Report No.	G0695050902
Specifications Test Method	FCC Part 95, Subpart B – Certification ANSI C63.4 2003
Applicant	RPM Sports
Applicant address	3734 Bluff Dr. Lewis Center, Ohio 43035, USA
Items tested Model No. EUT Condition	One Way FRS Transmitter Coaches System ☒Engineering sample; ☐Pre-production; ☐Final production (Sample # G060902)
Results	**Compliance** (As detailed within this report)
Date	11/15/2005 (month / day / year) (Sample received) 01/13/2006 (month / day / year) (Test)
Prepared by	Project Engineer (Jack Tsai)
Authorized by	General Manager (Frank Tsai)
Issue date	*January 17, 2005* (month / day / year)
Modifications	**None**
Tested by	Training Research Co., Ltd.
Office at	No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan
Anechoic Chamber at	1F, No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan

Conditions of issue :

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

(3) ***This test report, measurements made by TRC are traceable to the NIST only Conducted and Radiated Method.***

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Contents

Chapter 0 Application for Certification

95.651 : Transmitters may be either crystal controlled or frequency synthesized.
☒ crystal controlled ☐ frequency synthesized

2.1033(c)(1) : *RPM Sports* – applicant and manufacturer

2.1033(c)(2) : The equipment is a transmitter, wireless microphone
Model: Coaches System

2.1033(c)(3) : Quantity production is planned. See users manual

2.1033(c)(4) : Type of emission – F3E

2.1033(c)(5) : 462.5625 ~ 467.7125 MHz

2.1033(c)(6) : 1.68 mW

2.1033(c)(7) : Specification of 500 mW is met by the equipment in the applicable Part 95.693 (d)

2.1033(c)(8) : Final RF amplifier stage current : < 200mA

2.1033(c)(9) : Description follows

2.1033(c)(10) : Complete circuit diagrams are included. No modification was made

2.1033(c)(11) : See label, Instruction sheet to user included

2.1033(c)(12) : See photos

2.1033(c)(13) : Not applicable

2.1033(c)(14) : Description follows

2.1033(c)(15) : Not applicable

2.1033(c)(16) : Not applicable

2.1033(c)(17) : Not applicable

Chapter 1 GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of *RPM Sports* of the one way transmitter certification in accordance with FCC Rules 2.1031, 2.1046, 2.1047, 2.1049, 2.1053, 2.1055, and Part 95 Subpart B.

Description of EUT:

EUT	:	One Way FRS Transmitter
Model No.	:	Coaches System
FCC ID	:	TXP2005TELEPATH
Carrier Frequency Range	:	462.5625MHz ~ 467.7125MHz
RF Power Output	:	1.68mW
Supply Voltage	:	3.7VDC
Supply Current	:	200mA
Frequency Response	:	100Hz ~ 3kHz
Frequency Stability	:	0.00025%
Operating Temperature	:	–30 to +50 degree centigrade

One way FRS transmitter, which operates in the frequency range of 462.5625MHz ~ 467.7125MHz (lowest: 462.5625MHz, and highest: 467.7125MHz tested). This FRS device is worn by a performer and provide traveler assistance, make a voice page, or to conduct a brief test and so on.

Verify the Frequency and Channel:

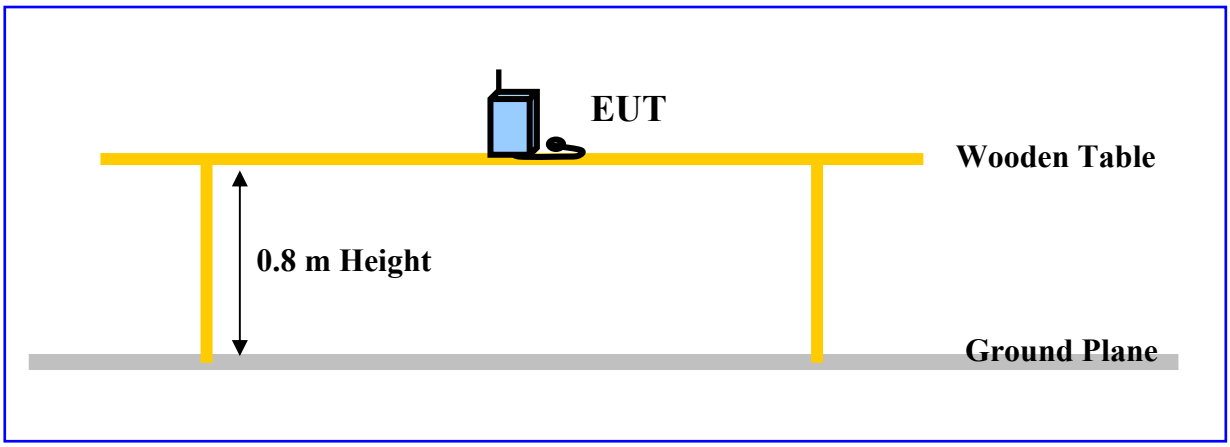
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	462.5625	8	467.5625
2	462.5875	9	467.5875
3	462.6125	10	467.6125
4	462.6375	11	467.6375
5	462.6625	12	467.6625
6	462.6875	13	467.6875
7	462.7125	14	467.7125

1.2 Description of Support Equipment

No support equipment

The EUT does not be connected with any product. No support equipment is requited for its normal operation.

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.,*** *No. 255, Nanyang Street, Shijr, 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 were 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 were 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.

Chapter 2 Type of Communication

2.1 Test condition and setup

Part 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 300Herz), the must last no longer than 15 seconds at one time. If the tone is subaudible (300Herz or less), it may be transmitted continuously only while you are talking.

2.2 List of test Instrument

None (Not Applicable)

2.3 Test Result

Test Result: None (Not Applicable, The device can't generated "tone" at non-voice communications)

Chapter 3 Conducted Emission Test

3.1 Test condition and setup

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak and average detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 3.3.

3.2 List of test Instrument

Calibration Date

Instrument Name	Model	Brand	Serial No.	Next time
EMI Receiver	8546A	HP	3520A00242	06/01/06
RF Filter Section	85460A	HP	3448A00217	06/01/06
LISN (EUT)	LISN-01	TRC	99-05	12/09/06
LISN (Support E.)	LISN-01	TRC	9912-03, 04	02/04/06
Pre-amplifier	15542 ZFL-500	Mini – Circuits	0 0117	05/20/06
6dB Attenuator	MCL BW-S6W2	Mini – Circuits	9915 – Conducted	05/20/06
10dB Attenuator	A5542 VAT010	Mini – Circuits	0215 – Conducted	05/20/06
Coaxial Cable (2 meter)	A30A30-0058-50FS-2M	Jyebao	SMA-08	05/20/06
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	Jyebao	SMA-09	05/20/06
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-01	05/20/06
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-02	05/20/06
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	05/20/06

3.3 Conducted Emission Test Result

The following table shows a summary of the highest emissions of power line conducted emissions on the LIVE and NETURAL conductors of the EUT power cord. Show as follows.

Test Conditions: Temperature : 25 °C Humidity : 73 % RH

Test mode: Charging mode

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	161.085	54.50	48.46	14.21	65.60	55.60	-17.14
	205.540	53.70	46.94	12.56	64.17	54.17	-17.23
	314.855	51.31	44.61	10.78	61.06	51.06	-16.45
	383.870	50.91	43.51	9.06	59.43	49.43	-15.92
	503.590	50.82	42.48	7.70	56.03	46.03	-13.55
	549.090	50.02	40.90	6.00	56.00	46.00	-15.10
Line 2	163.570	54.25	48.52	14.76	65.54	55.54	-17.02
	362.055	50.71	44.05	9.76	59.91	49.91	-15.86
	498.240	50.53	43.28	8.80	56.00	46.00	-12.72
	561.170	48.87	40.88	6.53	56.00	46.00	-15.12
	622.000	40.79	---	---	56.00	46.00	-5.21
	963.000	33.36	---	---	56.00	46.00	-12.64

NOTE:

(1) Margin = Peak Amplitude – Limit, *The reading amplitudes are all under limit.*

(2) A "+" sign in the margin column means the emission is OVER the Class B Limit and "–" sign of means UNDER the Class B limit

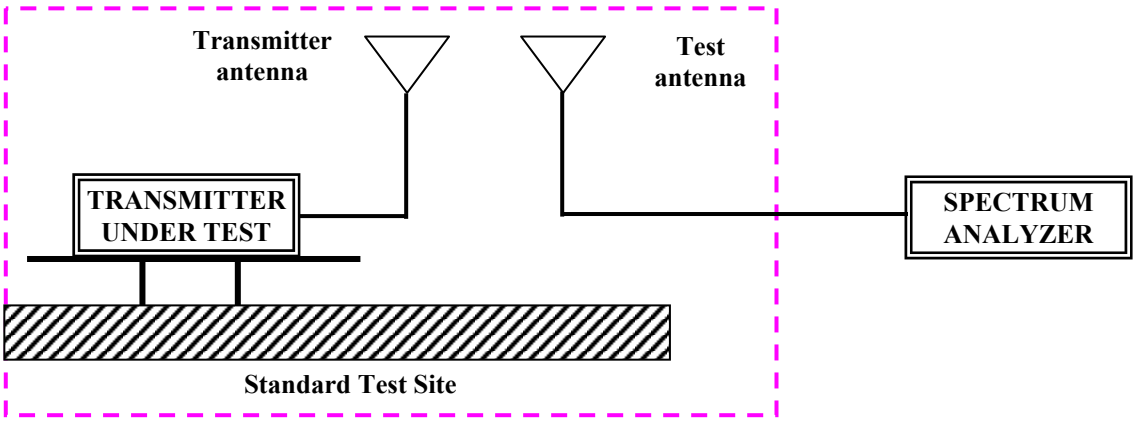
Chapter 4 Power Output Measurement

4.1 Rules and Specification Limits

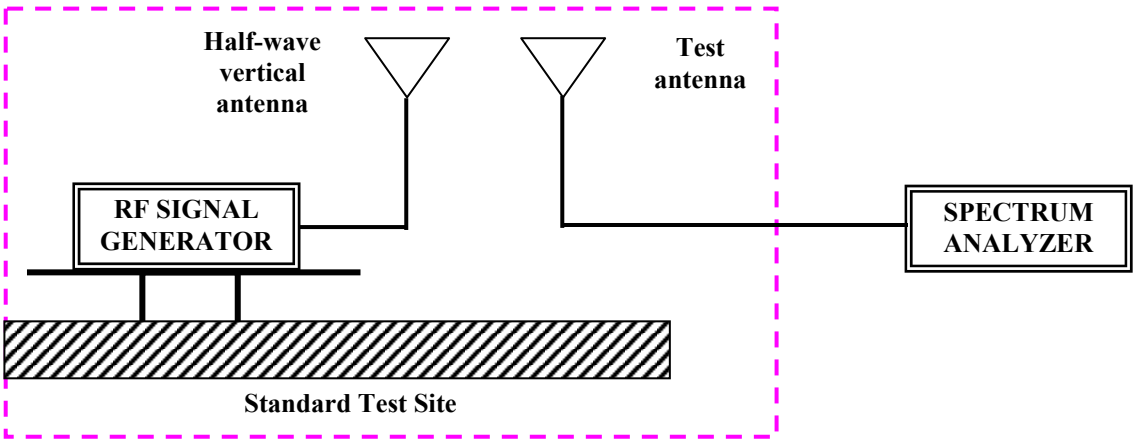
2.1046(a), ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.1.

95.639 (d): No FRS unit, under any condition of modulation, shall exceed 0.5W effective radiated power (ERP).

4.2 Test condition and setup



1. Measurement was made on anechoic chamber. 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. Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.
3. Raise and lower the test antenna from 1m to 4m with the transmitter facing the antenna and record the highest received signal.
4. Repeat step (3), the transmitter shall then rotated trough 360° in the turn-table, until a maximum signal level is detected by the measuring receiver.



5. Replace the transmitter under test with a half-wave vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output and record value.

6. FI_a(dBm) = FI_r (dBm) – Corrected (dB)
   Corrected (dB) = AF(dB) + [CL(dB) – AG] + Switching Box Loss
   FI_a : Actual Field Intensity
   FI_r : Reading of the Field Intensity
   AF : Antenna Factor
   CL : Cable Loss
   AG : Amplitude Gain

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

4.3 Test condition and setup

Calibration Date

Instrument Name	Model	Brand	Serial No.	Next time
EMI Receiver	8546A	HP	3520A00242	06/01/06
RF Filter Section	85460A	HP	3448A00217	06/01/06
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	08/17/06
Pre-amplifier	PA1F	TRC	1FAC	05/20/06
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	05/20/06
Coaxial Cable (Double shielded, 15 meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	05/20/06
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	05/20/06

4.4 Measurement Result

Channel	*Frequency (MHz)*	*A. P. (H/V)*	*A.H. (m)*	*Amplitude (dBμV/m)*	*E. R. P (mW)*
01	462.5625	H	1.00	97.39	1.64
		V	1.00	96.78	1.43
14	467.7125	H	1.00	94.75	0.90
		V	1.00	97.49	1.68

Note:

1. A. P. means antenna polarization, horizontal and vertical.
2. A. H. means antenna height.
3. Table means turntable turning position.
4. Amplitude means the fundamental emission measured.
5. The maximum field measured is 97.49 dBμV/m

   FI (Volt) = $10^{97.49/20}$ X 10^{-6} = 0.07490V

   FI (W) = $(0.07490 \text{ X } 3)^2 / 30$ = 1.68 mW

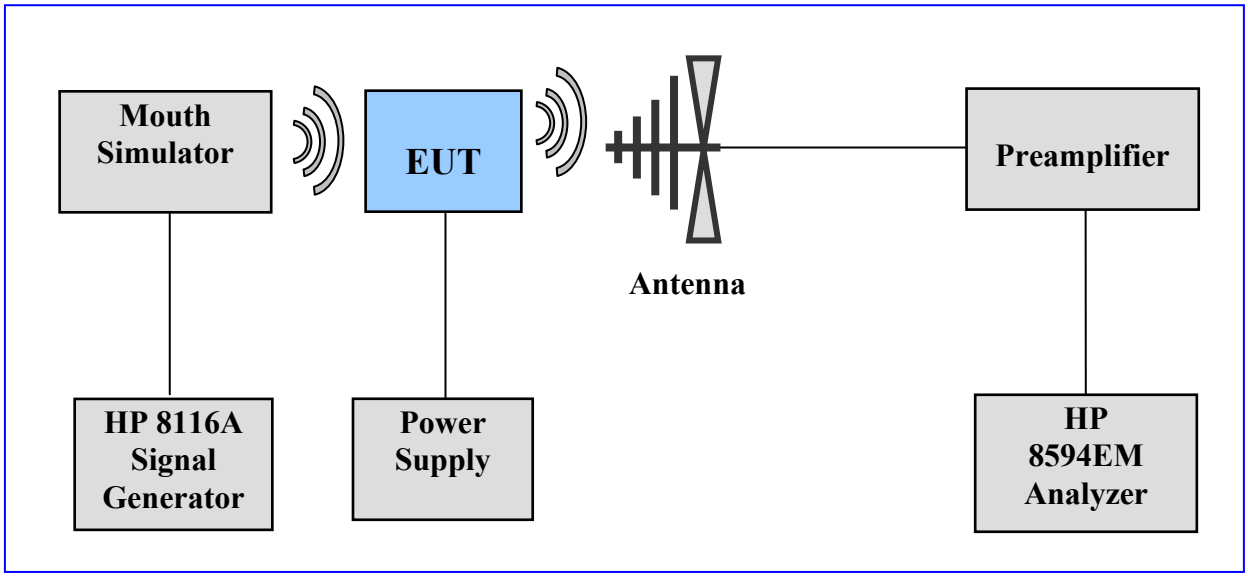
Chapter 5 Modulation Characteristics Measurement

5.1 Rules and Specification Limits

2.1047 (a), ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.6.
Voice modulated communication equipment

2.1047 (b), ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.3.
Equipment which employs modulation limiting

5.2 Test Configuration & List of Test Instruments



5.3 List of test instrument

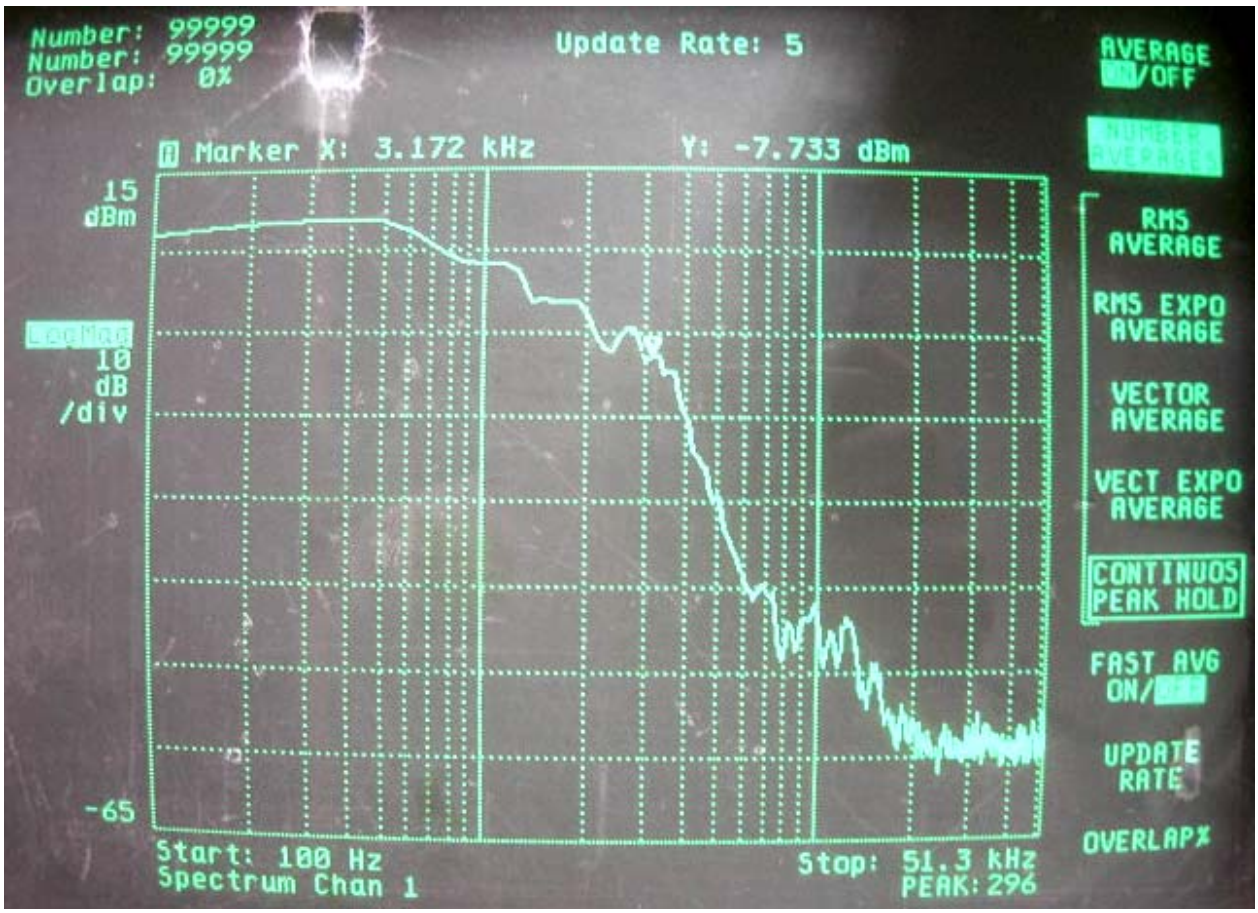
Manufacturer	Device	Model No.	Input Impedance
HP	Dynamic Signal Analyzer	HP35660A	50
HP	Signal Generator 50 MHz	HP8116A	50
SCHAFFNER	Bi-log Antenna	CBL6141A	50
Farnell	Modulation Meter	AMM2000	50
TRC	Preamplifier	TRC001	50
ANRITSU	Spectrum Analyzer	MS2665C	50

5.4 Frequency Response of Audio Modulation Circuit and Low Pass Filter Measurement Condition & Setup

2.1047 (a)

1. The EUT and test equipment were set up as shown on the Section 5.2.
2. The Plus/Function generator was connected to the microphone of EUT, via an artificial mouth simulator.
3. The audio signal input was adjusted to obtain 50% modulation at 1kHz.
4. With input levels held constant and below limiting at all frequencies, the generator was varied from 100Hz to 51.3kHz, 1kHz to 103.4kHz
5. The response in dBm relative to 1kHz was then measured, using the HP 35660A Dynamic Signal Analyzer as follow page.

100Hz to 51.3kHz



1kHz to 103.4kHz

5.5 Modulation Limiting Measurement Condition & Setup

2.1047 (b)

1. The Plus/Function generator was connected to the microphone of EUT, via an artificial mouth simulator.
2. The modulation response was measured for each of following frequencies: 300Hz, 1kHz, 2.5kHz, 3.0kHz
3. The input level was varied from 30% modulation to at least 20dB 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 5.1 and Chart 5.2

Chart 5.1 Modulation Limiting Measuerment Negative

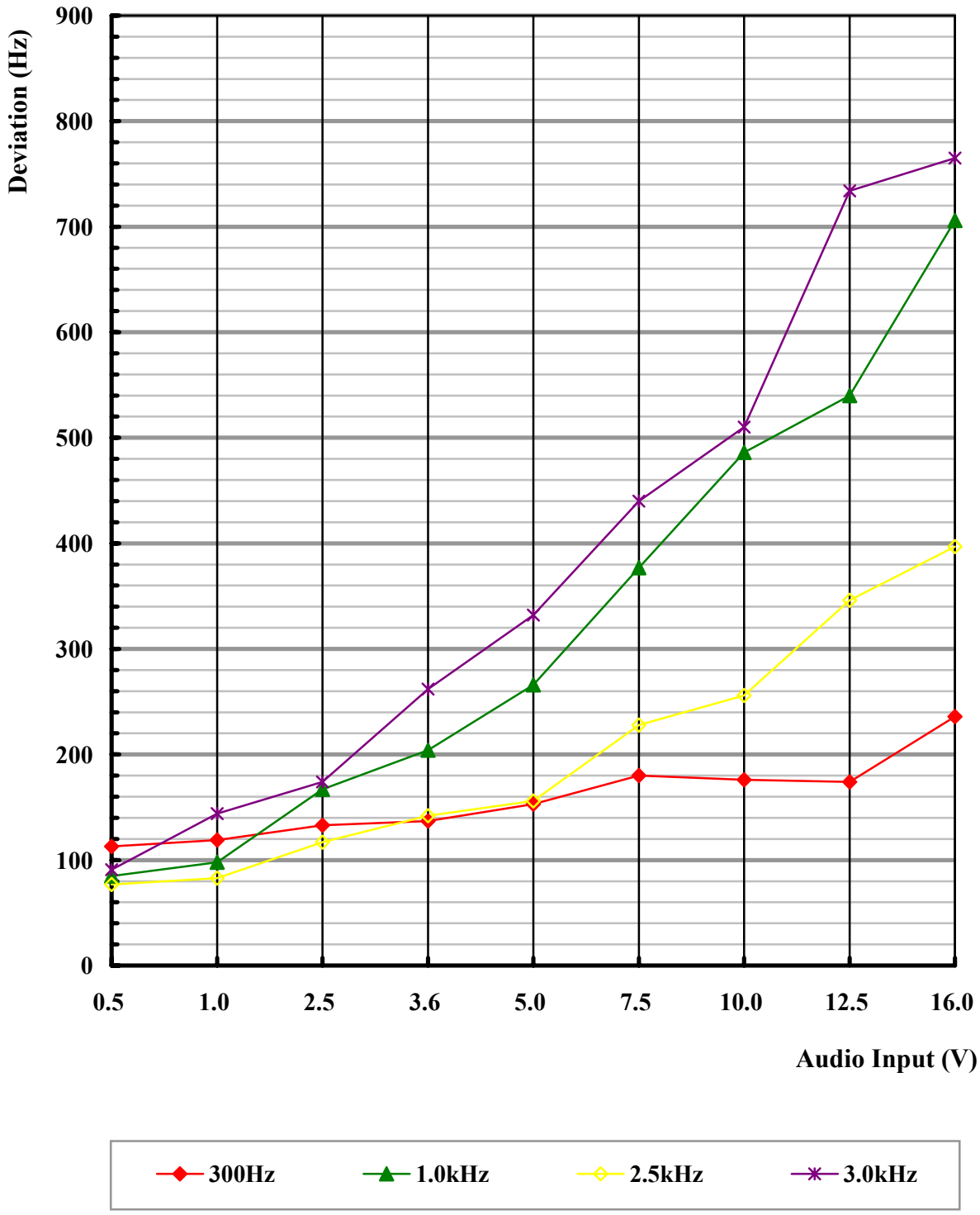
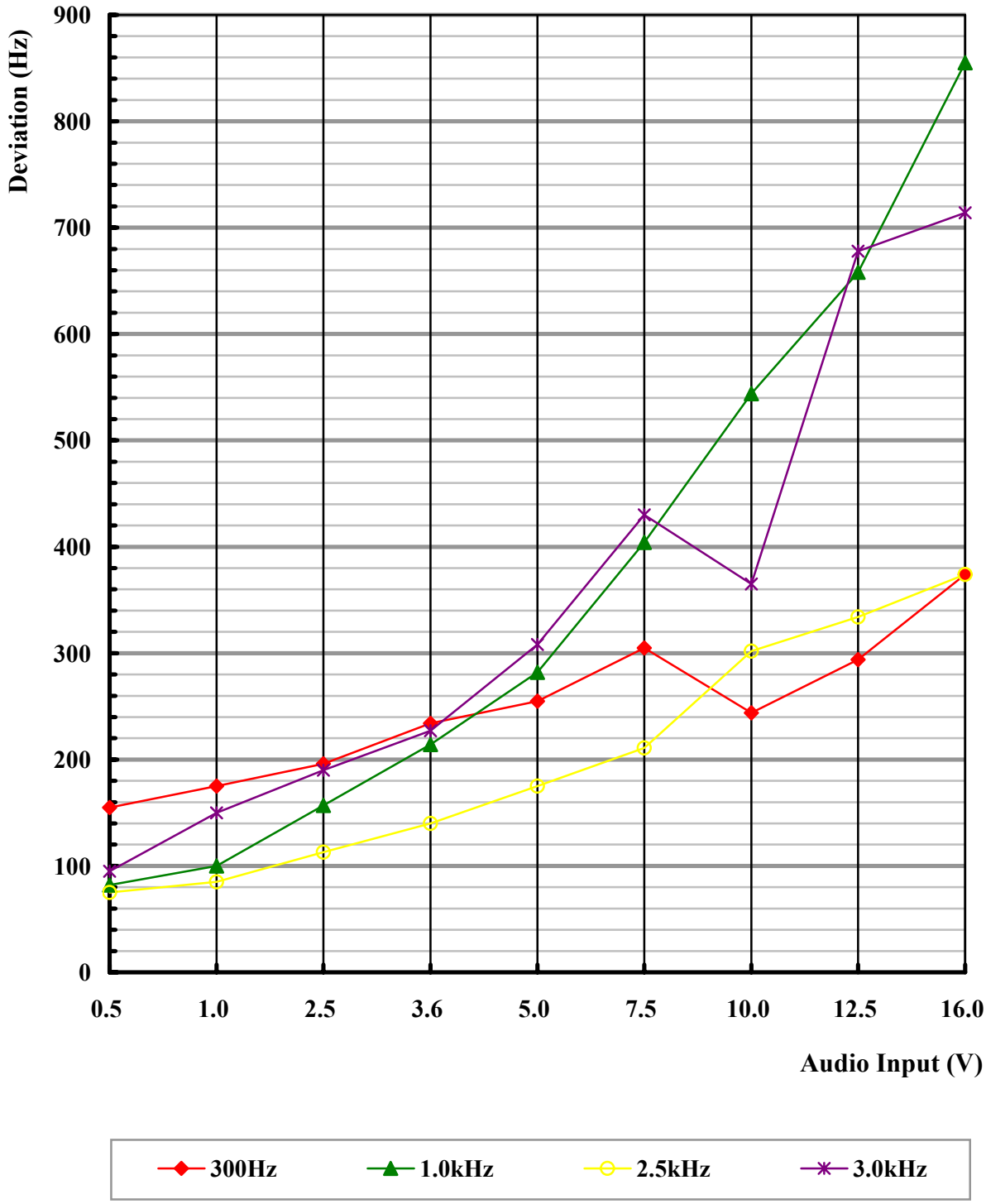


Chart 5.2 Modulation Limiting Measuerment Positive



Chapter 6 Occupied Bandwidth Measurement

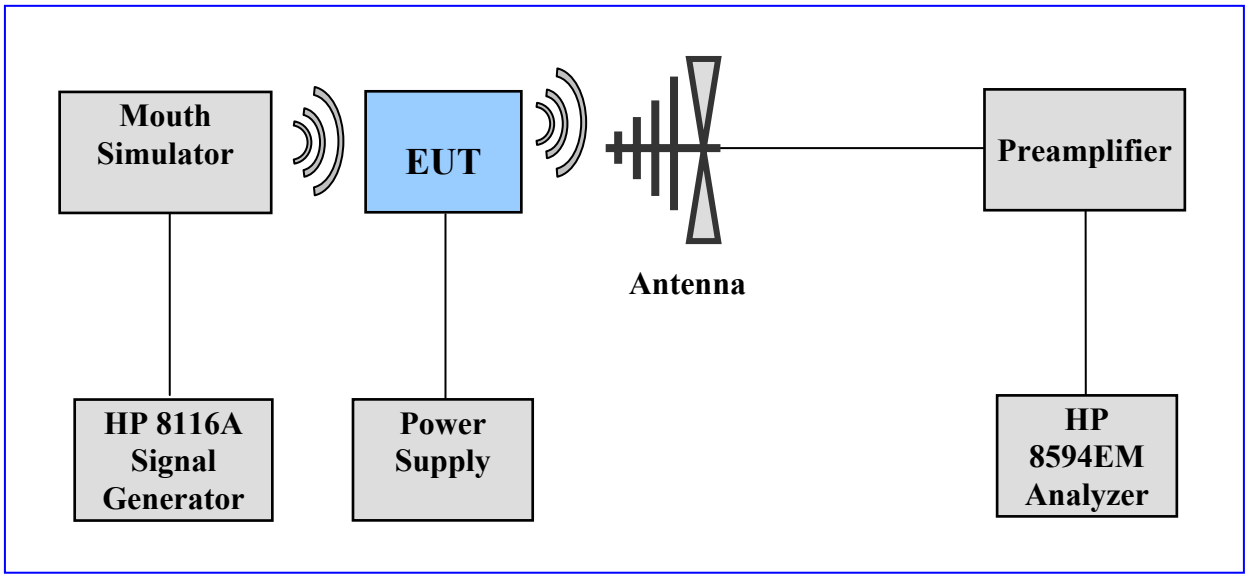
6.1 Rules and Specification Limits

2.1049(c)(1): ANSI/ TIA / EIA-603-1992, Paragraph 2.2.11.

95.633(a): The authorized bandwidth (maximum permissible bandwidth of a transmission) for emission type H1D, J1D, R1D, H3E, J3E or R3E is 4kHz.

95.633(c): The authorized bandwidth for emission type F3E or F2D transmitted by a FRS unit is 12.5kHz.

6.2 Test Configuration & List of Test Instruments



6.3 List of test Instrument

Instrument Name	Model No.	Brand	Input Impedance
Spectrum analyzer (9K~1.8GHz)	8594EM	HP	50
Spectrum analyzer (9K~1.8GHz)	8564E	HP	50
Preamplifier (30MHz~1GHz)	TRC001	TRC	50
Signal Generator 50 MHz	HP8116A	HP	50
Bi-log Antenna	CBL6141A	SCHAFFNER	50
Spectrum Analyzer	MS2665C	ANRITSU	50

6.4 Measurement Procedure

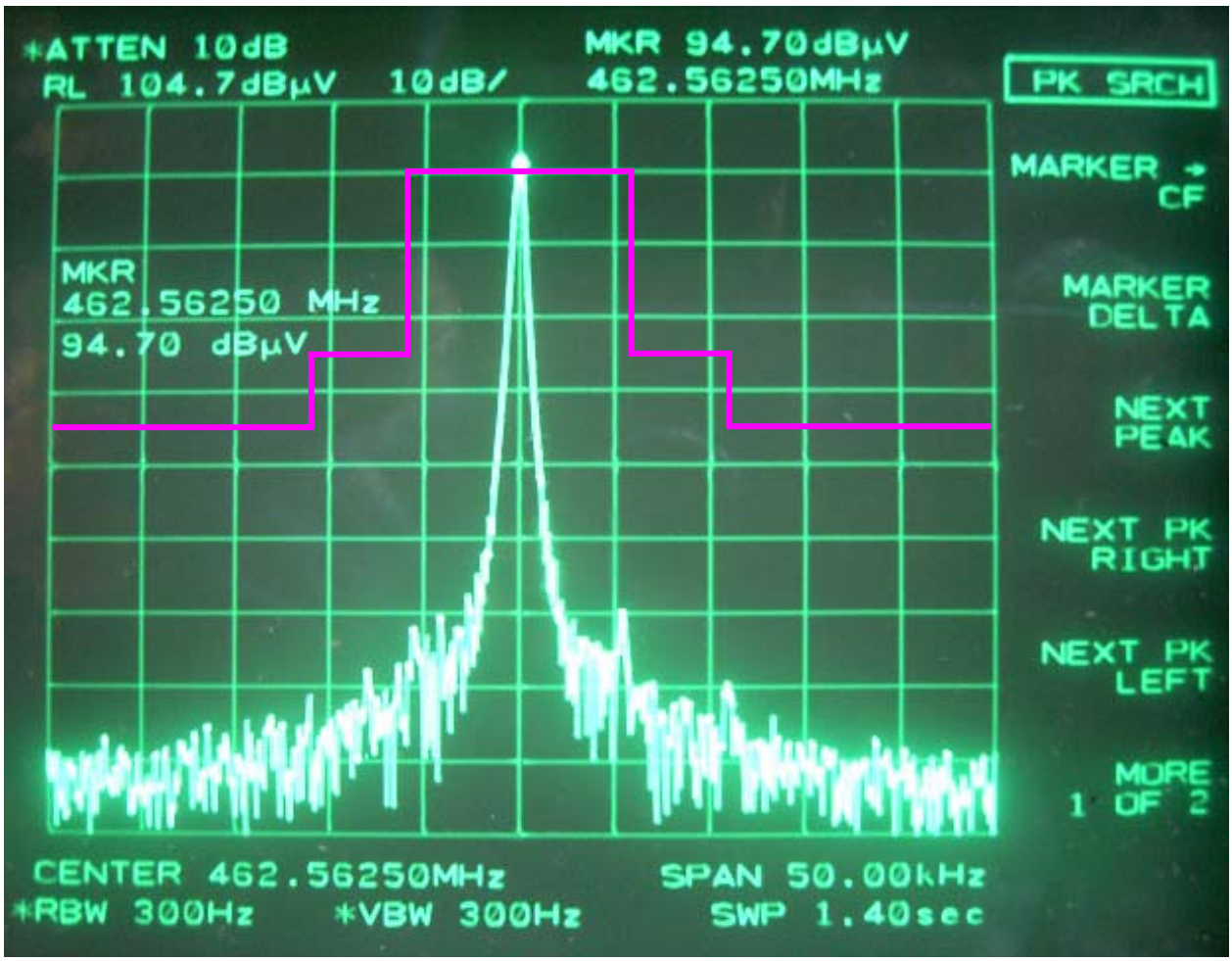
1. Connect the EUT as Section 5.2 .
2. Plot the unmodulated chart shows on spectrum.
3. Set the output of the signal generator to 300Hz, 1.0kHz, 2.5kHz, and 3.0kHz. Increase the amplitude of the signal, while monitoring the modulation meter. Until modulation is maximum measure the bandwidth under 25dB compared to the unmodulated fundamental carrier peak level of the modulated signal displayed on the spectrum analyzer.
4. The occupied Bandwidth was measured as follow pages.

6.5 Measurement Result

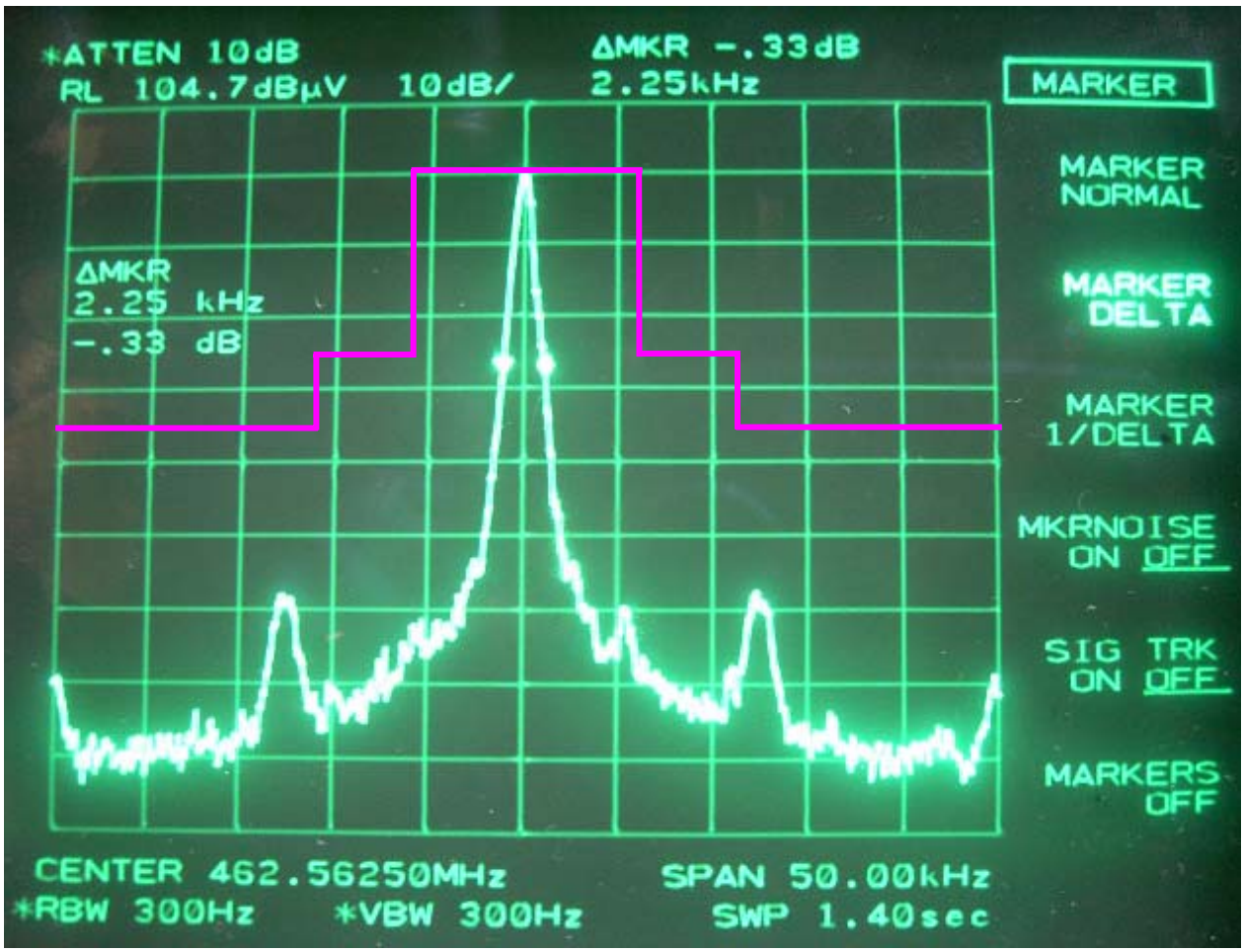
The occupied bandwidth's plot is presented on following pager, which illustrates compliance with the rules.

Calculation of Necessary Bandwidth (Bn)
Bn = 2M + 2D
M = Max. Modulation Frequency => 3.0kHz
D = Peak Frequency Deviation => 0.855kHz (Chart 5.2, Page-21)
K = 1
Bn = 7.71kHz

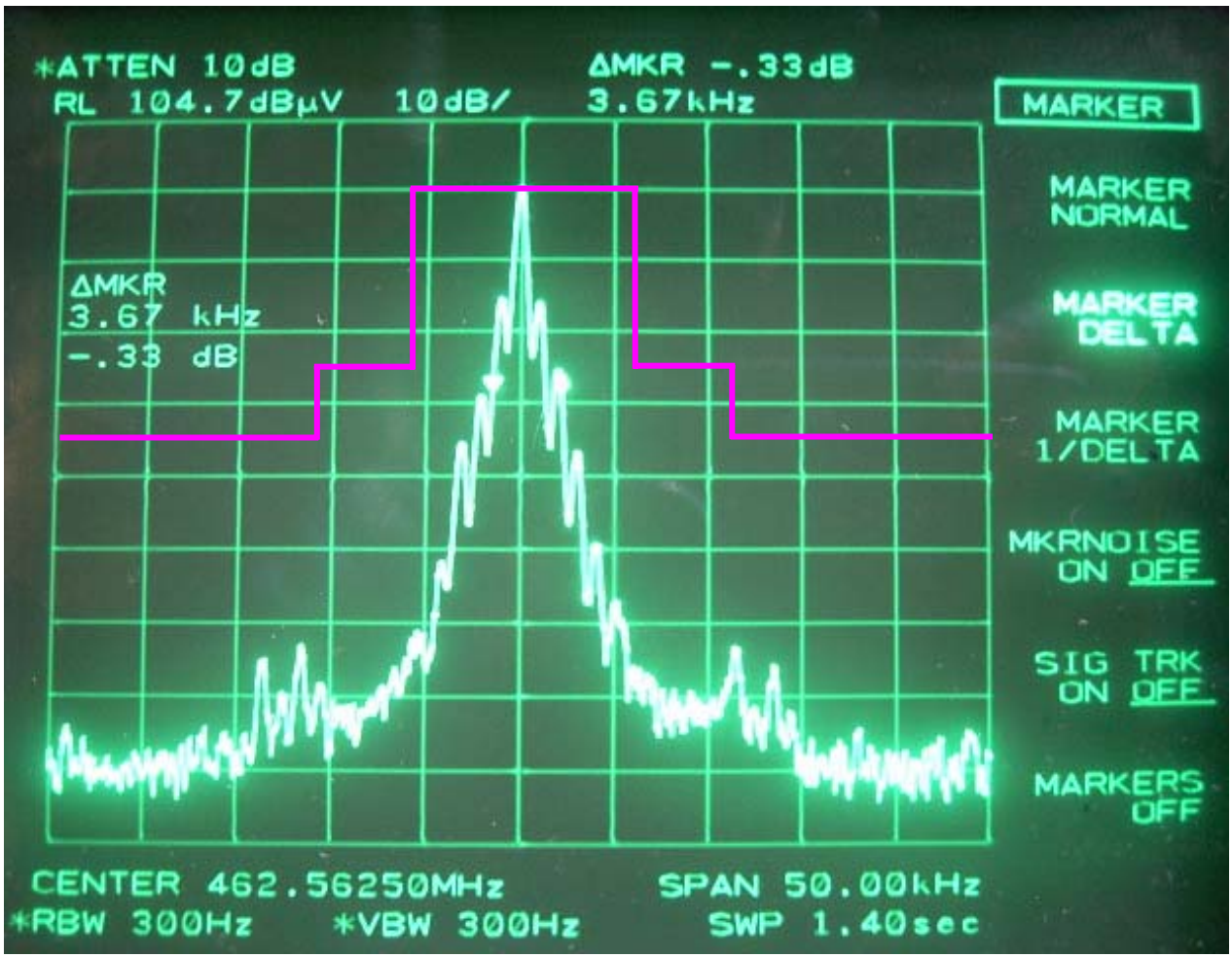
Unmodulation



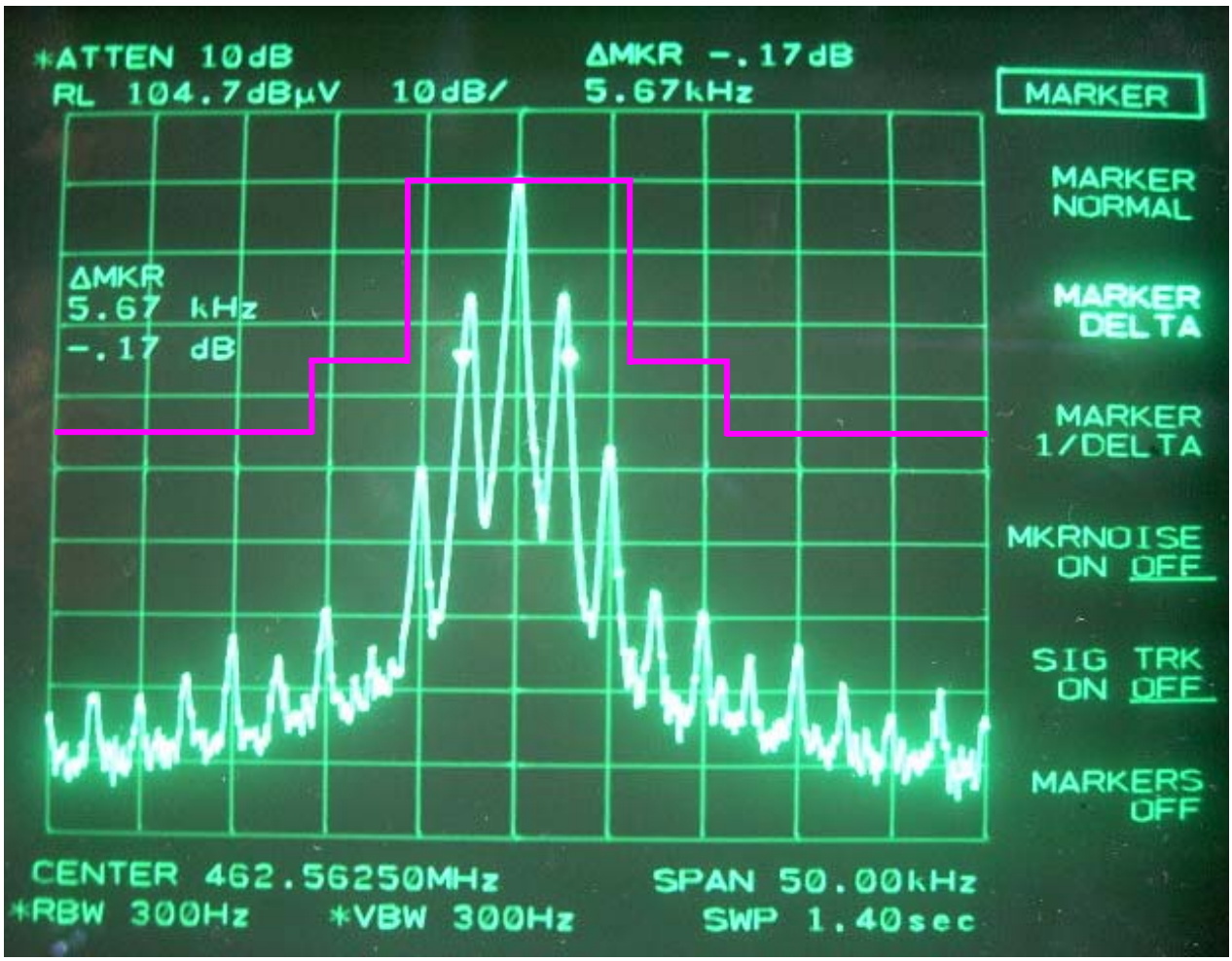
300Hz modulation



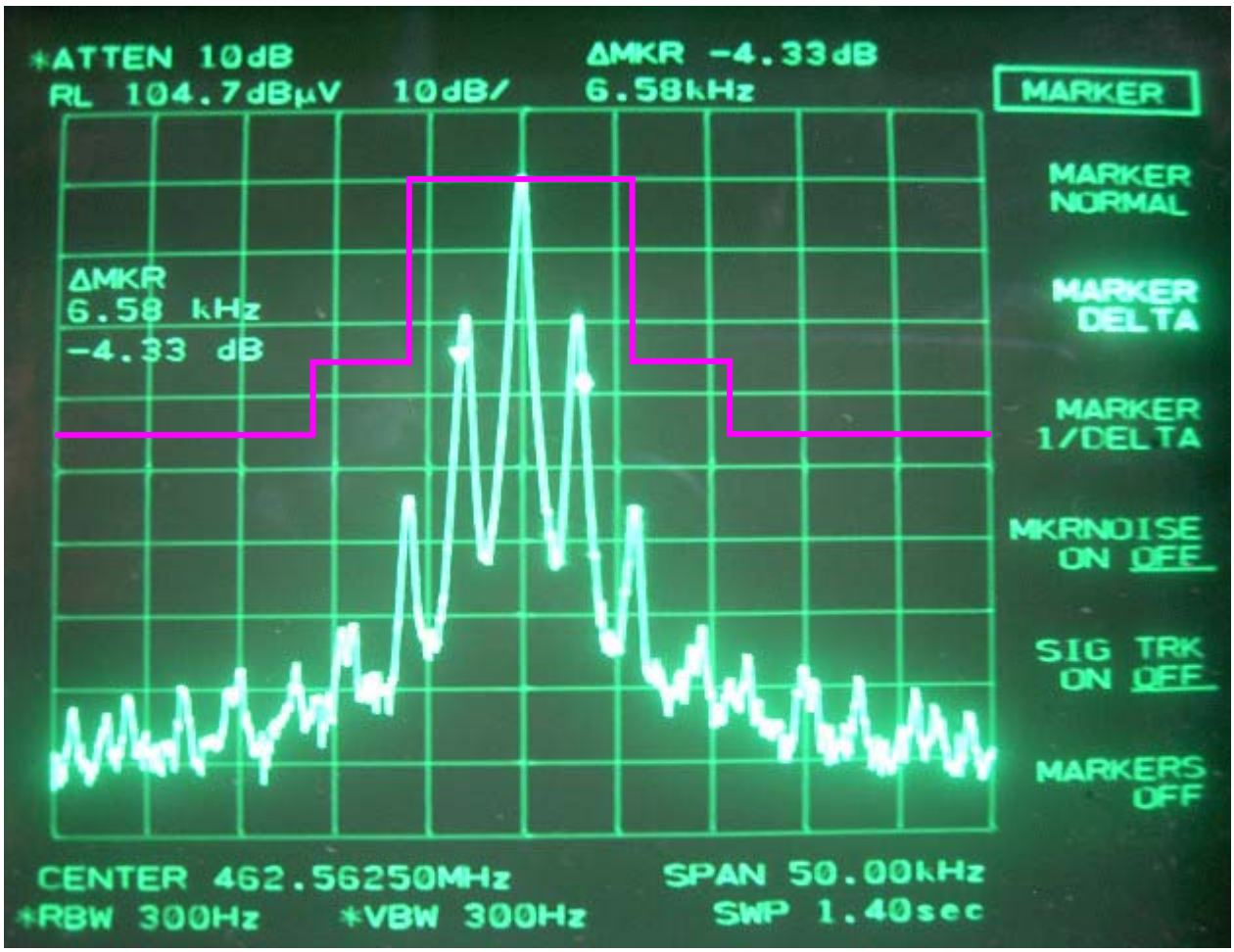
1.0kHz modulation



2.5kHz modulation



3.0kHz modulation



Chapter 7 Field Strength of Spurious Radiation Measurement

7.1 Rules and Specification Limits

2.1053(a): ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.12

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.

95.635(b)(1):

At least 25dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

95.635(b)(3):

At least 35dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

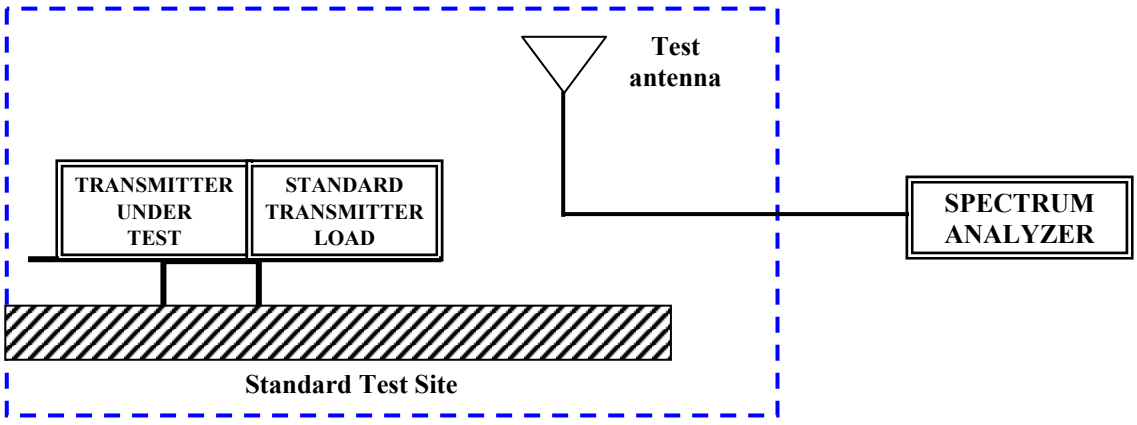
95.635(b)(7):

Spurious and harmonics must be at least 43 + 10 $\log_{10}$ (Output Power)dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

2.1057:

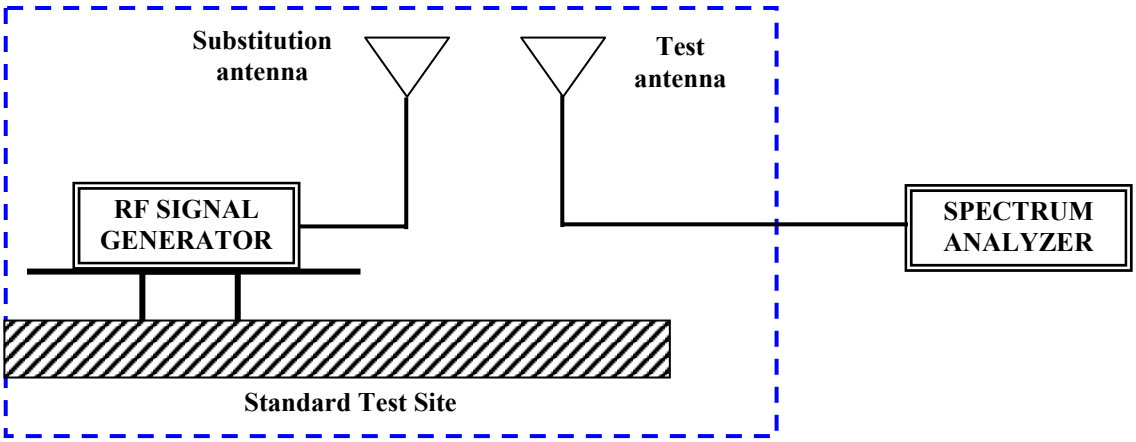
In all measurements set forth, the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10^{th} harmonic of the carrier frequency.

7.2 Measurement Condition & Setup



1. Connect the equipment as illustrated.
2. Adjust the spectrum analyzer for the following setting:
   a) Resolution Bandwidth ≦ 3kHz
   b) Video Bandwidth ≧ 10kHz
   c) Sweep Speed ≦ 2000Hz /second
   d) Detector mode = Positive Peak

3. Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load, which is placed on the turntable. The RF cable to this load should be of minimum length.
4. For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. The length may be determined form a calibration ruler supplied with the equipment. Measurements shall be made form the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ±the test bandwidth (see section 1.3.4.4)
5. For each spurious frequency, raise and lower the test antenna from 1m to 4m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360º to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
6. Repeat step (5) for each spurious frequency with the test antenna polarized vertically.



7. Reconnect the equipment as illustrated.
8. Keep the spectrum analyzer adjusted as in step (2)

9. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3m above the ground.

10. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

11. Repeat step (10) with both antennas vertically polarized for each spurious frequency.

12. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps (10) and (11) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to and ideal half-wave dipole antenna.

13. The levels record in step (12) are the absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

    Radiated spurious emissions (dB) =

$$10 \log_{10} \left[\frac{\text{TX power in watts}}{0.001} \right] - \text{the levels in step (12)}$$

7.3 List of Measurement Instruments

				Calibration Date
Instrument Name	**Model**	**Brand**	**Serial No.**	**Next time**
EMI Receiver	8546A	HP	3520A00242	06/01/06
RF Filter Section	85460A	HP	3448A00217	06/01/06
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	08/17/06
Pre-amplifier	PA1F	TRC	1FAC	05/20/06
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	05/20/06
Coaxial Cable (Double shielded, 15 meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	05/20/06
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	05/20/06
Spectrum Analyzer	8564E	HP	3720A00840	11/07/06
Microwave Preamplifier	84125C	HP	US36433002	11/07/06
Horn Antenna	3115	EMCO	9104-3668	03/27/06
Standard Guide Horn Antenna	84125-80008	HP	18-26.5GHz	11/09/06
Standard Guide Horn Antenna	84125-80001	HP	26.5-40GHz	11/09/06
Horn Antenna	1196E (3115)	HP (EMCO)	9704-5178	04/11/06
Pre-amplifier	PA2F	TRC	2F1GZ	06/20/06
Coaxial Cable (3 miter)	A30A30-0058-50FST118	JYEBAO	MSA-05	06/20/06
Coaxial Cable (1 meter)	A30A30-0058-50FST118	JYEBAO	MSA-04	06/20/06

7.4 Measurement Result:

Test Conditions: Testing room : Temperature : 25 °C Humidity : 73 % RH

Test mode: EUT – X plane, Lowest CH – 462.5625MHz (Horizontal)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Power*	*Attenuated below the mean power*	*Minimum attenuation limit*
MHz	**dBm**	**m**	**degree**	**dB**	**dBm**	**dBc**	**dBc**
926.04	-49.19	1.00	58	7.63	-41.56	41.57	13.01
1388.33	-57.66	1.00	310	0.45	-57.21	57.22	
2311.67	-56.16	1.00	181	5.85	-50.31	50.32	
2775.00	-62.66	1.00	35	8.50	-54.16	54.17	
3700.00	-65.99	1.00	98	11.20	-54.79	54.80	

Test mode: EUT – Y plane, Lowest CH – 462.5625MHz (Vertical)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Power*	*Attenuated below the mean power*	*Minimum attenuation limit*
MHz	**dBm**	**m**	**degree**	**dB**	**dBm**	**dBc**	**dBc**
926.04	-49.49	1.00	48	7.63	-41.86	41.26	12.40
1388.33	-61.99	1.00	60	0.45	-61.54	60.94	
2311.67	-53.49	1.00	189	5.85	-47.64	47.04	
2775.00	-61.32	1.00	175	8.50	-52.82	52.22	
3700.00	-65.82	1.00	277	11.20	-54.62	54.02	

Note:

1. Corrected Amplitude = Reading Amplitude + Correction Factors

2. The maximum field measured is 0.01 dBm [Page-14]

Attenuated below the mean power = Power – Corrected Power

{ For example: 0.01 – (-41.56) = 41.57 dBc }

3. Attenuation required = 43 + 10 log (1.003 mW) = 13.01

Test mode: EUT – Z plane, Highest CH – 467.7125MHz (Horizontal)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Power*	*Attenuated below the mean power*	*Minimum attenuation limit*
MHz	**dBm**	**m**	**degree**	**dB**	**dBm**	**dBc**	**dBc**
935.74	-48.40	1.00	204	7.98	-40.42	37.79	10.37
1403.33	-57.49	1.00	348	0.39	-57.10	54.47	
2338.33	-56.49	1.00	138	5.99	-50.50	47.87	
2805.00	-62.32	1.00	137	8.62	-53.70	51.07	
3741.67	-65.83	1.00	184	11.37	-54.46	51.83	

Test mode: EUT – Y plane, Highest CH – 467.7125MHz (Vertical)

Frequency	*Reading Amplitude*	*Ant. Height*	*Table*	*Correction Factors*	*Corrected Power*	*Attenuated below the mean power*	*Minimum attenuation limit*
MHz	**dBm**	**m**	**degree**	**dB**	**dBm**	**dBc**	**dBc**
935.74	-47.69	1.00	41	7.98	-39.71	39.82	13.11
1403.33	-62.16	1.00	178	0.39	-61.77	61.88	
2338.33	-54.99	1.00	182	5.99	-49.00	49.11	
2805.00	-62.99	1.00	197	8.62	-54.37	54.48	
3741.67	-65.49	1.00	133	11.37	-54.12	54.23	

Note:

1. **Corrected Amplitude = Reading Amplitude + Correction Factors**
2. **The maximum field measured is 0.11 dBm**
   Attenuated below the mean power = Power – Corrected Power
   { For example: 0.11 – (-39.71) = 39.82 dBc }
3. **Attenuation required = 43 + 10 log (1.03mW) = 13.11**

Chapter 8 Frequency Stability Tolerance Measurement

8.1 Rules and Specification Limits

2.1055, ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.2 .

95.627(b):

Each FRS unit must be maintained within a frequency tolerance of 0.00025%.

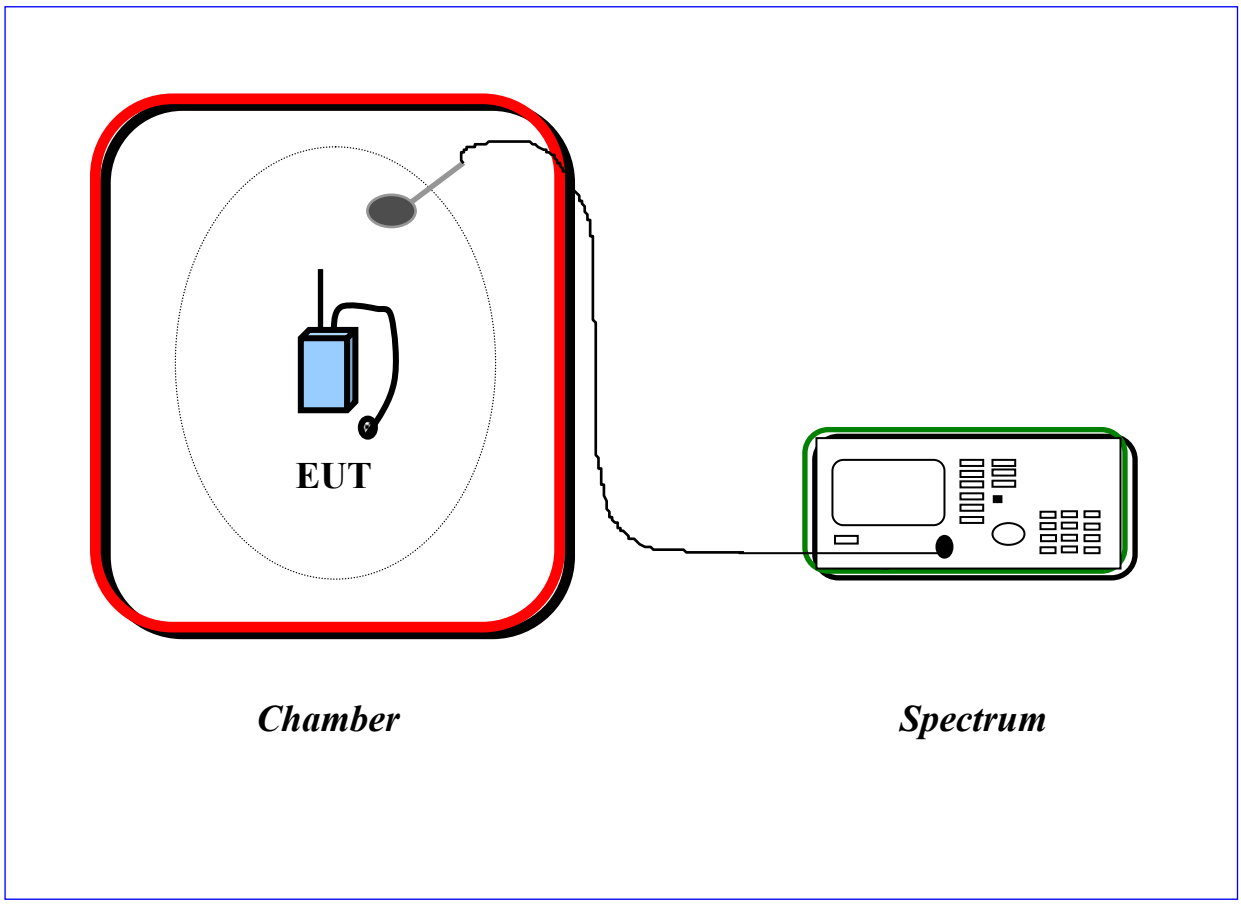
8.2 Measurement Condition & Setup with Temperature Variation

1. Place the EUT in the chamber, powered in its normal operation.
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.

8.3 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.	

8.4 Measurement Configuration of Temperature Variation Test



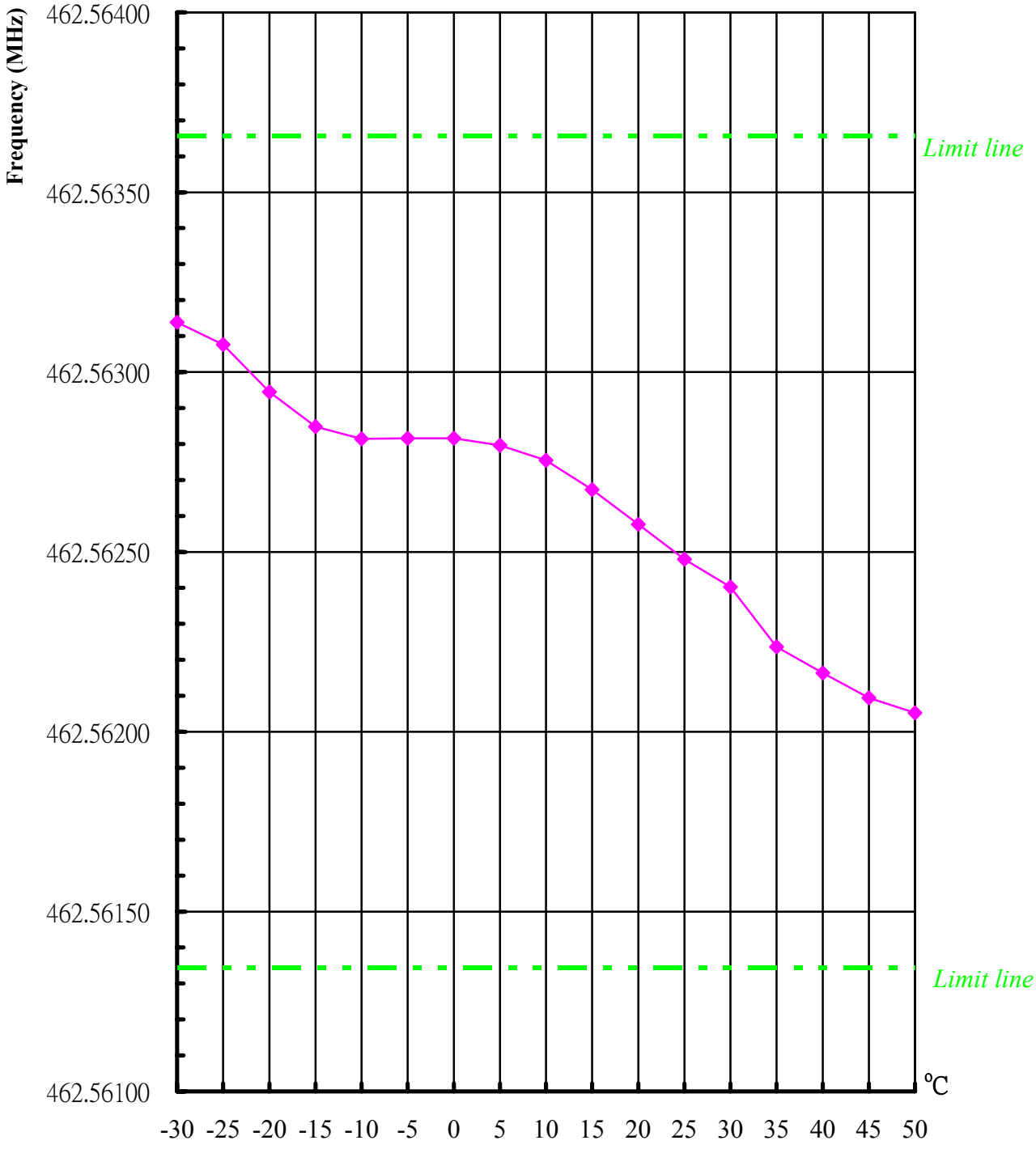
8.5 Measurement Result with Temperature Variation

A plot and table is presented which illustrates compliance with the rule where the center frequency is 462.5625MHz.

Temperature Variation Table

Temperature (Centigrade)	*Frequency (MHz)*	*Tolerance (MHz)*
-30	462.563139	
-25	462.563076	
-20	462.562945	
-15	462.562848	
-10	462.562815	
-5	462.562815	
0	462.562816	462.561344
5	462.562796	
10	462.562755	To
15	462.562673	
20	462.562577	462.563656
25	462.562480	
30	462.562402	
35	462.562236	
40	462.562164	
45	462.562094	
50	462.562053	

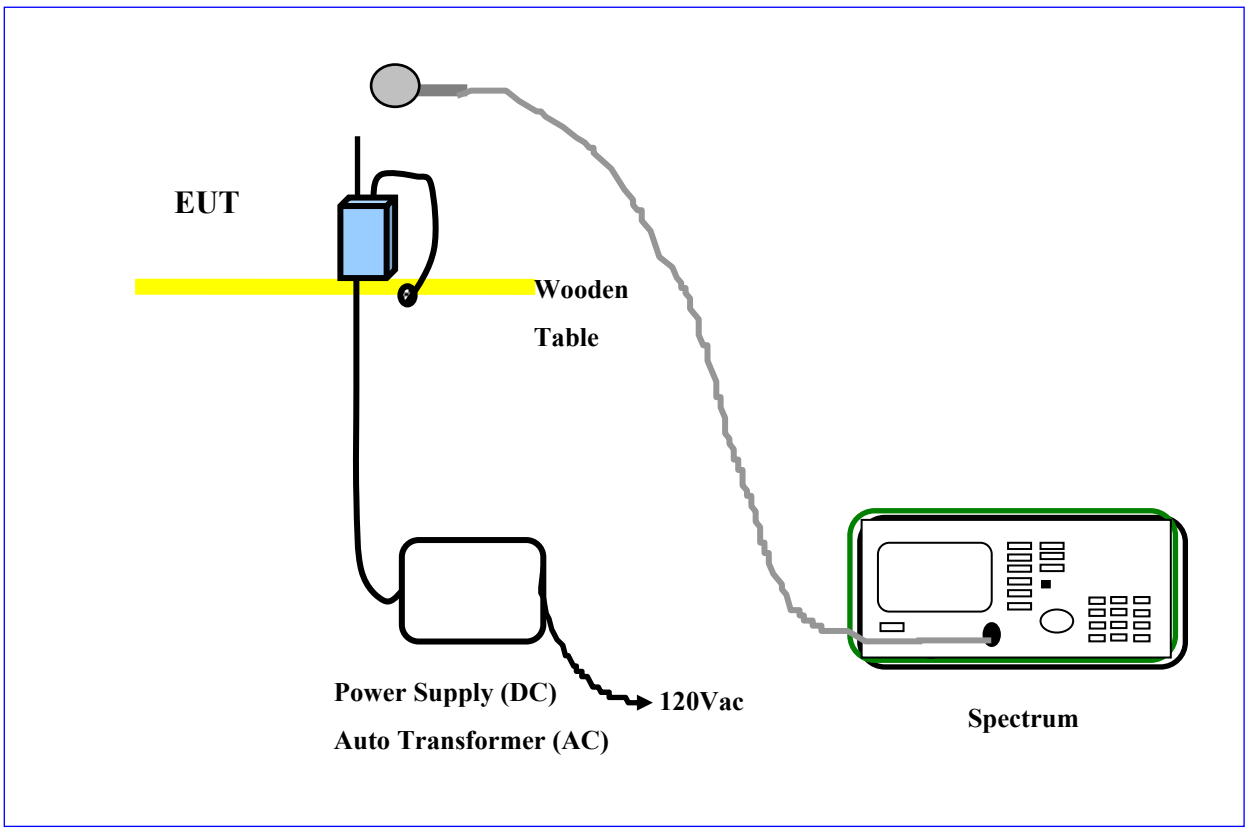
Chart 8.1 Temperatuer Variation Vs. Frequency



8.6 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.

8.7 Configuration of Voltage Variation Test



8.8 Measurement Result with Voltage Variation

Frequency Stability of Voltage Variation Measurement Table

Supply Voltage (Volt)	*Frequency (MHz)*	*Tolerance (MHz)*
3.145 (85%)	EUT shutdown operated.	462.561344
3.700 (100%)	462.562480	to
4.255 (115%)	462.562449	462.563656

Endpoint Voltage (Volt)
3.487