Accreditation
N°1-1633
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Template : May 28th, 2024

TEST REPORT

N°: **22597699-801747-B(FILE#5652354)** Version: **01**

Subject	**Electromagnetic compatibility tests according to the standards:** **FCC CFR 47 Part 15, Subpart B** **ANSI C63.4 / ANSI C63.4a** **ICES-003** **FCC CFR 47 Part 18 / FCC/OST MP-5**
Issued to	**ENLAPS** 26 avenue Jean Kuntzmann 38330 – MONTBONNOT FRANCE
Apparatus under test	
Product	**Timelapse digital cameras**
Trade mark	**enlaps™**
Manufacturer	**ENLAPS**
Model under test	**Tikee mini**
Serial number	**M-MIN-0A-001105 / M-MIN-0A-001090**
FCCID	**2ASLI-TIKEEM01**
IC	**24785-TIKEEM01**
Conclusion	See Test Program chapter
Test date	July 02, 2024 to July 18, 2024
Test location	LCIE Grenoble
FCC Test site	FR0008 - 918017 (MOI)
ISED Test site	6500A (MOI)
Sample receipt date	July 02, 2024
Composition of document	28 pages
Document issued on	August 08, 2024

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	August 08, 2024	Akram HAKKARI	Creation of the document

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.

SUMMARY

1. TEST PROGRAM

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance 150kHz-30MHz **FCC §15.107 / ICES-003**	**Access: AC power**			**PASS**
	Frequency	**Quasi-peak**	**Average**	
	150-500kHz	66 to 56 dBµV	56 to 46 dBµV	
	0.5-5MHz	56 dBµV	46 dBµV	
	5-30MHz	60 dBµV	50 dBµV	
Radiated emissions 30MHz-1GHz **FCC §15.109**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Quasi-peak @3m**		
	30MHz-88MHz	40.0 dBµV/m		
	88MHz-216MHz	43.5 dBµV/m		
	216MHz-960MHz	46.0 dBµV/m		
	Above 960MHz	54.0 dBµV/m		
Radiated emissions 30MHz-1GHz **ICES-003**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Quasi-peak @3m**		
	30MHz-88MHz	40.0 dBµV/m		
	88MHz-216MHz	43.5 dBµV/m		
	216MHz-230MHz	46.0 dBµV/m		
	230MHz-960MHz	47.0 dBµV/m		
	Above 960MHz	54.0 dBµV/m		
Radiated emissions 1GHz-14GHz* **FCC §15.109 / ICES-003**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Peak @3m**	**Average @3m**	
	1- 14GHz	74.0 dBµV/m	54.0 dBµV/m	

NA: Not Applicable / NP: Not Performed, not requested by the customer (It cannot be taken into account for the declaration of conformity)
[D]: Divergence, the last version is used to make it possible to test the product with the standard which describes the current state of the art and thus to answer as well as possible his environment of final use. If this test is covered by the COFRAC accreditation, the declaration of conformity for product standard only are carried out outside the framework of accreditation.
***§15.33:** The highest internal source of a testing device is defined like more the highest frequency generated or used in the testing device or on which the testing device works or agrees.
- If the highest frequency of the internal sources of the testing device is lower than 108 MHz, measurement must be only performed until 1GHz.
- If the highest frequency of the internal sources of the testing device ranges between 108 MHz and 500 MHz, measurement must be only performed until 2GHz.
- If the highest frequency of the internal sources of the testing device ranges between 500 MHz and 1 GHz, measurement must be only performed until 5GHz.
If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.
Special condition for intentional radiator:

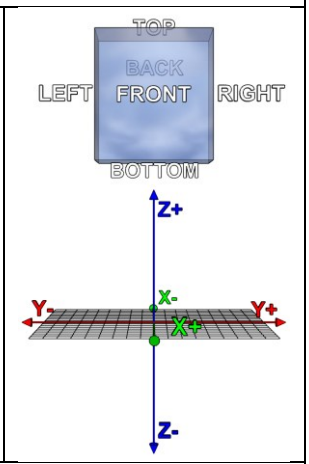
- For a composite system comprised of a digital device using a clock frequency of 1 GHz as the highest frequency for the digital logic and an intentional radiator operating at 2.4 GHz, the composite is required to be investigated to the upper frequency of 24 GHz (in this case, 10 times the intentional radiator frequency is the higher frequency).

- For a composite system comprised of a digital device using a clock frequency of 2 GHz as the highest frequency for the digital logic and an intentional radiator operating at 913 MHz, the composite is required to be investigated to the upper frequency of 10 GHz (in this case, 5 times the unintentional radiator clock frequency is the higher frequency).

2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES)

Equipment under test (EUT):

Model under test :	**Tikee mini**
Serial Number:	**M-MIN-0A-001105 / M-MIN-0A-001090**
	
Dimensions:	12.5cm x 13cm x 7cm (Length x Width x Height)
Type :	Table-Top

Power supply:

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	Battery	3.6Vdc [2.5Vdc-4.2Vdc]	/	Internal battery charged by USB-C or propretary connector
Supply2	AC	100-240V/50-60Hz	SAMSUNG EP-TA200	USB-C, No provided by manufacturer
Supply3	AC	100-240V/50-60Hz	Intertek MX15Z-0502500VX E467127	Proprietary, No provided by manufacturer

NC: Not communicated by provider

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	Internal Battery	/	/	/	/	/
Supply2	USB-C: Samsung SMPS, only supply access for user other than debug	2	Yes	Yes	Yes	No provided by manufacturer
Supply3	Prorietary connector: Intertek SMPS (solar panel possible)	2	Yes	No	Yes	No provided by manufacturer
Access1	µSD connector	/	NA	NA	NA	/
Access2	SIM connector	/	NA	NA	NA	/

NC: Not communicated by provider

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
ASUS Router	-	-	-
Laptop	LENOVO	-	-

NC: Not communicated by provider

2.2. EUT CONFIGURATION

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor…):	**$F_{Highest}$:**	**2500**	**MHz**
Firmware (if applicable):	**V. :**	6.0.2 / MP0.3.10	
Software (if applicable):	**V. :**	NA	

NC: Not communicated by provider

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power.

2.3. EQUIPMENT MODIFICATIONS DURING THE TESTS

None

2.4. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where *FS = Field Strength*
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

2.5. TEST DISTANCE EXTRAPOLATION – FCC/ISED

The field strength is extrapolated to the new measurement distance using formula from FCC Part15.31 (f) and §6.5-6.6 RSS-GEN:

Below 30MHz,

$$FS_{\text{limit}} = FS_{\max} - 40\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

Above 30MHz,

$$FS_{\text{limit}} = FS_{\max} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

Where:
FS_{limit} is the calculation of field strength at the limit distance, expressed in dBµV/m
FS_{max} is the measured field strength, expressed in dBµV/m
$d_{measure}$ is the distance of the measurement point from the EUT
d_{limit} is the reference limit distance

2.6. CALIBRATION DATE

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period. The symbol -/- replaces the date for equipment checking before test or that have none impact on the test or that have no calibration required by the standard.

3. MEASUREMENT OF CONDUCTED EMISSION

3.1. TEST CONDITIONS

Date of test	:	July 17, 2024
Test performed by	:	Akram HAKKARI
Relative humidity (%)	:	33
Ambient temperature (°C)	:	21

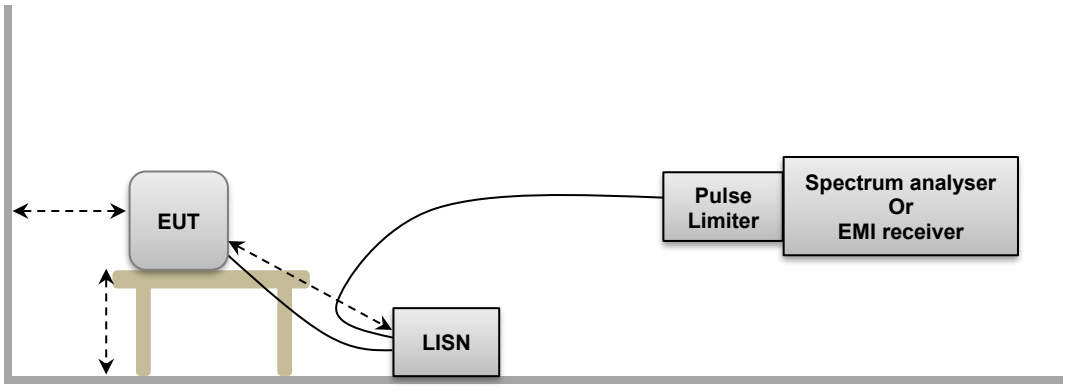
3.2. TEST SETUP

Test procedure:
ANSI C63.4 & FCC Part 15 subpart B

The EUT and auxiliaries are set 80cm above the ground on the non-conducting table (Table-top equipment) at 80cm from the LISN, the cable has been shorted to 1meter length. The distance between the EUT and the vertical ground plane is 40cm. Measurement is made with a receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. Interconnecting cables and equipment were moved to position that maximized emission. The EUT is powered like specified in following table, through a LISN (measure); auxiliaries are powered by another LISN.

Frequency range:	**150kHz to 30MHz**	
Test:	**Pre-Characterization**	**Qualification**
RBW Filter:	10kHz	9kHz
Detector:	Peak & Average	QPeak & Cispr Average
Mode:	Linear Scan	

Type	**Measurement performed:**	
☑ AC / ☐ DC (Auxiliary used)	☑ 120VAC/60Hz	☑ 240VAC/50Hz
☐ USB (Laptop auxiliary)	☐ 120VAC/60Hz (Laptop auxiliary)	☐ 240VAC/50Hz (Laptop auxiliary)



Test setup of AC Power Line Conducted Emissions

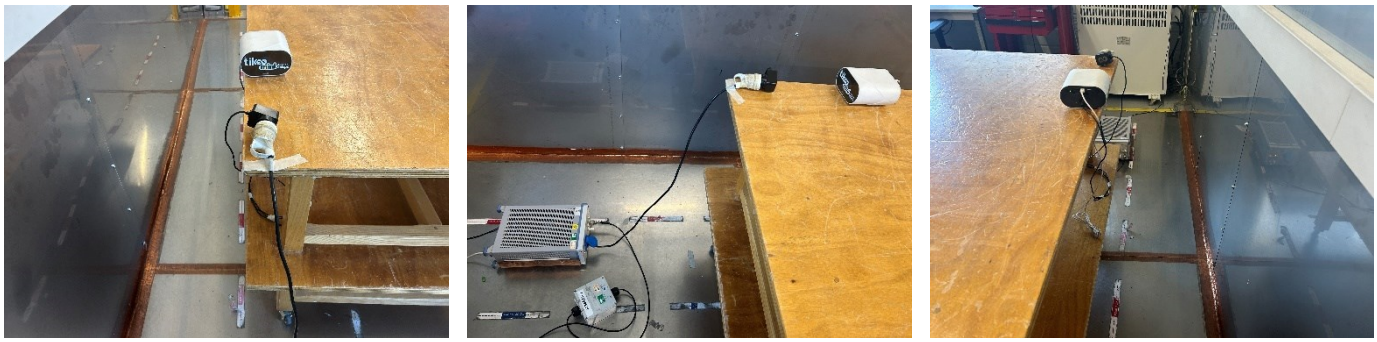


Photo of AC Power Line Conducted Emissions

3.3. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable + self	_	_	A5329578	05/24	05/26
EMC comb generator	LCIE SUD EST	_	A3169098		
LISN	ROHDE & SCHWARZ	ENV216	C2320291	07/23	07/24
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	03/23	03/25
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	05/23	05/25
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	08/22	08/24

3.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

3.5. TEST RESULTS – RUNNING MODE N°1

Mains terminals:

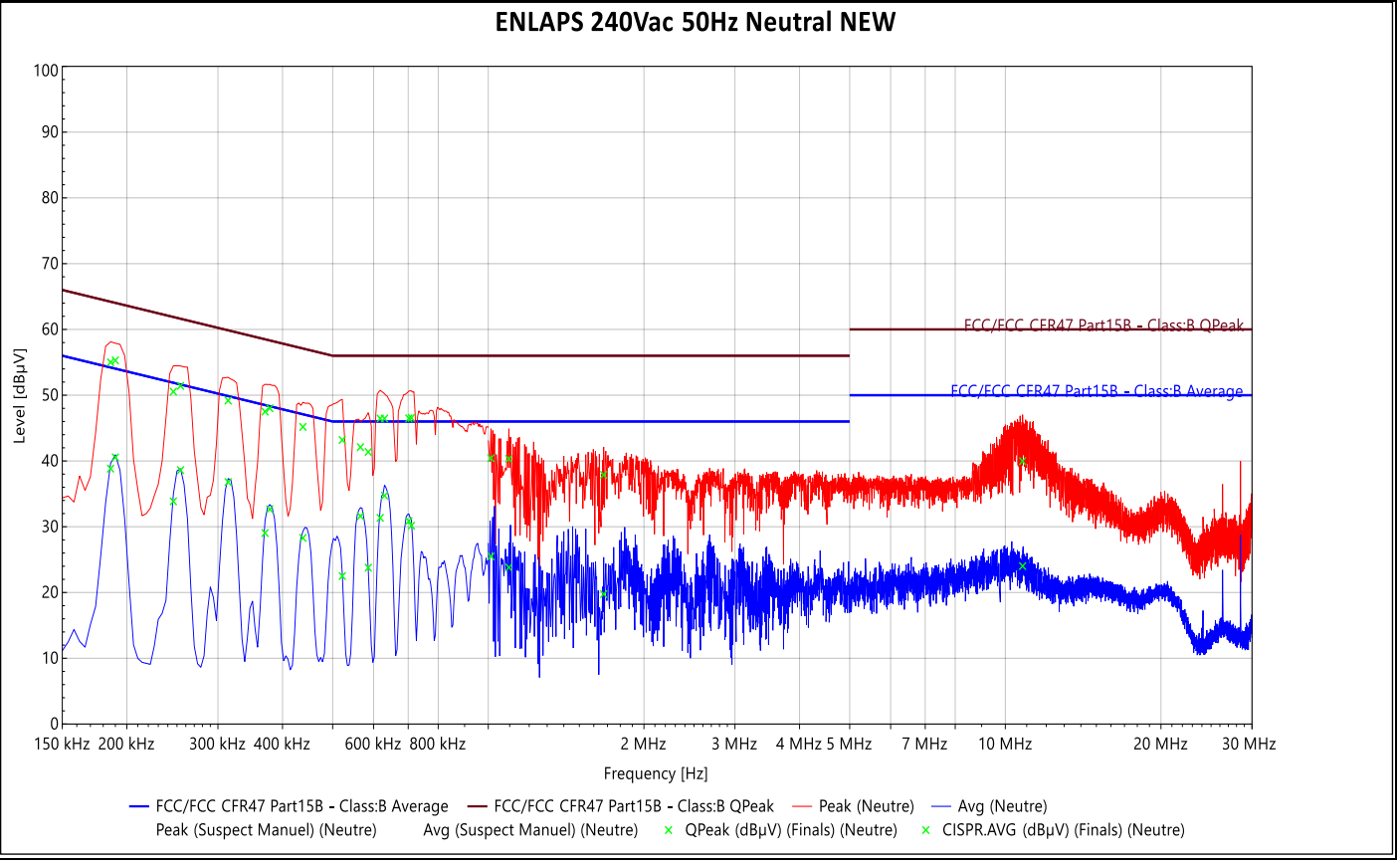
SUPPLY1

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Results: (PEAK detection)

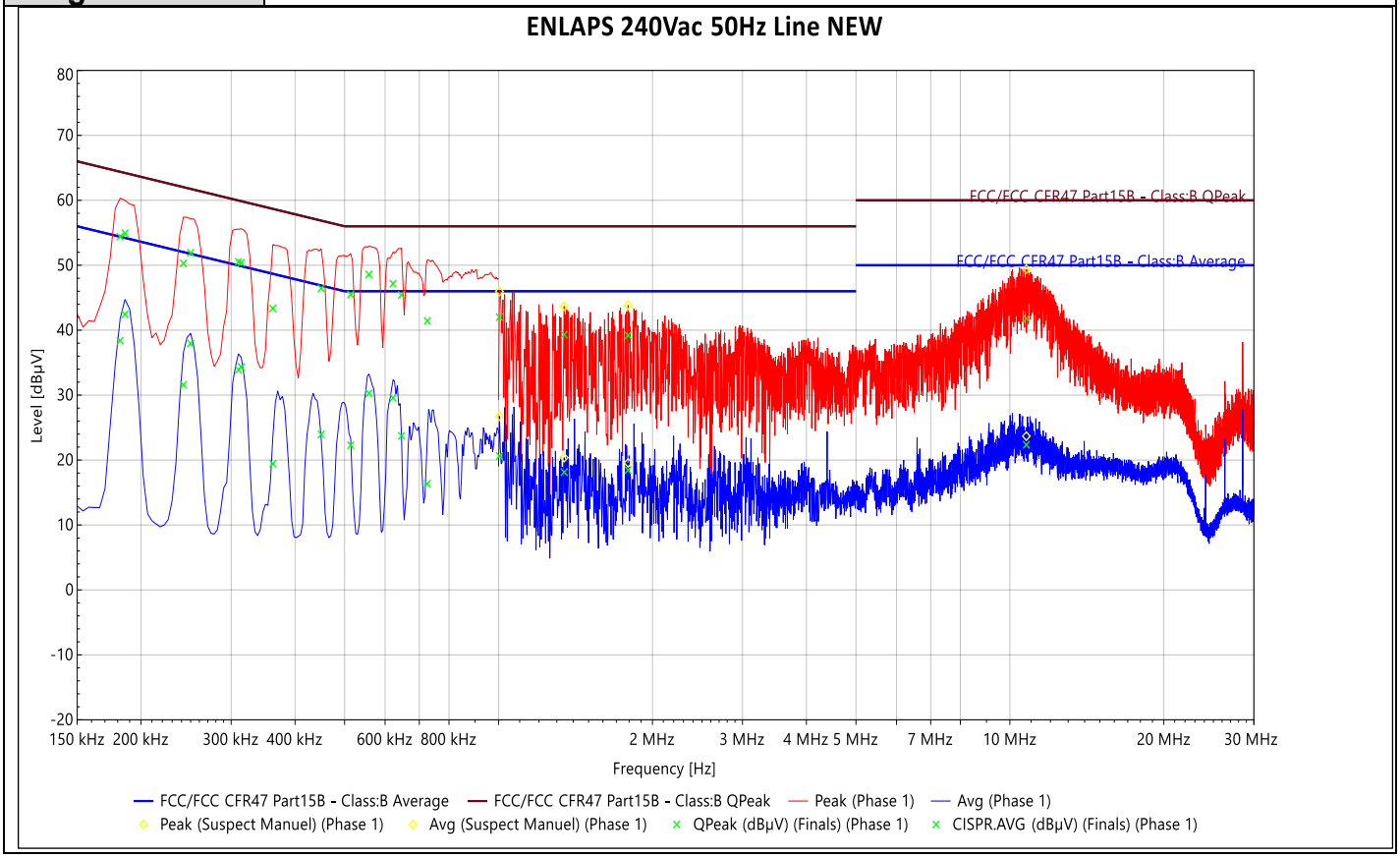
Graph identifier		Line	Comments	
Emc#	1	Neutral	240VAC/50Hz	See below
Emc#	2	Phase	240VAC/50Hz	See below
Emc#	3	Neutral	120VAC/60Hz	See below
Emc#	4	Phase	120VAC/60Hz	See below

Conducted Emissions	
Graph name:	Emc#1
Frequency range:	150 kHz to 30 MHz



Frequency	QP Level (dBµV)	Lim.QP (dBµV)	QP-Lim.QP (dB)	CAVG Level (dBµV)	Lim.CAVG (dBµV)	CAVG-Lim.CAVG (dB)	Meas.Time (s)	Correction (dB)
186.000 kHz	55.01	64.21	-9.21	38.84	54.21	-15.38	0.10	19.84
190.000 kHz	55.29	64.04	-8.75	40.55	54.04	-13.49	0.10	19.80
246.000 kHz	50.55	61.89	-11.34	33.86	51.89	-18.03	0.10	19.44
254.000 kHz	51.42	61.62	-10.21	38.60	51.62	-13.03	0.10	19.42
314.000 kHz	49.18	59.86	-10.68	36.79	49.86	-13.08	0.10	19.64
370.000 kHz	47.50	58.50	-11.00	29.04	48.50	-19.46	0.10	19.78
378.000 kHz	48.02	58.32	-10.30	32.66	48.32	-15.67	0.10	19.78
438.000 kHz	45.18	57.10	-11.92	28.29	47.10	-18.81	0.10	19.82
522.000 kHz	43.19	56.00	-12.81	22.50	46.00	-23.50	0.10	19.82
566.000 kHz	42.10	56.00	-13.90	31.61	46.00	-14.39	0.10	19.80
586.000 kHz	41.37	56.00	-14.63	23.78	46.00	-22.22	0.10	19.78
618.000 kHz	46.45	56.00	-9.55	31.35	46.00	-14.65	0.10	19.77
630.000 kHz	46.46	56.00	-9.54	34.72	46.00	-11.28	0.10	19.76
702.000 kHz	46.48	56.00	-9.52	30.87	46.00	-15.13	0.10	19.73
710.000 kHz	46.55	56.00	-9.45	30.15	46.00	-15.85	0.10	19.73
1.000 ,012 MHz	40.42	56.00	-15.58	25.49	46.00	-20.51	0.01	19.63
1.000 ,096 MHz	40.32	56.00	-15.68	23.81	46.00	-22.19	0.01	19.56
1.000 ,672 MHz	37.89	56.00	-18.11	19.75	46.00	-26.25	0.01	19.62
10.000 ,8 MHz	39.97	60.00	-20.04	24.02	50.00	-25.98	0.01	20.07

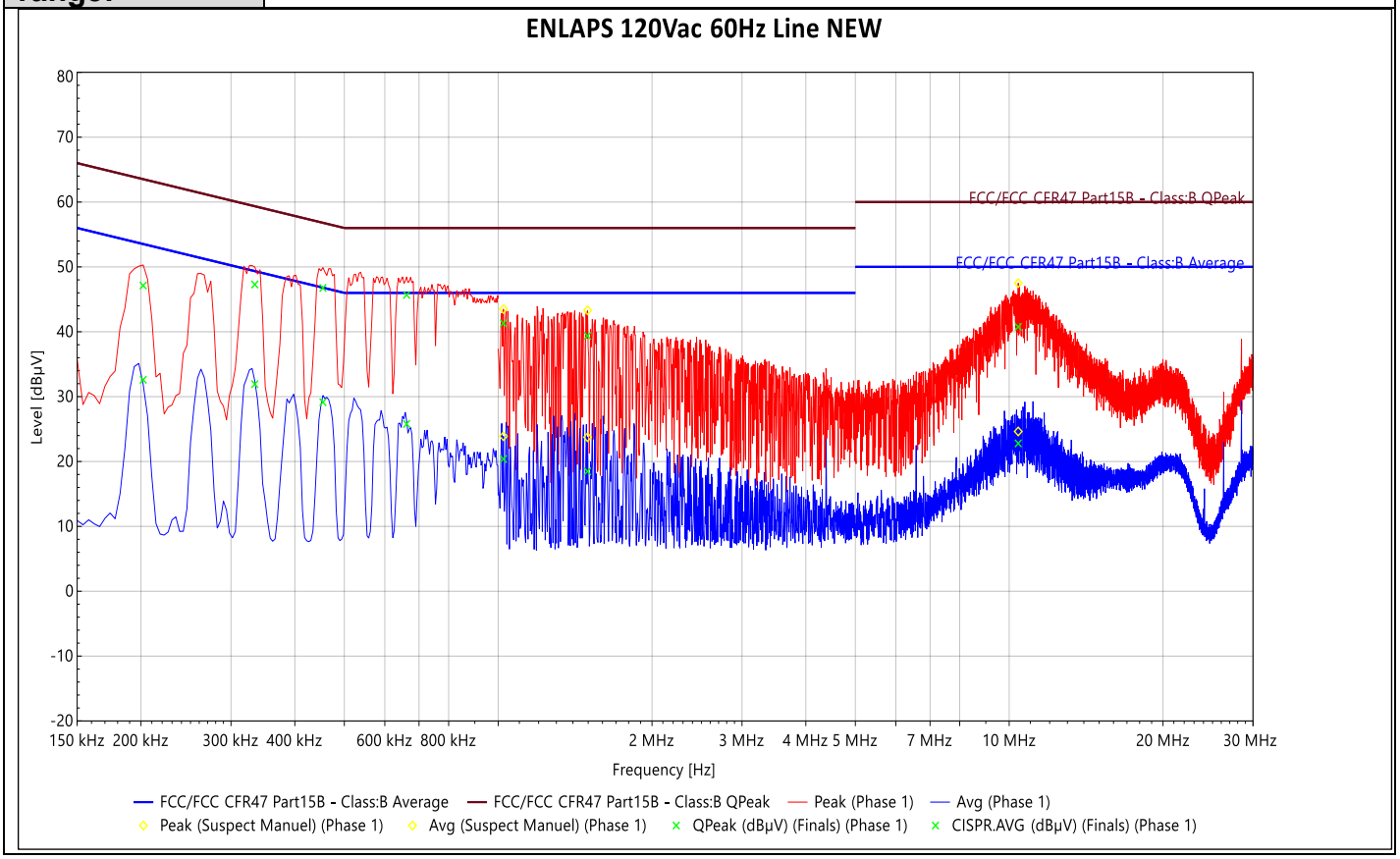
Conducted Emissions	
Graph name:	Emc#2
Frequency range:	150 kHz to 30 MHz



Qualification:

Frequency	QP Level (dBµV)	Lim.QP (dBµV)	QP-Lim.QP (dB)	CAVG Level (dBµV)	Lim.CAVG (dBµV)	CAVG-Lim.CAVG (dB)	Meas.Time (s)	Correction (dB)
182.000 kHz	54.40	64.39	-9.99	38.39	54.39	-16.00	0.10	19.87
186.000 kHz	54.93	64.21	-9.28	42.44	54.21	-11.77	0.10	19.84
242.000 kHz	50.28	62.03	-11.74	31.60	52.03	-20.43	0.10	19.47
250.000 kHz	51.91	61.76	-9.85	37.94	51.76	-13.82	0.10	19.41
310.000 kHz	50.50	59.97	-9.47	33.91	49.97	-16.06	0.10	19.64
314.000 kHz	50.40	59.86	-9.46	34.34	49.86	-15.53	0.10	19.65
362.000 kHz	43.35	58.68	-15.33	19.42	48.68	-29.27	0.10	19.76
449.000 ,999 kHz	46.45	56.88	-10.42	23.95	46.88	-22.92	0.10	19.82
514.000 kHz	45.50	56.00	-10.50	22.29	46.00	-23.71	0.10	19.83
558.000 kHz	48.59	56.00	-7.41	30.27	46.00	-15.73	0.10	19.81
622.000 kHz	47.15	56.00	-8.85	29.57	46.00	-16.43	0.10	19.77
646.000 kHz	45.43	56.00	-10.57	23.73	46.00	-22.27	0.10	19.75
726.000 kHz	41.43	56.00	-14.57	16.34	46.00	-29.66	0.10	19.72
1.000 ,004 MHz	42.01	56.00	-13.99	20.62	46.00	-25.38	0.01	19.64
1.000 ,344 MHz	39.31	56.00	-16.69	18.13	46.00	-27.87	0.01	19.46
1.000 ,792 MHz	39.21	56.00	-16.79	18.44	46.00	-27.56	0.01	19.63
10.000 ,768 MHz	41.78	60.00	-18.23	22.35	50.00	-27.65	0.01	20.07

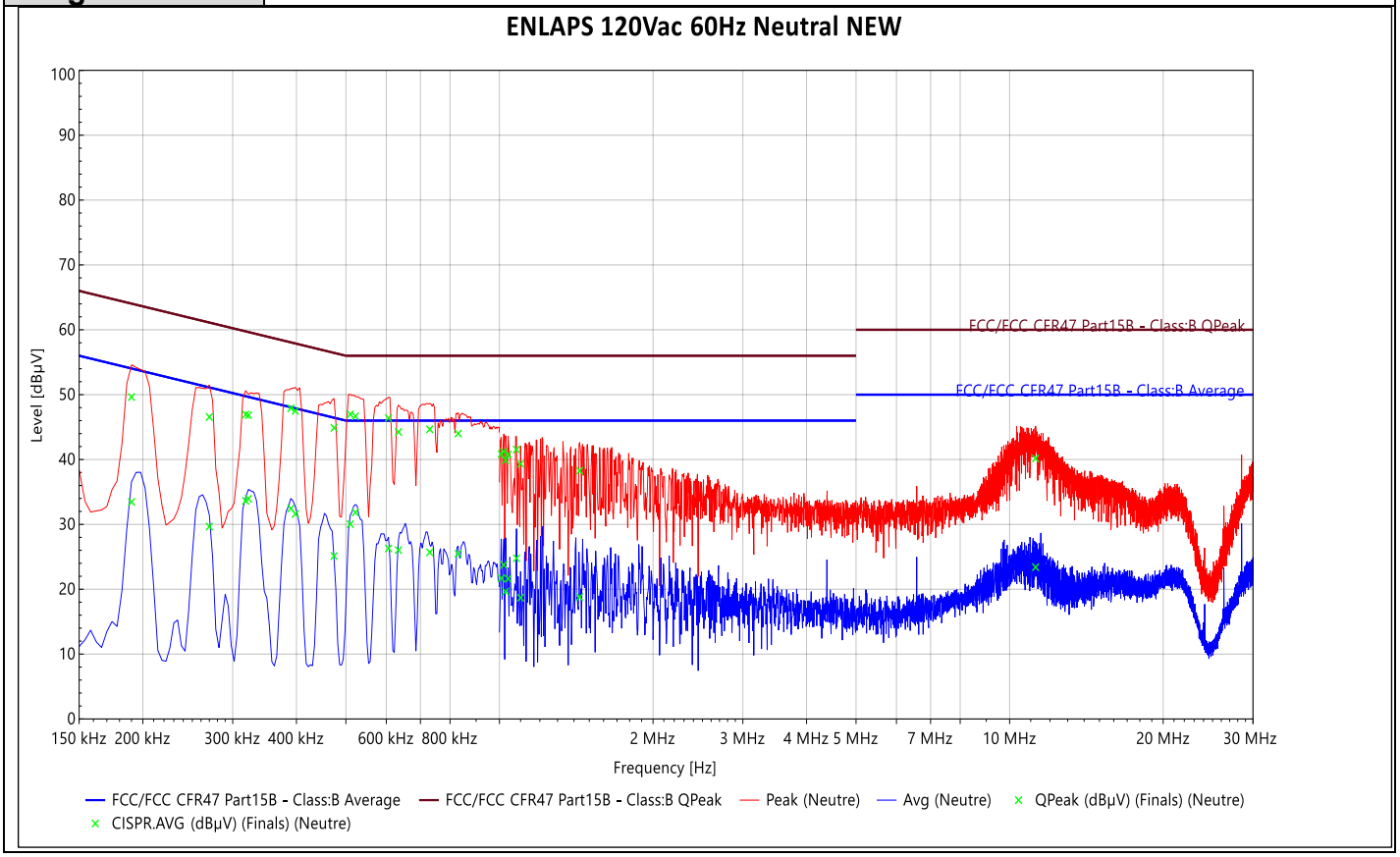
Conducted Emissions	
Graph name:	Emc#3
Frequency range:	150 kHz to 30 MHz



Qualification:

Frequency	QP Level (dBµV)	Lim.QP (dBµV)	QP-Lim.QP (dB)	CAVG Level (dBµV)	Lim.CAVG (dBµV)	CAVG-Lim.CAVG (dB)	Meas.Time (s)	Correction (dB)
202.000 kHz	47.13	63.53	-16.40	32.60	53.53	-20.93	0.10	19.69
333.000 ,999 kHz	47.29	59.35	-12.06	31.93	49.35	-17.42	0.10	19.65
453.000 ,999 kHz	46.76	56.80	-10.04	29.14	46.80	-17.66	0.10	19.82
662.000 kHz	45.68	56.00	-10.32	25.79	46.00	-20.21	0.10	19.75
1.000 ,024 MHz	41.31	56.00	-14.69	20.39	46.00	-25.61	0.01	19.63
1.000 ,496 MHz	39.37	56.00	-16.63	18.48	46.00	-27.52	0.01	19.48
10.000 ,416 MHz	40.75	60.00	-19.25	22.79	50.00	-27.21	0.01	20.05

Conducted Emissions	
Graph name:	Emc#4
Frequency range:	150 kHz to 30 MHz



Qualification:

Frequency	QP Level (dBµV)	Lim.QP (dBµV)	QP-Lim.QP (dB)	CAVG Level (dBµV)	Lim.CAVG (dBµV)	CAVG-Lim.CAVG (dB)	Meas.Time (s)	Correction (dB)
190.000 kHz	49.64	64.04	-14.40	33.45	54.04	-20.58	0.10	19.80
270.000 kHz	46.55	61.12	-14.57	29.66	51.12	-21.46	0.10	19.47
318.000 kHz	46.93	59.76	-12.83	33.64	49.76	-16.12	0.10	19.64
322.000 kHz	46.84	59.66	-12.82	33.94	49.66	-15.72	0.10	19.64
390.000 kHz	47.91	58.06	-10.15	32.45	48.06	-15.62	0.10	19.77
398.000 kHz	47.50	57.90	-10.39	31.61	47.90	-16.28	0.10	19.79
474.000 kHz	44.89	56.44	-11.55	25.12	46.44	-21.33	0.10	19.82
510.000 kHz	46.97	56.00	-9.03	30.04	46.00	-15.96	0.10	19.83
522.000 kHz	46.68	56.00	-9.32	31.85	46.00	-14.15	0.10	19.82
606.000 kHz	46.40	56.00	-9.60	26.29	46.00	-19.71	0.10	19.78
634.000 kHz	44.24	56.00	-11.76	26.04	46.00	-19.96	0.10	19.75
730.000 kHz	44.66	56.00	-11.34	25.69	46.00	-20.31	0.10	19.72
830.000 kHz	44.00	56.00	-12.00	25.48	46.00	-20.52	0.10	19.68
1.000 ,008 MHz	40.83	56.00	-15.17	21.69	46.00	-24.31	0.01	19.63
1.000 ,02 MHz	41.22	56.00	-14.78	23.76	46.00	-22.24	0.01	19.62
1.000 ,028 MHz	39.88	56.00	-16.12	19.65	46.00	-26.35	0.01	19.62
1.000 ,04 MHz	40.77	56.00	-15.23	21.63	46.00	-24.37	0.01	19.61
1.000 ,08 MHz	41.54	56.00	-14.46	24.77	46.00	-21.23	0.01	19.60
1.000 ,1 MHz	39.34	56.00	-16.66	18.69	46.00	-27.31	0.01	19.55
1.000 ,436 MHz	38.27	56.00	-17.73	18.79	46.00	-27.21	0.01	19.45
11.000 ,244 MHz	40.16	60.00	-19.84	23.40	50.00	-26.60	0.01	20.10

3.6. CONCLUSION

The sample of the equipment **Tikee mini**, Sn : **M-MIN-0A-001105 / M-MIN-0A-001090**, tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for conducted emissions.

4. MEASUREMENT OF RADIATED EMISSION

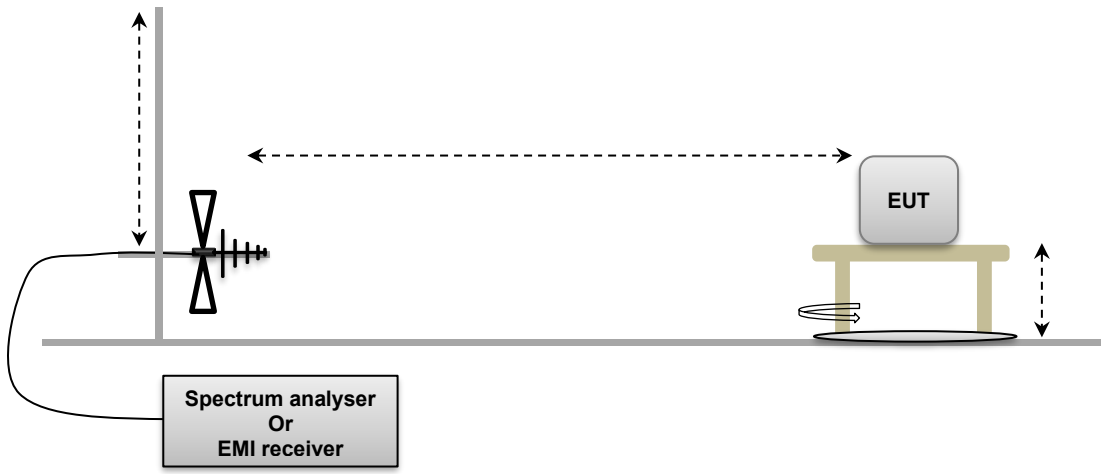
4.1. TEST CONDITIONS

Date of test	:	July 17, 2024
Test performed by	:	Akram HAKKARI
Relative humidity (%)	:	33
Ambient temperature (°C)	:	21

4.2. TEST SETUP

Test procedure:
ANSI C63.4 & FCC Part 15 subpart B

The EUT and auxiliaries are set 80cm above the ground on the non-conducting table (Table-top equipment).
The EUT is powered by V_{nom}.



Test setup of Radiated Emission

Same setup is used in semi anechoic chamber during pre-characterization, with a distance of 3m between EUT and antenna.



Photo in anechoic chamber

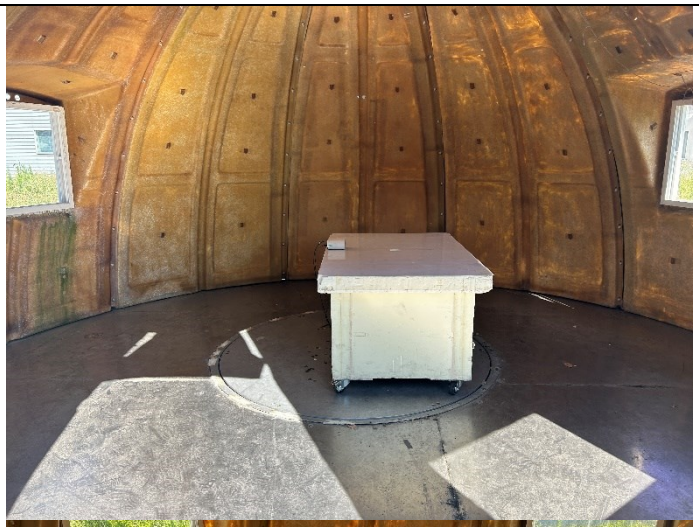



Photo on OATS

4.3. TEST METHOD

During pre-characterization, a pre-scan of all the setup has been performed on all axis of EUT used in normal configuration. The pre-characterization graphs are obtained in PEAK detection, and AVERAGE detection for frequencies above 1GHz. A summary of the worst case emissions found in all test configurations and modes is shown. Spurious or frequency band are measured with qualification method to show compliance with limits.
Following frequency ranges, test setup parameters are different and specified in tables below.

4.3.1. 30MHz –1GHz

Frequency range:	**30MHz to 1GHz**	
Test:	**Pre-Characterization**	**Qualification**
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT	Varied by step from 1m to 4m
Antenna Type:	Bi-Log	Bi-Log
Min. Antenna Beamwidth:	Teseq CBL 6111 / w@3m - 4.2m<1GHz	Teseq CBL 6111 / w@10m - 14m<1GHz
RBW Filter:	100kHz	100kHz
Maximization:	Turntable rotation of 360 degrees range	
Test site:	Full Anechoic Chamber	Open Aera Test Site
Distance EUT - Antenna:	3m	10m
Detector:	QPeak	QPeak
Mode:	Linear Scan	

4.3.2. 1GHz – 14GHz:

Frequency range:	**1GHz to 6GHz**	
Test:	**Pre-Characterization**	**Qualification**
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT	Centered on EUT
Antenna Type:	Horn	Horn
Min. Antenna Beamwidth:	Teseq CBL 6143 / w@3m - 2.5m>1GHz	Teseq CBL 6143 / w@3m - 2.5m>1GHz
RBW Filter:	1MHz	1MHz
Maximization:	Turntable rotation of 360 degrees range	
Test site:	Full Anechoic Chamber	Full Anechoic Chamber
Distance EUT - Antenna:	3m	3m
Detector:	Peak & Average	Peak & Average
Mode:	Linear Scan	

4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
Amplifier 10MHz - 18GHz	LCIE SUD EST	_	A7102082	05/22	09/24
Antenna Bi-log	AH System	SAS-521-7	C2040180	05/23	05/25
Antenna horn 18GHz	EMCO	3115	C2042029	03/22	03/25
BAT EMC	NEXIO	v3.21.0.32	L1000115		
CABLE	TELEDYNE	R82-0404-0.5M	A5330010	03/22	03/25
Cable 0.75m	-	18GHz	A5329900	08/22	08/24
Cable SMA 40cm	WITHWAVE	W101-SM1-0.4M	A5329979	10/23	10/26
Comb EMR HF	YORK	CGE01	A3169114		
CONTROLLER	INNCO	CO3000	D3044034		
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	08/22	08/25
Filter Matrice	LCIE SUD EST	Combined filters	A7484078	03/23	03/25
Rehausse Table C3	LCIE	_	F2000507		
Rehausse Table C3	LCIE	_	F2000511		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017_BF	04/22	04/25
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017_VSWR	04/22	04/25
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/23	09/25
Table C3	LCIE	_	F2000461		
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	05/23	05/25
TILT	INNCO	TILT	D3044033		
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

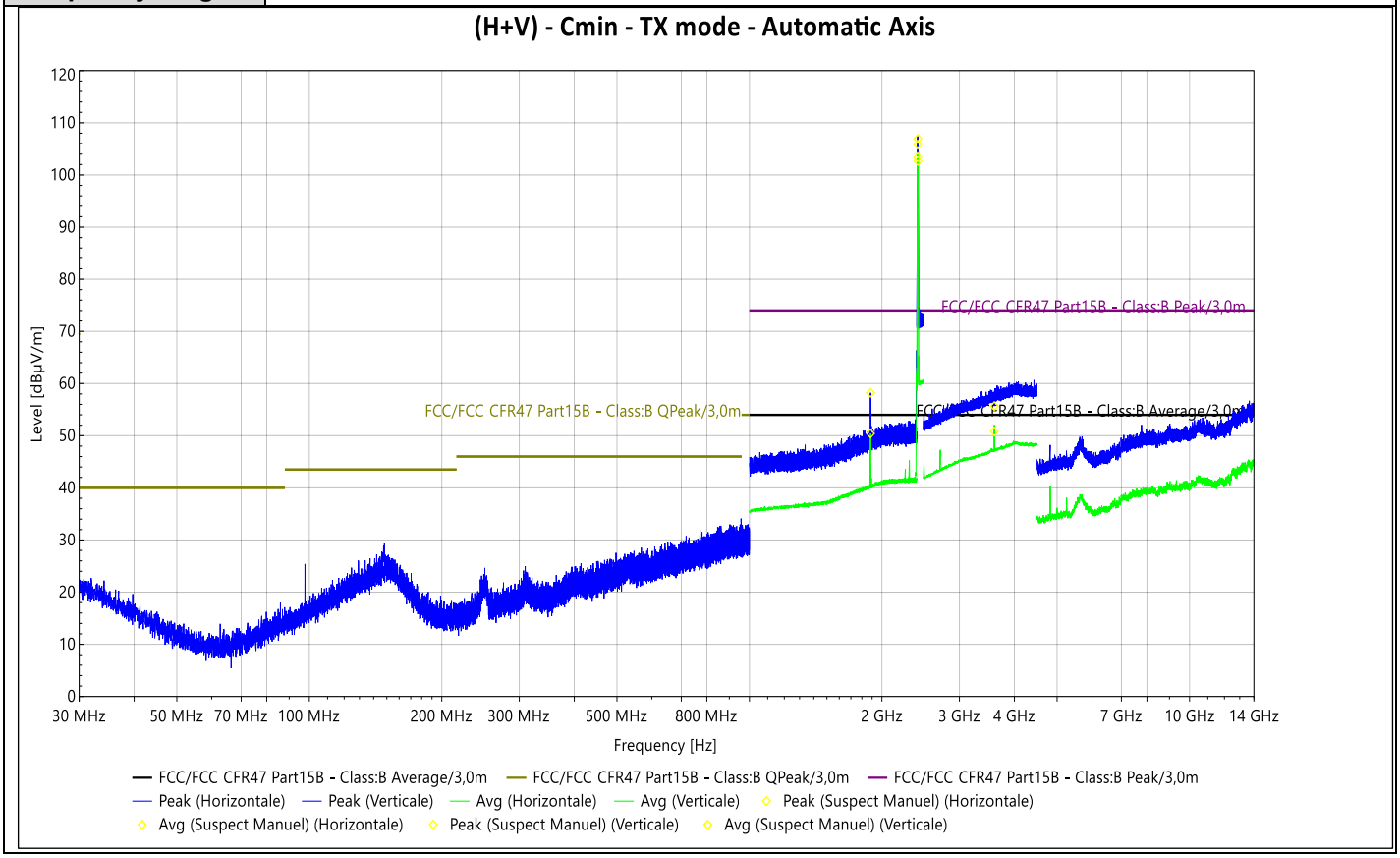
None

4.6. TEST RESULTS – RUNNING MODE N°1

4.6.1. 30MHz –14GHz

Graph identifier		Polarization	Mode	Channel	EUT position	Comments
Emr#	3	H/V	TX	Cmin	Axis XY/Z	See the following results
Emr#	4	H/V	TX	Cmid	Axis XY/Z	See the following results
Emr#	5	H/V	TX	Cmax	Axis XY/Z	See the following results

Radiated Emissions	
Graph name:	Emr#1
Frequency range:	30 MHz to 14 GHz

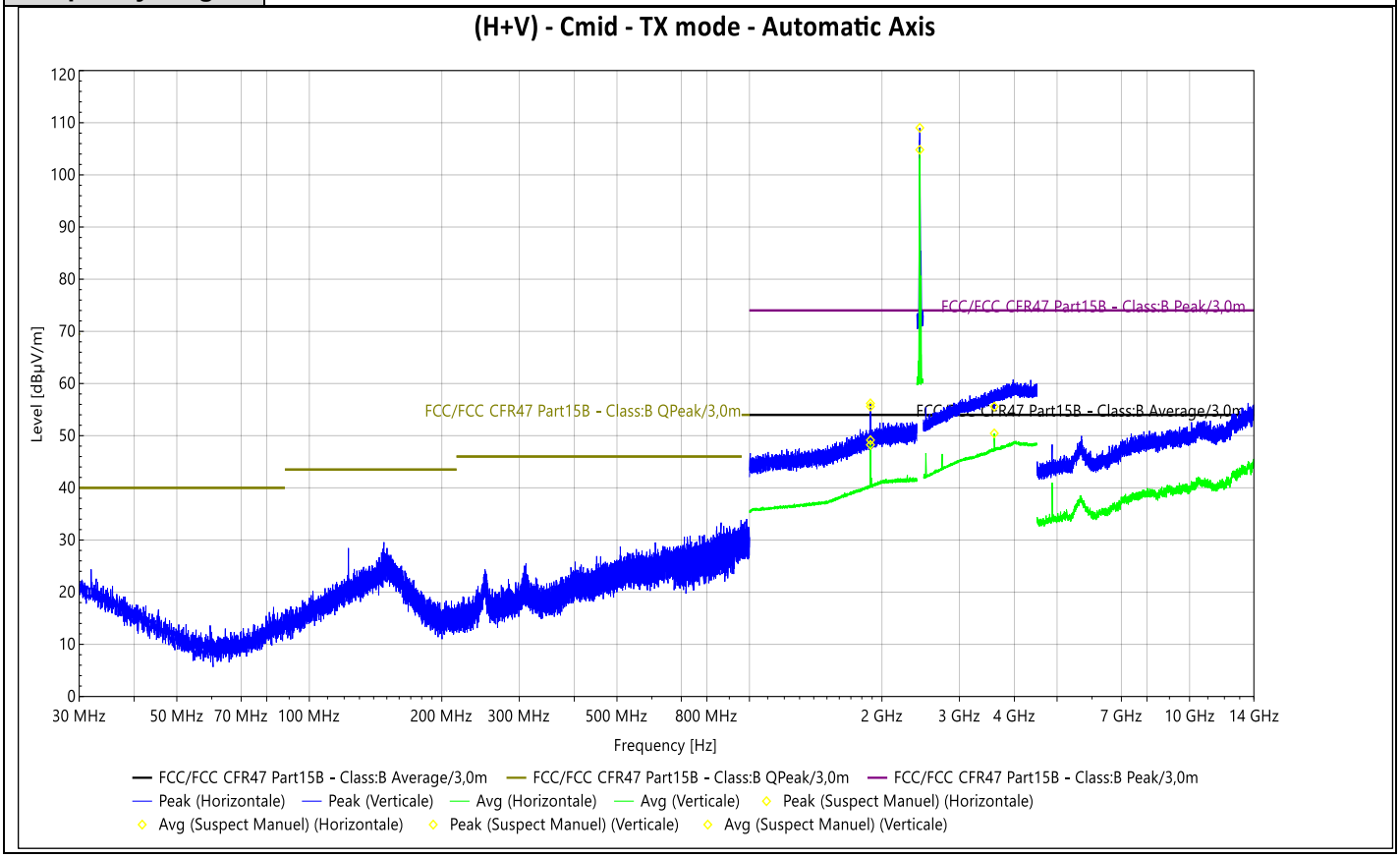


Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.QP (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.41123075 GHz*	105.81	74.00	103.39	54.00		268	H	35.72
2.4129425 GHz*	106.91	74.00	102.70	54.00		268	H	35.72
1.88375 GHz	58.22	74.00	50.41	54.00		114	H	34.65
3.599834399 GHz	55.66	74.00	50.82	54.00		233	V	40.39
4.012758320 GHz	60.12	74.00	48.32	54.00		218	V	40.39

*Carrier frequency
No significant frequency observed

Radiated Emissions	
Graph name:	Emr#2
Frequency range:	30 MHz to 14 GHz

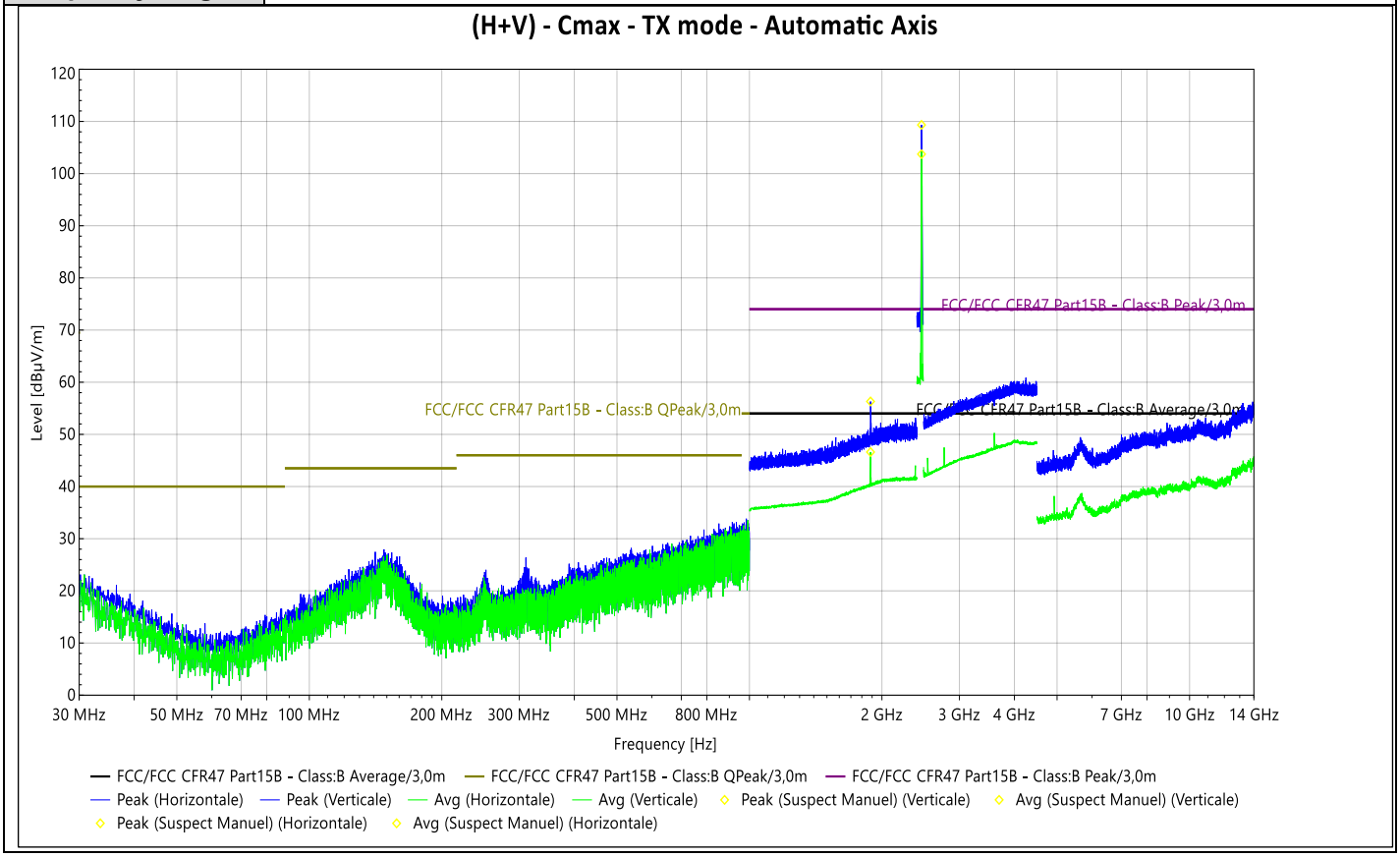


Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.QP (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
1.88305 GHz	56.20	74.00	48.24	54.00		192	H	34.64
3.599834399 GHz	55.57	74.00	50.44	54.00		327	V	40.39
2.43795075 GHz*	109.03	74.00	104.81	54.00		301	V	35.77
1.8834 GHz	55.60	74.00	49.15	54.00		5	V	34.65
4.03758532 GHz	60.34	74.00	49.02	54.00		197	V	40.39

*Carrier frequency
No significant frequency observed

Radiated Emissions	
Graph name:	Emr#3
Frequency range:	30 MHz to 14 GHz



Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.QP (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.46007825 GHz*	109.33	74.00	103.72	54.00		281	V	35.78
1.8841 GHz	56.31	74.00	46.61	54.00		354	H	34.65
4.009837189 GHz	60.02	74.00	48.12	54.00		183	V	40.39

*Carrier frequency
No significant frequency observed

4.7. CONCLUSION

The sample of the equipment **Tikee mini**, Sn : **M-MIN-0A-001105 / M-MIN-0A-001090**, tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for radiated emissions.

5. UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) ±x	Incertitude limite du CISPR / CISPR uncertainty limit ±y
Mesure des perturbations conduites en tension sur le réseau d'énergie (monophasé /triphasé) 9kHz-150kHz *Measurement of conducted disturbances in voltage on the power port (single & three phases)9kHz-150kHz*	3.7dB	3.8dB
Mesure des perturbations conduites en tension sur le réseau d'énergie (monophasé /triphasé) 150kHz-30MHz *Measurement of conducted disturbances in voltage on the power port (single & three phases)150kHz-30MHz* LISN 50Ω/50µH Capacitive Voltage Probe	 3.3dB 3.7dB	 3.4dB 3.9dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication *Measurement of conducted disturbances in voltage on the telecommunication port.* AAN avec aLCL = 55 … 40 dBc AAN avec aLCL = 65 … 50 dBc AAN avec aLCL = 75 … 60 dBc	 4.2dB 4.6dB 5.0dB	 4.2dB 4.6dB 5.1dB
Mesure des perturbations discontinues conduites en tension *Measurement of discontinuous conducted disturbances in voltage*	3.4dB	3.4dB
Mesure des perturbations conduites en courant *Measurement of conducted disturbances in current*	2.9dB	2.9dB
Mesure du champ électrique rayonné en cage de Faraday semi-anéchoïque de 30MHz à 1GHz *Measurement of radiated electric field in half-anechoic Faraday room From 30MHz to 1GHz*	6.3dB	6.3dB
Mesure du champ électrique rayonné en cage de Faraday anéchoïque de 1GHz à 6GHz *Measurement of radiated electric field in full-anechoic Faraday room From 1GHz à 6GHz*	5.2dB	5.2dB
Mesure du champ électrique rayonné en cage de Faraday anéchoïque de 6GHz à 18GHz *Measurement of radiated electric field in full-anechoic Faraday room From 6GHz to 18GHz*	5.5dB	5.5dB
Mesure du champ électrique rayonné sur le site en espace libre de Moirans 30MHz – 1GHz. *Measurement of radiated electric field on the Moirans open area test site 30MHz – 1GHz.*	6.3dB	6.3dB
Mesure du champ électrique rayonné IN SITU de 30 à 1000 MHz *IN SITU measurement of radiated electric field from 30 to 1000MHz*	A l'étude / Under consideration	5.2dB
Mesure de la puissance perturbatrice *Measurement of disturbance power*	3.32dB	4.5dB
Mesure des harmoniques de courant *Measurement of current harmonics*	11.11%	/
Mesure du flicker *Flicker measurement*	9.26%	/

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. Ce tableau regroupe l'ensemble des incertitudes maximales pour les essais réalisables dans le laboratoire, qu'ils aient été ou non réalisés dans le cadre du présent rapport / *The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report*

Note - L'incertitude de mesure instrumentale est déterminée selon la CISPR 16-4-2. / *The instrumentation measurement uncertainty is determined according to CISPR16-4-2*

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) ±x	Incertitude limite du CISPR / CISPR uncertainty limit ±y
Immunité aux perturbations conduites, induites par les champs électromagnétiques *Immunity to conducted disturbance, induced by radio-frequency fields.*	2.76dB	/
Immunité aux champs électromagnétiques rayonnés aux fréquences radioélectriques (80MHz-6GHz) *Immunity to radiated, radio-frequency, electromagnetic field (80MHz-6GHz)*	4.98dB	/
Immunité aux ondes de choc *Surge immunity*		
Tension crête / Peak voltage	<±10%	/
Durée du front (circuit ouvert) / Front time (open circuit)	<±30%	/
Durée jusqu'à la mi-valeur (circuit ouvert) / Time to half-value (open circuit)	<±20%	/
Courant crête / Peak current	<±10%	/
Durée du front (court-circuit) / Front time (short-circuit)	<±20%	/
Durée jusqu'à la mi-valeur (court-circuit) / Time to half-value (short-circuit)	<±20%	/
Immunité aux transitoires électriques rapides en salves *Immunity to electrical fast transient/burst immunity*		
Incertitude sous 50 ohms */ Uncertainty under 50ohms*		
Tension crête / *peak voltage*	<±10%	/
Temps de montée t_r */ rise time* t_r	<±30%	/
Durée t_d à 50% / Duration t_d to 50%	<±30%	/
Durée de la salve */ Burst duration*	<±20%	/
Période de la salve */ Burst periode*	<±20%	/
Fréquence de répétition */ Repetition frequency*	<±20%	/
Incertitude sous 1000 ohms */ Uncertainty under 1000ohms*		
Tension crête / *peak voltage*	<±10% - 15%	/
Temps de montée t_r */ rise time* t_r	<±30%	/
Durée t_d à 50% / Duration t_d to 50%	+200% -30%	/
Durée de la salve */ Burst duration*	<±20%	/
Période de la salve */ Burst periode*	<±20%	/
Fréquence de répétition */ Repetition frequency*	<±20%	/
Immunité aux décharges électrostatiques *Immunity to electrostatic discharge immunity*		
Tension de sortie */ Output voltage*	<±5%	/
Crête de courant / *Peak current*	<±13%	/
Temps de montée t_r / *Rise time* t_r	0.7 – 1ns	/
Intensité à 30ns / *Current at 30ns*	<±45%	/
Intensité à 60ns / Current at 60ns	<±52%	/
Immunité aux creux de tension et coupures brèves *Immunity to Voltage dips, short interruptions*		
Tension de sortie à vide*/ Output voltage at no load*	<±1.5%	/
Tension de sortie en charge*/ Output voltage in load*	<±5%	/
Temps de montée et de descente t_r & t_f / *Rise and fall time* t_r & t_f	1-5µs	/
Valeur crête instantanée du sur-dépassement/sous dépassement *Instantaneous peak overshoot/undershoot of the voltage Ut,*	<±5% Ut	/
Angle de phase / *Phase angle*	<±10°	/
Immunité aux champs magnétique à la fréquence du réseau *Power frequency magnetic field immunity*	±4.42dB	/
Immunité conduite en mode commun de 0Hz à 150kHz *Common mode immunity from 0Hz to 150kHz*		
Niveau de test / Test level :1V - 30V	14.5%	/
Niveau de test / Test level :1V - 300V	13.3%	/
Immunité à l'onde oscillatoire amortie lente / *Slow damped oscillatory wave immunity*		
Temps de montée (tension) / *Voltage rise time*	<±20%	/
Fréquence d'oscillation (tension) / *Voltage oscillation frequencies*	<±10%	/

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) ±x	Incertitude limite du CISPR / CISPR uncertainty limit ±y
Fréquence de répétition / *Repetition rate*	<±10%	/
Décroissance Pk5-Pk1 / *Decaying Pk5-Pk1*	>50%	/
Décroissance Pk10-Pk1 / *Decaying Pk10-Pk1*	<50%	/
Tension à vide (Pk1) / *Open circuit voltage*	<±10%	/
Courant de court-circuit (Pk1) / *Short-circuit current*	<±20%	/
Immunité à l'onde oscillatoire amortie rapide *Fast damped oscillatory wave immunity*		
Temps de montée (tension) / *Voltage rise time*	<±30%	/
Fréquence d'oscillation (tension) / *Voltage oscillation frequencies*	<±10%	/
Fréquence d'oscillation (courant) / *Current oscillation frequencies*	<±30%	/
Fréquence de répétition / *Repetition rate*	<±10%	/
Décroissance Pk5-Pk1 (Circuit ouvert)/ *Decaying Pk5-Pk1*	>50%	/
Décroissance Pk5-Pk1 (Court circuit)/ *Decaying Pk5-Pk1*	>25%	/
Décroissance Pk10-Pk1 (Circuit ouvert)/ *Decaying Pk10-Pk1*	<50%	/
Décroissance Pk10-Pk1 (Court circuit)/ *Decaying Pk10-Pk1*	<25%	/
Durée des salves / *Burst duration*	<±20%	/
Période des salves / *Burst period*	<±20%	/
Impédance de sortie / *Output impedance*	<±20%	/
Tension à vide (Pk1) / *Open circuit voltage*	<±10%	/
Courant de court-circuit (Pk1) / *Short-circuit current*	<±20%	/
Immunité aux champs rayonnés de proximité *Immunity to radiated fields in close proximity*		
De 9kHz à 150kHz / *From 9kHz to 150kHz*	3.1dB	/
De 150kHz à 26MHz / *From 150kHz to 26MHz*	2.7dB	/
De 380MHz à 6GHz / *From 380MHz to 6GHz*	3.3dB	/

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. Ce tableau regroupe l'ensemble des incertitudes maximales pour les essais réalisables dans le laboratoire, qu'ils aient été ou non réalisés dans le cadre du présent rapport */ The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report*

Note - L'incertitude de mesure instrumentale est déterminée selon la CISPR 16-4-2. / *The instrumentation measurement uncertainty is determined according to CISPR16-4-2*