APPLICATION CERTIFICATION On Behalf of XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD

Soft Spa Massaging Bath Pillow Remote Control Model No.: AB225

FCC ID: YMX-AB225

Prepared for : XIAMEN COMFORT SCIENCE & TECHNOLOGY

GROUP CO., LTD

Address : 18# LONGSHAN SOUTH ROAD, XIAMEN, FUJIAN

CHINA

Prepared by : ACCURATE TECHNOLOGY CO., LTD

Address : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.

Science & Industry Park, Nanshan, Shenzhen, Guangdong

P.R. China

Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number : ATE20101530
Date of Test : July 20, 2010
Date of Report : July 22, 2010

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Test Report Certification

Applicant : XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD

Manufacturer Zhangzhou Easepal Industrial Co., LTD

EUT Description : Soft Spa Massaging Bath Pillow Remote Control

(A) MODEL NO.: AB225

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: 4.5V DC ("AAA" batteries 3×)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.231 ANSI 63.4: 2003

The device described above is tested by ACCURATE TECHNOLOGY CO., LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.231. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO., LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO., LTD.

July 20, 2010

Date of Test:	July 20, 2010
Prepared by :	Joe
	(Engineer)
Approved & Authorized Signer :	Lemb
	(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT : Soft Spa Massaging Bath Pillow Remote Control

Model Number : AB225

Power Supply : 4.5V DC ("AAA" batteries $3\times$)

Operation Frequency : 433.9MHz

Applicant : XIAMEN COMFORT SCIENCE & TECHNOLOGY

GROUP CO., LTD

Address : 18# LONGSHAN SOUTH ROAD, XIAMEN, FUJIAN

CHINA

Manufacturer : Zhangzhou Easepal Industrial Co., LTD

Address : No.288 Jiaosong Road, Longchi Industrial Zone

Zhangzhou City, Fujian Province, P.R. China

Date of sample received: July 15, 2010

Date of Test : July 20, 2010

1.2.Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC

The Registration Number is 752051

Listed by Industry Canada

The Registration Number is 5077A-2

Accredited by China National Accreditation Committee

for Laboratories

The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO., LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.

Science & Industry Park, Nanshan, Shenzhen, Guangdong

P.R. China

1.3. Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2

(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2

(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2

(Above 1GHz)

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Туре	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 9, 2011
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 9, 2011
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 9, 2011
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 9, 2011
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 9, 2011
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 9, 2011
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 9, 2011
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 9, 2011
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 9, 2011
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 9, 2011

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission	N/A
Section 15.231(b)	Radiated Emission	Compliant
Section 15.231(c)	20dB Bandwidth	Compliant
Section 15.231(a)(1)	Release Time	Compliant
	Measurement	

The product is a manually operated Remote Control transmitter. Section 15.231 (a) (2), (3), (4) and (5) are not applicable.

4. THE FIELD STRENGTH OF RADIATION EMISSION

4.1.Block Diagram of Test Setup

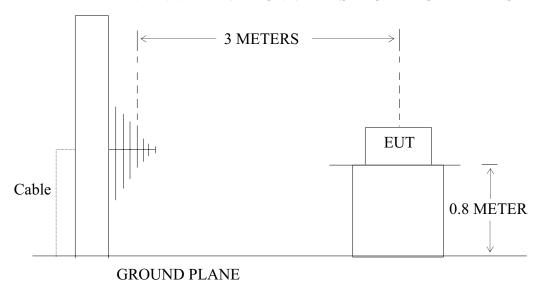
4.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Soft Spa Massaging Bath Pillow Remote Control)

4.1.2.Semi-Anechoic Chamber Test Setup Diagram

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



(EUT: Soft Spa Massaging Bath Pillow Remote Control)

4.2. The Field Strength of Radiation Emission Measurement Limits

4.2.1. Radiation Emission Measurement Limits According to FCC Part 15 Section 15.231(b)

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [µV/m]	Field Strength of Spurious Emission [Average] [µV/m]
40.66-40.70	2250	225
70-130	1250	125
130-174	1250-3750	125-375
174-260	3750	375
260-470	3750-12500	375-1250
Above 470	12500	1250

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

4.2.2. Restricted Band Radiation Emission Measurement Limits According to FCC part 15 Section 15.205 and Section15.209.

4.3. Configuration of EUT on Measurement

The following equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1. Soft Spa Massaging Bath Pillow Remote Control (EUT)

Model Number : AB225 Serial Number : N/A

Manufacturer : Zhangzhou Easepal Industrial Co., LTD

4.4. Operating Condition of EUT

- 4.4.1. Setup the EUT and simulator as shown as Section 4.1.
- 4.4.2. Turn on the power of all equipment.
- 4.4.3. Let the EUT work in TX mode measure it.

4.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI 63.4 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 120 kHz in 30-1000 MHz, and 1 MHz in 1000-5000 MHz.

The frequency range from 30 MHz to 5000 MHz is checked.

4.6. The Field Strength of Radiation Emission Measurement Results **PASS.**

The frequency range 30MHz to 5000MHz is investigated.

Date of Test: 25°C July 20, 2010 Temperature: Soft Spa Massaging Bath Pillow 50% EUT: Remote Control Humidity: $\overline{4.5}$ V DC ("AAA" batteries 3×) Model No.: **AB225** Power Supply: Test Mode: TXTest Engineer: Joe

Frequency (MHz)	Reading (dBµV/m)	Factor Corr.	Average Factor	Result(c	esult($dB\mu V/m$) Limit($dB\mu V/m$)		Margi	in(dB)	Polarization	
	PEAK	(dB)	(dB)	AV	PEAK	AV	PEAK	AV	PEAK	
433.8560	58.09	22.95	-3.71	77.69	81.04	80.8	100.8	-3.11	-19.76	
867.7040	31.44	28.64	-3.71	56.37	60.08	60.8	80.8	-4.43	-20.72	
*1301.552	67.04	-12.20	-3.71	51.13	54.84	54.0	74.0	-2.87	-19.16	
1735.474	63.83	-10.39	-3.71	49.73	53.44	60.8	80.8	-11.07	-27.36	Horizontal
2169.256	61.57	-8.38	-3.71	49.48	53.19	60.8	80.8	-11.32	-27.61	
2603.116	58.83	-6.72	-3.71	48.40	52.11	60.8	80.8	-12.40	-28.69	
433.8560	53.90	22.95	-3.71	73.14	76.85	80.8	100.8	-7.66	-23.95	
867.7040	26.06	28.64	-3.71	50.99	54.70	60.8	80.8	-9.81	-26.10	
*1301.552	66.55	-12.20	-3.71	50.64	54.35	54.0	74.0	-3.36	-19.65	***
1735.474	63.77	-10.39	-3.71	49.67	53.38	60.8	80.8	-11.13	-27.42	Vertical
2169.256	60.79	-8.38	-3.71	48.70	52.41	60.8	80.8	-12.10	-28.39	
2603.116	58.76	-6.72	-3.71	48.23	52.04	60.8	80.8	-12.57	-28.76	

Note:

- 1. Emissions attenuated more than 20 dB below the permissible value are not reported.
- 2. *: Denotes restricted band of operation.

Measurements were made using a peak detector and average detector. Any emission falling within the restricted bands of FCC Part 15 Section 15.205 were compliance with the emission limit of FCC Part 15 Section 15.209.

3. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain

- 4. FCC Limit for Average Measurement = 41.6667(433.9)- $7083.3333 = 10995.84783 ~\mu\text{V/m} = 80.8 ~dB ~\mu\text{V/m}$
- 5. The spectral diagrams in appendix I display the measurement of peak values.

5. 20DB OCCUPIED BANDWIDTH

5.1.Block Diagram of Test Setup

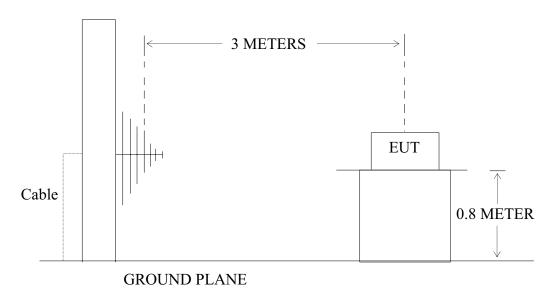
5.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Soft Spa Massaging Bath Pillow Remote Control)

5.1.2.Semi-Anechoic Chamber Test Setup Diagram

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



(EUT: Soft Spa Massaging Bath Pillow Remote Control)

5.2. The Bandwidth of Emission Limit According To FCC Part 15 Section

15.231(c)

The bandwidth of emission shall be no wider than 0.25% of the center frequency. Therefore, the bandwidth of the emission limit is $433.9 \text{ MHz} \times 0.25\% = 1084.75 \text{ kHz}$. Bandwidth is determined at the two points 20 dB down from the top of modulated carrier.

5.3.EUT Configuration on Measurement

The following equipment are installed on the bandwidth of emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.3.1.Soft Spa Massaging Bath Pillow Remote Control (EUT)

Model Number : AB225 Serial Number : N/A

Manufacturer : Zhangzhou Easepal Industrial Co., LTD

5.4. Operating Condition of EUT

- 5.4.1. Setup the EUT and simulator as shown as Section 5.1.
- 5.4.2. Turn on the power of all equipment.
- 5.4.3.Let the EUT work in TX mode measure it.

5.5.Test Procedure

- 5.5.1. Set SPA Center Frequency = Fundamental frequency, RBW = 10 kHz, VBW = 30 kHz, Span = 500 kHz.
- 5.5.2.Set SPA Max hold, Mark peak, -20 dB.

5.6.Measurement Result

The EUT does meet the FCC requirement.

-20 dB bandwidth = 49 kHz < 1084.75 kHz.

The spectral diagrams in appendix I.

6. RELEASE TIME MEASUREMENT

6.1.Block Diagram of Test Setup

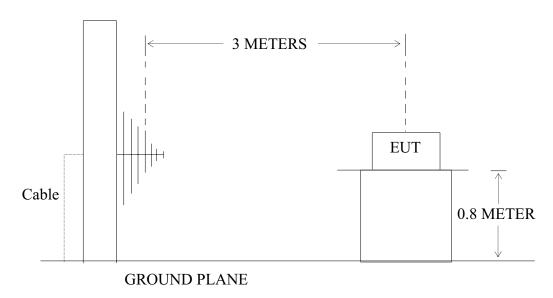
6.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Soft Spa Massaging Bath Pillow Remote Control)

6.1.2.Semi-Anechoic Chamber Test Setup Diagram

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



(EUT: Soft Spa Massaging Bath Pillow Remote Control)

6.2. Release Time Measurement According To FCC Part 15 Section 15.231(a)

Section 15.231(a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.3.EUT Configuration on Measurement

The following equipment are installed on Release Time Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.3.1. Soft Spa Massaging Bath Pillow Remote Control (EUT)

Model Number : AB225 Serial Number : N/A

Manufacturer : Zhangzhou Easepal Industrial Co., LTD

6.4. Operating Condition of EUT

- 6.4.1. Setup the EUT and simulator as shown as Section 6.1.
- 6.4.2. Turn on the power of all equipment.
- 6.4.3.Let the EUT work in TX mode measure it.

6.5. Test Procedure

- 6.5.1. Set SPA Center Frequency = Fundamental frequency, RBW = 100 kHz, VBW = 300 kHz, Span = 0 Hz. Sweep time = 5 s.
- 6.5.2.Set EUT as normal operation and press Transmitter button.
- 6.5.3.Set SPA View. Delta Mark time.

6.6. Measurement Result

The release time less than 5 seconds.

Release Time= 118 ms

The spectral diagrams in appendix I.

7. AVERAGE FACTOR MEASUREMENT

7.1.Block Diagram of Test Setup

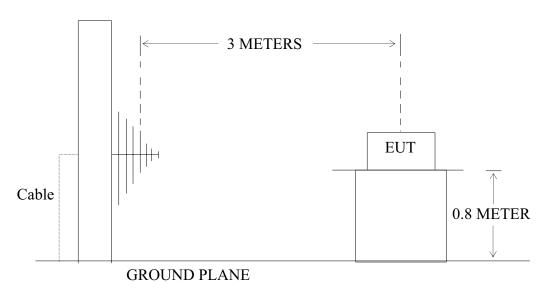
7.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Soft Spa Massaging Bath Pillow Remote Control)

7.1.2.Semi-Anechoic Chamber Test Setup Diagram

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



(EUT: Soft Spa Massaging Bath Pillow Remote Control)

7.2. Average factor Measurement according to ANSI 63.4: 2003

ANSI 63.4: 2003 Section 13.1.4.2 Devices transmitting pulsed emissions and subject to a limit requiring an average detector function for radiated emissions shall initially be measured with an instrument that uses a peak detector. A radiated emission measured with a peak detector may then be corrected to a true average using the appropriate factor for emission duty cycle. This correction factor relates the measured peak level to the average limit and is derived by averaging absolute field strength over one complete pulse train that is 0.1 s, or less, in length. If the pulse train is longer than 0.1 s, the average shall be determined from the average absolute field strength during the 0.1 s interval in which the field strength is at a maximum. Instructions on calculating the duty cycle of a transmitter with pulsed emissions are provided in ANSI 63.4 H.4, step j.

Average factor in $dB = 20 \log (duty \text{ cycle})$

7.3.EUT Configuration on Measurement

The following equipment are installed on average factor Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.3.1. Soft Spa Massaging Bath Pillow Remote Control (EUT)

Model Number : AB225 Serial Number : N/A

Manufacturer : Zhangzhou Easepal Industrial Co., LTD

7.4. Operating Condition of EUT

- 7.4.1. Setup the EUT and simulator as shown as Section 7.1.
- 7.4.2. Turn on the power of all equipment.
- 7.4.3.Let the EUT work in TX mode measure it.

7.5.Test Procedure

- 7.5.1. The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation.
- 7.5.2.Set SPA Center Frequency = Fundamental frequency, RBW = 100 kHz, VBW = 300 kHz, Span = 0 Hz.
- 7.5.3.Set EUT as normal operation.
- 7.5.4.Set SPA View. Delta Mark time.

7.6. Measurement Result

The duty cycle is simply the on time divided by the period:

The duration of one cycle = 36.6 msEffective period of the cycle = $(0.63 \times 8) + (1.23 \times 8) + 3 + 6 \text{ ms} = 23.88 \text{ ms}$

$$DC = 23.88 \text{ ms}/36.6 \text{ ms} = 0.652$$

Therefore, the average factor is found by $20\log 0.652 = -3.71dB$

The spectral diagrams in appendix I.

APPENDIX I (Test Curves)



F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 966 chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: RTTE #5526

Standard: FCC Class B 3M Radiated

Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 50 %

EUT: Soft Spa Massaging Bath Pillow Remote Control

Mode: TX

Model: AB225

Manufacturer: Zhangzhou Easepal Industrial Co., Ltd.

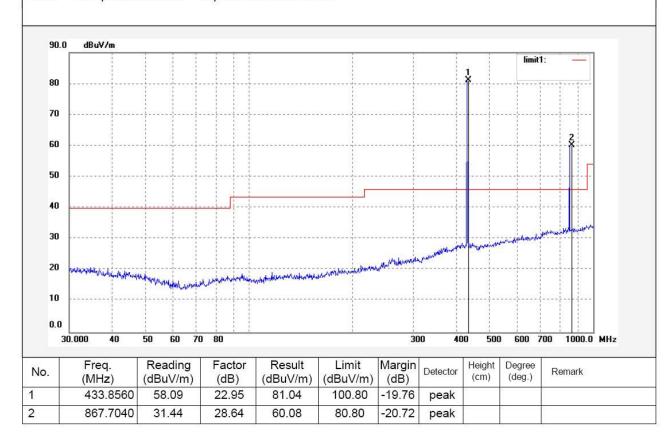
Note: Sample No.:101739 Report No.:ATE20101530

Polarization: Horizontal Power Source: DC 4.5V

Date: 2010/07/20 Time: 10:16:17

Engineer Signature: Joe

Distance: 3m





F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 966 chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: RTTE #5527

Standard: FCC Class B 3M Radiated

Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 50 %

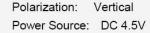
EUT: Soft Spa Massaging Bath Pillow Remote Control

Mode: TX

Model: AB225

 $\label{thm:manufacturer: Zhangzhou Easepal Industrial Co., Ltd.} \\$

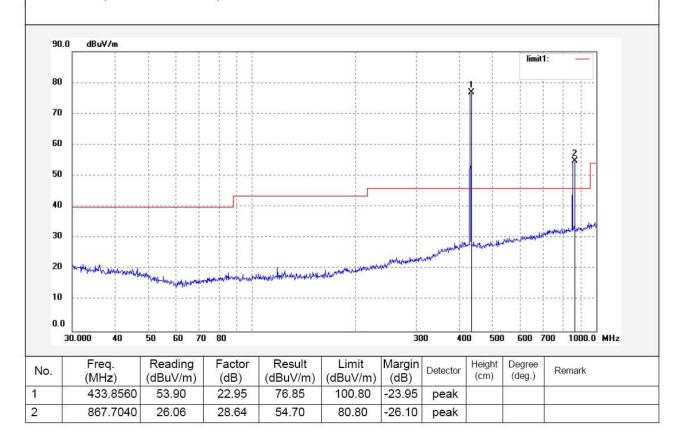
Note: Sample No.:101739 Report No.:ATE20101530



Date: 2010/07/20 Time: 10:20:30

Engineer Signature: Joe

Distance: 3m





F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 966 chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: RTTE #5523

Standard: FCC Class B 3M Radiated

Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 50 %

Sample No.:101739

EUT: Soft Spa Massaging Bath Pillow Remote Control

Mode: TX

Note:

Model: AB225

Manufacturer: COMFORT

Manufacturer. COMI ON

Date: 2010/07/20 Time: 9:49:26

Engineer Signature: Joe

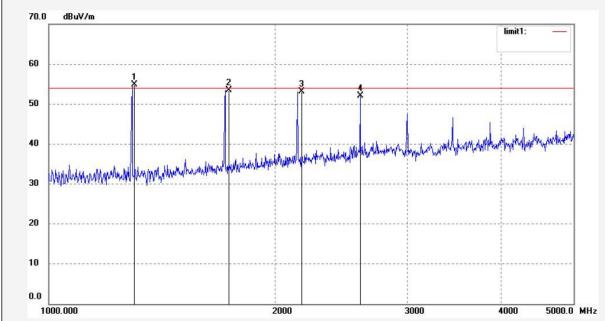
Power Source: DC 4.5V

Horizontal

Distance: 3m

Polarization:

Report No.:ATE20101530



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	1301.552	67.04	-12.20	54.84	74.00	-19.16	peak				
2	1735.474	63.83	-10.39	53.44	80.80	-27.36	peak				
3	2169.256	61.57	-8.38	53.19	80.80	-27.61	peak				
4	2603.116	58.83	-6.72	52.11	80.80	-28.69	peak				



F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park, Nanshan Shenzhen, P.R. China

Site: 966 chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: RTTE #5522

Standard: FCC Class B 3M Radiated

Test item: Radiation Test Temp.(C)/Hum.(%) 25 C / 50 %

EUT: Soft Spa Massaging Bath Pillow Remote Control

Mode: TX

AB225 Model:

Manufacturer: COMFORT

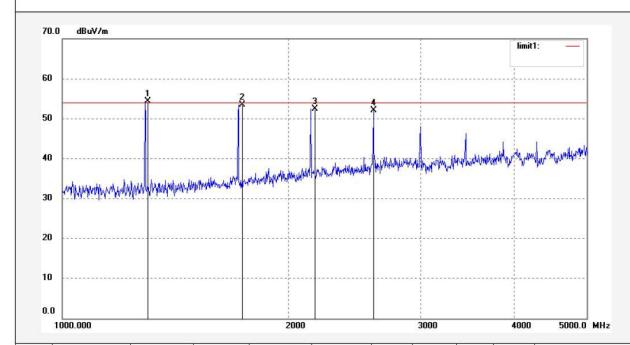
Polarization: Vertical Power Source: DC 4.5V

Date: 2010/07/20 Time: 9:45:01

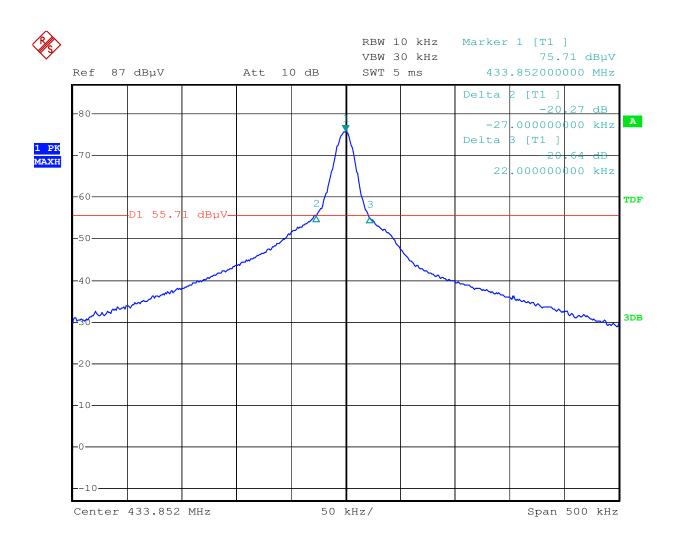
Engineer Signature: Joe

Distance: 3m

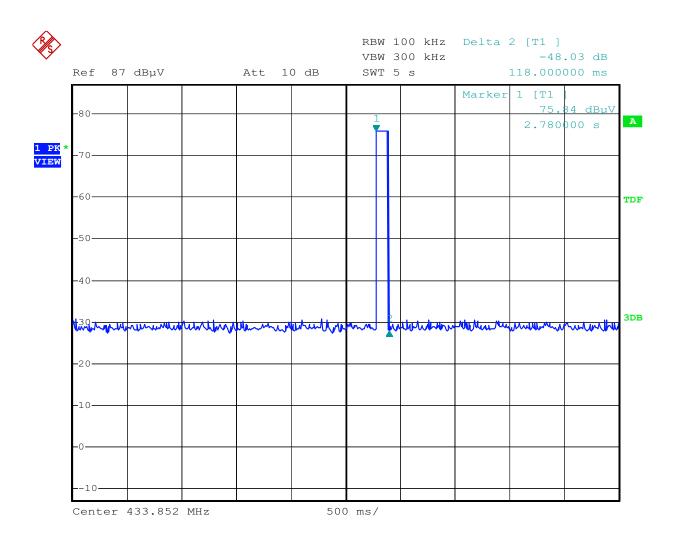
Note: Sample No.:101739 Report No.:ATE20101530



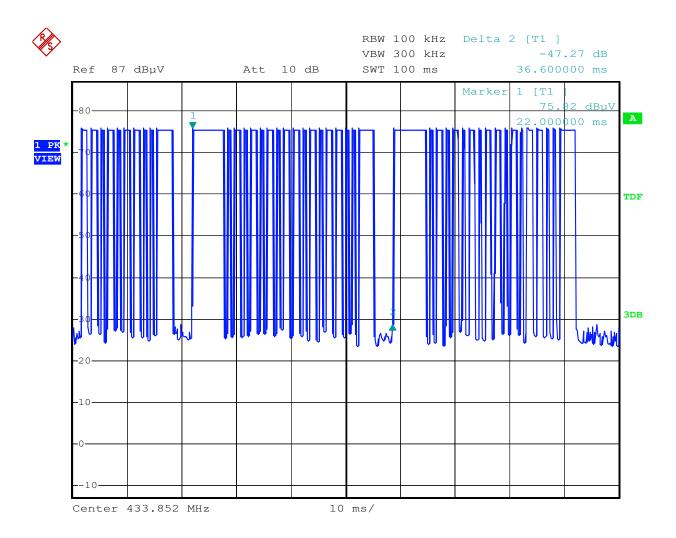
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1301.552	66.55	-12.20	54.35	74.00	-19.65	peak			
2	1735.474	63.77	-10.39	53.38	80.80	-27.42	peak			
3	2169.256	60.79	-8.38	52.41	80.80	-28.39	peak			
4	2603.116	58.76	-6.72	52.04	80.80	-28.76	peak			



Date: 20.JUL.2010 14:31:22

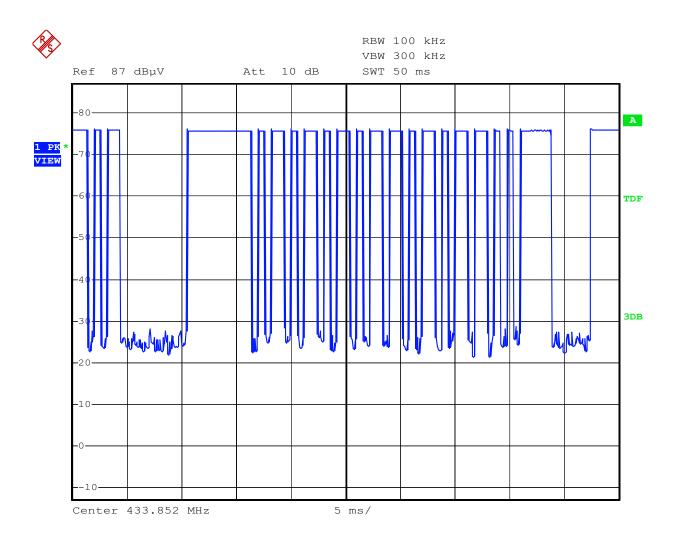


Date: 20.JUL.2010 14:40:12



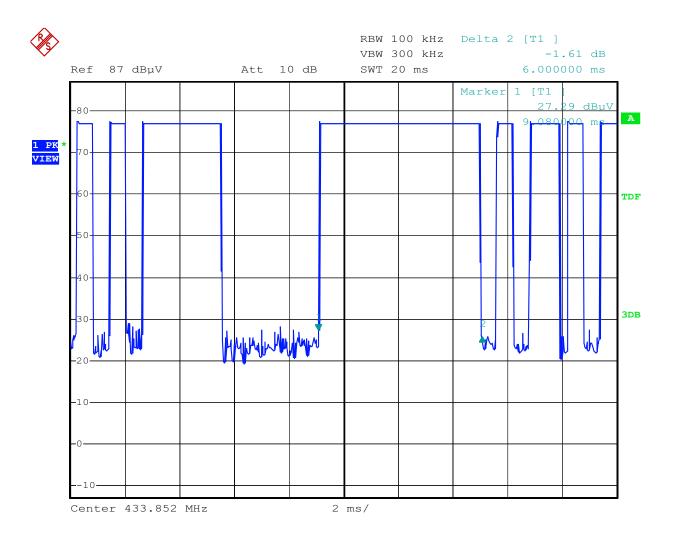
Date: 20.JUL.2010 14:45:22

The graph shows the pattern of coding during the signal transmission. The duration of one cycle = 36.6 ms.



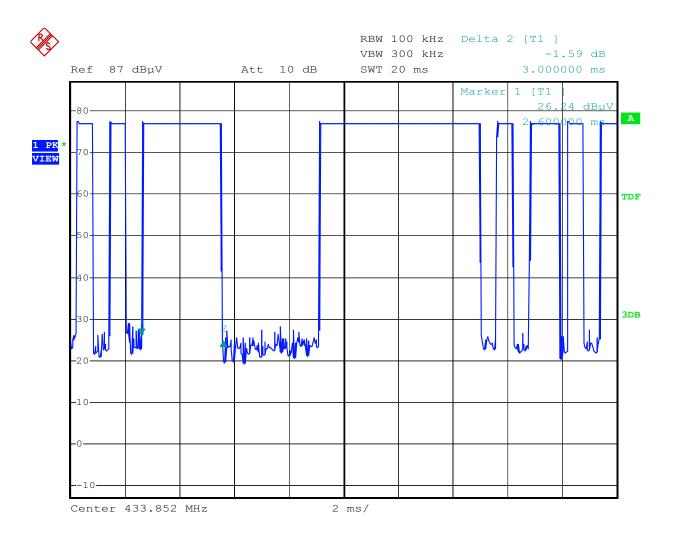
Date: 20.JUL.2010 14:51:40

The graph shows the pattern of coding during the signal transmission.



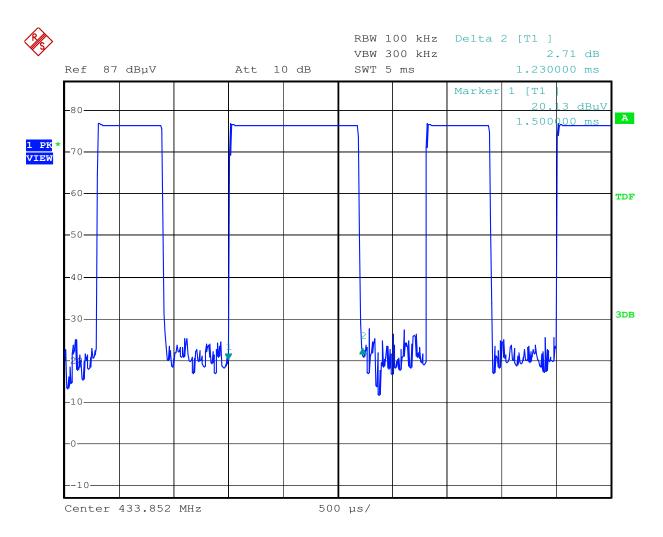
Date: 20.JUL.2010 14:54:10

The graph shows the duration of 'on' signal. From marker 1 to marker 2, duration is 6 ms.



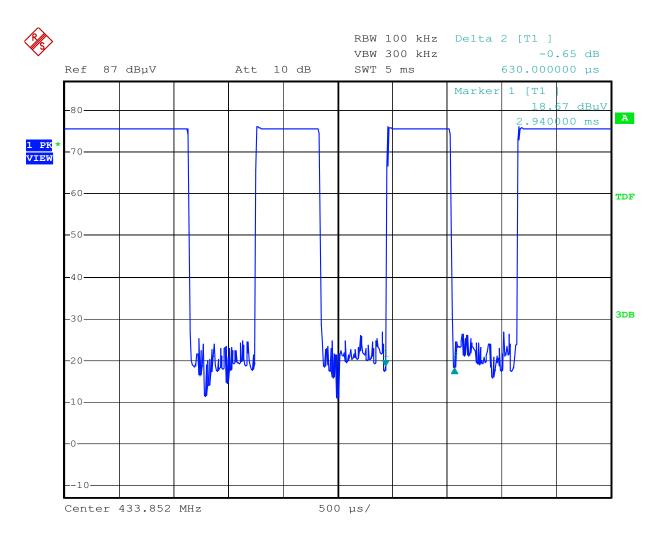
Date: 20.JUL.2010 14:54:46

The graph shows the duration of 'on' signal. From marker 1 to marker 2, duration is 3 ms.



Date: 20.JUL.2010 14:57:54

The graph shows the duration of 'on' signal. From marker 1 to marker 2, duration is 1.23 ms.



Date: 20.JUL.2010 15:00:43

The graph shows the duration of 'on' signal. From marker 1 to marker 2, duration is 0.63 ms.