



MEASUREMENT REPORT

FCC Part 15 Subpart B / ICES-003

FCC ID: FHO-F1715
IC: 10912A-F1715
Applicant: IKEA of Sweden AB

Application Type: Certification
Product: FREKVENNS Portable
Model No.: F1715
Brand Name: IKEA
FCC Rule Part(s): FCC Part 15 Subpart B: 2018 Class B
IC Rule Part(s): ICES-003 Issue 6
Test Procedure(s): ANSI C63.4: 2014
Result: Complies
Test Date: July 05 ~ July 25, 2018

Reviewed By


(Kevin Guo)

Approved By


(Robin Wu)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1809WSU003-U3	Rev. 01	Initial report	05-21-2019	Valid

CONTENTS

Description	Page
§2.1033 General Information	4
1. INTRODUCTION	5
1.1. Scope	5
1.2. MRT Test Location.....	5
2. PRODUCT INFORMATION	6
2.1. Equipment Description.....	6
2.2. Test Mode	6
2.3. Configuration of Tested System.....	7
2.4. Test System Details.....	8
2.5. Test Procedure	8
2.6. EMI Suppression Device(s)/Modifications.....	8
3. DESCRIPTION OF TEST	9
3.1. Evaluation Procedure	9
3.2. AC Line Conducted Emissions	9
3.3. Radiated Emissions.....	10
4. TEST EQUIPMENT CALIBRATION DATE	11
5. MEASUREMENT UNCERTAINTY.....	12
6. TEST RESULT	13
6.1. Summary	13
6.2. Conducted Emission Measurement	14
6.2.1. Test Limit	14
6.2.2. Test Setup.....	14
6.2.3. Test Result of Conducted Emissions.....	15
6.3. Radiated Emission Measurement	19
6.3.1. Test Limit	19
6.3.2. Test Setup.....	19
6.3.3. Test Result of Radiated Emissions.....	21
7. CONCLUSION.....	29
Appendix A – Test Setup Photograph.....	30
Appendix B – EUT Photograph	31

§2.1033 General Information

Applicant:	IKEA of Sweden AB
Applicant Address:	SE-343 81, Älmhult, Sweden
Manufacturer:	IKEA of Sweden AB
Manufacturer Address:	SE-343 81, Älmhult, Sweden
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
IC Registration No.:	11384A-1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	FREKVENNS Portable
Model No.:	F1715
Brand Name:	IKEA
Bluetooth Version:	V4.2 (Only support Bluetooth v3.0+HS)

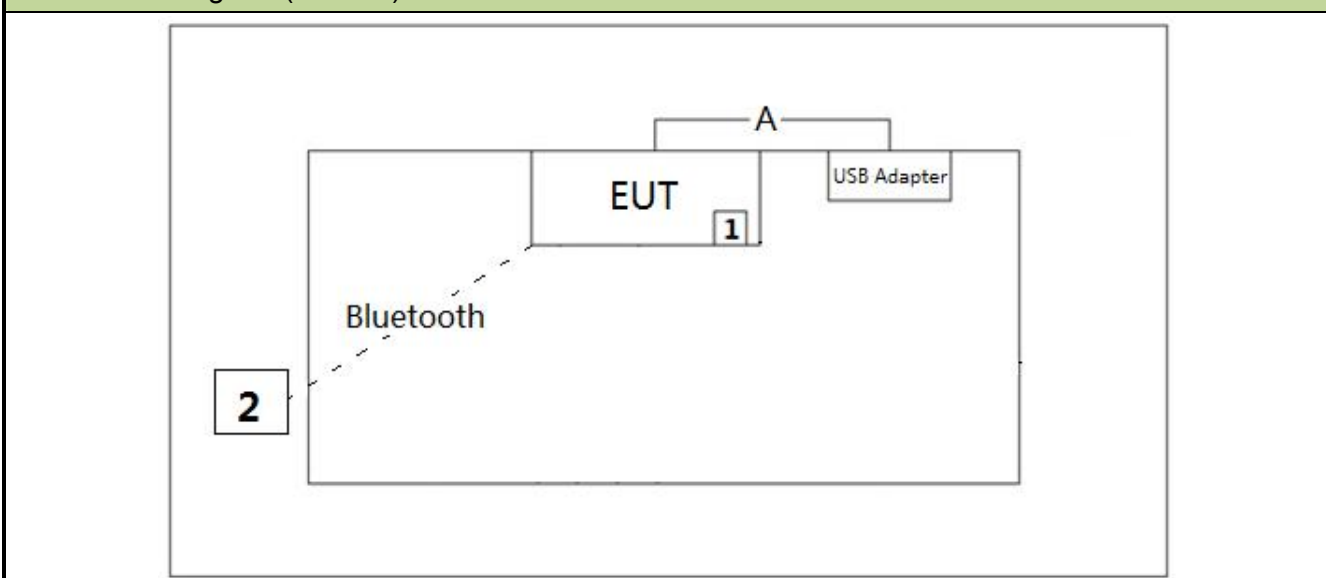
2.2. Test Mode

EMI Mode	Mode 1: Charging by USB adapter & Connect to Bluetooth Speaker through Bluetooth and play music
	Mode 2: Charging by USB adapter & Connect to Bluetooth Speaker through Audio Cable and play music

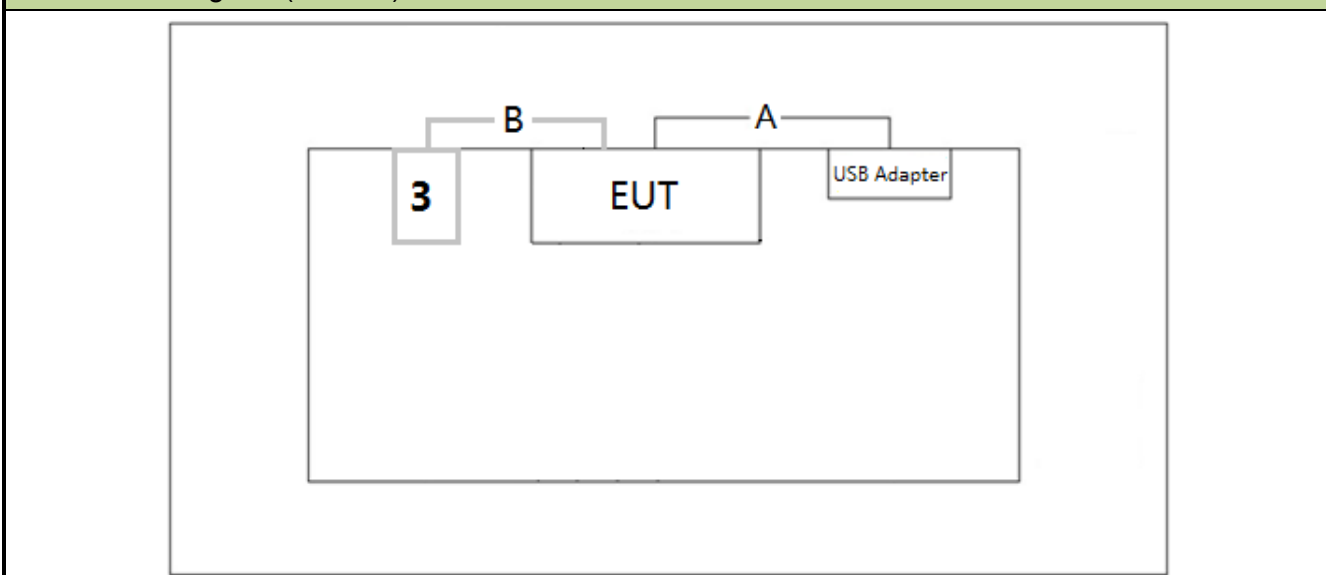
2.3. Configuration of Tested System

The **FREKVENS Portable** was tested per the guidance FCC Part 15 Subpart B: 2018 Class B, CES-003 Issue 6 and ANSI C63.4: 2014 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

Connection Diagram (Mode 1)



Connection Diagram (Mode 2)



Signal Cable Type		Signal Cable Description
A	USB Cable	Non-Shielding, 0.35m
B	Audio Cable	Non-Shielding, 1m

2.4. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Mobile Phone	OPPO	X9009	MZWG99B6NZ7HY9VW	N/A

Note: USB adapter is provided by MRT.

2.5. Test Procedure

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	a) Make EUT Charging by USB adapter & Connect to Bluetooth Speaker through Bluetooth and play music b) Make EUT Charging by USB adapter & Connect to Bluetooth Speaker through Audio Cable and play music

2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical Equipment in the Range of 9kHz to 18GHz (ANSI C63.4-2014) was used in the measurement of the device.

Deviation from measurement procedure.....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150 kHz to 30 MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or resolution, clock or data exchange speed, scrolling H pattern to the EUT and/or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30 MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30 MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB beam-width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2019/06/15
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2019/06/15
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2019/08/15
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/14
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2019/09/14
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2019/10/20
Broadband Coaxial Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/16
Digital Thermometer & Hygrometer	Testo	608-H1	MRTSUE06403	1 year	2019/08/15
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06213	1 year	2019/05/02

Radiated Emissions - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2019/08/14
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2019/10/19
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2019/11/09
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2019/11/16
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2019/12/13
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2019/05/02

Software	Version	Function
e3	V 8.3.5	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 150kHz~30MHz: 2.42dB
Radiated Disturbance - AC1
The maximum measurement uncertainty is evaluated as: Horizontal: 30MHz~300MHz: ± 4.07 dB 300MHz~1GHz: ± 3.63 dB Vertical: 30MHz~300MHz: ± 4.18 dB 300MHz~1GHz: ± 3.60 dB
Radiated Disturbance - AC1
The maximum measurement uncertainty is evaluated as: Horizontal: 1GHz~6GHz: ± 4.16 dB Vertical: 1GHz~6GHz: ± 4.76 dB
Radiated Disturbance - AC2
The maximum measurement uncertainty is evaluated as: Horizontal: 30MHz~300MHz: ± 3.75 dB 300MHz~1GHz: ± 3.53 dB Vertical: 30MHz~300MHz: ± 3.86 dB 300MHz~1GHz: ± 3.53 dB
Radiated Disturbance - AC2
The maximum measurement uncertainty is evaluated as: Horizontal: 1GHz~6GHz: ± 4.28 dB Vertical: 1GHz~6GHz: ± 4.33 dB

6. TEST RESULT

6.1. Summary

Product Name: FREKVENs Portable

FCC ID: FHO-F1715

IC: 10912A-F1715

FCC Part Section(s)	IC Part Section(s)	Test Description	Test Result
15.107	ICES-003 Issue 6	Conducted Emissions	Pass
15.109	ICES-003 Issue 6	Radiated Emissions	Pass

6.2. Conducted Emission Measurement

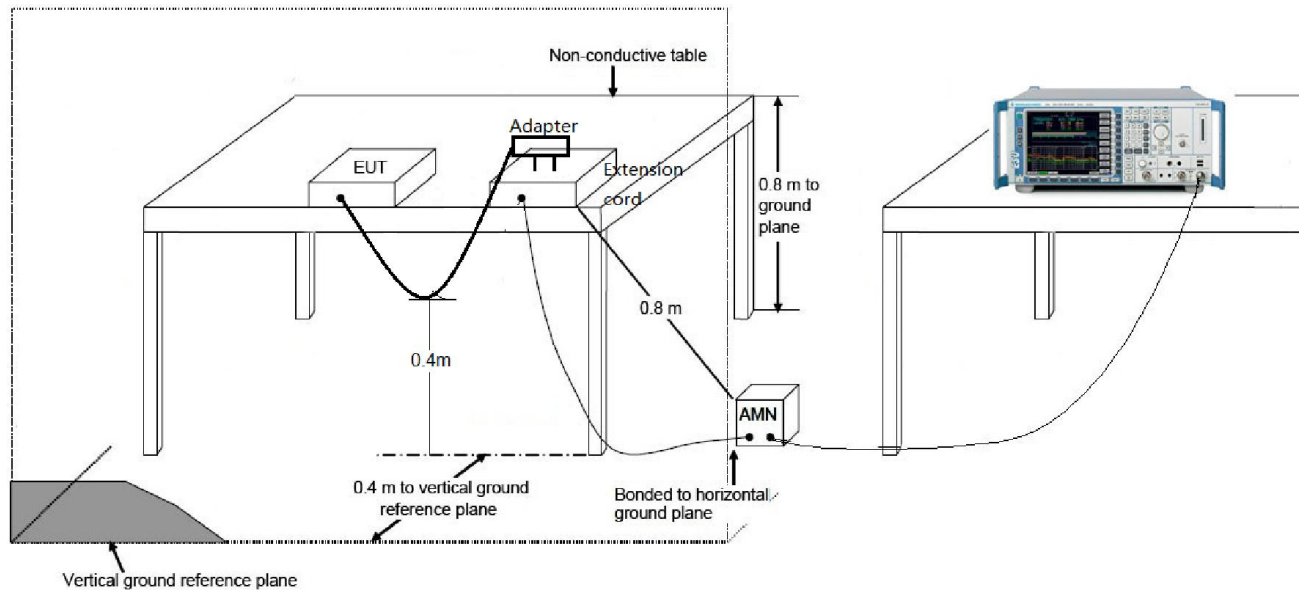
6.2.1. Test Limit

FCC Part 15.107 & ICES-003 Limits		
Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

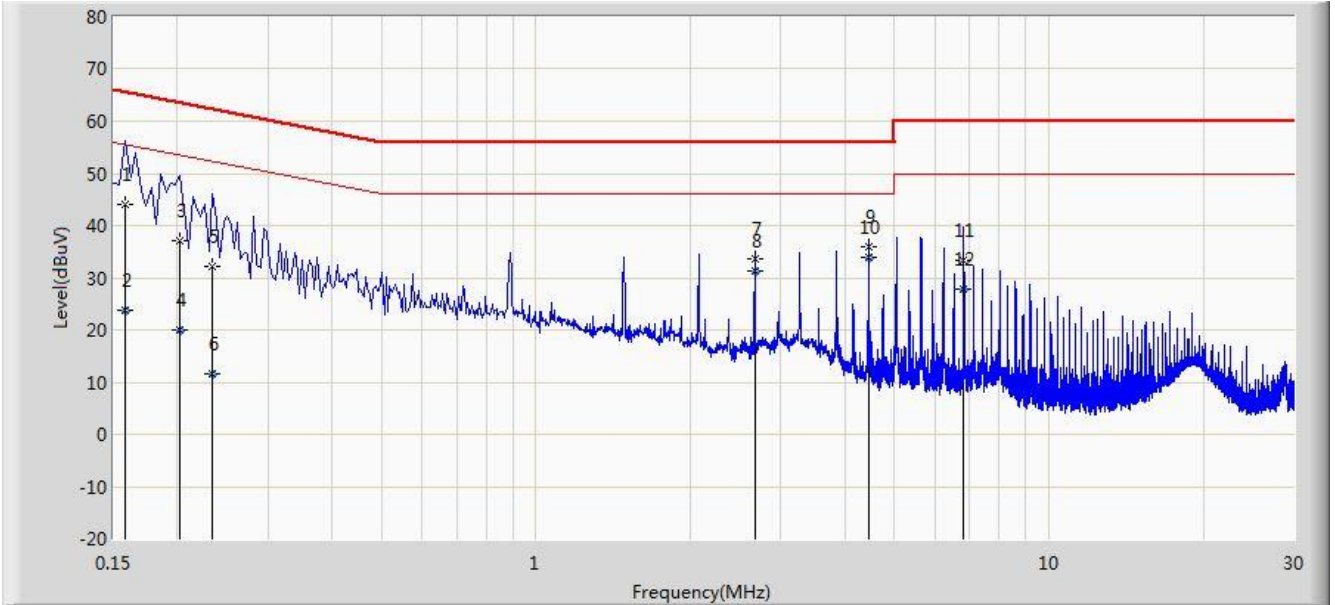
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.2.2. Test Setup



6.2.3. Test Result of Conducted Emissions

Site: SR2	Time: 2018/09/06 - 11:08
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Max Wang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: FREKVENIS Portable	Power: AC 120V/60Hz
Test Mode 1	

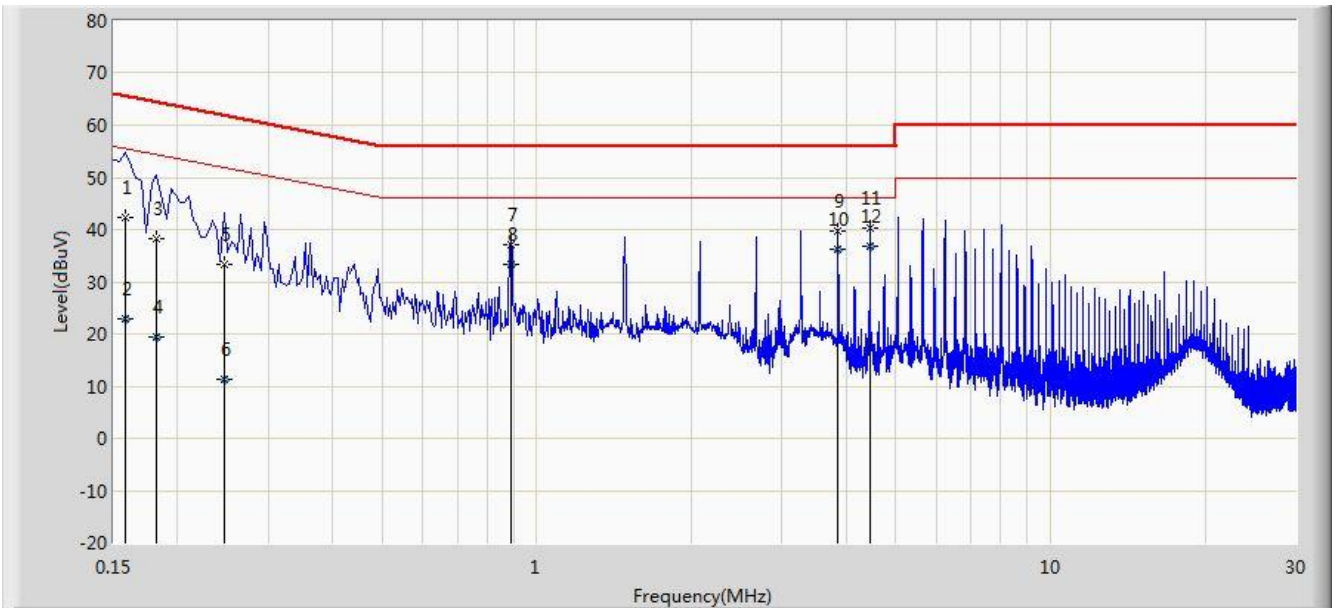


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Over Limit (dB)	Limit (dBμV)	Factor (dB)	Type
1			0.158	43.944	33.633	-21.625	65.568	10.311	QP
2			0.158	23.690	13.379	-31.878	55.568	10.311	AV
3			0.202	37.010	27.017	-26.518	63.528	9.993	QP
4			0.202	19.934	9.941	-33.594	53.528	9.993	AV
5			0.234	32.188	22.237	-30.118	62.307	9.951	QP
6			0.234	11.454	1.503	-40.852	52.307	9.951	AV
7			2.670	33.607	23.755	-22.393	56.000	9.852	QP
8			2.670	31.218	21.366	-14.782	46.000	9.852	AV
9			4.450	36.075	26.088	-19.925	56.000	9.986	QP
10		*	4.450	34.050	24.064	-11.950	46.000	9.986	AV
11			6.822	33.400	23.250	-26.600	60.000	10.150	QP
12			6.822	27.764	17.613	-22.236	50.000	10.150	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2018/09/06 - 11:14
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Max Wang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: FREKVENs Portable	Power: AC 120V/60Hz
Test Mode 1	

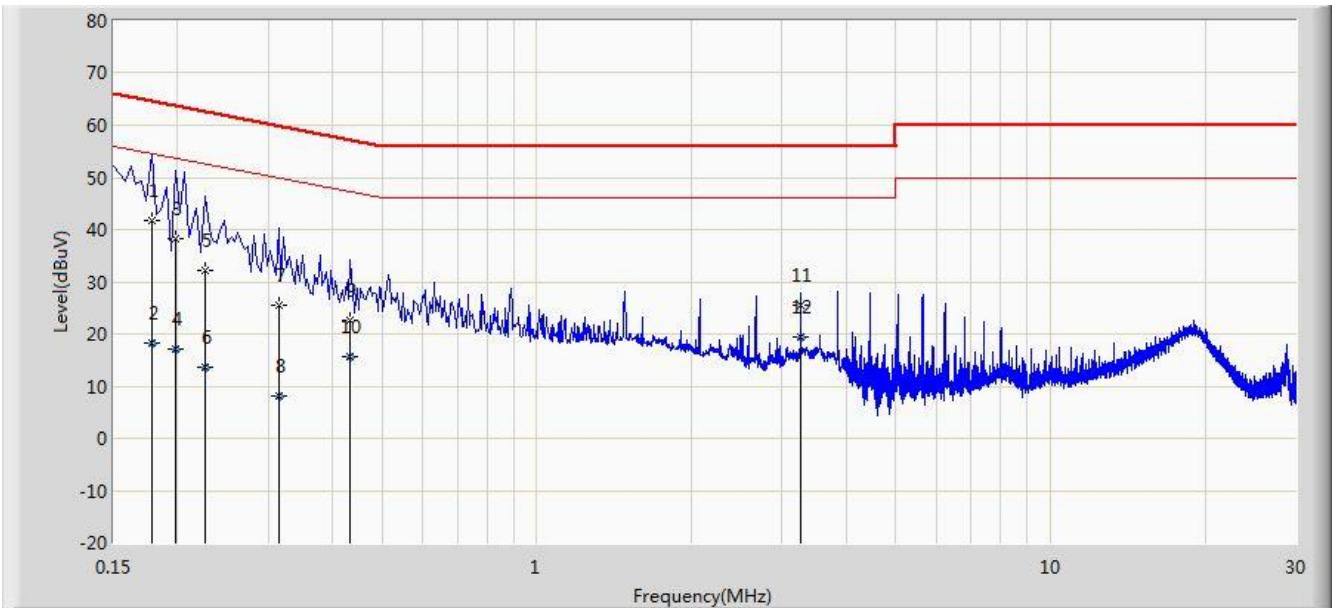


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.158	42.406	32.116	-23.163	65.568	10.290	QP
2			0.158	22.978	12.689	-32.590	55.568	10.290	AV
3			0.182	38.179	28.137	-26.215	64.394	10.042	QP
4			0.182	19.405	9.363	-34.989	54.394	10.042	AV
5			0.246	33.472	23.474	-28.419	61.891	9.998	QP
6			0.246	11.256	1.258	-40.635	51.891	9.998	AV
7			0.890	37.083	27.114	-18.917	56.000	9.970	QP
8			0.890	33.462	23.493	-12.538	46.000	9.970	AV
9			3.858	39.602	29.636	-16.398	56.000	9.966	QP
10			3.858	36.337	26.371	-9.663	46.000	9.966	AV
11			4.450	40.304	30.309	-15.696	56.000	9.995	QP
12		*	4.450	36.934	26.939	-9.066	46.000	9.995	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2018/09/06 - 11:19
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Max Wang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 2	

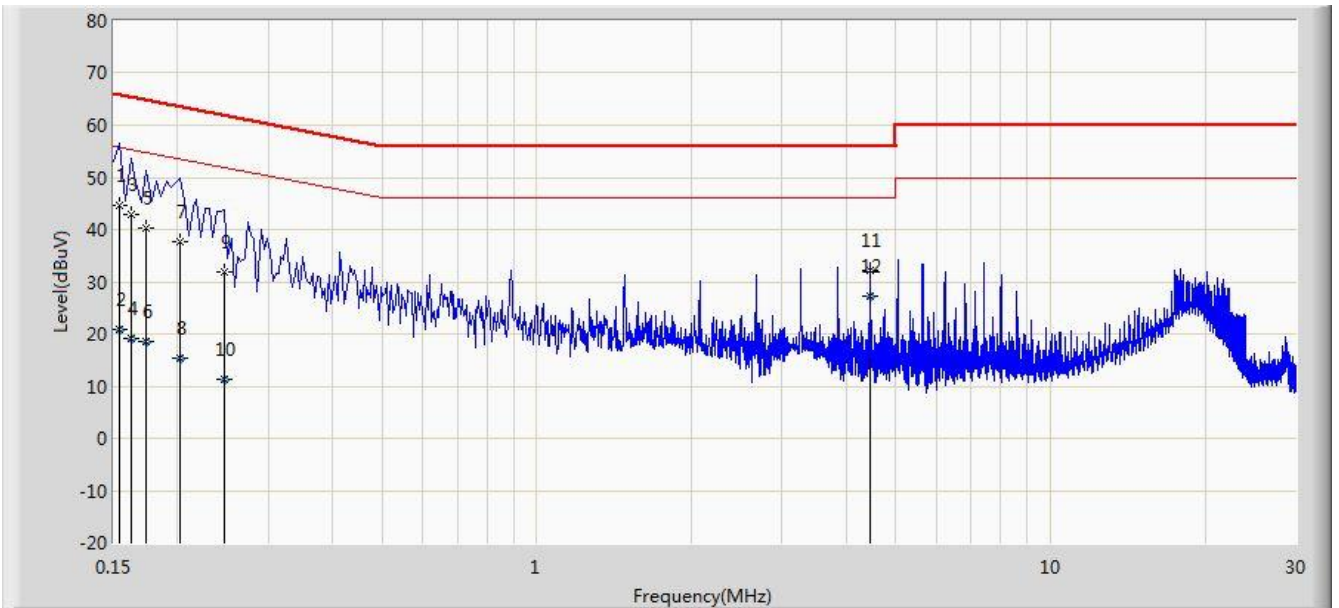


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.178	41.677	31.619	-22.901	64.578	10.058	QP
2			0.178	18.239	8.181	-36.339	54.578	10.058	AV
3			0.198	38.283	28.278	-25.411	63.694	10.005	QP
4			0.198	17.079	7.074	-36.615	53.694	10.005	AV
5			0.226	32.256	22.312	-30.339	62.595	9.944	QP
6			0.226	13.559	3.615	-39.037	52.595	9.944	AV
7			0.314	25.540	15.524	-34.324	59.864	10.015	QP
8			0.314	8.123	-1.892	-41.741	49.864	10.015	AV
9			0.434	22.549	12.435	-34.627	57.176	10.113	QP
10			0.434	15.599	5.486	-31.577	47.176	10.113	AV
11			3.262	25.509	15.628	-30.491	56.000	9.882	QP
12			3.262	19.471	9.590	-26.529	46.000	9.882	AV

Note: Measure Level (dBuV) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2018/09/06 - 11:40
Limit: FCC_Part15.107_CE_AC Power_Class B	Engineer: Max Wang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: FREKVENIS Portable	Power: AC 120V/60Hz
Test Mode 2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.154	44.589	33.873	-21.192	65.781	10.716	QP
2			0.154	20.816	10.100	-34.965	55.781	10.716	AV
3			0.162	42.967	32.888	-22.394	65.361	10.078	QP
4			0.162	19.259	9.181	-36.102	55.361	10.078	AV
5			0.174	40.399	30.343	-24.368	64.767	10.057	QP
6			0.174	18.492	8.436	-36.275	54.767	10.057	AV
7			0.202	37.562	27.554	-25.966	63.528	10.008	QP
8			0.202	15.489	5.481	-38.039	53.528	10.008	AV
9			0.246	31.931	21.933	-29.961	61.891	9.998	QP
10			0.246	11.438	1.440	-40.453	51.891	9.998	AV
11			4.450	32.186	22.191	-23.814	56.000	9.995	QP
12		*	4.450	27.297	17.301	-18.703	46.000	9.995	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

6.3. Radiated Emission Measurement

6.3.1. Test Limit

FCC Part 15.109 Limits		
Frequency (MHz)	Distance (m)	Level (dB μ V/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

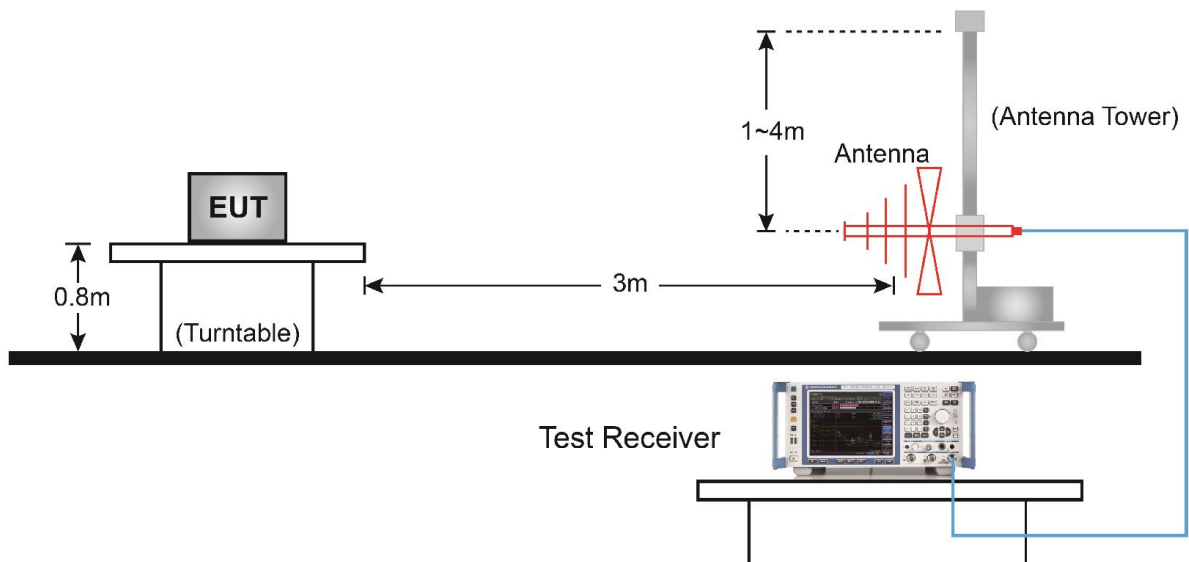
Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

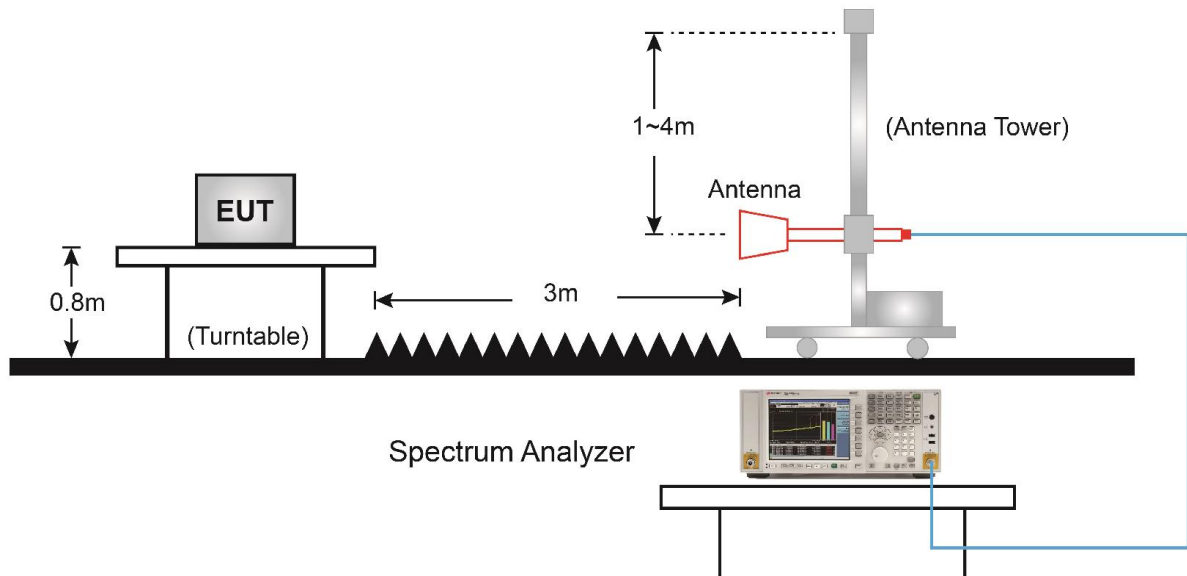
Note 3: E field strength (dB μ V/m) = 20 log E field strength (μ V/m)

6.3.2. Test Setup

30MHz ~ 1GHz Test Setup:

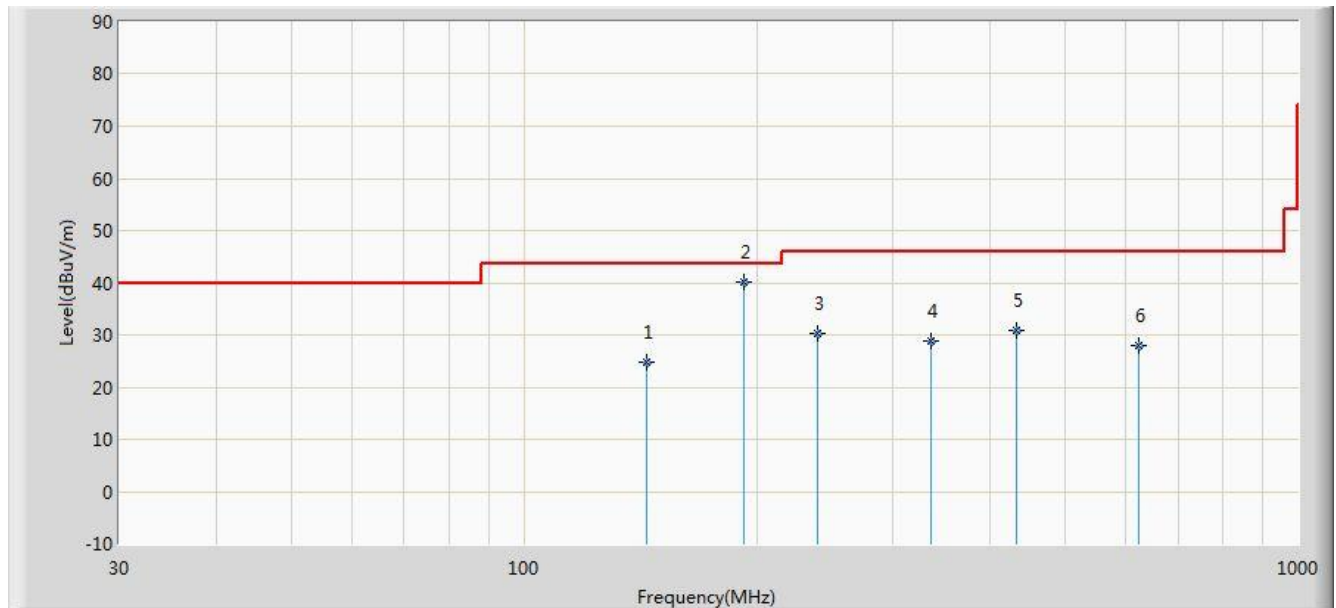


1GHz ~18GHz Test Setup:



6.3.3. Test Result of Radiated Emissions

Site: AC1	Time: 2018/09/08 - 11:40
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 1	

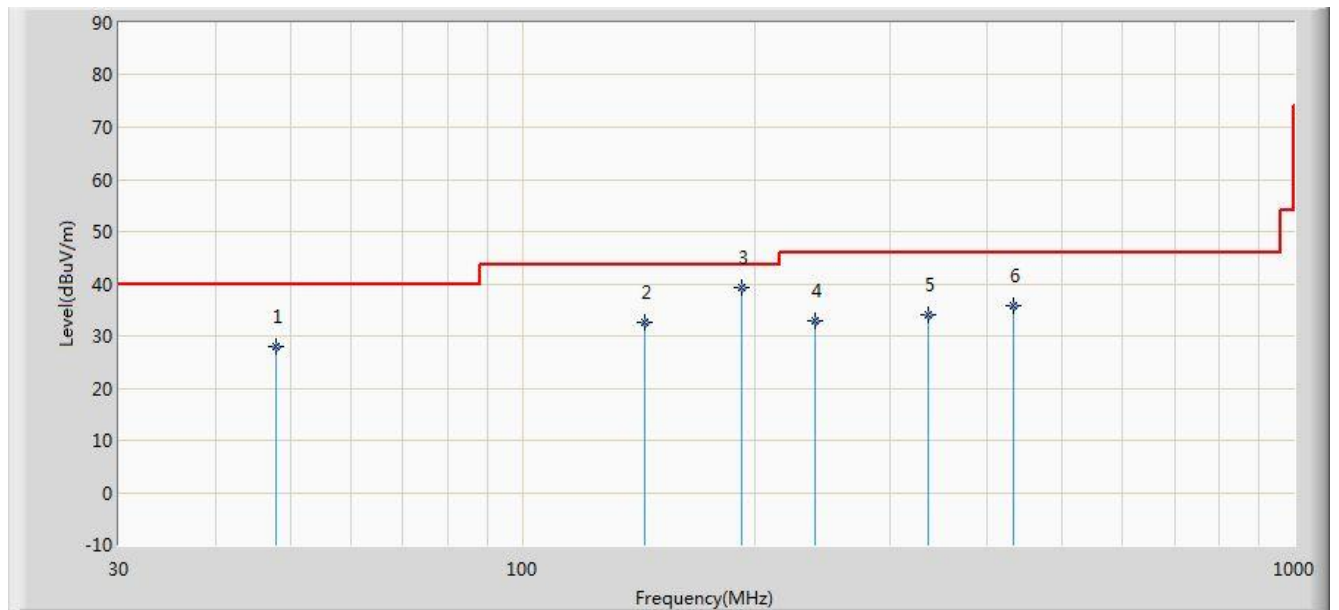


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			143.975	24.730	9.864	-18.770	43.500	14.866	QP
2		*	192.000	40.124	28.500	-3.376	43.500	11.624	QP
3			240.005	30.151	17.283	-15.849	46.000	12.868	QP
4			336.035	28.917	13.624	-17.083	46.000	15.293	QP
5			432.065	30.862	13.405	-15.138	46.000	17.457	QP
6			624.125	27.916	6.832	-18.084	46.000	21.084	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2018/09/08 - 11:40
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: FREKVENS Portable	Power: AC 120V/60Hz
Test Mode 1	

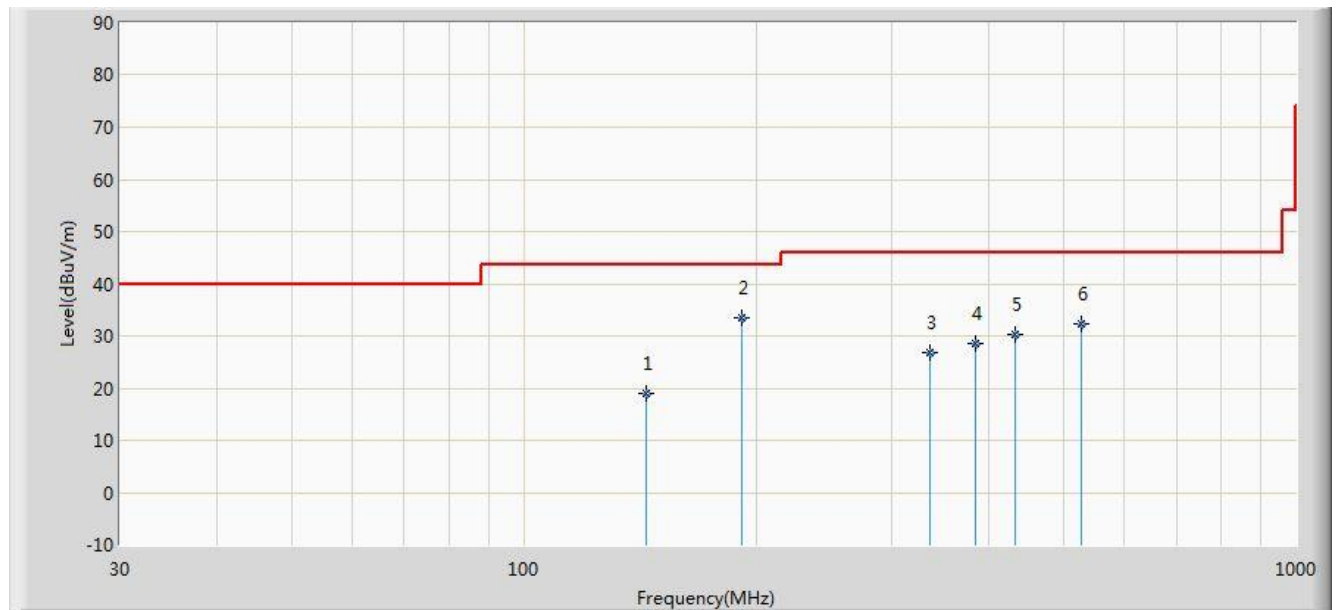


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			47.945	27.954	13.728	-12.046	40.000	14.226	QP
2			143.975	32.500	17.634	-11.000	43.500	14.866	QP
3		*	192.000	39.404	27.780	-4.096	43.500	11.624	QP
4			240.005	32.802	19.934	-13.198	46.000	12.868	QP
5			336.035	34.027	18.734	-11.973	46.000	15.293	QP
6			432.065	35.878	18.421	-10.122	46.000	17.457	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2018/09/08 - 11:40
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: FREKVENS Portable	Power: AC 120V/60Hz
Test Mode 2	

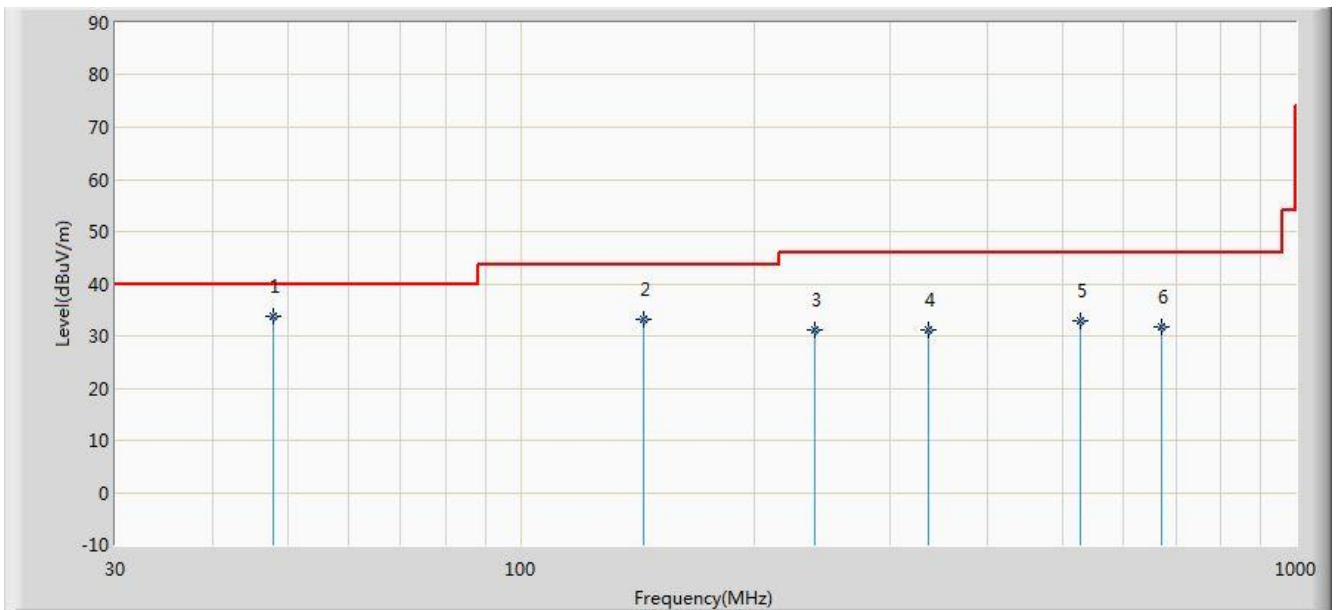


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			143.975	19.048	4.182	-24.452	43.500	14.866	QP
2		*	191.990	33.458	21.834	-10.042	43.500	11.624	QP
3			336.035	26.819	11.526	-19.181	46.000	15.293	QP
4			384.050	28.492	12.218	-17.508	46.000	16.274	QP
5			432.065	30.394	12.937	-15.606	46.000	17.457	QP
6			528.095	32.340	13.205	-13.660	46.000	19.135	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2018/09/08 - 11:40
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: FREKVENS Portable	Power: AC 120V/60Hz
Test Mode 2	

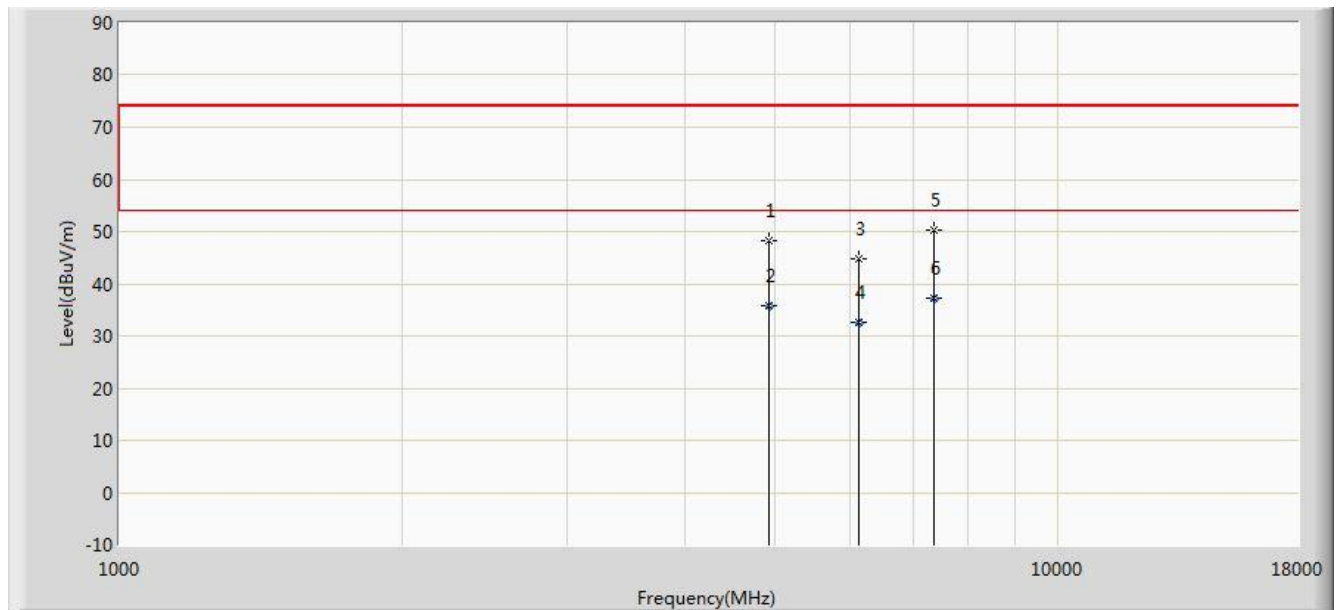


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	48.000	33.725	19.500	-6.275	40.000	14.225	QP
2			143.975	33.218	18.352	-10.282	43.500	14.866	QP
3			240.005	31.295	18.427	-14.705	46.000	12.868	QP
4			336.035	31.117	15.824	-14.883	46.000	15.293	QP
5			528.095	32.996	13.861	-13.004	46.000	19.135	QP
6			672.140	31.843	10.082	-14.157	46.000	21.761	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2018/09/08 - 11:41
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 1	

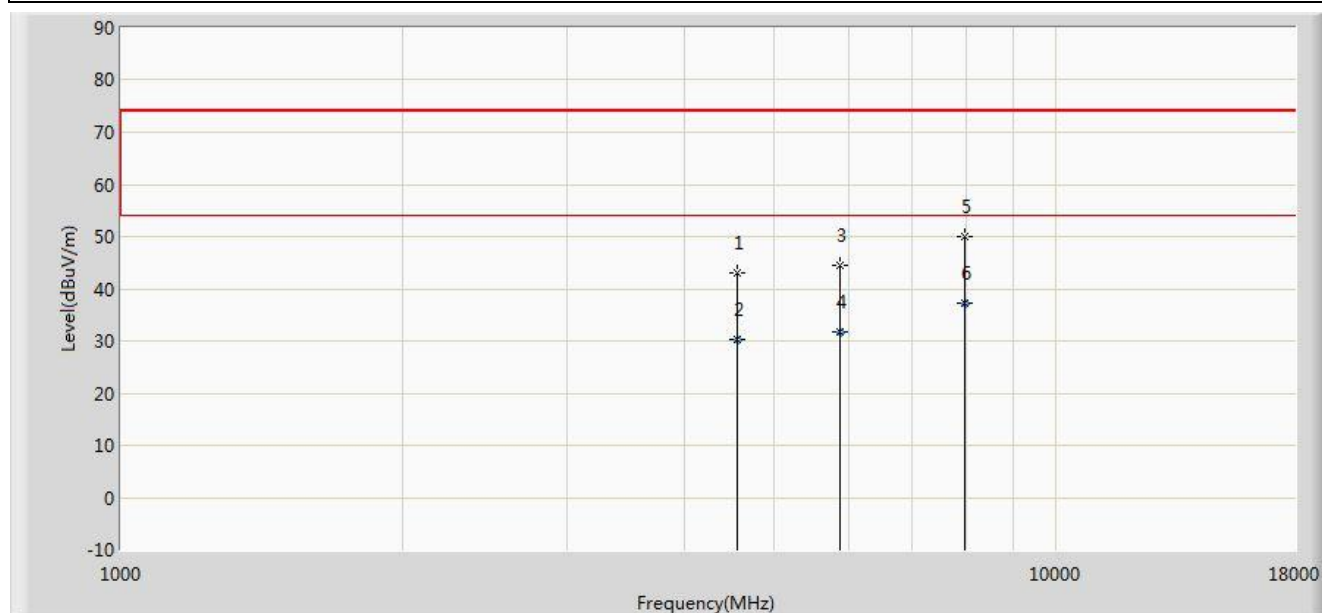


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			4918.500	48.275	42.168	-25.725	74.000	6.107	PK
2			4918.500	35.842	29.735	-18.158	54.000	6.107	AV
3			6142.500	44.851	36.606	-29.149	74.000	8.245	PK
4			6142.500	32.550	24.305	-21.450	54.000	8.245	AV
5			7383.500	50.155	37.530	-23.845	74.000	12.625	PK
6		*	7383.500	37.262	24.637	-16.738	54.000	12.625	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Site: AC1	Time: 2018/09/08 - 11:41
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 1	

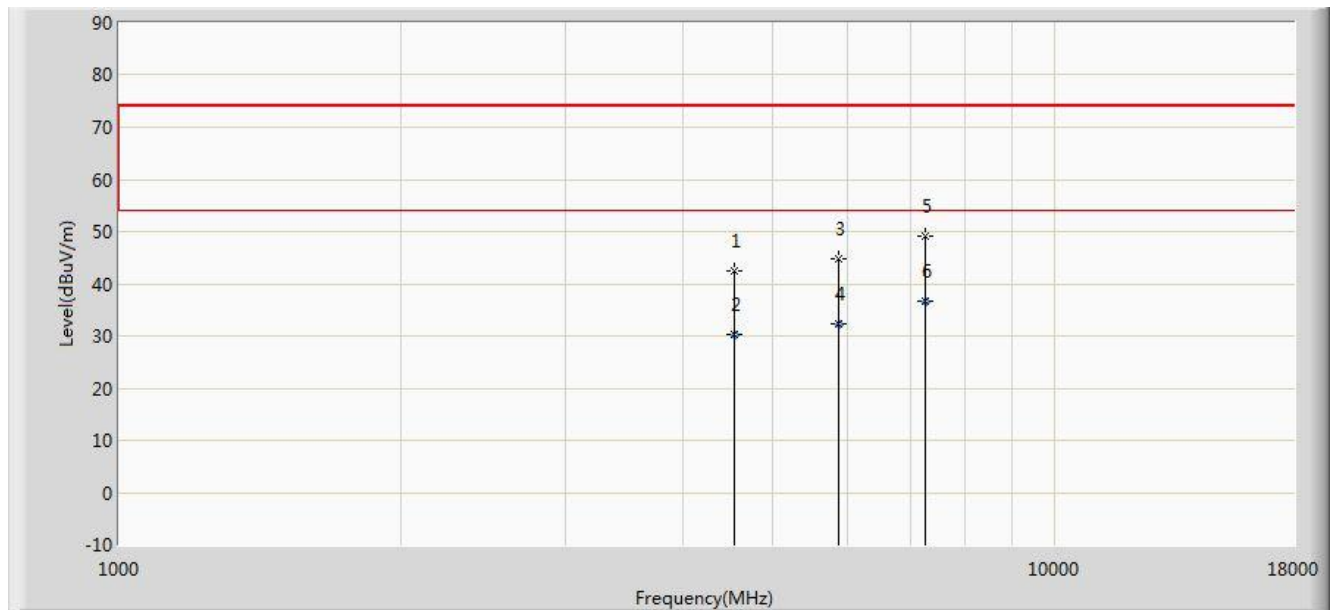


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			4561.500	42.900	37.935	-31.100	74.000	4.966	PK
2			4561.500	30.402	25.437	-23.598	54.000	4.966	AV
3			5879.000	44.559	36.729	-29.441	74.000	7.830	PK
4			5879.000	31.766	23.936	-22.234	54.000	7.830	AV
5			7970.000	50.138	36.562	-23.862	74.000	13.576	PK
6		*	7970.000	37.292	23.716	-16.708	54.000	13.576	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Site: AC1	Time: 2018/09/08 - 11:41
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 2	

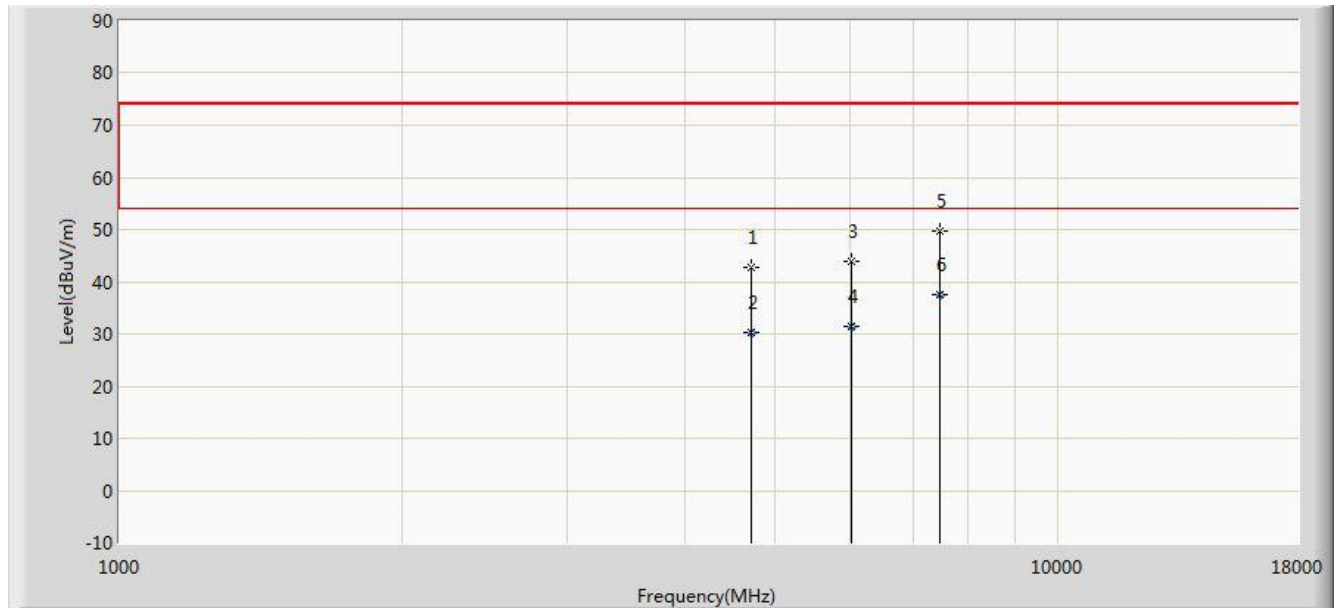


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			4544.500	42.538	37.552	-31.462	74.000	4.987	PK
2			4544.500	30.287	25.301	-23.713	54.000	4.987	AV
3			5870.500	44.831	37.026	-29.169	74.000	7.804	PK
4			5870.500	32.311	24.506	-21.689	54.000	7.804	AV
5			7256.000	49.034	36.300	-24.966	74.000	12.734	PK
6		*	7256.000	36.577	23.843	-17.423	54.000	12.734	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Site: AC1	Time: 2018/09/08 - 11:41
Limit: FCC_Part15.109_RE(3m)_Class B	Engineer: Messiah Li
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: FREKVEN'S Portable	Power: AC 120V/60Hz
Test Mode 2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			4714.500	42.787	37.240	-31.213	74.000	5.548	PK
2			4714.500	30.315	24.768	-23.685	54.000	5.548	AV
3			6015.000	43.903	36.036	-30.097	74.000	7.867	PK
4			6015.000	31.501	23.634	-22.499	54.000	7.867	AV
5			7485.500	49.611	36.802	-24.389	74.000	12.810	PK
6		*	7485.500	37.437	24.628	-16.563	54.000	12.810	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **FREKVENS Portable** has been tested to comply with the requirements specified in Part 15B of the FCC Rules and ICES-003 Issue 6 of IC Rules.

The End

Appendix A – Test Setup Photograph

Refer to “1809WSU003-UT” file.

Appendix B – EUT Photograph

Refer to “1809WSU003-UE” file.