

FCC TEST REPORT

Client Name : Autel Intelligent Tech. Corp., Ltd.

Address : 7th-8th, 10th Floor, Bldg. B1, Zhiyuan,Xueyuan Rd. Xili,
Nanshan Shenzhen China

Product Name : AUTOMOTIVE DIAGNOSIS & ANALYSIS SYSTEM

Date : Jul. 09, 2021

Shenzhen Anbotech Compliance Laboratory Limited



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TEST REPORT

Applicant : Autel Intelligent Tech. Corp., Ltd.
Manufacturer : Autel Intelligent Tech. Corp., Ltd.
Product Name : AUTOMOTIVE DIAGNOSIS & ANALYSIS SYSTEM
Model No. : MS906 Pro-TS
Trade Mark : AUTEL
Rating(s) : Input: DC 12V, 3A (with DC 3.85V, 11600mAh battery inside)

Test Standard(s) : FCC Part15 Subpart C, Paragraph 15.209

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 FCC Part 15 Subpart C 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

Apr. 20, 2021

Date of Test

Apr. 20~May 08, 2021

Prepared By

Ella Liang

(Ella Liang)

Approved & Authorized Signer

Kingkong Jin

(Kingkong Jin)

1. General Information

1.1. Client Information

Applicant	:	Autel Intelligent Tech. Corp., Ltd.
Address	:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan,Xueyuan Rd. Xili, Nanshan Shenzhen China
Manufacturer	:	Autel Intelligent Tech. Corp., Ltd.
Address	:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan,Xueyuan Rd. Xili, Nanshan Shenzhen China
Factory 1	:	Autel Intelligent Technology Corp., Ltd. Guangming Branch
Address	:	7F&6F, East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen
Factory 2	:	AUTEL VIETNAM COMPANY LIMITED
Address	:	4th Floor, Factory#6, Land#CN1, An Duong Industrial Zone, Hong Phong Township, An Duong County, Hai Phong, Viet Nam

1.2. Description of Device (EUT)

Product Name	:	AUTOMOTIVE DIAGNOSIS & ANALYSIS SYSTEM
Model No.	:	MS906 Pro-TS
Trade Mark	:	AUTEL
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter DC 3.85V Battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	Operation Frequency:	BDR+EDR: 2402-2480MHz WiFi 2.4G: 802.11b/ g/ n(HT20): 2412-2462MHz WiFi 5.2G: 5180MHz~5240MHz WiFi 5.8G: 5745MHz~5825MHz SRD: 315MHz, 433.92MHz RF ID: 125KHz
	Number of Channel:	BDR+EDR: 79 Channels SRD: 2 Channels RF ID: 1 Channel WiFi 2.4G: 11 Channels for 802.11g/ n(HT20) WiFi 5.2G: 4 Channels for 802.11a/n(HT20)/ac(HT20) 2 Channels for 802.11n(HT40)/ac(HT40) 1 Channels for 802.11ac(HT80) WiFi 5.8G: 5 Channels for 802.11a/n(HT20)/ac(HT20) 2 Channels for 802.11n(HT40)/ac(HT40) 1 Channels for 802.11ac(HT80)

	Modulation Type:	BDR+EDR: GFSK, $\pi/4$ -DQPSK, 8-DPSK SRD: FSK, ASK RF ID: ASK WiFi 2.4G: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM WiFi 5G: OFDM with BPSK/QPSK/16QAM/64QAM/256QAM
	Antenna Type:	BDR+EDR: Ceramic antenna WiFi 2.4G & WiFi 5.2G & WiFi 5.8G: PIFA Antenna 433.92MHz&315 MHz&125KHz: Monopole antenna
	Antenna Gain(Peak):	BDR+EDR: 0 dBi WiFi 2.4G: 3.4 dBi WiFi 5.2G / WiFi 5.8G: 3.4 dBi 433.92MHz: 0 dBi 315 MHz: 0dBi 125KHz: 0 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) This report is for 125KHz module.		



1.3. Auxiliary Equipment Used During Test.

N/A

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

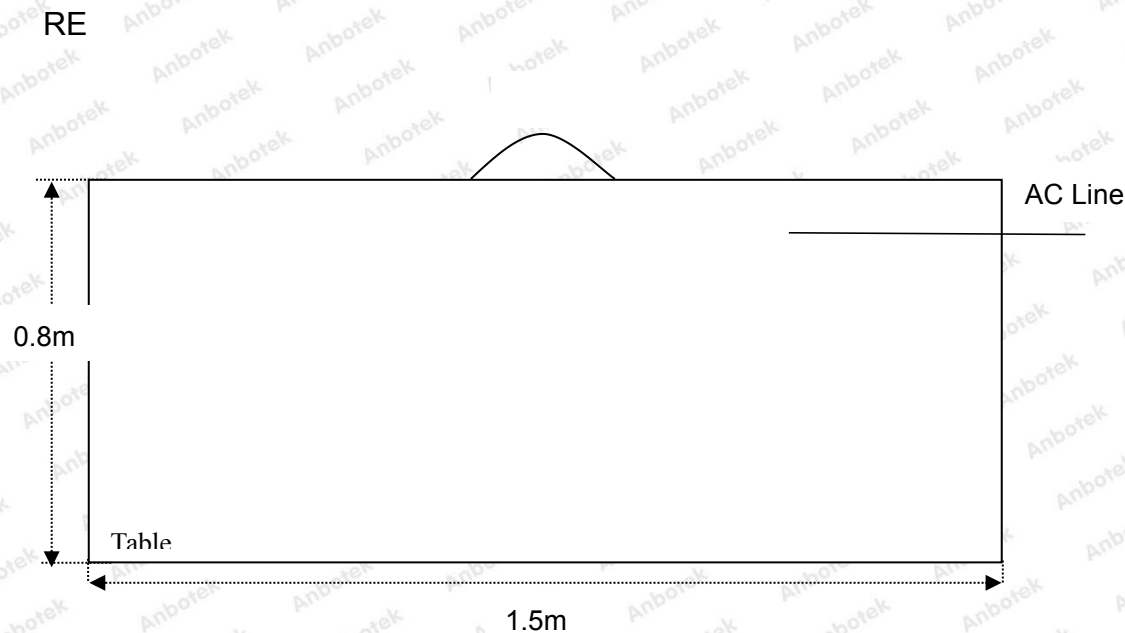
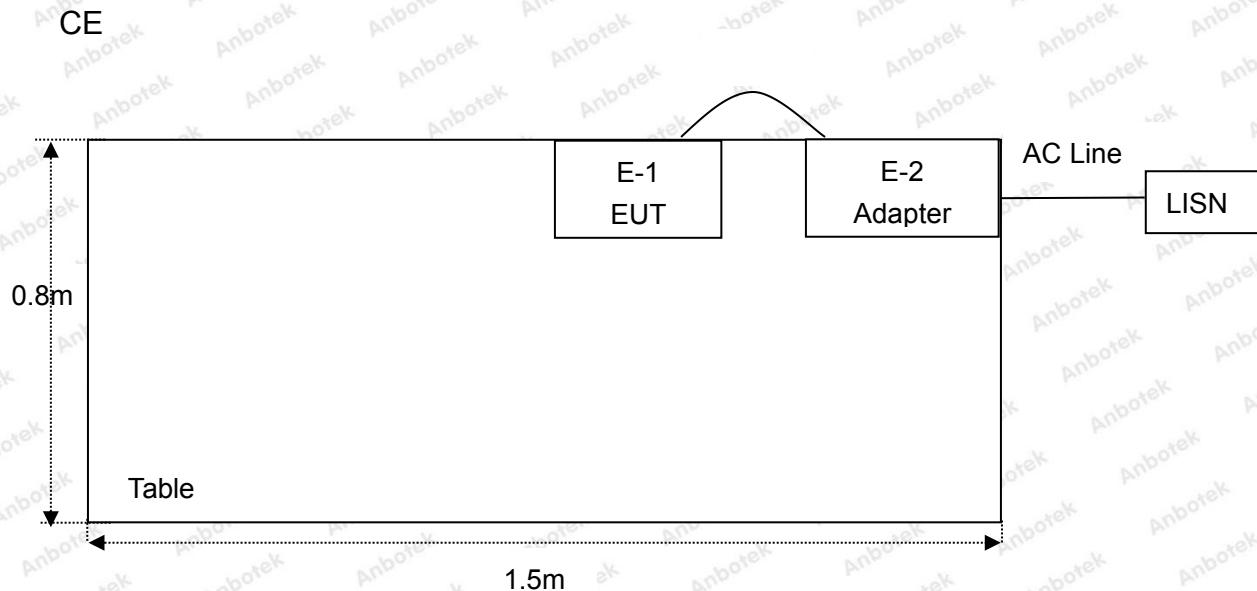
For Conducted Emission	
Final Test Mode	Description
125KHz	TX

For Radiated Emission	
Final Test Mode	Description
125KHz	TX

1.5. List of Channels

Channel	Freq. (MHz)
01	0.125

1.5. Description Of Test Setup



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	Oct. 26, 2020	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 26, 2020	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 26, 2020	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 26, 2020	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Oct. 26, 2020	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 02, 2020	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 02, 2020	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 02, 2020	2 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Nov. 02, 2020	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 26, 2020	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 26, 2020	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 26, 2020	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 26, 2020	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 26, 2020	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 26, 2020	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 26, 2020	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 26, 2020	1 Year



1.7. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotech 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. 184111, September 30, 2020.

ISED-Registration No.: 8058A-1

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

Test Location

Shenzhen Anbotech Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



2. Summary of Test Results

Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
FCC Part 15, Paragraph 15.203	Antenna Requirement	PASS
FCC Part 15, Paragraph 15.215 (c)	20dB Emission Bandwidth	PASS

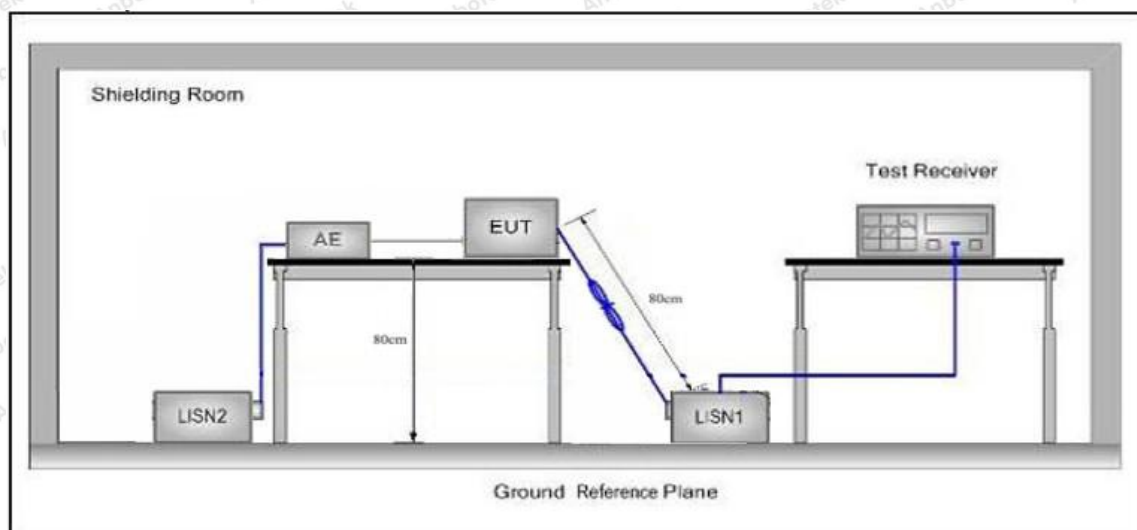


3. Conducted Emission Test

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.

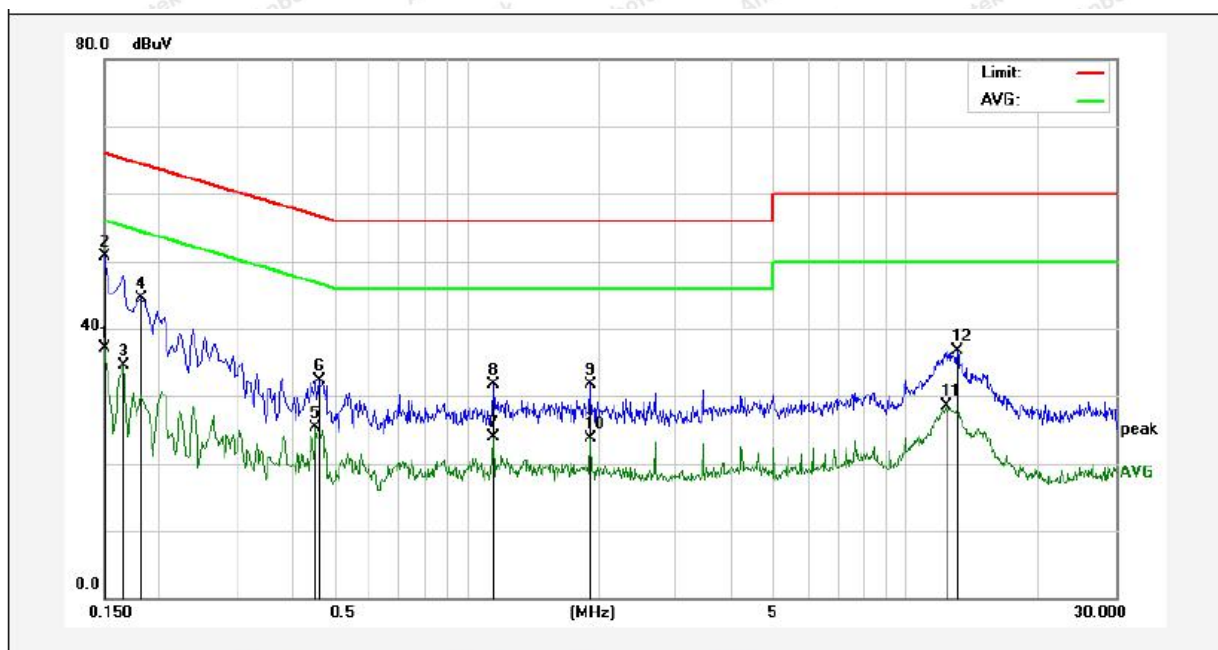
The bandwidth of test receiver (ESCI) set at 9kHz.

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

3.4. Test Data

Please to see the following pages. **Conducted Emission Test Data**

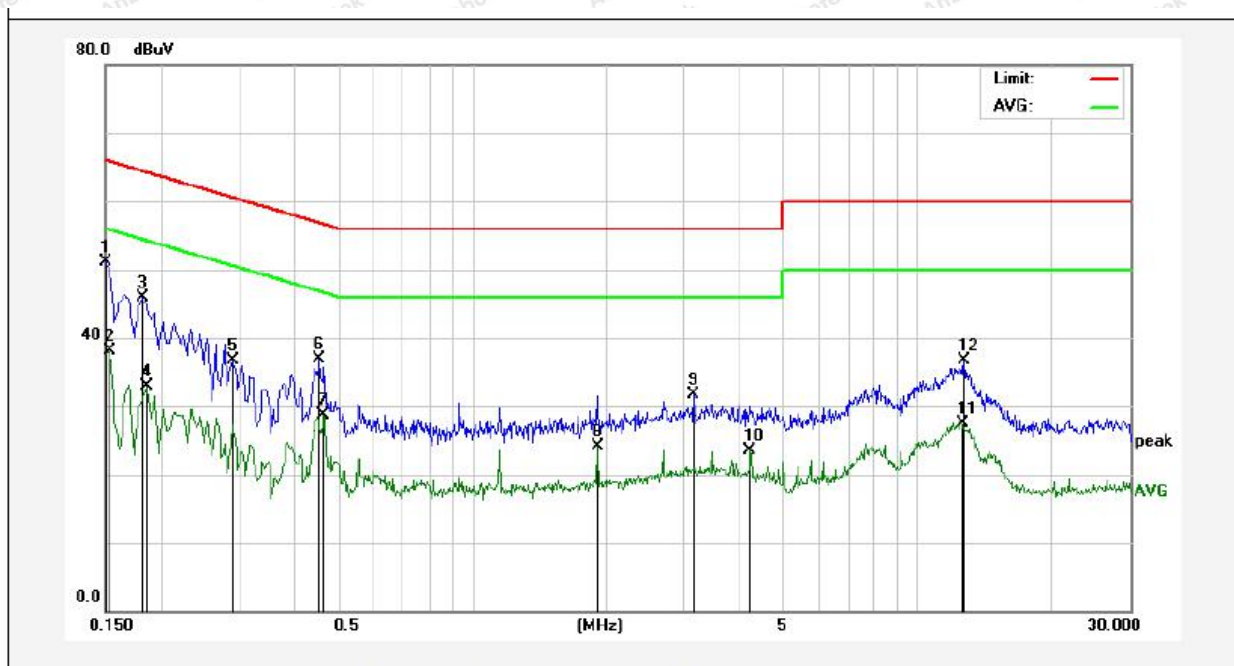
Test Site: 1# Shielded Room
Operating Condition: 125KHz
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 24.4°C Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1499	17.13	19.90	37.03	56.00	-18.97	AVG	
2	0.1500	30.72	19.90	50.62	65.99	-15.37	QP	
3	0.1660	14.57	19.90	34.47	55.15	-20.68	AVG	
4	0.1819	24.57	19.90	44.47	64.39	-19.92	QP	
5	0.4540	5.42	19.96	25.38	46.80	-21.42	AVG	
6	0.4620	12.43	19.96	32.39	56.66	-24.27	QP	
7	1.1500	3.80	20.12	23.92	46.00	-22.08	AVG	
8	1.1539	11.57	20.12	31.69	56.00	-24.31	QP	
9	1.9180	11.49	20.14	31.63	56.00	-24.37	QP	
10	1.9180	3.62	20.14	23.76	46.00	-22.24	AVG	
11	12.3339	8.29	20.30	28.59	50.00	-21.41	AVG	
12	13.0620	16.34	20.29	36.63	60.00	-23.37	QP	

Conducted Emission Test Data

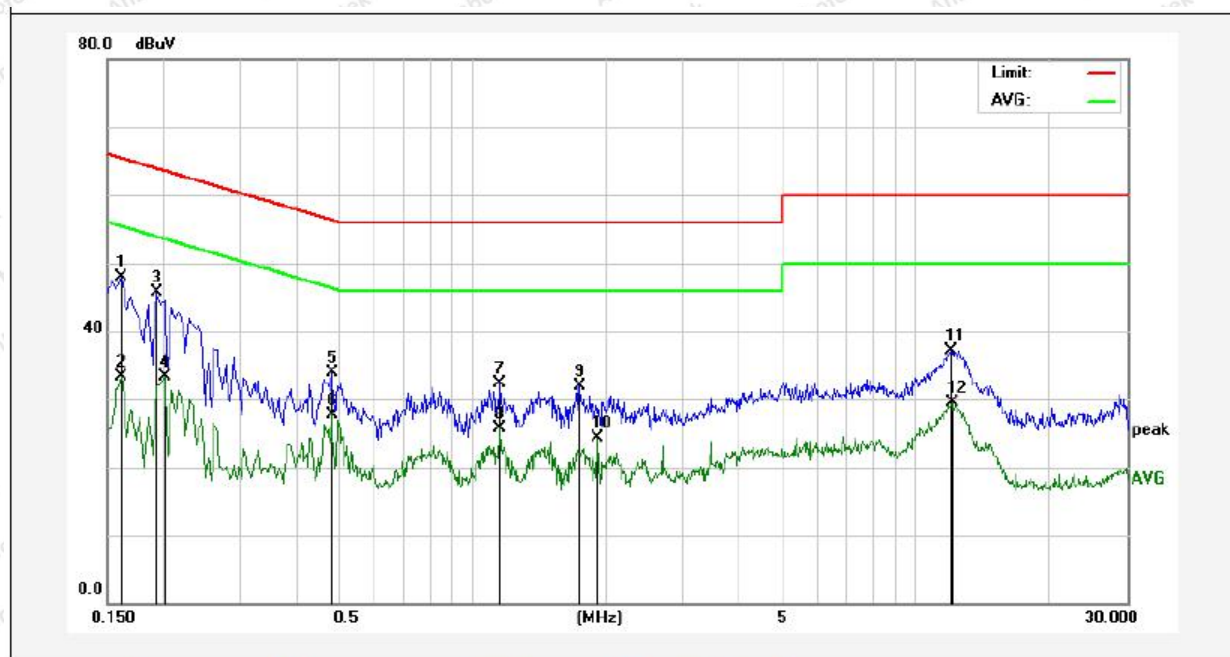
Test Site: 1# Shielded Room
 Operating Condition: 433.92MHz (ASK)
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Neutral Line
 Tem.: 24.4℃ Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1499	31.27	19.90	51.17	66.00	-14.83	peak	
2	0.1539	18.29	19.90	38.19	55.78	-17.59	AVG	
3	0.1819	25.93	19.90	45.83	64.39	-18.56	peak	
4	0.1860	13.00	19.90	32.90	54.21	-21.31	AVG	
5	0.2900	16.77	19.89	36.66	60.52	-23.86	peak	
6	0.4540	17.04	19.96	37.00	56.80	-19.80	peak	
7	0.4660	8.70	19.96	28.66	46.58	-17.92	AVG	
8	1.9180	3.88	20.14	24.02	46.00	-21.98	AVG	
9	3.1500	11.56	20.16	31.72	56.00	-24.28	peak	
10	4.2219	3.30	20.19	23.49	46.00	-22.51	AVG	
11	12.5299	7.19	20.30	27.49	50.00	-22.51	AVG	
12	12.7739	16.48	20.30	36.78	60.00	-23.22	peak	

Conducted Emission Test Data

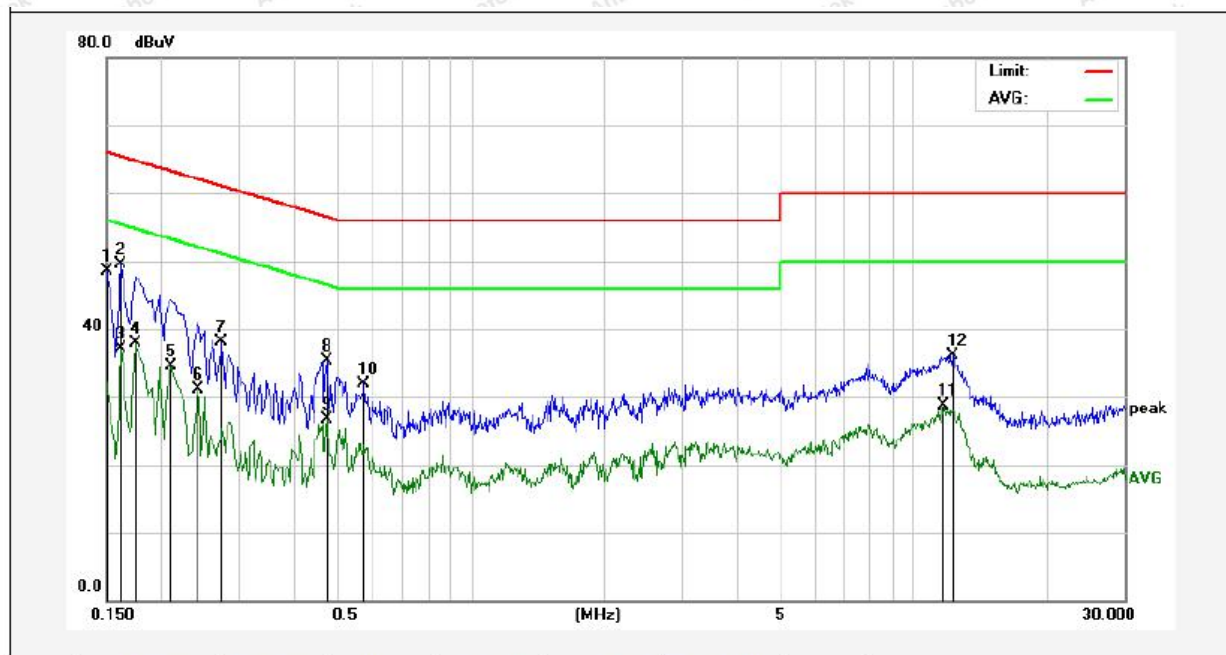
Test Site: 1# Shielded Room
Operating Condition: 433.92MHz (ASK)
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 24.4°C Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1620	28.10	19.90	48.00	65.36	-17.36	QP	
2	0.1620	13.33	19.90	33.23	55.36	-22.13	AVG	
3	0.1940	25.77	19.90	45.67	63.86	-18.19	QP	
4	0.2020	13.37	19.90	33.27	53.52	-20.25	AVG	
5	0.4820	13.84	19.97	33.81	56.30	-22.49	QP	
6	0.4820	7.67	19.97	27.64	46.30	-18.66	AVG	
7	1.1539	12.28	20.12	32.40	56.00	-23.60	QP	
8	1.1539	5.60	20.12	25.72	46.00	-20.28	AVG	
9	1.7460	11.80	20.13	31.93	56.00	-24.07	QP	
10	1.9220	4.13	20.14	24.27	46.00	-21.73	AVG	
11	12.0180	16.86	20.31	37.17	60.00	-22.83	QP	
12	12.1059	9.21	20.31	29.52	50.00	-20.48	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 125KHz
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 24.4°C Hum.: 49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1500	28.57	19.90	48.47	65.99	-17.52	QP	
2	0.1620	29.54	19.90	49.44	65.36	-15.92	QP	
3	0.1620	17.13	19.90	37.03	55.36	-18.33	AVG	
4	0.1740	18.05	19.90	37.95	54.76	-16.81	AVG	
5	0.2100	14.70	19.90	34.60	53.20	-18.60	AVG	
6	0.2420	11.12	19.89	31.01	52.02	-21.01	AVG	
7	0.2740	18.13	19.89	38.02	60.99	-22.97	QP	
8	0.4740	15.33	19.97	35.30	56.44	-21.14	QP	
9	0.4740	6.77	19.97	26.74	46.44	-19.70	AVG	
10	0.5740	11.84	20.00	31.84	56.00	-24.16	QP	
11	11.6579	8.48	20.31	28.79	50.00	-21.21	AVG	
12	12.2620	15.83	20.30	36.13	60.00	-23.87	QP	

4. Radiation Spurious 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.

4.2. Test Setup

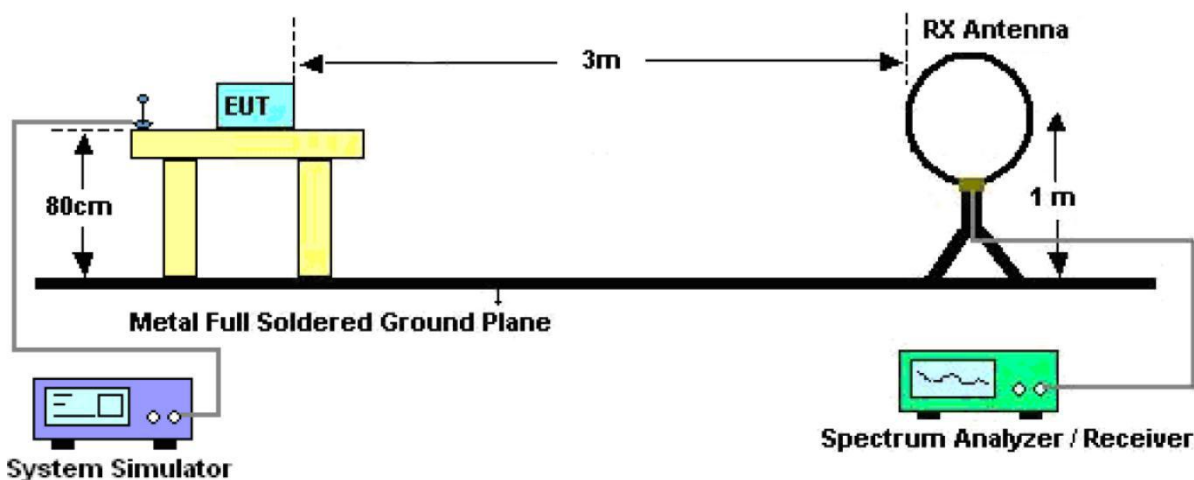


Figure 1. Below 30MHz

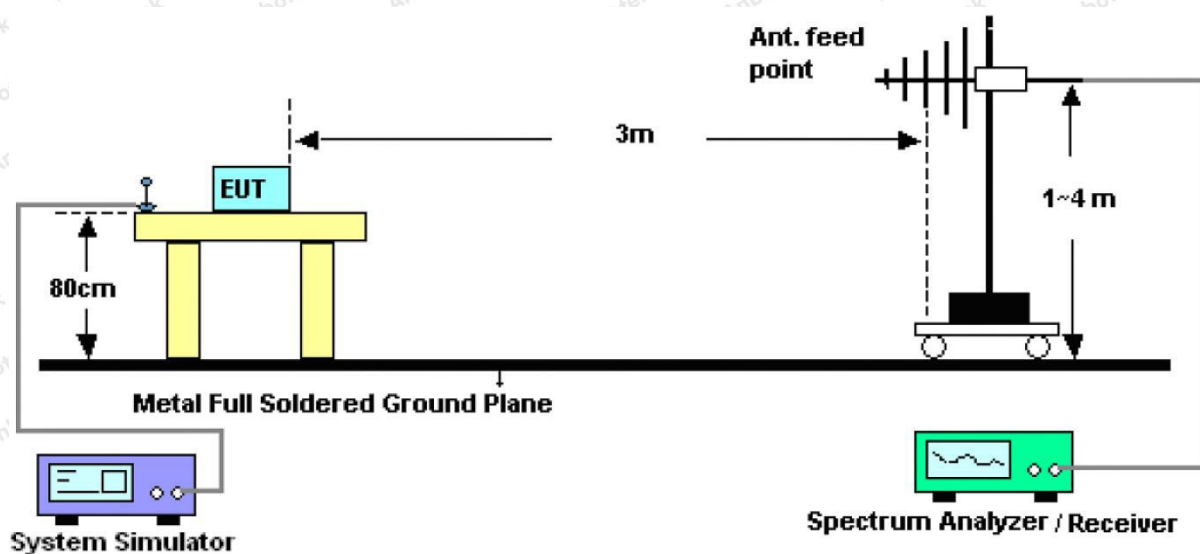


Figure 2. 30MHz to 1GHz

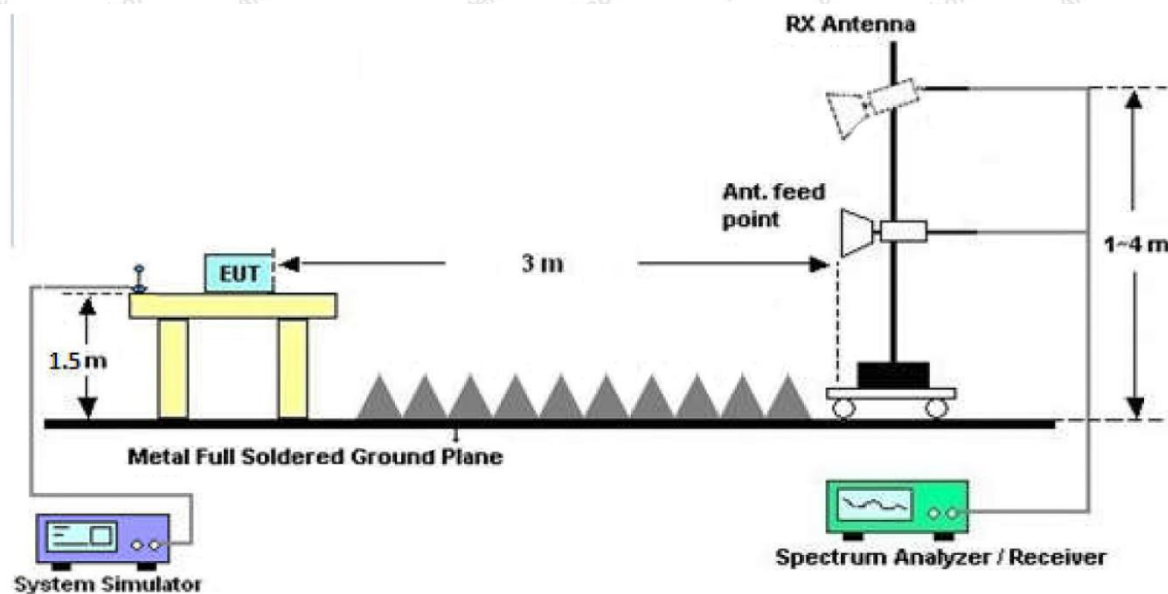


Figure 3. Above 1 GHz

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 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.

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.

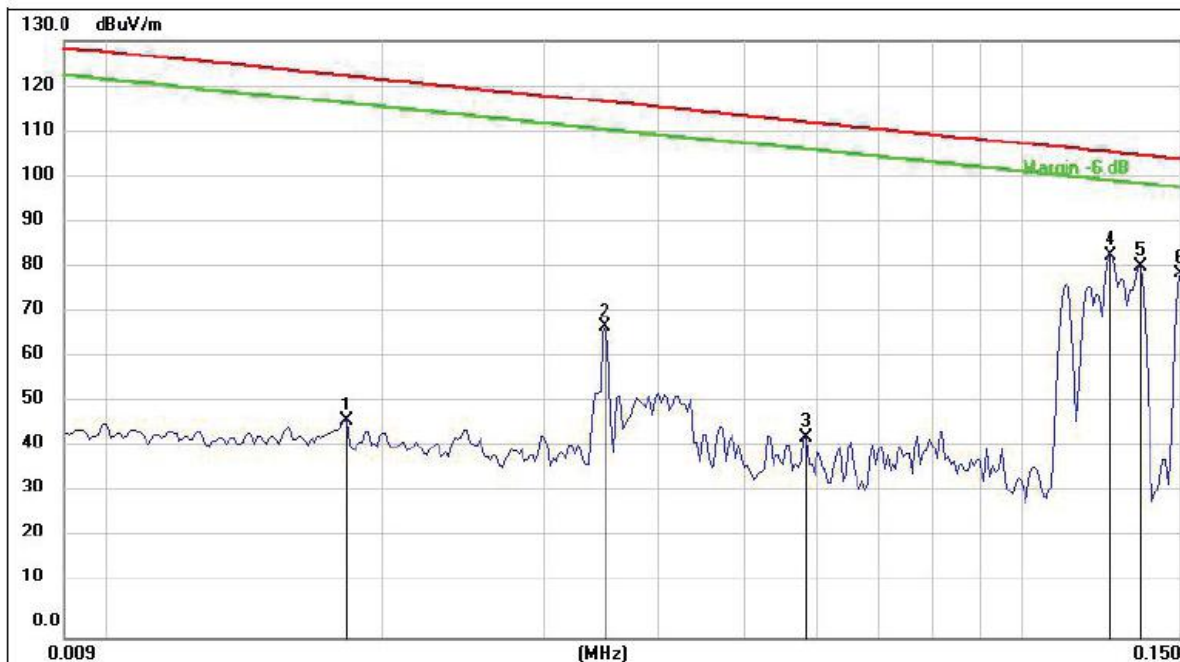
Note: The data is in TX mode, and this is the worst mode.



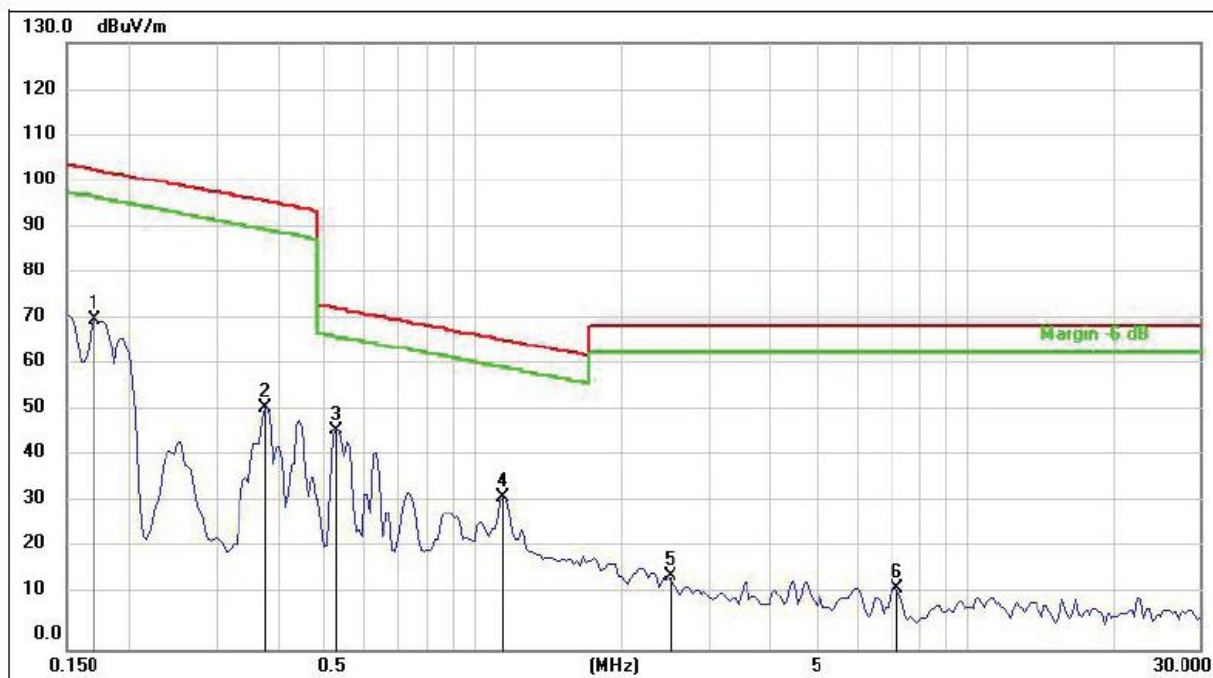
Test Results

(Between 9KHz – 30MHz)

Standard:	FCC PART15 C _3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3℃/54%RH
Test Mode:	125KHz	Distance:	3m



No.	Frequency (KHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0182	26.89	20.20	47.09	122.31	-75.22	peak
2	0.0352	47.04	20.48	67.52	116.60	-49.08	peak
3	0.0584	23.09	20.36	43.45	112.21	-68.76	peak
4	0.1258	62.72	20.34	83.06	105.57	-22.51	peak
5	0.1350	60.57	20.33	80.90	104.96	-24.06	peak
6	0.1500	58.95	20.33	79.28	104.05	-24.77	peak



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1712	50.34	20.32	70.66	102.88	-32.22	peak
2	0.3791	31.55	20.28	51.83	96.01	-44.18	peak
3	0.5279	26.81	20.27	47.08	73.15	-26.07	peak
4	1.1534	12.44	20.26	32.70	66.39	-33.69	peak
5	2.4868	-4.39	20.29	15.90	69.50	-53.60	peak
6	7.1754	-7.14	20.46	13.32	69.50	-56.18	peak

Remark: According to FCC PART 15.209 (d), the emission limits for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, Radiated emission limits in these three bands are based on measurements employing an average detector.

(Between 30MHz –1000 MHz)

Standard: FCC PART15 C _3m**Polarization:****Horizontal****Test Mode:** 125KHz**Power Source:****AC 120V, 60Hz for adapter****Distance:** 3m**Temp.(C)/Hum.(%RH):****24.4°C/47%RH**

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	72.0843	43.80	-20.69	23.11	40.00	-16.89	QP	100	0	
2	124.1330	46.56	-21.32	25.24	43.50	-18.26	QP	100	360	
3	140.8351	44.79	-20.92	23.87	43.50	-19.63	QP	100	0	
4	160.9089	48.88	-21.75	27.13	43.50	-16.37	QP	100	360	
5	210.0482	47.15	-19.66	27.49	43.50	-16.01	QP	100	0	
6	228.4904	49.03	-19.28	29.75	46.00	-16.25	QP	100	360	



Standard: FCC PART15 C _3m**Polarization:****Vertical****Test Mode:** 125KHz**Power Source:****AC 120V, 60Hz for adapter****Distance:** 3m**Temp.(C)/Hum.(%RH):****24.4°C/47%RH**

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	37.8121	41.88	-14.76	27.12	40.00	-12.88	QP	100	0	
2	71.0803	46.41	-18.52	27.89	40.00	-12.11	QP	100	360	
3	129.0146	50.88	-19.26	31.62	43.50	-11.88	QP	100	0	
4	140.3421	47.20	-20.05	27.15	43.50	-16.35	QP	100	360	
5	160.3456	51.75	-19.40	32.35	43.50	-11.15	QP	100	0	
6	172.5988	45.66	-18.68	26.98	43.50	-16.52	QP	100	360	

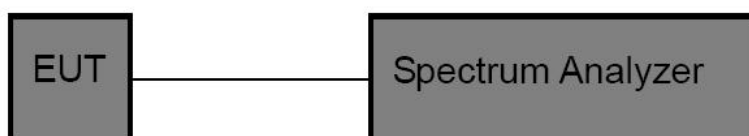


5. 20dB Emission Bandwidth

5.1. Test Standard

Test Standard	FCC Part15 C Section 15.247 (a)(1)
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5.2. Test Setup



5.3. Test Procedure

Using the following spectrum analyzer settings:

1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
2. Set the RBW = 220 Hz.
3. Set the VBW = set approximately 3 x RBW.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

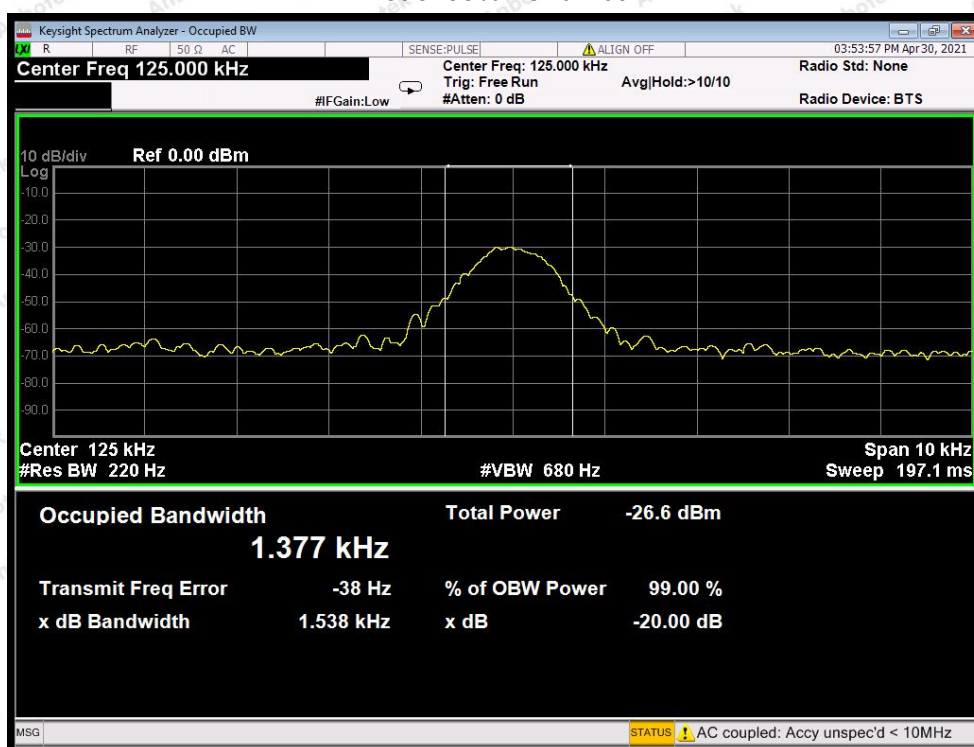
5.4. Test Data

Test Item	: 20dB Bandwidth
Test Voltage	: DC 3.85V Battery inside
Test Result	: PASS

Test Mode	: 125KHz
Temperature	: 23.6° C
Humidity	: 49 %

20dB Down BW (KHz)	99% BW (KHz)	Modulation Mode
1.538	1.377	ASK

Plot of 99% Bandwidth



6. Antenna Requirement

5.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 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

6.2. Antenna Connected Construction

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



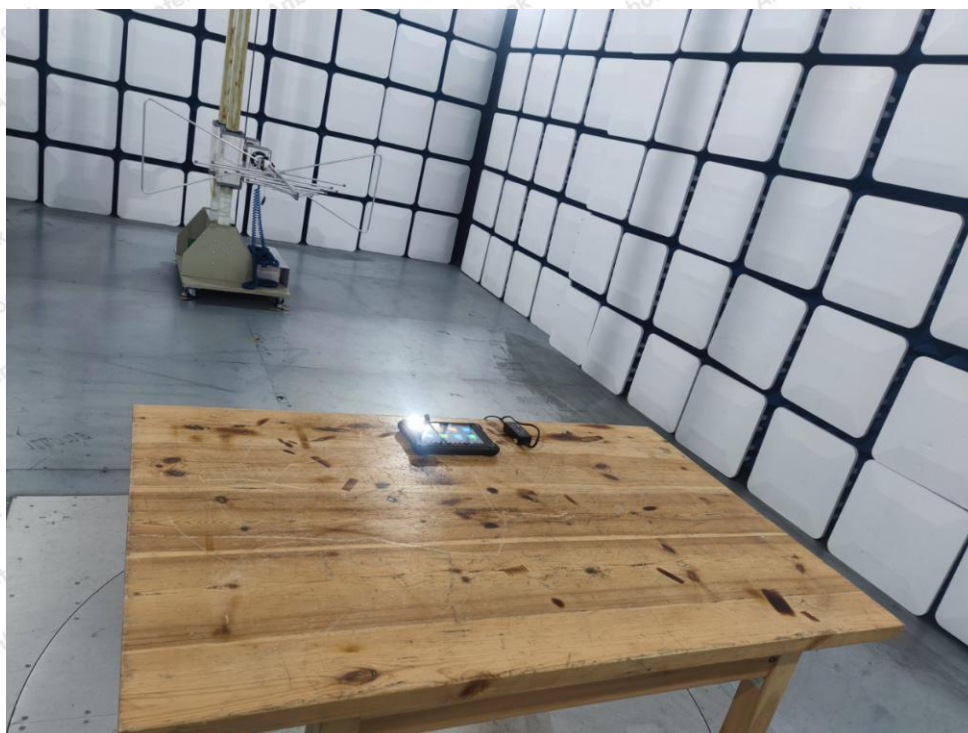
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement



Photo of Radiation Emission Test





APPENDIX II -- EXTERNAL PHOTOGRAPH

Reference to the test report 18220WC10072601.

APPENDIX III -- INTERNAL PHOTOGRAPH

Reference to the test report 18220WC10072601.

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