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Robosen Robotics (ShenZhen) Co., Ltd.

TEST REPORT

SCOPE OF WORK
FCC TESTING–K1JD

REPORT NUMBER
221121049SZN-001

ISSUE DATE	**[REVISED DATE]**
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101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen, P.R. China.

Tel: (86 755) 8601 6288
Fax: (86 755) 8601 6751
www.intertek.com

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TEST REPORT

Intertek Report No.: 221121049SZN-001

Robosen Robotics (ShenZhen) Co., Ltd.

Application
For
Certification

FCC ID: 2ATNWK1ZNJD

Robosen AI Base Lite

Model: K1JD

2.4GHz Transceiver

Report No.: 221121049SZN-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-21]

Prepared and Checked by:

Mandy Chen
Engineer

Approved by:

Ryan Chen
Project Engineer
Date: 22 December 2022

MEASUREMENT/TECHNICAL REPORT

This report concerns (check one) Original Grant ___X___ Class II Change _____

Equipment Type: DTS - Part 15 Digital Transmission Systems

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X___

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No ___X___

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-21] Edition] provision.

Report prepared by:

Mandy Chen
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue,
Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen, P.R. China.
Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6661

Table of Contents

1.0 Summary of Test results

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.

Address: A3703, Bldg 11, Shenzhen Bay ECO-Tech Park, No.16, Gaoxin South Science and Tech Rd., Nanshan Dist. Shenzhen, Guangdong, China

Manufacturer: Robosen Robotics (ShenZhen) Co., Ltd.

Address: A3703, Bldg 11, Shenzhen Bay ECO-Tech Park, No.16, Gaoxin South Science and Tech Rd., Nanshan Dist. Shenzhen, Guangdong, China

Model: K1JD

FCC ID: 2ATNWK1ZNJD

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d), 15.209, FCC 15.205	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Robosen AI Base Lite with Bluetooth 4.2 BLE function operating in 2402-2480MHz and Wi-Fi function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing and 2422-2452MHz for 802.11n-HT40, 7 channels with 5MHz channel spacing. The EUT is powered by DC 12V from adapter. For more detail information pls. refer to the user manual.

Type of Modulation: GFSK
Antenna Type: Integral Antenna
Antenna Gain: 0.18dBi Max

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of transceiver for the Robosen AI Base Lite which has Bluetooth function and Wi-Fi 2.4GHz Transmitter Function. Wi-Fi 2.4GHz Function were reported in the certification report: 221121049SZN-002. Other digital functions were reported in the verification report: 221121049SZN-003.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013) and KDB 558074 D01 v05r02. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.4 Test Facility

The Semi-anechoic chamber and shielded room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by DC 12V from adapter during the test. Simultaneous transmission has been tested and only the worst data was reported in this report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

The EUT and transmitting antenna was centered on the turntable.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program command(provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:
During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

Test Software: Windows PowerShell

3.3 Special Accessories

No special accessory attached.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Measurement Uncertainty	Uncertainty
Channel Bandwidth	±3.46%
RF Output Power	±0.31dB
Power Density	±3.0dB
Conducted Unwanted Emission	±0.55dB
Spurious emission (Above 18GHz)	±5.3dB
Spurious emission (6GHz to 18GHz)	±5.1dB
Radiated emission (1GHz to 6GHz)	±4.8dB
Radiated emission (Up to 1GHz)	±4.8dB
AC Conducted emission	±3.6 dB
Temperature	±1°C
Humidity	±5%

3.5 Equipment Modification

Any modifications installed previous to testing by Robosen Robotics (ShenZhen) Co., Ltd. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

3.6 Support Equipment List and Description

Description	Manufacturer	Model No.
Charging Cable	N/A (provided by Client)	Unshielded, Length 34.5cm
AC/DC ADAPTER	N/A (provided by Client)	Model: KA1801A-1201500US Input: 100-240V~ 50/60Hz 0.55A Max Output: 12V/1500mA
INTERSTELLAR SCOUT	ROBOSEN (provided by Client)	Model: K1

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter has a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 0.18 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

GFSK		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2402	5.93	3.92
Middle Channel: 2440	6.38	4.35
High Channel: 2480	6.54	4.51

Cable loss: 1 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 6.54dBm
EUT max. E.I.R.P = 6.54dBm + 0.18dBi = 6.72dBm = 4.70mW

For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

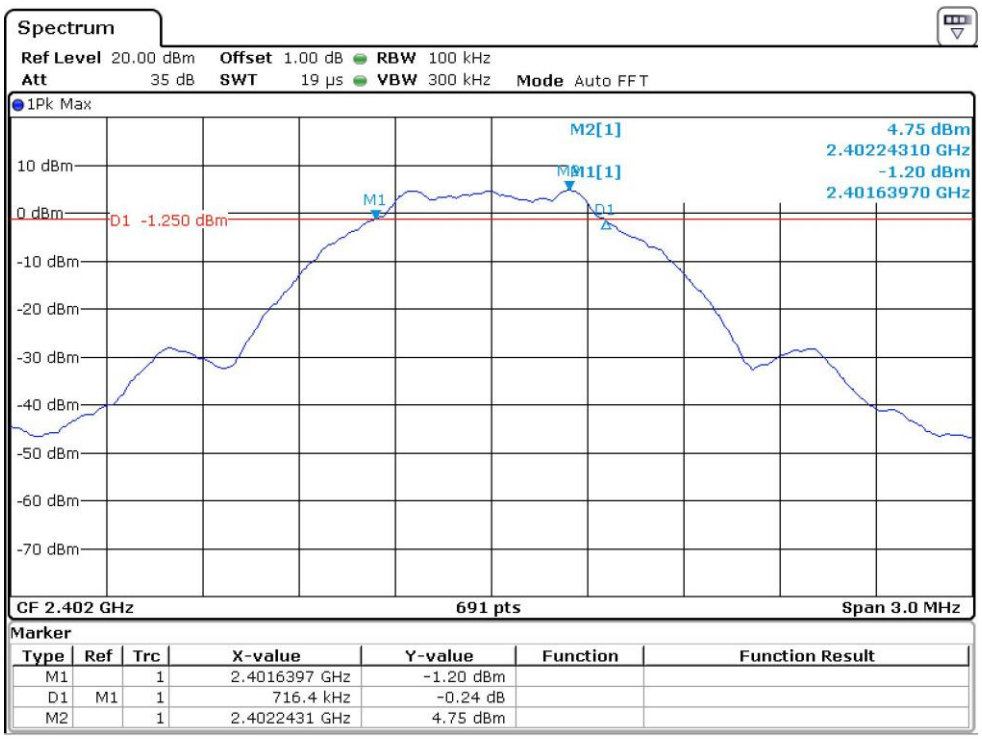
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v05r02. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

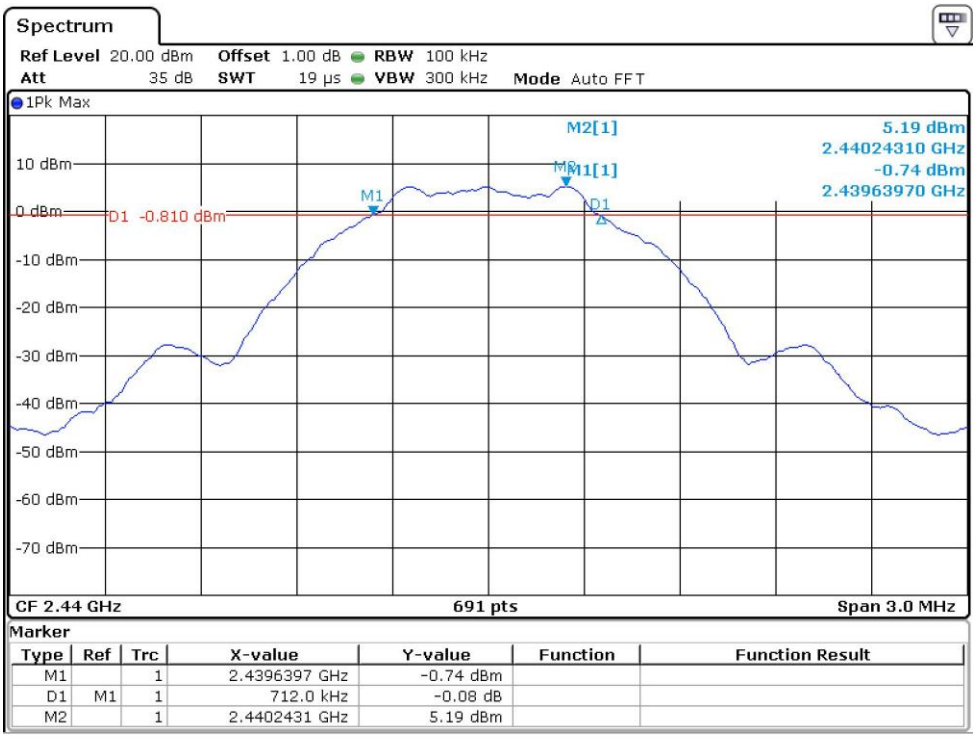
GFSK	
Frequency (MHz)	6 dB Bandwidth (MHz)
2402	0.716
2440	0.712
2480	0.708

The test plots are attached as below.

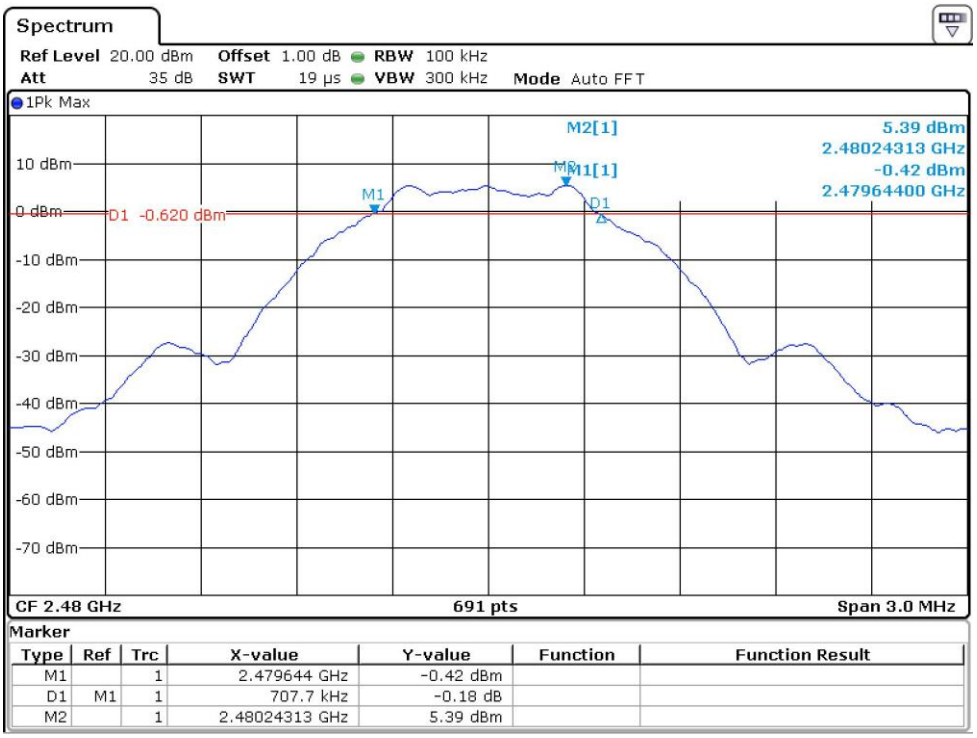
2402MHz:



2440MHz:



2480MHz:



Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v05r02.

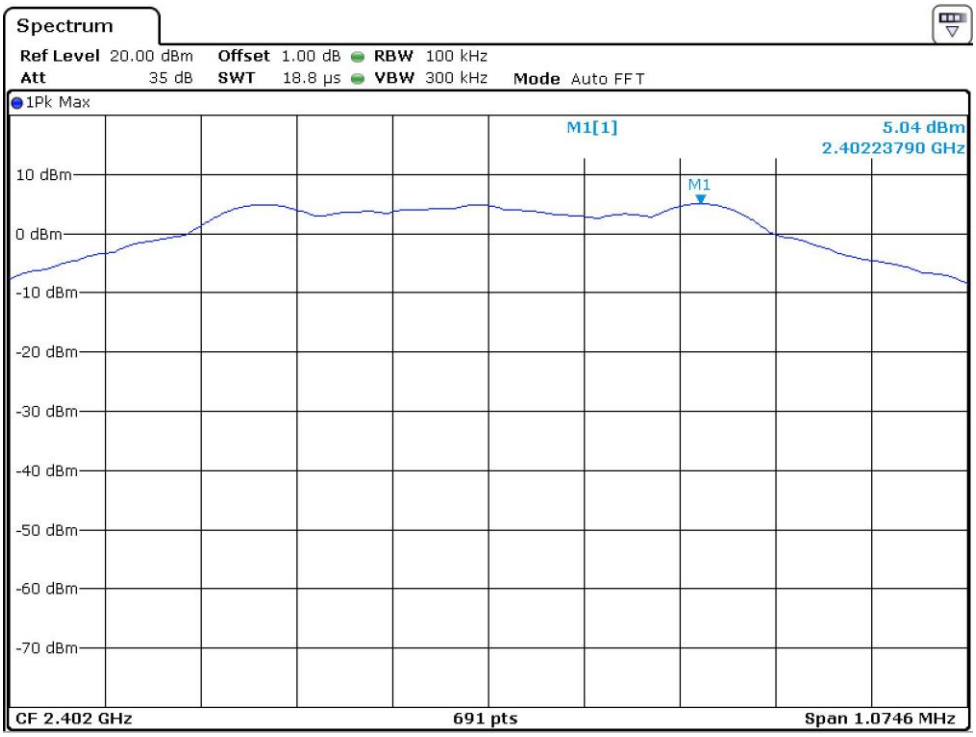
Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

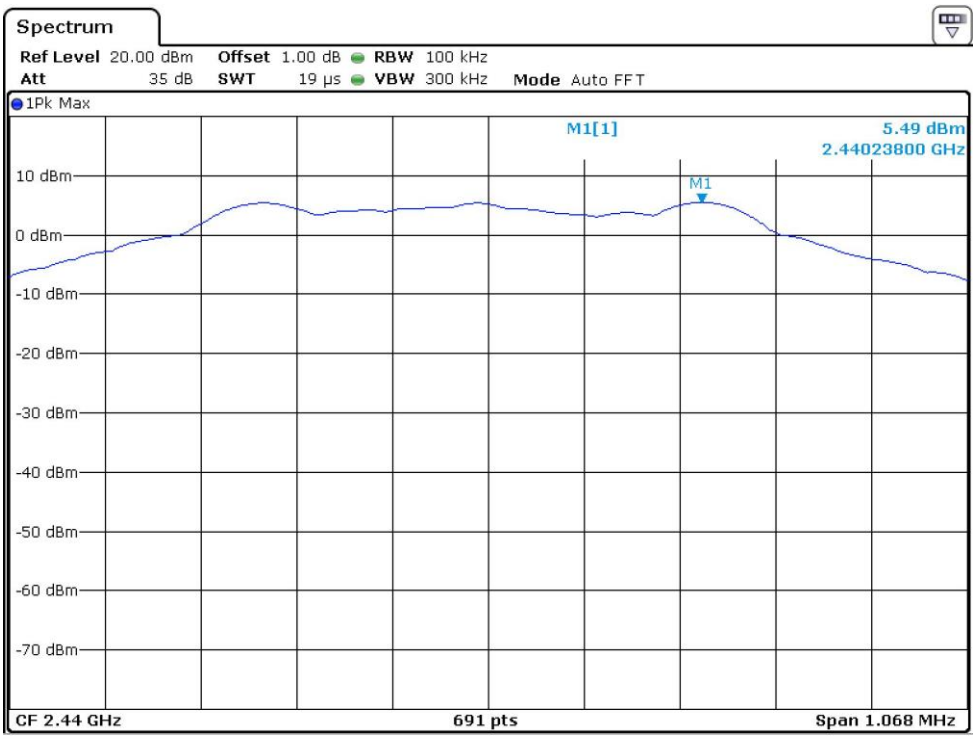
GFSK	
Frequency (MHz)	Power Density with RBW 100KHz
2402	5.04
2440	5.49
2480	5.66

The test plots are attached as below.

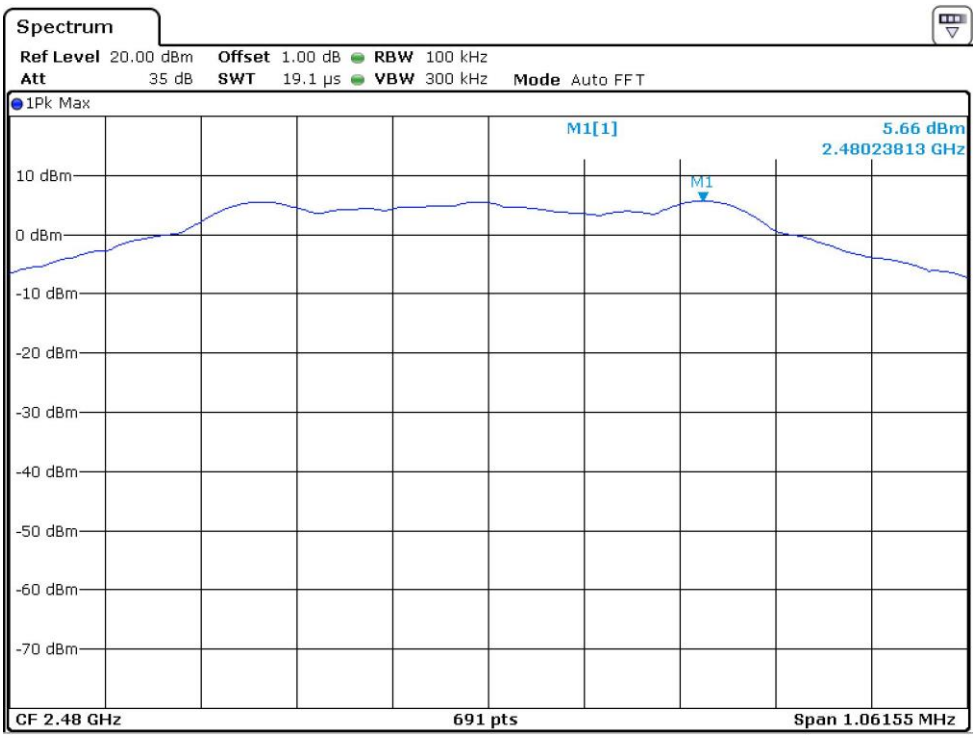
2402MHz:



2440MHz:



2480MHz:



Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

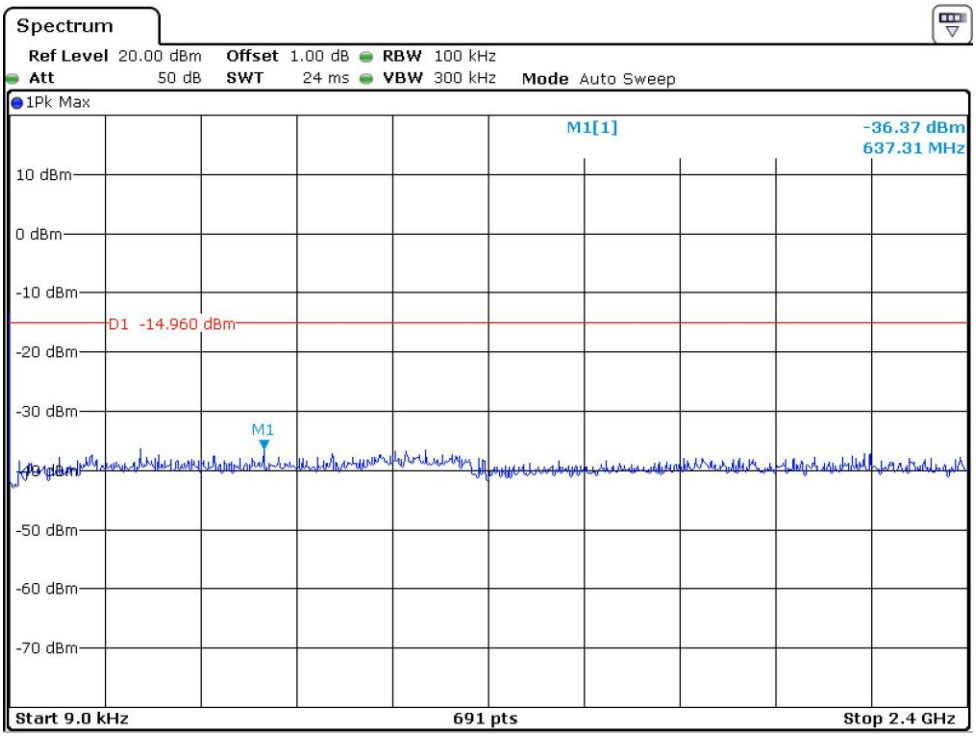
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074 D01 v05r02.

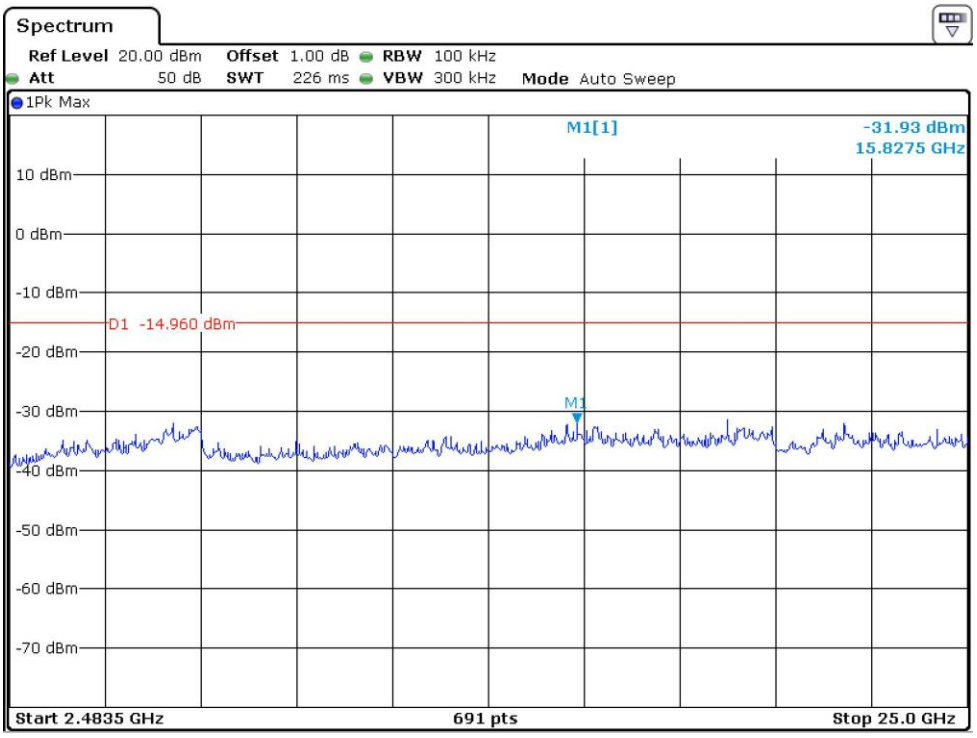
The type of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

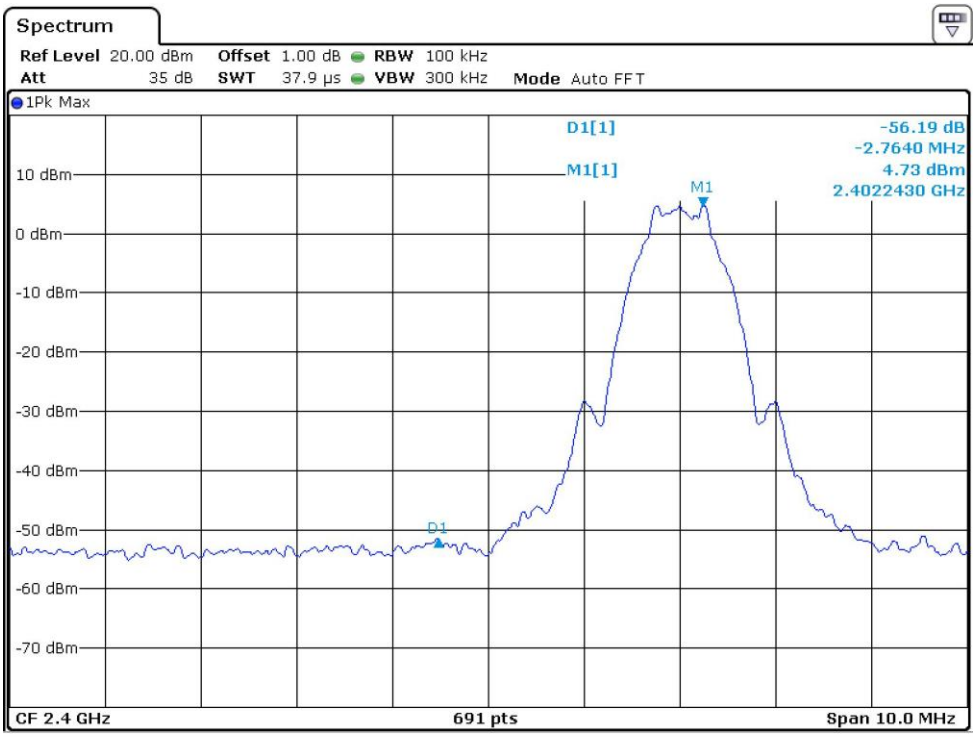
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

The test plots are attached as below.

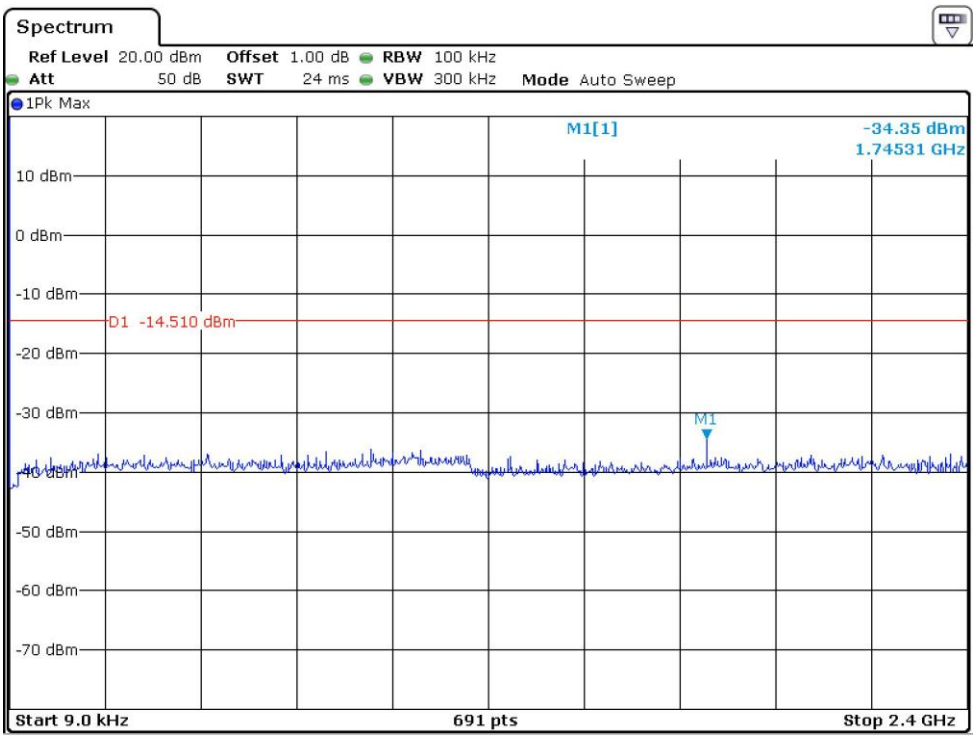
2402MHz Reference Level: 5.04dBm

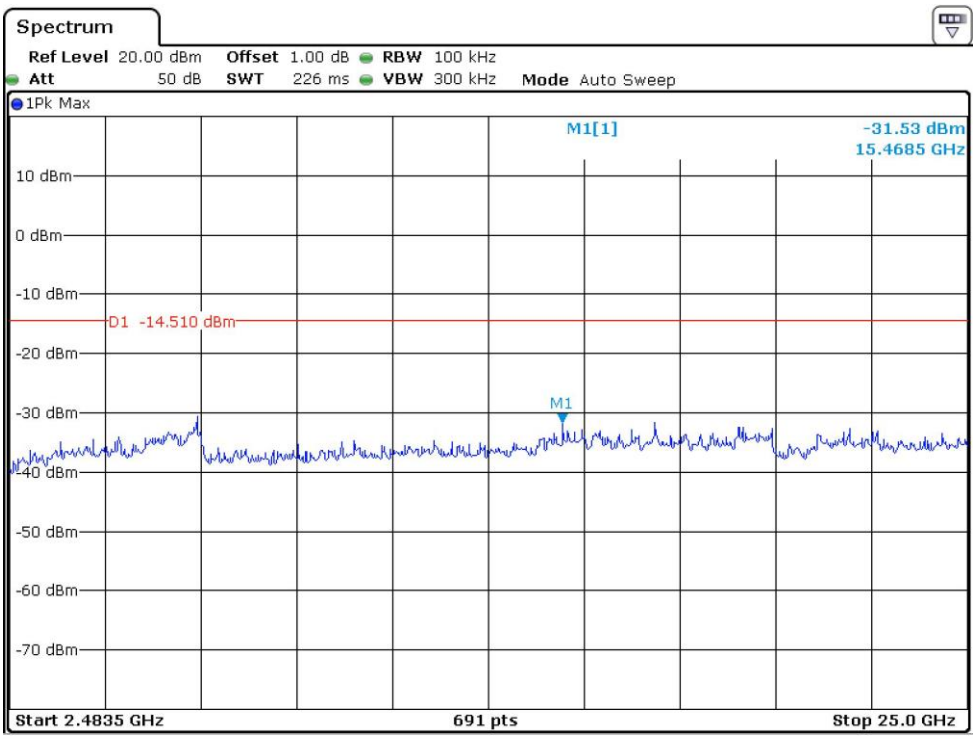




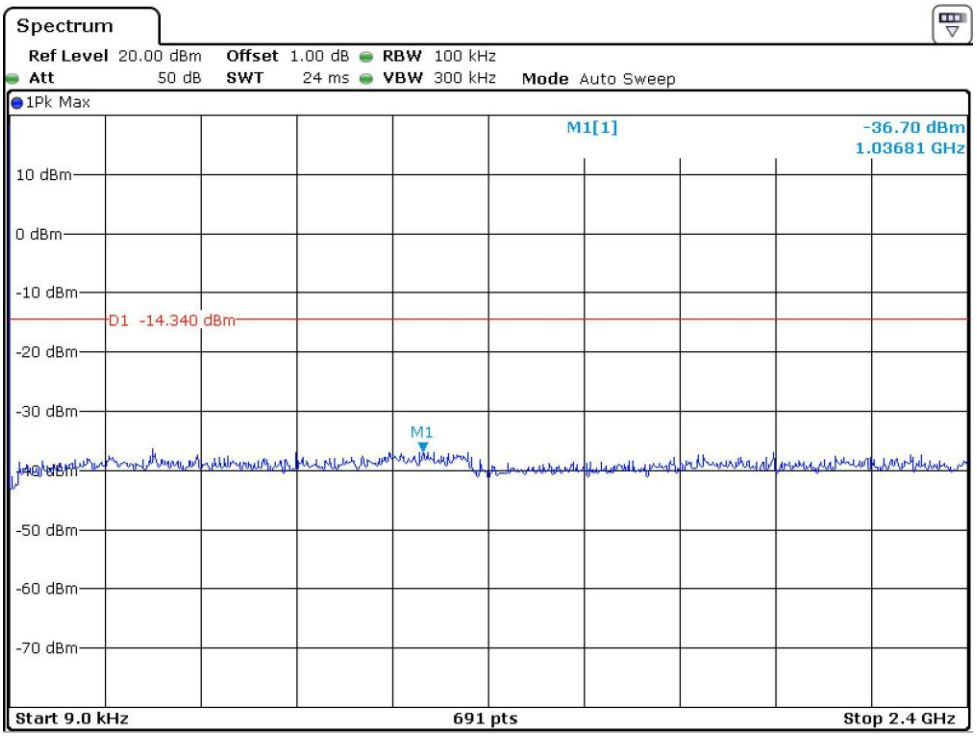

Spectrum
Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz
Att 35 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -56.19 dB
-2.7640 MHz
M1[1] 4.73 dBm
2.4022430 GHz
M1
D1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.4 GHz
691 pts
Span 10.0 MHz

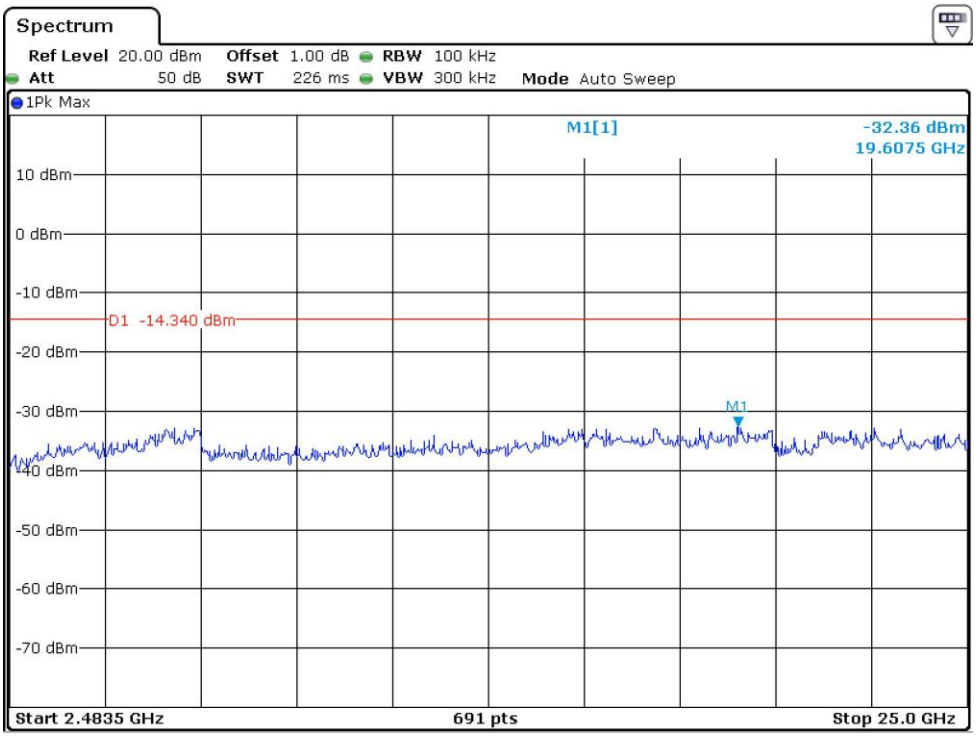
2440MHz Reference Level: 5.49dBm

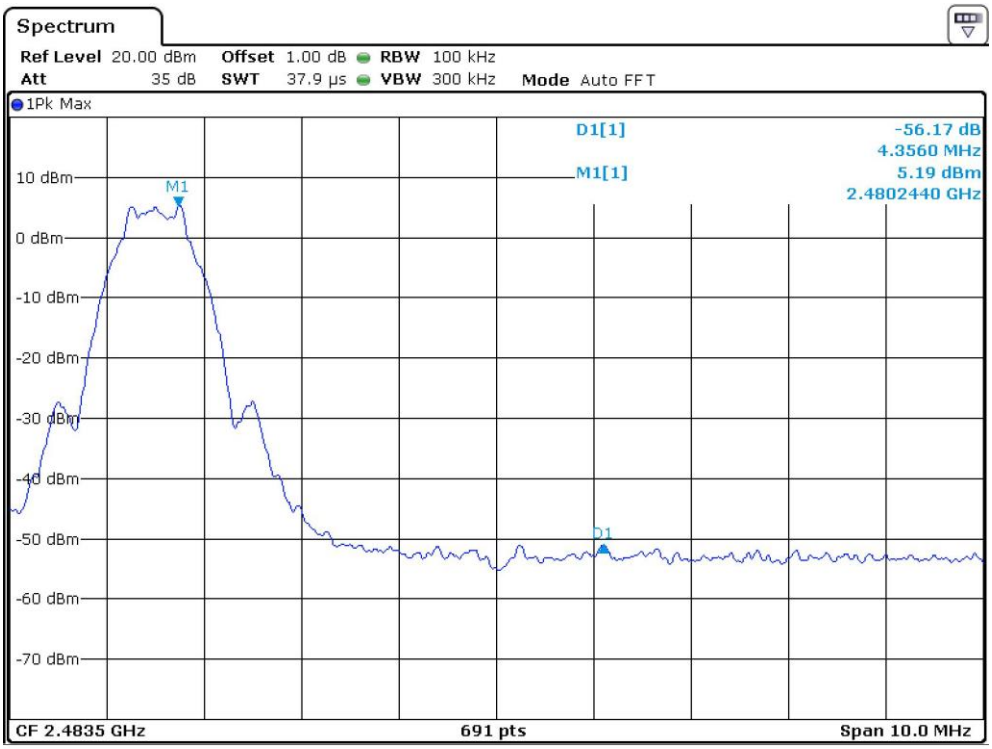




2480MHz Reference Level: 5.66dBm






Spectrum
Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz
Att 35 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -56.17 dB
4.3560 MHz
M1[1] 5.19 dBm
2.4802440 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1
CF 2.4835 GHz
691 pts
Span 10.0 MHz

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

[×] Not required, since all emissions are more than 20dB below fundamental
[ ] See attached data sheet

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b) (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Simultaneous transmission has been tested and only the worst data was reported in this report.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB/m
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD

Example

Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

Level in mV/m = Common Antilogarithm [(42 dBμV/m)/20] = 125.9 μV/m

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at 399.960000MHz
is passed by 5.1dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

TEST PERSONNEL:

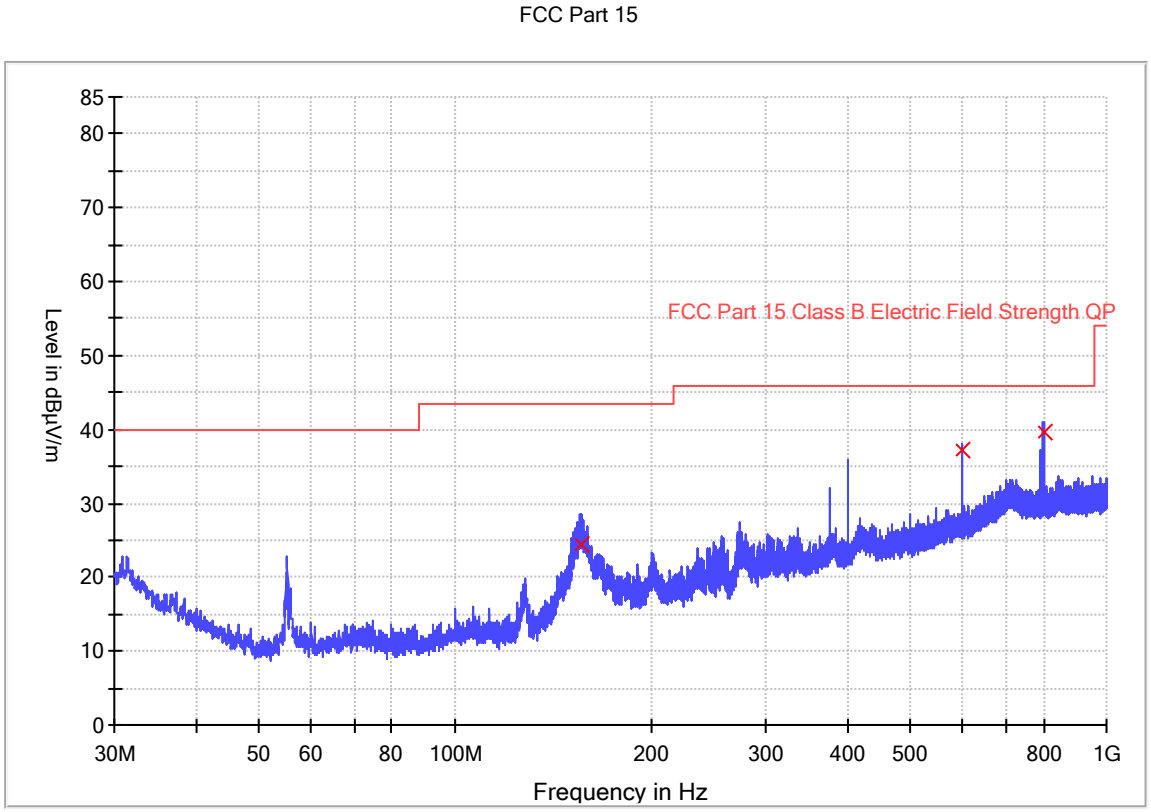
Sign on file

Mandy Chen, Engineer
Typed/Printed Name

29 November 2022
Date

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD
Worst Case and Operating Mode: BT Link

ANT Polarity: Horizontal



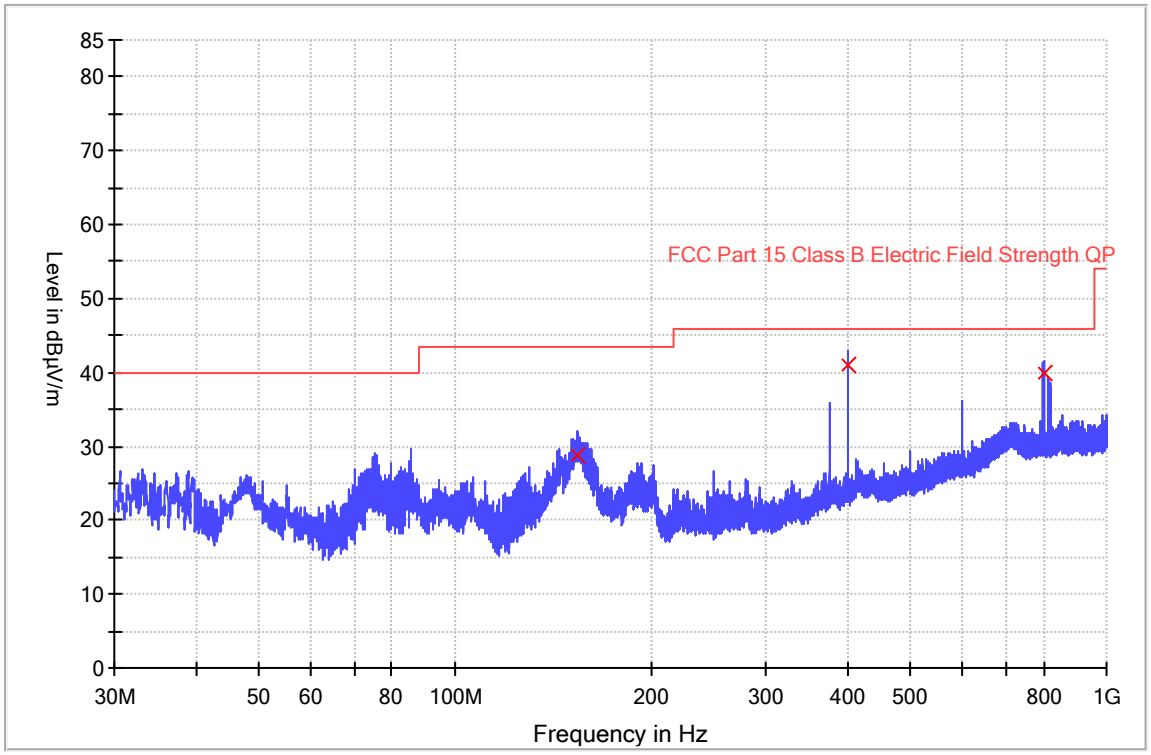
Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
155.776667	24.4	1000.0	120.000	100.0	H	17.0	19.1	43.5
600.004333	37.3	1000.0	120.000	100.0	H	28.6	8.7	46.0
800.040000	39.5	1000.0	120.000	100.0	H	32.0	6.5	46.0

Remark:
1. Corr. (dB/m)= Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD
Worst Case Operating Mode: BT Link

ANT Polarity: Vertical

FCC Part 15



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
154.063000	28.8	1000.0	120.000	100.0	V	16.8	14.7	43.5
399.960000	40.9	1000.0	120.000	100.0	V	25.1	5.1	46.0
800.018333	40.0	1000.0	120.000	100.0	V	32.0	6.0	46.0

Remark:
1. Corr. (dB/m)= Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD
Worst Case and Operating Mode: Transmitting (2402MHz)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4804.000	50.6	36.7	35.5	49.4	74.0	-24.6
Horizontal	*7206.000	61.0	36.4	29.1	53.7	74.0	-20.3
Horizontal	*2390.000	58.8	36.4	29.1	51.5	74.0	-22.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4804.000	40.1	36.7	35.5	38.9	54.0	-15.1
Horizontal	*7206.000	49.1	36.4	29.1	41.8	54.0	-12.2
Horizontal	*2390.000	47.9	36.4	29.1	40.6	54.0	-13.4

NOTES:

1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD
Worst Case and Operating Mode: Transmitting (2440MHz)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4880.000	47.1	36.7	35.5	45.9	74.0	-28.1
Horizontal	*7320.000	50.3	36.1	37.2	51.4	74.0	-22.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4880.000	41.0	36.7	35.5	39.8	54.0	-14.2
Horizontal	*7320.000	41.4	36.1	37.2	42.5	54.0	-11.5

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022 Model: K1JD
Worst Case and Operating Mode: Transmitting (2480MHz)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4960.000	46.3	36.7	35.5	45.1	74.0	-28.9
Horizontal	*7440.000	48.7	36.1	37.2	49.8	74.0	-24.2
Horizontal	*2483.500	56.9	36.4	29.1	49.6	74.0	-24.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4960.000	41.7	36.7	35.5	40.5	54.0	-13.5
Horizontal	*7440.000	42.8	36.1	37.2	43.9	54.0	-10.1
Horizontal	*2483.500	46.8	36.4	29.1	39.5	54.0	-14.5

NOTES:

1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022
Model: K1JD

4.9 Conducted Emission

Worst Case Conducted Emission
at 0.374000MHz
is passed by 19.7dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: conducted photos.pdf.

Simultaneous transmission has been tested and only the worst data was reported in this report.

TEST PERSONNEL:

Sign on file

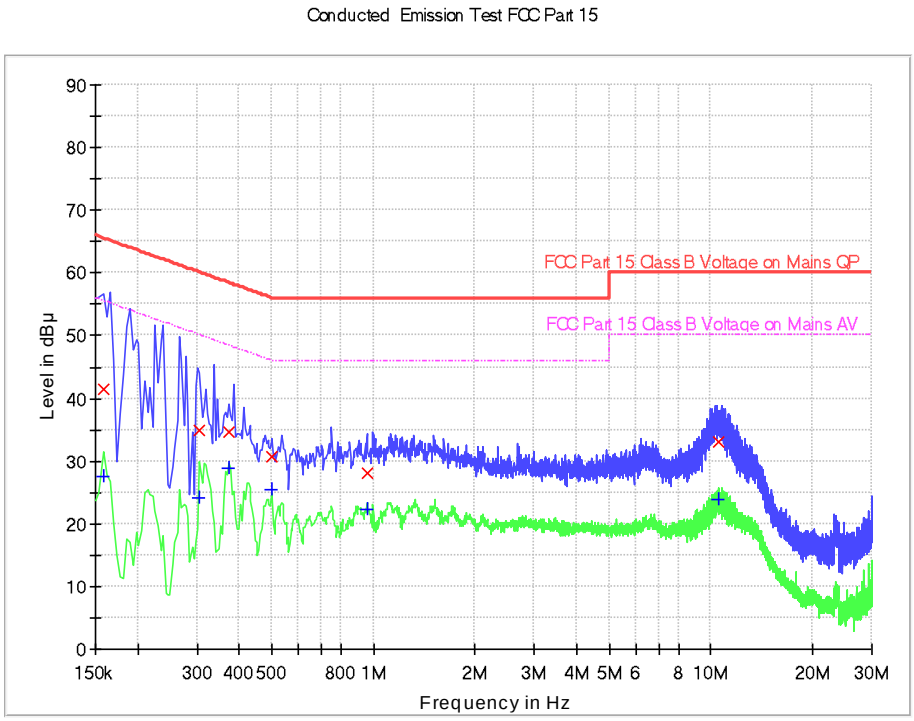
Mandy Chen, Engineer
Typed/Printed Name

29 November 2022
Date

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022
Model: K1JD
Worst Case and Operating Mode: BT Link
Test Voltage: AC 120V/60Hz
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Result Table QP

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.158000	41.4	9.000	L1	9.6	24.2	65.6
0.306000	34.9	9.000	L1	9.6	25.2	60.1
0.374000	34.8	9.000	L1	9.6	23.7	58.4
0.498000	30.7	9.000	L1	9.6	25.3	56.0
0.958000	28.2	9.000	L1	9.7	27.8	56.0
10.582000	33.1	9.000	L1	10.0	26.9	60.0

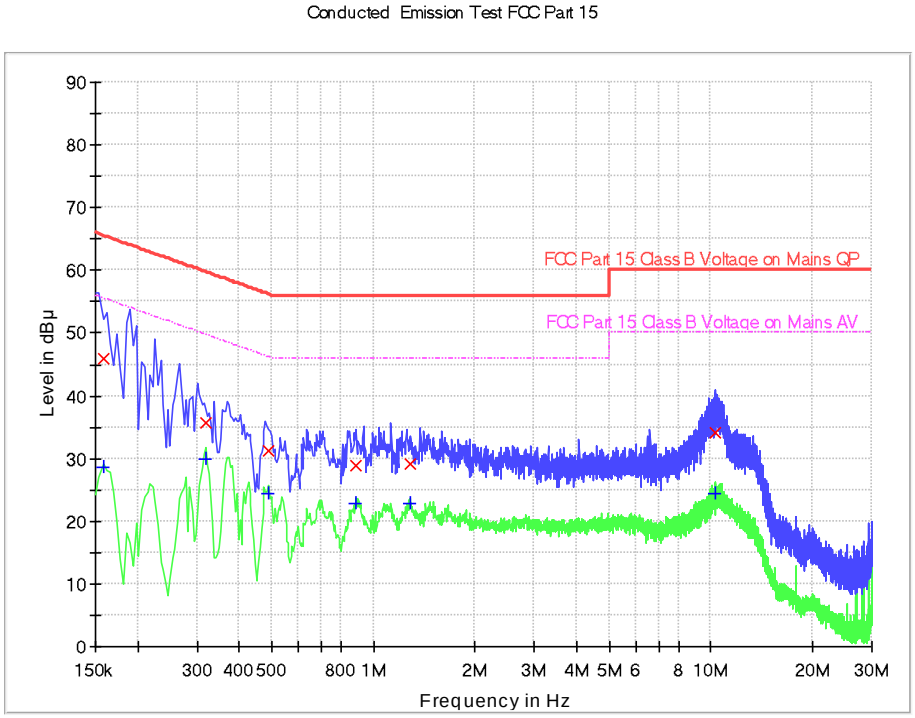
Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.158000	27.6	9.000	L1	9.6	28.0	55.6
0.306000	24.2	9.000	L1	9.6	25.8	50.1
0.374000	28.8	9.000	L1	9.6	19.7	48.4
0.498000	25.4	9.000	L1	9.6	20.6	46.0
0.958000	22.4	9.000	L1	9.7	23.6	46.0
10.582000	23.8	9.000	L1	10.0	26.2	50.0

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022
Model: K1JD
Worst Case and Operating Mode: BT Link
Test Voltage: AC 120V/60Hz
Phase: Neutral

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Result Table QP

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.158000	45.9	9.000	N	9.6	19.9	56.2
0.318000	35.6	9.000	N	9.6	29.3	56.0
0.490000	31.2	9.000	N	9.7	25.9	56.0
0.890000	28.8	9.000	N	9.7	25.9	56.0
1.282000	29.2	9.000	N	9.7	24.0	56.0
10.338000	34.2	9.000	N	10.1	33.3	60.0

Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.158000	28.5	9.000	N	9.6	27.1	55.6
0.318000	29.8	9.000	N	9.6	20.0	49.8
0.490000	24.4	9.000	N	9.6	21.8	46.2
0.890000	22.8	9.000	N	9.6	23.2	46.0
1.282000	22.9	9.000	N	9.6	23.1	46.0
10.338000	24.4	9.000	N	9.9	25.6	50.0

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022
Model: K1JD

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

[ ] Not required - No digital part

[ ] Test results are attached

[x] Included in the separated report.

Applicant: Robosen Robotics (ShenZhen) Co., Ltd.
Date of Test: 29 November 2022
Model: K1JD

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	2021-08-04	2024-08-04
SZ185-03	EMI Receiver	R&S	ESR7	101975	2021-12-20	2022-12-20
SZ061-08	Horn Antenna	ETS	3115	00092346	2021-09-05	2024-09-05
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2021-05-18	2023-05-18
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	2022-05-16	2023-05-16
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2021-12-20	2022-12-20
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	2022-05-16	2023-05-16
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2022-11-15	2023-05-15
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-15	2023-05-15
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-15	2023-05-15
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	2022-05-17	2023-05-17
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	2022-07-08	2023-07-08
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	2022-10-24	2023-10-24
SZ188-03	Shielding Room	ETS	RFD-100	4100	2020-01-07	2023-01-07

********** End of Report**********