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Hefei BOE Vision-electronic Technology Co.,Ltd.

TEST REPORT

SCOPE OF WORK
FCC TESTING–100146660, TBRED100146660, TBSIL100146660, TBGRY100146660, TBROS100146660

REPORT NUMBER
240530014SZN-002

ISSUE DATE	**[REVISED DATE]**
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TEST REPORT

Intertek Report No.: 240530014SZN-002

Hefei BOE Vision-electronic Technology Co.,Ltd.

Application
For
Certification

FCC ID: 2AYT5100146660

onn. 11 Tablet Pro

Model: 100146660,
TBRED100146660, TBSIL100146660, TBGRY100146660, TBROS100146660

2.4GHz Wi-Fi Transceiver

Report No.: 240530014SZN-002

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 [10-1-23]

Prepared and Checked by:

Bruce

Bruce Zheng
Project Engineer

Approved by:

Peter Kang

Peter Kang
Senior Technical Supervisor
Date: 22 July 2024

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MEASUREMENT/TECHNICAL REPORT

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

Equipment Type: DTS - Part 15 Digital Transmission Systems (transmitter portion)

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 [10-01-23] Edition] provision.

Report prepared by:

Bruce Zheng
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Table of Contents

1.0 Summary of Test results 4

2.0 General Description 5

2.1 Product Description 5
2.2 Related Submittal(s) Grants 5
2.3 Test Methodology 5
2.4 Test Facility 5

3.0 System Test Configuration 6

3.1 Justification 6
3.2 EUT Exercising Software 6
3.3 Special Accessories 6
3.4 Measurement Uncertainty 6
3.5 Equipment Modification 6
3.6 Support Equipment List and Description 7

4.0 Measurement Results 8

4.1 Maximum Conducted Output Power at Antenna Terminals 8
4.2 Minimum 6 dB RF Bandwidth 9
4.3 Maximum Power Density Reading 12
4.4 Out of Band Conducted Emissions 15
4.5 Out of Band Radiated Emissions 23
4.6 Transmitter Radiated Emissions in Restricted Bands 24
4.7 Field Strength Calculation 25
4.8 Radiated Spurious Emission 26
4.9 Conducted Emission 32
4.10 Radiated Emissions from Digital Section of Transceiver 35
4.11 Transmitter Duty Cycle Calculation and Measurements 36

5.0 Equipment Photographs 37

6.0 Product Labelling 37

7.0 Technical Specifications 37

8.0 Instruction Manual 37

9.0 Confidentiality Request 37

10.0 Discussion of Pulse Desensitization 37

11.0 Test Equipment List 38

1.0 Summary of Test results

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Applicant Address: NO.2177 Dongfang RD, Xinzhan General Pilot Zone, Hefei, Anhui, 230012, P.R.China
Manufacturer: Hefei BOE Vision-electronic Technology Co.,Ltd.
Manufacturer Address: NO.2177 Dongfang RD, Xinzhan General Pilot Zone, Hefei, Anhui, 230012, P.R.China

Model: 100146660
FCC ID: 2AYT5100146660

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 Monopole 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 onn. 11 Tablet Pro with Bluetooth 5.1 BLE function operating in 2402-2480MHz, 2.4G WIFI function operating in 2412-2462MHz and 5G WIFI function operating in 5150MHz~5250 MHz, 5250MHz~5350MHz, 5470MHz-5725MHZ, 5725MHz~5850MHz. The EUT is powered by battery DC 3.85V, 7500mAh, 28.88Wh, or charging by AC 100-240V, 50/60Hz. For more detailed features description, please refer to the user's manual.

Antenna Type: Monopole Antenna
Modulation Type: GFSK
Antenna Gain: -1.4dBi
Bluetooth Version: 5.1 BLE

The Model: TBRED100146660, TBSIL100146660, TBGRY100146660, TBROS100146660 are the same as the Model: 100146660 in hardware and electrical aspect. The difference in model number serves as packaging and marketing purpose only.

For the model of EUT cable, the Model: 8B47-4CS0002R-FG、8B47-4CS0003R-FG、8B47-4CS0004R-FG is the same as the Model: 8B47-4CS0001R-FG in hardware aspect. The difference in model number serves as shell colour, corresponding to different colours of EUT series models. Only the 8B47-4CS0001R-FG has used in the test.

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

2.2 Related Submittal(s) Grants

This is an application for certification of transceiver for the onn. 11 Tablet Pro which has BLE function.
For the classic Bluetooth (EDR) function was tested and demonstrated in report 240530014SZN-001.
For the 2.4GHz WIFI function was tested and demonstrated in report 240530014SZN-003.
For the 5GHz WIFI function was tested and demonstrated in report 240530014SZN-004.

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

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by battery DC 3.85V, 7500mAh, 28.88Wh, or charging by AC 100-240V, 50/60Hz during the test.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Section 4.

The EUT and transmitting antenna was centered on the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.
Software: QRCT v4.0

3.3 Special Accessories

N/A.

3.4 Measurement Uncertainty

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

3.5 Equipment Modification

Any modifications installed previous to testing by Hefei BOE Vision-electronic Technology 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.
AC Adapter (Provided by Applicant)	ASAP Technology(Jiangxi) Co., Ltd.	LACA271(Input:100-240V~,50/60Hz,0.5A;Output:5.0Vdc,3.0A or 9.0Vdc,2.22A)
C to C cable (Provided by Applicant)	Luxshare-ICT	8B47-4CS0001R-FG (0.915m length, shielded, without ferrite core)
SD card (provided by Intertek)	SanDisk	BE0934314559D (C10)

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 06 June 2024 Model: 100146660

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 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

Antenna Gain = -1.4dBi			
Modulation Type	Frequency (MHz)	Output Power (Peak Reading) (dBm)	Output Power (mW)
GFSK	2402	3.03	2.009
	2440	5.27	3.365
	2480	5.91	3.899

Cable loss: 0.5 dB External Attenuation: 0 dB

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 06 June 2024 Model: 100146660

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

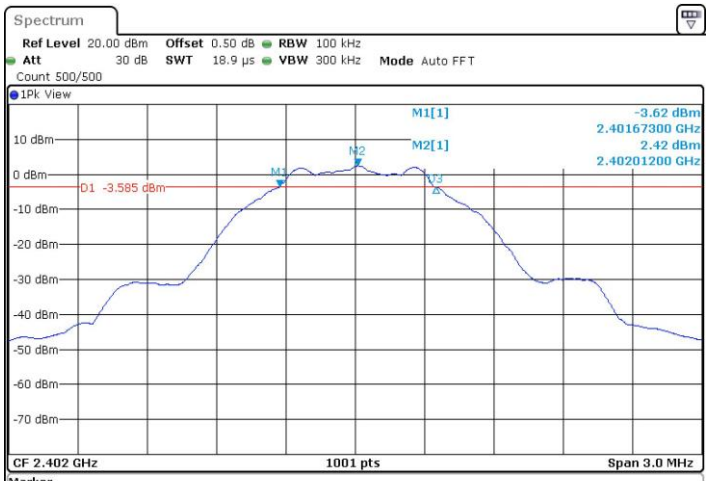
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v05r02. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a 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.

Modulation Type: GFSK

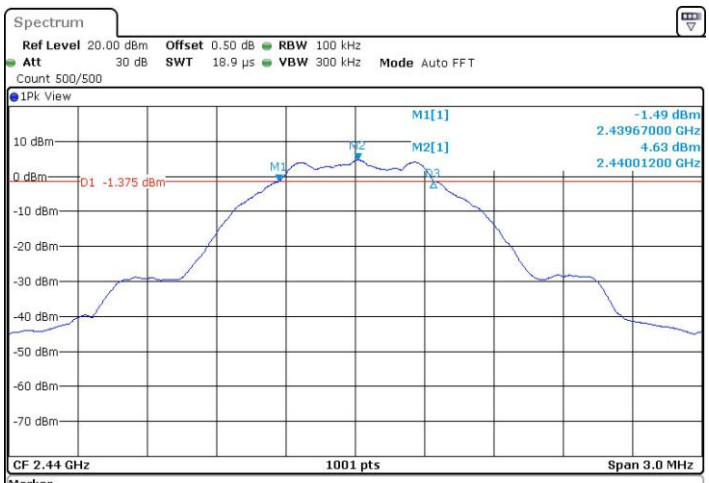
Frequency (MHz)	6 dB Bandwidth (MHz)
2402	0.675
2440	0.669
2480	0.669

The test plots are attached as below.



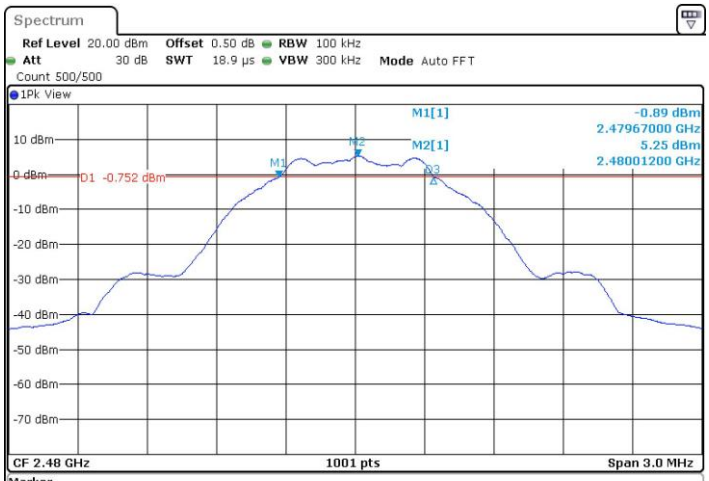
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.401673 GHz	-3.62 dBm		
M2		1	2.402012 GHz	2.42 dBm		
D3	M1	1	675.0 kHz	0.02 dB		



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43967 GHz	-1.49 dBm		
M2		1	2.440012 GHz	4.63 dBm		
D3	M1	1	669.0 kHz	0.11 dB		



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47967 GHz	-0.89 dBm		
M2		1	2.480012 GHz	5.25 dBm		
D3	M1	1	669.0 kHz	0.11 dB		

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 06 June 2024 Model: 100146660

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.

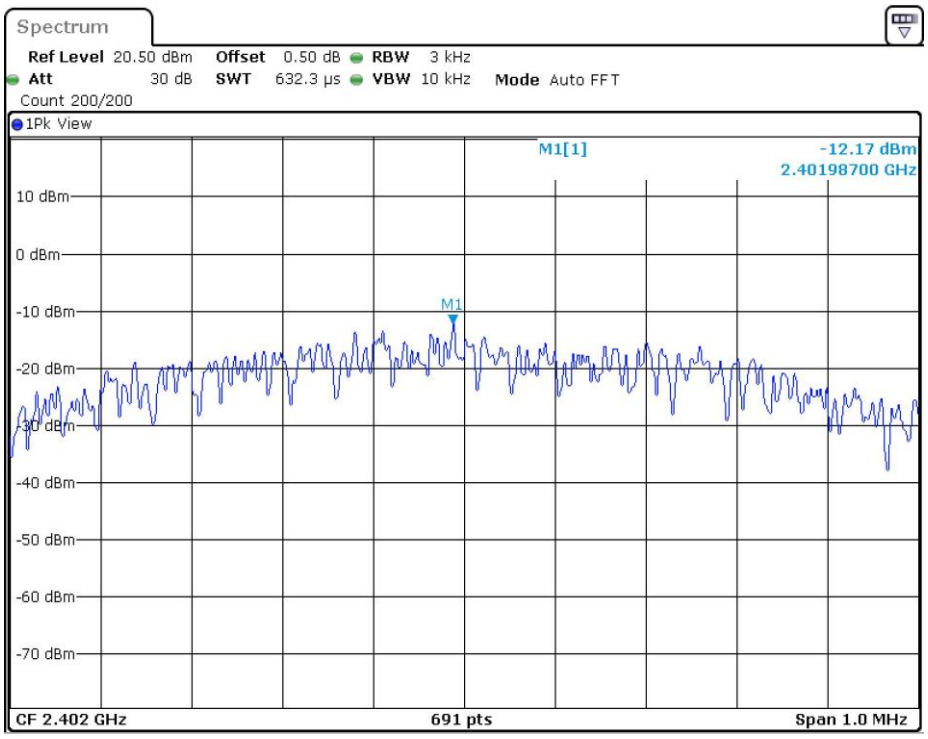
Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

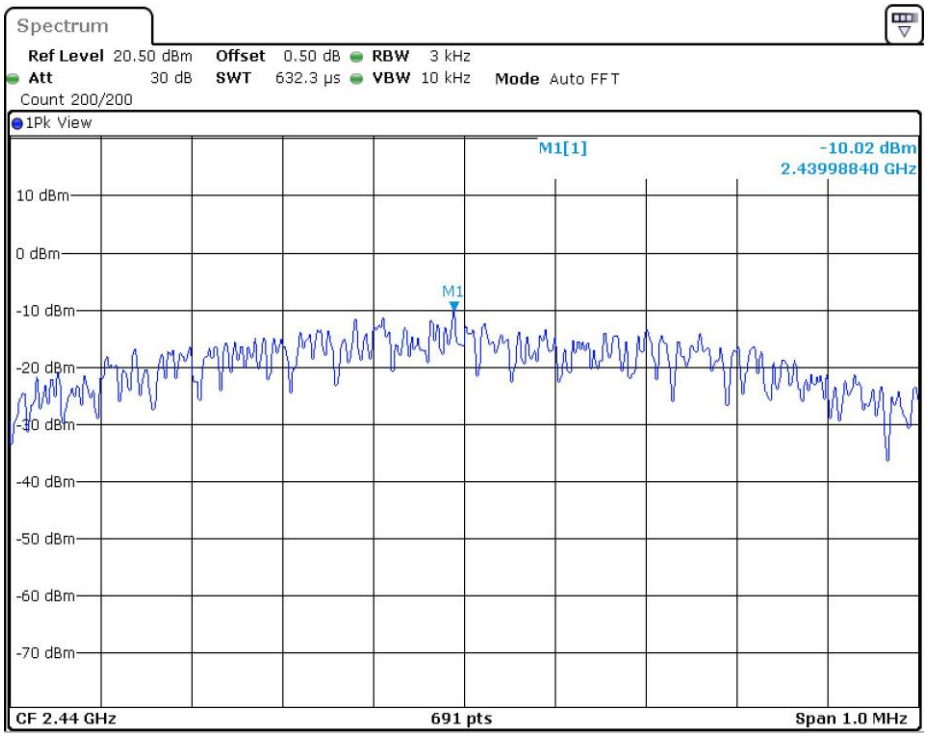
Limit: The Power Density does not exceed 8dBm/3 kHz.

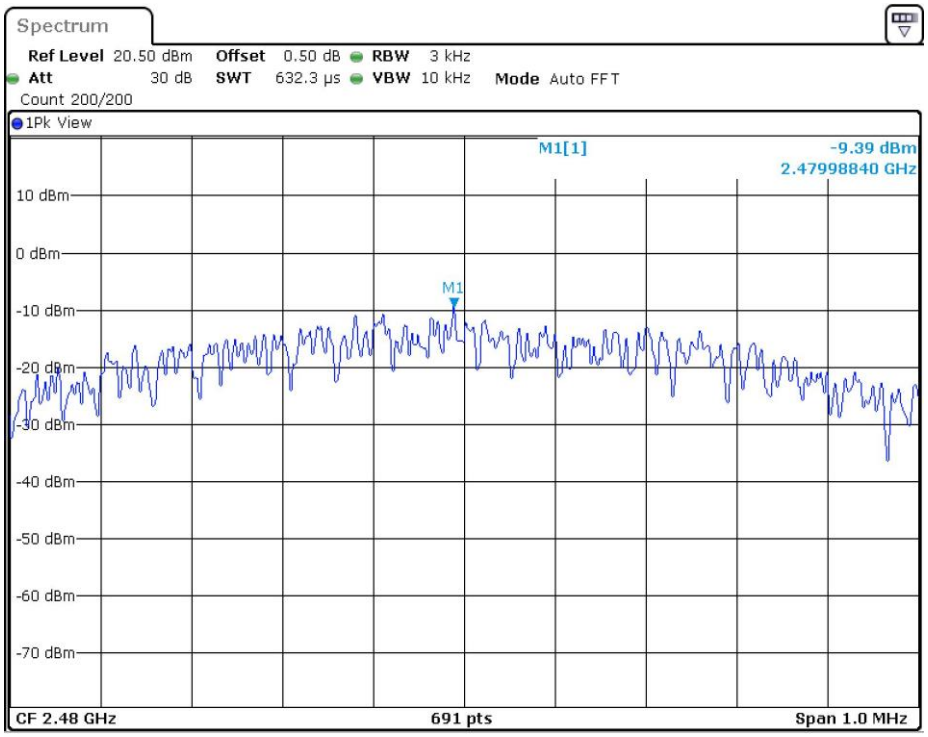
Modulation Type: GFSK

Frequency (MHz)	Power Density with RBW 3kHz
2402	-12.17
2440	-10.02
2480	-9.39

The test plots are attached as below.


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 632.3 µs VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -12.17 dBm
2.40198700 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.402 GHz
691 pts
Span 1.0 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 632.3 µs VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -10.02 dBm
2.43998840 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.44 GHz
691 pts
Span 1.0 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 632.3 µs VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -9.39 dBm
2.47998840 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.48 GHz
691 pts
Span 1.0 MHz

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 06 June 2024 Model: 100146660

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.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

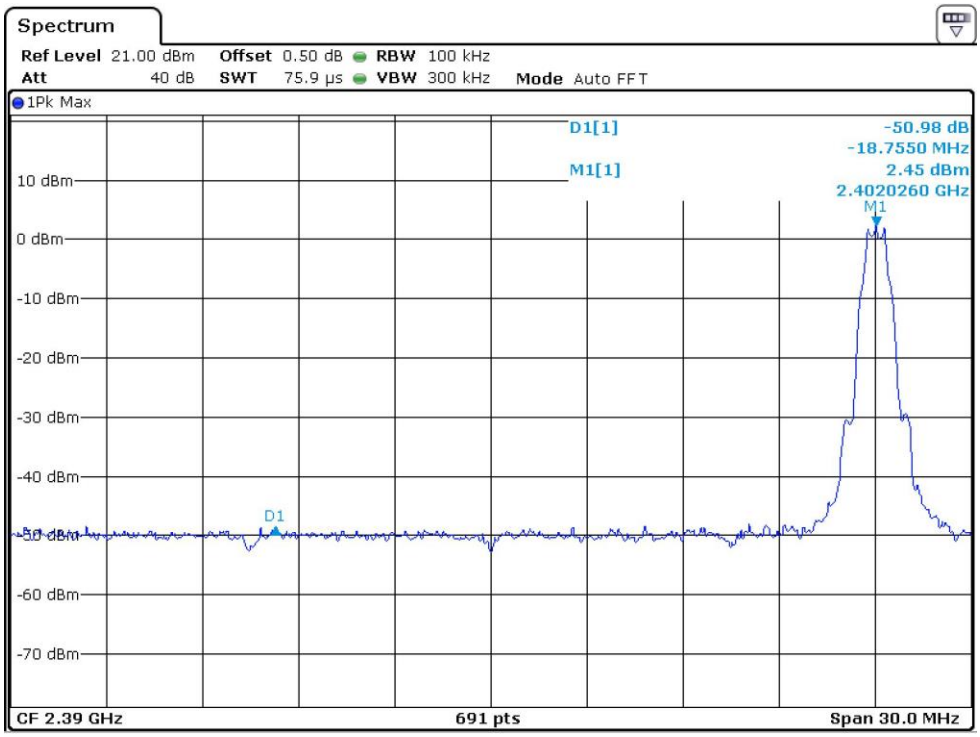
Refer to the attached test plots for out of band conducted emissions data .

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.

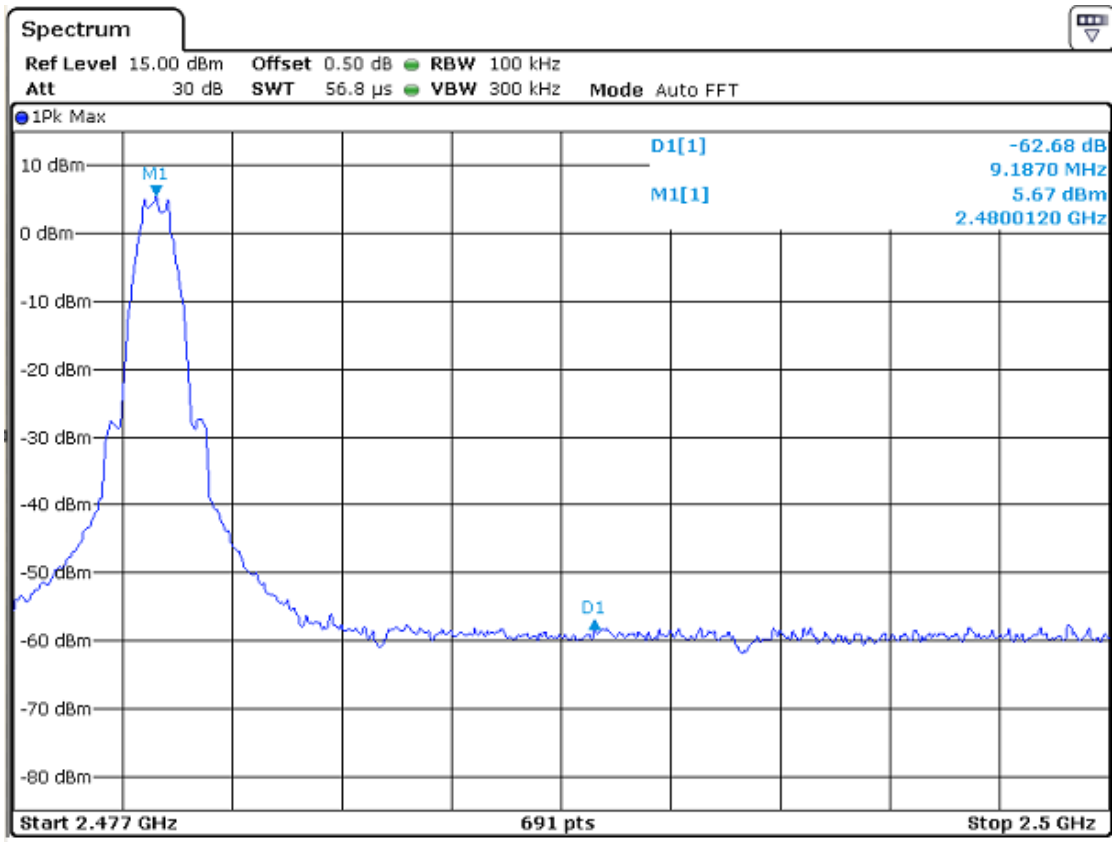
The test plots are attached as below.

Band edge measurements

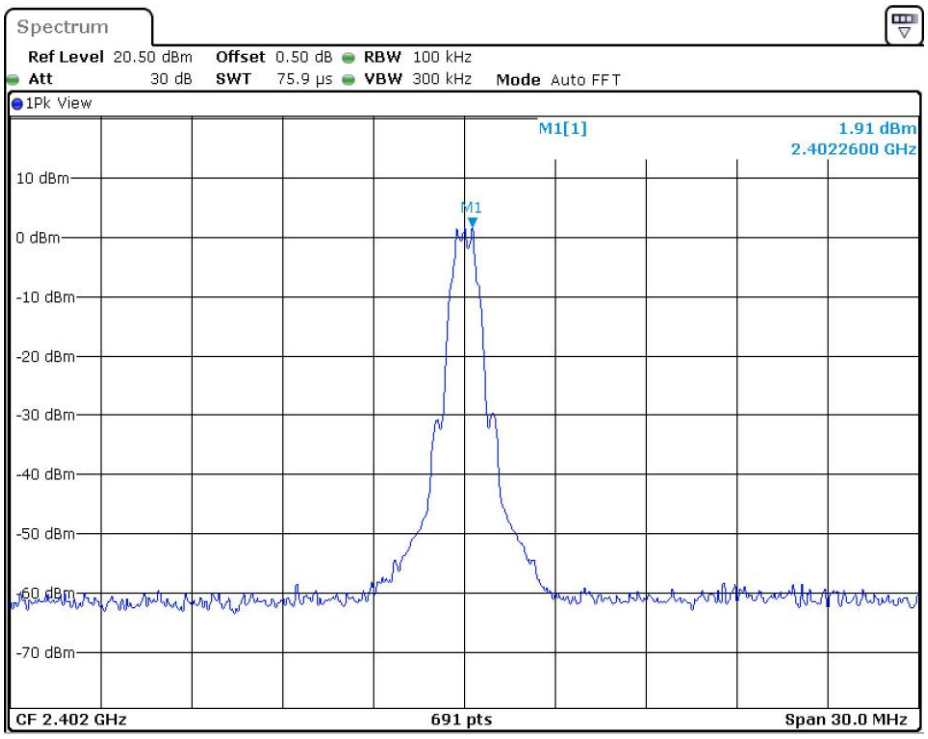
2402MHz:

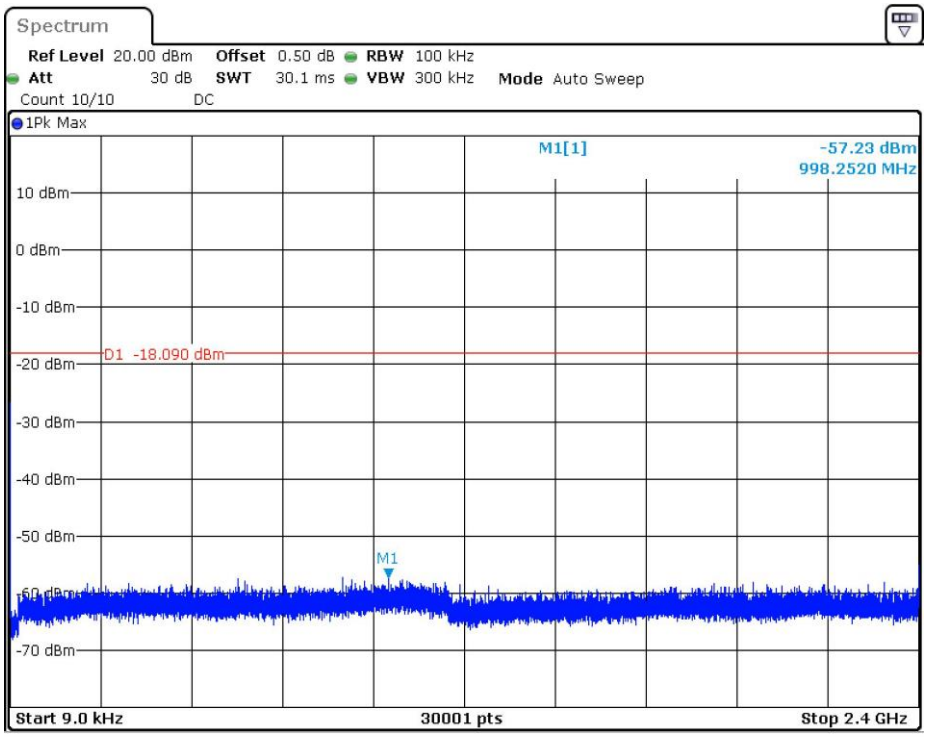


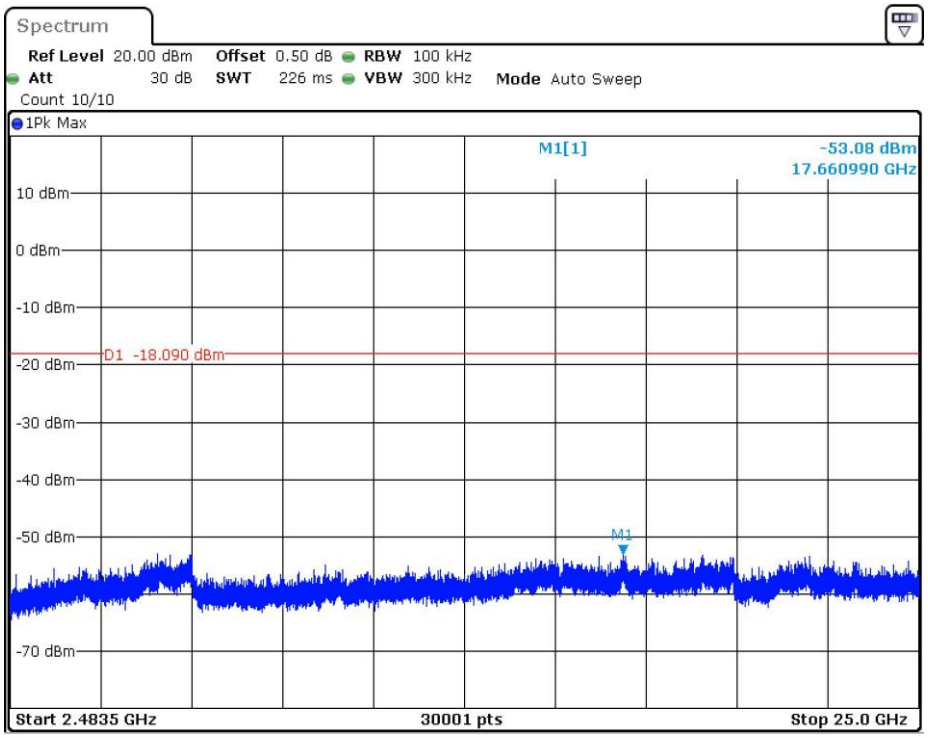
2480MHz:


Spectrum
Ref Level 15.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 56.8 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -62.68 dB
9.1870 MHz
M1[1] 5.67 dBm
2.4800120 GHz
M1
D1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Start 2.477 GHz
691 pts
Stop 2.5 GHz

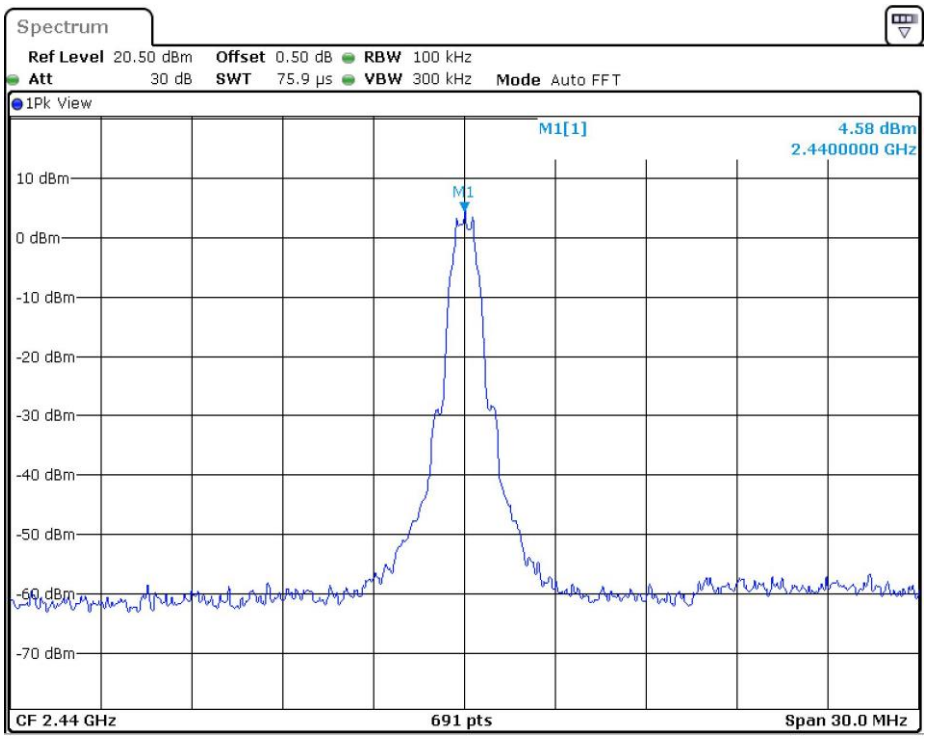
2402MHz: Reference Level: 1.91dBm

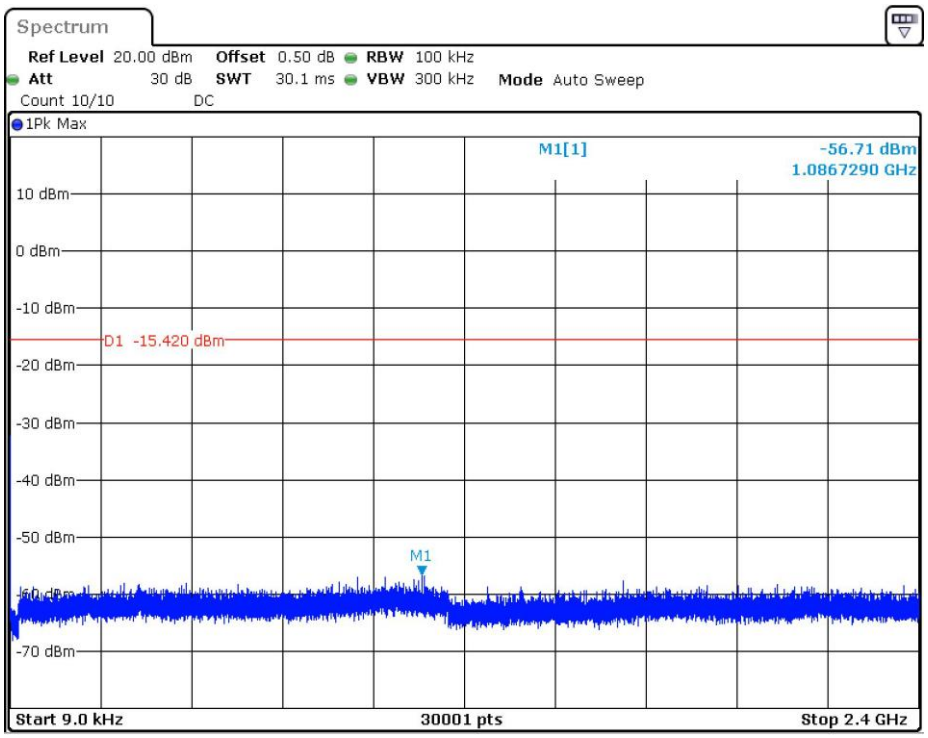


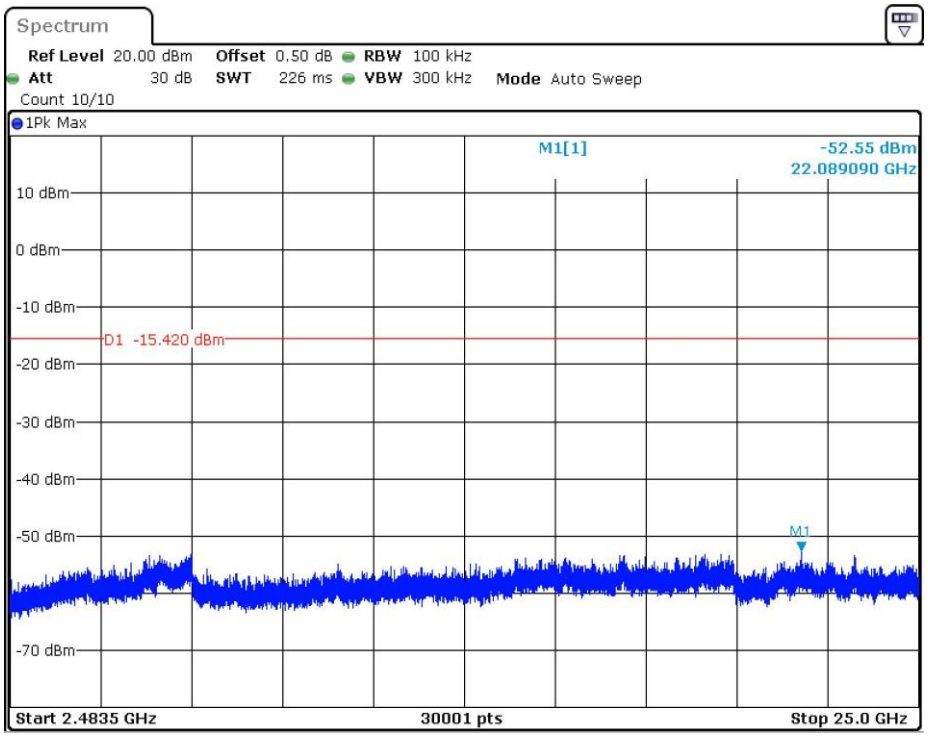



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -53.08 dBm
17.660990 GHz
10 dBm
0 dBm
-10 dBm
D1 -18.090 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

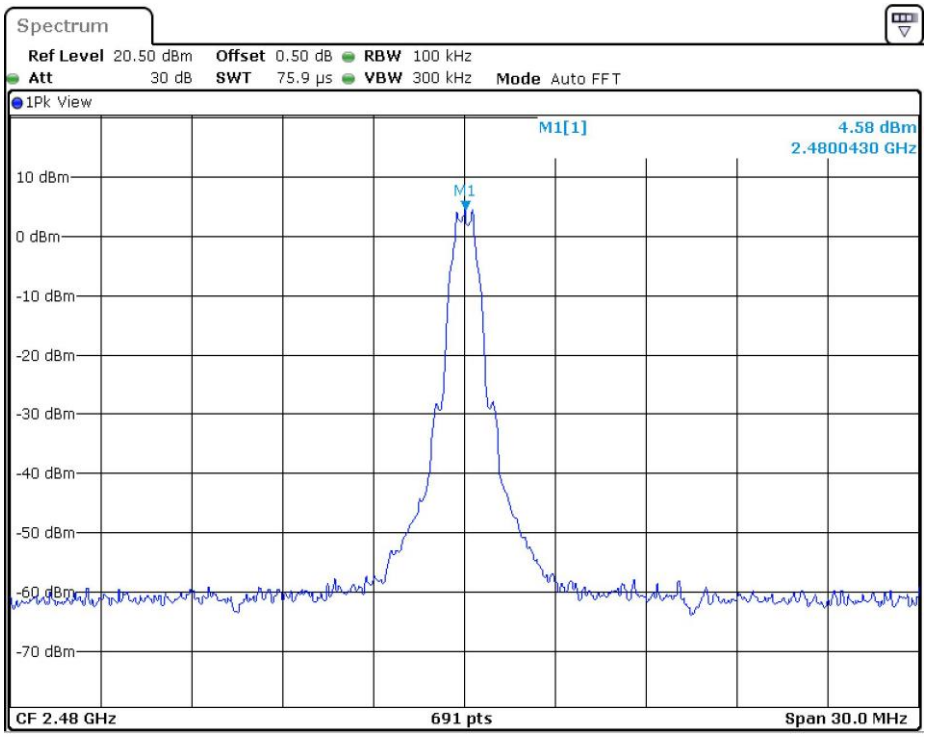
2440MHz: Reference Level: 4.58dBm

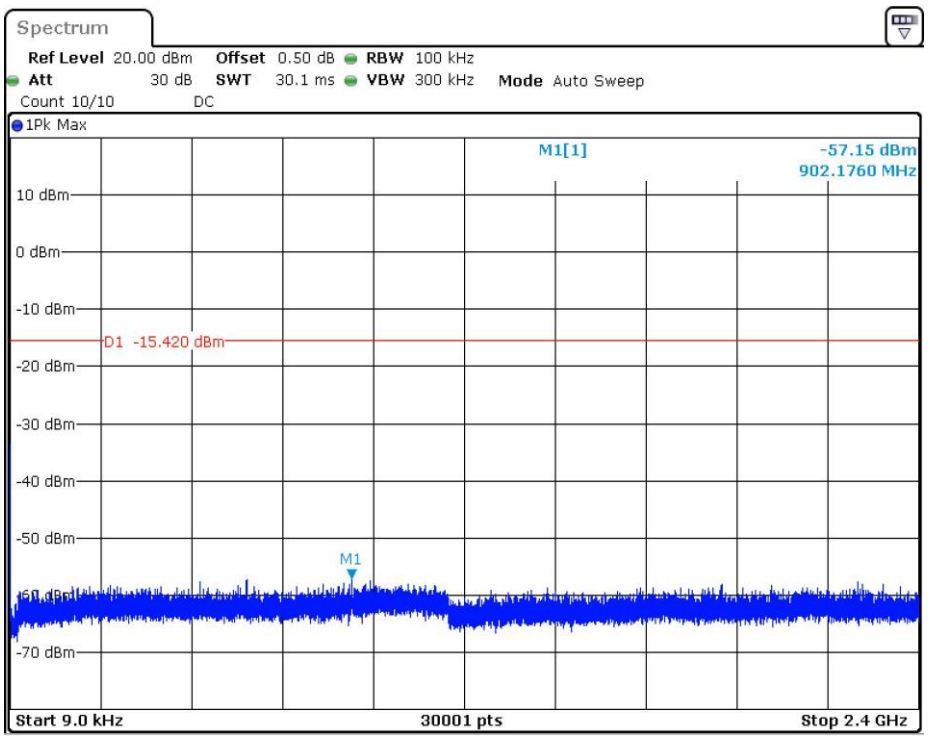


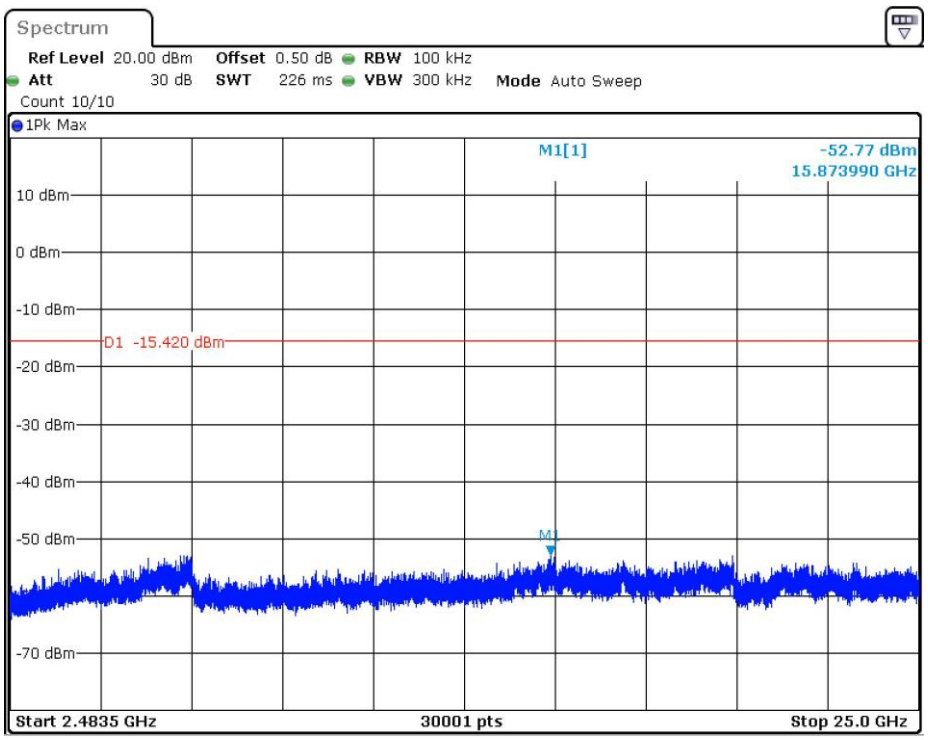



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.55 dBm
22.089090 GHz
10 dBm
0 dBm
-10 dBm
D1 -15.420 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

2480MHz: Reference Level: 4.58dBm






Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.77 dBm
15.873990 GHz
10 dBm
0 dBm
-10 dBm
D1 -15.420 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: N/A Model: 100146660

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

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.

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660

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

<u>Example</u>
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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660

4.8 Radiated Spurious Emission

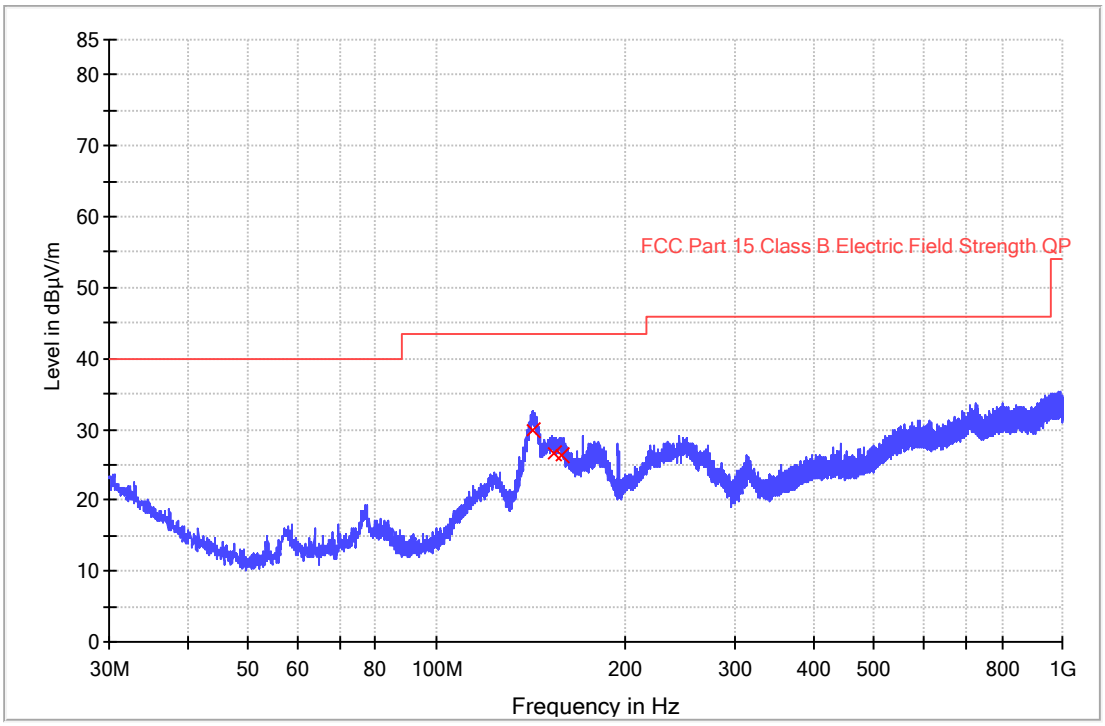
Worst Case Radiated Spurious Emission
at 7440MHz
is passed by 5.5dB margin.

Synchronous transmission has been considered, only the worst case data is represented in the report.

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

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660
Worst Case Operating Mode: Synchronous transmission (BLE+5G WiFi)

ANT Polarity: Horizontal

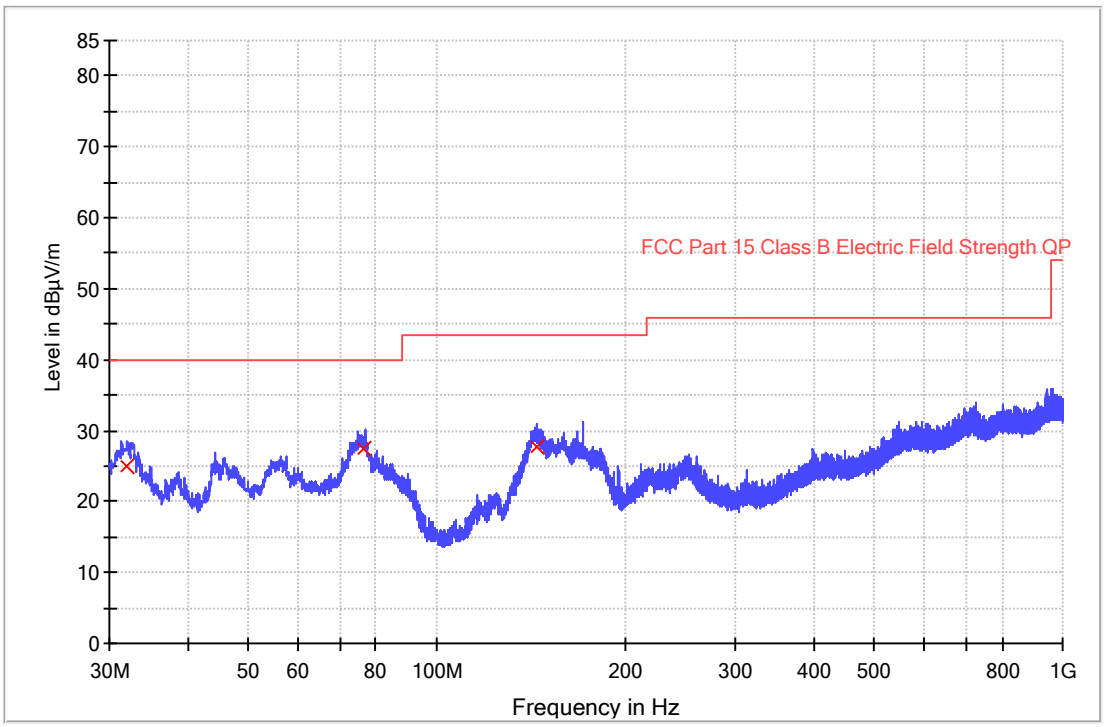


Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
142.875667	29.8	1000.0	120.000	H	15.6	13.7	43.5
154.418667	26.7	1000.0	120.000	H	16.7	16.8	43.5
158.040000	26.4	1000.0	120.000	H	17.0	17.1	43.5

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

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660
Worst Case Operating Mode: Synchronous transmission (BLE+5G WiFi)

ANT Polarity: Vertical



Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
31.972333	25.0	1000.0	120.000	V	21.9	15.0	40.0
76.592333	27.4	1000.0	120.000	V	13.8	12.6	40.0
144.589333	27.8	1000.0	120.000	V	15.8	15.7	43.5

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

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660
Worst Case Operating Mode: Transmitting (BLE 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	49.5	36.8	33.5	46.2	74.0	-27.8
Horizontal	*2390.000	66.2	36.4	29.1	58.9	74.0	-15.1

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	*4824.000	43.4	36.8	33.5	40.1	54.0	-13.9
Horizontal	*2390.000	55.1	36.4	29.1	47.8	54.0	-6.2

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660
Worst Case Operating Mode: Transmitting (BLE 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	50.8	36.7	33.4	47.5	74.0	-26.5
Horizontal	*7320.000	54.7	36.6	35.8	53.9	74.0	-20.1

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	43.1	36.7	33.4	39.8	54.0	-14.2
Horizontal	*7320.000	47.8	36.6	35.8	47.0	54.0	-7.0

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 08 June 2024 Model: 100146660
Worst Case Operating Mode: Transmitting (BLE 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	53.6	36.8	33.3	50.1	74.0	-23.9
Horizontal	*7440.000	63.6	36.5	29.3	56.4	74.0	-17.6

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	*4960.000	45.8	36.8	33.3	42.3	54.0	-11.7
Horizontal	*7440.000	55.7	36.5	29.3	48.5	54.0	-5.5

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 05 June 2024
Model: 100146660

4.9 Conducted Emission

Worst Case Conducted Emission
at 0.65MHz
is passed by 6.3dB margin.

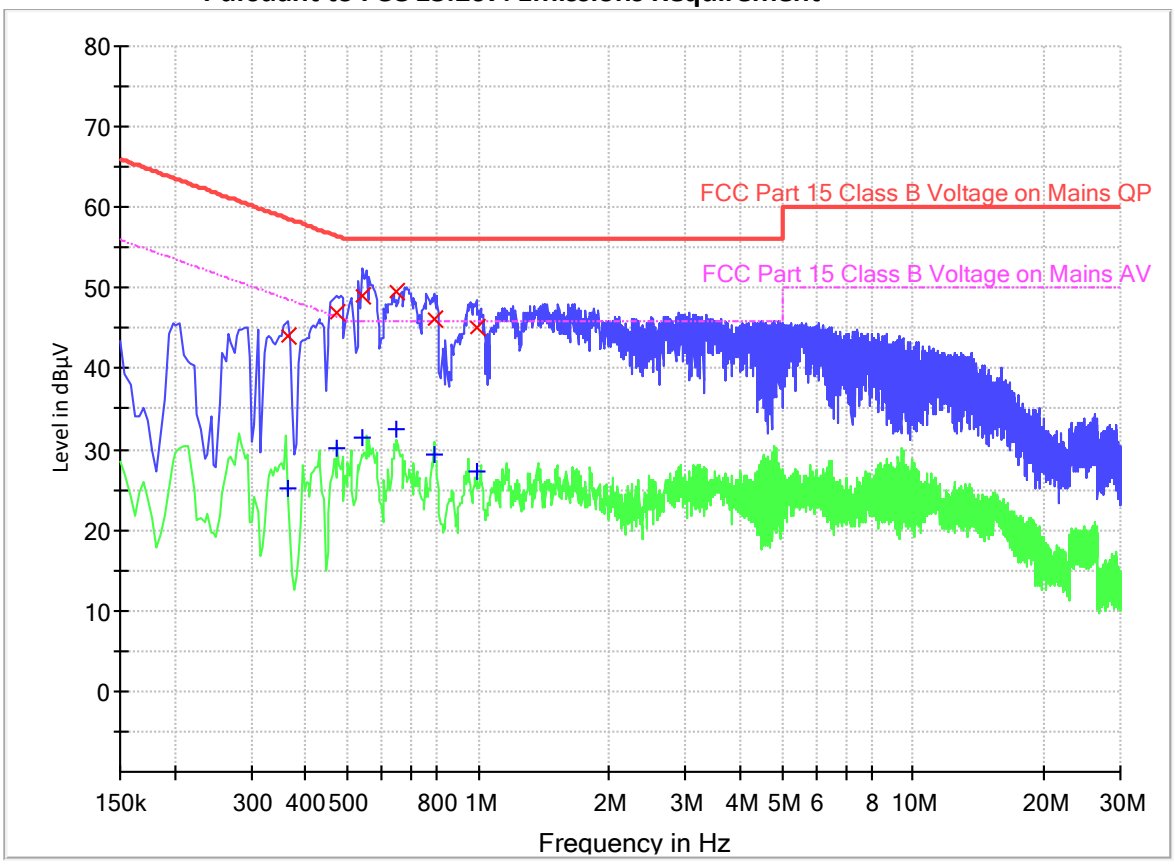
Synchronous transmission has been considered, only the worst case data is represented in the report.

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

Date of Test: 05 June 2024
Model: 100146660
Worst Case Operating Mode: Charging + Synchronous transmission (BLE+5G WiFi)
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.366000	44.0	9.000	L1	9.6	14.6	58.6
0.474000	47.0	9.000	L1	9.6	9.4	56.4
0.542000	49.1	9.000	L1	9.6	6.9	56.0
0.650000	49.7	9.000	L1	9.6	6.3	56.0
0.790000	46.2	9.000	L1	9.6	9.8	56.0
0.990000	45.1	9.000	L1	9.6	10.9	56.0

Limit and Margin AV

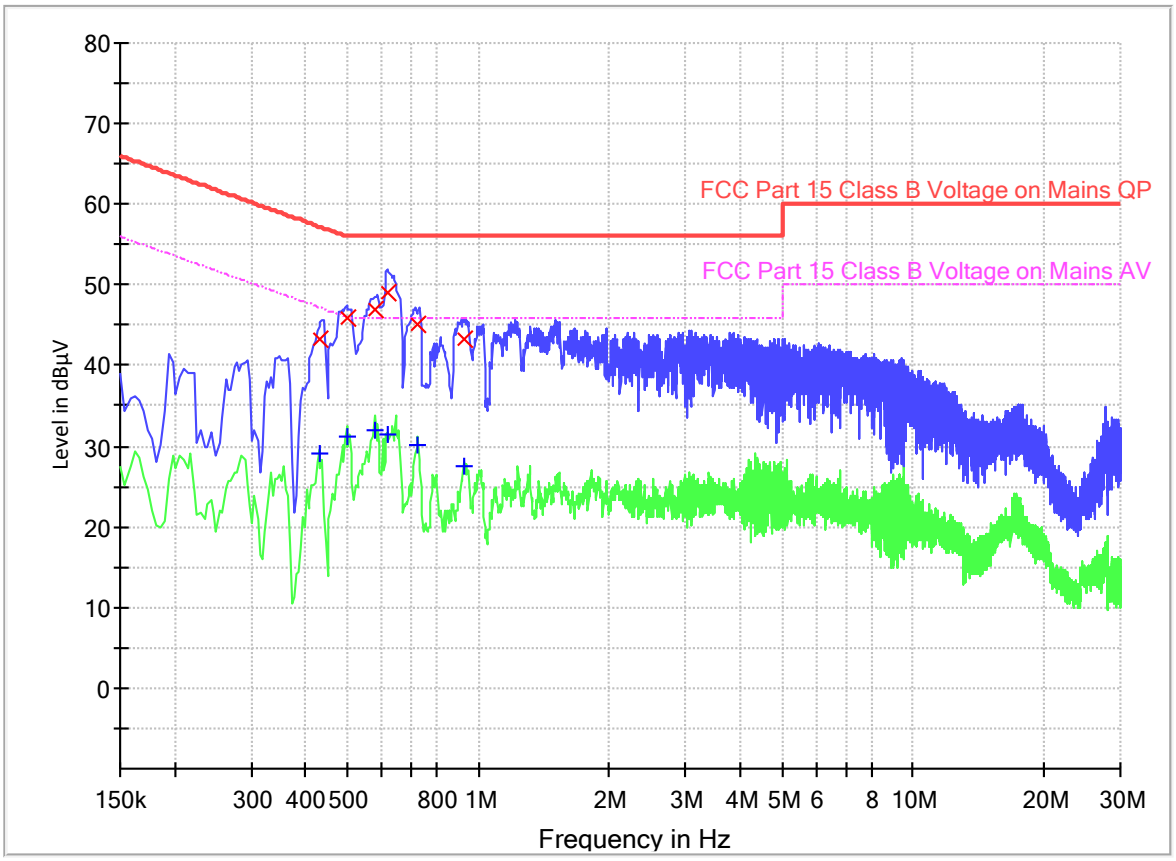
Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.366000	25.1	9.000	L1	9.6	23.5	48.6
0.474000	30.1	9.000	L1	9.6	16.3	46.4
0.542000	31.5	9.000	L1	9.6	14.5	46.0
0.650000	32.6	9.000	L1	9.6	13.4	46.0
0.790000	29.4	9.000	L1	9.6	16.6	46.0
0.990000	27.1	9.000	L1	9.6	18.9	46.0

Date of Test: 05 June 2024
Model: 100146660
Worst Case Operating Mode: Charging + Transmitting(2402MHz)
Phase: Neutral

Graphic / Data Table

Conducted Emissions

Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.430000	43.2	9.000	N	9.6	14.1	57.3
0.498000	45.8	9.000	N	9.6	10.2	56.0
0.578000	46.9	9.000	N	9.6	9.1	56.0
0.618000	49.2	9.000	N	9.6	6.8	56.0
0.726000	45.2	9.000	N	9.6	10.8	56.0
0.926000	43.4	9.000	N	9.6	12.6	56.0

Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.430000	29.0	9.000	N	9.6	18.3	47.3
0.498000	31.1	9.000	N	9.6	14.9	46.0
0.578000	32.1	9.000	N	9.6	13.9	46.0
0.618000	31.3	9.000	N	9.6	14.7	46.0
0.726000	30.1	9.000	N	9.6	15.9	46.0
0.926000	27.4	9.000	N	9.6	18.6	46.0

Date of Test: 11 June 2024
Model: 100146660

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: N/A
Model: 100146660

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
SZ061-09	Double-Ridged Waveguide Horn Antenna	ETS	3115	00092347	2022-10-14	2025-10-14
SZ185-02	EMI Receiver	R&S	ESCI	100692	2023-07-11	2024-07-11
SZ061-08	Horn Antenna	ETS	3115	00092346	2021-09-05	2024-09-05
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2024-05-05	2027-05-05
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	2024-04-22	2025-04-22
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2023-12-13	2024-12-13
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	2024-04-22	2025-04-22
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2024-05-01	2024-11-01
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2024-05-01	2024-11-01
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2024-05-01	2024-11-01
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	2024-04-23	2025-04-23
SZ185-03	EMI Test Receiver	R&S	ESR7	101975	2024-04-23	2025-04-23
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	2023-10-18	2024-10-18
SZ188-03	Shielding Room	ETS	RFD-100	4100	2022-12-20	2025-12-20

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