



FCC TEST REPORT

Report No: STS2107090W06

Issued for

Shanghai Lianchong Intelligent Technology Co., Ltd

Room221, Kehai Building, No.800 Naxian road, Pudong,
Shanghai, China

Product Name:	CATLINK AI Feeder - One
Brand Name:	N/A
Model Name:	CL-F-01
Series Model:	CL-F-02,CL-F-03,CL-F-04,CL-F-05, CL-F-06,CL-F-07,CL-F-08,CL-F-09
FCC ID:	2A2JT-CL-F-01
Test Standard:	FCC Part 15 Subpart C

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**TEST RESULT CERTIFICATION**

Applicant's Name: Shanghai Lianchong Intelligent Technology Co., Ltd
Address.....: Room221, Kehai Building, No.800 Naxian road, Pudong, Shanghai, China
Manufacture's Name: Shanghai Lianchong Intelligent Technology Co., Ltd
Address.....: Room221, Kehai Building, No.800 Naxian road, Pudong, Shanghai, China

Product Description

Product Name: CATLINK AI Feeder - One
Brand Name.....: N/A
Model Name.....: CL-F-01
SeriesModel: CL-F-02,CL-F-03,CL-F-04,CL-F-05,CL-F-06,CL-F-07,CL-F-08,CL-F-09

Test Standards.....: FCC Part 15 Subpart C

Test Procedure: ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test.....:
Date of receipt of test item.....: 12 July 2021
Date (s) of performance of tests: 12 July 2021 ~ 26 July 2021
Date of Issue: 26 July 2021
Test Result: **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	26 July 2021	STS2107090W06	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.209 (a)	Radiated emission, Spurious Emission	PASS	
15.215	20 dB Bandwidth	PASS	

1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 2.68\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 4.39\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 5.10\text{dB}$
6	All emissions, radiated >6G	$\pm 5.48\text{dB}$
7	Conducted Emission (9KHz-150KHz)	$\pm 2.79\text{dB}$
8	Conducted Emission (150KHz-30MHz)	$\pm 2.80\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	CATLINK AI Feeder - One
Trade Name	N/A
Model Name	CL-F-01
Series Model	CL-F-02,CL-F-03,CL-F-04,CL-F-05,CL-F-06, CL-F-07,CL-F-08,CL-F-09
Model Difference	Only the appearance and model are different
Channel List	Please refer to the Note 2.
Equipemnt Category	Non-ISM frequency
Operating frequency	125KHz
Modulation Type	FSK
Rating	Input: Rated Voltage: 5Vdc 1A, Rated power: 1.5W
Hardware version number	V1.1
Software version number	1.7.4.0
Connecting I/O Port(s)	Please refer to the Note 1.

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 (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)
00	125				

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	NOTE
1	N/A	CL-F-01	Coil	N/A	Antenna



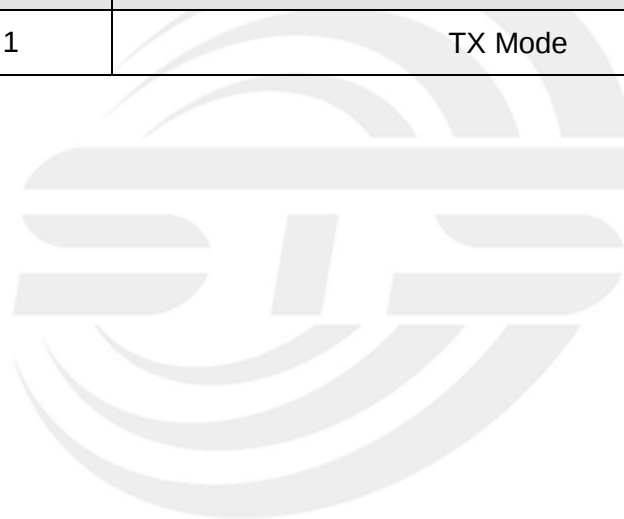
2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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	TX Mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX Mode

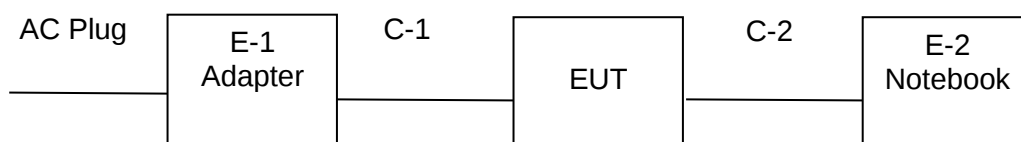
For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode



2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Radiated Emission Test



Conducted Emission Test



2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Adapter	HUAWEI	HW-050450C00	N/A	N/A
C-1	DC Cable	N/A	N/A	150cm	NO

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Notebook	LENOVO	Think Pad E470	N/A	N/A
C-2	USB Cable	N/A	N/A	150cm	NO

Note:

- (1) FCC DOC approved.
- (2) FTP is Foiled Twisted Pair.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2020.10.12	2021.10.11
Signal Analyzer	R&S	FSV 40-N	101823	2020.10.10	2021.10.09
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2022.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2019.10.15	2021.10.14
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2020.10.12	2021.10.11
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2020.10.12	2021.10.11
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2020.10.10	2021.10.09
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2020.10.12	2021.10.11
LISN	R&S	ENV216	101242	2020.10.12	2021.10.11
LISN	EMCO	3810/2NM	23625	2020.10.12	2021.10.11
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Power Sensor	Keysight	U2021XA	MY55520005	2020.10.10	2021.10.09
			MY55520006	2020.10.10	2021.10.09
			MY56120038	2020.10.10	2021.10.09
			MY56280002	2020.10.10	2021.10.09
Signal Analyzer	Agilent	N9020A	MY51110105	2021.03.04	2022.03.03
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
MIMO Power measurement test Set	Keysight	U2021XA	MY55520005	2020.10.10	2021.10.09
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			



3. CONDUCTED EMISSION TEST RESULT(SECTION 15.207)

3.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

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.

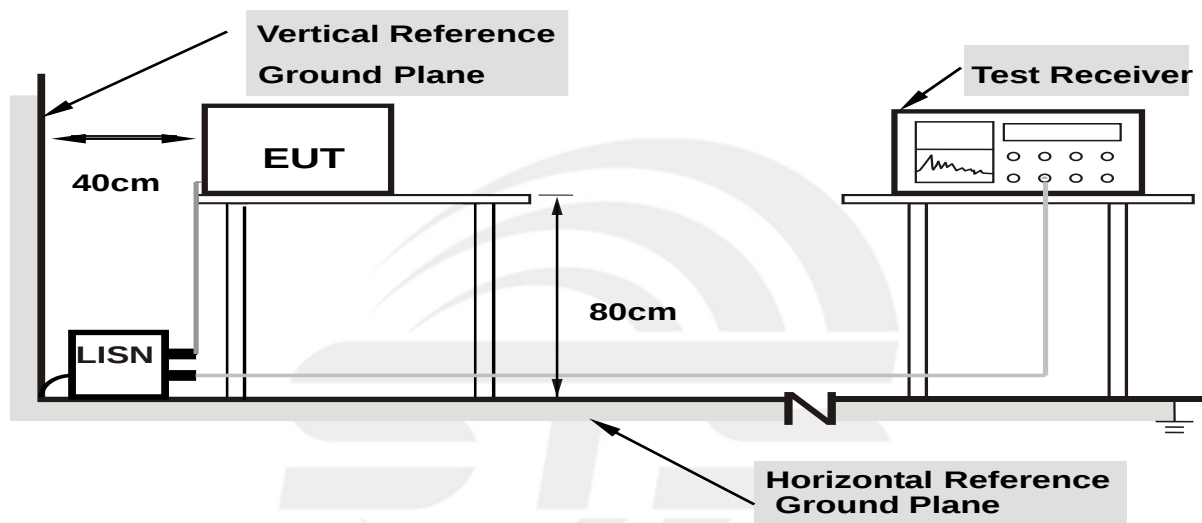
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

- The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling 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 30 to 40 cm long.
- 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.
- LISN is at least 80 cm from the nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support.

3.4 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.



3.5 TEST RESULTS

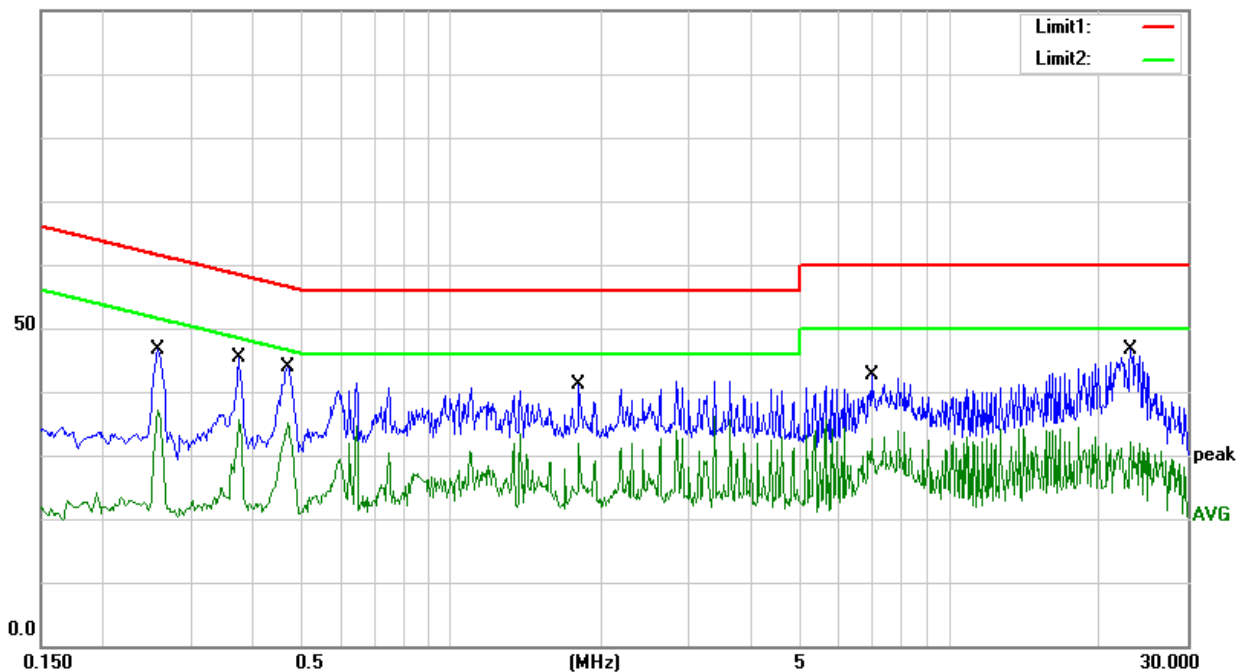
Temperature:	26.1℃	Relative Humidity:	56%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.2580	26.04	20.62	46.66	61.50	-14.84	QP
2	0.2580	16.60	20.62	37.22	51.50	-14.28	AVG
3	0.3740	24.76	20.63	45.39	58.41	-13.02	QP
4	0.3740	14.90	20.63	35.53	48.41	-12.88	AVG
5	0.4700	23.30	20.51	43.81	56.51	-12.70	QP
6	0.4700	13.05	20.51	33.56	46.51	-12.95	AVG
7	1.8060	20.62	20.38	41.00	56.00	-15.00	QP
8	1.8060	11.45	20.38	31.83	46.00	-14.17	AVG
9	6.9700	22.16	20.58	42.74	60.00	-17.26	QP
10	6.9700	12.10	20.58	32.68	50.00	-17.32	AVG
11	23.0980	23.83	22.79	46.62	60.00	-13.38	QP
12	23.0980	9.34	22.79	32.13	50.00	-17.87	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) – Limit
3. Factor = LISN factor + Cable loss + Limiter (10dB)

100.0 dBuV





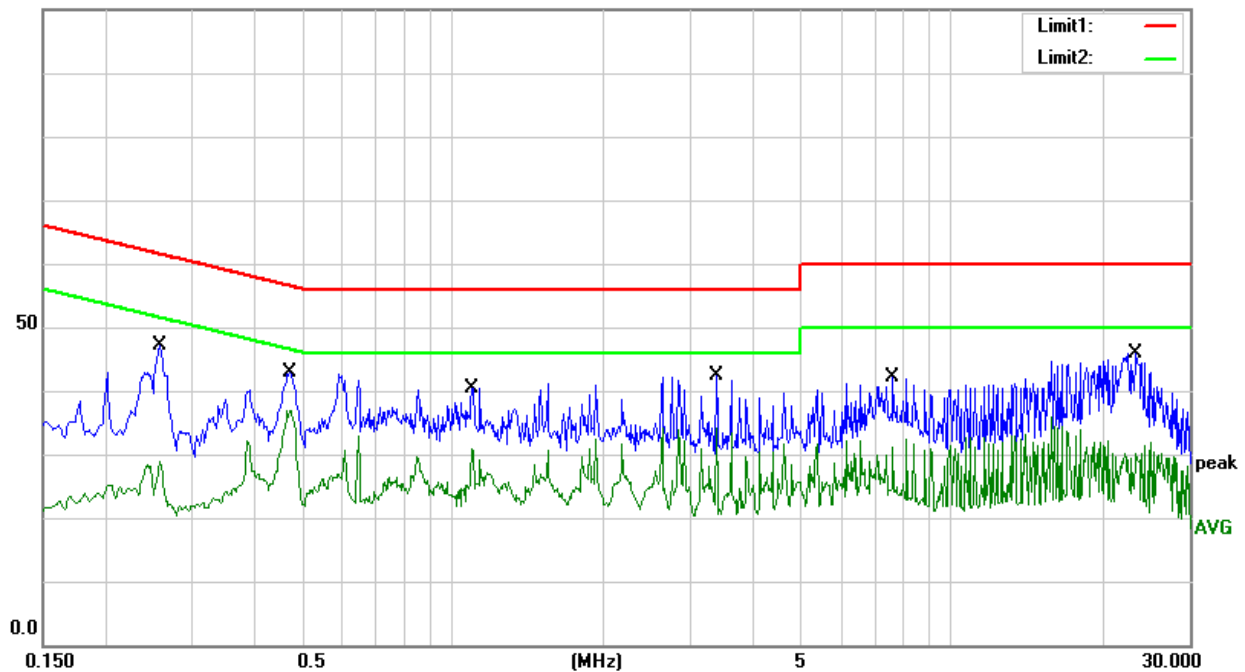
Temperature:	26.1℃	Relative Humidity:	56%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.2580	26.41	20.62	47.03	61.50	-14.47	QP
2	0.2580	8.28	20.62	28.90	51.50	-22.60	AVG
3	0.4700	22.48	20.51	42.99	56.51	-13.52	QP
4	0.4700	16.32	20.51	36.83	46.51	-9.68	AVG
5	1.0900	20.15	20.31	40.46	56.00	-15.54	QP
6	1.0900	10.53	20.31	30.84	46.00	-15.16	AVG
7	3.3740	21.81	20.47	42.28	56.00	-13.72	QP
8	3.3740	13.77	20.47	34.24	46.00	-11.76	AVG
9	7.6260	21.40	20.65	42.05	60.00	-17.95	QP
10	7.6260	11.74	20.65	32.39	50.00	-17.61	AVG
11	23.3940	23.21	22.78	45.99	60.00	-14.01	QP
12	23.3940	8.65	22.78	31.43	50.00	-18.57	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor = LISN factor + Cable loss + Limiter (10dB)

100.0 dBuV





4. RADIATED&FIELD EMISSION TEST RESULT(SECTIOU 15.209)

4.1 Limit

Frequency [MHz]	Field Strength [uV/m]	Measurement Distance [Meters]
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz forAV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

§ 15.209(d)The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.2 TEST PROCEDURE

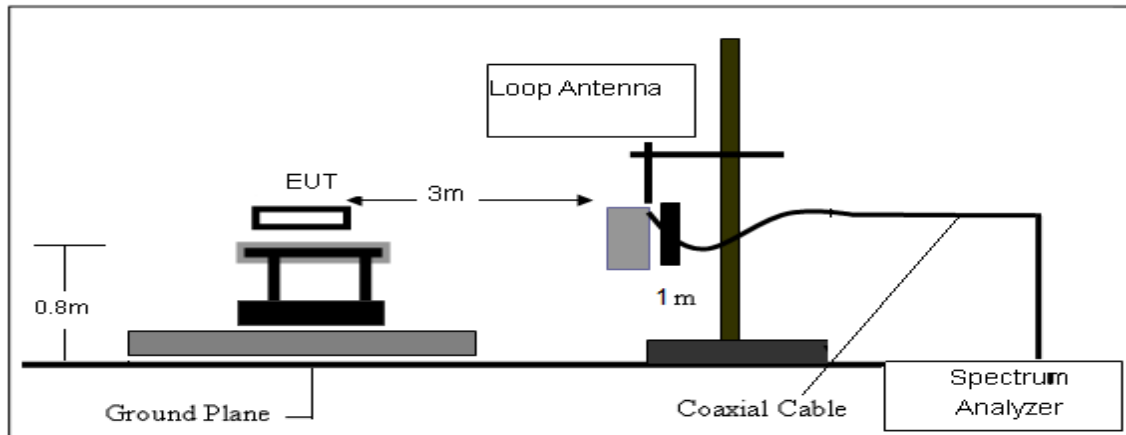
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- d. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

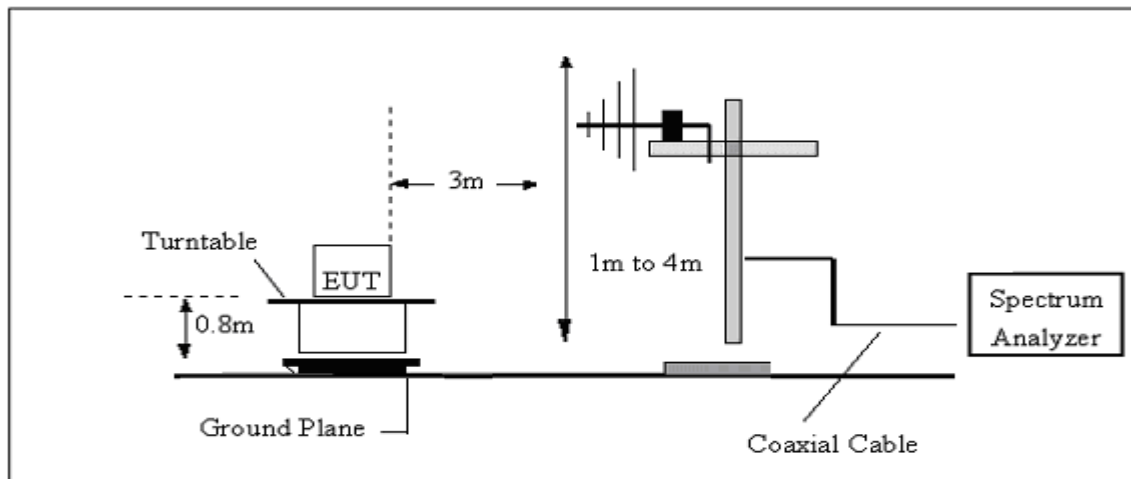
Both horizontal and vertical antenna polarities were testedand performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



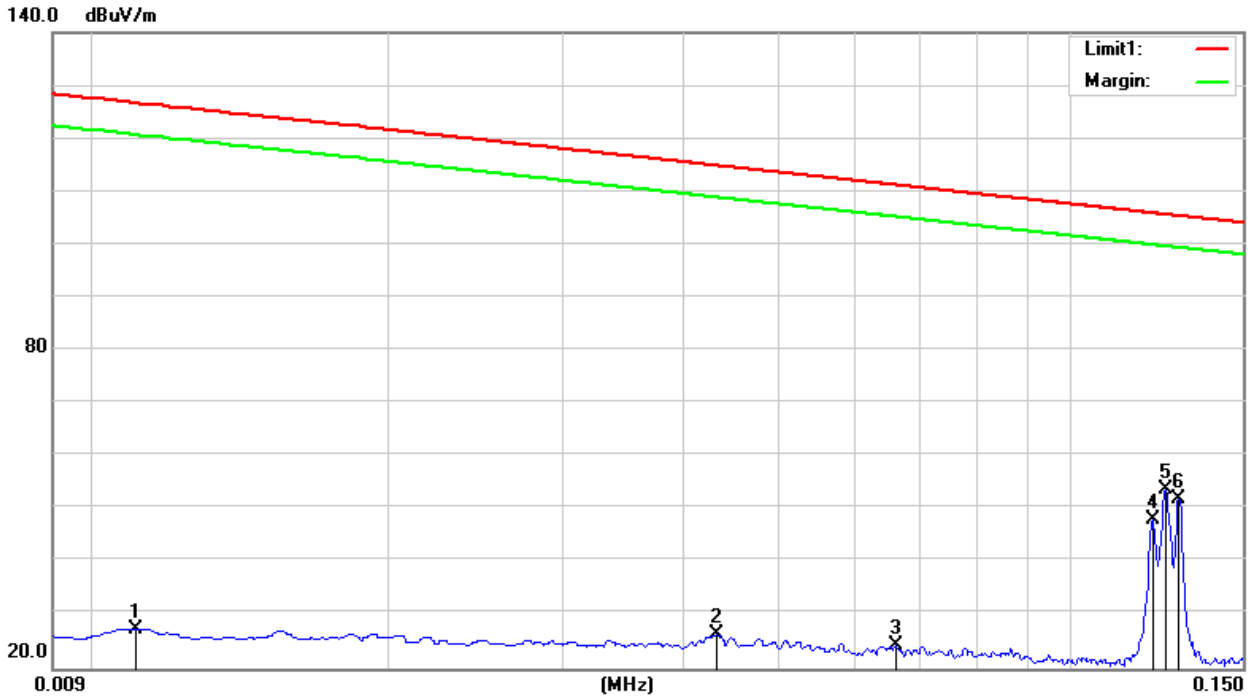


4.4 TEST RESULTS

Temperature:	23.1℃	Relative Humidity:	60%
Test Voltage :	DC 5V	Test Mode:	TX Mode

4.4.1 Spurious Radiated Emission Below 30 MHz

9KHz-150KHz

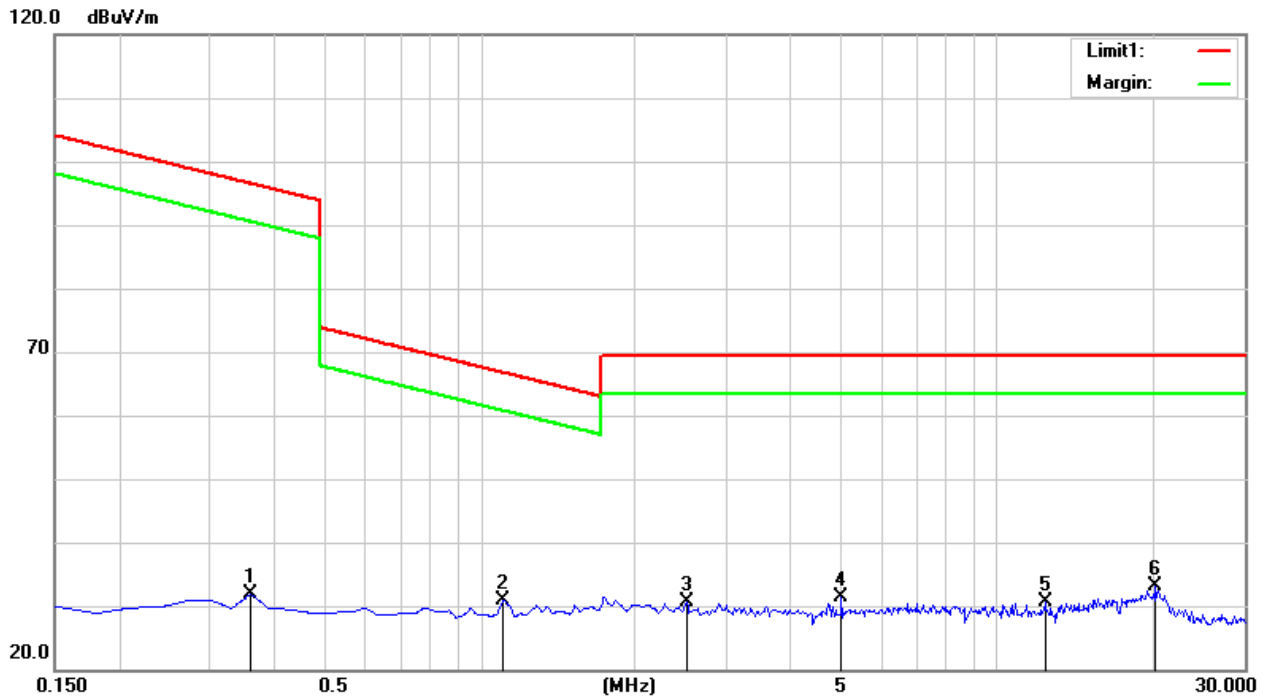


Remark:

1. $\text{Margin} = \text{Result} (\text{Result} = \text{Reading} + \text{Factor}) - \text{Limit}$
2. $\text{Factor} = \text{Antenna factor} + \text{Cable attenuation factor (cable loss)} - \text{Amplifier gain}$

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0110	8.03	19.45	27.48	126.78	-99.30	AV
2	0.0432	6.70	19.64	26.34	114.89	-88.55	AV
3	0.0661	5.18	19.05	24.23	111.20	-86.97	AV
4	0.1212	30.60	17.56	48.16	105.93	-57.77	AV
5	0.1250	36.26	17.55	53.81	105.67	-51.86	AV
6	0.1290	34.43	17.54	51.97	105.39	-53.42	AV

150KHz-30MHz



Remark:

1. Margin = Result (Result = Reading + Factor) – Limit
2. Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.3590	11.77	20.14	31.91	96.50	-64.59	AV
2	1.1052	10.73	20.22	30.95	66.74	-35.79	QP
3	2.5082	10.26	20.25	30.51	69.50	-38.99	QP
4	4.9856	10.76	20.50	31.26	69.50	-38.24	QP
5	12.3587	9.89	20.72	30.61	69.50	-38.89	QP
6	20.1793	10.67	22.43	33.10	69.50	-36.40	QP

4.4.2 Spurious Radiated Emission below 1 GHz

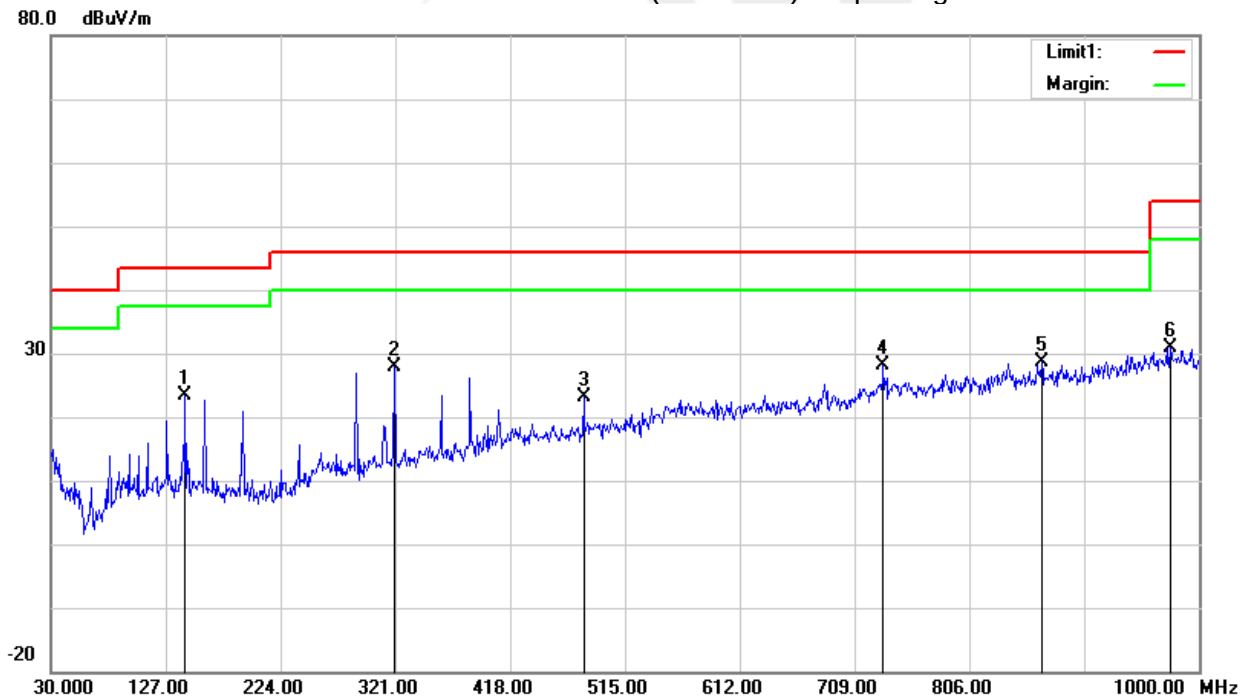
Temperature:	23.1℃	Relative Humidity:	60%
Test Voltage:	DC 5V	Test Mode:	Mode 1

The following table shows the highest levels of radiated emissions on polarizations of vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	143.4900	41.66	-18.23	23.43	43.50	-20.07	QP
4	320.0300	41.80	-14.00	27.80	46.00	-18.20	QP
5	480.0800	31.66	-8.65	23.01	46.00	-22.99	QP
6	733.2500	30.45	-2.35	28.10	46.00	-17.90	QP
7	867.1100	29.22	-0.50	28.72	46.00	-17.28	QP
8	975.7500	28.47	2.38	30.85	54.00	-23.15	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





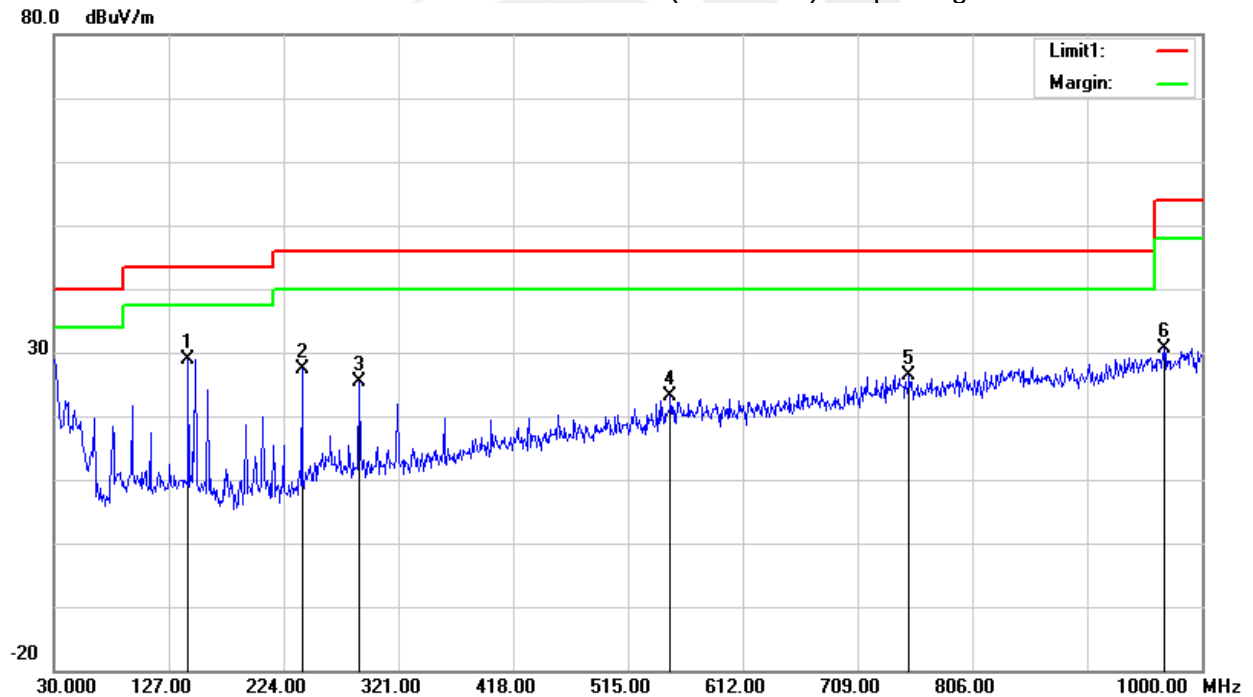
Temperature:	23.1℃	Relative Humidity:	60%
Test Voltage:	DC 5V	Test Mode:	Mode 1

The following table shows the highest levels of radiated emissions on polarizations of horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	143.4900	47.13	-18.23	28.90	43.50	-14.60	QP
4	239.5200	45.58	-18.10	27.48	46.00	-18.52	QP
6	288.0200	40.54	-15.26	25.28	46.00	-20.72	QP
8	550.8900	28.78	-5.74	23.04	46.00	-22.96	QP
9	752.6500	28.45	-2.16	26.29	46.00	-19.71	QP
10	967.9900	28.69	1.95	30.64	54.00	-23.36	QP

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit
2. Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain





5. 20 DB BANDWIDTH TEST

5.1 Limit

FCC Part 2.1049, Only applicable to report.

5.2 TEST SETUP

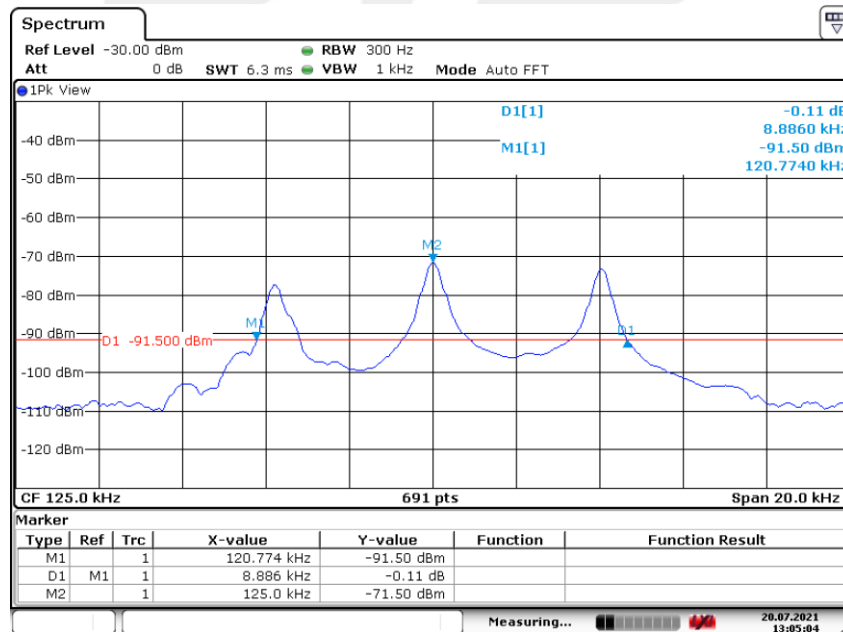
Spectrum Parameter	Setting
Span Frequency	approximately 2 to 3 times the 20 dB bandwidth
RB	greater than 1 % of the 20 dB bandwidth
VB	equal to the RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto



5.3 TEST RESULTS

OperatingFrequency (kHz)	20 dB Bandwidth(KHz)
125	8.886

CH00



Date: 20.JUL.2021 13:05:04



APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※

