FCC PART 15
EMI TEST REPORT

of

E.U.T. : 2.4GHz Wireless Audio Link (Receiver)
FCC ID : NOQSSG2250R
MODEL : SSG2250R

for

APPLICANT : JESMAY ELECTRONICS CO., LTD.
ADDRESS : 74, CHUNG-DER 20TH STREET TAINAN, TAIWAN, R.O.C.

Test Performed by

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Report Number : ET93R-03-116-02

TEST REPORT CERTIFICATION

Applicant : JESMAY ELECTRONICS CO., LTD.
74, CHUNG-DER 20TH STREET TAINAN, TAIWAN, R.O.C.

Manufacturer : JESMAY ELECTRONICS CO., LTD.
74, CHUNG-DER 20TH STREET TAINAN, TAIWAN, R.O.C.

Description of EUT :

a) Type of EUT : 2.4GHz Wireless Audio Link (Receiver)
b) Trade Name : JESMAY
c) Model No. : SSG2250R
d) FCC ID : NOQSSG2250R
e) Power Supply : Adaptor： I/P: 120Vac, 60Hz；
O/P: 9Vdc, 400mA
f) Frequency Range : 1. 2.4GHz~2.4835GHz
2. 433.92MHz

Regulation Applied : FCC Rules and Regulations Part 15 Subpart B & C (2003)

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 (2001) and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note : 1. The results of the testing report relate only to the items tested.
2. The testing report shall not be reproduced except in full, without the written approval of ETC.

Issued Date : Apr. 27, 2004

Test Engineer : Tien Lu Liao
(Tien Lu Liao)

Approve & Authorized Signer : Will Yauo
Will Yauo, Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: 2.4GHz Wireless Audio Link (Receiver)
b) Trade Name	: JESMAY
c) Model No.	: SSG2250R
d) FCC ID	: NOQSSG2250R
e) Power Supply	: Adaptor：I/P: 120Vac, 60Hz； O/P: 9Vdc, 400mA

1.2 Characteristics of Device:

1. 2.4GHz wireless video and audio receiver employing frequencies 2414MHz, 2432MHz, 2450 MHz and 2468 MHz.
2. Infrared extender using 433.92 MHz for transmitting.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2001).

The Transmitter under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the device under test, rewiring in the circuit was done by the manufacturer so as to affect its intended operation.

The receiving antenna polarized horizontally was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the Transmitter under test.

In order to determining the average value during one pulse train of the radiated power generated from the Transmitter under test, the encoded wave form in the time domain was used.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Feb. 10, 2000.

2. DEFINITION AND LIMITS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipement via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

Remark "**" : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.3 Limitation

(1) Conducted Emission Limits:

Except for Class A digital devices, for equpment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency MHz	Quasi Peak dB µ V	Average dB µ V
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

(2) Radiated Emission Limits :

A.

According to 15.231, Periodic operation in the band 40.66-40.70 MHz and above 70 MHz, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Frequency Band (MHz)	Field strength of Fundamental (uV/m)	Field strength of Spurious (uV/m)
40.66-40.70	2250	225
70-130	1250	125
130-174	*1,250 to 3,750	*125 to 375
174-260	3750	375
260-470	*3,750 to 12,500	*375 to 1250
Above 470	12500	1250

* Linear interpolations.

According to 15.235, the field strength of emissions from intentional radiators operated under these frequency bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental µV/meter	dBµV/meter
49.82 - 49.90	10000	80

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209,as following table:

Other Frequencies (MHz)	Field Strength of Fundamental µV/meter	dBµV/meter
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

B.

According to 15.109, Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Class B Radiated Emission Limits :

Frequency MHz	**Distance Meters**	**Radiated dB µ V/m**	**Radiated µ V/m**
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

(3) Limit of transmission time

a) A manually operated Transmitter shall employ a switch that will automatically deactivate the Transmitter (Transmitter) within not more than 5 seconds of being released.

b) A Transmitter activated automatically shall cease transmission within 5 seconds after activation.

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

All measurement were intentional to maximum the emissions from EUT by varying the connection cables, therefore, the test result is sure to meet the applicable requirement.

3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID.	Description
2.4GHz Wireless Audio Link (Receiver) *	JESMAY ELECTRONICS CO., LTD.	SSG2250R/NOQSSG2250R	2.5m Unshielded AC Adaptor Poewr Cord 1.0m Unshielded AV Cable Linex2
Portable LCD TV	KOLIN	CT-056LC	2.5m Unshielded AC Adaptor Power Cord
Adaptor	----	ZID41014U	1.2m Unshielded AC Power Line

Remark "*" means equipment under test.

4. RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For periodic operation intentional radiator, the radiated emission shall comply with §15.231(b). According to §15.33 (b), radiated emission frequency was measured from 30 MHz to 5GHz.

4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in normal function.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.

3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.

4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

5. Repeat step 4 until all frequencies need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

7. Check the three frequencies of highest emission with varying the placement of cables (if any) associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

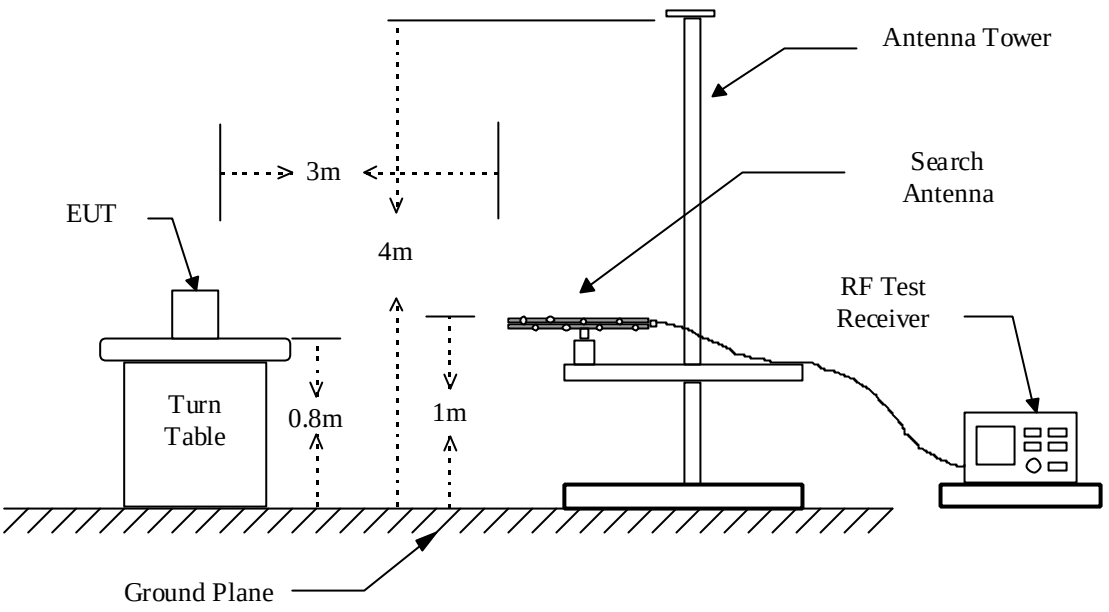
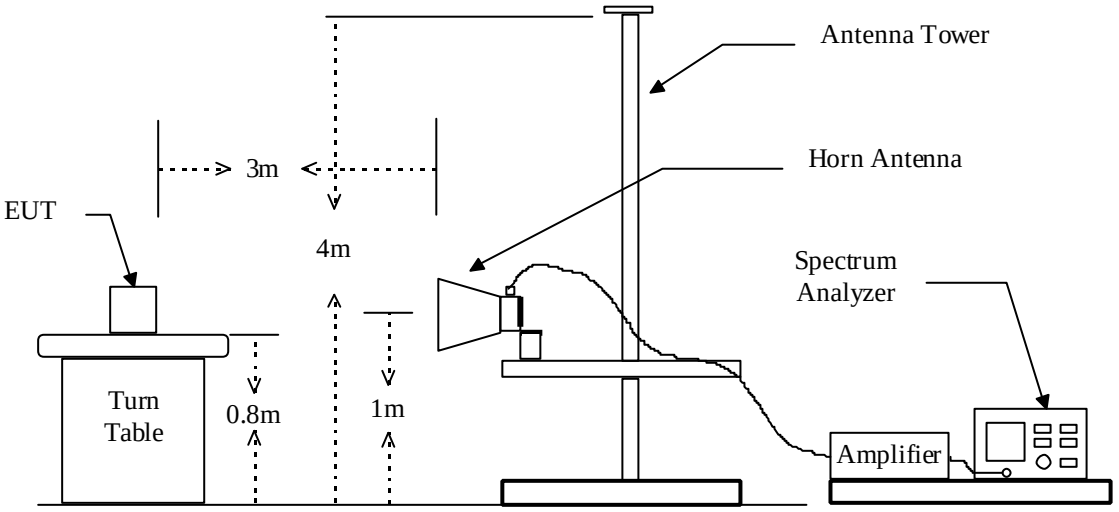


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Test Data

4.3.1 TX Portion

Operation Mode : Transmitting

Test Date : Mar. 29, 2004 Temperature : 21 ℃ Humidity: 69 %

Frequency (MHz)	Ant Pol H/V	Reading (dBuV) Peak	Factor (dB) C	Factor (dB) D	Result @3m (dBuV/m) Peak	Result @3m (dBuV/m) Ave.	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
433.920	V	105.5	-5.5	-23.6	100.0	76.4	100.8	80.8	-4.4	175	1.0
867.840	H	36.8	2.3	-23.6	39.1	15.5	80.8	60.8	-41.7	185	1.2
*1301.760	V	55.3	-8.4	-23.6	46.9	23.3	74.0	54.0	-27.1	315	1.3
1735.680	H	54.4	-6.1	-23.6	48.3	24.7	80.8	60.8	-32.5	310	1.3
2169.600	H/V	---	-4.0	-23.6	---	---	80.8	60.8	---	---	---
2603.520	V	51.3	-2.4	-23.6	48.9	25.3	80.8	60.8	-32.0	270	1.3
3037.440	V	47.6	-1.1	-23.6	46.5	22.9	80.8	60.8	-34.3	180	1.2
3471.360	H	48.7	-0.1	-23.6	48.6	25.0	80.8	60.8	-32.2	180	1.3
*3905.280	H	47.8	1.6	-23.6	49.4	25.8	74.0	54.0	-24.6	275	1.3
*4339.200	H	45.9	2.0	-23.6	47.9	24.3	74.0	54.0	-26.1	265	1.3

Note :

1. *Factor C means "corrected", and that includes antenna factor, cable loss, amplifier gain (if any). And Factor D means "Duty", that is for calculating the average value and derived from Appendix 3 in this test report.*
2. *Peak Result = Reading + C. Factor*
   Ave. Result = Peak Value + D Factor
3. *"*" means the frequency fall in the restricted frequency band, and the limit of emission is referred to FCC class B*
4. *The limit for spurious emissions refers to FCC §15.231.*
5. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

If the measured frequencies fall in the restricted frequency band, the limit employed is § 15.209 general requirement when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function, no duty factor applied.

4.3.2 Rx Portion

A. CH 1

Operation Condition : 2414MHz (Local：1934.500 MHz)

Test Date : Mar. 29, 2004 Temperature : 21℃ Humidity: 69 %

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
1934.600	54.9	51.0	58.6	54.0	-5.0	53.6	49.0	74.0	54.0	-5.0	90	1.0
3869.200	44.8	36.3	43.8	31.9	1.5	46.3	37.8	74.0	54.0	-16.2	270	1.0
5803.800	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7738.400	---	---	---	---	6.3	---	---	74.0	54.0	---	---	---
9673.000	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
11607.600	---	---	---	---	9.1	---	---	74.0	54.0	---	---	---
13542.200	---	---	---	---	11.0	---	---	74.0	54.0	---	---	---
15476.800	---	---	---	---	9.1	---	---	74.0	54.0	---	---	---
17411.400	---	---	---	---	15.6	---	---	74.0	54.0	---	---	---
19346.000	---	---	---	---	8.7	---	---	74.0	54.0	---	---	---

Note :

1. *Item of margin shown in above table refer to average limit.*
2. *It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.*
3. *Remark "---" means that the emissions level is too low to be measured.*
4. *Item "Margin" referred to Average limit while there is only peak result.*
5. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

B. CH 2

Operation Condition : 2432MHz (Local：1952.500 MHz)

Test Date : Mar. 29, 2004 Temperature : 25 ℃ Humidity: 65 %

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Result Ave	Limit @3m (dBuV/m) Peak	Limit Ave.	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
1952.583	55.0	49.9	58.7	55.0	-4.9	53.8	50.1	74.0	54.0	-3.9	95	1.0
3905.166	45.8	36.8	44.2	32.8	1.6	47.4	38.4	74.0	54.0	-15.6	275	1.0
5857.749	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7810.332	---	---	---	---	6.3	---	---	74.0	54.0	---	---	---
9762.915	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
11715.498	---	---	---	---	9.1	---	---	74.0	54.0	---	---	---
13668.081	---	---	---	---	11.1	---	---	74.0	54.0	---	---	---
15620.664	---	---	---	---	8.7	---	---	74.0	54.0	---	---	---
17573.247	---	---	---	---	16.4	---	---	74.0	54.0	---	---	---
19525.830	---	---	---	---	8.5	---	---	74.0	54.0	---	---	---

Note :

1. *Item of margin shown in above table refer to average limit.*
2. *It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.*
3. *Remark "---" means that the emissions level is too low to be measured.*
4. *Item "Margin" referred to Average limit while there is only peak result.*
5. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

C. CH 4

Operation Condition : 2468MHz (Local：1988.500MHz)

Test Date : Mar. 29, 2004 Temperature : 21 ℃ Humidity: 69 %

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
1988.633	54.8	50.8	58.5	55.3	-4.7	53.8	50.6	74.0	54.0	-3.4	85	1.0
3977.266	45.8	30.8	43.4	33.3	1.9	47.7	35.2	74.0	54.0	-18.8	265	1.0
5965.899	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7954.532	---	---	---	---	6.4	---	---	74.0	54.0	---	---	---
9943.165	---	---	---	---	7.4	---	---	74.0	54.0	---	---	---
11931.798	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
13920.431	---	---	---	---	11.3	---	---	74.0	54.0	---	---	---
15909.064	---	---	---	---	8.0	---	---	74.0	54.0	---	---	---
17897.697	---	---	---	---	17.2	---	---	74.0	54.0	---	---	---
19886.330	---	---	---	---	8.6	---	---	74.0	54.0	---	---	---

Note :

1. *Item of margin shown in above table refer to average limit.*
2. *It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.*
3. *Remark "---" means that the emissions level is too low to be measured.*
4. *Item "Margin" referred to Average limit while there is only peak result.*
5. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

4.3.3 Other Emissions

a) Emission frequencies below 1 GHz

Operation Condition : Normal
Test Date : Mar. 29, 2004 Temperature : 21 ℃ Humidity: 69 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
30.000	H/V	---	-9.8	---	40.0	---	---	---
50.000	H/V	---	-14.1	---	40.0	---	---	---
80.000	H/V	---	-15.0	---	40.0	---	---	---
150.000	H/V	---	-10.0	---	43.5	---	---	---
350.000	H/V	---	-10.5	---	46.0	---	---	---
500.000	H/V	---	-4.4	---	46.0	---	---	---
800.000	H/V	---	0.7	---	46.0	---	---	---

Note :

1. *Remark "---" means that the emissions level is too low to be measured.*
2. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

4.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

Peak = Reading + Corrected Factor

where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)

And the average value is

Average = Peak Value + Duty Factor

Note : If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.

4.5 Activate Time

This transmitter is operated manually, the activate time is less than 5 second after being released.

4.6 Calculation of Duty Factor

The duty factor is calculated with following formula :

$$20\log\frac{Total\ Duty}{Period\ of\ Pulse\ Train}$$

$$20\log\frac{(4.3ms\times1 + 700\mu s\times1)}{75.5ms} = -23.6dB$$

Note : Please see Appendix 3

4.7 Radiated Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	08/14/2004
RF Test Receiver	Rohde & Schwarz	ESVS 30	08/09/2004
Horn Antenna	EMCO	3115	05/28/2004
Log periodic Antenna	EMCO	3146	10/14/2004
Biconical Antenna	EMCO	3110B	11/04/2004
Horn Antenna	EMCO	3116	03/09/2005
Preamplifier	Hewlett-Packard	8449B	06/20/2004
Preamplifier	Hewlett-Packard	8447D	10/12/2004

4.8 Measuring Instrument Setup

Explanation of measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

4.9 Radiated Measurement Photos

Please See Exhibit F-Test_Setup_Photos

5. BANDWIDTH OF EMISSION

5.1 Applicable Standard Plot Graphic of Bandwidth

Per FCC rule §15.231(c), the permitted emission bandwidth is no wider than 0.25%of the center frequency for devices operating above 70 MHz and below 900 MHz.

5.2 Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	07/21/2004
Plotter	Hewlett-Packard	7550A	N/A

5.3 Plot Graphic of Bandwidth

The emission bandwidth limit for this transmitter is
433.920 MHz×0.25%＝1084.800 KHz

20 dB bandwidth = 120 KHz

Test Result: 120 KHz ＜ 1084.800 KHz.

Note : Please see appendix 1 for Plotted Data

6. CONDUCTED EMISSION MEASUREMENT

6.1 Description

The initial setup in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on following data pages, and these signals are the quasi-peaked.

For this TV interface is a wireless receiver, applying a test signal recommended in ANSI C63.4 by directly conducting is not practical and available, therefore, a VITS test signal is applied via its respective transmitter.

6.2 Conducted Emission Data

A. CH 1

Operation Mode : 2414MHz (Local：1934.5MHz)

Test Date : Apr. 01, 2004 Temperature : 21 ℃ Humidity: 58 %

Freq.	Meter Reading (dBμV)				Factor	Limit (dBμV)		Result (dBμV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.162	46.2	46.8	----	----	0.2	65.4	55.4	46.4	47.0	----	----
0.209	43.4	45.6	----	----	0.2	63.2	53.2	43.6	45.8	----	----
0.252	38.1	44.1	----	----	0.2	61.7	51.7	38.3	44.3	----	----
0.326	22.6	38.8	----	----	0.3	59.6	49.6	22.9	39.1	----	----
0.898	22.3	26.3	----	----	0.3	56.0	46.0	22.6	26.6	----	----
1.918	14.0	25.2	----	----	0.5	56.0	46.0	14.5	25.7	----	----
24.000	13.4	32.9	----	----	1.5	60.0	50.0	14.9	34.4	----	----

Note : 1. Please see appendix 2 for Plotted Data

2. The expanded uncertainty of the conducted emission tests is 2.45 dB.

B. CH 2

Operation Mode : 2432MHz (Local：1952.5MHz)

Test Date : Apr. 01, 2004 Temperature : 21℃ Humidity: 58 %

Freq.	**Meter Reading** (dBμV)				**Factor**	**Limit** (dBμV)		**Result** (dBμV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.162	46.3	47.0	----	----	0.2	65.4	55.4	46.5	47.2	----	----
0.209	43.6	45.7	----	----	0.2	63.2	53.2	43.8	45.9	----	----
0.252	38.3	44.2	----	----	0.2	61.7	51.7	38.5	44.4	----	----
0.326	22.8	38.9	----	----	0.3	59.6	49.6	23.1	39.2	----	----
0.898	22.5	26.4	----	----	0.3	56.0	46.0	22.8	26.7	----	----
1.918	14.1	25.4	----	----	0.5	56.0	46.0	14.6	25.9	----	----
24.000	13.6	33.0	----	----	1.5	60.0	50.0	15.1	34.5	----	----

C. CH 4

Operation Mode : 2468MHz (Local：1988.5MHz)

Test Date : Apr. 01, 2004 Temperature : 21 ℃ Humidity: 58 %

Freq.	***Meter Reading*** (dBμV)				**Factor**	**Limit** (dBμV)		**Result** (dBμV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.162	46.4	46.9	----	----	0.2	65.4	55.4	46.6	47.1	----	----
0.209	43.5	45.8	----	----	0.2	63.2	53.2	43.7	46.0	----	----
0.252	38.2	44.3	----	----	0.2	61.7	51.7	38.4	44.5	----	----
0.326	22.7	39.0	----	----	0.3	59.6	49.6	23.0	39.3	----	----
0.898	22.4	26.5	----	----	0.3	56.0	46.0	22.7	26.8	----	----
1.918	14.2	25.3	----	----	0.5	56.0	46.0	14.7	25.8	----	----
24.000	13.5	33.1	----	----	1.5	60.0	50.0	15.0	34.6	----	----

Note : 1. Please see appendix 2 for Plotted Data
2. The expanded uncertainty of the conducted emission tests is 2.45 dB.

6.3 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

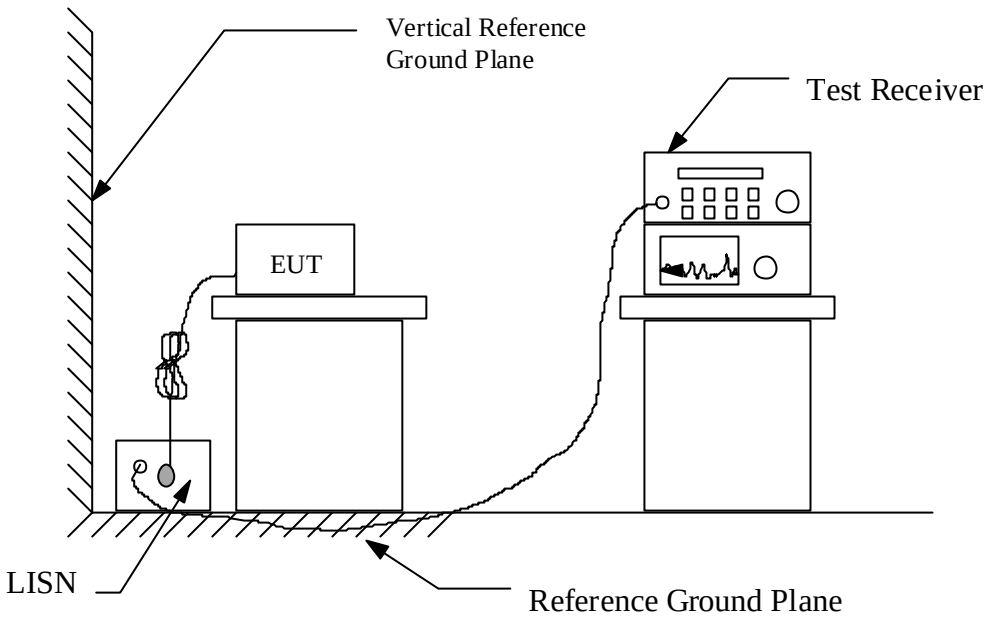
Assume a receiver reading of 22.5 dBμV is obtained, and LISN Factor is 0.1 dB, then the total of field strength is 22.6 dBμV.

RESULT = 22.5 + 0.1 = 22.6 dBμV
Level in μV = Common Antilogarithm[(22.6 dBμV)/20]
= 13.48 μV

6.4 Photos of Conduction Measuring Setup

Please See Exhibit F-Test_Setup_Photos

6.5 Conducted Measuring Setup Diagram



6.6 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Nest Cal. Date
EMI Test Receiver	Rohde and Schwarz	ESCS30	12/01/2004
Line Impedance Stabilization network	Rohde and Schwarz	ESH2-Z5	09/20/2004
Line Impedance Stabilization network	Kyoritsu	KNW-407	12/24/2004
Shielded Room	Riken	----	N/A
Monitor	IBM	E54	N/A
Printer	HP	LASERJET 1000	N/A
Computer	ACER	Veriton 7500G	N/A

7 ANTENNA REQUIREMENT

7.1 Standard Applicable

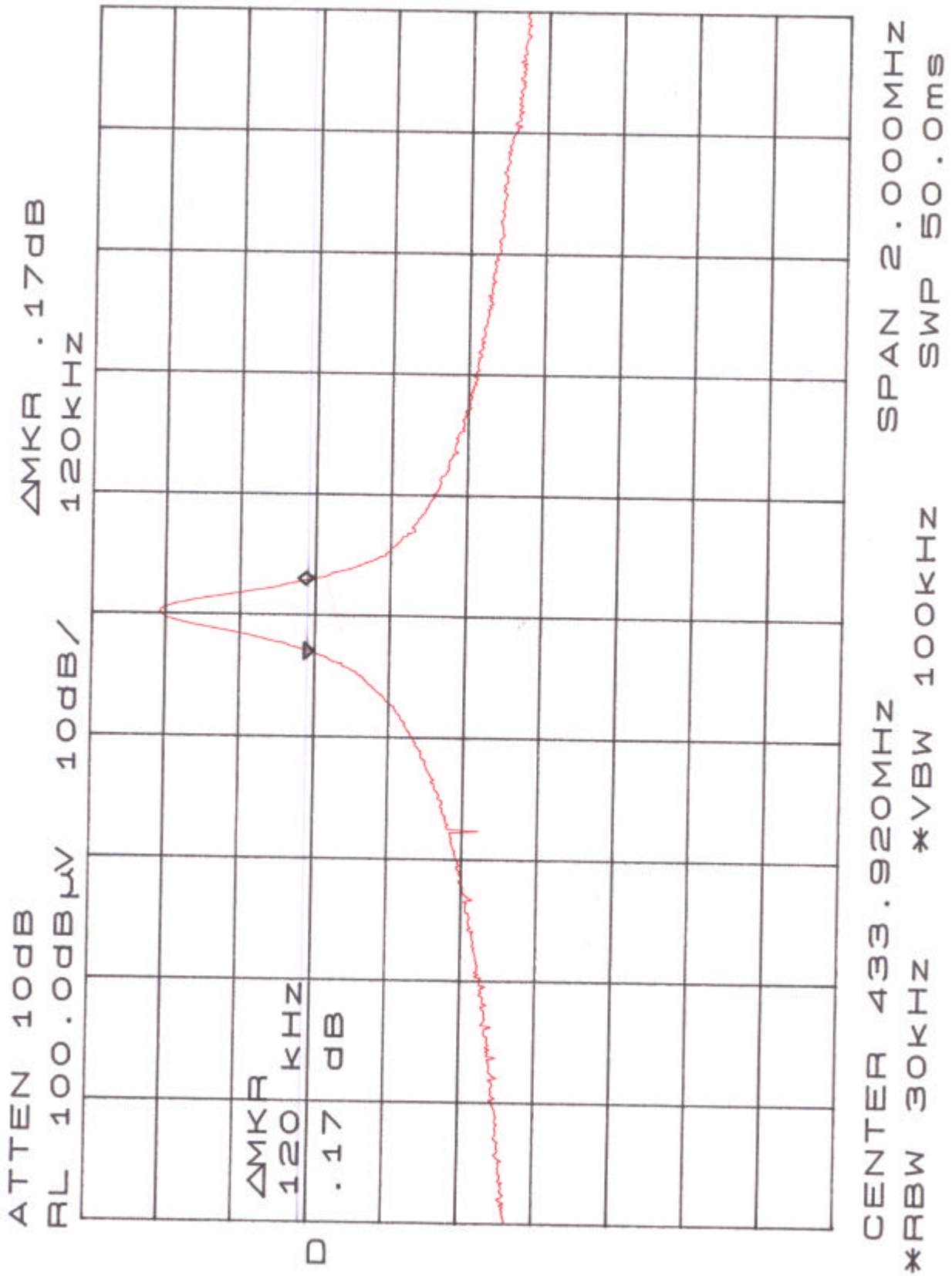
According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

7.2 Antenna Construction

1. The antenna for 433.92MHz transmitting is permanently attached, no consideration of replacement.
2. The antenna for 2.4GHz receiving is permanently attached, no consideration of replacement.

APPENDIX 1 : PLOTTED DATA FOR BANDWIDTH

Bandwidth Limit = 433.920 MHz×0.25%＝1084.8 KHz


ATTEN 10dB
RL 100.0dBμV 10dB/
ΔMKR .17dB
120kHz
ΔMKR
120 kHz
.17 dB
D
CENTER 433.920MHz
*RBW 30kHz
*VBW 100kHz
SPAN 2.000MHz
SWP 50.0ms

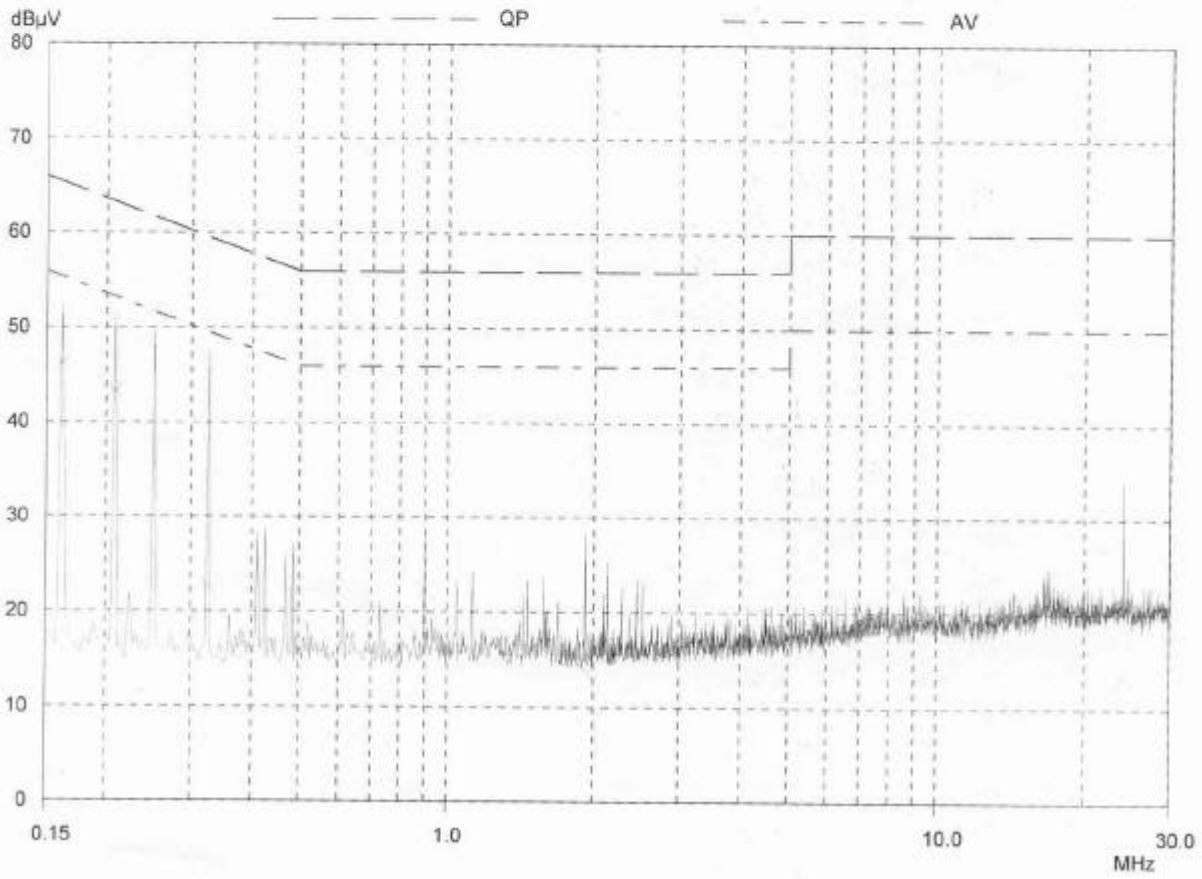
APPENDIX 2 : PLOTTED DATA OF POWER LINE CONDUCTED EMISSIONS

CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH01
Operator:	
Test Spec:	
Comment:	
	N

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

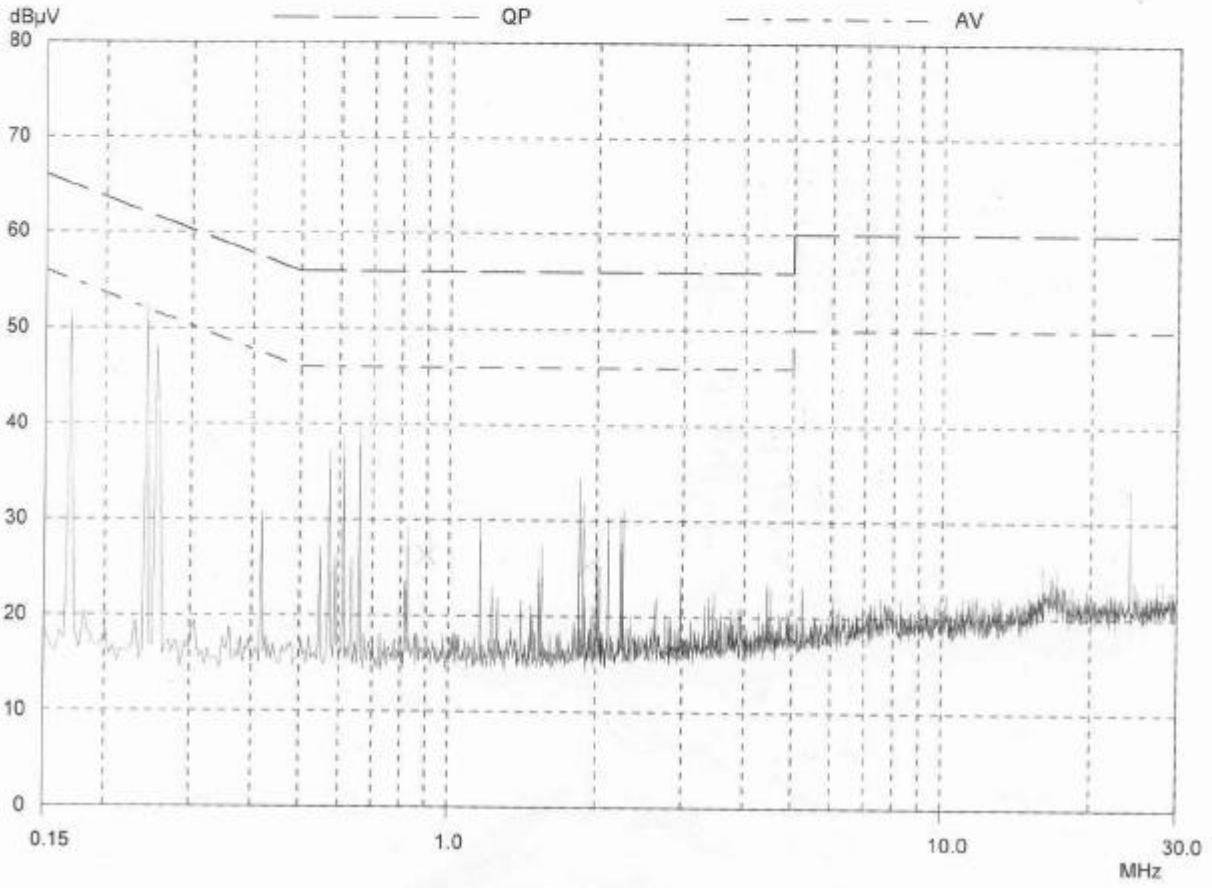


CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH01
Operator:	
Test Spec:	
Comment:	
	L1

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

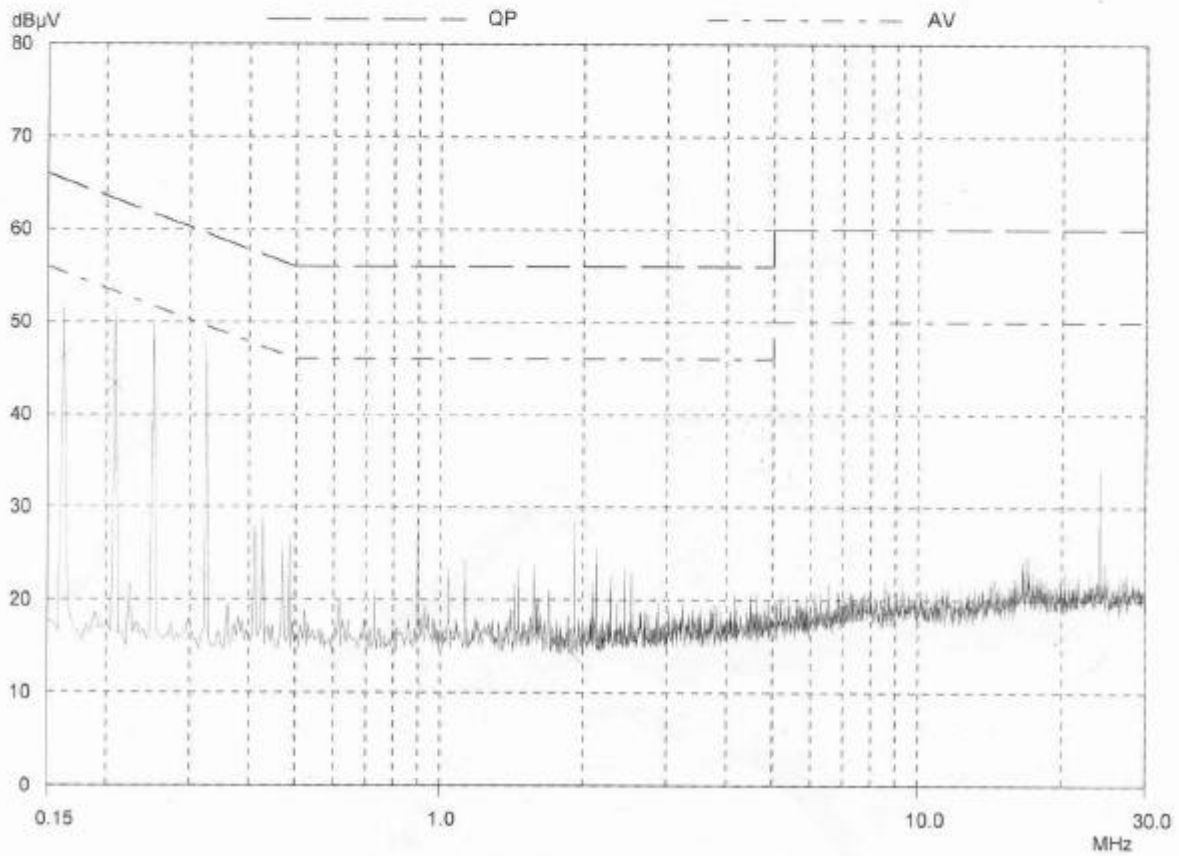


CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH02
Operator:	
Test Spec:	
Comment:	
	N

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

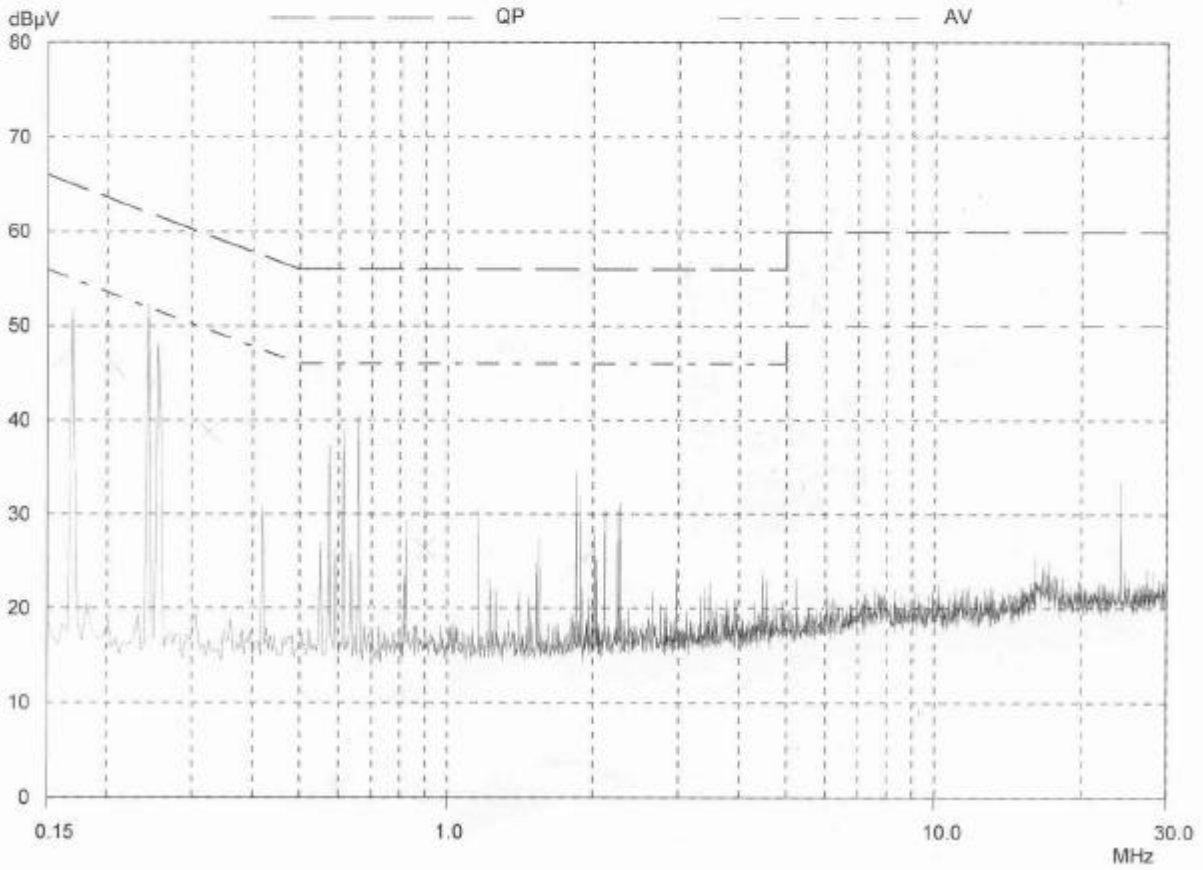


CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH02
Operator:	
Test Spec:	
Comment:	
	L1

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

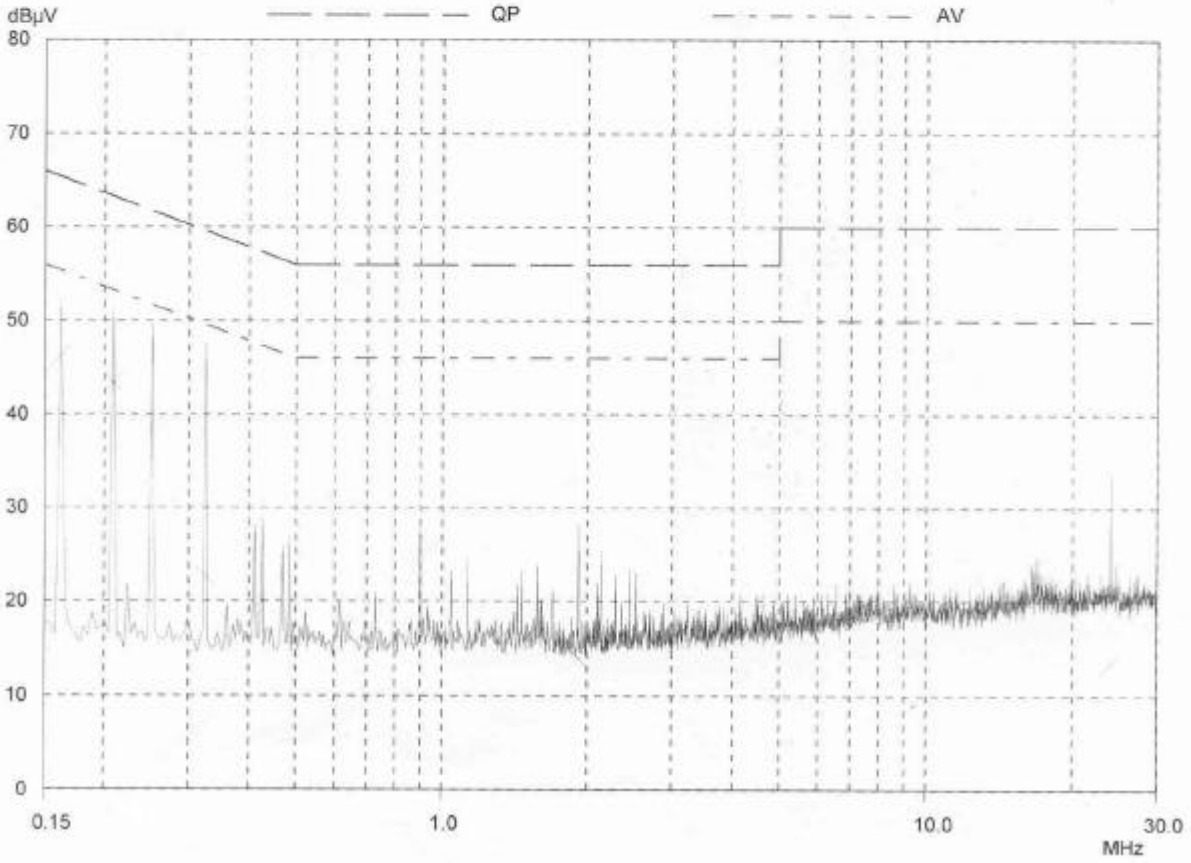


CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH04
Operator:	
Test Spec:	
Comment:	
	N

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

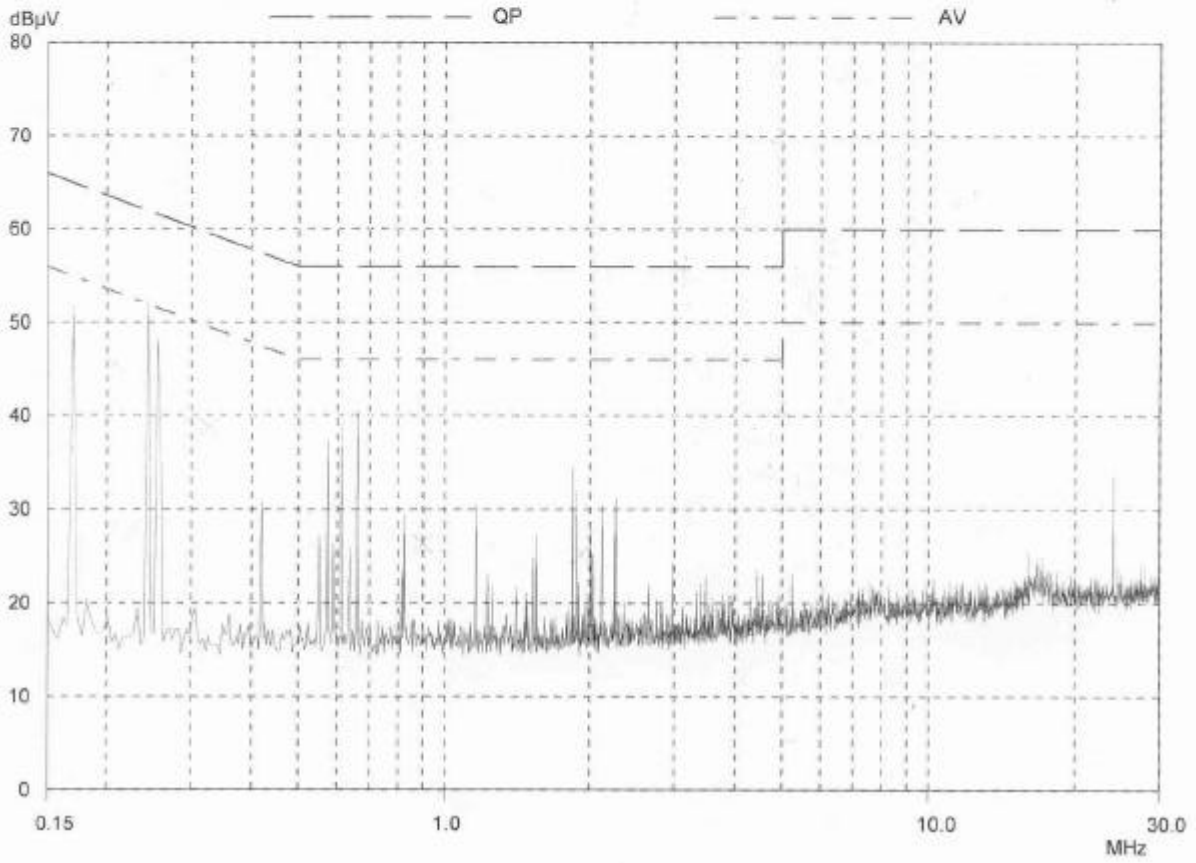


CONDUCTION EMISSION TEST

Peak Value

EUT:	2.4GHz Receiver
Manuf:	
Op Cond:	CH04
Operator:	
Test Spec:	
Comment:	
	L1

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB



APPENDIX 3 : PLOTTED DATA FOR DUTY FACTOR

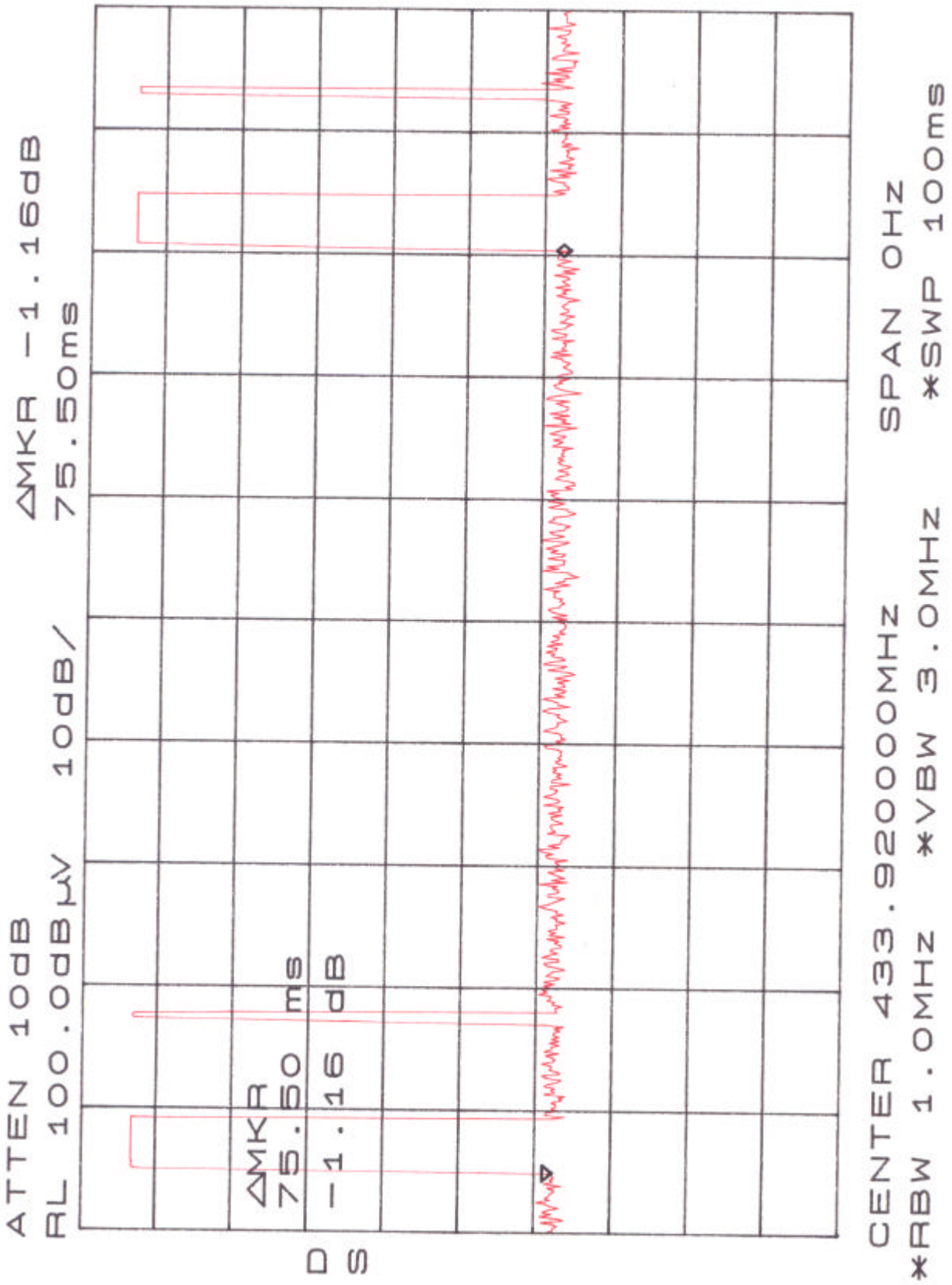
Calculation of Duty Factor

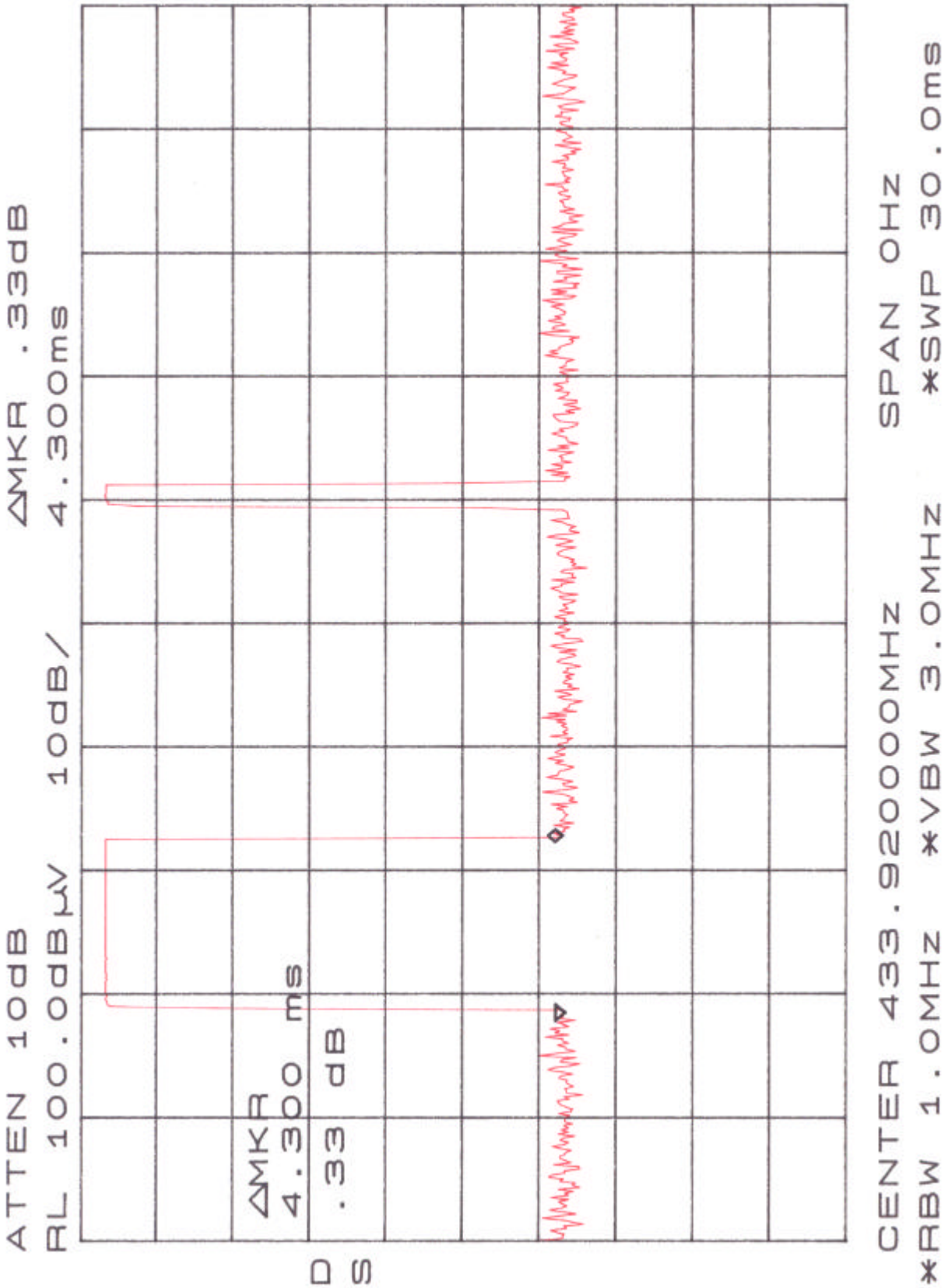
The duty factor is calculated with following formula:

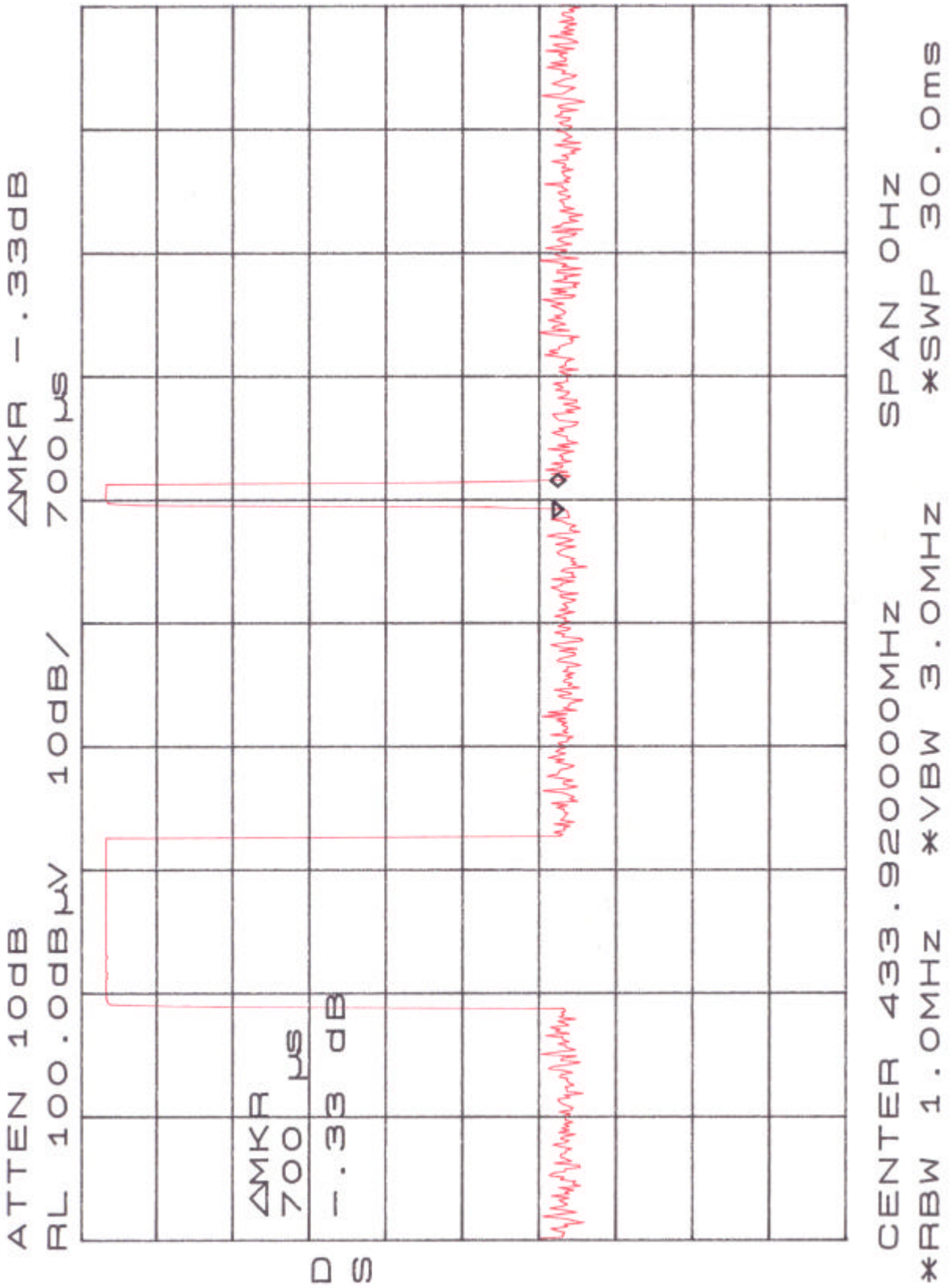
$$20\log \frac{\text{Total Duty}}{\text{Period of Pulse Train}}$$

$$20\log \frac{(4.3\text{ms}\times 1 + 0.7\text{ms}\times 1)}{75.5\text{ms}}$$

=-23.6 dB


ATTEN 10dB
RL 100.0dBμV 10dB/
ΔMKR -1.16dB
75.50ms
ΔMKR
75.50 ms
-1.16 dB
D S
CENTER 433.92000MHz
*RBW 1.0MHz *VBW 3.0MHz
SPAN 0Hz
*SWP 100ms


ATTEN 10dB
RL 100.0dBμV 10dB/
ΔMKR .33dB
4.300ms
ΔMKR
4.300 ms
.33 dB
D S
CENTER 433.920000MHz
*RBW 1.0MHz *VBW 3.0MHz
SPAN 0Hz
*SWP 30.0ms


ATTEN 10dB
RL 100.0dBμV 10dB/
ΔMKR -.33dB
700μs
ΔMKR
700 μs
-.33 dB
D S
CENTER 433.920000MHz
SPAN 0Hz
*RBW 1.0MHz
*VBW 3.0MHz
*SWP 30.0ms