

TEST REPORT

		,				
Report Number		RAPA13-O-732				
Type of Equipme	ent	Keyless Entry System				
Model Name		RED301-1WAY				
FCC ID		VA5RED301-1WSS				
IC Number		7087A-1WRED301SS				
	Name	SEGI LIMITED				
Applicant	Logo	SEGI				
	Address	UNIT F, 7/F, CENTURY INDUSTRIAL CENTER, 33-35 AU PUI WAN STREET, SHANTIN, NT, HONGKONG				
Manufacturan	Name	SEGI ELECTRONICS CO., LTD				
Manufacturer	Address	Chenjiapucun, Liaobu Town, Dongguan City, Guangdong Province, P.R.China				
Test period		October 28, 2013 to November 13, 2013				
Issuing date of r	eport	November 21, 2013				
Total page		39 pages (including this page)				

SUMMARY

The equipment complies with FCC Part 15.247: Operation within the bands 902 MHz to 928 MHz, 2 400 MHz to 2 483.5 MHz, and 5 725 MHz to 5 850 MHz 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 massproduction.

Date: November 21, 2013 Date: November 21, 2013

Prepared and tested by Tae Yang Yoon Reviewed by Sukil Park

Manager / TCL of RAPA Executive Managing Director / TCL of RAPA

Report No.: RAPA13-O-732

Report No.: RAPA13-O-732



CONTENTS

1. GENERAL DESCRIPTION	3
1.1 Applicant	3
1.2 Manufacturer	3
1.3 Basic description of EUT	3
1.4 Electrical specification	4
2. General information of test	5
2.1 Standard for measurement methods	5
2.2 Description of EUT modification	5
2.3 Description of test system configuration	5
3. Measurement data	6
3.1 Radiated emission in restricted band	6
3.2 Frequency separation	9
3.3 Number of hopping channels	11
3.4 Occupied bandwidth	13
3.5 Average time of occupancy	17
3.6 Maximum peak output power	23
3.7 Conducted emission and band edge	24
4. RF Exposure Compliance Requirement	38
5. Test equipment list	39

Page: 3 / 39 Report No.: RAPA13-O-732

1. GENERAL DESCRIPTION

1.1 Applicant

• Company name : SEGI LIMITED

• Address : UNIT F, 7/F, CENTURY INDUSTRIAL CENTER, 33-35 AU PUI WAN

STREET, SHANTIN, NT, HONGKONG

Contact person : Eui Seok Chung

Phone/Fax : +82-32-623-5550 / +82-32-623-6667

1.2 Manufacturer

• Company name : SEGI ELECTRONICS CO., LTD

Address : Chenjiapucun, Liaobu Town, Dongguan City, Guangdong Province,

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 : RED301-1WAY

• Serial number : N/A

• Frequency : 910.92 MHz ~ 919.08 MHz

Number of channel(s) : 25 Channels

Modulation method : FHSS

• FCC Rule Part(s) : FCC CFR47 Part 15 Subpart C Section 15.247

• IC Rule Part(s) : IC RSS-210 Issue8 Annex 8-2010

• FCC classification : DSS / Part 15 Spread Spectrum Transmitter (FHSS)

IC classification : Annex 8 / Frequency Hopping and Digital Modulation Systems Operating

in the bands 902 - 928 MHz, 2 400 - 2 483.5 MHz and 5 725 - 5 850

MHz

• Test period : October 28, 2013 to November 13, 2013

• Issuing date of report : November 21, 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)
(IC Submission Number : 143881)
(KCC Designation Number : KR0027)

Page : 4 / 39 Report No. : RAPA13-O-732

1.4 Electrical specification

Item	Specifications					
Type of Equipment	Keyless Entry Remote					
Model Name	RED301-1WAY					
Transmit Frequency	910.92 MHz ~ 919.08 MHz (25 CH / 340 kHz Step)					
Receive Frequency	-					
Modulation Method	FHSS					
Power Source	6.0 Vdc (CR2025 * 2)					
Size (mm)	28.4 x 46.6 x 9.3 mm (L x H x W)					

Page : 5 / 39 Report No. : RAPA13-O-732

2. General information of test

2.1 Standard for measurement methods

	Applied Standard : FCC CFR47 Part 15 Subpart C, IC RSS-210 Issue8 Annex 8-2010										
FCC	IC	Description of Test	Limit	Result							
15.209	RSS-210_2.2	Radiated Emission in Restricted Band	See 15.207	Pass							
15.247(a)(1)	RSS-210_A8.1_B	Frequency Separation	≥ 20 dB Bandwidth	Pass							
15.247(a)(1)(i)	RSS-210_A8.1_C	Number of Hopping Channels	≥ 25 CH	Pass							
15.247(a)(1)(i)	RSS-210_A8.1_C	Occupied Bandwidth	≤ 500 kHz	Pass							
15.247(a)(1)(i)	RSS-210_A8.1_C	Average Time of Occupancy	≤ 0.4 s within 10 s	Pass							
15.247(b)(2)	RSS-210_A8.4_1	Maximum Peak Output Power	≤ 0.25 Watt	Pass							
15.247(d)	RSS-210_A8.5	Conducted Emission & Band Edge	≥ 20 dBc	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	RED301-1WAY	N/A	SEGI	VA5RED301-1WSS	7087A-1WRED301SS

Cables used

Device from	Device to	Type of cable	Type of connector	Length
-	-	-	-	-

Page: 6 / 39 Report No.: RAPA13-O-732

3. Measurement data

3.1 Radiated emission in restricted band

3.1.1 Definitions

A radiated emission is a emission from the equipment when transmitting into a non-radiating load on frequencies that are restricted band sufficient to ensure transmission of information of required quality for the class of communications desired.

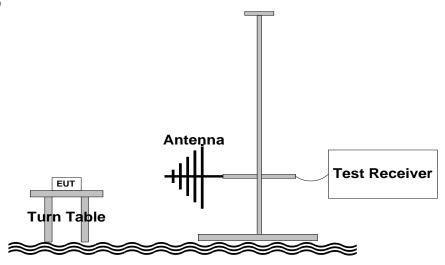
3.1.2 Specification

- FCC Rules Part 15 Subpart C Section 15.209
- IC Rules RSS-210 Section 2.2

3.1.3 Measurement method

• ANSI Standard C63.4-2003 8.3

3.1.4 Set-up



3.1.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	RED301-1WAY	SEGI
Test Receiver	ESCI 7	Rohde & Schwarz
Loop antenna	EMCO 6502	EMCO
Bi-conical antenna	VHA9103	Schwarzbeck
Log periodic antenna	VULP9118A	Schwarzbeck
Horn Antenna	BBHA-9120D	Schwarzbeck

Page: 7 / 39 Report No.: RAPA13-O-732

3.1.6 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.

3.1.7 Test condition

Test place : Open area test site
Test environment : 24.1 °C, 53 % R.H.

• Test mode : Operation at single channel

3.1.8 Limit

Frequency [MHz]	Field Strength [μV/m]	Field Strength [dBµV/m]	Measurement Distance [m]
0.009 - 0.490	2 400 / F(kHz)	48.52 to 13.80	300
0.490 – 1.705	2 4000 / 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 960	500	53.98	3

Remark: Radiated emissions which fall in the restricted bands must also comply with the limits as this table.

Page: 8 / 39 Report No.: RAPA13-O-732

3.1.9 Test result

• Operation frequency: 910.92 MHz

Frequency [MHz]	Pol. [H/V]	Plane [X/Y/Z]	Detect mode [Peak/AVG]	Reading [dBµV]	Antenna factor [dB/m]	Cable loss [dB]	Pre-amp gain [dB]	Emission level [dBµV]	Limit [dBµV]	Margin [dB]
910.92	Н	Υ	Peak	78.9	22.6	4.1	0	105.6	-	-
910.92	Н	Υ	AVG	75.0	22.6	4.1	0	101.7	-	-

• Operation frequency: 915.00 MHz

Frequency [MHz]	Pol. [H/V]	Plane [X/Y/Z]	Detect mode [Peak/AVG]	Reading [dBµV]	Antenna factor [dB/m]	Cable loss [dB]	Pre-amp gain [dB]	Emission level [dBµV]	Limit [dBµV]	Margin [dB]
915.00	Н	Υ	Peak	79.0	22.6	4.1	0	105.7	-	-
915.00	Н	Υ	AVG	72.5	22.6	4.1	0	99.2	-	-

• Operation frequency: 919.08 MHz

Frequency [MHz]	Pol. [H/V]	Plane [X/Y/Z]	Detect mode [Peak/AVG]	Reading [dBµV]	Antenna factor [dB/m]	Cable loss [dB]	Pre-amp gain [dB]	Emission level [dBµV]	Limit [dBµV]	Margin [dB]
919.08	Н	Υ	Peak	77.9	22.6	4.1	0	104.6	-	-
919.08	Н	Υ	AVG	69.6	22.6	4.1	0	96.3	-	-

Remark: The other emissions were not detected.

Page: 9 / 39 Report No.: RAPA13-O-732

3.2 Frequency separation

3.2.1 Definitions

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

3.2.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(a)(1)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.1 B

3.2.3 Measurement method

• Public Notice "DA 00-705"

3.2.4 Set-up



3.2.5 Test equipment list

Equipment	Model name	Manufacturer		
EUT	RED301-1WAY	SEGI LIMITED		
Spectrum analyzer	FSV	Rohde & Schwarz		

3.2.6 Test procedure

- The output of EUT was connected to the spectrum analyzer.
- The Hopping channel separation is defined as the channel is separated with next channel.

3.2.7 Test condition

• Test place : Test room

Test environment : 22.5 °C, 43 % R.H.
Test mode : Operation at full hopping

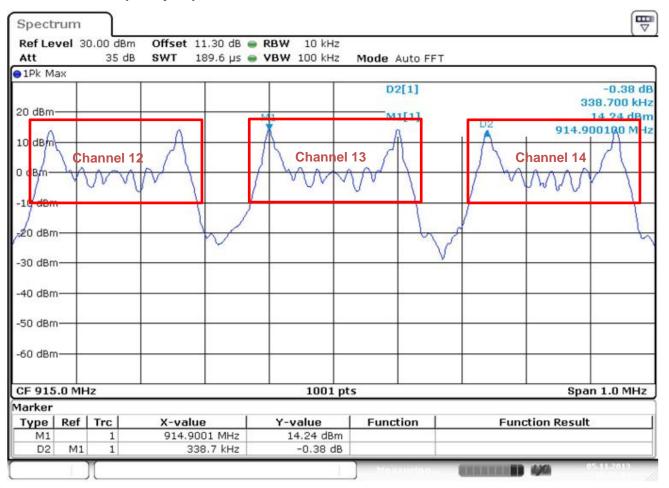
3.2.8 Test result

Channel	Frequency separation [kHz]	Limit [kHz]	
Full hopping	338.7	≥ 270.6	

Remark: For the limit value, please refer to the maximum 20 dB Bandwidth value of section 3.4.8 in this report.

Page: 10 / 39 Report No.: RAPA13-O-732

3.2.9 Plots of frequency separation



Operating frequency: Full hopping

RBW: 10 kHz

VBW: 100 kHz

Detector mode: Peak

Trace mode: Max hold

Sweep time: Auto

Frequency separation: 338.7 kHz

Page: 11 / 39 Report No.: RAPA13-O-732

3.3 Number of hopping channels

3.3.1 Definitions

Frequency hopping systems operating in the 902 MHz - 928 MHz should employ at least 25 hopping channels.

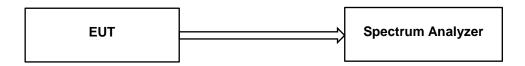
3.3.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(a)(1)(i)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.1 C

3.3.3 Measurement method

• Public Notice "DA 00-705"

3.3.4 Set-up



3.3.5 Test equipment list

Equipment	Model name	Manufacturer	
EUT	RED301-1WAY	SEGI LIMITED	
Spectrum analyzer	FSV	Rohde & Schwarz	

3.3.6 Test procedure

- The output of EUT was connected to the spectrum analyzer.
- Measure the hopping channels of EUT using spectrum analyzer.
- With the analyzer set to max hold readings were taken for 1 ~ 2 minutes in each band.

3.3.7 Test condition

• Test place : Test room

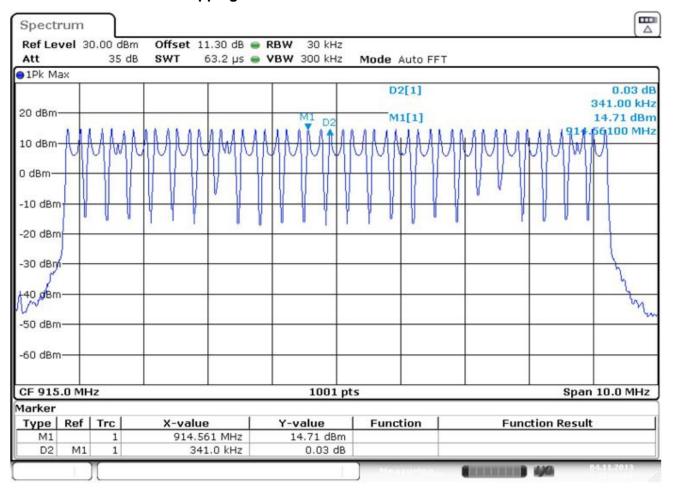
Test environment : 22.5 °C, 43 % R.H.
Test mode : Operation at full hopping

3.3.8 Test result

Channel	Number of hopping channels	Limit
Full hopping	25	≥ 25 Channels

Page: 12 / 39 Report No.: RAPA13-O-732

3.3.9 Plots of number of hopping channels



Operating frequency: Full hopping

<u>RBW</u>: 30 kHz

VBW: 300 kHz

Detector mode: Peak

Trace mode: Max hold

Sweep time : Auto

Number of hopping channels: 25

Page: 13 / 39 Report No.: RAPA13-O-732

3.4 Occupied bandwidth

3.4.1 Definitions

A occupied 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.

3.4.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(a)(1)(i)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.1 C

3.4.3 Measurement method

• Public Notice "DA 00-705"

3.4.4 Set-up



3.4.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	RED301-1WAY	SEGI LIMITED
Spectrum analyzer	FSV	Rohde & Schwarz

3.4.6 Test procedure

- The output of EUT was connected to the spectrum analyzer.
- Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level.

3.4.7 Test condition

• Test place : Test room

• Test environment : 22.5 °C, 43 % R.H.

• Test mode : Operation at single channel

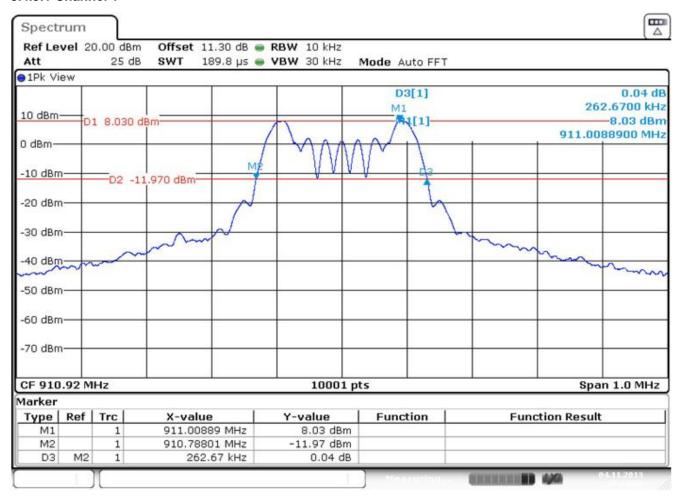
3.4.8 Test result

Frequency [MHz]	20 dB Bandwidth [kHz]	99 % Bandwidth [kHz]	
910.92	262.67	243.67	
915.00	262.67	243.57	
919.08	262.67	243.87	

Page: 14/39 Report No.: RAPA13-O-732

3.4.9 Plots of 20 dB bandwidth

3.4.9.1 Channel 1



Operating frequency: 910.92 MHz

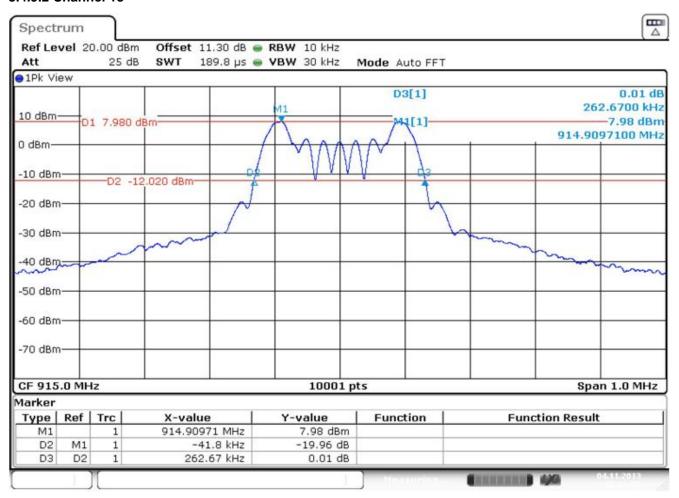
RBW: 10 kHz 30 kHz

VBW: **Detector mode:** Sample Trace mode : Max hold Sweep time: Auto

20 dB bandwidth: 262.67 kHz

Page: 15 / 39 Report No.: RAPA13-O-732

3.4.9.2 Channel 13



Operating frequency: 915.00 MHz

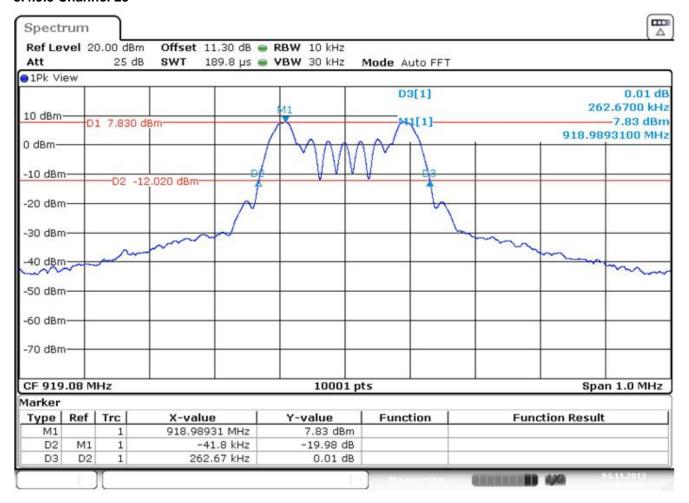
RBW: 10 kHz VBW: 30 kHz

<u>Detector mode :</u> Sample <u>Trace mode :</u> Max hold <u>Sweep time :</u> Auto

20 dB bandwidth: 262.67 kHz

Page: 16 / 39 Report No.: RAPA13-O-732

3.4.9.3 Channel 25



Operating frequency: 919.08 MHz

<u>RBW</u>: 10 kHz

VBW : 30 kHz

Detector mode : Sample

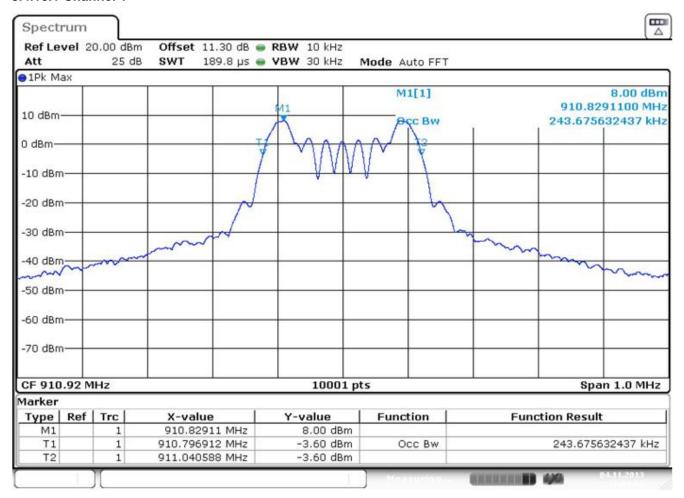
Trace mode : Max hold Sweep time : Auto

20 dB bandwidth: 262.67 MHz

Page: 17 / 39 Report No.: RAPA13-O-732

3.4.10 Plots of 99 % bandwidth

3.4.10.1 Channel 1



Operating frequency: 910.92 MHz

<u>RBW</u>: 10 kHz

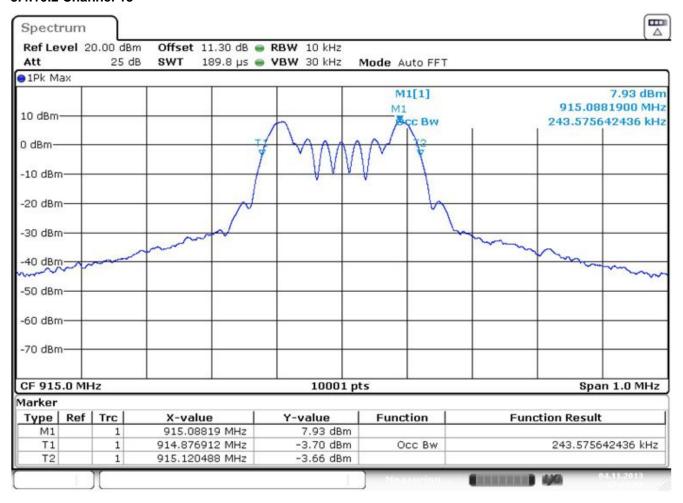
VBW: 30 kHz

Detector mode: Sample
Trace mode: Max hold
Sweep time: Auto

99 % bandwidth : 243.67 kHz

Page: 18 / 39 Report No.: RAPA13-O-732

3.4.10.2 Channel 13



Operating frequency: 915.00 MHz

<u>RBW</u>: 10 kHz

VBW: 30 kHz

Detector mode: Sample

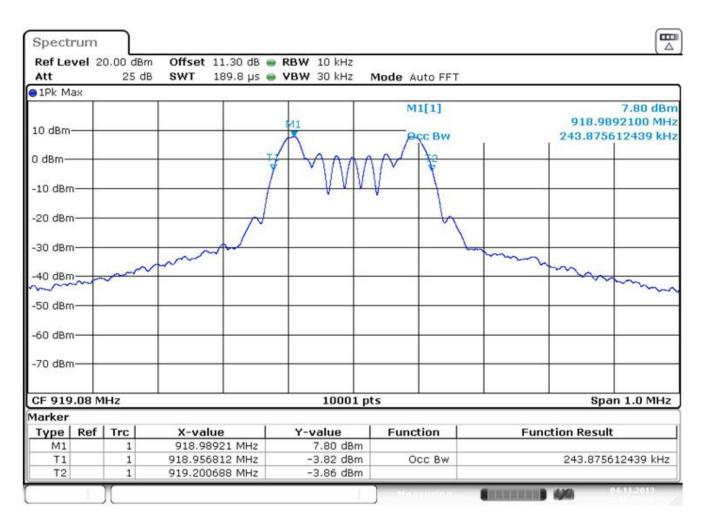
Trace mode: Max hold

Sweep time : Auto

99 % bandwidth : 243.57 kHz

Page: 19 / 39 Report No.: RAPA13-O-732

3.4.10.3 Channel 25



Operating frequency: 919.08 MHz

<u>RBW</u>: 10 kHz

VBW: 30 kHz

Detector mode: Sample
Trace mode: Max hold

Sweep time : Auto

99 % bandwidth: 243.87 kHz



Page: 20 / 39 Report No.: RAPA13-O-732

3.5 Average time of occupancy

3.5.1 Definitions

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10 second period.

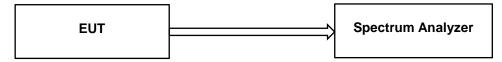
3.5.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(a)(1)(i)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.1 C

3.5.3 Measurement method

• Public Notice "DA 00-705"

3.5.4 Set-up



3.5.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	RED301-1WAY	SEGI LIMITED
Spectrum analyzer	FSV	Rohde & Schwarz

3.5.6 Test procedure

- The output of EUT was connected to the spectrum analyzer.
- Sets RBW 100 kHz, VBW 1 MHz, Max hold

3.5.7 Test condition

• Test place : Test room

Test environment : 22.7 °C, 43 % R.H.
Test mode : Operation at full hopping

3.5.8 Test result

Frequency [MHz]	Dwell time [ms]	Transmission Occurred	Result [ms]	Limit [ms]
915	300	1	300	400

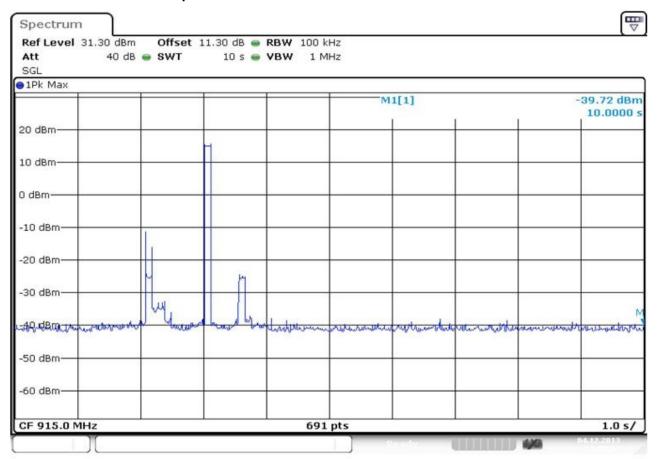
3.5.9 Limit

Less than 0.4 seconds within 10 seconds period.

Page: 21 / 39 Report No.: RAPA13-O-732

3.5.10 Plots of channel occupation

3.5.10.1 Within 10 seconds period



Operating frequency: Full hopping

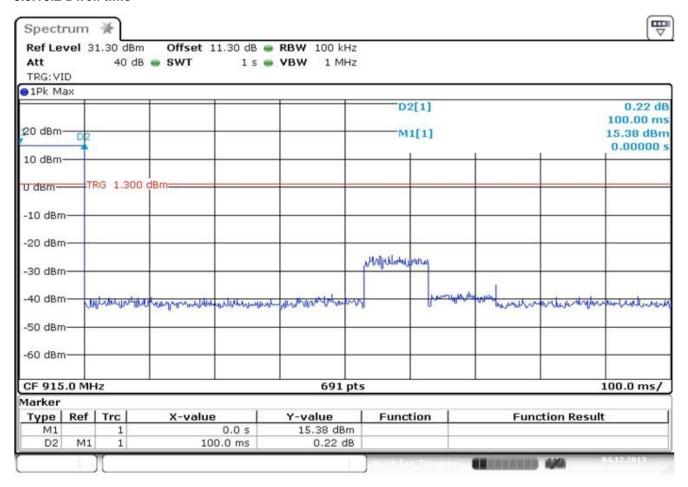
RBW: 100 kHz VBW: 1 MHz

Detector mode : Peak
Trace mode : View
Sweep time : 10 s

Number of channel within 10 s: 1

Page: 22 / 39 Report No.: RAPA13-O-732

3.5.10.2 Dwell time



Operating frequency: Full hopping

RBW: 100 kHz VBW: 1 MHz

<u>Detector mode :</u> Peak <u>Trace mode :</u> View <u>Sweep time :</u> 1 s

Dwell time: 100.0 ms



Page: 23 / 39 Report No.: RAPA13-O-732

3.6 Maximum peak output power

3.6.1 Definitions

Maximum conducted output power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

3.6.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(b)(2)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.4

3.6.3 Measurement method

• Public Notice "DA 00-705"

3.6.4 Set-up



3.6.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	RED301-1WAY	SEGI LIMITED
Spectrum analyzer	FSV	Rohde & Schwarz

3.6.6 Test procedure

• The output of EUT was connected to the spectrum analyzer.

• Peak Power : Sets RBW 1 MHz, VBW 3 MHz, Max hold

• Average Power : Sets RBW 100 kHz, VBW 300 kHz, RMS

3.6.7 Test condition

• Test place : Test room

Test environment : 22.5 °C, 43 % R.H.
Test mode : Operation at full hopping

3.6.8 Test result

	Peak l	Peak Power		Average Power		
Frequency [MHz]	Output Power [dBm]	Output Power [W]	Output Power [dBm]	Output Power [W]	Limit [W]	
910.92	14.53	0.02837	10.82	0.01207	0.25	
915.00	14.47	0.02798	10.74	0.01185	0.25	
919.08	14.32	0.02703	10.58	0.01142	0.25	

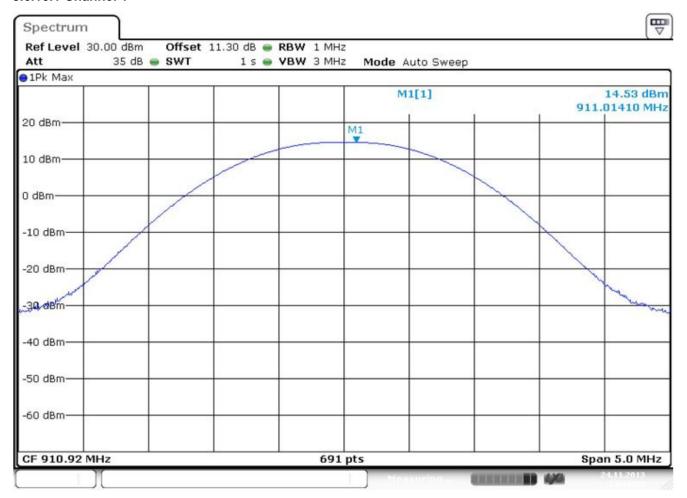
3.6.9 Limit

Less than 0.25 Watts.

Page: 24 / 39 Report No.: RAPA13-O-732

3.6.10 Plots of peak output power at Peak power

3.6.10.1 Channel 1



Operating frequency: 910.92 MHz

RBW: 1 MHz

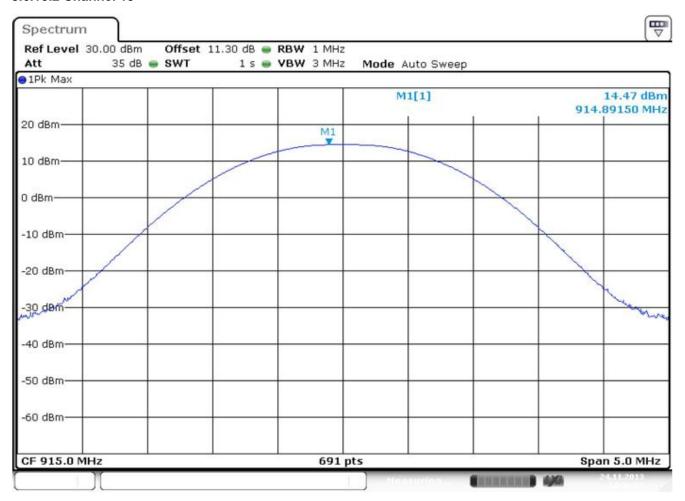
VBW: 20 MHz

Detector mode: Peak
Trace mode: Max hold
Sweep time: Auto

Output power: 14.53 dBm (=0.02837 W)

Page: 25 / 39 Report No.: RAPA13-O-732

3.6.10.2 Channel 13



Operating frequency: 915.00 MHz

RBW: 1 MHz

VBW: 20 MHz mode: Peak

<u>Detector mode :</u> Peak

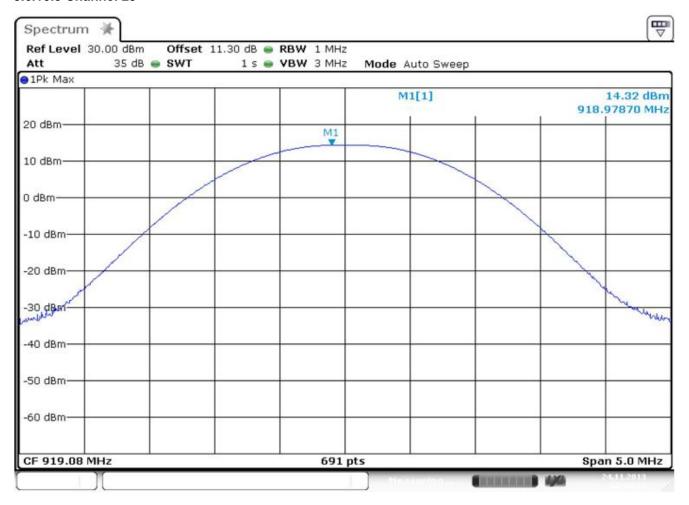
<u>Trace mode :</u> Max hold

<u>Sweep time :</u> Auto

Output power: 14.47 dBm (=0.02798 W)

Page: 26 / 39 Report No.: RAPA13-O-732

3.6.10.3 Channel 25



Operating frequency: 919.08 MHz

RBW: 1 MHz

VBW: 20 MHz mode: Peak

<u>Detector mode :</u> Peak

<u>Trace mode :</u> Max hold

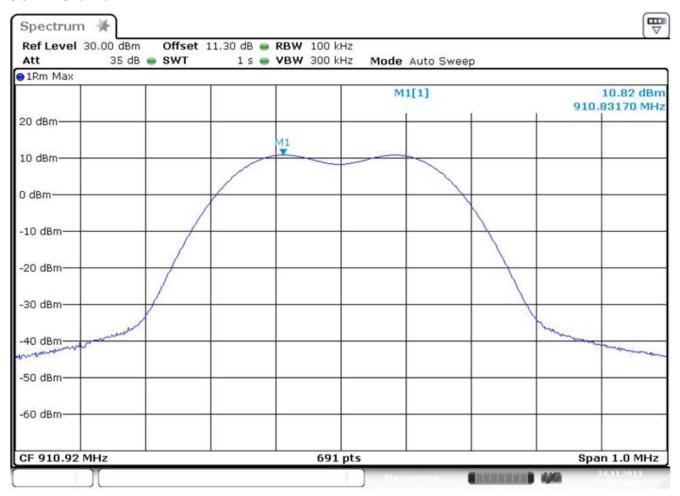
<u>Sweep time :</u> Auto

Output power: 14.32 dBm (=0.02703 W)

Page: 27 / 39 Report No.: RAPA13-O-732

3.6.11 Plots of peak output power at Average power

3.6.11.1 Channel 1



Operating frequency: 910.92 MHz

RBW: 100 kHz VBW: 300 kHz

Detector mode : RMS
Trace mode : Max hold
Sweep time : Auto

Output power: 10.82 dBm (=0.01207 W)

Page: 28 / 39 Report No.: RAPA13-O-732

3.6.11.2 Channel 13



Operating frequency: 915.00 MHz

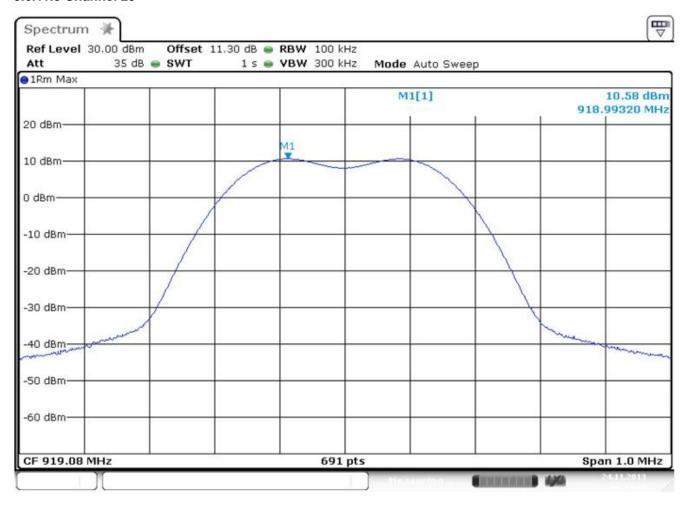
RBW: 100 kHz VBW: 300 kHz

Detector mode : RMS
Trace mode : Max hold
Sweep time : Auto

Output power: 10.74 dBm (=0.01185 W)

Page : 29 / 39 Report No. : RAPA13-O-732

3.6.11.3 Channel 25



Operating frequency: 919.08 MHz

RBW : 100 kHz

VBW: 300 kHz

Detector mode: RMS

Trace mode: Max hold

Sweep time: Auto

Output power: 10.58 dBm (=0.01142 W)



Page: 30 / 39 Report No.: RAPA13-O-732

3.7 Conducted emission and band edge

3.7.1 Definitions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on RF conducted measurement.

3.7.2 Specification

- FCC Rules Part 15 Subpart C Section 15.247(d)
- IC Rules RSS-210 Issue8 Annex 8-2010 A8.5

3.7.3 Measurement method

• Public Notice "DA 00-705"

3.7.4 Set-up



3.7.5 Test equipment list

Equipment	Model name	Manufacturer
EUT	RED301-1WAY	SEGI LIMITED
Spectrum analyzer	FSV	Rohde & Schwarz

3.7.6 Test procedure

- The output of EUT was connected to the spectrum analyzer.
- Sets RBW 100 kHz, VBW 1 MHz, Max hold

3.7.7 Test condition

• Test place : Test room

Test environment: 22.4 °C, 43 % R.H.
Test mode: Operation at full hopping

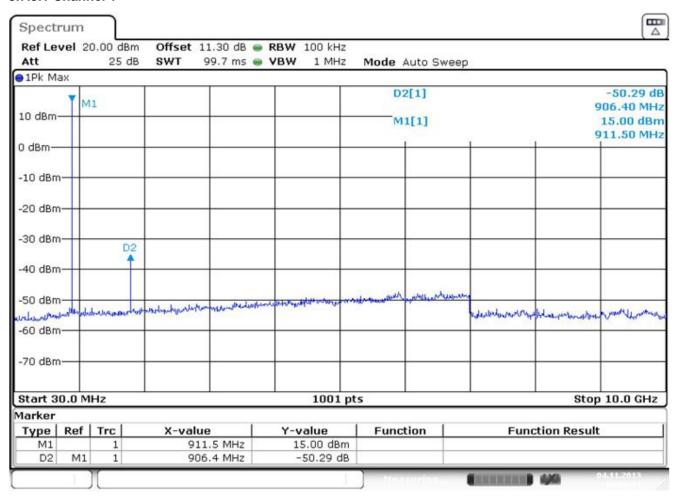
3.7.8 Limit

Less than 20 dBc.

Page: 31 / 39 Report No.: RAPA13-O-732

3.7.9 Plots of conducted emission & band edge

3.7.9.1 Channel 1



Operating frequency: 910.92 MHz

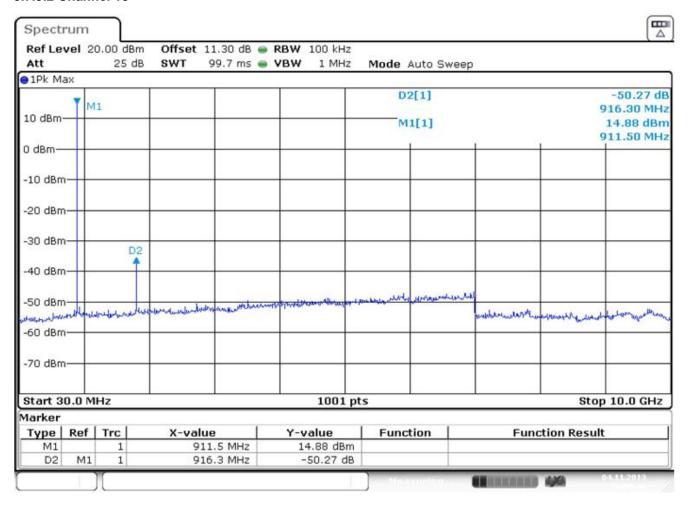
RBW: 100 kHz VBW: 1 MHz

Detector mode : Peak
Trace mode : Max hold
Sweep time : Auto

Spurious emission (2nd harmonic): 50.2 dBc

Page: 32 / 39 Report No.: RAPA13-O-732

3.7.9.2 Channel 13



Operating frequency: 915.00 MHz

RBW: 100 kHz

<u>VBW :</u> 1 MHz mode : Peak

<u>Detector mode :</u> Peak

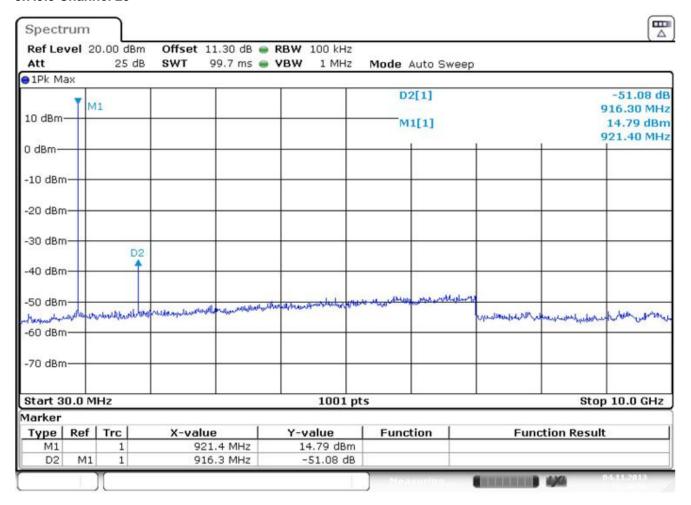
<u>Trace mode :</u> Max hold

<u>Sweep time :</u> Auto

Spurious emission (2nd harmonic): 50.2 dBc

Page: 33 / 39 Report No.: RAPA13-O-732

3.7.9.3 Channel 25



Operating frequency: 919.08 MHz

<u>RBW</u>: 100 kHz

VBW: 1 MHz

<u>Detector mode :</u> Peak

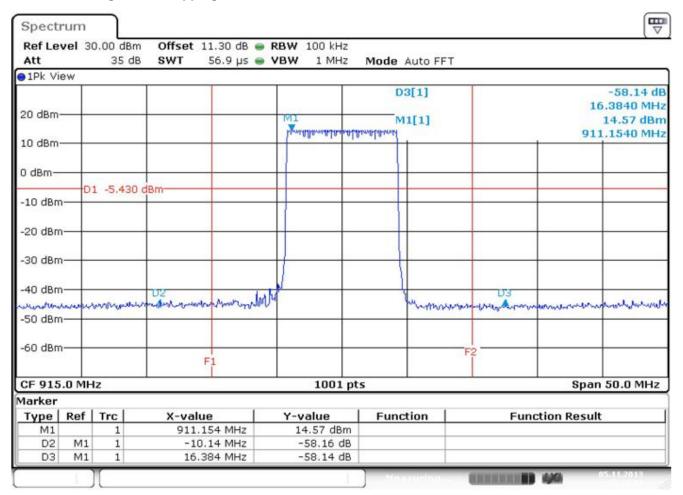
<u>Trace mode :</u> Max hold

<u>Sweep time :</u> Auto

Spurious emission (2nd harmonic): 51.0 dBc

Page: 34 / 39 Report No.: RAPA13-O-732

3.7.9.4 Band edge at full hopping mode



Operating frequency: Full hopping

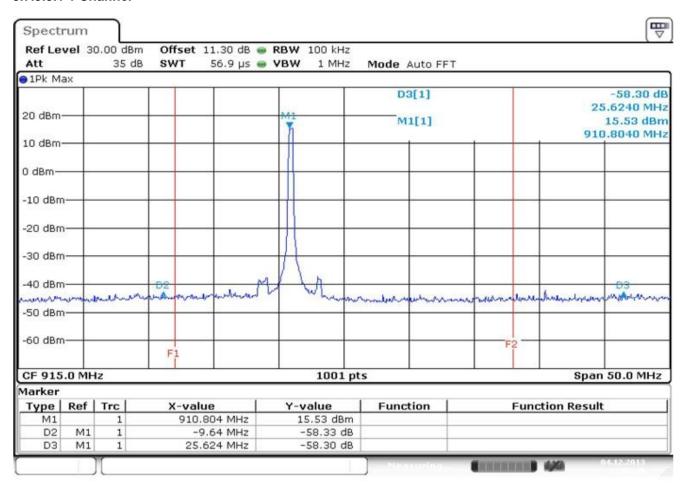
RBW: 100 kHz

VBW: 1 MHz
Detector mode: Peak
Trace mode: Max hold
Sweep time: Auto

<u>Lower band edge :</u> 52.72 dBc <u>Upper band edge :</u> 54.64 dBc Page: 35 / 39 Report No.: RAPA13-O-732

3.7.9.5 Band edge at Nomal mode

3.7.9.5.1 1 Channel



Operating frequency: Full hopping

RBW: 100 kHz VBW: 1 MHz

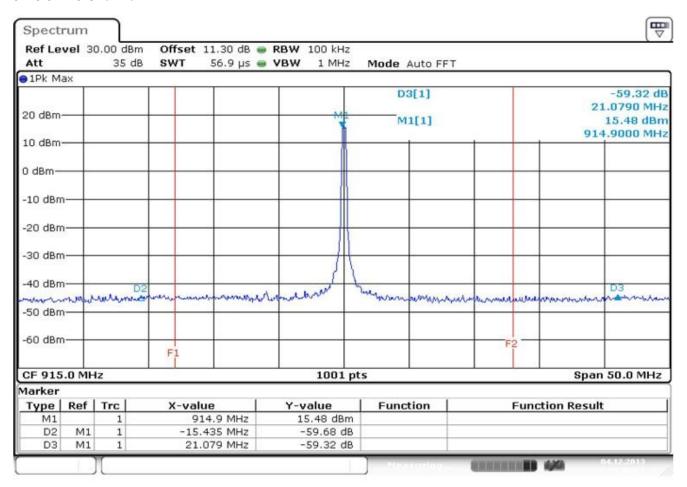
<u>Detector mode :</u> Peak

<u>Trace mode :</u> Max hold

Sweep time : Auto

<u>Lower band edge :</u> 58.33 dBc <u>Upper band edge :</u> 58.30 dBc Page: 36 / 39 Report No.: RAPA13-O-732

3.7.9.5.2 13 Channel



Operating frequency: Full hopping

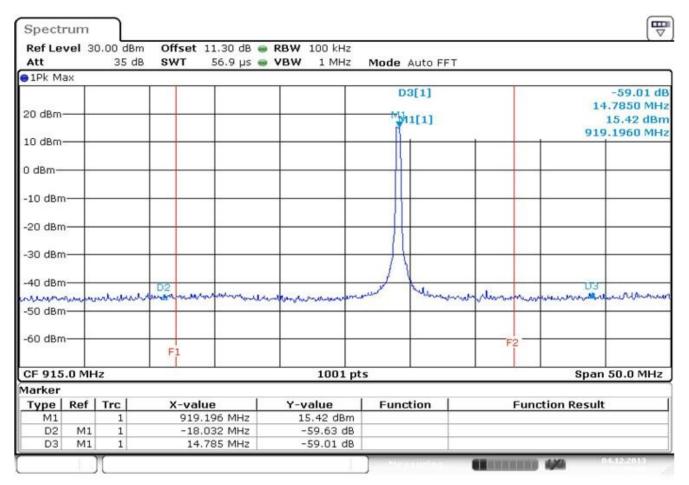
RBW: 100 kHz VBW: 1 MHz

Detector mode : Peak
Trace mode : Max hold
Sweep time : Auto

<u>Lower band edge:</u> 59.68 dBc <u>Upper band edge:</u> 59.32 dBc



3.7.9.5.3 25 Channel



Report No.: RAPA13-O-732

Operating frequency: Full hopping

<u>RBW</u>: 100 kHz <u>VBW</u>: 1 MHz

<u>Detector mode :</u> Peak <u>Trace mode :</u> Max hold <u>Sweep time :</u> Auto

<u>Lower band edge :</u> 59.63 dBc <u>Upper band edge :</u> 59.01 dBc Laboratory Page: 38 / 39 Report No.: RAPA13-O-732

4. RF Exposure Compliance Requirement

According to KDB447498 D01 General RF Exposure Guidance v05r01

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances \leq 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is \leq 50 mm and for transmission frequencies between 100 MHz and 6 GHz.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Channel Number	Frequency [MHz]	Max. Average Power [dBm]	Max. Average Power [mW]	Separation distance [mm]	1-g SAR value	Test exclusion thresholds
1	910.92	10.82	12.1	5	2.31	3.0
13	915.00	10.74	11.9	5	2.27	3.0
25	919.08	10.58	11.4	5	2.19	3.0

Result:

SAR is not required.

Page: 39 / 39 Report No.: RAPA13-O-732

5. 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	FSV	Rohde & Schwarz	101673	02/04/14
2	Test receiver	ESCI 7	Rohde & Schwarz	1166.5950.07	01/30/14
3	Power supply	E3633A	Agilent	SG40002272	01/28/14
4	Loop antenna	6502	EMCO	9609-9087	03/03/14
5	Biconical antenna	VHA9103	Schwarzbeck	2217	11/23/13
6	Log-Periodic antenna	VULP9118A	Schwarzbeck	382	11/23/13
7	Horn antenna	BBHA 9120 D	Schwarzbeck	395	08/07/14
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