TEST REPORT

Report Number		RAPA13-O-280
Type of Equipment		Keyless Entry System
Model Name		EZ100-R-315
FCC ID		VA5R1060-1A315
IC Number		7087A-R1060A315
Applicant	Name	SEGI LIMITED
	Logo	SEGI
	Address	1808, 18/F, Tower II, Admiralty Centre, 18 Harcourt Rd., Admiralty, Hong Kong
Manufacturer	Name	SEGI ELECTRONICS CO., LTD.
	Address	Chenjiapucun, Liaobu Town Dongguan City, Guangdong Province, 523-408, P.R.China
Test period		April 19, 2013 to April 30, 2013
Issuing date of report		May 09, 2013
Total page		13 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 1-2010.

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 : May 09, 2013

Prepared and tested by Chang Young Choi
Deputy General Manager /TCL of RAPA

Date : May 09, 2013

Reviewed by Sukil Park
Executive Managing Director/TCL of RAPA

CONTENTS

1. GENERAL DESCRIPTION

1.1 Applicant

• Company name	:	SEGI LIMITED
• Address	:	1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt Rd., Admiralty, Hong kong
• 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, Guangdong Province, 523-408, P.R.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	:	EZ100-R-315
• Serial number	:	N/A
• Frequency	:	315 MHz
• Output power	:	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 1-2010
• FCC classification	:	DSC / Part 15 Security/Remote control Transmitter
• IC classification	:	Annex 1 / Momentarily Operated Devices and Remote Control
• Test period	:	April 19, 2013 to April 30, 2013
• Issuing date of report	:	May 09, 2013
• Place of test	:	Head office 824, B104, Anyang Megavalley, 799, Gwanyang-dong, Dongan-gu, Anyang-si, Gyeonggi-do, 431-767, Korea Open area test site 80, Jeil-ri, Yangji-myun, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-825, Korea (FCC Registration Number : 337229) (FCC Conformity Assessment Body, Registration No: 608365) (IC Submission Number : 143881) (KCC Designation Number : KR0027)

1.4 Electrical specification

Item	Specifications
Type of Equipment	Keyless Entry System
Model Name	EZ100-R-315
Transmit Frequency	315 MHz by pattern antenna
Receive Frequency	20 kHz by coil inductor for RFID
Modulation Method	ASK
Power Source	3 Vdc (CR2032)
Size (mm)	26.8 x 37.3 x 8.3 (W x L x H)

2. GENERAL INFORMATION OF TEST

2.1 Standard for measurement methods

Applied Standard : FCC CFR47 Part 15 Subpart C, IC RSS-210 Issue8 Annex 1-2010				
FCC	**IC**	**Description of Test**	**Limit**	**Result**
15.209	RSS-210_2.2	Radiated Emission in Restricted Band	See 15.207	Pass
15.231(a)	A1.1.1	Transmission Time(s)	5	Pass
15.231(b)	A1.1.2	Field Strength of Fundamental (dBμV/m)	95.6(Peak) / 75.6(AVG)	Pass
15.231(b) & 15.209	A1.1.2	Radiated Emission(dBμV/m)	75.6(Peak) / 55.6(AVG)	Pass
15.231(c)	A1.1.3	Occupied Bandwidth(kHz)	787.5 kHz	Pass

2.2 Description of EUT modification

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

2.3 Description of test system configuration

• Peripheral equipment used;

Description	Model name	Serial No.	Manufacturer	FCC ID	IC Number
EUT	EZ100-R-315	N/A	SEGI ELECTRONICS CO., LTD.	VA5JA5R1060-1A315	7087A-R1060A315

• Cables used

Device from	Device to	Type of cable	Type of connector	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

Spectrum analyzer setting;

• Center Frequency : 315 MHz
• Span : Zero
• RBW : 1 MHz
• VBW : 3 MHz
• Sweep time : 1 s
• Detect Mode : Peak

3.1.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	EZ100-R-315	SEGI
Spectrum Analyzer	N9020A	Agilent

3.1.6 Test condition

• Test place : Open area test site
• Test environment : 21 °C, 37 % R.H.
• Test mode : Normal Operation

3.1.7 Test result

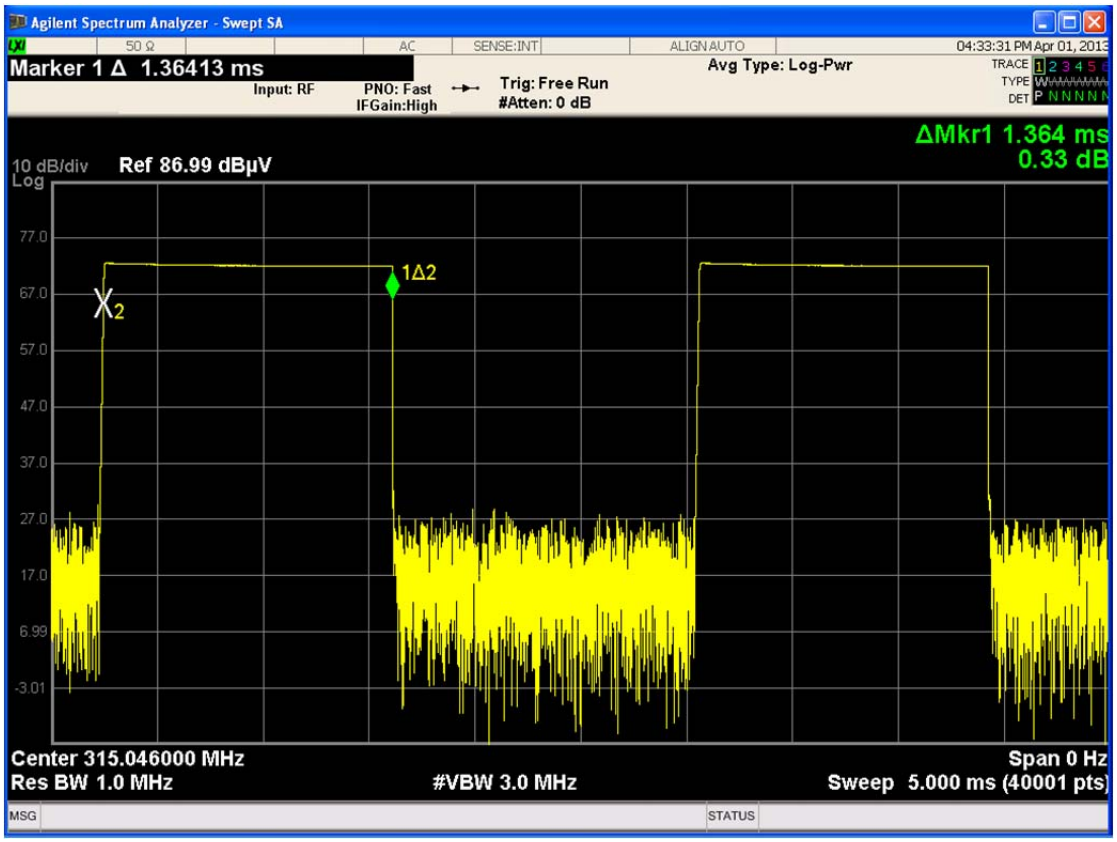
Frequency (MHz)	Transmission Time (s)	Limit (s)
315	0.677	5.00

3.1.8 Limit

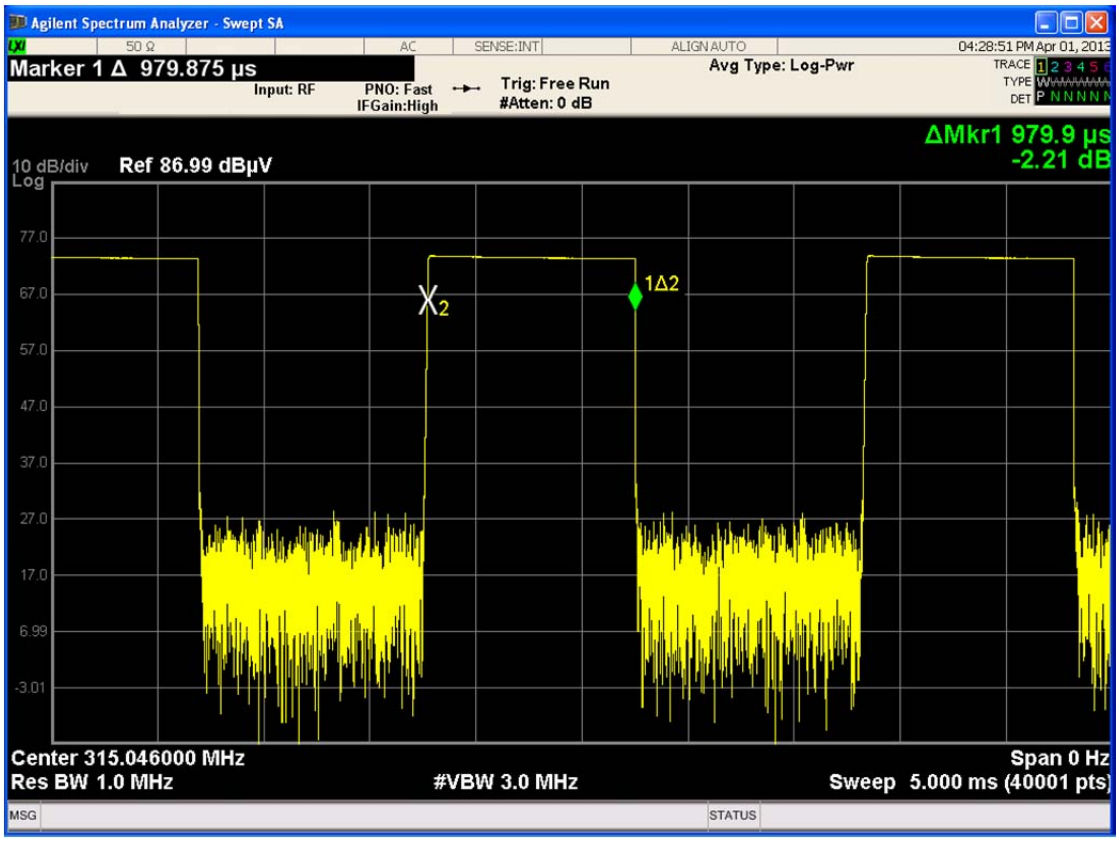
Less than 5 seconds.

3.1.9 Plots of transmission time

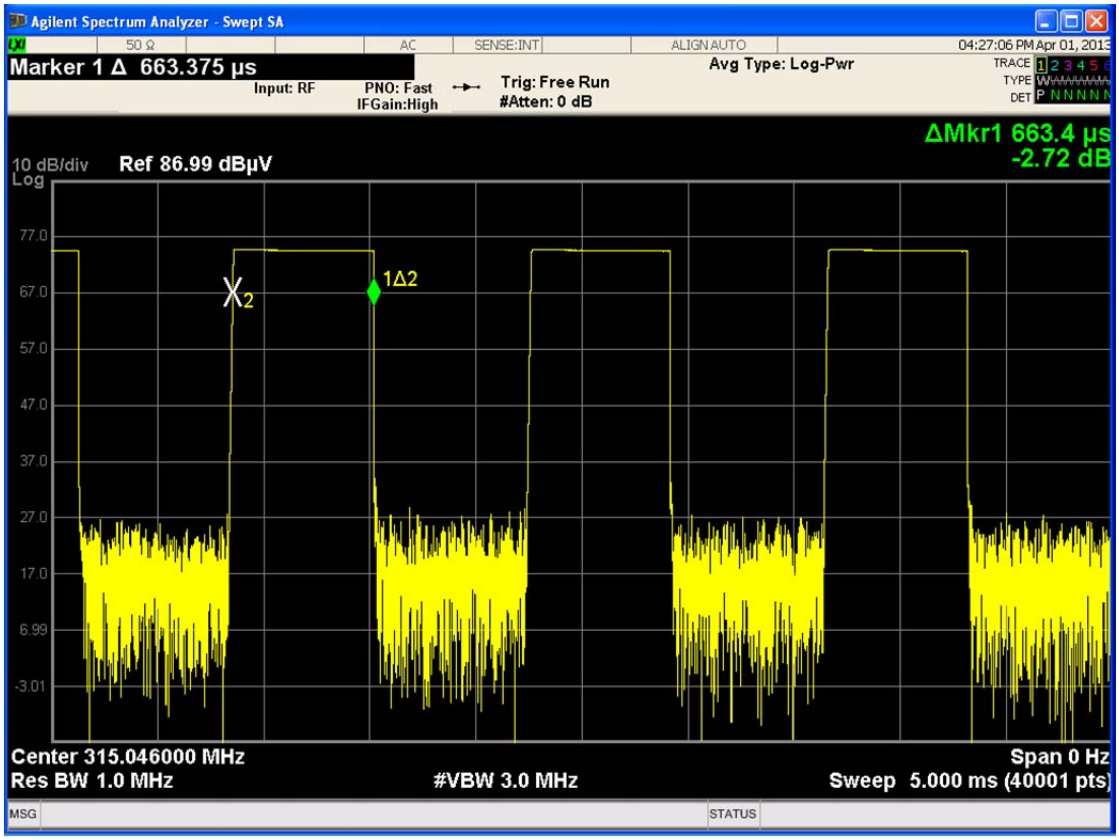
3.1.10 Plot of Data Format Type 1



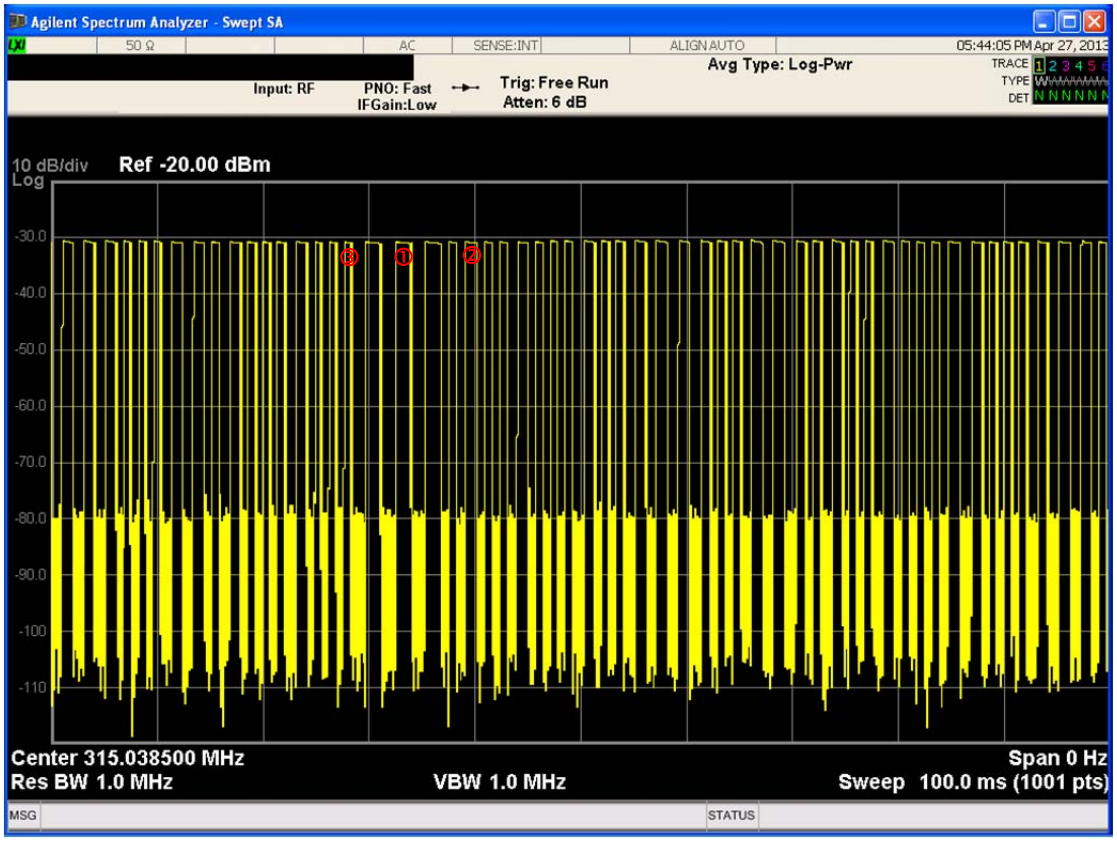
3.1.11 Plot of Data Format Type 2



3.1.12 Plot of Data Format Type 3



3.1.13 Plot of Data Format within 100 ms



3.1.13 Data Format within 100 ms

Data Type	Number	Duration Time (μs)	
Type 1	3	1 364 x 3	4 092.0
Type 2	20	979.9 x 20	19 598.0
Type 3	36	663.4 x 36	23 882.4

3.1.14 Average Factor

$$\text{Total Average Factor} = 20\log\left[\frac{(4092 + 19598 + 23882.4)}{100000}\right] dB$$

$$= -6.45 \text{ dB}$$

3.2 Field strength of fundamental and spurious emission

3.2.1 Definitions

A field strength emission is an 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.

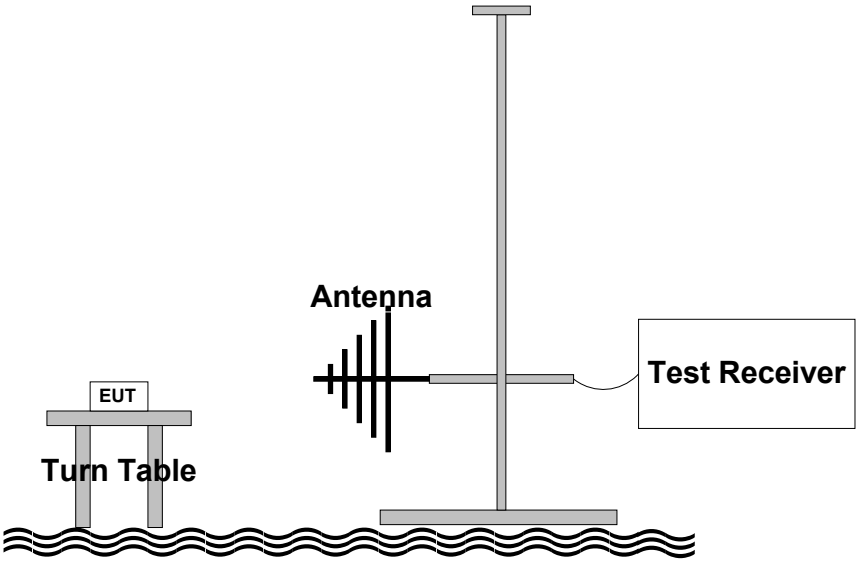
3.2.2 Specification

• FCC Rules Part 15 Subpart C Section 15.231(b)
• IC Rules RSS-210 Issue8 Annex 1-2010 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	EZ100-R-315	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	SCU-01	R&S
Pre-Amplifier	ESMI-Z7	R&S

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 to 3 orthogonal planes.

The RBW of test receiver is 120 kHz between 30 to 1 000 MHz, and 1 MHz above 1 GHz.

3.2.7 Test condition

- Test place : Open area test site
- Test environment : 17 °C, 41 % R.H.
- Test mode : Operation at single channel

3.2.8 limit

Freq. [MHz]	Pol. [H/V]	plane [X/Y/Z]	Detect Mode [Peak/QP/AVG]	Reading [dBμV]	ANT. Factor [dB/m]	Cable Loss [dB]	AVG Factor [dB]	Pre-Amp Gain [dB]	Emission Level [dBμV]	Limit [dBμV]	Margin [dB]
315.0	V	Y	Peak	47.0	16.6	2.4	0	40.5	68.5	95.6	27.1
			**AVG				-6.4		62.1	75.6	13.5
630.0	V	Y	Peak	31.6	19.5	3.4	0	40.5	49.2	75.6	26.4
			**AVG				-6.4		42.8	55.6	12.8
945.0	V	Y	Peak	32.6	22.7	4.1	0	40.5	46.3	75.6	29.3
			**AVG				-6.4		39.9	55.6	15.7
1260.0	-	-	Peak	-	-	-	0	16.6	-	75.6	-
			**AVG				-6.4		-	55.6	-
*1575.0	-	-	Peak	-	-	-	0	16.4	-	74.0	-
			**AVG				-6.4		-	54.0	-
1890.0	-	-	Peak	-	-	-	0	16.1	-	75.6	-
			**AVG				-6.4		-	55.6	-
*2205.0	-	-	Peak	-	-	-	0	16.2	-	74.0	-
			**AVG				-6.4		-	54.0	-
2520.0	-	-	Peak	-	-	-	0	15.8	-	75.6	-
			**AVG				-6.4		-	55.6	-
*2835.0	-	-	Peak	-	-	-	0	16.0	-	74.0	-
			**AVG				-6.4		-	54.0	-
3150.0	-	-	Peak	-	-	-	0	15.8	-	75.6	-
			**AVG				-6.4		-	55.6	-

Here, * means restricted frequency.
** means the average value applied with average factor.
"-" means no emission data detected above noise floor.

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

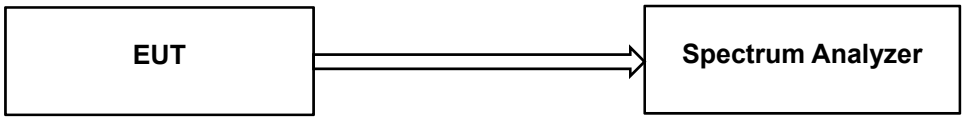
3.3.2 Specification

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

3.3.3 Measurement method

• ANSI Standard C63.4-2009 10.1.8.8

3.3.4 Set-up



Spectrum analyzer setting;

• Center Frequency : 315 MHz
• Span : 1 MHz
• RBW : 10 kHz
• VBW : 30 kHz
• Sweep time : Auto
• Detect Mode : RMS

3.3.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	EZ100-R-315	SEGI ELECTRONICS CO., LTD.
Spectrum analyzer	N9020A	Agilent

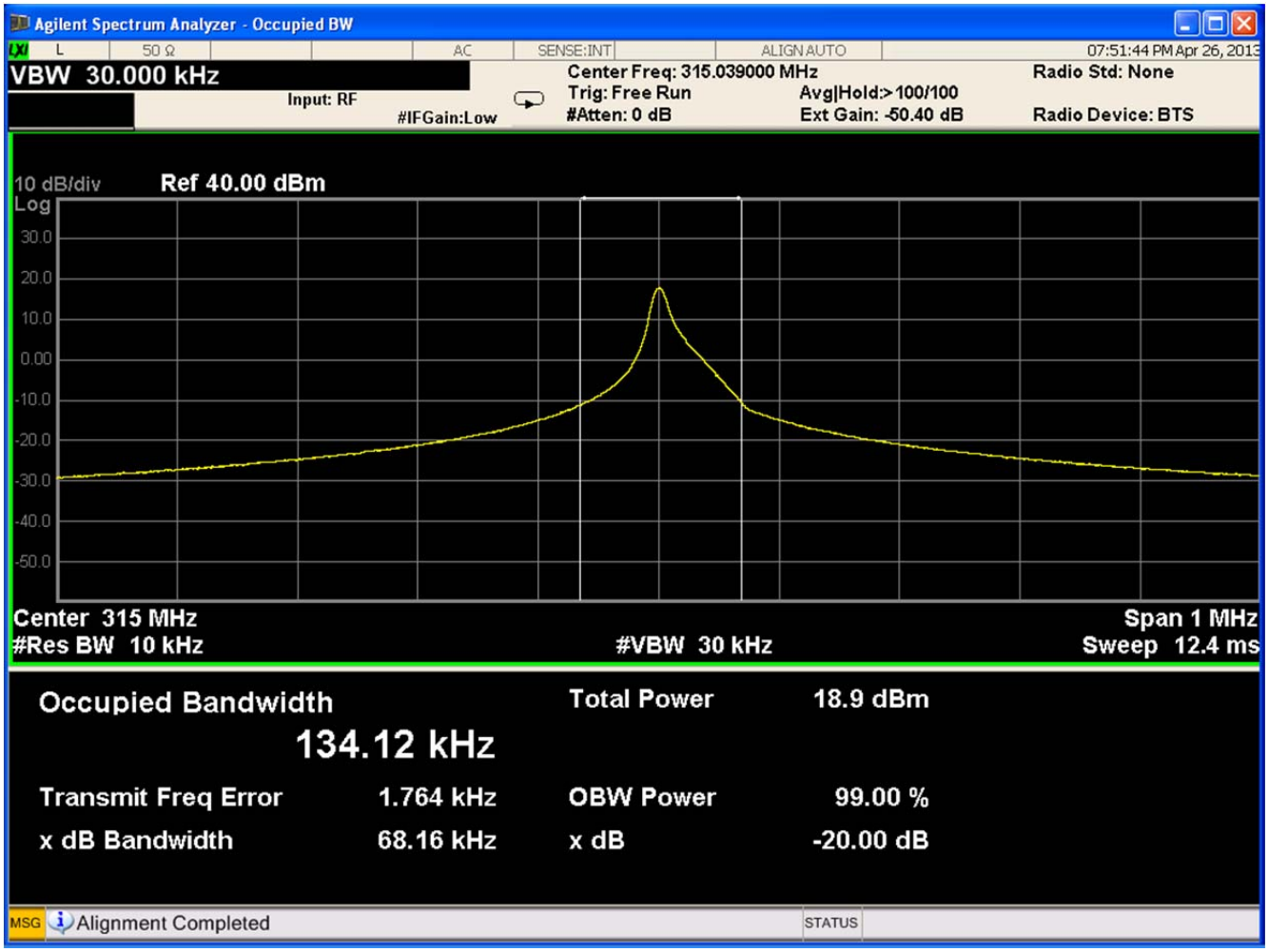
3.3.6 Test condition

• Test place : Open area test site
• Test environment : 21 °C, 37 % R.H.
• Test mode : Normal Operation

3.3.7 Test result

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)
315.0	68.16	134.12	787.5

3.3.8 Plots of 20 dB bandwidth



Operating frequency :	**315 MHz**
RBW :	**10 kHz**
VBW :	**30 kHz**
Detector mode :	**RMS**
Trace mode :	**Max hold**
Sweep time :	**Auto**
20 dB bandwidth :	**68.16 kHz**
99 % bandwidth :	**134.12 kHz**

4. TEST EQUIPMENT LIST

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

No.	Equipment	Model	Manufacturer	Serial Number	Calibration Due date
1	Spectrum analyzer	N9020A	Agilent	MY48010456	02/04/14
2	Test receiver	ESCI 7	Rohde & Schwarz	1166.5950.07	01/30/14
3	Loop antenna	6502	EMCO	9609-9087	02/26/14
4	Biconical antenna	VHA9103	Schwarzbeck	2217	11/29/13
5	Log-Periodic antenna	VULP9118A	Schwarzbeck	382	11/29/13
6	Horn antenna	BBHA 9120 D	Schwarzbeck	395	08/07/13
7	Pre-amplifier	SCU-01	R&S	10020	09/26/13
8	Pre-amplifier	JS4-00102600	MITEQ	383521	01/31/14
9	Turn table	N/A	Daeil EMC	N/A	N/A
10	Antenna mast	EAM4.5	Daeil EMC	N/A	N/A
11	Controller	DE200	Daeil EMC	AAA69813111	N/A

