

# FCC Test Report

Product Name	:	Wireless GPS Logger RCV-3000
Model No.	:	RCV-3000
FCC ID.	:	RJI-RCV3000

Applicant : Holux Technology, Inc.

Address : No. 1-1, Innovation Road 1, Science-Based Industrial Park, Hsinchu 30076, Taiwan, R.O.C.

Date of Receipt	:	2013/03/21
Issued Date	:	2013/04/18
Report No.	:	133407R-RFUSP43V01
Report Version	:	V1.0
lac-m	A	Testing Laboratory 1313

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.



Τe	est Report Certification Issued Date : 2013/04/18 Report No. : 133407R-RFUSP43V01						
	QuieTek						
	Gulerek						
Product Name	: Wireless GPS Logger RCV-3000						
Applicant	: Holux Technology, Inc.						
Address	No. 1-1, Innovation Road 1, Science-Based Industrial Park,						
	Hsinchu 30076, Taiwan, R.O.C.						
Manufacturer	: Holux Technology, Inc.						
Model No.	: RCV-3000						
FCC ID.	: RJI-RCV3000						
EUT Voltage							
Trade Name	<b>HOLUX</b>						
Applicable Standard	: FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2012						
Test Result	: Complied						
The test results relate only to	o the samples tested.						
The test report shall not be re	produced except in full without the written approval of QuieTek Corporation.						
Documented By	Demi Chang						
	( Demi Chang / Engineering Adm. Specialist )						
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	( Quale Tang / Engineer )						
Approved By	Roy Wang						
	(Roy Wang / Manager)						

### Laboratory Information

We, **QuieTek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	:	TAF, Accreditation Number: 1313
USA	:	FCC, Registration Number: 365520
Canada	:	IC, Submission No: 150981

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site:http://www.quietek.com/tw/ctg/cts/accreditations.htm

The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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## 1. General Information

### 1.1. EUT Description

Product Name	Wireless GPS Logger RCV-3000
Model No.	RCV-3000
Trade Name	HOLUX
Frequency Range/ Number of	2402~2480MHz / 79 channels
Channels	
Type of Modulation	GFSK
Antenna Type	Chip
Antenna Gain	2dBi

Component				
USB Cable Shielded, 0.5m				
ower Adapter Sage Power, KSAS0060500100VUU				
	I/P: 100-240V~ 50/60Hz 0.18A			
O/P: 5V===1.0A				

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00	2402 MHz	Channel 20	2422 MHz	Channel 40	2442 MHz	Channel 60	2462 MHz
Channel 01	2403 MHz	Channel 21	2423 MHz	Channel 41	2443 MHz	Channel 61	2463 MHz
Channel 02	2404 MHz	Channel 22	2424 MHz	Channel 42	2444 MHz	Channel 62	2464 MHz
Channel 03	2405 MHz	Channel 23	2425 MHz	Channel 43	2445 MHz	Channel 63	2465 MHz
Channel 04	2406 MHz	Channel 24	2426 MHz	Channel 44	2446 MHz	Channel 64	2466 MHz
Channel 05	2407 MHz	Channel 25	2427 MHz	Channel 45	2447 MHz	Channel 65	2467 MHz
Channel 06	2408 MHz	Channel 26	2428 MHz	Channel 46	2448 MHz	Channel 66	2468 MHz
Channel 07	2409 MHz	Channel 27	2429 MHz	Channel 47	2449 MHz	Channel 67	2469 MHz
Channel 08	2410 MHz	Channel 28	2430 MHz	Channel 48	2450 MHz	Channel 68	2470 MHz
Channel 09	2411 MHz	Channel 29	2431 MHz	Channel 49	2451 MHz	Channel 69	2471 MHz
Channel 10	2412 MHz	Channel 30	2432 MHz	Channel 50	2452 MHz	Channel 70	2472 MHz
Channel 11	2413 MHz	Channel 31	2433 MHz	Channel 51	2453 MHz	Channel 71	2473 MHz
Channel 12	2414 MHz	Channel 32	2434 MHz	Channel 52	2454 MHz	Channel 72	2474 MHz
Channel 13	2415 MHz	Channel 33	2435 MHz	Channel 53	2455 MHz	Channel 73	2475 MHz
Channel 14	2416 MHz	Channel 34	2436 MHz	Channel 54	2456 MHz	Channel 74	2476 MHz
Channel 15	2417 MHz	Channel 35	2437 MHz	Channel 55	2457 MHz	Channel 75	2477 MHz
Channel 16	2418 MHz	Channel 36	2438 MHz	Channel 56	2458 MHz	Channel 76	2478 MHz
Channel 17	2419 MHz	Channel 37	2439 MHz	Channel 57	2459 MHz	Channel 77	2479 MHz
Channel 18	2420 MHz	Channel 38	2440 MHz	Channel 58	2460 MHz	Channel 78	2480 MHz
Channel 19	2421 MHz	Channel 39	2441 MHz	Channel 59	2461 MHz		

- 1. This device is a Wireless GPS Logger RCV-3000 including a 2.4GHz receiving function, and transmitting function.
- 2. These test results on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- Regards to the frequency band operation; the lowest 
   middle and highest frequency of channel
   were selected to perform the test, and then shown on this report.
- 4. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 133407R-RFUSP37V02 under Declaration of Conformity.

## 1.3. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-Test Mode				
EMI Mode 1: Transmit				
Final Test Mode				
EMI	Mode 1: Transmit			

Emission	Mode 1
Conducted Emission	Yes
Peak Power Output	Yes
Radiated Emission	Yes
RF antenna conducted test	Yes
Band Edge	Yes
Number of hopping Frequency	Yes
Carrier Frequency Separation	Yes
Occupied Bandwidth	Yes
Dwell Time	Yes

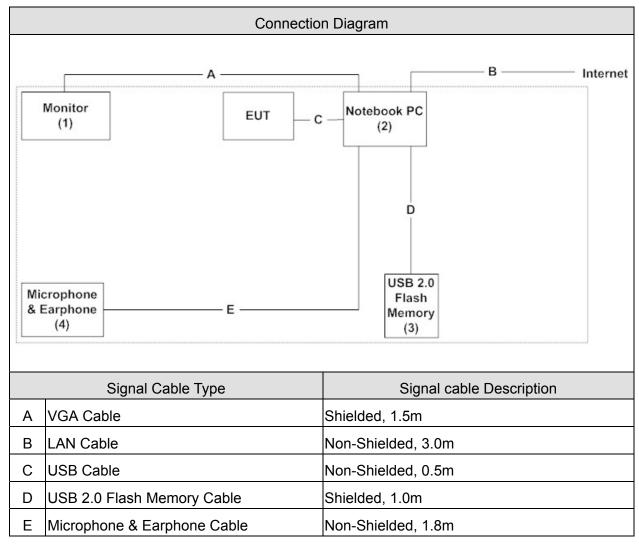
## 1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Monitor	DELL	U2410f	082WXD-72872-	DoC	Non-Shielded, 1.8m
				16R-0W2L		
2	Notebook PC	HP	HSTNN-146C	CNU8253S1X	DoC	Non-Shielded, 1.8m
3	USB 2.0 Flash	Apacer	AH223	N/A	DoC	
	Memory					
4	Microphone &	Fujiei	SBZ-38	N/A	DoC	
	Earphone					



## 1.5. Configuration of tested System



## 1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5
2	Execute the control program "CSR Blue Suite_Blue Test3" which is installed on the
	Notebook.
3	Configure the test mode, the test channel to start the continuous Transmitter
4	Verify that the EUT works properly.

## 1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207	15 - 35	23
Humidity (%RH)	Conducted Emission	25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	23
Humidity (%RH)	Peak Power Output (FHSS)	25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)		15 - 35	25
Humidity (%RH)	FCC PART 15 C 15.247	25 - 75	54
Barometric pressure (mbar)	Radiated Emission (FHSS)	860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	RF antenna conducted test	25 - 75	50
Barometric pressure (mbar)	(FHSS)	860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	23
Humidity (%RH)	Number of hopping Frequency	25 - 75	50
Barometric pressure (mbar)	(FHSS)	860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	23
Humidity (%RH)	Carrier Frequency Separation	25 - 75	50
Barometric pressure (mbar)	(FHSS)	860 - 1060	950-1000
Temperature (°C)		15 - 35	24
Humidity (%RH)	FCC PART 15 C 15.247	25 - 75	48
Barometric pressure (mbar)	Occupied Bandwidth (FHSS)	860 - 1060	950-1000
Temperature (°C)		15 - 35	23
Humidity (%RH)	FCC PART 15 C 15.247	25 - 75	50
Barometric pressure (mbar)	Dwell Time (FHSS)	860 - 1060	950-1000

## 2. Conducted Emission

### 2.1. Test Equipment

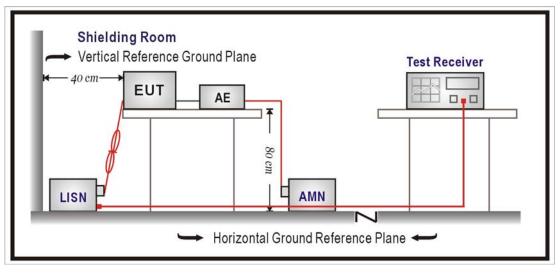
The following test equipments are used during the test:

Conducted Emission / SR3

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
LISN	R&S	ENV216	100096	2013/08/12
LISN	R&S	ESH3-Z5	836679/022	2014/01/20
Test Receiver	R&S	ESCS 30	825442/017	2014/01/01

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

## 2.2. Test Setup





### 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)						
Frequency MHz	QP	AV				
0.15 - 0.50	66-56	56-46				
0.50 - 5.0	56	46				
5.0 - 30	60	50				

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

### 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.) Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

#### 2.5. Test Specification

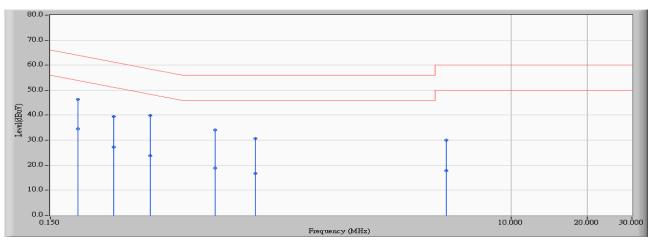
According to FCC Part 15 Subpart C Paragraph 15.207: 2012

#### 2.6. Uncertainty

The measurement uncertainty is defined as  $\pm$  2.26 dB.

### 2.7. Test Result

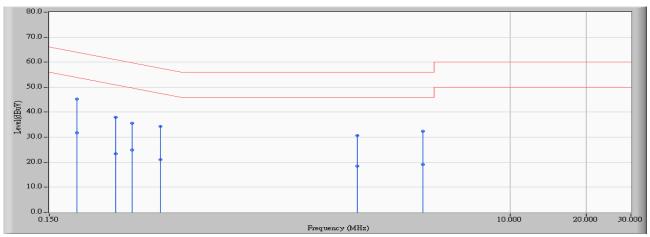
Site : SR3	Time : 2013/04/16 - 20:40
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-2_0813 - Line1	Power : AC 120V / 60Hz
EUT : Wireless GPS Logger RCV-3000	Note :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.193	9.692	36.540	46.232	-17.676	63.908	QUASIPEAK
2		0.193	9.692	24.820	34.512	-19.396	53.908	AVERAGE
3		0.267	9.696	29.740	39.436	-21.768	61.205	QUASIPEAK
4		0.267	9.696	17.440	27.136	-24.068	51.205	AVERAGE
5		0.373	9.757	30.110	39.867	-18.575	58.442	QUASIPEAK
6		0.373	9.757	14.000	23.757	-24.685	48.442	AVERAGE
7		0.673	9.870	24.220	34.089	-21.911	56.000	QUASIPEAK
8		0.673	9.870	8.980	18.849	-27.151	46.000	AVERAGE
9		0.974	9.935	20.830	30.764	-25.236	56.000	QUASIPEAK
10		0.974	9.935	6.850	16.784	-29.216	46.000	AVERAGE
11		5.541	10.110	19.860	29.970	-30.030	60.000	QUASIPEAK
12		5.541	10.110	7.710	17.820	-32.180	50.000	AVERAGE

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "  $^{\ast}$  ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor.

Site : SR3	Time : 2013/04/16 - 20:46
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-2_0813 - Line2	Power : AC 120V / 60Hz
EUT : Wireless GPS Logger RCV-3000	Note :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.193	9.655	35.660	45.315	-18.593	63.908	QUASIPEAK
2		0.193	9.655	22.010	31.665	-22.243	53.908	AVERAGE
3		0.275	9.697	28.370	38.067	-22.898	60.966	QUASIPEAK
4		0.275	9.697	13.710	23.407	-27.558	50.966	AVERAGE
5		0.318	9.719	25.980	35.700	-24.060	59.760	QUASIPEAK
6		0.318	9.719	15.180	24.900	-24.860	49.760	AVERAGE
7		0.412	9.769	24.620	34.389	-23.224	57.614	QUASIPEAK
8		0.412	9.769	11.210	20.979	-26.634	47.614	AVERAGE
9		2.486	9.961	20.730	30.691	-25.309	56.000	QUASIPEAK
10		2.486	9.961	8.470	18.431	-27.569	46.000	AVERAGE
11		4.517	10.052	22.290	32.342	-23.658	56.000	QUASIPEAK
12		4.517	10.052	9.040	19.092	-26.908	46.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.

- 2. "  $^{\ast}$  ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor.

## 3. Peak Power Output

### 3.1. Test Equipment

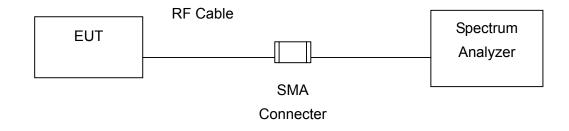
The following test equipment is used during the test:

Peak	Power	Outp	out /	SR7
				0.0

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

### 3.2. Test Setup



### 3.3. Test procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

### 3.4. Limits

For frequency hopping systems operating in the 902-928 MHz band: 1 Watt for systems employing at least 50 hopping channels; and, 0.25 Watts for systems employing less than 50 hopping channels.

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1Watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watt.

### 3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

### 3.6. Test Result

Product	Wireless GPS Logger RCV-3000		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2013/04/16	Test Site	SR7

#### GFSK

Channel No.	Frequency	Measure Level	Limit	Result
	(MHz)	(dBm)	(dBm)	
00	2402	0.471	1Watt= 30 dBm	Pass

dB/div	59 2.7	02000000 G Input: RF P IF	NO: Fast G		OYM	Type: Log-Pwr		E123456	Screen Image
		37 <b>7</b> 5	Gain:Low	Trig: Free R #Atten: 30 dl	un Avg H	lold: > 100/100 ain: -1.00 dB	TYP	E MMWWWW T P P N N N N	Theme
g	Ref 20	.00 dBm				Mkr1	2.401 8 0.47	00 GHz 71 dBm	Flat Monochrom
0.0 00									Save As
.0									
.0						$\leq$			
.0		medan den annal des Rock	8			1 Contraction of the second second	Karri-reiner & Art	or and a second second	
.0									
0.0									
	0200 G 3.0 MHz		#VB۱	W 3.0 MHz		#Sweep	Span 2: 100 ms (*	5.00 MHz 1001 pts)	
R MODE TRU N 1		× 2.401 80	0 GHz	⊻ 0.471 dBm	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	

Product	Wireless GPS Logger RCV-3000				
Test Item	Peak Power Output				
Test Mode	Mode 1: Transmit				
Date of Test	2013/04/16	Test Site	SR7		

#### GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
39	2441	-0.988	1Watt= 30 dBm	Pass

🖬 Agilent Spectrum Analyzer -			12	
50 Ω Center Freq 2.4410	DOODOO GHZ put: RF PNO: Fast C Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: >100/100	03:23:34 PM Apr 16, 2013 TRACE 1 2 3 4 5 6 TYPE MMWWWW	Screen Image
in	IFGain:Low #Atten: 30 dB	Ext Gain: -1.00 dB	DETPNNNN	Themes
10 dB/div <b>Ref 20.00</b> (	dBm	Mkr1	2.440 900 GHz -0.988 dBm	Flat Monochrome
10.0	1			Save As
10.0				
20.0				
10.0 Hinnermundermeter	a management	Munous also	- Ant more thanks and the second	
0.0				
70.0				
enter 2.44100 GHz			Span 25.00 MHz	
Res BW 3.0 MHz	#VBW 3.0 MHz	#Sweep	100 ms (1001 pts)	
KR MODE TRC SCL 1 N 1 f	× Y F 2.440 900 GHz -0.988 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
3				
4 5 6				
7				
9				
12				
ystart 📄 🔤 😂 🧭	🧿 👔 Agilent Spectrum Ana			🤹 🛄 🗿 3:23 P

Product	Wireless GPS Logger RCV-3000				
Test Item	Peak Power Output				
Test Mode	Mode 1: Transmit				
Date of Test	2013/04/16	Test Site	SR7		

#### GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
78	2480	-1.186	1Watt= 30 dBm	Pass

Agreent Spectrum Analyz 50 Ω	er - Swept SA	AC SENSE:INT	ALIGN AUTO	03:24:00 PM Apr 16, 2013	
enter Freq 2.48	Input: RF PNO: Fast		Avg Type: Log-Pwr Avg Hold: >100/100 Ext Gain: -1.00 dB	TRACE 1 2 3 4 5 6 TYPE MMWWWW DET P P N N N N	Screen Image
	IFGain:Low	#Atten: 30 dB		2.2.2.5 a 2 and a second displayed and his or both an information of the second sec	Theme
dB/div Ref 20.0	)0 dBm		Mkr1	2.479 875 GHz -1.186 dBm	Flat Monochrom
9 0.0		1			Save As
.0					Save As
.0					
.0				Brancher Jorgen Land Stranger	
.0					
.0					
.0					
enter 2.48000 GH Res BW 3.0 MHz		3W 3.0 MHz	#Sweep	Span 25.00 MHz 100 ms (1001 pts)	
R MODE TRC SCL N 1 f	× 2.479 875 GHz	Y F -1.186 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 3 1					
3	6				
7 7 3 3 3 3 1					

## 4. Radiated Emission

## 4.1. Test Equipment

The following test equipments are used during the test:

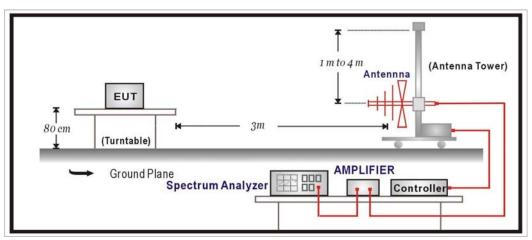
#### Radiated Emission / CB1

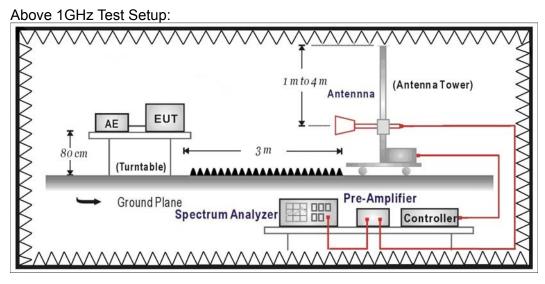
Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895	2013/08/14
Double Ridged Guide				
Horn Antenna	Schwarzback	BBHA 9120	D743	2014/02/17
		AMF-4D-005180-24		
Pre-Amplifier	MITEQ	-10P	888003	2013/12/02
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2014/02/19
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

### 4.2. Test Setup

Under 1GHz Test Setup:





## 4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits					
Frequency MHz	uV/m	dBuV/m			
30-88	100	40			
88-216	150	43.5			
216-960	200	46			
Above 960	500	54			

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

## 4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

#### 4.6. Test Result

#### **30MHz-1GHz Spurious**

Site : CB1	Time : 2013/04/12 - 14:31
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless GPS Logger RCV-3000	Note : 2441 MHz



42.075

39.740

-6.260

46.000

QUASIPEAK

#### Note:

6

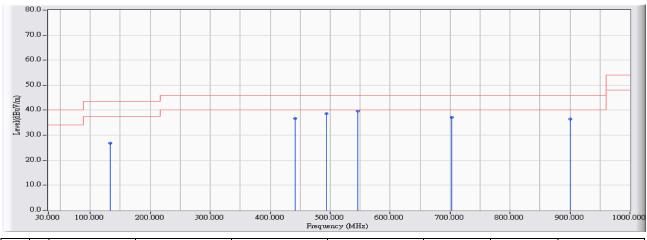
910.760

1. All Reading Levels are Quasi-Peak value.

-2.335

- 2. "\*", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

Site : CB1	Time : 2013/04/12 - 14:36
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless GPS Logger RCV-3000	Note : 2441 MHz

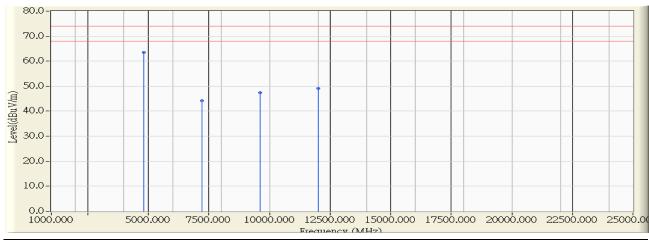


		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		132.820	-12.289	38.994	26.706	-16.794	43.500	QUASIPEAK
2		441.280	-6.486	43.099	36.614	-9.386	46.000	QUASIPEAK
3		493.660	-5.242	43.916	38.674	-7.326	46.000	QUASIPEAK
4	*	546.040	-4.975	44.688	39.713	-6.287	46.000	QUASIPEAK
5		703.180	-4.185	41.344	37.158	-8.842	46.000	QUASIPEAK
6		901.060	-2.448	38.964	36.516	-9.484	46.000	QUASIPEAK

- 1. All Reading Levels are Quasi-Peak value.
- 2. " \* ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

#### Harmonic & Spurious:

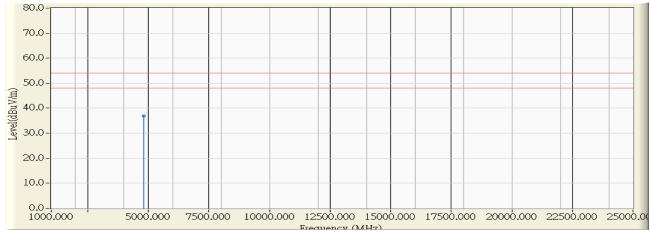
Site : CB1	Time : 2013/03/27 - 20:14
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4804.000	-0.856	64.300	63.444	-10.556	74.000	PEAK
2		7206.000	5.424	38.690	44.114	-29.886	74.000	PEAK
3		9608.000	8.941	38.460	47.401	-26.599	74.000	PEAK
4		12010.000	11.544	37.550	49.094	-24.906	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

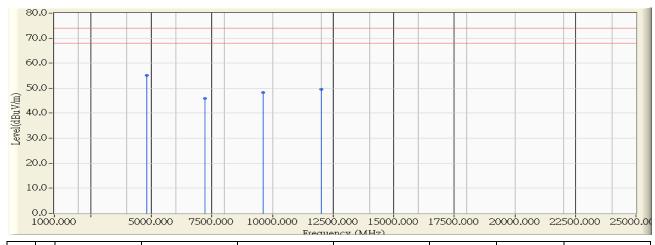
Site : CB1	Time : 2013/03/27 - 20:14
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4802.000	-0.861	37.836	36.975	-17.025	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

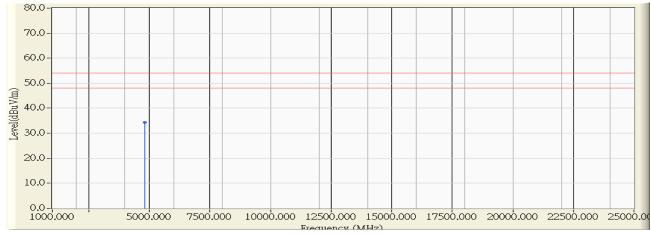
Site : CB1	Time : 2013/03/27 - 20:21
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



	F	Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4804.000	-0.856	55.950	55.094	-18.906	74.000	PEAK
2		7206.000	5.424	40.390	45.814	-28.186	74.000	PEAK
3		9608.000	8.941	39.380	48.321	-25.679	74.000	PEAK
4		12010.000	11.544	38.090	49.634	-24.366	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

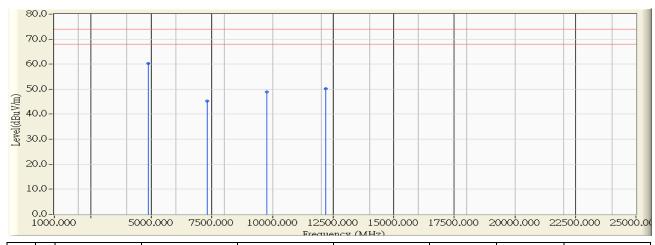
Site : CB1	Time : 2013/03/27 - 20:22
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4804.000	-0.856	35.120	34.264	-19.736	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

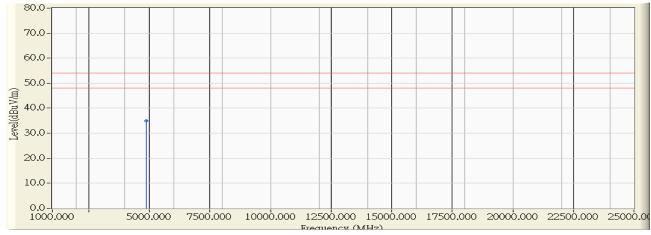
Site : CB1	Time : 2013/03/27 - 20:27
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2441MHz



			Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
			(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
	1	*	4881.000	-0.654	61.000	60.346	-13.654	74.000	PEAK
:	2		7323.000	5.706	39.640	45.346	-28.654	74.000	PEAK
:	3		9764.000	10.072	38.860	48.931	-25.069	74.000	PEAK
	4		12205.000	11.474	38.620	50.094	-23.906	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

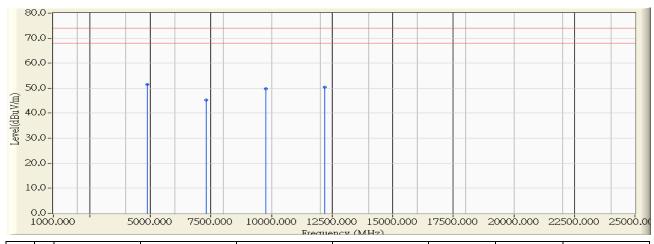
Site : CB1	Time : 2013/03/27 - 20:36
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2441MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4881.000	-0.654	35.680	35.026	-18.974	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

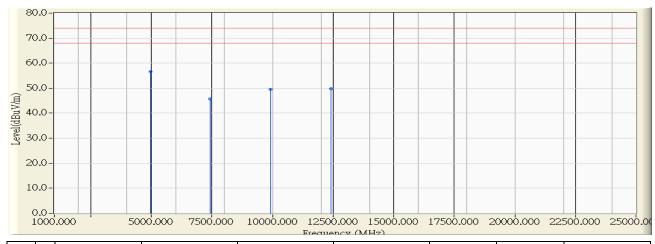
Site : CB1	Time : 2013/03/27 - 20:41
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2441MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4882.000	-0.651	52.130	51.479	-22.521	74.000	PEAK
2		7323.000	5.706	39.530	45.236	-28.764	74.000	PEAK
3		9764.000	10.072	39.590	49.661	-24.339	74.000	PEAK
4		12205.000	11.474	38.980	50.454	-23.546	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

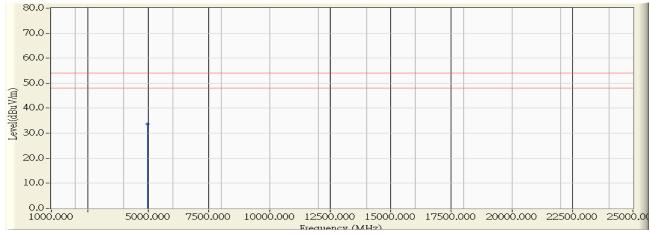
Site : CB1	Time : 2013/03/27 - 20:44
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-0.446	57.080	56.634	-17.366	74.000	PEAK
2		7440.000	5.989	39.690	45.679	-28.321	74.000	PEAK
3		9920.000	11.202	38.360	49.562	-24.438	74.000	PEAK
4		12400.000	11.405	38.440	49.845	-24.155	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

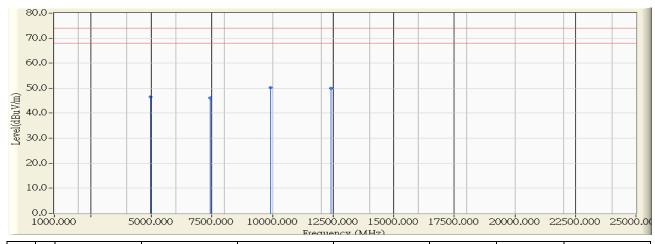
Site : CB1	Time : 2013/03/27 - 20:44
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-0.446	34.140	33.694	-20.306	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/27 - 20:49
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4960.000	-0.446	47.070	46.624	-27.376	74.000	PEAK
2		7440.000	5.989	40.100	46.089	-27.911	74.000	PEAK
3	*	9925.000	11.238	38.920	50.158	-23.842	74.000	PEAK
4		12400.000	11.405	38.490	49.895	-24.105	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The Emission above 13GHz were not included is because their levels are too low.

### 5. RF antenna conducted test

### 5.1. Test Equipment

The following test equipment is used during the test:

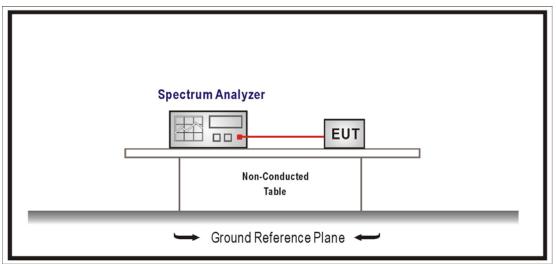
RF antenna conducted test / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31
· · · · · · · ·	·	•		

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

### 5.2. Test Setup

RF Conducted Measurement:



## 5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 an RF conducted or radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

## 5.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

## 5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

### 5.6. Test Result

Product	Wireless GPS Logger RCV-3000							
Test Item	RF antenna conducte	RF antenna conducted test						
Test Mode	Mode 1: Transmit							
Date of Test 2013/04/16 Test Site SR7								
GFSK								
Channel Na	Frequency	Measurement Level	Required Lim	it Desult				
Channel No.	(MHz)	(dB)	(dBc)	Result				
00	2402	42.176	≧20	Pass				

Agilent Spectrum Analyzer - Swept SA				
50 Ω Center Freq 2.402000000 GHz	AC SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: >100/100	03:21:34 PM Apr 16, 2013 TRACE 1 2 3 4 5 6 TYPE MMWWWW	Screen Image
Input: RF PNO: >30k IFGain:Low		Ext Gain: -1.00 dB	DET P P N N N N	Themes
10 dB/div Ref 20.00 dBm		Mkr2	2 2.400 00 GHz -41.896 dBm	Flat Monochrome
Log 10.0 0.00	/ 1 / 1			Save As
-20.0				
-30.0		1 min		
-50.0 Lower Langer and the second land		Les Martin Marian	warm har war hand	
-70.0				
Center 2.402000 GHz #Res BW 100 kHz #V	BW 100 kHz	#Sweep	Span 10.00 MHz 100 ms (1001 pts)	
MKR MODE TRC SCL X 1 N 1 F 2.402 19 GHz	0.280 dBm	VCTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 f 2.400 00 GHz 3 4 4	-41.896 dBm			
5 6 7				
8 9				
10				
🛃 start 🛛 🛥 🈂 🧭 🙆 📦 🗊 Agilent Spectru	m Ana			🤇 🛄 🥌 3:21 PM

78

2480

Pass

≧20

Product	Wireless GPS Logger	Wireless GPS Logger RCV-3000					
Test Item	RF antenna conducte	d test					
Test Mode	Mode 1: Transmit						
Date of Test	2013/04/16	Т	Test Site	SR7			
GFSK							
Channel No	Frequency	Measurement Leve	Required Lim	it	Decult		
Channel No.	(MHz)	(dB)	(dBc)		Result		

# Channel 78

45.843

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#### Channel 00 (30M~1GHz)

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10 di Log	B/div R	ef 21.00	IFC	NO: Fast 🖵 Gain:Low	#Atten: 30		Ext Gain:	-1.00 dB	⊳ 1 802.	12 MHz 01 dBm	Auto Tune
<b>a</b> 11.0											Center Freq 515.000000 MHz
1.00 -9.00											Start Freq 30.000000 MHz
-19.0 -29.0									1		<b>Stop Freq</b> 1.000000000 GHz
-39.0 -49.0											CF Step 97.000000 MHz <u>Auto</u> Man
-59.0 -69.0	uler-lanel-quarty	₽ <sub>₩</sub> ₩₽₩₽₩₽₩₽	where have a contraction of the second se	enter to the most	hele.ex.attilitati	habhlir aigeann	kkylussinskyl	mohad	Horlesonant	helend Highlight	Freq Offset 0 Hz
Star #Re	t 30.0 M s BW 10			#VBW	100 kHz			Sweep	117 ms (	0000 GHz 1001 pts)	
MSG								STATUS	5		

#### Channel 78 (30M~1GHz)

Agner		<mark>m Analyzer</mark> - ΙΩ	эмергэл	Â	.c SEI	ISE:INT		ALIGN AUTO	07:20:3	2 PM Apr 16, 2013	
tart		30.0000	put: RF P	NO: Fast 😱 Gain:Low	Trig: Free #Atten: 30	Run	Avg Type Avg Hold: Ext Gain:	: Log-Pwr >100/100	TR	ACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
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11.0			0								Center Fr 515.000000 M
- 00.											Start Fr 30.000000 M
9.0 — 9.0 —									<b>♦</b> <sup>1</sup>		Stop Fr 1.000000000 G
9.0 —											CF St 97.000000 M Auto M
9.0 – 9.0 <mark>–</mark>	alaan dahiliya haqda	hennyheriskenisk	nd partien and	hanfrageteeljigherse	mbuhadanoon	<sup>ha</sup> an/hatain-haha		hand the second	an hulenter	New-l-hitron-row	Freq Offs
i9.0 —											
	30.0 MH BW 100		1	#VBW	100 kHz		1	Sweep		.0000 GHz (1001 pts)	
G								STATUS	;		



	Avg Type: Log-Pwr	07:16:47 PM Apr 16, 2013 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	Ext Gain: -1.00 dB	kr1 2.401 GHz	Auto Tune
			Center Fred 4.500000000 GH
			Start Fre 1.000000000 GH
<u></u> 1Δ2			Stop Fre 8.000000000 GH
			CF Ste 700.000000 M⊢ <u>Auto</u> Ma
at the same of the state of the	ution and a second s	#YA&Mortherselfyrridyytaatyla	Freq Offse 0 H
#VBW 100 kHz	Sweep	Stop 8.000 GHz 844 ms (1001 pts)	
	Z NO: Fast Gain:Low #Atten: 30 dB	Z NO: Fast Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 23/100 Ext Gain: -1.00 dB ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ ΔΜ	Z NO: Fast Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 23/100 Ext Gain: -1.00 dB AMKr1 2.401 GHz -32.234 dB -32.234

#### Channel 00 (1G~8GHz)

#### Channel 78 (1G~8GHz)

Agilent Spectrum Analyzer - Swept SA 50 Ω	AC SENSE:INT	ALIGNAUTO	07:20:00 PM Apr 16, 2013	
tart Freq 1.000000000 G		Avg Type: Log-Pwr Avg Hold: 17/100 Ext Gain: -1.00 dB	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
0 dB/div Ref 21.00 dBm		Δ	Mkr1 -833 MHz 34.537 dB	Auto Tun
11.0				Center Fre 4.500000000 GH
1.00 ↓1∆2 . 0.00				Start Fre 1.000000000 GH
9.0				<b>Stop Fr</b> 8.00000000 GI
9.0	<u> </u>			CF Ste 700.000000 MI <u>Auto</u> M
19.0 crashows with a start the day	destrond and a spore search of reaching	, on white mener and an international	erenterstragetunierenterstenstenstenstenstenstenstenstenstensten	Freq Offs
29.0 tart 1.000 GHz Res BW 100 kHz	#VBW 100 kHz	Sweep	Stop 8.000 GHz 844 ms (1001 pts)	



			Cr	nanne	el 00 (	8G~16	GHZ)			
🛛 Agilen	t Spectrum Analyz	er - Swept SA								
× Start I	50 Ω Freq 8.000		AC Z NO: Fast 😱	Trig: Free		Avg Type Avg Hold:		TRACE	Apr 16, 2013	Frequency
10 dB/d	liv Ref 21.0	IF	Gain:Low	#Atten: 30	dB	Ext Gain:		kr1 13.48	B8 GHz 8 dBm	Auto Tune
11.0										Center Fred 12.000000000 GHz
1.00 — 9.00 —										Start Free 8.000000000 GH:
19.0 — 29.0 —										Stop Free 16.000000000 GH
39.0 — 49.0 —						•	1			CF Step 800.000000 MH: <u>Auto</u> Mar
-39.0	dament for the second	antivnessame. All	หนุม <sub>ี</sub> มุมารถ <sub>ู้</sub> พ <sub>ิส</sub> ารณ <sub>ี</sub>	wighymaenthew	anline hynesing	and the states of the states o	hala an	**************************************	eutenterkendigt	Freq Offset 0 Hz
	3.000 GHz ^ 3W 100 kHz		#VBW 1	100 kHz			Sweep		000 GHz 1001 pts)	
ISG							STATU	5		

#### 16CH-)

#### Channel 78 (8G~16GHz)

	ctrum Analyzer -	Swept SA							
₩ Start Fre	<sup>50 Ω</sup> <b>q 8.00000</b>			C SEI ] Trig: Free			ALIGNAUTO : Log-Pwr 21/100	07:19:27 PM Apr 16, 201 TRACE 1 2 3 4 5 TYPE MWWWWW	Frequency
10 dB/div	Ref 21.00 (	. IFC	NO: Fast 🌩 Gain:Low	#Atten: 30		Ext Gain:	-1.00 dB	ber P NNNN kr1 14.816 GHz -50.296 dBm	Auto Tune
11.0									Center Freq 12.00000000 GHz
1.00 -9.00									Start Freq 8.000000000 GHz
-19.0									<b>Stop Freq</b> 16.000000000 GHz
-39.0									CF Step 800.000000 MHz <u>Auto</u> Man
-59.0	production of the second states	in an	aggine indering the comparison	national depart	lagh <sub>h</sub> uly/putational	han an a	welkipingleathy	na la hini karakarakarakarakarakarakarakarakarakar	Freq Offset 0 Hz
-69.0 Start 8.00 #Res BW			#VBW	100 kHz			Sweep	Stop 16.000 GHz 965 ms (1001 pts	
MSG							STATU	5	



# Channel 00 (16G~25GHz)

🗊 Agi	ilent Spect	rum Analyzer -	Swept SA								
₩ Stai	rt Freq		00000 GH	z	C SE Trig: Free		Avg Type Avg Hold:	ALIGNAUTO	TRAC	MApr 16, 2013 E 1 2 3 4 5 6 E MWWWWW	Frequency
	B/div	Ref 21.00	IFO	NO: Fast 😱 Gain:Low	#Atten: 30		Ext Gain:	-1.00 dB	r1 24.8	56 GHz 33 dBm	Auto Tune
Log 11.0											Center Freq 20.50000000 GHz
1.00 -9.00											<b>Start Freq</b> 16.00000000 GHz
-19.0 -29.0											<b>Stop Freq</b> 25.000000000 GHz
-39.0 -49.0		Job with a grade of a start					-thirty bases	Linger Walk	<sub>₩₩</sub> ₩₩₩₩₩₩₩₩₩	upp. And the World	CF Step 900.000000 MHz Auto Man
-59.0	ut water	denter til beginner fra var	r kalender	hleytadographier (n. l	WARA-PANAPANA	Allovilles des a					Freq Offset 0 Hz
	t 16.00 s BW 1			#VBW	100 kHz			Sweep		.000 <sup>°</sup> GHz 1001 pts)	
MSG								STATUS			

#### Channel 78 (16G~25GHz)

🚺 Agilent Spectrum Analyzer - Swep					
M 50 Ω Start Freq 16.0000000	00 GHz	Avg Type: L	.og-Pwr TRA	PM Apr 16, 2013 CE 1 2 3 4 5 6	Frequency
Input: F 10 dB/div Ref 21.00 dBm Log	IFGain:Low #Atten: 30		00 dB Mkr1 24.9	901 GHz 38 dBm	Auto Tune
11.0					<b>Center Fre</b> 20.500000000 GH
9.00					Start Fre 16.00000000 G⊢
29.0					Stop Fre 25.00000000 GF
49.0	4		- Mary March 1	Norman Million Par	CF Ste 900.000000 MH <u>Auto</u> Ma
59.0	***************************************	Are Manager and Are	<b>T</b>		Freq Offs 0 H
69.0 Start 16.000 GĤz #Res BW 100 kHz	#VBW 100 kHz		Stop 2 Sweep 1.09 s	5.000 GHz (1001 pts)	
ISG	An interview (1997) and a state of the provide strategy of the provide strateg		STATUS		

#### 6. Band Edge

#### 6.1. Test Equipment

The following test equipments are used during the test:

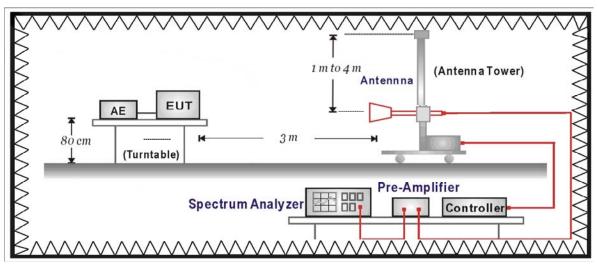
Band Edge / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Double Ridged Guide	Schwarzback	BBHA 9120	D743	2014/02/17
Horn Antenna				
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

#### 6.2. Test Setup

RF Radiated Measurement:



### 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

### 6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

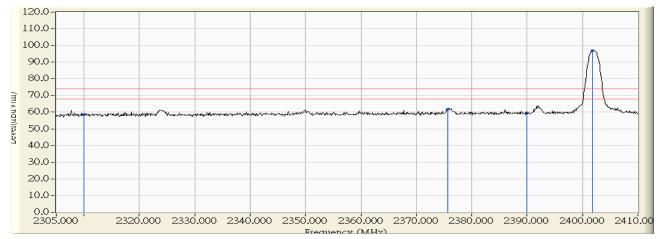
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

## 6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

#### 6.6. Test Result

Site : CB1	Time : 2013/03/28 - 10:35
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2310.000	29.779	28.614	58.393	-15.607	74.000	PEAK
2		2375.665	30.435	31.352	61.787	-12.213	74.000	PEAK
3		2390.000	30.578	29.096	59.674	-14.326	74.000	PEAK
4	*	2401.810	30.696	66.173	96.869	22.869	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

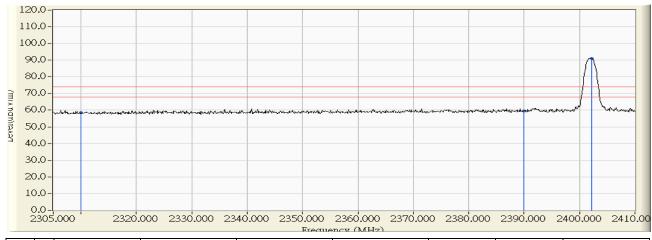
Site : CB1	Time : 2013/03/28 - 10:36
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
	1	2310.000	29.779	16.892	46.671	-7.329	54.000	AVERAGE
:	2	2375.770	30.436	21.466	51.902	-2.098	54.000	AVERAGE
;	3	2390.000	30.578	17.310	47.888	-6.112	54.000	AVERAGE
4	1 *	2402.020	30.698	56.129	86.827	32.827	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	Time : 2013/03/28 - 10:41
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2310.000	29.779	28.668	58.447	-15.553	74.000	PEAK
2		2390.000	30.578	29.054	59.632	-14.368	74.000	PEAK
3	*	2402.125	30.700	60.373	91.072	17.072	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

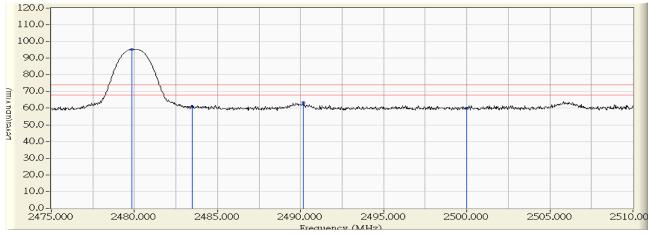
Site : CB1	Time : 2013/03/28 - 10:41
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2402MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2310.000	29.779	16.896	46.675	-7.325	54.000	AVERAGE
2		2390.000	30.578	17.249	47.827	-6.173	54.000	AVERAGE
3	*	2402.020	30.698	51.352	82.050	28.050	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

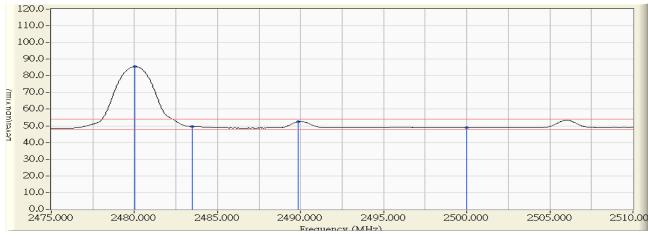
Site : CB1	Time : 2013/03/28 - 10:58
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.865	31.476	63.717	95.193	21.193	74.000	PEAK
2		2483.500	31.512	29.312	60.824	-13.176	74.000	PEAK
3		2490.155	31.578	31.925	63.503	-10.497	74.000	PEAK
4		2500.000	31.638	28.146	59.785	-14.215	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

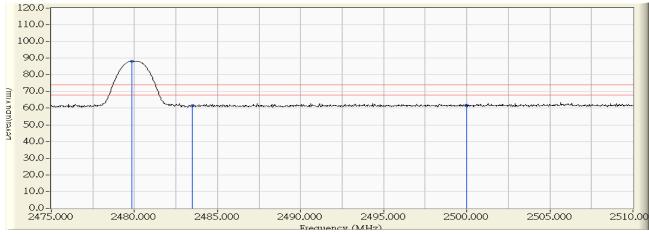
Site : CB1	Time : 2013/03/28 - 10:58
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.040	31.477	54.083	85.560	31.560	54.000	AVERAGE
2		2483.500	31.512	18.088	49.600	-4.400	54.000	AVERAGE
3		2489.840	31.576	20.919	52.494	-1.506	54.000	AVERAGE
4		2500.000	31.638	17.334	48.973	-5.027	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

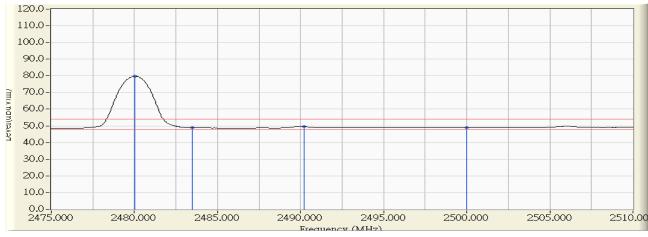
Site : CB1	Time : 2013/03/28 - 11:02
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
	(MHz) (dB)		(dBuV) (dBuV/m)		(dB)	(dBuV/m)		
1	*	2479.830	31.475	56.745	88.220	14.220	74.000	PEAK
2		2483.500	31.512	29.806	61.318	-12.682	74.000	PEAK
3		2500.000	31.638	30.060	61.699	-12.301	74.000	PEAK

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	Time : 2013/03/28 - 11:03
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V
EUT : Wireless GPS Logger RCV-3000	Note : DH5 2480MHz



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.005	31.477	48.288	79.765	25.765	54.000	AVERAGE
2		2483.500	31.512	17.359	48.871	-5.129	54.000	AVERAGE
3		2490.190	31.579	18.033	49.612	-4.388	54.000	AVERAGE
4		2500.000	31.638	17.337	48.976	-5.024	54.000	AVERAGE

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

### 7. Number of hopping frequency

#### 7.1. Test Equipment

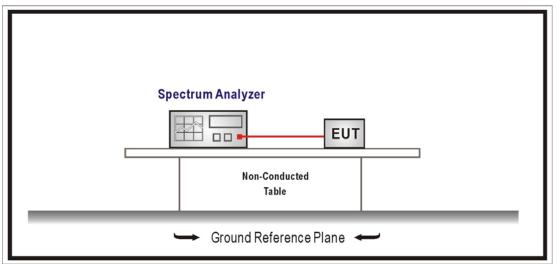
The following test equipment is used during the test:

Number of hopping frequency / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

#### 7.2. Test Setup



## 7.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequencies and the average time of occupancy on any frequencies and the average time of not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

For frequency hopping systems operating in the 2400-2483.5 MHz bands, which use fewer than 75 hopping frequencies, may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

## 7.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Span = the frequency band of operation
RBW < 1% of the span , VBW ≥ RBW</li>
Sweep = auto, Detector function = peak, Trace = max hold

## 7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

#### 7.6. Test Result

Product	Wireless GPS Logger RCV-3000		
Test Item	Number of hopping frequency		
Test Mode	Mode 1: Transmit		
Date of Test	2013/04/16	Test Site	SR7

Frequency Range	Measure Level	Limit	Result
(MHz)	(Channels)	(Channels)	
2402 ~ 2480	79	>75	Pass

#### 2401.5-2420.5MHz

D Agi	lent Spec	ctrum /	Analyzer - 1	Swept SA								
Star	t Free	50Ω <b>q 2.</b> 4	401500	0000 GHz	2	1		Avg Type Avg Hold:	ALIGNAUTO	TRAC	M Apr 16, 2013 E 1 2 3 4 5 6 E MMWWWW	Screen Image
			Inj	put: RF PI IF(	NO: Fast 😱 Gain:Low	#Atten: 30		Ext Gain:	-1.00 dB	DE		Themes
10 dE	3/div	Ref	20.00 a	dBm					WIKF2	-2.2	17 dBm	Flat Monochrome
Log 10.0 0.00		/**\			1 / 1 /		n /  /	$\gamma \land \gamma$	n m	m m		Save As
-10.0 -20.0		V	$\bigvee$	VV	$\vee$ $\vee$	VV	VV	VV	VV	$\vee$		
-30.0												
-40.0 -50.0												
-60.0												
-70.0						0						
	t 2.40 s BW				#VBW	1.0 MHz	27				)500 GHz 1001 pts)	
MKR N	MODE TR	C  SCL		X		Y	FUN		NCTION WIDTH	-	IN VALUE	
1	N 1 N 1	f		2.402 00 2.420 00		-1.479 d -2.217 d						
3 4 5												
6		0			8		6	8				
89												
10 11 12								0	l.			
🐮 st	tart	CIX (		🧿 🛛 🔊 Agil	ent Spectrum An	a						🤇 🛄 🍯 2:57 PM



### 2420.5-2440.5MHz

D Agi	ilent S	Spect		Analyzer - S	Swept SA			12					
Star	t Fi	req	<sup>50</sup> Ω.	420500	0000 GH	z	]	NSE:INT		ALIGNAUTO	TRAC	M Apr 16, 2013	Screen Image
				Inj	put: RF F IF	NO: Fast 🕞 Gain:Low	Trig: Free #Atten: 30		Avg Hold: Ext Gain:	-1.00 dB	1	ET P P N N N N	Themes
10 di	Bidiu	,	Rei	f 20.00 d	1Bm					Mkr		00 GHz 86 dBm	Flat Monochrome
Log 10.0				20.00 (									
0.00	$\square$	1		~ *	not not							¢²	Save As
-10.0	$\int $	$\bigvee$		$\square$			$\square$	AA	f	AA	A A	A	
-20.0		V	ľ	v		<u>v</u> v	ur u		/ 1		* /		
-30.0 -40.0													
-50.0													
-60.0													
-70.0													
Star #Re				GHz kHz		#VBW	( 1.0 MHz					4050 GHz 1001 pts)	
MKR					X		Y		CTION FU	NCTION WIDTH	FUNCTIO	ON VALUE	
1	N N	1	f f			DO GHZ	-2.498 d -1.986 d						
3									2				
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### 2440.5-2460.5MHz

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oturt	Tieq	2.		put: RF P	NO: Fast G Gain:Low	→ Trig: Fre #Atten: 3		Avg Hold Ext Gain:		¤ 2 2.460		Themes ► Flat Monochrome
10 dB	/div	Ref	f 20.00 d	1Bm						-2.6	98 dBm	
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## 2460.5-2480.5MHz

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### 8. Carrier Frequency Separation

#### 8.1. Test Equipment

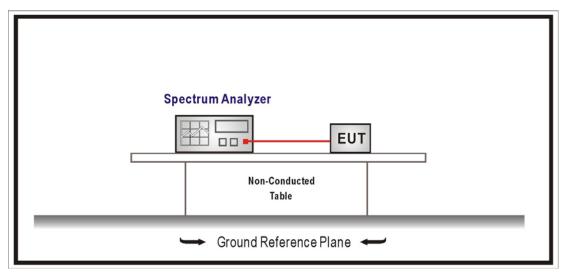
The following test equipment is used during the test:

Carrier Frequency Separation / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

#### 8.2. Test Setup



#### 8.3. Limits

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

#### 8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements Span = wide enough to capture the peaks of two adjacent channels Resolution Bandwidth (RBW)  $\geq$  1% of the span, VBW  $\geq$  RBW Sweep = auto, Detector function = peak, Trace = max hold

#### 8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

## 8.6. Test Result

Product	Wireless GPS Logger RCV-3000							
Test Item	Carrier Frequency Separation							
Test Mode	Mode 1: Transmit							
Date of Test	2013/04/16	Test Site	SR7					
GFSK								

Channel No.	Frequency	Measure Level	Limit	Result
Channel No.	(MHz)	(MHz)	(MHz)	Result
00	2402	1.040	>0.74	Pass

nter	-	οΩ <b>2.4</b>		0000 C	SHz PNO: Fast	AC	SEI			ALIGNAUTO ype: Log-Pwr old: >100/100	TR/	PM Apr 16, 2013 ACE 1 2 3 4 5 6 YPE MMWWWW	Screen Imag
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	6	1											

Product	Wireless GPS Logger RCV-3000					
Test Item	Carrier Frequency Separation					
Test Mode	Mode 1: Transmit					
Date of Test	2013/04/16 Test Site SR7					
GFSK						

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
39	2441	1.060	>0.75	Pass

# <u>Channel 39</u>

Agilent Spectrum Analyzer - Swept	t SA			
50 Ω enter Freq 2.4410000 Input: R		ALIGNAUTO Avg Type: Log-Pwr Avg Hold: >100/100 Ext Gain: -1.00 dB	02:52:01 PM Apr 16, 2013 TRACE 1 2 3 4 5 6 TYPE MMWWWW DET P P N N N N	Screen Image Themes
dB/div Ref 20.00 dBm	n	Mkr1	2.441 90 GHz -1.425 dBm	Flat Monochrom
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enter 2.44100 GHz es BW 1.0 MHz	#VBW 1.0 MHz	#Sweep 2	Span 20.00 MHz 20.0 ms (1001 pts)	
	X Y FUNC 2.441 90 GHz -1.425 dBm -1.06 MHz (Δ) 0.001 dB	TION FUNCTION WIDTH	FUNCTION VALUE	
start 📄 🔤 😂 🙆 🧿	D Agilent Spectrum Ana		,	<li>C 🚺 🙆 2:52  </li>

Pass

# QuieTek

78

2480

Product	Wireless GPS Logger RCV-3000									
Test Item	Carrier Frequency Separation									
Test Mode	Mode 1: Transmit									
Date of Test	2013/04/16 Test Site SR7									
GFSK	GFSK									
Channel No.	Frequency	Measure Level	Limit		Result					
Channel 10.	(MHz)	(MHz)	(MHz)		rtesuit					

# Channel 78

1.020

>0.74

D Agi	lent S	pecti			er - S	wept	SA														
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MKB N		TRC	100			×					Y		FUN	CTION	FUI	NCTION WIDTH	FUN	CTION	VALUE		
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### 9. Occupied Bandwidth

#### 9.1. Test Equipment

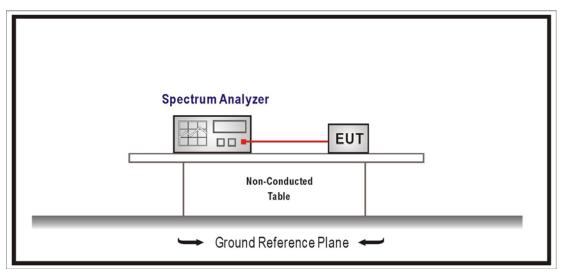
The following test equipment is used during the test:

Occupied Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

#### 9.2. Test Setup



### 9.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequencies and the average time of occupancy on any frequencies and the average time of the hopping frequencies and the average time of the hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

For frequency hopping systems operating in the 5725-5850 MHz bands. The maximum 20 dB bandwidth of the hopping channel is 1 MHz.

For 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.

## 9.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  RBW

Sweep = auto, Detector function = peak, Trace = max hold

The EUT should be transmitting at its maximum data rate.

### 9.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

#### 9.6. Test Result

Product	Wireless GPS Logger RCV-3000					
Test Item	Dccupied Bandwidth					
Test Mode	Mode 1: Transmit					
Date of Test	2013/04/16	Test Site	SR7			

#### GFSK

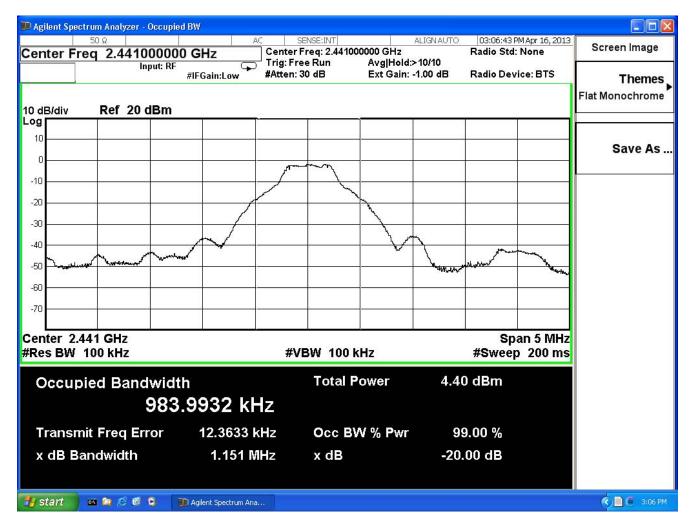
Channel No.	Frequency	Measure Level	Limit	Result	
Channel NO.	(MHz)	(MHz)	(MHz)	Result	
00	2402	0.985		Pass	



Product	Wireless GPS Logger RCV-3000					
Test Item	Occupied Bandwidth					
Test Mode	Mode 1: Transmit					
Date of Test	2013/04/16	Test Site	SR7			

#### GFSK

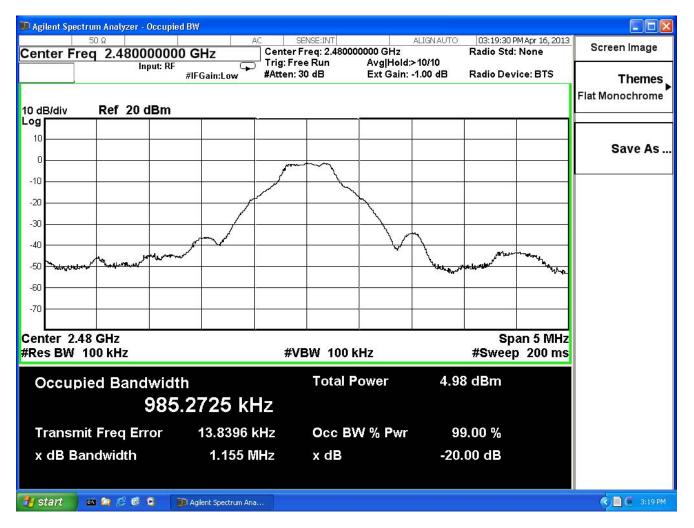
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
39	2441	0.983		Pass



Product	Wireless GPS Logger RCV-3000										
Test Item	Occupied Bandwidth										
Test Mode	Mode 1: Transmit										
Date of Test	201/04/16	Test Site	SR7								

#### GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
78	2480	0.985		Pass



#### 10. Dwell Time

#### 10.1. Test Equipment

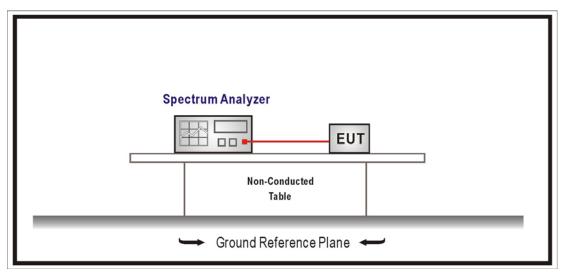
The following test equipment is used during the test:

Dwell Time / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date		
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31		

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

#### 10.2. Test Setup



### 10.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. For frequency hopping systems operating in the 2400-2483.5 MHz bands. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

For frequency hopping systems operating in the 5725-5850 MHz bands. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

### 10.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements Span = zero span, centered on a hopping channel RBW = 1 MHz, VBW  $\ge$  RBW Sweep = as necessary to capture the entire dwell time per hopping channel Detector function = peak, Trace = max hold

## 10.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

#### 10.6. Test Result

Product	Wireless GPS Logger RCV-3000							
Test Item	Dwell Time							
Test Mode	Mode 1: Transmit							
Date of Test	2013/04/16	Test Site	SR7					

Occupancy Time of Frequency Hopping System

- A) 2402MHz Test Time Period: 0.4\*79=31.6sec , Time slot length : 2.889msec = 0.002889sec Dwell Time = 0.002889\*(266.67/79)\*31.6 = 0.30816sec 。
- B) 2441MHz Test Time Period: 0.4\*79=31.6sec , Time slot length : 2.889msec = 0.002889sec Dwell Time = 0.002889\*(266.67/79)\*31.6 = 0.30816sec 。
- C) 2480MHz Test Time Period: 0.4\*79=31.6sec , Time slot length : 2.889msec = 0.002889sec Dwell Time = 0.002889\*(266.67/79)\*31.6 = 0.30816sec 。

Test Result: The Average Occupancy Time of Each Highest  $\,^{,}$  Middle and Lowest Channel Is Less Than 0.4sec  $\,^{,}$  And Corresponds to The Standard  $\,^{,}$ 

#### Hop rate-2402MHz

D Ag	ilent S	Spect	rum	Analyzer	- Swept SA		-		U.	1.5	29			Mar		
Cer	nter	Fre	ک 50 q	2.402	000000			AC		ISE:INT	Avg Ty	ALIGNAU		TRACE	4 Apr 16, 2013 1 2 3 4 5 6 WWWWWWW	Screen Image
	Input: RF PNO: Fast 🖵 IFGain:Low								: Vide en: 30		Ext Gai	n: -1.00 dE	_	DE		Themes
10 d	ΔMkr3 6.269 ms ٥ dB/div Ref 20.00 dBm 0.01 dB													Flat Monochrome		
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# Hop rate-2441MHz

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nter Freq	2.44100000 Input: RF		] Trig: Video #Atten: 30 dB	Avg Type: Log-Pwi Ext Gain: -1.00 dB	TRACE 123456 TYPE WWWWWW DET PNNNNN	
B/div R	ef 20.00 dBm				∆Mkr3 6.269 ms 0.02 dB	<b>Them</b> Flat Monochror
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nter 2.441 8 BW 1.0 M	000000 GHz //Hz	#VBW	1.0 MHz	Sweep	Span 0 Hz 20.00 ms (1001 pts)	
MODE TRC SO N 1 t		6.211 ms	-1.96 dBm	JNCTION FUNCTION WID	TH FUNCTION VALUE	
Δ1 1 t Δ1 1 t		2.889 ms (Δ) 6.269 ms (Δ)	-0.04 dB 0.02 dB			
	1					



## Hop rate-2480MHz

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12		-												-		1					
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Note: Dwell time = time slot length \* hop rate / number of hopping channels \* period