



Test Report

Product Name : 5.8GHz Video Sender
Model No. : AWW698, AWW602, AWW603, AWW604
FCC ID.: NGVAWW698RX

Applicant : AIRWAVE TECHNOLOGIES INC.
Address : 4F, NO.9, INDUSTRY E. RD. IX, SCIENCE-BASED
INDUSTRIAL PARK, HSINCHU, TAIWAN, R.O.C.

Date of Receipt : 2007/01/26
Issued Date : 2007/03/21
Report No. : 072H002-RFUSP04V01

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.

Test Report Certification

Issued Date : 2007/03/21

Report No. : 072H002-RFUSP04V01



QuieTek Corporation

Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : 5.8GHz Video Sender

Applicant : AIRWAVE TECHNOLOGIES INC.

Address : 4F, NO.9, INDUSTRY E. RD. IX, SCIENCE-BASED
INDUSTRIAL PARK, HSINCHU, TAIWAN, R.O.C.

Manufacturer : AIRWAVE TECHNOLOGIES INC.

Model No. : AWV698, AWV602, AWV603, AWV604

FCC ID. : NGVAWW698RX

Rated Voltage : AC 120V/60Hz

Trade Name : AIRWAVE

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.231

Measurement Procedure : ANSI C63.4:2003

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

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1. General Information

1.1. EUT Description

Product Name	5.8GHz Video Sender
Trade Name	AIRWAVE
Model No.	AWV698, AWV602, AWV603, AWV604
Frequency Range	433.05~434.79 MHz
Antenna Gain	0 dBi
Channel Number	1
Type of Modulation	ASK
Channel Control	Fixed
Antenna Type	Soldered on PCB

Component	
Power Adapter	DVE, DV-9300S /P: 120V / 60Hz O/P: 9V / 300mA Cable Out: Non-Shielded, 1.8m

Working Frequency of Each Channel	
Channel	Frequency
001	433.92 MHz

Note:

1. This device is a 5.8GHz Video Sender which including a 433MHz transmitting function.
2. The variation of model number is for different housing. The circuit of each model is identical.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
4. This device is a composite device in accordance with Part 15 regulations.
5. The function receiving was measured and made a test report that the report number is 072H002-RFUSP01V02 under Declaration of Conformity.
6. QuieTek had verified the construction and function in typical operation, then shown in this test report.

1.2. Operation Description

The EUT is a 433MHz transmitter. The infrared remote control signal can be transferred to 433MHz radio frequency in ASK modulation. The transmission antenna is soldered on the EUT.

1.3. Tested System Details

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	
EMI	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

Note: 1. In order to make EUT transmit, use remote-control signal to strike the IR window on EUT.

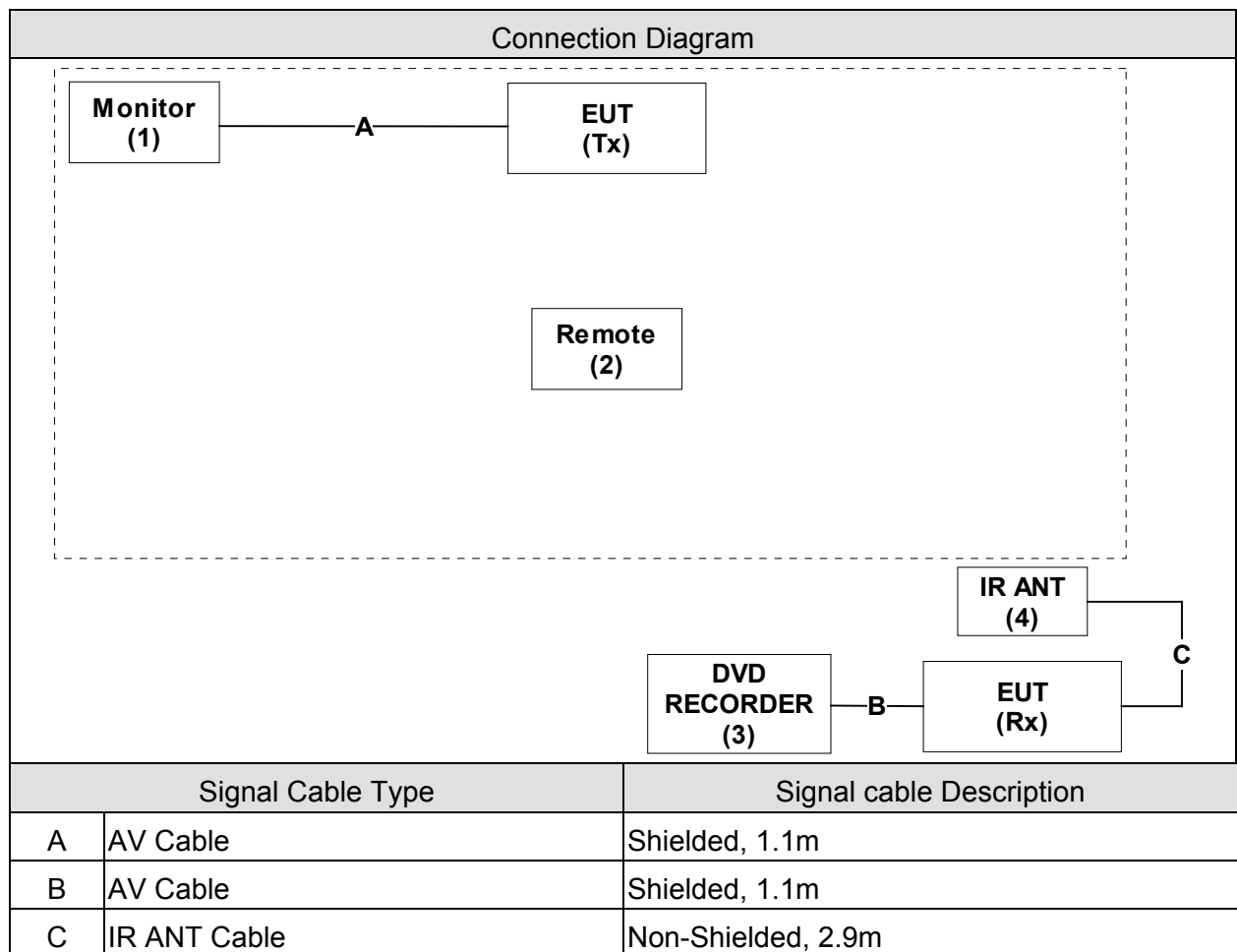
2. The EUT 's transmission activated automatically cease transmission within 5 seconds after activation.
3. This product sends out the periodic signal, but it is not regular predetermined Intervals

Tested System Details

The types for all equipment, 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	BRAND	15LCDMO3B SN FRD100078	DoC	Non-Shielded, 1.8m
2 Remote	SANSUI	AH59-00004L	N/A	DoC	--
3 DVD RECORDER	BenQ	JH300	99K1402200509 00001H	DoC	Non-Shielded, 1.8m
4 IR ANT	AIRWAVE	N/A	--	DoC	--

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT and display as shown on 1.4.
2	Turn on the power of all equipment.
3	The EUT(Tx) will start to remote control.
4	Repeat the above procedure (2) to (3)

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.231 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Band Edge (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Power Density (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

January 24, 2005 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520



Accredited by CNLA
Accreditation Number: 1313
Effective through: September 27, 2007



1313

ILAC MRA

Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2006



Site Name: Quietek Corporation
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2. Conducted Emission

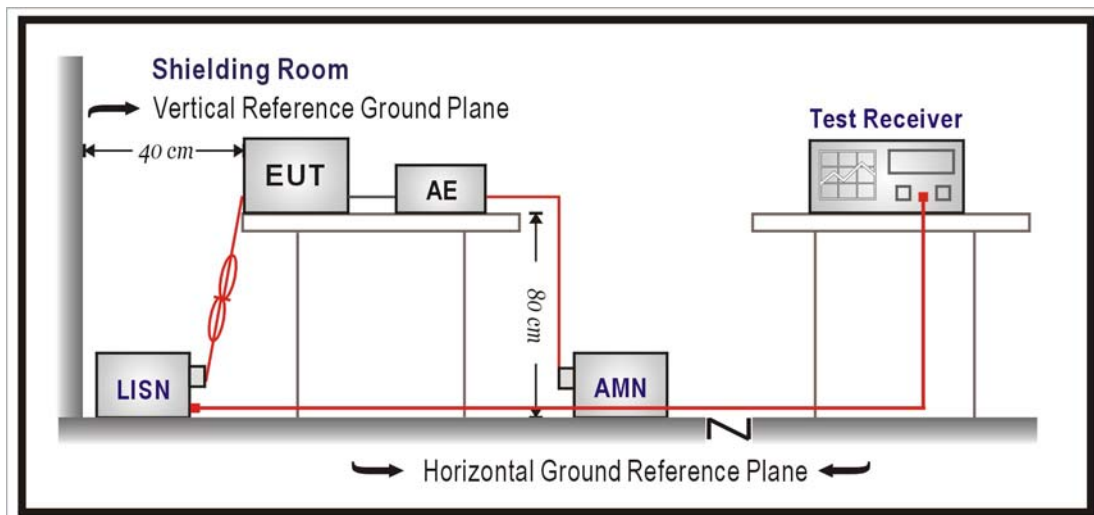
2.1. Test Equipment

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., 2006	
2	Artificial Mains Network	R & S	ENV4200/848411/10	Feb., 2007	Peripheral
3	LISN	R & S	ESH3-Z5/825562/002	Feb., 2007	EUT
4	Pulse Limiter	R & S	ESH3-Z2/357.8810.52	Feb., 2007	
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: 2003 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: 2005

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Product : 5.8GHz Video Sender
Test Item : Conducted Emission
Power Line : Line 1
Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m	Detector Type
Quasi-Peak						
0.166	0.142	38.440	38.582	-26.961	65.543	QUASIPeAK
0.291	0.174	35.420	35.594	-26.377	61.971	QUASIPeAK
0.517	0.210	21.300	21.510	-34.490	56.000	QUASIPeAK
1.474	0.310	15.010	15.320	-40.680	56.000	QUASIPeAK
5.259	0.490	7.910	8.400	-51.600	60.000	QUASIPeAK
14.603	0.850	9.390	10.240	-49.760	60.000	QUASIPeAK
Average						
0.166	0.142	10.940	11.082	-44.461	55.543	AVERAGE
0.291	0.174	9.920	10.094	-41.877	51.971	AVERAGE
0.517	0.210	3.420	3.630	-42.370	46.000	AVERAGE
1.474	0.310	2.890	3.200	-42.800	46.000	AVERAGE
5.259	0.490	3.310	3.800	-46.200	50.000	AVERAGE
14.603	0.850	4.740	5.590	-44.410	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : 5.8GHz Video Sender
Test Item : Conducted Emission
Power Line : Line 2
Test Mode : Mode 1: Transmit

Frequency	Correct	Reading	Measuremen	Margin	Limit	Detector
MHz	Factor	Level	t Level			Type
	dB	dBuV	dBuV/m	dB	dBuV/m	
Quasi-Peak						
0.236	0.160	37.440	37.600	-25.943	63.543	QUASIPeAK
0.345	0.190	35.100	35.290	-25.139	60.429	QUASIPeAK
0.564	0.210	18.320	18.530	-37.470	56.000	QUASIPeAK
0.880	0.230	20.100	20.330	-35.670	56.000	QUASIPeAK
1.478	0.310	15.250	15.560	-40.440	56.000	QUASIPeAK
4.298	0.447	7.700	8.147	-47.853	56.000	QUASIPeAK
Average						
0.236	0.160	10.380	10.540	-43.003	53.543	AVERAGE
0.345	0.190	8.960	9.150	-41.279	50.429	AVERAGE
0.564	0.210	3.600	3.810	-42.190	46.000	AVERAGE
0.880	0.230	3.620	3.850	-42.150	46.000	AVERAGE
1.478	0.310	3.380	3.690	-42.310	46.000	AVERAGE
4.298	0.447	3.480	3.927	-42.073	46.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

3. Radiated Emission

3.1. Test Equipment

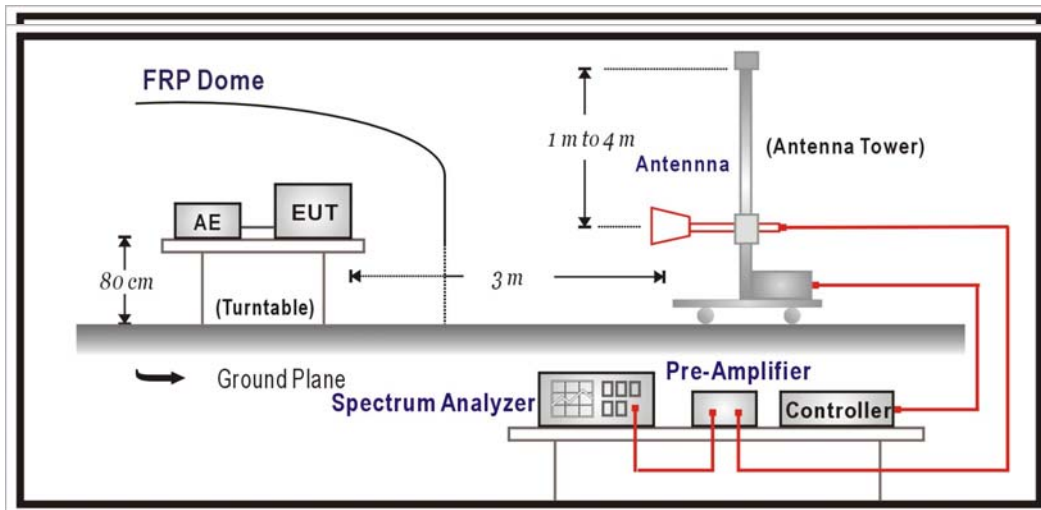
The following test equipment are used during the test:

Item		Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	X	Test Receiver	R & S	ESCS 30 / 825442/017	Jan., 2007
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., 2006
5	X	Spectrum Analyzer	R & S	FSP40 / 100005	Aug., 2006
6	X	Pre-Amplifier	HP	8449B / 3008A01123	Feb., 2006
7	X	Horn Antenna	Schwarzbeck	BBHA 9120D / BBHA9120D312	Jul., 2006
8		No.1 OATS			Sep., 2006

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. "N/A" Ca1.Date is used to Pre-test, not final test.

3.2. Test Setup

Under 1GHz Test Setup:



3.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.231 Limit

FCC Part 15 Subpart C Paragraph 15.231 Limits				
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	82.0	1250	62.0

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

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency (MHz)	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
 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 C63.4:2003 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 Specification

According to FCC Part 15 Subpart C Paragraph 15.209 and 15.231

3.6. Uncertainty

The measurement uncertainty is defined as ± 3.9 dB above 1GHz

The measurement uncertainty is defined as ± 3.8 dB below 1GHz

3.7. Test Result

Product : 5.8GHz Video Sender
 Test Item : Fundamental Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmit

Frequency	Correct	Reading	Measurement	Margin	Limit	Limit
MHz	Factor	Level	Level		(Average)	(Peak)
	dB	dBuV	dBuV/m	dB	dBuV/m	dBuV/m

Horizontal

Peak Detector:

433.900	24.200	67.310	91.510	10.685	80.825	100.825
---------	--------	--------	--------	--------	--------	---------

Peak = 91.510 dBuV/m

Duty Cycle = 0.254 = 20 Log(0.254) = -11.9 dB

Average = Peak + Duty Cycle = 79.61 dBuV/m

Average Limit = 41.6667*(433.900 MHz) – 7083.333 = 10995.848 uV/m = 80.825 dBuV/m

Peak Limit = 80.825 + 20dB = 100.825 dBuV/m

Frequency	Correct	Reading	Measurement	Margin	Limit	Limit
MHz	Factor	Level	Level		(Average)	(Peak)
	dB	dBuV	dBuV/m	dB	dBuV/m	dBuV/m

Vertical

Peak Detector:

433.900	16.394	65.030	81.424	0.599	80.825	100.825
---------	--------	--------	--------	-------	--------	---------

Peak = 81.424 dBuV/m

Duty Cycle = 0.254 = 20 Log(0.254) = -11.9 dB

Average = Peak + Duty Cycle = 69.524 dBuV/m

Average Limit = 41.6667*(433.900 MHz) – 7083.333 = 10995.848 uV/m = 80.825 dBuV/m

Peak Limit = 80.825 + 20dB = 100.825 dBuV/m

Note:

1. All Reading Levels are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Probe Factor + Cable Loss.

Product : 5.8GHz Video Sender
Test Item : Harmonic Radiated Emission
Test Site : No.1 OATS
Test Mode : Mode 1: Transmit

Frequency	Correct	Reading	Measurement	Margin	Limit	Detector
MHz	Factor	Level	Level		(Average)	Type
	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
1299.100	-8.854	36.680	27.826	-34.104	61.930	PEAK
1732.500	-6.979	36.720	29.741	-32.189	61.930	PEAK
2165.400	-3.661	37.100	33.439	-28.491	61.930	PEAK
2598.400	-1.789	37.300	35.511	-26.419	61.930	PEAK
2648.300	-1.671	40.230	38.558	-23.372	61.930	PEAK
3031.200	-0.560	37.300	36.740	-25.190	61.930	PEAK
3464.100	0.118	35.910	36.028	-25.902	61.930	PEAK
3897.200	1.213	35.650	36.864	-25.066	61.930	PEAK
4330.500	2.394	34.520	36.915	-25.015	61.930	PEAK
Vertical						
1299.030	-8.054	37.350	29.296	-32.634	61.930	PEAK
1732.010	-6.179	36.440	30.261	-31.669	61.930	PEAK
2165.300	-5.262	36.590	31.328	-30.602	61.930	PEAK
2598.300	-3.389	36.790	33.401	-28.529	61.930	PEAK
2648.300	-3.271	40.520	37.248	-24.682	61.930	PEAK
3031.500	-0.560	35.720	35.160	-26.770	61.930	PEAK
3464.010	0.118	35.200	35.318	-26.612	61.930	PEAK
3897.230	0.347	35.060	35.406	-26.524	61.930	PEAK
4330.120	0.594	34.750	35.343	-26.587	61.930	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
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 : 5.8GHz Video Sender
Test Item : General Radiated Emission
Test Site : No.1 OATS
Test Mode : Transmitter

Frequency	Correct	Reading	Measurement	Margin	Limit	Detector
MHz	Factor	Level	Level			Type
	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
300.200	-3.511	25.756	22.245	-31.235	53.480	Quasi-Peak
397.395	1.158	31.599	32.757	-25.560	58.317	Quasi-Peak
426.553	-1.110	53.742	52.633	-7.135	59.768	Quasi-Peak
469.319	1.509	44.253	45.762	-16.134	61.896	Quasi-Peak
652.044	0.333	31.037	31.370	-30.560	61.930	Quasi-Peak
867.816	4.980	46.012	50.992	-10.938	61.930	Quasi-Peak
Vertical						
203.006	-3.127	25.620	22.493	-28.987	51.480	Quasi-Peak
426.553	-3.862	51.670	47.808	-11.960	59.768	Quasi-Peak
479.038	-3.577	39.012	35.435	-26.495	61.930	Quasi-Peak
587.896	2.684	25.894	28.578	-33.352	61.930	Quasi-Peak
867.816	3.276	38.039	41.315	-20.615	61.930	Quasi-Peak
937.796	9.020	25.727	34.747	-27.183	61.930	Quasi-Peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above 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. Occupied Bandwidth

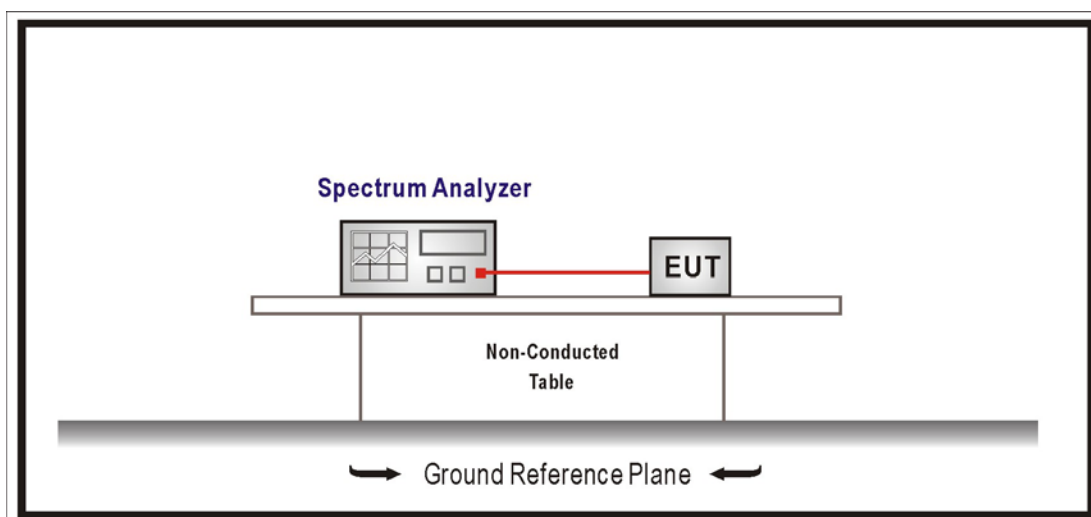
4.1. Test Equipment

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., 2006
2	No.1 OATS			Sep., 2006

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 70 MHz and below 900 MHz. For devices operating above 900 MHz, 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.

For frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231

4.5. Uncertainty

The measurement uncertainty is defined as $\pm 50\text{kHz}$

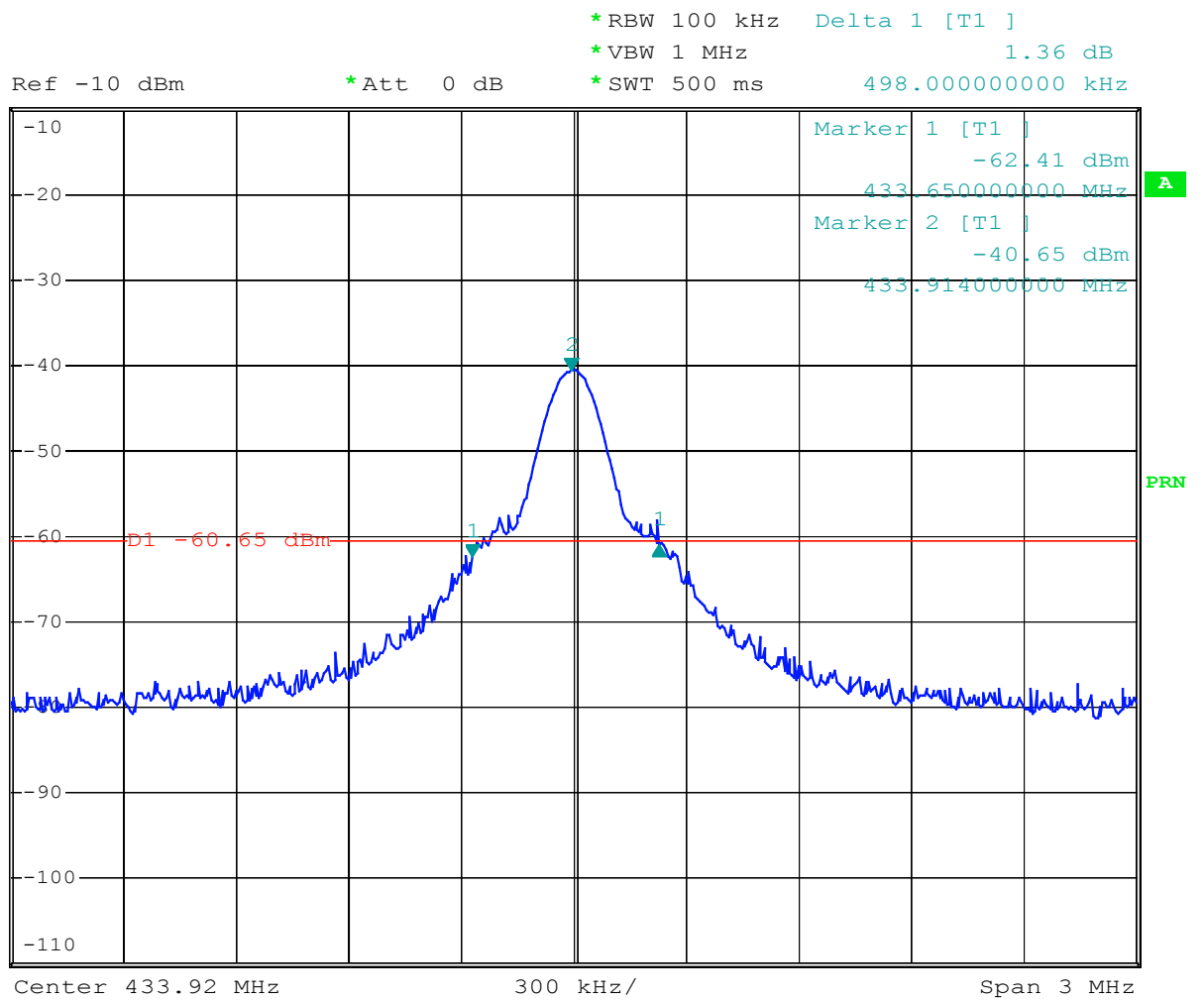
4.6. Test Result of Occupied Bandwidth

Product : 5.8GHz Video Sender
Test Item : Occupied Bandwidth
Test Site : No.1 OATS
Test Mode : Mode 1: Transmit

Center Frequency	433.914	MHz
Allowable Bandwidth (70-900 MHz:0.25%, Above 900MHz: 0.5%)	1.0848	MHz
Bandwidth at 20dB down (Max)	498	kHz
Result	Complied with regulation	



1 PK
VIEW



Date: 1.JAN.2000 22:40:11

5. Duty Cycle

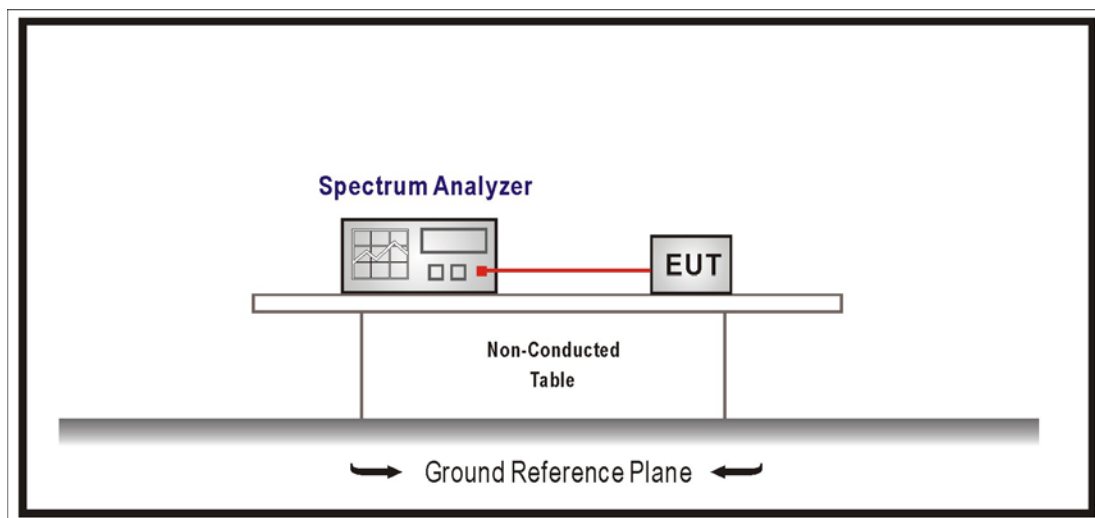
5.1. Test Equipment

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., 2006
2	No.1 OATS			Sep., 2006

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

5.2. Test Setup

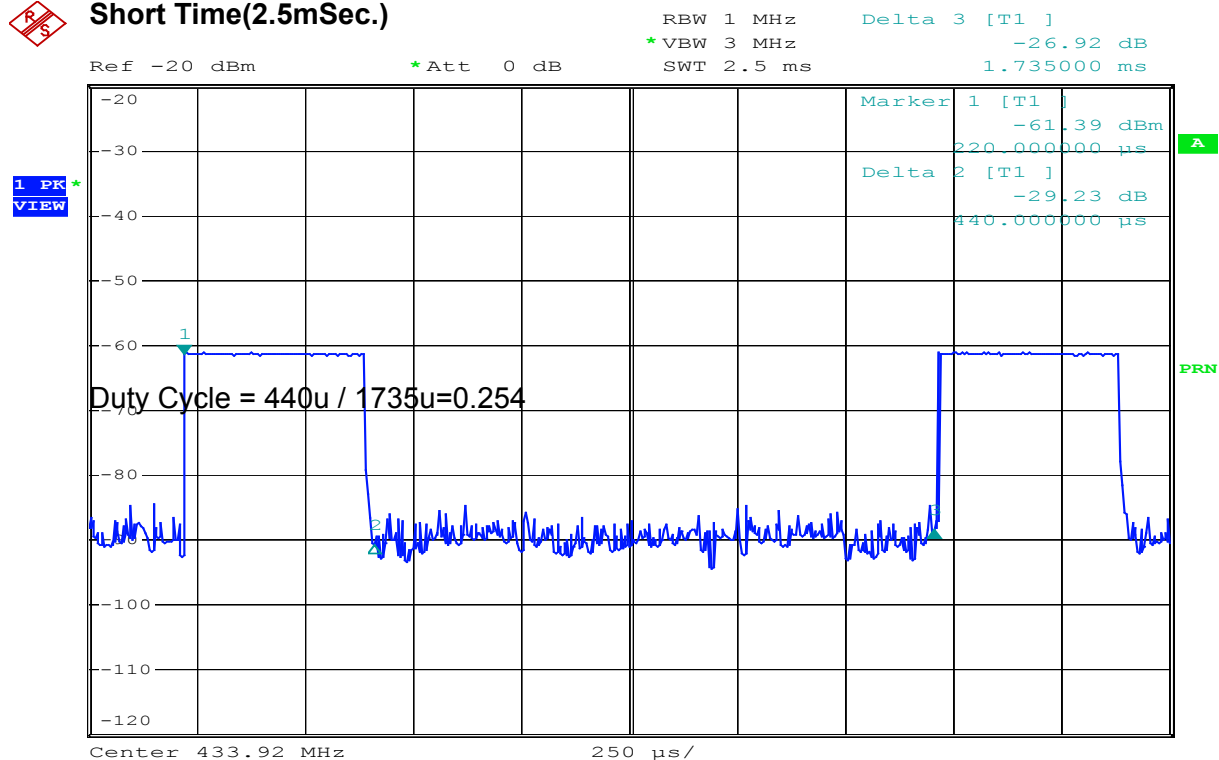


5.3. Test Result of Duty Cycle

Product : 5.8GHz Video Sender
 Test Item : Duty Cycle
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmit



Short Time(2.5mSec.)

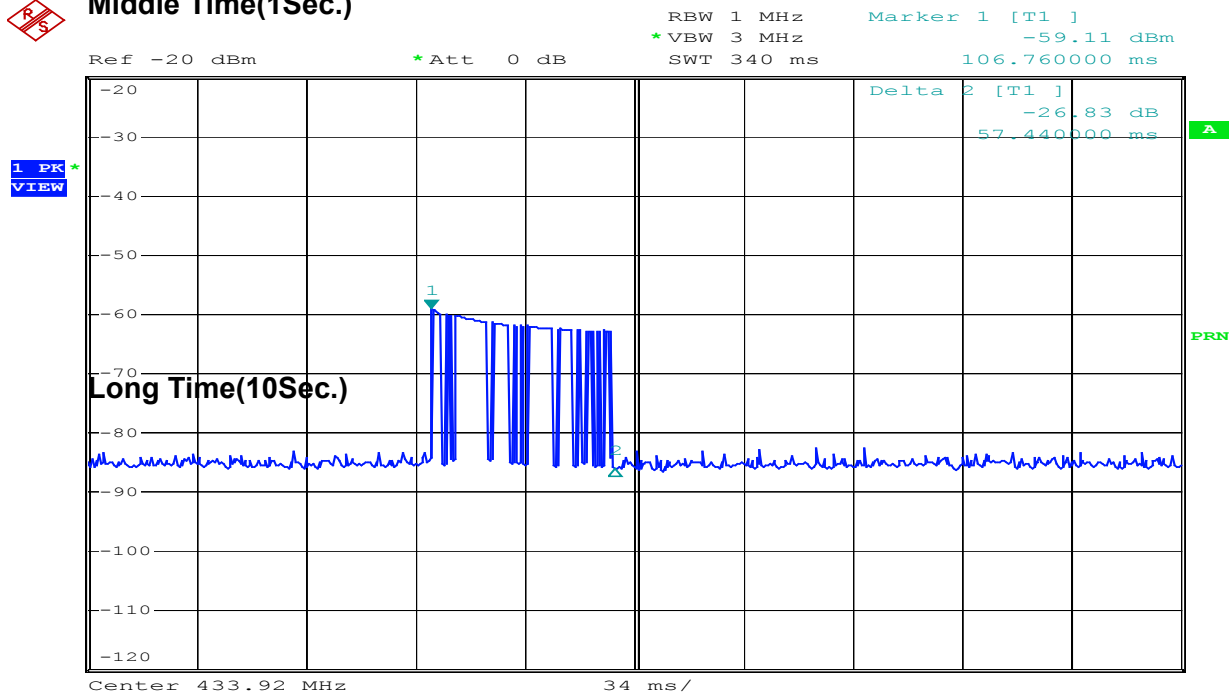


Date: 18.APR.2007 15:56:58

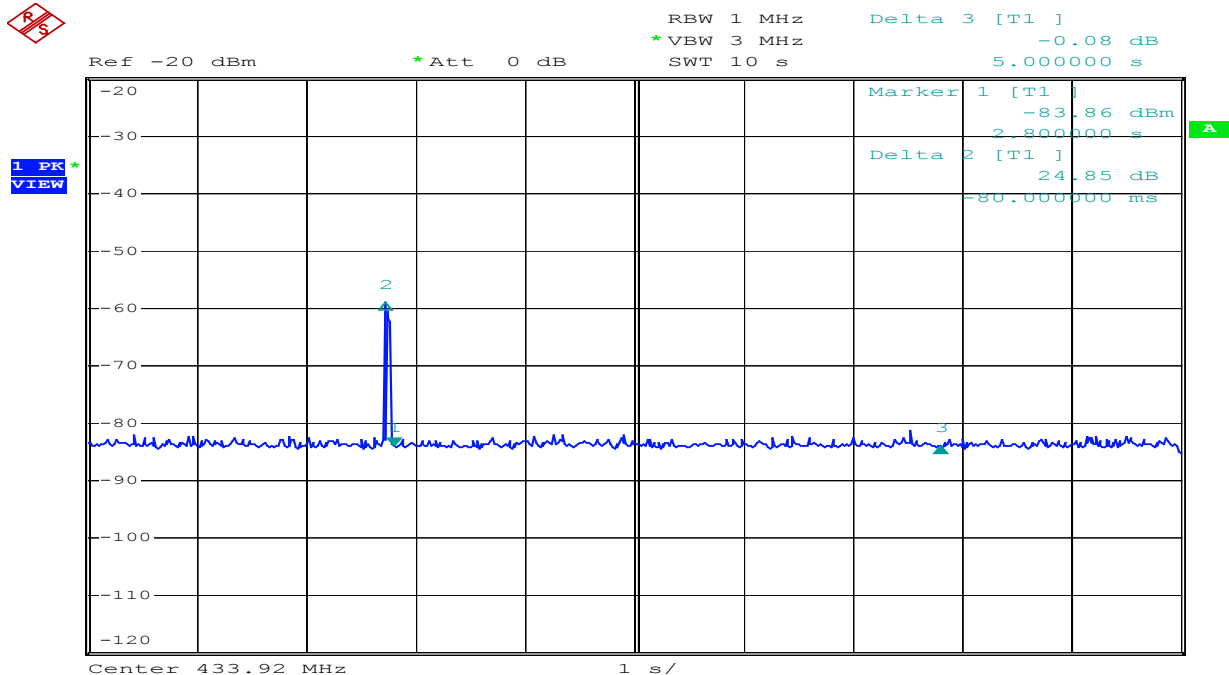
Results: 1. The EUT sends out the periodic signal, but not exceeds 57.44msec.



Middle Time(1Sec.)



Date: 18.APR.2007 16:10:51



Date: 18.APR.2007 13:14:30

2. Transmitter is deactivated automatically within no more than 5 seconds of being released.

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.