FCC TEST REPORT

FCC ID: 2A359-CT221B

Report No.	:	SSP24010046-1E
Prepared For	:	Shenzhen Dudian Technology Co., Ltd.
Product Name	:	Label Printer
Model Name	:	CT221B
FCC Rule	:	FCC Part 15.247
Date of Issue	:	2024-01-18
Prepared By	:	Shenzhen CCUT Quality Technology Co., Ltd.

Shenzhen CCUT Quality Technology Co., Ltd.
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This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

Test Report Basic Information

Applicant.....:	Shenzhen Dudian Technology Co., Ltd.
Address of Applicant.....:	1101, Building 3, COFCO Chuangzhi Factory, No. 67 District, Xingdong, Xin'an, Bao'an, Shenzhen, Guangdong, China
Manufacturer.....:	Shenzhen Dudian Technology Co., Ltd.
Address of Manufacturer.....:	1101, Building 3, COFCO Chuangzhi Factory, No. 67 District, Xingdong, Xin'an, Bao'an, Shenzhen, Guangdong, China
Product Name.....:	Label Printer
Brand Name.....:	-
Main Model.....:	CT221B
Series Models.....:	-
Test Standard.....:	FCC Part 15 Subpart C ANSI C63.10-2013
Date of Test .....:	2024-01-08 to 2024-01-16
Test Result.....:	PASSED

Tested Engineer .....: Lorzix Luo (Lorzix Luo)

Project Manager.....: Lieber Ouyang (Lieber Ouyang)

Authorized Signatory.....: Lahm Peng (Lahm Peng)

Shenzhen CCUT Quality Technology Co., Ltd. APPROVED

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CONTENTS

Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-01-18	Initial Release	Lahm Peng

1. General Information

1.1 Product Information

Product Name:	Label Printer
Trade Name:	-
Main Model:	CT221B
Series Models:	-
Rated Voltage:	DC 7.4V by battery, USB 5V charging
Battery:	DC 7.4V/1200mAh
Hardware Version:	V1.0
Software Version:	V1.0
Note 1: The test data is gathered from a production sample, provided by the manufacturer.	
Note 2: The original battery manufacturer Shenzhen Youlongyuan Technology Co., Ltd is change to HuiZhou SuperStar Technology Co., Ltd.	

Wireless Specification	
Wireless Standard:	Bluetooth BR+BLE
Operating Frequency:	2402MHz ~2480MHz
Number of Channel:	BR: 79 BLE: 40
Channel Separation:	BR: 1MHz BLE: 2MHz
Modulation:	GFSK
Antenna Gain:	0dBi
Type of Antenna:	PCB Antenna
Type of Device:	☒ Portable Device ☐ Mobile Device ☐ Modular Device

1.2 Test Setup Information

List of Test Modes		
Test Mode	Description	Remark
TM1	Lowest Channel	2402MHz(BR)
TM2	Middle Channel	2441MHz(BR)
TM3	Highest Channel	2480MHz(BR)
TM4	Lowest Channel	2402MHz(BLE)
TM5	Middle Channel	2441MHz(BLE)
TM6	Highest Channel	2480MHz(BLE)

List and Details of Auxiliary Cable			
Description	Length (cm)	Shielded/Unshielded	With/Without Ferrite
-	-	-	-

List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Adapter	Huawei	HW-100225C00	-
-	-	-	-

BR List of Channels							
No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)
01	2402	21	2422	41	2442	61	2462
02	2403	22	2423	42	2443	62	2463
03	2404	23	2424	43	2444	63	2464
04	2405	24	2425	44	2445	64	2465
05	2406	25	2426	45	2446	65	2466
~	~	~	~	~	~	~	~
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461		

BLE List of Channels							
No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

1.3 Compliance Standards

Compliance Standards	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
All measurements contained in this report were conducted with all above standards	
According to standards for test methodology	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.4 Test Facilities

Laboratory Name:	**Shenzhen CCUT Quality Technology Co., Ltd.** 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China
CNAS Laboratory No.:	L18863
A2LA Certificate No.:	6893.01
FCC Registration No:	583813
ISED Registration No.:	CN0164
All measurement facilities used to collect the measurement data are located at 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China.	

1.5 List of Measurement Instruments

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Conducted Emissions					
AMN	ROHDE&SCHWARZ	ENV216	101097	2023-07-31	2024-07-30
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100242	2023-07-31	2024-07-30
Radiated Emissions					
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100154	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	MY48030972	2023-07-31	2024-07-30
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40-N	101692	2023-07-31	2024-07-30
Amplifier	SCHWARZBECK	BBV 9743B	00251	2023-07-31	2024-07-30
Amplifier	HUABO	YXL0518-2.5-45	--	2023-07-31	2024-07-30
Amplifier	COM-MW	DLAN-18G-4G-02	10229104	2023-07-31	2024-07-30
Loop Antenna	DAZE	ZN30900C	21104	2023-08-07	2024-08-06
Broadband Antenna	SCHWARZBECK	VULB 9168	01320	2023-08-07	2024-08-06
Horn Antenna	SCHWARZBECK	BBHA 9120D	02553	2023-08-07	2024-08-06
Horn Antenna	COM-MW	ZLB7-18-40G-950	12221225	2023-08-07	2024-08-06
Conducted RF Testing					
RF Test System	MWRFTest	MW100-RFCB	220418SQS-37	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	ATO-90521	2023-07-31	2024-07-30

1.6 Measurement Uncertainty

Test Item	Conditions	Uncertainty
Conducted Emissions	9kHz ~ 30MHz	±1.64 dB
Radiated Emissions	9kHz ~ 30MHz	±2.88 dB
	30MHz ~ 1GHz	±3.32 dB
	1GHz ~ 18GHz	±3.50 dB
	18GHz ~ 40GHz	±3.66 dB
Conducted Output Power	9kHz ~ 26GHz	±0.50 dB
Occupied Bandwidth	9kHz ~ 26GHz	±4.0 %
Conducted Spurious Emission	9kHz ~ 26GHz	±1.32 dB

2. Summary of Test Results

FCC Rule	Description of Test Item	Result
FCC Part 15.207	Conducted Emissions	Passed
FCC Part 15.209, 15.247(d)	Radiated Emissions	Passed
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

3. Conducted Emissions

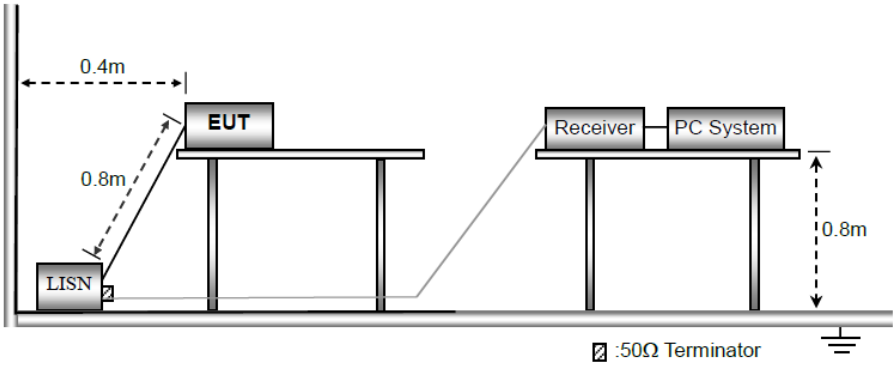
3.1 Standard and Limit

According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

Frequency of Emission (MHz)	Conducted emissions (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: Decreases with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz Note 2: The lower limit applies at the band edges		

3.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.2.



Test Setup Block Diagram

a) 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 is the setting of the receiver
Attenuation: 10dB
Start Frequency: 0.15MHz
Stop Frequency: 30MHz
IF Bandwidth: 9kHz

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 equipment 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.

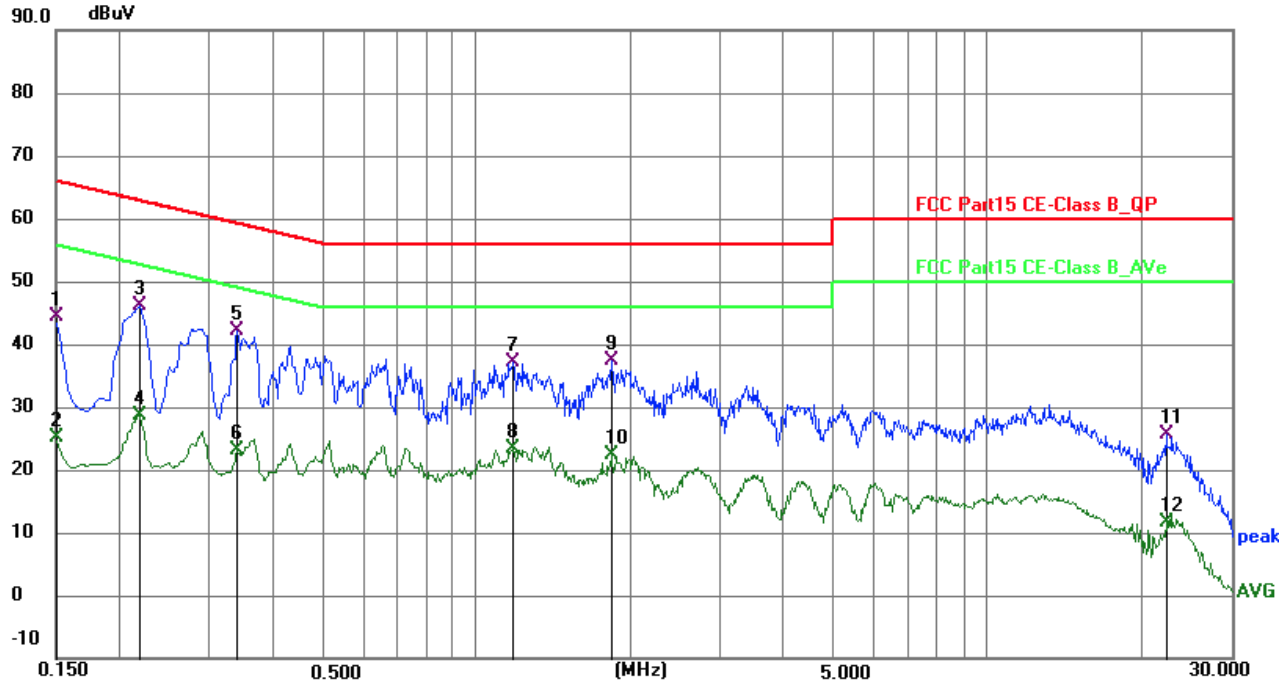
f) LISN is at least 80 cm from nearest part of EUT chassis.

g) For the actual test configuration, please refer to the related Item - photographs of the test setup.

3.3 Test Data and Results

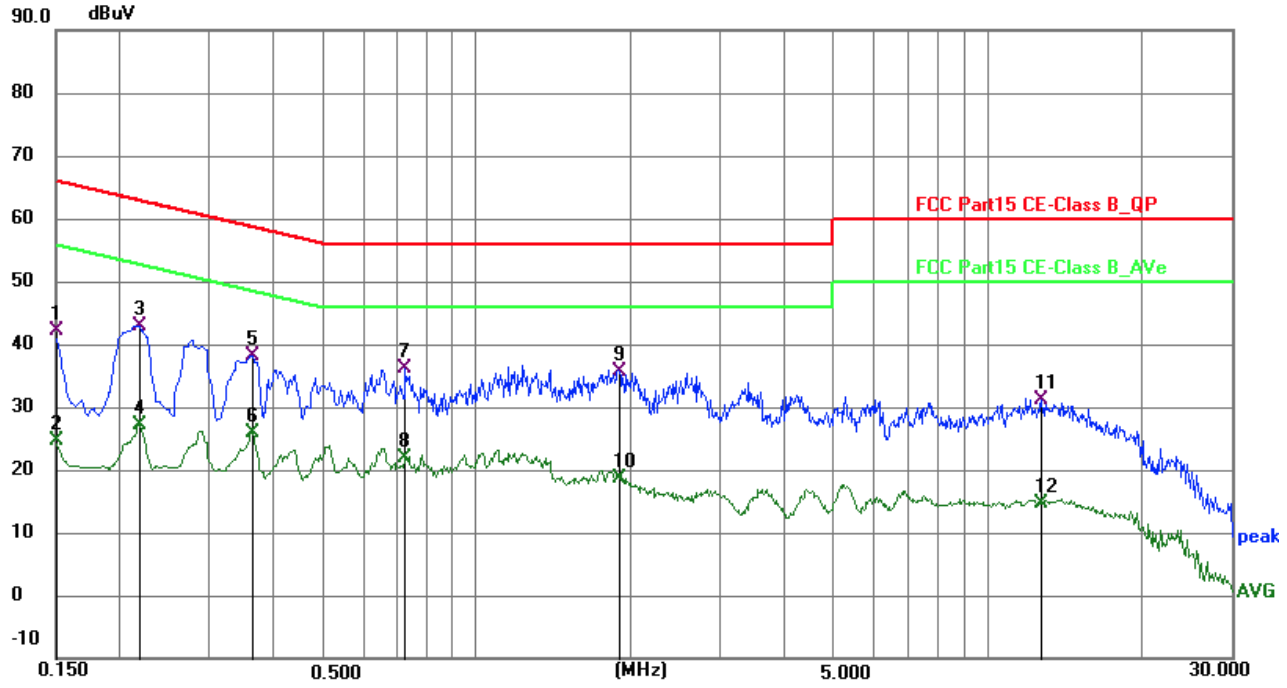
Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as below:
Remark: Level = Reading + Factor, Margin = Level - Limit

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Neutral
Remark:	



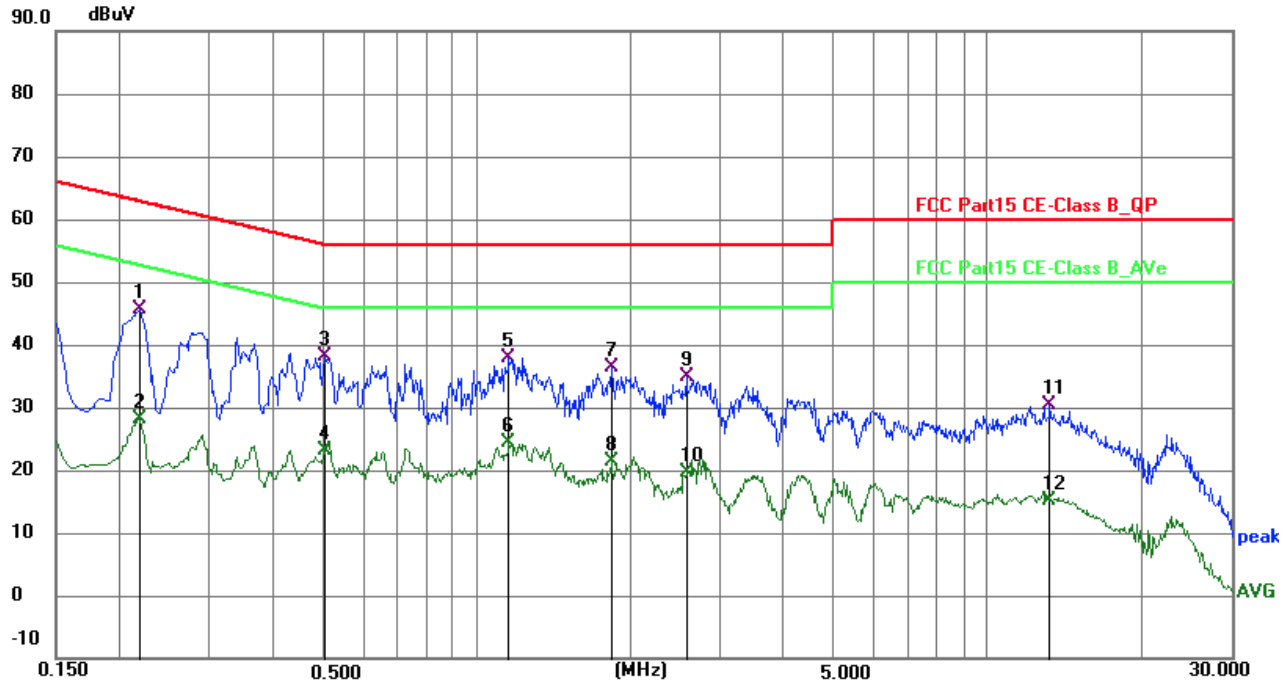
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	34.98	9.51	44.49	66.00	-21.51	QP	P	
2	0.1500	15.52	9.51	25.03	56.00	-30.97	AVG	P	
3 *	0.2174	36.39	9.62	46.01	62.92	-16.91	QP	P	
4	0.2174	18.95	9.62	28.57	52.92	-24.35	AVG	P	
5	0.3390	32.68	9.42	42.10	59.23	-17.13	QP	P	
6	0.3390	13.62	9.42	23.04	49.23	-26.19	AVG	P	
7	1.1805	27.13	9.97	37.10	56.00	-18.90	QP	P	
8	1.1805	13.53	9.97	23.50	46.00	-22.50	AVG	P	
9	1.8374	27.24	10.04	37.28	56.00	-18.72	QP	P	
10	1.8374	12.41	10.04	22.45	46.00	-23.55	AVG	P	
11	22.3485	15.21	10.41	25.62	60.00	-34.38	QP	P	
12	22.3485	1.31	10.41	11.72	50.00	-38.28	AVG	P	

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Live
Remark:	



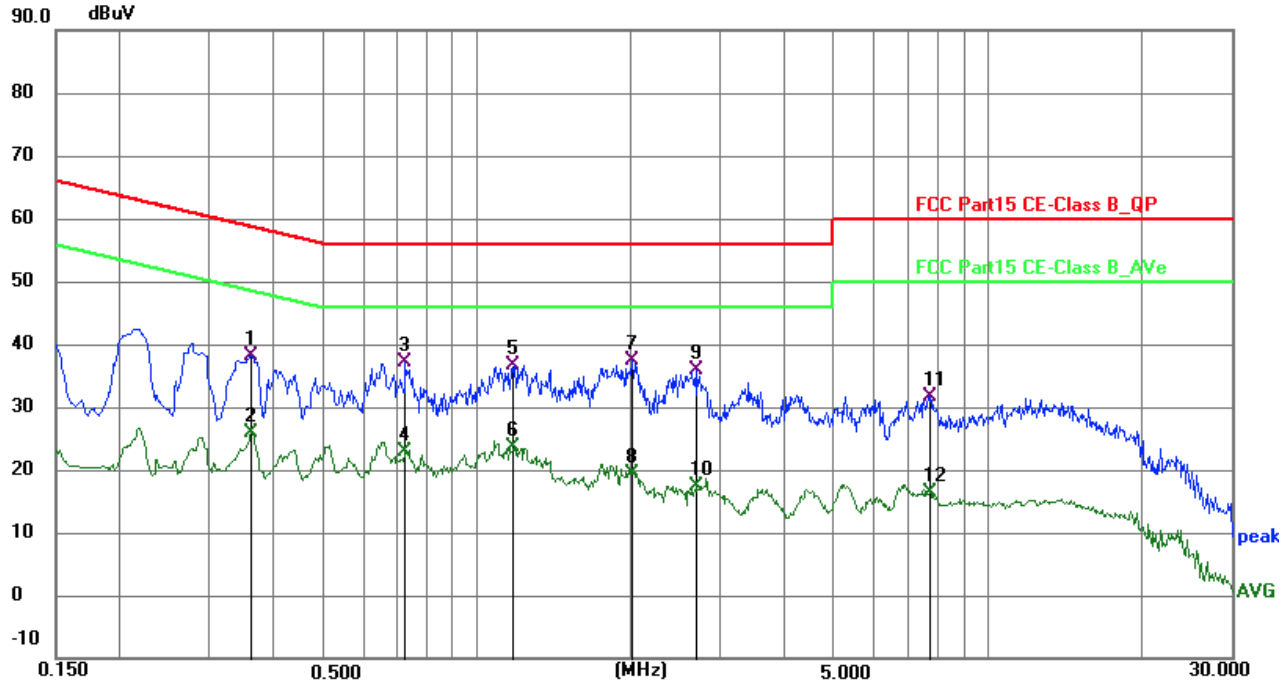
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	32.75	9.27	42.02	66.00	-23.98	QP	P	
2	0.1500	15.45	9.27	24.72	56.00	-31.28	AVG	P	
3	0.2174	33.62	9.15	42.77	62.92	-20.15	QP	P	
4	0.2174	17.98	9.15	27.13	52.92	-25.79	AVG	P	
5	0.3614	28.38	9.82	38.20	58.70	-20.50	QP	P	
6	0.3614	16.01	9.82	25.83	48.70	-22.87	AVG	P	
7 *	0.7260	26.36	9.87	36.23	56.00	-19.77	QP	P	
8	0.7260	11.95	9.87	21.82	46.00	-24.18	AVG	P	
9	1.9005	25.66	10.05	35.71	56.00	-20.29	QP	P	
10	1.9005	8.52	10.05	18.57	46.00	-27.43	AVG	P	
11	12.7814	21.05	10.16	31.21	60.00	-28.79	QP	P	
12	12.7814	4.52	10.16	14.68	50.00	-35.32	AVG	P	

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM4
Test Voltage:	AC 120V/60Hz
Test Power Line:	Neutral
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.2174	35.89	9.62	45.51	62.92	-17.41	QP	P	
2	0.2174	18.45	9.62	28.07	52.92	-24.85	AVG	P	
3	0.5050	28.24	9.94	38.18	56.00	-17.82	QP	P	
4	0.5050	13.07	9.94	23.01	46.00	-22.99	AVG	P	
5	1.1532	28.01	9.93	37.94	56.00	-18.06	QP	P	
6	1.1532	14.51	9.93	24.44	46.00	-21.56	AVG	P	
7	1.8370	26.24	10.04	36.28	56.00	-19.72	QP	P	
8	1.8370	11.41	10.04	21.45	46.00	-24.55	AVG	P	
9	2.5754	24.91	10.08	34.99	56.00	-21.01	QP	P	
10	2.5754	9.64	10.08	19.72	46.00	-26.28	AVG	P	
11	13.2315	20.25	10.09	30.34	60.00	-29.66	QP	P	
12	13.2315	5.05	10.09	15.14	50.00	-34.86	AVG	P	

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM4
Test Voltage:	AC 120V/60Hz
Test Power Line:	Live
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3613	28.38	9.82	38.20	58.70	-20.50	QP	P	
2	0.3613	16.01	9.82	25.83	48.70	-22.87	AVG	P	
3	0.7260	27.36	9.87	37.23	56.00	-18.77	QP	P	
4	0.7260	12.95	9.87	22.82	46.00	-23.18	AVG	P	
5	1.1849	26.53	10.02	36.55	56.00	-19.45	QP	P	
6	1.1849	13.72	10.02	23.74	46.00	-22.26	AVG	P	
7 *	2.0130	27.29	10.06	37.35	56.00	-18.65	QP	P	
8	2.0130	9.31	10.06	19.37	46.00	-26.63	AVG	P	
9	2.7014	25.84	10.09	35.93	56.00	-20.07	QP	P	
10	2.7014	7.25	10.09	17.34	46.00	-28.66	AVG	P	
11	7.7233	21.44	10.21	31.65	60.00	-28.35	QP	P	
12	7.7233	6.11	10.21	16.32	50.00	-33.68	AVG	P	

4. Radiated Emissions

4.1 Standard and Limit

According to §15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

According to the rule FCC Part 15.209, Radiated emission limit for a wireless device as below:

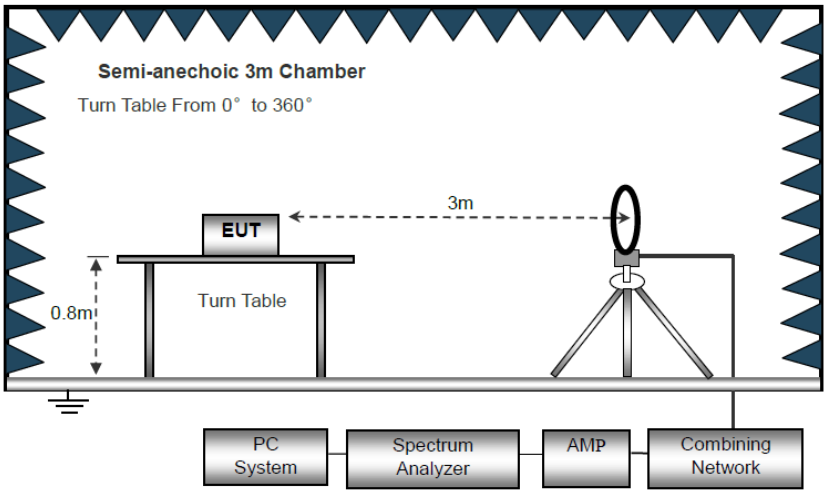
Frequency of emission (MHz)	Radiated emissions (3m)
	Quasi-peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54
Note: The more stringent limit applies at transition frequencies.	

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

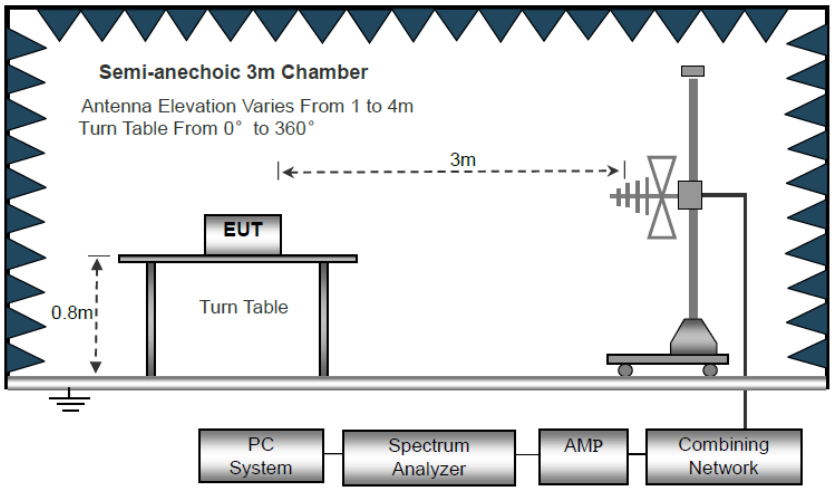
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

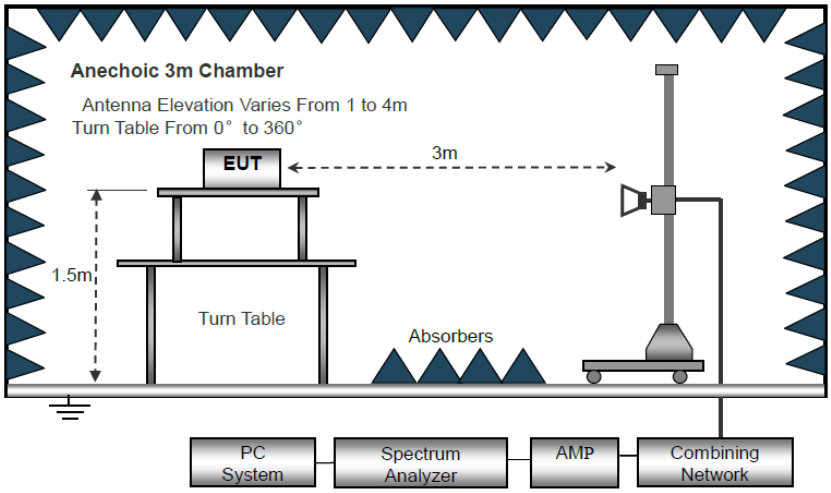
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



Block Diagram of Radiated Emission Below 30MHz



Block Diagram of Radiated Emission From 30MHz to 1GHz



Block Diagram of Radiated Emission Above 1GHz

a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

c) Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, 10kHz for f < 30MHz
VBW ≥ RBW, Sweep = auto
Detector function = peak
Trace = max hold

d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

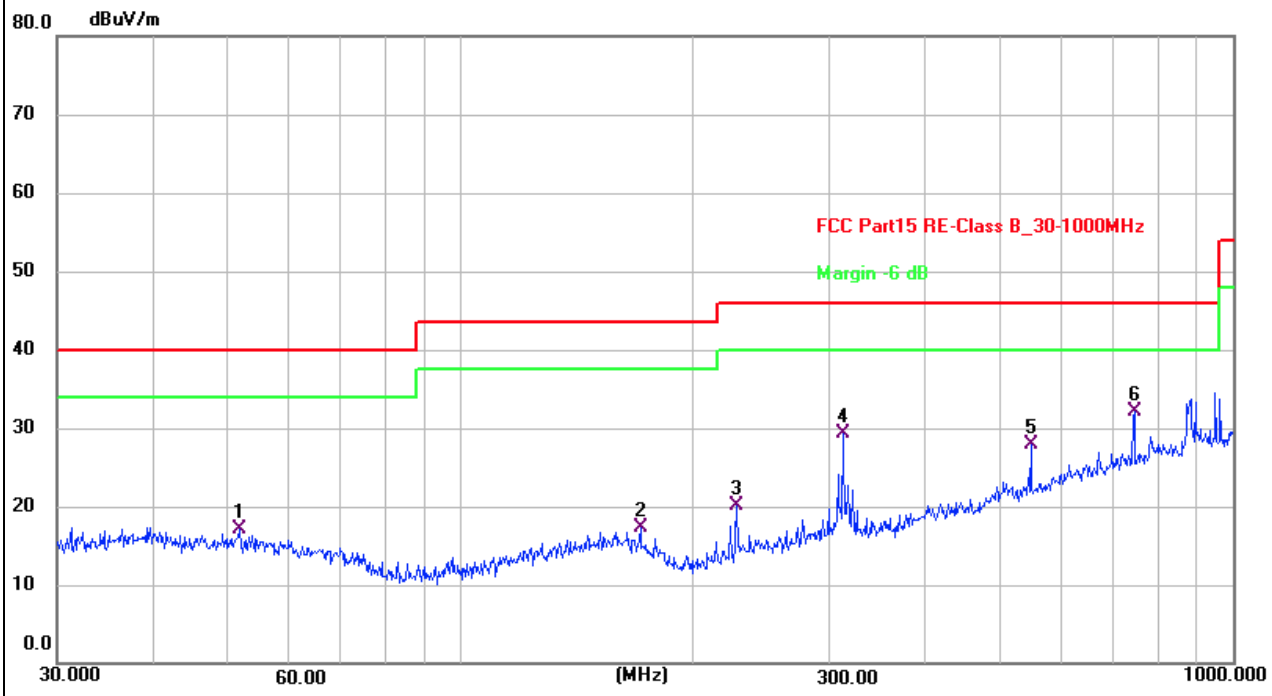
f) For the actual test configuration, please refer to the related item - EUT test photos.

5.3 Test Data and Results

Based on all tested data, the EUT complied with the FCC Part 15.247 standard limit for a wireless device, and with the worst case as below:

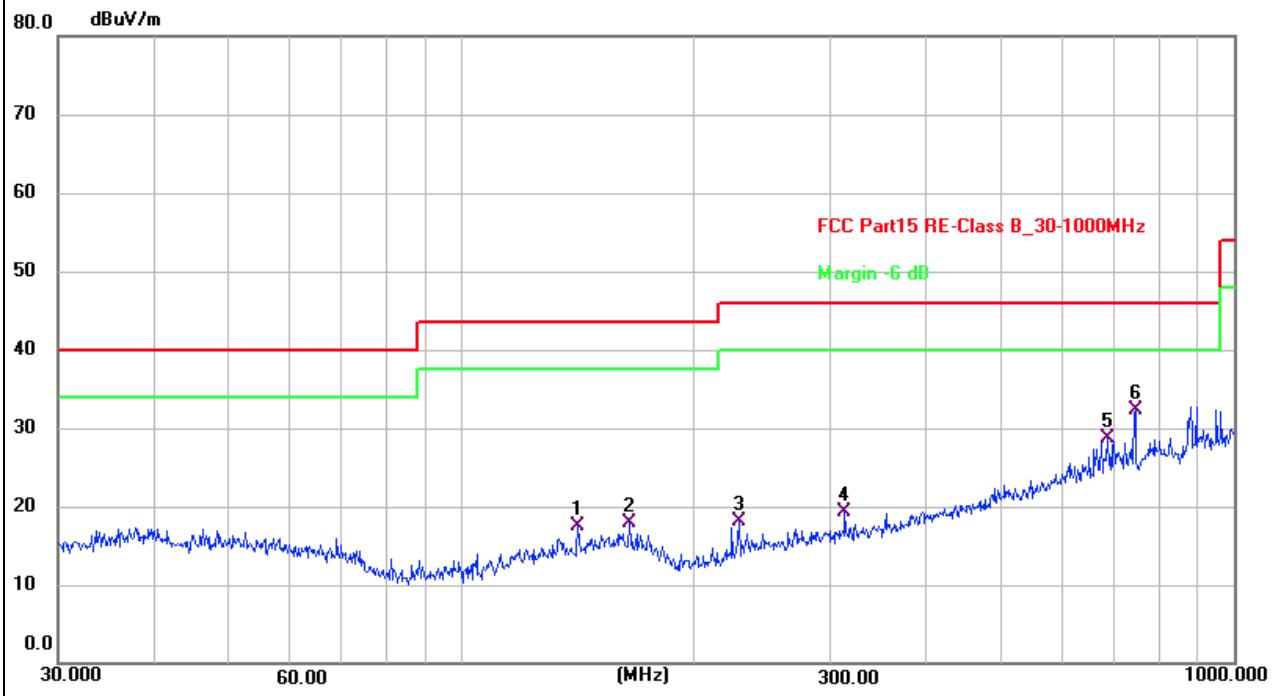
Remark: Level = Reading + Factor, Margin = Level - Limit
For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM1
Test Antenna Polarization:	Horizontal
Remark:	



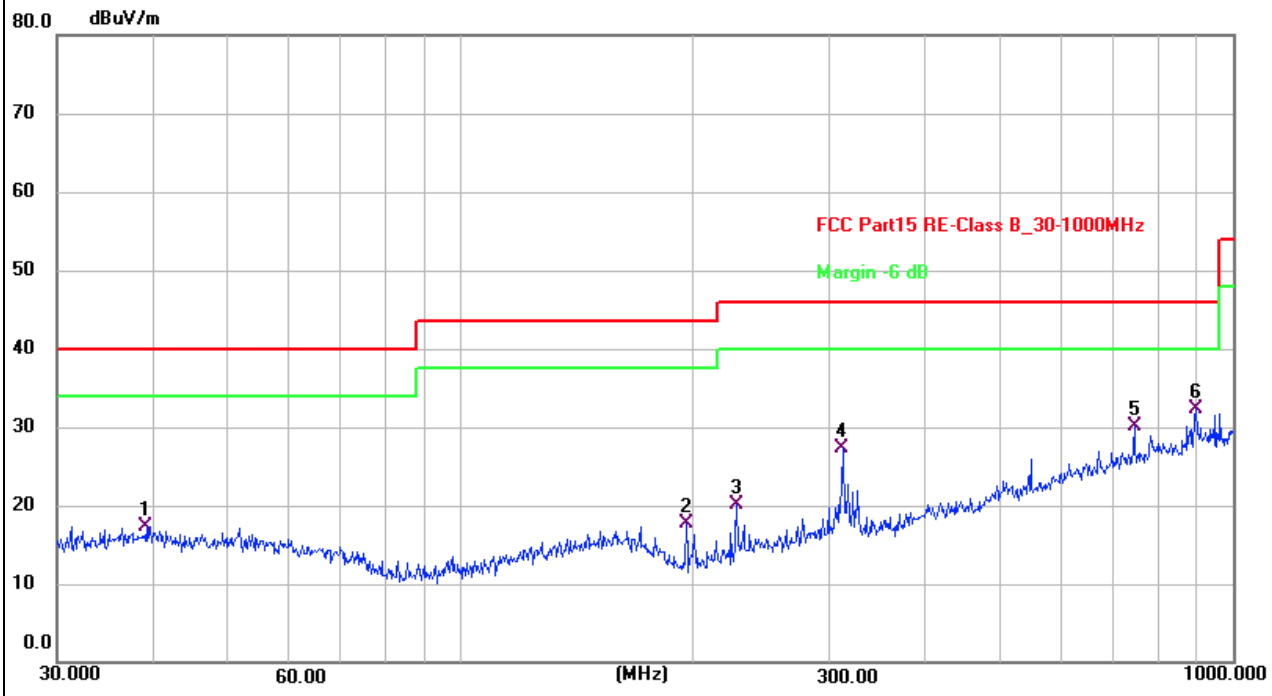
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	51.6616	25.94	-8.93	17.01	40.00	-22.99	QP	100	107	P	
2	170.7926	27.02	-9.74	17.28	43.50	-26.22	QP	100	133	P	
3	227.6906	30.87	-10.79	20.08	46.00	-25.92	QP	100	335	P	
4	312.1794	37.55	-8.23	29.32	46.00	-16.68	QP	100	107	P	
5	547.0977	30.87	-2.92	27.95	46.00	-18.05	QP	100	267	P	
6 *	744.8661	31.28	0.80	32.08	46.00	-13.92	QP	100	107	P	

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM1
Test Antenna Polarization:	Vertical
Remark:	



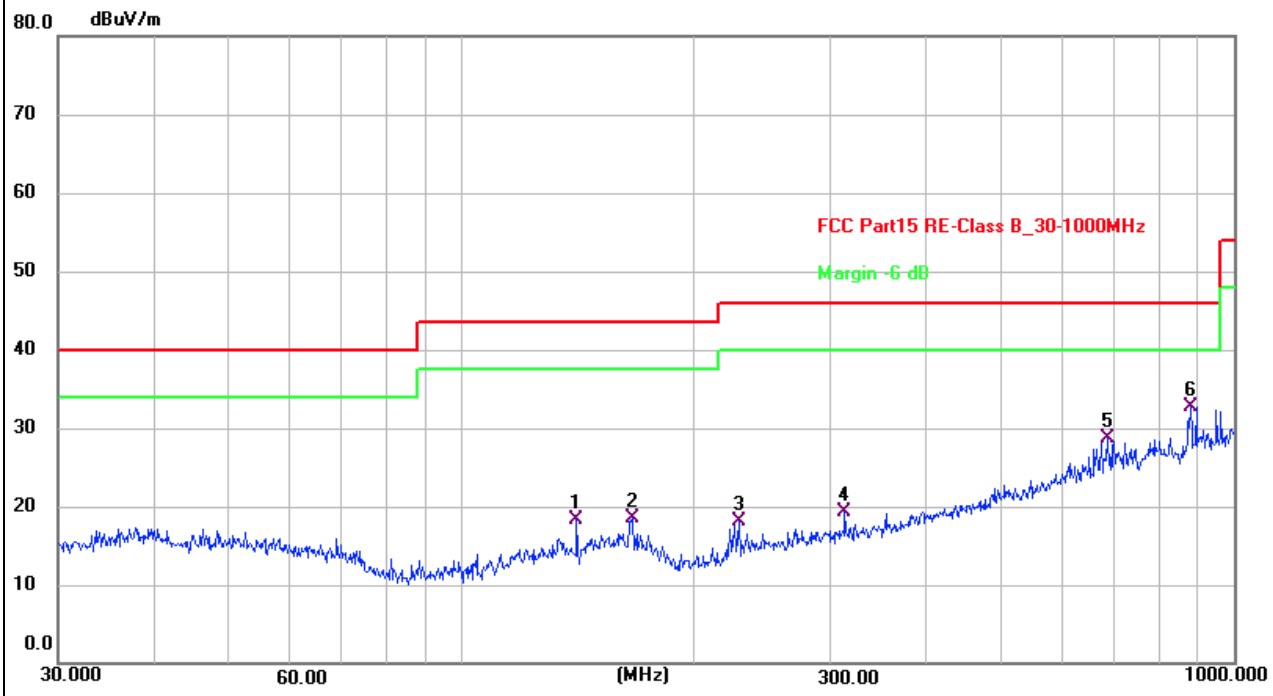
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	141.3298	26.72	-9.28	17.44	43.50	-26.06	QP	100	160	P	
2	164.9075	27.23	-9.34	17.89	43.50	-25.61	QP	100	333	P	
3	228.4904	28.82	-10.73	18.09	46.00	-27.91	QP	100	12	P	
4	313.2760	27.54	-8.22	19.32	46.00	-26.68	QP	100	12	P	
5	684.7454	28.30	0.32	28.62	46.00	-17.38	QP	100	80	P	
6 *	744.8661	31.52	0.80	32.32	46.00	-13.68	QP	100	52	P	

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM4
Test Antenna Polarization:	Horizontal
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.1613	25.54	-8.22	17.32	40.00	-22.68	QP	100	245	P	
2	195.8220	29.81	-12.13	17.68	43.50	-25.82	QP	100	123	P	
3	227.6904	30.87	-10.79	20.08	46.00	-25.92	QP	100	58	P	
4	312.1792	35.55	-8.23	27.32	46.00	-18.68	QP	100	148	P	
5	744.8660	29.28	0.80	30.08	46.00	-15.92	QP	100	351	P	
6 *	896.9963	28.65	3.73	32.38	46.00	-13.62	QP	100	136	P	

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM4
Test Antenna Polarization:	Vertical
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	140.8350	27.68	-9.31	18.37	43.50	-25.13	QP	100	352	P	
2	166.6513	27.93	-9.44	18.49	43.50	-25.01	QP	100	14	P	
3	228.4904	28.82	-10.73	18.09	46.00	-27.91	QP	100	12	P	
4	313.2760	27.54	-8.22	19.32	46.00	-26.68	QP	100	17	P	
5	684.7454	28.30	0.32	28.62	46.00	-17.38	QP	100	80	P	
6 *	878.3214	29.72	3.01	32.73	46.00	-13.27	QP	100	254	P	

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