



Test Report

Product Name : Wireless vehicle safety video system
 Model No. : 2400R
 FCC ID. : SQJCA0433TBCR0433

Applicant : Anchor Security System Co., Ltd.
 Address : 4F, No.70, Chien-Liu Rd., Chung-Ho City, Taipei,
 Taiwan, R.O.C.

Date of Receipt : 2004/11/24
 Issued Date : 2004/12/06
 Report No. : 04BH078-F-R02-T

The test results relate only to the samples tested.
 The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
 This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date : 2004/12/06

Report No. : 04BH078-F-R02-T



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : Wireless vehicle safety video system
 Applicant : Anchor Security System Co., Ltd.
 Address : 4F, No.70, Chien-Liu Rd., Chung-Ho City, Taipei, Taiwan,
 R.O.C.
 Manufacturer : Anchor Security System Co., Ltd.
 Model No. : 2400R
 FCC ID. : SQJCA0433TBCR0433
 Rated Voltage : DC 12V
 EUT Voltage : DC 12V
 Trade Name : Anchor
 Measurement Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.231: 2003
 Measurement Procedure : ANSI C63.4: 2001
 Test Result : Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented By : Carol Tsai
 (Carol Tsai)

Tested By : Dampier Chang
 (Dampier Chang)

Approved By : James Chang
 (James Chang)

TABLE OF CONTENTS

Description	Page
1. General Information	4
1.1. EUT Description	4
1.2. Operation Description	5
1.3. Test Mode	6
1.4. Tested System Details	7
1.5. Configuration of tested System	7
1.6. EUT Exercise Software	8
1.7. Test Facility	9
2. Conducted Emission	10
2.1. Test Equipment	10
2.2. Test Setup	10
2.3. Limits	11
2.4. Test Procedure	11
2.5. Test Specification	11
2.6. Test Result	12
3. Radiated Emission	13
3.1. Test Equipment	13
3.2. Test Setup	13
3.3. Limits	14
3.4. Test Procedure	15
3.5. Test Specification	15
3.6. Test Result	16
3.7. Test Photo	22
4. Occupied Bandwidth	24
4.1. Test Equipment	24
4.2. Test Setup	24
4.3. Limits	24
4.4. Test Specification	24
4.5. Test Result	25
5. Duty Cycle	26
5.1. Test Equipment	26
5.2. Test Setup	26
5.3. Test Specification	26
5.4. Test Result	27
Attachement	28
EUT Photograph	28

1. General Information

1.1. EUT Description

Product Name	Wireless vehicle safety video system
Trade Name	Anchor
Model No.	2400R
FCC ID	SQJCA0433TBCR0433
Frequency Range	433 MHz
Channel Number	1
Type of Modulation	FSK
Working Voltage	DC 12V
Antenna Gain	-3dBi
Channel Control	Non-Applied
Antenna Type	Soldered on PCB

Component	
Power Cable	Non-Shielded, 0.23m

Working Frequency of Each Channel	
Channel	Frequency
001	433 MHz

Note:

1. This device is a Wireless vehicle safety video system included a 2.4GHz receiving function, a 433 MHz transmitting/receiving 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.
 - (1) The function 2.4GHz transmitting was measured and made a test report that report number is 04BH079-F-R02-T, certified under FCC ID: SQJCA2400TBCR2400.
 - (2) The function 2.4GHz receiving was measured and made a test report that the report number is 04BH078-F-R01-R under Declaration of Conformity.
 - (3) The function for the 433 MHz receiving was measured and made a test report that the report number is 04BH078-F-R01-R under Declaration of Conformity.

1.2. Operation Description

The EUT is a Wireless vehicle safety video system. The signal can be transferred to 433 MHz radio frequency in FSK modulation. The transmission antenna is soldered on the EUT.

Aside from the ISM 2.4 GHz within the system, there is another ISM dual direction control channel by using ISM 433 MHz channel to control over 2.4 GHz channel for camera signaling and the frequency is automatically swappable to assure of more stable signaling.

The device is manually operated and that the device ceases transmission within not more than 5 seconds of being released.

1.3. Test Mode

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

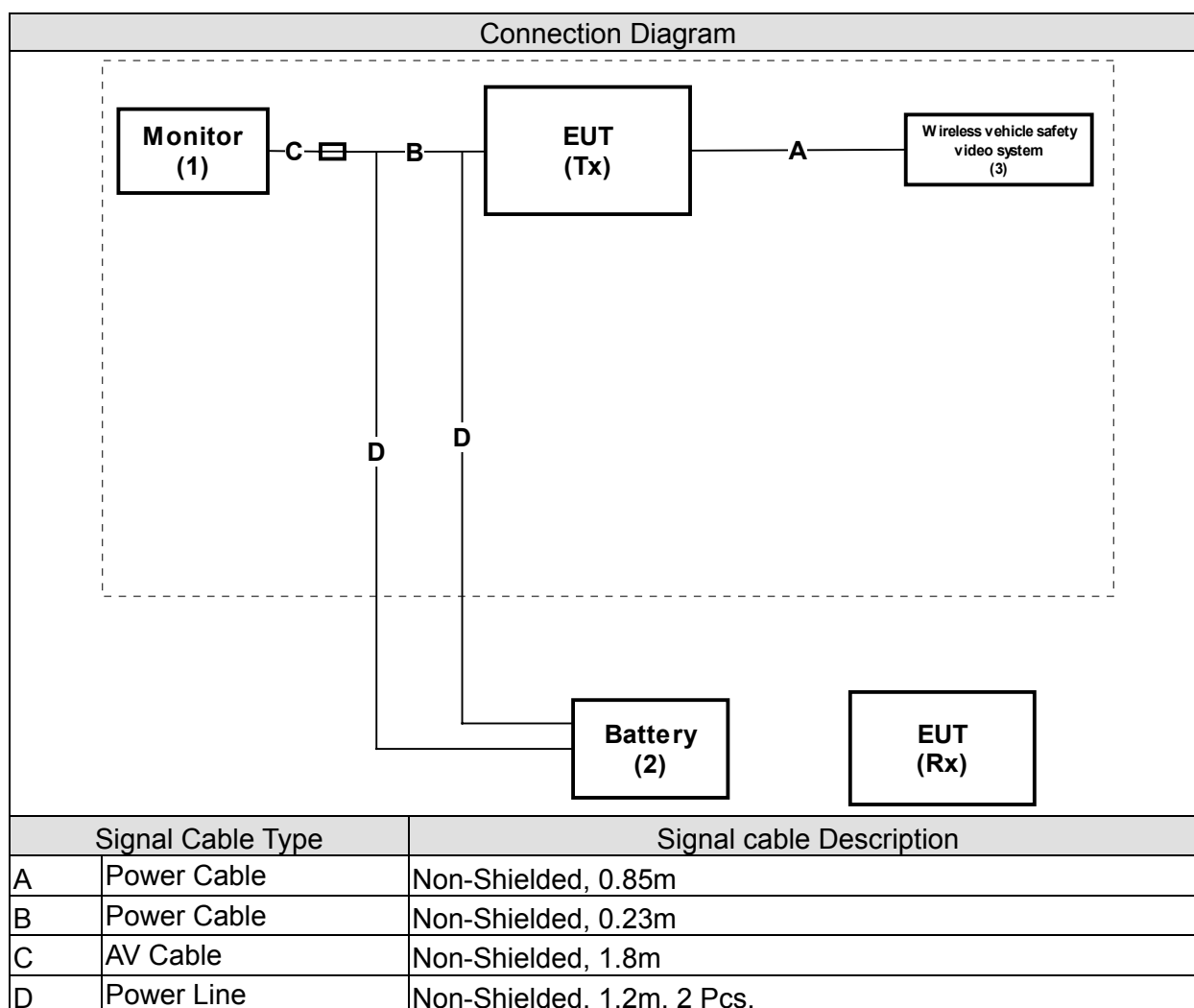
Pre-Test Mode	
TX	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

1.4. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Monitor	THOMSON	15LCDMO3B SN	15LCDMO3B SN FRD100085	DoC	Non-shielded, 1.8m
2	Battery	Global & Yuasa	36B20R	N/A	DoC	--
3	Wireless vehicle safety video system	Anchor	2400TB/TC	N/A	SQJCA2400T BCR2400	--

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.5.
2	Enable RF signal and confirm EUT active.
3	Modulate output capacity of EUT up to specification.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Duty Cycle	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Occupied Bandwidth	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Radiated Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description: June 18, 2004 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195



Accreditation on NVLAP
NVLAP Lab Code: 200347-0
Effective through Sep. 30, 2005



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

2. Conducted Emission

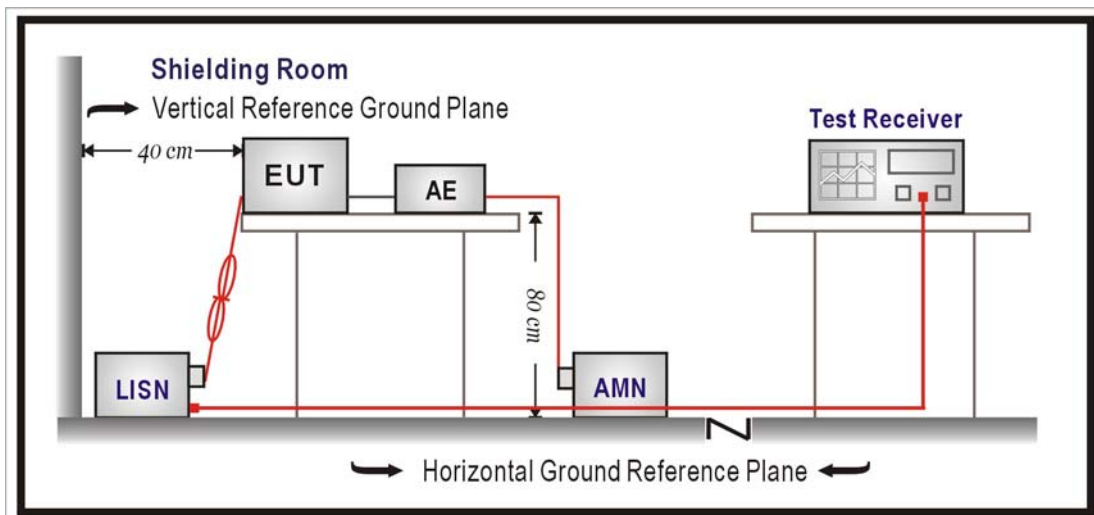
2.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/018	Sep., 2004	
2	Artificial Mains Network	R & S	ENV4200/848411/10	Feb., 2004	Peripheral
3	LISN	R & S	ESH3-Z5/825562/002	Feb., 2004	EUT
4	Pulse Limiter	R & S	ESH3-Z2/357.8810.52	Feb., 2004	
5	No.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 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

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: 2001 on conducted measurement.

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

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2003

2.6. Test Result

Product	Wireless vehicle safety video system		
Test Item	Conducted Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.2 Shielded Room

Owing to the DC operation of EUT, this test item is not performed.

3. Radiated Emission

3.1. Test Equipment

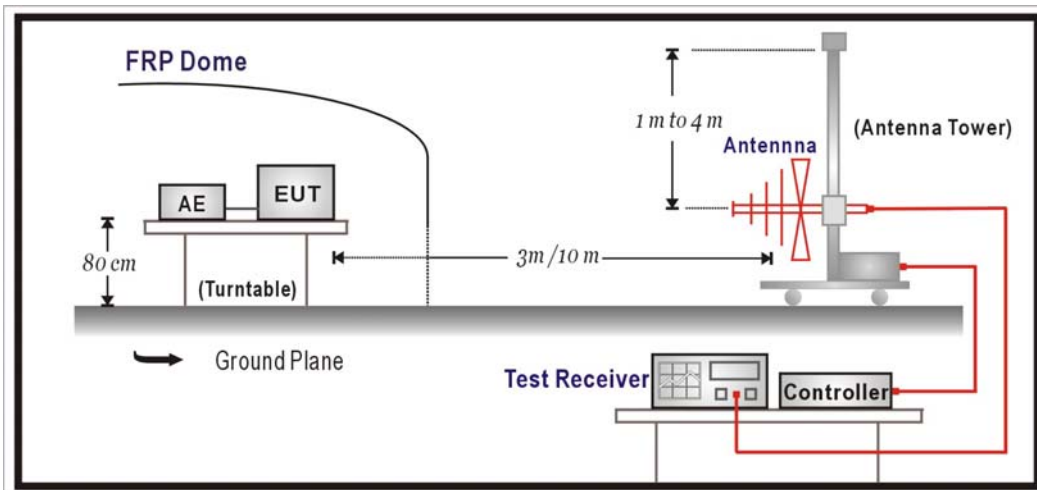
The following test equipment are used during the test:

Item		Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	X	Test Receiver	R & S	ESCS 30 / 825442/017	Jan., 2004
2	X	Spectrum Analyzer	Advantest	R3261C / 81720266	N/A
3	X	Pre-Amplifier	HP	8447D / 2944A09276	N/A
4	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2004
5	X	Spectrum Analyzer	R & S	FSP40 / 100005	Aug., 2004
6	X	Pre-Amplifier	HP	8449B / 3008A01123	Feb., 2004
7	X	Horn Antenna	Schwarzbeck	BBHA 9120D / BBHA9120D312	Jul., 2004
8		No.1 OATS			Sep., 2004

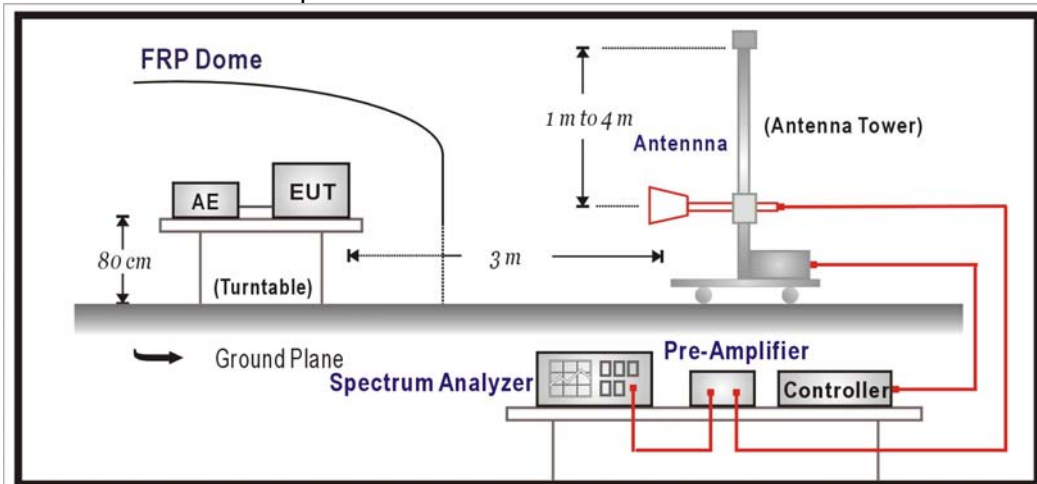
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.231 Limits				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.0	225	47.0
70-130	1250	62.0	125	42.0
130-174	1250-3750	62.0-71.5	125-375	42.0-51.5
174-260	3750	71.5	375	51.5
260-470	3750-12500	71.5-82.00	375-1250	51.5-62.0
above 470	12500	82.00	1250	62.0

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF 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 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 C63.4:2001 on radiated measurement.

On the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing a average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function.

When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

3.6. Test Result

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
=====							

Fundamental Radiated Emission

Horizontal

Peak

433.930 0.93 19.61 0.00 74.27 94.81 5.77 100.82

Peak = 94.81dBuV/m; Duty Cycle= 20 Log (0.046);

Average = Peak +Duty Cycle= 68.065 dBuV/m

Average Limit = 80.82 dBuV/m

Peak Limit = 80.82 + 20dB = 100.82 dBuV/m

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
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. If the readings given are average, peak measurement should also be supplied.

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

=====

Fundamental Radiated Emission

Vertical

Peak

433.930	0.93	17.86	0.00	74.54	93.33	7.25	100.82
---------	------	-------	------	-------	-------	------	--------

Peak = 93.33dBuV/m; Duty Cycle= 20 Log (0.046);

Average = Peak +Duty Cycle= 66.585 dBuV/m

Average Limit = 80.82 dBuV/m

Peak Limit = 80.82 + 20dB = 100.82 dBuV/m

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
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. If the readings given are average, peak measurement should also be supplied.

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
=====							
Horizontal							
Peak							
863.230	4.44	24.87	0.00	27.40	56.71	24.11	80.82
1301.340	1.29	24.65	31.92	38.14	32.16	41.84	74.00
1735.780	1.50	25.37	31.99	43.59	38.47	42.35	80.82
2169.840	1.68	26.46	31.96	36.52	< 32.71	48.11	80.82
2603.780	1.83	27.71	31.75	35.52	< 33.31	47.51	80.82
3037.740	1.98	28.26	31.51	37.28	< 36.00	44.82	80.82
3471.680	2.12	28.48	31.43	36.40	< 35.57	45.25	80.82
3905.640	2.25	29.45	31.59	35.19	< 35.30	38.70	74.00
4339.620	2.39	30.31	31.83	36.19	< 37.06	36.94	74.00

Note:

1. All Readings are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW: 100kHz (under 1GHz), 1MHz (above 1 GHz); VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
=====							
Vertical							
Peak							
863.230	4.44	24.52	0.00	24.60	53.56	27.26	80.82
1301.780	1.29	24.65	31.92	39.22	33.24	40.76	74.00
1735.860	1.50	25.37	31.99	47.11	41.99	38.83	80.82
2169.800	1.68	26.46	31.96	40.28	36.47	44.35	80.82
2603.820	1.83	27.71	31.75	40.50	< 38.29	42.53	80.82
3037.740	1.98	28.26	31.51	37.18	< 35.90	44.92	80.82
3471.700	2.12	28.48	31.43	36.34	< 35.51	45.31	80.82
3905.680	2.25	29.45	31.59	35.07	< 35.18	38.82	74.00
4339.600	2.39	30.31	31.83	35.23	< 36.10	37.90	74.00

Note:

1. All Readings are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW: 100kHz (under 1GHz), 1MHz (above 1 GHz); VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
=====							
Horizontal							
Quasi-Peak							
192.960	1.68	9.30	20.87	29.80	19.91	60.91	80.82
378.230	2.45	15.46	20.40	28.80	26.31	54.51	80.82
* 405.390	2.56	15.73	20.15	35.80	33.94	12.06	46.00
457.770	2.77	15.72	20.14	36.80	35.16	45.66	80.82
485.900	2.89	17.27	20.10	34.20	34.25	46.57	80.82
863.230	4.44	24.87	19.66	27.40	37.05	43.77	80.82

Note:

1. All Readings for restricted bands are Quasi-Peak, other are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
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. If the readings given are average, peak measurement should also be supplied.

Product	Wireless vehicle safety video system		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/06	Test Site	No.1 OATS

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
=====							
Vertical							
Quasi-Peak							
95.960	1.29	15.77	20.71	27.80	24.15	56.67	80.82
* 405.390	2.56	13.75	20.15	30.60	26.76	19.24	46.00
458.740	2.78	14.15	20.12	31.80	28.60	52.22	80.82
484.930	2.88	15.03	20.10	35.20	33.02	47.80	80.82
512.090	3.00	17.70	20.18	28.40	28.91	51.91	80.82
848.680	4.38	24.72	19.51	25.20	34.79	46.03	80.82

Note:

1. All Readings for restricted bands are Quasi-Peak, other are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
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. If the readings given are average, peak measurement should also be supplied.

4. Occupied Bandwidth

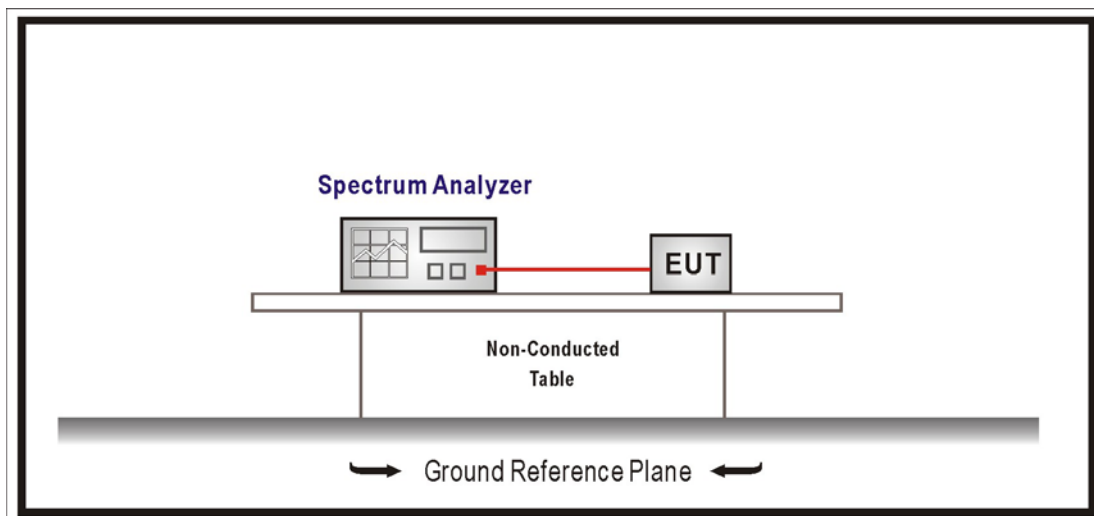
4.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2004
2	No.1 OATS			Sep., 2004

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

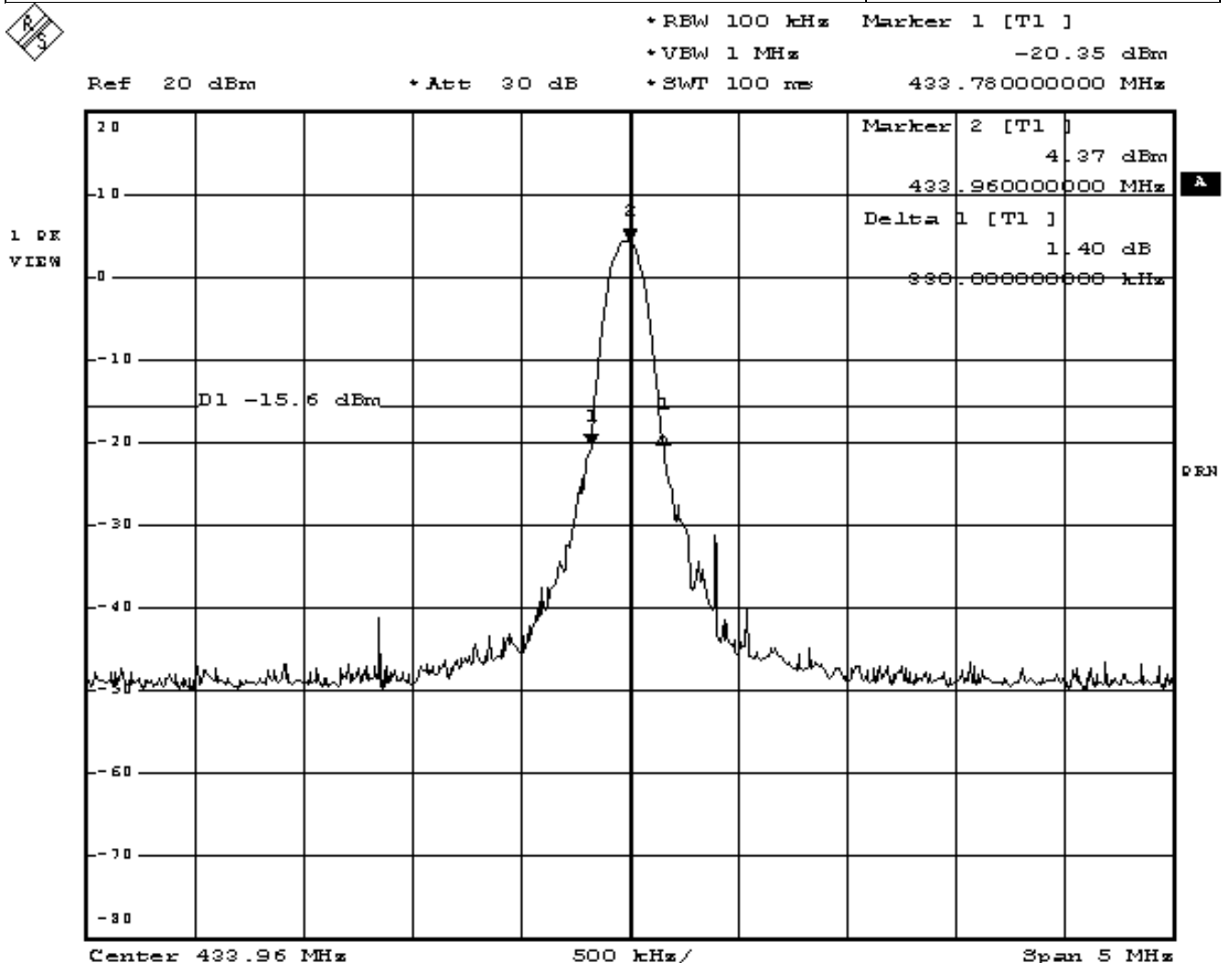
4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

4.5. Test Result

Product	Wireless vehicle safety video system		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/03	Test Site	No.1 OATS

Center Frequency	433.96 MHz
Allowable Bandwidth (70-900 MHz:0.25%, Above 900MHz: 0.5%)	1.0849 MHz
Bandwidth at 20dB down (Max)	330 kHz
Result	Complied with regulation



Date: 3.DEC.2004 12:20:15

5. Duty Cycle

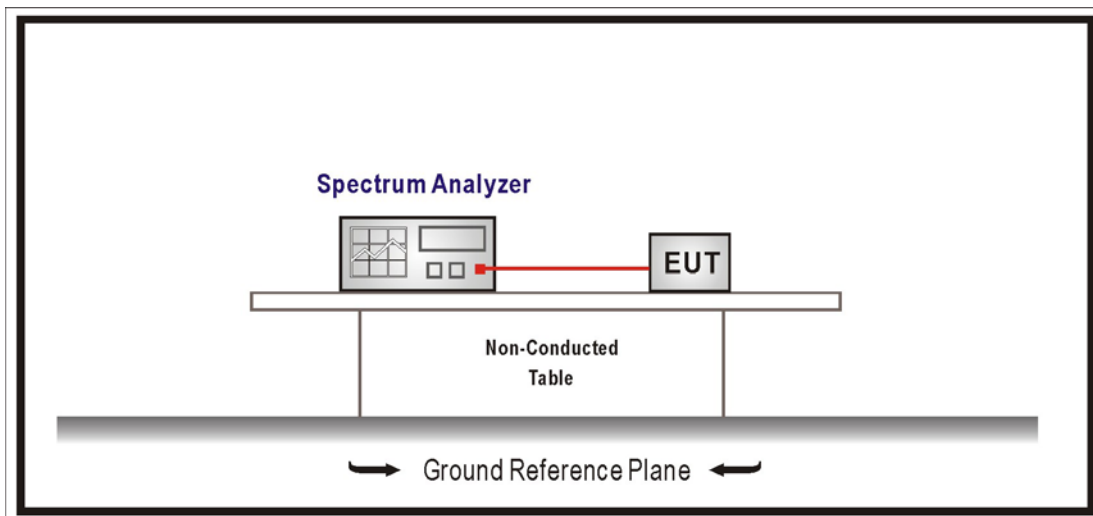
5.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2004
2	No.1 OATS			Sep., 2004

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup



5.3. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

5.4. Test Result

Product	Wireless vehicle safety video system,Wireless vehicle safety video system		
Test Item	Duty Cycle		
Test Mode	Mode 1: Transmit		
Date of Test	2004/12/03	Test Site	No.1 OATS

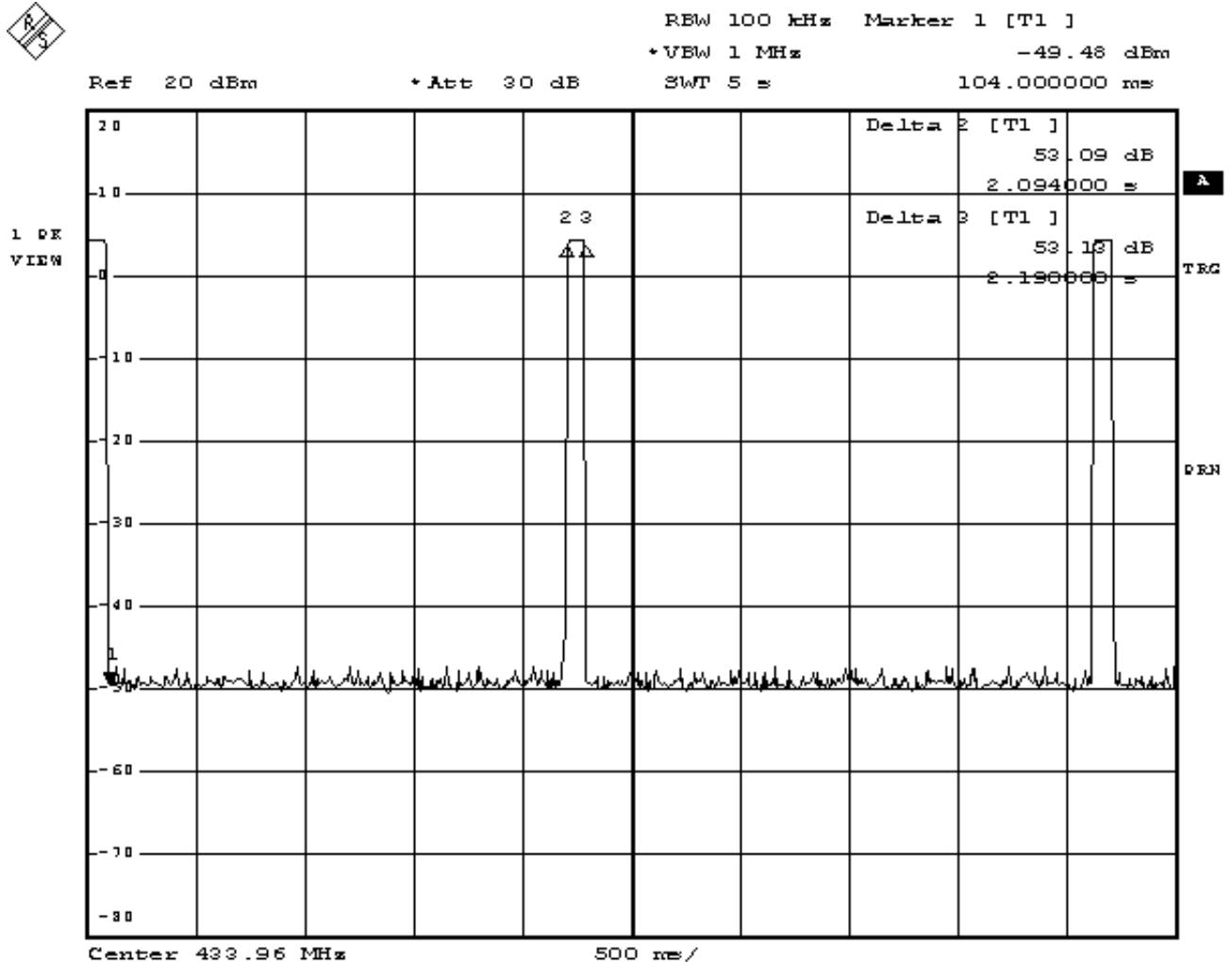
$$(T_{ON} + T_{OFF}) = 2.19 \text{ (s)} - 104 \text{ (ms)} = 2.086 \text{ (s)}$$

$$T_{ON} = 2.19 \text{ (s)} - 2.094 \text{ (s)} = 0.096 \text{ (s)}$$

$$T_{ON} / (T_{ON} + T_{OFF}) = 0.096 / 2.086 = 0.046$$

Result

Duty Cycle=0.046



Date: 3.DEC.2004 12:23:38