

**FCC 47 CFR PART 15 SUBPART C &
INDUSTRY CANADA RSS-210**

TEST REPORT

For

Computer

IC Model: AIM-37AT

FCC Model:

**AIM-37AT ; AIM-37ATxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxx
(where "x" may be any alphanumeric character, "-" or blank for
marketing purpose and no impact safety related critical components
and constructions)**

Trade Name: ADVANTECH

Issued to

Advantech Co., Ltd.

**No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan,
R.O.C.**

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)**

<http://www.ccsrf.com>

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Issued Date: November 21, 2016



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 21, 2016	Initial Issue	ALL	Doris Chu

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1. TEST RESULT CERTIFICATION

Applicant: Advantech Co., Ltd.
 No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
 Taipei 114, Taiwan, R.O.C.

Manufacturer: Advantech Co., Ltd.
 No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
 Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Computer

Trade Name: ADVANTECH

IC Model: AIM-37AT

FCC Model: AIM-37AT ; AIM-37ATxxxxxxxxxxxxxxxx ;
 AIM37ATxxxxxxxxxxxxxxxx
 (where "x" may be any alphanumeric character, "-" or blank for
 marketing purpose and no impact safety related critical
 components and constructions)

Date of Test: November 10 ~ 14, 2016

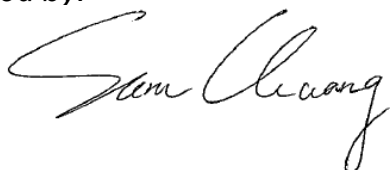
APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C Industry Canada RSS-210 Issue 9	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.225 and Industry Canada RSS-210.

The test results of this report relate only to the tested sample identified in this report.

Approved by:



 Sam Chuang
 Manager
 Compliance Certification Services Inc.

Tested by:



 Dennis Li
 Engineer
 Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer				
Trade Name	ADVANTECH				
IC Model Name	AIM-37AT				
IC Model Discrepancy		barcode scan	Card Reader,	OS	
	SKU 1	V	V	Win10 IoT Enterprise	
	SKU 2	X	X	Win10 IoT Enterprise	
	SKU 3	X	X	Android 6.0	
FCC Model Number	AIM-37AT ; AIM-37ATxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)				
FCC Model Discrepancy	Model Name		Model Discrepancy		
	-		-	barcode scan	Card Reader, OS
	AIM-37AT	SKU 1	V	V	Win10 IoT Enterprise
		SKU 2	X	X	Win10 IoT Enterprise
		SKU 3	X	X	Android 6.0
AIM-37ATxxxxxxxxxxxxxxxx ; AIM37ATxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)		All the model number was just for marketing purpose only.			
Received Date	November 1, 2016				
Power Rating	1. VDC from Power Adapter APD / WA-15105R I/P: 100-240Vac, 0.5A, 50-60Hz O/P: 5Vdc, 3A 2. From DC Battery 3.8V, 3850mAh, 14.6Wh				
Frequency Range	13.56MHz				
Modulation Technique	ASK				
Number of Channels	1 Channel				

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **M82-AIM37** & ISED No. : **9404A-AIM37** filing to comply with FCC Part 15C, Section 15.207, 15.209 and IC RSS-210 & RSS-GEN.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.225, RSS-210, RSS-Gen.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.3 DESCRIPTION OF TEST MODES

The EUT (IC model: AIM-37AT, FCC model: AIM-37AT) had been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

3.3.1 The worst mode of measurement

AC Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT Power by AC adapter Mode 2: EUT Power by AC adapter and NFC Antenna Terminal
Worst Mode	<input type="checkbox"/> Mode 1 <input checked="" type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark: The worst mode was record in this test report.

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT Power by AC adapter
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (X-Plane) were recorded in this report.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	R&S	FSV 40	101073	10/5/2016	10/4/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	12/8/2015	12/7/2016
Loop Ant	COM-POWER	AL-130	121051	2/25/2016	2/24/2017
Bilog Antenna	Sunol Sciences	JB3	A030105	7/3/2016	7/2/2017
Pre-Amplifier	EMEC	EM330	60609	6/8/2016	6/7/2017
Horn Antenna	ETC	MCTD 1209	DRH13M02003	9/2/2016	9/1/2017
Pre-Amplifier	MITEQ	AMF-6F-2604 00-40-8P	985646	1/14/2016	1/13/2017
Horn Antenna	EMCO	3116	26370	1/15/2016	1/14/2017
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

Conducted Emission Room # B					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
LISN	R&S	ENV216	101054	5/11/2016	5/10/2017
Receiver	R&S	ESCI	101073	8/20/2016	8/19/2017
Software	CCS-3A1-CE				

Remark:

1. Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
2. N.C.R. = No Calibration Request.

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2159
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- No.199, Chungsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841,
TAIWAN, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT




Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bucolical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

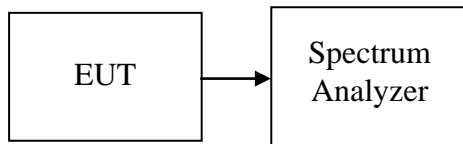
No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Ear phone	Logitech	H150	N/A	N/A	N/A	N/A
2	SD Card	Kingston	4GB	N/A	N/A	N/A	N/A

Remark:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7. FCC PART 15.225 REQUIREMENTS & RSS-210 REQUIREMENTS

7.1 OCCUPIED BANDWIDTH(99%) AND 20 DB BANDWIDTH TEST CONFIGURATION



TEST PROCEDURE

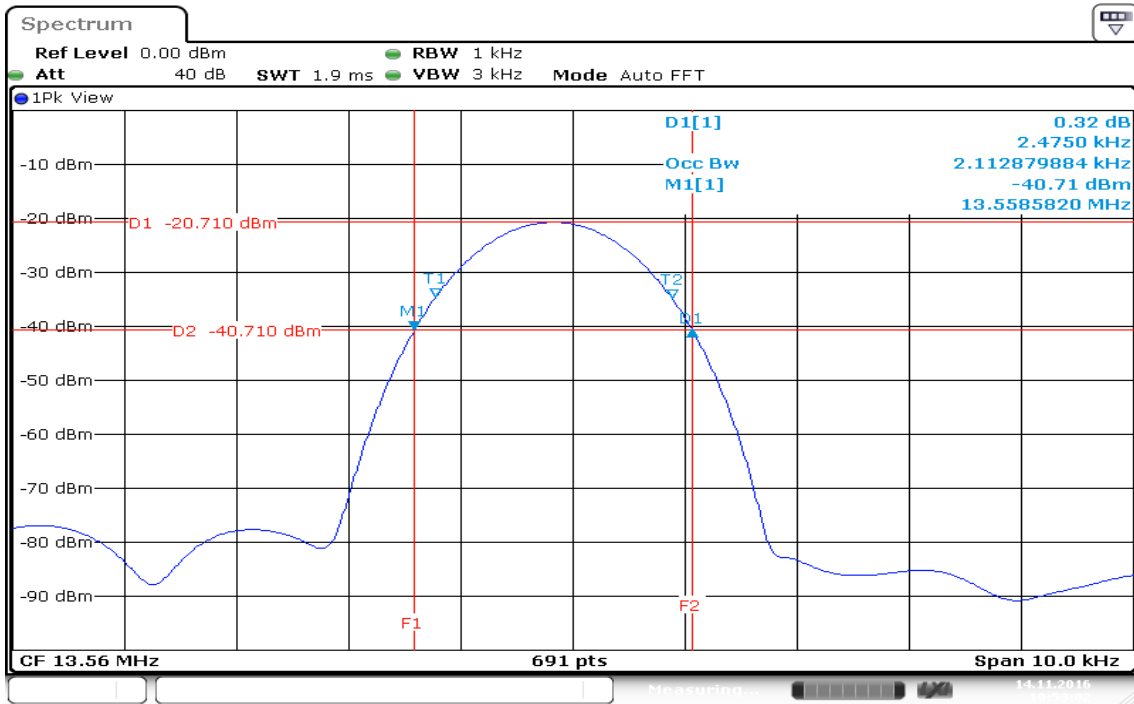
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=1kHz, VBW = 3kHz, Span = 10kHz, Sweep = auto.
4. Record the max. reading.

TEST RESULTS

No non-compliance noted

Test Condition	Frequency(MHz)	Occupied Bandwidth 99% (kHz)	20 dB Bandwidth (kHz)
NFC	13.56	2.1128	2.4750

Test Plot



Date: 14 NOV.2016 10:53:02

7.2 RADIATED EMISSIONS

LIMIT

According to §15.225 & RSS-210) Annex B)B.6

- (a) The field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts / meter at 30 meters.

All spurious emissions shall comply with the limits of §15.209(a) and RSS-Gen Table 2 & Table 4.

RSS-Gen Table 2 & Table 4: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz ^(Note)

Frequency (MHz)	Field Strength microvolts/m at 3 meters (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: *Measurements for compliance with limits in the above table may be performed at distances other than 3 meters, in accordance with Section 6.5.

Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

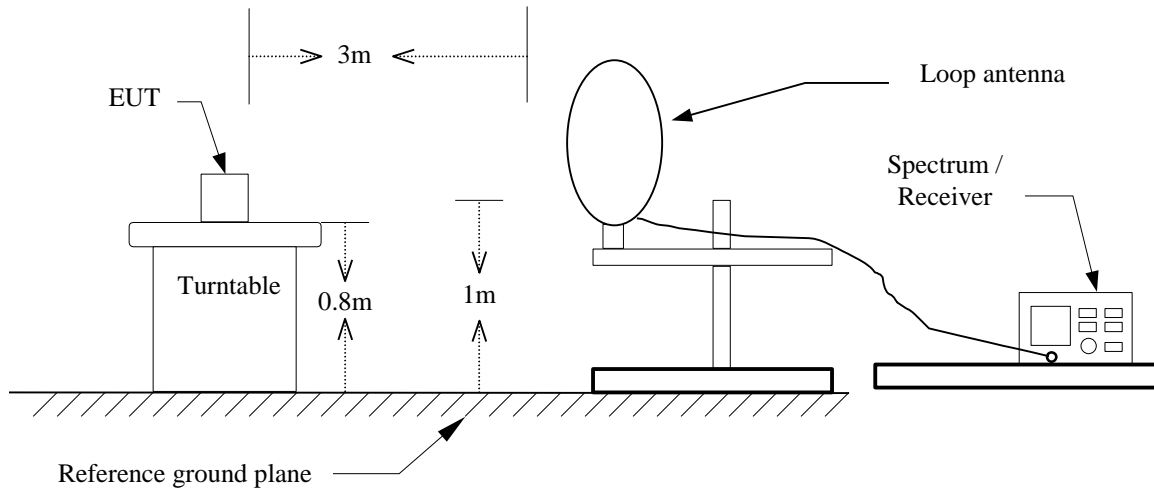
RSS-Gen Table 5: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (meters)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

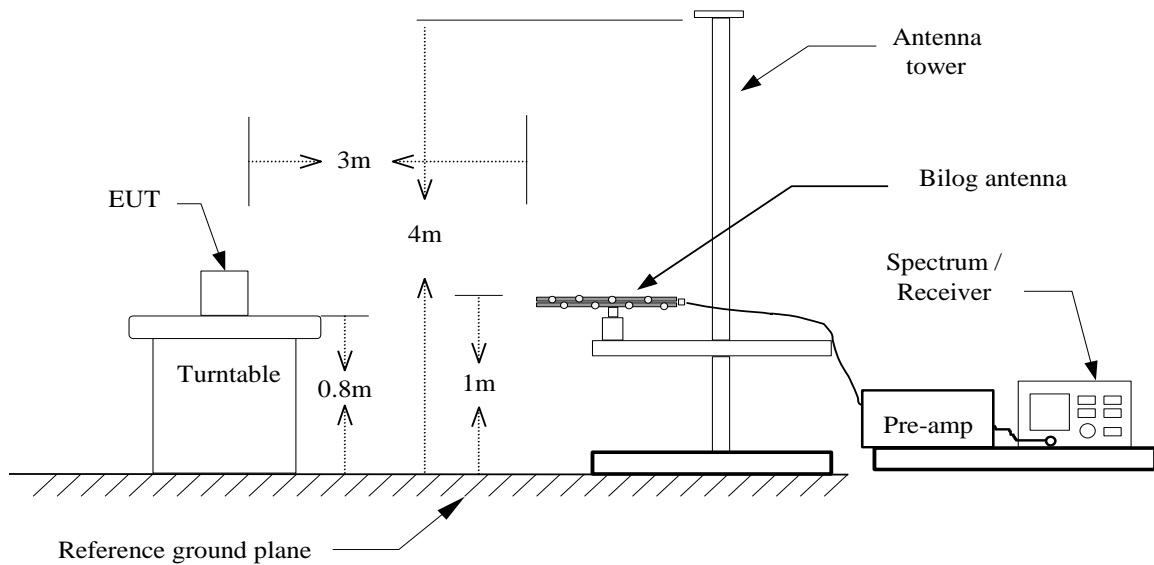
Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

Test Configuration

9kHz ~ 30MHz



30MHz ~ 1GHz



TEST PROCEDURE

For 9kHz ~ 30MHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, The center of the loop shall be 1 m above the ground then to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Set the spectrum analyzer in the following setting as:
9KHz-490KHz : RBW=200Hz / VBW=1kHz / Sweep=AUTO
490KHz-30MHz : RBW=10kHz / VBW=30kHz / Sweep=AUTO
6. Repeat above procedures until the measurements for all frequencies are complete.

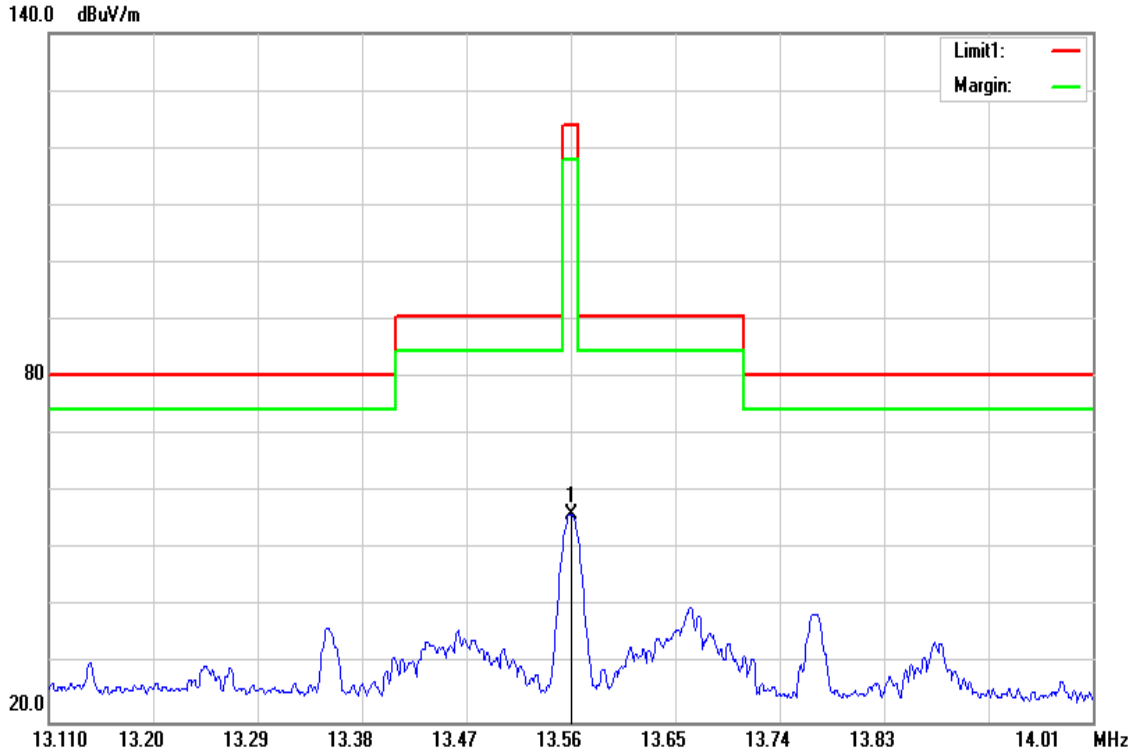
For 30MHz ~ 1GHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
RBW=100kHz / VBW=300kHz / Sweep=Auto
7. Repeat above procedures until the measurements for all frequencies are complete.

Remark :

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Operation Mode: TX mode **Test Date:** November 10, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53 % RH **Polarity:** Ver. / Hor.



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	13.5600	41.63	14.66	56.29	124.00	-67.71	peak

Remark:

1. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).

9kHz ~ 490kHz

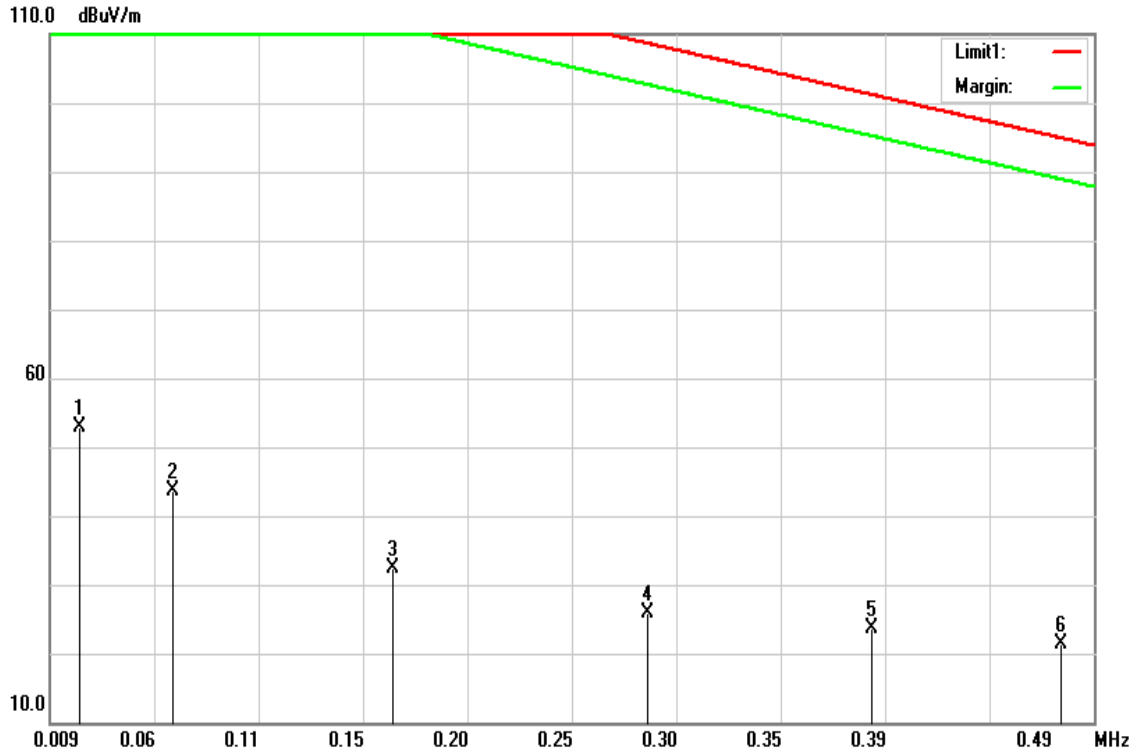
Operation Mode: TX mode

Test Date: November 10, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53 % RH



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Mode (PK/QP/AVG)
0.0229	68.76	-15.99	52.77	127.51	-74.74	peak
0.0658	60.62	-16.91	43.71	124.41	-80.70	peak
0.1668	49.54	-17.22	32.32	117.12	-84.80	peak
0.2841	43.16	-17.31	25.85	108.66	-82.81	peak
0.3875	40.84	-17.33	23.51	101.20	-77.69	peak
0.4746	38.68	-17.34	21.34	94.91	-73.57	peak

490kHz ~ 30MHz

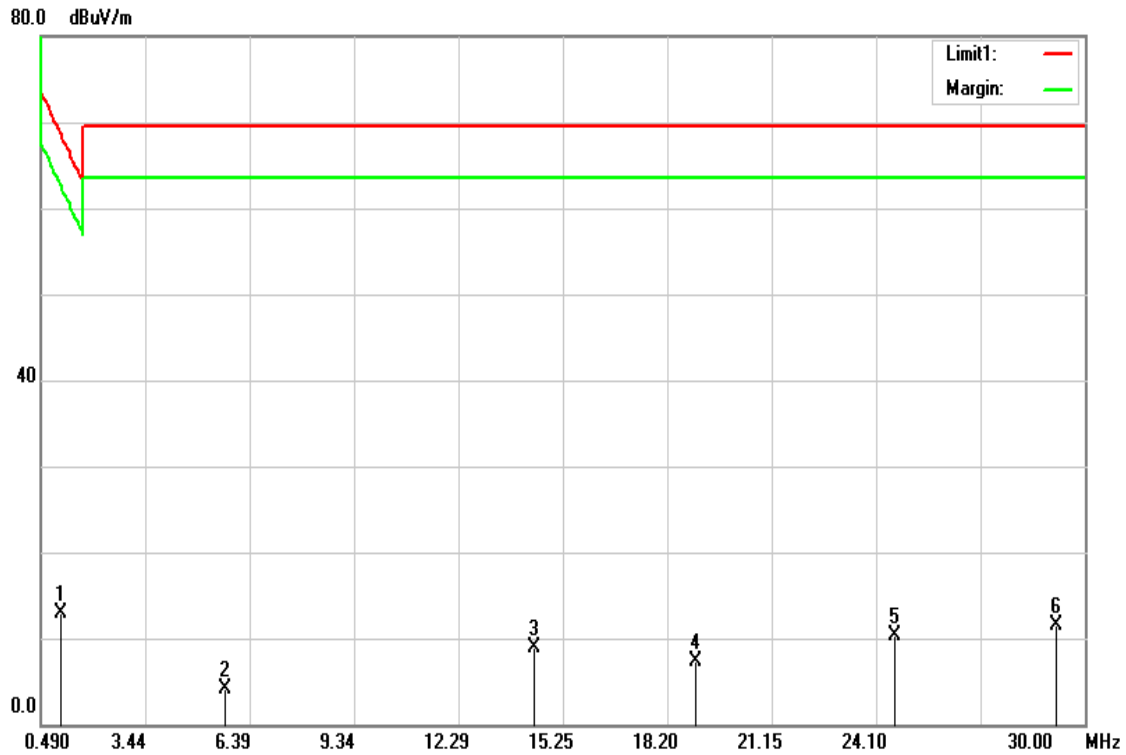
Operation Mode: TX mode

Test Date: November 10, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53 % RH



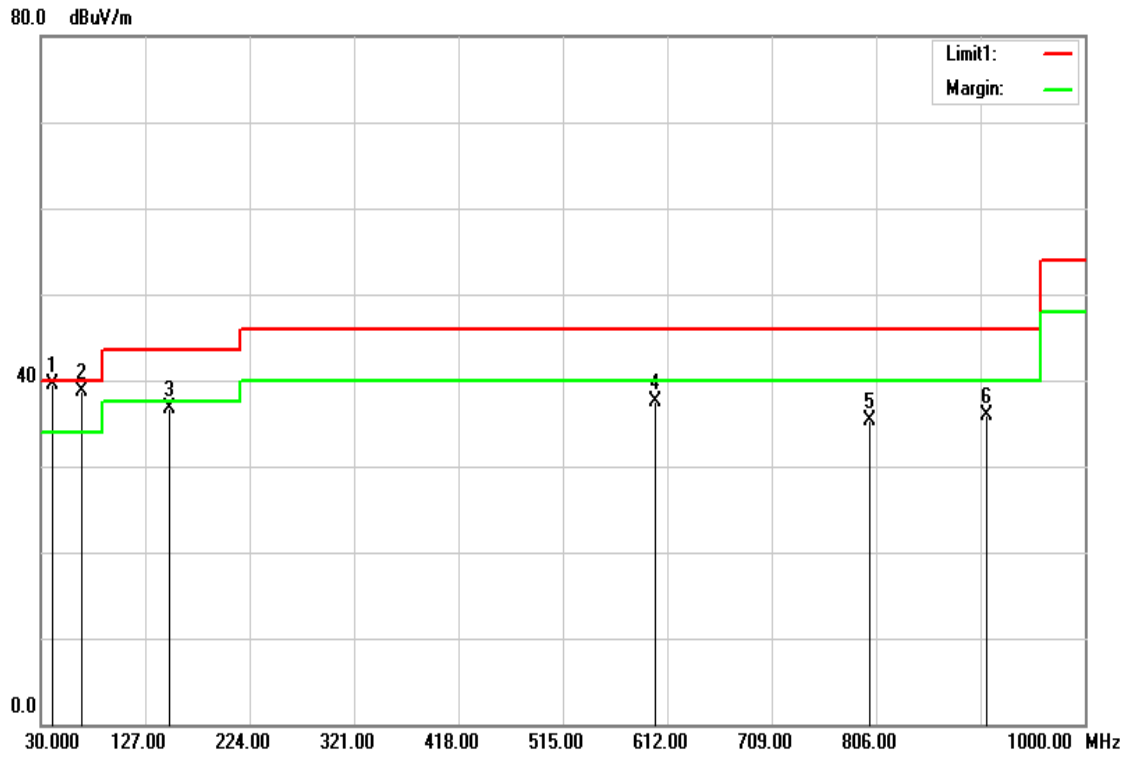
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Mode (PK/QP/AVG)
1.0507	29.99	-17.06	12.93	68.80	-55.87	peak
5.7133	18.11	-13.96	4.15	69.50	-65.35	peak
14.4187	16.84	-7.90	8.94	69.50	-60.56	peak
18.9928	12.31	-4.99	7.32	69.50	-62.18	peak
24.6292	12.02	-1.69	10.33	69.50	-59.17	peak
29.1737	11.48	0.00	11.48	69.50	-58.02	peak

30MHz ~ 1GHz

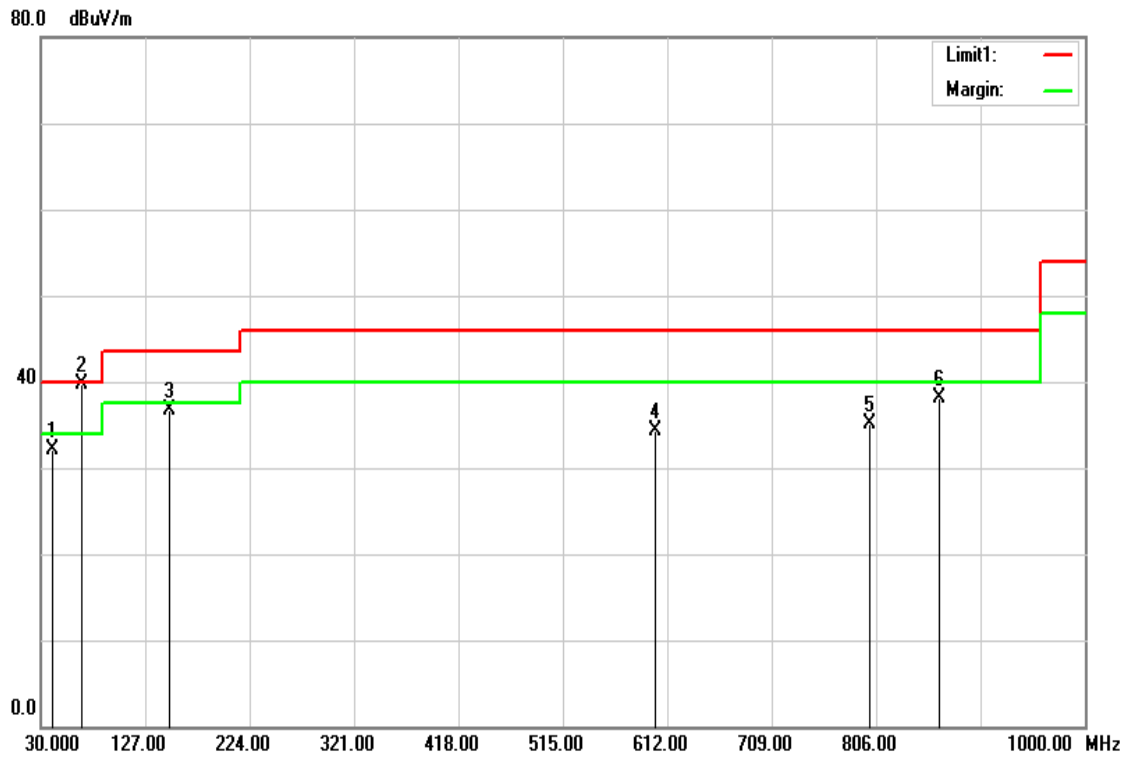
Operation Mode: TX mode **Test Date:** November 10, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53 % RH

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Detector Mode (PK/QP/AVG)
40.6700	55.15	-15.72	39.43	40.00	-0.57	QP
67.8300	59.76	-21.02	38.74	40.00	-1.26	QP
149.3100	52.82	-16.05	36.77	43.50	-6.73	peak
600.3600	45.17	-7.75	37.42	46.00	-8.58	peak
800.1800	39.87	-4.50	35.37	46.00	-10.63	peak
908.8200	38.92	-3.05	35.87	46.00	-10.13	peak
40.6700	47.80	-15.72	32.08	40.00	-7.92	peak
67.8300	60.70	-21.02	39.68	40.00	-0.32	QP
149.3100	52.71	-16.05	36.66	43.50	-6.84	peak
600.3600	41.97	-7.75	34.22	46.00	-11.78	peak
800.1800	39.51	-4.50	35.01	46.00	-10.99	QP
864.2000	41.63	-3.61	38.02	46.00	-7.98	peak

Vertical



Horizontal



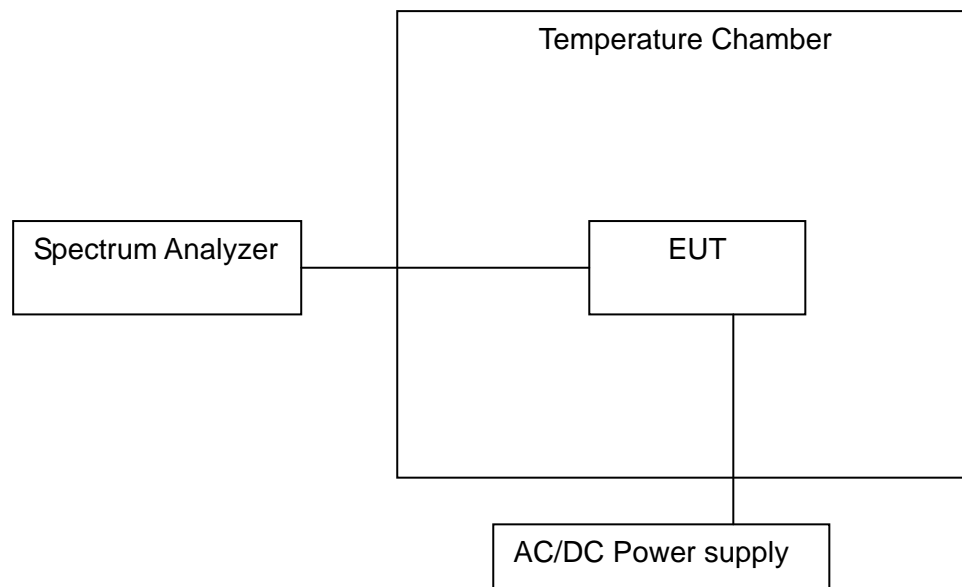
7.3 FREQUENCY STABILITY

LIMIT

According to §15.225(e), the frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Configuration

Temperature and Voltage Measurement (under normal and extreme test conditions)



TEST PROCEDURE

1. Turn the EUT off, and place it inside the environmental temperature chamber.
2. Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
3. Set the spectrum analyzer as RBW=1kHz, VBW = RBW, Span = 200kHz, Sweep = auto.
4. Turn the EUT on and record the operating frequency at startup and two, five, and ten minutes after the EUT is energized.
5. Switch off the EUT and Lower the chamber temperature by not more than 10 °C and allow the temperature inside the chamber to stabilize.
6. Mark the peak frequency and measure the frequency tolerance using frequency counter function.
7. Repeat step 4 through step 6 down to the lowest specified temperature.

TEST RESULTS

No non-compliance noted.

TEST DATA

Condition			Frequency Error (ppm)									
Temperature	Modulation Mode	Test Freq.	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min	Limit (ppm)	Result
			Normal									
T20°CVmax	CW	13.56	13.5603	13.5603	13.5603	13.5603	18.44	18.44	19.54	19.54	100	Pass
T20°CVmin	CW	13.56	13.5599	13.5599	13.5599	13.5599	-8.48	-8.48	-8.48	-8.11		Pass
			Extreme									
T50°CVnom	CW	13.56	13.5608	13.5608	13.5608	13.5608	57.15	56.78	57.15	56.78	100	Pass
T40°CVnom	CW	13.56	13.5607	13.5607	13.5607	13.5607	50.52	50.52	50.15	50.52		Pass
T30°CVnom	CW	13.56	13.5605	13.5605	13.5605	13.5605	35.77	35.03	35.03	35.40		Pass
T20°CVnom	CW	13.56	13.5603	13.5603	13.5603	13.5603	18.88	18.58	18.58	18.44		Pass
T10°CVnom	CW	13.56	13.5600	13.5600	13.5600	13.5600	0.37	1.11	0.74	0.37		Pass
T0°CVnom	CW	13.56	13.5599	13.5599	13.5599	13.5599	-8.48	-9.22	-8.70	-8.26		Pass
T-10°CVnom	CW	13.56	13.5598	13.5598	13.5598	13.5598	-17.85	-17.85	-17.85	-18.07		Pass
T-20°CVnom	CW	13.56	13.5596	13.5596	13.5596	13.5596	-32.89	-33.19	-33.19	-32.89		Pass

Remark: Vnom: 24
 Vmax: 27.6
 Vmin: 20.4

7.4 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a) & RSS-Gen §8.8, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete
4. If NFC Mode fail in fundamental, use Antenna Terminal to proof it was the fundamental and recorded it without fundamental signal.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode: NFC mode **Test Date:** November 14, 2016
Temperature: 26°C **Tested by:** Dennis Li
Humidity: 60% RH

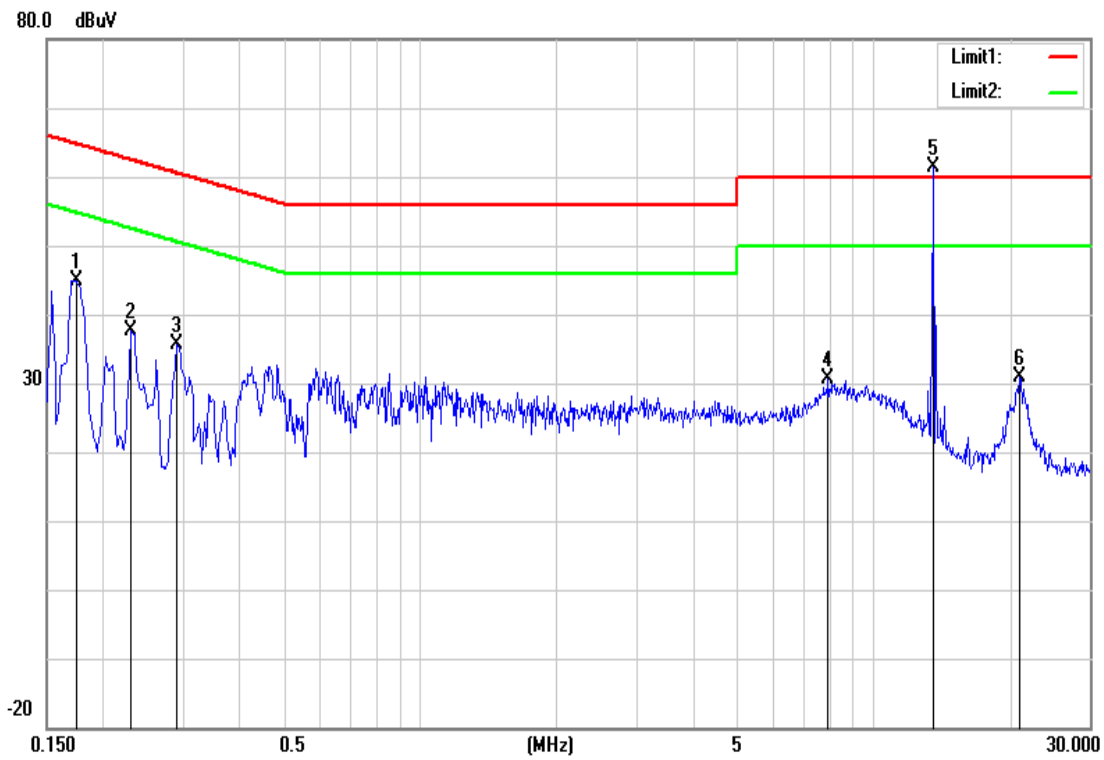
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1740	33.38	18.45	9.71	43.09	28.16	64.77	54.77	-21.68	-26.61	L1
0.2300	26.38	14.96	9.70	36.08	24.66	62.45	52.45	-26.37	-27.79	L1
0.2900	21.94	13.43	9.70	31.64	23.13	60.52	50.52	-28.88	-27.39	L1
7.9380	15.53	10.28	9.77	25.30	20.05	60.00	50.00	-34.70	-29.95	L1
13.5580	51.27	51.52	9.82	61.09	61.34	60.00	50.00	1.09	11.34	L1
20.9540	15.97	10.29	9.87	25.84	20.16	60.00	50.00	-34.16	-29.84	L1
0.1620	25.60	15.13	9.78	35.38	24.91	65.36	55.36	-29.98	-30.45	L2
0.1860	22.19	10.98	9.77	31.96	20.75	64.21	54.21	-32.25	-33.46	L2
0.3580	20.13	13.37	9.76	29.89	23.13	58.77	48.77	-28.88	-25.64	L2
0.3900	18.56	11.41	9.76	28.32	21.17	58.06	48.06	-29.74	-26.89	L2
13.5580	50.93	51.18	10.11	61.04	61.29	60.00	50.00	1.04	11.29	L2
21.4260	11.52	2.35	10.29	21.81	12.64	60.00	50.00	-38.19	-37.36	L2

Remark:

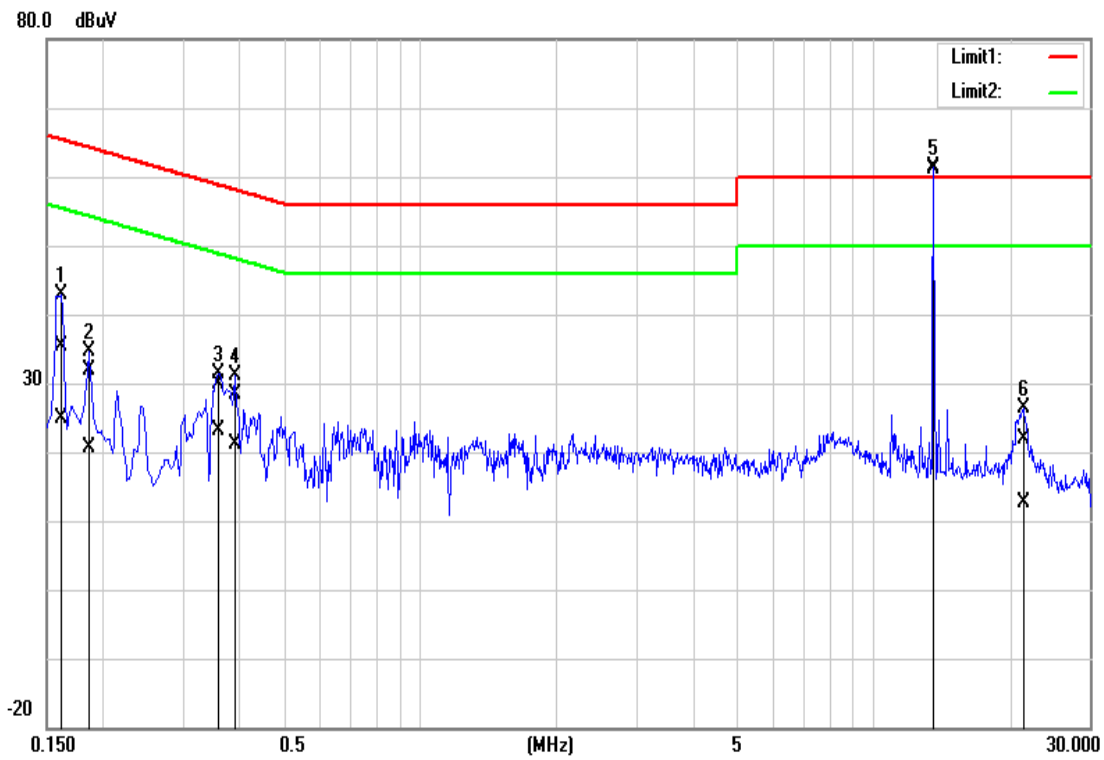
1. *The measuring frequencies range between 0.15 MHz and 30 MHz.*
2. *The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.*
3. *The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*
5. *"-" means Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)



Operation Mode: NFC mode- Terminal Ant **Test Date:** November 14, 2016
Temperature: 26°C **Tested by:** Dennis Li
Humidity: 60% RH

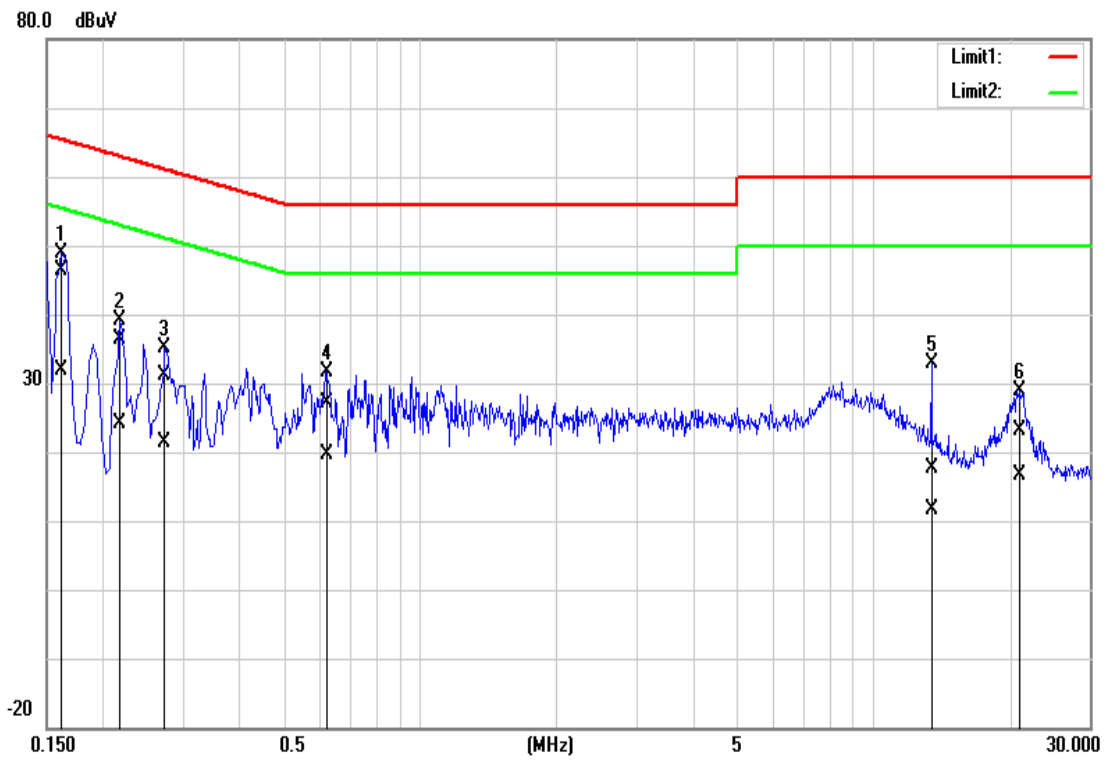
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1620	36.71	22.19	9.71	46.42	31.90	65.36	55.36	-18.94	-23.46	L1
0.2180	26.63	14.51	9.70	36.33	24.21	62.89	52.89	-26.56	-28.68	L1
0.2740	21.44	11.64	9.70	31.14	21.34	61.00	51.00	-29.86	-29.66	L1
0.6220	17.31	9.96	9.70	27.01	19.66	56.00	46.00	-28.99	-26.34	L1
13.4500	7.75	1.92	9.82	17.57	11.74	60.00	50.00	-42.43	-38.26	L1
20.9660	13.35	6.74	9.87	23.22	16.61	60.00	50.00	-36.78	-33.39	L1
0.1580	30.75	16.77	9.78	40.53	26.55	65.57	55.57	-25.04	-29.02	L2
0.1900	25.37	12.74	9.77	35.14	22.51	64.04	54.04	-28.90	-31.53	L2
0.2740	22.22	14.11	9.77	31.99	23.88	61.00	51.00	-29.01	-27.12	L2
0.4180	16.16	9.44	9.76	25.92	19.20	57.49	47.49	-31.57	-28.29	L2
13.5180	11.23	2.66	10.11	21.34	12.77	60.00	50.00	-38.66	-37.23	L2
21.1820	12.43	6.41	10.28	22.71	16.69	60.00	50.00	-37.29	-33.31	L2

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)
5. "-" means Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

