ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

GPS Portable Navigation with FM Transmitter

MODEL No.: A4301, A4302, A4303, S4304, A4305, A4801, A5001, A5002, A5003, A5004, A5005, A5006, S5007, A5008, A5009, S5010, A5011, A5012, A5013, S5014, A5015, G301, G421, G521, G601, G602, A6001, A6002, A6003, G503, G703, G705

FCC ID: X8Z-A4301

REPORT NO: E1003037F

ISSUE DATE: March 16, 2010

Prepared for

APICAL TECHNOLOGY (HK) CO., LTD.

20/F., Cheung Lee Industrial Building, 9 Cheung Lee Street, Chai Wan, Hong Kong

Prepared by

SHENZHEN EMTEK CO., LTD

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VERIFICATION OF COMPLIANCE

Applicant:	APICAL TECHNOLOGY (HK) CO., LTD. 20/F., Cheung Lee Industrial Building, 9 Cheung Lee Street, Chai Wan, Hong Kong
Product Description:	GPS Portable Navigation with FM Transmitter
Model Number:	A4301,A4302,A4303,S4304,A4305,A4801,A5001,A5002,A5003,A5004, A5005,A5006,S5007,A5008,A5009,S5010,A5011,A5012,A5013,S5014, A5015,G301,G421,G521,G601,G602,A6001, A6002, A6003,G503, G703, G705(Note: All the modes are the same, only different with the color and their model numbers)
Serial Number:	N/A
File Number:	E1003037F
Date of Test:	March 10, 2010 to March 15, 2010

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.239.

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

Approved By

David Lee / Q.A. Manager
SHENZHEN EMTEK CO., LTD.

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

The APICAL TECHNOLOGY (HK) CO., LTD. Model: A4301 (referred to as the EUT in this report). The EUT is a GPS Portable Navigation with FM Transmitter; The actual tuning Controls can be manually adjusted to from 88.1MHz~107.9MHz .

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 88.1MHz~107.9MHz
B) Step: 50KHz
C). Antenna Designation: PCB antenna.
D). Power Supply: DC 12V or AC 120V/60Hz or DC 3.7V from Li-ion Battery

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: X8Z-A4301 filing to comply with Section 15.239 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2005.11.02
The certificate is valid until 2010.11
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Guangzhou, 2008.3
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, March 18, 2008
The Certificate Registration Number is 709623.

Accredited by Industry Canada, May 24, 2008
The Certificate Registration Number is 46405-4480

Name of Firm : SHENZHEN EMTEK CO., LTD

Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

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

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was 88.1MHz~107.9MHz.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** using **CISPR Quasi-Peak and average detector mode**.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 Limitation

(1)Power Line Conducted Emission Limits (Class B)

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

(2) Radiated Emission

(b) The field strength of any emissions within the permitted 200kHz band shall not exceed 250 microvolts/meter at 3 meters, The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

(c) The field strength of any emissions radiated on any frequency outside of the specified 200Khz band shall not exceed the general radiated emission limits in Section 15.209.

Remark: The limit for average field strength dBuv/m for the fundamental frequency=48.0 dBuv/m.
And the limit for peak field strength dBuv/m for the fundamental frequency=68.0 dBuv/m.

Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength μV/m	Distance(m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

(3) Occupied Bandwidth

(a) Emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operation frequency; The 200kHz band lies wholly within the frequency range of 88.1 to 107.9 MHz.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

For AC Mains:

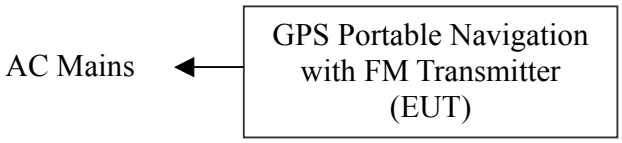


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	GPS Portable Navigation with FM Transmitter	APICAL TECHNOLOGY (HK) CO., LTD.	A4301	X8Z-A4301	N/A	***EUT***

Note:

(1) Unless otherwise denoted as EUT in『Remark』column , device(s) used in tested system is a support equipment.

3. Summary Of Test Results

FCC Rules	Description Of Test	Result
§ 15.209	Conducted Emission	Compliant
§ 15.239	Radiated Emission	Compliant
§ 15.239	Bandwidth Test	Compliant

4. Description of test modes

The EUT (GPS Portable Navigation with FM Transmitter) has been tested under normal operating condition. Three channels of EUT (88.1~107.9MHz) have been chosen for testing under Normal Operating condition. In this report, all the measured datum of the three channels have been reported. No software used to control the EUT for staying in continuous transmitting mode for testing. Power supply: AC mains (120V/60Hz), DC Line (DC12V).

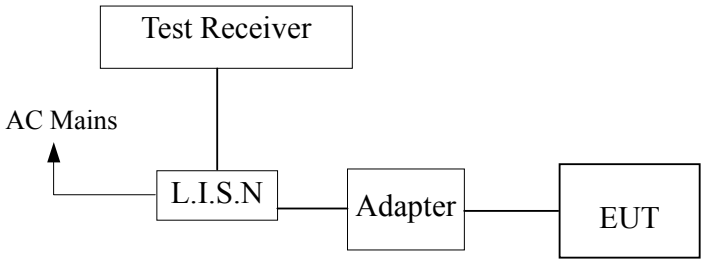
1. For lowest channel : 88.1MHz
2. For middle channel : 98.0MHz
3. For highest channel: 107.9MHz

5. Conducted Emissions Test

5.1 Measurement 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.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2009	05/29/2010
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2009	05/29/2010
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2009	05/29/2010
50ΩCoaxial Switch	Anritsu	MP59B	M20531	005/29/2009	05/29/2010

5.4 Measurement Result:

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Conduction	Temperature :	28 ℃
Humidity :	65 %	Power Supply:	120V/60Hz
Test Result:	PASS	Test By:	Andy

Test Line	Frequency MHz	Emission Level QP dB(μV)	Emission Level AV dB(μV)	Limits QP dB(μV)	Limits AV dB(μV)	Margin QP dB(μV)	Margin AV dB(μV)
Neutral	0.185	60.90	48.70	64.26	54.26	-3.36	-5.56
	0.250	54.20	40.96	61.76	51.76	-7.56	-10.80
	0.310	48.50	35.50	59.97	49.97	-11.47	-14.47
	0.490	44.75	29.02	56.00	46.00	-11.25	-16.98
	4.150	45.65	27.94	60.00	50.00	-14.35	-22.06
	22.321	45.08	33.93	60.00	50.00	-14.92	-16.07
Line	0.185	61.40	47.00	64.26	54.26	-2.86	-7.26
	0.250	54.20	39.83	61.76	51.76	-7.56	-11.93
	0.310	47.90	32.11	59.97	49.97	-12.07	-17.86
	4.230	39.27	27.43	56.00	46.00	-16.73	-18.57
	6.800	46.54	32.61	60.00	50.00	-13.46	-17.39
	22.321	48.50	37.84	60.00	50.00	-11.50	-12.16

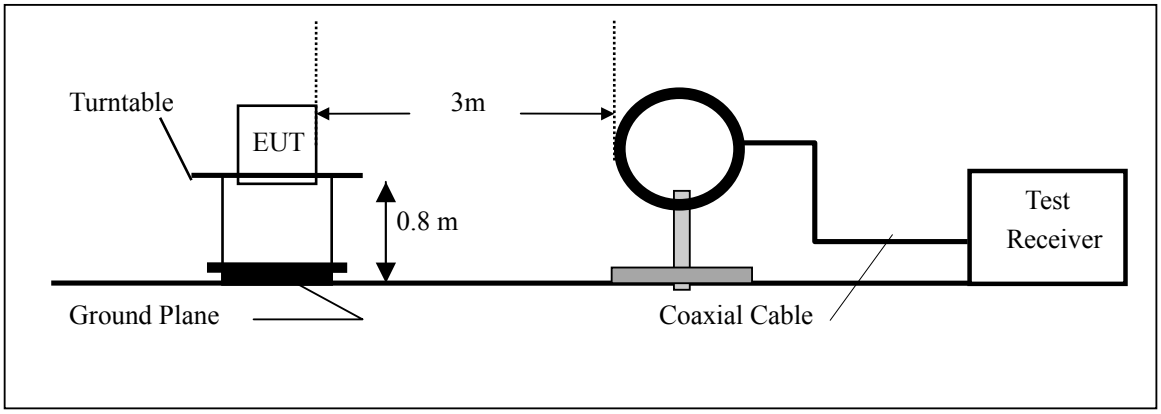
6. Radiated Emission Test

6.1 Measurement Procedure

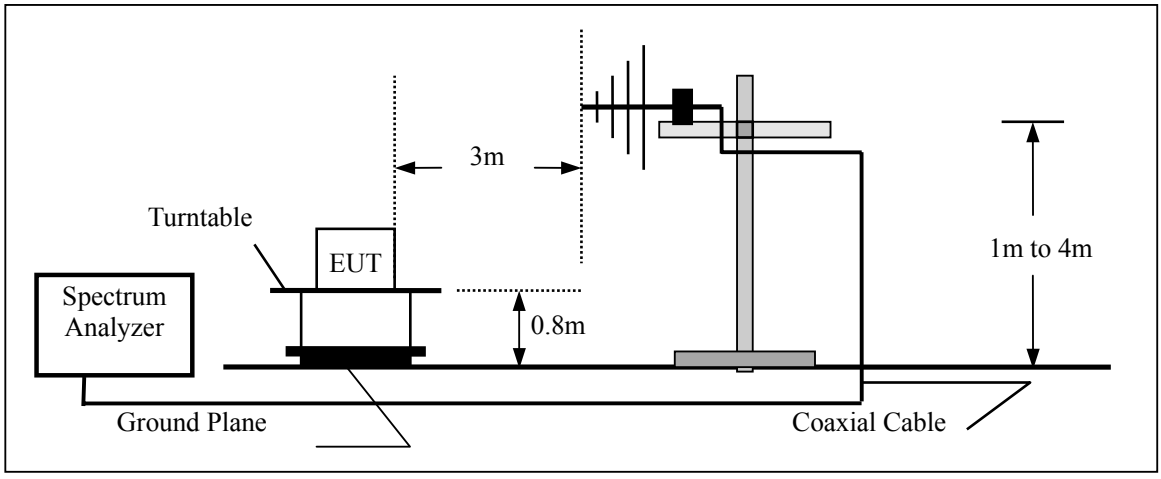
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

Test Site # 1					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/29/2009	05/29/2010
Pre-Amplifier	HP	8447D	2944A07999	05/29/2009	05/29/2010
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2009	05/29/2010
Loop Antenna	ARA	PLA-1030/ B	1029	05/29/2009	05/29/2010

6.4 Measurement Result

A. Fundamental Radiated Emission Data

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Fundamental Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	Lowest channel(88.1MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
88.10	V	34.43	68.00	-33.57	Peak
88.10	H	44.92	68.00	-23.08	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
88.10	V	33.93	48.00	-14.07	AV
88.10	H	39.02	48.00	-8.98	AV

2. Power supply: AC120V/60Hz

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
88.10	V	35.12	68.00	-32.88	Peak
88.10	H	45.36	68.00	-22.64	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
88.10	V	35.15	48.00	-12.85	AV
88.10	H	39.48	48.00	-8.52	AV

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Fundamental Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	Middle channel (98.0MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
98.0	V	33.78	68.00	-34.22	Peak
98.0	H	40.35	68.00	-27.65	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
98.0	V	33.28	48.00	-14.72	AV
98.0	H	40.89	48.00	-7.11	AV

2. Power supply: AC120V/60Hz

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
98.0	V	34.92	68.00	-33.08	Peak
98.0	H	41.23	68.00	-26.77	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
98.0	V	34.12	48.00	-13.88	AV
98.0	H	41.57	48.00	-6.43	AV

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Fundamental Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	Highest channel (107.9MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
107.90	V	34.52	68	-33.48	Peak
107.90	H	41.49	68	-26.51	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
107.90	V	33.42	48	-14.58	AV
107.90	H	40.69	48	-7.31	AV

2. Power supply: AC120V/60Hz

Peak Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
107.90	V	41.61	68	-26.39	Peak
107.90	H	46.13	68	-21.87	Peak

Average Measurement

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
107.90	V	37.53	48	-10.47	AV
107.90	H	41.81	48	-6.19	AV

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

B. Harmonics Radiated Emission Data

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	Lowest channel (88.1MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
120.16	V	21.79	43.5	-21.71	Peak
157.46	V	16.93	43.5	-26.57	Peak
211.88	V	17.25	43.5	-26.25	Peak
445.05	V	22.01	46.00	-23.99	Peak
685.99	V	25.93	46.00	-20.07	Peak
211.88	H	17.99	43.50	-25.51	Peak
249.18	H	20.09	46.00	-25.91	Peak
264.73	H	25.79	46.00	-20.21	Peak
440.38	H	22.37	46.00	-23.63	Peak
614.48	H	21.85	46.00	-24.15	Peak

2. Power supply: AC120V/60Hz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
62.79	V	29.32	40	-10.68	Peak
121.32	V	27.56	43.5	-15.94	Peak
499.13	V	26.33	46	-19.67	Peak
710.25	V	27.51	46	-18.49	Peak
828.43	V	26.91	46	-19.09	Peak
57.36	H	27.37	40	-12.63	Peak
116.89	H	25.70	43.5	-17.8	Peak
284.56	H	23.65	46	-22.35	Peak
677.31	H	27.48	46	-18.52	Peak
710.20	H	27.36	46	-18.64	Peak

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.239

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	Middle channel (98.0MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
120.16	V	21.79	43.5	-21.71	Peak
157.46	V	16.93	43.5	-26.57	Peak
211.87	V	17.25	43.5	-26.25	Peak
445.04	V	22.01	46	-23.99	Peak
685.99	V	25.93	46	-20.07	Peak
211.87	H	18.19	43.5	-25.31-	Peak
249.18	H	20.66	46	-25.34	Peak
294.26	H	27.68	46	-18.32	Peak
314.47	H	22.23	46	-23.77	Peak
361.10	H	23.08	46	-22.92	Peak

2. Power supply: AC120V/60Hz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
62.58	V	29.51	40	-10.49	Peak
120.16	V	28.35	43.5	-15.15	Peak
497.90	V	25.67	46	-20.33	Peak
709.35	V	27.15	46	-18.85	Peak
830.56	V	27.44	46	-18.56	Peak
54.87	H	27.53	40	-12.47	Peak
118.6	H	26.59	43.5	-16.91	Peak
286.49	H	23.87	46	-22.13	Peak
673.56	H	27.08	46	-18.92	Peak
709.31	H	28.93	46	-17.07	Peak

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.239

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	Transmitting Mode	Test Date :	March 10, 2010
Test Item:	Radiated Emission Data	Temperature :	28 ℃
Fundamental Frequency:	High channel (107.9MHz)	Humidity :	65 %
Test Result:	PASS	Test By:	Andy

1. Power supply: DC 12V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
120.16	V	21.48	43.5	-22.02	Peak
176.12	V	16.82	43.5	-26.68	Peak
193.22	V	18.39	43.5	-25.11	Peak
305.14	V	18.75	46	-27.25	Peak
480.80	V	22.54	46	-23.46	Peak
230.52	H	20.27	46	-25.73	Peak
249.18	H	21.06	46	-24.94	Peak
286.49	H	21.20	46	-24.80	Peak
323.79	H	26.95	46	-19.05	Peak
361.10	H	23.73	46	-22.27	Peak

2. Power supply: AC120V/60Hz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
62.12	V	30.12	40	-9.88	Peak
121.23	V	29.54	43.5	-13.96	Peak
498.35	V	25.69	43.5	-17.81	Peak
708.58	V	30.37	46	-15.63	Peak
841.39	V	30.53	46	-15.47	Peak
59.61	H	25.81	40	-14.19	Peak
118.74	H	27.51	43.5	-15.99	Peak
287.32	H	24.52	46	-21.48	Peak
674.50	H	28.97	46	-17.03	Peak
720.12	H	29.35	46	-16.65	Peak

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.239

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

6.5 Conduction Measurement Photos

Power supply: AC 120V/60Hz

6.6 Radiation Measurement Photos

Power supply: AC 120V/60Hz

Power supply: DC 12V

7. Occupied Bandwidth

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW = 10KHz, VBW= 30KHz
4. Set SPA Max hold. Mark peak.

Note: The EUT can be connected to iPod Player. The input signal of EUT is controlled by iPod Player. So the volume control of iPod Player was set to maximum during the test. It means that the test was performed with the maximum audio input.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

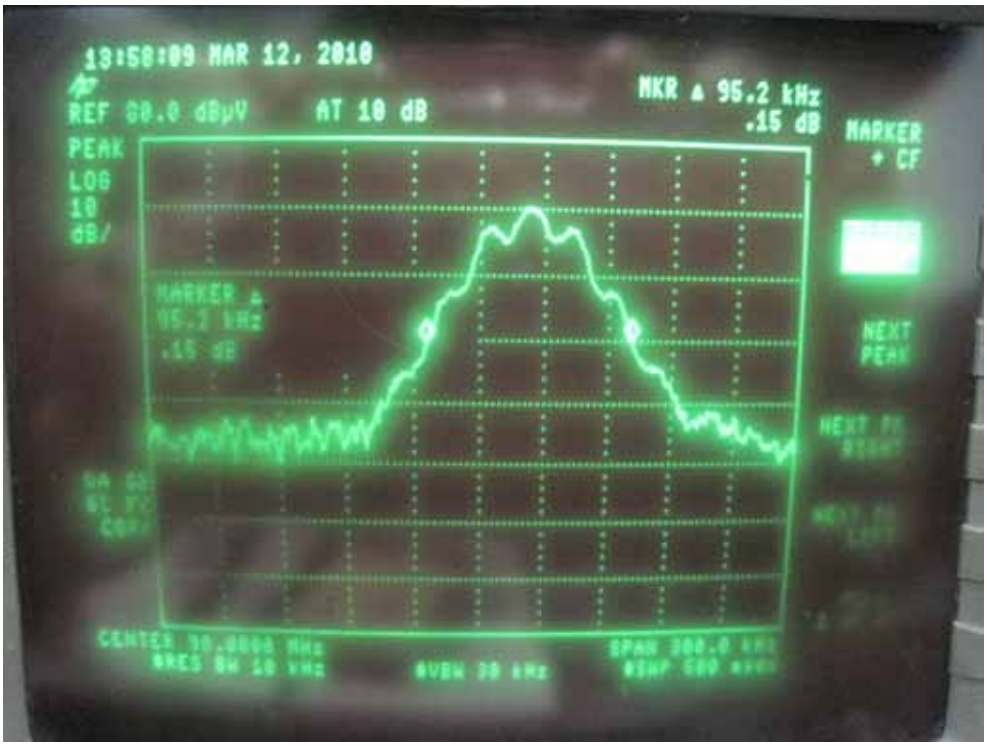
7.3 Measurement Equipment Used:

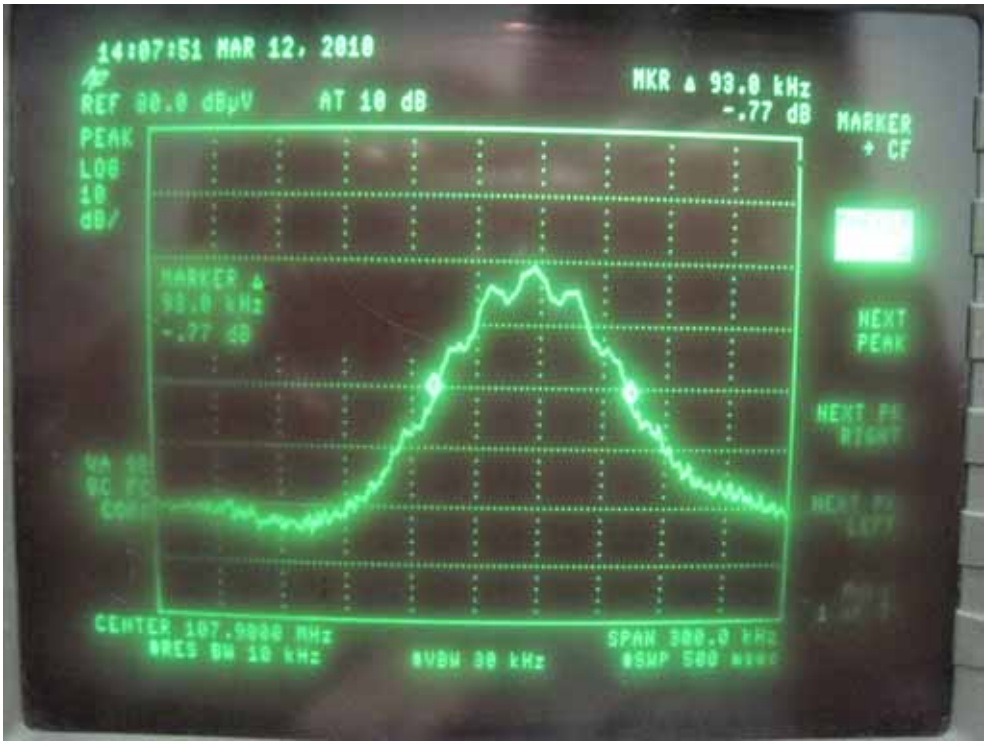
Same as 4.2 Radiated Emission Measurement.

7.4 Measurement Results:

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209.
Refer to attached data chart.

Band Width Test Data




14:07:51 MAR 12, 2010
REF 80.0 dBµV
AT 10 dB
MKR Δ 93.0 kHz
-.77 dB
PEAK
LOG
10
dB/
MARKER Δ
93.0 kHz
-.77 dB
MARKER
→ CF
NEXT
PEAK
CENTER 107.9000 MHz
#RES BW 10 kHz
#VBW 30 kHz
SPAN 300.0 kHz

8. Antenna Application

8.1 Antenna requirement

The EUT's antenna used a dipole antenna and integrated on PCB, The EUT'S antenna is met the requirement of FCC part 15C section 15.203