

TEST REPORT

Report No..... : KS2212S5455E01
FCC ID..... : 2A88A-MK16
Applicant..... : Wuhan Yixin Technology Co., Ltd
Address..... : Rm2,4F,building10,Sun city,Gezhouba,No.40,Gaoxin 4th Road,East Lake
New Technology Development Zone Wuhan China
Manufacturer..... : Wuhan Yixin Technology Co., Ltd
Address..... : Rm2,4F,building10,Sun city,Gezhouba,No.40,Gaoxin 4th Road,East Lake
New Technology Development Zone Wuhan China
Product Name..... : Bluetooth Low Energy Module
Model/Type reference..... : MK16A , MK16B
Standard..... : 47 CFR Part 15.247
Date of Receipt..... : December 9, 2022
Date of Test Date..... : December 9, 2022 to December 15, 2022
Date of issue..... : December 16, 2022
Test result..... : Pass

Prepared by:
(Printed name + Signature) Pai Zheng

Pai Zheng
Sky Dong

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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TABLE OF CONTENTS

Page

1. TEST SUMMARY	3
1.1. Test Standards	3
1.2. Report Version	3
1.3. Test Description	4
1.4. Test Facility	5
1.5. Measurement Uncertainty	6
2. GENERAL INFORMATION	7
2.1. General Description Of EUT	7
2.2. Accessory Equipment Information	7
2.3. Description of Test Modes	7
2.4. Measurement Instruments List	8
3. EVALUATION RESULTS (EVALUATION)	11
3.1. Antenna requirement	11
4. RADIO SPECTRUM MATTER TEST RESULTS (RF)	12
4.1. Conducted Emission at AC power line	12
4.2. Occupied Bandwidth	15
4.3. Maximum Conducted Output Power	16
4.4. Power Spectral Density	18
4.5. Emissions around the fundamental	19
4.6. Emissions in restricted frequency bands (below 1GHz)	28
4.7. Emissions in restricted frequency bands (above 1GHz)	33
5. EUT TEST PHOTOS	46
6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL	49
6.1. Appendix A: DTS Bandwidth	56
6.2. Appendix B: Occupied Channel Bandwidth	60
6.3. Appendix C: Maximum conducted output power	64
6.4. Appendix D: Maximum power spectral density	68
6.5. ppendix E: Reference level measurement	72
6.6. Appendix F: Band edge measurements	76
6.7. Appendix G: Conducted Spurious Emission	79
6.8. Appendix H: Duty Cycle	85

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

1.2. Report Version

Revised No.	Date of issue	Description
01	December 16, 2022	Original

1.3. Test Description

Test Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 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 around the fundamental	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	15.247(c)&15.209	Pass

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 Requirements for 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
Output Power, Conducted	$\pm 1.4\text{dB}$
PSD, Conducted	$\pm 1.0\text{dB}$
RSE (1-18GHz)	$\pm 4.68\text{dB}$
RSE (30-1000MHz)	$\pm 5.7\text{dB}$
RSE (18-40GHz)	$\pm 5.18\text{dB}$

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

2. GENERAL INFORMATION

2.1. General Description Of EUT

Test Sample Number:	1-1(Normal Sample), 1-2(Engineering Sample)
Product Name:	Bluetooth Low Energy Module
Model / Type reference:	MK16A , MK16B
Model Difference:	MK16A is a PCB antenna, and MK16B has an antenna base, other power supply mode, internal structure, circuit and key components are the same, does not affect the safety and electromagnetic compatibility performance.
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	40
Modulation Type:	GFSK
Antenna Type:	Internal antenna
Antenna Gain(MK16A):	0.29dBi
Antenna Gain(MK16B):	4.42dBi

2.2. Accessory Equipment Information

Equipment	Model	S/N	Manufacturer	Certificate type
Portable computer	TPN-Q192	/	HP	/

2.3. Description of Test Modes

No.	Title	Description of Mode
Test Mode1	TX mode	Keep the EUT works in continuously transmitting mode with GFSK modulation.

2.4. Measurement Instruments List

Occupied Bandwidth				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-1 87	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920 -188	09203401	2023-03-04
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2023-03-04
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2023-03-04
Hygrothermograph	Anymetre	JB913	/	2023-03-07
Climate Chamber	Angul	AGNH80L	1903042120	2023-03-04
Spectrum Analyzer	HP	8593E	3831U02087	2023-03-04
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2023-03-04
RF Control Unit	Tonscend	JS0806-2	/	2023-03-04
Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04
Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04

Maximum Conducted Output Power				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-1 87	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920 -188	09203401	2023-03-04
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Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04

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Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04
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Power Spectral Density				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-187	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920-188	09203401	2023-03-04
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2023-03-04
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2023-03-04
Hygrothermograph	Anymetre	JB913	/	2023-03-07
Climate Chamber	Angul	AGNH80L	1903042120	2023-03-04
Spectrum Analyzer	HP	8593E	3831U02087	2023-03-04
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2023-03-04
RF Control Unit	Tonscend	JS0806-2	/	2023-03-04
Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04
Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04

Emissions around the fundamental				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05

Emissions in restricted frequency bands (below 1GHz)				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04

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Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05

Emissions in restricted frequency bands (above 1GHz)				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05

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3. Evaluation Results (Evaluation)

3.1. Antenna requirement

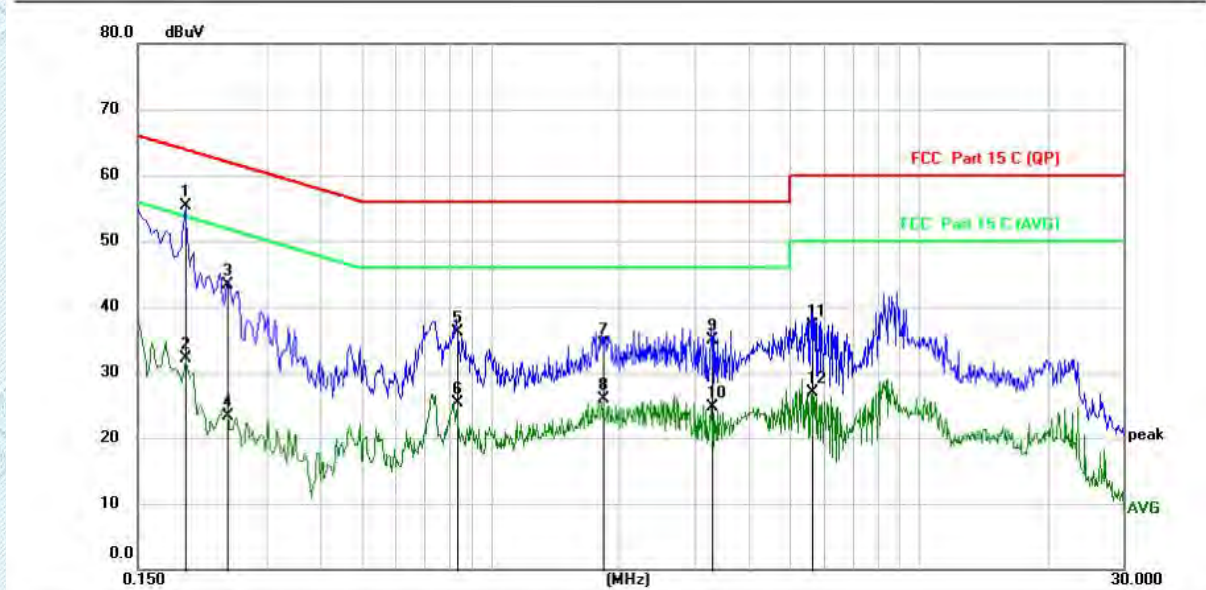
Test Requirement:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered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

The MK16A's antenna gain is 0.29dB, MK16B's antenna gain is 4.42dB, 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.

4.1.3. Test Data:

Test Mode1 / Line: Line / Band: 2.4G / BW: 1 / CH: L

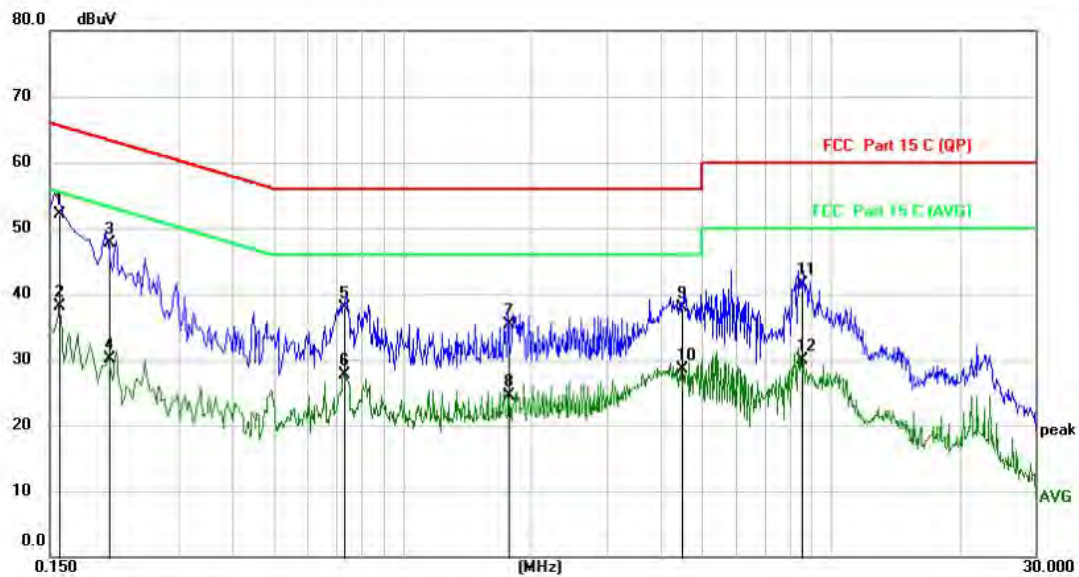


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1 *	0.1940	44.62	10.75	55.37	63.86	-8.49	QP	
2	0.1940	21.27	10.75	32.02	53.86	-21.84	AVG	
3	0.2429	32.66	10.72	43.38	62.00	-18.62	QP	
4	0.2429	12.60	10.72	23.32	52.00	-28.68	AVG	
5	0.8380	25.72	10.44	36.16	56.00	-19.84	QP	
6	0.8380	14.83	10.44	25.27	46.00	-20.73	AVG	
7	1.8380	23.83	10.54	34.37	56.00	-21.63	QP	
8	1.8380	15.34	10.54	25.88	46.00	-20.12	AVG	
9	3.2900	24.33	10.60	34.93	56.00	-21.07	QP	
10	3.2900	14.11	10.60	24.71	46.00	-21.29	AVG	
11	5.6459	26.46	10.60	37.06	60.00	-22.94	QP	
12	5.6459	16.40	10.60	27.00	50.00	-23.00	AVG	

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Test Mode1 / Line: Neutral / Band: 2.4G / BW: 1 / CH: L


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1 *	0.1580	41.49	10.71	52.20	65.57	-13.37	QP	
2	0.1580	27.42	10.71	38.13	55.57	-17.44	AVG	
3	0.2059	36.98	10.76	47.74	63.37	-15.63	QP	
4	0.2059	19.30	10.76	30.06	53.37	-23.31	AVG	
5	0.7300	27.45	10.44	37.89	56.00	-18.11	QP	
6	0.7300	17.23	10.44	27.67	46.00	-18.33	AVG	
7	1.7700	24.89	10.51	35.40	56.00	-20.60	QP	
8	1.7700	13.92	10.51	24.43	46.00	-21.57	AVG	
9	4.4858	27.27	10.62	37.89	56.00	-18.11	QP	
10	4.4858	17.97	10.62	28.59	46.00	-17.41	AVG	
11	8.5138	30.92	10.60	41.52	60.00	-18.48	QP	
12	8.5138	19.39	10.60	29.99	50.00	-20.01	AVG	

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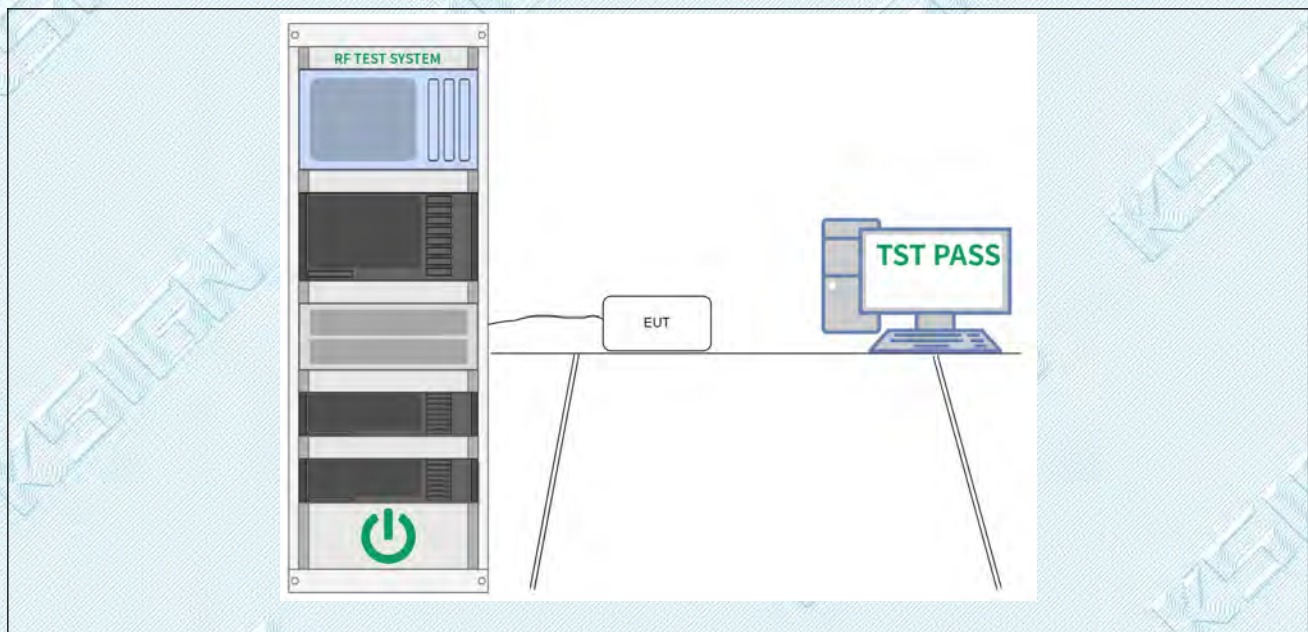
4.2. Occupied Bandwidth

Test Requirement:	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 Limit:	Section (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:	DTS bandwidth
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW $\geq [3 \times \text{RBW}]$. 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:	25.4 °C
Humidity:	54.3 %
Atmospheric Pressure:	103 kPa
Final test mode:	Test Mode 1

4.2.2. Test Setup Diagram:



4.2.3. Test Data:

Please Refer to Appendix for Details.

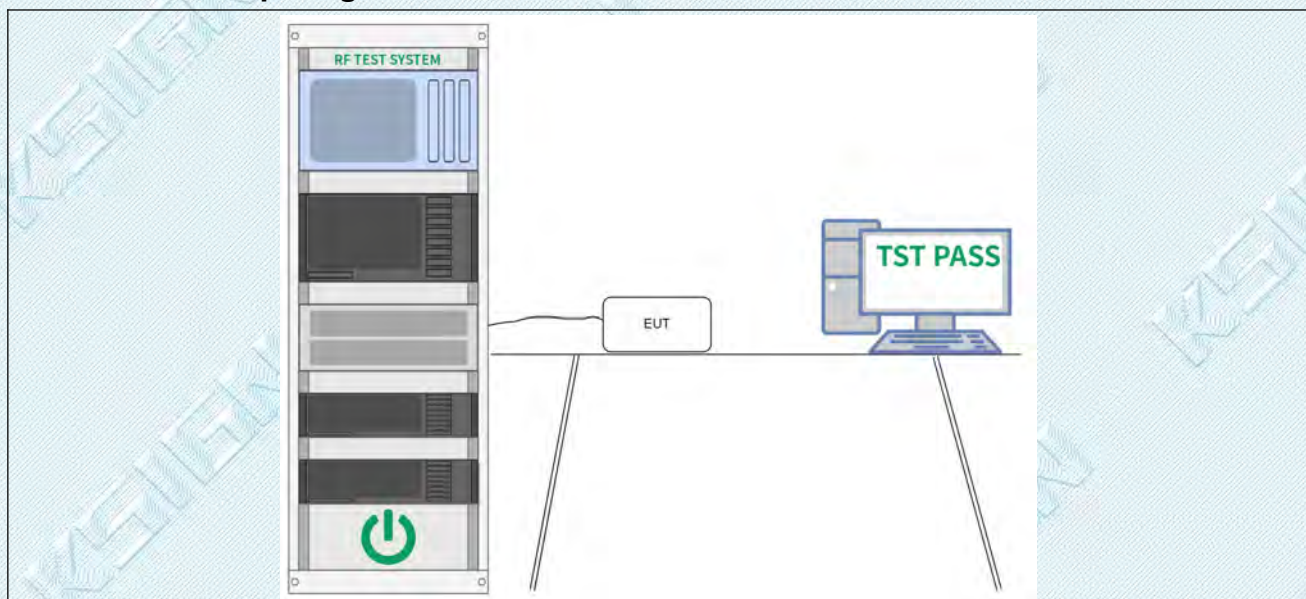
4.3. Maximum Conducted Output Power

Test Requirement:	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 Limit:	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:	Maximum peak conducted output power
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power

4.3.1. E.U.T. Operation:

Operating Environment:	
Temperature:	25.4 °C
Humidity:	54.3 %
Atmospheric Pressure:	103 kPa
Final test mode:	Test Mode 1

4.3.2. Test Setup Diagram:



4.3.3. Test Data:

Please Refer to Appendix for Details.

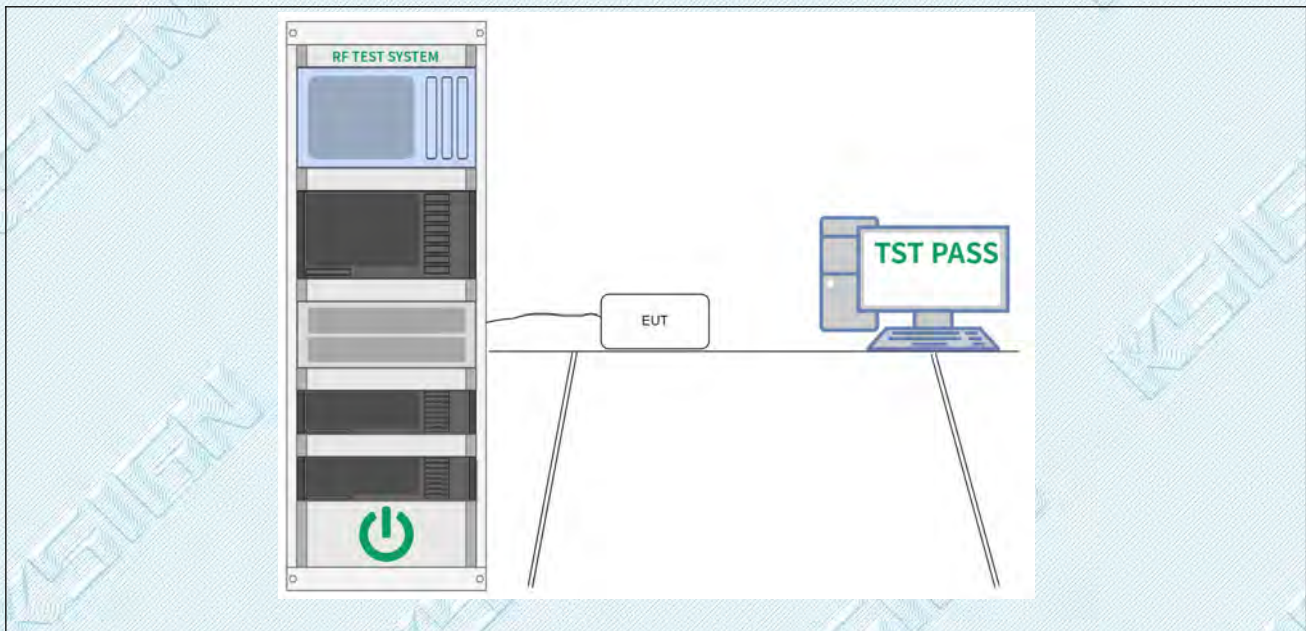
4.4. Power Spectral Density

Test Requirement:	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 Limit:	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:	Maximum power spectral density level in the fundamental emission

4.4.1. E.U.T. Operation:

Operating Environment:	
Temperature:	25.4 °C
Humidity:	54.3 %
Atmospheric Pressure:	103 kPa
Final test mode:	Test Mode1

4.4.2. Test Setup Diagram:



4.4.3. Test Data:

Please Refer to Appendix for Details.

4.5. Emissions around the fundamental

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:	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.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

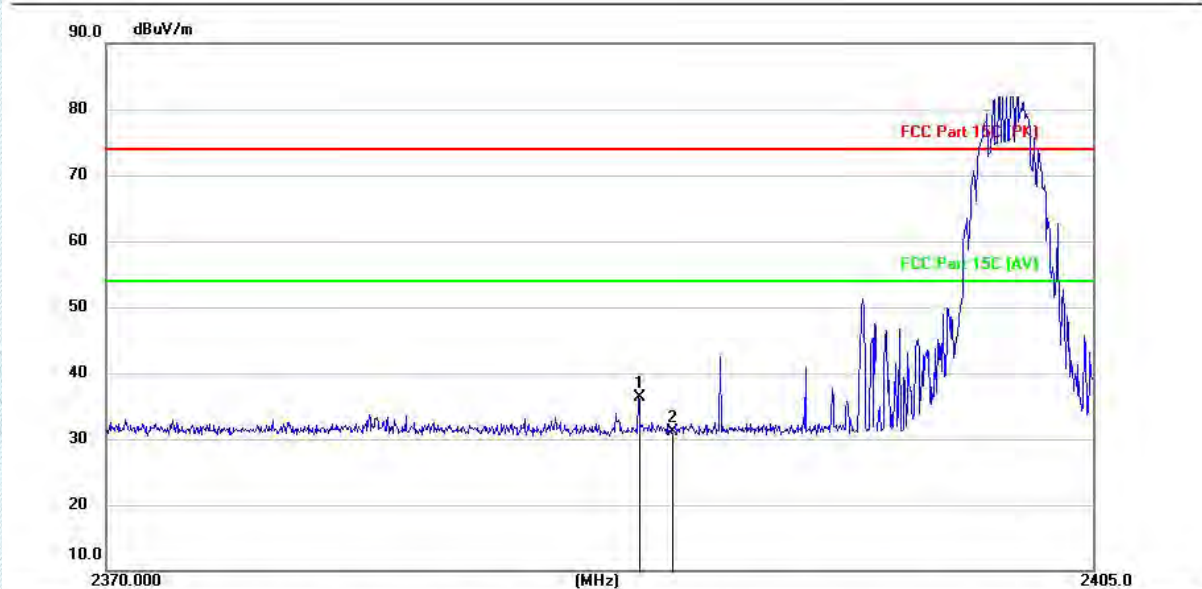
4.5.1. E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 °C
Humidity:	43.2 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.5.2. Test Data:

MK16A

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

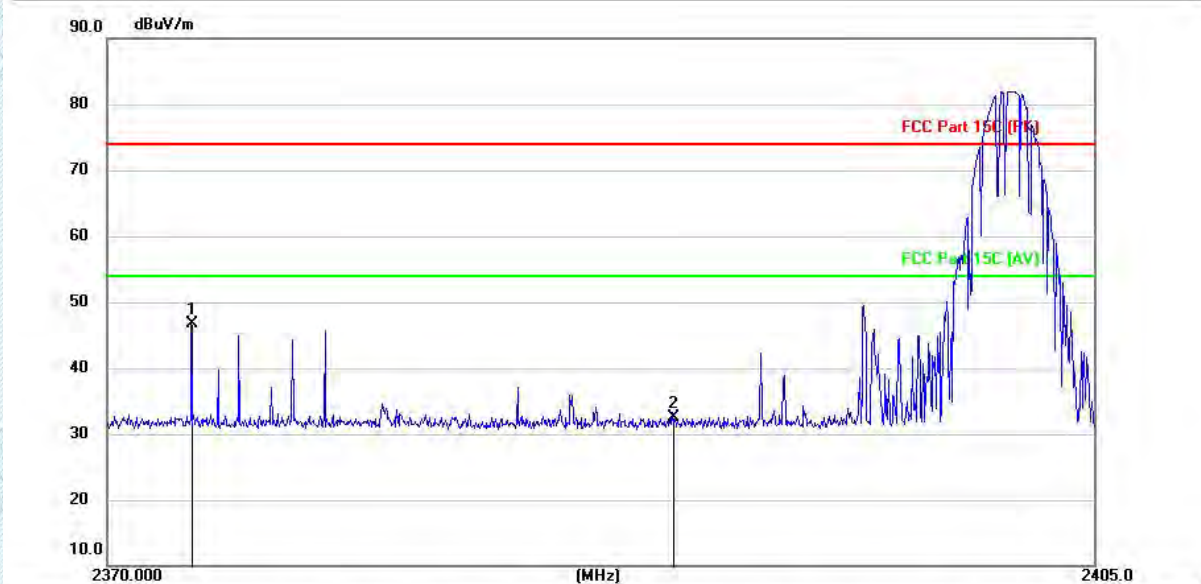


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2388.830	47.21	-10.93	36.28	74.00	-37.72	peak
2		2390.000	42.09	-10.92	31.17	74.00	-42.83	peak

TRF EMC_R1

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@gdkesign.cn Web: www.gdkesign.com

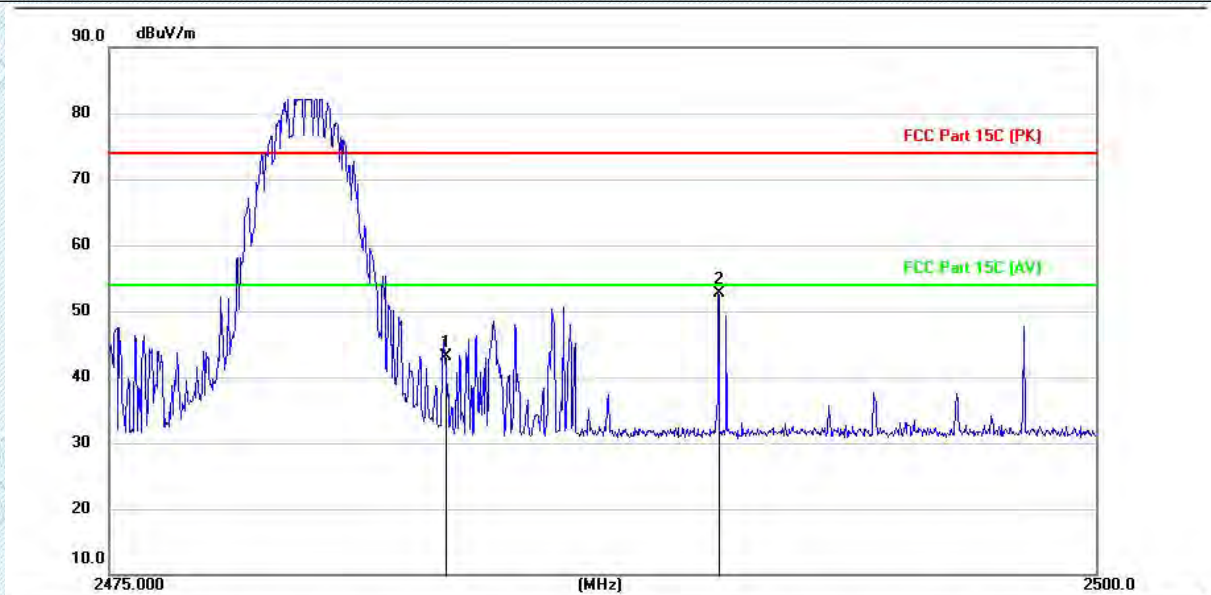
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2372.965	57.59	-10.92	46.67	74.00	-27.33	peak
2		2390.000	43.35	-10.92	32.43	74.00	-41.57	peak

TRF EMC_R1

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

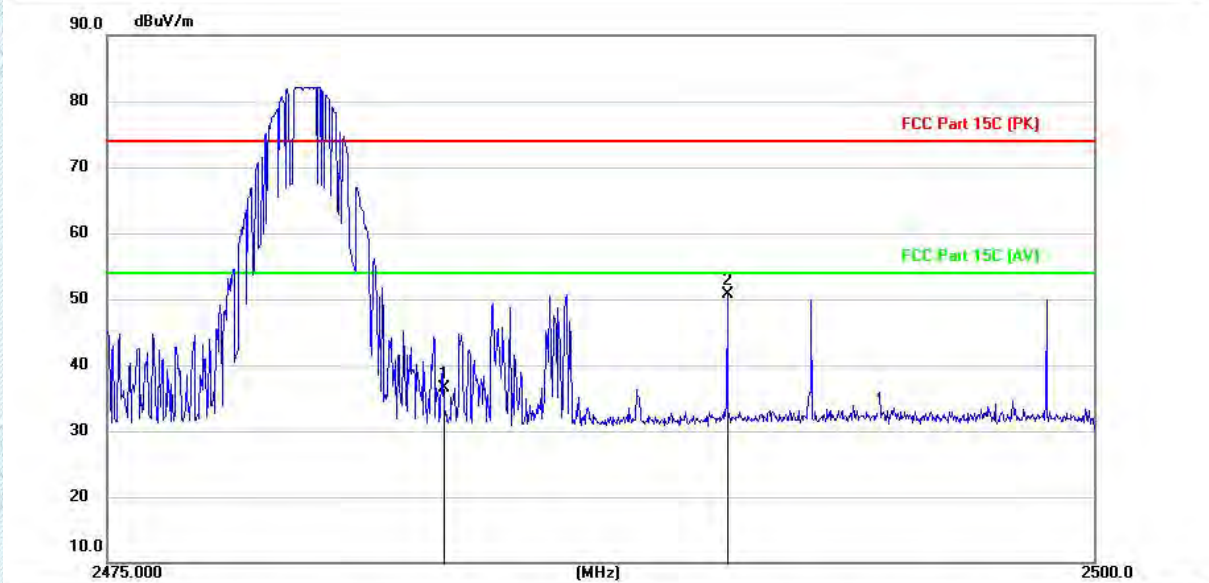
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	54.03	-10.88	43.15	74.00	-30.85	peak
2	*	2490.403	63.62	-10.89	52.73	74.00	-21.27	peak

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	47.38	-10.88	36.50	74.00	-37.50	peak
2	*	2490.693	61.61	-10.89	50.72	74.00	-23.28	peak

Note:

1. Measurement = Reading level + Correct Factor
2. Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3. Both modes of BLE 1Mbps and 2Mbps were tested at Low and High channel and recorded worst mode at BLE 1Mbps.
4. Since the peak value is less than the limit of the AVG value, there is no AVG data.

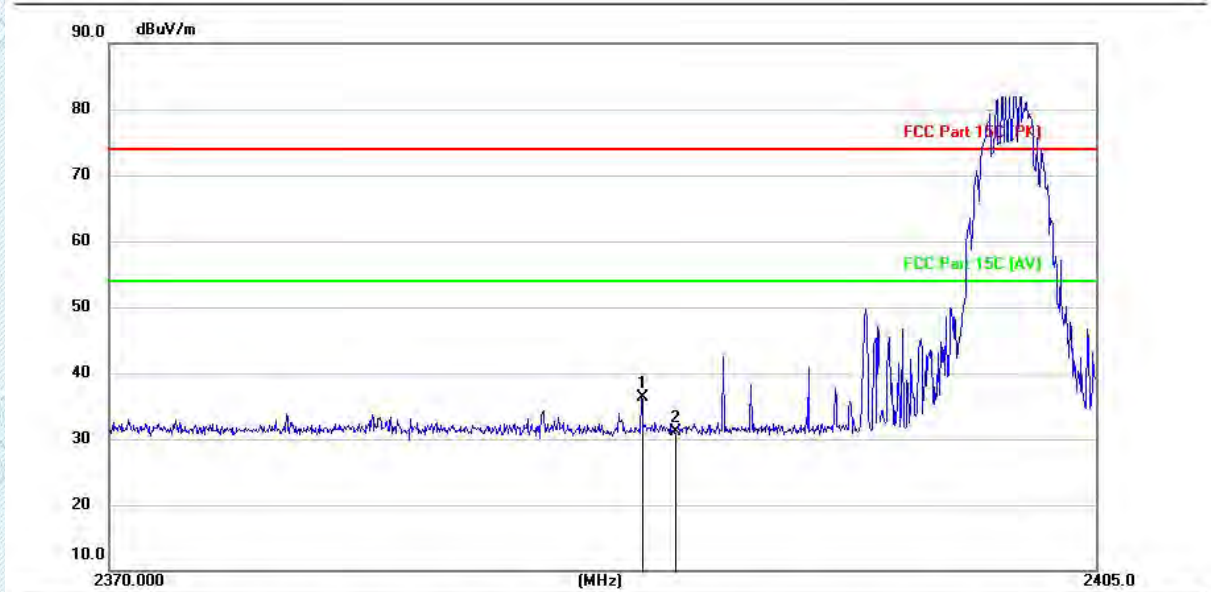
TRF EMC_R1

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

MK16B

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: L

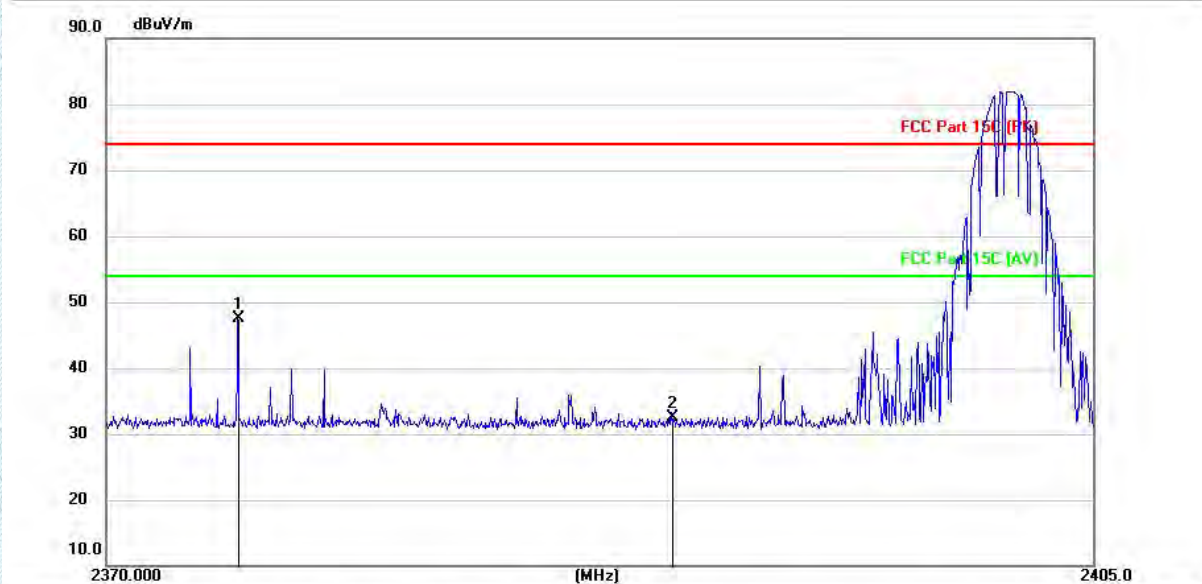


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2388.830	47.21	-10.93	36.28	74.00	-37.72	peak
2		2390.000	42.09	-10.92	31.17	74.00	-42.83	peak

TRF EMC_R1

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

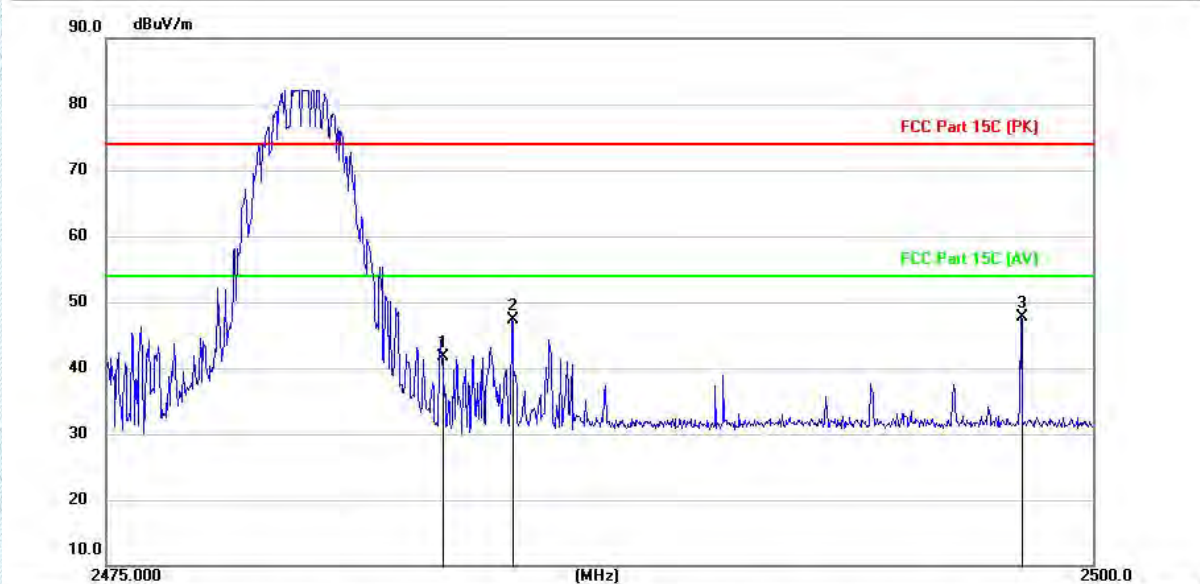
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: L


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2374.627	58.41	-10.93	47.48	74.00	-26.52	peak
2		2390.000	43.35	-10.92	32.43	74.00	-41.57	peak

TRF EMC_R1

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

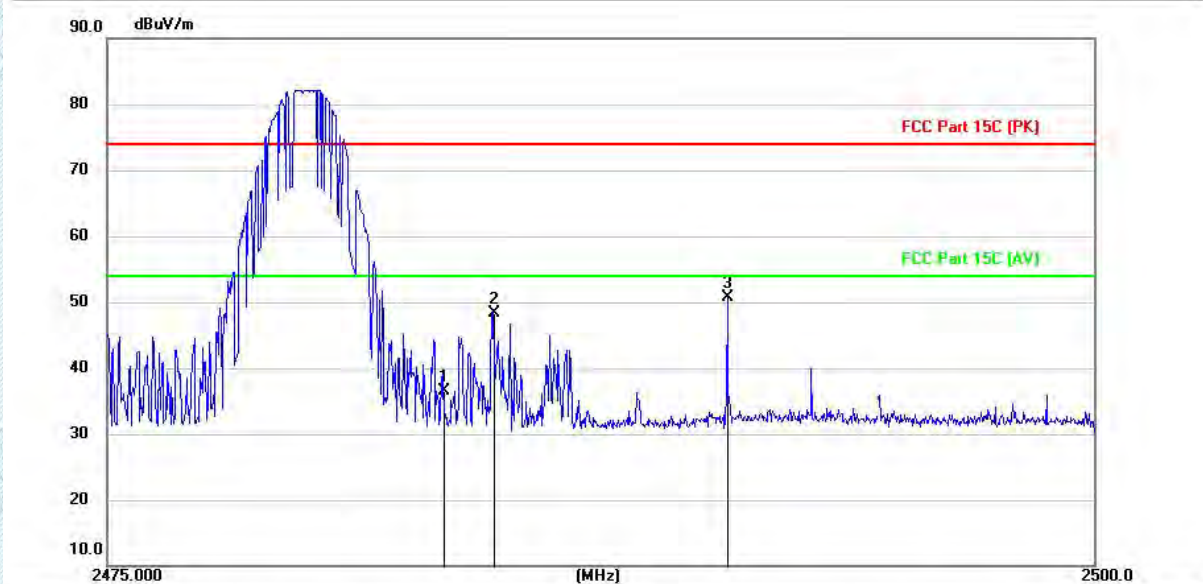
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: H


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	52.53	-10.88	41.65	74.00	-32.35	peak
2		2485.267	58.23	-10.88	47.35	74.00	-26.65	peak
3	*	2498.190	58.49	-10.88	47.61	74.00	-26.39	peak

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: H


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	47.38	-10.88	36.50	74.00	-37.50	peak
2		2484.747	59.16	-10.88	48.28	74.00	-25.72	peak
3	*	2490.693	61.61	-10.89	50.72	74.00	-23.28	peak

Note:

1. Measurement = Reading level + Correct Factor
2. Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
3. Both modes of BLE 1Mbps and 2Mbps were tested at Low and High channel and recorded worst mode at BLE 1Mbps.
4. Since the peak value is less than the limit of the AVG value, there is no AVG data.

4.6. Emissions in restricted frequency bands (below 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:	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.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

4.6.1. E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 °C
Humidity:	43.2 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.6.2. Test Data:

MK16A

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		146.9907	48.64	-21.37	27.27	43.50	-16.23	QP
2		192.1489	51.32	-18.33	32.99	43.50	-10.51	QP
3		216.0998	55.08	-17.29	37.79	46.00	-8.21	QP
4		239.9032	54.75	-16.13	38.62	46.00	-7.38	QP
5	*	264.0041	56.84	-15.48	41.36	46.00	-4.64	QP
6		566.6223	46.00	-8.49	37.51	46.00	-8.49	QP

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / 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	*	30.7132	47.91	-18.98	28.93	40.00	-11.07	QP
2		88.1873	44.83	-20.12	24.71	43.50	-18.79	QP
3		264.0041	45.73	-15.48	30.25	46.00	-15.75	QP
4		288.0914	43.23	-14.95	28.28	46.00	-17.72	QP
5		384.0665	44.77	-11.43	33.34	46.00	-12.66	QP
6		564.6389	40.99	-8.54	32.45	46.00	-13.55	QP

TRF EMC_R1

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

MK16B

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		95.9975	46.62	-18.29	28.33	43.50	-15.17	QP
2		192.0142	51.54	-18.34	33.20	43.50	-10.30	QP
3		239.9874	53.01	-16.13	36.88	46.00	-9.12	QP
4	*	264.0041	53.24	-15.48	37.76	46.00	-8.24	QP
5		499.9503	45.12	-9.93	35.19	46.00	-10.81	QP
6		564.8369	43.30	-8.53	34.77	46.00	-11.23	QP

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	*	45.7429	49.08	-16.01	33.07	40.00	-6.93	QP
2		47.9940	48.33	-15.80	32.53	40.00	-7.47	QP
3		95.9975	40.87	-18.29	22.58	43.50	-20.92	QP
4		143.8295	47.71	-21.33	26.38	43.50	-17.12	QP
5		239.9874	47.57	-16.13	31.44	46.00	-14.56	QP
6		498.3750	45.86	-9.95	35.91	46.00	-10.09	QP

TRF EMC_R1

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

4.7. Emissions in restricted 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:	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.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

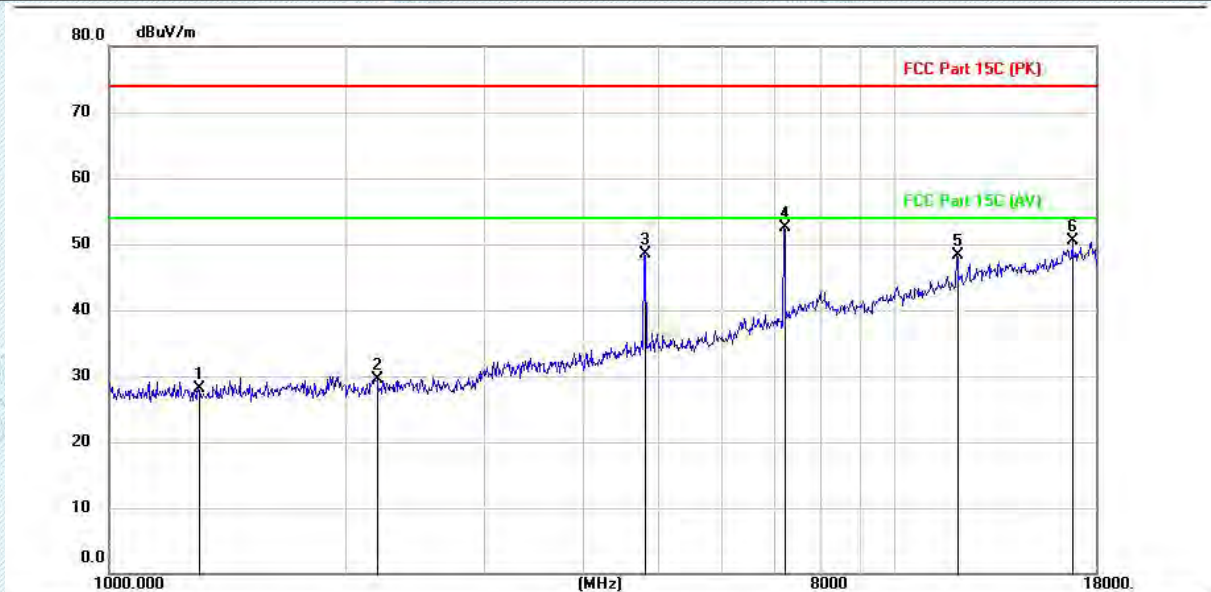
4.7.1. E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 °C
Humidity:	43.2 %
Atmospheric Pressure:	102 kPa
Final test mode:	Test Mode1

4.7.2. Test Data:

MK16A

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

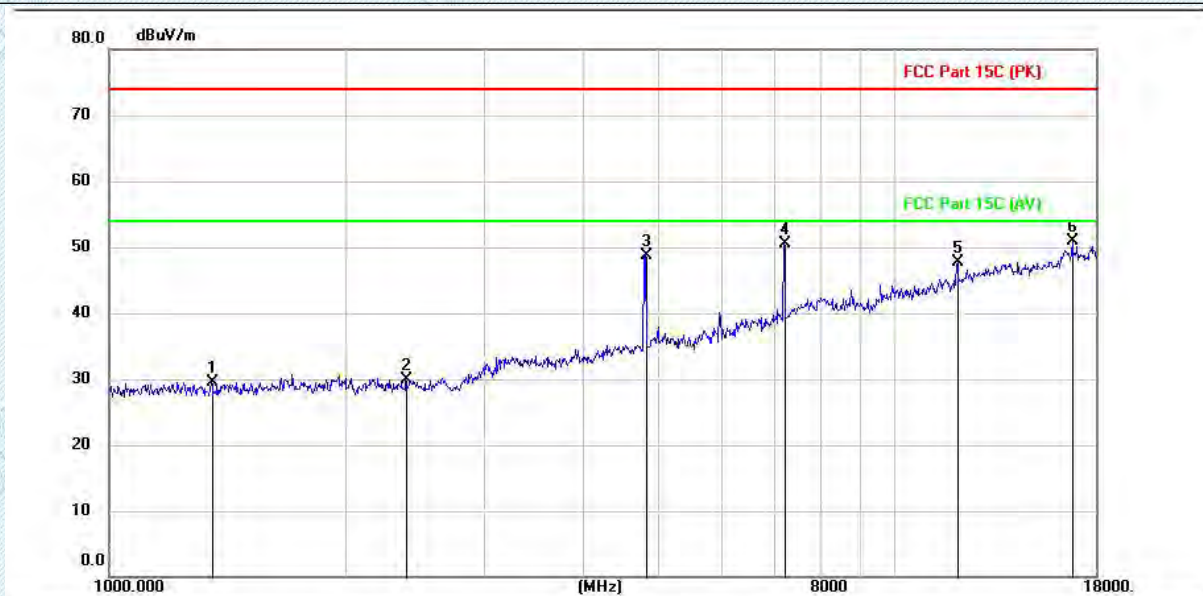


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		1299.200	40.10	-11.97	28.13	74.00	-45.87	peak
2		2200.200	40.58	-10.99	29.59	74.00	-44.41	peak
3		4802.900	54.39	-5.92	48.47	74.00	-25.53	peak
4	*	7206.700	52.58	-0.07	52.51	74.00	-21.49	peak
5		12009.200	40.39	7.91	48.30	74.00	-25.70	peak
6		16815.100	37.20	13.32	50.52	74.00	-23.48	peak

TRF EMC_R1

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

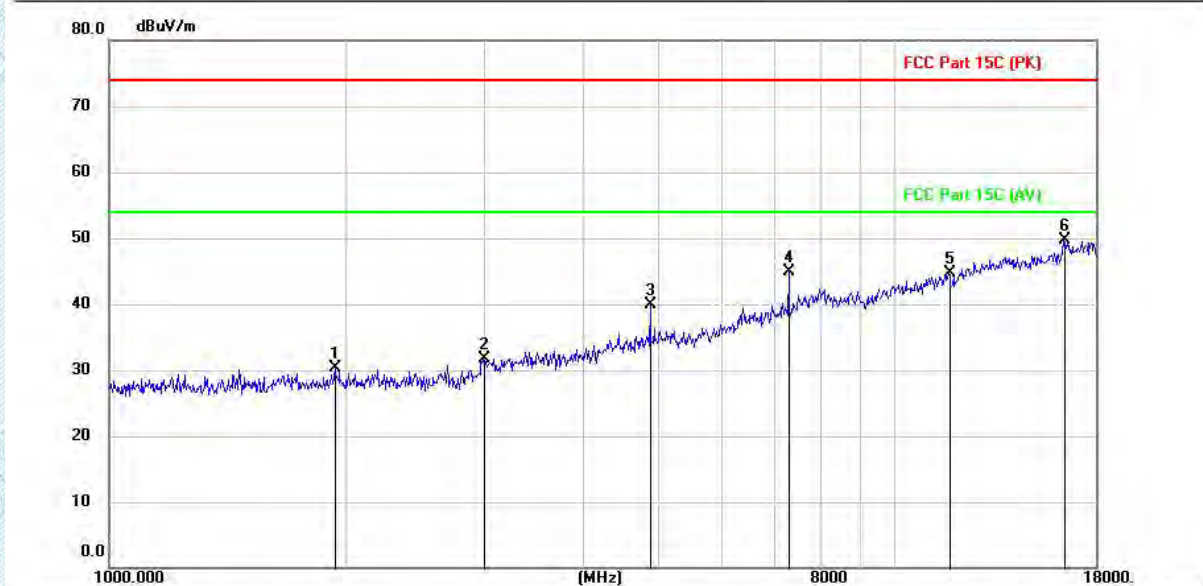
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		1350.200	41.40	-11.95	29.45	74.00	-44.55	peak
2		2390.600	40.73	-10.92	29.81	74.00	-44.19	peak
3		4804.600	54.53	-5.92	48.61	74.00	-25.39	peak
4		7205.000	50.64	-0.09	50.55	74.00	-23.45	peak
5		12010.900	39.84	7.91	47.75	74.00	-26.25	peak
6	*	16811.700	37.65	13.32	50.97	74.00	-23.03	peak

TRF EMC_R1

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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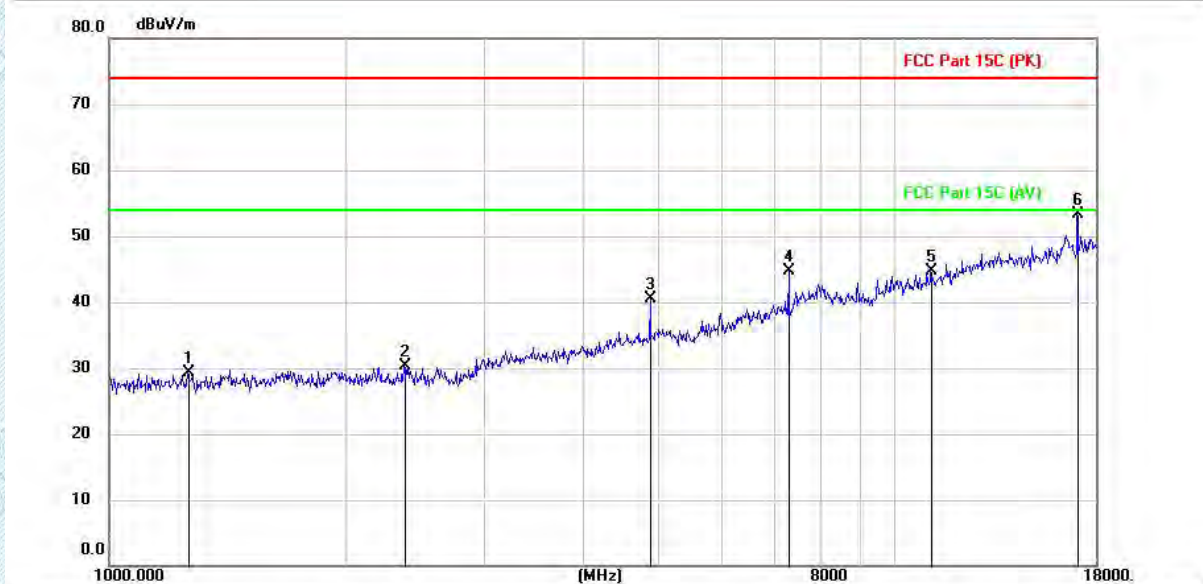
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		1933.300	41.51	-11.12	30.39	74.00	-43.61	peak
2		2992.400	42.28	-10.60	31.68	74.00	-42.32	peak
3		4879.400	45.55	-5.72	39.83	74.00	-34.17	peak
4		7318.900	44.59	0.27	44.86	74.00	-29.14	peak
5		11718.500	37.48	7.31	44.79	74.00	-29.21	peak
6	*	16376.500	36.29	13.51	49.80	74.00	-24.20	peak

TRF EMC_R1

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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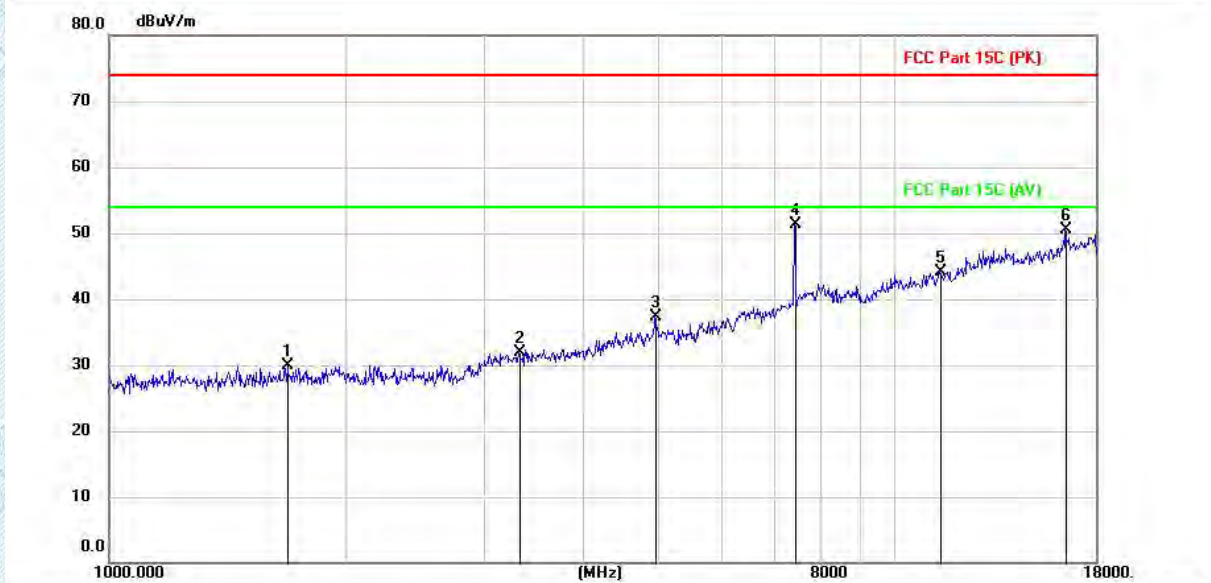
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		1260.100	41.31	-12.00	29.31	74.00	-44.69	peak
2		2375.300	41.32	-10.93	30.39	74.00	-43.61	peak
3		4881.100	46.25	-5.71	40.54	74.00	-33.46	peak
4		7320.600	44.51	0.27	44.78	74.00	-29.22	peak
5		11118.400	38.65	5.98	44.63	74.00	-29.37	peak
6	*	17082.000	40.13	13.09	53.22	74.00	-20.78	peak

TRF EMC_R1

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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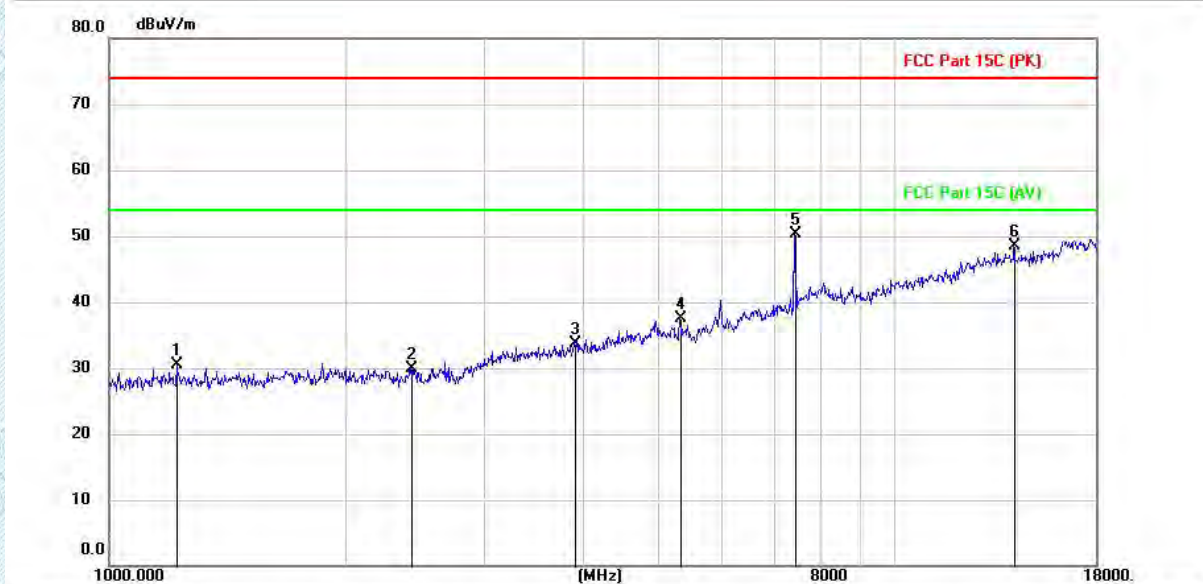
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		1685.100	41.36	-11.44	29.92	74.00	-44.08	peak
2		3325.600	41.87	-10.00	31.87	74.00	-42.13	peak
3		4959.300	42.84	-5.51	37.33	74.00	-36.67	peak
4	*	7441.300	50.60	0.64	51.24	74.00	-22.76	peak
5		11432.900	37.45	6.70	44.15	74.00	-29.85	peak
6		16495.500	36.64	13.80	50.44	74.00	-23.56	peak

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H


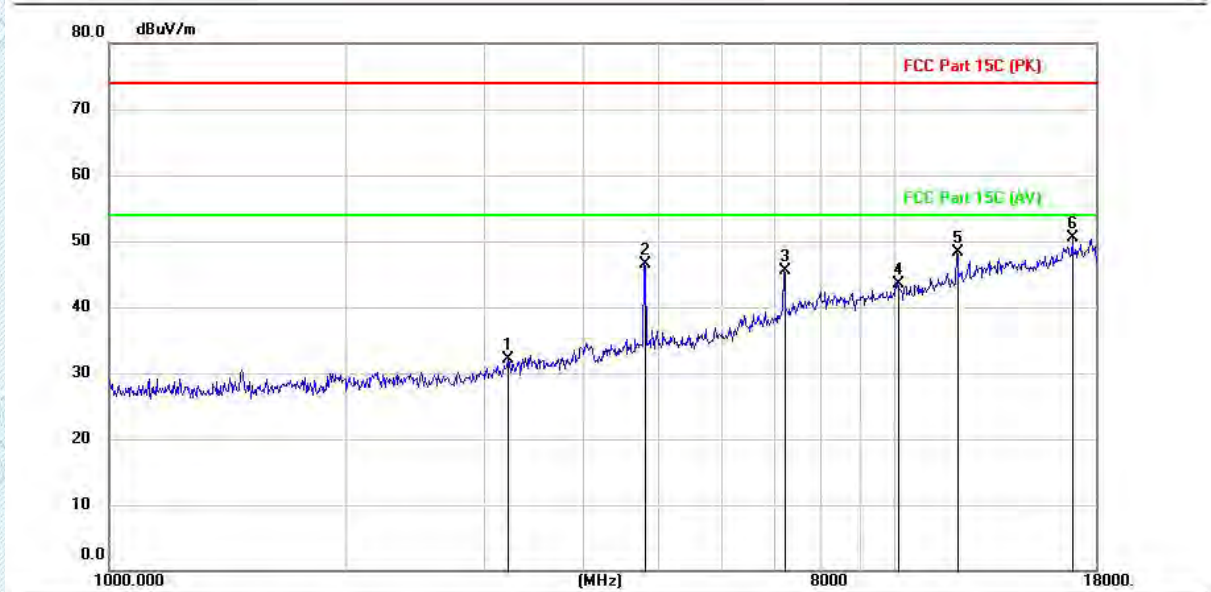
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		1217.600	42.60	-12.02	30.58	74.00	-43.42	peak
2		2426.300	40.87	-10.90	29.97	74.00	-44.03	peak
3		3912.100	42.43	-8.65	33.78	74.00	-40.22	peak
4		5319.700	42.62	-5.10	37.52	74.00	-36.48	peak
5	*	7441.300	49.67	0.64	50.31	74.00	-23.69	peak
6		14195.400	37.53	10.97	48.50	74.00	-25.50	peak

Note:

1. 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.
2. Since the peak value is less than the limit of the AVG value, there is no AVG data.
3. Both modes of BLE 1Mbps and 2Mbps were tested at Low and High channel and recorded worst mode at BLE 1Mbps.

MK16B

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: L

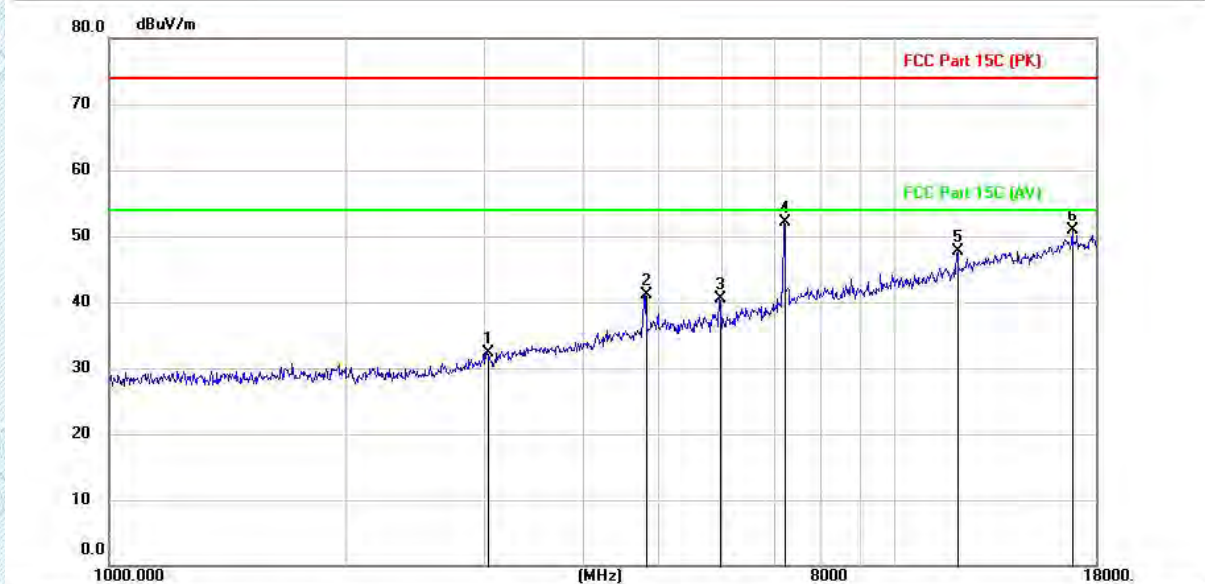


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3216.800	42.38	-10.19	32.19	74.00	-41.81	peak
2		4802.900	52.39	-5.92	46.47	74.00	-27.53	peak
3		7206.700	45.58	-0.07	45.51	74.00	-28.49	peak
4		10095.000	39.21	4.23	43.44	74.00	-30.56	peak
5		12009.200	40.39	7.91	48.30	74.00	-25.70	peak
6	*	16815.100	37.20	13.32	50.52	74.00	-23.48	peak

TRF EMC_R1

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

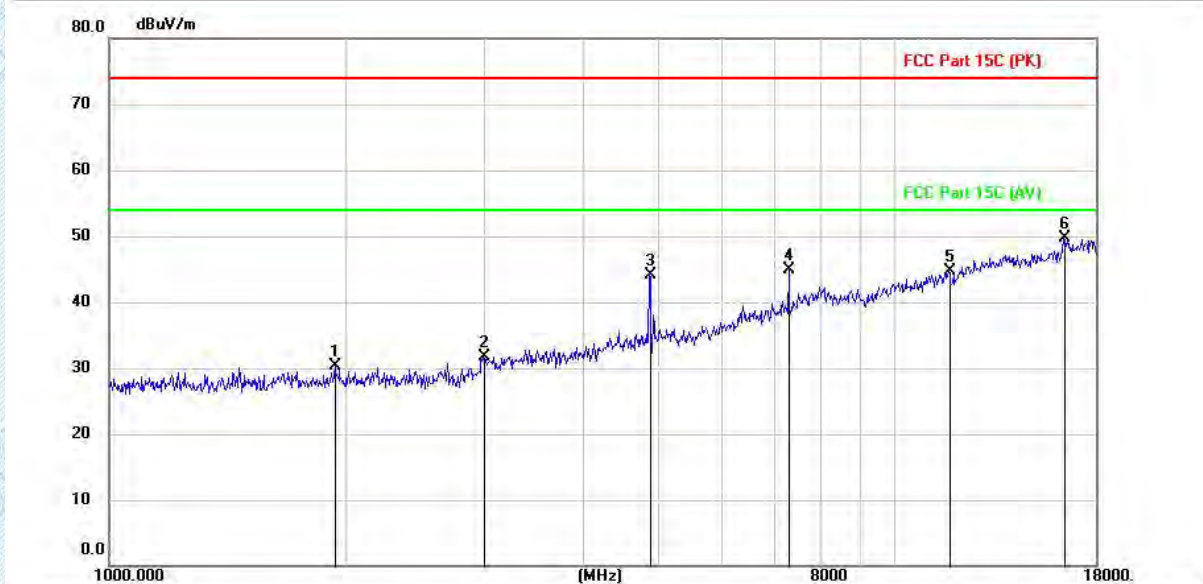
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: L


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		3031.500	42.86	-10.53	32.33	74.00	-41.67	peak
2		4804.600	47.03	-5.92	41.11	74.00	-32.89	peak
3		5981.000	44.44	-3.84	40.60	74.00	-33.40	peak
4	*	7205.000	52.14	-0.09	52.05	74.00	-21.95	peak
5		12010.900	39.84	7.91	47.75	74.00	-26.25	peak
6		16811.700	37.65	13.32	50.97	74.00	-23.03	peak

TRF EMC_R1

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

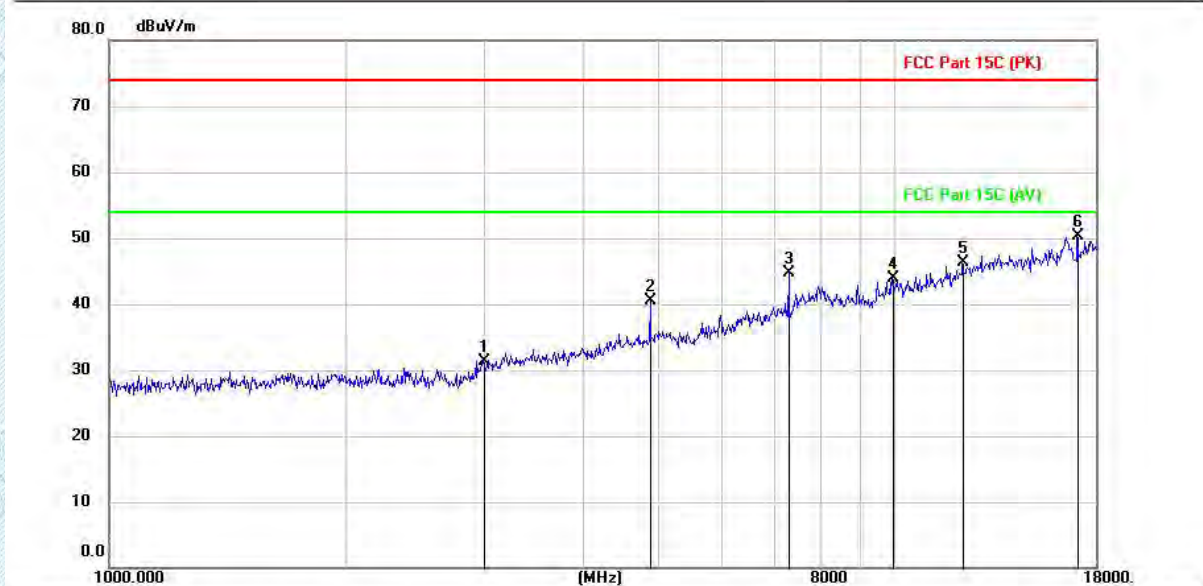
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: M


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		1933.300	41.51	-11.12	30.39	74.00	-43.61	peak
2		2992.400	42.28	-10.60	31.68	74.00	-42.32	peak
3		4872.600	49.91	-5.74	44.17	74.00	-29.83	peak
4		7318.900	44.59	0.27	44.86	74.00	-29.14	peak
5		11718.500	37.48	7.31	44.79	74.00	-29.21	peak
6	*	16376.500	36.29	13.51	49.80	74.00	-24.20	peak

TRF EMC_R1

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

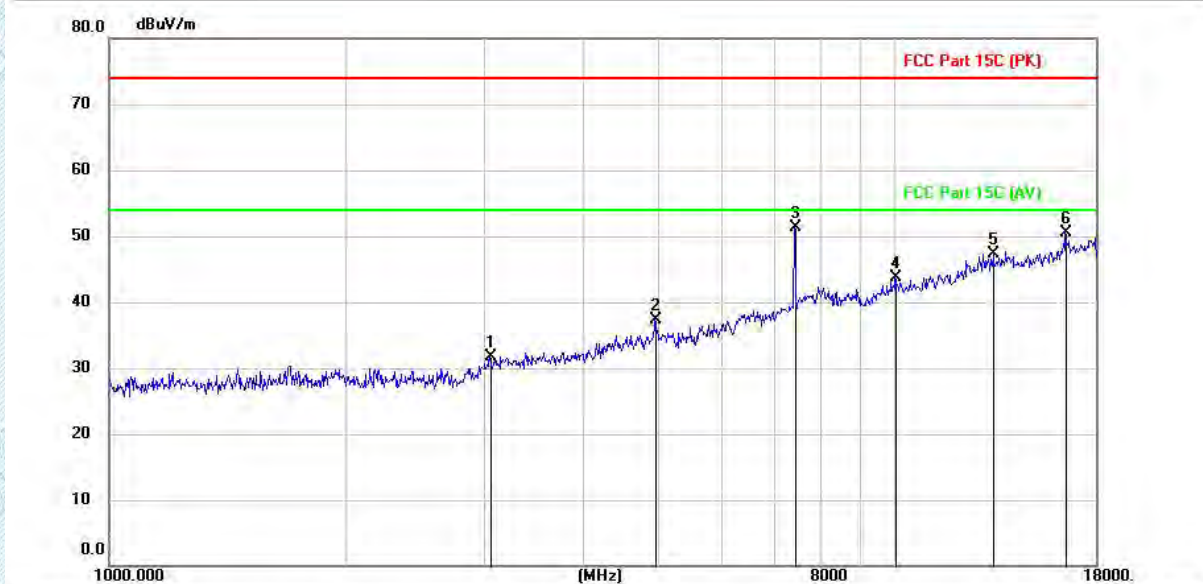
Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: M


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		2990.700	41.99	-10.60	31.39	74.00	-42.61	peak
2		4881.100	46.25	-5.71	40.54	74.00	-33.46	peak
3		7320.600	44.51	0.27	44.78	74.00	-29.22	peak
4		9936.900	39.97	3.93	43.90	74.00	-30.10	peak
5		12199.600	38.00	8.32	46.32	74.00	-27.68	peak
6	*	17082.000	37.13	13.09	50.22	74.00	-23.78	peak

TRF EMC_R1

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

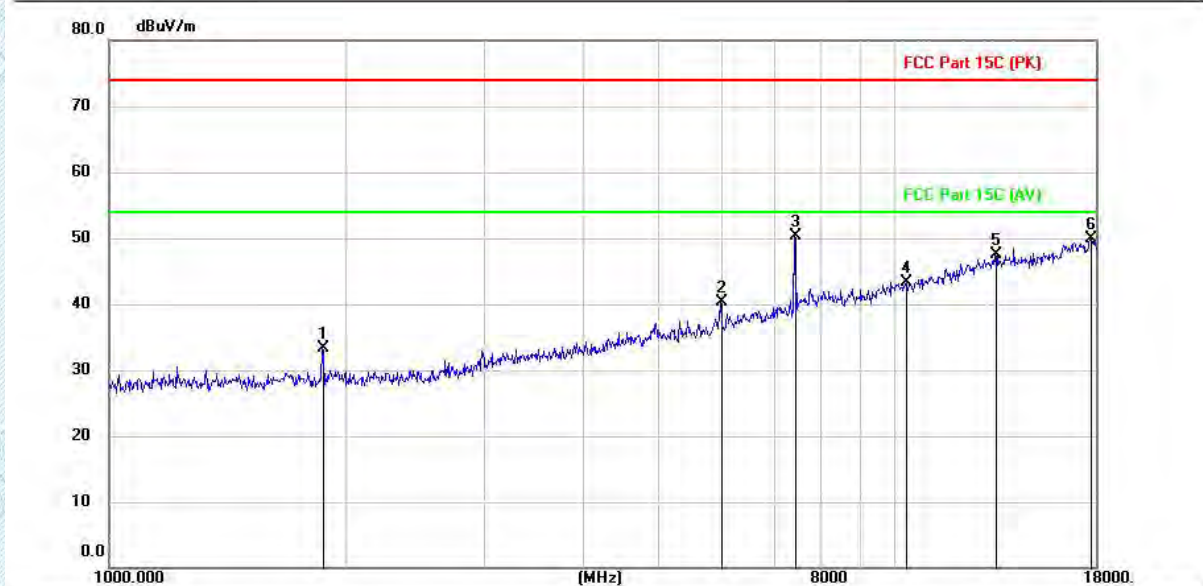
Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: H


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1		3055.300	42.26	-10.49	31.77	74.00	-42.23	peak
2		4959.300	42.84	-5.51	37.33	74.00	-36.67	peak
3	*	7441.300	50.60	0.64	51.24	74.00	-22.76	peak
4		10037.200	39.54	4.13	43.67	74.00	-30.33	peak
5		13333.500	36.90	10.39	47.29	74.00	-26.71	peak
6		16495.500	36.64	13.80	50.44	74.00	-23.56	peak

TRF EMC_R1

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

Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: H


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		1861.900	44.43	-11.18	33.25	74.00	-40.75	peak
2		5989.500	44.09	-3.82	40.27	74.00	-33.73	peak
3	*	7441.300	49.67	0.64	50.31	74.00	-23.69	peak
4		10338.100	38.59	4.64	43.23	74.00	-30.77	peak
5		13430.400	37.07	10.51	47.58	74.00	-26.42	peak
6		17705.900	36.49	13.49	49.98	74.00	-24.02	peak

Note:

- 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.
- Since the peak value is less than the limit of the AVG value, there is no AVG data.
- Both modes of BLE 1Mbps and 2Mbps were tested at Low and High channel and recorded worst mode at BLE 1Mbps.

TRF EMC_R1

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 restricted frequency bands (above 1GHz) / MK16A

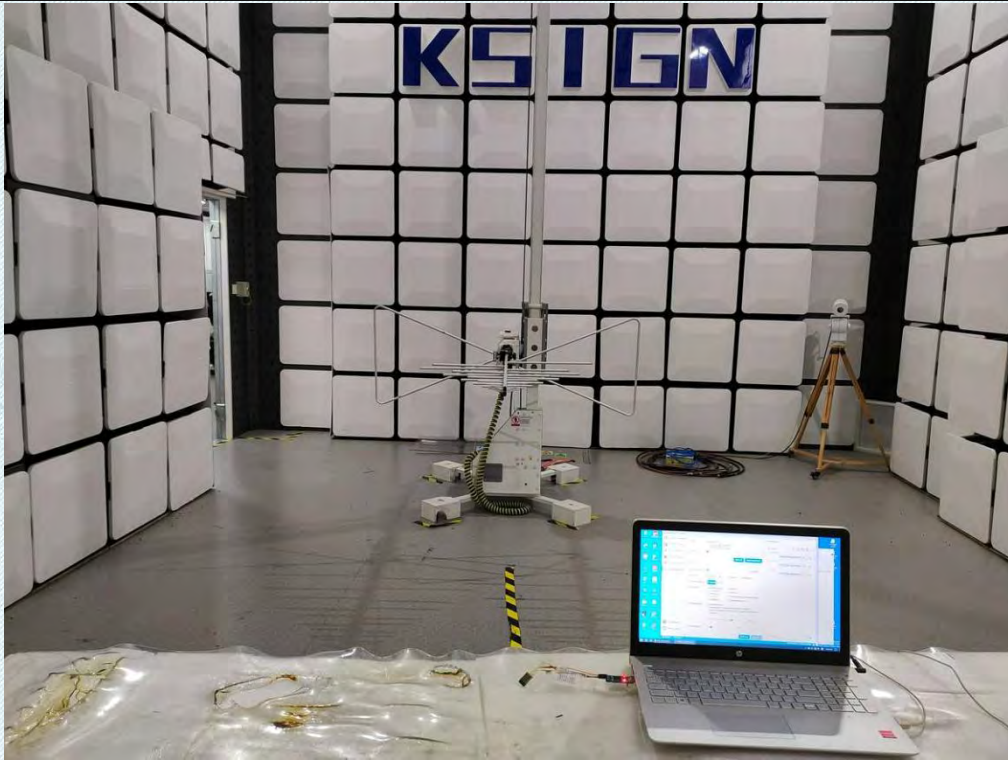
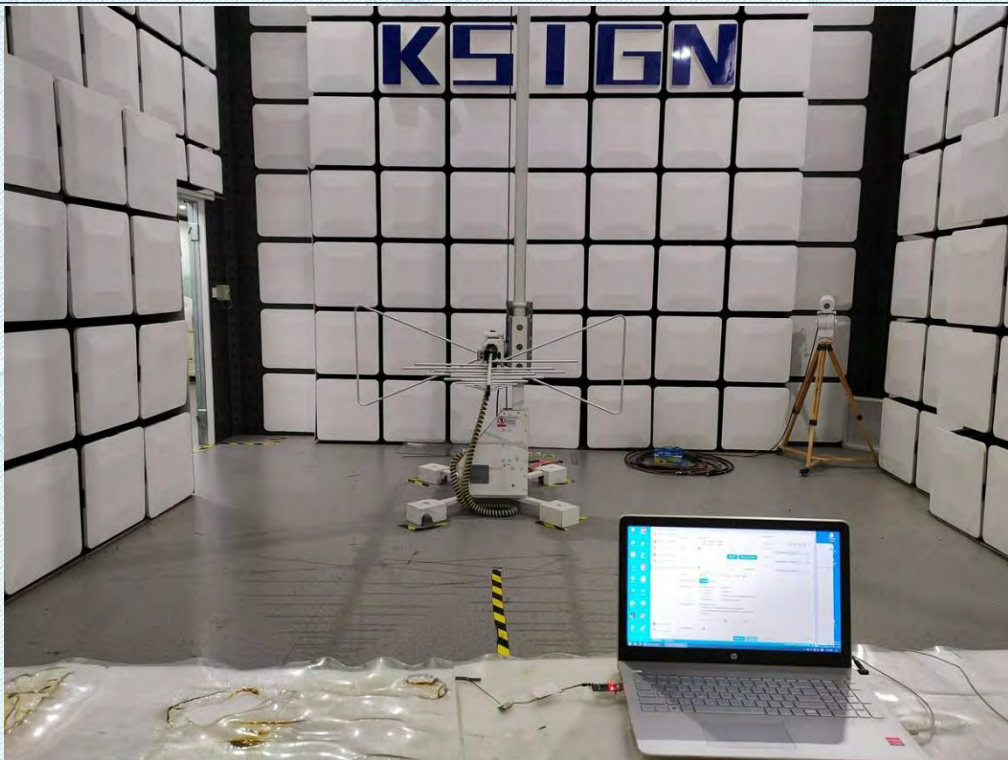


Emissions in restricted frequency bands (above 1GHz) / MK16B

TRF EMC_R1

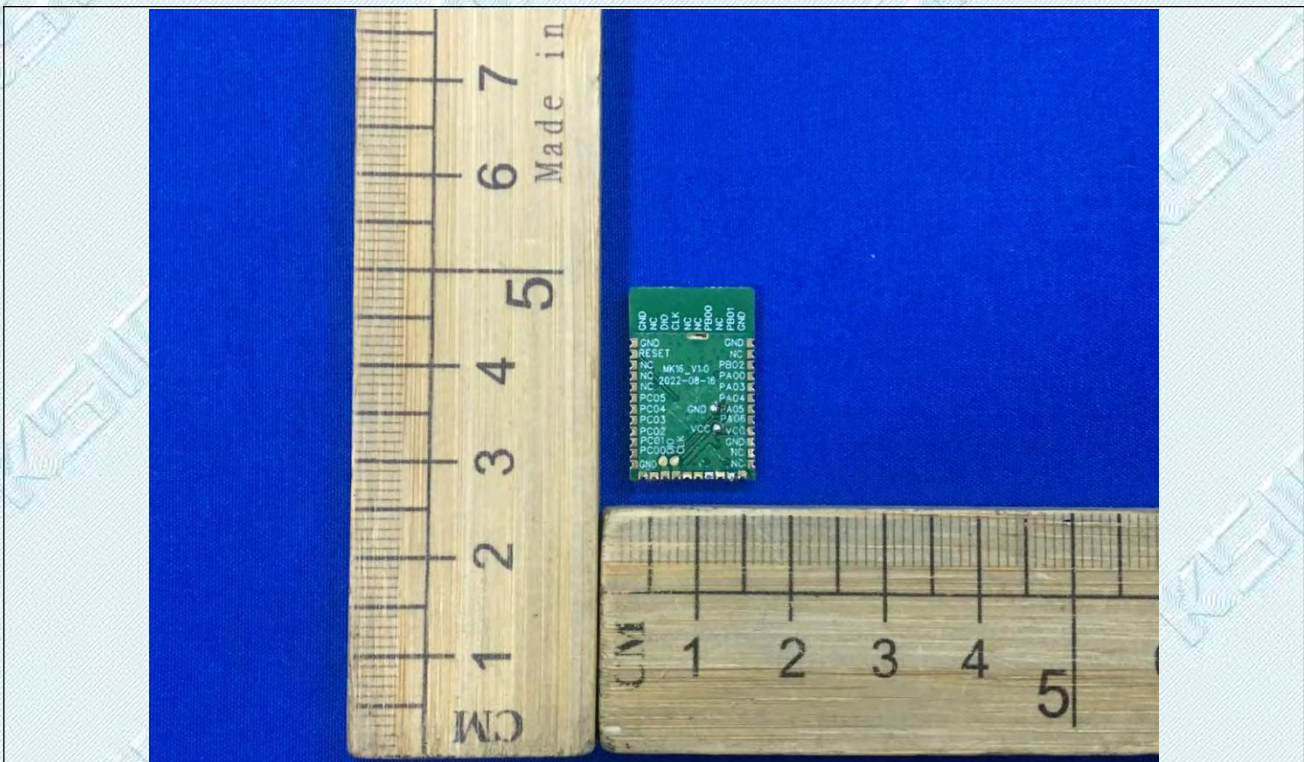
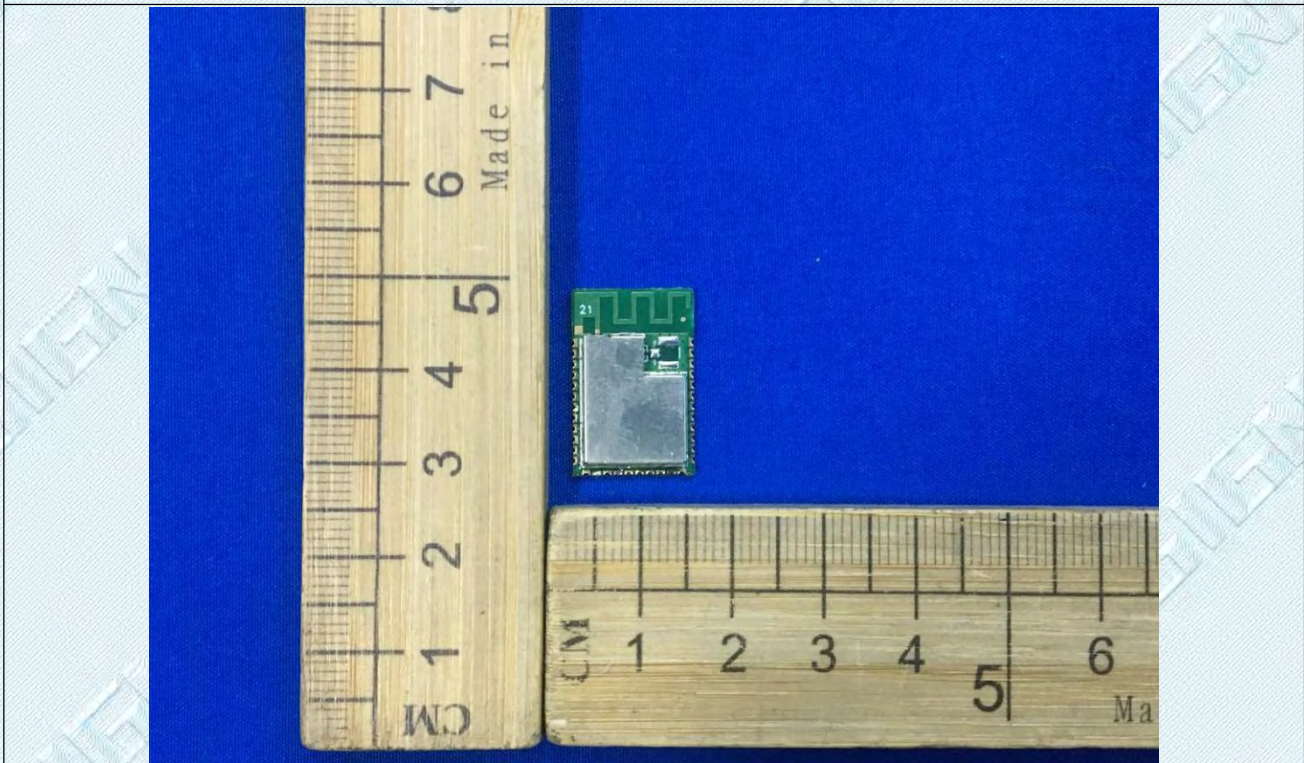
Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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

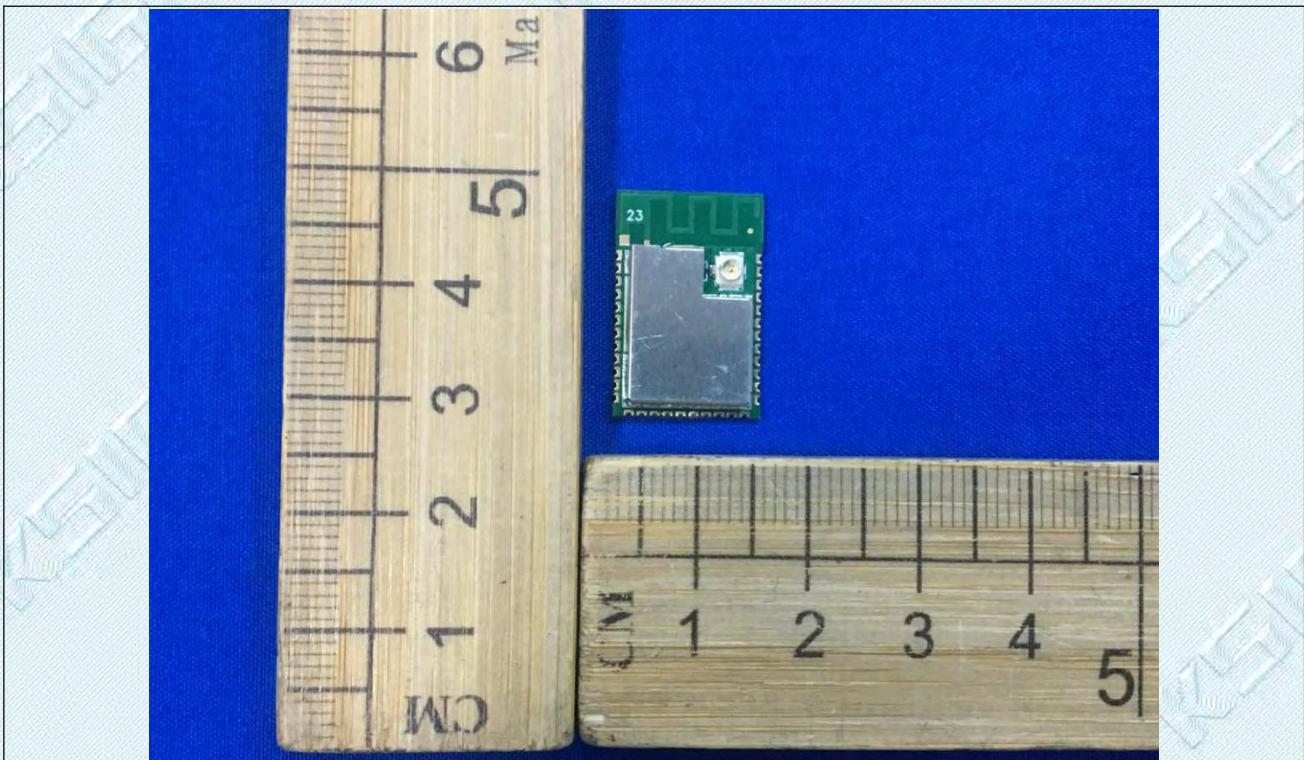
Emissions in restricted frequency bands (below 1GHz) / MK16A**Emissions in restricted frequency bands (below 1GHz) / MK16B**

6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL MK16A

External



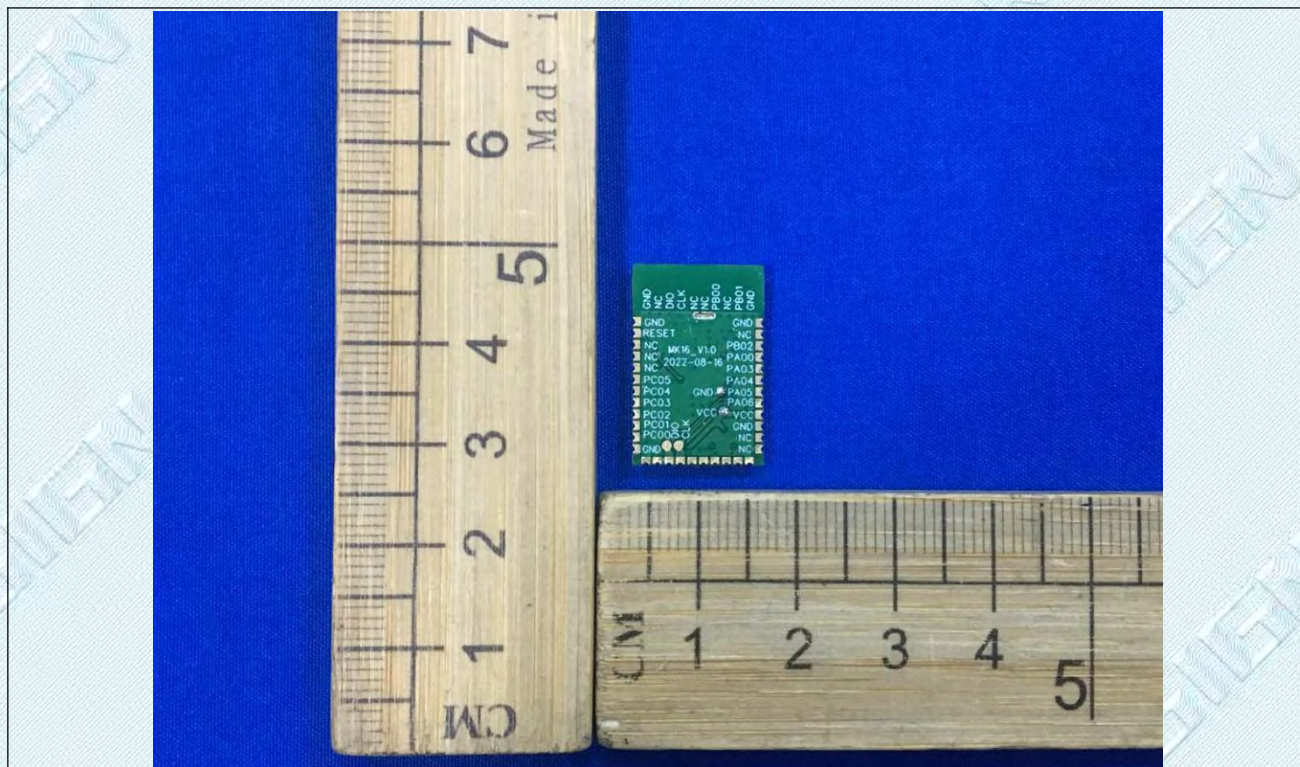
MK16B



TRF EMC_R1

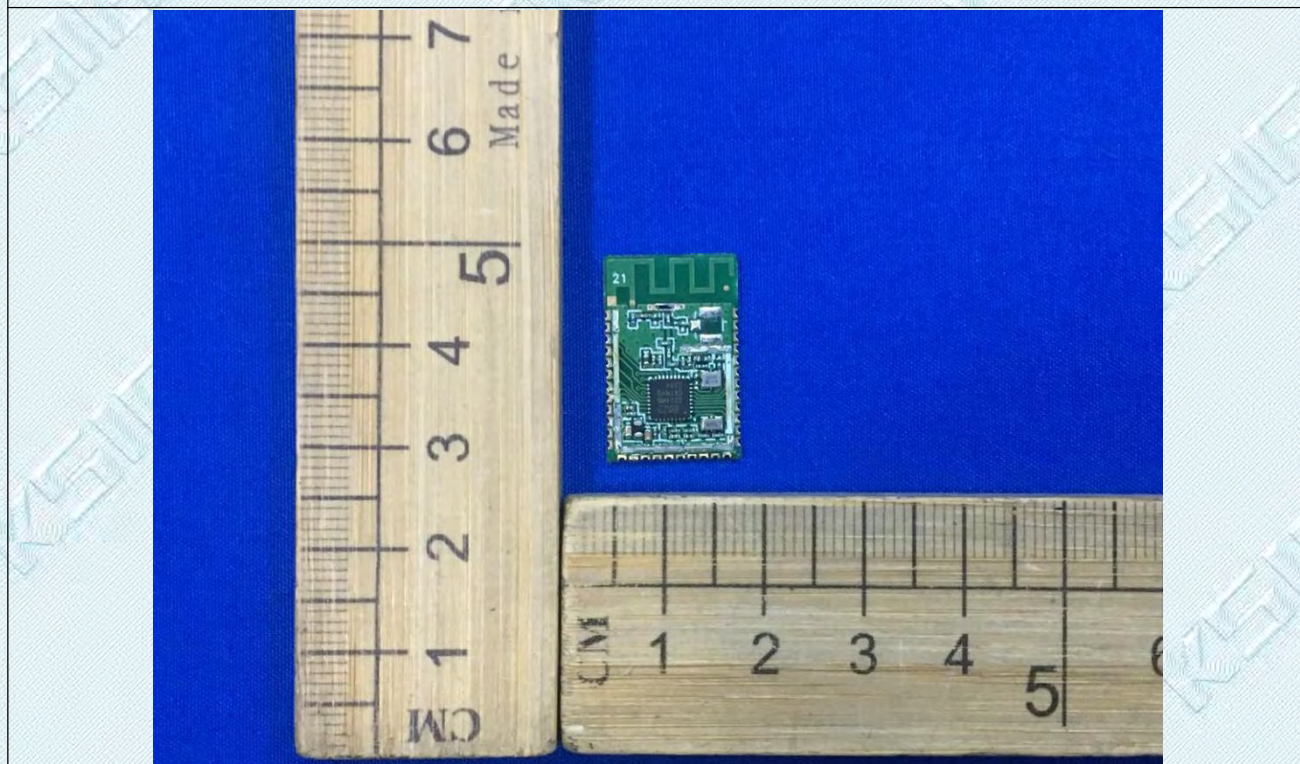
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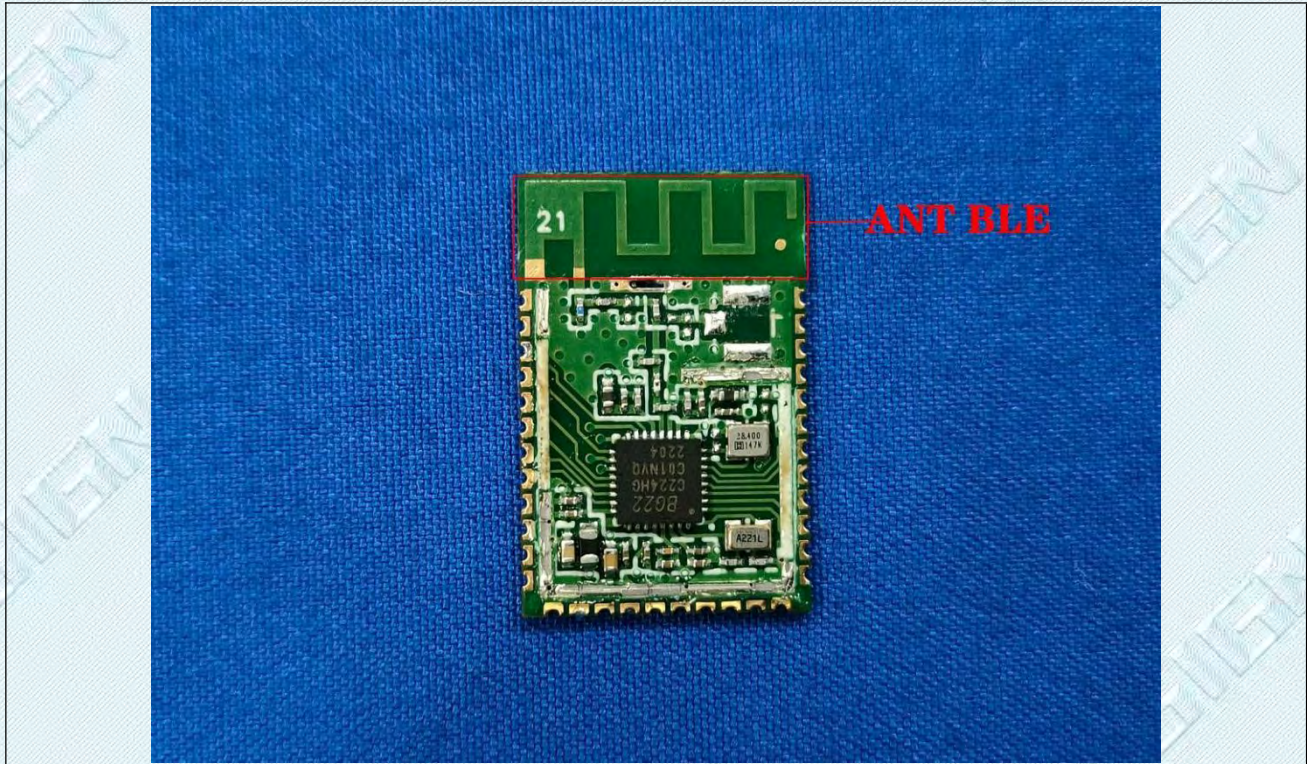
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdkesign.cn Web: www.gdkesign.com



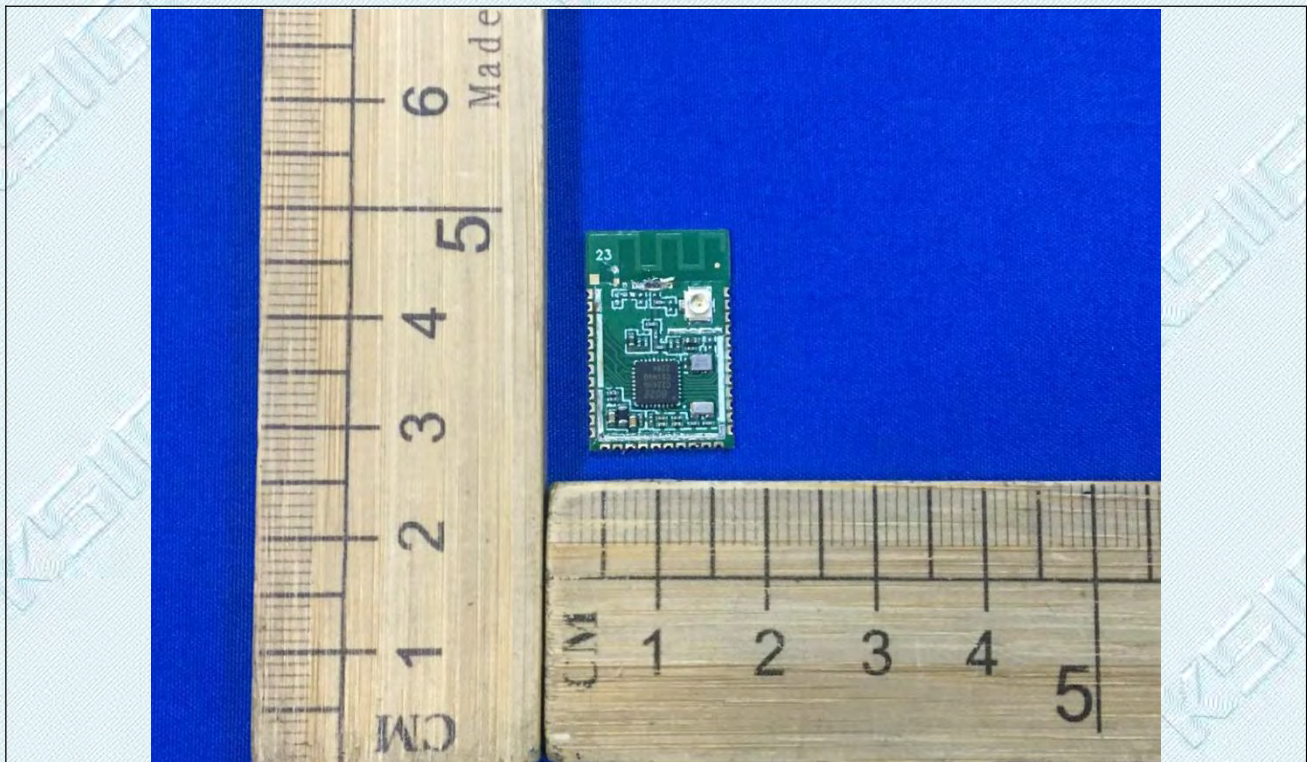
MK16A

Internal





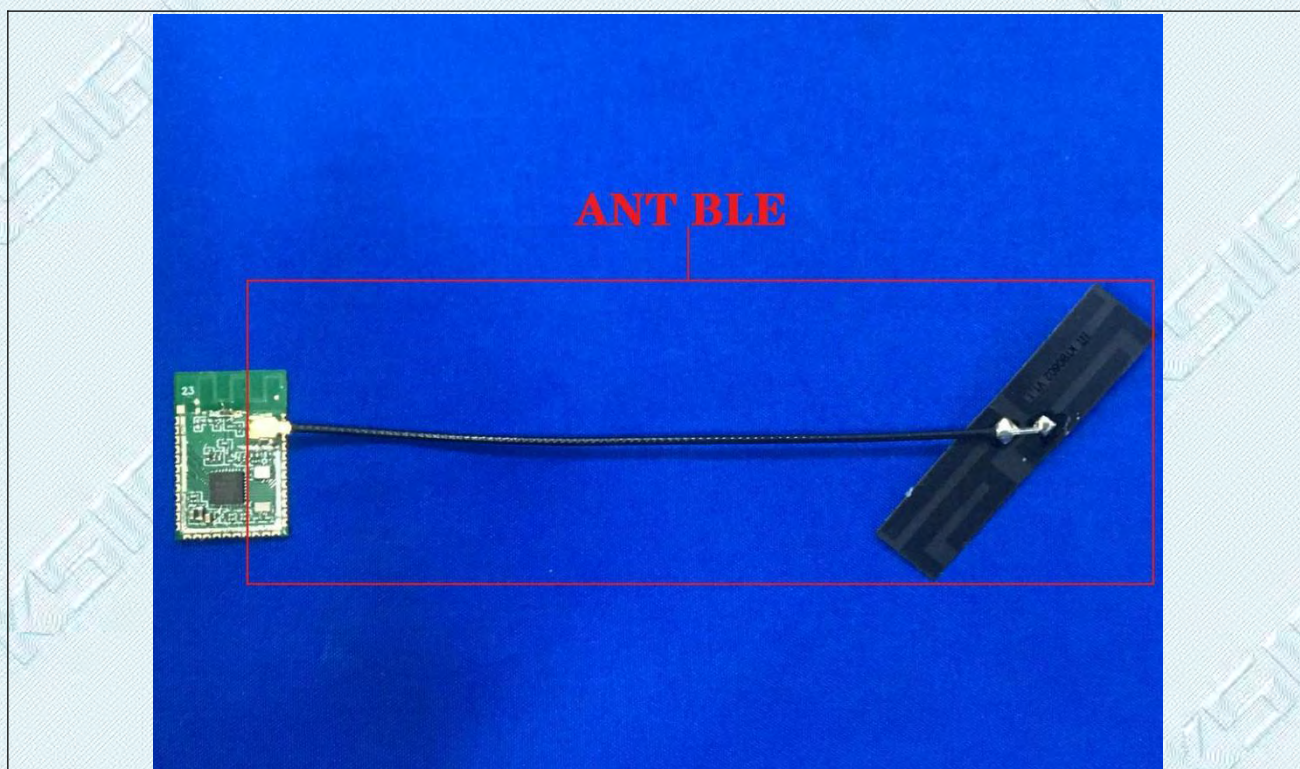
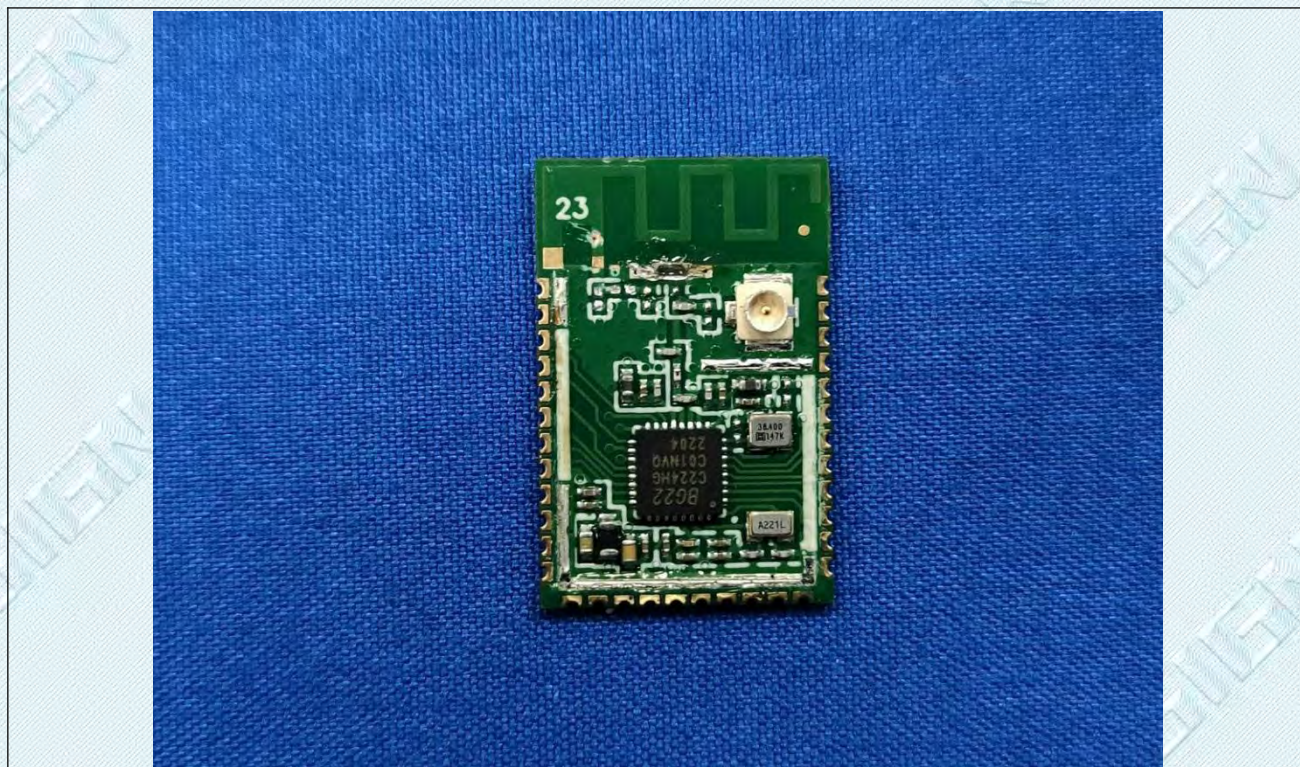
MK16B

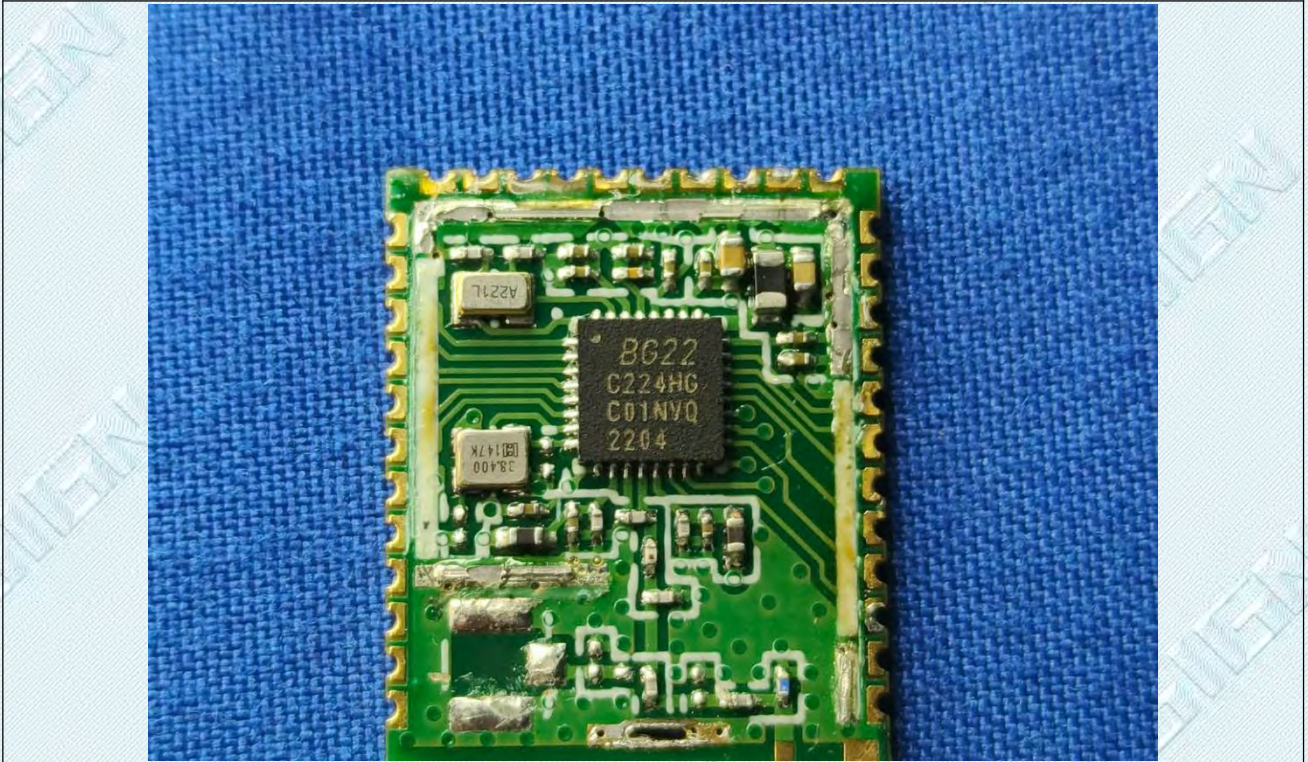


TRF EMC_R1

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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**Note:**

The internal MK16A and MK16B chips are the same.

Appendix

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	0.66	2401.67	2402.33	0.5	PASS
		2440	0.66	2439.67	2440.33	0.5	PASS
		2480	0.66	2479.67	2480.32	0.5	PASS
BLE_2M	Ant1	2402	1.17	2401.42	2402.59	0.5	PASS
		2440	1.17	2439.42	2440.59	0.5	PASS
		2480	1.17	2479.42	2480.59	0.5	PASS

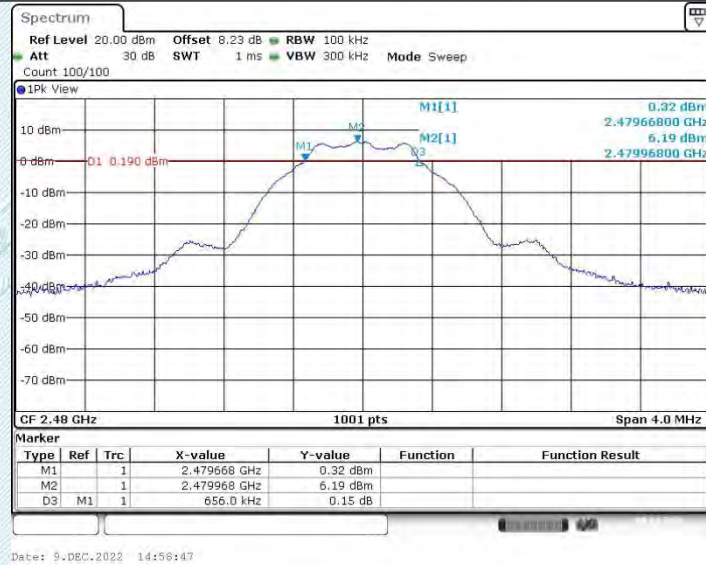
6.1.2. Test Graphs



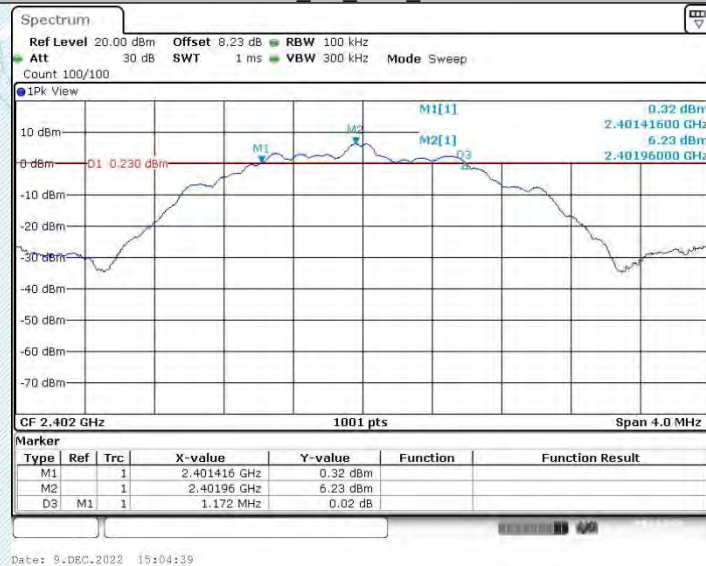
TRF EMC_R1

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

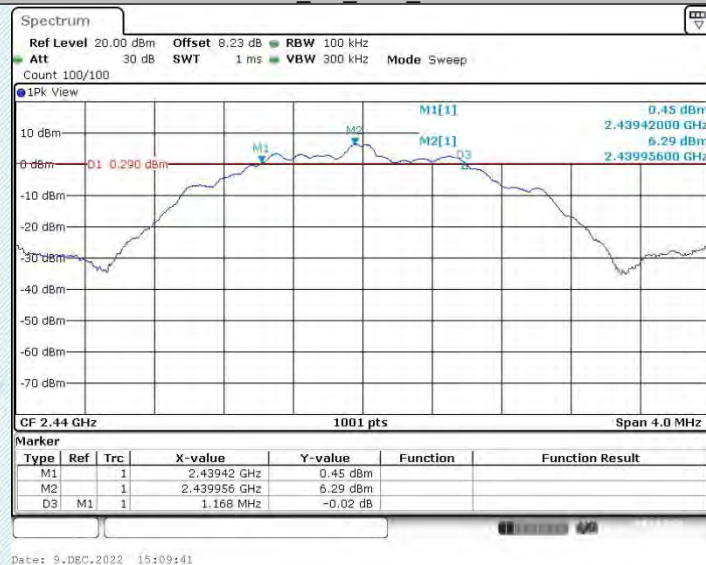
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdkesign.cn Web: www.gdkesign.com



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

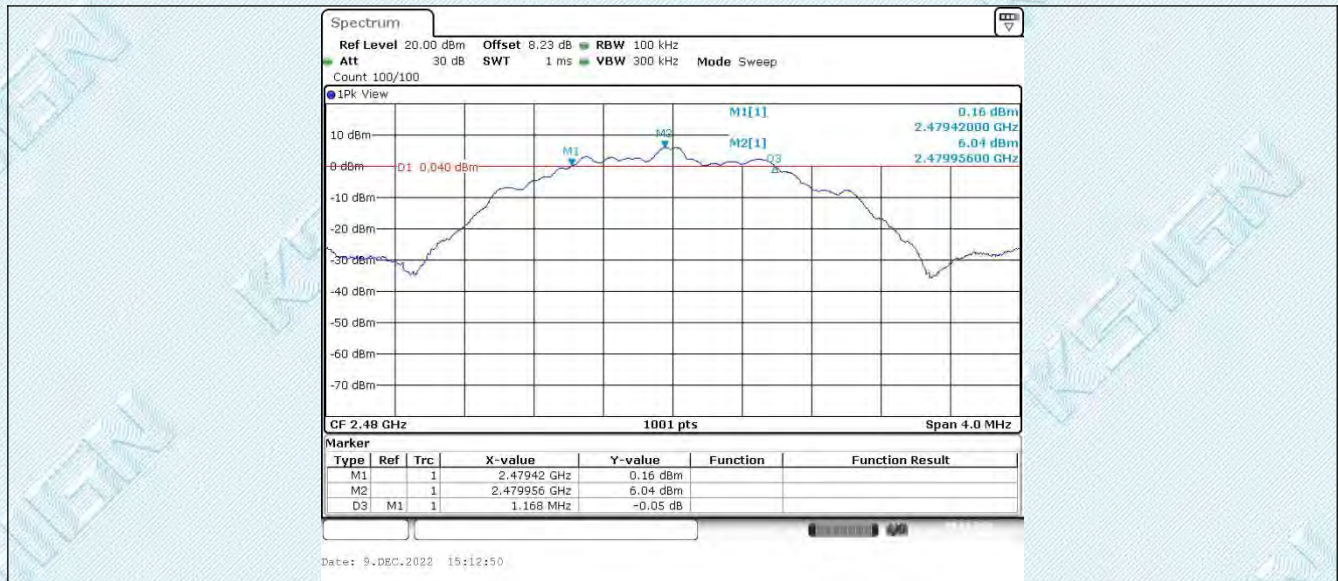


BLE_2M_Ant1_2480

TRF EMC_R1

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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TRF EMC_R1

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

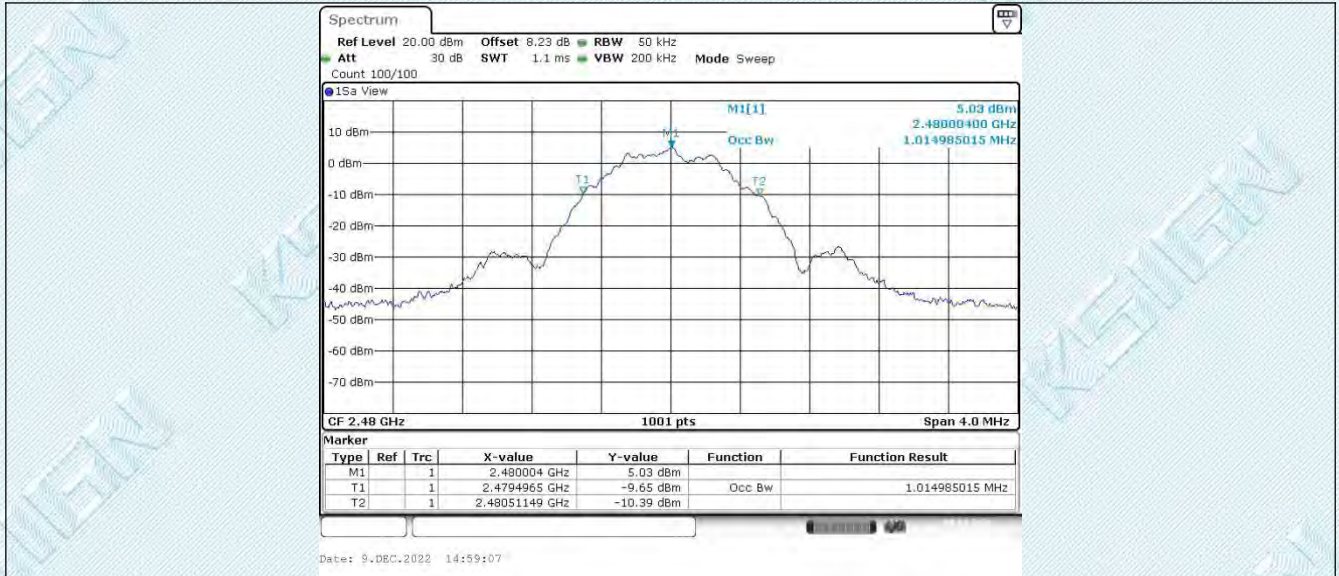
6.2. Appendix B: Occupied Channel Bandwidth

6.2.1. Test Result

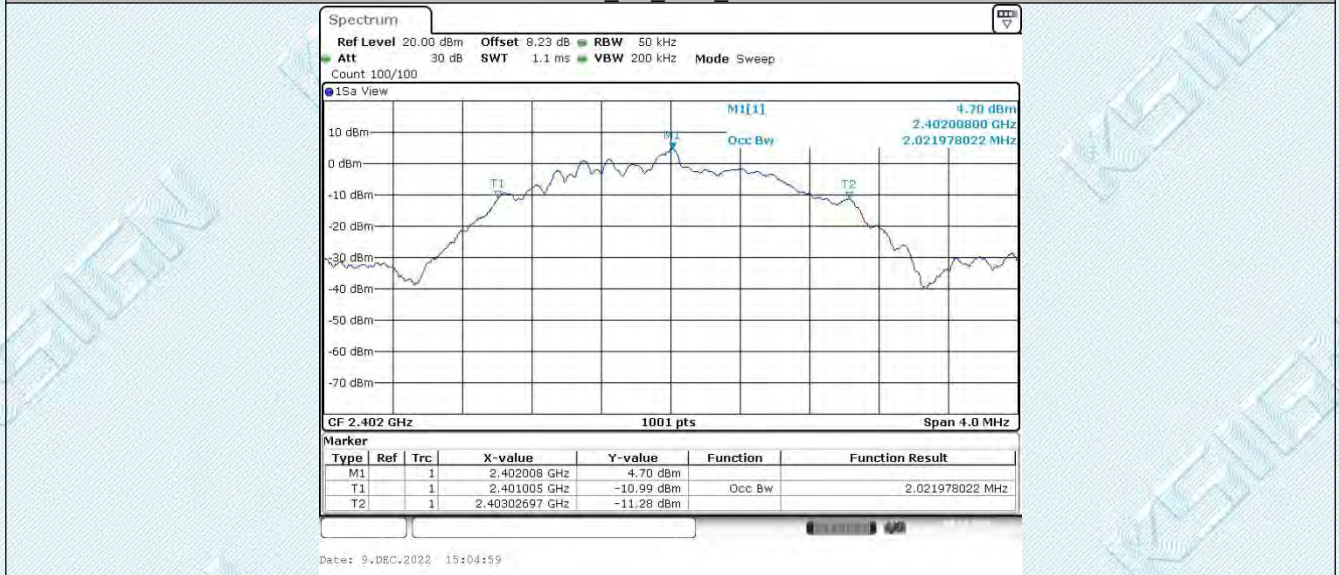
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.011	2401.500	2402.511	---	PASS
		2440	1.011	2439.500	2440.511	---	PASS
		2480	1.015	2479.497	2480.511	---	PASS
BLE_2M	Ant1	2402	2.022	2401.005	2403.027	---	PASS
		2440	2.018	2439.009	2441.027	---	PASS
		2480	2.022	2479.005	2481.027	---	PASS

6.2.2. Test Graphs

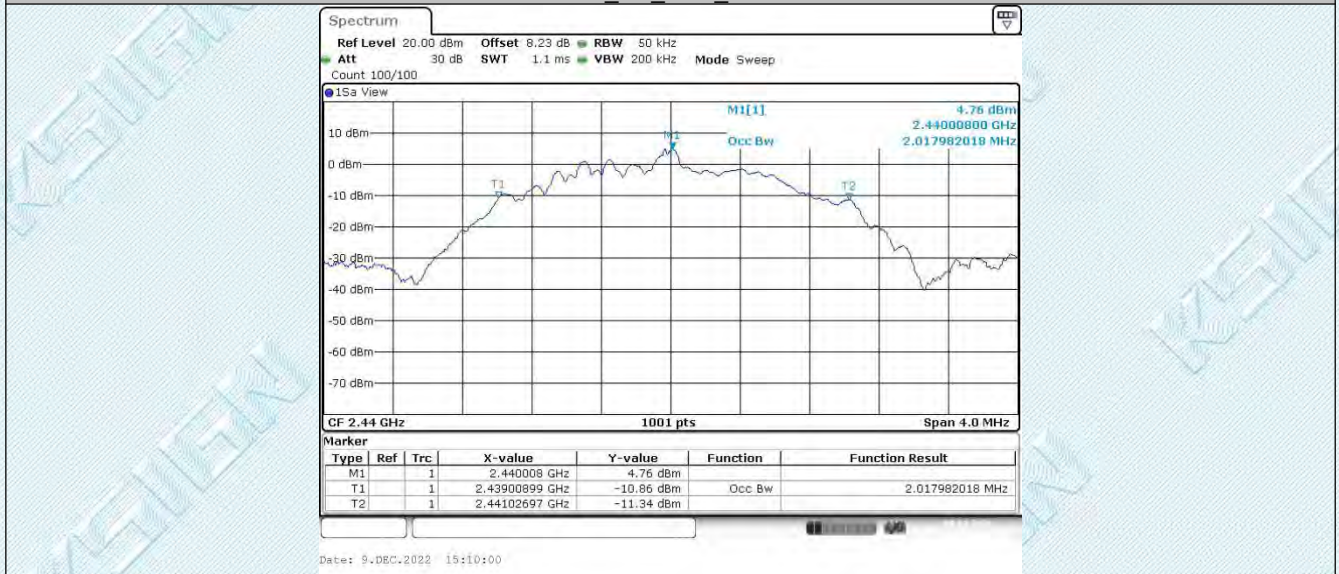




BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

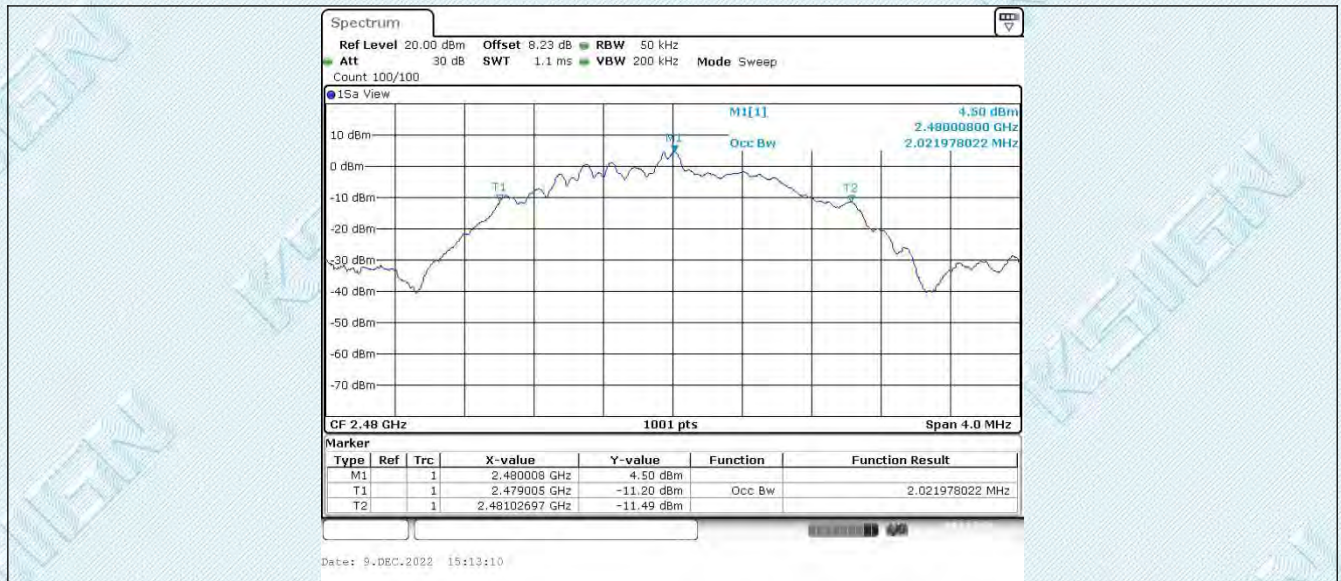


BLE_2M_Ant1_2480

TRF EMC_R1

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@gdkesign.cn Web: www.gdkesign.com



TRF EMC_R1

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

6.3. Appendix C: Maximum conducted output power

6.3.1. Test Result Peak

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	6.86	≤30	PASS
		2440	6.9	≤30	PASS
		2480	6.62	≤30	PASS
BLE_2M	Ant1	2402	6.81	≤30	PASS
		2440	6.88	≤30	PASS
		2480	6.61	≤30	PASS

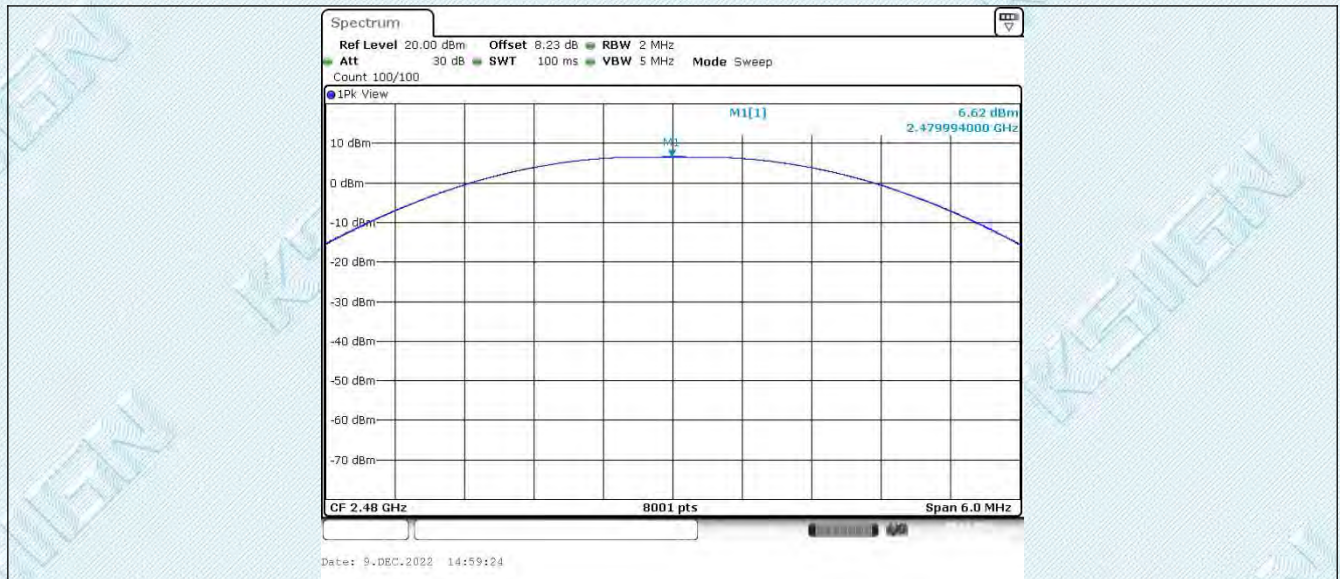
6.3.2. Test Graphs Peak



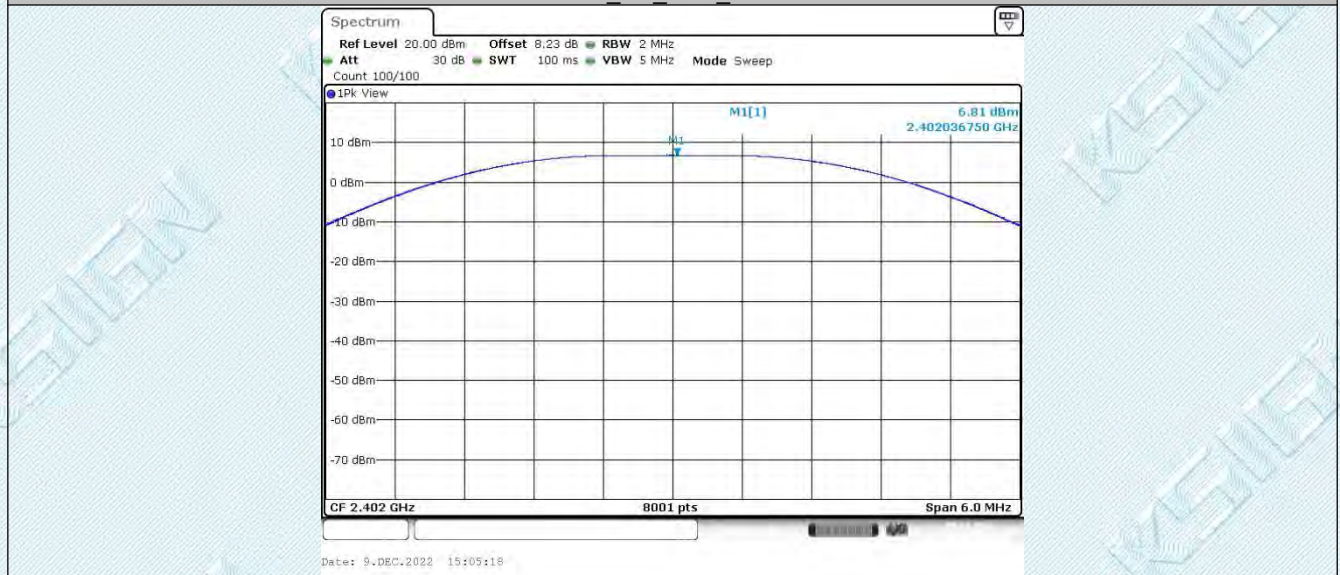
TRF EMC_R1

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

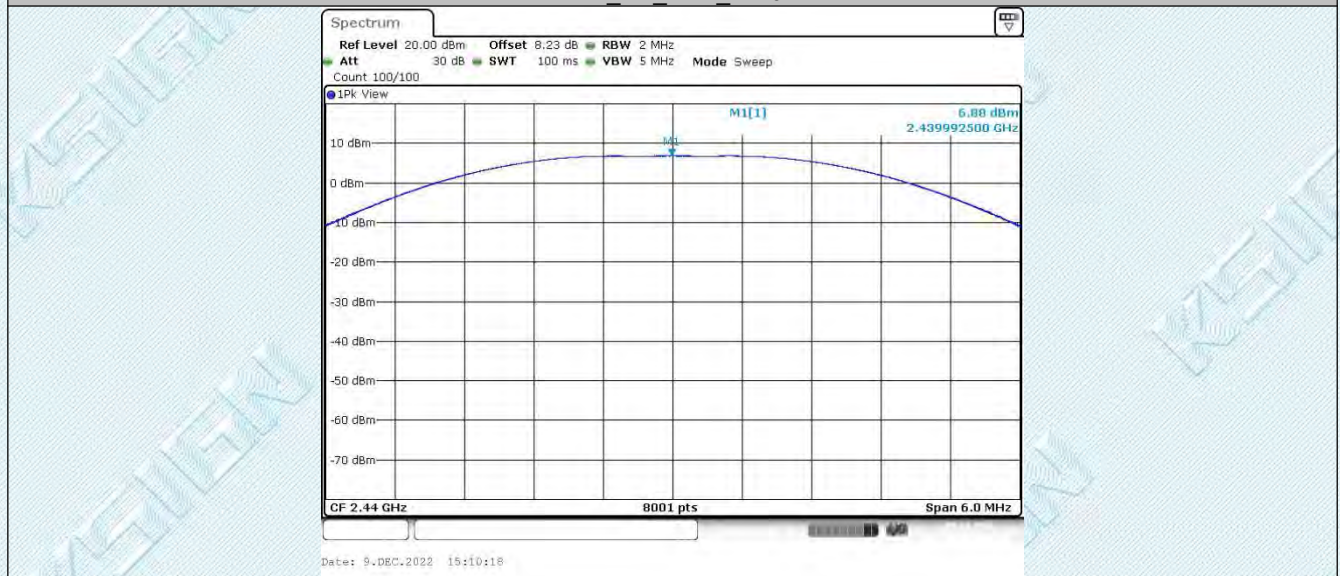
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

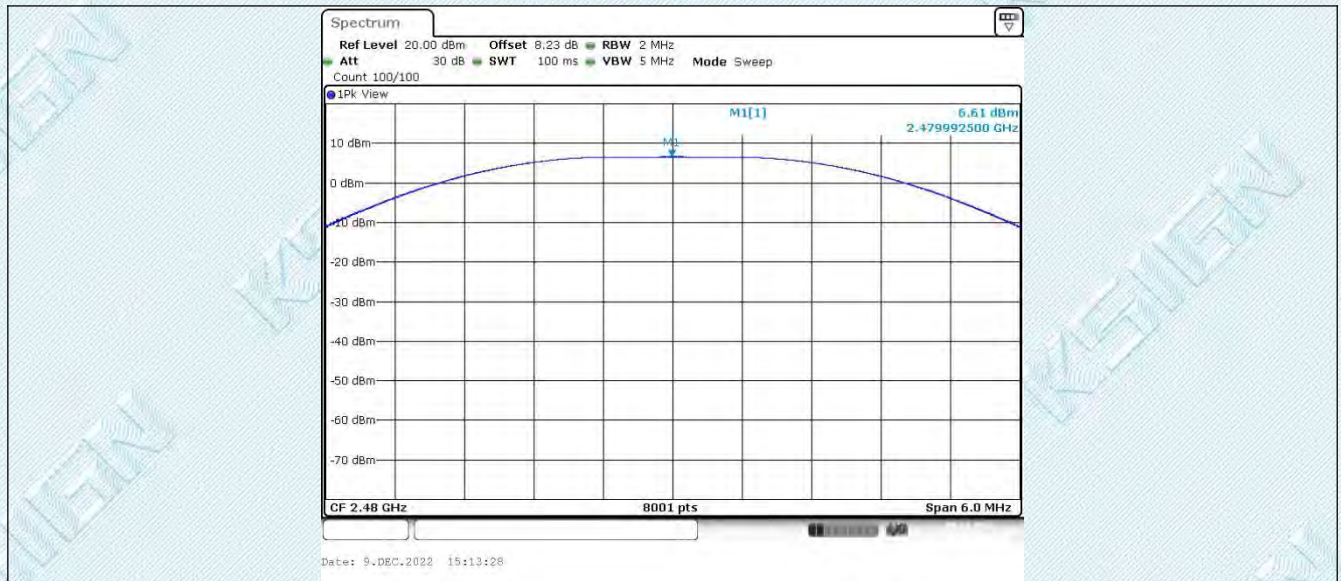


BLE_2M_Ant1_2480

TRF EMC_R1

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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TRF EMC_R1

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

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	-7.94	≤8.00	PASS
		2440	-7.87	≤8.00	PASS
		2480	-8.15	≤8.00	PASS
BLE_2M	Ant1	2402	-10.91	≤8.00	PASS
		2440	-10.76	≤8.00	PASS
		2480	-11	≤8.00	PASS

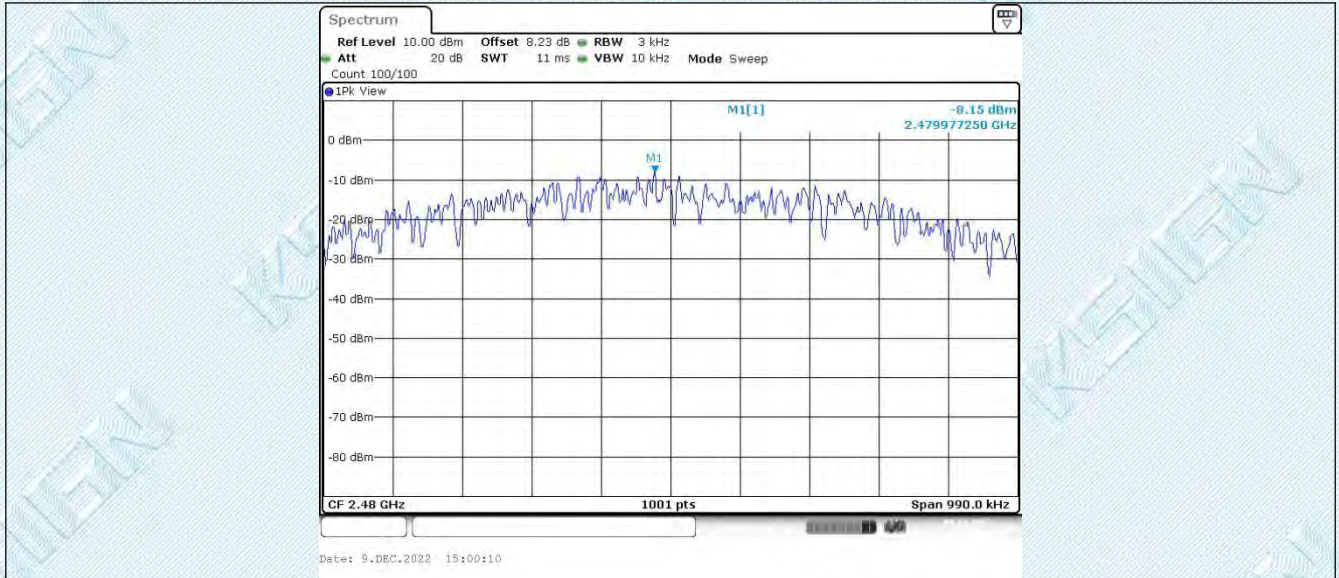
6.4.2. Test Graphs



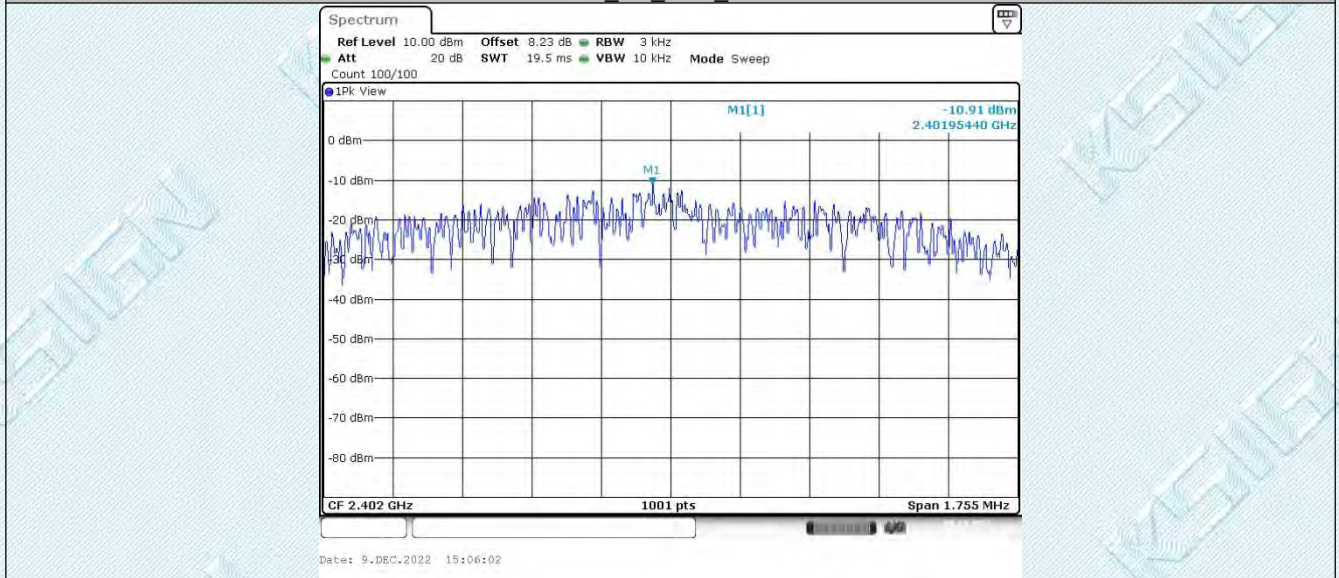
TRF EMC_R1

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

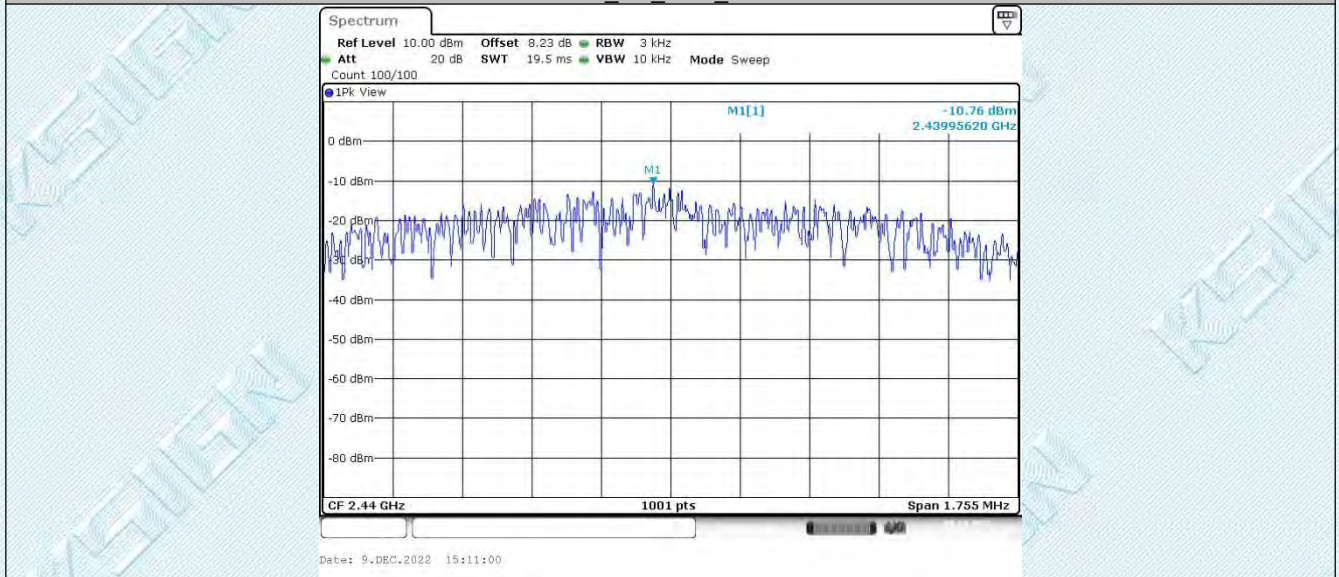
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdksign.cn Web: www.gdksign.com



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

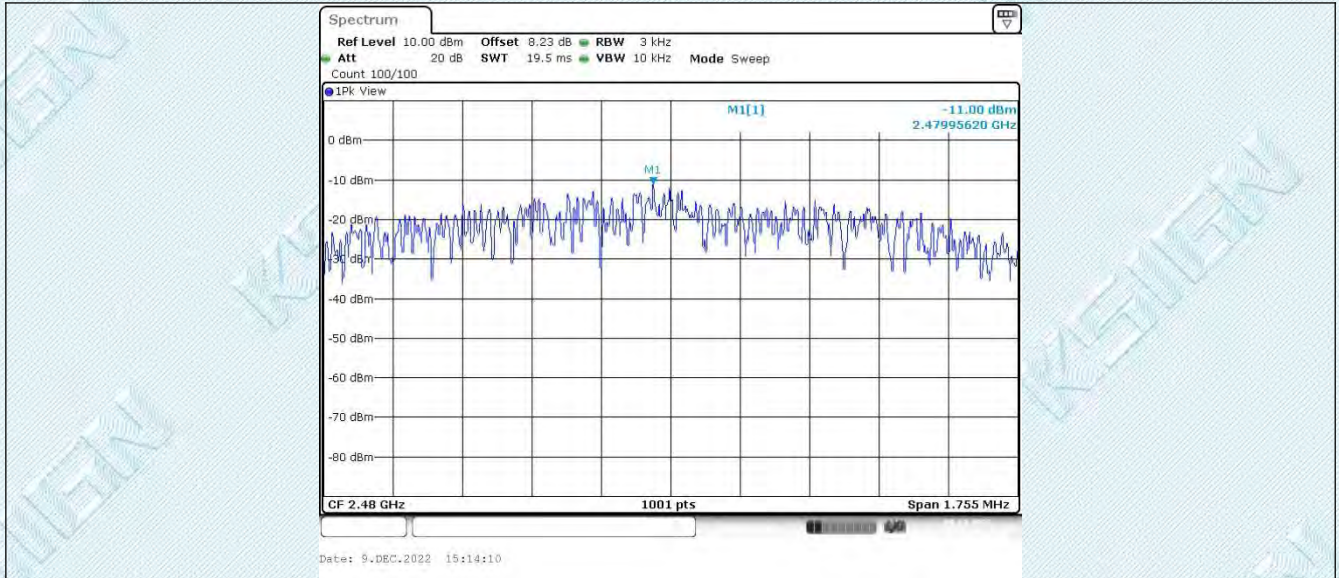


BLE_2M_Ant1_2480

TRF EMC_R1

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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TRF EMC_R1

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

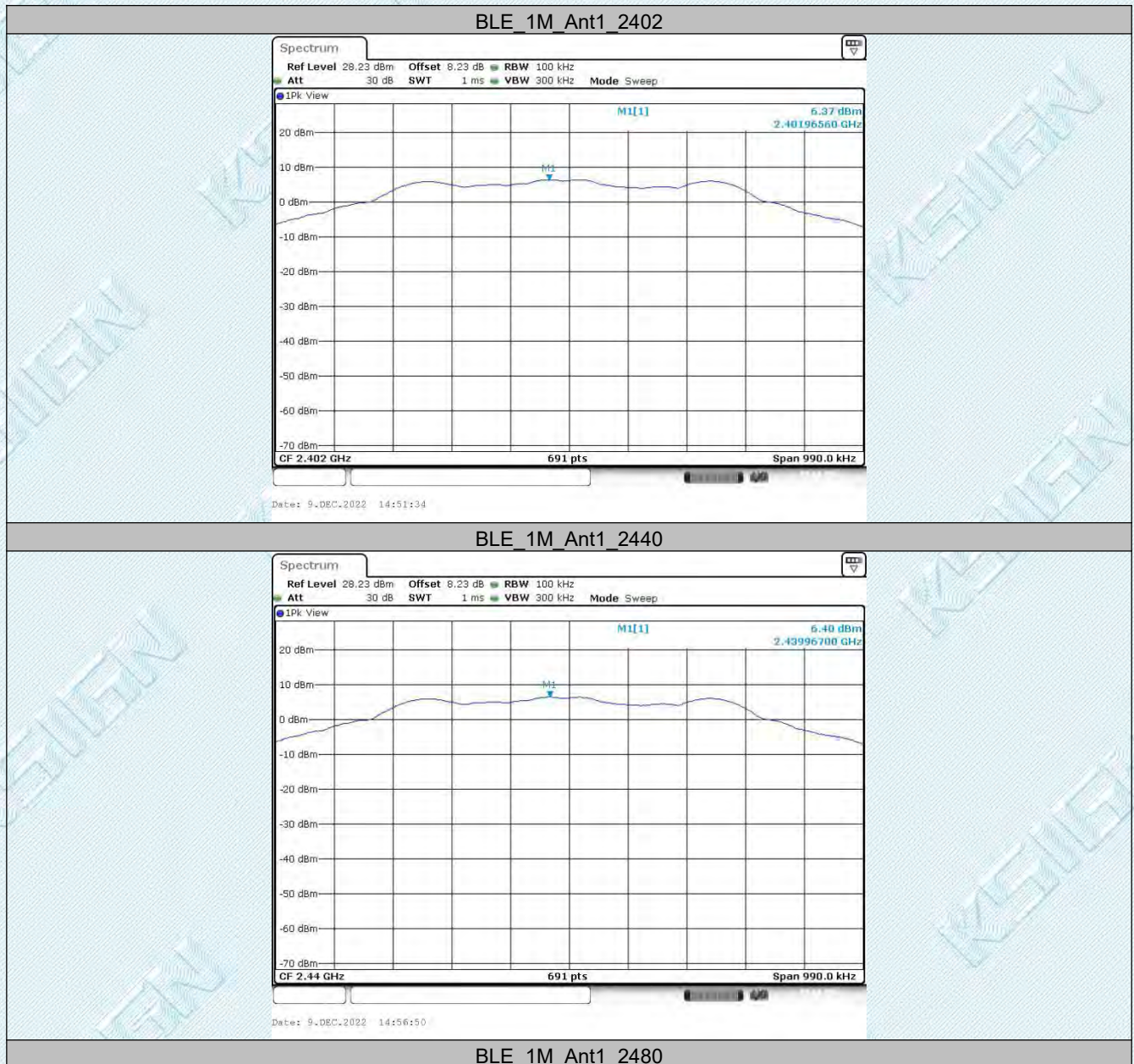
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6.5. ppendix E: Reference level measurement

6.5.1. Test Result

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2401.97	6.37
		2440	2439.97	6.40
		2480	2479.96	6.12
BLE_2M	Ant1	2402	2401.95	6.51
		2440	2439.96	6.27
		2480	2479.97	6.24

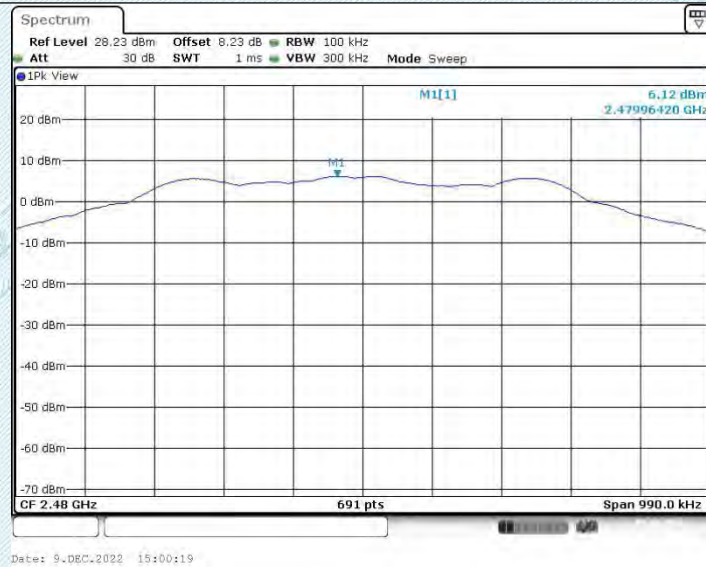
6.5.2. Test Graphs



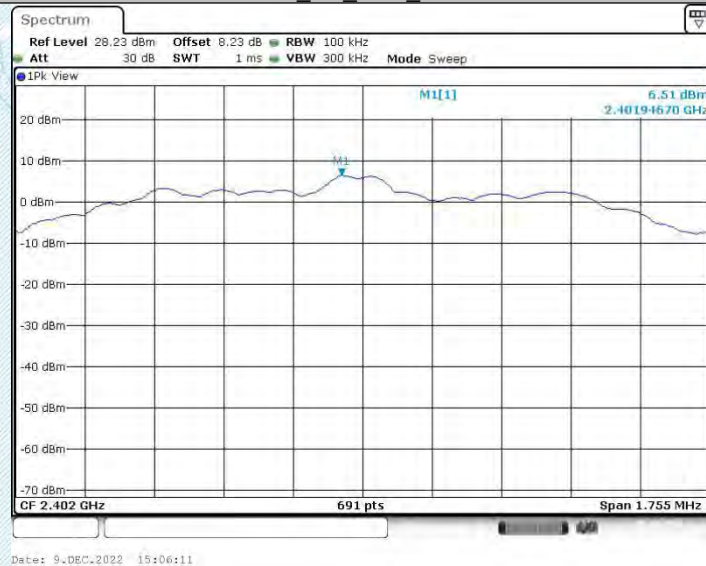
TRF EMC_R1

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

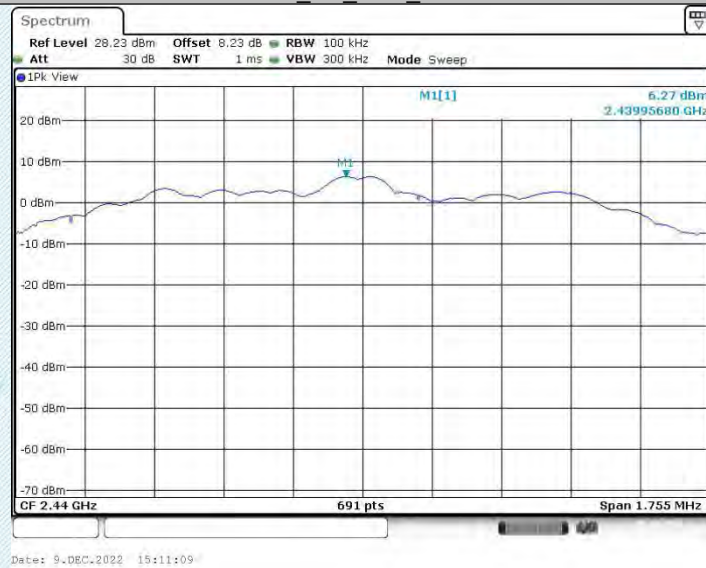
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BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

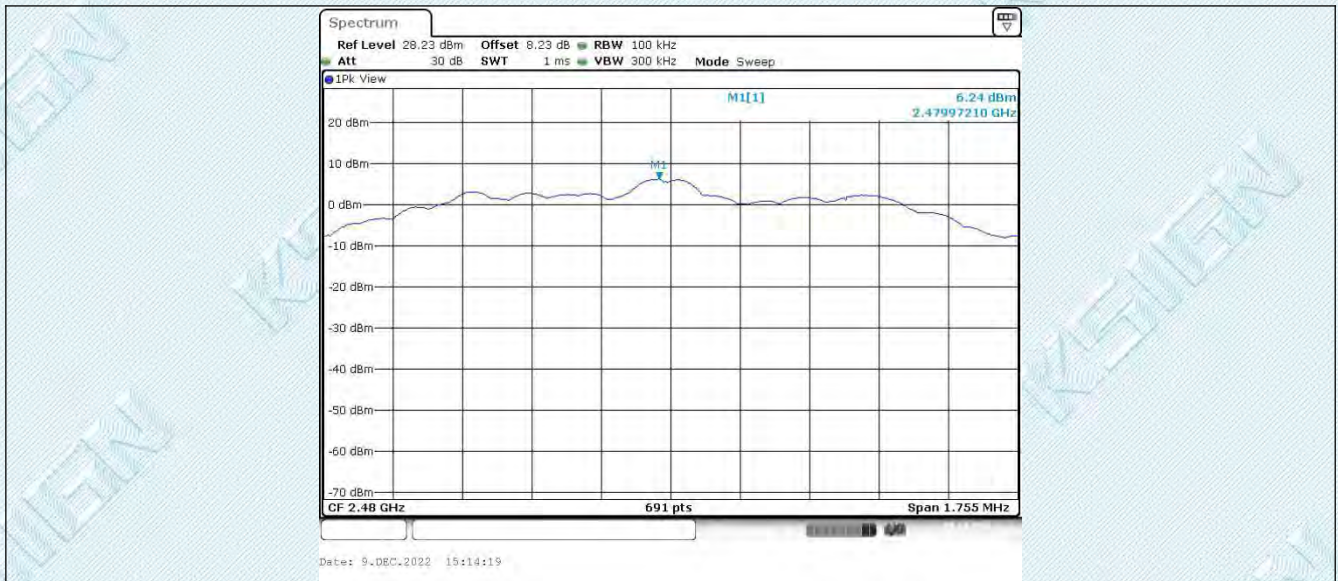


BLE_2M_Ant1_2480

TRF EMC_R1

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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TRF EMC_R1

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	6.37	-40.12	≤-13.63	PASS
		High	2480	6.12	-42.14	≤-13.88	PASS
BLE_2M	Ant1	Low	2402	6.51	-26.54	≤-13.49	PASS
		High	2480	6.24	-39.95	≤-13.76	PASS

6.6.2. Test Graphs



TRF EMC_R1

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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TRF EMC_R1

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

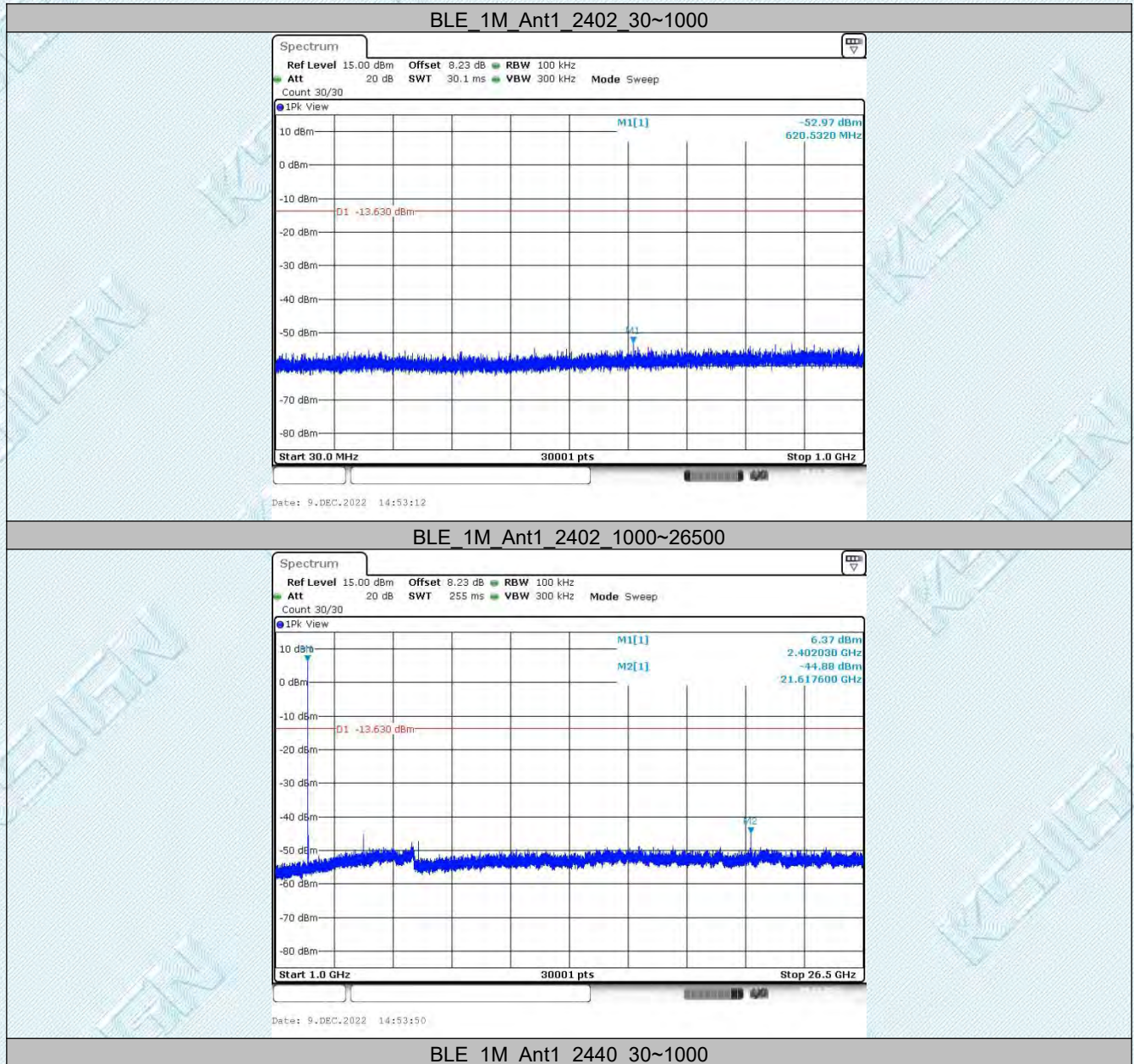
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6.7. Appendix G: Conducted Spurious Emission

6.7.1. Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	6.37	-52.97	≤-13.63	PASS
			1000~26500	6.37	-44.88	≤-13.63	PASS
		2440	30~1000	6.40	-53.45	≤-13.6	PASS
			1000~26500	6.40	-45.01	≤-13.6	PASS
		2480	30~1000	6.12	-52.87	≤-13.88	PASS
			1000~26500	6.12	-46.08	≤-13.88	PASS
BLE_2M	Ant1	2402	30~1000	6.51	-53.47	≤-13.49	PASS
			1000~26500	6.51	-47.01	≤-13.49	PASS
		2440	30~1000	6.27	-52.79	≤-13.73	PASS
			1000~26500	6.27	-45.35	≤-13.73	PASS
		2480	30~1000	6.24	-53.76	≤-13.76	PASS
			1000~26500	6.24	-47.22	≤-13.76	PASS

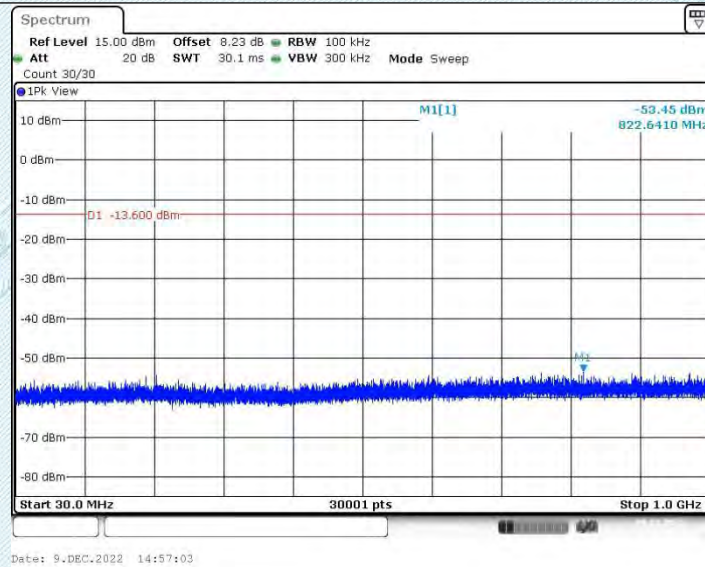
6.7.2. Test Graphs



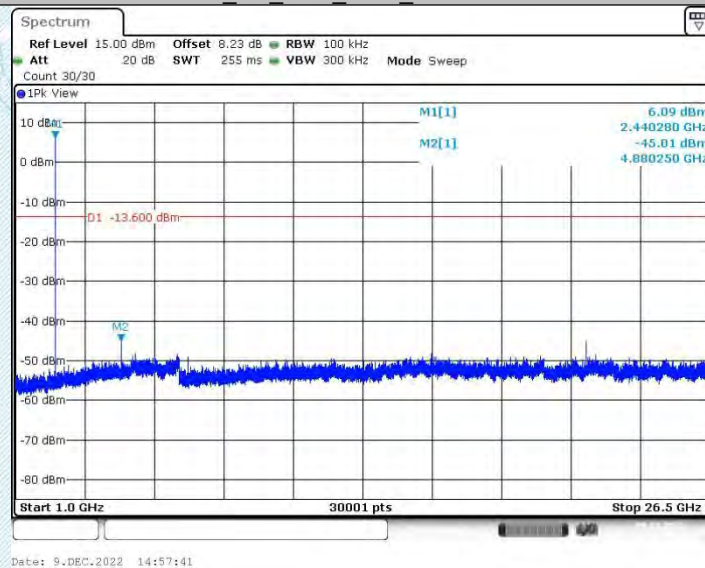
TRF EMC_R1

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

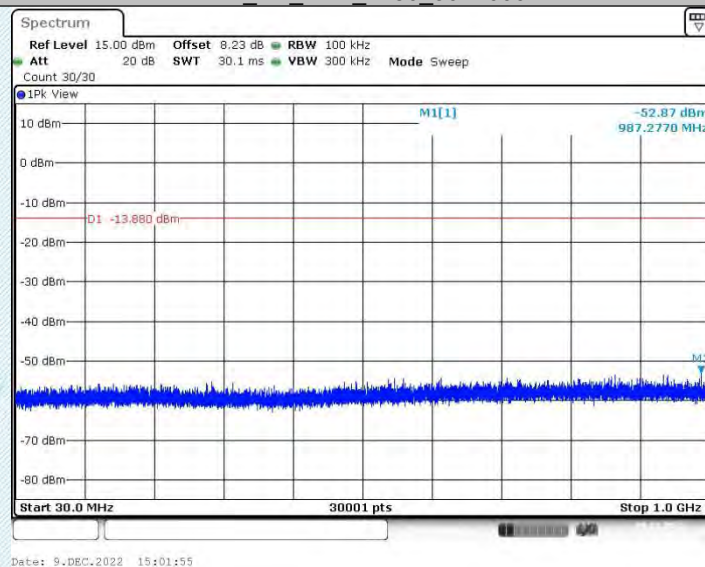
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BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_30~1000

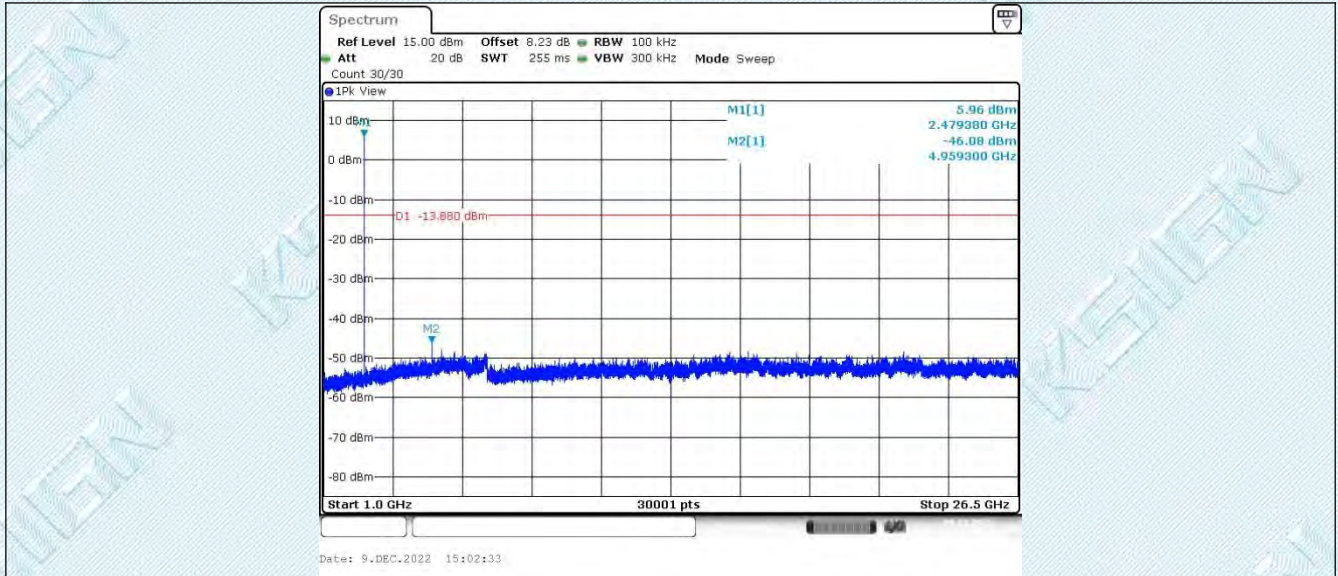


BLE_1M_Ant1_2480_1000~26500

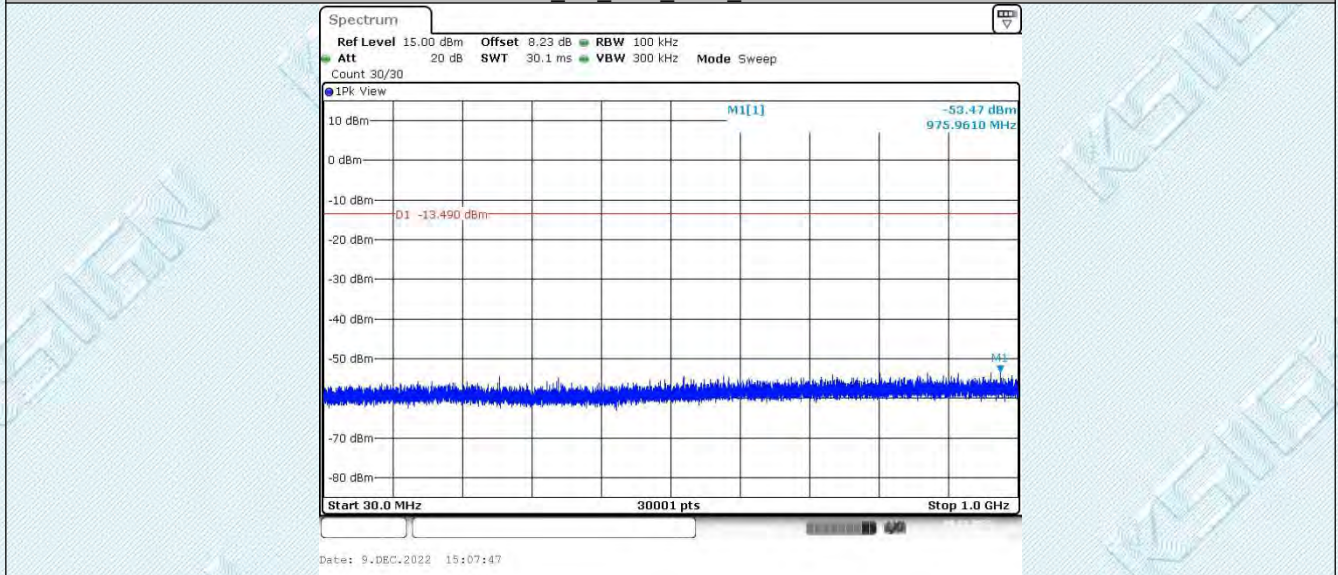
TRF EMC_R1

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

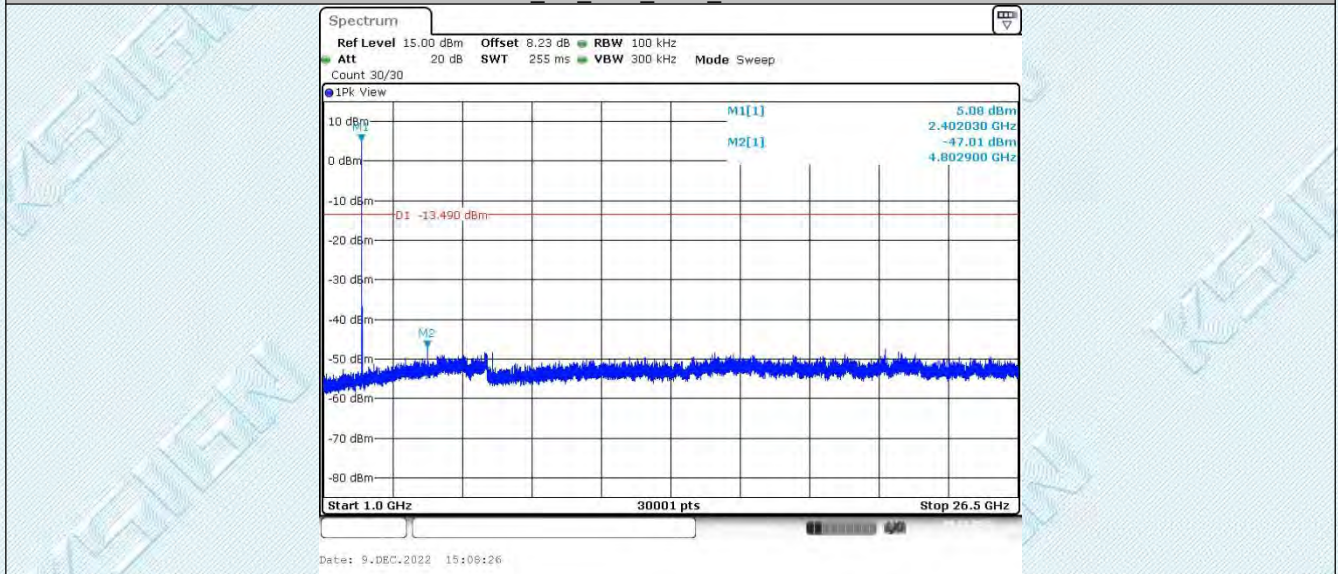
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BLE 2M Ant1_2402_30~1000



BLE 2M Ant1_2402_1000~26500

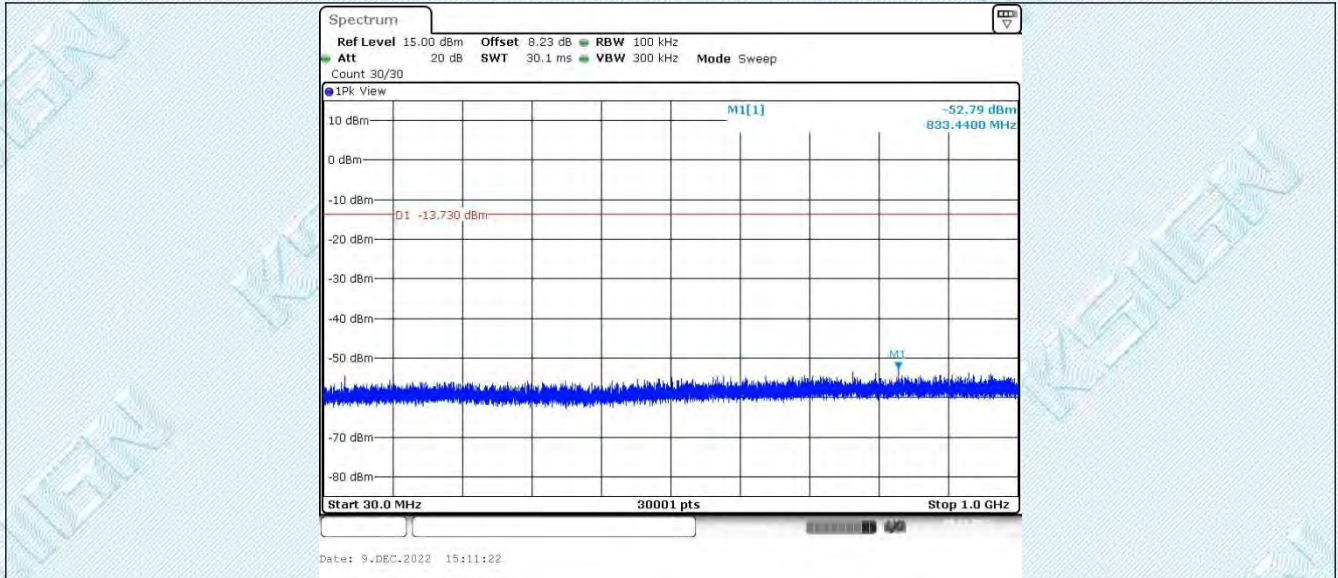


BLE 2M Ant1_2440_30~1000

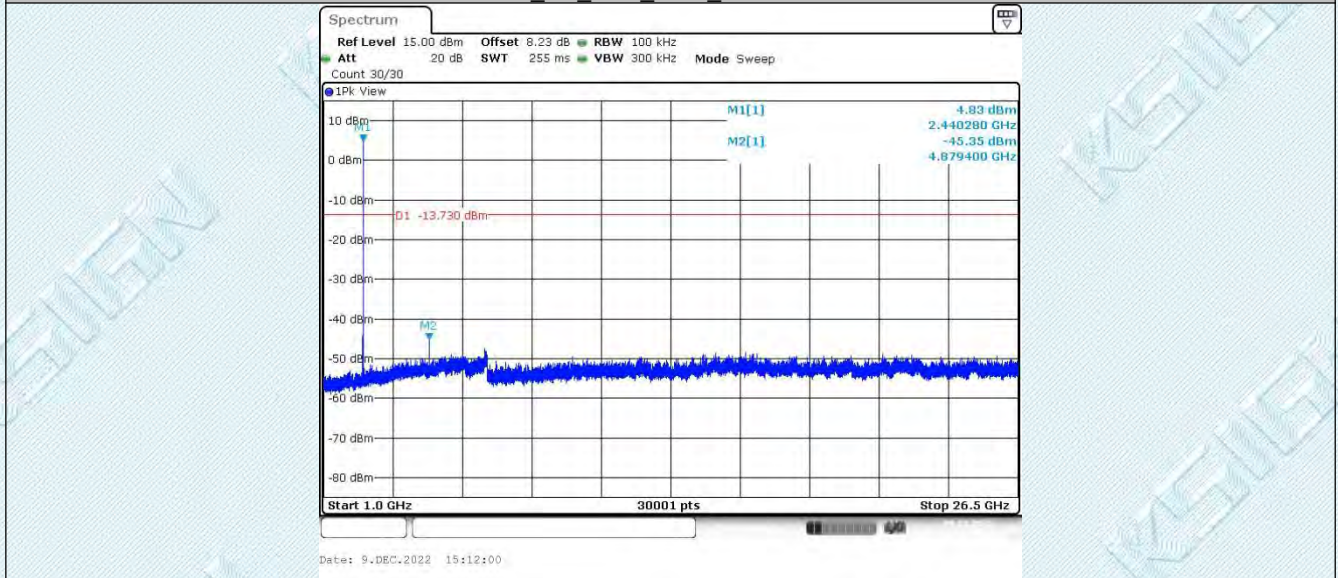
TRF EMC_R1

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

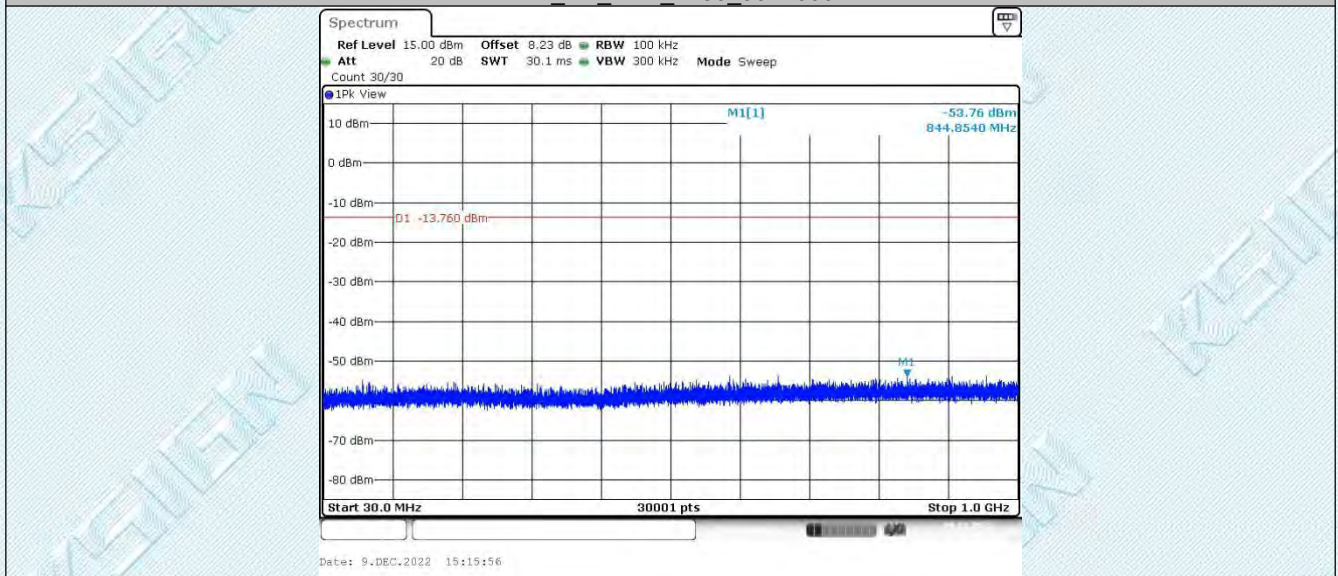
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BLE_2M_Ant1_2440_1000~26500



BLE_2M_Ant1_2480_30~1000

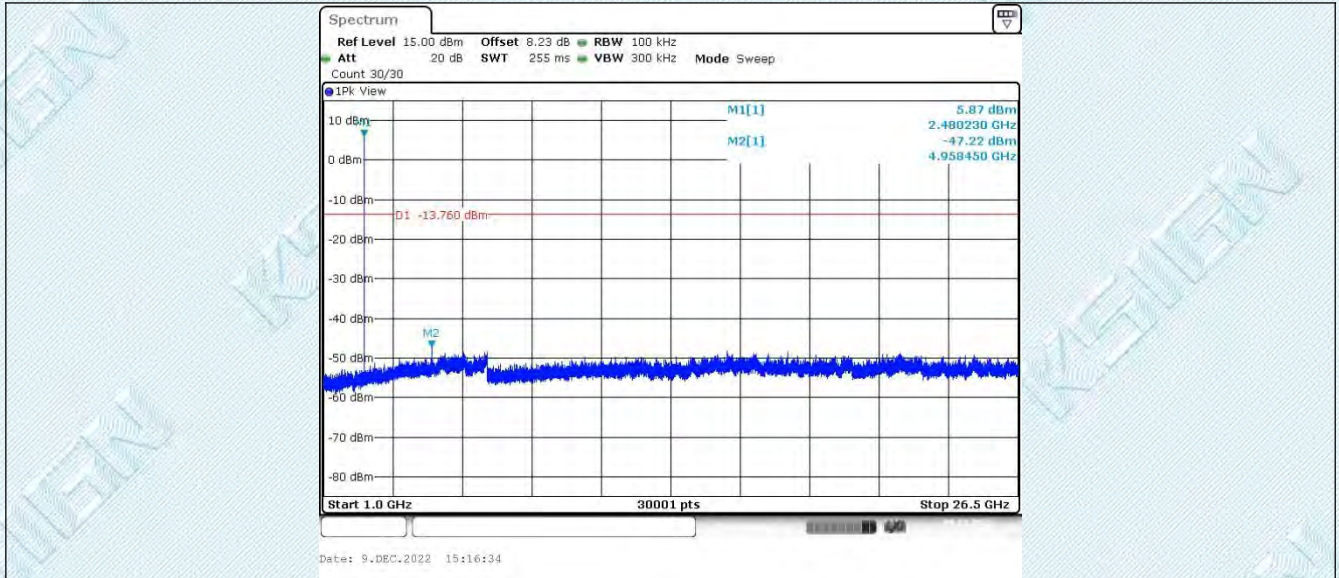


BLE_2M_Ant1_2480_1000~26500

TRF EMC_R1

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

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

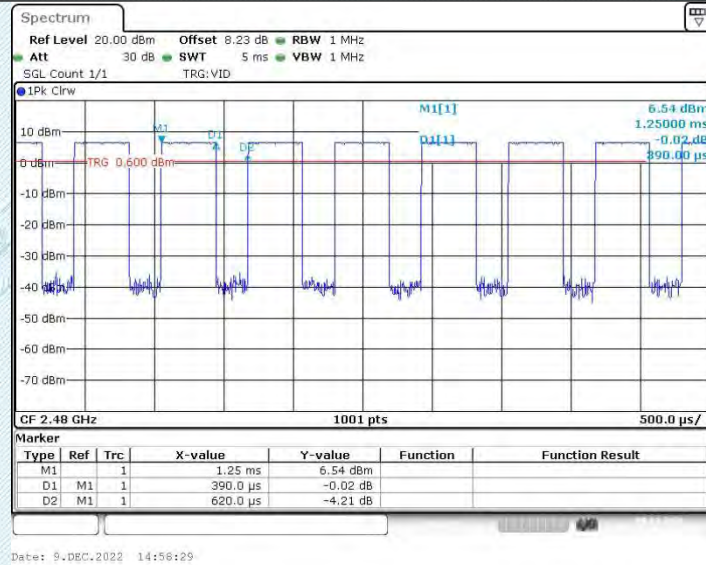
6.8. Appendix H: Duty Cycle

6.8.1. Test Result

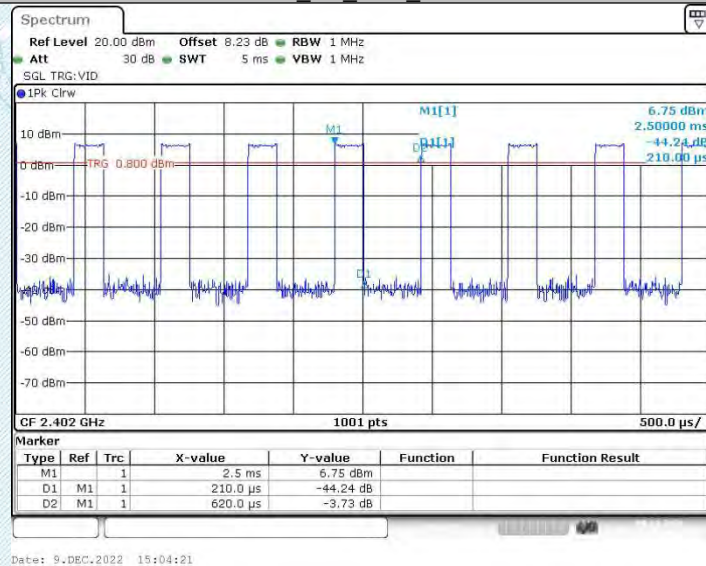
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	DC [%]	Factor	Limit	Verdict
BLE_1M	Ant1	2402	0.39	0.62	62.90	2.01	---	PASS
		2440	0.39	0.62	62.90	2.01	---	PASS
		2480	0.39	0.62	62.90	2.01	---	PASS
BLE_2M	Ant1	2402	0.21	0.62	33.87	4.70	---	PASS
		2440	0.21	0.62	33.87	4.70	---	PASS
		2480	0.21	0.62	33.87	4.70	---	PASS

6.8.2. Test Graphs

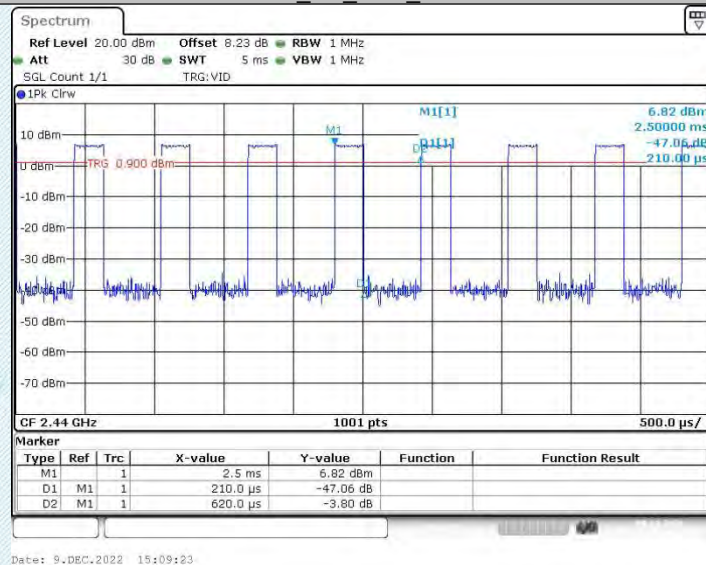




BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

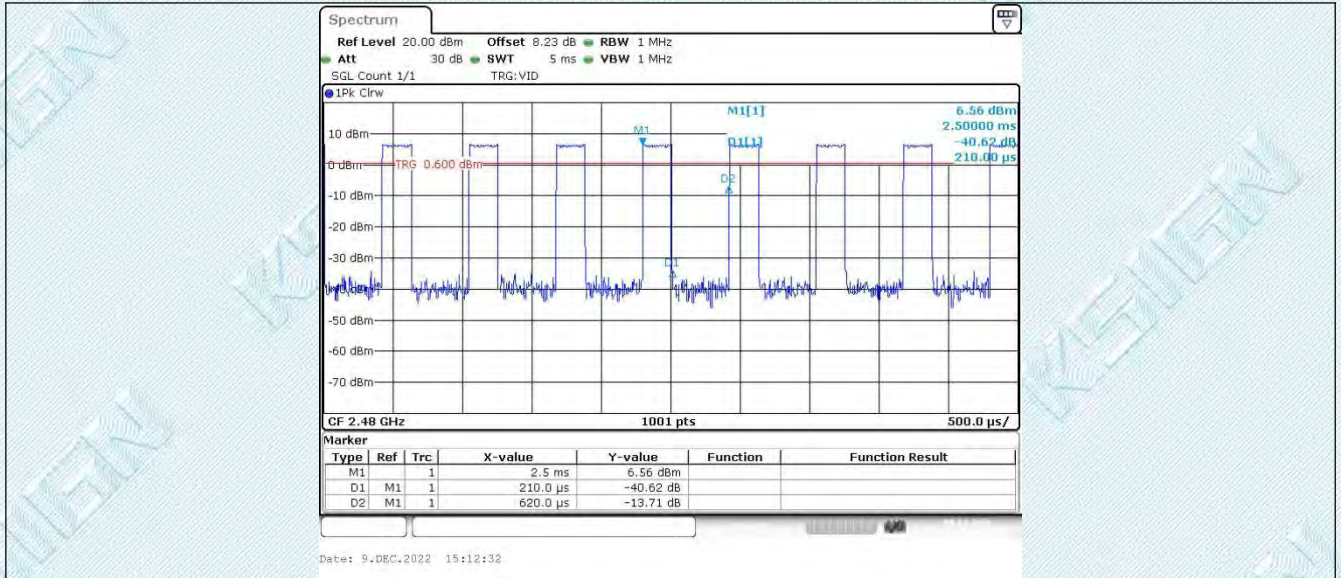


BLE_2M_Ant1_2480

TRF EMC_R1

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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--THE END--