

FCC Test Report

Product Name : Wireless power receiver
Trade Name : Powerwow
Model No. : R1205C3DG, R1205C3ST, R1205C3I7,
R1205C3S8, R1205C3CM
FCC ID. : 2ALTR-PW1205

Applicant : Powerwow technology incorporation
Address : 2F., No.127, Chenggong 11th St., Zhubei City,
Hsinchu County 302, Taiwan

Date of Receipt : Apr. 06, 2017
Issued Date : Jun. 13, 2017
Report No. : 1740189R-RFUSP01V00-A
Report Version : V1.0



The test results relate only to the samples tested.

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Test Report Certification

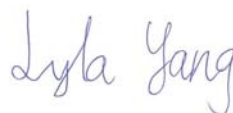
Issued Date : Jun. 13, 2017

Report No. : 1740189R-RFUSP01V00-A



Product Name : Wireless power receiver
Applicant : Powerwow technology incorporation
Address : 2F., No.127, Chenggong 11th St., Zhubei City, Hsinchu County
302, Taiwan
Manufacturer : Shin Puu Technology Co., Ltd.
Model No. : R1205C3DG, R1205C3ST, R1205C3I7, R1205C3S8,
R1205C3CM
FCC ID. : 2ALTR-PW1205
EUT Voltage : DC 5V
Testing Voltage : DC 5V
Trade Name : Powerwow
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2015
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu
County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



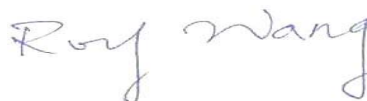
(Lyla Yang / Engineering Adm. Specialist)

Tested By :



(Carter Hsu / Senior Engineer)

Approved By :



(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1740189R-RFUSP01V00-A	V1.0	Initial issue of report	Jun. 13, 2017

Laboratory Information

We, **DEKRA Testing and Certification Co., Ltd.**, 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: 3024
USA	:	FCC, Registration Number: 834100
Canada	:	IC, Submission No: 181665
		IC Registration Number: 22397-1 / 22397-2 / 22397-3

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:

- 1 No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan (R.O.C.)
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : info.tw@dekra.com
- 2 No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com
- 3 No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com

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1. General Information

1.1. EUT Description

Product Name	Wireless power receiver
Trade Name	Powerwow
Model No.	R1205C3DG, R1205C3ST, R1205C3I7, R1205C3S8, R1205C3CM
Frequency Range/Channel Number	2402~2480MHz / 40 Channels
Type of Modulation	Bluetooth 4.0 (GFSK)

Antenna Information	
MFR. / Model	Powerwow / nRF-nickPRU
Antenna Type	Soldered on PCB Antenna
Antenna Gain	-3.56 dBi

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00	2402 MHz	Channel 10	2422 MHz	Channel 20	2442 MHz	Channel 30	2462 MHz
Channel 01	2404 MHz	Channel 11	2424 MHz	Channel 21	2444 MHz	Channel 31	2464 MHz
Channel 02	2406 MHz	Channel 12	2426 MHz	Channel 22	2446 MHz	Channel 32	2466 MHz
Channel 03	2408 MHz	Channel 13	2428 MHz	Channel 23	2448 MHz	Channel 33	2468 MHz
Channel 04	2410 MHz	Channel 14	2430 MHz	Channel 24	2450 MHz	Channel 34	2470 MHz
Channel 05	2412 MHz	Channel 15	2432 MHz	Channel 25	2452 MHz	Channel 35	2472 MHz
Channel 06	2414 MHz	Channel 16	2434 MHz	Channel 26	2454 MHz	Channel 36	2474 MHz
Channel 07	2416MHz	Channel 17	2436 MHz	Channel 27	2456 MHz	Channel 37	2476 MHz
Channel 08	2418 MHz	Channel 18	2438 MHz	Channel 28	2458 MHz	Channel 38	2478 MHz
Channel 09	2420 MHz	Channel 19	2440 MHz	Channel 29	2460 MHz	Channel 39	2480 MHz

Note:

1. This device is a Wireless power receiver including BT4.0 transmitting and receiving function.
2. The variation of model number is for different strategy of marketing.
3. The different of the each model is shown as below:

Model No	DG	ST	I7	S8	CM
R1205C3DG	Integration of I7 & S8 back cover				
R1205C3ST		Stickers			
R1205C3I7			iPhone7 back cover		
R1205C3S8				Samsung S8 back cover	
R1205C3CM					PCB module

4. 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	Mode 1: TX
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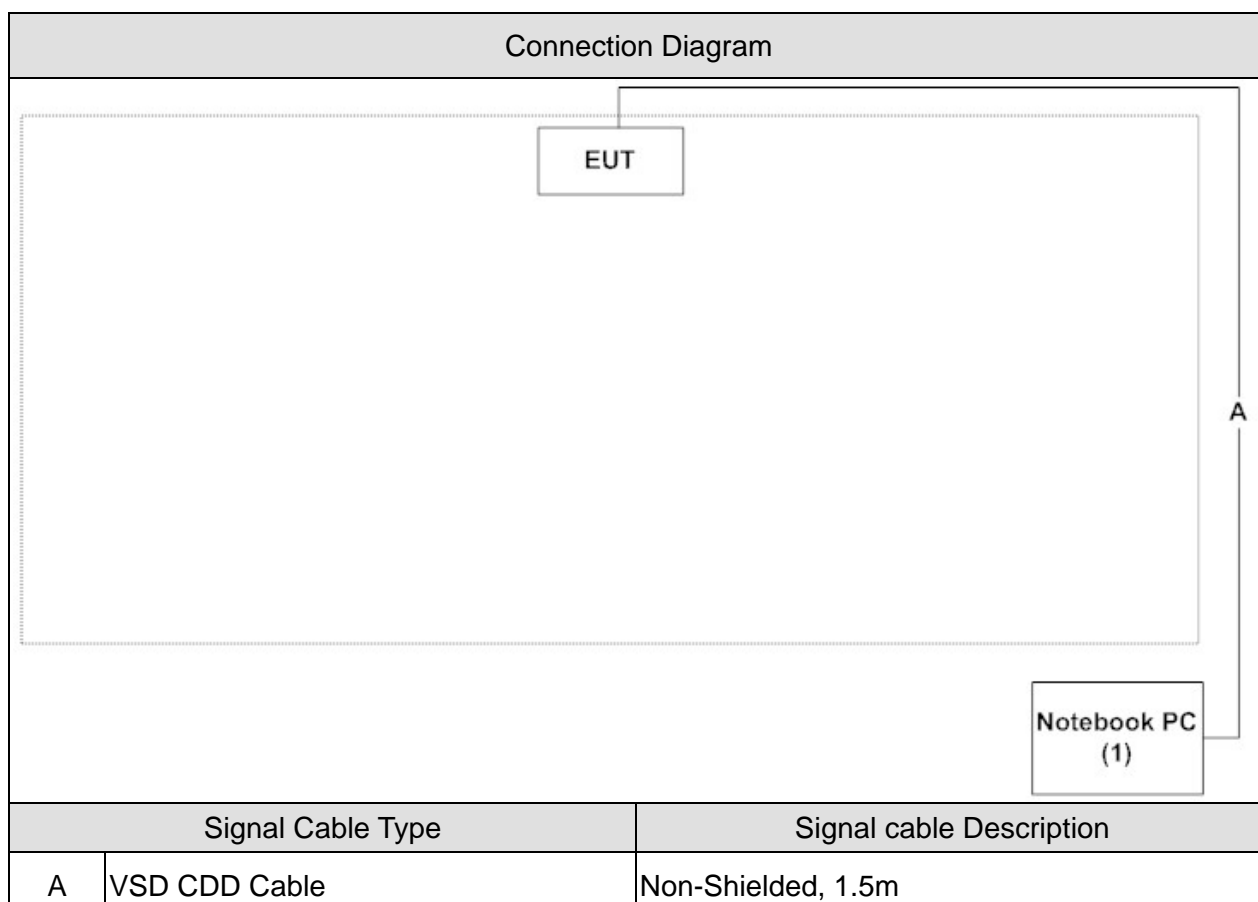
Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	GFSK	19	0	N/A
Peak Power Output	GFSK	00/19/39	0	Complies
Radiated Emission	GFSK	00/19/39	0	Complies
RF antenna conducted test	GFSK	00/19/39	0	Complies
Radiated Emission Band Edge	GFSK	00/19/39	0	Complies
Occupied Bandwidth	GFSK	00/19/39	0	Complies
Power Density	GFSK	00/19/39	0	Complies

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.	FCC ID	Power Cord
1 Notebook PC	ACER	Aspire V3-372	NXG7ATA0065 47014826600	DoC	Non-Shielded, 1.5m, one ferrite core bonded

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the test program “nRFgo”.
3	Configure the test mode, the test channel, and the data rate.
4	Press “Start TX” to start the continuous transmitting.
5	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 15.247 Peak Power Output	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	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	15 - 35	25	3
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth	15 - 35	24	2
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Power Density	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test site information refers to Laboratory Information.

2. Conducted Emission

2.1. Test Equipment

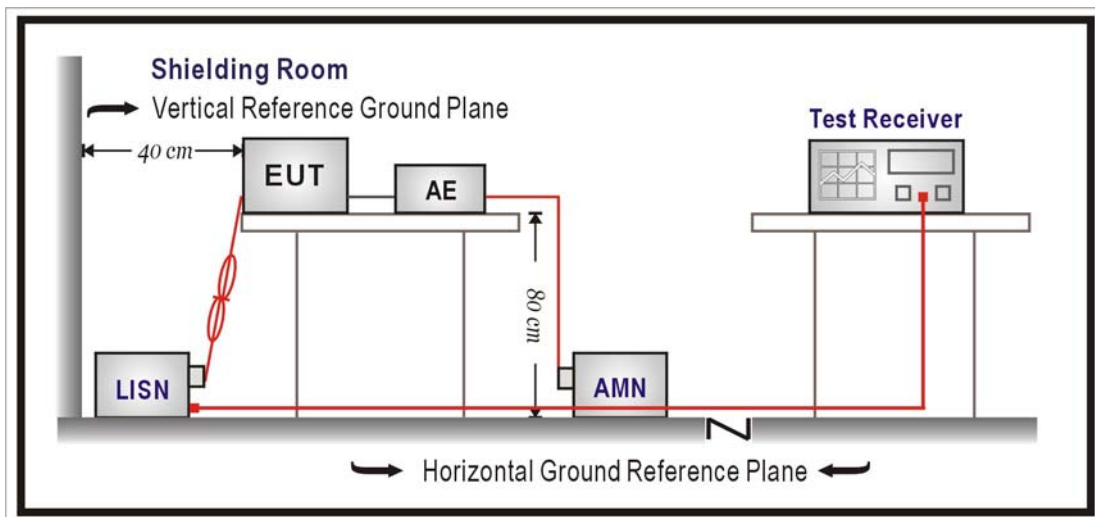
The following test equipment are used during the test:

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2018/02/05
LISN	R&S	ENV216	100092	2017/08/16
Test Receiver	R&S	ESCS 30	836858/022	2018/01/14

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 was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated 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: 2015

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

3. Peak Power Output

3.1. Test Equipment

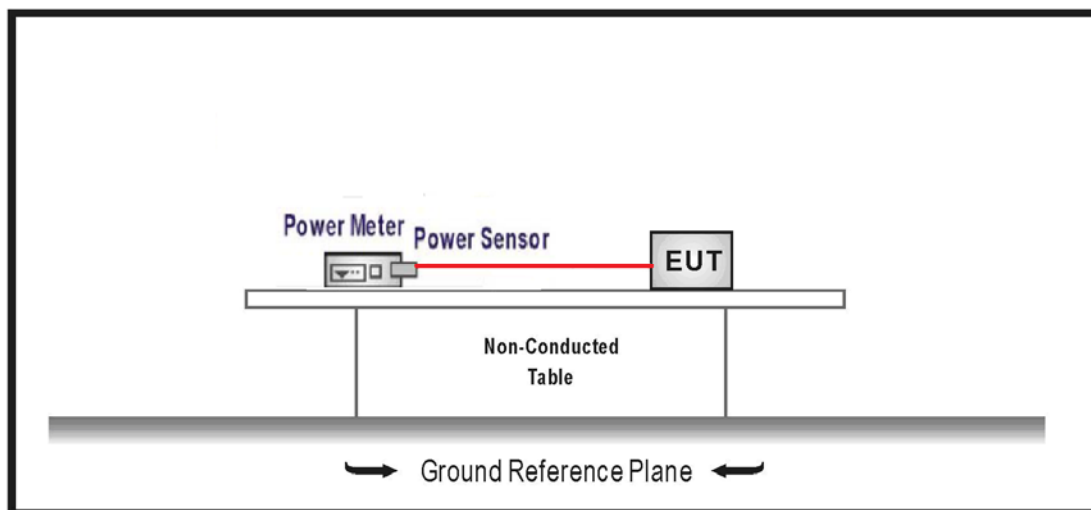
The following test equipment is used during the test:

Peak Power Output / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	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; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

3.6. Test Result

Product	Wireless power receiver		
Test Item	Peak Power Output		
Test Mode	Mode 1: TX		
Date of Test	2017/05/03	Test Site	SR10-H

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	2.091	30	Pass
19	2440	-0.214	30	Pass
39	2480	0.310	30	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the test:

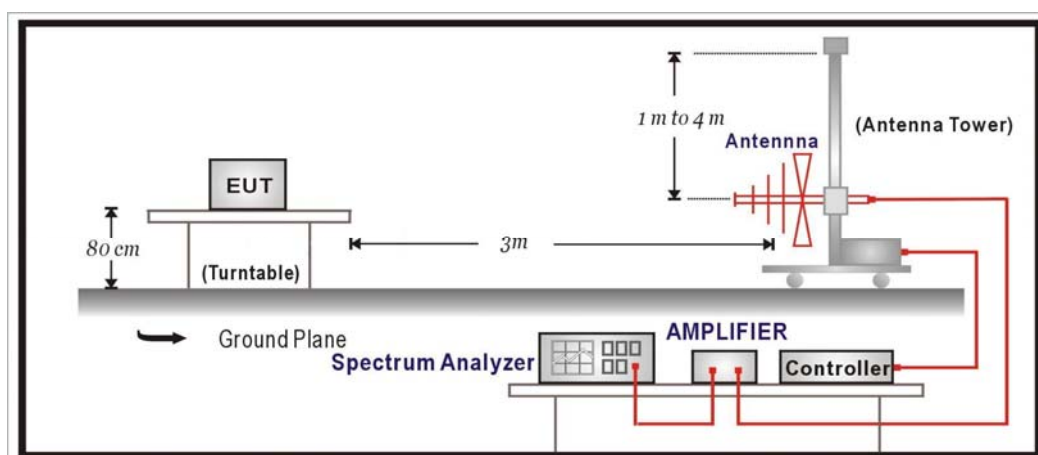
Radiated Emission / CB4-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2891	2017/08/14
Horn Antenna	Schwarzbeck	BBHA 9120	D312	2017/10/25
Pre-Amplifier	EMCI	EMC0031835	980233	2018/02/02
Pre-Amplifier	Schwarzbeck	DBL-1840N506	013	2017/09/29
Pre-Amplifier	Miteq	JS41-00104000 0-58-5P	1573954	2017/10/04
Horn Antenna	Schwarzbeck	BBHA 9170	203	2017/08/28
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/22

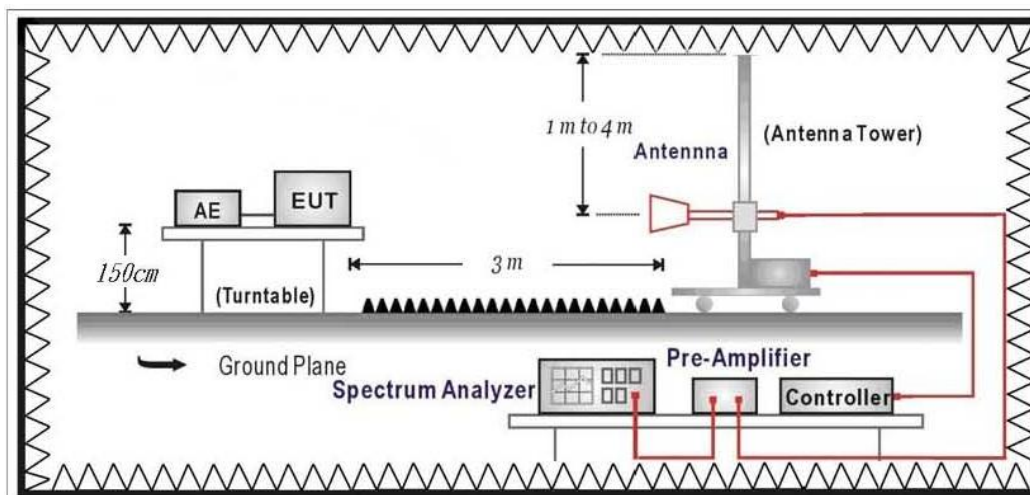
Note: All equipment that need to calibrate are with calibration period of 1 year.

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 DTS test procedure of KDB558074 V03R02 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.

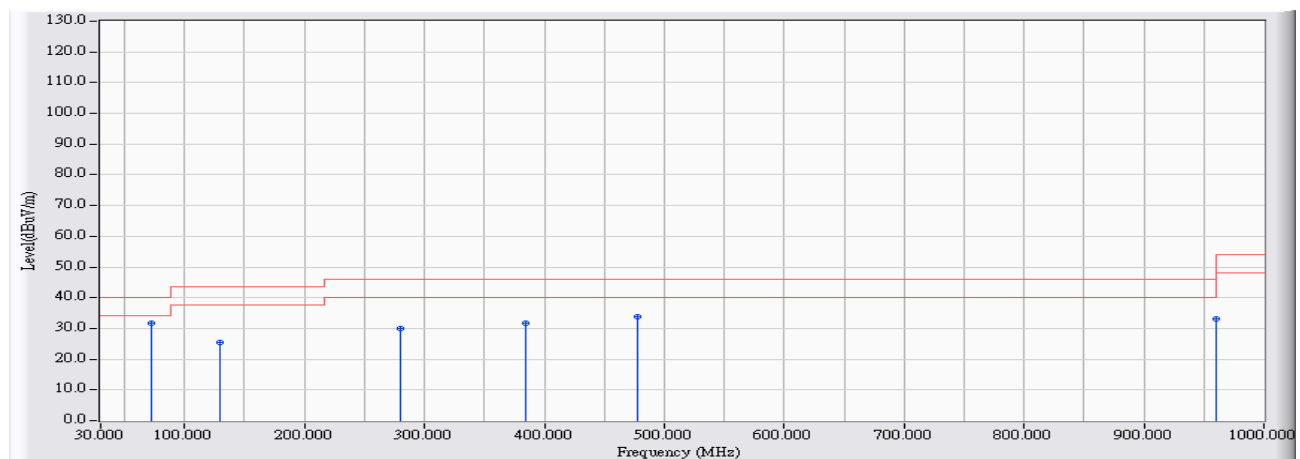
4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

4.6. Test Result

30MHz-1GHz Spurious

Site : CB4-H	Time : 2017/04/27
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2440MHz

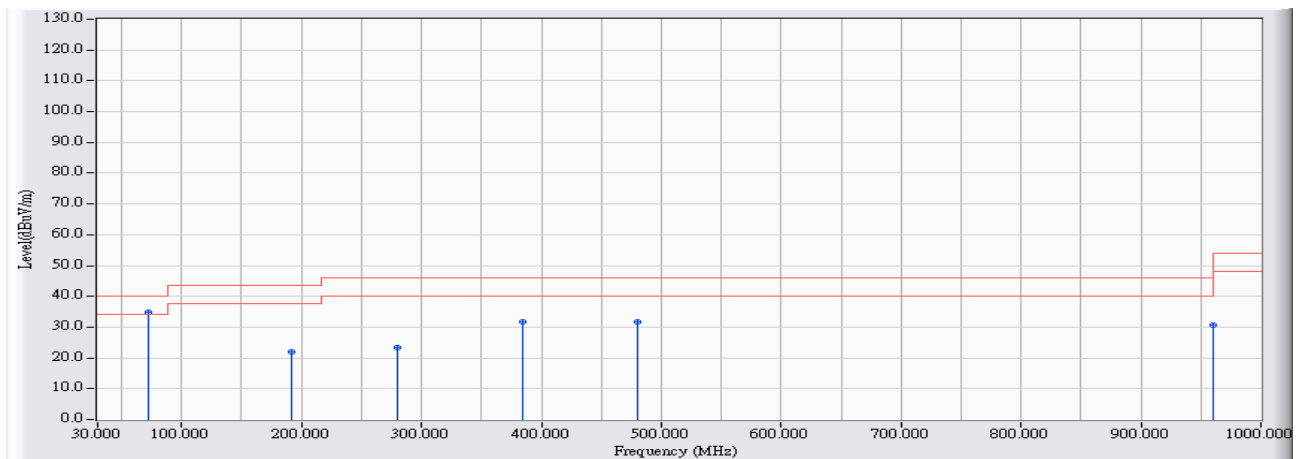


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	71.710	-27.777	59.393	31.616	-8.384	40.000	QUASIPeAK
2		128.940	-21.246	46.567	25.321	-18.179	43.500	QUASIPeAK
3		280.260	-19.340	49.389	30.049	-15.951	46.000	QUASIPeAK
4		384.050	-16.465	48.054	31.590	-14.410	46.000	QUASIPeAK
5		477.170	-14.529	48.328	33.799	-12.201	46.000	QUASIPeAK
6		959.745	-7.607	40.732	33.125	-12.875	46.000	QUASIPeAK

Note:

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

Site : CB4-H	Time : 2017/04/27
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4-H_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2440MHz



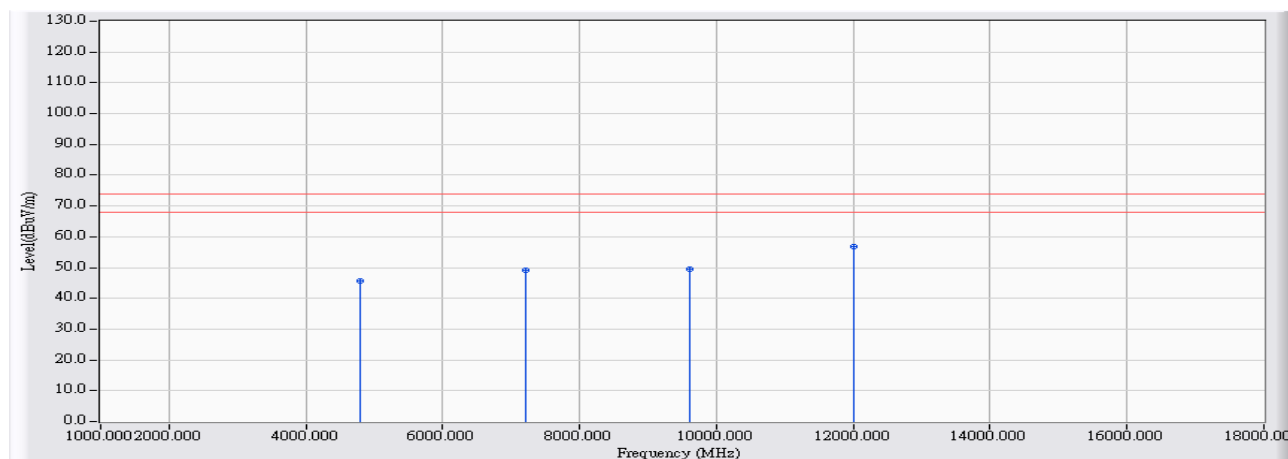
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	71.710	-27.777	62.586	34.809	-5.191	40.000	QUASIPeAK
2		191.990	-23.520	45.342	21.821	-21.679	43.500	QUASIPeAK
3		280.260	-19.340	42.605	23.265	-22.735	46.000	QUASIPeAK
4		384.050	-16.465	48.187	31.723	-14.277	46.000	QUASIPeAK
5		480.080	-14.513	46.148	31.635	-14.365	46.000	QUASIPeAK
6		960.230	-7.635	38.440	30.805	-23.195	54.000	QUASIPeAK

Note:

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 : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2402MHz



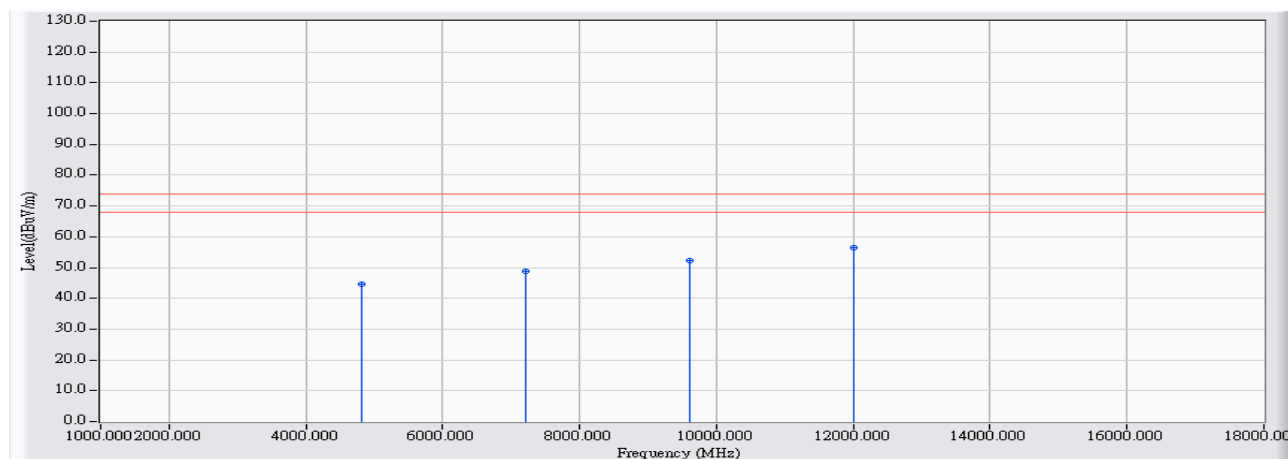
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4803.000	7.575	38.140	45.715	-28.285	74.000	PEAK
2		7201.000	16.135	33.070	49.205	-24.795	74.000	PEAK
3		9605.000	21.881	27.750	49.631	-24.369	74.000	PEAK
4	*	12001.000	26.460	30.410	56.870	-17.130	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Horizontal					
Average Detector:					
12001	56.87	-3.406	53.464	-0.536	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2402MHz



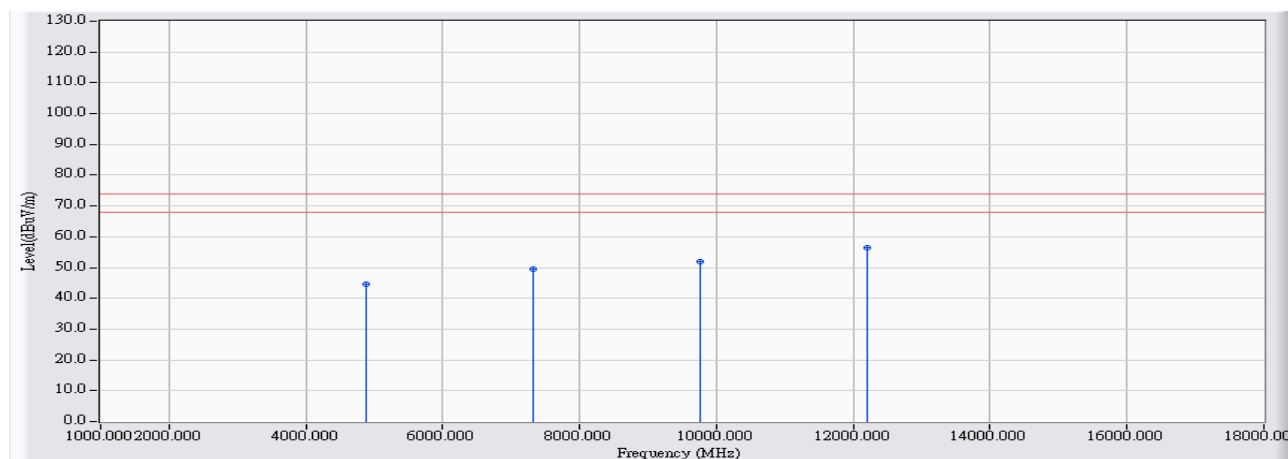
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	7.579	37.040	44.619	-29.381	74.000	PEAK
2		7209.000	16.177	32.570	48.747	-25.253	74.000	PEAK
3		9612.000	21.898	30.300	52.197	-21.803	74.000	PEAK
4	*	12012.000	26.452	30.070	56.522	-17.478	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Vertical					
Average Detector:					
12012	56.522	-3.406	53.116	-0.884	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2440MHz



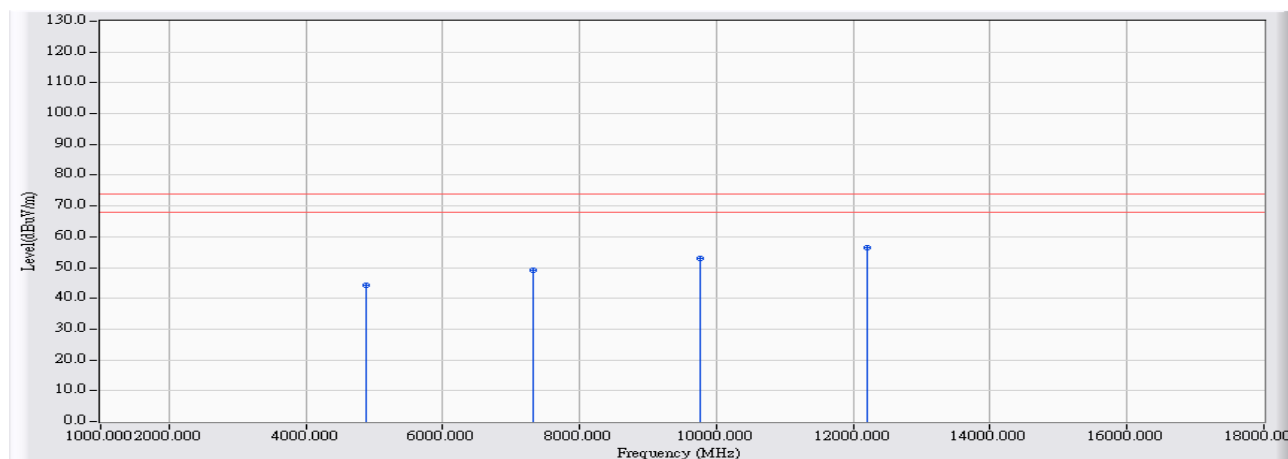
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4879.000	7.840	36.900	44.739	-29.261	74.000	PEAK
2		7316.000	16.696	32.720	49.417	-24.583	74.000	PEAK
3		9761.000	22.241	29.620	51.861	-22.139	74.000	PEAK
4	*	12203.000	26.299	30.110	56.409	-17.591	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Horizontal					
Average Detector:					
12203	56.409	-3.406	53.003	-0.997	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2440MHz



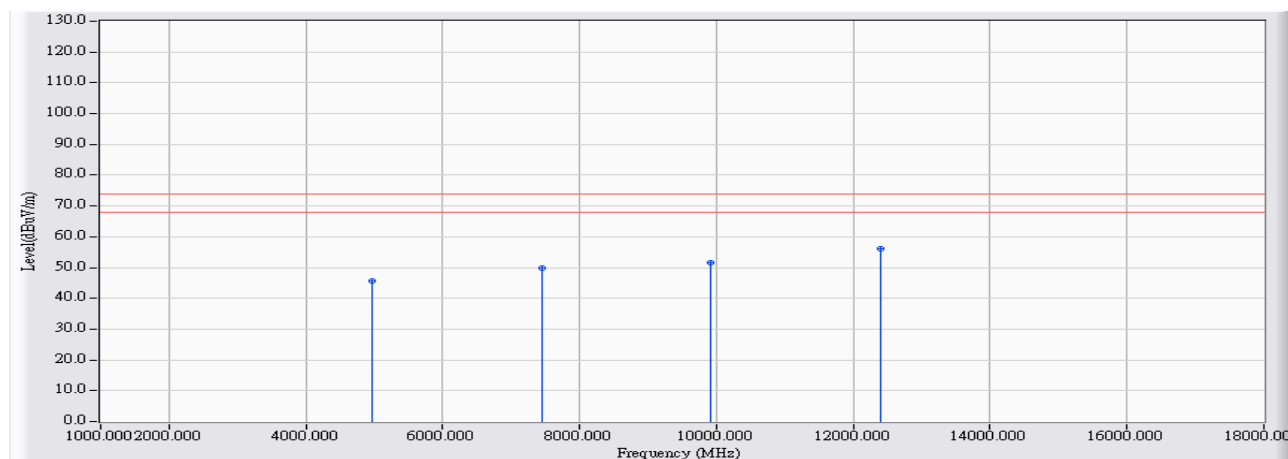
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	7.843	36.520	44.363	-29.637	74.000	PEAK
2		7316.000	16.696	32.560	49.257	-24.743	74.000	PEAK
3		9757.000	22.234	30.660	52.894	-21.106	74.000	PEAK
4	*	12201.000	26.300	30.000	56.300	-17.700	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Vertical					
Average Detector:					
12201	56.3	-3.406	52.894	-1.106	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2480MHz



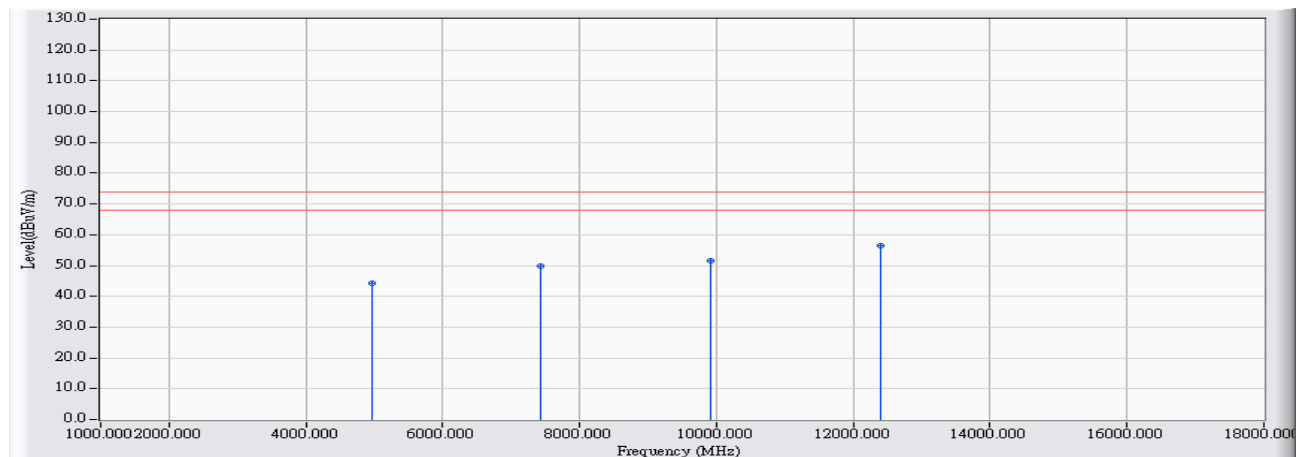
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	8.121	37.620	45.741	-28.259	74.000	PEAK
2		7443.000	17.292	32.540	49.832	-24.168	74.000	PEAK
3		9920.000	22.512	29.110	51.622	-22.378	74.000	PEAK
4	*	12404.000	26.147	30.130	56.277	-17.723	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Horizontal					
Average Detector:					
12404	56.277	-3.406	52.871	-1.129	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	8.121	36.140	44.261	-29.739	74.000	PEAK
2		7436.000	17.259	32.520	49.779	-24.221	74.000	PEAK
3		9920.000	22.512	28.930	51.442	-22.558	74.000	PEAK
4	*	12401.000	26.149	30.300	56.449	-17.551	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Vertical					
Average Detector:					
12401	56.449	-3.406	53.043	-0.957	54.000

5. RF antenna conducted test

5.1. Test Equipment

The following test equipment is used during the test:

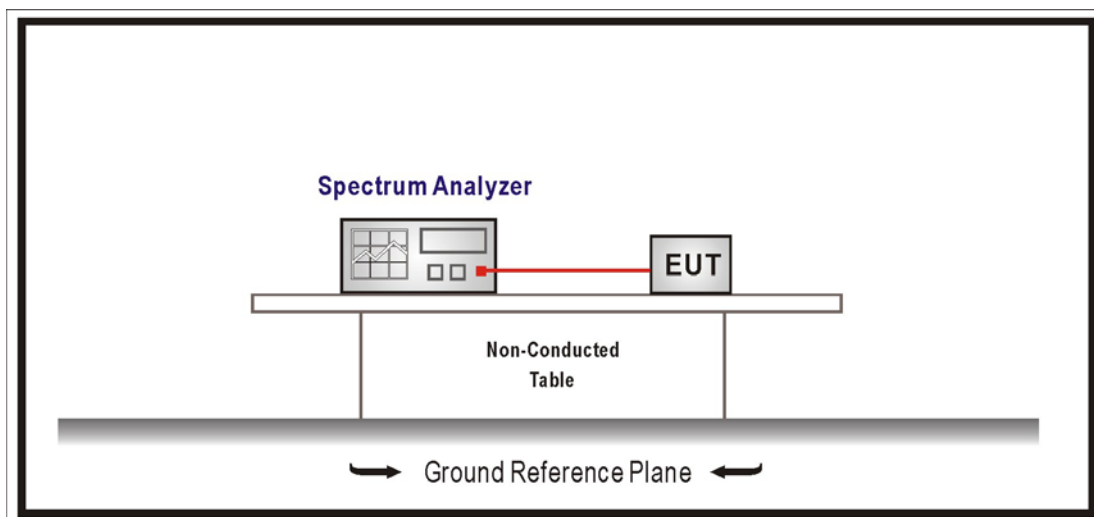
RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
EXA Signal Analyzer	Keysight	N9010A	MY51440132	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 DTS test procedure of KDB558074 V03R02 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

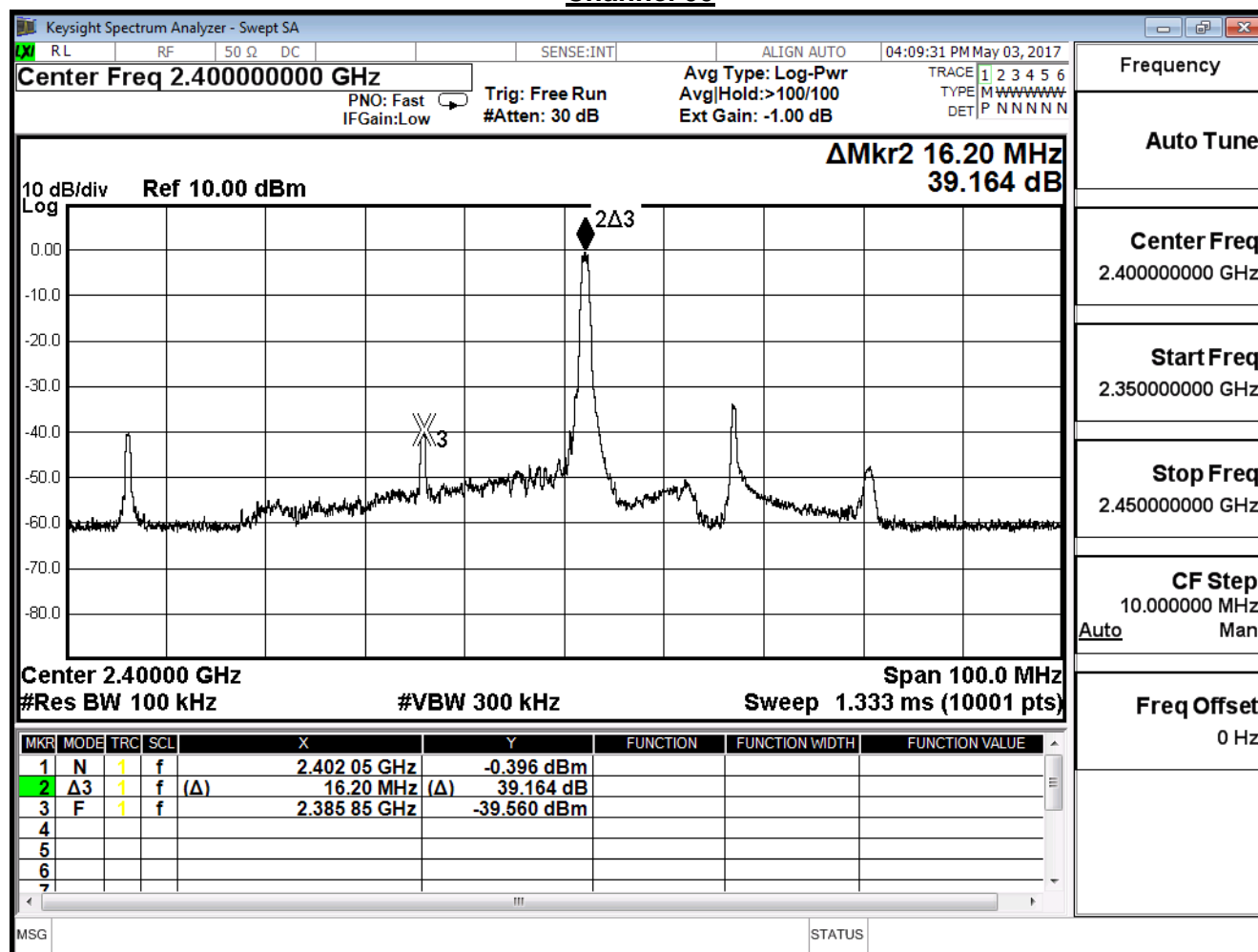
5.6. Test Result

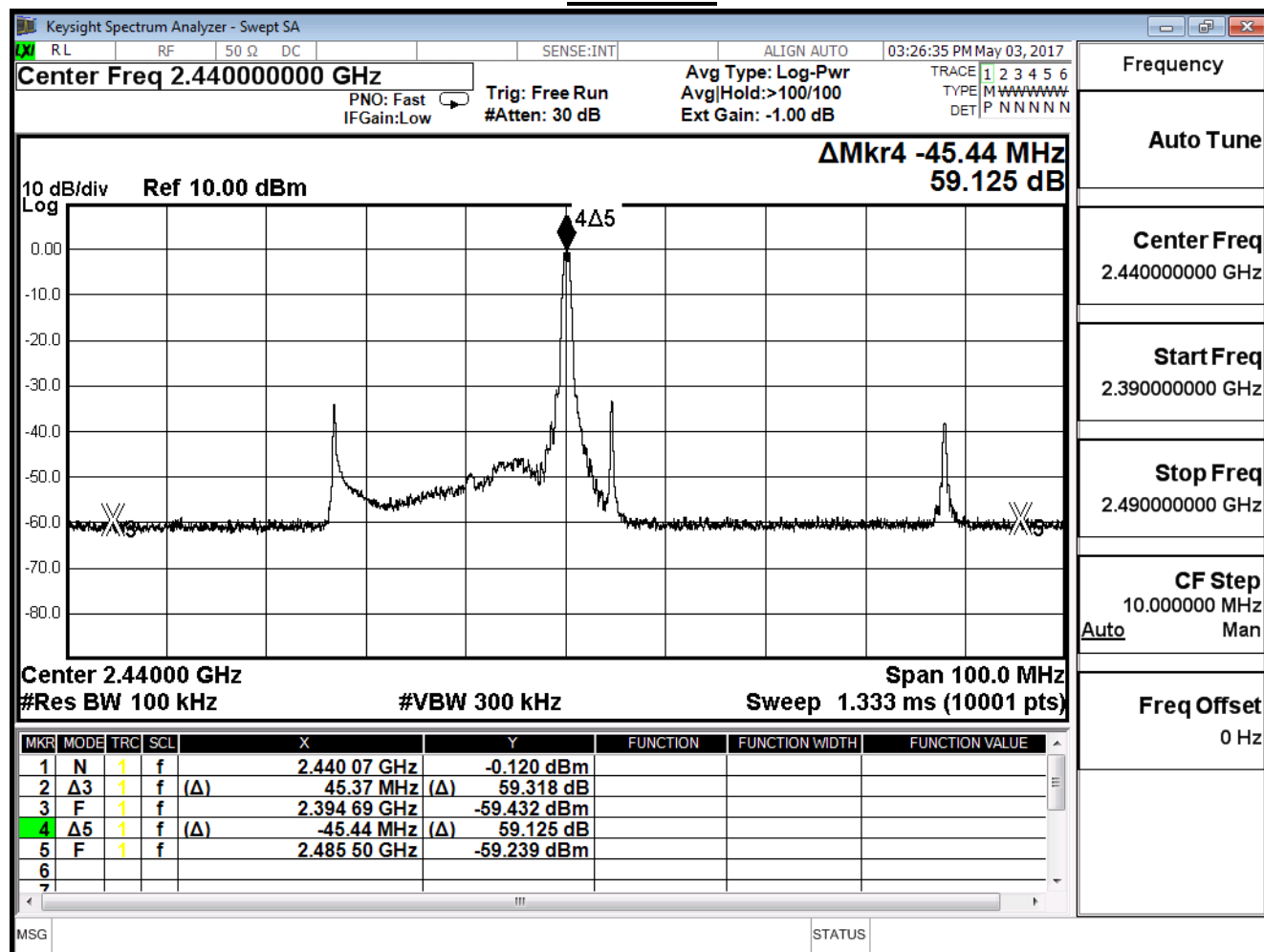
Product	Wireless power receiver		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: TX		
Date of Test	2017/05/03	Test Site	SR10-H

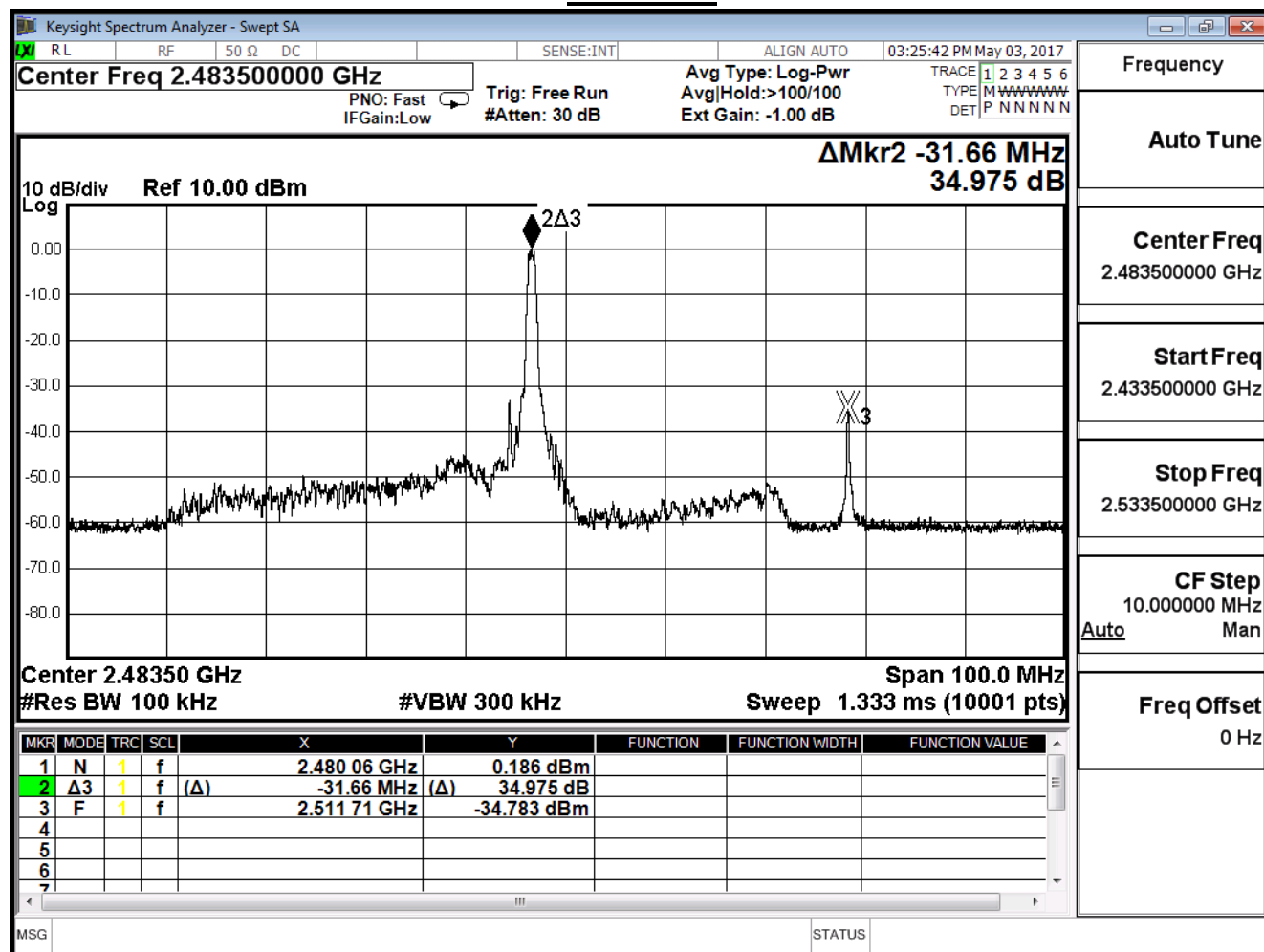
GFSK

Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
00	2402	39.164	≥ 20	Pass
19	2440	59.125	≥ 20	Pass
39	2480	34.975	≥ 20	Pass

Channel 00

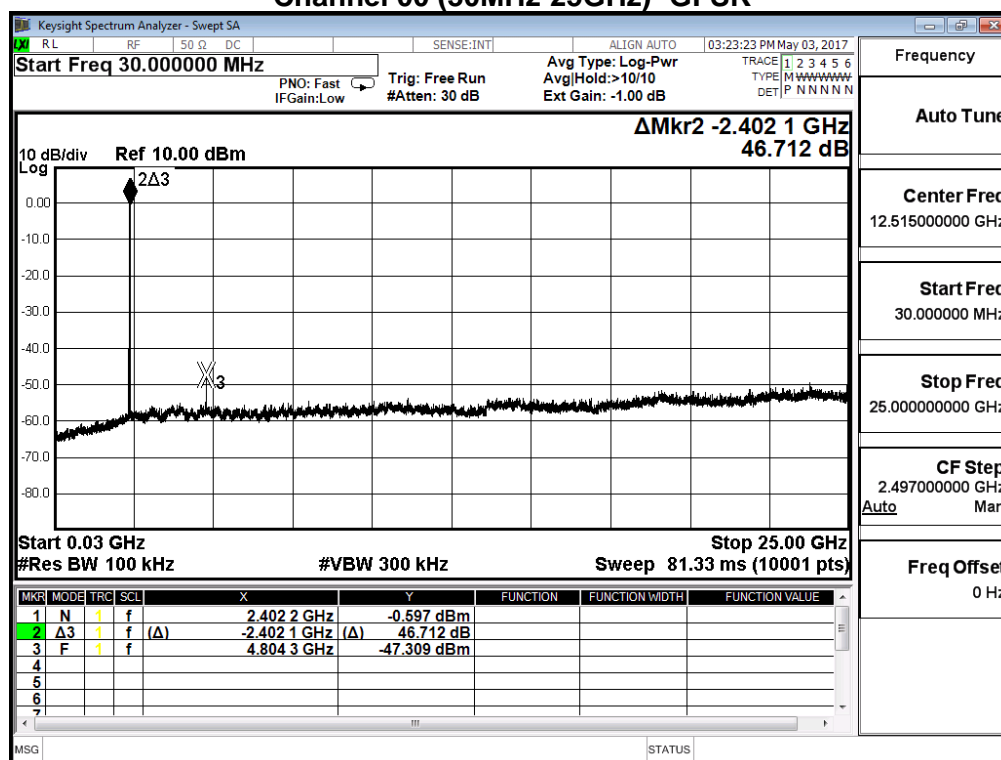


Channel 19

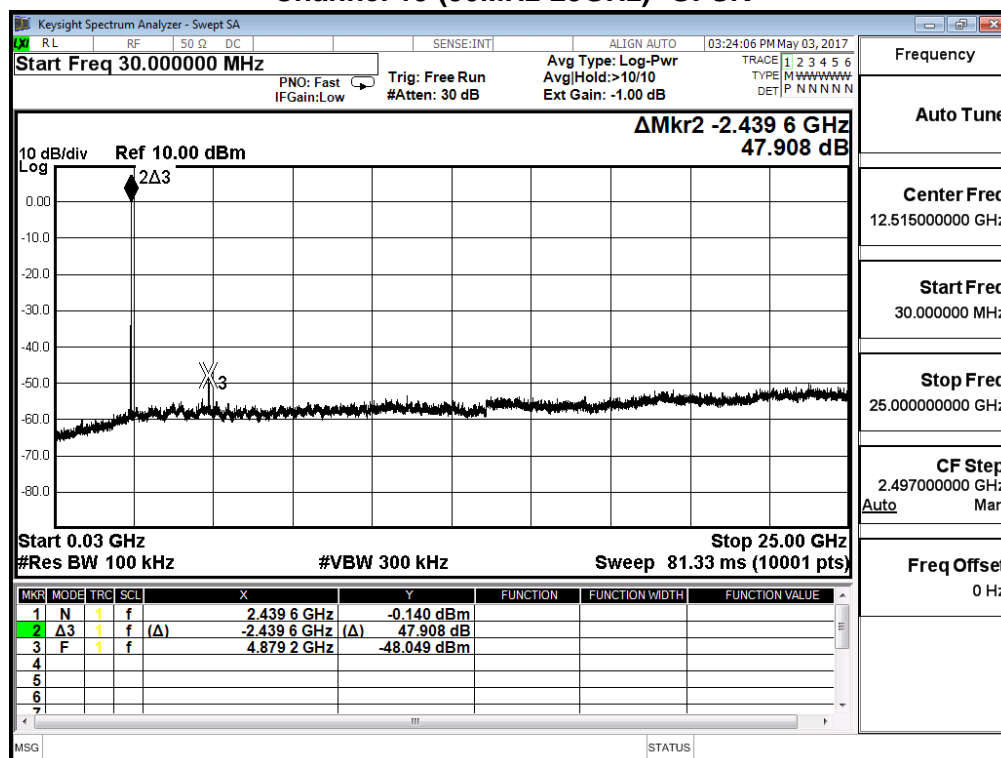
Channel 39

Product	Wireless power receiver		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: TX		
Date of Test	2017/05/03	Test Site	SR10-H

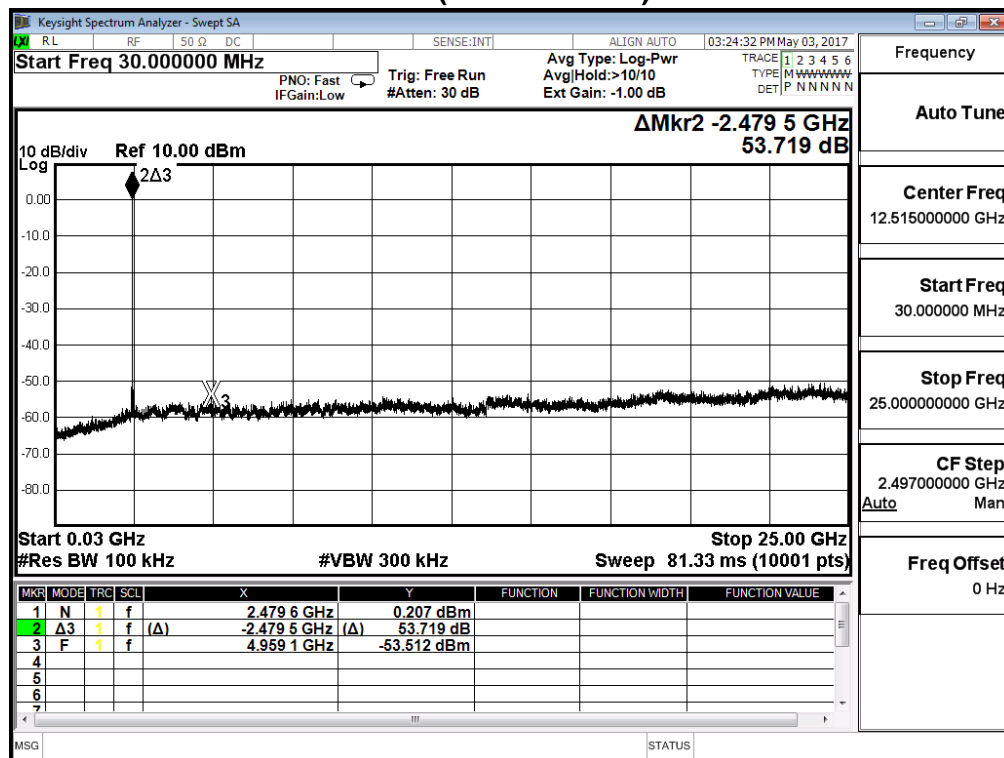
Channel 00 (30MHz-25GHz)- GFSK



Channel 19 (30MHz-25GHz)- GFSK



Channel 39 (30MHz-25GHz)- GFSK



6. Band Edge

6.1. Test Equipment

The following test equipment are used during the test:

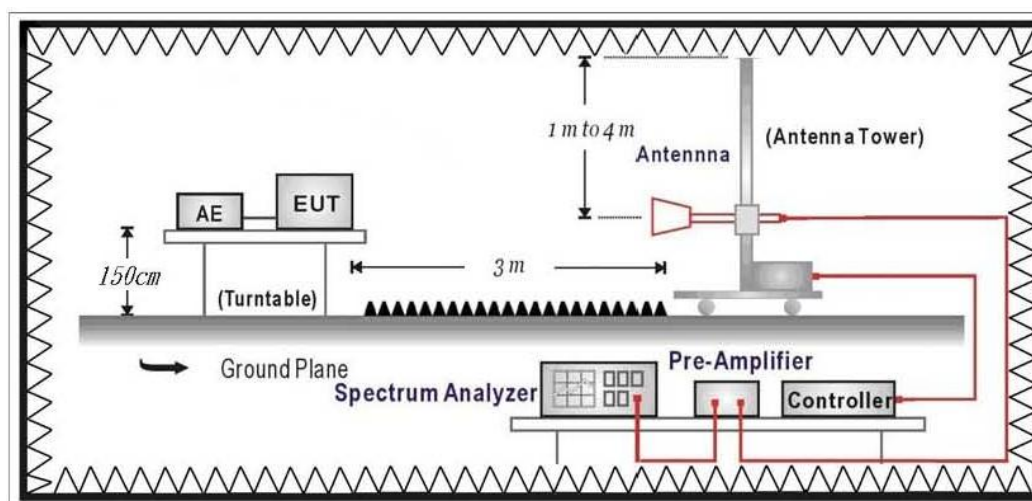
Band Edge / CB4-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2891	2017/08/14
Horn Antenna	Schwarzbeck	BBHA 9120	D312	2017/10/25
Pre-Amplifier	EMCI	EMC0031835	980233	2018/02/02
Pre-Amplifier	Schwarzbeck	DBL-1840N506	013	2017/09/29
Pre-Amplifier	Miteq	JS41-00104000 0-58-5P	1573954	2017/10/04
Horn Antenna	Schwarzbeck	BBHA 9170	203	2017/08/28
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/22

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 DTS test procedure of KDB558074 V03R02 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.

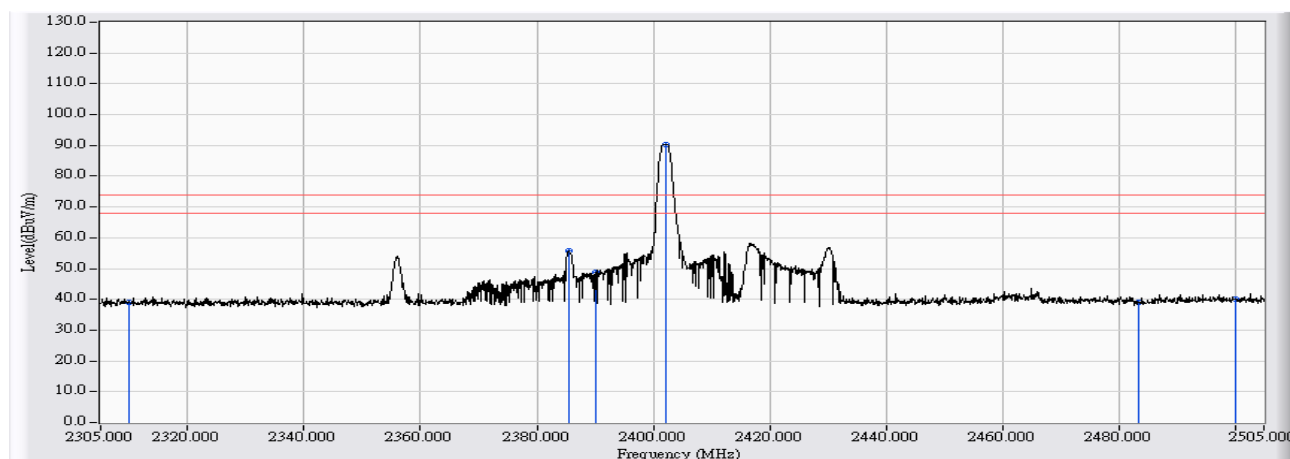
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

6.6. Test Result

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2402MHz



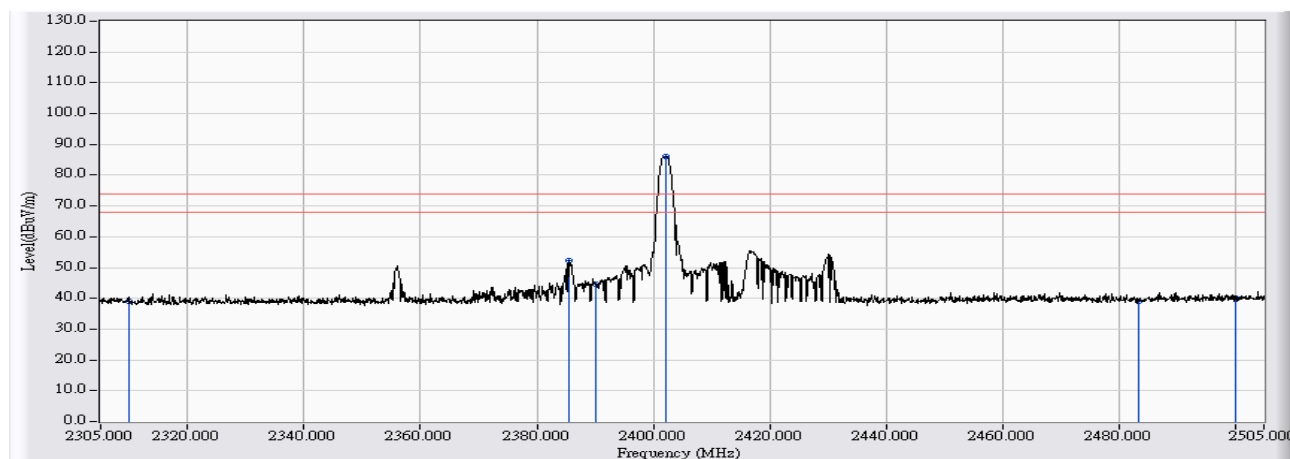
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	9.887	29.206	39.093	-34.907	74.000	PEAK
2		2385.400	10.164	45.761	55.926	-18.074	74.000	PEAK
3		2390.000	10.146	38.562	48.708	-25.292	74.000	PEAK
4	*	2402.300	10.098	80.342	90.440	16.440	74.000	PEAK
5		2483.500	10.634	28.240	38.874	-35.126	74.000	PEAK
6		2500.000	10.544	29.506	40.050	-33.950	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Horizontal					
Average Detector:					
2385.4	55.926	-3.406	52.520	-1.480	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2402MHz

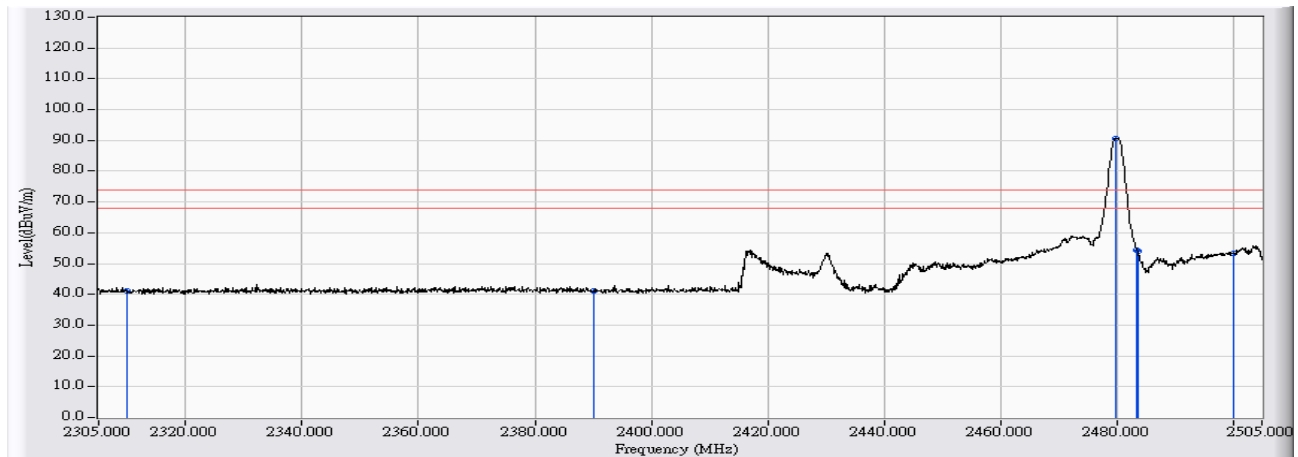


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	9.887	29.102	38.989	-35.011	74.000	PEAK
2		2385.500	10.165	42.142	52.307	-21.693	74.000	PEAK
3		2390.000	10.146	34.471	44.617	-29.383	74.000	PEAK
4	*	2402.300	10.098	75.875	85.973	11.973	74.000	PEAK
5		2483.500	10.634	28.329	38.963	-35.037	74.000	PEAK
6		2500.000	10.544	29.388	39.932	-34.068	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 = 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 : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - HORIZONTAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2480MHz



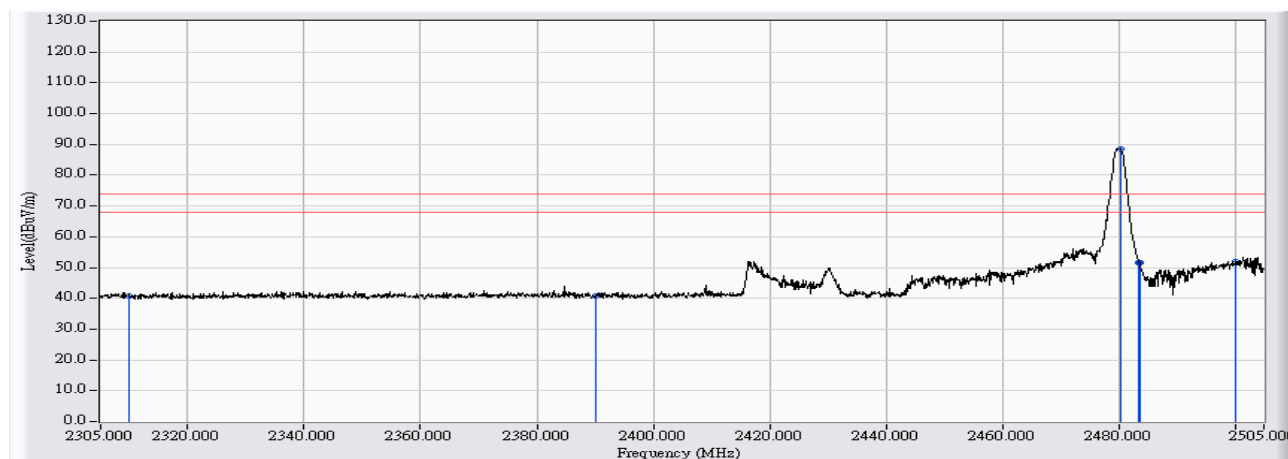
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	9.887	31.259	41.146	-32.854	74.000	PEAK
2		2390.000	10.146	31.113	41.259	-32.741	74.000	PEAK
3	*	2479.800	10.663	79.989	90.651	16.651	74.000	PEAK
4		2483.500	10.634	43.809	54.443	-19.557	74.000	PEAK
5		2483.600	10.634	43.380	54.013	-19.987	74.000	PEAK
6		2500.000	10.544	42.931	53.475	-20.525	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 = 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.

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Factor	Level		
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
Horizontal					
Average Detector:					
2385.4	55.926	-3.406	52.520	-1.480	54.000
2483.6	54.013	-3.406	50.607	-3.393	54.000

Site : CB4-H	Time : 2017/04/27
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4-H_FCC_EFS_B432_1-18GHz_3M_1116 - VERTICAL	Power : AC 120V/60Hz
EUT : Wireless power receiver	Note : Mode 1: TX_802.15.1_BLE_2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	9.887	30.778	40.665	-33.335	74.000	PEAK
2		2390.000	10.146	30.655	40.801	-33.199	74.000	PEAK
3	*	2480.300	10.658	77.968	88.626	14.626	74.000	PEAK
4		2483.500	10.634	41.102	51.736	-22.264	74.000	PEAK
5		2483.600	10.634	40.852	51.485	-22.515	74.000	PEAK
6		2500.000	10.544	41.400	51.944	-22.056	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 = 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. Occupied Bandwidth

7.1. Test Equipment

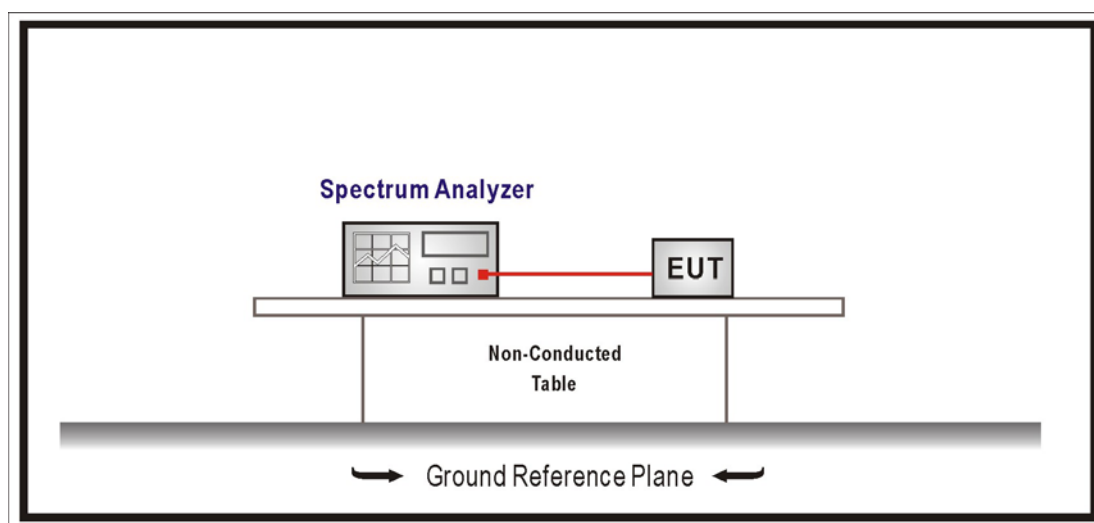
The following test equipment is used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2018/03/12

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

7.2. Test Setup



7.3. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1% of EBW, Span greater than RBW.

7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

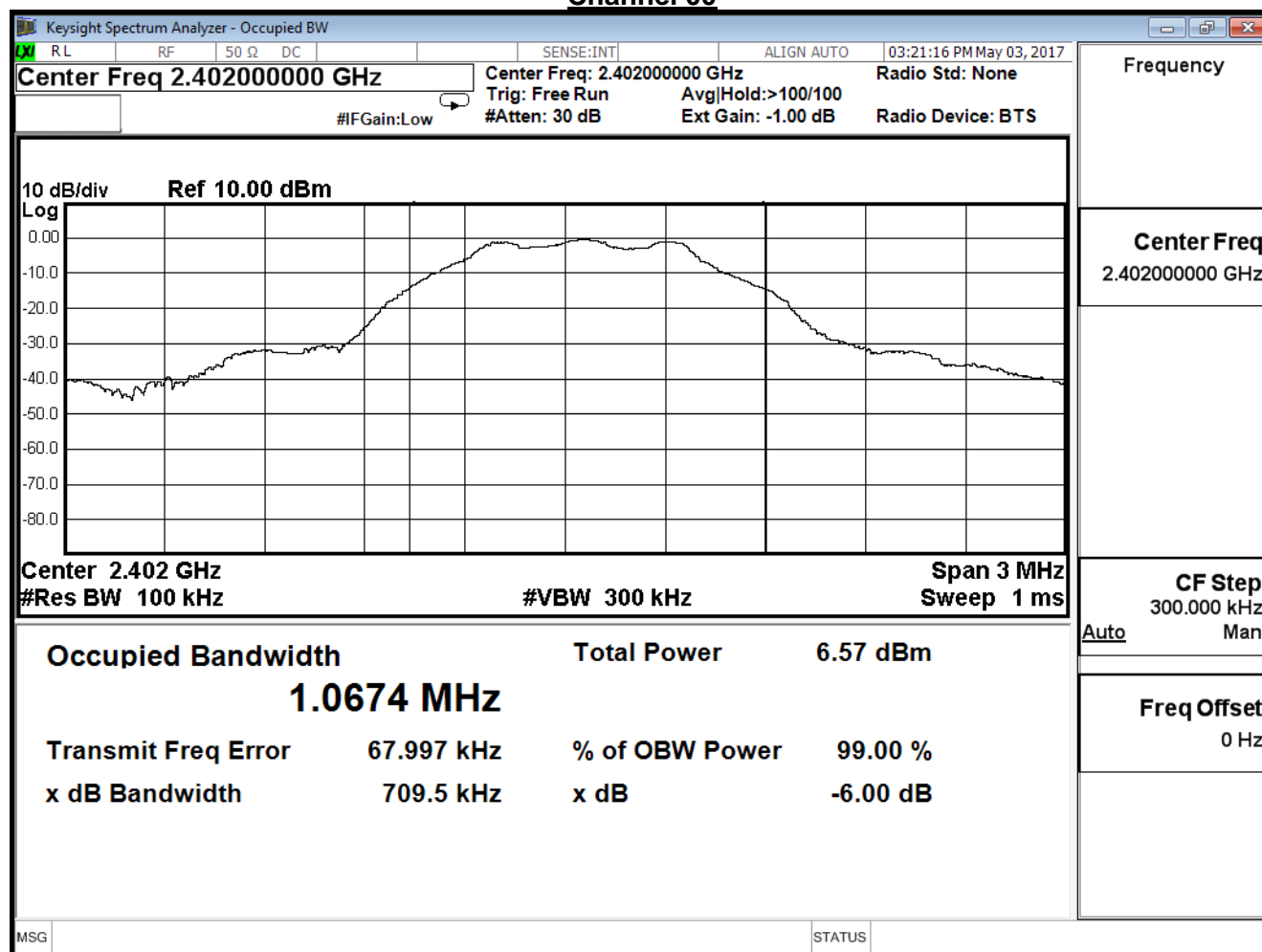
7.6. Test Result

Product	Wireless power receiver		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: TX		
Date of Test	2017/05/03	Test Site	SR10-H

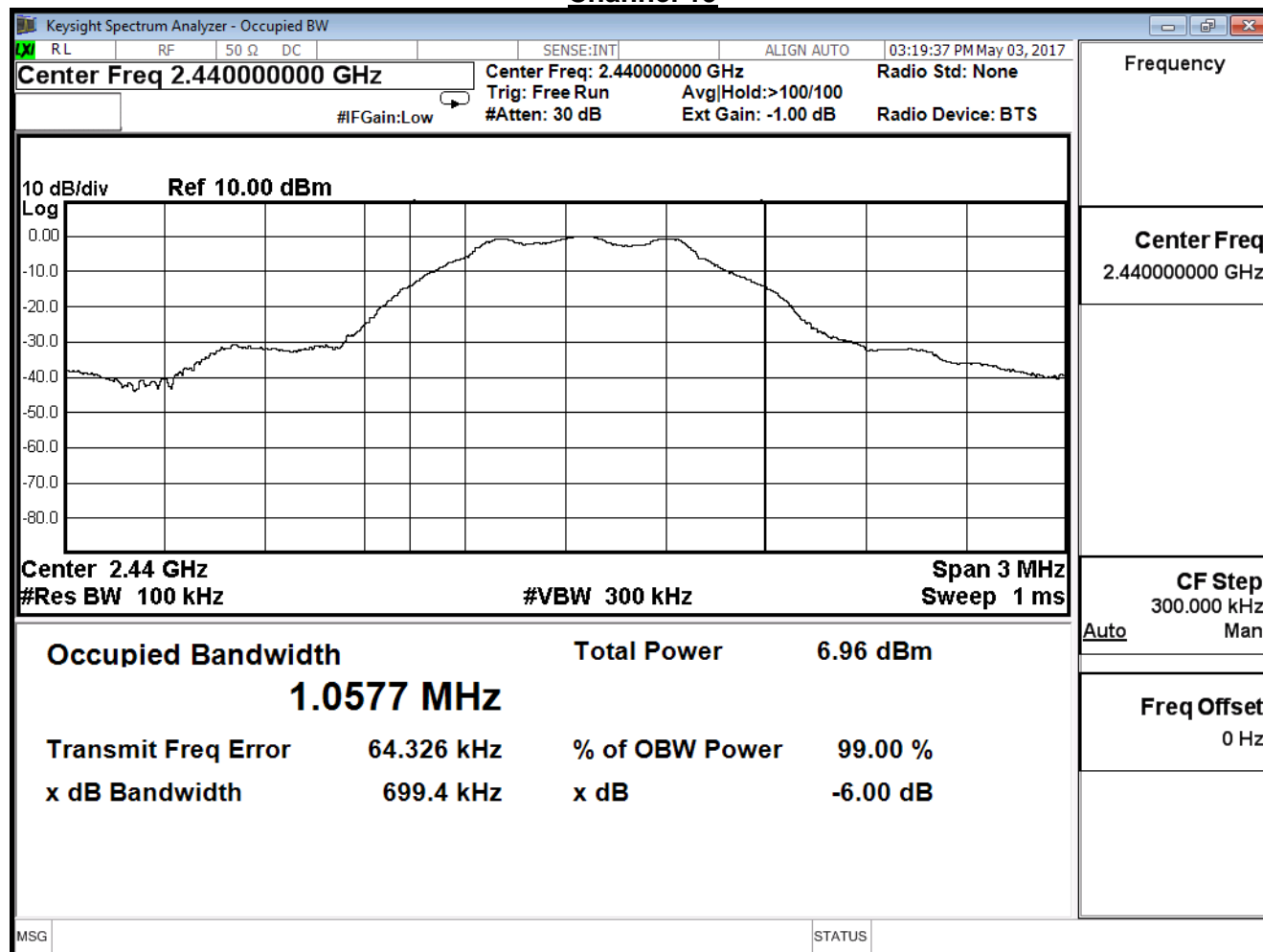
GFSK

Channel No.	Frequency (MHz)	Measure Level (KHz)	Limit (KHz)	Result
00	2402	709.50	≥ 500	Pass
19	2440	699.40	≥ 500	Pass
39	2480	712.80	≥ 500	Pass

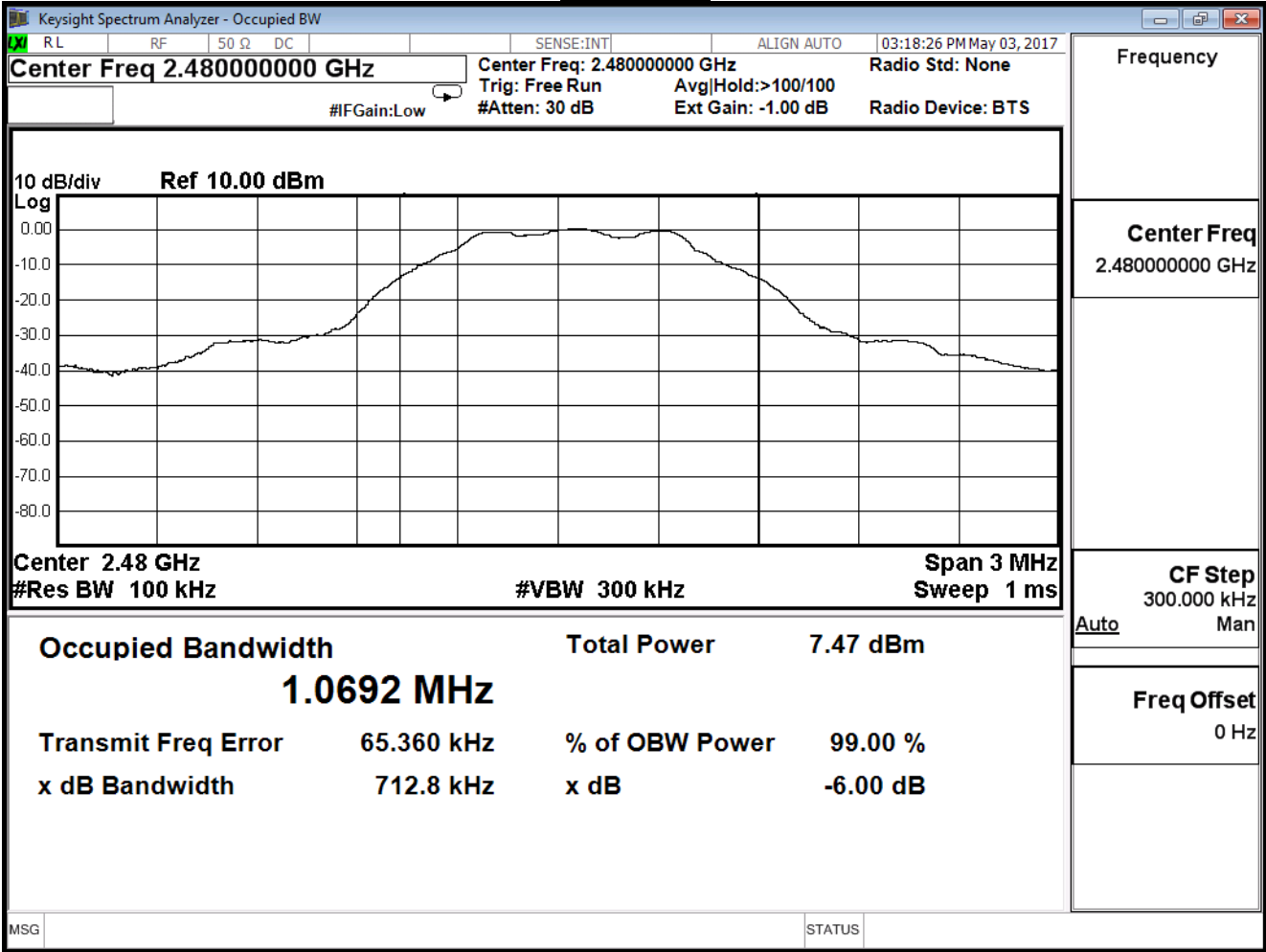
Channel 00



Channel 19



Channel 39



8. Power Density

8.1. Test Equipment

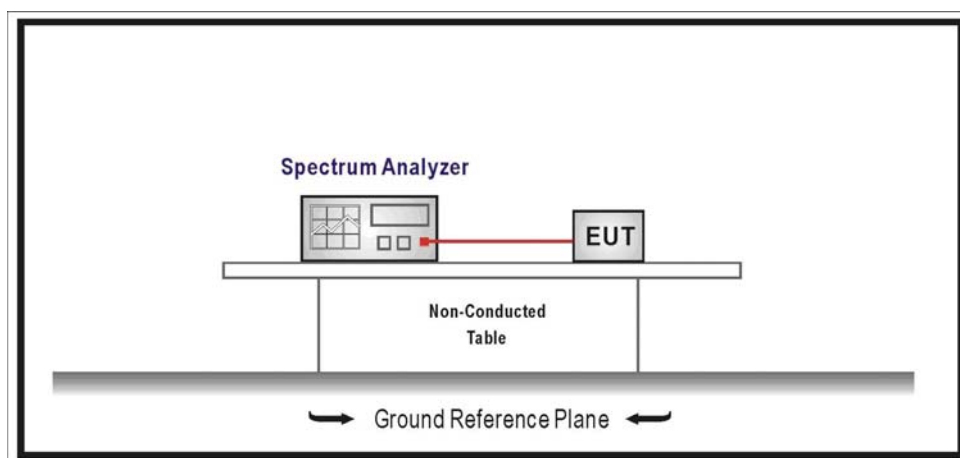
The following test equipment is used during the test:

Power Density / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2018/03/12

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

8.2. Test Setup



8.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

8.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

8.6. Uncertainty

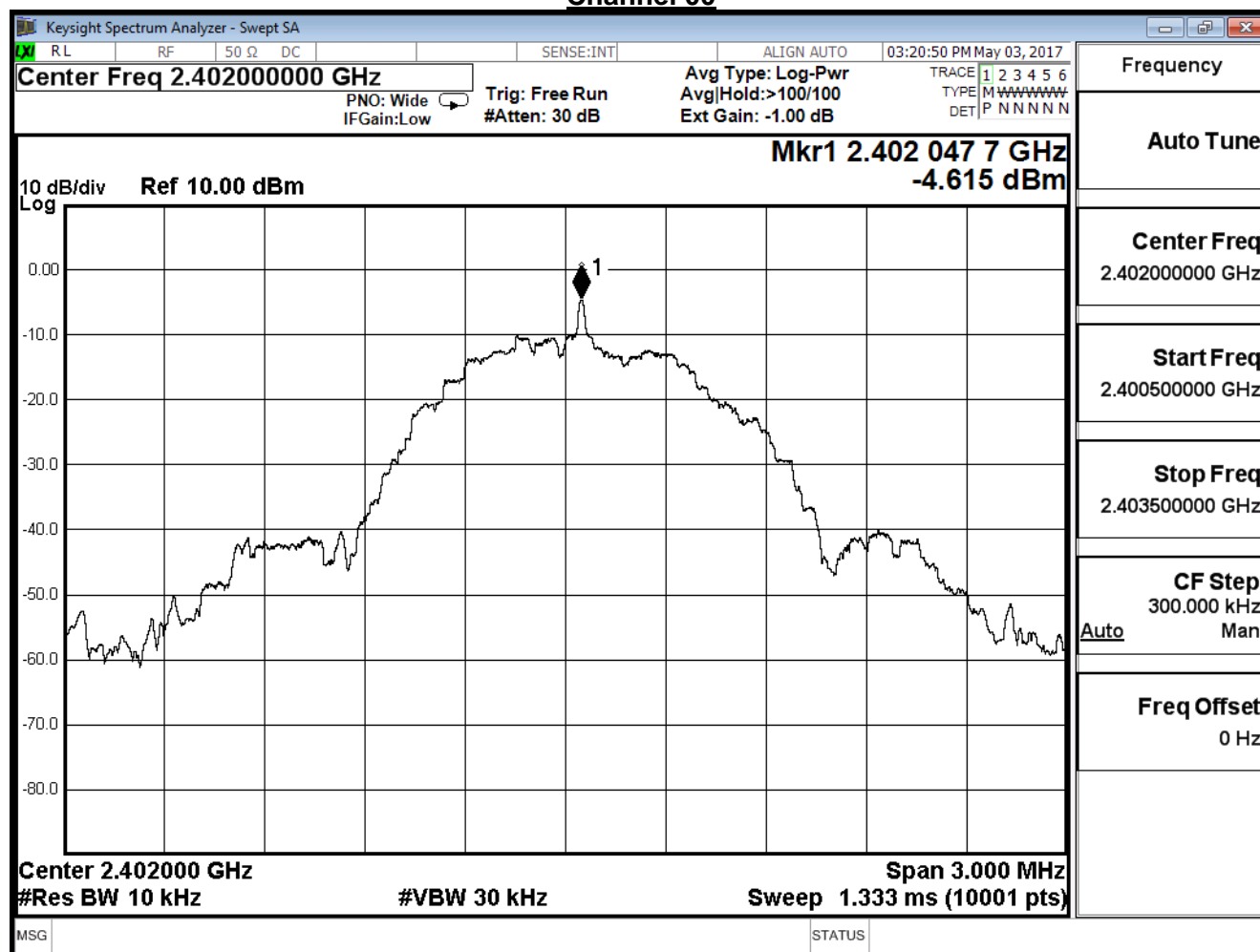
The measurement uncertainty is defined as $\pm 1.27\text{dB}$.

8.7. Test Result

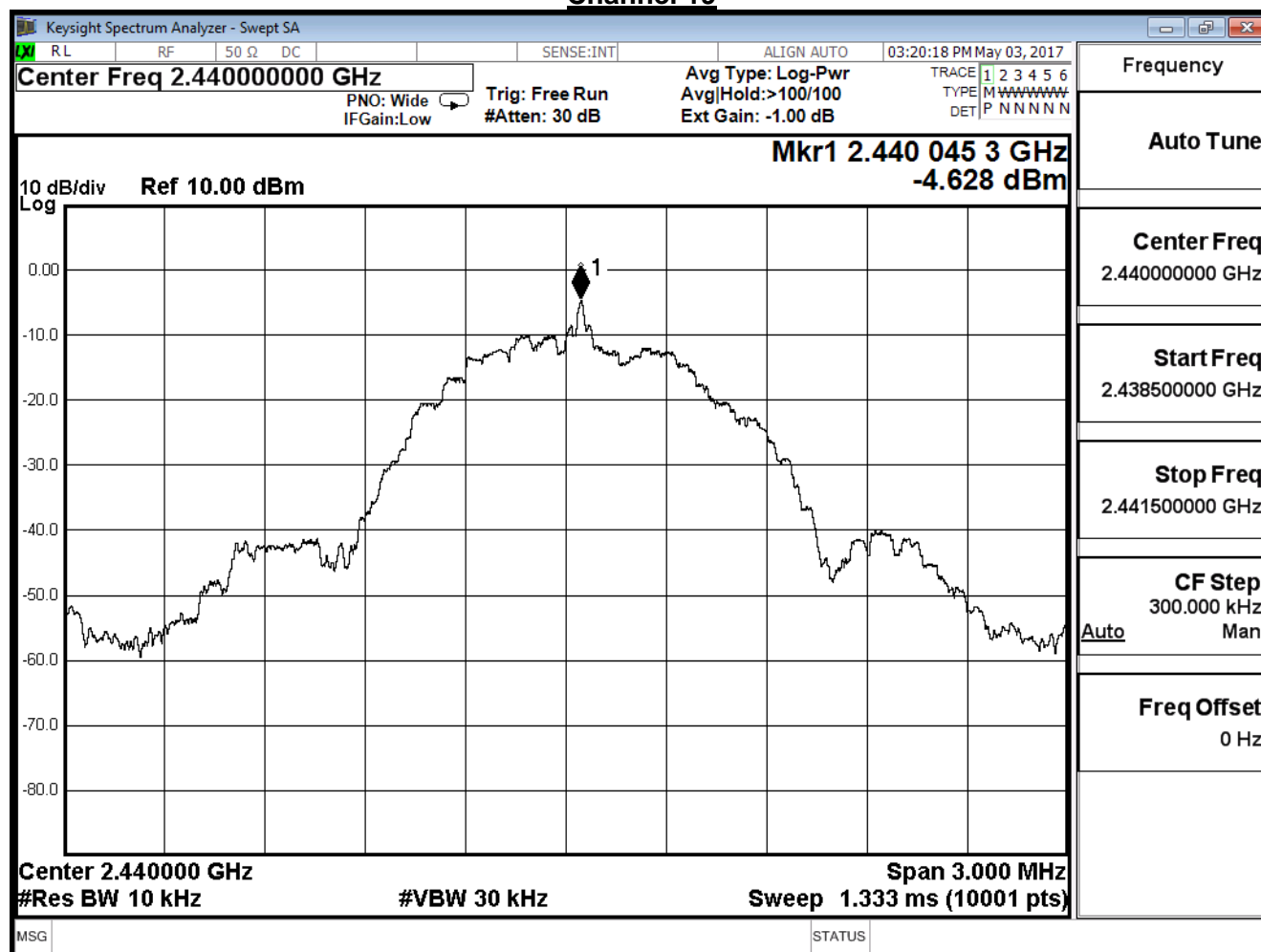
Product	Wireless power receiver		
Test Item	Power Density		
Test Mode	Mode 1: TX		
Date of Test	2017/05/03	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level(dBm)	Limit (dBm)	Result
00	2402	-4.615	≤ 8	Pass
19	2440	-4.628	≤ 8	Pass
39	2480	-3.478	≤ 8	Pass

Channel 00



Channel 19



Keysight Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN AUTO 02:10:20 PM May 03, 2017

Center Freq 2.480000000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: >100/100 Ext Gain: -1.00 dB

TRACE 1 2 3 4 5 6 TYPE M W W W W W W W DET P N N N N N N

Frequency

Auto Tune

Center Freq 2.480000000 GHz

Start Freq 2.478500000 GHz

Stop Freq 2.481500000 GHz

CF Step 300.000 kHz Man

Auto

Freq Offset 0 Hz

10 dB/div Ref 10.00 dBm

Mkr1 2.480 050 4 GHz -3.478 dBm

Log

Center 2.480000 GHz #Res BW 10 kHz #VBW 30 kHz Span 3.000 MHz Sweep 1.333 ms (10001 pts)

MSG STATUS