



FCC 47 CFR PART 15 SUBPART B

Product Type : Wireless Modem
Applicant : Novatel Wireless Inc.
Address : 6715 - 8th Street N.E., Suite 200 Calgary Alberta T2E 7H7 Canada
Trade Name : HS 3002
Model Number : CNN0403
Test Specification : FCC 47 CFR PART 15 SUBPART B: Oct., 2012
ANSI C63.4: 2009
CISPR 22: 1997
ICES-003: Issue 5
Receive Date : Jun. 17, 2013
Test Period : Jun. 24 ~ Jun. 26, 2013
Issue Date : Jul. 02, 2013

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jul. 02, 2013	Initial Issue	

Verification of Compliance

Issued Date: 07/02/2013

Product Type : Wireless Modem
 Applicant : Novatel Wireless Inc.
 Address : 6715 - 8th Street N.E., Suite 200 Calgary Alberta T2E 7H7
 Canada
 Trade Name : HS 3002
 Model Number : CNN0403
 FCC ID : PKRNVWCNN0403
 IC : 3229A-CNN0403
 EUT Rated Voltage : DC 3.3V
 Test Voltage : 120 Vac / 60 Hz
 Applicable Standard : FCC 47 CFR PART 15 SUBPART B: Oct., 2012
 ANSI C63.4: 2009
 CISPR 22: 1997
 ICES-003: Issue 5
 Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330
<http://www.atl-lab.com.tw/e-index.htm>



The above equipment has been tested by A Test Lab Techno Corp., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.



Approved By :  Reviewed By : 
 (Manager) (Murphy Wang) (Testing Engineer) (Frank Lin)

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1 General Information

1.1 Summary of Test Result

Emission			
Standard	Item	Result	Remark
FCC 47 CFR PART 15 SUBPART B ANSI C63.4 ICES-003	Conducted Emission	PASS	Meet Class B limit
FCC 47 CFR PART 15 SUBPART B ANSI C63.4 ICES-003	Radiated Emission	PASS	Meet Class B limit

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)	
Conducted Emission	9kHz ~ 30MHz	± 2.020	
Radiated Emission	30MHz ~ 1000MHz	Horizontal	± 3.960
		Vertical	± 3.570
	1000MHz ~ 18000MHz	Horizontal	± 3.072
		Vertical	± 3.028
	18000MHz ~ 40000MHz	Horizontal	± 3.622
		Vertical	± 3.506

2 EUT Description

Product Type	Wireless Modem
Trade Name	HS 3002
Model Number	CNN0403
FCC ID	PKRNVWCNN0403
IMEI Number	3229A-CNN0403
Applicant	Novatel Wireless Inc. 6715 - 8th Street N.E., Suite 200 Calgary Alberta T2E 7H7 Canada
Manufacturer	Novatel Wireless Inc. 6715 - 8th Street N.E., Suite 200 Calgary Alberta T2E 7H7 Canada

I/O Port Description :

I/O Port Types	Q'TY	Test Description
1). Signal Port	1	Connected to Fixture

3 Test Methodology

3.1. Decision of Test Mode

3.1.1. The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode
Mode 1: GSM 850 link mode
Mode 2: PCS 1900 link mode
Mode 3: WCDMA Band II link mode
Mode 4: WCDMA Band V link mode

3.1.2. After the preliminary scan, the following test mode was found to produce the highest emission level.

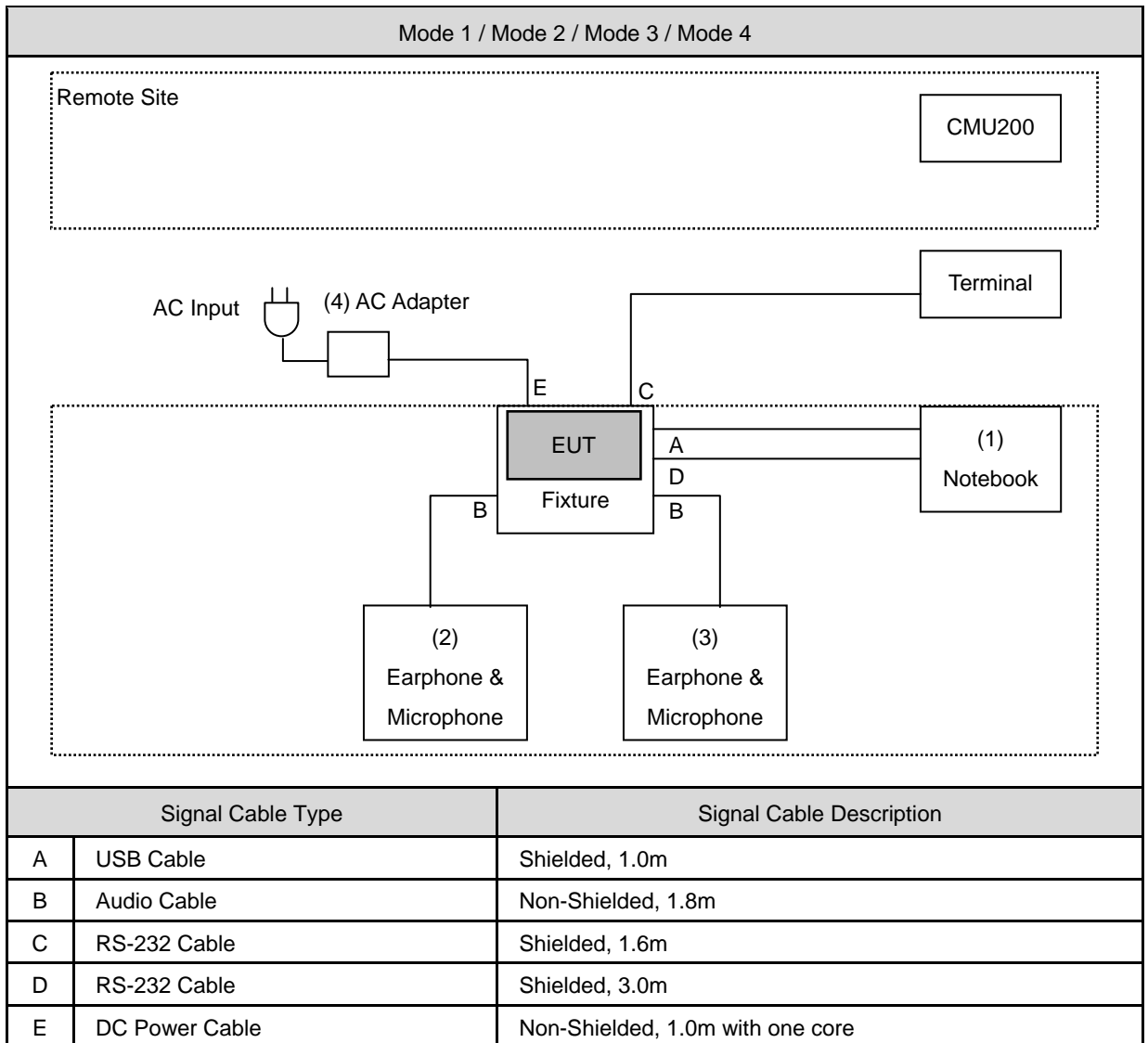
Final Test Mode			
Emission	Conducted Emission		Mode 1 / Mode 2 / Mode 3 / Mode 4
	Radiated Emission	Below 1GHz	Mode 1 / Mode 2 / Mode 3 / Mode 4
		Above 1GHz	Mode 1 / Mode 2 / Mode 3 / Mode 4

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

3.2. EUT Exercise Software

1. Setup the EUT and simulators as shown on 3.3.
2. Turn on the power of all equipment.
3. EUT link to CMU200.
4. The EUT will start to operate function.

3.3. Configuration of Test System Details



Devices Description					
	Product	Manufacturer	Model Number	Serial Number	Power Cord
(1)	Notebook	DELL	D830	CN-OHN341-48643 -88Q-1221	Non-Shielded, 2.0m
(2)	Earphone & Microphone	N/A	N/A	N/A	N/A
(3)	Earphone & Microphone	N/A	N/A	N/A	N/A
(4)	AC Adapter	CUI INC	3A-181WP05	N/A	Non-Shielded, 1.0m with one core

3.4. Test Site Environment

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC part 15: 15.107 Conducted Emission	15-35	26
Humidity (%RH)		25-75	60
Barometric pressure (mbar)		860-1060	950
Temperature (°C)	FCC part 15: 15.109 Radiated Emission	15-35	26
Humidity (%RH)		25-75	60
Barometric pressure (mbar)		860-1060	950

4 Emission Test

4.1. Conducted Emission Measurement

4.1.1. Limit

A.C. Mains Conducted Interference Limit

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

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

(2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

4.1.2. Test Instruments

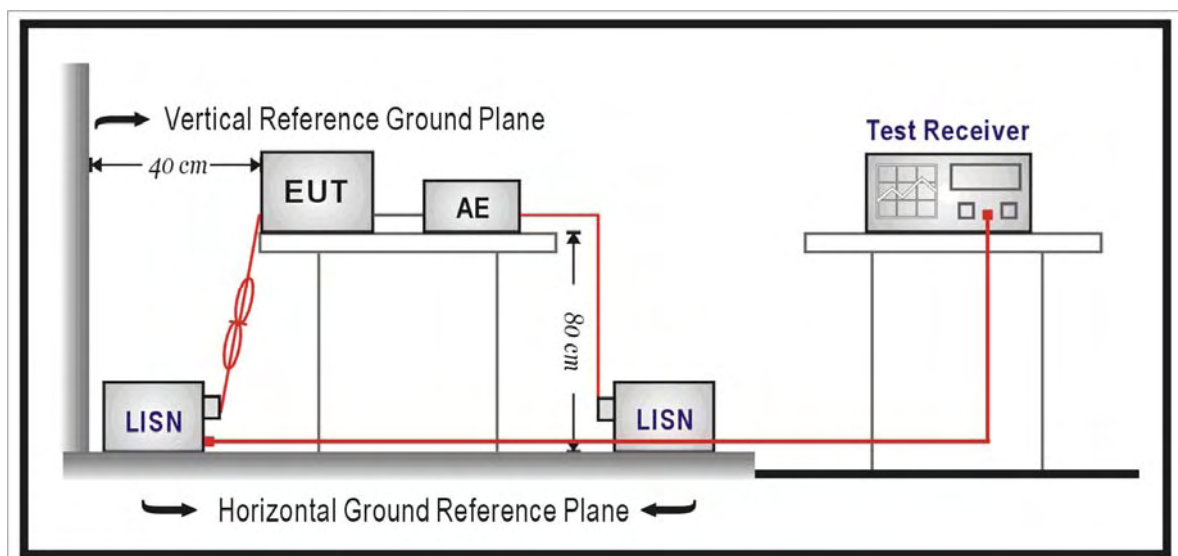
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/06/2013	(1)
LISN	R&S	ENV216	101040	03/04/2013	(1)
LISN	R&S	ENV216	101041	03/04/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

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

4.1.3. Test Setup

A.C. mains setup



4.1.4. 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 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

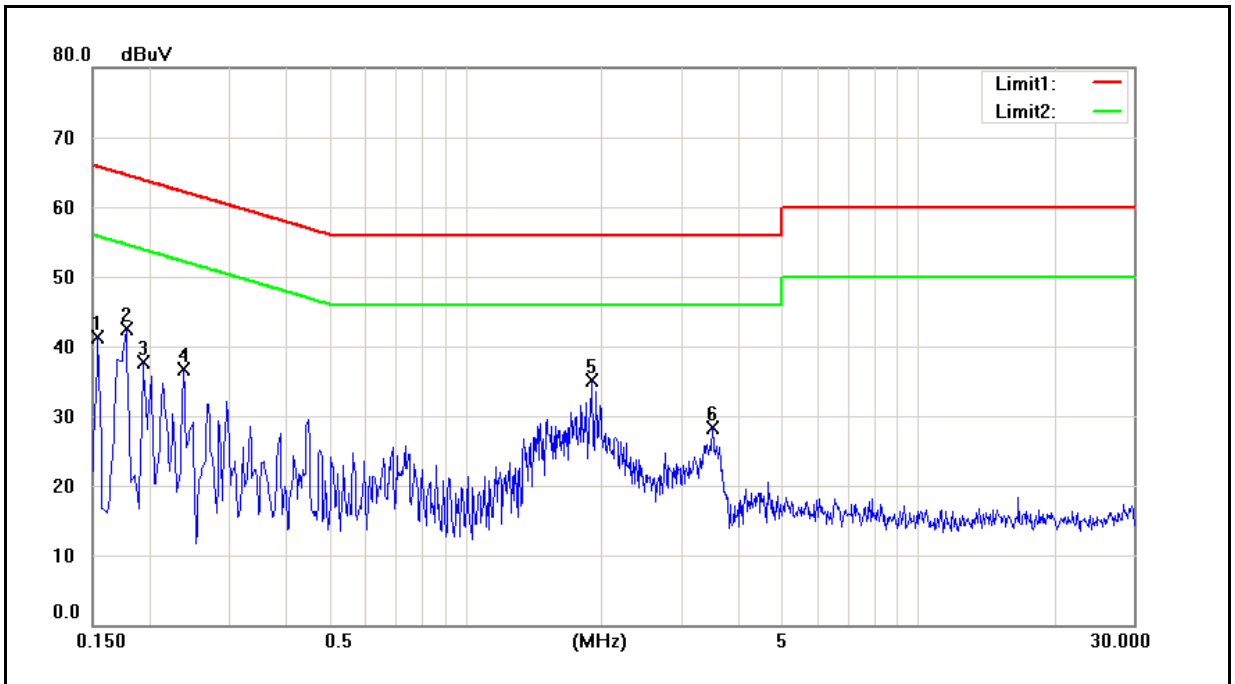
For A.C. mains conducted interference, measured both sides of A.C. lines and carried out using quasi-peak and average detector receivers of maximum conducted interference.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz. The equipment under test (EUT) shall meet the limits in section 4.1.1, 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. The voltage limits shall be met. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

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.

4.1.5. Test Result

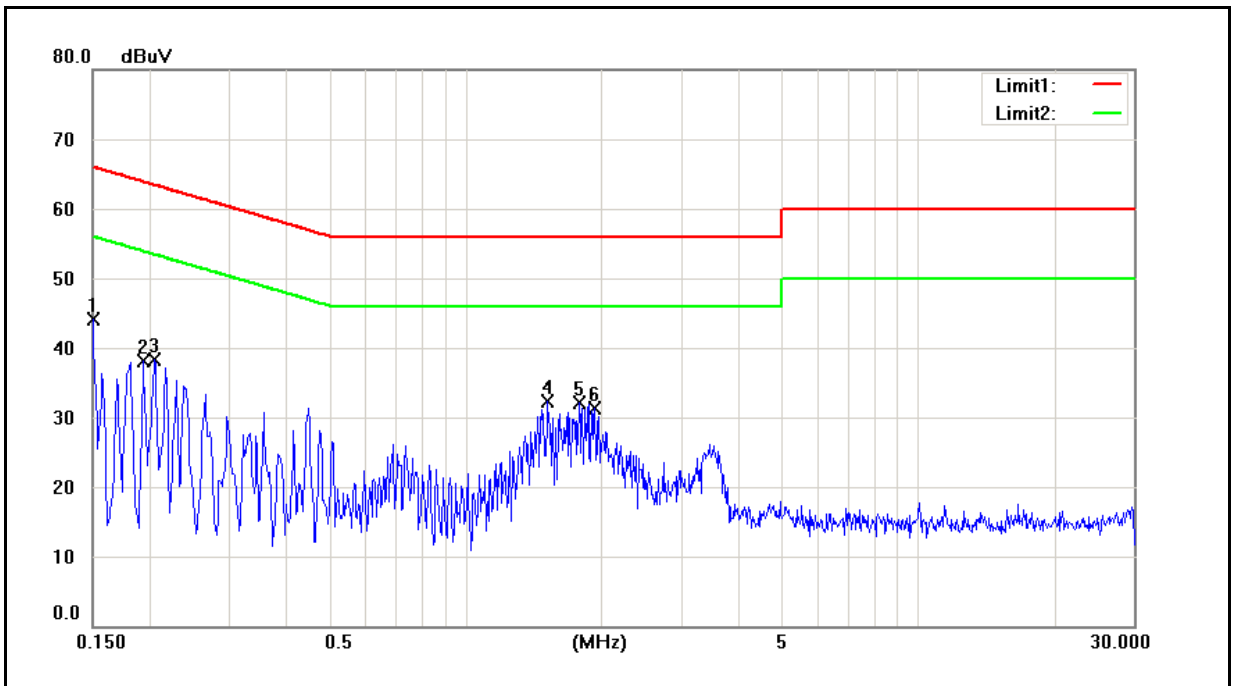
Standard:	FCC Part 15B Class B	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1540	29.10	11.60	9.62	38.72	21.22	65.78	55.78	-27.06	-34.56	Pass
2	0.1780	29.50	13.30	9.62	39.12	22.92	64.58	54.58	-25.46	-31.66	Pass
3	0.1940	21.25	2.28	9.62	30.87	11.90	63.86	53.86	-32.99	-41.96	Pass
4	0.2380	25.75	11.06	9.62	35.37	20.68	62.17	52.17	-26.80	-31.49	Pass
5	1.8980	19.16	10.07	9.70	28.86	19.77	56.00	46.00	-27.14	-26.23	Pass
6	3.5260	13.23	7.18	9.73	22.96	16.91	56.00	46.00	-33.04	-29.09	Pass

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

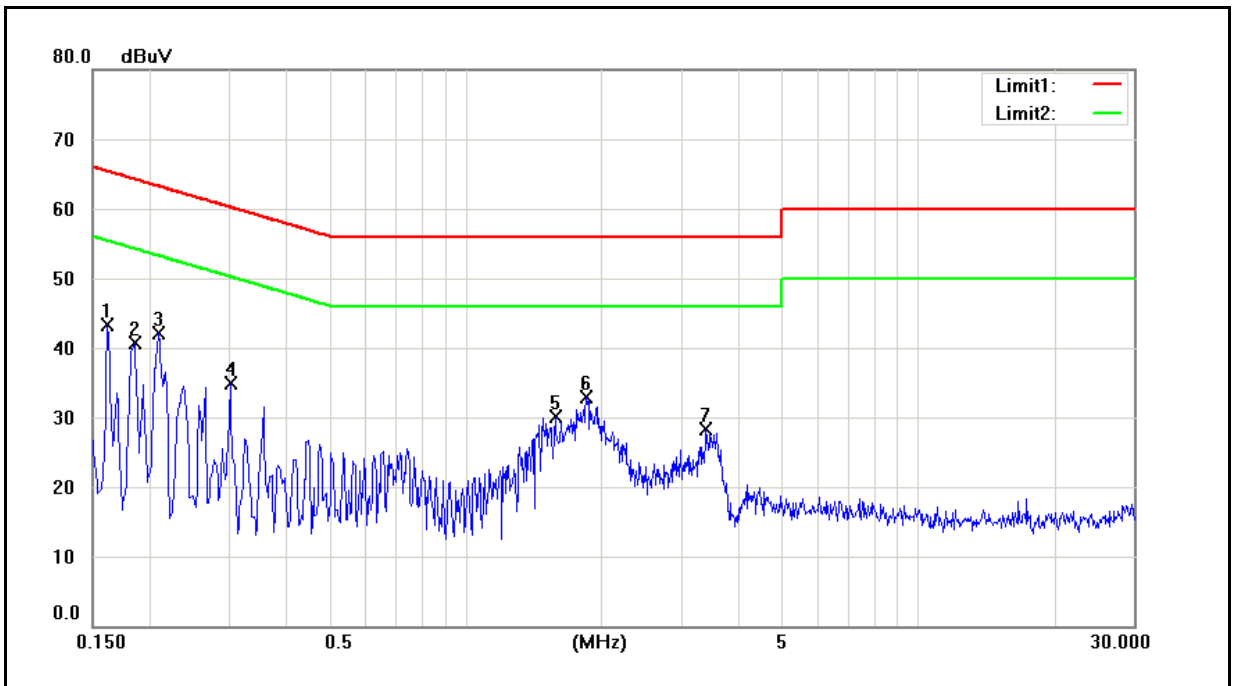
Standard:	FCC Part 15B Class B	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1500	33.14	15.09	9.63	42.77	24.72	66.00	56.00	-23.23	-31.28	Pass
2	0.1940	20.63	1.87	9.63	30.26	11.50	63.86	53.86	-33.60	-42.36	Pass
3	0.2060	25.79	13.05	9.63	35.42	22.68	63.37	53.37	-27.95	-30.69	Pass
4	1.5220	17.47	10.96	9.68	27.15	20.64	56.00	46.00	-28.85	-25.36	Pass
5	1.7900	19.96	10.51	9.69	29.65	20.20	56.00	46.00	-26.35	-25.80	Pass
6	1.9300	15.26	8.34	9.70	24.96	18.04	56.00	46.00	-31.04	-27.96	Pass

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

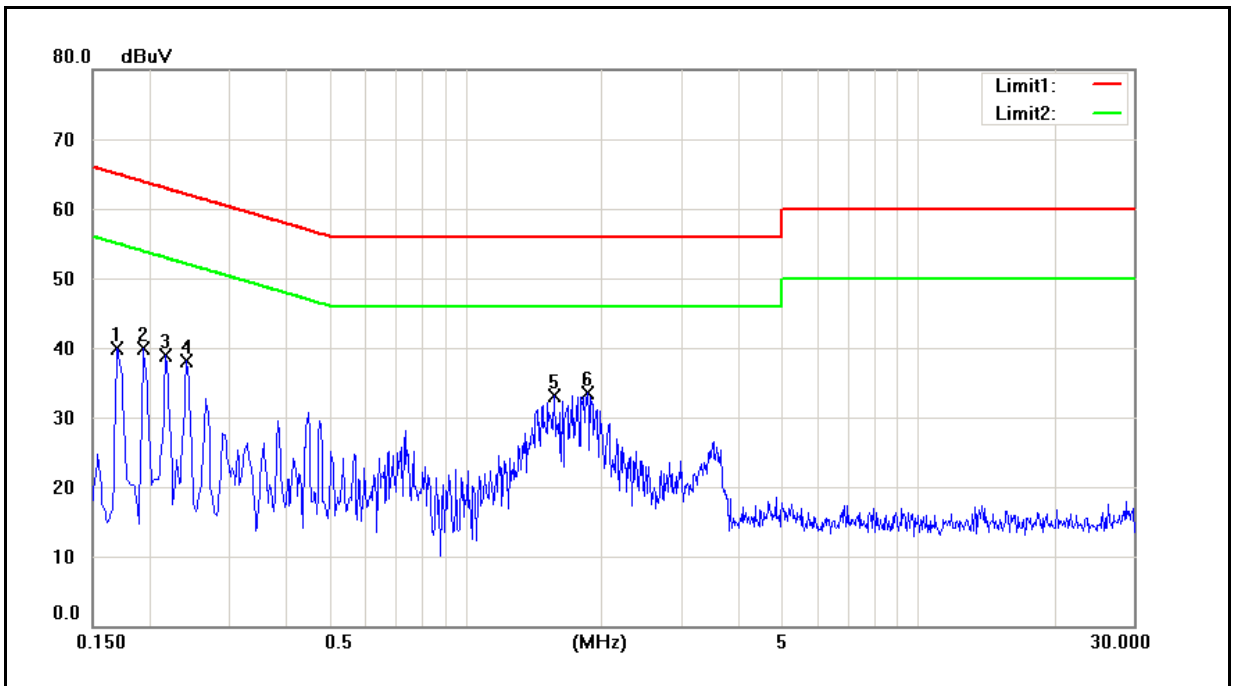
Standard:	FCC Part 15B Class B	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1620	25.36	2.58	9.62	34.98	12.20	65.36	55.36	-30.38	-43.16	Pass
2	0.1860	22.50	5.97	9.62	32.12	15.59	64.21	54.21	-32.09	-38.62	Pass
3	0.2100	25.80	12.33	9.62	35.42	21.95	63.21	53.21	-27.79	-31.26	Pass
4	0.3020	17.55	5.56	9.62	27.17	15.18	60.19	50.19	-33.02	-35.01	Pass
5	1.5820	17.24	8.78	9.68	26.92	18.46	56.00	46.00	-29.08	-27.54	Pass
6	1.8500	18.10	12.51	9.69	27.79	22.20	56.00	46.00	-28.21	-23.80	Pass
7	3.4020	14.53	7.64	9.72	24.25	17.36	56.00	46.00	-31.75	-28.64	Pass

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

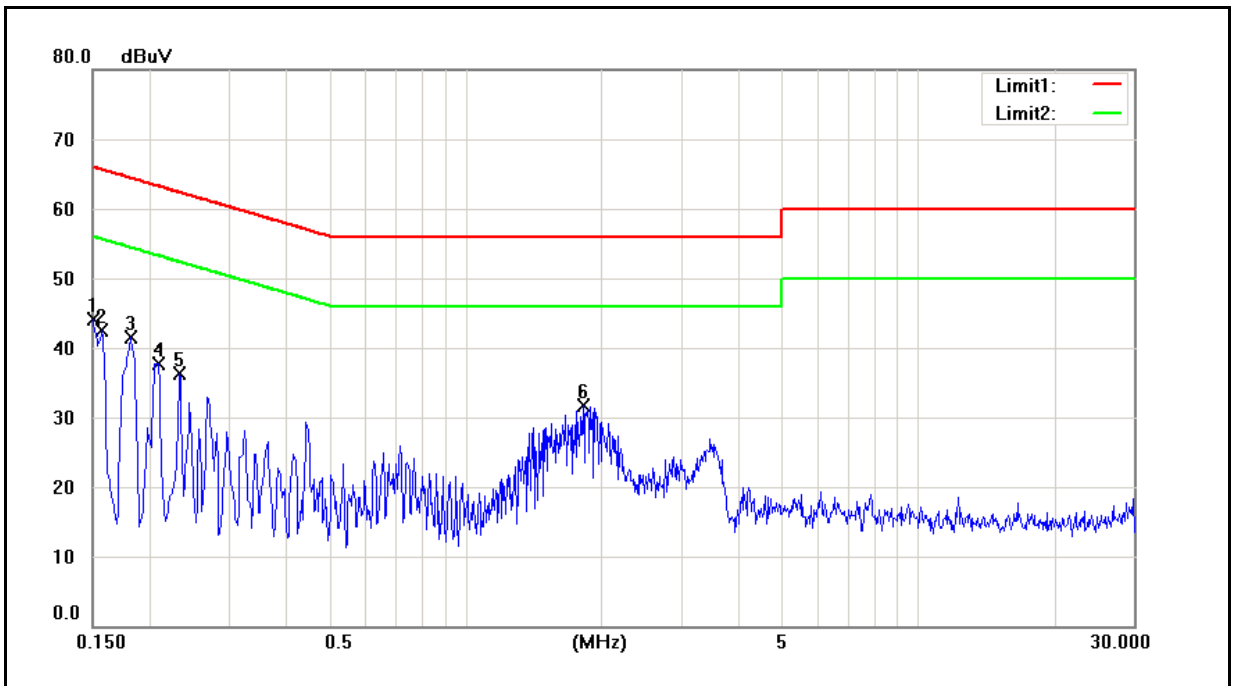
Standard:	FCC Part 15B Class B	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1700	23.55	8.51	9.63	33.18	18.14	64.96	54.96	-31.78	-36.82	Pass
2	0.1940	20.91	1.75	9.63	30.54	11.38	63.86	53.86	-33.32	-42.48	Pass
3	0.2180	19.05	3.70	9.63	28.68	13.33	62.89	52.89	-34.21	-39.56	Pass
4	0.2420	22.64	12.34	9.63	32.27	21.97	62.03	52.03	-29.76	-30.06	Pass
5	1.5740	18.60	9.01	9.68	28.28	18.69	56.00	46.00	-27.72	-27.31	Pass
6	1.8660	17.51	8.44	9.69	27.20	18.13	56.00	46.00	-28.80	-27.87	Pass

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

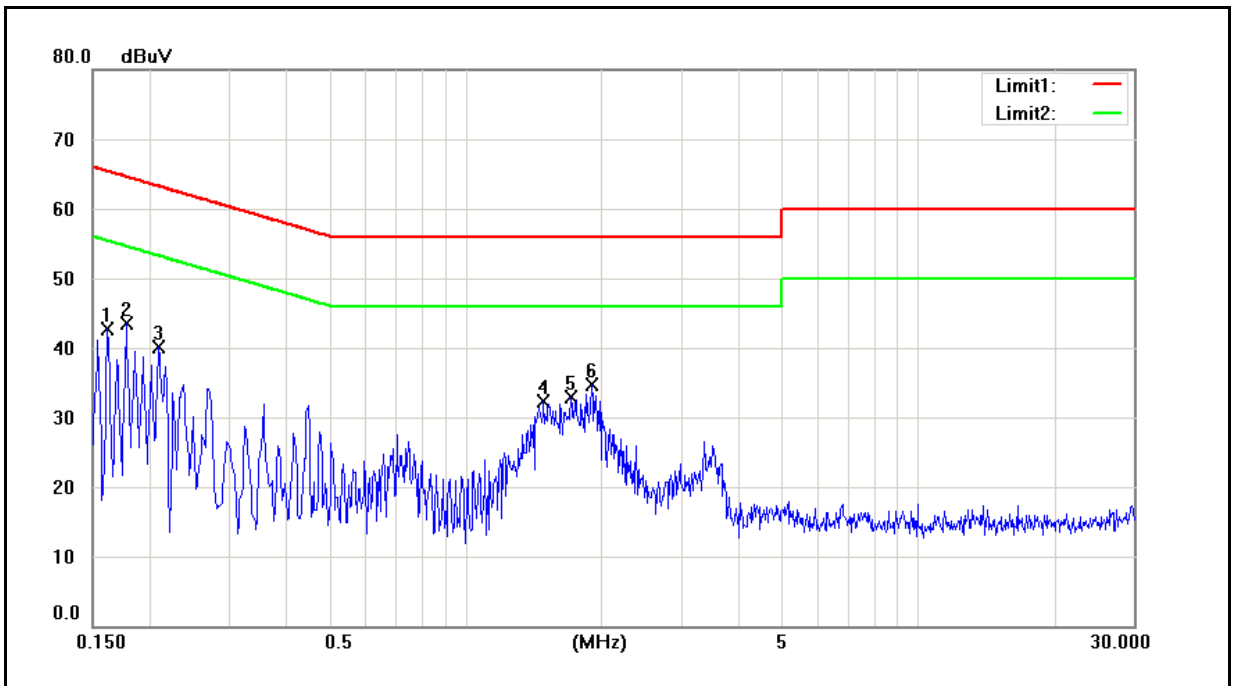
Standard:	FCC Part 15B Class B	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1500	34.43	17.00	9.62	44.05	26.62	66.00	56.00	-21.95	-29.38	Pass
2	0.1580	26.97	5.67	9.62	36.59	15.29	65.57	55.57	-28.98	-40.28	Pass
3	0.1820	29.75	13.50	9.62	39.37	23.12	64.39	54.39	-25.02	-31.27	Pass
4	0.2100	27.56	12.39	9.62	37.18	22.01	63.21	53.21	-26.03	-31.20	Pass
5	0.2340	20.09	7.59	9.62	29.71	17.21	62.31	52.31	-32.60	-35.10	Pass
6	1.8220	19.08	11.46	9.69	28.77	21.15	56.00	46.00	-27.23	-24.85	Pass

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

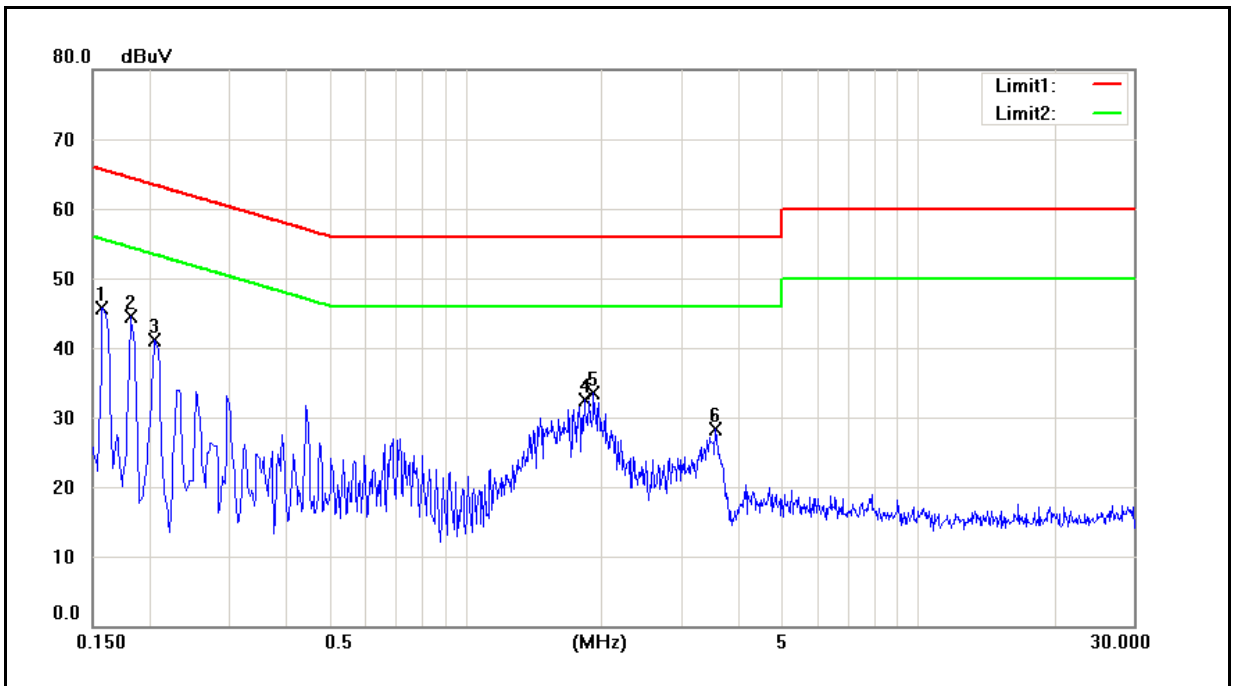
Standard:	FCC Part 15B Class B	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1620	25.71	2.14	9.63	35.34	11.77	65.36	55.36	-30.02	-43.59	Pass
2	0.1780	29.26	13.25	9.63	38.89	22.88	64.58	54.58	-25.69	-31.70	Pass
3	0.2100	25.71	13.48	9.63	35.34	23.11	63.21	53.21	-27.87	-30.10	Pass
4	1.4940	19.41	12.08	9.67	29.08	21.75	56.00	46.00	-26.92	-24.25	Pass
5	1.7140	14.92	7.85	9.69	24.61	17.54	56.00	46.00	-31.39	-28.46	Pass
6	1.8980	16.37	10.13	9.70	26.07	19.83	56.00	46.00	-29.93	-26.17	Pass

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

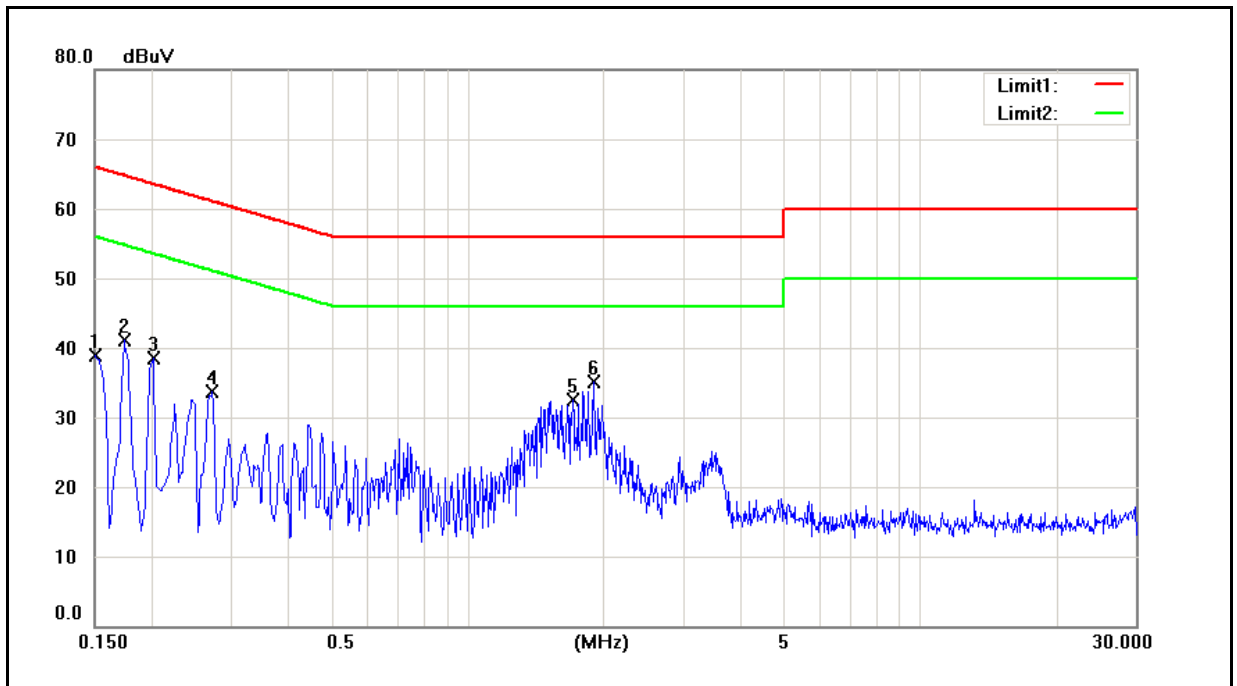
Standard:	FCC Part 15B Class B	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	06/24/2013
		Test By:	Frank Lin
Description:			



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	0.1580	27.06	5.84	9.62	36.68	15.46	65.57	55.57	-28.89	-40.11	Pass
2	0.1820	28.53	12.68	9.62	38.15	22.30	64.39	54.39	-26.24	-32.09	Pass
3	0.2060	25.48	11.23	9.62	35.10	20.85	63.37	53.37	-28.27	-32.52	Pass
4	1.8340	19.31	9.66	9.69	29.00	19.35	56.00	46.00	-27.00	-26.65	Pass
5	1.9260	20.79	10.24	9.70	30.49	19.94	56.00	46.00	-25.51	-26.06	Pass
6	3.5700	13.67	7.35	9.73	23.40	17.08	56.00	46.00	-32.60	-28.92	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 15B Class B	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	06/24/2013
		Test By:	Frank Lin
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	0.1500	34.56	16.83	9.63	44.19	26.46	66.00	56.00	-21.81	-29.54	Pass
2	0.1740	25.96	10.40	9.63	35.59	20.03	64.77	54.77	-29.18	-34.74	Pass
3	0.2020	20.69	7.92	9.63	30.32	17.55	63.53	53.53	-33.21	-35.98	Pass
4	0.2740	17.34	6.19	9.63	26.97	15.82	61.00	51.00	-34.03	-35.18	Pass
5	1.7140	17.09	8.86	9.69	26.78	18.55	56.00	46.00	-29.22	-27.45	Pass
6	1.8980	13.76	8.10	9.70	23.46	17.80	56.00	46.00	-32.54	-28.20	Pass

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

4.2. Radiated Emission Measurement

4.2.1. Limit

Under 1GHz test shall not exceed following value

FCC 47 CFR PART 15 SUBPART B				
Frequency range (MHz)	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
30 to 88	10	39	3	40
88 to 216	10	43.5	3	43.5
216 to 960	10	46.4	3	46
Above 960	10	49.5	3	54

CISPR 22				
Frequency range (MHz)	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
30 to 230	10	40	10	30
230 to 1000	10	47	10	37

Above 1GHz test shall not exceed following value

Frequency (MHz)	dBuV/m (Distance 3m)			
	Class A		Class B	
	Average	Peak	Average	Peak
1000 ~ 40000	60	80	54	74

- Remark:
1. The tighter limit shall apply at the edge between two frequency bands.
 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.
 3. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
 4. Peak detector limit is corresponding to 20 dB above the maximum permitted average limit.

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or in which the device operated or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.75	30
1.75-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

4.2.2. Test Instruments

10 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Pre Amplifier	Agilent	8447D	2944A11120	01/10/2013	(1)
Pre Amplifier	Agilent	8447D	2944A11119	01/10/2013	(1)
Test Receiver	R&S	ESCI	100722	10/18/2012	(1)
Test Receiver	R&S	ESCI	101000	12/18/2012	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3268	06/05/2013	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3273	12/13/2012	(1)
Universal Radio Communication Tester	R&S	CMU200	109369	08/07/2012	(2)
Test Site	ATL	TE06	TE06	08/13/2012	(1)

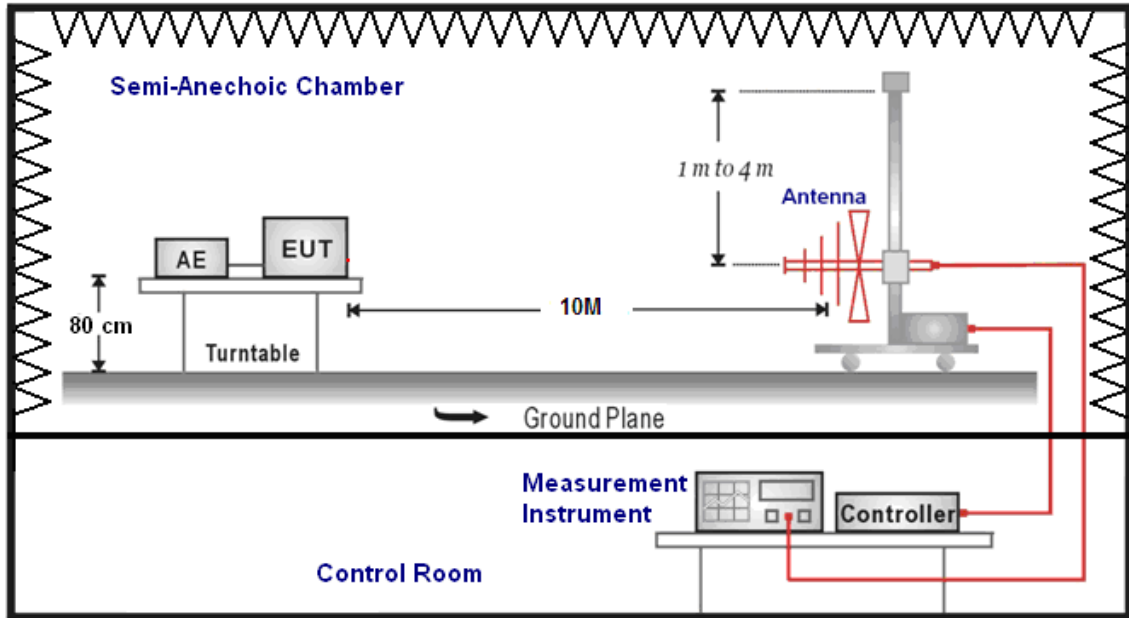
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/16/2013	(1)
Amplifier	EM	EM330	060545	11/17/2012	(1)
Amplifier	Mini-Circuits	ZVA-213-S+	467900926	05/26/2013	(1)
RF Pre-selector	Agilent	N9039A	MY46520255	05/16/2013	(1)
Horn Antenna (1~18GHz)	ETS-Lindgren	3117	00128055	08/09/2012	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2013	(1)
Universal Radio Communication Tester	R&S	CMU200	109369	08/07/2012	(2)
Test Site	ATL	TE09	TE09	05/10/2013	(1)

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

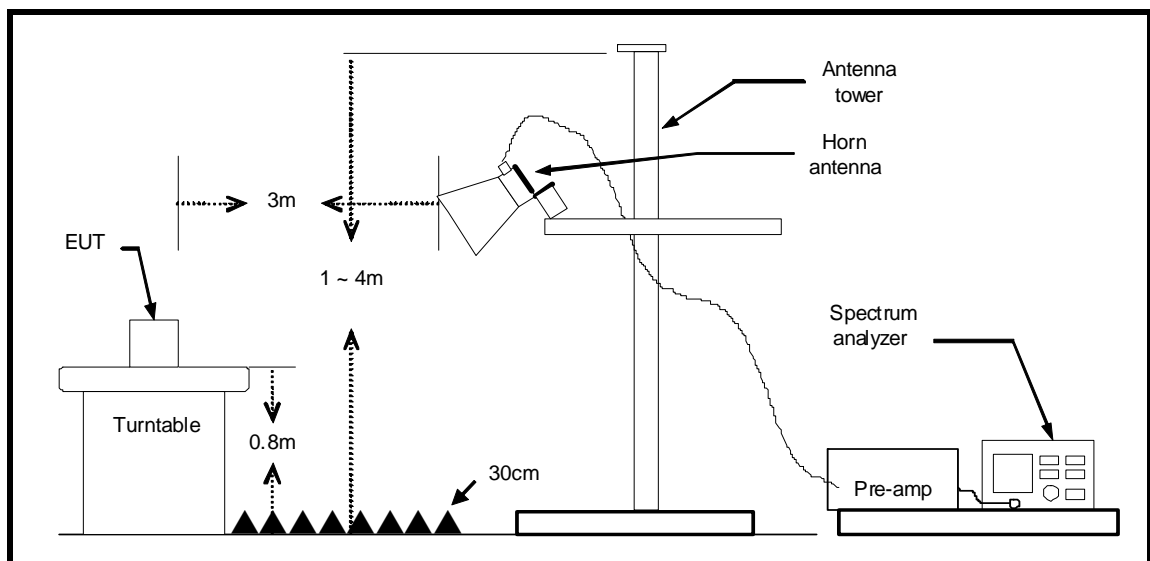
Note: N.C.R. = No Calibration Request.

4.2.3. Setup

Below 1GHz



Above 1GHz



4.2.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters for under 1GHz, and 3 meter for above 1GHz, the highest frequency performed according to internal source frequency of the EUT, the specification was below:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

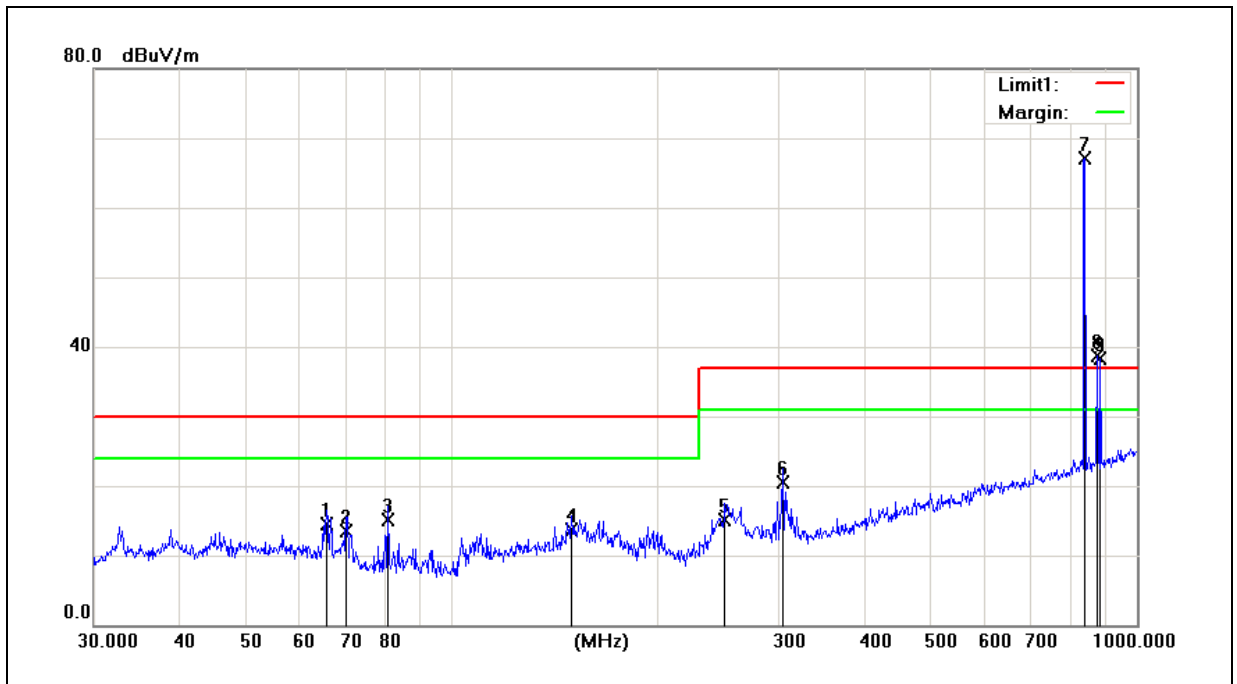
According to this standard paragraph 15.109, as an alternative to the radiated emission limits, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement".

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120 kHz. Radiated was performed at an antenna to EUT distance of 10 meters.

4.2.5. Test Result

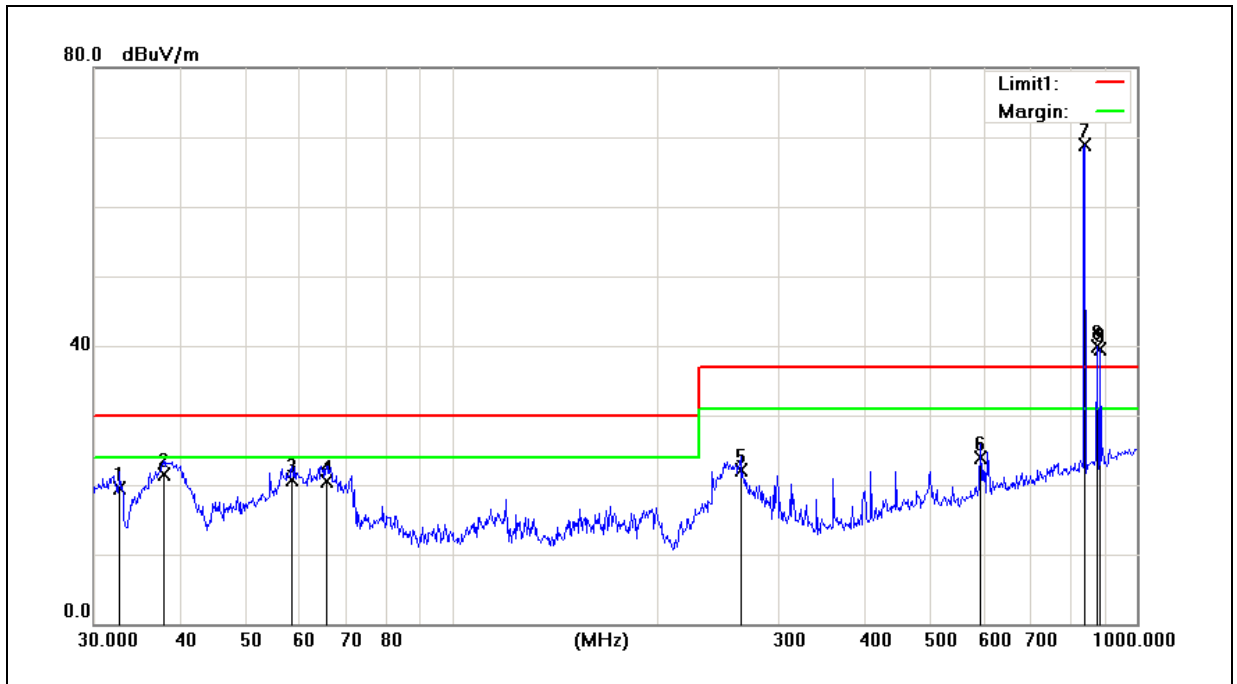
Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	06/26/2013
Ant.Polar.:	Horizontal	Test By:	Frank Lin



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	65.5727	30.58	-16.08	14.50	30.00	-15.50	200	10	QP
2	70.0903	30.45	-16.85	13.60	30.00	-16.40	300	181	QP
3	80.6442	34.00	-18.80	15.20	30.00	-14.80	200	33	QP
4	149.4857	27.28	-13.58	13.70	30.00	-16.30	300	305	QP
5	250.3012	28.94	-13.74	15.20	37.00	-21.80	200	349	QP
6	304.6100	32.29	-11.79	20.50	37.00	-16.50	100	207	QP
7	839.1817	68.96	-1.88	67.08	N/A	N/A	200	263	TX
8	875.2470	39.95	-1.18	38.77	N/A	N/A	300	22	BS
9	884.5028	39.38	-0.99	38.39	N/A	N/A	200	147	RX

- Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
 2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).
 3. TX: Communication channel from the EUT to the Universal Radio Communications Tester.
 4. RX: Communication channel from the Universal Radio Communications Tester to the EUT.
 5. BS: Broadcasting channel from Universal Radio Communications Tester.

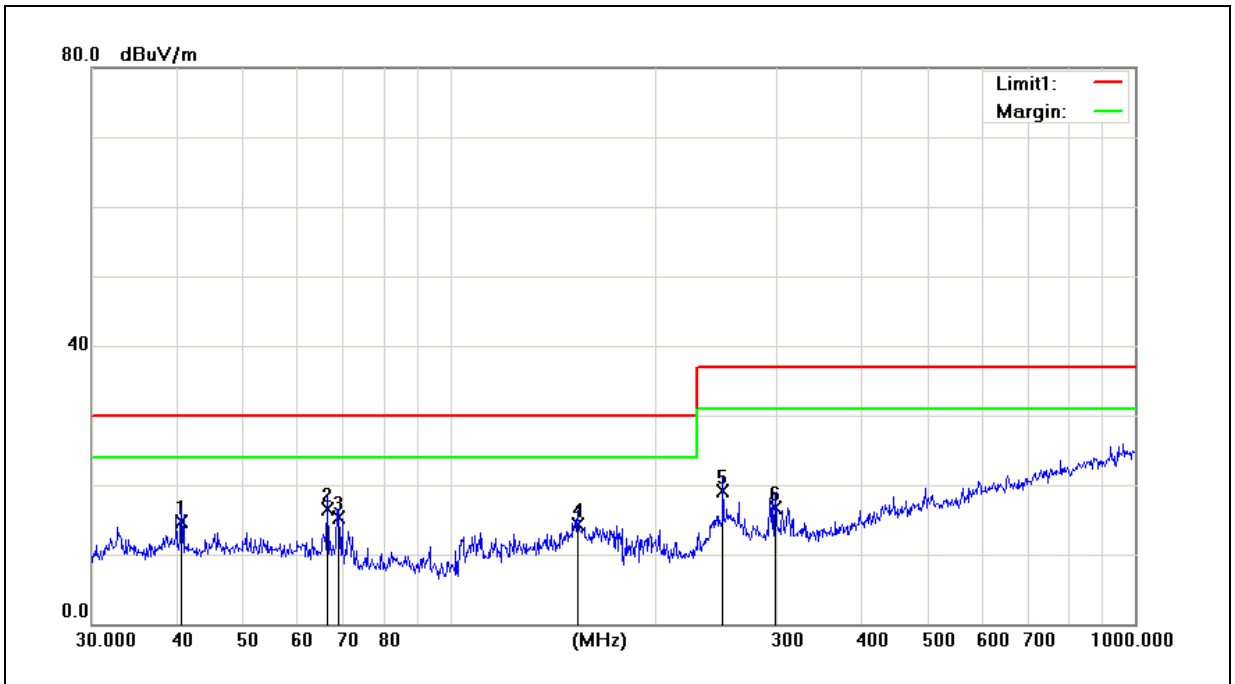
Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	06/26/2013
Ant.Polar.:	Vertical	Test By:	Frank Lin



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	32.7486	35.45	-15.95	19.50	30.00	-10.50	100	160	QP
2	37.9450	36.77	-15.17	21.60	30.00	-8.40	200	3	QP
3	58.4074	35.35	-14.65	20.70	30.00	-9.30	200	41	QP
4	65.5727	36.04	-15.44	20.60	30.00	-9.40	300	291	QP
5	263.8190	34.24	-12.14	22.10	37.00	-14.90	100	359	QP
6	590.9737	28.57	-4.67	23.90	37.00	-13.10	200	317	QP
7	839.1817	68.44	0.43	68.87	N/A	N/A	200	269	TX
8	875.2470	38.84	1.05	39.89	N/A	N/A	100	331	BS
9	884.5028	38.26	1.18	39.44	N/A	N/A	200	183	RX

- Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
 2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).
 3. TX: Communication channel from the EUT to the Universal Radio Communications Tester.
 4. RX: Communication channel from the Universal Radio Communications Tester to the EUT.
 5. BS: Broadcasting channel from Universal Radio Communications Tester.

Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	06/26/2013
Ant.Polar.:	Horizontal	Test By:	Frank Lin

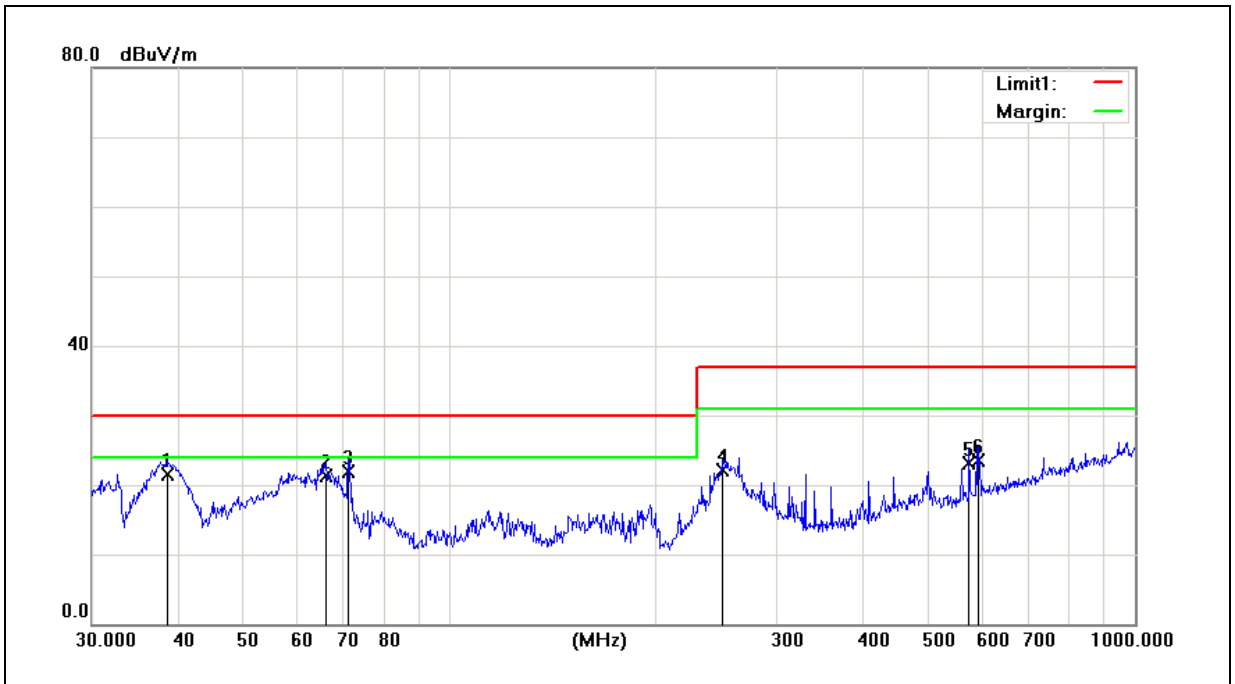


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	40.5591	30.22	-15.42	14.80	30.00	-15.20	200	240	QP
2	66.2662	32.70	-16.20	16.50	30.00	-13.50	300	159	QP
3	68.8721	32.05	-16.65	15.40	30.00	-14.60	300	308	QP
4	153.7385	27.80	-13.40	14.40	30.00	-15.60	200	220	QP
5	250.3012	32.94	-13.74	19.20	37.00	-17.80	200	317	QP
6	298.2681	28.73	-11.93	16.80	37.00	-20.20	300	214	QP

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

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

Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	06/26/2013
Ant.Polar.:	Vertical	Test By:	Frank Lin

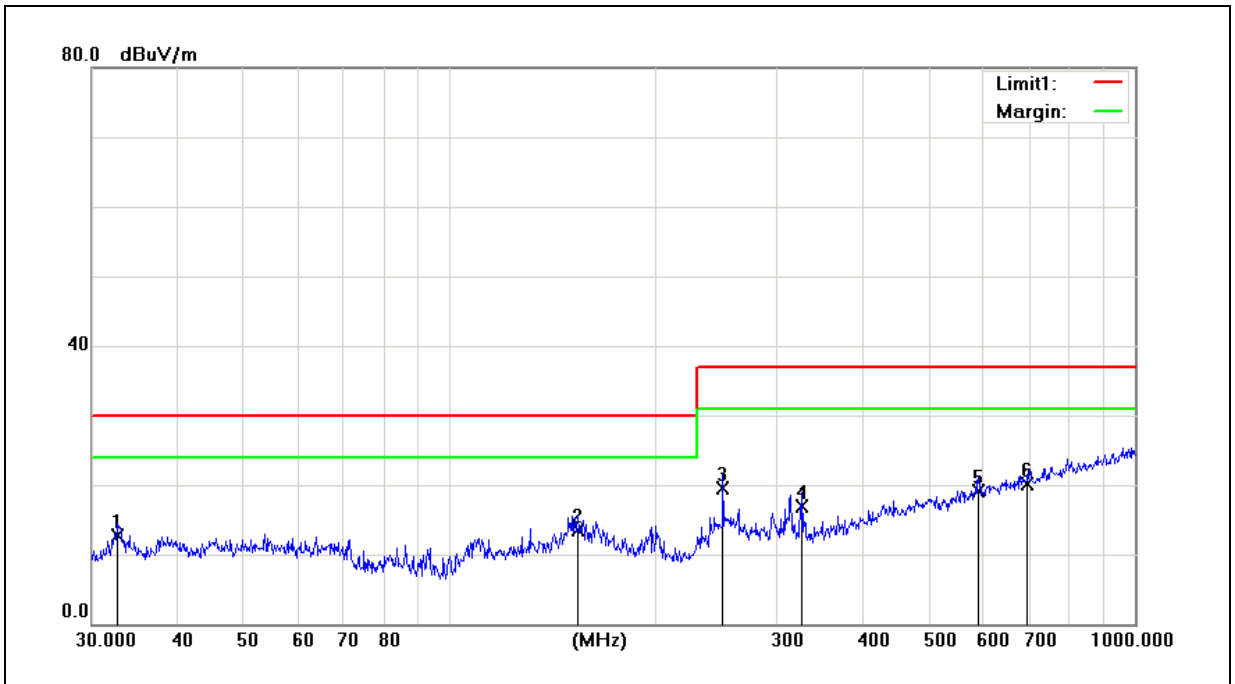


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	38.7518	36.64	-15.04	21.60	30.00	-8.40	100	51	QP
2	66.0342	36.90	-15.50	21.40	30.00	-8.60	200	309	QP
3	71.0803	38.15	-16.25	21.90	30.00	-8.10	300	123	QP
4	249.4250	34.74	-12.64	22.10	37.00	-14.90	200	339	QP
5	572.6144	28.37	-5.17	23.20	37.00	-13.80	200	254	QP
6	590.9737	28.17	-4.67	23.50	37.00	-13.50	100	173	QP

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

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

Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	06/26/2013
Ant.Polar.:	Horizontal	Test By:	Frank Lin

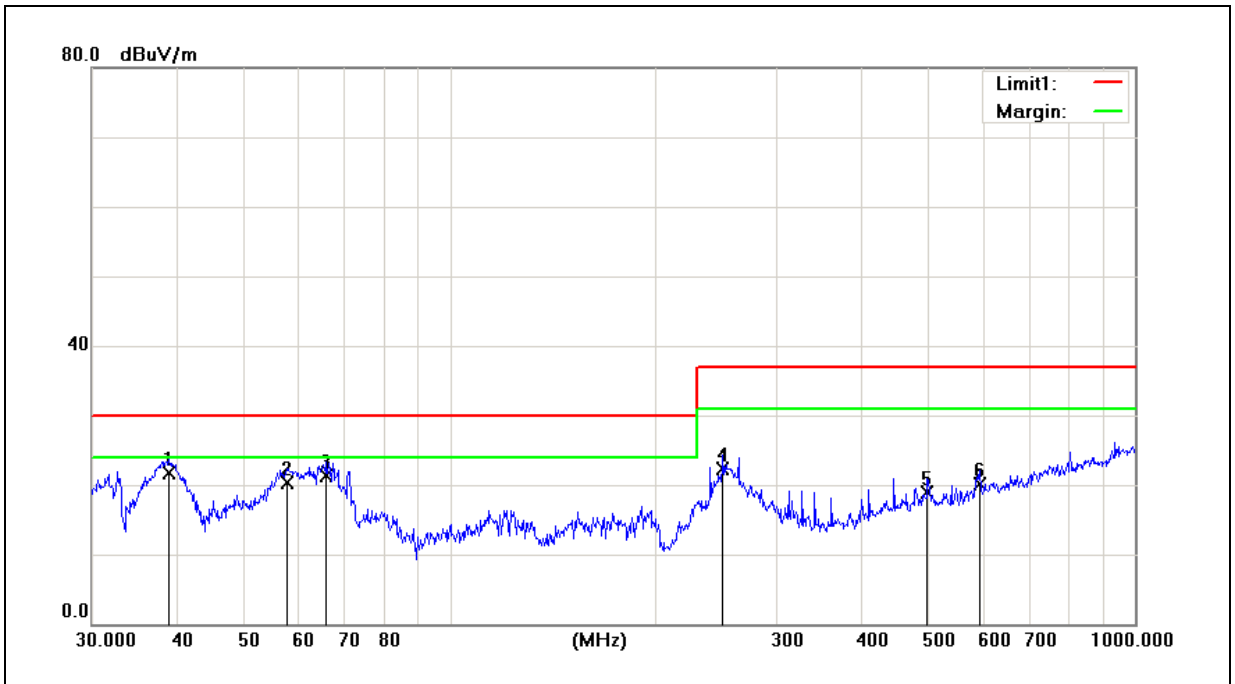


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	32.7486	28.53	-15.83	12.70	30.00	-17.30	200	67	QP
2	153.7385	27.00	-13.40	13.60	30.00	-16.40	300	293	QP
3	250.3012	33.24	-13.74	19.50	37.00	-17.50	200	108	QP
4	326.7395	28.38	-11.48	16.90	37.00	-20.10	200	64	QP
5	590.9737	25.36	-6.16	19.20	37.00	-17.80	100	29	QP
6	696.8567	24.59	-4.49	20.10	37.00	-16.90	200	148	QP

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

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

Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	06/26/2013
Ant.Polar.:	Vertical	Test By:	Frank Lin

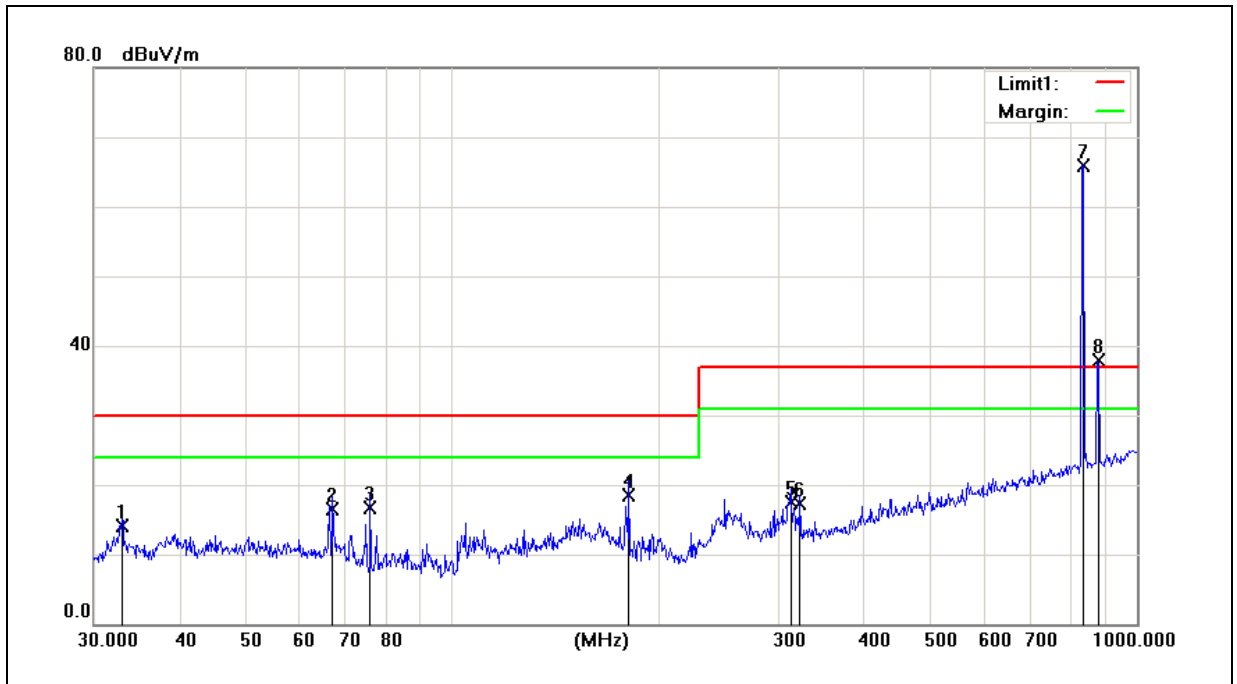


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	38.8878	36.73	-15.03	21.70	30.00	-8.30	100	123	QP
2	57.7962	35.04	-14.64	20.40	30.00	-9.60	300	228	QP
3	66.0342	36.90	-15.50	21.40	30.00	-8.60	100	177	QP
4	250.3012	35.00	-12.60	22.40	37.00	-14.60	200	359	QP
5	497.6765	25.68	-6.68	19.00	37.00	-18.00	200	32	QP
6	593.0497	24.69	-4.59	20.10	37.00	-16.90	100	23	QP

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

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

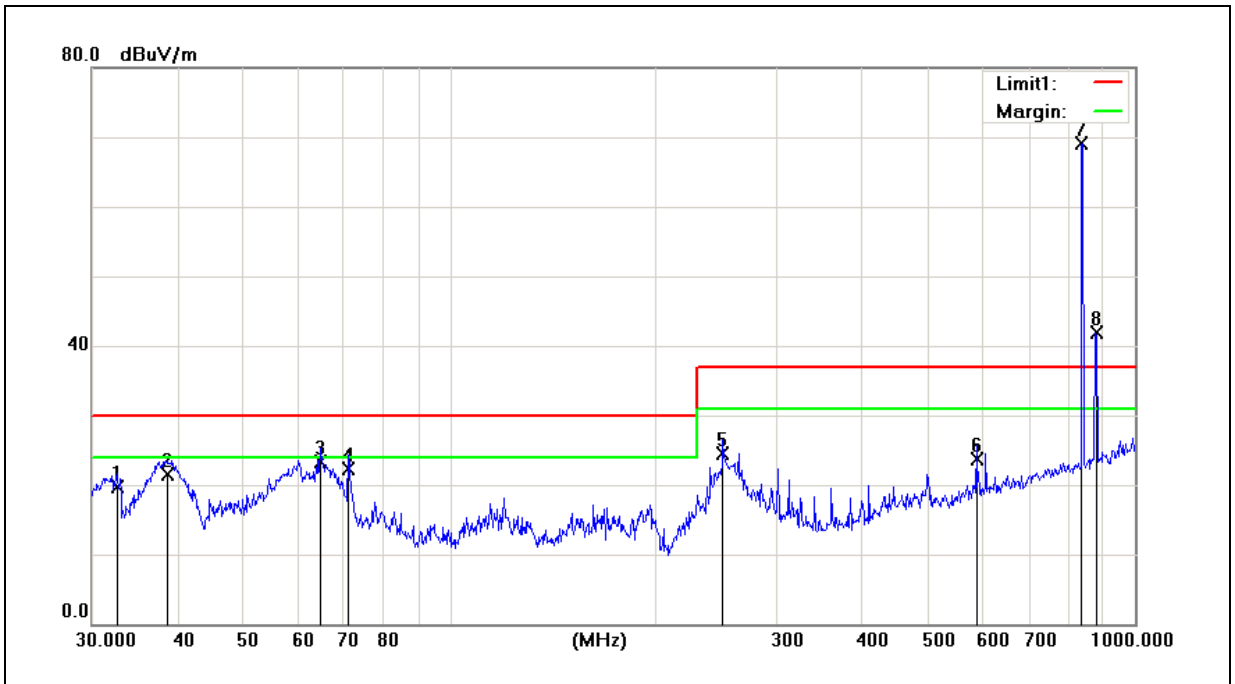
Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	06/26/2013
Ant.Polar.:	Horizontal	Test By:	Frank Lin



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	32.9791	30.03	-15.83	14.20	30.00	-15.80	200	234	QP
2	66.9670	32.81	-16.31	16.50	30.00	-13.50	300	130	QP
3	75.9773	34.62	-17.92	16.70	30.00	-13.30	300	17	QP
4	181.2834	33.38	-14.78	18.60	30.00	-11.40	400	331	QP
5	312.1794	29.16	-11.66	17.50	37.00	-19.50	200	247	QP
6	322.1886	29.00	-11.60	17.40	37.00	-19.60	200	59	QP
7	836.2441	68.06	-2.06	66.00	N/A	N/A	100	259	TX
8	878.3214	38.95	-1.13	37.82	N/A	N/A	200	220	RX

- Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
 2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).
 3. TX: Communication channel from the EUT to the Universal Radio Communications Tester.
 4. RX: Communication channel from the Universal Radio Communications Tester to the EUT.

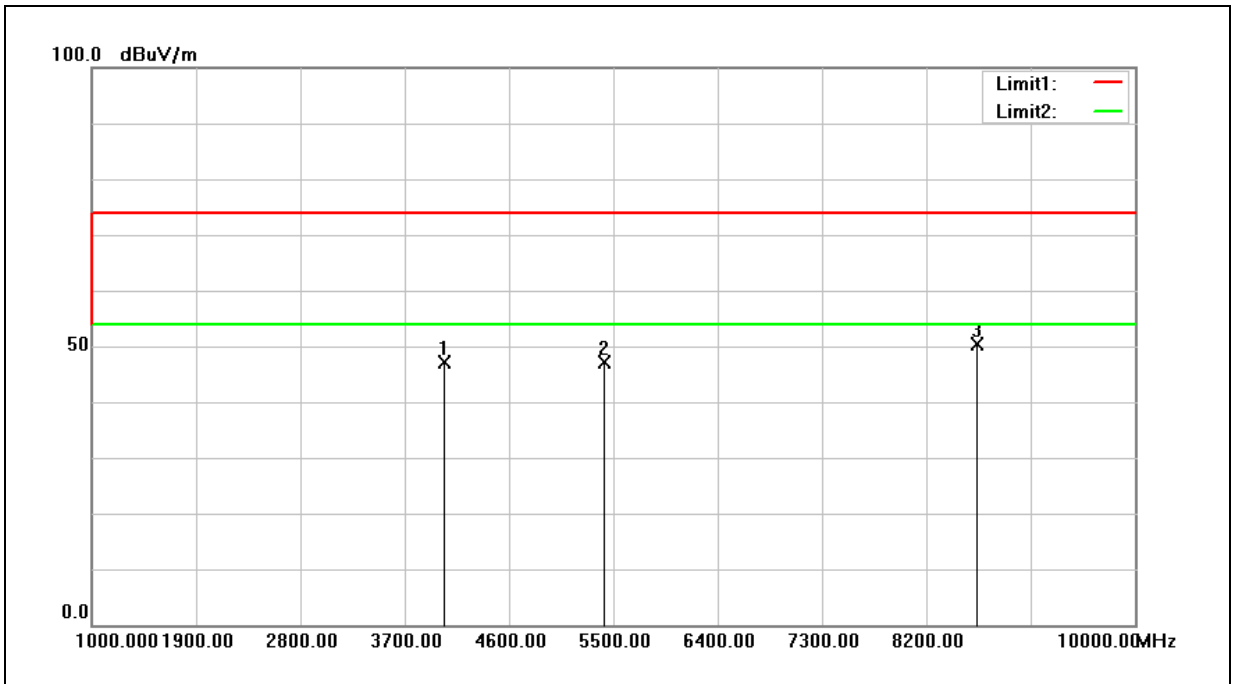
Standard:	CISPR 22 Class B	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	06/26/2013
Ant.Polar.:	Vertical	Test By:	Frank Lin



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	32.6340	35.66	-15.96	19.70	30.00	-10.30	200	185	QP
2	38.6160	36.56	-15.06	21.50	30.00	-8.50	300	11	QP
3	64.6594	38.63	-15.33	23.30	30.00	-6.70	200	290	QP
4	71.0803	38.55	-16.25	22.30	30.00	-7.70	100	266	QP
5	250.3012	37.10	-12.60	24.50	37.00	-12.50	100	159	QP
6	586.8437	28.60	-4.80	23.80	37.00	-13.20	200	182	QP
7	836.2441	68.82	0.33	69.15	N/A	N/A	100	243	TX
8	878.3214	40.76	1.09	41.85	N/A	N/A	100	133	RX

- Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
 2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).
 3. TX: Communication channel from the EUT to the Universal Radio Communications Tester.
 4. RX: Communication channel from the Universal Radio Communications Tester to the EUT.

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Horizontal	Test By:	Frank Lin

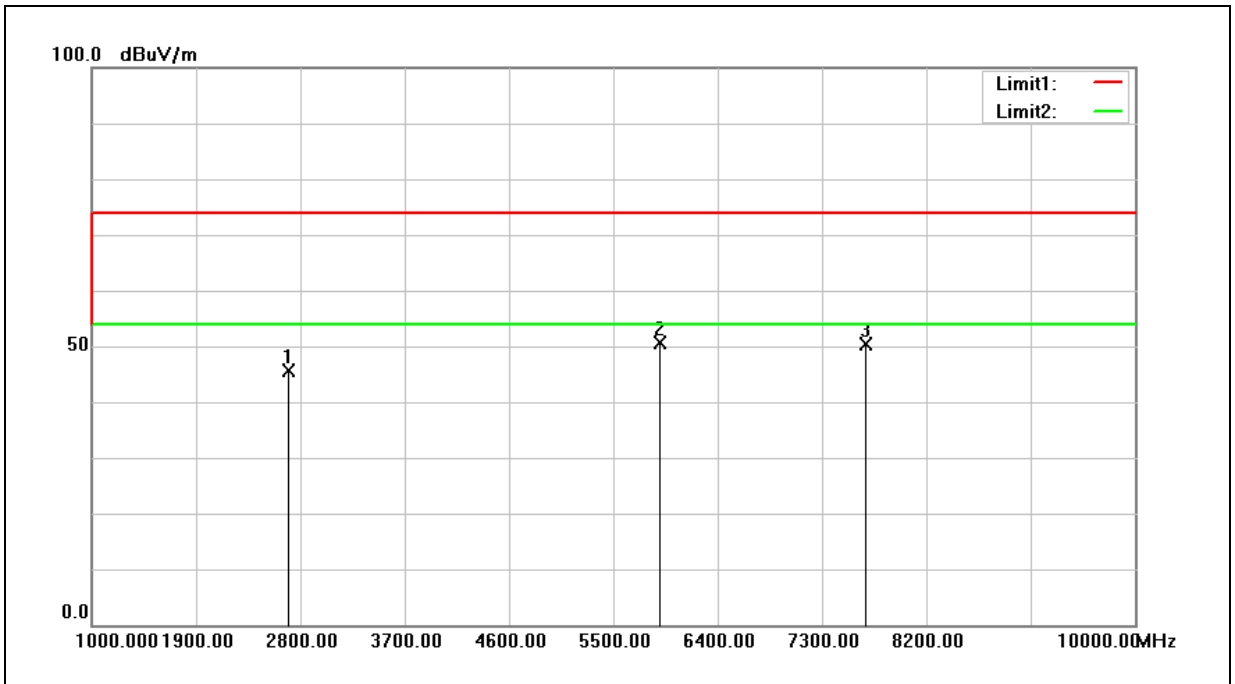


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4042.000	61.44	-14.39	47.05	74.00	-26.95	peak
2	5419.000	58.98	-11.89	47.09	74.00	-26.91	peak
3	8632.000	57.06	-6.66	50.40	74.00	-23.60	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Vertical	Test By:	Frank Lin

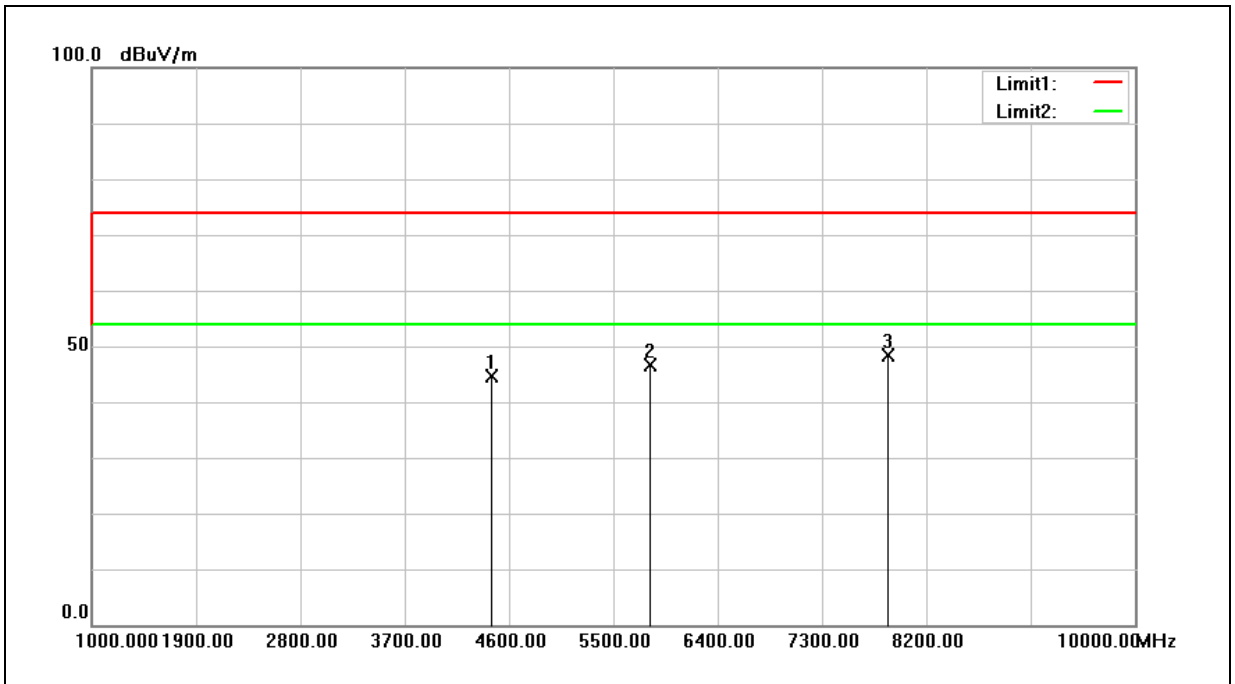


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2701.000	63.15	-17.54	45.61	74.00	-28.39	peak
2	5896.000	60.93	-10.35	50.58	74.00	-23.42	peak
3	7678.000	58.25	-7.98	50.27	74.00	-23.73	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Horizontal	Test By:	Frank Lin

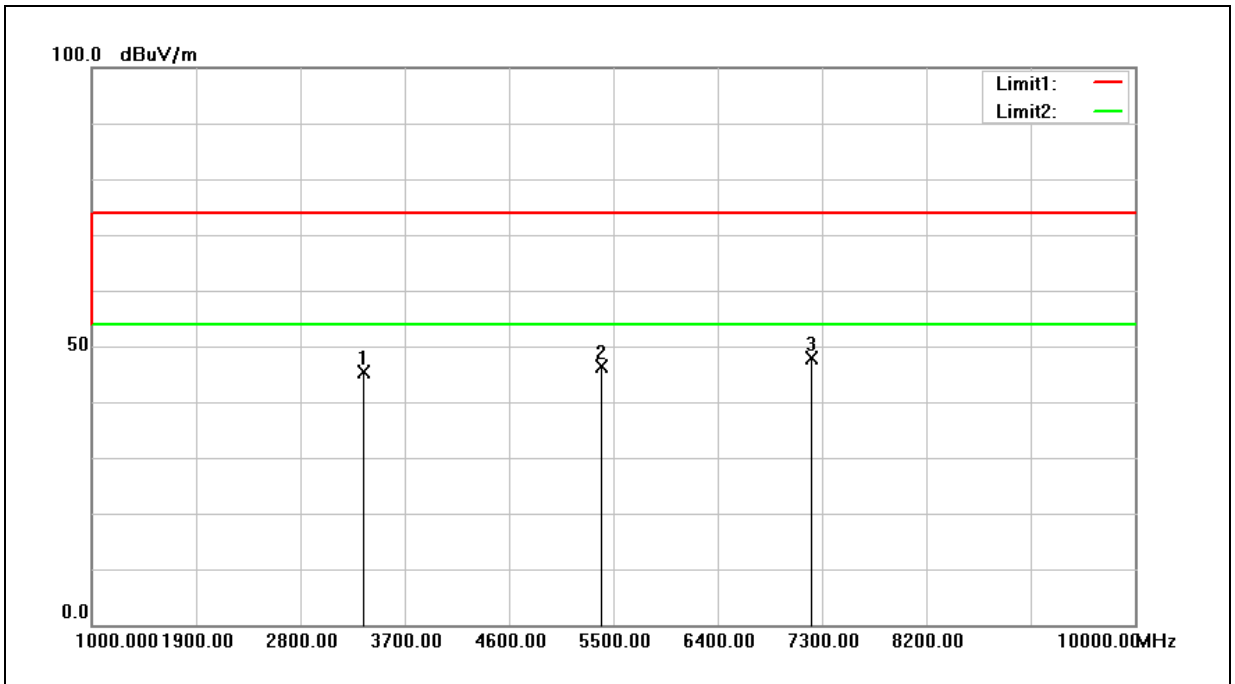


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4447.000	57.89	-13.29	44.60	74.00	-29.40	peak
2	5815.000	57.35	-10.63	46.72	74.00	-27.28	peak
3	7867.000	56.29	-7.79	48.50	74.00	-25.50	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Vertical	Test By:	Frank Lin

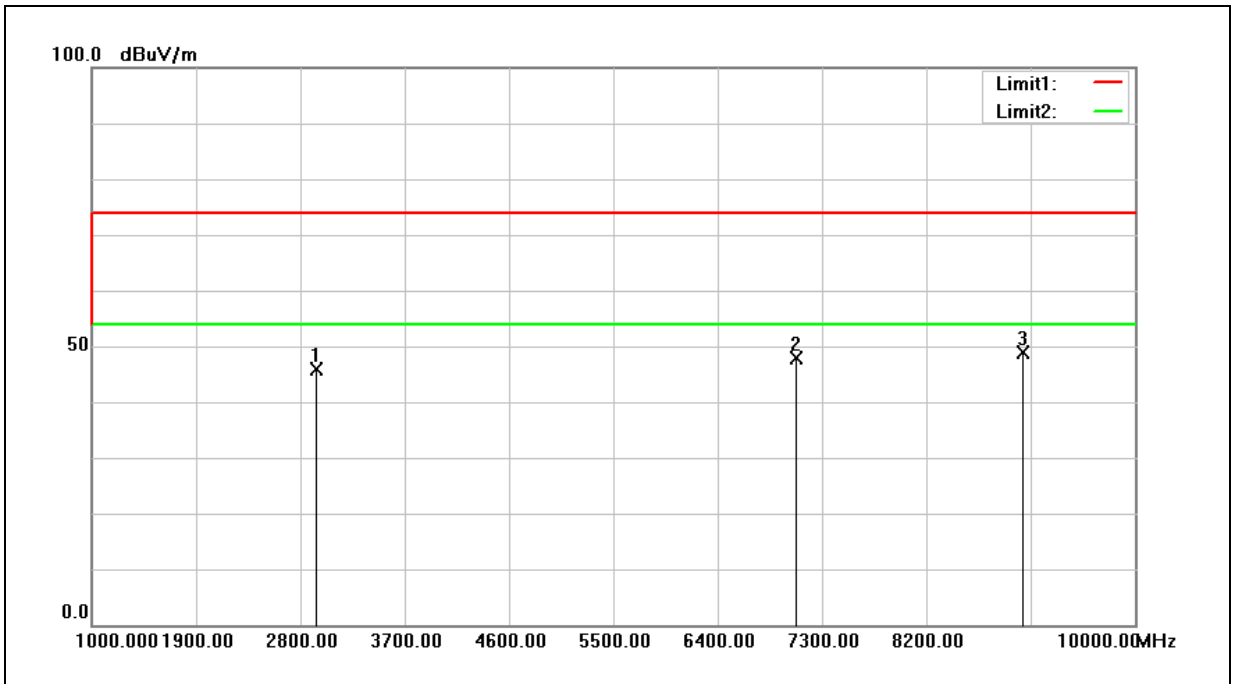


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3349.000	61.78	-16.30	45.48	74.00	-28.52	peak
2	5401.000	58.20	-11.93	46.27	74.00	-27.73	peak
3	7210.000	56.27	-8.48	47.79	74.00	-26.21	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Horizontal	Test By:	Frank Lin

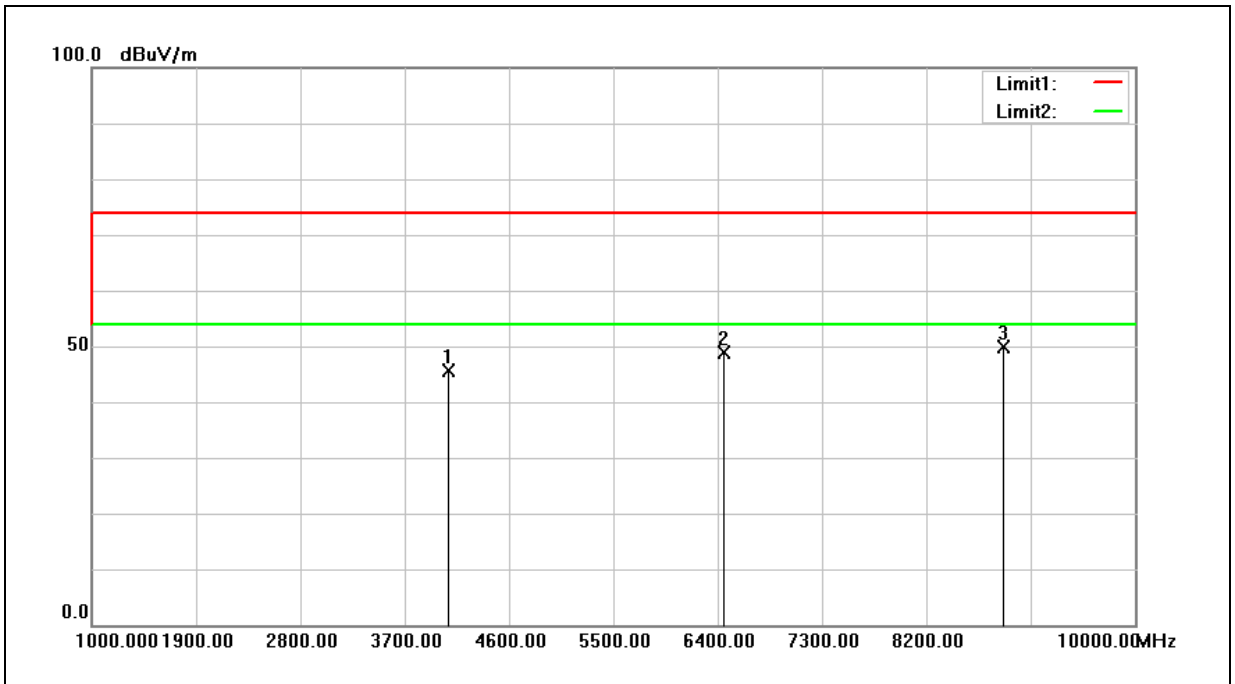


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2935.000	62.73	-16.86	45.87	74.00	-28.13	peak
2	7075.000	56.62	-8.63	47.99	74.00	-26.01	peak
3	9037.000	55.05	-6.05	49.00	74.00	-25.00	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Vertical	Test By:	Frank Lin

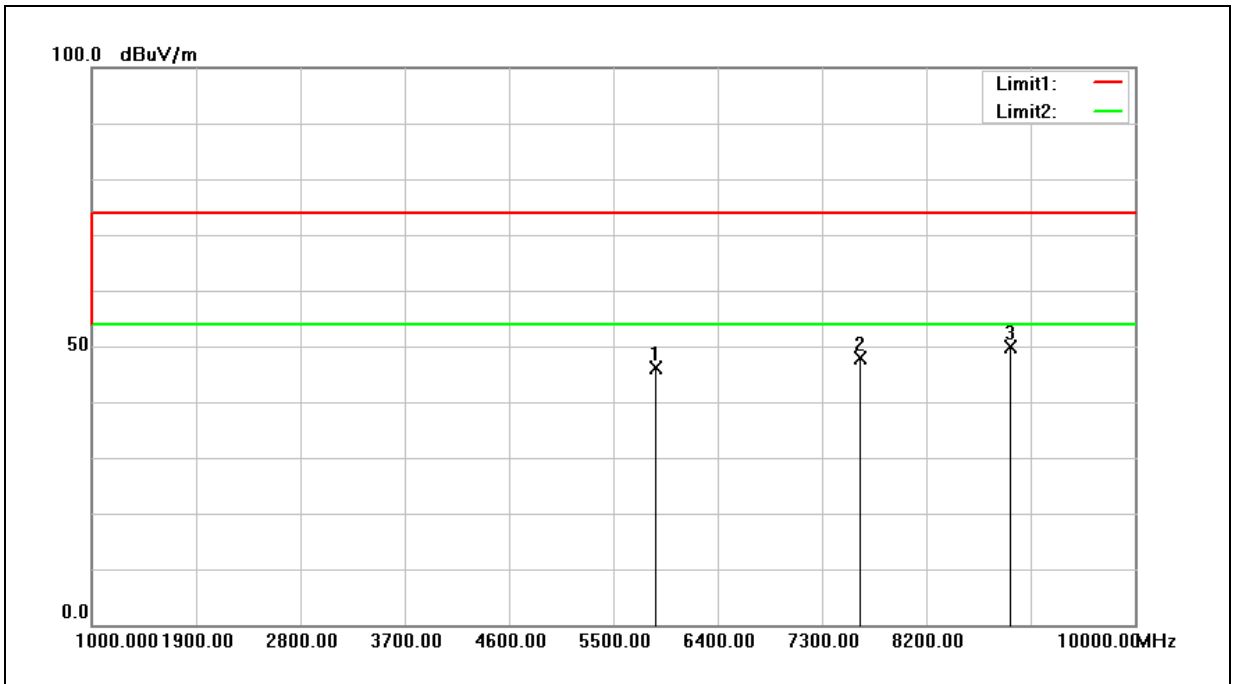


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4078.000	60.01	-14.29	45.72	74.00	-28.28	peak
2	6454.000	58.27	-9.42	48.85	74.00	-25.15	peak
3	8866.000	56.23	-6.30	49.93	74.00	-24.07	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Horizontal	Test By:	Frank Lin

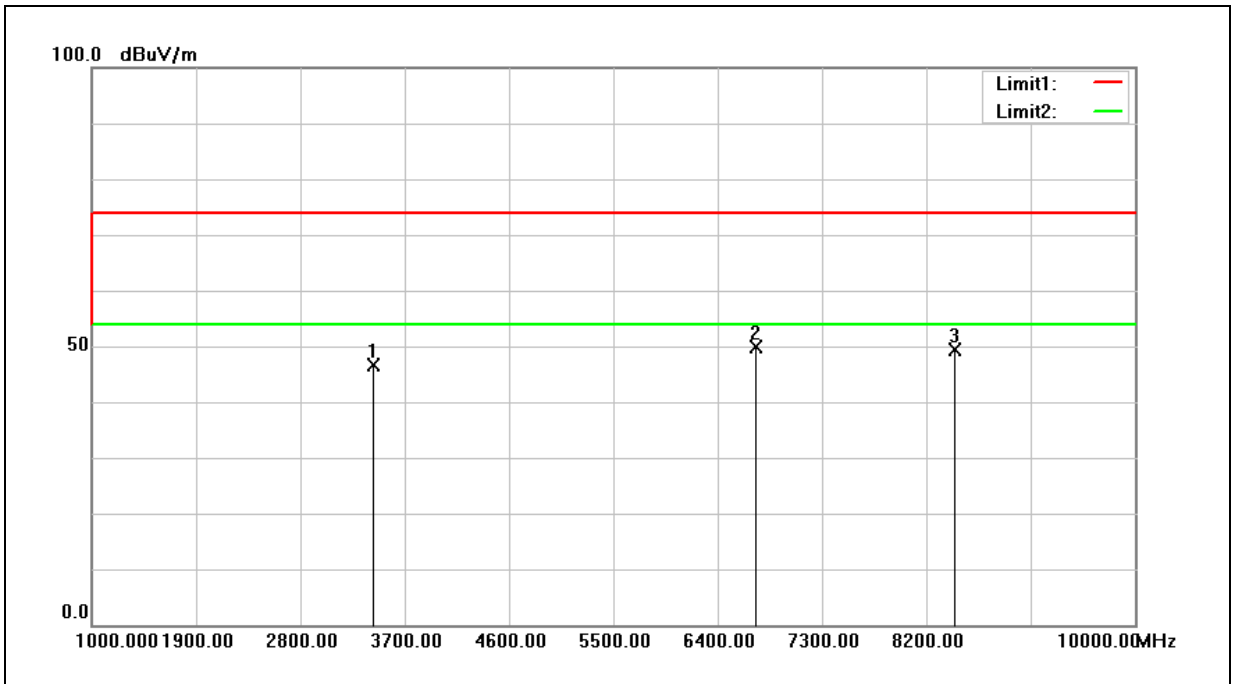


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5869.000	56.48	-10.45	46.03	74.00	-27.97	peak
2	7633.000	55.80	-8.02	47.78	74.00	-26.22	peak
3	8929.000	56.02	-6.20	49.82	74.00	-24.18	peak

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

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

Standard:	FCC Part 15B Class B	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	CNN0403	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4 (1GHz~10GHz)	Date:	06/26/2012
Ant.Polar.:	Vertical	Test By:	Frank Lin



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3430.000	62.81	-16.22	46.59	74.00	-27.41	peak
2	6733.000	59.03	-9.06	49.97	74.00	-24.03	peak
3	8443.000	56.26	-6.95	49.31	74.00	-24.69	peak

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

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