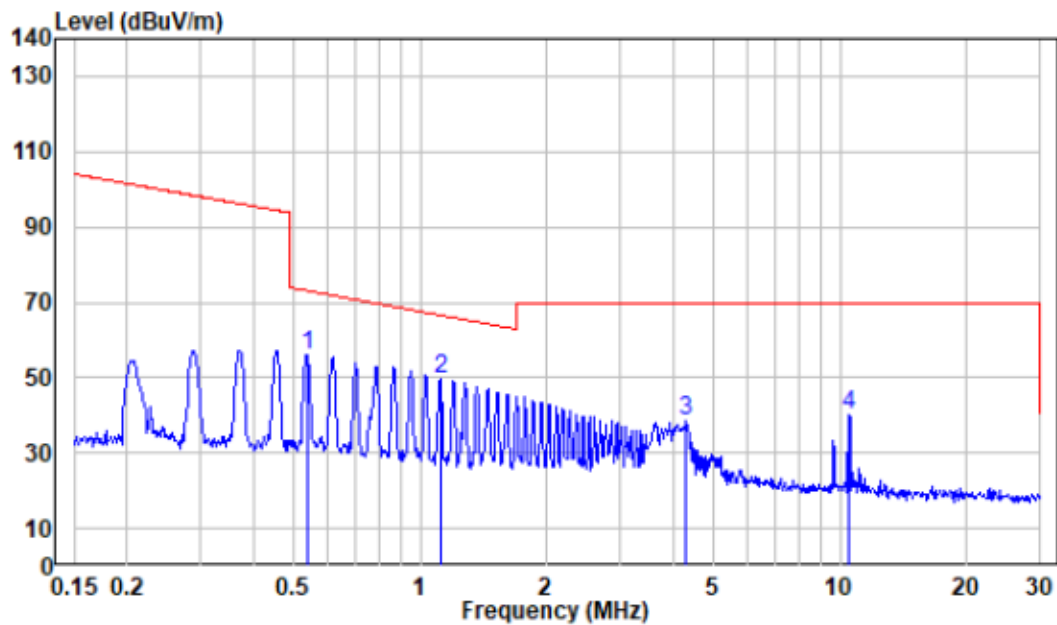
Ground-parallel:

9 kHz~150 kHz



	Freq Factor		Read	Limit	Over	Remark
	MHz	dB/m	Level	Level	Line	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1	0.012	-11.44	45.70	34.26	125.83	-91.57 Peak
2	0.021	-11.69	88.87	77.18	121.16	-43.98 Peak
3	0.051	-11.54	48.74	37.20	113.37	-76.17 Peak
4	0.124	-11.83	55.20	43.37	105.72	-62.35 Peak

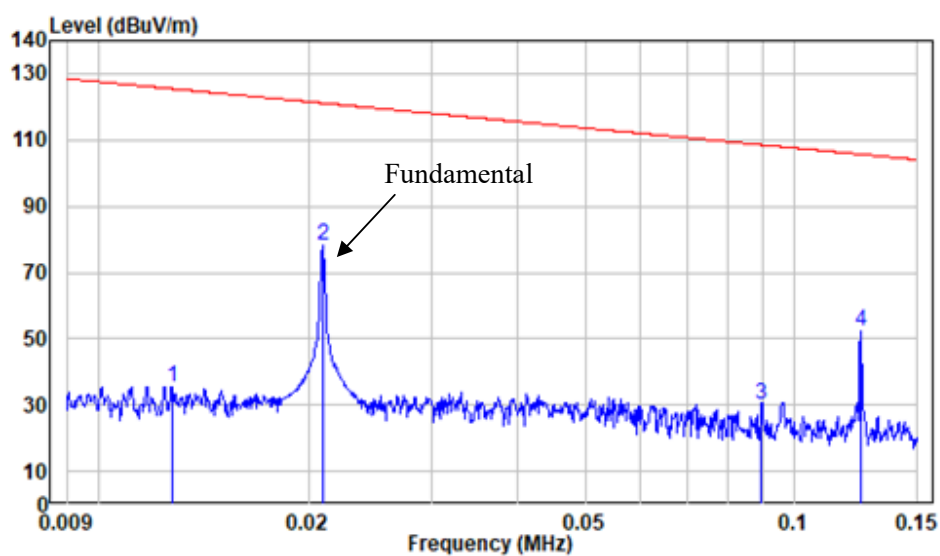
150 kHz~30 MHz



	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.538	-11.63	67.69	56.06	72.97	-16.91	Peak
2	1.117	-11.56	61.34	49.78	66.49	-16.71	Peak
3	4.292	-11.69	50.22	38.53	69.54	-31.01	Peak
4	10.508	-10.93	51.24	40.31	69.54	-29.23	Peak

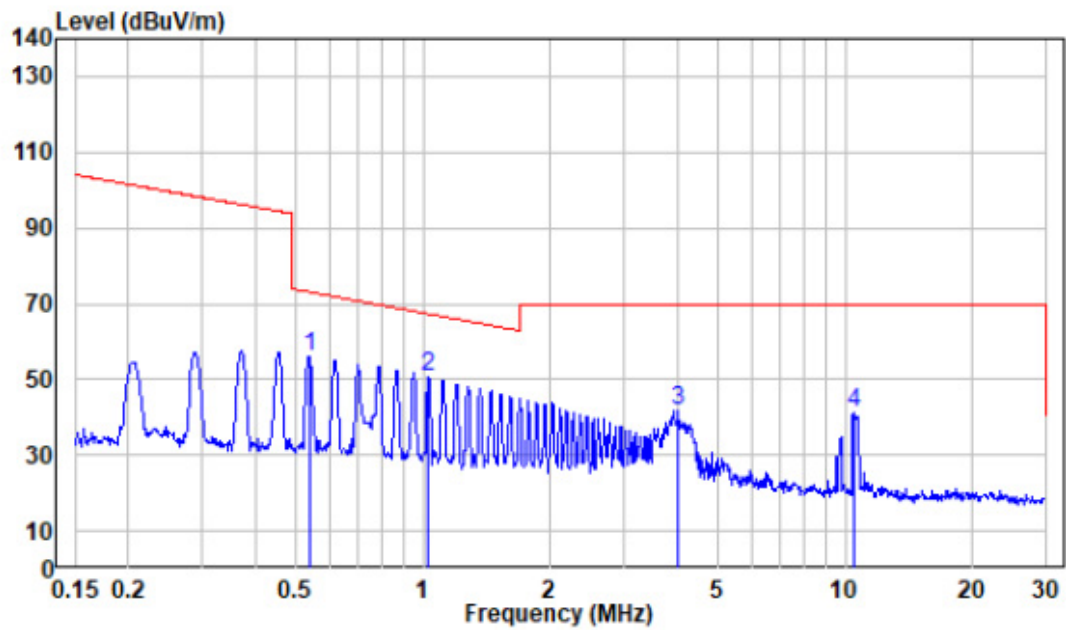
Perpendicular:

9 kHz~150 kHz



	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.013	-11.45	47.02	35.57	125.49	-89.92	Peak
2	0.021	-11.69	89.89	78.20	121.16	-42.96	Peak
3	0.090	-11.57	41.43	29.86	108.55	-78.69	Peak
4	0.124	-11.83	64.15	52.32	105.72	-53.40	Peak

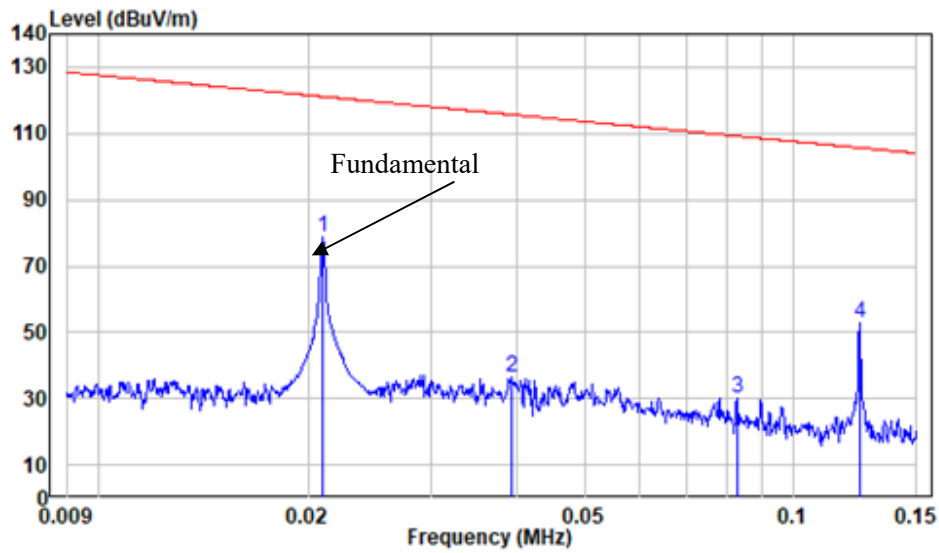
150 kHz~30 MHz



	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.538	-11.63	67.62	55.99	72.97	-16.98	Peak
2	1.032	-11.57	62.05	50.48	67.19	-16.71	Peak
3	4.027	-11.69	53.43	41.74	69.54	-27.80	Peak
4	10.452	-10.93	51.95	41.02	69.54	-28.52	Peak

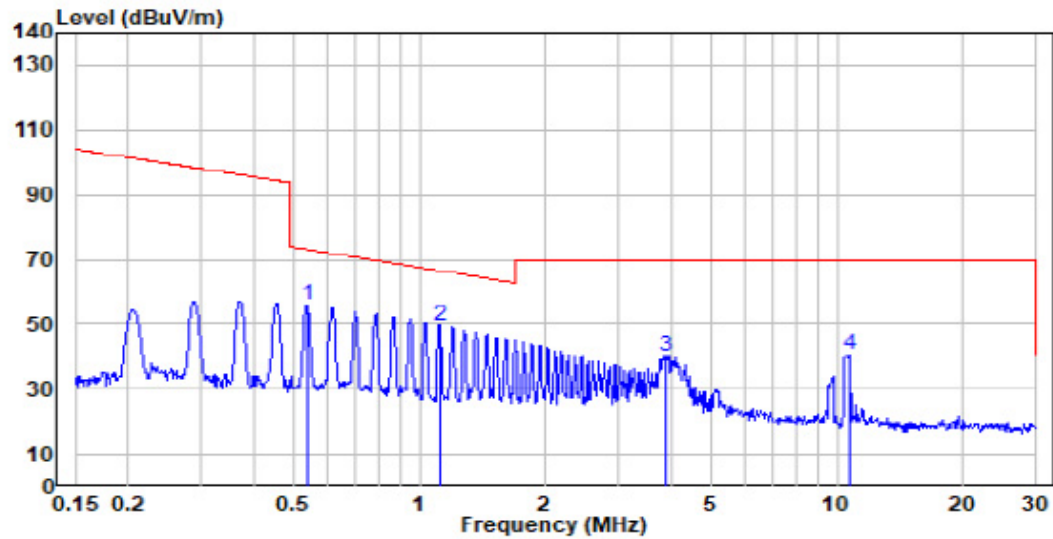
Parallel:

9 kHz~150 kHz



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.021	-11.69	90.50	78.81	121.16	-42.35	Peak
2	0.039	-11.59	47.91	36.32	115.74	-79.42	Peak
3	0.083	-11.58	41.72	30.14	109.24	-79.10	Peak
4	0.124	-11.83	64.92	53.09	105.72	-52.63	Peak

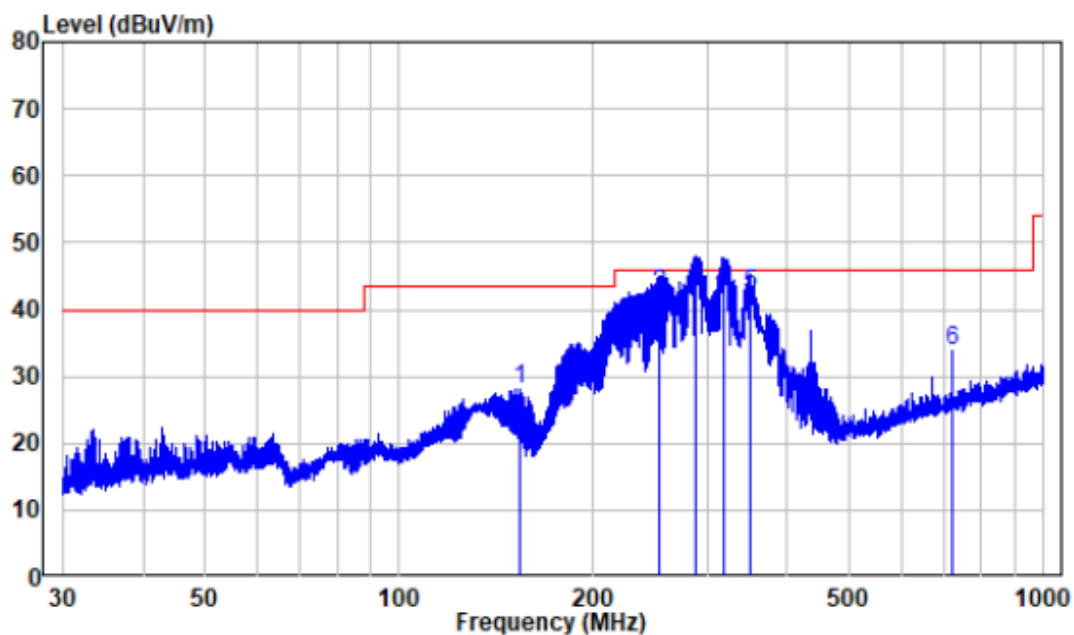
150 kHz~30 MHz



	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.538	-11.63	67.56	55.93	72.97	-17.04	Peak
2	1.117	-11.56	61.25	49.69	66.49	-16.80	Peak
3	3.901	-11.70	52.03	40.33	69.54	-29.21	Peak
4	10.676	-10.92	51.83	40.91	69.54	-28.63	Peak

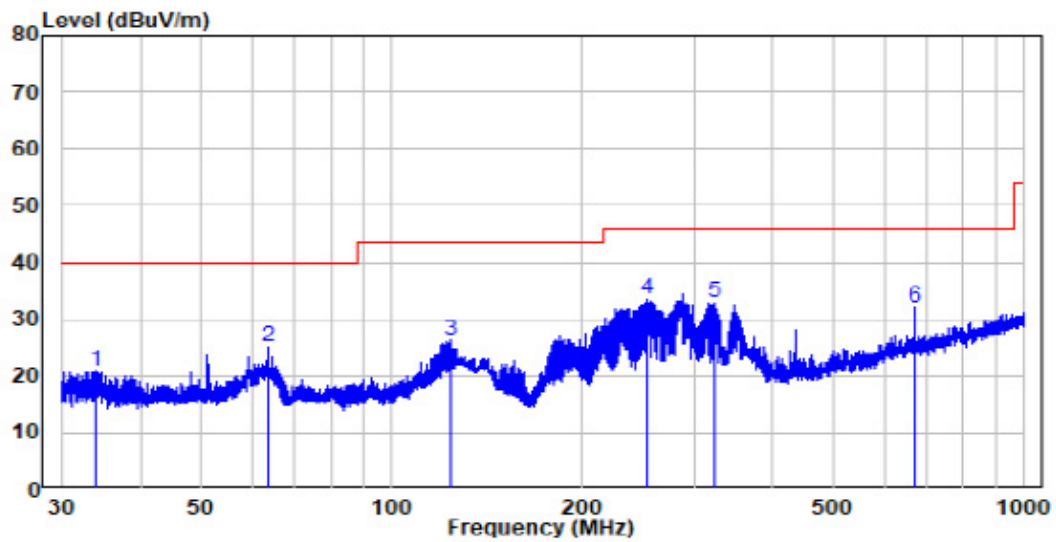
30MHz~1GHz:

Note: when the result of Peak below the limit of QP more than 6dB, just the peak value was record

Horizontal

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	154.008	-15.04	43.26	28.22	43.50	-15.28	Peak
2	252.948	-10.66	52.99	42.33	46.00	-3.67	QP
3	288.622	-9.35	52.71	43.36	46.00	-2.64	QP
4	317.701	-8.58	51.41	42.83	46.00	-3.17	QP
5	349.710	-7.29	49.48	42.19	46.00	-3.81	QP
6	720.146	-1.35	35.15	33.80	46.00	-12.20	Peak

Vertical



	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBUV/m	dBUV/m	dB	
1	34.022	-11.84	32.59	20.75	40.00	-19.25	Peak
2	63.563	-12.00	37.18	25.18	40.00	-14.82	Peak
3	124.187	-14.23	40.46	26.23	43.50	-17.27	Peak
4	253.059	-10.66	44.08	33.42	46.00	-12.58	Peak
5	323.037	-8.34	41.27	32.93	46.00	-13.07	Peak
6	671.960	-1.64	33.73	32.09	46.00	-13.91	Peak

FCC §15.215 (c) – 20 dB EMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH

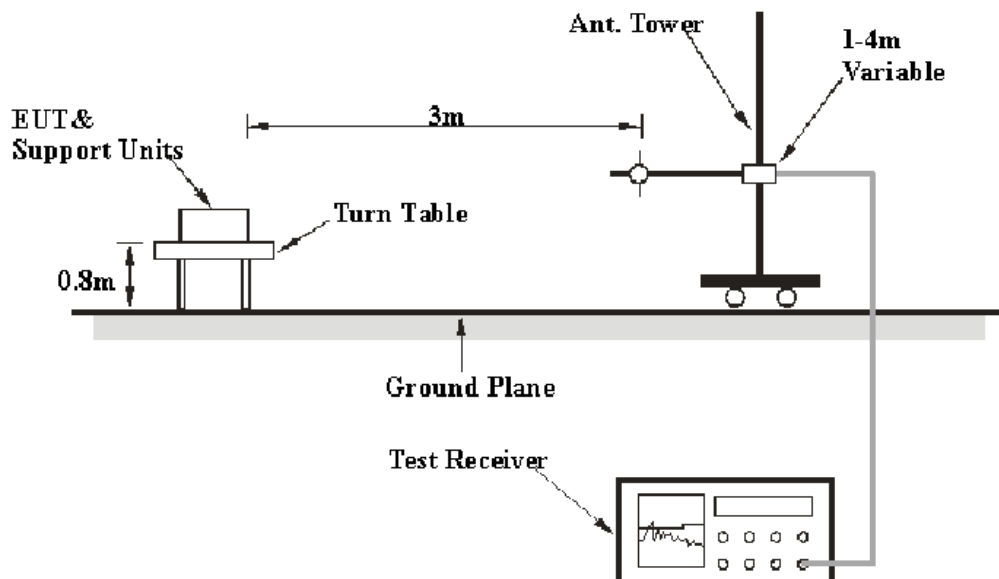
Applicable Standard

According to § 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. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. 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

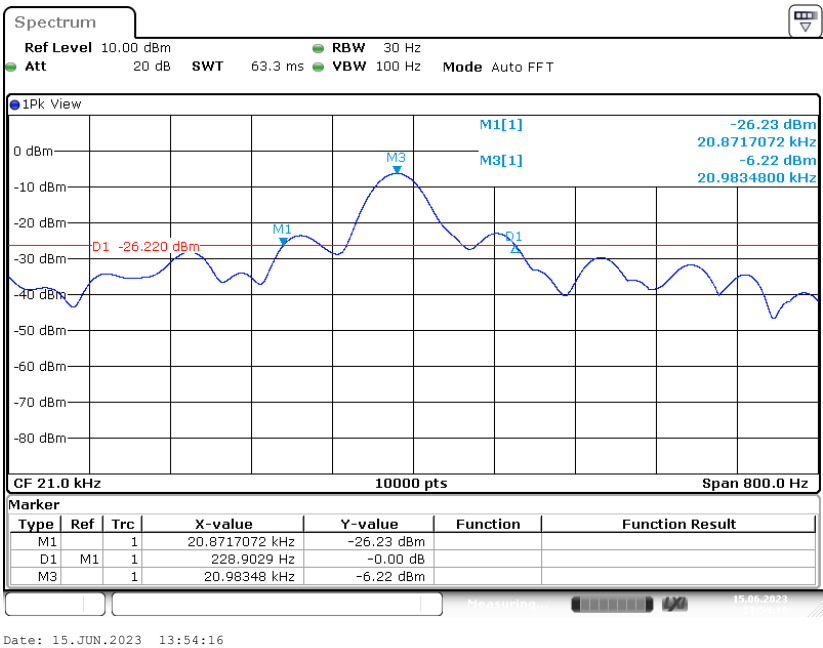
Temperature:	25.5 °C
Relative Humidity:	61 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang on 2023-06-15.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to following table and plot.

Channel Frequency (kHz)	20 dB Emission Bandwidth (KHz)
21.575	0.229



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