

Testing Tomorrow's Technology

**Application For
Title 47 FCC Part 2, Subpart J, and FCC Part 95, Subpart D
Certification
and
ANSI/TIA-603-C-2003, Unbridled CB AM Communications Equipment
Measurement and Performance Standards**

For

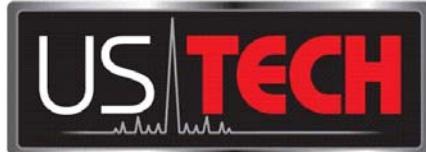
RADIO SOUND, INC.

**N-Touch Model RS-51033
27 MHz CB Transceiver**

**FCC ID: JOFRS51033
IC: 5855A-51033**

**UST Project No: 12-0243
June 27, 2012**

**3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com**



Testing Tomorrow's Technology

I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US Tech (Agent Responsible For Test):

A handwritten signature in black ink, appearing to read 'George Yang'.

By: _____

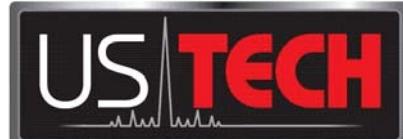
Name: George Yang

Title: Laboratory Manager- Test Engineer

Date: June 27, 2012

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MEASUREMENT/TECHNICAL REPORT

This report concerns (check one): Original grant Class II change _____

Equipment type: **Transceiver**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes _____ No

If yes, defer until: _____
date

N.A. agrees to notify the Commission by N.A.
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

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Fax Number: (770) 740-1508

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List of Attachments

- Agency Agreement
- Application Forms
- Letter of Confidentiality
- Equipment Label
- Block Diagram(s)
- Schematic(s)
- Test Configuration Photographs
- Internal Photographs
- Theory of Operation
- User's Manual

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1 General Information

1.1 Product Description

The Equipment Under Test (EUT) is the Radio Sound, Incorporated N-Touch Model RS-51033 (proposed/assigned FCC ID: JOFRS51033 and IC: 5855A-51033). The EUT is an AM-only (A3E), 40 channel, Citizen's Band transceiver presented for certification under FCC Rules Part 95, Subpart D. The EUT consists of a transceiver module enclosed in aluminum extrusion case. This module is designed for professional installation (eg factory/dealer) in a motorcycle. No user interface (controls or display) is incorporated in the unit. All CB transceiver functions are operated via remotely located (motorcycle handlebar) controls. There are no control buttons on the transceiver. The display of an external AM/FM entertainment system is used for the display function. A single interface connector on the transceiver provides lines for control data, receive and transmit audio, and power. A separate connector (SO-239) is provided on the transceiver for connection to the antenna. The transceiver is designed to operate with common commercially available citizens band antennas having a nominal impedance of 50 ohms.

The external control system must provide volume control, channel select (optional), and connections for PTT, TX audio in and RX audio out.

1.2 Related Submittal(s)/Grant(s)

There are no related submittals or grants associated with this project.

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2 Test and Measurements

2.1 Configuration of Tested System

A block diagram of the tested system is shown in Figure 1. Test configuration photographs for spurious emissions measurements are shown in Figure 2. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions.

2.2 Characterization of Tested System

The sample used for testing was received by US Tech on June 5, 2012 in good condition.

2.3 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. Conducted and digital device testing was performed at US Tech's OATS measurement facility. This site has been fully described and registered by the FCC under Registration Number 91037. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number IC2982.

2.4 Test Equipment

Table 2 describes test equipment used to evaluate this product.

2.5 Modifications to Equipment under Test (EUT)

No modifications were made by US Tech to bring the EUT into compliance with the FCC limits for the transmitter portion of the EUT.

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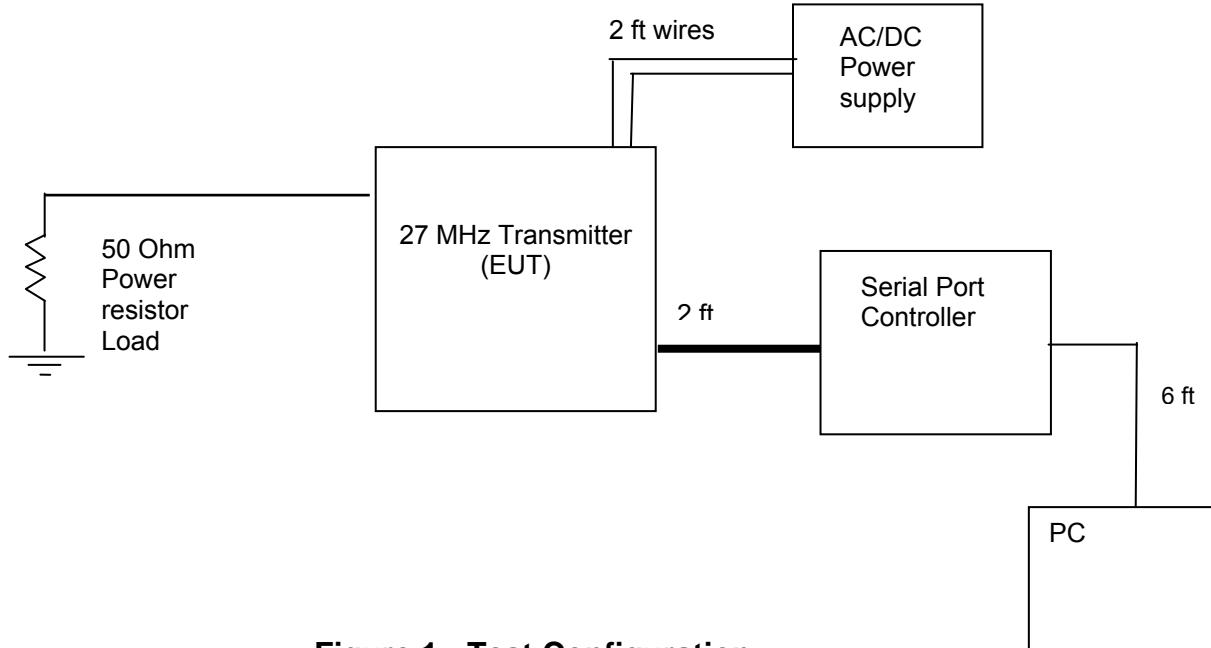


Figure 1 - Test Configuration

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Figure 2 - Photograph of Spurious Radiation Test Setup, (Front View)

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Figure 3 - Photograph of Spurious Radiation Test Setup, Rear View

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Table 1 - EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC/IC ID:	CABLES P/D
EUT 27 MHz Transmitter	N-Touch Model RS-51033	None	FCCID: JOFRS51033 IC: 5855A-51033	2'
ASTRODYNE (Power supply)	S-150-13.5	None	--	6'
Control box Radio Sound	--	--	--	6'

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Table 2 - Test Instruments

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8566B	HEWLETT-PACKARD	2410A00109	11/4/2011
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	10/26/2011
Loop Antenna	SAS-200/562	A. H. Systems	142	8/9/2011 2 yrs*
BICONICAL ANTENNA	3110B	EMCO	9306-1708	04/29/11 90 days extended
LOG PERIODIC 100 MHz to 1000 MHz	3146	EMCO	9305-3600	11/22/11 2 yrs*
PREAMP	8447D	HEWLETT PACKARD	2944A07436	10/6/11
SIGNAL GENERATOR	8664A	HEWLETT-PACKARD	3438A00787	5/22/2012
Graphical Multi-Meter	867B	FLUKE	DM7060268	05/18/12
Temperature Chamber	SM16/DR45 00A	Thermotron/ Honeywell	17095	03/14/2011 2 yrs*
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A
Modulation Analyzer	8091A	HP/ Agilent	2925A05335	Verified With SG before use

***Note: The calibration interval of the above test instruments is 12 months unless otherwise noted and all calibrations are traceable to NIST/USA.**

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2.6 Antenna Description

Radio antenna connector is a UHF female.

2.7 CB transmitter power (FCC Section 2.1046, 95.337 and 95.667)

The transmitter (EUT) was programmed to continuously generate maximum power. RF output power was measured by connecting the output of the transmitter directly to the input of a calibrated spectrum analyzer through a power attenuator whose loss had been measured and was entered into the spectrum analyzer as offset. The spectrum analyzer was set for an impedance of 50Ω with the RBW set greater than the 6 dB bandwidth of the EUT, and the $VBW \geq RBW$. The allowable Carrier power is 4 W when transmitting emission type A1D or A3E

Table 3 - RF Transmitter Power

Frequency of Fundamental (MHz)	ERP Measurement (dBm)* (Watts)*		FCC Limit (Watts)
27.185	35.90	3.98	4W

Test Date: June 8, 2012

Tester Signature: Keyvan Muvahhid

Name: Keyvan Muvahhid

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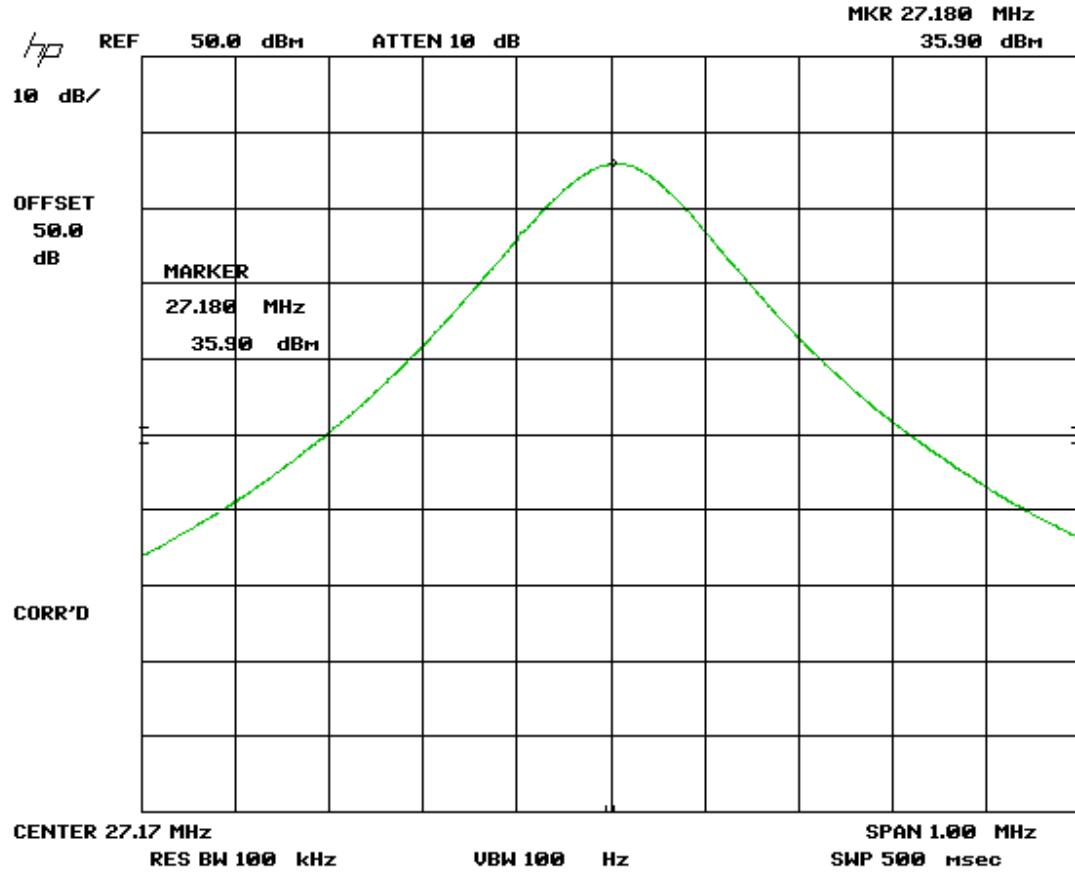


Figure 4 - Plot of Low band Output

Note: Attenuators and cable loss are added to spectrum analyzer.

2.8 Audio Frequency Response (2.1047(a) & 95.637)

The rated audio input signal was applied to the input of the audio low-pass filter (or of all modulation stages) using an audio source. This input signal level and its corresponding frequency deviation were then measured and recorded using a Modulation Analyzer. Tests were repeated at different audio signal frequencies from 100 Hz to 5 KHz.

2.8.1 Audio Frequency Requirements

§ 2.1047(a): Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

2.8.2 Audio Frequency Test Results

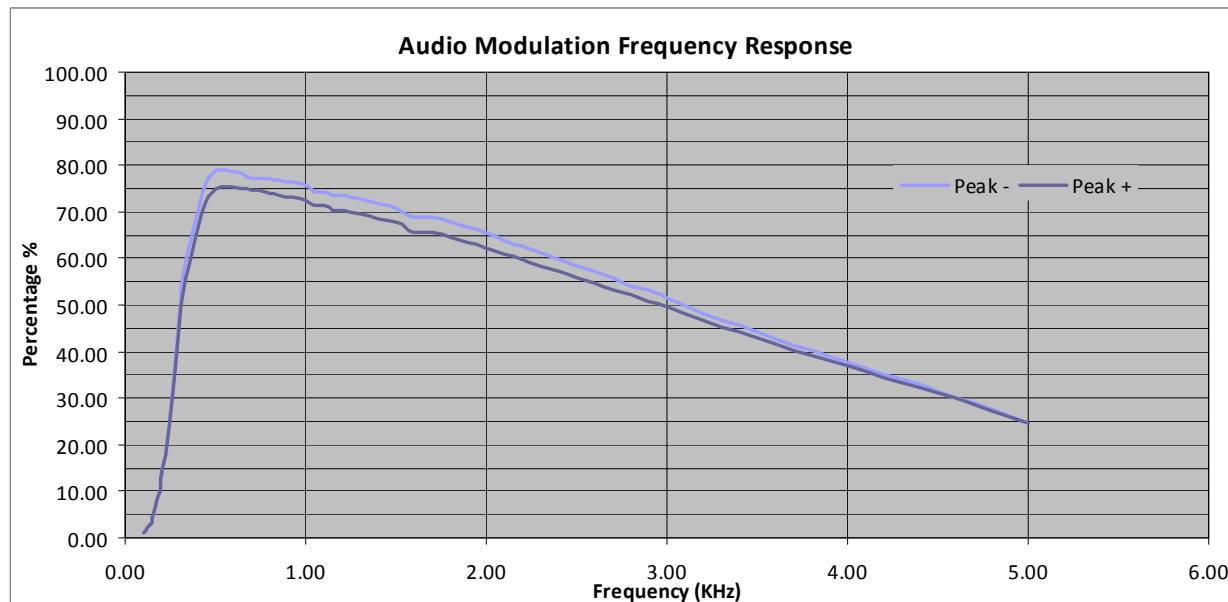


Figure 5 - Plot of the Audio Frequency Response

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Table 4 - Data of the Audio Frequency Response

Frequency (Mhz)	Peak + %	Peak - %
0.10	1.09	1.01
0.11	1.40	1.43
0.12	2.00	1.90
0.13	2.50	2.50
0.15	3.30	3.20
0.16	5.30	5.20
0.18	8.50	8.30
0.19	10.10	10.04
0.20	12.80	12.40
0.22	17.60	17.76
0.24	23.40	23.90
0.26	29.90	31.00
0.28	37.25	39.10
0.30	45.30	47.90
0.33	54.00	57.50
0.36	60.00	64.00
0.40	66.40	70.00
0.44	71.30	75.20
0.48	74.40	78.20
0.53	75.50	78.90
0.58	75.40	78.60
0.64	75.00	78.10
0.70	74.50	77.00
0.78	74.10	77.30
0.85	73.50	76.80
1.00	72.50	75.90
1.05	71.20	74.40
1.10	71.20	74.40
1.15	70.40	73.60
1.20	70.40	73.60
1.30	69.40	72.80
1.40	68.50	71.60
1.50	67.60	70.70
1.60	65.50	68.90
1.70	65.50	68.90
1.80	64.40	67.70
1.90	63.40	66.60
2.00	62.30	65.40
2.10	60.90	63.90
2.20	59.70	62.70
2.30	58.30	61.20
2.40	57.10	59.90
2.50	55.80	58.50
2.60	54.60	57.20
2.70	53.40	55.70
2.80	52.00	54.10
2.90	50.90	53.10
3.00	49.60	51.50

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3.20	46.80	48.20
3.40	44.20	45.70
3.60	41.70	42.90
3.80	39.20	40.10
4.00	37.00	37.80
4.20	34.50	35.20
4.40	32.30	32.90
4.60	30.00	30.00
4.80	27.10	27.40
5.00	24.50	24.78

Test Date: June 23, 2012

Tester Signature: Keyvan Muvahhid

Name: Keyvan Muvahhid

2.8.3 Modulation Characteristics

§ 2.1047(b): Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed. Modulation level must be below 100%.

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Table 5 - Modulation Limiting Test Data

Voltage	100 Hz + (%)	100 Hz - (%)	1000 Hz + (%)	1000 Hz - (%)	2500 Hz + (%)	2500 Hz - (%)	5000 Hz + (%)	5000 Hz - (%)
0.05	0.89	1.10	59.20	62.40	55.60	58.70	15.88	16.00
0.08	1.04	1.18	75.70	79.60	66.90	70.10	20.86	21.07
0.10	1.28	1.30	76.20	79.40	66.80	70.30	24.15	24.42
0.20	2.10	2.00	75.30	78.10	66.70	69.70	28.60	29.07
0.30	2.63	2.80	74.60	77.60	66.50	69.40	28.68	29.05
0.40	3.42	4.91	74.50	77.30	66.30	69.60	28.68	29.05
0.50	4.55	3.21	74.30	77.10	62.90	65.90	28.68	29.05
0.60	5.62	4.09	73.90	76.90	62.80	65.90	28.68	29.05
0.70	5.16	4.61	73.60	76.70	62.80	65.90	28.68	29.05
0.80	6.80	5.00	73.50	76.50	62.80	65.90	28.68	29.05
0.90	8.50	5.30	73.40	76.40	62.70	65.90	28.68	29.05
1.00	9.27	10.00	73.30	76.10	62.30	64.80	28.45	28.80
1.50	12.00	19.00	72.30	80.50	64.40	67.30	28.25	28.59
2.00	19.23	22.50	72.00	81.00	65.00	68.20	30.00	30.40
2.50	25.40	28.00	71.50	81.40	65.30	68.60	30.00	30.40
3.00	33.90	32.90	71.30	82.00	65.40	68.80	30.00	30.40
3.50	39.00	44.60	71.30	82.60	65.40	68.80	30.00	30.40
4.00	46.50	54.30	71.60	82.90	65.40	68.80	30.00	30.40
4.50	49.00	54.00	72.10	83.60	65.40	68.80	30.00	30.40
5.00	53.90	56.50	72.40	83.70	65.40	68.80	30.00	30.40
5.50	70.00	58.70	72.90	84.60	65.40	68.80	30.00	30.40
6.00	84.00	90.50	73.30	84.80	65.40	68.80	30.00	30.40
6.50	78.00	89.80	73.40	84.90	65.40	68.80	30.00	30.40
7.00	77.60	83.30	73.60	85.00	65.40	68.80	30.00	30.40
8.00	74.90	76.30	73.70	85.30	65.40	68.80	30.00	30.40
8.30	73.90	76.30	73.90	85.30	65.40	68.80	30.00	30.40

Test Date: June 23, 2012

Tester Signature:



Name: Keyvan Muvahhid

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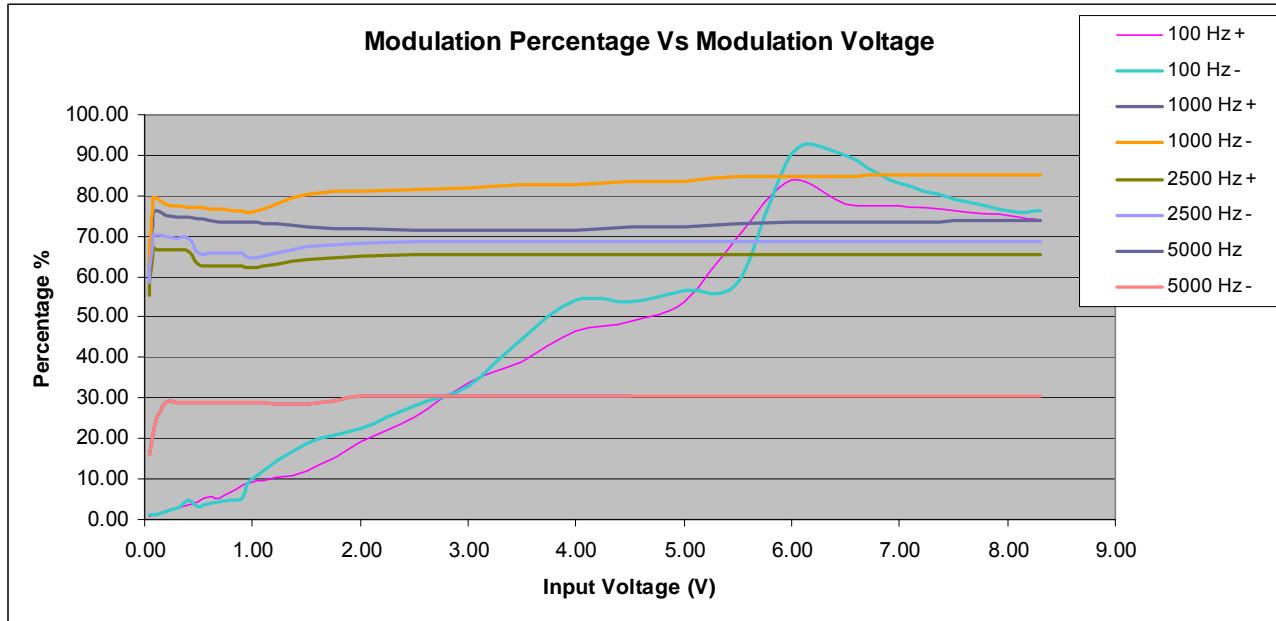


Figure 6 - Modulation Limiting Graph

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2.9 Occupied Bandwidth (FCC Section 2.1049, 95.635)

The transmitter was modulated by a 2.5 KHz tone signal at an input level 16 dB greater than that required to produce 50% modulation (e.g.: +2.5 KHz peak deviation at 1 KHz modulating frequency). The input level was established at the frequency of maximum response of the audio modulating circuit.

The occupied bandwidth of the fundamental was measured using a spectrum analyzer, as shown in Figure 7.

2.10 Unwanted radiation per FCC 95.635

The power of each unwanted emission shall be less than TP for:

- (1) At least 25 dB (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.
- (3) At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- (8) At least $53 + 10 \log_{10} (T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.
- (9) At least 60 dB on any frequency twice or greater than twice the fundamental frequency.

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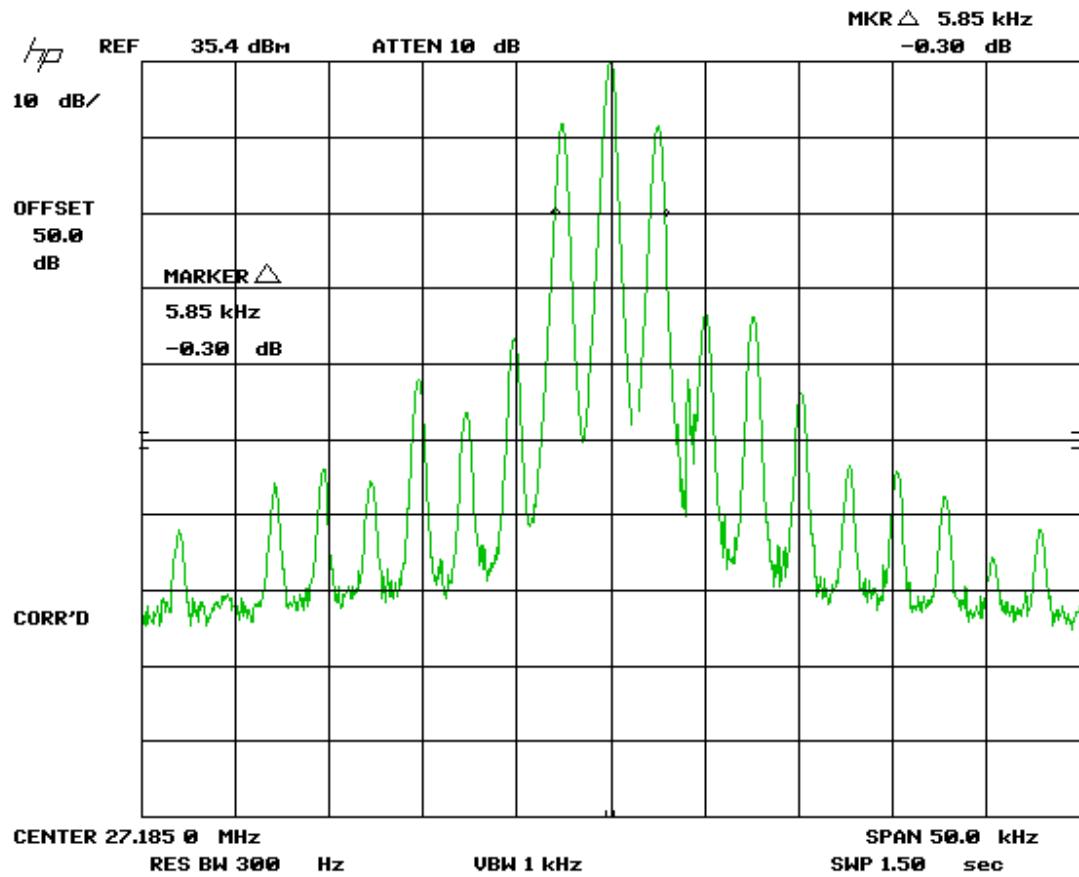


Figure 7 - Occupied Bandwidth of Transmitter Tuned to 27.185 MHz

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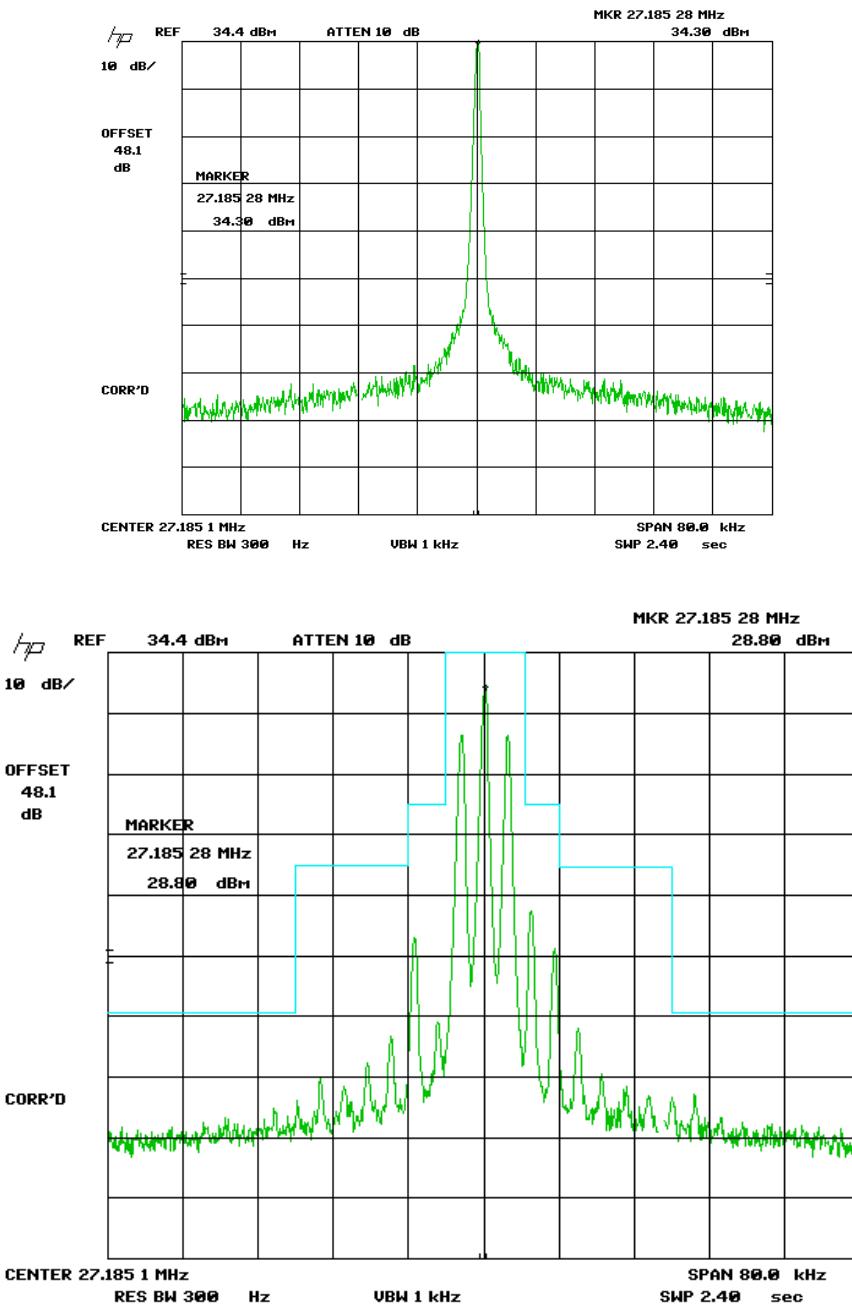


Figure 8 - Unwanted in band emissions- Transmitter Tuned to 27.185 MHz

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2.11 Spurious Emissions at Antenna Terminals (FCC 2.1051, 2.1057, 90.210)

Spurious emissions in the frequency range 30 MHz – 1 GHz have been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable and attenuator (whose loss was entered in the spectrum analyzer as offset) to the antenna output terminals. The spectrum analyzer was set for a $50\ \Omega$ impedance with the RBW = 100 kHz and VBW > RBW.

2.11.1 Spurious Emissions Limits

The measured spurious emissions shall be at least 60 dB below the power at the fundamental frequency on any frequency twice or greater than twice the fundamental frequency.

2.11.2 Test data

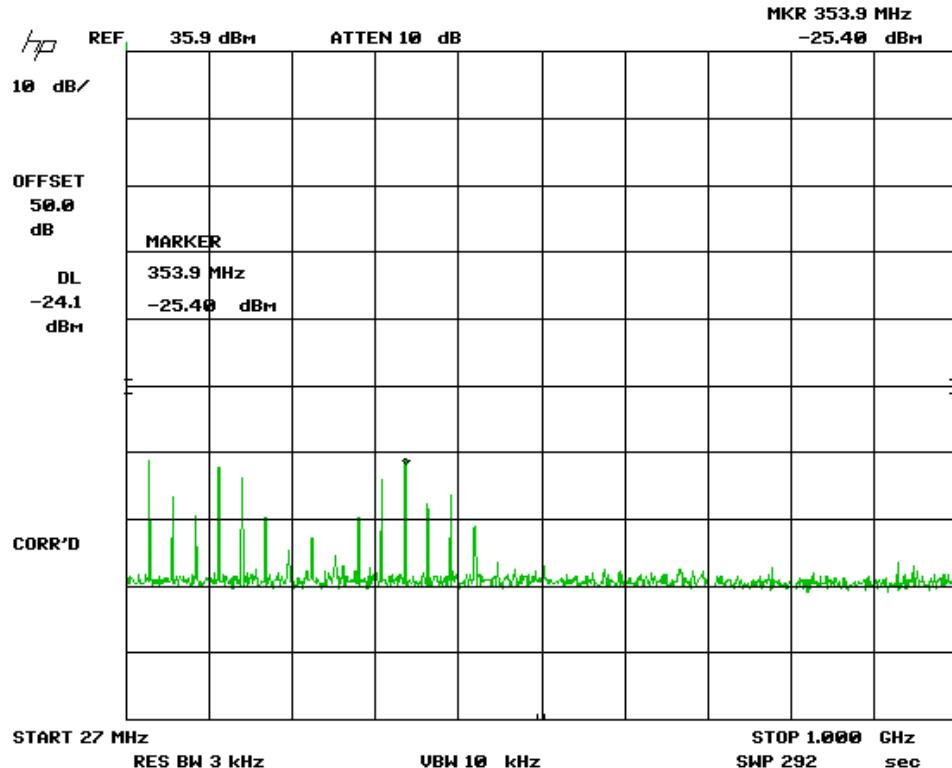


Figure 9 - Antenna Conducted Spurious Emissions

Max Measured Level = -25.40 < Limit = 35.90 dBm - (60 dBm) = -24.10

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2.12 Field Strength of Spurious Radiation (FCC Section 2.1053, 2.1057, 90.210)

Spurious emissions were evaluated from 30 MHz to 1 GHz at a distance of 3 meters from the EUT.

The EUT was placed on an open area test site and the spurious emissions were tested with the EUT antenna terminated with a 50 Ohm load. Measurements for 30 to 1000 MHz were made with the analyzer's bandwidth at 100 kHz and video bandwidth set to 300 kHz.

Table 6 - Field Strength of Spurious Radiation

The following applies information from test as performed									
Frequency	Maximum RX Reading (Units A)	Recreated Reading During Substitution (Using Same Units A) - Ideally 0	Difference Column A - B	TX Gain (dBi)	TX Gain Relative to Dipole (dB)	RF Power into TX antenna (Corrected (dBm) (SG Value-CL)	RF Power into substitution TX antenna corrected by TX Gain Relative to Dipole (dBm)	Limit (dBm)	Margin Below Limit (dB)
54.3	50.5	50.2	0.3	-6.7	-8.84	-55.39	-63.93	-24	39.93
81.55	72.7	72.3	0.4	1.7	-0.44	-43.32	-43.36	-24	19.36
108.73	67.2	68.6	-1.4	-1.6	-3.74	-43.6	-48.74	-24	24.74
135.925	78.2	78.3	-0.1	0.3	-1.84	-34.95	-36.89	-24	12.89
163.107	71.6	69.2	2.4	-0.4	-2.54	-43.28	-43.42	-24	19.42
190.2	63	62.1	0.9	-2.1	-4.24	-47.56	-50.9	-24	26.9
353.4	67.8	68.6	-0.8	3	0.86	-40.2	-40.14	-24	16.14

Test Date: June 17, 2012

Tester Signature: Keyvan Muvahhid

Name: Keyvan Muvahhid

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2.13 Frequency Stability (FCC 2.1055, 95.625)

The EUT RF output was measured as its input bias voltages were changed from 12.10 VDC to 16.30 VDC. The temperature was varied from -30°C to +50 °C. Each soak period was 10 minutes. The EUT frequency stability versus temperature and DC bias variation was within the FCC 2.1055 requirements. Frequency change was less than 0.005 %.

2.13.1 Frequency Stability Requirements

Over the temperature range of -30 °C to +50 °C, for fixed and based stations operating in the frequency range of 27 MHz with channel bandwidth of 8 KHz, transmitters used must have a minimum frequency stability of 0.005 %.

2.13.2 Frequency Stability Test Data

Table 7 - Frequency Stability Measurement at Nominal Voltage

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (%)
-30	27.1847565	-0.0008
-20	27.1847560	-0.0008
-10	27.1848550	-0.0004
0	27.1848895	-0.0003
10	27.1849420	-0.0001
20	27.1849765	0.0000
30	27.1849780	0.0000
40	27.1850335	0.0002
50	27.1851965	0.0008

Table 8 - Frequency Stability Measurement at Nominal Voltage

Input Voltage	Measured Frequency (MHz)	Deviation (%)
V Low(12.10 V)	27.1850150	0.0001
V nominal	27.1849765	0.000
V high (16.30 V)	27.1848145	0.0001

Test Date: June 24, 2012

Tester Signature: Keyvan Muvahhid

Name: Keyvan Muvahhid

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2.14 RF Exposure Requirements (1.1310 & 2.1091)

2.14.1 Limits

§ 1.1310: The criteria listed in Table 1 of this section shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

2.14.2 Maximum Public Exposure to RF (MPE)

The maximum exposure level to the public from the RF power of the EUT shall not exceed the following:

Occupational/Controlled Exposure, $S_{\text{controlled}} [\text{mW/cm}^2] = 900/(27 \text{ MHz}^2) = 1.23 \text{ mW/cm}^2 = 12.3 \text{ W/m}^2$

General population/Uncontrolled Exposure, $S_{\text{uncontrolled}} [\text{mW/cm}^2] = 180/(27 \text{ MHz}^2) = 0.25 \text{ mW/cm}^2 = 2.5 \text{ W/m}^2$

Therefore, for: Gain Antenna= 0 dBi

Peak Power (Watts) = 3.98 (from Table 3 of Test Report)

Gain of Transmit Antenna = 0 dB_i = 1,

$r_{\text{controlled}} = \sqrt{(PG/ 4\pi S)} = 3.98(1)/4*\pi*12.3 = 0.16 \text{ m} = 16 \text{ cm}$

$r_{\text{uncontrolled}} = \sqrt{(PG/ 4\pi S)} = 3.98(1)/4*\pi*2.5 = 0.36 \text{ m} = 35.6 \text{ cm}$

2.15 Emission Designation

For AM Voice Modulation:

Channel Spacing = 10 KHz; Authorized bandwidth= 8 kHz

Emission designation: 5K85A3EG

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2.16 Unintentional Radiator, Radiated Emissions (CFR 15.109 (a))

The test data is provided herein to support the verification requirements for digital devices. Radiated emissions coming from the EUT in a non-transmit state were evaluated from 30 MHz to 1 GHz per ANSI C63.4, Paragraph 8.

Measurements were made with the analyzer's resolution bandwidth set to 120 kHz for measurements made below 1 GHz and 1 MHz for measurements made above 1 GHz. The video bandwidth was set to three times the resolution bandwidth: 1 MHz RBW and 3 MHz VBW. The test data was maximized for magnitude by rotating the turn-table through 360 degrees and raising and lowering the receiving antenna between 1 to 4 meters in height as a part of the measurement procedure.

All measured signals were at least 2.1 dB below the specification limit. The results are shown in Table 9 following.

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Table 9 - Unintentional Radiator, Radiated Emissions

Unintentional Radiator, Radiated Emissions- 30 MHz to 1 GHz							
Test By: KM	Test: FCC Part 15.109, 15.209			Client: Radio Sound			
	Project: 12-0243 Class: B			Model: RS-51033			
Frequency (MHz)	Test Data (dBuV)	AF+CL-PA (dB)	Results (dBuV/m)	Limits (dBuV/m)	Distance / Polarization	Margin (dB)	DETECTOR PK / QP
Tested from 30 MHz to 1 GHz							
60.0000	47.10	-17.03	30.07	40.0	m./	9.9	PK
120.0000	50.60	-12.97	37.63	43.5	m./	5.9	PK
143.9950	50.90	-12.33	38.57	43.5	m./	4.9	PK
168.0300	50.10	-11.71	38.39	43.5	m./	5.1	QP
204.0400	51.70	-12.09	39.61	43.5	m./	3.9	PK
240.0400	55.10	-11.25	43.86	46.0	m./	2.1	PK
288.0500	50.50	-9.06	41.44	46.0	m./	4.6	PK
361.0000	44.10	-8.13	35.97	46.0	m./	10.0	PK

No other emissions detected within 20 dB of the FCC Part 15.109 limits

AF = Antenna Factor CL = Cable Loss PA = Preamplifier Gain

SAMPLE CALCULATION:

RESULTS: At 60.00 MHz: $47.10 + (-17.03) = 30.07$ dBuV/m @ 3m

Margin = $(30.07-40.0) = 9.9$ dB

Test Date: June 18, 2012

Tested by Signature: Keyvan Muvahhid Name: Keyvan Muvahhid

U.S. Tech Test Report:

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IC:

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Model:

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2.17 Unintentional Radiator Power Lines Conducted Emissions (CFR 15.107)

The test data provided herein is to support the Verification requirement for the digital apparatus. The power line conducted voltage measurements for Receiver and Digital Devices have been carried out in accordance with CFR 15.107 and ANSI C63.4, Paragraph 7, with a spectrum analyzer connected to an LISN and the EUT placed into an idle condition or a continuous mode of receive (non-transmitting). Please refer to the results as shown in Table 12 below.

Table 10 - Power Line Conducted Emissions Data

CONDUCTED EMISSIONS						
Tested By: K.M.	Specification Requirement: FCC Part 15, Para 15.107 Class B		Project No.: 12-0243	Client: Radio Sound Model: RS-51033		
Frequency (MHz)	Test Data (dBuV)	LISN+CL-PA (dB)	Model: KG506- 40E25K	Avg Limits (dBuV)	Margin (dB)	Detector
This test is not applicable. EUT is DC powered.						

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2.18 Measurement Uncertainty

2.18.1 Conducted Emissions Measurement Uncertainty

Measurement Uncertainty (within a 95% confidence level) for this test is ± 2.8 dB.
This test was not applicable to the EUT.

2.18.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.3 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.1 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.1 dB.

The data listed in this test report does not have sufficient margin to negate the effects of uncertainty, therefore, the EUT conditionally meets this requirement.