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TESTING
CNAS L5795



RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant/Manufacturer : Pinsheng technologies Co., Ltd
Address : 7Floor, No.5 middle Huangshan Avenue, North New Zone, Chongqing
Factory : Chongqing Datiejiang Science and Technology Co., Ltd.
Address : NO.368, BOE Avenue, Beibei District, Chongqing
E.U.T. : Label Printer
Brand Name : MakelD
Model No. : WB51R-WT (For additional model and model difference refer to section 1)
FCC ID : 2AVAP-WB51
Measurement Standard : FCC PART 15.249
Date of Receiver : February 28, 2020
Date of Test : February 28, 2020 to June 05, 2020
Date of Report : June 05, 2020

This Test Report is Issued Under the Authority of :

Prepared by

Alina Guo / Engineer

Approved & Authorized Signer



Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Revision History of This Test Report

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Product Name	: Label Printer
Main Model Number	: WB51R-WT
Additional Model Number	: See page 7, 8 of model list.
Description of Model Difference	: These models have the same circuit schematic, construction, PCB Layout and critical components. The difference are model number, brand name, color of appearance and resolution due to trading purpose.
Brand Name	: MakelD
Rating	: DC 24V From adapter
Adapter	: Model: EA10682P-240 Input: AC 100-240V, 2.0A, 50-60Hz Output: DC 24V, 2.5A
Test voltage	: AC 120V 60Hz, AC 240V 60Hz (Only the worst case was recorded in this report)
Cable	: USB Line: 2.51m shielded AC Mains: 1.51m unshielded DC Line: 1.20m with one core unshielded
Hardware Version	: 18L3_Main_V1.2
Software Version	: DS51_V1.0_V1.0
Note	: According to the model difference, all tests were performed on model WB51R-WT.
Remark	: This report applies to RFID function.

Technical Specification:

RFID Function

Frequency Range : 902.25-927.75MHz

Modulation Type : ASK

Number of Channel : 52

Channel Space : 0.5MHz

Antenna Type : PCB antenna

Antenna Gain : 0.8dBi

Model List

WB51-2N	WB51A-2N	WB51B-2N	WB51C-2N	WB51T-2N	WB51S-2N
WB51-3N	WB51A-3N	WB51B-3N	WB51C-3N	WB51T-3N	WB51S-3N
WB51-2F	WB51A-2F	WB51B-2F	WB51C-2F	WB51T-2F	WB51S-2F
WB51-3F	WB51A-3F	WB51B-3F	WB51C-3F	WB51T-3F	WB51S-3F
WB51-2NR	WB51A-2NR	WB51B-2NR	WB51C-2NR	WB51T-2NR	WB51S-2NR
WB51-3NR	WB51A-3NR	WB51B-3NR	WB51C-3NR	WB51T-3NR	WB51S-3NR
WB51-2FR	WB51A-2FR	WB51B-2FR	WB51C-2FR	WB51T-2FR	WB51S-2FR
WB51-3FR	WB51A-3FR	WB51B-3FR	WB51C-3FR	WB51T-3FR	WB51S-3FR
DS51-2N	DS51A-2N	DS51B-2N	DS51C-2N	DS51T-2N	DS51S-2N
DS51-3N	DS51A-3N	DS51B-3N	DS51C-3N	DS51T-3N	DS51S-3N
DS51-2F	DS51A-2F	DS51B-2F	DS51C-2F	DS51T-2F	DS51S-2F
DS51-3F	DS51A-3F	DS51B-3F	DS51C-3F	DS51T-3F	DS51S-3F
DS51-2NR	DS51A-2NR	DS51B-2NR	DS51C-2NR	DS51T-2NR	DS51S-2NR
DS51-3NR	DS51A-3NR	DS51B-3NR	DS51C-3NR	DS51T-3NR	DS51S-3NR
DS51-2FR	DS51A-2FR	DS51B-2FR	DS51C-2FR	DS51T-2FR	DS51S-2FR
DS51-3FR	DS51A-3FR	DS51B-3FR	DS51C-3FR	DS51T-3FR	DS51S-3FR
WD51-2N	WD51A-2N	WD51B-2N	WD51C-2N	WD51T-2N	WD51S-2N
WD51-3N	WD51A-3N	WD51B-3N	WD51C-3N	WD51T-3N	WD51S-3N
WD51-2F	WD51A-2F	WD51B-2F	WD51C-2F	WD51T-2F	WD51S-2F
WD51-3F	WD51A-3F	WD51B-3F	WD51C-3F	WD51T-3F	WD51S-3F
WD51-2NR	WD51A-2NR	WD51B-2NR	WD51C-2NR	WD51T-2NR	WD51S-2NR
WD51-3NR	WD51A-3NR	WD51B-3NR	WD51C-3NR	WD51T-3NR	WD51S-3NR
WD51-2FR	WD51A-2FR	WD51B-2FR	WD51C-2FR	WD51T-2FR	WD51S-2FR
WD51-3FR	WD51A-3FR	WD51B-3FR	WD51C-3FR	WD51T-3FR	WD51S-3FR
HC51-2N	HC51A-2N	HC51B-2N	HC51C-2N	HC51T-2N	HC51S-2N
HC51-3N	HC51A-3N	HC51B-3N	HC51C-3N	HC51T-3N	HC51S-3N
HC51-2F	HC51A-2F	HC51B-2F	HC51C-2F	HC51T-2F	HC51S-2F
HC51-3F	HC51A-3F	HC51B-3F	HC51C-3F	HC51T-3F	HC51S-3F
HC51-2NR	HC51A-2NR	HC51B-2NR	HC51C-2NR	HC51T-2NR	HC51S-2NR
HC51-3NR	HC51A-3NR	HC51B-3NR	HC51C-3NR	HC51T-3NR	HC51S-3NR
HC51-2FR	HC51A-2FR	HC51B-2FR	HC51C-2FR	HC51T-2FR	HC51S-2FR
HC51-3FR	HC51A-3FR	HC51B-3FR	HC51C-3FR	HC51T-3FR	HC51S-3FR
XT51-2N	XT51A-2N	XT51B-2N	XT51C-2N	XT51T-2N	XT51S-2N
XT51-3N	XT51A-3N	XT51B-3N	XT51C-3N	XT51T-3N	XT51S-3N
XT51-2F	XT51A-2F	XT51B-2F	XT51C-2F	XT51T-2F	XT51S-2F
XT51-3F	XT51A-3F	XT51B-3F	XT51C-3F	XT51T-3F	XT51S-3F
XT51-2NR	XT51A-2NR	XT51B-2NR	XT51C-2NR	XT51T-2NR	XT51S-2NR
XT51-3NR	XT51A-3NR	XT51B-3NR	XT51C-3NR	XT51T-3NR	XT51S-3NR
XT51-2FR	XT51A-2FR	XT51B-2FR	XT51C-2FR	XT51T-2FR	XT51S-2FR
XT51-3FR	XT51A-3FR	XT51B-3FR	XT51C-3FR	XT51T-3FR	XT51S-3FR
HS51-2N	HS51A-2N	HS51B-2N	HS51C-2N	HS51T-2N	HS51S-2N
HS51-3N	HS51A-3N	HS51B-3N	HS51C-3N	HS51T-3N	HS51S-3N
HS51-2F	HS51A-2F	HS51B-2F	HS51C-2F	HS51T-2F	HS51S-2F
HS51-3F	HS51A-3F	HS51B-3F	HS51C-3F	HS51T-3F	HS51S-3F

HS51-2NR	HS51A-2NR	HS51B-2NR	HS51C-2NR	HS51T-2NR	HS51S-2NR
HS51-3NR	HS51A-3NR	HS51B-3NR	HS51C-3NR	HS51T-3NR	HS51S-3NR
HS51-2FR	HS51A-2FR	HS51B-2FR	HS51C-2FR	HS51T-2FR	HS51S-2FR
HS51-3FR	HS51A-3FR	HS51B-3FR	HS51C-3FR	HS51T-3FR	HS51S-3FR
WB51	WB51A	WB51B	WB51A-WT	WB51B-WT	WB51R-WT
WB51C	WB51A-BU	WB51B-BU	WB51R-BU	WB51F	WB51R-PK
WB51D	WB51A-GN	WB51B-GN	WB51R-GN	WB51B-PK	WB51A-PK
WB51E					

Channel List:

Channel	Frequency MHz						
1	902.25	14	908.75	27	915.25	40	921.75
2	902.75	15	909.25	28	915.75	41	922.25
3	903.25	16	909.75	29	916.25	42	922.75
4	903.75	17	910.25	30	916.75	43	923.25
5	904.25	18	910.75	31	917.25	44	923.75
6	904.75	19	911.25	32	917.75	45	924.25
7	905.25	20	911.75	33	918.25	46	924.75
8	905.75	21	912.25	34	918.75	47	925.25
9	906.25	22	912.75	35	919.25	48	925.75
10	906.75	23	913.25	36	919.75	49	926.25
11	907.25	24	913.75	37	920.25	50	926.75
12	907.75	25	914.25	38	920.75	51	927.25
13	908.25	26	914.75	39	921.25	52	927.75

Note: According to section 15.31(m), regards to the operating frequency range over 10MHz, the Lowest, Middle, and the Highest frequency of channel were selected to perform the test. The selected frequency see below:

Channel	Frequency (MHz)
1	902.25
27	915.25
52	927.75

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2AVAP-WB51** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rule.

1.3 Test Methodology

Radiated emission measurements performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

Notebook	:	Manufacturer: IBM Model: 1834 P/N: 13N5615
Adapter (For Notebook)	:	Manufacturer: Huntkey Model: HKA09019047-6D I/P: AC 100-240V 50-60Hz, 1.5A O/P: DC 19V 4.74A

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2021
The Laboratory has been assessed and proved to be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-9743A

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science and Technology park, Hongtu road, Nancheng district, Dongguan city, Guangdong province, China

1.7 Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

1.8 Summary of Test Results

FCC Rules	Description Of Test	Uncertainty	Result
§15.207(a)	AC Power Conducted Emission	±1.06dB	Compliant
§15.249(a)/ 15.209 §15.249(d)/ 15.205	Radiated Emissions & Band Edge	Below 1GHz: ±4.60 dB Above 1GHz: ±5.02 dB	Compliant
§15.215(c)	20dB Bandwidth	±1.42 x10-4%	Compliant
§15.203	Antenna Requirement	±0.60dB	Compliant

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

The EUT has been tested under continuous operating condition (The duty cycle >98%). Test program used to control the EUT staying in continuous transmitting mode. The Lowest, Middle and highest channel were chosen for testing.

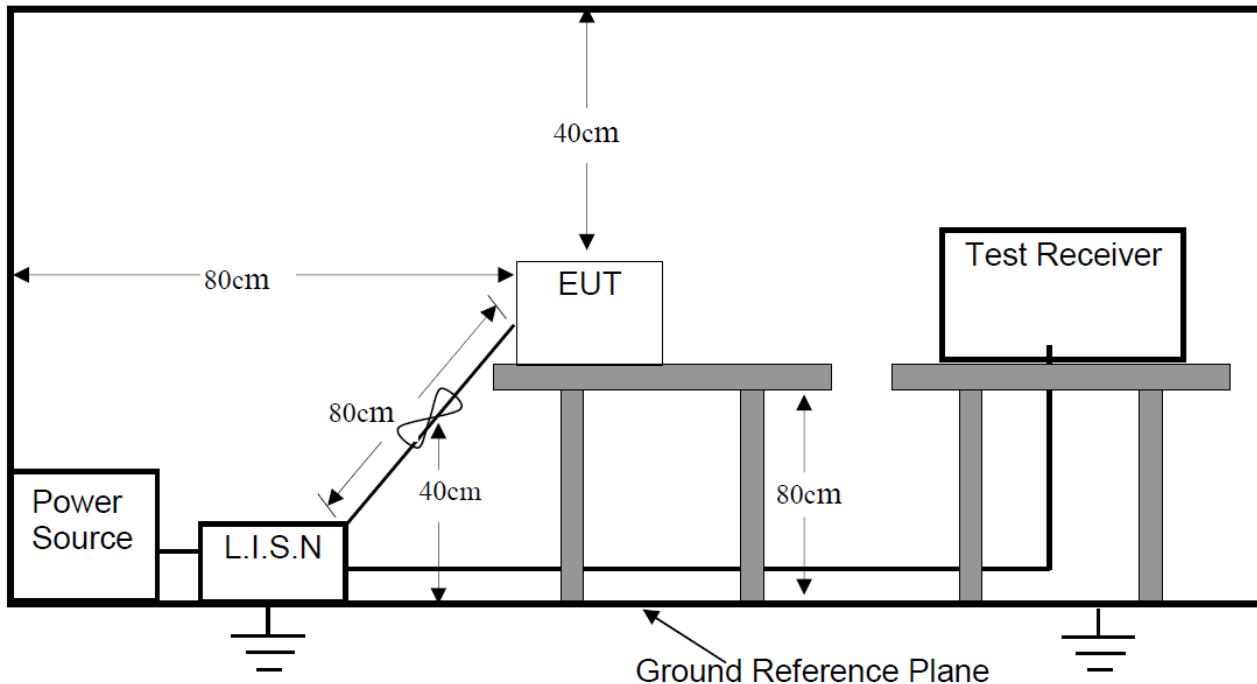
Test Item	Software	Description
Conducted RF Testing and Radiated testing	RFID_Reader_GUI_V2.1	Set the EUT to different channel

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: TX

3.3 Measurement Results

Please refer to following plots.



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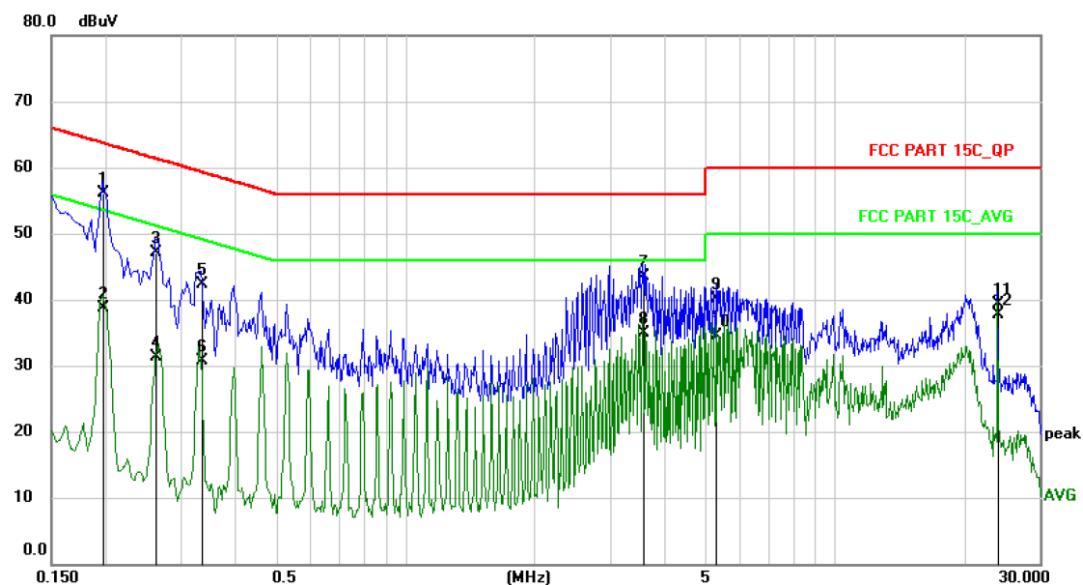
Conducted Emission Measurement

File :WB51R-WT

Data :#2

Date: 2020/3/24

Time: 11:34:29



Site

Phase: **L1**

Temperature: 26

Limit: FCC PART 15C_QP

Power: AC120V//60Hz

Humidity: 50 %

EUT: Label Printer

M/N: WB51R-WT

Mode: TX

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1980	45.50	10.60	56.10	63.69	-7.59	QP	
2		0.1980	28.10	10.60	38.70	53.69	-14.99	AVG	
3		0.2620	36.60	10.60	47.20	61.37	-14.17	QP	
4		0.2620	20.70	10.60	31.30	51.37	-20.07	AVG	
5		0.3339	31.70	10.60	42.30	59.35	-17.05	QP	
6		0.3339	20.20	10.60	30.80	49.35	-18.55	AVG	
7		3.5740	32.79	10.71	43.50	56.00	-12.50	QP	
8		3.5740	24.29	10.71	35.00	46.00	-11.00	AVG	
9		5.2940	29.49	10.71	40.20	60.00	-19.80	QP	
10		5.2940	23.89	10.71	34.60	50.00	-15.40	AVG	
11		23.9980	28.52	10.78	39.30	60.00	-20.70	QP	
12		23.9980	26.92	10.78	37.70	50.00	-12.30	AVG	



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Conducted Emission Measurement

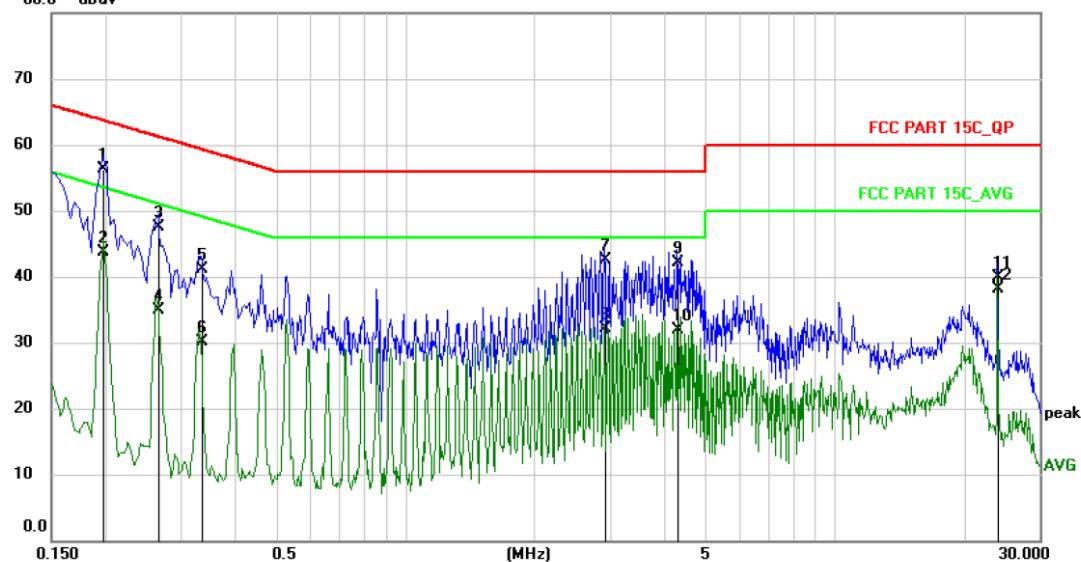
File :WB51R-WT

Data :#1

Date: 2020/3/24

Time: 11:27:37

80.0 dBuV



Site

Phase:

N

Temperature: 26

Limit: FCC PART 15C_QP

Power: AC120V/60Hz

Humidity: 50 %

EUT: Label Printer

M/N: WB51R-WT

Mode: TX

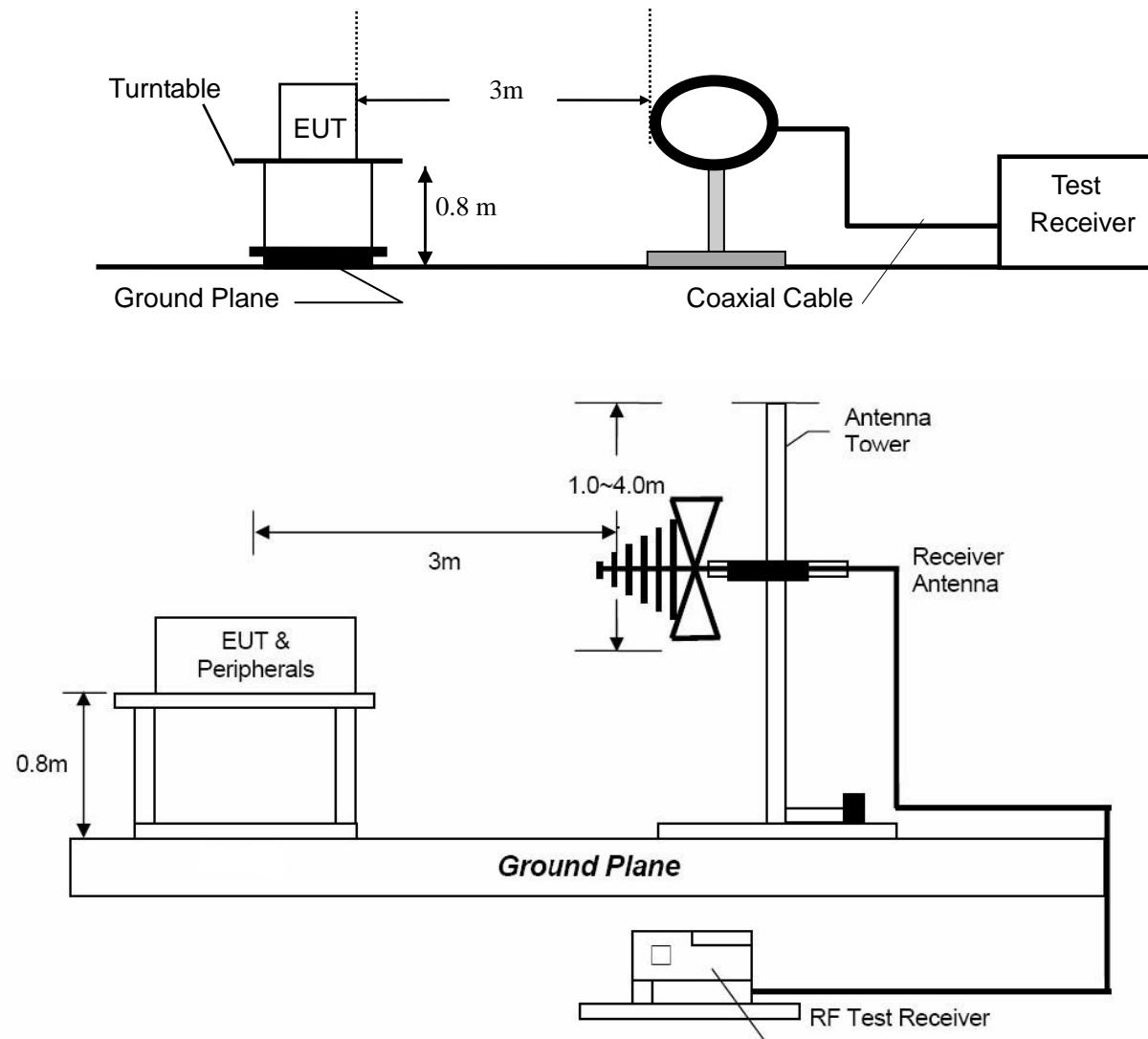
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1980	45.80	10.60	56.40	63.69	-7.29	QP	
2		0.1980	33.10	10.60	43.70	53.69	-9.99	AVG	
3		0.2660	37.00	10.60	47.60	61.24	-13.64	QP	
4		0.2660	24.30	10.60	34.90	51.24	-16.34	AVG	
5		0.3339	30.50	10.60	41.10	59.35	-18.25	QP	
6		0.3339	19.50	10.60	30.10	49.35	-19.25	AVG	
7		2.9100	31.89	10.71	42.60	56.00	-13.40	QP	
8		2.9100	21.39	10.71	32.10	46.00	-13.90	AVG	
9		4.2980	31.39	10.71	42.10	56.00	-13.90	QP	
10		4.2980	21.29	10.71	32.00	46.00	-14.00	AVG	
11		23.9980	29.22	10.78	40.00	60.00	-20.00	QP	
12		23.9980	27.42	10.78	38.20	50.00	-11.80	AVG	

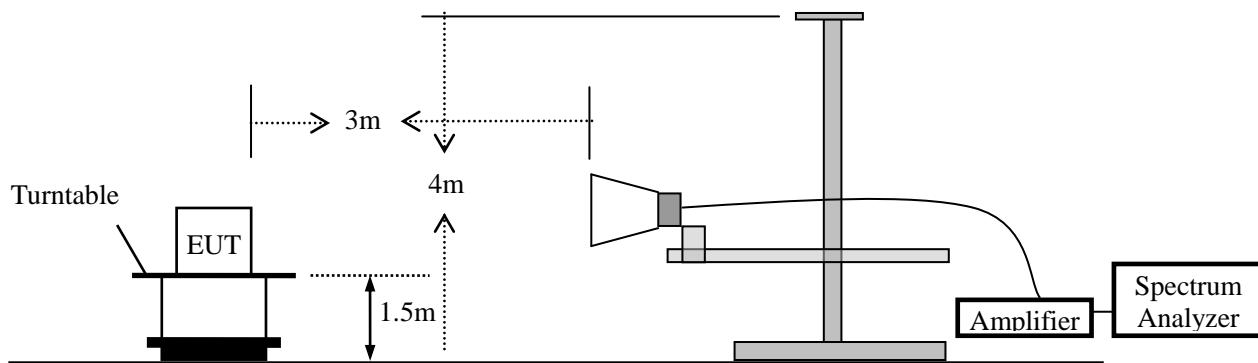
4. Radiated Emission Test

4.1 Test SET-UP (Block Diagram of Configuration)

4.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz



4.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



4.2 Measurement Procedure

- a. Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:
The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

4.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)	
		μV/m	2400/F(kHz)
0.009 ~ 0.490	300	2400/F(kHz)	24000/F(kHz)
0.490 ~ 1.705	30	30	100
1.705 ~ 30	30	150	200
30 ~ 88	3	500	500
88 ~ 216	3	500	500
216 ~ 960	3	500	500
Above 960	3	500	500
Frequency range MHz	Distance Meters	Field Strengths Limit (15.249)	
		mV/m (Field strength of fundamental)	μV/m (Field strength of Harmonics)
902 ~ 928	3	50	500
2400 ~ 2483.5	3	50	500
5725 ~ 5875	3	50	500
24000 ~ 2425000	3	250	2500

Remark : (1) Emission level (dB) μ V = 20 log Emission level μ V/m

- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
- (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

4.4 Measurement Results

Please refer to following the test plots.



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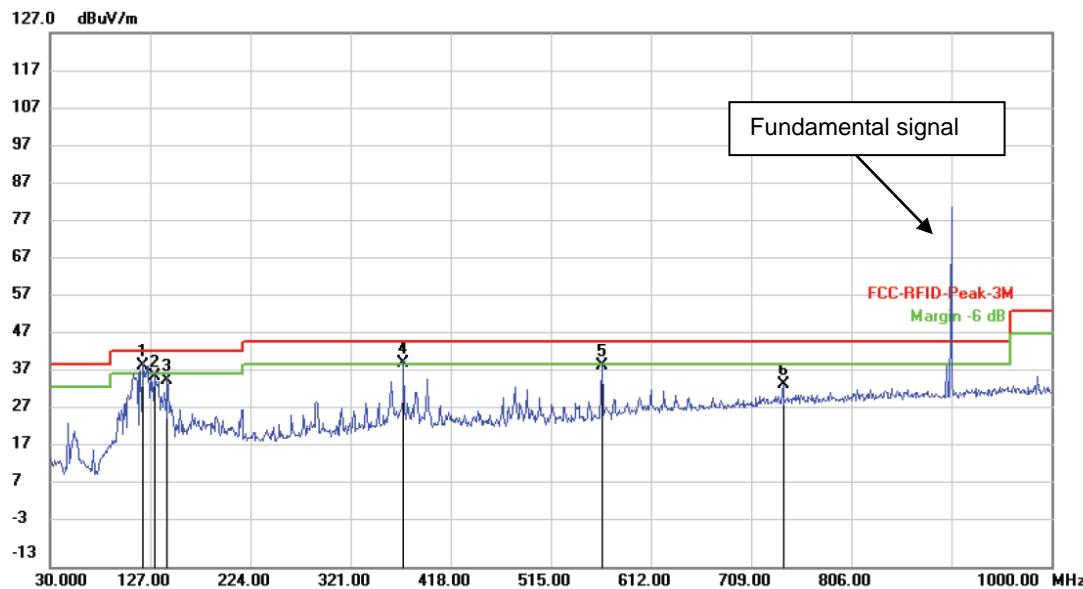
Radiated Emission Measurement

File :WB51R-WT

Data :#464

Date: 2020/3/13

Time: 17:00:26



Site

Polarization: **Horizontal**

Temperature: 26

Limit: FCC-RFID-Peak-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: Low 902.25MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	119.2400	53.49	-13.89	39.60	43.50	-3.90	QP	200	243
2		130.8800	52.00	-15.20	36.80	43.50	-6.70	QP	200	243
3		143.4900	51.39	-15.59	35.80	43.50	-7.70	QP	200	243
4	!	372.4100	49.58	-9.18	40.40	46.00	-5.60	QP	200	243
5		564.4699	45.78	-6.08	39.70	46.00	-6.30	QP	200	243
6		740.0400	37.74	-2.82	34.92	46.00	-11.08	QP	200	243

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.



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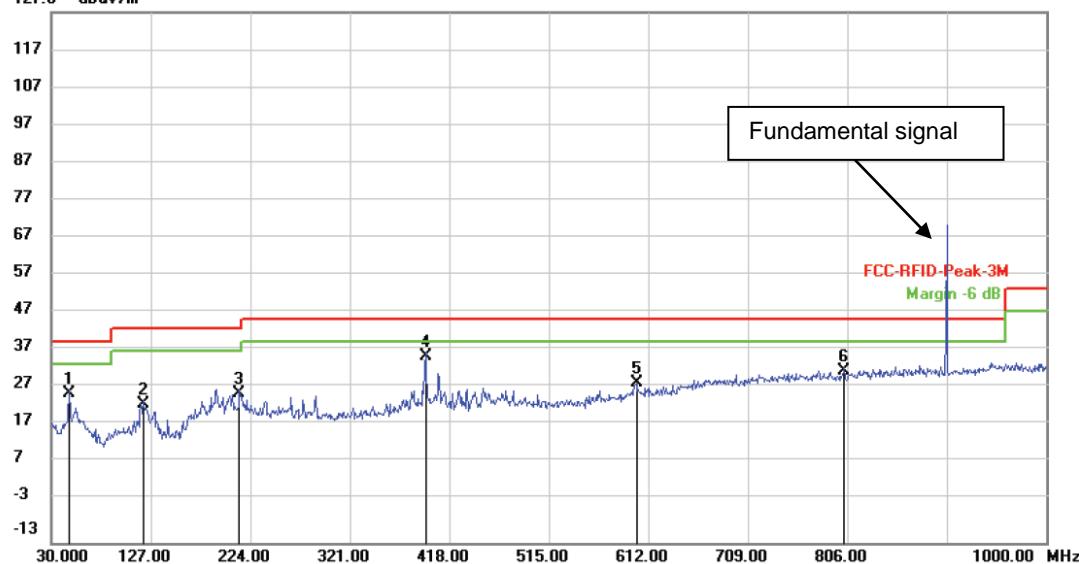
Radiated Emission Measurement

File :WB51R-WT
127.0 dBuV/m

Data :#465

Date: 2020/3/13

Time: 17:07:27



Site: Polarization: **Vertical** Temperature: 26
 Limit: FCC-RFID-Peak-3M Power: AC 120V/60Hz Humidity: 47 %
 EUT: Label Printer Distance: 3m
 M/N: WB51R-WT
 Mode: TX
 Note: Low 902.25MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		47.4600	39.80	-13.50	26.30	40.00	-13.70	QP	100	183
2		119.2400	40.39	-16.89	23.50	43.50	-20.00	QP	100	183
3		213.3300	42.66	-16.16	26.50	43.50	-17.00	QP	100	183
4	*	394.7200	47.34	-11.14	36.20	46.00	-9.80	QP	100	183
5		600.3600	36.01	-7.00	29.01	46.00	-16.99	QP	100	183
6		803.0900	34.19	-1.89	32.30	46.00	-13.70	QP	100	183

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Frequency Range: 1-10GHz
 Test Result: PASS
 Measured Distance: 3m
 Test By: Lee

Test Date : March 13, 2020
 Temperature : 21 °C
 Humidity : 55 %

Freq. (MHz)	Ant.Pol . (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
1804.5	V	55.82	42.45	-3.43	52.39	39.02	74.00	54.00	-21.61	-14.98
2706.75	V	48.74	33.52	1.13	49.87	34.65	74.00	54.00	-24.13	-19.35

1804.5	H	59.44	43.95	-3.43	56.01	40.52	74.00	54.00	-17.99	-13.48
2706.75	H	47.66	32.38	-3.43	48.79	33.51	74.00	54.00	-25.21	-20.49

Operation Mode: TX Mode (Mid)										
1830.50	V	55.47	43.10	-3.09	52.38	40.01	74.00	54.00	-21.62	-13.99
2745.75	V	48.49	32.32	1.27	49.76	33.59	74.00	54.00	-24.24	-20.41

1830.50	H	58.20	43.22	-3.09	55.11	40.13	74.00	54.00	-18.89	-13.87
2745.75	H	48.01	32.59	1.27	49.28	33.85	74.00	54.00	-24.72	-20.15

Operation Mode: TX Mode (High)										
1855.50	V	55.14	43.32	-2.76	52.38	40.56	74.00	54.00	-21.62	-13.44
2783.25	V	48.66	33.61	1.35	50.01	34.96	74.00	54.00	-23.99	-19.04

1855.50	H	61.08	43.11	-2.76	58.32	40.35	74.00	54.00	-15.68	-13.65
2783.25	H	48.70	33.32	1.35	50.05	34.67	74.00	54.00	-23.95	-19.33

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level + Factor
 (3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
 (4) Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
 (5) Horn antenna used for the emission over 1000MHz.

Fundamental and Band Edge

Low channel

Horizontal



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Radiated Emission Measurement

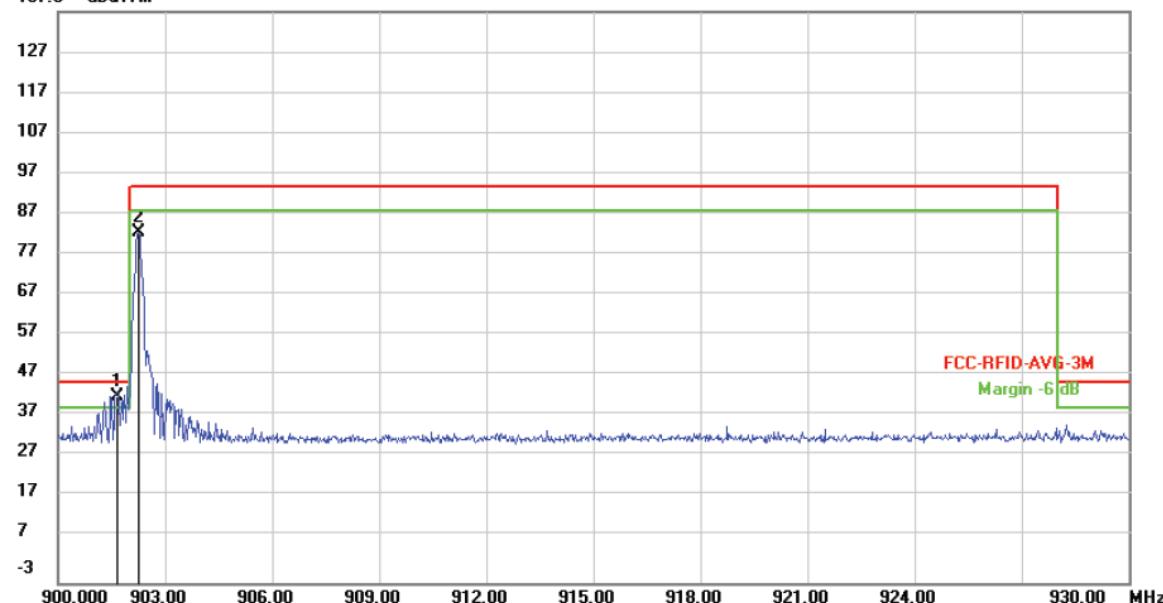
File :WB51R-WT

Data :#470

Date: 2020/3/13

Time: 17:42:19

137.0 dBuV/m



Site

Polarization: **Horizontal**

Temperature: 26

Limit: FCC-RFID-AVG-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: Low 902.25MHz

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table		
			Level	Factor	ment						
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	901.6500	43.72	-1.20	42.52	46.00	-3.48	QP	200	245	
2		902.2500	83.99	-1.18	82.81	94.00	-11.19	QP	200	245	

Vertical



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Radiated Emission Measurement

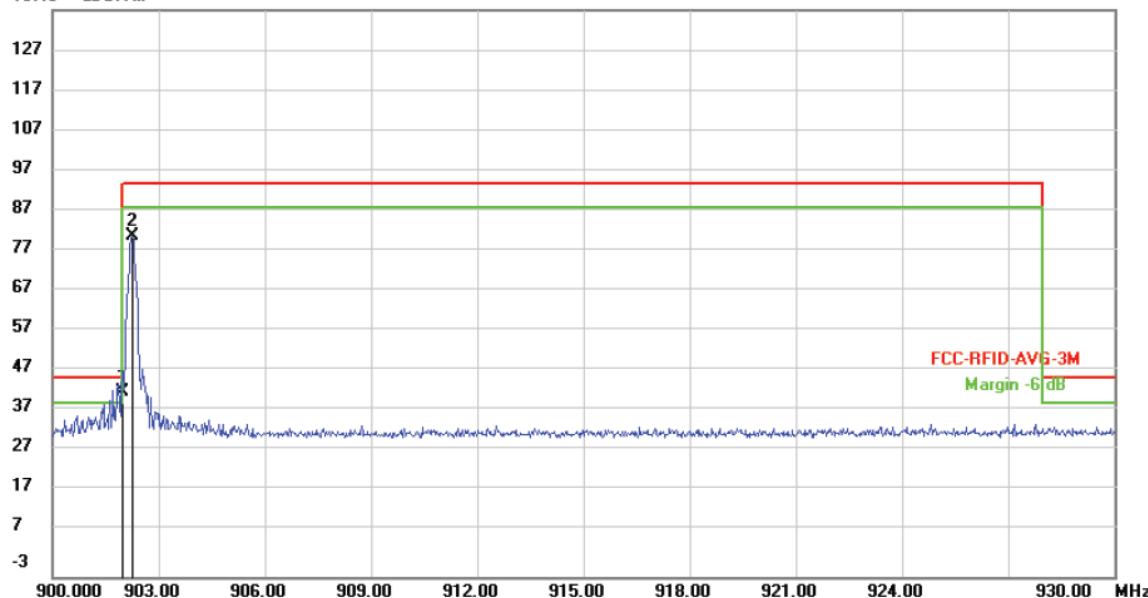
File :WB51R-WT

Data :#471

Date: 2020/3/13

Time: 17:49:21

137.0 dBuV/m



Site

Polarization: **Vertical**

Temperature: 26

Limit: FCC-RFID-AVG-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: Low 902.25MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	901.9800	43.90	-1.20	42.70	46.00	-3.30	QP	100	183	
2		902.2500	82.30	-1.18	81.12	94.00	-12.88	QP	100	183	

Mid channel

Horizontal



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Radiated Emission Measurement

File :WB51R-WT

Data :#472

Date: 2020/3/13

Time: 17:56:40

137.0 dBuV/m



Site

Polarization: **Horizontal**

Temperature: 26

Limit: FCC-RFID-AVG-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: Mid 915.25MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	
1	*	915.2500	85.99	-0.92	85.07	94.00	-8.93	QP	200	245	

Vertical



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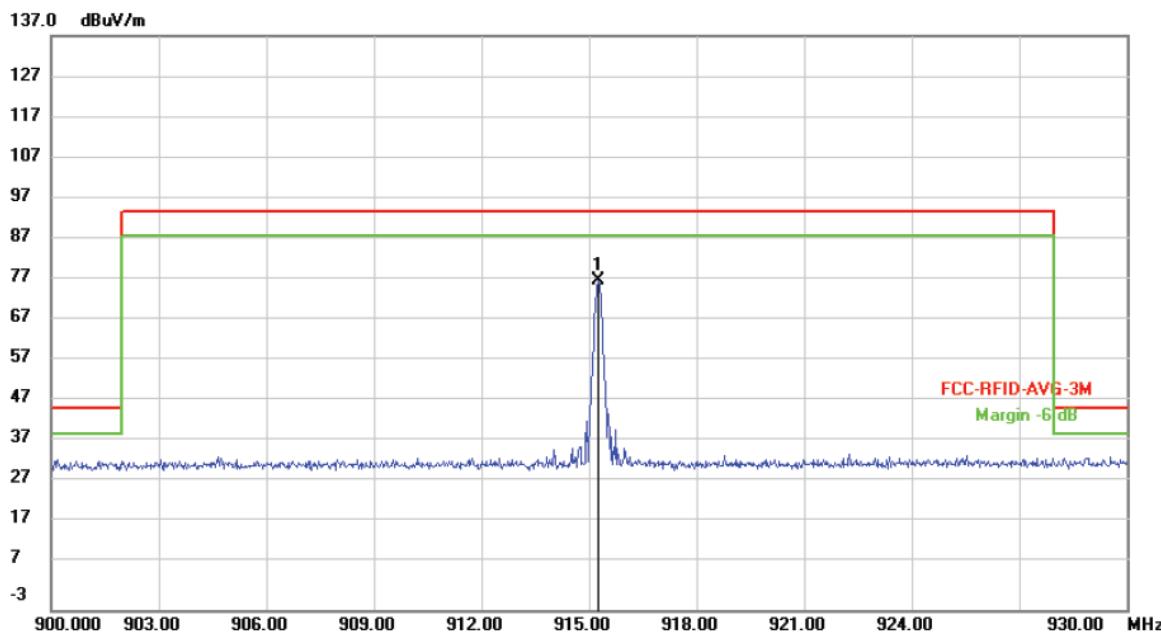
Radiated Emission Measurement

File :WB51R-WT

Data :#473

Date: 2020/3/13

Time: 18:03:42



Site

Polarization: **Vertical**

Temperature: 26

Limit: FCC-RFID-AVG-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: Mid 915.25MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	
1	*	915.2500	78.30	-0.92	77.38	94.00	-16.62	QP	100	181	

High channel

Horizontal



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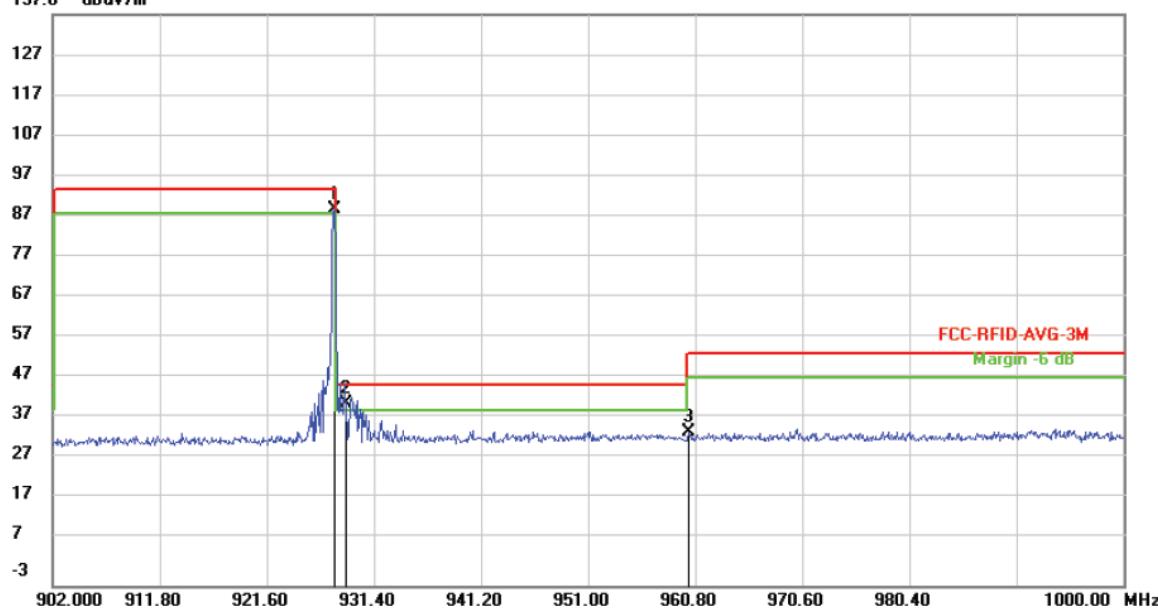
Radiated Emission Measurement

File :WB51R-WT
 137.0 dBuV/m

Data :#474

Date: 2020/3/13

Time: 18:10:30



Site: Polarization: **Horizontal** Temperature: 26
 Limit: FCC-RFID-AVG-3M Power: AC 120V/60Hz Humidity: 47 %
 EUT: Label Printer Distance: 3m
 M/N: WB51R-WT
 Mode: TX
 Note: High 927.75MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	!	927.7500	89.94	-0.67	89.27	94.00	-4.73	QP	200	242
2	*	928.8519	42.15	-0.65	41.50	46.00	-4.50	QP	200	242
3		960.2119	34.89	-0.23	34.66	54.00	-19.34	QP	200	242

Vertical



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Radiated Emission Measurement

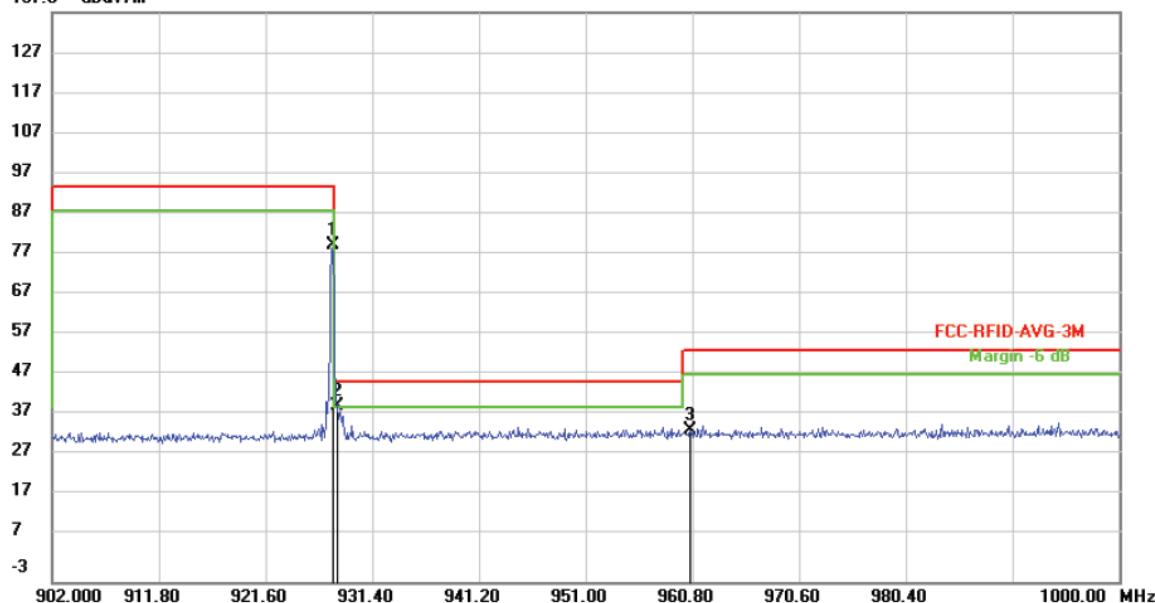
File :WB51R-WT

Data :#475

Date: 2020/3/13

Time: 18:17:34

137.0 dBuV/m



Site

Polarization: **Vertical**

Temperature: 26

Limit: FCC-RFID-AVG-3M

Power: AC 120V/60Hz

Humidity: 47 %

EUT: Label Printer

Distance: 3m

M/N: WB51R-WT

Mode: TX

Note: High 927.75MHz

No.	Mk.	Freq. MHz	Reading	Correct	Measure-	Limit dB	Over Detector	Antenna Height cm	Table Degree
			Level dBuV	Factor dB	ment dBuV/m				
1		927.7500	80.58	-0.67	79.91	94.00	-14.09	QP	100
2	*	928.1660	40.76	-0.66	40.10	46.00	-5.90	QP	100
3		960.6040	34.51	-0.22	34.29	54.00	-19.71	QP	100

5. 20dB Bandwidth

5.1 Measurement Procedure

The 20dB bandwidth of the emission was contained within the frequency band designated which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered, FCC Rule 15.215(c):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

5.2 Test SET-UP (Block Diagram of Configuration)



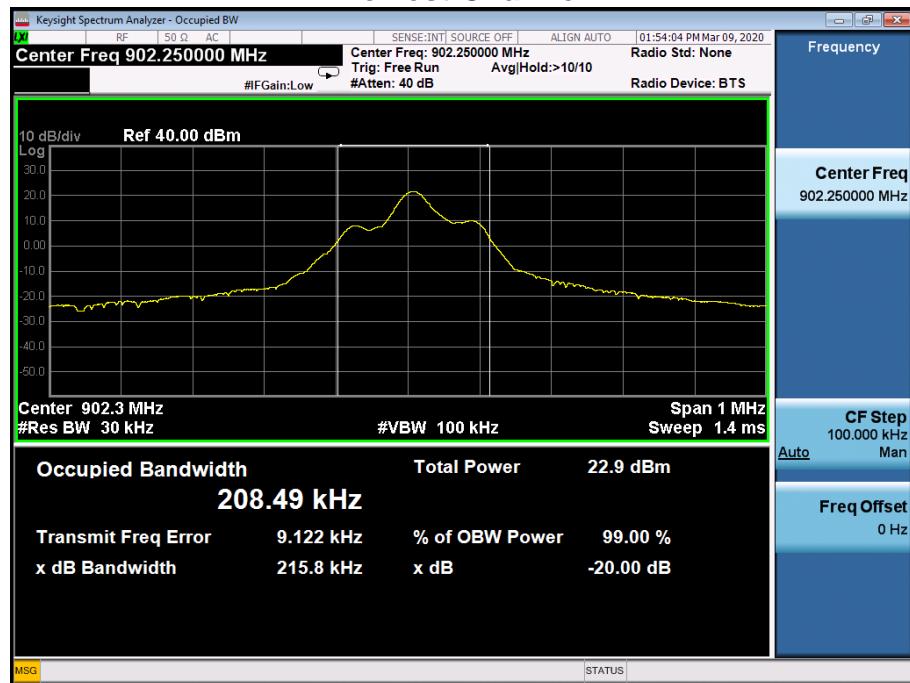
5.3 Measurement Results

Refer to attached data chart.

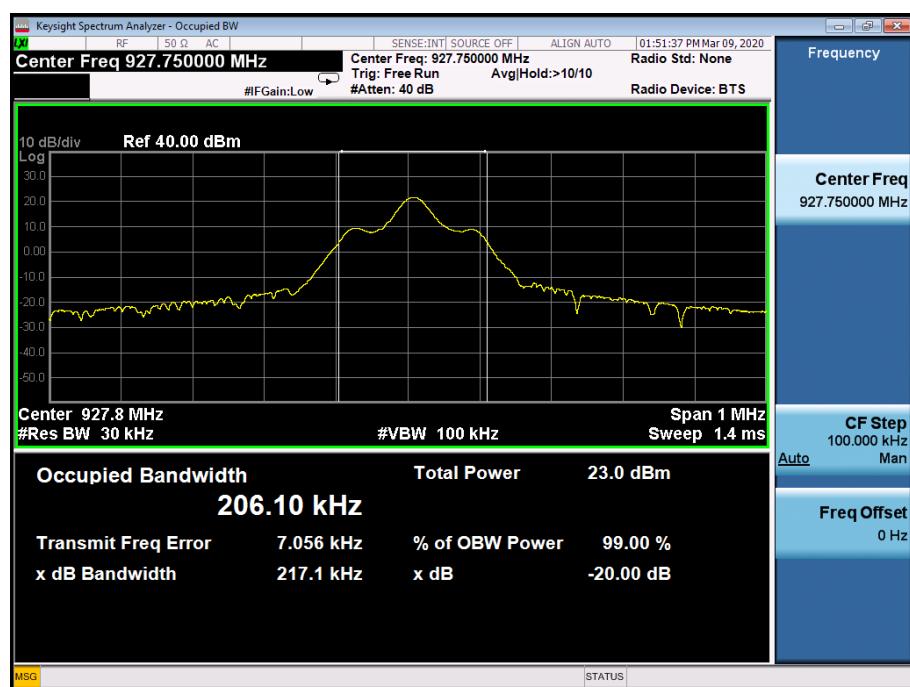
RBW:	100KHz	VBW:	300KHz
Spectrum Detector:	PK	Temperature :	22 °C
Test By:	Lee	Humidity :	54 %
Test Result:	PASS	Test Date :	March 18, 2020

Channel frequency (MHz)	20dB Down BW(kHz)
902.25	215.8
927.75	217.1

Lowest Channel



Highest Channel



6. Antenna requirement

6.1 Measurement Procedure

According to of FCC part 15C section 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, 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.

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

6.2 Measurement Results

The antenna is FPC antenna and no consideration of replacement, and the best case gain of the antenna is 0.8dBi. So, the antenna is consider meet the requirement.

7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2020	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2020	1 Year
3.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2020	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2020	1 Year
5.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2020	1 Year
6.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2020	1 Year
7.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2020	1 Year
8.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2020	1 Year
9.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
10.	Chamber	SAEMC	9*7*7m	N/A	Jun. 20, 2019	2 Year
11.	Test Software	EZ	EZ_EMCA	N/A	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.