EXHIBIT B

Test Report

Report No.	G1515923
Specifications Test Method	FCC Part 95 ANSI C63.4 1992
Applicant address	Rm 1, 3th F1., No. 77, Sec.1, Hsin Tai Wu Rd., Hsi-Chih, Taipei Hsien, Taiwan, R.O.C.
Applicant Items tested Model No.	GOLD APOLLO CO., LTD. walkie-talkie GPFRS-200 (Sample # G15923)
Results Sample received date	**Compliance** (As detailed within this report) 10/26/99 (month / day / year)
Prepared by	Jack Tsai — project engineer
Authorized by	Frank Tsai — General Manager (Frank Tsai)
Issue date	*Dec. 01, 1999* (month / day / year)
Modifications	**None**
Tested by	Training Research Co., Ltd.
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan
Anechoic Chamber at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan

Conditions of issue:

(1) ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***

(2) ***This report must not be used by the client to claim product endorsement by NVLAP or nay agency of U.S. Government.***

★ ***FCC ID : NDAGPFRS-200***

Contents

Chapter 5 Field Strength of Spurious Radiation Measurement

Chapter 6 Frequency Stability Measurement

Chapter 7 Antenna of Requirements

Chapter 0 Application for Certification

2.983 (a)	:	GOLD APOLLO CO., LTD. – applicant and manufacturer
2.983 (b)	:	walkie-talkie Model No.: GPFRS-200
2.983 (c)	:	Quantity production is planned
2.983 (d) (1)	:	Type of emission – F8E - FM Modulation
2.983 (d) (2)	:	164 Hz – 3.048 KHz
2.983 (d) (3)	:	388.259 mW
2.983 (d) (4)	:	No recommendations as to standardized output power levels are made
2.983 (d) (5)	:	Final RF amplifier stage current : 400mA, 4.5V_{DC}
2.983 (d) (6)	:	Description in the Block Diagram
2.983 (d) (7)	:	Complete circuit diagrams are included . No modification was made
2.983 (d) (8)	:	Instruction sheet to user included
2.983 (d) (9)	:	Tune up procedure follows
2.983 (d) (10)	:	Description in the Block Diagram
2.983 (d) (11)	:	Description in the Block Diagram

Chapter 1 General

1.1 Introduction:

The following measurement report is submitted on behalf of ***GOLD APOLLO CO., LTD.*** in support of a FRS radio transceiver certification in accordance FCC Rules. 2.981 through 2.999 and Part 95, Subpart B.

Description of EUT:

EUT	:	walkie-talkie
Model	:	GPFRS-200
Carrier Frequency Range	:	462.5625 – 467.7125 MHz
RF Power Output	:	388.259 mW
Supply Voltage	:	DC 4.5V ($1.5V_{DC}$ * 3 Batteries)
Supply Current	:	400 mA
Frequency Response	:	164 Hz ~ 3.048 KHz
Frequency Stability	:	0.00025%
Operating Temperature	:	-30 to +50 degree centigrade

FRS radio transceiver is a transmitter which operates in the frequency range of 462.5625 – 467.7125 MHz (462.5625 and 467.7125 MHz tested). This transceiver is worn by a performer and other participants in a program, filming, reporting …etc.

1.2 Description of Support Equipment:

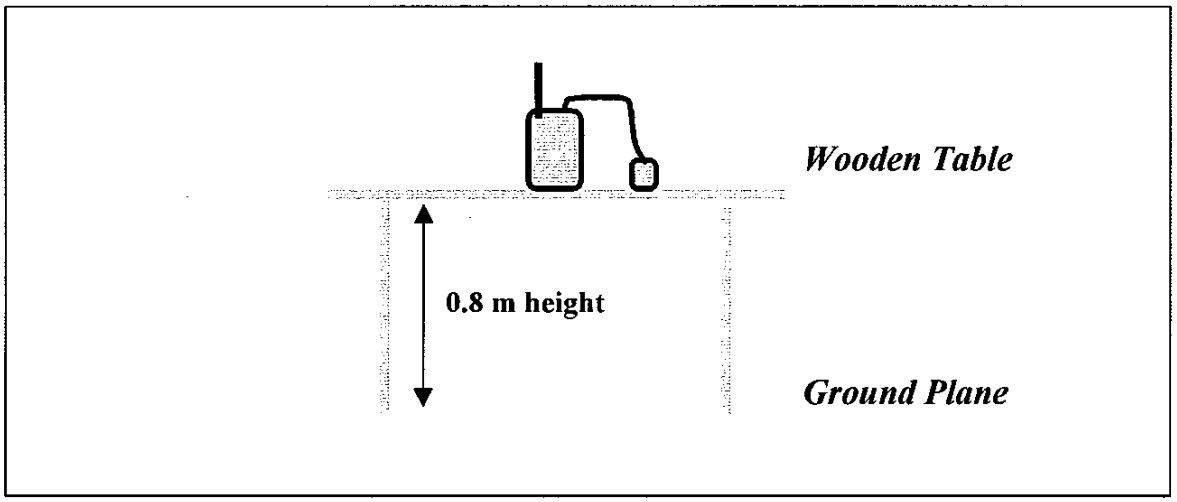
Clip of style for Microphone and Speaker: MODEM (Brand name)

Model No.	:	MS-201
Serial No.	:	N/A
Power type	:	By EUT
Power cord	:	Non-shielded, 230cm long, metal plug, no ferrite core

Verify the Frequency and Channel:

Channel	*Frequency (MHz)*	*Channel*	*Frequency (MHz)*
1	*462.5625*	*8*	*467.5625*
2	*462.5875*	*9*	*467.5875*
3	*462.6125*	*10*	*467.6125*
4	*462.6375*	*11*	*467.6375*
5	*462.6625*	*12*	*467.6525*
6	*462.6875*	*13*	*467.6875*
7	*462.7125*	*14*	*467.7125*

1.3 Configuration of test setup



1.4 Location of the Measurement Site:

The radiated emissions measurements required by the Rules were performed on the Three-meter, anechoic chamber at test site maintained by ***Training Research Co., Ltd.,*** *2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan.* Complete description and measurement data have been placed on file with the Commission. The conducted power line Emissions tests were performed in a shielded enclosure also located at the above facility.

Training Research Co., Ltd. is listed by the FCC (Registration Number: 93906) as a facility available to do measurement work for others on a contract basis.

1.5 General Test Condition:

The conditions under which the EUT operates we varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests was chosen as that Which produced the highest emission levels. However, only those conditions which the EUT was considered likely to encounter in normal use were investigated.

1.6 Type of Communication

95.193(b) The FRS unit may transmit tones to make contact or to continue communications with a particular FRS unit. If the tone is audible (more than 300 Herz), it must last no longer than 15 seconds at one time. If the tone is subaudible (300 Herz or less), it may be transmitted continuously only while your are talking.

CTCSS Privacy Codes VS Frequency Hz

No.	*Frequency (Hz)*	*No.*	*Frequency (Hz)*
01	67.0	21	136.5
02	71.9	22	141.3
03	74.4	23	146.2
04	77.0	24	151.4
05	79.7	25	156.7
06	82.5	26	162.2
07	85.4	27	167.9
08	88.5	28	173.8
09	91.5	29	179.9
10	94.8	30	186.2
11	97.4	31	192.8
12	100.0	32	203.5
13	103.5	33	210.7
14	107.2	34	218.1
15	110.9	35	225.7
16	114.8	36	233.6
17	118.8	37	241.8
18	123.0	38	250.3
19	127.3		
20	131.8		

Chapter 2 Maximum Transmitter Power Output Measurement

2.1 Rules and Specification Limits

95.639 (d) : No FRS unit, under any condition of modulation, shall exceed 0.500W effective radiated power (ERP).

2.2 Test condition and setup :

1. Measurement was made on open-field test site. The EUT system was placed on non-conductive turntable which is 0.8 meters height, top surface 1.0 X 1.5 meter. The EUT was placed in three direction of the space in order to obtain maximum emission.
2. A EMCO whole range antenna with horizontal and vertical polarization was raised from 1 – 4 meter as well as the turntable was rotate from 0 to 360 degree to search for the maximum Field Strength Spectrum where the spectrum analyzer was operated in the quasi-peak detection mode. Recorded all the values which measured under horizontal and vertical position for the biconical antenna.
3. The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBμV) into field intensity in Watt.
   (1) The actual field intensity in decibels referenced to 1 micro volt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna tactor (dB), and cable loss (dB) at the appropriate frequency.

   FI_a (dBμV/m) = FI_r (dBμV) + Corrected (dB)
   Corrected (dB) = AF(dB) + CL (dB)
   FI_a : Actual Field Intensity
   FI_r : Reading of the Field Intensity
   AF : Antenna Factor
   CL : Cable Loss

   (2) The field intensity in Volt can then be determined by the following equation:
   $FI(Volt) = 10^{FI(dBuV/m)/20} \times 10^{-6}$

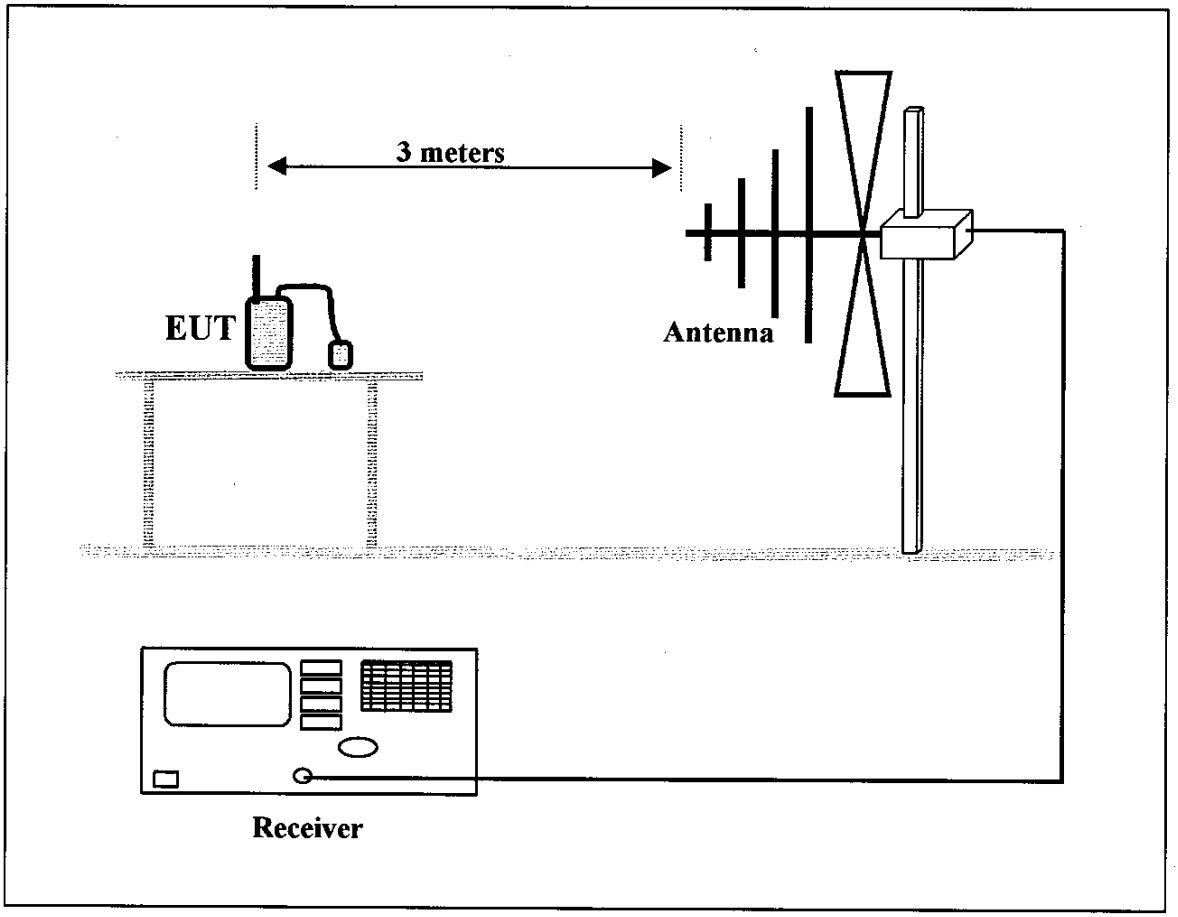
   The field intensity in Watt can then be determined by the following equation :
   $P (watt) = FI^2 (Volt) \times d^2 (meter) / 30G$
   G=1
   P: Power in Watt
   D: Measurement Distance (3m)

2.3 List of test Instrument:

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	10/18/99	10/18/00
RF Filter Section	85460A	H P	3448A00217	10/18/99	10/18/00
Bi-log Antenna	CBL6141A	SCHAFFNER	4150	05/21/99	05/21/00
Anechoic Chamber (Amplify, cable calibrated together)				04/16/99	04/16/00

The level of confidence of 95%, the uncertainty of measurement of radiated emission is ± 4.96 dB.

2.4 Measurement Configuration



2.5 Measurement Result

Channel	*Frequency (MHz)*	*A. P. (H/V)*	*Amplitude (dBμV/m)*	*E.R.P. (mW)*
01	462.5625	H	103.01	5.999
		V	121.12	388.259
14	467.7125	H	103.02	6.013
		V	119.68	278.690

The maximum field measured is 121.00 dBμV/m

FI (Volt) = $10^{121.12/20}$ X 10^{-6} = 1.13763 V

FI (mW) = $(1.13763 \text{ X } 3)^2 / 30$ = 388.259 mW

Chapter 3 Modulation Characteristics Measurement

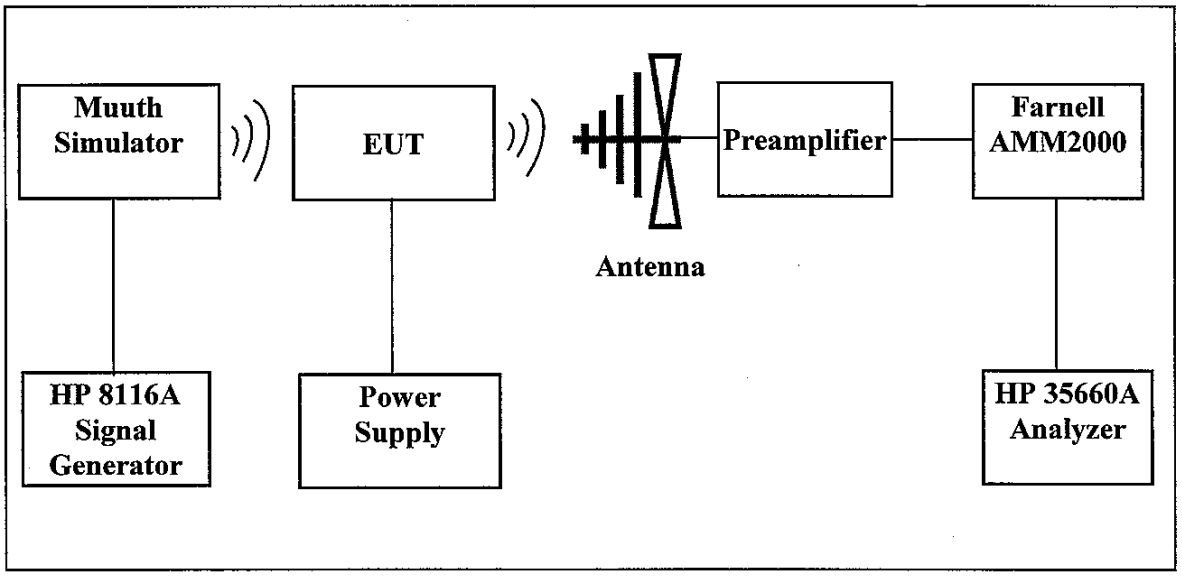
3.1 Rules and Specification Limits

2. 987 (a): Voice modulated communication equipment

2. 987 (b): Equipment which employs modulation limiting

95.637 (a): A FRS unit that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 2.5KHz, and the audio frequency response must not exceed 3.125KHz.

3.2 Test Configuration & List of Test Instruments



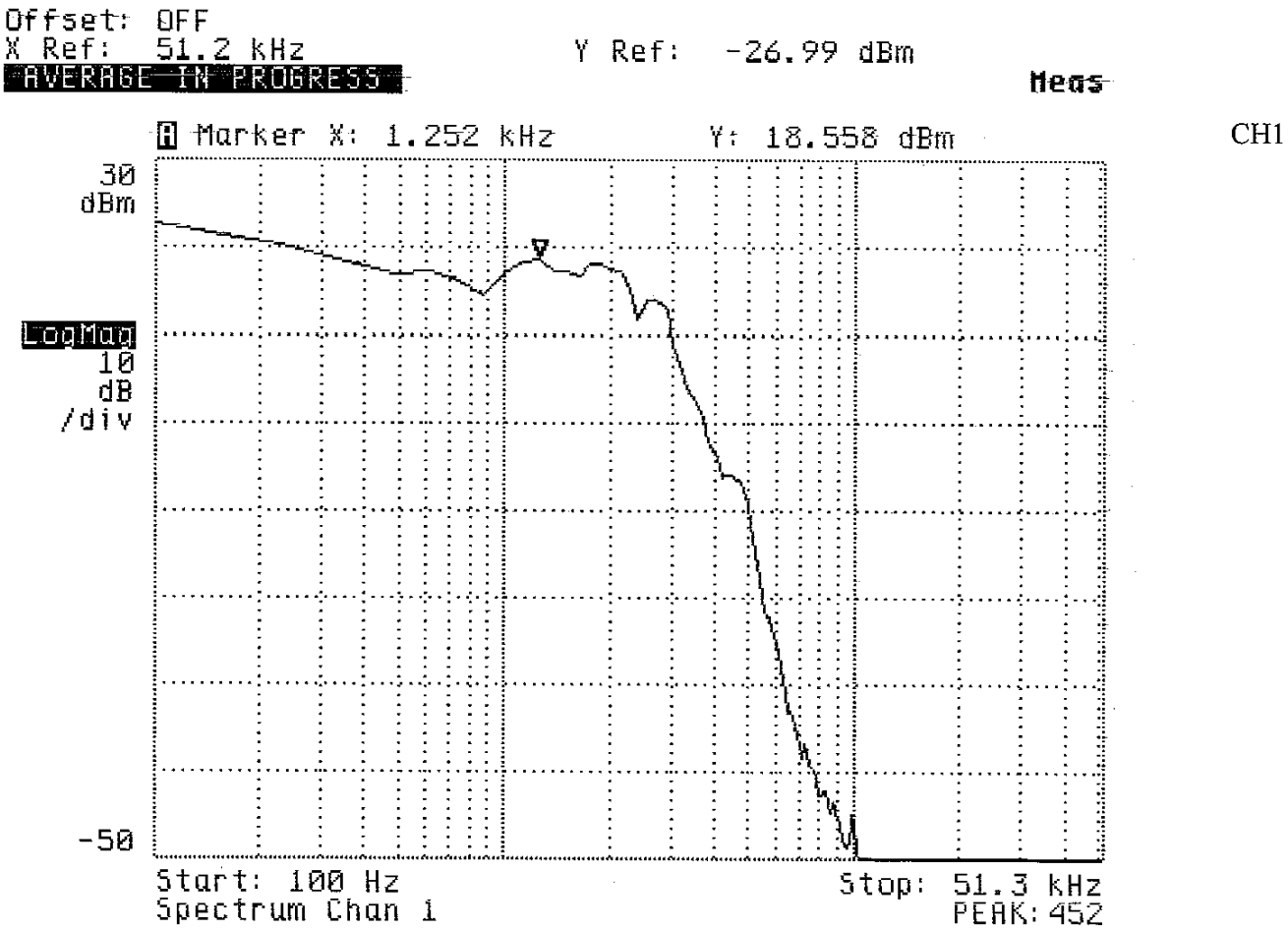
List of test instrument:

Manufacturer	Device	Model No.	Input Impedance
HP	Dynamic Signal Analyzer	HP35660A	50
HP	Signal Generator 50 MHz	HP8116A	50
SCHAFFNER	Bi-log Antenna	CBL6141A	50
Farnell	Modulation Meter	AMM2000	50
TRC	Preamplifier	TRC001	50
B&K	Mouth Simulator	4227	---

3.3 Frequency Response of Audio Modulation Circuit Measurement Condition & Setup

2.987 (a)

1. The EUT and test equipment were set up as shown on the Section 3.2 .
2. The Plus/Function generator was connected to the microphone of the EUT via artificial mouth Simulator.
3. The audio signal input was adjusted to obtain 50% modulation at 1 KHz.
4. With input levels held constant and below limiting at all frequencies, the generator was varied from 100 Hz to 51.3 kHz.
5. The response in dBVrms relative to 1kHz was then measured, using the HP 35660A Dynamic Signal Analyzer as follow page that have no page number.


Offset: OFF
X Ref: 51.2 kHz
Y Ref: -26.99 dBm
AVERAGE IN PROGRESS
Meas
Marker X: 1.252 kHz
Y: 18.558 dBm
CH1
30
dBm
LogMag
10
dB
/div
-50
Start: 100 Hz
Spectrum Chan 1
Stop: 51.3 kHz
PEAK: 452

3.4 Frequency Response of Audio Low Pass Filter Measurement Condition & Setup

1. The measurement condition and setup as Section 3.3 .
2. With input levels held constant and below limiting at all frequencies, the generator was varied from 1KHz to 103.4KHz .
3. The response in dBVrms relative to 1kHz was then measured, using the HP 35660A Dynamic Signal Analyzer as follow page that have no page number.

3.5 Modulation Limiting Measurement Condition & Setup

1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit".
2. The modulation response was measured for each of five frequencies: CH1 — 164Hz, 996Hz, 3.048KHz.
3. The input level was varied from 30% modulation to at least 20 dB higher than the saturation point.
4. Measurements were performed for both negative and positive modulation and the respective results were recorded.
5. Measurement results as Chart 3.1 to 3.2

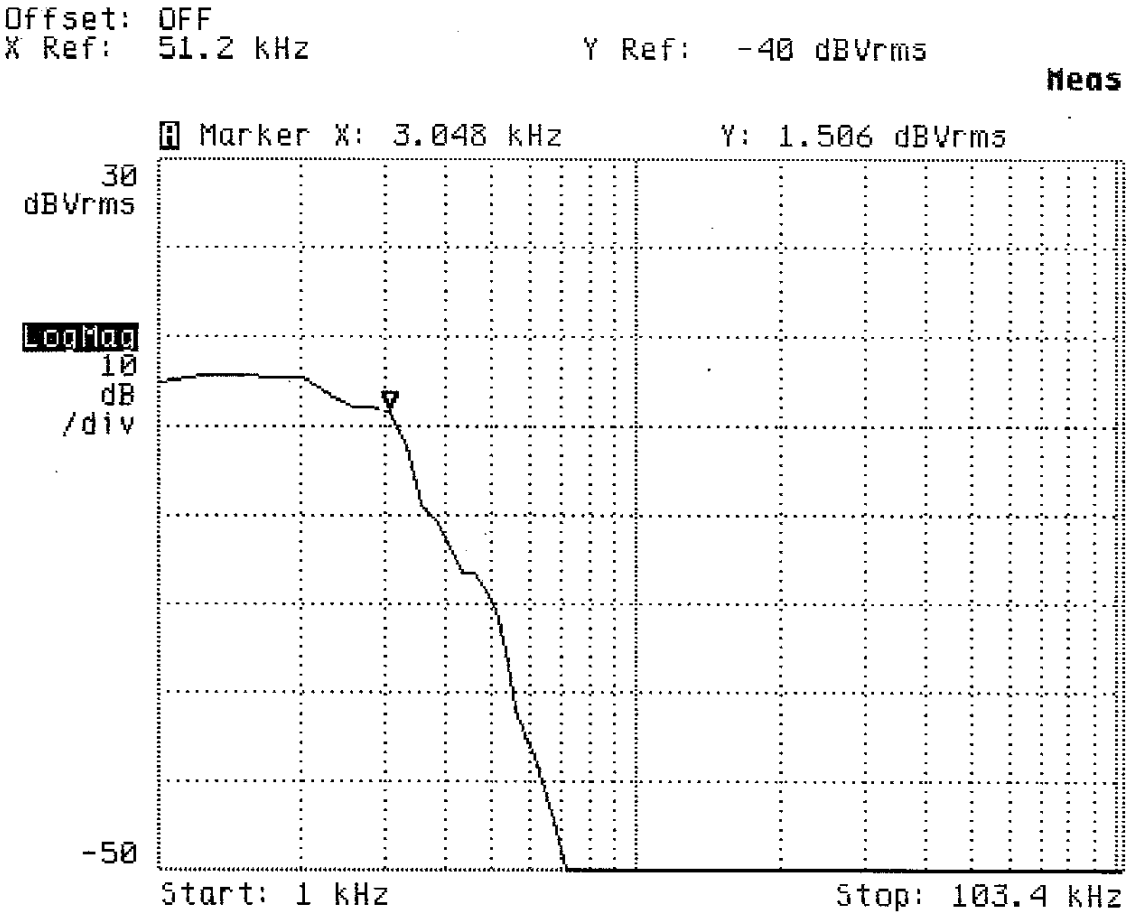

Offset: OFF
X Ref: 51.2 kHz
Y Ref: -40 dBVrms
Meas
CH1
A Marker X: 3.048 kHz
Y: 1.506 dBVrms
30
dBVrms
LogMag
10
dB
/div
-50
Start: 1 kHz
Stop: 103.4 kHz

Chart 3.1 Modulation Limiting Measuerment CH 01 Negative

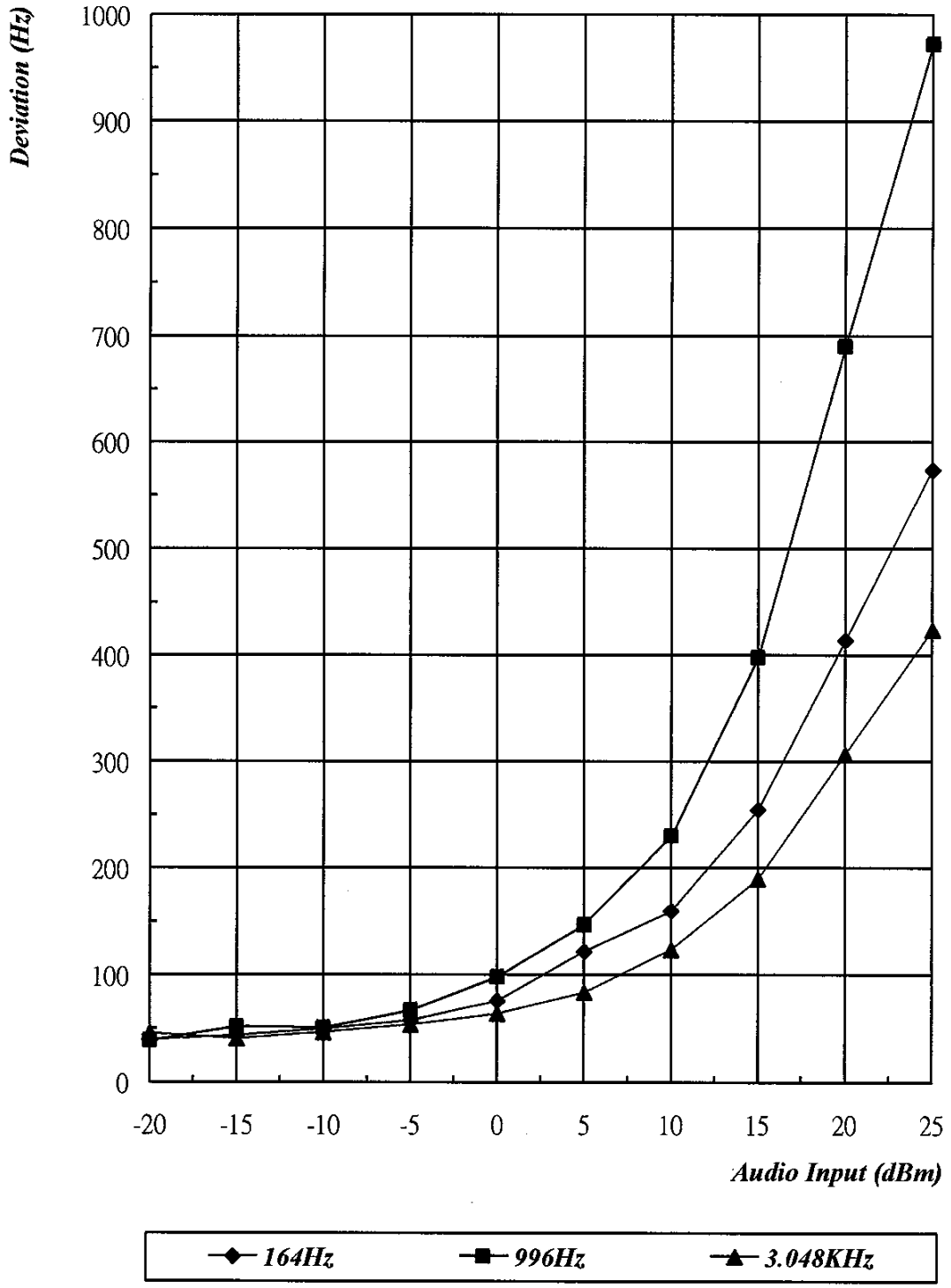


Chart 3.2 Modulation Limiting Measuerment CH 01 Positive

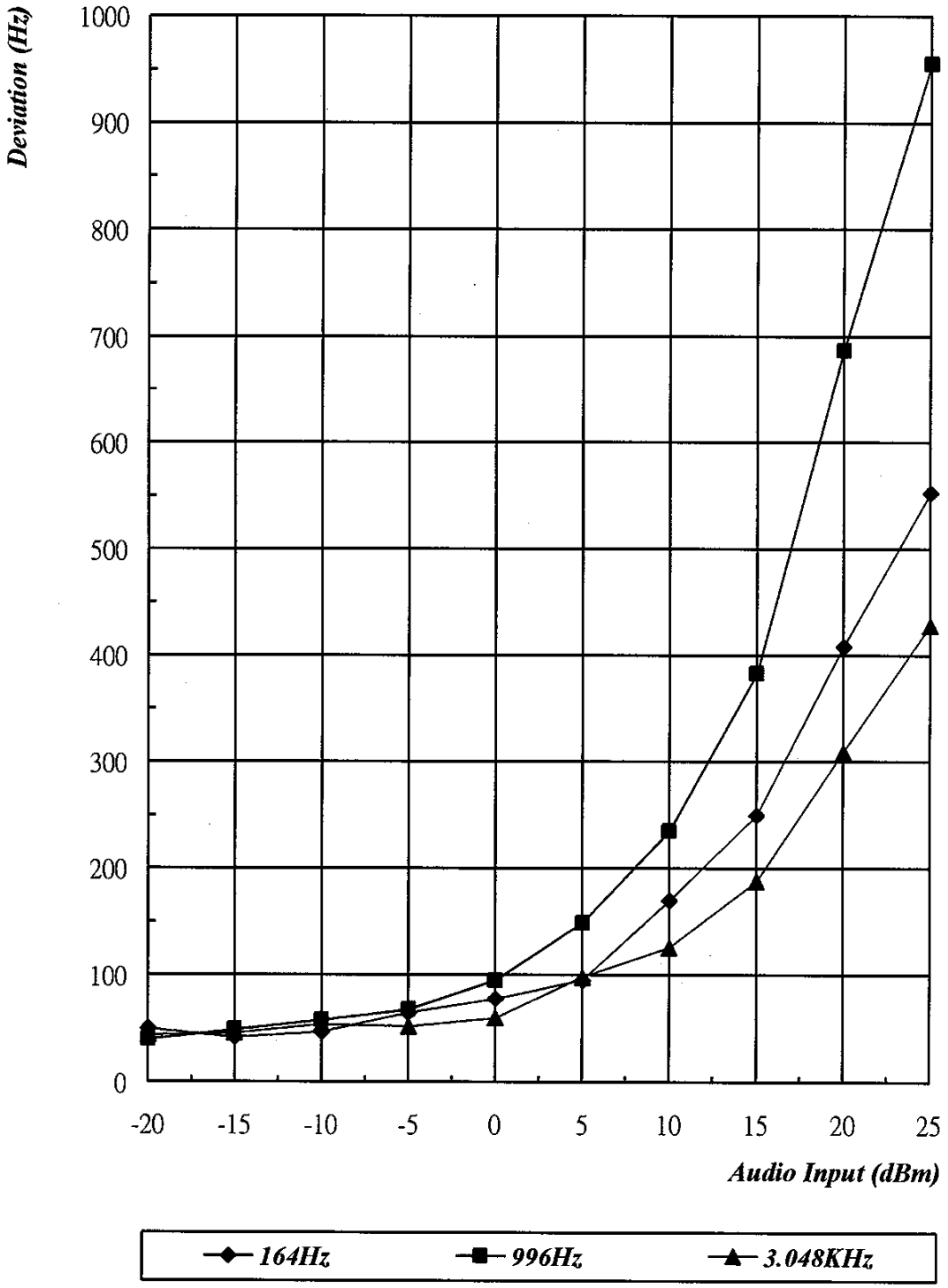


Chart 4 Occupied and Emission Bandwidth Measurement

4.1 Rules and Specification Limits

95.633(c): The authorized bandwidth for emission type F3E transmitted by a FRS unit is 12.5 KHz.

90.210(d): Emission Mask D — 12.5 KHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 KHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

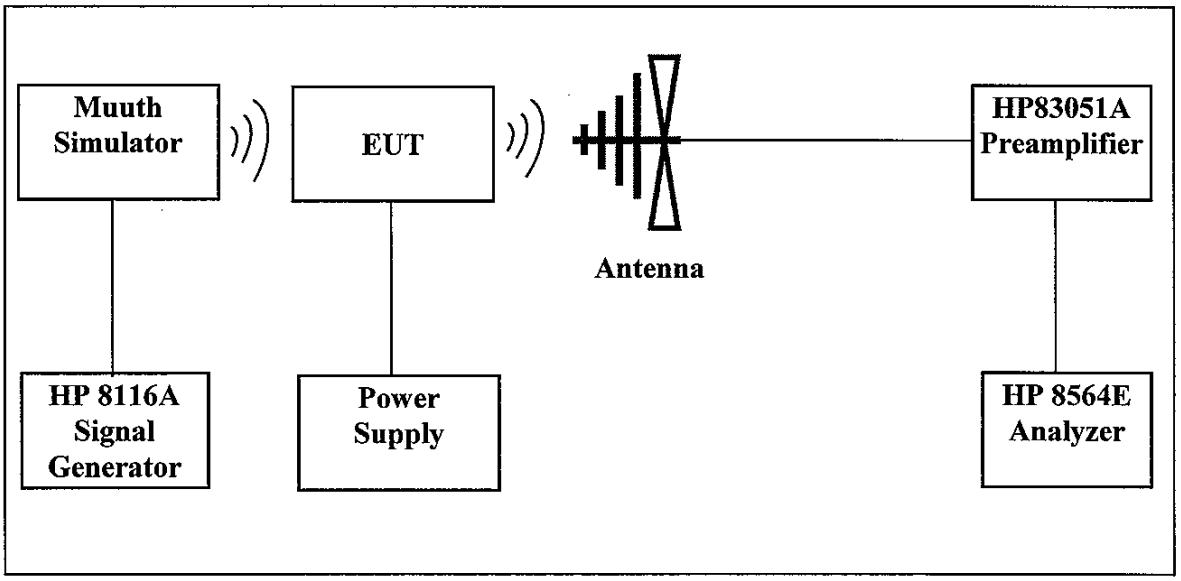
90.210(d)(1): On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0.: Zero dB.

90.210(d)(2): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625kHz but no more than 12.5 kHz : At least 7.27(f_d – 2.88 kHz) dB.

90.210(d)(3): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz : At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation .

2.989: Occupied bandwidth

4.2 Test Configuration & List of Test Instruments



List of test Instrument :

Instrument Name	Model No.	Brand	Serial No.
Spectrum analyzer (9K~40GHz)	8564E	HP	---
Preamplifier (45M~50GHz)	83051A	HP	VS36433002
Close-Field Probe 30M~1GHz	11940A	HP	---

4.3 Measurement Procedure

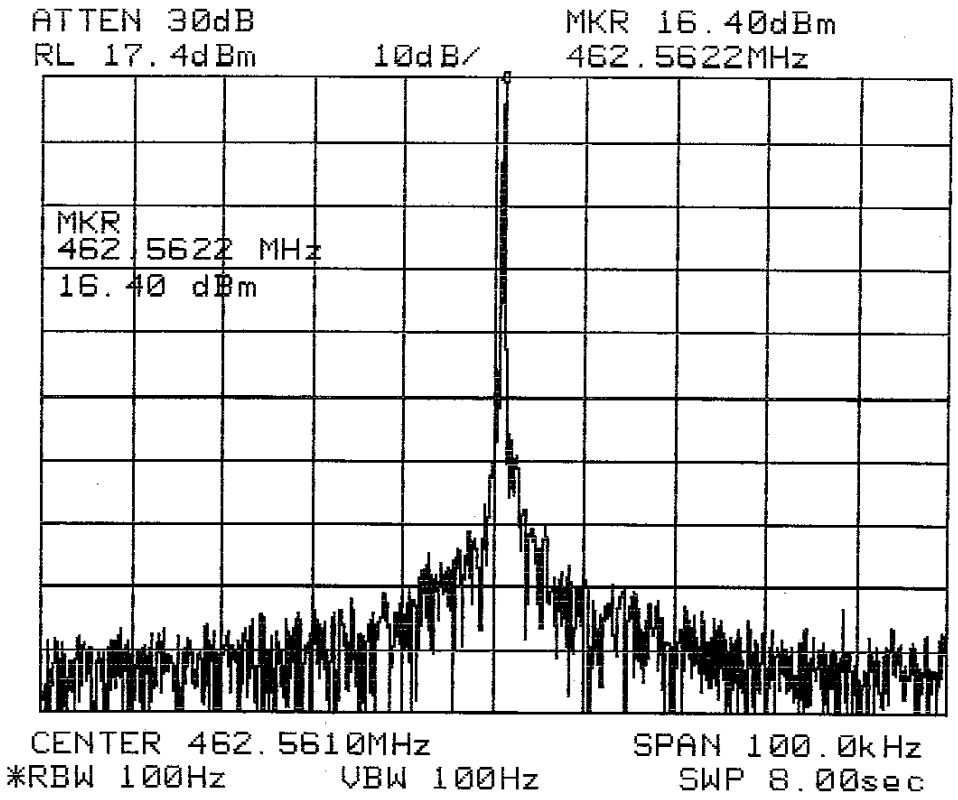
1. For EUT's supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ± 2.5 KHz (or 50% modulation). With level constant , the signal level was increased 16 dB.
2. For EUT's supporting digital modulation, the digital modulation mode was operated to its maximum extent .
3. The occupied Bandwidth was measured as follow four pages with no page number.

4.4 Calculation of Necessary Bandwidth (Bn)

The occupied bandwidth's plot is presented on following pager which illustrates compliance with the rules.

Calculation of Necessary Bandwidth (Bn)
Bn = 2M + 2D
M = Max. Modulation Frequency = 3.048 KHz
D = Peak Frequency Deviation = 0.972 KHz (Chart 3-1)
K = 1
Bn = 8.040 KHz

CH1


ATTEN 30dB
RL 17.4dBm
10dB/
MKR 16.40dBm
462.5622MHz
MKR
462.5622 MHz
16.40 dBm
CENTER 462.5610MHz
SPAN 100.0kHz
*RBW 100Hz
VBW 100Hz
SWP 8.00sec

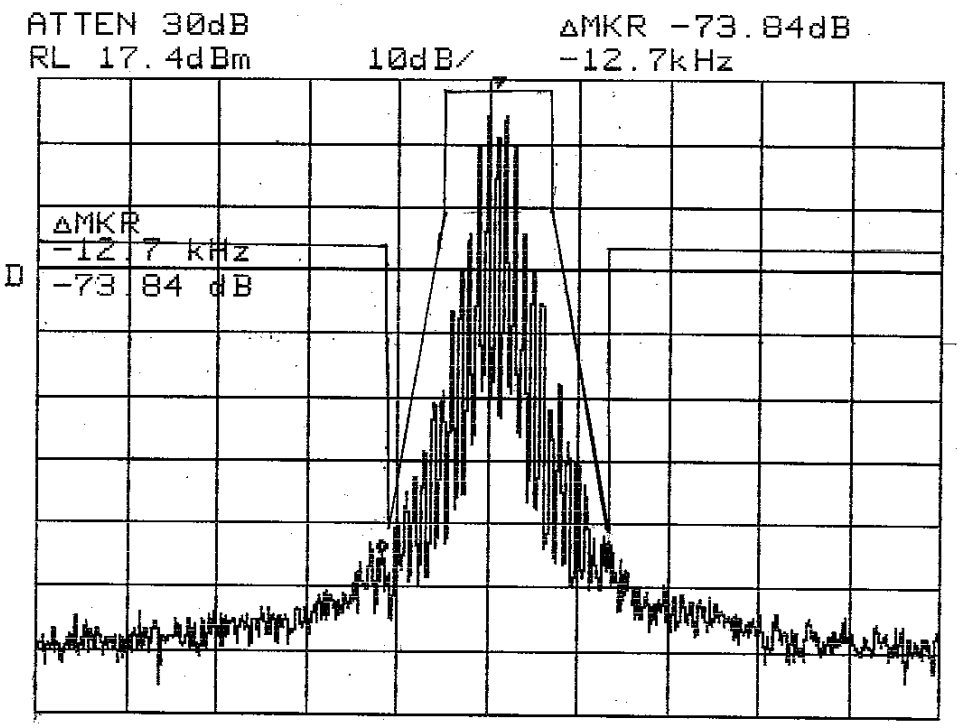

ATTEN 30dB
RL 17.4dBm
10dB/
ΔMKR -73.84dB
-12.7kHz
ΔMKR
-12.7 kHz
-73.84 dB
D

Chart 5 Field Strength of Spurious Radiation Measurement

5.1 Rules and Specification Limits

2.993(a): Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, Power leads, or intermediate circuit elements under normal conditions of installation and operation.

90.210(d)(3): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz : At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation .

2.997: In all measurements set forth , the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10^{th} harmonic of the carrier frequency.

5.2 Measurement Condition & Setup

Pretest : The EUT is placed in a anechoic chamber, and scan from 30MHz to 1GHz.This is done to ensure the radiation exactly emits form the EUT.

Final test : Final radiation measurements is made on a ***3 - meter, anechoic chamber***. The EUT is placed on a nonconductive table which is 0.8 m height, the top surface is 1.0 x 1.5 meter. All the placement is according to ANSI C63.4 - 1992.

The spectrum is examined from 30 MHz to 18 GHz measured by HP spectrum.

The SCHAFFNER and EMCO whole range Antenna is used to measure frequency from 30 MHz to 18 GHz. The final test is used the spectrum HP 8546A, HP 85460A and 8564E .

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meter to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer's 6dB bandwidth is set to 120 K Hz , and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the data will be rechecked by the tester and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from anechoic chamber will be taken as the final data.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB) and cable loss (dB) at the appropriate frequency.

Band of Frequency: (30M Hz ~ 1G Hz)
FI_a (dBμV/m) = FI_r (dBμV) – Corrected (dB)
Corrected (dB) = AF(dB) + CL (dB) – Amplifier Gain
FI_a : Actual Field Intensity
FI_r : Reading of the Field Intensity
AF : Antenna Factor
CL : Cable Loss

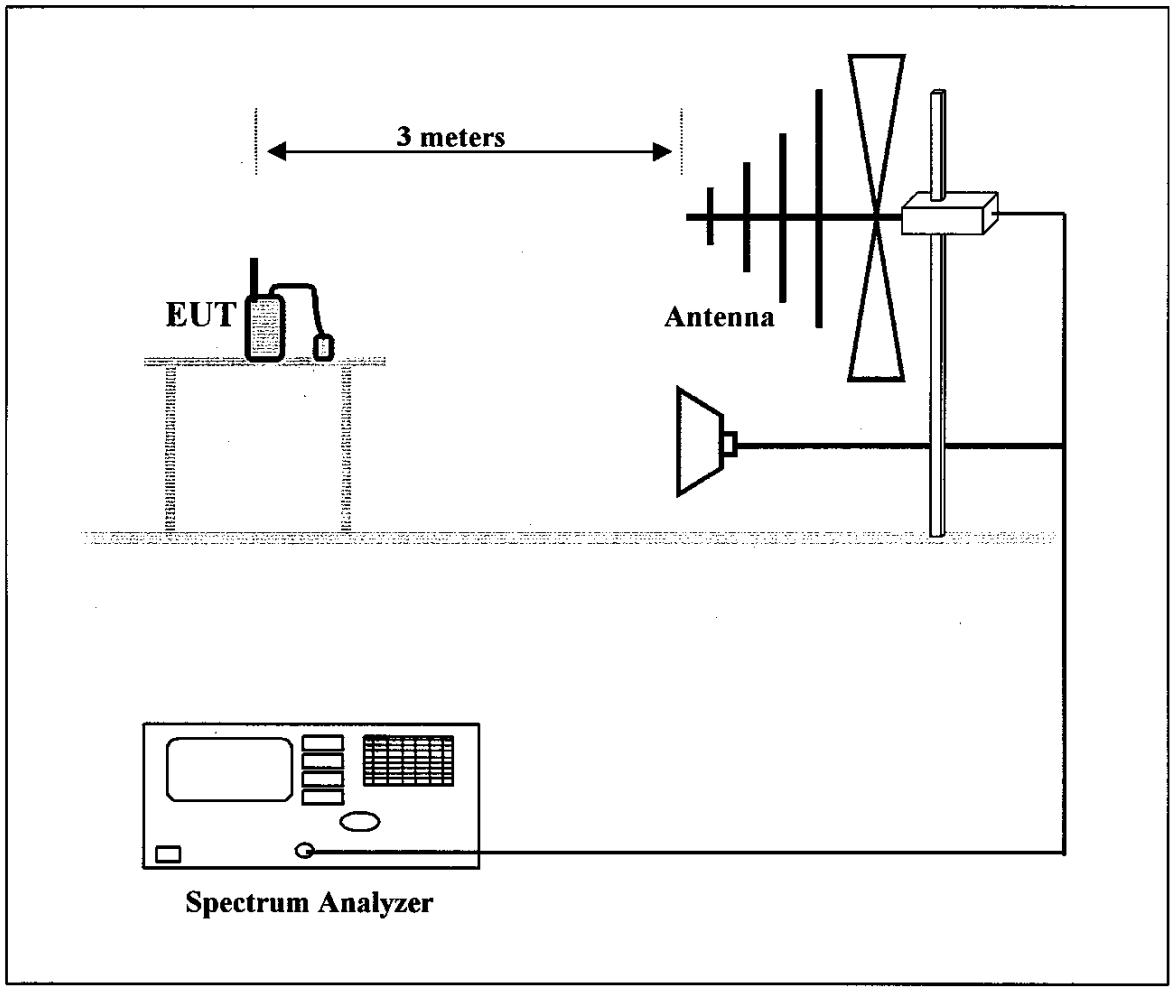
Band of Frequency: (1G Hz ~ 18 G Hz)
FI_a (dBμV/m) = FI_r (dBμV) + AF (dB) + CL(dB)
FI_a : Actual Field Intensity
FI_r : Reading of the Field Intensity
AF : Antenna Factor
CL : Cable Loss

5.3 List of Measurement Instruments

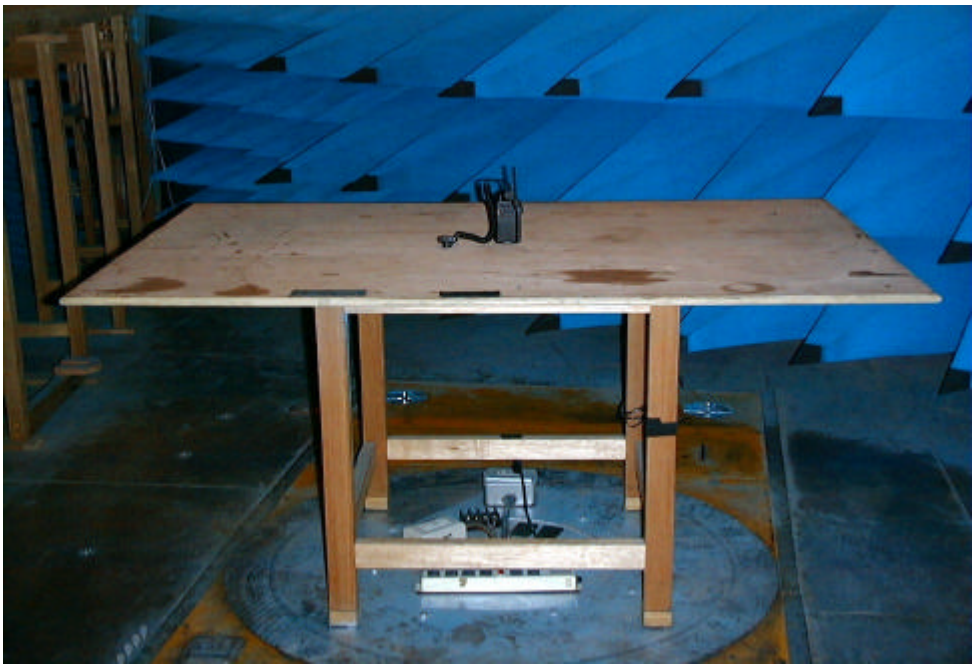
				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	10/18/99	10/18/00
RF Filter Section	85460A	H P	3448A00217	10/18/99	10/18/00
Bi-log Antenna	CBL6141A	SCHAFFNER	4150	05/21/99	05/21/00
Spectrum analyzer	8564E	H P	US36433002	08/09/99	08/09/00
Antenna (1G-18G Hz)	3142	EMCO	5178	08/09/99	08/09/00
Anechoic Chamber (Amplify, cable calibrated together)				04/16/99	04/16/00

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 4.96 dB.

5.4 Measurement Configuration



Pic 1 Front View of Test Configuration



Pic 2 Rear View of the Test Configuration

5.5 Measurement Result (CH01): (Horizontal for 30 MHz ~ 1 GHz)

Test Conditions:

Testing room : Temperature : 26 °C Humidity : 73 % RH

Testing site : Temperature : 31 °C Humidity : 75 % RH

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Amplitude*	*Limit*	*Margin*
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
231.270	48.95	1.00	87	-12.73	61.68	70.00	-8.32
925.110	28.93	1.94	24	-28.18	57.11	70.00	-12.89
***							

Note:

1. Margin = Amplitude - limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude – Correction Factors
3. Correction factor = Antenna factor + Cable Loss – Amplitude gain
   (For example : 30MHz correction factor = 15.5 – (–15.26) = 30.76 dB/m)
4. Attenuation required = 50 + 10 log (0.388 W) = 45.89
   Limit = 121.12 – 45.89 = 75.23

Measurement Result (CH01): (Horizontal for 1 GHz ~ 18 GHz)

Radiated Emission				*Correction Factors*	*Corrected Amplitude (dBμV/m)*	*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBμV/m)*	*Ant. H. (cm)*	*Table (°)*	*(dB)*		*Limit (dBμV/m)*	*Margin (dB)*
1.84	72.23	100.00	88	-8.67	63.56	70.00	-6.44
2.30	61.13	100.00	147	-8.67	52.46	70.00	-17.54
2.76	64.47	100.00	310	-6.84	57.63	70.00	-12.37
3.24	65.97	100.00	81	-6.84	59.13	70.00	-10.87
3.69	67.60	100.00	290	-5.64	61.96	70.00	-8.04
4.16	69.10	100.00	157	-5.64	63.46	70.00	-6.54
4.61	55.22	100.00	102	3.91	59.13	70.00	-10.87
5.08	54.22	100.00	331	3.91	58.13	70.00	-11.87
5.55	45.74	100.00	7	9.72	55.46	70.00	-14.54
6.00	44.07	100.00	208	9.72	53.79	70.00	-16.21
6.47	38.57	100.00	35	9.72	48.29	70.00	-21.71
6.94	35.41	100.00	2	9.72	45.13	70.00	-24.87
7.40	38.24	100.00	231	9.72	47.96	70.00	-22.04
7.86	35.07	100.00	227	9.72	44.79	70.00	-25.21
8.82	34.41	100.00	328	9.72	44.13	70.00	-25.87
9.24	36.07	100.00	95	9.72	45.79	70.00	-24.21
***							

Note:

1. Margin = Corrected - Limit.
2. Peak Amplitude + Correction Factor = Corrected

Measurement Result (CH01): (Vertical for 30 MHz ~ 1 GHz)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Amplitude*	*Limit*	*Margin*
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
231.270	51.65	1.97	89	-12.73	64.38	70.00	-5.62
925.110	34.36	1.00	141	-28.18	62.54	70.00	-7.46
***							

Measurement Result (CH01): (Vertical for 1 GHz ~ 18 GHz)

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBμV/m)*	*Ant. H. (cm)*	*Table (°)*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
1.84	72.23	100.00	211	-8.67	63.56	70.00	-0.87
2.30	61.13	100.00	181	-8.67	52.46	70.00	-18.21
2.76	64.47	100.00	71	-6.84	57.63	70.00	-15.04
3.24	65.97	100.00	318	-6.84	59.13	70.00	-15.04
3.69	67.60	100.00	94	-5.64	61.96	70.00	-10.37
4.16	69.10	100.00	5	-5.64	63.46	70.00	-8.54
4.61	55.22	100.00	172	3.91	59.13	70.00	-20.04
5.08	54.22	100.00	327	3.91	58.13	70.00	-17.37
5.55	45.74	100.00	135	9.72	55.46	70.00	-8.71
6.00	44.07	100.00	18	9.72	53.79	70.00	-19.71
6.47	38.57	100.00	229	9.72	48.29	70.00	-19.71
6.94	35.41	100.00	330	9.72	45.13	70.00	-24.04
7.40	38.24	100.00	192	9.72	47.96	70.00	-16.04
7.86	35.07	100.00	328	9.72	44.79	70.00	-17.04
8.82	34.41	100.00	201	9.72	44.13	70.00	-24.37
9.24	36.07	100.00	90	9.72	45.79	70.00	-19.54
***							

Measurement Result (CH14): (Horizontal for 30 MHz ~ 1 GHz)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Amplitude*	*Limit*	*Margin*
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
75.980	1.22	2.97	59	-9.72	10.94	70.00	-59.06
233.840	35.64	1.00	64	-12.90	48.54	70.00	-21.46
***							

Measurement Result (CH14): (Horizontal for 1 GHz ~ 18 GHz)

Radiated Emission				*Correction Factors*	*Corrected Amplitude (dBμV/m)*	*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBμV/m)*	*Ant. H. (cm)*	*Table (°)*	*(dB)*		*Limit (dBμV/m)*	*Margin (dB)*
1.86	65.30	100.00	91	-8.67	56.63	70.00	-13.37
2.35	64.96	100.00	334	-8.67	56.29	70.00	-13.71
2.78	63.30	100.00	208	-6.84	56.46	70.00	-13.54
3.27	67.13	100.00	52	-6.84	60.29	70.00	-9.71
3.73	68.27	100.00	274	-5.64	62.63	70.00	-7.37
4.20	66.77	100.00	114	-5.64	61.13	70.00	-8.87
4.67	48.38	100.00	207	3.91	52.29	70.00	-17.71
5.14	53.55	100.00	308	3.91	57.46	70.00	-12.54
5.60	41.41	100.00	208	9.72	51.13	70.00	-18.87
6.07	40.41	100.00	29	9.72	50.13	70.00	-19.87
6.54	32.41	100.00	336	9.72	42.13	70.00	-27.87
7.01	33.24	100.00	272	9.72	42.96	70.00	-27.04
7.49	36.24	100.00	300	9.72	45.96	70.00	-24.04
7.94	34.41	100.00	341	9.72	44.13	70.00	-25.87
8.41	43.95	100.00	195	9.72	53.67	70.00	-25.87
8.89	40.95	100.00	105	9.72	50.67	70.00	-28.87
***							

Measurement Result (CH14): (Vertical for 30 MHz ~ 1 GHz)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Amplitude*	*Limit*	*Margin*
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
232.330	-5.35	1.94	109	-12.88	7.53	70.00	-62.47
869.847	-4.97	1.94	46	-27.10	22.13	70.00	-47.87
935.420	32.82	1.05	46	-28.38	61.20	70.00	-8.80
***							

Measurement Result (CH14): (Vertical for 1 GHz ~ 18 GHz)

Radiated Emission				*Correction Factors*	*Corrected Amplitude (dBμV/m)*	*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBμV/m)*	*Ant. H. (cm)*	*Table (°)*	*(dB)*		*Limit (dBμV/m)*	*Margin (dB)*
1.86	76.96	100.00	277	-8.67	68.29	70.00	-1.71
2.35	60.46	100.00	108	-8.67	51.79	70.00	-18.21
2.78	59.97	100.00	174	-6.84	53.13	70.00	-16.87
3.27	63.97	100.00	128	-6.84	57.13	70.00	-12.87
3.73	63.27	100.00	331	-5.64	57.63	70.00	-12.37
4.20	66.60	100.00	224	-5.64	60.96	70.00	-9.04
4.67	42.22	100.00	265	3.91	46.13	70.00	-23.87
5.14	47.22	100.00	75	3.91	51.13	70.00	-18.87
5.60	45.41	100.00	37	9.72	55.13	70.00	-14.87
6.07	38.91	100.00	246	9.72	48.63	70.00	-21.37
6.54	36.41	100.00	162	9.72	46.13	70.00	-23.87
7.01	33.07	100.00	94	9.72	42.79	70.00	-27.21
7.49	39.07	100.00	154	9.72	48.79	70.00	-21.21
7.94	39.24	100.00	329	9.72	48.96	70.00	-21.04
***							

Chart 6 Frequency Stability Tolerance Measurement

6.1 Rules and Specification Limits

2.995: Measurements required – Frequency stability

95.627 (b): Each FRS unit must be maintained within a frequency tolerance of 0.00025%.

6.2 Measurement Condition & Setup with Temperature Variation

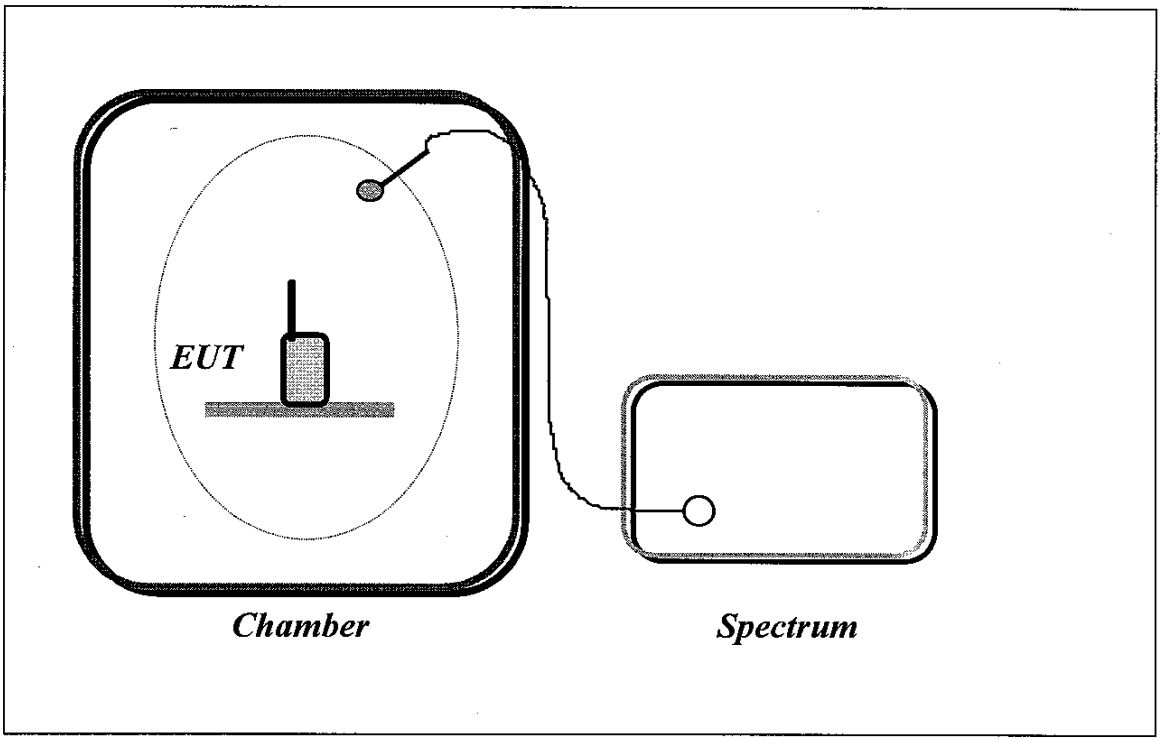
1. Place the EUT in the chamber, powered in its normal operation and select channel 1 or 14.
2. Set the temperature of the chamber -30 degree Centigrade. Allow the equipment to stabilize at that temperature.
3. Measured the carrier frequency using preamplifier and frequency counter.
4. Repeated procedures 1 to 3 from -20 to 50 degree Centigrade at internals of 10 degree.

6.3 List of Measurement Instruments with Temperature Variation

List of test Instrument :

Instrument Name	Model No.	Brand	Remark
Spectrum Analyzer	8591A	H P	1.8GHz
Temperature Chamber	THS-MV2	King Son	
Near field Probe	7405-901	EMCO	
Power Supply	GPR-6030	Good Will	
Auto Transformer	Powerstat	Supprior Elec. Co.	

6.4 Measurement Configuration of Temperature variation test:



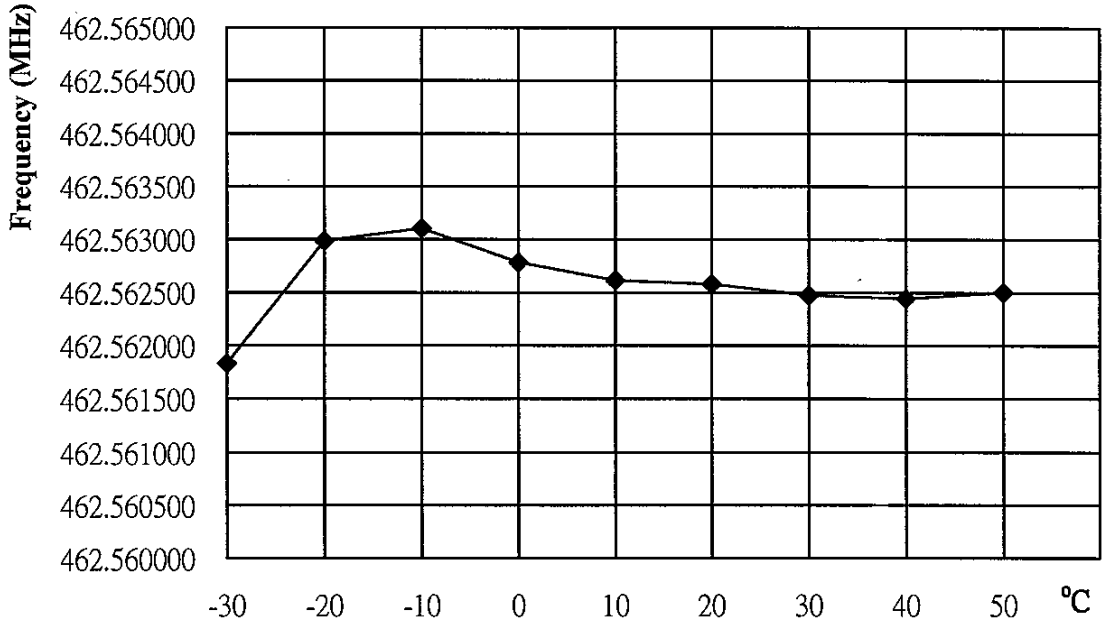
6.5 Measurement Result with Temperature Variation

A plot and table is presented which illustrates compliance with the rule where the center frequency are CH1– 462.5625 MHz and CH14 – 467.7125 MHz.

Temperature Variation Table (CH01)

Temperature (Centigrade)	*Frequency (MHz)*	*Tolerance (MHz)*
-30	462.561830	462.539372 ~ 462.585628
-20	462.562984	462.539372 ~ 462.585628
-10	462.563103	462.539372 ~ 462.585628
0	462.562782	462.539372 ~ 462.585628
10	462.562615	462.539372 ~ 462.585628
20	462.562583	462.539372 ~ 462.585628
30	462.562474	462.539372 ~ 462.585628
40	462.562443	462.539372 ~ 462.585628
50	462.562504	462.539372 ~ 462.585628

Temperatuer Variation Vs. Frequency Chart



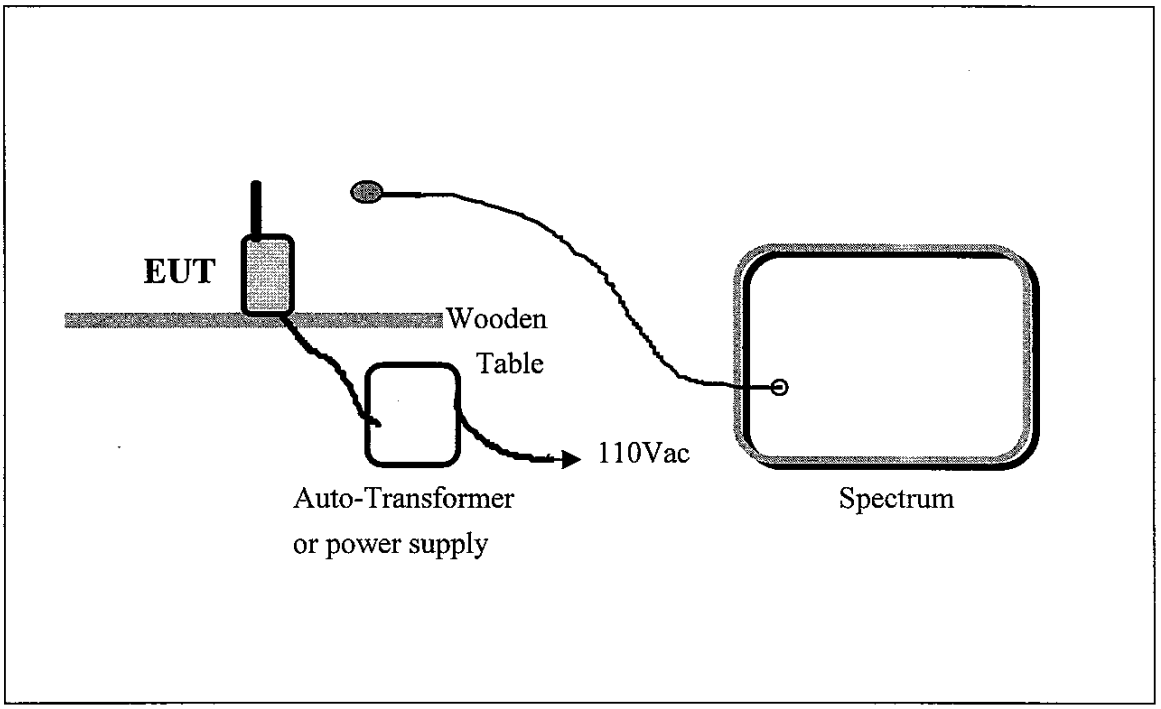
6.6 Measurement Condition & Setup with Voltage Variation

1. Attached the power line of the power supply to the battery position of the EUT.
2. Tuned the output power level to battery end point , 85 % , 100%, 115% of the normal operation power of EUT.
3. Recorded the frequency with a frequency counter.

6.7 List of test Instrument :

Instrument Name	Model No.	Brand	Remark
Spectrum Analyzer	8591A	H P	1.8GHz
Temperature Chamber	THS-MV2	King Son	
Near field Probe	7405-901	EMCO	
Power Supply	GPR-6030	Good Will	
Auto Transformer	Powerstat	Supprior Elec. Co.	

6.8 Configuration of Voltage variation test :



6.9 Measurement Result with Voltage Variation

Frequency Stability of Voltage Variation Measurement Table

Supply Voltage (Volt)	*Frequency (MHz)*	*Tolerance (MHz)*
3.83 (85%)	462.562528	462.539372 ~ 462.585628
4.50 (100%)	462.562540	462.539372 ~ 462.585628
5.18 (115%)	462.562520	462.539372 ~ 462.585628
Endpoint-Voltage : 3.50 V		

Voltage Variation Vs. Frequency Chart

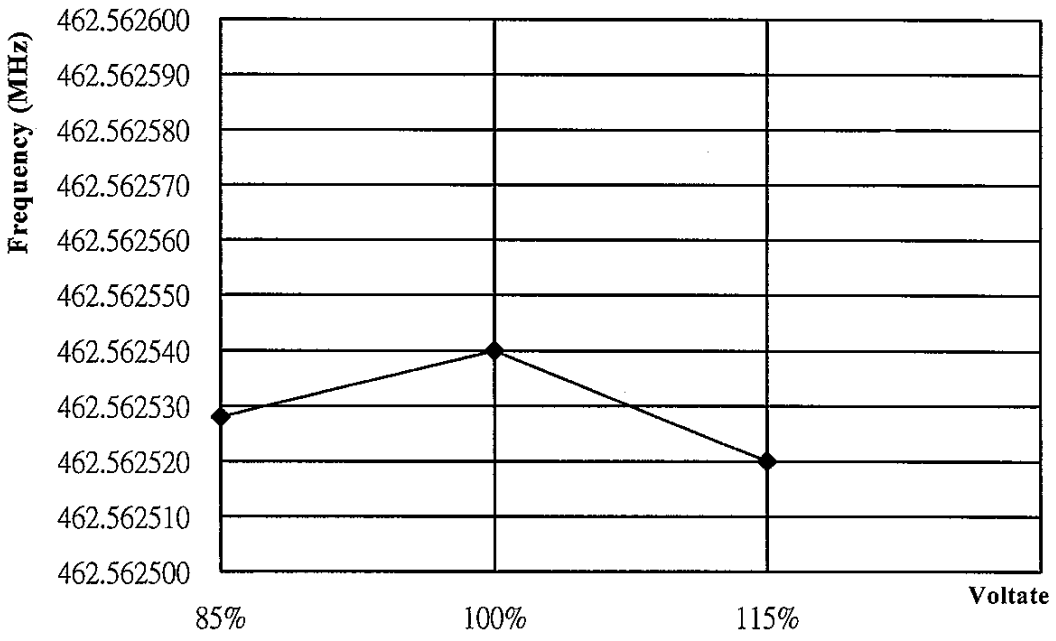


Chart 7 Antenna of Requirements

95.647: FRS unit and R/C transmitter antennas. – The antenna of each FRS unit, and the antenna of each R/C station transmitting in the 72-76 MHz band, must be an integral part of the transmitter. The antenna must have no gain (as compared to a half-wave dipole) and must be vertically polarized.

Normal-mode helical antennas of EUT

The subject device its antenna polarization is vertically polarized and define by its physical dimension.

When the dimensions of the helix are small compared with wavelength, the maximum radiation is in a direction normal to the helix axis. Kraus has shown that the radiation from a short-axial-length helix can be calculated by assuming that the helix is composed of small loops of diameter D and short dipoles of length S. The far field of a short dipole has only an E_θ component,

$$E_\theta = \frac{jBe^{-jkr}}{r}\left[\frac{S}{\lambda}\right] Sin\,\theta$$

and the far field of a small loop has only an E_ϕ component,

$$E_\varphi = \frac{Be^{-jkr}}{2r}\left[\frac{\pi D}{\lambda}\right]^2 Sin\,\theta$$

where r is the distance and B is a constant. The E_θ and E_φ components are 90° out of phase, and the far field of a small helix is, in general, elliptically polarized. The axial ratio is given by

$$AR = \frac{|E_\theta|}{|E_\varphi|} = \left[\frac{2S}{\lambda}\right] \Big/ \left[\frac{\pi D}{\lambda}\right]^2$$

In our case:

λ *(Meter) = 300 / f (MHz)* $\Longrightarrow$ λ *= 300 / 462 MHz = 0.649 Meter = 649 mm*

D = 3.40 mm, S = 69.50 mm, See Follow Page

$$\Longrightarrow AR = \left[\frac{2 \times 69.50}{649}\right] \Big/ \left[\frac{3.1416 \times 3.40}{649}\right]^2$$

$$\Longrightarrow AR = 790.682119$$

AR$\rightarrow\infty$ when $\pi D \ll \sqrt{2S\lambda}$

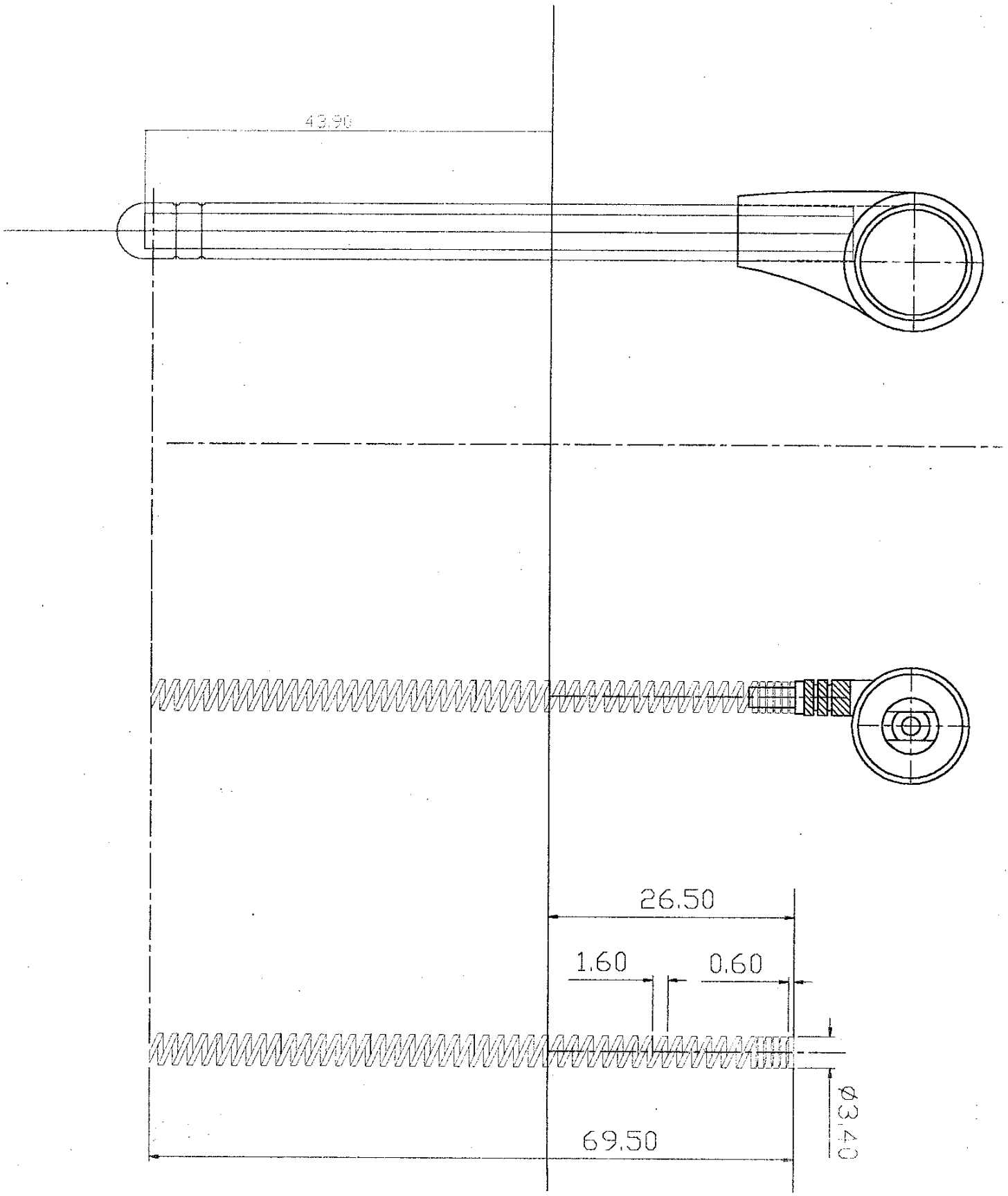
$$\Longrightarrow 3.1416 \times 3.40 \ll \sqrt{2 \times 69.50 \times 649}$$

$$\Longrightarrow 10.681 \ll 300.351$$

$\Longrightarrow$ **So, AR$\rightarrow$0 because** $\pi D \gg \sqrt{2S\lambda}$

So, antenna is vertically polarized.

The length of the antenna of EUT is 0.1 λ of the operated frequency of EUT.
The antenna gain of EUT is –1.6 dB. (See follow page for Antenna Radiation Pattern)


43.90
26.50
1.60
0.60
Ø3.40
69.50

Antenna Radiation Pattern

FCC ID: NDAGPFRS-200

Gain: -1.6dB