TEST REPORT

Report Number		**RAPA11-O-314**
Type of Equipment		**Keyless Entry System**
Model Name	**U.S.A**	**MR1060**
	Canada	**EZ100-R**
FCC ID		**VA5JR1060-1A433**
IC Number		**7087A-R1060A433**
Applicant	**Name**	**SEGI LIMITED**
	Logo	**SEGI**
	Address	**Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt Rd., Hongkong**
Manufacturer	**Name**	**SEGI ELECTRONICS CO., LTD.**
	Address	**Chenjiapucun, Liaobu Town Dongguan City, Guandong Province, China**
Date of reception		**July 13, 2011**
Date of test		**July 18, 2011 to August 25, 2011**
Date of issue		**August 26, 2011**
Total Page		**17 pages (including this page)**

SUMMARY

The equipment complies with FCC CFR 47 Part 15 Subpart C Section 15.231 and IC RSS-210 Issue8 Annex I-2010.

This test report contains only the results of a single test of the sample supplied for the examination.
It is not a general valid assessment of the features of the respective products of the mass-production.

Date : August 26, 2011

Tested by **Chang Young, Choi**
Duputy General Manager

Date : August 26, 2011

Reviewed by **Sukil, Park**
Executive Managing Director

CONTENTS

1. General description of EUT

1.1 Applicant

- Company name : SEGI LIMITED
- Address : Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt Rd., Hongkong
- Contact person : Eui Seok, Chung
- Phone/Fax : +82-32-623-5550 / +82-32-623-6667

1.2 Manufacturer

- Company name : SEGI ELECTRONICD CO., LTD
- Address : Chenjiapucun, Liaobu Town, Dongguan City, Guandong Province, China
- Contact person : Eui Seok, Chung
- Phone / Fax : 82-32-623-5550 / 82-32-623-6667

1.3 Basic description of EUT

- Product name : Keyless Entry System
- Model name : MR1060(U.S.A.) / EZ100-R(Canada)
- Serial number : Not available(Proto Type)
- Frequency : TX / 433.92 MHz, RX / 20 kHz
- Channel number : 1 Channel
- Modulation method : ASK
- FCC Rule Part(s) : FCC CFR47 Part 15 Subpart C Section 15.231
- IC Rule Part(s) : IC RSS-210 Issue8 Annex I-2010
- FCC classification : DSC / Part 15 Security/Remote control Transmitter
- IC classification : Annex 1 / Momentarily Operated Devices and Remote Control
- Date of test : July 18, 2011 to August 25, 2011
- Date of issue : August 26, 2011
- Place of test : Head office

  C-3601, Dongil Technotown, 889-1, Gwanyang-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea, 483-060

  Open area test site

  80, Jeil-ri, Yangji-myun, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 449-825

  (FCC Registration Number : 337229)

  (IC Submission Number : 143881)

  (KCC Designation Number : KR0027)

1.4 Technical specification of EUT

Product Name	Keyless Entry System
Product Type	One Way Remote
Size(mm)	26.8 x 37.3 x 8.3 (W x L x H)
Battery Size	CR2032
Transmit Frequency	433.92 MHz by pattern antenna
Receive Frequency	20 kHz by coil inductor for RFID
Modulation Method	ASK

2. General information of test

2.1 Standard for measurement methods

Applied Standard : FCC CFR47 Part 15 Subpart C, IC RSS-210 Issue8 Annex I-2010				
FCC	**IC**	**Description of Test**	**Limit**	**Result**
15.207	-	Conducted Emission(dBμV/m)	Various	N/A[note 1]
15.231(a)	A1.1.1	Transmission Time(s)	5 sec	Pass
15.231(b)	A1.1.2	Field Strength of Fundamental (dBμV/m)	100.82(Peak) / 80.82(AV)	Pass
15.231(b) & 15.209	A1.1.2	Radiated Emission(dBμV/m)	80.82(Peak) / 60.82(AV)	Pass
15.231(c)	A1.1.3	Occupied Bandwidth(kHz)	1 084.8 kHz	Pass

Note1 : This equipment is battery operated.

2.2 Description of EUT modification

During the test, there was no mechanical or circuitry modification to improve RF and spurious characteristic, and any RF and spurious suppression device(s) was not added against the device tested.

2.3 Test configuration

• Type of peripheral equipment used

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	MR1060	N/A	SEGI LIMITED	VA5JR1060-1A433

• Type of cable used

Device from	Device to	Type of Cable	Cable Number	Length
-	-	-	-	-

3. Measurement data

3.1 Transmission time

3.1.1 Definitions

A transmission time is a switching time that will automatically deactivate the transmission of transmitter of EUT.

3.1.2 Specification

FCC Rules Part 15 Subpart C Section 15.231(a)(1)
IC Rules RSS-210 Issue8 Annex I-2010 A1.1.1

3.1.3 Measurement method

The device output is connected to the spectrum analyzer.

3.1.4 Set-Up

3.1.5 Test equipment list

Equipment	Model Name	Manufacture
EUT	MR1060	SEGI LIMITED
Spectrum Analyzer	N9020A	Agilent

3.1.6 Test procedure

Spectrum analyzer setting;

- Center Frequency: 433.92 MHz
- Span : Zero
- RBW : 100 kHz
- VBW : 100 kHz
- Sweep time : 1 s
- Detect Mode : Peak

3.1.7 Test condition

- Test place : Shield Room
- Test mode : Normal Operation
- Test environment : 28 ℃, 61 %R.H.

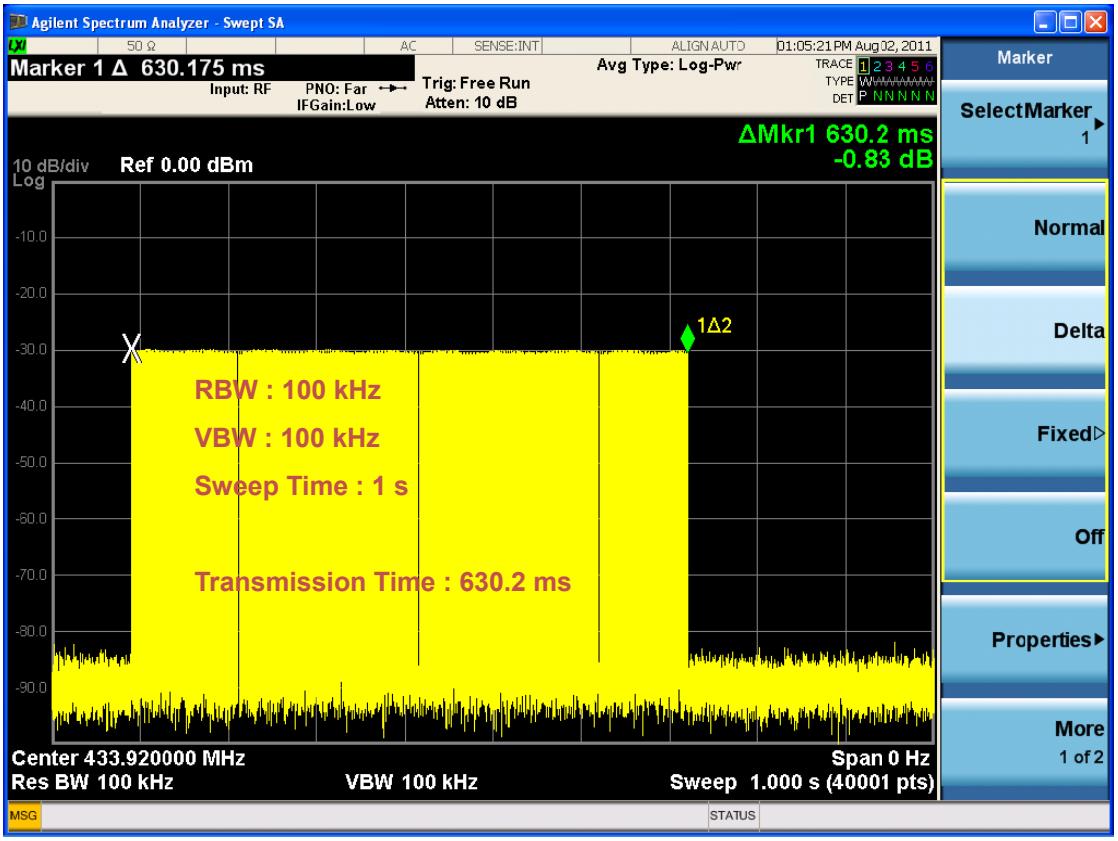
3.1.8 Test result

Frequency (MHz)	Transmission Time (s)	Limit (s)
433.92	0.63	5.00

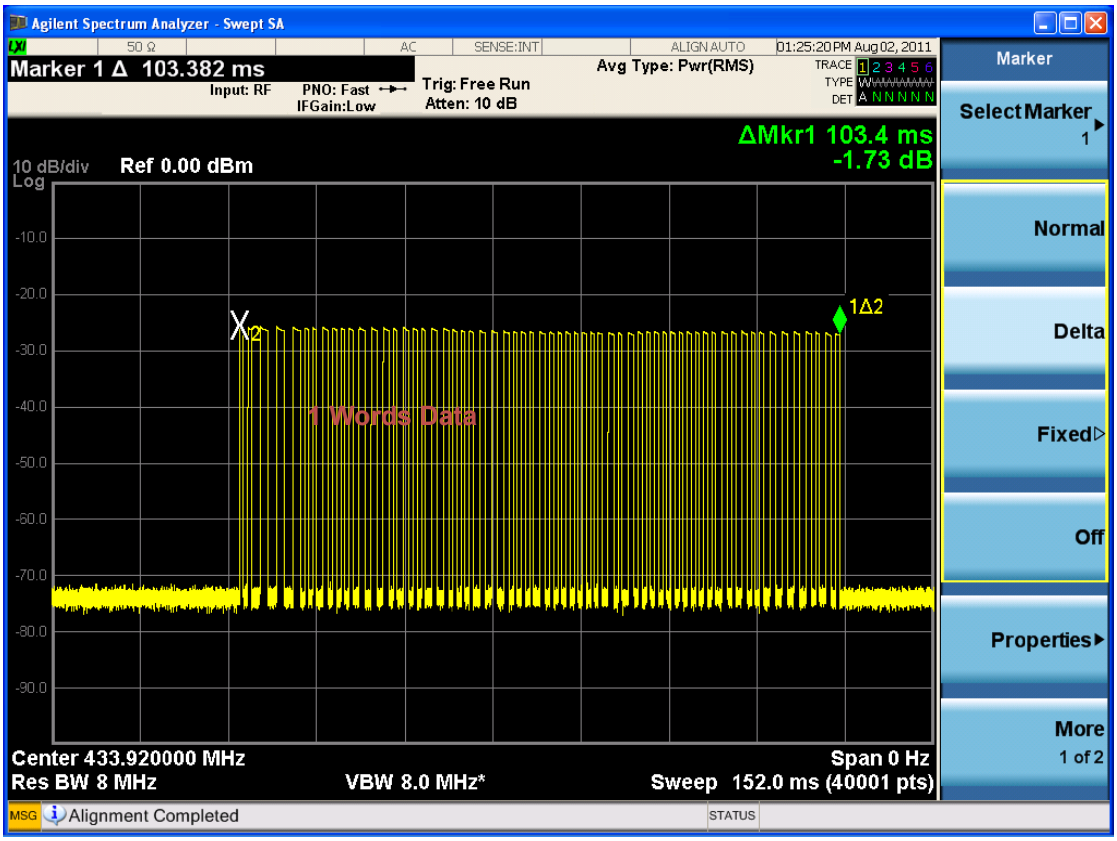
3.1.9 Limit

Less than 5 seconds.

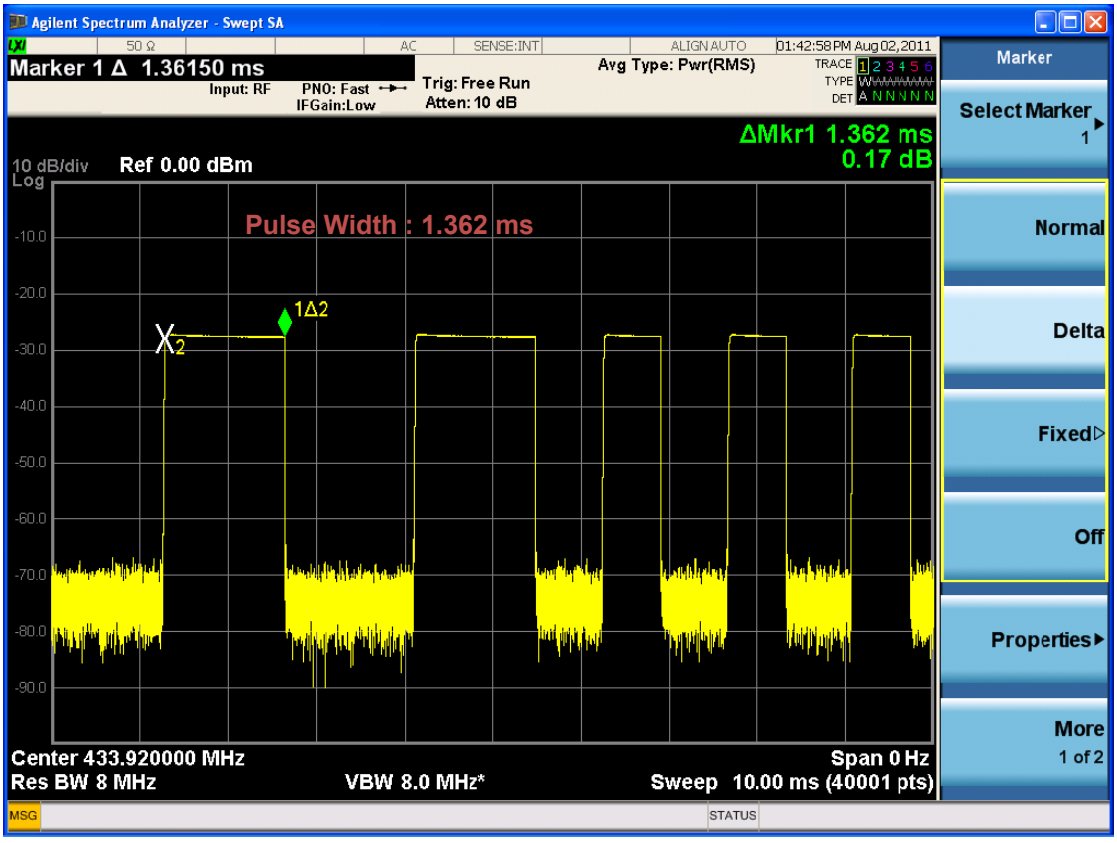
3.1.10 Plots of transmission time (6 words)

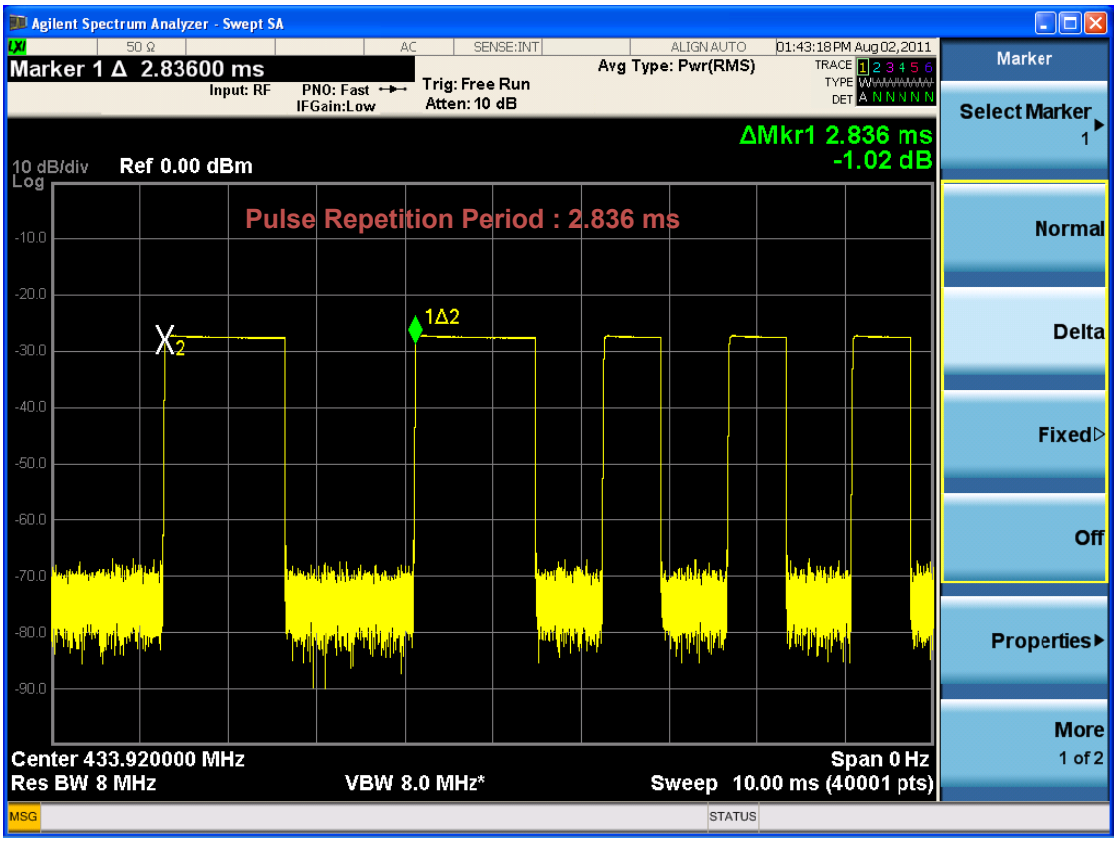


3.1.11 Plot of 1 word



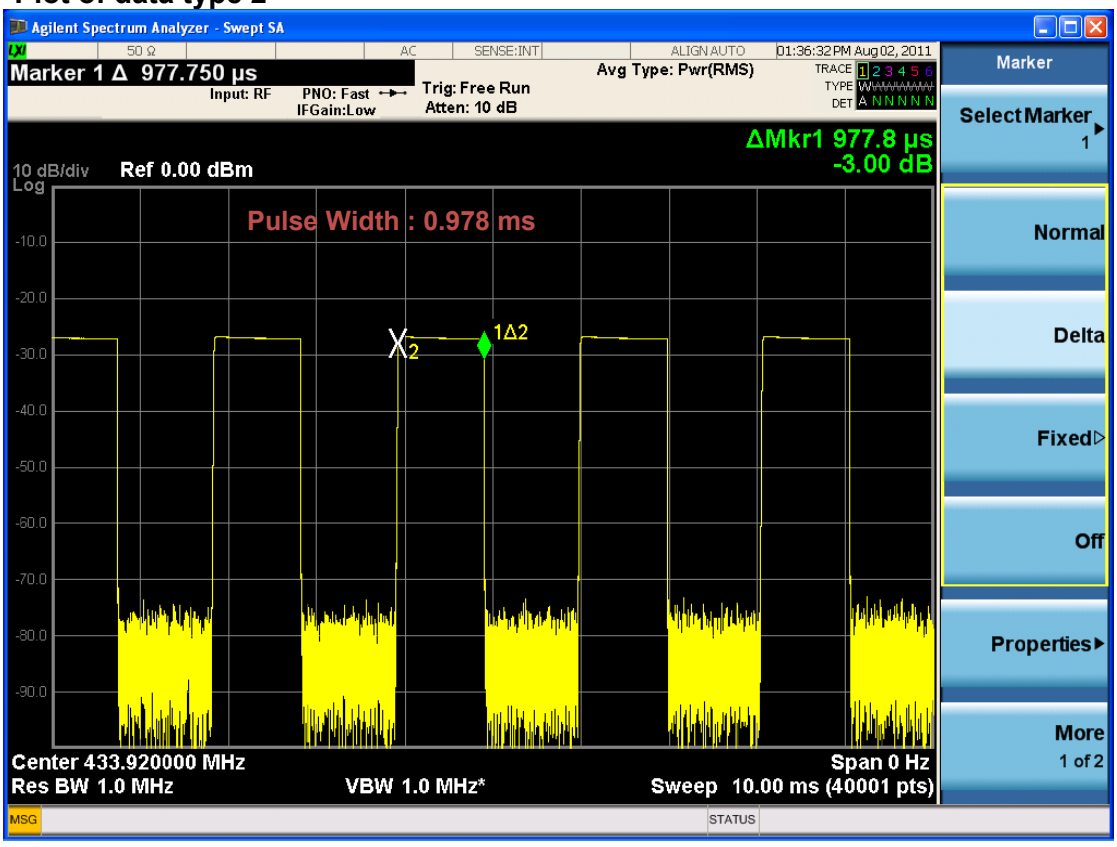
3.1.12 Plot of data type 1

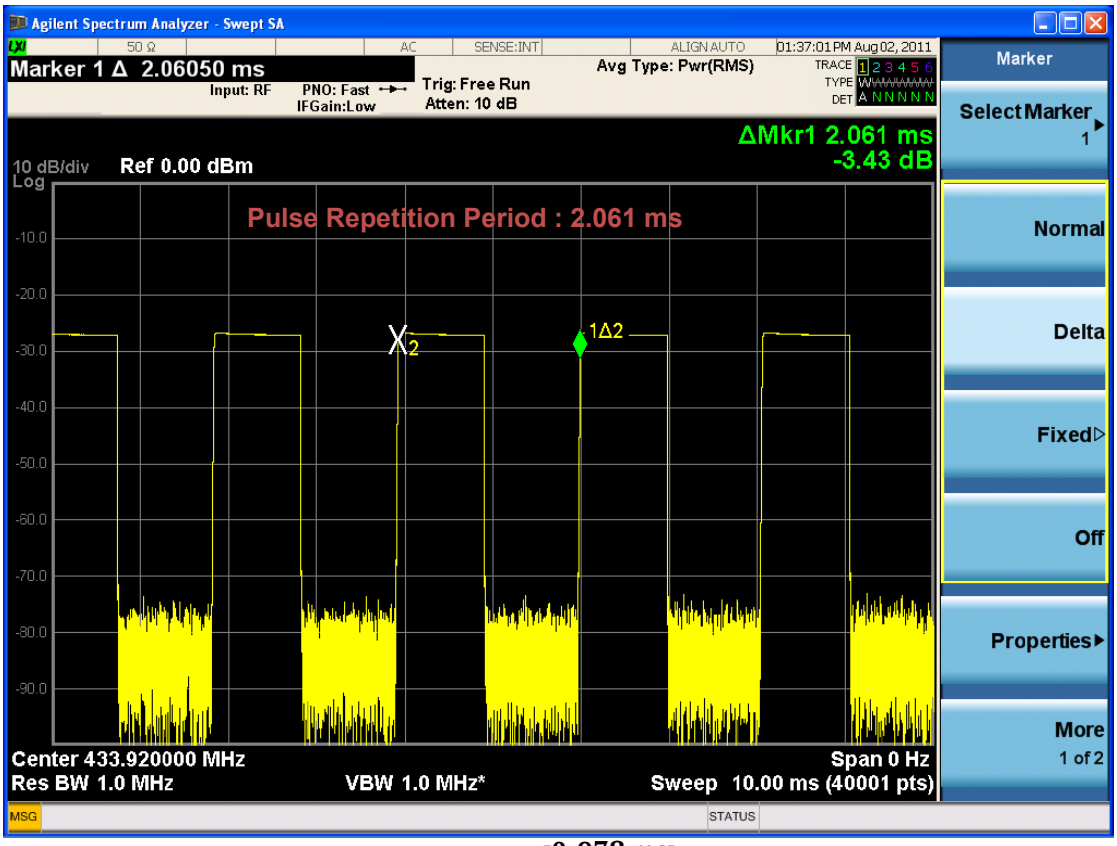




$$\text{Average Factor 1} = 20\log\left[\frac{1.362\ \text{ms}}{2.836\ \text{ms}}\right]\text{dB} = -6.37\ \text{dB}$$

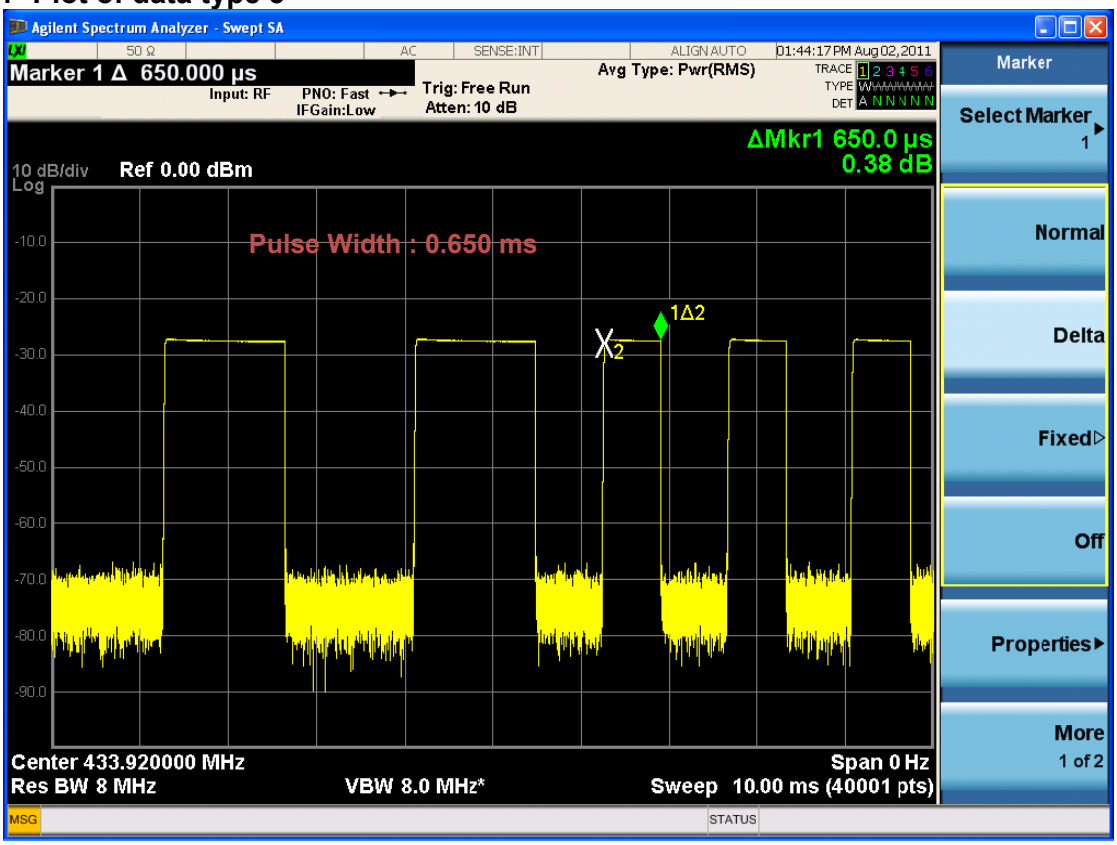
3.1.13 Plot of data type 2

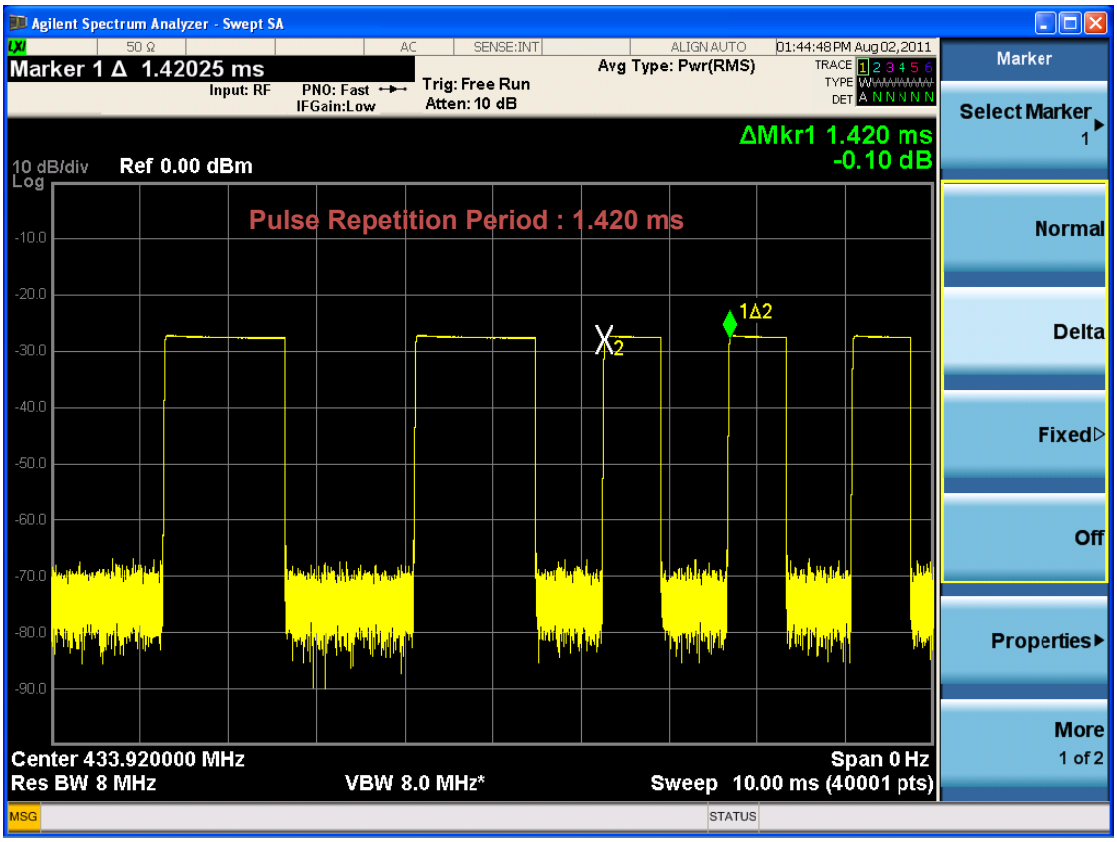




$$\text{Average Factor 2} = 20\log\left[\frac{0.978\ \text{ms}}{2.061\ \text{ms}}\right]\text{dB} = -6.47\ \text{dB}$$

3.1.14 Plot of data type 3





$$\text{Average Factor } 3 = 20\log\left[\frac{0.650\ \text{ms}}{1.420\ \text{ms}}\right]\text{dB} = -6.79\ \text{dB}$$

3.1.15 Total Averaging Factor

$$\text{Total Average Factor} = 20\log\left[\frac{\text{data type 1} + \text{data type 2} + \text{data type 3}}{3}\right]$$
$$= 20\log\left[\frac{\left(\frac{1.362\ \text{ms}}{2.836\ \text{ms}} + \frac{0.978\ \text{ms}}{2.061\ \text{ms}} + \frac{0.650\ \text{ms}}{1.420\ \text{ms}}\right)}{3}\right]$$
$$= -6.54\ (\text{dB})$$

3.2 Field strength of fundamental and spurious emission

3.2.1 Definitions

A field strength emission is a emission from the equipment when transmitting into a non-radiating load on fundamental frequency and frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

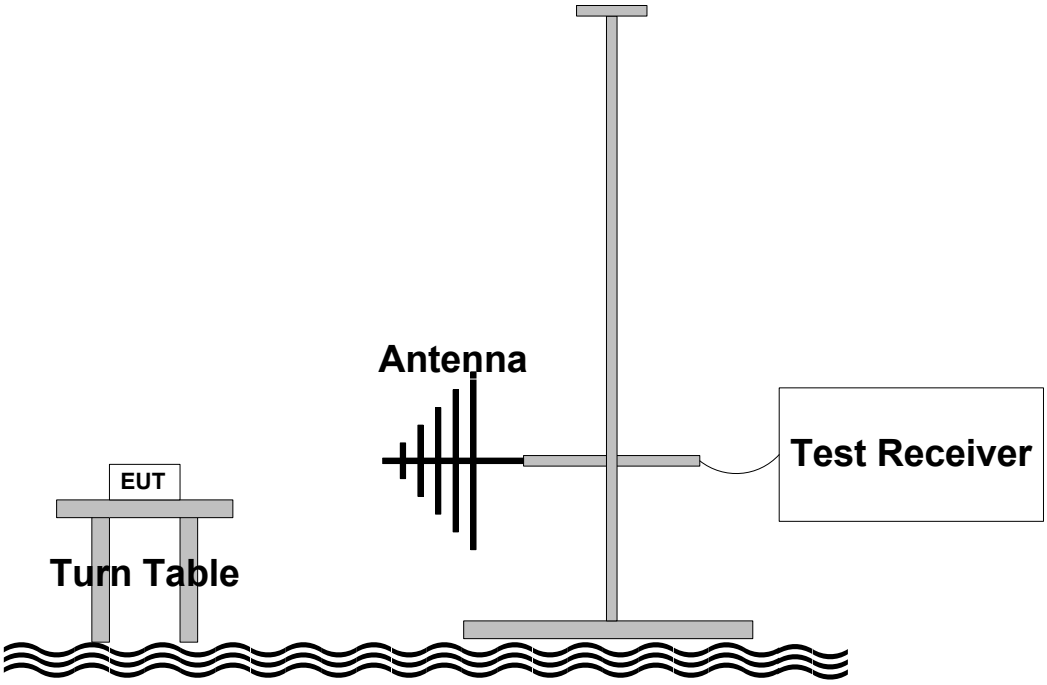
3.2.2 Specification

FCC Rules Part 15 Subpart C Section 15.231(b)
IC Rules RSS-210 Issue8 Annex I-2010 A1.1.2

3.2.3 Measurement method

ANSI Standard C63.4-2009 8.3

3.2.4 Set-Up



3.2.5 Test equipment list

Equipment	Model Name	Manufacturer
EUT	MR1060	SEGI LIMITED
Spectrum Analyzer	N9020A	Agilent
Loop Antenna	EMCO 6502	EMCO
Bi-conical Antenna	VHA9103	Schwarzbeck
Log Periodic Antenna	VULP9118A	Schwarzbeck
Horn Antenna	BBHA-9120D	Schwarzbeck
Pre-Amplifier	JS4-00102600-26-5P	MITEQ

3.2.6 Test procedure

The EUT is placed on a turntable, which is 0.8 meter high above ground.
The turntable rotates 360 degrees to determine the position of the maximum emission level.
EUT is set 3.0 meters away from the receiving antenna, broadband antenna, which is mounted on an antenna mast.
The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level form the EUT. Both horizontal and vertical polarizations of the antenna are set on measurement.
In order to find out the maximum emission levels, all of the EUT location were manipulated according to ANSI 63.4 during the radiated emission measurement.
The EUT was tested in 3 orthogonal planes. The worst case position was reported.
The bandwidth of test receiver is set at 120 kHz between 30 to 1 000 MHz, and 1 MHz between 1 to 4 GHz.

3.2.7 Test condition

- Test place : Open area test site
- Test mode : Normal operation
- Test environment : 18 ℃, 59 % R.H.

3.2.8 Test result

Frequency [MHz]	Polarization [H/V]	Detect Mode [Peak/QP/AVG]	Reading [dBμV]	Antenna Factor [dB/m]	Cable Loss [dB]	AVG Factor [dB]	Pre-Amp Gain [dB]	Emission Level [dBμV]	Limit [dBμV]	Margin [dB]
433.92	V	Peak	91.2	15.9	4.5	0	40.5	71.1	100.8	29.7
		**AVG				-6.5		64.6	80.8	16.2
867.84	V	Peak	53.7	22.4	9.0	0	40.5	44.6	80.8	36.2
		**AVG				-6.5		38.1	60.8	22.7
*1301.76	-	Peak	35.6	24.3	13.6	0	27.1	46.4	74.0	27.6
		**AVG				-6.5		39.9	54.0	14.1
1735.68	-	Peak	34.5	24.8	18.1	0	27.1	50.3	80.8	30.5
		**AVG				-6.5		43.8	60.8	17.0
2169.60	-	Peak	31.1	25.4	22.6	0	27.1	52.0	80.8	28.8
		**AVG				-6.5		45.5	60.8	15.3
2603.52	-	Peak	27.8	27.9	27.1	0	27.1	55.7	80.8	25.1
		**AVG				-6.5		49.2	60.8	11.6
3037.44	-	Peak	31.4	28.4	31.6	0	27.1	64.3	80.8	16.5
		**AVG				-6.5		57.8	60.8	3.0
3471.36	-	Peak	26.6	29.1	36.1	0	27.1	64.7	80.8	16.1
		**AVG				-6.5		58.2	60.8	2.6
*3905.28	-	Peak	9.0	29.7	40.7	0	27.1	52.3	74.0	21.7
		**AVG				-6.5		45.8	54.0	8.2
*4339.20	-	Peak	2.8	30.3	45.2	0	27.1	51.2	74.0	22.8
		**AVG				-6.5		44.7	54.0	9.3

Here, * is restricted frequency, ** is the average value applied with average factor.

3.2.9 Limit

- Fundamental

Fundamental Frequency (MHz)	Field Strength of Fundamental (μV/m)	Field Strength of Fundamental (dBμV/m)
40.66 – 40.70	2 250	67.04
70 – 130	1 250	61.94
130 – 174	1 250 to 3 750	61.94 to 71.48
174 – 260	3 750	71.48
260 – 470	3 750 to 12 500	71.48 to 81.94
Above 470	12 500	81.94

- Spurious emission

Fundamental Frequency (MHz)	Field Strength of Spurious Emission (μV/m)	Field Strength of Spurious Emission (dBμV/m)
40.66 – 40.70	225	47.04
70 – 130	125	41.94
130 – 174	125 to 375	41.94 to 51.48
174 – 260	375	51.48
260 – 470	375 to 1 250	51.48 to 61.94
Above 470	1 250	61.94

- Spurious emission at restricted band

Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	48.52 to 13.80	300
0.490 – 1.705	24000/F(kHz)	33.80 to 22.97	30
1.705 – 30.0	30	29.54	30
30 – 88	100	40.00	3
88 – 216	150	43.52	3
216 – 960	200	46.02	3
Above 470	500	53.98	3

Here, Restricted band are 1 301 to 1 427 MHz and 3 600 to 4 400

3.3 20 dB Bandwidth

3.3.1 Definitions

A 20 dB Bandwidth is width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each lower 20 dB of the total mean power of a given emission

3.3.2 Specification

FCC Rules Part 15, Subpart C, Section 15.231(c)

3.3.3 Measurement methods

ANSI Standard C63.4-2009 10.1.8.8

3.3.4 Set-Up

3.3.5 Test equipment list

Equipment	Model Name	Manufacture
EUT	MR1060	SEGI LIMITED
Spectrum Analyzer	N9020A	Agilent

3.3.6 Test procedure

Spectrum Analyzer setting

- Center Frequency : 433.92 MHz
- Span : 0.5 MHz / 1 MHz
- RBW : 9 kHz / 120 kHz
- VBW : 30 kHz / 300 kHz
- Detect Mode : Peak

3.3.7 Test condition

- Test Place : Shield Room
- Test Mode : Normal Operation
- Test Environment : 22 ℃, 53 %R.H.

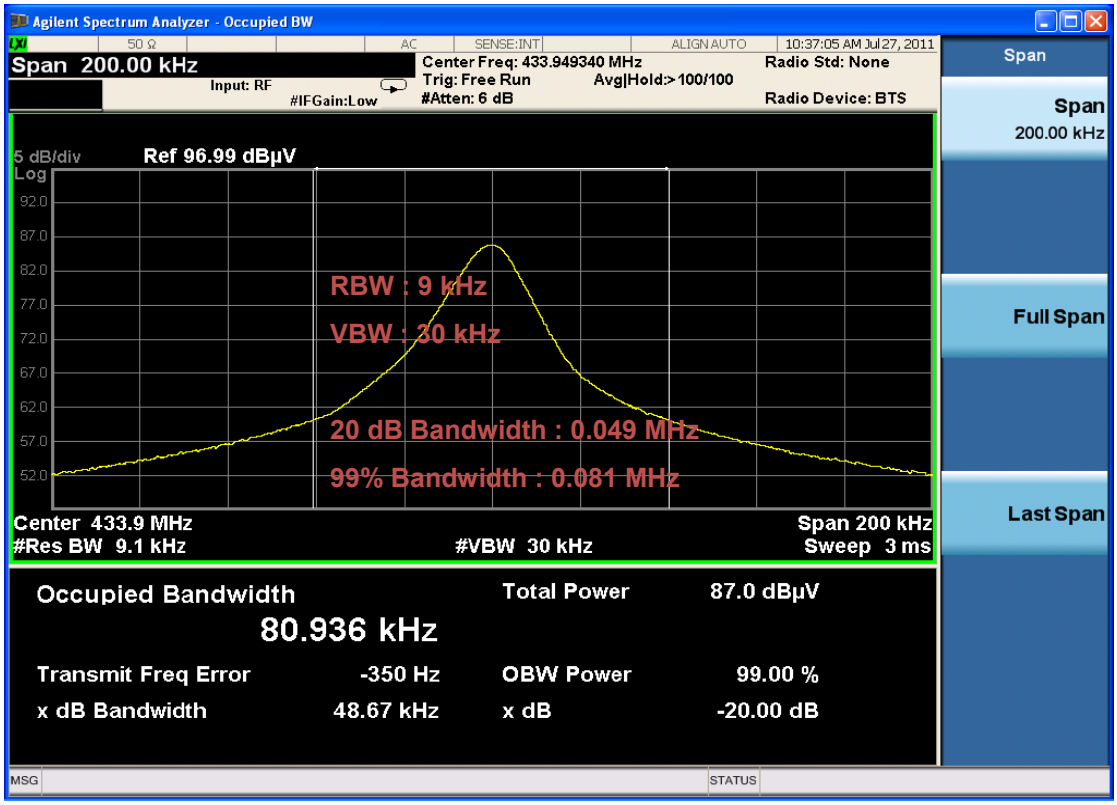
3.3.8 Test result

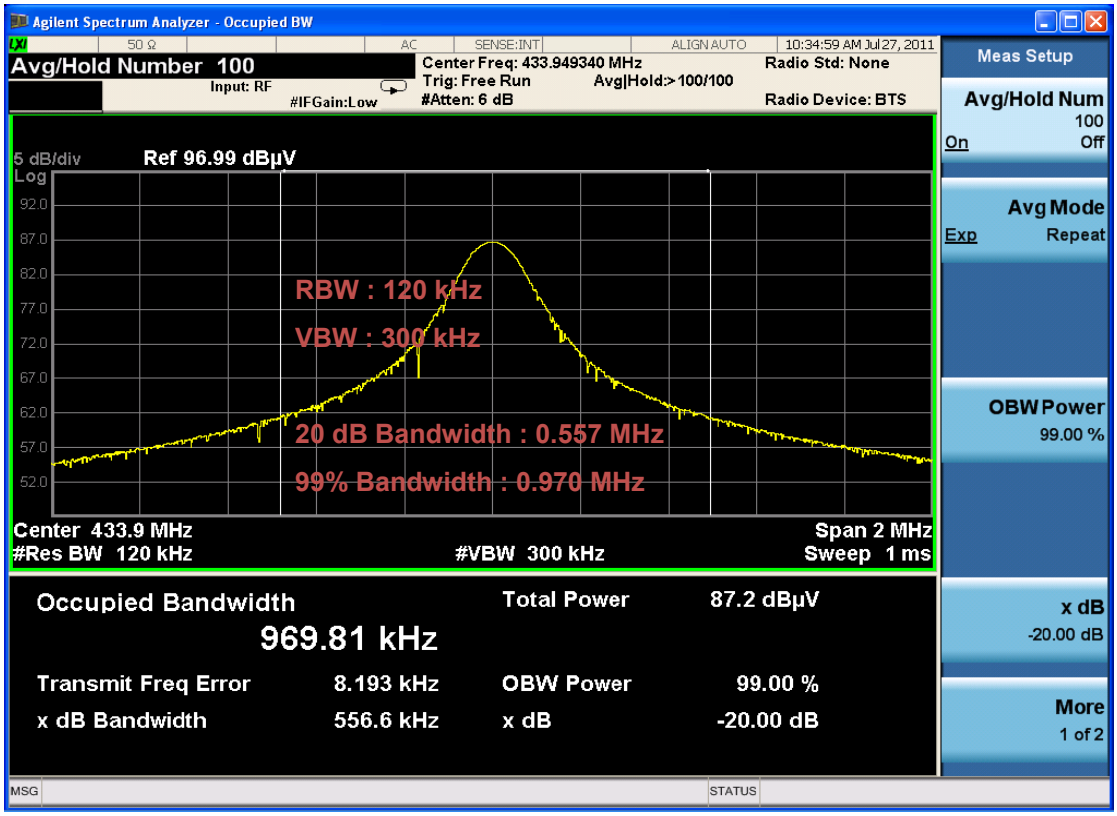
Frequency (MHz)	RBW (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)
433.95	9 kH	0.049	0.081	1.085
	120 kHz	0.557	0.970	

3.3.9 Limit

Less than 0.25 % (1.085 MHz).

3.3.10 Plots of 20 dB bandwidth and 99% Bandwidth





4. Test equipments list

The listing below denotes the test equipments for the test(s).

No.	Equipment	Model	Manufacturer	Serial Number	Calibration Due date
1	Spectrum Analyzer	N9020A	Agilent	MY48010456	03/10/12
2	Power Supply	E3633A	Agilent	SG400022272	10/02/11
3	Loop Antenna	6502	EMCO	9609-9087	03/03/12
4	Biconical Antenna	BBAK9137	Schwarzbeck	2217	02/23/12
5	Log-Periodic Antenna	VULP9118A	Schwarzbeck	382	02/23/12
6	Horn Antenna	BBHA 9120 D	Schwarzbeck	395	08/13/12
7	Pre-Amplifier	JS4-00102600-26-5	Miteq	383521	03/10/12
8	Turn Table	N/A	Daeil EMC	N/A	N/A
9	Antenna Mast	EAM4.5	Daeil EMC	N/A	N/A
10	Controller	DE200	Daeil EMC	AAA69813111	N/A

