3. Explanation of Model No. VC-H998U with Supplemental Photo

(1) The full name and complete address of the manufacturer of the device.

(a) Name

SHARP CORPORATION

(B) Adress

174 Hayakawa-cho, Yaita-shi, Tochigi, 329-2193, Japan.

(2) Trade name, if any, under which the device will be marketed.

SHARP

(3) Model number

VC-H998U

(4) List any additional model number and/or trade names under which the device will be marketed.

N/A

(5) For a device other than an FM or TV brodecast receiver, attach a copy of the installation and operating instructions furnished to the user.

Attached

(6) For a device used in decoding the Emergency Brodecast System Attention Signals defined in "73.906" the value of the necessary voltage (RMS) or range of voltages of the attention signal to be applied to the input terminals of the decorder which will cause the desired response of the device shall be submitted to the commission with the certification data.

Attached

(7) This model has converter so that playback is possible through ordinary TV sets without any additional accessory.

* Refer to photo 1 ····· a : RF Converter of Type No. VTUENG56701-1
(This tuner and the RF converter are built in one body.)

(a) "VHF OUT" channel selection

RF converter channel selection is pre-set to channel 3 at factory.
Reset the channel to 4 if channel 3 is used for the TV broadcasting in your area.

* Refer to photo 2 ····· a : RF Converter Channel Select Switch

(b) "TV/VCR" Select Switch
The select VIDEO (VCR) mode or TV mode can be made by "TV/VCR" that is provided at the remote control unit, and further, when play mode key is pushed, it selects automatically the VIDEO (VCR) mode.

* Refer to photo 3 ····· a : TV/VCR Selector

(c) Antenna circuit block diagram

* Refer to Attachment 1

(d) RF Converter block diagram

* Refer to Attachment 2 ····· RF Converter Type No. VTUENG56701-1

(8) RF Converter (Type No.: VTUENG56701-1, Mfr's name: Matsushita Elec.)
(This tuner and the RF converter are built in one body.)

(a) Type of emission

Video Modulation Type : A5
Polarity of Video modulation : Negative
Audio Modulation Type : F3, ±25 kHz, 75 μsec preemphasis
Color Standard : NTSC Standard

(b) Frequency range

US CH. No. 3 : 60 MHz - 66 MHz
US CH. No. 4 : 66 MHz - 72 MHz

(c) Range of operating power and description of means provided for variation of operating power

: Not Application

(d) Maximum power rating as defined in applicable rules :

US CH. No. 3 : 69.5 dBμ
US CH. No. 4 : 69.5 dBμ

(e) The Voltage and Current to Converter : 5 V DC 40 mA

(f) Function of each electrontube, semiconductor or other active circuit device :

Q1 - Q3 : Switching ..... 2SC4965 (Hitachi Ltd.)
2SC4774 (Rohm Co., Ltd.)

IC1 : Video Clamper ..... AN3117SA (Matsushita Elec.)

Video carrier OSC.
Video carrier Limiter
Video Modulation
Audio CH. Converter
Audio Amplifier
4.5 MHz OSC. (Frequency Modulation)
CH. Switching

Description of circuit function

Refer to Attachment and RF converter circuit diagram. Video signal comes from the "VIDEO IN" terminal, which then passes through the resistance devider (R10) and goes into pin No.16 on IC1. The pin No.16 on IC1 is an input gate for Video als; the Video signal hence passes through the clamper and white clip, and is supplies to the Video-modulator.
The Video carrier is made by the oscillator (a transistor for which is in cooperated to the IC1), using the SAW Resonator(X1).

The Video Carrier is supplied, through the carrier limiter inside IC1, to the Video modulator, where the modulator also is incorporated to IC1.

The modulated signal comes out from the pin No.15 with C15 in series, and is suppied to "VHF OUT" through the attenuator (R13), the band pass filter (L7, C17 and C18) and the switching trnasistor (Q3).

Audio signal comes from the "AUDIO IN" terminal, followed by R5, C9, C10, and R7 which has 75 μsec pre-emphasis time constant, and is supplied to the pin No.6 on IC1.

The pin No.6 on IC1 is an audio input terminal; the audio signal having 75 μsec pre-emphasis time constant is supplied to 4.5 MHz oscillator after being amplified in the audio amp.
The oscillator of 4.5 MHz consists of T1 and a transistor integrated in IC1.

The 4.5 MHz signal, having been modulated, forms an audio carrier by going through the frequency converter and comes out from the pin No.15 on IC1, and is mixed with the video modulated signal through the attenator (R13).

The power supply is regulated by the IC1. Channel selection is done by the slide switch (S101) in Main PWB, that selects the Video carrier by either impressing a voltage on the pin No. 7 or shorting the same, since there is a switching circuit inside the IC1.

(g) Complete Schematic diagram : Attached

(h) Operation manual : Attached

(i) Tune up procedure over the power range or at specific operating power level : Not Adjustable

(j) A description of all circuit and devices provided for determing and stabilizing frequency :

In order to perform a good reguration of the video carrier, the oscillator employs a SAW Resonator (X1). An inter-carrier is formed by a LC oscillator, since the capacitor in T1 has the temperature constant RH (N220 ±60 PPM / deg C), drift due to temperature change is small. To protect effects from the outside power source, the internal circuits are supplied their power through a regulator.

(k) A description of any circuit or devices employed for suppression of sprious radiation, for limiting modulation, and limiting the operation power :

Suppression of sprious radiation

The oscillator circuit are designed to get oscillator power as small as possible.
And on the "VHF OUT", there is a band pass filter (C17, C18, L7 and C16), to suppress sprious.
Also on the input circuit of "VIDEO", and on the input circuit of "AUDIO", there are buffer amplifier, which is incorporated to IC1.
These buffer amplifier are used for suppressing sprious radiation.

Limiting modulation

The modulation is set with resistors (R10, R11 and R12).

Limiting the operation power

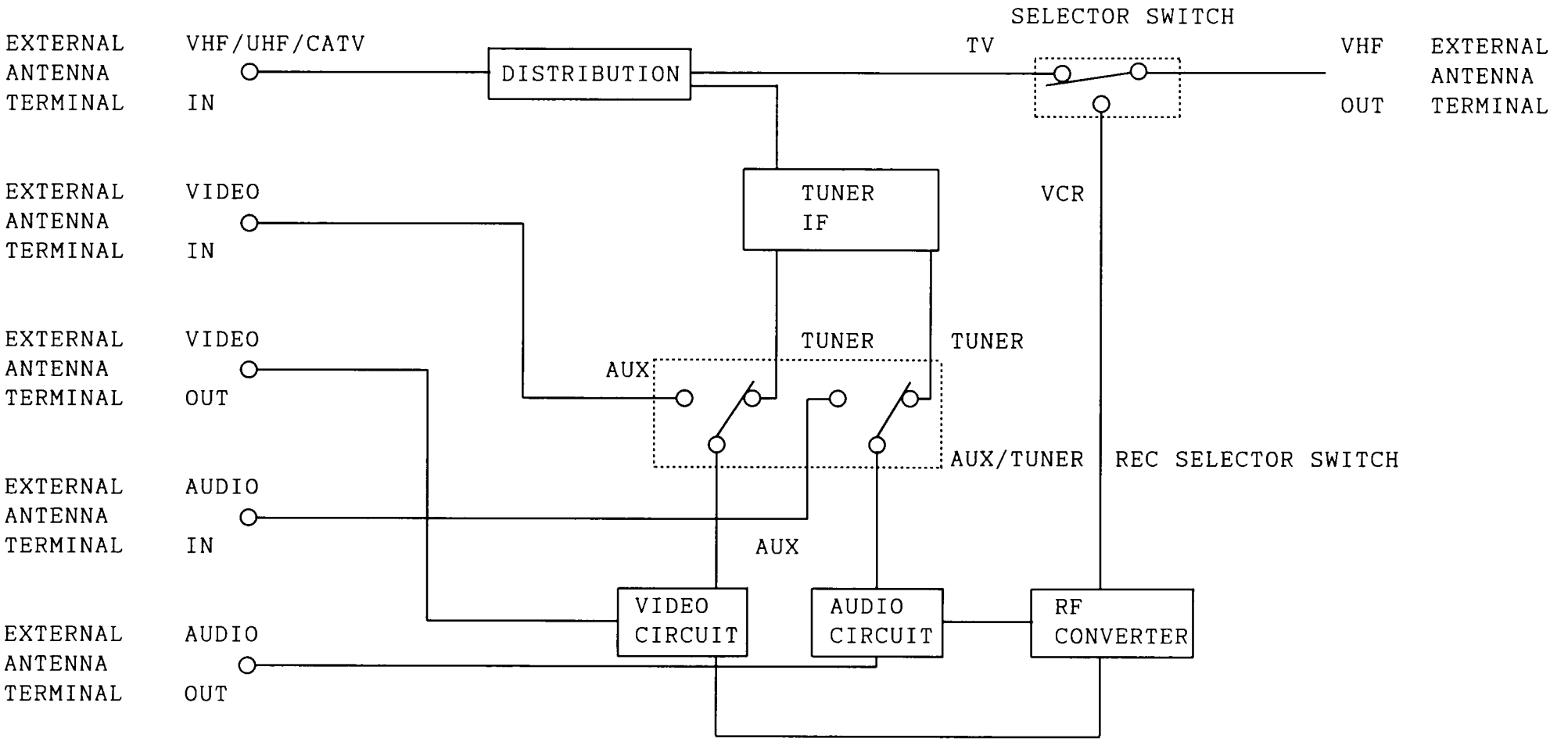
The output power is set with resistors R13.

(9) Identification photo or label : Attached

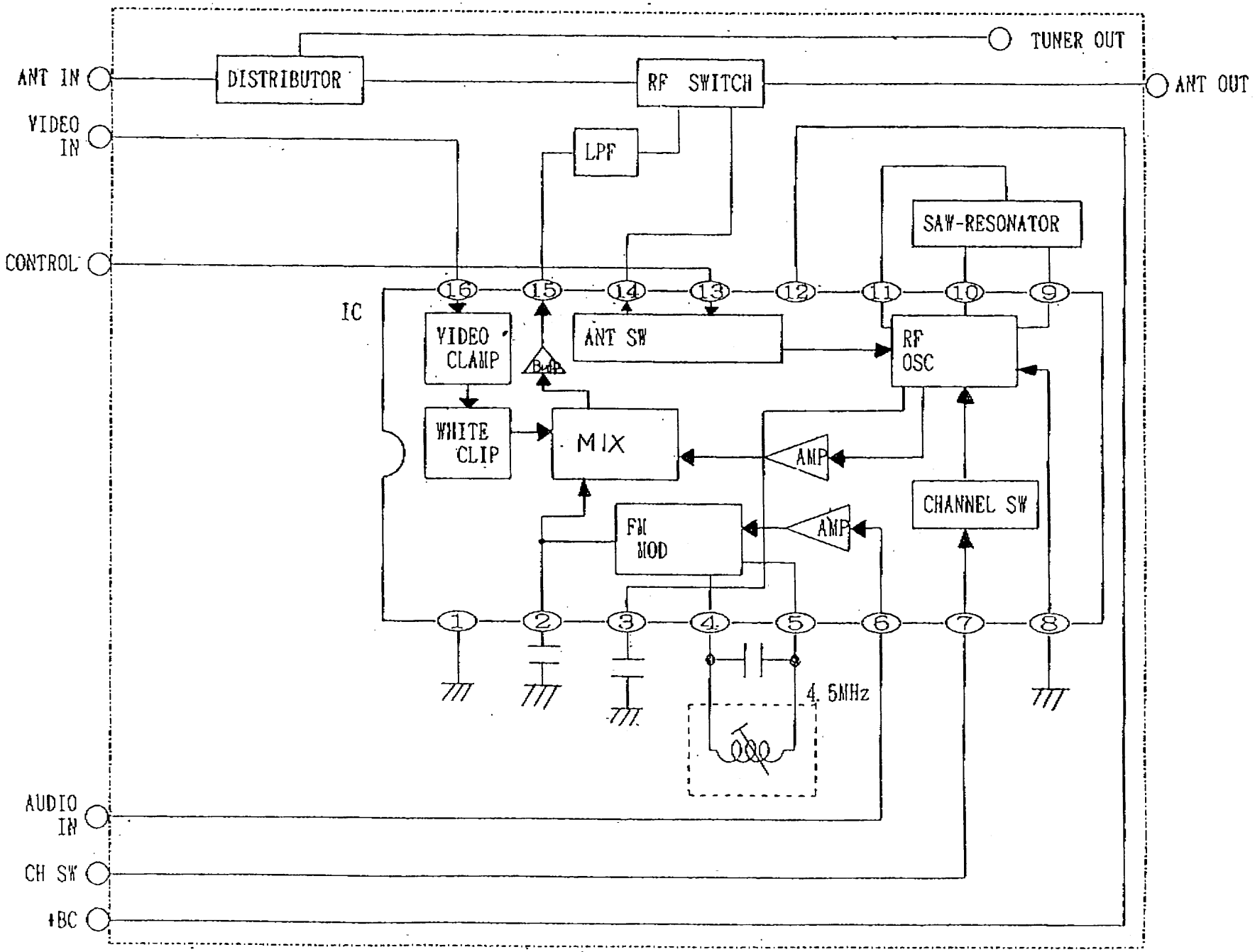
Enclosure rear

Attachment 1

ANTENNA CIRCUIT BLOCK DIAGRAM



RF CONVERTER BLOCK DIAGRAM



Attachment 2

4. Explanation on Machanism and Tuning Method of VHF and UHF Tuner for Model VC-H988U with Supplemental photos.

(1). Mechanism of channel selection :

This model is employed Phase Locked Loop (PLL) type frequency synthesizer circuit systems.
The local oscillation frequency of selected channel is detected by this circuit and compared with the correct local oscillation frequency which is generated by the standard crystal oscillation circuit.
The different frequency from correct one is detected by the phase detector circuit and feed back to the local oscillation circuit of tuner for correcting frequency.

The tuning accuracy by this PLL circuit system is within ±10 kHz to the correct local oscillation frequency allocated by FCC.

Therefore, this accurate frequency control system eliminates the need of fine tuning.

This model is equipped with both random access selection system and up/down system for channel selection, and possible to receive midband, superband and hyperband channels (CATV).

Photo 4. a. channel ▲/▼ button
b. channel number display

Photo 5. Remote control unit

a. MENU button
b. ▲/▼ button (To select "CHANNEL PRESET" mode)
c. SET button
d. ◀/▶ button
e. randam acces channel selector buttons (0-9・100)

Photo 6. Control part

a. MENU button
b. SET button
c. FF/REW switch

Photo 7. Remote control unit

a. Channel ▲/▼ button

(2) Setting the channels

When setting using the "NENU" button on the Remote control unit.

① Press the "POWER" button

② Press the 'MENU" button

After above setting, operate according to the procedure displayed on the TV screen.
Concerning the details of setting, please refer "SETTING THE CHANNELS" in the Operation manual.

When setting using the "NEMU" button on the main unit.

① Press the "POWER" button

② Press the 'MENU" button

After above setting, operate according to the procedure displayed on the TV screen.
Concerning the datails of setting, please refer "SETTING THE CHANNELS" in the Operation manual.

(3) Channel read out :

This model is employed Digital Sign System which selected channel number is indicated on display (Photo 4-b) and TV screen.

TV Node		Covered channel
"TV" display	:	VHF ; 2 - 13 CH UHF ; 14 - 69 CH
"CATV-STD" display	:	CATV ; 2 - 125 CH (STANDARD)
"CATV-HRC" display	:	CATV ; 1 - 125 CH (HRC/IRC) (Refer to Operation manual)

Channel selection up/down system can be performed by pushing channel up/down buttons (Please 4-a and 7-a).

This directional channel selection is capable selecting from low CH to high CH (up " ▲" button) and from high CH to low CH (down " ▼" button).

" ▲" and " ▼" buttons employ both function (Channel up/down function and Auto Tracking function).

Channel up/down function operate only EE (stop) Mode and "REC + PAUSE" Mode.
Auto Trackong function operate only play-back Mode.

* * * * * * * * * *

With the above explanation, we believe that this model complies with requirement of FCC comparable tuning rules.

5. TV RECEIVER APPLICATION CHECK LIST for Model VC-H998U

(X)(1). A statement identifying the production run plan you will be using to show compliance in meeting a 14 dB UHF noise figure - reference "TV Receiver, UHF noise figure - Certification and Compliance Criteria" second issue, January 1981).

We will use the same "plan C" of the "TV Receiver UHF noise figure - Certification and Compliance Criteria" for production.

(X)(2). A statement that NF measurements were made pursuant to OST Measurement Procedure MP-2, Second Issue, January 1980. Departure from the procedures of OST Measurement Procedure MP-2 must be approved by the Chief Scientist or his designate. Details of any departures from OST Measurement Procedure MP-2 must accompany the certificate application.

Our measurement were made pursuant to OST Measurement Procedure MP-2 Second Issue, July 1982 for measuring the UHF noise figure.

(X)(3). The names of all manufacturing sources for the VHF and UHF tuners as well as the tuner Manufacture's Nos.

Parts Name : ENG56701G (VHF & UHF combined in one unit)
Manufacturer's Name : Matsushita Electronic components (M) Sdn. Bhd.

(X)(4). UHF and VHF tuner part numbers assigned by the receiver manufacturer.

Parts Name : VTUENG56701-1 (VHF & UHF combined in one unit)

(X)(5). Frequency bands tuned by the receiver (i.e., UHF, VHF, midband, superband, AM/FM, etc.).

VHF (L)	54 - 88 MHz	UHF including CATV(ULTRA)	470 - 806 MHz
(H)	174 - 216 MHz	CATV (LOW/MID)	72 - 174 MHz
		CATV (SUPER)	216 - 300 MHz
		CATV (HYPER)	300 - 474 MHz

(X)(6). Pursuant to Section 15.117 of the Rules, a statement specifying the receiver design noise figure, in dB.

Refer to Attachment 1.

- to be continued -

(X) 7. The length of the UHF lead, from antenna input terminals to the tuner.

None

(X) 8. Schematic diagram for the receiver.

Attached

(X) 9. The exact chassis number.

None

(X) 10. Picture tube size in inches.

None

(X) 11. Type of receiver - clow of black and white.

None

(X) 12. A description of the cabinet material.

Plastic

(X) 13. Copy of all the information submitted with the original certification for basic receiver (for application for FCC ID numbers other than those for initial application submittals with a report of measurements).

None

(X) 14. The IF noise figure contribution that was added to the measured value for each UHF channels noise figure in the report of measurements, or a statement that the contribution is not exceeded 0.25 dB for the channel.

We measured the UHF noise figure on the ten (10) production units of the test samples for this application and the IF noise figure contribution. As the result of this measurement, at least 97.5% of all production units have a noise figure not exceeding 14 dB and the IF noise figure contribution is not exceed 0.25 dB.
Please refer to the attached UHF noise figure measurement report.

With the above explanation, we believe that this model complies with the requirement of the FCC rules and regulations, section 15.117.

UHF NOISE FIGURE MEASURENENT DATA

Manufactuer : SHARP CORPORATION
Trade Name (Brand Name) : SHARP
Noise Figure Measurement :

Model No. : VC-H998U
FCC ID where assigned : N/A
Converte VTUENG56701-1

	UHF Channel Number										Plan C				
	14	20	26	32	38	44	50	56	62	69	MAX	CH	x	Sn	x+K*Sn
1	5.2	5.8	6.1	6.1	5.7	4.8	4.8	5.4	5.4	5.0	6.1	26/32	5.43	0.49	6.90
2	6.3	6.8	6.8	6.4	5.6	4.8	5.2	5.9	6.0	5.6	6.8	20/26	5.94	0.66	7.92
3	6.7	7.0	7.4	7.7	7.8	7.2	7.3	7.6	7.6	7.1	7.8	38	7.34	0.35	8.39
4	5.0	5.6	5.9	5.9	5.5	4.6	4.6	5.2	5.2	4.8	5.9	26/32	5.23	0.49	6.70
5	6.1	6.5	6.6	6.2	5.4	4.6	5.0	5.7	5.8	5.4	6.6	26	5.73	0.64	7.67
6	5.5	6.1	6.4	6.5	6.0	5.1	5.1	5.7	5.7	5.3	6.5	32	5.74	0.50	7.26
7	6.0	6.3	6.7	7.0	7.1	6.5	6.6	7.0	7.0	6.5	7.1	38	6.67	0.36	7.75
8	7.0	7.5	7.5	7.1	6.3	6.5	5.9	6.6	6.6	6.3	7.5	20/26	6.73	0.53	8.33
9	5.8	6.3	6.5	5.9	5.1	4.3	4.7	5.4	5.5	5.1	6.5	26	5.46	0.69	7.54
10	7.2	7.8	7.9	8.1	7.7	6.8	6.8	7.4	7.4	7.0	8.1	32	7.41	0.46	8.80

* I substracted 4 dB from the measured NF, because a power splitter is equipped in set.
Sample Size 10 (K=3.0113)

x : Mean of ten distributed noise figures including the max. value.
Sn : Standard deviation for ten distributed noise figure including max. value.
Note : The above "MAX." value is indicated the worst noise figure in the total range of the 69 UHF channel.

Noise Figure Contribution of the N.F. Amplifier
(Measured Values)

Second Stage Noise Figure : dB

Tuner Gain : N.A. dB

Noise Figure Contributin : less than 0.30 dB

Measurement procedure : OST Measurement Procedure MP-2.
July 1982.

(Technical Conference on Noise Figure Measurements)

List of Measuring Equipment :

1. Automatic Noise Figure Indicator :
   Model No. ENF-2005 ELENA

2. Solid - State Noise Generator :
   Model No. MC1100 MICROWAVE SEMICONDUCTOR

3. UHF Balun :
   Model No. U2A MEASUREMENTS

8. Explanation on UHF-VHF antenna comparability of Model No. VC-H998U

UHF Loop and VHF Dipole antenna are not mounted on VCR set.
They are not provided in carton.

* * * * * * * * * *

With the above explanation, we are confident that this Video Cassette Recorder comply with the rule, section 15.117.