



# EMI TEST REPORT

Test Report No. : 24BE0140-HO-2

Applicant : NEC System Integration & Construction, Ltd.  
Type of Equipment : Radio Equipment  
Model No. : HX68-V  
Test standard : FCC Part 90  
FCC ID : RJGHX68V  
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test: September 29 - October 4 and October 19, 20, 22 and 27, 2003

Tested by :

Kenichi Adachi  
EMC Service

Approved by:

Naoki Sakamoto  
Group Leader of EMC Service

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

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**CONTENTS**

	<b>PAGE</b>
<b>SECTION 1: Client information .....</b>	<b>3</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>3</b>
<b>SECTION 3: Test specification, procedures and results .....</b>	<b>5</b>
<b>SECTION 4: Operation of E.U.T. during testing .....</b>	<b>7</b>
<b>SECTION 5: RF Output power .....</b>	<b>9</b>
<b>SECTION 6: Modulation Characteristics.....</b>	<b>11</b>
<b>SECTION 7: Emission Bandwidth .....</b>	<b>15</b>
<b>SECTION 8: Spurious emission at Antenna Terminals .....</b>	<b>18</b>
<b>SECTION 9: Field Strength of Spurious Emission .....</b>	<b>24</b>
<b>SECTION 10: Frequency Stability .....</b>	<b>32</b>
<b>SECTION 11: Transient Frequency Behavior .....</b>	<b>34</b>
 <b>APPENDIX 1: Photographs of test setup .....</b>	 <b>37</b>
<b>APPENDIX 2: Test Instruments .....</b>	<b>40</b>

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## **SECTION 1: Client information**

Company name : NEC System Integration & Construction, Ltd.  
Brand name : NEC  
Address : 1-39-9,HIGASHI-SHINAGAWA,SHINAGAWA-KU, TOKYO-TO,  
140-8620 JAPAN  
Telephone Number : +81 3 5463 7102  
Facsimile Number : +81 3 5463 7112  
Contact Person : Jun Arai

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Radio Equipment  
Model No. : HX68-V  
Serial No. : 1002  
Rating : DC 13.8V  
Country of Manufacture : Japan  
Receipt Date of Sample : September 29, 2003  
Condition of EUT : Production model

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## 2.2 Identification of equipment connected with HX68-V

Type of equipment : Combiner (Duplexer)  
Model No. : HX69-V  
Serial No. : 1004  
Rating : N/A  
Country of manufacturer : Japan  
Receipt Date of Sample : September 29, 2003  
Condition of EUT : Production model

\*Note : Normally we use HX68-V independently. If we could use HX68-V in system, we use HX68-V with HX69-V.  
Therefore, this report contains data measuring characteristics of HX68-V with HX69-V.

## 2.3 Product Description

NEC System Integration & Construction, Ltd. Model: HX68-V (referred to as the EUT in this report) is the Radio Equipment.

Equipment identification : Radio Equipment  
Intended use/Purpose of the equipment : Selecting one of two ways. Alternate way of Rx / Tx and simultaneous way of Rx / Tx.  
Equipment Type : Transceiver  
Emission class : F3E  
Frequency of Operation : 458.5125MHz  
Other Clock Frequency : IF : 45.0MHz and 455kHz  
Modulation : Frequency modulation  
Bandwidth / Channel spacing : 12.5kHz  
Transmit power or power range : 10W +20%, -50%  
Method of Frequency Generation : Synthesized method

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### SECTION 3: Test specification, procedures and results

#### 3.1 Test Specification

Test Specification : FCC Part90  
Title : PRIVATE LAND MOBILE RADIO SERVICES

#### 3.2 Procedures and results

##### 3.2.1 procedures and results of HX68-V

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	RF Output Power	Section 2.1046 Section 2.1053	Section 90.217	-	N/A	-	Complied
2	Modulation Characteristics	Section 2.1047(a) and (b)	-	-	N/A	-	Complied
3	Emission Bandwidth	Section 2.1049	Section 90.209	-	N/A	-	Complied
4	Spurious Emission at Antenna Terminals	Section 2.1051	Section 90.210	-	N/A	6.1dB 1375.54MHz	Complied
5	Field Strength of Spurious Emission	Section 2.1053	Section 90.210	-	N/A	3.3B 1834.04MHz Vertical	Complied
6	Frequency Stability Measurement	Section 2.1055	Section 90.213	-	N/A	-	Complied
7	Transient Frequency Behavior	TIA-603-B 2.2.19	Section 90.214	-	N/A	-	Complied

Note: UL Apex's EMI Work Test Procedure QPM05.

##### 3.2.2 Procedures and result of HX68-V with HX69-V

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	RF Output Power	Section 2.1046 Section 2.1053	Section 90.217	-	N/A	-	Complied
3	Emission Bandwidth	Section 2.1049	Section 90.209	-	N/A	-	Complied
4	Spurious Emission at Antenna Terminals	Section 2.1051	Section 90.210	-	N/A	18.8dB 2751.08MHz/ 4126.61MHz	Complied
5	Field Strength of Spurious Emission	Section 2.1053	Section 90.210	-	N/A	1.3dB 1834.04MHz Vertical	Complied

Note: UL Apex's EMI Work Test Procedure QPM05.

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### 3.3 Additions to Standards

No addition, deviation or exclusion has been made from standards.

### 3.4 Confirmation

UL Apex Co, Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 90.

### 3.5 Uncertainty

#### Spurious Emission(Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.5$ dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 5.2$ dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 6.6$ dB.

The result is within Head Office EMC Lab's uncertainty.

### 3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m and No.3 measurement room  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124

This semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002.  
(Registration number: No.2 :846015 )

\*NVLAP Lab. code: 200572-0

### 3.7 Test setup and test instruments

Refer to APPENDIX 1 and 2.

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#### Head Office EMC Lab.

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## SECTION 4: Operation of E.U.T. during testing

### 4.1 Operating Modes

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

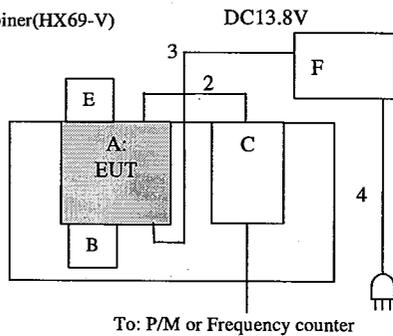
The sequence is used : Continuous Transmitting mode

Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

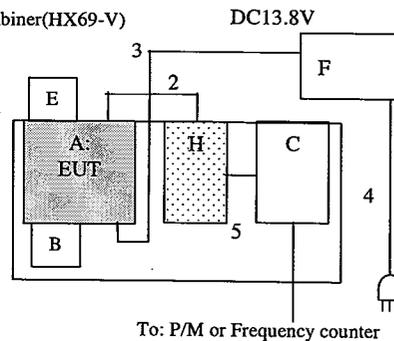
### 4.2. Configuration and peripherals

#### 4.2.1. RF Power , Frequency Stability, Transient Frequency Behavior

Non Combiner(HX69-V)

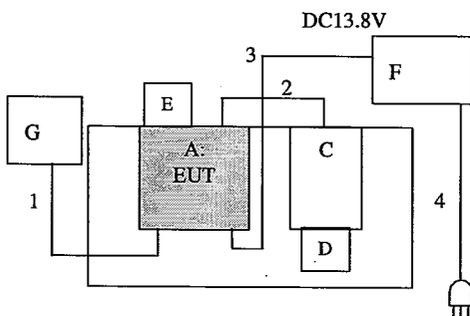


With Combiner(HX69-V)

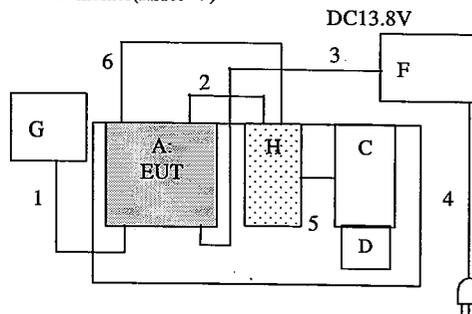


#### 4.2.2. Field Strength of Spurious Emission

Non Combiner(HX69-V)



With Combiner(HX69-V)



\* Cabling was taken into consideration and test data was taken under worse case conditions.

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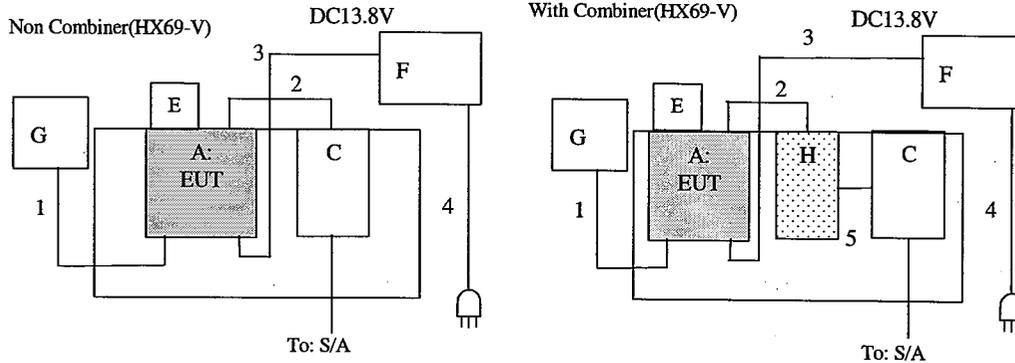
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**4.2.3. Modulation Characteristics , Emission Mask , Bandwidth , Spurious emission at antenna terminals**



**Description of EUT and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Transceiver	HX68-V	1002	NEC	RJGHX68V	EUT
B	Dummy microphone	-	-	-	-	-
C	Attenuator (40dB)	53-40-33	MM131	Weinscel Corp	-	-
D	Terminator	NTRM-50	941513	MCL	-	-
E	Terminator	NTRM-50	932211	MCL	-	-
F	DC Supply	6642A	Agilent	MY40000358	-	-
G	Audio Analyzer	UPA	835837/004	Rohde & Schwarz	-	-
H	Combiner	HX69-V	1004	NEC	-	-

**List of cables used**

No.	Name	Length (m)	Shield	Backshell Material
1	Coaxial Cable	3.0	Y	Polyvinyl chloride
2	Coaxial Cable	0.5	Y	Polyvinyl chloride
3	DC Cable	1.3	Y	Polyvinyl chloride
4	AC Cable	2.0	N	Polyvinyl chloride
5	Coaxial Cable	0.5	Y	Polyvinyl chloride
6	Coaxial Cable	1.5	Y	Polyvinyl chloride

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**SECTION 5: RF Output power**

**5.1 Test Procedure : FCC 2.1046, 90.205**

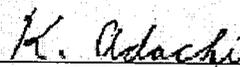
To achieve the maximum power output rating, measurement was taken with HX68-V with power supply 13.8V DC.

**5.2 Test data**

**DATA OF RF OUTPUT POWER(CONDUCTED)**

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: NEC System Integration & Construction, Ltd.	REPORT NO	: 24BE0140-HO
EQUIPMENT	: Radio Equipment	REGULATION	: Fcc Part90 .205 / Part2.1046
MODEL	: HX68-V	TEST DISTANCE	: -
S/N	: 1002	DATE	: 09/29/2003 10/04/2003
FCC ID	: RJGHX68V	TEMPERATURE	: 27deg.C 23deg.C
IC Number	: -	HUMIDITY	: 41% 46%
POWER	: DC 13.8V		
MODE	: Tx : 458.5125MHz		

  
Engineer : Kenichi Adachi

**None HX69-V**

Detect	FREQ [MHz]	P/M Reading [dBm]	Cable+ATT Loss [dB]	Result [dBm]	Limit [dBm]
PK	458.513	-1.0	40.1	39.1	-

**with HX69-V**

Detect	FREQ [MHz]	P/M Reading [dBm]	Cable+ATT Loss [dB]	Result [dBm]	Limit [dBm]
PK	458.513	-7.5	40.1	32.6	-

**5.3 Test result : Pass**

**5.4 Test instruments : MPM-04, MPSE-04, MAT-13, MCC-07, MTA-04, MDPS-01**

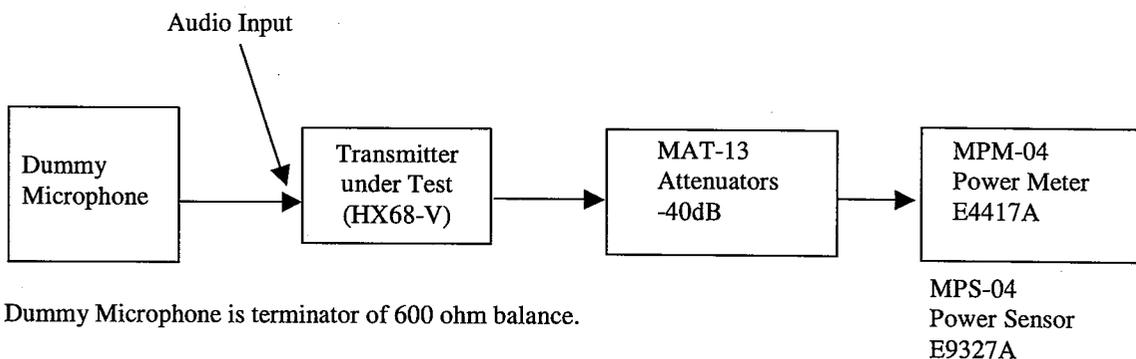
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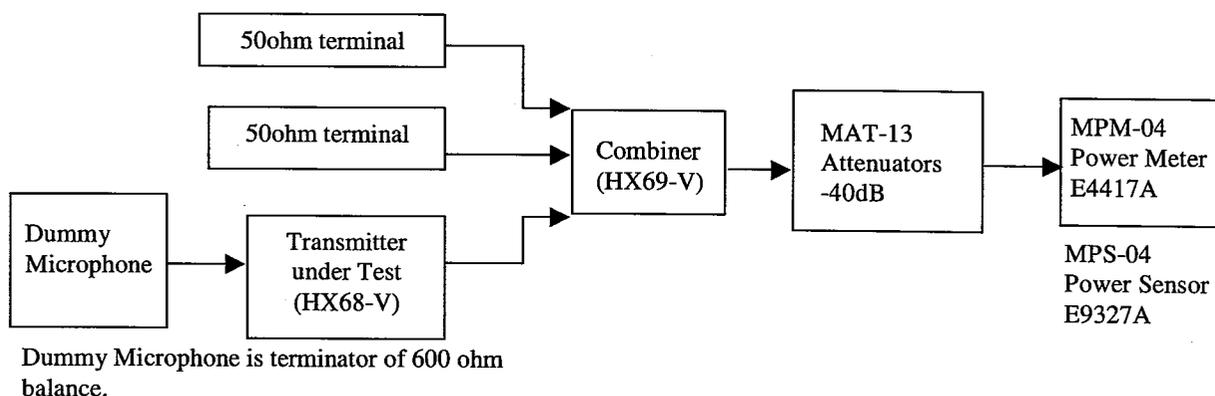
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5.5 Measurement Block Diagram of RF Power output



RF Power Measurement (FCC Part 2.1046, FCC90.205)



RF Power Measurement of Transmitter with Combiner

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## SECTION 6: Modulation Characteristics

### 6.1 Transmitter Deviation for Input Level and Modulation frequency

#### 6.1.1 Test Procedure : FCC Part 2.1047

- 1) The HX68-V was aligned for transmitter operation on 458.5125MHz at full rated power.
- 2) When input Level from -24dBm to 20dBm is applied to audio (microphone) input of HX68-V each modulation frequency 300Hz, 1KHz and 3KHz, frequency deviation is measured with Model CMS54.

#### 6.1.2. Test Data

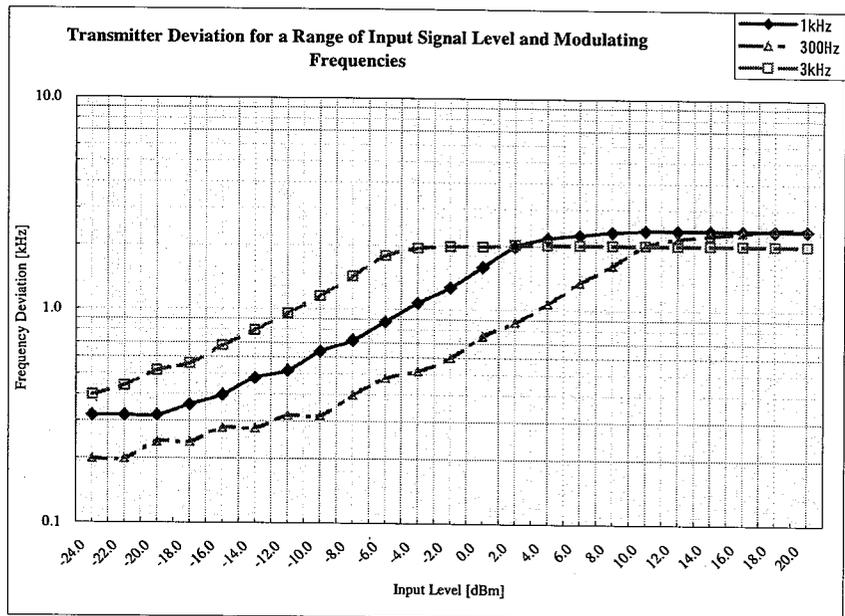
### DATA OF MODULATION CHARACTERISTICS

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: NEC System Integration & Construction, Ltd.	REPORT NO	: 24BE0140-HO
EQUIPMENT	: Radio Equipment	REGULATION	: FCC part 2.1047
MODEL	: HX68-V	TEST DISTANCE	: -
S/N	: 1002	DATE	: 10/02/2003
FCC ID	: RJGHX68V	TEMPERATURE	: 25deg.C
IC Number	: -	HUMIDITY	: 55%
POWER	: DC 13.8V		
MODE	: Tx : 458.5125MHz		

*K. Adachi*  
Engineer : Kenichi Adachi

Input [dBm]	Deviation [kHz](PK)		
	300Hz	1kHz	3kHz
-24.0	0.20	0.32	0.40
-22.0	0.20	0.32	0.44
-20.0	0.24	0.32	0.52
-18.0	0.24	0.36	0.56
-16.0	0.28	0.40	0.68
-14.0	0.28	0.48	0.80
-12.0	0.32	0.52	0.96
-10.0	0.32	0.64	1.16
-8.0	0.40	0.72	1.44
-6.0	0.48	0.88	1.80
-4.0	0.52	1.08	1.96
-2.0	0.60	1.28	2.00
0.0	0.76	1.60	2.00
2.0	0.88	2.00	2.04
4.0	1.08	2.20	2.04
6.0	1.36	2.28	2.04
8.0	1.64	2.36	2.04
10.0	2.04	2.40	2.04
12.0	2.20	2.40	2.04
14.0	2.28	2.40	2.04
16.0	2.36	2.40	2.04
18.0	2.44	2.40	2.04
20.0	2.44	2.40	2.04



\* Input Frequency : 300Hz, 1kHz, 3kHz  
\* Center frequency : 458.51241 MHz  
\* CMS54 setting : filter OFF

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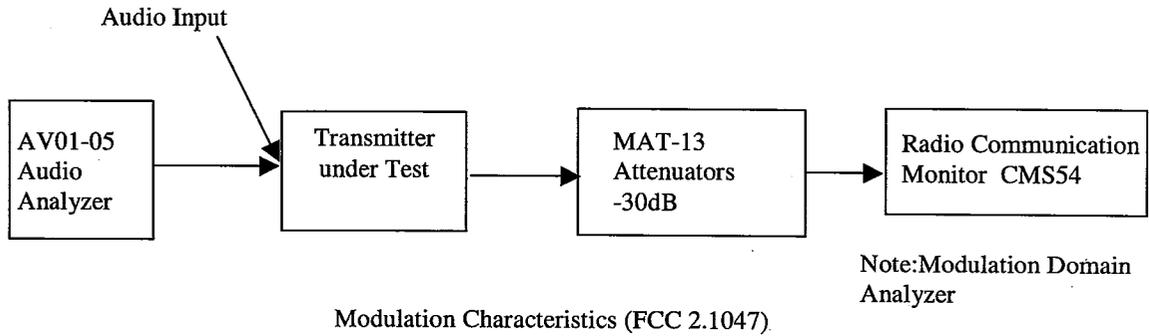
Facsimile : +81 596 24 8124

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6.1.3 Test Result : Pass

6.1.4 Test Instrument : AV01-05 , MST-01 , MCC-07 , MAT-13 , MCC-22 , CMS54 , MDPS-01

6.1.5 Measurement Block Diagram



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## 6.2 Transmitter Deviation for Input Frequency Response

### 6.2.1 Test procedure : FCC Part 2.1047

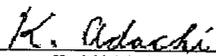
- 1) The HX68-V was aligned for transmitter operation on 458.5125MHz at full rated power.
- 2) When frequency from 300Hz to 5KHz is applied to audio (microphone) input of HX68-V each input level -10dBm, -5dBm and 0dBm, frequency deviation is measured with Model CMS54.

### 6.2.2 Test Data

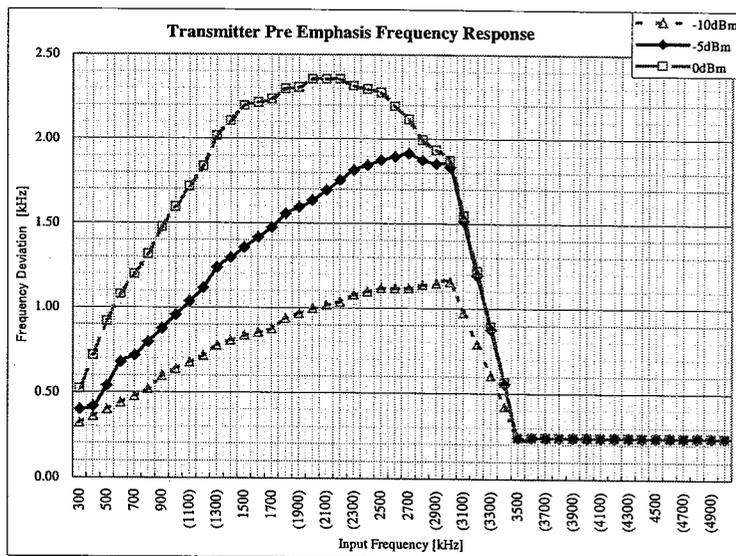
## DATA OF MODULATION CHARACTERISTICS

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: NEC System Integration & Construction, Ltd.	REPORT NO	: 24BE0140-HO
EQUIPMENT	: Radio Equipment	REGULATION	: FCC part 2.1047
MODEL	: HX68-V	TEST DISTANCE	: -
S/N	: 1002	DATE	: 10/02/2003
FCC ID	: RJGHX68V	TEMPERATURE	: 25deg.C
IC Number	: -	HUMIDITY	: 55%
POWER	: DC 13.8V		
MODE	: Tx : 458.5125MHz		

  
Engineer : Kenichi Adachi

Input Freq	Deviation [kHz]		
	-10dBm	-5dBm	0dBm
300	0.32	0.40	0.52
400	0.36	0.42	0.72
500	0.40	0.54	0.92
600	0.44	0.68	1.08
700	0.48	0.72	1.20
800	0.52	0.80	1.32
900	0.60	0.88	1.48
1000	0.64	0.96	1.60
(1100)	0.68	1.04	1.72
1200	0.72	1.12	1.84
(1300)	0.78	1.24	2.02
(1400)	0.81	1.30	2.11
1500	0.84	1.36	2.20
(1600)	0.86	1.42	2.22
1700	0.88	1.48	2.24
(1800)	0.94	1.56	2.30
(1900)	0.97	1.60	2.31
2000	1.00	1.64	2.36
(2100)	1.02	1.70	2.36
2200	1.04	1.76	2.36
(2300)	1.08	1.82	2.32
(2400)	1.10	1.85	2.30
2500	1.12	1.88	2.28
(2600)	1.12	1.90	2.20
2700	1.12	1.92	2.12
(2800)	1.14	1.88	2.00
(2900)	1.15	1.86	1.94
3000	1.16	1.84	1.88
(3100)	0.97	1.52	1.55
(3200)	0.79	1.20	1.22
(3300)	0.61	0.88	0.89
(3400)	0.42	0.56	0.57



\* Input level : -10dBm, -5dBm, 0dBm  
\* Center frequency : 458.51249 MHz  
\* CMS54 setting : filter OFF.  
\* note : Frequency's ( ) is calculate data.

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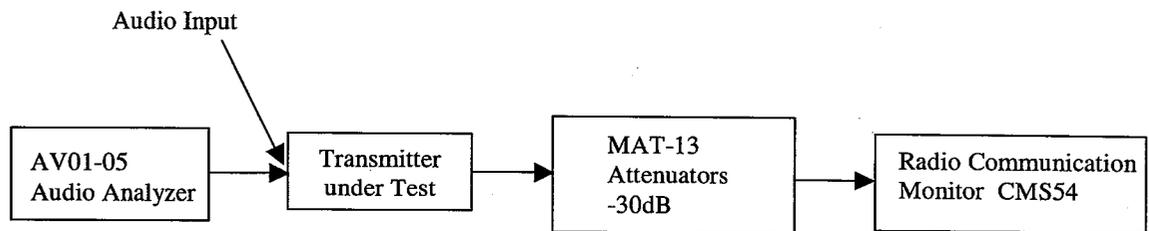
Facsimile : +81 596 24 8124

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6.2.3 Test Result : Pass

6.2.4 Test Instrument : AV01-05 , MST-01 , MCC-07 , MAT-13 , MCC-22 , CMS54 , MDPS-01

6.2.5 Measurement Block Diagram



Modulation Characteristics (FCC 2.1047)

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**SECTION 7: Emission Bandwidth**

Emission Bandwidth is measured with two kind of configuration, the one is with HX68-V only and the another is with HX68-V connected with HX69-V.

**7.1 Test Procedure : FCC 2.1049**

- 1) Set the reference level the spectrum analyzer to the unmodulation carrier level on the EUT
- 2) The Carrier is modulated by a 2.5KHz tone at an input level 16dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulation.

**7.2 Test Data**

**7.2.1 Test Data of HX68-V without HX69-V**

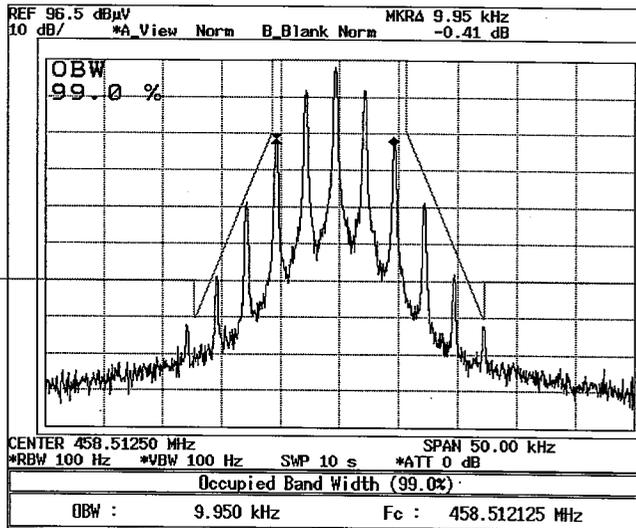
**DATA OF EMISSION BANDWIDTH**

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Cha

COMPANY	: NEC System Integration & Construction, Ltd.	REPORT NO	: 24BE0140-HO
EQUIPMENT	: Radio Equipment	REGULATION	: Fcc Part2.1049
MODEL	: HX68-V	TEST DISTANCE	: -
S/N	: 1002	DATE	: 10/04/2003
FCC ID	: RJGHX68V	TEMPERATURE	: 23deg.C
IC Number	: -	HUMIDITY	: 46%
POWER	: DC 13.8V		
MODE	: Tx : 458.5125MHz		

*K. Adachi*  
ENGINEER : Kenichi Adachi

99 % Occupied Bandwidth



\*99% Occupied Bandwidth : 9.95 kHz Limit 11.25 kHz  
Input Level : 8 dBm

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7.2.2 Test Data of HX68-V connected with HX69-V

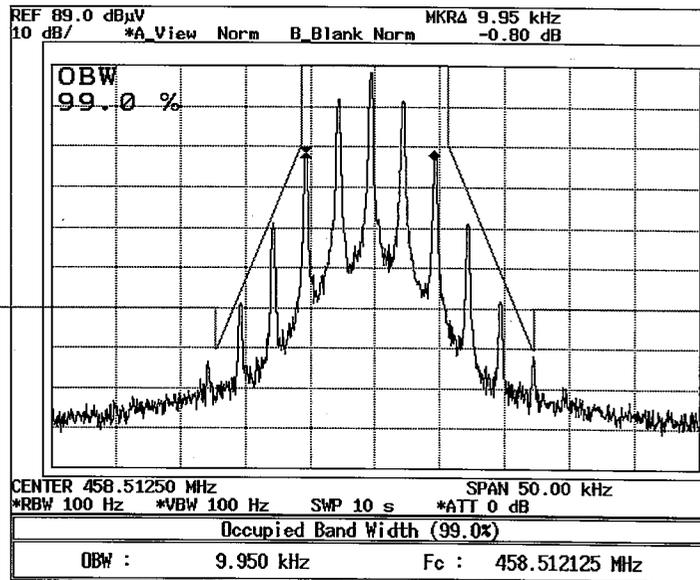
**DATA OF EMISSION BANDWIDTH**

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Head Office EMC Lab. No.2 Semi Anechoic Cha

COMPANY	: NEC System Integration & Construction, Ltd.	REPORT NO	: 24BE0140-HO
EQUIPMENT	: Radio Equipment	REGULATION	: Fcc Part2.1049
MODEL	: HX68-V + HX69-V	TEST DISTANCE	: -
S/N	: 1002, 1004	DATE	: 10/04/2003
FCC ID	: RJGHX68V	TEMPERATURE	: 23deg.C
IC Number	: -	HUMIDITY	: 46%
POWER	: DC 13.8V		
MODE	: Tx : 458.5125MHz		

*K. Adachi*  
ENGINEER : Kenichi Adachi

99% Occupied Bandwidth



\* 99% Occupied Bandwidth : 9.95 kHz Limit 11.25 kHz  
Input Level : 8 dBm

7.3 Test Result

7.3.1 Test Result of HX68-V without HX69-V : Pass

7.3.2 Test result of HX68-V connected with HX69-V : Pass

7.4 Test Instrument

: SA-07 , MCC-22 , MAT-13 , MCC-07 , MCC-08, MDPS-01, AV01-05

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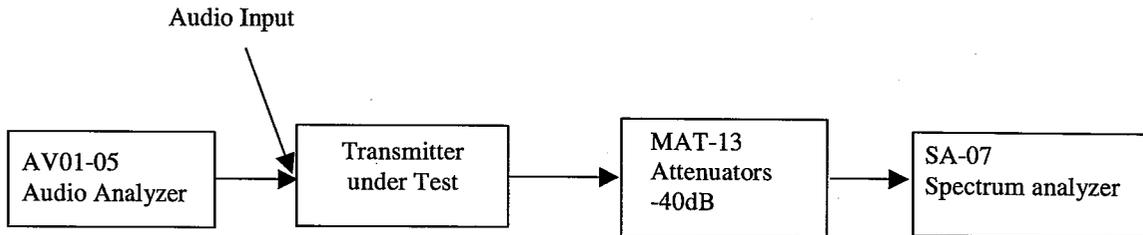
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## 7.5 Measurement Block Diagram

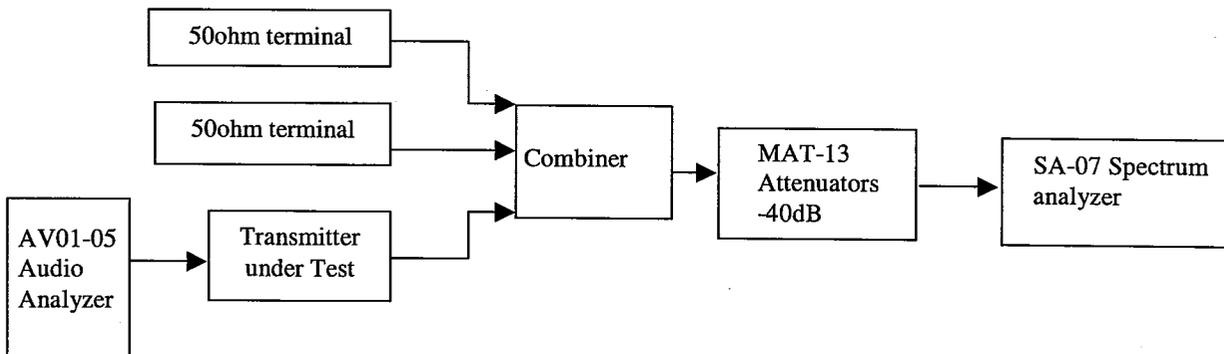
### 7.5.1 Measurement Block Diagram of HX68-V without HX69-V



Output Level: 8dBm  
Modulation Frequency: 2.5kHz

Emission Bandwidth (FCC Part 2.1049)

### 7.5.1 Measurement Block Diagram of HX68-V connected with HX69-V



Output Level: 8dBm  
Modulation Frequency: 2.5kHz

Emission Bandwidth of transmitter with combiner

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## **SECTION 8: Spurious emission at Antenna Terminals**

Spurious Emission at Antenna Terminals is measured with two kind of configuration, the one is with HX68-V only and the another is with HX68-V connected with HX69-V.

### **8.1 Test Procedure : FCC 2.1051**

- 1) The HX68-V was aligned for transmitter operation on 458.5125MHz at full rated power.
- 2) The Carrier is modulated by a 2.5KHz tone at an input level 16dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulation.
- 3) Output of HX68-V was connected with spectrum analyzer through dummy load attenuator 40dB.

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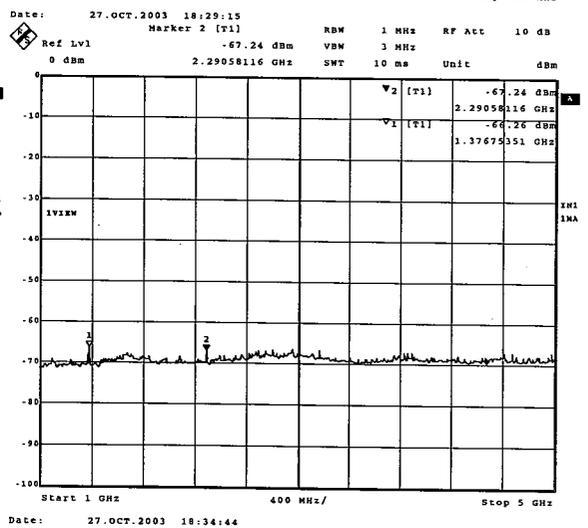
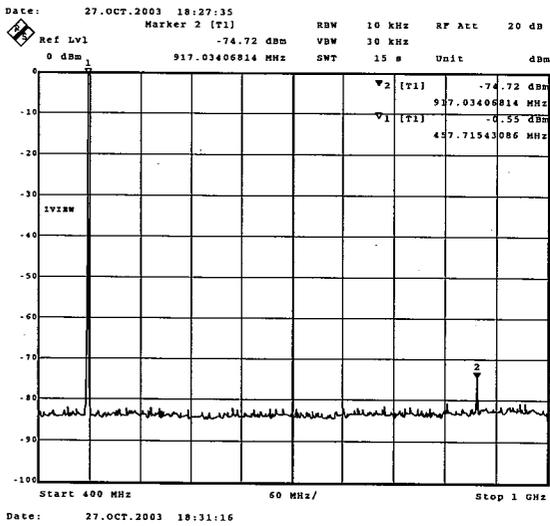
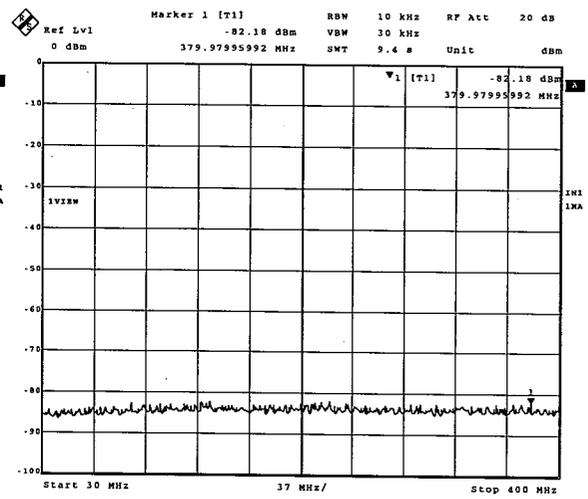
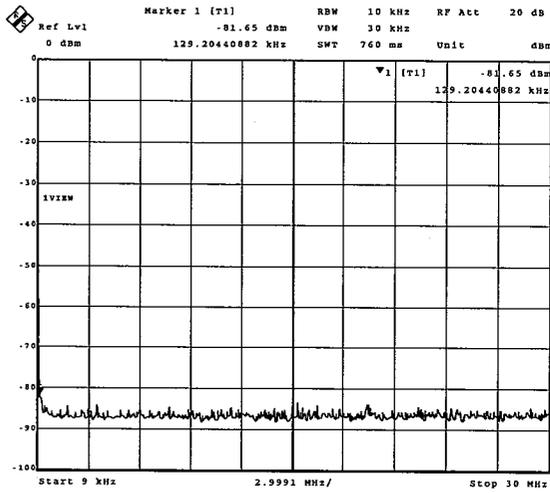
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8.2 Test Data

**HX68-V (Transmitting)**  
**Spurious Emission(Conducted)**



## DATA OF CONDUCTED EMISSIONS

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Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : NEC System Integration & Construction, Ltd.	REPORT NO : 24BE0140-HO
EQUIPMENT : Radio Equipment	REGULATION : Fcc Part 2 Section 2.1051 / Part 90 Section 90.210
MODEL : HX68-V	TEST DISTANCE : -
S/N : 1002	DATE : 10/27/2003
FCC ID : RJGHX68V	TEMPERATURE : 23 deg.C
IC Number : -	HUMIDITY : 40%
POWER : DC 13.8V	
MODE : Tx : 458.5125MHz (Input : 8dBm , 2.5kHz)	

*K. Adachi*  
ENGINEER : Kenichi Adachi

(Carrier Frequency)  
458.51

(Spurious Below 1GHz) (RBW: 10kHz , VBW:30kHz , ATT 20dB , SWP :auto)

No.	FREQ [MHz]	S/A READING [dBm]	ATT Factor [dB]	HPF Loss [dB]	Cable Loss [dB]	RESULT Conducted [dBm]	Limit [dBm]	MARGIN Conducted [dB]
2	415.72	-82.0	40.0	0.0	0.3	-41.7	-20.0	21.7
3	503.51	-83.0	40.0	0.0	0.1	-42.9	-20.0	22.9
4	917.03	-73.3	40.0	0.0	0.3	-33.0	-20.0	13.0

(Spurious Above 1GHz) (RBW: 1MHz , VBW:3MHz , ATT 10dB , SWP: auto)

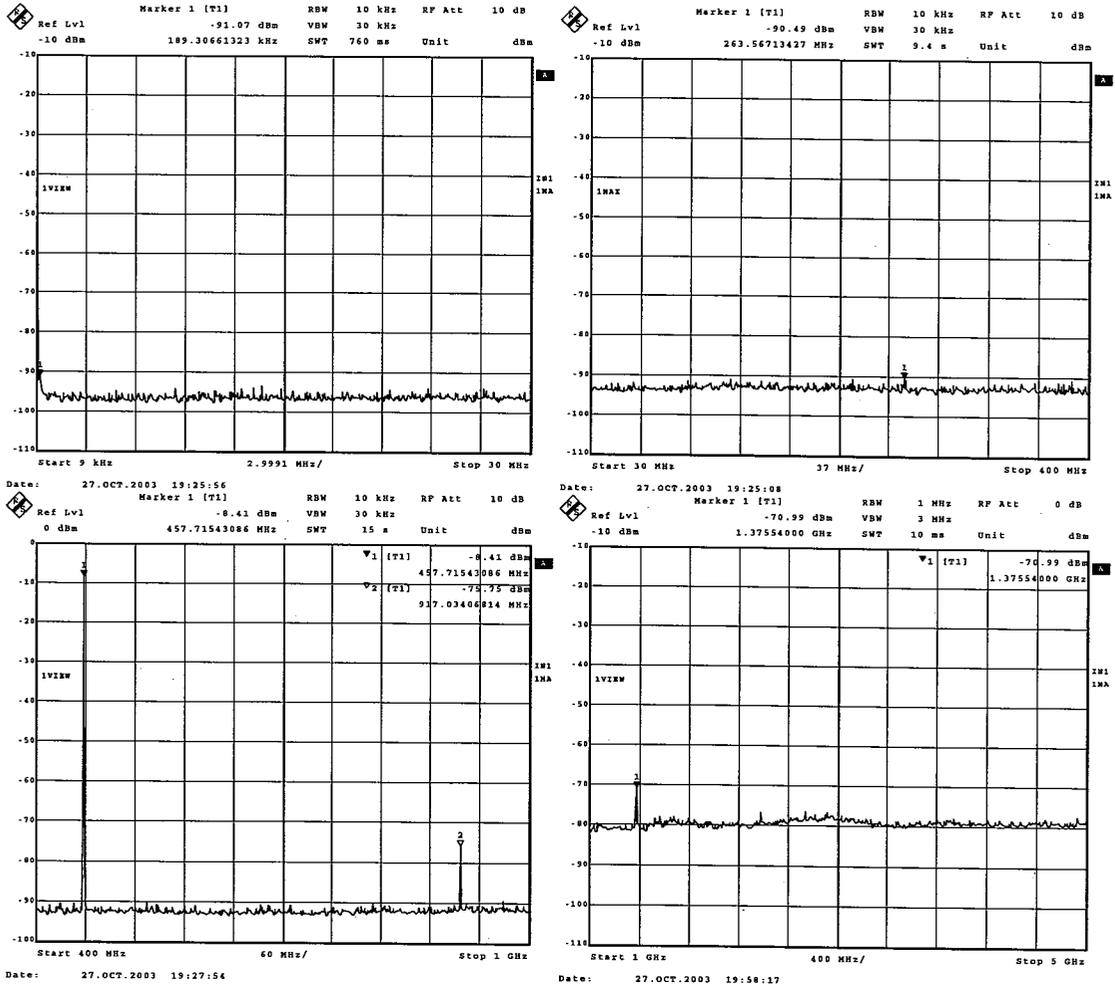
No.	FREQ [MHz]	S/A READING [dBm]	ATT Factor [dB]	HPF Loss [dB]	Cable Loss [dB]	RESULT Conducted [dBm]	Limit [dBm]	MARGIN Conducted [dB]
5	1375.54	-66.2	40.0	0.0	0.1	-26.1	-20.0	6.1
6	1834.05	-68.6	40.0	0.0	0.0	-28.6	-20.0	8.6
7	2292.56	-67.9	40.0	0.0	0.0	-27.9	-20.0	7.9
8	2751.08	-66.4	40.0	0.0	0.1	-26.4	-20.0	6.4
9	3668.10	-69.3	40.0	0.0	0.1	-29.1	-20.0	9.1
10	4126.61	-69.2	40.0	0.0	0.2	-29.0	-20.0	9.0
11	4585.13	-68.5	40.0	0.0	0.2	-28.3	-20.0	8.3

REMARKS

CALCULATION RESULT=Reading + ATT Factor + LOSS (Cable)  
\*Except for the above table : All other spurious emissions were less than 20dB for the limit.  
Carrier Power = 39.1dBm  
- Attenuation limits = 50 + 10log(Carrier Power) = 59.1dB(-20.0dBm)  
- Attenuation = Carrier Power - Spurious Power > 59.1dB(-20.0dBm)  
- Below 1GHz : SA PK(RBW:10kHz / VBW:30kHz) Above 1GHz : S/A PK(RBW/VBW:1MHz)

**UL Apex Co., Ltd.**  
**Head Office EMC Lab.**  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8116  
Facsimile : +81 596 24 8124

**HX68-V + HX69-V (Transmitting)**  
**Spuripous Emission(Conducted)**



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**Head Office EMC Lab.**  
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 Telephone : +81 596 24 8116  
 Facsimile : +81 596 24 8124

## DATA OF CONDUCTED EMISSIONS

UL Apex Co., Ltd.  
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COMPANY : NEC System Integration & Construction, Ltd.	REPORT NO : 24BE0140-HO
EQUIPMENT : Radio Equipment	REGULATION : Fcc Part 2 Section 2.1051 / Part 90 Section 90.210
MODEL : HX68-V + HX69-V	TEST DISTANCE : -
S/N : 1002 , 1004	DATE : 10/27/2003
FCC ID : RJGHX68V	TEMPERATURE : 23 deg.C
IC Number : -	HUMIDITY : 40%
POWER : DC 13.8V	
MODE : Tx : 458.5125MHz (Input : 8dBm , 2.5kHz)	

*K. Adachi*  
ENGINEER : Kenichi Adachi

(Carrier Frequency)  
458.51

(Spurious Below 1GHz) (RBW: 10kHz, VBW:30kHz, ATT 20dB, SWP :auto)

No.	FREQ [MHz]	S/A READING [dBm]	ATT Factor [dB]	HPF Loss [dB]	Cable Loss [dB]	RESULT Conducted [dBm]	Limit [dBm]	MARGIN Conducted [dB]
2	415.72	-84.6	40.0	0.0	0.3	-44.3	-20.0	24.3
3	503.51	-84.1	40.0	0.0	0.1	-44.0	-20.0	24.0
4	917.03	-80.9	40.0	0.0	0.3	-40.6	-20.0	20.6

(Spurious Above 1GHz) (RBW: 1MHz, VBW:3MHz, ATT 0dB, SWP: auto)

No.	FREQ [MHz]	S/A READING [dBm]	ATT Factor [dB]	HPF Loss [dB]	Cable Loss [dB]	RESULT Conducted [dBm]	Limit [dBm]	MARGIN Conducted [dB]
5	1375.54	-77.7	40.0	3.8	0.1	-41.5	-20.0	21.5
6	1834.05	-79.7	40.0	0.0	0.0	-39.6	-20.0	19.6
7	2292.56	-80.8	40.0	0.0	0.0	-40.8	-20.0	20.8
8	2751.08	-78.8	40.0	0.0	0.1	-38.8	-20.0	18.8
9	3668.10	-79.8	40.0	0.0	0.1	-39.7	-20.0	19.7
10	4126.61	-79.0	40.0	0.0	0.2	-38.8	-20.0	18.8
11	4585.13	-79.3	40.0	0.0	0.2	-39.1	-20.0	19.1

**REMARKS**

CALCULATION RESULT=Reading + ATT Factor - HPF LOSS + LOSS (Cable)

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

Carrier Power = 32.6dBm

- Attenuation limits = 50 + 10log(Carrier Power) = 52.6dB(-20.0dBm)

- Attenuation = Carrier Power - Spurious Power > 52.6dB(-20.0dBm)

- Below 1GHz : SA PK(RBW:10kHz / VBW:30kHz) Above 1GHz : S/A PK(RBW/VBW:1MHz)

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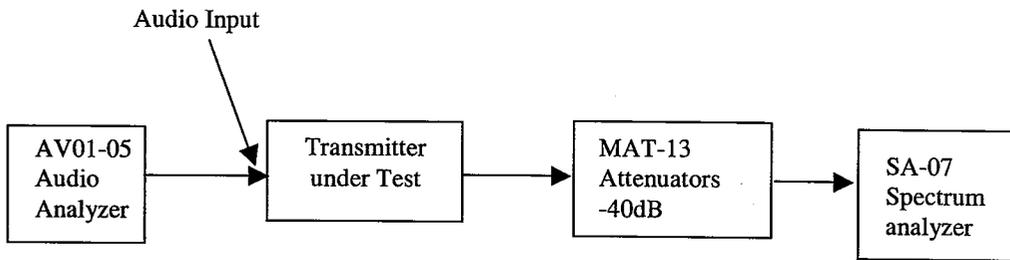
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8.3 Test result :Pass

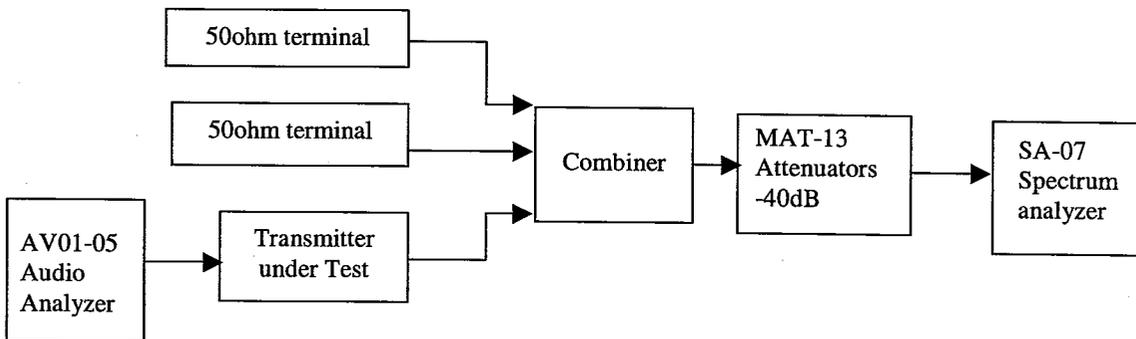
8.4 Test Instrument :MTR-02, SA-07, MAT-11, MCC-10, MAT-13, MCC-07, MCC-08, AV01-05, MDPS-01

8.5 Measurement Block Diagram



Output Level: 8dBm  
Modulation Frequency: 2.5kHz

Spurious emission at Antenna Terminals (FCC Part 2.1051)



Output Level: 8dBm  
Modulation Frequency: 2.5kHz

Spurious emission at Antenna Terminals of transmitter with combiner

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## **SECTION 9: Field Strength of Spurious Emission**

Field Strength of Spurious Emission is measured with two kind of configuration, the one is with HX68-V only and the another is with HX68-V connected with HX69-V.

### **9.1 Test Procedure : FCC 2.1053**

- 1) The HX68-V was aligned for transmitter operation on 458.5125MHz at full rated power.
- 2) The Carrier is modulated by a 2.5KHz tone at an input level 16dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulation.
- 4) Output of HX68-V was connected with dummy load attenuator 40dB.
- 5) Tune-up the transmitter (EUT).
- 6) Device Vertical: Place the device so that it's longest axis of antenna is vertical.
- 7) For each spurious measurement the receiving antenna is adjusted to the correct length for the frequency involved. These measurements are made from the lowest radio frequency generated in the EUT or 30MHz to the tenth harmonics of the carrier.
- 8) For each spurious frequency, raise and lower the receiving antenna to obtain a maximum reading on the spectrum analyzer with the antenna at horizontal polarity. Then the turntable is rotated to further increase this maximum reading. Repeat this procedure of raising and lower the antenna and rotating the turntable until highest possible signal has been obtain.  
Record this maximum reading.
- 9) Repeat Step8 for each spurious frequency with the antennae polarized vertically.
- 10) Device Horizontal : Place the device so that it's longest axis of antenna is horizontal.
- 11) Repeat Step6, Step7, and Step8.

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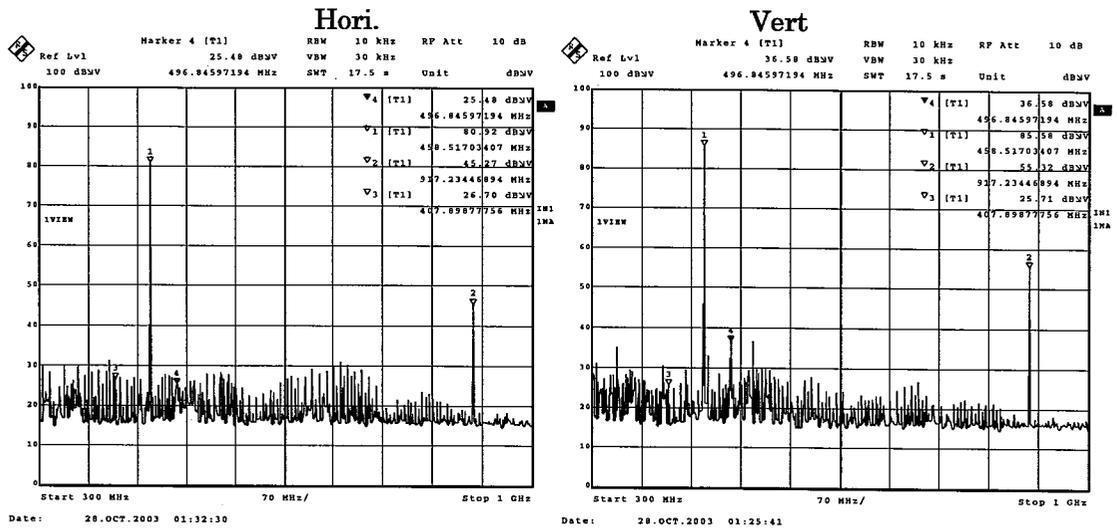
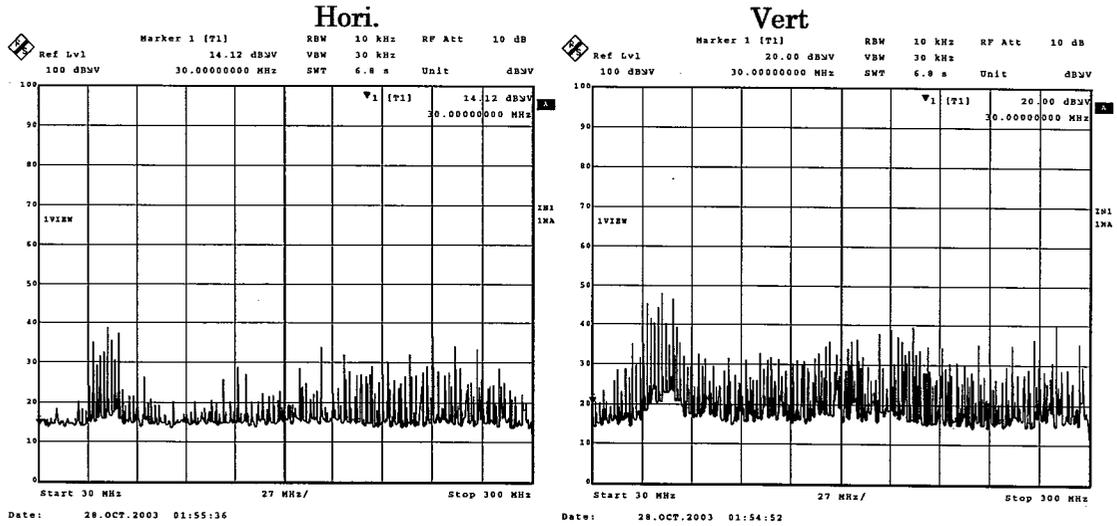
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9.2 Test Data

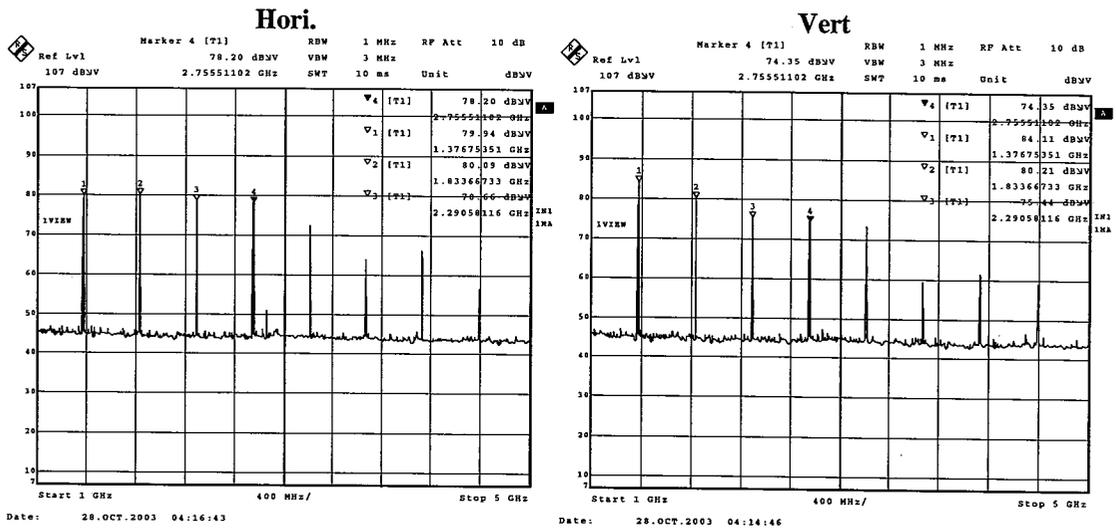
**HX68-V (Transmitting)**  
**Spurious Emission(Radiated)(Below 1GHz)**



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**Head Office EMC Lab.**  
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**HX68-V (Transmitting)**  
**Spurious Emission(Radiated) (Above 1GHz-)**



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