

FCC/ISED EMC Test Report

Report No. : BTL-FCCE-1-2205T007
Equipment : HANDHELD COMPUTER
Model Name : DH8
Brand Name : MilDef Crete Inc.
Applicant : MilDef Crete Inc.
Address : 7F, No.250, Sec.3, Pei Shen Rd., Shen Keng District, New Taipei City, Taiwan

FCC Rule Part(s) : FCC CFR Title 47, Part 15, Subpart B, Class B
ISED Standard(s) : ICES-003, Issue 7, October 2020, Class B
Measurement Procedure(s) : ANSI C63.4-2014
ANSI C63.4a-2017

Date of Receipt : 2022/6/17
Date of Test : 2022/6/17 ~ 2022/8/2
Issued Date : 2022/8/9

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCE-1-2205T007	R00	Original Report.	2022/8/3	Invalid
BTL-FCCE-1-2205T007	R01	Revised report to address TCB's comments.	2022/8/9	Valid

1 SUMMARY OF TEST RESULTS

Emission			
Standard	Test Item	Limit	Judgment
FCC CFR Title 47, Part 15, Subpart B ICES-003, Issue 7, October 2020	AC power line conducted emissions	Class B	PASS
	Radiated emissions below 1 GHz NOTE (2)	Class B	PASS
	Radiated emissions above 1 GHz	Class B	PASS

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) Due to the limits of applied standards are different, but the test setup and test procedure are identical, the test results of this item are multiple recorded with correspond limits.
- (3) The report format version is TP.1.1.3.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

BTL's ISED CAB identifier number is TW0659.

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

The test sites and facilities are covered under FCC RN: 355421 and DN: TW1099.

☒ C05 ☐ CB08 ☒ CB11 ☐ CB15 ☐ CB16

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k = 2$, providing a level of confidence of approximately **95 %**.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions below 1 GHz test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB11 (3m)	CISPR	30 MHz ~ 200 MHz	V	4.26
		30 MHz ~ 200 MHz	H	3.76
		200 MHz ~ 1,000 MHz	V	4.46
		200 MHz ~ 1,000 MHz	H	3.84

C. Radiated emissions above 1 GHz test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB11 (3m)	CISPR	1 GHz ~ 6 GHz	V	4.44
		1 GHz ~ 6 GHz	H	4.40
		6 GHz ~ 18 GHz	V	4.02
		6 GHz ~ 18 GHz	H	4.00

Test Site	Method	Measurement Frequency Range	U,(dB)
CB11 (3m)	CISPR	18 GHz ~ 26.5 GHz	4.76
		26.5 GHz ~ 40 GHz	5.24

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Tested by
Conducted emissions	22°C, 50%	Eric Tai
Radiated emissions below 1 GHz	20°C, 50%	Ray Chen
Radiated emissions above 1 GHz	20°C, 50%	Eric Tai

2 GENERAL INFORMATION

2.1 EUT INFORMATION

Equipment	HANDHELD COMPUTER
Model Name	DH8
Brand Name	MilDef Crete Inc.
Model Difference	N/A
Power Source	#1 DC voltage supplied from External Power Supply. #2 Supplied from battery.
Power Rating	#1 I/P: 100-240V~50-60Hz 1.5A MAX. O/P: 5.0V---3.0A 15.0W or 9.0V---3.0A 27.0W or 12.0V---3.0A 36.0W or 15.0V---3.0A 45.0W or 20.0V---3.0A 60.0W #2 7.2V---2500mAh/18Wh
Products Covered	1 * Adapter: ADAPTER TECH / CDP060A1-P200 1 * Battery: BDH82A 1 * WIFI+BT Module: Intel / AX210NGW (FCC ID: IR5DH8)
Test Model	DH8
Highest Internal Frequency	5.24 GHz
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2.2 TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation modes according to test plan.

Pretest Mode	Description
Mode 1	FULL SYSTEM 1280*720/60Hz

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test	
Final Test Mode	Description
Mode 1	FULL SYSTEM 1280*720/60Hz

Radiated emissions below 1 GHz test	
Final Test Mode	Description
Mode 1	FULL SYSTEM 1280*720/60Hz

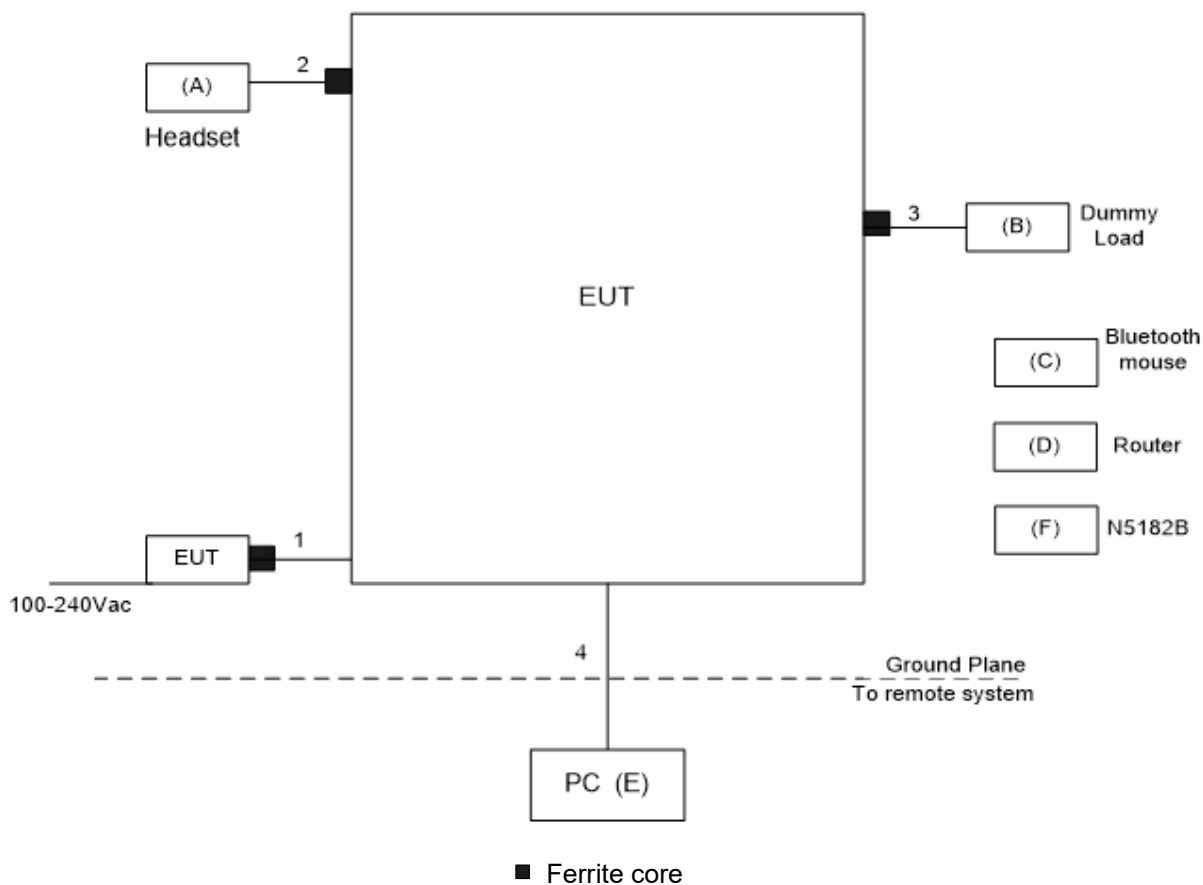
Radiated emissions above 1 GHz test	
Final Test Mode	Description
Mode 1	FULL SYSTEM 1280*720/60Hz

2.3 EUT OPERATING CONDITION

The EUT exercise program (BurninTEST V9.0) used during radiated and/or conducted emissions measurement was designed to exercise the various system components in a manner similar to a typical use.

2.4 TESTED CONFIGURATION DIAGRAM

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.5.



2.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Headset	KINYO	EM-10	N/A	Furnished by test lab.
B	Dummy Load	N/A	N/A	N/A	Furnished by test lab.
C	Bluetooth mouse	Logitech	M337	2137LZA0DTG8	Furnished by test lab.
D	Router	ASUS	RT-AC66U	E11TGG000235	Furnished by test lab.
E	PC	DELL	OptiPlex 7080	9T3HN A00	Furnished by test lab.
F	MXG Vector Signal	Keysight	N5182B	MY57300051	Furnished by test lab.

Item	Cable Type	Shielded	Ferrite Core	Length	Remarks
1	Power Cable	YES	YES	1.1m	Supplied by test requester
2	Audio Cable	NO	YES	1.7m	Furnished by test lab.
3	RS 232 Cable	NO	YES	1m	Supplied by test requester
4	RJ 45 Cable	NO	NO	10m	Type: Cat.5e / 4-pair (8-wire) Furnished by test lab.

3 EMC EMISSION TEST

3.1 CONDUCTED EMISSIONS TEST

3.1.1 LIMITS

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56 *	56 - 46 *
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

- (3) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)

Margin Level = Measurement Value – Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101339	2022/3/29	2023/3/28
2	Test Cable	EMCI	EMCRG58-BM-B M-9000	210501	2022/5/2	2023/5/1
3	EMI Test Receiver	R&S	ESR7	101433	2021/11/24	2022/11/23
4	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

REMARK:

- (1) "N/A" denotes no model name, no serial no. or no calibration specified.
- (2) All calibration period of equipment list is one year.

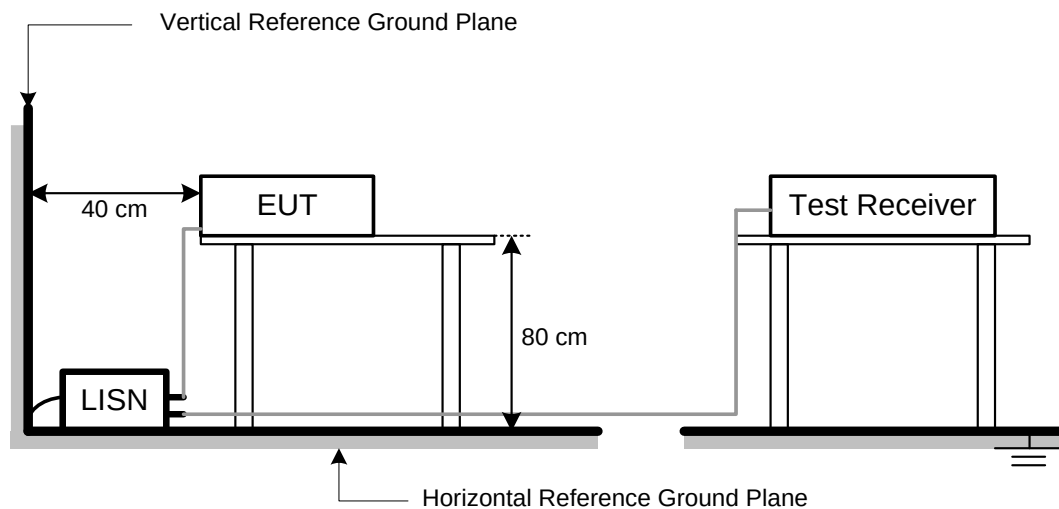
3.1.3 TEST PROCEDURE

- The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
- The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- The receiver was set to quasi-peak and average detect function and specified bandwidth with maximum hold mode.
- For the actual test configuration, please refer to the related Item - TEST PHOTOS.

3.1.4 DEVIATION FROM TEST STANDARD

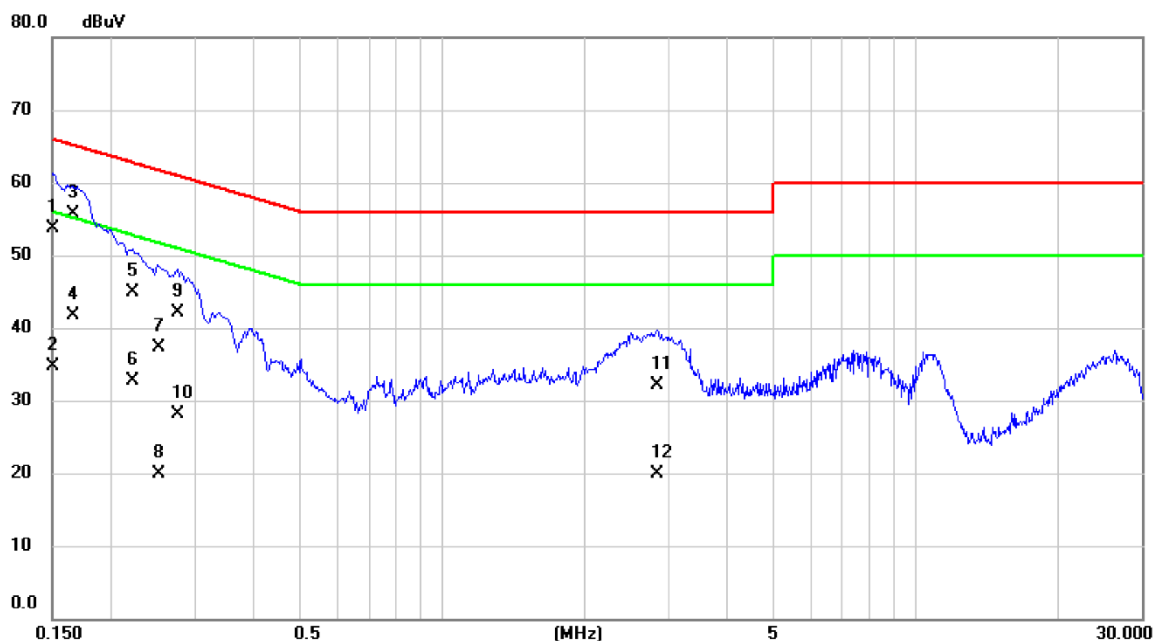
No deviation.

3.1.5 TEST SETUP



3.1.6 TEST RESULT

Test Mode	Mode 1	Tested Date	2022/7/5
Test Voltage	AC 120V/60Hz	Phase	Line

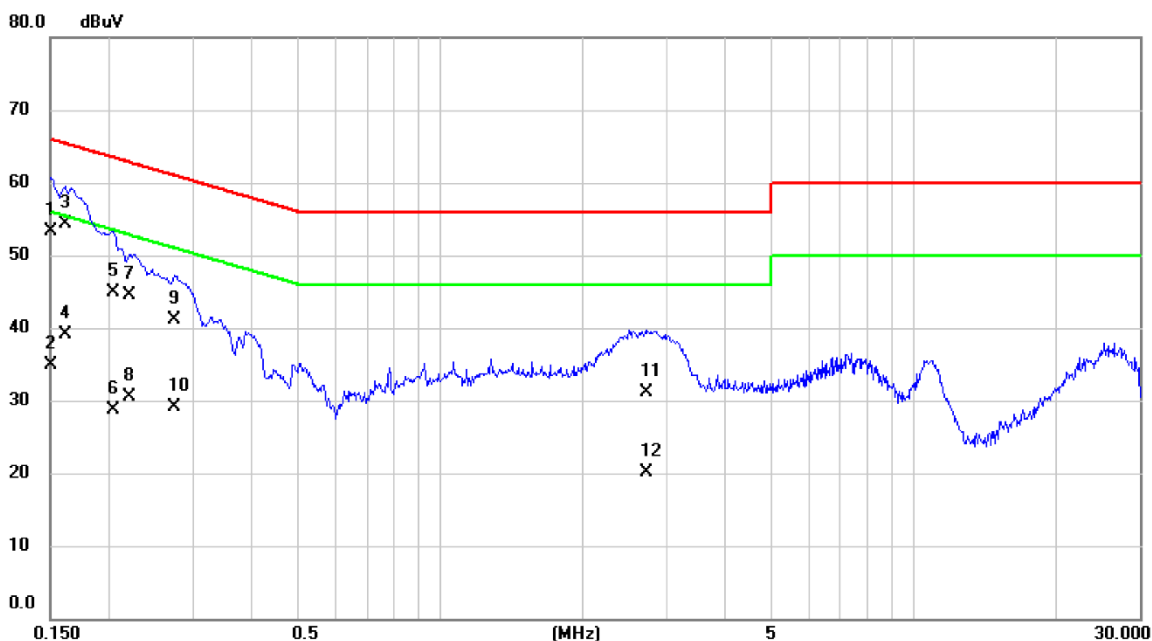


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	44.00	9.67	53.67	66.00	-12.33	QP	
2		0.1500	25.00	9.67	34.67	56.00	-21.33	AVG	
3	*	0.1658	46.00	9.67	55.67	65.17	-9.50	QP	
4		0.1658	32.00	9.67	41.67	55.17	-13.50	AVG	
5		0.2220	35.20	9.67	44.87	62.74	-17.87	QP	
6		0.2220	23.00	9.67	32.67	52.74	-20.07	AVG	
7		0.2513	27.70	9.66	37.36	61.71	-24.35	QP	
8		0.2513	10.30	9.66	19.96	51.71	-31.75	AVG	
9		0.2760	32.50	9.66	42.16	60.94	-18.78	QP	
10		0.2760	18.50	9.66	28.16	50.94	-22.78	AVG	
11		2.8523	22.30	9.84	32.14	56.00	-23.86	QP	
12		2.8523	10.00	9.84	19.84	46.00	-26.16	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/5
Test Voltage	AC 120V/60Hz	Phase	Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	43.70	9.67	53.37	66.00	-12.63	QP	
2		0.1500	25.20	9.67	34.87	56.00	-21.13	AVG	
3	*	0.1615	44.70	9.67	54.37	65.39	-11.02	QP	
4		0.1615	29.40	9.67	39.07	55.39	-16.32	AVG	
5		0.2040	35.30	9.66	44.96	63.45	-18.49	QP	
6		0.2040	19.10	9.66	28.76	53.45	-24.69	AVG	
7		0.2198	34.80	9.66	44.46	62.83	-18.37	QP	
8		0.2198	20.90	9.66	30.56	52.83	-22.27	AVG	
9		0.2737	31.40	9.65	41.05	61.00	-19.95	QP	
10		0.2737	19.50	9.65	29.15	51.00	-21.85	AVG	
11		2.7285	21.20	9.84	31.04	56.00	-24.96	QP	
12		2.7285	10.30	9.84	20.14	46.00	-25.86	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

3.2 RADIATED EMISSIONS BELOW 1 GHZ TEST

3.2.1 LIMITS - FCC

FCC CFR Title 47, Part 15, Subpart B:

Frequency (MHz)	Class A (at 10 m)		Class A (at 3 m)*	Class B (at 3 m)	
	(uV/m) Field strength	(dBuV/m) Field strength	(dBuV/m) Field strength	(uV/m) Field strength	(dBuV/m) Field strength
30 - 88	90	39	49.46	100	40
88 - 216	150	43.5	53.96	150	43.5
216 - 960	210	46.4	56.86	200	46
Above 960	300	49.5	59.96	500	54

* FCC CFR Title 47, Part 15, Subpart A, section 15.31(f)(1), the distance could be extrapolated by using 20 dB/decade factor.

Alternative Limits:

Frequency (MHz)	Class A (at 10 m)	Class B (at 10 m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

FCC CFR Title 47, Part 15, Subpart B, section 15.109(g) provides, as an alternative, compliance to the CISPR 22 (Third Edition) radiated emission limits in the 30 MHz to 1000 MHz range.

Frequency range of radiated measurements (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

NOTE:

- The tighter limit applies at the band edges.
- Emission level (dBuV/m) = 20log Emission level (uV/m).
3 m Emission level = 10 m Emission level + 20log(10 m/3 m).
- The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	=	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	40	=	-18.78

3.2.2 LIMITS - ICES

Frequency range (MHz)	Class A		Class B	
	Quasi-peak		Quasi-peak	
	(dBuV/m) (at 3 m)	(dBuV/m) (at 10 m)	(dBuV/m) (at 3 m)	(dBuV/m) (at 10 m)
30 – 88	50.0	40.0	40.0	30.0
88 – 216	54.0	43.5	43.5	33.1
216 – 230	56.9	46.4	46.0	35.6
230 – 960	57.0	47.0	47.0	37.0
960 – 1000	60.0	49.5	54.0	43.5

Required highest measurement frequency for radiated emissions

Highest internal frequency (F_x)	Highest measurement frequency (F_M)
$F_x \leq 108$ MHz	1 GHz
$108 \text{ MHz} < F_x \leq 500$ MHz	2 GHz
$500 \text{ MHz} < F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 40 GHz

NOTE:

- (4) The more stringent limit applies at transition frequencies.
- (5) F_x is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.
- (6) Emission level (dBuV/m) = $20 \log$ Emission level (uV/m).
3 m Emission level = 10 m Emission level + $20 \log(10 \text{ m}/3 \text{ m})$.
- (7) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)
Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	=	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	40	=	-18.78

3.2.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Log-Bicon Antenna	Schwarzbeck	VULB 9168	9168-0992	2021/8/11	2022/8/10
2	Attenuator	EMCI	EMCI-N-6-05	AT-N0508	2021/8/11	2022/8/10
3	Pre-Amplifier	EMCI	EMC001330	980144	2022/5/12	2023/5/11
4	Test Cable	EMCI	EMCCFD400-NM-NM-8000	200346	2022/5/12	2023/5/11
5	Test Cable	EMCI	EMC104-SM-SM-2500	150303	2022/5/12	2023/5/11
6	Test Cable	EMCI	EMC104-SM-NM-1000	170311	2022/5/12	2023/5/11
7	Signal Analyzer	Agilent	N9020B	MY60112534	2022/4/15	2023/4/14
8	Measurement Software	Farad	EZ EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

REMARK:

- (1) "N/A" denotes no model name, no serial no. or no calibration specified.
- (2) All calibration period of equipment list is one year.

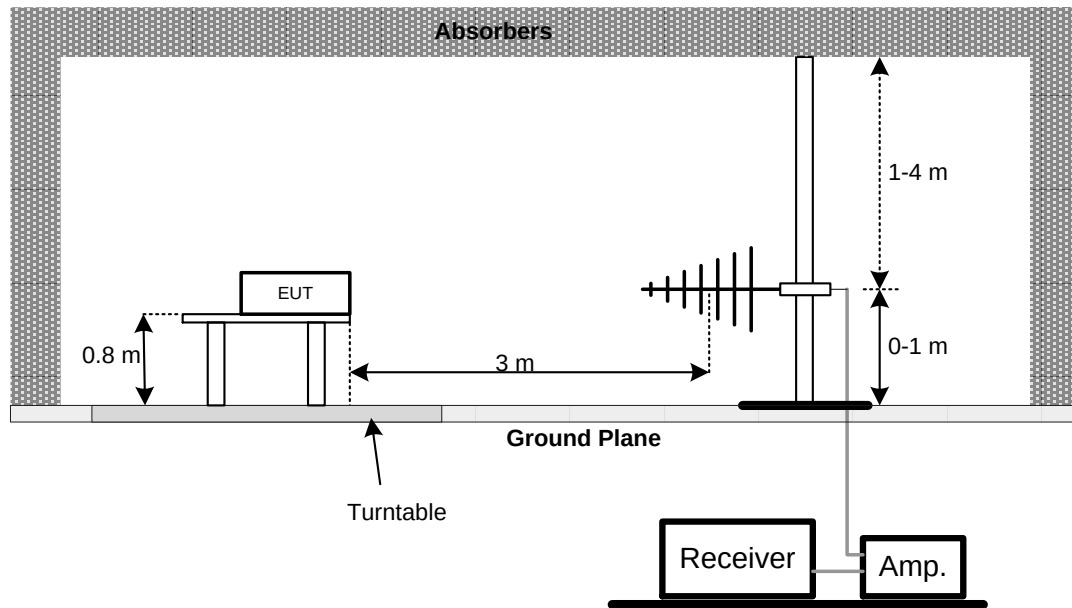
3.2.4 TEST PROCEDURE

- a. The separation distance of 3 m was used for measurements below 1 GHz.
The EUT was placed on the top of a rotating table 0.8 m above the ground in a 3 m semi-anechoic chamber.
- b. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the receive antenna was varied between 1 m and 4 m. Both horizontal and vertical polarizations of the antenna were checked.
- d. For each suspected emission, the EUT was arranged at its worst case and then the antenna was scanned in height to find the maximum. The tower Bore sight function was used.
- e. The receiver was set to quasi-peak detect function and specified bandwidth with maximum hold mode.
- f. For the actual test configuration, please refer to the related Item - TEST PHOTOS.

3.2.5 DEVIATION FROM TEST STANDARD

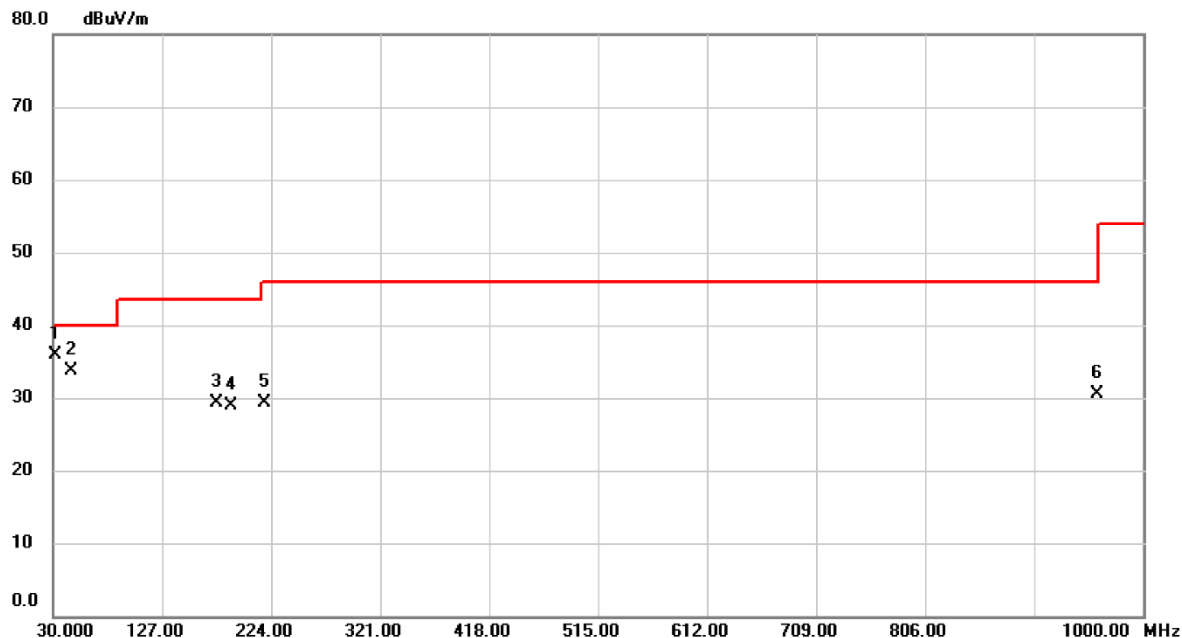
No deviation.

3.2.6 TEST SETUP



3.2.7 TEST RESULT - FCC

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Vertical



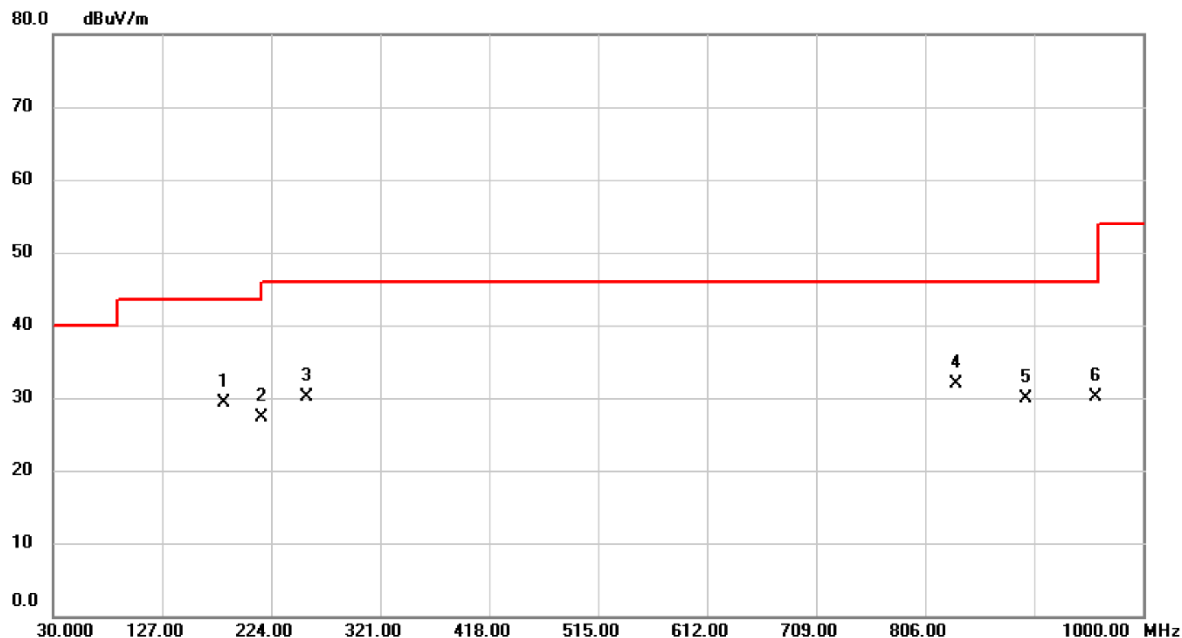
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	31.9400	49.81	-13.81	36.00	40.00	-4.00	QP	100	269
2		46.4900	45.93	-12.27	33.66	40.00	-6.34	QP	100	0
3		175.5000	42.18	-12.83	29.35	43.50	-14.15	QP	100	132
4		188.1100	43.24	-14.38	28.86	43.50	-14.64	QP	100	164
5		218.1800	44.51	-15.13	29.38	46.00	-16.62	QP	100	169
6		959.2600	29.68	0.81	30.49	46.00	-15.51	QP	100	74

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		181.3200	42.84	-13.45	29.39	43.50	-14.11	200	227	
2		215.2700	42.53	-15.13	27.40	43.50	-16.10	200	216	
3		255.0400	43.16	-13.08	30.08	46.00	-15.92	100	92	
4	*	833.1600	32.47	-0.53	31.94	46.00	-14.06	100	136	
5		896.2100	29.63	0.21	29.84	46.00	-16.16	100	217	
6		957.3200	29.41	0.77	30.18	46.00	-15.82	129	0	

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

3.2.8 TEST RESULT - ICES

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	31.9400	49.81	-13.81	36.00	40.00	-4.00	QP	100	269
2		46.4900	45.93	-12.27	33.66	40.00	-6.34	QP	100	0
3		175.5000	42.18	-12.83	29.35	43.50	-14.15	QP	100	132
4		188.1100	43.24	-14.38	28.86	43.50	-14.64	QP	100	164
5		218.1800	44.51	-15.13	29.38	46.00	-16.62	QP	100	169
6		959.2600	29.68	0.81	30.49	47.00	-16.51	QP	100	74

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	181.3200	42.84	-13.45	29.39	43.50	-14.11	QP	200	227
2		215.2700	42.53	-15.13	27.40	43.50	-16.10	QP	200	216
3		255.0400	43.16	-13.08	30.08	47.00	-16.92	QP	100	92
4		833.1600	32.47	-0.53	31.94	47.00	-15.06	QP	100	136
5		896.2100	29.63	0.21	29.84	47.00	-17.16	QP	100	217
6		957.3200	29.41	0.77	30.18	47.00	-16.82	QP	129	0

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

3.3 RADIATED EMISSIONS ABOVE 1 GHZ TEST

3.3.1 LIMITS - FCC

Frequency (GHz)	Class A				Class B	
	(dBuV/m) (at 3 m)		(dBuV/m) (at 10 m)		(dBuV/m) (at 3 m)	
	Peak	Average	Peak	Average	Peak	Average
Above 1	80	60	69.5	49.5	74	54

Frequency range of radiated measurements (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m) = 20log Emission level (uV/m).
- (3) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
36.89	+	4.23	=	41.12

Measurement Value		Limit Value		Margin Level
41.12	-	54	=	-12.88

3.3.2 LIMITS - ICES

Frequency range (GHz)	Class A		Class B	
	Average	Peak	Average	Peak
	(dB μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB μ V/m)
1 – F_M	60	80	54	74

Required highest measurement frequency for radiated emissions

Highest internal frequency (F_X)	Highest measurement frequency (F_M)
$F_X \leq 108$ MHz	1 GHz
108 MHz < $F_X \leq 500$ MHz	2 GHz
500 MHz < $F_X \leq 1$ GHz	5 GHz
$F_X > 1$ GHz	5 x F_X up to a maximum of 40 GHz

NOTE:

- (4) The more stringent limit applies at transition frequencies.
- (5) F_X is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.
- (6) Emission level (dB μ V/m) = 20log Emission level (uV/m).
- (7) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)
 Margin Level = Measurement Value - Limit Value
 Calculation example:

Reading Level		Correct Factor		Measurement Value
36.89	+	4.23	=	41.12

Measurement Value		Limit Value		Margin Level
41.12	-	54	=	-12.88

3.3.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Horn Antenna	RFSPIN	DRH18-E	210108A18E	2022/5/12	2023/5/11
2	Pre-Amplifier	EMCI	EMC012645SE	980411	2022/1/22	2023/1/21
3	Test Cable	EMCI	EMC104-SM-SM-2500	150306	2021/12/9	2022/12/8
4	Test Cable	EMCI	EMC104-SM-SM-7000	201222	2021/12/9	2022/12/8
5	Test Cable	EMCI	EMC104-SM-SM-1000	170815	2021/12/9	2022/12/8
6	Signal Analyzer	Agilent	N9020B	MY60112534	2022/4/15	2023/4/14
7	Horn Antenna	COM-POWER	AH-840	10090003	2021/8/12	2022/8/11
8	Pre-Amplifier	EMCI	EMC184045SE	980511	2021/11/11	2022/11/10
9	Test Cable	EMCI	EMC102-KM-KM-1000	150805	2021/10/22	2022/10/21
10	Test Cable	EMCI	EMC101G-KM-KM-3300	201022	2021/10/22	2022/10/21
11	EXA Signal Analyzer	Keysight	N9010A	MY54200483	2021/10/6	2022/10/5
12	Measurement Software	Farad	EZ EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

REMARK:

- (1) "N/A" denotes no model name, no serial no. or no calibration specified.
- (2) All calibration period of equipment list is one year.

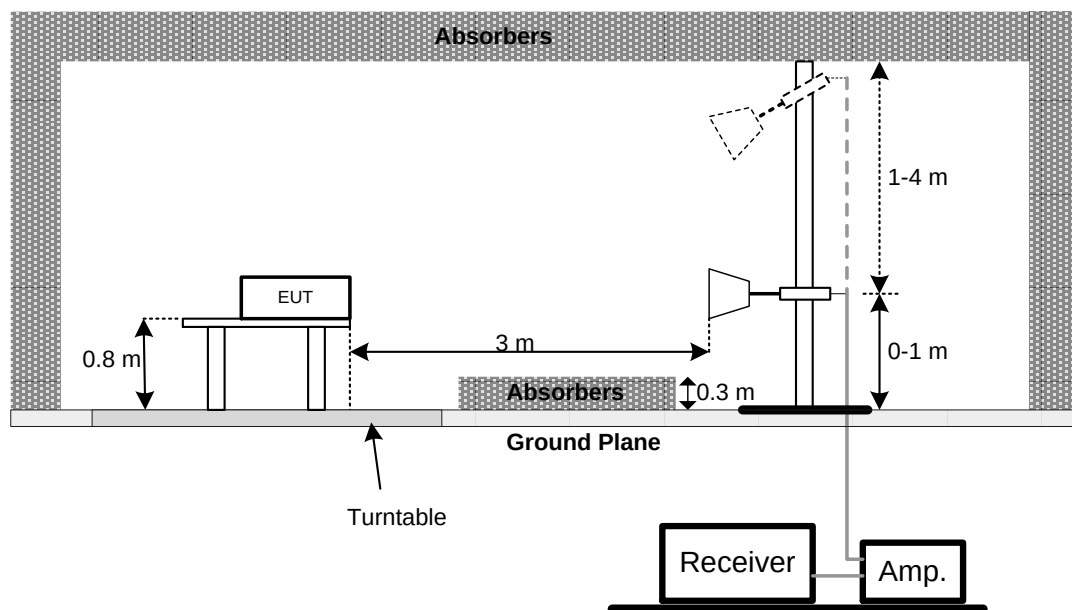
3.3.4 TEST PROCEDURE

- a. The separation distance of 3 m was used for measurements above 1 GHz.
The test limits were altered using the 20 dB/decade extrapolation factor.
The EUT was placed on the top of a rotating table 0.8 m above the ground in a 3 m semi-anechoic chamber.
- b. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the receive antenna was varied between 1 m and 4 m. Both horizontal and vertical polarizations of the antenna were checked.
- d. For each suspected emission, the EUT was arranged at its worst case and then the antenna was scanned in height to find the maximum. The tower Bore sight function was used.
- e. The receiver/spectrum analyzer was set to peak and average detect function and specified bandwidth with maximum hold mode.
- f. For the actual test configuration, please refer to the related Item - TEST PHOTOS.

3.3.5 DEVIATION FROM TEST STANDARD

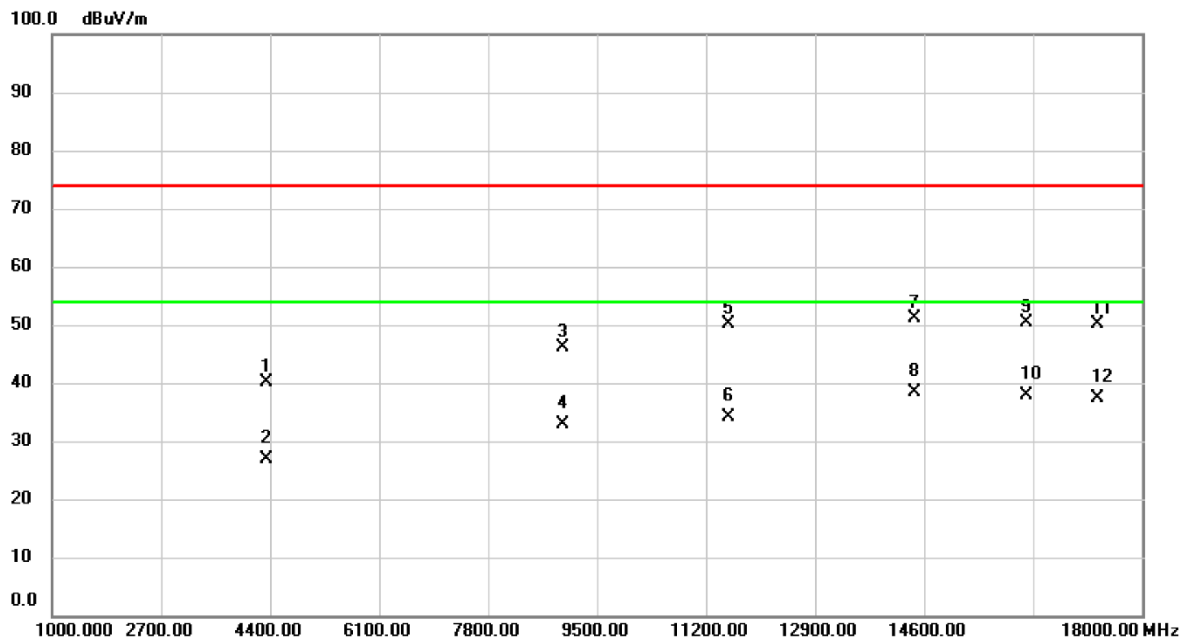
No deviation.

3.3.6 TEST SETUP



3.3.7 TEST RESULT

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Vertical



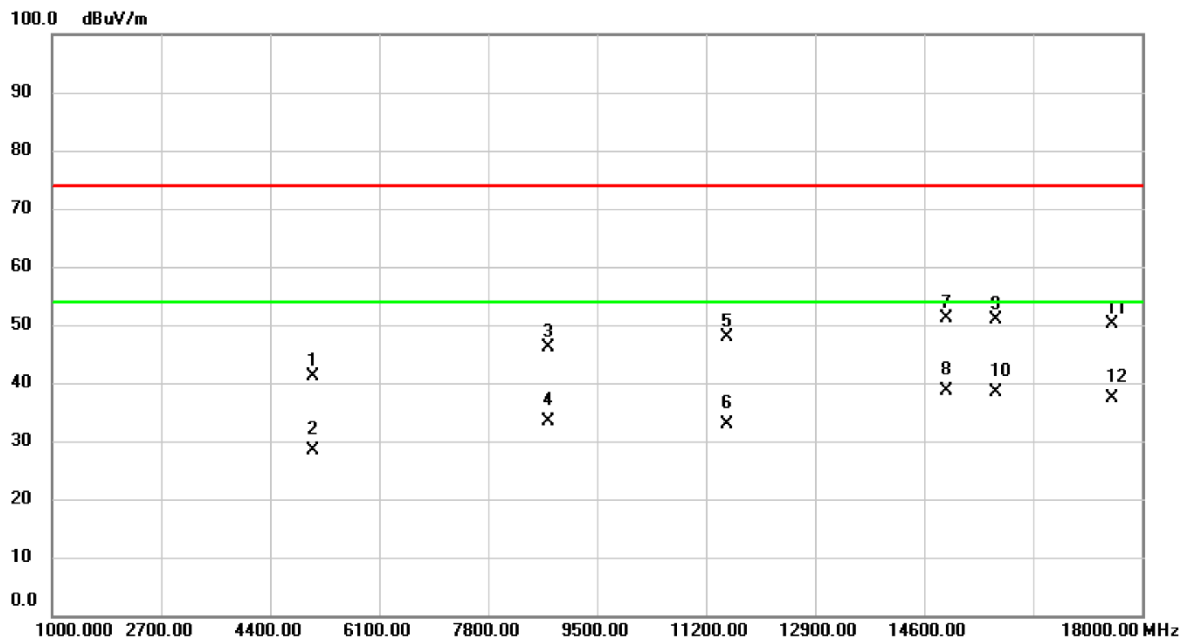
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4332.000	51.12	-11.06	40.06	74.00	-33.94	peak	100	24
2		4332.000	37.87	-11.06	26.81	54.00	-27.19	AVG	100	24
3		8956.000	47.57	-1.39	46.18	74.00	-27.82	peak	100	117
4		8956.000	34.37	-1.39	32.98	54.00	-21.02	AVG	100	117
5		11540.00	50.77	-0.53	50.24	74.00	-23.76	peak	100	144
6		11540.00	34.59	-0.53	34.06	54.00	-19.94	AVG	100	144
7		14447.00	46.07	5.03	51.10	74.00	-22.90	peak	100	325
8	*	14447.00	33.37	5.03	38.40	54.00	-15.60	AVG	100	325
9		16198.00	44.99	5.32	50.31	74.00	-23.69	peak	200	44
10		16198.00	32.58	5.32	37.90	54.00	-16.10	AVG	200	44
11		17303.00	45.71	4.36	50.07	74.00	-23.93	peak	100	182
12		17303.00	33.02	4.36	37.38	54.00	-16.62	AVG	100	182

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



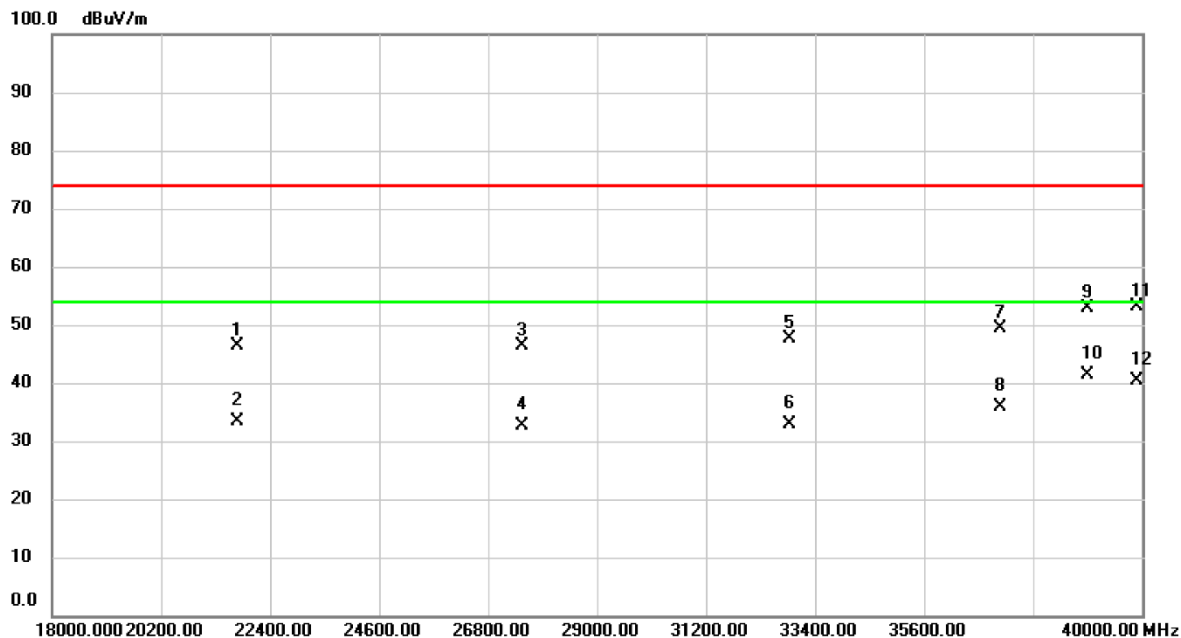
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		5063.000	50.29	-9.23	41.06	74.00	-32.94	peak	153	360
2		5063.000	37.60	-9.23	28.37	54.00	-25.63	AVG	153	360
3		8735.000	47.76	-1.51	46.25	74.00	-27.75	peak	200	271
4		8735.000	34.77	-1.51	33.26	54.00	-20.74	AVG	200	271
5		11523.00	48.40	-0.57	47.83	74.00	-26.17	peak	100	150
6		11523.00	33.54	-0.57	32.97	54.00	-21.03	AVG	100	150
7		14940.00	45.68	5.35	51.03	74.00	-22.97	peak	100	89
8	*	14940.00	33.23	5.35	38.58	54.00	-15.42	AVG	100	89
9		15722.00	45.28	5.56	50.84	74.00	-23.16	peak	100	227
10		15722.00	32.89	5.56	38.45	54.00	-15.55	AVG	100	227
11		17524.00	45.61	4.51	50.12	74.00	-23.88	peak	200	84
12		17524.00	32.96	4.51	37.47	54.00	-16.53	AVG	200	84

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Vertical



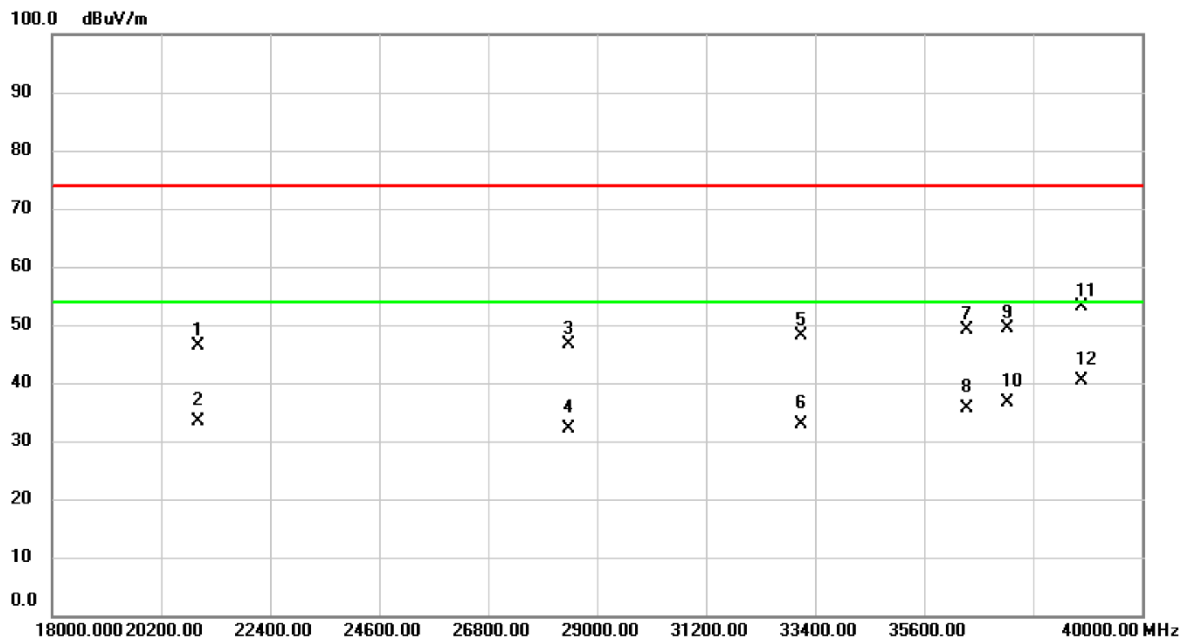
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		21740.00	55.72	-9.45	46.27	74.00	-27.73	peak	100	108
2		21740.00	42.74	-9.45	33.29	54.00	-20.71	AVG	100	108
3		27482.00	55.52	-9.13	46.39	74.00	-27.61	peak	100	91
4		27482.00	41.65	-9.13	32.52	54.00	-21.48	AVG	100	91
5		32894.00	57.57	-9.84	47.73	74.00	-26.27	peak	100	86
6		32894.00	42.73	-9.84	32.89	54.00	-21.11	AVG	100	86
7		37140.00	57.34	-7.97	49.37	74.00	-24.63	peak	100	306
8		37140.00	43.96	-7.97	35.99	54.00	-18.01	AVG	100	306
9		38900.00	56.05	-3.16	52.89	74.00	-21.11	peak	100	224
10	*	38900.00	44.61	-3.16	41.45	54.00	-12.55	AVG	100	224
11		39890.00	54.79	-1.69	53.10	74.00	-20.90	peak	100	155
12		39890.00	42.15	-1.69	40.46	54.00	-13.54	AVG	100	155

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Mode 1	Tested Date	2022/7/4
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		20948.00	55.84	-9.37	46.47	74.00	-27.53	peak	100	306
2		20948.00	42.75	-9.37	33.38	54.00	-20.62	AVG	100	306
3		28428.00	55.95	-9.35	46.60	74.00	-27.40	peak	100	258
4		28428.00	41.53	-9.35	32.18	54.00	-21.82	AVG	100	258
5		33114.00	57.86	-9.77	48.09	74.00	-25.91	peak	100	36
6		33114.00	42.57	-9.77	32.80	54.00	-21.20	AVG	100	36
7		36458.00	58.03	-8.90	49.13	74.00	-24.87	peak	100	208
8		36458.00	44.63	-8.90	35.73	54.00	-18.27	AVG	100	208
9		37272.00	57.27	-7.92	49.35	74.00	-24.65	peak	100	166
10		37272.00	44.53	-7.92	36.61	54.00	-17.39	AVG	100	166
11		38790.00	56.44	-3.29	53.15	74.00	-20.85	peak	100	147
12	*	38790.00	43.56	-3.29	40.27	54.00	-13.73	AVG	100	147

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

5 EUT PHOTOS

Please refer to document Appendix No.: EP-2205T007-2 (APPENDIX-EUT PHOTOS).

End of Test Report