

FCC PART 15.231

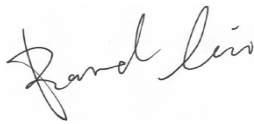
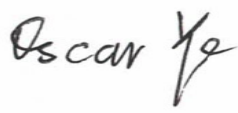
TEST REPORT

For

Feit Electric Company

4901 Gregg Road, Pico Rivera, California 90660 United States

FCC ID: SYW-BTRGB3ECPREM1

Report Type: Original Report	Product Name: Remote Control
Report Number: RKS240703004-00B	
Report Date: 2024-11-21	
Reviewed By:	Bard Liu 
Approved By:	Oscar Ye 
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RKSB240703004-00B	R1V1	2024-11-21	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Feit Electric Company
Tested Model:	BTA19RGB3KECP/REM1
Product Name:	Remote Control
Power Supply:	DC 3V from battery
RF Function:	SRD
Operating Band/Frequency:	433.92 MHz
Field strength of fundamental:	82.42dB μ V/m@3m
Channel Number:	1
Modulation Type:	ASK
Antenna Type:	PCB Antenna

All measurement and test data in this report was gathered from production sample serial number: RKSB240703004-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-07-03.)

Objective

This test report is prepared for *Feit Electric Company*. All the test measurements were performed according to the measurement procedure described in ANSI C63.10 - 2013.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.209, 15.35(c) and 15.231 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10 - 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
Radiated emission	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz ~18GHz	5.23dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by NVLAP (Lab code: 600338-0) and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No.: CN5055.

SYSTEM TEST CONFIGURATION**Justification**

Channel List:

Channel	Frequency (MHz)
1	433.92

EUT Exercise Software

For radiated emission testing:

Engineering mode which can continue transmit. All buttons with same power level, which provide by manufacturer, the Light on/off button was tested

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

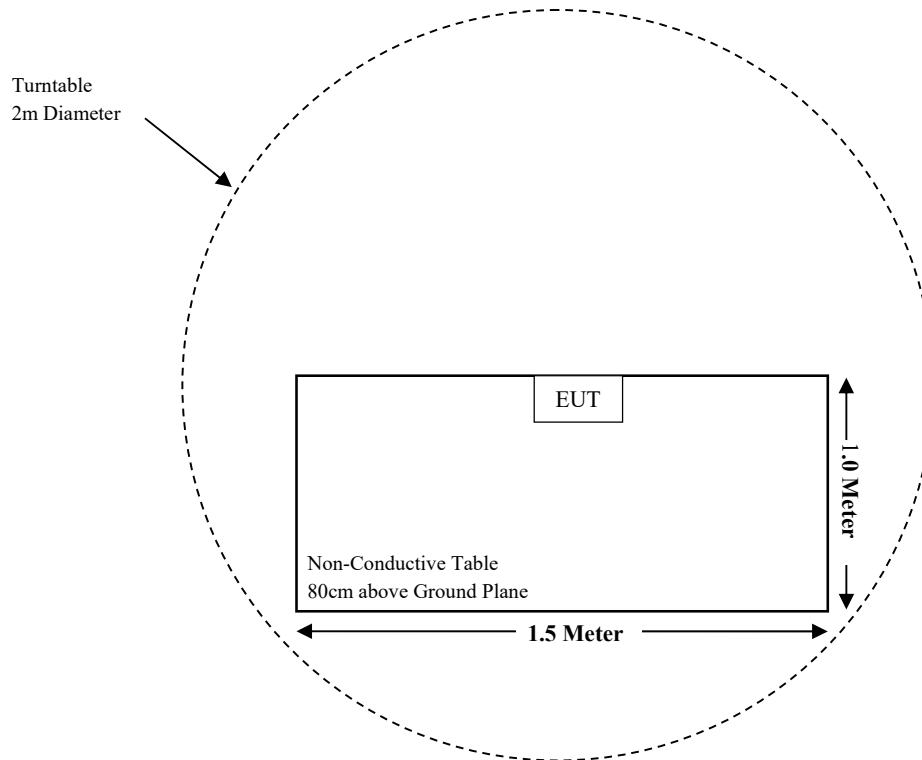
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

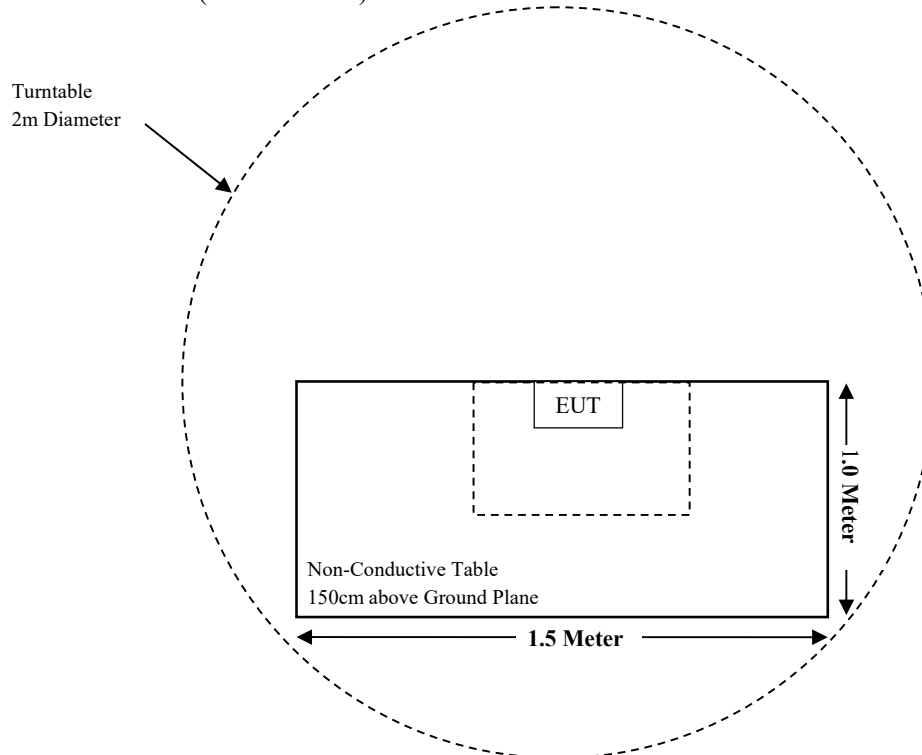
Cable Description	Length (m)	From Port	To Port
/	/	/	/

Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conducted Emissions	Not applicable (See Note)
§15.205, §15.209, §15.231(b)	Radiated Emissions	Compliant
§15.231 (a) (1)	Deactivation	Compliant
§15.231 (c)	20dB Emission Bandwidth	Compliant
§1.1307	RF Exposure Evaluation	Compliant

Note: The EUT is powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Sonoma Instrument	Amplifier	310N	171205	2024-04-23	2025-04-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
ETS-LINDGREN	Loop Antenna	6512	108100	2023-11-09	2024-11-08
Narda	6 dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Rohde & Schwarz	Signal Analyzer	FSV40-N	103298	2024-04-24	2025-04-23
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2023-06-27	2026-06-26
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-13	013	2024-04-25	2025-04-24
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connected Construction

The EUT has a PCB antenna which was permanently attached; fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliant.

FCC §15.205, §15.209, §15.231 (b) - RADIATED EMISSIONS**Applicable Standard**

FCC §15.205, §15.209, §15.231 (b)

According to FCC §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750 **	125 to 375 **
174-260	3750	375
260-470	3750 to 12500 **	375 to 1250**
Above 470	12500	1250

Note: ** means Linear interpolations

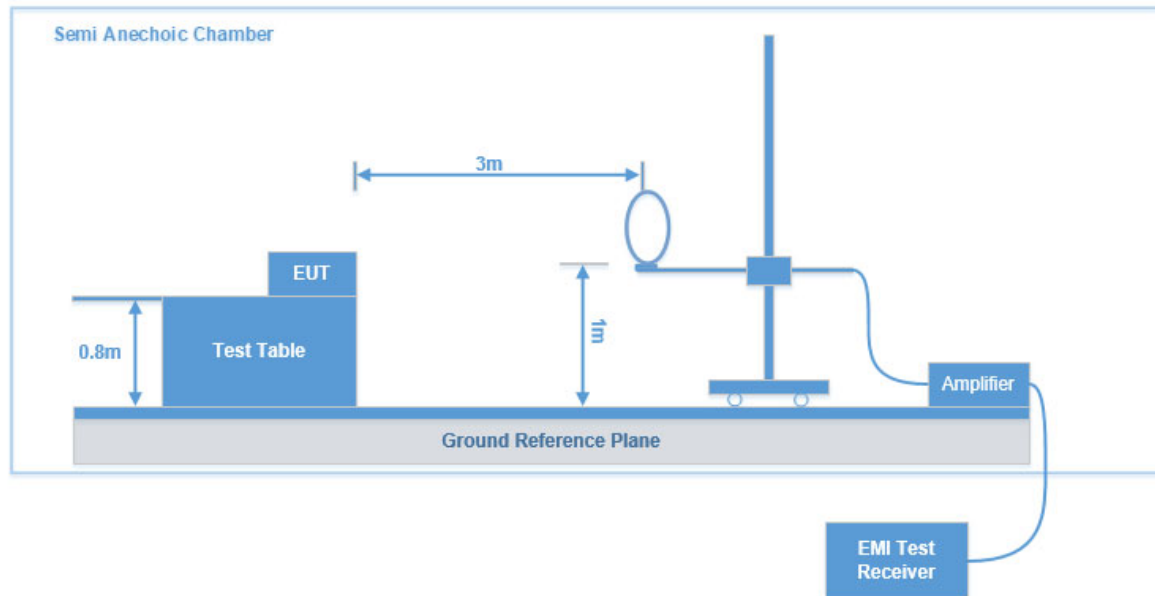
(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

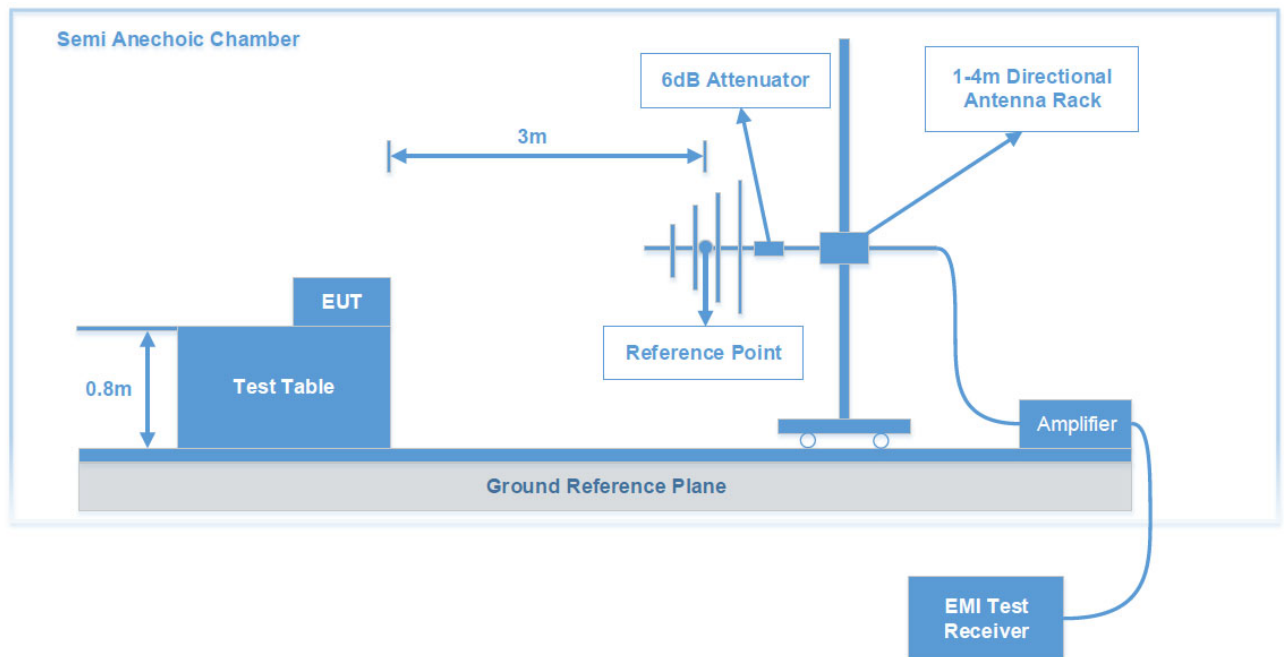
(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

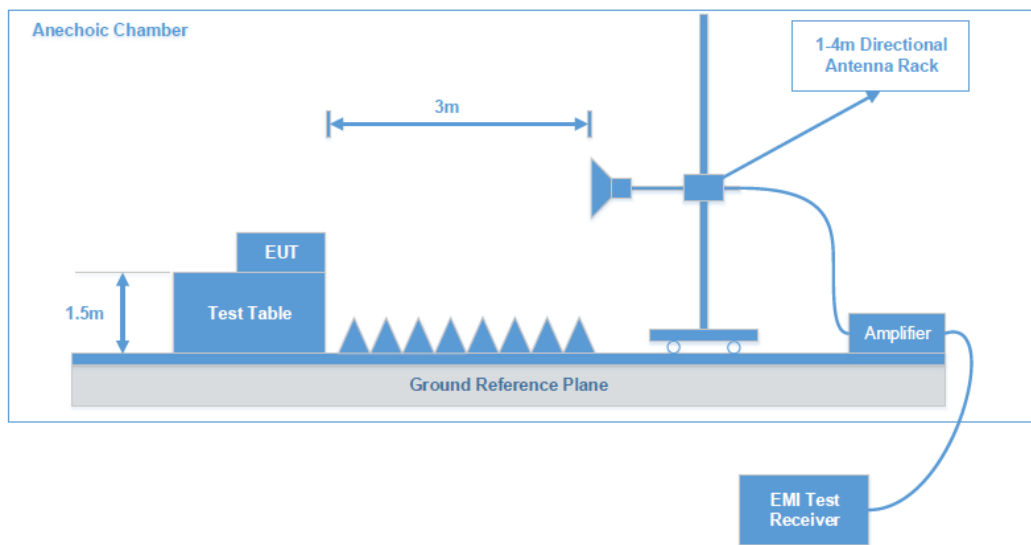
Test System Setup

9 kHz - 30 MHz:



30 MHz-1 GHz:



Above 1 GHz:

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10 - 2013. The specification used was the FCC § 15.209, 15.205 and 15.231.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 5 GHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 kHz	QP/Average
150 kHz – 30 MHz	10 kHz	30 kHz	9 kHz	QP/Average
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak

For 9 kHz-30 MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

Test Procedure

Maximizing procedure was performed on at least six (6) highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.205, §15.209, §15.231 (b).

Test Data: See Appendix

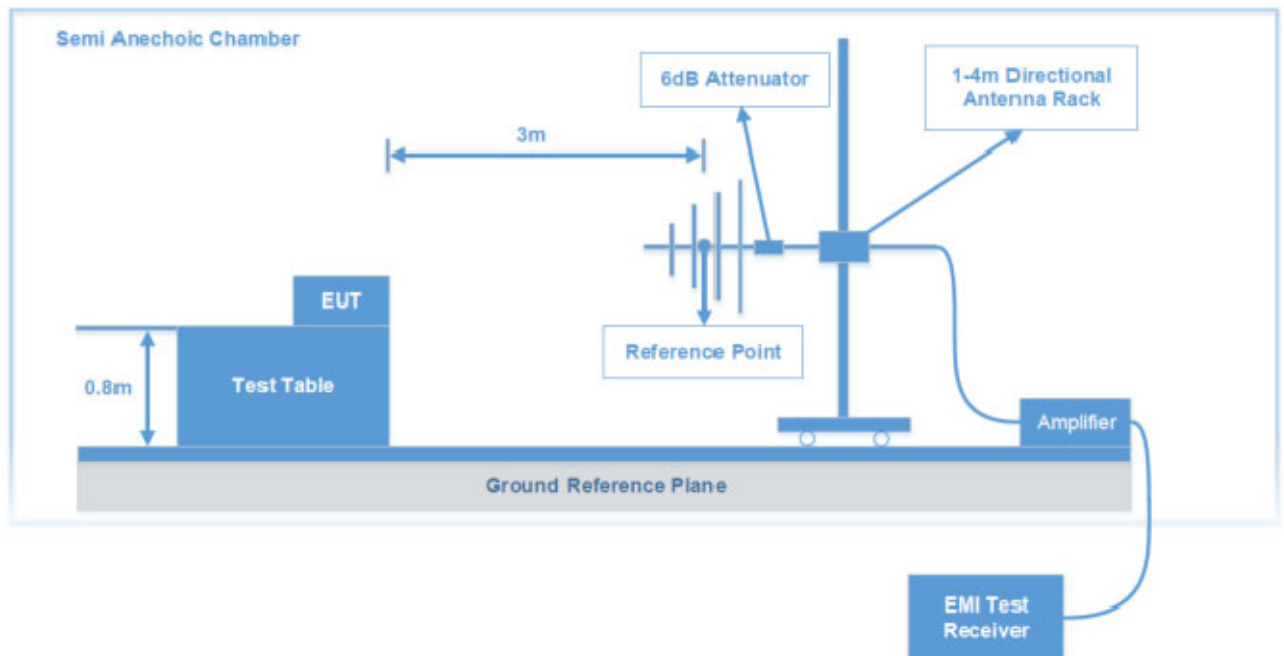
FCC §15.231(a) (1) - DEACTIVATION TESTING

Applicable Standard

Per FCC §15.231(a) (1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Test Procedure

1. With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=100k VBW=300k Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.



Test Data: See Appendix

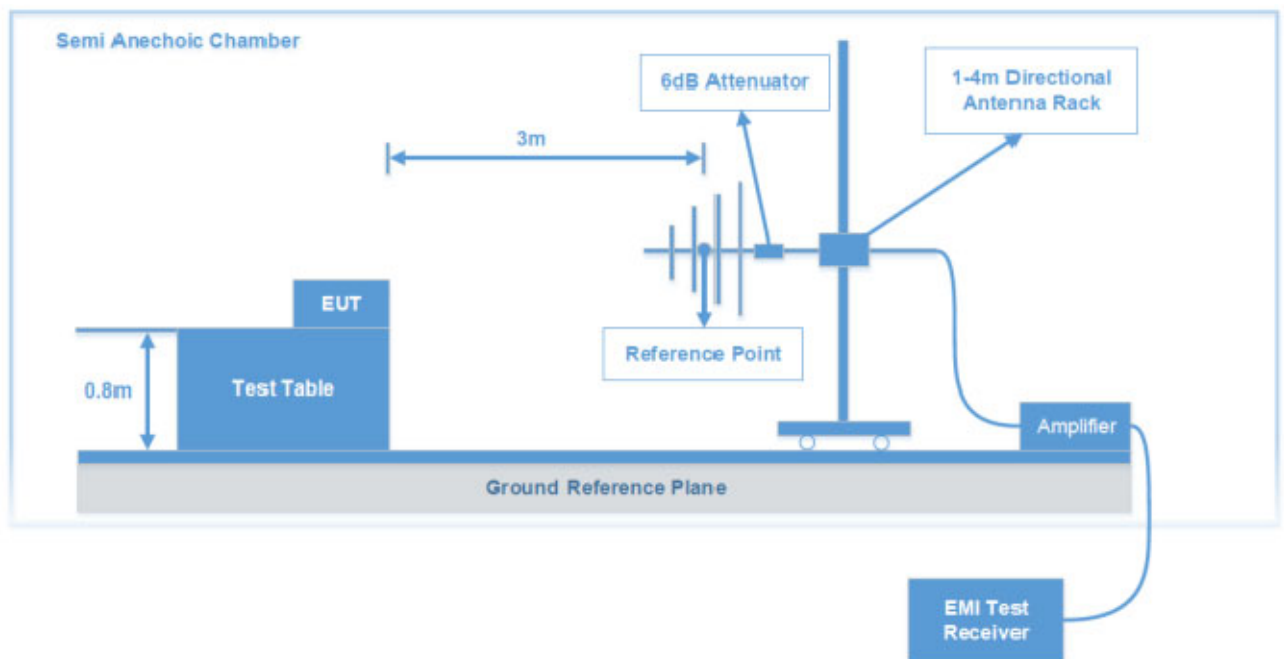
FCC §15.231(c) - 20dB EMISSION BANDWIDTH TESTING

Applicable Standard

Per 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Procedure

With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer, plot the 20 dB bandwidth.



Test Data: See Appendix

RF EXPOSURE EVALUATION

Applicable Standard

§1.1307(b)(3)(i) For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A).

Frequency (MHz)	Maximum EIRP (dBm)	Maximum ERP		1-mW Test Exemption
		dBm	mW	
433.92	-12.78	-14.93	0.03	Compliant

Note:

1. Chose the maximum power to do MPE analysis.
2. This device maximum E-Field level is 82.42 dB μ V/m at 3m, so the EIRP power is -12.78 dBm.
3. Pout EIRP (dBm)= Field Strength of Fundamental(dB μ V/m)-95.2

Result: Compliant. RF Exposure is exemption.

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT C - TEST SETUP PHOTOGRAPHS.

APPENDIX - TEST DATA

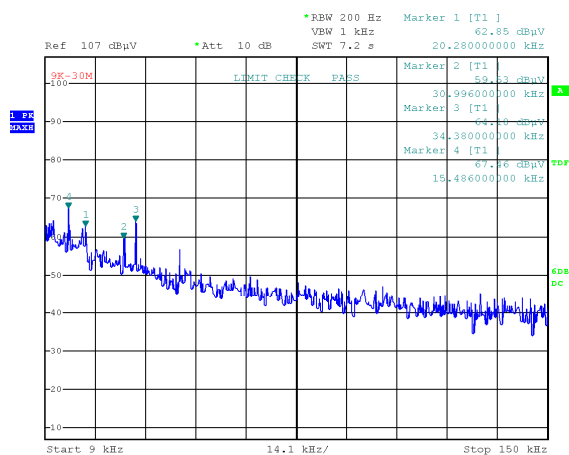
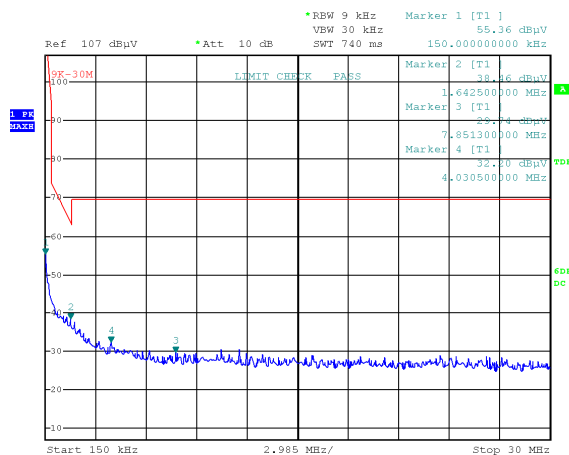
Environmental Conditions & Test Information

Test Item:	RADIATED EMISSIONS			Duty Cycle
	9 kHz-30 MHz	30 MHz-1 GHz	Above 1 GHz	
Test Date:	2024-08-16	2024-08-09	2024-08-16	2024-08-16
Temperature:	22.5 °C	21.5 °C	22.5 °C	22.5 °C
Relative Humidity:	40 %	41 %	40 %	40 %
ATM Pressure:	100.7 kPa	100.2 kPa	100.7 kPa	100.7 kPa
Test Result:	Pass	Pass	Pass	/
Test Engineer:	Grace Luo	Grace Luo	Klein Zhu	Neil Zhou

Test Item:	DEACTIVATION TESTING	20DB EMISSION BANDWIDTH TESTING
Test Date:	2024-08-16	2024-08-16
Temperature:	22.5 °C	22.5 °C
Relative Humidity:	40 %	40 %
ATM Pressure:	100.7 kPa	100.7 kPa
Test Result:	Pass	Pass
Test Engineer:	Neil Zhou	Neil Zhou

RADIATED EMISSIONS

After pre-scan in the X, Y and Z axes of orientation, the worst case **Y-axis of orientation** was recorded.

9 kHz-30 MHz:**Parallel (worst case):****9 kHz-150 kHz****150 kHz -30 MHz**

Project No. RKSB240703004
Date: 16.AUG.2024 18:15:35

Tester: Grace Luo

Project No. RKSB240703004
Date: 16.AUG.2024 18:03:39

Tester: Grace Luo

9 kHz-150 kHz:

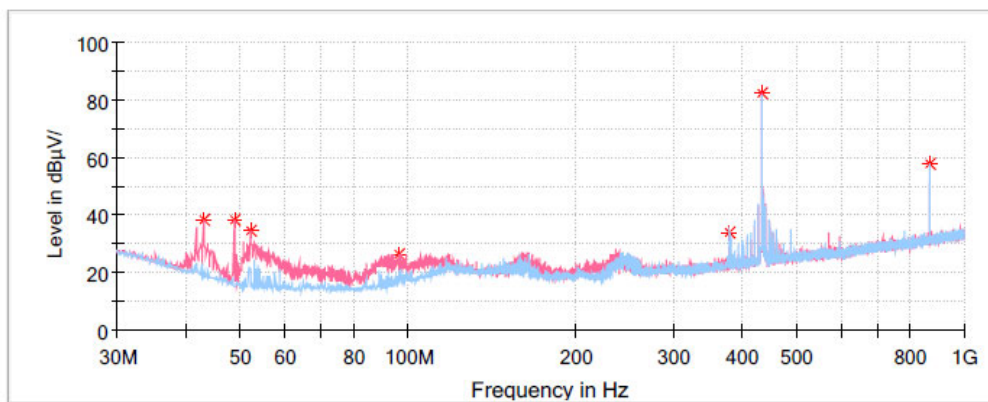
Frequency	Corrected Amplitude	Detector	Corrected Factor	Limit	Margin
(MHz)	(dBμV/m) @3m	PK/QP/Ave.	(dB/m)	(dBμV/m @ 3m)	(dB)
0.01549	67.46	PK	52.87	123.81	56.35
0.02028	62.85	PK	49.92	121.46	58.61
0.03100	59.53	PK	46.94	117.78	58.25
0.03438	64.18	PK	46.06	116.88	52.70

150 kHz -30 MHz:

Frequency	Corrected Amplitude	Detector	Corrected Factor	Limit	Margin
(MHz)	(dBμV/m) @3m	PK/QP/Ave.	(dB/m)	(dBμV/m @ 3m)	(dB)
0.15000	55.36	PK	50.90	104.08	48.72
1.64250	38.46	PK	21.75	63.29	24.83
4.03050	32.20	PK	18.67	69.54	37.34
7.85130	29.74	PK	6.46	69.54	39.80

30 MHz - 1 GHz:**Common Information**

Project No: RKSB240703004
EUT Model: BTA19RGB3KECP/REM1
Test Mode: SRD
Standard: FCC Part 15.205 & FCC Part 15.209 & FCC Part 15.231
Test Equipment: ESCI, JB3, 310N
Temperature: 21.5°C
Humidity: 41%
Barometric Pressure: 100.2kPa
Test Engineer: Grace Luo
Test Date: 2024/8/9

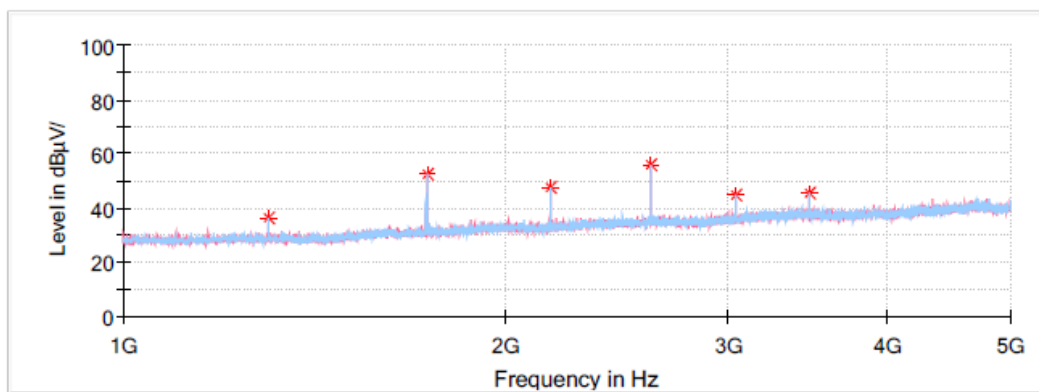
**Critical_Freqs**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
42.852500	38.22	40.00	1.78	V	-13.0
48.672500	38.09	40.00	1.91	V	-16.1
52.067500	34.80	40.00	5.20	V	-16.9
96.323750	26.69	43.50	16.81	V	-15.4
379.685000	34.18	46.00	11.82	H	-8.5
433.920000	82.42	100.83	18.41	V	-7.1
867.840000	57.78	80.83	23.05	H	0.4

Note: If the spurious emissions maximized peak measured value complies with the QP/Average limit, it is unnecessary to perform QP/Average measurement.

Above 1 GHz:**Common Information**

Project No.: RKSB240703004
Test Mode: SRD
Standard: FCC Part 15.231&FCC Part 15.205&FCC Part 15.209
Test Engineer: Klein Zhu

Full Spectrum**Critical_Freqs**

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1301.600000	36.41	---	74.00	37.59	H	-15.0
1735.600000	52.47	---	80.83	28.36	V	-13.3
2170.000000	47.82	---	80.83	33.01	H	-11.2
2603.200000	55.72	---	80.83	25.11	H	-9.8
3038.000000	45.06	---	80.83	35.77	H	-8.3
3471.600000	45.39	---	80.83	35.44	H	-6.5

Field Strength of Average Emission

Frequency (MHz)	Peak Measurement@3m (dBμV/m)	Height (cm)	Polar (H/V)	Duty Cycle Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
433.920000	82.42	100	V	-5.58	76.84	80.83	3.99
867.840000	57.78	100	H	-5.58	52.2	60.83	8.63
1301.600000	36.41	150	H	-5.58	30.83	54.00	23.17
1735.600000	52.47	150	V	-5.58	46.89	60.83	13.94
2170.000000	47.82	150	H	-5.58	42.24	60.83	18.59
2603.200000	55.72	150	H	-5.58	50.14	60.83	10.69
3038.000000	45.06	200	H	-5.58	39.48	60.83	21.35
3471.600000	45.39	200	H	-5.58	39.81	60.83	21.02

Note 1:

Corrected Amplitude (dBμV/m) = Peak level (dBμV/m) + Duty Cycle Corrected Factor (dB)

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Note 2:

Calculate Duty Cycle Value:

$T_p = 51.4257\text{ms}$

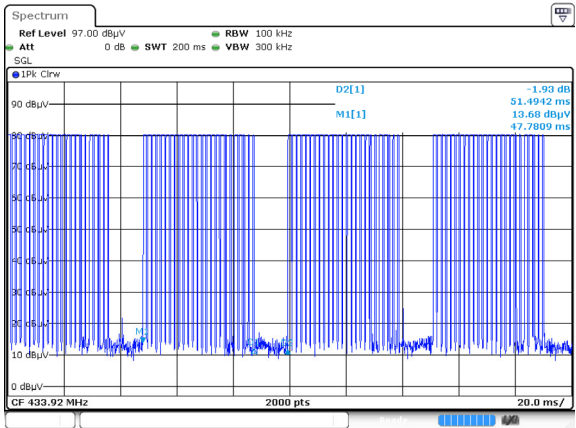
$T_{on} = \text{Burst1} * N1 + \text{Burst2} * N2 = 1.24562\text{ms} * 20 + 0.43022 * 5 = 27.0635\text{ms}$

Duty Cycle = $T_{on} / T_p = 27.0635\text{ms} / 51.4257\text{ms} = 52.63\%$

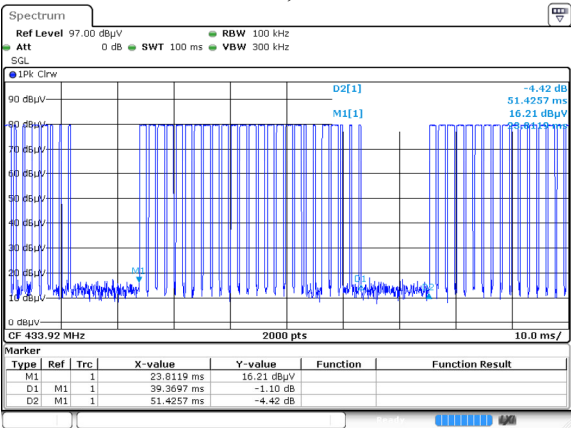
Duty Cycle Corrected Factor = $20\log(\text{Duty Cycle}) = -5.58$

This duty cycle is the worst case for the EUT(Light on/off button)

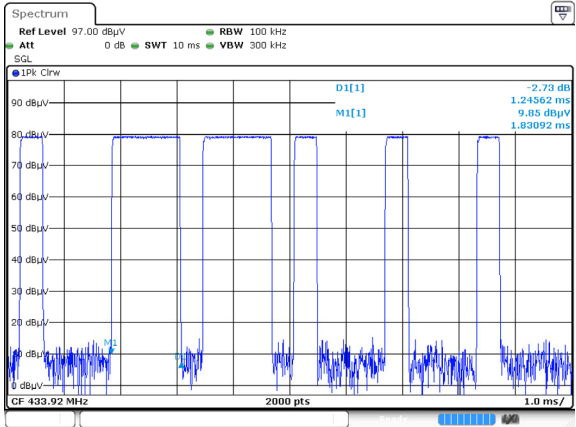
Duty Cycle



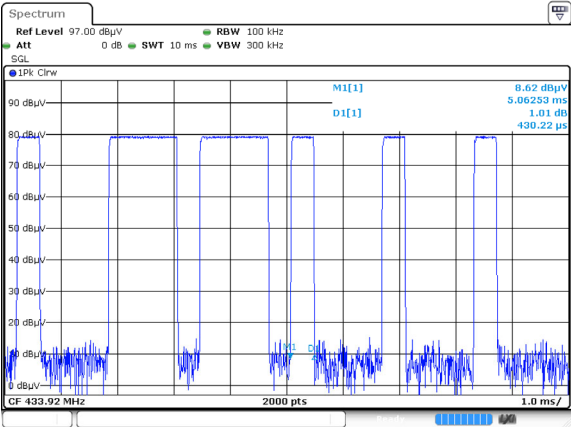
Zoom in Pulse Train
N1=20, N2=5



Duty Cycle Burst 1



Duty Cycle Burst 2

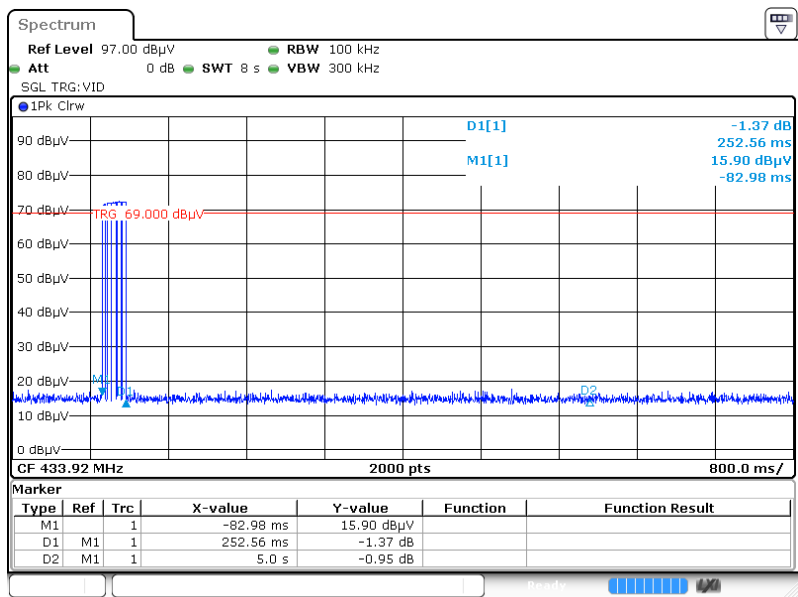


DEACTIVATION TESTING

Test mode: Single trigger (worst case is Light on/off button)

Channel Frequency (MHz)	Limit (s)	Result
433.92	<5	Pass

T_{stop} <5s

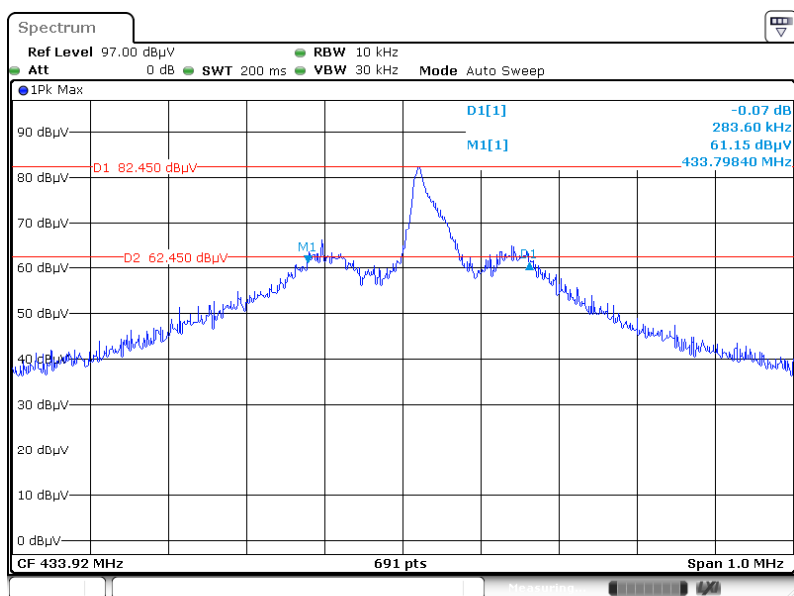


Project No.:RKSB240703004 Tester: Neil Zhou
Date: 16 AUG.2024 15:07:50

20dB EMISSION BANDWIDTH TESTING

Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
433.92	283.60	1084.8	Pass

Note: Limit = 0.25% * Center Frequency = 0.25% * 433.92 MHz = 1084.8 kHz

20 dB Emission Bandwidth

Project No.: RKSB240703004 Tester: Neil Zhou
Date: 16 AUG. 2024 14:24:48

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with “★”.
2. The test data was only valid for the test sample(s).
3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor $k=2$ with the 95.45% confidence interval.

******* END OF REPORT *******