TEST REPORT

Report No.:	KS2404S1505E02
FCC ID.:	2BB59-F2400-US
Applicant.:	RUNHOOD POWER INC.
Address.:	3980-D Valley Blvd,Walnut,California 91789 United States
Manufacturer.:	Shanghai Runhood Smart Energy Co., Ltd.
Address.:	Room 401, 4F, Building 5, No.218 Mingnan Road, Songjiang District, Shanghai, China
Product Name.:	RESIDENTIAL ESS & PORTABLE POWER STATION
Model/Type reference.:	F2400-US
Standard.:	47 CFR Part 15.247
Date of Receipt.:	April 24, 2024
Date of Test Date.:	April 24, 2024 to August 5, 2024
Date of issue.:	August 5, 2024
Test result.....:	**Pass**
Conclusion.:	The submitted sample was found to COMPLY with the standards above.

Prepared by: (Printed name + Signature)	Chad Lin	
Approved by: (Printed name + Signature)	Sky Dong	

Testing Laboratory Name...:	**KSIGN(Guangdong) Testing Co., Ltd.**
Address.:	West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

KDB 558074 D01 15.247 Meas Guidance v05r02: Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.

1.2. Report Version

Revised No.	Date of issue	Description
01	August 5, 2024	Original

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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1.3. Test Description

Test Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	47 CFR 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass

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1.4. Test Facility

KSIGN(Guangdong) Testing Co., Ltd .
West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified, or accredited by the following organizations:
CNAS-Lab Code: L 13261
KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.
A2LA-Lab Cert. No.: 5457.01
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirementsfor the Competence of Testing and Calibration Laboratories and any additional program requirements in the
identified field of testing
ISED# : 25693 CAB identifier.: CN0096
KSIGN(Guangdong) Testing Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.
FCC-Registration No.: 294912 Designation Number: CN1328
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

1.5. Measurement Uncertainty

Test Items	Measurement Uncertainty
Conducted Emission (150k-30MHz)	± 3.34dB
Output Power, Conducted	± 1.4dB
PSD, Conducted	± 1.0dB
Spurious Emissions, Conducted	± 3.3dB
RSE (1-18GHz)	± 4.68dB
RSE (30-1000MHz)	± 5.7dB
RSE (18-40GHz)	± 5.18dB

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %. Otherwise required by the applicant or Product Regulations.Decision Rule in this report did not consider the uncertainty.

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2. GENERAL INFORMATION

2.1. General Description Of EUT

Test Sample Number:	1-1(Normal Sample), 1-2(Engineering Sample)
Product Name:	RESIDENTIAL ESS & PORTABLE POWER STATION
Model / Type reference:	F2400-US
Power Supply:	DC 48V from battery
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	40
Modulation Type:	GFSK
Antenna Type:	PCB
Antenna Gain:	3.96dBm
Max TX Power:	-6.55dBm
Hardware Version:	V1.0
Software Version:	V1.0.0

Note: Antenna gain provided by the applicant Can affect the validity of results

2.2. Accessory Equipment Information

Title	Manufacturer	Model No.	Technical Parameters	Provided by
Computer	HP	15-cd028AX	/	Laboratory

2.3. Description of Test Modes

No.	Title	Description of Mode
Test Mode1	TX mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with GFSK modulation.

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2.4. Operation channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

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2.5. Measurement Instruments List

Conducted Emission at AC power line				
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
LISN	R&S	ENV432	1326.6105.02	2025-01-21
EMI Test Receiver	R&S	ESR	102524	2025-01-21
Manual RF Switch	JS TOYO	/	MSW-01/002	2025-01-21
ISN CAT6	Schwarzbeck	CAT5 8158	227	2025-01-21
Color Signal Generator	Philips	PM5418	672926	2025-01-21
Power Absorbing Clamp	R&S	MDS-21	100925	2025-01-22
TV Tuner	SUNLIGHT	ST5075	/	2024-12-12
Artificial power network	EVERFINE	LS-5	G657431CD1431112	2025-01-21

Occupied Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands				
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Wideband Radio Communication Tester	R&S	CMU200	115297	2025-01-19
Audio Analyzer	R&S	UPL16	100001	2025-01-19
Shielding box	Gxiong	GX-5915A	2201113	2025-01-19
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-187	09203403	2025-01-19
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920-188	09203401	2025-01-19
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2025-01-19
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2025-01-19
Hygrothermograph	Anymetre	JB913	/	2025-01-19
Climate Chamber	Angul	AGNH80L	1903042120	2025-01-19
Spectrum Analyzer	HP	8593E	3831U02087	2025-01-19
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2025-01-19
RF Control Unit	Tonscend	JS0806-2	/	2025-01-19
Analog Signal Generator	HP	83752A	3344A00337	2025-01-19
Vector Signal Generator	Agilent	N5182A	MY50142520	2025-01-19
Wideband Radio Communication Tester	R&S	CMW500	157282	2025-01-19
Spectrum Analyzer	R&S	FSV40-N	101798	2025-01-19

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Band edge emissions (Radiated) Emissions in frequency bands (below 1GHz) Emissions in frequency bands (above 1GHz)				
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Color Signal Generator	Philips	PM5418	672926	2025-01-21
Log Periodic Antenna	Schwarzbeck	VULB 9163	1230	2025-01-29
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2025-01-21
Broadcast Television Signal Generator	R&S	SFE100	141038	2025-01-21
Analog Signal Generator	Agilent	8648A	3847M00445	2025-01-21
EMI Test Receiver	R&S	ESR	102525	2025-01-21
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2025-01-29
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2025-01-22
Pre-Amplifier	EMCI	EMC051835SE	980662	2025-01-21
Spectrum Analyzer	Keysight	N9020A	MY46471971	2025-01-21

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3. Evaluation Results (Evaluation)

3.1. Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, 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.
Conclusion:	The EUT uses a PCBantenna, the max antenna gain less than 6dBi, which is deemed to comply with the antenna requirement.

4. Radio Spectrum Matter Test Results (RF)

4.1. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 *Decreases with the logarithm of the frequency.
Test Method:	ANSI C63.10-2013 section 6.2
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

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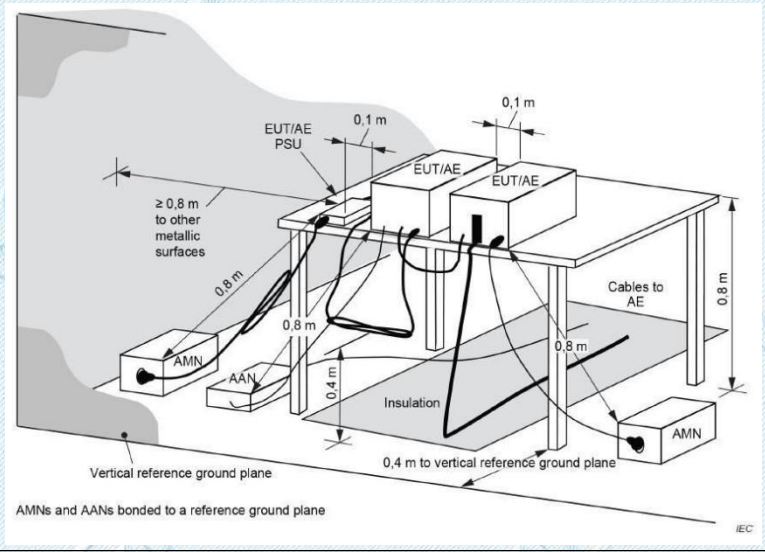
4.1.2. Test Setup Diagram:



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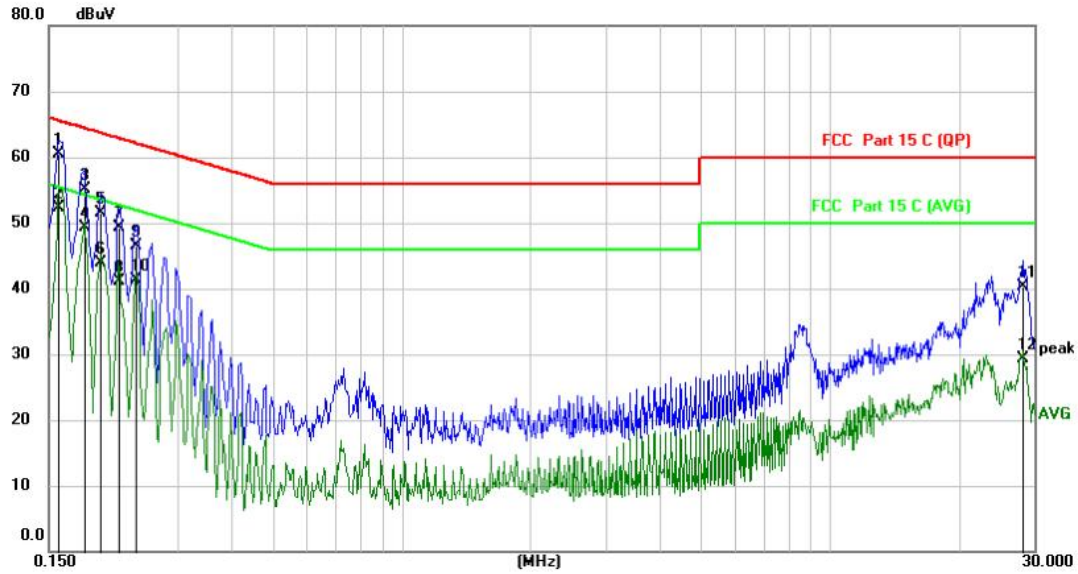
4.1.3. Test Data:

Test Mode1 / Line: Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1580	38.97	21.45	60.42	65.57	-5.15	QP	
2	*	0.1580	30.88	21.45	52.33	55.57	-3.24	AVG	
3		0.1819	33.76	21.40	55.16	64.40	-9.24	QP	
4		0.1819	27.88	21.40	49.28	54.40	-5.12	AVG	
5		0.1980	30.23	21.36	51.59	63.69	-12.10	QP	
6		0.1980	22.54	21.36	43.90	53.69	-9.79	AVG	
7		0.2179	27.94	21.36	49.30	62.90	-13.60	QP	
8		0.2179	19.72	21.36	41.08	52.90	-11.82	AVG	
9		0.2379	25.25	21.35	46.60	62.17	-15.57	QP	
10		0.2379	19.98	21.35	41.33	52.17	-10.84	AVG	
11		28.2540	14.26	25.97	40.23	60.00	-19.77	QP	
12		28.2540	3.42	25.97	29.39	50.00	-20.61	AVG	

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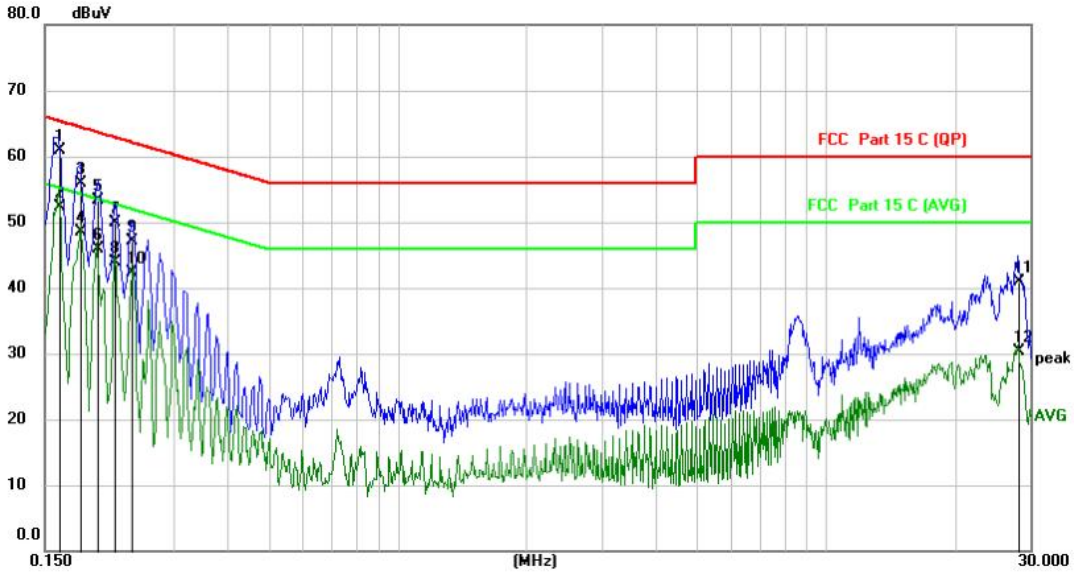
Test Mode1 / Line: Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	39.52	21.45	60.97	65.36	-4.39	QP	
2	*	0.1620	30.88	21.45	52.33	55.36	-3.03	AVG	
3		0.1819	34.53	21.41	55.94	64.40	-8.46	QP	
4		0.1819	27.17	21.41	48.58	54.40	-5.82	AVG	
5		0.1995	31.94	21.37	53.31	63.63	-10.32	QP	
6		0.1995	24.57	21.37	45.94	53.63	-7.69	AVG	
7		0.2184	28.60	21.36	49.96	62.88	-12.92	QP	
8		0.2184	22.51	21.36	43.87	52.88	-9.01	AVG	
9		0.2379	25.71	21.36	47.07	62.17	-15.10	QP	
10		0.2379	20.95	21.36	42.31	52.17	-9.86	AVG	
11		28.1500	15.15	25.80	40.95	60.00	-19.05	QP	
12		28.1500	4.60	25.80	30.40	50.00	-19.60	AVG	

Note:
1.Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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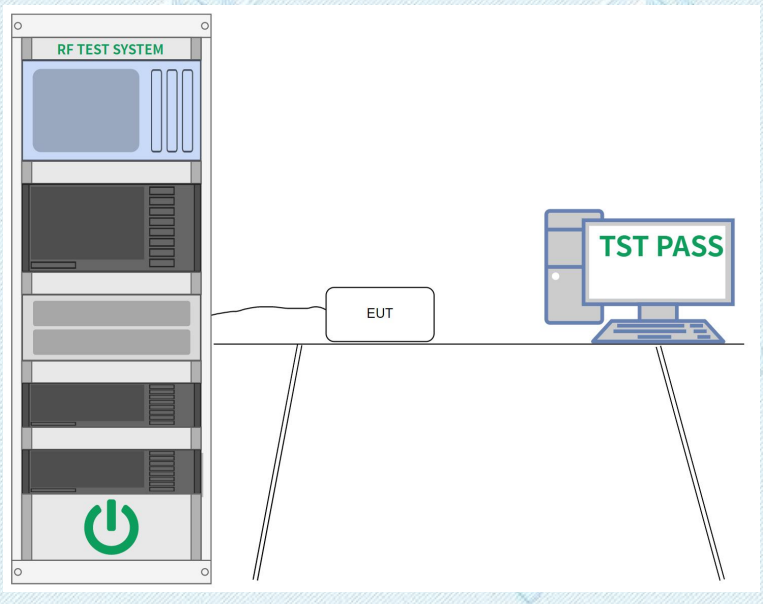
4.2. Occupied Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW >= [3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.2.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.2.2. Test Setup Diagram:



4.2.3. Test Data:

Please Refer to Appendix for Details.

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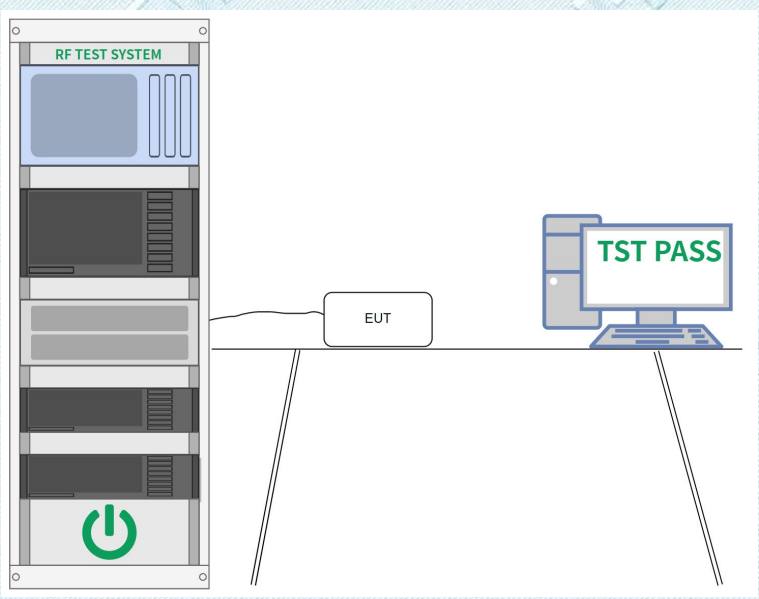
4.3. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2013, section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power

4.3.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.3.2. Test Setup Diagram:



4.3.3. Test Data:

Please Refer to Appendix for Details.

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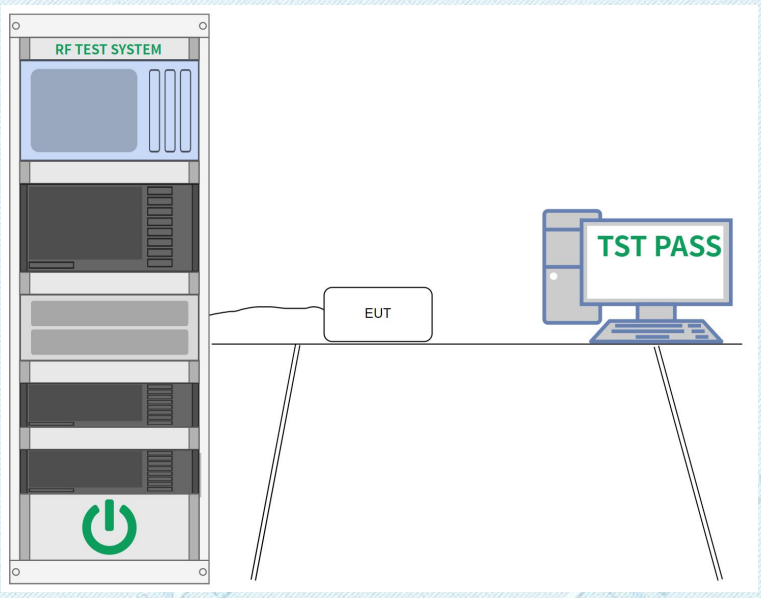
4.4. Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2013, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013, section 11.10, Maximum power spectral density level in the fundamental emission

4.4.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.4.2. Test Setup Diagram:



4.4.3. Test Data:

Please Refer to Appendix for Details.

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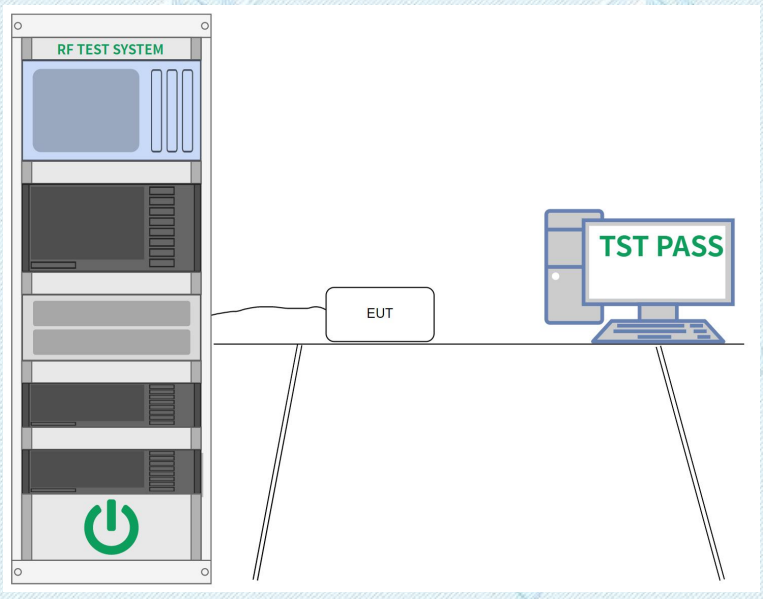
4.5. Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2013 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013 Section 11.11.1, Section 11.11.2, Section 11.11.3

4.5.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.5.2. Test Setup Diagram:



4.5.3. Test Data:

Please Refer to Appendix for Details.

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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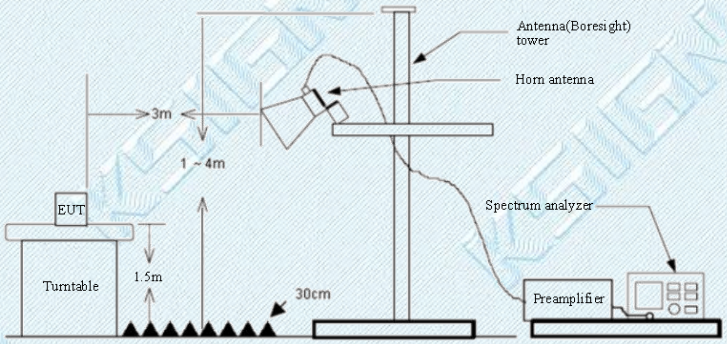
4.6. Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	Frequency (MHz) / Field strength (microvolts/meter) / Measurement distance (meters) 0.009-0.490 / 2400/F(kHz) / 300 0.490-1.705 / 24000/F(kHz) / 30 1.705-30.0 / 30 / 30 30-88 / 100 ** / 3 88-216 / 150 ** / 3 216-960 / 200 ** / 3 Above 960 / 500 / 3 ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
Test Method:	ANSI C63.10-2013 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013 section 6.10.5.2

4.6.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.6.2. Test Setup Diagram:



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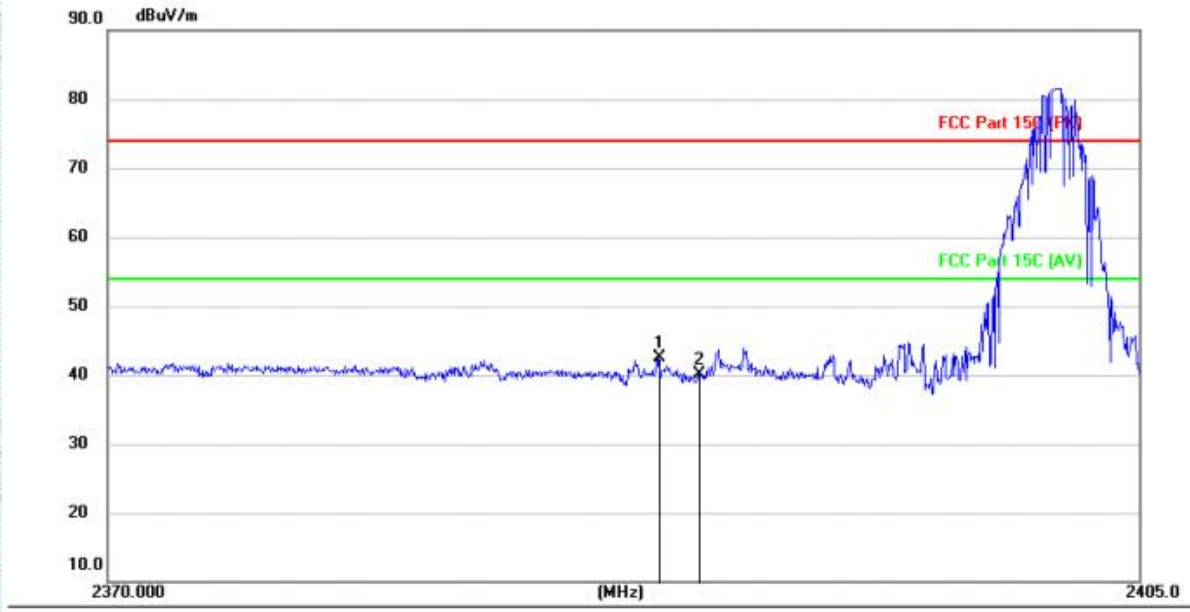
4.6.3. Test Data:

Test Mode1 / Polarization: Horizontal / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2388.644	52.62	-10.13	42.49	74.00	-31.51	peak
2		2390.000	50.21	-10.12	40.09	74.00	-33.91	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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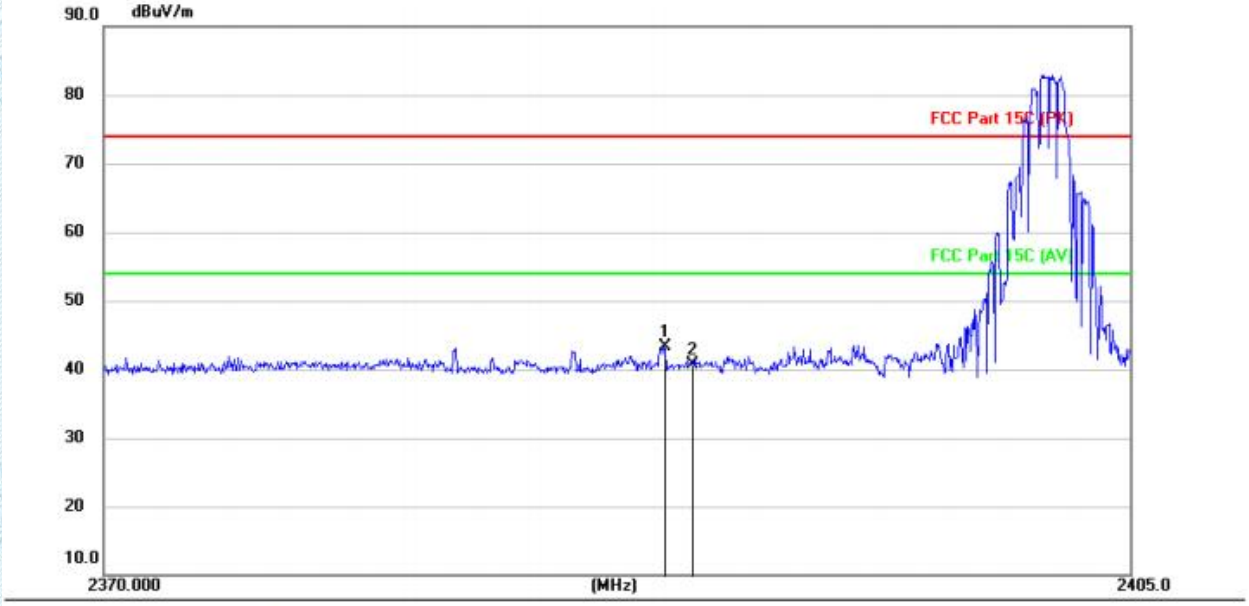
Test Mode1 / Polarization: Vertical / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2389.079	53.02	-9.71	43.31	74.00	-30.69	peak
2		2390.000	50.46	-9.70	40.76	74.00	-33.24	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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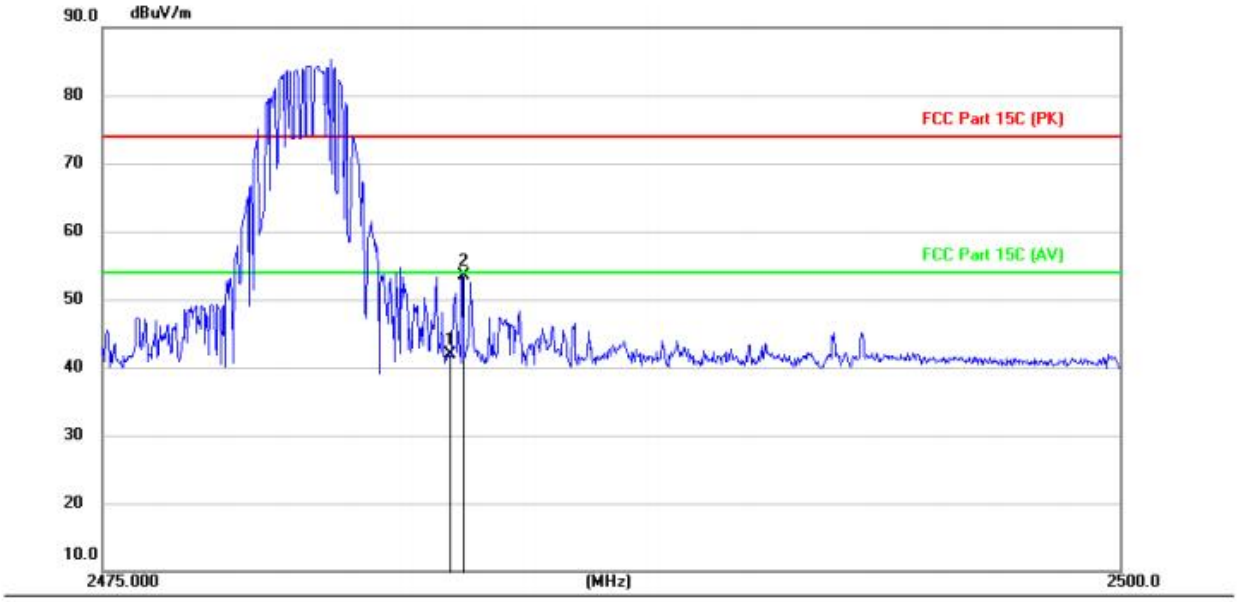
Test Mode1 / Polarization: Horizontal / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	51.94	-10.09	41.85	74.00	-32.15	peak
2	*	2483.845	63.59	-10.09	53.50	74.00	-20.50	peak

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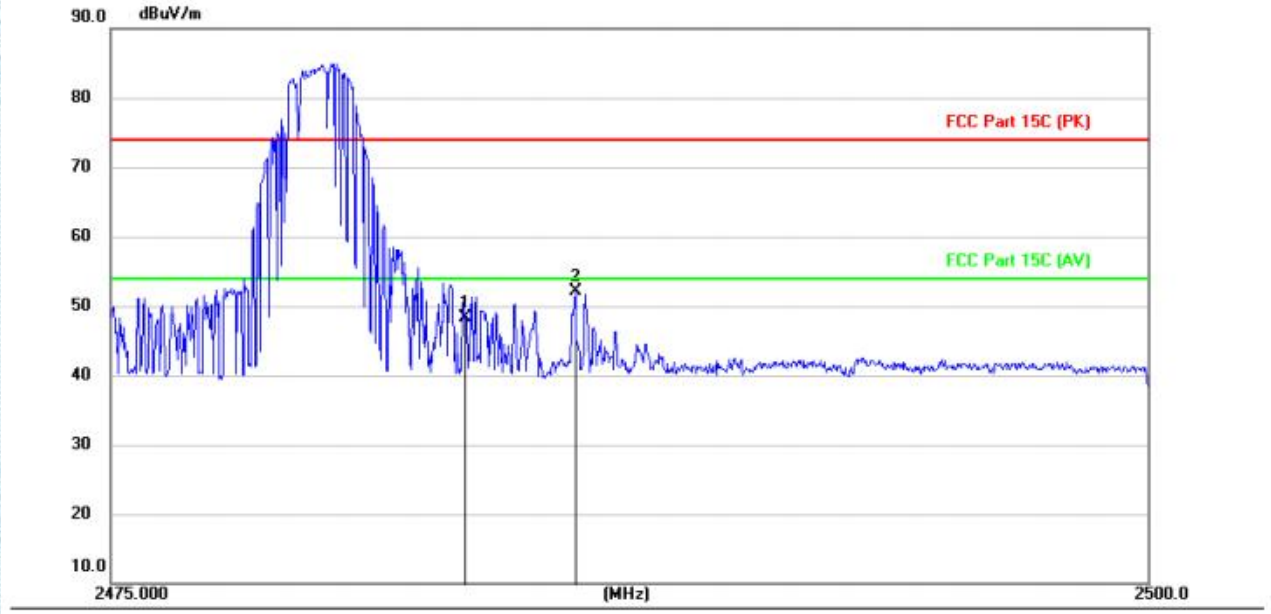
Test Mode1 / Polarization: Vertical / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	58.02	-9.68	48.34	74.00	-25.66	peak
2	*	2486.177	61.69	-9.68	52.01	74.00	-21.99	peak

Note:
1.Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3.Since the peak value is less than the limit of the AVG value, there is no AVG data
4.Pre-scan all mode, and found the GFSK_1M mode which it is worse case, so only show the test data for worse case.

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4.7. Emissions in frequency bands (below 1GHz)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

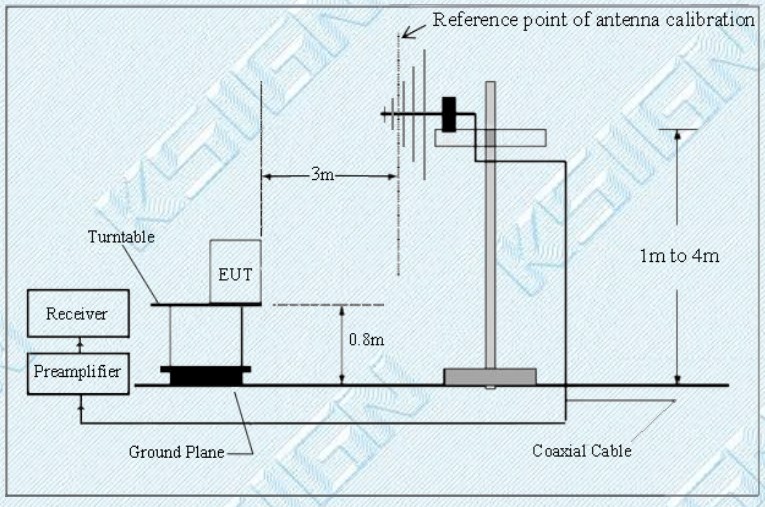
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013 section 6.6.4

4.7.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.7.2. Test Setup Diagram:



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4.7.3. Test Data:

Test Mode1 / Polarization: Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		35.7616	35.24	-11.37	23.87	40.00	-16.13	QP
2	*	61.0031	41.61	-9.68	31.93	40.00	-8.07	QP
3		103.3696	43.00	-11.79	31.21	43.50	-12.29	QP
4		123.6984	44.43	-13.10	31.33	43.50	-12.17	QP
5		447.1974	37.66	-2.62	35.04	46.00	-10.96	QP
6		604.3862	33.96	0.95	34.91	46.00	-11.09	QP

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Test Mode1 / Polarization: Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		45.0266	40.32	-10.28	30.04	40.00	-9.96	QP
2	*	67.0609	42.16	-11.33	30.83	40.00	-9.17	QP
3		129.7400	46.64	-13.61	33.03	43.50	-10.47	QP
4		217.5440	44.52	-11.32	33.20	46.00	-12.80	QP
5		336.5067	35.32	-6.33	28.99	46.00	-17.01	QP
6		630.3605	33.18	0.91	34.09	46.00	-11.91	QP

9 KHz - 30 MHz:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Note:
1.Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3.Since the peak value is less than the limit of the AVG value, there is no AVG data
4.Found the GFSK_1M mode which it is 2402MHz channel which it is worse case for below 1GHz, so only show the test data for worse case.

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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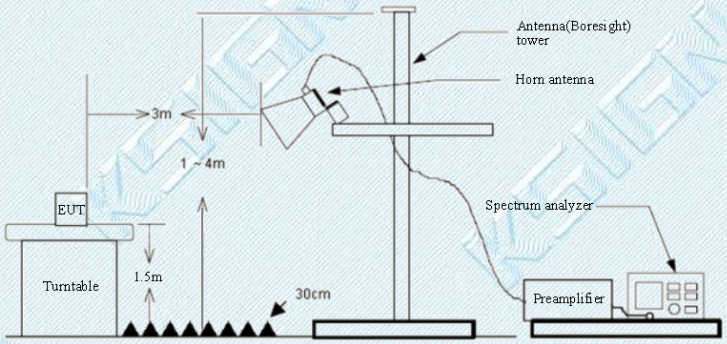
4.8. Emissions in frequency bands (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	<table><tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705-30.0</td><td>30</td><td>30</td></tr><tr><td>30-88</td><td>100 **</td><td>3</td></tr><tr><td>88-216</td><td>150 **</td><td>3</td></tr><tr><td>216-960</td><td>200 **</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>3</td></tr></table> ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
Test Method:	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013 section 6.6.4

4.8.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.3 °C
Humidity:	46.8 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.8.2. Test Setup Diagram:



Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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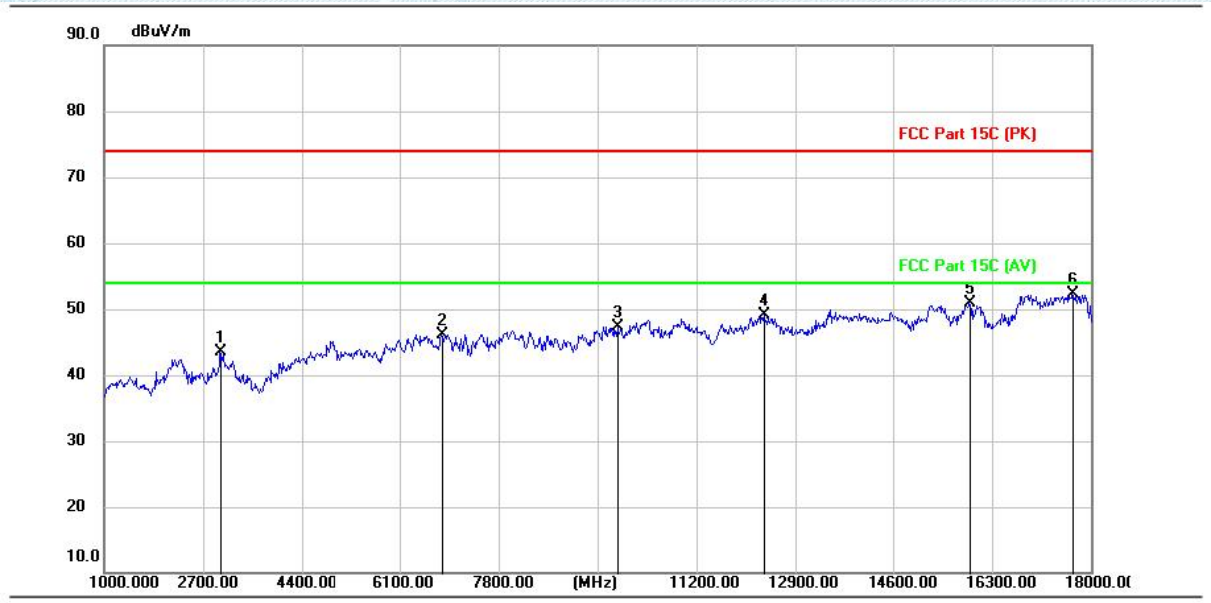
4.8.3. Test Data:

Test Mode1 / Polarization: Horizontal / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3002.600	50.32	-6.90	43.42	74.00	-30.58	peak
2		6815.700	44.54	1.56	46.10	74.00	-27.90	peak
3		9843.400	41.12	6.17	47.29	74.00	-26.71	peak
4		12357.700	41.21	7.90	49.11	74.00	-24.89	peak
5		15920.900	41.72	9.22	50.94	74.00	-23.06	peak
6	*	17685.500	36.19	16.11	52.30	74.00	-21.70	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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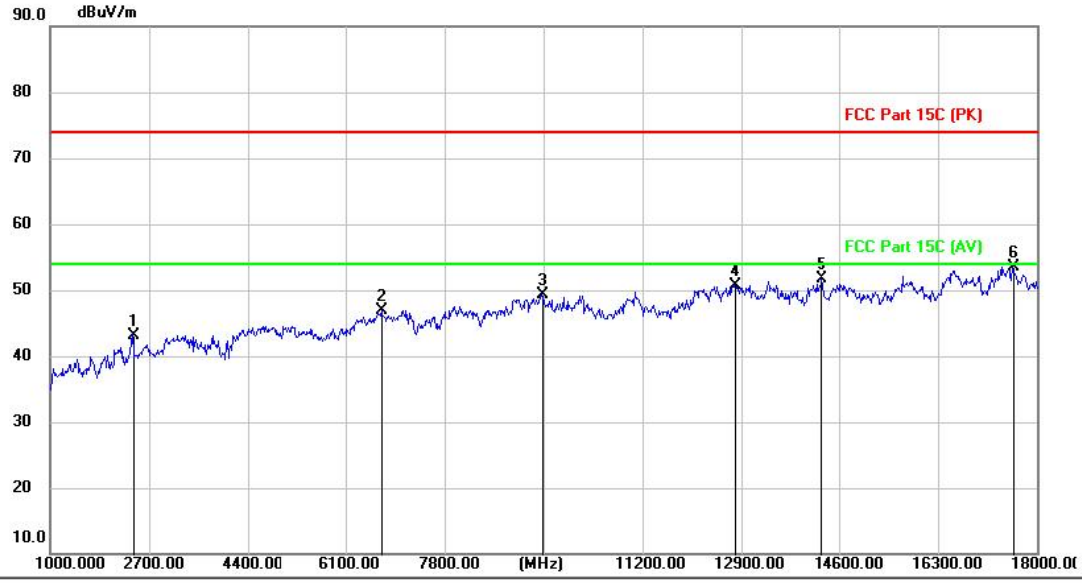
Test Mode1 / Polarization: Vertical / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2412.700	51.12	-7.92	43.20	74.00	-30.80	peak
2		6723.900	45.79	1.10	46.89	74.00	-27.11	peak
3		9479.600	43.93	5.30	49.23	74.00	-24.77	peak
4		12794.600	41.38	9.39	50.77	74.00	-23.23	peak
5		14294.000	39.68	11.95	51.63	74.00	-22.37	peak
6	*	17576.700	38.04	15.52	53.56	74.00	-20.44	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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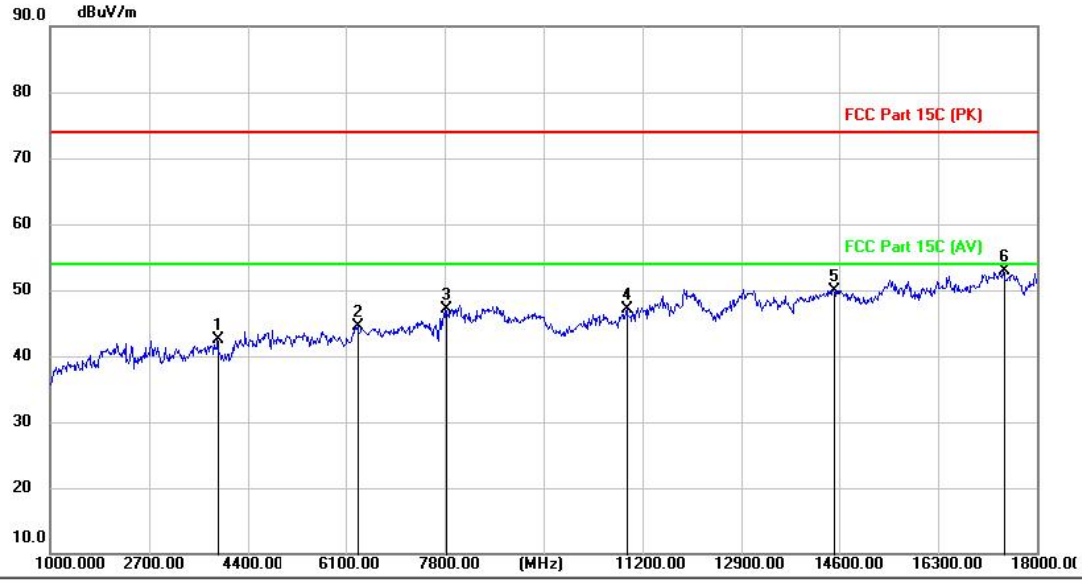
Test Mode1 / Polarization: Horizontal / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3884.900	48.05	-5.54	42.51	74.00	-31.49	peak
2		6309.100	44.81	-0.33	44.48	74.00	-29.52	peak
3		7823.800	43.05	4.12	47.17	74.00	-26.83	peak
4		10938.200	38.96	8.23	47.19	74.00	-26.81	peak
5		14506.500	38.17	11.82	49.99	74.00	-24.01	peak
6	*	17430.500	37.97	14.84	52.81	74.00	-21.19	peak

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Test Mode1 / Polarization: Vertical / CH: M

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2035.300	50.82	-9.35	41.47	74.00	-32.53	peak
2		5029.000	47.27	-2.97	44.30	74.00	-29.70	peak
3		9015.500	42.97	4.25	47.22	74.00	-26.78	peak
4		12138.400	40.84	8.01	48.85	74.00	-25.15	peak
5		15720.300	41.37	9.15	50.52	74.00	-23.48	peak
6	*	17767.100	35.95	16.48	52.43	74.00	-21.57	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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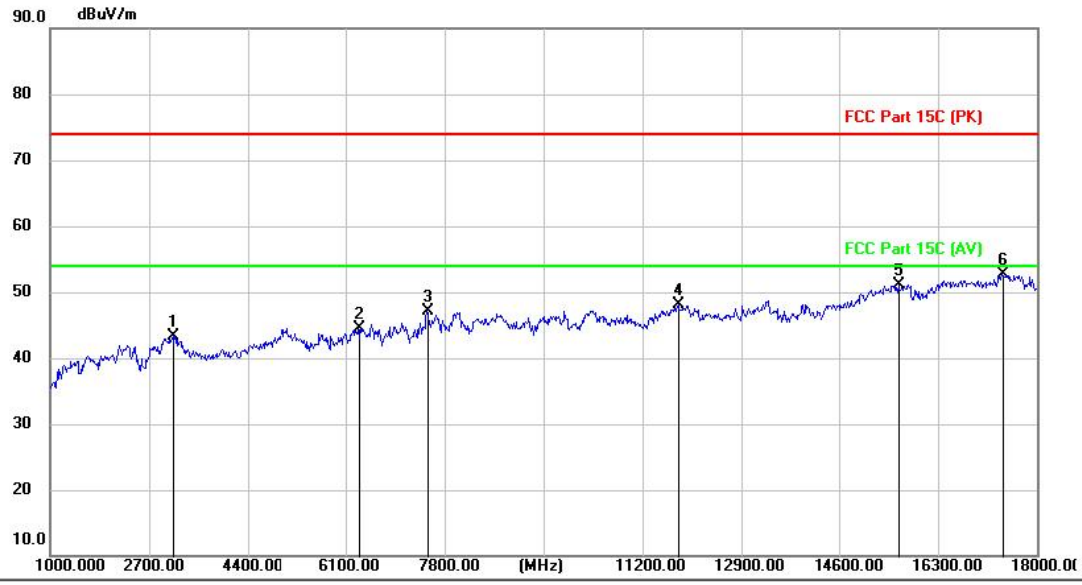
Test Mode1 / Polarization: Horizontal / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3118.200	50.20	-6.86	43.34	74.00	-30.66	peak
2		6334.600	44.78	-0.23	44.55	74.00	-29.45	peak
3		7502.500	43.80	3.36	47.16	74.00	-26.84	peak
4		11818.800	40.15	7.99	48.14	74.00	-25.86	peak
5		15630.200	41.97	9.15	51.12	74.00	-22.88	peak
6	*	17418.600	37.89	14.80	52.69	74.00	-21.31	peak

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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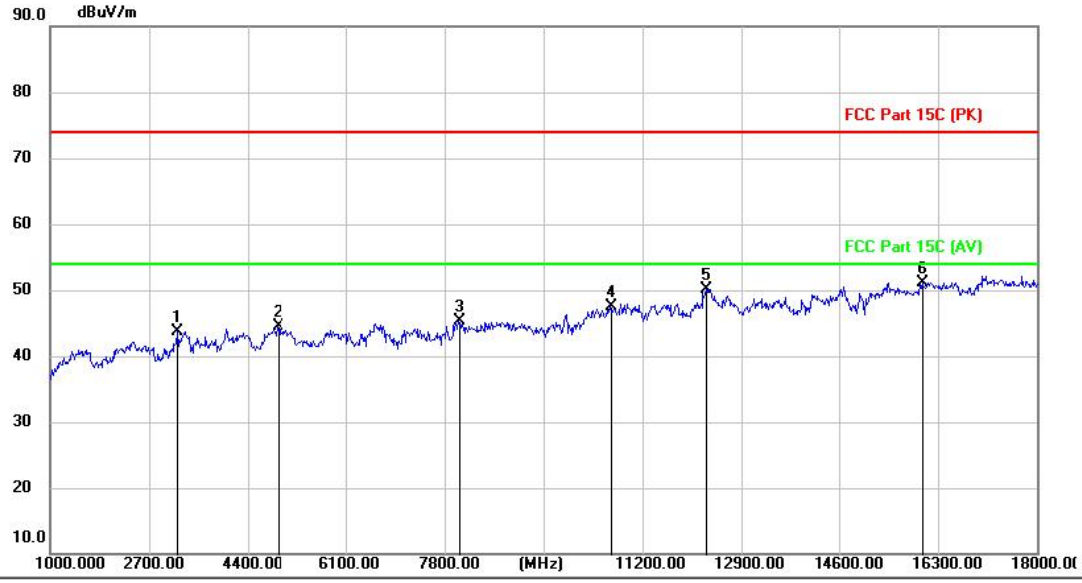
Test Mode1 / Polarization: Vertical / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3193.000	50.50	-6.75	43.75	74.00	-30.25	peak
2		4923.600	47.83	-3.41	44.42	74.00	-29.58	peak
3		8048.200	40.57	4.83	45.40	74.00	-28.60	peak
4		10645.800	40.11	7.35	47.46	74.00	-26.54	peak
5		12291.400	42.30	7.86	50.16	74.00	-23.84	peak
6	*	16038.200	41.65	9.51	51.16	74.00	-22.84	peak

Note:
1.Measurement = Reading level + Correct Factor
Correct Factor=Antenna Factor + Cable Loss - Preamplifier Factor
Over = Measurement -Limit
2. Since the peak value is less than the limit of the AVG value, there is no AVG data.
3.From 18GHz to 26.5GHz,the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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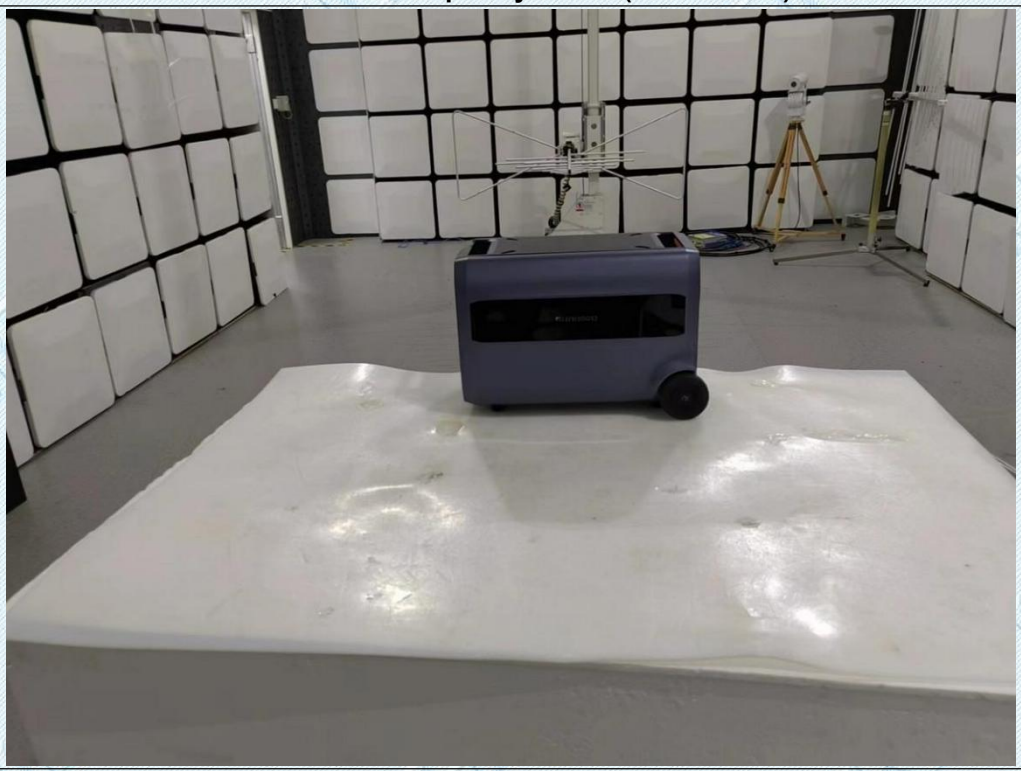
5. EUT TEST PHOTOS

Conducted Emission at AC power line

Emissions in frequency bands (below 1GHz)



Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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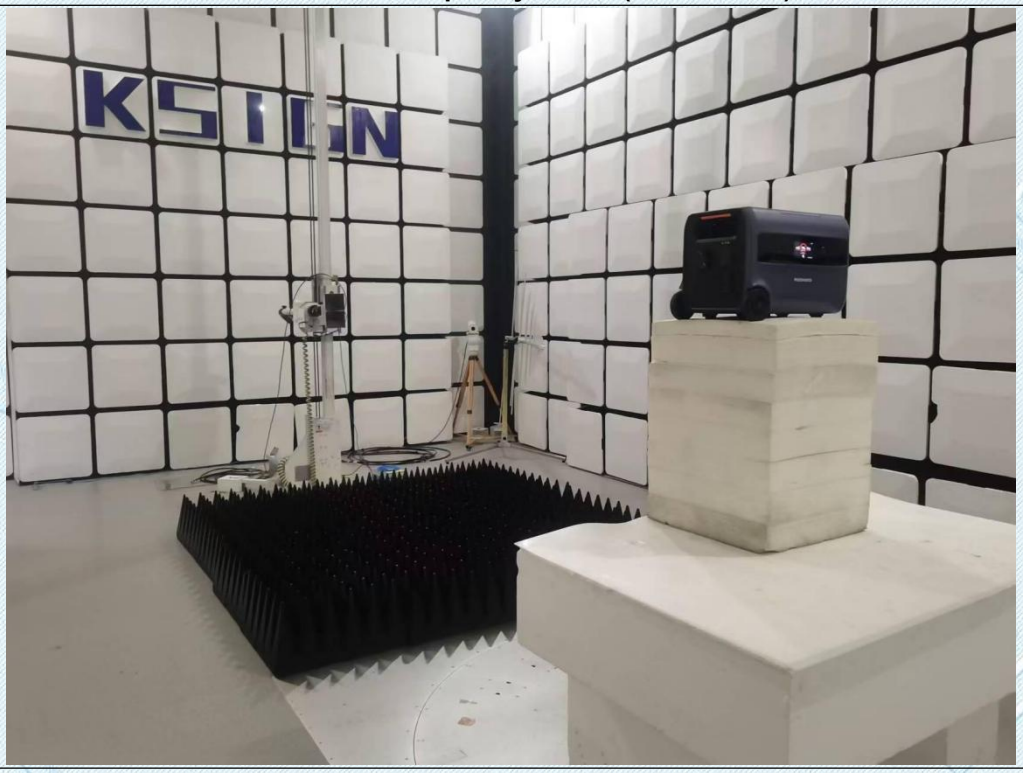
Emissions in frequency bands (above 1GHz)


RF Conducted


Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Refer to Appendix - EUT Photos for KS2404S1505E.

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Appendix

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6.1. Appendix A: DTS Bandwidth

6.1.1. Test Result

TestMode	Antenna	Freq[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.67	2401.66	2402.33	0.5	PASS
		2440	0.66	2439.66	2440.32	0.5	PASS
		2480	0.67	2479.66	2480.32	0.5	PASS

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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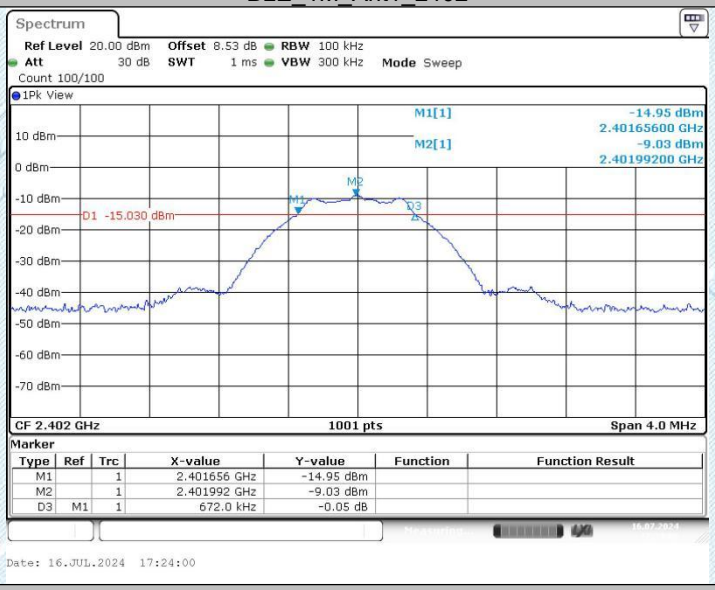
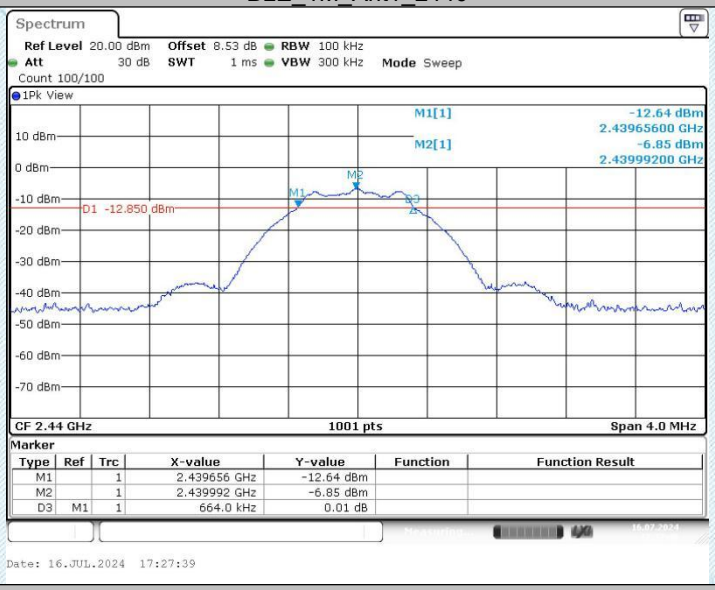
6.1.2. Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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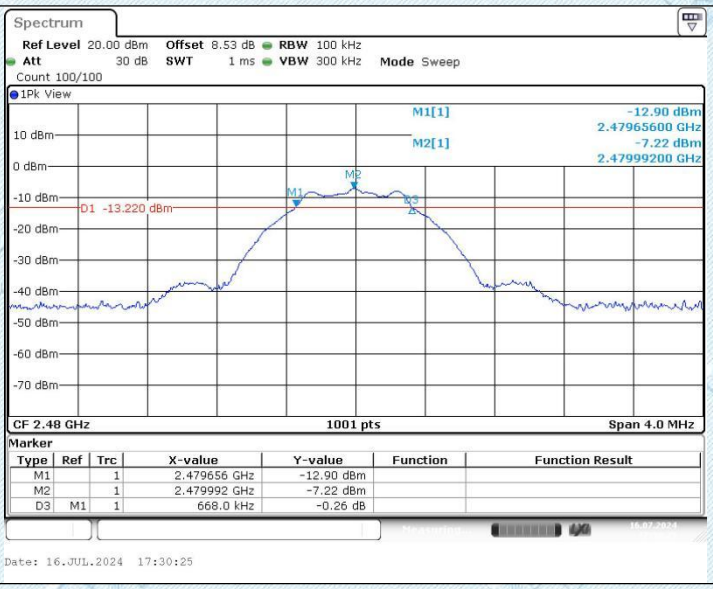

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.2. Appendix B: Occupied Channel Bandwidth

6.2.1. Test Result

TestMode	Antenna	Freq[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.043	2401.469	2402.511	---	---
		2440	1.039	2439.473	2440.511	---	---
		2480	1.039	2479.473	2480.511	---	---

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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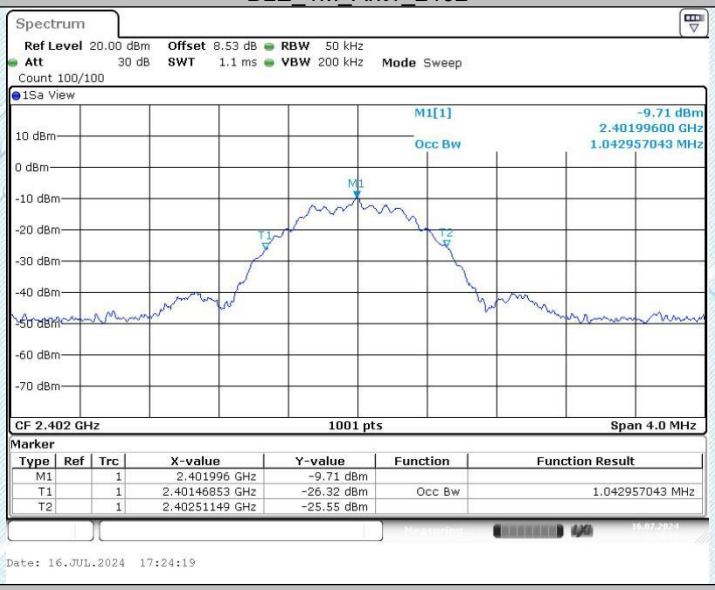
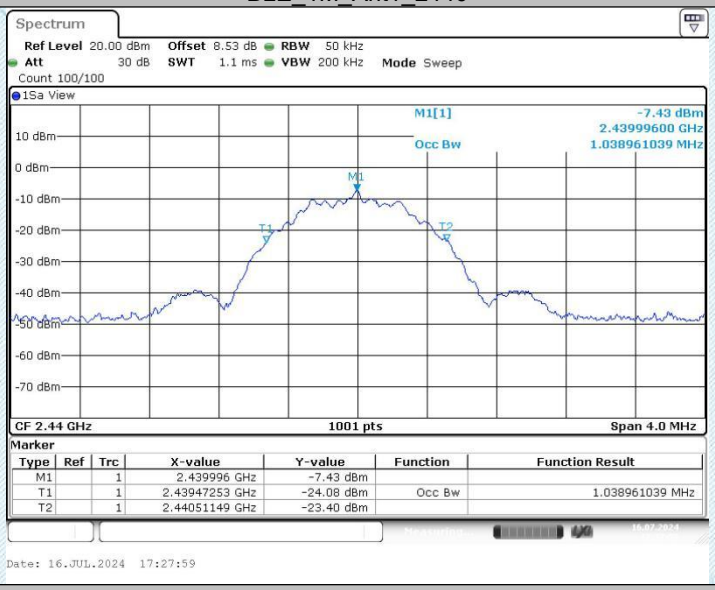
6.2.2. Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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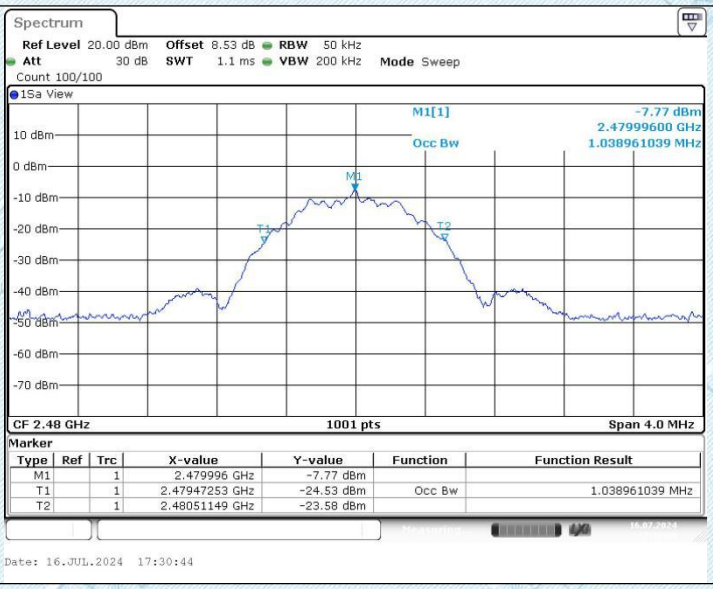

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.3. Appendix C: Maximum conducted output power

6.3.1. Test Result

TestMode	Antenna	Freq[MHz]	Conducted Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-8.63	≤30	PASS
		2440	-6.55	≤30	PASS
		2480	-6.86	≤30	PASS

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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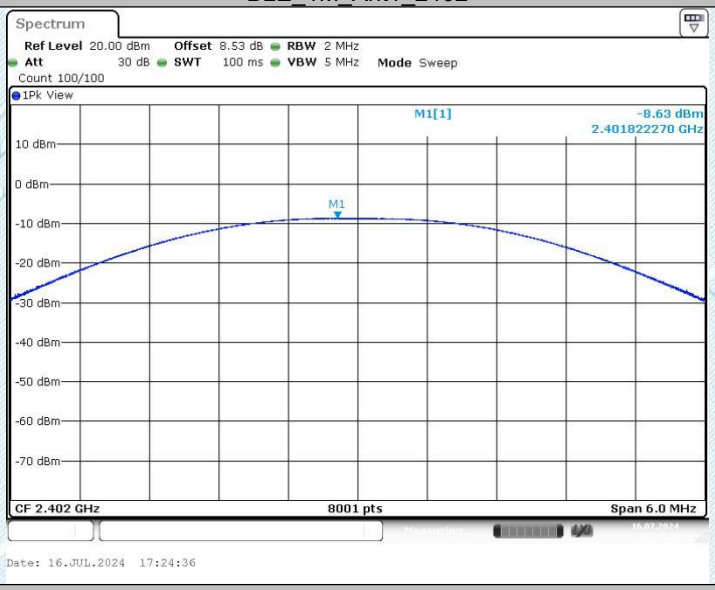
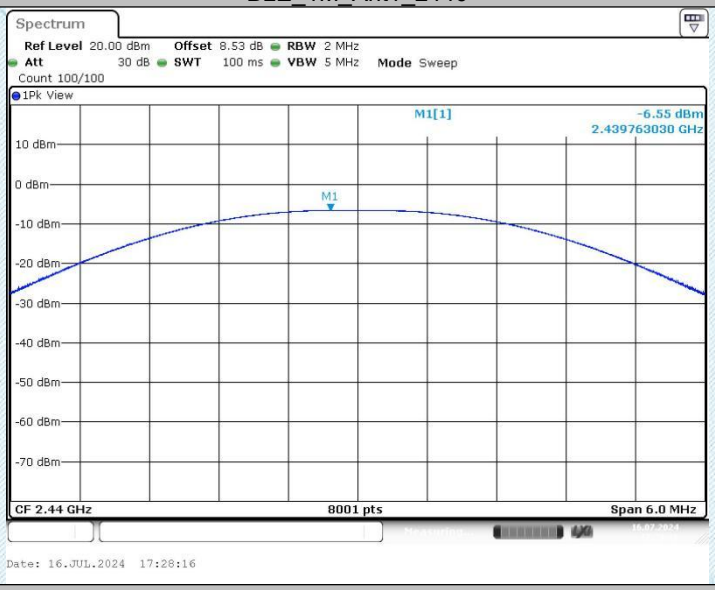
6.3.2. Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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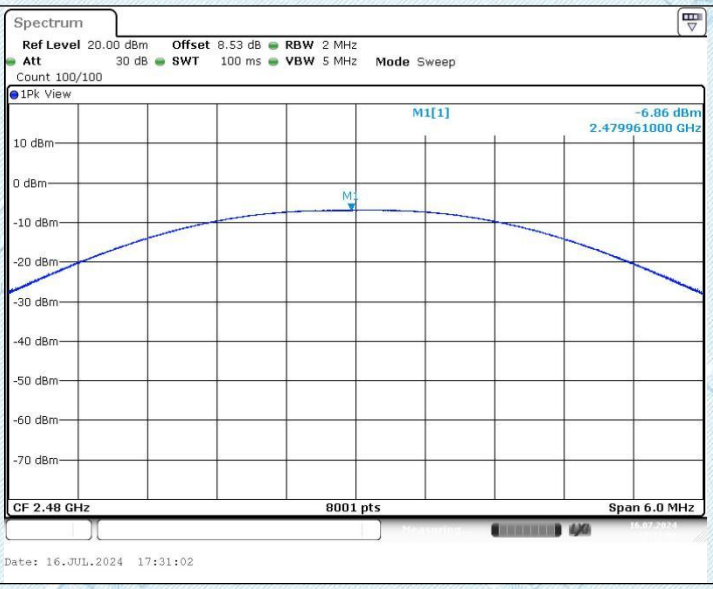

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.4. Appendix D: Maximum power spectral density

6.4.1. Test Result

TestMode	Antenna	Freq[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-24.27	≤8.00	PASS
		2440	-22.71	≤8.00	PASS
		2480	-23.14	≤8.00	PASS

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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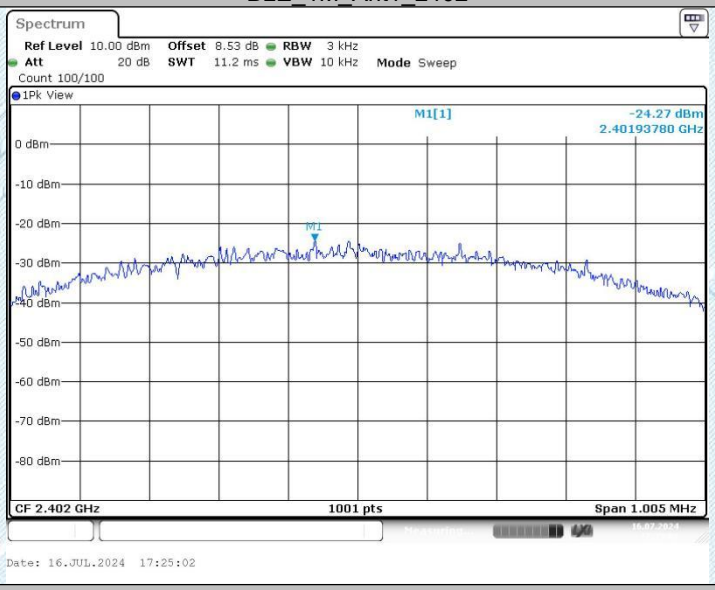
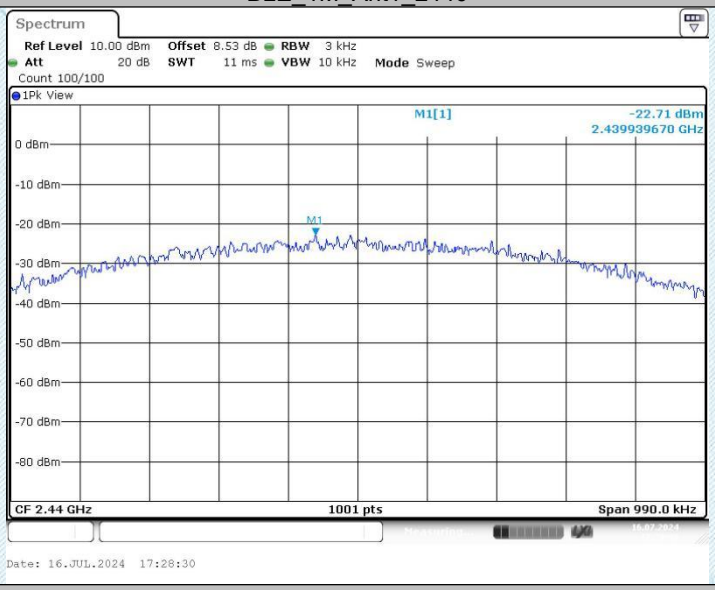
6.4.2. Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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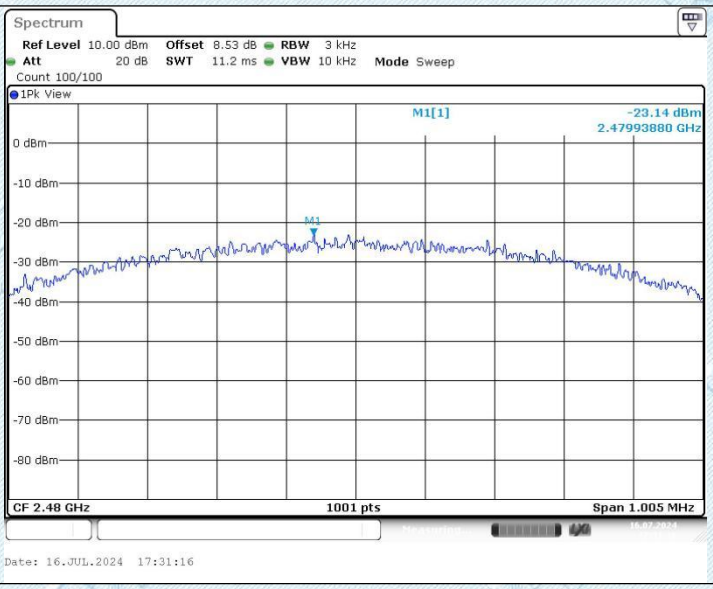

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.5. ppendix E: Reference level measurement

6.5.1. Test Result

TestMode	Antenna	Freq[MHz]	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2401.99	-9.21
		2440	2439.99	-6.92
		2480	2479.99	-7.19

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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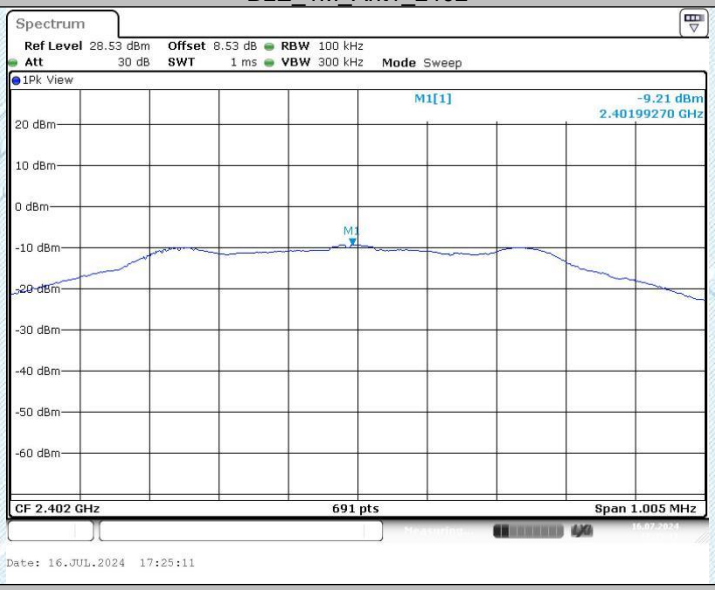
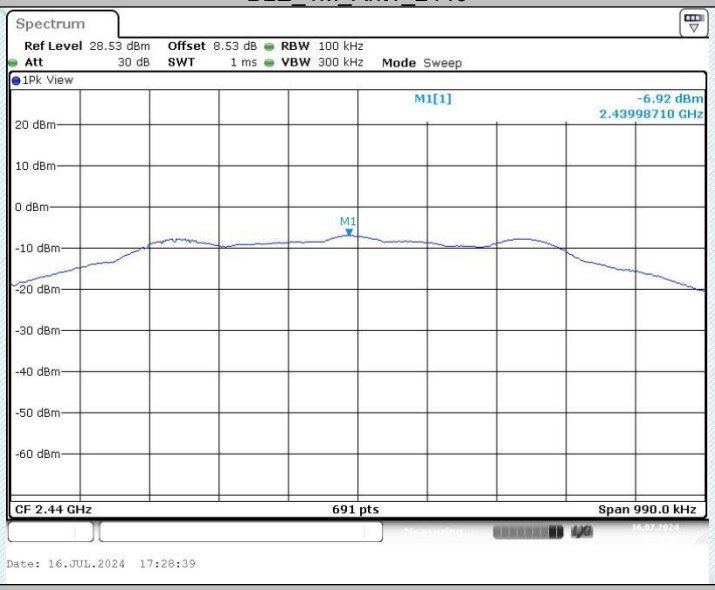
6.5.2. Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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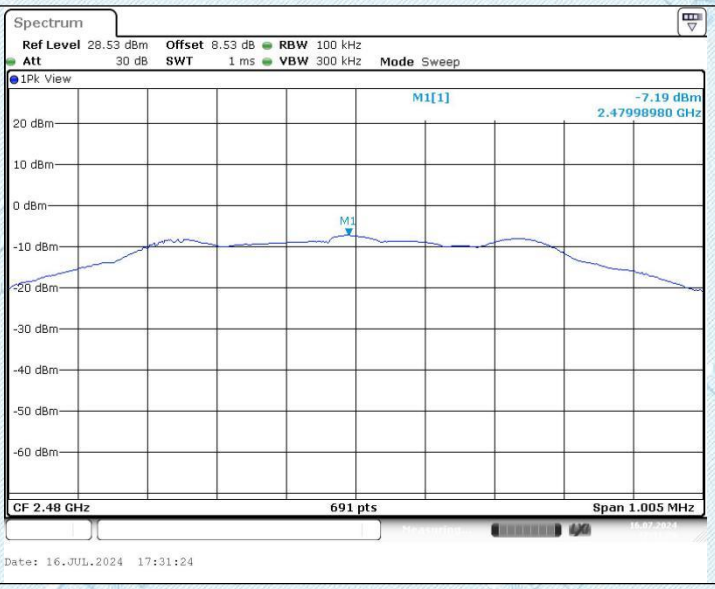

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.6. Appendix F: Band edge measurements

6.6.1. Test Result

TestMode	Antenna	ChName	Freq[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-9.21	-41.57	≤-29.21	PASS
		High	2480	-7.19	-40.88	≤-27.19	PASS

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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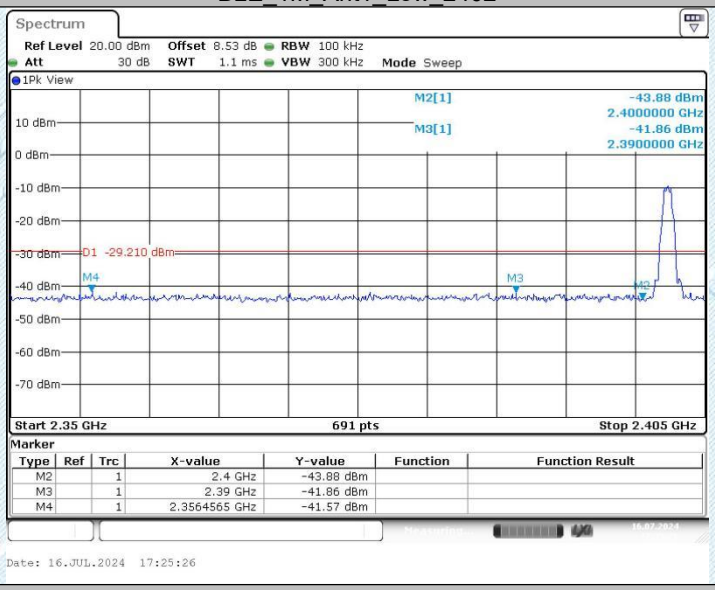
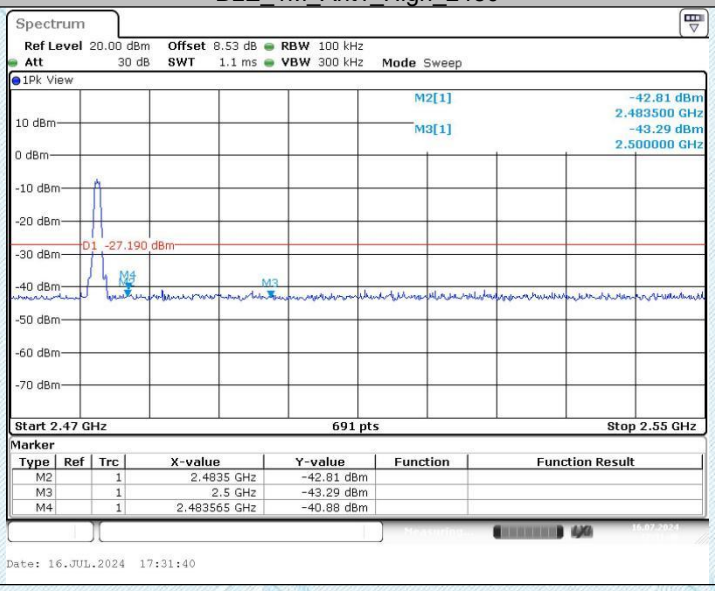
6.6.2. Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.7. Appendix G: Conducted Spurious Emission

6.7.1. Test Result

TestMode	Antenna	Freq[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	-9.21	-52.34	≤-29.21	PASS
			1000~26500	-9.21	-46.67	≤-29.21	PASS
		2440	30~1000	-6.92	-53.06	≤-26.92	PASS
			1000~26500	-6.92	-47.35	≤-26.92	PASS
		2480	30~1000	-7.19	-52.89	≤-27.19	PASS
			1000~26500	-7.19	-47.17	≤-27.19	PASS

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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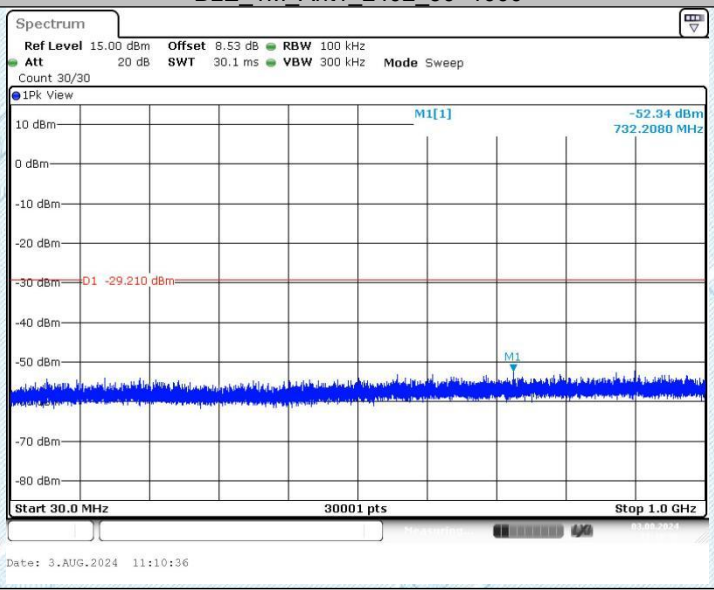
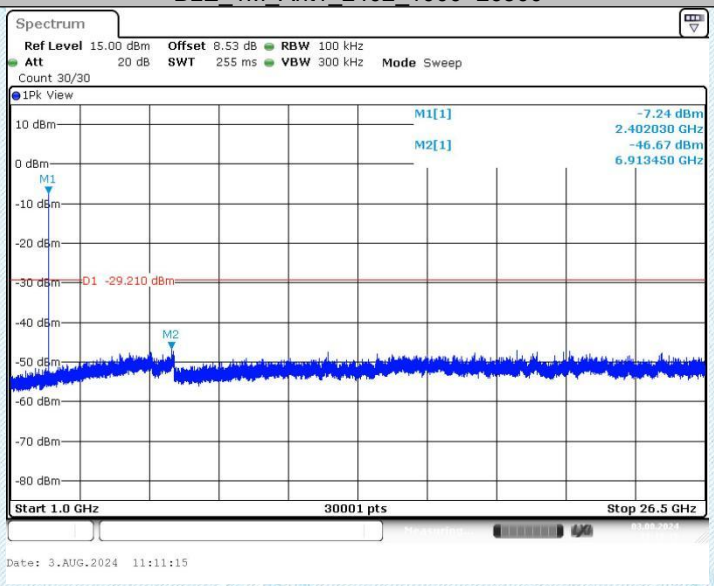
6.7.2. Test Graphs

BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_30~1000

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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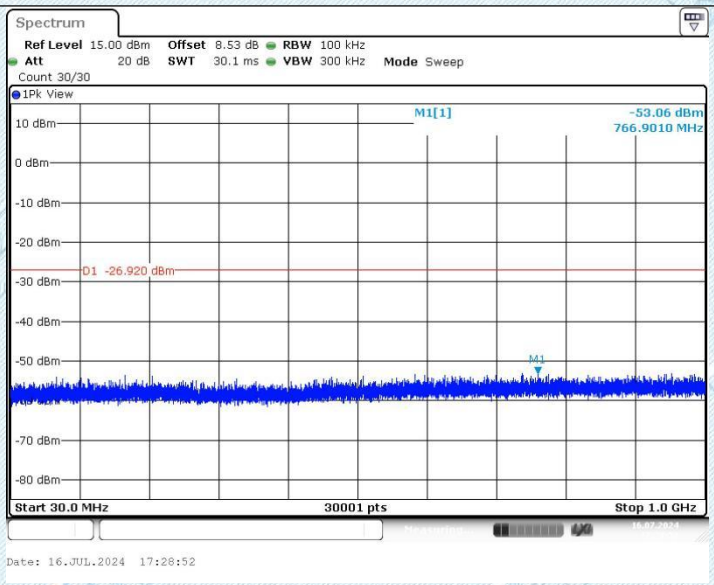
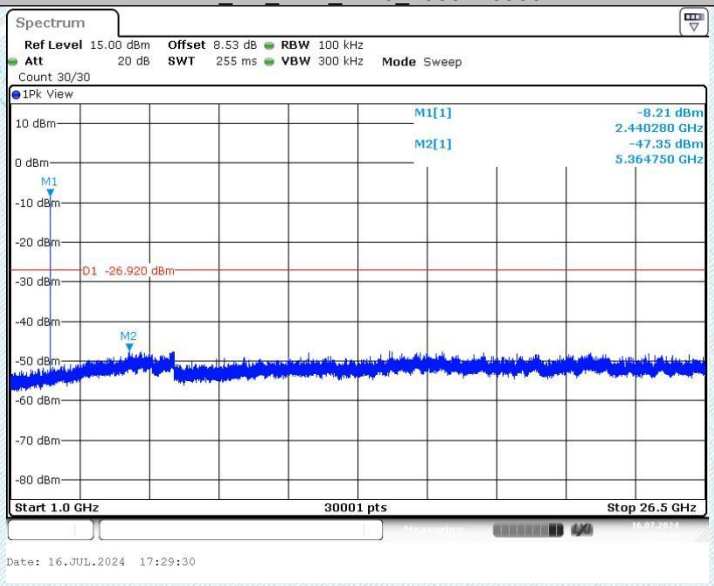
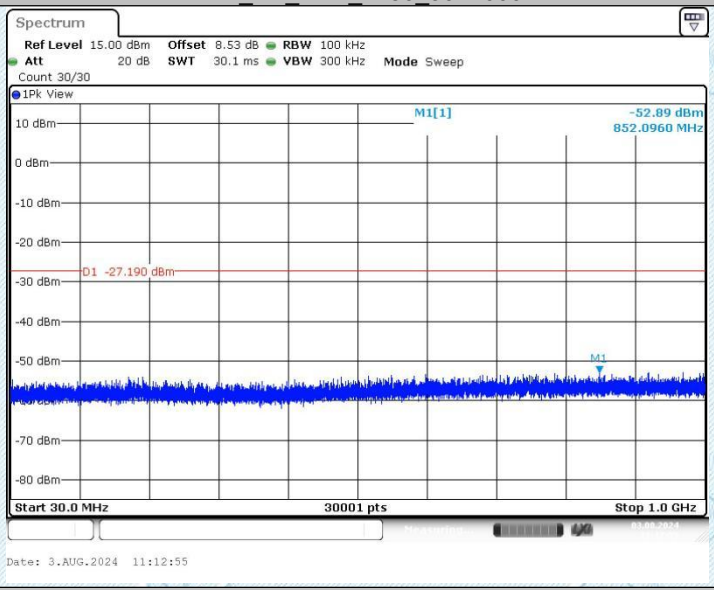


BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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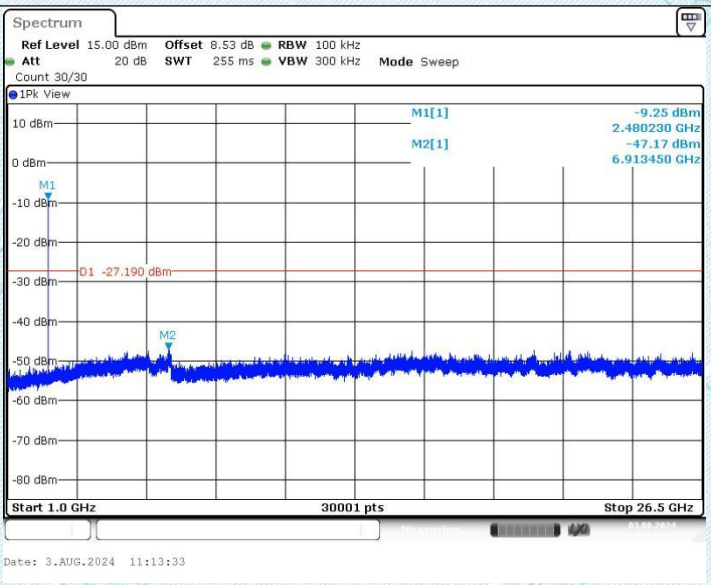

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.8. Appendix H: Duty Cycle

6.8.1. Test Result

TestMode	Antenna	Freq[MHz]	ON Time [ms]	Period [ms]	DC [%]	Limit	Verdict
BLE_1M	Ant1	2440	2.14	2.50	85.60	---	---

DC=ON Time/Period*100%

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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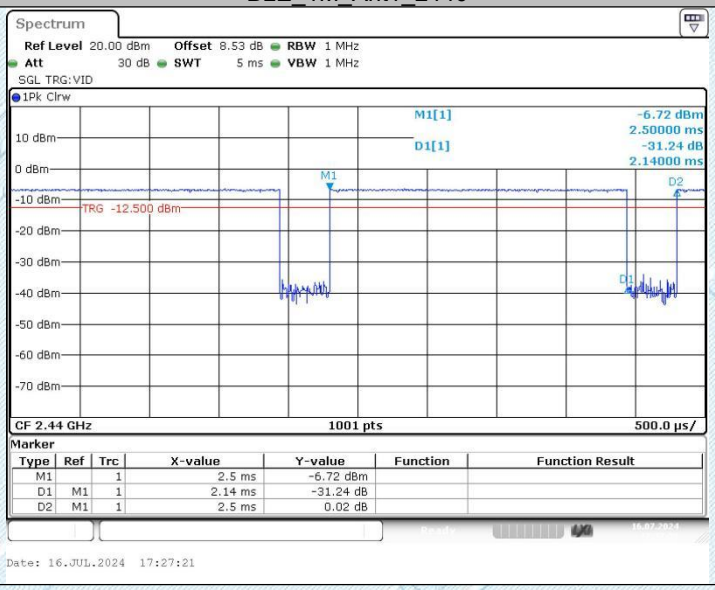
6.8.2. Test Graphs

BLE_1M_Ant1_2440



--THE END--

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