



**FCC CFR47 PART 95H REQUIREMENT**

**CERTIFICATION TEST REPORT**

**FOR**

**Medical Telemetry Transmitter**

**MODEL: ZM-940PA**

**FCC ID: B6BZM-940PA**

**REPORT NUMBER: 32CE0260-HO-A-R1**

**ISSUE DATE: November 14, 2011**

**Prepared for  
NIHON KOHDEN CORPORATION  
1-31-4, NISHIOCHIAI SHINJUKU-KU  
TOKYO 161-8560, JAPAN**

**Prepared by  
UL Japan, Inc.  
Head Office EMC Lab.  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
TEL: +81 596 24 8116  
FAX: +81 596 24 8124**



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. \*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

---

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	11/14/11	Initial Issue	T. Hatakeda
1	11/14/11	1. Corrected detector description on page 11 (from AV to QP). 2. Corrected equipment name on the relevant pages. *This report is a revised version of 32CE0260-HO-A, which is replaced with this report.	T. Hatakeda

---

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS</b> .....	<b>4</b>
<b>2. TEST METHODOLOGY</b> .....	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION</b> .....	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY</b> .....	<b>5</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i> .....	5
4.2. <i>MEASUREMENT UNCERTAINTY</i> .....	5
<b>5. EQUIPMENT UNDER TEST</b> .....	<b>6</b>
5.1. <i>DESCRIPTION OF EUT</i> .....	6
5.2. <i>DESCRIPTION OF CLASS II PERMISSIVE CHANGE</i> .....	6
5.3. <i>MAXIMUM OUTPUT POWER</i> .....	6
5.4. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> .....	6
5.5. <i>SOFTWARE AND FIRMWARE</i> .....	6
5.6. <i>WORST-CASE CONFIGURATION AND MODE</i> .....	7
5.7. <i>DESCRIPTION OF TEST SETUP</i> .....	7
<b>6. TEST AND MEASUREMENT EQUIPMENT</b> .....	<b>9</b>
<b>7. RADIATED EMISSION TEST RESULTS</b> .....	<b>10</b>
7.1. <i>FUNDAMENTAL OUTPUT POWER</i> .....	11
7.2. <i>RADIATED EMISSIONS BELOW 960 MHz</i> .....	12
7.3. <i>RADIATED EMISSIONS ABOVE 960 MHz</i> .....	17
<b>8. SETUP PHOTOS</b> .....	<b>19</b>

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** NIHON KOHDEN CORPORATION  
1-31-4, NISHIOCHIAI SHINJUKU-KU  
TOKYO 161-8560, JAPAN

**EUT DESCRIPTION:** Medical Telemetry Transmitter

**MODEL:** ZM-940PA

**SERIAL NUMBER:** 00821

**DATE TESTED:** NOVEMBER 3 - 5, 2011


APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 95 SUBPART H	Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Japan, Inc. By:      Tested By:

  
\_\_\_\_\_  
TAKAHIRO HATAKEDA  
Leader of WiSE Japan  
UL Verification Services  
UL Japan, Inc.

  
\_\_\_\_\_  
TOMOTAKA SASAGAWA  
Engineer of WiSE Japan  
UL Verification Services  
UL Japan, Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-C-2004, FCC CFR 47 Part 2 and FCC CFR 47 Part 95.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0  
 The full scope of accreditation can be viewed at  
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(±dB)			(1m*)(±dB)		(0.5m*)(±dB)	
	9kHz -30MHz	30MHz - 300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	5.6dB	5.9dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	5.7dB	5.8dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	5.7dB	5.8dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	5.7dB	5.8dB	5.1dB	4.2dB

\*3m/1m/0.5m = Measurement distance

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

a).	Type of EUT:	WMTS TRANSMITTER
b).	Brand Name:	NIHON KOHDEN
c).	Model No:	ZM-940PA
d).	FCC ID:	B6BZM-940PA
e).	Power Supply:	4.5 VDC (3 x AA)
f).	Number of Channels:	477 Channels
g).	Frequency Range:	608.0250-613.9750 MHz
h).	RF Conducted Output Power:	1 mW
i).	Channel Spacing:	50kHz or 37.5kHz (12.5kHz when interleave)
j).	Type of Modulation:	F1D
k).	Antenna Type	Helical Monopole Antenna with electric wire on the air core with the cover
l).	Antenna Gain	0 dBi

### 5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is changing the antenna.

### 5.3. MAXIMUM OUTPUT POWER

The test measurement passes within +/- 0.5dBm of the original output power.

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Helical Monopole antenna with electric wire on the air core with the cover, with a maximum gain of 0 dBi.

### 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Channel Writer Application rev. 1.0.1.0.

The EUT driver software installed in the host support equipment during testing was QI-901PK ver.02-04.

The test utility software used during testing was Channel.exe.

## 5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

During emission tests the antenna orientations as X, Y, and Z were investigated to determine the worst-case. The outcome showed that Horizontal: Y-orientation and Vertical: Z-orientation as the worst-case.

## 5.7 DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

N/A

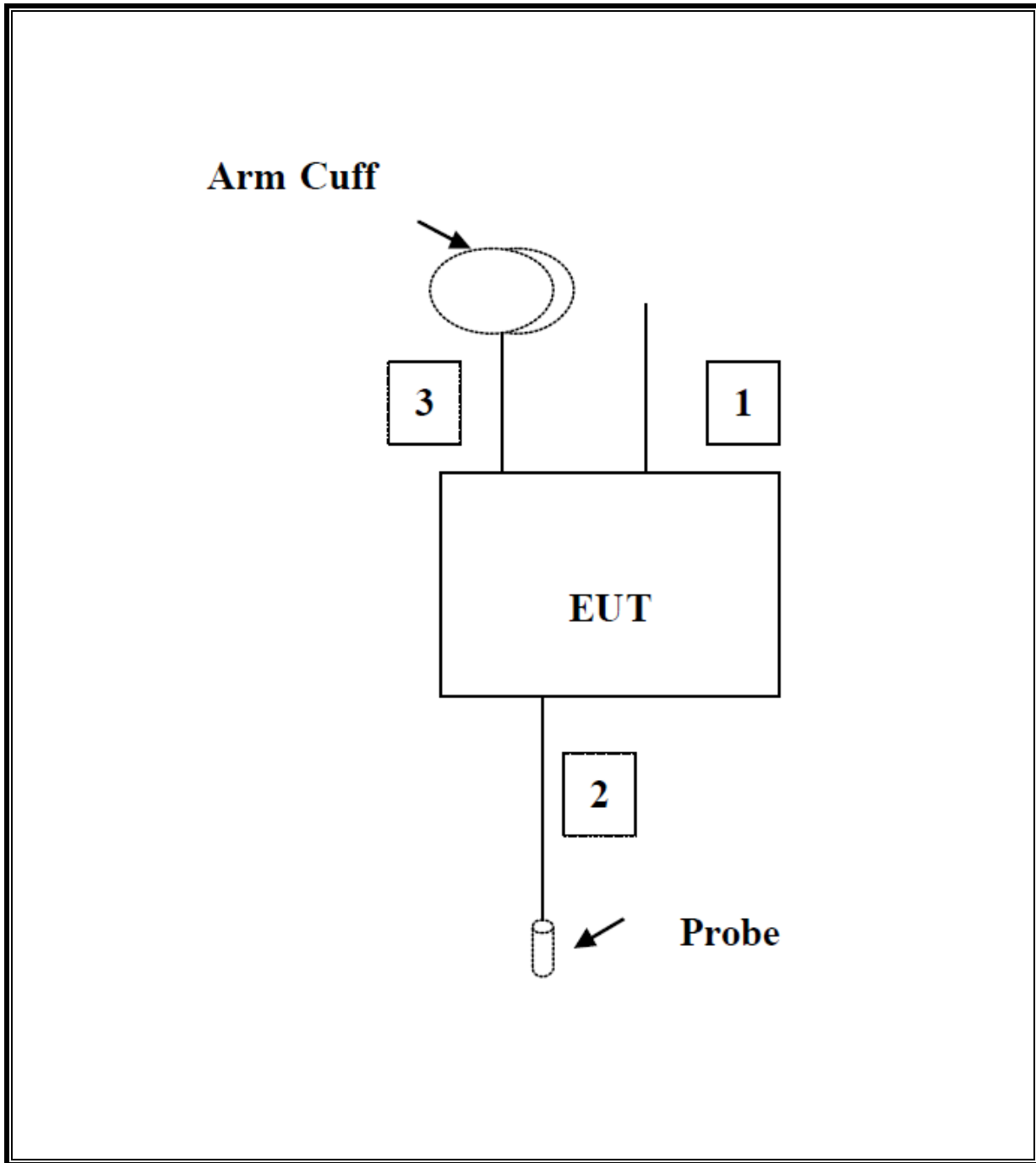
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	ECG	1	ECG	Un-shielded	0.7m	N/A
2	SpO2	1	SpO2	Un-shielded	0.7m	Probe
3	NIBP	1	NIBP socket	Rubber	0.3m	Connect to Arm Cuff

### TEST SETUP

The EUT was installed with three 1.5 VDC batteries (periodically changed to ensure 4.5VDC output). During the testing process the EUT was put in continuous transmit mode.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2011/09/21 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

RE: Radiated emission

## 7. RADIATED EMISSION TEST RESULTS

### LIMITS

§95.1115

(a) Field strength limits

(1) In the 608–614 MHz band, the maximum allowable field strength is 200 mV/m, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector.

(b) Undesired emissions.

(1) Out-of-band emissions below 960 MHz are limited to 200 microvolts/meter, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector.

(2) Out-of-band emissions above 960 MHz are limited to 500 microvolts/meter as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.

### TEST PROCEDURE

ANSI/TIA-603-C-2004

### RESULTS

## 7.1. FUNDAMENTAL OUTPUT POWER

Test Place : Head Office EMC Lab.  
 Semi Anechoic Chamber: : No. 2  
 Date : 2011/11/03  
 Temperature/Humidity : 23deg.C / 56% RH  
 Engineer: : Takayuki Shimada  
 Mode: : Tx

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	608.025	QP	94.4	19.8	10.2	28.7	95.7	106.0	10.3	
Vert	608.025	QP	91.7	19.8	10.2	28.7	93.0	106.0	13.0	
Hori	613.975	QP	93.7	19.9	10.2	28.7	95.1	106.0	10.9	
Vert	613.975	QP	91.5	19.9	10.2	28.7	92.9	106.0	13.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

## **7.2. RADIATED EMISSIONS BELOW 960 MHz**

Note 1: Plots in the range of 960 to 1000 MHz in this section are shown for reporting purposes only.

**SPURIOUS EMISSIONS 30 TO 960 MHz (HORIZONTAL)**

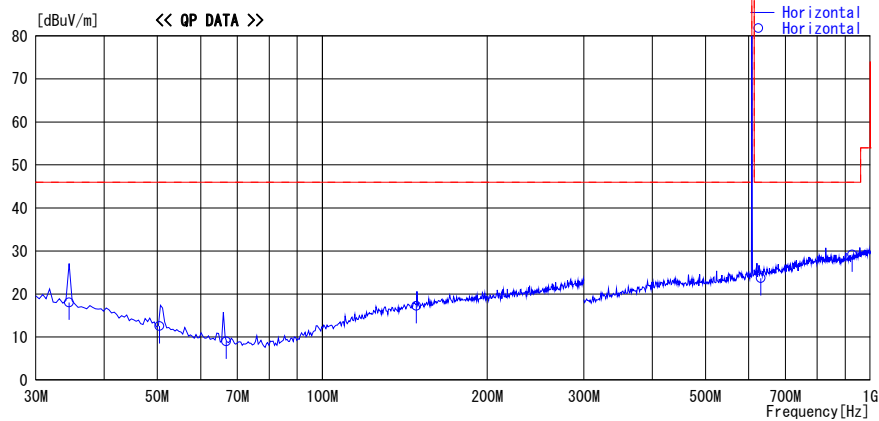
608.025MHz

**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2011/11/04

Report No. : 32CE0260-H0  
 Temp./Humi. : 22deg.C / 49% RH  
 Engineer : Tomotaka Sasagawa

Mode / Remarks : Tx 608.025MHz

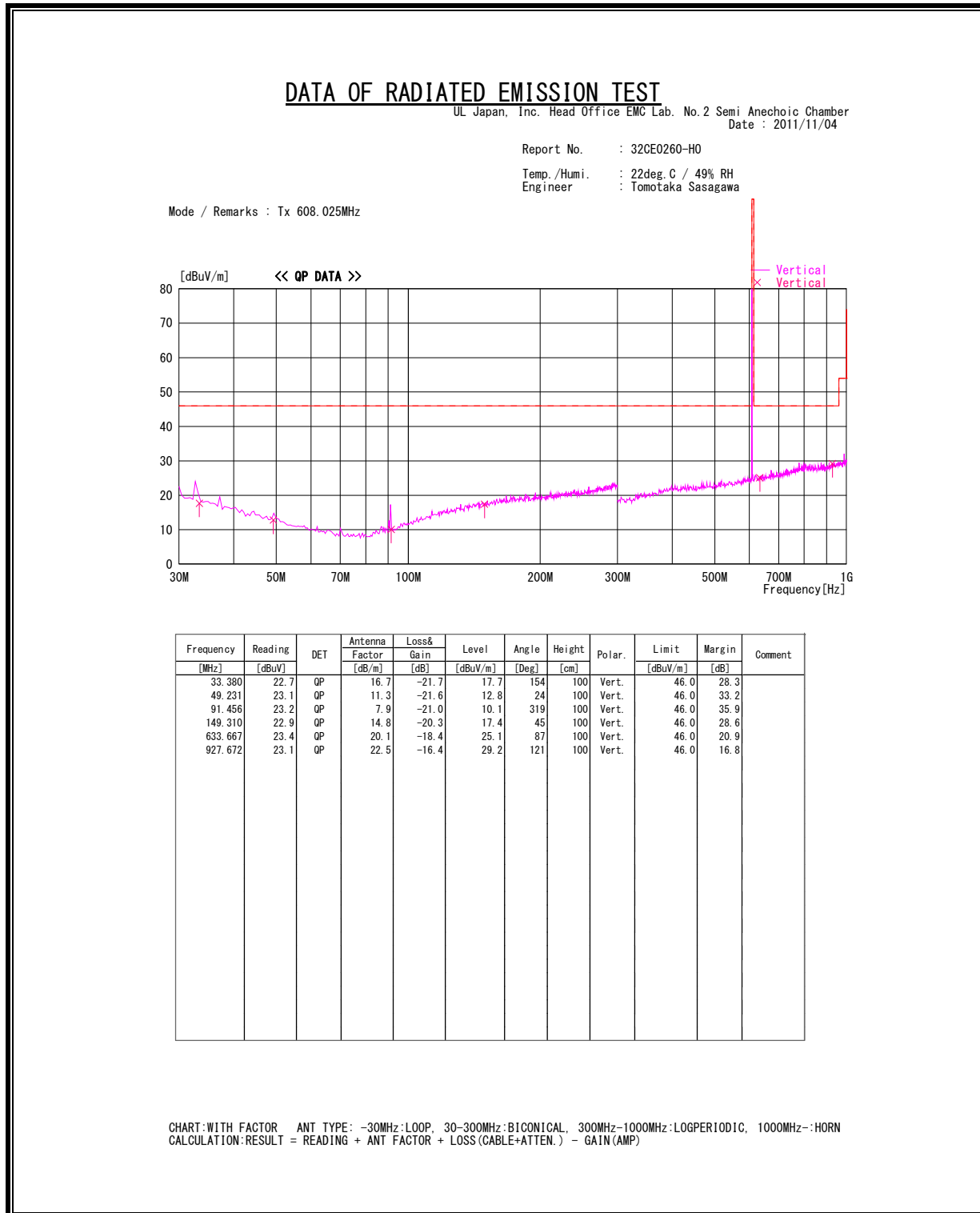


Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
34.524	23.4	QP	16.3	-21.7	18.0	245	100	Hori.	46.0	28.0	
50.413	23.1	QP	11.0	-21.6	12.5	92	100	Hori.	46.0	33.5	
66.751	23.1	QP	7.2	-21.3	9.0	331	100	Hori.	46.0	37.0	
148.392	22.8	QP	14.7	-20.3	17.2	101	100	Hori.	46.0	28.8	
631.334	22.0	QP	20.1	-18.4	23.7	233	100	Hori.	46.0	22.3	
926.505	23.1	QP	22.5	-16.4	29.2	143	100	Hori.	46.0	16.8	

CHART:WITH FACTOR ANT TYPE:-30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz--:HORN  
 CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

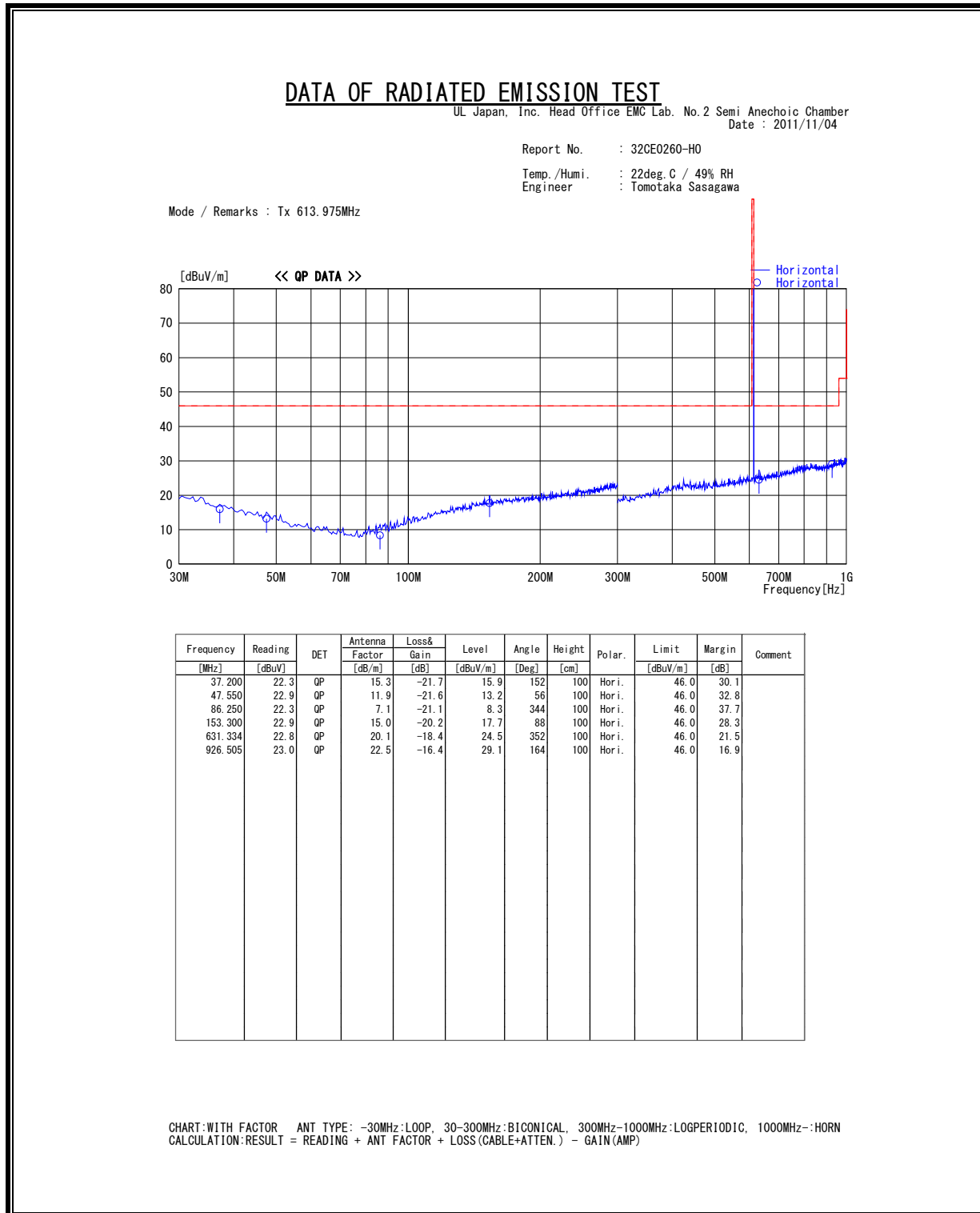
**SPURIOUS EMISSIONS 30 TO 960 MHz (VERTICAL)**

608.025MHz



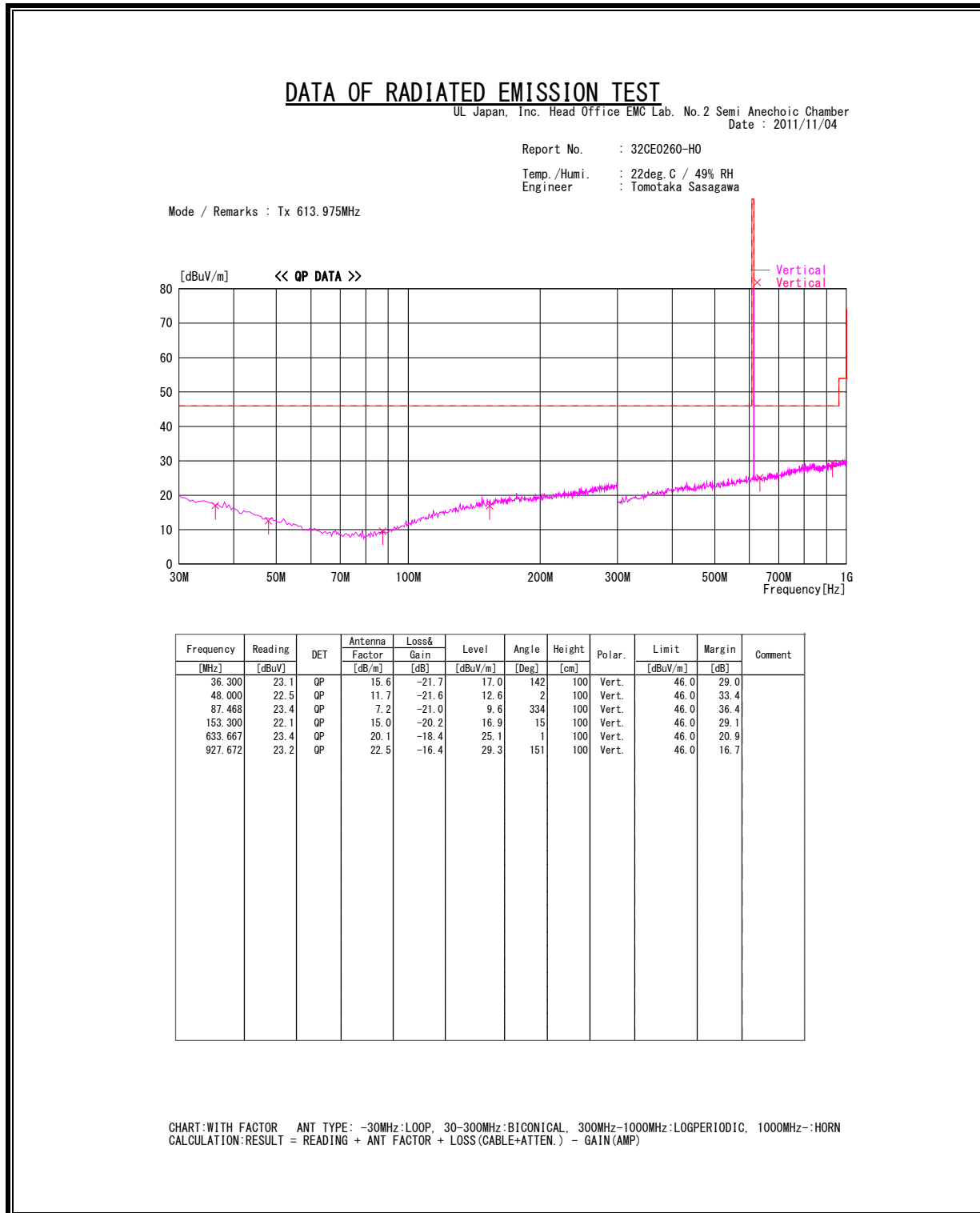
**SPURIOUS EMISSIONS 30 TO 960 MHz (HORIZONTAL)**

613.975MHz



**SPURIOUS EMISSIONS 30 TO 960 MHz (VERTICAL)**

613.975MHz





### 7.3. RADIATED EMISSIONS ABOVE 960 MHz

#### HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz 608.025MHz

Report No. : 32CE0260-HO  
 Test Place : Head Office EMC Lab.  
 Semi Anechoic Chamber: : No. 2  
 Date : 2011/11/05  
 Temperature/Humidity : 22deg.C / 49% RH  
 Engineer: : Tomotaka Sasagawa  
 Mode: : Tx 608.025MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1216.050	AV	41.5	24.6	2.2	33.6	34.7	54.0	19.4	
Hori	1824.075	AV	34.8	26.3	2.4	32.8	30.7	54.0	23.3	
Hori	2432.100	AV	39.9	27.5	2.8	32.4	37.8	54.0	16.2	
Hori	3040.125	AV	42.0	28.4	3.0	32.3	41.1	54.0	13.0	
Hori	3648.150	AV	35.5	29.5	3.3	32.0	36.3	54.0	17.7	
Hori	4256.175	AV	35.3	30.3	3.5	31.7	37.4	54.0	16.6	
Hori	4864.200	AV	35.5	31.5	3.7	31.5	39.2	54.0	14.8	
Hori	5472.225	AV	34.5	31.8	3.9	31.3	38.9	54.0	15.1	
Hori	6080.250	AV	34.1	32.9	4.7	31.4	40.3	54.0	13.7	
Vert	1216.050	AV	44.7	24.6	2.2	33.6	37.9	54.0	16.1	
Vert	1824.075	AV	35.0	26.3	2.4	32.8	30.9	54.0	23.1	
Vert	2432.100	AV	40.3	27.5	2.8	32.4	38.2	54.0	15.8	
Vert	3040.125	AV	45.1	28.4	3.0	32.3	44.2	54.0	9.8	
Vert	3648.150	AV	36.0	29.5	3.3	32.0	36.8	54.0	17.2	
Vert	4256.175	AV	34.5	30.3	3.5	31.7	36.6	54.0	17.4	
Vert	4864.200	AV	34.7	31.5	3.7	31.5	38.4	54.0	15.6	
Vert	5472.225	AV	34.2	31.8	3.9	31.3	38.6	54.0	15.4	
Vert	6080.250	AV	33.9	32.9	4.1	31.4	39.5	54.0	14.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amplifier)

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz**  
**613.975MHz**

Report No. : 32CE0260-HO  
 Test Place : Head Office EMC Lab.  
 Semi Anechoic Chamber: : No. 2  
 Date : 2011/11/05  
 Temperature/Humidity : 22deg.C / 49% RH  
 Engineer: : Tomotaka Sasagawa  
 Mode: : Tx 613.975MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1227.950	AV	41.7	24.6	1.6	33.6	34.3	54.0	19.7	
Hori	1841.950	AV	35.1	26.4	1.9	32.7	30.7	54.0	23.3	
Hori	2455.900	AV	37.7	27.5	2.3	32.4	35.1	54.0	18.9	
Hori	3069.875	AV	42.3	28.5	2.6	32.3	41.1	54.0	12.9	
Hori	3683.850	AV	34.2	29.6	2.8	31.9	34.7	54.0	19.3	
Hori	4297.825	AV	34.5	30.3	3.0	31.7	36.1	54.0	17.9	
Hori	4911.800	AV	34.1	31.6	3.3	31.5	37.5	54.0	16.5	
Hori	5525.775	AV	34.2	31.9	3.5	31.3	38.3	54.0	15.7	
Hori	6139.750	AV	34.0	33.0	3.7	31.4	39.3	54.0	14.7	
Vert	1227.950	AV	47.3	24.6	2.2	33.6	40.5	54.0	13.5	
Vert	1841.950	AV	34.8	26.4	2.4	32.7	30.9	54.0	23.1	
Vert	2455.900	AV	37.4	27.5	2.9	32.4	35.4	54.0	18.6	
Vert	3069.875	AV	43.4	28.5	3.1	32.3	42.7	54.0	11.3	
Vert	3683.850	AV	34.5	29.6	3.3	31.9	35.5	54.0	18.5	
Vert	4297.825	AV	34.2	30.3	3.5	31.7	36.3	54.0	17.7	
Vert	4911.800	AV	34.3	31.6	3.8	31.5	38.2	54.0	15.8	
Vert	5525.775	AV	34.3	31.9	3.9	31.3	38.8	54.0	15.2	
Vert	6139.750	AV	34.1	33.0	4.2	31.4	39.9	54.0	14.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amplifier)