

RF Test Report

Applicant : Micro-Star INT'L CO., LTD.

Product Name : Wireless Mouse

Trade Name : msi

Model Number : MS-8ZBF

Applicable Standard : Notification No.88 of MIC, 2004, Annex 43
2.4 GHz band wide-band low-power data communication system
(Item 19 of Article 2 Paragraph 1)

Received Date : Sep. 17, 2025

Test Period : Nov. 19, 2025 ~ Nov. 20, 2025

Issued Date : Dec. 11, 2025

Issued by

Eurofins E&E Wireless Taiwan Co., Ltd.
No. 140-1, Changan Street, Bade District,
Taoyuan City, Taiwan (R.O.C.)
Tel : +886-3-2710188 / Fax : +886-3-2710190

Note:

1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
2. This report shall not be reproduced except in full, without the written approval of Eurofins E&E Wireless Taiwan Co., Ltd.
3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Description	Revised by
00	Dec. 11, 2025	Initial Issue	Snow Wang

Verification of Compliance

Applicant : Micro-Star INT'L CO., LTD.

Product Name : Wireless Mouse

Trade Name : msi

Model Number : MS-8ZBF

Applicable Standard : Notification No.88 of MIC, 2004, Annex 43
2.4 GHz band wide-band low-power data communication system
(Item 19 of Article 2 Paragraph 1)

Test Result : Complied

Issued By : Eurofins E&E Wireless Taiwan Co., Ltd.
No. 140-1, Changan Street, Bade District,
Taoyuan City, Taiwan (R.O.C)
Tel : +886-3-2710188 / Fax : +886-3-2710190

The above equipment has been tested by Eurofins E&E Wireless Taiwan Co., Ltd., and found compliance with the requirements set forth in the 2.4 GHz band wide-band low-power data communication system (Item 19 of Article 2 Paragraph 1) and technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By : Kai Yu Yang

TABLE OF CONTENTS

1	General Information.....	5
1.1.	EUT Description	5
1.2.	Testing Location	7
1.3.	Summary of Test Result	7
2	Test Methodology	8
2.1.	Mode of Operation	8
2.2.	EUT Test Step	9
2.3.	Configuration of Test System Details	9
2.4.	Test Instruments.....	10
2.5.	Uncertainty of Measured Value	11
2.6.	Test Site Environment	11
3	Measurement Procedure	12
3.1.	Frequency Error Measurement	12
3.2.	Occupied Bandwidth Measurement	13
3.3.	Antenna Power (Conducted) Measurement	15
3.4.	Unwanted Emission Strength Measurement	16
3.5.	Secondarily Emitted Radio Wave Strength Measurement.....	18
3.6.	Radio Interference Prevention Capability Measurement.....	19
3.7.	Construction Protection Confirmation Method.....	19
4	Test Results	20

Appendix A. Test Data

Appendix B. Test Plots

Appendix C. Test Setup Photographs

1 General Information

1.1. EUT Description

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity(except Declared Rated Power , E.I.R.P.).

Applicant	Micro-Star INT'L CO., LTD. No.69, Lide St., Zhonghe Dist.,New Taipei City 235
Product Name	Wireless Mouse
Trade Name	msi
Model Number	MS-8ZBF
Hardware Version	V1.0
Software Version	V001
Antenna Information	Trade Name: ChuanD Model Number: VERSA 500W 8K ANT Antenna Type: PCB Antenna Max. Gain: 1.52 dBi
Radio Equipment	2.4 GHz Band Wide-Band Low-Power Data Communication System
Classification of Specified Radio Equipment	Article 2 Clause 1 Item 19
Frequency Band	Bluetooth LE : 1 Mbps Bluetooth 2LE : 2 Mbps Bluetooth BLR C2 : 500 kbps Bluetooth BLR C8 : 125 kbps
Frequency Range	2402-2480 MHz
Channel Number	40
Channel Separated	2 MHz
Modulation Type	GFSK
Type of Emissions	F1D
Operate Temp. Range	0 ~ +40 °C
EUT Power Rating	DC 5 V, 800 mA

Declared Rated Power	BLE 1M	2.183 mW	3.391 dBm
	BLE 2M	2.178 mW	3.381 dBm
	BLR C2	1.202 mW	--- dBm
	BLR C8	1.202 mW	--- dBm
E.I.R.P.	BLE 1M	4.911 dBm	
	BLE 2M	4.901 dBm	
	BLR C2	--- dBm	
	BLR C8	--- dBm	

Testing Sample No.	
Test Item	Sample Number
Conducted	C259226_A007

1.2. Testing Location

Lab Name: Eurofins E&E Wireless Taiwan Co., Ltd.
 Site Address: ☒ No. 140-1, Changan Street, Bade District, Taoyuan City, Taiwan (R.O.C.)
 Site Address: ☐ No. 2, Wuquan 5th Rd. Wugu Dist., New Taipei City, Taiwan (R.O.C.)

1.3. Summary of Test Result

Item	Result	Remark
Frequency Error	PASS	-----
Occupied Bandwidth	PASS	-----
Antenna Power (Conducted)	PASS	-----
Unwanted Emission Strength	PASS	-----
Secondarily Emitted Radio Wave Strength	PASS	-----
Radio Interference Prevention Capability Measurement	PASS	-----

Decision Rule

- ☒ Uncertainty is not included.
☐ Uncertainty is included.

2 Test Methodology

2.1. Mode of Operation

Test Category

2.4 GHz Band Wideband Low-Power Data Communication System

Test Mode	Final-Test Mode
BLE 1M	V
BLE 2M	V
BLR C2	
BLR C8	

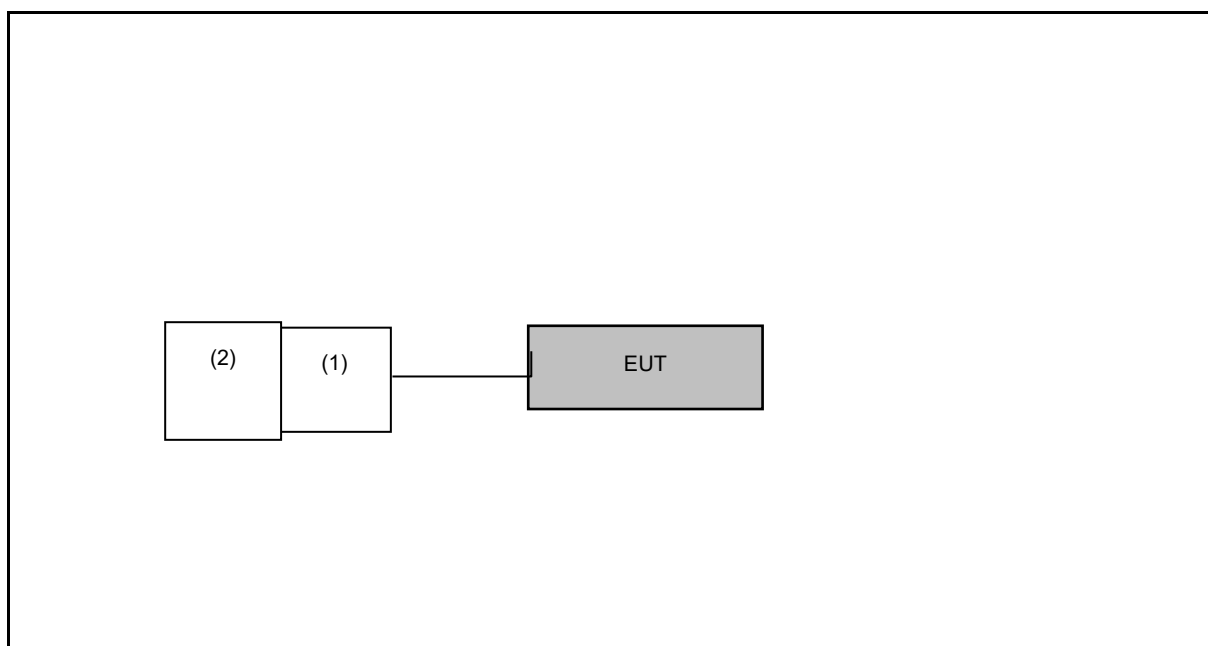
Comprehensive operation test

Three voltage settings are respectively adopted during the test. They are Normal Voltage, Normal Voltage + 10 % and Normal Voltage - 10 %.

2.2. EUT Test Step

1.	Setup the EUT shown on "Configuration of Test System Details".
2.	Turn on Bluetooth function.
3.	EUT run test program.

2.3. Configuration of Test System Details



	Product	Manufacturer	Model Number
(1)	NB	ASUS	P1488U
(2)	Fixture	msi	MS-8ZBH
(3)	USB Cable	msi	VERSA 300W 8K USB Cable

2.4. Test Instruments

For Conducted

Test Period: Nov. 19, 2025 ~ Nov. 20, 2025

Testing Engineer: Peter Shui

Test Site			RF01-BD					
Use	Equipment	Manufacturer	Model Number	Serial Number	Calibration Authority	Cal. Date	Cal. Period	Cal. Method
☐	Power Sensor	Anritsu	MA2411B	1126022	ETC	Aug. 28, 2025	1 year	(C)
☐	Power Meter	Anritsu	ML2495A	1135009	ETC	Aug. 28, 2025	1 year	(C)
☐	Power Sensor	Agilent	N1921A	MY45241957	ETC	Dec. 02, 2024	1 year	(C)
☐	Power Meter	Agilent	N1911A	MY45101619	ETC	Dec. 02, 2024	1 year	(C)
☒	Power Sensor	Anritsu	MA24208A	2326014	ETC	Dec. 02, 2024	1 year	(C)
☐	Spectrum Analyzer (10 Hz~26.5 GHz)	Keysight	N9010B	MY59071418	ETC	Apr. 14, 2025	1 year	(C)
☒	Spectrum Analyzer (20 Hz~26.5 GHz)	Agilent	N9020A	US47520902	ETC	Sep. 01, 2025	1 year	(C)
☐	Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	ETC	Mar. 07, 2025	1 year	(C)
☐	Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9020B	MY60112361	ETC	Jan. 13, 2025	1 year	(C)
☐	Signal Generator	Keysight	N5182B	MY53052569	ETC	Apr. 18, 2025	1 year	(C)
☐	Signal Generator	Keysight	N5182BX07	MY59360221	ETC	Apr. 18, 2025	1 year	(C)
☒	Power Supply	KEITHLEY	2303	4045290	OCL	Jan. 03, 2025	1 year	(C)
☐	Digital Power Analyzer	IDRC	CP-268	268711	OCL	Dec. 19, 2024	1 year	(C)

Remark :

- (a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
- (b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992).
- (c) Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- (d) Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to (c)

From JRL Article 24-2, paragraph 4, Item 2

2.5. Uncertainty of Measured Value

Test Item	Uncertainty	
	BD	WG
Frequency Error	4.8×10^{-7}	4.9×10^{-7}
Occupied Bandwidth	4.4%	4.4%
Spread Bandwidth	4.4%	4.4%
Antenna Power Error	1.1 dB	1.1 dB
Unwanted Emission Strength	1.0 dB	1.0 dB
Secondarily Emitted Radio Wave Strength	1.0 dB	1.0 dB

2.6. Test Site Environment

Items	Test Item	Required	Interval(*)
Temperature (°C)	Conducted	5-35	20-30
Humidity (%RH)		45-85	45-75

(*)The measurement ambient temperature is within this range.

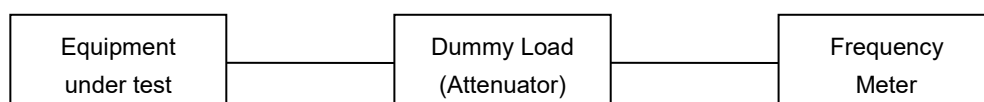
3 Measurement Procedure

3.1. Frequency Error Measurement

■ Limit

Frequency Tolerances ≤ 50 ppm.

■ Test Setup



■ Measuring Equipment Conditions

- (1) Use a frequency counter that has sensitivity of -20 dBm or better or a spectrum analyzer that has synthesized local oscillator.
- (2) Accuracy of the frequency counter shall be one tenth of the tolerance specified for EUT or less (e.g. 5×10^{-6} or less)
- (3) Attenuation of the attenuator shall be adjusted to give the optimum operation input level to the frequency meter in order to avoid the effect from the amplitude fluctuation of measurement wave.
- (4) When measuring burst waves, use the pulse measuring function of the counter and set the gate open time to a value that enables the measurement though entire period of burst as long as possible.

■ Conditions of Equipment under Test

- (1) Set the EUT to the test frequency and transmit RF signal.
- (2) The modulation state is "continuous wave without modulation" by stopping spread spectrum in principle. But, if it is not possible, it shall be "continuous burst wave without modulation".

■ Measuring Operation Procedures

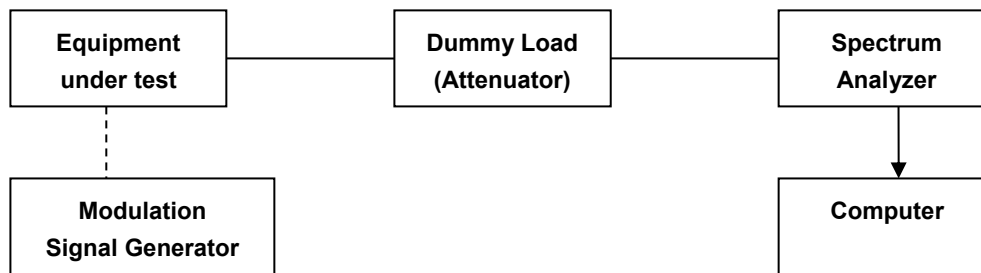
In case of burst waves, the measurement shall be done for enough time (e.g. covering 20 or more of burst waves) in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

3.2. Occupied Bandwidth Measurement

■ Limit

Max. Occupied Bandwidth: 26 MHz.

■ Test Setup



■ Measuring Equipment Conditions

Spectrum Analyzer Setting

SPAN : 200 MHz

RBW : 300 kHz

VBW : 300 kHz

Sweep Time : AUTO (Minimum time to ensure measurement accuracy.)

Data Points : 401 points or more

Indication mode : Max hold

Detection Mode : Positive Peak

Storage Mode : Normal

Y-axis Scale : 10 dB/Div.

Reference Level : Enough level for maximum dynamic range

■ Conditions of Equipment under Test

Set to testing frequency and modulate using standard encoding test signals.

■ Measuring Operation Procedures

- (1) Configure the setting of the spectrum analyzer to 3.3(1).
- (2) After repeating sweeps until no display changes are found, import the values of all the data points as array variables of the computer.
- (3) Convert the dB value into the antilog of the power dimension (i.e. mW) for all the data.
- (4) Find the total power of the all the data and record as "Total Power" in mW.
- (5) Add power to the minimum frequency data in order and find the value of the limiting data point that is 0.5 % of the "Total Power". Convert the limiting point into a frequency and record as the "lower limit" frequency.
- (6) Add power to the maximum frequency data in order and find the value of the limiting data point that is 0.5 % of the "Total Power". Convert the limiting point into a frequency and record as the "upper limit" frequency.

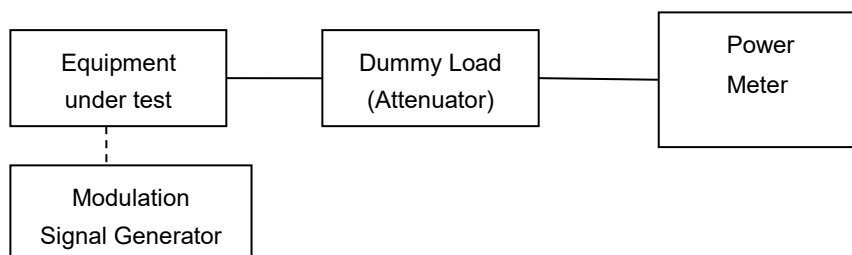
3.3. Antenna Power (Conducted) Measurement

■ Limit

RF Output Power ≤ 10 mW.

RF Output Power Tolerance ≤ 20 %.

■ Test Setup



■ Measuring Equipment Conditions

a. Use power meter to measure burst power.

■ Conditions of Equipment under Test

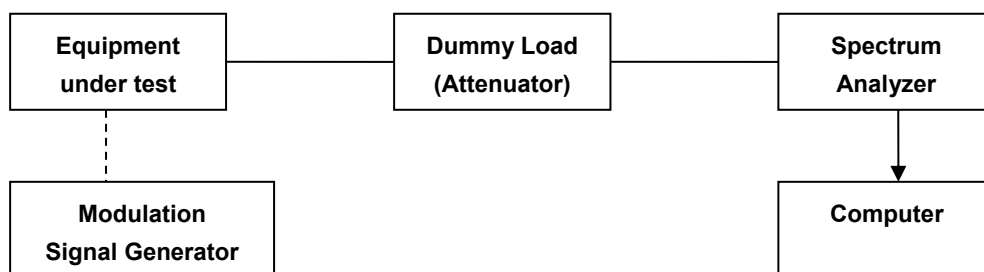
a. Connect the high frequency power meter to the output of the attenuator and measure the total power (without bandwidth limitation)

3.4. Unwanted Emission Strength Measurement

■ Limit

Frequency (MHz)	Limit ($\mu\text{W}/\text{MHz}$)
Under 2387 MHz	≤ 2.5
2387-2400 MHz	≤ 25
2483.5-2496.5 MHz	≤ 25
2496.5 - 12.5 GHz	≤ 2.5

■ Test Setup



Note 1: The computer is used for calculating the mean value of amplitude levels.

■ Measuring Equipment Conditions

(1) The setting of the spectrum analyzer during spurious searches are as follow:

Sweep Bandwidth:	Starts spurious searches from the smallest possible frequencies to more than 5 times the carrier frequencies..
Resolution bandwidth:	1 MHz
Video bandwidth:	1 MHz
Y-axis scale:	10 dB/Div.
Input level:	Maximum dynamic range value
Sweep time:	Minimum amount of time to ensure measurement accuracy.
Sweep mode:	Continuous mode
Data Points:	Over 400 points
Detection mode:	Positive peak
Display mode:	Maximum hold

- (2) The setting of spectrum analyzer while conducting spurious amplitude measurement are as follows:

Center Frequency:	Acquired spurious frequency in (1)
Frequency sweep width:	0 MHz
Resolution bandwidth:	1 MHz
Video bandwidth:	Same as Resolution bandwidth
	Note: take into account that the requirement limits the power in a bandwidth of 1 MHz. If the measurement is carried out with a bandwidth of 100 kHz (for frequencies below 1 GHz), the limit shall be reduced with 10 dB
Y-axis scale:	10 dB/Div
Input level:	Choose input level within the linear range of the SA mixer (so that no additional spurious are generated by the mixer).
Sweep mode:	Minimum amount of time to ensure measurement accuracy.
Data Points:	Over 400 points
Sweep mode:	Single sweep
Detection mode:	Sample (BIN-Width $\ll$ RBW, so that all spurious emissions are captured). [BIN-width is the frequency difference between 2 adjacent sample points on the display.]

■ Conditions of Equipment under Test

Set the testing frequency and testing spread codes and modulate using standard encoding test signals. Choose a frequency / channel according to specified range (Low, Middle and High).

Note: If the spurious limit is specified with the EIRP value, the effective (maximum) antenna gain shall be taken into account.

■ Measuring Operation Procedures

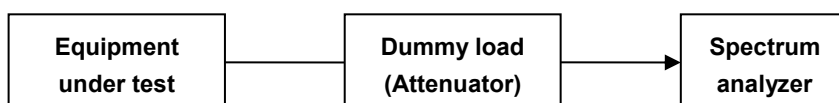
- (1) Configure the settings of the spectrum analyzer to 8.3(1) and search for spurious frequencies by sweeping. Do not conduct the measurements in 8.3(2) if the amplitude value of the acquired spurious frequencies meets the standard value.
- (2) If the acquired spurious amplitude value exceeds the standard value, narrow the sweep Bandwidth, in the order of 100 MHz, 10 MHz, and 1 MHz, to increase the frequency accuracy of the spectrum analyzer and accurately find the spurious frequency. Configure the spectrum analyzer to the settings in 8.3(2), find the average of the spurious amplitude values (in the case of burst waves, the average values are within the respective burst and set this as the measured value. Averaging can be done by summing up the power (display must give the linear power in uW) according to 8.3(2) and dividing by the amount of points. Correction on the equivalent noise bandwidth shall be necessary (if not realized automatically).

3.5. Secondly Emitted Radio Wave Strength Measurement

■ Limit

Frequency (MHz)	Limit (nW)
Under 1 GHz	≤ 4
1 - 12.5 GHz	≤ 20

■ Test Setup



■ Measuring Equipment Conditions

- (1) Set the attenuation of the attenuator to under 20 dB because the subject for measurement is of low level.
- (2) Set the spectrum analyzer as follow:

Frequency sweep width:	See 7.5 Measuring Operation Procedures
Resolution bandwidth:	A value determined by the specified dynamic range and the sweep time. (e.g. 30 kHz for 8 GHz sweep width and 30 second sweep time.).
Video bandwidth:	Approximately the same bandwidth as resolution bandwidth.
Y-axis scale:	10 dB/Div
Input level:	0 dB, if possible.
Sweep mode:	Single sweep
Detection mode:	Positive peak

■ Conditions of Equipment under Test

Set the EUT to receiver the test frequency with forced continuous receiving control.

■ Measuring Operation Procedures

Sweep the spectrum analyzer from a low frequency to a frequency of 3 times if the carrier or over (e.g. 10 MHz to about 8 GHz) and measure the collateral radio emissions.

3.6. Radio Interference Prevention Capability Measurement

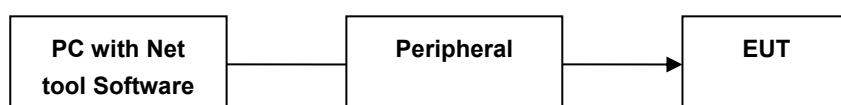
■ Limit

Identification code $\geq$ 48 bits

■ Measuring Id Code Software

MAC IP List: MAC Scan

■ Test Setup



■ Measuring Operation Procedures

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes form EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes form the counterpart. b . Check if communication is normal. c. Transmit the signals other than predetermined ID codes form the counterpart. d. check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

3.7. Construction Protection Confirmation Method

■ Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

4 Test Results

Frequency Error

Reference Appendix A / Appendix B

Occupied Bandwidth

Reference Appendix A / Appendix B

Antenna Power (Conducted)

Reference Appendix A

Unwanted Emission Strength

Reference Appendix A / Appendix B

Secondarily Emitted Radio Wave Strength

Reference Appendix A / Appendix B

■ Antenna List

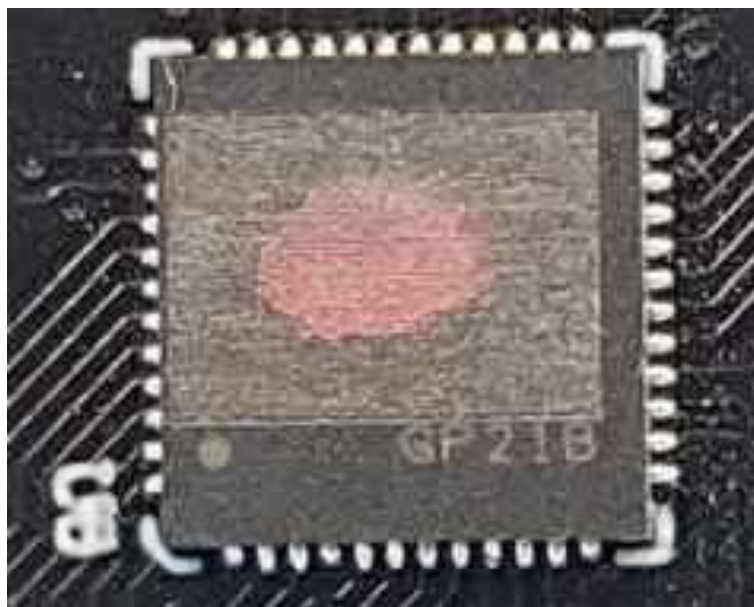
Antenna			Gain Specification			Notes (Cable or Others)
No	Type	Model Name	Max Gain (dBi)	Attenuation (dB)	Net Gain (dBi)	
1	PCB Antenna	VERSA 500W 8K ANT	1.52	0	0	Horizontal + Vertical

■ **Construction Protection Confirmation Method**

Confirmation Method

☐	1. Sealed with special screws (indicate the special screws used in Exterior View Drawings, and also attach its technical drawings of such screws).
☐	2. Plastic chassis is being welded using ultrasonic waves.
☐	3. Chassis is glued using a special adhesive.
☐	4. Metal covers are spot-fused (indicate the fused points in Exterior View Drawings).
☐	5. Cover is specially interlocked (indicate the interlocked part in Exterior View Drawings).
☐	6. Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
☐	7. Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
☐	8. Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.
☒	9. RF Module/Chip Pins > 20 and Chip Pins distance < 1.5 mm

Photo



--- END---