FCC Test Report

Report No: FCS202007005W03

Issued for

Sinocan International Technologies Co., Ltd

4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China

Product Name:	Interactive Touch Panel
Brand Name:	Bestboard
Model Name:	R5E65
Series Model:	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
FCC ID:	2AT6L-R5E65

Issued By: Flux Compliance Service Laboratory
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com

TEST RESULT CERTIFICATION

Applicant's Name ..... :	Sinocan International Technologies Co., Ltd
Address ..... :	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China
Manufacture's Name ..... :	Sinocan International Technologies Co., Ltd
Address ..... :	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China

Product Description

Product Name ..... :	Interactive Touch Panel
Model Name ..... :	R5E65
Series Model ..... :	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
Test Standards ..... :	CFR 47 FCC Part15E section 15.407
Test Procedure ..... :	ANSI C63.10-2013 KDB 789033 D02 General UNII Test procedures New Rules 02 KDB558074 D01 Meas Guidance v05

This device described above has been tested by Flux Compliance Service Laboratory, 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.
This report shall not be reproduced except in full, without the written approval of Flux Compliance Service Laboratory, this document may be altered or revised by Flux Compliance Service Laboratory, personal only, and shall be noted in the revision of the document..

Date of Test .....:

Date (s) of performance of tests .:	10 July 2020 to 22 July 2020
Date of Issue .....:	22 July 2020
Test Result .....:	Pass

Tested by : Chris chen

(Chris Chen)

Reviewed by : Jack chen

(Jack Chen)

Approved by : Andy yue

(Andy yue)

Table of Contents **Page**

1. SUMMARY OF TEST RESULTS **6**
1.1 TEST FACTORY 7
1.2 MEASUREMENT UNCERTAINTY 7
2. GENERAL INFORMATION **8**
2.1 GENERAL DESCRIPTION OF THE EUT 8
2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 10
2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS 11
2.4 EQUIPMENTS LIST 12
3. 26DB BANDWIDTH, 6DB BANDWIDTH AND 99% BANDWIDTH **13**
3.1 LIMIT 13
3.2 TEST PROCEDURE 13
3.3 TEST SETUP 13
3.4 TEST RESULTS 14
4 CONDUCTED OUTPUT POWER **16**
4.1 LIMIT 16
4.2 TEST PROCEDURE 16
4.3 TEST SETUP 16
4.4 TEST RESULTS 16
5. POWER SPECTRAL DENSITY **19**
5.1 LIMIT 19
5.2 TEST PROCEDURE 19
5.3 TEST SETUP 20
5.4 TEST RESULTS 20
5.5 ORIGINAL TEST DATA 20
6. FREQUENCY STABILITY MEASUREMENT **22**
6.1 LIMIT 22
6.2 TEST PROCEDURE 22
6.3 TEST SETUP 22
6.4 TEST RESULTS 23
7. BAND EDGE **25**
7.1 LIMIT 25
7.3 TEST SETUP 26

Table of Contents **Page**

7.5 TEST RESULTS 27
7.5 ORIGINAL TEST DATA 27
8. DUTY CYCLE 29
8.1 TEST REQUIREMENT 29
8.2 TEST PROCEDURE 29
7.3 TEST SETUP 29
8.4 TEST RESULTS 29
8.5 ORIGINAL TEST DATA 29
9 RADIATED EMISSION MEASUREMENT 30
10 CONDUCTED EMISSION TEST 38
11. ANTENNA REQUIREMENT 42
11.1 STANDARD REQUIREMENT 42
11.2 RESULT 42

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	22 July 2020	FCS202007005W03	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Standard Section	Test Item	Judgment	Remark
FCC 15.407 (e)	6/26db Bandwidth and 99% Bandwidth	PASS	--
FCC 15.407 (a)	Maximum Conducted Output Power	PASS	--
FCC 15.407 (a)	Power Spectral Density	PASS	--
FCC 15.407 (g)	Frequency Stability Measurement	PASS	
FCC 15.407 (a) FCC 15.209 FCC 15.205	Emissions in restricted frequency bands	PASS	
FCC 15.407 (a) FCC 15.209 FCC 15.205	Band Edge Compliance	PASS	
FCC 15.207	Power Line Conducted Emission	PASS	
FCC 15.203	Antenna requirement	PASS	--

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number：5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ±**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	±0.71dB
2	Unwanted Emissions, conducted	±2.988 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±5.2 dB
6	All emissions,radiated 1GHz -18GHz	±4.66 dB
7	All emissions,radiated 18GHz -40GHz	±4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Interactive Touch Panel
Trade Name	Bestboard
Model Name	R5E65
Series Model	R5R65, R5N65, R5S65, R5M65, R5T65, R5D65, R5G65, R5Y65, S5EC65, S5C65, S5M65, S5S65, S5T65, S5D65, S5G65, S5Y65
Model Difference	The difference between the test sample and other models are that the color is different, and all circurts are the same.
Channel List	Please refer to the Note 2.2.
Operation frequency	IEEE 802.11a: 5725MHz ~5850 MHz band
Number of channel	5CH
Transmitter rate	IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Modulation:	OFDM(64QAM, 16QAM, QPSK, BPSK)
Power supply	AC 120V/60HZ
Battery	NA
Hardware version number	V1.0
Software version number	V1.0
Sample type	Fix Location
Connecting I/O Port(s)	Please refer to the User's Manual

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)	Channel	Frequency (MHz)
149	5745	157	5785	165	5825
153	5765	161	5805		

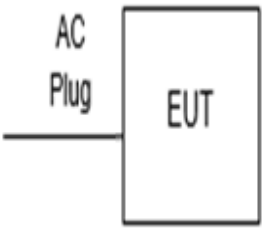
3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	CC2	PIFA antenna	N/A	1.5B dBi	Antenna

2.2 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.

Block diagram of EUT configuration for test



Test software: the QA tool-D
The test softeware was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

Test mode	TX	RF Channel		
		Low CH(CH149)	Middle CH(CH157)	High CH(CH165)
802.11a	5725MHZ-5850MHZ	5745MHZ	5785MHZ	5825MHZ

2.3 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

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2019.10.09	2020.10.10
Signal Analyzer	R&S	FSV40-N	FCS-E012	2019.10.09	2020.10.10
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2019.10.09	2020.10.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2019.10.26	2020.10.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2019.10.03	2020.10.02
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2019.10.09	2020.10.10
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2019.05.31	2020.05.30
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2019.10.03	2020.10.02
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2019.10.08	2020.10.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2019.10.03	2020.10.02

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2019.10.03	2020.10.02
LISN	R&S	ENV216	FCS-E007	2019.10.03	2020.10.02
LISN	ETS	3810/2NM	FCS-E009	2019.10.15	2020.10.14
Temperature & Humidity	HTC-1	victor	FCS-E008	2019.10.03	2020.10.02

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2019.10.02	2020.10.01
Spectrum Analyzer	Agilent	E4447A	MY50180039	2019.11.08	2020.11.07
Spectrum Analyzer	R&S	FSV-40	101499	2019.10.10	2020.10.09

3. 26dB Bandwidth, 6dB Bandwidth and 99% Bandwidth

3.1 Limit

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6dB Bandwidth: VBW=300kHz For 26dB Bandwidth: >3RBW
Trace	Max hold
Sweep	Auto couple

(2) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26dB and 6dB relative to the maximum level measured in the fundamental emission.

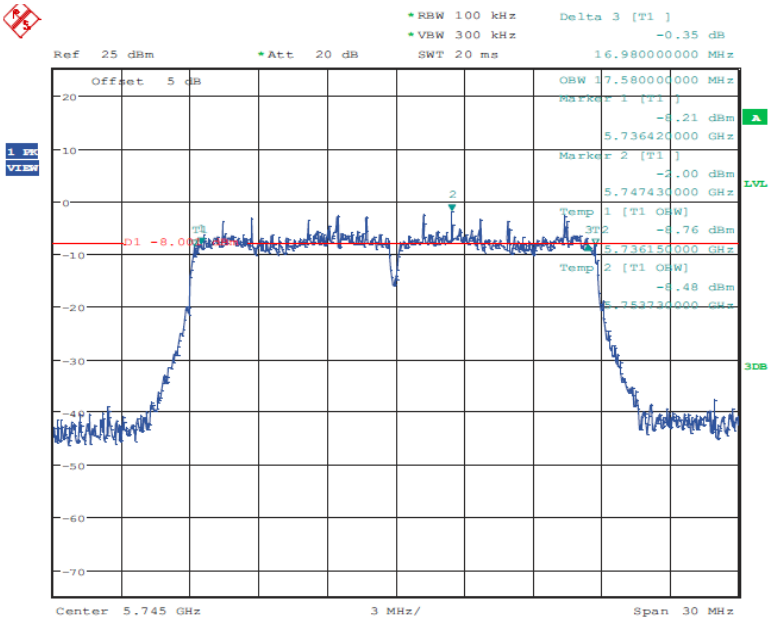
3.3 Test setup

3.4 Test results

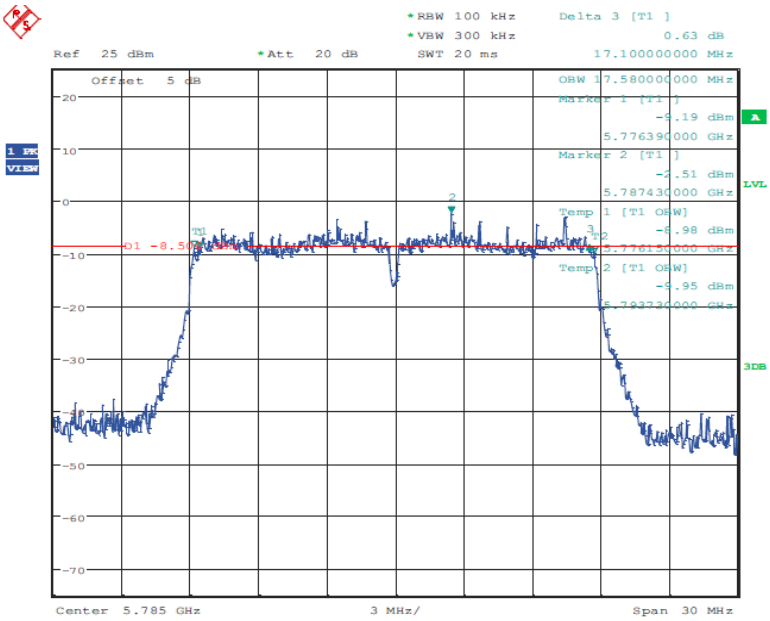
TestMode	Channel (MHz)	99%BW (MHz)	EBW (MHz)	Verdict
802.11a	5745MHz	16.47	16.380	Pass
802.11a	5785MHz	16.47	16.410	Pass
802.11a	5825MHz	16.47	16.410	Pass

3.5 Original Test Data

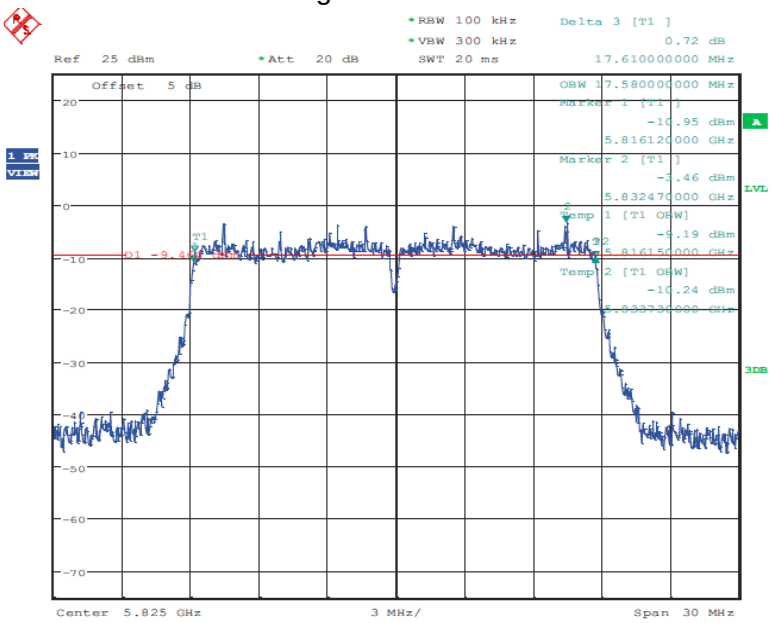
11a Low CH 5745MHZ



11a Middle CH 5785MHZ



11a High CH 5825MHZ



4 CONDUCTED OUTPUT POWER

4.1 limit

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices: 250mW (24dBm)	5150-5250
	For RSS: e.i.r.p. power: not exceed 200 mW(23dBm) or 10 + 10 log10 B	
	250mW (24dBm) or 11 + 10 log10 B	5250-5350
	250mW (24dBm) or 11 + 10 log10 B	For FCC:5470-5725 For IC:5470-5600 5650-5725
	1 Watt (30dBm)	5725-5850
Note: For ISED: B=99% bandwidth.		

4.2 test procedure

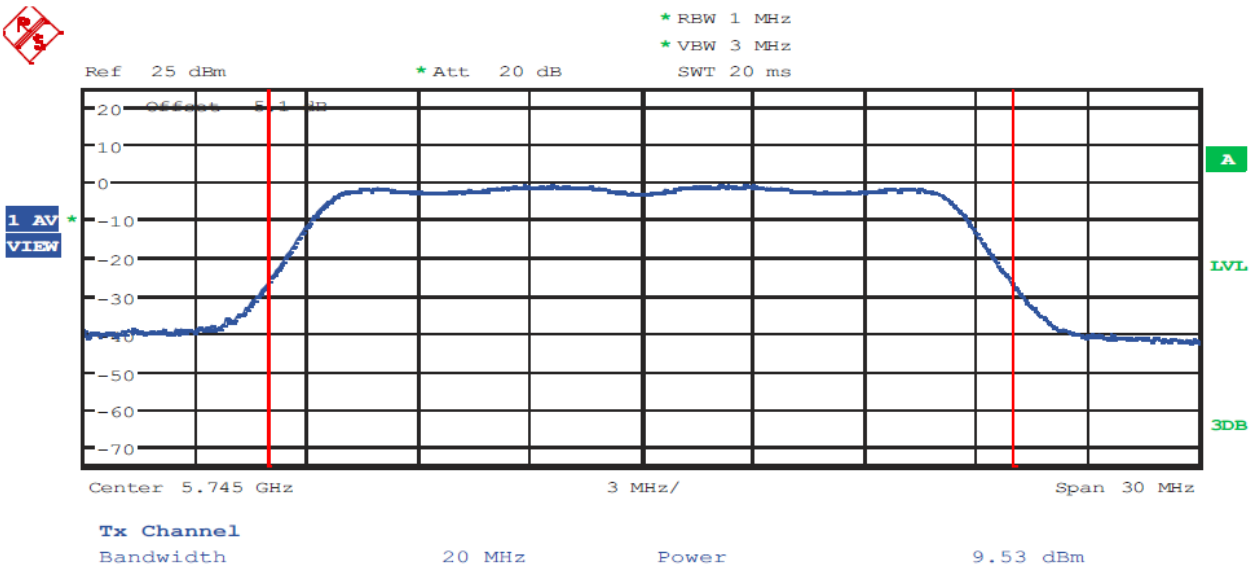
a. Connect each EUT's antenna output to Spectrum Analyzer by RF cable and attenuator
b. Get each antenna port's output power of EUT.

4.3 TEST SETUP

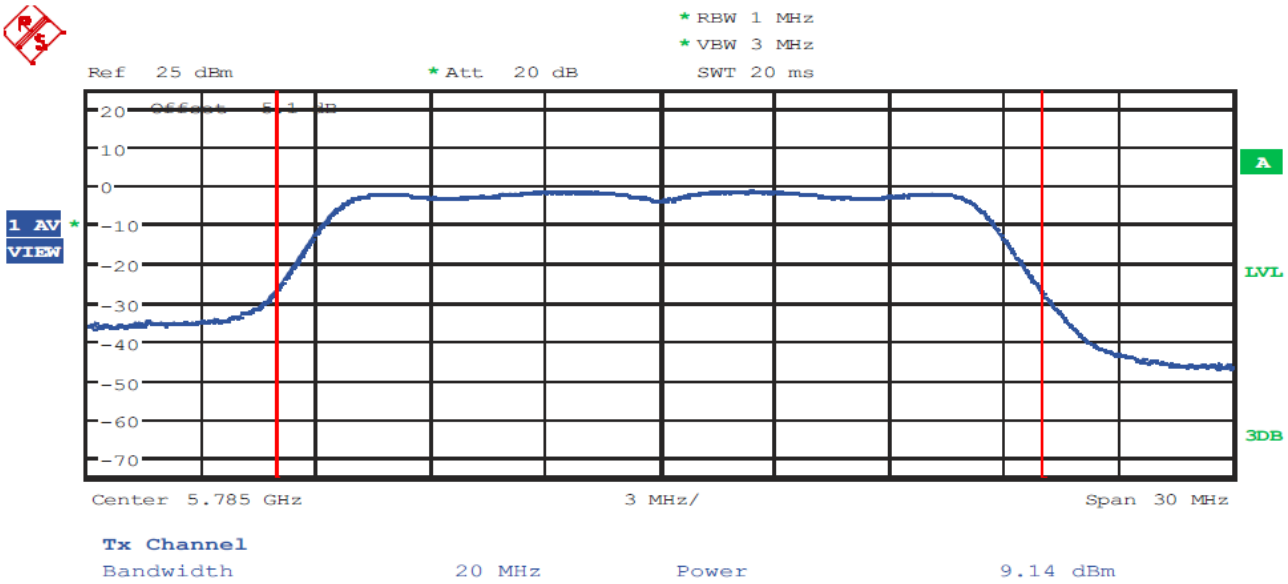
4.4 test results

TestMode	Channel (MHz)	Result（dBm）	Limit（dBm）	Verdict
802.11a	5475MHz	9.53	30	Pass
802.11a	5785MHz	9.14	30	Pass
802.11a	5825MHz	8.37	30	Pass

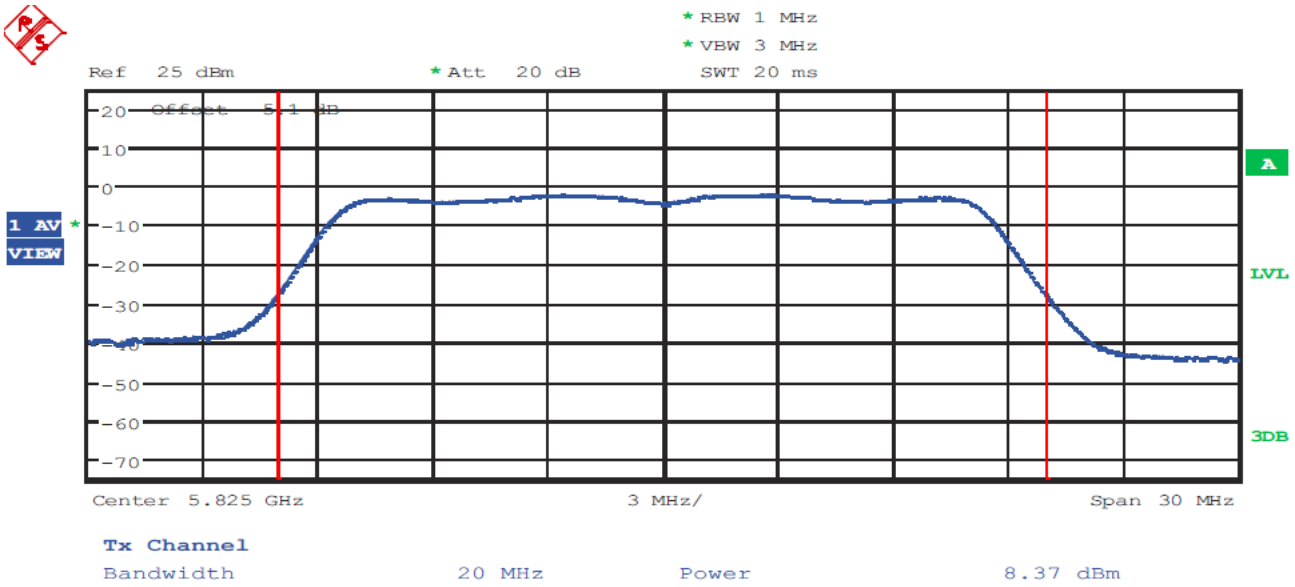
802.11a-Low CH



802.11a-Middle CH



802.11a-High CH



5. POWER SPECTRAL DENSITY

5.1 LIMIT

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250
	For RSS eirp:10dBm/MHz	
	11dBm/MHz	5250-5350
	11dBm/MHz	For FCC:5470-5725 For IC:5470-5600 5650-5725
	30dBm/500kHz	5725-5850

5.2 TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

Connect the UUT to the spectrum analyser and use the following settings:

5725MHz-5850MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Note:

1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v01, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.

2. The value measured with RBW=1MHz is to be added with 10log(500kHz/1MHz) which is - 3dB. For example, if the measured value is +10dBm using RBW=1MHz (that is +10dBm/MHz), then the converted value will be +7dBm/500kHz.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

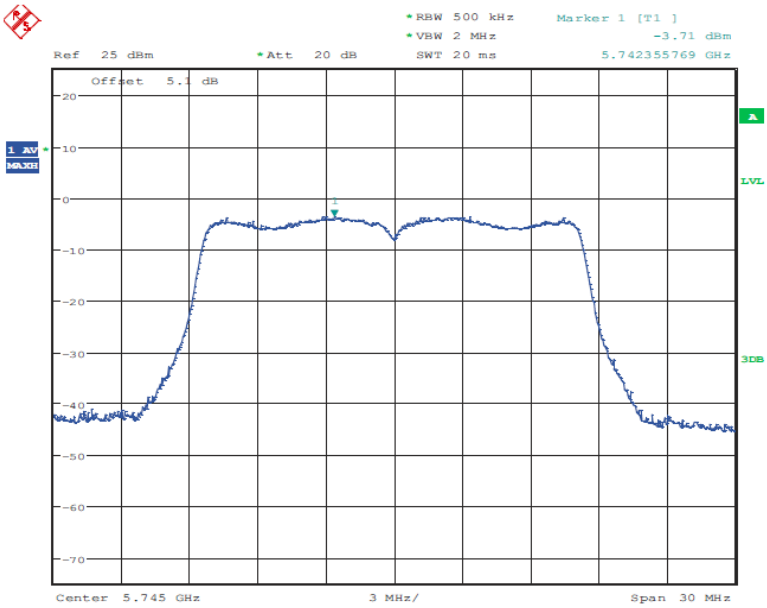
5.3 TEST SETUP

5.4 TEST RESULTS

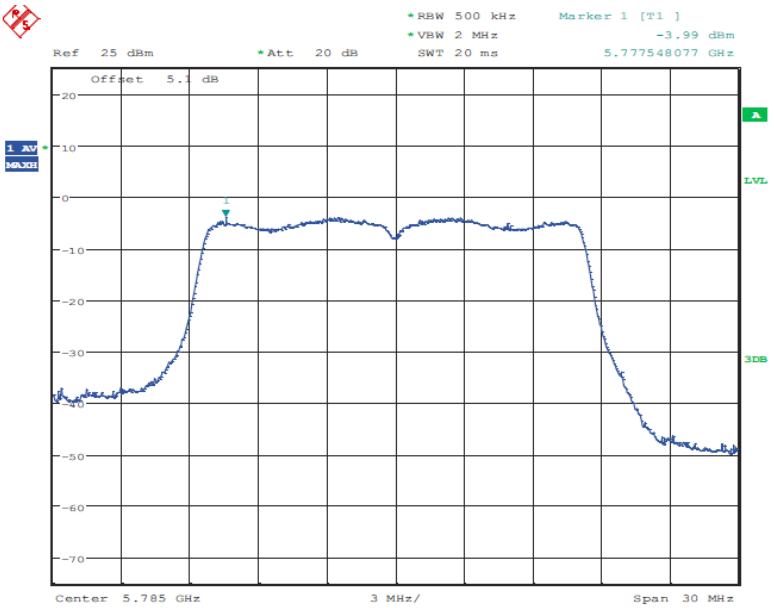
TestMode	Channel (MHz)	Result （dBm/MHz）	Limit dBm/MHz	Verdict
802.11a	5475MHz	-3.71	30.00dBm/500KHz	Pass
802.11a	5785MHz	-3.99	30.00dBm/500KHz	Pass
802.11a	5825MHz	-4.03	30.00dBm/500KHz	Pass

5.5 original test data

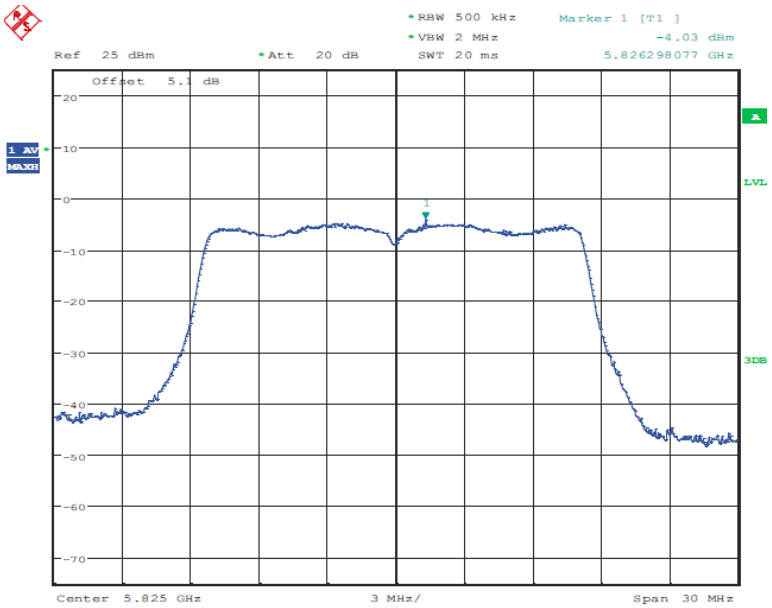
802.11a-5475MHz



802.11a-5785MHz



802.11a-5825MHz



6. FREQUENCY STABILITY MEASUREMENT

6.1 LIMIT

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual

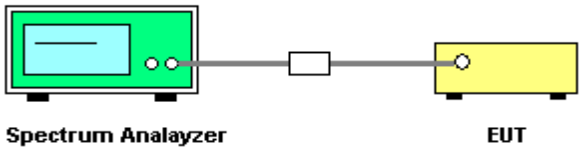
6.2 TEST PROCEDURE

(1) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

(2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.

(3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

6.3 TEST SETUP



6.4 TEST RESULTS

Voltage					
TestMode	Channel (MHz)	Voltage	Deviation (KHz)	Deviation (ppm)	Limit (ppm)
802.11a	5475MHz	NV	-75	-13.05483	20
		LV	-75	-13.05483	
		HV	-75	-13.05483	
	5785MHz	NV	-75	-12.964564	
		LV	-75	-12.964564	
		HV	-75	-12.964564	
	5825MHz	NV	-75	-12.875536	
		LV	-75	-12.875536	
		HV	-75	-12.875536	
Test result ： pass					

Remakr： NV-Nomal Votage
LV-Low Votage
HV-High Votage

Temperature					
TestMode	Channel (MHz)	Temperature (℃)	Deviation (KHz)	Deviation (ppm)	Limit (ppm)
802.11a	5475MHz	-30	-75	-13.05483	20
		-20	-75	-13.05483	20
		-10	-75	-13.05483	20
		0	-75	-13.05483	20
		10	-75	-13.05483	20
		20	-75	-13.05483	20
		30	-75	-13.05483	20
		40	-75	-13.05483	20
		50	-75	-13.05483	20
	5785MHz	-30	-75	-12.964564	20
		-20	-75	-12.964564	20
		-10	-75	-12.964564	20
		0	-75	-12.964564	20
		10	-75	-12.964564	20
		20	-75	-12.964564	20
		30	-75	-12.964564	20
		40	-75	-12.964564	20
		50	-75	-12.964564	20
	5825MHz	-30	-75	-12.875536	20
		-20	-75	-12.875536	20
		-10	-75	-12.875536	20
		0	-75	-12.875536	20
		10	-75	-12.875536	20
		20	-75	-12.875536	20
		30	-75	-12.875536	20
		40	-75	-12.875536	20
		50	-75	-12.875536	20
Test result ： pass					

7. Band edge

7.1 LIMIT

For transmitters operating in the 5.15-5.25 GHz and 5.725-5.85G band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

-27 dBm/MHz Limit=95.2+EIRP[dBm]=95.2-27=68.2 dBμV/m

7.2 TEST PROCEDURE

(1) EUT height should be 0.8m for below 1GHz at a semi□ anechoic chamber while EUT height should be 1.5m for above 1GHz at full chamber or semi□ anechoic chamber ground with absorbers

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna(18GHz-40GHz)	1m

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9kHz to 40GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it’s fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9kHz to 40GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9kHz to 30MHz and 18GHz to 40GHz, so below final test was performed with frequency range from 30MHz to 18GHz.

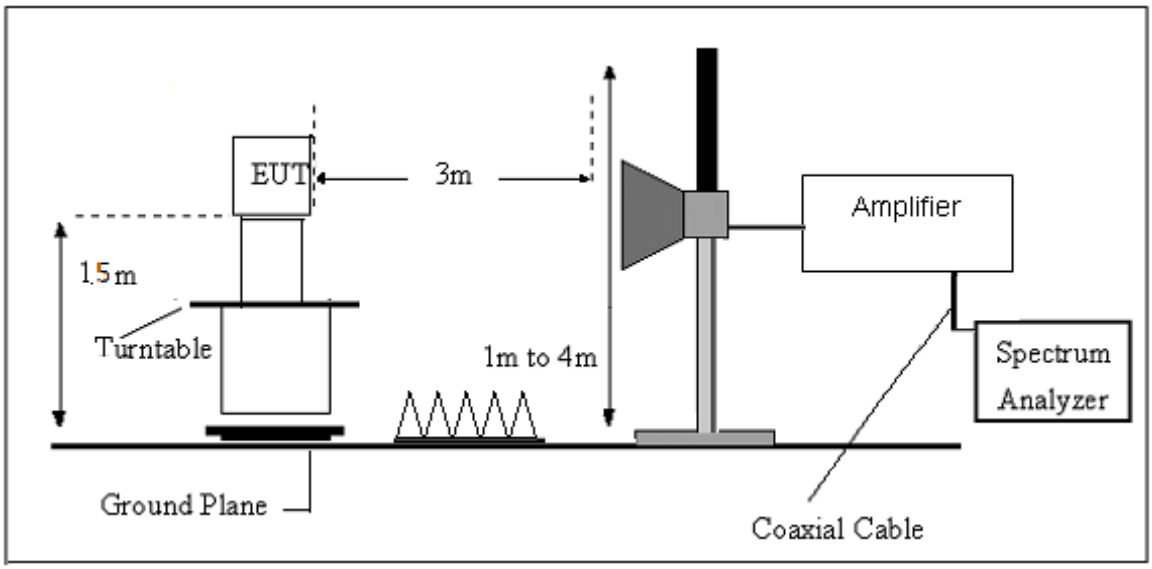
(6) The emissions from 9kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz, for emissions from 9kHz-90kHz,110kHz-490kHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit

(7) The emissions from 9kHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9kHz-150kHz	200Hz
150kHz-30MHz	9kHz
30MHz-1GHz	120kHz

(8) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz, Peak detector for Peak measure, RMS detector for AV value

7.3 TEST SETUP

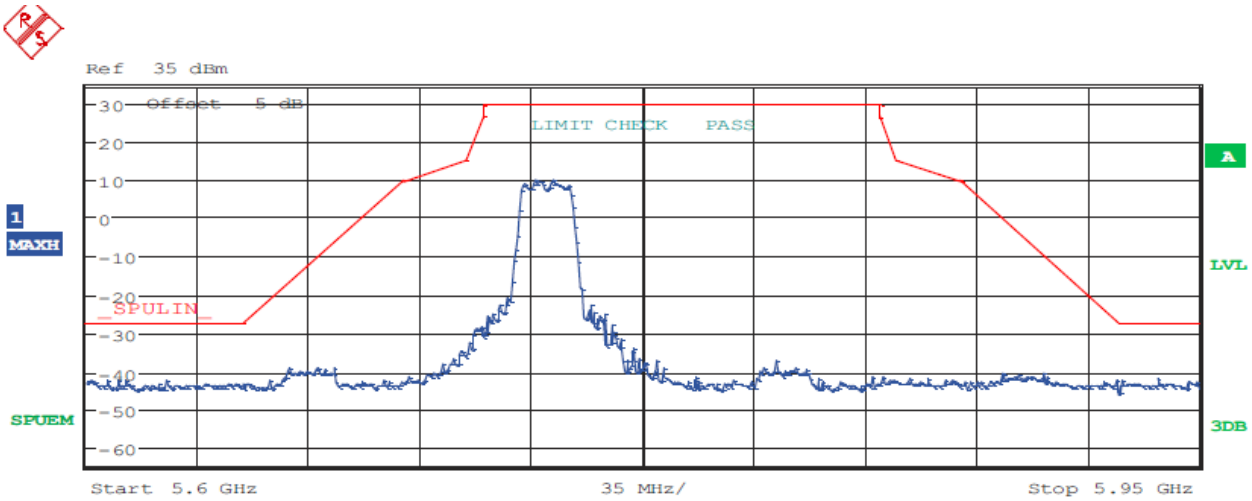


7.5 TEST RESULTS

Eut set mode	CH or Frequency	Result
802.11a	Low CH	Pass
	Middle CH	Pass
	High CH	Pass

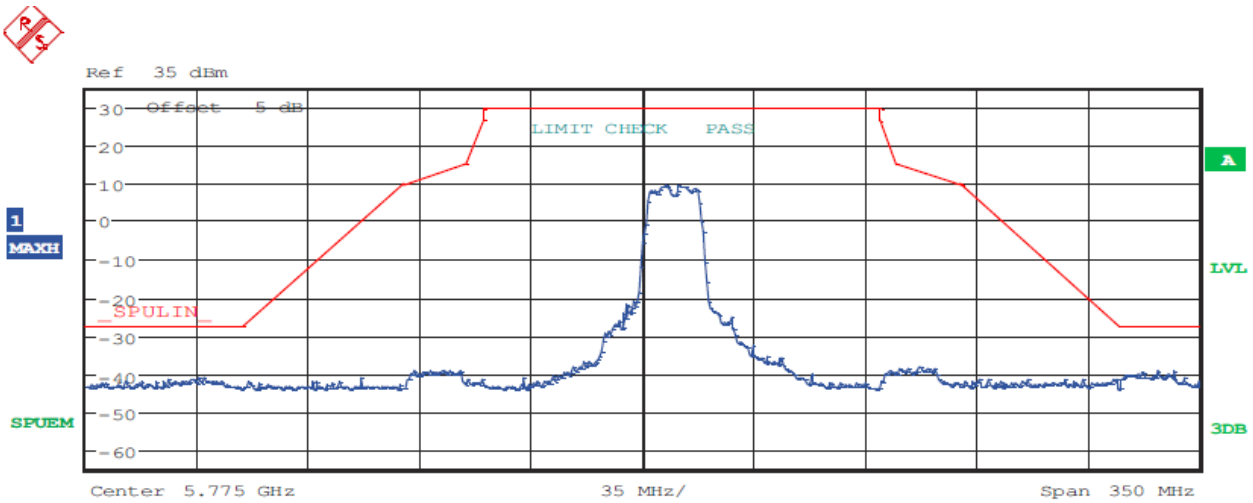
7.5 Original test data

LOW CH



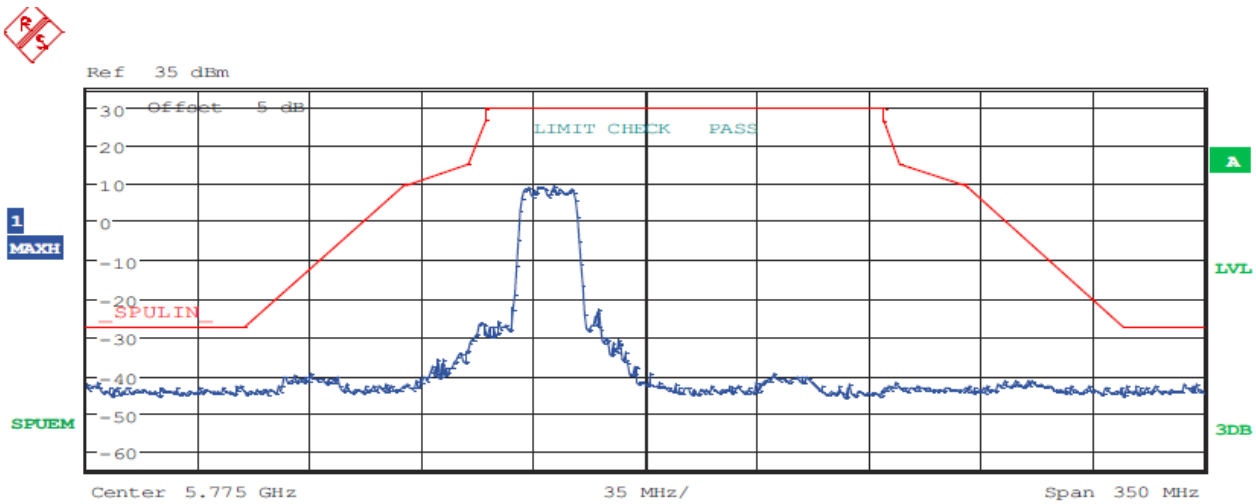
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.610094 G	-42.74	-15.74
5.650 G	5.700 G	1.00 M	5.650344 G	-43.60	-16.86
5.700 G	5.720 G	1.00 M	5.717775 G	-35.41	-50.38
5.720 G	5.725 G	1.00 M	5.720797 G	-32.89	-50.31
5.725 G	5.850 G	1.00 M	5.746719 G	9.73	-20.27
5.850 G	5.855 G	1.00 M	5.854772 G	-43.29	-59.41
5.855 G	5.875 G	1.00 M	5.872513 G	-42.64	-53.33
5.875 G	5.925 G	1.00 M	5.924750 G	-42.91	-16.09
5.925 G	5.950 G	1.00 M	5.937031 G	-42.40	-15.40

MIDDLE CH



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.635438 G	-41.28	-14.28
5.650 G	5.700 G	1.00 M	5.650875 G	-42.02	-15.66
5.700 G	5.720 G	1.00 M	5.703400 G	-39.61	-50.56
5.720 G	5.725 G	1.00 M	5.720216 G	-41.88	-57.97
5.725 G	5.850 G	1.00 M	5.782031 G	9.33	-20.67
5.850 G	5.855 G	1.00 M	5.854988 G	-40.75	-56.37
5.855 G	5.875 G	1.00 M	5.866763 G	-38.91	-51.22
5.875 G	5.925 G	1.00 M	5.924531 G	-41.79	-15.14
5.925 G	5.950 G	1.00 M	5.941937 G	-39.35	-12.35

High CH



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.603250 G	-42.40	-15.40
5.650 G	5.700 G	1.00 M	5.650344 G	-44.87	-18.13
5.700 G	5.720 G	1.00 M	5.710000 G	-36.12	-48.92
5.720 G	5.725 G	1.00 M	5.720428 G	-30.78	-47.36
5.725 G	5.850 G	1.00 M	5.746328 G	9.27	-20.73
5.850 G	5.855 G	1.00 M	5.854794 G	-43.79	-59.86
5.855 G	5.875 G	1.00 M	5.873900 G	-43.72	-54.03
5.875 G	5.925 G	1.00 M	5.924563 G	-43.72	-17.04
5.925 G	5.950 G	1.00 M	5.947922 G	-42.77	-15.77

8. Duty Cycle

8.1 TEST REQUIREMENT

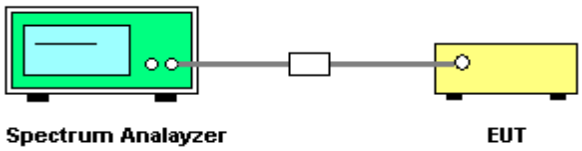
47 CFR Part 15C 15.407 and 789033 D02 General UNII Test Procedures New Rules v02r01(December 14, 2017), Section (B)

ANSI C63.10: 2013

8.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

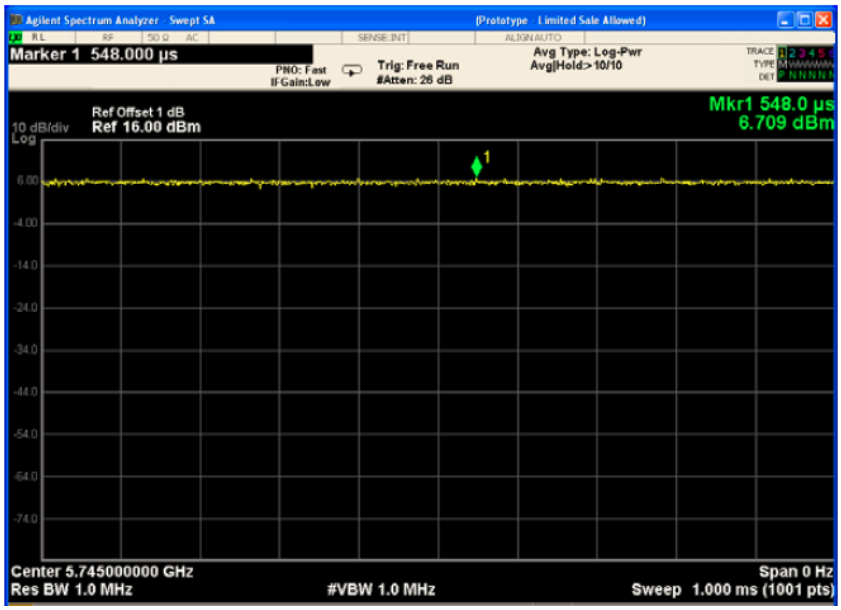
7.3 TEST SETUP



8.4 TEST RESULTS

Frequency	5745MHZ
On time(ms)	100
Period(ms)	100
Duty Cycle(%)	100

8.5 Original test data



9 RADIATED EMISSION MEASUREMENT

9.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/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

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz

9.2 TEST PROCEDURE

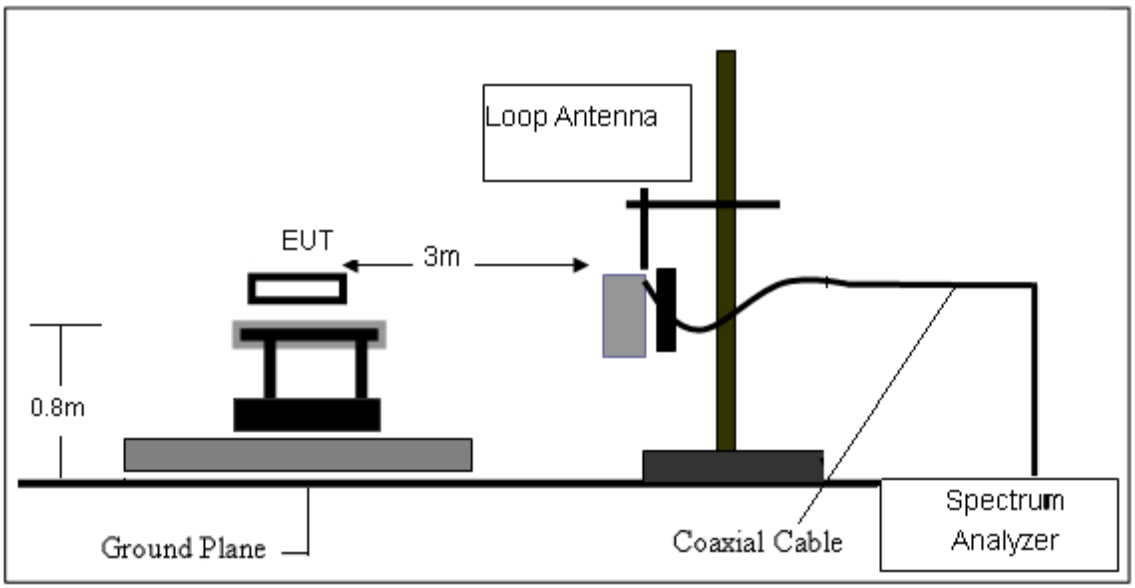
a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
d. 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 QuasiPeak detector mode re-measured.
e. 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.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

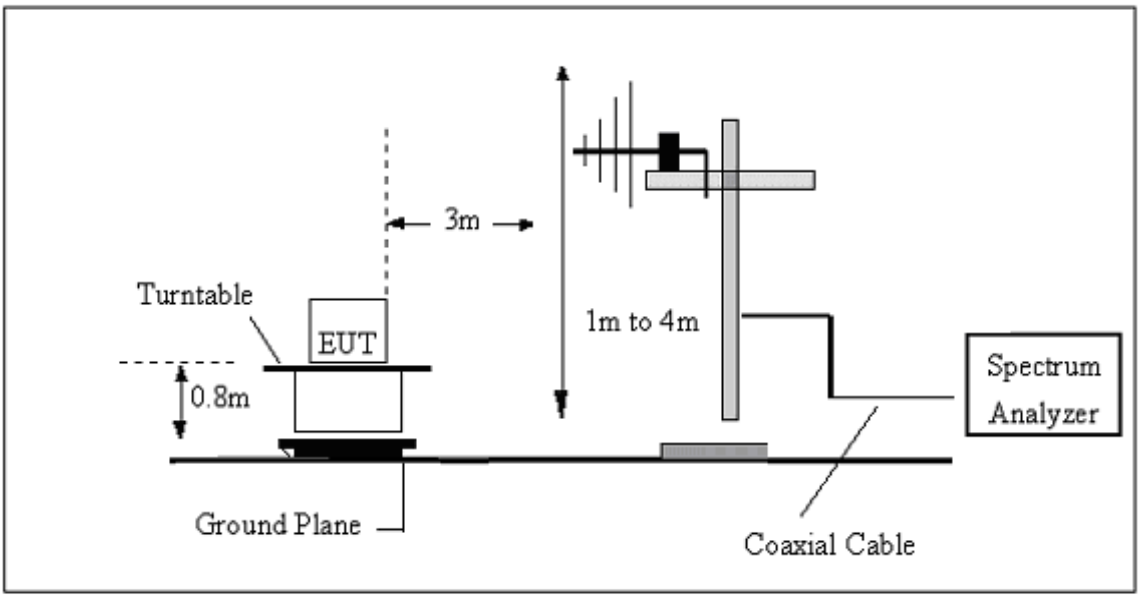
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

9.3 TESTSETUP

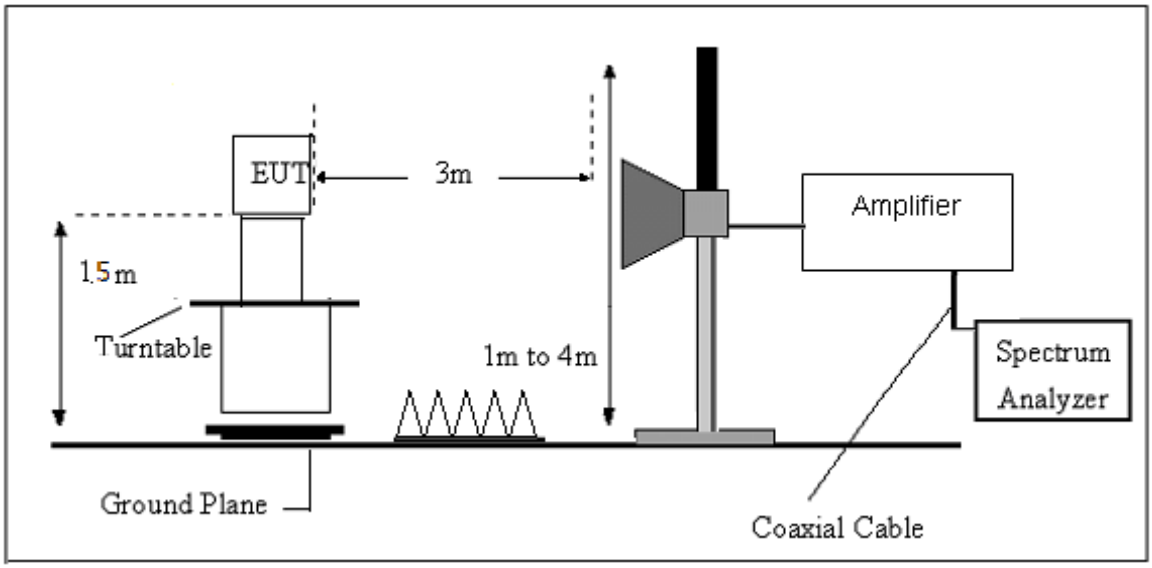
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



（C）Radiated Emission Test-Up Frequency Above 1GHz



9.4. TEST RESULTS

(9KHz-30MHz)

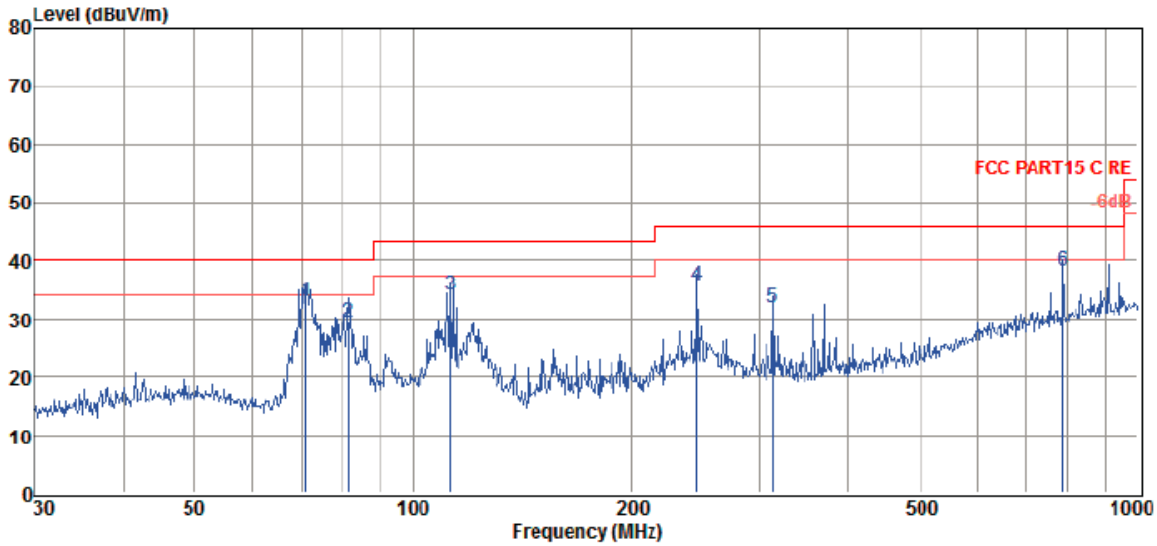
Temperature:	22.7℃	Relative Humidity:	61%
Test Voltage:	AC 120V/60HZ	Test Mode:	802.11 a(worst)

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F	Test Result
--	--	--	--	--	PASS
--	--	--	--	--	PASS

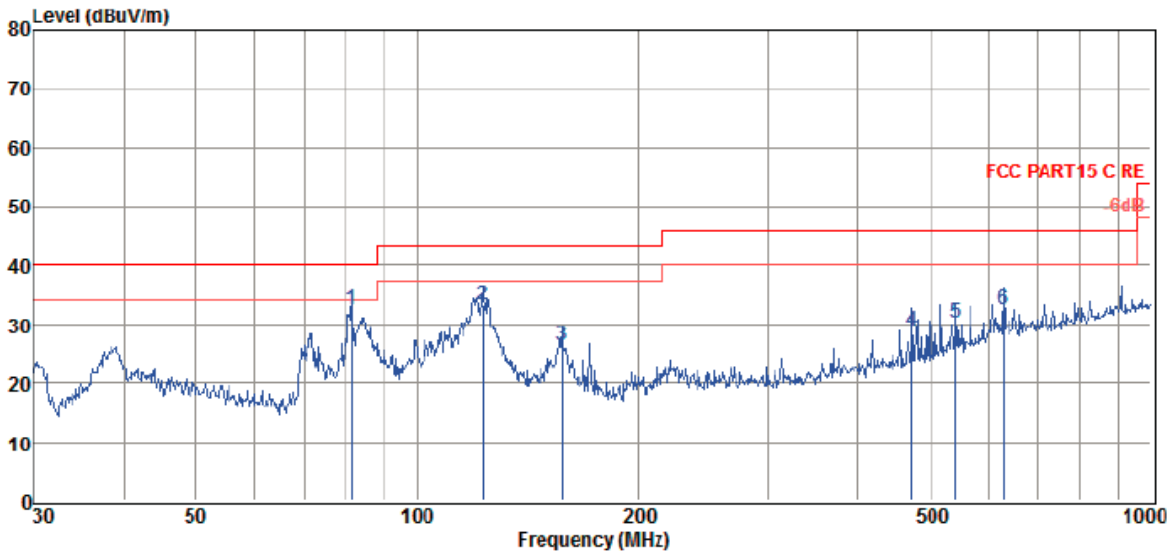
Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuv) + distance extrapolation factor.

(30MHz-1000MHz)

Temperature:	22.7℃	Relative Humidity:	61%
Test Voltage:	AC 120V/60HZ	Test Mode:	802.11 a(worst)



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	71.33	19.72	8.97	4.19	32.88	40.00	-7.12	QP	HORIZONTAL
2	81.50	17.27	7.88	4.26	29.41	40.00	-10.59	QP	HORIZONTAL
3	112.52	19.43	10.01	4.51	33.95	43.50	-9.55	QP	HORIZONTAL
4	246.82	18.00	12.43	5.28	35.71	46.00	-10.29	QP	HORIZONTAL
5	314.38	12.69	13.61	5.59	31.89	46.00	-14.11	QP	HORIZONTAL
6	787.85	9.70	21.12	7.28	38.10	46.00	-7.90	QP	HORIZONTAL



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	81.50	20.43	7.88	4.26	32.57	40.00	-7.43	QP	VERTICAL
2	122.83	19.83	8.93	4.59	33.35	43.50	-10.15	QP	VERTICAL
3	157.56	13.12	8.46	4.81	26.39	43.50	-17.11	QP	VERTICAL
4	472.18	6.37	16.91	5.48	28.76	46.00	-17.24	QP	VERTICAL
5	541.37	6.11	18.33	5.91	30.35	46.00	-15.65	QP	VERTICAL
6	629.48	6.09	19.49	6.78	32.36	46.00	-13.64	QP	VERTICAL

(1MHz~40GHz) Restricted band and Spurious emission Requirements

Freq (MHz)	Read level (dBμV)	Antenna Factor (dB/m)	PRM Factor(dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector type	Polarization
11a CH149									
4213.00	47.30	33.22	44.27	6.79	43.04	68.20	-25.16	Peak	HORIZONTAL
5964.00	46.11	35.69	43.22	8.19	46.77	68.20	-21.43	Peak	HORIZONTAL
7732.00	44.98	37.09	43.72	8.99	47.34	68.20	-20.86	Peak	HORIZONTAL
9092.00	44.32	37.54	44.13	10.42	48.15	68.20	-20.05	Peak	HORIZONTAL
10248.00	47.12	38.35	44.36	10.93	52.04	68.20	-16.16	Peak	HORIZONTAL
12679.00	44.84	38.98	44.27	11.23	50.78	68.20	-17.42	Peak	HORIZONTAL
4009.00	48.84	32.53	44.39	6.59	43.57	68.20	-24.63	Peak	VERTICAL
6219.00	44.38	35.70	43.27	8.24	45.05	68.20	-23.15	Peak	VERTICAL
8650.00	44.48	37.36	43.99	9.97	47.82	68.20	-20.38	Peak	VERTICAL
10452.00	46.84	38.47	44.33	10.97	51.95	68.20	-16.25	Peak	VERTICAL
12747.00	45.40	39.05	44.29	11.25	51.41	68.20	-16.79	Peak	VERTICAL
14141.00	43.28	40.42	44.55	12.43	51.58	68.20	-16.62	Peak	VERTICAL
11a CH157									
4808.00	47.18	34.69	43.92	7.39	45.34	68.20	-22.86	Peak	HORIZONTAL
6423.00	44.67	35.70	43.33	8.26	45.30	68.20	-22.90	Peak	HORIZONTAL
7834.00	44.26	37.13	43.75	9.08	46.72	68.20	-21.48	Peak	HORIZONTAL
9500.00	46.52	37.70	44.25	10.63	50.60	68.20	-17.60	Peak	HORIZONTAL
11608.00	44.03	38.66	44.16	11.01	49.54	68.20	-18.66	Peak	HORIZONTAL
12832.00	45.25	39.13	44.31	11.29	51.36	68.20	-16.84	Peak	HORIZONTAL
5165.00	45.94	35.17	43.70	7.68	45.09	68.20	-23.11	Peak	VERTICAL
6831.00	45.09	36.43	43.45	8.31	46.38	68.20	-21.82	Peak	VERTICAL
8055.00	45.86	37.21	43.82	9.29	48.54	68.20	-19.66	Peak	VERTICAL
9262.00	44.95	37.60	44.18	10.51	48.88	68.20	-19.32	Peak	VERTICAL
11829.00	45.04	38.80	44.13	10.99	50.70	68.20	-17.50	Peak	VERTICAL
12934.00	43.85	39.23	44.33	11.32	50.07	68.20	-18.13	Peak	VERTICAL
11a CH165									
4468.00	46.99	34.09	44.12	7.05	44.01	68.20	-24.19	Peak	HORIZONTAL
6355.00	45.29	35.70	43.31	8.25	45.93	68.20	-22.27	Peak	HORIZONTAL
7511.00	44.20	37.00	43.65	8.79	46.34	68.20	-21.86	Peak	HORIZONTAL
9398.00	44.89	37.66	44.22	10.58	48.91	68.20	-19.29	Peak	HORIZONTAL
11778.00	43.81	38.77	44.13	10.99	49.44	68.20	-18.76	Peak	HORIZONTAL
13937.00	43.46	39.97	44.58	12.30	51.15	68.20	-17.05	Peak	HORIZONTAL
4604.00	46.96	34.37	44.04	7.18	44.47	68.20	-23.73	Peak	VERTICAL
5590.00	45.50	35.54	43.45	7.95	45.54	68.20	-22.66	Peak	VERTICAL
7018.00	45.06	36.81	43.51	8.35	46.71	68.20	-21.49	Peak	VERTICAL
8327.00	43.75	37.27	43.90	9.60	46.72	68.20	-21.48	Peak	VERTICAL
9313.00	44.19	37.63	44.19	10.53	48.16	68.20	-20.04	Peak	VERTICAL
11761.00	44.92	38.76	44.14	10.99	50.53	68.20	-17.67	Peak	VERTICAL

Note:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

10 CONDUCTED EMISSION TEST

10.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (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.

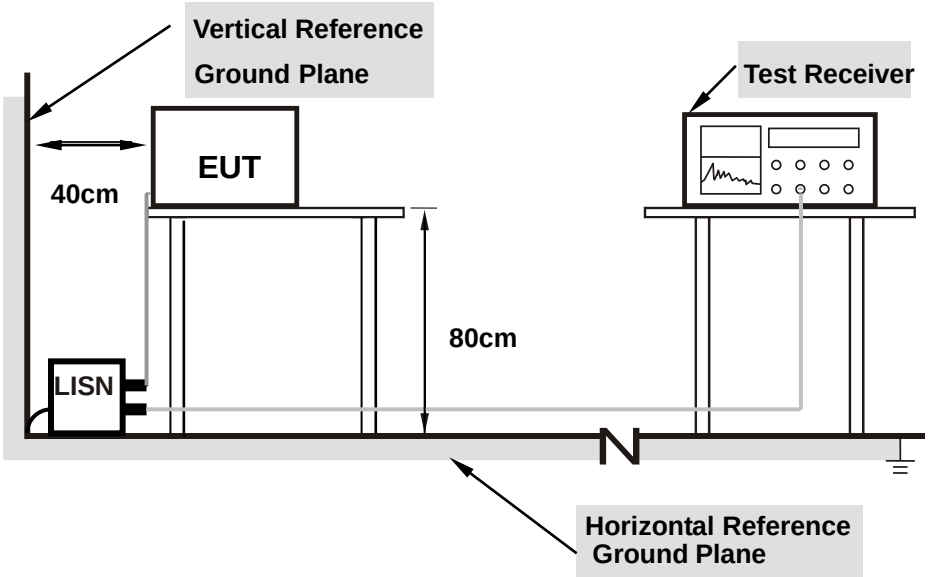
The following table is the setting of the receiver

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

10.2 TEST PROCEDURE

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments 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.

10.3 TEST SETUP



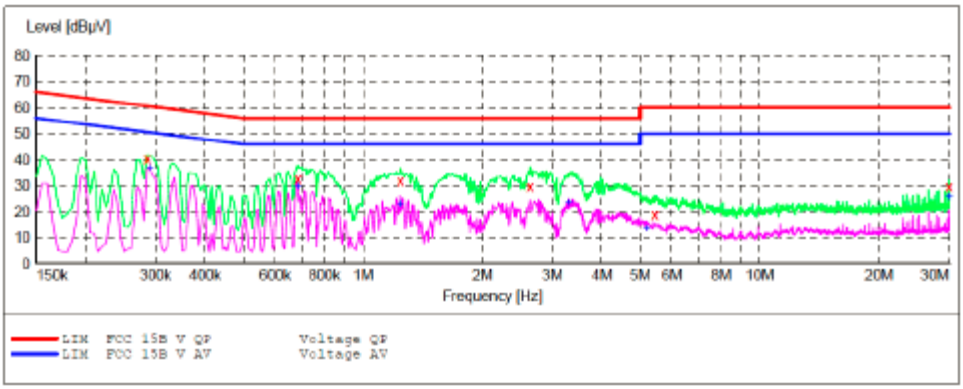
Note: 1.Support units were connected to second LISN.

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

10 .4 TEST RESULT

Temperature:	22.1 ℃	Relative Humidity:	56%
Test Voltage:	120V/60HZ	Phase:	L/N
Test Mode:	ON		

L-line



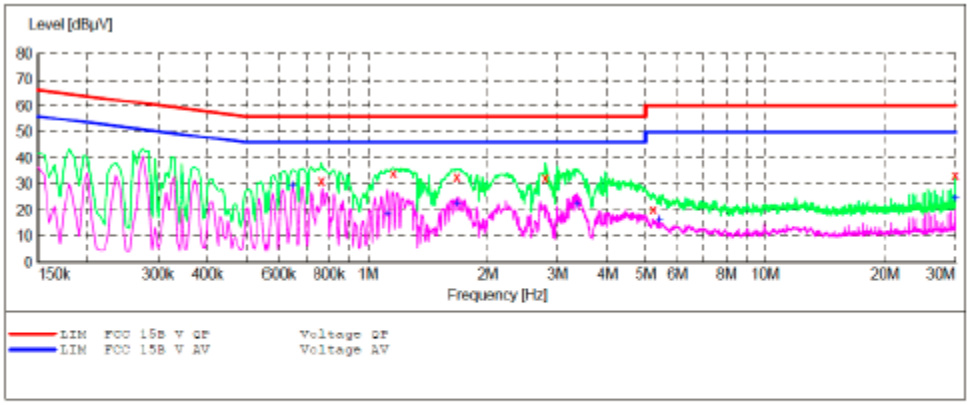
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.285000	40.10	10.6	60.7	20.6	QP	L1	GND
0.685000	32.50	10.8	56	23.5	QP	L1	GND
1.245000	31.70	10.9	56	24.3	QP	L1	GND
2.640000	29.80	11.0	56	26.2	QP	L1	GND
5.450000	18.90	11.2	60	41.1	QP	L1	GND
30.000000	29.80	11.5	60	30.2	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	37.10	10.6	50.5	13.4	AV	L1	GND
0.685000	30.00	10.8	46	16.0	AV	L1	GND
1.240000	23.00	10.9	46	23.0	AV	L1	GND
3.300000	23.60	11.1	46	22.4	AV	L1	GND
5.180000	13.70	11.2	50	36.3	AV	L1	GND
30.000000	25.60	11.5	50	24.4	AV	L1	GND

N-line



MEASUREMENT RESULT :

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.765000	31.00	10.8	56	25.0	QP	N	GND
1.160000	34.00	10.9	56	22.0	QP	N	GND
1.675000	32.70	10.9	56	23.3	QP	N	GND
2.800000	32.20	11.0	56	23.8	QP	N	GND
5.210000	20.20	11.2	60	39.8	QP	N	GND
30.000000	33.30	11.5	60	26.7	QP	N	GND

MEASUREMENT RESULT :

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.645000	29.80	10.8	46	16.2	AV	N	GND
1.120000	18.80	10.9	46	27.2	AV	N	GND
1.675000	22.80	10.9	46	23.2	AV	N	GND
3.360000	22.50	11.1	46	23.5	AV	N	GND
5.410000	16.50	11.2	50	33.5	AV	N	GND
30.000000	24.60	11.5	50	25.4	AV	N	GND

11. ANTENNA REQUIREMENT

11.1 STANDARD REQUIREMENT

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2 RESULT

The antennas used for this product are PIFA antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.5.dBi.

※※※※※END OF THE REPORT※※※※※