

RF Test Report

Applicant : EnGenius Technologies

Product Type : 11ax Indoor Managed Access Point (For : EWS377AP v3)
11ax Cloud Managed Access Point (For : ECW230 v3)

Trade Name : EnGenius

Model Number : EWS377AP v3, ECW230 v3

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

Received Date : May 13, 2020

Test Period : Oct. 22 ~ Oct. 23, 2020

Issued Date : Nov. 03, 2020

Issued by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C.)
Tel : +86-3-2710188 / Fax : +86-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330
Frequency Range : 9 kHz to 40 GHz
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	Nov. 03, 2020	Initial Issue	Yu Chiang

Verification of Compliance

Applicant : EnGenius Technologies

Product Type : 11ax Indoor Managed Access Point (For : EWS377AP v3)
11ax Cloud Managed Access Point (For : ECW230 v3)

Trade Name : EnGenius

Model Number : EWS377AP v3, ECW230 v3

FCC ID : A8J-EWS377APV3

EUT Rated Voltage : DC 12 V, 2.5 A (DC Power Adapter)
DC 54 V, 0.6 A (PoE injector (802.3af/at))

Test Voltage : 120 Vac / 60 Hz

Applicable Standard : FCC 47 CFR PART 15 SUBPART E
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.)
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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 : Ken Yang
(Manager) (Ken Yang)

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	10
3.1.	Mode of Operation	10
3.2.	EUT Test Step	11
3.3.	Configuration of Test System Details	12
3.4.	Test Instruments.....	14
3.5.	Test Site Environment	14
4	Measurement Procedure.....	15
4.1.	AC Power Conducted Emission Measurement	15
4.2.	Transmitter Radiated Emissions Measurement.....	17
5	Test Results	21
	Annex A. Conducted Emission.....	21
	Annex B. Radiated Emission Measurement.....	25

1 General Information

1.1. Summary of Test Result

Standard	Item	Result	Remark
15.407(b)(6) 15.207	AC Power Conducted Emission	PASS	Note
15.407(b) 15.205 / 15.209	Transmitter Radiated Emissions	PASS	Note
15.407(a)	Maximum Conducted Output Power	N/A	N/A
15.407(a)	26 dB RF Bandwidth & 99 % Occupied Bandwidth	N/A	N/A
15.407(e)	6 dB RF Bandwidth	N/A	N/A
15.407(a)	Maximum Power Spectral Density	N/A	N/A
15.407(c)	Automatically discontinue transmission	N/A	N/A
15.407(a) 15.203	Antenna Requirement	N/A	N/A

Note : Transmitter Radiated Emissions is larger than the original report but not out of 3 dBm. After evaluation above, C1PC is applicable.

After the evaluation, AC Power Conducted and Transmitter Radiated Emissions (Below 1 GHz) need to be re-evaluated.

Decision Rule

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

Standard	Description
CFR47, Part 15, Subpart C §15.247	Intentional Radiators
ANSI C63. 10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 v05	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

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
Conducted Output Power		0.92 dB
RF Bandwidth		4.79 %
Power Spectral Density		0.92 dB
Frequency Stability		4.1×10^{-8}
Duty Cycle		1.06 %
Time Occupancy		1.40 %

2 EUT Description

Applicant	EnGenius Technologies 1580 Scenic Avenue, Costa Mesa, CA 92626				
Manufacturer	EnGenius Networks. Inc. No.500, Fusing 3rd Rd., Hwa-Ya Technology Park Kuei-Shan Dist., Taoyuan City, Taiwan (R.O.C.)				
Product Type	11ax Indoor Managed Access Point (For : EWS377AP v3) 11ax Cloud Managed Access Point (For : ECW230 v3)				
Trade Name	EnGenius				
Model Number	EWS377AP v3, ECW230 v3				
Difference description of product type/ model number	Differences are due to selling region.				
FCC ID	A8J-EWS377APV3				
Class I Permissive Change	Add conductive foam.				
Operate Frequency	Frequency Band		Frequency Range (MHz)	Number of Channels	
	IEEE 802.11a	U-NII Band I	5180 – 5240	4	
		U-NII Band III	5745 – 5825	5	
	IEEE 802.11n 5 GHz 20 MHz / IEEE 802.11ac 20 MHz/ IEEE 802.11ax 20 MHz	U-NII Band I	5180 – 5240	4	
		U-NII Band III	5745 – 5825	5	
	IEEE 802.11n 5 GHz 40 MHz / IEEE 802.11ac 40 MHz/ IEEE 802.11ax 40 MHz	U-NII Band I	5190 – 5230	2	
		U-NII Band III	5755 – 5795	2	
	IEEE 802.11ac 80 MHz/ IEEE 802.11ax 80 MHz	U-NII Band I	5210	1	
U-NII Band III		5775	1		
Modulation Type	OFDM/OFDMA				
Antenna information	Antenna	Model	Type	Max. Gain (dBi)	
	ANT-0	5718A0518300	PIFA Antenna	U-NII Band I	5.13
				U-NII Band III	5.19
	ANT-1	5718A0522300	PIFA Antenna	U-NII Band I	4.26
				U-NII Band III	3.81
	ANT-2	5718A0520300	PIFA Antenna	U-NII Band I	4.03
				U-NII Band III	4.56
	ANT-3	5718A0521300	PIFA Antenna	U-NII Band I	5.04
U-NII Band III				5.04	
Antenna Delivery	Reference section 3.1				
Operate Temp. Range	0 ~ 40 ℃				

Frequency Band		RF Output Power (W)
IEEE 802.11a	U-NII Band I	0.189
	U-NII Band III	0.351
IEEE 802.11ac 20 MHz	U-NII Band I	0.342
	U-NII Band III	0.338
IEEE 802.11ac 40 MHz	U-NII Band I	0.362
	U-NII Band III	0.359
IEEE 802.11ac 80 MHz	U-NII Band I	0.176
	U-NII Band III	0.344
IEEE 802.11ax 20 MHz	U-NII Band I	0.361
	U-NII Band III	0.359
IEEE 802.11ax 40 MHz	U-NII Band I	0.377
	U-NII Band III	0.369
IEEE 802.11ax 80 MHz	U-NII Band I	0.164
	U-NII Band III	0.356

Beamforming on

Frequency Band		RF Output Power (W)
IEEE 802.11ac 20 MHz	U-NII Band I	0.084
	U-NII Band III	0.083
IEEE 802.11ac 40 MHz	U-NII Band I	0.086
	U-NII Band III	0.085
IEEE 802.11ac 80 MHz	U-NII Band I	0.040
	U-NII Band III	0.081
IEEE 802.11ax 20 MHz	U-NII Band I	0.089
	U-NII Band III	0.088
IEEE 802.11ax 40 MHz	U-NII Band I	0.087
	U-NII Band III	0.087
IEEE 802.11ax 80 MHz	U-NII Band I	0.038
	U-NII Band III	0.086

EUT Modify Description :

Modify Description:
Add conductive foam.

After the evaluation, AC Power Conducted Emission & Transmitter Radiated Emissions (Below 1 GHz) is smaller than the original. After evaluation above, C1PC is applicable.

Original Report : 2007FR29 Rev.01
Modify: 2010FR11 Rev.00

Equipment Type		
Outdoor access point	point-to-point	---
	point-to-multipoint	---
Indoor access point		V
Fixed point-to-point access points		---
Client devices		---

3 Test Methodology

3.1. Mode of Operation

In the test report use EUT model: EWS377AP v3 to operate testing.

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: IEEE 802.11a Continuous TX mode
Mode 3: IEEE 802.11ac 20 MHz Continuous TX mode
Mode 4: IEEE 802.11ac 40 MHz Continuous TX mode
Mode 5: IEEE 802.11ac 80 MHz Continuous TX mode
Mode 6: IEEE 802.11ax 20 MHz Continuous TX mode
Mode 7: IEEE 802.11ax 40 MHz Continuous TX mode
Mode 8: IEEE 802.11ax 80 MHz 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 : EUT only supports Full RU °

Test Mode	ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
Mode 2	V	V	V	V	V
Mode 3	V	V	V	V	V
Mode 4	V	V	V	V	V
Mode 5	V	V	V	V	V
Mode 6	V	V	V	V	V
Mode 7	V	V	V	V	V
Mode 8	V	V	V	V	V

Test Mode	Antenna Delivery	Data Rate (Mbps)	Band	Test Channel
Mode 2	4TX (CDD)	6	U-NII Band I	36, 40, 48
			U-NII Band III	149, 157, 165
Mode 3	4TX (STBC/Beamforming on)	26	U-NII Band I	36, 40, 48
			U-NII Band III	149, 157, 165
Mode 4	4TX (STBC/Beamforming on)	54	U-NII Band I	38, 46
			U-NII Band III	151,159
Mode 5	4TX (STBC/Beamforming on)	117.2	U-NII Band I	42
			U-NII Band III	155
Mode 6	4TX (STBC/Beamforming on)	MCS 0	U-NII Band I	36, 40, 48
			U-NII Band III	149, 157, 165
Mode 7	4TX (STBC/Beamforming on)	MCS 0	U-NII Band I	38, 46
			U-NII Band III	151,159
Mode 8	4TX (STBC/Beamforming on)	MCS 0	U-NII Band I	42
			U-NII Band III	155

3.2. EUT Test Step

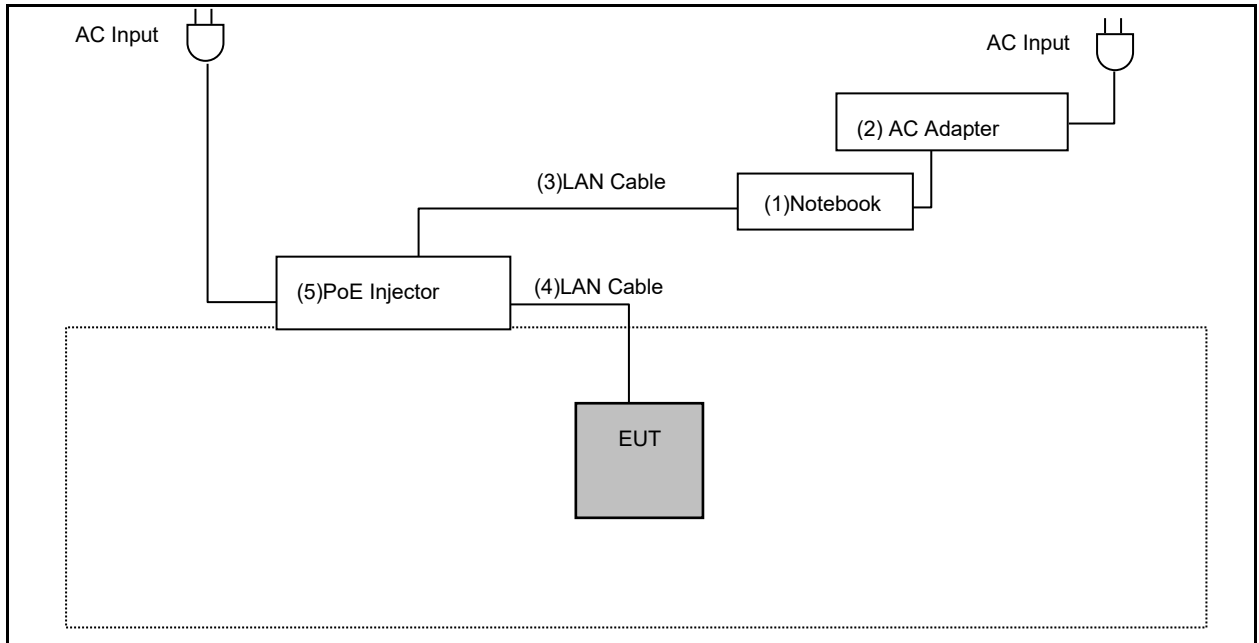
The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement. According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

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.

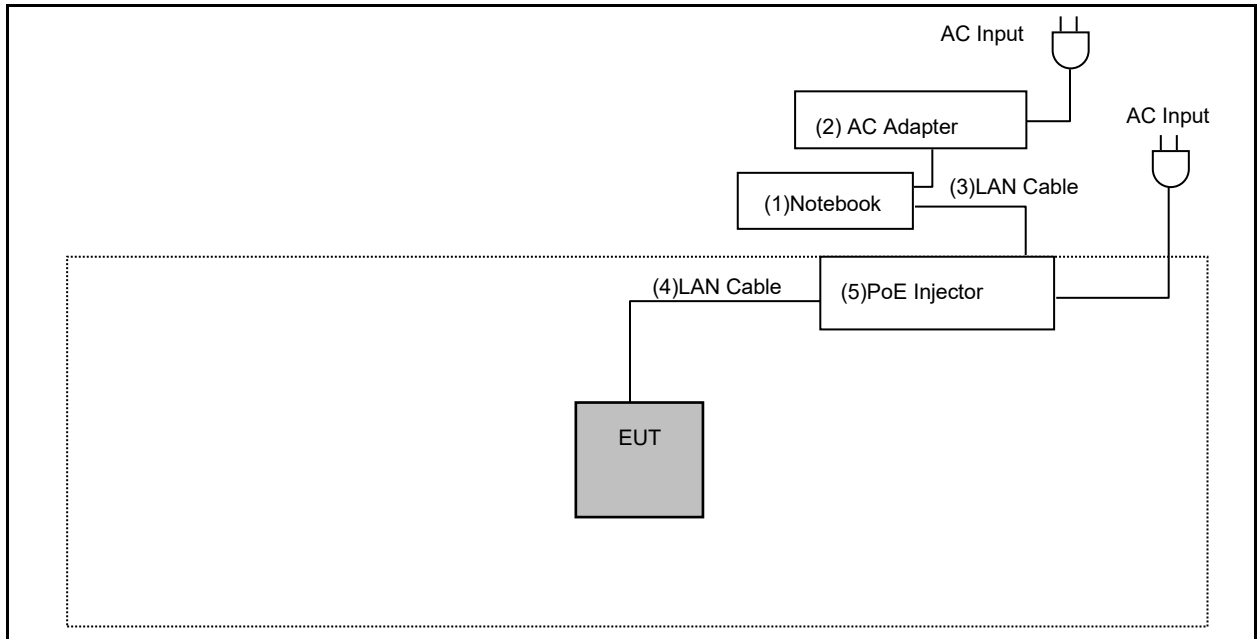
Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	EZ EMC	1.1.4.3
2	Radiated Emission	EZ EMC	1.1.4.4

3.3. Configuration of Test System Details

Conducted Emission



Radiated Emissions



Devices Description					
	Product	Manufacturer	Model Number	Serial Number	Remark
(1)	Notebook	DELL	LATITUDE E6440	5HZBD72	---
(2)	AC Adapter	DELL	HA65NM130	---	INPUT : 100-240 VAC, 50/60 Hz, 1.7 A OUTPUT : 19.5 VDC, 3.34 A Non-Shielded, 1.8 m
(3)	LAN Cable	WINKEY ENTERPRISE CO., LTD.	CY-SZ-141224	---	---
(4)	LAN Cable	WINKEY ENTERPRISE CO., LTD.	CY-SZ-141224	---	---
(5)	PoE Injector	emplus	EPA5006GAT	---	INPUT : 100-240 VAC, 50-60 Hz, 0.8 A OUTPUT : 54 VDC, 0.6 A
(6)	AC Adapter	SPC	ZZU1588-250120-2A	---	INPUT : 100-240 VAC, 50-60 Hz, 1.5 A OUTPUT : 12.0 VDC, 2.5 A

Note: The device used (6)AC Adapter and (5)PoE Injector to evaluation AC Power line Conducted Emission, (5)POE Injector is worst case to perform testing.

3.4. Test Instruments

For Conducted Emission

Test Period: Oct. 23, 2020

Testing Engineer: Peter Liu

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	100367	05/25/2020	1 year
LISN	R&S	ENV216	101040	03/23/2020	1 year
LISN	R&S	ENV216	101041	04/06/2020	1 year
RF Cable	Woken	00100D1380194M	TE-02-03	05/25/2020	1 year

For Radiated Emissions

Test Period: Oct. 22, 2020

Testing Engineer: Marc Yeh

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
RF Cable	EMCI	EMC104-N-N-6000	TE01-1	02/20/2020	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1 3000	170814	10/29/2019	1 year

Note: N.C.R. = No Calibration Request.

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	20-30
Humidity (%RH)	25-75	45-75

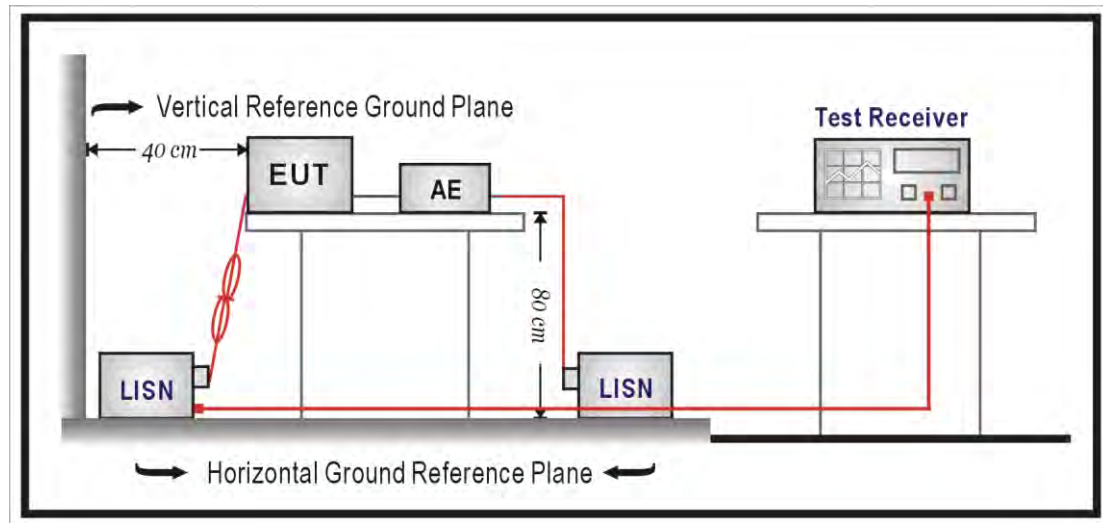
4 Measurement Procedure

4.1. AC Power 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. Transmitter Radiated Emissions Measurement

■ Limit

(1)Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(a)For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(b)For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(c)For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(d)For transmitters operating in the 5.725-5.85 GHz band:

(i)All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2)Limits of Radiated Emission Measurement

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency Range (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	10	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

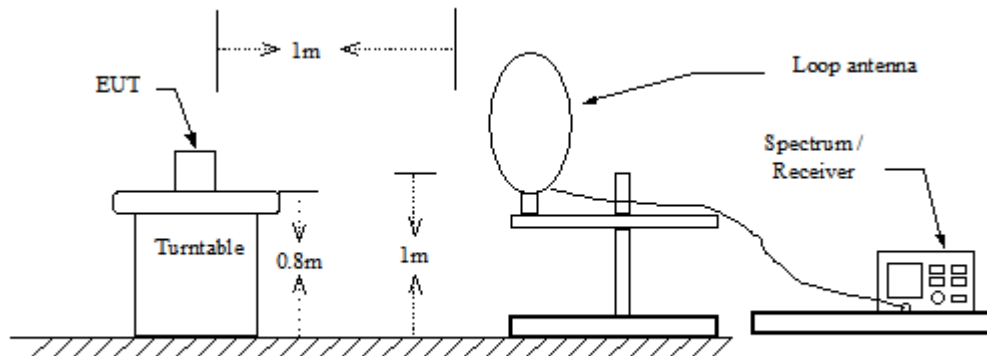
Note: 1. The lower limit shall apply at the transition frequencies.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

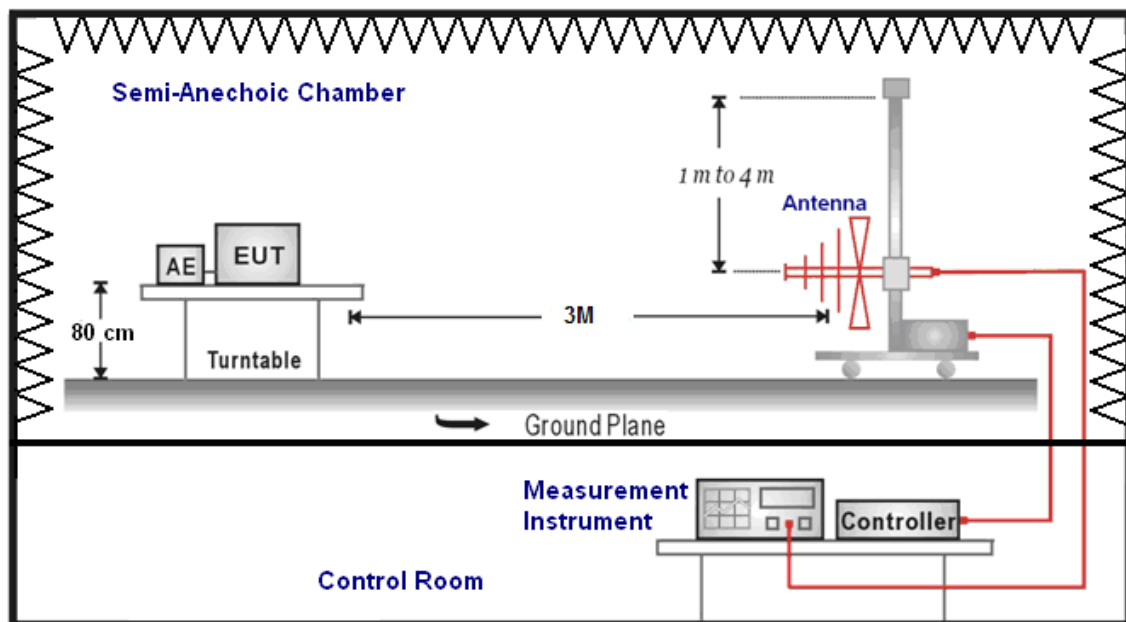
3. As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

■ Setup

9 kHz ~ 30 MHz



30 MHz ~ 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 (below 1 GHz use 0.8 m turntable / above 1 GHz use 1.5 m turntable), 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 40 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 restricted 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.

For out of band 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.

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 Trilog-Broadband Antenna at 3 Meter and the ETS-Lindgren Double-Ridged Waveguide Horn antenna Schwarzbeck Mess-Elektronik Broadband Horn Antenna was used in frequencies 1 – 40 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 per 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 is 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) $\text{Amplitude (dBuV/m)} = \text{FI (dBuV)} + \text{AF (dBuV)} + \text{CL (dBuV)} - \text{Gain (dB)}$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

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

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

Measuring Instruments and setting

The following table is the setting of spectrum analyzer and receiver.

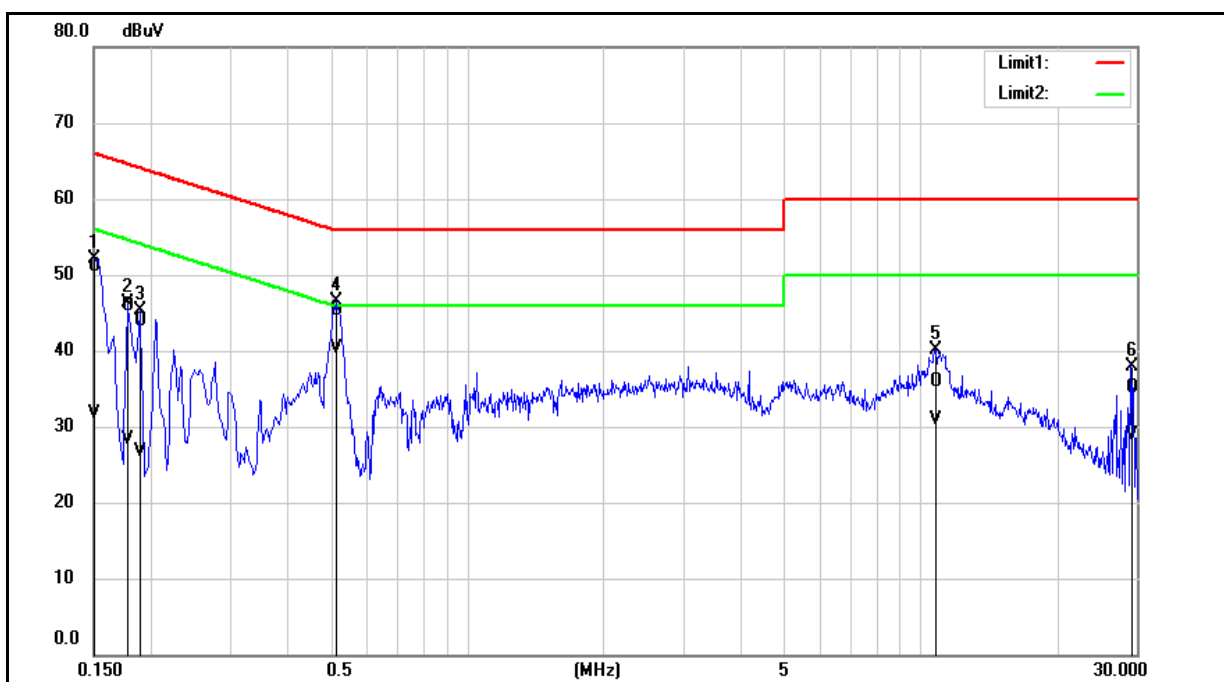
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW/VBW(Emission in restricted band)	1 MHz / 3 MHz for Peak 1 MHz / (1/T) for Average
RBW/VBW(Emission in non-restricted band)	1 MHz / 3 MHz for Peak

5 Test Results

Annex A. Conducted Emission

POE Injector	
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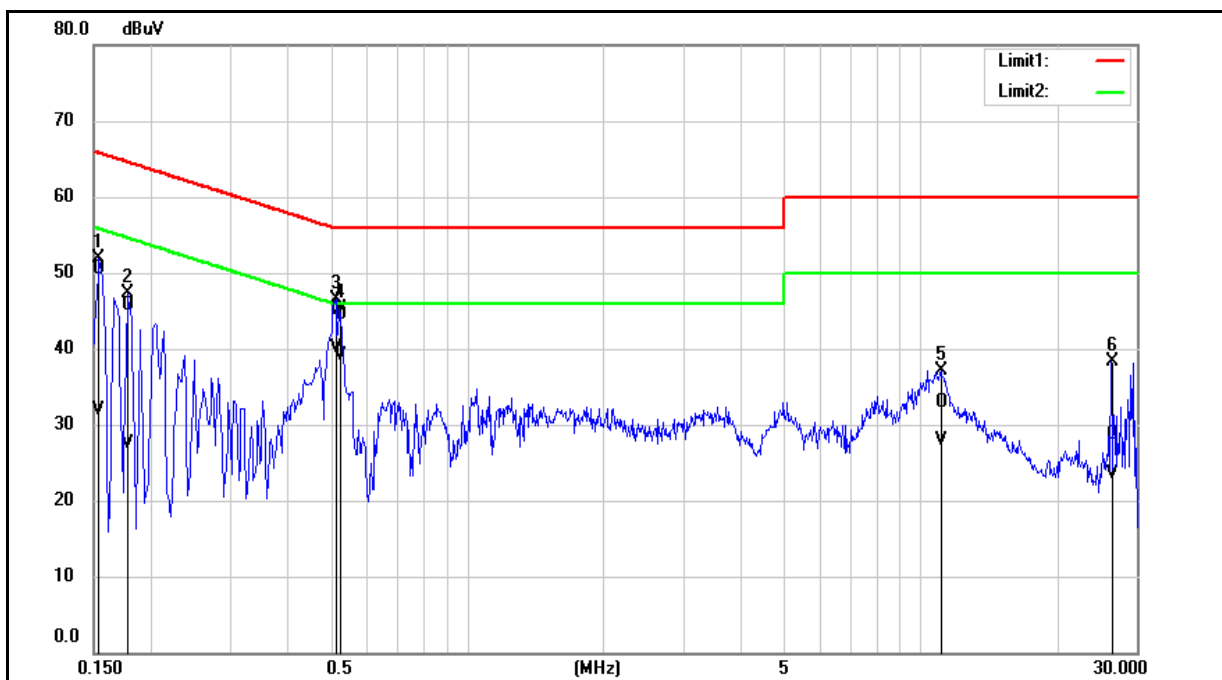
Standard:	FCC Part 15.407	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		



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 15.407	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		



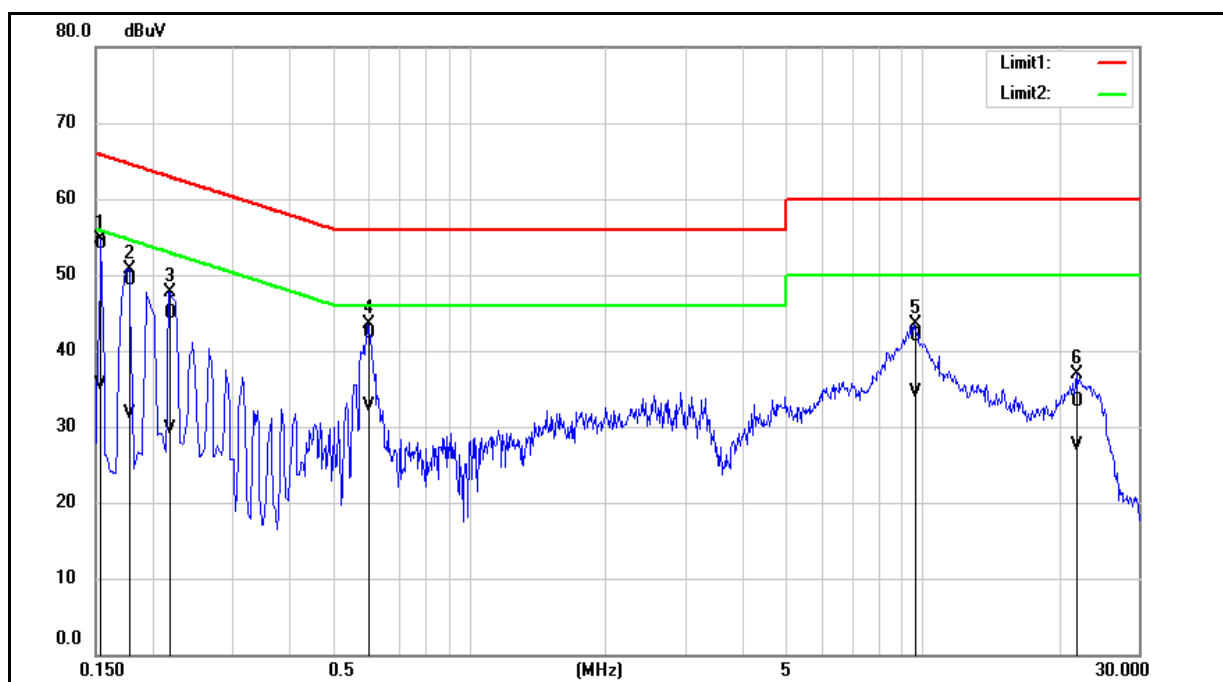
No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	40.89	22.29	9.68	50.57	31.97	65.78	55.78	-15.21	-23.81	Pass
2	0.1780	36.00	17.85	9.67	45.67	27.52	64.58	54.58	-18.91	-27.06	Pass
3	0.5140	35.46	30.38	9.69	45.15	40.07	56.00	46.00	-10.85	-5.93	Pass
4	0.5220	34.79	29.46	9.69	44.48	39.15	56.00	46.00	-11.52	-6.85	Pass
5	11.1100	22.97	17.83	9.99	32.96	27.82	60.00	50.00	-27.04	-22.18	Pass
6	26.3300	18.44	13.30	10.26	28.70	23.56	60.00	50.00	-31.30	-26.44	Pass

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

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

AC Adapter

Standard:	FCC Part 15.407	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		

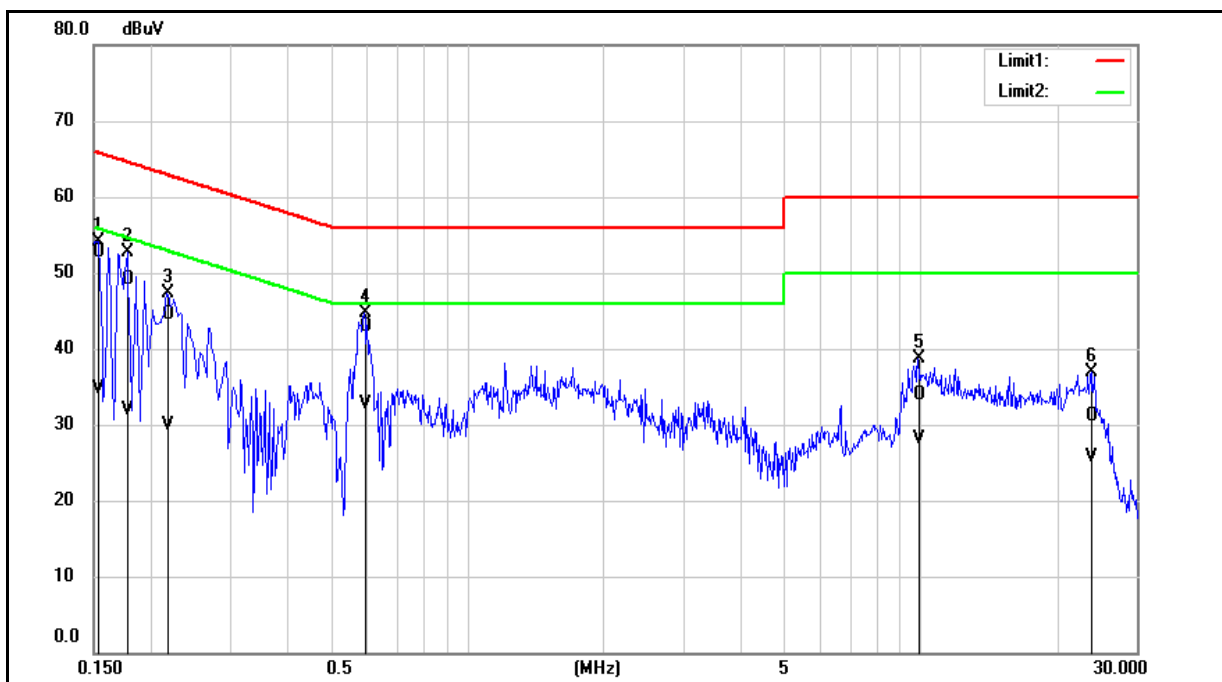


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	44.40	25.84	9.65	54.05	35.49	65.78	55.78	-11.73	-20.29	Pass
2	0.1780	39.61	21.99	9.64	49.25	31.63	64.58	54.58	-15.33	-22.95	Pass
3	0.2180	35.22	19.99	9.64	44.86	29.63	62.89	52.89	-18.03	-23.26	Pass
4	0.5980	32.60	23.07	9.66	42.26	32.73	56.00	46.00	-13.74	-13.27	Pass
5	9.6300	31.96	24.61	9.90	41.86	34.51	60.00	50.00	-18.14	-15.49	Pass
6	21.9140	23.28	17.55	10.03	33.31	27.58	60.00	50.00	-26.69	-22.42	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 15.407	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		



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	0.1540	43.02	25.05	9.68	52.70	34.73	65.78	55.78	-13.08	-21.05	Pass
2	0.1780	39.37	22.24	9.67	49.04	31.91	64.58	54.58	-15.54	-22.67	Pass
3	0.2180	34.79	20.15	9.67	44.46	29.82	62.89	52.89	-18.43	-23.07	Pass
4	0.5940	33.23	23.06	9.69	42.92	32.75	56.00	46.00	-13.08	-13.25	Pass
5	9.9100	23.88	18.08	9.96	33.84	28.04	60.00	50.00	-26.16	-21.96	Pass
6	23.7740	20.93	15.56	10.23	31.16	25.79	60.00	50.00	-28.84	-24.21	Pass

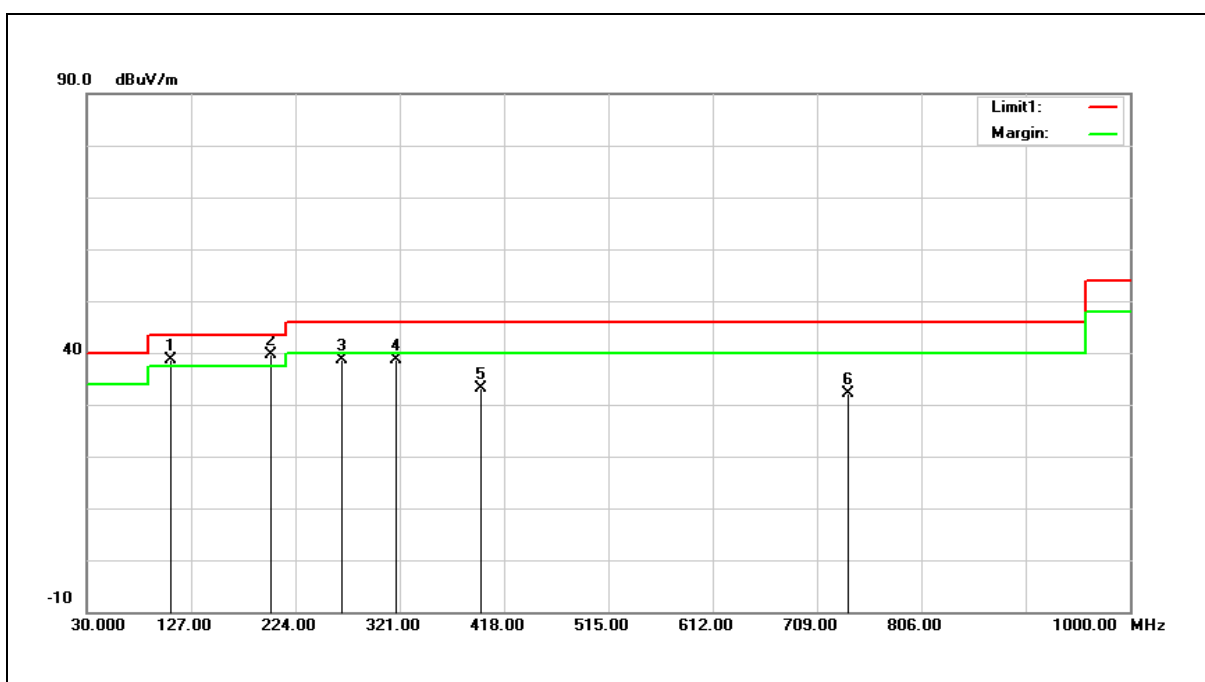
Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

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

Annex B. Radiated Emission Measurement

Below 1 GHz

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5745 MHz		
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	108.5700	48.06	-9.45	38.61	43.50	-4.89	QP
2	201.6900	47.31	-7.79	39.52	43.50	-3.98	QP
3	267.6500	43.79	-5.23	38.56	46.00	-7.44	QP
4	317.1200	42.45	-3.93	38.52	46.00	-7.48	QP
5	396.6600	35.42	-2.18	33.24	46.00	-12.76	QP
6	738.1000	27.14	4.91	32.05	46.00	-13.95	QP

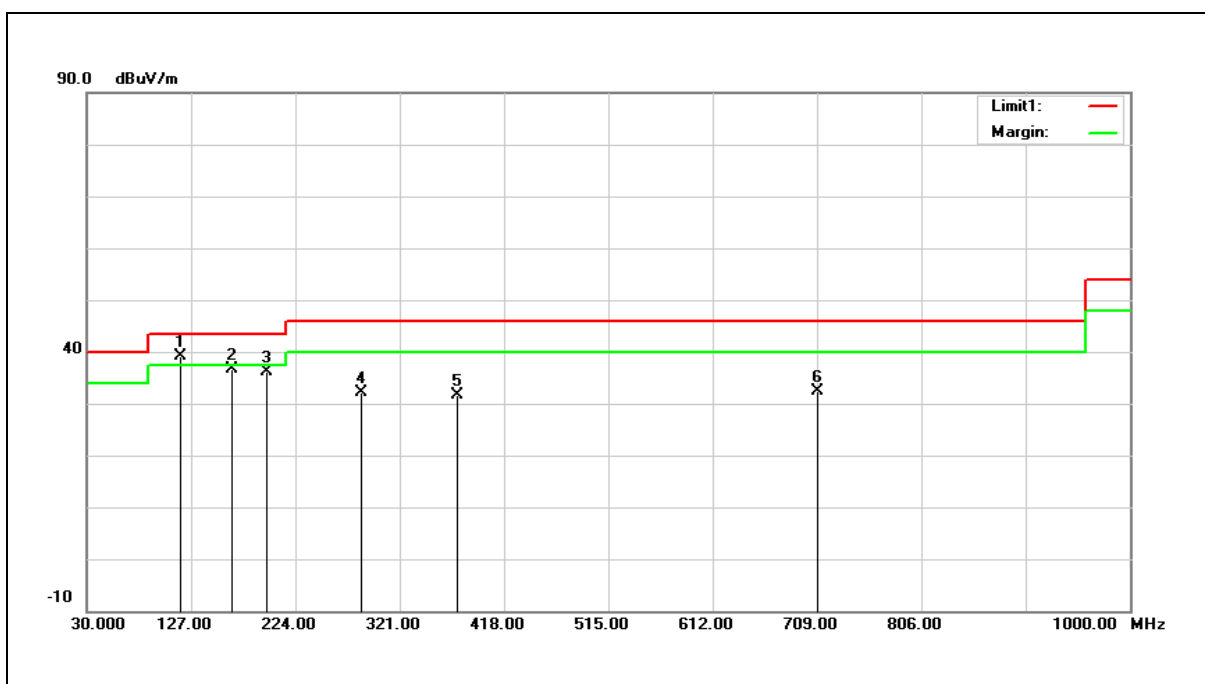
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: $38.61 = -9.45 + 48.06$.

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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5745 MHz		
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	117.3000	47.87	-8.66	39.21	43.50	-4.29	QP
2	164.8300	42.37	-5.62	36.75	43.50	-6.75	QP
3	197.8100	43.78	-7.68	36.10	43.50	-7.40	QP
4	285.1100	36.81	-4.56	32.25	46.00	-13.75	QP
5	374.3500	34.44	-2.77	31.67	46.00	-14.33	QP
6	709.0000	28.27	4.16	32.43	46.00	-13.57	QP

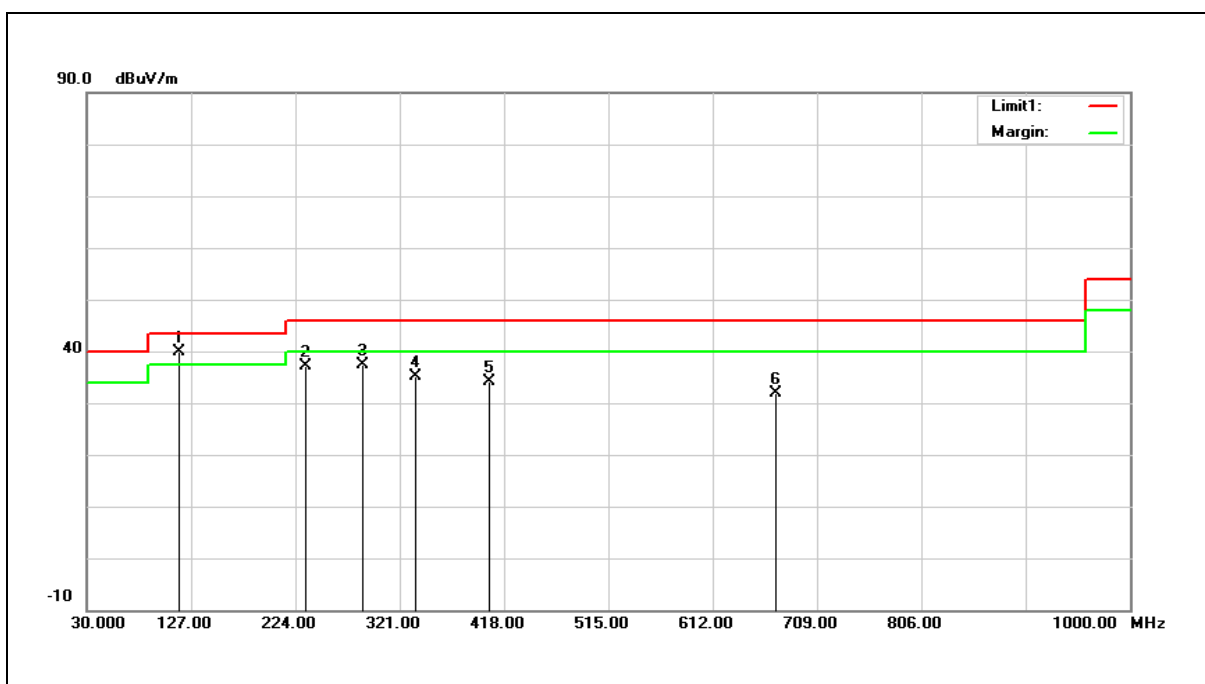
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: $39.21 = -8.66 + 47.87$.

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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5785 MHz		
Mode:	Mode 6		
Ant.Polar.:	Horizontal		



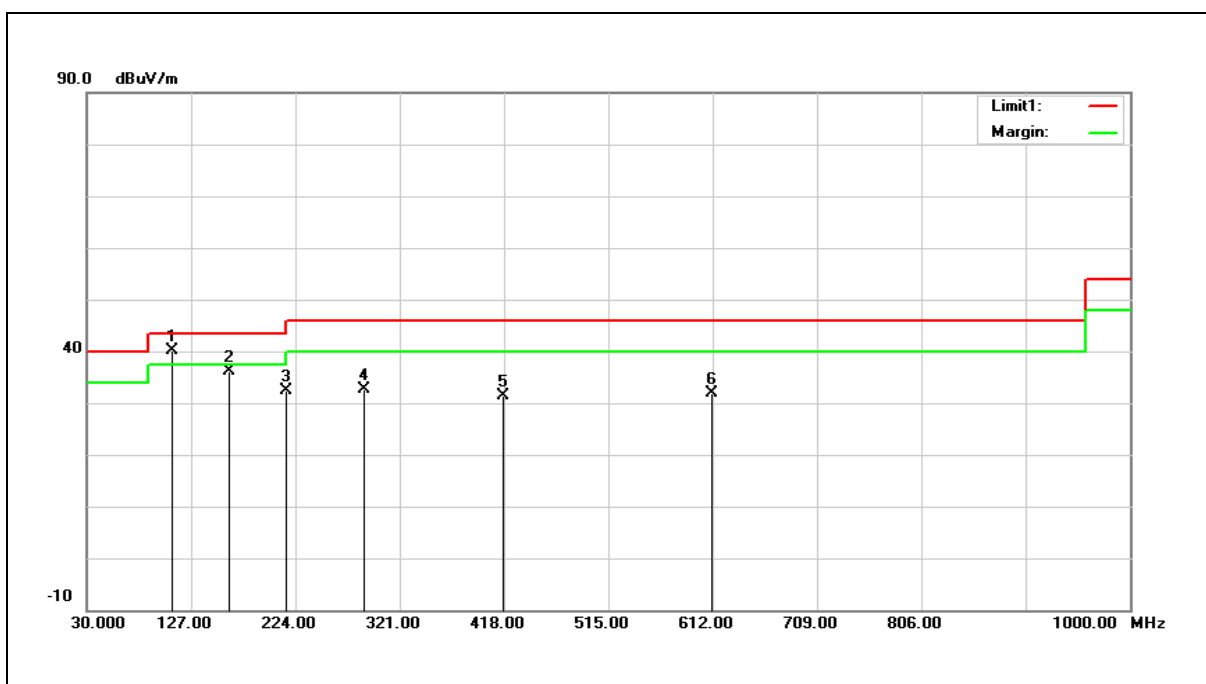
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	116.3300	48.55	-8.74	39.81	43.50	-3.69	QP
2	233.7000	43.79	-6.68	37.11	46.00	-8.89	QP
3	286.0800	41.82	-4.54	37.28	46.00	-8.72	QP
4	335.5500	38.64	-3.63	35.01	46.00	-10.99	QP
5	404.4200	36.07	-1.96	34.11	46.00	-11.89	QP
6	671.1700	28.60	3.35	31.95	46.00	-14.05	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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5785 MHz		
Mode:	Mode 6		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	109.5400	49.53	-9.29	40.24	43.50	-3.26	QP
2	162.8900	41.69	-5.54	36.15	43.50	-7.35	QP
3	215.2700	39.70	-7.39	32.31	43.50	-11.19	QP
4	288.0200	37.19	-4.50	32.69	46.00	-13.31	QP
5	417.0300	32.91	-1.61	31.30	46.00	-14.70	QP
6	611.0300	29.18	2.59	31.77	46.00	-14.23	QP

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

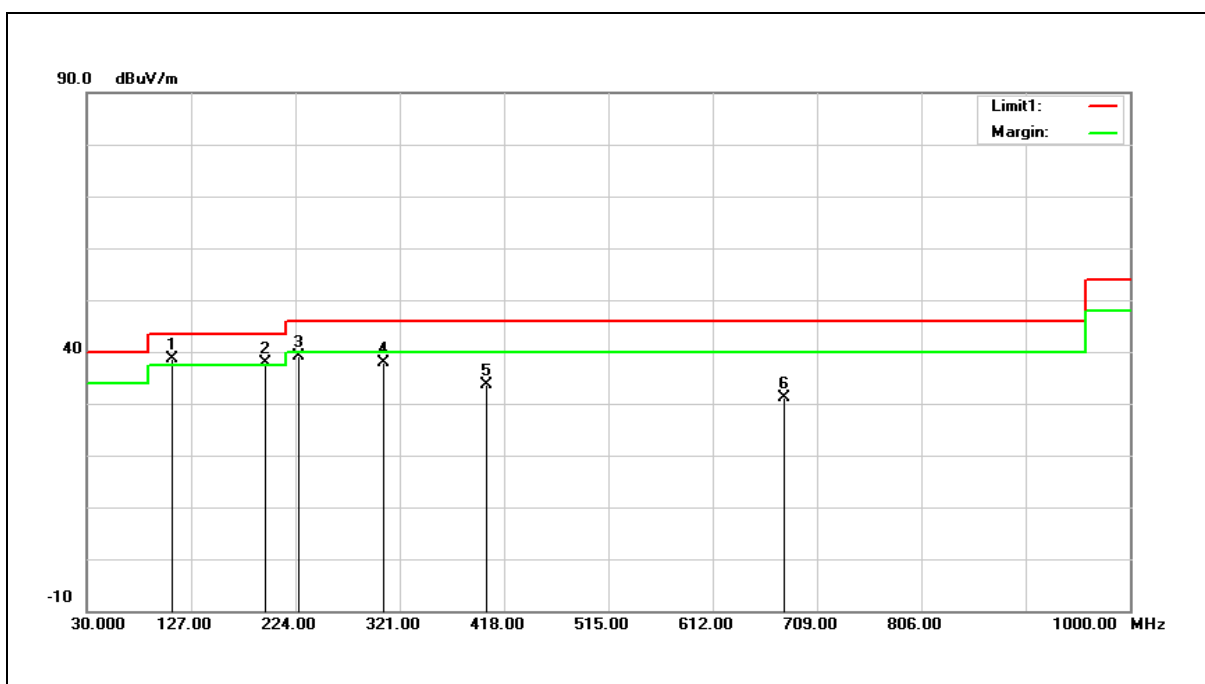
2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

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

Beamforming on

Below 1 GHz

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5745 MHz		
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	109.5400	47.84	-9.29	38.55	43.50	-4.95	QP
2	195.8700	45.51	-7.56	37.95	43.50	-5.55	QP
3	226.9100	46.06	-7.03	39.03	46.00	-6.97	QP
4	306.4500	41.97	-4.09	37.88	46.00	-8.12	QP
5	401.5100	35.79	-2.05	33.74	46.00	-12.26	QP
6	678.9300	27.55	3.51	31.06	46.00	-14.94	QP

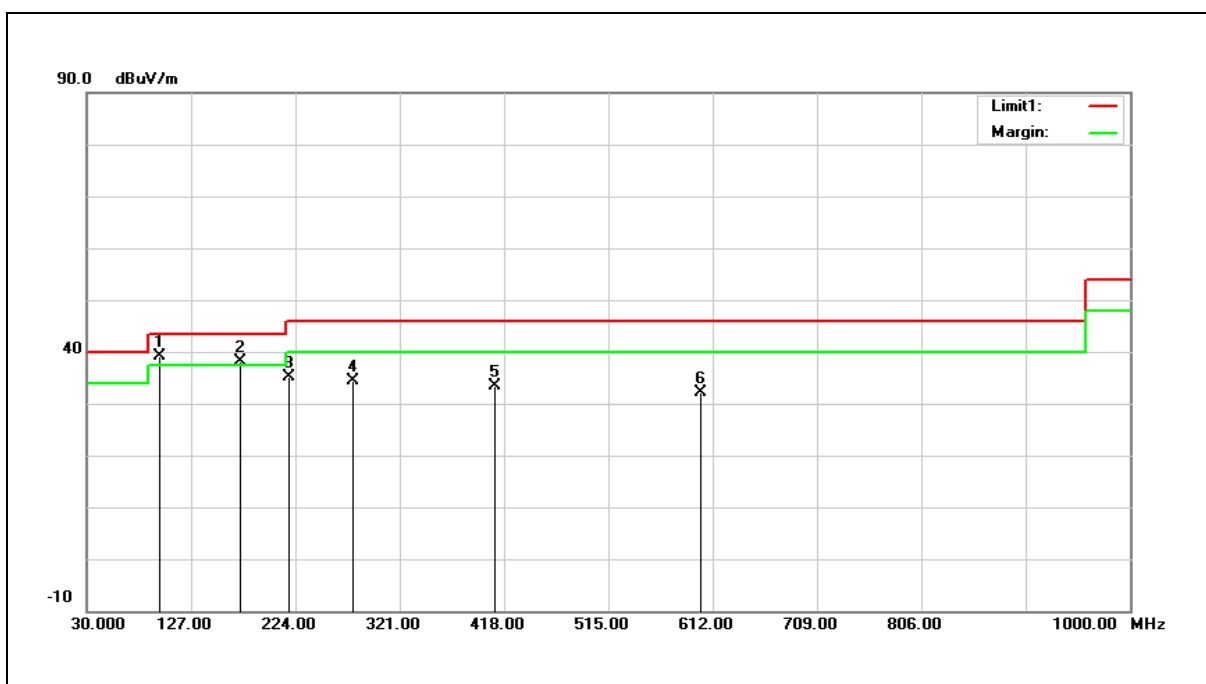
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 38.55 = -9.29+47.84.

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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5745 MHz		
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	97.9000	50.10	-11.07	39.03	43.50	-4.47	QP
2	172.5900	44.13	-6.00	38.13	43.50	-5.37	QP
3	218.1800	42.24	-7.23	35.01	46.00	-10.99	QP
4	277.3500	39.21	-4.81	34.40	46.00	-11.60	QP
5	409.2700	35.26	-1.83	33.43	46.00	-12.57	QP
6	600.3600	29.75	2.49	32.24	46.00	-13.76	QP

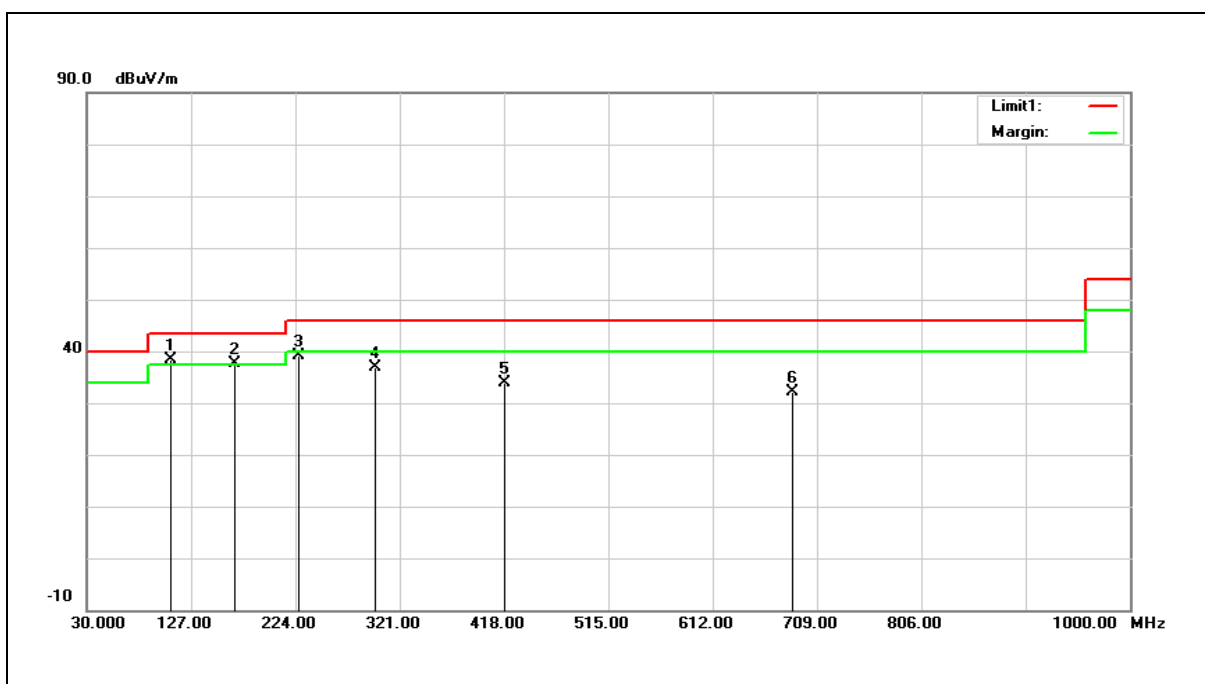
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: $39.03 = -11.07 + 50.10$.

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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5825 MHz		
Mode:	Mode 6		
Ant.Polar.:	Horizontal		



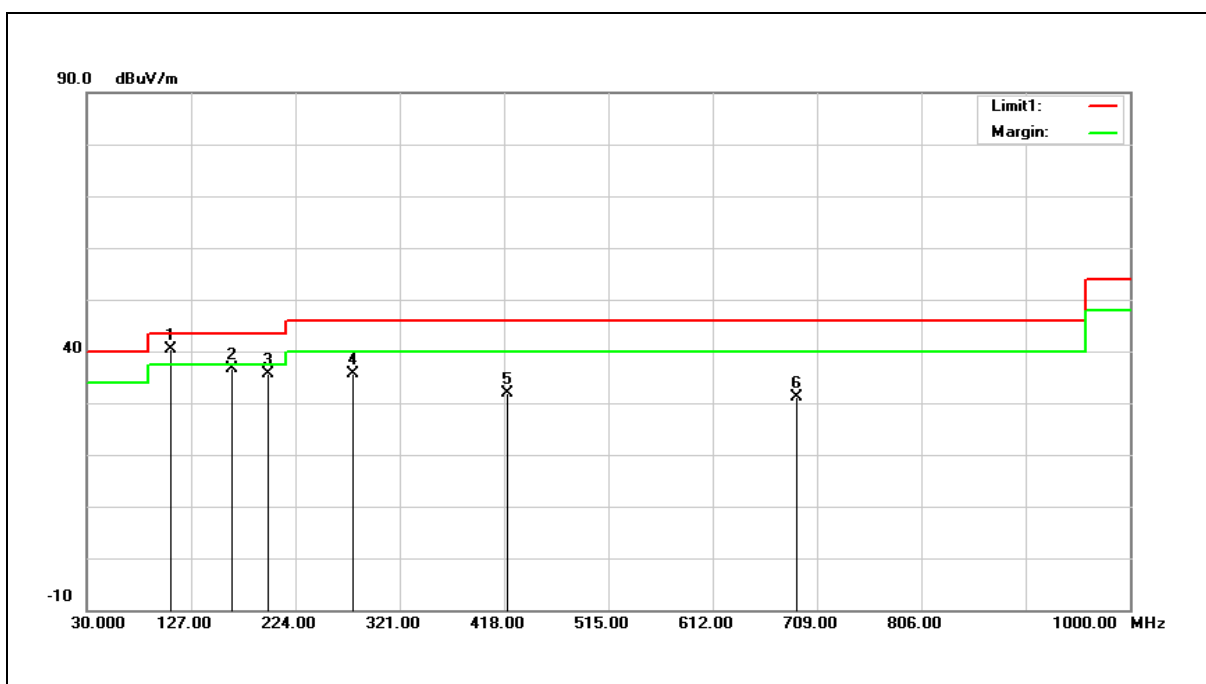
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	108.5700	47.75	-9.45	38.30	43.50	-5.20	QP
2	167.7400	43.40	-5.71	37.69	43.50	-5.81	QP
3	226.9100	46.23	-7.03	39.20	46.00	-6.80	QP
4	298.6900	41.11	-4.23	36.88	46.00	-9.12	QP
5	418.0000	35.53	-1.59	33.94	46.00	-12.06	QP
6	686.6900	28.47	3.66	32.13	46.00	-13.87	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.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Radiated Emission		
Frequency:	5825 MHz		
Mode:	Mode 6		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	108.5700	49.81	-9.45	40.36	43.50	-3.14	QP
2	164.8300	42.21	-5.62	36.59	43.50	-6.91	QP
3	198.7800	43.39	-7.75	35.64	43.50	-7.86	QP
4	277.3500	40.45	-4.81	35.64	46.00	-10.36	QP
5	420.9100	33.37	-1.51	31.86	46.00	-14.14	QP
6	690.5700	27.47	3.74	31.21	46.00	-14.79	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.

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