Test Lab
Cert 2951.01

TEST REPORT

Applicant	Shenzhen TimeLink Technology Co.,Ltd
Address	14th Floor,Block C2 ,Nanshan Zhi Garden,1001 Academy Ave,Nanshan District,Shenzhen

Manufacturer or Supplier	Shenzhen TimeLink Technology Co.,Ltd	
Address	14th Floor,Block C2 ,Nanshan Zhi Garden,1001 Academy Ave,Nanshan District,Shenzhen	
Product	Cloud-Intelligent-Whiteboard	
Brand Name	TimeLink	
Model	CB-9010-E2	
Additional Model & Model Difference	CB-XXXX-YX, See item 2.1 note	
Date of tests	Apr. 28, 2016 ~ Jul. 05, 2016	

The submitted sample of the above equipment has been tested according to the requirements of the following standard:

☒ **47 CFR FCC Part 15, Subpart C (Section 15.225)**
☒ **47 CFR FCC Part 15, Subpart C (Section 15.215)**
☒ **ANSI C63.10:2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Breeze Jiang Project Engineer / EMC Department	Approved by Chris Chen Manager / EMC Department
	Date: Jul. 06, 2016

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC160427N038	Original release	Jul. 06, 2016

SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Applied Standard: 47 CFR FCC Part 15, Subpart C (SECTION 15.225, 15.215)			
Standard Clause	Test Item	Result	Remarks
15.207	Conducted emission test	PASS	Meet the requirement of limit.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	PASS	Meet the requirement of limit.
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	PASS	Meet the requirement of limit.
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	PASS	Meet the requirement of limit.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	PASS	Meet the requirement of limit.
15.225 (e)	The frequency tolerance	PASS	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.

1.1. TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Agilent	E4446A	MY46180622	Nov. 25,15	Nov. 24,16
Spectrum Analyzer (10Hz–40GHz)	Rohde&Schwarz	FSV40	101003	Nov. 25,15	Nov. 24,16
Signal Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 25,15	Nov. 24,16
EMI Test Receiver	Rohde&Schwarz	ESVS10	841431/004	May 17,16	May 16,17
Loop antenna (9kHz~30MHz)	Daze	ZN30900A	0708	Dec. 05,15	Dec. 05,16
Bilog Antenna	Teseq	CBL 6111D	27089	Jun. 27, 16	Jun. 26, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Oct. 18, 15	Oct. 17, 16
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Nov. 25,15	Nov. 24,16
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 13,16	May 12,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 30, 15	Oct. 29, 16
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	May 15, 16	May 14, 17
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jul. 16, 15	Jul. 15, 16

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 10m Chamber and RF Oven room.

3. The FCC Site Registration No. is 502831.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Amplifier	Burgeon	BPA-530	100220	Apr. 05,16	Apr. 04,17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A

NOTE: 1. The test was performed at 966 Chamber (a 3m Semi-anechoic chamber).
2.The calibration interval of the above test instruments is 12 or 24 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3.The FCC Site Registration No. is 494399

1.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	3.83dB

PARAMETER	UNCERTAINTY
RF frequency	$\pm 1.1 \times 10^{-8}$
RF power, conducted	±0.6
RF power, radiated	± 3.2 dB
Temperature	± 0.4 °C
Humidity	± 3.1 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.3. MAXIMUM MEASUREMENT UNCERTAINTY

For the test methods, according to the present document the uncertainty figures shall be calculated according to the methods described in the TR 100 028 [3] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2(which provide confidence levels of respectively 95 % and 95,45 % in case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Maximum measurement uncertainty

PARAMETER	UNCERTAINTY
RF frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	±1
RF power, radiated	± 6 dB
Temperature	± 1 °C
Humidity	± 5 %

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

PRODUCT	Cloud-Intelligent-Whiteboard
MODEL NO.	CB-9010-E2
ADDITIONAL MODEL	CB-XXXX-YX(X can be letter 0 to 9 or nil/Y can be letter A to Z)
NOMINAL VOLTAGE	DC12V from Adapter Input AC120V 60Hz
MODULATION TECHNOLOGY	NFC
MODULATION TYPE	ASK
OPERATING FREQUENCY	13.56MHz
FCC ID	2AEK2TLCIB
ANTENNA TYPE	Loop Antenna with 0dBi
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB Line 1: Shielded detachable 0.4m, MicroUSB Line 2: Shielded detachable 0.5m, DC Line: Unshielded Undetachable 0.5m

NOTE:

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

2 For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3 Please refer to the EUT photo document (Reference No.: 160427N038) for detailed product photo.

4 Additional models CB-XXXX-YX(X can be letter 0 to 9 or nil/Y can be letter A to Z) are identical with the test model CB-9010-E2 except the appearance with different size and color for marketing purpose.

5 The EUT was powered by the following adapters:

ADAPTER	
BRAND:	CWT
MODEL:	KPL-060F
INPUT:	AC 100-240V, 50/60HZ, 1.7
OUTPUT:	DC 12V, 5A
DC LINE:	Unshielded Undetachable 1.2m, with One Core

2.2. DESCRIPTION OF TEST MODES

The EUT only have 1 channel.

CHANNEL	FREQUENCY (MHz)
1	13.56

2.2.1. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports
The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE	PLC	FS	BW	
A	√	√	√	√	**DC12V from Adapter with NFC link**

Where **RE≥1G:** Radiated Emission above 1GHz **PLC:** Power Line Conducted Emission
FS: Frequency Stability **BW:** 20dB Bandwidth measurement

RADIATED FIELD STRENGTH:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1	1	ASK

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1	1	ASK

TRANSMITTER SPURIOUS EMISSIONS TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
	1	1	ASK

FREQUENCY STABILITY:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1	1	ASK

20DB BANDWIDTH:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGUURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1	1	ASK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	25deg. C, 60%RH	DC12V from Adapter Input AC120V 60Hz	Robert cheng
PLC	22deg. C, 63%RH	DC12V from Adapter Input AC120V 60Hz	David wang
FS	25deg. C, 55%RH	DC12V from Adapter Input	Robert cheng
BW	24deg. C, 55%RH	DC12V from Adapter Input AC120V 60Hz	Robert cheng

2.3. GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.225)
FCC Part 15, Subpart C (15.215)
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.4. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with host 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

3. TEST PROCEDURES AND RESUTLS

3.1 TRANSMITTER SPURIOUS EMISSIONS

3.1.1 Limits of Radiated Emission Measurement

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequencies (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

Radiated Emissions Limits at 10 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B, ICES-003, Class A	FCC 15B, ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.1.2 DEVIATION FROM TEST STANDARD

No deviation.

3.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.(Below 30MHz)

c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. (Below 1000MHz)

d. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

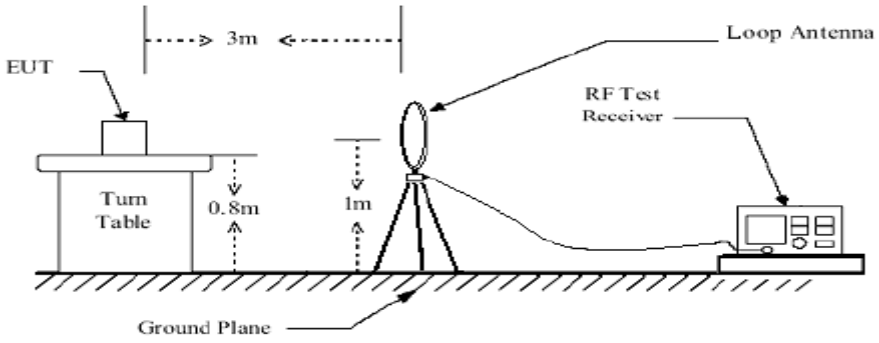
g. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

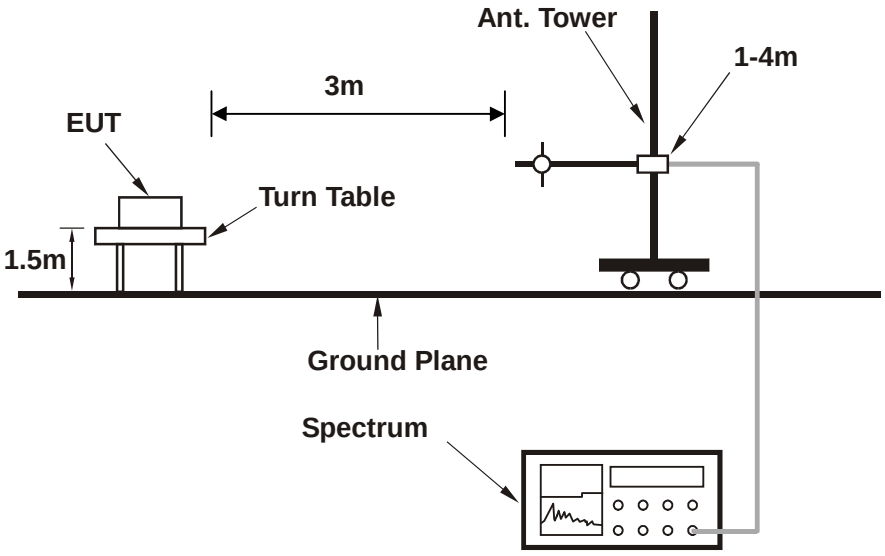
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 Test Set Up

Below 30MHz



30MHz~1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.5 EUT Operating Conditions

a. Placed the EUT on the testing table.

b. Set the EUT under transmission condition continuously at specific channel frequency.

3.1.6 TEST RESULTS

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567MHz
Input Power (System)	DC12V from Adapter Input AC120V 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25deg. C, 60%RH	Tested By	Robert cheng

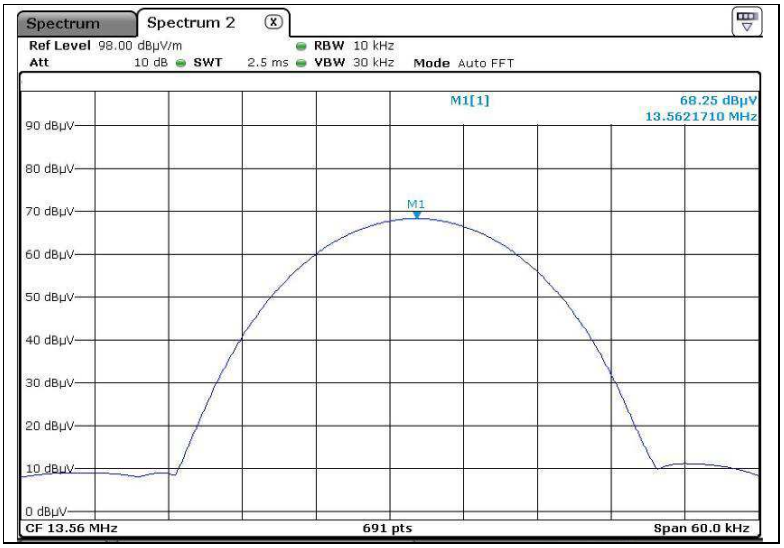
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.56217	68.25	124.00	-55.75	1.0	236	77.63	-9.38

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567MHz
Input Power (System)	DC12V from Adapter Input AC120V 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25deg. C, 60%RH	Tested By	Robert cheng

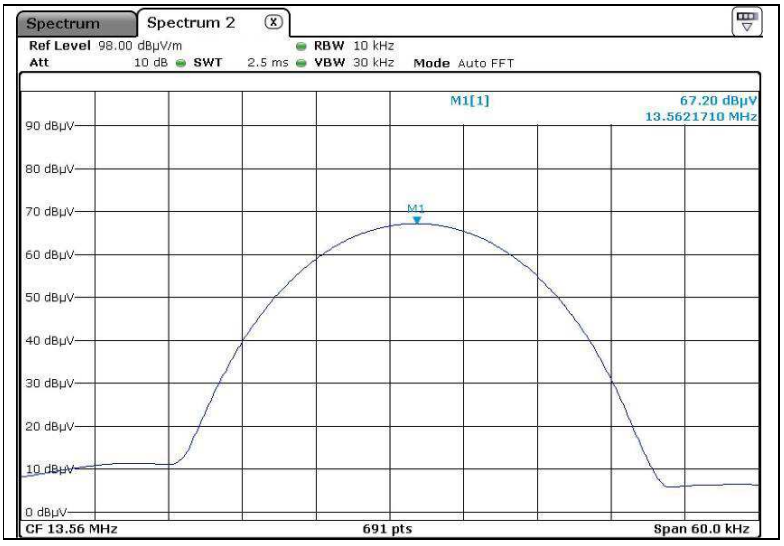
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.56217	62.20	124.00	-61.80	1.0	215	71.58	-9.38

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m

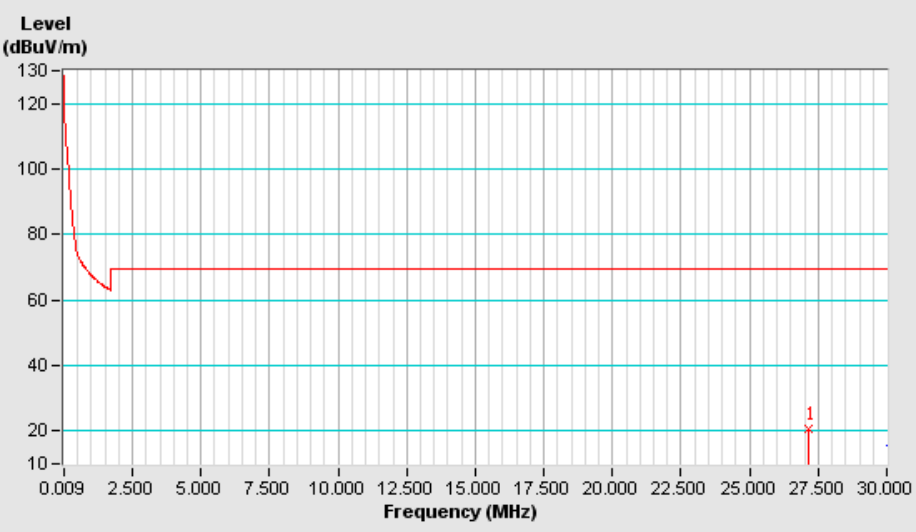


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30MHz
Input Power (System)	DC12V from Adapter Input AC120V 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25deg. C, 60%RH	Tested By	Robert cheng

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	27.12	20.57	69.54	-48.97	1.0	158	29.33	-8.76

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

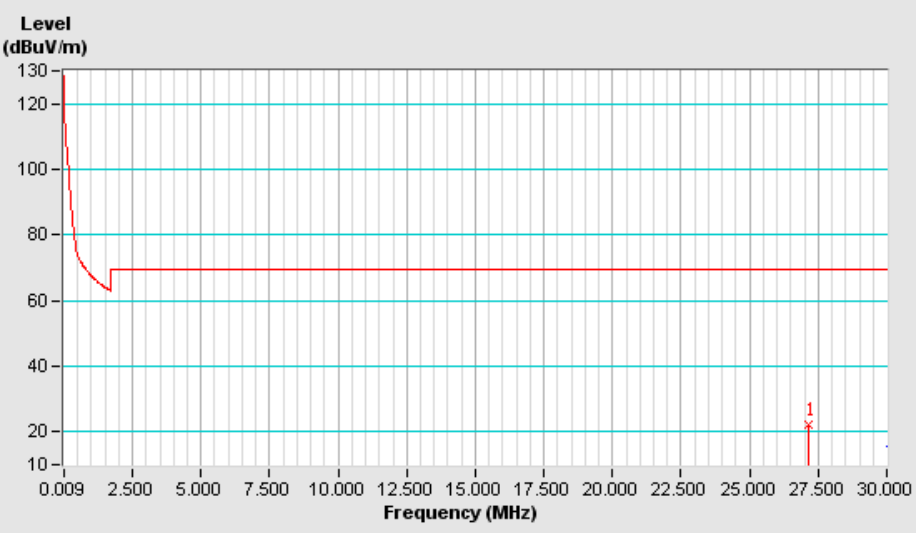


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30MHz
Input Power (System)	DC12V from Adapter Input AC120V 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25deg. C, 60%RH	Tested By	Robert cheng

Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	27.12	22.37	69.54	-47.17	1.0	142	31.13	-8.76

REMARKS:

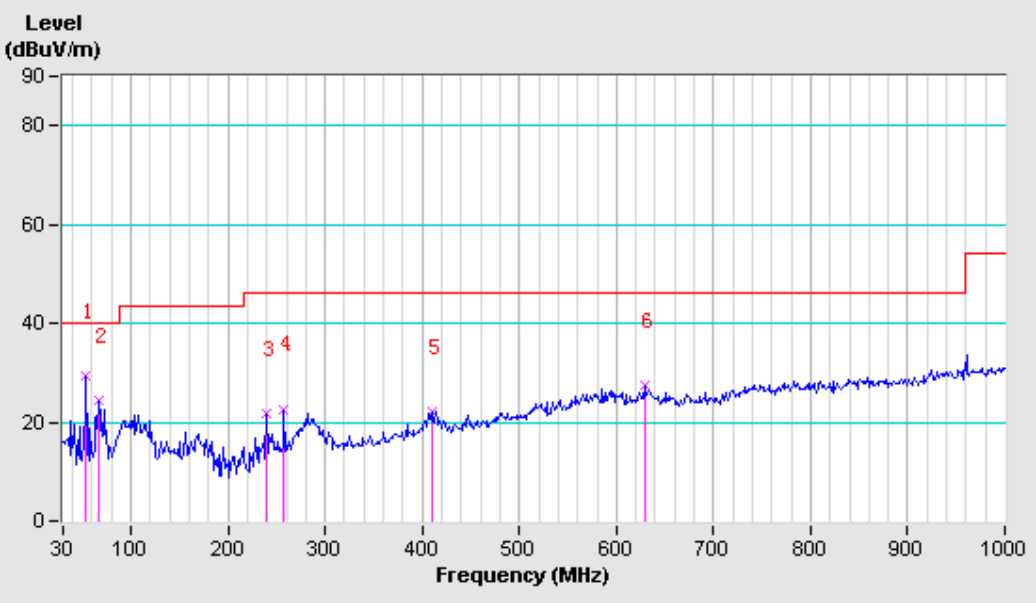
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



TEST MODE	Normal Working	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC12V from Adapter Input AC120V 60Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH	**TESTED BY**: Robert cheng	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	53.90	-23.37	52.55	29.18	40.00	-10.82	300	0
2	66.55	-24.66	49.05	24.39	40.00	-15.61	300	0
3	239.46	-17.31	39.11	21.80	46.00	-24.20	300	0
4	257.74	-14.78	37.46	22.68	46.00	-23.32	300	0
5	409.57	-9.80	31.87	22.07	46.00	-23.93	300	0
6	628.87	-4.64	31.98	27.34	46.00	-18.66	300	0

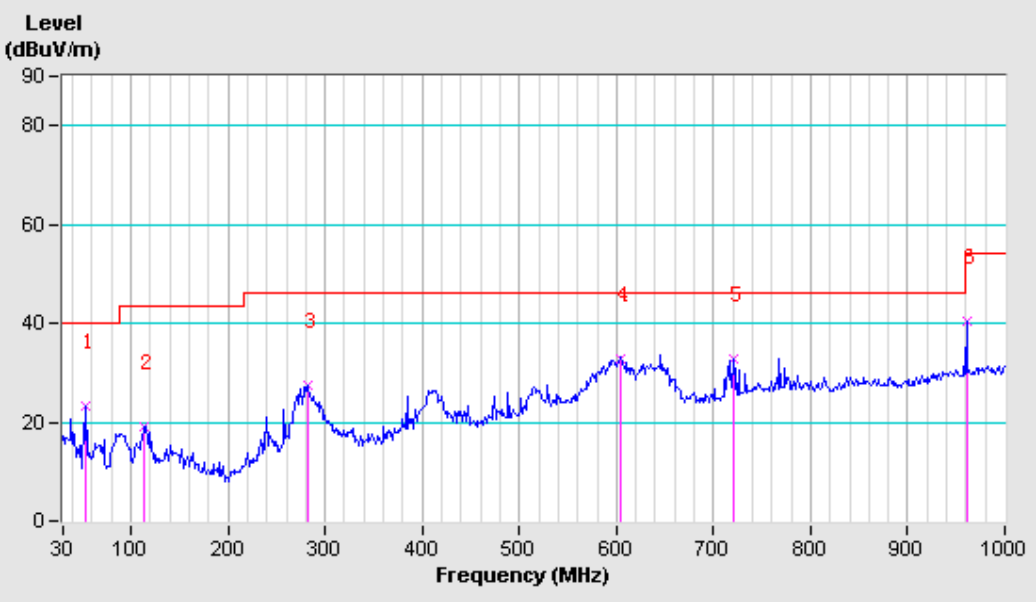
REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE	Normal Working	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC12V from Adapter Input AC120V 60Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH	**TESTED BY**: Robert cheng	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	53.90	-23.37	46.58	23.21	40.00	-16.79	200	0
2	114.35	-18.27	37.43	19.16	43.50	-24.34	200	0
3	281.64	-15.13	42.58	27.45	46.00	-18.55	200	0
4	603.57	-5.53	38.43	32.90	46.00	-13.10	200	0
5	720.25	-2.93	35.85	32.92	46.00	-13.08	200	0
6	960.64	1.73	38.68	40.41	54.00	-13.59	200	0

REMARKS: The emission levels of other frequencies were very low against the limit.



3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	79	66	66-56	56-46
0.5-5	73	60	56	46
5-30	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.2.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101588	Jan. 22,16	Jan. 21,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Cond _V7.3.7	N/A	N/A	N/A

NOTE: 1. The test was performed in shielded room 553.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.2.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

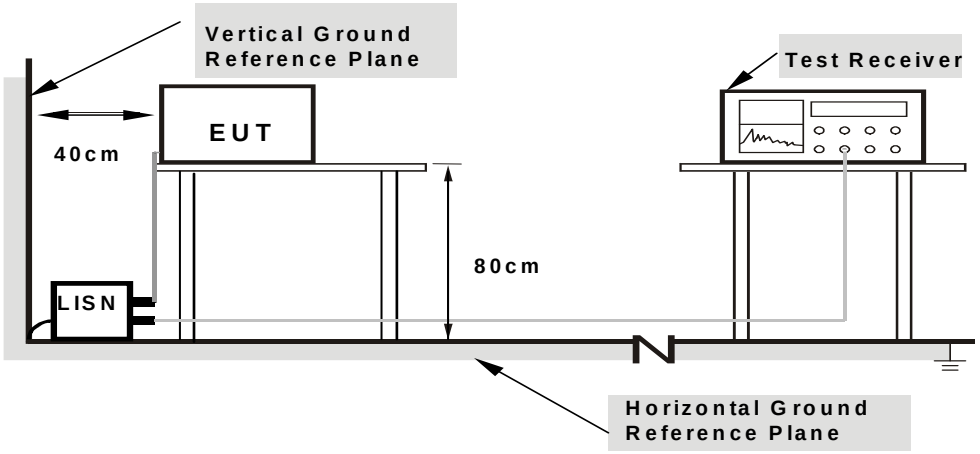
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under Limit - 20dB were not recorded.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

3.2.5 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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

3.2.6 EUT OPERATING CONDITIONS

a. Turned on the power of all equipment.

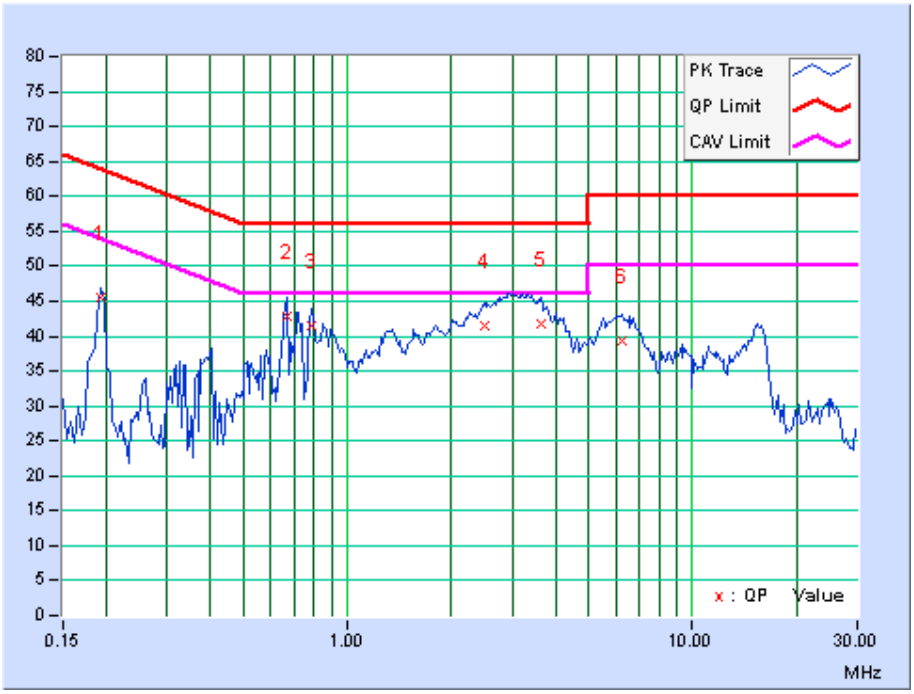
b. EUT was operated according to the type described in manufacturer's specifications or the user's manual.

3.2.7 TEST RESULTS

TEST MODE	Normal Working	**PHASE**	Line(L)
TEST VOLTAGE	DC12V from Adapter Input AC120V 60Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH	**TESTED BY**: David wang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.02	38.04	19.44	48.06	29.46	66.00	56.00	-17.94	-26.54
2	0.18600	10.02	32.26	14.76	42.28	24.78	64.21	54.21	-21.93	-29.43
3	0.51225	10.12	22.15	14.59	32.27	24.71	56.00	46.00	-23.73	-21.29
4	10.2120	10.16	22.19	15.43	32.35	25.59	60.00	50.00	-27.65	-24.41
5	15.13725	10.15	30.93	23.12	41.08	33.27	60.00	50.00	-18.92	-16.73
6	16.58625	10.19	33.28	24.41	43.47	34.60	60.00	50.00	-16.53	-15.40

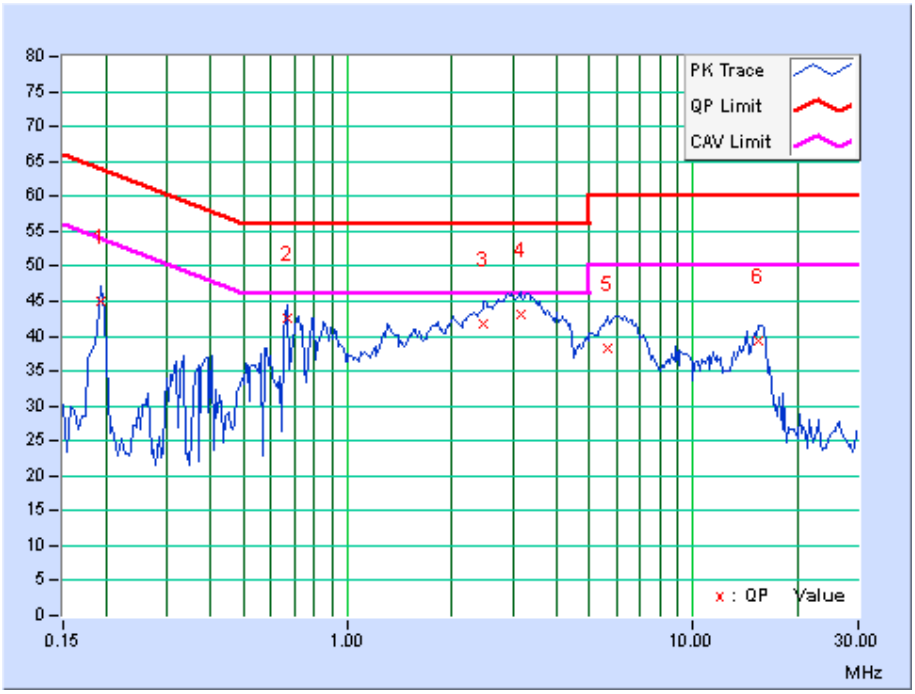
REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE	Normal Working	**PHASE**	Neutral (N)
TEST VOLTAGE	DC12V from Adapter Input AC120V 60Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH	**TESTED BY**: David wang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15924	9.82	36.10	17.68	45.92	27.50	65.50	55.50	-19.58	-28.00
2	0.20625	9.82	28.49	8.99	38.31	18.81	63.35	53.35	-25.05	-34.55
3	0.51290	9.82	24.37	17.02	34.19	26.84	56.00	46.00	-21.81	-19.16
4	9.83625	10.06	17.67	11.11	27.73	21.17	60.00	50.00	-32.27	-28.83
5	14.74381	10.15	28.28	19.75	38.43	29.90	60.00	50.00	-21.57	-20.10
6	16.55700	10.16	31.80	23.15	41.96	33.31	60.00	50.00	-18.04	-16.69

REMARKS: The emission levels of other frequencies were very low against the limit.

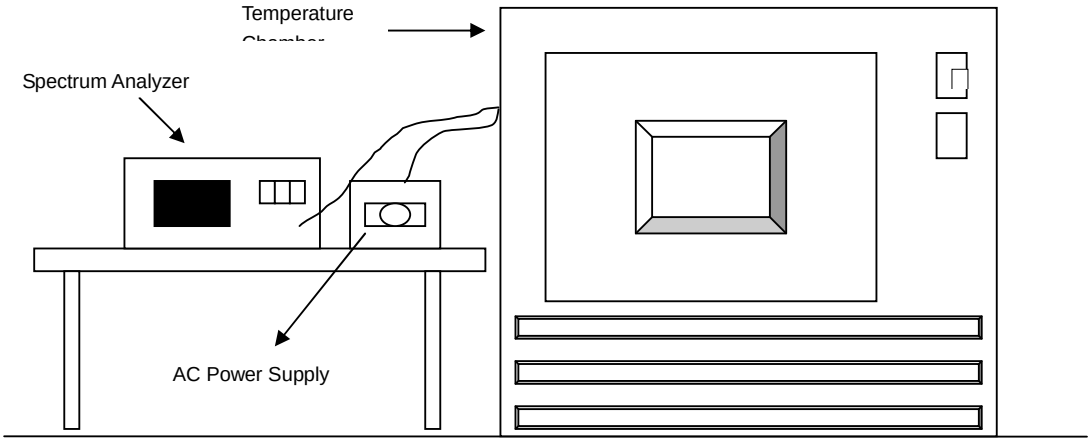


3.3 FREQUENCY STABILITY

3.3.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

3.3.2 Test Setup



3.3.3 Test Instruments

Refer to section 1.1 to get information of above instrument.

3.3.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turned the EUT on and coupled its output to a spectrum analyzer.

c. Turned the EUT off and set the chamber to the highest temperature specified.

d. Allowed sufficient time (approximately 30 min) for the temperature of the chamber to stabilize then turned the EUT on and measured the operating frequency after 2, 5, and 10 minutes.

e. Repeated step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

3.3.5 Deviation fromTest Standard

No deviation.

3.3.6 EUT Operating Conditions

Same as Item 3.1.5.

3.3.7 Test Result

Frequemcy Stability Versus Temp.									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	13.56221	0.00029	13.56221	0.00029	13.56221	0.00029	13.56221	0.00029
40	120	13.56223	0.00044	13.56221	0.00029	13.56222	0.00036	13.56223	0.00044
30	120	13.56221	0.00029	13.5622	0.00021	13.56221	0.00029	13.5622	0.00021
20	120	13.56217	-0.00001	13.56218	0.00007	13.56216	-0.00008	13.56217	-0.00001
10	120	13.56223	0.00044	13.56223	0.00044	13.56223	0.00044	13.56223	0.00044
0	120	13.56219	0.00014	13.56218	0.00007	13.5622	0.00021	13.56219	0.00014
-10	120	13.56214	-0.00023	13.56214	-0.00023	13.56214	-0.00023	13.56214	-0.00023
-20	120	13.56222	0.00036	13.56223	0.00044	13.56222	0.00036	13.56221	0.00029

Frequemcy Stability Versus Voltage									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	13.56217	-0.00001	13.56218	0.00007	13.56216	-0.00008	13.56217	-0.00001
	120	13.56217	-0.00001	13.56218	0.00007	13.56216	-0.00008	13.56217	-0.00001
	102	13.56217	-0.00001	13.56218	0.00007	13.56216	-0.00008	13.56217	-0.00001

3.4 20dB BANDWIDTH

3.4.1 Limits Of 20dB BANDWIDTH Measurement

The 20dB bandwidth shall be specified in operating frequency band.

3.4.2 Test Setup

Same as Item 3.1.4.

3.4.3 Test Instruments

Refer to section 1.1 to get information of above instrument.

3.4.4 Test Procedures

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1kHz RBW and 3kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

3.4.5 Deviation from Test Standard

No deviation.

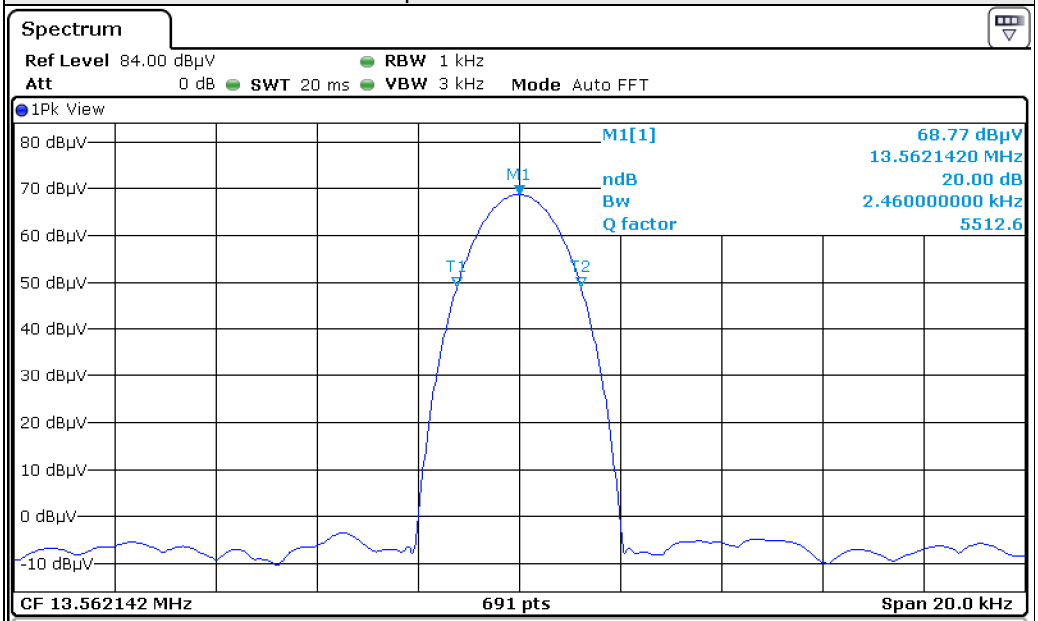
3.4.6 EUT Operating Conditions

Same as Item 3.1.5.

3.4.7 Test Results

20dBc point (Low)	20dBc point (High)	Operating frequency band (KHz)	Pass/Fail
13.560897	13.563358	2.46	Pass

Spectrum Plot Of Value



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	13.562142 MHz	68.77 dBµV	ndB down	2.46 kHz
T1		1	13.560897 MHz	49.11 dBµV	ndB	20.00 dB
T2		1	13.563358 MHz	49.20 dBµV	Q factor	5512.6

4. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

--- END ---