



EMC TEST REPORT

EN 55032:2015/A11:2020

EN 55035:2017/A11:2020

EN IEC 61000-3-2:2019/A1:2021

EN 61000-3-3:2013/A1:2019

MEASUREMENT AND TEST REPORT

For

Shenzhen Jiaomao Technology Co., Ltd.

Jiaomao,1003, Unit 1, Fucheng Digital Innovation Park, No. 15, Shijing Road, Fumin Community, Longhua District, Shenzhen

Model: JMMGW-mini, JMMGW-mini1, JMMGW-mini2

2022-10-09

This Report Concerns: Original Report	Equipment Type: Mini Multi-Mode Gateway
Test Engineer:	Sinphy Xie/ <i>Sinphy Xie</i>
Report Number:	TH2209185-C03-R01
Test Date:	2022-09-22 to 2022-10-09
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of TianHai Compliance Testing Laboratory Ltd.



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1 - SUMMARY OF STANDARDS AND RESULTS

1.1 DESCRIPTION OF STANDARDS AND RESULTS

The EUT have been tested according to the applicable standards as referenced below.

EMISSION				
Description of Test Item	Test Standard	Basic Standard	Requirement	Results
Conducted disturbance at mains terminals	EN 55032:2015 /A11:2020	EN 55032:2015 /A11:2020	Class B	PASS
Asymmetric mode conducted emission	EN 55032:2015 /A11:2020	EN 55032:2015 /A11:2020	/	N/A
Radiated disturbance	EN 55032:2015 /A11:2020	EN 55032:2015 /A11:2020	Class B	PASS
Harmonic current emissions	EN IEC 61000-3-2: 2019/A1:2021	EN IEC 61000-3-2: 2019/A1:2021	Class A	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2013 /A1:2019	EN 61000-3-3:2013 /A1:2019	Clause 5	PASS
IMMUNITY				
Description of Test Item	Test Standard	Basic Standard	Test configuration	Results
Electrostatic discharge (ESD)	EN 55035:2017 /A11:2020	IEC 61000-4-2:2008	Air Discharge: ±2kV, ±4kV, ±8kV Contact Discharge: ±2kV, ±4kV	PASS
Radio-frequency, Continuous radiated disturbance	EN 55035:2017 /A11:2020	IEC 61000-4-3:2020	1%1kHz, 80% AM, 80 ~ 1000MHz, 1800MHz,2600MHz 3500MHz,6000MHz 3V/m	PASS
Electrical fast transient (EFT)	EN 55035:2017 /A11:2020	IEC 61000-4-4:2012	Tr/Td 5/50 ns, 5kHz, AC power port: ±1kV	PASS
Surge (Input a.c. power ports)	EN 55035:2017 /A11:2020	IEC 61000-4-5:2014 +AMD1:2017	AC port: 1.2/50 (8/20)Tr/Th us Line-Line:±1kV Line-PE:±2kV	PASS
Radio-frequency, Continuous conducted disturbance	EN 55035:2017 /A11:2020	IEC 61000-4-6:2013	1%1kHz, 80%, AM Mod. 0.15 ~ 10MHz: 3V/m 10 ~ 30MHz: 3V/m to1V/m 30 ~ 80MHz: 1V/m	PASS
Power frequency Magnetic field*	EN 55035:2017 /A11:2020	IEC 61000-4-8:2009	--	N/A
Voltage dips, <5% reduction	EN 55035:2017 /A11:2020	IEC 61000-4-11: 2020	0.5 Cycle for 50Hz 0.5 Cycle for 60Hz	PASS
Voltage dips, 70% reduction			25 Cycle for 50Hz 30 Cycle for 60Hz	PASS



Voltage interruptions <5% reduction			250 Cycle for 50Hz 300 Cycle for 60Hz	PASS
Remark: N/A is an abbreviation for Not Applicable. “*”: The EUT does not contain devices susceptible to magnetic fields; therefore the Power-Frequency Magnetic Fields test is not necessary.				

1.2 DESCRIPTION OF PERFORMANCE CRITERIA

General Performance Criteria

General performance criteria are defined in 8.2, 8.3 and 8.4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable. When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

1.2.1 Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

1.2.2 Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

1.2.3 Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



2 - GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST

Client Information

Applicant: **Shenzhen Jiaomao Technology Co., Ltd.**
 Address: Jiaomao,1003, Unit 1, Fucheng Digital Innovation Park, No. 15, Shijing Road, Fumin Community, Longhua District, Shenzhen
 Manufacturer: **Shenzhen Jiaomao Technology Co., Ltd.**
 Address: Jiaomao,1003, Unit 1, Fucheng Digital Innovation Park, No. 15, Shijing Road, Fumin Community, Longhua District, Shenzhen

General Description of E.U.T

EUT Name: **Mini Multi-Mode Gateway**
 Trade Mark: /
 Model No.: JMMGW-mini, JMMGW-mini1, JMMGW-mini2
 Model Difference: The circuit design of all models is the same, but the appearance and model are different.
 Ratings: DC 5V/1.0A power from adapter:
 Model: TPA-147C050100VU01
 Input: AC 100-240V, 50/60Hz, 0.2A
 Output: DC 5V, 1.0A, 5.0W
 Test Mode: A. ON
 Sample No.: TH2209185
 Note: /

2.2 STATEMENT OF THE MEASUREMENT UNCERTAINTY TEST FACILITY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration Limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16-4-2

“Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.3 MEASUREMENT UNCERTAINTY

Test	Parameters	Expanded uncertainty (U _{lab})	Expanded uncertainty (U _{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz)	±2.52 dB	±3.80 dB
	(150kHz to 30MHz)	±2.36 dB	±3.40 dB
Power disturbance	Level accuracy (30MHz to 300MHz)	±3.20dB	±4.50 dB



Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	±3.10dB	N/A
Radiated emission	Level accuracy (30MHz to 1000MHz)	±5.78dB	±6.30dB
	Level accuracy (above 1000MHz)	±4.62dB	N/A
Mains Harmonic	Voltage	±1.80%	N/A
Voltage Fluctuations & Flicker	Voltage	±0.64%	N/A

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

(3) The measurement uncertainty is not included in the test result.

2.4 TEST LOCATION

All tests were performed at Shenzhen Tianhai Test Technology Co., Ltd.
125-126, No.66, Zhangge Road ,Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, P.R. China

2.5 PRINCIPLE OF CONFIGURATION SELECTION

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

2.6 TEST OPERATION

Test operation refers to test setup in chapter 4 & 5 & 6 & 7 & 8.

Pre-test in all operation modes, and find out the worst case for compliance test.

According to section 2.1, full tests was applied on the model: JMMGW-mini

2.7 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT

The EUT was tested together with the following accessories:

Kind of Equipment	Manufacturer	Type	S/N
/	/	/	/

The EUT was tested with following cables:

Cable name	Length (m)	Shield	Core No.	Detachable
/	/	/	/	/

**3 - TEST EQUIPMENT LIST AND DETAILS**

Kind of Equipment	Manufacturer	Type	S/N	Calibrate until
Conducted Emission				
EMI Test Receiver	R&S	ESR7	102333	2022-11-15
L.I.S.N	Schwarzbeck	NNLK 8128	5089	2022-11-15
8-Wire ISN CAT6	Schwarzbeck	NTFM 8158	231	2022-11-15
Pulse Limiter	Schwarzbeck	VTSD 9561-F	847	2022-11-15
EZ_EMCC	EZ	EMC-CON 3A1.1	/	/
Radiated Emission (3m)				
EMI Test Receiver	R&S	ESR7	102333	2022-11-15
MXA Signal Analyzer	Keysight	N9020A	MY51281805	2023-04-15
Bilog Antenna	Schwarzbeck	VULB 9168	01148	2022-11-20
Pre-Amplifier	Schwarzbeck	BBV 9718 B	00109	2022-11-16
Pre-Amplifier	Schwarzbeck	BBV 9743 B	00253	2022-11-15
Horn Antenna	Schwarzbeck	BBHA 9120	02379	2022-11-20
EZ_EMCC	EZ	FA-03A2 RE	/	/
Harmonics & Flicker				
5kVA AC Power Source	AMETEK CTS	5001iX-CTS-400	2046A03237	2022-11-15
Signal Conditioning Unit	AMETEK CTS	PACS-1	2046A03238	2022-11-15
CTS 4	California Instruments	Version 4.26.0	/	/
Electrostatic discharge (ESD)				
ESD Simulator	TESEQ	NSG 437	1569	2022-11-20
Pistol	TESEQ	V06.04	/	/
Base Station	TESEQ	V06.02	/	/
Radio-frequency, Continuous radiated disturbance (RS)				
Signal generator	R&S	SMB 100A	113650	2023-04-15
Power meter	Agilent	E4417A	MY45100899	2023-04-15
Power sensor	Agilent	E9300	US40390494	2023-04-15
Power sensor	Agilent	E9300	MY44420219	2023-04-15
Power amplifier	Micotop	MPA-80-1000-250	MPA2112426	2023-04-15

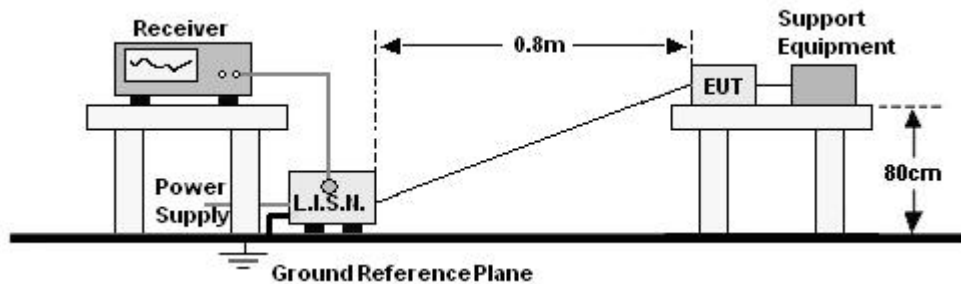


Power amplifier	Micotop	MPA-1000-6000-100	MPA2201013	2023-04-15
Stacked Log. Periodic Antenna	Schwarzbeck	STLP 9129	201	/
RF Switch	Emtrace	SW X4	/	/
EM 3	Emtrace	V1.2.1	/	/
Electrical fast transient (EFT)				
Burst Tester	3C TEST	EFT 500T	ES027000120015	2022-11-15
Coupling Clamp	3C TEST	CCC 100	CCC 20092269	2022-11-15
CCS	3C TEST	V4.2.7	ES027000120015	/
Surge				
Surge simulator	3C TEST	CWS 600CT	ES058000920005	2022-11-15
Three phases CDN	3C TEST	SPN 3832T	ES0911910	2022-11-15
CDN for unshielded symmetrical high-speed Telecom cable	3C TEST	CDN405T8A	ES064001220010	2022-11-15
CDN for Telecom cable	3C TEST	CDN405M40-5	ES1071910	2022-11-15
CWS	3C TEST	V1.0.5.2	ES058000920005	/
Radio-frequency,Continuous conducted disturbance (CS)				
Conducted Immunity Test System	3C TEST	CST 1075	ES096000120008	2022-11-15
6dB Attenuator	3C TEST	DTC75-6	ES095000120006	2022-11-15
Single phase CDN	3C TEST	CDN M2M3	ES064002620007	2022-11-15
Three phases CDN	3C TEST	CDN M5-16	ES064003320004	2022-11-15
Calibration Set	3C TEST	CDN 100KIT	ES064002820016	2022-11-15
Calibration Set	3C TEST	EM CL100KIT	EM C20032816	2022-11-15
EM-Clamp	3C TEST	EM CL100	EM C20032811	2022-11-15
EMC-s	SKET	V1.4.0.54	/	/
Voltage dips &Voltage interruptions				
Power failure simulator	3C TEST	PFS 2216SD	ES049001220003	2022-11-15
CCS	3C TEST	V4.2.8	ES049001220003	/



4 - CONDUCTED EMISSION MEASUREMENT

4.1 BLOCK DIAGRAM OF TEST SETUP



4.2 LIMITS

Frequency range (MHz)	Class B Limits (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 - 56	56 - 46
0.50 ~ 5	56	46
5 ~ 30	60	50

Remark: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

(3) All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.3 TEST PROCEDURE

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through a Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement.

The bandwidth of the field strength meter is set at 9kHz.

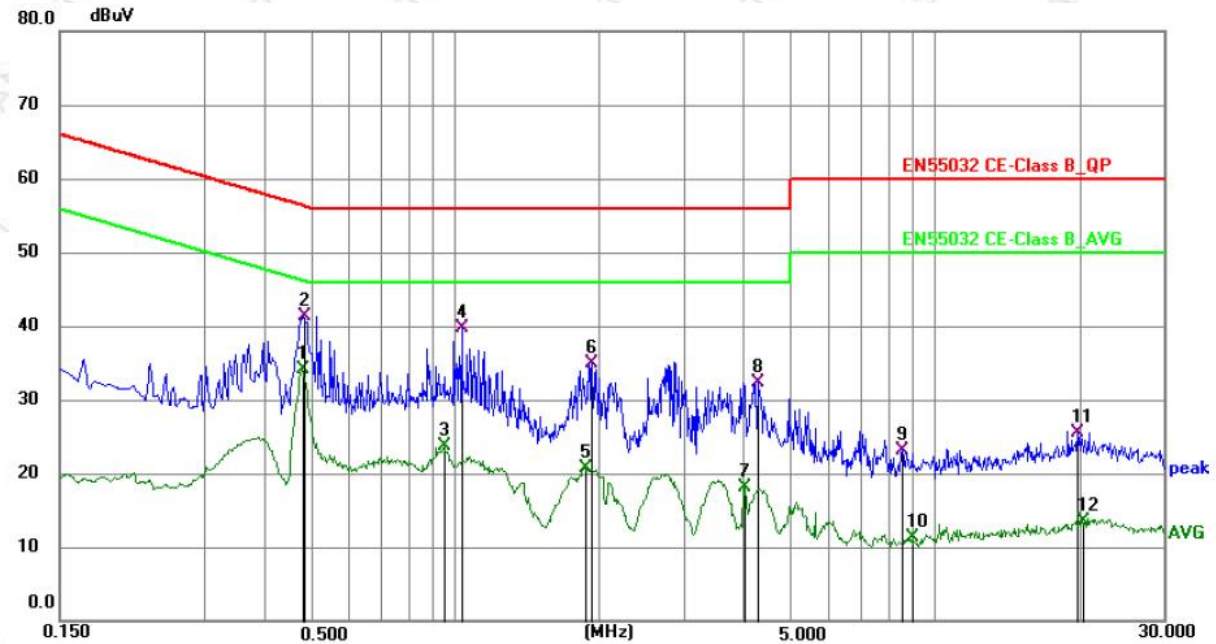
The frequency range from 150kHz to 30MHz is investigated. The scanning waveform please refer to the next page.



4.4 TEST RESULTS AND DATA

EUT: Mini Multi-Mode Gateway
 M/N: JMMGW-mini
 Test Mode: Mode A
 Test Voltage : AC 230V/50Hz
 Temperature: 23°C
 Humidity: 55%
 Atmosphere pressure: 101Kpa
 Test Results Pass

Phase:L1

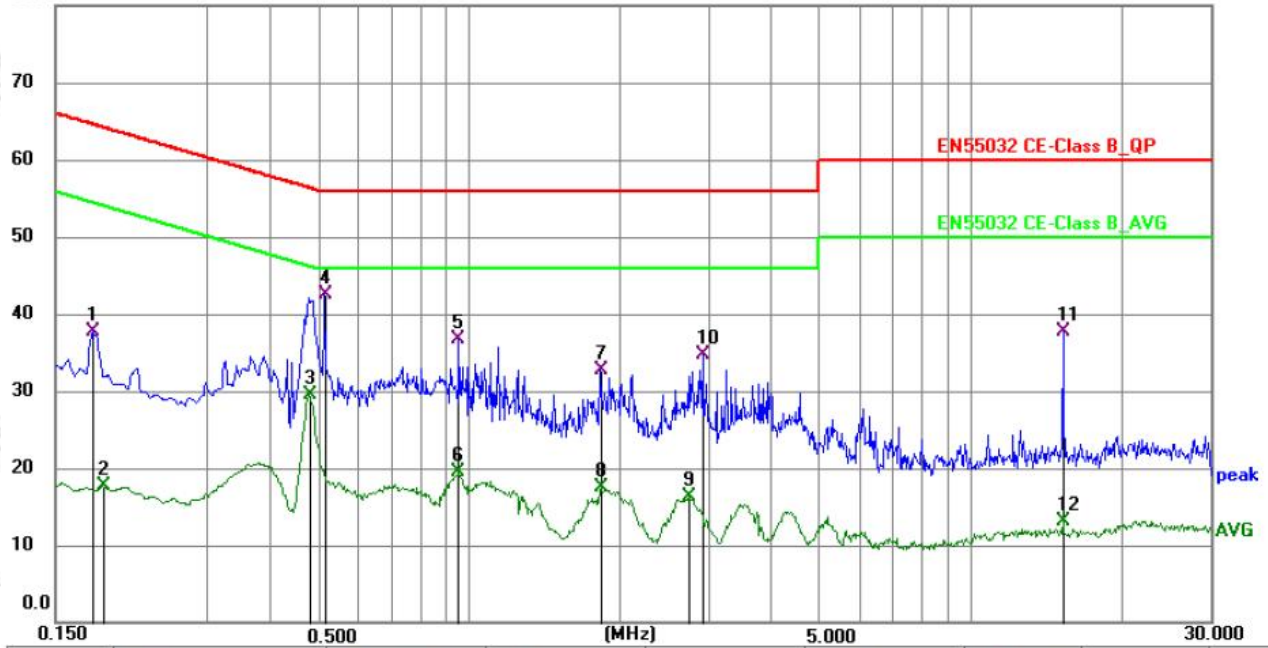


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.4785	23.75	10.31	34.06	46.37	-12.31	AVG	P
2	0.4830	31.06	10.31	41.37	56.29	-14.92	QP	P
3	0.9510	13.23	10.40	23.63	46.00	-22.37	AVG	P
4	1.0365	29.22	10.39	39.61	56.00	-16.39	QP	P
5	1.8735	10.29	10.45	20.74	46.00	-25.26	AVG	P
6	1.9365	24.42	10.46	34.88	56.00	-21.12	QP	P
7	4.0065	7.66	10.45	18.11	46.00	-27.89	AVG	P
8	4.2810	21.91	10.43	32.34	56.00	-23.66	QP	P
9	8.5820	12.55	10.51	23.06	60.00	-36.94	QP	P
10	8.9870	0.76	10.52	11.28	50.00	-38.72	AVG	P
11	19.8550	14.57	10.91	25.48	60.00	-34.52	QP	P
12	20.2870	2.65	10.91	13.56	50.00	-36.44	AVG	P



Phase:N

80.0 dBuV

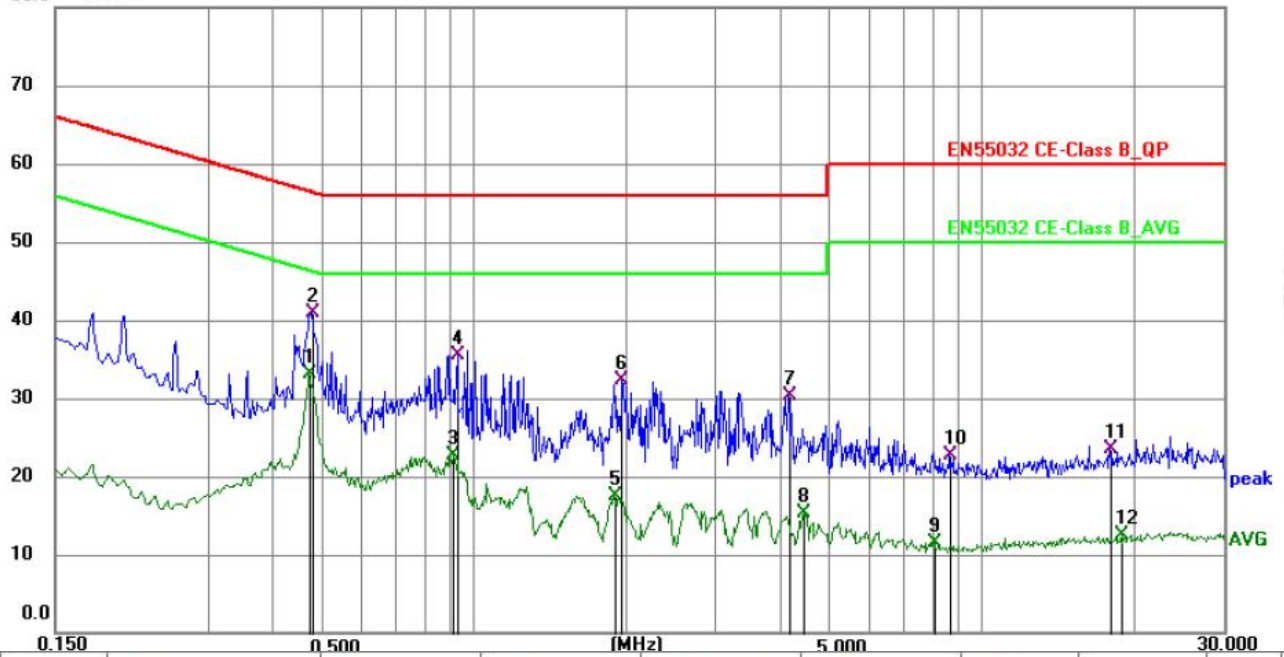


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1770	27.39	10.22	37.61	64.63	-27.02	QP	P
2	0.1860	7.53	10.21	17.74	54.21	-36.47	AVG	P
3	0.4785	19.20	10.32	29.52	46.37	-16.85	AVG	P
4 *	0.5144	32.14	10.33	42.47	56.00	-13.53	QP	P
5	0.9555	26.24	10.41	36.65	56.00	-19.35	QP	P
6	0.9555	9.14	10.41	19.55	46.00	-26.45	AVG	P
7	1.8195	22.26	10.52	32.78	56.00	-23.22	QP	P
8	1.8375	6.93	10.52	17.45	46.00	-28.55	AVG	P
9	2.7375	5.89	10.45	16.34	46.00	-29.66	AVG	P
10	2.9219	24.17	10.46	34.63	56.00	-21.37	QP	P
11	15.2785	27.01	10.72	37.73	60.00	-22.27	QP	P
12	15.2785	2.42	10.72	13.14	50.00	-36.86	AVG	P



EUT: Mini Multi-Mode Gateway
 M/N: JMMGW-mini
 Test Mode: Mode A
 Test Voltage : AC 120V/60Hz
 Temperature: 23°C
 Humidity: 55%
 Atmosphere pressure: 101Kpa
 Test Results Pass

Phase:L1
80.0 dBuV

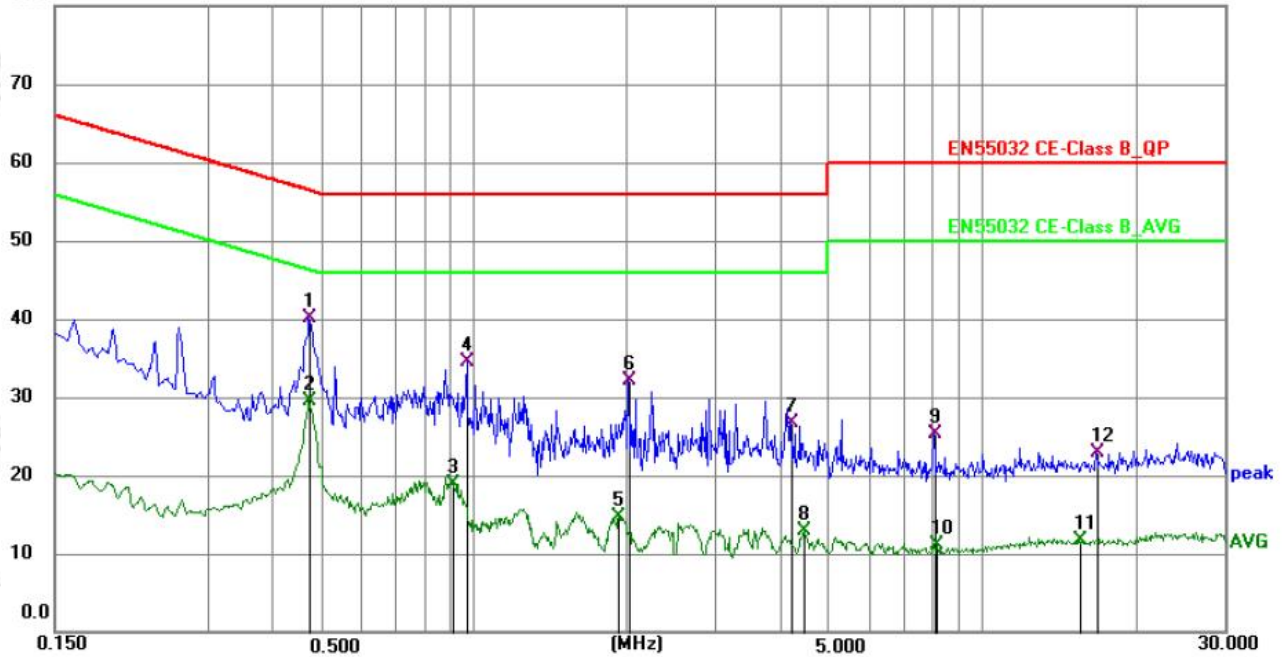


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.4740	22.76	10.31	33.07	46.44	-13.37	AVG	P
2	0.4785	30.61	10.31	40.92	56.37	-15.45	QP	P
3	0.9150	12.40	10.39	22.79	46.00	-23.21	AVG	P
4	0.9330	25.18	10.39	35.57	56.00	-20.43	QP	P
5	1.8915	6.98	10.46	17.44	46.00	-28.56	AVG	P
6	1.9635	21.92	10.46	32.38	56.00	-23.62	QP	P
7	4.1640	19.86	10.45	30.31	56.00	-25.69	QP	P
8	4.4745	4.84	10.43	15.27	46.00	-30.73	AVG	P
9	8.0780	1.07	10.49	11.56	50.00	-38.44	AVG	P
10	8.6495	12.20	10.51	22.71	60.00	-37.29	QP	P
11	17.9290	12.64	10.82	23.46	60.00	-36.54	QP	P
12	18.8604	1.70	10.86	12.56	50.00	-37.44	AVG	P



Phase:N

80.0 dBuV



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.4740	29.83	10.32	40.15	56.44	-16.29	QP	P
2	0.4740	19.14	10.32	29.46	46.44	-16.98	AVG	P
3	0.9150	8.57	10.38	18.95	46.00	-27.05	AVG	P
4	0.9735	24.08	10.41	34.49	56.00	-21.51	QP	P
5	1.9365	4.19	10.49	14.68	46.00	-31.32	AVG	P
6	2.0130	21.62	10.48	32.10	56.00	-23.90	QP	P
7	4.2135	16.13	10.49	26.62	56.00	-29.38	QP	P
8	4.4610	2.43	10.47	12.90	46.00	-33.10	AVG	P
9	8.0285	14.70	10.55	25.25	60.00	-34.75	QP	P
10	8.1635	0.59	10.56	11.15	50.00	-38.85	AVG	P
11	15.5170	1.07	10.72	11.79	50.00	-38.21	AVG	P
12	16.8265	12.07	10.76	22.83	60.00	-37.17	QP	P



5 - RADIATED DISTURBANCE MEASUREMENT

5.1 BLOCK DIAGRAM OF TEST SETUP

Below 1GHz

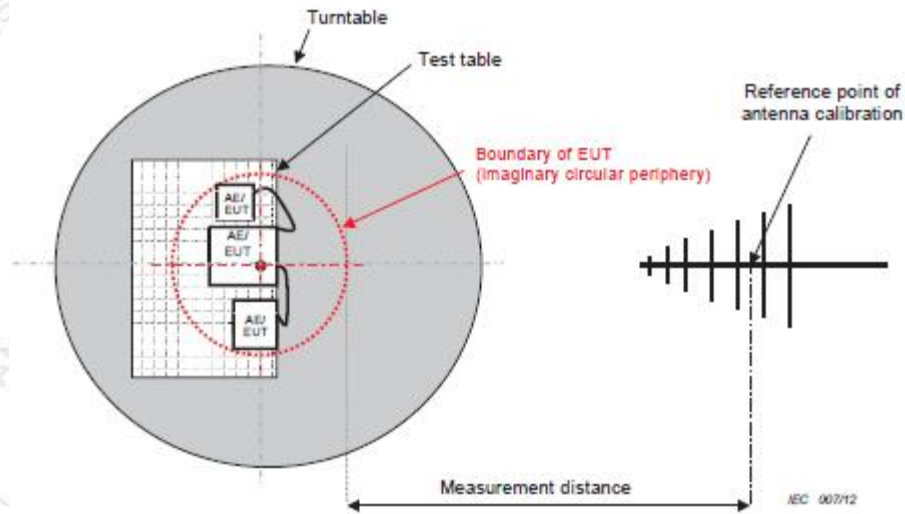


Figure C.1 – Measurement distance

Above 1GHz

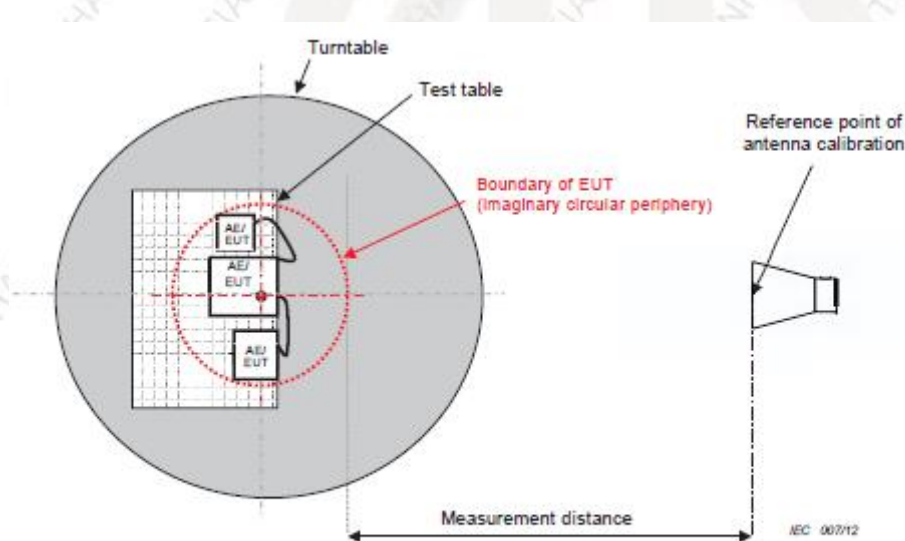


Figure C.1 – Measurement distance

5.2 LIMITS

Below 1GHz

Frequency (MHz)	Quasi-peak Limits at 3m dB(μ V/m)
30-230	40
230-1000	47

NOTE: The lower limit shall apply at the transition frequencies.



Above 1GHz

Frequency (MHz)	Class B Limits at 3m	
	Peak dB(μ V/m)	Average
1000-3000	70	50
3000-6000	74	54

5.3 TEST PROCEDURE

a. The Product was placed on the non-conductive turntable 0.8/0.1 m above the ground at a chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW(Below 1GHz), 1MHz RBW(Above 1GHz). Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP or peak value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector / peak / AVG, and specified bandwidth with Maximum Hold Mode, and record the maximum value.



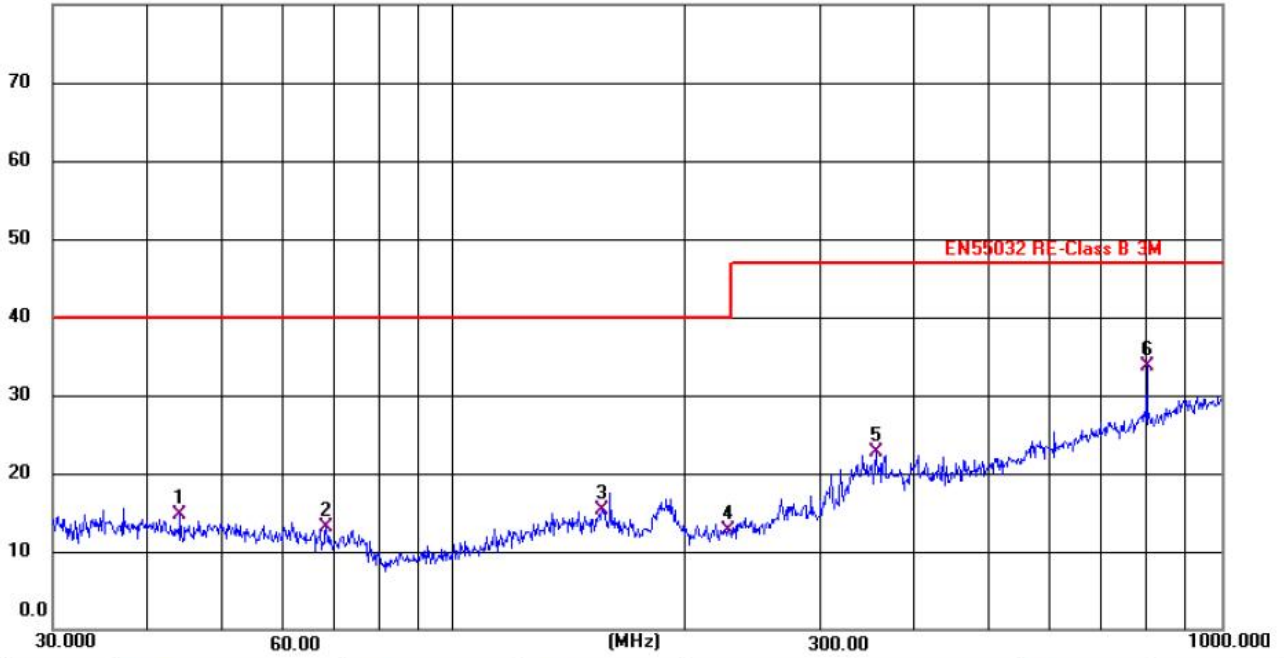
5.4 TEST RESULTS AND DATA

Below 1GHz

EUT: Mini Multi-Mode Gateway
 M/N: JMMGW-mini
 Test Mode: Mode A
 Test Voltage : AC 230V/50Hz
 Temperature: 26°C
 Humidity: 54%
 Atmosphere pressure: 101Kpa
 Test Results Pass

Polarization:Horizontal

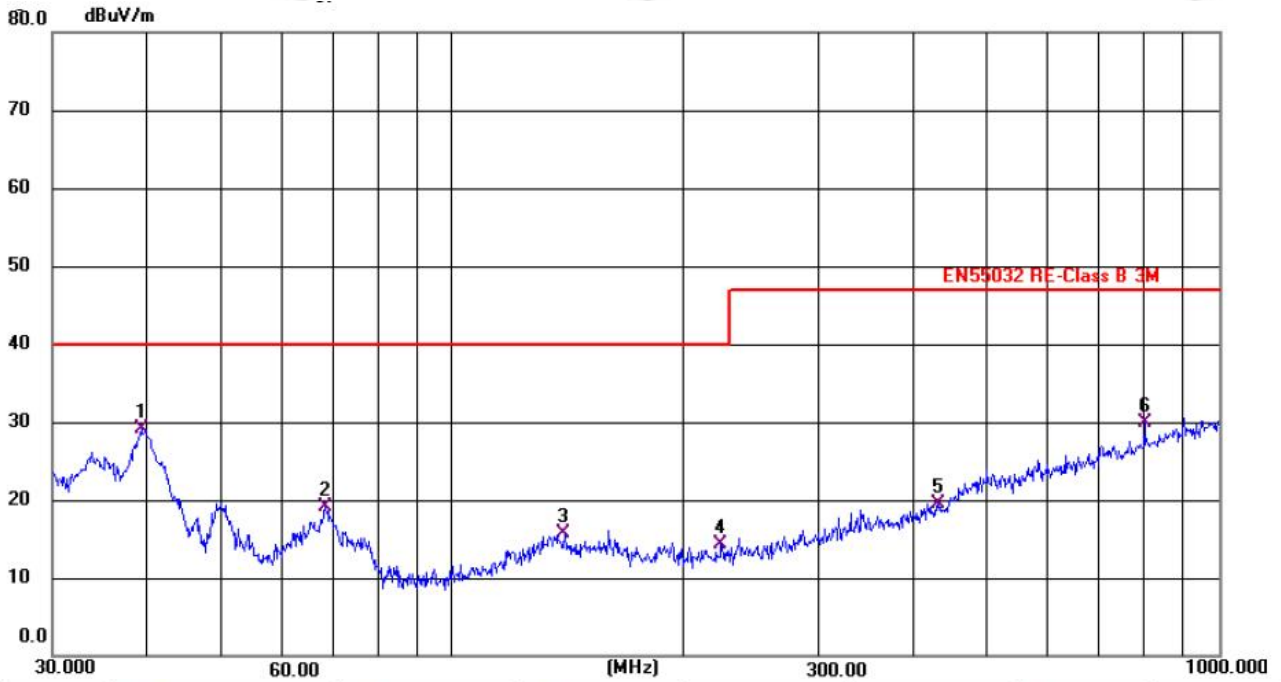
80.0 dBuV/m



No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	43.9658	29.34	-14.70	14.64	40.00	-25.36	QP
2	68.2710	30.44	-17.29	13.15	40.00	-26.85	QP
3	156.4578	30.79	-15.49	15.30	40.00	-24.70	QP
4	228.0902	29.59	-16.95	12.64	40.00	-27.36	QP
5	355.4273	35.95	-13.28	22.67	47.00	-24.33	QP
6 *	800.3817	37.26	-3.65	33.61	47.00	-13.39	QP



Polarization:Vertical



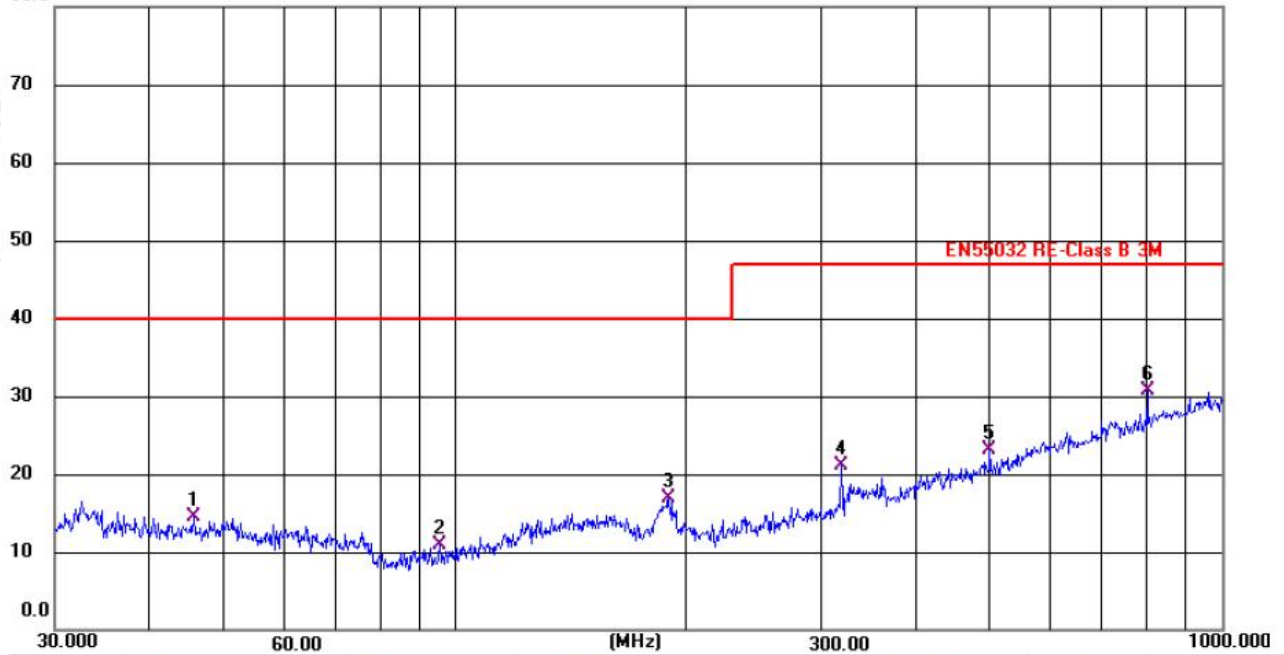
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	39.2991	43.82	-14.78	29.04	40.00	-10.96	QP
2	68.2710	36.24	-17.16	19.08	40.00	-20.92	QP
3	140.0961	31.39	-15.71	15.68	40.00	-24.32	QP
4	224.1260	31.72	-17.45	14.27	40.00	-25.73	QP
5	430.2765	30.84	-11.40	19.44	47.00	-27.56	QP
6	800.3817	34.06	-4.15	29.91	47.00	-17.09	QP



EUT: Mini Multi-Mode Gateway
M/N: JMMGW-mini
Test Mode: Mode A
Test Voltage : AC 120V/60Hz
Temperature: 26°C
Humidity: 54%
Atmosphere pressure: 101Kpa
Test Results Pass

Polarization:Horizontal

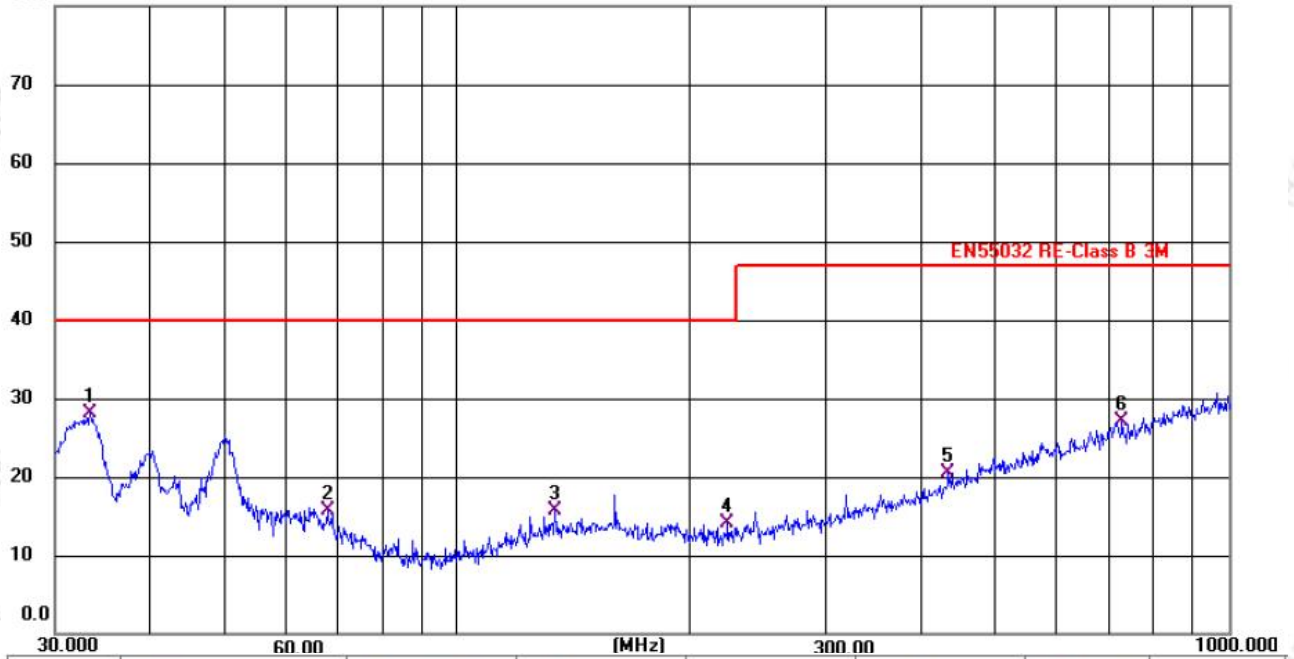
80.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	45.6948	29.24	-14.75	14.49	40.00	-25.51	QP
2	95.5945	29.75	-18.90	10.85	40.00	-29.15	QP
3	190.4050	34.87	-18.00	16.87	40.00	-23.13	QP
4	319.9370	35.52	-14.50	21.02	47.00	-25.98	QP
5	498.5498	32.54	-9.40	23.14	47.00	-23.86	QP
6 *	800.3817	34.27	-3.65	30.62	47.00	-16.38	QP



Polarization:Vertical
80.0 dBuV/m



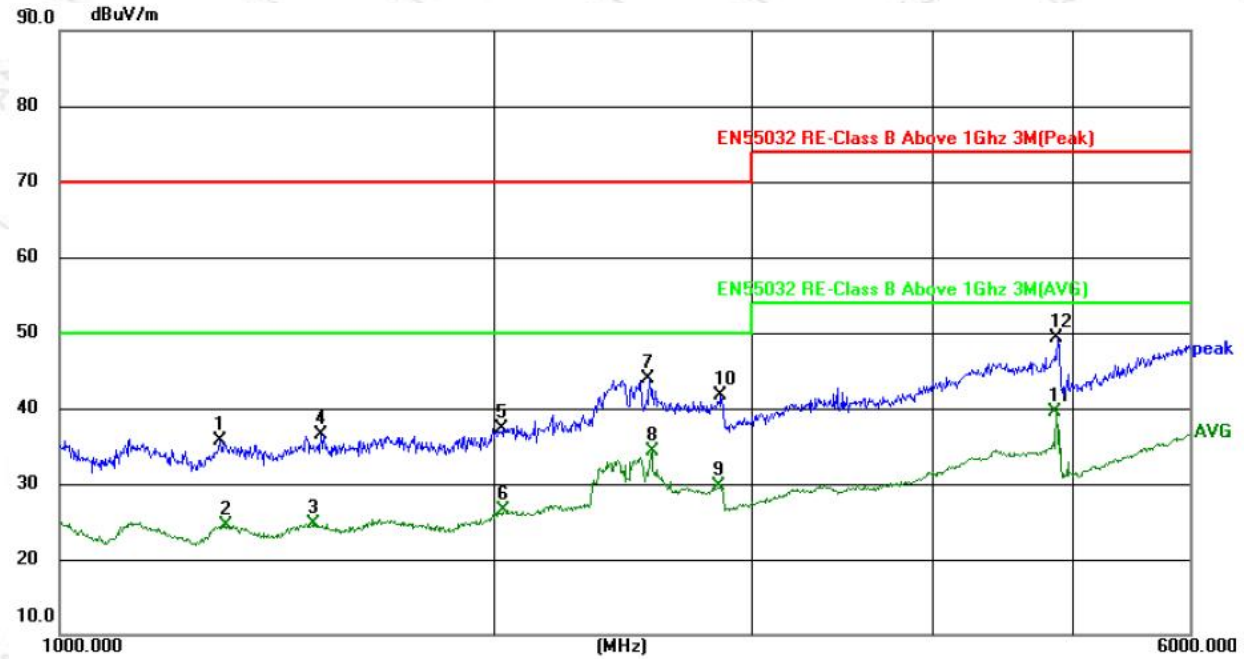
No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1 *	33.3279	43.77	-15.69	28.08	40.00	-11.92	QP
2	67.7939	32.86	-17.11	15.75	40.00	-24.25	QP
3	133.6188	31.92	-16.13	15.79	40.00	-24.21	QP
4	224.1260	31.55	-17.45	14.10	40.00	-25.90	QP
5	433.3047	31.88	-11.32	20.56	47.00	-26.44	QP
6	728.0806	32.46	-5.33	27.13	47.00	-19.87	QP



Above 1GHz

EUT: Mini Multi-Mode Gateway
M/N: JMMGW-mini
Test Mode: Mode A
Test Voltage : AC 230V/50Hz
Temperature: 26°C
Humidity: 54%
Atmosphere pressure: 101Kpa
Test Results Pass

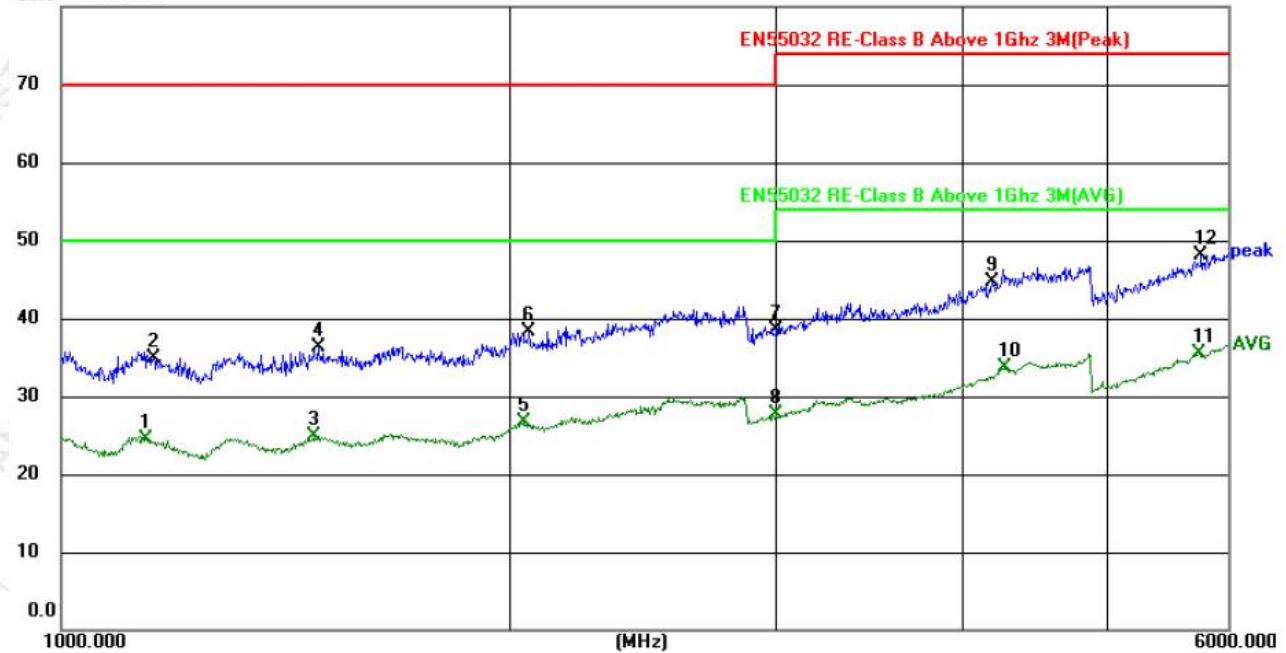
Polarization:Horizontal



No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	1292.039	42.98	-7.37	35.61	70.00	-34.39	peak
2	1304.834	31.87	-7.30	24.57	50.00	-25.43	AVG
3	1493.846	31.02	-6.30	24.72	50.00	-25.28	AVG
4	1515.413	42.81	-6.23	36.58	70.00	-33.42	peak
5	2022.150	41.25	-4.00	37.25	70.00	-32.75	peak
6	2027.592	30.52	-3.98	26.54	50.00	-23.46	AVG
7	2552.543	46.72	-2.76	43.96	70.00	-26.04	peak
8	2559.413	37.04	-2.75	34.29	50.00	-15.71	AVG
9	2855.009	32.06	-2.27	29.79	50.00	-20.21	AVG
10	2857.568	43.98	-2.27	41.71	70.00	-28.29	peak
11 *	4869.637	36.36	3.23	39.59	54.00	-14.41	AVG
12	4874.002	46.05	3.24	49.29	74.00	-24.71	peak



Polarization:Vertical
80.0 dBuV/m

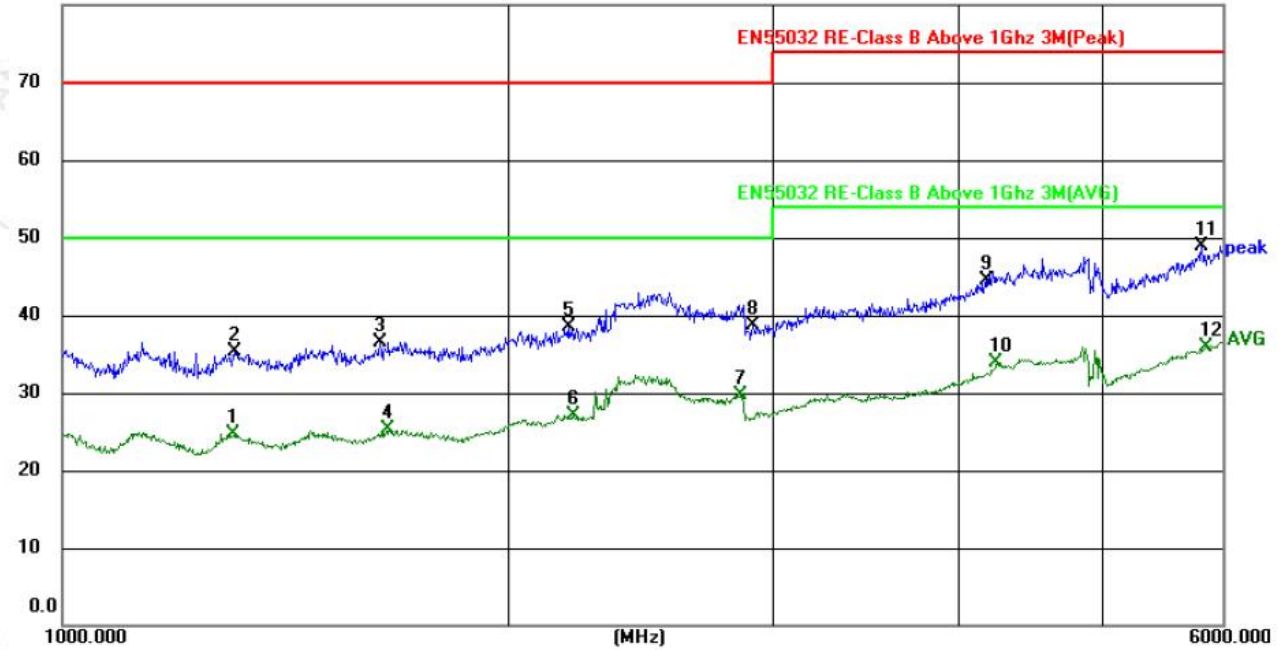


No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	1139.738	31.37	-6.77	24.60	50.00	-25.40	AVG
2	1154.123	41.66	-6.71	34.95	70.00	-35.05	peak
3	1475.227	30.08	-5.15	24.93	50.00	-25.07	AVG
4	1485.838	41.50	-5.10	36.40	70.00	-33.60	peak
5	2038.521	29.17	-2.54	26.63	50.00	-23.37	AVG
6	2055.024	40.79	-2.48	38.31	70.00	-31.69	peak
7	3001.897	37.83	0.66	38.49	74.00	-35.51	peak
8	3001.897	27.02	0.66	27.68	54.00	-26.32	AVG
9	4189.208	40.64	3.99	44.63	74.00	-29.37	peak
10	4261.126	29.53	4.09	33.62	54.00	-20.38	AVG
11 *	5747.456	28.50	7.04	35.54	54.00	-18.46	AVG
12	5768.089	40.91	7.13	48.04	74.00	-25.96	peak



EUT: Mini Multi-Mode Gateway
M/N: JMMGW-mini
Test Mode: Mode A
Test Voltage : AC 120V/60Hz
Temperature: 26°C
Humidity: 54%
Atmosphere pressure: 101Kpa
Test Results Pass

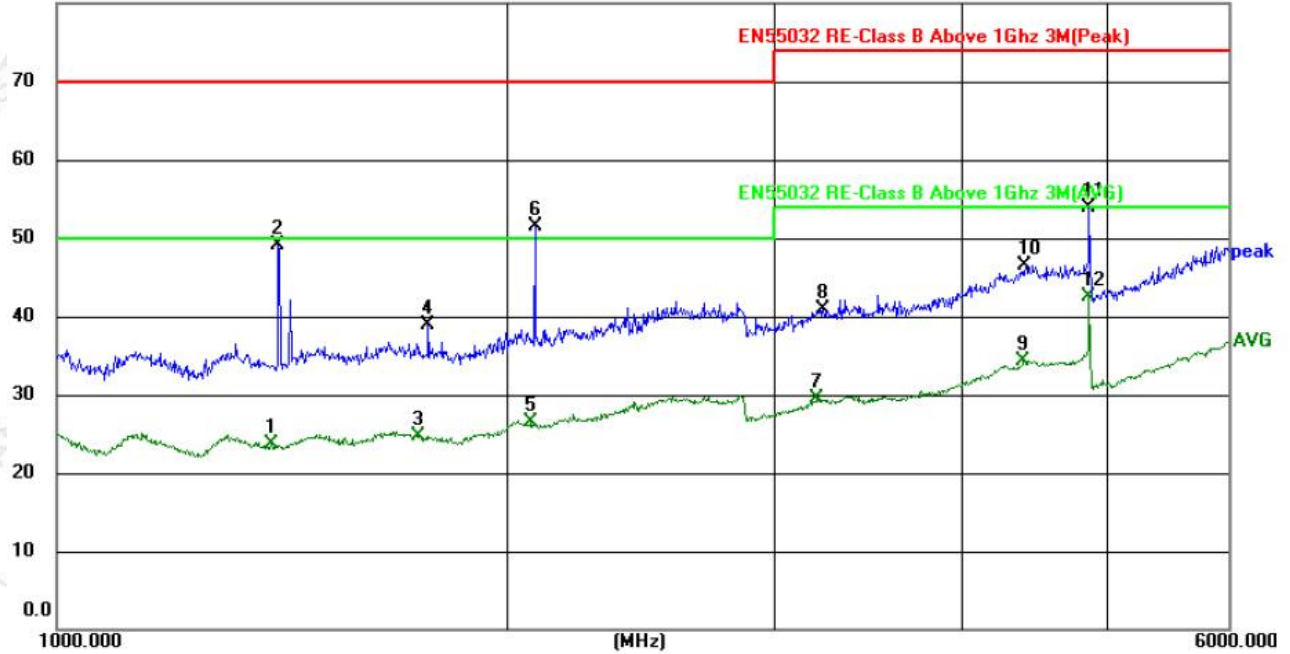
Polarization:Horizontal
80.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1304.834	31.91	-7.30	24.61	50.00	-25.39	AVG
2	1304.835	42.64	-7.30	35.34	70.00	-34.66	peak
3	1638.252	42.25	-5.73	36.52	70.00	-33.48	peak
4	1658.928	30.90	-5.61	25.29	50.00	-24.71	AVG
5	2188.024	42.03	-3.59	38.44	70.00	-31.56	peak
6	2201.789	30.72	-3.57	27.15	50.00	-22.85	AVG
7	2860.130	32.02	-2.26	29.76	50.00	-20.24	AVG
8	2909.231	40.95	-2.19	38.76	70.00	-31.24	peak
9	4174.223	42.48	1.94	44.42	74.00	-29.58	peak
10	4242.081	31.82	2.11	33.93	54.00	-20.07	AVG
11	5819.996	43.10	5.85	48.95	74.00	-25.05	peak
12 *	5861.858	29.87	5.97	35.84	54.00	-18.16	AVG



Polarization:Vertical
80.0 dBuV/m

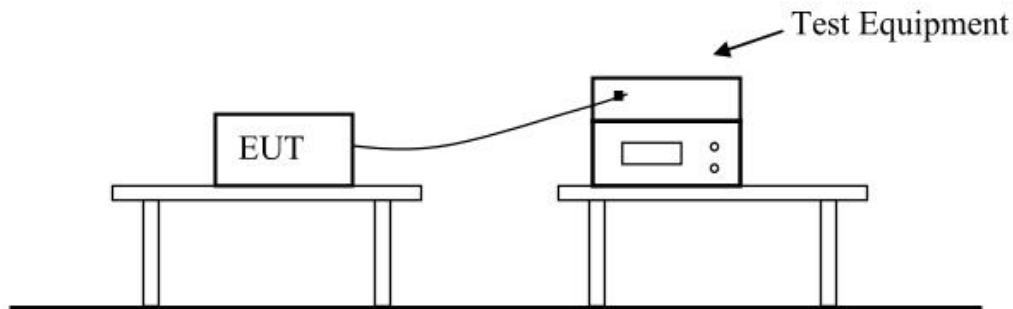


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1390.528	29.35	-5.56	23.79	50.00	-26.21	AVG
2	1404.299	54.62	-5.50	49.12	70.00	-20.88	peak
3	1739.597	28.65	-3.89	24.76	50.00	-25.24	AVG
4	1766.294	42.62	-3.76	38.86	70.00	-31.14	peak
5	2071.660	28.84	-2.43	26.41	50.00	-23.59	AVG
6	2080.961	53.90	-2.41	51.49	70.00	-18.51	peak
7	3204.781	28.91	0.57	29.48	54.00	-24.52	AVG
8	3236.519	40.25	0.56	40.81	74.00	-33.19	peak
9	4400.794	30.07	4.30	34.37	54.00	-19.63	AVG
10	4412.638	42.10	4.32	46.42	74.00	-27.58	peak
11	4856.567	48.57	5.42	53.99	74.00	-20.01	peak
12 *	4856.567	37.10	5.42	42.52	54.00	-11.48	AVG



6 - HARMONIC CURRENT EMISSION MEASUREMENT

6.1 BLOCK DIAGRAM OF TEST SETUP



6.2 TEST STANDARD

Please refer to EN IEC 61000-3-2:2019/A1:2021

6.3 TEST PROCEDURE

- a. The Product was placed on the top of a non-conductive table above the ground and operated to produce the maximum harmonic components under normal Test Modes for each successive harmonic component in turn.
- b. The correspondent test program of test instrument to measure the current harmonics emanated from Product was chosen. The measure time shall be not less than the time necessary for the Product to be exercised.

6.4 TEST RESULTS

Pass



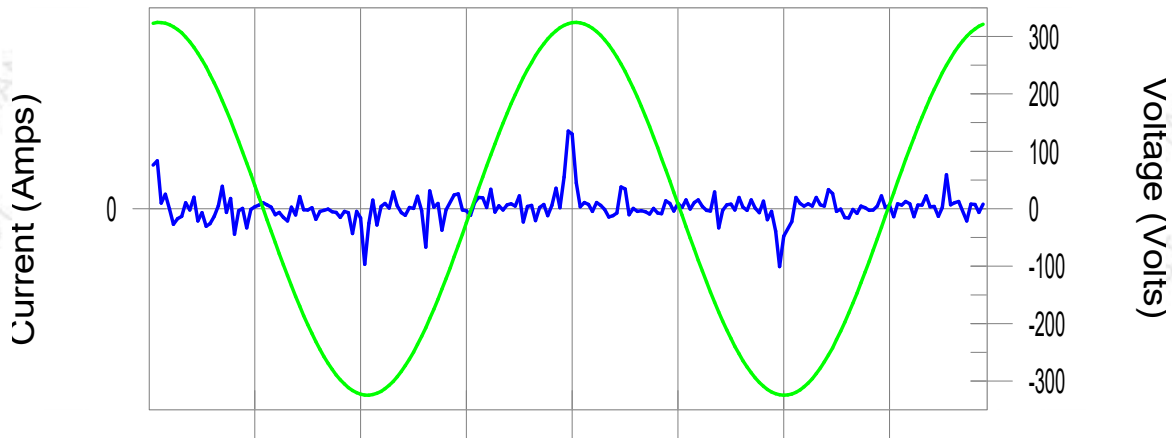
Harmonics – Class-A per Ed. 5.0 (2018)(Run time)

EUT: Mini Multi-Mode Gateway
Test category: Class-A per Ed. 5.0 (2018) (European limits)
Test date: 2022/9/28 Start time: 11:01:32 End time: 11:04:14
Test duration (min): 2.5 Data file name: H-000482.cts_data
Comment: JMMGW-mini
Customer: Shenzhen Jiaomao Technology Co., Ltd.

Tested by: Rich
Test Margin: 100

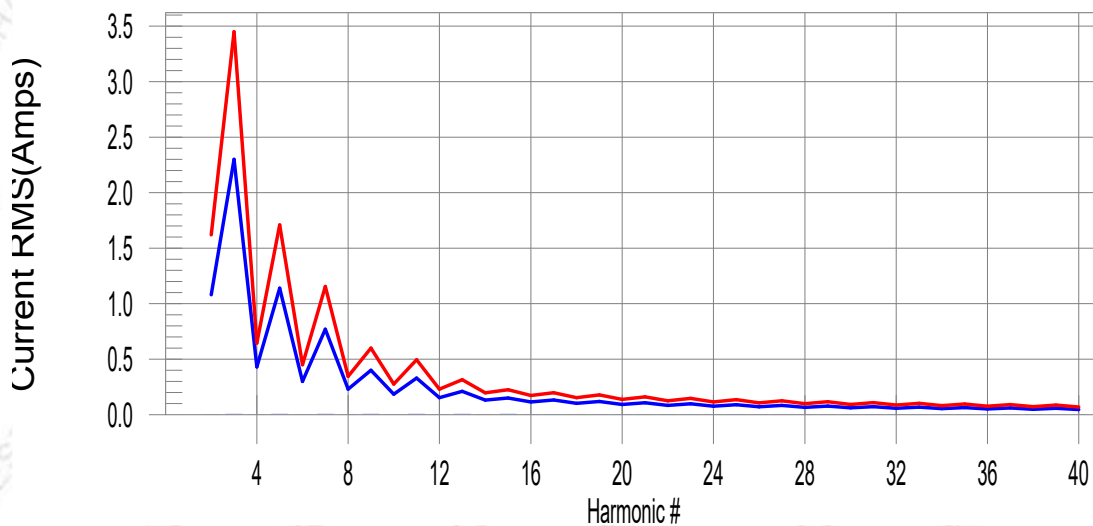
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H0-0.0% of 150% limit, H0-0% of 100% limit



Current Test Result Summary (Run time)

EUT: Mini Multi-Mode Gateway Tested by: Rich
 Test category: Class-A per Ed. 5.0 (2018) (European limits) Test Margin: 100
 Test date: 2022/9/28 Start time: 11:01:32 End time: 11:04:14
 Test duration (min): 2.5 Data file name: H-000482.cts_data
 Comment: JMMGW-mini
 Customer: Shenzhen Jiaomao Technology Co., Ltd.

Test Result: Pass Source qualification: Normal
 THC(A): 0.008 I-THD(%): 253.5 POHC(A): 0.004 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 229.58 Frequency(Hz): 50.00
 I_Peak (Amps): 0.128 I_RMS (Amps): 0.014
 I_Fund (Amps): 0.003 Crest Factor: 10.115
 Power (Watts): 0.7 Power Factor: 0.266

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.003	2.300	N/A	0.004	3.450	N/A	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.002	1.140	N/A	0.003	1.710	N/A	Pass
6	0.000	0.300	N/A	0.001	0.450	N/A	Pass
7	0.002	0.770	N/A	0.003	1.155	N/A	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.002	0.400	N/A	0.003	0.600	N/A	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.002	0.330	N/A	0.002	0.495	N/A	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.002	0.210	N/A	0.003	0.315	N/A	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.002	0.150	N/A	0.002	0.225	N/A	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.002	0.132	N/A	0.002	0.198	N/A	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.002	0.118	N/A	0.002	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.002	0.107	N/A	0.002	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.002	0.098	N/A	0.002	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.002	0.090	N/A	0.002	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.001	0.083	N/A	0.002	0.125	N/A	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.000	0.058	N/A	0.001	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass



Voltage Source Verification Data (Run time)

EUT: Mini Multi-Mode Gateway Tested by: Rich
 Test category: Class-A per Ed. 5.0 (2018) (European limits) Test Margin: 100
 Test date: 2022/9/28 Start time: 11:01:32 End time: 11:04:14
 Test duration (min): 2.5 Data file name: H-000482.cts_data
 Comment: JMMGW-mini
 Customer: Shenzhen Jiaomao Technology Co., Ltd.

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

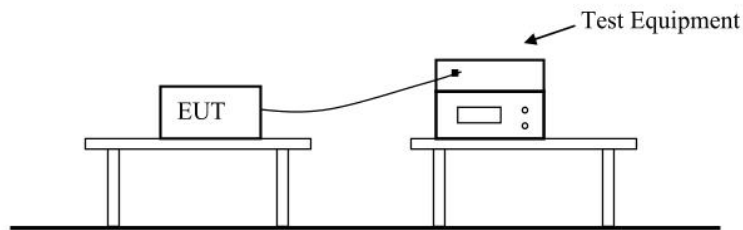
Voltage (Vrms): 229.58 Frequency(Hz): 50.00
 I_Peak (Amps): 0.128 I_RMS (Amps): 0.014
 I_Fund (Amps): 0.003 Crest Factor: 10.115
 Power (Watts): 0.7 Power Factor: 0.266

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.087	0.459	18.88	OK
3	0.475	2.066	22.98	OK
4	0.062	0.459	13.45	OK
5	0.033	0.918	3.58	OK
6	0.028	0.459	6.11	OK
7	0.038	0.689	5.47	OK
8	0.016	0.459	3.44	OK
9	0.014	0.459	3.11	OK
10	0.015	0.459	3.27	OK
11	0.010	0.230	4.21	OK
12	0.014	0.230	6.26	OK
13	0.011	0.230	4.74	OK
14	0.009	0.229	4.02	OK
15	0.010	0.230	4.29	OK
16	0.007	0.229	2.97	OK
17	0.008	0.230	3.34	OK
18	0.008	0.229	3.41	OK
19	0.010	0.230	4.17	OK
20	0.011	0.230	4.86	OK
21	0.009	0.230	3.73	OK
22	0.007	0.230	2.88	OK
23	0.008	0.230	3.45	OK
24	0.007	0.230	2.93	OK
25	0.008	0.229	3.37	OK
26	0.006	0.230	2.82	OK
27	0.008	0.230	3.30	OK
28	0.007	0.230	2.88	OK
29	0.008	0.229	3.48	OK
30	0.006	0.230	2.80	OK
31	0.007	0.229	3.17	OK
32	0.007	0.230	2.98	OK
33	0.006	0.230	2.64	OK
34	0.007	0.230	2.85	OK
35	0.007	0.230	3.22	OK
36	0.006	0.229	2.40	OK
37	0.008	0.230	3.42	OK
38	0.006	0.229	2.71	OK
39	0.008	0.230	3.50	OK
40	0.008	0.230	3.66	OK



7 - VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

7.1 BLOCK DIAGRAM OF TEST SETUP



7.2 TEST STANDARD

Please refer to EN 61000-3-3:2013/A1:2019

7.3 TEST PROCEDURE

- a. The Product was placed on the top of a non-conductive table above the ground and operated to produce the most unfavorable sequence of voltage changes under normal Test Modes.
- b. During the flick test, the measure time shall include that part of whole operation cycle in which the Product procedure the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.4 TEST RESULTS

Pass



Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

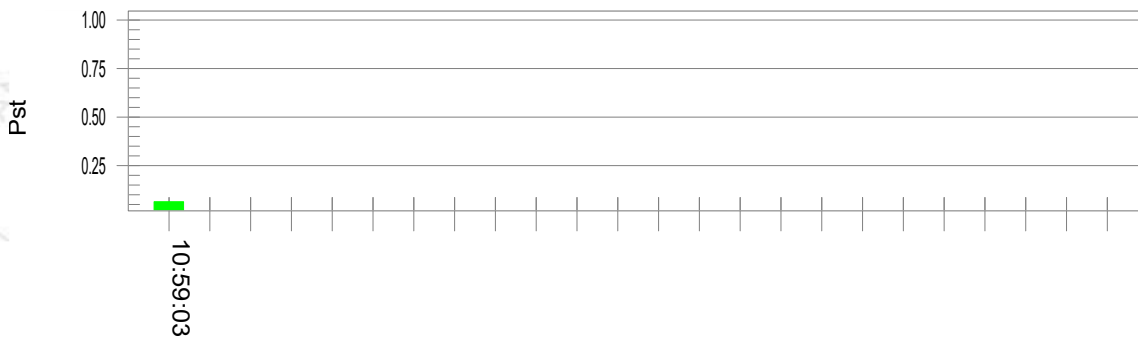
EUT: Mini Multi-Mode Gateway
 Test category: All parameters (European limits)
 Test date: 2022/9/28 Start time: 10:48:42
 Test duration (min): 10 Data file name: F-000481.cts_data
 Comment: JMMGW-mini
 Customer: Shenzhen Jiaomao Technology Co., Ltd.

Tested by: Rich
 Test Margin: 100
 End time: 10:59:09

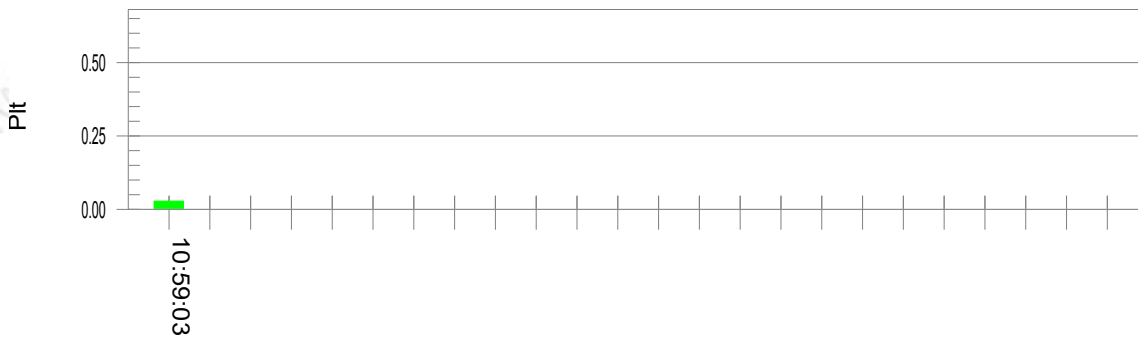
Test Result: Pass Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

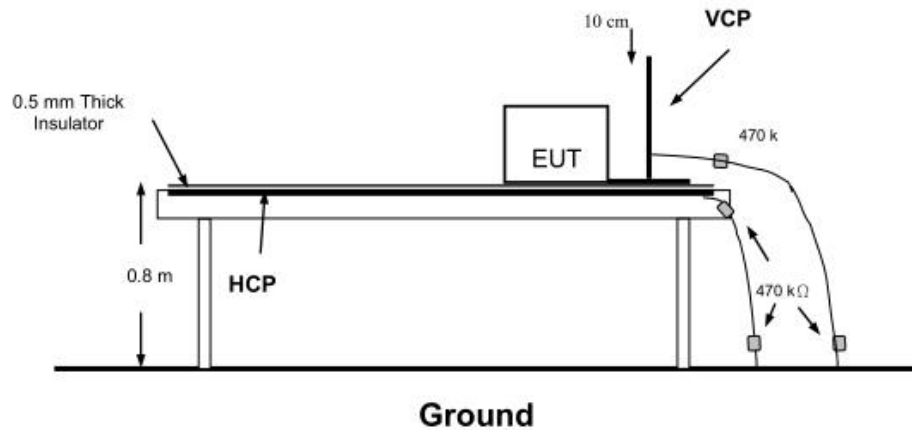
Vrms at the end of test (Volt):	229.93		
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650 Pass



8 - IMMUNITY TEST

8.1 ELECTROSTATIC DISCHARGE IMMUNITY TEST

8.1.1 BLOCK DIAGRAM OF TEST SETUP



8.1.2 TEST SPECIFICATION

Basic Standard	: IEC 61000-4-2:2008
Test Port	: Enclosure port
Discharge Impedance	: 330 ohm / 150 pF
Discharge Mode	: Single Discharge
Discharge Period	: one second between each discharge

8.1.3 TEST PROCEDURE

8.1.3.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

8.1.3.2. Contact Discharge

All the procedure shall be same as Section 8.1.3.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

8.1.3.3. Indirect Discharge for Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

8.1.3.4. Indirect Discharge for Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.



8.1.4 TEST RESULTS

Electrostatic Discharge	
Basic Standard:	IEC 61000-4-2:2008
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

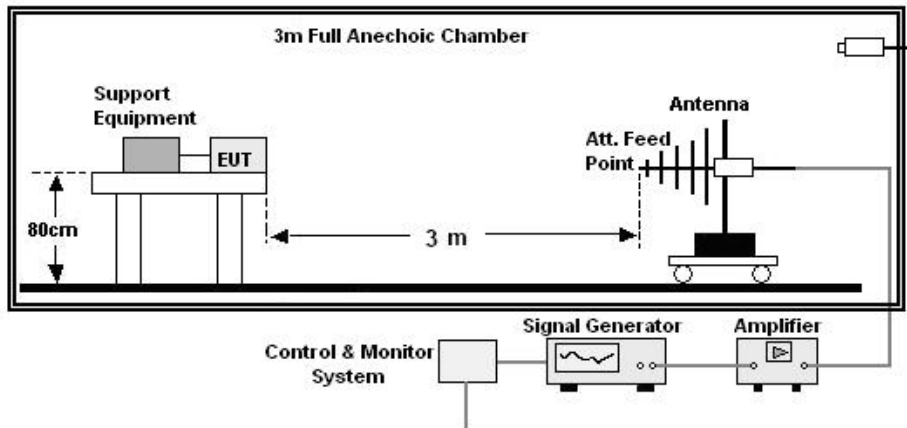
Discharge Method	Discharge Position	Voltage (\pm kV)	Min. No. of Discharge per polarity (Each Point)	Performance criteria	Result
Contact Discharge	Mini USB port	2, 4	10	B	Pass
	Indirect Discharge HCP	2, 4	10	B	Pass
	Indirect Discharge VCP	2, 4	10	B	Pass
Air Discharge	Insulating Surfaces, Indicator light	2, 4, 8	10	B	Pass



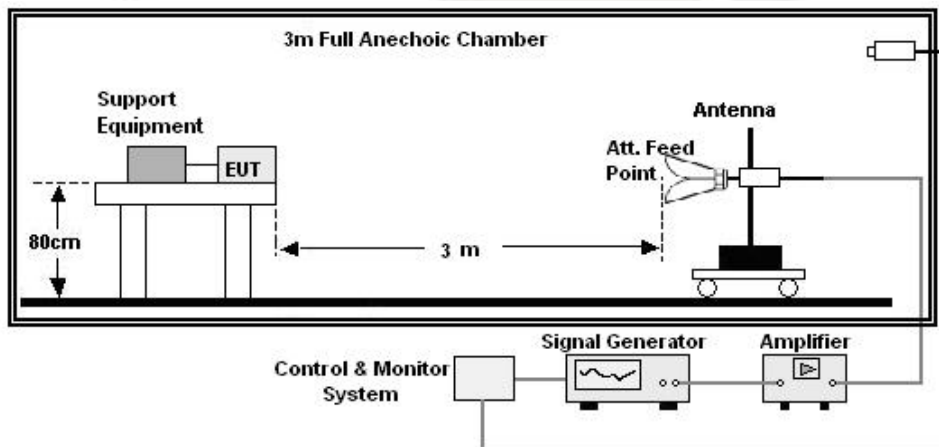
8.2 RADIO FREQUENCY ELECTROMAGNETIC FIELDS

8.2.1 BLOCK DIAGRAM OF TEST SETUP

80-1000MHz:



80-6000MHz:



8.2.2 TEST SPECIFICATION

Basic Standard	: IEC 61000-4-3:2020
Test Port	: Enclosure port
Step Size	: 1%
Modulation	: 1kHz, 80% AM
Dwell Time	: 1 second
Polarization	: Horizontal & Vertical

8.2.3 TEST PROCEDURE

- The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
- The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 6000MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1%.
- The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.



8.2.4 TEST RESULTS

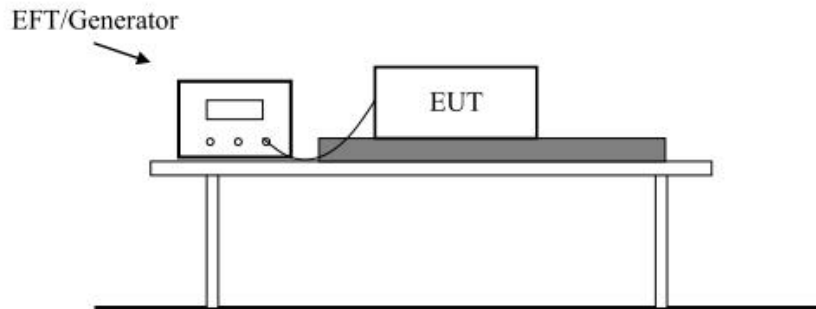
Radio frequency electromagnetic fields	
Basic Standard:	IEC 61000-4-3:2020
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

Frequency (MHz)	Position	Field Strength (V/m)	Performance criteria	Result
80 - 1000	Front	3	A	Pass
	Right	3	A	Pass
	Back	3	A	Pass
	Left	3	A	Pass
1800	Front	3	A	Pass
	Right	3	A	Pass
	Back	3	A	Pass
	Left	3	A	Pass
2600	Front	3	A	Pass
	Right	3	A	Pass
	Back	3	A	Pass
	Left	3	A	Pass
3500	Front	3	A	Pass
	Right	3	A	Pass
	Back	3	A	Pass
	Left	3	A	Pass
6000	Front	3	A	Pass
	Right	3	A	Pass
	Back	3	A	Pass
	Left	3	A	Pass



8.3 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

8.3.1 BLOCK DIAGRAM OF TEST SETUP



8.3.2 TEST SPECIFICATION

Basic Standard	: IEC 61000-4-4:2012
Test Port	: input a.c.power port
Impulse Frequency	: 5 kHz
Impulse Wave-shape	: 5/50 ns
Burst Duration	: 15 ms
Burst Period	: 300 ms
Test Duration	: 2 minutes per polarity

8.3.3 TEST PROCEDURE

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

8.3.3.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

8.3.3.2. For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

8.3.3.3. For DC output line ports:

No DC output ports. It's unnecessary to test.



8.3.4 TEST RESULTS

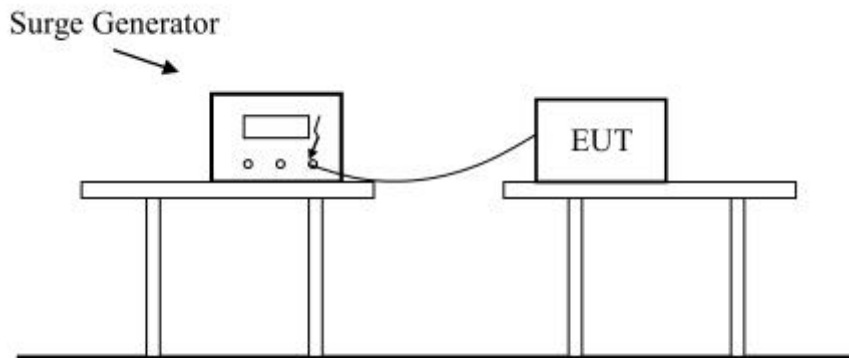
Electrical Fast Transient/Burst	
Basic Standard:	IEC 61000-4-4:2012
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

Line	Test Voltage	Performance criteria	Result
L	± 1kV	B	Pass
N	± 1kV	B	Pass
L - N	± 1kV	B	Pass



8.4 SURGE IMMUNITY TEST

8.4.1 BLOCK DIAGRAM OF TEST SETUP



8.4.2 TEST SPECIFICATION

Basic Standard	IEC 61000-4-5:2014+AMD1:2017
Test Port	input a.c. power port
Wave-Shape	Open Circuit Voltage - 1.2 / 50 us Short Circuit Current - 8 / 20 us
Pulse Repetition Rate	1 pulse / min.
Test Events	Five positive/negative polarity pulses at the 0°, 90°, 180°, 270° phase angle

8.4.3 TEST PROCEDURE

8.4.1.1. Set up the EUT and test generator as shown on Section 8.4.1.

8.4.1.2. For line to line coupling mode, provide a 1.0 KV or 2.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

8.4.1.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test

8.4.1.4. Different phase angles are done individually.

8.4.1.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.



8.4.4 TEST RESULTS

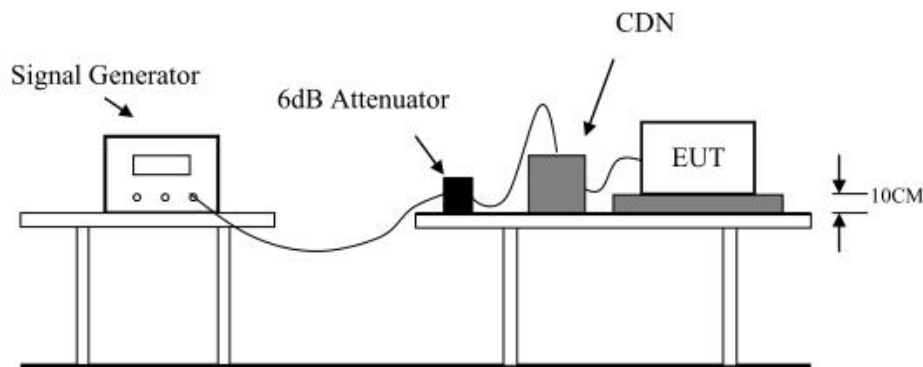
SURGE IMMUNITY	
Basic Standard:	IEC 61000-4-5:2014+AMD1:2017
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

Line	Phase Angle	Test Voltage	Number of Pulse	Performance criteria	Result
L - N	90°	+ 1kV	5	B	Pass
	270°	- 1kV	5	B	Pass



8.5 INJECTED CURRENTS SUSCEPTIBILITY TEST

8.5.1 BLOCK DIAGRAM OF TEST SETUP



8.5.2 TEST SPECIFICATION

Basic Standard	: IEC 61000-4-6:2013
Test Port	: input a.c. power port
Step Size	: 1%
Modulation	: 1kHz,80% AM
Dwell Time	: 1 second

8.5.3 TEST PROCEDURE

8.5.3.1. Set up the EUT, CDN and test generators as shown on Section 8.5.1.

8.5.3.2. Let the EUT work in test mode and measure it.

8.5.3.3. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

8.5.3.4. The disturbance signal described below is injected to EUT through CDN.

8.5.3.5. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

8.5.3.6. The frequency range is swept from 150kHz to 10MHz using 3V, 10MHz to 30MHz using 3V to 1V,30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

8.5.3.7. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

8.5.3.8. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.



8.5.4 TEST RESULTS

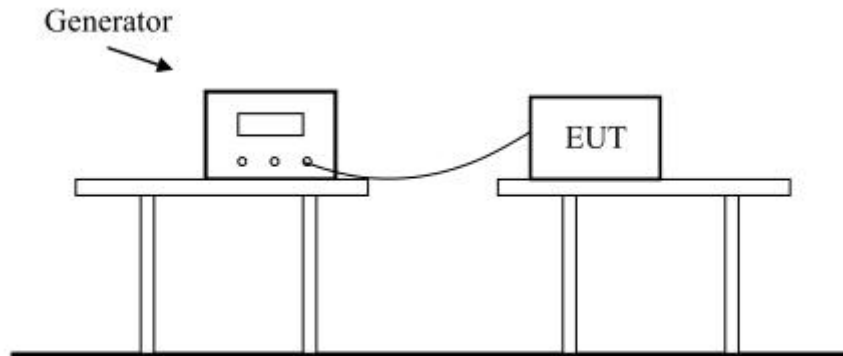
INJECTED CURRENTS SUSCEPTIBILITY	
Basic Standard:	IEC 61000-4-6:2013
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

Frequency Range (MHz)	Injected Position	Strength (Non-modulated)	Performance criteria	Result
0.15 ~ 10	AC Mains	3V r.m.s.	A	Pass
10 ~ 30	AC Mains	3V r.m.s. to 1V r.m.s.	A	Pass
30 ~ 80	AC Mains	1V r.m.s.	A	Pass



8.6 VOLTAGE DIPS AND INTERRUPTIONS TEST

8.6.1 BLOCK DIAGRAM OF TEST SETUP



8.6.2 TEST SPECIFICATION

Basic Standard	: IEC 61000-4-11:2020
Test Port	: input a.c. power port
Phase Angle	: 0°, 180°

8.6.3 TEST PROCEDURE

8.6.3.1. Set up the EUT and test generator as shown on Section 8.6.1.

8.6.3.2. The interruptions is introduced at selected phase angles with specified duration.

8.6.3.3. Record any degradation of performance.

8.6.4 TEST RESULTS

VOLTAGE DIPS AND INTERRUPTIONS	
Basic Standard:	IEC 61000-4-11:2020
EUT:	Mini Multi-Mode Gateway
M/N:	JMMGW-mini
Test Mode:	Mode A.1
Test Voltage:	AC 230V/50Hz, AC 120V/60Hz
Temperature:	24°C
Humidity:	60%
Atmosphere pressure:	101Kpa

Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)		Performance criteria	Result
		50Hz	60Hz		
< 5	100	0.5	0.5	B	Pass
70	30	25	30	C	Pass
< 5	100	250	300	C	Pass

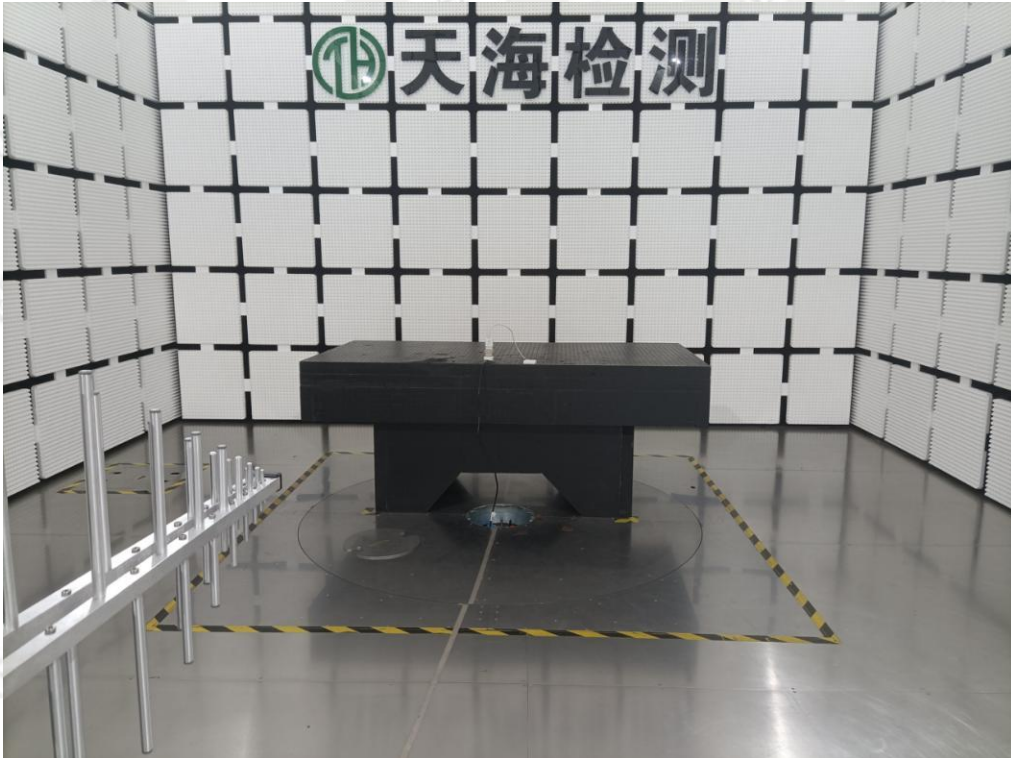


APPENDIX A - TEST SETUP PHOTOGRAPHS

Photographs 1: Set-up for Conducted disturbance at mains terminals

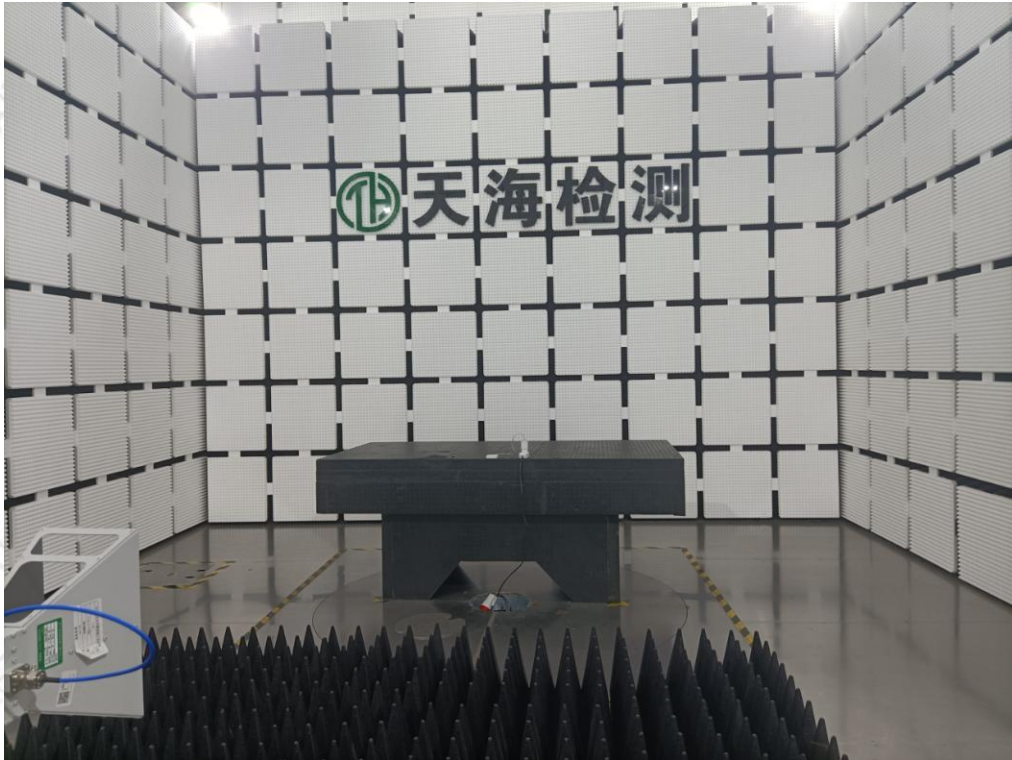


Photographs 2: Set-up for Radiated disturbance-Below 1GHz





Photographs 3: Set-up for Radiated disturbance-Above 1GHz



Photographs 4: Set-up for Harmonic current emissions





Photographs 5: Set-up for Voltage fluctuations & flicker

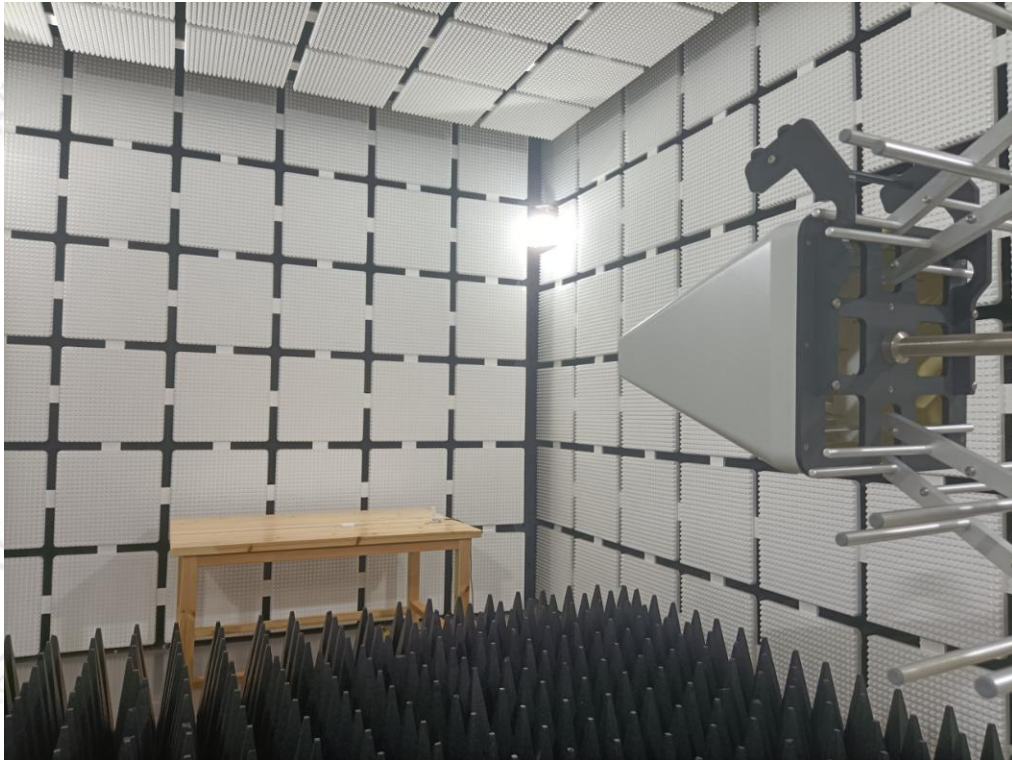


Photographs 6: Set-up for Electrostatic discharge (ESD)





Photographs 7: Set-up for Radio-frequency, Continuous radiated disturbance(RS)



Photographs 8: Set-up for Electrical fast transient (EFT)





Photographs 9: Set-up for Surge



Photographs 10: Set-up for Radio-frequency, Continuous conducted disturbance (CS)





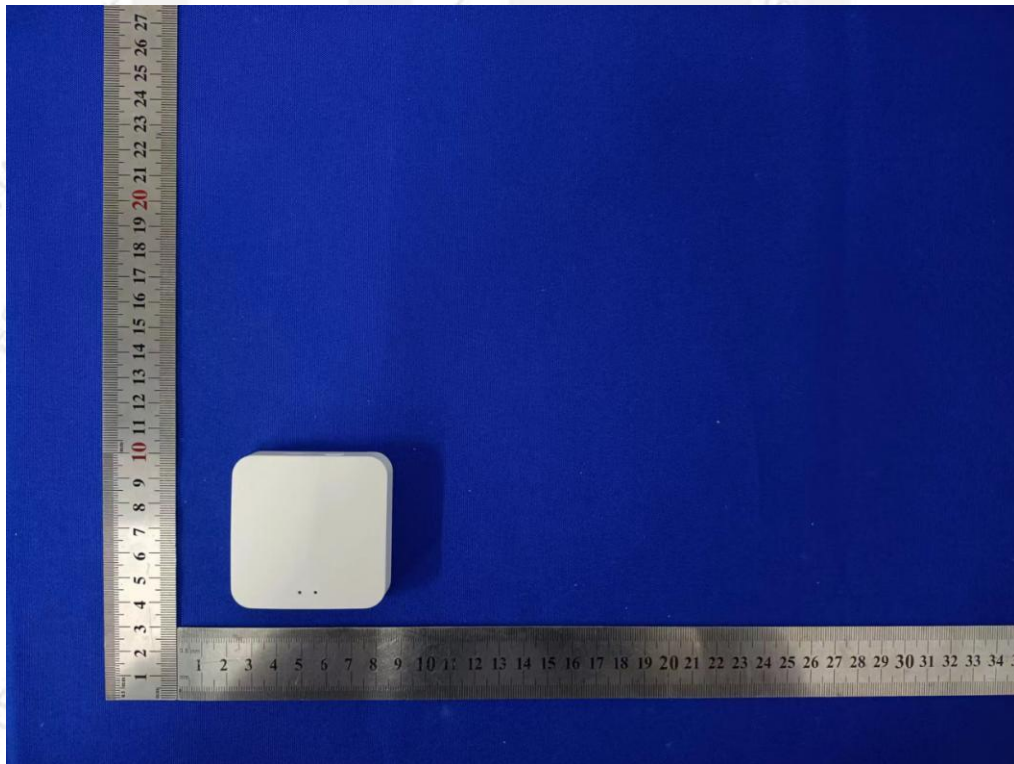
Photographs 11: Set-up for Voltage dips & Voltage interruptions

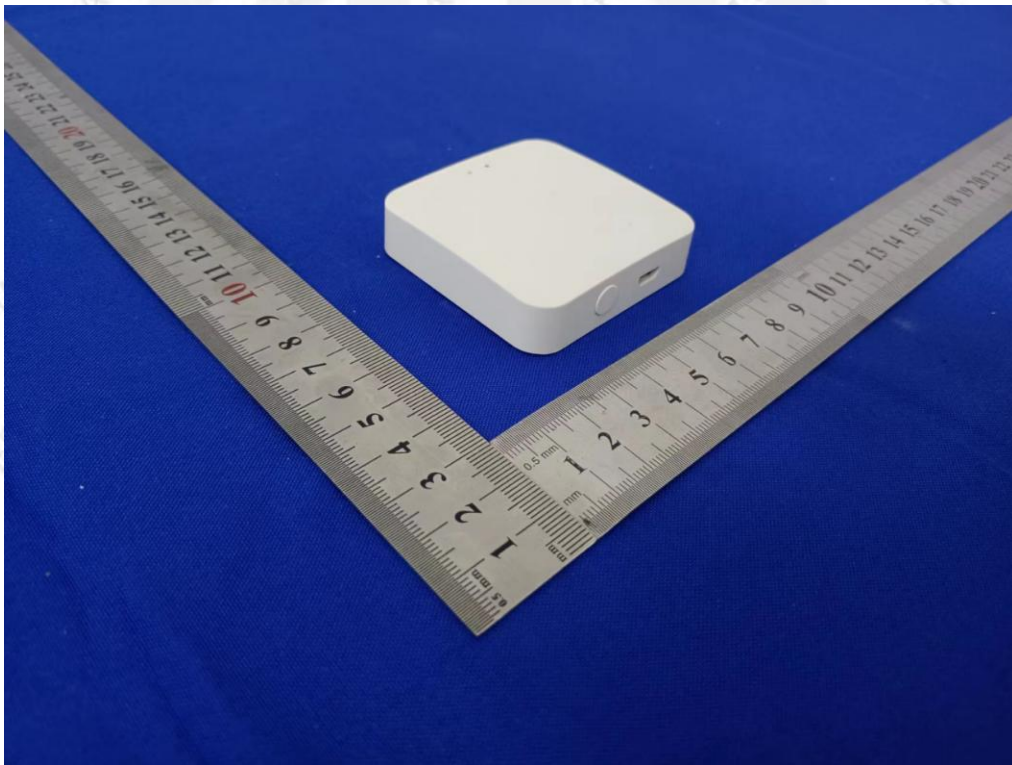
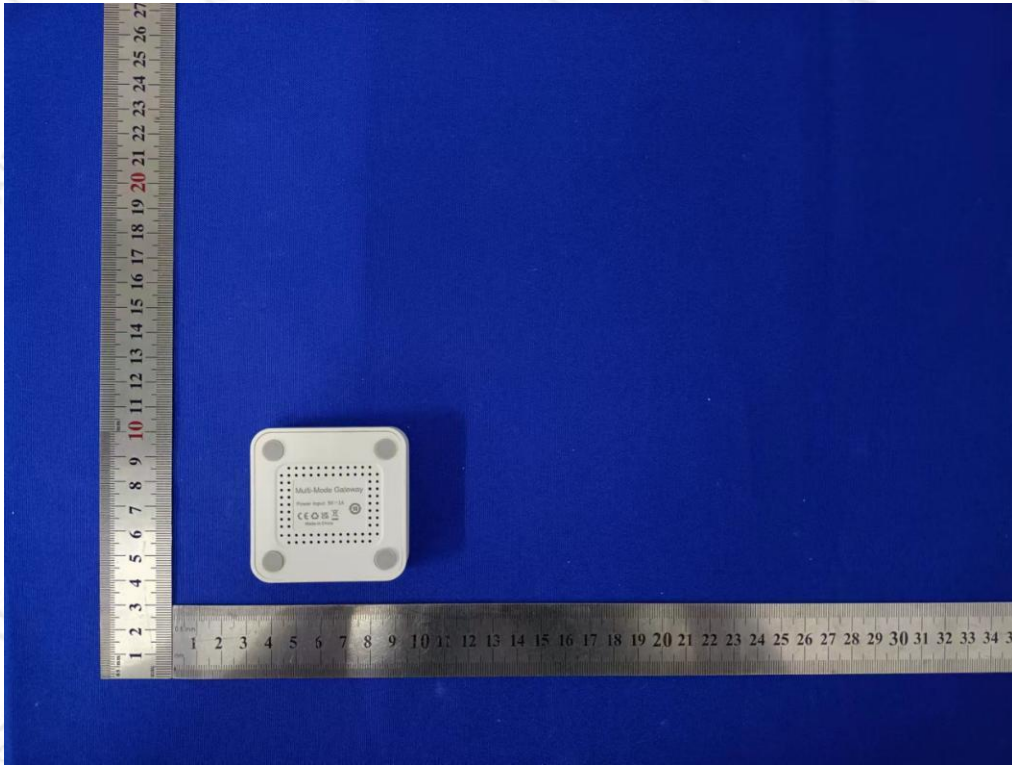


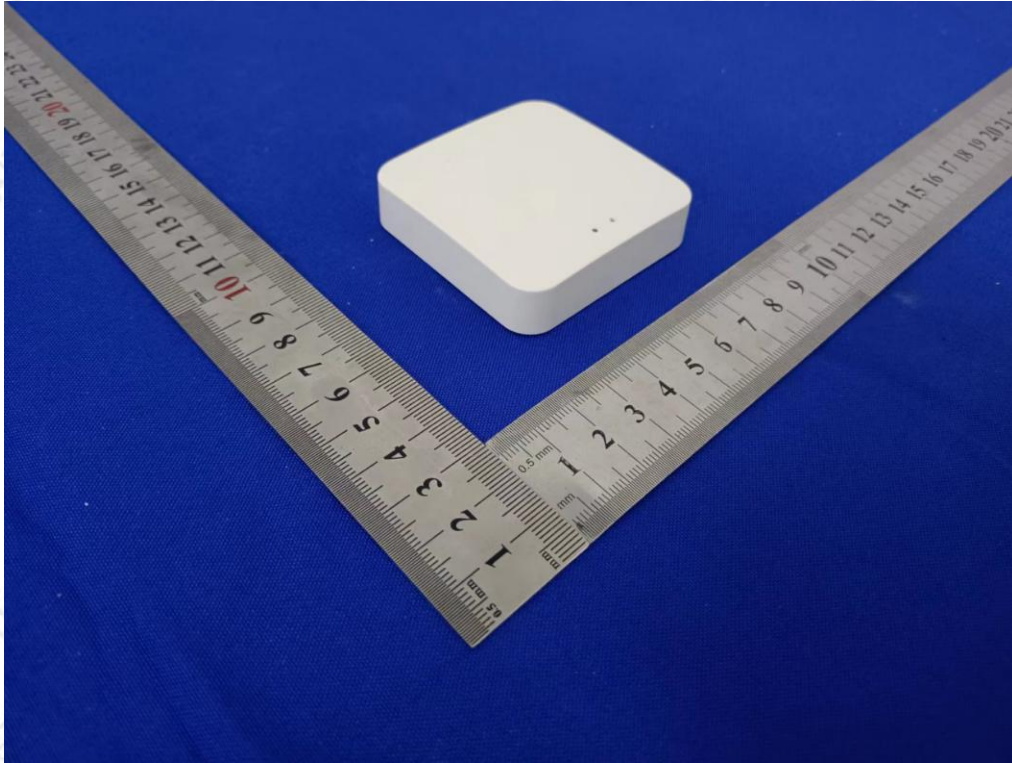


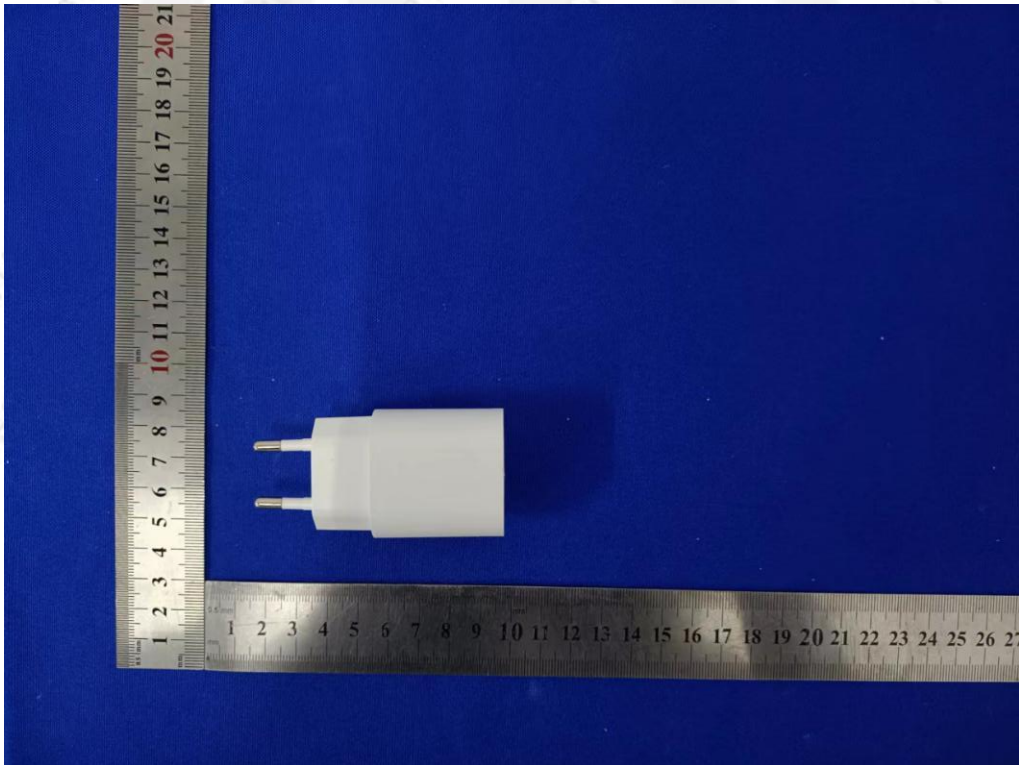
APPENDIX B - EUT PHOTOGRAPHS

External Photos of EUT





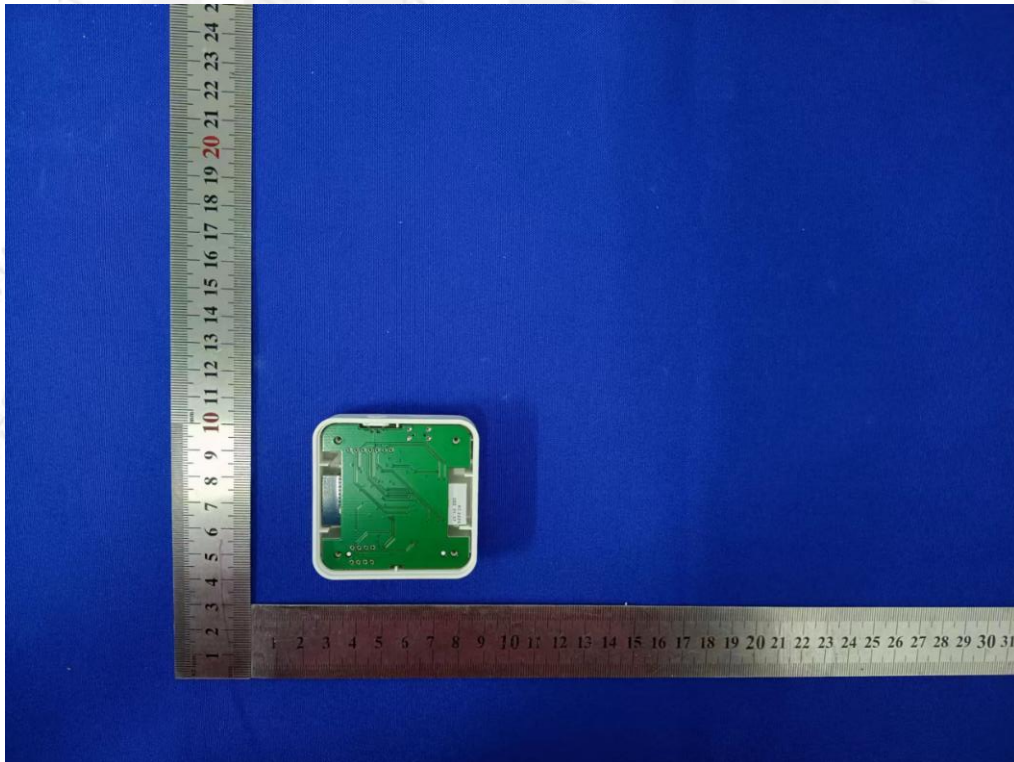
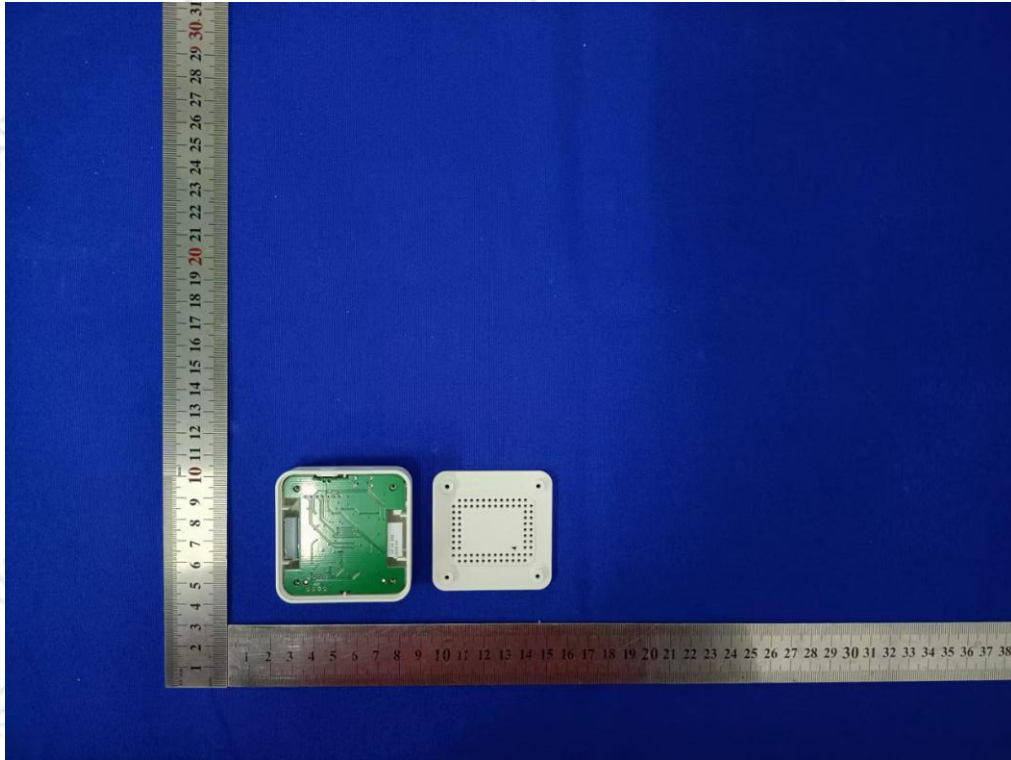


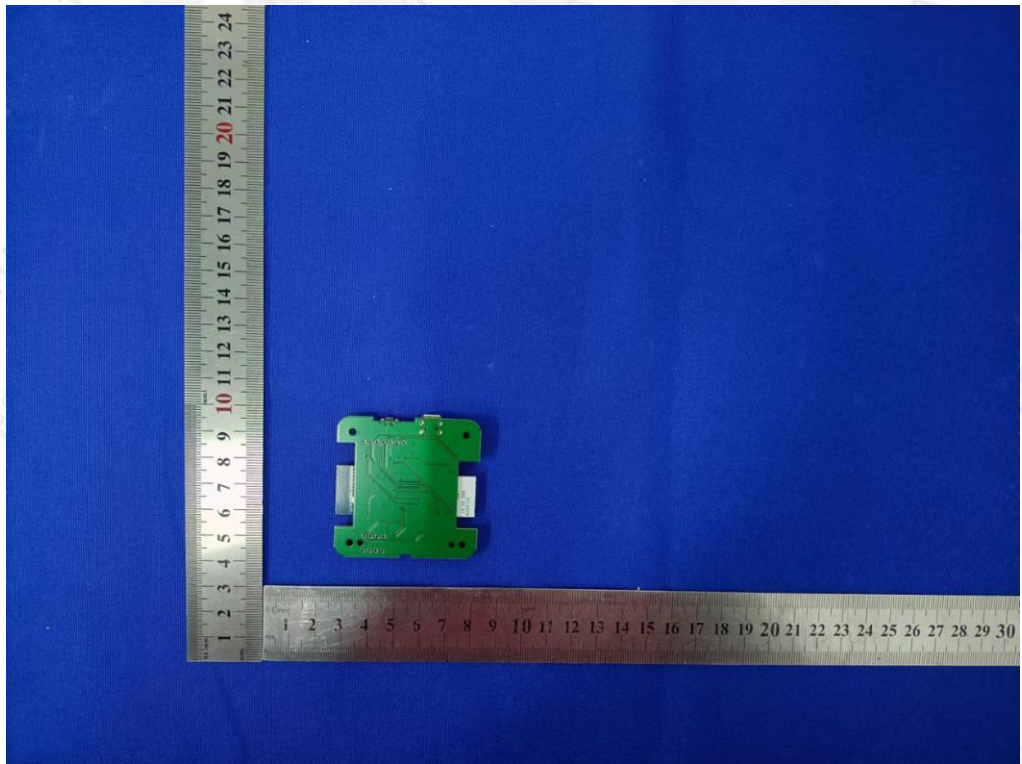
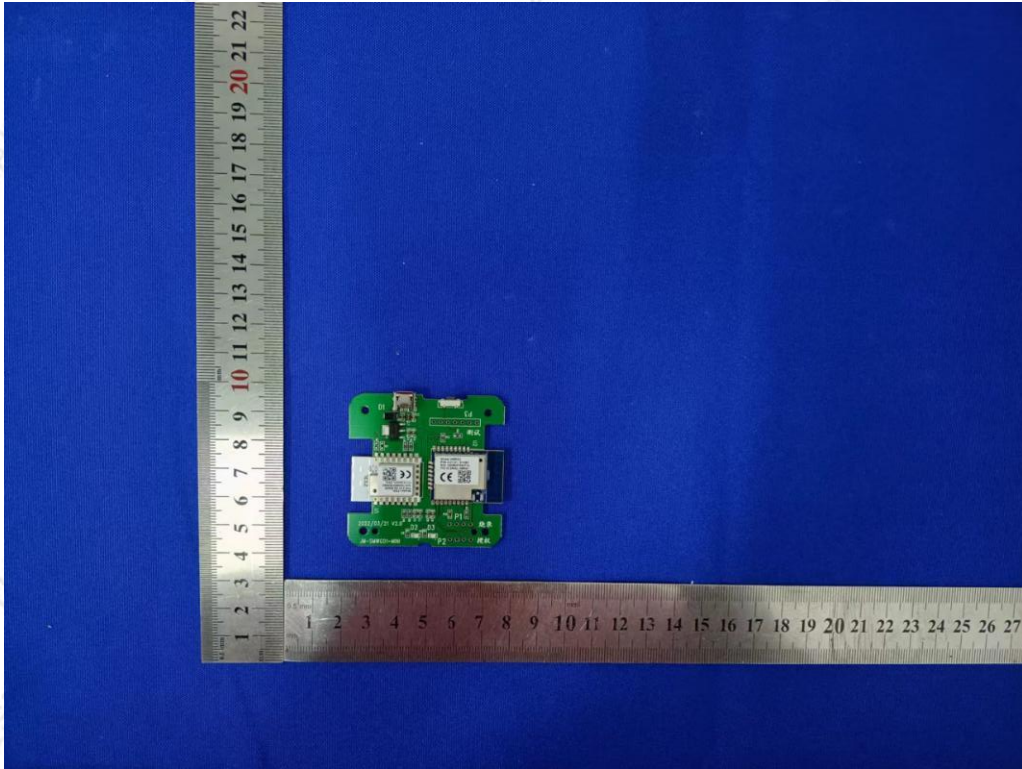






Internal Photos of EUT





*****END OF THE REPORT*****