JAPAN QUALITY ASSURANCE ORGANIZATION
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EMI TEST REPORT

JQA File No.	: 400-50264
Model No.	: HBH0143-010010
Type of Equipment	: Bluetooth Headset
Regulations Applied	: CFR 47 FCC Rules and Regulations Part 15 : Industry Canada RSS-210 Issue 5(inc. Amendment)
FCC ID IC	: PYAHS-26W : 661V-HS26W
Applicant	: NOKIA Corporation
Address	: Joensuunkatu 7, 24100 Salo, Finland
Manufacturer	: HOSIDEN Corporation
Address	: 1-4-33, Kitakyuhoji, Yao-City, Osaka, 581-0071 Japan
Received date of EUT	: July 11, 2005

Final Judgment : Passed

Test results in this report are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.

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1. DOCUMENTATION

1.1 TEST REGULATION

FCC Rules and Regulations Part 15 Subpart B and C Radiated Spurious Emissions and Industry Canada IC RSS-210 (inc. amendment)

Test procedure :

The tests were performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000. The test set-up was made in accordance to the general provisions of ANSIC63.4-2003.

1.2 GENERAL INFORMATION

1.2.1 Test facility :

JQA Safety & EMC Center EMC Engineering Department is recognized under ISO/IEC 17025 by NVLAP and VLAC.

1) Test Facility located at EMC Engineering Dept. Testing Div. :
   - No.2 and 3 Anechoic Chambers(3 meters Site).
   - Shielded Enclosure.

   Open Area Test Site Industry Canada No.: IC4126-4

2) EMC Engineering Dept. Testing Div. is recognized under the National Voluntary Laboratory accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.
   NVLAP Lab Code : 200189-0 (Effective through : June 30, 2006)

1.2.2 Description of the Equipment Under Test (EUT) :

1)	Type of Equipment	: Bluetooth Headset
2)	Product Type	: Pre-production
3)	Category	: Spread Spectrum Transmitter(FHSS)
4)	EUT Authorization	: Certification
5)	FCC ID	: PYAHS-26W
	IC	: 661V-HS26W
6)	Trade Name	: NOKIA
7)	Model No.	: HBH0143-010010
8)	Operating Frequency Range	: 2402 MHz - 2480 MHz
9)	Highest Frequency Used in the EUT	: 2480 MHz
10)	RF Output Power	: 0.01Bm(measured value)
11)	Serial No.	: None
12)	Date of Manufacture	: None
13)	Power Rating	: 2.4VDC (rechargeable battery)

The EUT was also operated with
the AC Adaptor(Model:AC-3U or AC-4U, Input:100-240VAC 50/60Hz, Output:2.0VDC by NOKIA Corporation)
or DC Adaptor(Model:DC-4, Input:100-240VAC 50/60Hz, Output:2.0VDC by NOKIA Corporation)

14) EUT Grounding : None

1.2.3 Definitions for symbols used in this test report :

_x_ - indicates that the listed condition, standard or equipment is applicable for this report.

___ - indicates that the listed condition, standard or equipment is not applicable for this report.

1.3 TEST CONDITION

1.3.1 The measurement of Channel Separation

___ - was performed.
_x_ - was not applicable.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18
Antenna	N/A

1.3.2 The measurement of Minimum Hopping Channel

___ - was performed.
_x_ - was not applicable.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18
Antenna	N/A

1.3.3 The measurement of Occupied Bandwidth

_x_ - was performed.
___ - was not applicable.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18
Antenna	N/A

1.3.4 The measurement of Dwell Time

___ - was performed.
_x_ - was not applicable.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18
Antenna	N/A

1.3.5 The measurement of Peak Output Power and Density (Conduction)

_x_ - was performed.
___ - was not applicable.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18
Antenna	N/A
Digitizing Oscilloscope	AU25
RF Detector	AU23
Signal Generator	SG03

1.3.6 The measurement of Peak Output Power and Density (Radiation)

___ - was performed in the following test site.
_x_ - was not applicable.

Test location :

Safety & EMC Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

___ - No. 2 site (3 meters)
___ - No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A
2) Interval : N/A

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	N/A
Spectrum Analyzer	N/A
Cable	N/A
Attenuator	N/A
Antenna	N/A
Power Meter	N/A
Power Sensor	N/A
Signal Generator	N/A

1.3.7 The measurement of Spurious Emissions (Conduction)

_x_ - was performed.
___ - was not performed.

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11
Attenuator	AU18

1.3.8 The measurement of Spurious Emissions (Radiation)(9 kHz – 30 MHz)

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety & EMC Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - Anechoic Chamber No. 2 (3 meters)
___ - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A
2) Interval : N/A

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Cable	CA06
Antenna	AN01

1.3.9 The measurement of Spurious Emissions (Radiation) (30 MHz – 1000 MHz)

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety & EMC Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - Anechoic Chamber No. 2 (3 meters)
___ - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 2005
2) Interval :1 year

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR05
Cable	CA01
Antenna	AN06, AN08
RF Amplifier	N/A

1.3.10 The measurement of Spurious Emissions (Radiation) (Above 1000 MHz)

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety & EMC Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - No. 2 site (3 meters)
___ - No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 2005
2) Interval :1 year

Used test instruments :

Type	Number of test instruments (Refer to Appendix)
Test Receiver	TR07
Spectrum Analyzer	N/A
Cable	CA11, CA13
Antenna	AN10, AN12
RF Amplifier	AM09
Band Reject Filter	AU16
High Pass Filter	AU17

1.3.11 The measurement of AC Power Line Conducted Emissions

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety & EMC Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - Shielded Enclosure
___ - Anechoic Chamber No. 2 (portable Type)

Used test instruments :

Type	**Number of test instruments (Refer to Appendix)**
Test Receiver	TR01
Spectrum Analyzer	SA02, SA03
Cable	CA03
AMN(for EUT)	NE01
AMN(for Peripheral)	NE02
Termination	AU01

1.4 EUT MODIFICATION / Deviation from Standard

1.4.1 EUT MODIFICATION

_x_ - No modifications were conducted by JQA to achieve compliance to Class B levels.
___- To achieve compliance to Class B levels, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Date :

Typed Name : Position :

1.4.2 Deviation from Standard:

_x_ - No deviations from the standard described in clause 1.1.
___- The following deviations were employed from the standard described in clause 1.1:

1.5 TEST RESULTS

Channel Separation x - Applicable ___ - NOT Applicable
[§15.247(a)(1)], [§6.2.2(o)(a1)]
The requirements are x - PASSED ___ - NOT PASSED
Remarks :

Minimum Hopping Channel x - Applicable ___ - NOT Applicable
[§15.247(a)(1)(iii)], [§6.2.2(o)(a3)]
The requirements are x - PASSED ___ - NOT PASSED
Remarks:

Occupied Bandwidth x - Applicable ___ - NOT Applicable
[§15.247(a)(2)], [§5.9.1]
The requirements are x - PASSED ___ - NOT PASSED
Remarks:

Dwell Time x - Applicable ___ - NOT Applicable
[§15.247(a)(1)(iii)/(g)], [§6.2.2(o)(a3)/(c2)]
The requirements are x - PASSED ___ - NOT PASSED
Remarks:

Peak Output Power (Conduction) x - Applicable ___ - NOT Applicable
[§15.247(b)(3)], [§6.2.2(o)(b)]
The requirements are x - PASSED ___ - NOT PASSED
Remarks:

Peak Output Power (Radiation) ___ - Applicable x - NOT Applicable
[§15.247(b)(1)], [§6.2.2(o)(b)]
The requirements are ___ - PASSED ___ - NOT PASSED
Remarks:

Peak Power Density (Conduction) x - Applicable ___ - NOT Applicable
[§15.247(d)], [§6.2.2(o)(b)]
The requirements are x - Not Performed
Remarks:

Peak Power Density (Radiation) ___ - Applicable x - NOT Applicable
[§15.247(d)], [§6.2.2(o)(b)]
The requirements are ___ - PASSED ___ - NOT PASSED
Remarks:

Spurious Emissions (Conduction) [§15.247(c)], [§6.2.2(o)(e1)] x - Applicable ___ - NOT Applicable

The requirements are x - PASSED ___ - NOT PASSED

Remarks:

Spurious Emissions (Radiation) [§15.247(c), §15.35(b), §15.209(a)], [§6.2.2(o)(e1)] x - Applicable ___ - NOT Applicable

The requirements are x - PASSED ___ - NOT PASSED

Remarks:

AC Power Line Conducted Emissions [§15.207(a)], [§6.6] x - Applicable ___ - NOT Applicable

The requirements are x - PASSED ___ - NOT PASSED

Remarks:

RF Exposure Compliance [§15.247(b)(5)], [§14] ___ - Applicable x - NOT Applicable

The requirements are ___ - PASSED ___ - NOT PASSED

Remarks:

Spurious Emissions for Receiver (Radiation)[§15.109(a)], [§7.3] x - Applicable ___ - NOT Applicable

The requirements are x - PASSED ___ - NOT PASSED

Remarks:

AC Power Line Conducted Emissions for Receiver [§15.107(a)], [§7.4] x - Applicable ___ - NOT Applicable

The requirements are x - PASSED ___ - NOT PASSED

Remarks:

1.6 SUMMARY

General Remarks :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart B, Subpart C and IC RSS-210 issue 5 (including Amendment) under the test configuration, as shown in clause 1.7 to 1.10.
The conclusion for the test items which are required by the applied regulation is indicated under the final judgment.

Final Judgment :

The "as received" sample;

x - fulfill the test requirements of the regulation mentioned on clause 1.1.

___ - fulfill the test requirements of the regulation mentioned on clause 1.1, but with certain qualifications.

___ - doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing : July 13, 2005

End of testing : July 16, 2005

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by:

M. Takahashi

Masaaki Takahashi
Senior Manager
JQA EMC Engineering Dept.

Issued by:

Shigeru Osawa

Shigeru Osawa
Assistant Manager
JQA EMC Engineering Dept.

1.7 TEST CONFIGURATION / OPERATION OF EUT

1.7.1 Test Configuration

The equipment under test (EUT) consists of :

Symbol	Item	Manufacturer	Model No.	FCC ID/IC	Serial No.
A(*1)	Bluetooth Headset	HOSIDEN Corporation	HBH0143-010010	PYAHS-26W 661V-HS26W	None
B	Rechargeable Battery	-	-	N/A	None
C	AC Adaptor	NOKIA Corporation	AC-3U, AC-4U	N/A	None None
D	DC Adaptor	NOKIA Corporation	DC-4	N/A	None None

(*1) The EUT was also operated with the AC adaptor(Model:AC-3U or AC-4U, Input:100-240VAC 50/60Hz, Output:2.0DC by NOKIA Corporation) or DC adaptor(Model:AC-4, Input:12/24VDC, Output:2.0DC by NOKIA Corporation).

The measurement was carried out with the following support equipment connected :

Symbol	Item	Manufacturer	Model No.	FCC ID/IC	Serial No.
E	Battery	JAPAN STORAGE BATTERY CO., LTD.	PXL12072	N/A	None

Type of Cable :

Symbol	Description	Identification (Manufacturer etc.)	Connector Shielded YES / NO	Cable Shielded YES / NO	Ferrite Core	Length (m)
1	AC-3U DC Cable	-	NO	NO	NO	1.80
2	AC-4U DC Cable	-	NO	NO	NO	1.80
3	DC-4 DC Cable	-	NO	NO	NO	0.30
4	DC ext. Cable	-	NO	NO	NO	0.80

1.7.2 Operating condition

Power supply Voltage : 2.4VDC operate with AC or DC Adaptor

The tests have been carried out the following mode.

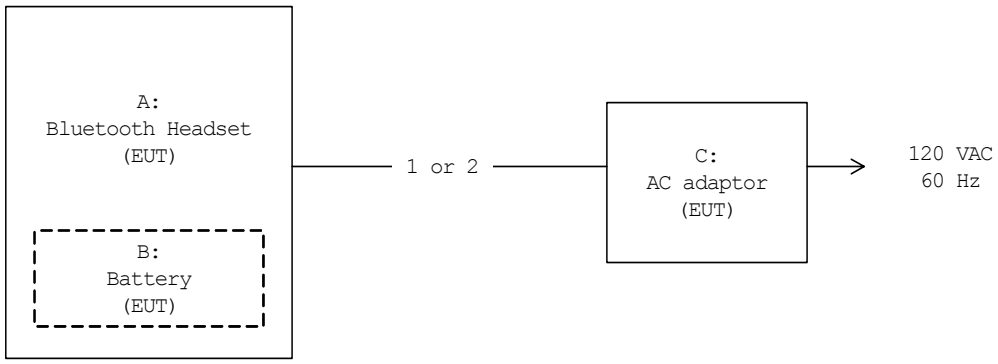
1) TX mode (0ch: 2402 MHz)
2) TX mode (39ch: 2441 MHz)
3) TX mode (78ch: 2480 MHz)
4) RX mode

1.7.3 Generating and Operating frequency of EUT

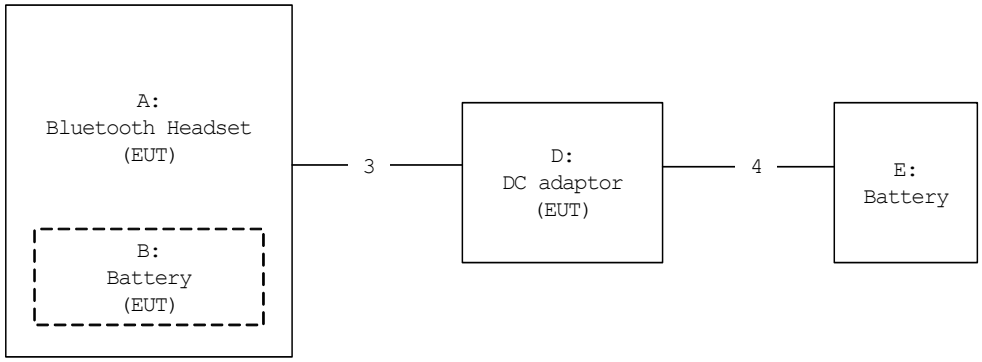
2402 MHz to 2480 MHz

1.8 EUT ARRANGEMENT (DRAWINGS)

(a)AC Adaptor Operation



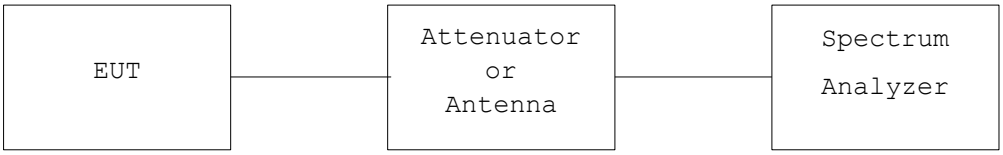
(b)DC Adaptor Operation



1.9 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.9.1 Channel Separation

The EUT have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.



1.9.2 Minimum Hopping Channel

The EUT have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.
Measurement setup is same as sub-clause 1.9.1.

1.9.3 Occupied Bandwidth

Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 6 dB or 20 dB bandwidth, centered on a channel
RBW ≥ 1% of the 6 dB or 20 dB bandwidth
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB or 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB or 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.
Measurement setup is same as sub-clause 1.9.1.

1.9.4 Dwell Time

The EUT must have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel
RBW ≤ Channel Separation
VBW ≥ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold
If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.
Measurement setup is same as sub-clause 1.9.1.

1.9.5 Peak Output Power (Conduction)

In case of conducted measurements, the transmitter shall be connected to the measuring equipment via a suitable attenuator. The measurement shall be performed using normal operation of the equipment with the test modulation applied.

The test procedure shall be as follows;

(step 1):

- using a suitable means, the output of the transmitter shall be coupled to a diode detector;
- the output of the diode detector shall be connected to the vertical channel of an oscilloscope;
- the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal;
- The observed value shall be recorded as "A" (in dBm);

(step 2):

- the transmitter shall be replaced by a signal generator. The output frequency of the signal shall be made equal to the centre of the frequency range occupied by the transmitter;
- the signal generator shall be unmodulated. The output power of the signal generator shall be raised to a level such that the deviation of the Y-trace of the oscilloscope reaches level A, as indicated in step 1;
- The signal generator output level shall be recorded;

The measurement shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range.

1.9.6 Peak Power Density (Conduction)

Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a channel
RBW = Specified Value
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
Measurement setup is same as sub-clause 1.9.1.

1.9.7 Peak Output Power and Peak Power Density (Radiation)

The radiated power output and the field strength of the transmitter radiation were measured at the distance at 3 meters away from the transmitter under test which was placed on a turntable 0.8 meter in height. The receiving antenna was oriented for vertical polarization and raised or lowered through 1 to 4 meters until the maximum signal level was detected on the measuring instrument. The transmitter under test was rotated through 360° until the maximum signal was received. The measurement was repeated with the receiving antenna in the horizontal polarization.

The transmitter was removed and replaced with the antenna. The center of the antenna was placed approximately at the same location as the center of the transmitter. The antenna was fed with a signal generator, and the output level of the signal generator was adjusted to obtain the previously recorded maximum reading at the particular frequency and recorded. This procedure was repeated with the receiving antenna and the antenna in the orthogonal polarization.

The input power into the antenna was measured using the power meter. The level of the emissions in dBm(EIRP) were calculated from the following formula:

Transmitter Power[dBm](EIRP)= (Meter Reading of Power Meter) + (Antenna Gain[dBi])

Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a channel
RBW : Greater then the 20 dB bandwidth of the emission being measured
or Specified Value
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

1.9.8 Spurious Emission (Conduction)

Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

Spurious RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

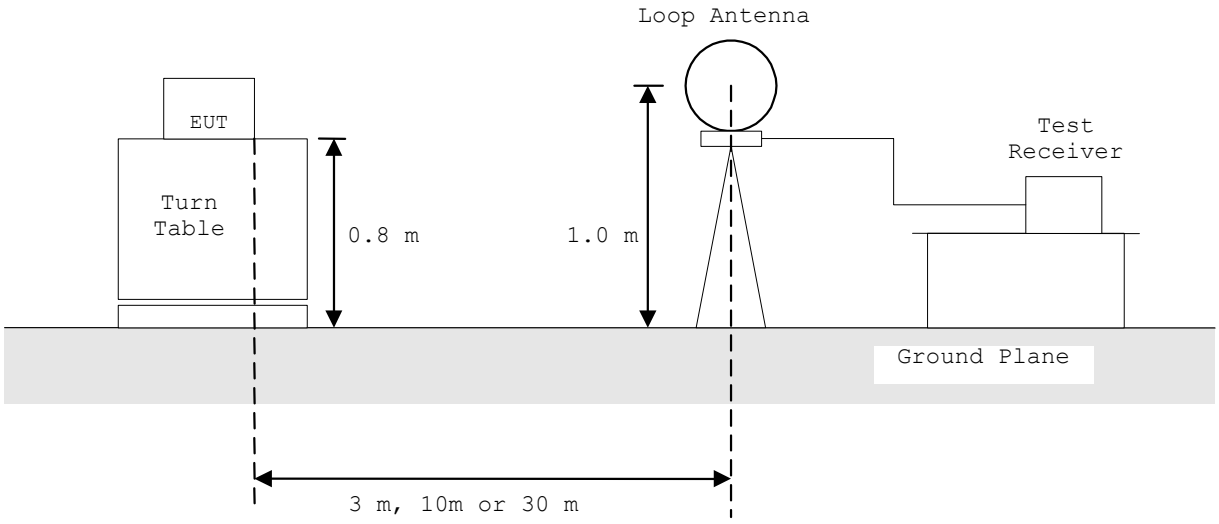
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

Measurement setup is same as sub-clause 1.9.1.

1.9.9 Radiated Emission (9 kHz – 30 MHz) :

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -

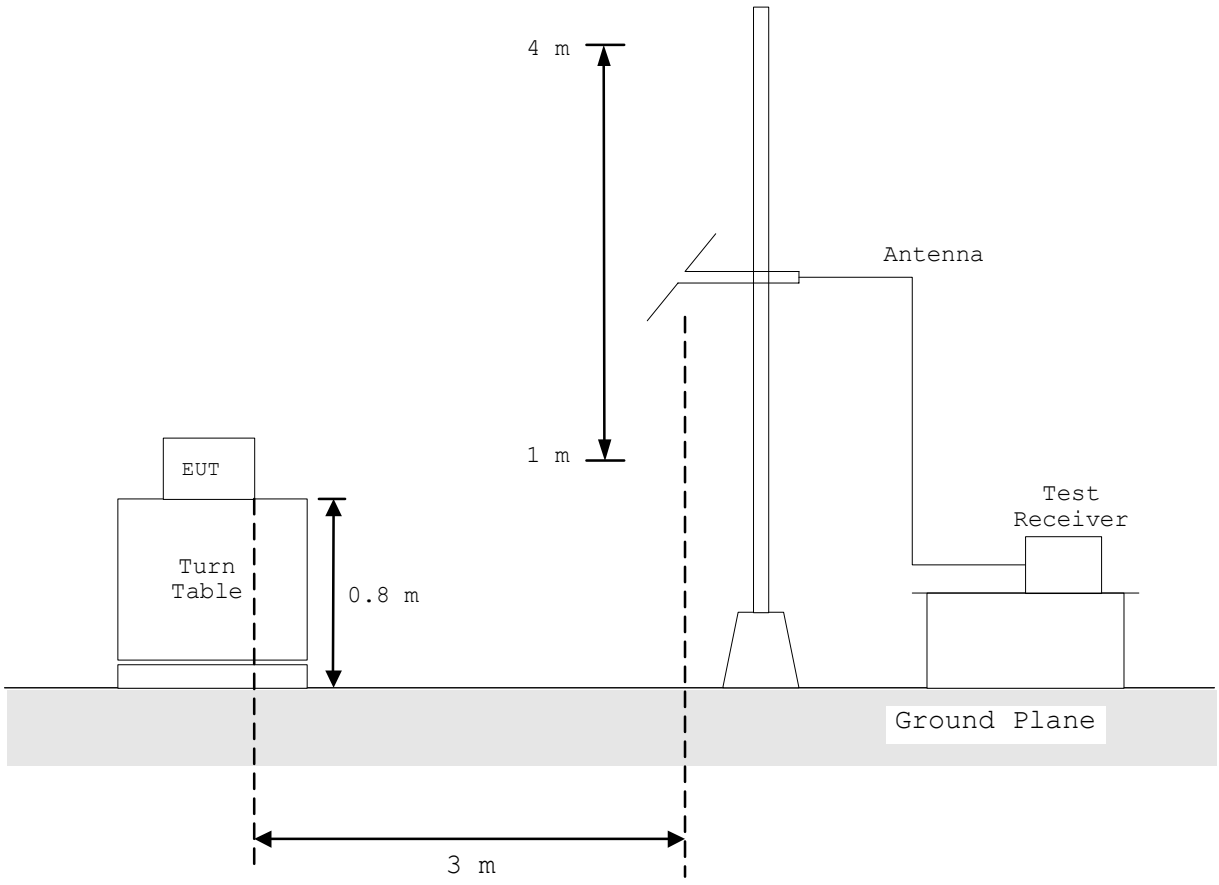


1.9.10 Radiated Emission (30 MHz – 1000 MHz) :

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

- Side View -

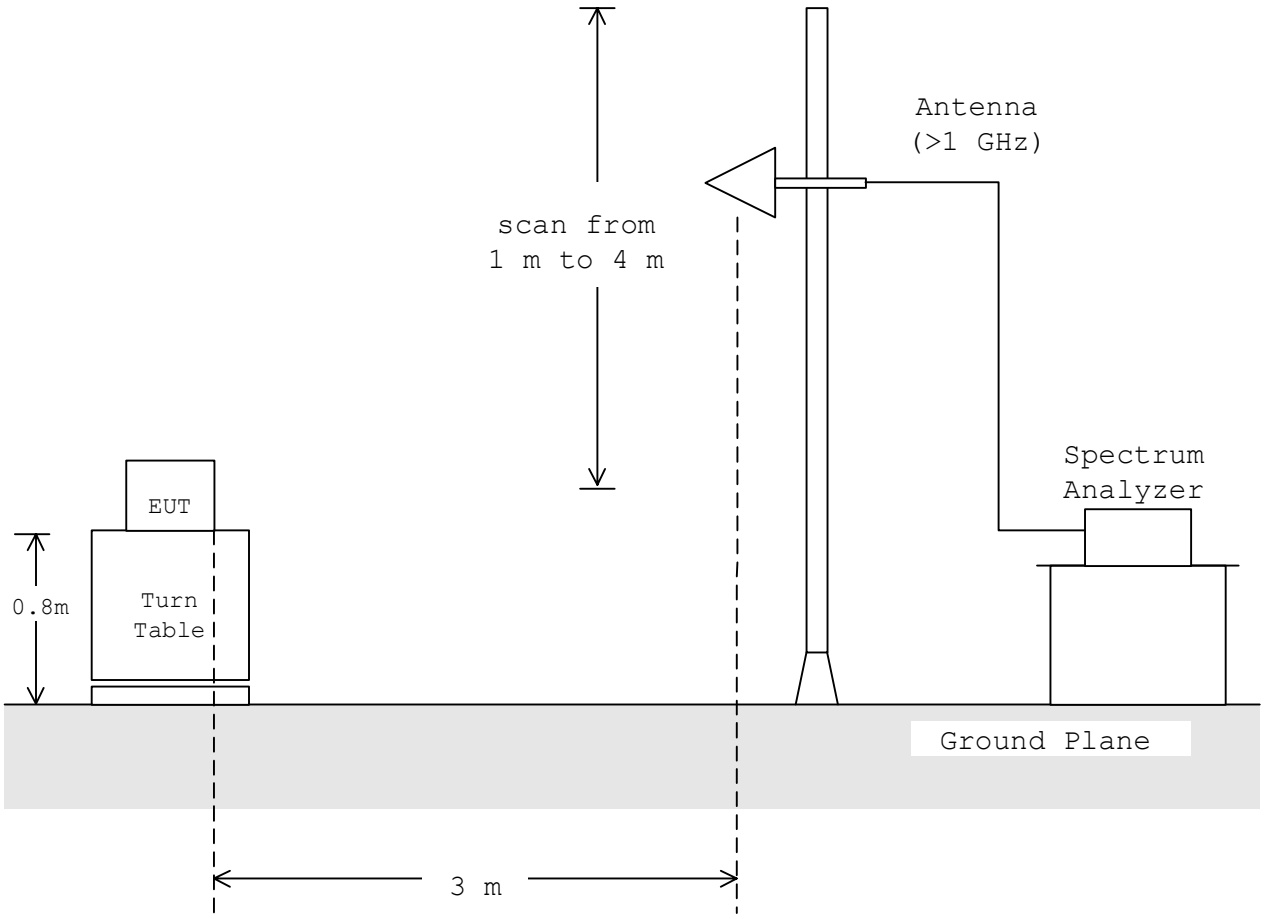


1.9.11 Radiated Emission (Above 1 GHz) :

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

- Side View -

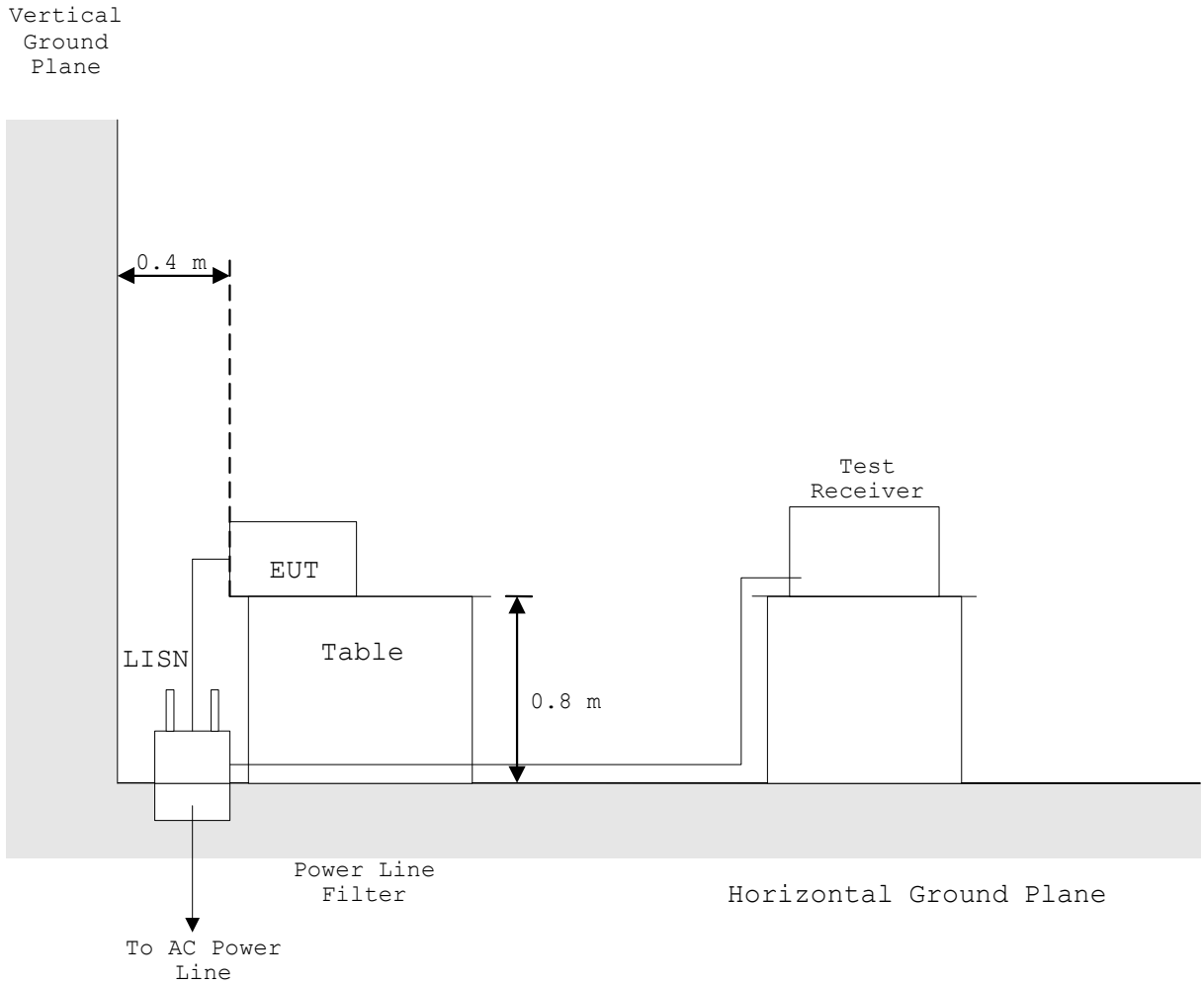


1.9.12 AC Power Line Conducted Emission (150 kHz – 30 MHz) :

According to description of ANSI C63.4-2003 sec.13.1.3, the AC power line preliminary conducted emissions measurements were carried out.
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

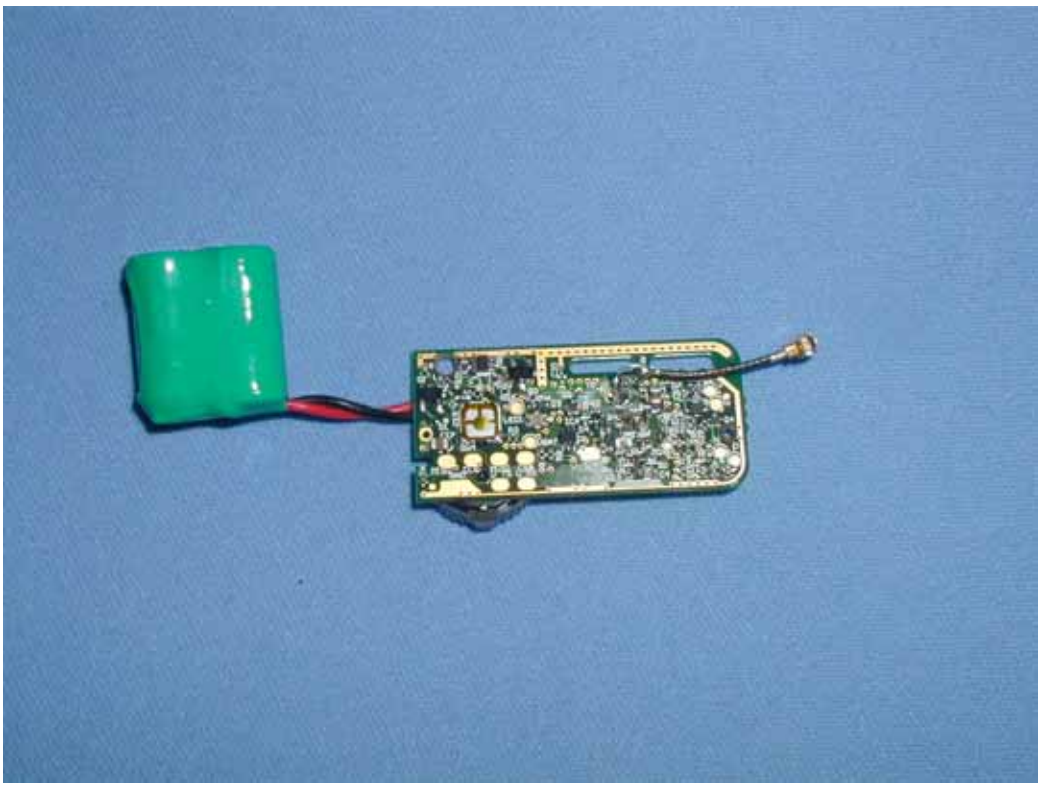
Shielded Enclosure

- Side View -



1.10 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF THE CONDUCTED TEST



PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission

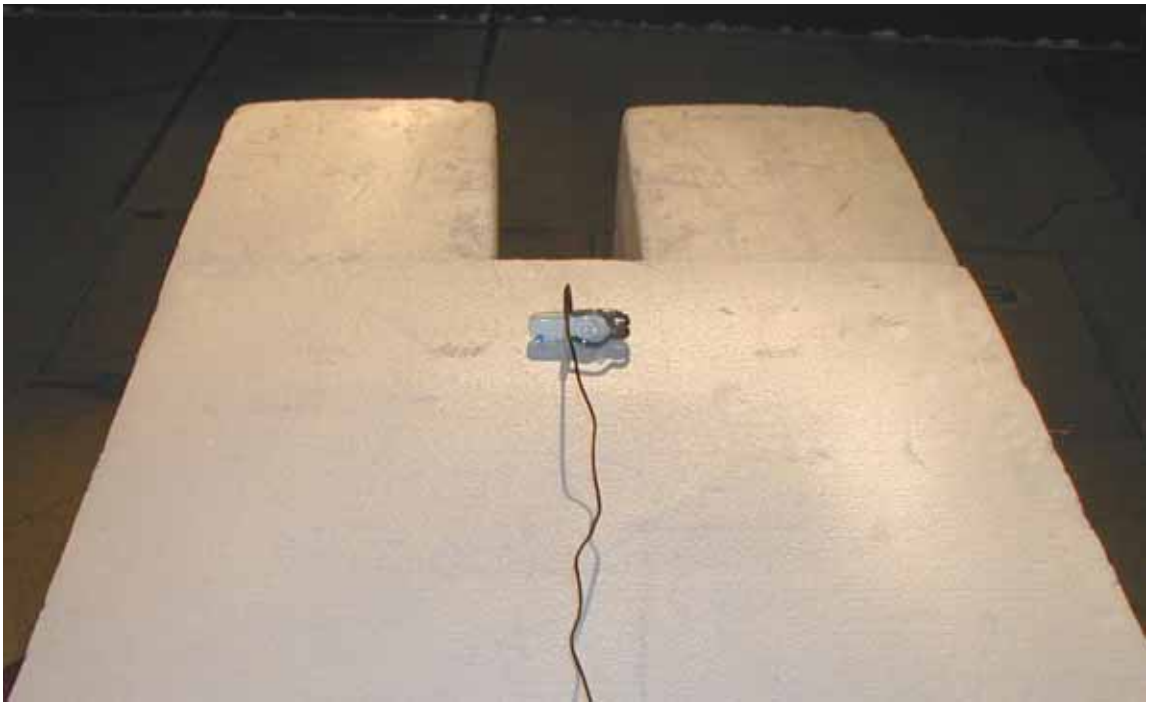
- Front view (AC Adaptor operation X axis) -

- Rear view (AC Adaptor operation X axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission

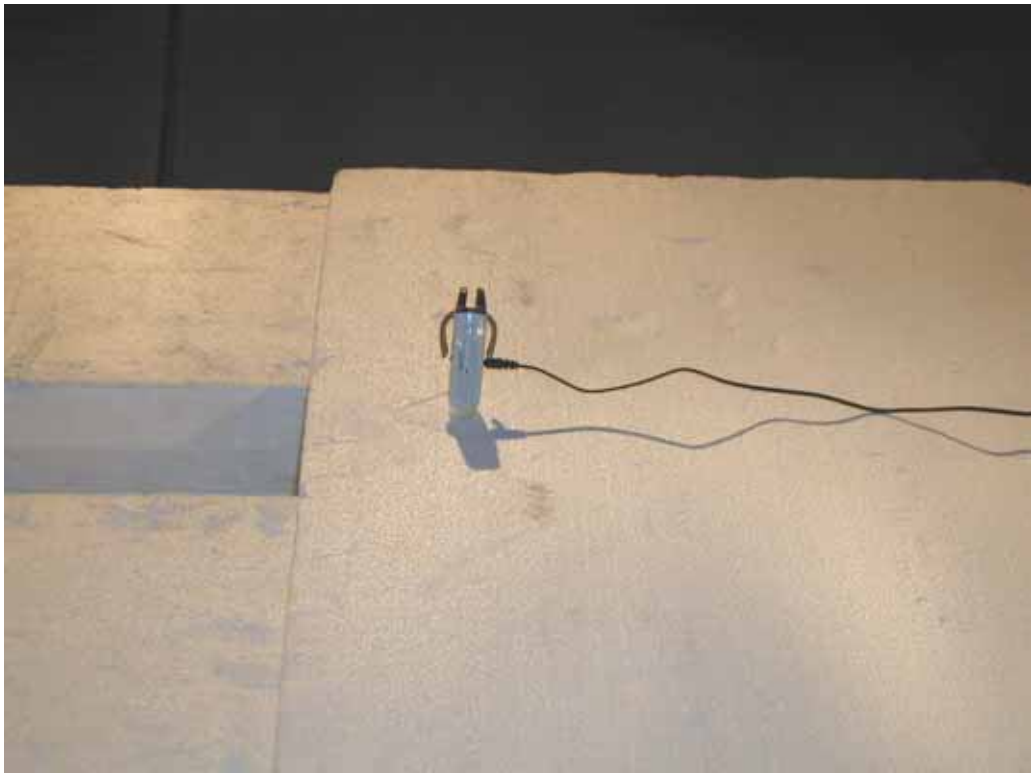
- Front view (AC Adaptor operation Y axis) -



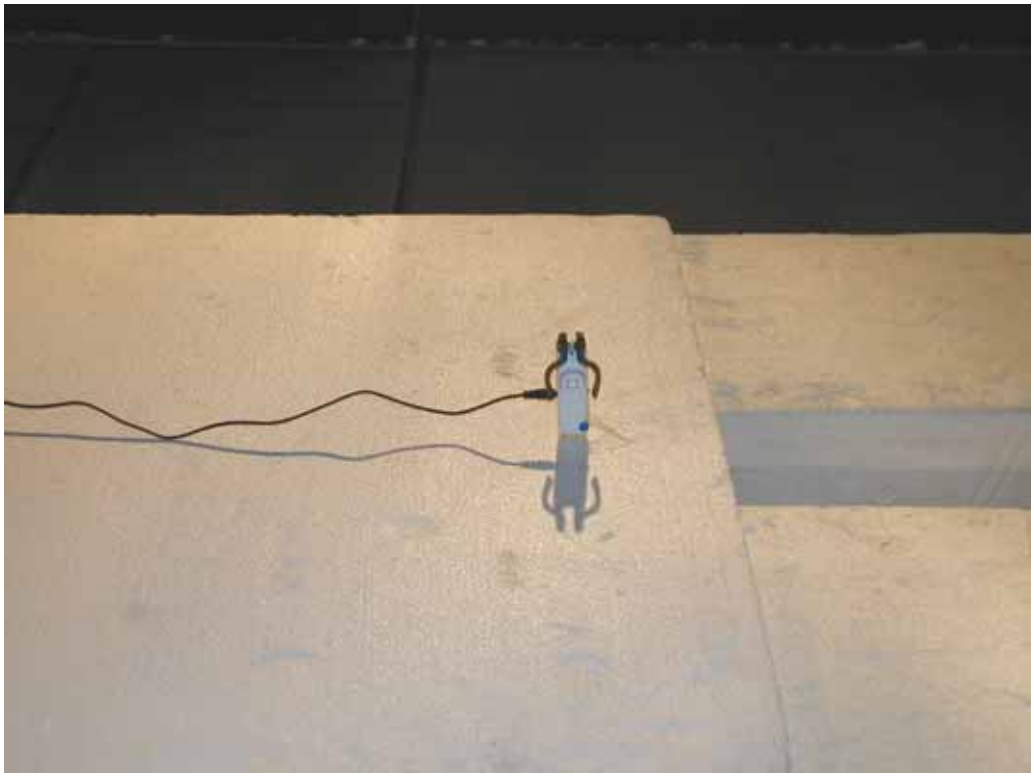
- Rear view (AC Adaptor operation Y axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission



- Front view (AC Adaptor operation Z axis) -



- Rear view (AC Adaptor operation Z axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

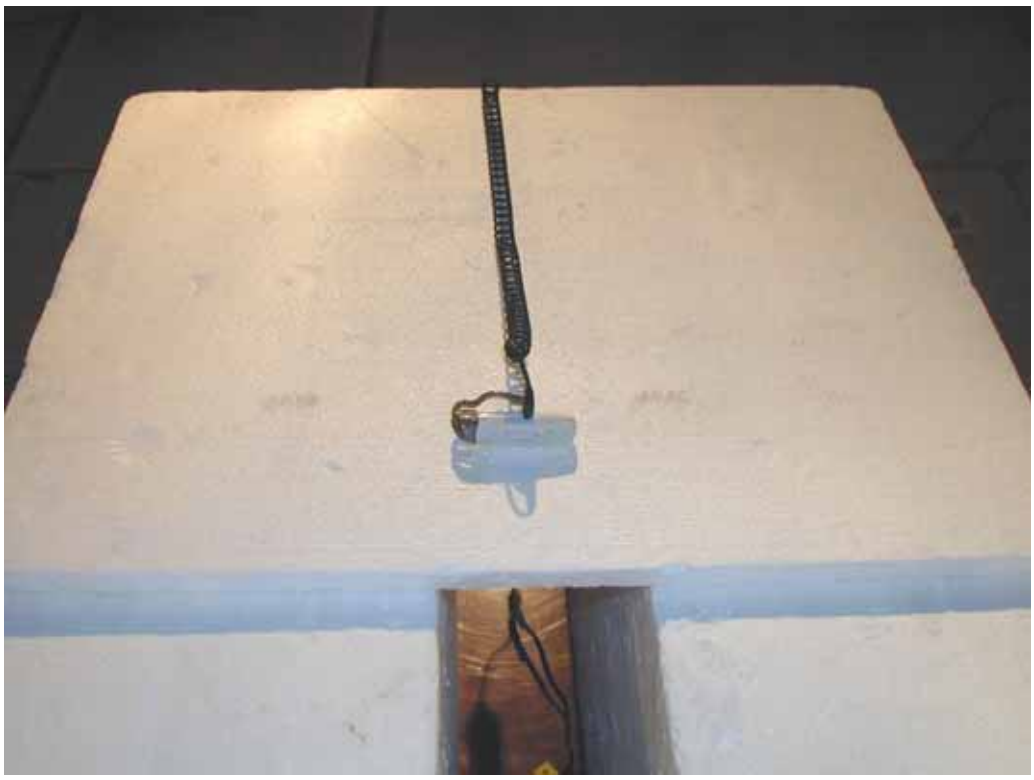
Photograph present configuration with maximum emission

- Front view (DC Adaptor operation X axis) -

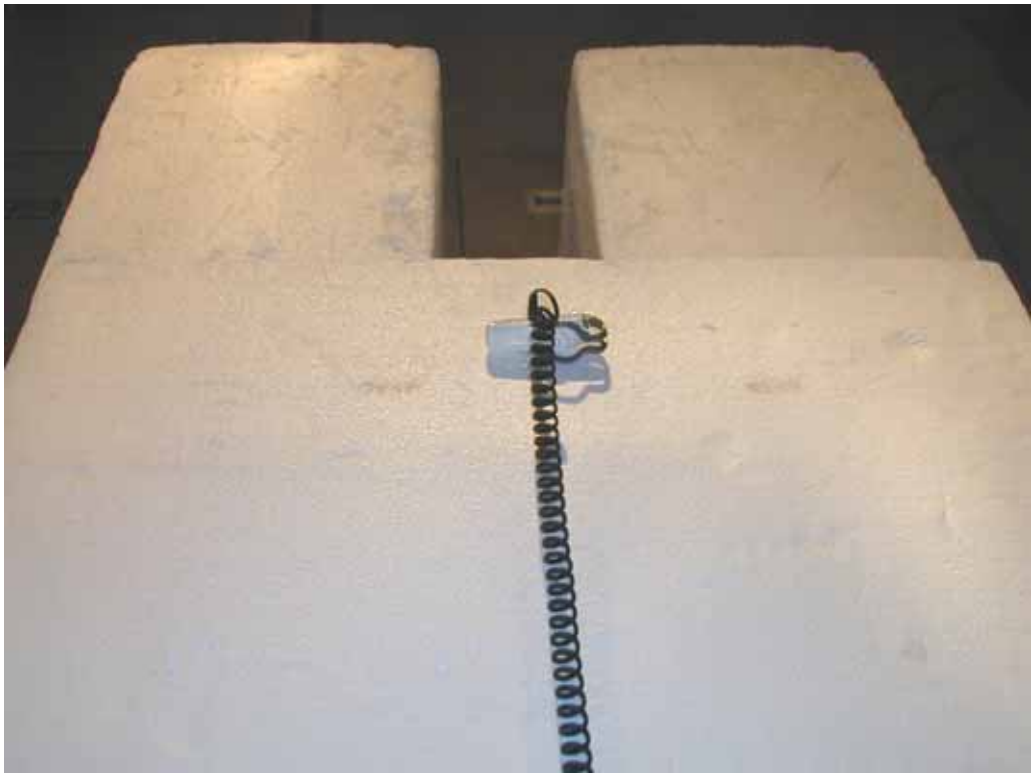
- Rear view (DC Adaptor operation X axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission



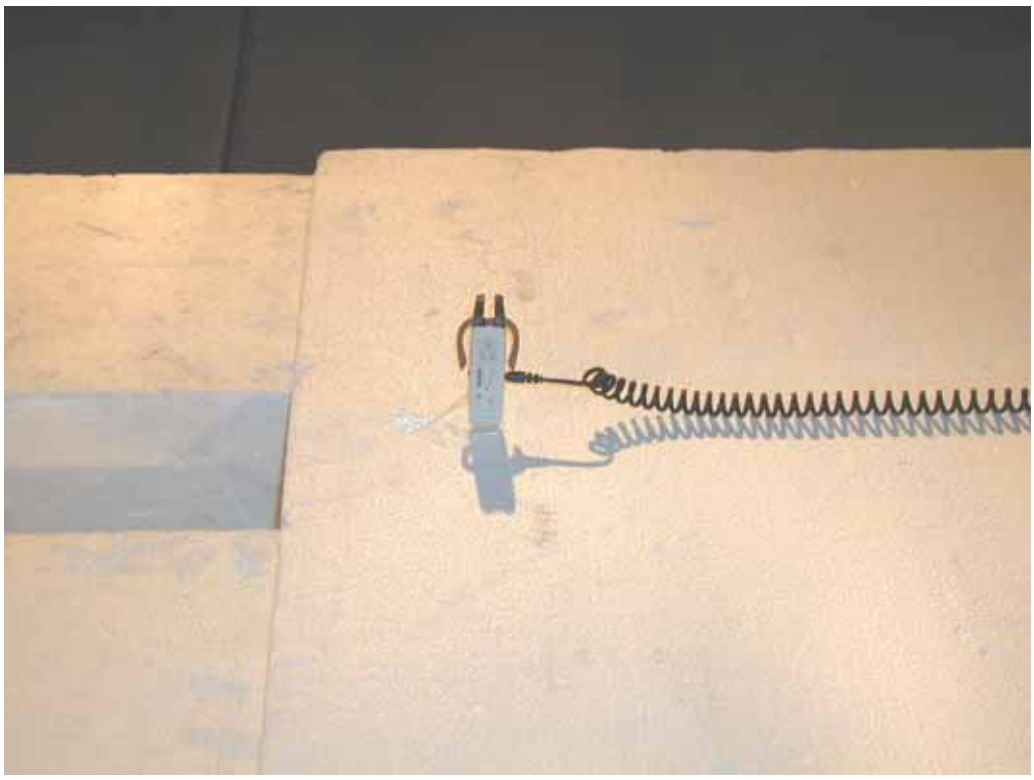
- Front view (DC Adaptor operation Y axis) -



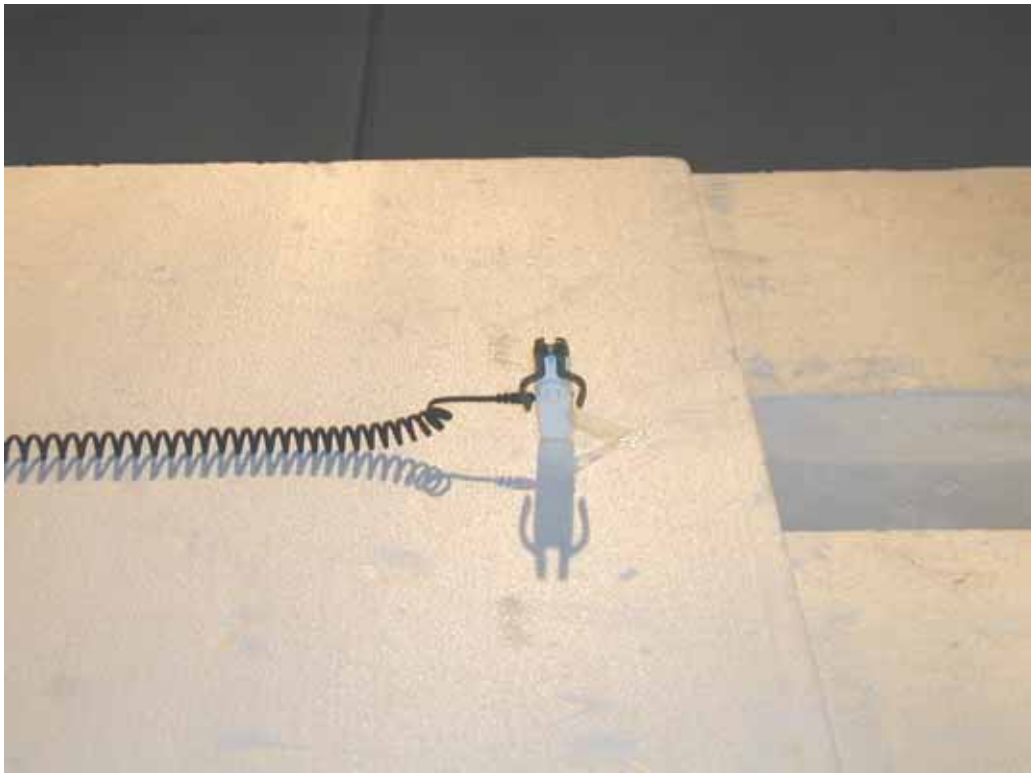
- Rear view (DC Adaptor operation Y axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission



- Front view (DC Adaptor operation Z axis) -



- Rear view (DC Adaptor operation Z axis) -

PHOTOGRAPHS OF EUT CONFIGURATION FOR AC POWER LINE CONDUCTED EMISSION MEASUREMENT

Photograph present configuration with maximum emission

- Front view -

- Side View -

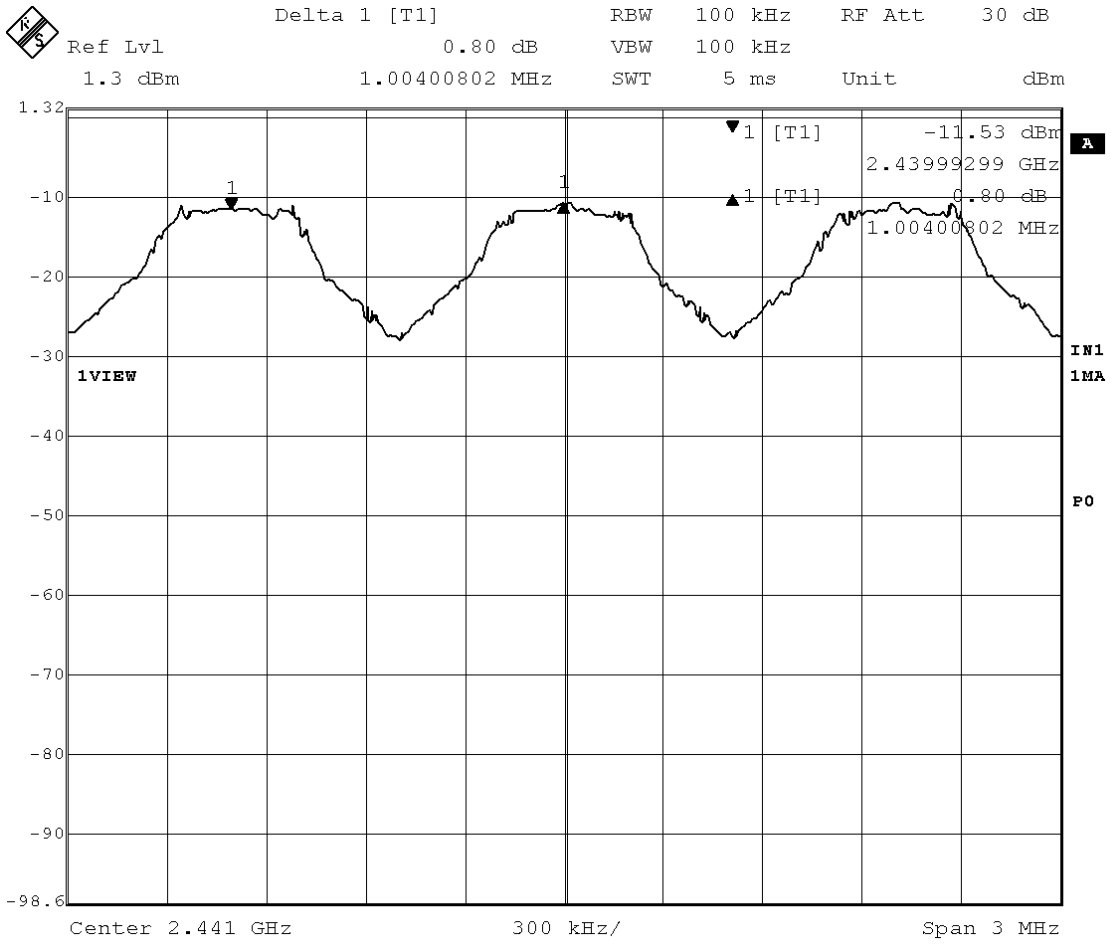
2. TEST DATA

2.1 Channel Separation

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

Mode of EUT : Hopping
Test Port : Temporary antenna connector

Channel Separation (kHz)	Limit
1004.008	25 kHz or 20 dB bandwidth of hopping channel



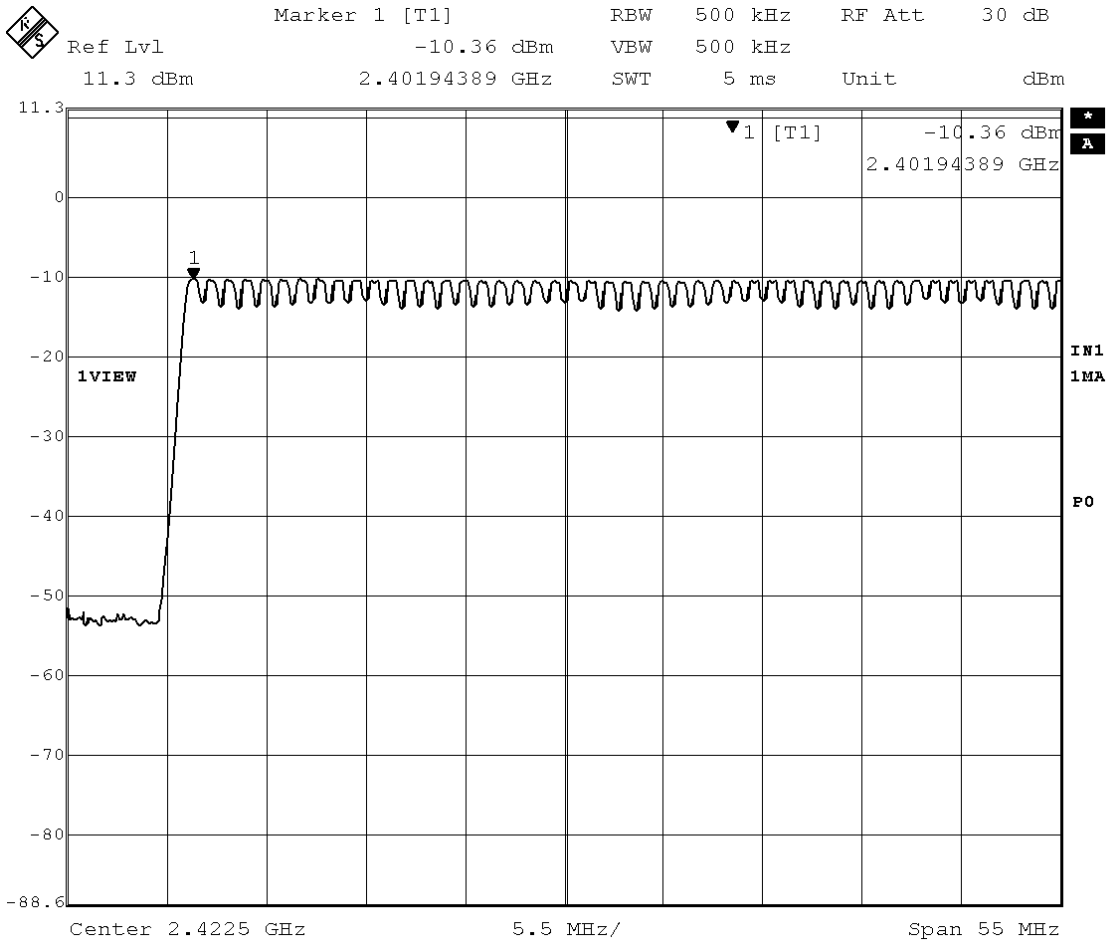
Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

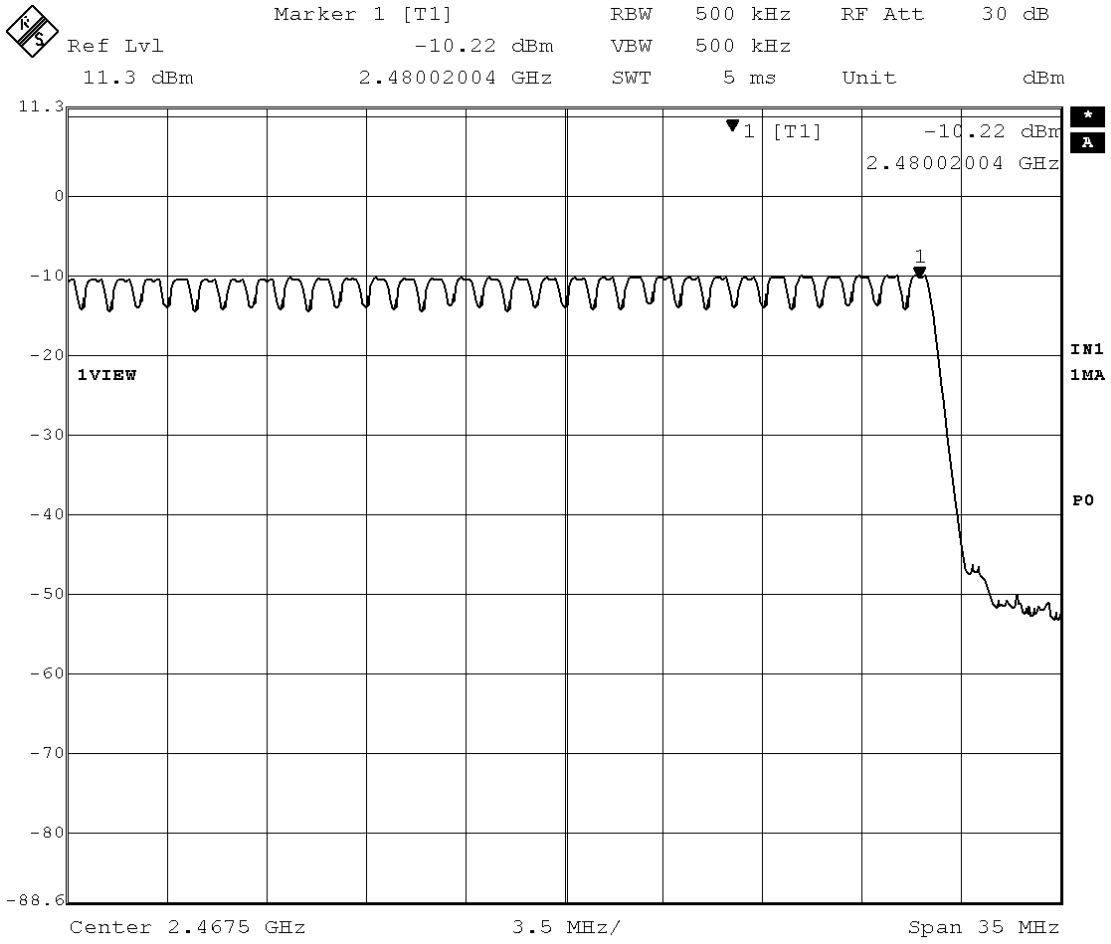
2.2 Minimum Hopping Channel

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

Mode of EUT : Hopping
Test Port : Temporary antenna connector

Hopping Channel	Limit
79	15





Tested by : M. Takahashi

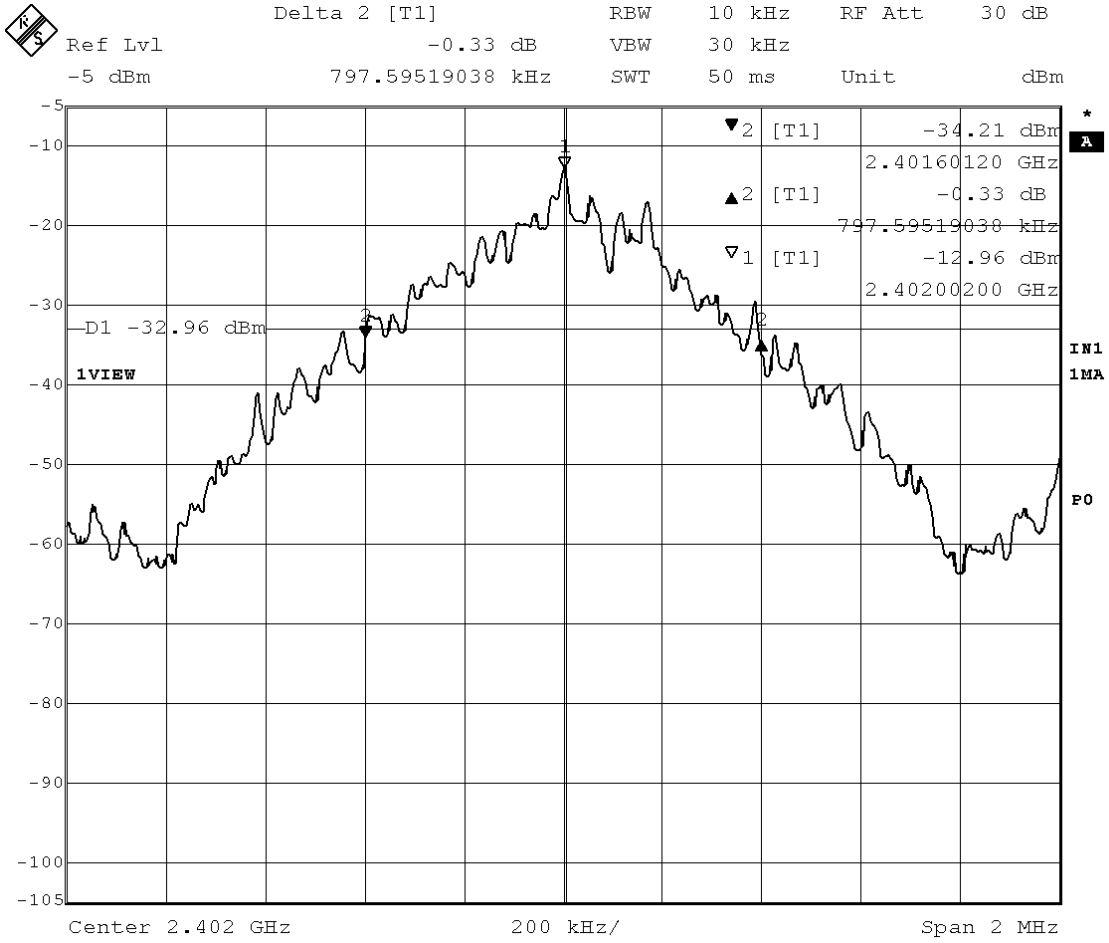
Masanori Takahashi
Testing Engineer

2.3 Occupied Bandwidth

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

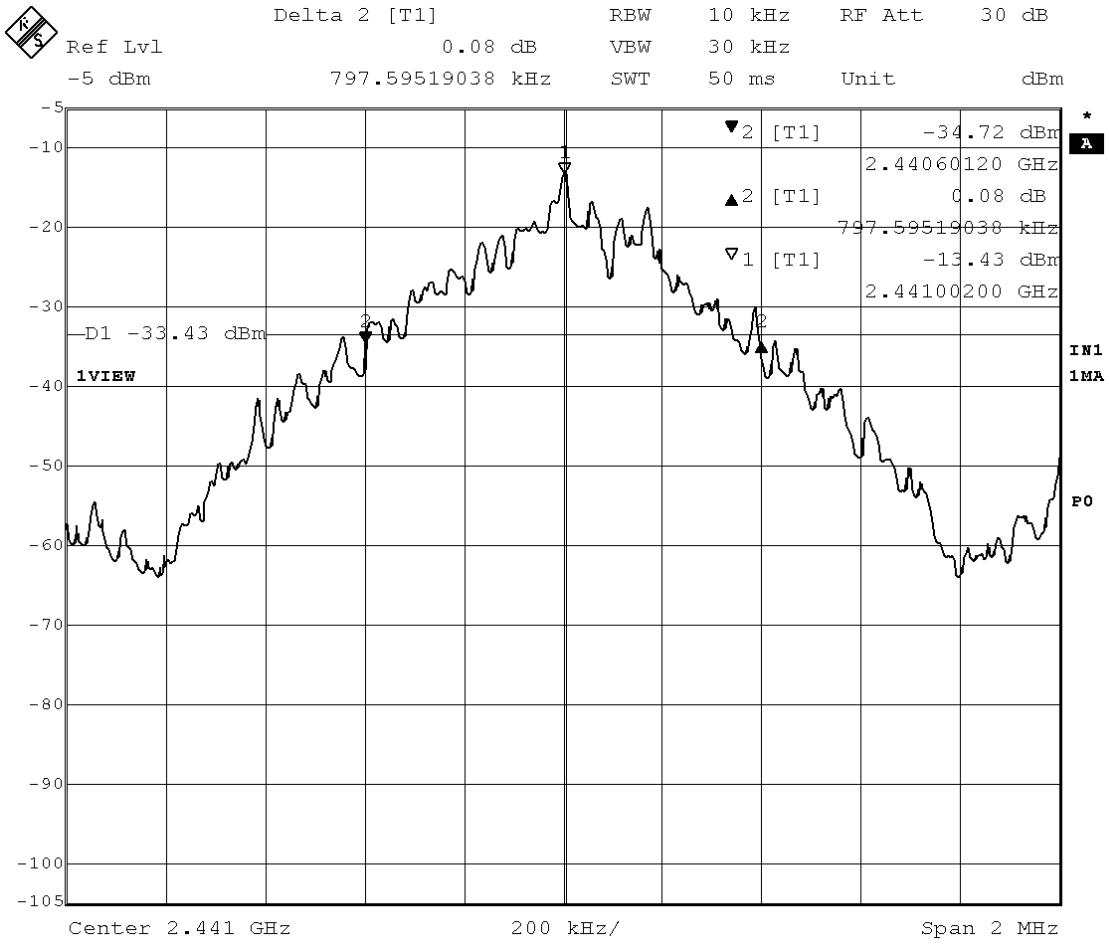
Mode of EUT : TX (0ch: 2402 MHz)
Test Port : Temporary antenna connector

Bandwidth (kHz)	Limit (kHz)
797.6	N/A



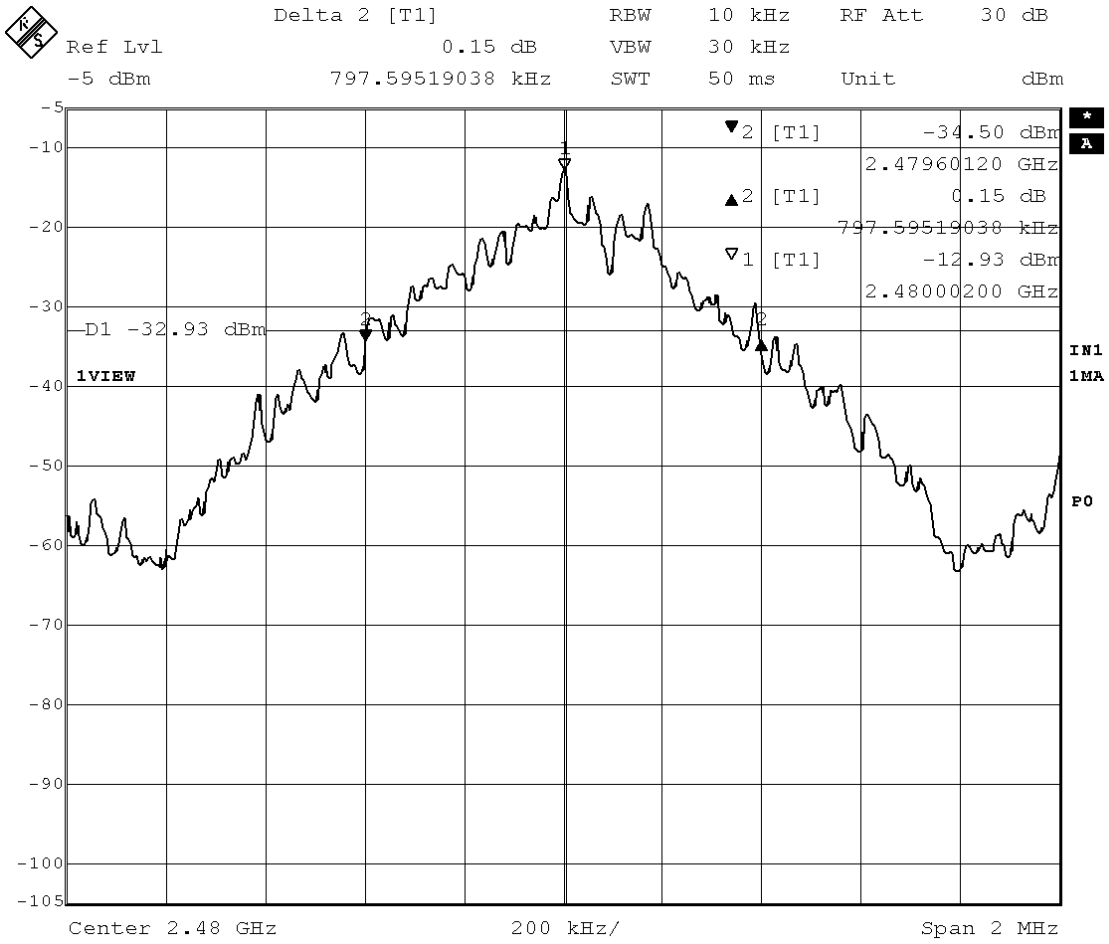
Mode of EUT : TX (39ch: 2441 MHz)
Test Port : Temporary antenna connector

Bandwidth (kHz)	Limit (kHz)
797.6	N/A



Mode of EUT : TX (78ch: 2480 MHz)
Test Port : Temporary antenna connector

Bandwidth (kHz)	Limit (kHz)
797.6	N/A



Tested by : M. Takahashi

Masanori Takahashi
Testing Engineer

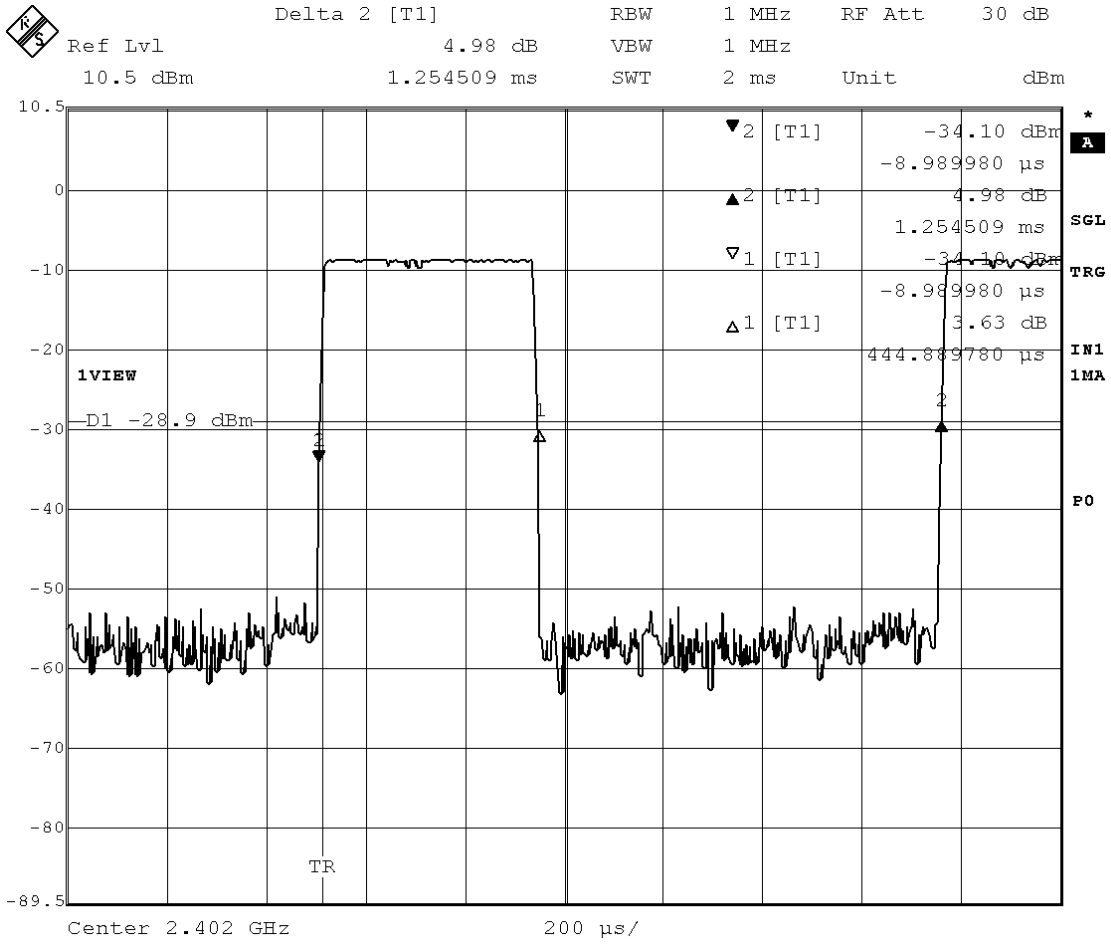
2.4 Dwell Time

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

Mode of EUT : Hopping(DH1 packet)
Test Port : Temporary antenna connector

Dwell Time (ms)	Limit
142.4	400 ms per 31.6 s

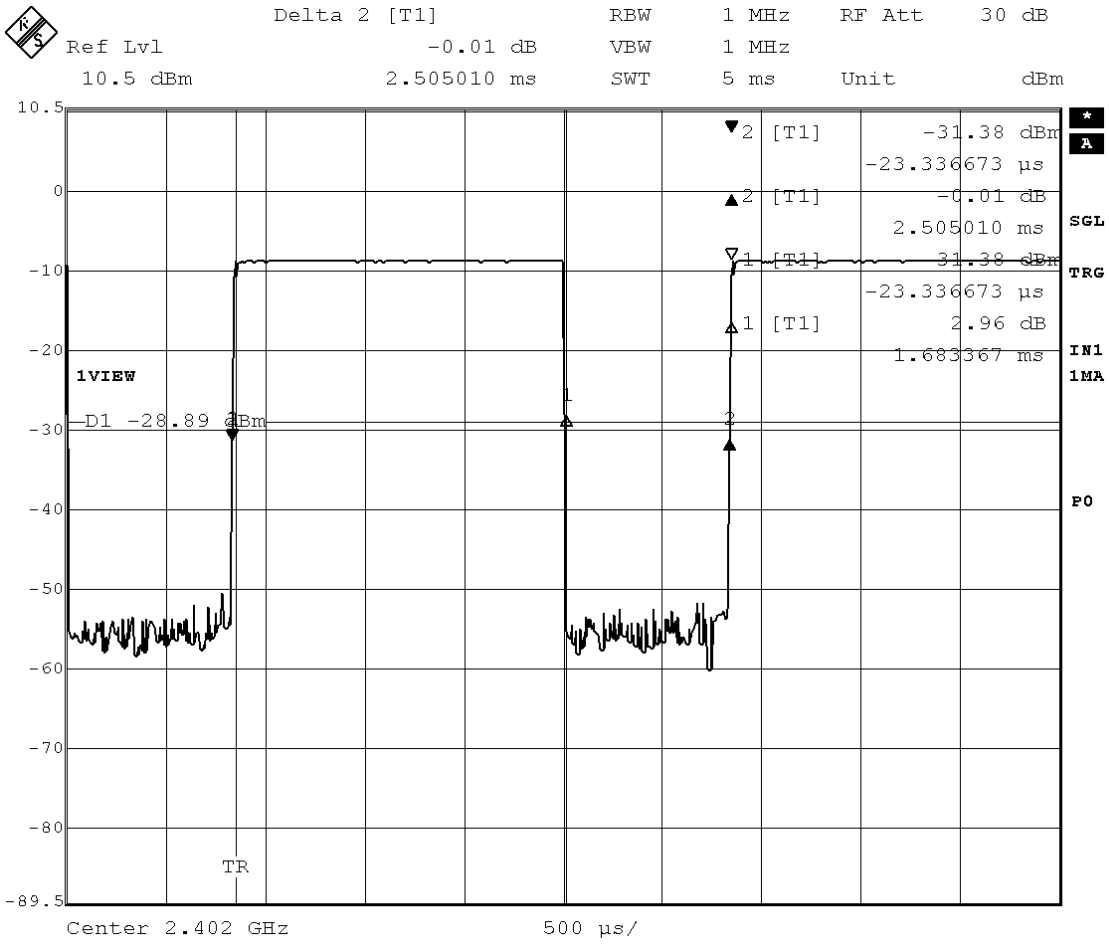
Note : The system makes worst case 1600 hops per second or 1 time slot has a length of 625 µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So the system has each channel 10.1266 times per second and so for 31.6 seconds the system have 320.0 times of appearance.
Each tx-time per appearance is 0.4449 ms.
Dwell time = 320.0 * 0.4449 = 142.4 ms



Mode of EUT : Hopping(DH3 packet)
Test Port : Temporary antenna connector

Dwell Time (ms)	Limit
269.3	400 ms per 31.6 s

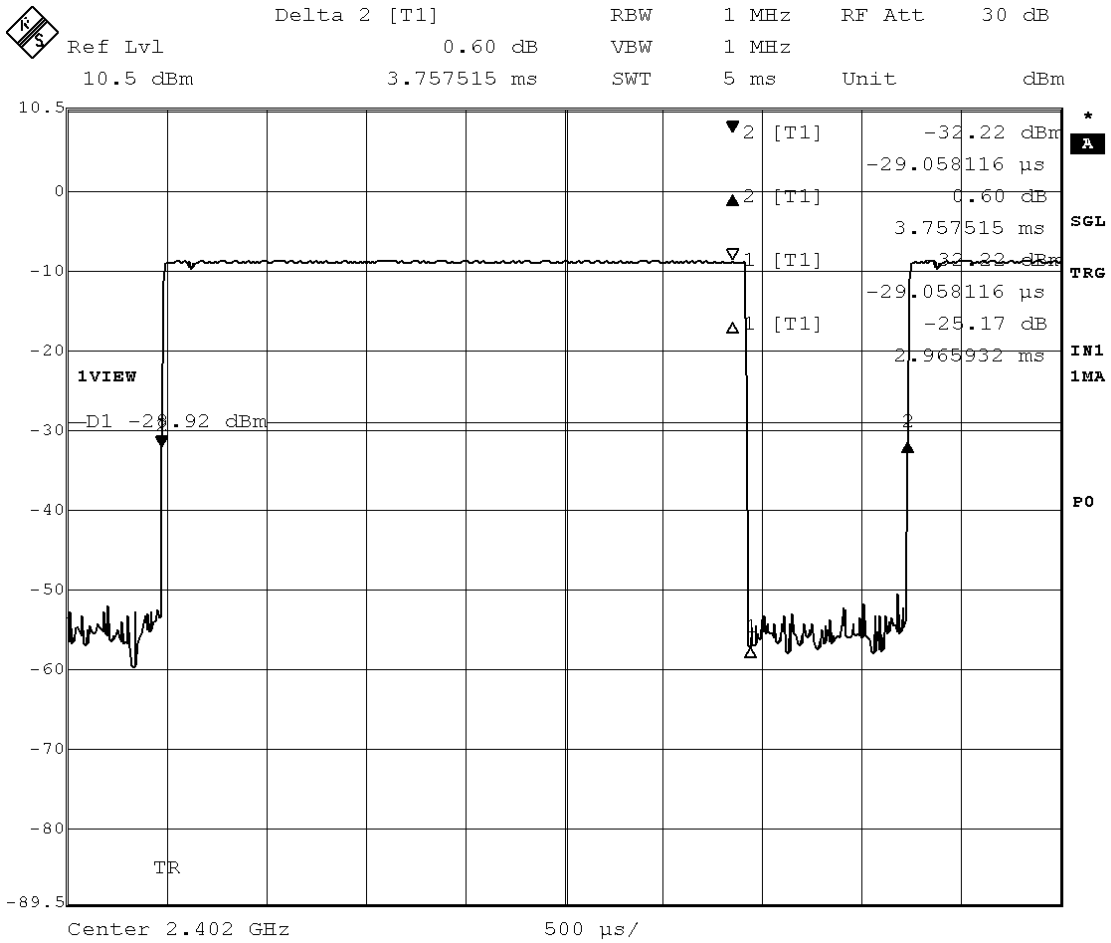
Note : A DH3 Packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So the system have each channel 5.063 times per second and so for 31.6 seconds the system have 160.0 times of appearance.
Each tx-time per appearance is 1.683 ms.
Dwell time = 160.0 * 1.683 = 269.3 ms



Mode of EUT : Hopping(DH5 packet)
Test Port : Temporary antenna connector

Dwell Time (ms)	Limit
316.5	400 ms per 31.6 s

Note : A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving.
Then the system makes worst case 266.667 hops per second with 79 channels.
So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.7 times of appearance.
Each tx-time per appearance is 2.966 ms.
Dwell time = 106.7 * 2.966 = 316.5 ms



Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

2.5 Peak Output Power (Conduction)

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

Test Port : Temporary antenna connector

Mode of EUT	Cable Loss (dB)	Att. Loss (dB)	Meter Reading (dBm)	Peak Power (dBm)	Limit (dBm)
TX (2402 MHz)	0.0	10.08	-10.23	-0.15	30
TX (2441 MHz)	0.0	10.08	-10.39	-0.31	30
TX (2480 MHz)	0.0	10.08	-10.07	+0.01	30

Note : 1) Rated Supply Voltage : Flash Battery was used
2) A sample calculation was made at 2402 MHz.
CL + AL + MR = 0.0 + 10.08 −10.23 = -0.15 (dBm)
CL : Cable Loss
AL : Attenuator Loss
MR : Meter Reading
3) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth
Peak	1 MHz

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

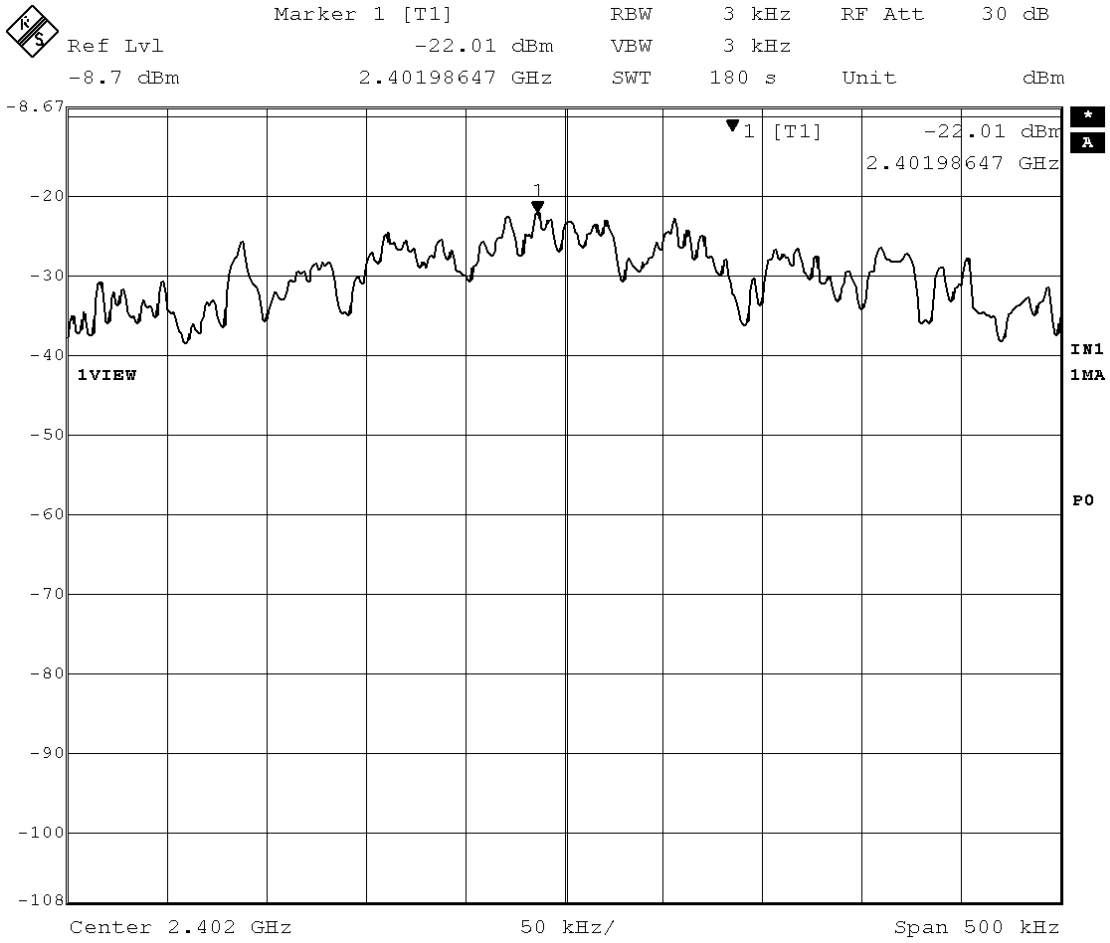
2.6 Peak Output Power (Radiation)
Not Applicable

2.7 Peak Power Density (Conduction)

Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

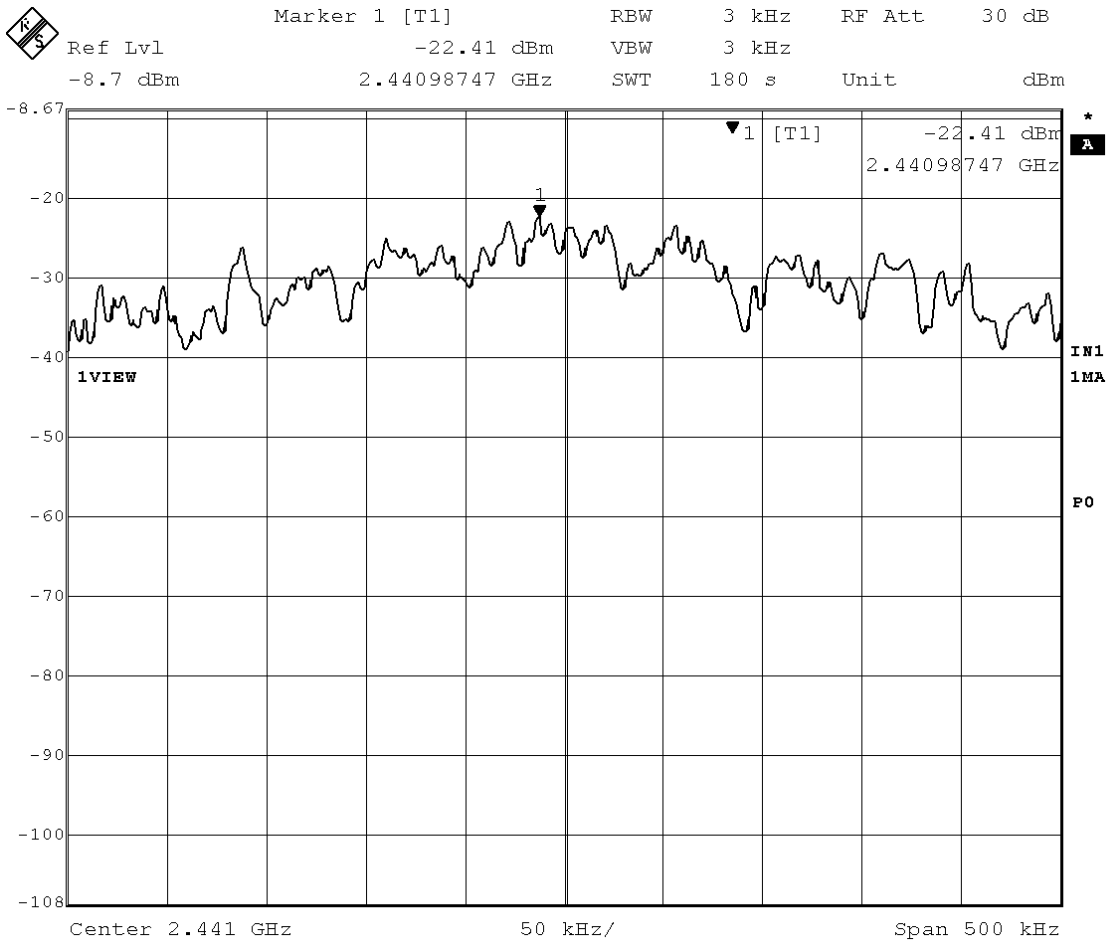
Mode of EUT : TX (0ch: 2402 MHz)
Test Port : Temporary antenna connector

Cable Loss (dB)	Att. Loss (dB)	Meter Reading (dBm)	Peak Power (dBm)	Limit (dBm)
0.40	10.08	-22.01	-11.53	8



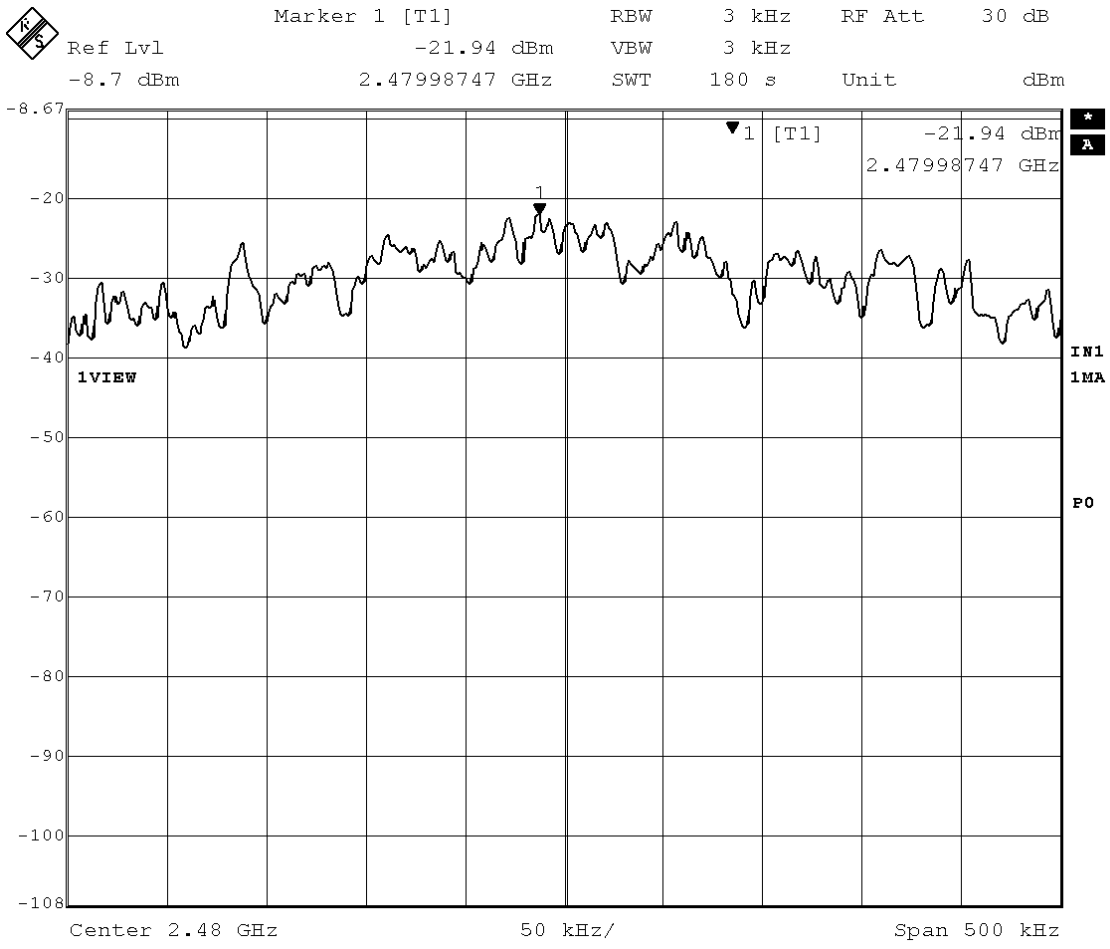
Mode of EUT : TX (39ch: 2441 MHz)
Test Port : Temporary antenna connector

Cable Loss (dB)	Att. Loss (dB)	Meter Reading (dBm)	Peak Power (dBm)	Limit (dBm)
0.40	10.08	-22.41	-11.93	8



Mode of EUT : TX (78ch: 2480 MHz)
Test Port : Temporary antenna connector

Cable Loss (dB)	Att. Loss (dB)	Meter Reading (dBm)	Peak Power (dBm)	Limit (dBm)
0.40	10.08	-21.94	-11.46	8



Note : 1) A sample calculation was made.
CL + AL + MR = 0.40 + 10.08 − 21.97 = -11.49 (dBm)
CL : Cable Loss
AL : Attenuator Loss
MR : Meter Reading
2) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth
Peak	3 kHz

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

2.8 Peak Power Density (Radiation)

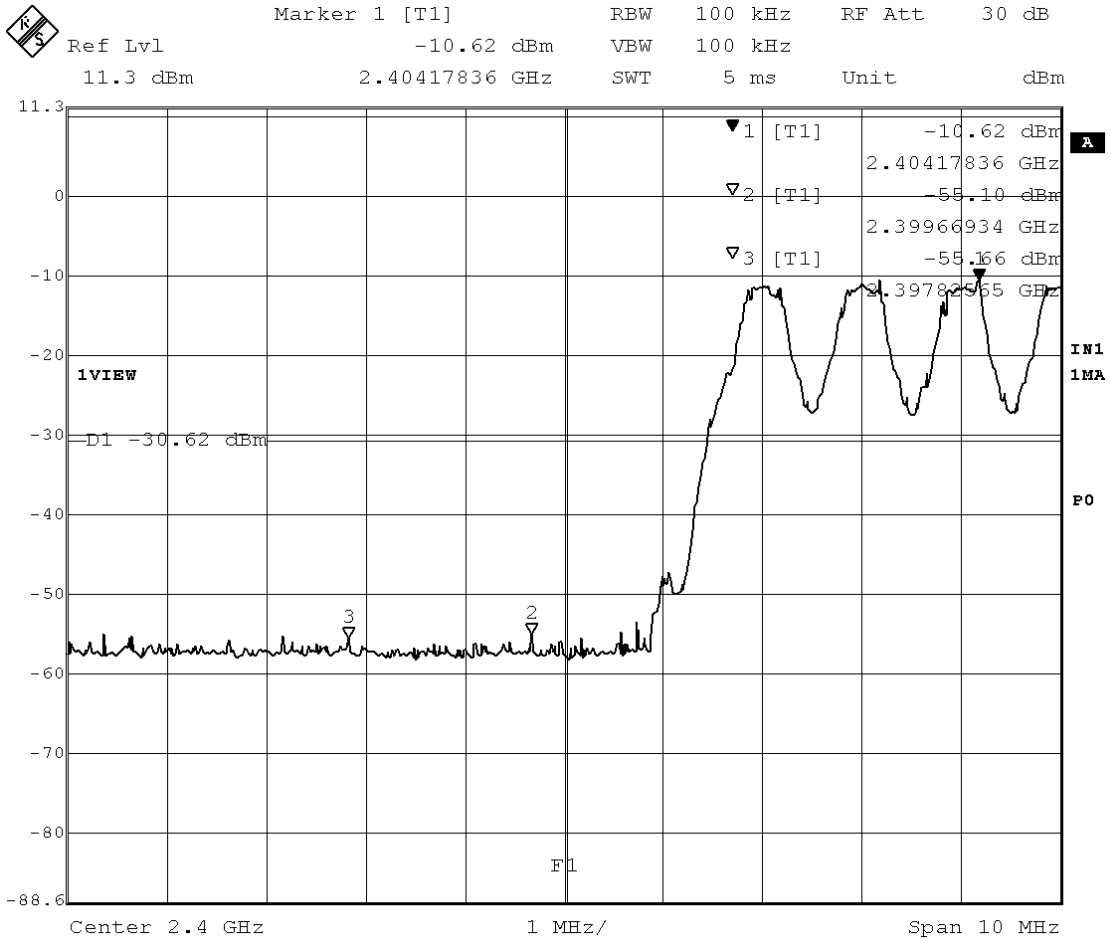
Not Applicable

2.9 Spurious Emissions (Conduction)

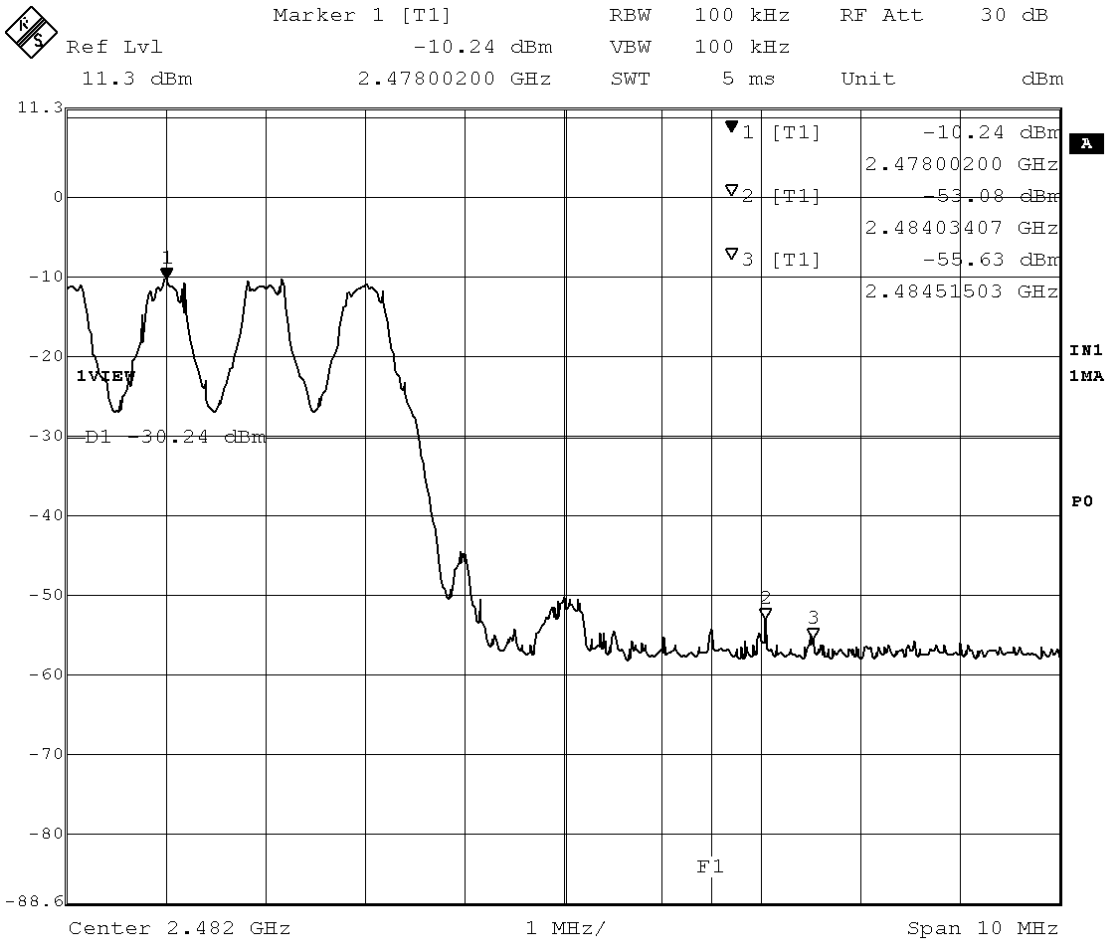
Date : July 16, 2005
Temp.: 22 °C Humi.: 70 %

2.9.1 Band Edge Compliance

Mode of EUT : Hopping
Test Port : Temporary antenna connector



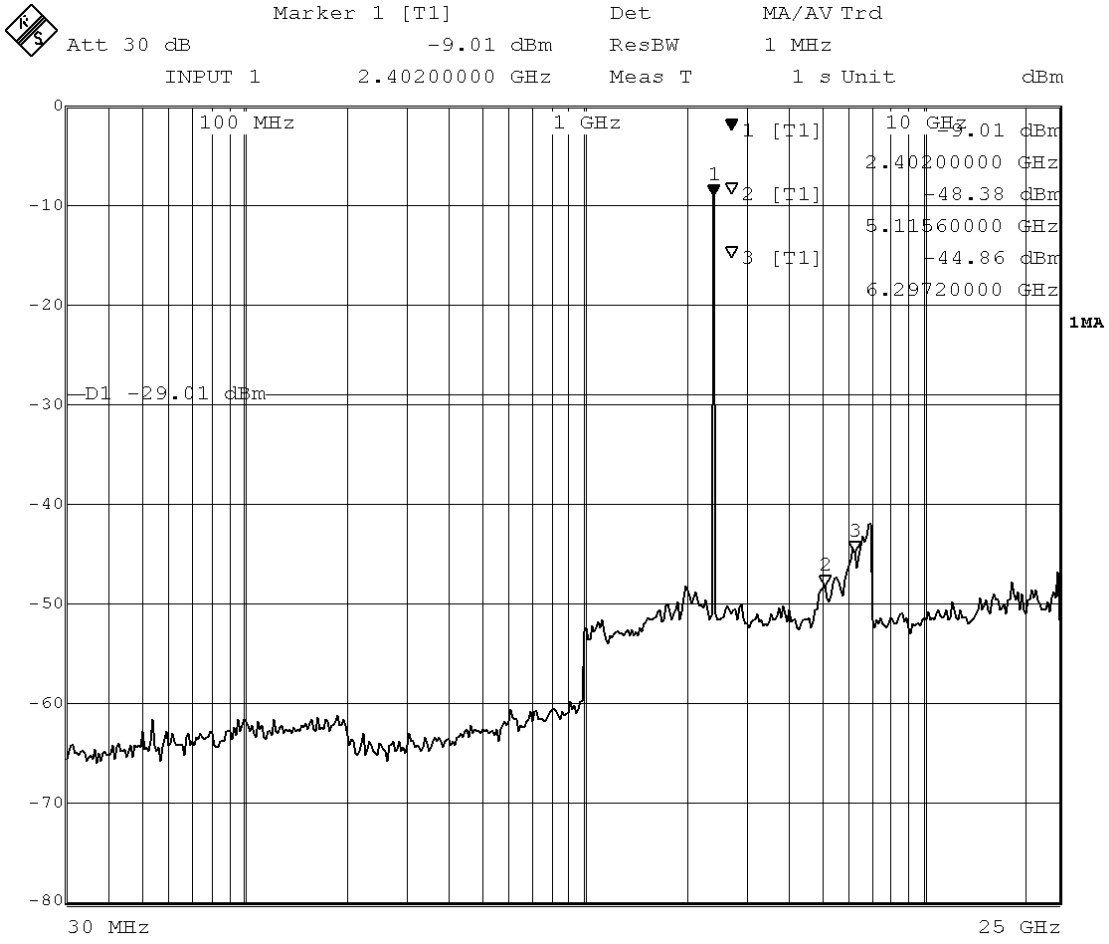
Mode of EUT : Hopping
Test Port : Temporary antenna connector



2.9.2 Other Spurious Emissions

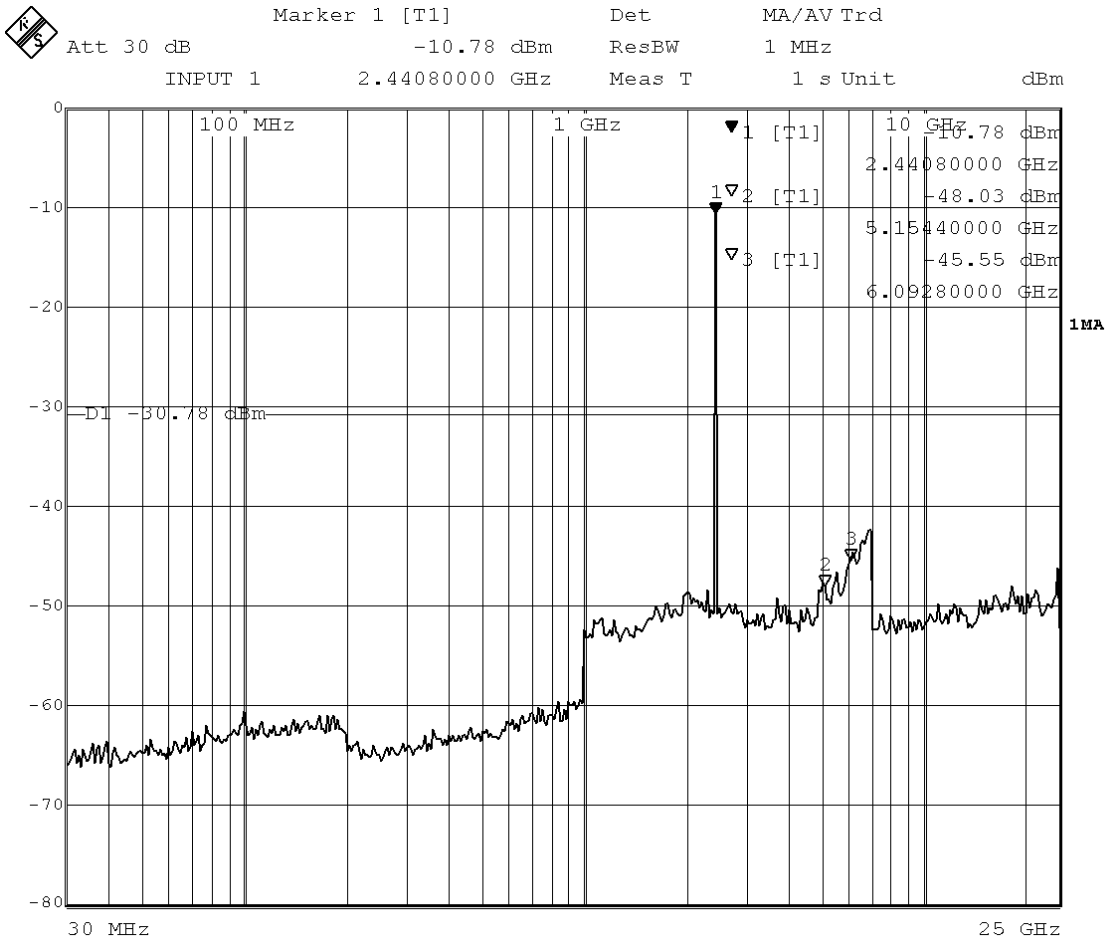
Mode of EUT : TX (0ch: 2402 MHz)
Test Port : Temporary antenna connector

No spurious emissions in the range 20 dB below the limit.



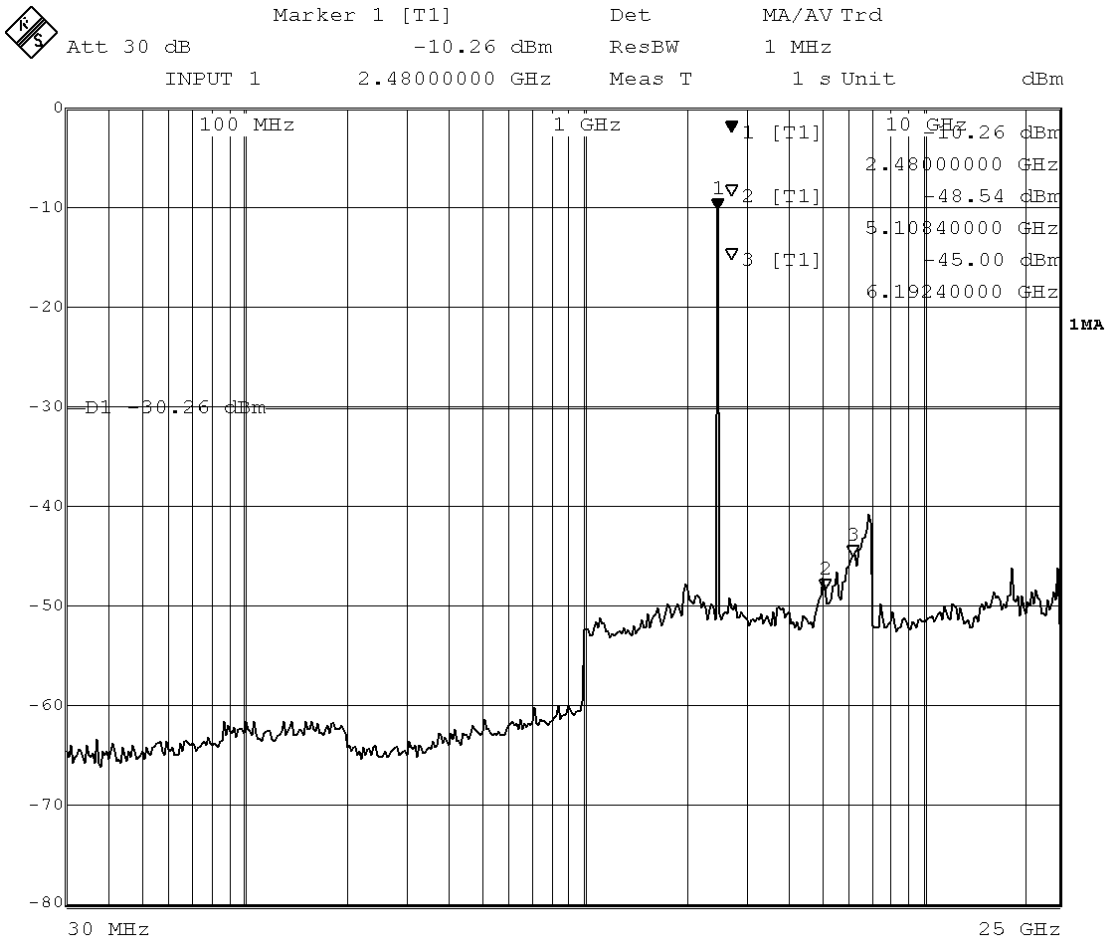
Mode of EUT : TX (39ch: 2441 MHz)
Test Port : Temporary antenna connector

No spurious emissions in the range 20 dB below the limit.



Mode of EUT : TX (78ch: 2480 MHz)
Test Port : Temporary antenna connector

No spurious emissions in the range 20 dB below the limit.



Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

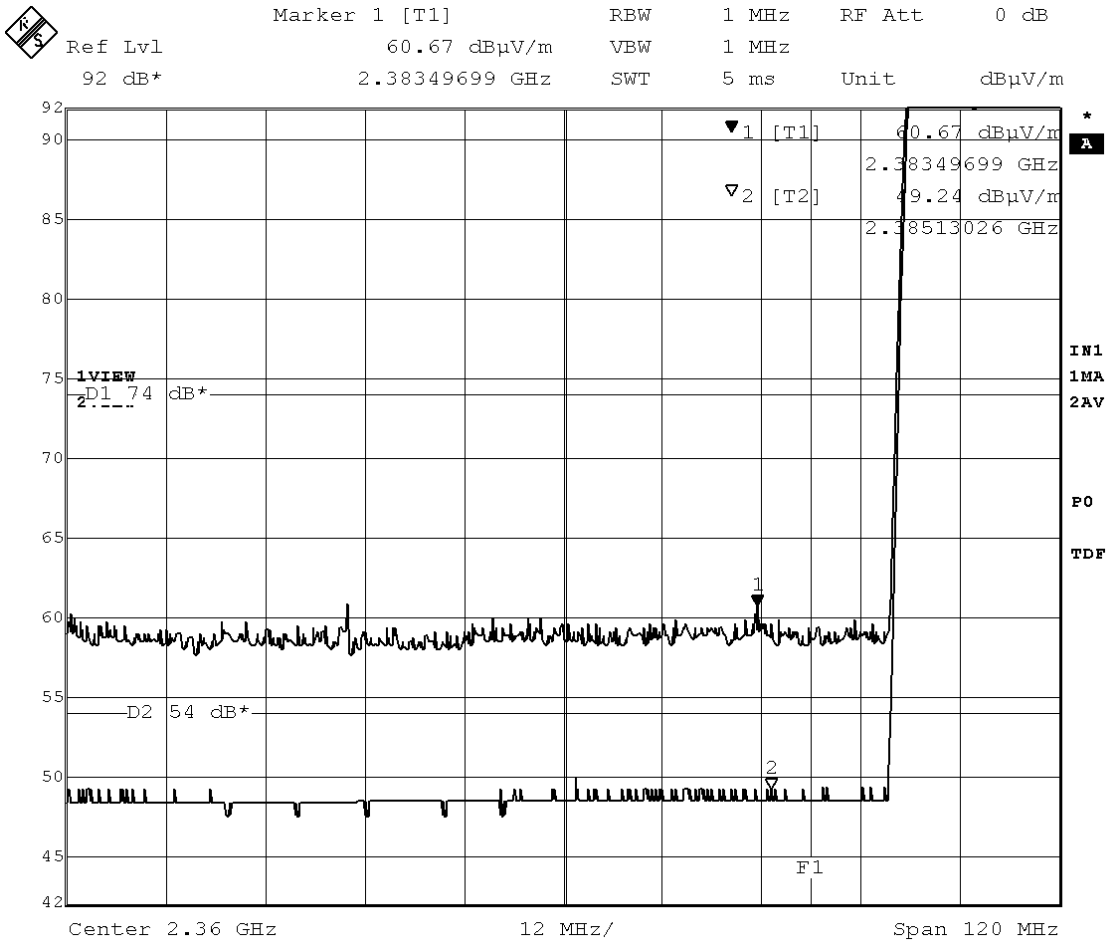
2.10 Spurious Emissions (Radiation)

2.10.1 Band Edge Compliance

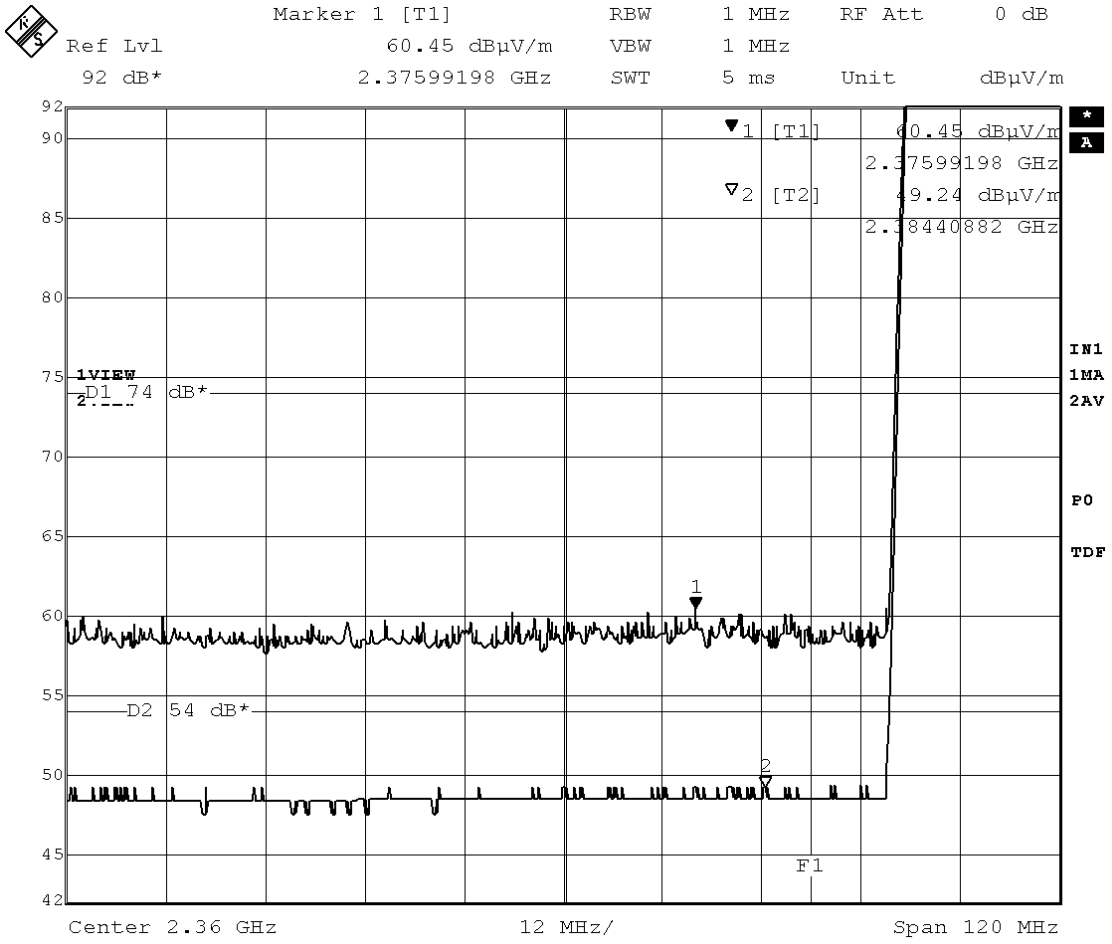
2.10.1.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

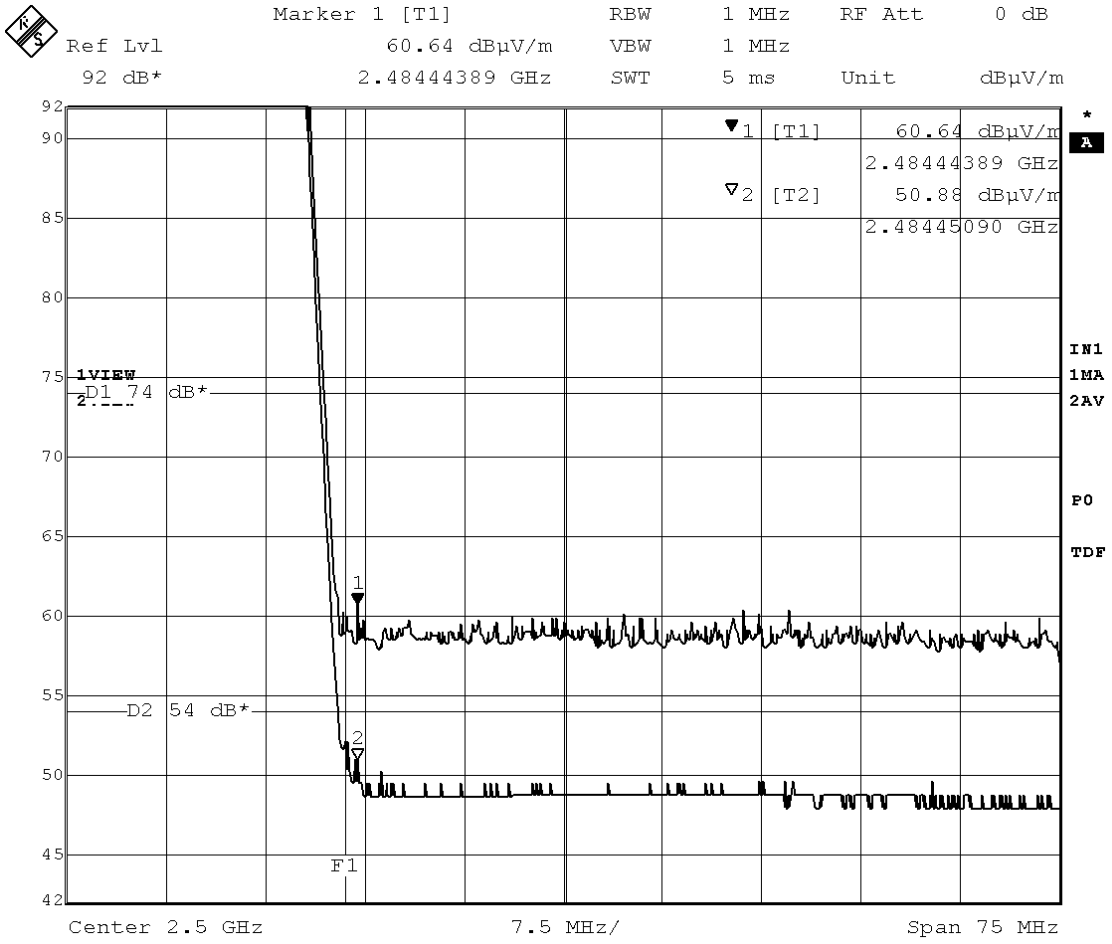
Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Horizontal



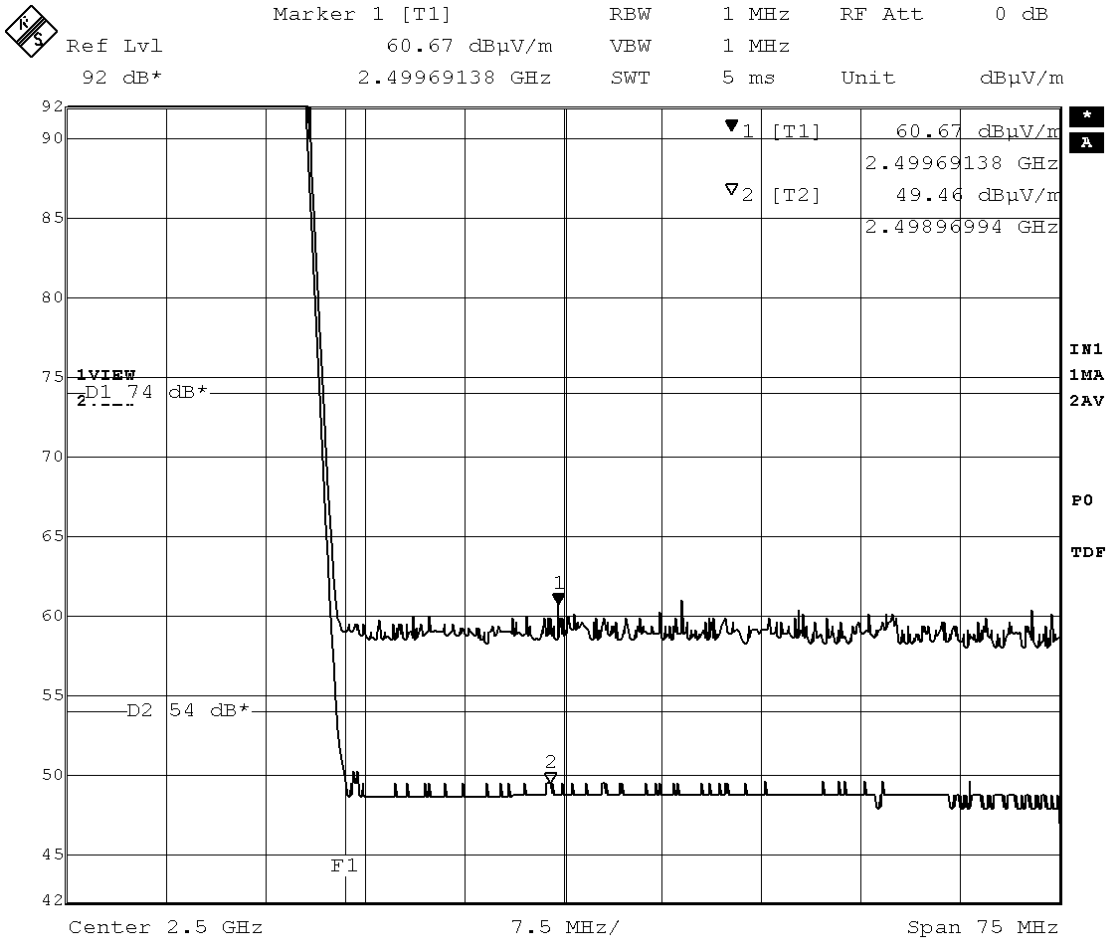
Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Vertical



Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Horizontal



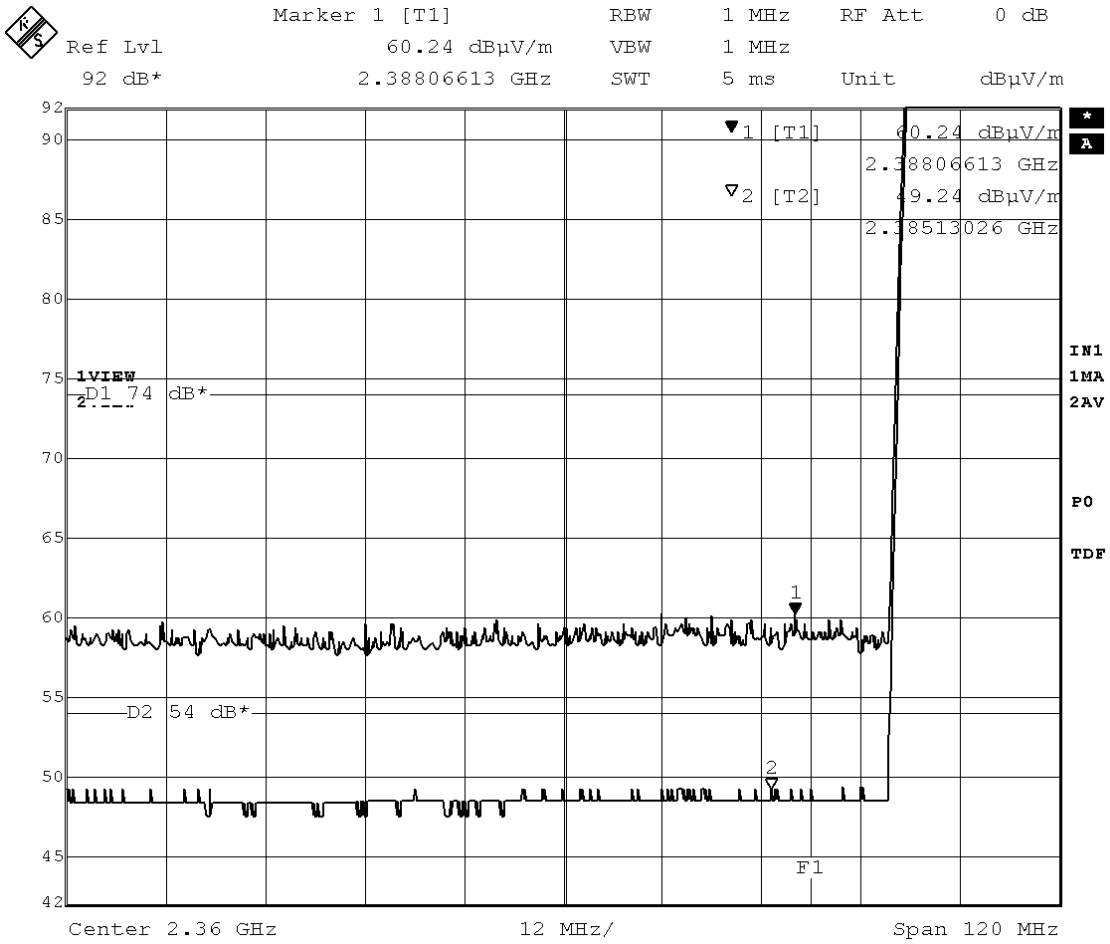
Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Vertical



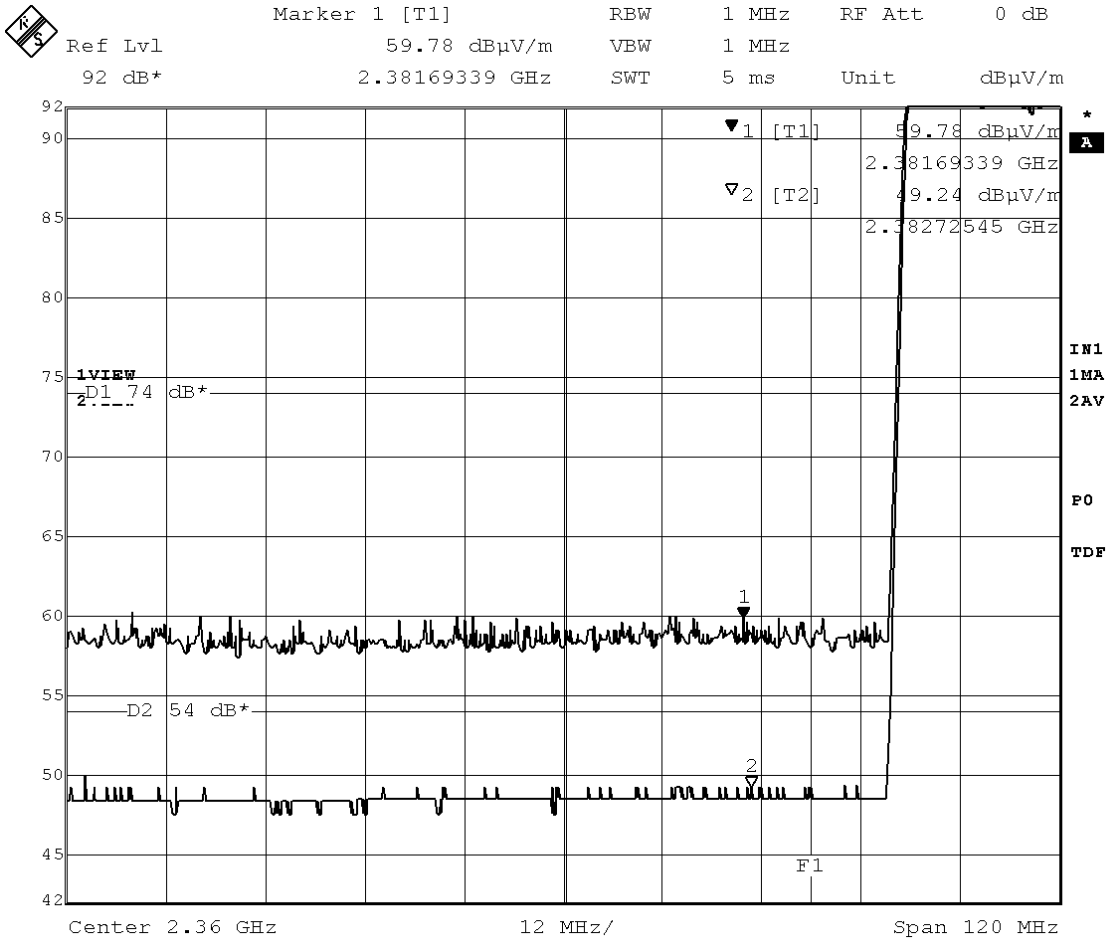
2.10.1.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

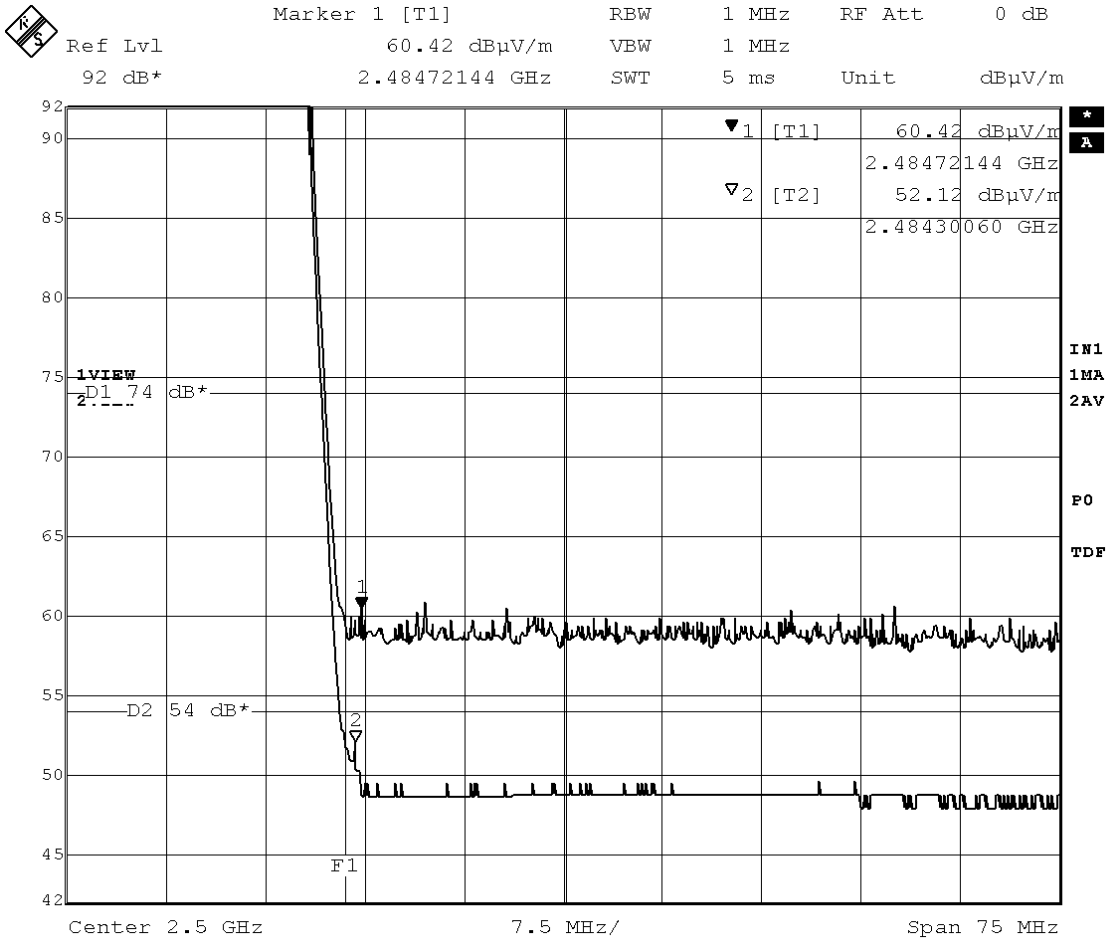
Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Horizontal



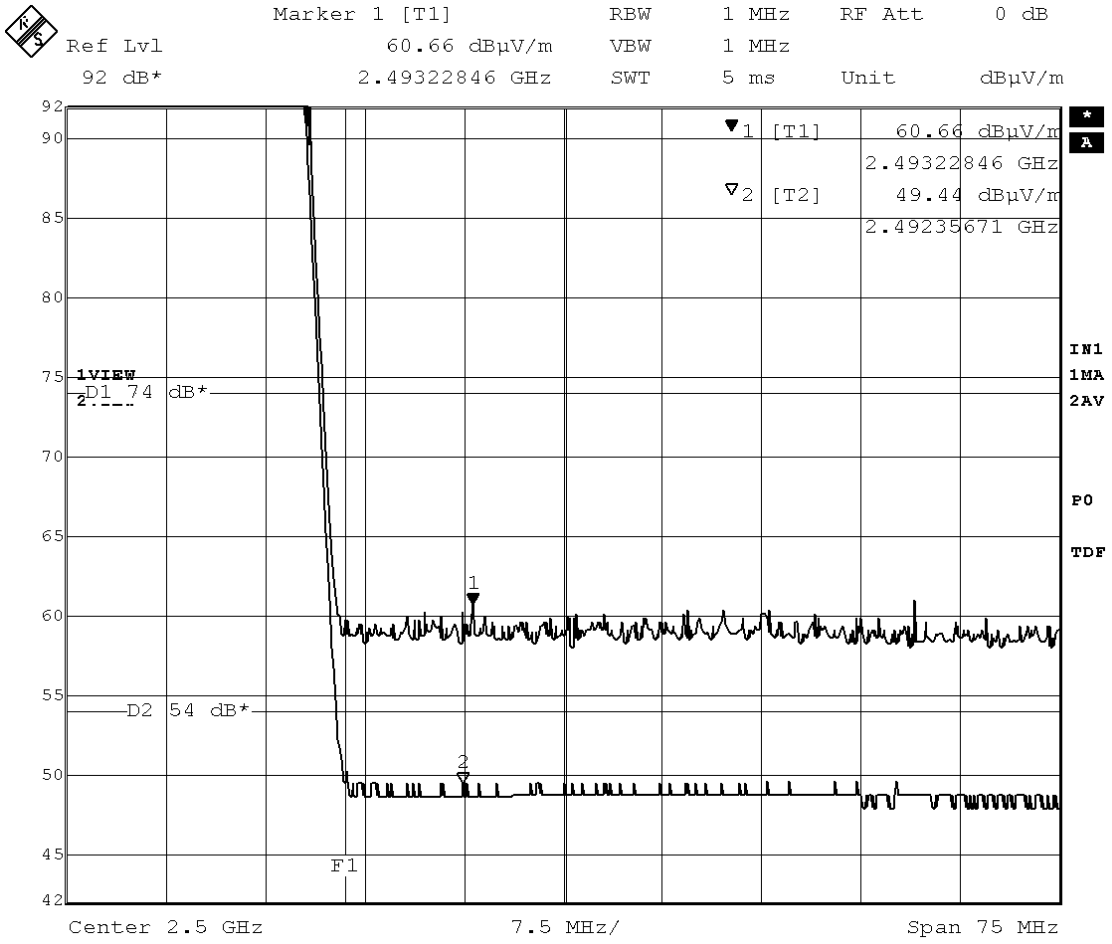
Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Vertical



Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Horizontal



Mode of EUT : Hopping
Test Port : Enclosure
Antenna Polarization: Vertical



2.10.2 Other Spurious Emissions

2.10.2.1 Spurious Emissions in the frequency range from 9 kHz to 30 MHz

2.10.2.1.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (78ch: 2480 MHz) has been listed.

No spurious emissions in the range 20 dB below the limit.

2.10.2.1.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (78ch: 2480 MHz) has been listed.

No spurious emissions in the range 20 dB below the limit.

2.10.2.2 Spurious Emissions in the frequency range from 30 MHz to 1000 MHz

2.10.2.2.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 14, 2005
Temp.: 22 °C Humi.: 55 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (78ch: 2480 MHz) has been listed.

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) QP	AV	Peak	Limits (dBuV/m) QP/AV	Peak	Emission Levels (dBuV/m) QP/AV	Peak	Margins (dB) QP/AV	Peak
36.20	0.0	15.0	V	< 0.0	-	-	40.0	-	< 15.0	-	> 25.0	-
46.57	0.0	12.8	V	16.4	-	-	40.0	-	29.2	-	10.8	-

Notes :
1) The spectrum was checked from 30 MHz to 1000 MHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(QP/AV) was made at 36.2 (MHz).

PA + Cf + Mr = 0 + 15 + 0 = 15 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading

6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Quasi-peak(QP)	120 kHz	-

2.10.2.2.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (78ch: 2480 MHz) has been listed.

No spurious emissions in the range 20 dB below the limit.

2.10.2.3 Spurious Emissions in the frequency above 1000 MHz

2.10.2.3.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 13, 2005
Temp.: 22 °C Humi.: 68 %

Test Port : Enclosure

Mode of EUT : TX (0ch: 2402 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6020	0.0	-1.0	V	41.6	45.5	54.0	74.0	40.6	44.5	13.4	29.5
3.2040	0.0	5.5	V	28.2 <	41.0	54.0	74.0	33.7 <	46.5	20.3 >	27.5
4.8040	0.0	8.9	H	33.5	45.0	54.0	74.0	42.4	53.9	11.6	20.1

Mode of EUT : TX (39ch: 2441 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6280	0.0	-0.8	V	41.8	45.8	54.0	74.0	41.0	45.0	13.0	29.0
3.2560	0.0	5.6	V	< 28.0 <	41.0	54.0	74.0	< 33.6 <	46.6 >	20.4 >	27.4
4.8820	0.0	9.0	V	37.7	46.8	54.0	74.0	46.7	55.8	7.3	18.2

Mode of EUT : TX (78ch: 2480 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6540	0.0	-0.7	V	42.8	46.4	54.0	74.0	42.1	45.7	11.9	28.3
3.3080	0.0	5.7	V	< 28.0 <	41.0	54.0	74.0	< 33.7 <	46.7 >	20.3 >	27.3
4.9600	0.0	9.1	H	40.6	48.4	54.0	74.0	49.7	57.5	4.3	16.5

Notes : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(Peak) was made at 1.602 (GHz).
PA + Cf + Mr = 0 + -1 + 45.5 = 44.5 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading
6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

2.10.2.3.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : TX (0ch: 2402 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6020	0.0	-1.0	V	41.4	45.4	54.0	74.0	40.4	44.4	13.6	29.6
3.2040	0.0	5.5	V	28.1 <	41.0	54.0	74.0	33.6 <	46.5	20.4 >	27.5
4.8040	0.0	8.9	H	33.3	45.0	54.0	74.0	42.2	53.9	11.8	20.1

Mode of EUT : TX (39ch: 2441 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6280	0.0	-0.8	V	41.6	45.7	54.0	74.0	40.8	44.9	13.2	29.1
3.2560	0.0	5.6	V	< 28.0 <	41.0	54.0	74.0	< 33.6 <	46.6 >	20.4 >	27.4
4.8820	0.0	9.0	V	37.6	46.6	54.0	74.0	46.6	55.6	7.4	18.4

Mode of EUT : TX (78ch: 2480 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6540	0.0	-0.7	V	42.6	46.3	54.0	74.0	41.9	45.6	12.1	28.4
3.3080	0.0	5.7	V	< 28.0 <	41.0	54.0	74.0	< 33.7 <	46.7 >	20.3 >	27.3
4.9600	0.0	9.1	H	40.3	48.2	54.0	74.0	49.4	57.3	4.6	16.7

Notes : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(Peak) was made at 1.602 (GHz).
PA + Cf + Mr = 0 + -1 + 45.4 = 44.4 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading
6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

2.11 AC Power Line Conducted Emissions

2.11.(a) AC Adaptor (Model: AC-3U) Operation

Date : July 16, 2005
Temp.: 24 °C Humi.: 70 %

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

Frequency	LISN Factor	Meter Reading (dBuV) V-A		V-B		Limits (dBuV)		Emission Level (dBuV)		Margins (dB)	
(MHz)	(dB)	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.3	25.5	-	35.4	-	66.0	56.0	35.7	-	30.3	-
0.28	0.2	26.3	-	30.0	-	60.8	50.8	30.2	-	30.7	-
0.41	0.1	21.9	-	26.9	-	57.7	47.7	27.0	-	30.6	-
0.60	0.1	14.3	-	20.8	-	56.0	46.0	20.9	-	35.1	-
0.89	0.1	18.0	-	23.4	-	56.0	46.0	23.5	-	32.5	-
1.20	0.1	14.1	-	20.5	-	56.0	46.0	20.6	-	35.4	-
2.52	0.2	13.0	-	20.0	-	56.0	46.0	20.2	-	35.8	-
3.36	0.2	18.4	-	23.3	-	56.0	46.0	23.5	-	32.5	-
5.51	0.2	10.2	-	17.0	-	60.0	50.0	17.2	-	42.8	-
7.63	0.3 <	10.0	-	10.4	-	60.0	50.0	10.7	-	49.3	-
10.08	0.3 <	10.0	-	10.5	-	60.0	50.0	10.8	-	49.2	-
15.00	0.4 <	10.0	-	< 10.0	-	60.0	50.0	< 10.4	-	> 49.6	-
20.00	0.5 <	10.0	-	< 10.0	-	60.0	50.0	< 10.5	-	> 49.5	-
25.00	0.6 <	10.0	-	< 10.0	-	60.0	50.0	< 10.6	-	> 49.4	-
30.00	0.7 <	10.0	-	< 10.0	-	60.0	50.0	< 10.7	-	> 49.3	-

Notes : 1) The spectrum was checked from 0.15 MHz to 30 MHz.
2) The cable loss is included in the LISN factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) The symbol of "-"means "Not applicable".
6) V-A : One end & Ground V-B : The other end & Ground
7) Q.P : Quasi-peak AVE : Average
8) A sample calculation was made at 0.15 (MHz).
Lf + Mr =0.3 + 35.4 = 35.7(dBuV)
Lf = LISN Factor
Mr = Meter Reading

2.11.(b) AC Adaptor (Model: AC-4U) Operation

Date : July 16, 2005
Temp.: 24 °C Humi.: 70 %

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

Frequency	LISN Factor	Meter Reading (dBuV) V-A		Meter Reading (dBuV) V-B		Limits (dBuV)		Emission Level (dBuV)		Margins (dB)	
(MHz)	(dB)	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.3	24.3	-	24.2	-	66.0	56.0	24.6	-	41.4	-
0.28	0.2	11.4	-	13.4	-	60.8	50.8	13.6	-	47.3	-
0.45	0.1	16.0	-	26.2	-	56.9	46.9	26.3	-	30.6	-
0.65	0.1 <	10.0	-	13.7	-	56.0	46.0	13.8	-	42.2	-
0.85	0.1 <	10.0	-	14.4	-	56.0	46.0	14.5	-	41.5	-
1.19	0.1 <	10.0	-	17.0	-	56.0	46.0	17.1	-	38.9	-
2.75	0.2	13.5	-	21.8	-	56.0	46.0	22.0	-	34.0	-
3.48	0.2	10.5	-	19.2	-	56.0	46.0	19.4	-	36.6	-
5.78	0.2	12.4	-	21.0	-	60.0	50.0	21.2	-	38.8	-
8.06	0.3 <	10.0	-	15.4	-	60.0	50.0	15.7	-	44.3	-
10.00	0.3 <	10.0	- <	10.0	-	60.0	50.0	< 10.3	-	> 49.7	-
15.00	0.4 <	10.0	- <	10.0	-	60.0	50.0	< 10.4	-	> 49.6	-
20.00	0.5 <	10.0	- <	10.0	-	60.0	50.0	< 10.5	-	> 49.5	-
25.00	0.6 <	10.0	- <	10.0	-	60.0	50.0	< 10.6	-	> 49.4	-
30.00	0.7 <	10.0	- <	10.0	-	60.0	50.0	< 10.7	-	> 49.3	-

Notes : 1) The spectrum was checked from 0.15 MHz to 30 MHz.
2) The cable loss is included in the LISN factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) The symbol of "-"means "Not applicable".
6) V-A : One end & Ground V-B : The other end & Ground
7) Q.P : Quasi-peak AVE : Average
8) A sample calculation was made at 0.15 (MHz).
Lf + Mr =0.3 + 24.3 = 24.6(dBuV)
Lf = LISN Factor
Mr = Meter Reading

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

2.12 RF Exposure Compliance

Not Applicable

2.13 Spurious Emissions for Receiver (Radiation)

2.13.1 Spurious Emissions in the frequency range from 30 MHz to 1000 MHz

2.13.1.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 14, 2005
Temp.: 22 °C Humi.: 55 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) QP	AV	Peak	Limits (dBuV/m) QP/AV	Peak	Emission Levels (dBuV/m) QP/AV	Peak	Margins (dB) QP/AV	Peak
36.20	0.0	15.0	V	< 0.0	-	-	40.0	-	< 15.0	-	> 25.0	-
46.57	0.0	12.8	V	16.2	-	-	40.0	-	29.0	-	11.0	-

Notes :
1) The spectrum was checked from 30 MHz to 1000 MHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(QP/AV) was made at 36.2 (MHz).

PA + Cf + Mr = 0 + 15 + 0 = 15 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading

6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Quasi-peak(QP)	120 kHz	-

2.13.1.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

No spurious emissions in the range 20 dB below the limit.

2.13.2 Spurious Emissions in the frequency above 1000 MHz

2.13.2.(a) AC Adaptor (Model: AC-4U) Operation

Date : July 13, 2005
Temp.: 22 °C Humi.: 68 %

Test Port : Enclosure

Mode of EUT : RX (0ch: 2402 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6003	0.0	-1.2	V	41.7	45.4	54.0	74.0	40.5	44.2	13.5	29.8
2.4005	0.0	2.2	V	37.4	43.3	54.0	74.0	39.6	45.5	14.4	28.5

Mode of EUT : RX (39ch: 2441 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6263	0.0	-0.9	V	43.0	46.2	54.0	74.0	42.1	45.3	11.9	28.7
2.4395	0.0	2.3	V	36.8	42.7	54.0	74.0	39.1	45.0	14.9	29.0

Mode of EUT : RX (78ch: 2480 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6523	0.0	-0.8	V	43.7	47.1	54.0	74.0	42.9	46.3	11.1	27.7
2.4785	0.0	2.3	V	38.5	43.7	54.0	74.0	40.8	46.0	13.2	28.0

Notes : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(Peak) was made at 1.600335 (GHz).
PA + Cf + Mr = 0 + -1.2 + 45.4 = 44.2 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading
6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

2.13.2.(b) DC Adaptor (Model: DC-4) Operation

Date : July 15, 2005
Temp.: 23 °C Humi.: 62 %

Test Port : Enclosure

Mode of EUT : RX (0ch: 2402 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6003	0.0	-1.2	V	41.6	45.2	54.0	74.0	40.4	44.0	13.6	30.0
2.4005	0.0	2.2	V	37.2	43.1	54.0	74.0	39.4	45.3	14.6	28.7

Mode of EUT : RX (39ch: 2441 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6263	0.0	-0.9	V	42.8	46.1	54.0	74.0	41.9	45.2	12.1	28.8
2.4395	0.0	2.3	V	36.7	42.6	54.0	74.0	39.0	44.9	15.0	29.1

Mode of EUT : RX (78ch: 2480 MHz)

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.6523	0.0	-0.8	V	43.5	47.0	54.0	74.0	42.7	46.2	11.3	27.8
2.4785	0.0	2.3	V	38.3	43.6	54.0	74.0	40.6	45.9	13.4	28.1

Notes : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) A sample calculation(Peak) was made at 1.600335 (GHz).
PA + Cf + Mr = 0 + -1.2 + 45.2 = 44 (dBuV/m)
PA = Peak to Average Factor(P-A Factor)
Cf = Correction Factor
Mr = Meter Reading
6) Measuring Instrument Setting :

Detector function	Resolution Bandwidth	Video Bandwidth
Average(AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

2.14 AC Power Line Conducted Emissions for Receiver

2.14.(a) AC Adaptor (Model: AC-3U) Operation

Date : July 16, 2005
Temp.: 24 °C Humi.: 70 %

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

Frequency	LISN Factor	Meter Reading (dBuV) V-A		Meter Reading (dBuV) V-B		Limits (dBuV)		Emission Level (dBuV)		Margins (dB)	
(MHz)	(dB)	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.3	36.2	-	36.2	-	66.0	56.0	36.5	-	29.5	-
0.28	0.2	26.5	-	30.0	-	60.8	50.8	30.2	-	30.7	-
0.41	0.1	21.5	-	26.5	-	57.7	47.7	26.6	-	31.0	-
0.60	0.1	15.2	-	21.0	-	56.0	46.0	21.1	-	34.9	-
0.89	0.1	17.0	-	22.5	-	56.0	46.0	22.6	-	33.4	-
1.20	0.1	13.1	-	20.0	-	56.0	46.0	20.1	-	35.9	-
2.52	0.2	13.0	-	20.0	-	56.0	46.0	20.2	-	35.8	-
3.36	0.2	18.1	-	23.4	-	56.0	46.0	23.6	-	32.4	-
5.51	0.2	10.6	-	17.0	-	60.0	50.0	17.2	-	42.8	-
7.63	0.3 <	10.0	-	10.7	-	60.0	50.0	11.0	-	49.0	-
10.05	0.3 <	10.0	-	10.5	-	60.0	50.0	10.8	-	49.2	-
15.00	0.4 <	10.0	-	< 10.0	-	60.0	50.0	< 10.4	-	> 49.6	-
20.00	0.5 <	10.0	-	< 10.0	-	60.0	50.0	< 10.5	-	> 49.5	-
25.00	0.6 <	10.0	-	< 10.0	-	60.0	50.0	< 10.6	-	> 49.4	-
30.00	0.7 <	10.0	-	< 10.0	-	60.0	50.0	< 10.7	-	> 49.3	-

Notes : 1) The spectrum was checked from 0.15 MHz to 30 MHz.
2) The cable loss is included in the LISN factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) The symbol of "-"means "Not applicable".
6) V-A : One end & Ground V-B : The other end & Ground
7) Q.P : Quasi-peak AVE : Average
8) A sample calculation was made at 0.15 (MHz).
Lf + Mr =0.3 + 36.2 = 36.5(dBuV)
Lf = LISN Factor
Mr = Meter Reading

2.14.(b) AC Adaptor (Model: AC-4U) Operation

Date : July 16, 2005
Temp.: 24 °C Humi.: 70 %

Mode of EUT : All modes have been investigated and the worst case mode for Channel (39ch: 2441 MHz) has been listed.

Frequency	LISN Factor	Meter Reading (dBuV) V-A		V-B		Limits (dBuV)		Emission Level (dBuV)		Margins (dB)	
(MHz)	(dB)	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.3	26.5	-	26.5	-	66.0	56.0	26.8	-	39.2	-
0.28	0.2	11.4	-	14.0	-	60.8	50.8	14.2	-	46.7	-
0.45	0.1	15.6	-	26.2	-	56.9	46.9	26.3	-	30.6	-
0.65	0.1 <	10.0	-	13.2	-	56.0	46.0	13.3	-	42.7	-
0.85	0.1 <	10.0	-	14.4	-	56.0	46.0	14.5	-	41.5	-
1.20	0.1 <	10.0	-	16.9	-	56.0	46.0	17.0	-	39.0	-
2.76	0.2	13.5	-	22.1	-	56.0	46.0	22.3	-	33.7	-
3.48	0.2	10.5	-	19.2	-	56.0	46.0	19.4	-	36.6	-
5.78	0.2	12.4	-	21.0	-	60.0	50.0	21.2	-	38.8	-
8.06	0.3 <	10.0	-	15.5	-	60.0	50.0	15.8	-	44.2	-
10.00	0.3 <	10.0	- <	10.0	-	60.0	50.0	< 10.3	-	> 49.7	-
15.00	0.4 <	10.0	- <	10.0	-	60.0	50.0	< 10.4	-	> 49.6	-
20.00	0.5 <	10.0	- <	10.0	-	60.0	50.0	< 10.5	-	> 49.5	-
25.00	0.6 <	10.0	- <	10.0	-	60.0	50.0	< 10.6	-	> 49.4	-
30.00	0.7 <	10.0	- <	10.0	-	60.0	50.0	< 10.7	-	> 49.3	-

Notes : 1) The spectrum was checked from 0.15 MHz to 30 MHz.
2) The cable loss is included in the LISN factor.
3) The symbol of "<"means "or less".
4) The symbol of ">"means "or greater".
5) The symbol of "-"means "Not applicable".
6) V-A : One end & Ground V-B : The other end & Ground
7) Q.P : Quasi-peak AVE : Average
8) A sample calculation was made at 0.15 (MHz).
Lf + Mr =0.3 + 26.5 = 26.8(dBuV)
Lf = LISN Factor
Mr = Meter Reading

Tested by : M. Takahashi
Masanori Takahashi
Testing Engineer

Appendix

Test Instruments List

July 8, 2005

Test Facilities

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
TF01	Anechoic Chamber A	-	TDK	-	800-01-502E0	Mar. 2005	1 Year
TF02	Anechoic Chamber B	-	TDK	-	800-01-503E0	Mar. 2005	1 Year
TF03	Shield Room A	-	TDK	-	800-01-501E0	-	-
TF04	Shield Room B	-	Ray Proof	-	800-01-010E0	-	-
TF05	Shield Room C	-	TDK	-	800-01-504E0	-	-
TF06	Shield Room D	-	Emerson	-	800-01-022E0	-	-
TF07	Shield Room E	-	TDK	-	800-01-505E0	-	-

Test Receivers

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
TR01	Test Receiver	ESH2	Rohde & Schwarz	880370/016	119-01-503E0	May 2005	1 Year
TR02	Test Receiver	ESH3	Rohde & Schwarz	881460/030	119-01-023E0	May 2005	1 Year
TR03	Test Receiver	ESHS10	Rohde & Schwarz	835871/004	119-01-505E0	Apr. 2005	1 Year
TR05	Test Receiver	ESVS10	Rohde & Schwarz	826148/002	119-03-504E0	Apr. 2005	1 Year
TR06	Test Receiver	ESVS10	Rohde & Schwarz	832699/001	119-03-506E0	Apr. 2005	1 Year
TR07	Test Receiver	ESI26	Rohde & Schwarz	100043	119-04-511E0	Aug. 2004	1 Year

Spectrum Analyzers

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
SA01	Spectrum Analyzer	R3182	ADVANTEST	120600581	122-02-521E0	Mar. 2005	1 Year
SA02	Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	122-02-501E0	Oct. 2004	1 Year
SA03	RF Pre-selector	85685A	Hewlett Packard	2648A00522	122-02-503E0	Oct. 2004	1 Year
SA04	Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	122-02-517E0	Apr. 2005	1 Year
SA05	RF Pre-selector	85685A	Hewlett Packard	2901A00933	122-02-519E0	Apr. 2005	1 Year
SA06	Spectrum Analyzer	R3132	ADVANTEST	120500072	122-02-520E0	Sep. 2004	1 Year

Antennas

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
AN01	Loop Antenna	HFH2-Z2	Rohde & Schwarz	881058/62	119-05-033E0	May. 2005	1 Year
AN02	Dipole Antenna	KBA-511	Kyoritsu	0-170-1	119-05-506E0	Oct. 2004	1 Year
AN03	Dipole Antenna	KBA-511A	Kyoritsu	0-201-13	119-05-504E0	Oct. 2004	1 Year
AN04	Dipole Antenna	KBA-611	Kyoritsu	0-147-14	119-05-507E0	Oct. 2004	1 Year
AN05	Dipole Antenna	KBA-611	Kyoritsu	0-210-5	119-05-505E0	Oct. 2004	1 Year
AN06	Biconical Antenna	BBA9106	Schwarzbeck	VHA91031150	119-05-111E0	Nov. 2004	1 Year
AN07	Biconical Antenna	BBA9106	Schwarzbeck	-	119-05-078E0	Nov. 2004	1 Year
AN08	Log-peri. Antenna	UHALP9107	Schwarzbeck	-	119-05-079E0	Nov. 2004	1 Year
AN09	Log-peri. Antenna	UHALP9107	Schwarzbeck	-	119-05-110E0	Nov. 2004	1 Year
AN10	Log-peri. Antenna	HL025	Rohde & Schwarz	340182/015	119-05-100E0	Feb. 2005	1 Year
AN11	Horn Antenna	3115	EMC Test Systems	6442	119-05-514E0	Jan. 2005	1 Year
AN12	Horn Antenna	3116	EMC Test Systems	2547	119-05-515E0	May 2005	2 Year

Networks

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
NE01	LISN	KNW-407	Kyoritsu	8-833-6	149-04-052E0	Apr. 2005	1 Year
NE02	LISN	KNW-407	Kyoritsu	8-855-2	149-04-055E0	Apr. 2005	1 Year
NE03	LISN	KNW-407	Kyoritsu	8-1130-6	149-04-062E0	Apr. 2005	1 Year
NE04	LISN	KNW-242C	Kyoritsu	8-837-13	149-04-054E0	Apr. 2005	1 Year
NE05	Absorbing Clamp	MDS21	Luthi	03293	119-06-506E0	Aug. 2004	1 Year

Cables

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
CA01	RF Cable	5D-2W	Fujikura	-	155-21-001E0	Feb. 2005	1 Year
CA02	RF Cable	5D-2W	Fujikura	-	155-21-002E0	Feb. 2005	1 Year
CA03	RF Cable	3D-2W	Fujikura	-	155-21-005E0	Apr. 2005	1 Year
CA04	RF Cable	3D-2W	Fujikura	-	155-21-006E0	Apr. 2005	1 Year
CA05	RF Cable	3D-2W	Fujikura	-	155-21-007E0	Apr. 2005	1 Year
CA06	RF Cable	RG213/U	Rohde & Schwarz	-	155-21-010E0	Apr. 2005	1 Year
CA07	RF Cable(10m)	S 04272B	Suhner	-	155-21-011E0	May 2005	1 Year
CA08	RF Cable(2m 18GHz)	SUCOFLEX 104	Suhner	-	155-21-012E0	May 2005	1 Year
CA09	RF Cable(1m 18GHz)	SUCOFLEX 104	Suhner	-	155-21-013E0	May 2005	1 Year
CA10	RF Cable(1m N)	S 04272B	Suhner	-	155-21-015E0	May 2005	1 Year
CA11	RF Cable(1m 26GHz)	SUCOFLEX 104	Suhner	182811/4	155-21-016E0	Dec. 2004	1 Year
CA12	RF Cable(4m 26GHz)	SUCOFLEX 104	Suhner	190630	155-21-017E0	Dec. 2004	1 Year
CA13	RF Cable(10m)	F130-S1S1-394	MEGA PHASE	10510	155-21-018E0	Dec. 2004	1 Year
CA14	RF Cable(7m)	3D-2W	Fujikura	-	155-21-009E0	Apr. 2005	1 Year
CA15	RF Cable(7m)	RG223/U	Suhner	-	155-21-021E0	May 2005	1 Year

Amplifiers

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
AM01	AF Amplifier	P-500L	Accuphase	BOY806	127-01-501E0	Feb. 2005	1 Year
AM06	RF Amplifier	WJ-6882-814	Watkins-Johnson	0414	127-04-017E0	Jun. 2005	1 Year
AM07	RF Amplifier	WJ-5315-556	Watkins-Johnson	106	127-04-006E0	Jun. 2005	1 Year
AM08	RF Amplifier	WJ-5320-307	Watkins-Johnson	645	127-04-005E0	Jun. 2005	1 Year
AM09	RF Amplifier	JS4-00102600-28-5A	MITEQ	669167	127-04-502E0	Apr. 2005	1 Year

Signal Generators

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
SG01	Function Generator	3325B	Hewlett Packard	2847A03284	118-08-124E0	Jul. 2005	1 Year
SG02	Function Generator	VP-7422A	Matsushita Communication	050351E122	118-08-503E0	Jul. 2005	1 Year
SG03	Signal Generator	8664A	Hewlett Packard	3035A00140	118-03-014E0	Jun. 2005	1 Year
SG04	Signal Generator	8664A	Hewlett Packard	3438A00756	118-04-502E0	Jun. 2005	1 Year
SG05	Signal Generator	6061A	Gigatronics	5130593	118-04-024E0	Mar. 2005	1 Year

Auxiliary Equipment

No.	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
AU01	Termination(50)	-	Suhner	-	154-06-501E0	Jan. 2005	1 Year
AU02	Termination(50)	-	Suhner	-	154-06-502E0	Jan. 2005	1 Year
AU03	Power Meter	436A	Hewlett Packard	1725A01930	100-02-501E0	Apr. 2005	1 Year
AU04	Power Sensor	8482A	Hewlett Packard	1551A01013	100-02-501E0	Apr. 2005	1 Year
AU05	Power Sensor	8485A	Hewlett Packard	2942A08969	100-04-021E0	Apr. 2005	1 Year
AU06	FM Linear Detector	MS61A	Anritsu	M77486	123-02-008E0	Oct. 2004	1 Year
AU07	Level Meter	ML422C	Anritsu	M87571	114-02-501E0	Jun. 2005	1 Year
AU08	Measuring Amplifier	2636	B & K	1614851	082-01-502E0	May 2005	1 Year
AU09	Microphone	4134	B & K	1253497	147-01-502E0	May 2005	1 Year
AU10	Preamplifier	2639	B & K	1268763	127-01-504E0	N/A	N/A
AU11	Pistonphone	4220	B & K	1165008	147-02-501E0	Mar. 2005	1 Year
AU12	Artificial Mouth	4227	B & K	1274869	-	N/A	N/A
AU13	Frequency Counter	53131A	Hewlett Packard	3546A11807	102-02-075E0	May 2005	1 Year
AU14	Oven	-	Ohnishi	-	023-02-018E0	May 2005	1 Year
AU15	DC Power Supply	6628A	Hewlett Packard	3224A00284	072-05-503E0	Jun. 2005	1 Year
AU16	Band Reject Filter	BRM12294	Micro-tronics	003	149-01-501E0	Jan. 2005	1 Year
AU17	High Pass Filter	F-100-4000-5-R	RLC Electronics	0149	149-01-502E0	Feb. 2005	1 Year
AU18	Attenuator	43KC-10	Anritsu	-	148-03-506E0	Feb. 2005	1 Year
AU19	Attenuator	43KC-20	Anritsu	-	148-03-507E0	Feb. 2005	1 Year
AU20	Attenuator	355D	Hewlett Packard	219-10782	148-03-065E0	Apr. 2005	1 Year
AU21	FFT Analyzer	R9211C	Advantest	02020253	122-02-506E0	Jun. 2005	1 Year
AU22	Noise Meter	MN-446	Meguro	53030478	082-01-144E0	Apr. 2005	1 Year
AU23	RF Detector	75KC-50	Anritsu	305002	100-02-506E0	Jul. 2004	1 Year
AU24	Peak Power Analyzer	8990A/84815A	Hewlett Packard	3220A00486/ 3227A00118	100-02-016E0	Apr. 2005	1 Year