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

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

TEST REPORT

Report No.: 24081198HKG-002

Nacon (HK) Limited

Application For Certification
(Original Grant)

FCC ID: 2AVPR-9MAXHS

Transceiver

This report contains the data of 2.4GHz portion only

Prepared and Checked by:	**Approved by:**
Signed on File Leung Chun Ning, Peter Assistant Engineer	Digitally signed by Herbert Wong Location: Intertek Testing Services Hong Kong Limited Wong Cheuk Ho, Herbert Assistant Manager Date: January 14, 2025

TEST REPORT

GENERAL INFORMATION

Grantee:	Nacon (HK) Limited
Grantee Address:	17/F., 148 Electric Road, North Point, Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2022 Edition
FCC ID:	2AVPR-9MAXHS
FCC Model(s):	9HS
Type of EUT:	Transceiver
Description of EUT:	Gaming Headset Dongle
Brand Name:	RIG
Serial Number:	Not Labelled
Sample Receipt Date:	August 30, 2024
Date of Test:	August 30, 2024 to November 22, 2024
Report Date:	January 14, 2025
Environmental Conditions:	Temperature: +10 to 40°C Relative Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification. This report contains the data of 2.4GHz portion only

TEST REPORT

SUMMARY OF TEST RESULT

Test Items	FCC Part 15 Section	Results
Transmitter Power Line Conducted Emissions	15.207	Complied
Radiated Emission	15.249, 15.209	Complied
Radiated Emission on the Bandedge		Complied
Radiated Emission in Restricted Bands	15.205	Complied

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

FCC Part 15, October 1, 2022 Edition

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.
2. 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.

TEST REPORT

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TEST REPORT

1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT), is a 2.4GHz and Bluetooth 5.2 Transceiver for a dongle. For the Bluetooth 5.2 mode, the sample supplied operated on 79 channels, normally at 2402 - 2480MHz. The channels are separated with 1MHz spacing. For the 2.4GHz mode, the sample supplied operated on 40 channels, normally at 2402 - 2480MHz. The channels are separated with 2MHz spacing. The EUT is powered by USB port (5VDC).

Antenna Type: Internal, Integral

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

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine 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.

1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been placed on file with the FCC and IC No. 2042H, CABID is "HKAP01".

TEST REPORT

2.0 SYSTEM TEST CONFIGURATION

2.1 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).

There are two powering methods for the dongle (EUT).

Case 1) Powered by Notebook USB port (5VDC).
Case 2) Powered by Notebook USB port (5VDC) with Docking (Cradle).

All powering methods were tested.

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 Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

The EUT exercise program (AB1565/68 Lab Test Tool-2.11.2) used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044.

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

2.5 Support Equipment List and Description

Description	Remark
HP 820G1 Notebook	Provided by Intertek
RIG900MAX Headset	Provided by Applicant
66.5cm USB Type-C Cable	Provided by Applicant
Charging Cradle	Provided by Applicant

TEST REPORT

3.0 EMISSION RESULTS

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.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading.

The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
AF = Antenna Factor in dB
CF = Cable Attenuation Factor in dB
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain.

An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29.0 dB and average factor of 5.0 dB are subtracted, giving a field strength of 27.0 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB RR = 18.0 dBµV
CF = 1.6 dB LF = 9.0 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18.0 + 9.0 = 27.0 dBµV/m

Level in µV/m = Common Antilogarithm [(27.0 dBµV/m)/20] = 22.4 µV/m

TEST REPORT

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 2400 MHz

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

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 2.7 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.1545 MHz

For electronic filing, the worst-case line-conducted configuration photographs are saved with filename: Setup Photos.pdf.

3.5 Conducted Emission Data

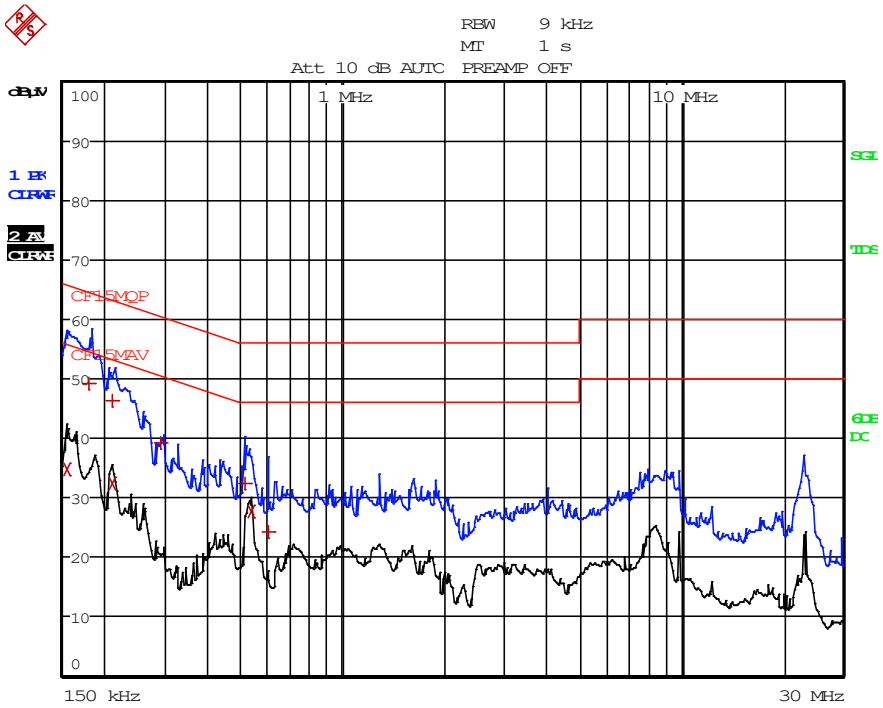
The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Pass by 13.97 dB

TEST REPORT

CONDUCTED EMISSION

Model: 9HS
Date of Test: October 18, 2024
Worst-Case Operating Mode: Transmitting (Powered by Notebook USB port)



EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

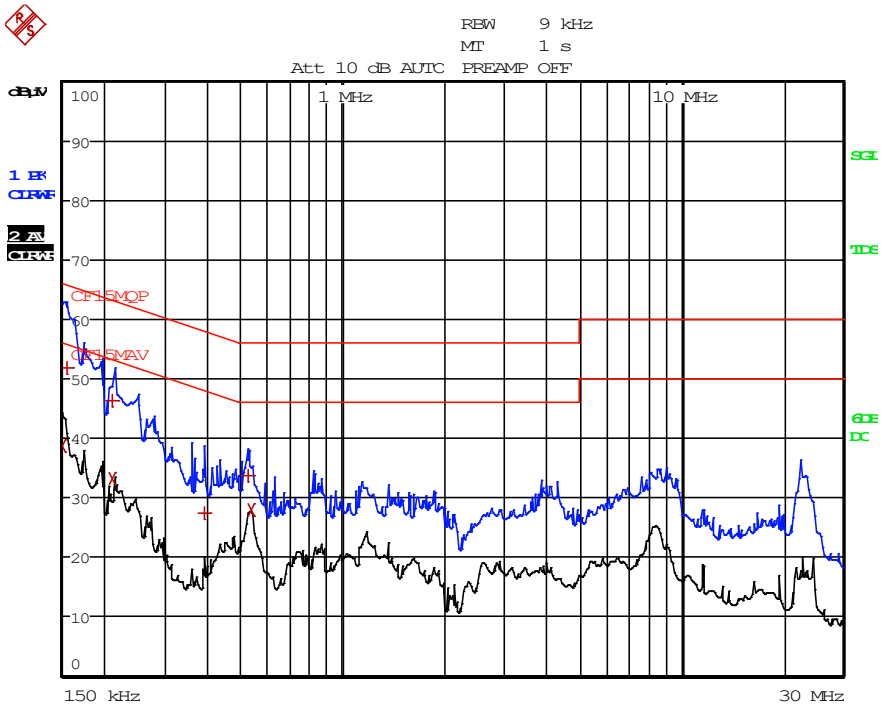
TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	154.5 kHz	34.86	N	-20.88
1	Quasi Peak	181.5 kHz	49.24	N	-15.17
1	Quasi Peak	213 kHz	46.22	N	-16.86
2	CISPR Average	213 kHz	32.44	L1	-20.64
1	Quasi Peak	294 kHz	39.12	N	-21.28
1	Quasi Peak	514.5 kHz	32.54	N	-23.45
2	CISPR Average	537 kHz	27.72	L1	-18.27
1	Quasi Peak	600 kHz	24.40	L1	-31.59

Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

TEST REPORT

CONDUCTED EMISSION

Model: 9HS
Date of Test: October 18, 2024
Worst-Case Operating Mode: Transmitting (Powered by Notebook USB port with Docking Base)



EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	150 kHz	38.70	N	-17.29
1	Quasi Peak	154.5 kHz	51.77	N	-13.97
1	Quasi Peak	213 kHz	46.33	L1	-16.75
2	CISPR Average	213 kHz	33.25	L1	-19.83
1	Quasi Peak	388.5 kHz	27.54	L1	-30.55
1	Quasi Peak	523.5 kHz	33.78	N	-22.22
2	CISPR Average	537 kHz	28.03	L1	-17.96

Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 1Mbps)

Table 1

Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	90.1	33	29.4	86.5	94.0	-7.5
H	4804.000	34.8	33	34.9	36.7	54.0	-17.3
H	7206.000	24.8	33	37.9	29.7	54.0	-24.3
H	9608.000	33.8	33	40.4	41.2	54.0	-12.8
H	12010.000	38.7	33	40.5	46.2	54.0	-7.8
V	14412.000	37.8	33	40.0	44.8	54.0	-9.2

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	96.9	33	29.4	93.3	114.0	-20.7
H	4804.000	46.9	33	34.9	48.8	74.0	-25.2
H	7206.000	38.6	33	37.9	43.5	74.0	-30.5
H	9608.000	47.4	33	40.4	54.8	74.0	-19.2
H	12010.000	52.6	33	40.5	60.1	74.0	-13.9
V	14412.000	50.7	33	40.0	57.7	74.0	-16.3

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 1Mbps)

Table 2

Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2440.000	89.2	33	29.4	85.6	94.0	-8.4
H	4880.000	36.0	33	34.9	37.9	54.0	-16.1
H	7320.000	35.0	33	37.9	39.9	54.0	-14.1
H	9760.000	34.3	33	40.4	41.7	54.0	-12.3
H	12200.000	38.6	33	40.5	46.1	54.0	-7.9
H	14640.000	39.8	33	38.4	45.2	54.0	-8.8

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2440.000	95.8	33	29.4	92.2	114.0	-21.8
H	4880.000	52.6	33	34.9	54.5	74.0	-19.5
H	7320.000	56.1	33	37.9	61.0	74.0	-13.0
H	9760.000	48.0	33	40.4	55.4	74.0	-18.6
H	12200.000	52.3	33	40.5	59.8	74.0	-14.2
H	14640.000	52.7	33	38.4	58.1	74.0	-15.9

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 1Mbps)

Table 3

Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	82.6	33	29.4	79.0	94.0	-15.0
H	4960.000	31.0	33	34.9	32.9	54.0	-21.1
H	7440.000	27.0	33	37.9	31.9	54.0	-22.1
V	9920.000	34.1	33	40.4	41.5	54.0	-12.5
H	12400.000	38.9	33	40.5	46.4	54.0	-7.6
V	14880.000	39.0	33	38.4	44.4	54.0	-9.6

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	90.0	33	29.4	86.4	114.0	-27.6
H	4960.000	44.0	33	34.9	45.9	74.0	-28.1
H	7440.000	40.5	33	37.9	45.4	74.0	-28.6
V	9920.000	47.6	33	40.4	55.0	74.0	-19.0
H	12400.000	53.0	33	40.5	60.5	74.0	-13.5
V	14880.000	51.8	33	38.4	57.2	74.0	-16.8

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 2Mbps)

Table 4

Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	85.9	33	29.4	82.3	94.0	-11.7
H	4804.000	32.2	33	34.9	34.1	54.0	-19.9
H	7206.000	31.8	33	37.9	36.7	54.0	-17.3
H	9608.000	34.6	33	40.4	42.0	54.0	-12.0
H	12010.000	38.9	33	40.5	46.4	54.0	-7.6
V	14412.000	38.2	33	40.0	45.2	54.0	-8.8

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	99.5	33	29.4	95.9	114.0	-18.1
H	4804.000	45.9	33	34.9	47.8	74.0	-26.2
H	7206.000	50.0	33	37.9	54.9	74.0	-19.1
H	9608.000	47.8	33	40.4	55.2	74.0	-18.8
H	12010.000	52.3	33	40.5	59.8	74.0	-14.2
V	14412.000	51.1	33	40.0	58.1	74.0	-15.9

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 2Mbps)

Table 5

Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2440.000	82.1	33	29.4	78.5	94.0	-15.5
H	4880.000	33.8	33	34.9	35.7	54.0	-18.3
H	7320.000	32.9	33	37.9	37.8	54.0	-16.2
H	9760.000	34.3	33	40.4	41.7	54.0	-12.3
H	12200.000	39.0	33	40.5	46.5	54.0	-7.5
H	14640.000	39.2	33	38.4	44.6	54.0	-9.4

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2440.000	95.4	33	29.4	91.8	114.0	-22.2
H	4880.000	46.8	33	34.9	48.7	74.0	-25.3
H	7320.000	50.8	33	37.9	55.7	74.0	-18.3
H	9760.000	47.9	33	40.4	55.3	74.0	-18.7
H	12200.000	52.5	33	40.5	60.0	74.0	-14.0
H	14640.000	52.3	33	38.4	57.7	74.0	-16.3

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (2.4GHz 2Mbps)

Table 6

Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	78.3	33	29.4	74.7	94.0	-19.3
H	4960.000	31.4	33	34.9	33.3	54.0	-20.7
V	7440.000	32.3	33	37.9	37.2	54.0	-16.8
V	9920.000	34.8	33	40.4	42.2	54.0	-11.8
H	12400.000	38.9	33	40.5	46.4	54.0	-7.6
V	14880.000	39.9	33	38.4	45.3	54.0	-8.7

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2480.000	92.1	33	29.4	88.5	114.0	-25.5
H	4960.000	44.4	33	34.9	46.3	74.0	-27.7
V	7440.000	50.2	33	37.9	55.1	74.0	-18.9
V	9920.000	47.4	33	40.4	54.8	74.0	-19.2
H	12400.000	52.8	33	40.5	60.3	74.0	-13.7
V	14880.000	52.9	33	38.4	58.3	74.0	-15.7

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 .
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (Powered by Notebook USB port)

Table 7

Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
H	215.998	18.7	16	17.0	19.7	43.5	-23.8
H	248.250	16.5	16	20.0	20.5	46.0	-25.5
H	372.046	23.3	16	24.0	31.3	46.0	-14.7
V	421.880	23.1	16	25.0	32.1	46.0	-13.9
V	472.563	21.0	16	26.0	31.0	46.0	-15.0
V	596.359	18.0	16	29.0	31.0	46.0	-15.0

Notes:
1. Peak Detector Data unless otherwise stated.
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. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 9HS
Date of Test: October 17, 2024
Worst-Case Operating Mode: Transmitting (Powered by Notebook USB port with Docking Base)

Table 8

Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
H	92.323	23.1	16	11.0	18.1	43.5	-25.4
H	119.968	20.4	16	14.0	18.4	43.5	-25.1
H	240.005	33.6	16	19.0	36.6	46.0	-9.4
H	431.944	31.5	16	25.0	40.5	46.0	-5.5
V	479.959	27.8	16	26.0	37.8	46.0	-8.2
V	551.981	26.0	16	28.0	38.0	46.0	-8.0

Notes:
1. Peak and Quasi-Peak Detector Data unless otherwise stated.
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. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: External Photos.pdf and Internal Photos.pdf.

5.0 PRODUCT LABELLING

For electronics filing, the FCC ID label artwork and the label location are saved with filename: Label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: Block.pdf and Circuit.pdf respectively.

7.0 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.

TEST REPORT

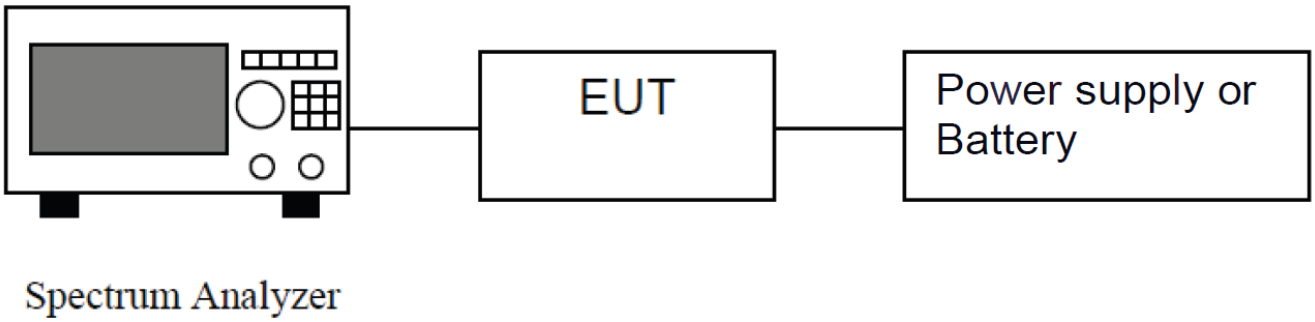
8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.10 (2013) for frequency being measured.

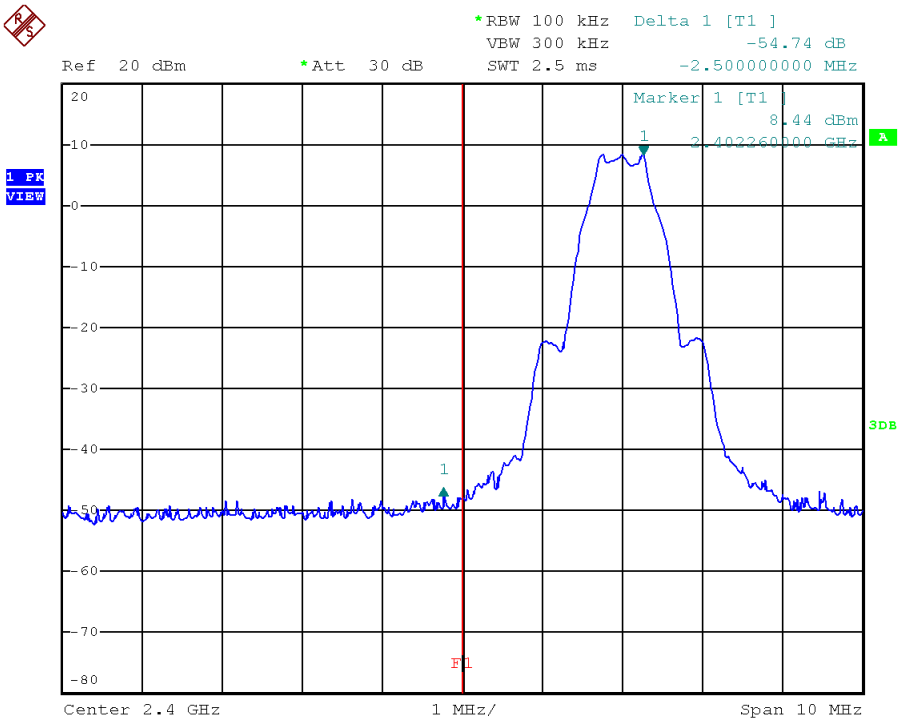
Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits inSection 15.209, whichever is the lesser attenuation, which meet the requirement of Part 15.249(d).

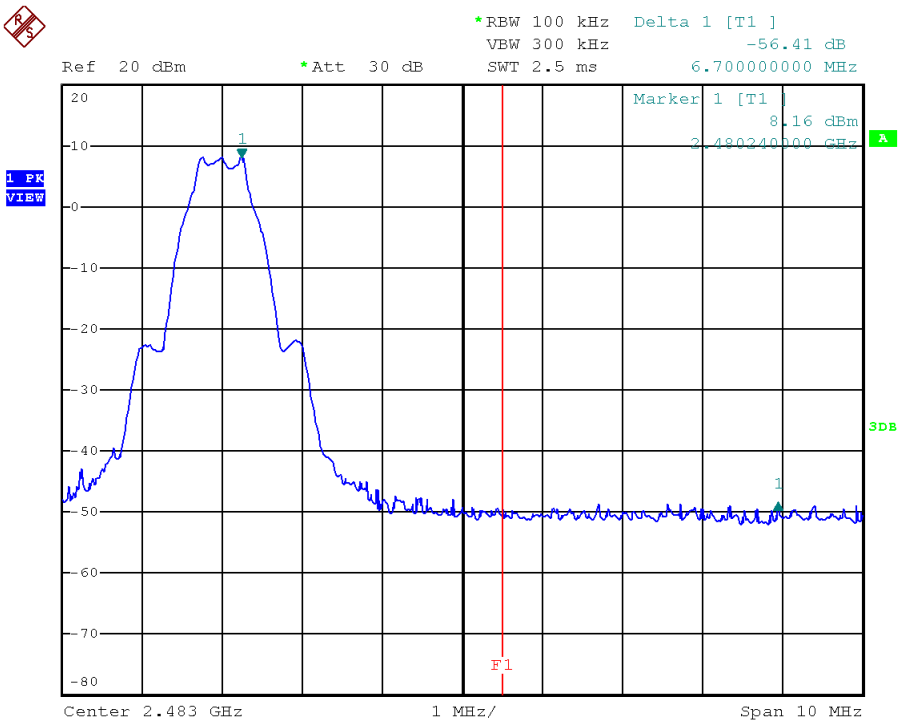


Block diagram of Test setup

TEST REPORT

PEAK MEASUREMENT (2.4GHz 1Mbps)





TEST REPORT

PEAK MEASUREMENT (2.4GHz 1Mbps)

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 93.3 dBµV/m - 54.7 dB
= 38.6 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 86.5 dBµV/m - 54.7 dB
= 31.8 dBµV/m

Upper Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 86.4 dBµV/m - 56.4 dB
= 30.0 dBµV/m

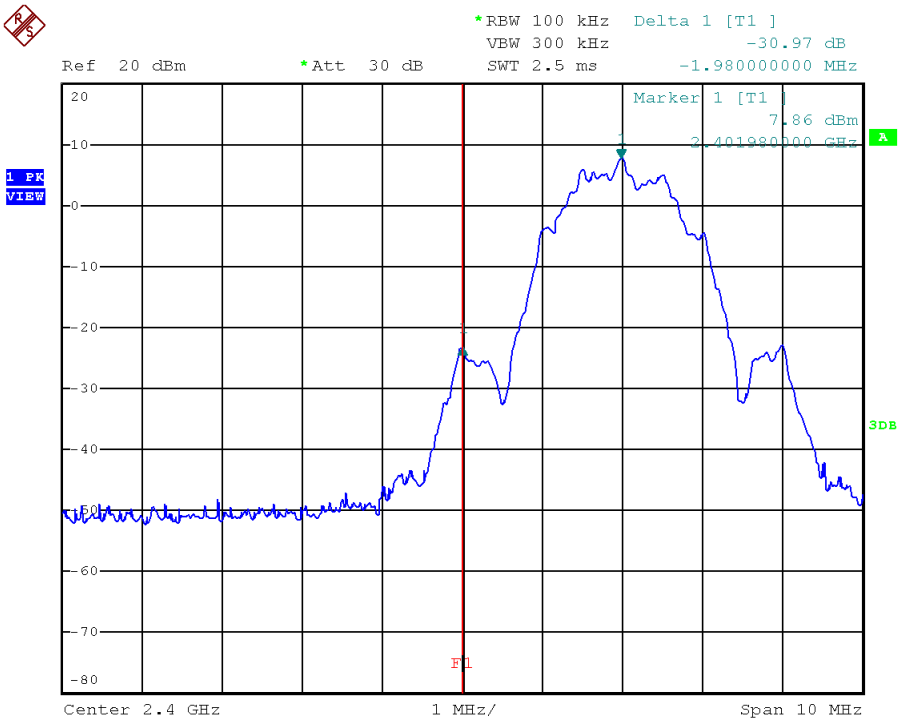
Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

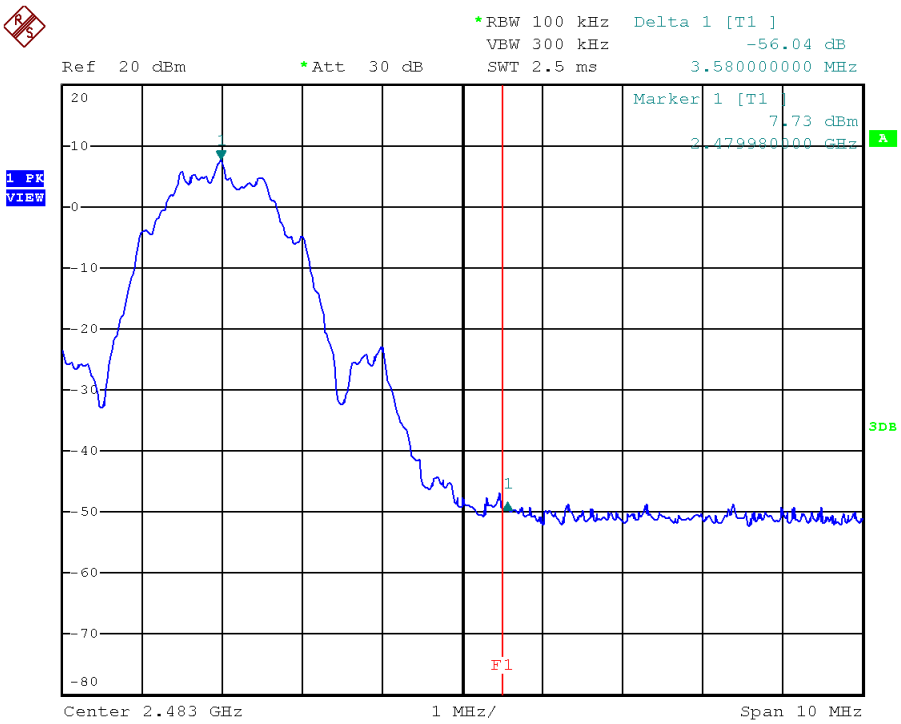
= 79.0 dBµV/m - 56.4 dB
= 22.6 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

TEST REPORT

PEAK MEASUREMENT (2.4GHz 2Mbps)





TEST REPORT

PEAK MEASUREMENT (2.4GHz 2Mbps)

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 95.9 dBµV/m - 31.0 dB
= 64.9 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 82.3 dBµV/m - 31.0 dB
= 51.3 dBµV/m

Upper Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 88.5 dBµV/m - 56.0 dB
= 32.5 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 74.7 dBµV/m - 56.0 dB
= 18.7 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

TEST REPORT

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 625µs for a digital “1” bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 3MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

Not Applicable

TEST REPORT

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are 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 Exhibit 8.3.

The frequency range scanned is 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 40 GHz, whichever is lower.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

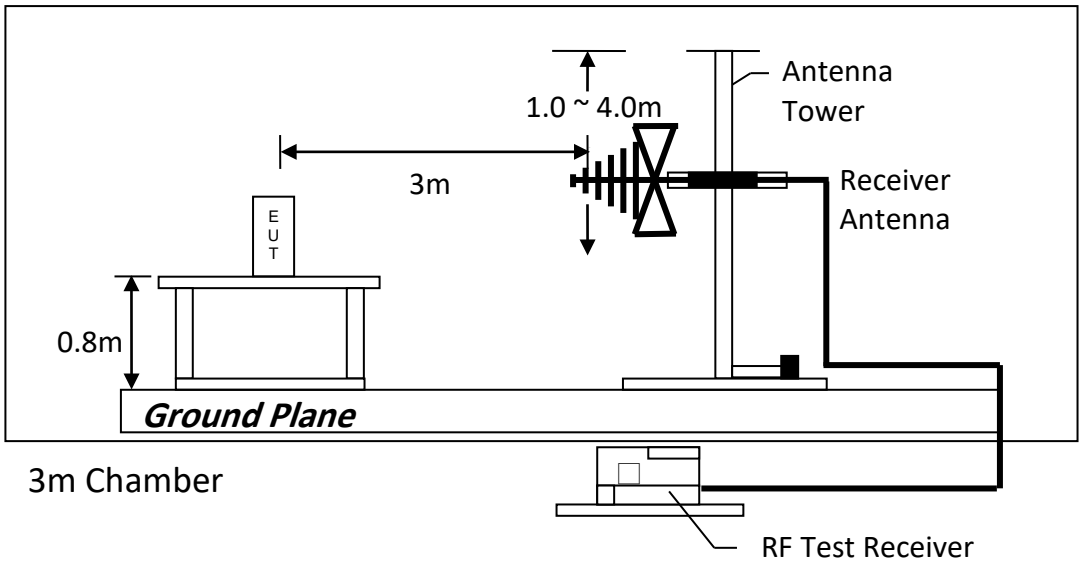
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

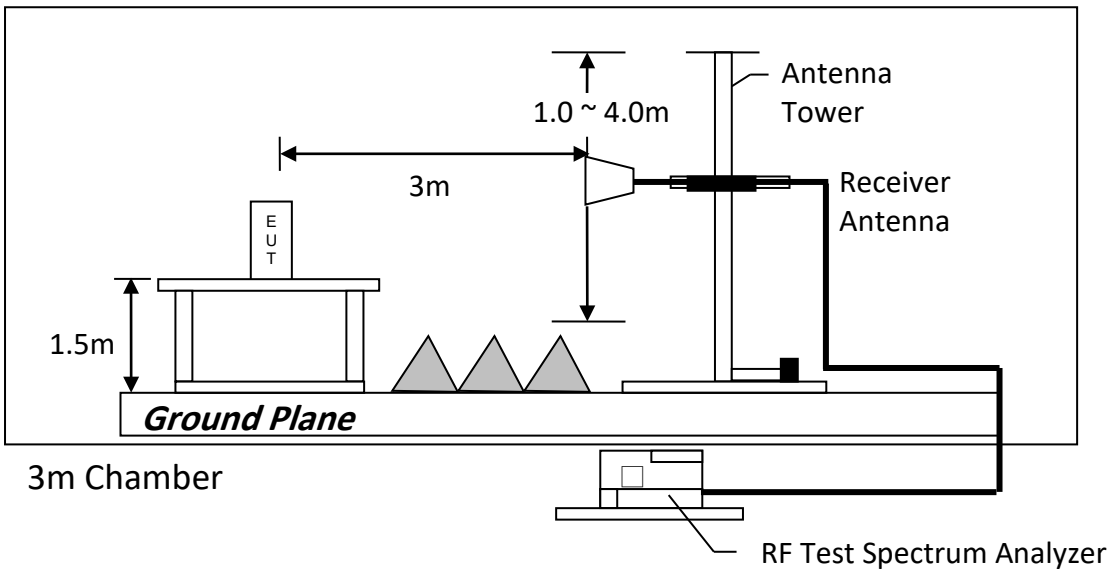
TEST REPORT

8.4.1 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

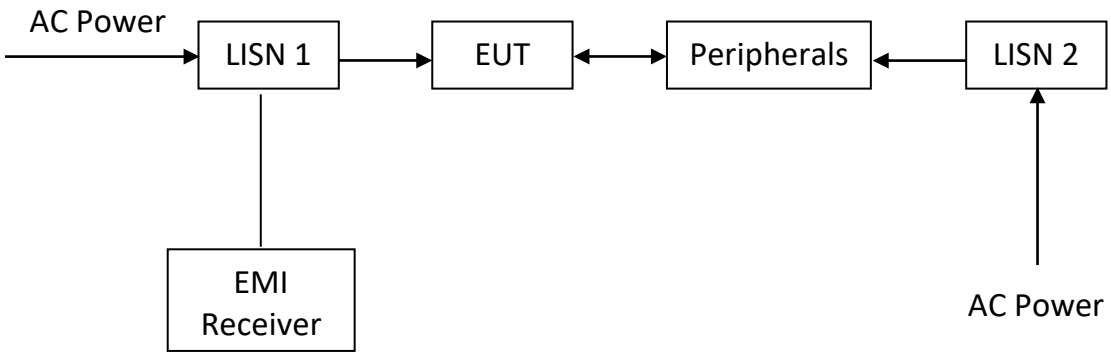
TEST REPORT

8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. 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 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

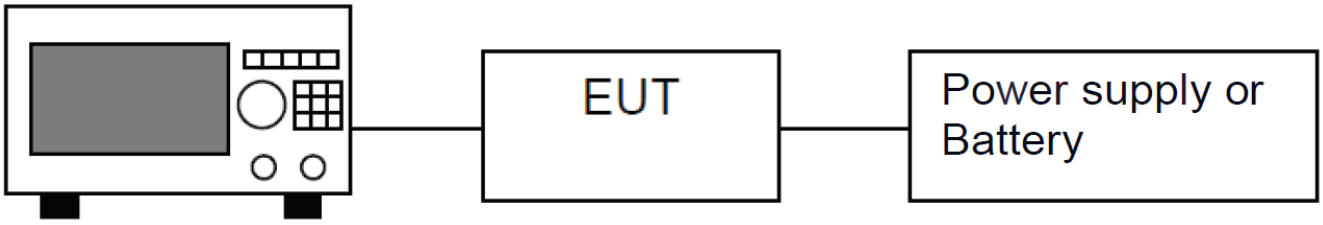
All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4.3 Conducted Emission Test Setup



TEST REPORT

8.5 Occupied Bandwidth

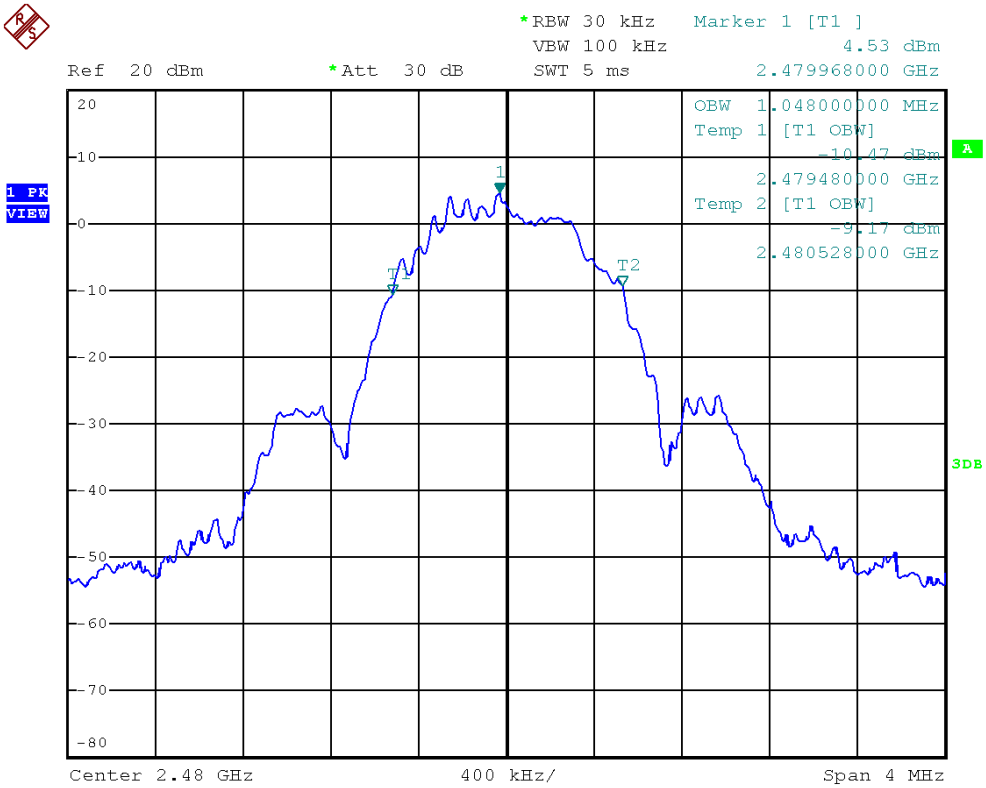


Block diagram of Test setup

Occupied Bandwidth Results: (2.4GHz 1Mbps)

Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	1048
Middle Channel: 2440	1048
High Channel: 2480	1048

The worst case is shown as below:

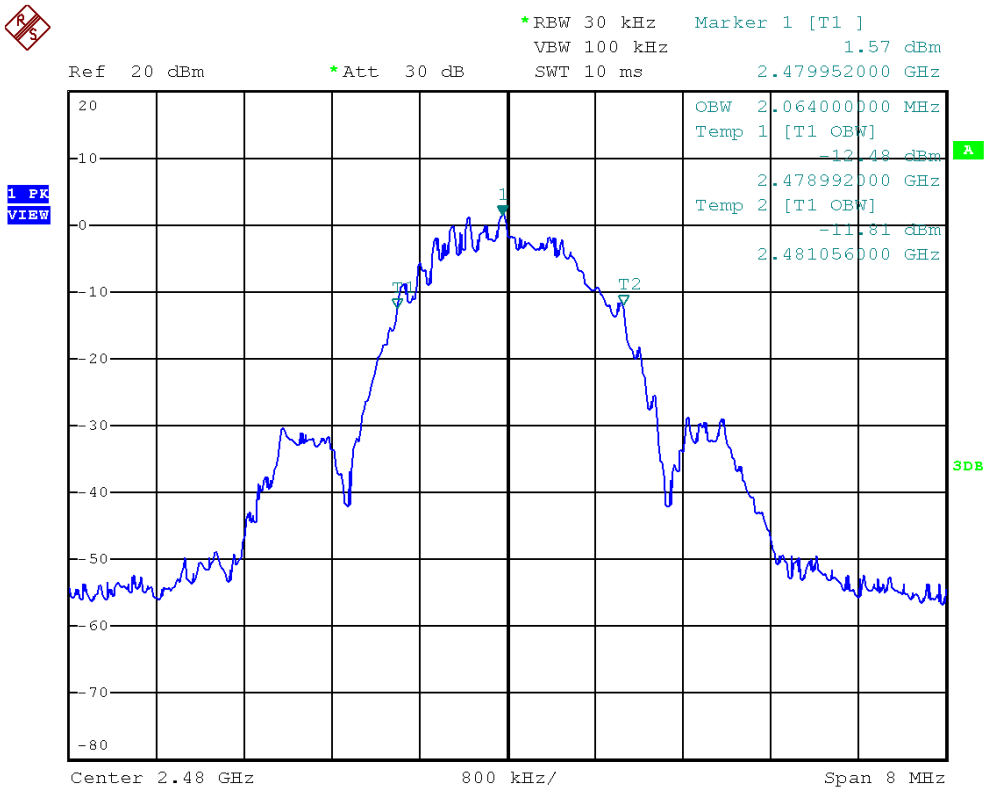


TEST REPORT

Occupied Bandwidth Results: (2.4GHz 2Mbps)

Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	2064
Middle Channel: 2440	2064
High Channel: 2480	2064

The worst case is shown as below:



TEST REPORT

9.0 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: Request.pdf.

10.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver (9kHz to 26.5GHz)	Biconical Antenna (30MHz to 300MHz)	Log Periodic Antenna
Registration No.	EW-3156	EW-3242	EW-3243
Manufacturer	ROHDESCHWARZ	EMCO	EMCO
Model No.	ESR26	3110C	3148B
Calibration Date	January 31, 2024	July 30, 2024	July 30, 2024
Calibration Due Date	January 31, 2025	July 30, 2026	January 30, 2026

Equipment	Double Ridged Guide Antenna (1GHz - 18GHz)	Active Loop Antenna (H-field) (9kHz to 30MHz)	RF Preamplifier (9kHz to 6000MHz)
Registration No.	EW-0194	EW-3326	EW-3006b
Manufacturer	EMCO	EMCO	SCHWARZBECK
Model No.	3115	6502	BBV9718
Calibration Date	May 10, 2023	January 05, 2024	October 20, 2023
Calibration Due Date	November 10, 2024	July 05, 2025	October 20, 2024

Equipment	2.4GHz Notch Filter	14m Double Shield RF Cable (20MHz - 6GHz)	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-3435	EW-2505	EW-2781
Manufacturer	MICROWAVE	RADIALL	GREATBILLION
Model No.	N0324413	nm / br5d / sma 14m	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	September 26, 2023	October 05, 2023	January 16, 2024
Calibration Due Date	December 26, 2024	January 05, 2025	January 16, 2025

Equipment	12 metre RF Cable (1-40)GHz	RF Cable 240cm (RG142) - (9kHz to 30MHz)	Pyramidal Horn Antenna
Registration No.	EW-2774	EW-2454	EW-0905
Manufacturer	GREATBILLION	RADIALL	EMCO
Model No.	SMA m-m ra 12m 40G outdoor	bnc m st / 142 /bnc m ra 240cm	3160-09
Calibration Date	January 16, 2024	June 20, 2024	December 15, 2023
Calibration Due Date	January 16, 2025	June 20, 2025	June 15, 2025

TEST REPORT

2) Conducted Emissions Test

Equipment	RF Cable 240cm (RG142) - (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver (9kHz to 3GHz)
Registration No.	EW-2454	EW-3360	EW-3095
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	bnc m st / 142 /bnc m ra 240cm	ENV-216	ESCI
Calibration Date	June 20, 2024	April 07, 2024	January 18, 2024
Calibration Due Date	June 20, 2025	April 07, 2025	January 18, 2025

3) Bandedge & OBW Measurement

Equipment	EMI Test Receiver (9kHz to 3GHz)
Registration No.	EW-3095
Manufacturer	ROHDESCHWARZ
Model No.	ESCI
Calibration Date	January 18, 2024
Calibration Due Date	January 18, 2025

4) Control Software for Radiated Emission

Software Information	
Software Name	EMC32
Manufacturer	ROHDESCHWARZ
Software version	10.50.40

END OF TEST REPORT