

# TEST REPORT

## 1. Applicant

**Name** : SEGI LIMITED  
**Address** : Room 1808, 18/F, Tower 2, Admiralty Center, 18  
Harcourt road, Hongkong City, 186, CHINA

## 2. Products

**Name** : Security/Remote Control transceiver (Car Alarm System)  
**Model/Type** : 2WG5R-SH  
**Manufacturer** : SEGI LIMITED

**3. Test Standard** : FCC CFR 47 Part 15, Subpart C section 15.231  
IC RSS 210 Annex I - 2007

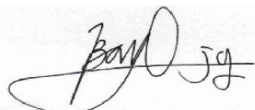
**4. Test Method** : ANSI C63.4-2003

**5. Test Result** : Positive

**6. Date of Application** : June. 26, 2010

**7. Date of Issue** : August. 4, 2010

Tested by



Jong-gon Ban

Telecommunication Center  
Engineer

Approved by



Jeong-min Kim

Telecommunication Center  
Manager

*The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.*

## Korea Testing Laboratory

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## 1. GENERAL INFORMATION

### 1.1. Applicant (Client)

Name	SEGI LIMITED
Address	Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt road, Hongkong City, 186, CHINA
Contact Person	Hyun-suk, Kim
Telephone No.	82-32-623-5550 (#278)
Facsimile No.	82-32-623-6667
E-mail address	hyunsuk@magicar.com
Manufacturer Name	SEGI LIMITED
Manufacturer Address	Chenjiapucun, Liaobu Town, Dongguan City, Guangdong Province, P.R.China(523-408)

### 1.2. Equipment (EUT)

Type of equipment	Security/Remote Control transceiver (Car Alarm System)
Model Name	2WG5R-SH
FCC ID	VA5JR961-2A433
IC Number	7087A-R961A433
Frequency Band	433.92 MHz
EUT Modes of Operation	Transceiver
Type of Modulation	ASK
Number of Channels	1 channel
Input power supply	DC 3 V (CR2450, Coin battery)

### 1.3. Testing Laboratory

Testing Place	Korea Testing Laboratory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298A-1
Test Engineer	Jong-gon Ban
Telephone number	+82 31 5000 133
Facsimile number	+82 31 5000 149
E-mail address	banjg@ktl.re.kr
Other Comments	-

## 2. SUMMARY OF TEST RESULTS

Testing performed for : SEGI LIMITED

Equipment Under Test : 2WG5R-SH

Receipt of Test Sample : 2010. 07. 26

Test Start Date : 2010. 07. 27

Test End Date : 2010. 08. 03

The following table represents the list of measurements required under the FCC CFR 47 Part 15.231 and RSS 210 Annex I.

FCC Rules	IC Rules	Test Requirements	Result	Comments
15.231 (a)(1)	A1.1.1	Transmission Requirements	Pass	See Data sheets
15.231(c)	A1.1.3	20 dB & 99% Bandwidth	Pass	See Data sheets
15.231 (b)(1)	A1.1.2	Transmitter Radiated Emissions – Fundamental, Harmonic and Spurious	Pass	See Data sheets

**Note1** : Test results reported in this document relate only to the items tested

**Note2** : The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

**Note3** : Test results apply only to the item(s) tested

### \* Modifications required for compliance

No modifications were implemented by KTL.

All results in this report pertain to the un-modified sample provided to KTL.

### 3. TEST RESULTS

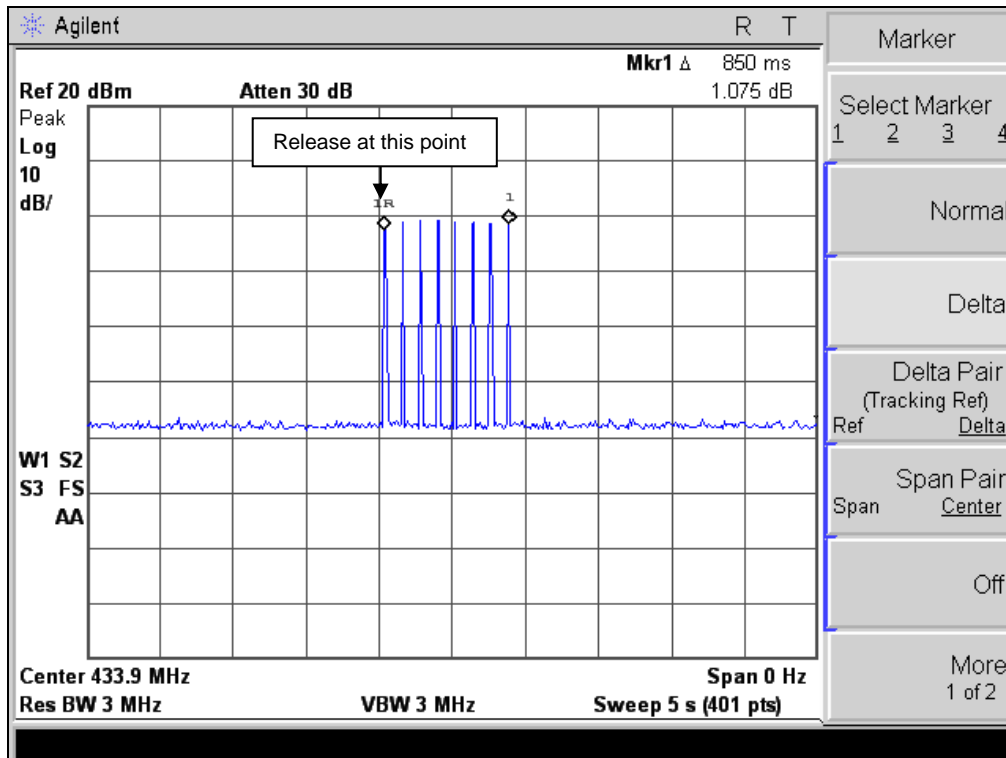
### 3.1. Transmission Requirements [FCC Part 15.231(a) & RSS-210 A1.1.1]

### 3.1.1. Requirements of Transmission Time

- ☒ According to 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 release.
- ☐ According to 15.231(a)(2), a transmitter activated automatically shall cease transmission within 5 seconds after activation.

### 3.1.2. Test Results

After 850 ms, the transmitter was automatically deactivated.



- Transmission Time -

## 3.2. Bandwidth of Momentary Signals [FCC Part 15.231(c) & RSS-210 A1.1.3]

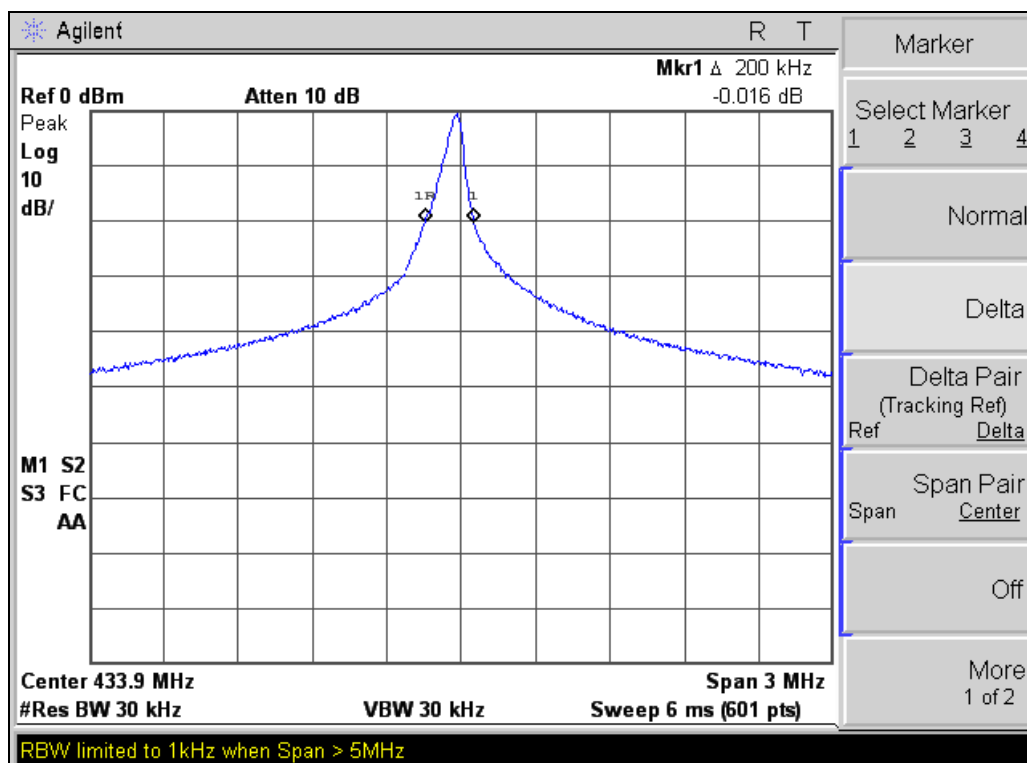
### 3.2.1. Requirements of Bandwidth

The bandwidth of emission shall be no wider than 0.25% of the centre frequency for devices operating between 70~900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

1. Carrier Frequency = 433.92 MHz
2. The bandwidth of emission shall be no wider than 0.5 % of center frequency.
3. Limit : less than 1.0848 MHz ( $433.92 \times 0.0025$ )

### 3.2.2. Test Results (20 dB Bandwidth)

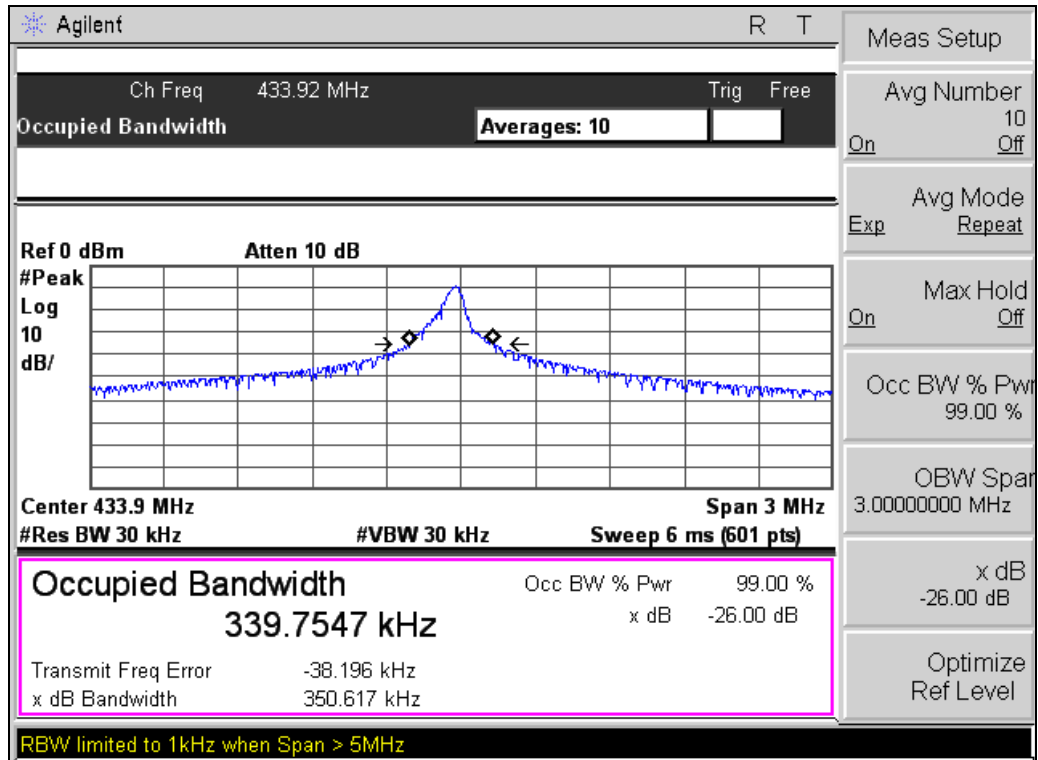
Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	200	1.0848	Pass



- 20dB Bandwidth -

### 3.2.3. Test Results (99% Bandwidth)

Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	339.7	1.0848	Pass



- 99% Bandwidth -



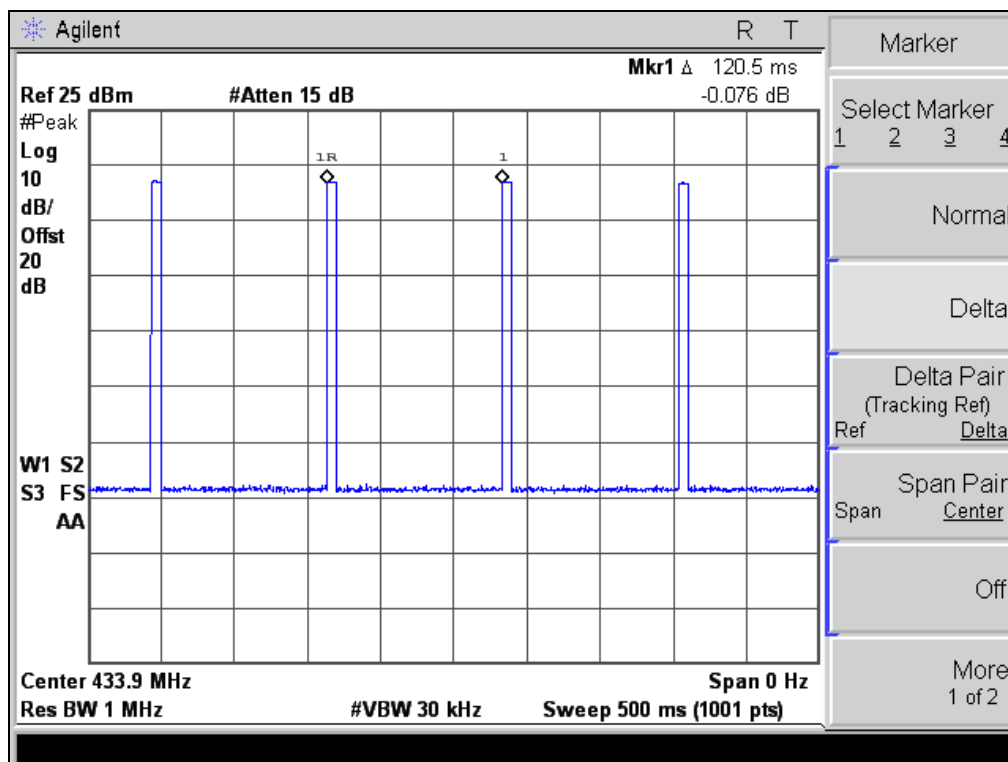
### 3.3. Duty Cycle Correction Factor

The period of the pulse train is determined by observing it on a spectrum analyzer with zero frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train, which in this case is millisecond.

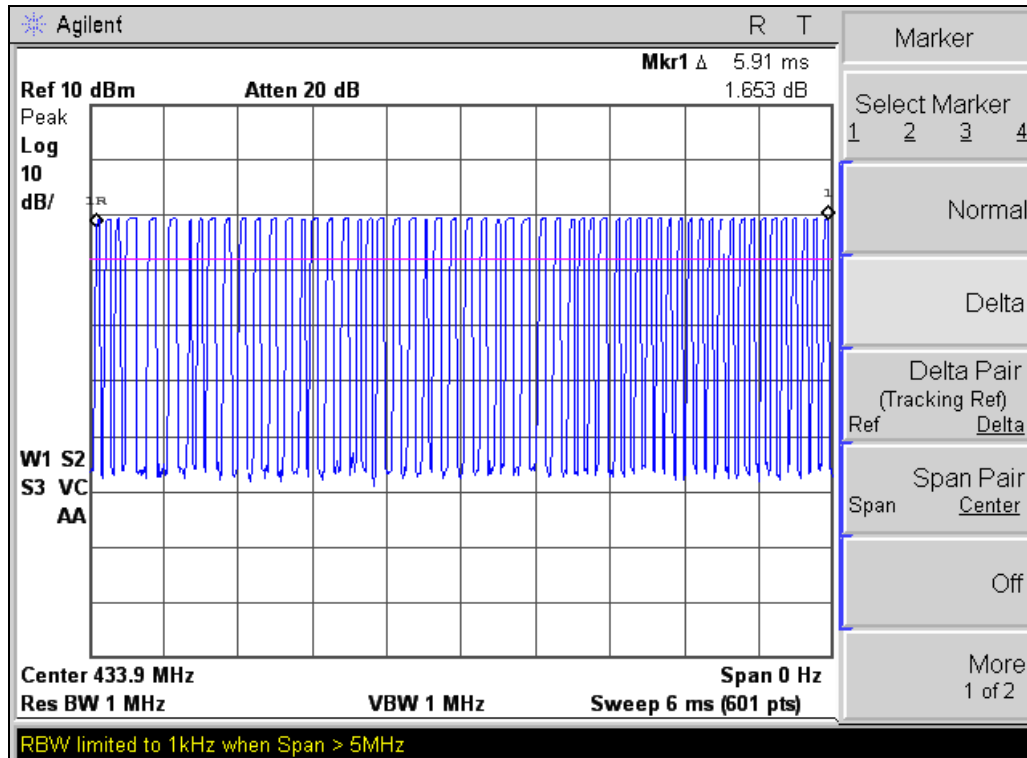
Total ON Time during 100 ms = 57.75 us x 14 + 41.25 us x 44 = 2.62 ms

Duty cycle correction factor =  $20 \log (2.62 \text{ ms}/100\text{ms}) = -31.6$

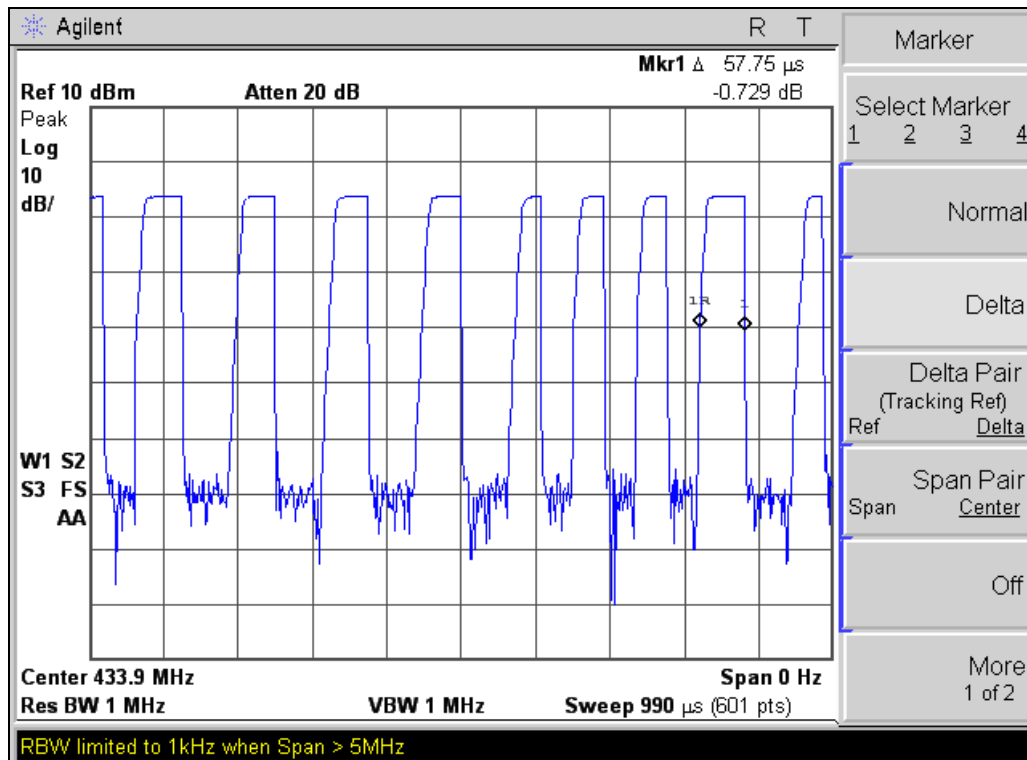
**Duty Cycle correction factor = -31.6 dB**



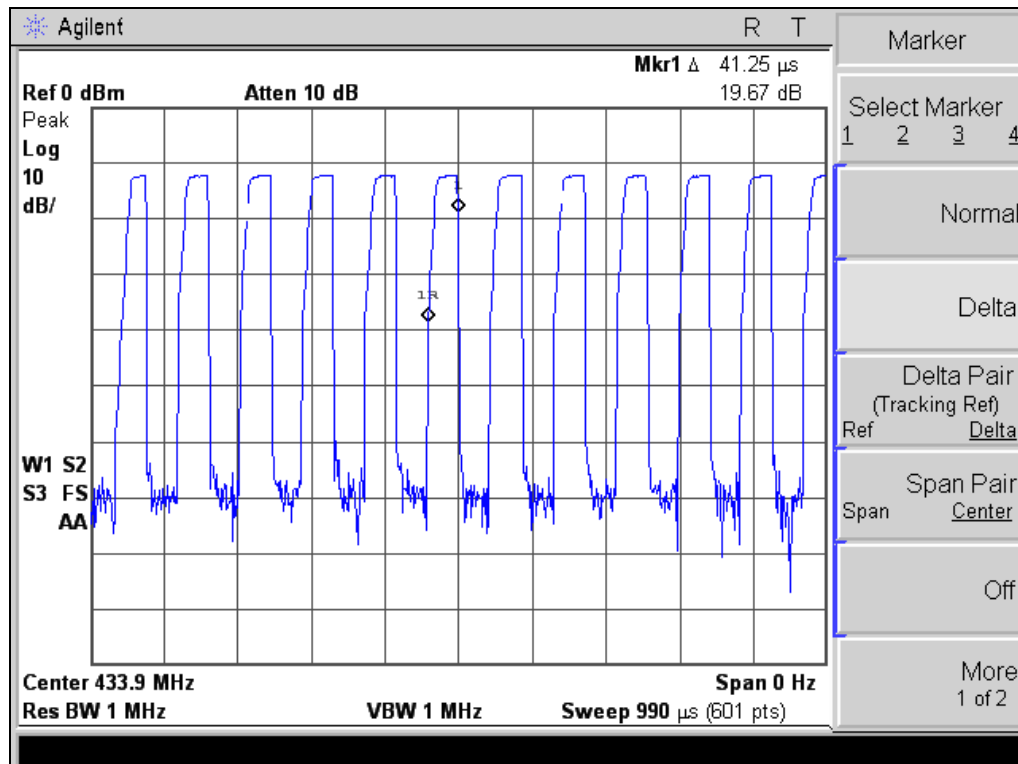
– Duty cycle plot 1 –



– Duty cycle plot 2 –



– Duty cycle plot 3 –



– Duty cycle plot 4 –

### 3.4. Radiated Spurious Emissions : Session 15.205 & 15.209

#### 3.4.1. Test Procedure

##### 3.4.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.

The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

##### 3.4.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

Tested in x, y, z axis and worst case results are reported.

The maximum frequency range measuring with the spectrum from 30 MHz to 10<sup>th</sup> harmonic was investigated with the transmitter.

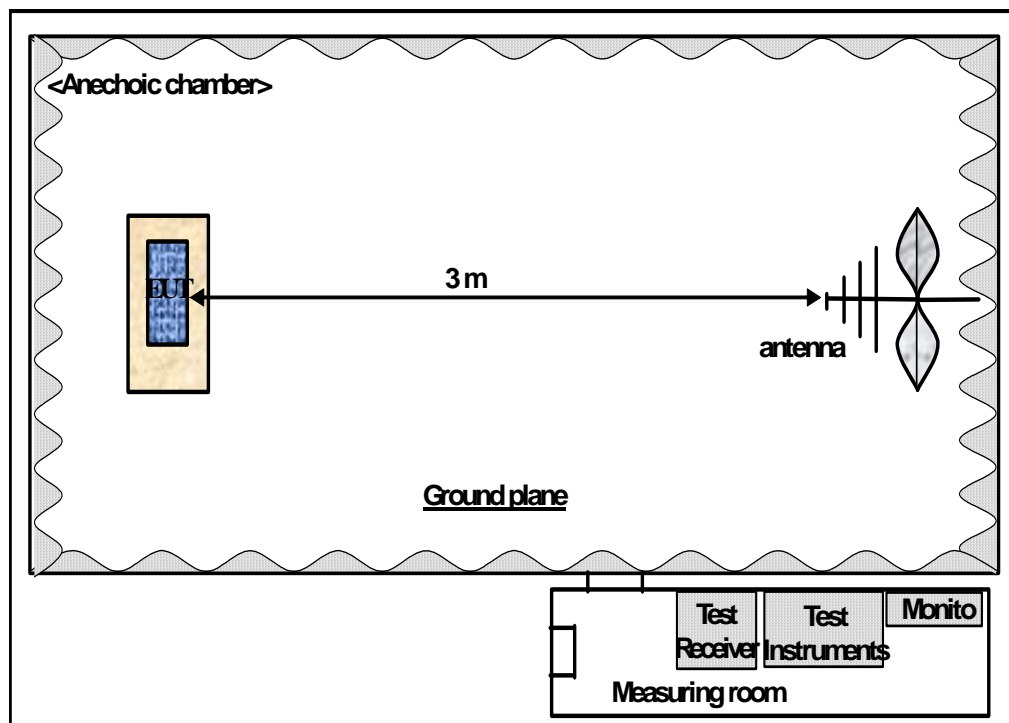
### 3.4.2. Limits

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750**	125 to 375**
174-260	3,750	375
260-470	3,750 to 12,500**	375 to 1,250**
Above 470	12,500	1,250

\*\* linear interpolations

### 3.4.3. Test configuration



### 3.4.4. Test Results

#### 3.4.4.1 Spurious Radiated Emission

Frequency (MHz)	Ant. Pol. H/V	D.M	Reading Level (dBμV)	Correction (AF+CL) dBμV/m	A.G	Duty Cycle Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin +/-	Remark	Plane X/Y/Z
433.92	H	P	88.31	20.35	0	-31.6	77.06	80.8	3.74	Average	X
433.92	V	P	89.23	20.35	0	-31.6	77.98	80.8	2.82	Average	X
867.84	H	P	38.97	28.10	0	-31.6	35.47	60.8	25.33	Average	X
867.84	V	P	37.41	28.10	0	-31.6	33.91	60.8	26.89	Average	X
1301.76	V	P	53.50	31.67	35.4	-31.6	18.17	54.0	35.85	Average	Y
2603.52	H	P	55.10	38.20	33.9	-31.6	27.80	60.8	33.00	Average	Y
2603.52	V	P	57.35	38.20	33.9	-31.6	30.05	60.8	30.75	Average	Z

**Note :** 1. Measurement was done over the frequency range from 30 MHz to 10<sup>th</sup> harmonic. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.

\* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)  
Antenna Polarization (H : Horizontal, V : Vertical)  
A.F. : Antenna Factor  
C.L. : Cable Loss  
A.G. : Amplifier Gain

**Remark :** Emission level (dBμV/m) = Reading level (dBμV) + Correction (dB/m) - Amplifier Gain (dB)  
Margin (dB) = Limit (dBμV/m) – Emission level (dBμV/m)  
The “+” sign of the margin means that emission level are within the limit and the “-” sign means over the limit.

### 3.4.4.2 Receiver Spurious Radiated Emission

Frequency (MHz)	Ant. Pol. H/V	D.M	Reading Level (dB $\mu$ V)	Correction (AF+CL) dB $\mu$ V/m	A.G	Duty Cycle Factor	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin +/-	Remark	Plane X/Y/Z
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

**Note :** 1. Measurement was done over the frequency range from 30 MHz to 5<sup>th</sup> harmonic. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.

\* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)  
 Antenna Polarization (H : Horizontal, V : Vertical)  
 A.F. : Antenna Factor  
 C.L. : Cable Loss  
 A.G. : Amplifier Gain

**Remark :** There was no emission detected above ambient noise level.

## 4. Test Equipment

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver	R&S	ESIB26	100280	08/17//2010
2	Pre-Amplifier	Agilent	83017A	MY39500982	04/02/2011
3	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-180	08/24/2010
4	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	03/26/2011
5	Antenna Mast	Frankonia	FAM4	1101F4006	--
6	Spectrum Analyzer	Agilent	E4407B	US41443316	12/01/2010



## Appendix.1 Test setup photo

