JQA JAPAN QUALITY ASSURANCE ORGANIZATION
KITA-KANSAI TESTING CENTER
7-7, Ishimaru 1-Chome, Minoh-shi, Osaka 562 Japan. Phone.+81-727-29-2243/Facsimile. +81-727-28-6848

EMC EMISSION - TEST REPORT

JQA APPLICATION No.	:	KL8080617
Model/Type No.	:	VRA671AT21
Name of Product	:	Video Cassette Recorder / Remote Locator (Intentional Radiator)
FCC ID	:	ADTVRA671
Applicant	:	FUNAI ELECTRIC CO., LTD.
Address	:	7-1, 7-chome, Nakagaito, Daito-shi, Osaka, Japan
Manufacturer	:	FUNAI ELECTRIC CO., LTD.
Address	:	7-1, 7-chome, Nakagaito, Daito-shi, Osaka, Japan
Final Judgement	:	**Passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electro-technical Lab. of MITI Japan and Comminications Research Lab. of PTT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

JAPAN QUALITY ASSURANCE ORGANIZATION (JQA)
KITA-KANSAI TESTING CENTER
EMC DIVISION

NVLAP®
LAB CODE: 200191-0

DIRECTORY

DIRECTORY

TEST CONDITIONS

The measurement of the Conducted Emission (Disturbance Voltage)
was performed in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan
● - Shielded room
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - Shielded room
○ - On metal plane of open site

Used test instruments and sites:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
○ - ESH 3	A - 1		
● - ESH 2	A - 2	December, 1998	1 Year
○ - ESH 2	A - 3		
● - KNW-407	D - 6	February, 1998	1 Year
○ - KNW-408	D - 11		
○ - KNW-242	D - 7		
○ - ESH3-Z5	D - 12		
○ - KNW-341C	D - 13		
○ - KNW-408	D - 14		
○ - KNW-244C	D - 77		
○ - KNW-408	D - 78		
○ - ESH2-Z5	D - 10		
○ - ESH2-Z3	D - 17		
○ - 8568B	A - 10		
○ - 8566B	A - 13		
○ - 8593A	A - 15		
● - Cable	H - 8	February, 1998	1 Year

Environmental conditions:

Temperature: 19 °C Humidity: 27 %

The measurement of the Radiated Emission (Magnetic Field)
was performed in the frequency range of 9 kHz - 30 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan
● - 1st site (3 meters)
○ - 2nd site (3 meters)
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - 3 meters
○ - 10 meters
○ - 30 meters

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
○ - ESH 3	A - 1		
● - ESH 2	A - 2	December, 1998	1 Year
○ - ESH 2	A - 3		
● - HFH2-Z2	C - 2	September, 1998	1 Year
○ - HFH2-Z2	C - 3		

Environmental conditions:

Temperature: 18 °C Humidity: 38 %

The measurement of the Radiated Emission (Electric Field)
was performed in horizontal and vertical polarization, in the frequency range of 30 MHz - 1000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan
● - 1st site (3 meters)
○ - 2nd site (3 meters)
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - 3 meters
○ - 10 meters

Validation of Site Attenuation:

1) Last Confirmed Date: November 27, 1998
2) Interval : 1 Year

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - ESV/ESV-Z3	A - 7 / A - 17	December, 1998	1 Year
○ - ESV/ESV-Z3	A - 6 / A - 18		
○ - ESV/ESV-Z3	A - 5 / A - 16		
○ - ESV/ESV-Z3	A - 4 / A - 20		
○ - ESV/ESV-Z3	A - 8 / A - 19		
● - KBA-511A	C - 12	November, 1998	1 Year
● - KBA-611	C - 22	November, 1998	1 Year
○ - KBA-511A	C - 13		
○ - KBA-611	C - 19		
○ - KBA-511A	C - 11		
○ - KBA-611	C - 21		
● - Cable	H - 5	November, 1998	1 Year

Environmental conditions:

Temperature: 18 °C Humidity: 38 %

The measurement of the Radiated Emission (Electric Field)

was performed in horizontal and vertical polarization, in the frequency range of 1 GHz - 4 GHz, in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan
● - 1st site (3 meters)
○ - 2nd site (3 meters)
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - 3 meters
○ - 10 meters

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - 8566B	A - 13	October, 1998	1 Year
○ - 8593A	A - 15		
○ - ESV	A - 5		
● - 4T-10	D - 73	May, 1998	1 Year
● - 4T-10	D - 74	May, 1998	1 Year
● - WJ-6611-513	A - 23	May, 1998	1 Year
● - WJ-6882-824	A - 21	May, 1998	1 Year
○ - DBL-0618N515	A - 33		
● - 91888-2	C - 41 - 1	May, 1998	1 Year
● - 91889-2	C - 41 - 2	May, 1998	1 Year
● - 94613-1	C - 41 - 3	May, 1998	1 Year
○ - 91891-2	C - 41 - 4		
○ - 94614-1	C - 41 - 5		
○ - 3160-09	C - 48		
○ - TRA-603D	D - 24		
○ - 8494H/8595H	D - 76		
○ - MZ5010C	D - 81		
● - Cable	C - 40 - 11	May, 1998	1 Year
● - Cable	C - 40 - 12	May, 1998	1 Year

Setting of the spectrum analyzer:

RES B.W : 1 MHz Video B.W : 1 MHz
SCALE : LINEAR Sweep Time: 20 msec.

Environmental conditions:

Temperature: 18 °C Humidity: 38 %

The measurement of the Ocupied Bandwidth
was performed in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan
○ - 1st site
○ - 2nd site
● - Shielded room
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - Open site
○ - Shielded room

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - 8568B	A - 10	May, 1998	1 Year
○ - 8566B	A - 13		
○ - 8593A	A - 15		
○ - 8673D	B - 2		
● - TR5212	B - 30	March, 1998	1 Year
● - KBA-511A	C - 16		
○ - KBA-611	C - 18	November, 1998	1 Year
○ - 2-10	D - 40		
○ - TRA-603D	D - 24		
○ - 8494H/8595H	D - 76		

Setting of the spectrum analyzer:

RES B.W.: 100 kHz Video B.W.: 3 MHz
SCALE : LOG 10dB/div Sweep Time: 1.5 sec.

Environmental conditions:

Temperature: 24 °C Humidity: 46 %

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
Video Cassette Recorder	FUNAI ELECTRIC CO., LTD. (FUNAI ELECTRIC CO., LTD.)	VRA671AT21 (00003)	ADTVRA671

The measurement was carried out with the following equipment connected:

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
None			

Type of Interference Cable(s) and the AC Power Cord used with the EUT:

No.	Cable	Shielded	Ferrite Core	Length
1	EUT (VIDEO INPUT (Rear)) / 75Ω termination	--	--	-- m
2	EUT (VIDEO INPUT (Front)) / 75Ω termination	--	--	-- m
3	EUT (VIDEO OUTPUT) / 75Ω termination	YES	NO	1.0m
4	EUT (AUDIO INPUT L/R (Rear)) / No termination	--	--	-- m
5	EUT (AUDIO INPUT L/R (Front)) / No termination	--	--	-- m
6	EUT (AUDIO OUTPUT L/R) / No termination	YES	NO	1.0m
7	EUT (ANTENNA INPUT) / 75Ω termination	--	--	-- m
8	EUT (RF OUTPUT) / 75Ω termination	YES	NO	1.0m
9	AC Power Cord (EUT) with 2-pin plug	NO	NO	1.5m

Operation - mode of the EUT:

The equipment under test was operated during the measurement under the following specification:

The transmitter operation of the EUT is designed as the period within 4.9 seconds after power switching ON, therefore the EUT was modified to be continuously transmitted during the test.

The code of pulse operation, as command code "02", was set to obtain the maximum duty rate (Setting rate 55%).

Test system:

The EUT has ports shown as follows:

F-Type Plugs : ANTENNA IN, RF OUT
Pin Plugs : VIDEO IN (Front/Rear), AUDIO IN L/R (Front/Rear), VIDEO OUT, AUDIO OUT L/R

Special accessories:

None

The used (generated) frequencies in the EUT:

Center Frequency of transmitting : 390 MHz

System Control : 14.3 MHz
Color Carrier : 3.58 MHz
Clock : 32 kHz

EUT Modification

● - No modifications were conducted by JQA to achive compliance to applied levels.

○ - To achieve compliance to applied levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A

Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsibe party :

Contact Person : _____
Signatory

TEST RESULTS

Conducted Emission 450 kHz - 30 MHz

The requirements are ● - KEPT ○ - NOT KEPT

Min. limit margin + 8.9 dB at 0.45 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results + 2.1 dB(2σ) - 2.1 dB(2σ)

Remarks: _____

_____

Radiated Emission (Electric Field) 9 kHz - 4 GHz

The requirements are ● - KEPT ○ - NOT KEPT

Min. limit margin + 6.9 dB at 780.0 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results			
9 kHz - 30 MHz	+ 2.5 dB(2σ)	- 2.5 dB(2σ)
30 MHz - 1 GHz	+ 4.1 dB(2σ)	- 4.2 dB(2σ)
1 GHz - 10 GHz	+ 3.1 dB(2σ)	- 3.2 dB(2σ)

Remarks: _____

_____

Ocupied Bandwidth

The requirements are ● - KEPT ○ - NOT KEPT

Results Refer to pages 25 - 26

Uncertainty of measurement results ±0.05 ppm(2σ)

Remarks: _____

_____

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (April 17, 1997) under the test configuration, as shown in page 14.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;

● - fulfill the test requirements of the regulation mentioned on page 3.

○ - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.

○ - doesn't fulfill the test regulation mentioned on page 3.

Begin of testing : January 5, 1999

End of testing : January 14, 1999

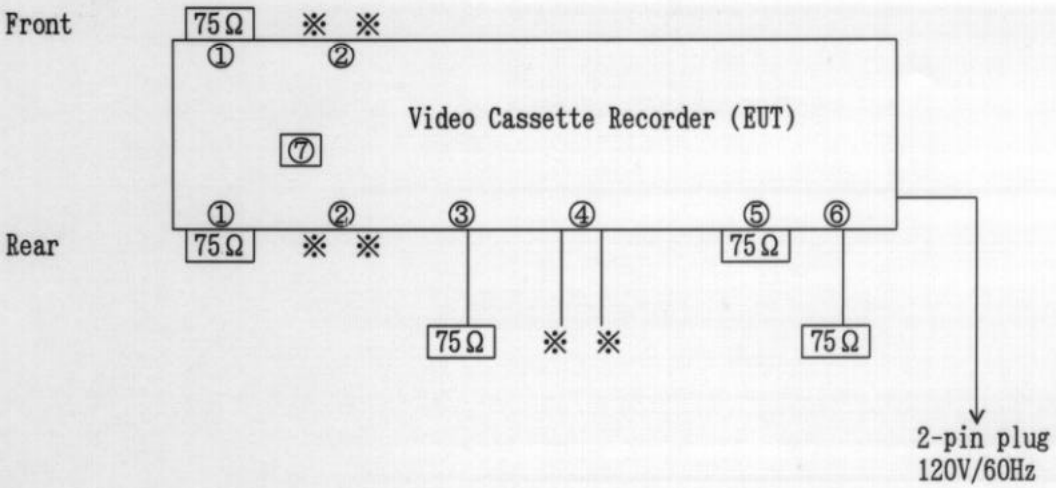
- JAPAN QUALITY ASSURANCE ORGANIZATION -

Takashi Yamanaka
Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Approved Signatory :

Akio Hosoda
Project Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)



Note)
※ - No termination
① - VIDEO INPUT
② - AUDIO INPUT L/R
③ - VIDEO OUTPUT
④ - AUDIO OUTPUT L/R
⑤ - ANTENNA INPUT
⑥ - RF OUTPUT
⑦ - Channel Selector Switch (3ch and 4ch)

Preliminary Test and Test-setup(Drawings)

Conducted Emission 450 kHz - 30 MHz:

The preliminary test was performed according to the description of ANSI C63.4-1992 Sec.7.2.3 (Preliminary AC Powerline Conducted Emissions Tests) and Sec.6.2.1 (Tabletop Equipment Tests). The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

Step 2: Using both of a spectrum analyzer and a test receiver, the emission's circumstance from the system was monitored in one of ten divided frequency bands of the specified frequency range (450 kHz - 30 MHz). The maximum emission in the band was found by changing the typical cable positions or cable manipulation under a typical system configuration and by selecting of current-carrying conductor. The level and the frequency at the one point which are regarded as relative high emission in the band was measured and recorded. This step was repeated until the ending frequency band.

Step 3: Return to step 1, if the other operation mode was possible to be setting.

Step 4: Based on the collected results, the operation mode produced the maximum emission was selected. The final test on the selected operation mode was performed. But if it was difficult to select the operation mode, the final tests on all operation modes were performed.

Step 5: Based on the same data, as result if the final measurement, at the worst point that has the highest amplitude relative to the limit the repeatability of the worst was reconfirmed. The photographs of the test system setup on the worst point were taken and recorded.