FCC EMC Test Report

Project No.	:	2201C050
Equipment	:	5G Wireless Router
Brand Name	:	TOZED KANGWEI
Test Model	:	ZLT X21
Series Model	:	ZLT X21Y("Y" in the model name can be A to Z)
Applicant	:	Guangzhou Tozed Kangwei Intelligent Technology Co., LTD
Address	:	13/F,Tower 1, Xiangjiang Sci-tech Innovation Center, No.37 Jinlong Road, Nansha District, Guangzhou
Manufacturer	:	Guangzhou Tozed Kangwei Intelligent Technology Co., LTD
Address	:	13/F,Tower 1, Xiangjiang Sci-tech Innovation Center, No.37 Jinlong Road, Nansha District, Guangzhou
Factory	:	Guangzhou Tozed Kangwei Intelligent Technology Co., LTD
Address	:	13/F,Tower 1, Xiangjiang Sci-tech Innovation Center, No.37 Jinlong Road, Nansha District, Guangzhou
Date of Receipt	:	Jan. 12, 2022
Date of Test	:	Jan. 17, 2022 ~ Jan. 27, 2022
Issued Date	:	Mar. 17, 2022
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG20220111218
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart B

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

Dave Hong

Prepared by : Dave Hong

Kevin Li

Approved by : Kevin Li

TESTING CERT #5123.02

Add: No. 3 Jinshagang 1st Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of China .

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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.

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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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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Mar. 17, 2022

1. SUMMARY OF TEST RESULTS

Emission		
Standard(s)	Test Item	Result
FCC CFR Title 47,Part 15,Subpart B ANSI C63.4-2014	AC Power Line Conducted Emissions	PASS
	Radiated Emissions 30 MHz to 1 GHz	PASS
	Radiated Emissions Above 1 GHz	PASS

1.1 TEST FACILITY

The test facilities used to collect the test data in this report at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of China.
BTL's Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.60

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB01 (3m)	CISPR	30MHz ~ 200MHz	V	4.62
		30MHz ~ 200MHz	H	3.58
		200MHz ~ 1,000MHz	V	4.44
		200MHz ~ 1,000MHz	H	4.36

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB01 (3m)	CISPR	1GHz ~ 6GHz	3.72
		6GHz ~ 18GHz	4.62

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB01 (1m)	CISPR	18 ~ 26.5 GHz	3.62
		26.5 ~ 40 GHz	4.00

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	Temperature	Humidity	Tested By
AC Power Line Conducted Emissions	22°C	53%	Rod Tang
Radiated emissions 30 MHz to 1 GHz	19°C	49%	Torocat Yuan
Radiated emissions above 1 GHz	19°C-25°C	45%-60%	Torocat Yuan

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	5G Wireless Router
Brand Name	TOZED KANGWEI
Test Model	ZLT X21
Series Model	ZLT X21Y("Y" in the model name can be A to Z)
Model Difference(s)	There is no difference except model difference, shell color and silk screen change.
HVIN	TZ7.823.411
FVIN	1.2.17
Power Source	DC voltage supplied from AC adapter. Model: GS-P120200E334
Power Rating	I/P: 100-240V ~ 50/60Hz 0.8A O/P: 12V ⎓ 2A
Connecting I/O Port(s)	1* DC port 4* LAN port 1* Type-C port 1* SIM Card port
Classification of EUT	Class B
Highest Internal Frequency(Fx)	5850MHz

Note:

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

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	FULL SYSTEM(LTE B4/B5/B7/B66/B7C+2.4G WIFI+5G WIFI)
Mode 2	FULL SYSTEM(5G NR SA:N78 / N77 NSA: DC:7A_N78 / DC_66A_n78+2.4G WIFI+5G WIFI)
Mode 3	FULL SYSTEM(idle +2.4G WIFI+5G WIFI)

AC Power Line Conducted Emissions test	
Final Test Mode	Description
Mode 2	FULL SYSTEM(5G NR SA:N78+2.4G WIFI+5G WIFI)

Radiated Emissions 30 MHz to 1 GHz test	
Final Test Mode	Description
Mode 2	FULL SYSTEM(5G NR SA:N78+2.4G WIFI+5G WIFI)

Radiated emissions above 1 GHz test	
Final Test Mode	Description
Mode 2	FULL SYSTEM(5G NR SA:N78+2.4G WIFI+5G WIFI)

Note:

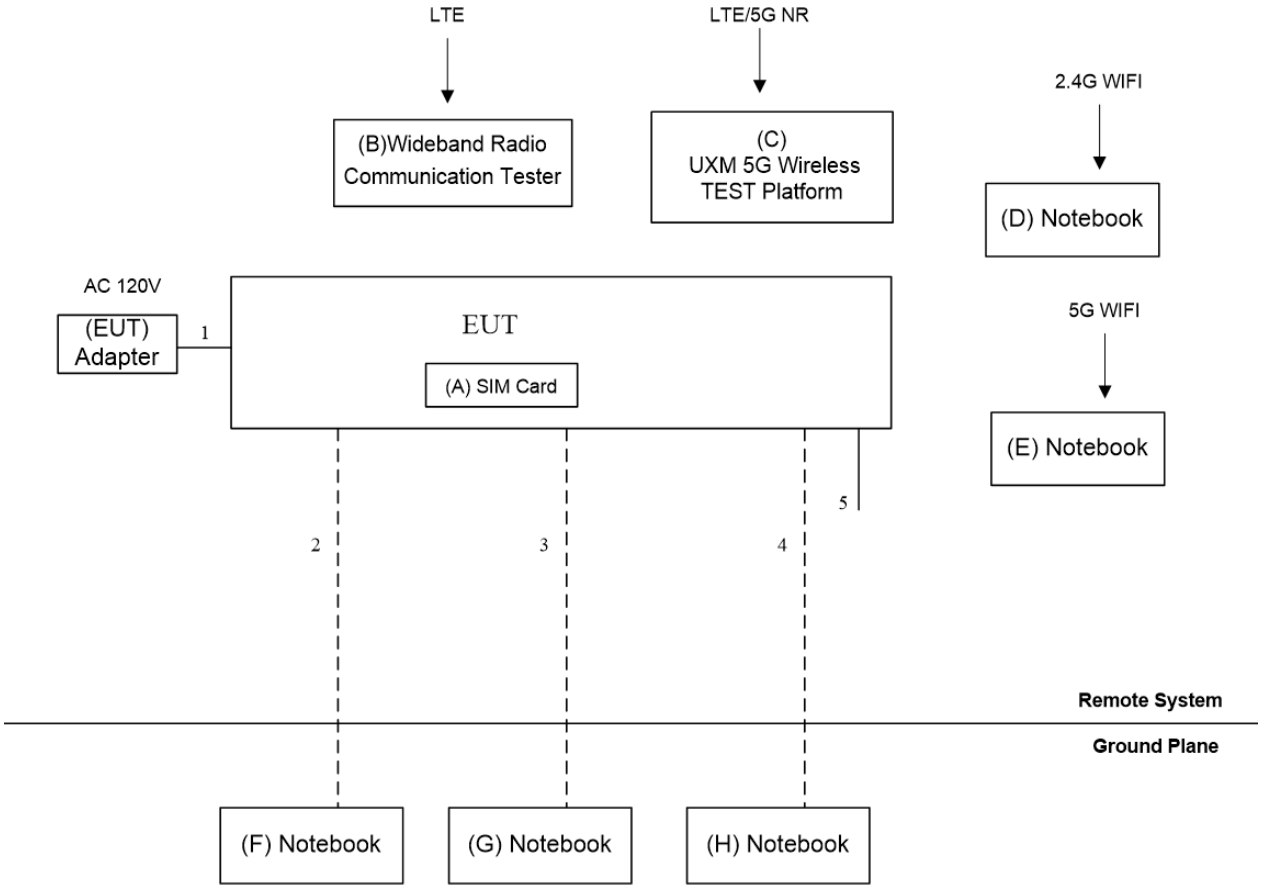
1. Pretested Mode 1-Mode 3, the worst case is Mode 2 and recorded.
2. Mode 2 tested 5G NR SA: N78 / N77, NSA: DC:7A_N78 / DC_66A_n78, the worst case is 5G NR SA:N78 and recorded.
3. The product supports BT&2.4G&5G WIFI function.
4. The frequency exemption are 2400-2483.5MHz, 5150-5250MHz, 5250-5350MHz, 5470-5725MHz, 5725-5850MHz.
5. Radiated emission above 1GHz tested with 2.4G&5G filter.

2.3 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The standard test signals and output signal as following:

1. The SIM Card is plugged into EUT.
2. EUT connected to Adapter via DC Cable.
3. EUT connected to Wideband Radio Communication Tester via LTE.
4. EUT connected to UXM 5G Wireless TEST Platform via LTE/5G NR.
5. EUT connected to Notebook (D) via 2.4G WIFI.
6. EUT connected to Notebook (E) via 5G WIFI.
7. EUT connected to Notebook (F&G&H) via RJ45 Cable.

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	SIM Card	RS	N/A	N/A
B	Wideband Radio Communication Tester	RS	CMW500	122125
C	UXM 5G Wireless TEST Platform	KEYSIGHT	E7515B	MY59110295
D	Notebook	Lenovo	G40	YB09261386
E	Notebook	Lenovo	V310-14ISK	LR07GZHC
F	Notebook	Lenovo	V310-14ISK	LR07GZNB
G	Notebook	Lenovo	V310-14IKB	LR07SH58
H	Notebook	Lenovo	V310-14IKB	LR07SH32

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m
2-4	RJ45 Cable	NO	NO	10m
5	Type-C Cable	YES	NO	1.2m

3. EMC EMISSION TEST

3.1 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1.1 LIMIT

Frequency of Emission (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.5 - 5	56	46
5 - 30	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

3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Jan. 22, 2023
2	LISN	EMCO	3816/2	52765	Jan. 23, 2023
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Jan. 23, 2023
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	Cable	N/A	RG223	12m	Mar. 09, 2022

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

3.1.3 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

d. LISN at least 80 cm from nearest part of EUT chassis.

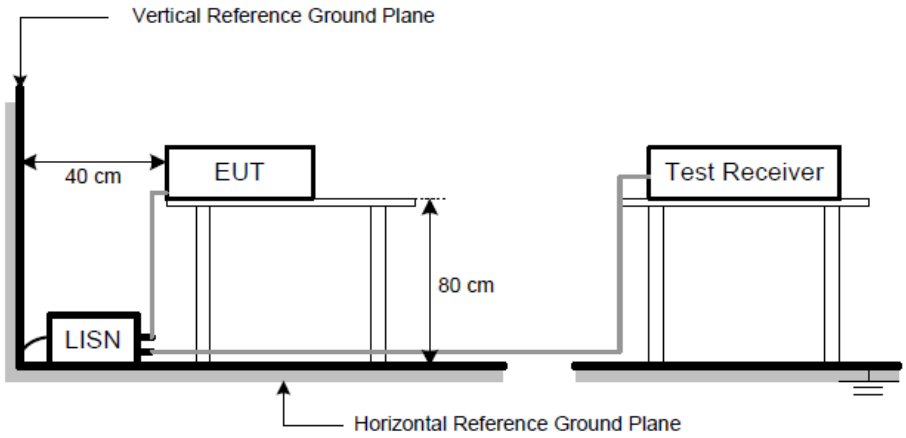
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

f. Measuring frequency range from 150KHz to 30MHz.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation

3.1.5 TEST SETUP



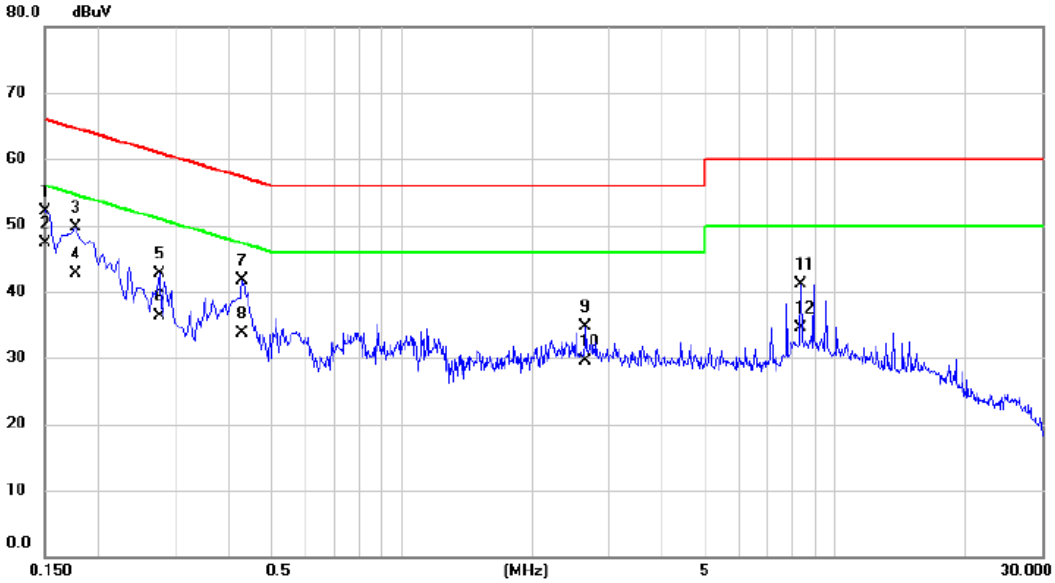
3.1.6 TEST RESULTS

Remark:

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9 kHz; SPA setting in RBW=10 kHz, VBW =10 kHz, Swp. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=10 kHz, VBW=10 kHz, Swp. Time =0.3 sec./MHz.

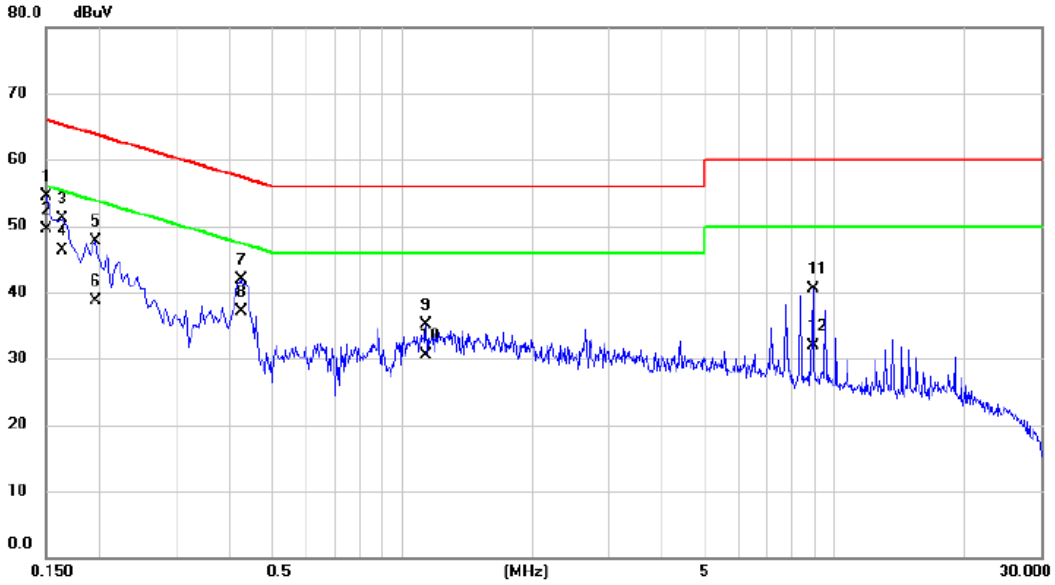
(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.

Test Voltage	AC 120V/60Hz	Phase	Line
Test Mode	Mode 2		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	42.42	9.78	52.20	66.00	-13.80	QP	
2	*	0.1500	37.50	9.78	47.28	56.00	-8.72	AVG	
3		0.1770	39.94	9.79	49.73	64.63	-14.90	QP	
4		0.1770	32.90	9.79	42.69	54.63	-11.94	AVG	
5		0.2760	32.88	9.83	42.71	60.94	-18.23	QP	
6		0.2760	26.50	9.83	36.33	50.94	-14.61	AVG	
7		0.4290	31.86	9.86	41.72	57.27	-15.55	QP	
8		0.4290	23.80	9.86	33.66	47.27	-13.61	AVG	
9		2.6520	24.52	10.19	34.71	56.00	-21.29	QP	
10		2.6520	19.30	10.19	29.49	46.00	-16.51	AVG	
11		8.3175	30.68	10.42	41.10	60.00	-18.90	QP	
12		8.3175	24.10	10.42	34.52	50.00	-15.48	AVG	

Test Voltage	AC 120V/60Hz	Phase	Neutral
Test Mode	Mode 2		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	44.65	9.82	54.47	66.00	-11.53	QP	
2	*	0.1500	39.60	9.82	49.42	56.00	-6.58	AVG	
3		0.1635	41.17	9.84	51.01	65.28	-14.27	QP	
4		0.1635	36.50	9.84	46.34	55.28	-8.94	AVG	
5		0.1950	37.81	9.85	47.66	63.82	-16.16	QP	
6		0.1950	28.90	9.85	38.75	53.82	-15.07	AVG	
7		0.4245	31.94	9.92	41.86	57.36	-15.50	QP	
8		0.4245	27.10	9.92	37.02	47.36	-10.34	AVG	
9		1.1355	24.88	10.15	35.03	56.00	-20.97	QP	
10		1.1355	20.30	10.15	30.45	46.00	-15.55	AVG	
11		8.9025	29.98	10.46	40.44	60.00	-19.56	QP	
12		8.9025	21.50	10.46	31.96	50.00	-18.04	AVG	

3.2 RADIATED EMISSIONS 30 MHZ TO 1 GHZ

3.2.1 LIMIT

Frequency (MHz)	Class B (at 3m)	
	(uV/m) Quasi-peak	(dBuV/m) Quasi-peak
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
960 - 1000	500	54

NOTE:
(1) The tighter limit applies at the band edges.
(2) Emission level (dBuV/m) = 20log Emission level (uV/m).
3m Emission level = 10m Emission level + 20log(10m/3m).
(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

3.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	ETS	3142B	26419	Apr. 14, 2022
2	Amplifier	SONOMA	310N	186128	Jan. 22, 2023
3	MXE EMI Receiver	Keysight	N9038A	MY56400091	Jan. 22, 2023
4	Cable	emci	LMR-400(30MHz-1GHz)(7m+7m)	N/A	Sep. 23, 2022
5	Controller	ETS-Lindgren	2090	N/A	N/A
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

3.2.3 TEST PROCEDURE

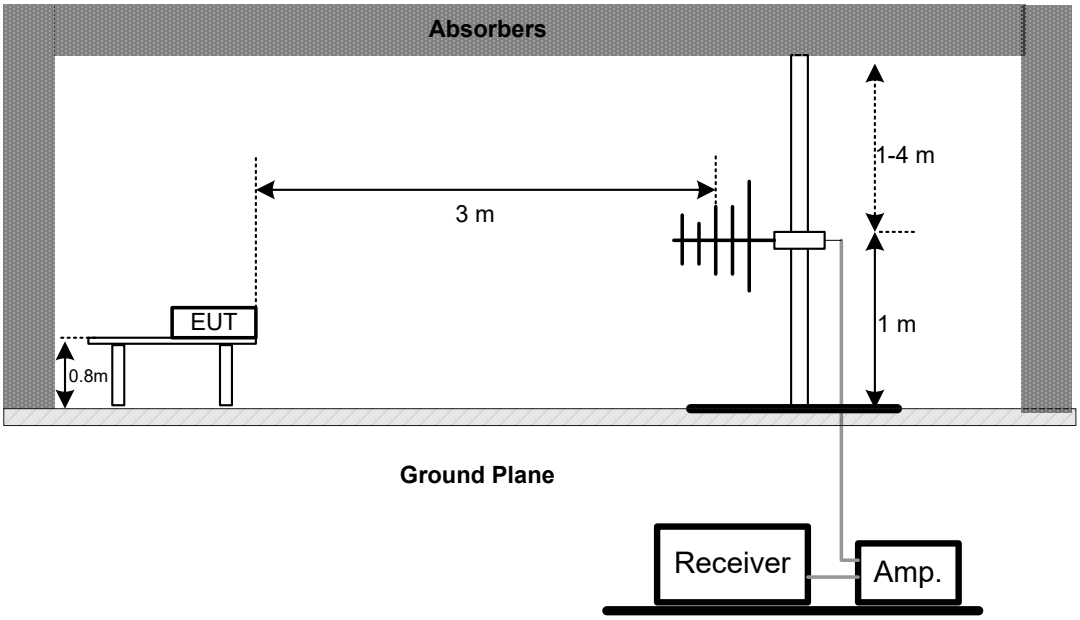
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
d. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
f. For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP

30 MHz to 1 GHz

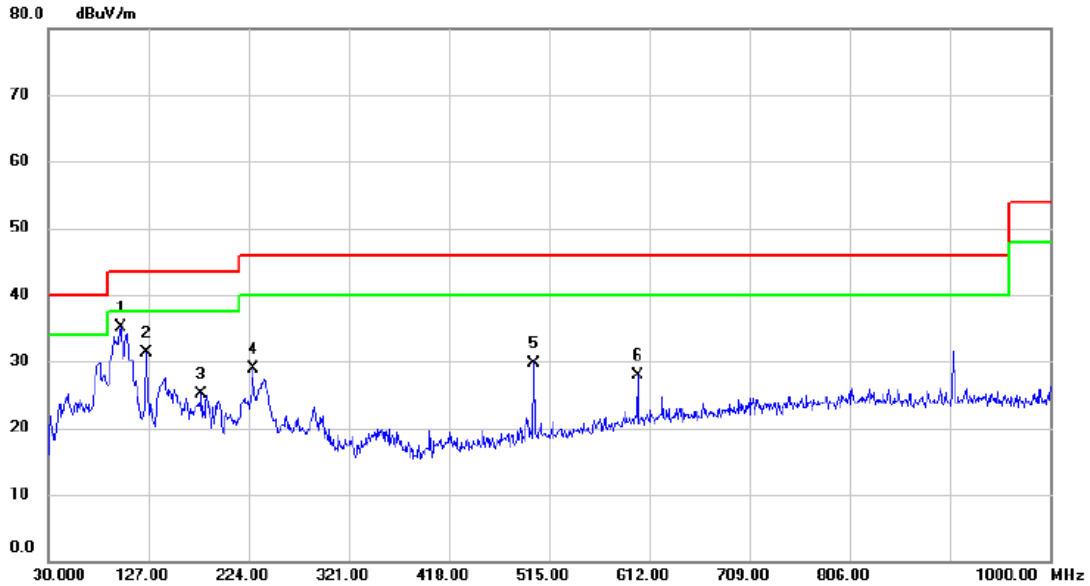


3.2.6 TEST RESULTS

Remark:

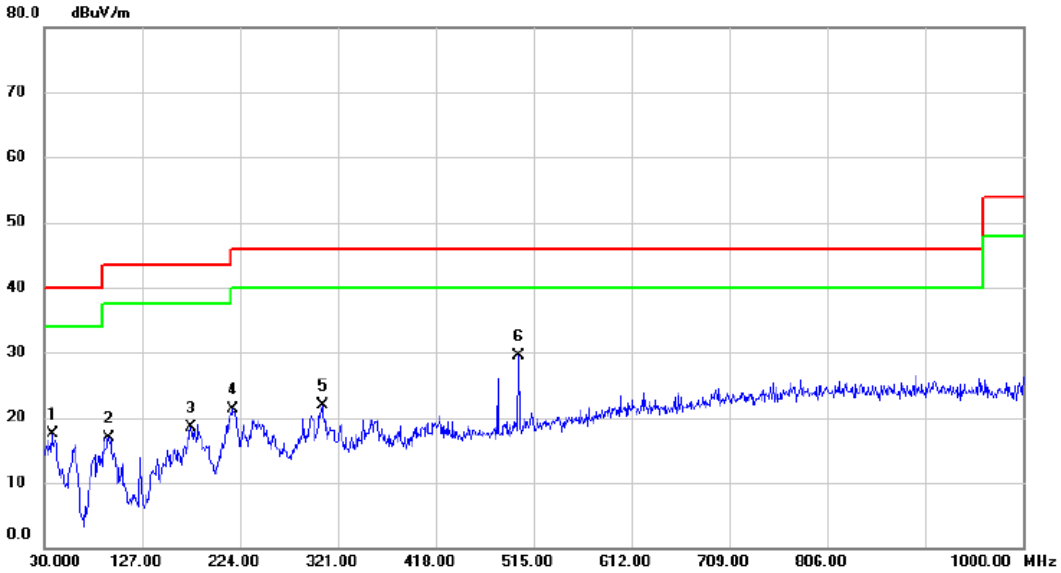
(1) Measuring frequency range from 30 MHz to 1000 MHz
(2) If the peak scan value lower limit more than 20 dB, then this signal data does not show in table.

Test Voltage	AC 120V/60Hz	Polarization	Vertical
Test Mode	Mode 2		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	99.8400	57.15	-22.13	35.02	43.50	-8.48	QP	
2		125.0600	54.74	-23.38	31.36	43.50	-12.14	QP	
3		178.4100	44.95	-19.90	25.05	43.50	-18.45	QP	
4		227.8800	46.08	-17.26	28.82	46.00	-17.18	QP	
5		500.4500	39.52	-9.72	29.80	46.00	-16.20	QP	
6		600.3600	34.86	-7.02	27.84	46.00	-18.16	QP	

Test Voltage	AC 120V/60Hz	Polarization	Horizontal
Test Mode	Mode 2		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		37.7600	34.94	-17.45	17.49	40.00	-22.51	QP	
2		94.0200	39.41	-22.43	16.98	43.50	-26.52	QP	
3		175.5000	38.53	-20.09	18.44	43.50	-25.06	QP	
4		217.2100	38.93	-17.67	21.26	46.00	-24.74	QP	
5		305.4800	37.63	-15.67	21.96	46.00	-24.04	QP	
6	*	500.4500	39.25	-9.72	29.53	46.00	-16.47	QP	

3.3 RADIATED EMISSIONS ABOVE 1 GHZ

3.3.1 LIMIT

Frequency (MHz)	Class B (dBuV/m) (at 3m)	
	Peak	Average
Above 1000	74	54

Frequency (MHz)	Class B (dBuV/m) (at 1m)	
	Peak	Average
Above 18000	83.5	63.5

FREQUENCY RANGE OF RADIATED MEASUREMENT (FOR UNINTENTIONAL RADIATORS)

Highest internal frequency (Fx)	Highest measurement frequency (F_M)
Fx ⩽ 108 MHz	1 GHz
108 MHz < Fx ⩽ 500 MHz	2 GHz
500 MHz < Fx ⩽ 1 GHz	5 GHz
Fx > 1 GHz	5 x Fx up to a maximum of 40 GHz
Note: Fx is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.	

NOTE:
(1) The tighter limit applies at the band edges.
(2) Emission level (dBuV/m) = 20log Emission level (uV/m).
1m Emission level = 3m Emission level + 20log(3m/1m).
(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

3.3.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double-Ridged Waveguide Horn Antennas	ETS-LINDGREN	3117-PA	224991	Apr. 21, 2022
2	MXA Signal Analyzer	Keysight	N9020B	MY57100162	Jan. 22, 2023
3	Cable	MIcable Inc.	B10-01-01-2M	18072745	Jan. 06, 2023
4	Preamplifier	ETS-LINDGREN	3117-PA	224991	Jul. 10, 2022
5	Controller	ETS-Lindgren	2090	N/A	N/A
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Cable	MIcable Inc.	B10-01-01-15M(10MHz~26.5GHz)	18047122	Jan. 06, 2023
8	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2022
9	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Jan. 23, 2023
10	MXE EMI Receiver	Agilent	N9038A	MY53220133	Jan. 22, 2023
11	Cable	emci	SUCOFLEX 102_8m(0.01GHz－40GHz)	N/A	Mar. 23, 2022
12*	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 2400/2483-2375/2505-50/10SS	16	Feb. 28, 2024
13*	Band Reject Filter	Micro-Tronics	BRC50704-01	8	Feb. 27, 2024
14*	Band Reject Filter	Micro-Tronics	BRC50703-01	7	Feb. 27, 2024
15*	Band Reject Filter	Micro-Tronics	BRC50705-01	10	Feb. 27, 2024

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
“*” calibration period of equipment list is three year.
Except * item, all calibration period of equipment list is one year.

3.3.3 TEST PROCEDURE

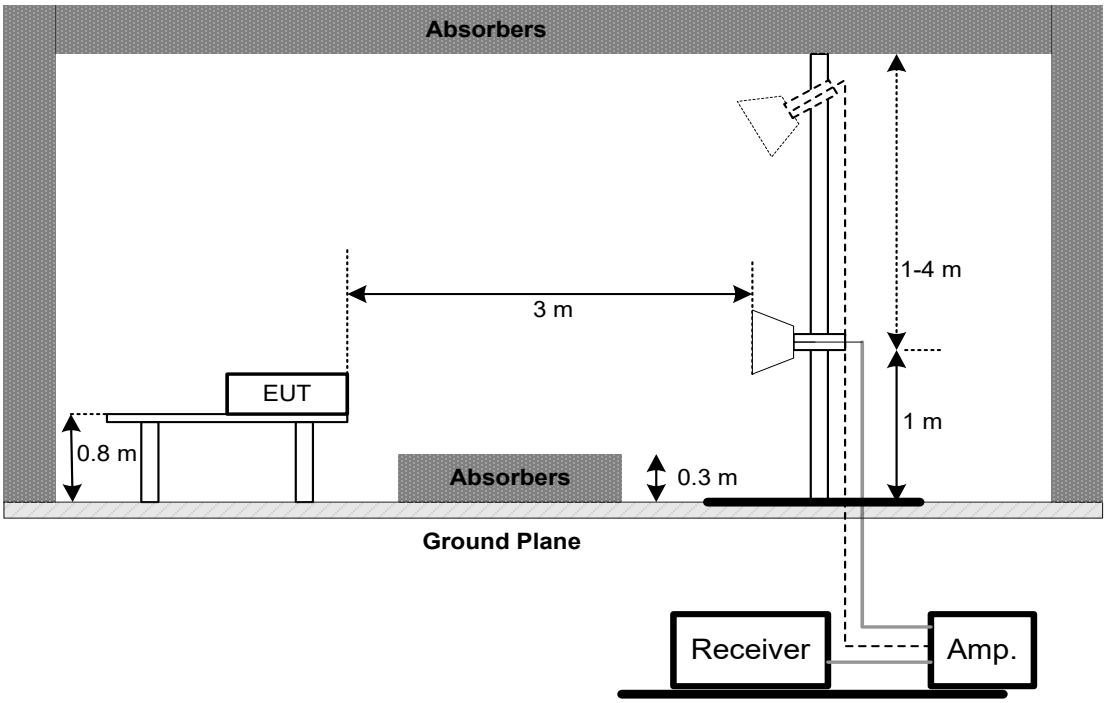
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
   Note:
   For measurement of frequency 1GHz -18GHz, the EUT was set 3 meters away from the receiver antenna. For 18G – 40GHz, the EUT was set 1 meter.
   Emission level (dBuV/m)=20log Emission level (uV/m).
   The limits above 18GHz shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m
   Distance extrapolation factor = 20 log (3m/1m) dB ;
   Limit line = specific limits (dBuV) + 9.5 dB.
b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
d. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then AVG detector mode re-measured.
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
f. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform.
g. For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.3.4 DEVIATION FROM TEST STANDARD

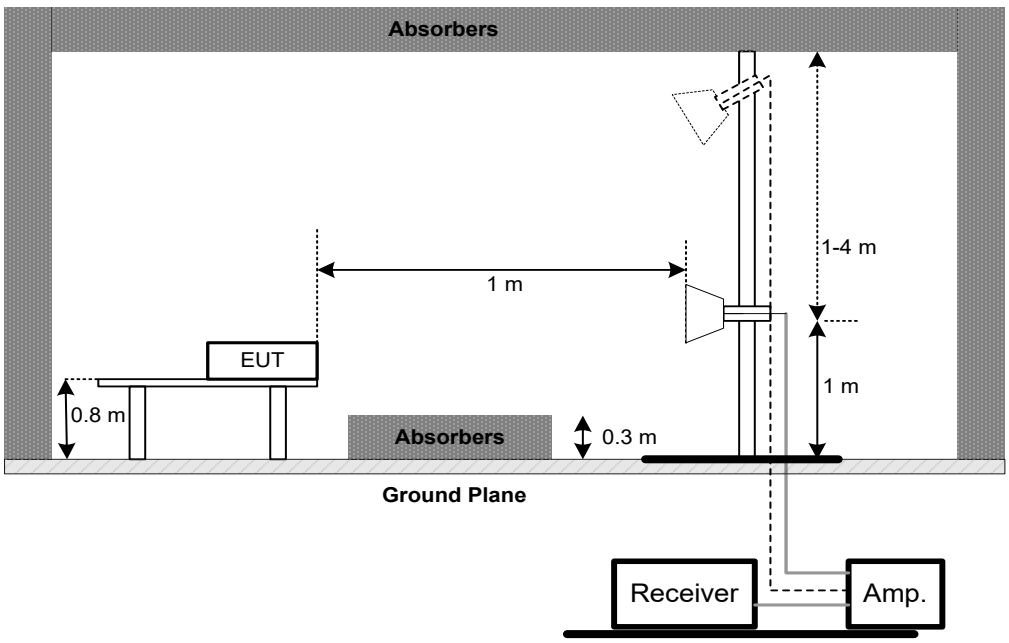
No deviation

3.3.5 TEST SETUP

1 GHz-18 GHz



18 GHz-40 GHz

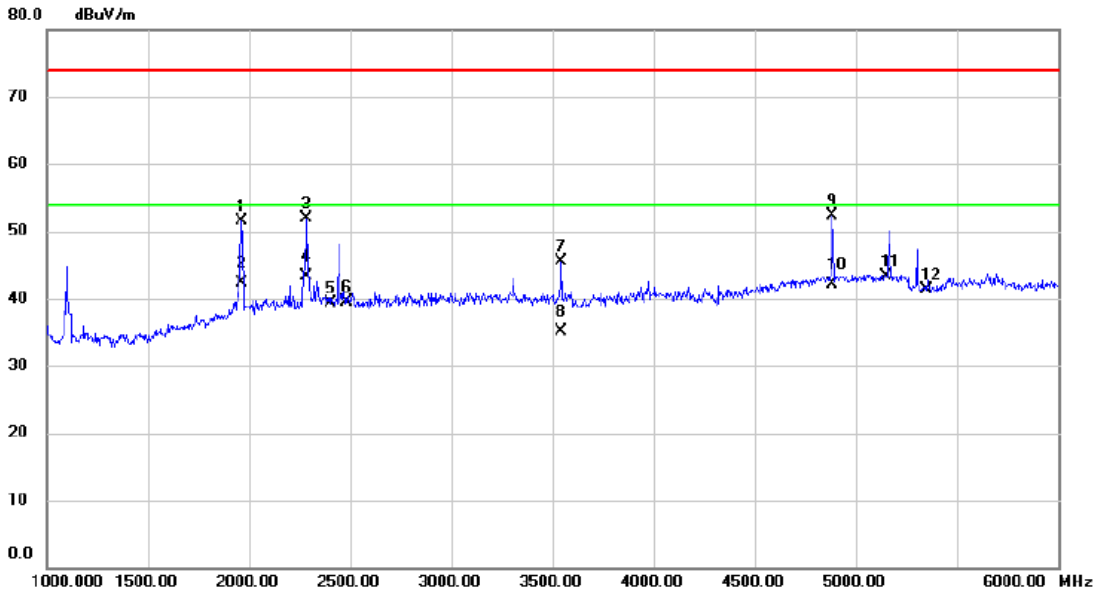


3.3.6 TEST RESULTS

Remark:

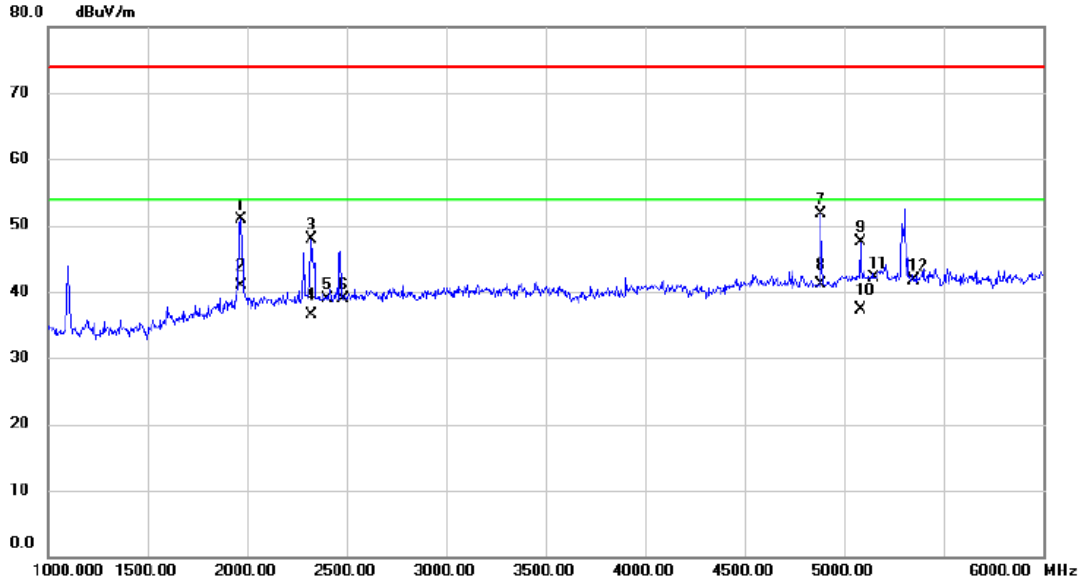
(1) Radiated emissions measured in frequency range above 1000 MHz were made with an instrument using Peak detector mode and AV detector mode of the emission.
(2) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
(3) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Test Voltage	AC 120V/60Hz	Polarization	Vertical
Test Mode	Mode 2		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are not applicable to the radiation emission requirements in this standard.		



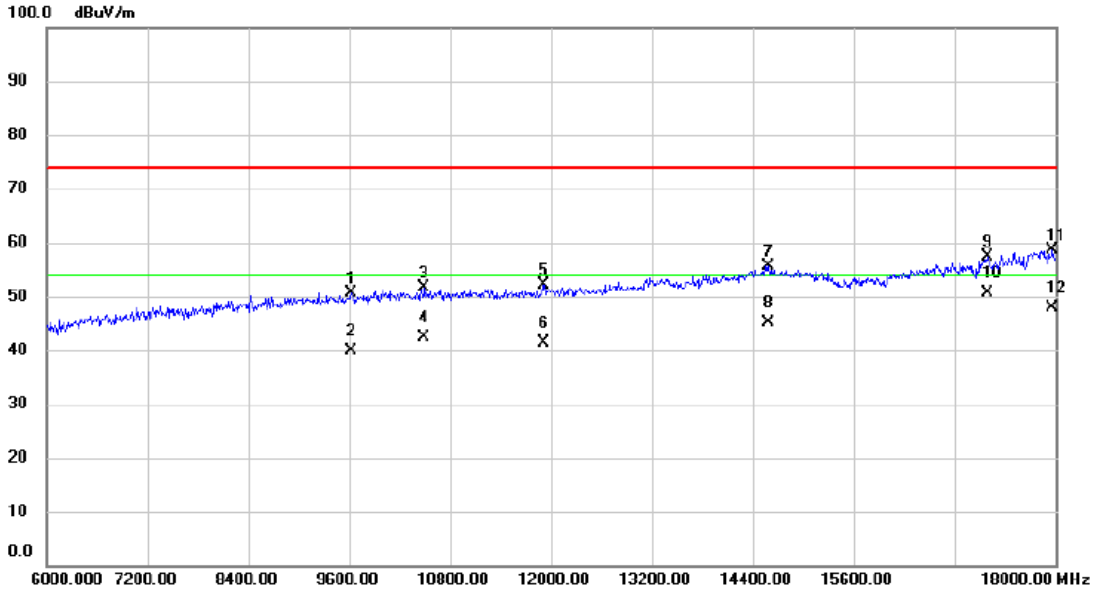
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1960.000	62.96	-11.47	51.49	74.00	-22.51	peak	
2		1960.000	53.80	-11.47	42.33	54.00	-11.67	AVG	
3		2285.000	62.06	-10.11	51.95	74.00	-22.05	peak	
4	*	2285.000	53.40	-10.11	43.29	54.00	-10.71	AVG	
5		2400.000	49.08	-9.72	39.36	74.00	-34.64	peak	
6		2483.500	48.94	-9.44	39.50	74.00	-34.50	peak	
7		3545.000	52.04	-6.59	45.45	74.00	-28.55	peak	
8		3545.000	41.60	-6.59	35.01	54.00	-18.99	AVG	
9		4885.000	55.33	-3.09	52.24	74.00	-21.76	peak	
10		4885.000	45.20	-3.09	42.11	54.00	-11.89	AVG	
11		5150.000	46.19	-2.88	43.31	74.00	-30.69	peak	
12		5350.000	44.37	-3.03	41.34	74.00	-32.66	peak	

Test Voltage	AC 120V/60Hz	Polarization	Horizontal
Test Mode	Mode 2		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are not applicable to the radiation emission requirements in this standard.		



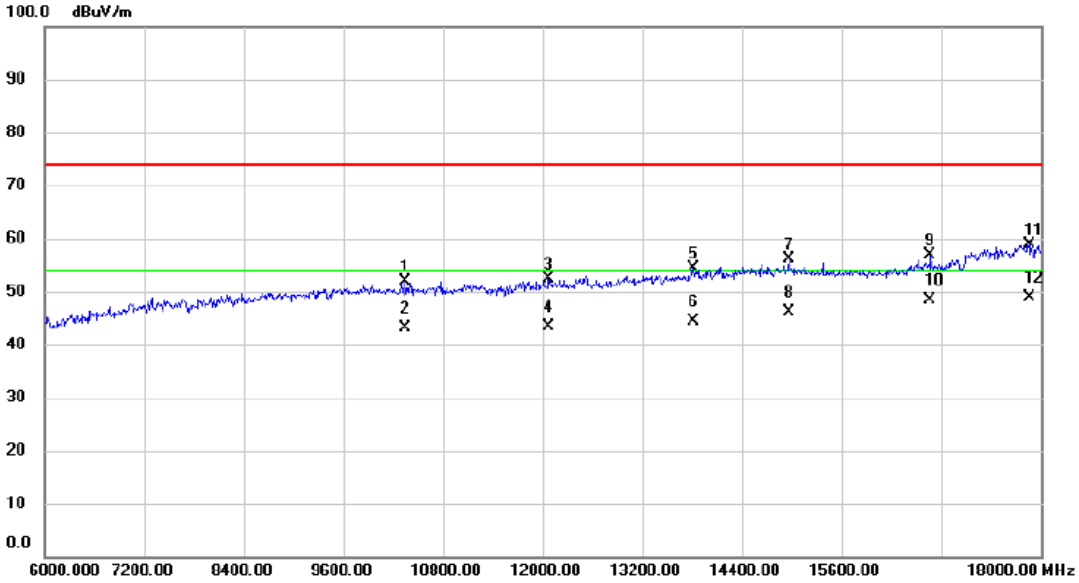
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1970.000	62.28	-11.37	50.91	74.00	-23.09	peak	
2		1970.000	52.18	-11.37	40.81	54.00	-13.19	AVG	
3		2325.000	57.86	-9.98	47.88	74.00	-26.12	peak	
4		2325.000	46.50	-9.98	36.52	54.00	-17.48	AVG	
5		2400.000	48.58	-9.72	38.86	74.00	-35.14	peak	
6		2483.500	48.40	-9.44	38.96	74.00	-35.04	peak	
7		4885.000	54.82	-3.09	51.73	74.00	-22.27	peak	
8	*	4885.000	44.21	-3.09	41.12	54.00	-12.88	AVG	
9		5080.000	50.25	-2.84	47.41	74.00	-26.59	peak	
10		5080.000	40.12	-2.84	37.28	54.00	-16.72	AVG	
11		5150.000	45.00	-2.88	42.12	74.00	-31.88	peak	
12		5350.000	44.76	-3.03	41.73	74.00	-32.27	peak	

Test Voltage	AC 120V/60Hz	Polarization	Vertical
Test Mode	Mode 2		



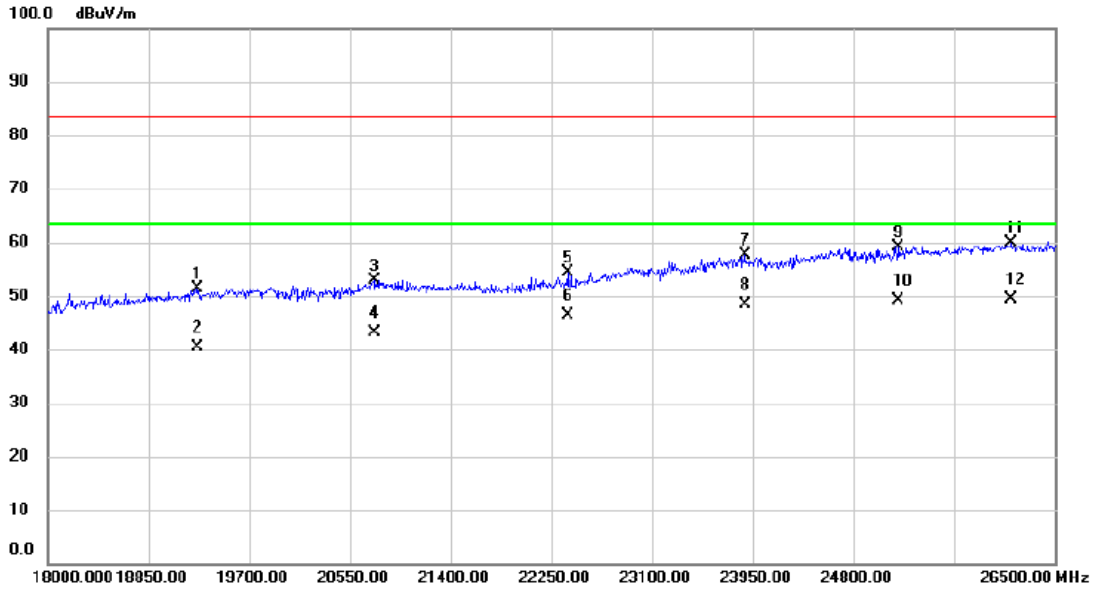
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		9630.000	34.98	15.72	50.70	74.00	-23.30	peak	
2		9630.000	24.10	15.72	39.82	54.00	-14.18	AVG	
3		10488.00	34.68	16.86	51.54	74.00	-22.46	peak	
4		10488.00	25.60	16.86	42.46	54.00	-11.54	AVG	
5		11916.00	33.82	18.20	52.02	74.00	-21.98	peak	
6		11916.00	23.10	18.20	41.30	54.00	-12.70	AVG	
7		14586.00	32.73	22.94	55.67	74.00	-18.33	peak	
8		14586.00	22.10	22.94	45.04	54.00	-8.96	AVG	
9		17184.00	31.24	26.05	57.29	74.00	-16.71	peak	
10	*	17184.00	24.60	26.05	50.65	54.00	-3.35	AVG	
11		17964.00	29.51	29.24	58.75	74.00	-15.25	peak	
12		17964.00	18.60	29.24	47.84	54.00	-6.16	AVG	

Test Voltage	AC 120V/60Hz	Polarization	Horizontal
Test Mode	Mode 2		



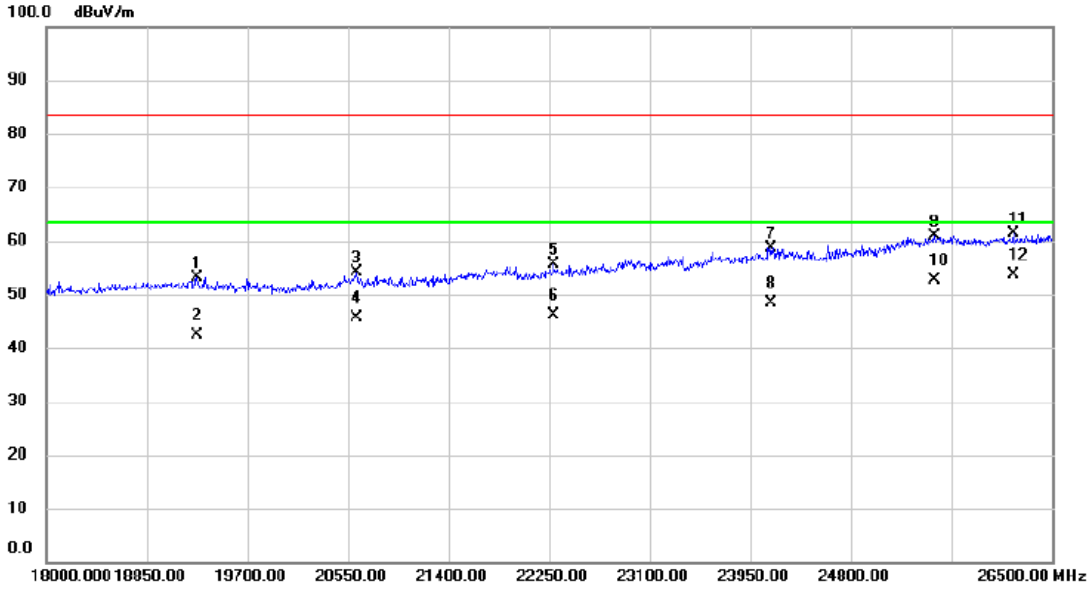
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10344.00	35.30	16.64	51.94	74.00	-22.06	peak	
2		10344.00	26.40	16.64	43.04	54.00	-10.96	AVG	
3		12072.00	34.02	18.41	52.43	74.00	-21.57	peak	
4		12072.00	24.90	18.41	43.31	54.00	-10.69	AVG	
5		13812.00	32.49	21.91	54.40	74.00	-19.60	peak	
6		13812.00	22.52	21.91	44.43	54.00	-9.57	AVG	
7		14964.00	33.25	22.92	56.17	74.00	-17.83	peak	
8		14964.00	23.16	22.92	46.08	54.00	-7.92	AVG	
9		16668.00	33.23	23.67	56.90	74.00	-17.10	peak	
10		16668.00	24.70	23.67	48.37	54.00	-5.63	AVG	
11		17862.00	30.14	28.74	58.88	74.00	-15.12	peak	
12	*	17862.00	20.19	28.74	48.93	54.00	-5.07	AVG	

Test Voltage	AC 120V/60Hz	Polarization	Vertical
Test Mode	Mode 2		



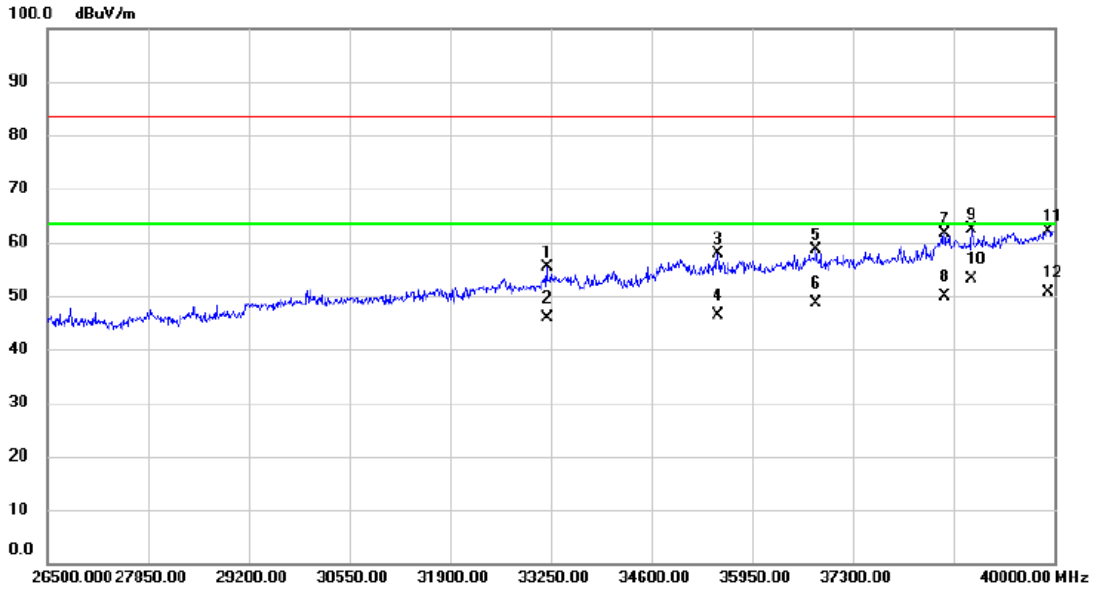
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		19258.00	31.24	20.14	51.38	83.50	-32.12	peak	
2		19258.00	20.17	20.14	40.31	63.50	-23.19	AVG	
3		20754.00	32.70	20.23	52.93	83.50	-30.57	peak	
4		20754.00	22.85	20.23	43.08	63.50	-20.42	AVG	
5		22386.00	32.20	22.17	54.37	83.50	-29.13	peak	
6		22386.00	24.16	22.17	46.33	63.50	-17.17	AVG	
7		23890.50	33.15	24.45	57.60	83.50	-25.90	peak	
8		23890.50	23.96	24.45	48.41	63.50	-15.09	AVG	
9		25182.50	32.98	26.26	59.24	83.50	-24.26	peak	
10		25182.50	22.78	26.26	49.04	63.50	-14.46	AVG	
11		26134.50	32.87	26.98	59.85	83.50	-23.65	peak	
12	*	26134.50	22.49	26.98	49.47	63.50	-14.03	AVG	

Test Voltage	AC 120V/60Hz	Polarization	Horizontal
Test Mode	Mode 2		



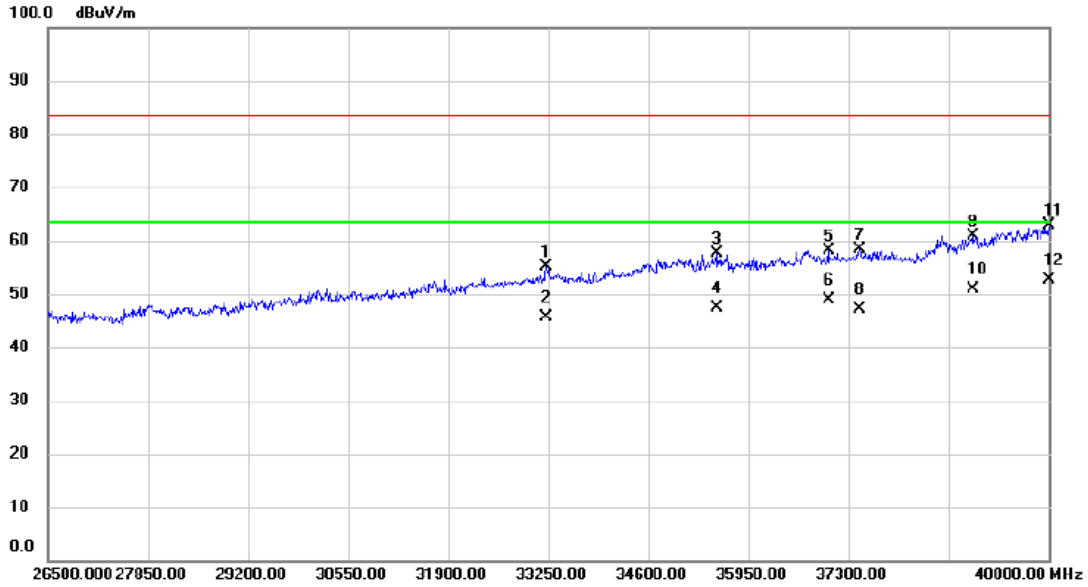
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		19275.00	32.90	20.15	53.05	83.50	-30.45	peak	
2		19275.00	22.16	20.15	42.31	63.50	-21.19	AVG	
3		20626.50	34.08	20.05	54.13	83.50	-29.37	peak	
4		20626.50	25.52	20.05	45.57	63.50	-17.93	AVG	
5		22284.00	33.54	22.04	55.58	83.50	-27.92	peak	
6		22284.00	24.16	22.04	46.20	63.50	-17.30	AVG	
7		24120.00	33.99	24.73	58.72	83.50	-24.78	peak	
8		24120.00	23.64	24.73	48.37	63.50	-15.13	AVG	
9		25505.50	34.03	26.84	60.87	83.50	-22.63	peak	
10		25505.50	25.85	26.84	52.69	63.50	-10.81	AVG	
11		26177.00	34.25	27.08	61.33	83.50	-22.17	peak	
12	*	26177.00	26.49	27.08	53.57	63.50	-9.93	AVG	

Test Voltage	AC 120V/60Hz	Polarization	Vertical
Test Mode	Mode 2		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		33196.00	45.71	9.71	55.42	83.50	-28.08	peak	
2		33196.00	36.25	9.71	45.96	63.50	-17.54	AVG	
3		35491.00	46.51	11.27	57.78	83.50	-25.72	peak	
4		35491.00	35.18	11.27	46.45	63.50	-17.05	AVG	
5		36800.50	47.78	10.77	58.55	83.50	-24.95	peak	
6		36800.50	37.85	10.77	48.62	63.50	-14.88	AVG	
7		38528.50	47.97	13.70	61.67	83.50	-21.83	peak	
8		38528.50	36.19	13.70	49.89	63.50	-13.61	AVG	
9		38893.00	47.73	14.59	62.32	83.50	-21.18	peak	
10	*	38893.00	38.49	14.59	53.08	63.50	-10.42	AVG	
11		39919.00	44.68	17.40	62.08	83.50	-21.42	peak	
12		39919.00	33.16	17.40	50.56	63.50	-12.94	AVG	

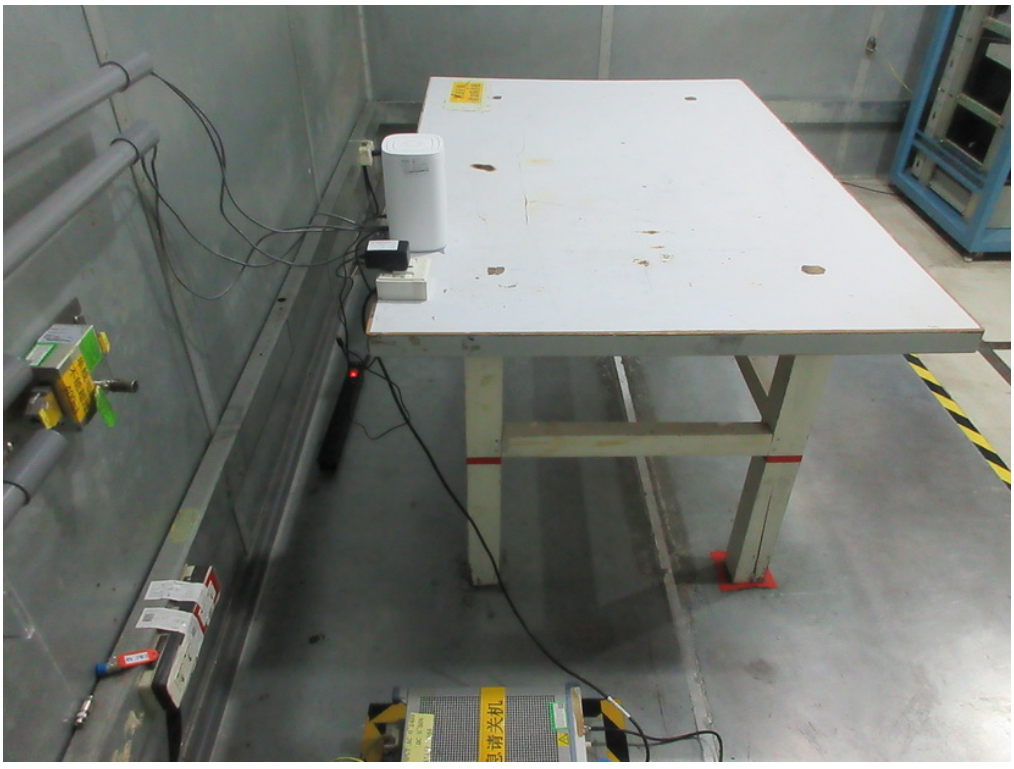
Test Voltage	AC 120V/60Hz	Polarization	Horizontal
Test Mode	Mode 2		



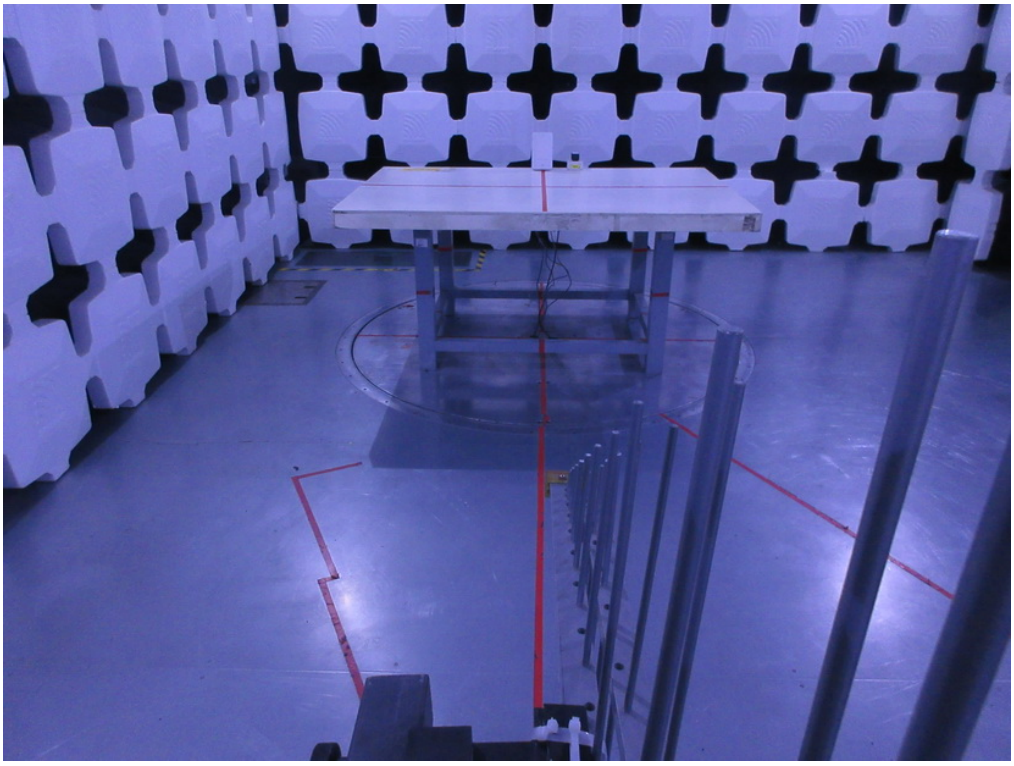
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		33223.00	45.29	9.73	55.02	83.50	-28.48	peak	
2		33223.00	35.85	9.73	45.58	63.50	-17.92	AVG	
3		35518.00	46.47	11.26	57.73	83.50	-25.77	peak	
4		35518.00	36.18	11.26	47.44	63.50	-16.06	AVG	
5		37030.00	47.24	10.91	58.15	83.50	-25.35	peak	
6		37030.00	37.85	10.91	48.76	63.50	-14.74	AVG	
7		37448.50	47.31	10.95	58.26	83.50	-25.24	peak	
8		37448.50	36.15	10.95	47.10	63.50	-16.40	AVG	
9		38987.50	46.08	14.82	60.90	83.50	-22.60	peak	
10		38987.50	35.94	14.82	50.76	63.50	-12.74	AVG	
11		40000.00	45.20	17.60	62.80	83.50	-20.70	peak	
12	*	40000.00	35.15	17.60	52.75	63.50	-10.75	AVG	

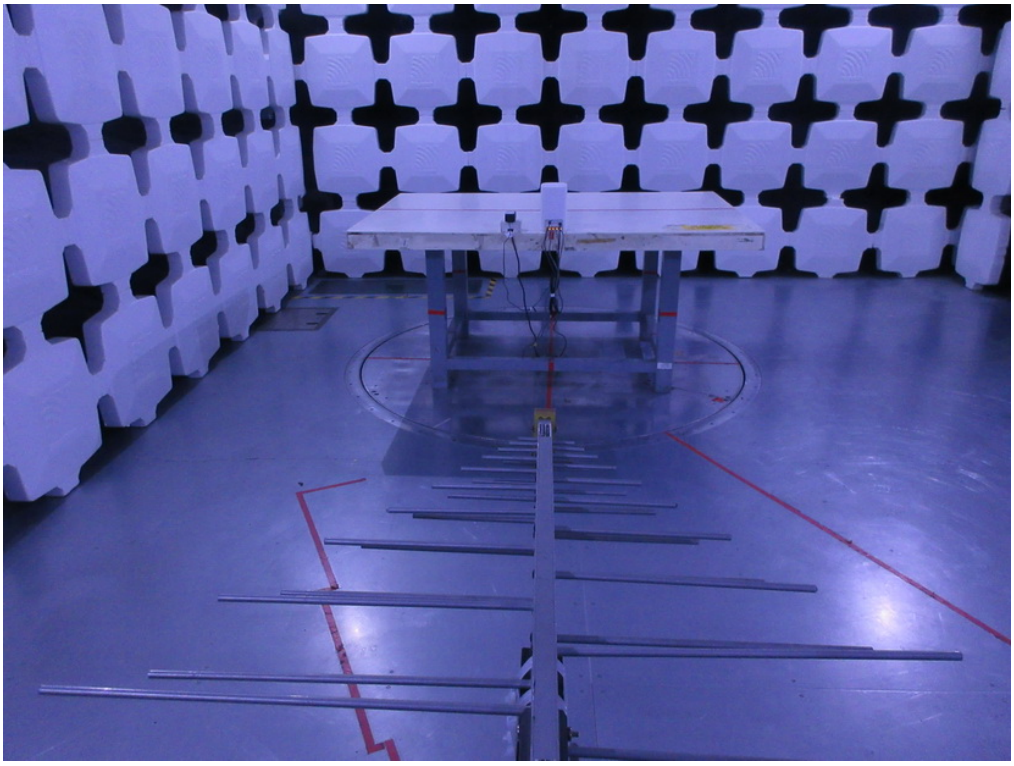
4. EUT TEST PHOTO

AC Power Line Conducted Emissions

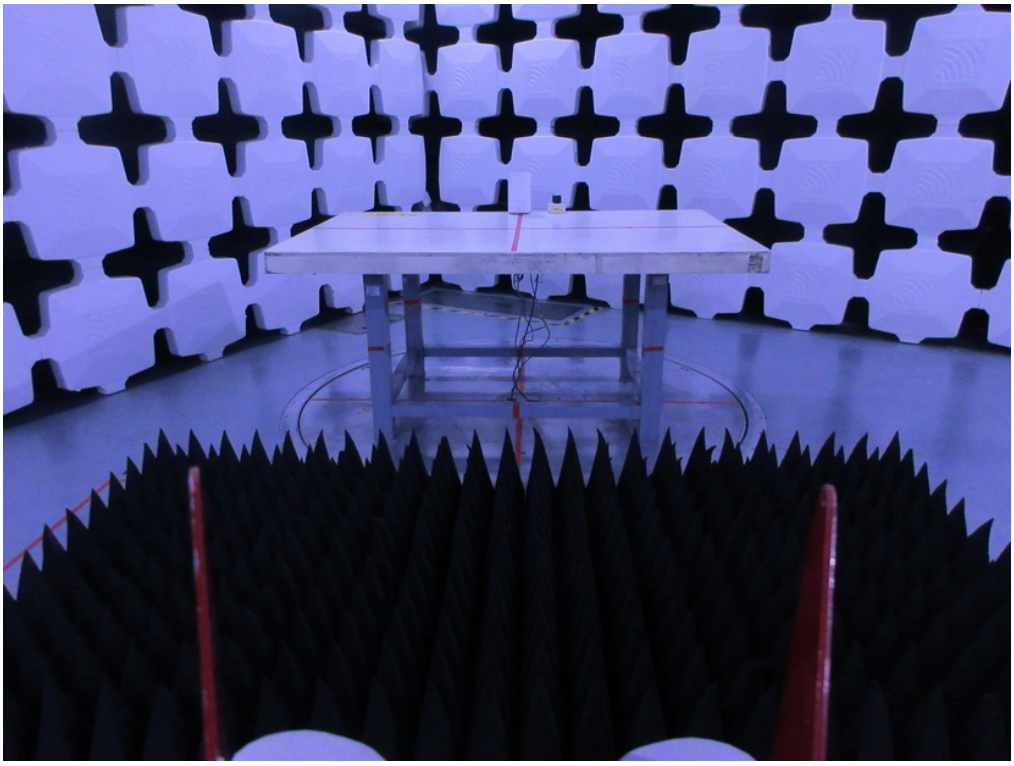


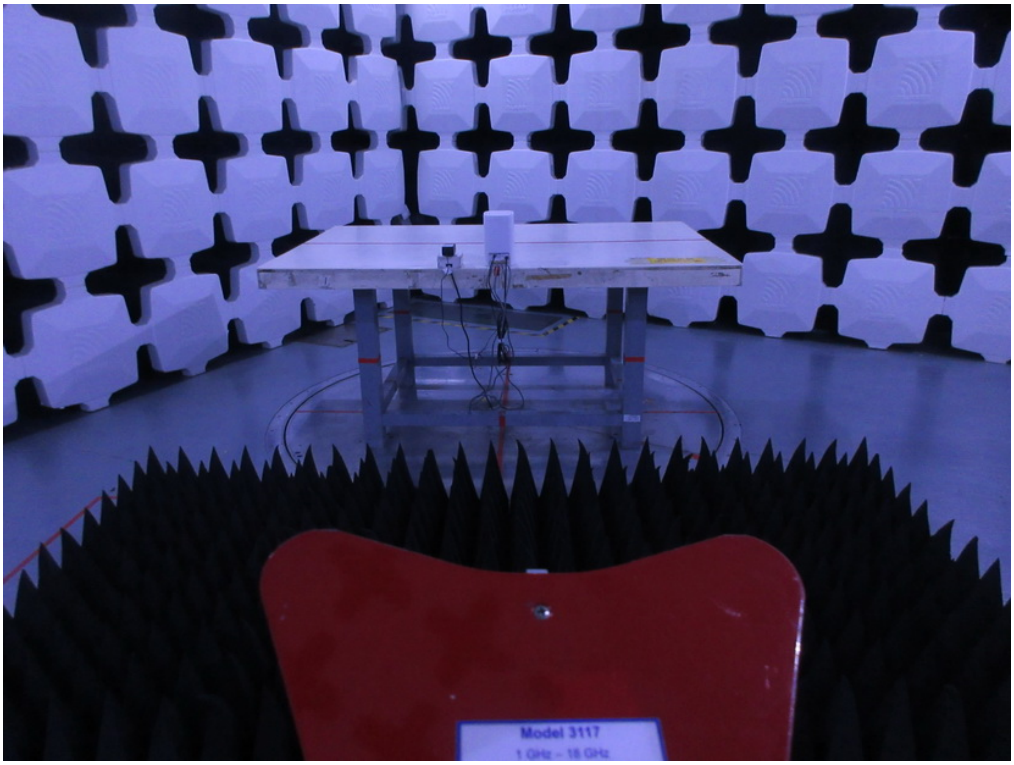
Radiated Emissions 30 MHz to 1 GHz





Radiated Emissions Above 1 GHz





End of Test Report