

<b>Prüfbericht - Nr.: 15023067 001</b>			Seite 1 von 27 Page 1 of 27		
<i>Test Report No.:</i>					
<b>Auftraggeber:</b> <i>Client:</i>		Intex Development Co., Ltd 9th Floor Dah Sing Financial Centre 108 Gloucester Road, Wanchai Hong Kong			
<b>Gegenstand der Prüfung:</b> Remote Control for Electric Air Pump <i>Test item:</i>					
<b>Bezeichnung:</b> <i>Identification:</i>		AP619DW		<b>Serien-Nr.:</b> N/A <i>Serial No.:</i>	
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>		153068217		<b>Eingangsdatum:</b> 21.11.2006 <i>Date of receipt:</i>	
<b>Prüfart:</b> <i>Testing location:</i>		Refer to section 1.1			
<b>Prüfgrundlage:</b> <i>Test specification:</i>		FCC Part 15, Subpart C			
<b>Prüfresultat:</b> <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>			
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>		TÜV Rheinland (Shanghai) Co., Ltd.			
<b>geprüft/ tested by:</b>			<b>kontrolliert/ reviewed by:</b>		
19.10.2007	Kong Xiangming/PE	<i>Kong Xiangming</i>	19.10.2007	Lu Xinhua/TC	<i>Lu Xinhua</i>
<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>	<i>Unterschrift</i> <i>Signature</i>	<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>	<i>Unterschrift</i> <i>Signature</i>
<b>Sonstiges/ Other Aspects:</b> FCC ID SVYAP619DW					
<b>Abkürzungen:</b>			<b>Abbreviations:</b>		
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		
<p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b></p> <p><i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i></p>					

## TEST SUMMARY

### 5.1.1 RADIATED EMISSION OF CARRIER FREQUENCY

*Result:*

*Passed*

### 5.1.2 SPURIOUS RADIATED EMISSIONS

*Result:*

*Passed*

### 5.1.3 BANDWIDTH MEASUREMENT

*Result:*

*Passed*

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## 1 Test Sites

### 1.1 Test Facilities

**Laboratory: TÜV Rheinland (Shanghai) Laboratory**

**Address: Building 2, No. 777 Guangzhong Road West, Shanghai 200072, P.R. China**

The used test equipment below 1GHz is in accordance with CISPR 16-1 series standards for measurement of radio interference.

### 1.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

<b>No.</b>	<b>Equipment</b>	<b>Model</b>	<b>Serial no.</b>	<b>Cal. due date</b>
1.	Spectrum analyzer	FSP30	100192	10.06.2008
2.	EMI test receiver	ESIB26	100227	10.06.2008
3.	EMI test receiver	ESCI	100280	03.12.2007
4.	Artificial mains network	NNB 42	04/10048	29.02.2008
5.	Broadband antenna	BTA-H	040005H	20.03.2008
6.	Double ridged broadband horn antenna	BBHA 9120 D	9120D-434	21.06.2007
7.	Broadband coaxial preamplifier	BBV 9718	9718-012	12.04.2008
8.	Broadband coaxial preamplifier	BBV 9740	9740-110	12.04.2008
9.	3m modified semi-anechoic chamber	SAC	-	12.02.2010
10.	DC power supply	0-60V/2A	0502073	08.08.2007

## 2 General Product Information

### 2.1 Product Function and Intended Use

The equipment under test (EUT) is a transmitter for the electric air pump operating at 433.920MHz.

The transmitter has three push-to-operate switches that will automatically and immediately deactivate the transmitter when release the switch, hence transmitter will be ceased to operate within not more than 5 seconds of being released.

FCC ID SVYAP619DW

Model	Product description
AP619DW	Remote Control For Electric Air Pump

### 2.2 Circuit Description

Two 1.5V batteries are used in this board, special IC HX2262 for remote control is used as main control circuit which was processed with CMOS and is also a remote control coding circuit, whose datum and address are coded into series strand codes. The datum is coded with the high level of HX2262 digit pin controlled by the three trigger switches, and then the codes are sent out through 433.92MHz carrier by high frequency oscillator.

### 2.3 Ratings and System Details

		Transmitter
Frequency range	:	433.920MHz
Crystal tolerance	:	+/-100kHz
Number of channels	:	1
Type of antenna	:	Integral antenna
Power supply	:	DC 3V
Ports	:	None
Protection Class	:	III

### 2.4 Independent Operation Modes

The basic operation modes are:

- Remote Control: It has a push to operate switch and is under manual control at all transmission time. It will cease transmission immediately when the switch is released. The EUT has three control buttons to control the inflation and deflation of the pump.

For further information refer to User Manual.

## 2.5 Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork

## 2.6 Related Submittal(s) Grants

This is a single application for certification of the transmitter.

### **3 Test Set-up and Operation Modes**

#### **3.1 Principle of Configuration Selection**

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

#### **3.2 Test Operation and Test Software**

Test operation should refer to test methodology.

- There was no special software to exercise the device.

#### **3.3 Special Accessories and Auxiliary Equipment**

None.

#### **3.4 Countermeasures to achieve EMC Compliance**

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.

## 4 Test Methodology

### 4.1 Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003.

The equipment under test (EUT) was placed on an 80 cm high turntable, and measurement distance is 3 meters. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

### 4.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the EMI test receiver or spectrum analyzer to the factors associated with antenna correction factor, cable loss and preamplifier.

The equation is expressed as follow:

$$FS = R + AF + CF - PA$$

Where FS = Field strength in dBuV/m at 3 meters.  
R = Reading of spectrum analyzer in dBuV.  
AF = Antenna factor in dB/m.  
CF = Cable attenuation Factor in dB.  
PA = Preamplifier factor in dB.



## 5 Test Result

### 5.1.1 Radiated Emission of Carrier Frequency

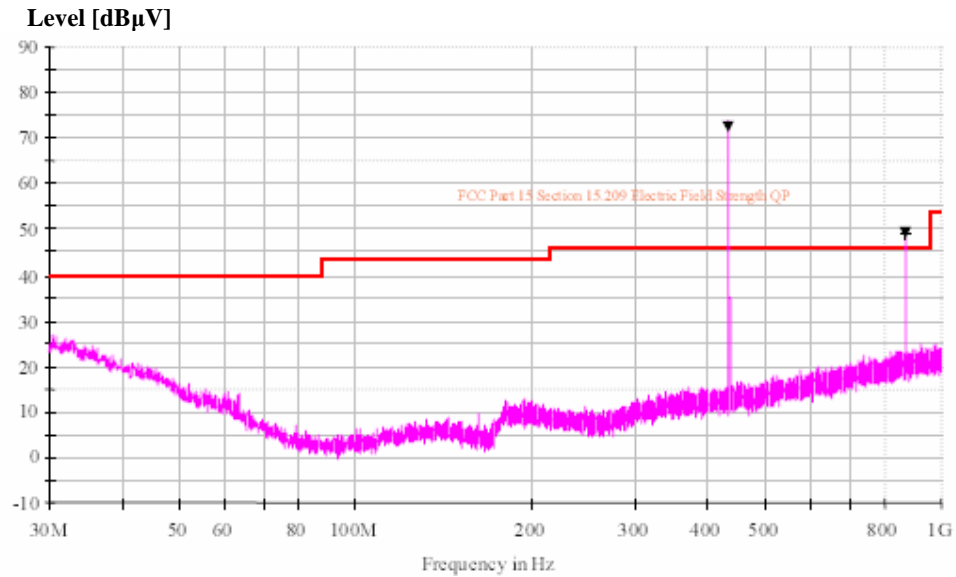
<b>Result:</b>	<b>Passed</b>
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Date of testing : 11.05.2007  
 Test specification : FCC Part 15 Section 15.231(b)(1) and (b)(2)  
 Test Method : ANSI 63.4-2003  
 Measurement location : Semi-anechoic chamber  
 Detector function : Quasi-peak  
 Measurement BW : 120 kHz  
 Supply voltage : DC 3V

Limit Section 15.231(b)

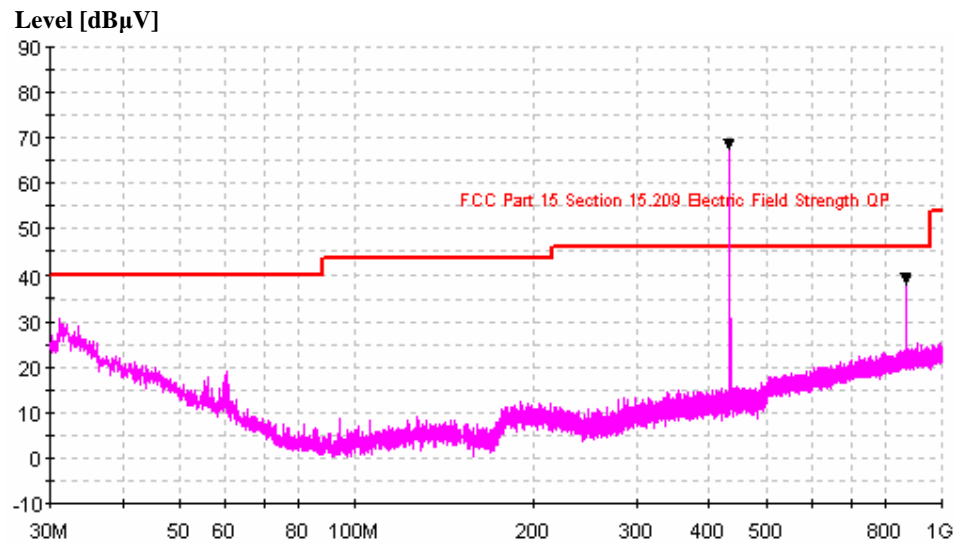
Frequency with in the band (MHz)	Quasi-peak Emission	
	(Microvolt/meter)	(dB $\mu$ V/m)
433.920	10996	80.8

The following figures and tables were those measured by an automatic measuring system. In the following figures, “+” means quasi-peak result which was measured in final measurement.

**Figure 1: Spectral diagrams and measurement results below 1GHz, Horizontal polarization**


Final quasi-peak measurement result:

Frequency (MHz)	Quasi-Peak (dBµV/m)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)	Polarization
433.906	72.6	0.5	80.8	8.2	H

**Figure 2: Spectral diagrams and measurement results below 1GHz, Vertical polarization**


Final quasi-peak measurement result:

Frequency (MHz)	Quasi-Peak (dBµV/m)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)	Polarization
433.906	68.3	0.6	80.8	12.5	V

**5.1.2 Spurious Radiated Emissions**

<b>Result:</b>	<b>Passed</b>
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Date of testing : 11.05.2007  
 Test specification : FCC Part 15 Section 15.231(b)(1) and (b)(3)  
 Test method : ANSI 63.4-2003  
 Measurement location : Semi-anechoic chamber  
 Measurement distance : 3m  
 Detector : Quasi-peak(30-1000MHz)/Peak, Average(1000MHz-4500MHz)  
 Measurement BW : 120 kHz(below 1GHz), 1MHz(above 1GHz)  
 Supply voltage : DC 3V  
 Measuring frequency range : 30-4500MHz

**Limit Section 15.231(b)**

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dB $\mu$ V/m)	Measurement distance (meters)
433.920	1099	$20 \cdot \log(1099) = 60.8$	3

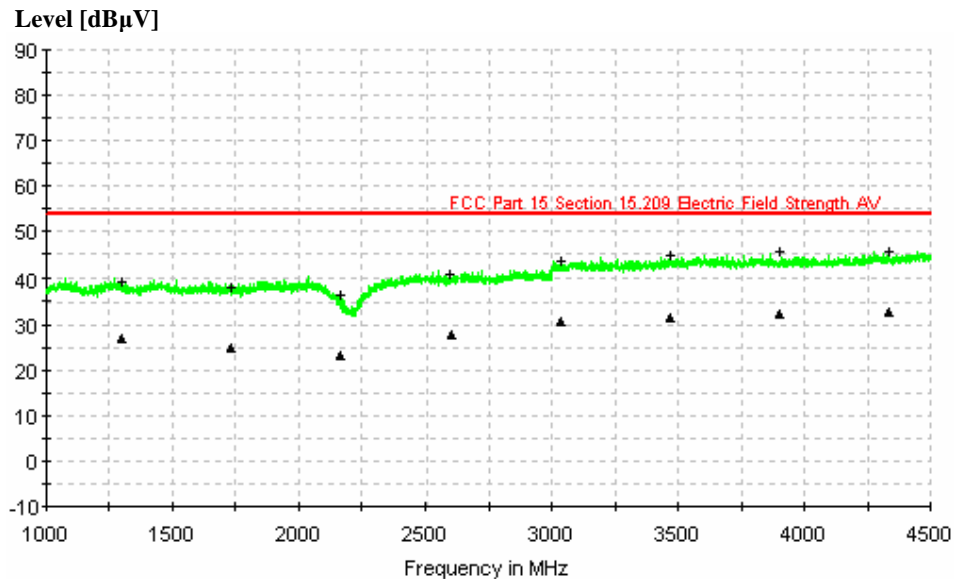
**Limit Section 15.209**

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dB $\mu$ V/m)	Measurement distance (meters)
30-88	100	$20 \cdot \log(100) = 40.0$	3
88-216	150	$20 \cdot \log(150) = 43.5$	3
216-960	200	$20 \cdot \log(200) = 46.0$	3
Above 960	500	$20 \cdot \log(500) = 54.0$	3

Note: Higher limits of above two tables apply except for restricted bands.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

The following figures and tables were those measured by an automatic measuring system. In final measurement, quasi-peak value were measured and listed respectively where they had a maximum in previous scanning survey below 1000MHz. And above 1000MHz, average emission measurements are employed. According to section 15.35(b), when average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated. In the following figures, "×" means peak value and "▼" means average value result which was measured in final measurement.

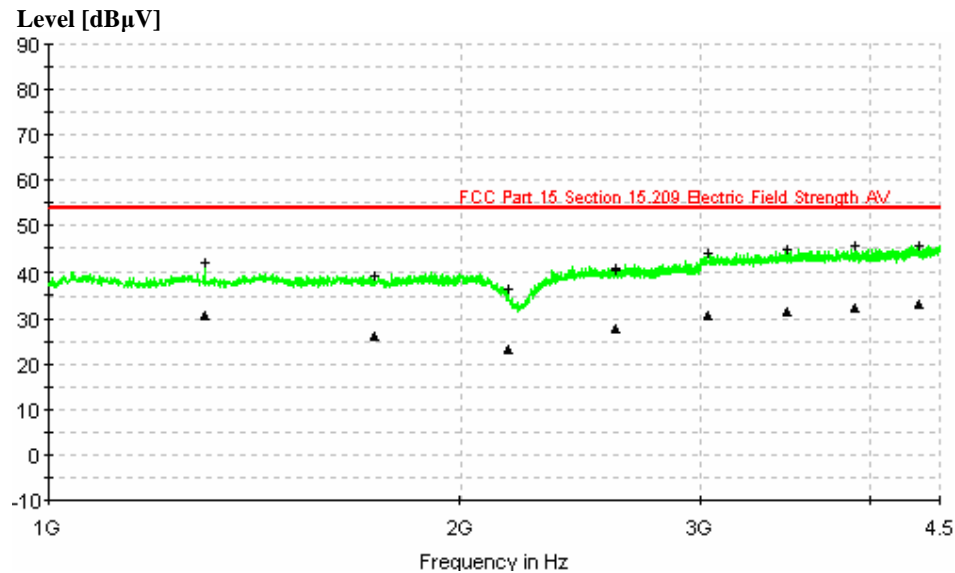
**Figure 3: Spectral diagrams and measurement results above 1GHz, Horizontal polarization**

**Final measurement result:**

Frequency (MHz)	QP/AV result (dBµV/m)	Peak result (dBµV/m)	Corr. (dB)	Limit(QP/AV detector) (dBµV/m)	Limit(Peak detector) (dBµV/m)	Margin(QP/AV detector) (dB)	Margin(Peak detector) (dB)	Polarization
867.813	49.4	N/A	9.1	60.8	80.8	11.4	N/A	H
*1301.875	27.0	39.0	-0.5	54.0	74.0	27.0	35.0	H
1735.625	24.8	37.7	1.3	60.8	80.8	36.0	43.1	H
2169.531	23.2	36.0	4.6	60.8	80.8	37.6	44.8	H
2603.438	27.8	40.6	6.7	60.8	80.8	33.0	40.2	H
3037.344	30.8	43.7	8.0	60.8	80.8	30.0	37.1	H
3471.250	31.6	44.7	9.4	60.8	80.8	29.2	36.1	H
*3905.000	32.1	45.7	11.5	54.0	74.0	21.9	28.3	H
*4339.063	32.9	45.4	13.6	54.0	74.0	21.1	28.6	H

**Remarks:**

“\*” indicates the frequency of the emissions falling into the restricted band.

Quasi-peak detector is used below 1GHz. Refer to figure 1 for detailed spectral diagram.

**Figure 4: Spectral diagrams and measurement results above 1GHz, Vertical polarization**

**Final measurement result:**

Frequency (MHz)	QP/AV result (dBµV/m)	Peak result (dBµV/m)	Corr. (dB)	Limit(QP/AV detector) (dBµV/m)	Limit(Peak detector) (dBµV/m)	Margin(QP/AV detector) (dB)	Margin(Peak detector) (dB)	Polarization
867.813	38.8	N/A	9.1	60.8	80.8	22.0	N/A	V
*1301.875	30.7	41.7	-0.5	54.0	74.0	23.3	32.3	V
1735.625	26.1	39.1	1.3	60.8	80.8	34.7	41.7	V
2169.531	23.0	36.0	4.6	60.8	80.8	37.8	44.8	V
2603.438	27.8	40.7	6.7	60.8	80.8	33	40.1	V
3037.344	30.9	44.1	8.0	60.8	80.8	29.9	36.7	V
3471.250	31.7	44.8	9.4	60.8	80.8	29.1	36	V
*3905.000	32.2	45.4	11.5	54.0	74.0	21.8	28.6	V
*4339.063	33.0	45.5	13.6	54.0	74.0	21	28.5	V

**Remarks:**

‘\*’ indicates the frequency of the emissions falling into the restricted band.

Quasi-peak detector is used below 1GHz. Refer to figure 2 for detailed spectral diagram.

**5.1.3 Bandwidth Measurement**
**Result:**
**Passed**

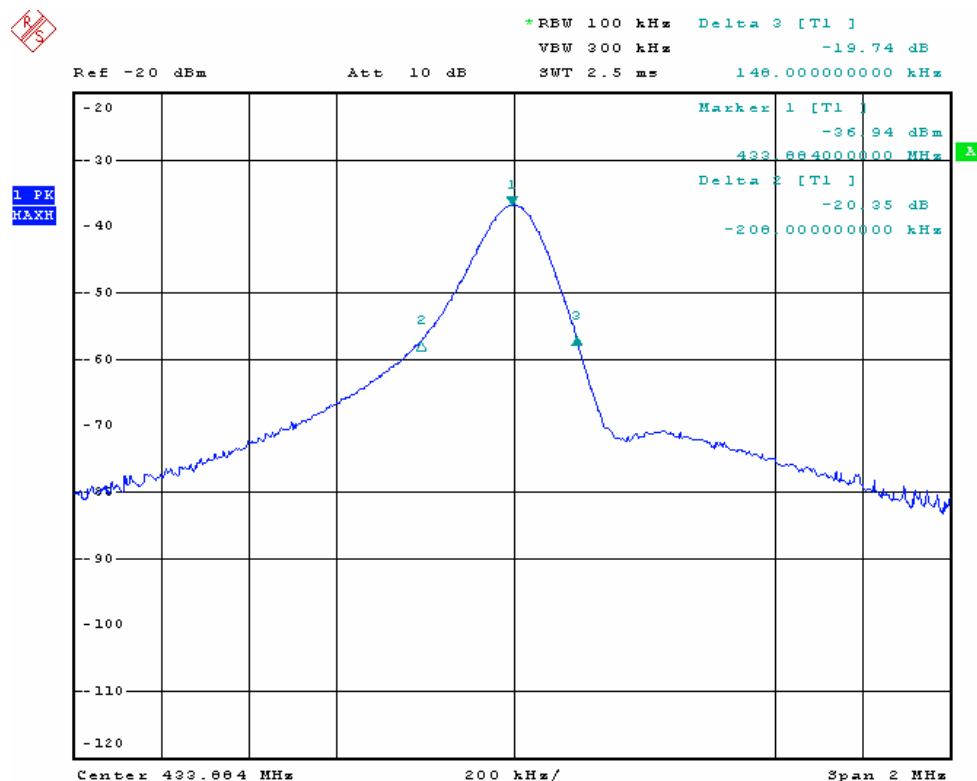
Date of testing : 13.06.2007  
 Test specification : FCC Part 15 section 231(c)  
 Port of testing : Coupling  
 Detector function : Peak  
 Supply voltage : DC 3V

Limit Section 15.231(c)

The bandwidth of the emission shall be no wider than 0.25% if the centre frequency for devices operating above 70MHz and below 900MHz.

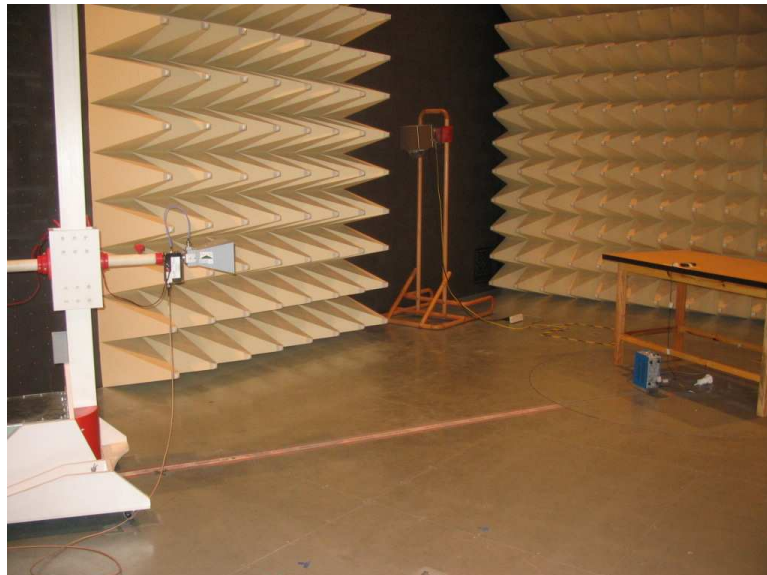
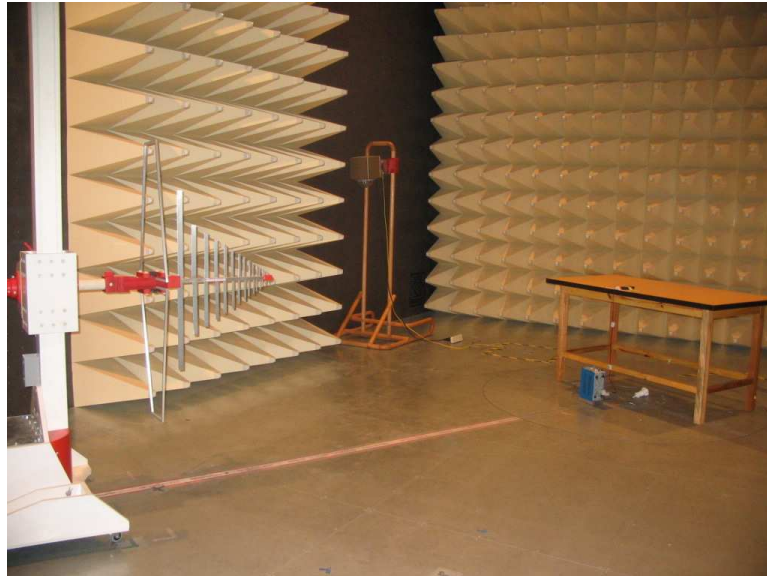
The 20dB bandwidth shall be no wider than 0.25% (1.08MHz) of the centre frequency 433.896MHz.

From the result, it shows that the 20dB points of the lower edge and upper edge are 208 kHz and 148 kHz respectively apart from the centre frequency. Therefore the bandwidth is 356 kHz, it is deemed to fulfill the requirement.

**Figure 5: Spectral Diagrams for bandwidth measurement result**


## 6 Photographs of the Test Set-Up

**Photograph 1: Set-up for radiated emissions**





**Photograph 2: Set-up for bandwidth measurement**



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