



Electromagnetic Emission

FCC MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE FCC PART15 CERTIFICATION

PRODUCT : 2.4 GHz A/V Transmitter
MODEL/TYPE NO : KIS-24AVT
FCC ID : RE2KIS-24AVT
TRADE NAME : KOREA I.S
APPLICANT : KOREA I.S CO., LTD.
321-19, KongDan-Dong, Gumi-Si,
KyungSangBuk-Do, 730-030, Korea
Attn. : B.Y. Kim / Manager of Research Dept.
FCC CLASSIFICATION : DXX Part 15 Low Power Communication Device Transmitter
FCC RULE PART(S) : FCC Part 15 Subpart C Section 15.249
FCC PROCEDURE : Certification
DATES OF TEST : July 28, 2003
DATES OF ISSUE : August 18, 2003
TEST REPORT No. : BWS-03-RF-0001
TEST LAB. : BWS Tech., Inc. (Registration No. : 553281)

This RF A/V Transmitter has been tested in accordance with the measurement procedures specified in ANSI C63.4-2000 at the BWS TECH/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart C Section15.249

I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

K.Young Kim
Chief of Laboratory Division
BWS TECH Inc.

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FCC TEST REPORT

Scope – Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)

1. General Information

Applicant

Company Name : KOREA I.S Co., Ltd.
Company Address : 321-19, Kongdan-dong, Gumi-si, Kyungsangbuk-do,
730-030, Korea
Phone/Fax : Phone : +82 54 465 1983 Fax : +82 54 465 2582

Manufacturer

Company Name : KOREA I.S Co., Ltd.
Company Address : 321-19, Kongdan-dong, Gumi-si, Kyungsangbuk-do,
730-030, Korea
Phone/Fax : Phone : +82 54 465 1983 Fax : +82 54 465 2582

- **EUT Type** : 2.4 GHz A/V Transmitter
- **Model Number** : KIS-24AVT
- **FCC Identifier** : RE2KIS-24AVT
- **S/N** : Prototype
- **Freq. Range** : 2400 MHz ~ 2480 MHz
- **Channel** : 2410 / 2430 / 2450 / 2470 MHz (4ch)
- **Modulation Method** : FM
- **RF Power Output** : 10 mW
- **FCC Classification** : DXX : Part 15 Low Power Communication Device Transmitter
- **FCC Rule Part(s)** : Part 15 Subpart C Section 15.249
- **Test Procedure** : ANSI C63.4-2000
- **Dates of Tests** : July 28, 2003

- **Place of Tests** : BWS TECH Inc.
EMC Testing Lab (FCC Registration Number : 553281)
294-9, Jungdae-Dong, Kwangju-Si,
Kyunggi-Do, 464-080, Korea
TEL: +82 31 762 0124 FAX: +82 31 762 0126
- **Test Report No.** : BWS-03-RF-0001

2. Description of Test Facility

The measurement test for radiated and conducted emission test were conducted at the open area test site of BWS TECH Inc. facility located at 294-9, Jungdae-Dong, Kwangju-Si, Kyunggi-Do, Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-2000 and CISPR Publication 16. The BWS TECH measurement facility has been filed to the Commission with the FCC for 3 and 10-meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-1992 and registered to the Federal Communications Commission (Registration Number : 553281).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-2000) was used in determining radiated and conducted emissions from the KOREA I.S CO., LTD. 2.4GHz A/V Transmitter Model : KIS-24AVT.

3. Product Information

3.1 Equipment Description

The Equipment Under Test (EUT) is the KOREA I.S Co., Ltd. Audio/Video 2.4GHz Wireless Transmitter model: KIS-24AVT(FCC ID: RE2KIS-24AVT). The transmitter modulate an audio and video signal from the external source by using the FM modulation and transmit 2.4 GHZ carrier to the receiver wireless.

The power is supplied from the external AC/DC adapter.

3.2 General Specification

- TX Carrier Freq.	2410, 2430, 2450, 2470MHz
- No. of Channel	4Ch
- Channel Spacing	20 MHz
- Occupied Bandwidth	16 MHz
- RF Output Power	10 mW
- Freq. Stability	± 50ppm(-10? ~ +50?)
- TX Signal	NTSC
- Modulation method	FM
- Power Requirement	DC 12V 500mA
- Leakage power of Adjacent channel	-60dBc
- Spurious Radiation	-60dBc

4. Description of Tests

4.1 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2000. The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50 /50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1m x 1.5m x 0.8m wooden table, which is placed 40cm away from the vertical wall, and 1.5m away from the sidewall of the chamber room. Two LISNs are bonded to the shielded room. The EUT is powered from the PMM LISN and the support equipment is powered from the another Koritsu LISN. Power to the LISNs is filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the EMCO LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling (serpentine fashion) to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the R3261A Spectrum Analyzer to determine the frequency producing the max. Emission from the EUT. The frequency producing the max. Level was reexamined using the detector function set to the CISPR Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0.45 to 30MHz. The bandwidth of the Spectrum Analyzer was set to 9KHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by switching power lines, varying the mode of operation or resolution, clock or data exchange speed, if applicable, whichever determined the worst-case emission. Each emission reported was calibrated using self-calibrating mode.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup.

4.2 Radiated Emission Measurement

Preliminary measurements were made at indoors 3-meter semi EMC Anechoic Chamber using broadband antennas, broadband amplifier, and spectrum analyzer to determine the emission frequencies producing the maximum EME.

Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configurations, mode of operation, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000MHz using biconilog antenna and above 1000MHz, linearly polarized double ridge horn antennas were used. Above 1GHz, linearly polarized double ridge horn antennas were used. The measurements were performed with three frequencies, which were selected as bottom, middle, and top frequency in the operating band. Emission level from the EUT with various configurations was examined on the spectrum analyzer connected with the RF amplifier and plotted graphically.

Final measurements were made outdoors open site at 3-meter test range using biconical and log periodic, Horn antenna. The output from the antenna was connected, via a preselector or a preamplifier, to the input of the EMI Measuring Receiver and Spectrum analyzer (for above 25GHz). The detector function was set to the quasi-peak or peak mode as appropriate. The measurement bandwidth on the Field strength receiver was set to at least 120kHz (1MHz for measurement above 1GHz), with all post-detector filtering no less than 10 times the measurement bandwidth. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during preliminary measurement was examined and investigated as the same set up and configuration which produced the maximum emission. The EUT, support equipment and interconnecting cables were configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1m x 1.5 meter table. The turntable containing the system was rotated and the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.

Varying the mode of operating frequencies of the EUT maximized each emission. The system was tested in all the three orthogonal planes and changing the polarity of the antenna. The worst-case emissions are recorded in the data tables. If necessary, the radiated emission measurement could be performed at a closer distance to ensure higher accuracy and the results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20dB/decade) as per section 15.31(f).

Photographs of the worst-case emission test setup can be seen in Appendix A.

5. Test Condition

5.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner, which tends to maximize its emission level in a typical application.

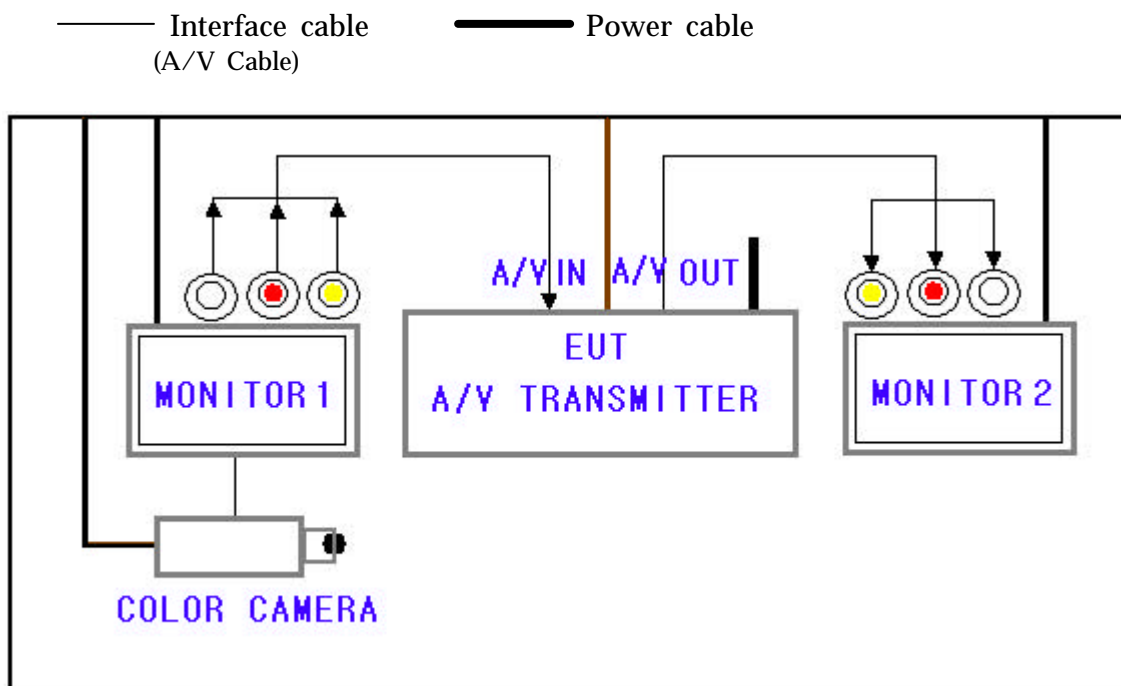
Radiated Emission Test

Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/2000 Clause 8.3.1.1 to determine the worst operating condition. Final radiated emission tests were conducted at 3-meter open field test site. To complete the test configuration required by the FCC, the EUT was tested in all three orthogonal planes. All testing was performed at 12 VDC via external DC power supply.

5.2 EUT operation

The EUT was set to the normal audio and video signal-transmitting mode in a 2.4GHz(ISM band) with external signal source during all the testing in a manner similar to a typical use. For the EUT operation, the CCTV Camera was used for an external the Audio/Video source.

5.3 Test System layout on EUT and peripherals



5.4 Peripherals / Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

Type of Peripheral Equipment Used:

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	KIS-24AVT	N/A	KOREA I.S CO., LTD.	RE2KIS-24AVT
MONITOR-1	SAM-14M	970610524	SAM SUNG	-
MONITOR-2	SAM-14M	970610528	SAM SUNG	-
COLOR CAMERA	CCN-251 IA	99020913	secura	-

Type of Cables Used:

Device from	Device to	Type of Cable	Length	Type of shield
EUT	MONITOR-1	Signal cable	1.5m	UnShielded
EUT	MONITOR-2	Signal cable	1.5m	Unshielded
POWER CABLE	POWER	-	1.6m	Unshielded
MONITOR-1	COLOR CAMERA	Signal cable	1.0m	shielded

6. TEST RESULTS

6.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

FCC Rule Parts	Measurement Required	Result
15.207	Conducted Emission	Passed by -15.53 dB
15.249(a)	Radiated Emissions of Carrier Frequency	Passed by -6.90 dB
15.249(a)	Radiated Emissions of Harmonics	Passed by -5.96 dB
15.249(d)/15.209	Out-of-Band Radiated Emissions	Passed by -1.66 dB

The data collected shows that the KOREA I.S Co., Ltd. 2.4GHz A/V Transmitter **KIS-24AVT** complies with technical requirements of the Part 15.207, 15.209 and 15.249 of the FCC Rules.

Note : Modification to EUT

The device tested is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified during testing.

6.2 Conducted Emissions

EUT : 2.4GHz A/V Transmitter KIS-24AVT (SN:Prototype)
Limit apply to : FCC Part15 Subpart C Section 15.207
Test Date : July 28, 2003
Operating Condition : Continuous Tx operating mode
Environment Condition : Humidity Level : 37 %RH, Temperature : 15
Result : Passed by – 15.53dB

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Tabulated Conducted Emission Test Data

Detector Mode ; CISPR Quasi Peak mode (6dB Bandwidth : 9kHz)

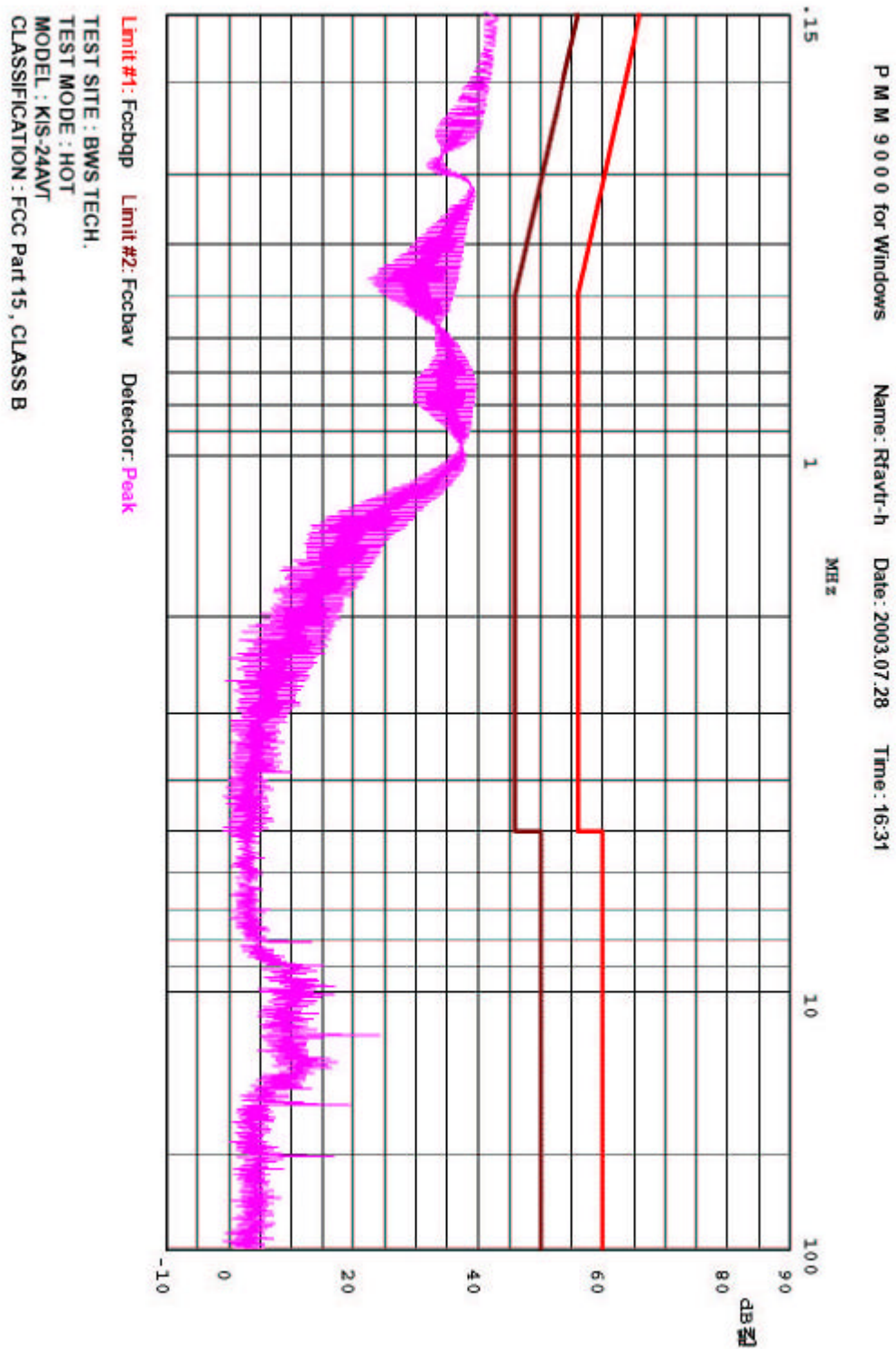
Freq [MHz]	Correcton		Phase [H/N]	Quasi-Peak Mode			Average Mode		
	AMN	C.L		Limit	Reading	Emission Level	Limit	Reading	Emission Level
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.155	0.06	0.03	N	65.90	43.80	43.89	55.90		
0.172	0.06	0.03	N	65.40	43.20	43.29	55.40		
0.184	0.06	0.03	N	65.10	42.80	42.89	55.10		
0.204	0.07	0.10	N	64.60	42.10	42.27	54.60		
0.213	0.07	0.10	N	64.30	41.80	41.97	54.30		
0.226	0.07	0.10	N	63.90	41.10	41.27	53.90		
0.671	0.07	0.30	N	56.00	39.10	39.47	46.00		
0.705	0.07	0.30	N		39.90	40.27			
0.732	0.07	0.30	N		40.10	40.47			
0.776	0.08	0.30	N		40.00	40.38			
0.805	0.08	0.30	N		39.80	40.18			
0.832	0.08	0.30	N		39.80	40.18			
9.700	0.07	1.02	H	60.00	17.20	18.29	50.00		
10.000	0.08	1.03	H		16.80	17.91			
12.000	0.04	1.15	N		25.30	26.49			
13.370	0.06	1.19	H		17.60	18.85			
15.990	0.07	1.22	H		19.50	20.79			
20.160	0.05	1.36	N		20.90	22.31			

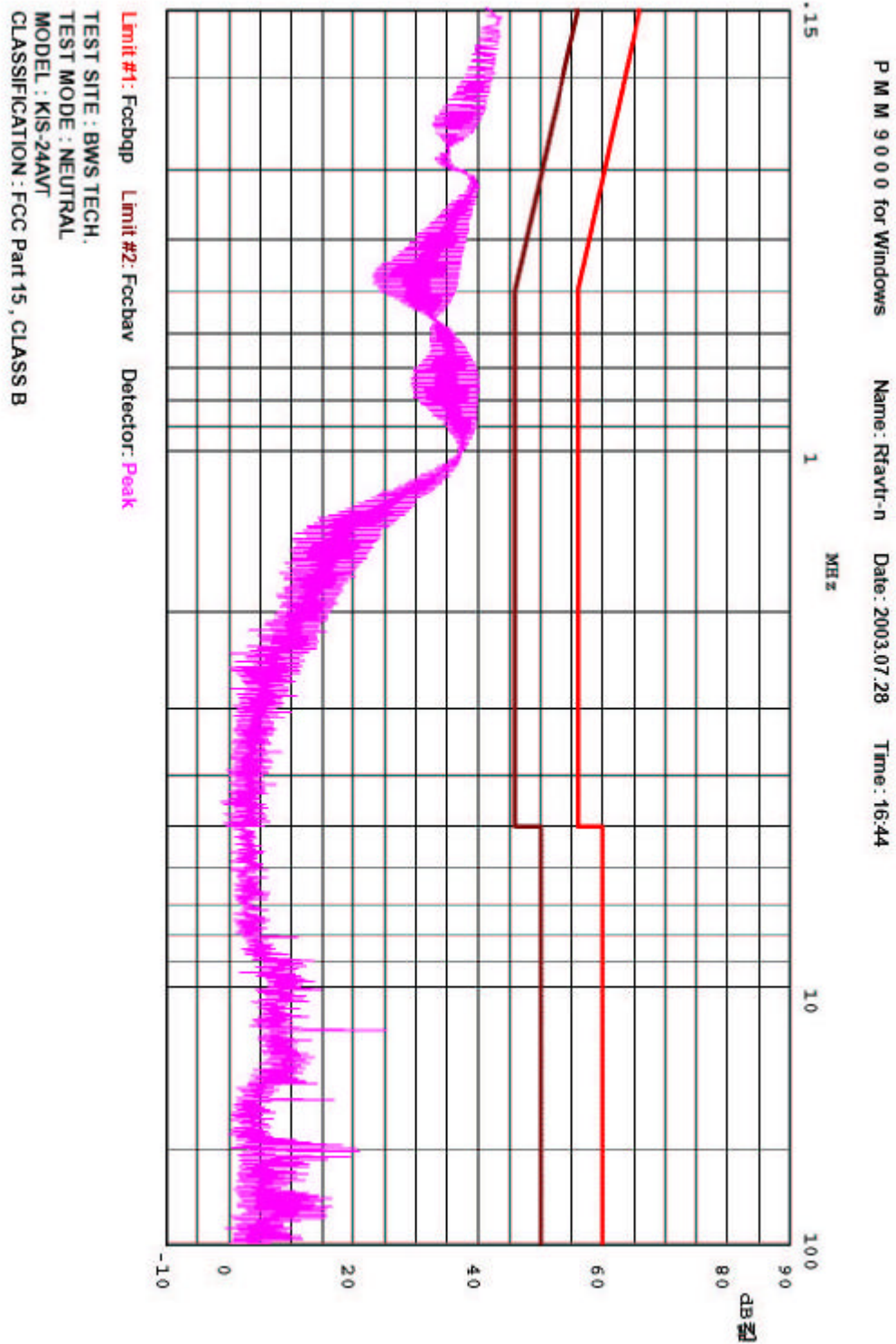
NOTES :

1. H : Hot Line , N :Neutral Line
2. Emission Level = Reading + Correction Factor
3. Measurements were performed at the AC Power Inlet of the host PC with the EUT plugged in the frequency band of 150kHz ~30MHz

Tested by Yang Sik, Ryu

Plots of Conducted Emission Test





6.3 Radiated Emissions of RF Carrier frequency

EUT : RF A/V Transmitter KIS-24AVT (SN:Prototype)
Limit apply to : FCC Part15 Subpart C Section 15.249(a)
Test Date : July 28, 2003
Operating Condition : RF transmit(Low, Mid, High Channel) with ext. audio/video source
Environment Condition : Humidity Level : 35 %RH, Temperature : 16
Result : Passed by - 6.90dB

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Measurement Distance : 3 meters

Detector mode : Peak mode

Freq. [GHz]	Reading [dBμV]	Ant.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
2.41	89.18	V	27.6	11.17	30	97.95	114	-16.05
2.45	92.45	H	27.6	11.33	30	101.38	114	-12.62
2.47	93.21	H	27.6	11.33	30	102.14	114	-11.86

Detector mode : Average mode

Freq. [GHz]	Reading [dBμV]	Ant.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
2.41	63.82	V	27.6	11.17	30	72.59	94	-21.41
2.45	77.24	H	27.6	11.33	30	86.17	94	-7.83
2.47	78.17	H	27.6	11.33	30	87.10	94	-6.90

NOTES :

1. H : Horizontal polarization , V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss-preamplifier gain
3. Measurement was performed at 3 operating channels.

Tested by Yang Sik, Ryu

6.4 Radiated Emissions of Carrier Harmonics

EUT : RF A/V Transmitter KIS-24AVT (SN:Prototype)
 Limit apply to : FCC Part15 Subpart C Section 15.249(a)
 Test Date : July 28, 2003
 Operating Condition : Low Ch. : 2410 MHz RF transmit with ext. audio/video source
 Environment Condition : Humidity Level : 35 %RH, Temperature : 16
 Result : Passed by - 10.79dB

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Measurement Distance : 3 meters

Detector mode : Peak mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.82	43.57	H	31.5	18.17	30	63.24	74	-10.76
7.23	-	-	-	-	-	-	-	-
9.64	-	-	-	-	-	-	-	-

Detector mode : Average mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.82	23.54	H	31.5	18.17	30	43.21	54	-10.79
7.23	-	-	-	-	-	-	-	-
9.64	-	-	-	-	-	-	-	-

NOTES :

1. H : Horizontal polarization , V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss-preamplifier gain
3. Measurement was performed at 3 operating channel.

Tested by **Yang Sik, Ryu**

Radiated Emissions of RF Carrier Harmonics

EUT : RF A/V Transmitter KIS-24AVT (SN:Prototype)
Limit apply to : FCC Part15 Subpart C Section 15.249(a)
Test Date : July 28, 2003
Operating Condition : Mid Ch.: 2450 MHz RF transmit with ext. audio/video source
Environment Condition : Humidity Level : 35 %RH, Temperature : 16
Result : Passed by - 5.96dB

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Measurement Distance : 3 meters

Detector mode : Peak mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.90	47.47	H	31.5	19.33	30	68.30	74	-5.70
7.35	-	-	35.2	24.67	30	-	74	-
9.80	-	-	38.2	31.83	30	-	74	-

Detector mode : Average mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.90	27.21	H	31.5	19.33	30	48.04	54	-5.96
7.35	-	-	35.2	24.67	30	-	54	-
9.80	-	-	38.2	31.83	30	-	54	-

NOTES :

1. H : Horizontal polarization , V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss-preamplifier gain
3. Measurement was performed at 3 operating channel.

Tested by **Yang Sik, Ryu**

Radiated Emissions of RF Carrier Harmonics

EUT : RF A/V Transmitter KIS-24AVT (SN:Prototype)
 Limit apply to : FCC Part15 Subpart C Section 15.249(a)
 Test Date : July 28, 2003
 Operating Condition : High Ch.: 2470 MHz RF transmit with ext. audio/video source
 Environment Condition : Humidity Level : 35 %RH, Temperature : 16
 Result : Passed by - 7.30dB

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Measurement Distance : 3 meters

Detector mode : Peak mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.94	48.87	H	31.5	18.33	30	68.70	74	-5.30
7.41	-	-	35.2	25.33	30	-	74	-
9.88	-	-	38.2	31.67	30	-	74	-

Detector mode : Average mode

Freq. [GHz]	Reading [dBμV]	ANT.Pol. [H/V]	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin
4.94	26.87	H	31.5	18.33	30	46.70	54	-7.30
7.41	-	-	35.2	25.33	30	-	54	-
9.88	-	-	38.2	31.67	30	-	54	-

NOTES :

1. H : Horizontal polarization , V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss-preamplifier gain
3. Measurement was performed at 3 operating channel.

Tested by **Yang Sik, Ryu**

6.5 Out-of-band Radiated Emissions

EUT : RF A/V Transmitter KIS-24AVT (SN:Prototype)
 Limit apply to : FCC Part15 Subpart C Section 15.249(d) / 15.209
 Test Date : JULY 28, 2003
 Operating Condition : RF transmit with ext. audio/video source
 Environment Condition : Humidity Level : 35%RH, Temperature : 16
 Result : Passed by - 1.66dB

Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Detector mode : CISPR Quasi-Peak mode (6dB Bandwidth : 120 kHz)

Measurement Distance : 3 meters

Frequency [MHz]	Reading [dBμV]	Polarization (*H/**V)	Ant. Factor [dB]	Cable Loss [dB]	Pre-amp. [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]
43.84	23.4	V	12.95	1.27		37.62	40	-2.38
123.96	26.4	V	13.16	2.28		41.84	43.5	-1.66
181.16	21.8	V	15.65	2.84		40.29	43.5	-3.21

NOTES :

- * H : Horizontal polarization , ** V : Vertical polarization
- Emission Level = Reading + Antenna factor + Cable loss
- Margin value = Limit - Emission Level
- All other emissions not reported were more than 25dB below the permitted limit.

Tested by **Yang Sik, Ryu**

7. ANTENNA REQUIREMENT

7.1 Antenna Requirement

According to the section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to be complied.

7.2 Antenna Construction

The antenna used for the EUT is so designed that antenna other than that furnished by the manufacturer shall not be used with this device.

8. Sample Calculation and Other Information

8.1 Sample Calculations

$$\text{dB}\mu\text{V} = 20 \log_{10} (\mu\text{V}/\text{m})$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

EX. 1.

@ 2,470 MHz Radiated Emissions limit(Average)= 50 mV/m = 94 dB μ V/m

Reading = 48.17 dB μ V (calibrated level)

Antenna factor + Cable Loss = 38.93 dB

Total = 87.10 dB μ V/m

$10^{(37.62/20)} = \mu\text{V}$

Margin = 87.10 - 94 = -6.90

6.90 dB ; below limit

EX. 2.

@ 123.96 MHz Radiated Emissions limit (Quasi-peak) =150 μ V/m = 43.5 dB μ V

Reading = 26.40 dB μ V(calibrated level)

Antenna factor + Cable Loss = 15.44 dB

Total = 41.84 dB μ V/m

$10^{(40.29/20)} = \mu\text{V}/\text{m}$

Margin = 41.84 - 43.5 = -1.66 dB

1.66 dB ; below limit

8.2. Measurement Uncertainty

Measurement uncertainty of RFI Voltage Measurement test was estimated at ± 3.51 dB(k=2)

Measurement uncertainty of RFI Field Strength Measurement test was estimated at ± 4.34 dB (k=2)

9. TEST EQUIPMENTS LIST

The listing below denotes the test equipments utilized for the test(s).

<u>Test Equipment</u>	<u>Manufacture</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Cal.Due date</u>
Signal Analyzer	PMM	PMM9000	3100570602	08/16/03
EMC Analyzer	HP	E7403A	US39150108	02/27/04
Spectrum Analyzer	ADVANTEST	E7403A	61720002	08/22/03
Spectrum Analyzer	HP	8563E	3611A05046	05/14/04
Amplifier (0.1MHz-1.3GHz)	HP	8447E	2945A02712	08/19/03
Preamplifier	HP	8449B	N/A	11/12/03
Biconical Antenna	SWALZBECK	BBA9106	N/A	09/12/03
Log Periodic Antenna	CHAFFNER	UPA6109	N/A	09/12/03
Horn Antenna	SCHAFFNER	BBHA 9120 D	N/A	06/20/04
Horn Antenna	SCHAFFNER	BBHA 9170	N/A	06/20/04
Plotter	HP	7475A	007475A	N/A
Shield Room 7m x 4m x 4m	SEMITECH	000815	N/A	
Turn Table	JAEMC	JAC-2	N/A	N/A
Antenna Mast	Dae-il EMC	JAC-1	N/A	N/A
Artificial Mains Network	PMM	L3-25	1110K70403	10/02/03
Artificial Mains Network	KYORITSU	KNW-242C	8-920-20	08/31/03
Antenna Turntable Controller	JAEMC	JAC-2	N/A	N/A