Test Report

For

Applicant	:	**TRANWO TECHNOLOGY CORP.**
Equipment Type	:	**Wireless A/V Sender with Remote Control Extender**
Model	:	**TTA-20R**
FCC ID	:	**O6LTTA-20R**

Report No. : 00CH003-1FI

Test Report Certification

QuieTek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,
Hsin-Chu County, Taiwan, R.O.C.
Tel : 886-3-592-8858, Fax: 886-3-592-8859
E-Mail : quietek@ms24.hinet.net

Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant	: TRANWO TECHNOLOGY CORP.
Address	: 2F, No. 45, Shian Jeng 2nd Rd., Jubei City, Hsin Chu, Taiwan, R.O.C.
Equipment Type	: Wireless A/V Sender with Remote Control Extender
Model	: TTA-20R
FCC ID.	: O6LTTA-20R
Measurement Standard	: FCC Part 15 Intentional Radiators for Subpart C Paragraph 15.231
Measurement Procedure	: ANSI C63.4 /1992
Operation Voltage	: 120VAC/60Hz
Test Result	: Complied
Test Date	: Dec 28, 2000
Report No.	: 00CH003-1FI

NVLAP®

The Test Results relate only to the samples tested.
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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government.

Documented by: Kim Hung	Test Engineer: Calien Kang	Approved: Kevin Wang

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1. General Information

1.1 EUT Description

Applicant	:	TRANWO TECHNOLOGY CORP.
Address		2F, No. 45, Shian Jeng 2nd Rd., Jubei City, Hsin Chu, Taiwan, R.O.C.
Equipment Type	:	Wireless A/V Sender with Remote Control Extender
Model	:	TTA-20R
FCC ID	:	O6LTTA-20R
Channel Number	:	1
Working Frequency	:	433.92 MHz
Operation Voltage	:	120VAC/60Hz
RCA Cable (3-3)	:	Non-shielded, 1.5m
Power Adapter	:	AHEAD, MW35-0900300 Cable Out: Non-shielded, 1.8m

Remark:
1. This device is a 2.4GHz Wireless A/V Sender with Remote Control Extender included a 2.4GHz receiving function, a 433.92MHz transmitting function and an Infrared Remote function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
3. This device is a composite device in accordance with Part 15 regulations. The function for the receiver was, measured and made a test report that the report number is 00CH003F, certified under verification.
4. The transmitter will stop transmitting after 3 seconds if the button is held down. If the button release it will stop immediately. The circuit was modified to keep the transmitter keep “ON” all the time for testing purpose.

1.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

1.2.1 Wireless A/V Sender with Remote Control Extender(EUT)

Model Number	: TTA-20R
Serial Number	: N/A
FCC ID	: O6LTTA-20R
Manufacturer	: TRANWO TECHNOLOGY CORP.
RCA Cable (3-3)	: Non-shielded, 1.5m
Power Adapter	: AHEAD, MW35-0900300 Cable Out: Non-shielded, 1.8m

1.2.2 Monitor

Model Number	: KV-14NX
Serial Number	: 103125
BSMI ID	: 3863A019
Manufacturer	: SONY
Power Cord	: Non-shielded, 1.8m

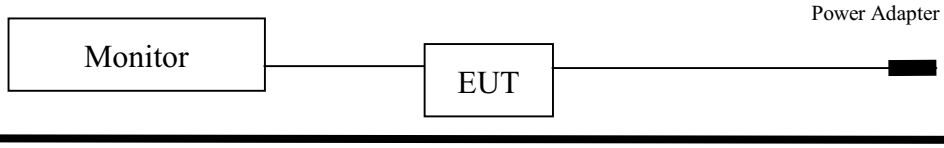
1.2.3 Wireless A/V Sender with Remote Control Extender(TX)

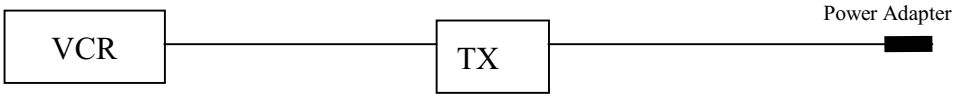
Model Number	: TTA-20T
Serial Number	: N/A
FCC ID	: O6LTTA-20T
Manufacturer	: TRANWO TECHNOLOGY CORP.
RCA Cable (3-3)	: Non-shielded, 1.5m
Power Adapter	: AHEAD, MW35-0900300 Cable Out: Non-shielded, 1.8m

1.2.4 Video Camera Recorder

Model Number	: PV-7450
Serial Number	: N/A
FCC ID	: ACJ927098AH
Manufacturer	: Panasonic
Power Cord	: Non-shielded, 1.6m
Data Cable (AV)	: Non-shielded, 1m

1.3 EUT Configuration





1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1.4.1 Setup the EUT and simulators as shown on 1.3.

1.4.2 Turn on the power of all equipment.

1.4.3 Audio/Video Data will emit the fundamental frequency with Audio/Video data to Receiver.

1.4.4 Repeat the above procedure 1.4.2 to 1.4.3

1.5 Test performed

Conducted emissions were invested over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9kHz.

Radiated emissions were invested over the frequency range from **30MHz to 1000MHz** using a receiver bandwidth of 120kHz and the frequency range from **1GHz to 4GHz** using a receiver bandwidth of 1MHz.
Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

February 23, 1999 Accreditation on DNV
Statement No. : 413-99-LAB11

December 8, 1998 Registration on VCCI
Registration No. for No.2 Shielded Room C-858
Registration No. for No.1 Open Area Test Site R-823
Registration No. for No.2 Open Area Test Site R-835

January 04, 1999 Accreditation on TUV Rheinland
Certificate No.: I9865712-9901

Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

2. Conducted Emission

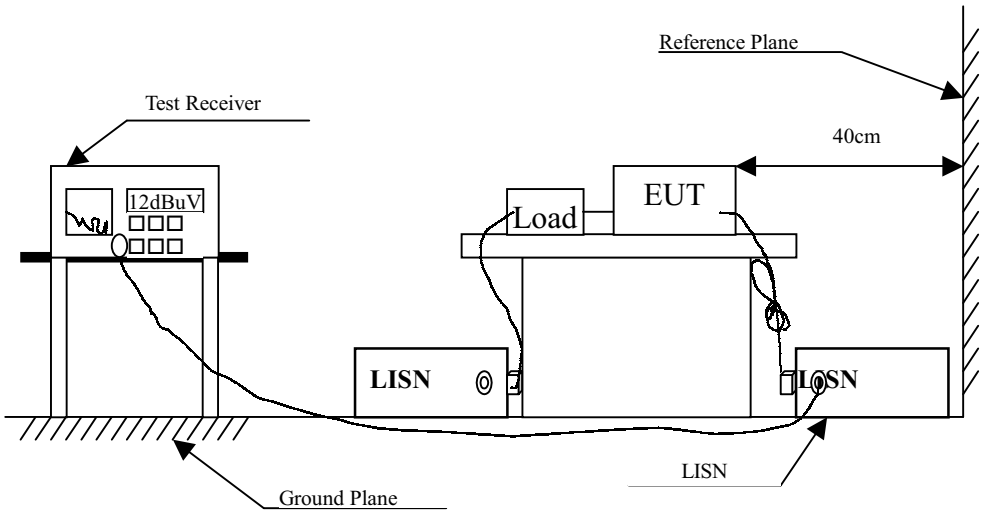
2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2000	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2000	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2000	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2 Test Setup



2.3 Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency	Limits	
MHz	uV	dBuV
0.45 - 30	250	48.0

2.4 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. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 /1992 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9 kHz.

2.5 Test Results

The conducted emission from the EUT is measured and shown in Attachment 1. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

3.1 Test Equipment

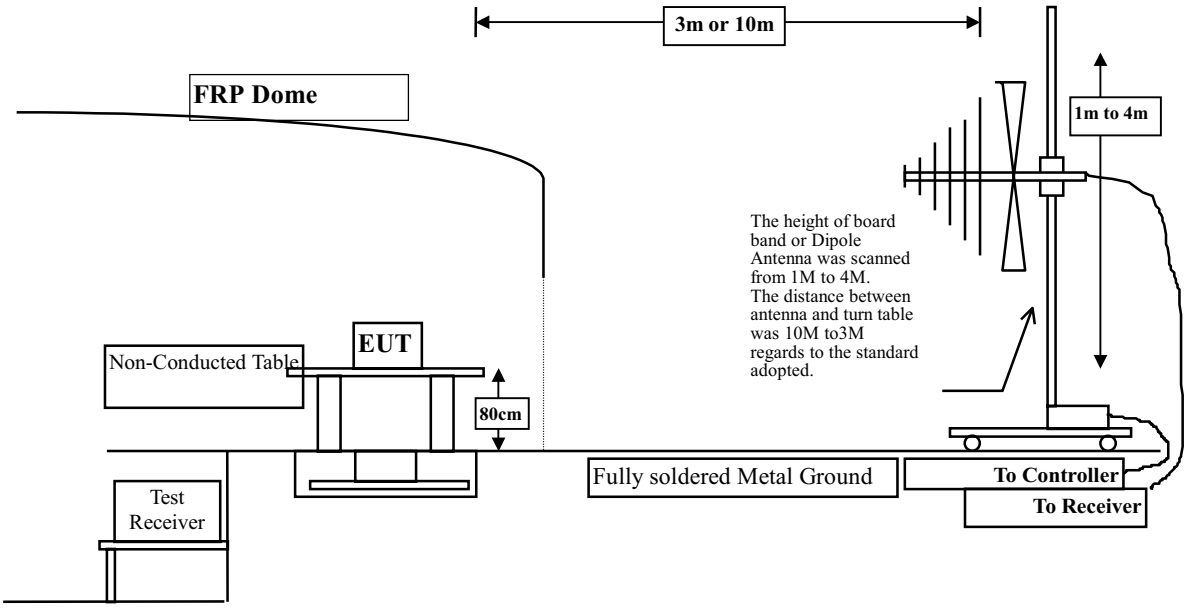
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
		Pre-Amplifier	HP	8447D/3307A01812	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2000
		Pre-Amplifier	HP	8447D/3307A01814	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.

2.. Mark "X" test instruments are used to measure the final test results.

3.2 Test Setup



3.3 Limits

➢ FCC Part 15 Subpart C Paragraph 15.231 Limit

Fundamental Frequency MHz	Field strength of fundamental		Field Strength of spurious emissions	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.0	225	47.0
70-130	1250	61.9	125	41.9
130-174	1250-3750[1]	61.9 – 71.5	125-375[1]	41.9 – 51.5
174-260	3750	71.5	375	51.5
260-470	3750-12500[1]	71.5 – 81.9	375-1250[1]	51.5 – 61.9
above 470	12500	81.9	1250	61.9

Remarks : 1. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
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.

➢ Frequencies in restricted band are complied to limits on Paragraph15.209.

Frequency MHz	15.209 Limits (dBuV/m @3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remarks : 1. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
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.

3.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. 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 3 meters .
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 according to ANSI C63.4 /1992 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz and above 1GHz is 1MHz.

3.5 Test Results

The radiated emission from the EUT is measured and shown in Attachment 1. The acceptance criterion was met and the EUT passed the test.

4. Occupied Bandwidth of Raidated Emission

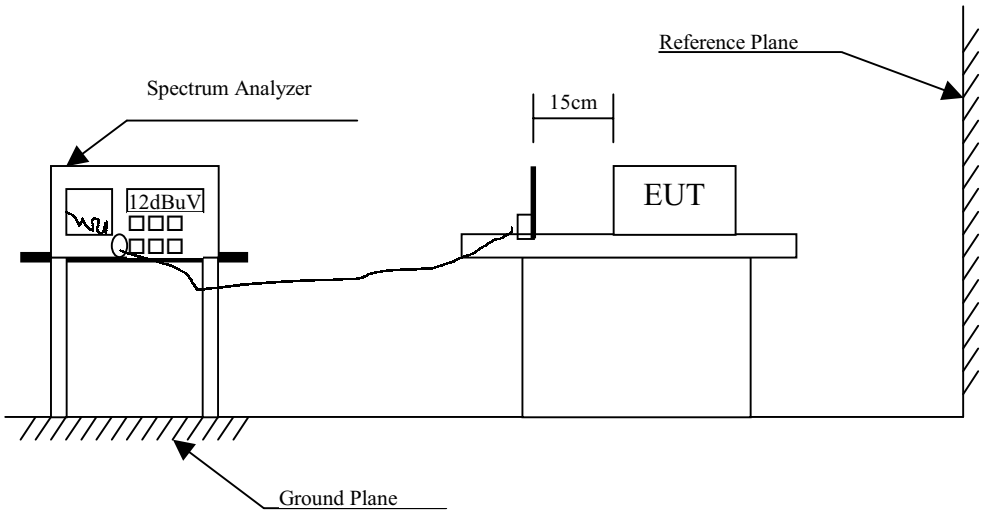
4.1 Test Equipment

The following test equipment are used during the radiated emission test:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
Monopole Antenna	QTK	MN2010 / 11001	Jun., 2000

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

4.2 Test Setup



4.3 Limits

(1) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

(2) The bandwidth of the emission shall be no wider than 0.5% of the center frequency for devices operating above 900MHz.

4.4 Test Procedure

The EUT on a non-conducted table was positioned such that the distance from antenna to the EUT was 15cm.
The bandwidth of radiated emission is measured under the EUT condition produced the generated carrier signal.

4.5 Test Results

The radiated emission from the EUT is measured and shown in Attachment 1. The acceptance criterion was met and the EUT passed the test.

5. Duty Cycle Measurement

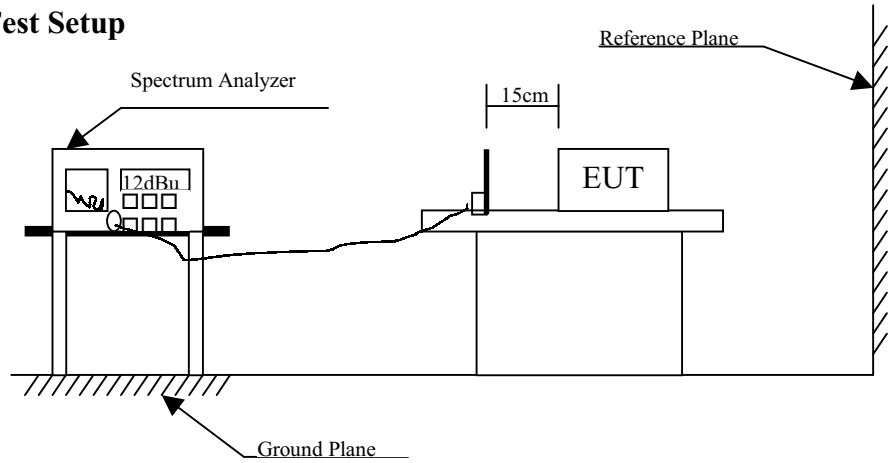
5.1 Test Equipment

The following test equipment are used during the radiated emission test:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
Monopole Antenna	QTK	MN2010 / 11001	Jun., 2000

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

5.2 Test Setup



5.3 Test Proceudre

The EUT on a non-conducted table was positioned such that the distance from antenna to the EUT was 15cm.

The bandwidth of radiated emission is measured under the EUT condition produced the generated carrier signal.

5.4 Duty Cycle Test Result

The Duty Cycle from the EUT is measured and shown in Attachment 1. The acceptance criterion was met and the EUT passed the test.

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.

7. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 6
Attachment 2: EUT Test Photographs	Number of Pages: 3
Attachment 3: EUT Detailed Photographs	Number of Pages: 12

Attachment 1 : Summary of Test Results

The test results in the emission were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

Mode 1: Wireless A/V Sender with Remote Control Extender

The EUT passed all the tests.

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

➢ **Emission Test**

- Uncertainty in the Conducted Emission Test: < ± 2.0 dB
- Uncertainty in the field strength measured: < ± 4.0 dB

CONDUCTED EMISSION DATA

Date of Test	:	Dec. 29, 2000	EUT	:	TTA-20R
Test Mode	:	Mode 1	Detect Mode	:	Quasi-Peak

Frequency	Cable Loss	LISN Factor	Reading Level	Measurement Level	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
Line 1:					
0.468	0.06	0.10	31.15	31.31	48.00
0.552	0.07	0.10	32.91	33.08	48.00
*0.593	0.07	0.10	33.21	33.38	48.00
0.653	0.08	0.10	31.77	31.95	48.00
0.770	0.09	0.10	25.85	26.04	48.00
25.141	0.38	0.54	21.05	21.97	48.00
Line 2:					
0.500	0.06	0.10	31.17	31.33	48.00
*0.565	0.07	0.10	32.83	33.00	48.00
0.592	0.07	0.10	32.43	32.60	48.00
0.657	0.08	0.10	29.71	29.89	48.00
0.721	0.08	0.10	26.17	26.35	48.00
18.774	0.35	0.43	25.43	26.20	48.00

Remarks :

1. " * " means that this data is the worst emission level.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

Radiated Emission Data

Date of Test	:	Dec. 29, 2000	EUT	:	TTA-20R
Test Mode	:	Mode 1	Test Site	:	No.1 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
Horizontal:									
Quasi-Peak Detector									
434.034	2.68	16.94	26.00	81.60	75.22	5.37	80.59	0	0
Peak Detector									
868.083	4.46	20.83	26.00	55.72	55.01	6.99	62.00	0	0
1302.140	2.48	25.70	35.47	58.36	51.07	10.93	62.00	0	0
1736.120	3.03	27.23	35.06	52.13	47.34	14.66	62.00	0	0
2170.180	3.57	28.64	34.90	53.05	50.37	11.63	62.00	0	0
2604.265	4.05	29.75	34.92	49.91	48.78	13.22	62.00	0	0
3038.270	4.53	30.86	35.01	45.77	46.15	15.85	62.00	0	0
3472.350	4.96	31.58	35.09	43.34	44.78	17.22	62.00	0	0
3906.345	5.40	32.33	34.69	41.74	44.78	17.22	62.00	0	0
4340.295	5.81	32.91	34.80	40.45	<44.37	17.63	62.00	0	0
Vertical:									
Quasi-Peak Detector									
434.032	2.68	16.56	26.00	80.62	73.86	6.73	80.59	0	0
Peak Detector									
868.080	4.46	20.97	26.00	51.72	51.15	10.85	62.00	0	0
1302.125	2.48	25.70	35.47	55.45	48.16	13.84	62.00	0	0
1736.200	3.03	27.23	35.06	56.05	51.26	10.74	62.00	0	0
2170.185	3.57	28.64	34.90	54.09	51.41	10.59	62.00	0	0
2604.230	4.05	29.75	34.92	49.40	48.27	13.73	62.00	0	0
3038.255	4.53	30.86	35.01	47.32	47.70	14.30	62.00	0	0
3472.325	4.96	31.58	35.09	42.66	44.10	17.90	62.00	0	0
3906.420	5.40	32.33	34.69	43.17	46.21	15.79	62.00	0	0
4340.355	5.81	32.91	34.80	39.98	<43.90	18.10	62.00	0	0

Remarks:

1. " * ", means this data is the worst emission level.
2. For Average Detect: Probe Factor = Antenna Factor+Duty cycle Factor
3. Emission Level = Reading Level + Probe Factor + Cable loss–PreAmp
4. The average measurement was not performed when the peak measured data under the limit of average detection.

General Radiated Emission Data

Date of Test	:	Dec. 29, 2000	EUT	:	TTA-20R
Test Mode	:	Mode 1	Test Site	:	No.1 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
HORIZONTAL:									
30.000	1.02	19.36	26.00	31.80	26.18	13.32	39.50	0	0
55.220	1.12	6.04	26.00	43.80	24.96	15.04	40.00	0	0
*126.030	1.41	13.05	26.00	53.00	41.46	2.04	43.50	0	0
153.190	1.52	11.71	26.00	43.00	30.23	13.27	43.50	0	0
214.300	1.77	10.05	26.00	41.00	26.82	16.68	43.50	0	0
243.400	1.89	12.44	26.00	44.20	32.53	13.47	46.00	0	0
VERTICAL:									
*35.820	1.04	13.65	26.00	50.00	37.69	2.31	40.00	0	0
57.160	1.13	7.90	26.00	54.00	37.02	2.98	40.00	0	0
73.650	1.20	9.40	26.00	40.20	24.80	15.20	40.00	0	0
125.060	1.41	11.79	26.00	47.60	34.80	8.70	43.50	0	0
155.130	1.53	10.26	26.00	41.20	26.99	16.51	43.50	0	0
290.930	2.09	13.61	26.00	35.20	24.90	21.10	46.00	0	0

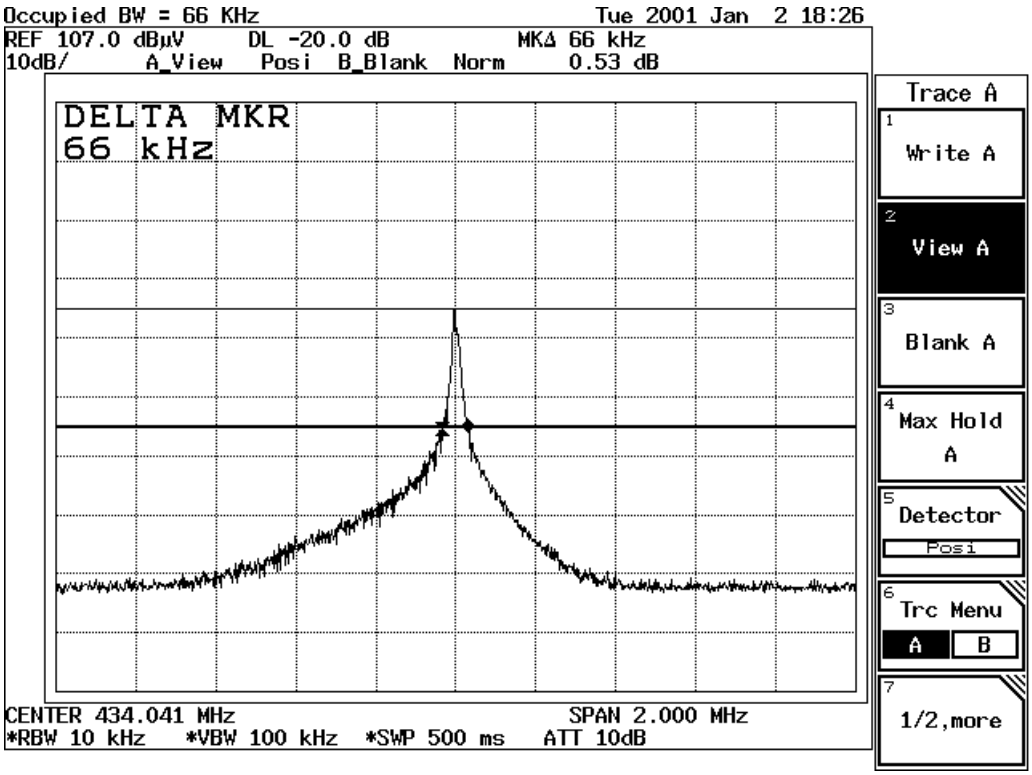
Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Occupied Bandwidth of Radiated Emission Data

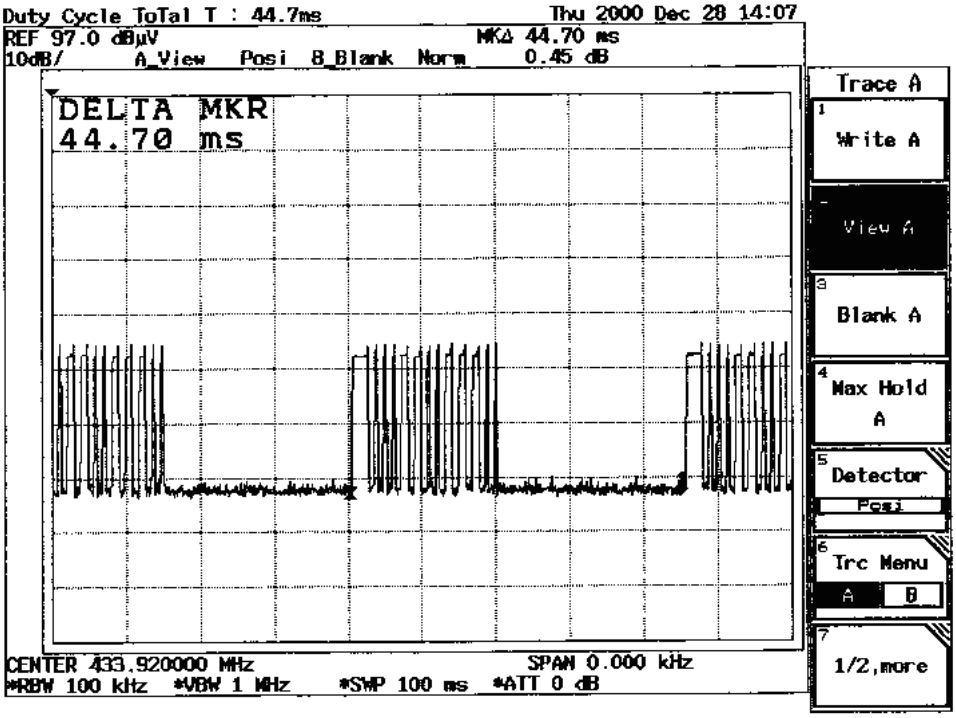
Date of Test	:	Dec. 29, 2000	EUT	:	TTA-20R
Test Mode	:	Mode 1	Test Site	:	No.1 Open Test Site

Center Frequency	433.92	MHz
Allowable Bandwidth (70-900 MHz:0.25%, Above 900MHz: 0.5%)	1084.8	kHz
Bandwidth at 20dB down (Max)	66	kHz
Result	Complied with regulation	



Duty Cycle Measurement Data

Date of Test	:	Dec. 29, 2000	EUT	:	TTA-20R
Test Mode	:	Mode 1	Test Site	:	No.1 Open Test Site



PEAK= 75.22dBuV/m; Duty Cycle= 20 LOG (12.4/44.7); Average= Peak +Duty Cycle= 64.08