

FCC TEST REPORT

FCC ID: 2BDA4STK-7009F

Report No. : SSP24080176-1E

Prepared For : Hubei Saitake Electronic Co., Ltd.

Product Name : Wireless Controller

Model Name : STK-7009F

FCC Rule : FCC Part 15.247

Date of Issue : 2024-09-02

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
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Test Report Basic Information

Applicant:	Hubei Saitake Electronic Co., Ltd. Building 8, Garment Industrial Park, No.1, Fazhan Avenue, Maoshi Town, Jianli City, Jingzhou City, Hubei Province, China
Manufacturer:	Hubei Saitake Electronic Co., Ltd. Building 8, Garment Industrial Park, No.1, Fazhan Avenue, Maoshi Town, Jianli City, Jingzhou City, Hubei Province, China
Product Name:	Wireless Controller
Brand Name:	-
Main Model:	STK-7009F
Series Models:	MC100
Test Standard:	FCC Part 15 Subpart C ANSI C63.10-2013
Date of Test	2024-08-17 to 2024-08-30
Test Result:	PASSED
Tested Engineer	<u>Lorzix Luo</u> (Lorzix Luo)
Project Manager:	<u>Lieber Ouyang</u> (Lieber Ouyang)
Authorized Signatory:	<u>Lahm Peng</u> (Lahm Peng)
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Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-09-02	Initial Release	Lahm Peng

1. General Information

1.1 Product Information

Product Name:	Wireless Controller
Trade Name:	-
Main Model:	STK-7009F
Series Models:	MC100
Rated Voltage:	DC 3.7V by battery, USB 5V charging
Battery:	DC 3.7V, 600mAh
Test Sample No:	SSP24080176-1
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 color of appearance and model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.	
Note 3: The original battery model 603040 is change to 802530, and the battery capacity unchanged.	

Wireless Specification	
Wireless Standard:	Bluetooth BR/EDR
Operating Frequency:	2402MHz ~2480MHz
Number of Channel:	79
Channel Separation:	1MHz
Modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Antenna Gain:	-0.71dBi
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(DH5/2DH5/3DH5)	
TM2	Middle Channel	2441MHz(DH5/2DH5/3DH5)	
TM3	Highest Channel	2480MHz(DH5/2DH5/3DH5)	
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-110600C02	JL28L4P2D06114
-	-	-	-

BR/EDR 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		

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	2024-08-07	2025-08-06
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100242	2024-08-07	2025-08-06
Test Cable	N/A	Cable 5	N/A	2024-08-07	2025-08-06
EMI Test Software	FARA	EZ-EMC	EMEC-3A1+	N/A	N/A
Radiated Emissions					
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100154	2024-08-07	2025-08-06
Amplifier	SCHWARZBECK	BBV 9743B	00251	2024-08-07	2025-08-06
Broadband Antenna	SCHWARZBECK	VULB 9168	01320	2024-08-03	2025-08-02
Attenuator	QUANJUDA	6dB	220731	2024-08-07	2025-08-06
Test Cable	N/A	Cable 1	N/A	2024-08-07	2025-08-06
Test Cable	N/A	Cable 4	N/A	2024-08-07	2025-08-06
EMI Test Software	FARA	EZ-EMC	FA-03A2 RE+	N/A	N/A

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

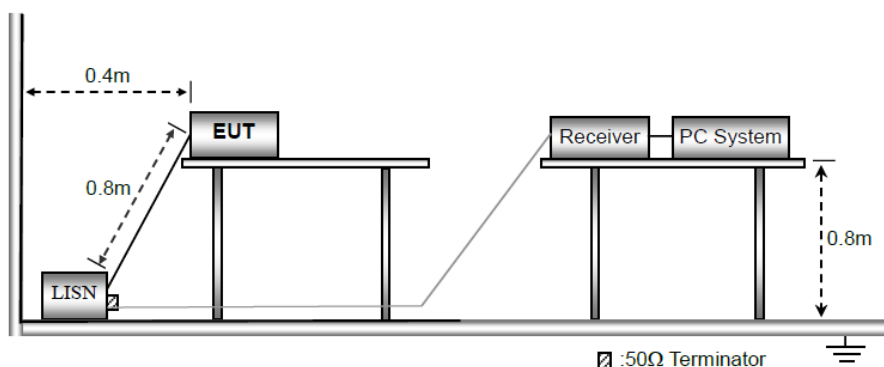
According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

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

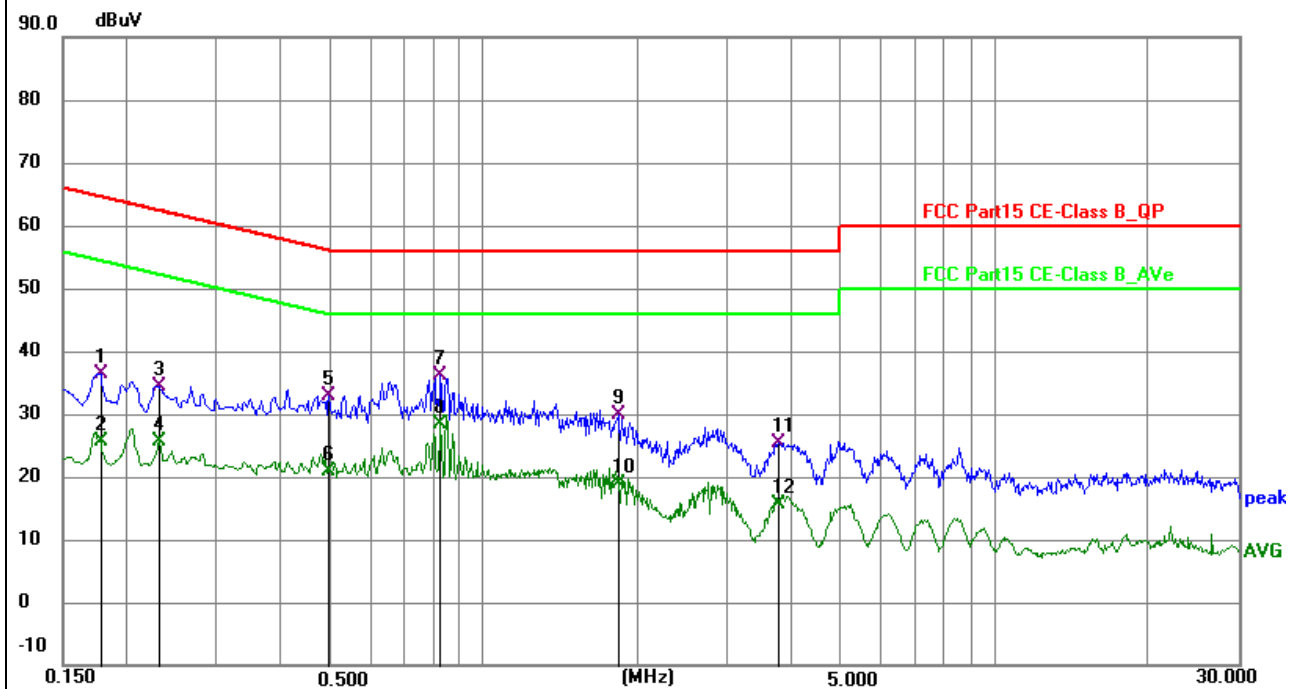
Test Plots and Data of Conducted Emissions

Tested Mode: TM1(DH5)

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	0.1770	27.15	9.23	36.38	64.63	-28.25	QP	P	
2	0.1770	16.34	9.23	25.57	54.63	-29.06	AVG	P	
3	0.2310	25.20	9.26	34.46	62.41	-27.95	QP	P	
4	0.2310	16.29	9.26	25.55	52.41	-26.86	AVG	P	
5	0.4964	23.57	9.39	32.96	56.06	-23.10	QP	P	
6	0.4964	11.61	9.39	21.00	46.06	-25.06	AVG	P	
7	0.8250	26.74	9.41	36.15	56.00	-19.85	QP	P	
8 *	0.8250	18.98	9.41	28.39	46.00	-17.61	AVG	P	
9	1.8374	20.50	9.46	29.96	56.00	-26.04	QP	P	
10	1.8374	9.52	9.46	18.98	46.00	-27.02	AVG	P	
11	3.7814	15.95	9.53	25.48	56.00	-30.52	QP	P	
12	3.7814	6.00	9.53	15.53	46.00	-30.47	AVG	P	

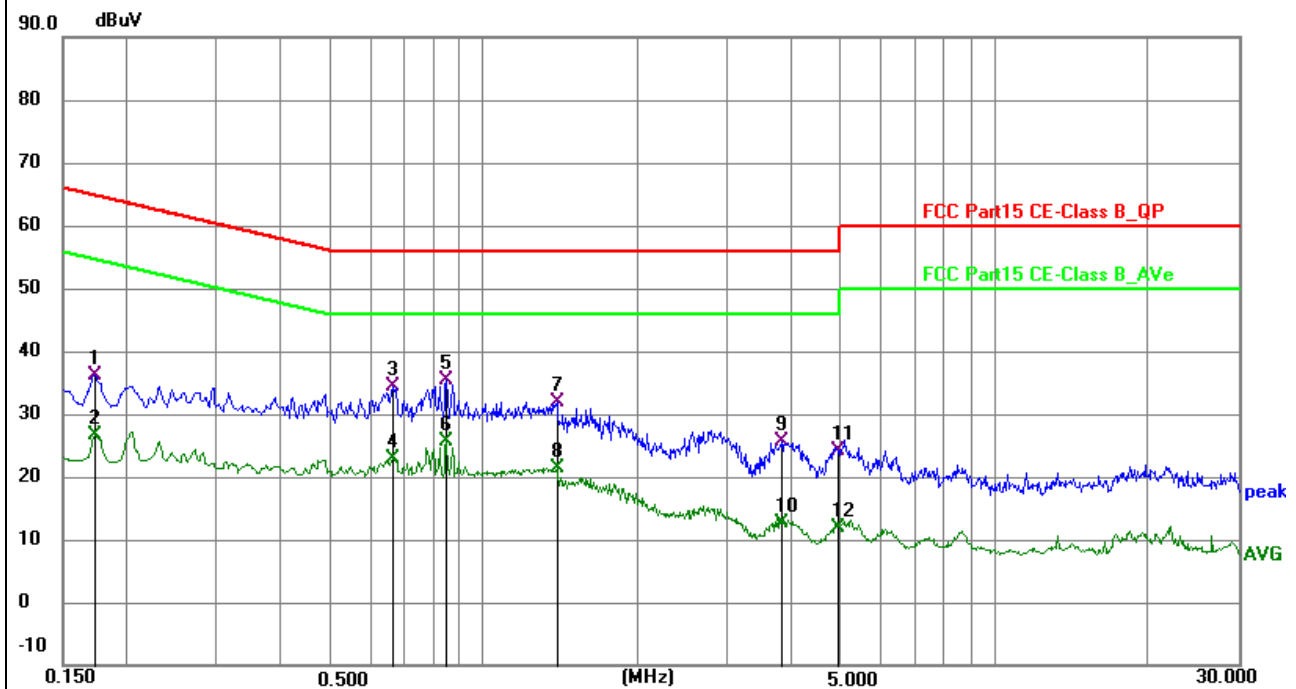
Test Plots and Data of Conducted Emissions

Tested Mode: TM1(DH5)

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	0.1724	26.83	9.40	36.23	64.84	-28.61	QP	P	
2	0.1724	17.29	9.40	26.69	54.84	-28.15	AVG	P	
3	0.6630	24.70	9.57	34.27	56.00	-21.73	QP	P	
4	0.6630	13.29	9.57	22.86	46.00	-23.14	AVG	P	
5	0.8475	25.79	9.59	35.38	56.00	-20.62	QP	P	
6 *	0.8475	16.14	9.59	25.73	46.00	-20.27	AVG	P	
7	1.3920	22.35	9.64	31.99	56.00	-24.01	QP	P	
8	1.3920	11.79	9.64	21.43	46.00	-24.57	AVG	P	
9	3.8264	15.87	9.72	25.59	56.00	-30.41	QP	P	
10	3.8264	2.84	9.72	12.56	46.00	-33.44	AVG	P	
11	4.9470	14.28	9.76	24.04	56.00	-31.96	QP	P	
12	4.9470	2.24	9.76	12.00	46.00	-34.00	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:

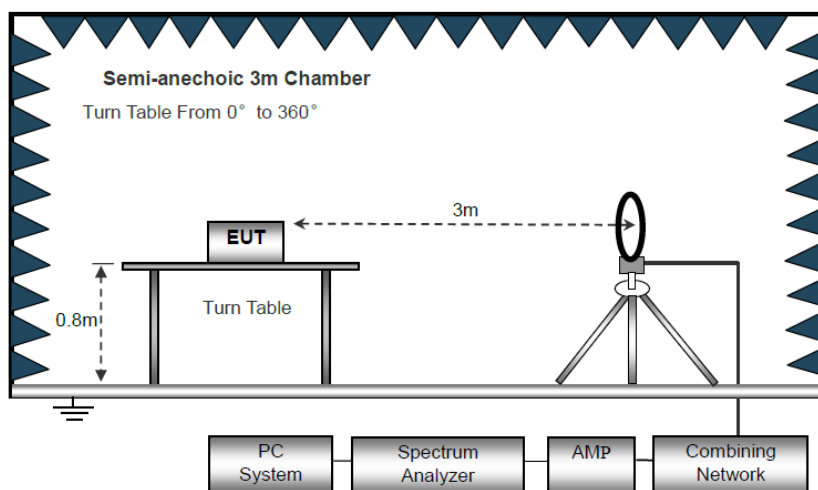
Frequency of emission (MHz)	Radiated emissions (3m)
	Quasi-peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54
Note: The more stringent limit applies at transition frequencies.	

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.

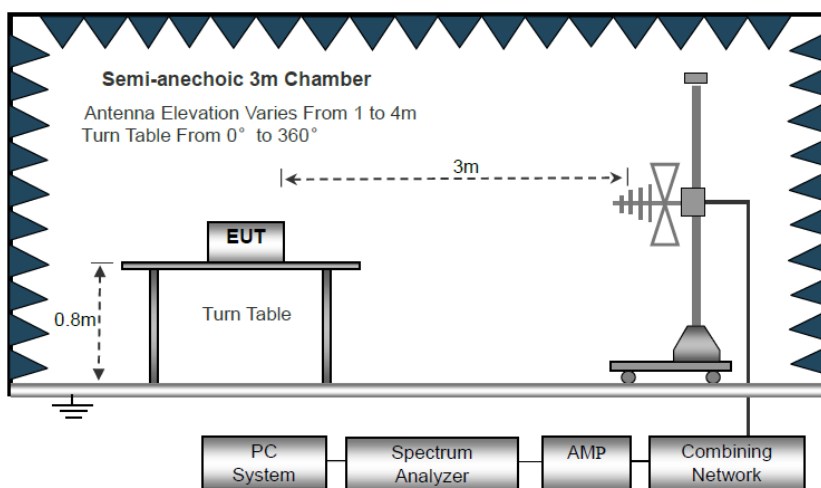
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

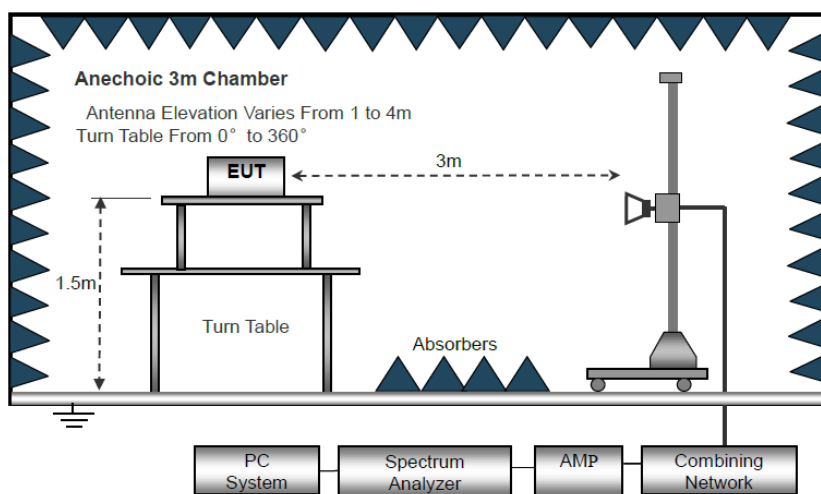
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



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 below 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 $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, 10kHz for $f < 30\text{MHz}$
VBW $\geq$ 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

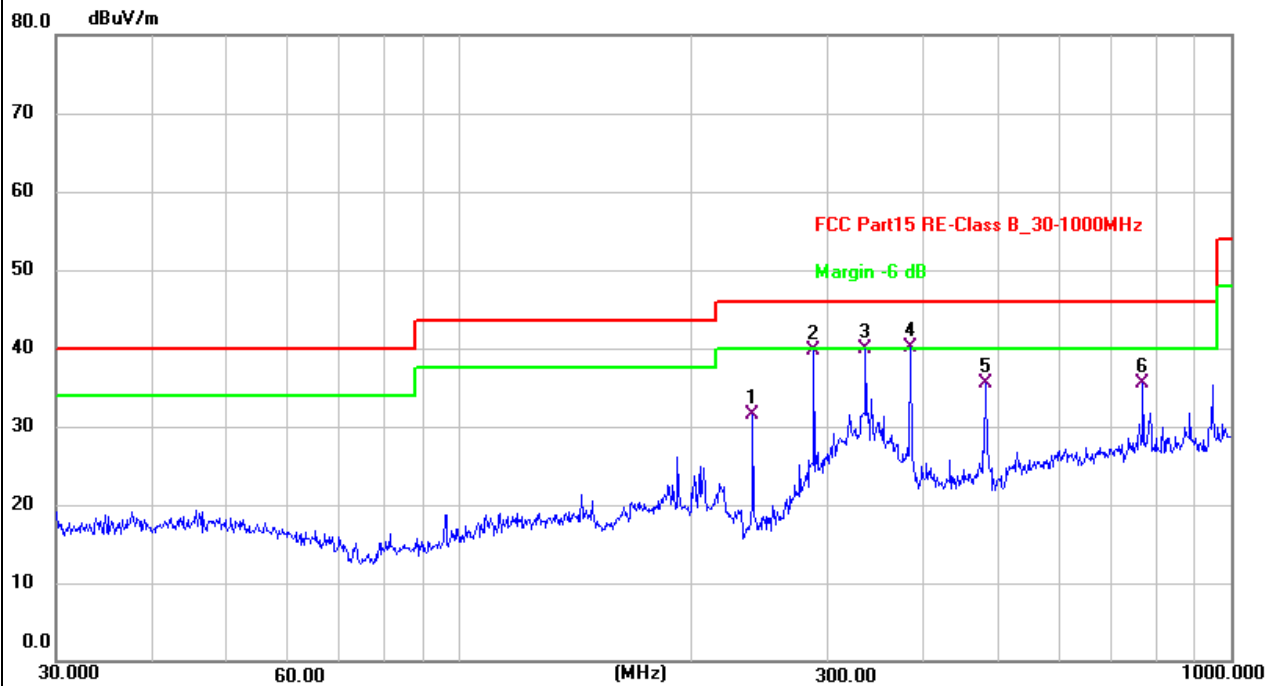
For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Radiated Emission Test Data (30MHz to 1GHz)

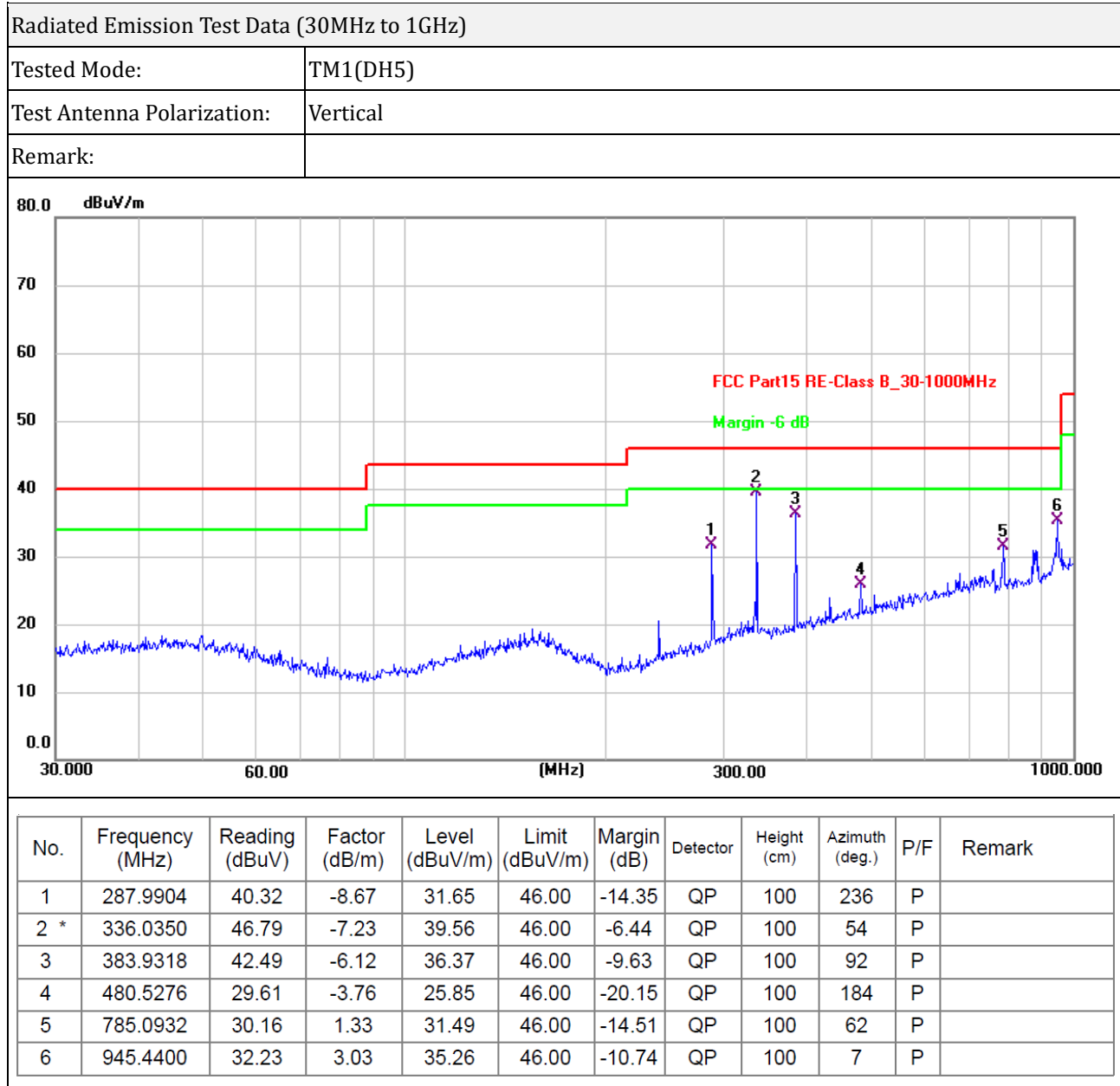
Tested Mode: TM1(DH5)

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	239.9873	41.98	-10.44	31.54	46.00	-14.46	QP	200	326	P	
2	287.9904	48.42	-8.67	39.75	46.00	-6.25	QP	200	5	P	
3	336.0350	47.09	-7.23	39.86	46.00	-6.14	QP	100	94	P	
4 *	383.9318	46.18	-6.12	40.06	46.00	-5.94	QP	100	162	P	
5	480.5276	39.30	-3.76	35.54	46.00	-10.46	QP	100	88	P	
6	768.7481	34.30	1.11	35.41	46.00	-10.59	QP	200	43	P	



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