CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C

Report No.: ET94S-03-028-01

Client:	TRANS ELECTRIC CO., LTD.
Product:	Wireless Remote Extender
Model:	IR520(NTSC)，IR500(PAL)，1511951(NTSC)
FCC ID:	BY4IR520
Manufacturer/supplier:	TRANS ELECTRIC CO., LTD.

Date test item received:	2005/03/02
Date test campaign completed:	2005/03/02
Date of issue:	2005/03/07

Total number of pages of this test report: 29 pages

Total number of pages of photos: External photos 1 pages
Internal photos 3 pages
Setup photos 3 pages

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TEST REPORT CERTIFICATION

Client	: TRANS ELECTRIC CO., LTD.
Address	: 765, Sec.2, Chungsan Rd., Huatang, Changhua, Taiwan, R.O.C.
Manufacturer	: TRANS ELECTRIC CO., LTD.
Address	: 765, Sec.2, Chungsan Rd., Huatang, Changhua, Taiwan, R.O.C.
EUT	: Wireless Remote Extender
Trade name	: PX (IR520(NTSC))，PX(IR500(PAL))，NEXXTECH(1511951(NTSC))
Model No.	: IR520(NTSC)，IR500(PAL)，1511951(NTSC)
Power Source	: Adapter Model No.: NEXXTECH / JOD-28U-40 Input: 120Vac, 60Hz, 4W Output: DC 12Vdc, 120mA
Regulations applied	: FCC 47 CFR, Part 15 Subpart C (2004)

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

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② ISO/IEC 17025: BSMI, CNLA, DGT, NVLAP, CCIBLAC, UL, Compliance
③ Filing: FCC, Industry Canada, VCCI
④ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through CNLA
⑤ FCC Registration Number: 90588, 91094, 91095

NVLAP Lab Code 200133-0

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: Wireless Remote Extender
b) Model No.	: IR520(NTSC)，IR500(PAL)，1511951(NTSC)
c) Serial No.	: ----
d) FCC ID	: BY4IR520
e) Working Frequency	: 418.25 MHz
f) Power Supply	: Adapter Model No.: NEXXTECH / JOD-28U-40 Input: 120Vac, 60Hz, 4W Output: DC 12Vdc, 120mA

1.2 Characteristics of Device:

EUT is a Wireless Remote Extender transmitter. It will extend the range of present Infrared IR Remote Control by radio frequency.

1.3 Test Methodology

Both Conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4.

The equipment 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, the circuit rewired by the manufacturer to affect its intended operation.

The receiving antenna 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 equipment under test.

1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.

This site has been accreditation as a FCC filing site.

2. DEFINITION AND LIMITS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency 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	4.5-5.25
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	3600-4400	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 :

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

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

(2) Radiated Emission Limits :

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.

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.

(3) Limit of transmission time

a) A manually operated transmitter shall employ a switch that will automatically deactivate the 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. RADIATED EMISSION MEASUREMENT

3.1 Applicable Standard

For periodic operation intentional radiator, the radiated emission shall comply with § 15.231(b).

3.2 Measurement Procedure

A.Preliminary Measurement For Portable Devices.

For portable devices, the following procedure was performed to determine the maximum emission axis of EUT:

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antennna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

B. Final Measurement

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 continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 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.

Figure 1 : Frequencies measured below 1 GHz configuration

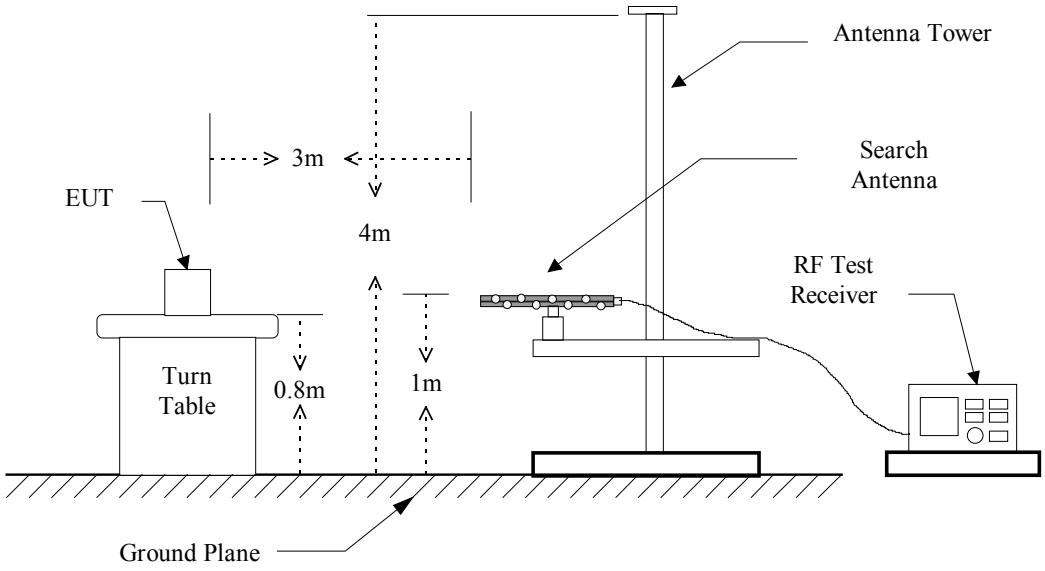
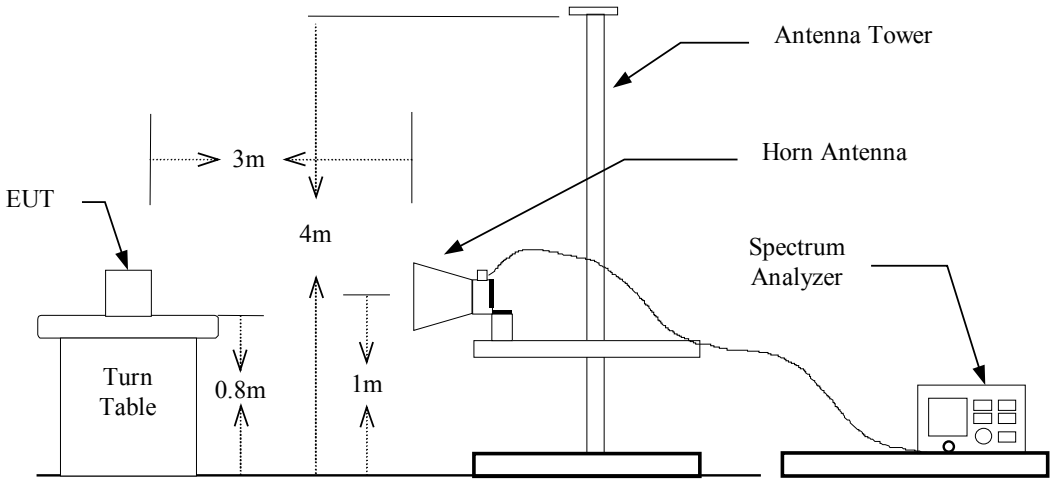


Figure 2 : Frequencies measured above 1 GHz configuration



3.3 Test Data

3.3.1

Model No./Type No. : IR520(NTSC)，IR500(PAL)，1511951(NTSC)

Operated mode : Transmitting
Test Date : Mar. 02, 2005 Temperature : 16 ℃ Humidity : 73 %

Frequency (MHz)	Ant Pol H / V	Reading (dBuV) Peak	QP	Correct Factor (dB)	Duty Factor (dB)	Result @3m (dBuV/m) Peak	QP	AVG	Limit @3m (dBuV/m) Peak	QP	AVG	Table Degree (Deg.)	Ant. High (m)
Fundamental													
418.250	H	48.1	----	19.8	-18.1	67.9	----	49.8	100.3	----	80.3	37	1.0
418.250	V	45.2	----	19.8	-18.1	65.0	----	46.9	100.3	----	80.3	189	1.2
Harmonic													
836.500	H	22.6	----	27.9	-18.1	50.5	----	32.4	80.3	----	60.3	241	1.1
836.500	V	20.7	----	27.9	-18.1	48.6	----	30.5	80.3	----	60.3	131	1.2
1254.750	H	60.8	----	-13.7	-18.1	47.1	----	29.0	80.3	----	60.3	89	1.0
1254.750	V	66.2	----	-13.7	-18.1	52.5	----	34.4	80.3	----	60.3	79	1.2
*1673.000	H	60.5	----	-11.6	-18.1	48.9	----	30.8	74.0	----	54.0	127	1.2
*1673.000	V	59.2	----	-11.6	-18.1	47.6	----	29.5	74.0	----	54.0	302	1.1
2091.250	H	59.8	----	-10.0	-18.1	49.8	----	31.7	80.3	----	60.3	241	1.1
2091.250	V	52.5	----	-10.0	-18.1	42.5	----	24.4	80.3	----	60.3	78	1.2
2509.500	H	----	----	-8.7	-18.1	----	----	----	80.3	----	60.3	----	----
2927.750	H	----	----	-6.7	-18.1	----	----	----	80.3	----	60.3	----	----
2927.750	V	50.0	----	-6.7	-18.1	43.3	----	25.2	80.3	----	60.3	138	1.2
*3346.000	H	----	----	-6.0	-18.1	----	----	----	74.0	----	54.0	----	----
*3346.000	V	50.3	----	-6.0	-18.1	44.3	----	26.2	74.0	----	54.0	78	1.2
*3764.250	H/V	----	----	-4.1	-18.1	----	----	----	74.0	----	54.0	----	----
*4182.500	H/V	----	----	-2.5	-18.1	----	----	----	74.0	----	54.0	----	----

Note:

1. Peak Result =Peak Reading + Correct Factor

2. AVG Result = Peak Result + Duty Factor

3. If the result of peak value is under the limit of average, the average value doesn't need to be measured.

4. "" means the frequency is in the Restricted Bands.*

5. Please refer to page 12 to page 13 for chart

3.3.2 Other Spurious

Model No./Type No. : IR520(NTSC)，IR500(PAL)，1511951(NTSC)

Operation Mode : Transmitting

Test Date : Mar. 02, 2005 Temperature : 16℃ Humidity : 73 %

Emission Frequency	Meter Reading (dBuV)		CORR'd Factor	Results (dBuV/m)		Limit (3m)	Margins	Table Degree (deg)		Ant. High (m)	
(MHz)	HOR.	VERT.	(dB)	HOR.	VERT.	(dBuV/m)	(dB)	HOR.	VERT.	HOR.	VERT.
31.940	13.0	13.0	13.1	26.1	26.1	40.0	-13.9	78	78	1.2	1.2
38.730	9.9	***	13.2	23.1	***	40.0	-16.9	312	***	1.0	***
58.130	6.9	9.1	13.2	20.1	22.3	40.0	-17.7	92	193	1.0	1.0
153.190	***	7.0	15.1	***	22.1	43.5	-21.4	***	212	***	1.2
167.740	6.0	***	15.4	21.4	***	43.5	-22.1	138	***	1.2	***
179.380	***	8.7	14.1	***	22.8	43.5	-20.7	***	342	***	1.2
268.620	***	8.5	15.7	***	24.2	46.0	-21.8	***	301	***	1.0
269.590	9.1	***	15.7	24.8	***	46.0	-21.2	191	***	1.3	***
293.130	***	8.6	16.8	***	25.4	46.0	-20.6	***	287	***	1.0
312.120	7.3	***	16.8	24.1	***	46.0	-21.9	112	***	1.0	***

Note:

1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f≦300MHz).
   ±4.4dB (300MHz<f≦1000MHz).
4. Please refer to page 12 to page 13 for chart

ETC TEST LABORTARY

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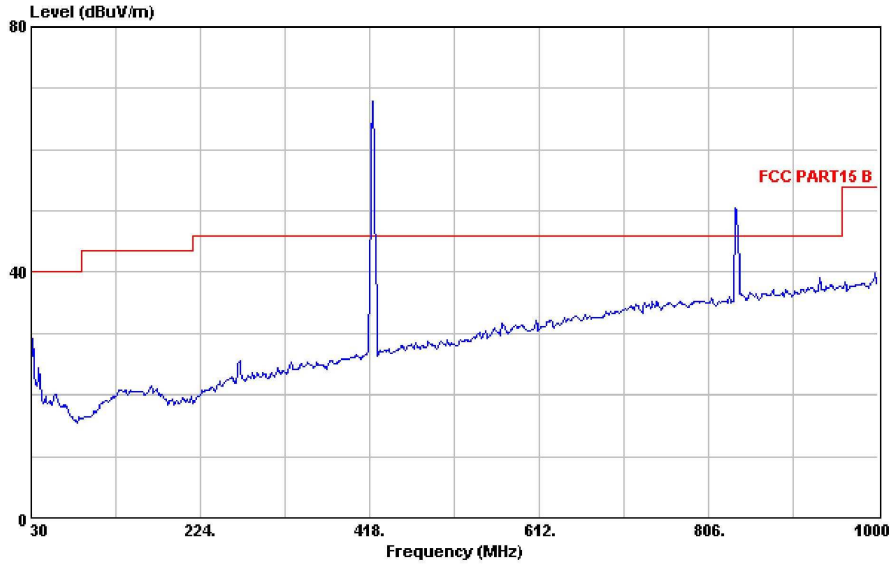

Site : M00 SITE
Condition : FCC PART15 B 3m HORIZONTAL
EUT :
MODEL : TX

ETC TEST LABORTARY

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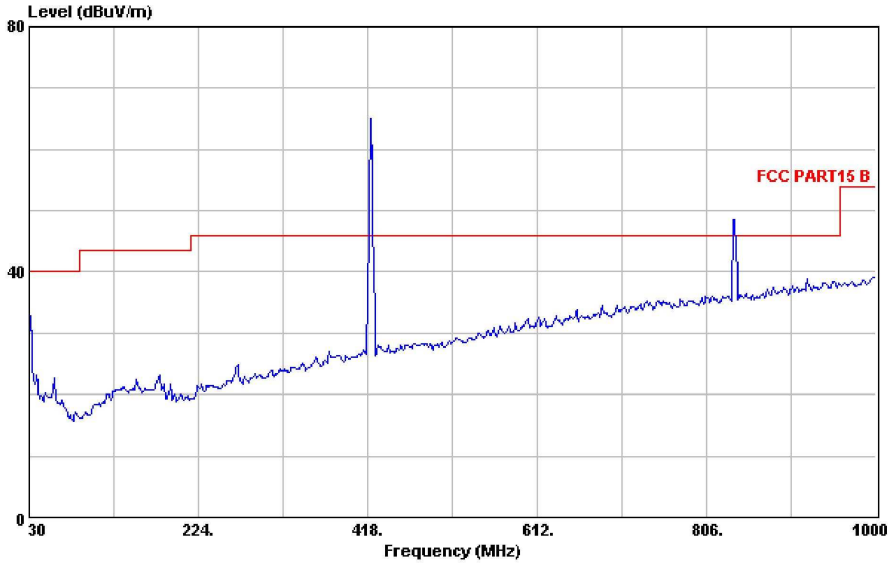

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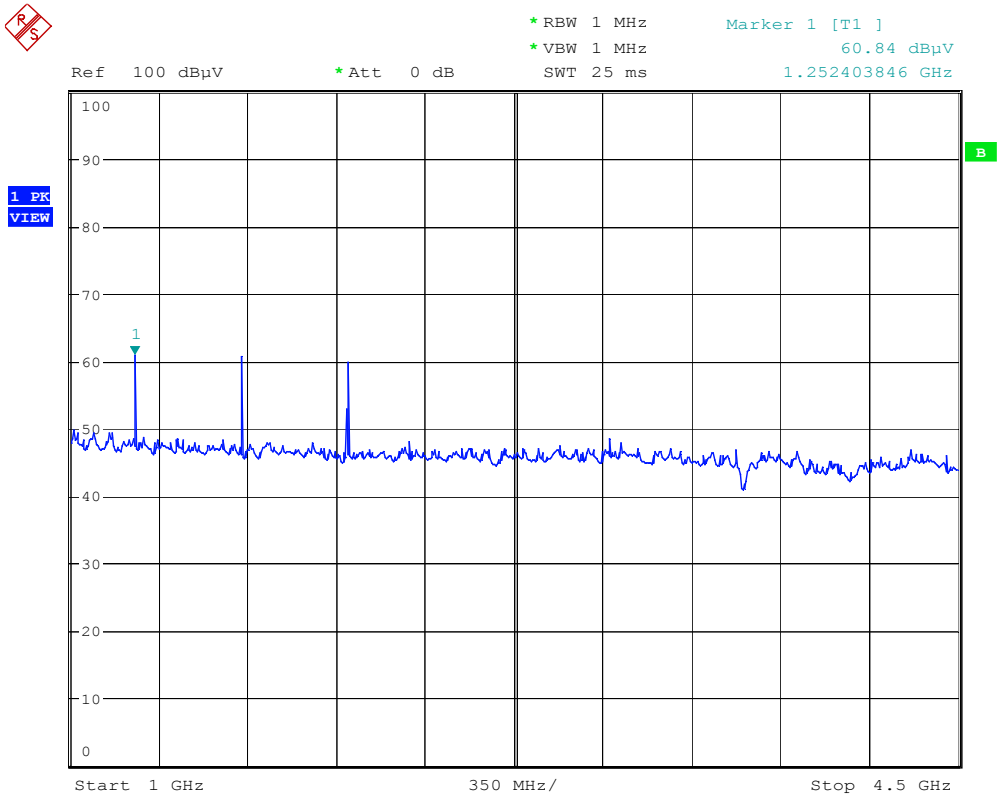
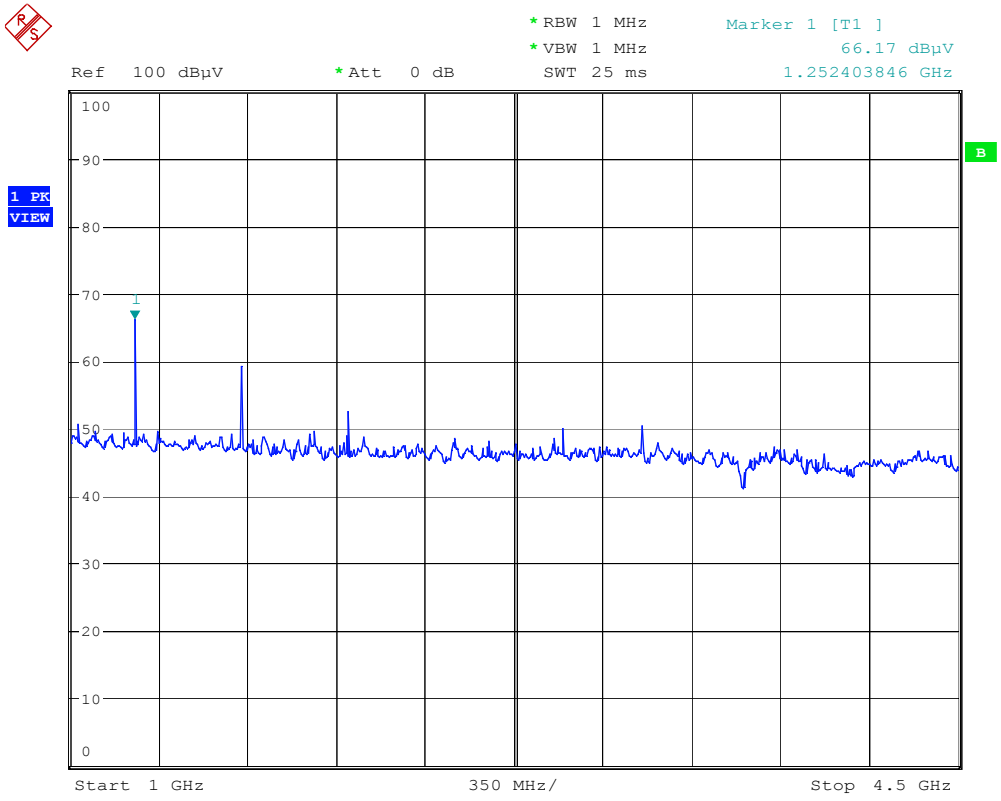
Condition : FCC PART15 B 3m VERTICAL
EUT :
MODEL : TX
memo :





Date: 28.FEB.2005 14:00:07

3.4 Field Strength Calculation

(a) Field Strength:

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + CORR. FACTOR

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

Assume a receiver reading of 62.4 dB μ V is obtained. The Antenna Factor of 14.1 and a Cable Factor of 3.4 is added. The total of field strength is 79.9 dB μ V/m.

RESULT = 62.4 + 14.1 + 3.4 = 79.9 dB μ V/m
Level in μ V/m = Common Antilogarithm[(79.9 dB μ V/m)/20] = 9885.5 μ V/m

(b) Duty Factor:

$$20\log\frac{1.6833(ms)\times 2 + 0.9083\times 10}{100(ms)} = \text{-18.1 dB}$$

The plotted graph of Duty Factor please see page 15 ~ 18.

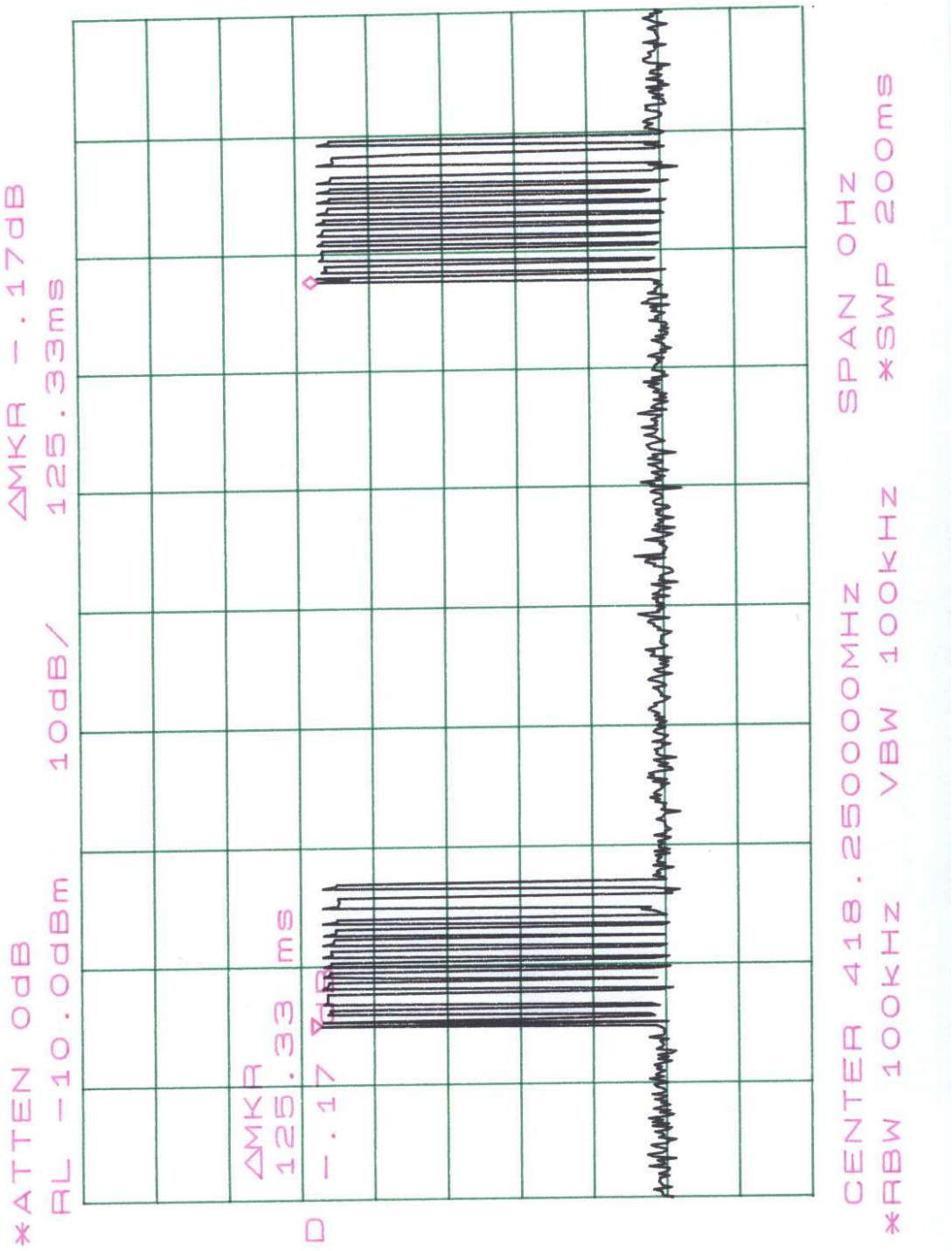
3.5 Radiated Test Equipment

The following instrument are used for radiated emissions measurement :

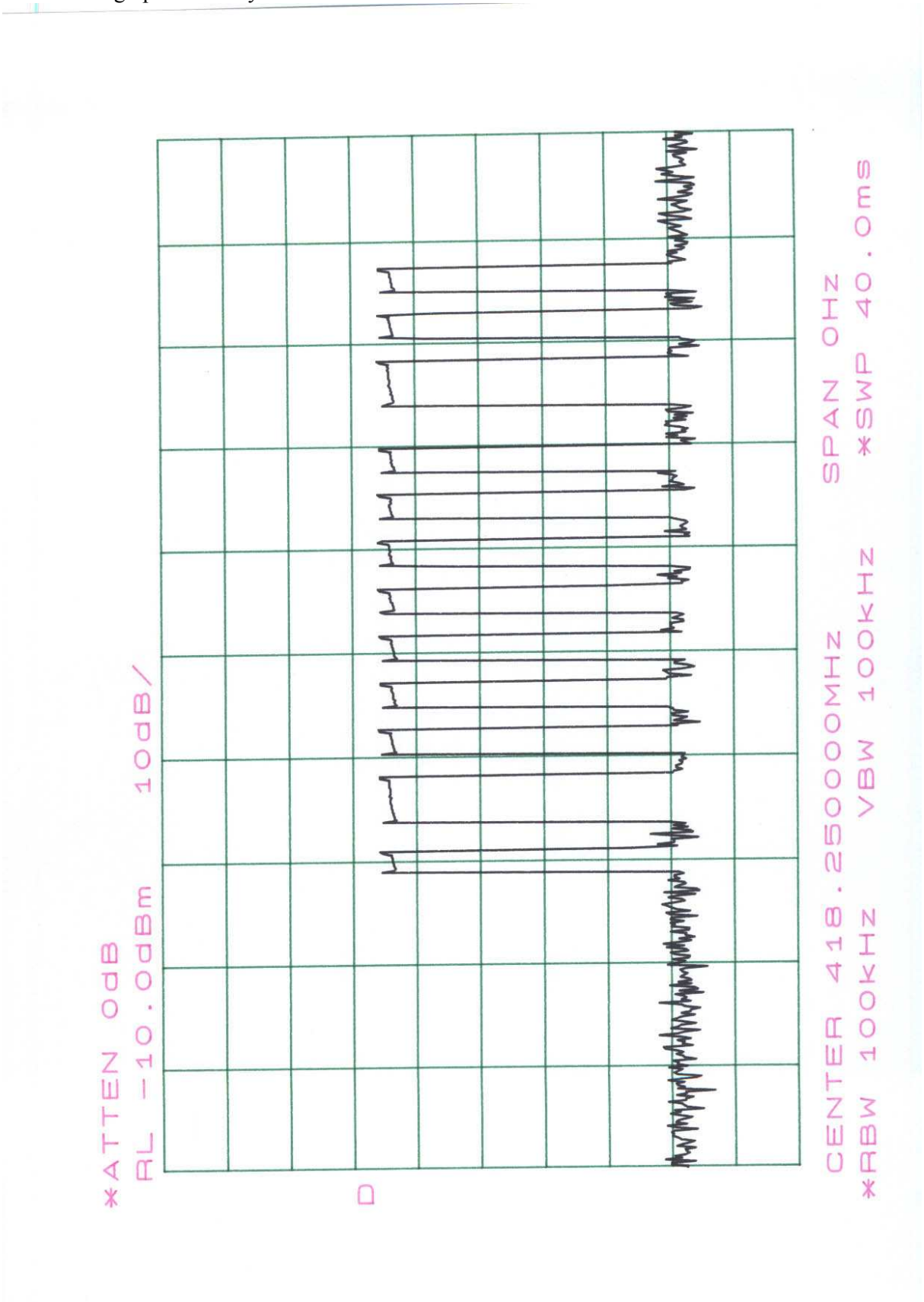
Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
EMI Test Receiver	HP	8546A	13054404-001	Sep. 06, 2005
BiconiLog Antenna	Schwarzbeck	VULB 9160	13057310-001	Oct. 28,2005
Horn Antenna	EMCO	3115	9107-3729	Jun. 04, 2005

Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL.

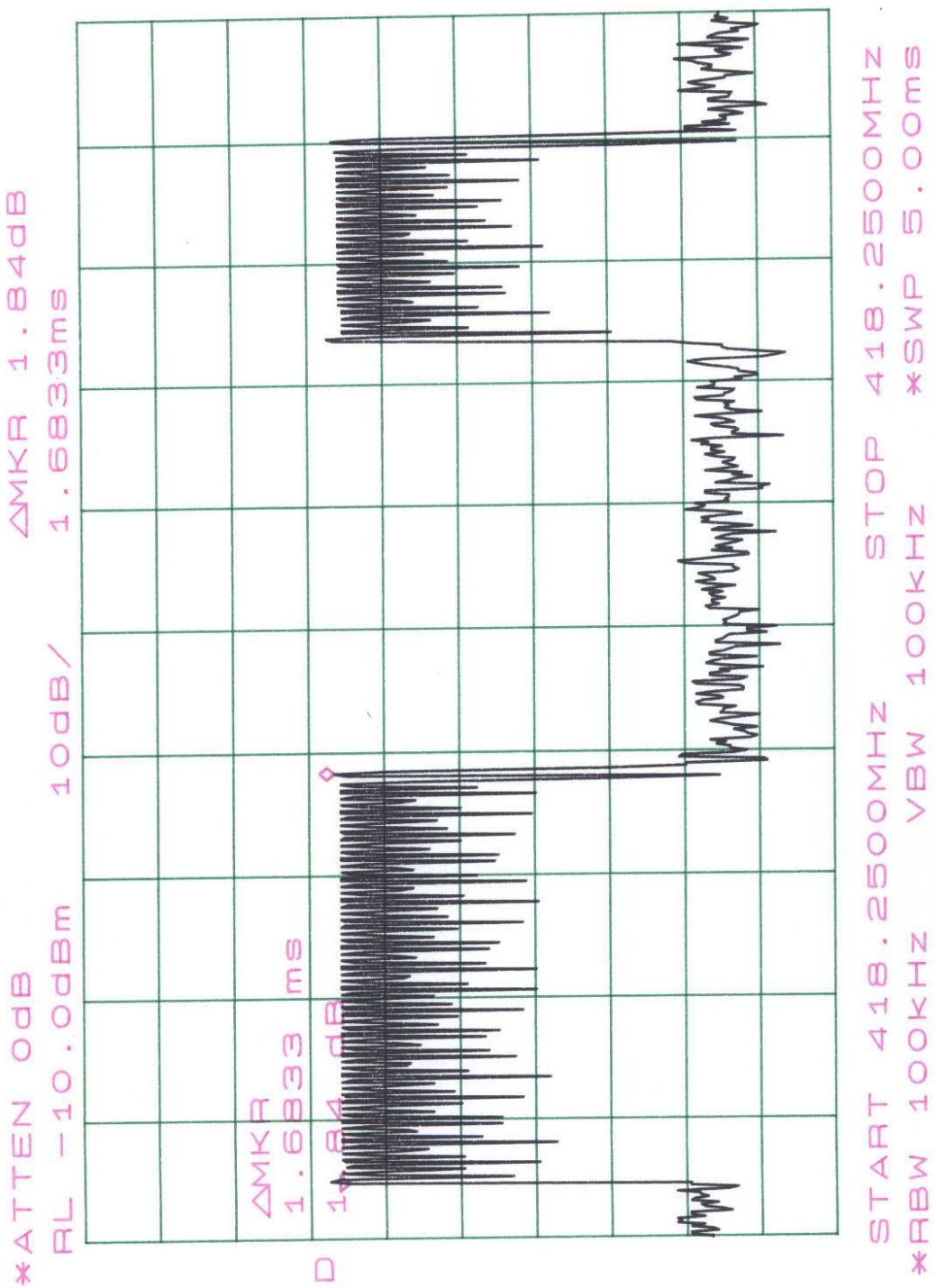
Plotted graph 1 of Duty Factor



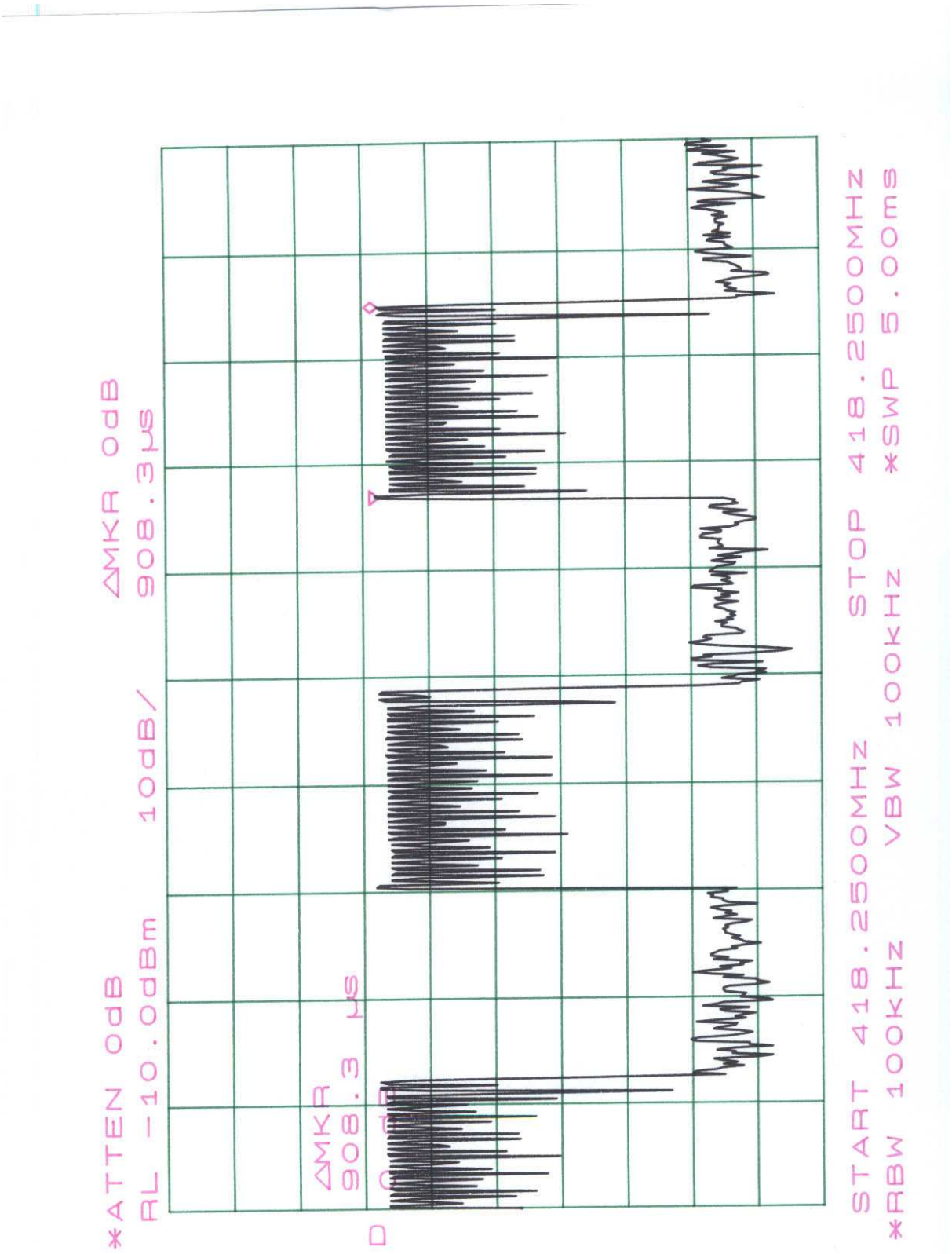
Plotted graph 2 of Duty Factor



Plotted graph 3 of Duty Factor



Plotted graph 4 of Duty Factor



3.6 Measuring Instrument Setup

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	EMI Test Receiver	Peak	120 kHz	300 kHz
1000 to 5000	EMI Test Receiver	Peak	1 MHz	1 MHz

4. BANDWIDTH OF EMISSION

4.1 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.

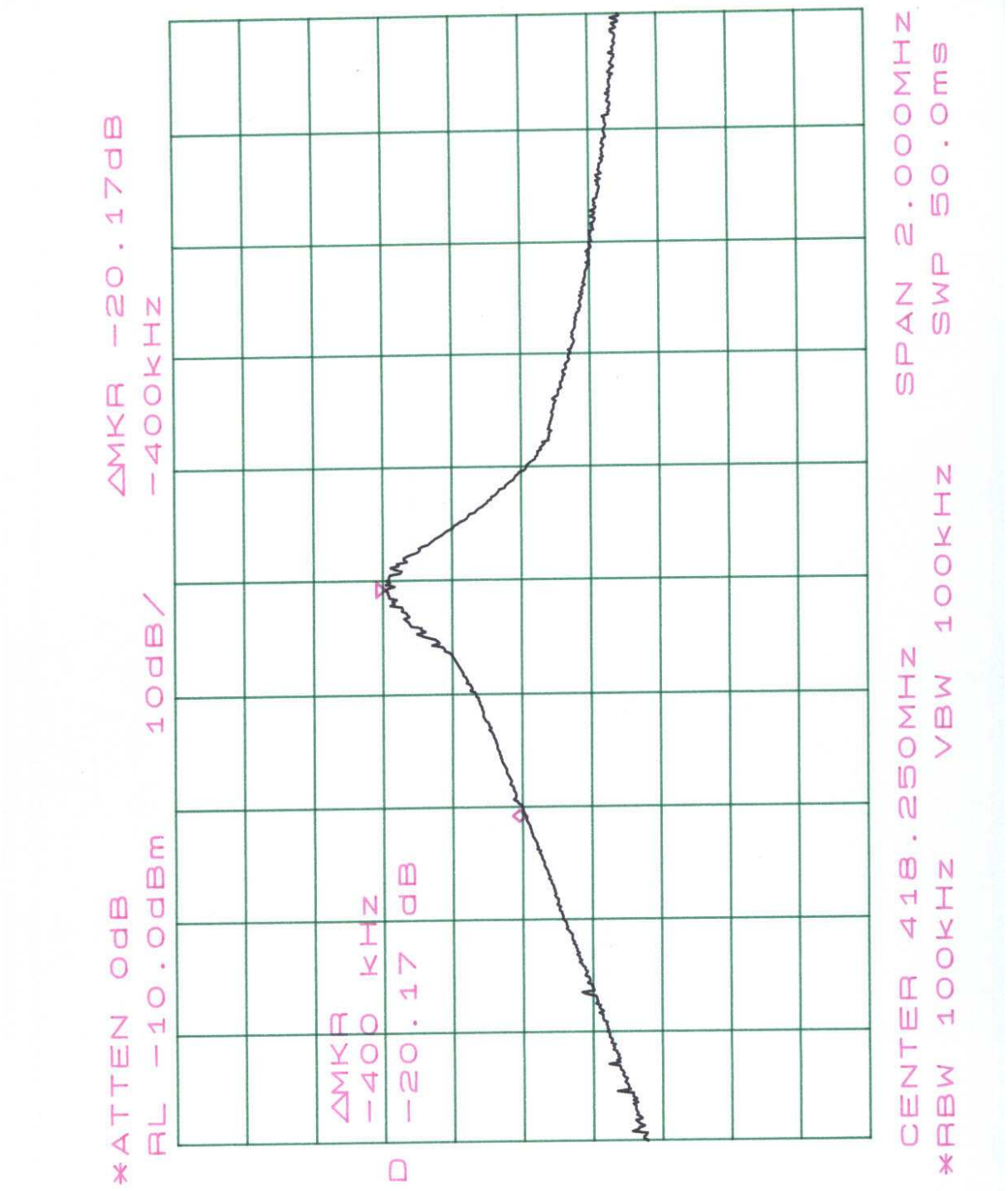
4.2 Test Equipment

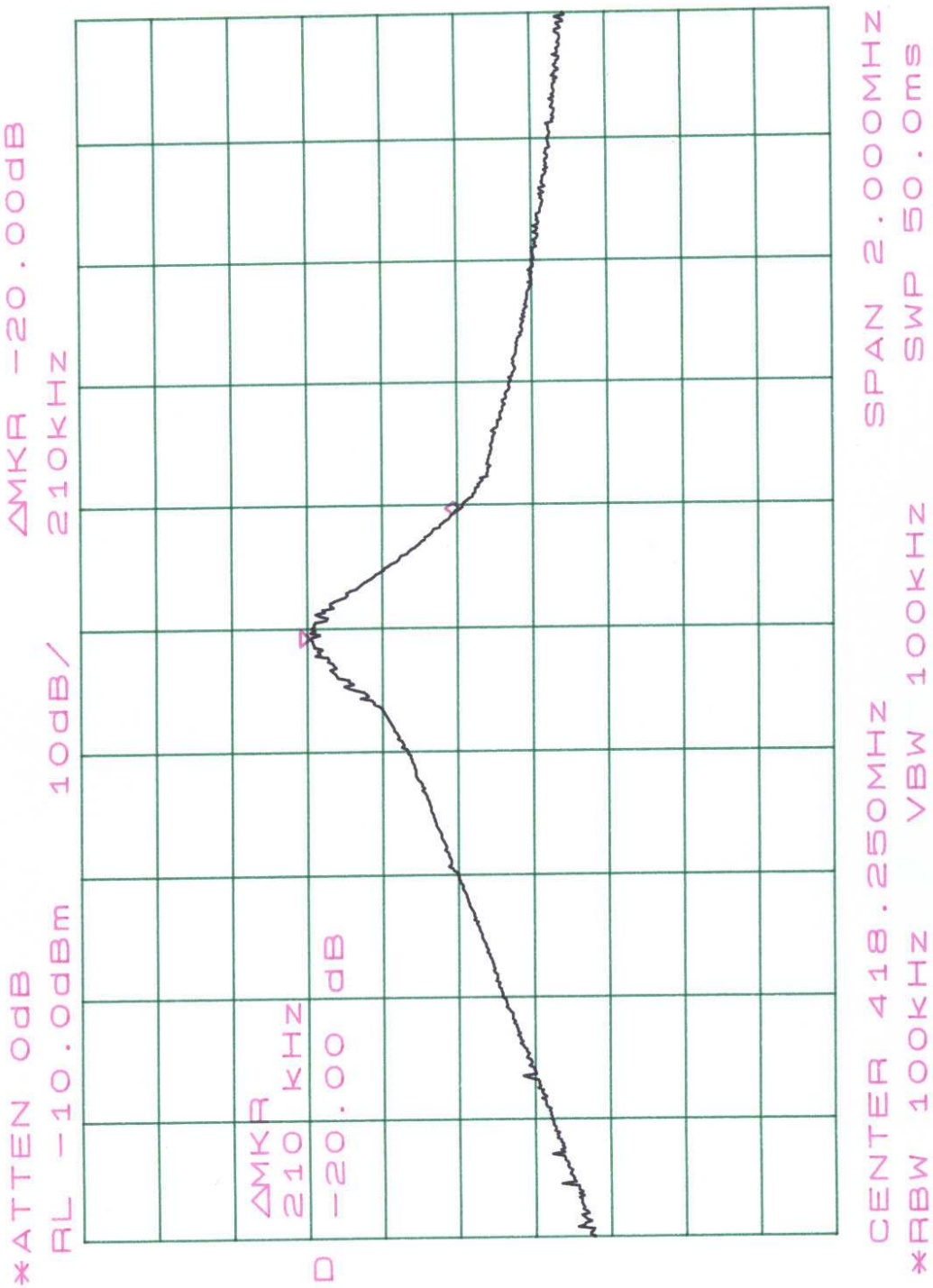
Equipment	Manufacturer	Model No.	Next Cal. Date
Test Receiver	Agilent	8564EC	Sep. 16,2005
Plotter	Hewlett-Packard	7470A	N/A

4.3 Test Result

Test Date : Oct. 28, 2004 Temperature : 24 ℃ Humidity : 70 %

Center Frequency	418.25 MHz
FCC Limit	418.25MHz ×0.25%＝1045.625 kHz
Bandwidth of Emission	400 kHz + 210 kHz＝ 610 kHz
Chart	Page 21, 22
Result	PASS


*ATTEN 0dB
RL -10.0dBm 10dB/
ΔMKR -20.17dB
-400kHz
ΔMKR
-400 kHz
-20.17 dB
CENTER 418.250MHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms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RL -10.0dBm
10dB/
ΔMKR -20.00dB
210kHz
ΔMKR
210 kHz
-20.00 dB
D
CENTER 418.250MHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

5. CONDUCTED EMISSION MEASUREMENT

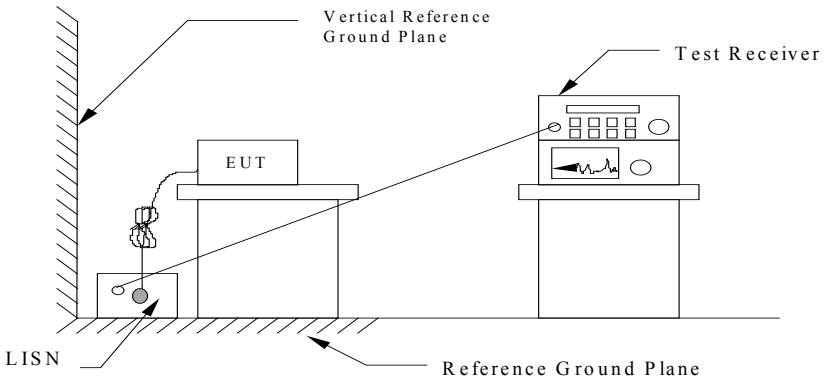
5.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to §15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



5.3 Conducted Emission Data

Model No./Type No. : IR520(NTSC)，IR500(PAL)，1511951(NTSC)

Operation Mode: Transmitting

Test Date : Mar. 02, 2005 Temperature : 16℃ Humidity : 73%

Freq. (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.150	27.8	26.9	----	----	0.2	28.0	27.1	----	----	66.0	56.0	-38.0
0.172	28.1	***	----	----	0.2	28.3	***	----	----	64.9	54.9	-36.6
0.173	***	27.3	----	----	0.2	***	27.5	----	----	64.8	54.8	-37.3
0.189	***	27.1	----	----	0.2	***	27.3	----	----	64.1	54.1	-36.8
0.193	27.6	***	----	----	0.2	27.8	***	----	----	63.9	53.9	-36.1
0.253	26.9	***	----	----	0.2	27.1	***	----	----	61.7	51.7	-34.6
0.392	25.1	***	----	----	0.2	25.3	***	----	----	58.0	48.0	-32.7
0.401	***	25.1	----	----	0.2	***	25.3	----	----	57.8	47.8	-32.5
0.517	21.3	***	----	----	0.2	21.5	***	----	----	56.0	46.0	-34.5
0.527	***	20.9	----	----	0.2	***	21.1	----	----	56.0	46.0	-34.9

Note:

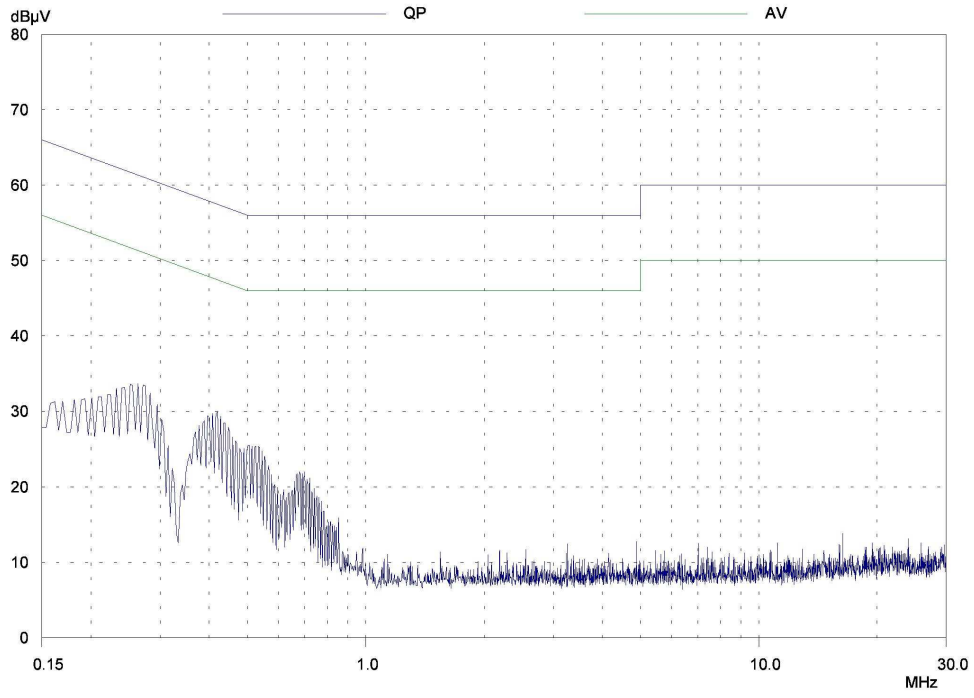
1. Place of measurement: EMC LAB. of the ETC.
2. “***” means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. “#” means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.
6. Please refer to page 51 to page 56 for chart

Conducted Emission Test

Peak Value

EUT:
Manuf:
Op Cond: TX
Operator: MARK
Test Spec: FCC
Comment: L1

Prescan Measurement: Detector: X PK
Meas Time: see scan settings
Peaks: 8
Acc Margin: 30 dB

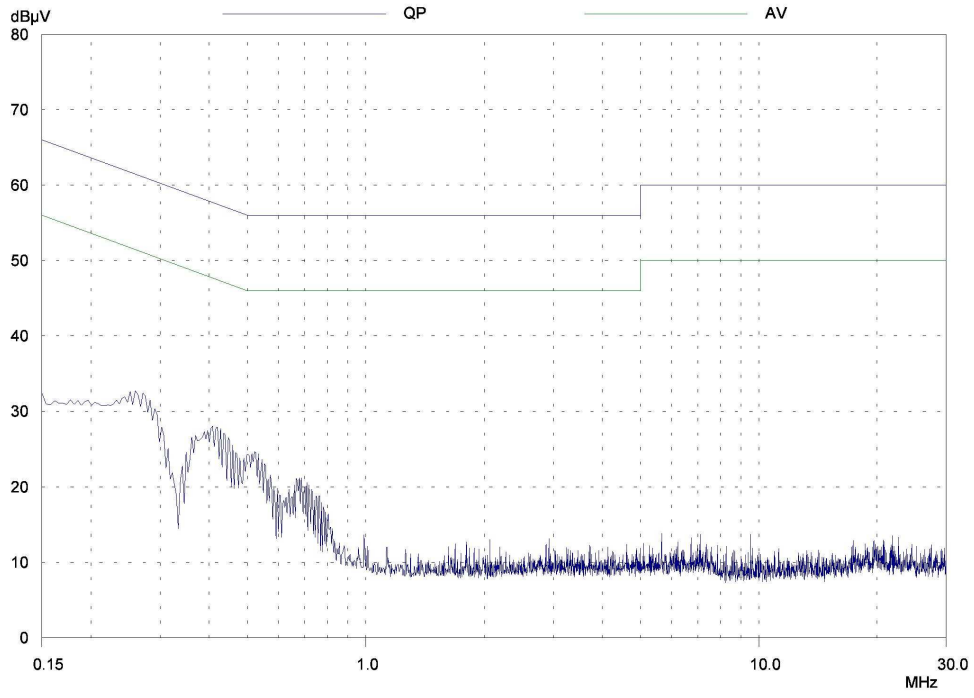


Conducted Emission Test

Peak Value

EUT:
Manuf:
Op Cond: TX
Operator: MARK
Test Spec: FCC
Comment: L2

Prescan Measurement: Detector: X PK
Meas Time: see scan settings
Peaks: 8
Acc Margin: 30 dB



5.4 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 (Included Cable Loss)

Assume a receiver reading of 22.5 dB μV is obtained, and LISN Factor is 0.1 dB, then the total of disturb 22.6 dB μV.

RESULT = 22.5 + 0.1 = 22.6 dB μV

Level in μV = Common Antilogarithm[(22.6 dB μV)/20]

= 13.48 μV

5.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test.

Equipment	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde and Schwarz	ESCS30	04/01/2005
Line Impedance Stabilization network	EMCO	3825	11/09/2005

6. LIMIT OF TRANSMISSION TIME

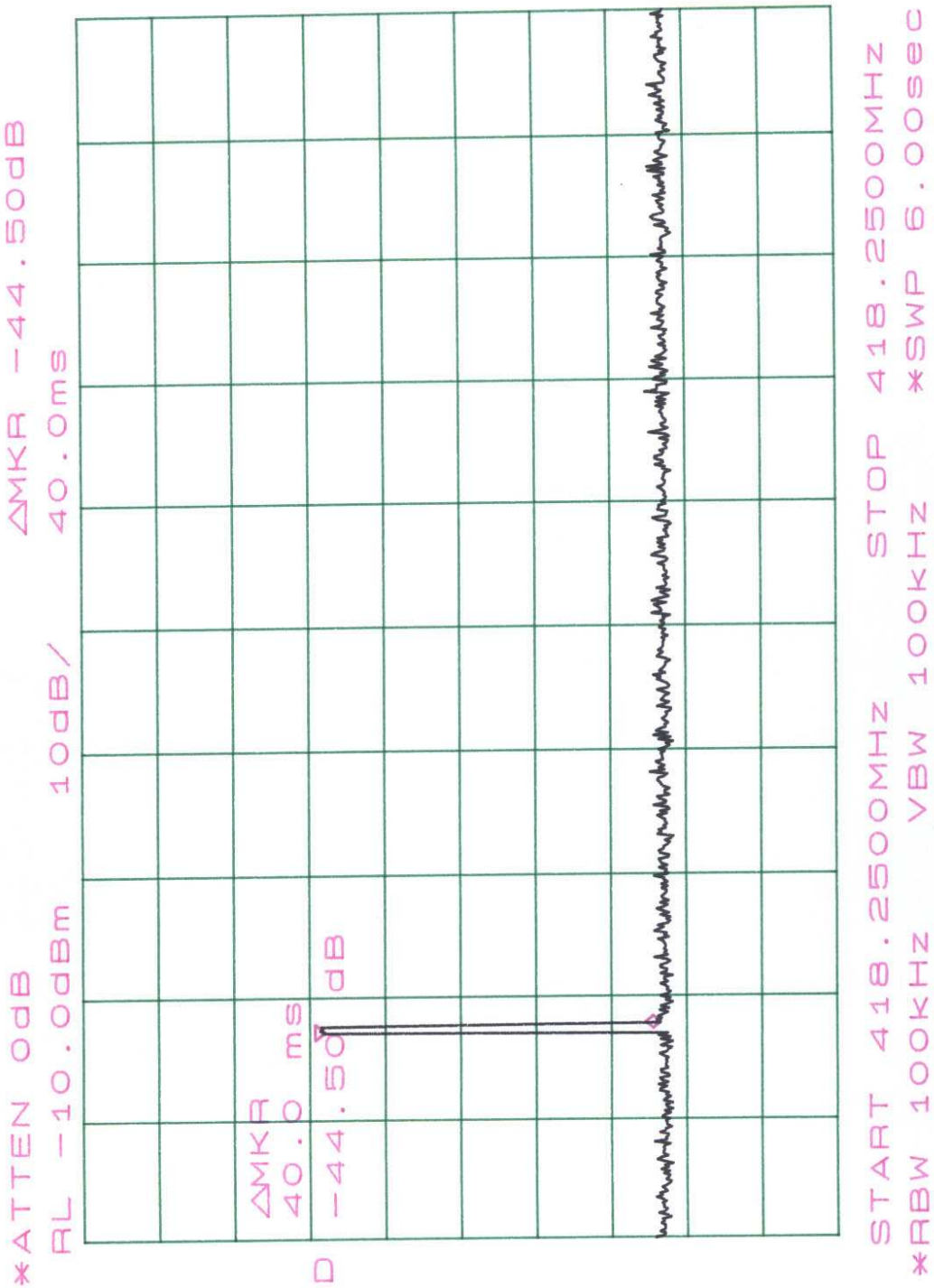
6.1 Applicable Standard

According to 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.2 Active Time

This transmitter is operated by manual and active time is 0.04 second after being released.

Note : Please refer to page 29 for chart


*ATTEN 0dB
RL -10.0dBm
10dB/
ΔMKR -44.50dB
40.0ms
ΔMKR
40.0 ms
-44.50 dB
D
START 418.2500MHz
*RBW 100KHz
STOP 418.2500MHz
VBW 100KHz
*SWP 6.00sec