2/F., Garment Centre,
576 Castle Peak Road, Kowloon,
Hong Kong.

Telephone: (852) 2173 8888
Facsimile: (852) 2785 5487
www.intertek.com

TEST REPORT

Report Number: 22120988HKG-002

Application for Original Grant of 47 CFR Part 15 Certification

Single New Application of RSS-247 Issue 2 Equipment

This report contains the data of 2.4GHz wireless portion only.

FCC ID: 2AVPR-4533

IC: 25872-4533C

Prepared and Checked by:	**Approved by:**
Signed On File Wong Cheuk Ho, Herbert Assistant Supervisor	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Limited Wong Kwok Yeung, Kenneth Assistant Manager Date: September 04, 2023

TEST REPORT

GENERAL INFORMATION

Applicant Name:	Nacon (HK) Limited
Applicant Address:	17/F. 148 Electric Road,North Point, Hong Kong
FCC Specification Standard:	FCC Part 15, October 1, 2021 Edition
FCC ID:	2AVPR-4533
FCC Model(s):	NC4533
IC Specification Standard:	RSS-247 Issue 2, February 2017 RSS-Gen Issue 5 Amendment 2, February 2021
IC:	25872-4533C
HVIN:	4533C
PMN:	NC4533
Type of EUT:	Spread Spectrum Transmitter
Description of EUT:	Revolution 5 PRO (Controller)
Sample Receipt Date:	July 28, 2023
Date of Test:	July 31, 2023 to August 08, 2023
Report Date:	September 04, 2023
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 / RSS-247 Issue 2 Certification.

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TEST REPORT

1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	RSS-247/ RSS-Gen# Section	Results	Details See Section
Antenna Requirement	15.203	7.1.2#	Pass	2.1
Max. Conducted Output Power (Peak)	15.247(b)(3)&(4)	5.4(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	5.2(1)	Pass	4.2
Max. Power Density (average)	15.247(e)	5.2(2)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	5.5	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	5.5	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	N/A	4.7

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2021 Edition
RSS-247 Issue 2, February 2017
RSS-Gen Issue 5 Amendment 2, February 2021

TEST REPORT

2.0 GENERAL DESCRIPTION

2.1 Product Description

The Equipment Under Test (EUT) (NC4533) is a composite device which consists of 2.4GHz wireless and Bluetooth 3.0 functions.

The 2.4GHz wireless portion is using two antenna with frequency range between 2402MHz and 2479MHz.

The EUT is powered by DC 3.7V internal rechargeable battery.

The antenna(s) used in the EUT is internal, integral, and the test sample is a prototype.
Peak Antenna Gain = 3.03 dBi (Antenna 1 of 2.4GHz wireless portion)
Peak Antenna Gain = 2.64 dBi (Antenna 2 of 2.4GHz wireless portion)

This report contains the data of 2.4GHz wireless portion only.

The circuit description is saved with filename: descri.pdf.

TEST REPORT

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v05r02 (02-April-2019) All other measurements were made in accordance with the procedures in 47 CFR Part 2 and RSS-Gen Issue 5 Amendment 2, February 2021.

2.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Shenzhen UnionTrust Quality and Technology Co., Ltd. at 16/F., Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109. This test facility and site measurement data have been fully placed on file with the FCC and Industry Canada No.: 21600, CABID “HKAP01”, “CN0023”.

2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (2.4GHz wireless portion only).

TEST REPORT

3.0 SYSTEM TEST CONFIGURATION

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by fully charged DC 3.7V internal rechargeable battery during test.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from 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.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209 / RSS-247 2.5. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 / RSS-247 Section 5.5 Limits.

TEST REPORT

3.1 Justification – Cont'd

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.8.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 3MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

Different data rates have been tested. Worst case is reported only.

All relevant operation modes have been tested, and the worst-case data is included in this report.

For simultaneous transmission, both 2.4GHz wireless and Bluetooth 3.0 portions are also switched on when taking radiated emission for determining worst-case spurious emission.

3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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3.3 Details of EUT and Description of Accessories

N/A

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty for conducted emission test is ±4.2dB.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

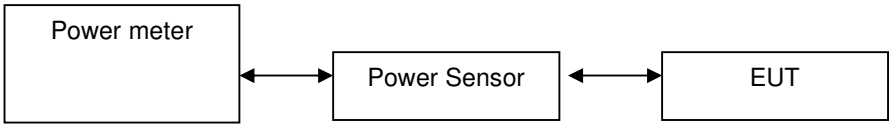
TEST REPORT

4.0 TEST RESULTS

4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

RF Conduct Measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



The antenna port of the EUT was connected to the input of a spectrum analyzer.

☒ The antenna port the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to the obtain power at the EUT antenna terminals. The measurement procedure 9.1.2 was used.

☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

Ant1:

Antenna Gain = 3.03 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2402	5.75	3.8
Middle Channel:	2440	5.95	3.9
High Channel:	2479	5.92	3.9

Ant2:

Antenna Gain = 2.64 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2402	4.80	3.0
Middle Channel:	2440	4.94	3.1
High Channel:	2479	4.97	3.1

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

Max. conducted (peak) output level = 5.95 dBm (Ant 1)
Max. conducted (peak) output level = 4.97 dBm (Ant 2)

Tested by: Rain Wang

TEST REPORT

Limits:

☒ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___W (___dBm) for antennas with gains more than 6dBi

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4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Ant1:

	Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel:	2402	1.373
Middle Channel:	2440	1.344
High Channel:	2479	1.409

Ant2:

	Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel:	2402	1.334
Middle Channel:	2440	1.392
High Channel:	2479	1.412

Limits
6 dB bandwidth shall be at least 500kHz

Tested by: Rain Wang

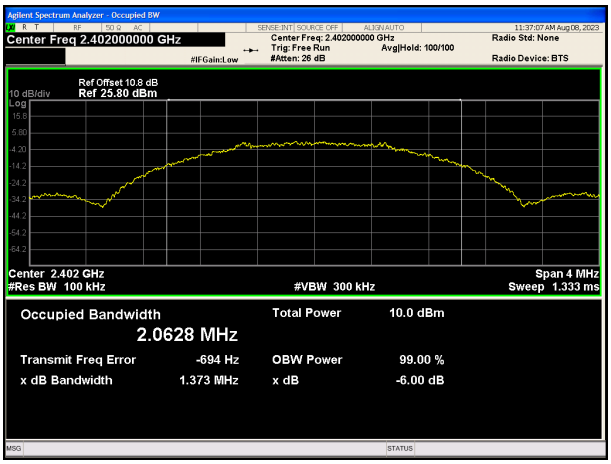
The plots of 6dB RF bandwidth are saved as below.

TEST REPORT

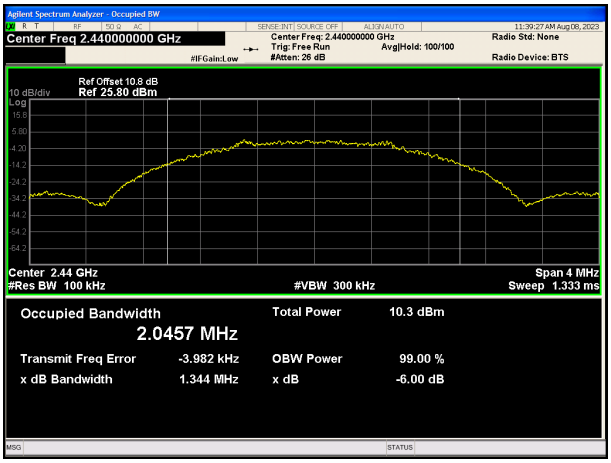
PLOTS OF 6dB RF BANDWIDTH

Ant1:

Lowest Channel



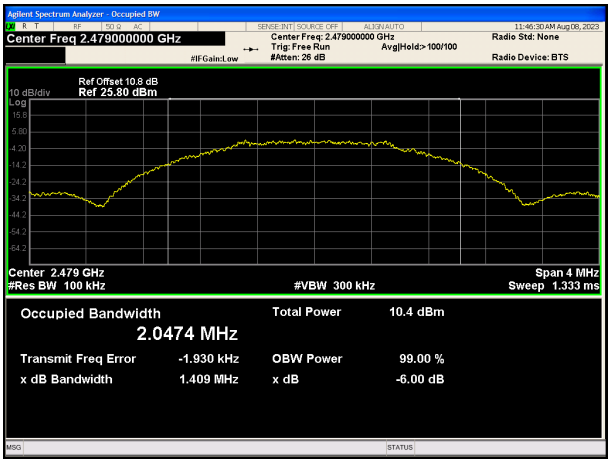
Middle Channel



TEST REPORT

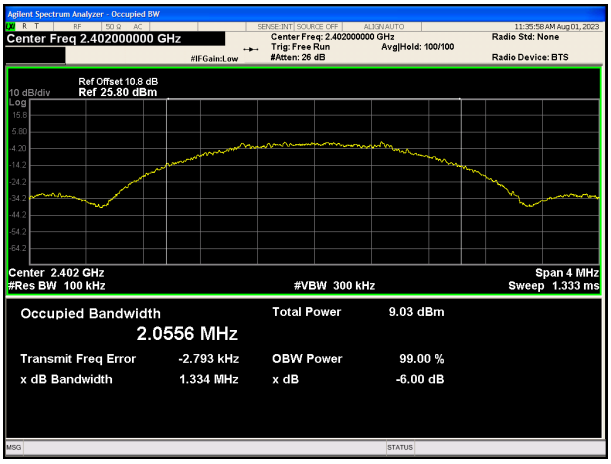
PLOTS OF 6dB RF BANDWIDTH

Highest Channel



Ant2:

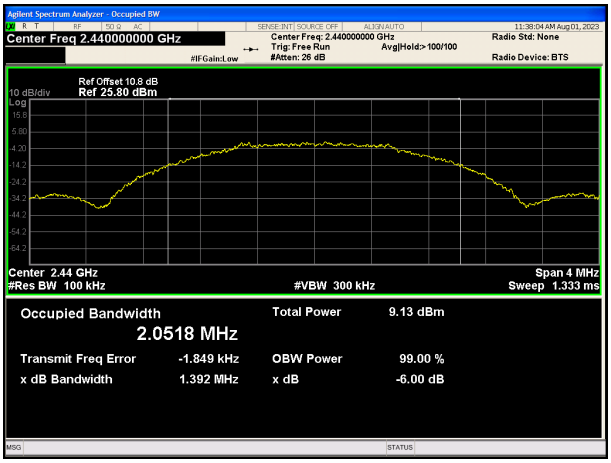
Lowest Channel



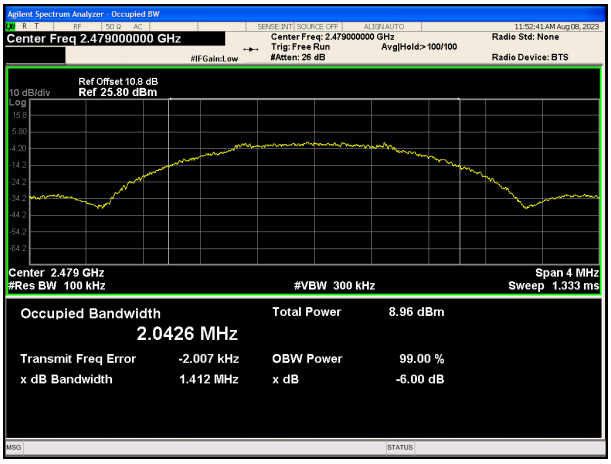
TEST REPORT

PLOTS OF 6dB RF BANDWIDTH

Middle Channel



Highest Channel



TEST REPORT

4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

Ant1:

Frequency (MHz)		PSD in 3kHz (dBm)
Low Channel:	2402	-10.864
Middle Channel:	2440	-9.911
High Channel:	2479	-10.166

Ant2:

Frequency (MHz)		PSD in 3kHz (dBm)
Low Channel:	2402	-12.493
Middle Channel:	2440	-12.812
High Channel:	2479	-13.215

Cable Loss: 0.5 dB

Limit:
8dBm

Tested by: Rain Wang

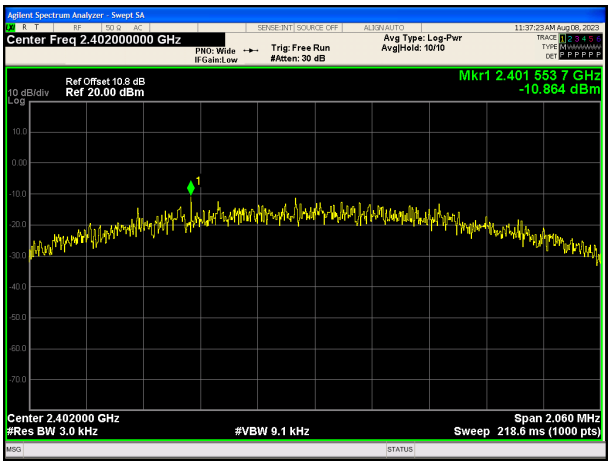
The plots of power spectral density are as below.

TEST REPORT

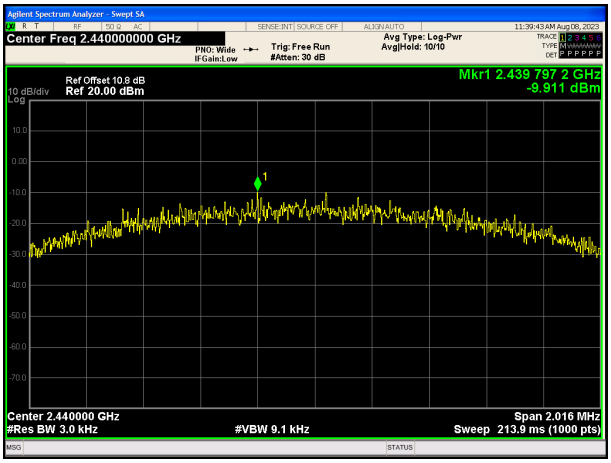
PLOTS OF POWER SPECTRAL DENSITY

Ant1：

Lowest channel



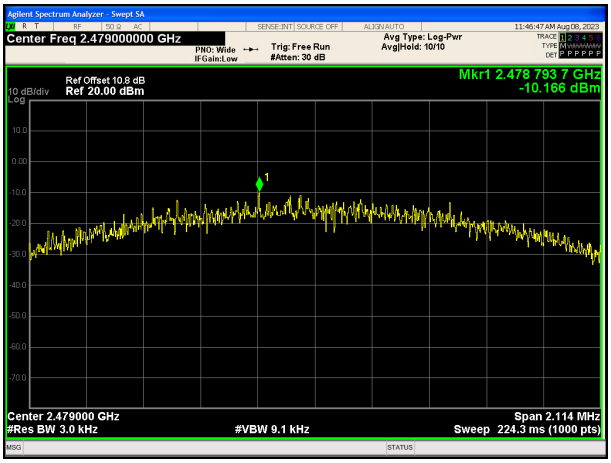
Middle channel



TEST REPORT

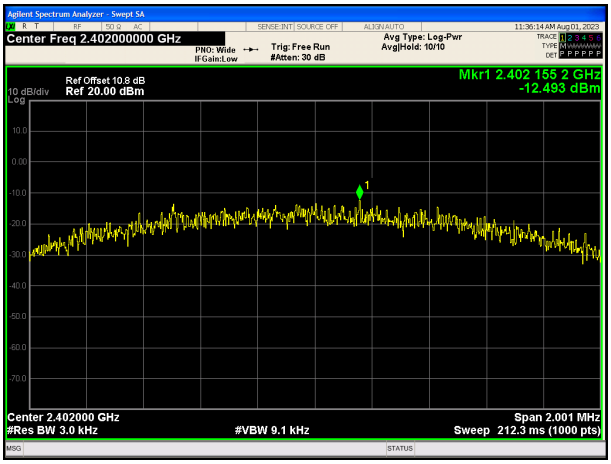
PLOTS OF POWER SPECTRAL DENSITY

Highest channel



Ant2：

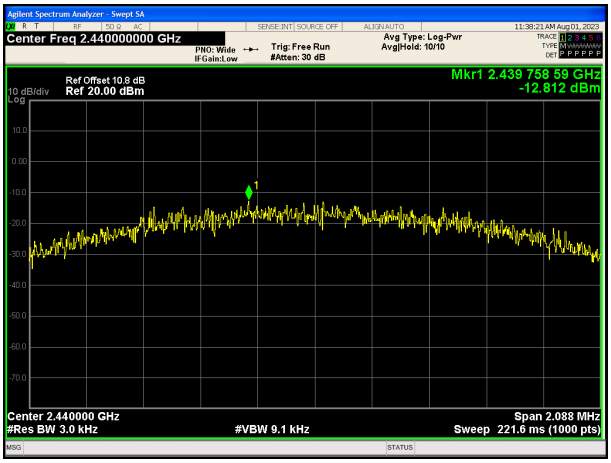
Lowest channel



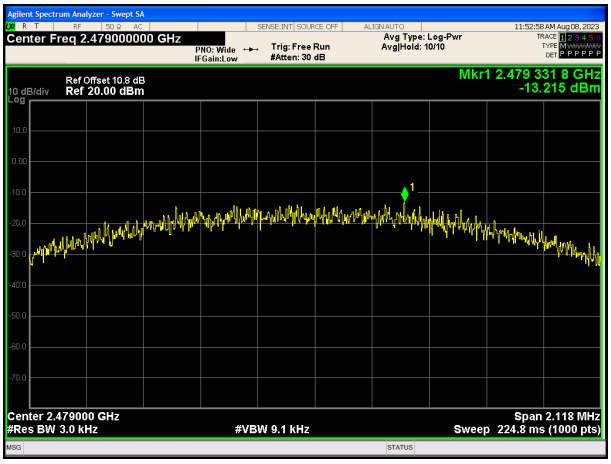
TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY

Middle channel



Highest channel



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4.4 Out of Band Conducted Emissions

For 2.4GHz wireless portion, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for 2.4GHz wireless portion.

The measurement procedures under sections 11 of KDB558074 D01 v05r01 (11-February-2019) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

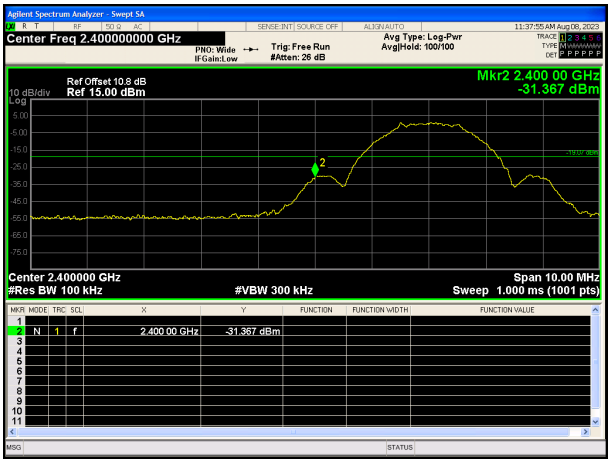
Limits:
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the maximum measured in-band peak PSD level for 2.4GHz wireless portion.

Tested by: Rain Wang

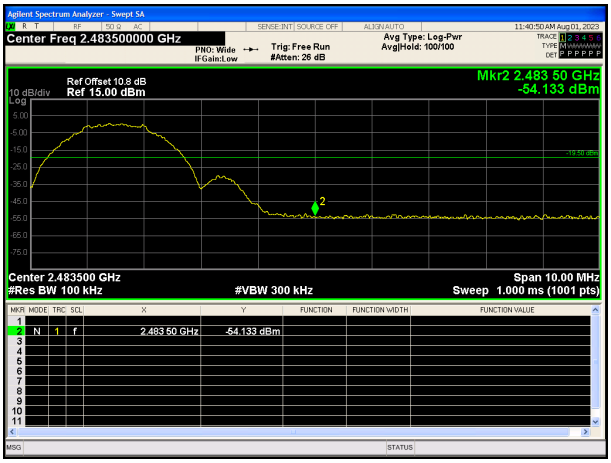
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 1)

Lowest Channel, Bandedge



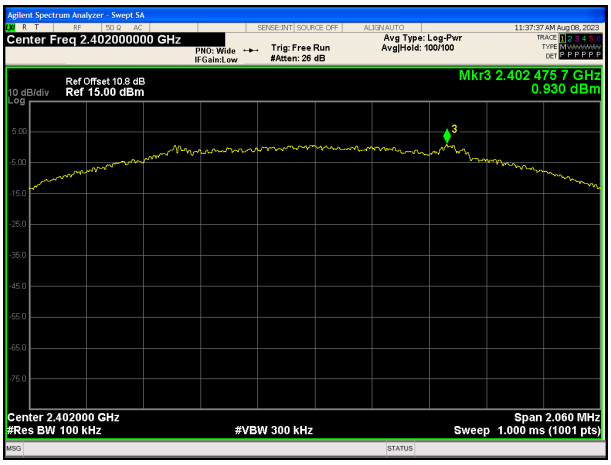
Highest Channel, Bandedge



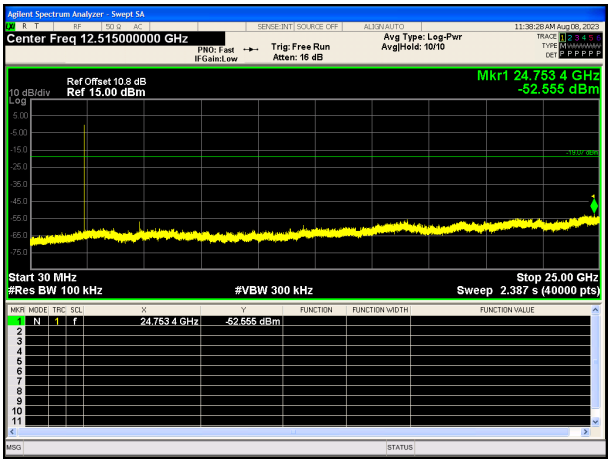
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 1)

Lowest Channel, Plot A



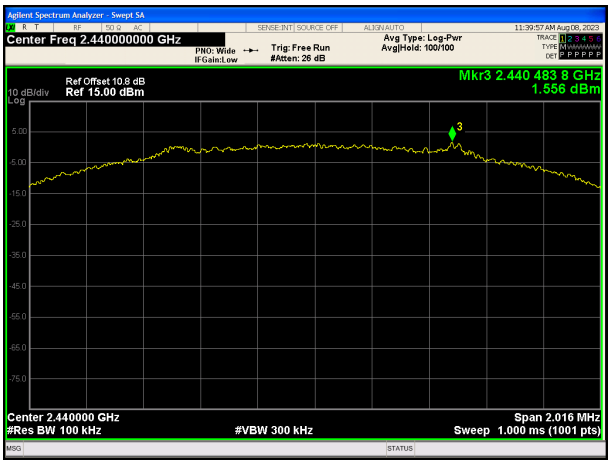
Lowest Channel, Plot B



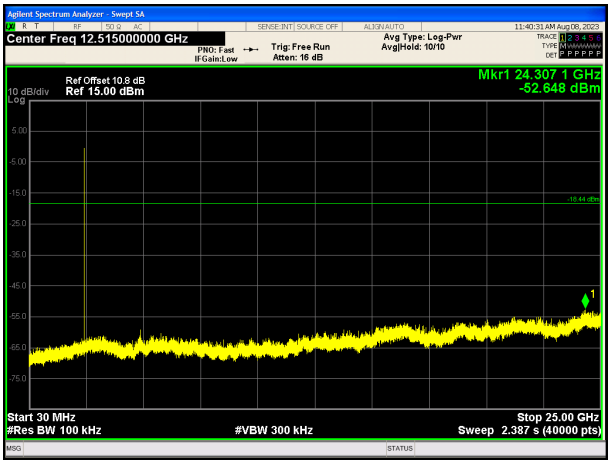
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Middle Channel, Plot A



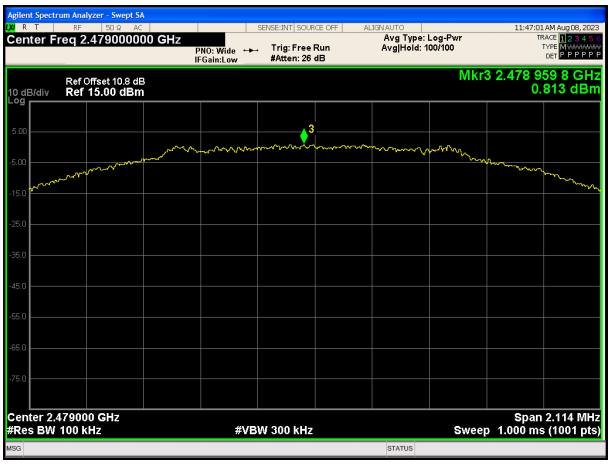
Middle Channel, Plot B



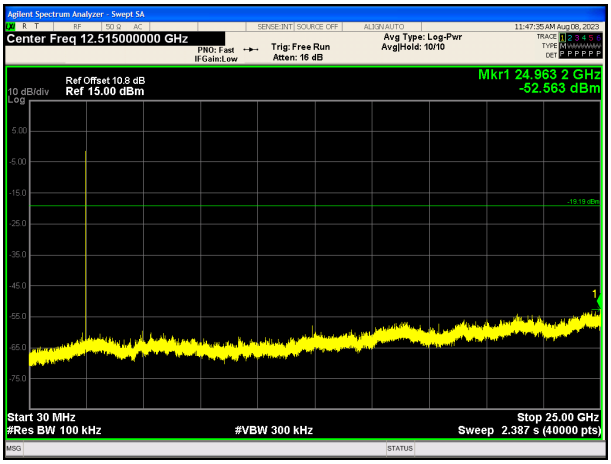
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Highest Channel, Plot A



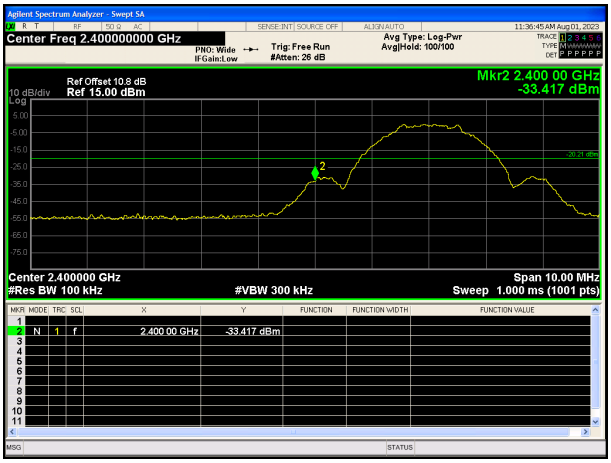
Highest Channel, Plot B



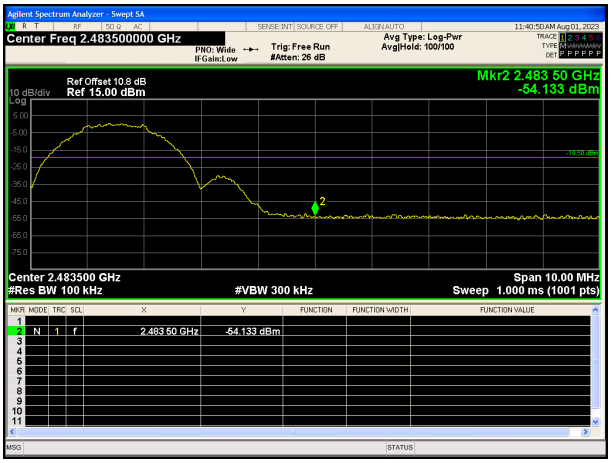
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Lowest Channel, Bandedge



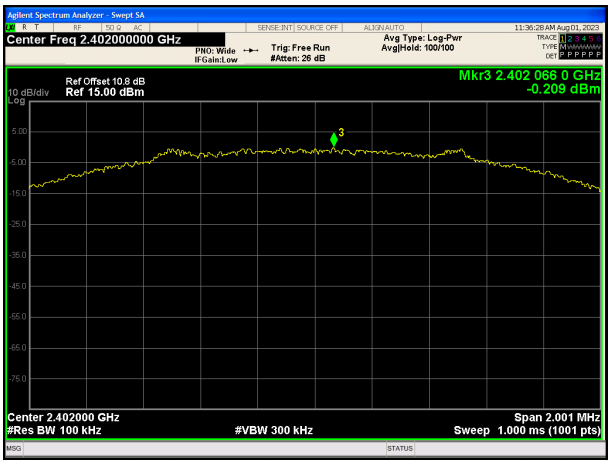
Highest Channel, Bandedge



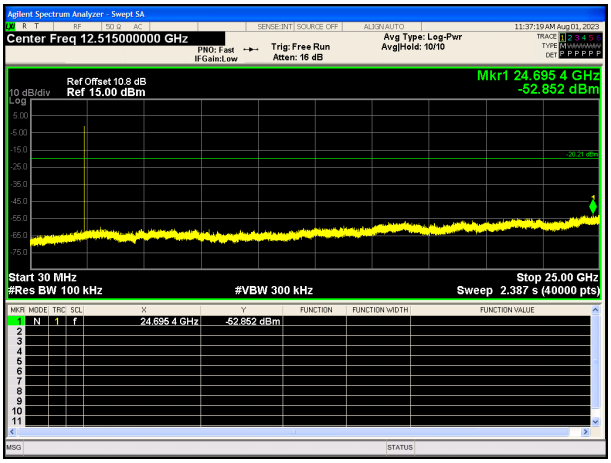
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Lowest Channel, Plot A



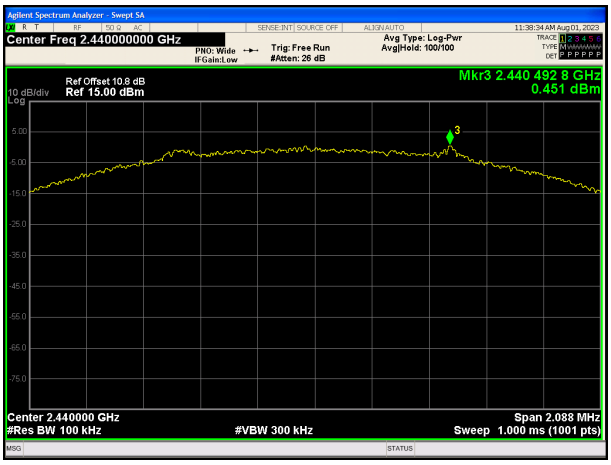
Lowest Channel, Plot B



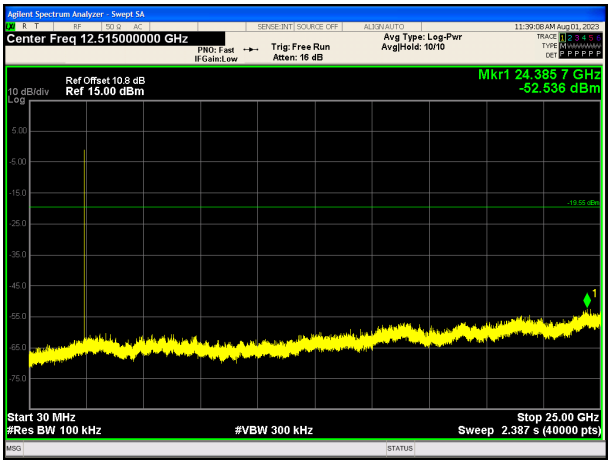
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Middle Channel, Plot A



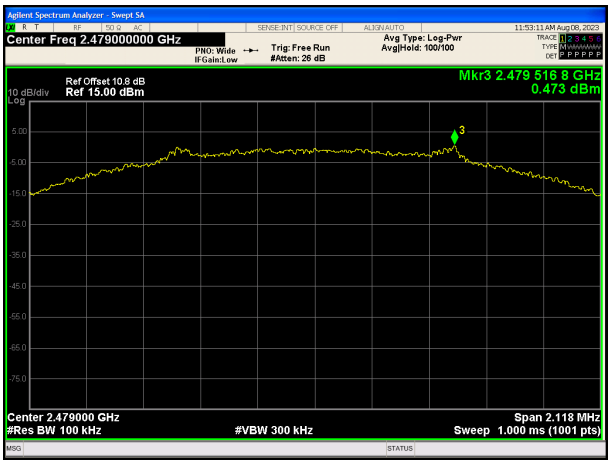
Middle Channel, Plot B



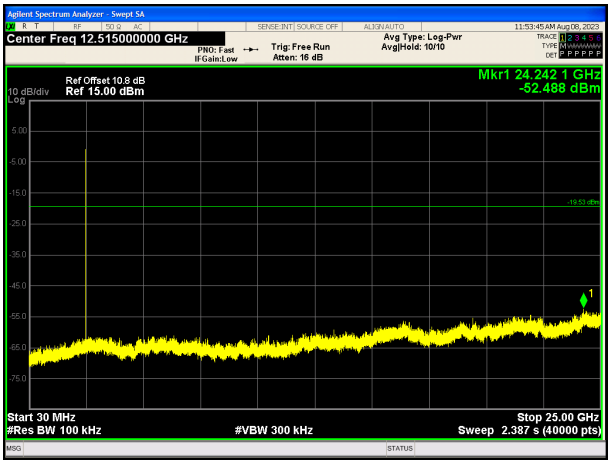
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS (Ant 2)

Highest Channel, Plot A



Highest Channel, Plot B



TEST REPORT

4.5 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 + AV

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
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor 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 + AV

Example
Assume a receiver reading of 62.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dBµV/m. This value in dBµV/m is converted to its corresponding level in µV/m.

RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

FS = 62.0 + 7.4 + 1.6 – 29.0 + 0.0 + (-10.0) = 32.0 dBµV/m

Level in µV/m = Common Antilogarithm [(32.0 dBµV/m)/20] = 39.8 µV/m

TEST REPORT

4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

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.

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

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

51.536 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.6.2 Radiated Emission Data

The data in tables 1-4 list the significant emission frequencies, the limit and the margin of compliance.

Tested by: Andy Lin

Judgement -

Passed by 9.0 dB margin

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 00

Table 1

Ant1:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2390.00	52.80	-8.22	44.58	74.00	-29.42	Peak	Horizontal
2	2390.00	39.41	-8.22	31.19	54.00	-22.81	Average	Horizontal
3	4804.00	42.89	-1.56	41.33	74.00	-32.67	Peak	Horizontal
4	4804.00	28.72	-1.56	27.16	54.00	-26.84	Average	Horizontal
5	7206.00	38.28	2.28	40.56	74.00	-33.44	Peak	Horizontal
6	7206.00	26.69	2.28	28.97	54.00	-25.03	Average	Horizontal
7	2390.00	54.72	-8.22	46.50	74.00	-27.50	Peak	Vertical
8	2390.00	39.26	-8.22	31.04	54.00	-22.96	Average	Vertical
9	4804.00	47.58	-1.56	46.02	74.00	-27.98	Peak	Vertical
10	4804.00	30.13	-1.56	28.57	54.00	-25.43	Average	Vertical
11	7206.00	39.05	2.28	41.33	74.00	-32.67	Peak	Vertical
12	7206.00	26.60	2.28	28.88	54.00	-25.12	Average	Vertical

Ant2:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2390.00	54.37	-8.22	46.15	74.00	-27.85	Peak	Horizontal
2	2390.00	40.59	-8.22	32.37	54.00	-21.63	Average	Horizontal
3	4804.00	43.54	-1.56	41.98	74.00	-32.02	Peak	Horizontal
4	4804.00	27.65	-1.56	26.09	54.00	-27.91	Average	Horizontal
5	7206.00	38.36	2.28	40.64	74.00	-33.36	Peak	Horizontal
6	7206.00	26.08	2.28	28.36	54.00	-25.64	Average	Horizontal
7	2390.00	54.49	-8.22	46.27	74.00	-27.73	Peak	Vertical
8	2390.00	39.32	-8.22	31.10	54.00	-22.90	Average	Vertical
9	4804.00	47.07	-1.56	45.51	74.00	-28.49	Peak	Vertical
10	4804.00	27.44	-1.56	25.88	54.00	-28.12	Average	Vertical
11	7206.00	37.75	2.28	40.03	74.00	-33.97	Peak	Vertical
12	7206.00	26.17	2.28	28.45	54.00	-25.55	Average	Vertical

NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

TEST REPORT

Mode: TX-Channel 19

Table 2

Ant1:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4880.00	30.70	-1.47	29.23	54.00	-24.77	Average	Horizontal
2	4880.00	46.92	-1.47	45.45	74.00	-28.55	Peak	Horizontal
3	7320.00	26.79	2.32	29.11	54.00	-24.89	Average	Horizontal
4	7320.00	39.27	2.32	41.59	74.00	-32.41	Peak	Horizontal
5	4880.00	31.34	-1.47	29.87	54.00	-24.13	Average	Vertical
6	4880.00	48.99	-1.47	47.52	74.00	-26.48	Peak	Vertical
7	7320.00	26.63	2.32	28.95	54.00	-25.05	Average	Vertical
8	7320.00	38.13	2.32	40.45	74.00	-33.55	Peak	Vertical

Ant2:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4880.00	30.94	-1.47	29.47	54.00	-24.53	Average	Horizontal
2	4880.00	46.67	-1.47	45.20	74.00	-28.80	Peak	Horizontal
3	7320.00	26.27	2.32	28.59	54.00	-25.41	Average	Horizontal
4	7320.00	38.70	2.32	41.02	74.00	-32.98	Peak	Horizontal
5	4880.00	32.02	-1.47	30.55	54.00	-23.45	Average	Vertical
6	4880.00	48.80	-1.47	47.33	74.00	-26.67	Peak	Vertical
7	7320.00	25.81	2.32	28.13	54.00	-25.87	Average	Vertical
8	7320.00	38.49	2.32	40.81	74.00	-33.19	Peak	Vertical

NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

TEST REPORT

Mode: TX-Channel 38

Table 3

Ant1:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2483.50	54.03	-7.65	46.38	74.00	-27.62	Peak	Horizontal
2	2483.50	43.49	-7.65	35.84	54.00	-18.16	Average	Horizontal
3	4958.00	44.84	-1.38	43.46	74.00	-30.54	Peak	Horizontal
4	4958.00	28.40	-1.38	27.02	54.00	-26.98	Average	Horizontal
5	7437.00	37.35	2.38	39.73	74.00	-34.27	Peak	Horizontal
6	7437.00	26.00	2.38	28.38	54.00	-25.62	Average	Horizontal
7	2483.50	52.16	-7.65	44.51	74.00	-29.49	Peak	Vertical
8	2483.50	40.53	-7.65	32.88	54.00	-21.12	Average	Vertical
9	4958.00	46.01	-1.38	44.63	74.00	-29.37	Peak	Vertical
10	4958.00	28.98	-1.38	27.60	54.00	-26.40	Average	Vertical
11	7437.00	35.57	2.38	37.95	74.00	-36.05	Peak	Vertical
12	7437.00	24.25	2.38	26.63	54.00	-27.37	Average	Vertical

Ant2:

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2483.50	52.48	-7.65	44.83	74.00	-29.17	Peak	Horizontal
2	2483.50	39.41	-7.65	31.76	54.00	-22.24	Average	Horizontal
3	4958.00	44.74	-1.38	43.36	74.00	-30.64	Peak	Horizontal
4	4958.00	28.72	-1.38	27.34	54.00	-26.66	Average	Horizontal
5	7437.00	37.45	2.38	39.83	74.00	-34.17	Peak	Horizontal
6	7437.00	25.63	2.38	28.01	54.00	-25.99	Average	Horizontal
7	2483.50	52.15	-7.65	44.50	74.00	-29.50	Peak	Vertical
8	2483.50	38.76	-7.65	31.11	54.00	-22.89	Average	Vertical
9	4958.00	45.93	-1.38	44.55	74.00	-29.45	Peak	Vertical
10	4958.00	28.88	-1.38	27.50	54.00	-26.50	Average	Vertical
11	7437.00	37.59	2.38	39.97	74.00	-34.03	Peak	Vertical
12	7437.00	24.84	2.38	27.22	54.00	-26.78	Average	Vertical

NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

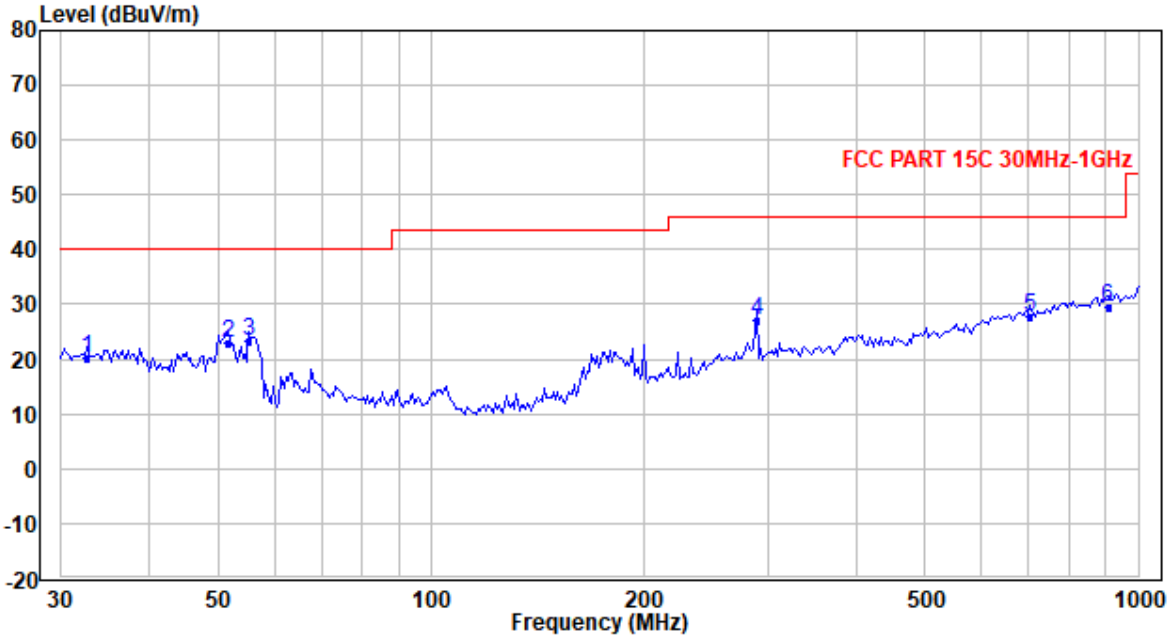
TEST REPORT

Mode: Transmit simultaneously

Table 4-Horizontal

	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.640	25.39	-5.19	20.20	40.00	-19.80	QP
2	51.536	38.23	-15.30	22.93	40.00	-17.07	QP
3	55.288	39.91	-16.77	23.14	40.00	-16.86	QP
4	288.284	34.07	-7.05	27.02	46.00	-18.98	QP
5	703.731	25.38	2.31	27.69	46.00	-18.31	QP
6	906.304	24.68	4.81	29.49	46.00	-16.51	QP

NOTES:
1. Quasi-Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

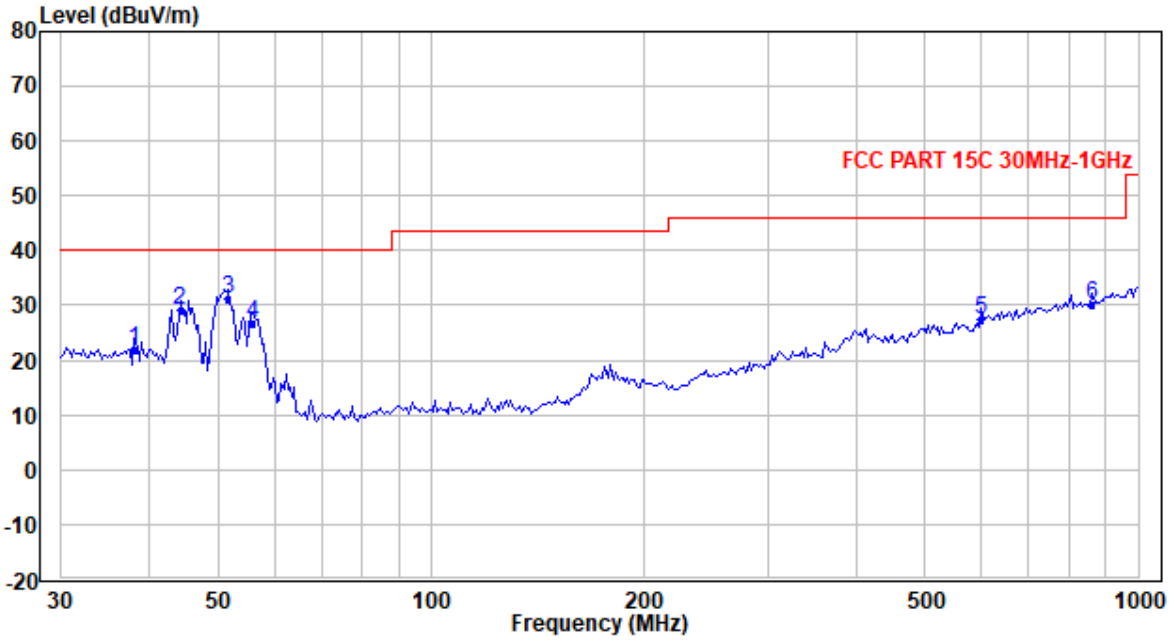


TEST REPORT

Table 5-Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.096	28.42	-6.50	21.92	40.00	-18.08	QP
2	44.154	39.79	-10.81	28.98	40.00	-11.02	QP
3	51.536	46.35	-15.30	31.05	40.00	-8.95	QP
4	56.071	43.87	-16.99	26.88	40.00	-13.12	QP
5	598.707	27.21	0.17	27.38	46.00	-18.62	QP
6	862.802	26.47	3.76	30.23	46.00	-15.77	QP

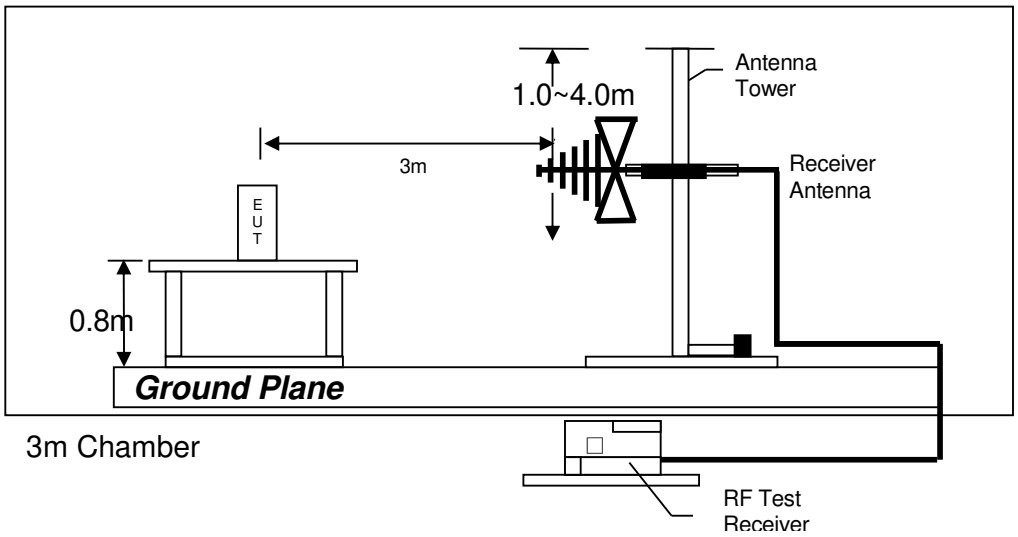
NOTES:
1. Quasi-Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.



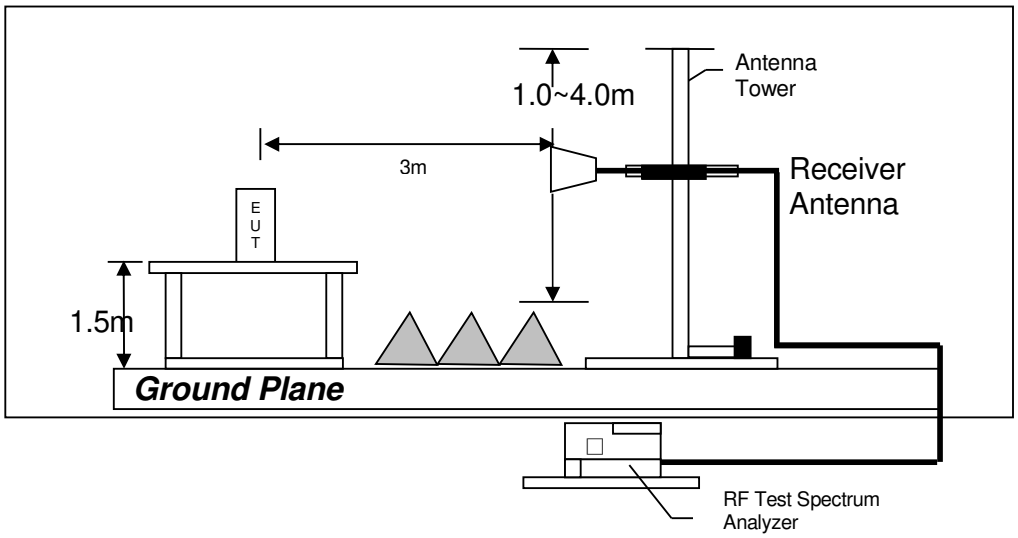
TEST REPORT

4.6.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

TEST REPORT

4.6.4 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

TEST REPORT

4.7 AC Power Line Conducted Emission

☐ Not applicable – EUT is only powered by battery for operation.

☒ EUT connects to AC power line. Emission Data is listed in following pages.

☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.190 MHz

The worst-case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.7.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 9.8 dB margin

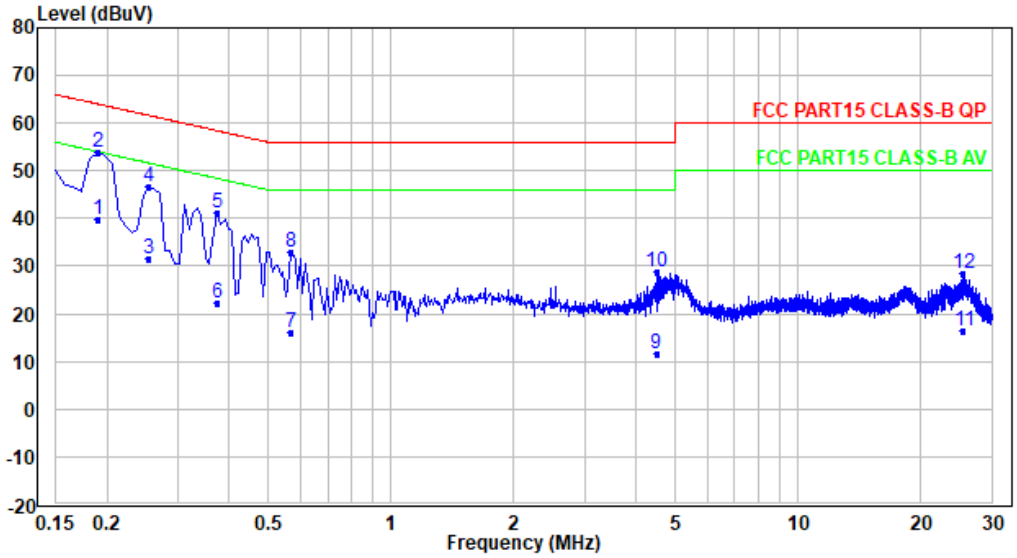
Tested by: Yana Zeng

TEST REPORT

AC POWER LINE CONDUCTED EMISSION

Worst Case: Transmit simultaneously

Line:



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.190	29.75	10.02	39.77	54.04	-14.27	Average
2	0.190	43.75	10.02	53.77	64.04	-10.27	QP
3	0.254	21.61	10.03	31.64	51.63	-19.99	Average
4	0.254	36.61	10.03	46.64	61.63	-14.99	QP
5	0.374	31.22	10.04	41.26	58.41	-17.15	Average
6	0.374	12.22	10.04	22.26	48.41	-26.15	QP
7	0.566	5.97	10.05	16.02	46.00	-29.98	Average
8	0.566	22.97	10.05	33.02	56.00	-22.98	QP
9	4.493	1.48	10.30	11.78	46.00	-34.22	Average
10	4.493	18.48	10.30	28.78	56.00	-27.22	QP
11	25.553	5.07	11.45	16.52	50.00	-33.48	Average
12	25.553	17.07	11.45	28.52	60.00	-31.48	QP

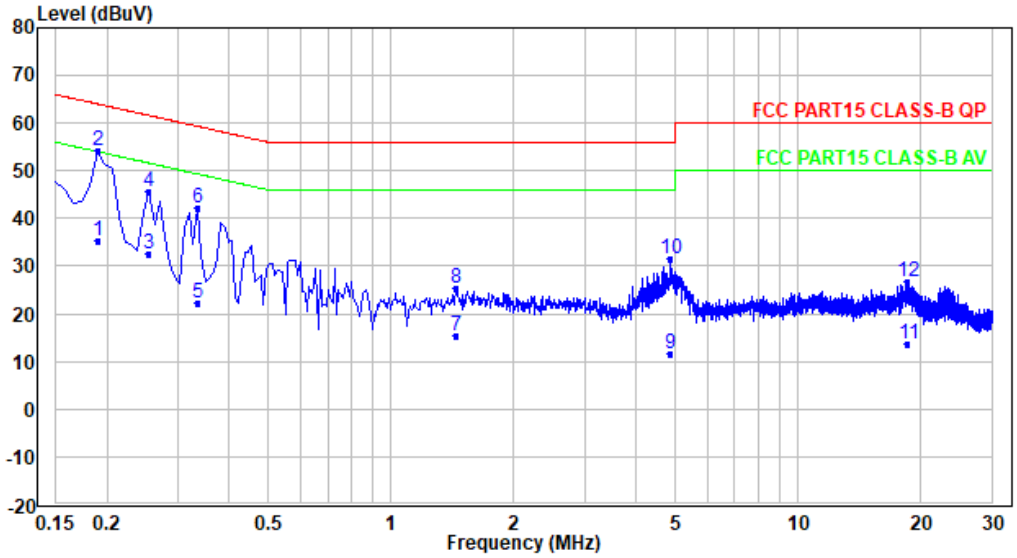
Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Limit –Result
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

TEST REPORT

Worst Case: Transmit simultaneously

Neatrul:



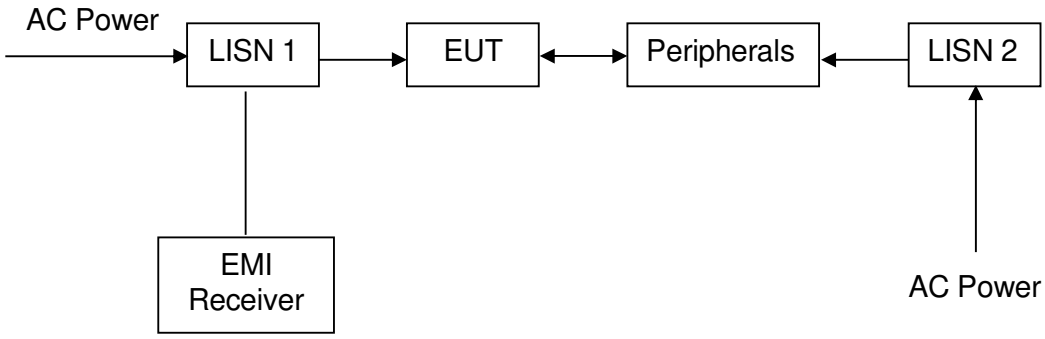
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.190	25.26	10.00	35.26	54.04	-18.78	Average
2	0.190	44.26	10.00	54.26	64.04	-9.78	QP
3	0.254	22.59	10.01	32.60	51.63	-19.03	Average
4	0.254	35.59	10.01	45.60	61.63	-16.03	QP
5	0.334	12.25	10.02	22.27	49.35	-27.08	Average
6	0.334	32.25	10.02	42.27	59.35	-17.08	QP
7	1.446	5.44	10.07	15.51	46.00	-30.49	Average
8	1.446	15.44	10.07	25.51	56.00	-30.49	QP
9	4.861	1.27	10.32	11.59	46.00	-34.41	Average
10	4.861	21.27	10.32	31.59	56.00	-24.41	QP
11	18.658	2.68	11.06	13.74	50.00	-36.26	Average
12	18.658	15.68	11.06	26.74	60.00	-33.26	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Limit –Result
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

TEST REPORT

4.7.3 Conducted Emission Test Setup



TEST REPORT

4.8 Occupied Bandwidth

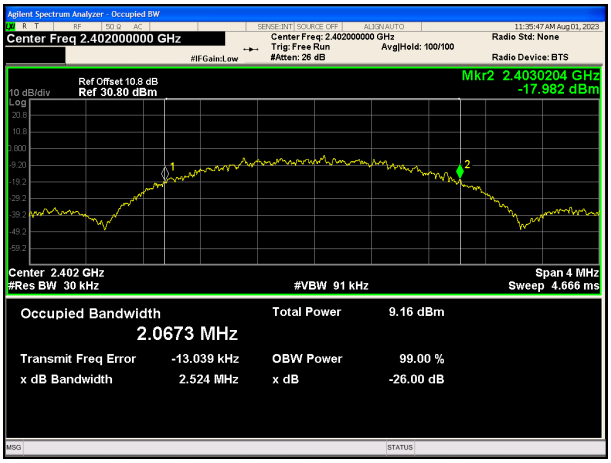
Occupied Bandwidth Results:

Ant1:

Bluetooth (MHz)		Occupied Bandwidth (MHz)
Low Channel:	2402	2.0673
Middle Channel:	2440	2.0598
High Channel:	2480	2.0188

Tested by: Rain Wang

The worst case is shown as below



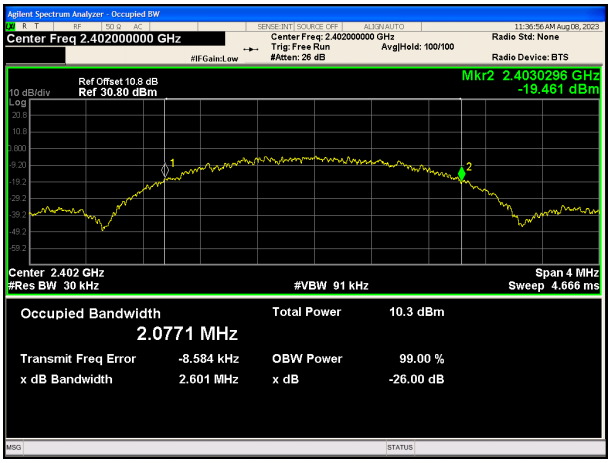
TEST REPORT

Ant2:

Bluetooth (MHz)		Occupied Bandwidth (MHz)
Low Channel:	2402	2.0771
Middle Channel:	2440	2.0327
High Channel:	2480	2.0475

Tested by: Rain Wang

The worst case is shown as below



TEST REPORT

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
3m SAC	ETS-LINDGREN	3m	N/A	Jan. 21, 2024
Receiver	R&S	ESIB26	100114	Nov. 2, 2023
Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec.12, 2023
6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec.12, 2023
Preamplifier	HP	8447F	2805A02960	Oct. 31, 2023
Double-Ridged Waveguide Horn Antenna	ETS-LINDGREN	3117-PA	00201541	Apr. 16, 2024
(Pre-amplifier)	ETS-LINDGREN	00118385	00201874	Oct. 31, 2023
Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A
Test Software	Audix	e3	Software Version: 9.160323	

2) Conducted Emissions Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
Receiver	R&S	ESR7	101181	Oct. 31, 2023
Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Oct. 31, 2023
LISN	R&S	ESH2-Z5	860014/024	Oct. 31, 2023
Test Software	Audix	e3	Software Version: 9.20151119i	

3) RF Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Apr. 13, 2024
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 02, 2023

END OF TEST REPORT