Prüfbericht - Nr.: *Test Report No.:*	**16023053 001**		**Seite 1 von 34** *Page 1 of 34*
Auftraggeber: *Client:*	**Sam Ash Music Corporation** **262 Duffy Avenue** **Hicksville, NY 11801** **United States**		
Gegenstand der Prüfung: *Test item:*	**Wireless Microphone Transmitter**		
Bezeichnung: *Identification:*	**AH2**	**FCC ID:** *FCC ID*	**CCRAH2**
Wareneingangs-Nr.: *Receipt No.:*	**173052333**	**Eingangsdatum:** *Date of receipt:*	**09.May.2010**
Prüfort: *Testing location:*	**TÜV Rheinland (Guangdong) Ltd. EMC Laboratory** **Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650** **P. R. China**		**Listed test laboratory according to FCC rules section 2.948 for measuring devices under Parts 74**
Prüfgrundlage: *Test specification:*	**TIA/EIA-603-C-2004** **FCC "Rules and Regulations", Part 74: 01, Oct., 2008** **Subpart H, Section 74.861**		
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (Guangdong) Ltd.**		

geprüft */ tested by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
02. Jul. 2010	Frank Du Project Engineer	Frank Du

kontrolliert/ *reviewed by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
05. Jul. 2010	Liangdong Xie Project Manager	

Sonstiges/ Other Aspects:

Abkürzungen:				*Abbreviations:*			
P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*	
F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*	
N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*	
N/T	=	*nicht getestet*		*N/T*	=	*not tested*	

TEST SUMMARY

5.1 CONDUCTED POWER OUTPUT MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1)
RESULT: N/A

5.2 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1)
RESULT: N/A

5.3 RADIATED POWER OUTPUT MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1) and RF-Exposure evaluation
RESULT: Pass

5.4 SPURIOUS RADIATION MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(6)(III)
RESULT: Pass

5.5 MODULATION CHARACTERISTICS MEASUREMENT
RESULT: Pass

5.6 OCCUPIED BANDWIDTH FOR FCC PART 74 PER SECTION 74.861(E)(3), 74.861(E)(5) AND 74.861(E)(6)
RESULT: Pass

5.7 FREQUENCY TOLERANCE FOR FCC PART 74 PER SECTION 74.861(E)(4)
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

Guangzhou Auto Market, Yuan Gang Section of Guangshan Road
Guangzhou 510650

P. R. China

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equipment	Manufacturer	Type	Serial No.	Calibrated until
TÜV Rheinland (Guangdong) Ltd.				
EMI Test Receiver	Rohde & Schwarz	ESCI-3	100216	16.Mar.2011
Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	16.Mar.2011
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	209	07.Nov.2011
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	210	26.Jun.2011
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF906	100385	18.Jul.2011
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF906	100407	26.Jun.2011
Pre-amplifier	MITEQ	AFS42-00101800-25-S-42	1101599	31.Jul.2010
Band Reject Filter	Micro-Tronics	BRM50702	023	14.Mar.2011
Precision Dipole	Schwarzbeck	VHAP	1180+1109	22.Dec.2011
Precision Dipole	Schwarzbeck	UHAP	1091+1092	26.Jun.2011
Standard Gain Horn Antenna	EMCO	3160-09	21642	26.Jun.2014
Standard Gain Horn Antenna	EMCO	3160-09	21645	N/A
Pre-amplifier	MITEQ	AFS33-18002650-30-8P-44	1108282	16.Mar.2011
3m Anechoic Chamber	Albatross Project GmbH	N/A	N/A	16.Apr.2011
Climatic Chamber	ESPEC	EL-04 KA	6107116	16.Mar.2011
Spectrum analyzer	Agilent	E4404B	MY41440753	16.Mar.2011
Communication Analyser	Hewlett-Packard	8920A	3906A10633	03.Nov.2011

2.3 Trace ability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

Uncertainty for conducted emissions measurements is ± 2.68dB.
Uncertainty for radiated emissions measurements is ± 4.94dB (30MHz-1GHz), ± 4.88dB (>1GHz).

The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor k=2, providing a level of confidence of approximately 95%.

2.6 Location of original data

The original copies of all test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TUV Rheinland (Guangzhou) file for certification follow-up purposes.

2.7 Status of facility used for testing

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 833845.

3 General Product Information

The submitted sample AH2 is wireless microphone transmitter operating within the frequency range of 642.375MHz to 645.750MHz.

3.1 Product Function and Intended Use

For details, refer to technical document and the user manual.

3.2 Ratings and System Details

Frequency range	:	CH1: 642.375MHz CH2: 642.875MHz CH3: 644.125MHz CH4: 644.750MHz CH5: 645.500MHz CH6: 645.750MHz
RF output power	:	10mW (e.r.p)
Channel bandwidth	:	200 kHz
Type of antenna	:	Integrated antenna
FCC ID	:	CCRAH2
Power Supply	:	DC 3.7V (powered by built-in battery)
Frequency Response	:	50Hz-15kHz
Protection Class	:	III

Refer to the technical document for further information.

3.3 Independent Operation Modes

The basic operation modes are:

Transmitting without modulation
Transmitting with modulation

For further information refer to User Manual

3.4 Submitted Documents

Block Diagram
Circuit Diagram
Components List
PCB layout
FCC label
User Manual
Photo document

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Refer to Test set-up in chapter 5.

4.3 Special Accessories and Auxiliary Equipment

None.

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the technical document. No additional measures were employed to achieve compliance.

4.5 Test set-up

Diagram 1 of Measurement Equipment Configuration for Testing Radiated Emission

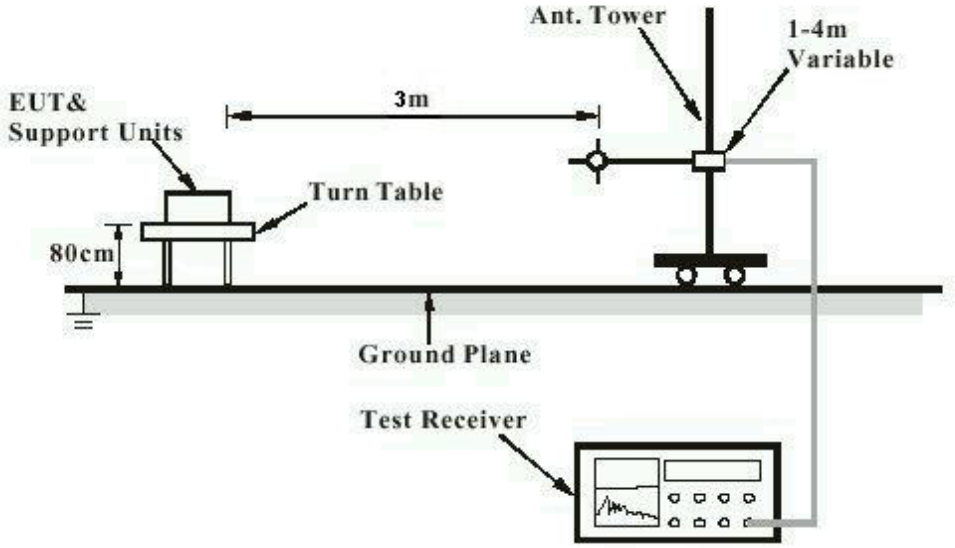


Diagram 2 of Measurement Equipment Configuration for Substitution Method

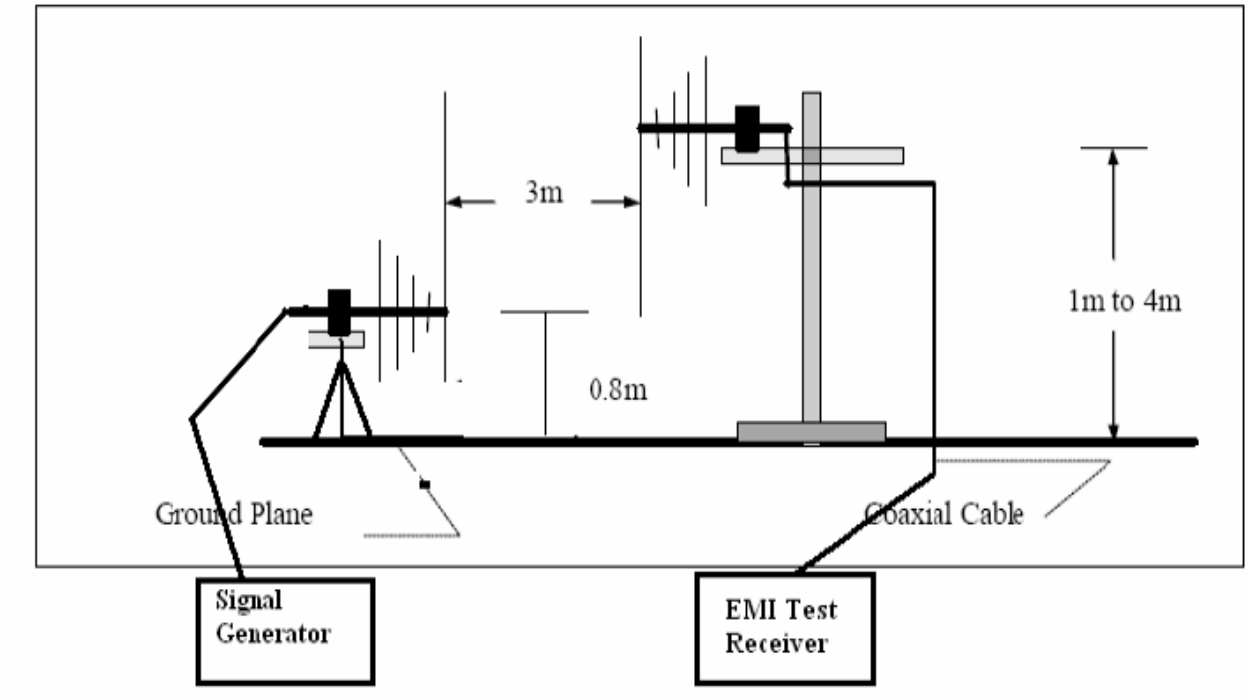


Diagram 3 of Measurement Equipment Configuration for Conducted power output and conducted spurious emissons measurement

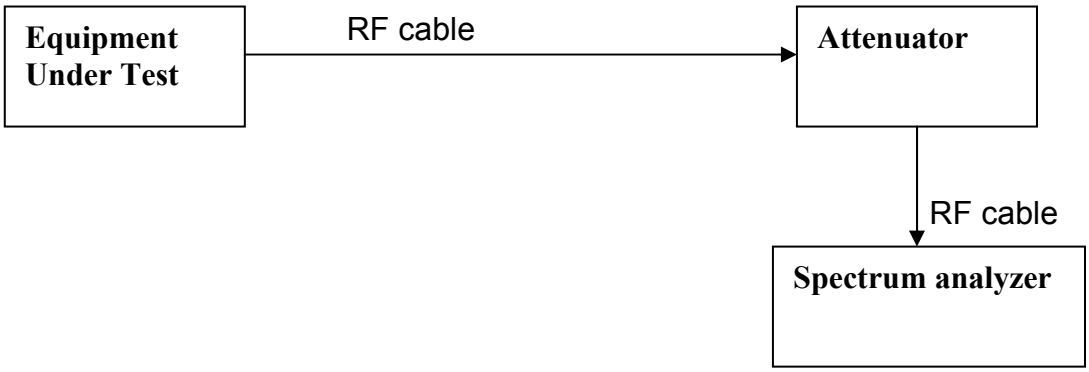
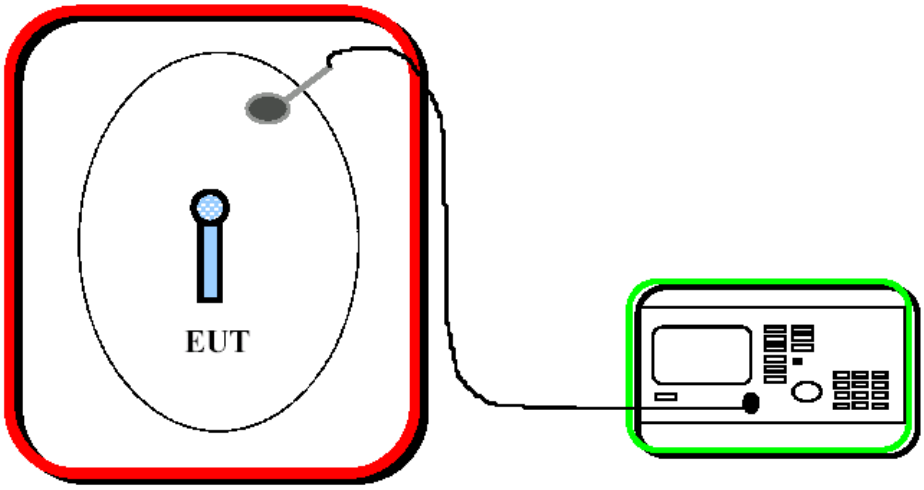
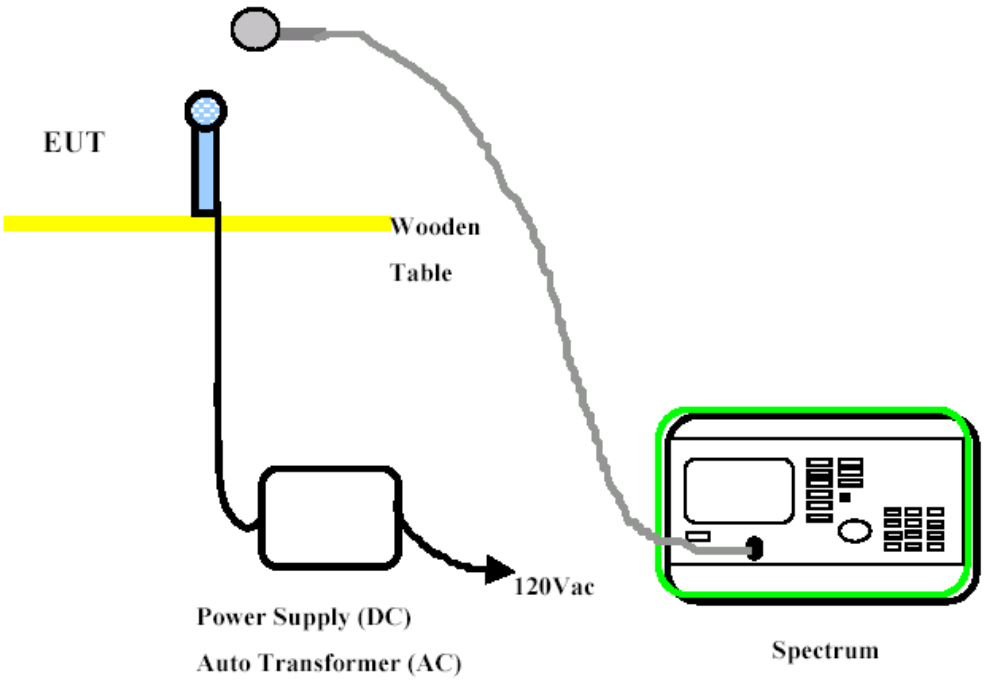


Diagram 4 of Measurement Equipment Configuration for Testing Modulation Characteristics measurement

Diagram 5 of Measurement Equipment Configuration for Testing Frequency Tolerance





5 Test Results EMISSION

5.1 Conducted Power Output measurement for FCC part 74 Per Section 74.861(e)(1)

RESULT: **N/A**

Date of testing	:	---
Test specification	:	FCC Part 2 Per Section 2.1046(a)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.1
Limits	:	FCC Part 74 Per Section 74.861(e)(1)
Kind of test site	:	3m Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. connected equipment as diagram 4;
2. The EUT was connected to spectrum analyzer through a resistive coaxial attenuator;
3. Correct all losses in the RF path.
4. The EUT was set to operate on unmodulation mode at low, mid and high channels;
5. Measure the EUT output power.

The EUT has no external antenna port, therefore this test is not applicable.

5.2 Conducted Spurious emissions measurement for FCC part 74 Per Section 74.861(e)(1)

RESULT: **N/A**

Date of testing	:	---
Test specification	:	FCC Part 2 Per Section 2.1046(a)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.1
Limits	:	FCC Part 74 Per Section 74.861(e)(1)
Kind of test site	:	3m Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. connected equipment as diagram 4;
2. The EUT was connected to spectrum analyzer through a resistive coaxial attenuator;
3. Correct all losses in the RF path.
4. The EUT was set to operate on unmodulation mode at low, mid and high channels;
5. Measure the EUT output power.

The EUT has no external antenna port, therefore this test is not applicable.

5.3 Radiated Power Output measurement for FCC part 74 Per Section 74.861(e)(1) and RF-Exposure evaluation

RESULT: **Pass**

Date of testing	:	14.May.2010
Test specification	:	FCC Part 2 Per Section 2.1046(a)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.17
Limits	:	FCC Part 74 Per Section 74.861(e)(1)
Kind of test site	:	3m Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	23°C
Humidity	:	50%

Measurement procedure:

1. The EUT was place on an 0.8 m high turntable in the anechoic chamber.
2. For radiated power output of the EUT, the measuring antenna was raised and lowered to obtain a maximum reading on the spectrum analyzer with the test antenna polarized vertically and horizontally. The turntable was rotated 360 to further searching the maximum reading on the spectrum analyzer. Then the max value on spectrum was recorded.
3. The EUT was removed and be replaced with a substitute dipole antenna. The length of the antenna was adjusted to a half-wave of transmitting frequency measured. The centre of the dipole antenna was placed approximately at the same location as the centre place of the EUT in step 1 and 2.
4. The dipole antenna was connected to a signal generator with a coaxial cable.
5. The signal generator is tuned to the transmitting frequency with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 2.
6. The input RF power in the dipole antenna was calculated from the coaxial cable loss and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 2.

Note:

While in Step 2, the EUT was placed in 3 orthogonal planes to find a maximum reading.

Measurement result:

Table 2: Measurement result of radiated output power at low, high channel

Channel	Freq. (MHz)	Polarization (V/H)	Reading (SG) (dBm)	Cable loss (dB)	Antenna Gain(dB)	Transmit power (dBm)	Transmit power (mW)	Limit (mW)
Low	642.375	V	-18.364	5.0	-10	-33.364	0.0004	250
		H	-4.574	5.0	-10	-19.574	0.0115	250
High	645.750	V	-20.502	5.2	-10	-35.500	0.0003	250
		H	-4.439	5.2	-10	-19.437	0.0114	250

Note:
SG means Signal Generator.
Transmit power (dBm) = Reading(SG) (dBm) - Cable loss(dB) + Antenna Gain(dB)
Transmit power (dBm) = 10Log(transmit power(mW)/1mW)

RF-Exposure evaluation

No SAR evaluation is required if the power is below the following threshold:

Tunable Range		Center of Tunable Band [GHz]	60/f SAR imitation ased on Center of Band [mW]
Lowest Frequency [GHz]	Highest Frequency [GHz]		
0.6423	0.6457	0.6444	86.96

Maximum measured transmitter power:

Transmit power Pout [mW]	Maximum Antenna Gain [dBi]	Pout EIRP [mW]
0.0115	0	0.0115

The threshold for SAR evaluation is 86.96 mW.
The maximum TX output power is 0.0115 mW EIRP.

Conclusion:
SAR evaluation is not required since the maximum transmitter Pout (EIRP) is below the FCC threshold.

5.4 Spurious Radiation Measurement for FCC Part 74 Per Section 74.861(e)(6)(iii)

RESULT: **Pass**

Date of testing	:	14.May.2010
Test specification	:	FCC Part 2 Per Section 2.1053(a) and 2.1057
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.12
Limits	:	FCC Part 74 Per Section 74.861(e)(6)(iii)
Kind of test site	:	3m Full-Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. Adjust the spectrum analyzer for the following settings:

a. RBW = 10kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

b. VBW = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1GHz.

c. Sweep speed slow enough to maintain measurement calibration.

d. Detector Mode = Positive Peak

2. The EUT was turned on and placed on the top of a rotatable table 0.8 m above the ground with 3-orthogonal XYZ direction and be kept close enough to the measurement receiving antenna (especially for the measurement frequency range above 1 GHz). The table was then rotated 360 degrees to detect the suspected emission frequency points. The position of the worst radiation case with both horizontal and vertical receiving antenna polarization was then recorded together with the suspected emission frequency points above-mentioned.

3. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.

4. For each suspected emission frequency point recorded in step 1, the EUT was arranged to its worst case that the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to read the maximum emission.

5. The EUT was removed and be replaced with substitute antenna correspondent to the suspected frequency point mentioned in Step 3 (if necessary, characteristic frequency of the antenna is adjusted to a half-wave of the suspected frequency point). The substitute antenna was then connected to a signal generator with a coaxial cable and its center is placed approximately at the same location as the centre place of the EUT in Step 3.

6. The signal generator is tuned to the suspected frequency point mentioned in Step 3 with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 3.

6. For each suspected frequency point, the input RF power in the substitute antenna was calculated from the coaxial cable loss, antenna factor and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 3, table 4 and table 5.

The allowed emissions for transmitters operating in the 535 MHz to 564 MHz bands are found under Part 74, Section 74.861, Paragraph (e) (6) for Low Power Auxiliary Stations. This paragraph states the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10Log10 (mean output power in watts) dB.

To determine the Limit for Spurious Emissions the following method was used:

Maximum output power in watts:

Maximum output power in Watt: 0.0418 W (see table 2)

The emission must be reduced by:

43+10Log(0.0418) = 29.212 dB

Therefore, the Emission Limit equals:

10Log(0.0418 x1000) – 29.212 dB = –13 dBm

While testing, the EUT was placed in 3 orthogonal planes and the maximum reading was recorded in the following tables.

Note:

Measurement result:

Table 3: Spurious Emission measured at low channel 642.375 MHz

Freq. (MHz)	Polarization (V/H)	Reading (SG) (dBm)	Cable loss (dB)	Antenna Gain(dB)	Transmit power (dBm)	Limit (dBm)
1284.625	V	-55.99	7.5	5.53	-57.96	-13
1927.000	V	-59.44	8.3	6.75	-60.99	-13
2569.375	V	-52.61	10.4	7.25	-55.76	-13
3211.750	V	-48.51	11.3	8.78	-51.03	-13
3854.125	V	-47.77	12.6	8.89	-51.48	-13
4496.500	V	-49.67	14.1	9.32	-54.45	-13
1284.625	H	-52.29	7.5	5.53	-54.26	-13
1927.000	H	-60.29	8.3	6.75	-61.84	-13
2569.375	H	-56.88	10.4	7.25	-60.03	-13
3211.750	H	-56.46	11.3	8.78	-58.98	-13
3854.125	H	-54.37	12.6	8.89	-58.08	-13
4496.500	H	-62.23	14.1	9.32	-67.01	-13

Table 4: Spurious Emission measured at high channel 645.750 MHz

Freq. (MHz)	Polarization (V/H)	Reading (SG) (dBm)	Cable loss (dB)	Antenna Gain(dB)	Transmit power (dBm)	Limit (dBm)
1291.375	V	-56.67	7.7	5.64	-58.73	-13
1937.125	V	-62.93	8.5	6.87	-64.56	-13
2582.875	V	-55.13	11.2	7.53	-58.80	-13
3228.625	V	-55.93	12.1	8.91	-59.12	-13
3874.375	V	-47.50	13.5	9.17	-51.83	-13
4520.125	V	-52.86	15.2	9.54	-58.52	-13
1291.375	H	-56.89	7.7	5.64	-58.95	-13
1937.125	H	-63.93	8.5	6.87	-65.56	-13
2582.875	H	-60.85	11.2	7.53	-64.52	-13
3228.625	H	-62.23	12.1	8.91	-65.42	-13
3874.375	H	-53.76	13.5	9.17	-58.09	-13
4520.125	H	-57.71	15.2	9.54	-63.37	-13

Disturbances other than those mentioned are small or not detectable.

Note: (for above mentioned three tables)

SG means Signal Generator

Transmit power (dBm) = Reading(SG) (dBm) - Cable loss(dB) + Antenna Gain(dB)

Transmit power (dBm) = 10Log(transmit power(mW)/1mW)

5.5 Modulation Characteristics measurement

RESULT: **Pass**

Date of testing	:	26.Jun.2010
Test specification	:	FCC Part 2 Per Section 2.1047(a) and (b)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.3
Limits	:	FCC Part 2 Per Section 2.1047(a) and (b)
Operation mode	:	Transmitting
Power supply	:	DC3.7V (battery powered)
Temperature	:	22°C
Humidity	:	50%

Audio frequency response:

Measurement procedure:

1) Configure the EUT as shown in diagram 3.

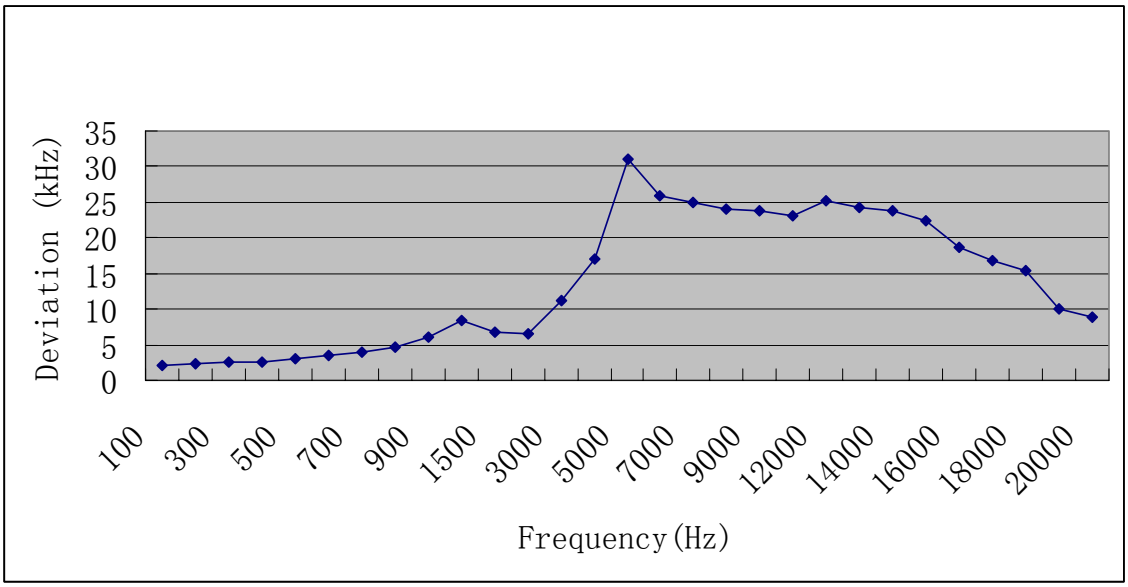
2) Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).

3) Vary the Audio frequency from 200 Hz to 20 kHz and record the frequency deviation.

Measurement result:

Frequency (Hz)	Deviation (kHz)
100	2.2
200	2.4
300	2.5
400	2.6
500	3.1
600	3.5
700	3.9
800	4.6
900	6.1
1000	8.3
1500	6.8
2000	6.5
3000	11.3

4000	17.0
5000	31.0
6000	25.8
7000	25.0
8000	24.0
9000	23.8
10000	23.1
12000	25.3
13000	24.2
14000	23.8
15000	22.4
16000	18.7
17000	16.9
18000	15.5
19000	10.1
20000	8.8



Modulation limit and Necessary Bandwidth (Bn):

Measurement procedure:

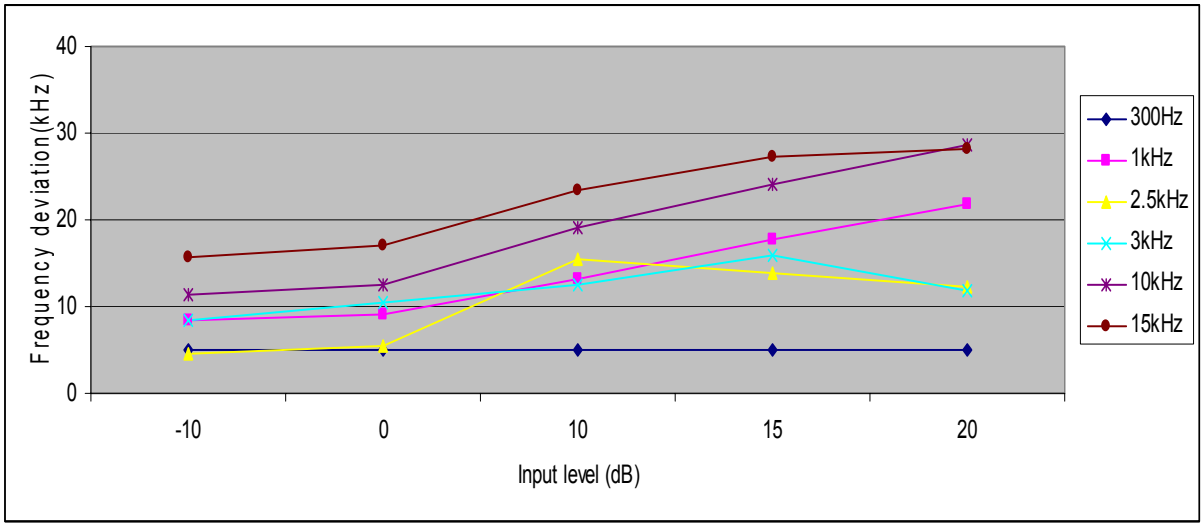
1). Configure the EUT as shown in diagram 4, adjust the audio input to produce 50 percent modulation at 2500Hz, this level is as a reference (0dB)

2). Vary the input level to at least 20dB higher than the saturation point;

2). Repeat step 1 with input frequency changing to 300Hz, 1kHz, 2.5kHz, 3kHz, 10kHz and 15kHz in sequence.

Measurement result for modulation limit:

Modulation (dB)		-10	0	10	15	20
300Hz	kHz	4.9	5.0	4.9	5.0	5.0
1kHz	kHz	8.4	9.1	13.2	17.8	21.9
2.5kHz	kHz	4.6	5.4	15.5	13.8	12.2
3kHz	kHz	8.3	10.5	12.5	16.0	11.8
10kHz	kHz	11.3	12.5	19.0	24.0	28.6
15kHz	kHz	15.7	17.0	23.5	27.2	28.2



Measurement result for Maximum Deviation and Necessary Bandwidth:

According to modulation limit of Modulation Characteristics, the Maximum Deviation and Necessary Bandwidth are list in the following table 5 and 6, the rule for Necessary bandwidth is according to part 2.202(g).

Table 5: Maximum Deviation

Reading:	28.6kHz
Limit:	± 75kHz

Table 6: Necessary Bandwidth (Bn)

Parameter:	M	D
Reading	15kHz	28.2kHz
Bn:	86.4kHz	
Limit:	200kHz	
Emission Designator:	86K4F3E	
Bn=2M+2D*K Bn: operation bandwidth M: Max. Modulation Frequency D: Peak Frequency Deviation K=1		

5.6 Occupied Bandwidth and Emission Mask for FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)

RESULT: **Pass**

Date of testing	:	01.Jun.2010 / 20.Jul.2010
Test specification	:	FCC Part 2 Per Section 2.1049(c)1
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.11
Limits	:	FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)
Operation mode	:	Transmitting (modulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	23°C
Humidity	:	50%

Measurement procedure:

1. Connect the EUT as diagram 4 in Section 4.5.

2. Plot the unmodulated chart shows on spectrum.

3. Set to 2500 Hz tone at an input level to produce the 50 percent modulation.

4. Set the input level 16 dB greater than that necessary to produce 50 percent modulation at 2500Hz, Emission Mask was measured with the spectrum analyzer controls set as shown on the test result;

5. Keep on the input level, Emission Mask were measured on frequencies 300Hz, 1 kHz, 2.5 kHz, 5 kHz and 15 kHz,

6. The 99% emitted energy Occupied Bandwidth were measured at frequencies 2.5 kHz, 5 kHz and 15 kHz.

Measurement result:

Please refer to appendix 1 of this report for result.

5.7 Frequency Tolerance for FCC Part 74 Per Section 74.861(e)(4)

RESULT: **Pass**

Date of testing	:	21.Jun.2010
Test specification	:	FCC Part 2 Per Section 2.1055
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.2
Limits	:	FCC Part 74 Per Section 74.861(e)(4)
Operation mode	:	Transmitting (unmodulated)
Power supply	:	DC3.7V (battery powered)
Temperature	:	-30°C to 50°C
Humidity	:	50%

Measurement procedure:

A. Frequency stability versus environmental temperature

1. Setup the configuration as diagram 4 in section 4.5 for frequency measured inside an environment chamber and install new battery in the EUT.

2. Turn on EUT and set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz and Frequency Span to 50kHz.Record this frequency as reference frequency.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

B. Frequency stability versus input voltage

1. Setup the configuration as diagram 4 for frequencies measurement at temperature range from15 ℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used.

2. Set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz. Record this frequency as reference frequency.

3. Set the supply voltage to the nominal voltage of the EUT.

4. Turn the EUT on and measure the EUT operating frequency

5. Repeat step 4 with decreased supply voltage, record all measured frequencies on each voltage step.

6. Stop the test until the lowest voltage specified by the manufacturer is reached or the EUT case to emission radio signal.

Table 7: the measurement of Frequency Tolerance (temperature)

Test condition	Power supply	Low Frequency (MHz) (642.375)	High Frequency (MHz) (645.750)
-30°C	DC3.7V	642.346875	645.719250
-20°C	DC3.7V	642.356750	645.729500
-10°C	DC3.7V	642.366375	645.739750
0°C	DC3.7V	642.373500	645.747750
10°C	DC3.7V	642.377625	645.753000
20°C	DC3.7V	642.379000	645.755875
30°C	DC3.7V	642.379250	645.757000
40°C	DC3.7V	642.378125	645.756625
50°C	DC3.7V	642.377625	645.756250
Frequency Error:		0.028125	0.03075
Frequency tolerance:		0.0044%	0.0048%
Frequency Tolerance Limit:		0.005%	

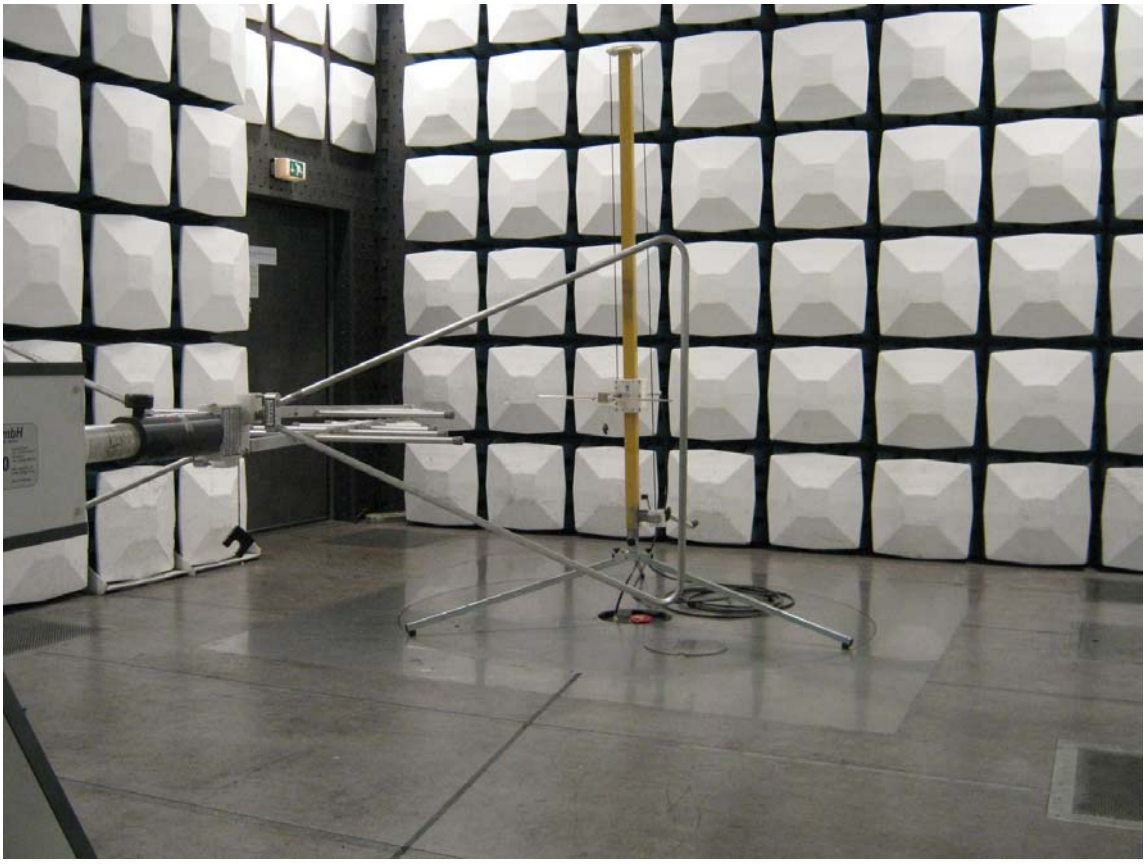
Table 8: The measurement of Frequency Tolerance (supply voltage)

Temperature (°C)	Power supply	Low Frequency (MHz) (642.375)	High Frequency (MHz) (645.750)
25	DC3.7V	642.379500	645.757500
25	DC3.3V	642.379875	645.757625
25	DC3.1V	642.379891	645.757644
25	DC4.1V	642.379625	645.757625
25	DC4.3V	642.379683	645.757637
Frequency Error:		0.004891	0.007644
Frequency tolerance:		0.0008%	0.0011%
Frequency Tolerance Limit:		0.005%	

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Radiation Measurement below 1GHz

Substitute antenna



Photograph 2: Set-up for Radiation Measurement above 1GHz

Substitute antenna

7 List of Tables

8 List of Photographs