CTC Laboratories, Inc.

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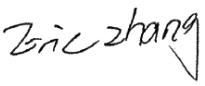
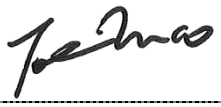
TEST REPORT

Report No. ..... :	**CTC20240101E18**
FCC ID.....:	**2AYD5-I23M03**
Applicant ..... :	**Imin Technology Pte Ltd**
Address.....:	11 Bishan Street 21, #03-05 Bosch Building, Singapore, 573943
Manufacturer.....:	Imin Technology Pte Ltd
Address.....:	11 Bishan Street 21, #03-05 Bosch Building, Singapore, 573943
Product Name ..... :	**POS Device**
Trade Mark ..... :	iMiN
Model/Type reference..... :	I23M03
Listed Model(s)..... :	/
Standard ..... :	**FCC CFR Title 47 Part 15 Subpart C Section 15.225**
Date of receipt of test sample.....:	Jan. 18, 2024
Date of testing.....:	Feb. 19, 2024 ~ Mar. 12, 2024
Date of issue.....:	Mar. 12, 2024
Result.....:	**PASS**

Compiled by: (Printed name + signature)	Terry Su	
Supervised by: (Printed name + signature)	Eric Zhang	
Approved by: (Printed name + signature)	Totti Zhao	

Testing Laboratory Name..... :	**CTC Laboratories, Inc.**
Address ..... :	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.225: Operation within the band 13.110-14.010MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Date of issue	Description
01	Mar. 12, 2024	Original

1.3. Test Description

FCC Part 15.225			
Test Item	**Standard Section**	**Result**	**Test Engineer**
Conducted Emission	15.207	Pass	Cecilia Luo
Radiated Emissions	15.209&15.225(d)	Pass	Terry Su
Field Strength of the Fundamental	15.209&15.225(d)	Pass	Terry Su
Occupied Bandwidth and 20dB Bandwidth	15.215	Pass	Terry Su
Antenna requirement	15.203	Pass	Terry Su
Frequency Stability	15.225(e)	Pass	Terry Su

Note: N/A: Not applicable.
The measurement uncertainty is not included in the test result.

1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

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

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. 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 inour files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.20 dB	(1)
Radiated Emissions 30~1000MHz	4.70 dB	(1)
Radiated Emissions 1~18GHz	5.00 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	25~35°C
Relative Humidity:	30~60 %
Air Pressure:	101kPa

1.7. EUT Operation state

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting mode for testing.

1. GENERAL INFORMATION

1.1. Client Information

Applicant:	Imin Technology Pte Ltd
Address:	11 Bishan Street 21, #03-05 Bosch Building, Singapore, 573943
Manufacturer:	Imin Technology Pte Ltd
Address:	11 Bishan Street 21, #03-05 Bosch Building, Singapore, 573943
Factory 1:	Jiangxi Neostra Electronic Co. Ltd
Address:	279 Shenzhen Road, Jinggangshan economic and Technological Development Zone, Ji'an, Jiangxi, China
Factory 2:	Neosta Technology Sdn. Bhd.
Address:	No. 78, Jln I-Park SAC 5, Taman Perindustrian i-Park SAC, 81400 Senai, Johor, Malaysia

1.2. General Description of EUT

Product Name:	POS Device
Trade Mark:	iMiN
Model/Type reference:	I23M03
Listed Model(s):	/
Power supply:	5Vdc/2A from AC/DC Adapter 7.6Vdc from 2500mAh Li-ion Battery
Adapter 1 Model:	ADS-10LA-06 05010EPCU Input: 100-240V~ 50/60Hz 0.3A Max Output: 5Vdc/2A
Adapter 2 Model:	TPA-67050200UU Input: 100-240V~ 50/60Hz 0.3A Output: 5Vdc/2A
Hardware version:	/
Software version:	/
RF Parameter	
Operation frequency:	13.56MHz
Antenna type:	Loop Antenna

1.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
/	/	/	/
/	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/
Test Software Information			
Name	Versions	/	/
/	/	/	/

1.4. Measurement Instruments List

RF Test System					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024
2	Spectrum Analyzer	R&S	FSV40-N	101654	Aug. 07, 2024
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 12, 2024
4	MXA Signal Analyzer	Keysight	N9020A	MY46471737	Dec. 12, 2024
5	MXA Signal Analyzer	Keysight	N9020A	MY52091402	Aug. 22, 2024
6	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 12, 2024
7	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 12, 2024
8	EXG Analog Signal Generator	Keysight	N5173B	MY59100842	Dec. 12, 2024
9	MXG Vector Signal Generator	Keysight	N5182B	MY59100212	Dec. 12, 2024
10	Wideband Radio Communication Tester	R&S	CMW500	102257	May. 25, 2024
11	Wideband Radio Communication Tester	R&S	CMW500	102414	Dec. 12, 2024
12	High and low temperature test chamber	ESPEC	MT3035	/	Mar. 24, 2024
13	RF Control Unit	Tonscend	JS0806-2	/	Aug. 22, 2024
14	Test Software	Tonscend	JS1120-3	V3.3.38	/

Radiated Emission (3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 07, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-648	Dec. 07, 2024
3	Loop Antenna	ETS	6507	1446	Dec. 07, 2024
4	Spectrum Analyzer	R&S	FSU26	100105	Dec. 12, 2024
5	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024
6	Pre-Amplifier	SONOMA	310	186194	Dec. 12, 2024
7	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 12, 2024
8	Test Receiver	R&S	ESCI7	100967	Dec. 12, 2024
9	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024
10	Test Software	FARA	EZ-EMC	FA-03A2	/

Radiated Emission (3m chamber 3)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9163	01026	Dec. 18, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 01, 2024
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 12, 2024
4	Broadband Amplifier	SCHWARZBECK	BBV9743B	259	Dec. 12, 2024

5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 12, 2024
6	3m chamber 3	YIHENG	EE106	/	Aug. 28, 2026
7	Test Software	FARA	EZ-EMC	FA-03A2	/

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	LISN	R&S	ENV216	101112	Dec. 12, 2024
2	LISN	R&S	ENV216	101113	Dec. 12, 2024
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 12, 2024
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 12, 2024
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 12, 2024
6	Test Software	R&S	EMC32	6.10.10	/

Note:1. The Cal. Interval was one year.
2. The cable loss has calculated in test result which connection between each test instruments.

2. TEST ITEM AND RESULTS

2.1. Conducted Emission

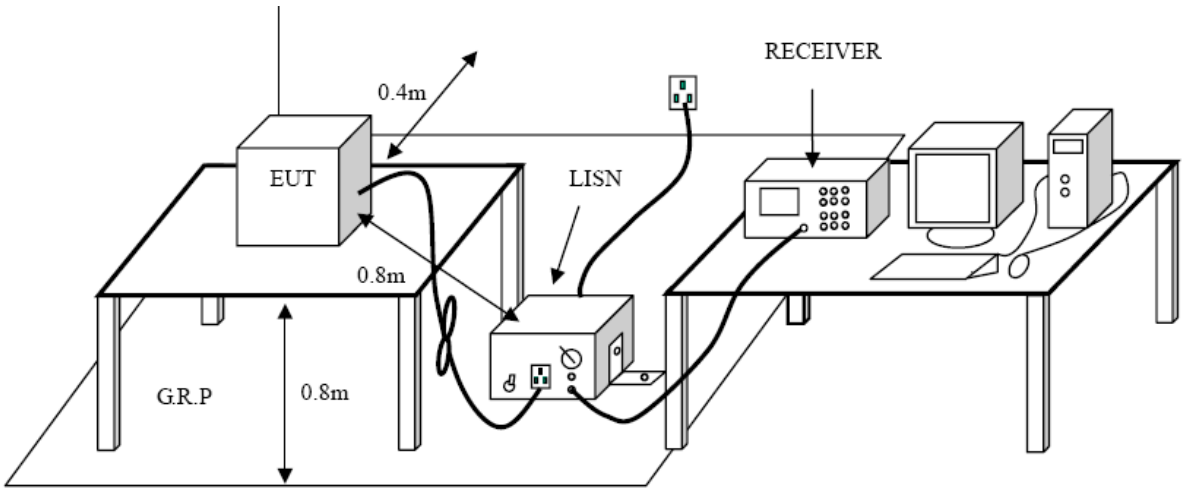
Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS-Gen 7.2:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Notes:
(1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequencies.
(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Configuration



Test Procedure

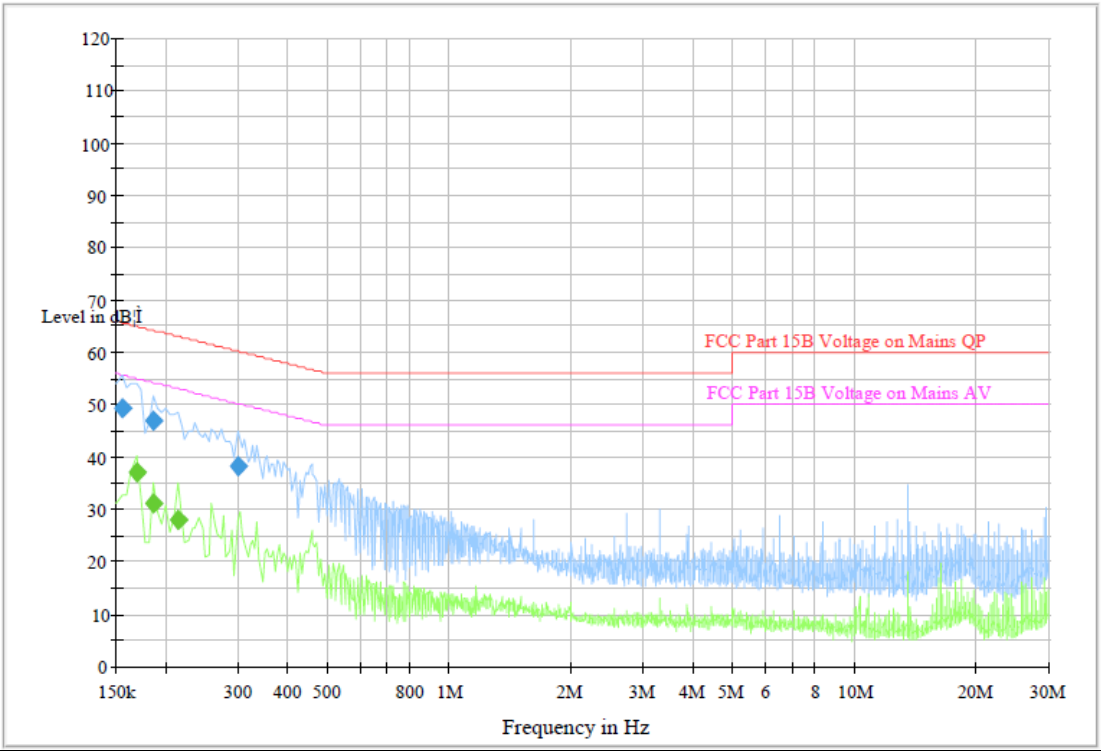
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

Test Mode:

Please refer to the clause 1.7.

Test Results

Test Voltage:	AC 120V/60 Hz
Terminal:	Line
Adapter Model:	ADS-10LA-06 05010EPCU



Final Measurement Detector 1

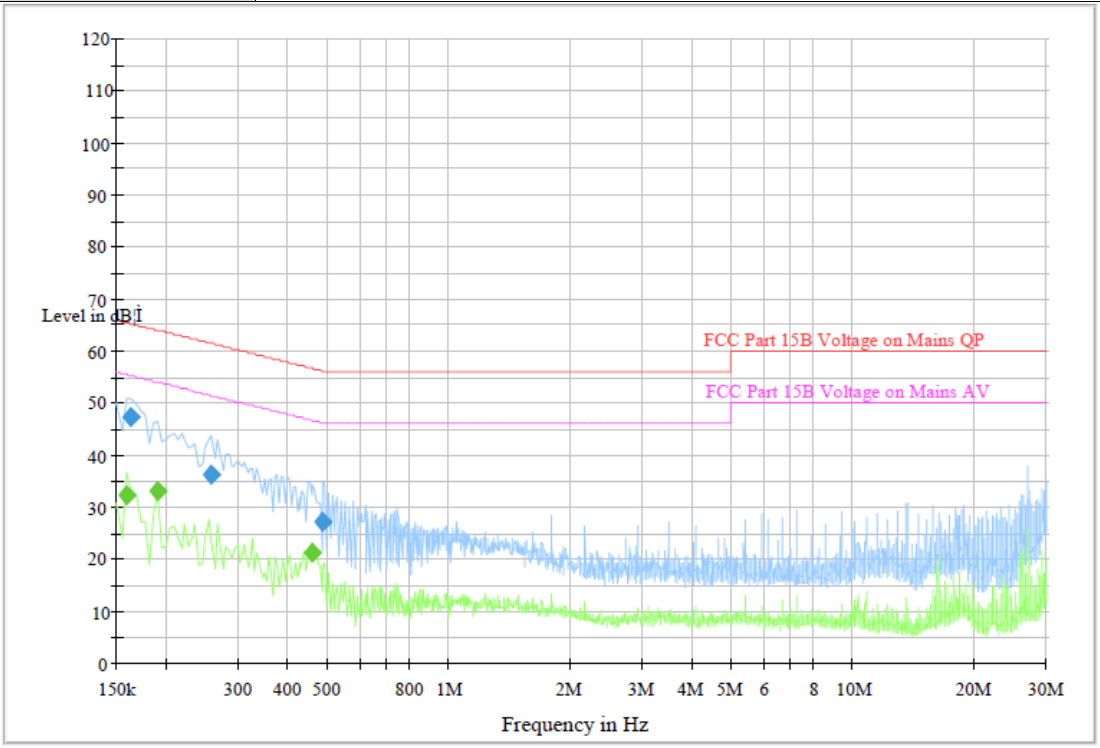
Frequency (MHz)	QuasiPeak (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.154500	49.5	1000.00	9.000	On	L1	9.4	16.3	65.8	
0.186000	47.2	1000.00	9.000	On	L1	9.4	17.0	64.2	
0.298500	38.2	1000.00	9.000	On	L1	9.5	22.1	60.3	

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.168000	37.0	1000.00	9.000	On	L1	9.4	18.1	55.1	
0.186000	31.3	1000.00	9.000	On	L1	9.4	22.9	54.2	
0.213000	27.9	1000.00	9.000	On	L1	9.4	25.2	53.1	

Emission Level= Read Level+ Correct Factor

Test Voltage:	AC 120V/60 Hz
Terminal:	Neutral
Adapter Model:	ADS-10LA-06 05010EPCU



Final Measurement Detector 1

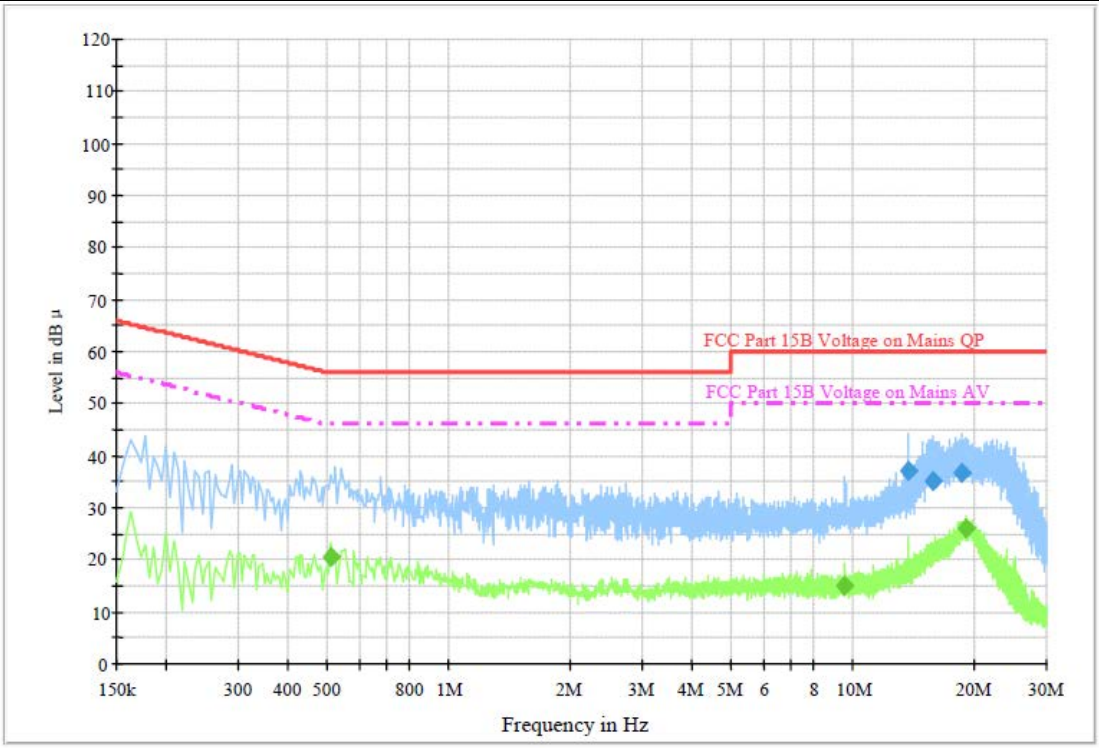
Frequency (MHz)	QuasiPeak (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.163500	47.4	1000.00	9.000	On	N	9.3	17.9	65.3	
0.258000	36.5	1000.00	9.000	On	N	9.4	25.0	61.5	
0.487500	27.1	1000.00	9.000	On	N	9.4	29.1	56.2	

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.159000	32.4	1000.00	9.000	On	N	9.3	23.1	55.5	
0.190500	33.0	1000.00	9.000	On	N	9.3	21.0	54.0	
0.460500	21.1	1000.00	9.000	On	N	9.4	25.6	46.7	

Emission Level= Read Level+ Correct Factor

Test Voltage:	AC 120V/60 Hz
Terminal:	Line
Adapter Model:	TPA-67050200UU



Final Measurement Detector 1

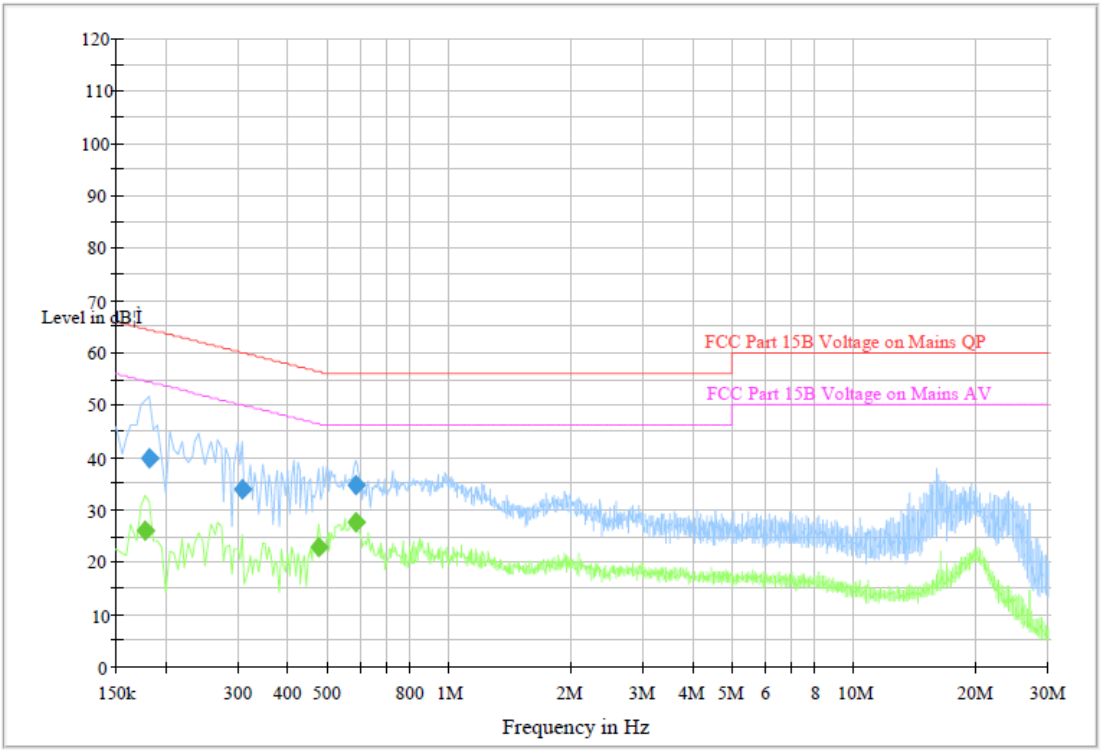
Frequency (MHz)	QuasiPeak (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
13.605000	37.2	1000.00	9.000	On	L1	9.8	22.8	60.0	
15.670500	35.3	1000.00	9.000	On	L1	9.7	24.7	60.0	
18.487500	36.9	1000.00	9.000	On	L1	9.6	23.1	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.510000	20.6	1000.00	9.000	On	L1	9.5	25.4	46.0	
9.510000	15.0	1000.00	9.000	On	L1	9.7	35.0	50.0	
18.915000	26.1	1000.00	9.000	On	L1	9.6	23.9	50.0	

Emission Level= Read Level+ Correct Factor

Test Voltage:	AC 120V/60 Hz
Terminal:	Neutral
Adapter Model:	TPA-67050200UU



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.181500	39.8	1000.00	9.000	On	N	9.3	24.6	64.4	
0.307500	34.1	1000.00	9.000	On	N	9.4	25.9	60.0	
0.586500	34.5	1000.00	9.000	On	N	9.4	21.5	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.177000	26.1	1000.00	9.000	On	N	9.3	28.5	54.6	
0.474000	23.0	1000.00	9.000	On	N	9.4	23.4	46.4	
0.586500	27.4	1000.00	9.000	On	N	9.4	18.6	46.0	

Emission Level= Read Level+ Correct Factor

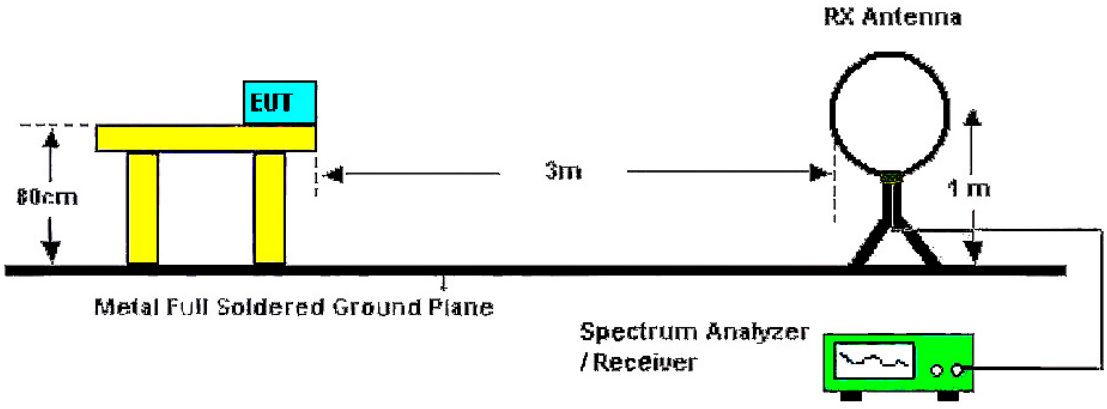
2.2. Radiated Emission

Limit

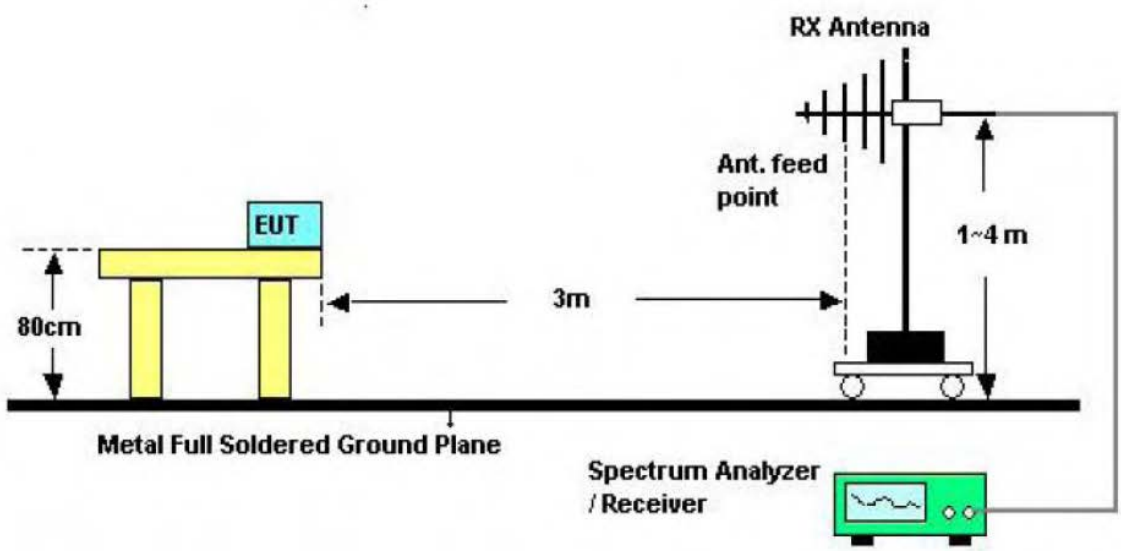
FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

NOTE:
(1) The tighter limit shall apply at the boundary between two frequency range.
(2) Limitation expressed in dBuV/m is calculated by 20log Emission Level (uV/m).
(3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$.
Example:
F.S Limit at 30m distance is 30uV/m , then F.S Limitation at 3m distance is adjusted as $L_{d1} = L_1 =$ 30uV/m * $(10)^2$ = 100 * 30 uV/m
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
Margin Level = Measurement Value – Limit Value

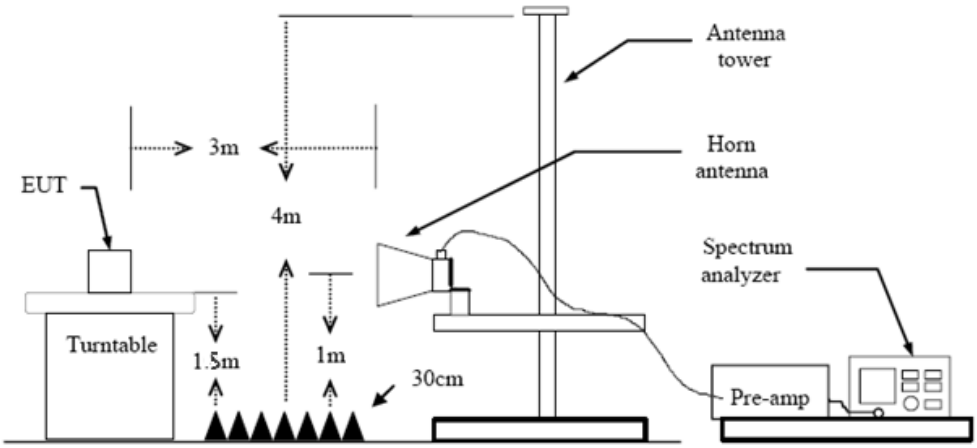
Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Below 1 GHz:
   RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
   If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
   (3) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

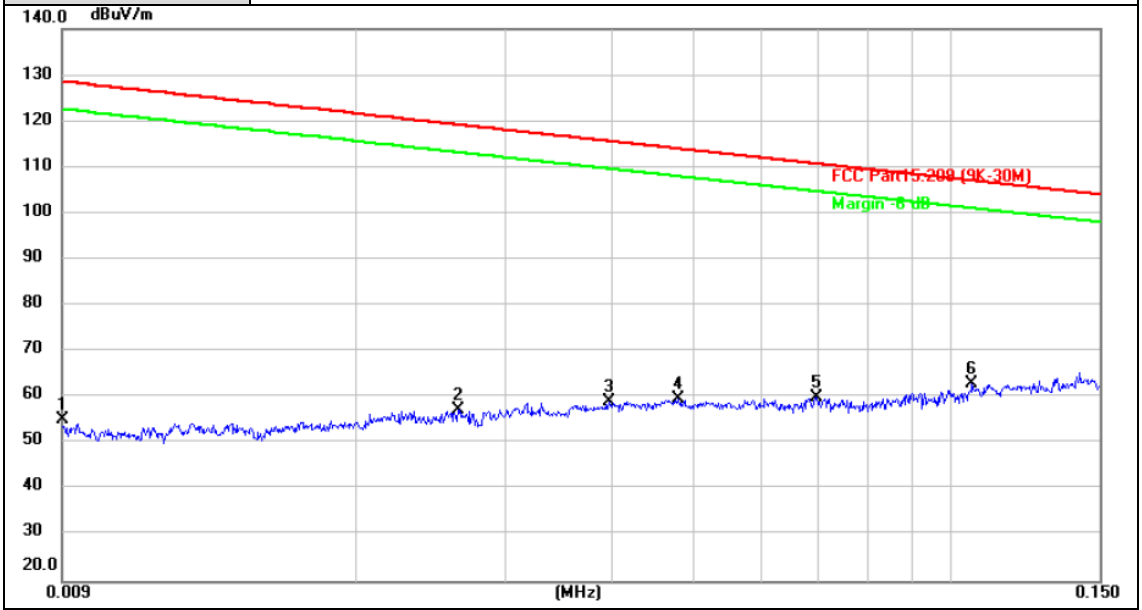
Test Mode

Please refer to the clause 1.7.

Test Result

9 KHz~150 KHz

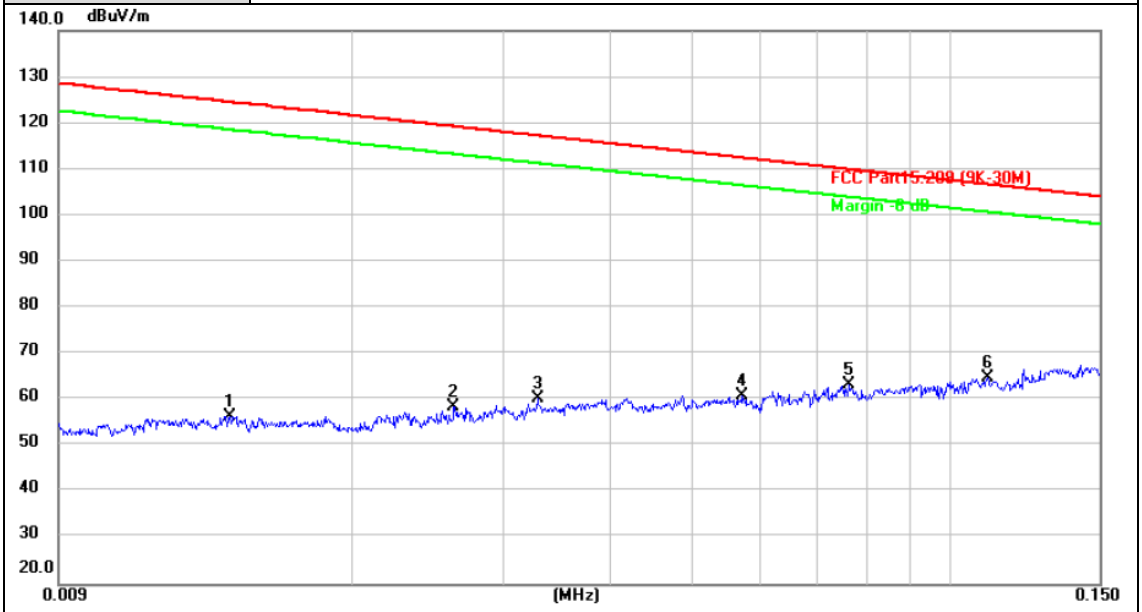
Ant. Pol.	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0088	85.24	-30.14	55.10	128.70	-73.60	peak
2	0.0263	67.18	-9.76	57.42	119.19	-61.77	peak
3	0.0396	70.06	-11.03	59.03	115.64	-56.61	peak
4	0.0478	70.98	-11.36	59.62	114.00	-54.38	peak
5	0.0694	71.66	-11.55	60.11	110.77	-50.66	peak
6 *	0.1058	76.50	-13.59	62.91	107.11	-44.20	peak

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Ant. Pol.	Vertical

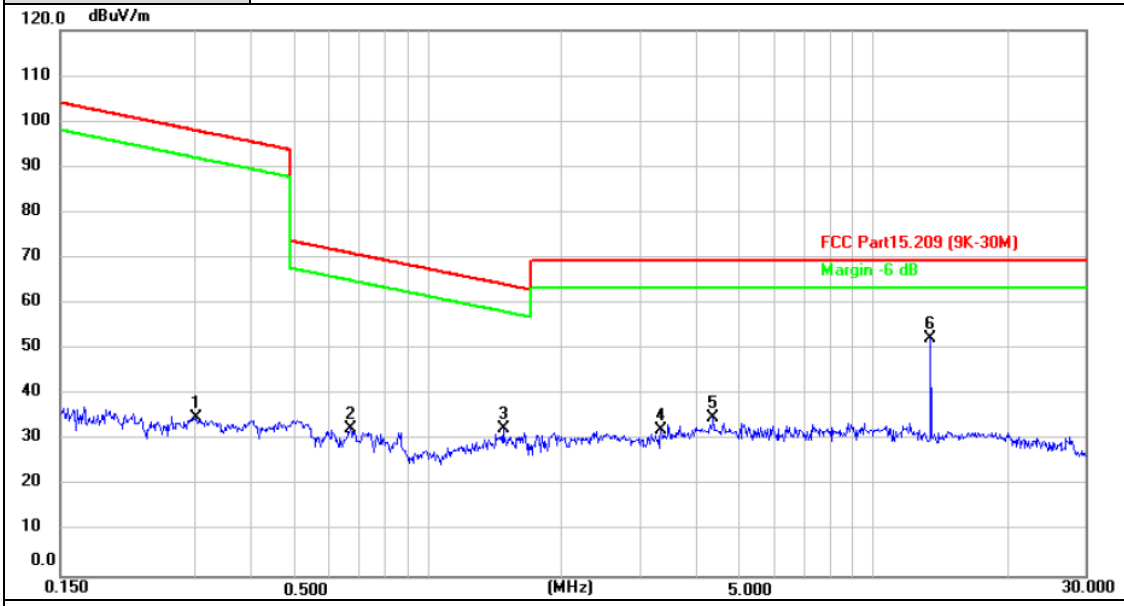


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0143	63.28	-6.73	56.55	124.48	-67.93	peak
2	0.0262	68.20	-9.73	58.47	119.22	-60.75	peak
3	0.0328	71.06	-10.76	60.30	117.27	-56.97	peak
4	0.0570	72.46	-11.49	60.97	112.48	-51.51	peak
5	0.0763	75.47	-12.25	63.22	109.94	-46.72	peak
6 *	0.1107	78.42	-13.56	64.86	106.71	-41.85	peak

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

150 KHz~30 MHz

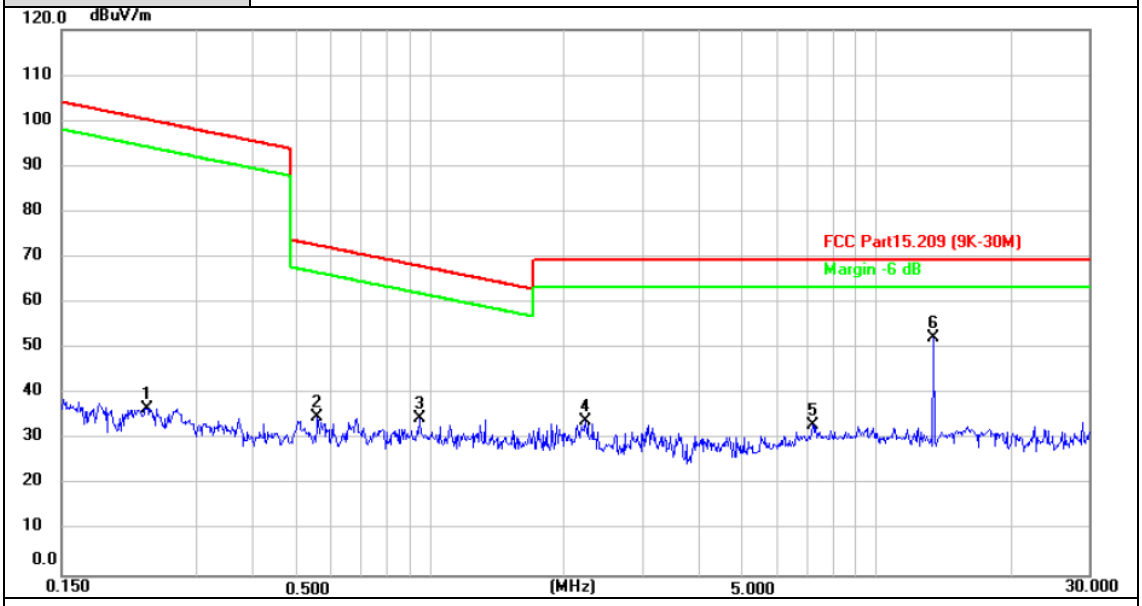
Ant. Pol.	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.3017	48.48	-13.62	34.86	98.01	-63.15	peak
2	0.6713	46.39	-13.72	32.67	71.07	-38.40	peak
3	1.4795	43.41	-10.84	32.57	64.23	-31.66	peak
4	3.3456	46.43	-14.13	32.30	69.50	-37.20	peak
5	4.3837	49.13	-14.11	35.02	69.50	-34.48	peak
6 *	13.4792	67.31	-15.08	52.23	69.50	-17.27	peak

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Ant. Pol.	Vertical

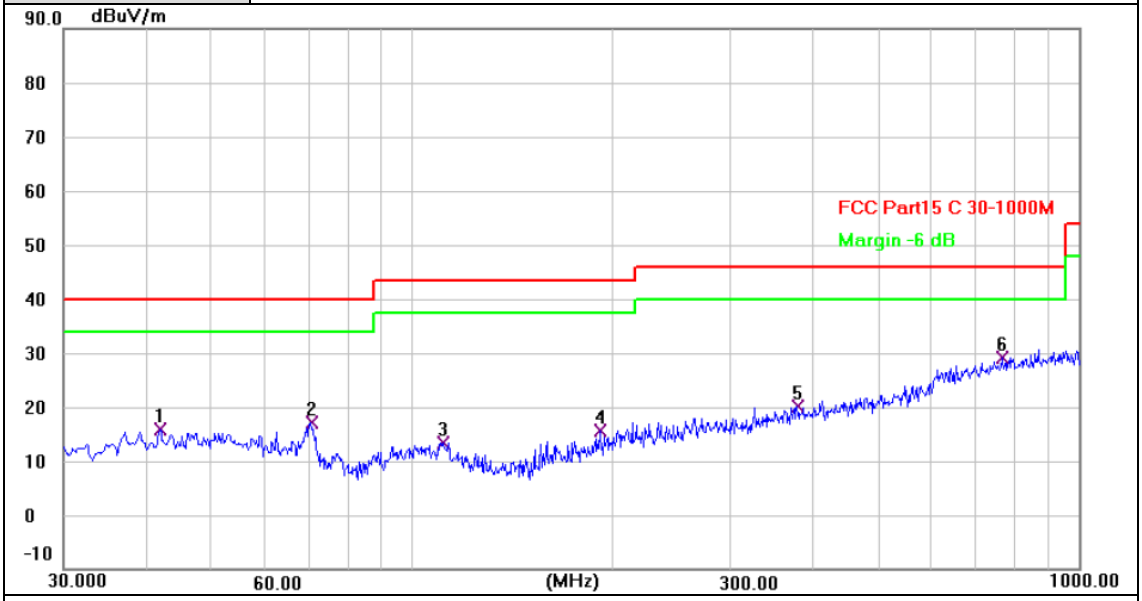


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.2328	50.47	-13.59	36.88	100.26	-63.38	peak
2	0.5611	48.62	-13.72	34.90	72.63	-37.73	peak
3	0.9475	46.33	-11.77	34.56	68.09	-33.53	peak
4	2.2366	48.10	-13.96	34.14	69.50	-35.36	peak
5	7.2134	47.69	-14.66	33.03	69.50	-36.47	peak
6 *	13.4792	67.51	-15.08	52.43	69.50	-17.07	peak

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

30MHz-1GHz

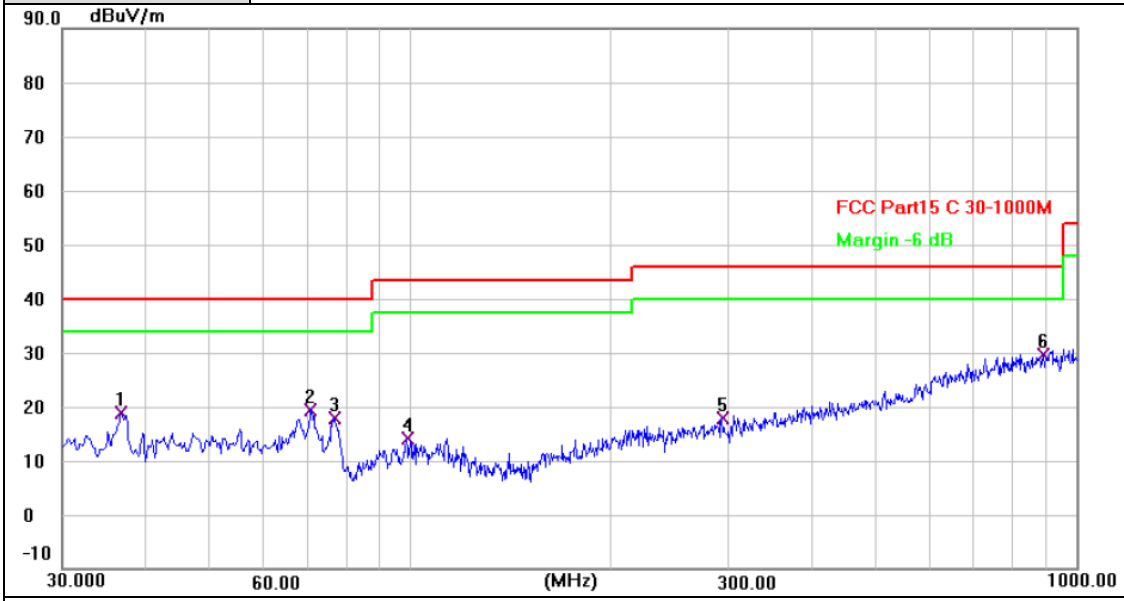
Ant. Pol.	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	41.9633	31.88	-16.11	15.77	40.00	-24.23	QP
2	70.4167	37.02	-19.98	17.04	40.00	-22.96	QP
3	111.4800	31.52	-18.02	13.50	43.50	-30.00	QP
4	191.3432	34.09	-18.55	15.54	43.50	-27.96	QP
5	377.9067	32.90	-12.89	20.01	46.00	-25.99	QP
6 *	767.2000	34.88	-5.77	29.11	46.00	-16.89	QP

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Ant. Pol.	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.7900	36.22	-17.31	18.91	40.00	-21.09	QP
2	71.0633	39.58	-20.22	19.36	40.00	-20.64	QP
3	76.8833	39.70	-21.72	17.98	40.00	-22.02	QP
4	98.5467	32.11	-18.05	14.06	43.50	-29.44	QP
5	293.5167	33.05	-15.22	17.83	46.00	-28.17	QP
6 *	891.3600	33.85	-4.14	29.71	46.00	-16.29	QP

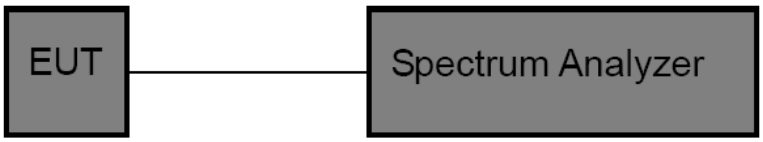
Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

2.3. 20dB Bandwidth

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.215
Intentional radiators must be designed to ensure that the 20dB emission bandwidth in the specific band. 13.553~13.567MHz.

Test Configuration



Test Procedure

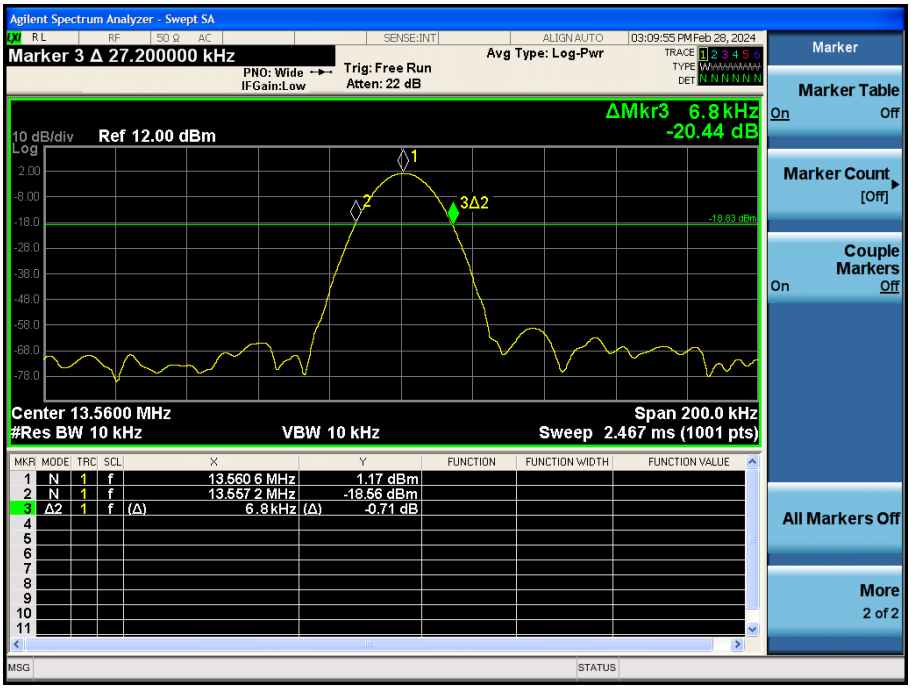
1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
   (1) Set RBW ≥ 1% of the 20dB bandwidth.
   (2) Set the video bandwidth (VBW) ≥ RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

Test Mode

Please refer to the clause 1.7.

Test Results

Channel Frequency(MHz)	F_L>13.553	F_H<13.567	20dB Bandwidth (kHz)	Result
13.56	13.557	13.564	6.8	PASS



2.4. Field Strength of the Fundamental

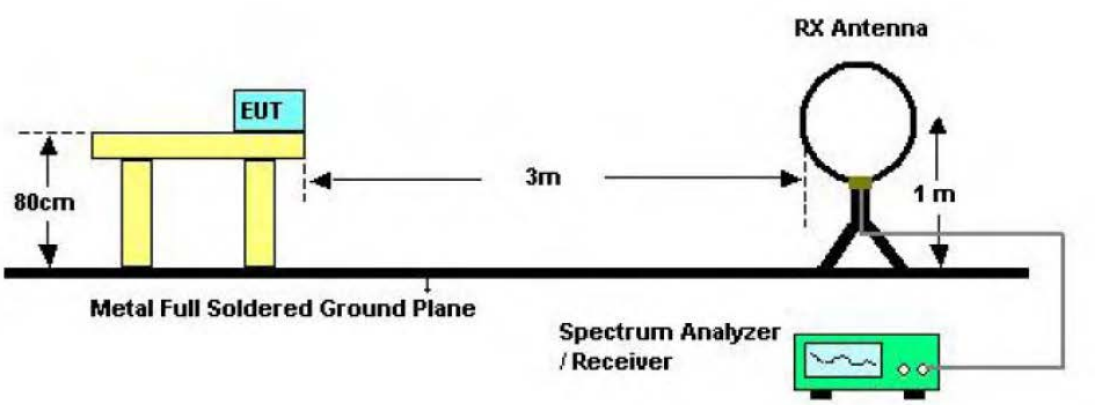
Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.225(a)(b)(c)

Fundamental frequency(MHz)	Field strength of fundamental (uV/m @30m)	Field strength of fundamental (dBuV/m @3m)
13.553-13.567	15848	124.0
13.410-13.553&13.567-13.710	334	90.5
13.110-13.410&13.710-14.010	106	80.5

Note: Limit dBuV/m @3m =Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

Test Configuration



Below 30MHz Test Setup

Test Procedure

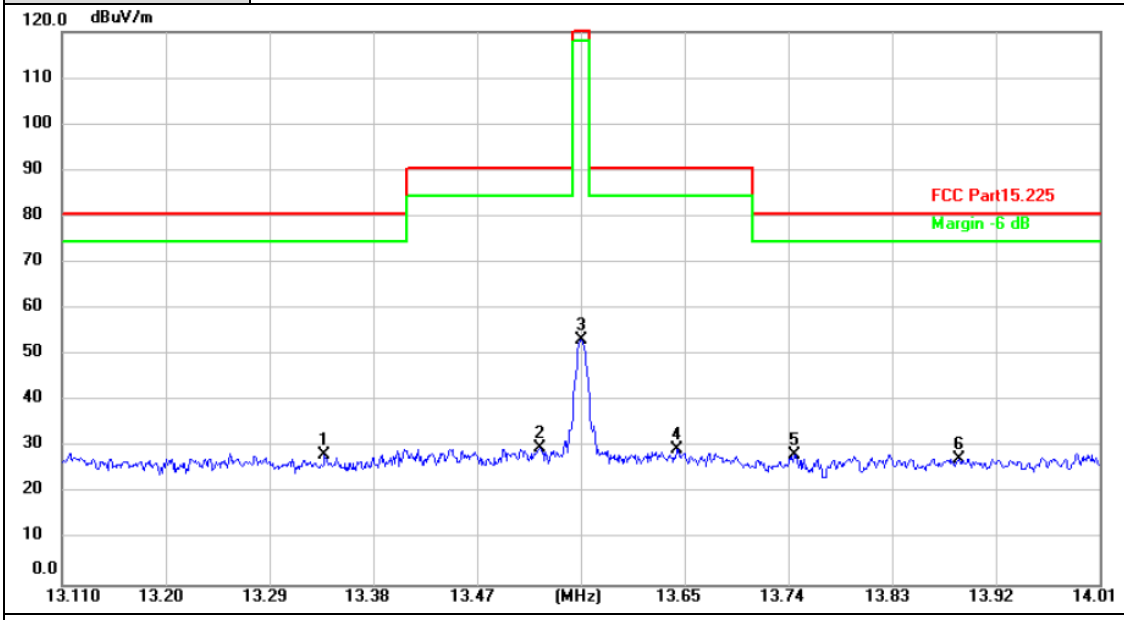
1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

Test Mode

Please refer to the clause 1.7.

Test Result

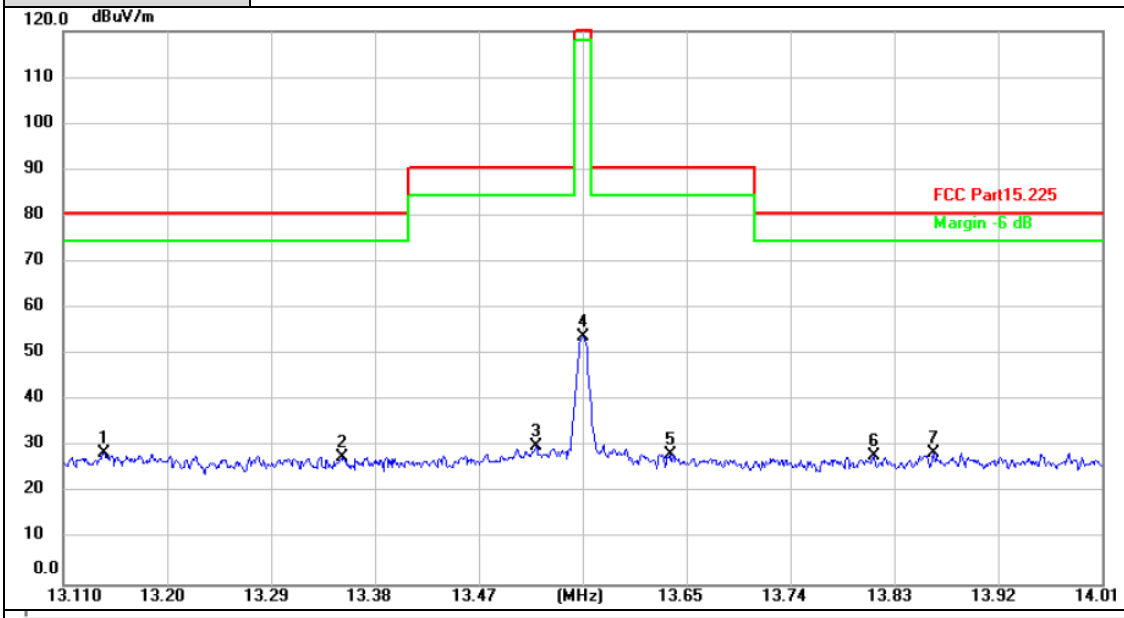
Ant. Pol.	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	13.3376	43.32	-15.08	28.24	80.50	-52.26	peak
2	13.5236	45.00	-15.08	29.92	90.50	-60.58	peak
3	13.5600	68.47	-15.08	53.39	124.00	-70.61	peak
4	13.6437	44.74	-15.08	29.66	90.50	-60.84	peak
5 *	13.7454	43.51	-15.07	28.44	80.50	-52.06	peak
6	13.8876	42.63	-15.07	27.56	80.50	-52.94	peak

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Ant. Pol.	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	13.1448	43.77	-15.09	28.68	80.50	-51.82	peak
2	13.3521	42.86	-15.08	27.78	80.50	-52.72	peak
3	13.5195	45.15	-15.08	30.07	90.50	-60.43	peak
4	13.5600	68.90	-15.08	53.82	124.00	-70.18	peak
5	13.6356	43.49	-15.08	28.41	90.50	-62.09	peak
6	13.8117	43.14	-15.07	28.07	80.50	-52.43	peak
7 *	13.8642	43.79	-15.07	28.72	80.50	-51.78	peak

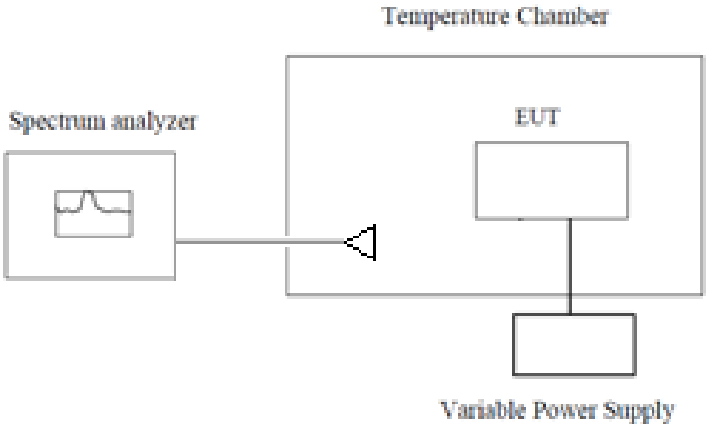
Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

2.5. Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Configuration



Test Procedure

1. The equipment under test was connected to an external power supply.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -10℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Test Mode

Please refer to the clause 1.7

Test Result

Test Environment		Frequency Reading(MHz)	Frequency Error (%)	Limit	Result
Voltage	Temperature(℃)				
DC 7.60V	-10	13.56019	0.0014%	±0.01%	Pass
	0	13.56011	0.0008%	±0.01%	Pass
	10	13.56014	0.0010%	±0.01%	Pass
	20	13.56013	0.0010%	±0.01%	Pass
	30	13.56007	0.0005%	±0.01%	Pass
	40	13.56008	0.0006%	±0.01%	Pass
	50	13.56013	0.0010%	±0.01%	Pass
DC 6.84V	25	13.56016	0.0012%	±0.01%	Pass
DC 8.36V	25	13.56007	0.0005%	±0.01%	Pass

2.6. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C 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.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

This antenna has no antenna gain, please refer to the below antenna photo.

**************************THE END**************************