FCC Test Report

Product Name ： Wireless System

Model No. ： EWS-10R

FCC ID. ： OSREWS-10R

Applicant ： Eastern Mastec Corp.

Address ： 5F Olympia Bldg,196,Jamsil Bon-dong,Songpa-gu,Seoul,Korea

Date of Receipt ： Aug. 01, 2017

Issued Date ： Jan. 26, 2018

Report No. ： 1780020R-RFUSP01V00

Report Version ： V1.0

Testing Laboratory

3024

Test Report Certification

Issued Date : Jan. 26, 2018
Report No. : 1780020R-RFUSP01V00

Product Name	:	Wireless System
Applicant	:	Eastern Mastec Corp.
Address	:	5F Olympia Bldg,196,Jamsil Bon-dong,Songpa-gu,Seoul,Korea
Manufacturer	:	Eastern Mastec Corp.
Model No.	:	EWS-10R
FCC ID.	:	OSREWS-10R
EUT Voltage	:	DC 24V
Testing Voltage	:	DC 24V
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2016
Laboratory Name	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Documented By : Lyla Yang

(Lyla Yang / Engineering Adm. Specialist)

Tested By : Elwin Lin

(Elwin Lin / Engineer)

Approved By : Roy Wang

(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1780020R-RFUSP01V00	V1.0	Initial issue of report	Jan. 26, 2018

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1. General Information

1.1. EUT Description

Product Name	Wireless System
Model No.	EWS-10R
Frequency Range	2409.5MHz ~ 2469MHz
Channel Number	18 Channels
Type of Modulation	GFSK

Antenna Information	
MFR. / Model No.	TRANWO / 119-000007-00
Antenna Type	Dipole
Antenna Gain	2 dBi

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2409.5MHz	02	2413MHz	03	2416.5MHz	04	2420MHz
05	2423.5MHz	06	2427MHz	07	2430.5MHz	08	2434MHz
09	2437.5MHz	10	2441MHz	11	2444.5MHz	12	2448MHz
13	2451.5MHz	14	2455MHz	15	2458.5MHz	16	2462MHz
17	2465.5MHz	18	2469MHz				

Note:

1. This device is a Wireless System including 2.4GHz transmitting and receiving function.
2. 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.

1.2. Test Mode

DEKRA 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:

Test Mode	
TX	Mode 1: Transmit

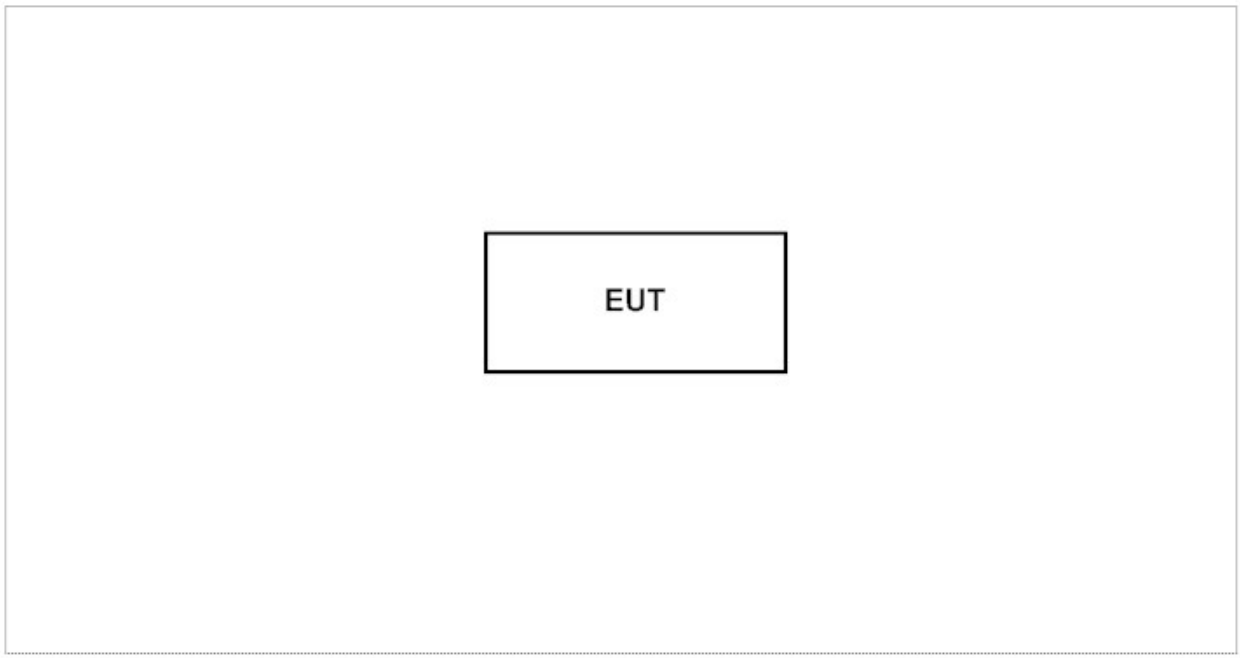
Emission	Mode 1
Conducted Emission	No
Peak Power Output	Yes
Radiated Emission	Yes
RF antenna conducted test	Yes
Band Edge	Yes
Number of hopping Frequency	Yes
Carrier Frequency Separation	Yes
Occupied Bandwidth	Yes
Dwell Time	Yes

1.3. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	N/A				

1.4. Configuration of tested System

Connection Diagram


1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Press the button on the EUT to change the channel.
3	Configure the test mode, the test channel.
4	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual	Test Site
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission (FHSS)	15 - 35	23	--
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission (FHSS)	15 - 35	25	2
Humidity (%RH)		25 - 75	54	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Band Edge (FHSS)	15 - 35	25	2
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Number of hopping Frequency (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Carrier Frequency Separation (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Dwell Time (FHSS)	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test site information refers to Laboratory Information.

Laboratory Information

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site :
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site : http://www.dekra.com.tw/index_en.aspx

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

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2. Conducted Emission

2.1. Test Equipment

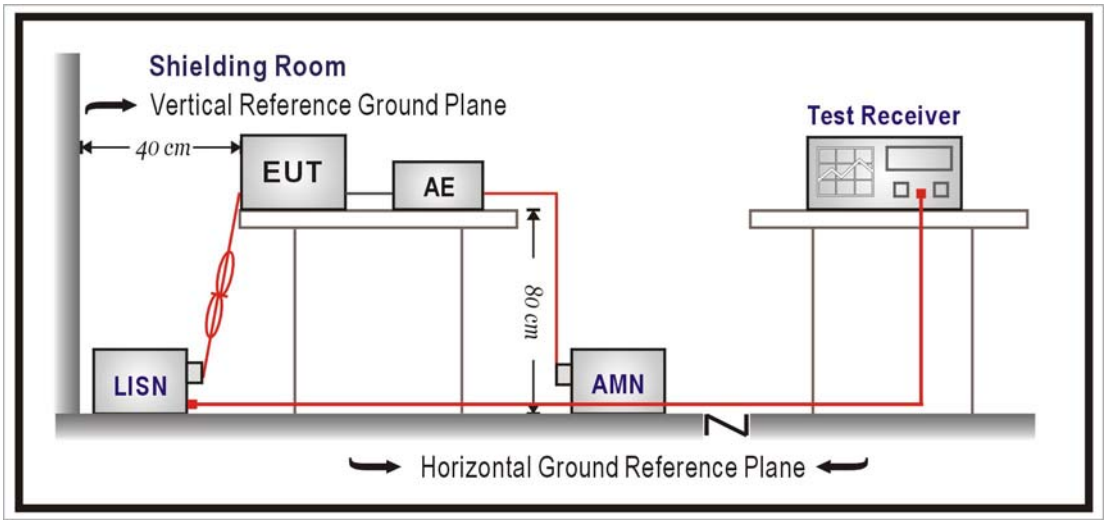
The following test equipment's are used during the test:

Conducted Emission /SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2017/02/06	2018/02/05
Test Receiver	R&S	ESCS 30	836858/022	2017/04/12	2018/04/11
LISN	R&S	ENV216	100092	2017/07/31	2018/07/30

Note: All equipment 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 C63.10: 2013 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: 2016

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

EUT using DC input voltage, so the project does not have to test for testing.

3. Peak Power Output

3.1. Test Equipment

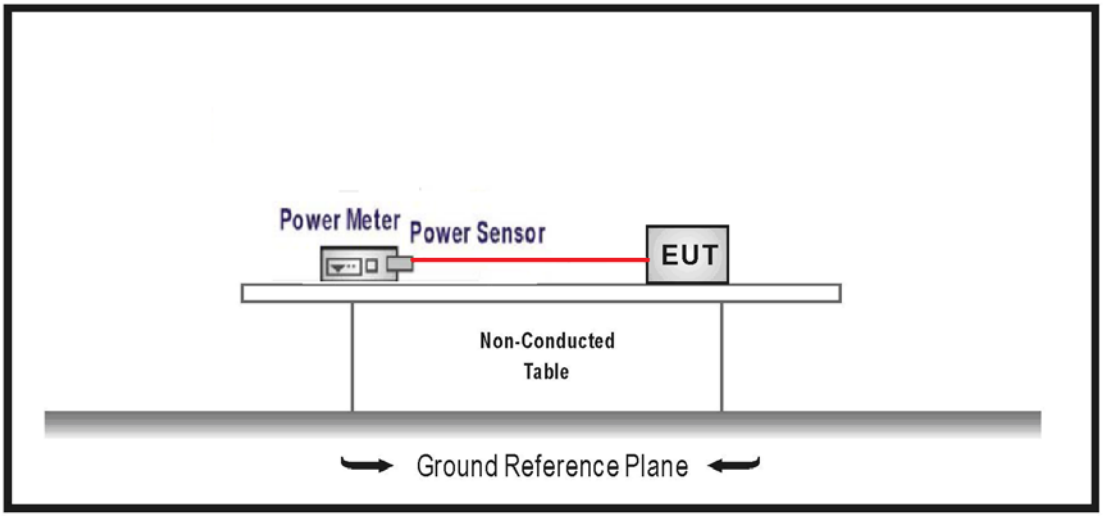
The following test equipment is used during the test:

Peak Power Output / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

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 C63.10:2013 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: 2016.

3.6. Test Result

Product	Wireless System		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/14	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2409.5	16.785	24	Pass
10	2441	17.017	24	Pass
18	2469	17.151	24	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the test:

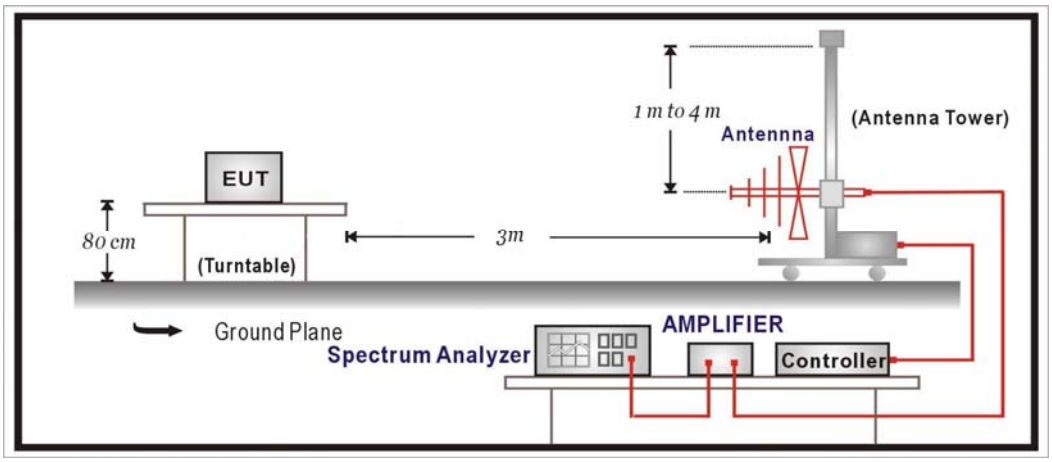
Radiated Emission / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2017/11/21	2018/11/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/10	2019/01/09
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2018/01/08	2019/01/07
Pre-Amplifier	MITEQ	JS44-18004000-45-8P	2014754	2017/12/13	2018/12/12

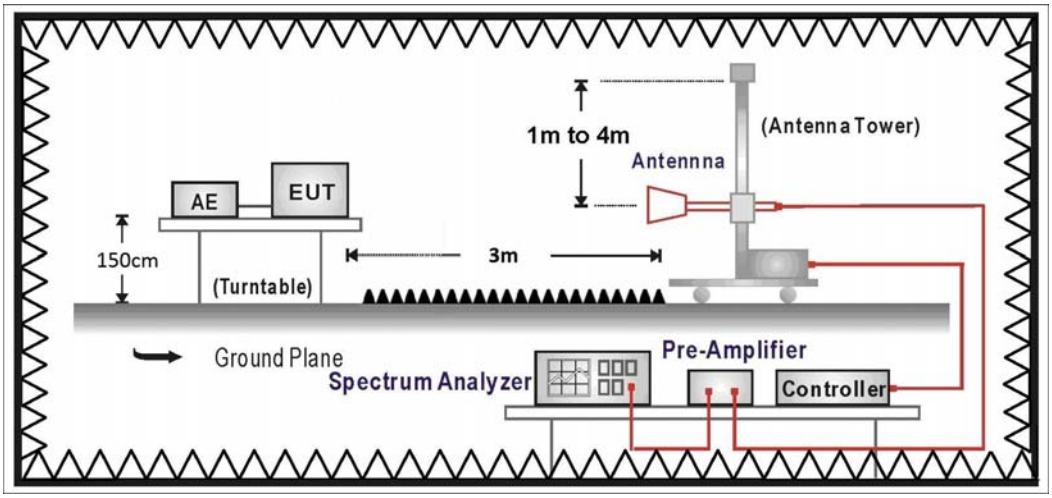
Note: All equipment's that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 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 C63.10:2013 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 or 1.5 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 C63.10:2013 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.

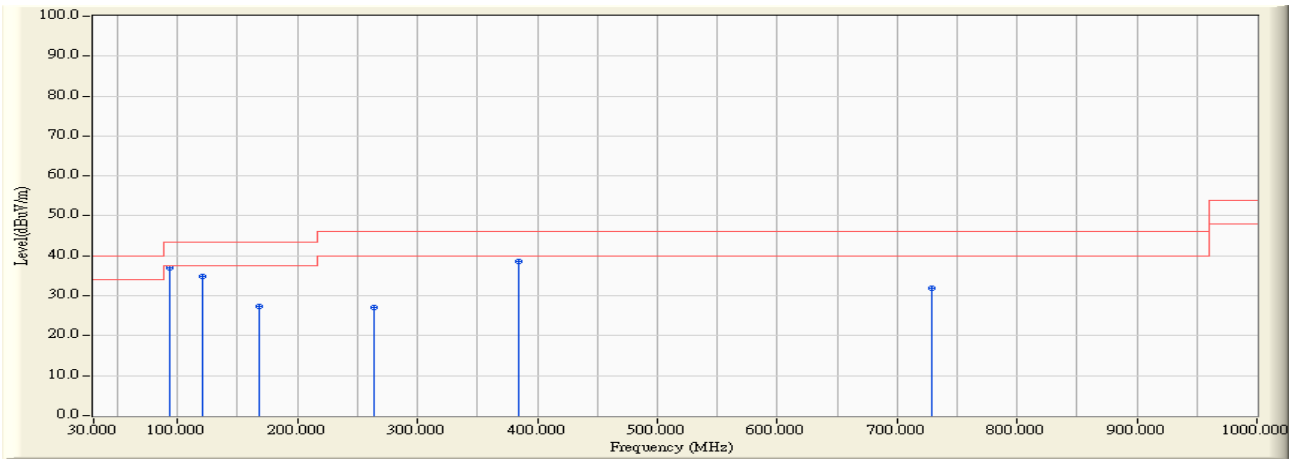
4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

4.6. Test Result

30MHz-1GHz Spurious

Site : CB4-H	**Time : 2018/01/24**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

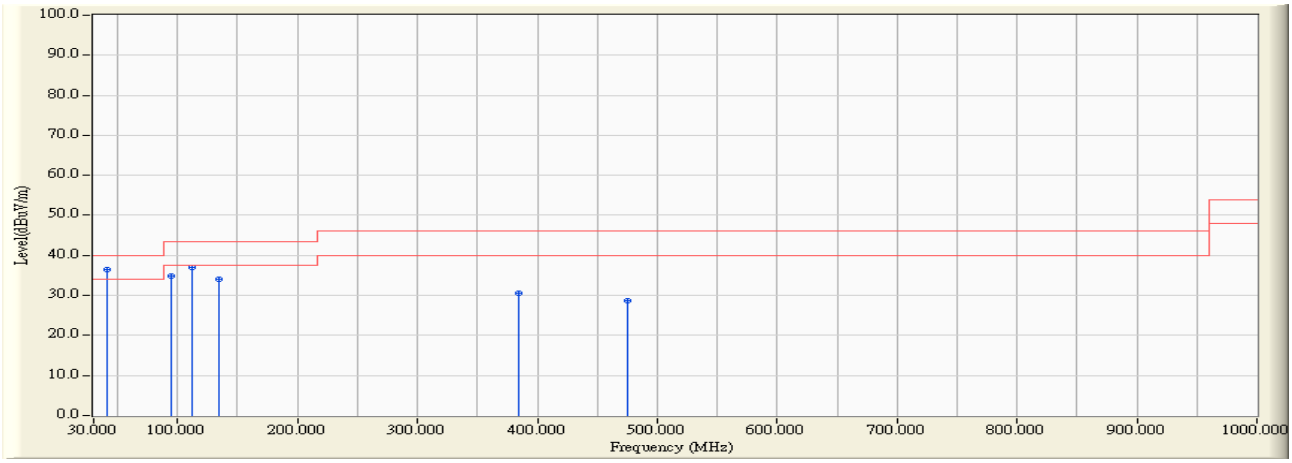


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	94.020	-25.213	62.086	36.873	-6.627	43.500	QUASIPEAK
2		120.210	-20.178	55.049	34.871	-8.629	43.500	QUASIPEAK
3		168.225	-22.937	50.408	27.472	-16.028	43.500	QUASIPEAK
4		263.770	-20.542	47.657	27.115	-18.885	46.000	QUASIPEAK
5		384.050	-16.692	55.219	38.527	-7.473	46.000	QUASIPEAK
6		729.370	-12.029	43.852	31.824	-14.176	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Site : CB4-H	**Time : 2018/01/24**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**



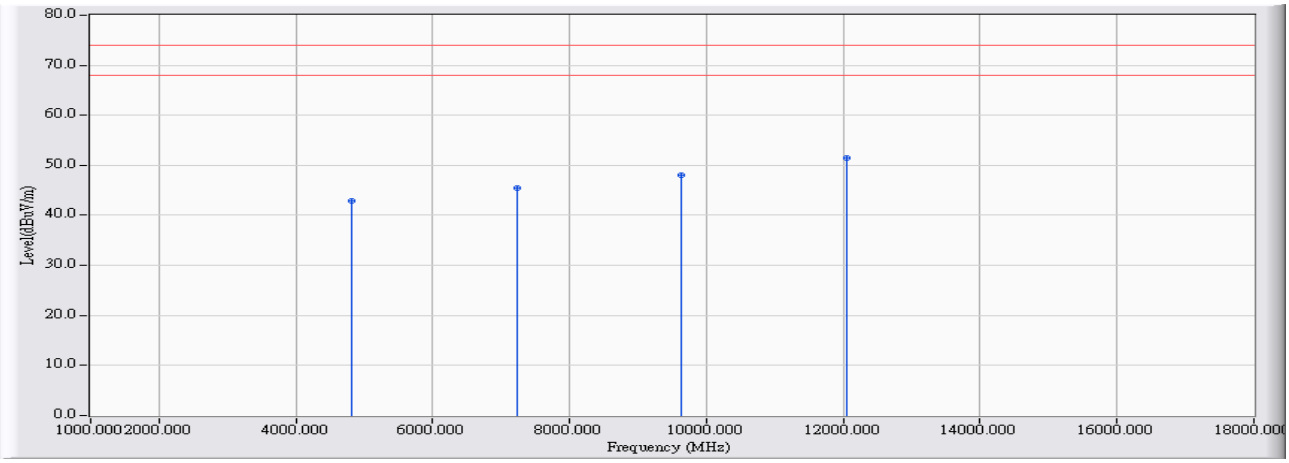
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	40.670	-17.011	53.535	36.525	-3.475	40.000	QUASIPEAK
2		94.505	-25.101	59.870	34.769	-8.731	43.500	QUASIPEAK
3		112.450	-21.564	58.496	36.932	-6.568	43.500	QUASIPEAK
4		134.275	-20.781	54.948	34.168	-9.332	43.500	QUASIPEAK
5		384.050	-16.692	47.331	30.639	-15.361	46.000	QUASIPEAK
6		475.230	-15.161	43.831	28.670	-17.330	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Harmonic & Spurious:

Site : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5MHz**

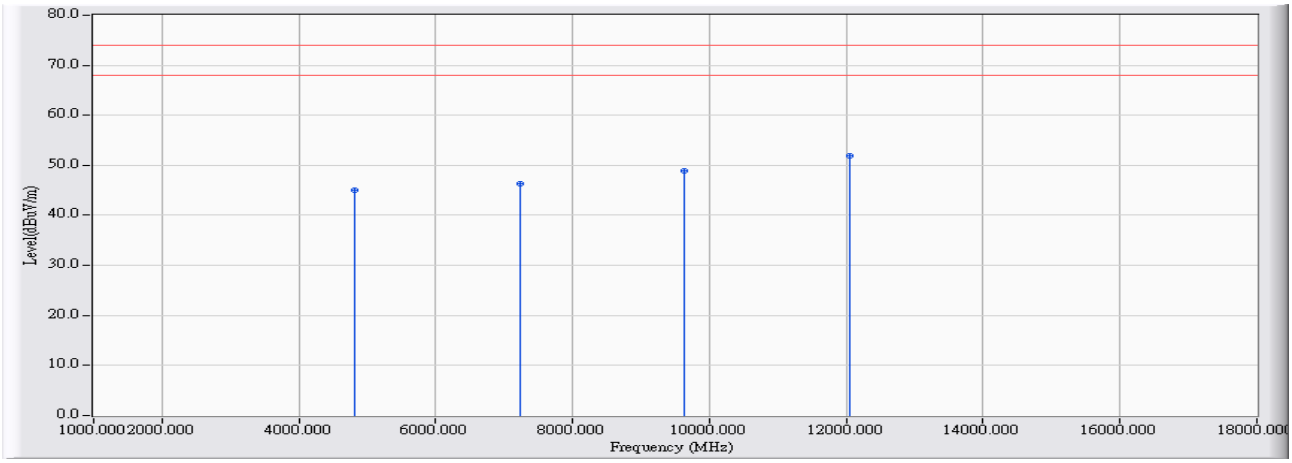


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4819.000	-0.214	43.060	42.846	-31.154	74.000	PEAK
2		7228.500	7.133	38.410	45.543	-28.457	74.000	PEAK
3		9638.000	12.615	35.390	48.005	-25.995	74.000	PEAK
4	*	12047.000	15.383	36.060	51.444	-22.556	74.000	PEAK

Note:

1. All reading above 1GHz is 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5MHz**

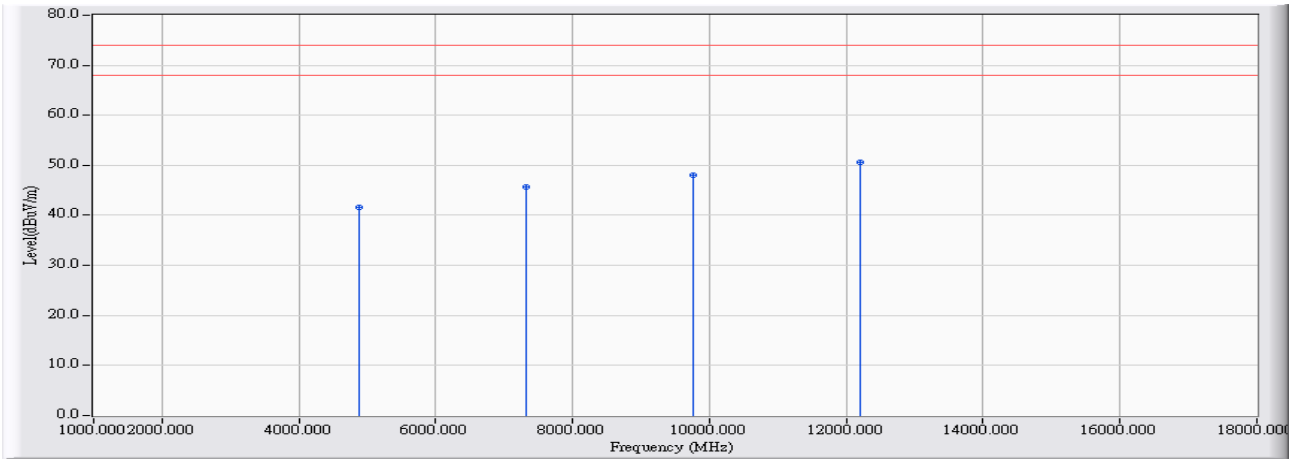


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4819.000	-0.214	45.210	44.996	-29.004	74.000	PEAK
2		7228.500	7.133	39.160	46.293	-27.707	74.000	PEAK
3		9638.000	12.615	36.310	48.925	-25.075	74.000	PEAK
4	*	12047.000	15.383	36.440	51.824	-22.176	74.000	PEAK

Note:

1. All reading above 1GHz is 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

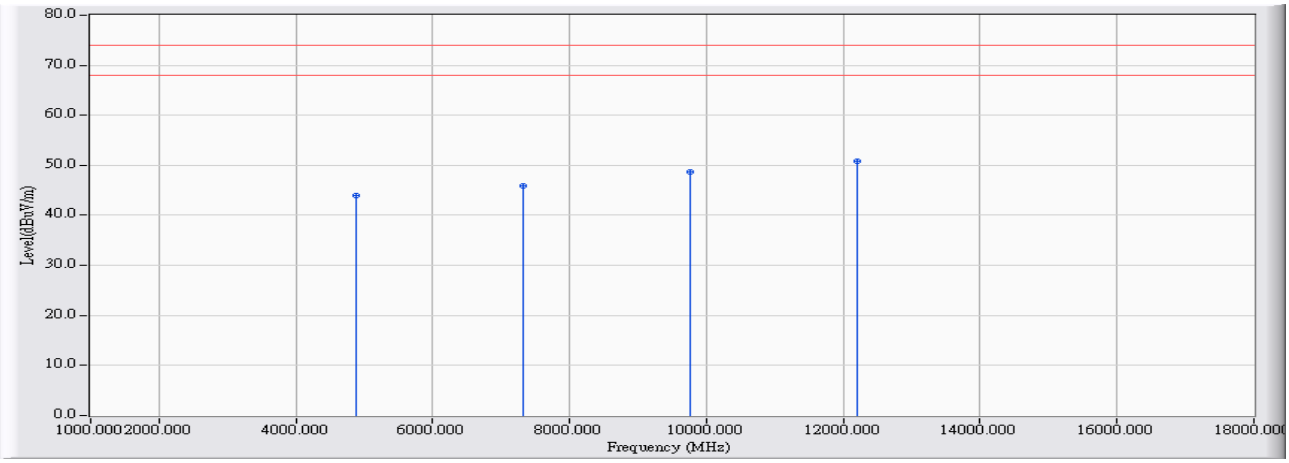


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4882.000	-0.124	41.790	41.667	-32.333	74.000	PEAK
2		7323.000	7.448	38.130	45.577	-28.423	74.000	PEAK
3		9764.000	12.871	35.260	48.131	-25.869	74.000	PEAK
4	*	12205.000	14.834	35.700	50.534	-23.466	74.000	PEAK

Note:

1. All reading above 1GHz is 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

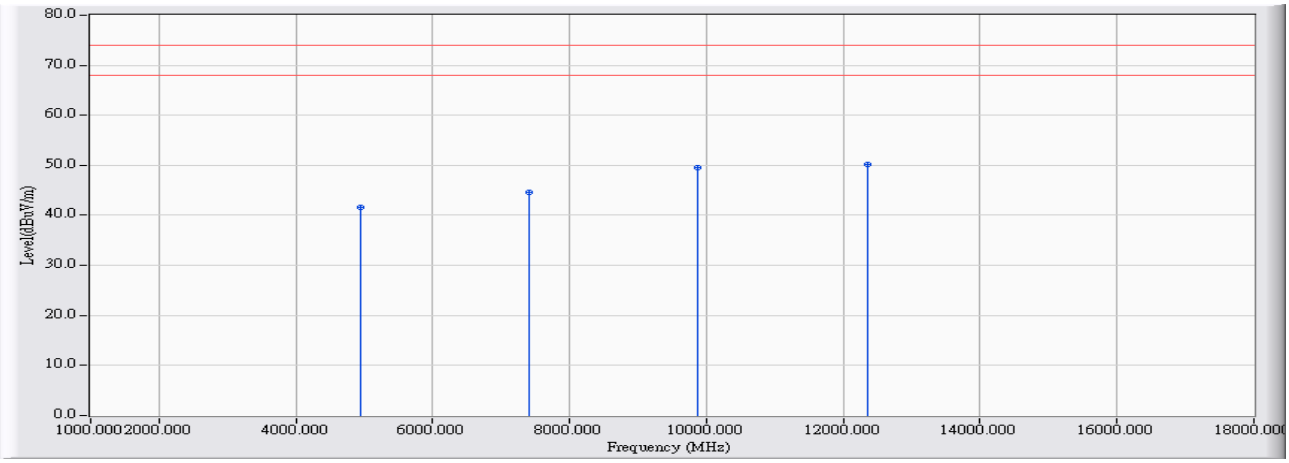


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4882.000	-0.124	44.180	44.057	-29.943	74.000	PEAK
2		7323.000	7.448	38.460	45.907	-28.093	74.000	PEAK
3		9764.000	12.871	35.710	48.581	-25.419	74.000	PEAK
4	*	12205.000	14.834	36.020	50.854	-23.146	74.000	PEAK

Note:

1. All reading above 1GHz is 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**

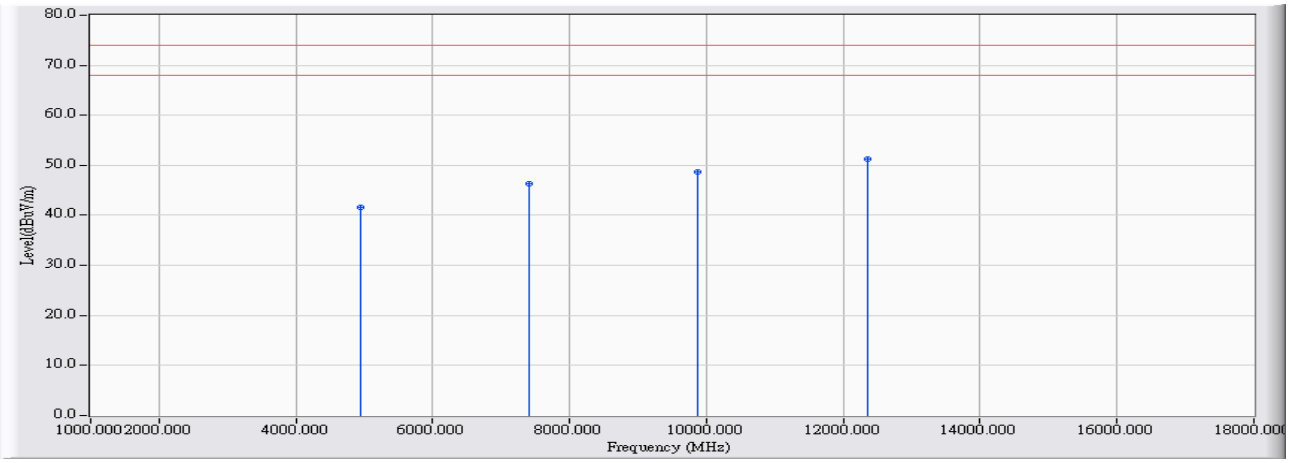


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4938.000	-0.060	41.750	41.690	-32.310	74.000	PEAK
2		7407.000	7.749	36.950	44.700	-29.300	74.000	PEAK
3		9876.000	13.029	36.520	49.549	-24.451	74.000	PEAK
4	*	12345.000	15.343	34.940	50.284	-23.716	74.000	PEAK

Note:

1. All reading above 1GHz is 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4938.000	-0.060	41.580	41.520	-32.480	74.000	PEAK
2		7407.000	7.749	38.630	46.380	-27.620	74.000	PEAK
3		9876.000	13.029	35.580	48.609	-25.391	74.000	PEAK
4	*	12345.000	15.343	35.870	51.214	-22.786	74.000	PEAK

Note:

1. All reading above 1GHz is 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:

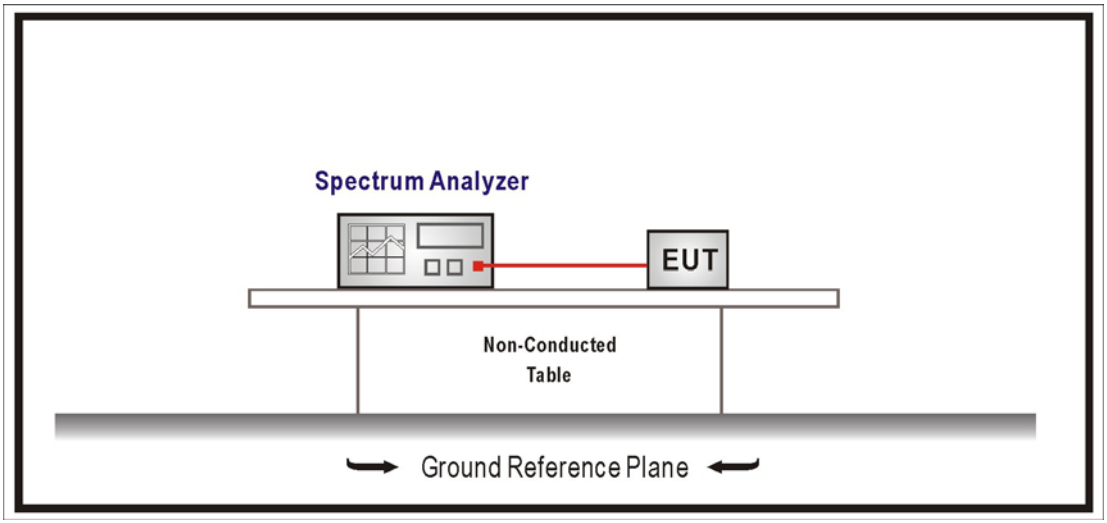
RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipment 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 C63.10:2013 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

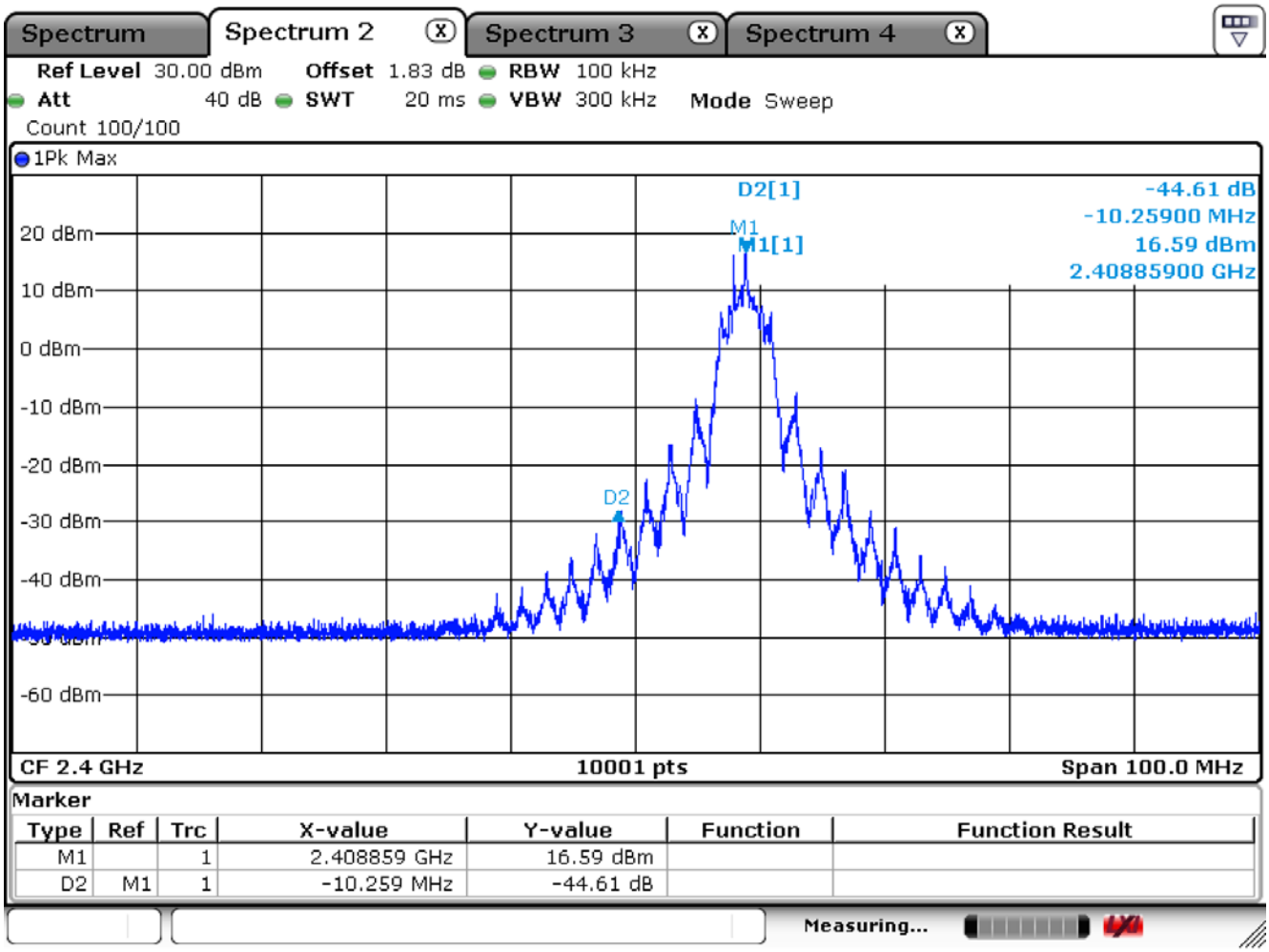
According to FCC Part 15 Subpart C Paragraph 15.247: 2016

5.6. Test Result

Product	Wireless System		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/14	Test Site	SR10-H

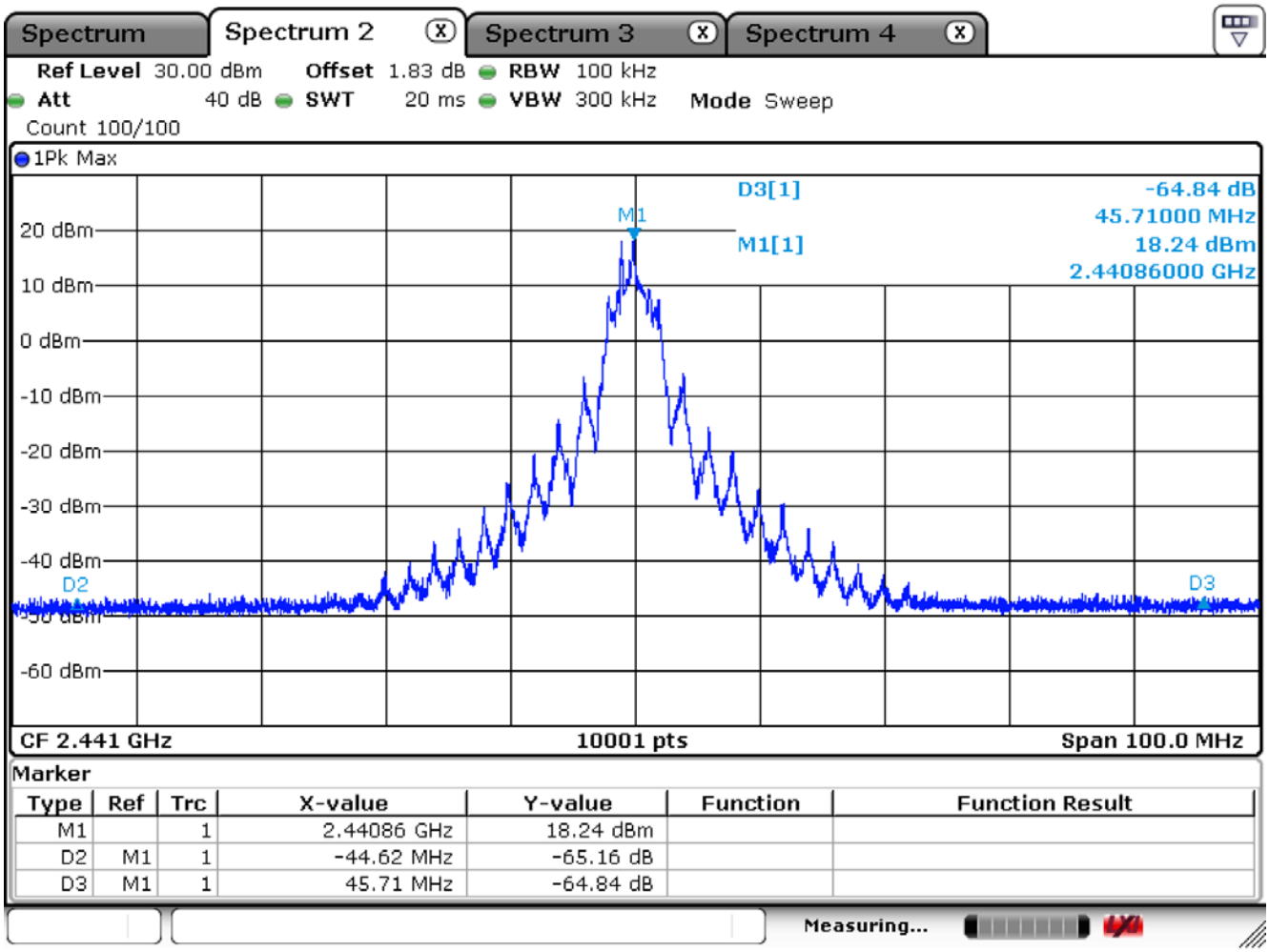
Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
01	2409.5	44.610	≧20	Pass
10	2441.0	64.840	≧20	Pass
18	2469.0	55.500	≧20	Pass

Channel 01



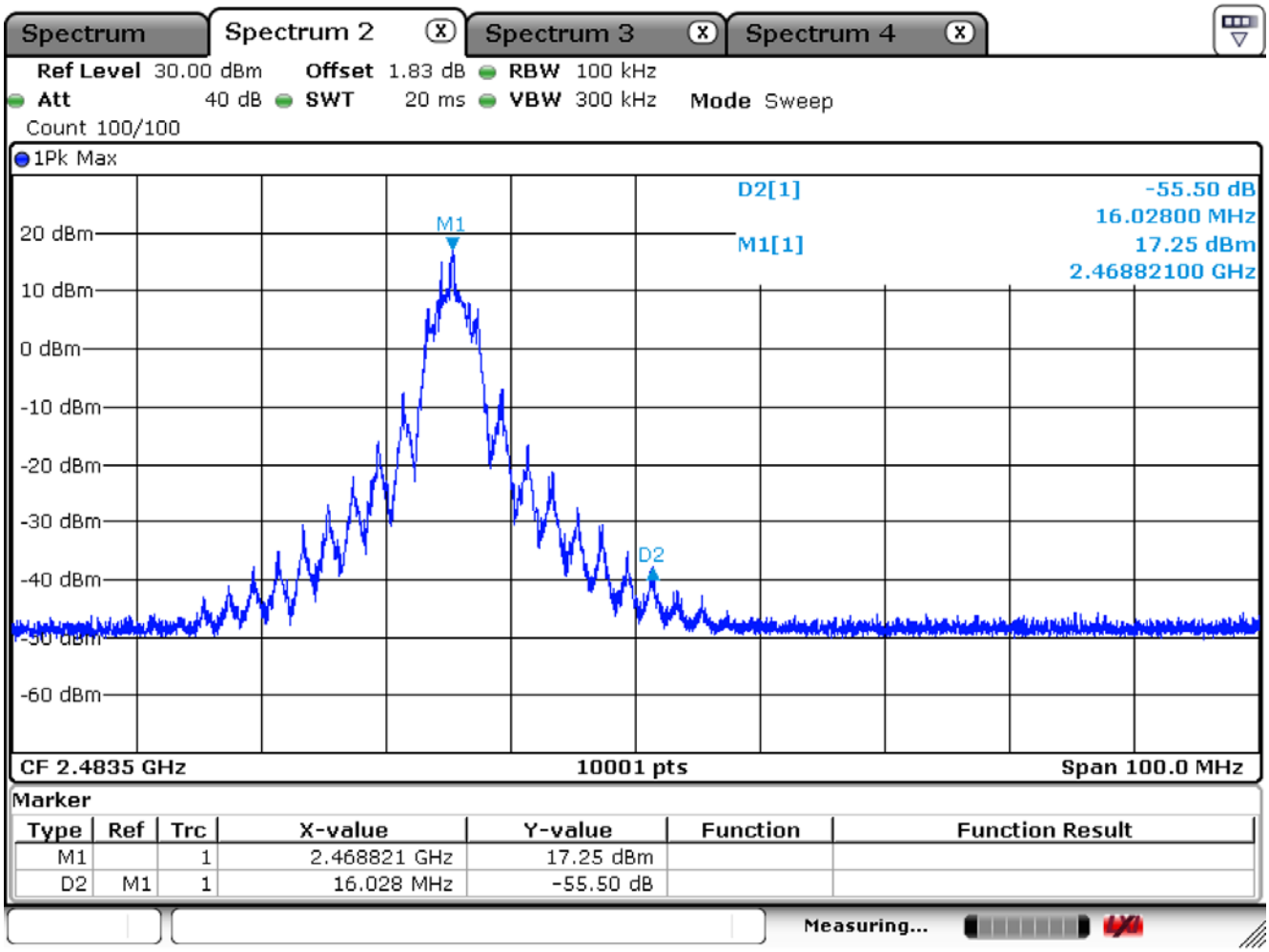
Date: 14.AUG.2017 17:13:10

Channel 10



Date: 14.AUG.2017 17:38:26

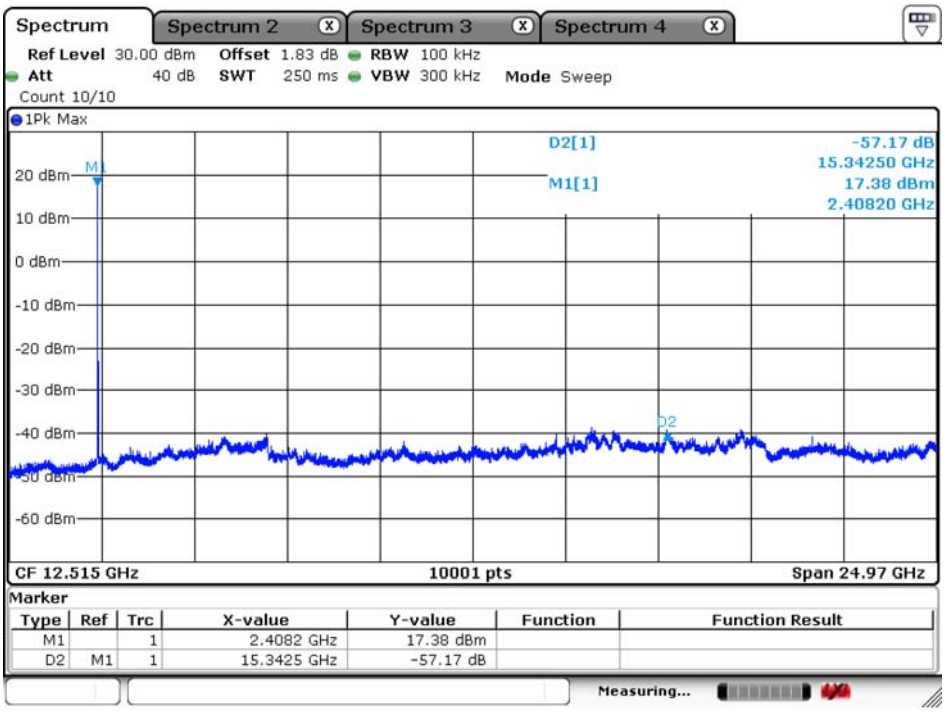
Channel 18



Date: 14.AUG.2017 17:43:17

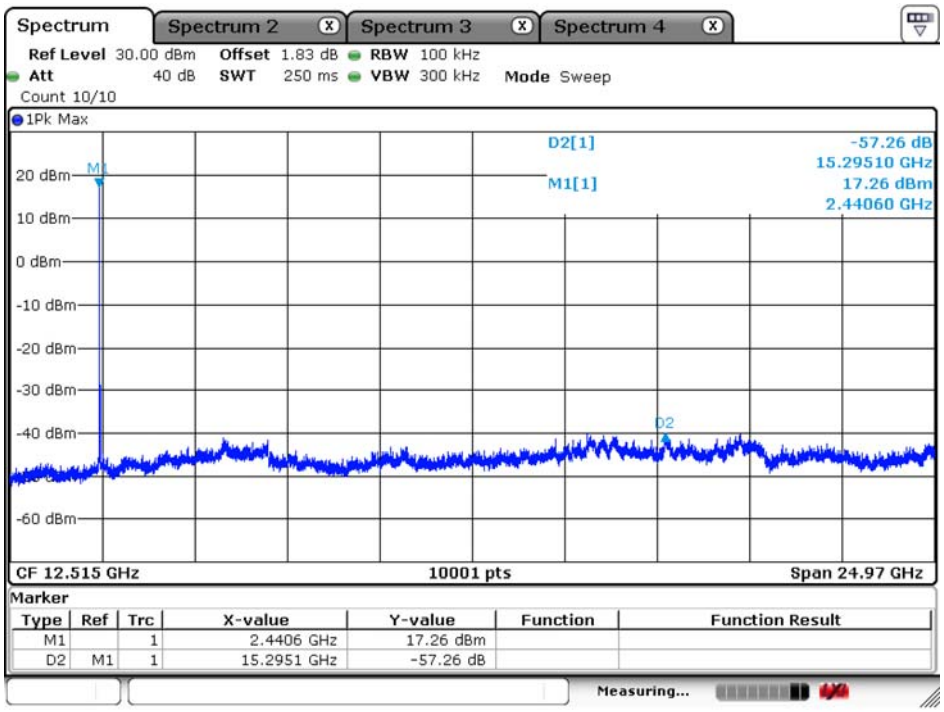
Product	Wireless System		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/14	Test Site	SR10-H

Channel 01 (30MHz-25GHz)



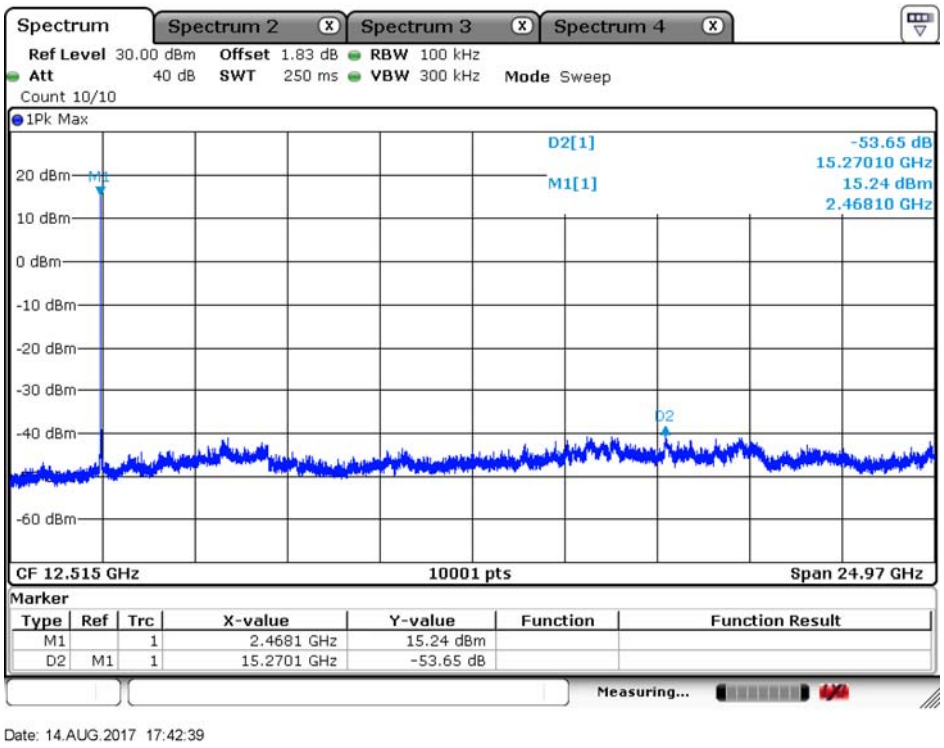
Date: 14.AUG.2017 17:12:30

Channel 10 (30MHz-25GHz)



Date: 14.AUG.2017 17:37:16

Channel 18 (30MHz-25GHz)



6. Band Edge

6.1. Test Equipment

The following test equipment are used during the test:

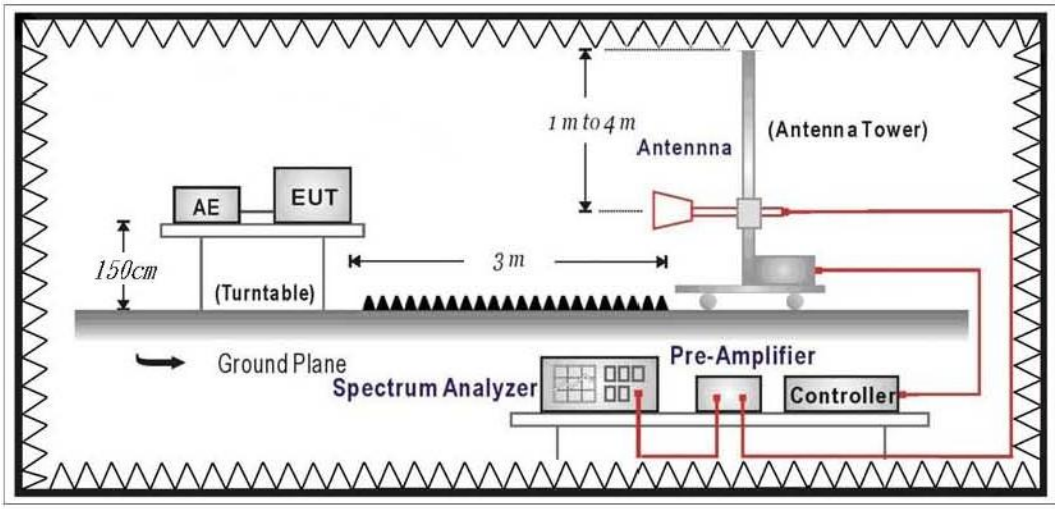
Band Edge / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	203	2016/08/29	2017/08/28
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

Note: All equipment 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 C63.10:2013 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 1.5 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.

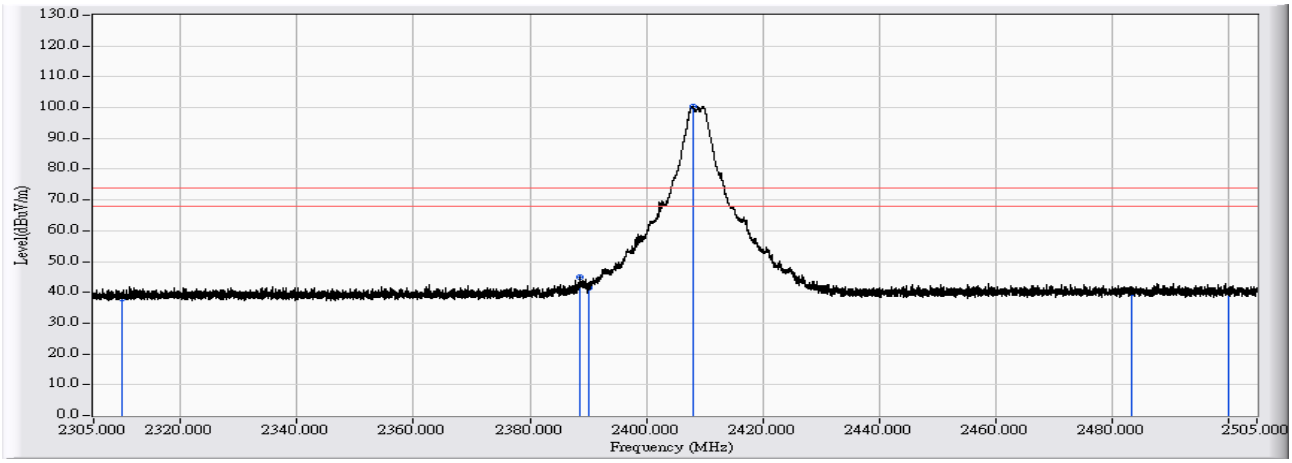
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

6.6. Test Result

Site : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 0**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5**

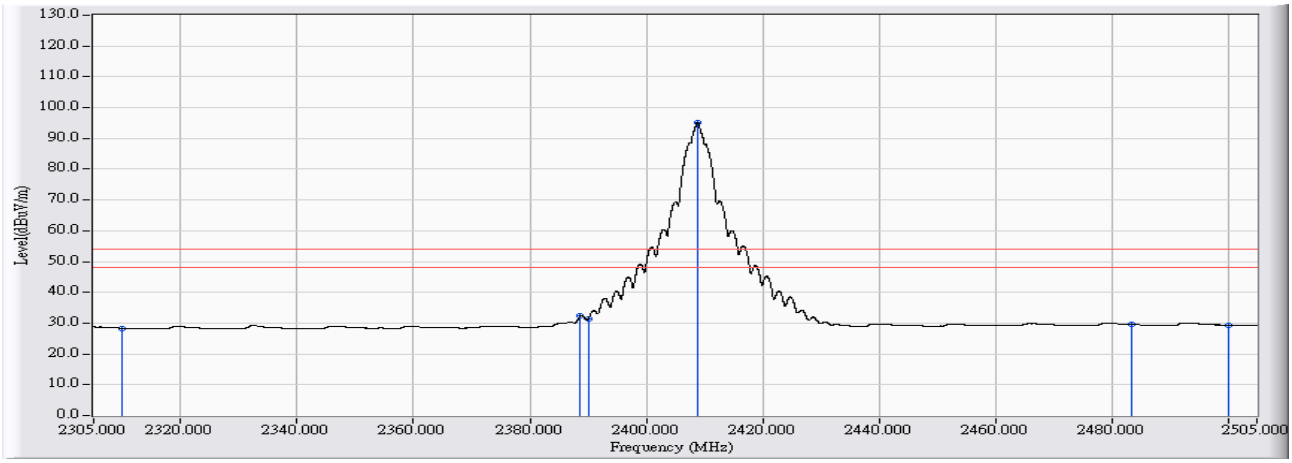


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	27.052	38.067	-35.933	74.000	PEAK
2		2388.612	11.535	33.408	44.943	-29.057	74.000	PEAK
3		2390.000	11.544	30.100	41.644	-32.356	74.000	PEAK
4	*	2407.950	11.665	88.761	100.425	26.425	74.000	PEAK
5		2483.500	12.172	27.538	39.710	-34.290	74.000	PEAK
6		2500.000	12.274	28.232	40.507	-33.493	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5**

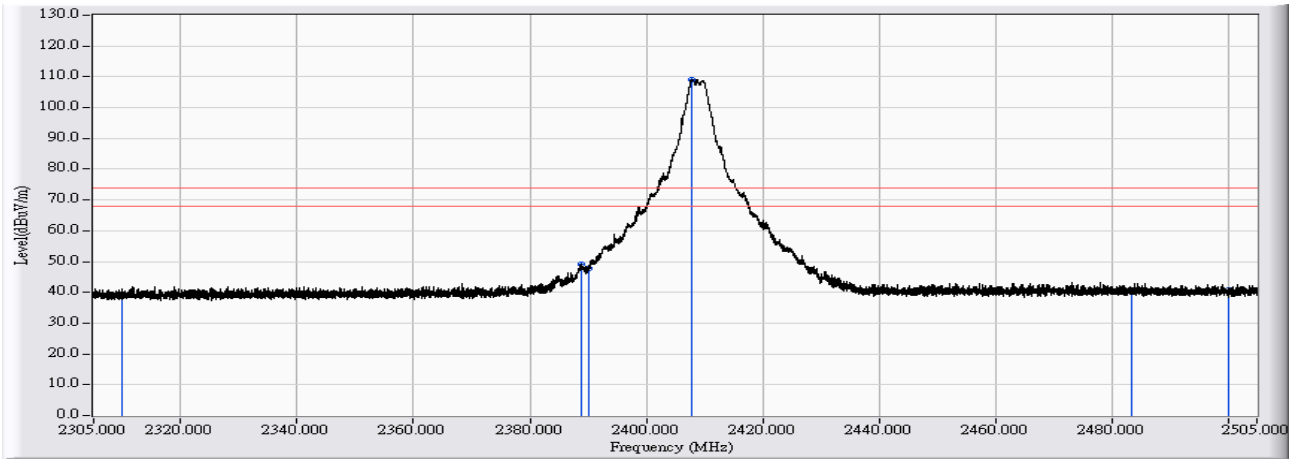


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.296	28.311	-25.689	54.000	AVERAGE
2		2388.652	11.535	20.725	32.260	-21.740	54.000	AVERAGE
3		2390.000	11.544	19.693	31.237	-22.763	54.000	AVERAGE
4	*	2408.830	11.671	83.573	95.243	41.243	54.000	AVERAGE
5		2483.500	12.172	17.357	29.529	-24.471	54.000	AVERAGE
6		2500.000	12.274	17.020	29.295	-24.705	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5**

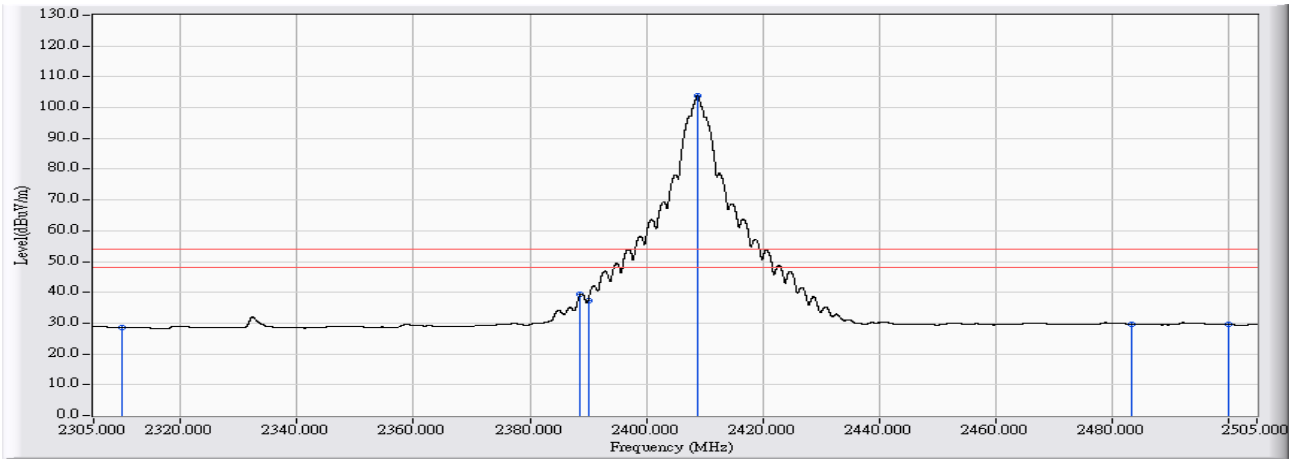


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	27.982	38.997	-35.003	74.000	PEAK
2		2388.892	11.536	37.759	49.295	-24.705	74.000	PEAK
3		2390.000	11.544	36.142	47.686	-26.314	74.000	PEAK
4	*	2407.730	11.663	97.422	109.085	35.085	74.000	PEAK
5		2483.500	12.172	27.979	40.151	-33.849	74.000	PEAK
6		2500.000	12.274	28.666	40.941	-33.059	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2409.5**

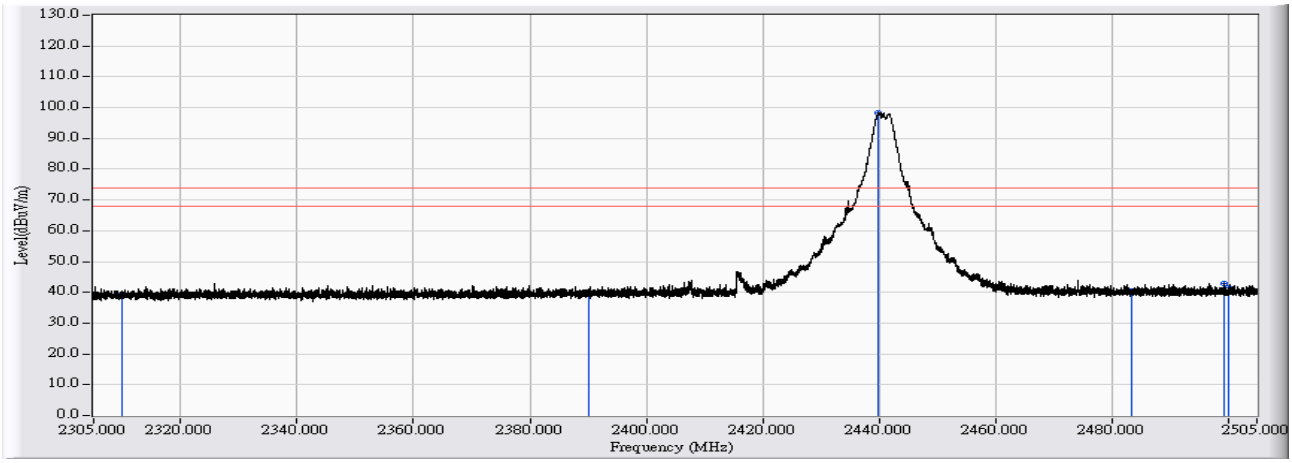


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.412	28.427	-25.573	54.000	AVERAGE
2		2388.712	11.535	27.769	39.304	-14.696	54.000	AVERAGE
3		2390.000	11.544	25.734	37.278	-16.722	54.000	AVERAGE
4	*	2408.830	11.671	92.362	104.032	50.032	54.000	AVERAGE
5		2483.500	12.172	17.535	29.707	-24.293	54.000	AVERAGE
6		2500.000	12.274	17.224	29.499	-24.501	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

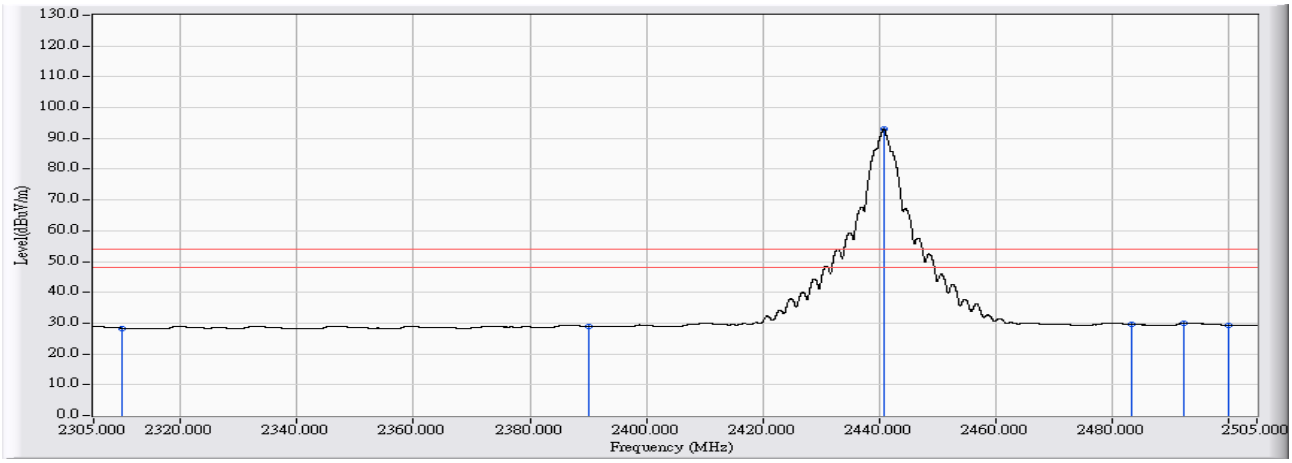


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	28.416	39.431	-34.569	74.000	PEAK
2		2390.000	11.544	28.144	39.688	-34.312	74.000	PEAK
3	*	2439.966	11.880	86.290	98.170	24.170	74.000	PEAK
4		2483.500	12.172	28.145	40.317	-33.683	74.000	PEAK
5		2499.440	12.272	30.552	42.824	-31.176	74.000	PEAK
6		2500.000	12.274	29.107	41.382	-32.618	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

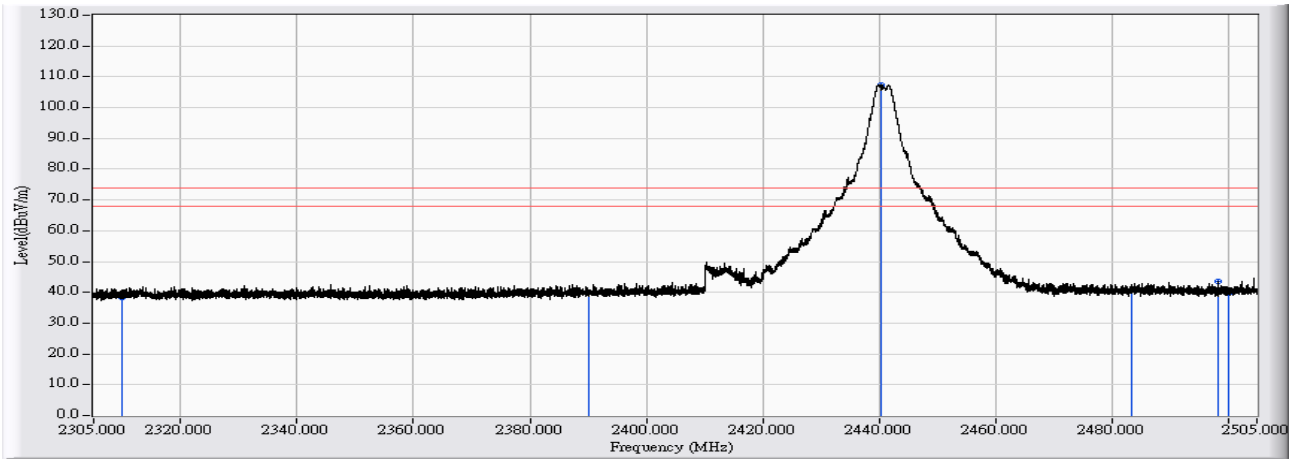


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.370	28.385	-25.615	54.000	AVERAGE
2		2390.000	11.544	17.467	29.011	-24.989	54.000	AVERAGE
3	*	2440.826	11.886	81.278	93.163	39.163	54.000	AVERAGE
4		2483.500	12.172	17.489	29.661	-24.339	54.000	AVERAGE
5		2492.401	12.232	17.832	30.063	-23.937	54.000	AVERAGE
6		2500.000	12.274	17.144	29.419	-24.581	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

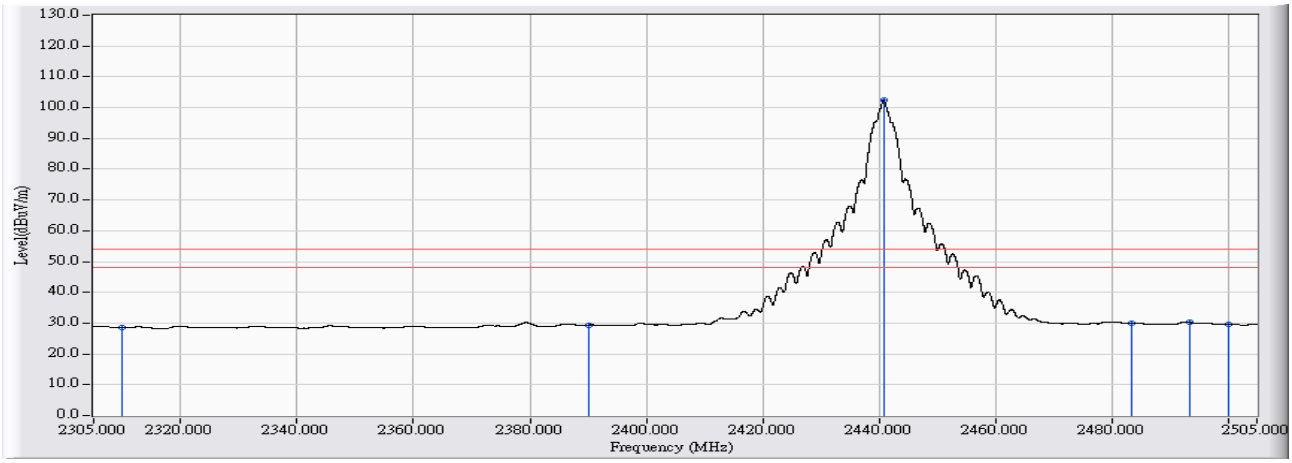


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	27.288	38.303	-35.697	74.000	PEAK
2		2390.000	11.544	28.476	40.020	-33.980	74.000	PEAK
3	*	2440.426	11.883	95.509	107.392	33.392	74.000	PEAK
4		2483.500	12.172	28.480	40.652	-33.348	74.000	PEAK
5		2498.421	12.267	31.431	43.698	-30.302	74.000	PEAK
6		2500.000	12.274	27.416	39.691	-34.309	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2441MHz**

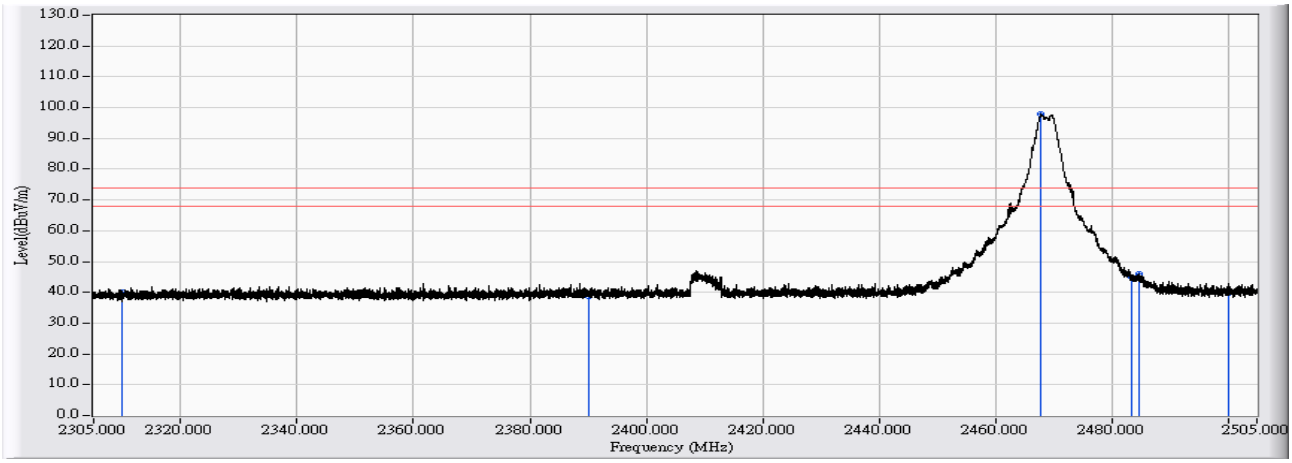


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.484	28.499	-25.501	54.000	AVERAGE
2		2390.000	11.544	17.806	29.350	-24.650	54.000	AVERAGE
3	*	2440.826	11.886	90.536	102.421	48.421	54.000	AVERAGE
4		2483.500	12.172	17.744	29.916	-24.084	54.000	AVERAGE
5		2493.341	12.237	17.953	30.190	-23.810	54.000	AVERAGE
6		2500.000	12.274	17.288	29.563	-24.437	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**

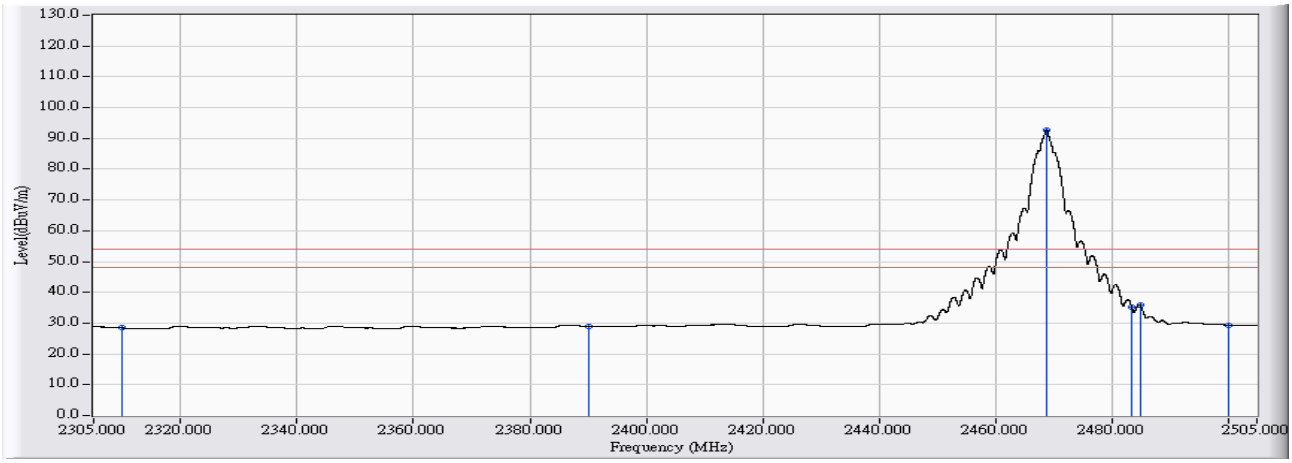


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	28.897	39.912	-34.088	74.000	PEAK
2		2390.000	11.544	27.166	38.710	-35.290	74.000	PEAK
3	*	2467.864	12.067	85.760	97.827	23.827	74.000	PEAK
4		2483.500	12.172	32.952	45.124	-28.876	74.000	PEAK
5		2484.802	12.181	33.814	45.995	-28.005	74.000	PEAK
6		2500.000	12.274	27.361	39.636	-34.364	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**

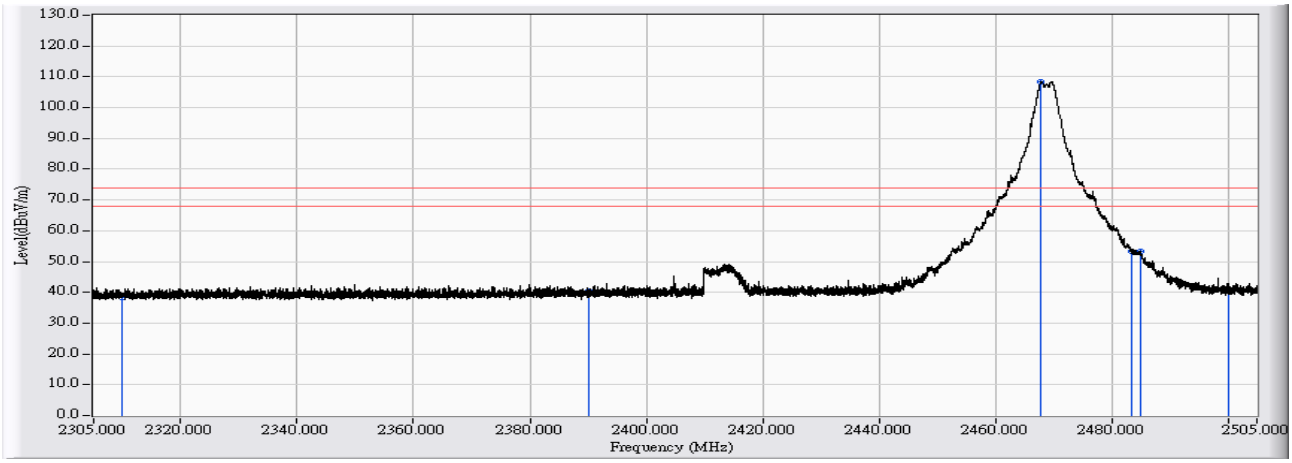


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.394	28.409	-25.591	54.000	AVERAGE
2		2390.000	11.544	17.464	29.008	-24.992	54.000	AVERAGE
3	*	2468.824	12.074	80.623	92.697	38.697	54.000	AVERAGE
4		2483.500	12.172	22.972	35.144	-18.856	54.000	AVERAGE
5		2484.882	12.182	23.594	35.775	-18.225	54.000	AVERAGE
6		2500.000	12.274	17.131	29.406	-24.594	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**

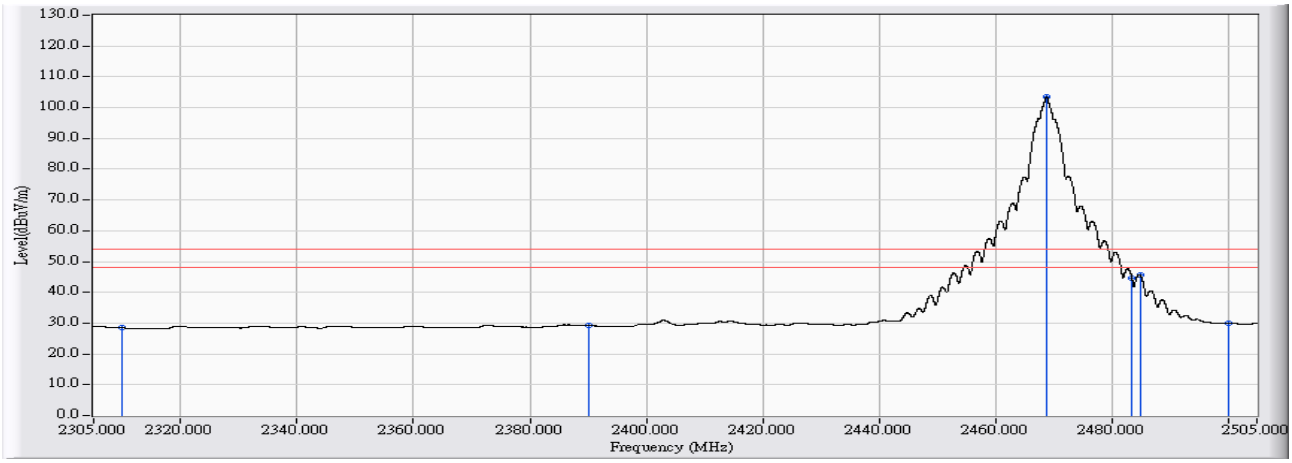


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	27.427	38.442	-35.558	74.000	PEAK
2		2390.000	11.544	28.930	40.474	-33.526	74.000	PEAK
3	*	2467.844	12.067	96.284	108.351	34.351	74.000	PEAK
4		2483.500	12.172	41.210	53.382	-20.618	74.000	PEAK
5		2484.882	12.182	41.213	53.394	-20.606	74.000	PEAK
6		2500.000	12.274	28.054	40.329	-33.671	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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 : CB4-H	**Time : 2017/08/14**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB4_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : DC 24V**
EUT : Wireless System	**Note : 2469MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	17.411	28.426	-25.574	54.000	AVERAGE
2		2390.000	11.544	17.639	29.183	-24.817	54.000	AVERAGE
3	*	2468.824	12.074	91.303	103.377	49.377	54.000	AVERAGE
4		2483.500	12.172	32.578	44.750	-9.250	54.000	AVERAGE
5		2484.882	12.182	33.432	45.613	-8.387	54.000	AVERAGE
6		2500.000	12.274	17.529	29.804	-24.196	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, 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

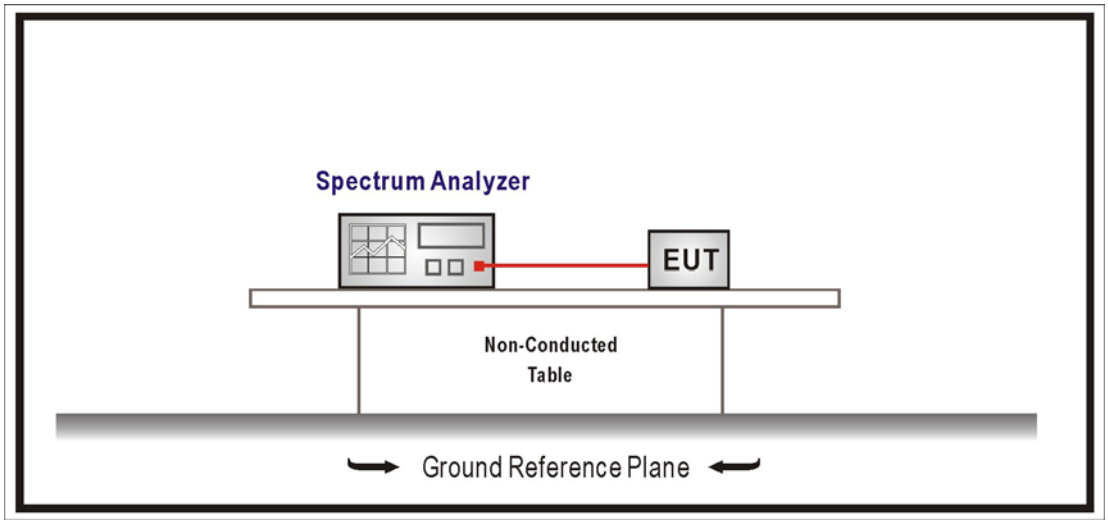
The following test equipment is used during the test:

Number of hopping frequency / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/07/26	2018/07/25

Note: All equipment 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 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 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 C63.10:2013 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 ,

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

7.5. Test Specification

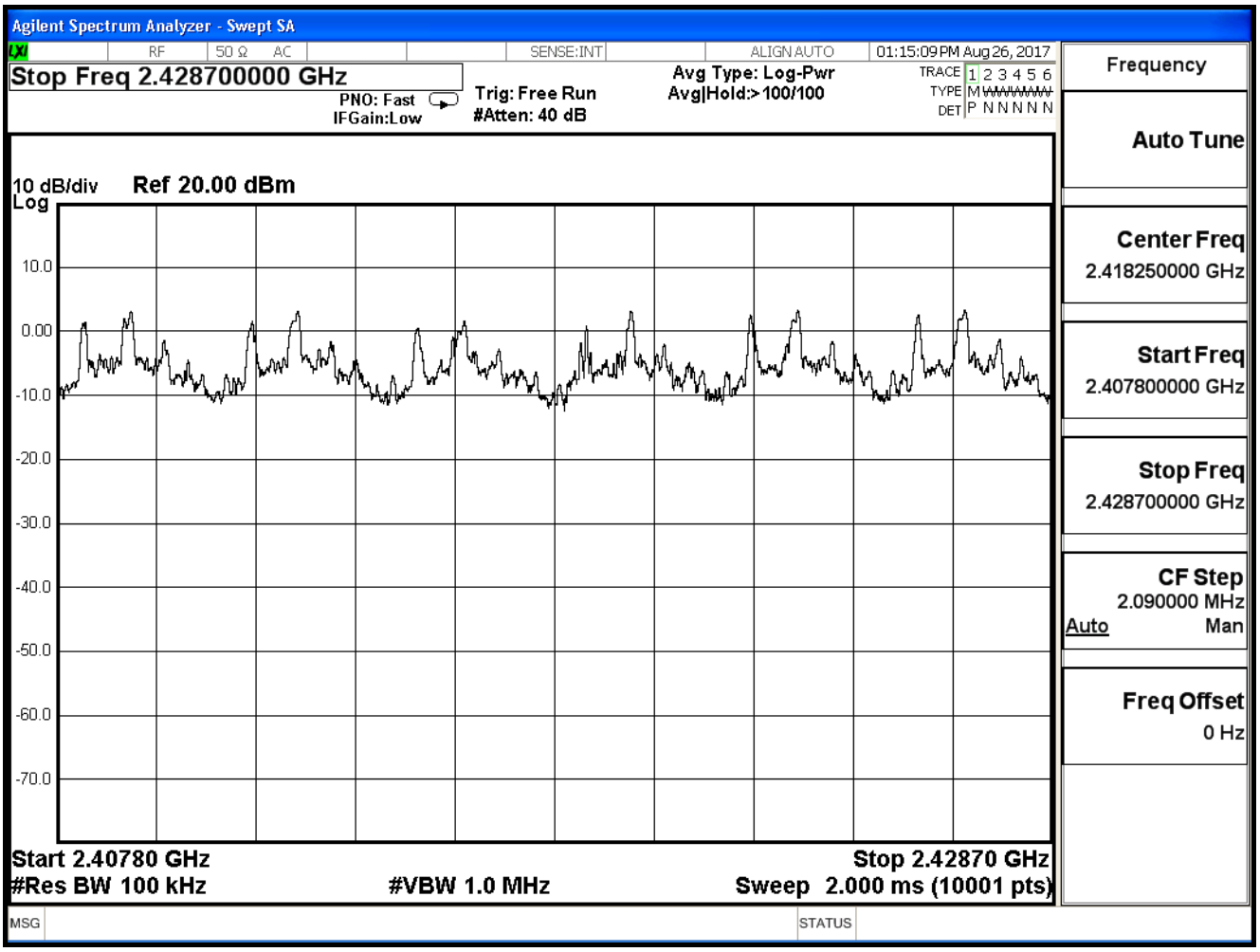
According to FCC Part 15 Subpart C Paragraph 15.247: 2016

7.6. Test Result

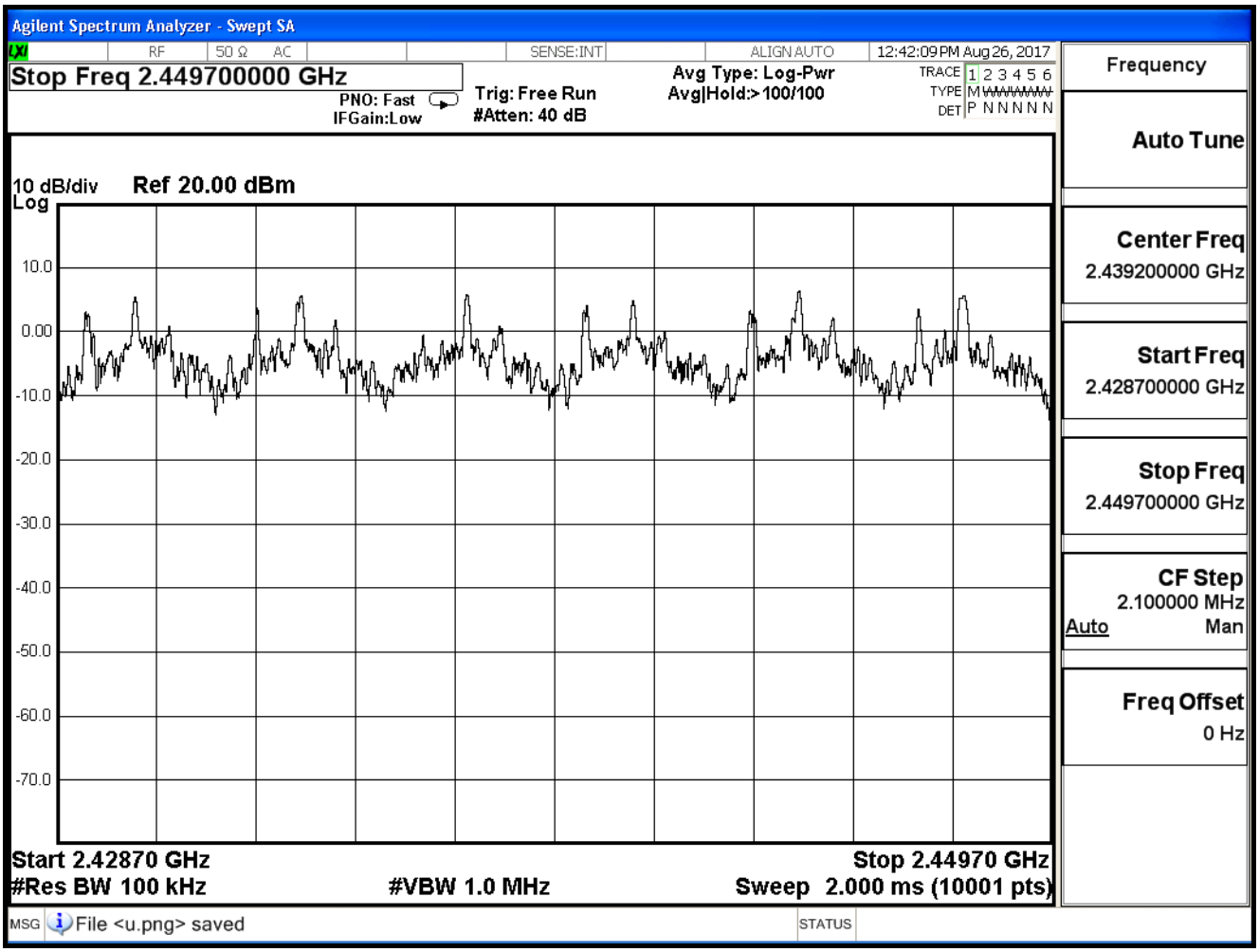
Product	Wireless System		
Test Item	Number of hopping frequency		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/26	Test Site	SR10-H

Frequency Range (MHz)	Measure Level (Channels)	Limit (Channels)	Result
2409.5 ~ 2469	18	≧ 75	Pass

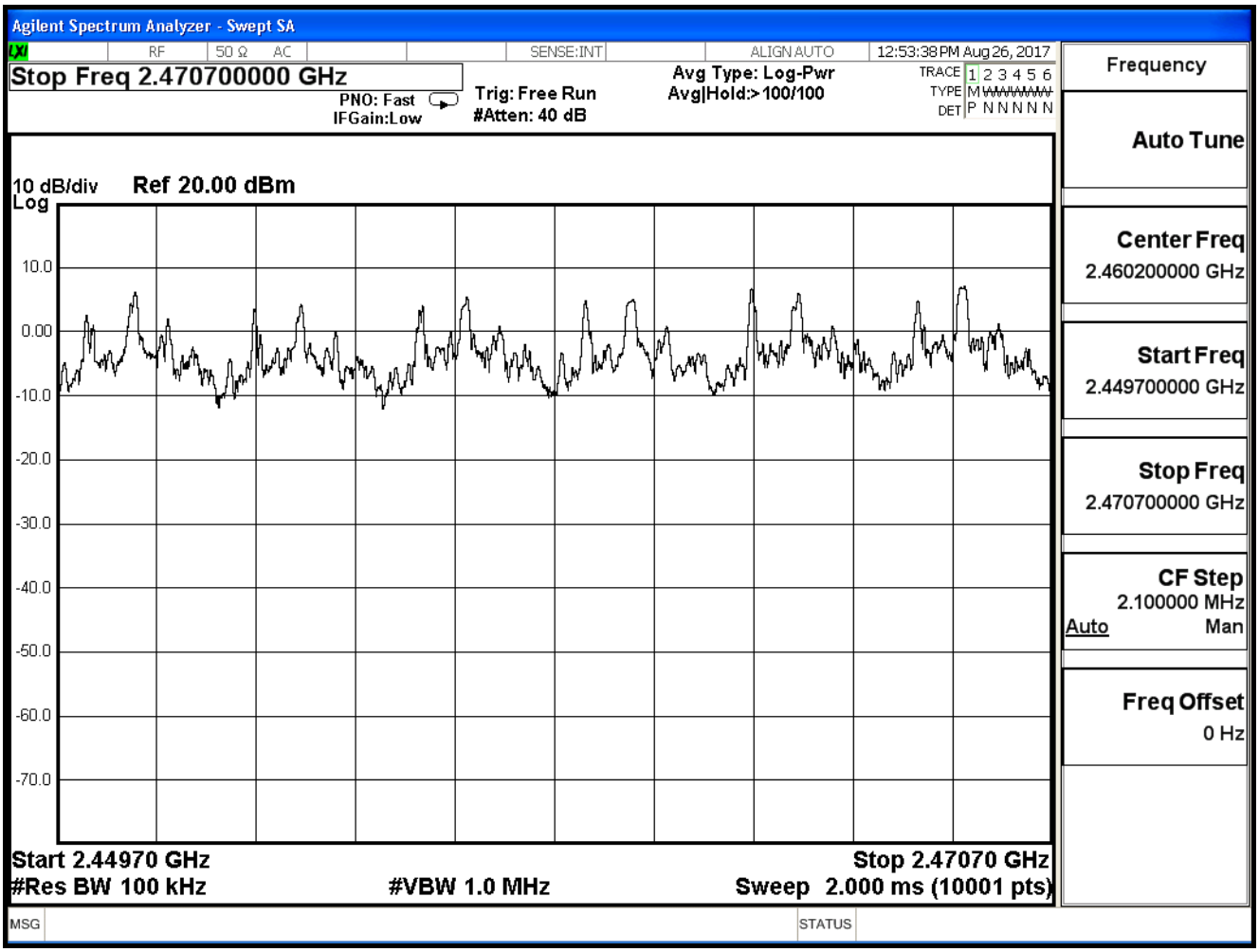
2407.8-2428.7MHz



2428.7-2449.7MHz



2449.7-2470.7MHz



8. Carrier Frequency Separation

8.1. Test Equipment

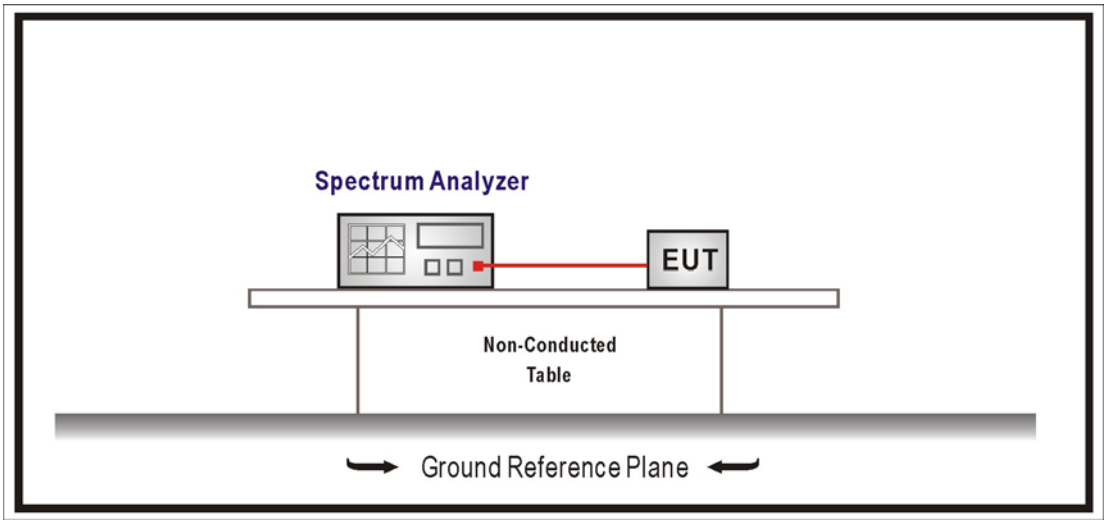
The following test equipment is used during the test:

Carrier Frequency Separation / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipment 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 C63.10:2013 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) ≥ 1% of the span, VBW ≥ RBW

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

8.5. Test Specification

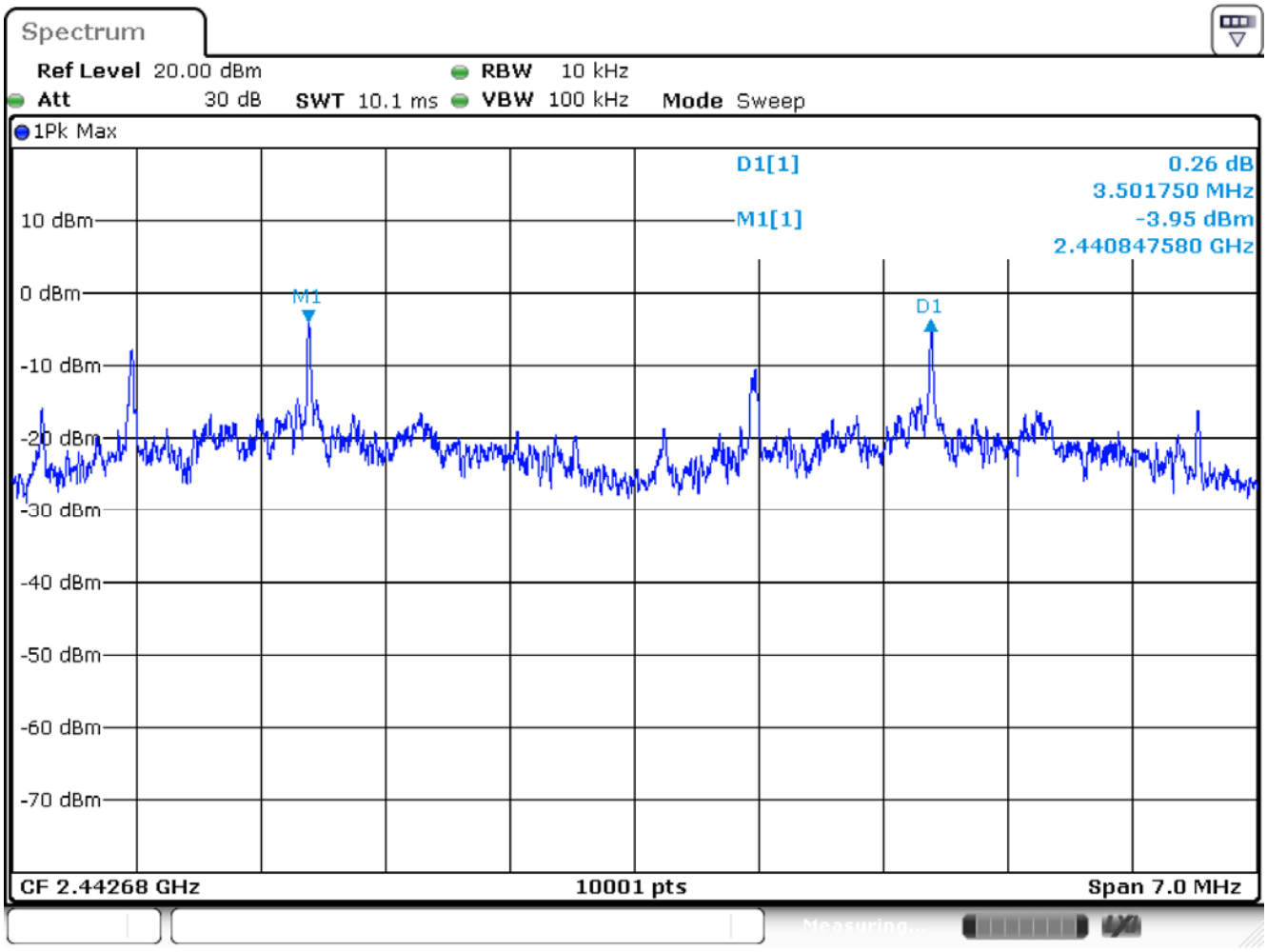
According to FCC Part 15 Subpart C Paragraph 15.247: 2016

8.6. Test Result

Product	Wireless System		
Test Item	Carrier Frequency Separation		
Test Mode	Mode 1: Transmit		
Date of Test	2017/09/05	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)
01	2409.5	3.502	3.130
10	2441		3.100
18	2469		3.117

Channel 10



Date: 5.SEP.2017 15:09:30

9. Occupied Bandwidth

9.1. Test Equipment

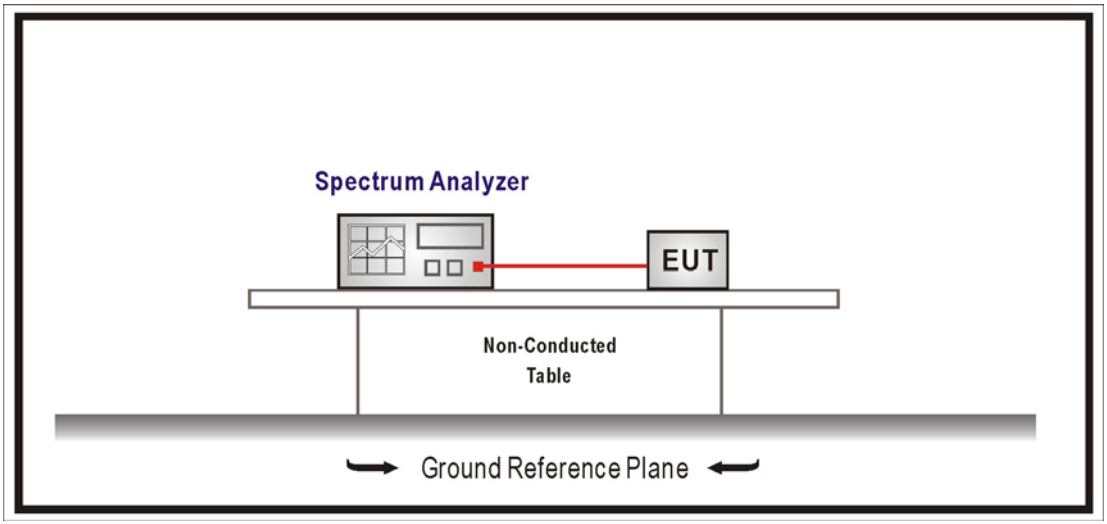
The following test equipment is used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

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

9.2. Test Setup



9.3. Limits

N/A

9.4. Test Procedures

The EUT was setup according to ANSI C63.10:2013 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 ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW , Sweep = auto, Detector function = peak, Trace = max hold , The EUT should be transmitting at its maximum data rate.

9.5. Test Specification

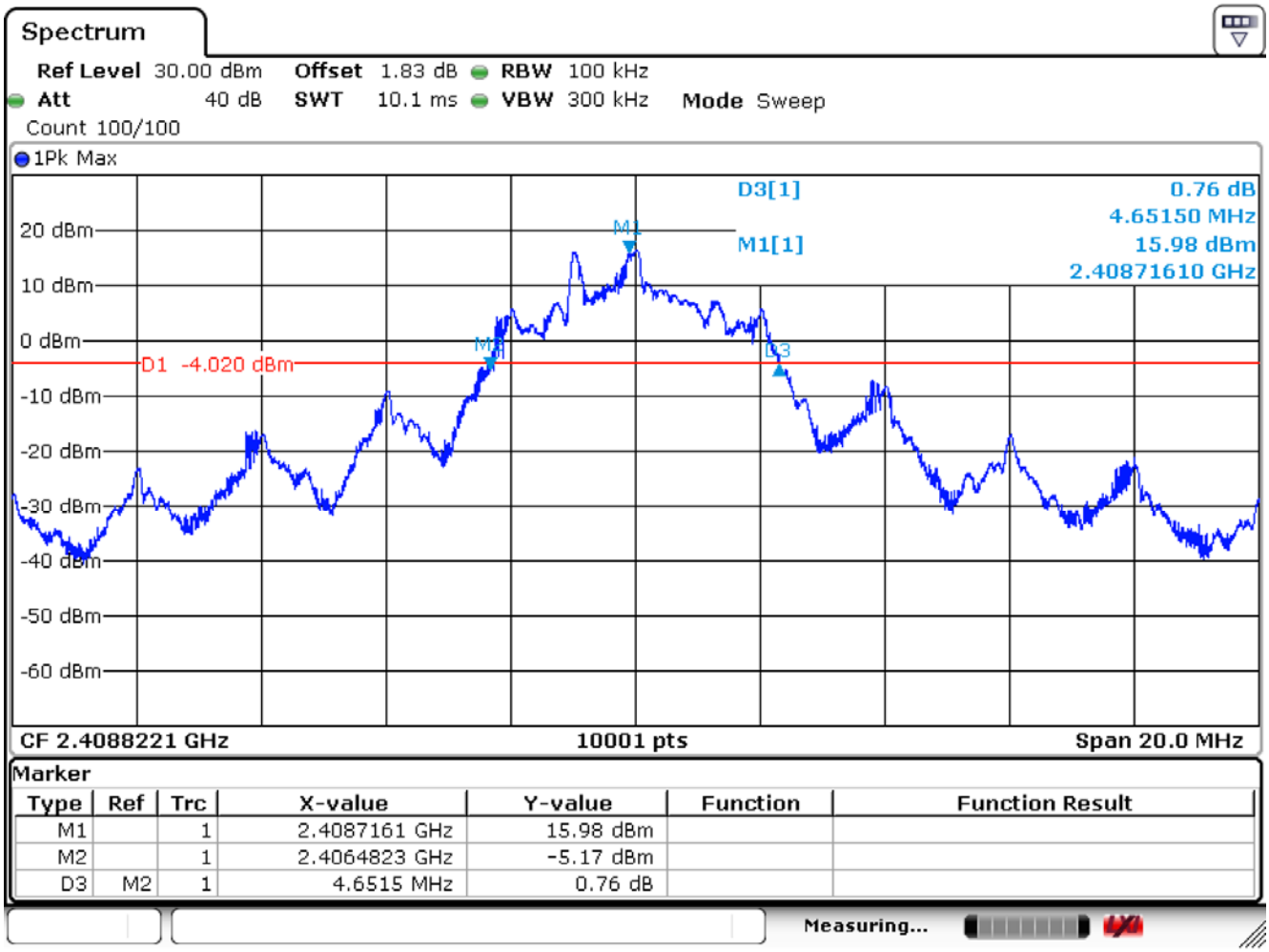
According to FCC Part 15 Subpart C Paragraph 15.247: 2016

9.6. Test Result

Product	Wireless System		
Test Item	Occupied Bandwidth (-20dB)		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/22	Test Site	SR10-H

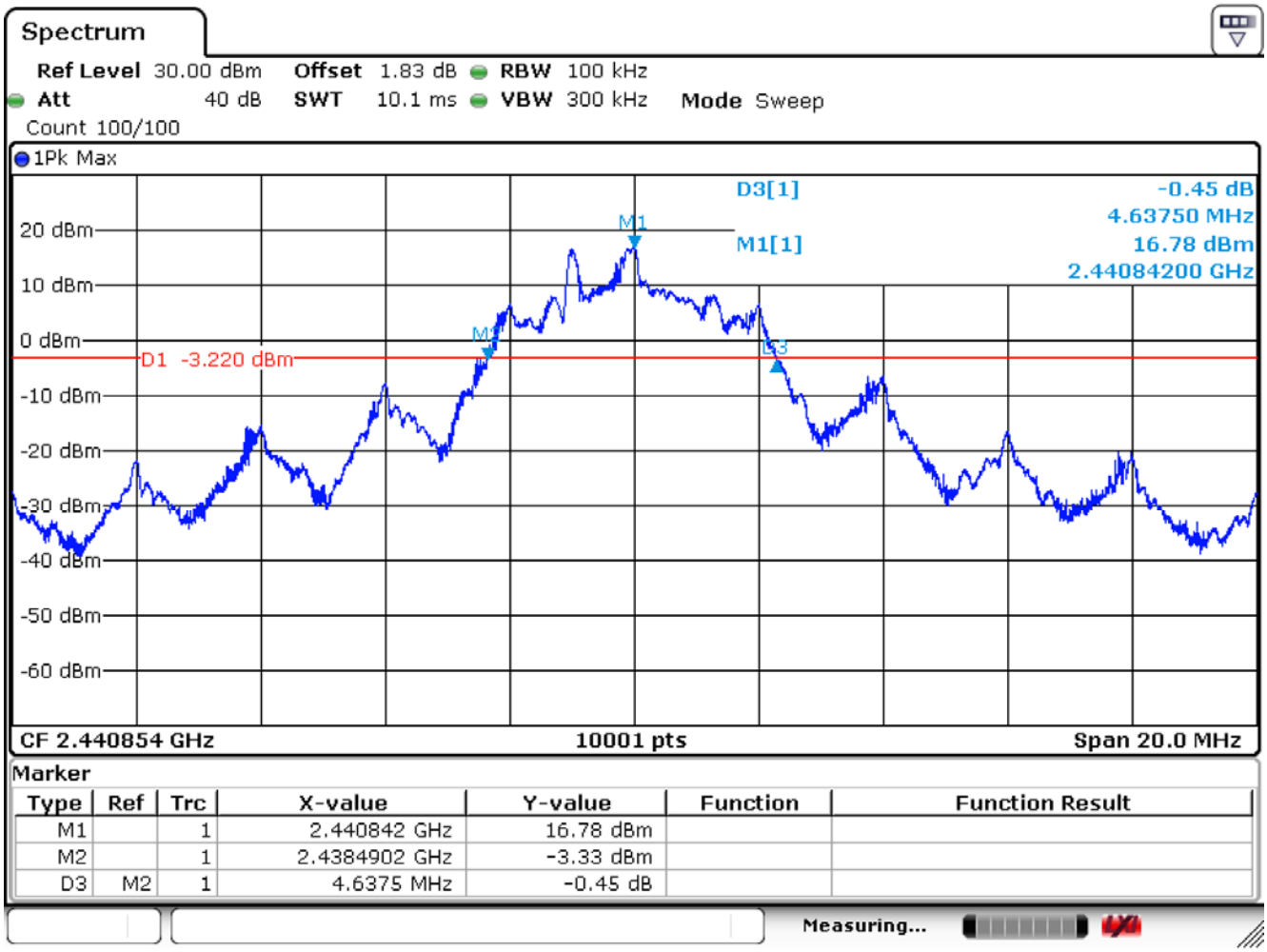
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
1	2409.5	4.652	--	Pass
10	2441	4.638	--	Pass
18	2469	4.621	--	Pass

Channel 01



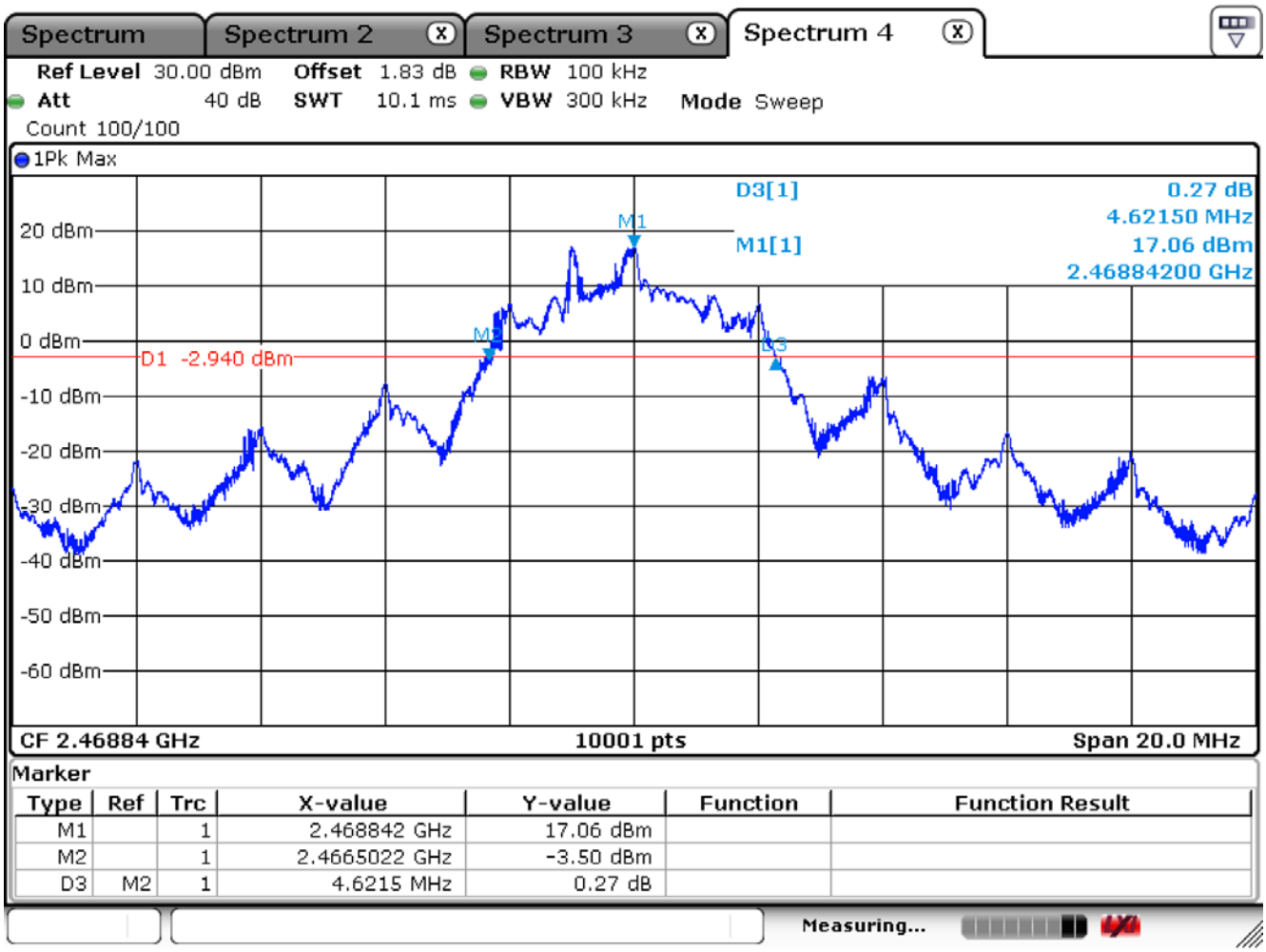
Date: 22.AUG.2017 21:01:13

Channel 10



Date: 22.AUG.2017 20:58:15

Channel 18



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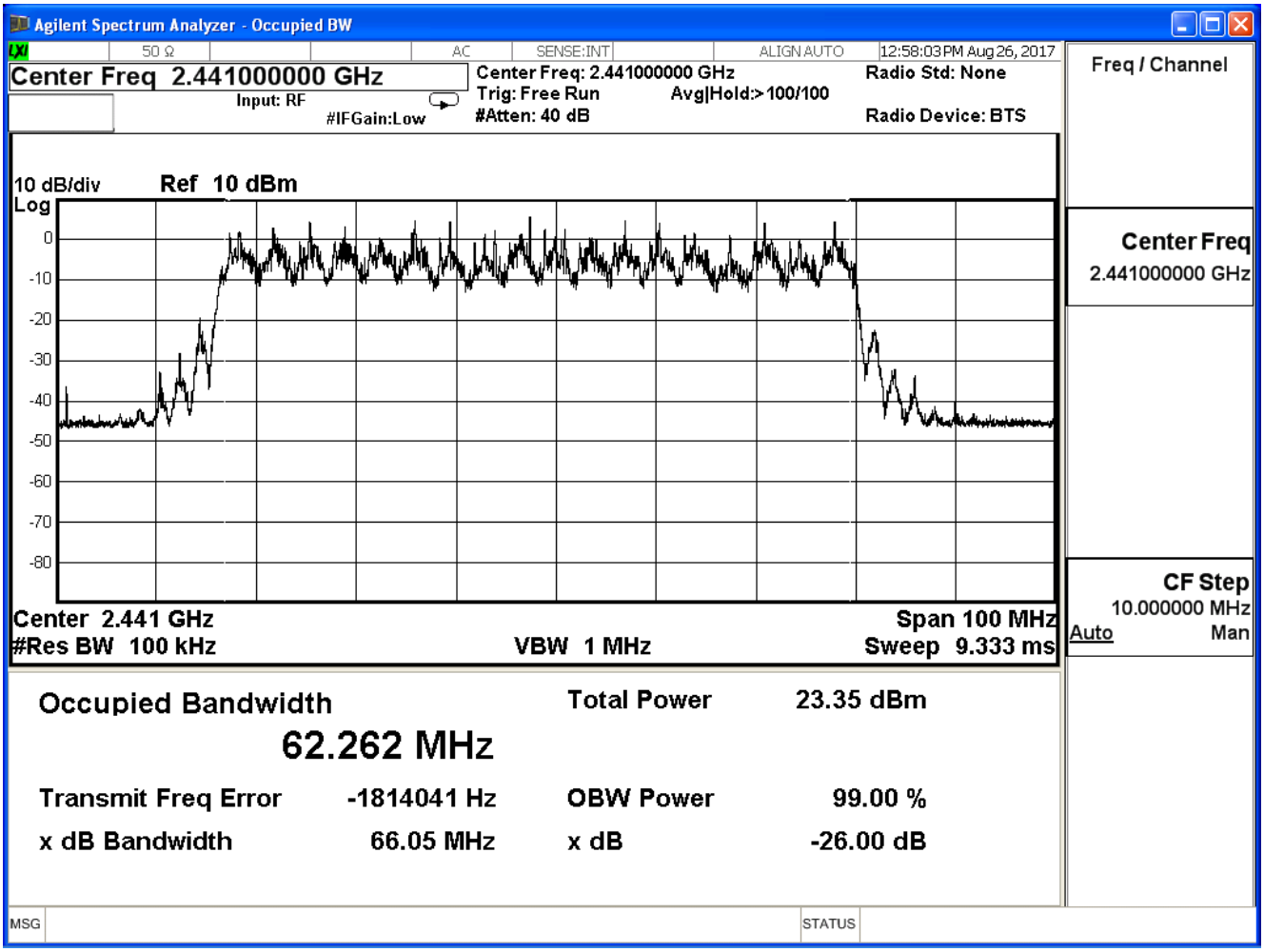
Product	Wireless System		
Test Item	Occupied Bandwidth (99%)		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/26	Test Site	SR10-H

Frequency Range (MHz)	Measure Level (Channels)	Limit (Channels)	Result
2409.5 ~ 2469	18	≧ 75	Pass



10. Dwell Time

10.1. Test Equipment

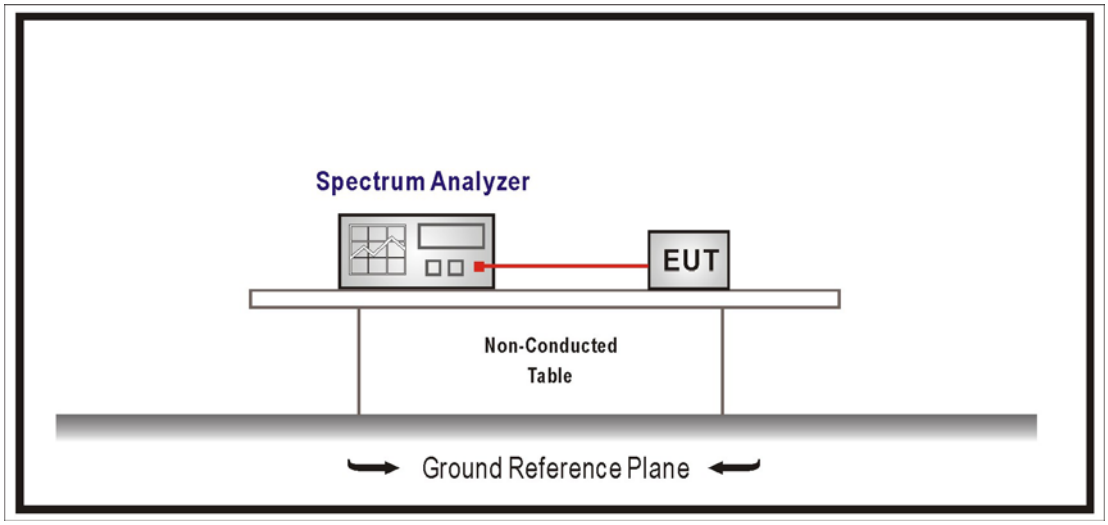
The following test equipment is used during the test:

Dwell Time / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

Note: All equipment 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 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 C63.10:2013 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 ≥ 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: 2016

10.6. Test Result

Product	Wireless System		
Test Item	Dwell Time		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/14	Test Site	SR10-H

Occupancy Time of Frequency Hopping System

A) 2409.5MHz Test Time Period: 0.4*18=7.2sec，Time slot length : 9.882 ms = 0.009882 sec

Dwell Time : 0.009882 *(77/18)*7.2= 0.3044 sec。

B) 2441MHz Test Time Period: 0.4*18=7.2sec，Time slot length : 9.936 ms = 0.009936 sec

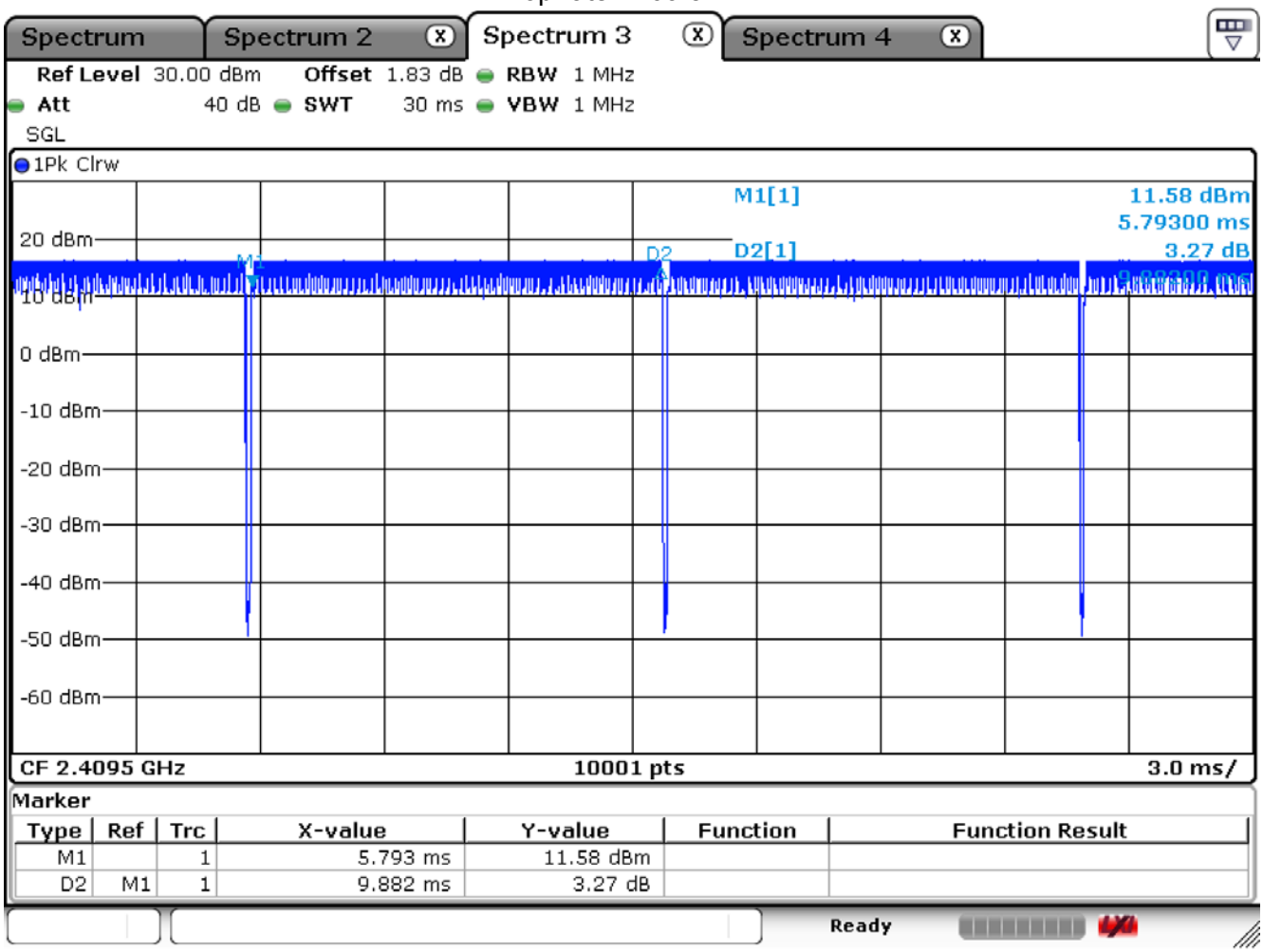
Dwell Time : 0.009936 *(77/18)*7.2= 0.3060 sec。

C) 2469MHz Test Time Period: 0.4*18=7.2sec，Time slot length : 9.939 ms = 0.009939 sec

Dwell Time : 0.009939 *(77/18)*7.2= 0.3061 sec。

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-2409.5MHz



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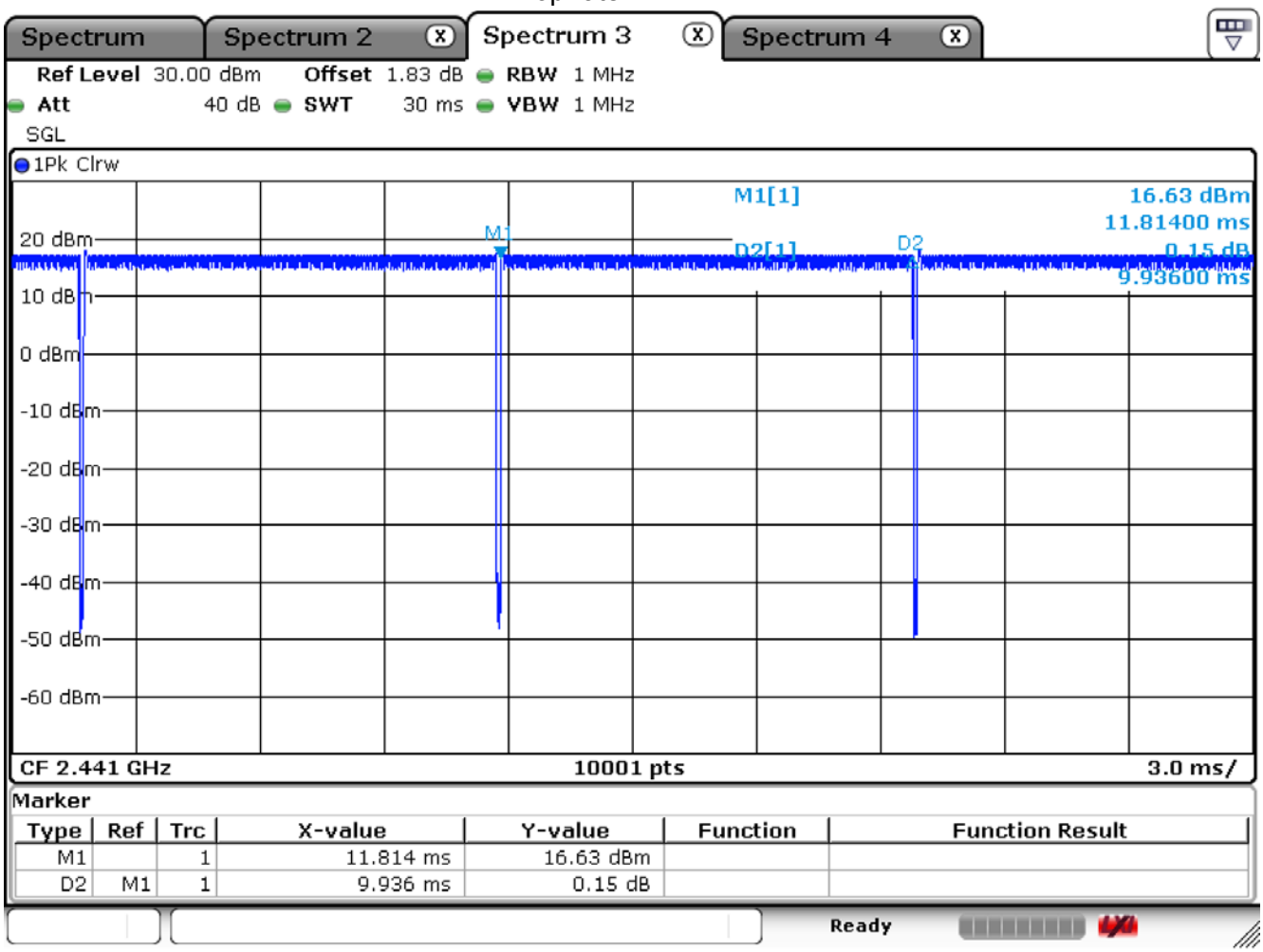
Hop rate-2441MHz



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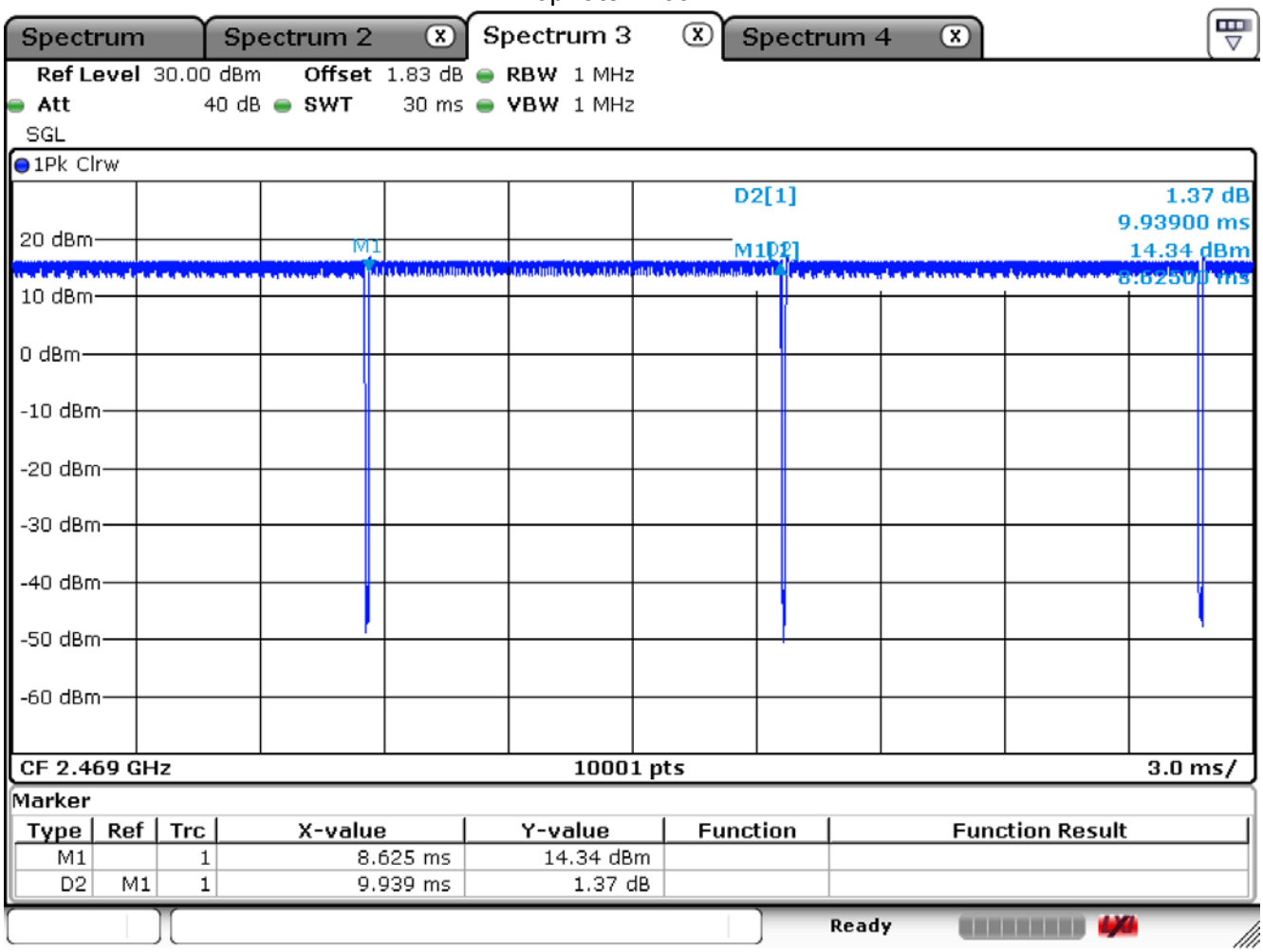
Hop rate-2469MHz



Date: 14.AUG.2017 17:43:59

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