



CTC Laboratories, Inc.

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TEST REPORT

Report No.: **CTC20231856E01**

FCC ID.....: **2A6MS-K12PRO**

Applicant.....: **Shenzhen Zhichuang All Technology Co., Ltd**
Address.....: D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

Manufacturer.....: Shenzhen Zhichuang All Technology Co., Ltd
Address.....: D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

Product Name.....: **All-in-one power adapter**

Trade Mark.....: /

Model/Type reference.....: K12 Pro

Listed Model(s): /

Standard.....: **FCC CFR Title 47 Part 15 Subpart C**

Date of receipt of test sample...: Nov. 17, 2023

Date of testing.....: Nov. 17, 2023 to Nov. 23, 2023

Date of issue.....: Nov. 24, 2023

Result.....: **PASS**

Compiled by:
(Printed name+signature) Jim Jiang *Jim Jiang*

Supervised by:
(Printed name+signature) Eric Zhang *Eric Zhang*

Approved by:
(Printed name+signature) Totti Zhao *Totti Zhao*

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.209](#): Radiated emission limits; general requirements.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report Version

Revised No.	Date of issue	Description
01	Nov. 24, 2023	Original

1.3. Test Description

FCC Part 15 Subpart C (15.209)			
Test Item	Standard Section	Result	Test Engineer
Antenna Requirement	15.203	Pass	Jim Jiang
AC Power Line Conducted Emissions	15.207	Pass	Cecilia Luo
Spurious Emission	15.209	Pass	Jim Jiang
20dB Bandwidth	15.215	Pass	Jim Jiang

Note:

1. The measurement uncertainty is not included in the test result.

2. N/A: means this test item is not applicable for this device according to the technology characteristic of device.



1.4. Test Facility

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:

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 in our 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
DTS Bandwidth	±0.0196%	(1)
Maximum Conducted Output Power	±0.686 dB	(1)
Maximum Power Spectral Density Level	±0.743 dB	(1)
Band-edge Compliance	±1.328 dB	(1)
Unwanted Emissions In Non-restricted Freq Bands	9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB	(1)
Conducted Emissions 9kHz~30MHz	±3.08 dB	(1)
Radiated Emissions 30~1000MHz	±4.51 dB	(1)
Radiated Emissions 1~18GHz	±5.84 dB	(1)
Radiated Emissions 18~40GHz	±6.12 dB	(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:	20~25 °C
Relative Humidity:	50~55 %RH
Atmospheric Pressure:	101 kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Zhichuang All Technology Co., Ltd
Address:	D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China
Manufacturer:	Shenzhen Zhichuang All Technology Co., Ltd
Address:	D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

2.2. General Description of EUT

Product Name:	All-in-one power adapter
Trade Mark:	/
Model/Type reference:	K12 Pro
Listed Model(s):	/
Model Difference:	/
Power Supply:	Adapter mode Input: 100-240V~ 50/60Hz 0.25A (Max) Type-C OUT: 5V \Rightarrow 2A USB OUT: 5V \Rightarrow 2A Type-C Line OUT: 5V \Rightarrow 2A IPH Line OUT: 5V \Rightarrow 2A Total OUT: 5V \Rightarrow 2A Mobile power mode Polymer battery powered: 10000mAh/3.7V/37Wh Type-C Line OUT: 5V \Rightarrow 2.1A IPH Line OUT: 5V \Rightarrow 2.1A Total OUT: 5V \Rightarrow 3A Type-C OUT: 5V \Rightarrow 3A, 9V \Rightarrow 2.22A, 12V \Rightarrow 1.67A USB OUT: 5V \Rightarrow 4.5A, 4.5V \Rightarrow 5A, 5V \Rightarrow 3A, 9V \Rightarrow 2A, 12V \Rightarrow 1.5A Type-C IN: 5V \Rightarrow 2A, 9V \Rightarrow 2A, 12V \Rightarrow 1.5A (Max) Total power: 22.5W Wireless charging power: 5W/7.5W/10W/15W Max
Hardware Version:	/
Software Version:	/
Wireless Charger	
Frequency Range:	112kHz ~ 205kHz
Modulation Type:	ASK
Antenna Type:	Induction Coil
Antenna Gain:	0dBi
Exposure category:	General population/uncontrolled environment
Device Type:	Portable Device



2.3. Accessory Equipment Information

Equipment Information			
Name	Model	S/N	Manufacturer
Intelligent wireless charging full function test module	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/

2.4. Operation State

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

Operation Frequency List:

Channel	Frequency (kHz)
1	118.5

Note: The display in grey were the channel selected for testing.

Test Mode:

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit. (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.



2.5. 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. 16, 2023
4	MXA Signal Analyzer	Keysight	N9020A	MY46471737	Dec. 16, 2023
5	MXA Signal Analyzer	Keysight	N9020A	MY52091402	Aug. 22, 2024
6	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 16, 2023
7	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 16, 2023
8	EXG Analog Signal Generator	Keysight	N5173B	MY59100842	Dec. 16, 2023
9	MXG Vector Signal Generator	Keysight	N5182B	MY59100212	Dec. 16, 2023
10	Wideband Radio Communication Tester	R&S	CMW500	102257	May 25, 2024
11	Wideband Radio Communication Tester	R&S	CMW500	102414	Dec. 16, 2023
12	High and low temperature test chamber	ESPEC	MT3035	/	Mar. 24, 2024
13	Test Software	WCS	WCS-WCN	2023.08.04	/

Radiated Emission					
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. 13, 2023
4	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023
5	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024
6	Pre-Amplifier	SONOMA	310	186194	Dec. 16, 2023
7	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 16, 2023
8	Test Receiver	R&S	ESCI7	100967	Dec. 16, 2023
9	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024

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Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	LISN	R&S	ENV216	101112	Dec. 16, 2023
2	LISN	R&S	ENV216	101113	Dec. 16, 2023
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 16, 2023
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 16, 2023
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 16, 2023

Note: 1. The Cal. Interval was one year.

2. The Cal. Interval was three years of the antenna.

3. The cable loss has been calculated in test result which connection between each test instruments.

3. TEST ITEM AND RESULTS

3.1. Conducted Emission

Limit

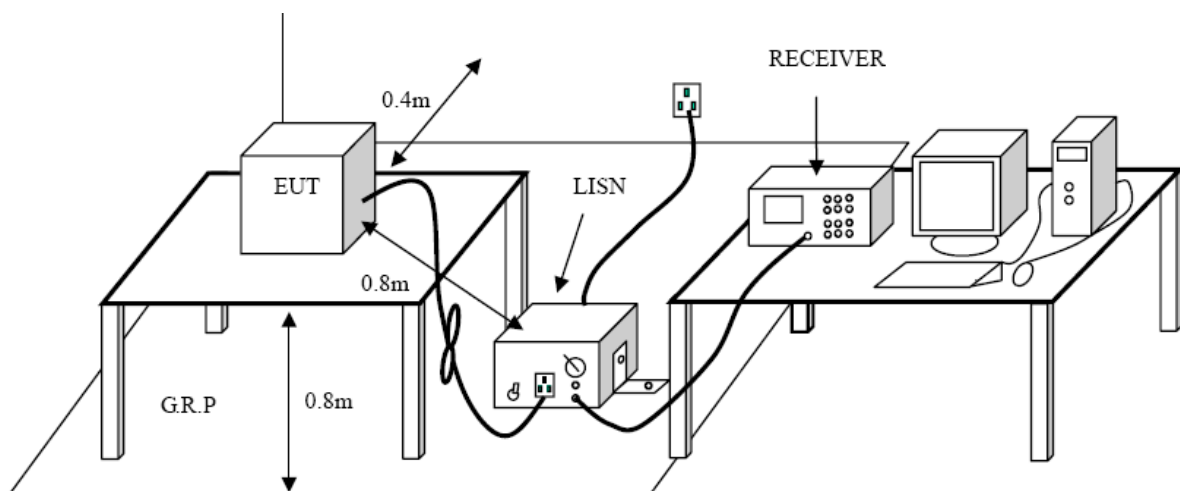
FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS - Gen 8.8

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

* Decreases with the logarithm of the frequency.

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 impedance stabilization network (LISN). The LISN provides a 50 ohm / 50 μH coupling impedance for the measuring equipment.
4. 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)
5. 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.
6. 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.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

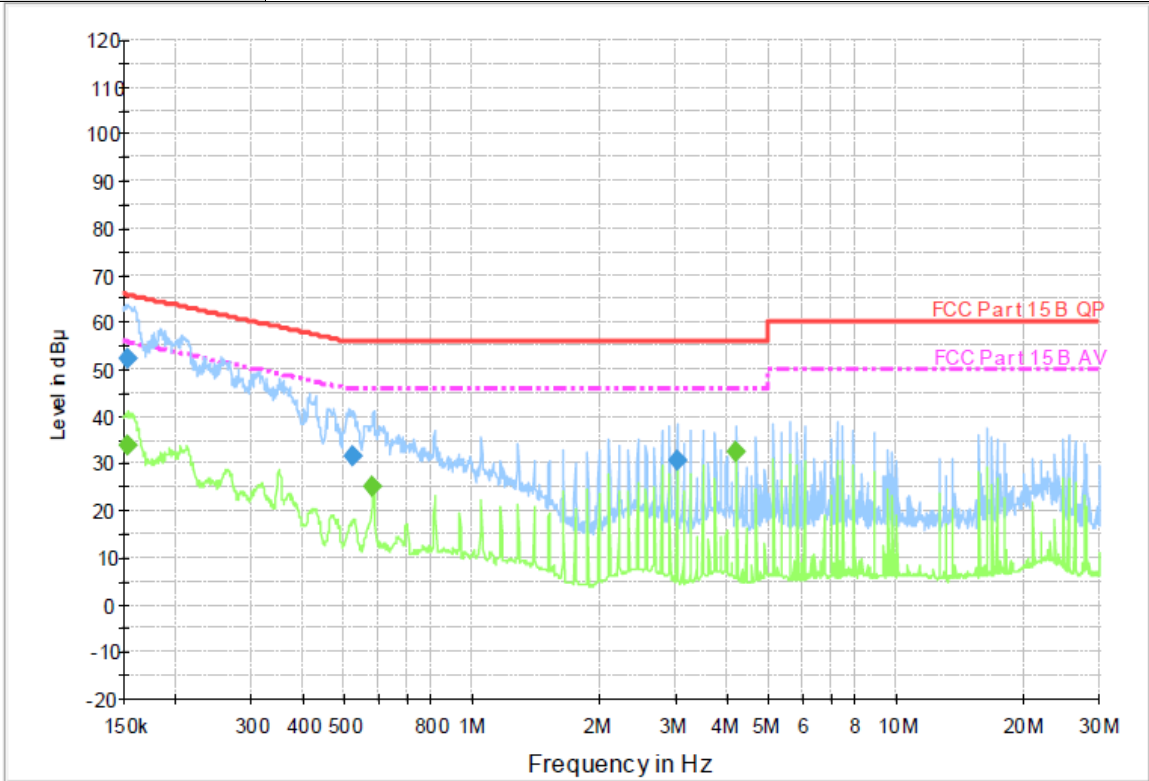
Test Mode

Please refer to the clause 2.4.



Test Results

Test Voltage:	AC 120V/60Hz
Terminal:	Line
Remark:	Only worse case is reported



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.153020	52.1	1000.00	9.000	On	L1	9.4	13.7	65.8	
0.523290	31.6	1000.00	9.000	On	L1	9.5	24.4	56.0	
3.018860	30.4	1000.00	9.000	On	L1	9.5	25.6	56.0	

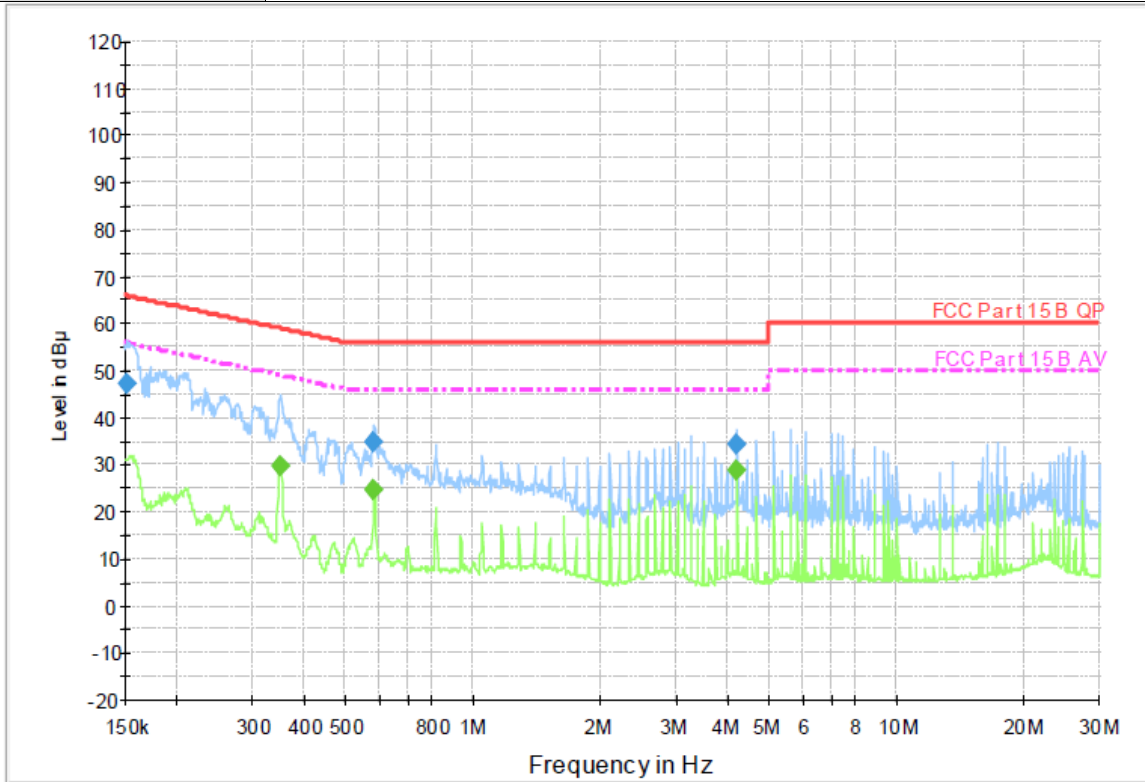
Final Measurement Detector 2

Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.153640	34.1	1000.00	9.000	On	L1	9.4	21.7	55.8	
0.580520	25.3	1000.00	9.000	On	L1	9.5	20.7	46.0	
4.188010	32.4	1000.00	9.000	On	L1	9.5	13.6	46.0	

Emission Level = Read Level + Correct Factor



Test Voltage:	AC 120V/60Hz
Terminal:	Neutral
Remark:	Only worse case is reported



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.151810	47.3	1000.00	9.000	On	N	9.3	18.6	65.9	
0.580520	34.8	1000.00	9.000	On	N	9.4	21.2	56.0	
4.188010	34.2	1000.00	9.000	On	N	9.4	21.8	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.348260	29.6	1000.00	9.000	On	N	9.4	19.4	49.0	
0.580520	24.5	1000.00	9.000	On	N	9.4	21.5	46.0	
4.188010	28.6	1000.00	9.000	On	N	9.4	17.4	46.0	

Emission Level = Read Level + Correct Factor

3.2. Radiated Spurious Emission

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.209&15.249(a)/ RSS – 210 F.1.e

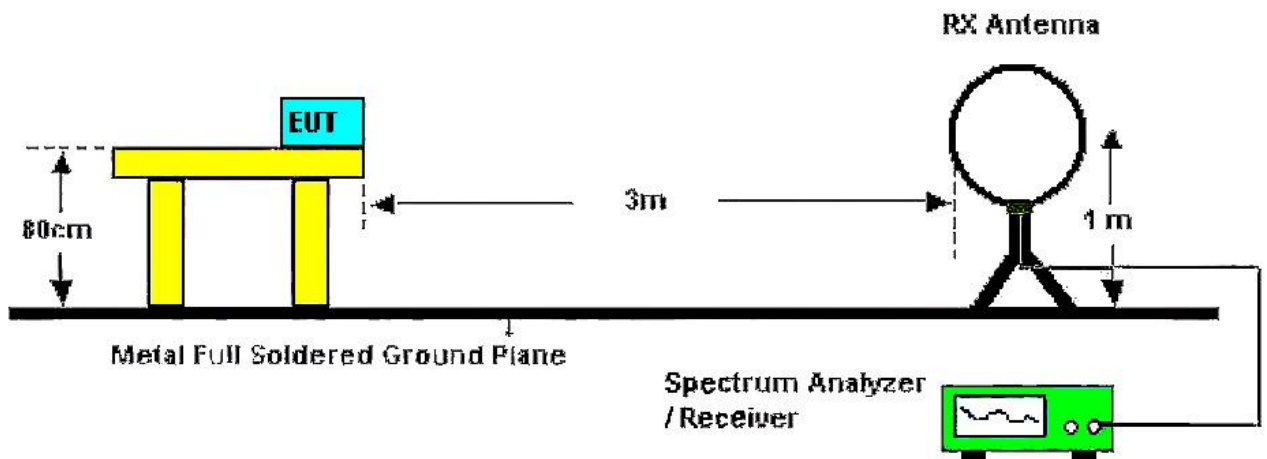
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Frequency Range (MHz)	dBµV/m (at 3 meters)	
	Peak	Average
Above 1000	74	54

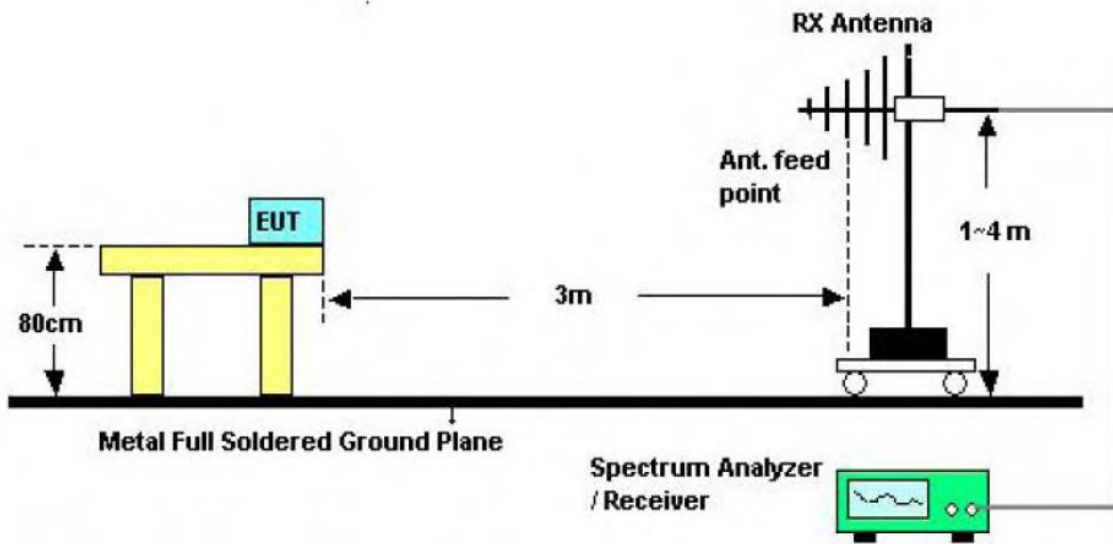
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

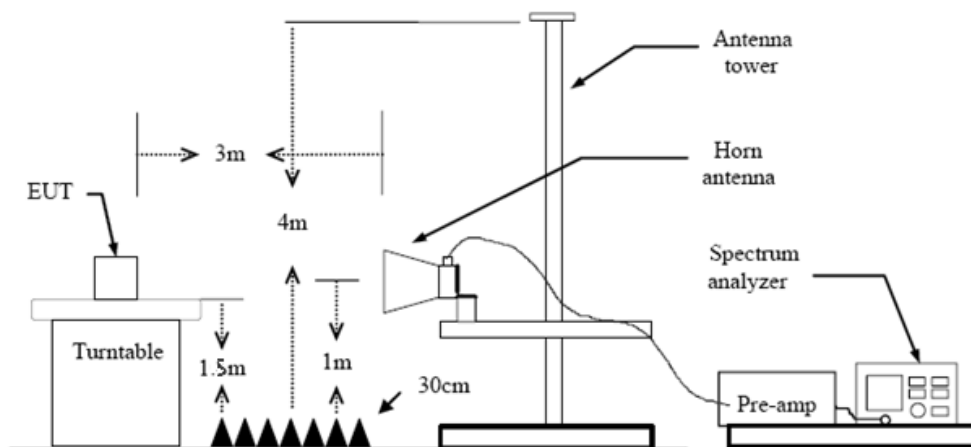
Test Configuration



Below 30MHz Test Setup



30-1000MHz 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) 9k – 150kHz:
RBW=300 Hz, VBW=1 kHz, Sweep=auto, Detector function=peak, Trace=max hold
 - (3) 0.15M – 30MHz:
RBW=10 kHz, VBW=30 kHz, Sweep=auto, Detector function=peak, Trace=max hold
 - (4) 30M - 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.

(5) From 1 GHz to 10th harmonic:

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

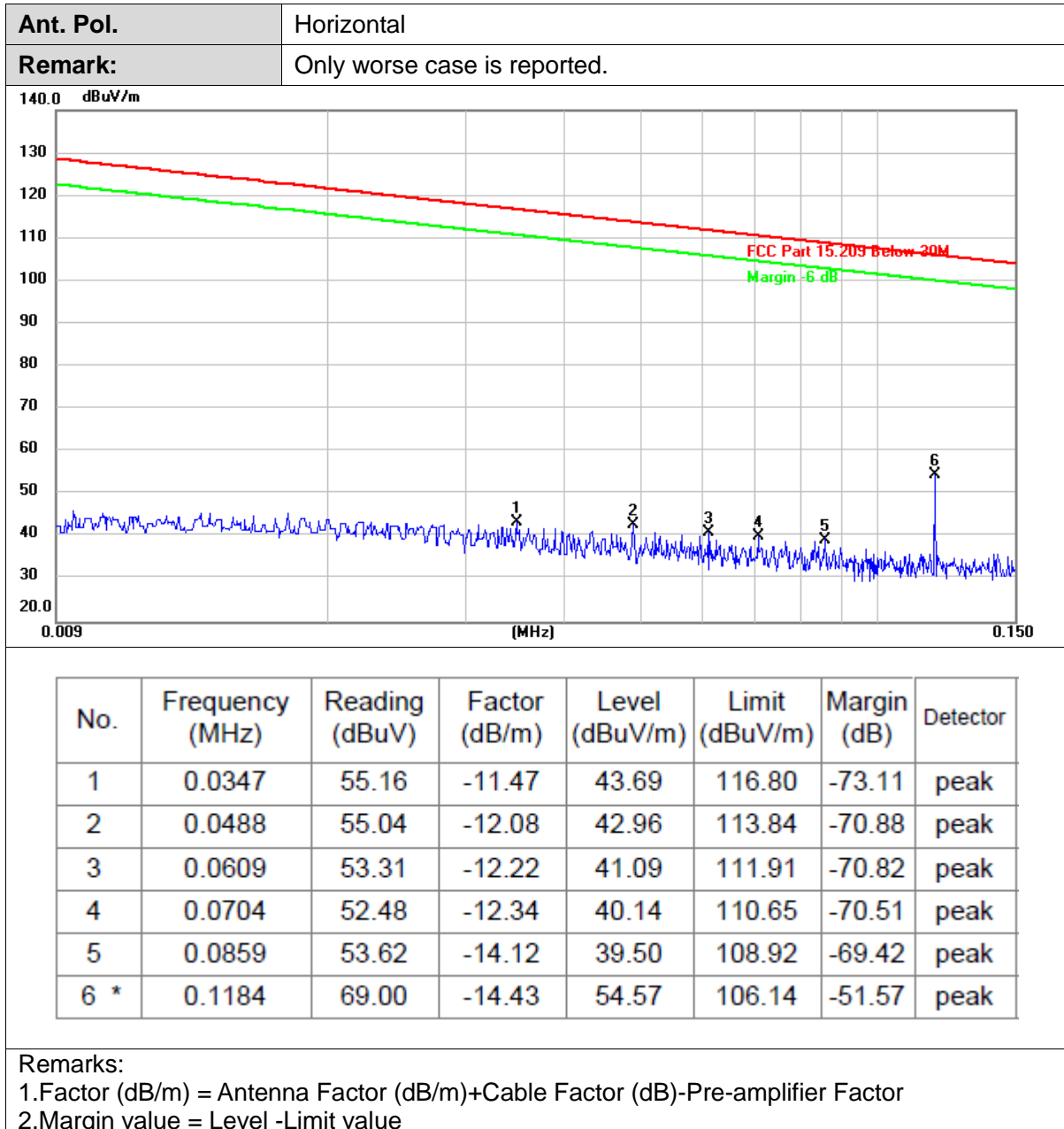
RBW=1MHz, VBW=10Hz with Peak Detector for Average Value.

Test Mode

Please refer to the clause 2.4.

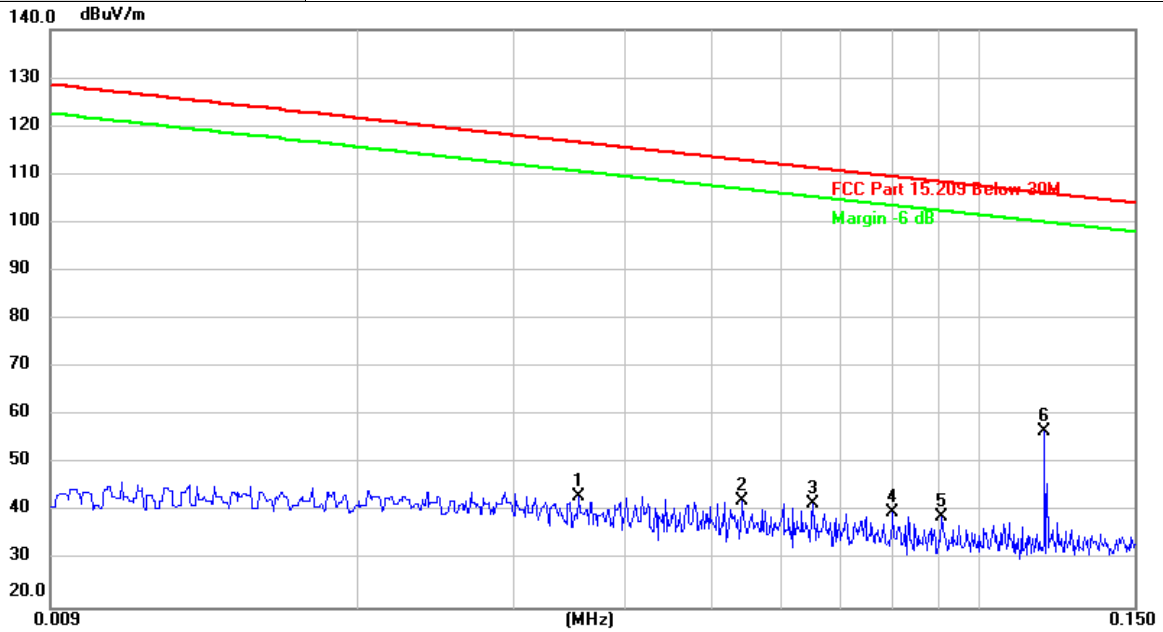
Test Result

9 kHz~150 kHz





Ant. Pol.	Vertical
Remark:	Only worse case is reported.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0354	54.78	-11.50	43.28	116.62	-73.34	peak
2	0.0541	54.57	-12.17	42.40	112.94	-70.54	peak
3	0.0650	53.98	-12.26	41.72	111.35	-69.63	peak
4	0.0800	53.33	-13.44	39.89	109.54	-69.65	peak
5	0.0907	53.57	-14.56	39.01	108.45	-69.44	peak
6 *	0.1184	71.06	-14.43	56.63	106.14	-49.51	peak

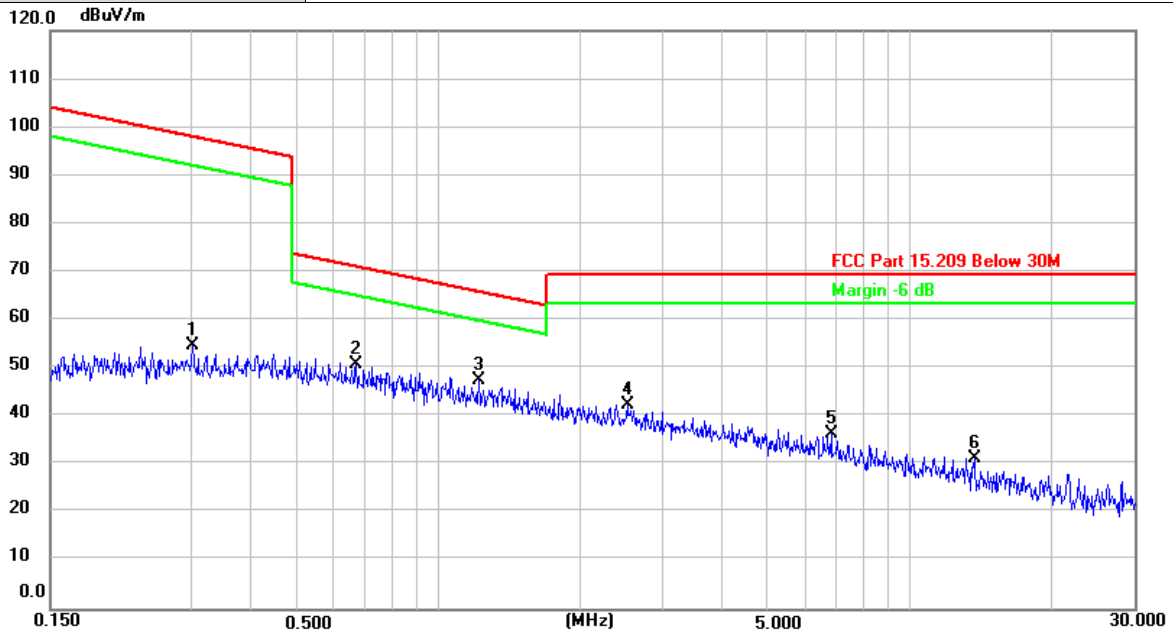
Remarks:

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
Remark:	Only worse case is reported.



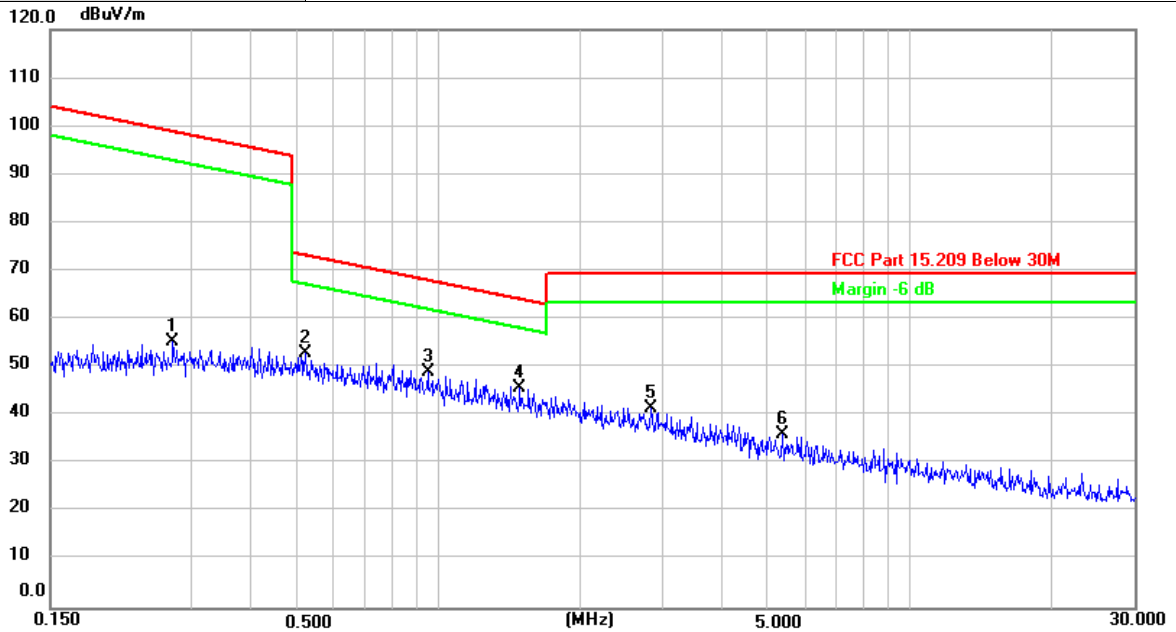
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.3002	69.77	-15.13	54.64	98.06	-43.42	peak
2	0.6683	65.89	-15.17	50.72	71.10	-20.38	peak
3 *	1.2157	62.59	-15.10	47.49	65.91	-18.42	peak
4	2.5131	57.69	-15.18	42.51	69.54	-27.03	peak
5	6.8048	51.61	-15.06	36.55	69.54	-32.99	peak
6	13.6951	46.50	-15.13	31.37	69.54	-38.17	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
Remark:	Only worse case is reported.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.2726	70.31	-15.04	55.27	98.89	-43.62	peak
2	0.5209	68.12	-15.20	52.92	73.27	-20.35	peak
3	0.9475	64.20	-15.08	49.12	68.07	-18.95	peak
4 *	1.4874	60.95	-15.12	45.83	64.16	-18.33	peak
5	2.8239	56.76	-15.20	41.56	69.54	-27.98	peak
6	5.3615	51.20	-14.94	36.26	69.54	-33.28	peak

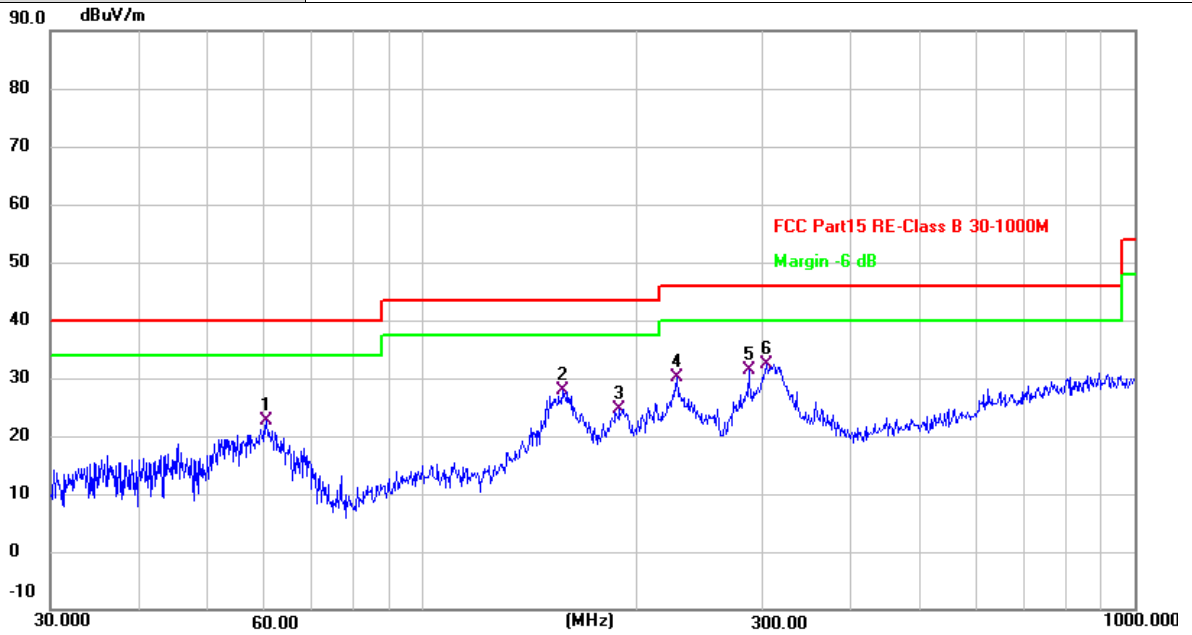
Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



30 MHz~1000 MHz

Ant. Pol.	Horizontal
Remark:	Only worse case is reported.



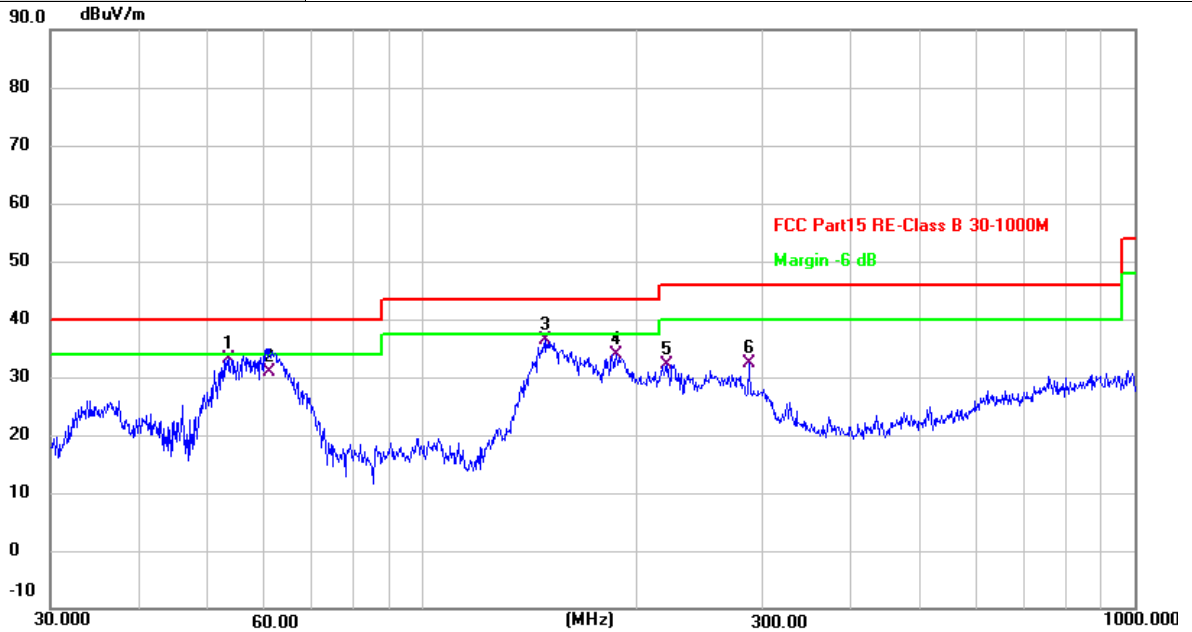
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	60.2800	37.96	-15.42	22.54	40.00	-17.46	QP
2	157.0072	47.01	-19.08	27.93	43.50	-15.57	QP
3	189.0742	41.55	-17.01	24.54	43.50	-18.96	QP
4	227.6905	45.19	-15.16	30.03	46.00	-15.97	QP
5	286.9823	45.21	-13.74	31.47	46.00	-14.53	QP
6 *	304.6099	45.75	-13.32	32.43	46.00	-13.57	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
Remark:	Only worse case is reported.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	53.5052	47.39	-14.18	33.21	40.00	-6.79	QP
2	60.9175	46.45	-15.51	30.94	40.00	-9.06	QP
3	149.3100	55.91	-19.41	36.50	43.50	-7.00	QP
4	187.0956	51.20	-17.22	33.98	43.50	-9.52	QP
5	219.8448	47.49	-15.39	32.10	46.00	-13.90	QP
6	286.9823	46.22	-13.74	32.48	46.00	-13.52	QP

Remarks:

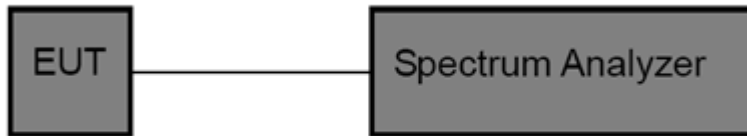
- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value

3.3. 20dB Bandwidth

Limit

/

Test Configuration



Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a test channel
RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

Test Mode

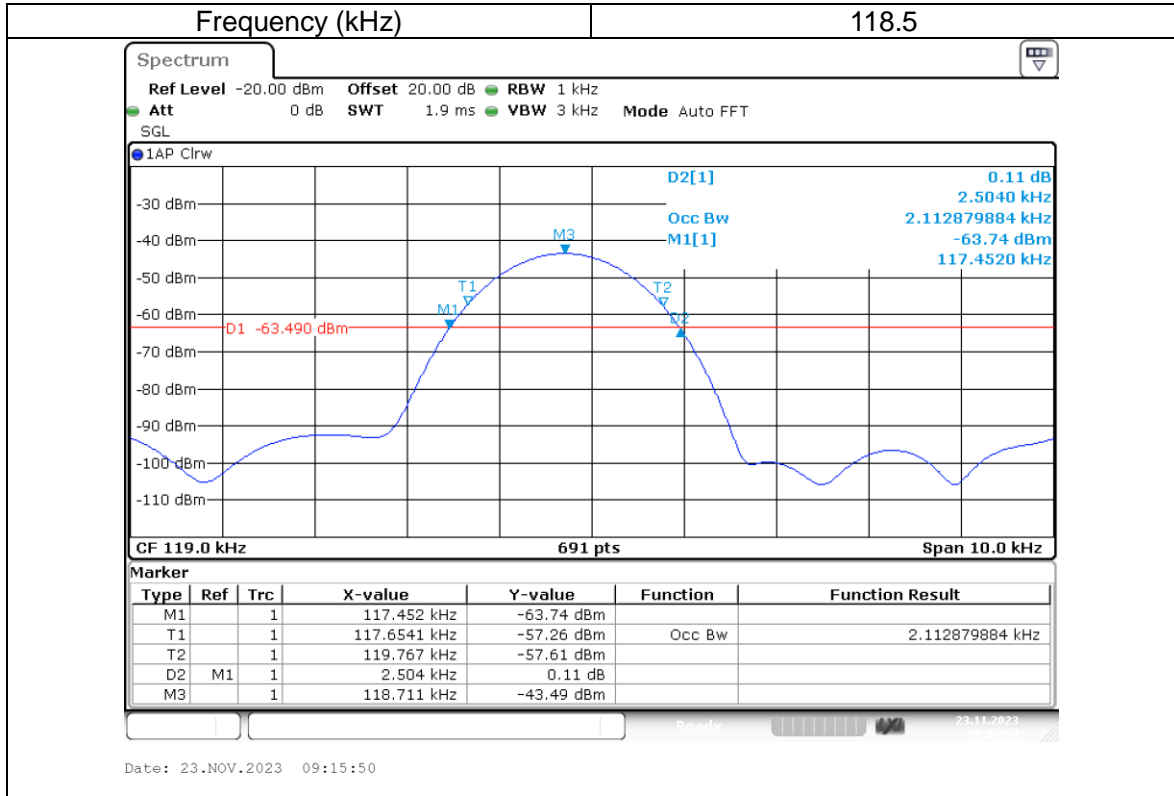
Please refer to the clause 2.4

Test Results

Frequency (kHz)	20dB Bandwidth (kHz)	Occupied Bandwidth (kHz)	Result
118.5	2.504	/	Pass



Test Graphs:





3.4. 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 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.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

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