Product Name: Set Top Box	**Report No: FCC022022-05669RF5**
Product Model: UIW4054MIL	**Security Classification: Open**
Version: V1.0	**Total Page: 25**

TIRT Testing Report

Prepared By:	**Checked By:**	**Approved By:**	
Stone Tang	Randy Lv	Daniel Chen	
Stone Tang	Randy LV	Daniel chen	

FCC Radio Test Report

FCC ID: G95UIW4054

This report concerns: Class II Permissive Change

Equipment	:	Set Top Box
Brand Name	:	Technicolor
Test Model	:	UIW4054MIL
Series Model	:	N/A
Applicant	:	Technicolor Connected Home USA LLC
Address	:	4855 Peachtree Industrial Blvd, Suite 200, Norcross, GA 30092, USA
Manufacturer	:	Technicolor Connected Home USA LLC
Address	:	4855 Peachtree Industrial Blvd, Suite 200, Norcross, GA 30092, USA
Date of Receipt	:	2022.08.08
Date of Test	:	2022.08.10 ~ 2022.10.29
Issued Date	:	2022.11.02
Report Version	:	V1.0
Test Sample	:	Engineering Sample No.: 20220808019075
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart C FCC KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2013

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen

Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen , China

TEL: +86-0755-27087573

Table of Contents Page

REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
FCC022022-05669RF5	V1.0	Compared with original report(BTL-FCCP-2-2104C150A), PCB Layout changes from LAB3D version to LAB3E version. Please see the following table for details. So, the AC Power Line Conducted Emissions, Radiated Emissions the worst case have been re-evaluated. In this report only updated the test results for AC Power Line Conducted Emissions, Radiated Emissions below 1GHz, other are kept the same.	2022.11.02	Valid

Change ID	PCB Layout changes from LAB3D version to LAB3E version
1	Due to UP06(RT9041B-10GE_SOT23-6) shortage, co-layout SOT23-5 part. Add RP98 and RP99 for SWAP.
2	Improved +5V_SW Power plan below HDMI connector in Layer 3. Replace power ground with track to reduce coupling from this power to HDMI signal.

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C			
Standard(s) Section	**Test Item**	**Test Result**	**Remark**
15.207	AC Power Line Conducted Emissions	PASS	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	PASS	Note(3)
15.247(a)(2)	Bandwidth	PASS	Note(3)
15.247(b)(3)	Maximum Output Power	PASS	Note(3)
15.247(d)	Conducted Spurious Emission	PASS	Note(3)
15.247(e)	Power Spectral Density	PASS	Note(3)
15.203	Antenna Requirement	PASS	Note(2)

Note:

(1) “N/A” denotes test is not applicable to this device.

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

(3) For test item: Radiated Emissions above 1GHz, Bandwidth, Conducted Spurious Emissions, Maximum Output Power and Power Spectral Density, Please refer to original report (BTL-FCCP-2-2104C150A).

1.1 TEST FACILITY

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101,3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number	6049.01
Telephone:	+86-0755-27087573

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 TIRT measurement uncertainty as below table:

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 KHz
RF power conducted	±0.74 dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (30MHz～1GHz)	±4.6dB
Spurious emissions, radiated (1GHz ~ 18GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.1 dB
Humidity	±4.6%
Temperature	±0.7°C
Time	±1.25%

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	Test Voltage	Tested By
AC Power Line Conducted Emissions	24.3°C	52%	AC 120V/60Hz	Stone Tang
Radiated Emissions-9 kHz to 30 MHz	24.6°C	55%	AC 120V/60Hz	Stone Tang
Radiated Emissions-30 MHz to 1000 MHz	24.6°C	55%	AC 120V/60Hz	Stone Tang
Maximum Output Power	24.2°C	55%	DC 12V	Stone Tang

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Set Top Box
Brand Name	Technicolor
Test Model	UIW4054MIL
Series Model	N/A
Model Difference(s)	N/A
Software Version	UIW4054MIL_HC_1.0
Hardware Version	LAB3E
Power Source	DC voltage supplied from AC adapter. 1#Brand / Model: MASS POWER / E012-1O120100VU 2#Brand / Model: HONOTO / ADS-12HG-12 12012EPCU
Power Rating	1# I/P: 100-240V~ 50/60Hz 0.4A O/P: 12.0V ⎓ 1.0A 2# I/P: 100-240V~ 50/60Hz Max. 0.4A O/P: 12V ⎓ 1.0A
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps, 2Mbps, 500kbps(S2), 125kbps(S8)
Max. Output Power	2Mbps: 5.49 dBm (0.0035 W)

Note:

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

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.2

Note:
The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 00/19/39
Mode 3	TX Mode_1Mbps Channel 19

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 5	TX Mode_1Mbps Channel 19

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 5	TX Mode_1Mbps Channel 19

Note:

(1) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
(2) For AC power line conducted emissions and radiated emissions below 1 GHz test, the 1Mbps Channel 19 is found to be the worst case and recorded.
(3) For AC power line conducted emissions and radiated emissions below 1 GHz test, all adapters had been pre-tested and in this report only recorded the worst case.
(4) For AC power line conducted emissions test, the prototype is tested with or without the monitor, and in this report only recorded the worst case(tested with monitor).

2.3 PARAMETERS OF TEST SOFTWARE

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	N/A		
Frequency (MHz)	2402	2440	2480
1Mbps	default	default	default
2Mbps	default	default	default

2.4 SUPPORT UNITS

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Notebook	Lenovo	L450	N/A
2	DC Cable	NO	NO	1.5m
3	RJ45 Cable	NO	NO	10m

3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5.0	56	46
5.0 - 30.0	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.

3.2 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.

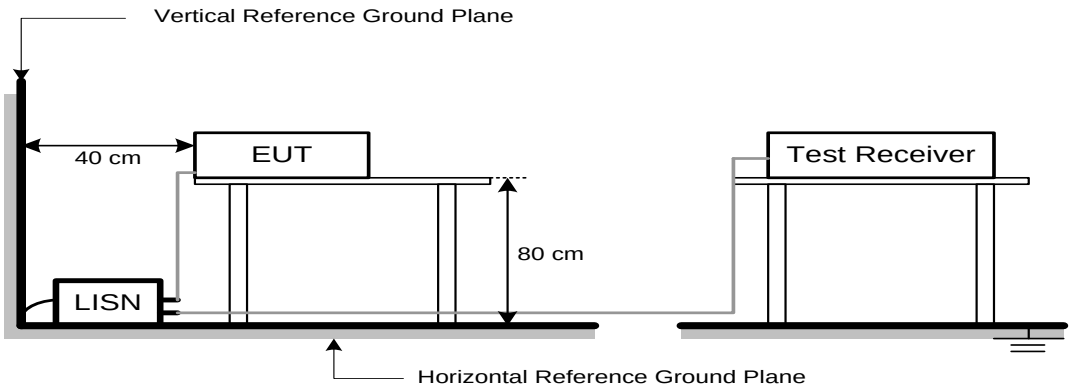
The following table is the setting of the receiver:

Receiver Parameters	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

(1) 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.
(2) Measuring frequency range from 150 kHz to 30 MHz.

4. RADIATED EMISSIONS

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

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

Note:

(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2 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.(below 1 GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 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.(above 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; 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.
d. 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).
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. 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.
g. 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. (below 1 GHz)
h. 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. (above 1 GHz)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

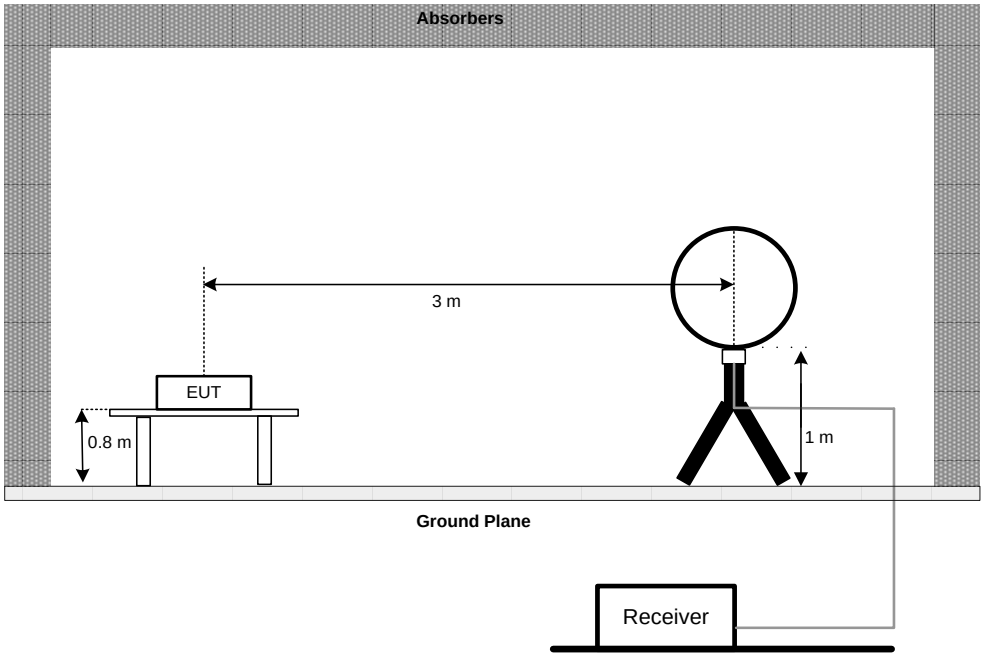
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.3 DEVIATION FROM TEST STANDARD

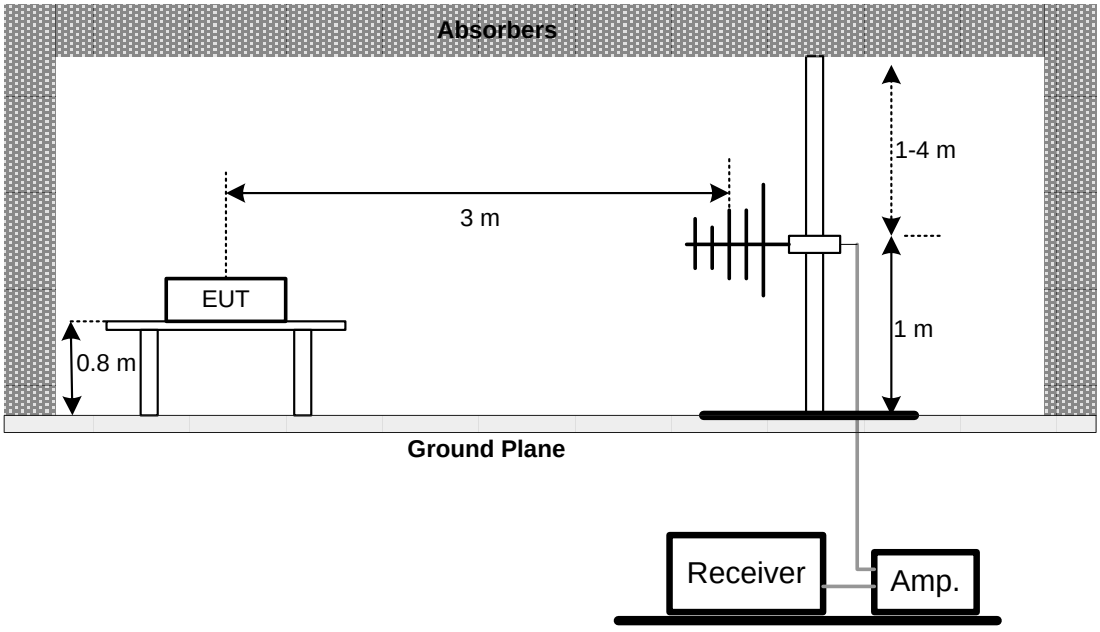
No deviation.

4.4 TEST SETUP

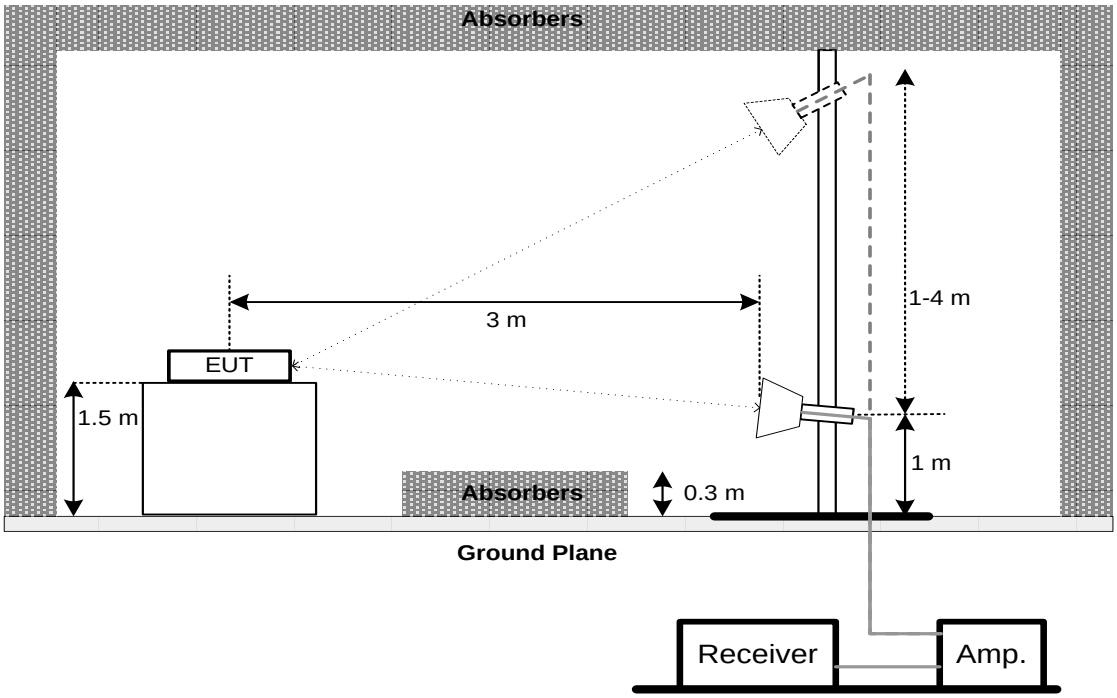
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT - 9 kHz TO 30 MHz

Please refer to the APPENDIX B.

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

Remark:

(1) Worst case for 2# adapter was recored

5. MEASUREMENT INSTRUMENTS LIST

No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Rohde&Schwarz	ESCI	1166.5950.03	2022/11/16
2	AMN	Rohde&Schwarz	ENV216	3560.6550.05	2022/11/09
3	AMN	Schwarzbeck	NSLK8127	#829	2022/11/09
4	ECSI RF IN RF Cable	Rohde&Schwarz	RP-X1	N/A	2022/11/18
5	ECSI RF IN RF Cable	Rohde&Schwarz	Sapre sm	N/A	2022/11/09
6	EMI Receiver	Rohde&Schwarz	ESR7	102013	2022/11/09
7	Spectrum analyzer	Rohde&Schwarz	FSV30	103741	2022/11/09
8	EMI receiver	Rohde&Schwarz	ESU	100184	2023/07/20
9	Spectrum analyzer	KEYSIGHT	N9010A-44	MY51440158	2022/11/09
10	Loop Antenna*	Schwarzbeck	FMZB1519B	00029	2025/07/03
11	Integral Antenna	Schwarzbeck	VULB 9163	VULB 9163-361	2022/11/09
12	Integral Antenna	Schwarzbeck	BBHA 9120D	BBHA 9120D 1201	2022/11/09
13	Integral Antenna	Schwarzbeck	BBHA 9170	9170#685	2022/11/09
14	Preamplifier	CD Systems Inc	PAP-03036-30	85060000	2022/11/09
15	Preamplifier	Schwarzbeck	BBV9721	9721-019	2022/11/09
16	Preamplifier	emci	EMC012645SE	980417	2022/11/09
17	ECSI RF IN RF Cable	Rohde&Schwarz	AP-X1	N/A	2022/11/09
18	Spectrum Analyzer	Agilent	N9010A	MY52221119	2022/11/09
19	Power Collection Unit	Tonscend	JS0806-2	188060134	2022/11/09
20	Tonscend Test System	Tonscend	2.6.77.0518	N/A	N/A
21	10dB Attenuator	Tonscend	10dB	N/A	N/A
22	Temp&Humidity Recorder	Anymetre	JR900	N/A	2022/11/03
23	Temp&Humidity Chamber	ETOMA	NTH1100-30A	16080628	2022/11/03
24	Filter	STI	STI15-9845	N/A	N/A
25	Filter	STI	5.1G	N/A	N/A
26	Filter	STI	STI15-9845	N/A	N/A
27	Testing Software	EZ-EMC	TW-03A2	N/A	N/A

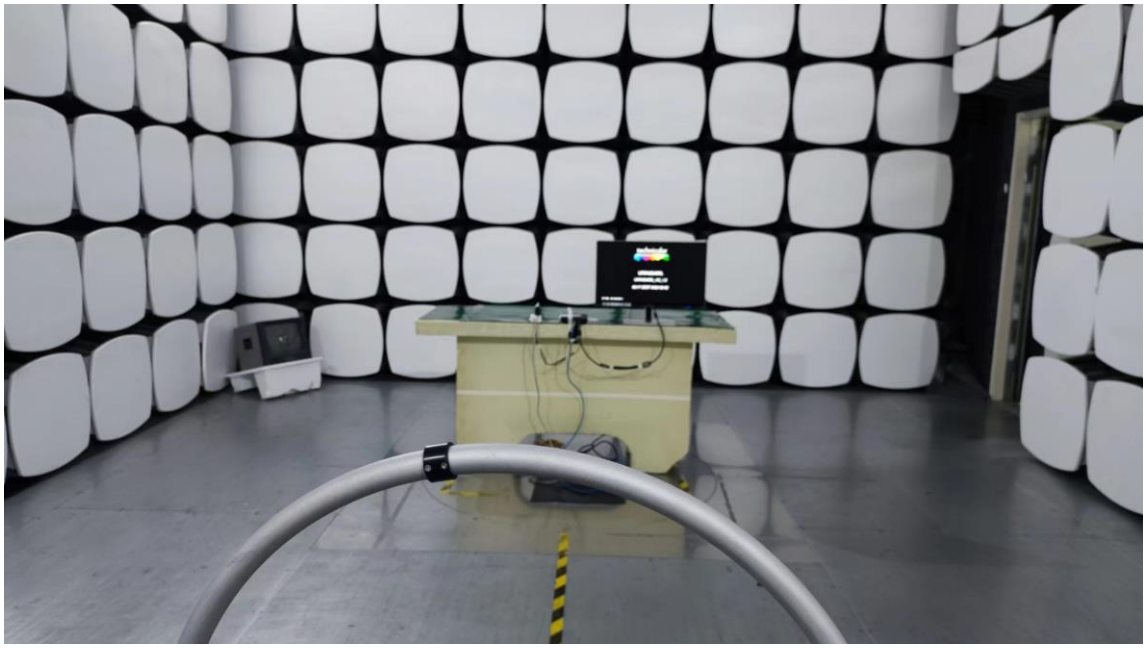
Remark: ”N/A” denotes no model name, serial no. or calibration specified.
“*” calibration period of equipment list is three year.
Except * item, all calibration period of equipment list is one year.

6. EUT TEST PHOTO

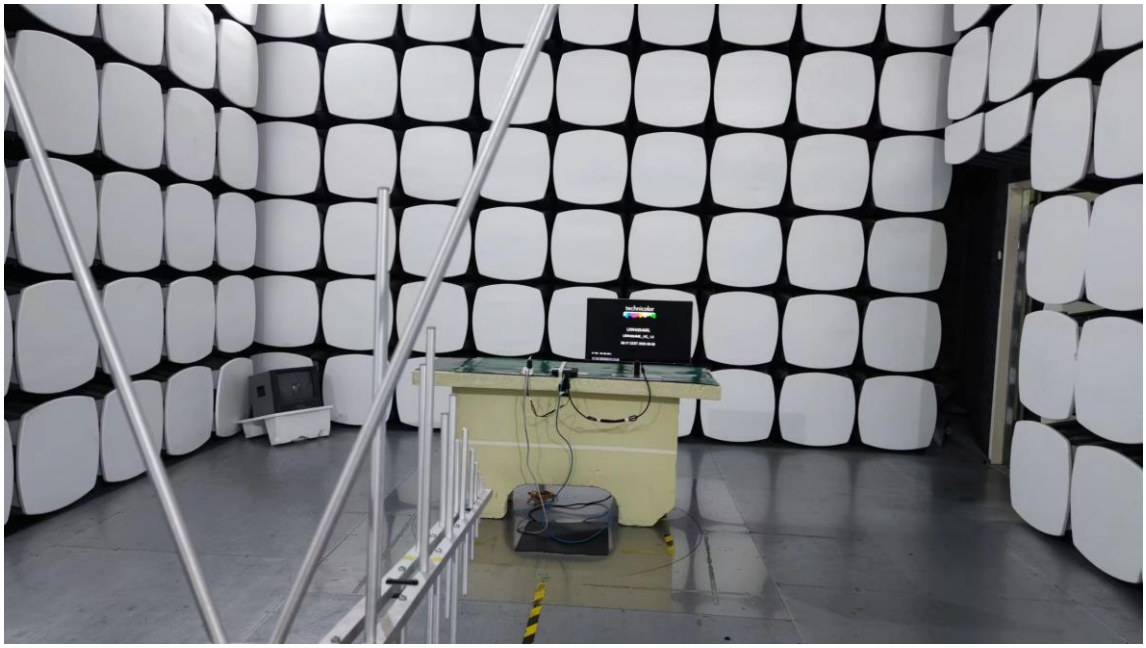
AC Power Line Conducted Emissions Test Photos

Radiated Emissions Test Photos

9 kHz to 30 MHz

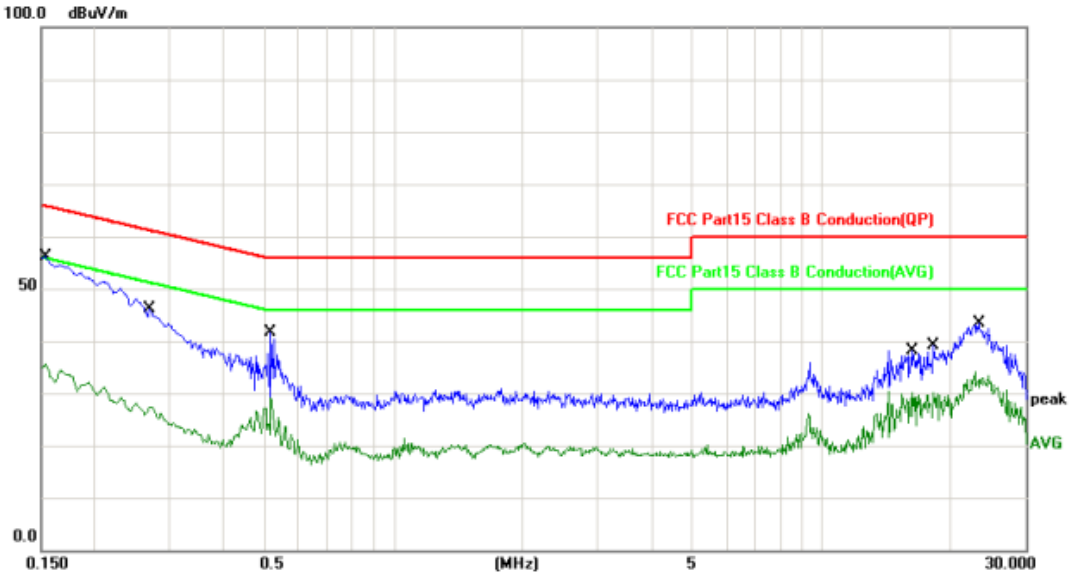


30 MHz to 1000 MHz



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

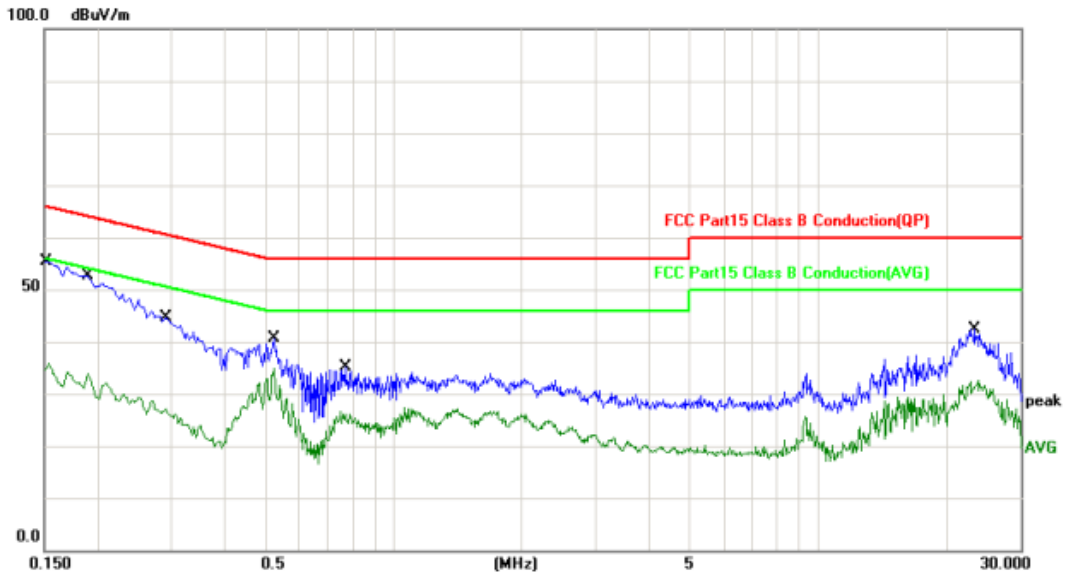
Test Mode	TX Mode_1Mbps Channel 19	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.1540	33.96	19.50	53.46	65.78	-12.32	QP	
2		0.1540	15.55	19.50	35.05	55.78	-20.73	AVG	
3		0.2700	23.76	19.53	43.29	61.12	-17.83	QP	
4		0.2700	6.35	19.53	25.88	51.12	-25.24	AVG	
5		0.5180	18.65	19.53	38.18	56.00	-17.82	QP	
6		0.5180	7.72	19.53	27.25	46.00	-18.75	AVG	
7		16.2260	13.56	20.72	34.28	60.00	-25.72	QP	
8		16.2260	9.01	20.72	29.73	50.00	-20.27	AVG	
9		18.2460	15.15	20.82	35.97	60.00	-24.03	QP	
10		18.2460	9.11	20.82	29.93	50.00	-20.07	AVG	
11		23.3820	17.75	20.86	38.61	60.00	-21.39	QP	
12		23.3820	11.47	20.86	32.33	50.00	-17.67	AVG	

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

Test Mode	TX Mode_1Mbps Channel 19	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	32.73	19.70	52.43	66.00	-13.57	QP	
2		0.1500	14.66	19.70	34.36	56.00	-21.64	AVG	
3		0.1900	29.88	19.70	49.58	64.04	-14.46	QP	
4		0.1900	12.42	19.70	32.12	54.04	-21.92	AVG	
5		0.2900	21.60	19.70	41.30	60.52	-19.22	QP	
6		0.2900	6.50	19.70	26.20	50.52	-24.32	AVG	
7		0.5220	17.84	19.74	37.58	56.00	-18.42	QP	
8	*	0.5220	14.63	19.74	34.37	46.00	-11.63	AVG	
9		0.7700	10.29	19.80	30.09	56.00	-25.91	QP	
10		0.7700	6.12	19.80	25.92	46.00	-20.08	AVG	
11		23.4740	17.43	20.40	37.83	60.00	-22.17	QP	
12		23.4740	10.74	20.40	31.14	50.00	-18.86	AVG	

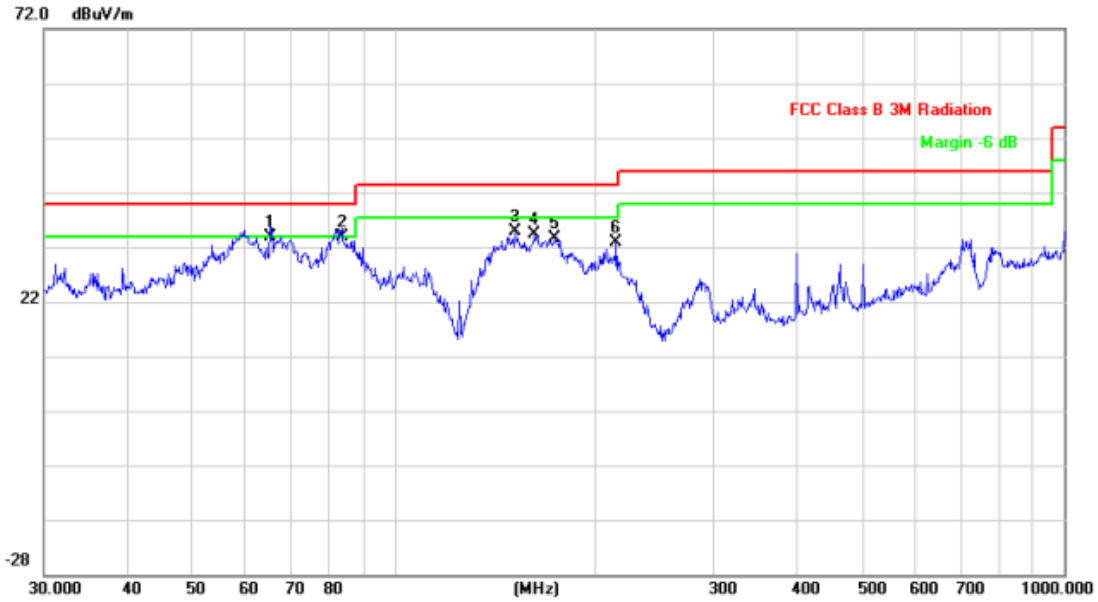
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

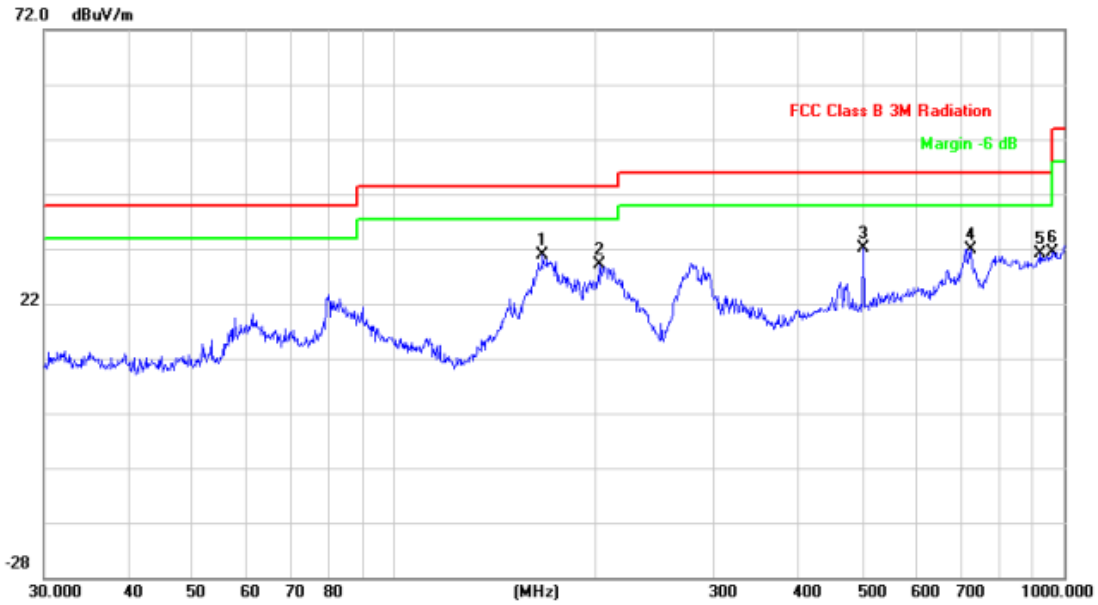
Test Mode	TX Mode_1Mbps Channel 19	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	65.3432	19.31	14.67	33.98	40.00	-6.02	peak	100	190	
2		83.5222	19.08	14.75	33.83	40.00	-6.17	peak	100	241	
3		151.5972	19.82	15.12	34.94	43.50	-8.56	peak	100	100	
4		162.0414	19.01	15.25	34.26	43.50	-9.24	peak	100	4	
5		173.8135	18.17	15.37	33.54	43.50	-9.96	peak	100	229	
6		214.5143	17.18	15.82	33.00	43.50	-10.50	peak	100	148	

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

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	166.6514	17.15	13.71	30.86	43.50	-12.64	peak	200	238	
2		202.8104	13.34	15.69	29.03	43.50	-14.47	peak	200	274	
3		501.1790	10.59	21.46	32.05	46.00	-13.95	peak	200	82	
4		726.8052	7.27	24.70	31.97	46.00	-14.03	peak	200	139	
5		922.5157	1.40	29.71	31.11	46.00	-14.89	peak	200	88	
6		958.7943	1.26	30.16	31.42	46.00	-14.58	peak	200	109	

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

End of Test Report