

FCC Test Report

Report No. : 1812C50273812502

Applicant : Shenzhen Heiman Technology Co.,Ltd.

Address : 101, No.4 Dafu Industrial Park, Kukeng
Community, Guanlan Street, Longhua
District, Shenzhen, Guangdong, China

Product Name : Smart Gateway

Report Date : 2025-09-18

Shenzhen Anbotek Compliance Laboratory Limited



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TEST REPORT

Applicant : Shenzhen Heiman Technology Co.,Ltd.
Manufacturer : Shenzhen Heiman Technology Co.,Ltd.
Product Name : Smart Gateway
Model No. : WS2GW-R
Trade Mark : N/A
Rating(s) : Input: 5V=1A

Test Standard(s) : 47 CFR Part 15.249

Test Method(s) : ANSI C63.10: 2020

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the 47 CFR Part 15.249 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt 2025-06-06

Date of Test 2025-06-06 to 2025-07-28

Prepared by

Cecilia Chen

(Cecilia Chen)

Approved & Authorized Signer

Hugo Chen

(Hugo Chen)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	2025-09-18

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Heiman Technology Co.,Ltd.
Address	:	101, No.4 Dafu Industrial Park, Kukeng Community, Guanlan Street, Longhua District, Shenzhen, Guangdong, China
Manufacturer	:	Shenzhen Heiman Technology Co.,Ltd.
Address	:	101, No.4 Dafu Industrial Park, Kukeng Community, Guanlan Street, Longhua District, Shenzhen, Guangdong, China
Factory	:	Shenzhen Heiman Technology Co.,Ltd.
Address	:	101, No.4 Dafu Industrial Park, Kukeng Community, Guanlan Street, Longhua District, Shenzhen, Guangdong, China

1.2. Description of Device (EUT)

Product Name	:	Smart Gateway
Model No.	:	WS2GW-R
Trade Mark	:	N/A
Test Power Supply	:	DC 5V from adapter input AC 120V/60Hz
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	Manufacturer: Shenzhen Sorghum red Electronics Technology Co.,Ltd Model: G006A0501000U Input: 100-240V~, 50/60Hz, 0.3A Output: 5.0V=1.0A, 5.0W
RF Specification		
Operation Frequency	:	915MHz
Number of Channel	:	1 Channel
Modulation Type	:	FSK
Antenna Type	:	Spring Antenna
Antenna Gain(Peak):	:	0dBi
Remark: 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
/	/	/	/

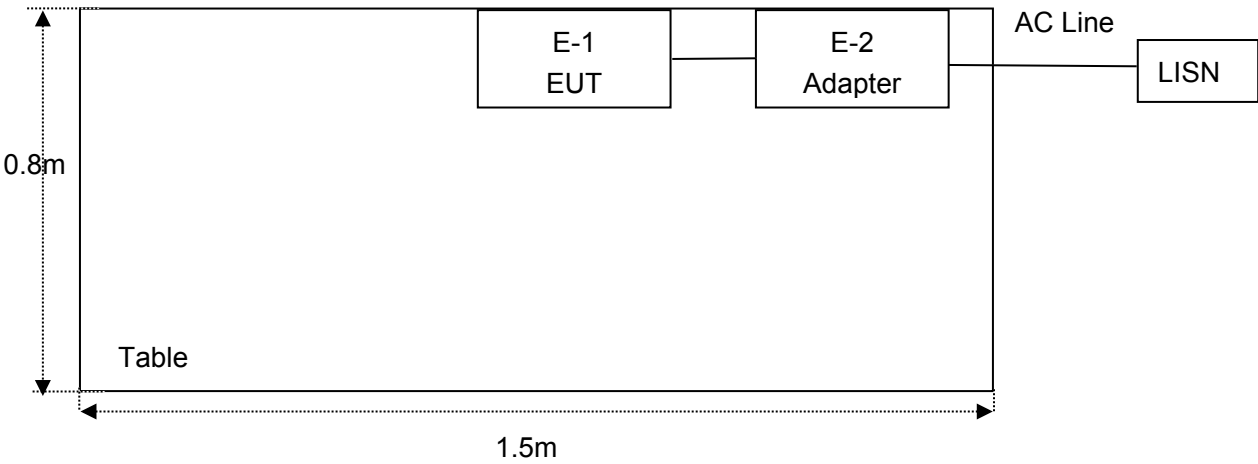
1.4. Description of Test Configuration

The engineering test program was provided and the EUT was programmed to be in transmitting mode.

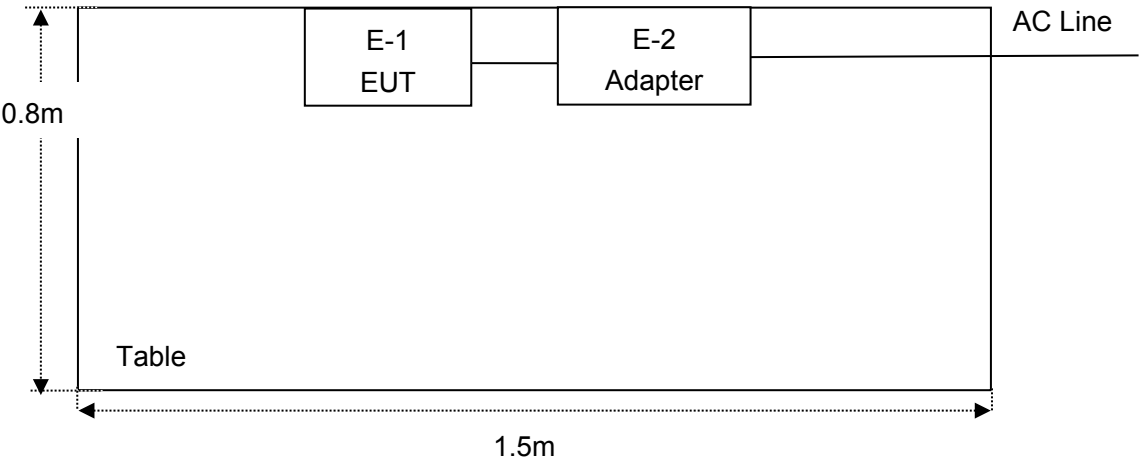
Channel	Freq.(MHz)
01	915

1.5. Description of Test Setup

CE



RE



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	2024-09-09	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT00 1	2025-01-13	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2025-01-13	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	2025-01-14	1 Year
5.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	2024-09-09	1 Year
6.	EMI Preamplifier	SKET Electronic	LNPA-0118G- 45	SKET-PA-002	2025-01-13	1 Year
7.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	2022-10-16	3 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	2022-10-13	3 Year
9.	Loop Antenna(9K-30M)	Schwarzbeck	FMZB1519B	00053	2024-09-12	1 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	2024-01-22	3 Year
11.	Pre-amplifier	SONOMA	310N	186860	2025-01-14	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	2024-09-09	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY47420647	2025-01-14	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	2025-02-21	1 Year
16.	DC Power Supply	IVYTECH	IV3605	1804D360510	2024-09-09	1 Year
17.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	2024-10-14	1 Year
18.	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102150	2024-05-06	1 Year

1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.2dB
Occupied Bandwidth	925Hz
Radiated spurious emissions (Below 30MHz)	3.26dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.70dB; Vertical: 4.42dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.64dB 6G-18GHz: 4.82dB 18G-40GHz: 5.62dB
<p>The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032.</p> <p>This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.</p>	

1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 279531

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 279531.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.
7. The data in this report will be synchronized with the corresponding national market supervision and management departments and cross-border e-commerce platforms as required by regulatory agencies.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.249	Radiated Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.249(c)	Band Edge	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

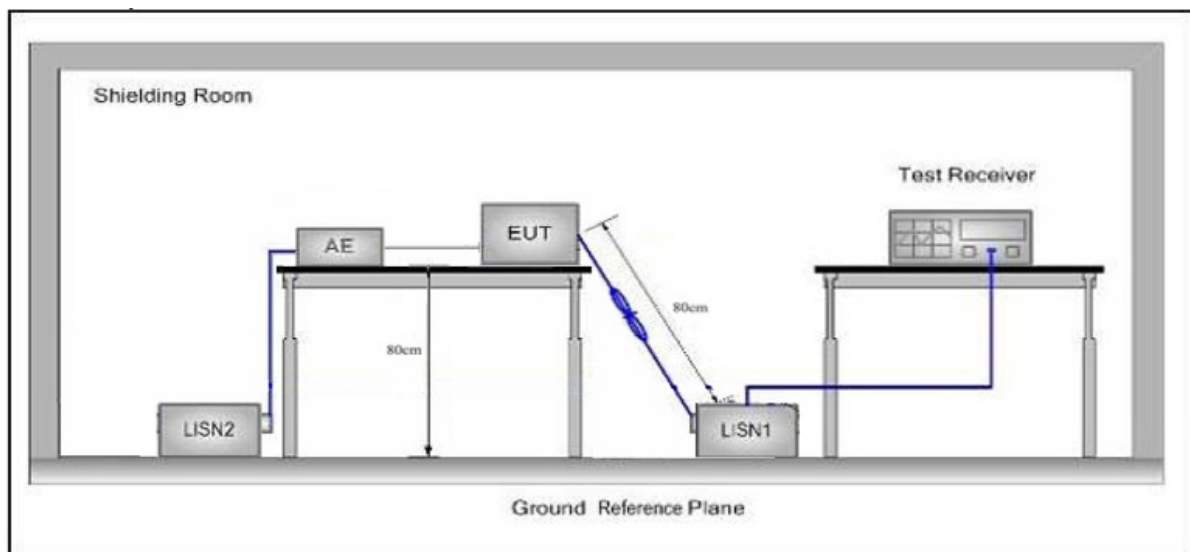
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

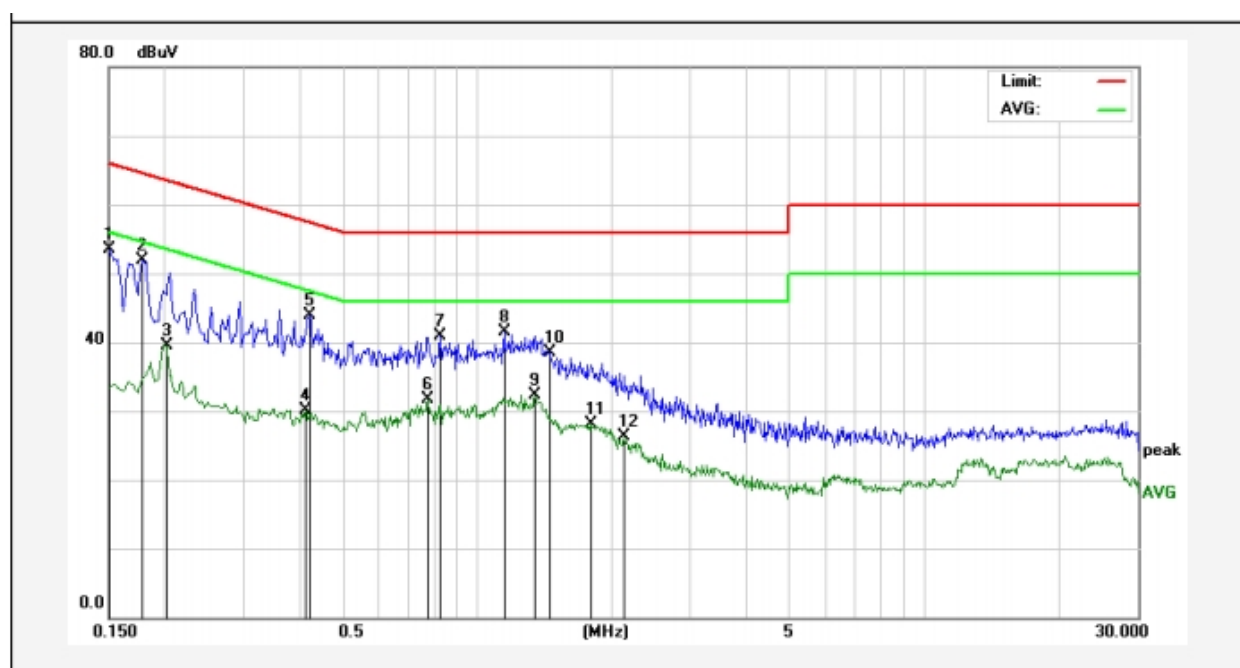
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

PASS

Conducted Emission Test Data

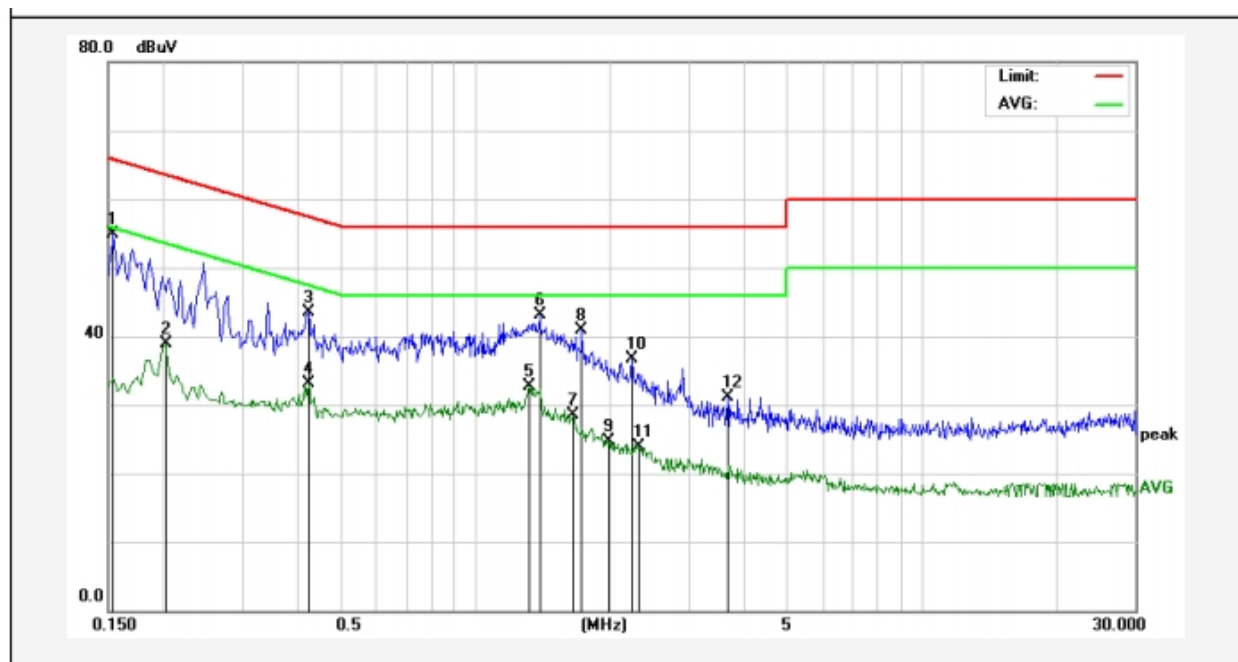
Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: DC 5V from adapter input AC 120V/60Hz
Comment: Live Line
Tem.: 24.6°C Hum.: 59%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1499	35.60	17.82	53.42	66.00	-12.58	QP	
2	0.1779	34.15	17.83	51.98	64.58	-12.60	QP	
3	0.2020	21.68	17.83	39.51	53.52	-14.01	AVG	
4	0.4138	12.29	17.82	30.11	47.57	-17.46	AVG	
5	0.4218	26.01	17.82	43.83	57.41	-13.58	QP	
6	0.7780	13.83	17.86	31.69	46.00	-14.31	AVG	
7	0.8297	22.96	17.86	40.82	56.00	-15.18	QP	
8	1.1496	23.68	17.85	41.53	56.00	-14.47	QP	
9	1.3500	14.49	17.84	32.33	46.00	-13.67	AVG	
10	1.4537	20.73	17.84	38.57	56.00	-17.43	QP	
11	1.7940	10.24	17.84	28.08	46.00	-17.92	AVG	
12	2.1218	8.49	17.83	26.32	46.00	-19.68	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: DC 5V from adapter input AC 120V/60Hz
Comment: Neutral Line
Tem.: 24.6°C Hum.: 59%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1539	37.15	17.83	54.98	65.78	-10.80	QP	
2	0.2020	21.16	17.83	38.99	53.52	-14.53	AVG	
3	0.4218	25.61	17.82	43.43	57.41	-13.98	QP	
4	0.4218	15.19	17.82	33.01	47.41	-14.40	AVG	
5	1.3180	14.78	17.84	32.62	46.00	-13.38	AVG	
6	1.3897	25.27	17.84	43.11	56.00	-12.89	QP	
7	1.6457	10.58	17.84	28.42	46.00	-17.58	AVG	
8	1.7338	23.01	17.84	40.85	56.00	-15.15	QP	
9	1.9899	6.81	17.83	24.64	46.00	-21.36	AVG	
10	2.2458	18.85	17.83	36.68	56.00	-19.32	QP	
11	2.3140	5.99	17.83	23.82	46.00	-22.18	AVG	
12	3.6619	13.18	17.85	31.03	56.00	-24.97	QP	

Note:

Result(dBμV) = Reading(dBμV) + Factor(dB);

Over Limit(dB) = Result(dBμV) - Limit(dBμV)

4. Radiated Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Standard	FCC Part15 C Section 15.249					
Test Limit	Frequency (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	902~928	50	-	94.0	QP	3
	902~928	-	500	74.0	Peak	3
	902~928	-	500	54.0	Average	3
	2400~2483.5	50	-	114.0	Peak	3
	2400~2483.5	50	-	94.0	Average	3
	2400~2483.5	-	500	74.0	Peak	3
	2400~2483.5	-	500	54.0	Average	3

Remark:

(1) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

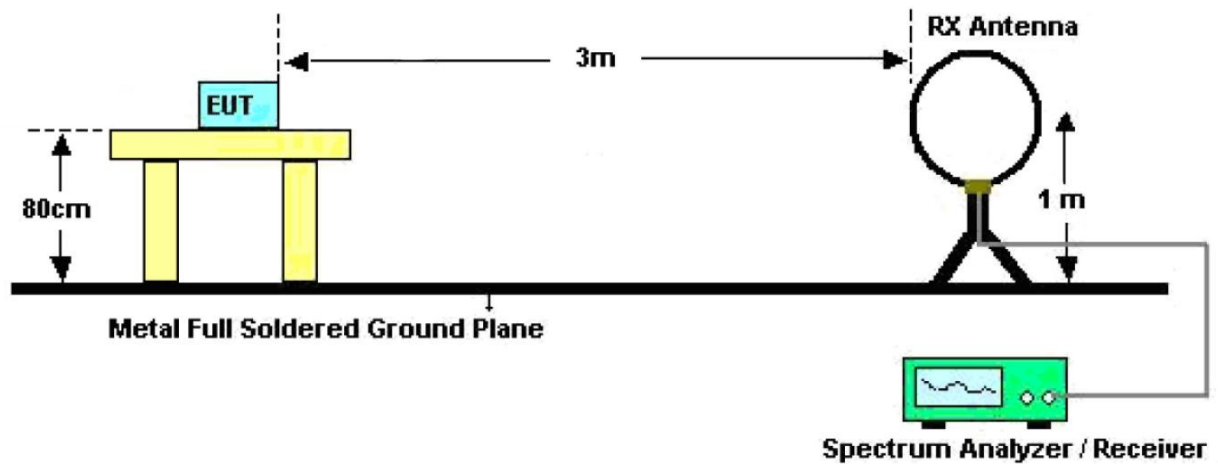


Figure 1. Below 30MHz

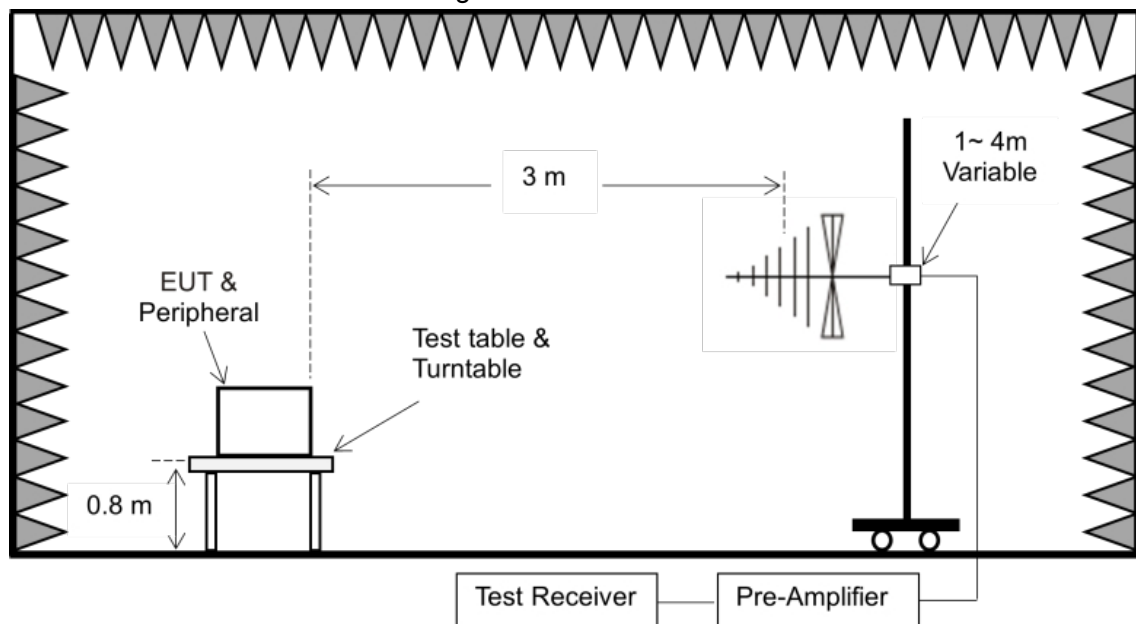


Figure 2. 30MHz to 1GHz

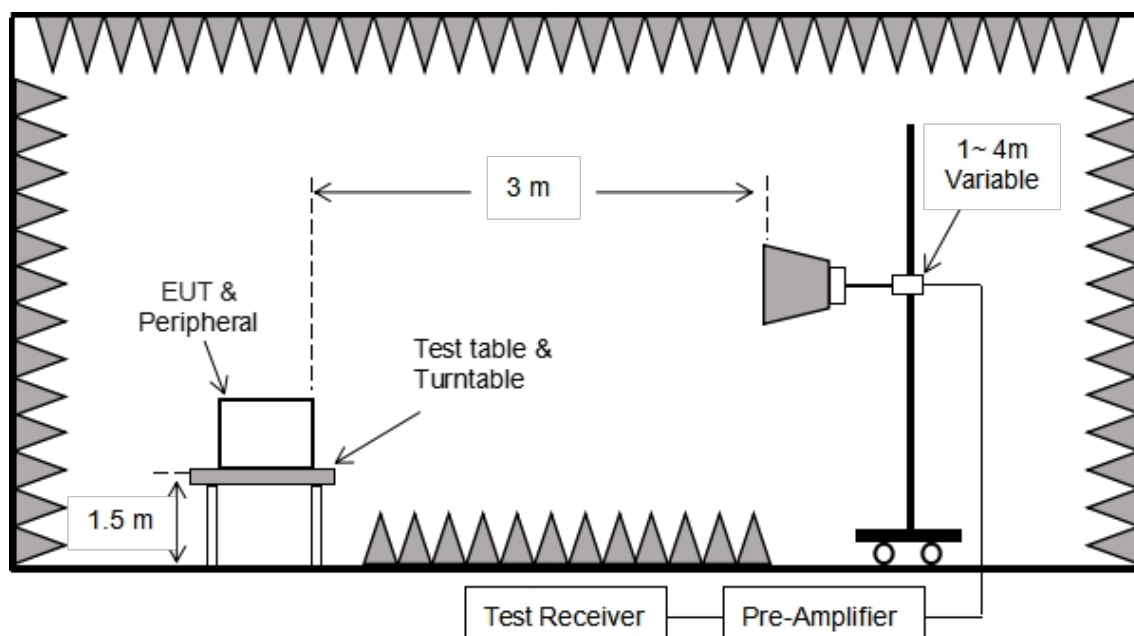


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

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.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz,Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

PASS

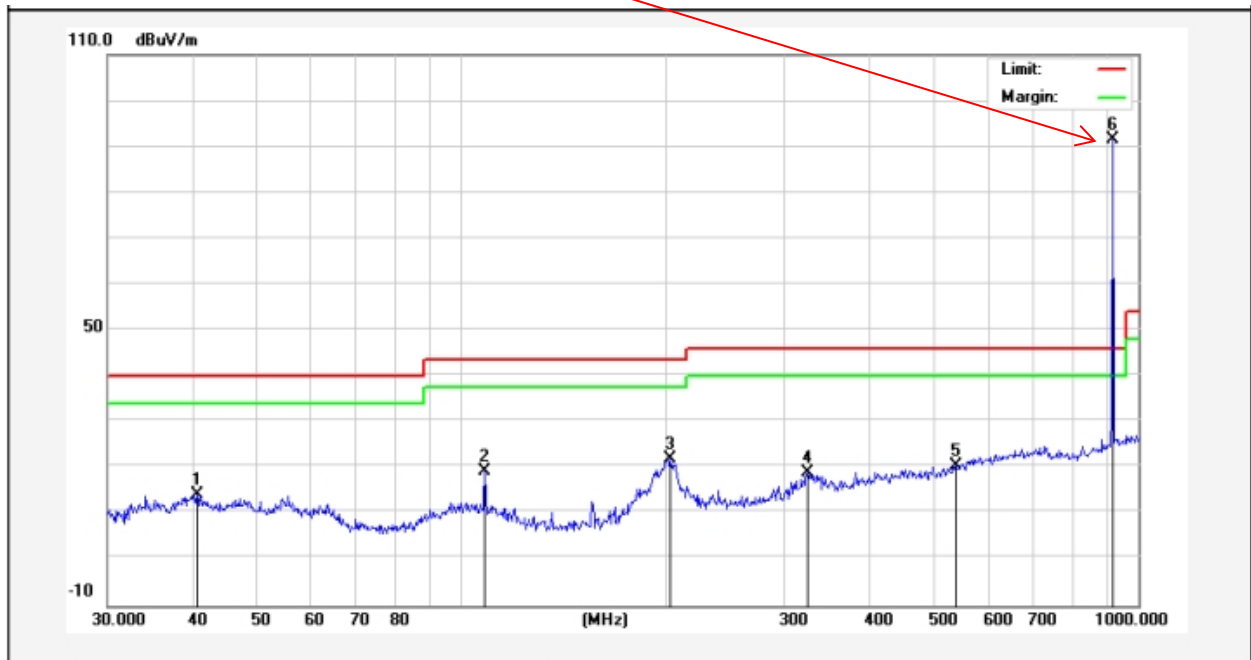
During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (30~1000MHz)

Test Mode: CH01
Power Source: DC 5V from adapter input AC 120V/60Hz
Polarization: Vertical
Temp.(°C)/Hum.(%RH): 22.5°C/55%RH

Fundamental

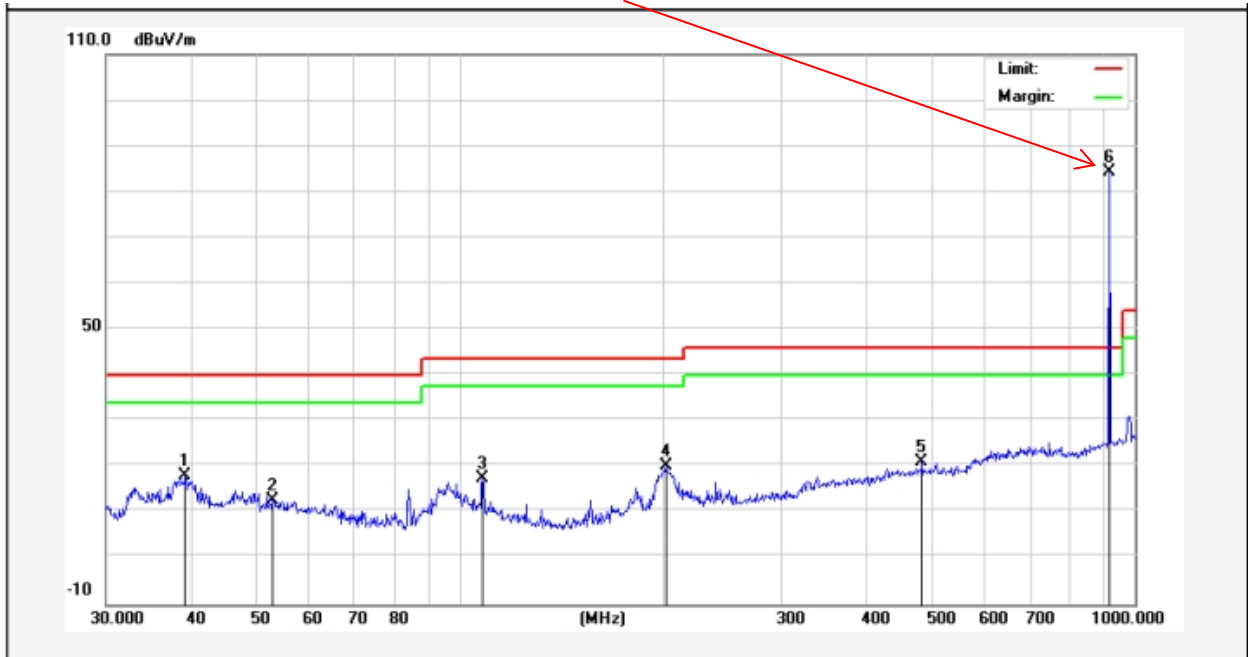


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Remark
1	40.7016	30.26	-16.05	14.21	40.00	-25.79	QP	
2	108.2667	38.17	-19.04	19.13	43.50	-24.37	QP	
3	203.5228	41.80	-19.99	21.81	43.50	-21.69	QP	
4	324.4561	34.91	-16.08	18.83	46.00	-27.17	QP	
5	537.5891	31.72	-11.24	20.48	46.00	-25.52	QP	
6	914.9797	97.91	-6.49	91.42			QP	

Test Results (30~1000MHz)

Test Mode: CH01
Power Source: DC 5V from adapter input AC 120V/60Hz
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 22.5°C/55%RH

Fundamental



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Remark
1	39.2991	34.28	-16.29	17.99	40.00	-22.01	QP	
2	52.9453	30.11	-17.55	12.56	40.00	-27.44	QP	
3	108.2667	36.37	-19.04	17.33	43.50	-26.17	QP	
4	202.1005	40.16	-19.98	20.18	43.50	-23.32	QP	
5	483.9094	33.05	-12.04	21.01	46.00	-24.99	QP	
6	915.0197	90.82	-6.49	84.33			QP	

Note:

Result(dBμV/m) = Reading(dBμV) + Factor(dB/m);

Over Limit(dB) = Result(dBμV/m) - Limit(dBμV/m)

Fundamental

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Det. Mode	Polarization	Verdict
915.00	97.91	-6.49	91.42	94.00	-2.58	QP	Vertical	Pass
915.00	90.82	-6.49	84.33	94.00	-9.67	QP	Horizontal	Pass

Test Results (1GHz-25GHz)

Test channel: Highest						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1830.00	48.76	7.53	56.29	74.00	-17.71	Vertical
2745.00	48.79	10.85	59.64	74.00	-14.36	Vertical
3660.00	46.62	12.49	59.11	74.00	-14.89	Vertical
4575.00	*			74.00		Vertical
5490.00	*			74.00		Vertical
1830.00	48.68	7.53	56.21	74.00	-17.79	Horizontal
2745.00	49.71	10.85	60.56	74.00	-13.44	Horizontal
3660.00	36.58	12.49	49.07	74.00	-24.93	Horizontal
4575.00	*			74.00		Horizontal
5490.00	*			74.00		Horizontal
1830.00	48.76	7.53	56.29	74.00	-17.71	Vertical
2745.00	48.79	10.85	59.64	74.00	-14.36	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
1830.00	27.65	7.53	35.18	54.00	-18.82	Vertical
2745.00	28.23	10.85	39.08	54.00	-14.92	Vertical
3660.00	29.66	12.49	42.15	54.00	-11.85	Vertical
4575.00	*			54.00		Vertical
5490.00	*			54.00		Vertical
1830.00	27.28	7.53	34.81	54.00	-19.19	Horizontal
2745.00	29.13	10.85	39.98	54.00	-14.02	Horizontal
3660.00	27.66	12.49	40.15	54.00	-13.85	Horizontal
4575.00	*			54.00		Horizontal
5490.00	*			54.00		Horizontal
1830.00	27.65	7.53	35.18	54.00	-18.82	Vertical
2745.00	28.23	10.85	39.08	54.00	-14.92	Vertical

Remark:

- 1.Result =Reading + Factor
2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Band Edge:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Det. Mode	Polarization	Verdict
902.00	49.37	-6.67	42.70	46.00	-3.30	QP	Vertical	Pass
928.00	46.72	-6.32	40.40	46.00	-5.60	QP	Vertical	Pass
902.00	45.72	-6.67	39.05	46.00	-6.95	QP	Horizontal	Pass
928.00	44.91	-6.32	38.59	46.00	-7.41	QP	Horizontal	Pass

Note:

When the PK measure result value is less than the AVG limit value, the AV measure result values test not applicable.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Max peak outside radiated emissions limit=114dBuV/m-50dB=64dBuV/m<15.209 peak

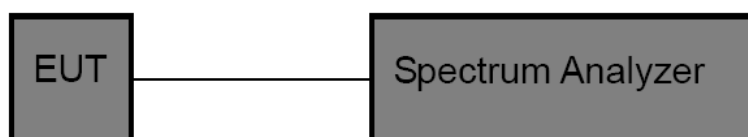
Limit(74dBuV/m), Max AV outside radiated emissions limit=94dBuV/m-50dB=44dBuV/m<15.209 AV Limit(54dBuV/m), so 15.209 PEAK/AV Limit are used here.

5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.249
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5.2. Test Setup



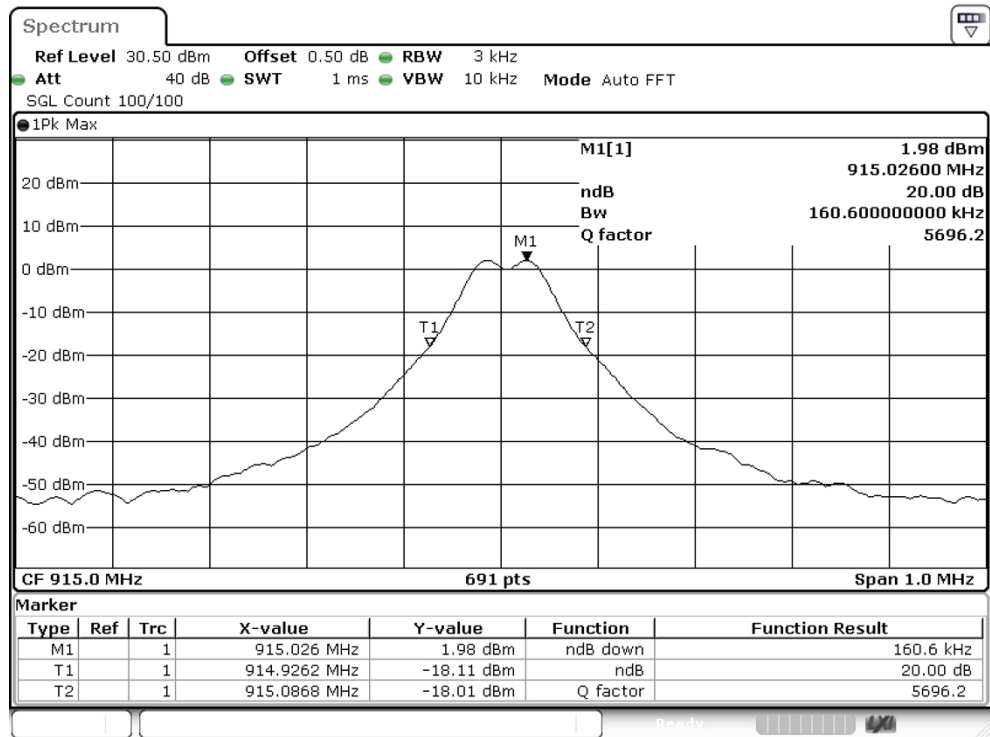
5.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW = 3kHz, VBW \geq 3*RBW =10kHz,
Detector= Average
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

5.4. Test Data

Temperature:	25.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
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Frequency (MHz)	Bandwidth (kHz)	Result
915	160.6	PASS



6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 15.203 requirement: 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.

6.2. Antenna Connected Construction

The antenna is a Spring Antenna which permanently attached, and the best case gain of the antenna is 0dBi. It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_RF

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----