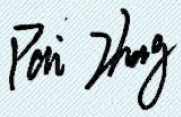
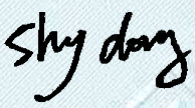
TEST REPORT

Report No. :	KS2405S1702E01
FCC ID :	2BGDJ-LS01
Applicant :	Shenzhen linkedsafe Sports Technology Co., Ltd.
Address :	Building C, Room 503, Huafeng Zhihui Innovation Park, Gushu 2nd Road, Gushu Community, Xixiang Street, Bao'an District, Shenzhen.
Manufacturer :	Shenzhen linkedsafe Sports Technology Co., Ltd.
Address :	Building C, Room 503, Huafeng Zhihui Innovation Park, Gushu 2nd Road, Gushu Community, Xixiang Street, Bao'an District, Shenzhen.
Product Name :	smart helmet
Trademark :	linkedsafe
Model/Type reference :	**LS01-B**, LS01-W
Standard :	47 CFR Part 15.247
Date of Receipt :	May 10, 2024
Date of Test Date :	May 10, 2024 to May 21, 2024
Date of issue :	May 21, 2024
Test result :	**Pass**

Conclusion :	The submitted sample was found to COMPLY with the standards above.

Prepared by: (Printed name + Signature)	Pai Zheng	
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	May 21, 2024	Original

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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 15.215(c)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(1)	Pass
Channel Separation	47 CFR Part 15.247	47 CFR 15.247(a)(1)	Pass
Number of Hopping Frequencies	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	Pass
Dwell Time	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	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: L13261
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
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:	smart helmet
Trademark:	linkedsafe
Model / Type reference:	**LS01-B**, LS01-W
Model Difference:	The difference between product models is only the color of the appearance is not the same, and the different model names are for the market demand. Other power supply methods, internal structure, circuit and key components are the same, do not affect the safety and electromagnetic compatibility performance.
Power Supply:	Battery powered DC 3.7V
Power Adaptor:	DC 5V
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	79
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type:	PCB Antenna
Antenna Gain:	2.07dBi
Max TX Power:	2.86dBm
Hardware Version:	V1.0
Software Version:	V1.0
Fixed frequency Software:	BT_Tool
Power Level:	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
Power Adapter	HUAWEI	HW-200440C00	/	/

2.3. Description of Test Modes

No.	Title	Description of Mode
Test Mode1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation.
Test Mode2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation.
Test Mode3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation.
Test Mode4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
Test Mode5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
Test Mode6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.

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2.4. Operation channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-

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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

Channel Separation Number of Hopping Frequencies Dwell Time Emissions in non-restricted frequency bands Occupied Bandwidth Maximum Conducted Output Power				
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.

3.1.1. Conclusion:

The directional gain of the antenna less than 6dBi. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used. Antenna structure please refer to the EUT internal photographs antenna photo.

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:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

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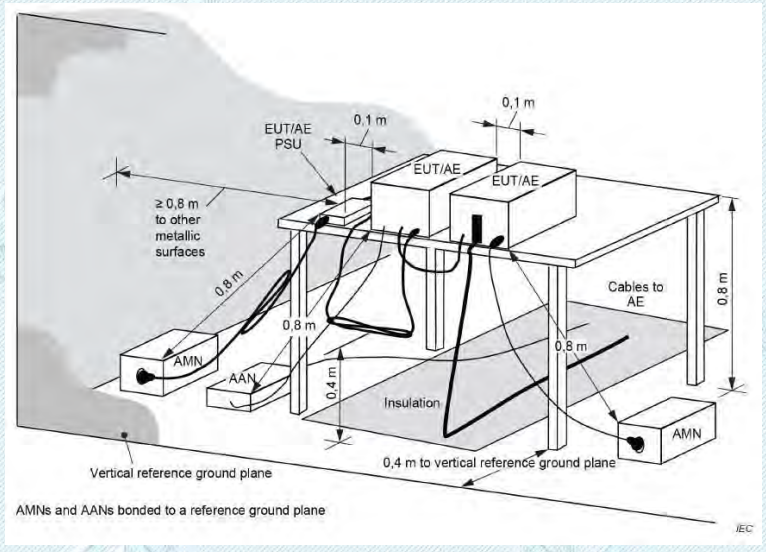
4.1.2. Test Setup Diagram:



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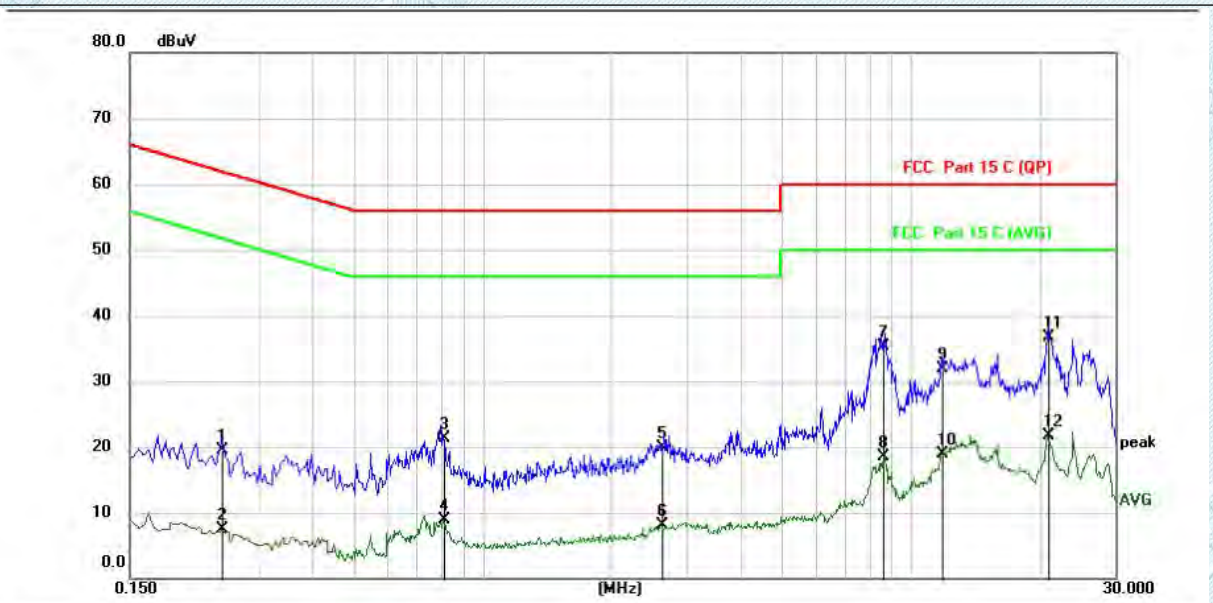
4.1.3. Test Data:

Test Mode1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2459	8.16	11.35	19.51	61.89	-42.38	QP	
2		0.2459	-3.94	11.35	7.41	51.89	-44.48	AVG	
3		0.8100	9.88	11.41	21.29	56.00	-34.71	QP	
4		0.8100	-2.48	11.41	8.93	46.00	-37.07	AVG	
5		2.6099	8.38	11.58	19.96	56.00	-36.04	QP	
6		2.6099	-3.46	11.58	8.12	46.00	-37.88	AVG	
7		8.6257	22.71	12.59	35.30	60.00	-24.70	QP	
8		8.6257	5.90	12.59	18.49	50.00	-31.51	AVG	
9		11.7700	18.39	13.43	31.82	60.00	-28.18	QP	
10		11.7700	5.54	13.43	18.97	50.00	-31.03	AVG	
11	*	20.9140	20.80	15.96	36.76	60.00	-23.24	QP	
12		20.9140	5.73	15.96	21.69	50.00	-28.31	AVG	

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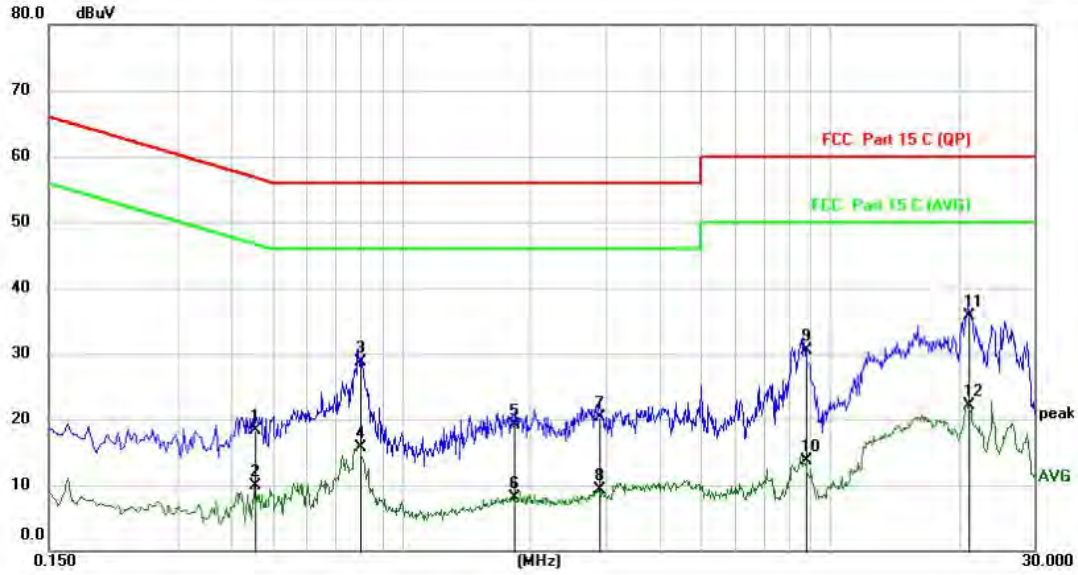
Test Mode1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4540	7.05	11.32	18.37	56.80	-38.43	QP	
2		0.4540	-1.43	11.32	9.89	46.80	-36.91	AVG	
3		0.8020	17.38	11.38	28.76	56.00	-27.24	QP	
4		0.8020	4.37	11.38	15.75	46.00	-30.25	AVG	
5		1.8260	7.63	11.51	19.14	56.00	-36.86	QP	
6		1.8260	-3.39	11.51	8.12	46.00	-37.88	AVG	
7		2.8860	8.59	11.63	20.22	56.00	-35.78	QP	
8		2.8860	-2.25	11.63	9.38	46.00	-36.62	AVG	
9		8.7779	17.95	12.60	30.55	60.00	-29.45	QP	
10		8.7779	1.13	12.60	13.73	50.00	-36.27	AVG	
11	*	21.1219	19.67	16.11	35.78	60.00	-24.22	QP	
12		21.1219	5.96	16.11	22.07	50.00	-27.93	AVG	

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4.2. Occupied Bandwidth

Test Requirement:	47 CFR 15.215(c)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method:	ANSI C63.10-2013, section 7.8.7, For occupied bandwidth measurements, use the procedure in 6.9.2. KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “−xx dB down” requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the “−xx dB down amplitude” using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “−xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division

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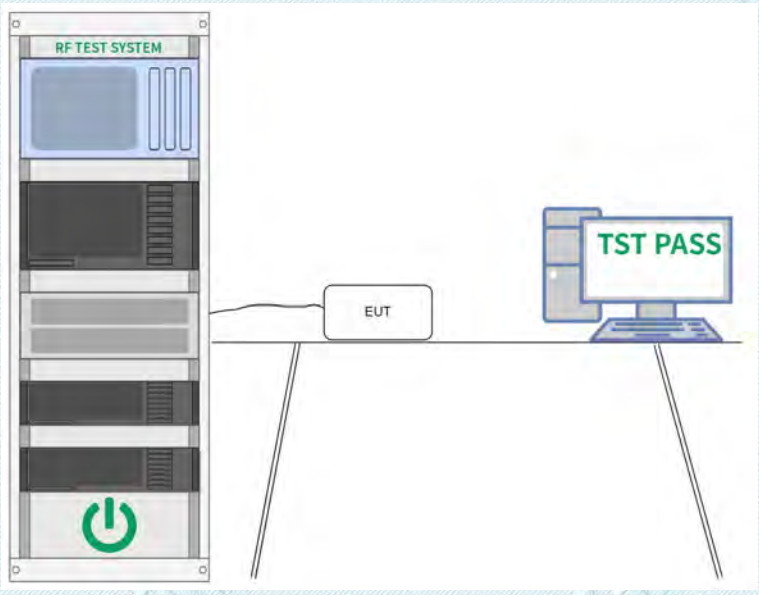
	shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.2.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1, Test Mode2, Test Mode3

4.2.2. Test Setup Diagram:



4.2.3. 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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4.3. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(1)
Test Limit:	Refer to 47 CFR 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test Method:	ANSI C63.10-2013, section 7.8.5 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test: a) Use the following spectrum analyzer settings: 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. 2) RBW > 20 dB bandwidth of the emission being measured. 3) VBW >= RBW. 4) Sweep: Auto. 5) Detector function: Peak. 6) Trace: Max hold. b) Allow trace to stabilize. c) Use the marker-to-peak function to set the marker to the peak of the emission. d) The indicated level is the peak output power, after any corrections for external attenuators and cables. e) A plot of the test results and setup description shall be included in the test report. NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

4.3.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1, Test Mode2, Test Mode3

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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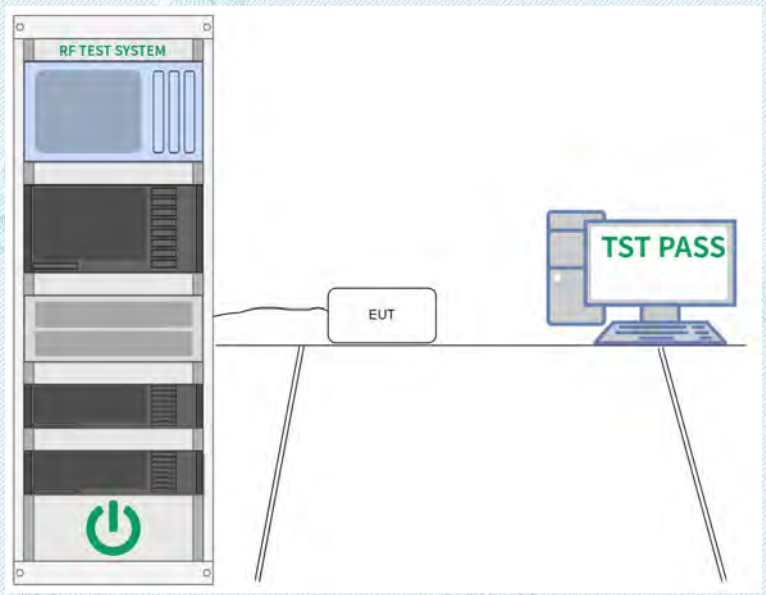
4.3.2. Test Setup Diagram:



4.3.3. 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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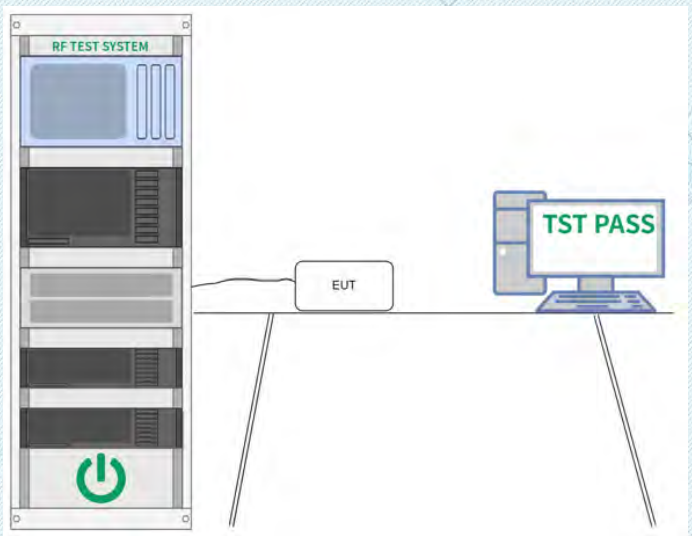
4.4. Channel Separation

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Test Method:	ANSI C63.10-2013, section 7.8.2 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

4.4.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode4, Test Mode5, Test Mode6

4.4.2. Test Setup Diagram:



4.4.3. 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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4.5. Number of Hopping Frequencies

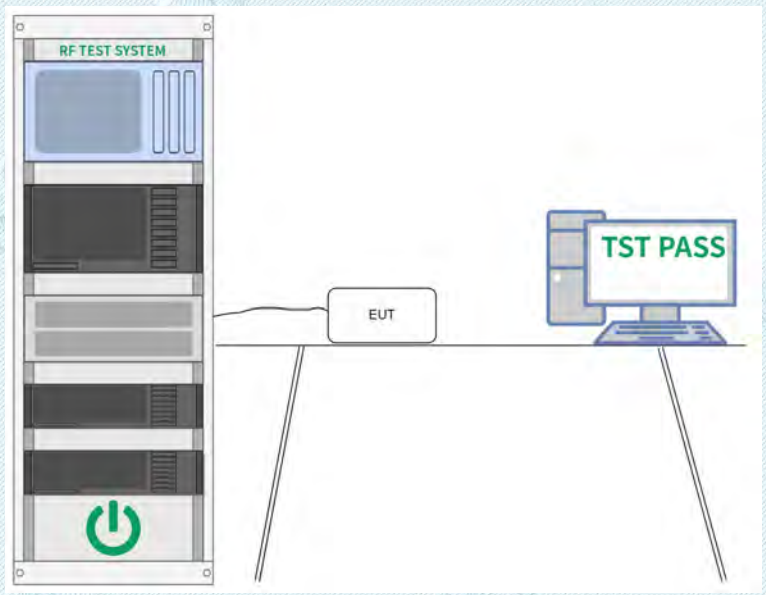
Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2013, section 7.8.3 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen. b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. c) VBW ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

4.5.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode4, Test Mode5, Test Mode6

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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com

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. Dwell Time

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2013, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Zero span, centered on a hopping channel. b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel. c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel. d) Detector function: Peak. e) Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation: (Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation. The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

4.6.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode4, Test Mode5, Test Mode6

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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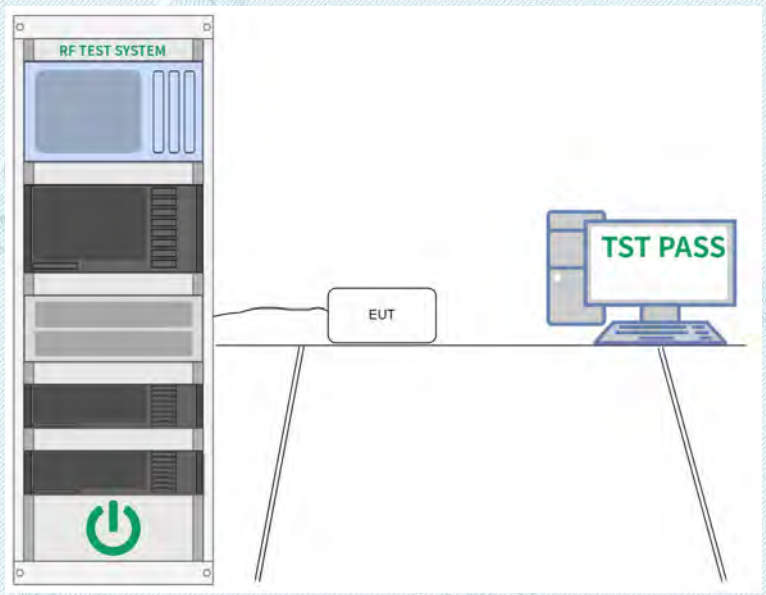
4.6.2. Test Setup Diagram:



4.6.3. 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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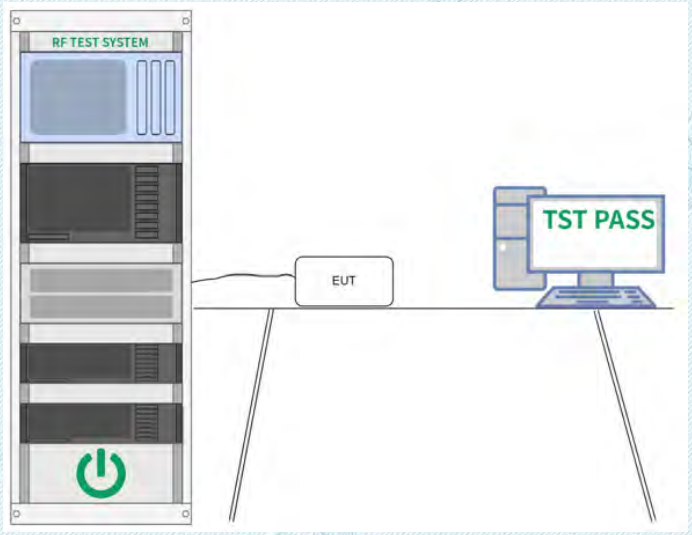
4.7. Emissions in non-restricted frequency bands

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 7.8.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the maximum transmit powers. Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector. The band 30 MHz to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.

4.7.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1, Test Mode2, Test Mode3, Test Mode4, Test Mode5, Test Mode6

4.7.2. Test Setup Diagram:



4.7.3. 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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4.8. 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

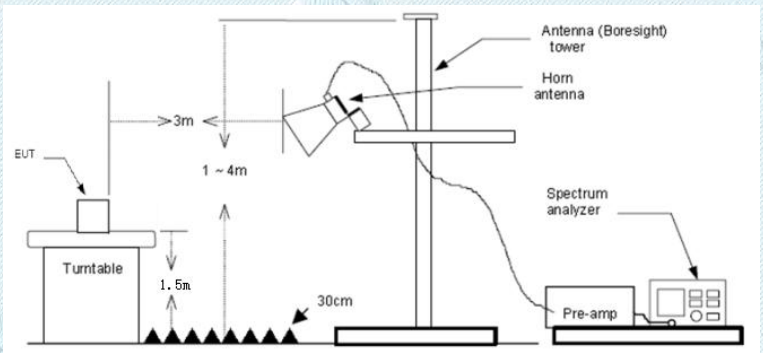
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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

4.8.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1, Test Mode2, Test Mode3

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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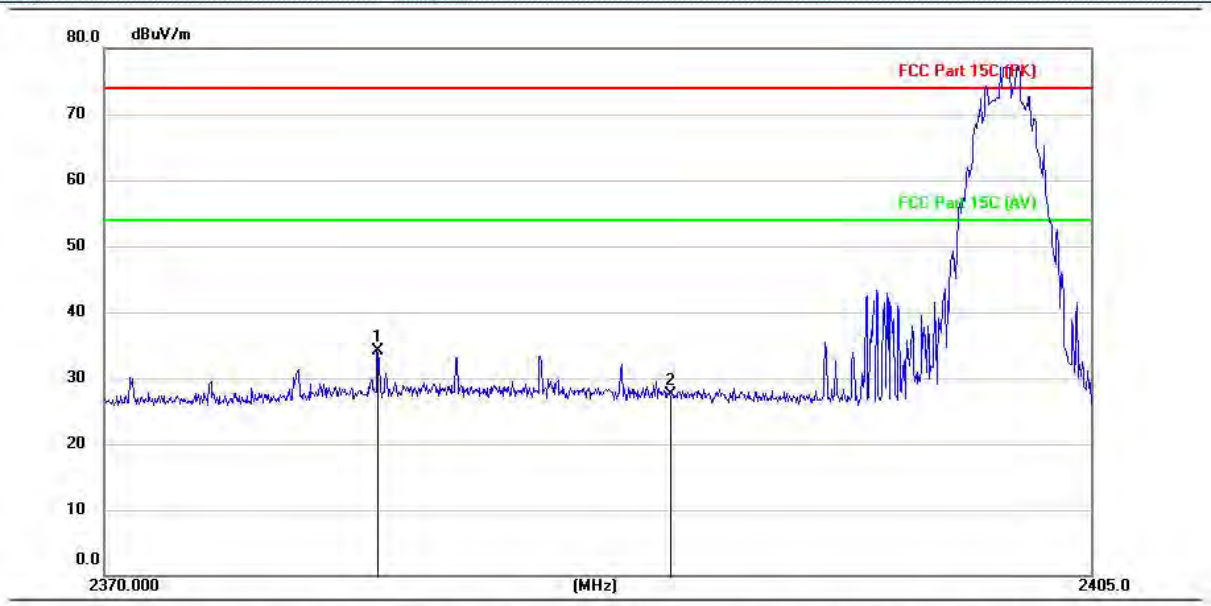
4.8.3. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2379.649	49.91	-15.86	34.05	74.00	-39.95	peak
2		2390.000	43.37	-15.87	27.50	74.00	-46.50	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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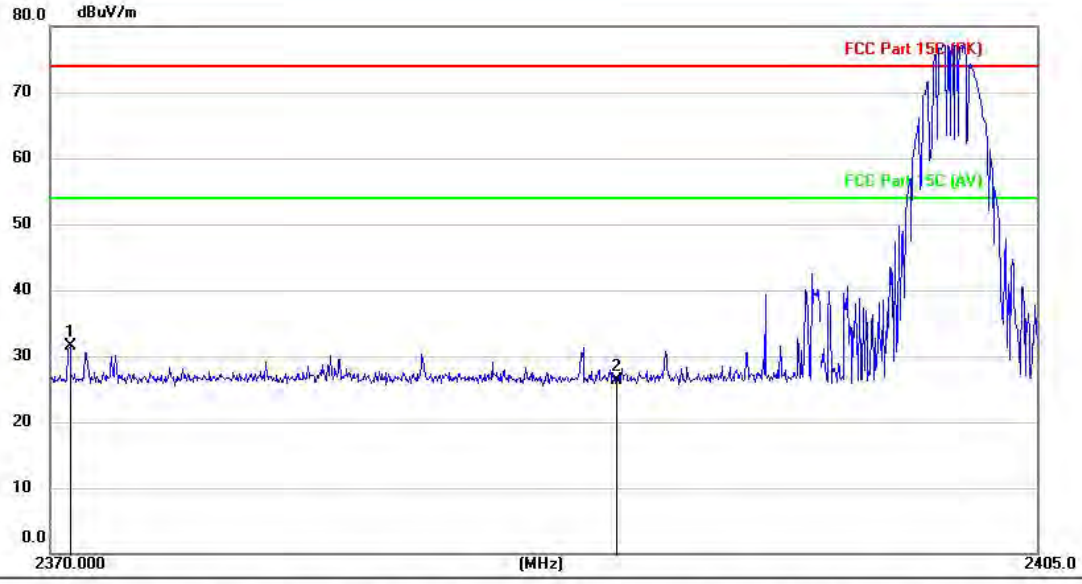
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2370.697	47.31	-15.85	31.46	74.00	-42.54	peak
2		2390.000	42.21	-15.87	26.34	74.00	-47.66	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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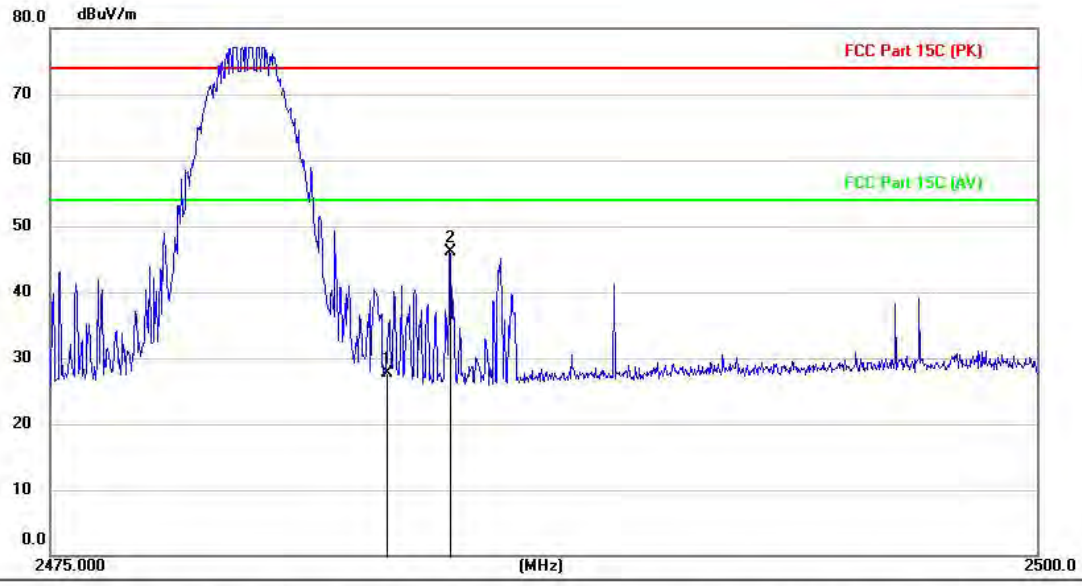
Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	43.96	-16.18	27.78	74.00	-46.22	peak
2	*	2485.117	62.30	-16.20	46.10	74.00	-27.90	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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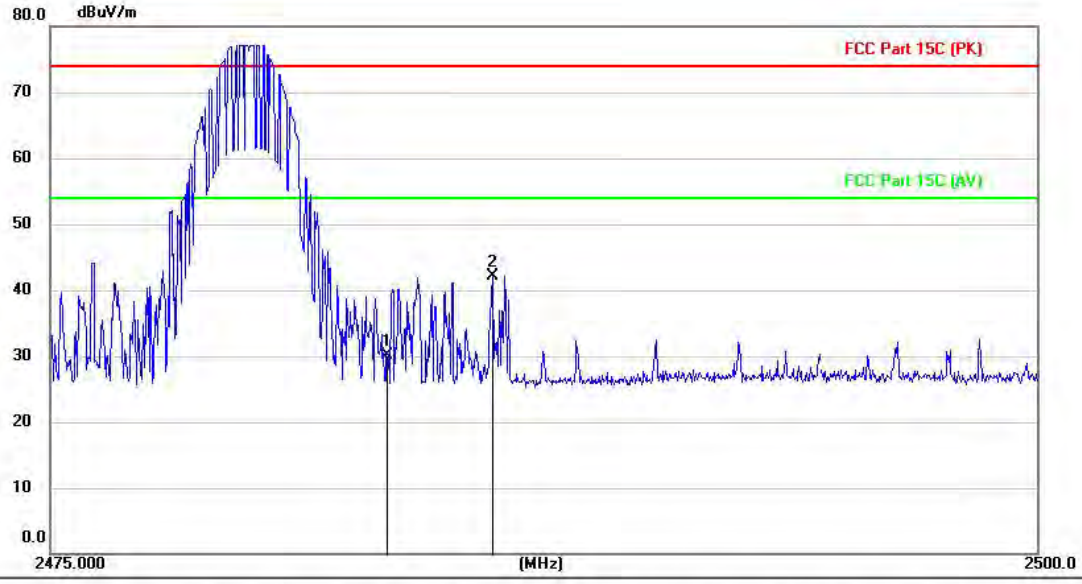
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	46.23	-16.18	30.05	74.00	-43.95	peak
2	*	2486.190	58.32	-16.21	42.11	74.00	-31.89	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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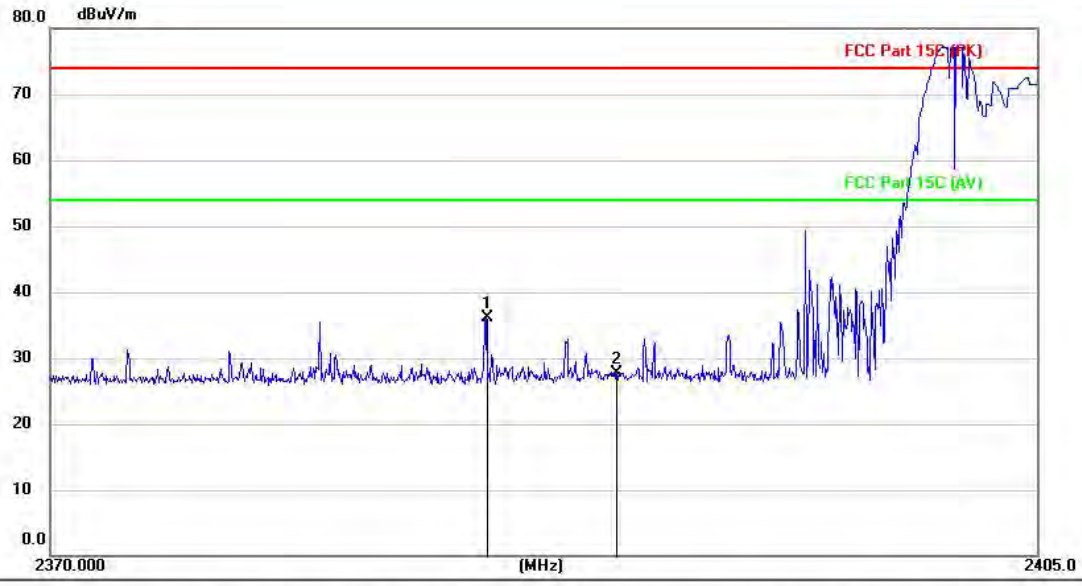
Test Mode2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2385.435	51.91	-15.86	36.05	74.00	-37.95	peak
2		2390.000	43.48	-15.87	27.61	74.00	-46.39	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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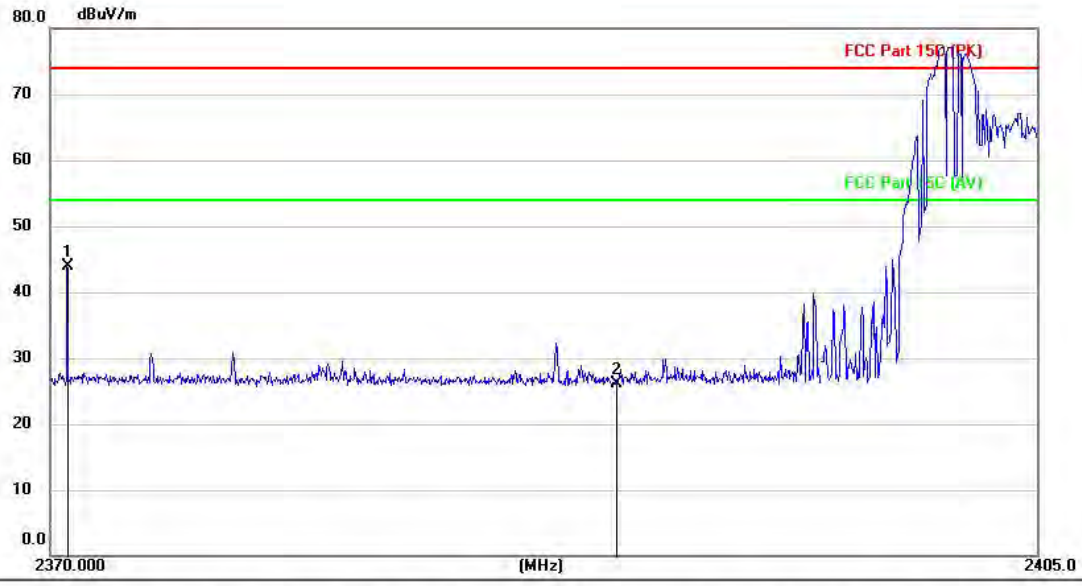
Test Mode2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2370.623	59.77	-15.85	43.92	74.00	-30.08	peak
2		2390.000	41.99	-15.87	26.12	74.00	-47.88	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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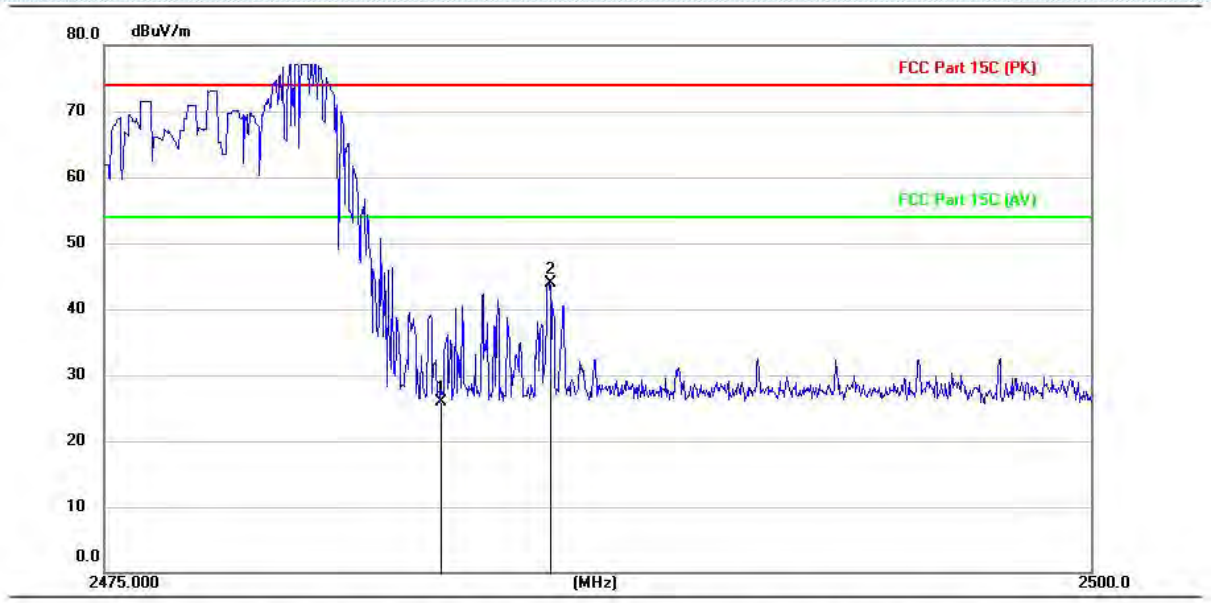
Test Mode2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	42.12	-16.18	25.94	74.00	-48.06	peak
2	*	2486.245	60.04	-16.22	43.82	74.00	-30.18	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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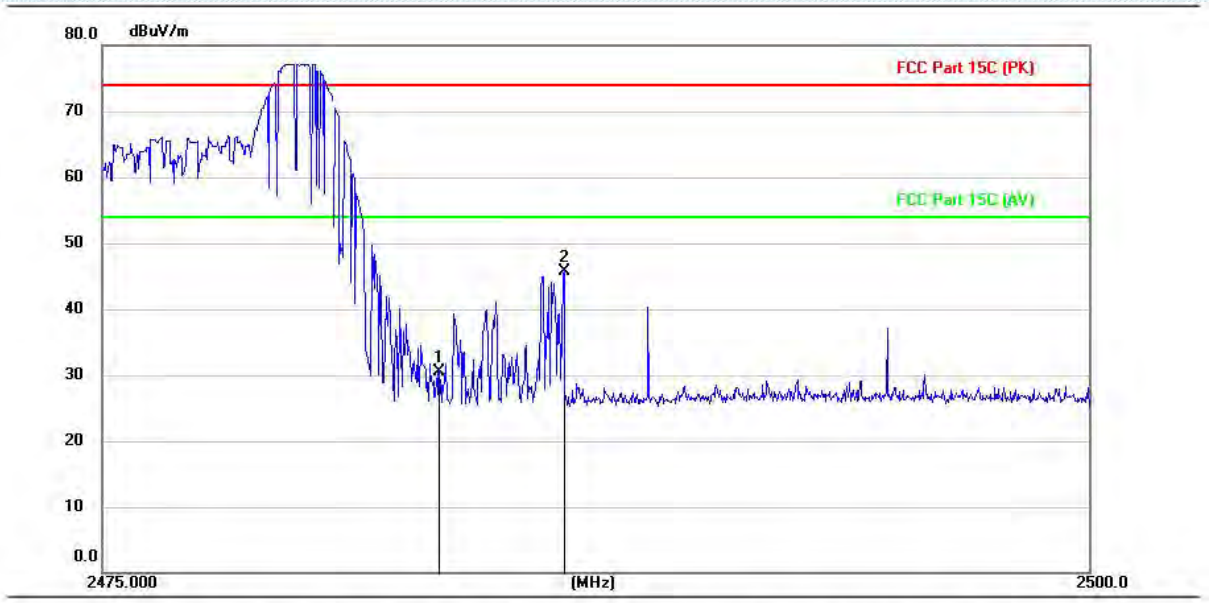
Test Mode2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	46.77	-16.18	30.59	74.00	-43.41	peak
2	*	2486.670	61.86	-16.22	45.64	74.00	-28.36	peak

Note:
1. Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3.Pre-scan DH5, 2DH5 and 3DH5 modulation, and found the DH5 modulation which it is worse case, so only show the test data for worse case.
4. Since the peak value is less than the limit of the AVG value, there is no AVG data.

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4.9. 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

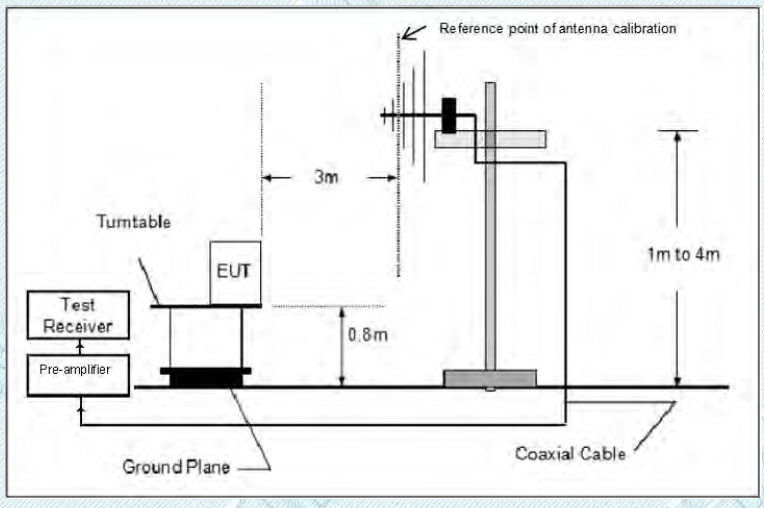
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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

4.9.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.9.2. Test Setup Diagram:



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4.9.3. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		103.9877	32.44	-18.62	13.82	43.50	-29.68	QP
2		134.4648	39.67	-20.97	18.70	43.50	-24.80	QP
3	*	161.3044	58.73	-20.61	38.12	43.50	-5.38	QP
4		328.1172	51.51	-14.04	37.47	46.00	-8.53	QP
5		384.2012	41.99	-10.60	31.39	46.00	-14.61	QP
6		467.3988	34.84	-10.21	24.63	46.00	-21.37	QP

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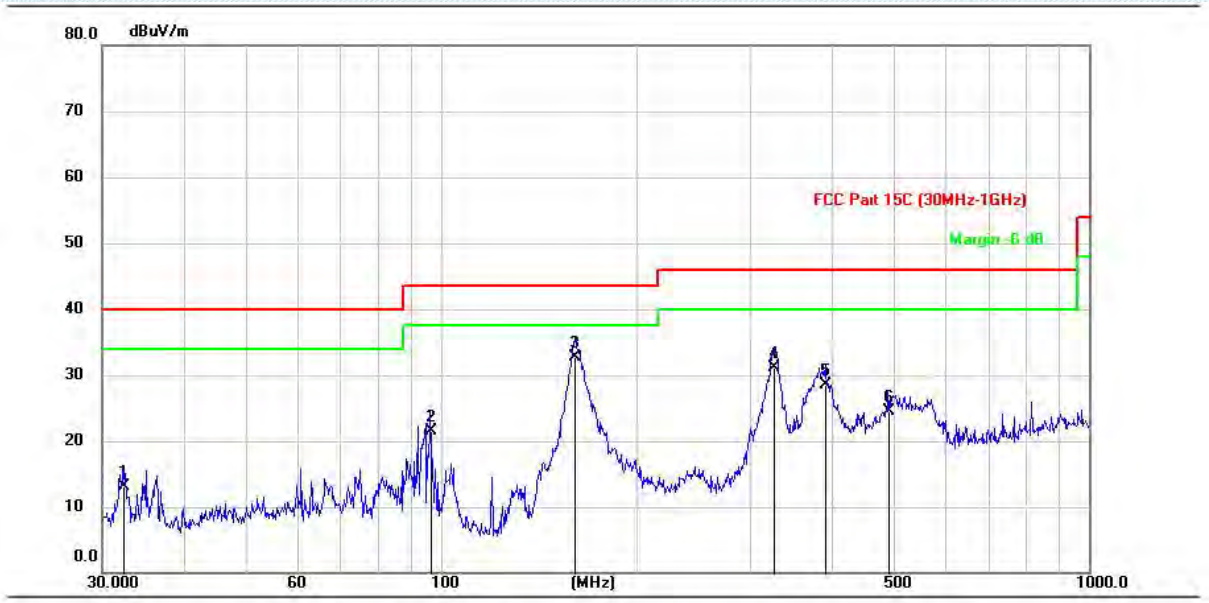
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		32.3038	31.66	-18.54	13.12	40.00	-26.88	QP
2		96.6393	40.60	-19.11	21.49	43.50	-22.01	QP
3	*	160.9089	53.28	-20.63	32.65	43.50	-10.85	QP
4		326.3960	45.39	-14.19	31.20	46.00	-14.80	QP
5		390.7226	38.87	-10.34	28.53	46.00	-17.47	QP
6		491.6059	34.49	-9.93	24.56	46.00	-21.44	QP

Note:
1. Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3.Pre-scan DH5, 2DH5 and 3DH5 modulation, and found the DH5 modulation which it is worse case, so only show the test data for worse case.

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.

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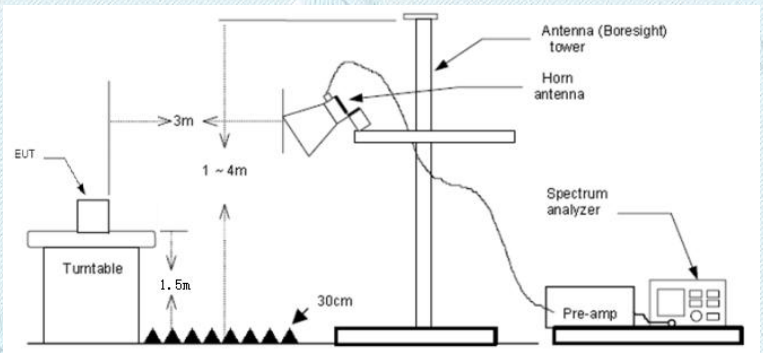
4.10. Emissions in frequency bands (above 1GHz)

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

4.10.1. E.U.T. Operation:

Operating Environment:	
Temperature:	24.2 °C
Humidity:	45.5 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1, Test Mode2, Test Mode3

4.10.2. Test Setup Diagram:



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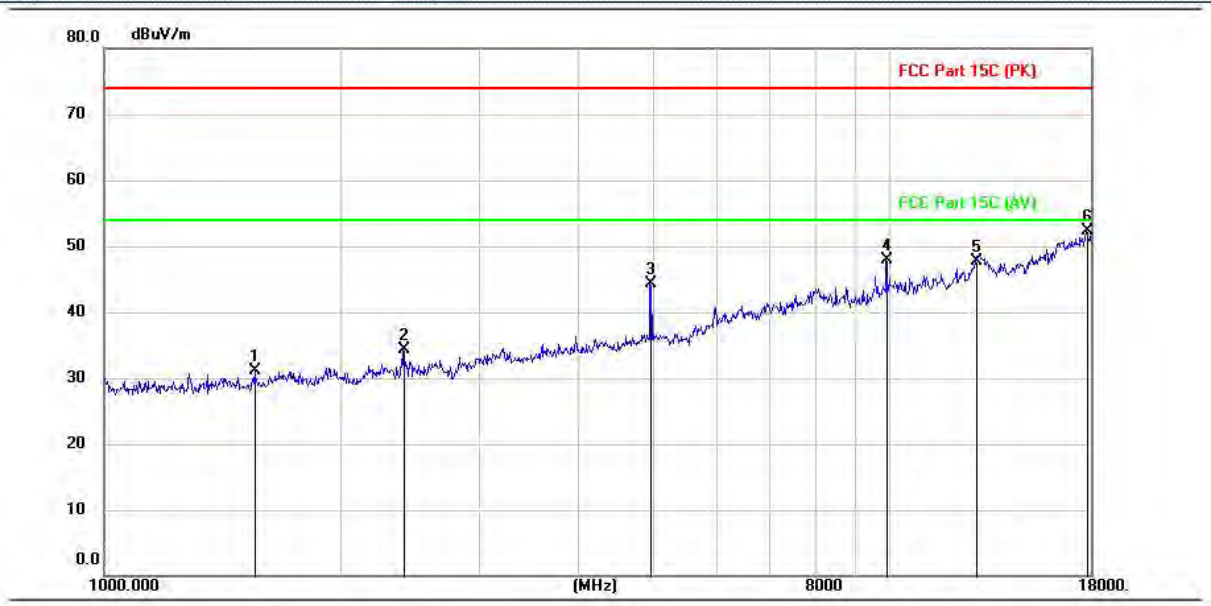
4.10.3. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		1552.500	42.61	-11.54	31.07	74.00	-42.93	peak
2		2402.500	44.45	-10.11	34.34	74.00	-39.66	peak
3		4959.300	49.84	-5.45	44.39	74.00	-29.61	peak
4		9919.900	43.17	4.71	47.88	74.00	-26.12	peak
5		12842.200	37.26	10.44	47.70	74.00	-26.30	peak
6	*	17760.300	37.32	14.91	52.23	74.00	-21.77	peak

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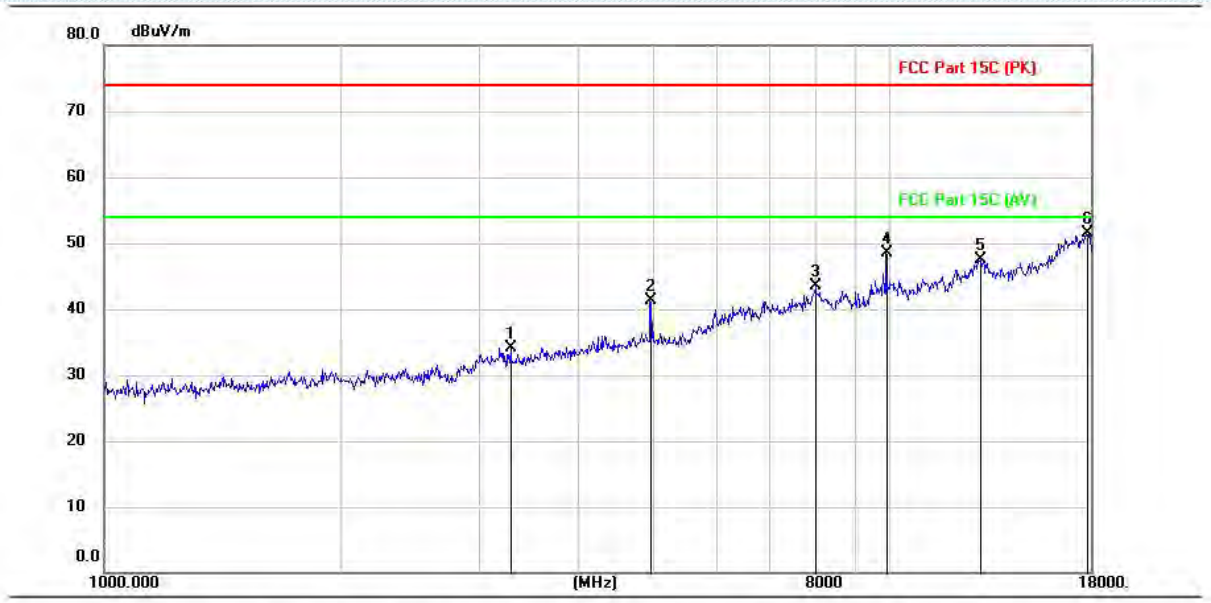
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3298.400	43.37	-9.29	34.08	74.00	-39.92	peak
2		4959.300	46.76	-5.45	41.31	74.00	-32.69	peak
3		8019.300	40.49	2.96	43.45	74.00	-30.55	peak
4		9919.900	43.84	4.71	48.55	74.00	-25.45	peak
5		13039.400	36.45	11.09	47.54	74.00	-26.46	peak
6	*	17755.200	36.64	14.91	51.55	74.00	-22.45	peak

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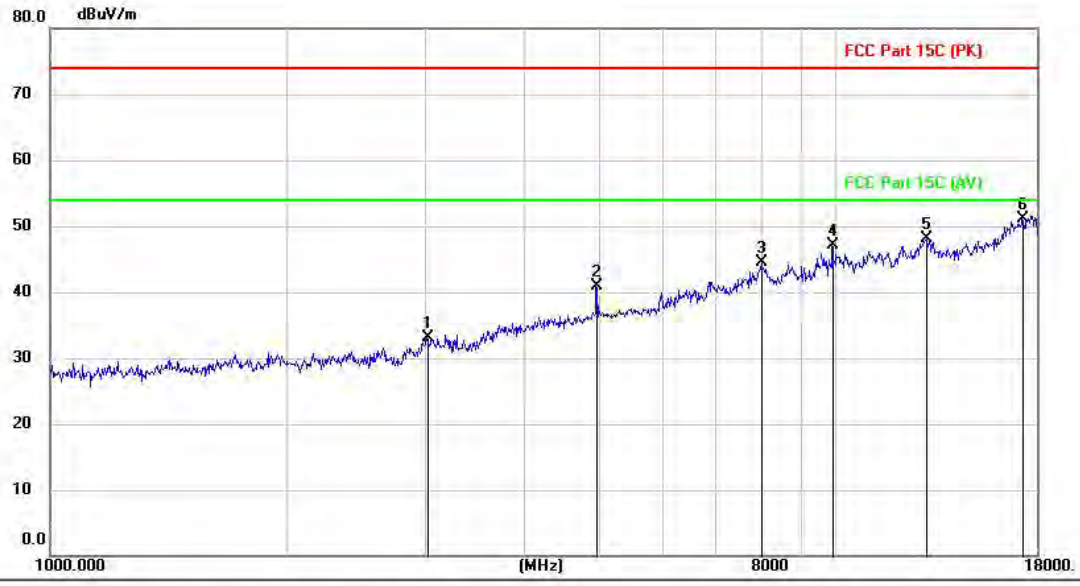
Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3024.700	42.45	-9.36	33.09	74.00	-40.91	peak
2		4959.300	46.26	-5.45	40.81	74.00	-33.19	peak
3		8019.300	41.49	2.96	44.45	74.00	-29.55	peak
4		9919.900	42.34	4.71	47.05	74.00	-26.95	peak
5		13039.400	36.95	11.09	48.04	74.00	-25.96	peak
6	*	17280.900	36.53	14.63	51.16	74.00	-22.84	peak

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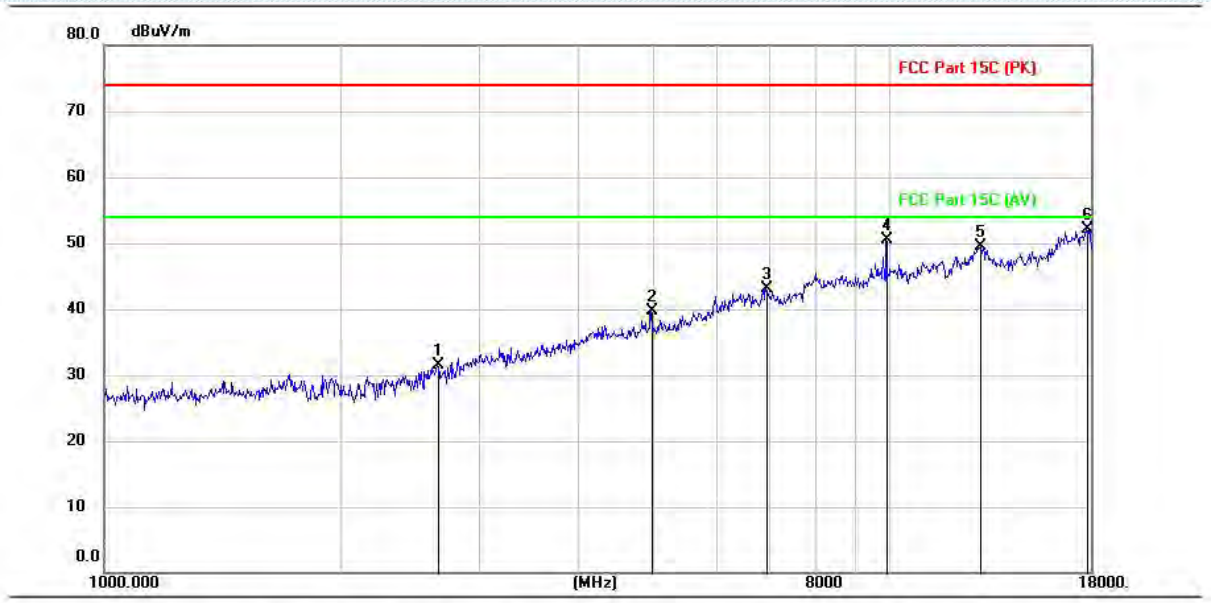
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2659.200	41.51	-10.02	31.49	74.00	-42.51	peak
2		4961.000	45.10	-5.44	39.66	74.00	-34.34	peak
3		6953.400	42.49	0.60	43.09	74.00	-30.91	peak
4		9919.900	45.84	4.71	50.55	74.00	-23.45	peak
5		13039.400	38.45	11.09	49.54	74.00	-24.46	peak
6	*	17755.200	37.14	14.91	52.05	74.00	-21.95	peak

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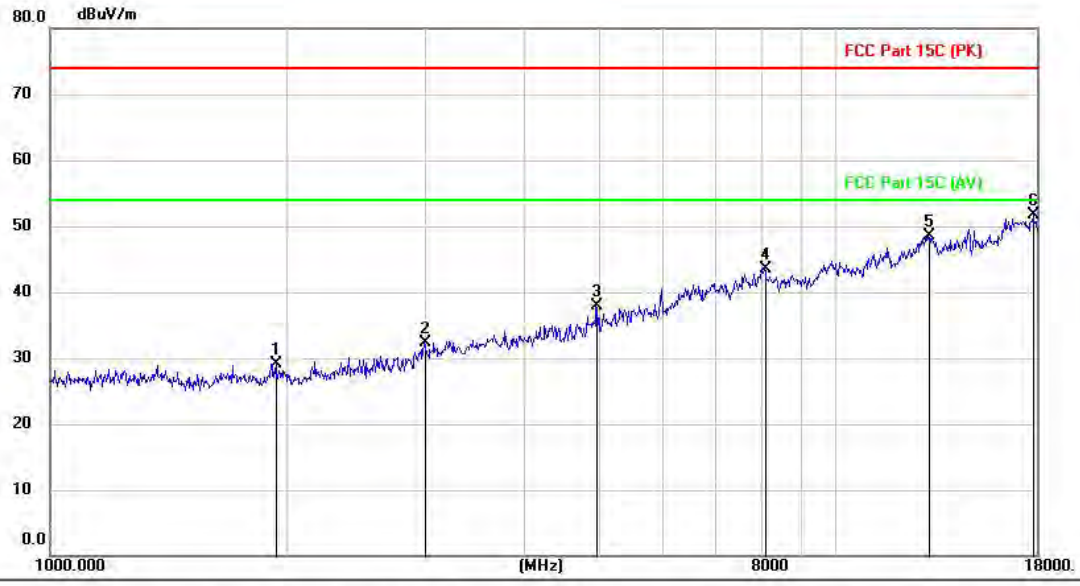
Test Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		1935.000	39.85	-10.73	29.12	74.00	-44.88	peak
2		2994.100	41.67	-9.42	32.25	74.00	-41.75	peak
3		4959.300	43.28	-5.45	37.83	74.00	-36.17	peak
4		8100.900	40.68	2.89	43.57	74.00	-30.43	peak
5		13098.900	37.58	10.90	48.48	74.00	-25.52	peak
6	*	17826.600	36.85	14.95	51.80	74.00	-22.20	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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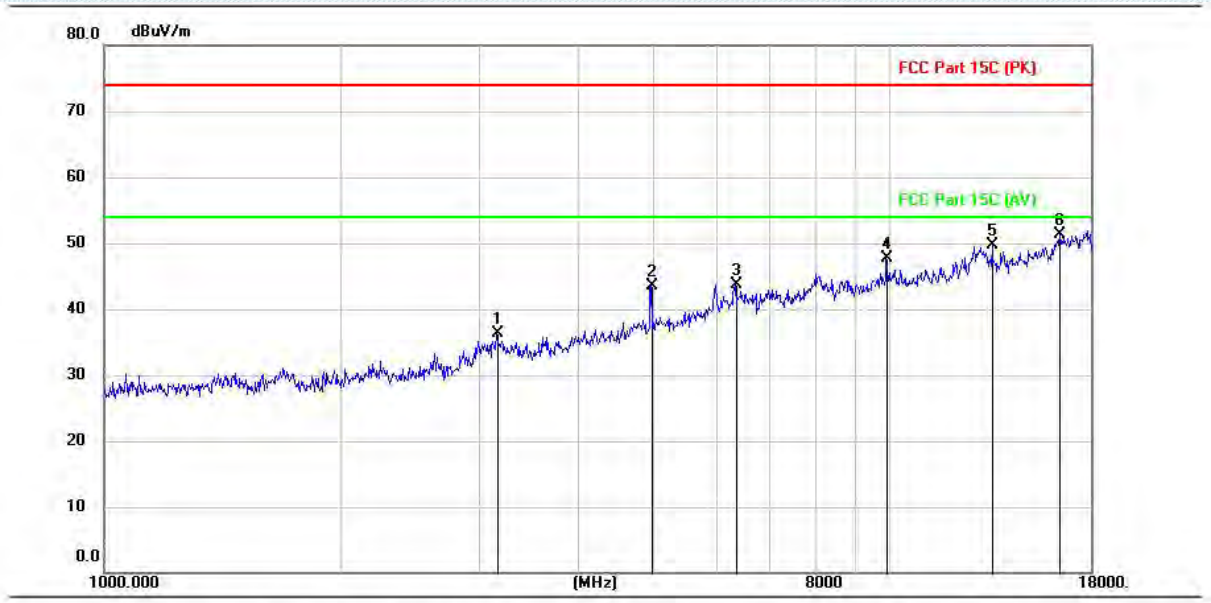
Test Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3167.500	45.59	-9.22	36.37	74.00	-37.63	peak
2		4961.000	49.01	-5.44	43.57	74.00	-30.43	peak
3		6358.400	45.26	-1.59	43.67	74.00	-30.33	peak
4		9919.900	43.02	4.71	47.73	74.00	-26.27	peak
5		13493.300	40.15	9.59	49.74	74.00	-24.26	peak
6	*	16420.700	37.24	14.12	51.36	74.00	-22.64	peak

Note:
1. Measurement = Reading level + Correct Factor
2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3.Pre-scan DH5, 2DH5 and 3DH5 modulation, and found the DH5 modulation which it is worse case, so only show the test data for worse case.
4. Since the peak value is less than the limit of the AVG value, there is no AVG data.

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5. EUT TEST PHOTOS

Conducted Emission at AC power line

Occupied Bandwidth

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Emissions in frequency bands (below 1GHz)


Emissions in frequency bands (above 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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6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Refer to Appendix - EUT Photos for KS2405S1702E.docx

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6.1. Appendix A: 20dB Emission Bandwidth

6.1.1. Test Result

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	1.04	2401.48	2402.52	---	PASS
		2441	1.04	2440.48	2441.52	---	PASS
		2480	1.07	2479.45	2480.52	---	PASS
2DH5	Ant1	2402	1.34	2401.33	2402.68	---	PASS
		2441	1.36	2440.33	2441.69	---	PASS
		2480	1.36	2479.33	2480.68	---	PASS
3DH5	Ant1	2402	1.30	2401.35	2402.65	---	PASS
		2441	1.30	2440.35	2441.65	---	PASS
		2480	1.29	2479.35	2480.64	---	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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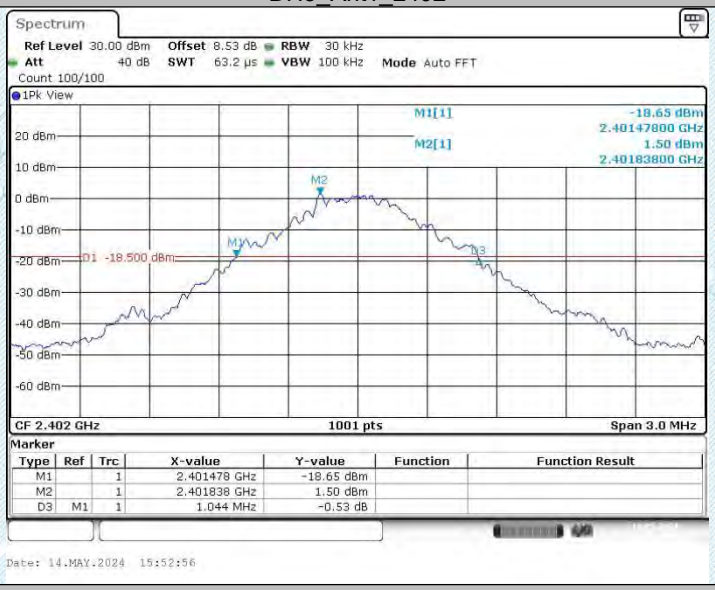
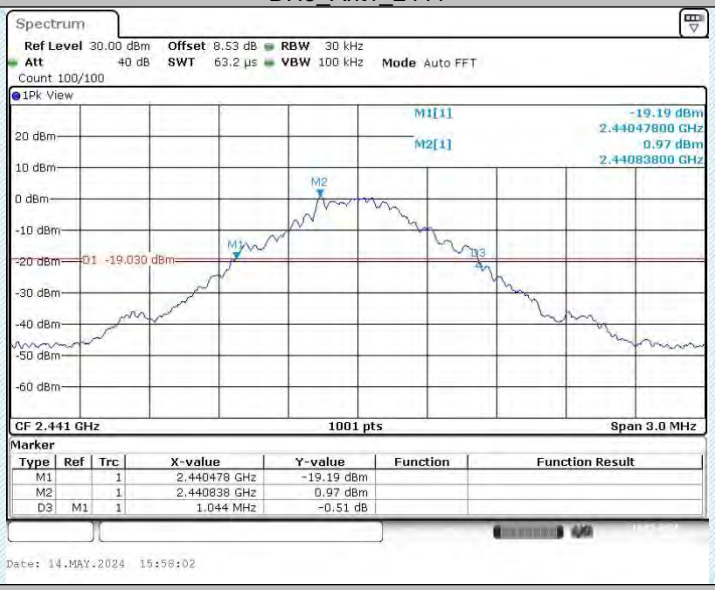
6.1.2. Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



DH5_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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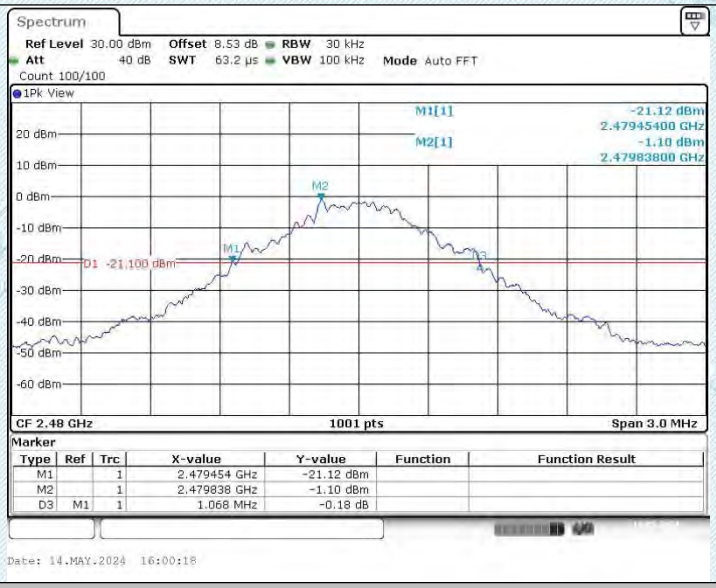
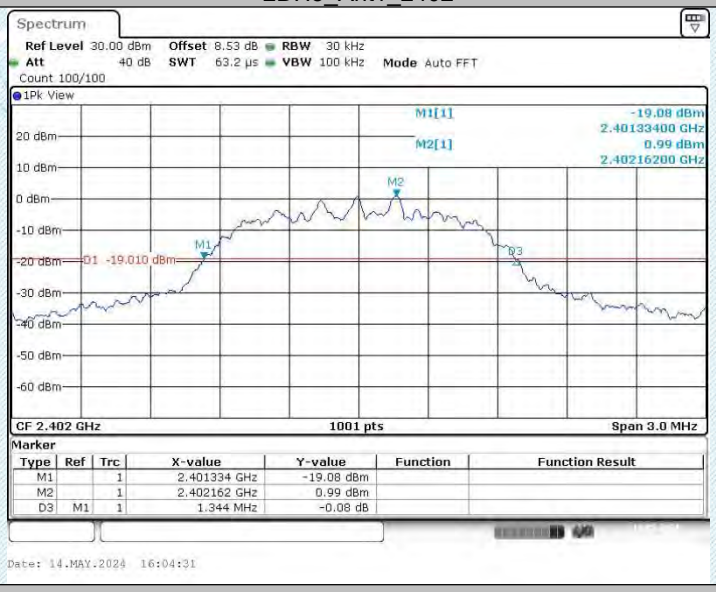
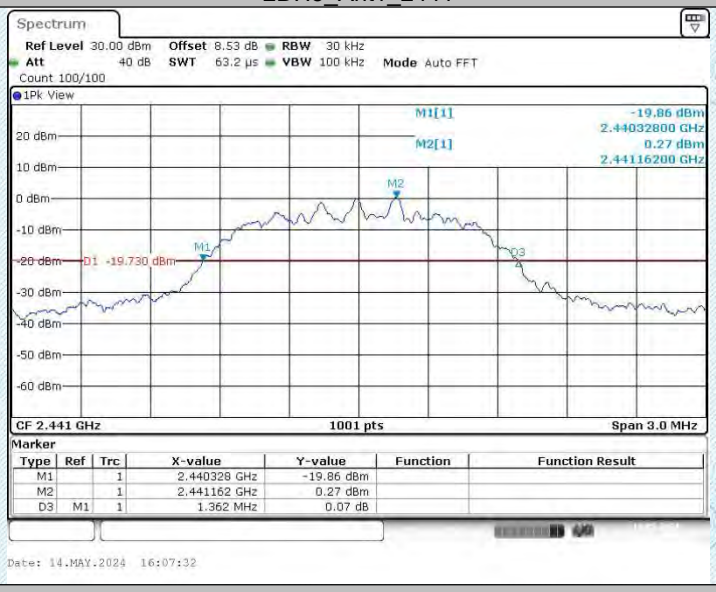


2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480

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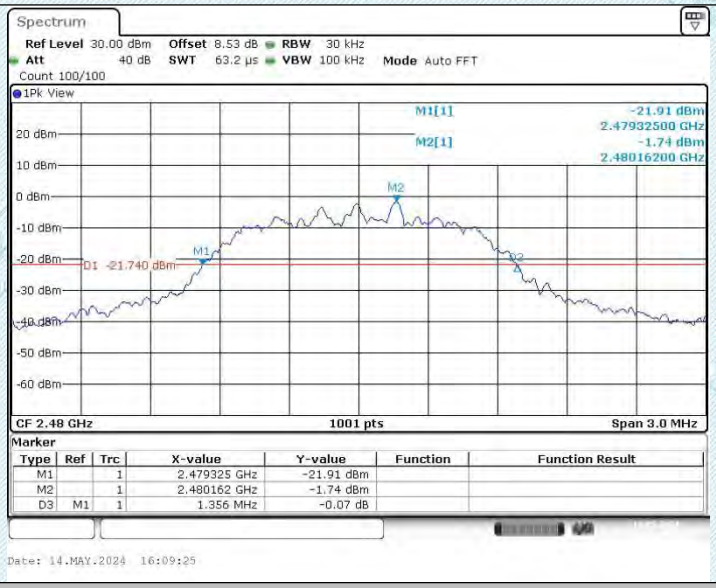
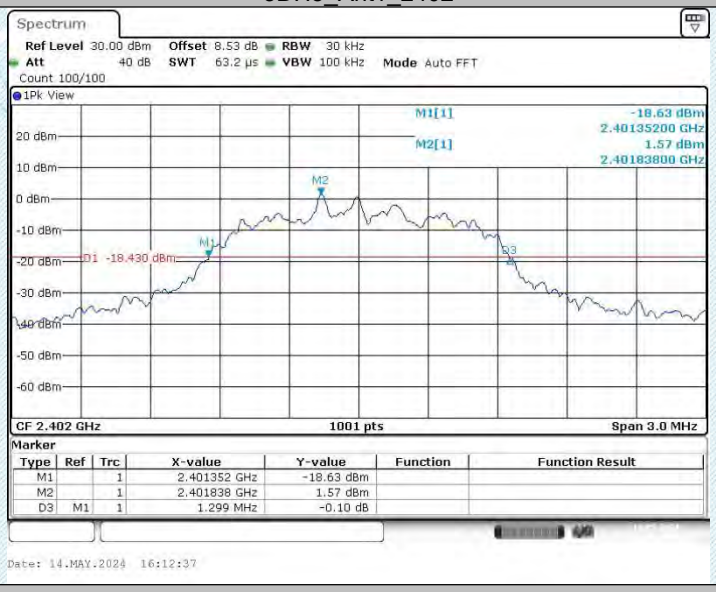


3DH5_Ant1_2402



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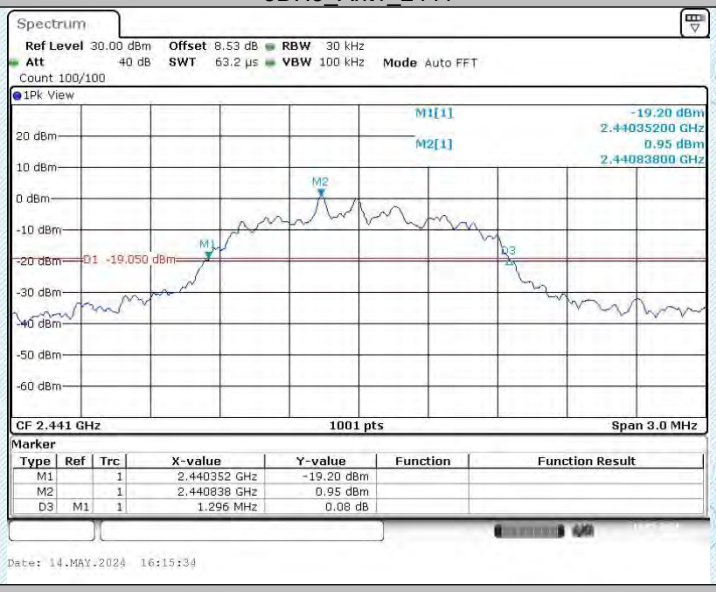

3DH5_Ant1_2480

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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	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.962	2401.514	2402.477	---	PASS
		2441	0.959	2440.514	2441.474	---	PASS
		2480	0.98	2479.505	2480.486	---	PASS
2DH5	Ant1	2402	1.244	2401.389	2402.632	---	PASS
		2441	1.25	2440.383	2441.632	---	PASS
		2480	1.259	2479.380	2480.638	---	PASS
3DH5	Ant1	2402	1.229	2401.383	2402.611	---	PASS
		2441	1.229	2440.386	2441.614	---	PASS
		2480	1.22	2479.389	2480.608	---	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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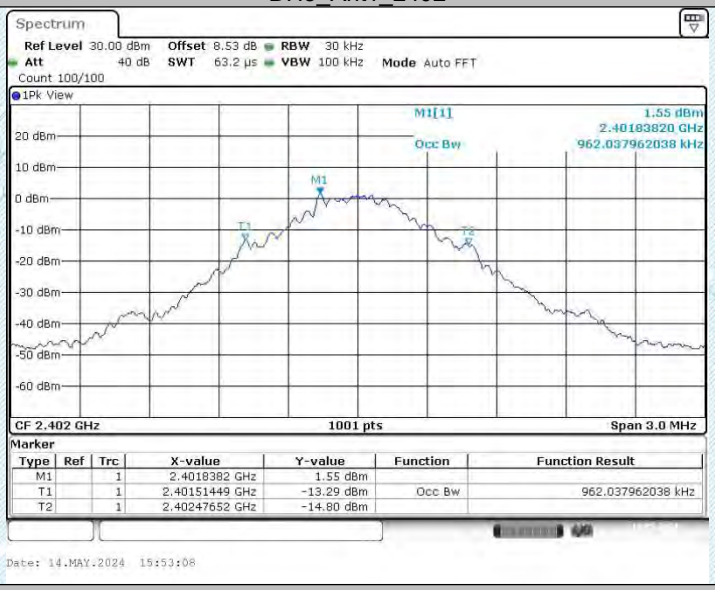
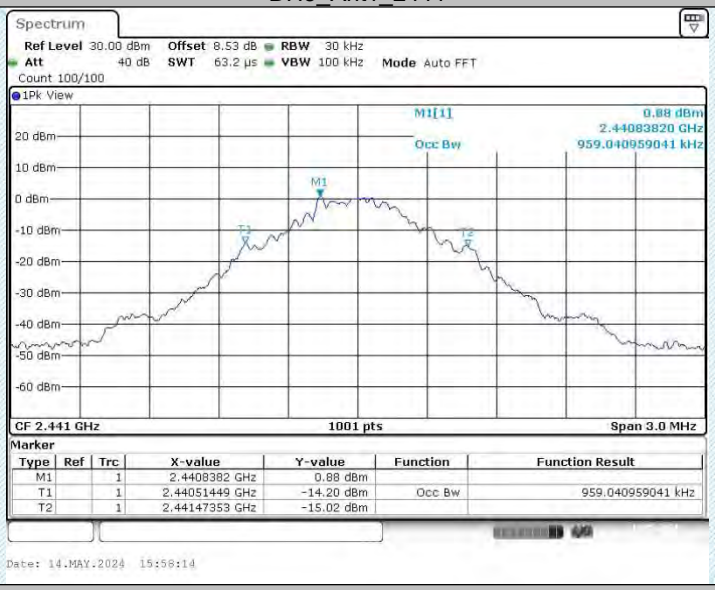
6.2.2. Test Graphs

DH5_Ant1_2402

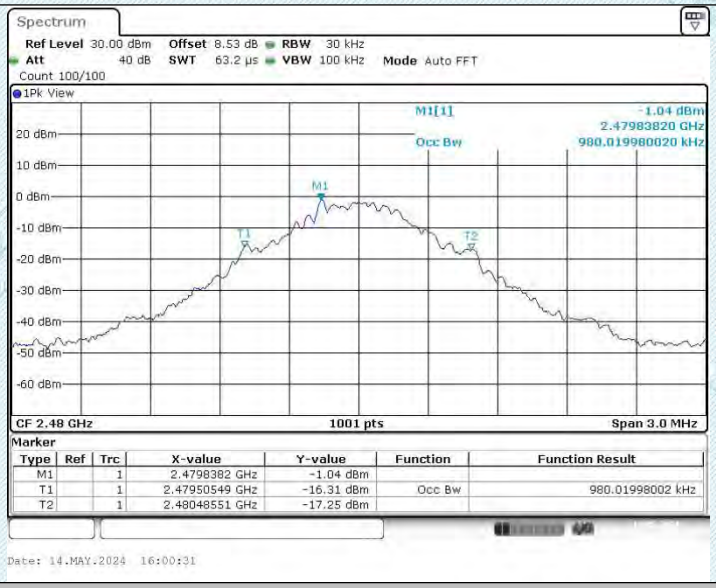


DH5_Ant1_2441

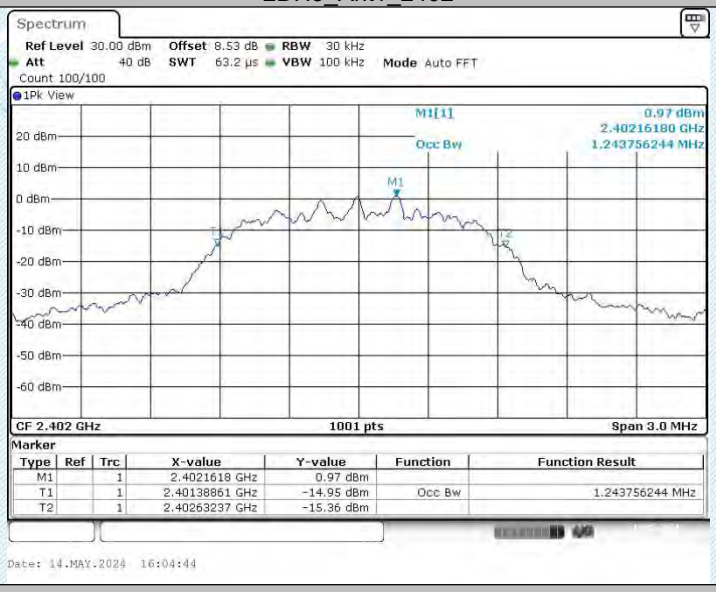


DH5_Ant1_2480

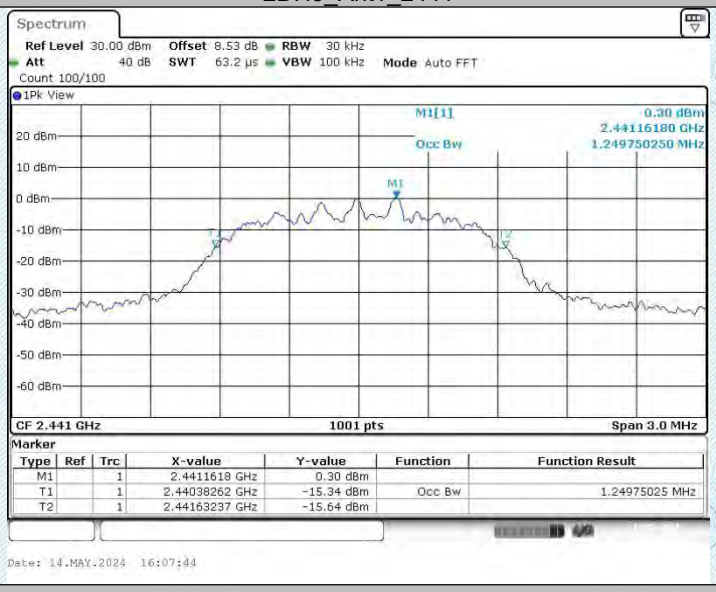
Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_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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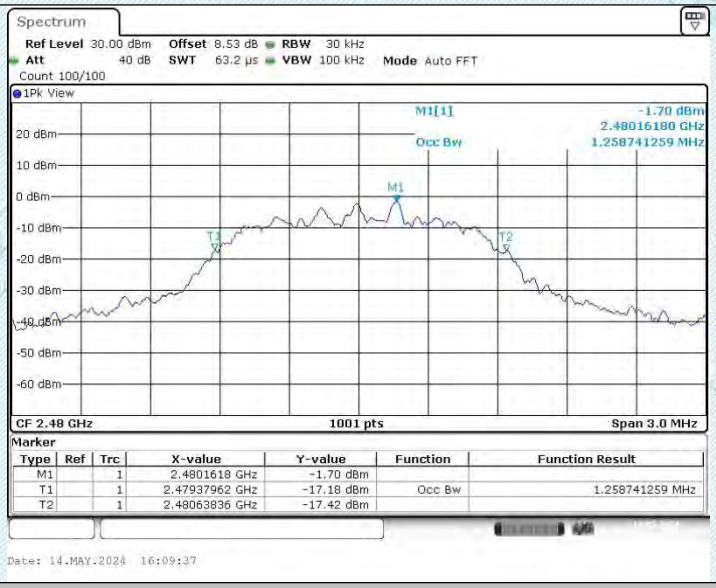

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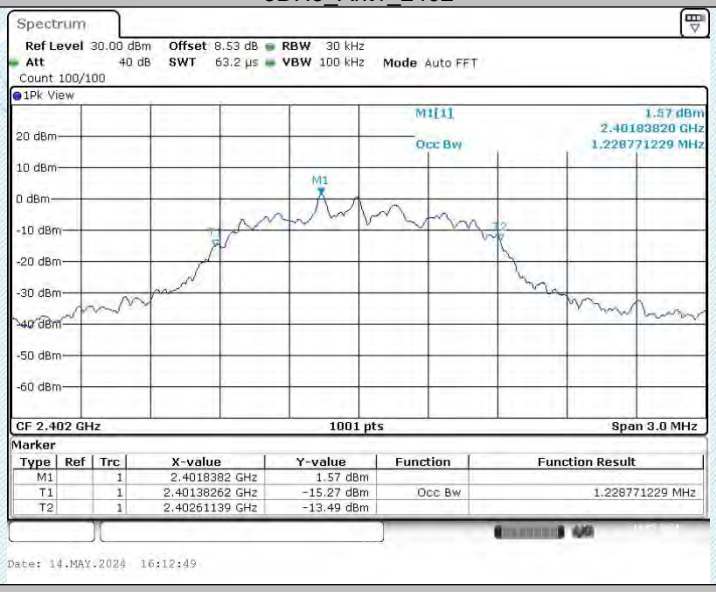
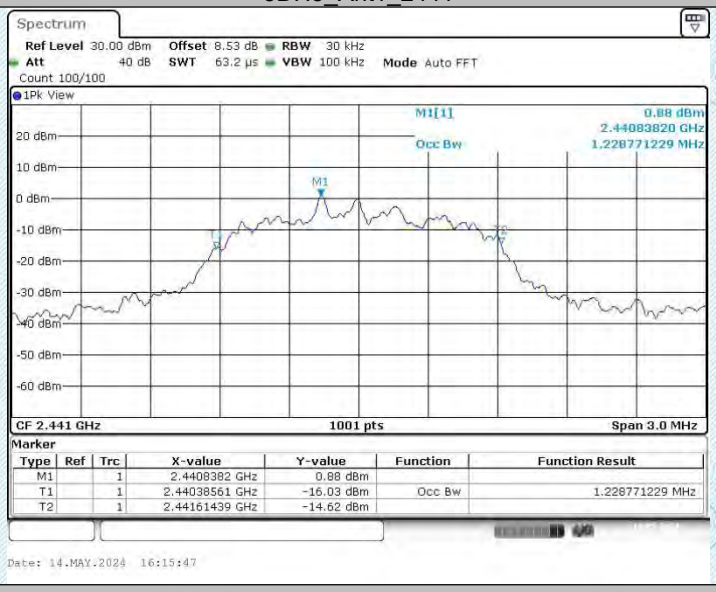


3DH5_Ant1_2441



3DH5_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 Peak

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	2.43	≤20.97	PASS
		2441	1.75	≤20.97	PASS
		2480	0.85	≤20.97	PASS
2DH5	Ant1	2402	2.74	≤20.97	PASS
		2441	2.13	≤20.97	PASS
		2480	1.32	≤20.97	PASS
3DH5	Ant1	2402	2.86	≤20.97	PASS
		2441	2.23	≤20.97	PASS
		2480	1.61	≤20.97	PASS

Note:
Antenna Gain:2.07dBi
EIRP=Conducted Power+Antenna Gain

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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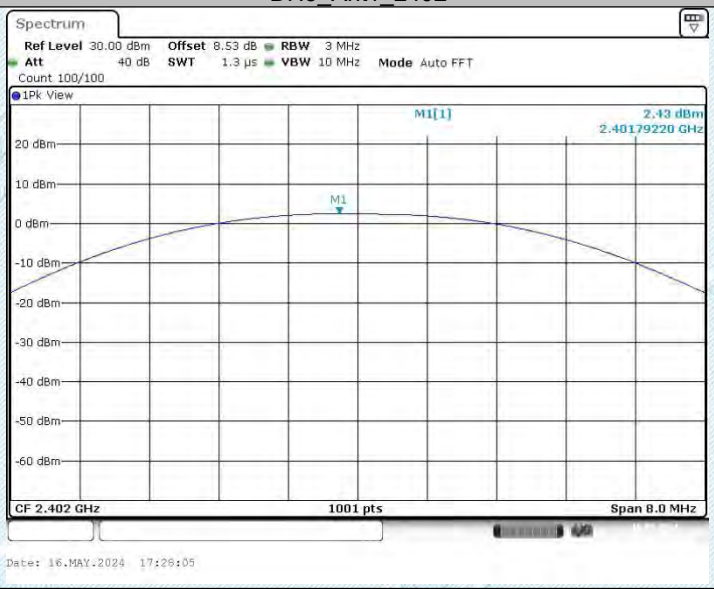
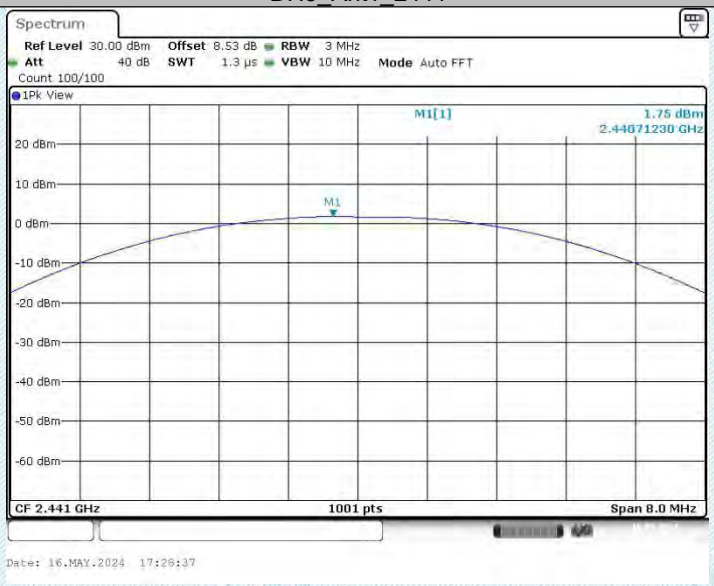
6.3.2. Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



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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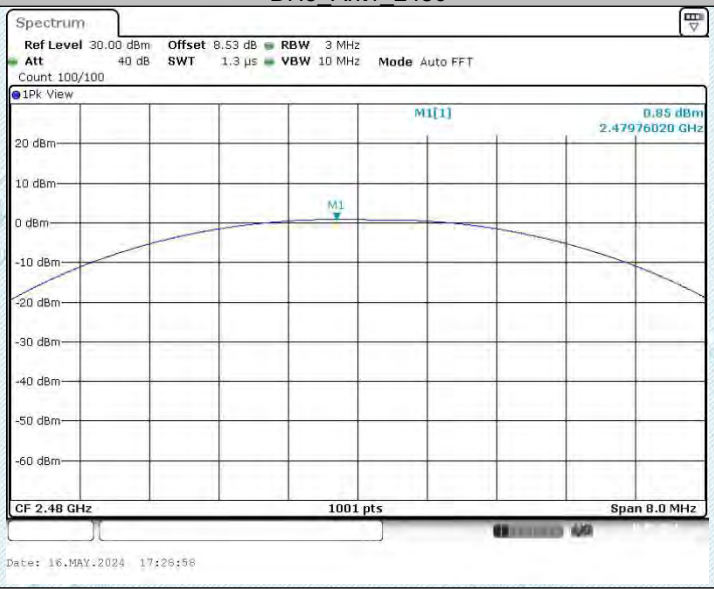
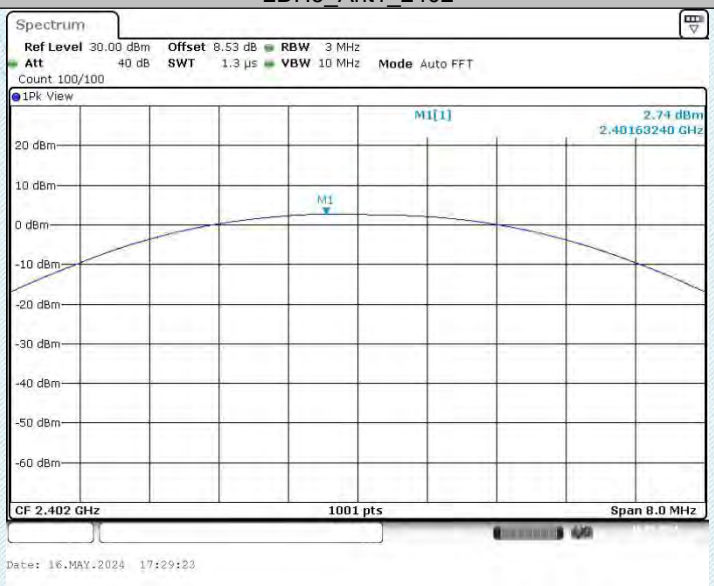
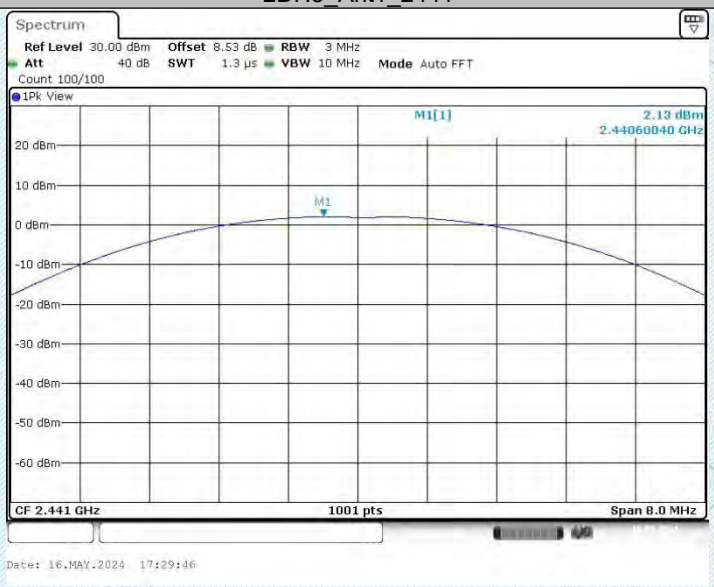
DH5_Ant1_2480



2DH5_Ant1_2402



2DH5_Ant1_2441



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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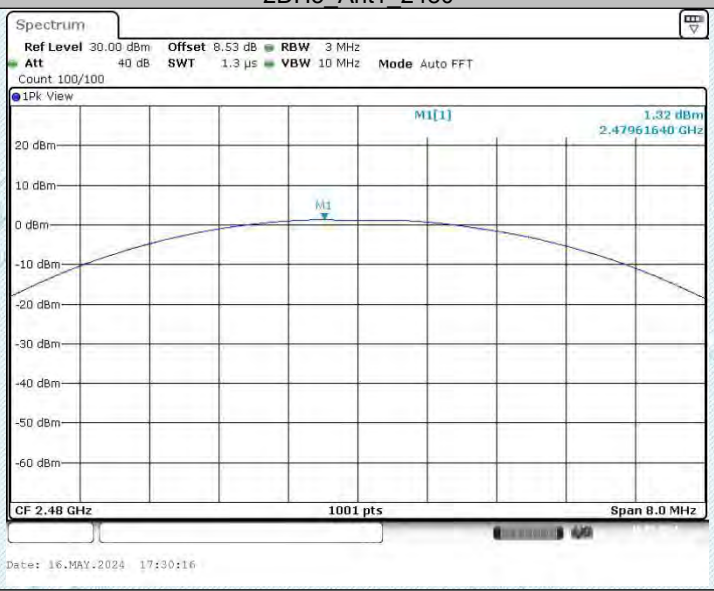
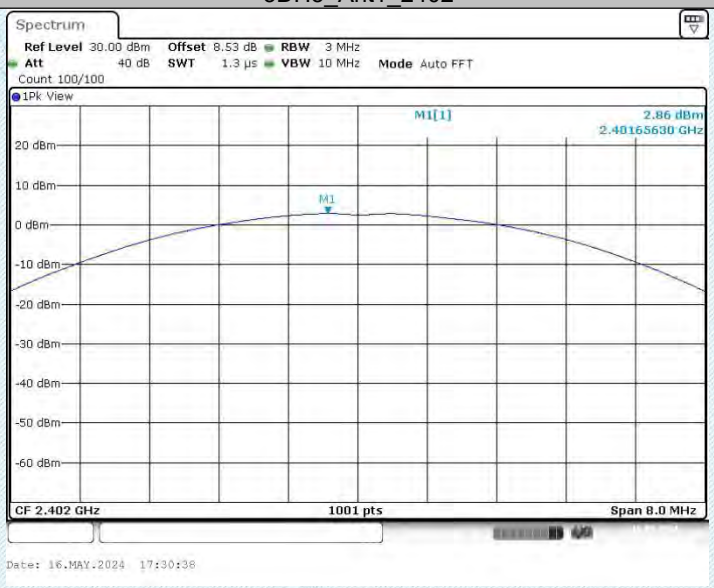
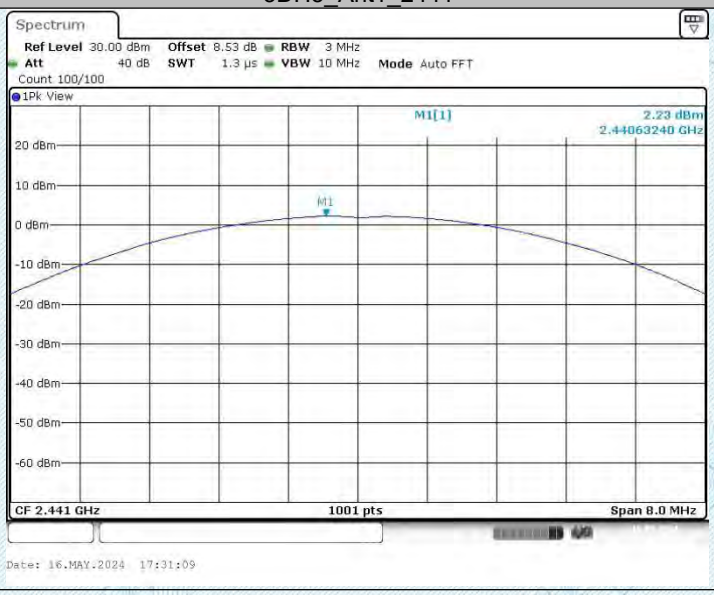
2DH5_Ant1_2480



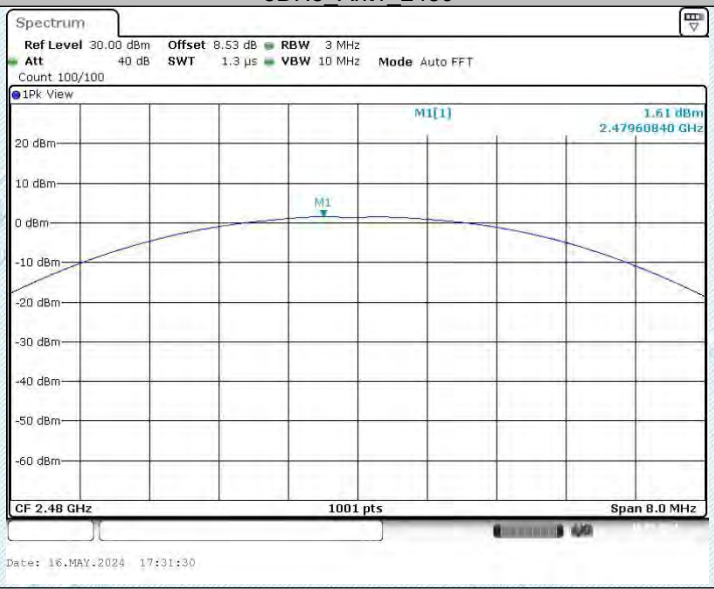
3DH5_Ant1_2402



3DH5_Ant1_2441



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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com

3DH5_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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6.4. Appendix D: Carrier frequency separation

6.4.1. Test Result

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.852	≥0.713	PASS
2DH5	Ant1	Hop	1.171	≥0.907	PASS
3DH5	Ant1	Hop	1.003	≥0.867	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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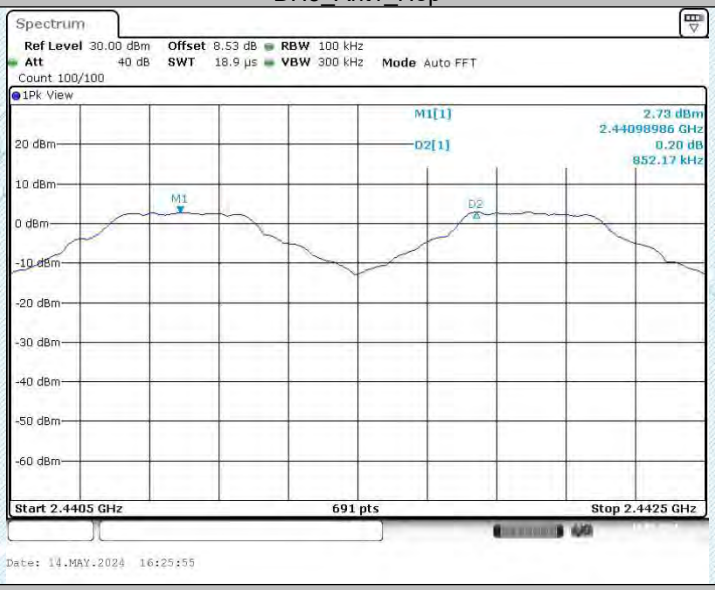
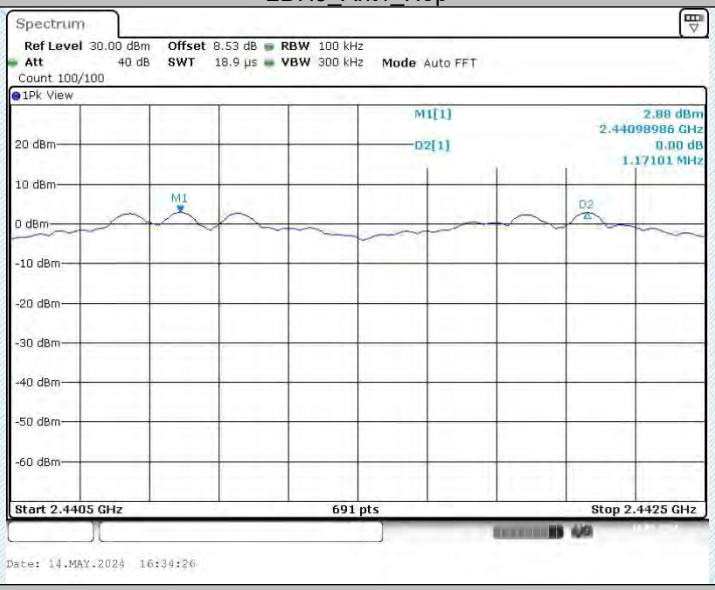
6.4.2. Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop

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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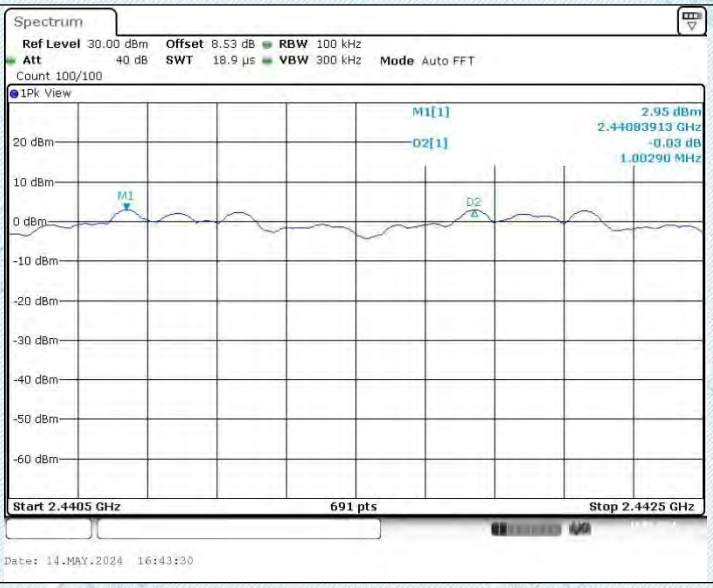

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.5. Appendix E: Time of occupancy

6.5.1. Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.86	60	0.172	≤0.4	PASS
2DH5	Ant1	Hop	2.87	100	0.287	≤0.4	PASS
3DH5	Ant1	Hop	2.87	110	0.316	≤0.4	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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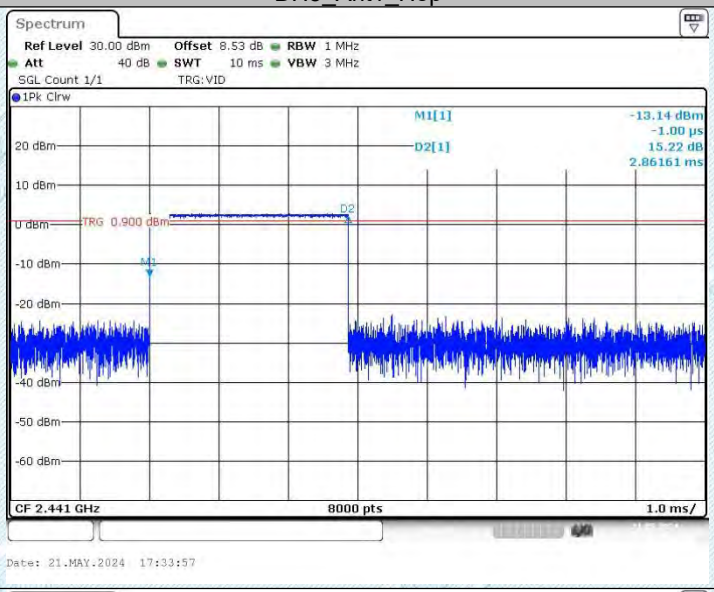
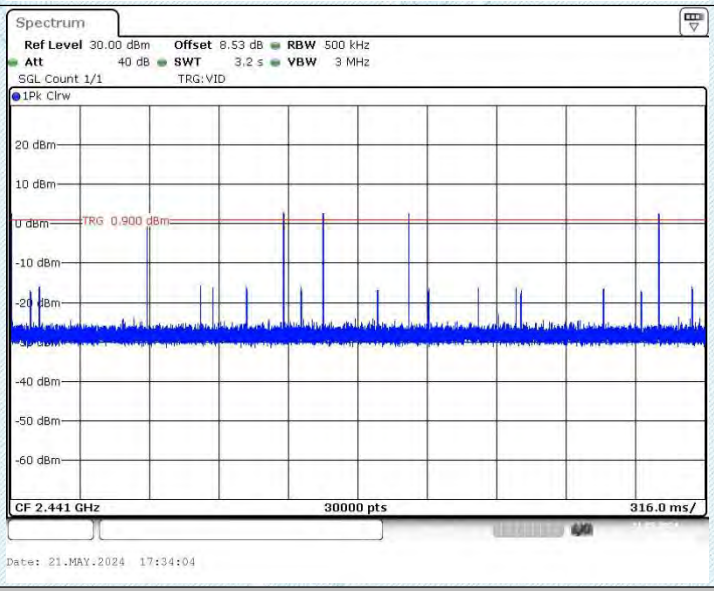
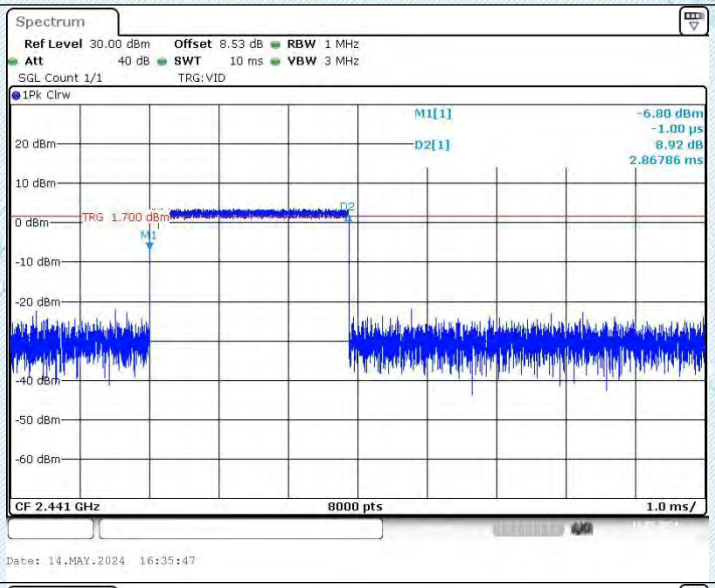
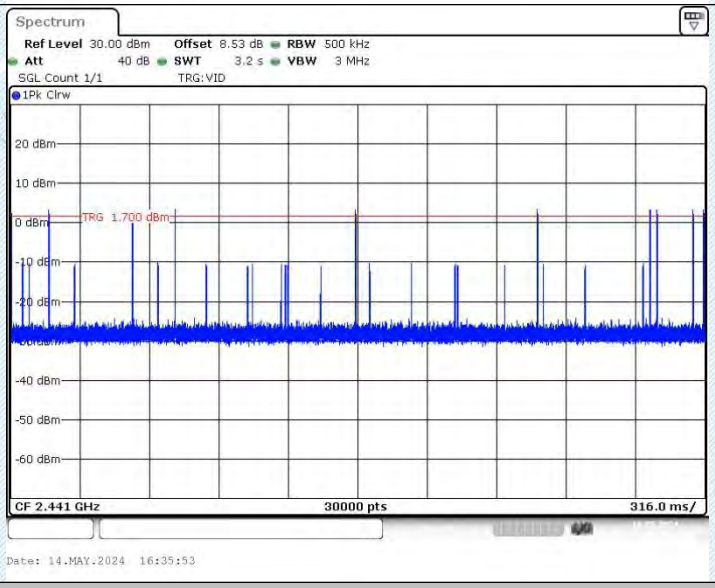
6.5.2. Test Graphs

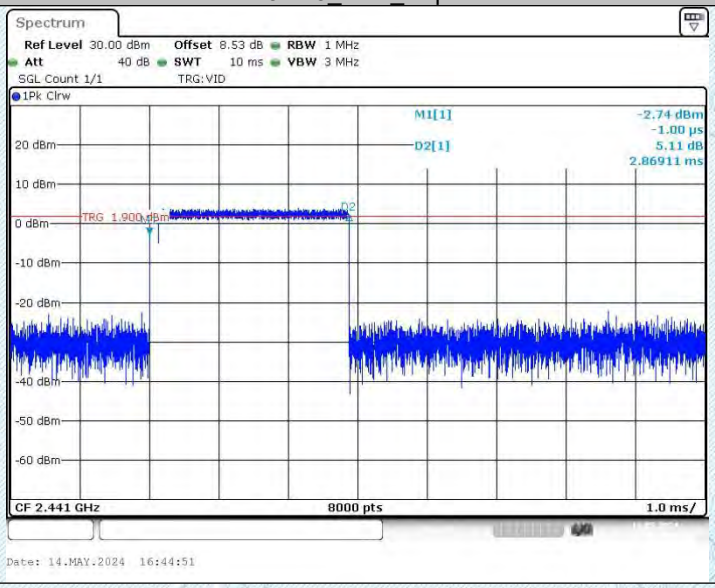
DH5_Ant1_Hop


2DH5_Ant1_Hop

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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com

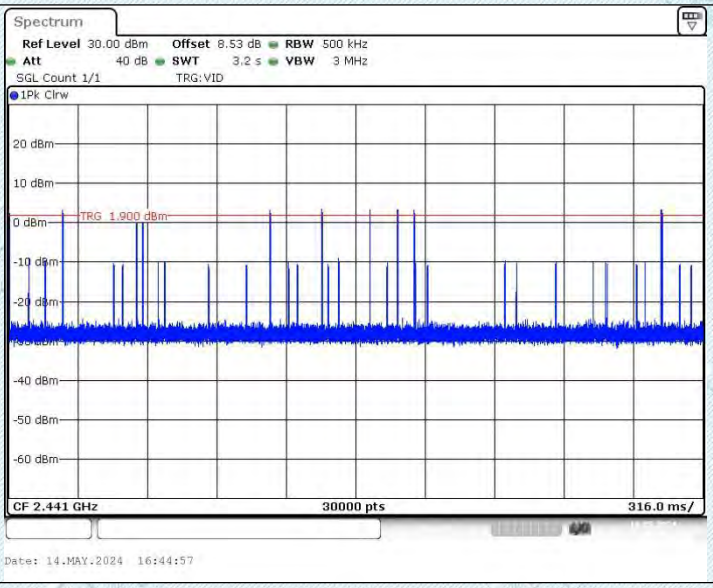




3DH5_Ant1_Hop



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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



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: Number of hopping channels

6.6.1. Test Result

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	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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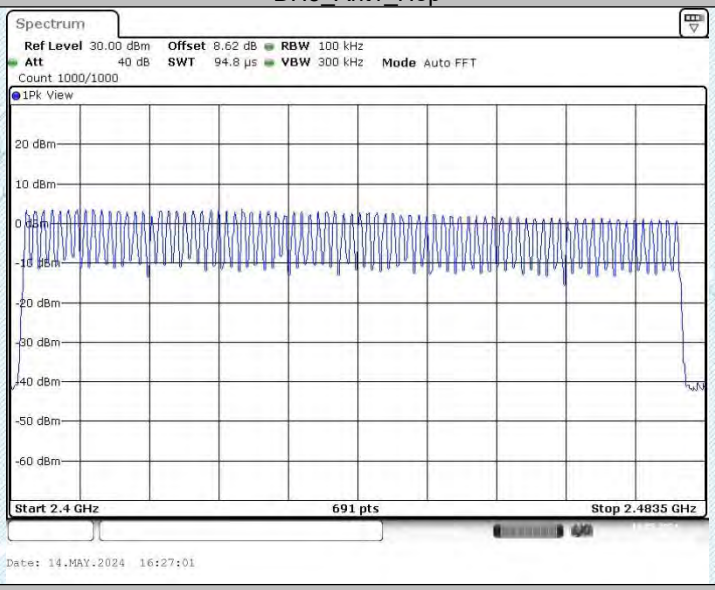
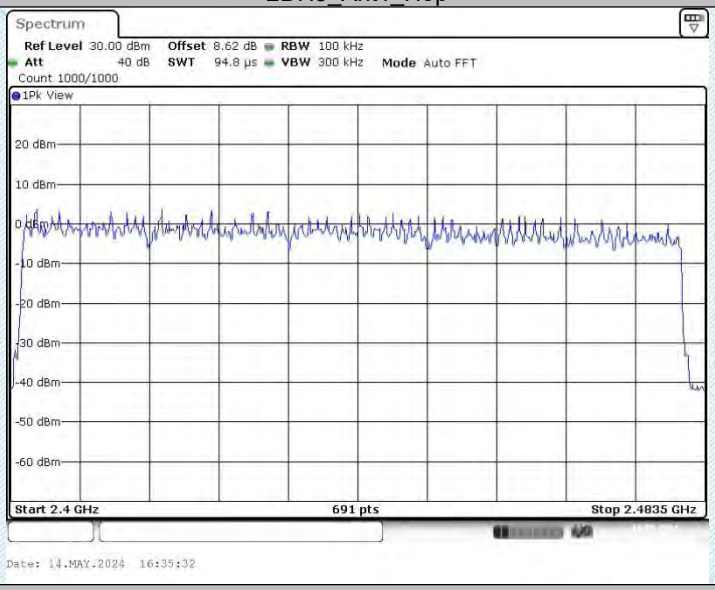
6.6.2. Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop

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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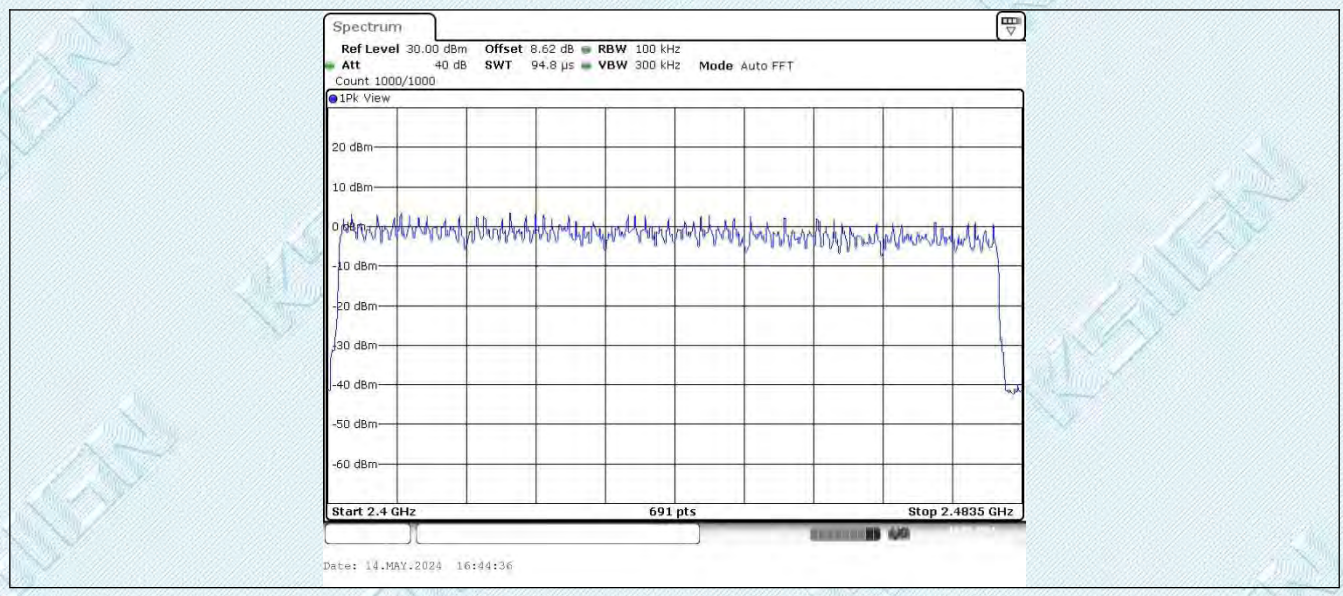

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.7. Appendix G: Band edge measurements

6.7.1. Test Result

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	3.76	-48.8	≤-16.24	PASS
		High	2480	0.80	-49.6	≤-19.2	PASS
		Low	Hop_2402	3.71	-50.41	≤-16.29	PASS
		High	Hop_2480	1.42	-48.28	≤-18.58	PASS
2DH5	Ant1	Low	2402	3.81	-47.41	≤-16.19	PASS
		High	2480	1.03	-48.81	≤-18.97	PASS
		Low	Hop_2402	2.21	-49.26	≤-17.79	PASS
		High	Hop_2480	0.09	-48.28	≤-19.91	PASS
3DH5	Ant1	Low	2402	3.87	-47.01	≤-16.13	PASS
		High	2480	0.33	-48.68	≤-19.67	PASS
		Low	Hop_2402	3.90	-49.19	≤-16.1	PASS
		High	Hop_2480	1.06	-48.25	≤-18.94	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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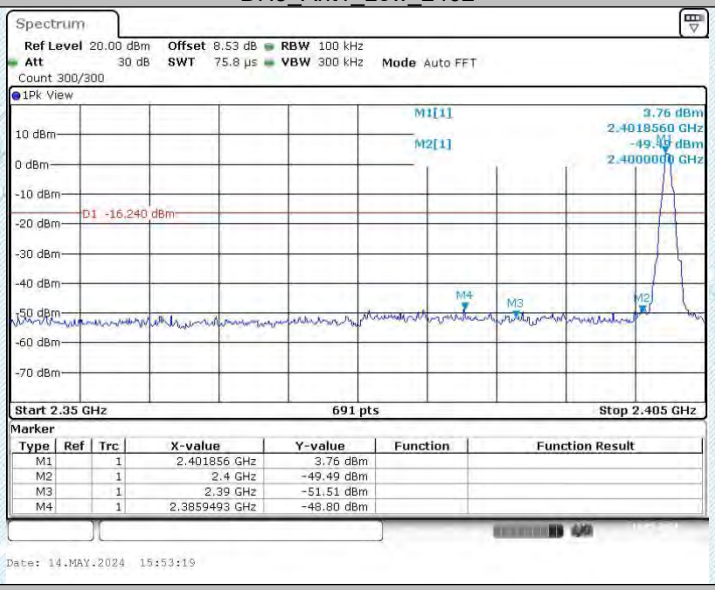
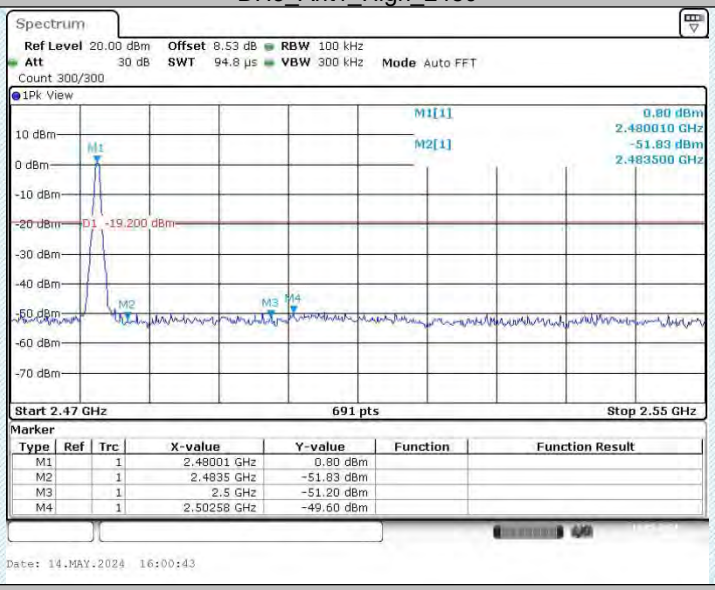
6.7.2. Test Graphs

DH5_Ant1_Low_2402



DH5_Ant1_High_2480



DH5_Ant1_Low_Hop_2402

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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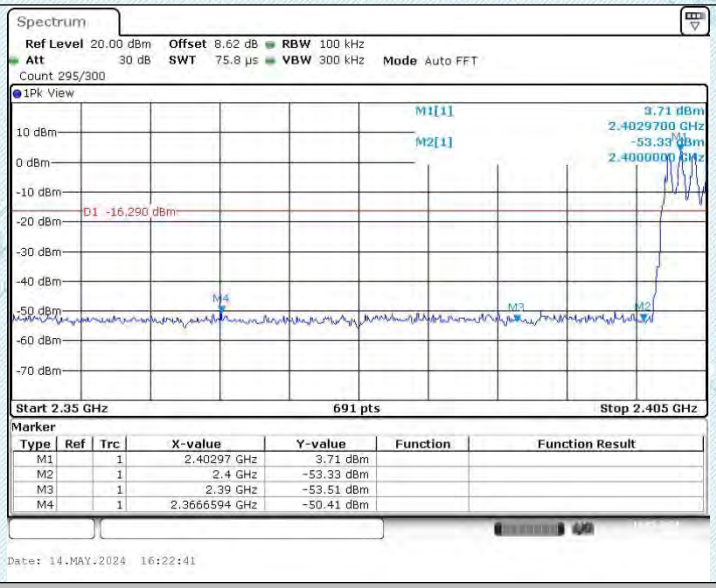
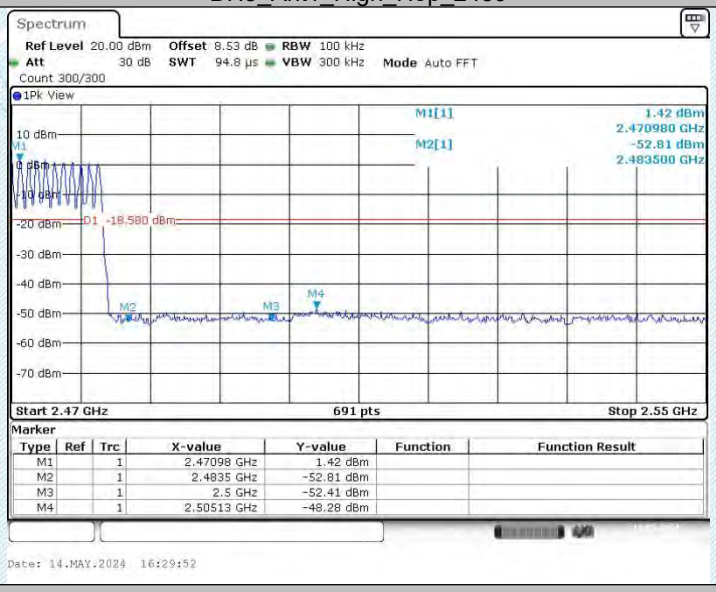
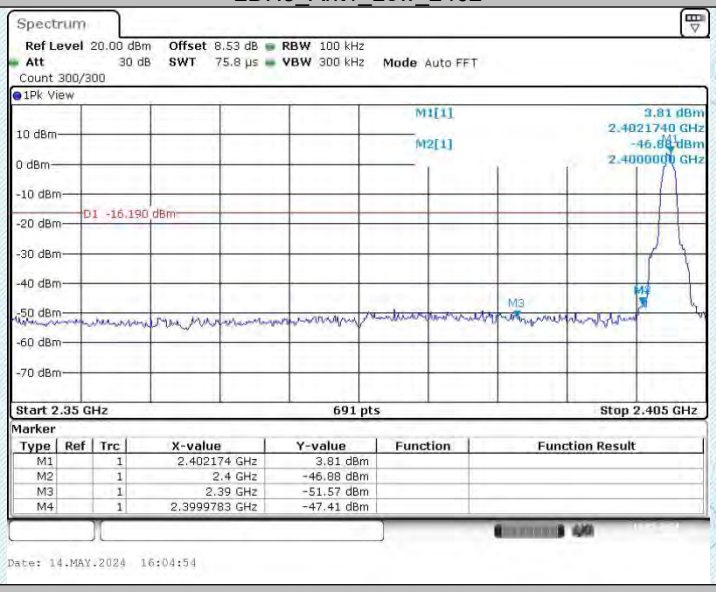


DH5_Ant1_High_Hop_2480



2DH5_Ant1_Low_2402



2DH5_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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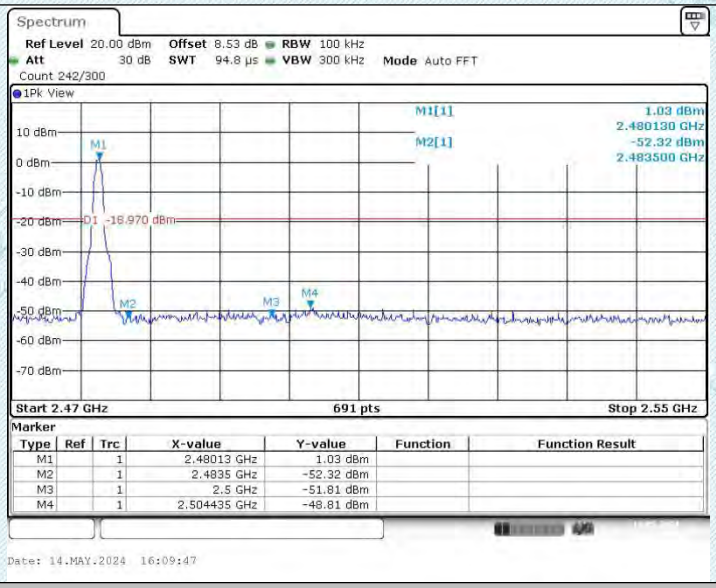

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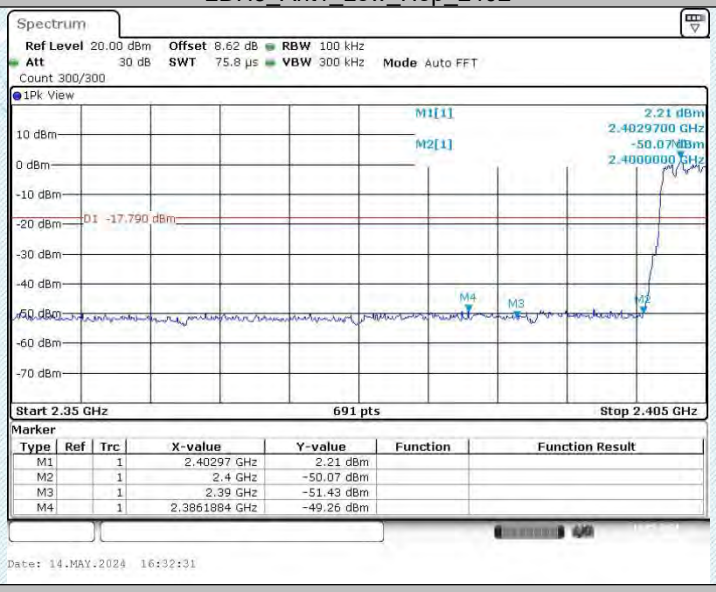
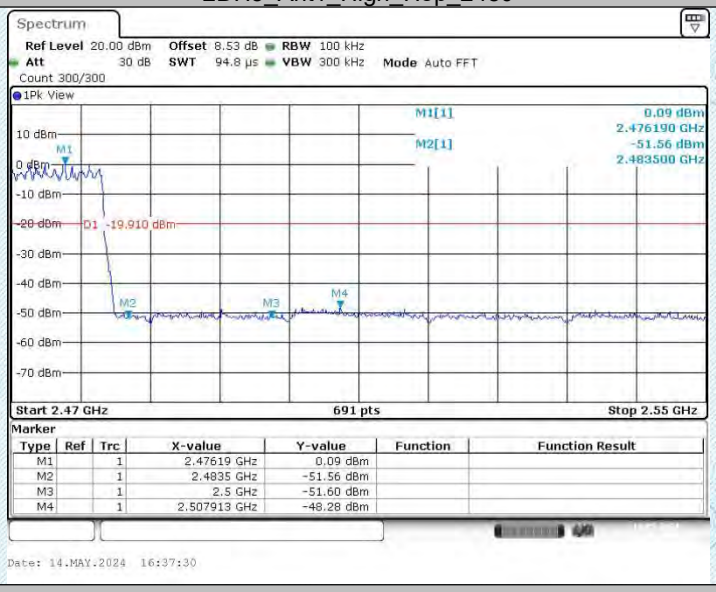


2DH5_Ant1_High_Hop_2480



3DH5_Ant1_Low_2402

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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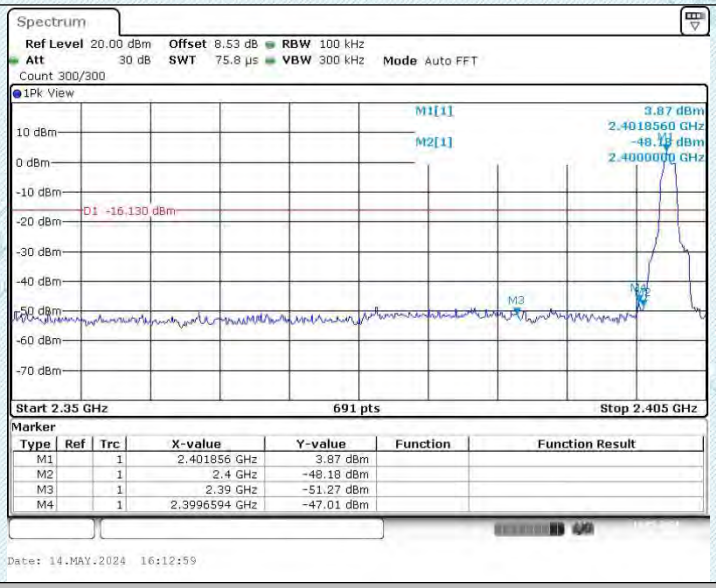
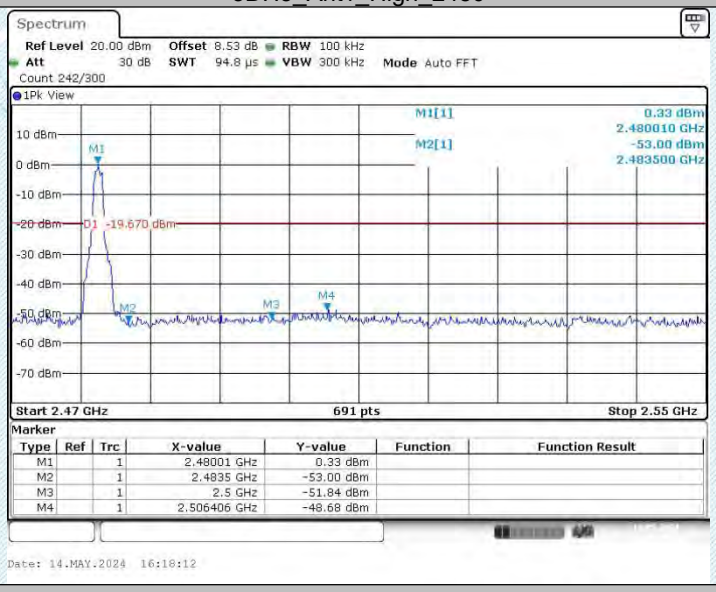
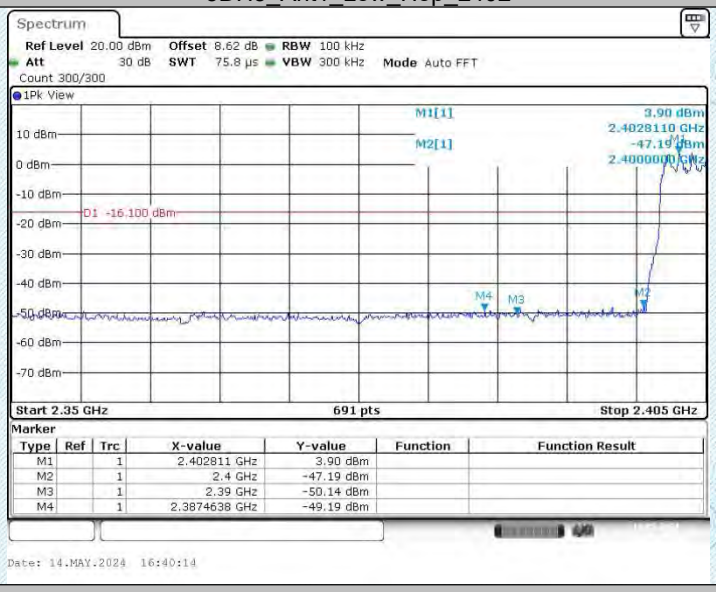


3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_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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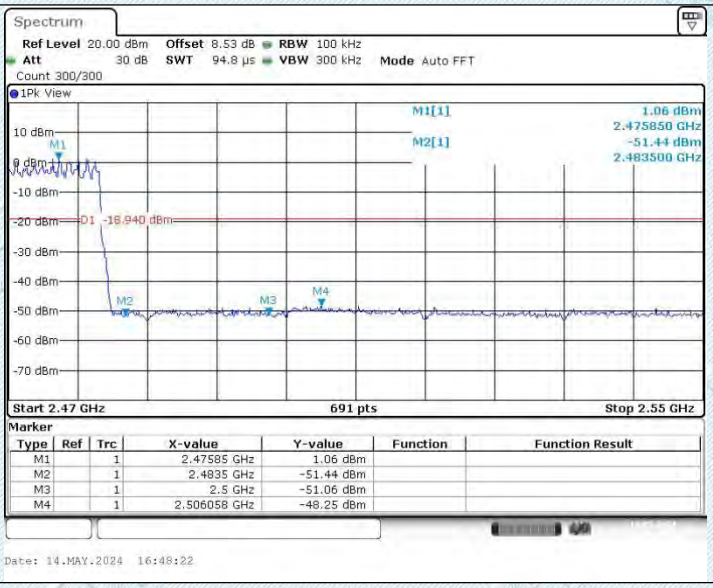

Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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6.8. Appendix H: Conducted Spurious Emission

6.8.1. Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	3.77	3.77	---	PASS
			30~1000	3.77	-60.85	≤-16.23	PASS
			1000~26500	3.77	-42.52	≤-16.23	PASS
		2441	Reference	3.10	3.10	---	PASS
			30~1000	3.10	-61.19	≤-16.9	PASS
			1000~26500	3.10	-40.96	≤-16.9	PASS
		2480	Reference	1.01	1.01	---	PASS
			30~1000	1.01	-60.43	≤-18.99	PASS
			1000~26500	1.01	-39.45	≤-18.99	PASS
2DH5	Ant1	2402	Reference	3.79	3.79	---	PASS
			30~1000	3.79	-60.63	≤-16.21	PASS
			1000~26500	3.79	-45.2	≤-16.21	PASS
		2441	Reference	3.08	3.08	---	PASS
			30~1000	3.08	-60.36	≤-16.92	PASS
			1000~26500	3.08	-43.48	≤-16.92	PASS
		2480	Reference	0.97	0.97	---	PASS
			30~1000	0.97	-60.4	≤-19.03	PASS
			1000~26500	0.97	-42.36	≤-19.03	PASS
3DH5	Ant1	2402	Reference	3.77	3.77	---	PASS
			30~1000	3.77	-61.17	≤-16.23	PASS
			1000~26500	3.77	-45.08	≤-16.23	PASS
		2441	Reference	3.08	3.08	---	PASS
			30~1000	3.08	-59.41	≤-16.92	PASS
			1000~26500	3.08	-42.78	≤-16.92	PASS
		2480	Reference	0.93	0.93	---	PASS
			30~1000	0.93	-60.52	≤-19.07	PASS
			1000~26500	0.93	-40.07	≤-19.07	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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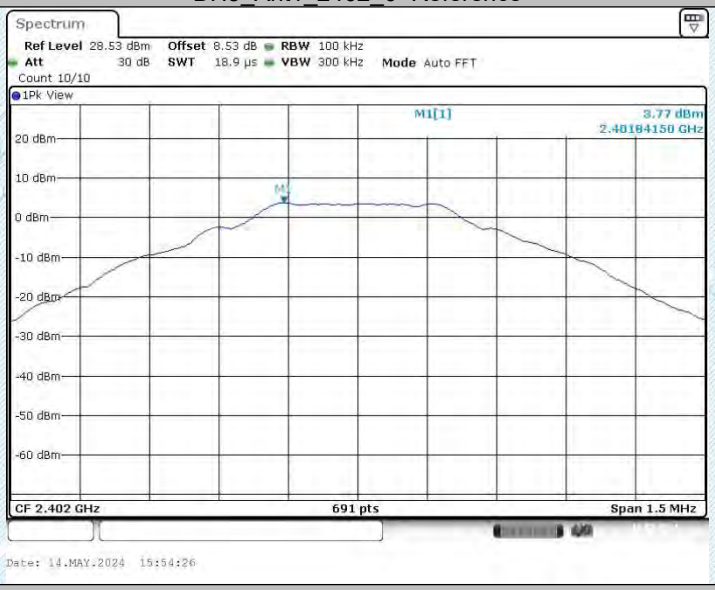
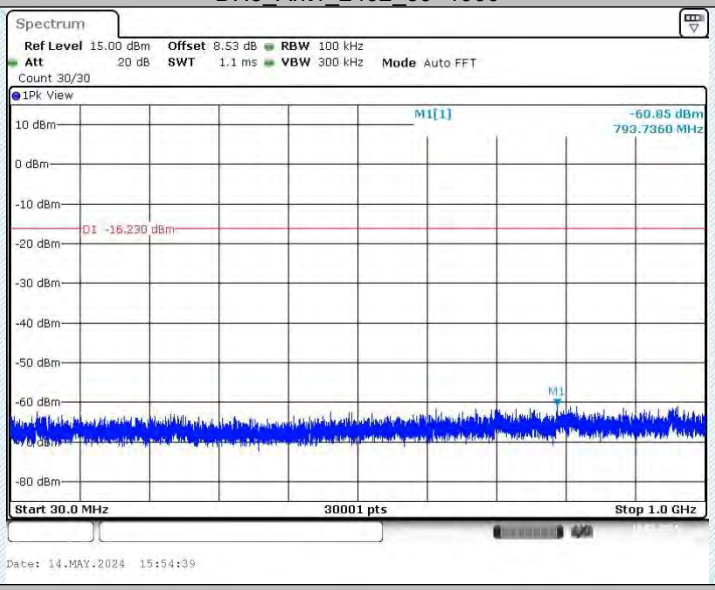
6.8.2. Test Graphs

DH5_Ant1_2402_0~Reference



DH5_Ant1_2402_30~1000



DH5_Ant1_2402_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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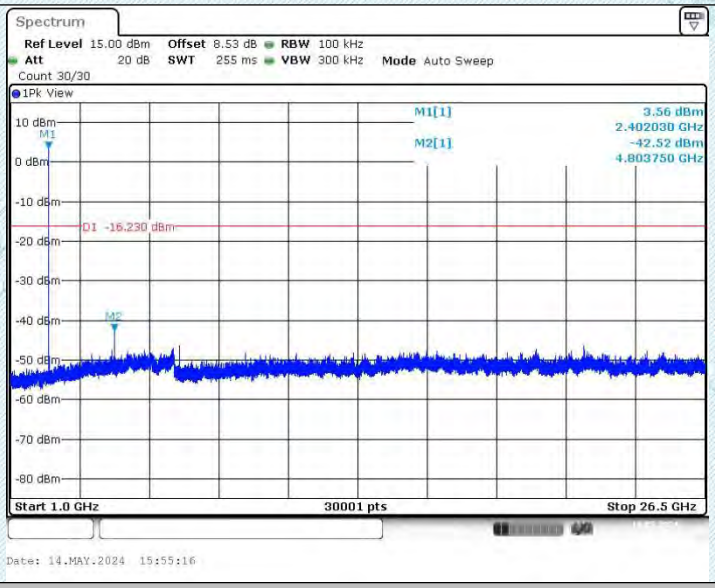
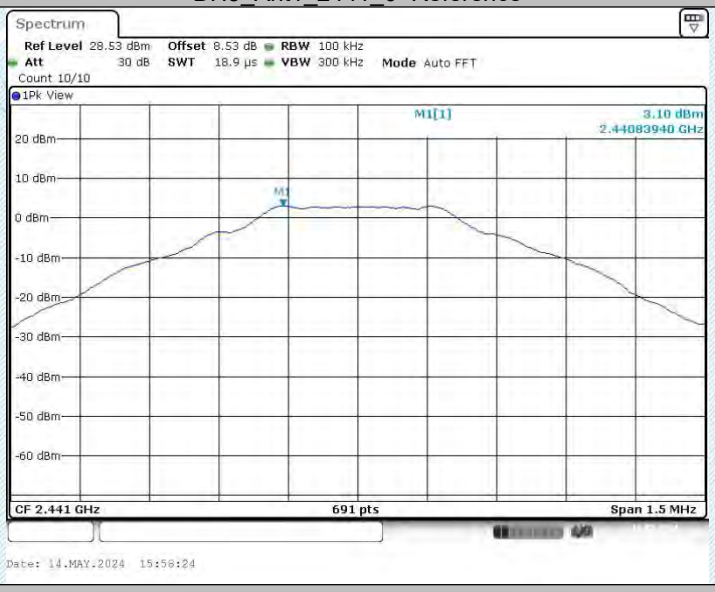


DH5_Ant1_2441_0~Reference



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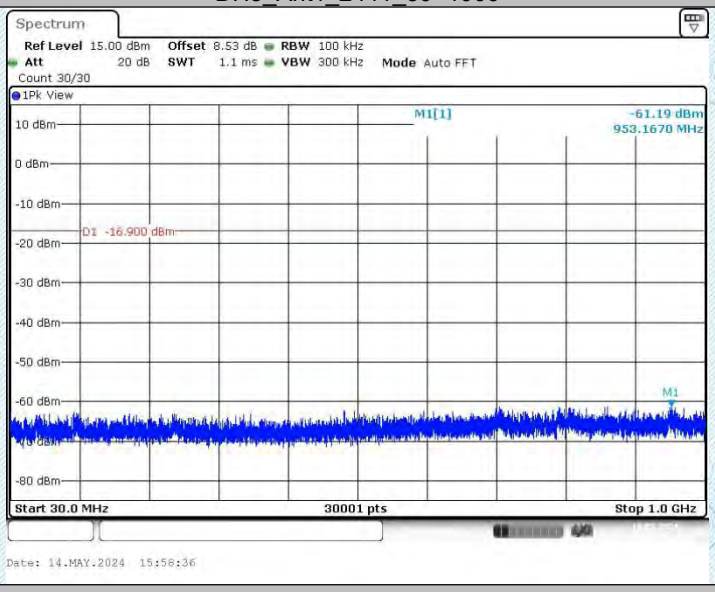
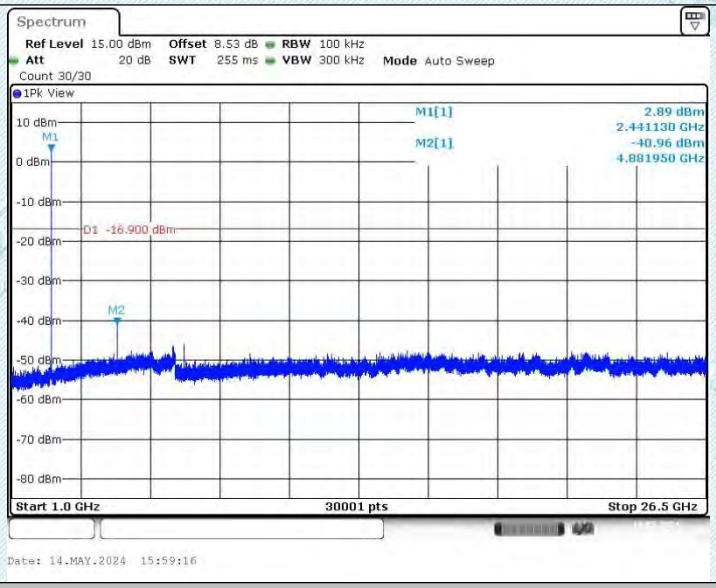
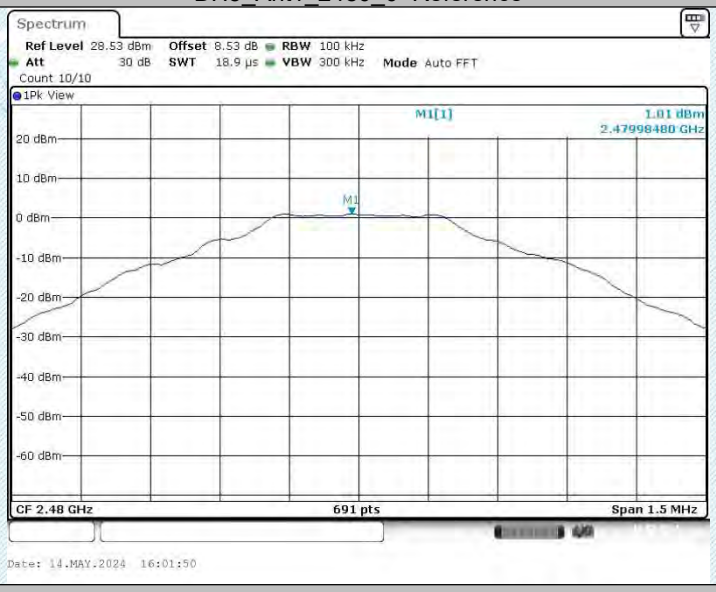


DH5_Ant1_2441_1000~26500

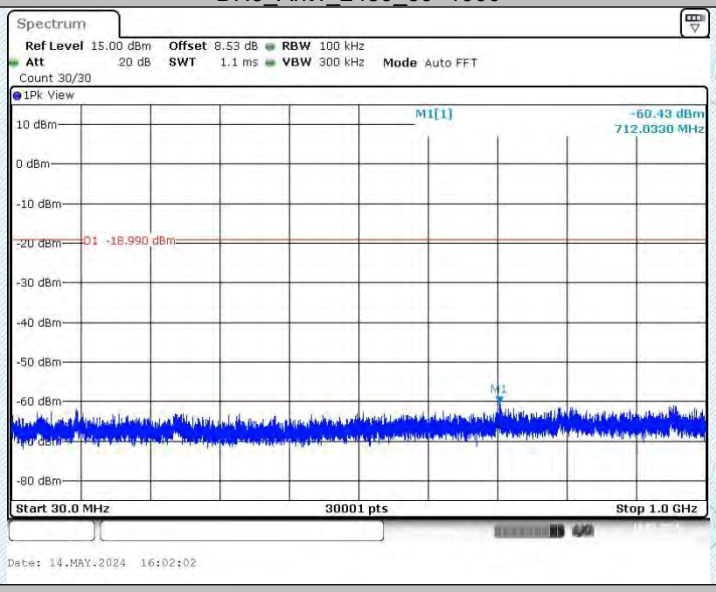
Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



DH5_Ant1_2480_0~Reference



DH5_Ant1_2480_30~1000



DH5_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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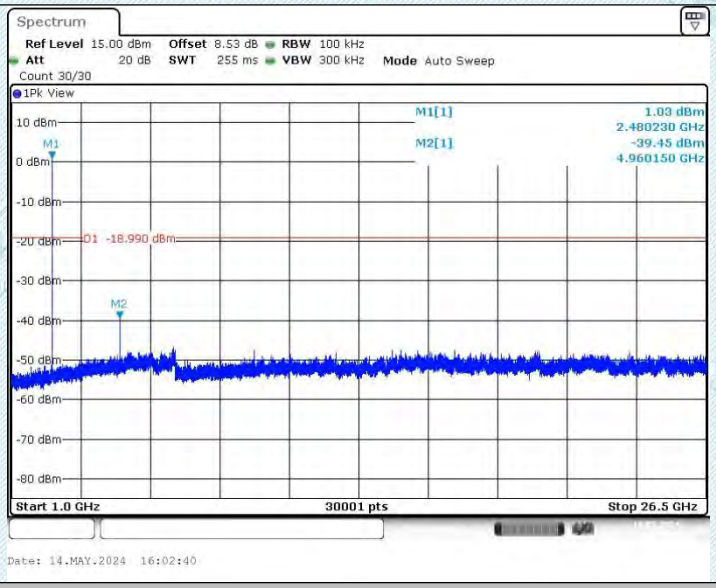
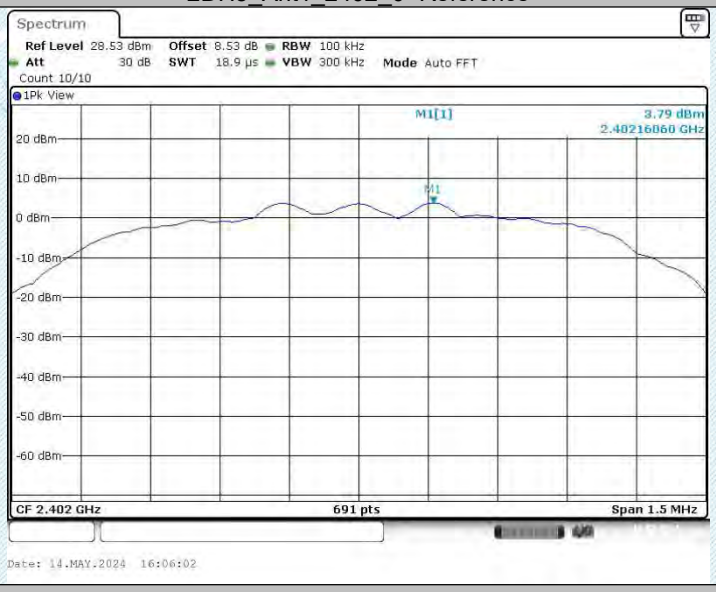


2DH5_Ant1_2402_0~Reference



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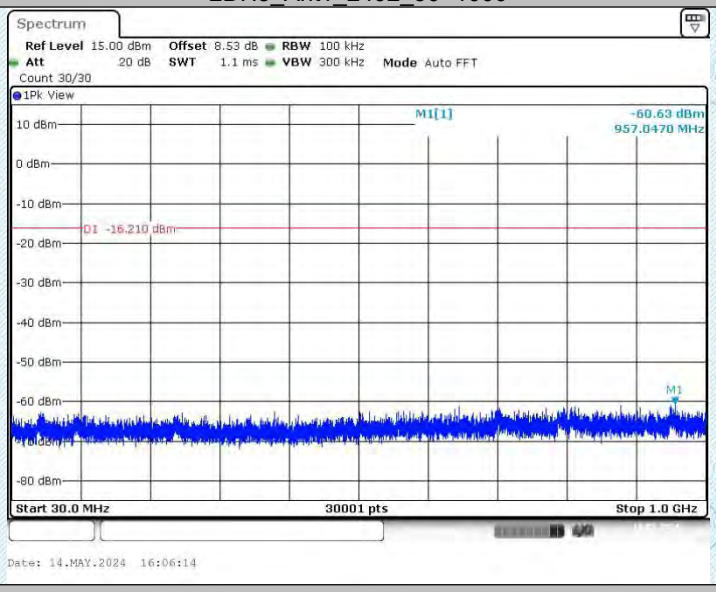

2DH5_Ant1_2402_1000~26500

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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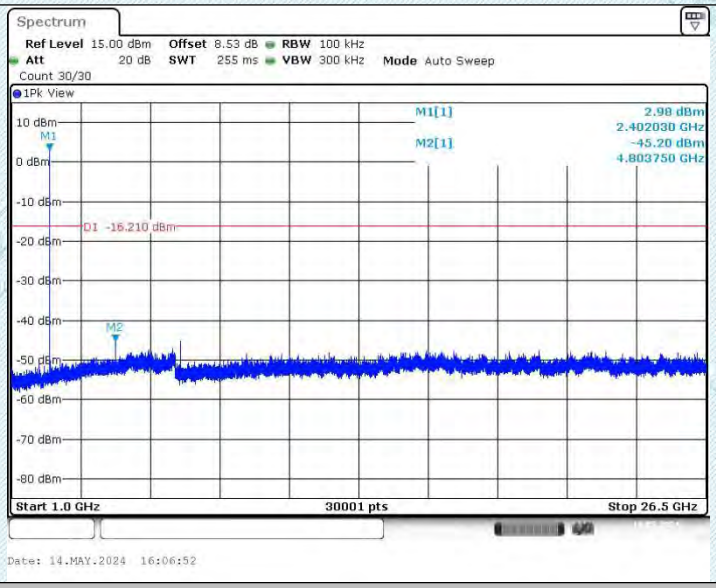
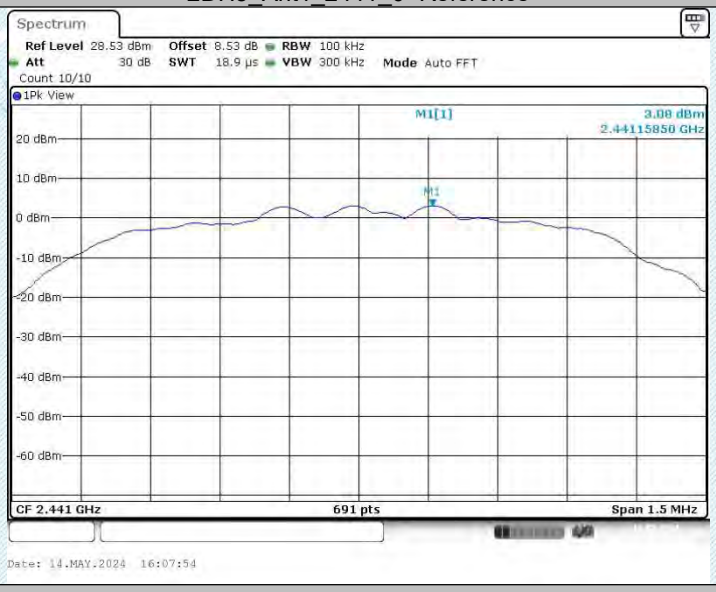


2DH5_Ant1_2441_0~Reference



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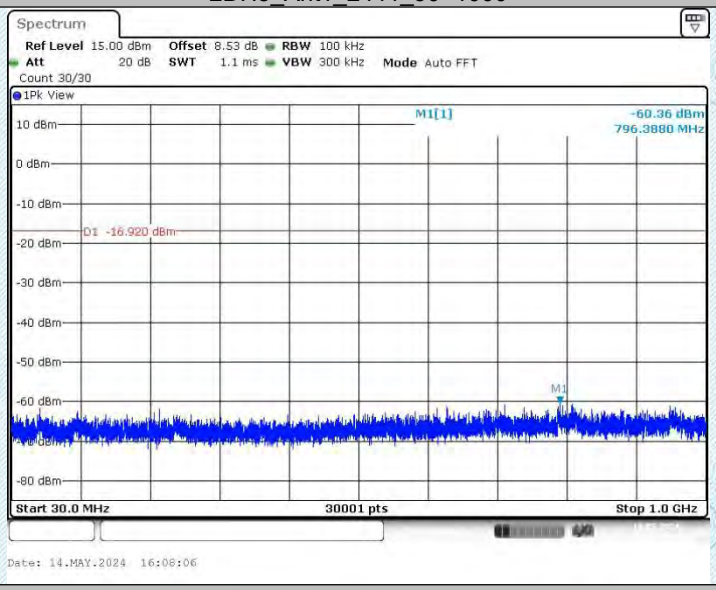

2DH5_Ant1_2441_1000~26500

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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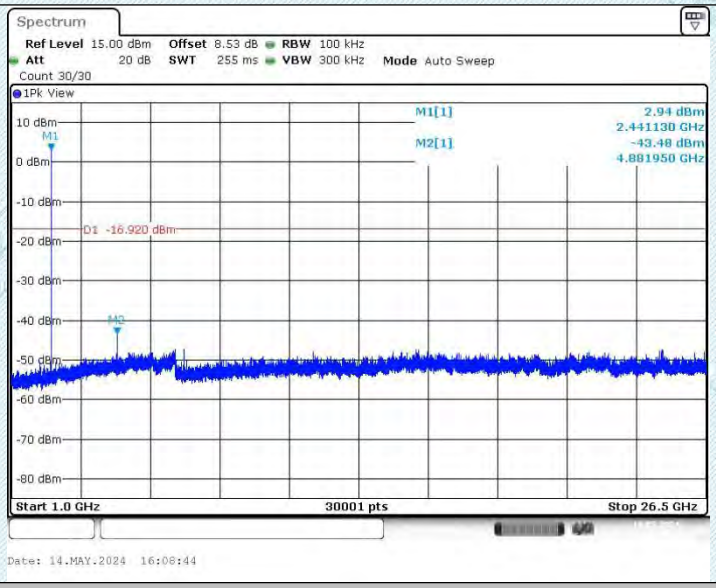
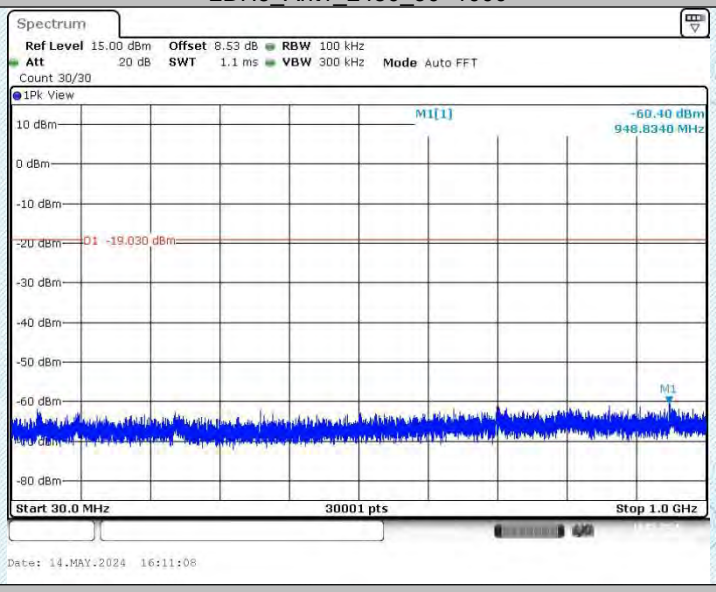


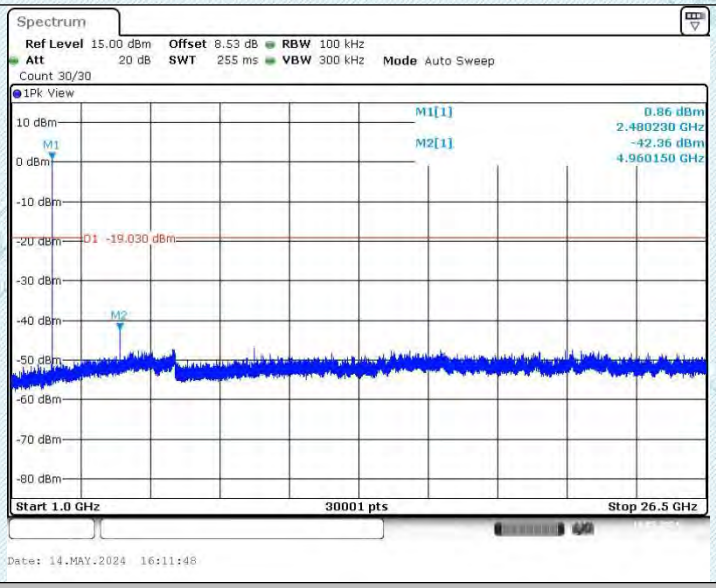
2DH5_Ant1_2480_0~Reference

2DH5_Ant1_2480_30~1000



2DH5_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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



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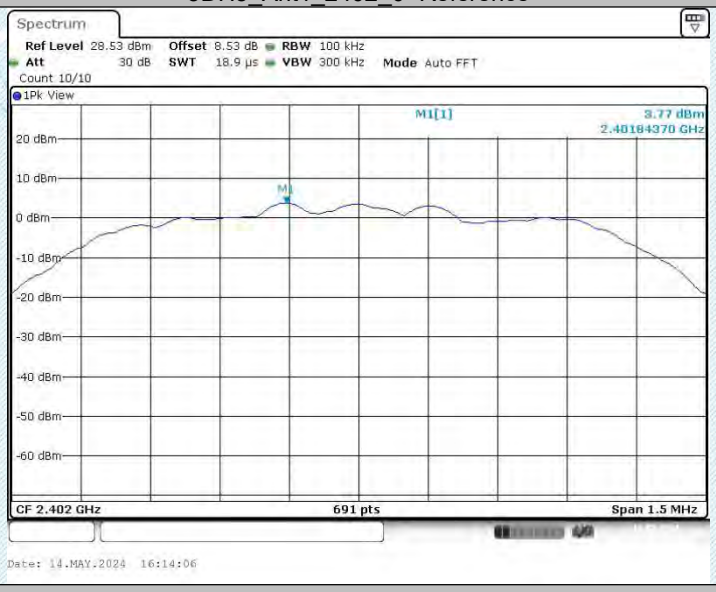

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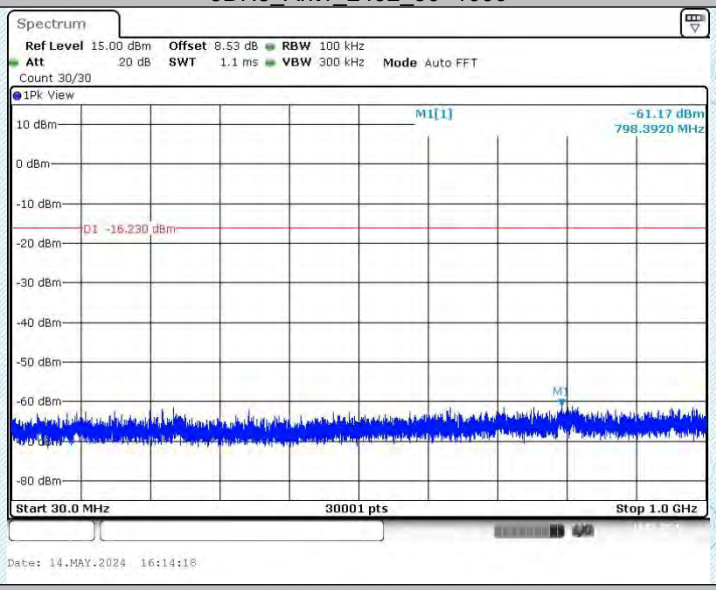

3DH5_Ant1_2402_1000~26500

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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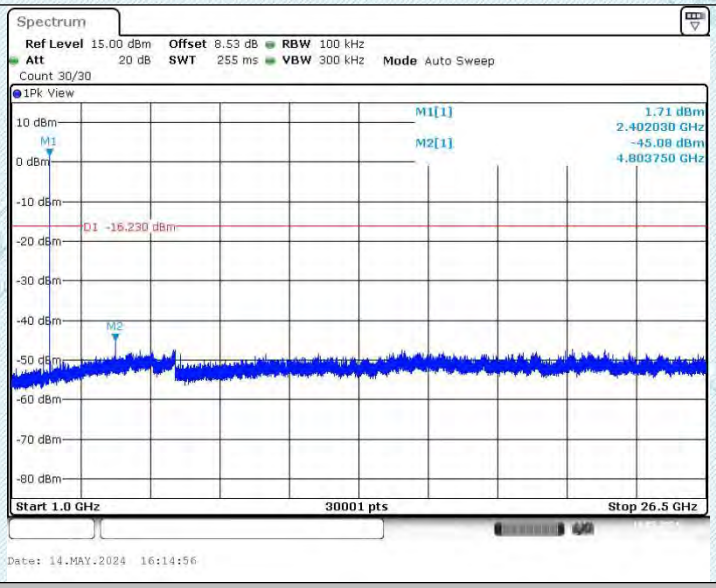

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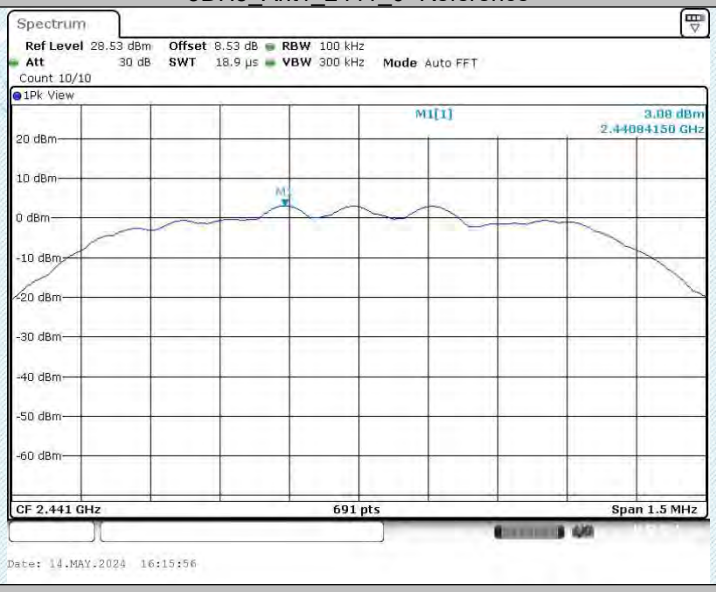

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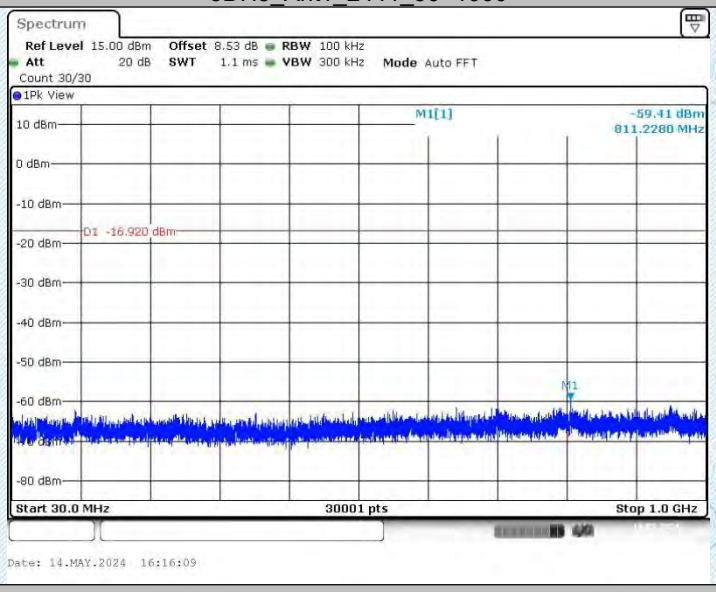

3DH5_Ant1_2441_1000~26500

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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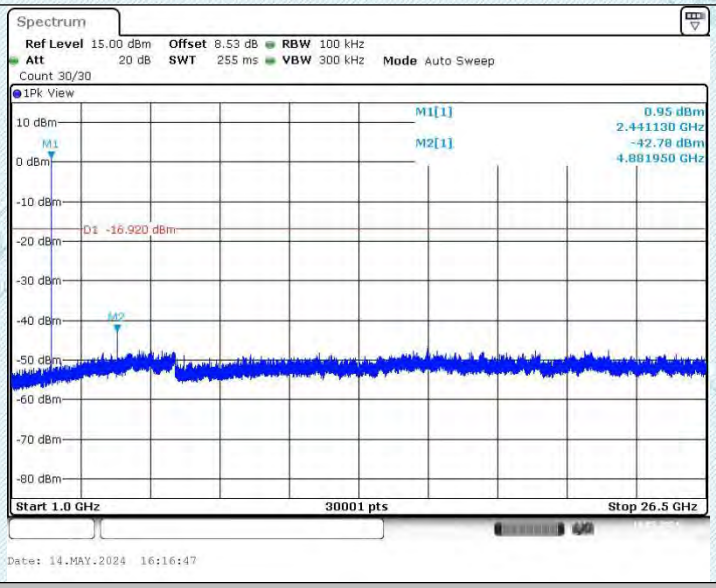
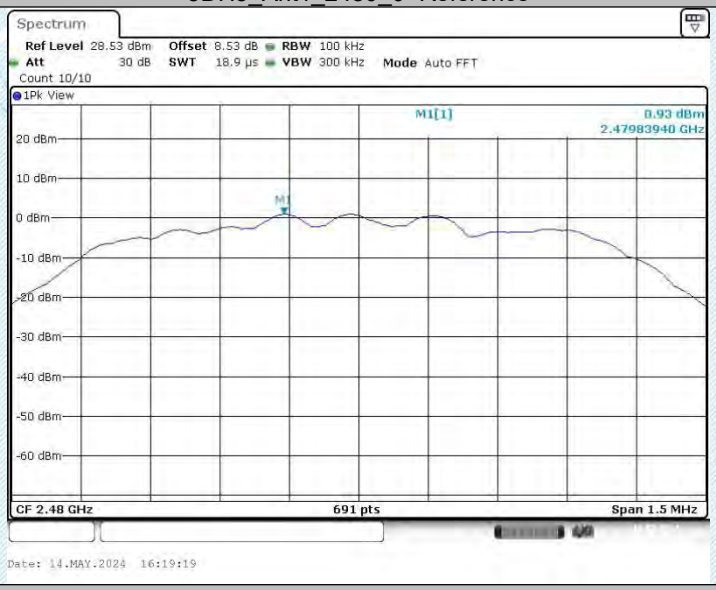
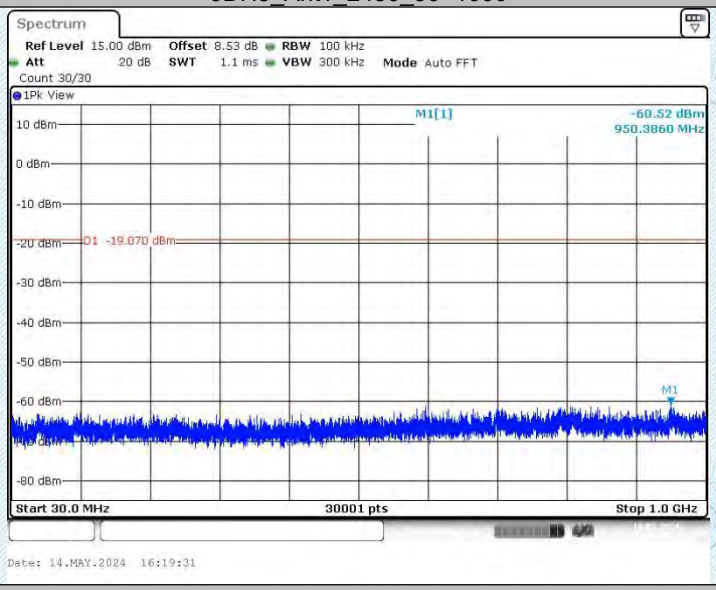


3DH5_Ant1_2480_0~Reference

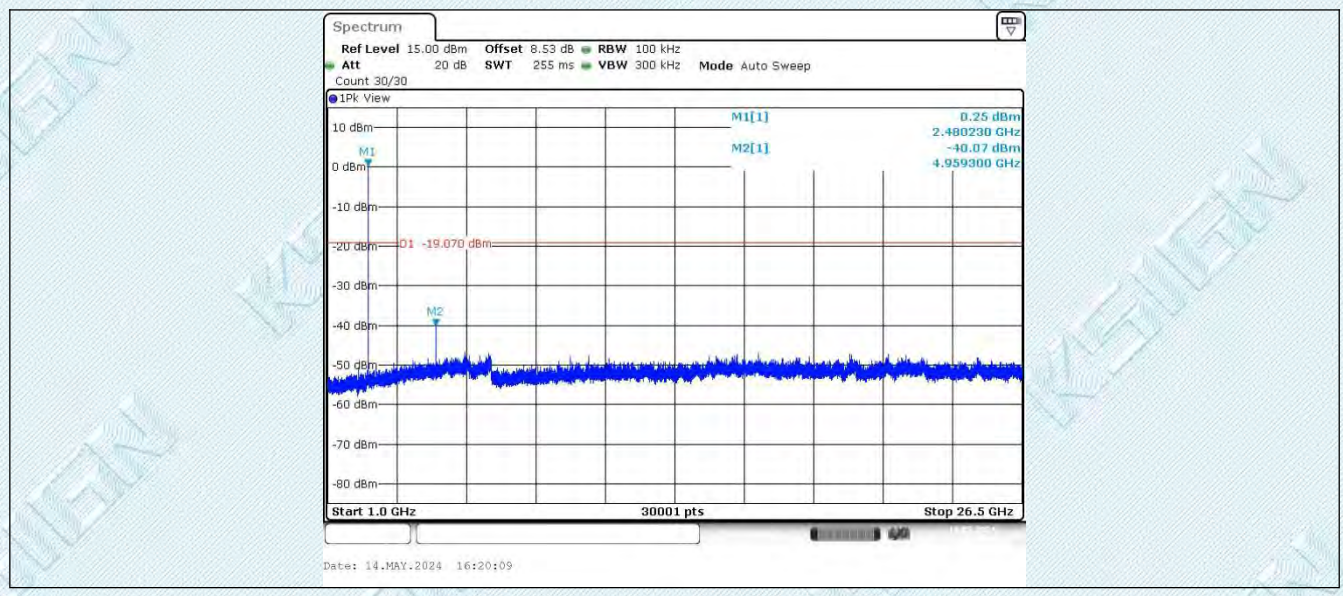


3DH5_Ant1_2480_30~1000



3DH5_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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



--THE END--

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
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com

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1.	The results are valid only for the samples submitted.
2.	The report is invalid without the "APPROVED”and the "seal for riding".
3.	The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
4.	The test report can not be partially copied unless prior written approval is issued from our lab.
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