



NVLAP LAB CODE 200707-0



# FCC PART 95 MEASUREMENT AND TEST REPORT

For

**The Hear Now Inc.**

#117,10836-24 Street SE Calgary, AB, T2Z 4C9, Canada.

**FCC ID: VPBTHN1D**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> FRS/GMRS
<b>Test Engineer:</b>	William Chan <i>William Chan</i> Merry Zhao <i>Merry Zhao</i>
<b>Report No.:</b>	RSZ07060104
<b>Test Date:</b>	2007-06-14 to 2007-11-15
<b>Report Date:</b>	2007-11-15
<b>Reviewed By:</b>	EMC Manager: Boni Baniqued <i>Boni Baniqued</i>
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**Note:** This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *The Hear Now Inc*'s product, model number: *THN1D* or the "EUT" as referred to in this report is a *FRS/GMRS*. The EUT is measured approximately 6.0 cm L x 2.5 cmW x 12.5 cmH, rated input voltage: DC 3.7 V Battery, with permanent Antenna 2.5 cm.

*\* The test data gathered are from production sample, serial number: 0706004 provided by the manufacturer, we received the EUT on 2007-06-01.*

### Objective

This Type approval report is prepared on behalf of *The Hear Now Inc* in accordance with Part 2, Subpart J, and Part 95 of the Federal Communication Commissions rules.

### Related Submittal(s)/Grant(s)

No related submittal(s).

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart A, B and Subpart E of the Federal Communication Commissions rules.

All emissions measurement was performed and Bay Area Compliance Laboratory Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179 and Industrial Canada registration test site No.: 5500A. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

### Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

### Configuration of Test Setup



Lie

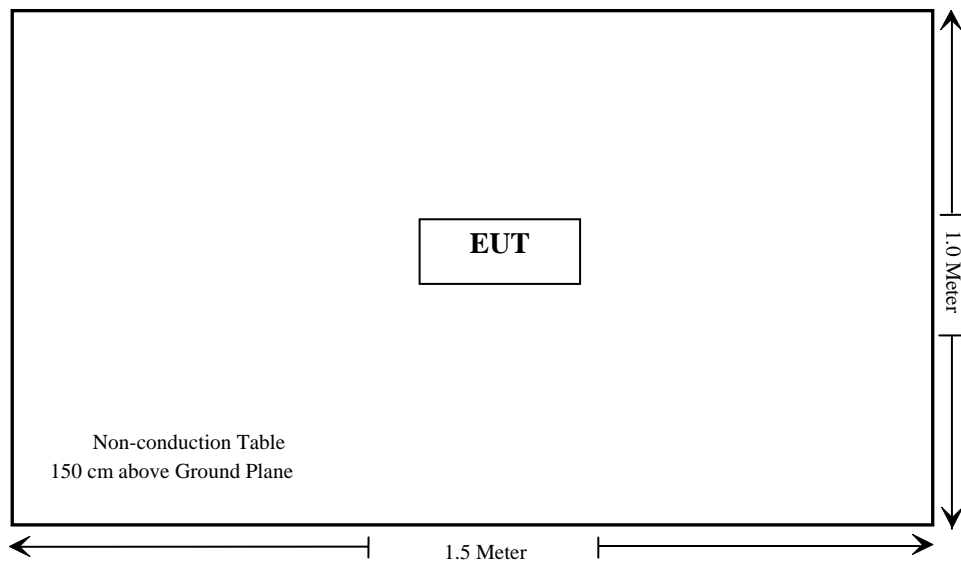


Side



Stand

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§2.1093 & §1.1307(b)(1)	RF Exposure	Compliant
§2.1046, §95.639(d)	RF Output Power	Compliant
§2.1047 §95.637(a)	Modulation Characteristic	Compliant
§2.1049 §95.633 (a)(c)	Occupied Bandwidth and Emission Mask	Compliant
§2.1053 §95.635(b) (7)	Radiated Spurious Emissions	Compliant
§ 2.1055, § 95.627(b) & § 95.621	Frequency stability	Compliant

## §2.1093 & §1.1307(b) (1) RF EXPOSURE

### Standard Applicable

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to FCC Exclusion list, In the following table, fGHz is mid-band frequency in GHz, and d is the distance to a person's body, excluding hands, wrists, feet, and ankles.

Exposure category	<u>low threshold</u>	<u>high threshold</u>
general population	$(60/f_{\text{GHz}}) \text{ mW}, d < 2.5 \text{ cm}$ $(120/f_{\text{GHz}}) \text{ mW}, d \geq 2.5 \text{ cm}$	$(900/f_{\text{GHz}}) \text{ mW}, d < 20 \text{ cm}$
occupational	$(375/f_{\text{GHz}}) \text{ mW}, d < 2.5 \text{ cm}$ $(900/f_{\text{GHz}}) \text{ mW}, d \geq 2.5 \text{ cm}$	$(2250/f_{\text{GHz}}) \text{ mW}, d < 20 \text{ cm}$

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

### Measurement Result:

This is a portable device and the Max peak output power is 177.42 mW which is less than the low threshold of  $260 \text{ mW} = (60/0.462 \text{ GHz}) \text{ mW} \times 2$

The SAR measurement is not required.

## **§2.1046 and §95.639(d) - RF OUTPUT POWER**

### **Applicable Standard**

Per FCC §2.1046, and §95.639(d), No FRS Unit, under any condition of modulation, shall exceed a 0.500 w effective radiated power (ERP).

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
HP	Signal Generator	HP8657A	2849U00982	2006-09-29	2007-09-29
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
COM POWER	Dipole Antenna	AD-100	041000	2006-09-25	2007-09-25

**\* Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### **Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =10 lg (TXpwr in Watts/0.001)-the absolute level

**Test Data****Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

*The testing was performed by William Chan on 2007-06-27.*

*Test Mode: Transmitting*

Indicated		Table	Test Antenna		Substituted			Antenna Gain (dBi)	Cable Loss (dB)	FCC Part 95			
Freq. (MHz)	Meter Reading (dBuV)	Angle Degree	Height (m)	Polar H/V	Freq. (MHz)	Level (dBm)	Polar H/V			Absolute Level (dBm)	Absolute Level (Watt)	Limit (Watt)	Comments
462.6375	95.26	0	1.50	V	462.6375	23.52	V	0	3.86	19.66	0.09250	0.5	FRS (Channel 4)
467.6375	97.85	0	1.50	V	467.6375	25.71	V	0	3.87	21.84	0.15275	0.5	FRS (Channel 11)
462.6250	98.32	0	1.50	V	462.6250	26.35	V	0	3.86	22.49	0.17742	5	GMRS (Channel 18)

**Test Result:** Pass



**§2.1047 and §95.637(a) - MODULATION CHARACTERISTIC****Applicable Standard**

§2.1047 &amp; §95.637:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.
- (c) A FRS Unit that transmits emission type F3E must not exceed peak frequency deviation of plus or minus 2.5 kHz.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Modulation Analyzer	8901B	3438A05208	2007-03-01	2008-03-01
NANYAN	Audio Generator	NY2201	019829	2006-12-23	2007-12-23

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

**Test Procedure**

Test Method: TIA/EIA-603 2.2.3

**Test Data****Environmental Conditions**

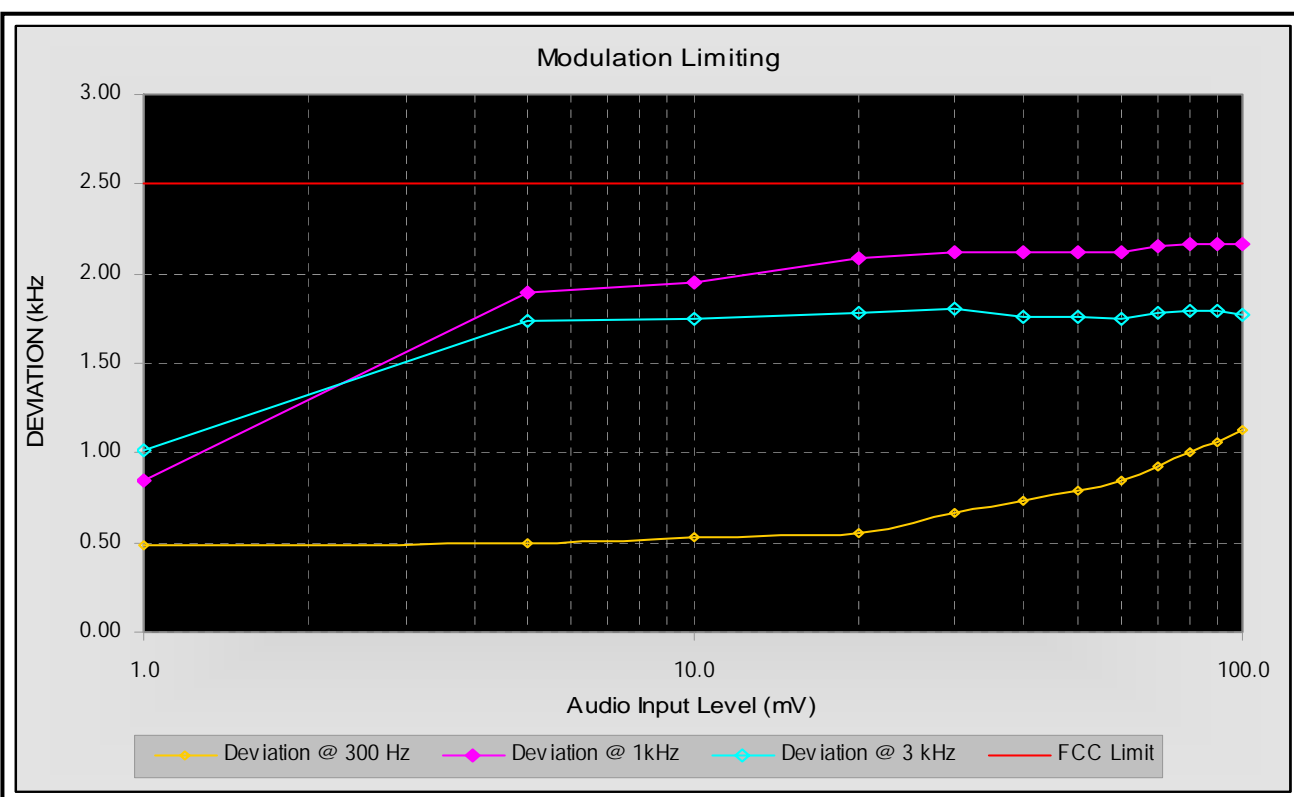
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

*The testing was performed by William Chan on 2007-06-27.*

**Test Result:** Pass*Test Mode: Transmitting*

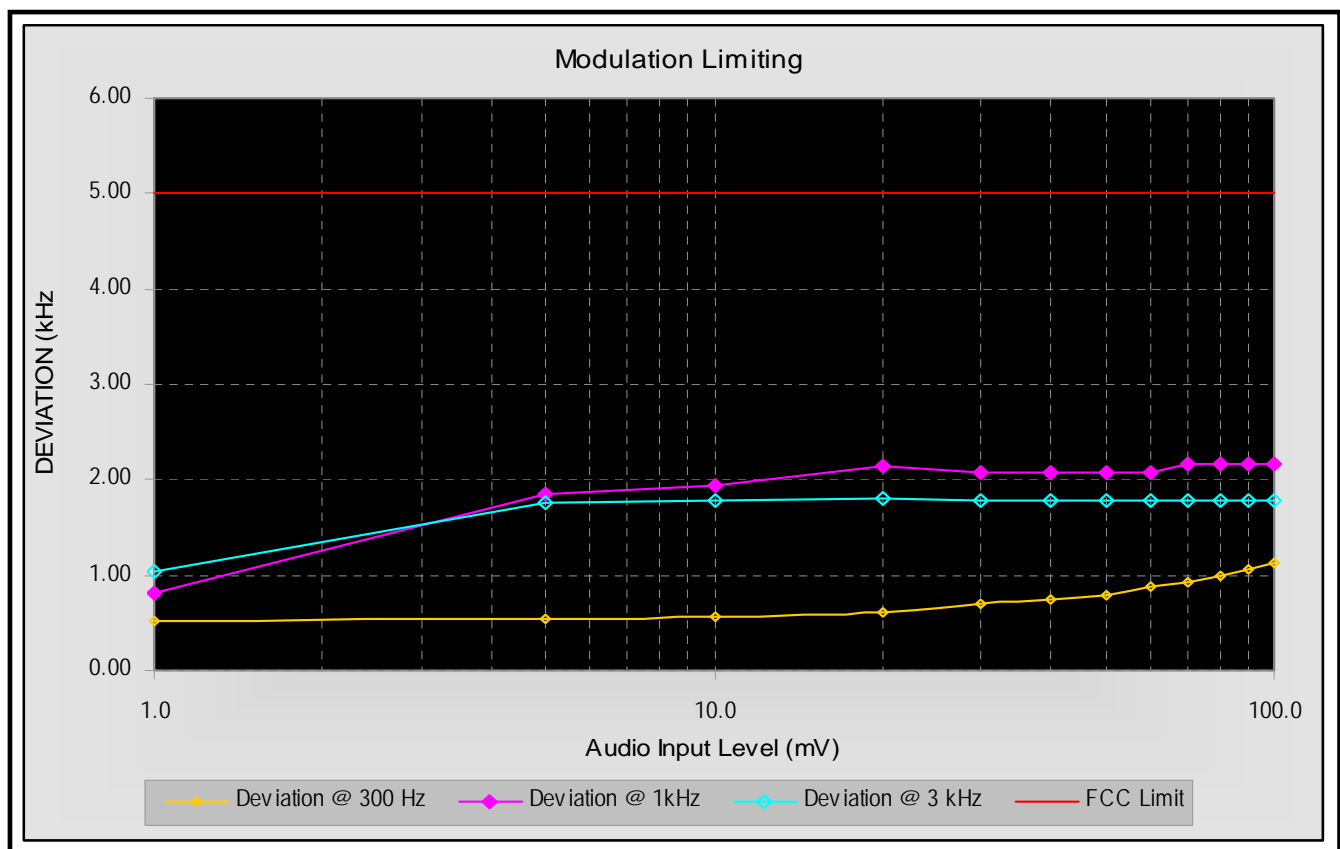
**FRS – Channel 4:**

Audio Input (mV)	300Hz Deviation (kHz)	1kHz Deviation (kHz)	3kHz Deviation (kHz)	FCC Limit (kHz)
1.0	0.49	0.85	1.01	2.5
5.0	0.50	1.89	1.74	2.5
10.0	0.53	1.95	1.75	2.5
20.0	0.55	2.09	1.78	2.5
30.0	0.67	2.12	1.81	2.5
40.0	0.73	2.12	1.76	2.5
50.0	0.79	2.12	1.76	2.5
60.0	0.85	2.12	1.75	2.5
70.0	0.93	2.15	1.78	2.5
80.0	1.00	2.16	1.79	2.5
90.0	1.06	2.16	1.79	2.5
100.0	1.13	2.16	1.77	2.5



**GMRS – Channel 18:**

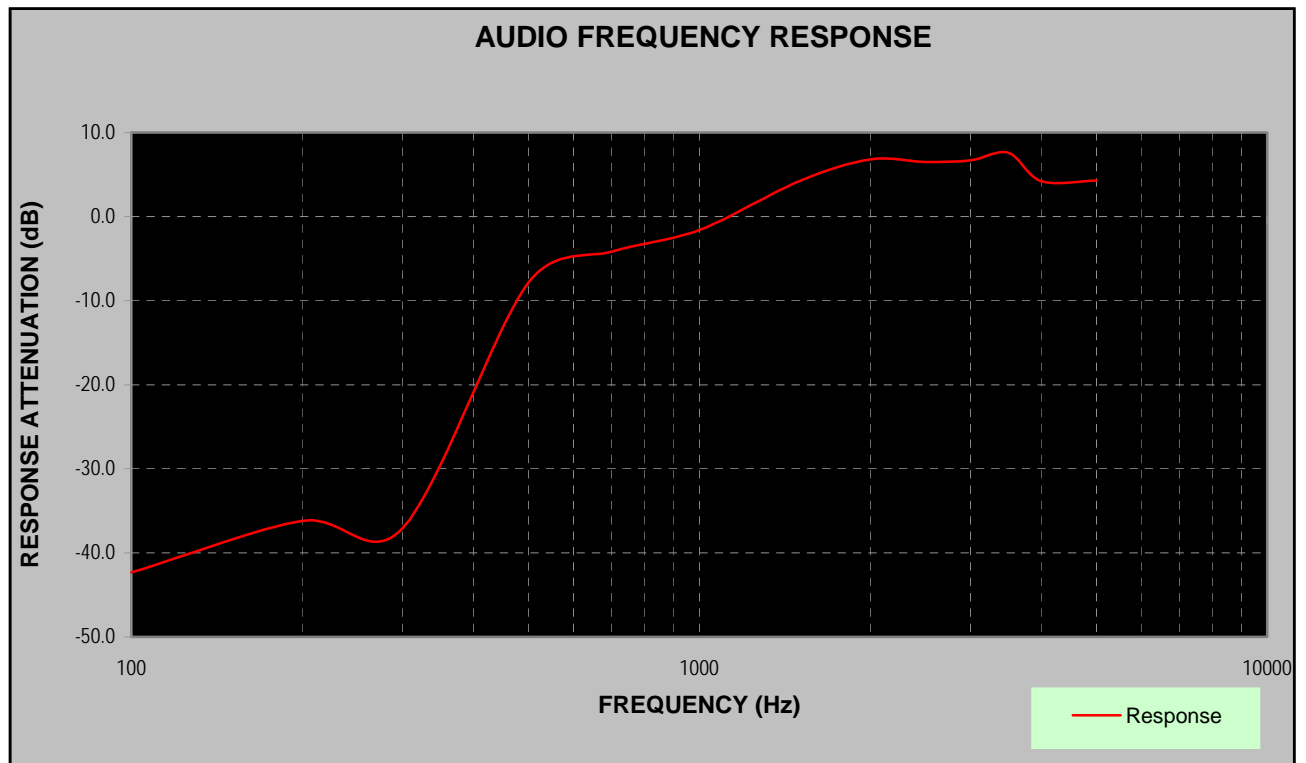
Audio Input (mV)	300Hz Deviation (kHz)	1kHz Deviation (kHz)	3kHz Deviation (kHz)	FCC Limit (kHz)
1.0	0.49	0.85	1.01	5.0
5.0	0.50	1.89	1.74	5.0
10.0	0.53	1.95	1.75	5.0
20.0	0.55	2.09	1.78	5.0
30.0	0.67	2.12	1.81	5.0
40.0	0.73	2.12	1.76	5.0
50.0	0.79	2.12	1.76	5.0
60.0	0.85	2.12	1.75	5.0
70.0	0.93	2.15	1.78	5.0
80.0	1.00	2.16	1.79	5.0
90.0	1.06	2.16	1.79	5.0
100.0	1.13	2.16	1.77	5.0



**AUDIO FREQUENCY RESPONSE****FRS**

Carrier Frequency: 462.6375 MHz

Audio Frequency (Hz)	Response Attenuation (dB)
100	-42.3
200	-36.2
300	-37.1
500	-7.9
700	-4.2
1000	-1.6
1500	4.2
2000	6.8
2500	6.5
3000	6.7
3500	7.6
4000	4.2
5000	4.3

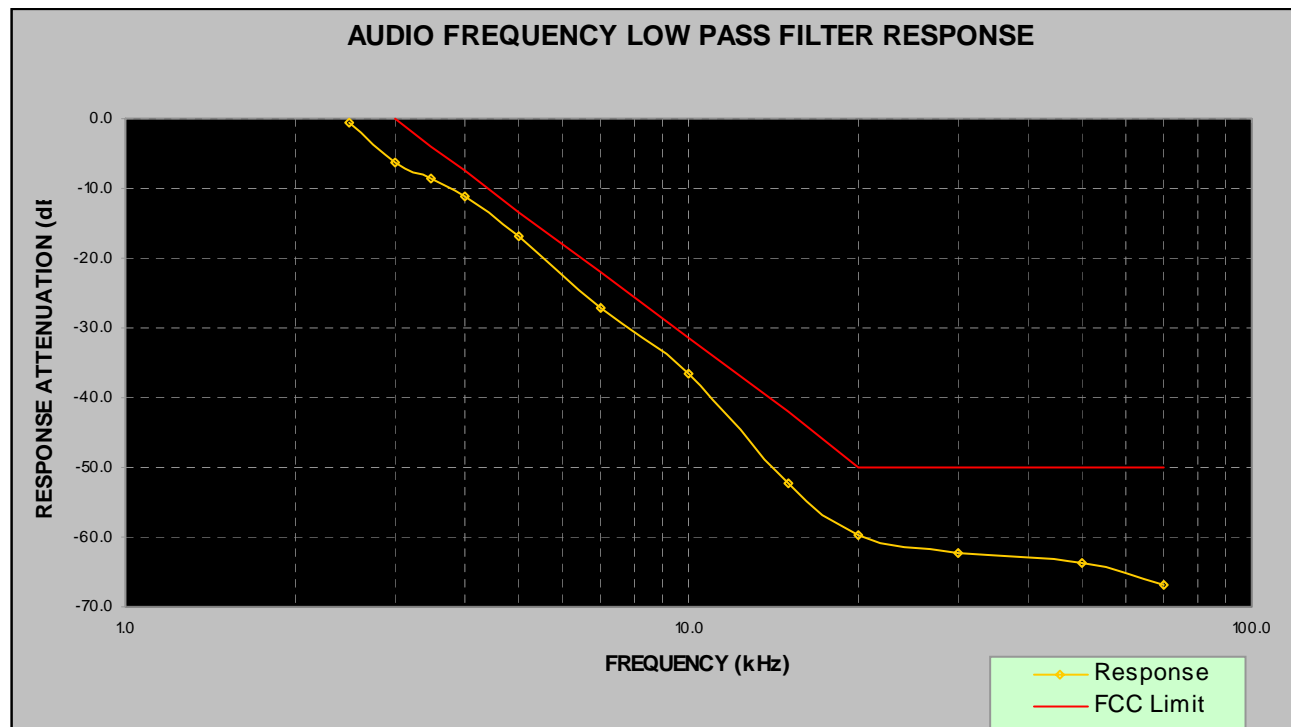


## AUDIO FREQUENCY LOW PASS FILTER RESPONSE

### FRS

Carrier Frequency: 462.6375 MHz

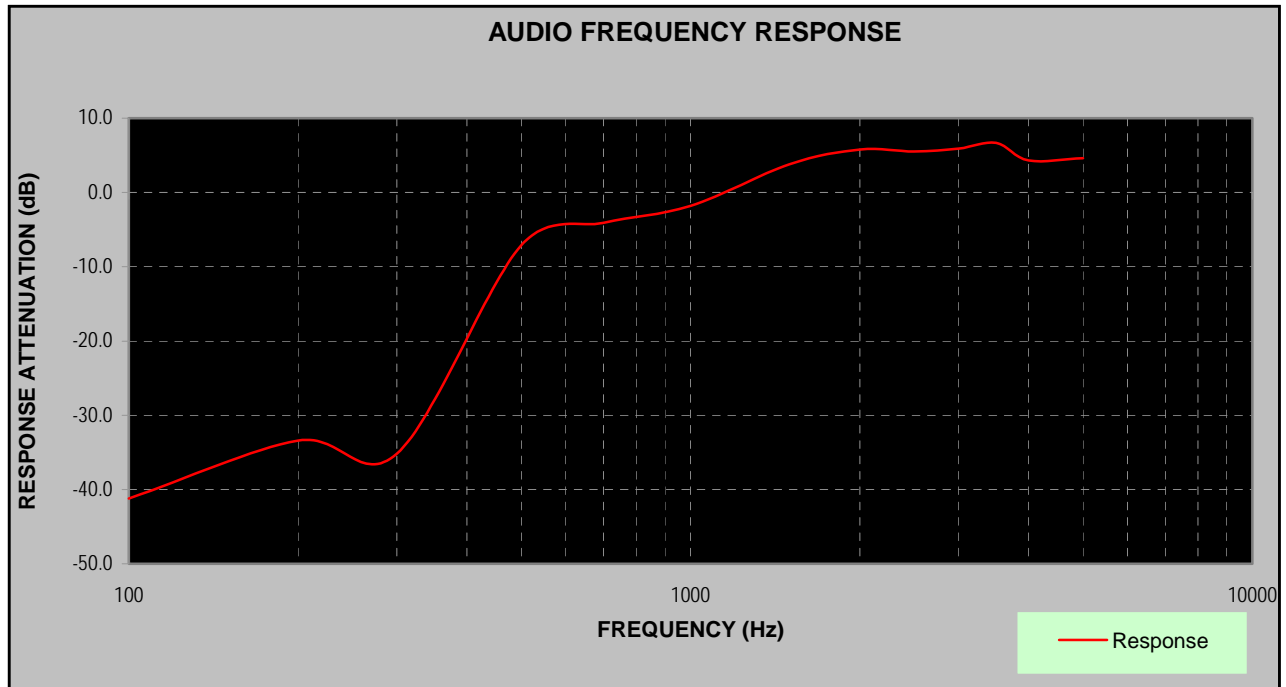
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
2.5	-0.5	/
3.0	-6.2	0.0
3.5	-8.6	-4.0
4.0	-11.2	-7.5
5.0	-16.8	-13.3
7.0	-27.2	-22.1
10.0	-36.7	-31.4
15.0	-52.3	-42.0
20.0	-59.6	-50.0
30.0	-62.3	-50.0
50.0	-63.7	-50.0
70.0	-66.8	-50.0



**AUDIO FREQUENCY RESPONSE****GMRS**

Carrier Frequency: 462.6250 MHz

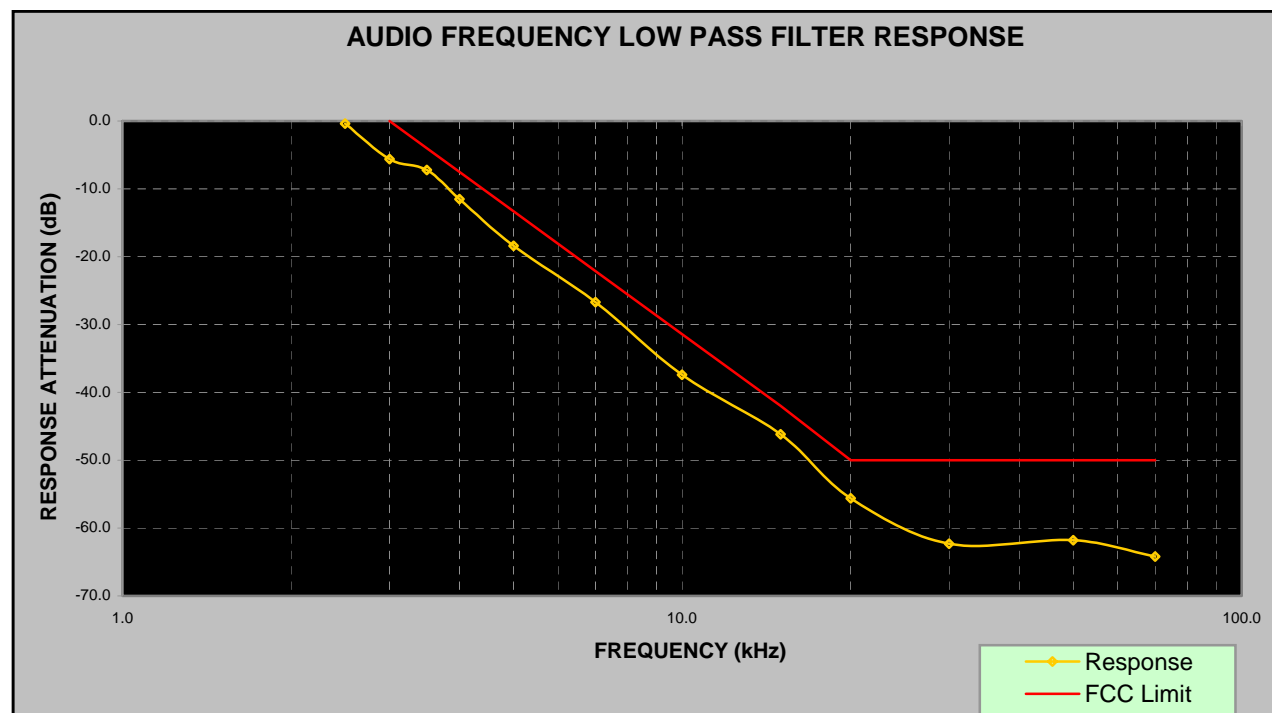
Audio Frequency (Hz)	Response Attenuation (dB)
100	-41.2
200	-33.4
300	-35.2
500	-7.1
700	-4.1
1000	-1.8
1500	3.8
2000	5.8
2500	5.5
3000	5.9
3500	6.7
4000	4.3
5000	4.6



**AUDIO FREQUENCY LOW PASS FILTER RESPONSE****Mode: GMRS**

Carrier Frequency: 462.6250 MHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
2.5	-0.4	/
3.0	-5.6	0.0
3.5	-7.2	-4.0
4.0	-11.5	-7.5
5.0	-18.4	-13.3
7.0	-26.7	-22.1
10.0	-37.4	-31.4
15.0	-46.2	-42.0
20.0	-55.6	-50.0
30.0	-62.3	-50.0
50.0	-61.8	-50.0
70.0	-64.2	-50.0



## §2.1049 and § 95.633(a) (c) - OCCUPIED BANDWIDTH AND EMISSION MASK

### Applicable Standard

Per FCC §2.1049 and FCC §95.633 (c), the authorized bandwidth for emission type F3E or F2D transmitted by an FRS Unit is 12.5 kHz and the authorized bandwidth for emission type F1D, G1D, F3E or G3E is 20 kHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
NANYAN	Audio Generator	NY2201	019829	2006-12-23	2007-12-23
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Procedure

The antenna was disconnected from the transmitter and the short cable was connected to the transmitter RF output.

The RF output was connected to the input of the spectrum analyzer through sufficient attenuation.

### Test Data

#### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

*The testing was performed by William Chan on 2007-06-27 and Merry Zhao on 2007-11-15.*

**Test Result:** Pass.

*Test Mode: Transmitting*

Please refer to the hereinafter plots.



## Occupied Bandwidth



\*RBW 1 kHz      Marker 1 [T1 ]  
VBW 3 kHz      19.98 dBm  
SWT 100 ms      462.637700000 MHz

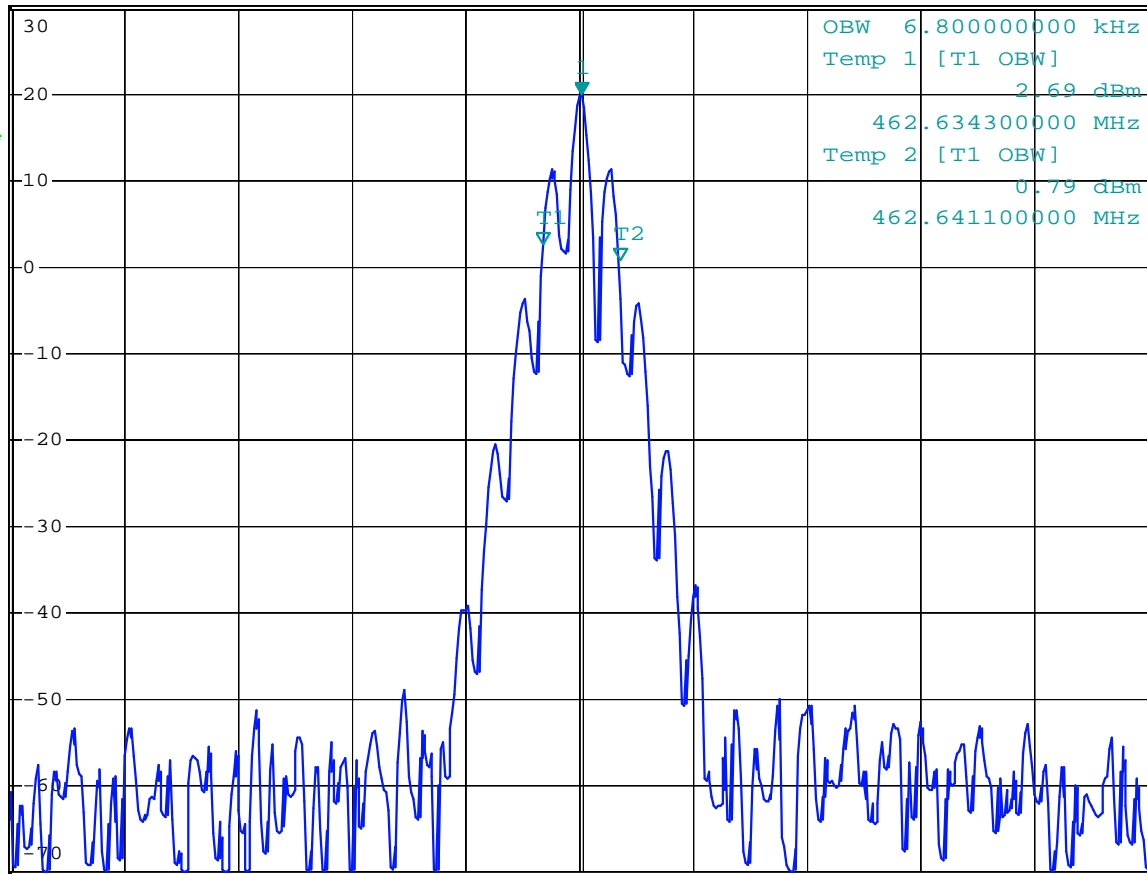
Ref 30 dBm

Att 45 dB

SWT 100 ms

462.637700000 MHz

1 SA\*  
VIEW



OBW 6.800000000 kHz

Temp 1 [T1 OBW]

2.69 dBm

462.634300000 MHz

Temp 2 [T1 OBW]

0.79 dBm

462.641100000 MHz

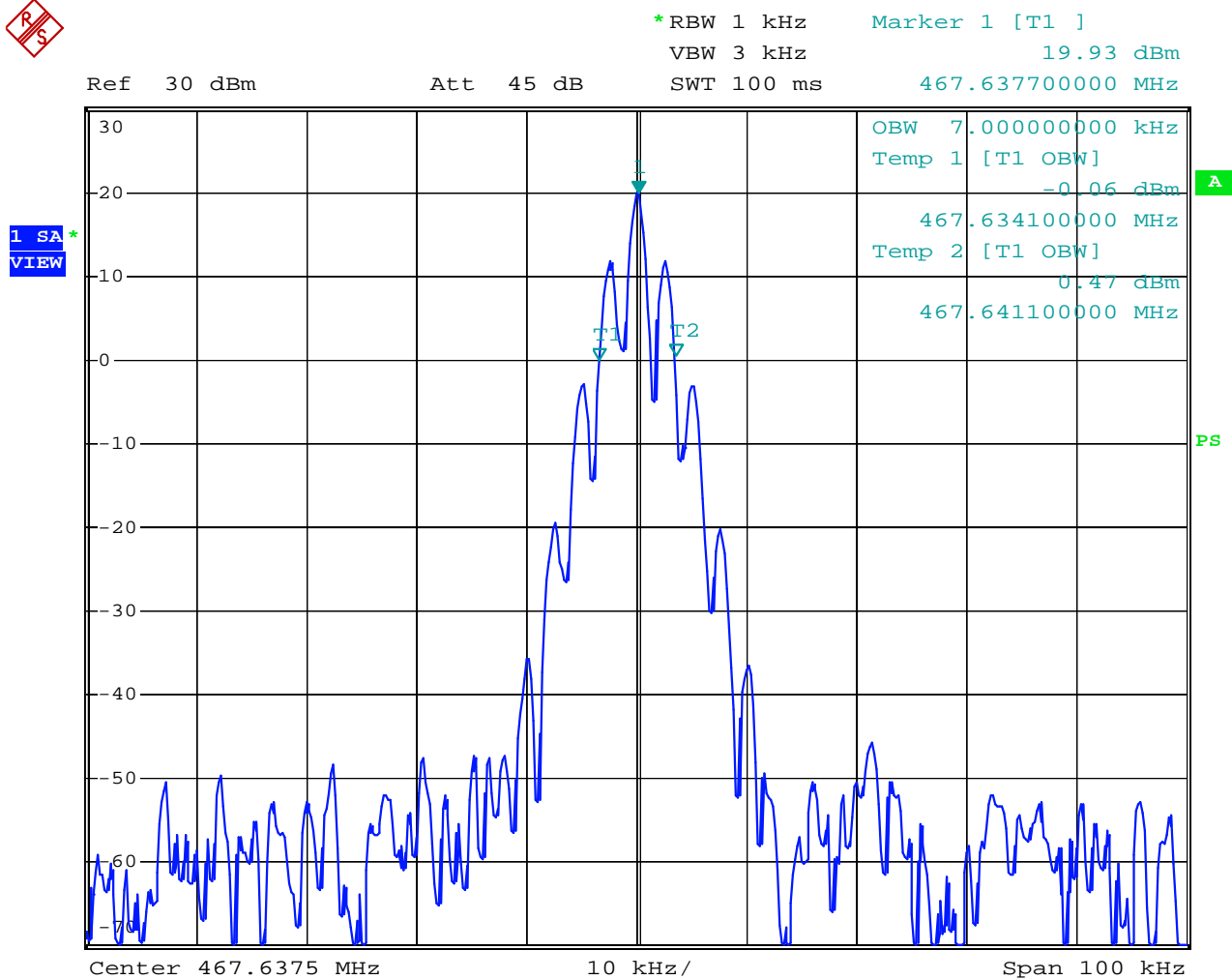
Center 462.6375 MHz

10 kHz/

Span 100 kHz

THN1D Occupied bandwidth, ch4

Date: 15.NOV.2007 22:21:43



THN1D Occupied bandwidth, ch11

Date: 15.NOV.2007 22:24:43



\*RBW 1 kHz

Marker 1 [T1 ]

\*VBW 3 kHz

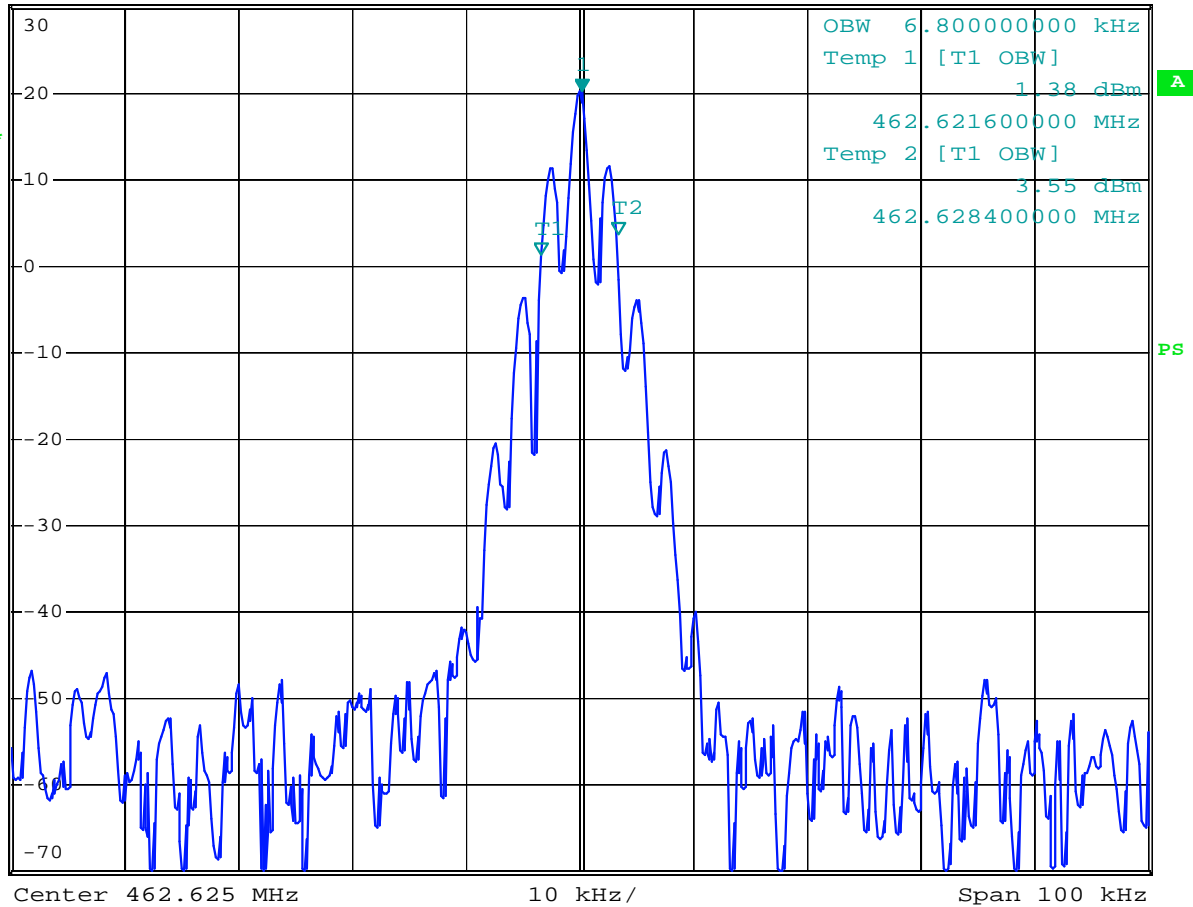
20.04 dBm

Ref 30 dBm

Att 60 dB

SWT 100 ms

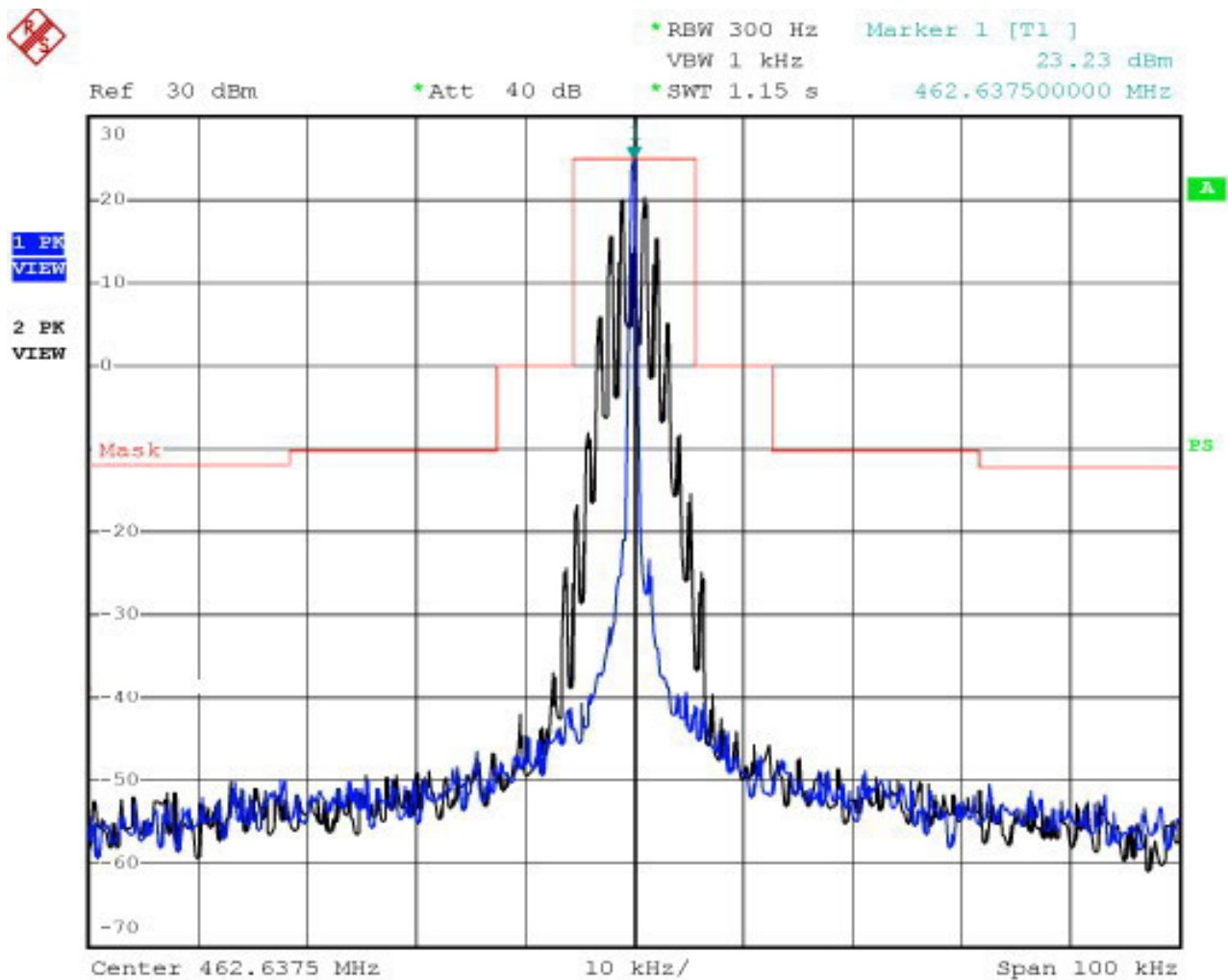
462.625200000 MHz

1 SA \*  
VIEW

THN1D Occupied bandwidth, ch18

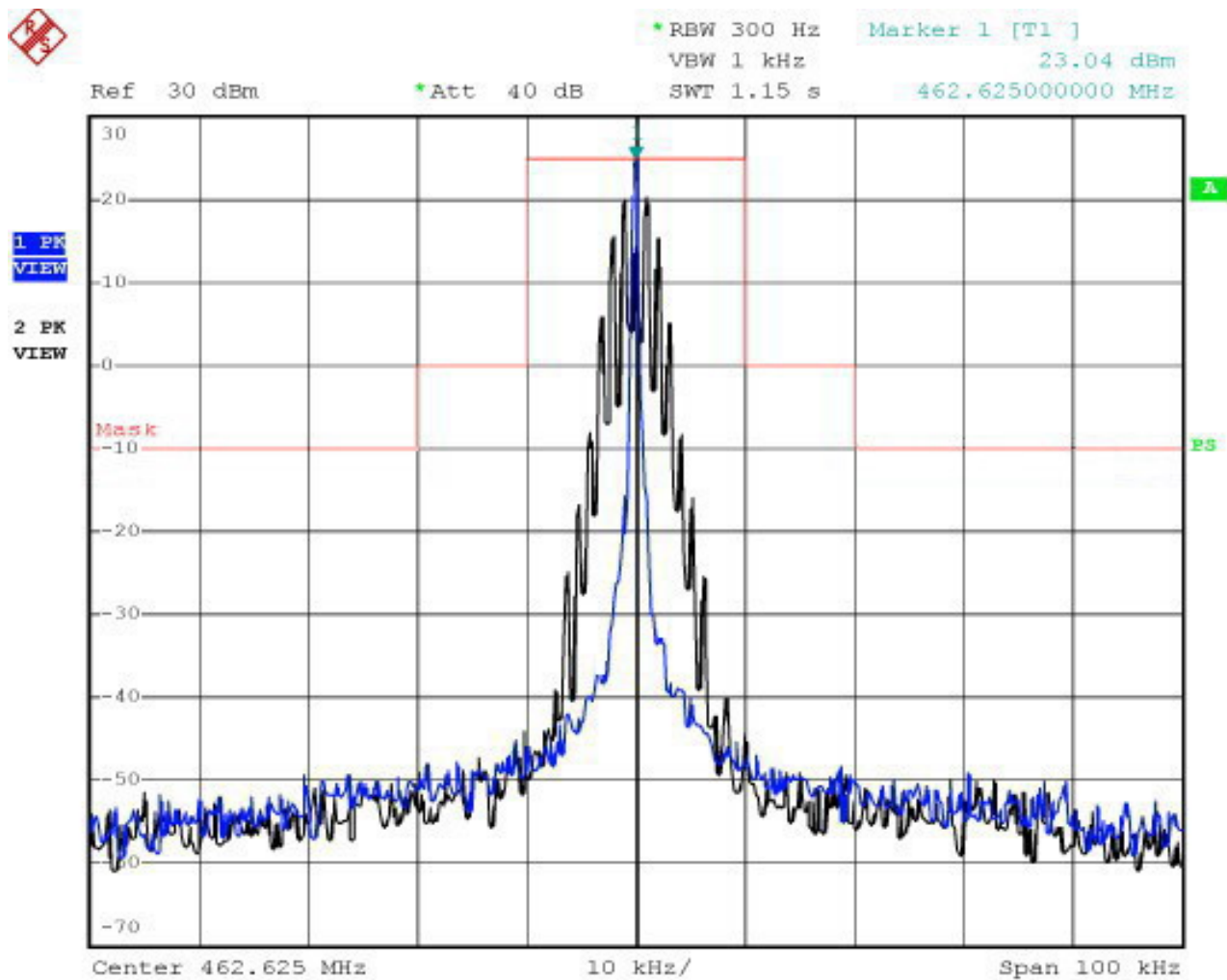
Date: 15.NOV.2007 22:30:06

## EMISSION MASK



Emission Mask (FRS -- Channel 4)

Date: 27.JUN.2007 22:36:23



Emission Mask (GMRS -- Channel 18)

Date: 27.JUN.2007 22:19:17

## **§2.1053 and §95.635(b) (7) - RADIATED SPURIOUS EMISSIONS**

### **Applicable Standard**

§2.1053 and §95.635

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
HP	Signal Generator	HP8657A	2849U00982	2006-09-29	2007-09-29
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
COM POWER	Dipole Antenna	AD-100	041000	2006-09-25	2007-09-25
SUNOL SCIENCES	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25

**\* Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### **Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \log(\text{TXpwr in Watts}/0.001)$  - the absolute level

Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

### **Test Results Summary**

For FRS channel CH4=462.6375 MHz: 16.22 dB at 89.72 MHz in the **Vertical** polarization.  
 For FRS channel CH11=467.6375 MHz: 15.28 dB at 145.85 MHz in the **Vertical** polarization.  
 For GMRS channel CH18=462.6250 MHz: 16.38 dB at 146.40 MHz in the **Vertical** polarization.

**Test Data****Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

*The testing was performed by William Chan on 2007-06-14 to 2007-06-15.*

*Test Mode: Transmitting (FRS channel CH4=462.6375MHz)*

Frequency (MHz)	Polar (H/V)	Absolute Level (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Spurious Attenuation Limit (dBc)	Margin (dB)
89.72	V	-29.22	19.66	48.88	32.66	16.22
89.75	H	-32.22	19.66	51.88	32.66	19.22
146.45	V	-34.27	19.66	53.93	32.66	21.27
925.2750	V	-34.82	19.66	54.48	32.66	21.82
601.26	V	-35.01	19.66	54.67	32.66	22.01
146.45	H	-36.27	19.66	55.93	32.66	23.27
1850.55	V	-36.63	19.66	56.29	32.66	23.63
601.26	H	-37.01	19.66	56.67	32.66	24.01
925.2750	H	-38.02	19.66	57.68	32.66	25.02
1850.55	H	-39.53	19.66	59.19	32.66	26.53
1387.9125	V	-39.63	19.66	59.29	32.66	26.63
1387.9125	H	-40.53	19.66	60.19	32.66	27.53
2775.825	H	-40.71	19.66	60.37	32.66	27.71
2775.825	V	-42.61	19.66	62.27	32.66	29.61
2313.1875	V	-43.82	19.66	63.48	32.66	30.82
2313.1875	H	-45.52	19.66	65.18	32.66	32.52

Note: Transmission Power = 0.0925 W = 19.66dBm

Spurious Attenuation Limit =  $43 + 10 \log (0.0925) = 32.66 \text{ dBc}$

Margin = Attenuation – Limit

*Test Mode: Transmitting (FRS channel CH11=467.6375MHz)*

Frequency (MHz)	Polar (H/V)	Absolute Level (dBm)	Transimission Power (dBm)	Attenunation (dBc)	Spurious Attenuation Limit (dBc)	Margin (dB)
145.85	V	-28.28	21.84	50.12	34.84	15.28
145.85	H	-31.28	21.84	53.12	34.84	18.28
1870.55	V	-35.13	21.84	56.97	34.84	22.13
935.2750	V	-36.38	21.84	58.22	34.84	23.38
935.2750	H	-36.58	21.84	58.42	34.84	23.58
782.76	V	-36.75	21.84	58.59	34.84	23.75
641.12	V	-36.79	21.84	58.63	34.84	23.79
782.76	H	-37.85	21.84	59.69	34.84	24.85
1402.9125	V	-38.03	21.84	59.87	34.84	25.03
641.12	H	-38.19	21.84	60.03	34.84	25.19
1402.9125	H	-39.13	21.84	60.97	34.84	26.13
1870.55	H	-42.23	21.84	64.07	34.84	29.23
2338.1875	V	-42.43	21.84	64.27	34.84	29.43
2805.825	V	-43.71	21.84	65.55	34.84	30.71
2805.825	H	-44.51	21.84	66.35	34.84	31.51
2338.1875	H	-46.33	21.84	68.17	34.84	33.33

Note: Transmission Power = 0.15275 W = 21.84dBm

Spurious Attenuation Limit =  $43 + 10 \log (0.15275) = 34.84 \text{ dBc}$

Margin = Attenuation - Limit

*Test Mode: Transmitting (GMRS channel CH18=462.625MHz)*

Frequency (MHz)	Polar (H/V)	Absolute Level (dBm)	Transimission Power (dBm)	Attenunation (dBc)	Spurious Attenuation Limit (dBc)	Margin (dB)
146.40	V	-29.38	22.49	51.87	35.49	16.38
146.40	H	-29.98	22.49	52.47	35.49	16.98
544.15	V	-32.15	22.49	54.64	35.49	19.15
544.12	H	-33.35	22.49	55.84	35.49	20.35
1850.5	V	-36.63	22.49	59.12	35.49	23.63
699.32	V	-37.46	22.49	59.95	35.49	24.46
1850.5	H	-38.23	22.49	60.72	35.49	25.23
635.32	H	-38.72	22.49	61.21	35.49	25.72
1387.875	H	-39.23	22.49	61.72	35.49	26.23
1387.875	V	-39.53	22.49	62.02	35.49	26.53
2313.325	H	-39.83	22.49	62.32	35.49	26.83
925.250	V	-40.42	22.49	62.91	35.49	27.42
925.250	H	-42.42	22.49	64.91	35.49	29.42
2775.75	V	-43.31	22.49	65.8	35.49	30.31
2775.75	H	-44.91	22.49	67.4	35.49	31.91
2313.325	V	-47.03	22.49	69.52	35.49	34.03

Note: Transmission Power = 0.17742 W = 22.49dBm

Spurious Attenuation Limit =  $43 + 10 \log (0.17742) = 35.49 \text{ dBc}$

Margin = Attenuation - Limit



## **§2.1055 (d) and §95.627(b) & § 95.621- FREQUENCY STABILITY**

### **Applicable Standard**

According to FCC §2.1055(a)(1), the frequency stability shall be measure with variation of ambient temperature from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ , and according to FCC 2.1055(d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.627(b), Each FRS Unit must be maintained within a frequency tolerance of 0.00025%.

### **Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2006-12-28	2007-12-28

**\* Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### **Test Procedure**

**Frequency Stability vs. Temperature:** The equipment under test was connected to an external DC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

**Frequency Stability vs. Voltage:** An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

### **Test Data**

#### **Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5 kPa

*The testing was performed by William Chan on 2007-06-27.*

**Test Result:** Pass

*Test Mode: Transmitting*

**FRS Channel 4:***Frequency Stability versus Temperature*

Reference Frequency: 462.6375 MHz, Limit: $\pm 2.5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
50	3.7	462.63811	+ 1.31
40	3.7	462.6380	+ 1.18
30	3.7	462.63762	+ 0.25
20	3.7	462.63768	+ 0.38
10	3.7	462.63755	+ 0.11
0	3.7	462.63758	+ 0.17
-10	3.7	462.63772	+ 0.47
-20	3.7	462.63759	+ 0.19
-30	3.7	462.63762	+ 0.25

*Frequency Stability versus Input Voltage*

Reference Frequency: 462.6375 MHz, Limit: $\pm 2.5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
20	3.2	462.63768	+ 0.38

**FRS Channel 11:***Frequency Stability versus Temperature*

Reference Frequency: 467.6375 MHz, Limit: $\pm 2.5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
50	3.7	467.63782	+ 0.68
40	3.7	467.63775	+ 0.53
30	3.7	467.63765	+ 0.32
20	3.7	467.63758	+ 0.17
10	3.7	467.63767	+ 0.36
0	3.7	467.63742	- 0.18
-10	3.7	467.63741	- 0.20
-20	3.7	467.63764	+ 0.29
-30	3.7	467.63765	+ 0.32

*Frequency Stability versus Input Voltage*

Reference Frequency: 467.6375 MHz, Limit: $\pm 2.5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
20	3.2	467.63765	+ 0.32

**GMRS Channel 18:***Frequency Stability versus Temperature*

Reference Frequency: 462.62500 MHz, Limit: $\pm 5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
50	3.7	462.62542	+ 0.90
40	3.7	462.62535	+ 0.75
30	3.7	462.62524	+ 0.51
20	3.7	462.62509	+ 0.19
10	3.7	462.62518	+ 0.38
0	3.7	462.62492	- 0.18
-10	3.7	462.62486	- 0.31
-20	3.7	462.62482	- 0.39
-30	3.7	462.62491	- 0.20

*Frequency Stability versus Input Voltage*

Reference Frequency: 462.625 MHz, Limit: $\pm 5$ ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (ppm)
20	3.2	462.62486	- 0.31

**\*\*\*\*\* End of Report \*\*\*\*\***