

TEST REPORT

of

FCC Part 15 Subpart C §15.249

FCC ID: WU2SMRS0911

Equipment Under Test : Digital Radio Slave
 Model Name : Flash Wave III (Additional model: PowerSync 16)
 Serial No. : N/A
 Applicant : S.M DEVELOPMENT CO., LTD
 Manufacturer : S.M DEVELOPMENT CO., LTD
 Date of Test(s) : 2010-01-15 ~ 2010-03-10
 Date of Issue : 2010-03-10

In the configuration tested, the EUT complied with the standards specified above.

Tested By:




Date

2010-03-10

Feel Jeong

Approved By



Date

2010-03-10

Charles Kim

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1. General information

1.1 Testing laboratory

SGS Testing Korea Co., Ltd.

Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

www.electrolab.kr.sgs.com

Telephone : +82 +31 428 5700

FAX : +82 +31 427 2371

1.2 Details of applicant

Applicant : S.M DEVELOPMENT CO., LTD

Address : 280-11, MORA-1, SASANG-GU, BUSAN, Korea

Contact Person : Ji Young, Kim

Phone No. : +82 051 324 0788

Fax No. : +82 051 324 0608

1.3 Description of EUT

Kind of Product	Digital Radio Slave
Model Name	Flash Wave III (Additional model: PowerSync 16)
Serial Number	N/A
Power Supply	DC 3 V
Frequency Range	2427 ~ 2457 MHz
Modulation Technique	GFSK
Number of Channels	16
Operating Conditions	-10 ~ 50 °C
Antenna Type	Fixed type

1.4 Details of Modification

-N/A

1.5 Details of added model

Model	information
Flash Wave III	Basic
PowerSync 16	- The same as basic model. - Model name is added for the commercial purpose only.

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1.6 Test equipment list

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Rohde & Schwarz	SMR40	Sep. 25 2010
Spectrum Analyzer	Agilent	E4440A	Apr. 01, 2010
Spectrum Analyzer	Rohde & Schwarz	FSV30	May 15,2010
Preamplifier	H.P	8447F	Jul. 02, 2010
Preamplifier	Agilent	8449B	Apr. 01, 2010
High Pass Filter	Wainwright	WHK3.0/18G-10SS	Sep. 29, 2010
Test Receiver	R & S	ESU65	Apr. 21, 2010
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	Jul. 22, 2010
Horn Antenna	Rohde & Schwarz	HF 906	Oct. 08, 2010
Antenna Master	EMCO	1050	N.C.R
Turn Table	Daeil EMC	DI-1500	N.C.R
Anechoic Chamber	SY Corporation	L × W × H (9.6 m×6.4 m×6.6 m)	Jan. 07, 2011

1.7. Summary of test results

The EUT has been tested according to the following specifications:

Applied Standard : FCC Part15, Subpart C		
Standard Section	Test Item	Result
15.209(a) 15.249(a) 15.249(d) 15.205	Fundamental, Spurious emission and edge band radiated emission	Complied

1.8. Test report revision

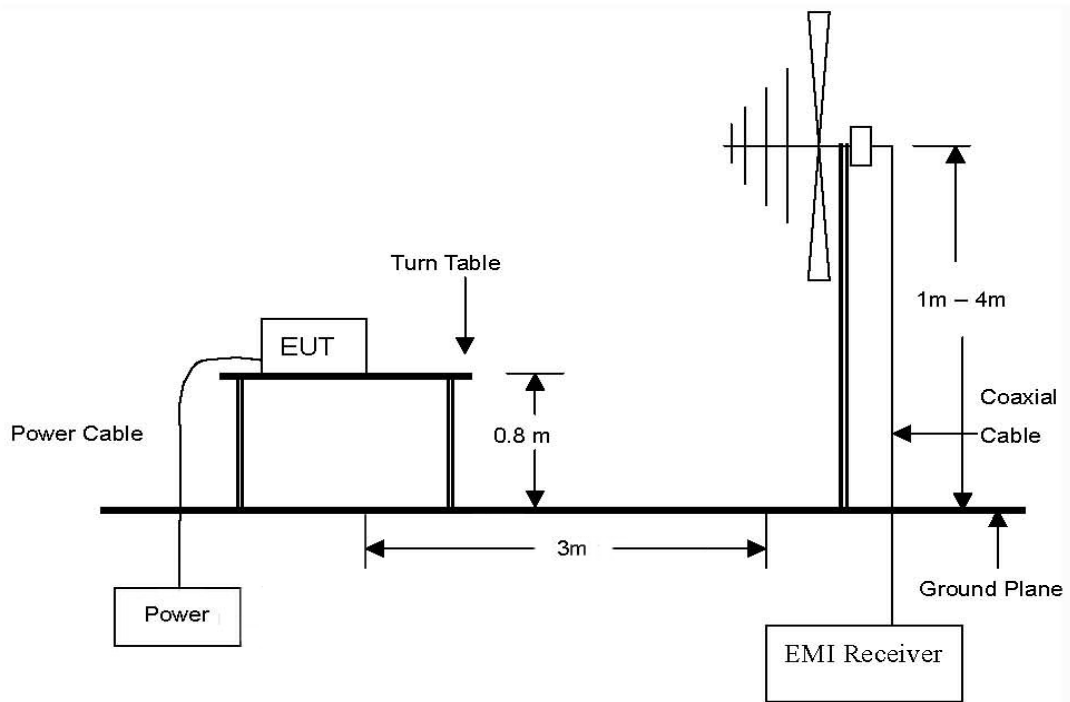
Revision	Report number	Description
0	F690501/RF-RTL003629	Initial
1	F690501/RF-RTL003629-1	Test 20 dB bandwidth

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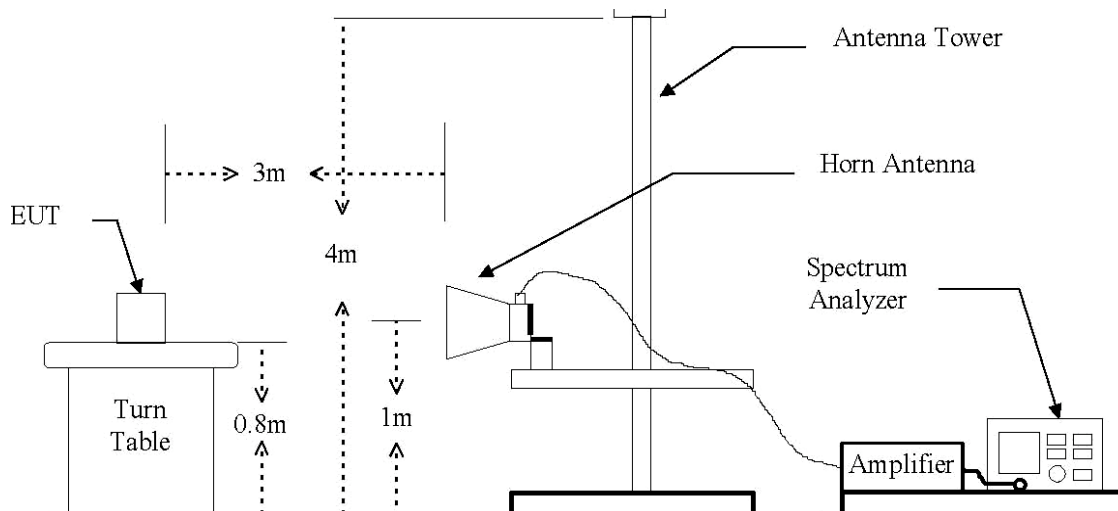
2. Fundamental, Spurious emission and edge band radiated emission

2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 24 GHz Emissions.



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2.2. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic Chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

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2.3. Limit

In the section 15.249(a) :

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (mV/m)	Field strength of harmonics (uV/m)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24.0 ~ 24.25 GHz	250	2500

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Fundamental frequency (MHz)	Field strength (uV/m)	Measurement distance (m)
30 ~ 88	100*	3
88 ~ 216	150*	3
216 ~960	200*	3
Above 960	500	3

Remark:

Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

In the above emission table, the tighter limit applies at the band edges.

Fundamental frequency (MHz)	Field strength (uV/m at 3 meter)	Field strength (dBuV/m at 3 meter)
30 ~ 88	100	40
88 ~ 216	150	43.5
216 ~960	200	46
Above 960	500	54

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2.4. Test result

Ambient temperature : 22 °C
Relative humidity : 48 % R.H.

2.4.1. Below 1 GHz

The frequency spectrum from 30 MHz to 1000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are quasi-peak values.

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Below 1000.00	Not Detected							

Remark

1. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes. XZ plane is worst case
2. All spurious emission at channels are almost the same below 1 GHz, so that the channel was chosen at representative in final test.

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2.4.2. Above 1 GHz

A. Low Channel

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2427.00	46.45	Peak	V	28.10	4.83	79.38	114.00	34.62
Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2390.00*	49.45	Peak	V	28.05	-30.41	47.09	74.00	26.91
4854.00	52.36	Peak	V	33.09	-27.78	57.67	74.00	16.33
4854.00	44.04	Average	V	33.09	-27.77	49.36	54.00	4.64
Above 4900.00	Not Detected							

B. Middle Channel

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2441.00	47.58	Peak	V	28.12	4.81	80.51	114.00	33.49
Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.00	51.19	Peak	V	33.17	-27.56	56.80	74.00	17.20
4882.00	43.45	Average	V	33.17	-27.56	49.06	54.00	4.94
Above 4900.00	Not Detected							

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C. High Channel

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2457.00	47.06	Peak	V	28.14	4.80	80.00	114.00	34.00
Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.50*	47.23	Peak	V	28.18	-30.58	44.83	74.00	29.17
4914.00	50.58	Peak	V	33.26	-27.40	56.44	74.00	17.56
4914.00	42.56	Average	V	33.26	-27.40	48.42	54.00	5.58
Above 5000.00	Not Detected							

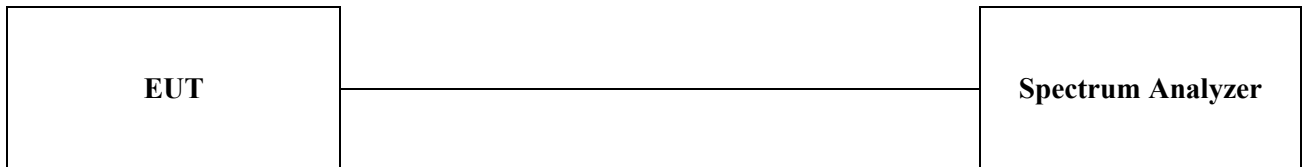
Remarks ;

1. “*” means the restricted band.
2. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes. XZ plane is worst case
3. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
4. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using peak/average detector mode.
5. Average test would be performed if the peak result were greater than the average limit.
6. Actual = Reading + AF - Amp Gain + CL

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3. Bandwidth of operation frequency

3.1. Test setup



3.2. Limit

None; for reporting purpose only

3.3. Test procedure

1. The transmitter output is connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=10 kHz, VBW=10 kHz and Span=3 MHz.

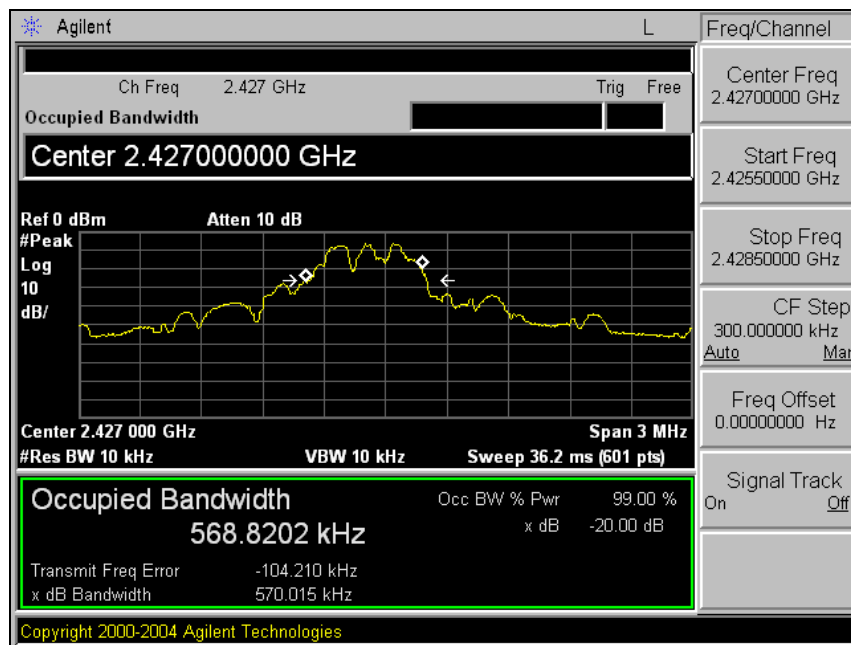
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3.4. Test result

Ambient temperature : 25 °C
Relative humidity : 49 % R.H.

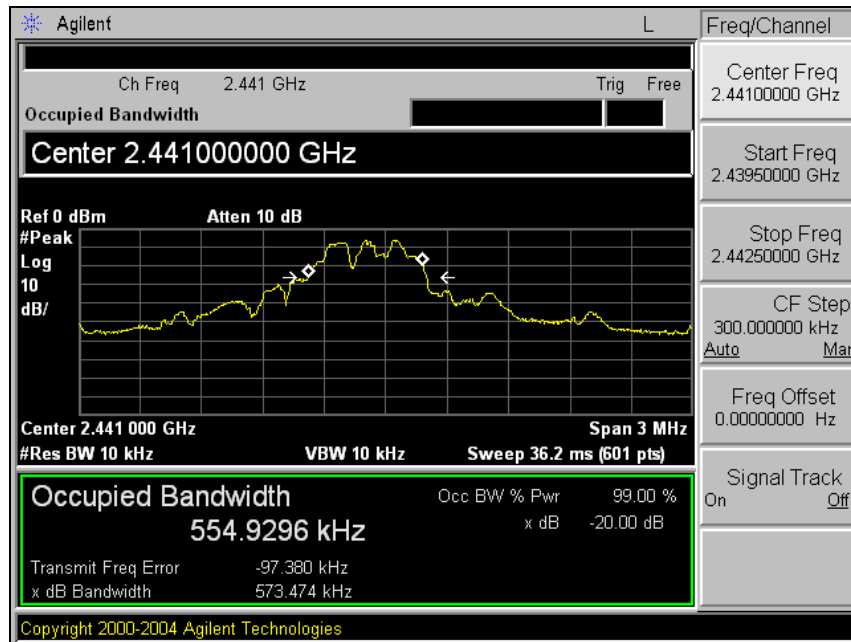
Channel	20 dB Bandwidth (kHz)
Low	569
Middle	555
High	514

Low channel

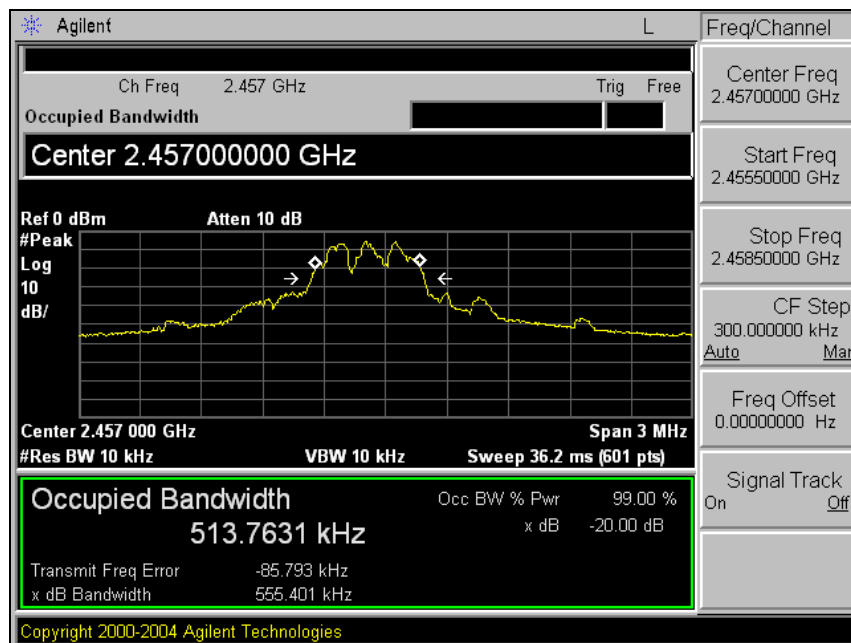


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Middle channel



High channel



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