FCC PART 15.225

TEST REPORT

For

Vanstone Electronic (Beijing) Co., Ltd.

3F No.2 Building, Aisino Corporation Park 18A, Xingshikou Road, Haidian District, Beijing, China 100195

FCC ID: OWLV71

Report Type:	**Product Type:**
Original Report	Wireless POS Terminal

Report Number:	SZXX1210918-48932E-00C
Report Date:	2021-11-01
Reviewed By:	Candy Li RF Engineer
Prepared By:	Shenzhen Accurate Technology Co., Ltd. 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396 Http://www.atc-lab.com

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.

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Wireless POS Terminal
Trademark	Aisino
Tested Model	V71
Frequency Range	13.56 MHz
Modulation Technique	ASK
Voltage Range	DC3.7V by battery or DC 5V from adapter.
Date of Test	2021-10-18 to 2021-10-28
Sample serial number	SZXX1210918-48932E-RF- S1 (Assigned by ATC)
Received date	2021-09-18
Sample/EUT Status	Good condition
Adapter1 Information	Model: A18A-050100U-US2 Input: 100-240V~, 50/60Hz, Max 0.2A Output: DC 5V, 1A
Adapter2 Information	Model: SW-0018 Input: 100-240V~, 50/60Hz, Max 0.2A Output: DC 5V, 1A

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		$0.082*10^{-7}$
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
Temperature		1℃
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 (ISEDC), 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

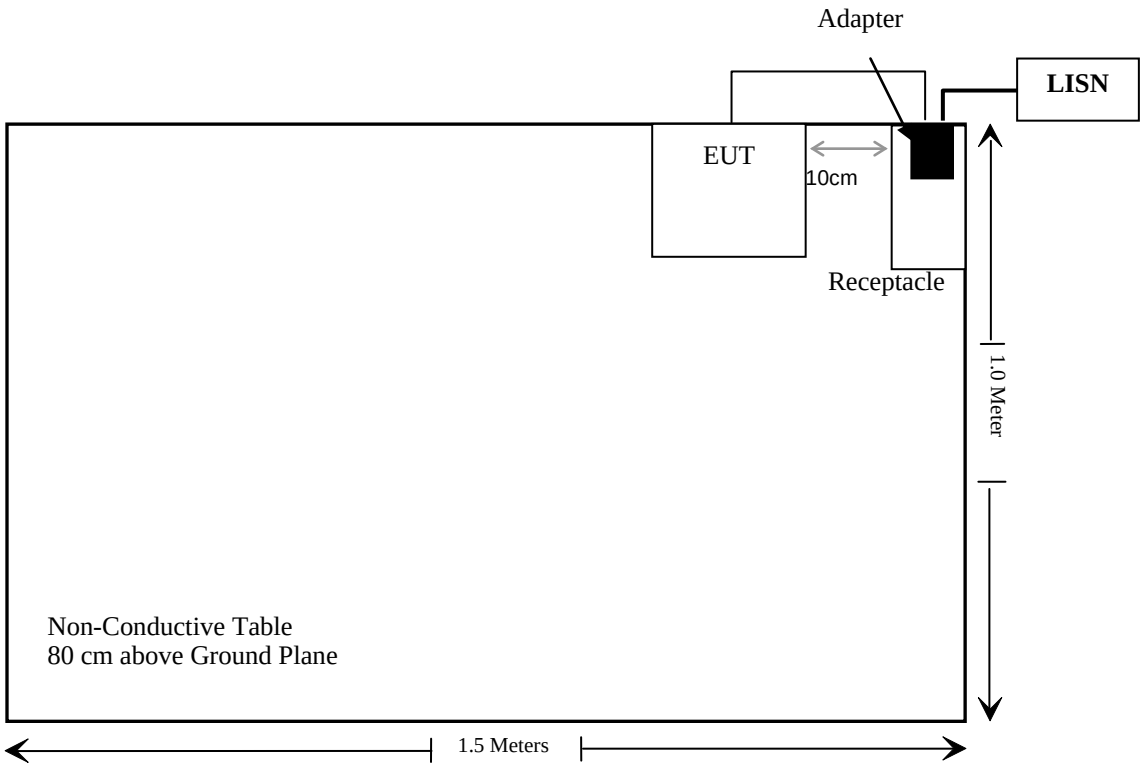
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

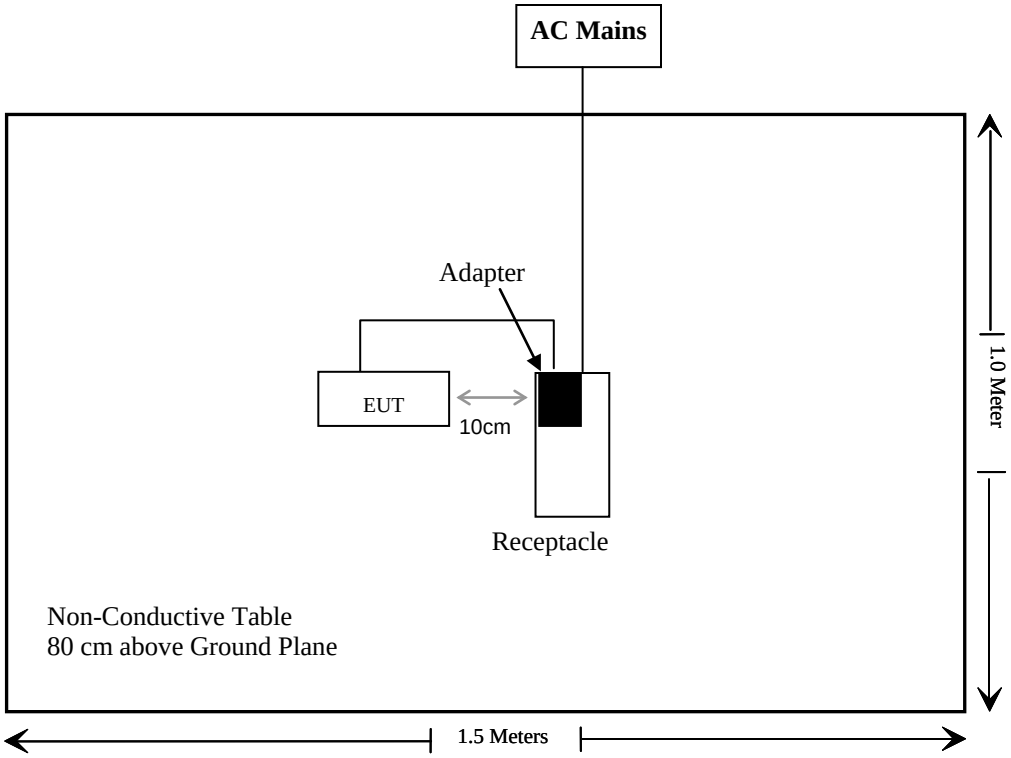
Cable Description	Length (m)	From Port	To
Unshielded Detachable USB Cable	1.5	Adapter	EUT

Block Diagram of Test Setup

For conducted emission:



For Radiated emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§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	Test Receiver	ESPI3	100396	2020/12/24	2021/12/23
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50Ω Coaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Conducted Emission Test Software: ES-K1 V1.71					
Radiated Emission Test					
Rohde&Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde& Schwarz	Test Receiver	ESPI3	100396	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Schwarzbeck	LOOP Antenna	FMZB1516	1516131	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/04	2023/01/03
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
UNI-T	DC Power Supply	UTP8305B	10584	NCR	NCR
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2020/12/25	2021/12/24
Fluke	Desktop Multi Meter	45	7664009	2020/12/25	2021/12/24
Radiated Emission Test Software: EZ_EMC V 1.1.4.2					

*** 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§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.

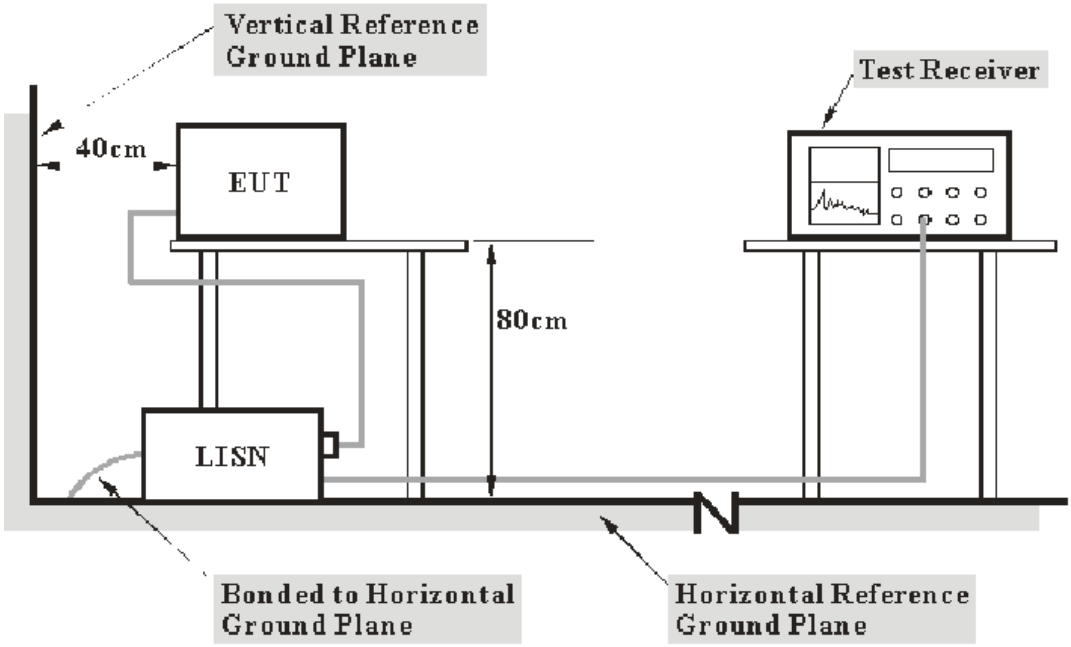
Result: Compliant.

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 80 cm from other units and other metal planes support units.

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

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 30 MHz.

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

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

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.

Corrected Factor & Margin Calculation

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

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Data

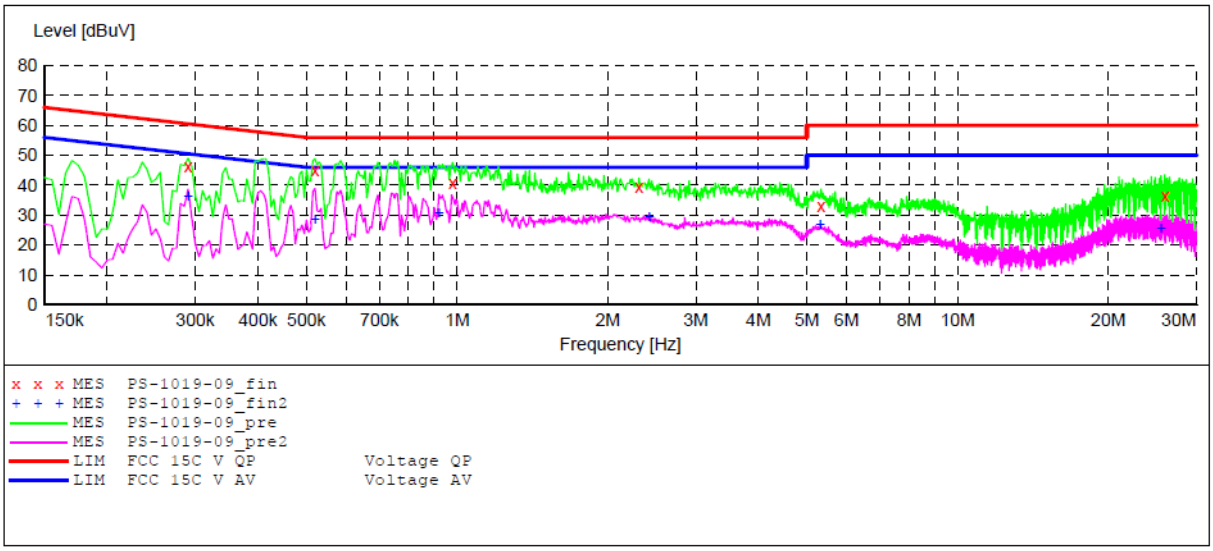
Environmental Conditions

Temperature:	24-25 °C
Relative Humidity:	60-65 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Ding on 2021-10-19 and 2021-10-20.

Test mode: Charging+NFC

For adapter1
AC 120 V/60 Hz, Line:



MEASUREMENT RESULT: "PS-1019-09_fin"

2021-10-19 09:34

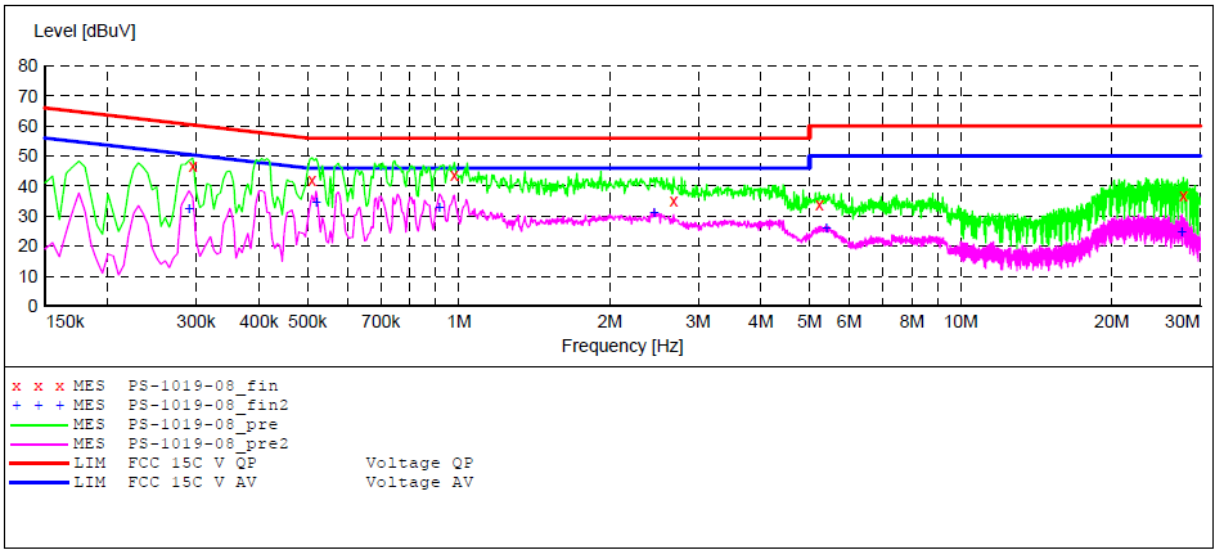
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.290000	45.90	10.9	61	15.1	QP	L1	GND
0.520000	44.90	11.0	56	11.1	QP	L1	GND
0.980000	40.80	11.1	56	15.2	QP	L1	GND
2.310000	39.60	11.3	56	16.4	QP	L1	GND
5.340000	33.10	11.5	60	26.9	QP	L1	GND
25.975000	36.40	11.8	60	23.6	QP	L1	GND

MEASUREMENT RESULT: "PS-1019-09_fin2"

2021-10-19 09:34

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.290000	36.60	10.9	51	14.4	AV	L1	GND
0.520000	28.60	11.0	46	17.4	AV	L1	GND
0.920000	31.10	11.1	46	14.9	AV	L1	GND
2.420000	29.60	11.3	46	16.4	AV	L1	GND
5.320000	27.00	11.4	50	23.0	AV	L1	GND
25.500000	25.90	11.7	50	24.1	AV	L1	GND

AC 120V/ 60 Hz, Neutral:



MEASUREMENT RESULT: "PS-1019-08_fin"

2021-10-19 09:32

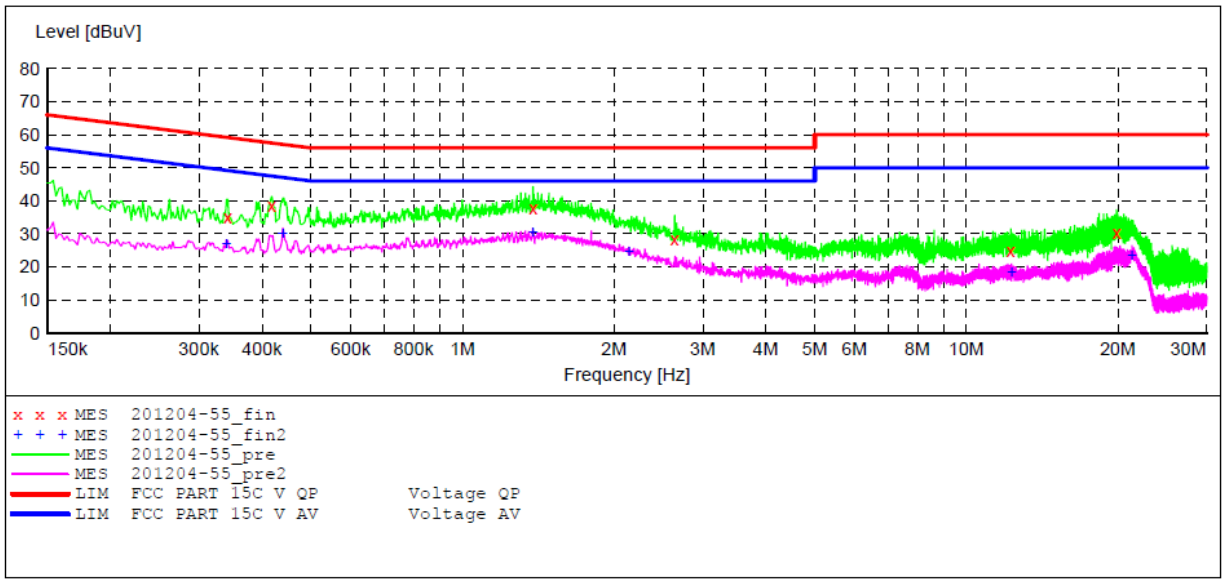
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.295000	46.00	10.9	60	14.0	QP	N	GND
0.510000	41.90	11.0	56	14.1	QP	N	GND
0.980000	43.90	11.1	56	12.1	QP	N	GND
2.680000	35.00	11.3	56	21.0	QP	N	GND
5.230000	33.90	11.4	60	26.1	QP	N	GND
27.800000	37.00	11.8	60	23.0	QP	N	GND

MEASUREMENT RESULT: "PS-1019-08_fin2"

2021-10-19 09:32

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.290000	32.80	10.9	51	18.2	AV	N	GND
0.520000	28.90	11.0	46	17.1	AV	N	GND
0.915000	33.20	11.1	46	12.8	AV	N	GND
2.450000	31.50	11.3	46	14.5	AV	N	GND
5.400000	26.30	11.5	50	23.7	AV	N	GND
27.600000	24.90	11.8	50	25.1	AV	N	GND

For adapter2
AC 120V/60 Hz, Line



MEASUREMENT RESULT: "201204-55_fin"

2021-10-20 14:34

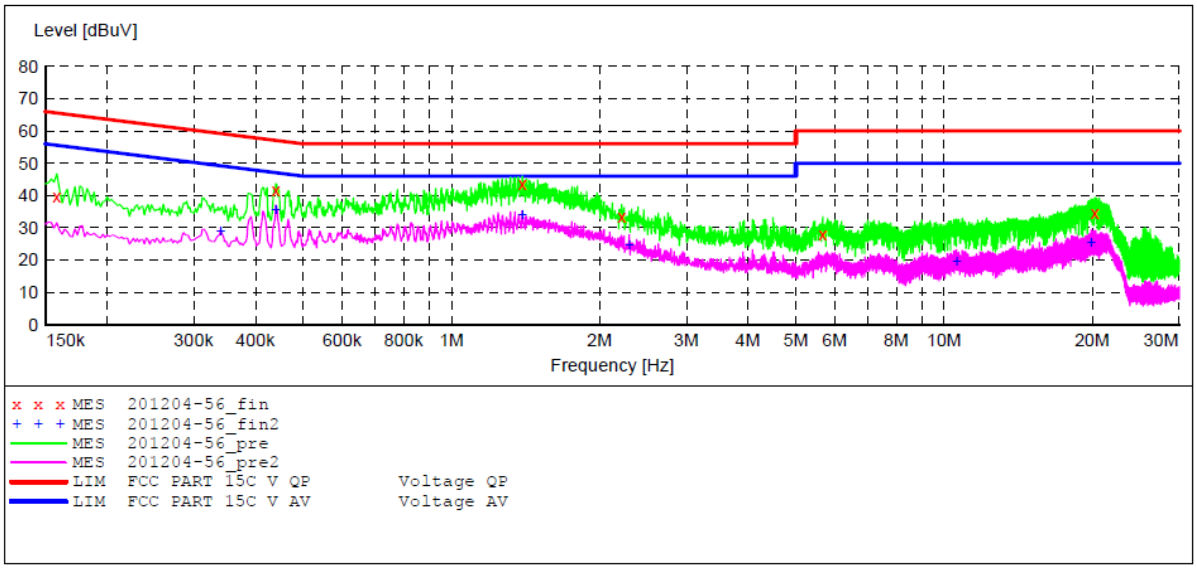
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.342000	35.00	10.9	59	24.0	QP	L1	GND
0.418000	38.40	11.0	58	19.6	QP	L1	GND
1.380000	37.70	11.2	56	18.3	QP	L1	GND
2.635000	28.40	11.3	56	27.6	QP	L1	GND
12.250000	24.70	11.6	60	35.3	QP	L1	GND
19.850000	30.40	11.7	60	29.6	QP	L1	GND

MEASUREMENT RESULT: "201204-55_fin2"

2021-10-20 14:34

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.340000	27.20	10.9	49	21.8	AV	L1	GND
0.440000	30.10	11.0	47	16.9	AV	L1	GND
1.380000	30.50	11.2	46	15.5	AV	L1	GND
2.140000	24.60	11.3	46	21.4	AV	L1	GND
12.285000	18.50	11.6	50	31.5	AV	L1	GND
21.310000	23.50	11.7	50	26.5	AV	L1	GND

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "201204-56_fin"

2021-10-20 14:37

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.158000	39.70	10.8	66	26.3	QP	N	GND
0.440000	41.50	11.0	57	15.5	QP	N	GND
1.392000	43.50	11.2	56	12.5	QP	N	GND
2.215000	33.60	11.3	56	22.4	QP	N	GND
5.670000	28.10	11.5	60	31.9	QP	N	GND
20.210000	34.40	11.7	60	25.6	QP	N	GND

MEASUREMENT RESULT: "201204-56_fin2"

2021-10-20 14:37

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.340000	28.90	10.9	49	20.1	AV	N	GND
0.440000	35.80	11.0	47	11.2	AV	N	GND
1.392000	34.00	11.2	46	12.0	AV	N	GND
2.295000	24.60	11.3	46	21.4	AV	N	GND
10.595000	19.70	11.6	50	30.3	AV	N	GND
19.870000	25.60	11.7	50	24.4	AV	N	GND

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

Applicable Standard

As per FCC Part 15.225

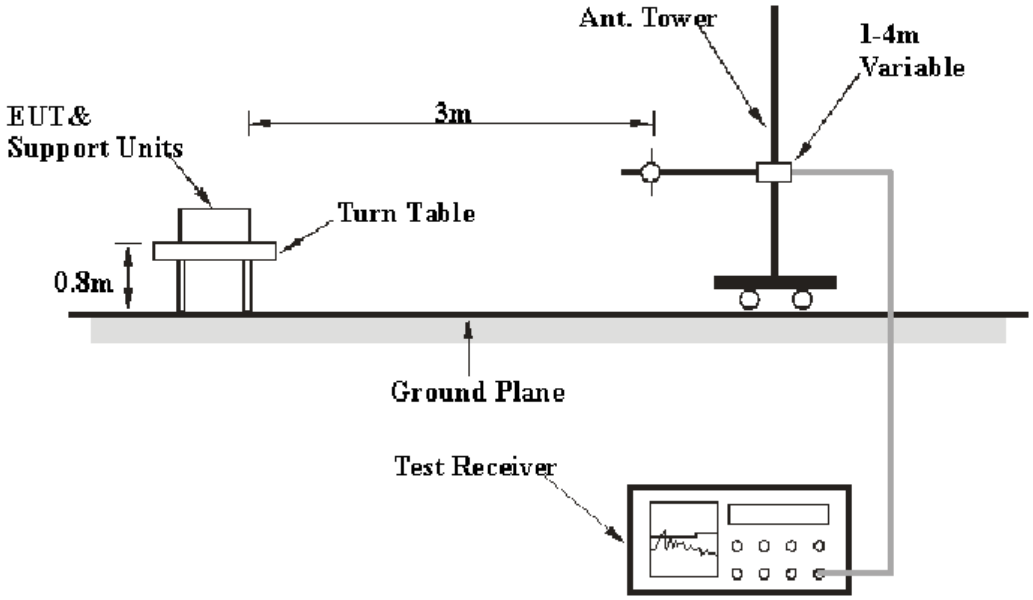
(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(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	1 kHz	/	QP
150 kHz –30 MHz	10 kHz	30 kHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	/	QP

Corrected Amplitude & Margin Calculation

The Factor 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

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 = Result / Corrected Amplitude-Limit
Result / Corrected Amplitude = Reading + Factor

Test Data

Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	47-52 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Ding on 2021-10-28 for below 30MHz, 2021-10-18 and 2021-10-19 for 30MHz-1GHz.

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

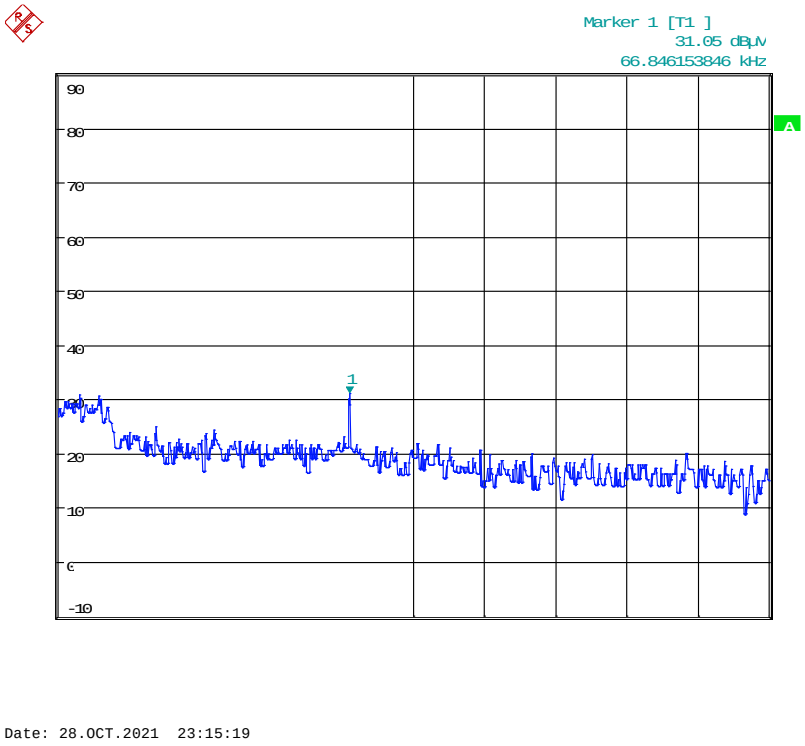
1) Spurious Emissions (9 kHz~30 MHz): Worst case for Adapter 2

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	Corrected Amplitude (dBμV/m)	PK/QP/AV		Height (m)	Polar (H/V)			
TX 13.56MHz								
0.067	31.05	QP	24	1.0	X	20.0	111.08	-80.03
13.401	42.53	QP	157	1.0	X	20.7	69.54	-27.01

Part 15 Section 15.31(f)(2) (9kHz-30MHz)
Limit @ 3m=Limit @ 300m-40*log(3(m)/300(m))
Limit @ 3m=Limit @ 30m-40*log(3(m)/30(m))

Worst case plots:

9 kHz~150 kHz



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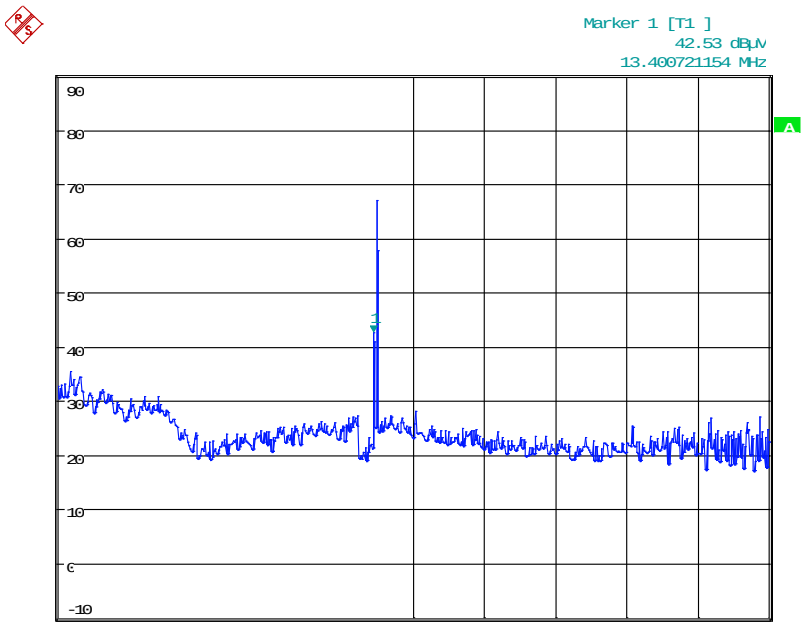
150 kHz~30 MHz



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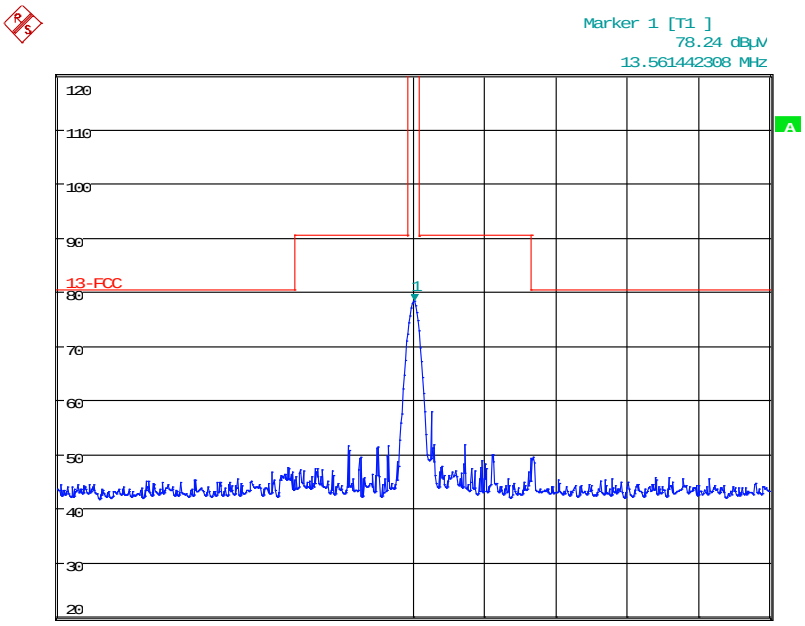
2) Emission Mask & Fundamental:

Frequency (MHz)	Corrected Amplitude (dBμV/m@3m)	Turntable Degree	Rx Antenna Height (m)	Factor (dB/m)	Limit (dBμV/m@3m)	Margin (dB)
13.5614	78.24	128	1.0	20.7	124	-45.76



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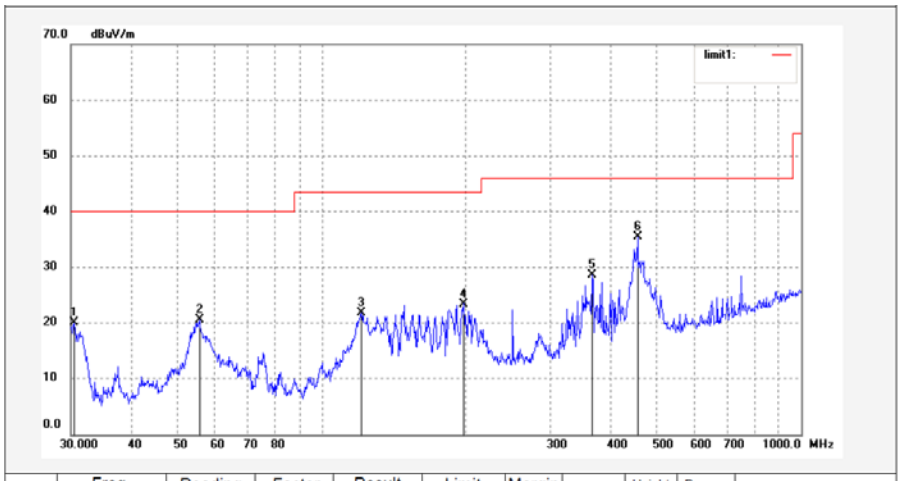
3) Spurious Emissions (30 MHz~1GHz):

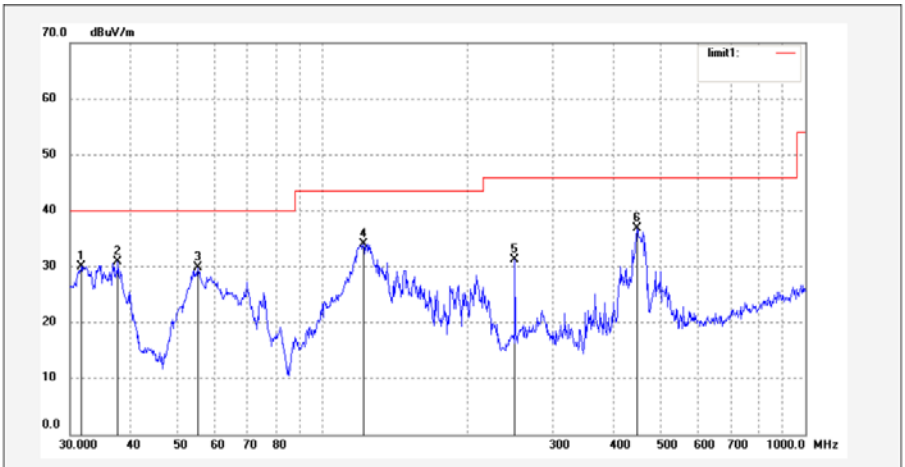
For adapter 1

Horizontal:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.4237	40.24	-20.16	20.08	40.00	-19.92	peak			
2	55.6094	38.15	-17.55	20.60	40.00	-19.40	peak			
3	121.1230	40.00	-18.22	21.78	43.50	-21.72	peak			
4	197.8926	41.08	-17.63	23.45	43.50	-20.05	peak			
5	366.8231	41.72	-13.11	28.61	46.00	-17.39	peak			
6	455.9057	46.13	-10.68	35.45	46.00	-10.55	peak			

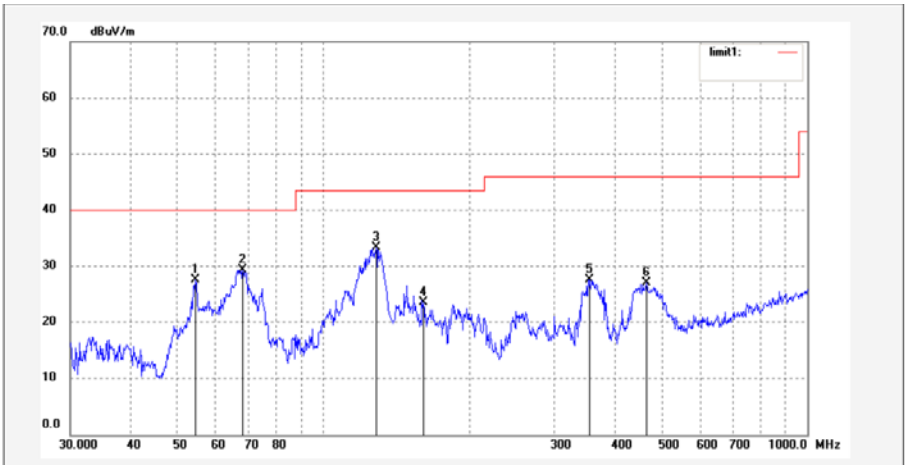
Vertical:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.6202	44.04	-14.04	30.00	40.00	-10.00	peak			
2	37.6798	46.55	-15.67	30.88	40.00	-9.12	peak			
3	55.2207	47.64	-17.73	29.91	40.00	-10.09	peak			
4	121.5485	52.36	-18.26	34.10	43.50	-9.40	peak			
5	250.3011	47.76	-16.44	31.32	46.00	-14.68	peak			
6	447.9821	47.64	-10.73	36.91	46.00	-9.09	peak			

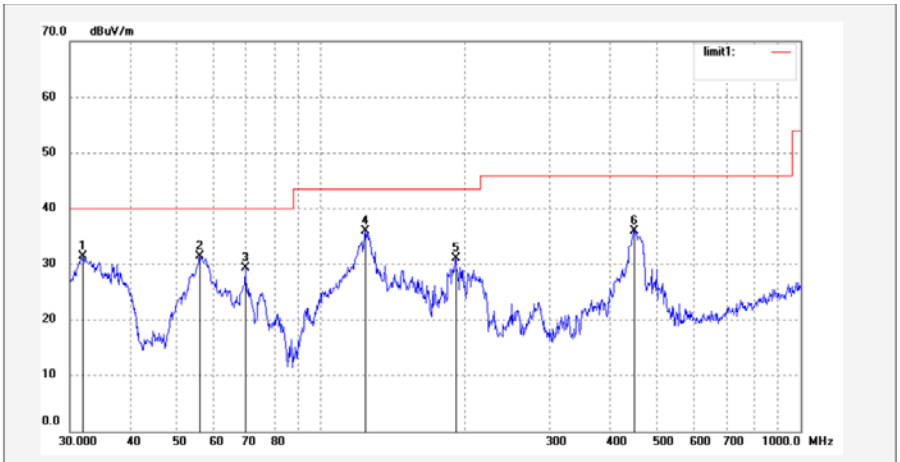
For adapter2

Horizontal:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	54.4515	44.85	-17.37	27.48	40.00	-12.52	peak			
2	68.1512	49.79	-20.40	29.39	40.00	-10.61	peak			
3	128.5629	52.11	-18.75	33.36	43.50	-10.14	peak			
4	160.9088	43.04	-19.49	23.55	43.50	-19.95	peak			
5	355.4273	40.82	-13.26	27.56	46.00	-18.44	peak			
6	465.5994	37.73	-10.71	27.02	46.00	-18.98	peak			

Vertical:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.9542	45.51	-14.14	31.37	40.00	-8.63	peak			
2	56.0007	49.25	-17.89	31.36	40.00	-8.64	peak			
3	69.6003	50.15	-20.87	29.28	40.00	-10.72	peak			
4	123.6984	54.51	-18.52	35.99	43.50	-7.51	peak			
5	191.0738	48.89	-17.75	31.14	43.50	-12.36	peak			
6	449.5557	46.59	-10.68	35.91	46.00	-10.09	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

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

The testing was performed by Black Ding on 2021-10-28

Test Mode: Transmitting

Test Result: Pass

Voltage Supply (V_{DC})	Temperature (℃)	Measured Frequency (MHz)	Frequency Error (%)	Limit (%)
3.7	-20	13.560636	0.00469	±0.01
	-10	13.560628	0.00463	±0.01
	0	13.560652	0.00481	±0.01
	10	13.560658	0.00485	±0.01
	20	13.560660	0.00487	±0.01
	30	13.560638	0.00471	±0.01
	40	13.560654	0.00482	±0.01
	50	13.560659	0.00486	±0.01
3.3	20	13.560617	0.00455	±0.01
4.1	20	13.560647	0.00477	±0.01

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

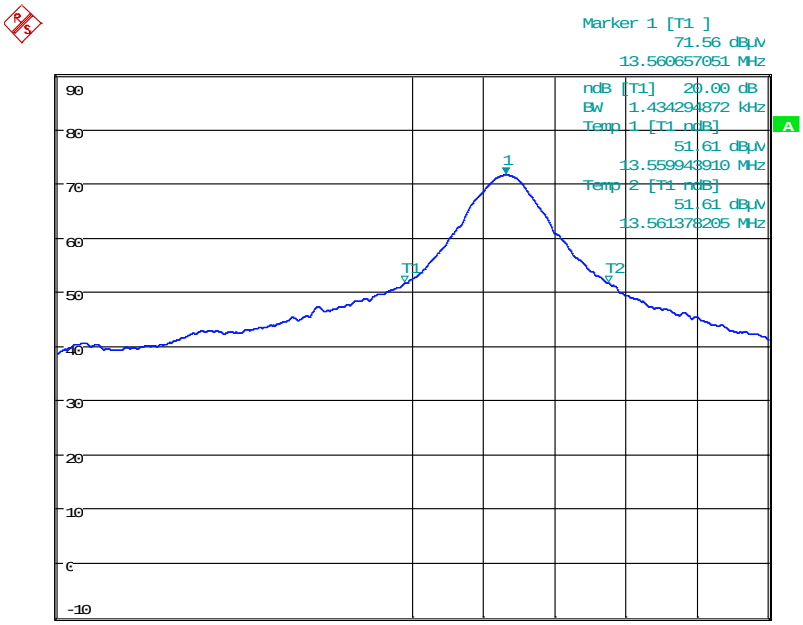
The testing was performed by Black Ding on 2021-10-28.

Test Mode: Transmitting

Test Result: Pass

Test Frequency (MHz)	20dB Bandwidth (kHz)
13.56	1.43

20 dB Emission Bandwidth



Date: 28.OCT.2021 23:00:59

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