



Microtest
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Test Report

Report No.: MTi210818005-05E4

Date of issue: Dec. 28, 2021

Applicant: Zhuhai Quin Technology Co., Ltd.

Product name: Smart Mini Label Maker

Model(s): D50, D50S, D51, D52, D51S, D51 PRO,
D50Pro, D50S, D55, D50A, D50T

FCC ID: 2ASRB-D50

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

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TEST RESULT CERTIFICATION	
Applicant's name.....	Zhuhai Quin Technology Co., Ltd.
Address.....	ROOM 201 2ND FLOOR, 3RD FLOOR, BLOCK 2, NO.1 CUIZHU 4TH STREET, QIANSHAN, XIANGZHOU DISTRICT, ZHUHAI CITY, CHINA
Manufacturer's Name.....	Zhuhai Quin Technology Co., Ltd.
Address.....	ROOM 201 2ND FLOOR, 3RD FLOOR, BLOCK 2, NO.1 CUIZHU 4TH STREET, QIANSHAN, XIANGZHOU DISTRICT, ZHUHAI CITY, CHINA
Factory's Name.....	Zhuhai Quin Technology Co., Ltd.
Address	BLOCK 1 FLOOR 4,5,6,7,BLOCK 2 FLOOR 1,2,3,4,5,6,NO.1 CUIZHU 4 STREET, QIANSHAN, XIANGZHOU DISCTRICT, ZHUHAI CITY
Product description	
Product name.....	Smart Mini Label Maker
Trademark	N/A
Model Name	D50
Serial Model.....	D50S, D51, D52, D51S, D51 PRO, D50Pro, D50S, D55, D50A, D50T
Standards.....	FCC Part 15.225
Test procedure	ANSI C63.10-2013
Date of Test	
Date (s) of performance of tests..... :	Sep. 10, 2021 ~Dec. 24, 2021
Test Result	Pass
This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

Testing Engineer

:

Cindy Qin

(Cindy Qin)

Technical Manager

:

Leon Chen

(Leon Chen)

Authorized Signatory

:

Tom Xue

(Tom Xue)

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	Smart Mini Label Maker
Model name:	D50
Series model:	D50S, D51, D52, D51S, D51 PRO, D50Pro, D50S, D55, D50A, D50T
Difference of series model:	All the models are the same circuit and RF module, except the color, logo printing, and model name.
Operating frequency:	RFID:13.56MHz
Modulation type:	ASK
Antenna Tpye:	PCB antenna
Antenna gain:	1.52dBi
Maximum Field Strength:	53.17dBμV/m at 3 meter
Hardware Version:	Q083_A
Software Version:	_0.2.4
Power Supply:	DC 5V from adapter AC 120V/60Hz or DC 7.4V from battery
Battery:	DC 7.4V 1000mAh
Adapter information:	N/A

1.2 Operation channel list

Channel	Frequency (MHz)
01	13.56

1.3 Test channel list

Channel	Frequency (MHz)
01	13.56

1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
Adapter	HW-090200CH0	/	HUAWEI	/

1.5 Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
/	/	/	/	/	/
/	/	/	/	/	/

Note:

(1)The support equipment was authorized by Declaration of Confirmation.

(2)For detachable type I/O cable should be specified the length in cm in 『Length』 column.

1.6 EUT operation mode

During testing, the EUT is operated in a keeping TX mode.

2 SUMMARY OF TEST RESULT

Test procedures according to the technical standards:

No.	Standard Section	Test Item	Result	Remark
1	15.203	Antenna Requirement	Pass	
2	15.207	Conducted Emission	Pass	
3	15.225(d)/15.209	Radiated Emissions	Pass	
4	15.227(a)(b)(c)/15.205	Field Strength of Fundamental Emissions	Pass	
5	15.215	20dB Bandwidth	Pass	
6	15.225(e)	Frequency Tolerance	Pass	

3 Test Facilities and Accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
FCC Registration No.:	FCC Registration No.: 448573

3.2 Environmental conditions

Temperature:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

3.4 Test software

Software Name	Manufacturer	Model	Version
/	/	/	/

4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E043	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2021/06/02	2022/06/01
MTI-E044	TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-1338	2021/05/30	2023/05/29
MTI-E047	Amplifier	Hewlett-Packard	8447F	3113A06150	2021/06/02	2022/06/01
MTI-E089	ESG Vector Signal Generator	Agilent	N5182A	MY49060455	2021/06/02	2022/06/01
MTI-E058	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2021/06/02	2022/06/01
MTI-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2021/06/02	2022/06/01
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2021/06/02	2022/06/01
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2021/06/02	2022/06/01
MTI-E045	Double Ridged Broadband Horn Antenna	schwarzbeck	BBHA 9120D	9120D-2278	2021/05/30	2023/05/29
MTI-E021	EMI Test Receiver	Rohde&schwarz	ESCS30	100210	2021/06/02	2022/06/01
MTI-E022	Pulse Limiter	Schwarzbeck	VSTD 9561-F	00679	2021/06/02	2022/06/01
MTI-E023	Artificial mains network	Schwarzbeck	NSLK 8127	NSLK 8127 #841	2021/06/02	2022/06/01
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519B	00044	2021/05/30	2023/05/29
MTI-E048	Amplifier	Agilent	8449B	3008A02400	2021/06/02	2022/06/01
MTI-E072	Thermometer Clock Humidity Monitor	-	HTC-1	/	2021/06/02	2022/06/01
Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).						

5 Test Result

5.1 Antenna requirement

5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 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

5.1.2 EUT Antenna

The antenna is an integrated antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is 0.82dBi.

5.2 Conducted emission

5.2.1 Limits

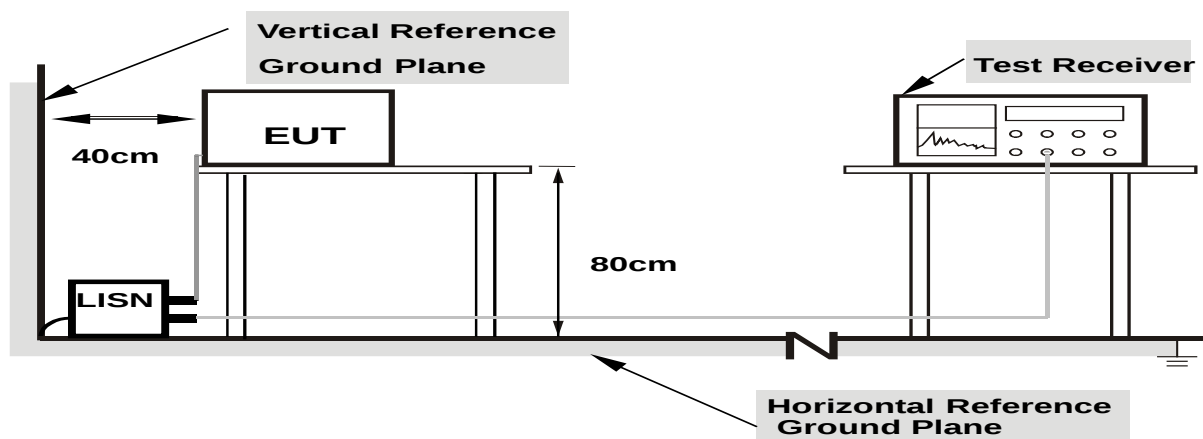
FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note

(1)The tighter limit applies at the band edges.

(2)The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.2.2 Test setup



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.2.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

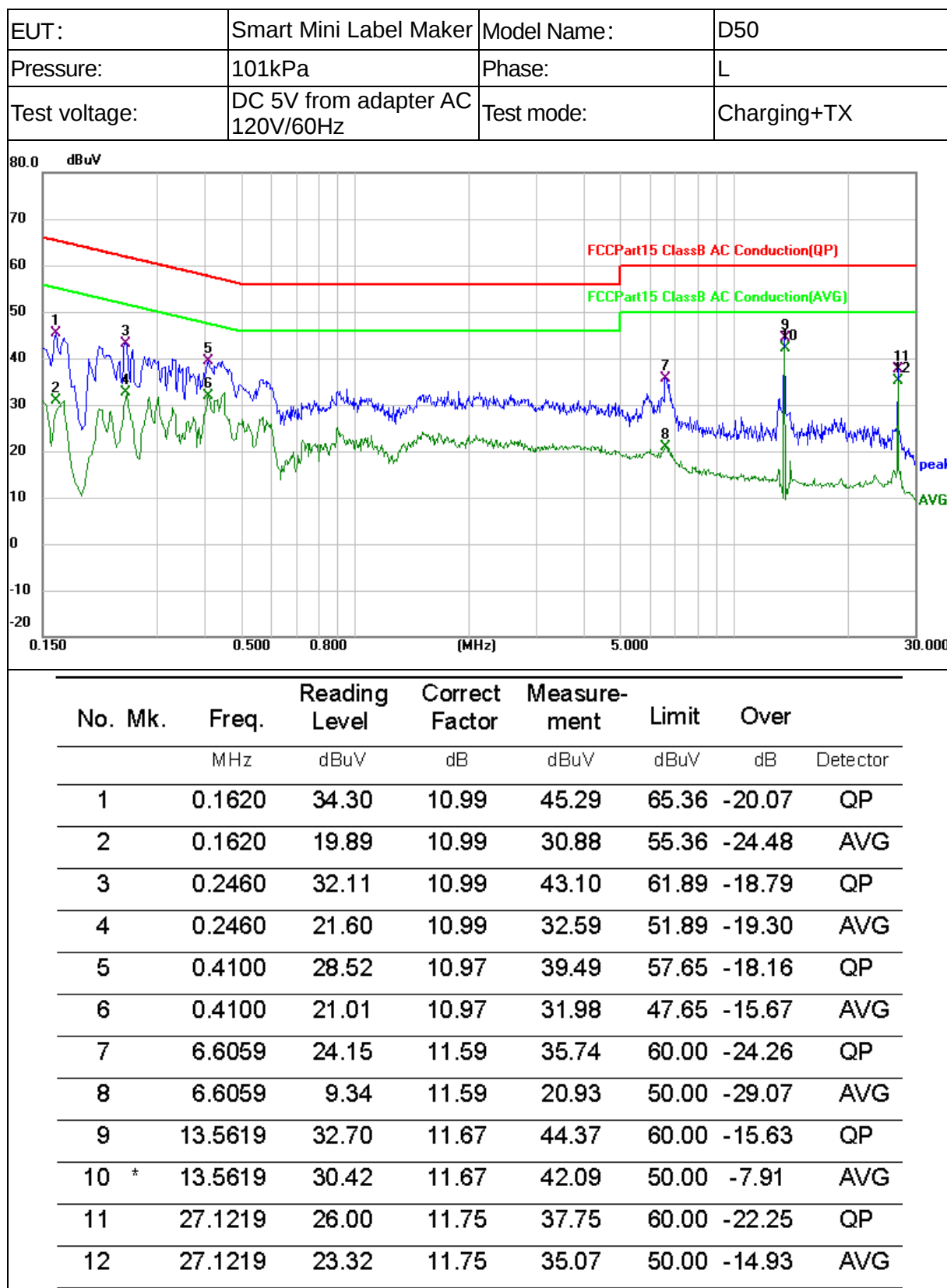
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

- c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- f. LISN at least 80 cm from nearest part of EUT chassis.

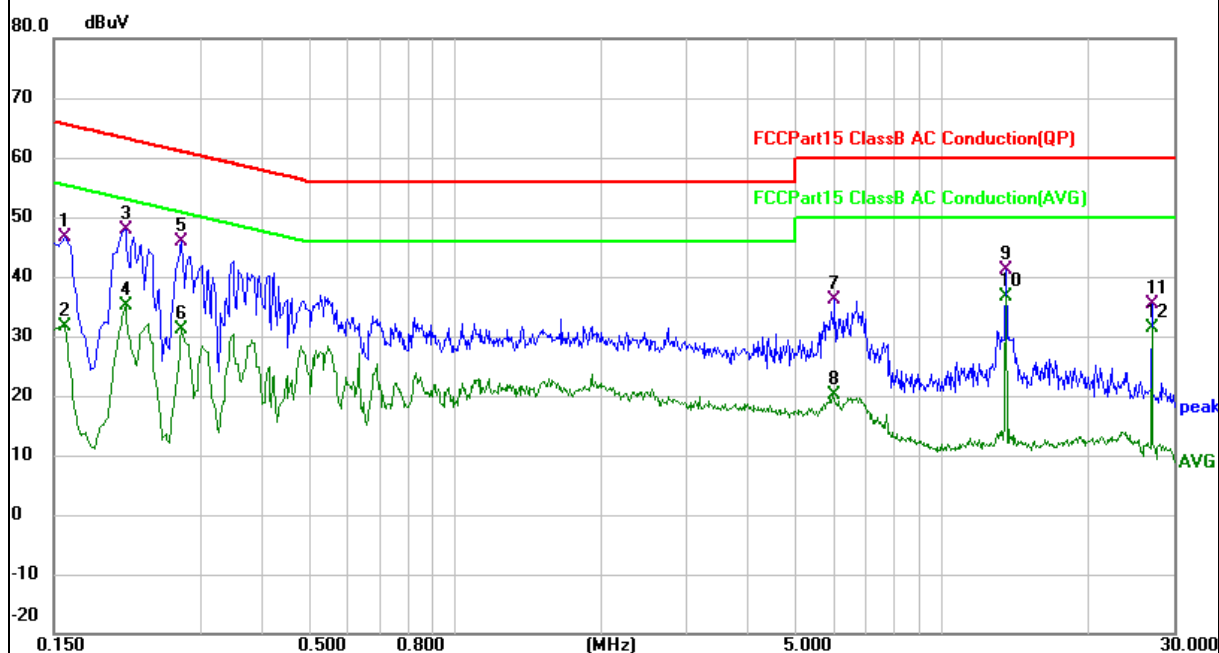
For the actual test configuration, please refer to the related Item –EUT Test Photos.



5.2.4 Test results



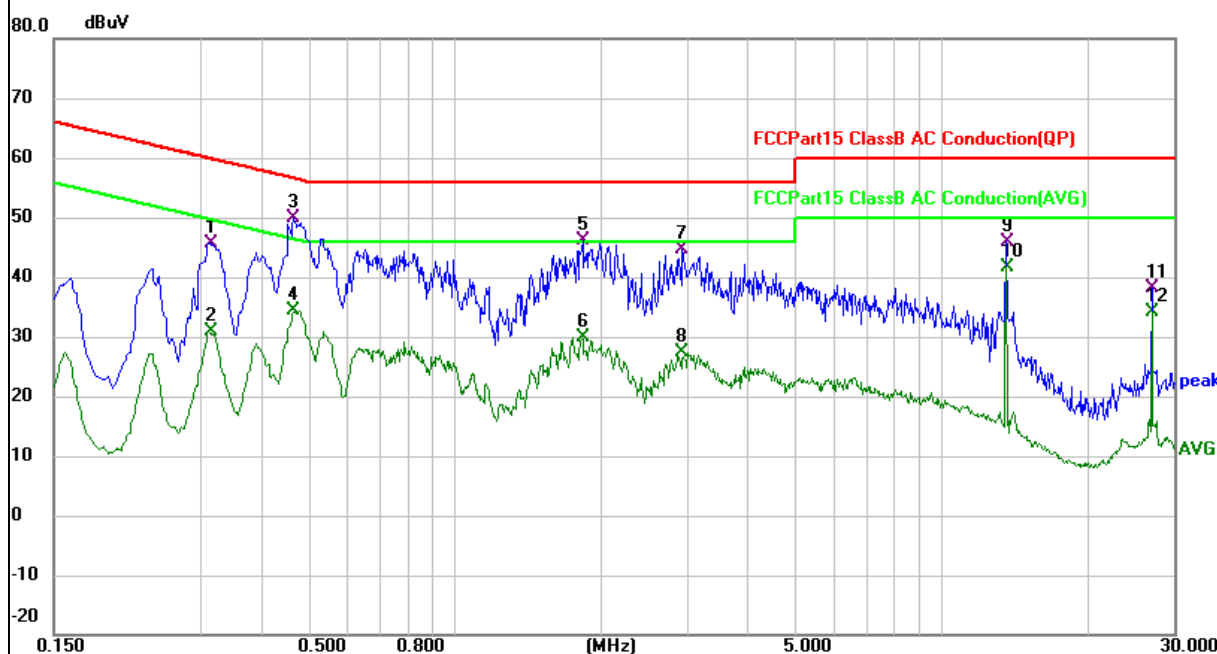
EUT:	Smart Mini Label Maker	Model Name:	D50
Pressure:	101kPa	Phase:	N
Test voltage:	DC 5V from adapter AC 120V/60Hz	Test mode:	Charging+TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1580	35.63	10.98	46.61	65.57	-18.96	QP
2		0.1580	20.75	10.98	31.73	55.57	-23.84	AVG
3		0.2100	37.04	10.91	47.95	63.21	-15.26	QP
4		0.2100	24.26	10.91	35.17	53.21	-18.04	AVG
5		0.2740	35.02	10.90	45.92	61.00	-15.08	QP
6		0.2740	20.14	10.90	31.04	51.00	-19.96	AVG
7		6.0419	24.77	11.39	36.16	60.00	-23.84	QP
8		6.0419	8.70	11.39	20.09	50.00	-29.91	AVG
9		13.5617	29.50	11.66	41.16	60.00	-18.84	QP
10	*	13.5617	24.85	11.66	36.51	50.00	-13.49	AVG
11		27.1219	23.69	11.73	35.42	60.00	-24.58	QP
12		27.1219	19.74	11.73	31.47	50.00	-18.53	AVG



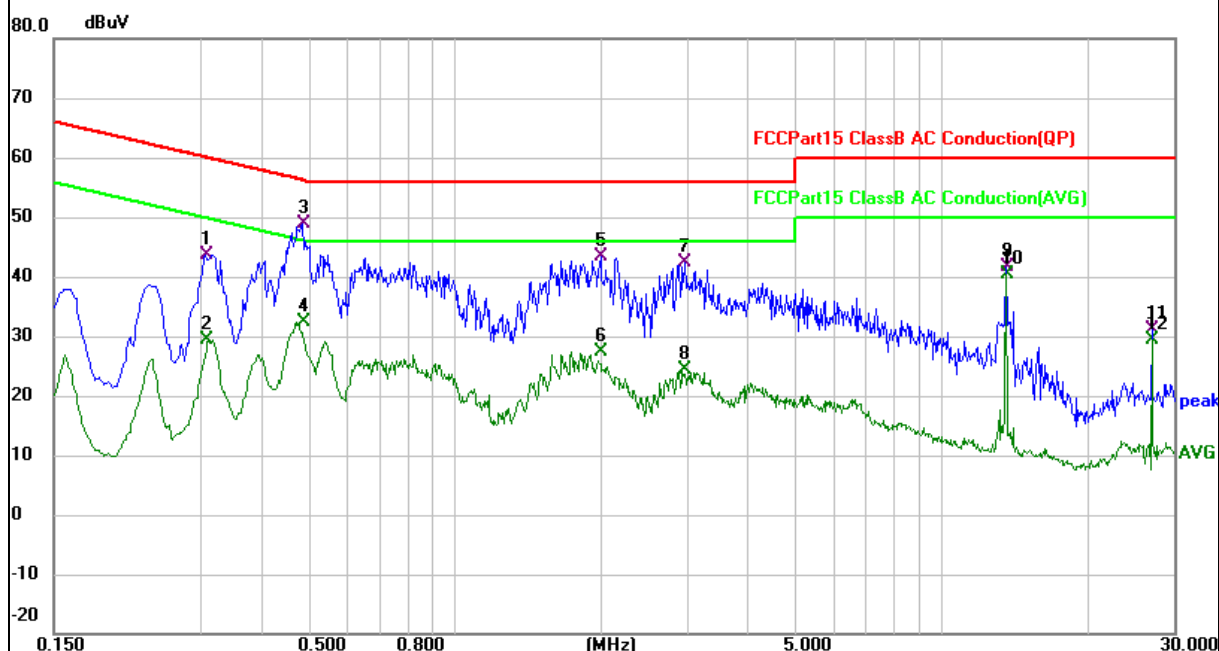
EUT:	Smart Mini Label Maker	Model Name:	D50
Pressure:	101kPa	Phase:	L
Test voltage:	DC 5V from adapter AC 240V/60Hz	Test mode:	Charging+TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.3140	34.70	10.98	45.68	59.86	-14.18	QP
2		0.3140	19.93	10.98	30.91	49.86	-18.95	AVG
3	*	0.4660	38.92	11.03	49.95	56.58	-6.63	QP
4		0.4660	23.38	11.03	34.41	46.58	-12.17	AVG
5		1.8300	31.07	15.05	46.12	56.00	-9.88	QP
6		1.8300	14.88	15.05	29.93	46.00	-16.07	AVG
7		2.9420	33.34	11.38	44.72	56.00	-11.28	QP
8		2.9420	16.05	11.38	27.43	46.00	-18.57	AVG
9		13.5619	34.21	11.67	45.88	60.00	-14.12	QP
10		13.5619	29.97	11.67	41.64	50.00	-8.36	AVG
11		27.1219	26.30	11.75	38.05	60.00	-21.95	QP
12		27.1219	22.49	11.75	34.24	50.00	-15.76	AVG



EUT:	Smart Mini Label Maker	Model Name:	D50
Pressure:	101kPa	Phase:	N
Test voltage:	DC 5V from adapter AC 240V/60Hz	Test mode:	Charging+TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.3060	32.84	10.88	43.72	60.08	-16.36	QP
2		0.3060	18.56	10.88	29.44	50.08	-20.64	AVG
3	*	0.4860	38.06	10.89	48.95	56.24	-7.29	QP
4		0.4860	21.41	10.89	32.30	46.24	-13.94	AVG
5		1.9940	28.06	15.38	43.44	56.00	-12.56	QP
6		1.9940	11.95	15.38	27.33	46.00	-18.67	AVG
7		2.9620	31.07	11.36	42.43	56.00	-13.57	QP
8		2.9620	12.92	11.36	24.28	46.00	-21.72	AVG
9		13.5619	30.08	11.66	41.74	60.00	-18.26	QP
10		13.5619	28.76	11.66	40.42	50.00	-9.58	AVG
11		27.1219	19.46	11.73	31.19	60.00	-28.81	QP
12		27.1219	17.67	11.73	29.40	50.00	-20.60	AVG

Note:

1. Emission Level = Reading Level + Factor, Margin = Emission Level - Limit;
2. Factor = LISN modulus + Cable Loss.



5.3 Radiated Emissions

5.3.1 Limit

According to FCC section 15.225, for <30 MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 KHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT)

There was no detected Restricted bands and Radiated suprious emission below 30MHz. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
 $3\text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15848) + 40\log(30/3) = 124\text{dBuV}$

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 range (MHz)	Field Strength@30m		Field Strength@3m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
Below 13.110	30	29.5	69.5
13.110 ~ 13.410	106	40.5	80.5
13.410 ~ 13.553	334	50.5	90.5
13.553 ~13.567	15.848	84	124
13.567 ~ 13.710	334	50.5	90.5
13.710 ~14.010	106	40.5	80.5
Above 14.010	30	29.5	69.5

Note:

1. Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.
2. In the emission tables above, the tighter limit applies at the band edges.

According to FCC section 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 ($\mu\text{V/m}$)
0.009 - 0.490	$2400/F(\text{kHz})$
0.490 - 1.705	$24000/F(\text{kHz})$
1.705 - 30.0	30
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Note1: For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

5.3.2 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency.

The EUT is placed on a non-conducting table 80cm above the ground plane for measurement blew 1 GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10-2013.

For measurement blew 1 GHz, the resolution bandwidth is set as item 5.4.2.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned form 1 to 4m meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and horizontal positions.

Special requirements for 9 KHz to 30 MHz:

The lowest height of the magnetic antenna shall be 1 m above the ground

When the EUT contains a loop antenna that can only be placed in a vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, and then orthogonal to the axis. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable.

When the EUT contains a loop antenna that can be placed in a horizontal or vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable.

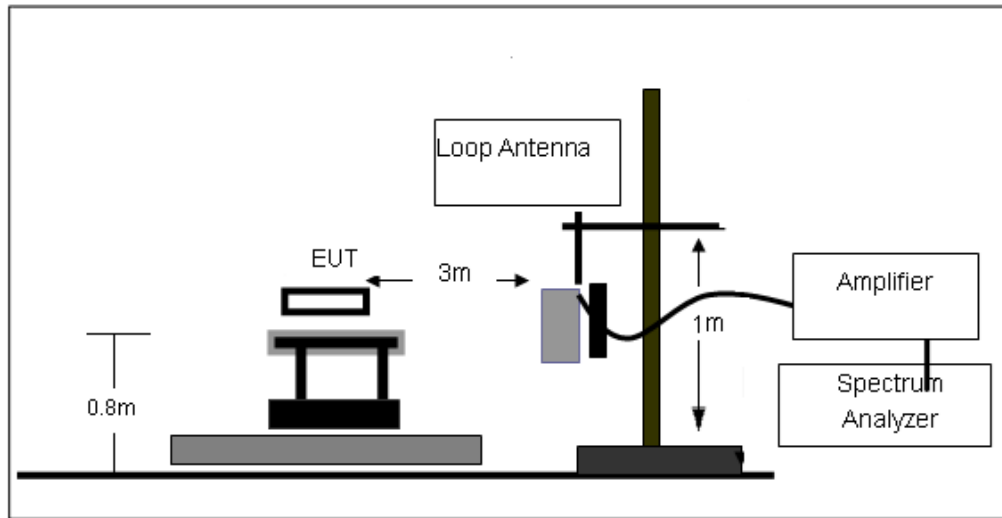
Test instrument setup:

Frequency	Test receiver / Spectrum analyzer setting
9 kHz ~ 150 kHz	Quasi Peak / 200 kHz
150 kHz ~ 30 MHz	Quasi Peak / 9 kHz
30 MHz ~ 1 GHz	Quasi Peak / 120 kHz

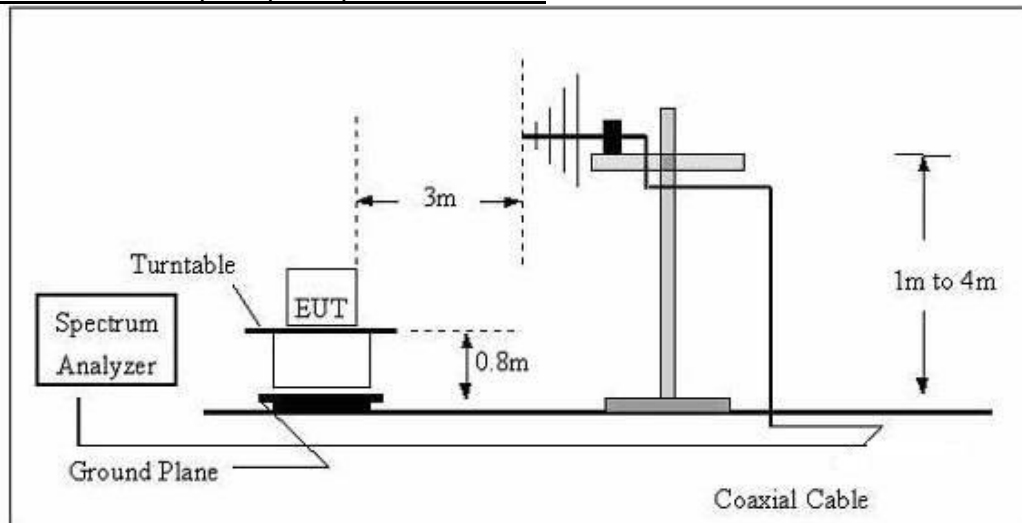


5.3.3 Test Setup

Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



5.3.4 Test Result

Fundamental

13.553 MHz – 13.567 MHz					
Frequency (MHz)	Level dBuV	Factor dBuV/m	Result @3m (dBμV/m)	Limit @3m dBuV/m	Margin dB
13.56	31.83	21.34	53.17	124	-70.83

Note: All the required orthogonal orientations of the measurement loop antenna were performed for pre-scan, the maximum radiated transmissions (Orthogonal to the site axis) were recorded.

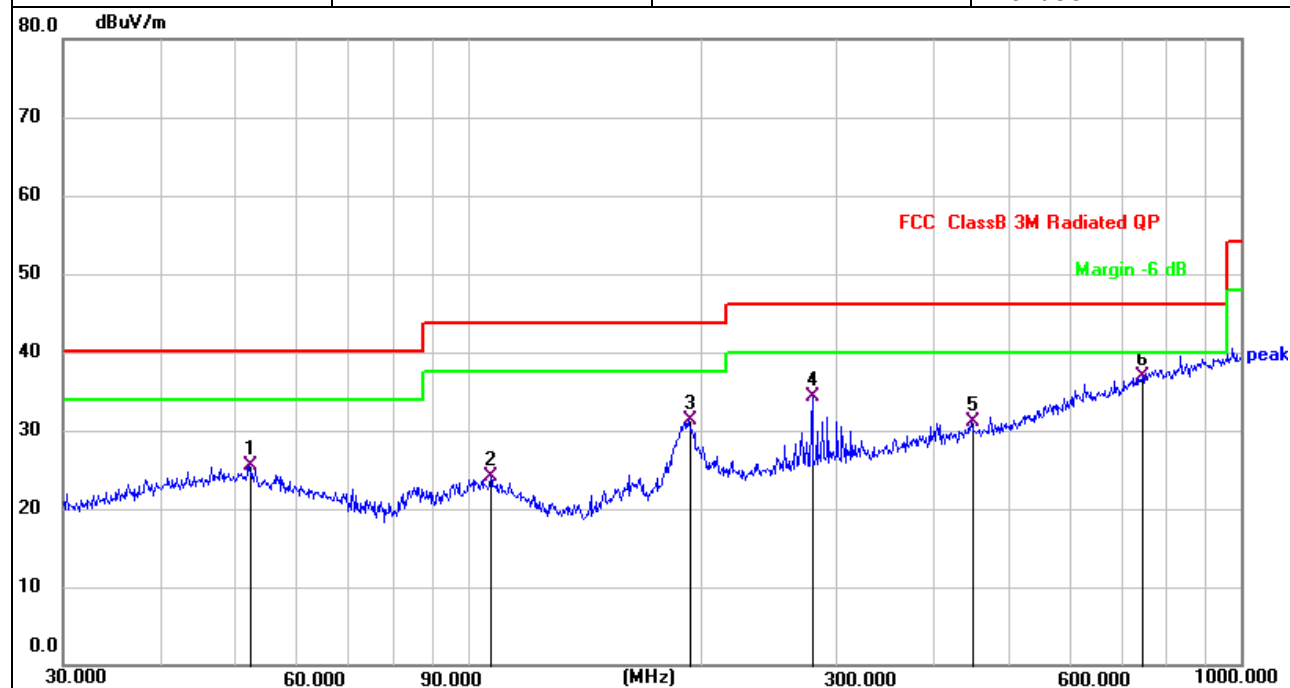
Frequency range (9kHz – 30MHz)

9kHz – 30MHz					
Frequency (MHz)	Level dBuV	Factor dBuV/m	Result @3m (dBμV/m)	Limit @3m dBuV/m	Margin dB
0.0519	14.32	22.28	36.60	69.50	-32.90
0.0575	11.99	22.55	34.24	69.50	-35.26
0.0674	10.90	22.21	33.11	69.50	-36.39
13.2020	2.84	21.29	24.13	69.50	-45.37
13.6980	3.37	21.35	24.72	69.50	-44.78
13.9420	4.24	21.40	25.64	69.50	-43.68

Note: All the required orthogonal orientations of the measurement loop antenna were performed for pre-scan, the maximum radiated transmissions (Orthogonal to the site axis) were recorded.

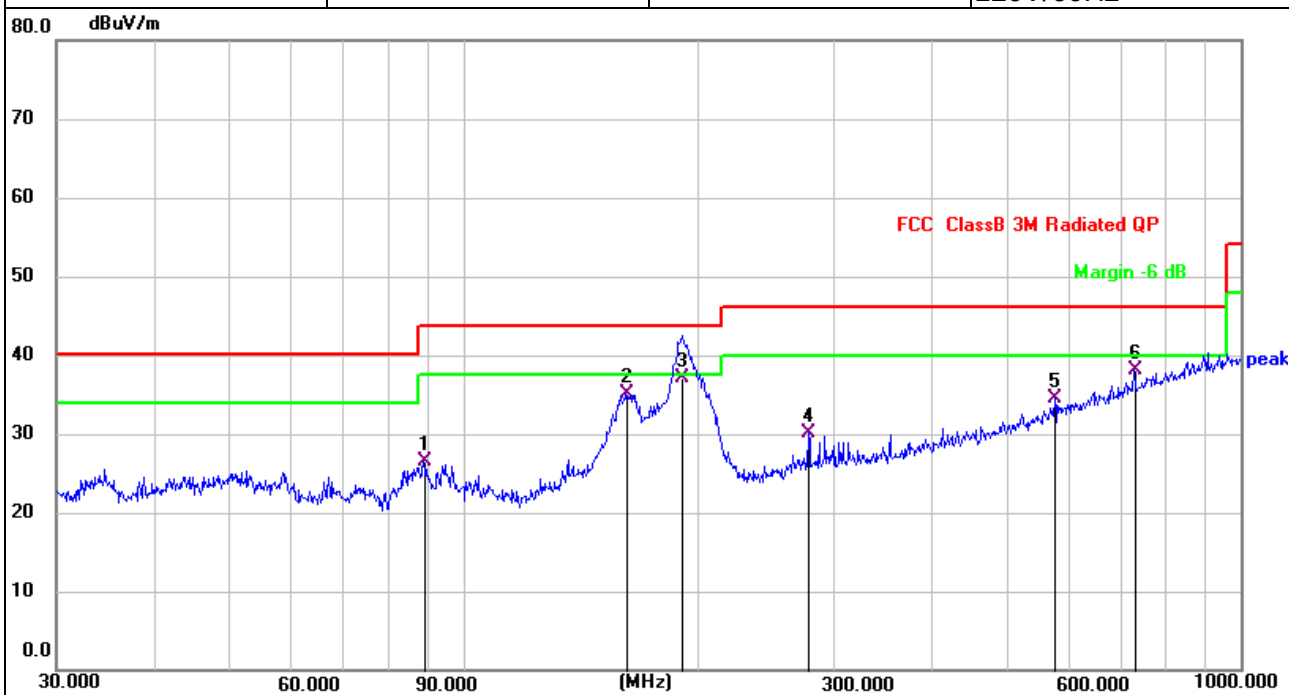
30MHz – 1GHz:

EUT:	Smart Mini Label Maker	Model Name:	D50
Pressure:	1010 hPa	Phase:	H
Test Mode :	Charging+TX	Test Voltage :	DC 5V from adapter AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		52.2079	31.29	-5.87	25.42	40.00	-14.58	QP
2		107.1337	30.95	-6.92	24.03	43.50	-19.47	QP
3		193.0945	37.98	-6.68	31.30	43.50	-12.20	QP
4		279.0436	37.91	-3.69	34.22	46.00	-11.78	QP
5		447.9822	31.59	-0.47	31.12	46.00	-14.88	QP
6	*	744.8661	31.41	5.44	36.85	46.00	-9.15	QP

EUT:	Smart Mini Label Maker	Model Name:	D50
Pressure:	1010 hPa	Phase:	V
Test Mode :	Charging+TX	Test Voltage :	DC 5V from adapter AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		88.9639	35.27	-8.82	26.45	43.50	-17.05	QP
2		162.0414	44.14	-9.11	35.03	43.50	-8.47	QP
3	*	191.0738	44.08	-6.88	37.20	43.50	-6.30	QP
4		278.0668	33.59	-3.55	30.04	46.00	-15.96	QP
5		576.6443	32.07	2.34	34.41	46.00	-11.59	QP
6		729.3583	32.85	5.26	38.11	46.00	-7.89	QP



5.4 20dB bandwidth

5.4.1 Limit

Operation within the band 13.110 MHz to 14.010 MHz

5.4.2 Requirement

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 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be. Demonstrated by measuring the radiated emissions.

5.4.3 Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth

RBW $\geq$ 1% of the 20 dB bandwidth

VBW $\geq$ RBW

Sweep = auto

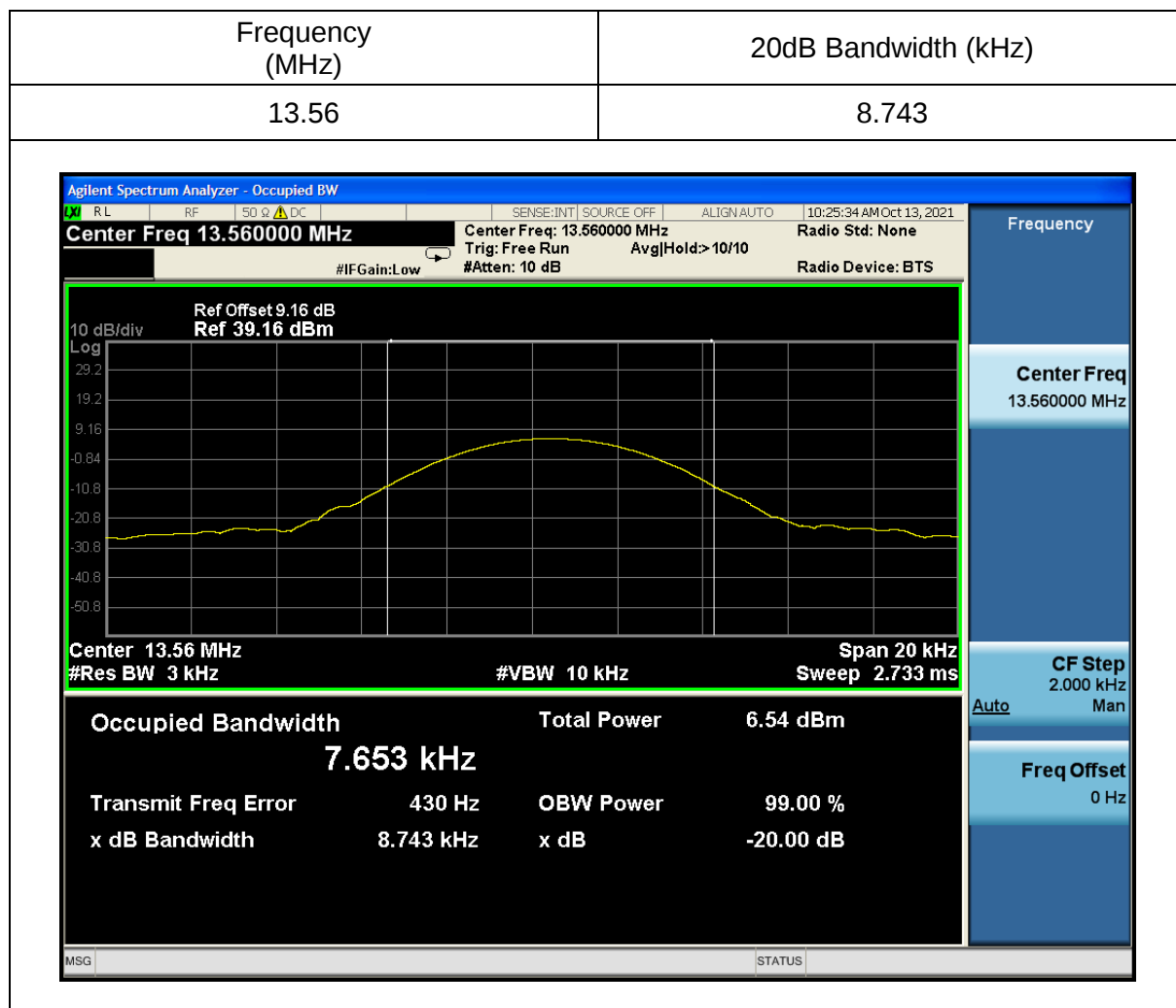
Detector function = peak

Trace = max hold

5.4.4 Test results

EUT :	Smart Mini Label Maker	Model Name :	Q30
Pressure:	1012 hPa	Test Voltage :	DC 5V from adapter AC 120V/60Hz
Test Mode :	TX Mode		

The test plot as follows:





5.5 Frequency stability

5.5.1 Limit

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.

5.5.2 Test Procedure

The test is performed in a Temperature Chamber.

5.5.3 Test result

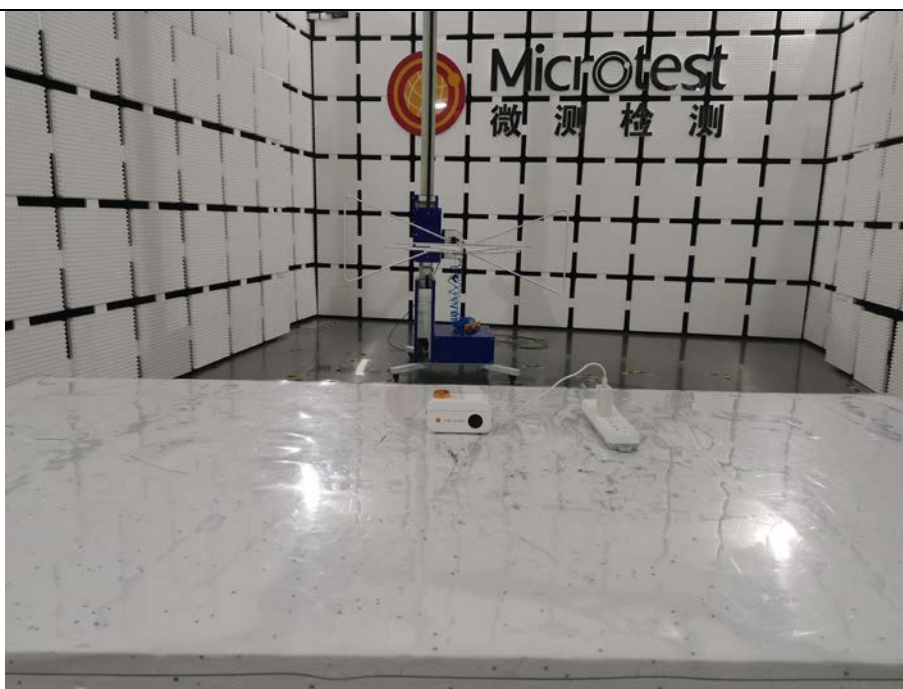
Voltage (Vdc)	Temp. (°C)	Frequency (MHz)	Deviation (%)	Limit (%)
7.40	-20	13.560331	0.002%	+/-0.01%
7.40	-10	13.560292	0.002%	
7.40	0	13.560293	0.002%	
7.40	10	13.560332	0.002%	
7.40	20	13.560296	0.002%	
7.40	30	13.560325	0.002%	
7.40	40	13.560299	0.002%	
7.40	50	13.560315	0.002%	
6.29	20	13.560322	0.002%	
8.51	20	13.560328	0.002%	

Photographs of the Test Setup

Radiated emission – below 30MHz



Radiated emission – below 1GHz





Conducted emission



Photographs of the EUT

See the APPENDIX 1- EUT PHOTO.

----End of Report----