



FCC TEST REPORT

REPORT NO.: 060808FIA01

MODEL NO.: PI-01

RECEIVED: Aug. 3, 2006

TESTED: Aug. 3, 2006 ~ Mar. 19, 2007

ISSUED: Mar. 19, 2007

APPLICANT: Roadmaster (USA) Corp.

ADDRESS: 41 James Way Eatontown, NJ, 07724 USA

ISSUED BY: ADT (Shanghai) Corporation

ADDRESS: 2F, Building C, No.1618, Yishan Rd., 201103,
Shanghai, China

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ADT (Shanghai) Corporation



V 1.0



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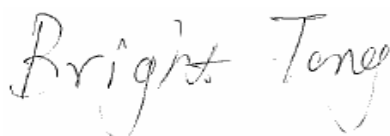
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1 CERTIFICATION

PRODUCT: Power inverter
MODEL NO.: PI-01
APPLICANT: Roadmaster (USA) Corp.
TESTED: Aug. 3, 2006 ~ Mar. 19, 2007
TEST ITEM: Engineering Sample
STANDARDS: FCC Part 15, Subpart C (Section 15.239),
ANSI C63.4-2003

We, **ADT (Shanghai) Corporation**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

TECHNICAL ACCEPTANCE :  , **DATE:** Mar. 19, 2007
Bright Tong
Engineering Supervisor

APPROVED BY :  , **DATE:** Mar. 19, 2007
Wallace Pan
Director of Operations

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	N/A	Refer to 4.1.2
15.239	Radiated Emission Test	PASS	Minimum passing margin is -0.76 dB at 106.70 MHz
15.239(c)	Emission Bandwidth Test	PASS	Meet the requirements

NOTE: The information of measurement uncertainty is available upon the customer's request.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~ 1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Power inverter
MODEL NO.	PI-01
POWER SUPPLY	13.5 Vdc from battery
MODULATION TYPE	FM
CARRIER FREQUENCY OF EACH CHANNEL	88.1 MHz, 88.3 MHz, 88.5 MHz, 88.7 MHz, 88.9 MHz, 106.7 MHz, 106.9 MHz, 107.1 MHz, 107.3 MHz, 107.5 MHz, 107.7 MHz, 107.9 MHz
NUMBER OF CHANNELS	12
BANDWIDTH	200kHz
ANTENNA TYPE	Printed
ANTENNA JOINT TYPE	N/A
DATA CABLE	N/A
I/O PORTS	N/A
ASSOCIATED DEVICES	N/A

NOTE: The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Twelve channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	88.1	5	88.9	9	107.3
2	88.3	6	106.7	10	107.5
3	88.5	7	106.9	11	107.7
4	88.7	8	107.1	12	107.9

NOTE: 1. The channel 1, 6 and 12 were tested individually.
 2. Tuning controls were manually adjusted to verify maximum tuning range no out-of-band operation violation observed



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the Power inverter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.239)

ANSI C63.4-2003

All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

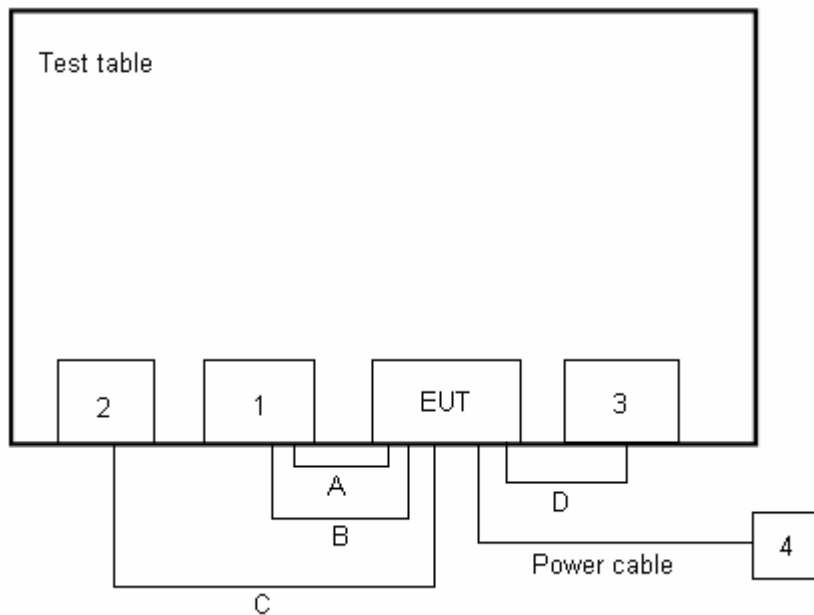
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	MP3 Player	iPod	A1137	5U621XFCUPR	FCC DoC Approved
2	Load	N/A	N/A	N/A	N/A
3	Load	N/A	N/A	N/A	N/A
4	Battery	KOBA	NF78-550	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
A	1m shielded USB cable.
B	1m non-shielded AV cable.
C	1.5m non-shielded 110V load line.
D	1.5m non-shielded 12V load line.

Note: 1.2m non-shielded power cable was used during the test.

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST TYPES AND RESULTS

4.1. CONDUCTED EMISSION MEASUREMENT

4.1.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

- NOTES:**
- (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 of 0.15 to 0.50 MHz.
 - (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2. TEST RESULTS

Since the EUT neither has AC port nor intends to be connected to the AC power source and is powered by the vehicle battery, so the test item is not applicable.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.239 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
88 to 108	67.96	47.96

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

Frequencies (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	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, 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 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Apr. 19, 2007
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sep. 26, 2007
Preamplifier Agilent	8447D	E1A2001	Jan. 27, 2008
Preamplifier Agilent	8449B	E1A2002	Jan. 27, 2008
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Feb.15, 2008
Spectrum Analyzer Agilent	E4403B	E1S1001	Jan. 13, 2008
Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May. 15, 2007
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH02	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2007
Software ADT	ADT_Radiated_V7.5	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months.
 2. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The Spectrum Analyzer (model: FSP30) and RF signal cable (SERIAL: E1CBH05&E1CBH07) are used only for the measurement of emission frequency above 1GHz if tested.

4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

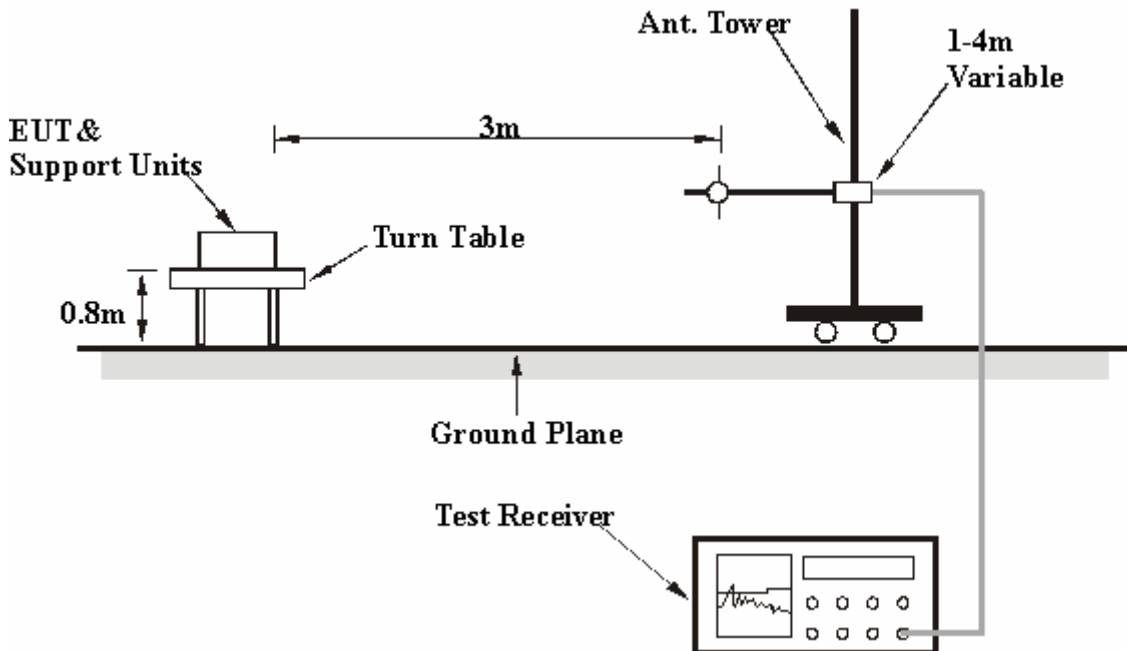
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. The analyzer settings used respectively for peak and average readings are RBW = 120kHz and VBW = 300kHz.
5. Span = 1MHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITION

- Connect the EUT with the battery.
- Connect the loads separately to the load lines and the USB cable and make the EUT work under fully load condition.
- Connect the EUT with MP3 player via AV cable and make the MP3 play music (The volume was set to maximum on iPod during the tests.).
- Adjust the working frequencies of the EUT and make it work under the specified frequency.
- Start the test under the above conditions.

Note: What the iPod Nano played is the symphony in MP3 format.

4.2.7 TEST RESULT

EUT	Power inverter	MODEL NO.	PI-01
CHANNEL	1	INPUT POWER	13.5 Vdc
FREQUENCY RANGE	30MHz ~ 2GHz	DETECTOR FUNCTION & BANDWIDTH	Peak(PK) Average (AV) Quasi-Peak
ENVIRONMENTAL CONDITIONS	21 deg. C, 76 % RH, 1005 hPa	TESTED BY: BRIGHT	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	60.90 QP	14.62	10.75	25.37	40	-14.63	317	202
2*	88.10 PK	11.73	36.5	48.23	68	-19.77	100	27
2*	88.10 AV	11.73	35.11	46.84	48	-1.16	235	343
3	204.00 QP	13.02	17.82	30.84	43.5	-12.66	164	122
4	288.00 QP	16.14	17.03	33.17	46	-12.83	103	131
5	336.00 QP	17.29	18.33	35.61	46	-10.39	100	160
6	360.00 QP	17.75	18.9	36.65	46	-9.35	100	153
7	384.00 QP	18.34	15.16	33.5	46	-12.5	100	105

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	46.20 QP	15.5	20.23	35.73	40	-4.27	100	253
2	61.67 QP	14.48	17.3	31.78	40	-8.22	100	346
3*	88.10 PK	11.73	32.28	44.01	68	-23.99	100	187
3*	88.10 AV	11.73	31.48	43.21	48	-4.79	133	221
4	204.00 QP	13.02	16.89	29.91	43.5	-13.59	182	250
5	228.00 QP	14.39	11.04	25.43	46	-20.57	120	232
6	336.00 QP	17.29	10.81	28.09	46	-17.91	100	179
7	360.00 QP	17.75	10.6	28.35	46	-17.65	100	16

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency.

EUT	Power inverter	MODEL NO.	PI-01
CHANNEL	6	INPUT POWER	13.5 Vdc
FREQUENCY RANGE	30MHz ~ 2GHz	DETECTOR FUNCTION & BANDWIDTH	Peak(PK) Average (AV) Quasi-Peak
ENVIRONMENTAL CONDITIONS	21 deg. C, 76 % RH, 1005 hPa	TESTED BY: BRIGHT	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1*	106.70 PK	13.32	35.16	48.48	68	-19.52	100	221
1*	106.70 AV	13.32	33.92	47.24	48	-0.76	100	233
2	264.00 QP	15.27	10.69	25.96	46	-20.04	100	315
3	360.00 QP	17.75	15.05	32.8	46	-13.2	100	216
4	408.00 QP	18.91	15.86	34.77	46	-11.23	100	105
5	456.00 QP	20.21	15.16	35.37	46	-10.63	100	99
6	540.00 QP	21.8	1.29	23.08	46	-22.92	131	234
7	684.75 QP	24.34	0.62	24.95	46	-21.05	221	158

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	46.52 QP	15.5	20.68	36.18	40	-3.82	102	258
2	61.37 QP	14.53	16.75	31.29	40	-8.71	100	357
3*	106.70 PK	13.32	30.94	44.26	68	-23.74	100	221
3*	106.70 AV	13.32	29.89	43.21	48	-4.79	100	234
4	204.00 QP	13.02	18.47	31.49	43.5	-12.01	100	280
5	228.00 QP	14.39	14.74	29.13	46	-16.87	117	223
6	360.00 QP	17.75	11.4	29.15	46	-16.85	128	96
7	384.00 QP	18.34	9.32	27.66	46	-18.34	100	127

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency.

EUT	Power inverter	MODEL NO.	PI-01
CHANNEL	12	INPUT POWER	13.5 Vdc
FREQUENCY RANGE	30MHz ~ 2GHz	DETECTOR FUNCTION & BANDWIDTH	Peak(PK) Average (AV) Quasi-Peak
ENVIRONMENTAL CONDITIONS	21 deg. C, 76 % RH, 1005 hPa	TESTED BY: BRIGHT	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	37.27 QP	15.56	10.42	25.99	40	-14.01	100	120
2*	107.90 PK	13.32	33.89	47.21	68	-20.79	100	136
2*	107.90 AV	13.32	32.92	46.24	48	-1.76	100	132
3	289.48 QP	16.2	14.22	30.42	46	-15.58	133	160
4	335.55 QP	17.28	14.46	31.74	46	-14.26	160	117
5	408.30 QP	18.92	14.07	32.99	46	-13.01	108	178
6	432.55 QP	19.67	12.75	32.42	46	-13.58	243	50
7	481.05 QP	20.6	12	32.6	46	-13.4	113	27

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	39.70 QP	15.89	22.05	37.94	40	-2.06	100	23
2*	107.90 PK	13.32	34.91	48.23	68	-19.77	100	221
2*	107.90 AV	13.32	33.71	47.03	48	-0.97	100	234
3	289.48 QP	16.2	7.14	23.34	46	-22.66	100	223
4	432.55 QP	19.67	8.21	27.88	46	-18.12	100	64
5	541.67 QP	21.84	6.51	28.35	46	-17.65	100	237
6	660.50 QP	24.01	3.82	27.83	46	-18.17	100	18
7	769.62 QP	25.56	0.84	26.4	46	-19.6	100	179

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency.



4.3 EMISSION BAND MEASUREMENT

4.3.1 LIMITS OF EMISSION BAND MEASUREMENT

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency ranges of 88.1 ~ 88.9 MHz and 106.7 ~ 107.9 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER R&S	FSP	E1S1002	May. 15, 2007

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

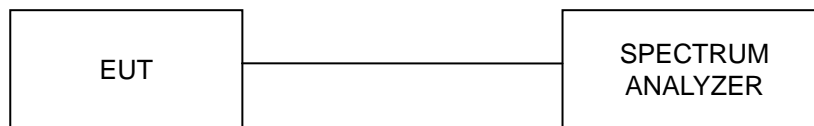
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10 kHz RBW and 30 kHz VBW. Measured the 26dBc bandwidth and plotted the graph.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Same as 4.2.6

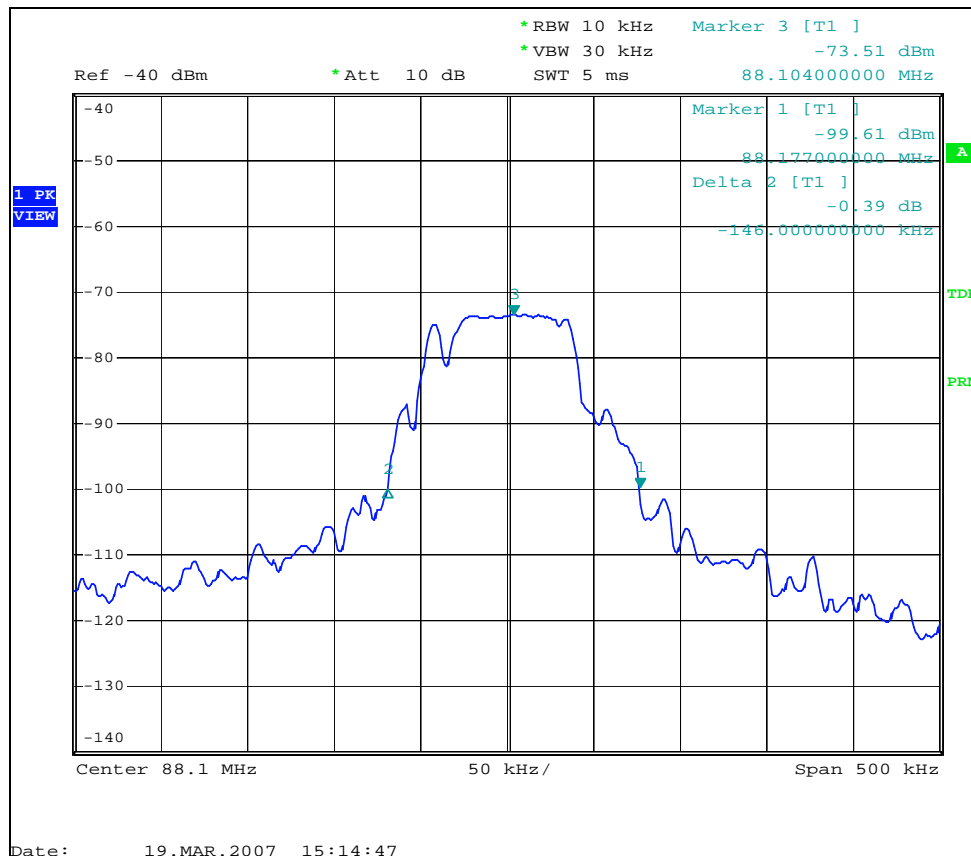


4.3.7 TEST RESULTS

EUT	Power inverter	MODEL NO.	PI-01
INPUT POWER (SYSTEM)	13.5 Vdc	ENVIRONMENTAL CONDITIONS	22deg. C, 74%RH, 991 hPa
TEST BY	BRIGHT		

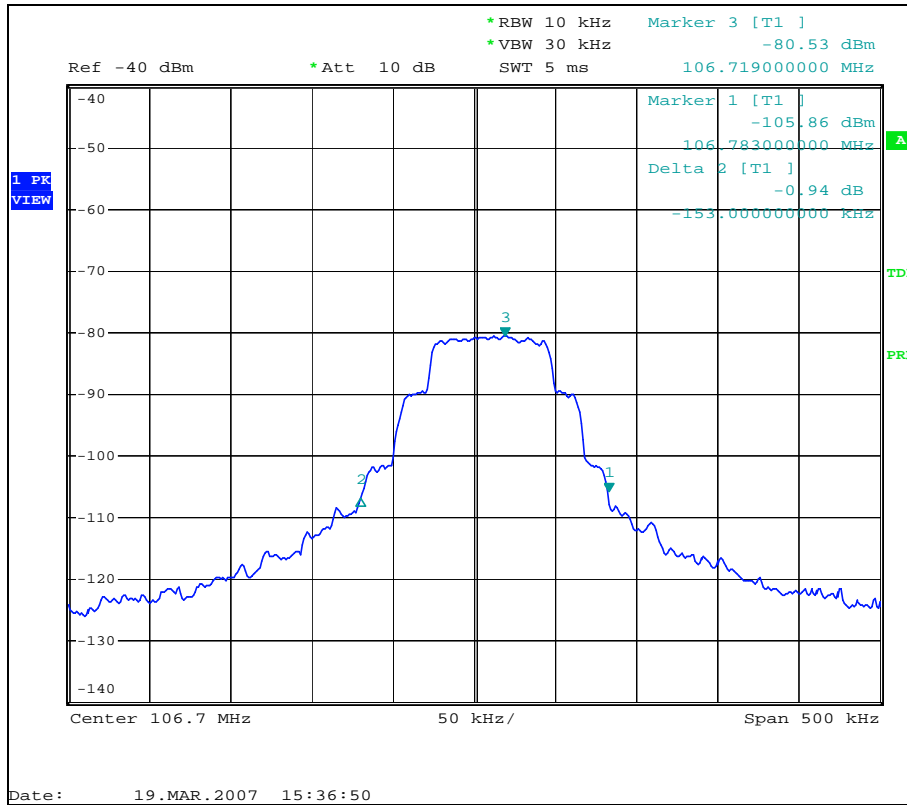
CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB BANDWIDTH (kHz)	MAXIMUM LIMIT (kHz)	PASS/FAIL
1	88.1MHz	146	200	PASS
6	106.7MHz	153	200	PASS
12	107.9MHz	188	200	PASS

CH1

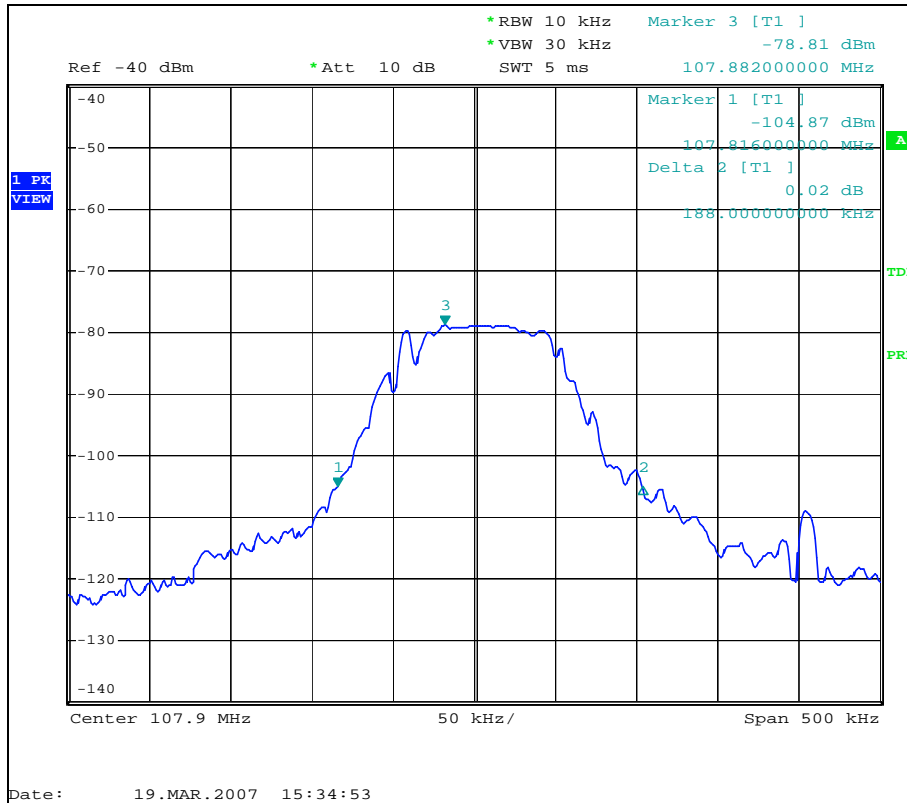




CH6



CH12



5 APPENDIX - INFORMATION ON THE TESTING LABORATORY

We, ADT (Shanghai) Corp., was founded in 2003 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratory is accredited and approved by the following approval agencies according to ISO / IEC 17025 (2005).

The client should not use it to claim product endorsement by CNLS, A2LA, or any government agency.

Japan	VCCI
USA	FCC, A2LA
Norway	DNV
China	CNAS



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