

RF Test Report

Applicant : Ring LLC

Product Type : Video Doorbell 3 Plus (for model : 5UM6E5)
Video Doorbell 3 (for model : 5AT3S9)

Trade Name : Ring

Model Number : 5UM6E5, 5AT3S9

Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013

Received Date : Mar. 02, 2020

Test Period : Mar. 03 ~ Mar. 04, 2020

Issued Date : Mar. 16, 2020

Issued by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C.)
Tel : +886-3-2710188 / Fax : +886-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330

Test Firm MRA designation number: TW0010

Note:

- 1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.



Revision History

Rev.	Issued Date	Revisions	Revised By
00	Mar. 10, 2020	Initial Issue	Tobey Cheng
01	Mar. 16, 2020	Page 7 Revised EUT Modify Description. Page 22~25 Revised Radiated Emission Measurement.	Tobey Cheng

Verification of Compliance

Issued Date: Mar. 16, 2020

Applicant : Ring LLC

Product Type : Video Doorbell 3 Plus (for model : 5UM6E5)
Video Doorbell 3 (for model : 5AT3S9)

Trade Name : Ring

Model Number : 5UM6E5, 5AT3S9

FCC ID : 2AEUPBHARG051

EUT Rated Voltage : AC 8-24 V, 50/60 Hz, 200 mA

Test Voltage : AC 24 V, 60 Hz

Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013

Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C.)
Tel : +886-3-2710188 / Fax : +886-3-2710190
Taiwan Accreditation Foundation accreditation number: 1330
<http://www.atl-lab.com.tw/e-index.htm>



A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By

: Fly Lu
(Manager) (Fly Lu)

TABLE OF CONTENTS

1	General Information	5
1.1.	Summary of Test Result.....	5
1.2.	Measurement Uncertainty.....	6
2	EUT Description	7
3	Test Methodology	8
3.1.	Mode of Operation.....	8
3.2.	EUT Test Step	9
3.3.	Configuration of Test System Details	10
3.4.	Test Instruments	11
3.5.	Test Site Environment.....	11
4	Measurement Procedure	12
4.1.	AC Power Line Conducted Emission Measurement.....	12
4.2.	Radiated Emission Measurement.....	14
5	Test Results.....	18
	Annex A. Conducted Emission	18
	Annex B. Radiated Emission Measurement	22

1 General Information

1.1. Summary of Test Result

Standard	Item	Result	Remark
15.207	AC Power Conducted Emission	PASS	-----
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(b)(3)	Max. Output Power	PASS	Refer report number : 1909FR15
15.247(a)(2)	6 dB RF Bandwidth	PASS	Refer report number : 1909FR15
15.247(e)	Maximum Power Spectral Density	PASS	Refer report number : 1909FR15
15.247(d)	Out of Band Conducted Spurious Emission	PASS	Refer report number : 1909FR15
15.203	Antenna Requirement	PASS	Refer report number : 1909FR15

Standard	Description
CFR47, Part 15, Subpart C	Intentional Radiators
ANSI C63. 10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 15.247 Meas Guidance v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES

Decision Rule

- ☒ Uncertainty is not included.
- ☐ Uncertainty is included.

1.2. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	150 kHz ~ 30 MHz	2.68
Radiated Emission	9 kHz ~ 30 MHz	2.14
	30 MHz ~ 1000 MHz	4.99
	1000 MHz ~ 18000 MHz	4.99
	18000 MHz ~ 26500 MHz	4.23
	26500 MHz ~ 40000 MHz	4.39

Decision Rule

- ☒ Uncertainty is not included.
- ☐ Uncertainty is included.

2 EUT Description

Applicant	Ring LLC 1523 26th Street, Santa Monica CA 90404, United States			
Manufacturer	Ring Inc. 1523 26th Street, Santa Monica CA 90404, United States			
Product Type	Video Doorbell 3 Plus (for model : 5UM6E5) Video Doorbell 3 (for model : 5AT3S9)			
Trade Name	Ring			
Model No.	5UM6E5, 5AT3S9			
Difference description of product type/model number	5UM6E5 : With glance 5AT3S9 : Without glance			
FCC ID	2AEUPBHARG051			
Frequency Range	2402 ~ 2480 MHz			
Modulation Type	GFSK			
Operate Temp. Range	-20 ~ +50 ℃			
Antenna information	Antenna	Model Number	Type	Max. Gain (dBi)
	ANT-0	RFPCA491914EMLB303	PCB Antenna	0.61
	ANT-1	RFPCA491914EMLB301	PCB Antenna	0.72
RF Output Power	ANT-0			
	LE, GFSK:	0.00120 W		
	2LE, GFSK:	0.00119 W		
	ANT-1			
	BLR C2, GFSK:	0.00124 W		
	BLR C8, GFSK:	0.00124 W		

EUT Modify Description :

Modification Description:

Product Type :

- 1) Video Doorbell 3 with model number 5UM6E5 adds one more model number : 5AT3S9 that removes glance, but the layout remains the same.
- 2) The product name of model name 5UM6E5 changes its name from Video Doorbell 3 to Video Doorbell 3 Plus. The product name of model 5AT3S9 remains the same.

After the evaluation, Conducted Emission & Radiated Emissions (Below 1 GHz) Mode 2 & Mode 3 - 2480 MHz of Model: 5AT3S9 need to be re-evaluated.

The other test data refer to the original report.

Original Report : 1909FR15

Modify: 2003FR15 Rev.01

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit mode
Mode 2: LE, GFSK Continuous TX Mode
Mode 3: 2LE, GFSK Continuous TX Mode

Final-Test Mode
Mode 1: Transmit Mode
Mode 2: LE, GFSK Continuous TX Mode
Mode 3: 2LE, GFSK Continuous TX Mode

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes.

Note: 1. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98 %.

2. ANT-1 is the worst case.

Test Mode	ANT-0	ANT-1	ANT-0+1
Mode 2	V	V	---
Mode 3	V	V	---

Test Mode	Antenna Delivery
Mode 2	1TX (Diversity)
Mode 3	1TX (Diversity)

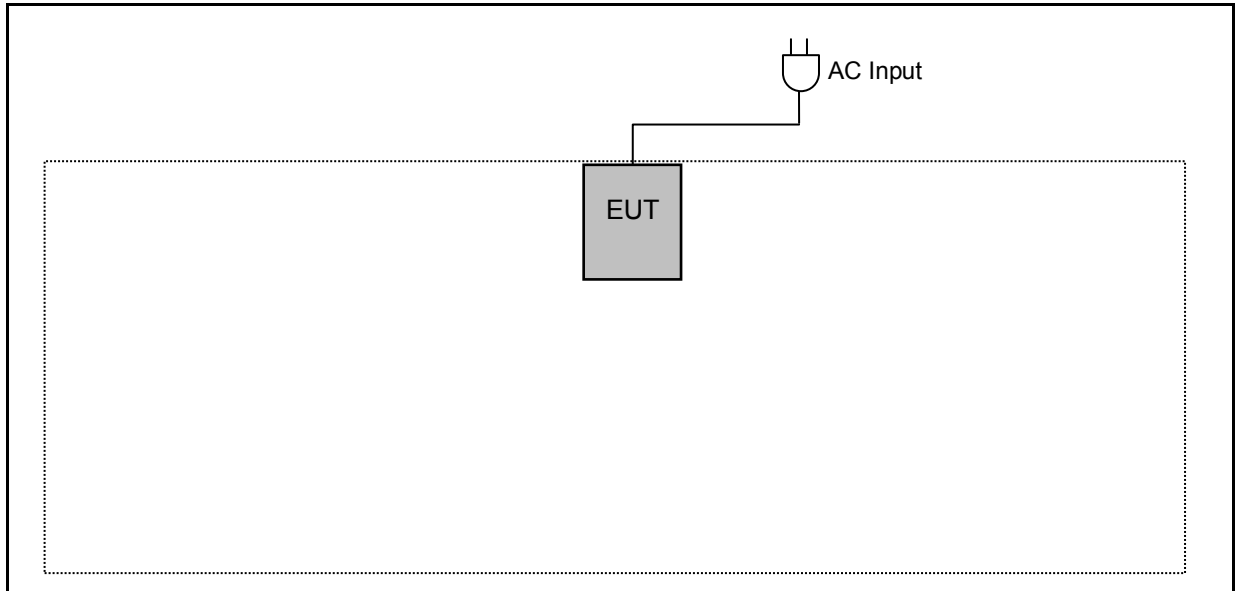
3.2. EUT Test Step

1	Setup the EUT shown on “Configuration of Test System Details”.
2	Turn on the power of all equipment.
3	Turn on TX function.
4	EUT run test program.

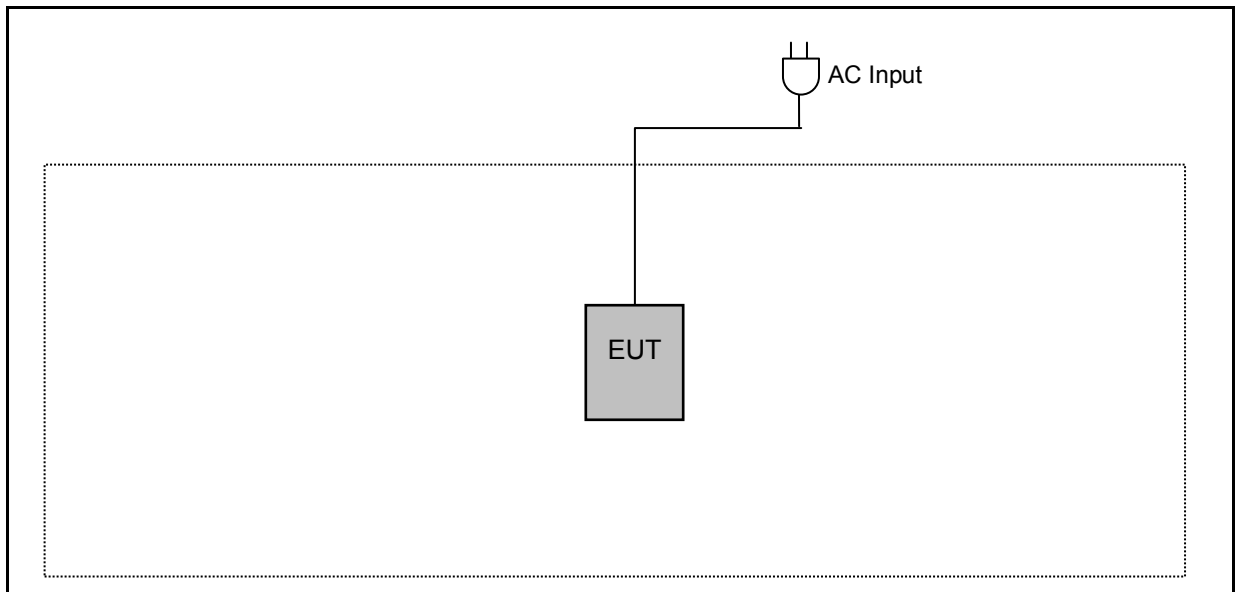
Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	EZ EMC	1.1.4.3
2	Radiated Emission	EZ EMC	1.1.4.4

3.3. Configuration of Test System Details

Conducted Emissions



Radiated Emission



Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
---	---	---	---	---	---

3.4. Test Instruments

For Conducted Emission

Test Period: Mar. 03, 2020

Testing Engineer: Louis Shen

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	100367	05/23/2019	1 year
LISN	R&S	ENV216	101040	04/03/2019	1 year
LISN	R&S	ENV216	101041	03/28/2019	1 year
RF Cable	Woken	00100D1380194M	TE-02-03	05/23/2019	1 year

For Radiated Emissions

Test Period: Mar. 04, 2020

Testing Engineer: Ricky Liu

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9010A	MY52221312	01/13/2020	1 year
Pre Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	01/15/2020	1 year
Broadband Antenna	Schwarzbeck	VULB9168	416	10/23/2019	1 year
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	03/29/2019	1 year
RF Cable	EMCI	EMC104-N-N-6000	TE01-1	02/20/2020	1 year
Microwave Cable	EMCI	EMC104-SM-SM-13000	170814	10/29/2019	1 year
Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	02/20/2020	1 year

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	20-30
Humidity (%RH)	25-75	45-75
Barometric pressure (mbar)	860-1060	990-1005

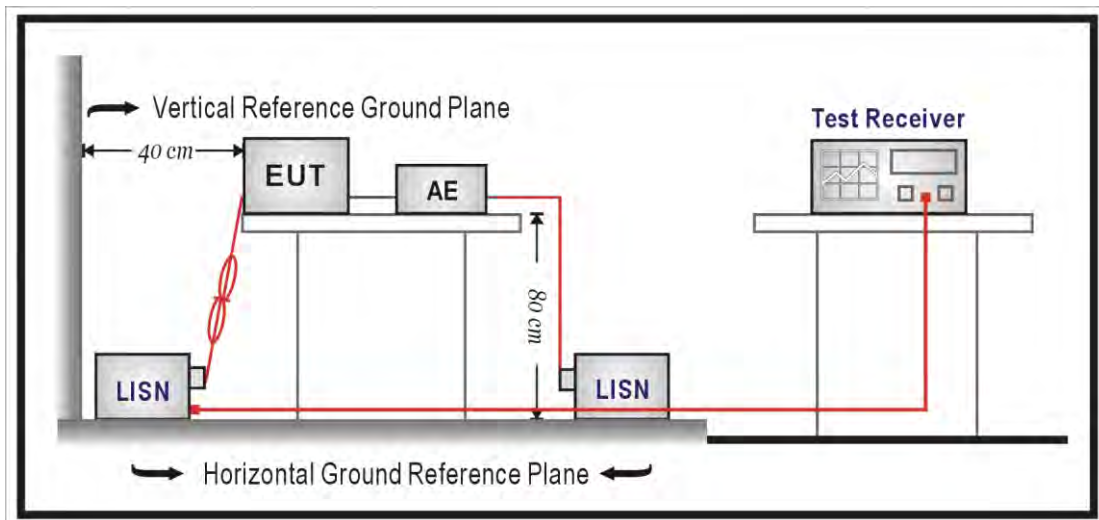
4 Measurement Procedure

4.1. AC Power Line Conducted Emission Measurement

■ Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

■ Test Setup



■ Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a $50\ \Omega // 50\ \mu\text{H}$ coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a $50\ \Omega // 50\ \mu\text{H}$ coupling impedance with 50 ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40 cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80 cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12 mm insulating material.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150 kHz to 30 MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the AMN. If the mains power cable is longer than 1 m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4 m. All of interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1 m. All 50 Ω ports of the LISN shall be resistively terminated into 50 Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.2. Radiated Emission Measurement

■ Limit

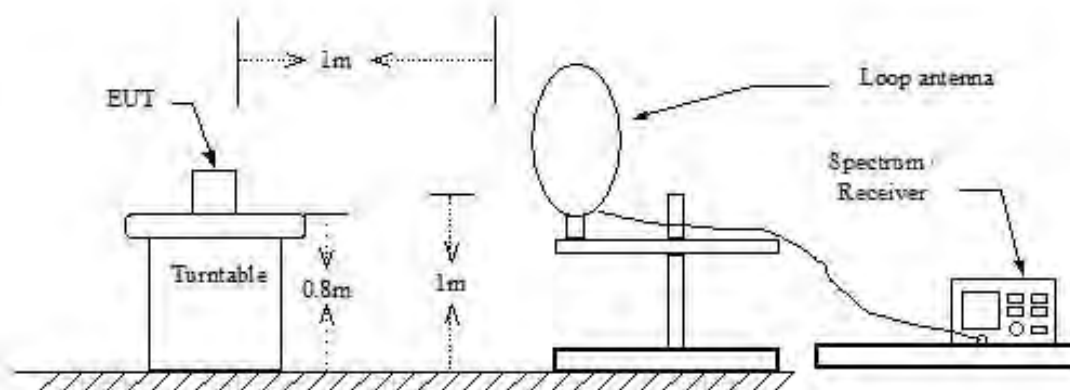
According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 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
Above 960	500	3

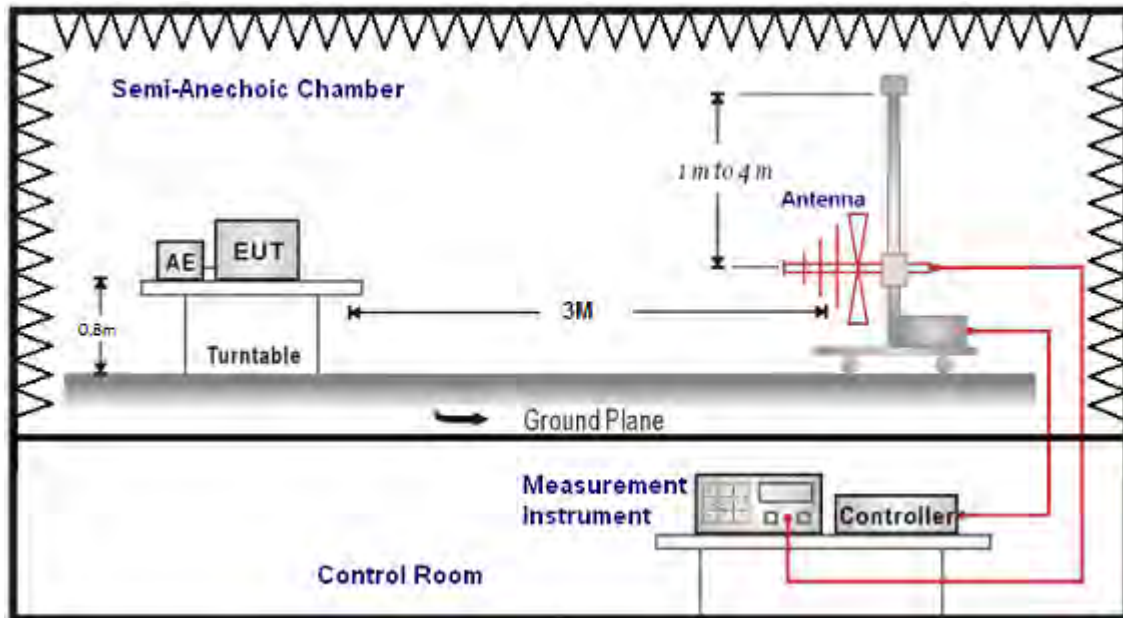
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

■ Setup

9 kHz ~ 30 MHz



Below 1 GHz



■ Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >0.98 / $1/T$ for average measurements when Duty cycle <0.98 . A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna was used in frequencies 1 –26.5 GHz at a distance of 3 meter. The antenna at an angle toward the source of the emission. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20 dB/decade).

For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro volts per meter (dBuV/m).

The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

$$(1) \text{ Amplitude (dBuV/m) = FI (dBuV) + AF (dBuV) + CL (dBuV) - Gain (dB)}$$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

$$(2) \text{ Actual Amplitude (dBuV/m) = Amplitude (dBuV) - Dis(dB)}$$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30 dBm

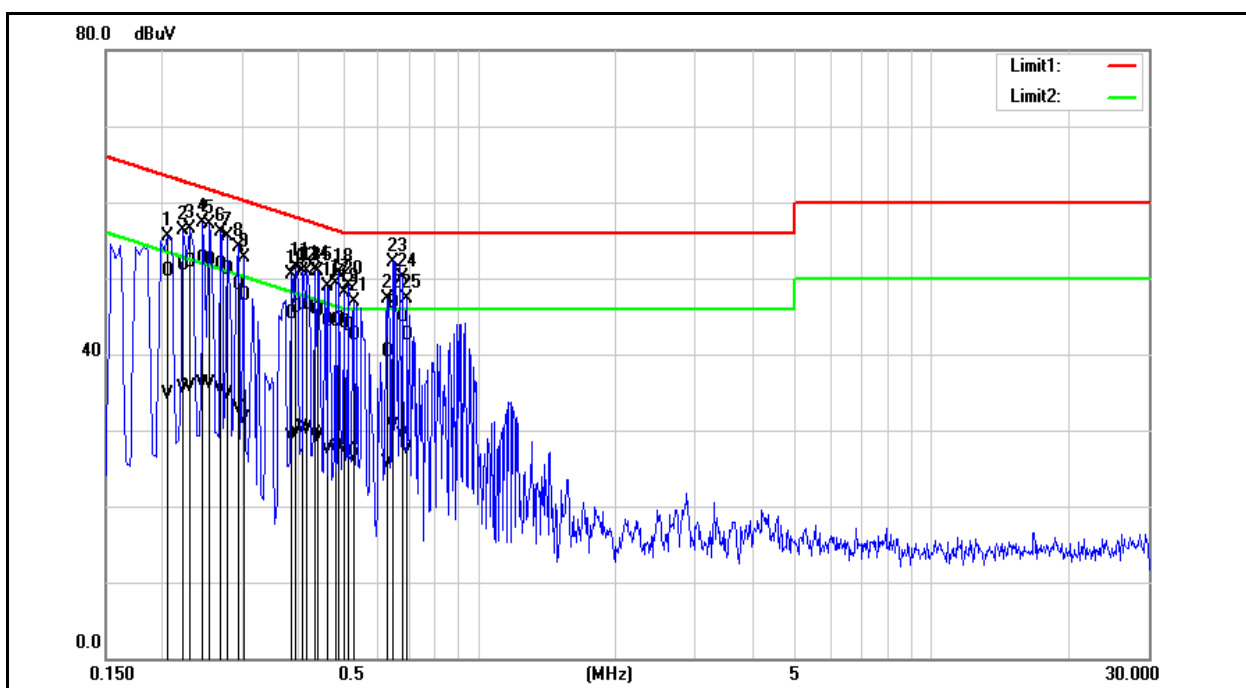
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

5 Test Results

Annex A. Conducted Emission

Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 24 V/60 Hz
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.2060	41.26	25.03	9.64	50.90	34.67	63.37	53.37	-12.47	-18.70	Pass
2	0.2220	42.14	25.82	9.64	51.78	35.46	62.74	52.74	-10.96	-17.28	Pass
3	0.2300	42.40	26.11	9.64	52.04	35.75	62.45	52.45	-10.41	-16.70	Pass
4	0.2460	42.83	26.52	9.64	52.47	36.16	61.89	51.89	-9.42	-15.73	Pass
5	0.2540	42.74	26.37	9.64	52.38	36.01	61.63	51.63	-9.25	-15.62	Pass
6	0.2700	42.00	25.61	9.64	51.64	35.25	61.12	51.12	-9.48	-15.87	Pass
7	0.2780	41.39	25.11	9.65	51.04	34.76	60.88	50.88	-9.84	-16.12	Pass
8	0.2940	39.47	23.29	9.65	49.12	32.94	60.41	50.41	-11.29	-17.47	Pass
9	0.3020	38.03	21.95	9.65	47.68	31.60	60.19	50.19	-12.51	-18.59	Pass
10	0.3860	35.69	19.46	9.65	45.34	29.11	58.15	48.15	-12.81	-19.04	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

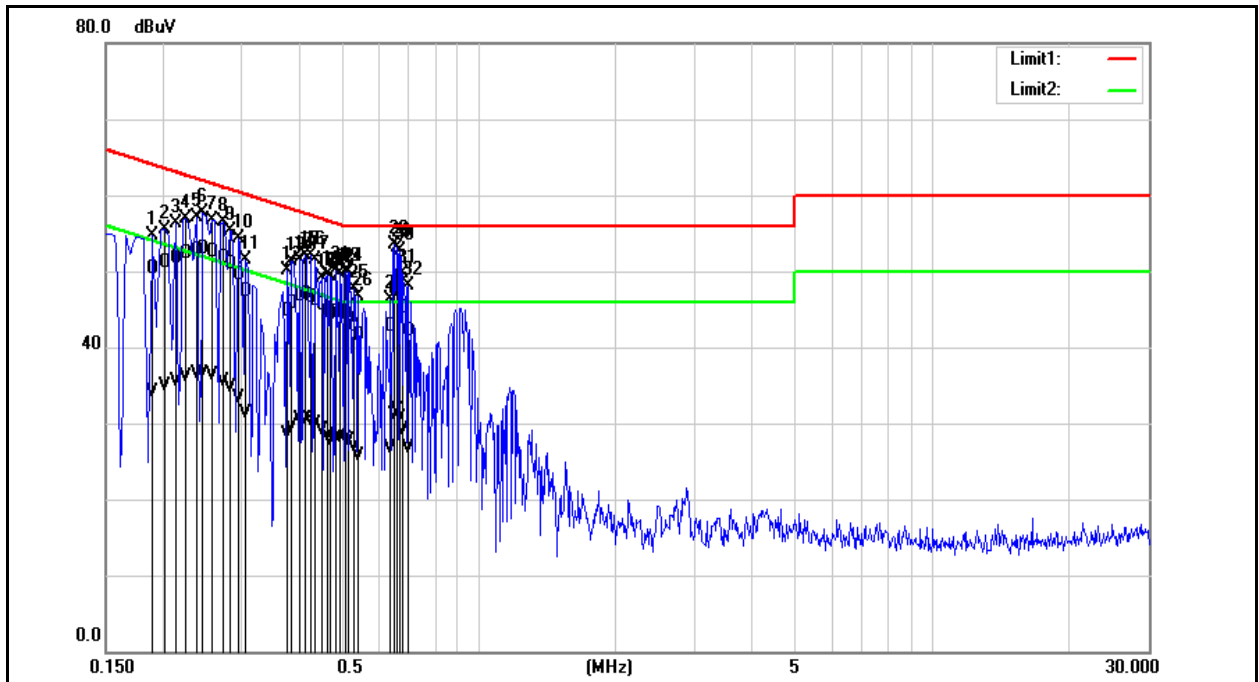
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 24 V/60 Hz
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Description:			

No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
11	0.3940	36.36	20.08	9.65	46.01	29.73	57.98	47.98	-11.97	-18.25	Pass
12	0.4100	36.90	20.57	9.65	46.55	30.22	57.65	47.65	-11.10	-17.43	Pass
13	0.4180	36.86	20.49	9.65	46.51	30.14	57.49	47.49	-10.98	-17.35	Pass
14	0.4340	36.23	19.80	9.66	45.89	29.46	57.18	47.18	-11.29	-17.72	Pass
15	0.4420	35.97	19.40	9.66	45.63	29.06	57.02	47.02	-11.39	-17.96	Pass
16	0.4660	34.55	17.90	9.66	44.21	27.56	56.58	46.58	-12.37	-19.02	Pass
17	0.4820	34.59	17.93	9.66	44.25	27.59	56.30	46.30	-12.05	-18.71	Pass
18	0.4900	34.81	18.14	9.66	44.47	27.80	56.17	46.17	-11.70	-18.37	Pass
19	0.5060	34.53	18.01	9.66	44.19	27.67	56.00	46.00	-11.81	-18.33	Pass
20	0.5140	34.04	17.74	9.66	43.70	27.40	56.00	46.00	-12.30	-18.60	Pass
21	0.5300	32.83	16.86	9.66	42.49	26.52	56.00	46.00	-13.51	-19.48	Pass
22	0.6300	30.69	16.10	9.66	40.35	25.76	56.00	46.00	-15.65	-20.24	Pass
23	0.6460	37.09	20.84	9.66	46.75	30.50	56.00	46.00	-9.25	-15.50	Pass
24	0.6780	35.26	19.60	9.66	44.92	29.26	56.00	46.00	-11.08	-16.74	Pass
25	0.6940	32.80	17.77	9.66	42.46	27.43	56.00	46.00	-13.54	-18.57	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 24 V/60 Hz
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1900	40.59	24.46	9.67	50.26	34.13	64.04	54.04	-13.78	-19.91	Pass
2	0.2020	41.38	25.25	9.67	51.05	34.92	63.53	53.53	-12.48	-18.61	Pass
3	0.2140	42.12	25.93	9.67	51.79	35.60	63.05	53.05	-11.26	-17.45	Pass
4	0.2260	42.67	26.43	9.67	52.34	36.10	62.60	52.60	-10.26	-16.50	Pass
5	0.2380	43.09	26.87	9.67	52.76	36.54	62.17	52.17	-9.41	-15.63	Pass
6	0.2460	43.16	26.86	9.67	52.83	36.53	61.89	51.89	-9.06	-15.36	Pass
7	0.2580	42.92	26.65	9.67	52.59	36.32	61.50	51.50	-8.91	-15.18	Pass
8	0.2740	42.07	25.82	9.67	51.74	35.49	61.00	51.00	-9.26	-15.51	Pass
9	0.2820	41.29	25.09	9.68	50.97	34.77	60.76	50.76	-9.79	-15.99	Pass
10	0.2940	39.81	23.72	9.68	49.49	33.40	60.41	50.41	-10.92	-17.01	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).



Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 24 V/60 Hz
Mode:	Mode 1	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Description:			

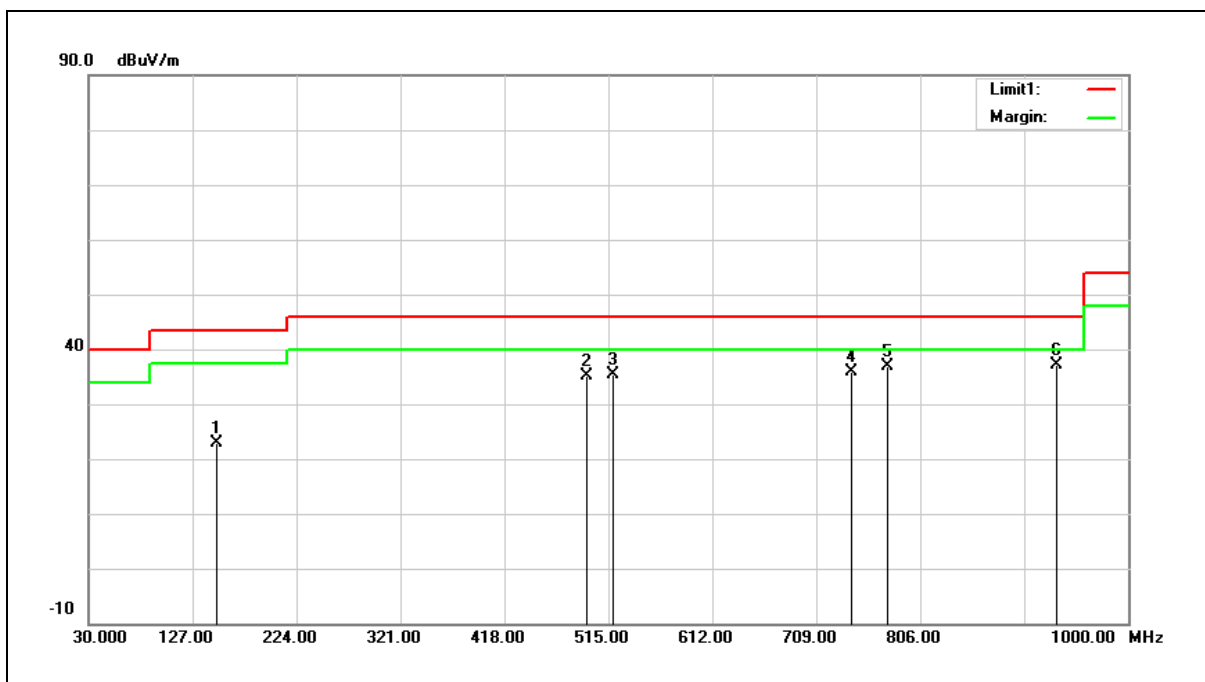
No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
11	0.3060	37.54	21.61	9.68	47.22	31.29	60.08	50.08	-12.86	-18.79	Pass
12	0.3780	34.94	18.80	9.68	44.62	28.48	58.32	48.32	-13.70	-19.84	Pass
13	0.3860	35.96	19.77	9.68	45.64	29.45	58.15	48.15	-12.51	-18.70	Pass
14	0.4020	37.03	20.79	9.68	46.71	30.47	57.81	47.81	-11.10	-17.34	Pass
15	0.4140	37.17	20.91	9.68	46.85	30.59	57.57	47.57	-10.72	-16.98	Pass
16	0.4260	36.89	20.54	9.69	46.58	30.23	57.33	47.33	-10.75	-17.10	Pass
17	0.4340	36.49	20.14	9.69	46.18	29.83	57.18	47.18	-11.00	-17.35	Pass
18	0.4500	35.77	19.34	9.69	45.46	29.03	56.88	46.88	-11.42	-17.85	Pass
19	0.4620	34.96	18.52	9.69	44.65	28.21	56.66	46.66	-12.01	-18.45	Pass
20	0.4700	34.59	18.10	9.69	44.28	27.79	56.51	46.51	-12.23	-18.72	Pass
21	0.4820	34.79	18.23	9.69	44.48	27.92	56.30	46.30	-11.82	-18.38	Pass
22	0.4940	35.00	18.50	9.69	44.69	28.19	56.10	46.10	-11.41	-17.91	Pass
23	0.5100	34.56	18.26	9.69	44.25	27.95	56.00	46.00	-11.75	-18.05	Pass
24	0.5180	34.09	17.94	9.69	43.78	27.63	56.00	46.00	-12.22	-18.37	Pass
25	0.5300	33.06	17.20	9.69	42.75	26.89	56.00	46.00	-13.25	-19.11	Pass
26	0.5420	31.73	16.04	9.69	41.42	25.73	56.00	46.00	-14.58	-20.27	Pass
27	0.6380	33.01	17.02	9.69	42.70	26.71	56.00	46.00	-13.30	-19.29	Pass
28	0.6500	37.82	21.32	9.69	47.51	31.01	56.00	46.00	-8.49	-14.99	Pass
29	0.6580	38.58	22.04	9.69	48.27	31.73	56.00	46.00	-7.73	-14.27	Pass
30	0.6700	37.36	21.03	9.69	47.05	30.72	56.00	46.00	-8.95	-15.28	Pass
31	0.6820	35.41	19.37	9.69	45.10	29.06	56.00	46.00	-10.90	-16.94	Pass
32	0.6980	32.35	16.97	9.69	42.04	26.66	56.00	46.00	-13.96	-19.34	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Annex B. Radiated Emission Measurement

Below 1 GHz

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 24 V/60 Hz
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	149.3100	28.71	-5.79	22.92	43.50	-20.58	QP
2	494.6300	35.40	-0.20	35.20	46.00	-10.80	QP
3	518.8800	35.11	0.31	35.42	46.00	-10.58	QP
4	741.9800	30.95	5.01	35.96	46.00	-10.04	QP
5	774.9600	31.26	5.51	36.77	46.00	-9.23	QP
6	933.0700	28.50	8.56	37.06	46.00	-8.94	QP

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

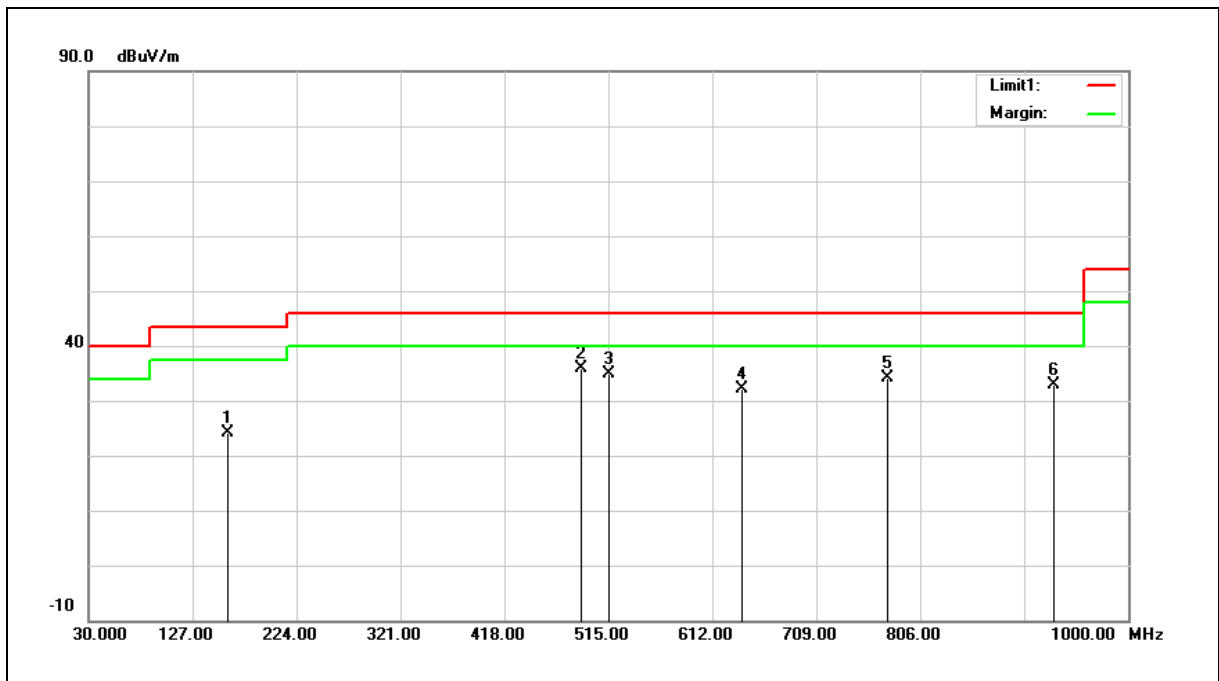
Example: 22.95 = -5.79 + 28.71

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

4.All amplitude of spurious emissions that are attenuated by more than 20 dB on below 30 MHz.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 24 V/60 Hz
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	159.9800	29.53	-5.41	24.12	43.50	-19.38	QP
2	489.7800	36.06	-0.25	35.81	46.00	-10.19	QP
3	515.0000	34.71	0.22	34.93	46.00	-11.07	QP
4	640.1300	29.39	2.83	32.22	46.00	-13.78	QP
5	775.9300	28.55	5.53	34.08	46.00	-11.92	QP
6	931.1300	24.27	8.50	32.77	46.00	-13.23	QP

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

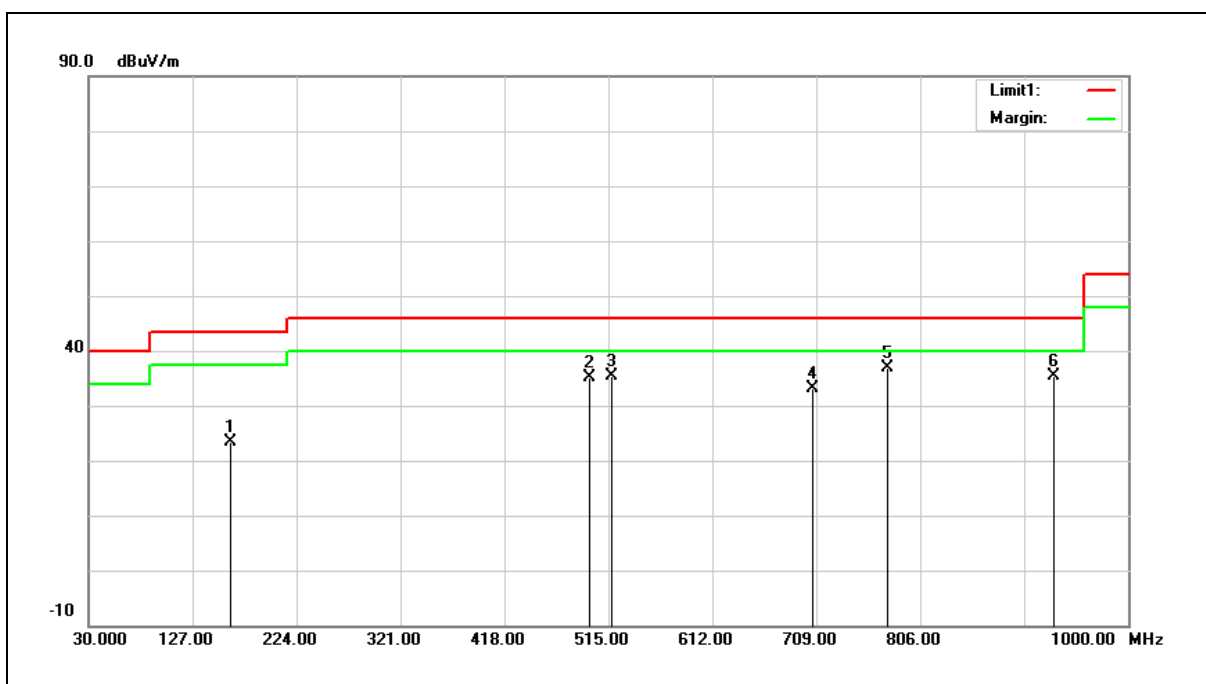
Example: $24.12 = -5.41 + 29.53$

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

4. All amplitude of spurious emissions that are attenuated by more than 20 dB on below 30 MHz.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 24 V/60 Hz
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	162.8900	28.99	-5.54	23.45	43.50	-20.05	QP
2	497.5400	35.36	-0.17	35.19	46.00	-10.81	QP
3	517.9100	35.16	0.28	35.44	46.00	-10.56	QP
4	705.1200	29.00	4.05	33.05	46.00	-12.95	QP
5	775.9300	31.26	5.53	36.79	46.00	-9.21	QP
6	930.1600	26.91	8.47	35.38	46.00	-10.62	QP

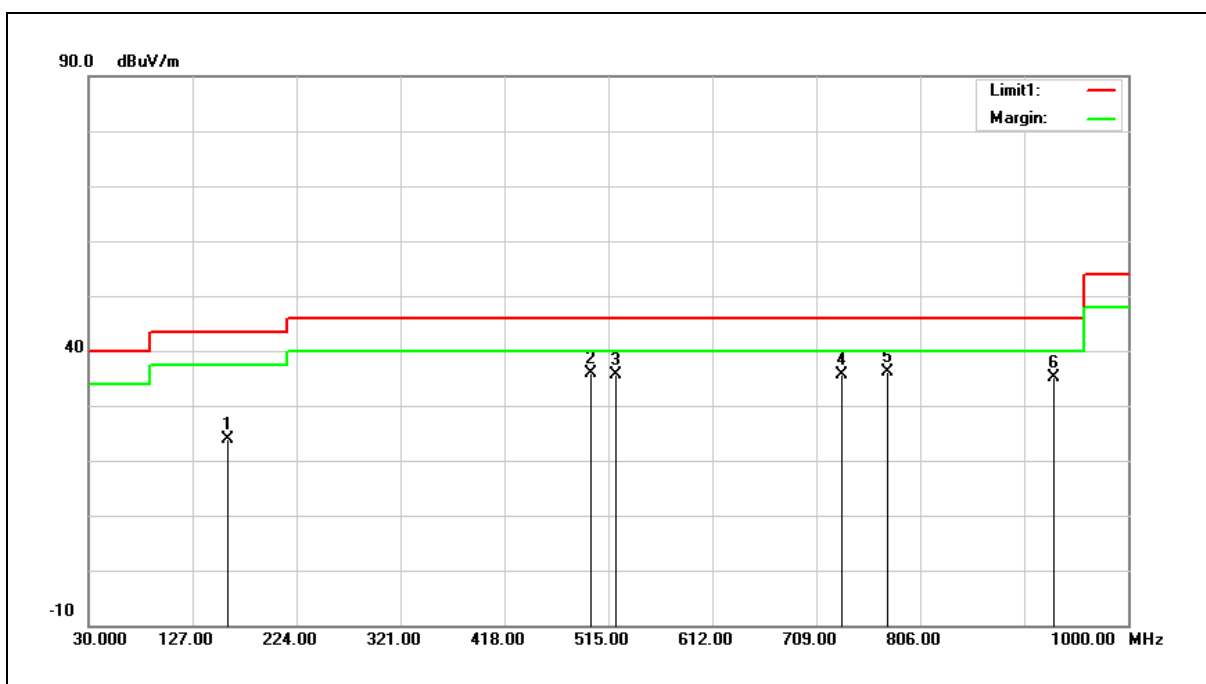
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

4.All amplitude of spurious emissions that are attenuated by more than 20 dB on below 30 MHz.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 24 V/60 Hz
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	159.9800	29.36	-5.41	23.95	43.50	-19.55	QP
2	498.5100	35.98	-0.15	35.83	46.00	-10.17	QP
3	521.7900	35.14	0.37	35.51	46.00	-10.49	QP
4	733.2500	30.94	4.78	35.72	46.00	-10.28	QP
5	775.9300	30.66	5.53	36.19	46.00	-9.81	QP
6	931.1300	26.72	8.50	35.22	46.00	-10.78	QP

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

4.All amplitude of spurious emissions that are attenuated by more than 20 dB on below 30 MHz.

---END---