

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 transmitter (Car Alarm System)
Model/Type : 2WSHLCDR-703
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

: August. 10, 2009

7. Date of Issue

: September. 15, 2009

Tested by

Sung-kyu Cho

Sung-kyu Cho

Telecommunication Center
Engineer

Approved by

Jeong-min Kim

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 INFORMATIONS

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	Byung Joon , Ko
Telephone No.	82-32-623-5550 (#272)
Facsimile No.	82-32-623-6667
E-mail address	Byungjoon@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 transmitter(Car Alarm System)
Model Name	2WSHLCDR-703
FCC ID	VA5JR703A433
IC Number	7087A-R703A433
Frequency Band	433.92 MHz
EUT Modes of Operation	Transceiver
Type of Modulation	ASK
Number of Channels	1 channels
Input power supply	DC Sources 1.5 V (AAA 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	Sung-kyu Cho
Telephone number	+82 31 5000 132
Facsimile number	+82 31 5000 159
E-mail address	skcho@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for : SEGI LIMITED

Equipment Under Test : 2WSHLCDR-703

Receipt of Test Sample : 2009. 08. 10

Test Start Date : 2009. 08. 22

Test End Date : 2009. 09. 11

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
15.247 (a)(1)	A1.1.1	Transmission Requirements	Pass	See Data sheets
15.247 (b)(1)	A1.1.2	Transmitter Radiated Emissions – Fundamental, Harmonic and Spurious	Pass	See Data sheets
15.247(d)	A1.1.3	20 dB & 99% Bandwidth	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 FACILITY

3.1. Korea Testing Laboratory Location

All tests were conducted at Korea Testing Laboratory. The site address is 516 Hae-an-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901, KOREA. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1:1993 and ANSI C63.4: 1992. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.



The FCC registration number is 408324. The Industry Canada filing number for this site is 6298A-1.

3.2. Test Equipment

No.	Equipment	Manufacturer	Model	S/N	Effective Cal. Duration
1	EMI Receiver	R&S	ESIB26	100280	09/08/2010
2	Pre-Amplifier	Agilent	83017A	MY39500982	05/18/2010
3	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-179	04/06/2010
4	Horn Ant. (1 GHz ~ 18 GHz)	Agilent	E4448A	MY43360322	02/26/2010
5	Antenna Mast	Frankonia	FAM4	1101F4006	--
6	Spectrum Analyzer	Agilent	E4407B	US41443316	12/01/2009

4. TEST RESULTS

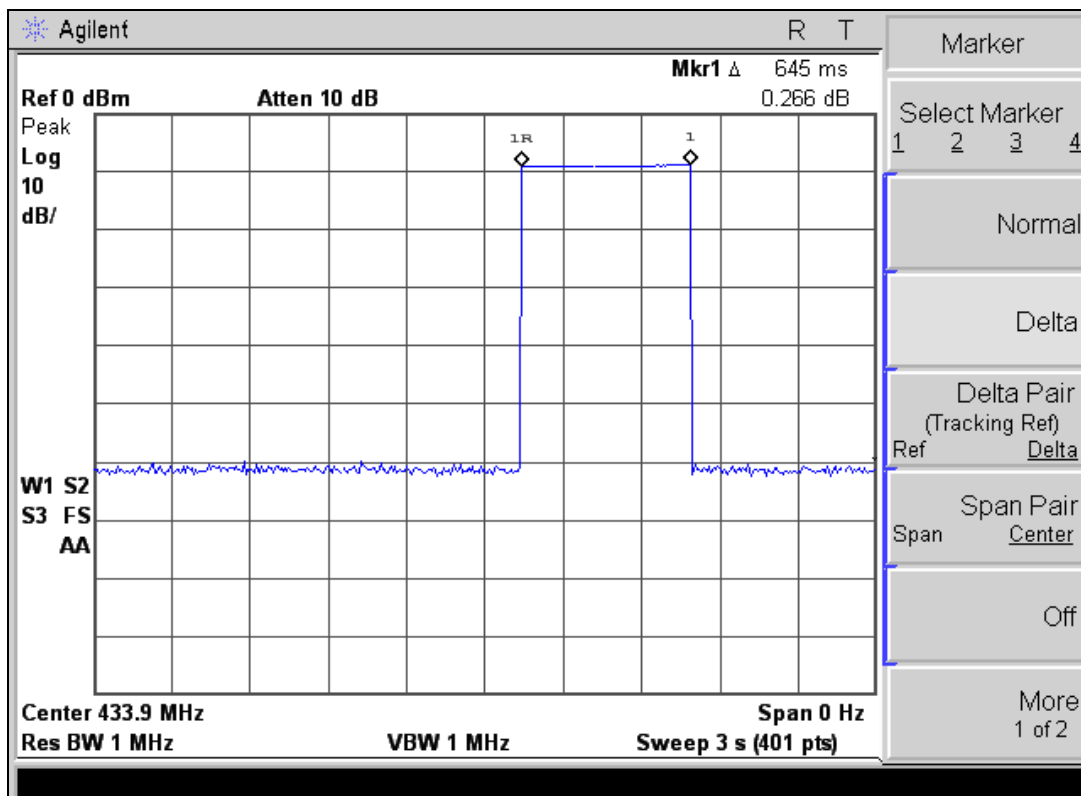
4.1. Transmission Requirements [FCC Part 15.231(a) & RSS-210 A1.1.1]

4.1.1. 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.

4.1.2. Test Results

After 645 ms, the transmitter was automatically deactivated.



- Transmission Time -

4.2. Bandwidth of Momnetary Signals [FCC Part 15.231(c) & RSS-210 A1.1.3]

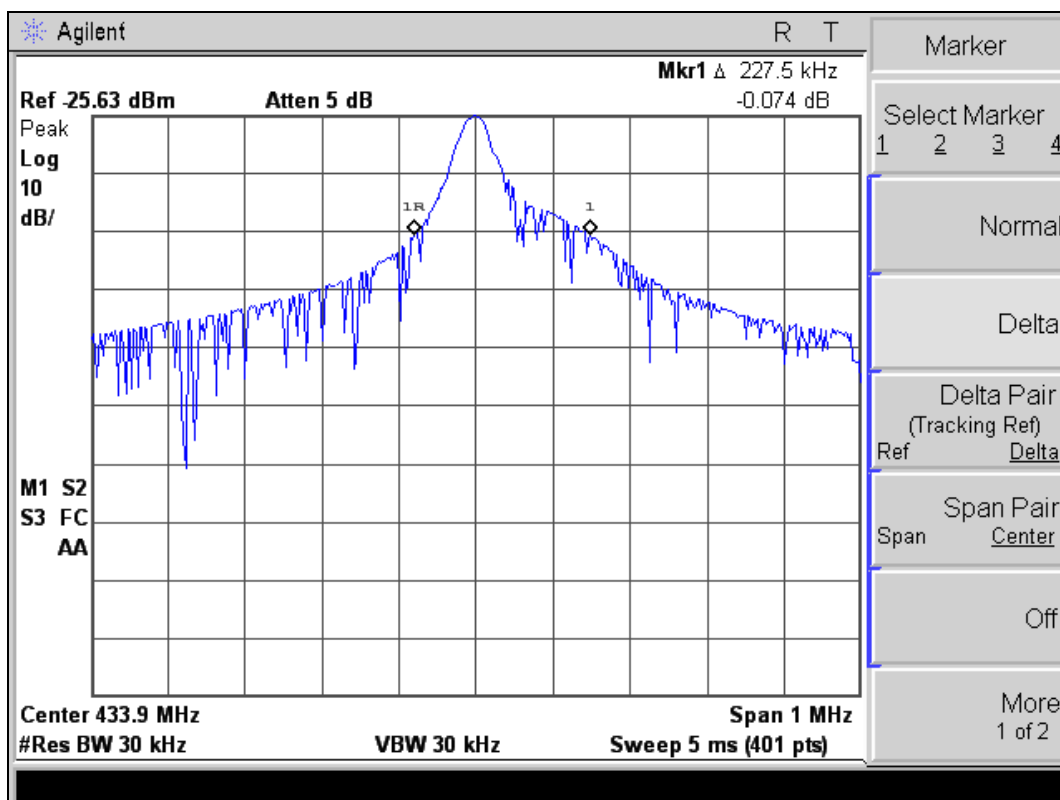
4.2.1. Requirements of Bandwidth

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 x 0.0025)

4.2.2. Test Results (20 dB Bandwidth)

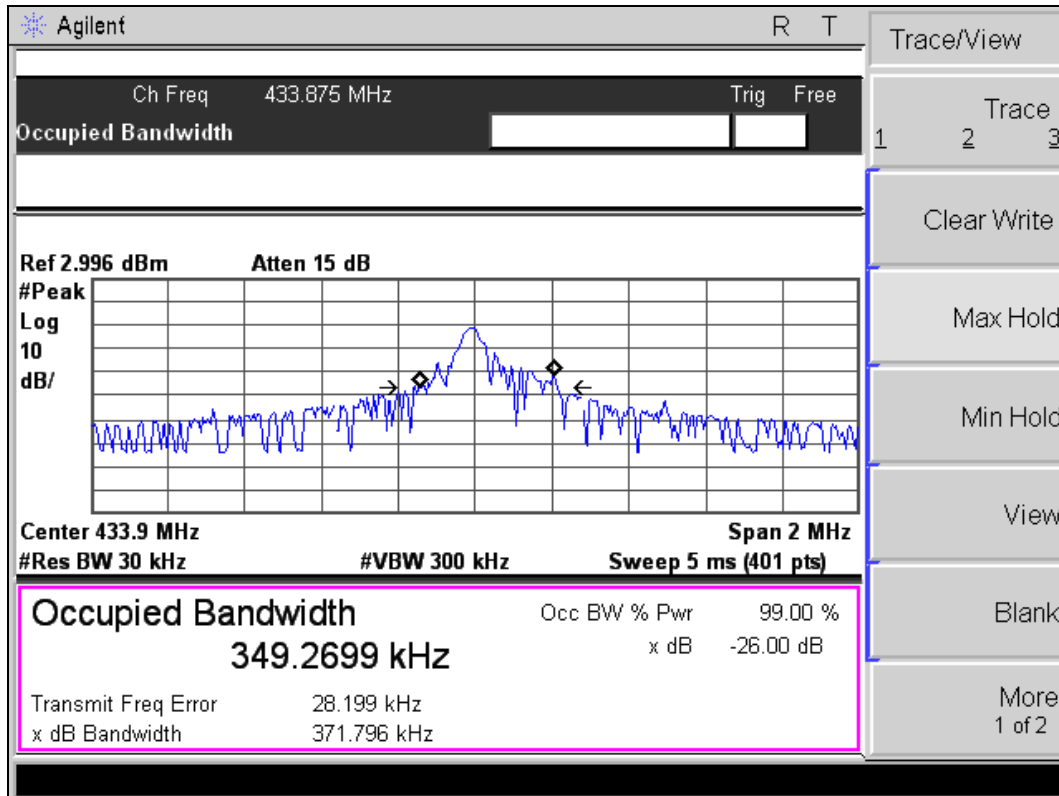
Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	227.5	1.0848	Pass



- 20dB Bandwidth -

4.2.3. Test Results (99% Bandwidth)

Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	349.27	1.0848	Pass



- 99% Bandwidth -

4.3. Radiated Spurious Emissions : Session 15.205 & 15.209

4.3.1. Test Procedure

4.3.1.1 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.

4.3.1.2 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 10th harmonic was investigated with the transmitter.

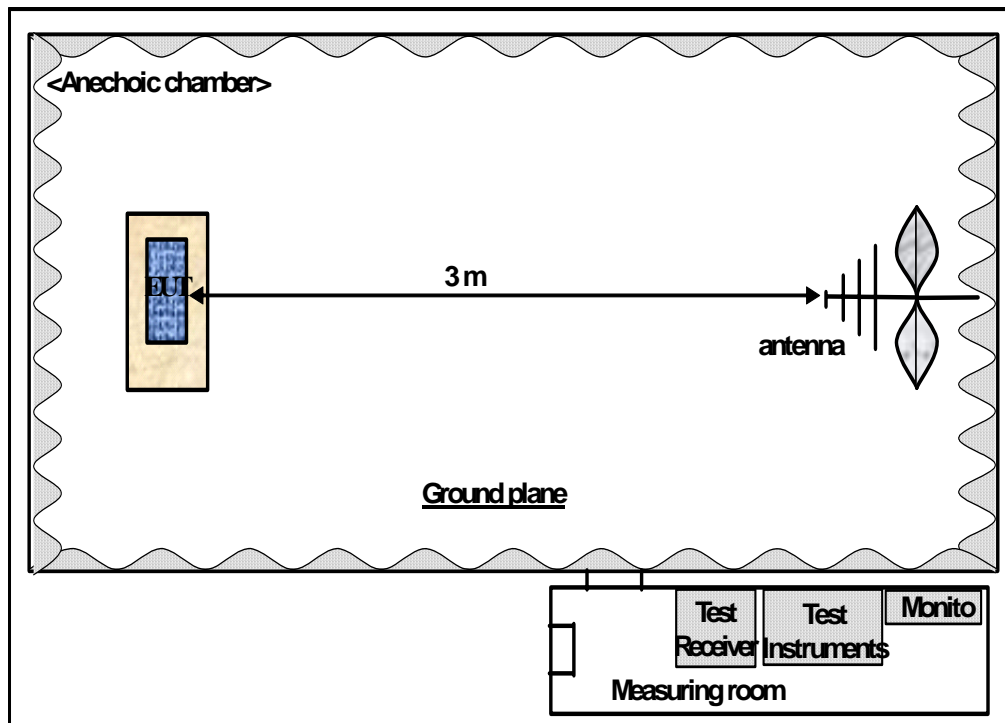
4.3.2. Limits

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

4.3.3. Test configuration



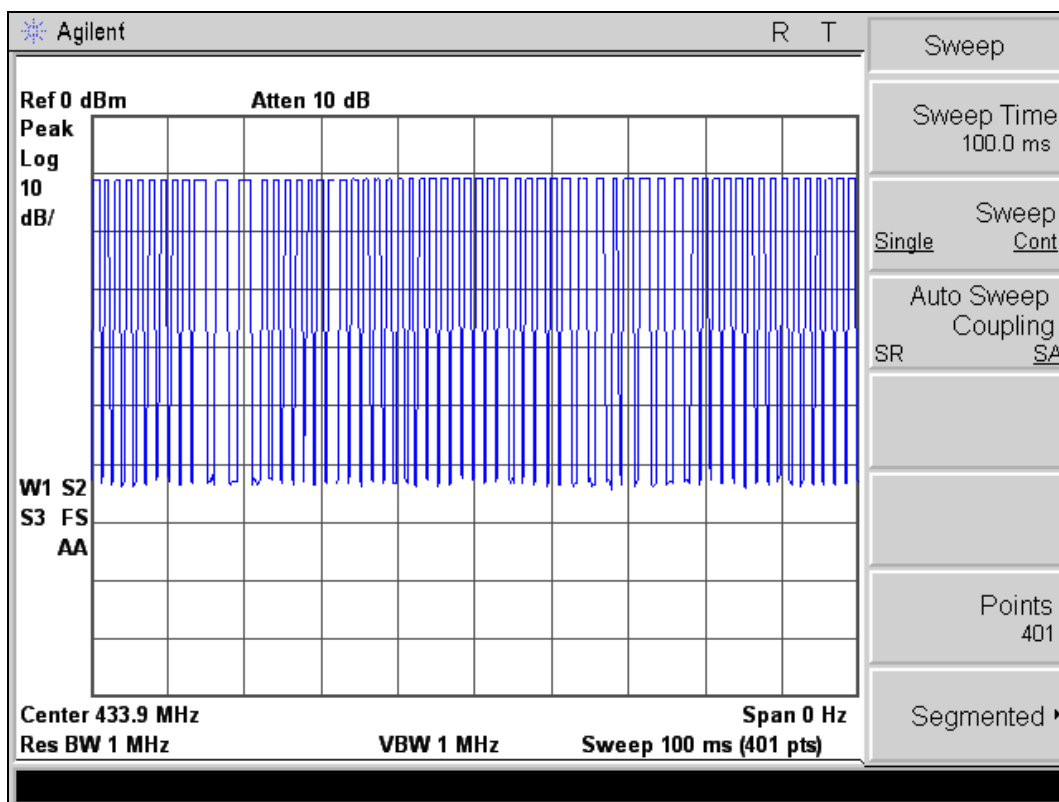
4.3.4. Calculation of Duty Cycle Correction Factor

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.

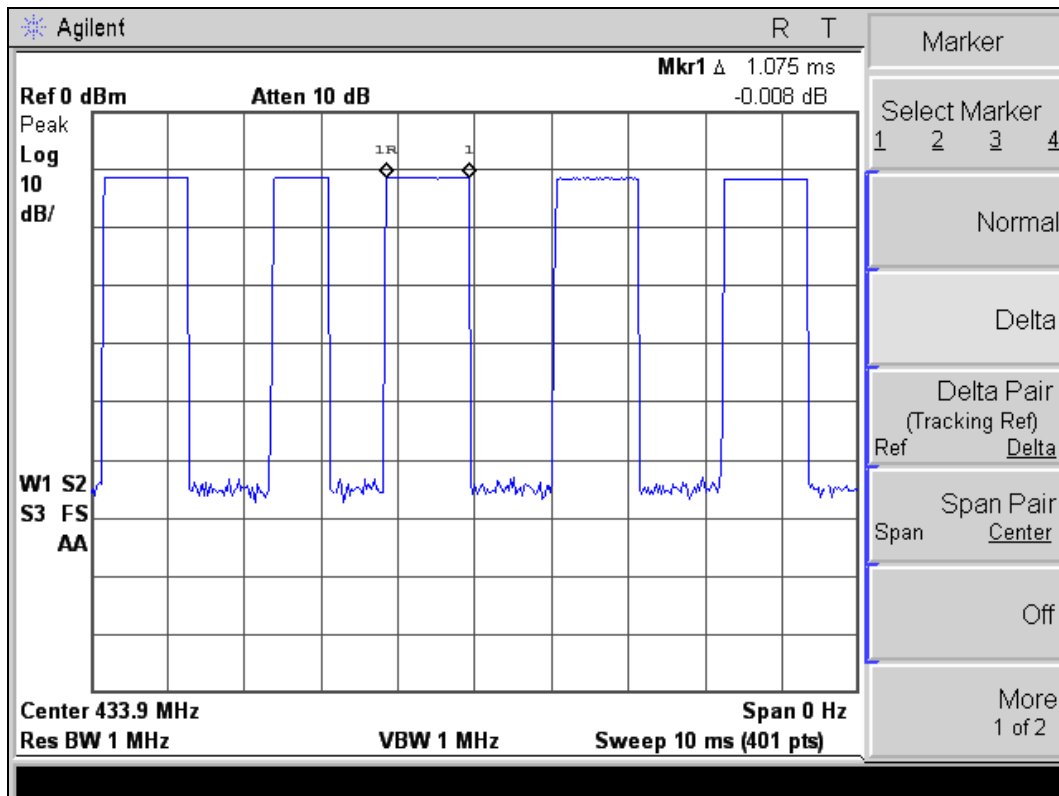
Total ON Time during 100 ms = 0.725 ms x 50 + 1.075 ms x 7 + 1.45 ms x 3 = 41.4 ms

Duty cycle correction factor = $20 \log (48.125 \text{ ms}/100\text{ms}) = -6.35$

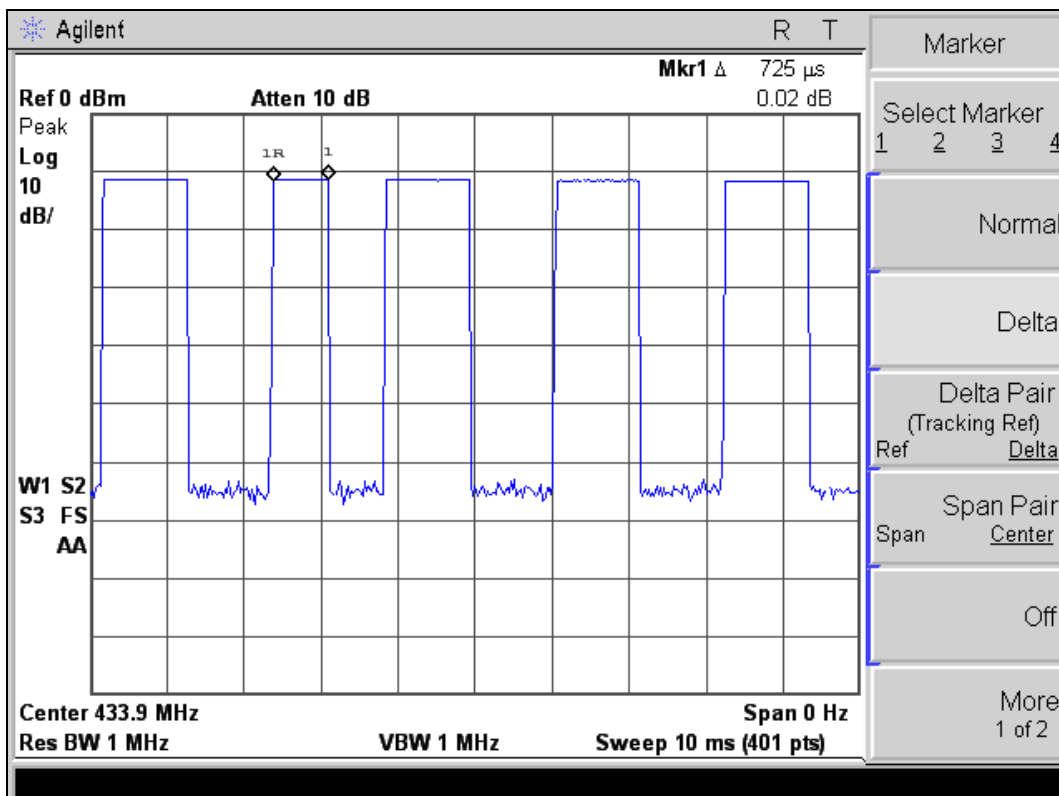
Duty Cycle correction factor = -6.35 dB



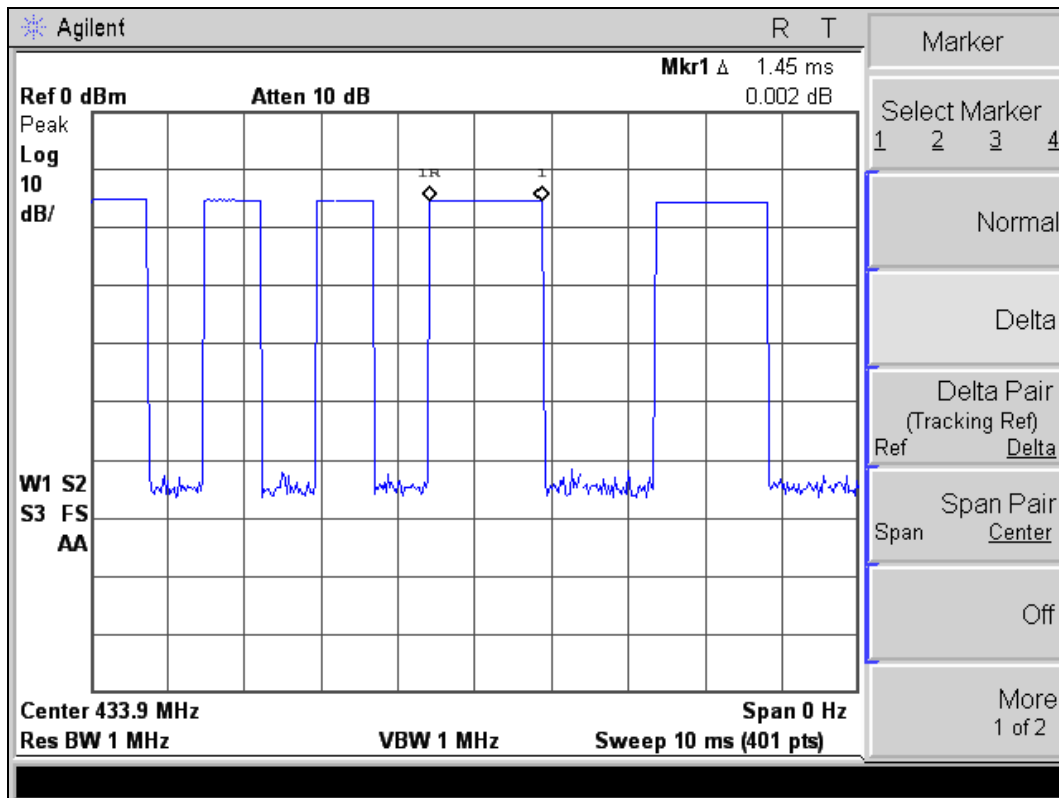
- Duty cycle plot 1 -



- Duty cycle plot 2 -



- Duty cycle plot 3 -



- Duty cycle plot 4 -

4.3.5. Test Results

4.3.5.1 Spurious Radiated Emission

Frequency (MHz)	Antenna Pol. H/V	Detector	Reading Level (dB μ V)	Correction (AF+CL) dB μ V/m	Amp Gain	Duty Cycle Factor	Emission Level (dB μ V/m)	Avg Limit (dB μ V/m)	Margin +/-
433.92	H	P	56.32	19.8	0	-6.35	69.77	80.8	11.03
433.92	V	P	66.11	19.8	0	-6.35	79.56	80.8	1.24
867.84	H	P	60.85	27.8	37.6	-6.35	44.70	60.8	16.10
867.84	V	P	54.24	27.8	37.6	-6.35	38.09	60.8	22.71
1301.76	H	P	47.98	32.7	35.4	-6.35	38.93	54.0	15.07
1301.76	V	P	50.31	32.7	35.4	-6.35	41.26	54.0	12.74
1735.68	H	P	53.06	34.3	34.4	-6.35	46.61	60.8	14.19
1735.68	V	P	56.38	34.3	34.4	-6.35	49.93	60.8	10.87
2169.60	H	P	53.89	36.2	34.1	-6.35	49.64	60.8	11.16
2169.60	V	P	56.55	36.2	34.1	-6.35	52.30	60.8	8.5
2603.52	H	P	56.84	38.4	33.9	-6.35	54.99	60.8	5.81
2603.52	V	P	56.71	38.4	33.9	-6.35	54.86	60.8	5.94

Note : 1. Measurement was done over the frequency range from 30 MHz to 10th 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.
2. The observed EMI Receiver (ESIB26) noise floor level was 2.0 dB μ V. And all other emissions not reported on data were more than 40 dB below the permitted level.

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

Appendix.1 Test setup photo

