

TEST REPORT FOR CERTIFICATION

On Behalf of

Jow Tong Technology Co., Ltd.

Universal Digital FM Transmitter

Model No. : ST-30

FCC ID : QPRST30

Prepared for : Jow Tong Technology Co., Ltd.
46, Lane 337, Chung Cheng Rd., Yung Kang,
Tainan Hsien 710, Taiwan, R.O.C.

Prepared by : Audix Corporation
Technical Division EMC Department
No. 53-11, Tin-Fu Tsun, Lin-Kou,
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Date of Report : Apr. 23, 2004

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TEST REPORT CERTIFICATION

Applicant : Jow Tong Technology Co., Ltd.
Manufacturer : Jow Tong Technology Co., Ltd.
EUT Description : Universal Digital FM Transmitter
FCC ID : QPRST30
(A) MODEL NO. : ST-30
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : DC +5V or Battery DC +3V

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, DEC. 2003
AND ANSI C63.4-2001
(FCC CFR 47 Part 15C, §15.203, §15.207, §15.209 and §15.239)

The device described above was tested by AUDIX CORPORATION to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits both radiated and conducted emissions.

The measurement results are contained in this test report and AUDIX CORPORATION. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX CORPORATION.

Date of Test: Apr. 07 ~ 13, 2004

Prepared by: Monica Chang Jun. 16. 2004
(Monica Chang/Assistant)

Test Engineer: Ben Cheng Jun. 18. 2004
(Ben Cheng/Assistant Manager)

Approved & Authorized Signer: Leon Liu Jun 18 2004
(Leon Liu/Assistant General Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Universal Digital FM Transmitter (It's a transmitting device to hold a MP3/iPod or CD player to transmit music signal that can accept by Car radio FM band)
Model Number	:	ST-30
FCC ID	:	QPRST30
Applicant	:	Jow Tong Technology Co., Ltd. 46, Lane 337, Chung Cheng Rd., Yung Kang, Tainan Hsien 710, Taiwan, R.O.C.
Manufacturer	:	Jow Tong Technology Co., Ltd. 46, Lane 337, Chung Cheng Rd., Yung Kang, Tainan Hsien 710, Taiwan, R.O.C.
Fundamental Frequency Range	:	FM: 88.1MHz~106.7MHz (16 channels)
Channel Number	:	88.1MHz, 88.3MHz, 88.5MHz, 88.7MHz, 94.1MHz, 94.3MHz, 94.5MHz, 94.7MHz, 100.1MHz, 100.3MHz, 100.5MHz, 100.7MHz, 106.1MHz, 106.3MHz, 106.5MHz, 106.7MHz.
USB Input Voltage	:	DC +5V/40mA (Max.)
Battery Voltage	:	DC +3V/75mA (Max.)
Adjustable Audio Cable	:	Detachable, 80cm
USB Cable (Link to PC's USB port)	:	Shielded, Detachable, 1.0m Bonded a ferrite core
AC Adapter (USB Type Connector)	:	HON-KWANG, M/N: HKD-04080 Input: 120VAC 60Hz Output: 5VDC 300mA DC Cord: Non-Shielded, Undetachable, 2.0m
Power-Supply Holder for Car (Optional)	:	Jow Tong 12V~24V

Date of Receipt of Sample : Apr. 01, 2004

Date of Test : Apr. 07 ~ 13, 2004

Remark:

Antenna requirement: This EUT's transmitter antenna is a kind of coil ANT and solder on PCB, comply with §15.203 and inform to user that any change and modify is prohibited.

1.2. Tested Supporting System Details

1.2.1. AUDIO PLAYER (MP3/iPod, 10GB)

Model Number : A1040
 Serial Number : GQ3270HVNHRH
 FCC ID : By DoC
 Manufacturer : Apple Computer
 Power Supply : DC 8-30V, 1.0A (MAX)
 HDD Unit : Toshiba, M/N: MK1003GAL

1.2.2. DC POWER SUPPLY (DC 12V)

Model Number : 3303A
 Serial Number : N/A
 Manufacturer : Topward
 Power Wire (to EUT) : Non-Shielded, Detachable, 0.8m *2
 Power Cord : Non-Shielded, Detachable, 1.8m

1.2.3. NOTEBOOK PC

Model Number : PP2130
 Serial Number : 5Y32KSQZ40ME
 FCC ID : By DoC
 BSMI ID Number : 3912A556
 Brand : Comapq Computer Corporation
 Manufacturer : LG Electronics Ltd.
 AC Adapter : Compaq, M/N PPP009L
 (LITE-ON, M/N PA-1650-02C)
 Non-Shielded, Undetachable, 1.8m,
 Power Cord : Non-Shielded, Detachable, 1.8m

1.3. Description of Test Facility

Name of Firm : Audix Corporation
 Technical Division EMC Department
 No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
 Taipei County 24443, Taiwan, R.O.C.

Test Location & Facility (C2/AC) : **No.2 Shielded Room**
 No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
 Taipei County 24443, Taiwan, R.O.C.

Semi-Anechoic Chamber
 No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
 Taipei County 24443, Taiwan, R.O.C.

May. 16, 2003 Re-File on
 Federal Communication Commission
 Registration Number: 90993

NVLAP Lab. Code : 200077-0

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	$\pm 2.66\text{dB}$
Radiation Test (Distance: 3m)	30MHz~300MHz	+4.26dB / -4.22dB
	300MHz~1000MHz	+5.28dB / -4.0dB

Remark : Uncertainty = $k u_c (y)$

2. POWERLINE CONDUCTED EMISSION MEASUREMENT

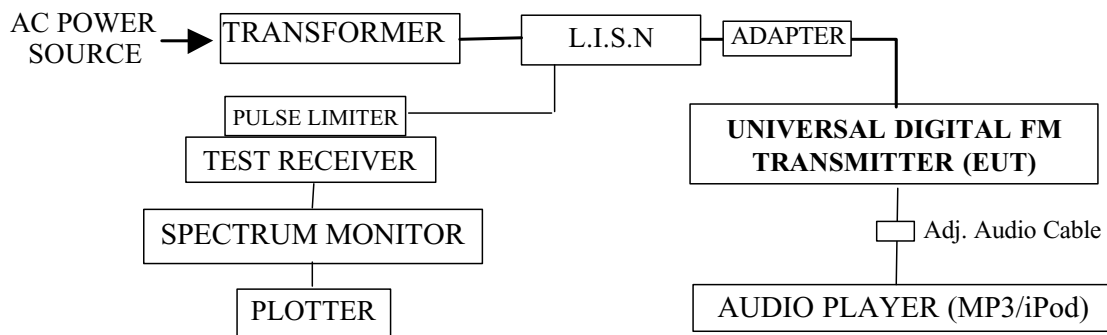
2.1. Test Equipment

The following test equipment are used during the power line conducted tests :

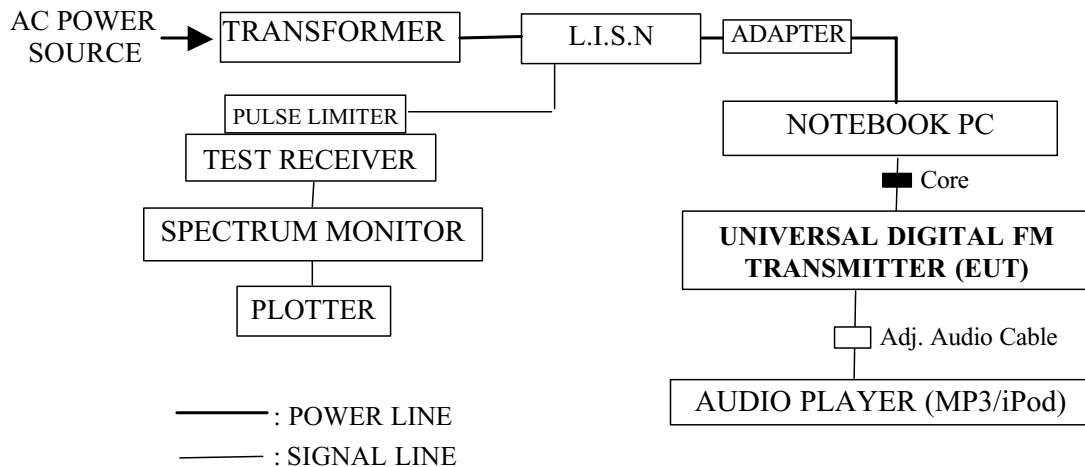
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Monitor	R & S	EZM	880486/002	N/A	N/A
2.	Test Receiver	R & S	ESH3	893044/015	Jul. 05, 03'	Jul. 04, 04'
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	Apr. 16, 03'	Apr. 15, 04'
4.	Pulse Limiter	R & S	ESH3-Z2	003	Jun. 18, 03'	Jun. 17, 04'

2.2. Block Diagram of Test Setup

2.2.1. EUT's Power Supply with AC Adapter (AC 120V/60Hz)



2.2.2. EUT's Power Supply with Notebook PC--USB +5V (AC 120V/60Hz)



2.3. Conducted Limits (Comply with §15.207)

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 *	56 ~ 46 *
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Remark: 1. * Decreases with the logarithm of the frequency.
 2. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.4. EUT's Configuration during Compliance Measurement

The following equipment was installed on radiated measurement to meet the commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

2.4.1. Universal Digital FM Transmitter (EUT)

Model Number	:	ST-30
Serial Number	:	N/A
FCC ID	:	QPRST30
Manufacturer	:	Jow Tong Technology Co., Ltd.
Fundamental Frequency	:	FM: 88.1MHz~106.7MHz
Adjustable Audio Cable	:	Detachable, 80cm
USB Cable	:	Shielded, Detachable, 1.0m
(Link to PC's USB port)	:	Bonded a ferrite core
AC Adapter	:	HON-KWANG, M/N: HKD-04080
(USB Type Connector)	:	Input: 120VAC 60Hz
	:	Output: 5VDC 300mA
	:	DC Cord: Non-Shielded, Undetachable, 2.0m

2.5. Operatting Condition of EUT

- 2.5.1. Setup the EUT and simulator as shown on 2.2.
- 2.5.2. Turned on the power of all equipment.
- 2.5.3. The EUT linked to Audio Player and set the transmitting frequency tune in to 88.1MHz、94.3MHz、100.5MHz and 106.7MHz to measure field strength.
- 2.5.4. The other peripheral devices were driven and operated in turn during all testing.

2.6. Test Procedure

The EUT was put on table which was above the ground by 80cm and it's power adapter or Notebook's adapter was connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to FCC ANSI C63.4-2001 on conducted measurement.

The bandwidth of R&S Test Receiver ESH3 was set at 10kHz.

The frequency range from 150kHz to 30MHz was checked.

EUT with the following test modes were performed during conducted voltage testing, and selected the two worst transmitting frequencies (106.7MHz and 88.1MHz) to read Q.P. & Average value, all the test results are listed in section 2.7.

Mode	Transmitting Frequency	Power Supply
1.	88.1MHz	w/ AC Adapter (AC 120V/60Hz)
2.	94.3MHz	
3.	100.5MHz	
※ 4.	106.7MHz	
※ 5.	88.1MHz	w/ Notebook PC--USB + 5V (AC 120V/60Hz)
6.	94.3MHz	
7.	100.5MHz	
8.	106.7MHz	

2.7. Conducted Emission Measurement Results

PASSED. All emissions not reported below are too low against the prescribed limits.Date of Test : Apr. 12, 2004 Temperature : 23 °CEUT : Universal Digital FM Transmitter Humidity : 60%Test Mode : Power w/AC Adapter, Transmitting frequency: 106.7MHz

Frequency (MHz)	Factor dB	Reading (dBμV)		Measurement (dBμV)		Limits		Margin	
		Phase Neutral (VA)				(dBμV)		dB	
		Q.P.	Average	Q.P.	Average	Q.P.	Average	Q.P.	Average
0.1832	0.4	36.8	*	37.2	*	64.3	54.3	27.1	*
0.2332	0.4	34.2	*	34.6	*	62.3	52.3	27.7	*
0.2687	0.4	35.6	*	36.0	*	61.1	51.1	25.1	*
0.3301	0.4	33.4	*	33.8	*	59.4	49.4	25.6	*
0.4783	0.5	24.0	*	24.5	*	56.3	46.3	31.8	*
0.6496	0.5	18.0	*	18.5	*	56.0	46.0	37.5	*

Frequency (MHz)	Factor dB	Reading (dBμV)		Measurement (dBμV)		Limits		Margin	
		Phase Line (VB)				(dBμV)		dB	
		Q.P.	Average	Q.P.	Average	Q.P.	Average	Q.P.	Average
0.1648	0.4	34.2	*	34.6	*	65.2	55.2	30.6	*
0.1853	0.4	31.6	*	32.0	*	64.2	54.2	32.2	*
0.2459	0.4	33.6	*	34.0	*	61.9	51.9	27.9	*
0.3340	0.4	33.2	*	33.6	*	59.3	49.3	25.7	*
0.4617	0.5	25.6	*	26.1	*	56.0	46.6	29.9	*
0.6458	0.5	19.6	*	20.1	*	56.0	46.0	35.9	*

- Remark :
1. All readings are Quasi-Peak and Average values.
 2. Measurement = Factor (Insertion Loss + Cable Loss) + Reading.
 3. Margin = Limits – Measurement.
 4. The “*” means above Q.P. values have met both limits, they are not necessary to measure with average detector.
 5. The worst emission was detected at 0.2687MHz with corrected signal level of 36.0dBμV (limit is 61.1dBμV) when the VA side of the EUT's power adapter was connected to L.I.S.N.

Date of Test : Apr. 12, 2004 Temperature : 23 °C

EUT : Universal Digital FM Transmitter Humidity : 60%

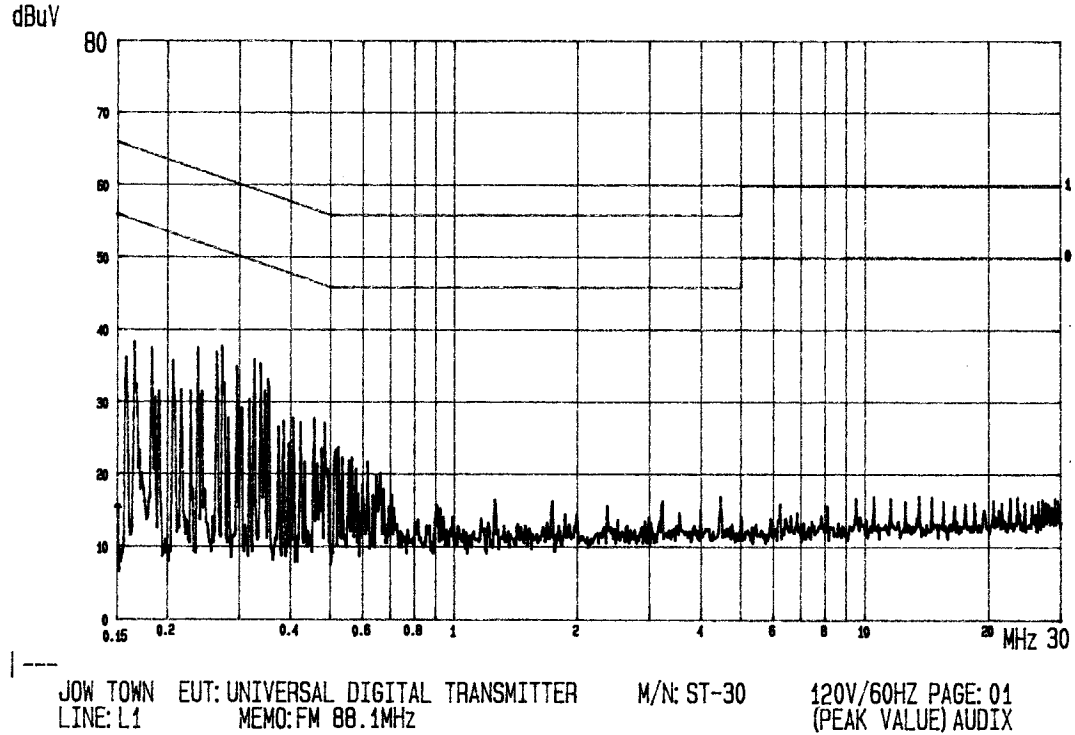
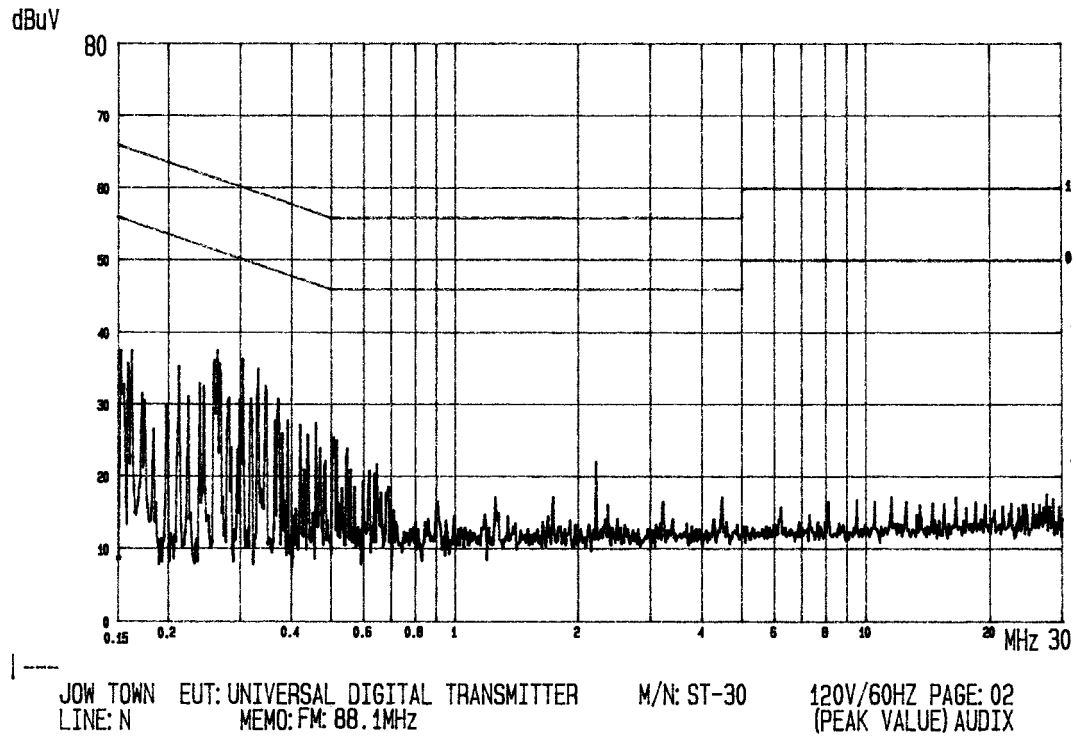
Test Mode : Power w/Notebook PC, Transmitting frequency: 88.1MHz

Frequency (MHz)	Factor dB	Reading (dBμV)		Measurement (dBμV)		Limits		Margin	
		Phase Neutral (VA)				(dBμV)		dB	
		Q.P.	Average	Q.P.	Average	Q.P.	Average	Q.P.	Average
0.1920	0.4	47.8	*	48.2	*	63.9	53.9	15.7	*
0.2900	0.4	36.8	*	37.2	*	60.5	50.5	23.3	*
1.1101	0.5	32.6	*	33.1	*	56.0	46.0	22.9	*
5.3141	0.8	25.6	*	26.4	*	60.0	50.0	33.6	*
11.5594	0.9	32.6	*	33.5	*	60.0	50.0	26.5	*
17.4544	1.0	34.2	*	35.2	*	60.0	50.0	24.8	*

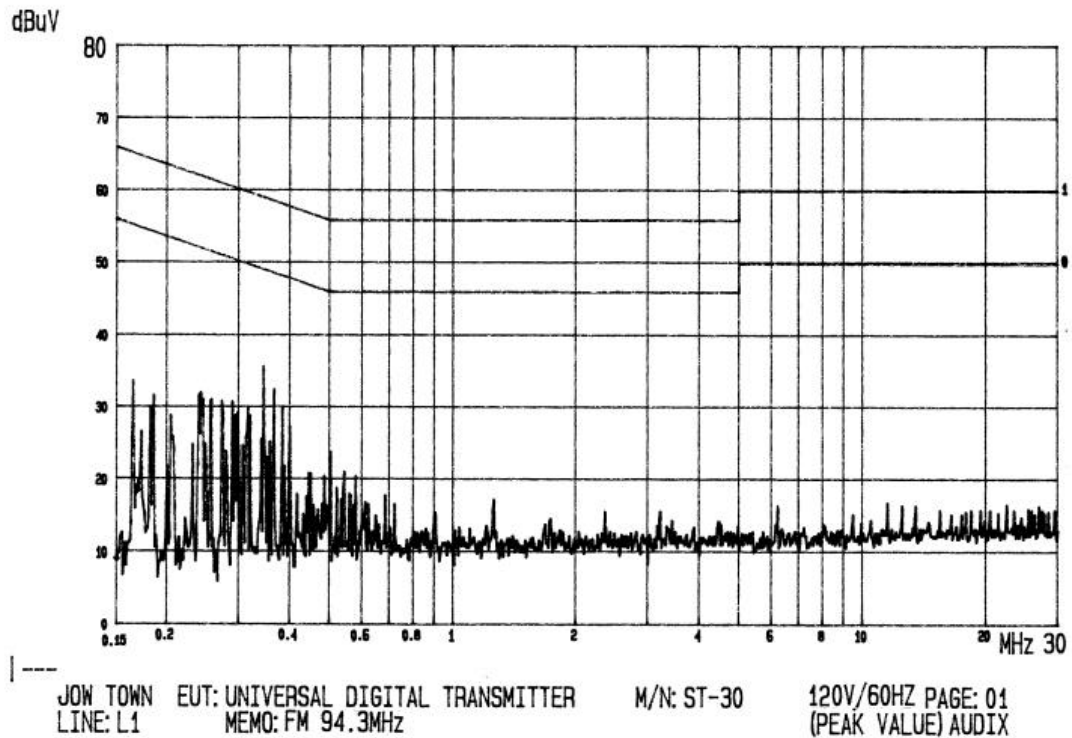
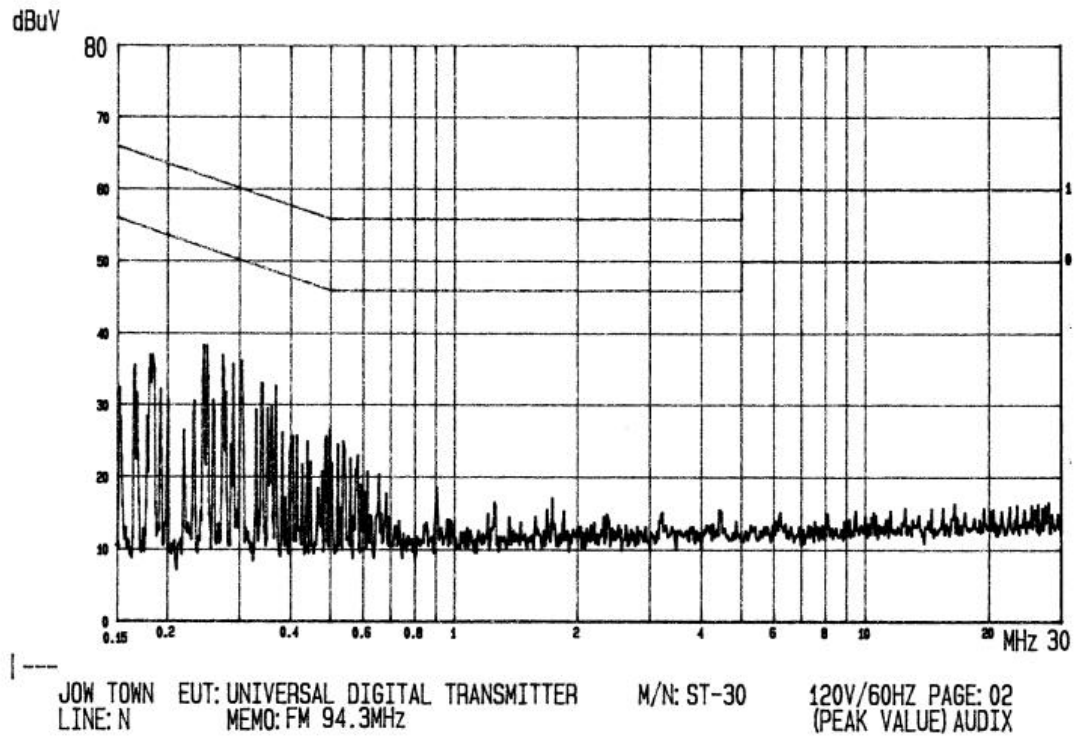
Frequency (MHz)	Factor dB	Reading (dBμV)		Measurement (dBμV)		Limits		Margin	
		Phase Line (VB)				(dBμV)		dB	
		Q.P.	Average	Q.P.	Average	Q.P.	Average	Q.P.	Average
0.1821	0.4	48.8	*	49.2	*	64.3	54.3	15.1	*
0.2799	0.4	39.1	*	39.5	*	60.8	50.8	21.3	*
1.1365	0.5	33.6	*	34.1	*	56.0	46.0	21.9	*
4.6141	0.8	28.4	*	29.2	*	56.0	46.0	26.8	*
12.1884	0.9	29.6	*	30.5	*	60.0	50.0	29.5	*
20.9490	1.1	31.6	*	32.7	*	60.0	50.0	27.3	*

- Remark :
1. All readings are Quasi-Peak and Average values.
 2. Measurement = Factor (Insertion Loss + Cable Loss) + Reading.
 3. Margin = Limits – Measurement.
 4. The “*” means above Q.P. values have met both limits, they are not necessary to measure with average detector.
 5. The worst emission was detected at 0.1821MHz with corrected signal level of 49.2dBμV (limit is 64.3dBμV) when the VB side of the Notebook PC’s power adapter was connected to L.I.S.N.

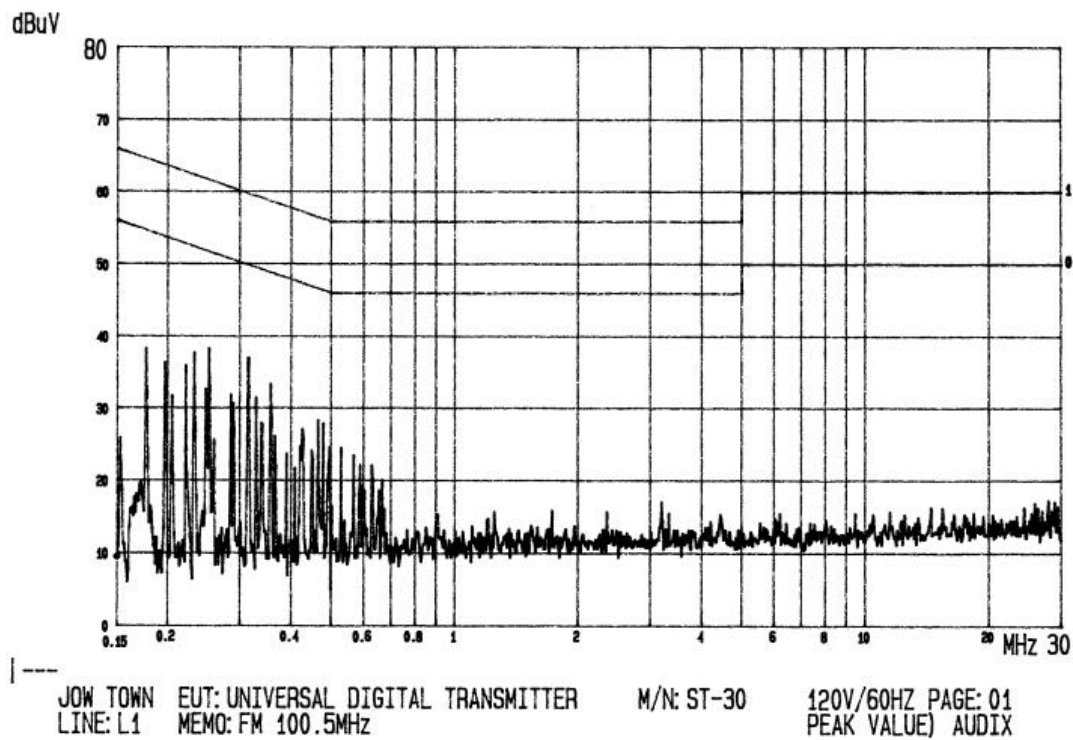
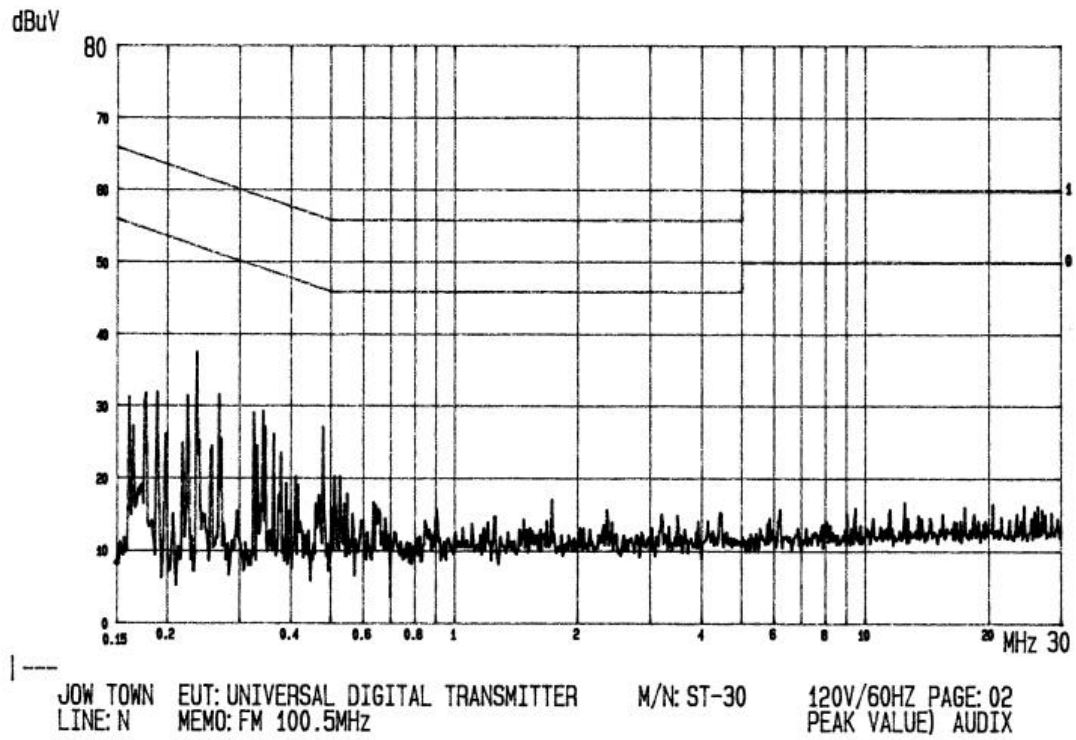
Test Mode: Power w/AC Adapter, Transmitting frequency: 88.1MHz



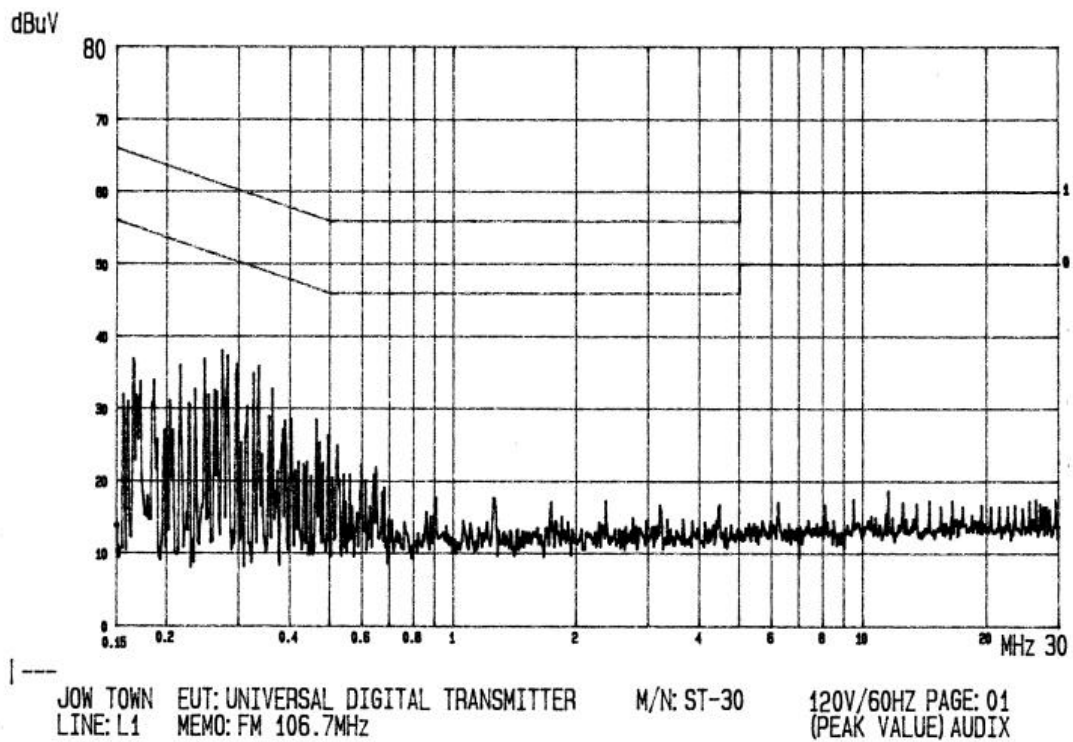
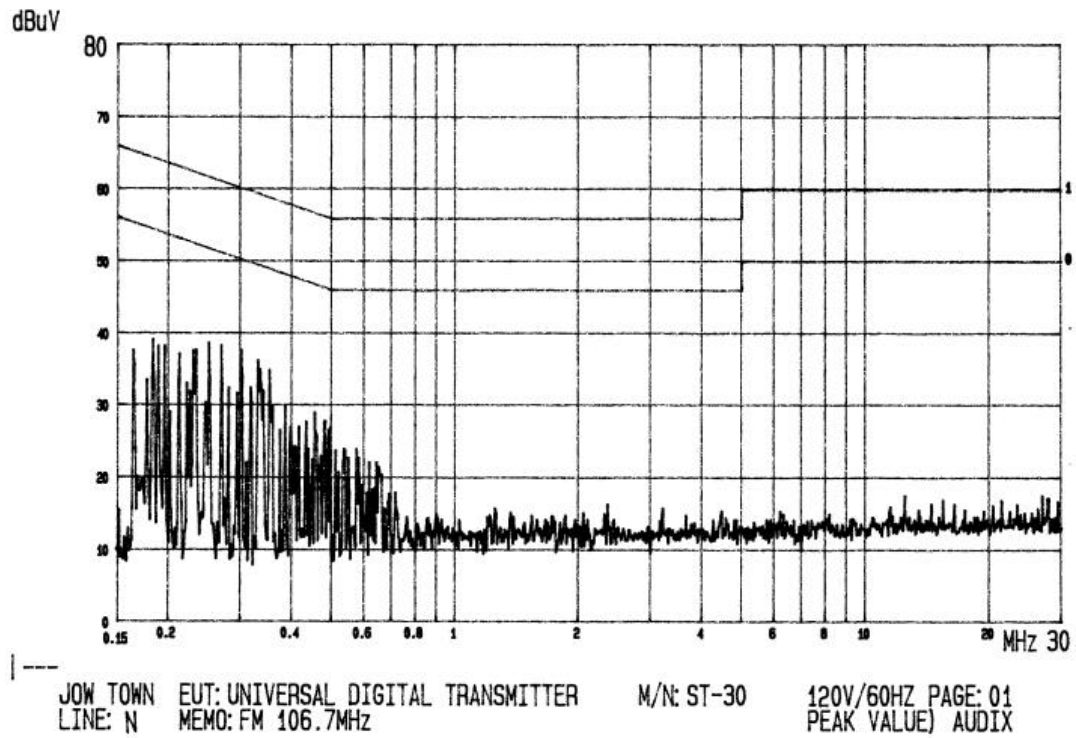
Test Mode: Power w/AC Adapter, Transmitting frequency: 94.3MHz



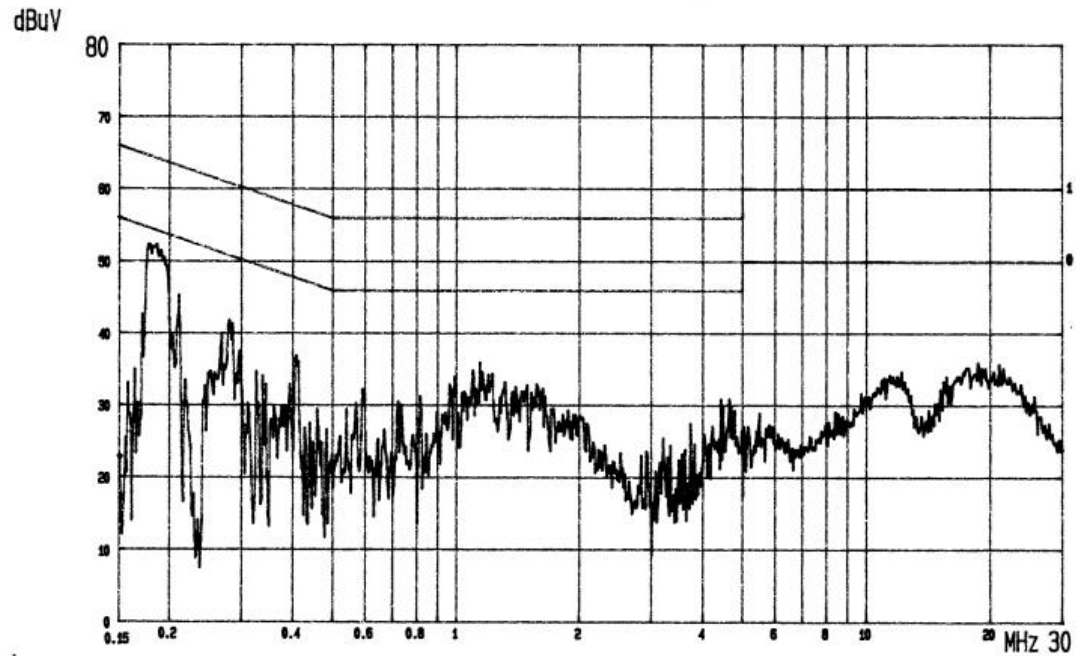
Test Mode: Power w/AC Adapter, Transmitting frequency: 100.5MHz



Test Mode: Power w/AC Adapter, Transmitting frequency: 106.7MHz



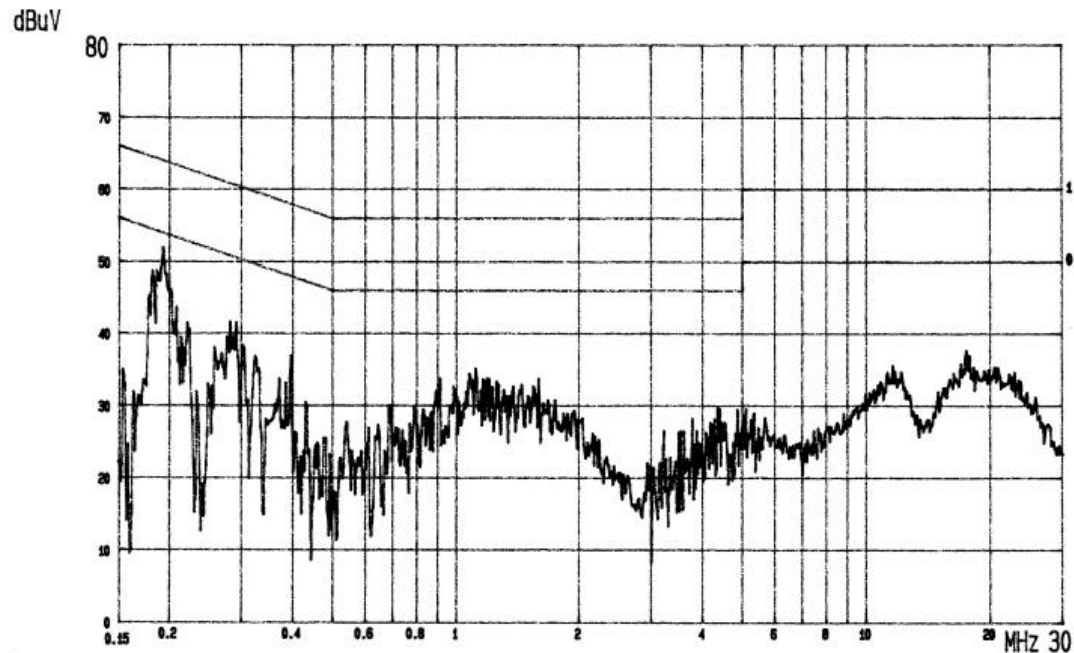
Test Mode: Power w/Notebook PC, Transmitting frequency: 88.1MHz



JOW TOWN EUT: UNIVERSAL DIGITAL TRANSMITTER
LINE: N MEMO: Via Notebook (FM 88.1MHz)

M/N: ST-30

120V/60HZ PAGE: 02
(PEAK VALUE) AUDIX

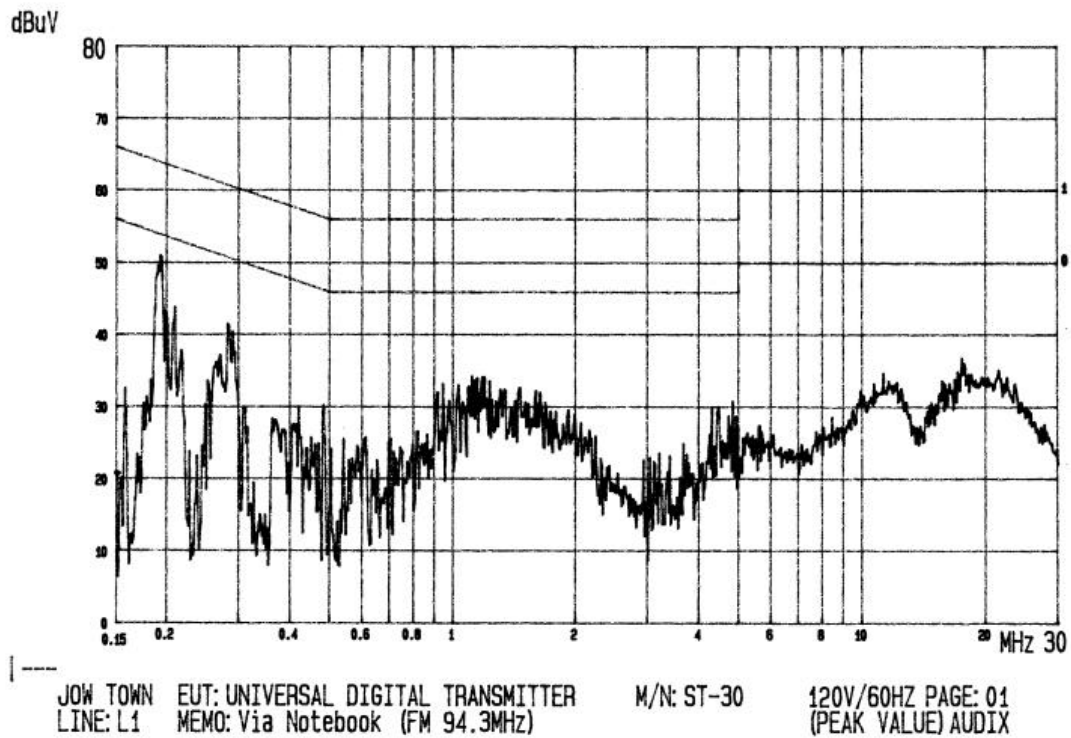
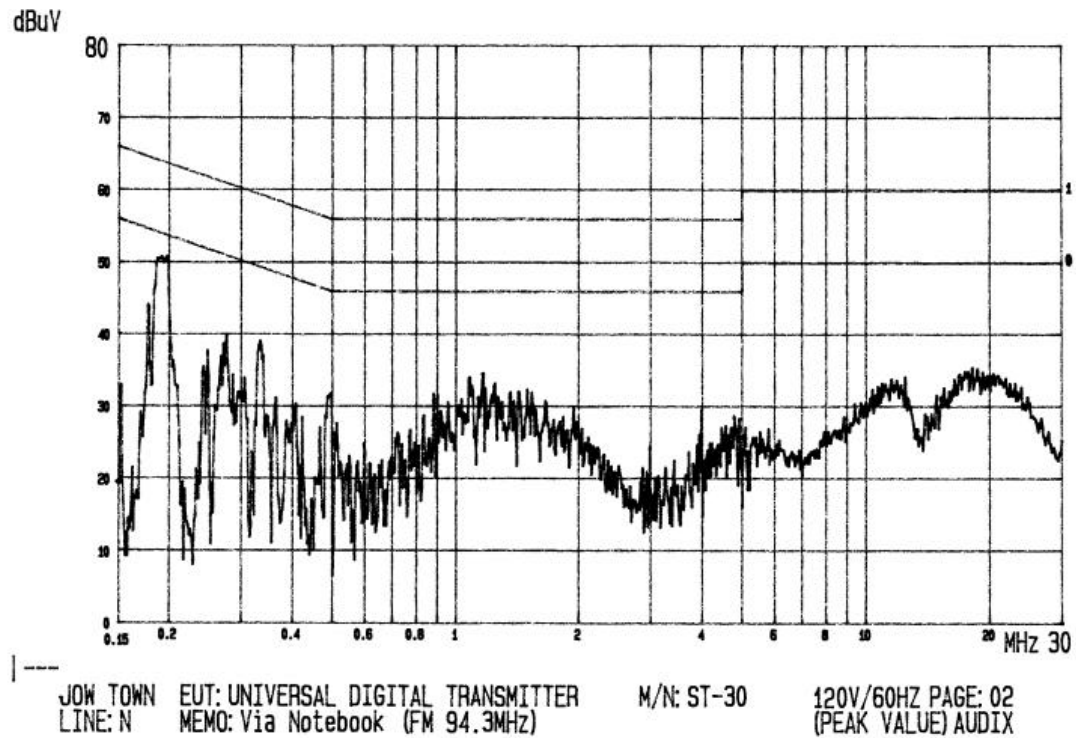


JOW TOWN EUT: UNIVERSAL DIGITAL TRANSMITTER
LINE: L1 MEMO: Via Notebook (FM 88.1MHz)

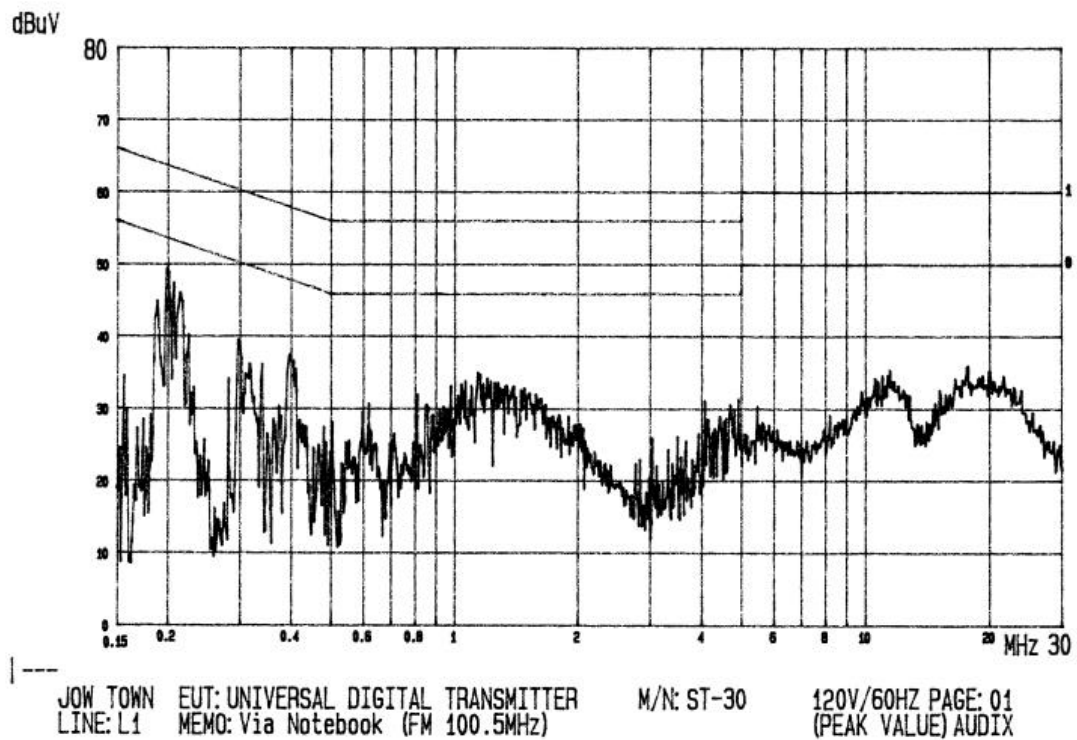
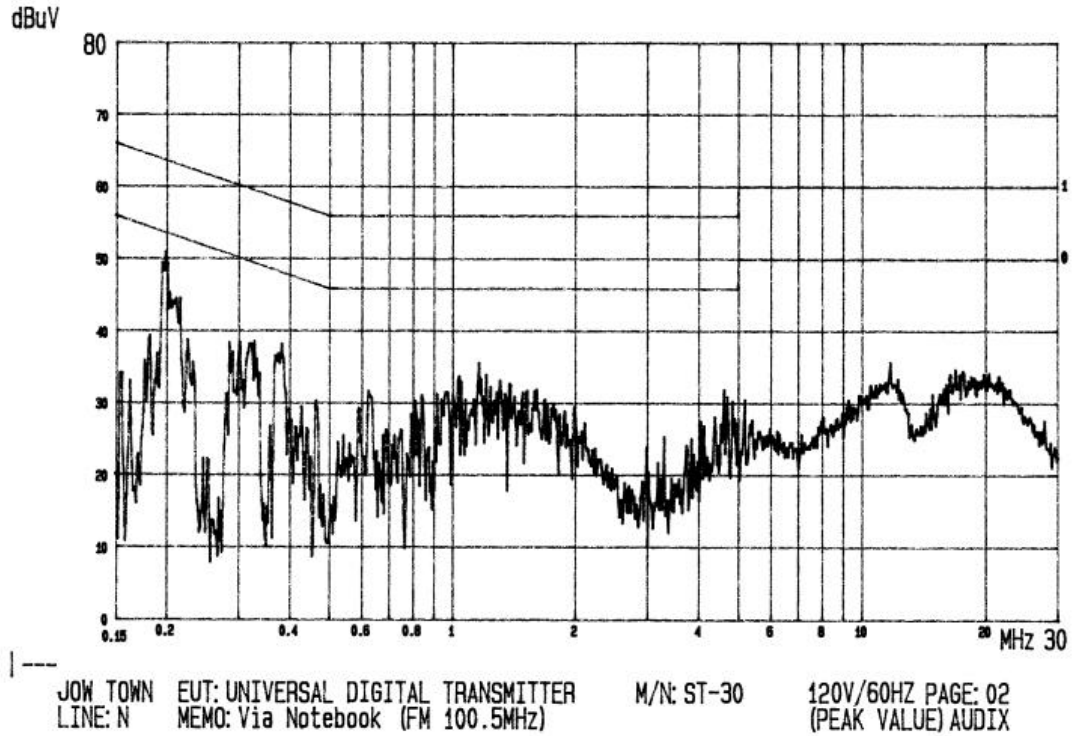
M/N: ST-30

120V/60HZ PAGE: 01
(PEAK VALUE) AUDIX

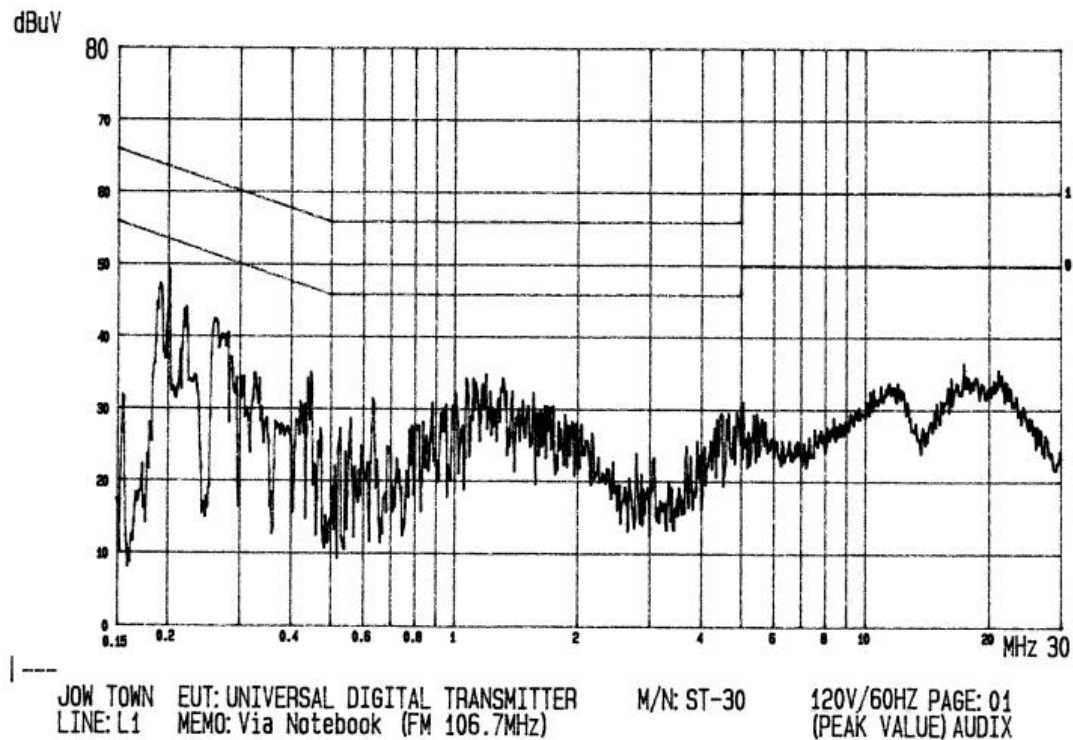
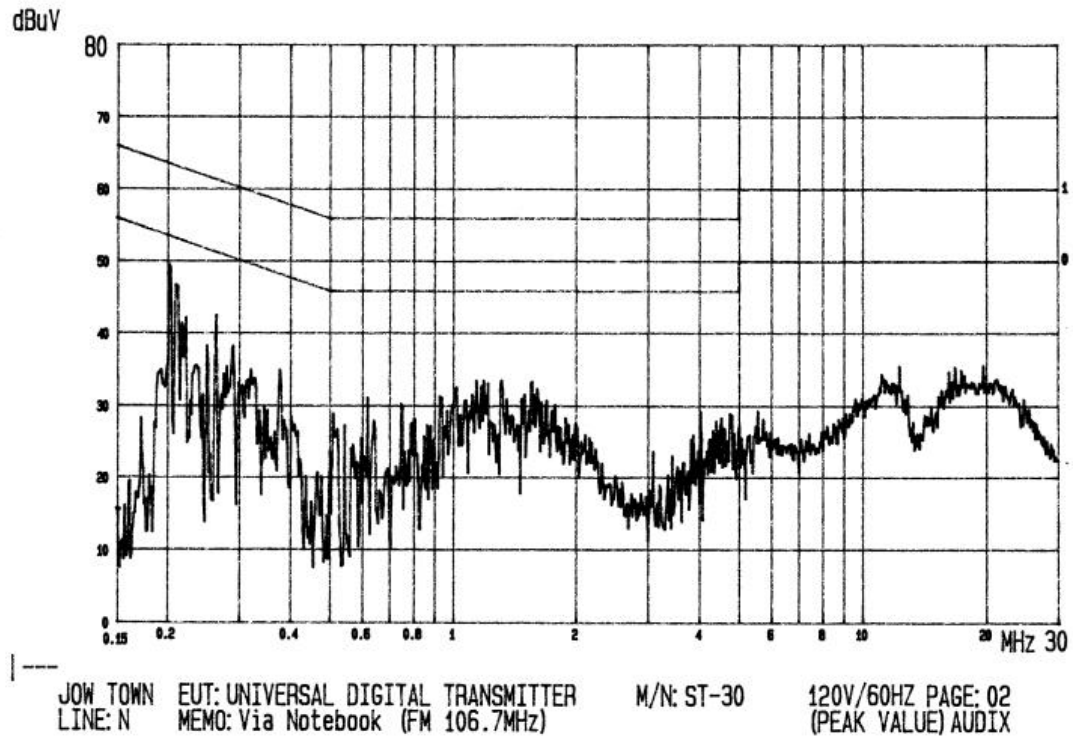
Test Mode: Power w/Notebook PC, Transmitting frequency: 94.3MHz



Test Mode: Power w/Notebook PC, Transmitting frequency: 100.5MHz



Test Mode: Power w/Notebook PC, Transmitting frequency: 106.7MHz



3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

3.1.1. For 30MHz~1000MHz Frequency (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep. 24, 03'	Sep. 23, 04'
2.	Test Receiver	R&S	ESVP	893202/001	Jul. 09, 03'	Jul. 08, 04'
3.	Pre-Amplifier	HP	8447D	2944A06305	Mar. 18, 04'	Mar. 17, 05'
4.	Broadband Antenna	Schwarzbeck	BBA 9106	A3L	Feb. 21, 04'	Feb. 20, 05'
5.	Broadband Antenna	Schwarzbeck	UHALP9108-A	0138	Feb. 21, 04'	Feb. 20, 05'

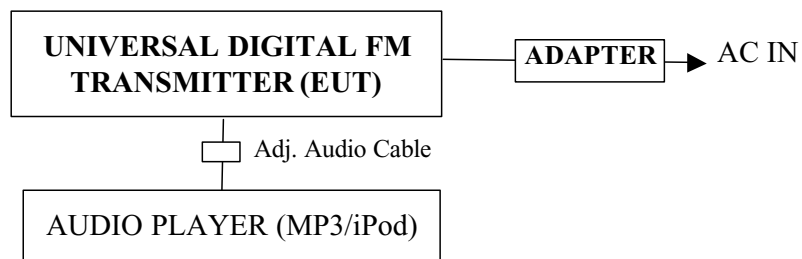
3.1.2. For above 1GHz Frequency (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep. 24, 03'	Sep. 23, 04'
2.	Pre-Amplifier	HP	8449B	3008A00529	Jan. 29, 04'	Jan. 28, 05'
3.	Horn Antenna	EMCO	3115	9112-3775	Apr. 21, 03'	Apr. 20, 04'

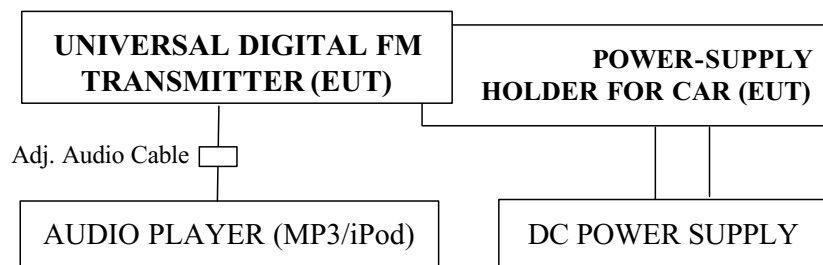
3.2. Test Setup

3.2.1. Block Diagram of connection between EUT and simulators

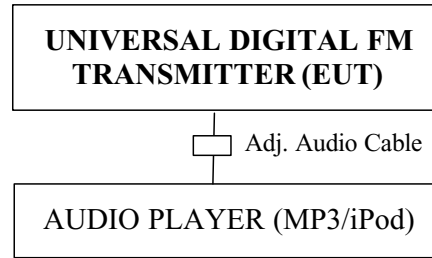
3.2.1.1. EUT' s Power Supply with AC Adapter (AC 120V/60Hz)



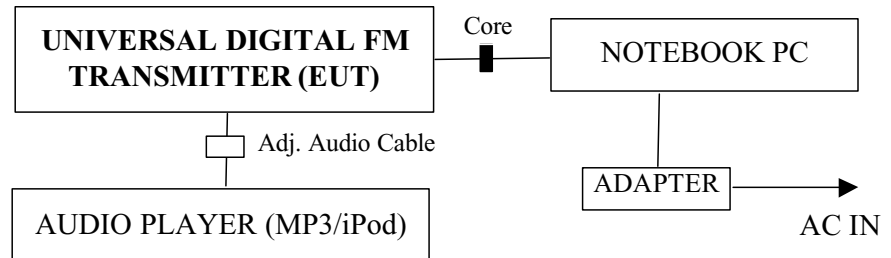
3.2.1.2. EUT' s Power Supply with Power-Supply Holder for Car (DC 12V)



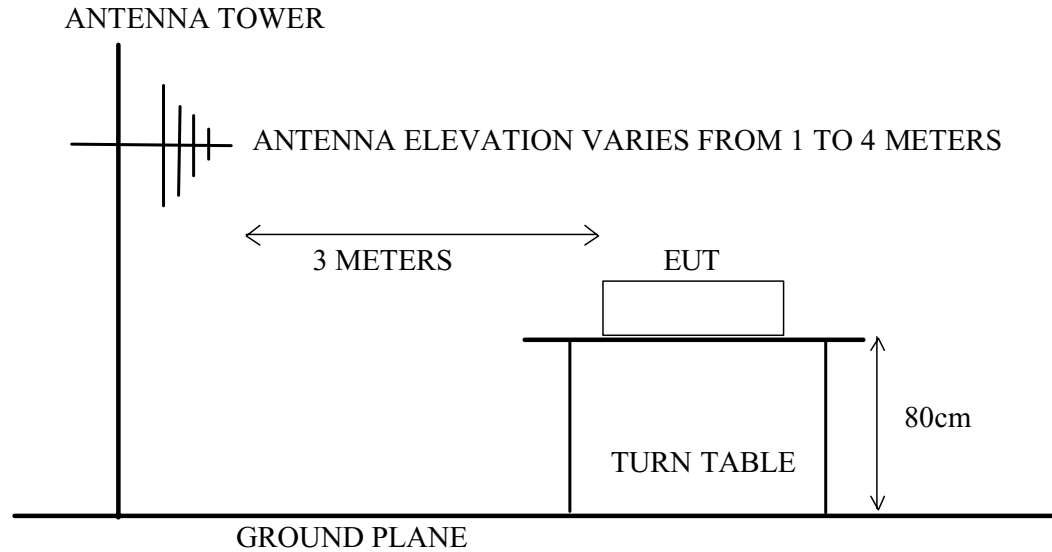
3.2.1.3. EUT's Power Supply with Battery (DC 3V)



3.2.1.4. EUT's Power Supply with Notebook PC--USB +5V (AC 120V/60Hz)



3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram



3.3. Radiation Limit (Comply with §15.239 & §15.209)

3.3.1. §15.239 Radiated Emission Limits (Fundamental Frequency)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/m	dBμV/m
Fundamental Freq.	3	250	48.0 (Average)
Fundamental Freq.	3	250	68.0 (Peak) ^{*(2)}

Remark : (1) Emission level (dBμV/m) = 20 log Emission level (μV/m)
 (2) The provision in section 15.35 for limiting peak emission apply.

3.3.2. §15.209 Radiated Emission Limits (Spurious Frequency)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

Remark : (1) Emission level (dBμV/m) = 20 log Emission level (μV/m)
 (2) The tighter limit applies at the edge between two frequency bands.
 (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 (4) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and 15.205(b) & Part 15.209(e).

3.4. EUT's Configuration during Compliance Measurement

The following equipment were installed on radiated measurement to meet the commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

3.4.1. Universal Digital FM Transmitter (EUT)

Model Number	:	ST-30
Serial Number	:	N/A
FCC ID	:	QPRST30
Manufacturer	:	Jow Tong Technology Co., Ltd.
Fundamental Frequency	:	FM: 88.1MHz~106.7MHz
Adjustable Audio Cable	:	Detachable, 80cm
USB Cable	:	Shielded, Detachable, 1.0m
(Link to PC's USB port)	:	Bonded a ferrite core
AC Adapter	:	HON-KWANG, M/N: HKD-04080
(USB Type Connector)	:	Input: 120VAC 60Hz Output: 5VDC 300mA DC Cord: Non-Shielded, Undetachable, 2.0m
Power-Supply Holder for Car	:	Jow Tong 12V~24V

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT and simulator as shown on 3.2.
- 3.5.2. Turned on the power of all equipment.
- 3.5.3. The EUT linked to Audio Player and set the transmitting frequency tune in to 88.1MHz、94.3MHz、100.5MHz and 106.7MHz to measure field strength.
- 3.5.4. The other peripheral devices were driven and operated in turn during all testing.

3.6. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2001 regulation.

The bandwidth of the R&S Test Receiver ESVP was set at 120kHz for frequency range 30MHz~1000MHz.

The bandwidth of the Spectrum Analyzer 8593EM was set at 1MHz for frequency range above 1GHz.

The EUT was measured with the following test modes within Semi-Anechoic Chamber and all the scanning waveform were attached within Appendix, which include :

Mode	Transmitting Frequency	Power Supply
1.	88.1MHz	w/AC Adapter (AC 120V/60Hz)
2.	94.3MHz	
3.	100.5MHz	
4.	106.7MHz	
5.	106.7MHz	w/Power-Supply Holder for Car (DC 12V)
※ 6.	106.7MHz	w/Battery (DC 3V)
※ 7.	106.7MHz	w/Notebook PC--USB + 5V (AC 120V/60Hz)

Finally, re-measured the two worst test modes (Mode 6 & 7) at Semi-Anechoic Chamber and all the test results are listed in section 3.7.

3.7. Radiated Emission Measurement Results

PASSED. Please refer to the following pages.

The frequency spectrum from 30 MHz to 1000MHz is investigated. All the emissions not reported below are too low against the FCC Part 15 Subpart C official limits.

Date of Test : Apr. 13, 2004 Temperature : 23 °C

EUT : Universal Digital FM Transmitter Humidity : 54%

Test Mode : Transmitting frequency, 106.7MHz (w/Battery, DC 3V)

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Fundamental Freq. (Average Value)						
106.725	17.42	2.20	20.90	40.52	48.00	7.48
Fundamental Freq. (Peak Value)						
106.725	17.42	2.20	25.17	44.79	68.00	23.21
Spurious Freq (Quasi-Peak Value)						
213.330	22.54	3.10	4.83	30.46	43.50	13.04
320.111	14.60	4.20	5.38	24.18	46.00	21.83
426.810	17.10	5.10	14.47	36.67	46.00	9.33
430.610	17.20	5.20	3.06	25.46	46.00	20.54
533.520	18.60	7.00	9.61	35.21	46.00	10.79
584.840	19.11	6.40	13.59	39.10	46.00	6.90
674.080	20.90	6.40	3.51	30.81	46.00	15.19
728.400	21.77	6.60	1.42	29.79	46.00	16.21
978.660	23.00	7.70	3.14	33.84	54.00	20.16

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. The emissions level is too low against the official limit and not report.
 3. For frequency above 1GHz not in the report is that the noise is too low to be measured.

Date of Test : Apr. 13, 2004 Temperature : 23 °C

EUT : Universal Digital FM Transmitter Humidity : 54%

Test Mode : Transmitting frequency, 106.7MHz (w/Battery, DC 3V)

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB

Fundamental Freq. (Average Value)						
106.700	17.40	2.20	26.15	45.75	48.00	2.25
Fundamental Freq. (Peak Value)						
106.700	17.40	2.20	32.35	51.95	68.00	16.05
Spurious Freq (Quasi-Peak Value)						
213.403	22.91	3.10	12.92	38.93	43.50	4.57
320.142	14.52	4.20	5.76	24.48	46.00	21.52
354.950	15.30	4.37	6.86	26.53	46.00	19.47
410.240	16.40	4.90	14.92	36.22	46.00	9.78
427.803	16.40	5.15	2.17	23.72	46.00	22.28
533.520	18.50	7.00	12.71	38.21	46.00	7.79
649.830	20.43	6.30	7.29	34.02	46.00	11.98
672.140	20.80	6.40	3.84	31.04	46.00	14.96
880.690	22.00	7.30	4.75	34.05	46.00	11.95

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. The emissions level is too low against the official limit and not report.
 3. For frequency above 1GHz not in the report is that the noise is too low to be measured.

Date of Test : Apr. 13, 2004 Temperature : 23 °C

EUT : Universal Digital FM Transmitter Humidity : 54%

Test Mode : Transmitting frequency, 106.7MHz
(w/Notebook PC--USB + 5V, AC 120V/60Hz)

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB

Fundamental Freq. (Average Value)						
106.725	17.58	2.20	16.63	36.41	48.00	11.59
Fundamental Freq. (Peak Value)						
106.725	17.58	2.20	20.62	40.40	68.00	27.60
Spurious Freq (Quasi-Peak Value)						
213.403	22.54	3.10	7.51	33.14	43.50	10.36
320.142	14.60	4.20	16.10	34.90	46.00	11.11
427.803	17.10	5.15	14.13	36.38	46.00	9.62
533.520	18.60	7.00	9.60	35.20	46.00	10.80
640.220	20.10	6.30	6.22	32.62	46.00	13.38
702.210	21.18	6.50	6.97	34.65	46.00	11.35
728.400	21.77	6.60	5.73	34.10	46.00	11.90
812.790	22.00	7.00	3.70	32.70	46.00	13.30
898.150	23.00	7.30	2.64	32.94	46.00	13.06

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. The emissions level is too low against the official limit and not report.
 3. For frequency above 1GHz not in the report is that the noise is too low to be measured.

Date of Test : Apr. 13, 2004 Temperature : 23 °C

EUT : Universal Digital FM Transmitter Humidity : 54%

Test Mode : Transmitting frequency, 106.7MHz
(w/Notebook PC--USB + 5V, AC 120V/60Hz)

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Fundamental Freq. (Average Value)						
106.725	17.40	2.20	25.43	45.03	48.00	2.97
Fundamental Freq. (Peak Value)						
106.725	17.40	2.20	29.14	48.74	68.00	19.26
Spurious Freq (Quasi-Peak Value)						
213.330	22.91	3.10	11.06	37.07	43.50	6.43
320.111	14.60	4.15	13.10	31.85	46.00	14.15
426.810	16.40	5.15	9.24	30.79	46.00	15.21
484.930	17.50	6.20	15.43	39.13	46.00	6.87
533.503	18.53	6.90	9.84	35.27	46.00	10.73
584.840	19.72	6.40	9.48	35.60	46.00	10.40
674.080	20.70	6.40	11.89	38.99	46.00	7.01
757.500	21.20	6.80	5.60	33.60	46.00	12.40
878.750	21.99	7.30	6.23	35.52	46.00	10.48

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. The emissions level is too low against the official limit and not report.
 3. For frequency above 1GHz not in the report is that the noise is too low to be measured.

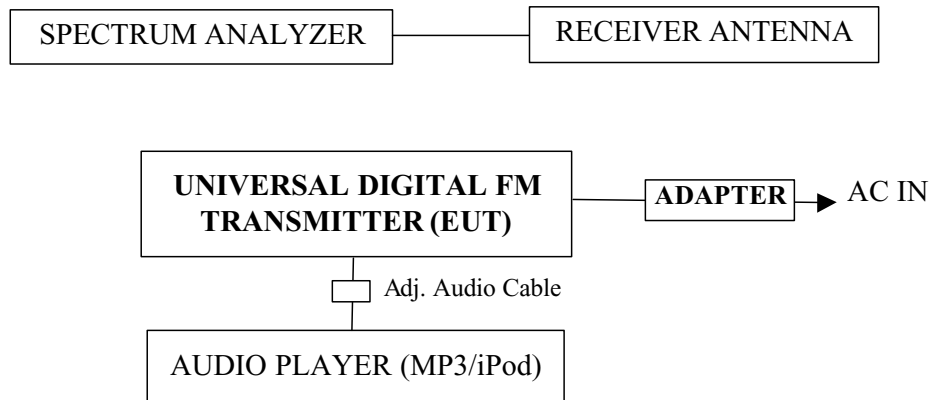
4. 26dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8564EC	3946A00249	Aug. 28, 03'	Aug. 27. 04'

4.2. Block Diagram of Test Setup



4.3. Specification Limits (§15.239)

The 26dB bandwidth of fundamental emission from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88.1-106.7MHz.

4.4. EUT's Configuration during Compliance Measurement

The configuration of EUT were same as section 2.4.

4.5. 26dB Bandwidth Measurement Results

PASSED. The graph of bandwidth measured is attached in next pages.

(Remark: -26dB below the peak level to measure)

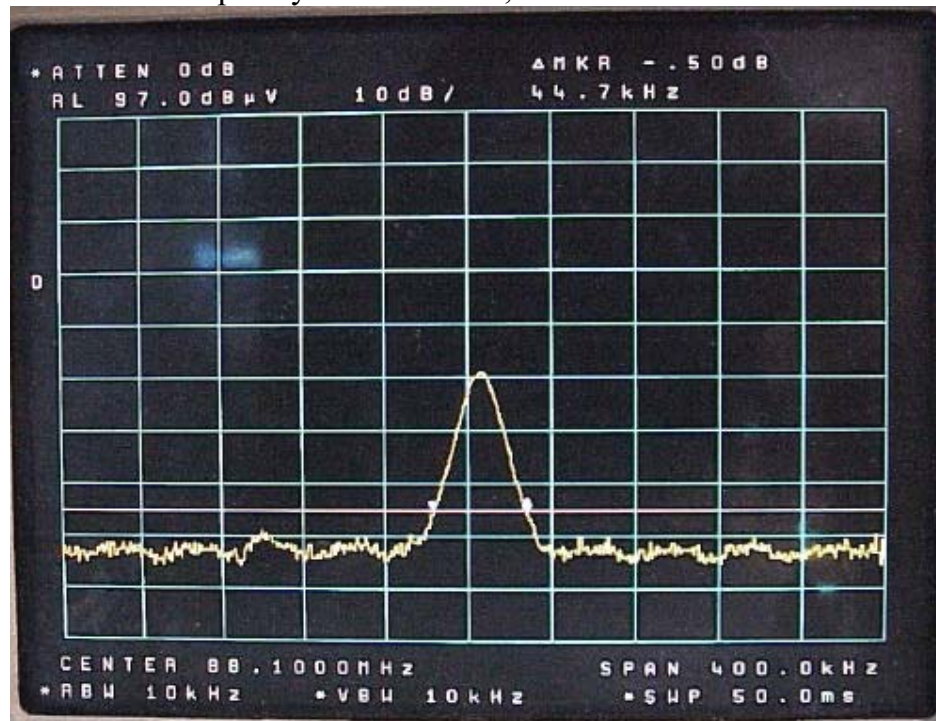
Date of Test: Apr. 13, 2004

Mode	Center Frequency	26dB Bandwidth	Limits
1.	88.1000MHz	44.7kHz	200kHz
2.	94.3000MHz	41.3kHz	200kHz
3.	100.5000MHz	48.7kHz	200kHz
4.	106.7000MHz	44.0kHz	200kHz

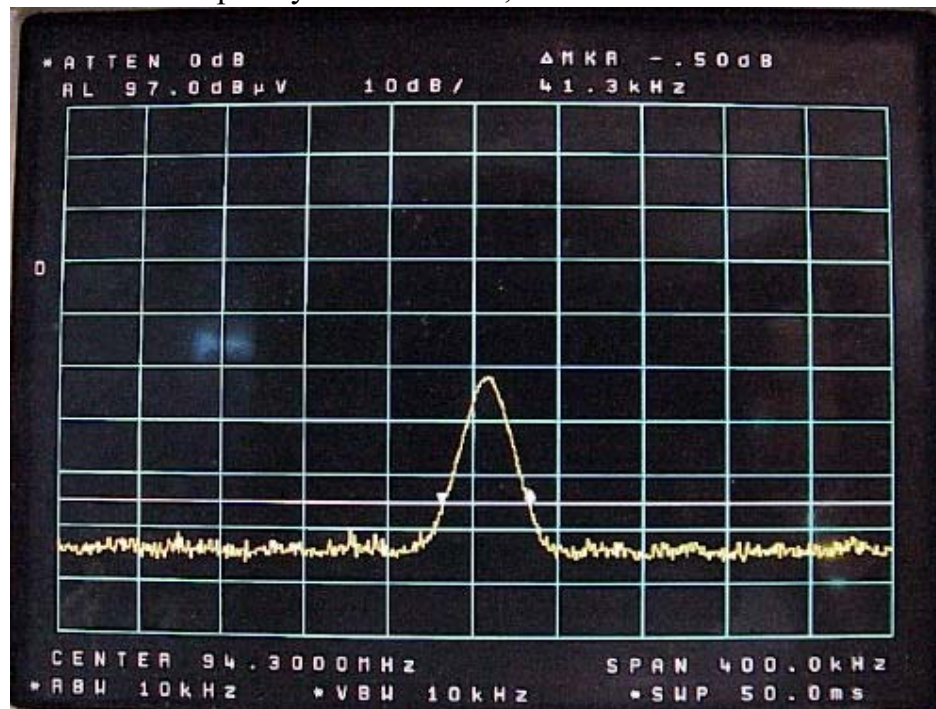
Remark: The lowest frequency is 88.07765MHz and the highest frequency is 106.7220MHz.

(Graph of Bandwidth Measurement)

Center Frequency 88.1000MHz, 26dB Bandwidth: 44.7kHz

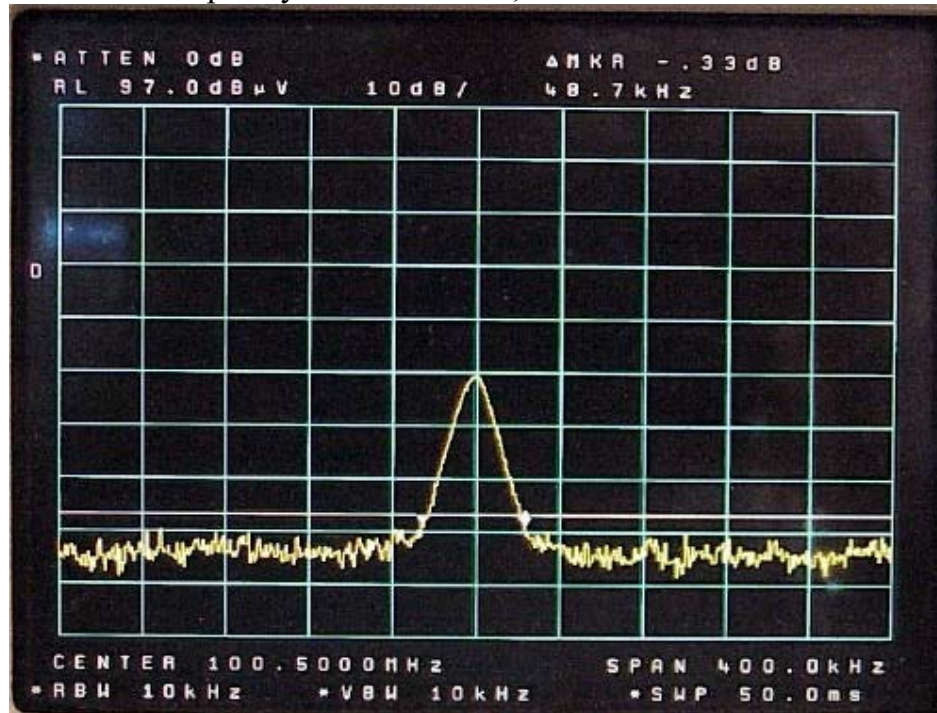


Center Frequency 94.3000MHz, 26dB Bandwidth: 41.3kHz

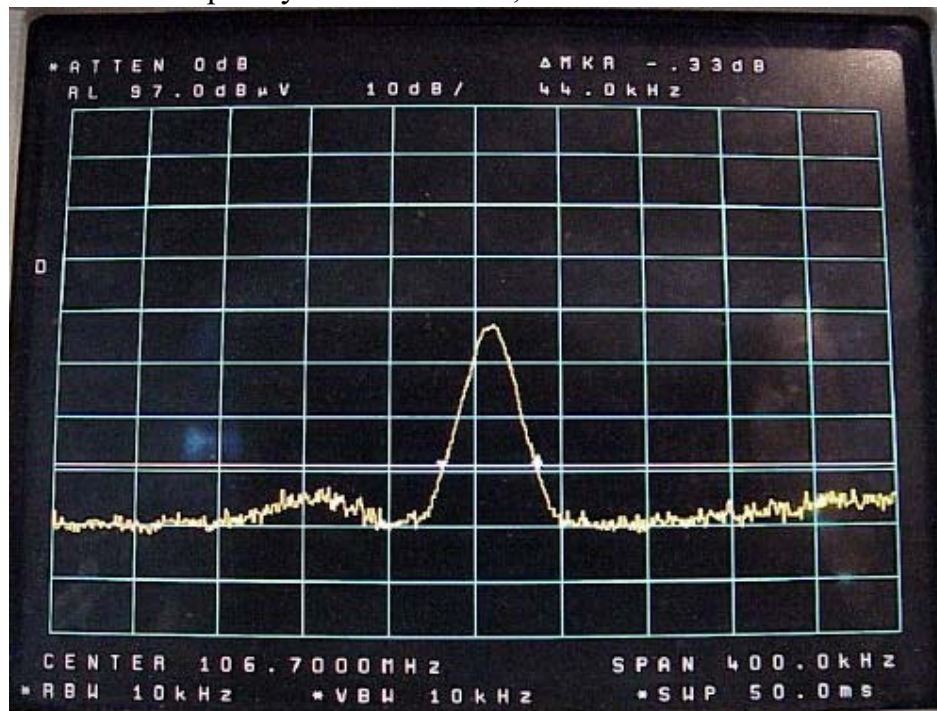


(Graph of Bandwidth Measurement)

Center Frequency 100.5000MHz, 26dB Bandwidth: 48.7kHz



Center Frequency 106.7000MHz, 26dB Bandwidth: 44.0kHz



5. DEVIATION TO TEST SPECIFICATIONS

【NONE】

6. PHOTOGRAPHS

6.1. Photos of Conducted Measurement

Test Mode: EUT's Power with AC Adapter (AC 120V/60Hz)



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

Test Mode: EUT's Power with Notebook PC-- USB +5V (AC 120V/60Hz)



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

6.2. Photos of Radiated Measurement at Semi-Anechoic Chamber

6.2.1. Frequency range 30MHz to 1000MHz

Test Mode: EUT's Power with AC Adapter (AC 120V/60Hz)

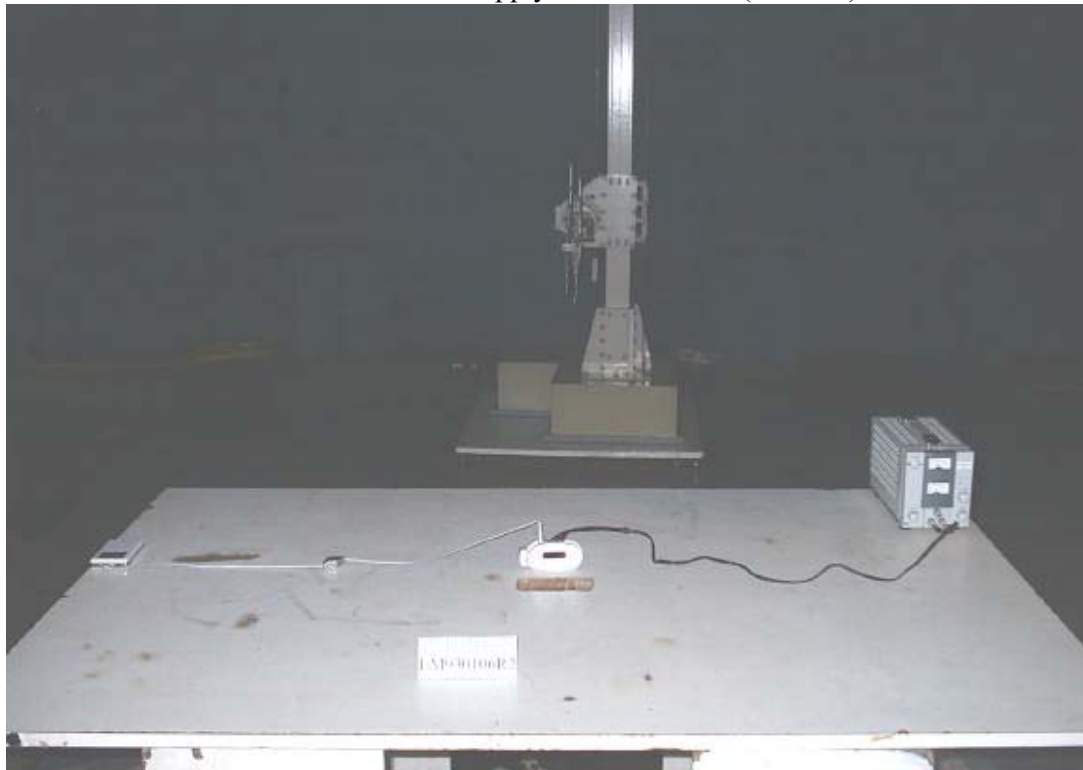


FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

EUT's Power with Power-Supply Holder for Car (DC 12V)



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

EUT' s Power with Battery (DC 3V)



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Test Mode: EUT's Power with Notebook PC-- USB +5V (AC 120V/60Hz)



FRONT VIEW OF RADIATED MEASUREMENT



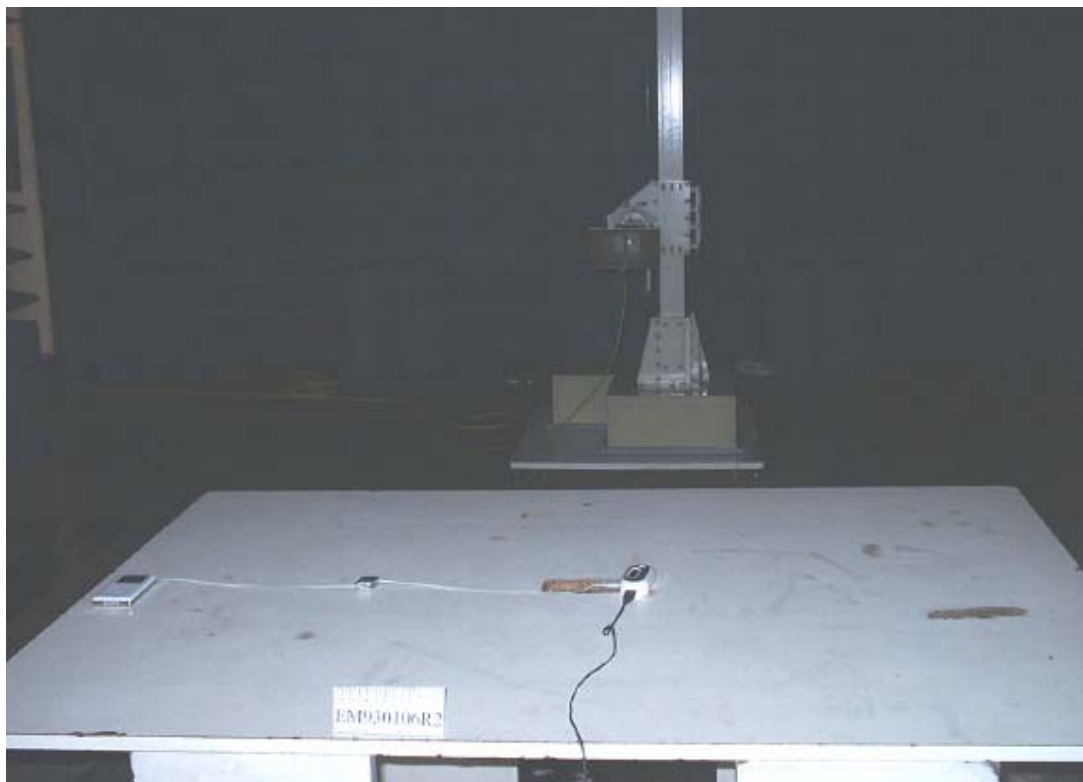
BACK VIEW OF RADIATED MEASUREMENT

6.2.2. Frequency range above 1GHz

Test Mode: EUT's Power with AC Adapter (AC 120V/60Hz)

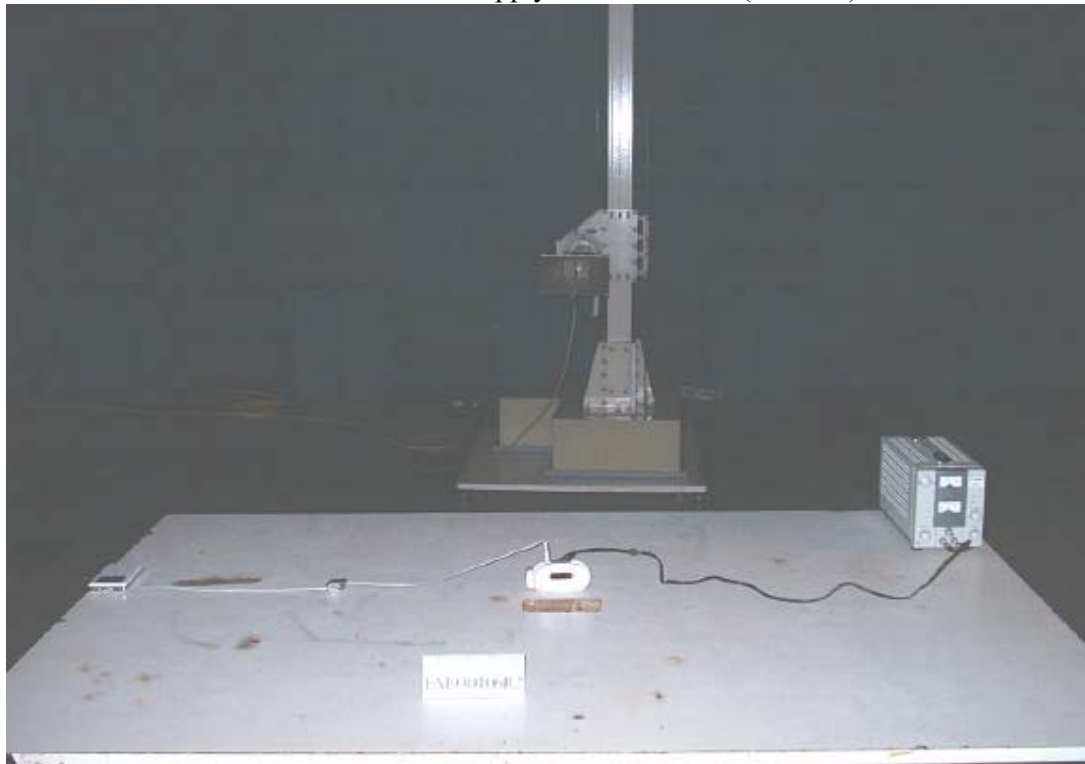


FRONT VIEW OF RADIATED MEASUREMENT

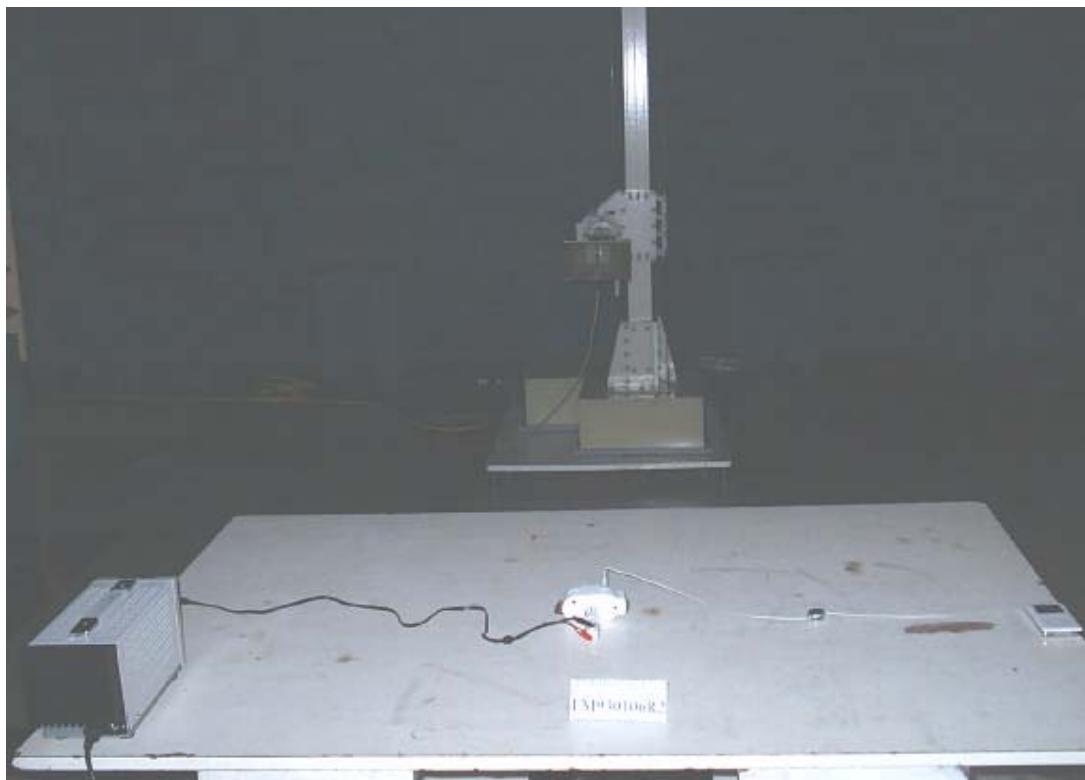


BACK VIEW OF RADIATED MEASUREMENT

EUT's Power with Power-Supply Holder for Car (DC 12V)



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

EUT's Power with Battery (DC 3V)



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Test Mode: EUT's Power with Notebook PC-- USB +5V (AC 120V/60Hz)

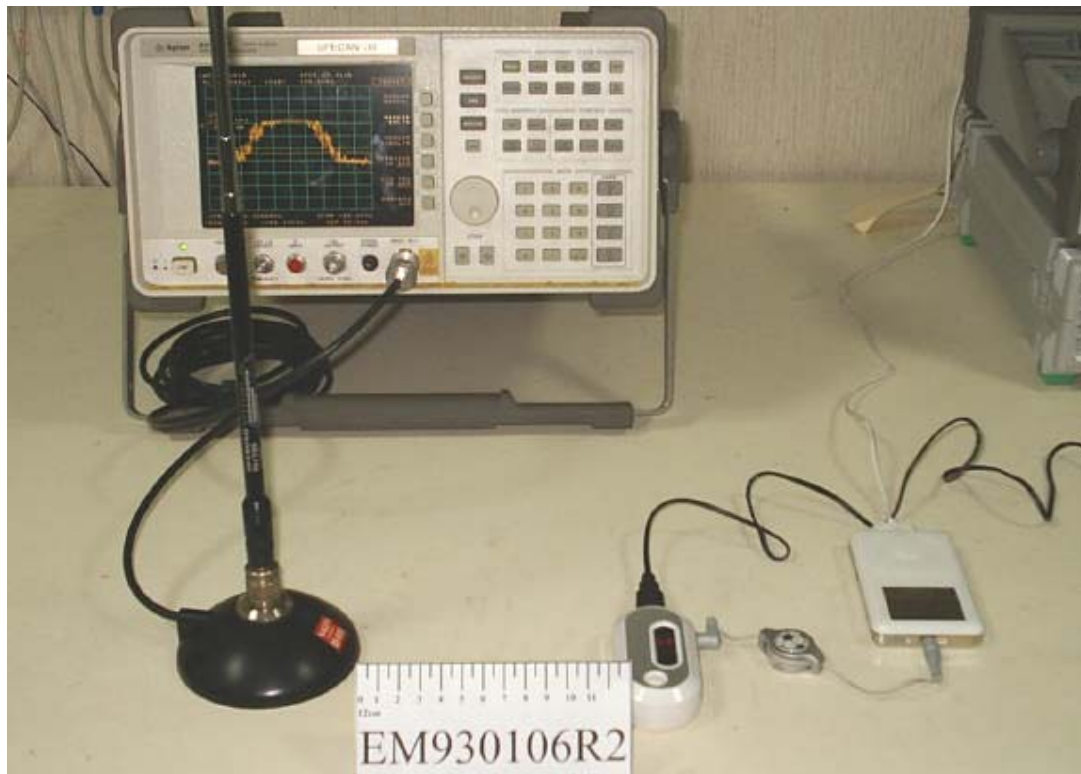


FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

6.3. Photos of Bandwidth Measurement



APPENDIX

Radiated Test Data At Semi-Anechoic Chamber

(Total Pages: 10)

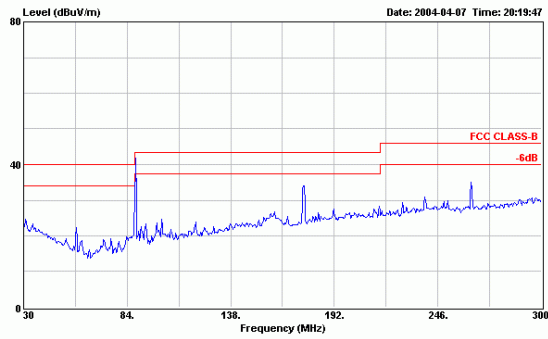


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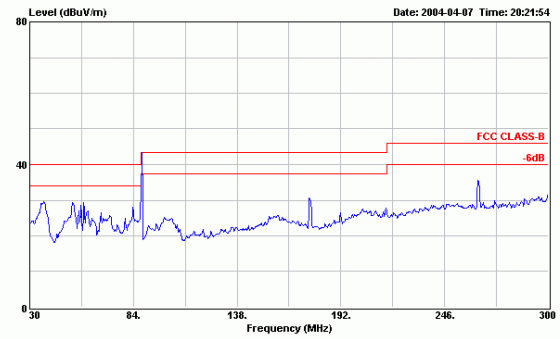
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Web:www.ttenc.com.tw

Data#: 1 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 88.1MHz
ENVIRONMENT : 22°C/56%

Data#: 2 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 88.1MHz
ENVIRONMENT : 22°C/56%

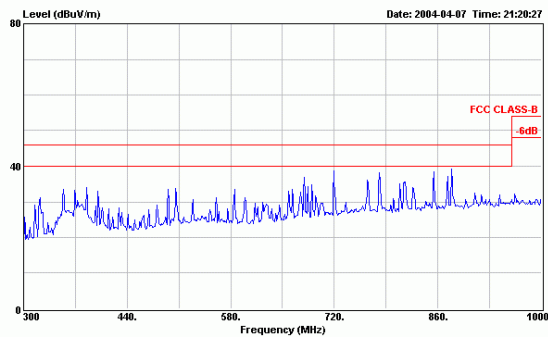


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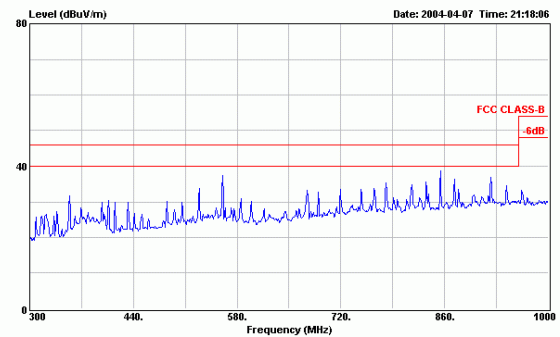
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Data#: 16 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 88.1MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

Data#: 15 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 88.1MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

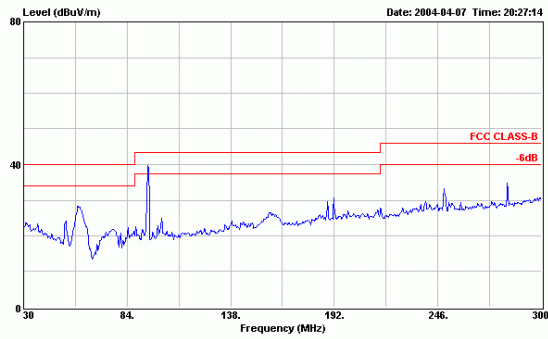


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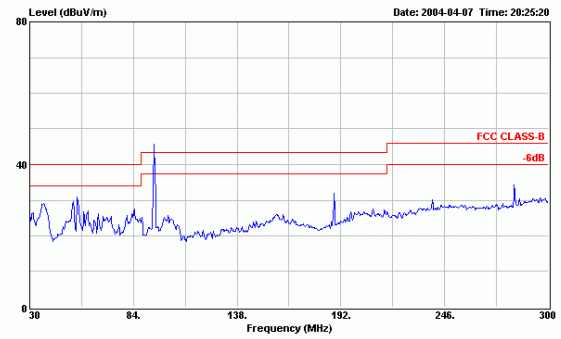
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Data#: 4 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 94.3MHz
ENVIRONMENT : 22°C/56%

Data#: 3 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 94.3MHz
ENVIRONMENT : 22°C/56%

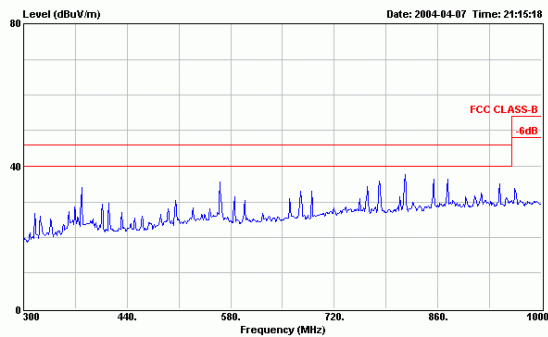


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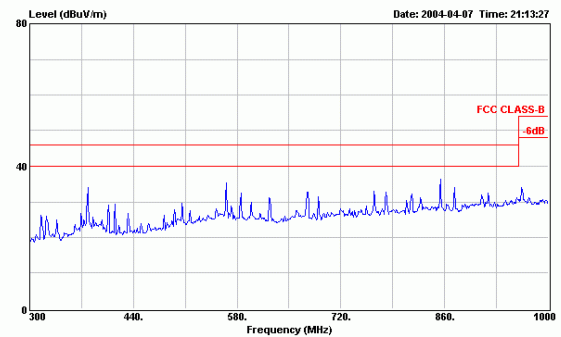
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Data#: 14 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 94.3MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

Data#: 13 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 94.3MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

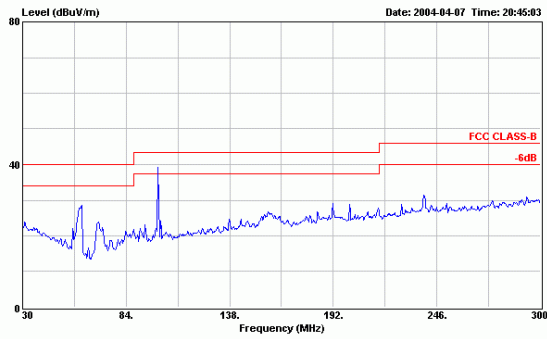


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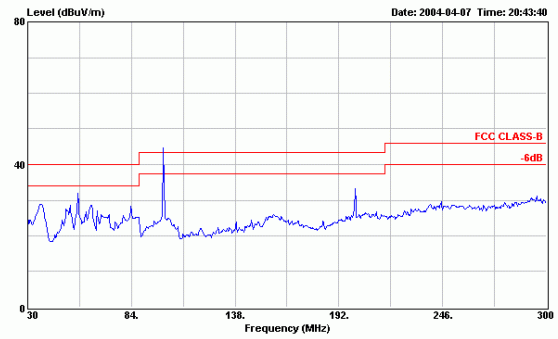
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Data#: 6 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 100.5MHz
ENVIRONMENT : 22°C/56%

Data#: 5 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 100.5MHz
ENVIRONMENT : 22°C/56%

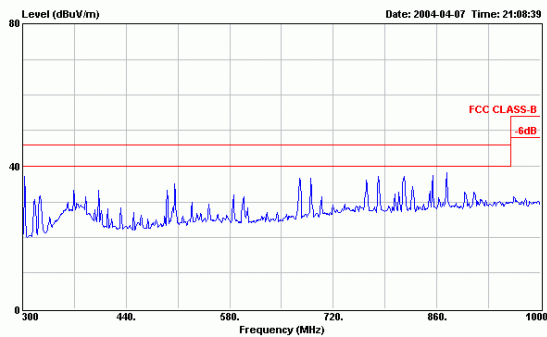


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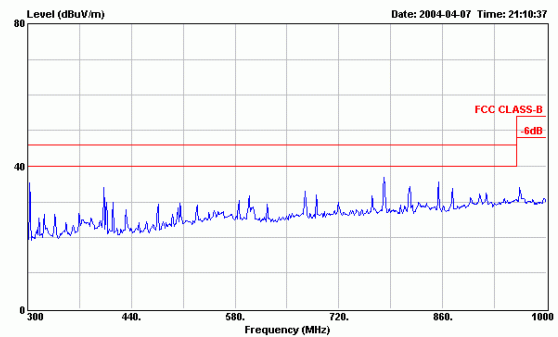
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Data#: 11 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 100.5MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

Data#: 12 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 100.5MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

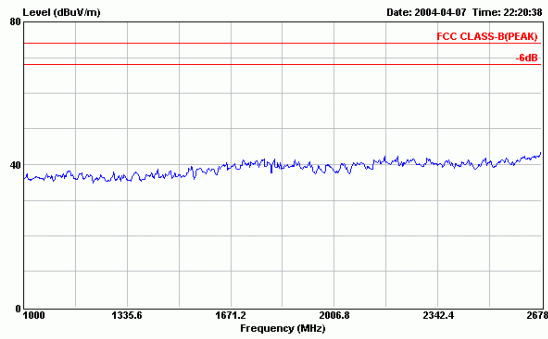


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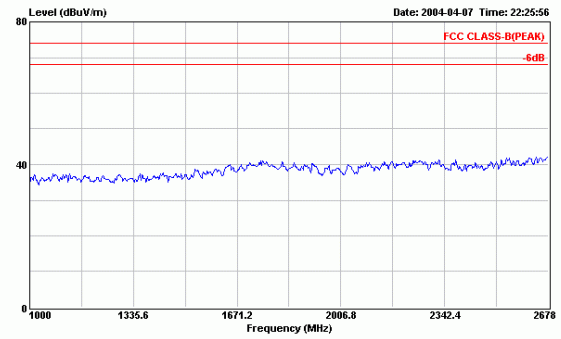
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Data#: 35 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B (PEAK) 3m 3115 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:100.5MHz
ENVIRONMENT : 22°C/56%

Data#: 36 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B (PEAK) 3m 3115 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 100.5MHz
ENVIRONMENT : 22°C/56%

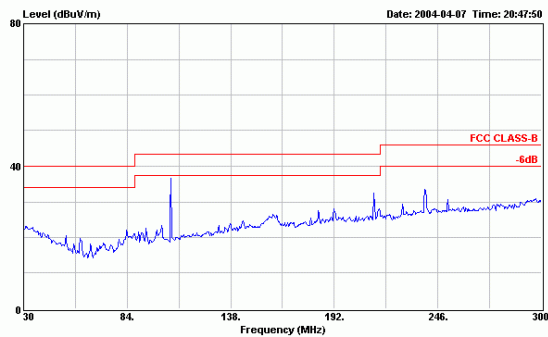


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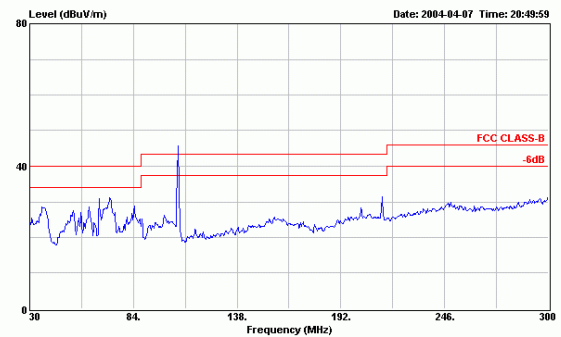
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Data#: 7 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 106.7MHz
ENVIRONMENT : 22°C/56%

Data#: 8 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 106.7MHz
ENVIRONMENT : 22°C/56%

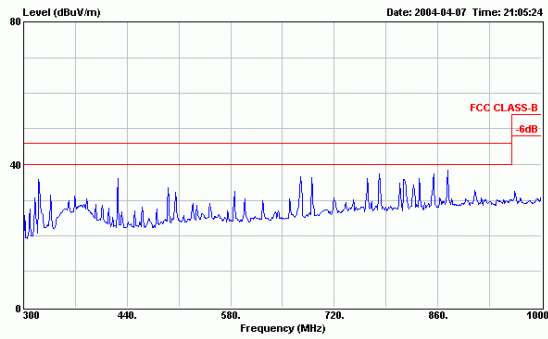


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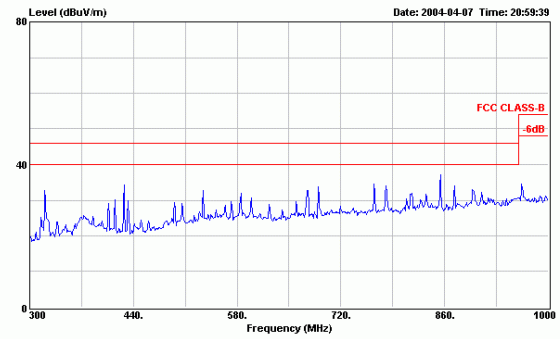
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Data#: 10 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

Data#: 9 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : 120Vac/60Hz
ENVIRONMENT : 22°C/56%

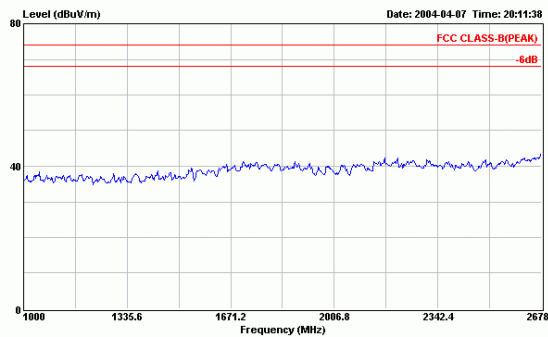


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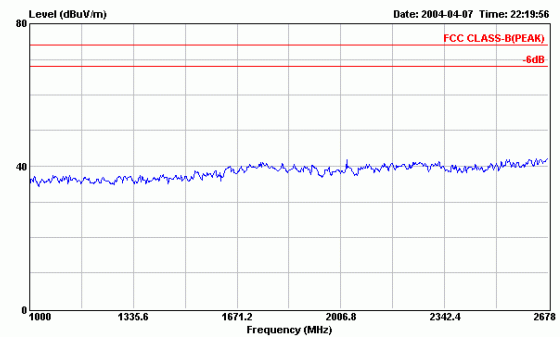
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Data#: 33 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(Peak) 3m 3115 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 106.7MHz
ENVIRONMENT : 22°C/56%

Data#: 34 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(Peak) 3m 3115 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : 120Vac/60Hz MODE:FM 106.7MHz
ENVIRONMENT : 22°C/56%

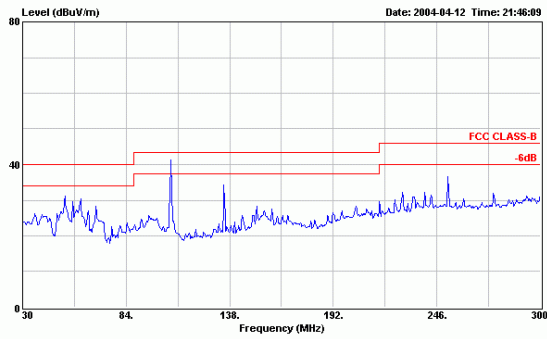


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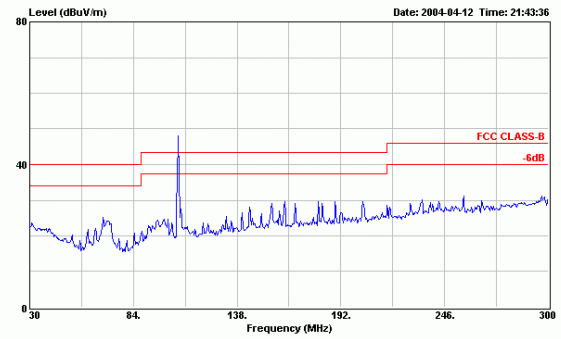
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Data#: 38 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 12V
ENVIRONMENT : 25°C/52%

Data#: 37 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 12V
ENVIRONMENT : 25°C/52%

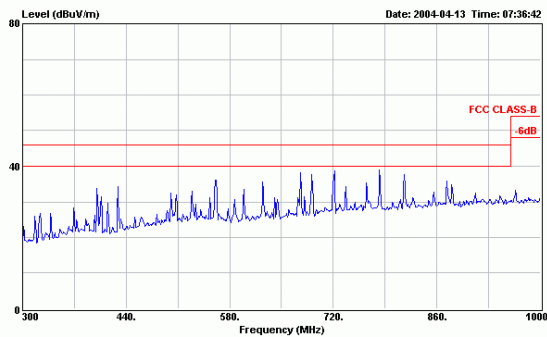


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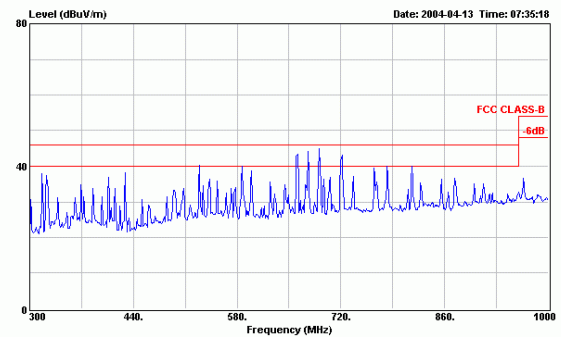
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Data#: 40 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 12V
ENVIRONMENT : 23°C/54%

Data#: 39 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 12V
ENVIRONMENT : 23°C/54%

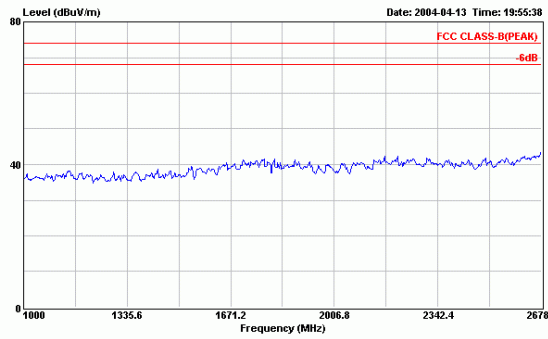


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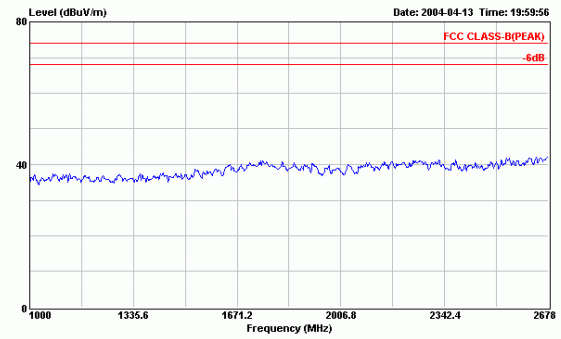
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Data#: 45 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(PEAK) 3m 3115 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : DC 12V MODE:106.7MHz
ENVIRONMENT : 23°C/54%

Data#: 46 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(PEAK) 3m 3115 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : DC 12V MODE:FM 106.7MHz
ENVIRONMENT : 23°C/54%

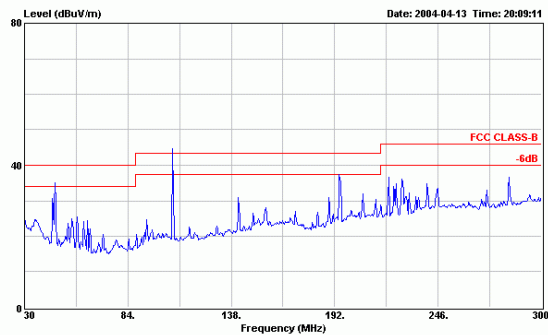


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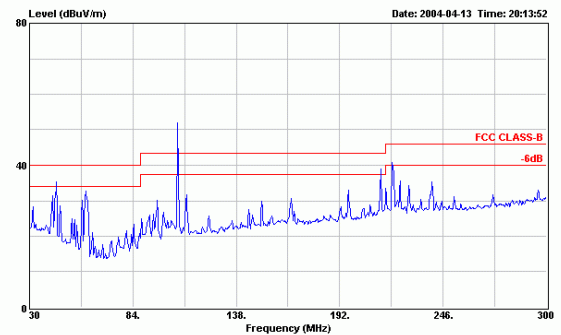
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Data#: 49 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 3V
ENVIRONMENT : 23°C/54%

Data#: 50 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 3V
ENVIRONMENT : 23°C/54%

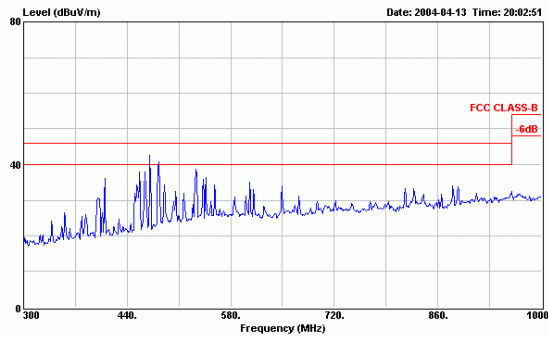


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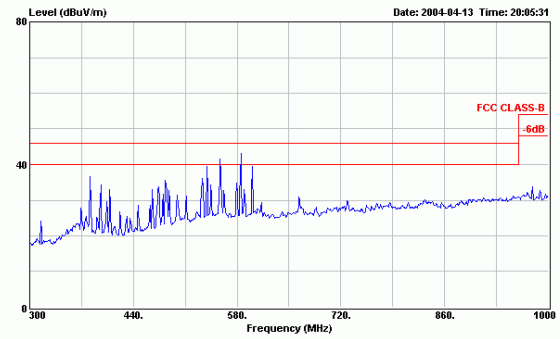
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Data#: 47 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 3V
ENVIRONMENT : 23°C/54%

Data#: 48 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : DC 3V
ENVIRONMENT : 23°C/54%

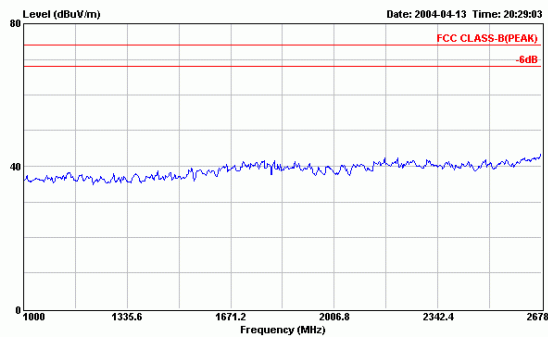


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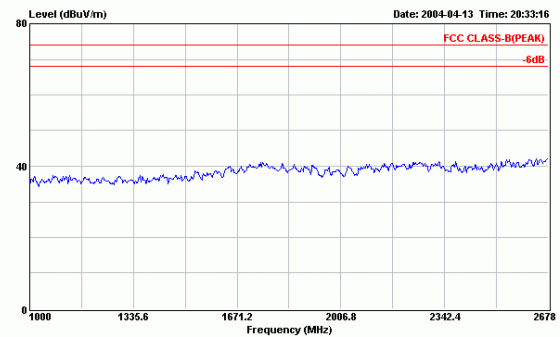
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Data#: 55 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(Peak) 3m 3115 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : DC 3V MODE:106.7MHz
ENVIRONMENT : 23°C/54%

Data#: 56 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(Peak) 3m 3115 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : DC 3V MODE:FM 106.7MHz
ENVIRONMENT : 23°C/54%

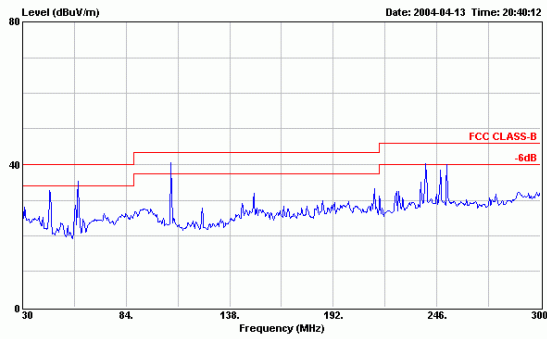


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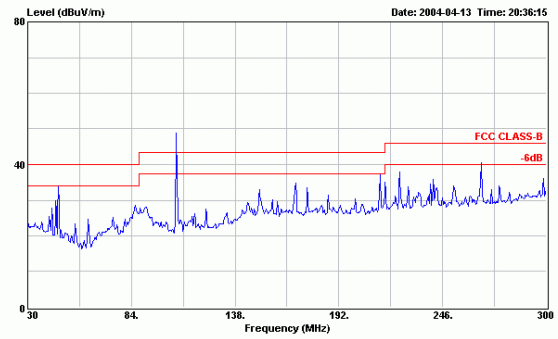
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Data#: 58 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : Via Notebook
ENVIRONMENT : 23°C/54%

Data#: 57 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m BBA9106(A3L) VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : Via Notebook
ENVIRONMENT : 23°C/54%

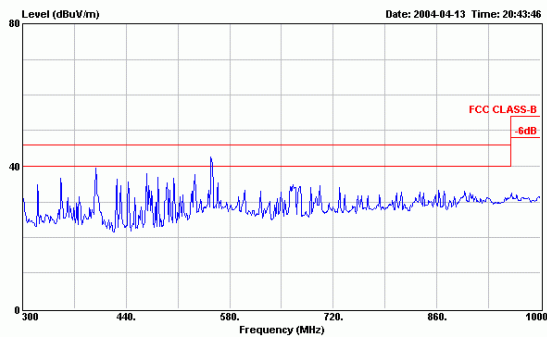


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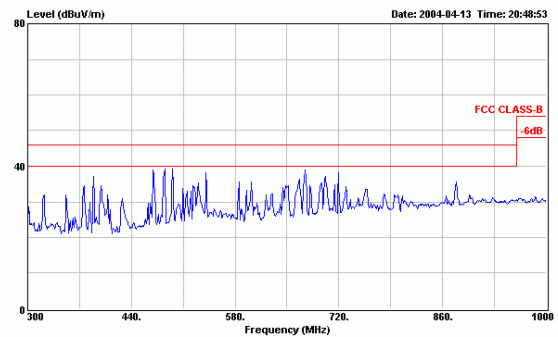
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Data#: 59 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : Via Notebook
ENVIRONMENT : 23°C/54%

Data#: 60 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B 3m UHALP 9108-A 0138 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30 MODE:FM 106.7MHz
POWER : Via Notebook
ENVIRONMENT : 23°C/54%

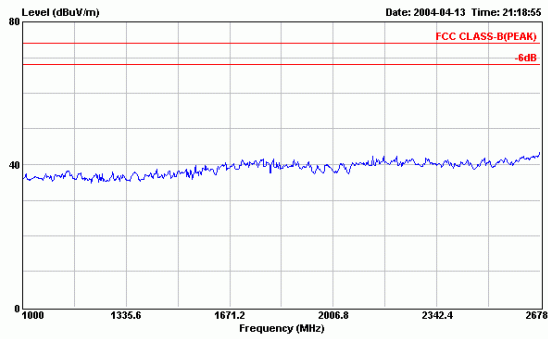


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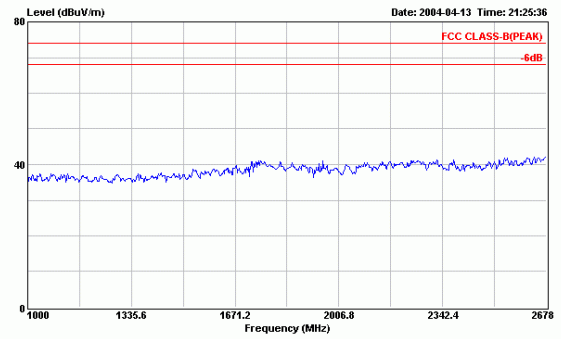
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Data#: 67 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(PEAK) 3m 3115 HORIZONTAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : Via Notebook MODE:106.7MHz
ENVIRONMENT : 23°C/54%

Data#: 68 File#: C:\EM930106R2\EM930106R2.EM1



Site : Anechoic Chamber
Condition : FCC CLASS-B(PEAK) 3m 3115 VERTICAL
EUT : Universal Digital Transmitter
MEMO : M/N:ST-30
POWER : Via Notebook MODE:FM 106.7MHz
ENVIRONMENT : 23°C/54%