

FCC/IC

RF

TEST REPORT

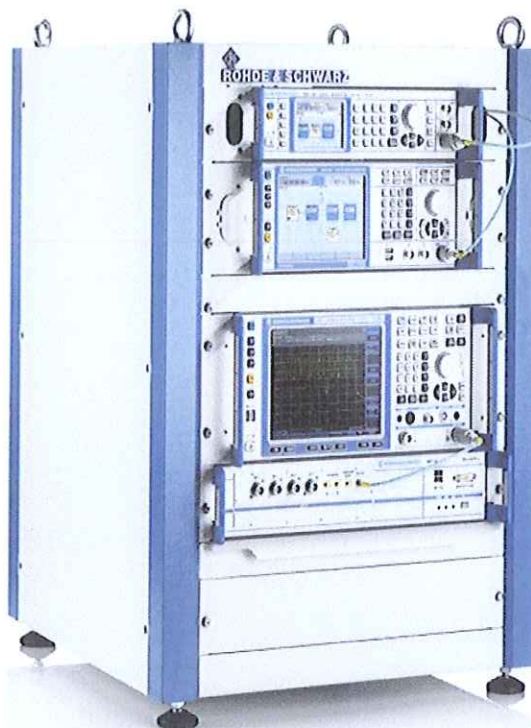
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Portable Tablet Computer

ISSUED TO
LENOVO (SHANGHAI) ELECTRONICS TECHNOLOGY CO
LTD

NO 68 BUILDING 199 FENJU RD, CHINA (SHANGHAI) PILOT FREE
TRADE ZONE, SHANGHAI, 200131 CHINA



Tested by:

Cao Shaocong
(Engineer)

Date Mar. 2, 2016

Approved by:

Liao Jianming
(Technical Director)

Date Mar. 2, 2016

Report No.: BL-SZ1610062-604

EUT Type: Portable Tablet Computer

Model Name: Lenovo TB3-X70F

Brand Name: Lenovo

Test Standard: 47 CFR Part 15 Subpart C
RSS-210 (Issue 8, December 2010)

FCC ID: O57TB3X70F

IC Number: 10407A-TB3X70F

Test conclusion: Pass

Test Date: Jan. 20, 2016 ~ Feb. 5, 2016

Date of Issue: Mar. 2, 2016

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Feb. 2, 2016	Initial Issue
Rev. 02	Feb. 5, 2016	The Second Issue
Rev. 03	Mar. 2, 2016	The Third Issue

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20 to 25°C
Ambient Relative Humidity	45% - 55%
Ambient Pressure	100 kPa - 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.1.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	LENOVO (SHANGHAI) ELECTRONICS TECHNOLOGY CO LTD
Address	NO 68 BUILDING 199 FENJU RD, CHINA (SHANGHAI) PILOT FREE TRADE ZONE, SHANGHAI, 200131 CHINA

2.2 Manufacturer Information

Manufacturer	Lenovo PC HK Limited.
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

2.3 Factory Information

Factory 1	BYD Precision Manufacture Co., Ltd.
Address 1	No.3001, Baohe Road, Baolong Industrial, Longgang, Shenzhen, P.R. China
Factory 2	Motorola (Wuhan) Mobility Technologies Communication Co., Ltd
Address 2	No.19, Gaoxin 4th Road, Wuhan East Lake High-tech Zone, Wuhan, China
Factory 3	Dong Guan Huabel Electronic Technology Co., Ltd
Address 3	No.9 Industrial Northern Road, National High-Tech Industrial Development Zone, SongShan Lake, Dong Guan City, China

2.4 General Description for Equipment under Test (EUT)

EUT Type	Portable Tablet Computer	
Model Name Under Test	Lenovo TB3-X70F	
Series Model Name	N/A	
Description of Model name differentiation	N/A	
Hardware Version	A6604_MB_PCB_V2.0	
Software Version	TB3-X70F_160108	
Dimensions (Approx.)	247.4 mm × 171.5 mm × 9.4 mm	
Weight (Approx.)	500 g(with battery)	
Network and Wireless connectivity	Bluetooth 3.0, Bluetooth 4.0 Low Energy (BLE), WIFI 802.11a,802.11b, 802.11g and 802.11n (HT20/40), 802.11ac, GPS, GLONASS, NFC	
EUT	Hardware	Manufacturer
Configuration A	LCD display	BOE TECHNOLOGY GROUP CO., LTD.
	Battery	Sunwoda Electronic Co.,Ltd.
Configuration B	LCD display	Innolux corporation
	Battery	SCUD (Fujian) Electronics Co.,Ltd.

Note: The EUT have two sample which Configuration A is OF display with XWD battery and Configuration B is AUO display with ATL battery), the internal structure and circuit electrical parameters are the same; but the LCD display and battery are different. All of them were tested in this report, the Configuration A sample as the main for tested and the Configuration B sample as confirmatory test. In Spurious Emissions test, only the Configuration A + C-P35 (HUNTKEY) and Configuration B + C-P35 (Acbel) were shown in this report.

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery 1	
	Brand Name	Lenovo
	Model No.	L14D2P31
	Serial No.	N/A
	Capacitance	7000 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.35 V
	Manufacturer	Sunwoda Electronic Co. Ltd
Ancillary Equipment 2	Battery 2	
	Brand Name	Lenovo
	Model No.	L14D2P31
	Serial No.	N/A
	Capacitance	7000 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	SCUD (Fujian) Electronics Co., Ltd.
Ancillary Equipment 3	Charger 1	
	Brand Name	Lenovo
	Model Name	C-P35
	Rated Input	100-240 V ~, 50/60 Hz, 0.5 A
	Rated Output	5.2 V =, 2.0 A
	Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO LTD
Ancillary Equipment 4	Charger 2	
	Brand Name	Lenovo
	Model Name	C-P35
	Rated Input	100-240 V ~, 50/60 Hz, 0.3 A
	Rated Output	5.2 V =, 2.0 A
	Manufacturer	Acbel Polytech Inc.
Ancillary Equipment 5	USB Cable 1 ^{Note 1}	
	Length(Approx.)	102 cm
	Manufacturer	SHIN AN WIRE&CABLE CO., LTD.
Ancillary Equipment 6	USB Cable 2 ^{Note 1}	
	Length(Approx.)	102 cm
	Manufacturer	SAIBO ELECTRON TECHNOLOGY (HK) CO., LTD.

Note 1: There tow USB cable only the manufacturer is different. All the USB cable were tested, but only the USB cable 1 was shown in this report.

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Modulation Type	ASK
Frequency Range	13.56 MHz
Receiver Categorization	3
Number of channel	1
Tested Channel	1
Antenna Gain	0 dBi
Antenna Type	FPC Antenna
About the Product	The equipment is portable tablet computer, intended for used with information technology equipment. Only NFC was tested in this report.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-14 Edition)	Intentional Radiators
2	RSS-210 (Issue 8, December 2010)	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
3	IC RSS-Gen (Issue 4, Nov. 2014)	General Requirements for Compliance of Radio Apparatus
4	ANSI C63.4-2014	American National Standard for Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	IC Part No	Test Result	Verdict
1	Antenna Requirement	15.203	N/A	--	Pass ^{Note 1}
2	Emissions Bandwidth	2.1049	N/A	ANNEX A.1	Pass
3	Field Strength of Fundamental Emissions	15.225(a)	RSS-210, A.6	ANNEX A.2	Pass
4	Radiated Emissions	15.225(d) 15.209	RSS-Gen, 8.9	ANNEX A.3	Pass
5	Frequency Stability	15.225(e)	RSS-210, A.6	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-Gen, 8.8	ANNEX A.5	Pass

Note 1: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	3.8 V

4.2 Test Equipment List

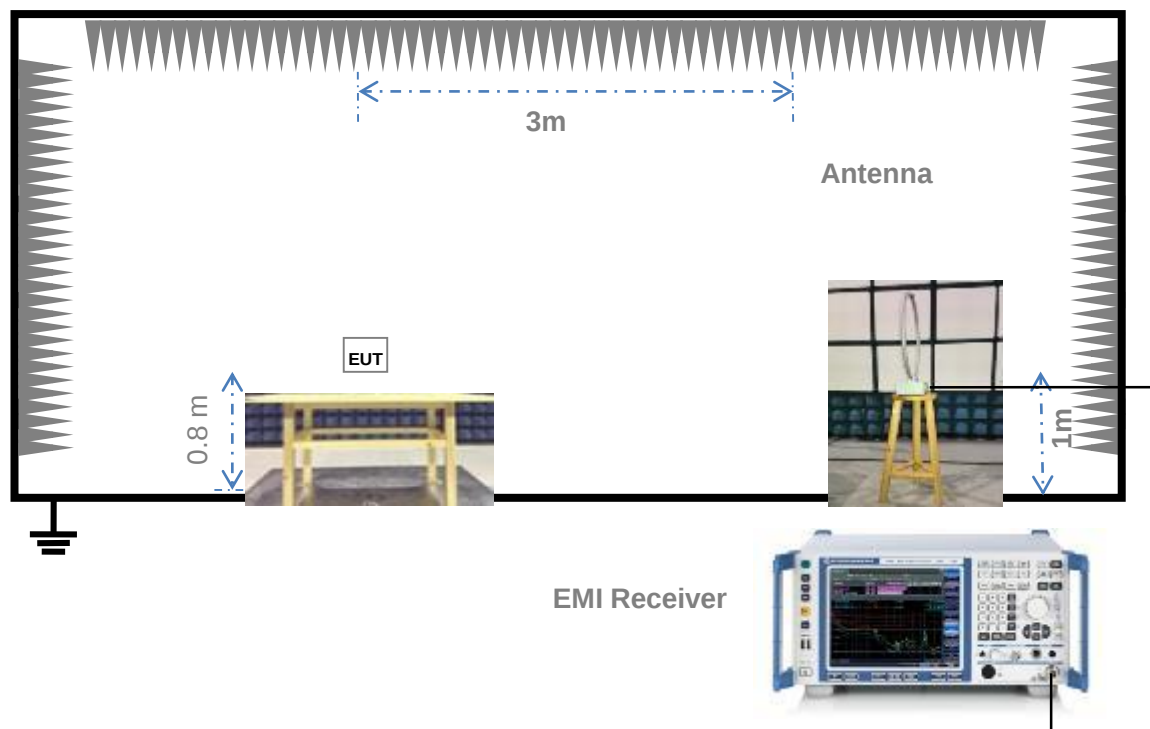
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2015.07.16	2016.07.15
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	177746	2015.07.16	2016.07.15
Signal Generator	ROHDE&SCHWARZ	SMB100A	260592	2015.07.16	2016.07.15
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2015.07.16	2016.07.15
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2015.10.15	2016.10.14
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2015.07.14	2016.07.13
LISN	SCHWARZBECK	NSLK 8127	8127-687	2015.07.14	2016.07.13
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2015.07.16	2016.07.15
Power Splitter	KMW	DCPD-LDC	1305003215	2015.07.01	2016.06.30
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2015.07.21	2016.07.20
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2015.07.17	2016.07.16
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2015.11.20	2016.11.19
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2016.02.27
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

4.3 Test Configurations

Test Configurations (TC) NO.	Description	
	Signal Description	Operating Frequency
Transmitter		
TC01	ASK	13.56 MHz

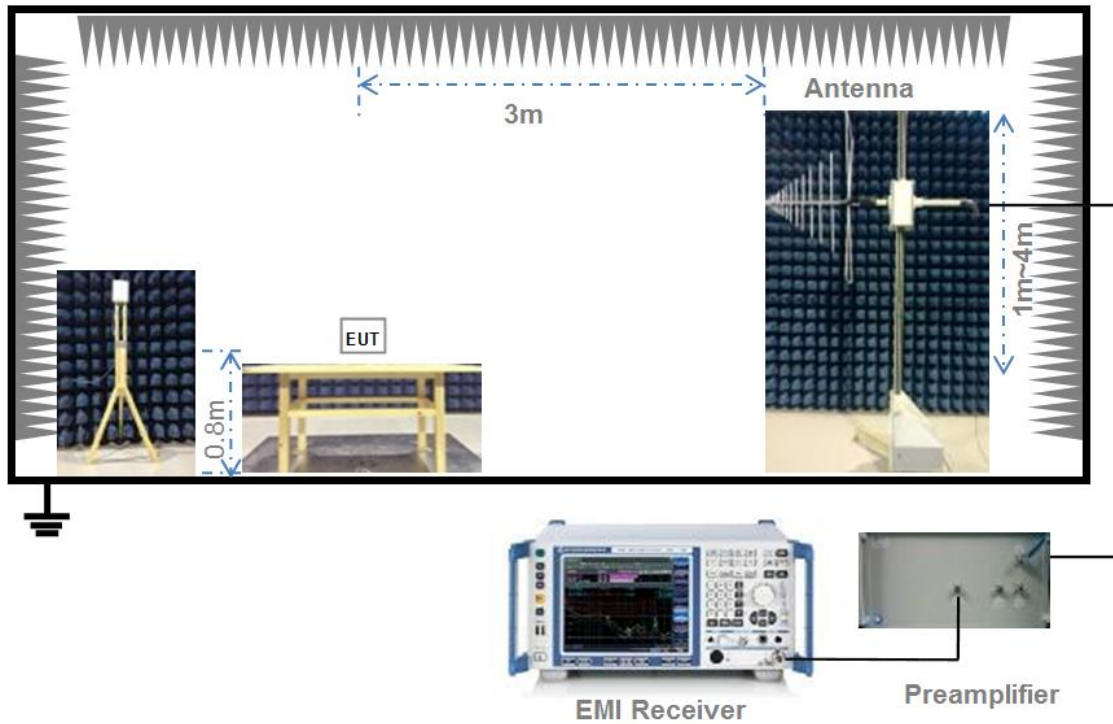
4.4 Description of Test Setup

4.4.1 For Radiated Test (Below 30 MHz)



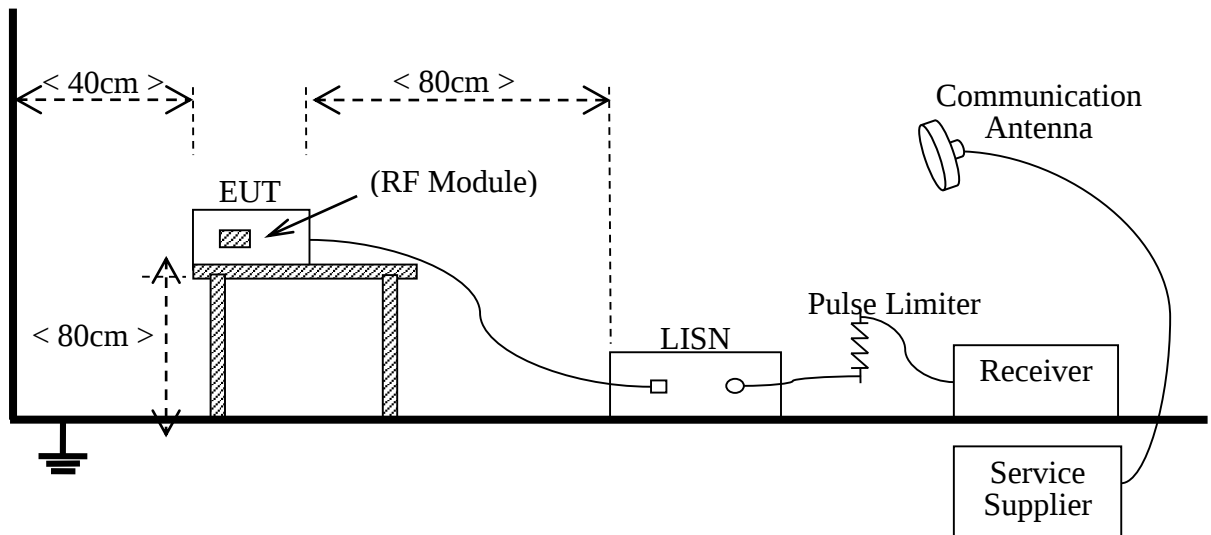
(Diagram 1)

4.4.2 For Radiated Test (30 MHz-1 GHz)



(Diagram 2)

4.4.3 For AC Power Supply Port Test



(Diagram 3)

4.5 Test Conditions

Test Case	Test Conditions		
	Test Env.	Test Setup ^{Note 1}	Test Configuration ^{Note 2}
Emissions Bandwidth	NTNV	Test Setup 1	TC01
Field Strength of Fundamental Emissions	NTNV	Test Setup 1	TC01
Radiated Emissions	NTNV	Test Setup 1 Test Setup 2	TC01
Frequency Stability	NTNV	Test Setup 1	TC01
Conducted Emission	NTNV	Test Setup 3	TC01
Note: 1. Please refer to section 4.4 for test setup details. 2. Please refer to section 4.3 for test configuration details.			

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Standard Applicable

FCC §15.203 & 15.247(b)

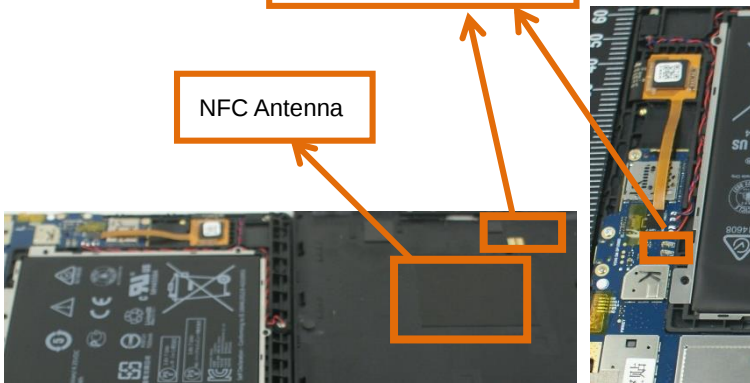
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is An embedded-in	An embedded-in antenna design is used.

Reference Documents	Item
Photo	NFC Antenna feed point NFC Antenna 

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Emission Bandwidth

5.2.1 Definition

FCC §2.1049&15.215(c)

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency.

5.2.2 Test Setup

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth

RBW $\geq$ 1% of the 20 dB bandwidth

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.2.4 Test Result

Please refer to ANNEX A.1

5.3 Field Strength of Fundamental Emissions and Radiated Emissions

5.3.1 Limit

FCC §15.225(a), (b), (c) and §15.31(f)(2)

RSS-210, A2.6

According to FCC section 15.225, for <30 MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 KHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT)

There was no detected Restricted bands and Radiated suprious emission below 30MHz. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows; 3 m Limit(dBuV/m) = $20\log(X)+40\log(30/3)= 20\log(15848)+40\log(30/3) = 124\text{dBuV}$

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FCC Limit:

Frequency range (MHz)	Field Strength@30m		Field Strength@3m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
Below 13.110	Not exceed the general radiated emission limits in §15.209		
13.110 ~ 13.410	106	40.5	80.5
13.410 ~ 13.553	334	50.5	90.5
13.553 ~13.567	15848	84	124
13.567 ~ 13.710	334	50.5	90.5
13.710 ~14.010	106	40.5	80.5
Above 14.010	Not exceed the general radiated emission limits in §15.209		

IC Limit:

Frequency range (MHz)	Field Strength@30m		Field Strength@3m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
Below 13.110	30	29.5	69.5
13.110 ~ 13.410	106	40.5	80.5
13.410 ~ 13.553	334	50.5	90.5
13.553 ~13.567	15848	84	124
13.567 ~ 13.710	334	50.5	90.5
13.710 ~14.010	106	40.5	80.5
Above 14.010	30	29.5	69.5

NOTE:

- Field Strength ($\text{dB}\mu\text{V/m}$) = $20*\log[\text{Field Strength } (\mu\text{V/m})]$.
- In the emission tables above, the tighter limit applies at the band edges.

At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

FCC §15.225(d)

RSS-Gen,8.9

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)
0.009 - 0.490	2400/F(kHz)
0.490 - 1.705	24000/F(kHz)
1.705 - 30.0	30
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Note:

- For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.3.2 Test Setup

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented. The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.3.4 Test Result

Please refer to ANNEX A.2, A.3.

5.4 Frequency Tolerance

5.4.1 Limit

FCC §15.225(e)&RSS-210, A2.6

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.4.2 Test Setup

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

5.4.4 Test Result

Please refer to ANNEX A.4.

5.5 Conducted Emission

5.5.1 Limit

FCC §15.207

RSS-Gen, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.5.2 Test Setup

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

5.5.4 Test Result

Please refer to ANNEX A.5.

ANNEX A TEST RESULT

A.1 Emission Bandwidth

Test Data

CONFIGURATION A+ C-P35 (HUNTKEY)

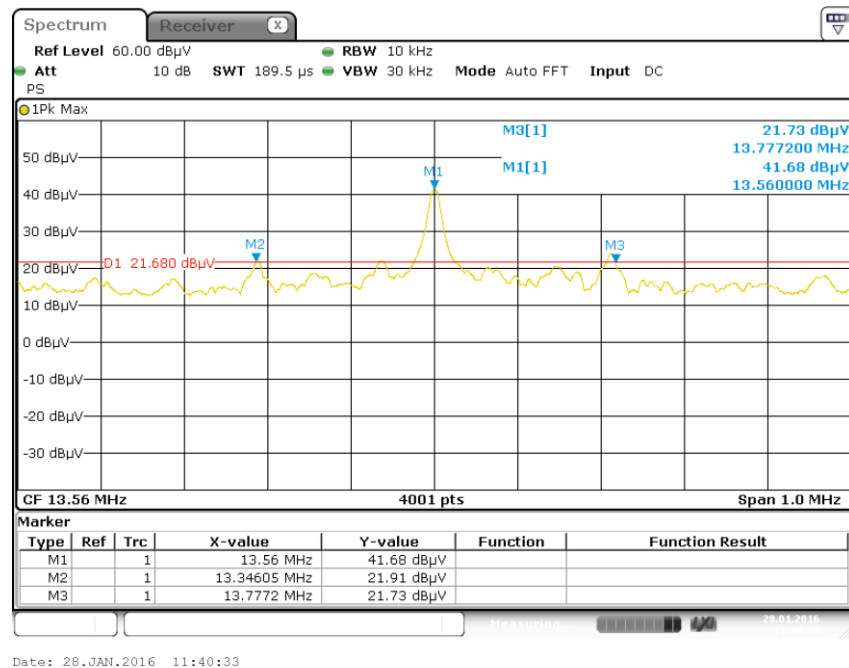
Frequency (MHz)	Emission Bandwidth (kHz)
13.56	0.43115

CONFIGURATION B+ C-P35 (Acbel)

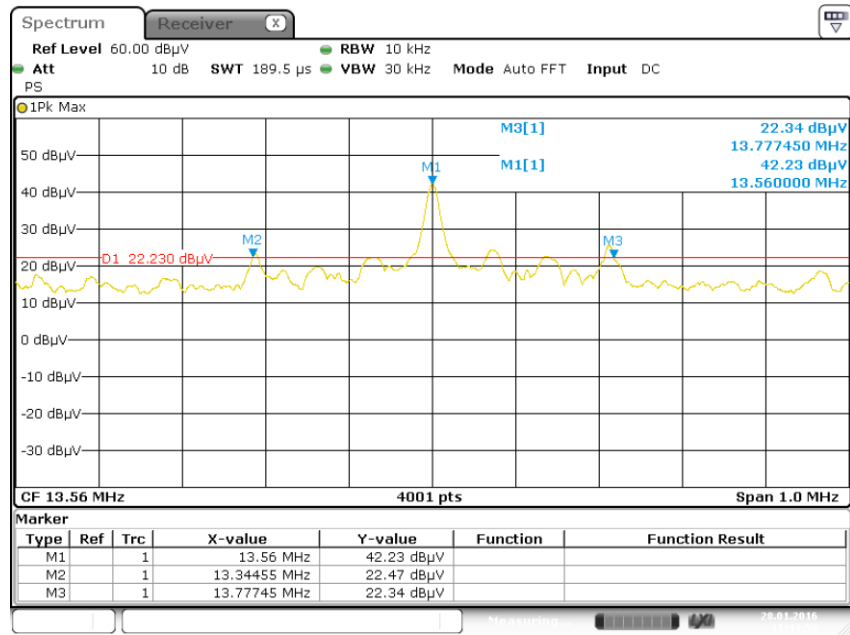
Frequency (MHz)	Emission Bandwidth (kHz)
13.56	0.4329

Test plots

Emission Bandwidth CONFIGURATION A+ C-P35 (HUNTKEY)



Emission Bandwidth CONFIGURATION B+ C-P35 (Acbel)

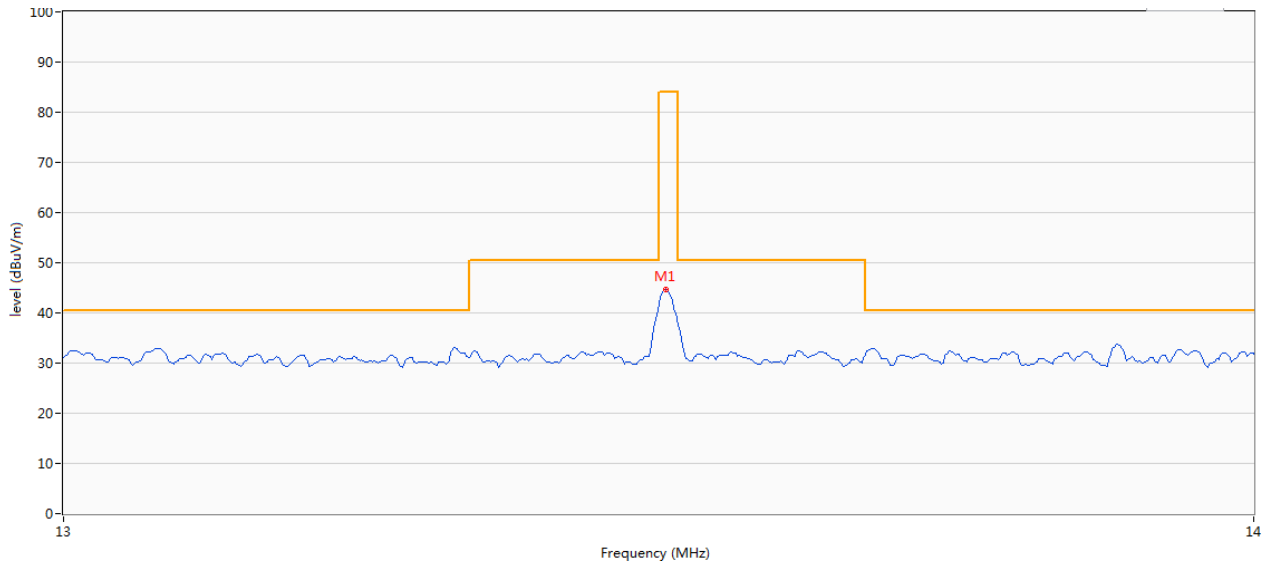


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A.2 Field Strength of Fundamental Emissions

Test Data and Plot

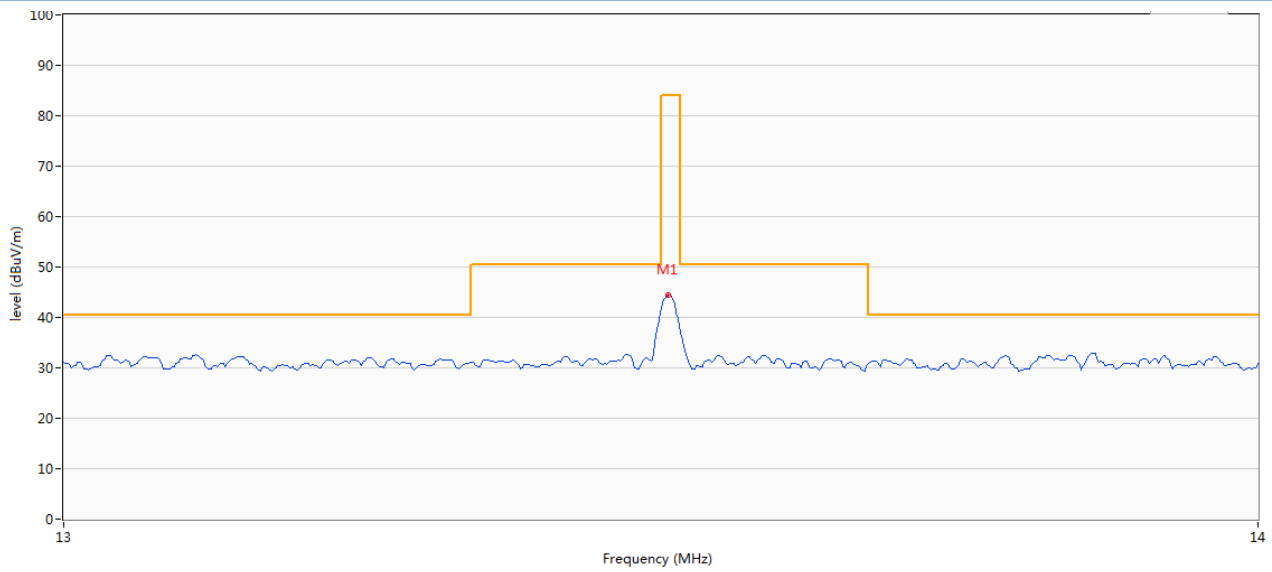
ANT-LOOP ANT Vertical CONFIGURATION A+ C-P35 (HUNTKEY)



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	13.56	45.00	20.98	84.0	39.00	Peak	31.00	100.0	Vertical	PASS

Note : Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2).

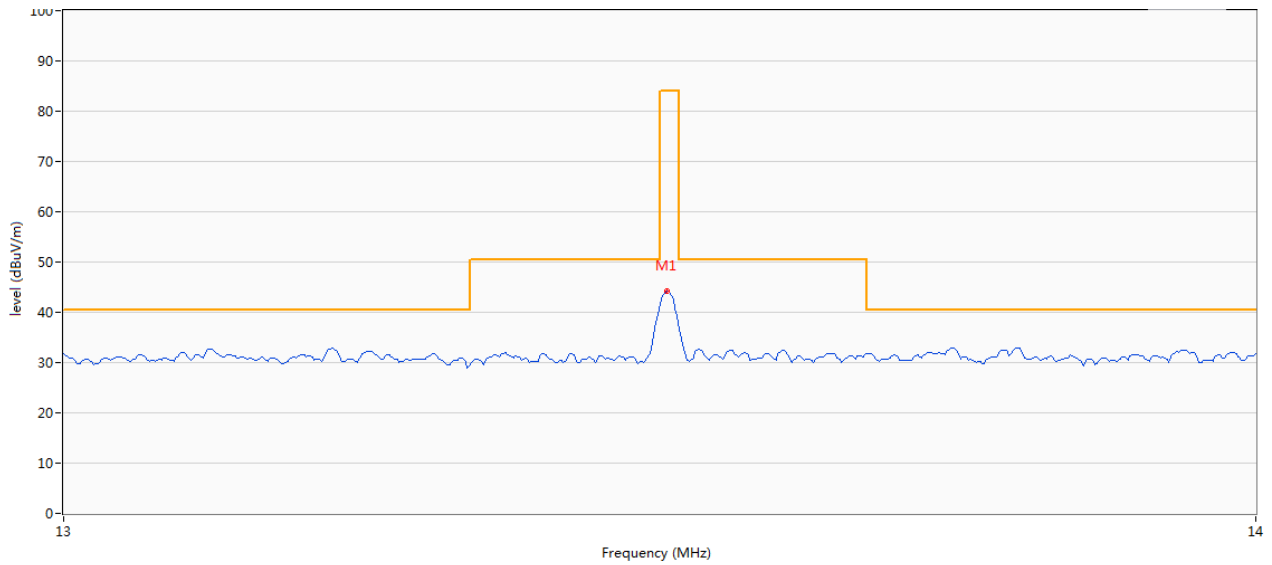
ANT-LOOP ANT Horizontal CONFIGURATION A+ C-P35 (HUNTKEY)



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	13.56	44.87	20.98	84.0	39.13	Peak	304.00	100.0	Horizontal	PASS

Note : Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2).

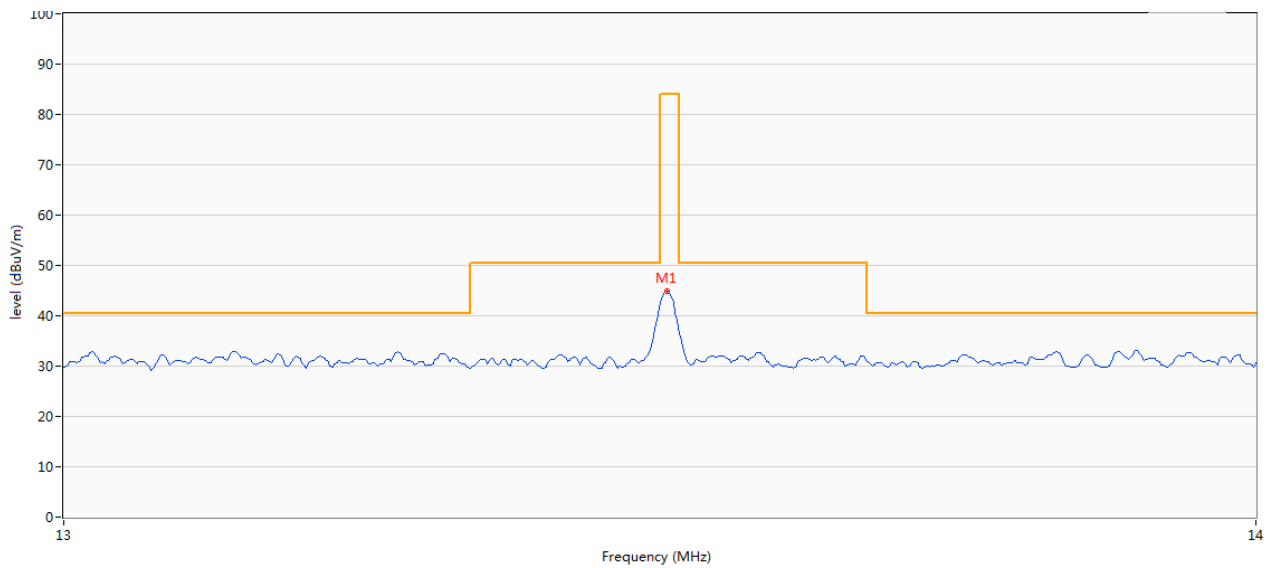
ANT-LOOP ANT Vertical CONFIGURATION B+ C-P35 (Acbel)



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	13.56	46.79	20.98	84.0	37.21	Peak	146.00	100.0	Vertical	PASS

Note : Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2).

ANT-LOOP ANT Horizontal CONFIGURATION B+ C-P35 (Acbel)



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	13.56	44.18	20.98	84.0	39.82	Peak	302.00	100.0	Horizontal	PASS

Note : Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2).

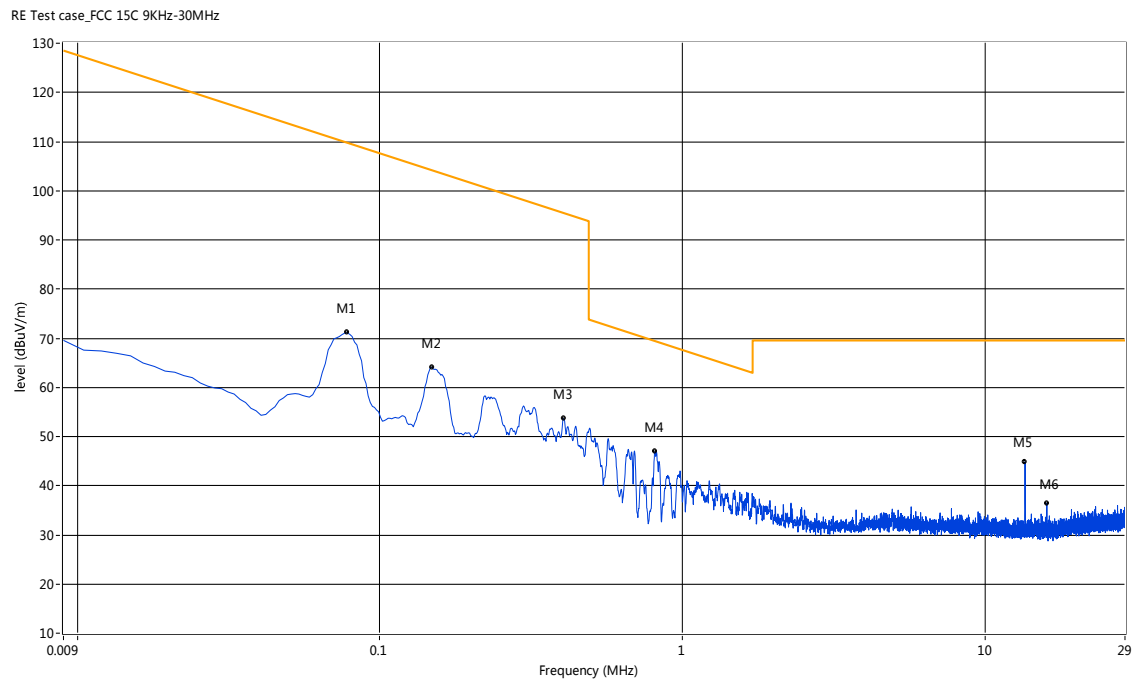
A.3 Radiated Emissions

The Data and Plots (9 kHz ~ 30 MHz)

Note1 : The frequency band of 13.110 MHz to 14.010 MHz, the test data and limit please refer to the A.2 of section.

Note2 : About IC standard required: Below 13.110 MHz and above 14.010 MHz, the limit is 69.5 dBuV/m Field Strength@3m. And the worst test data below 69.5 dBuV/m.

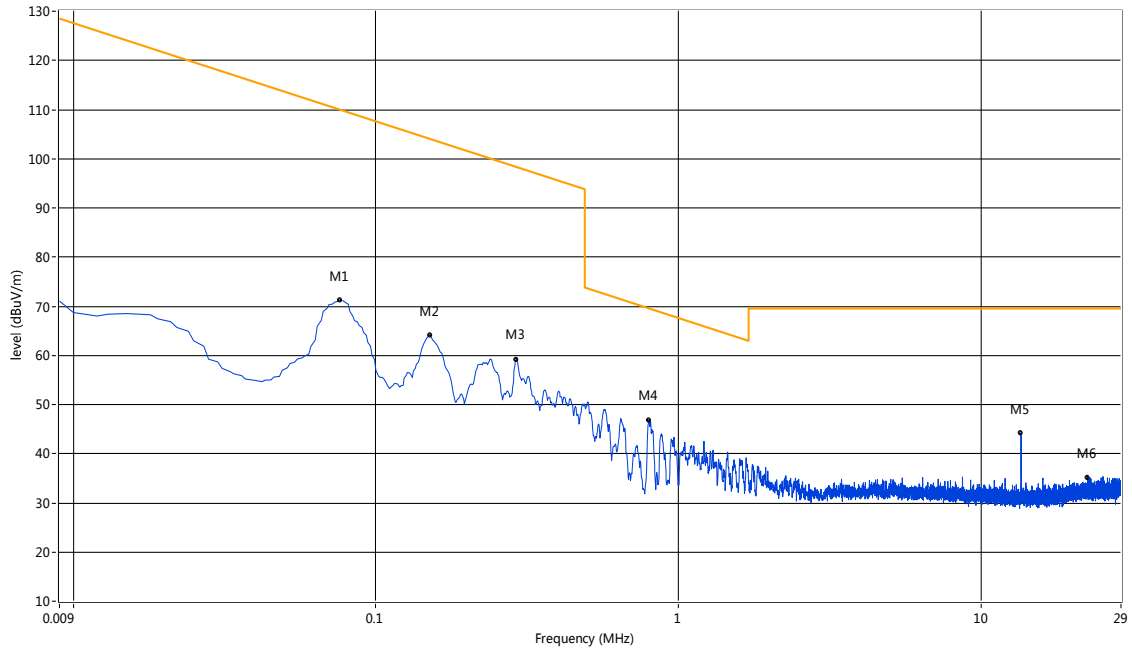
Below 30 MHz ANT Vertical CONFIGURATION A+ C-P35 (Huntkey)



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	FCC Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.08	71.09	19.86	123.5	52.41	Peak	307.00	100.0	Vertical	N/A
1*	0.08	65.34	19.86	123.5	58.16	Q-Peak	307.00	100.0	Vertical	Pass
2	0.15	64.08	19.81	118.4	54.32	Peak	299.40	100.0	Vertical	Pass
3	0.40	53.65	19.98	99.9	46.25	Peak	307.00	100.0	Vertical	Pass
4	0.81	46.94	20.21	70.9	23.96	Peak	307.00	100.0	Vertical	Pass
5	13.56	44.79	20.98	69.5	24.71	Peak	360.00	100.0	Vertical	N/A ^{Note 1}
6	16.00	36.35	21.07	69.5	33.15	Peak	149.10	100.0	Vertical	Pass

Below 30 MHz ANT Horizontal CONFIGURATION A+ C-P35 (Huntkey)

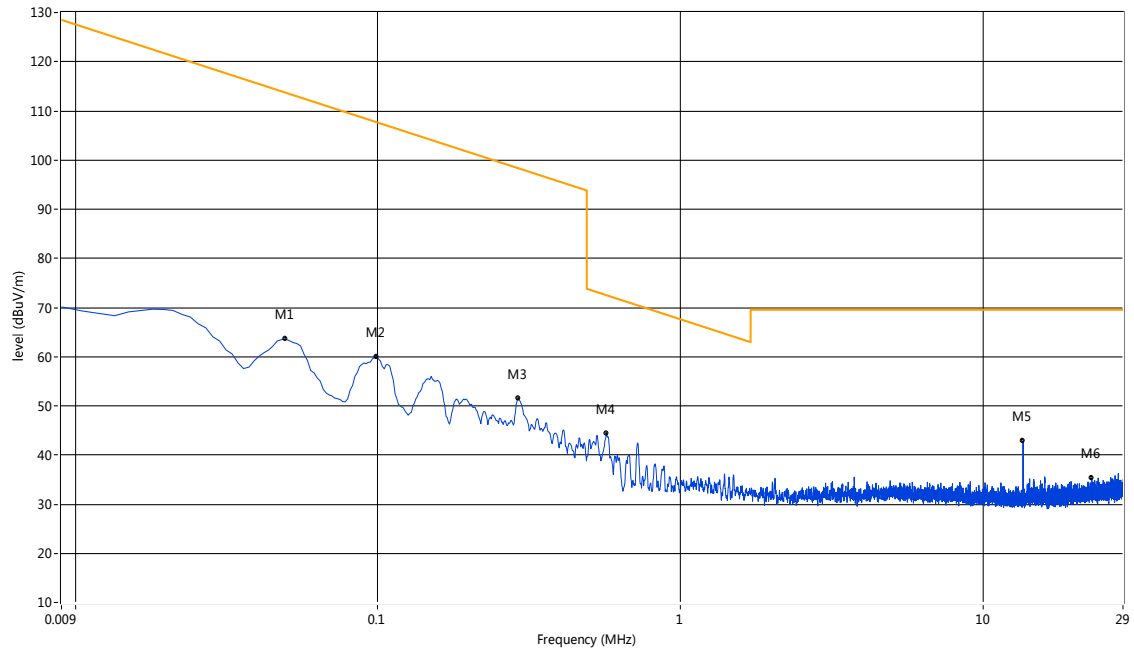
RE Test case_FCC 15C 9KHz-30MHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.08	71.15	19.86	123.7	52.55	Peak	295.50	100.0	Horizontal	N/A
1*	0.08	65.41	19.86	123.7	58.29	Q-Peak	295.50	100.0	Horizontal	Pass
2	0.15	64.10	19.81	118.3	54.20	Peak	287.50	100.0	Horizontal	Pass
3	0.29	59.16	19.82	108.2	49.04	Peak	295.50	100.0	Horizontal	Pass
4	0.80	46.86	20.20	71.1	24.24	Peak	295.50	100.0	Horizontal	Pass
5	13.56	44.08	20.98	69.5	25.42	Peak	2.30	100.0	Horizontal	N/A ^{Note 1}
6	22.51	35.10	21.51	69.5	34.40	Peak	154.30	100.0	Horizontal	Pass

Below 30 MHz ANT Vertical CONFIGURATION B+ C-P35 (Acbel)

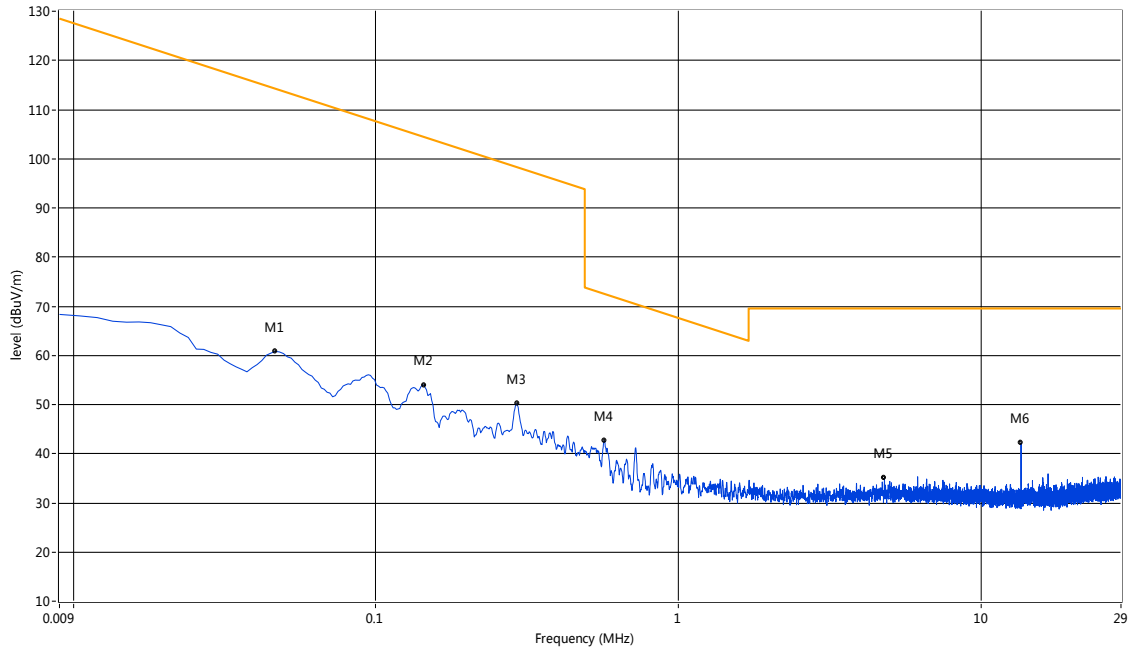
RE Test case_FCC 15C 9KHz-30MHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.05	63.56	19.91	125.6	62.04	Peak	65.00	100.0	Vertical	Pass
2	0.10	59.90	19.82	122.0	62.10	Peak	76.60	100.0	Vertical	Pass
3	0.29	51.44	19.82	108.2	56.76	Peak	65.00	100.0	Vertical	Pass
4	0.57	44.37	19.97	73.1	28.73	Peak	76.60	100.0	Vertical	Pass
5	13.56	42.78	20.98	69.5	26.72	Peak	353.10	100.0	Vertical	N/A ^{Note 1}
6	22.87	35.23	21.53	69.5	34.27	Peak	3.20	100.0	Vertical	Pass

Below 30 MHz ANT Horizontal CONFIGURATION B+ C-P35 (Acbel)

RE Test case_FCC 15C 9KHz-30MHz

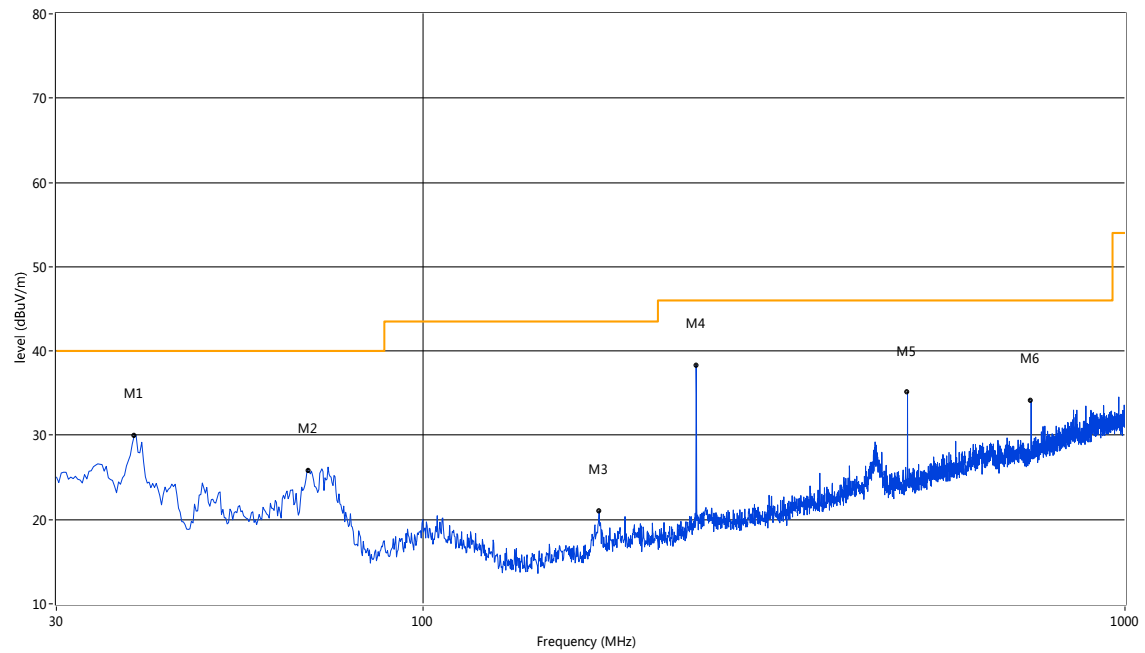


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.05	60.81	19.92	125.8	64.99	Peak	96.30	100.0	Horizontal	Pass
2	0.14	53.98	19.81	118.8	64.82	Peak	92.30	100.0	Horizontal	Pass
3	0.29	50.15	19.83	108.1	57.95	Peak	96.30	100.0	Horizontal	Pass
4	0.57	42.65	19.97	73.1	30.45	Peak	309.70	100.0	Horizontal	Pass
5	4.79	35.08	20.56	69.5	34.42	Peak	246.50	100.0	Horizontal	N/A ^{Note 1}
6	13.56	42.16	20.98	69.5	27.34	Peak	357.00	100.0	Horizontal	Pass

Test Data and Plots (30 MHz ~ 10th Harmonic)

30 MHz to 1 GHz, ANT Vertical CONFIGURATION A+ C-P35 (Huntkey)

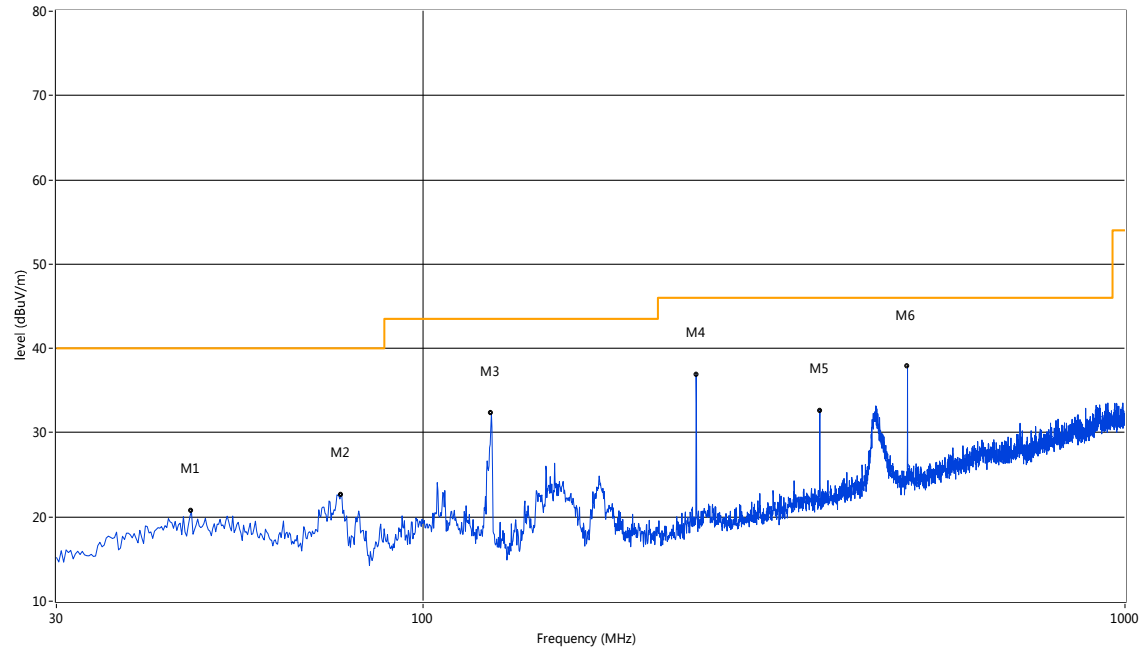
RE Test case_FCC 15C 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	38.73	29.22	-20.05	40.0	10.78	Peak	47.70	100	Vertical	Pass
2	68.55	25.78	-22.06	40.0	14.22	Peak	1.30	100	Vertical	Pass
3	178.13	20.99	-22.19	43.5	22.51	Peak	12.70	100	Vertical	Pass
4	244.80	38.31	-19.00	46.0	7.69	Peak	359.70	100	Vertical	Pass
5	489.91	35.06	-13.45	46.0	10.94	Peak	359.70	100	Vertical	Pass
6	734.77	34.11	-8.91	46.0	11.89	Peak	0.30	100	Vertical	Pass

30 MHz to 1 GHz, ANT Horizontal CONFIGURATION A+ C-P35 (Huntkey)

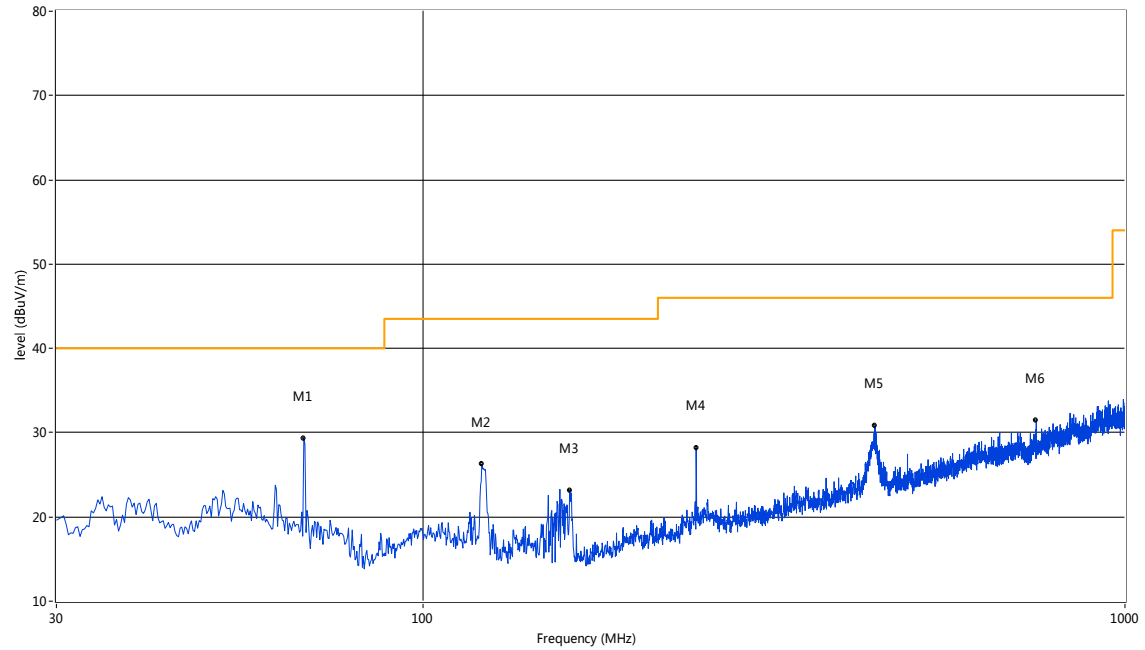
RE Test case_FCC 15C 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	46.73	20.70	-18.72	40.0	19.30	Peak	104.30	100	Horizontal	Pass
2	76.31	22.59	-24.60	40.0	17.41	Peak	360.00	100	Horizontal	Pass
3	125.04	32.27	-22.49	43.5	11.23	Peak	114.20	100	Horizontal	Pass
4	244.80	36.87	-19.00	46.0	9.13	Peak	114.20	100	Horizontal	Pass
5	367.48	31.74	-16.05	46.0	14.26	Peak	114.20	100	Horizontal	Pass
6	489.91	35.18	-13.45	46.0	10.82	Peak	78.50	100	Horizontal	Pass

30 MHz to 1 GHz, ANT Vertical CONFIGURATION B+ C-P35 (Acbel)

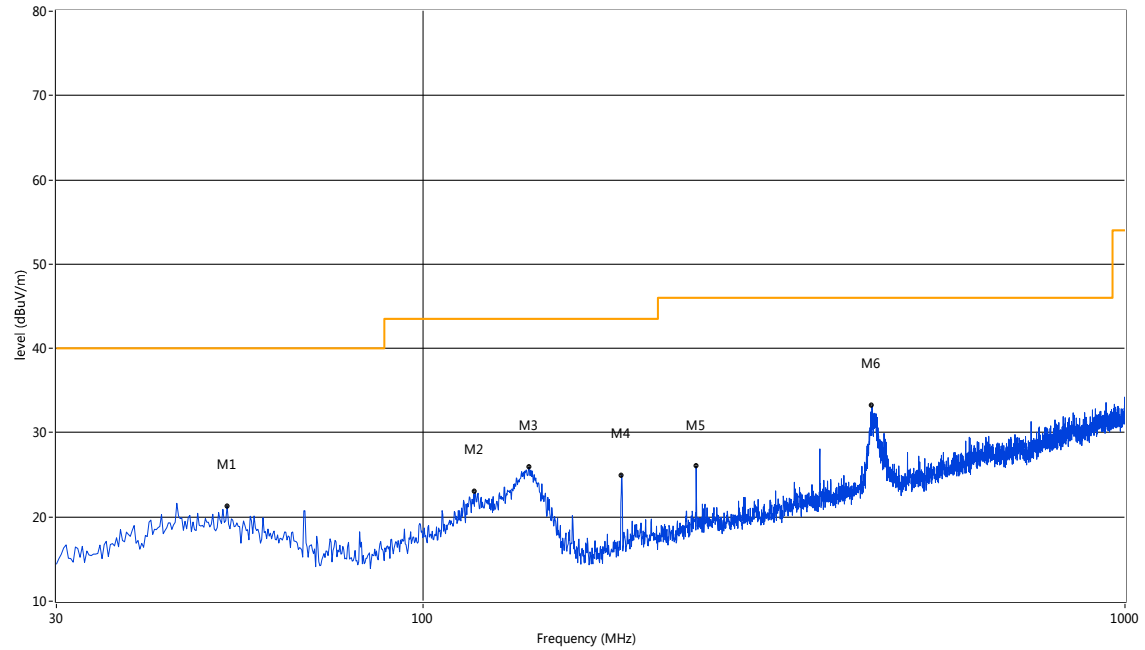
RE Test case_FCC 15C 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.58	29.36	-21.72	40.0	10.64	Peak	8.30	100	Vertical	Pass
2	121.16	26.23	-21.83	43.5	17.27	Peak	88.50	100	Vertical	Pass
3	161.64	23.14	-23.02	43.5	20.36	Peak	48.30	100	Vertical	Pass
4	244.80	28.21	-19.00	46.0	17.79	Peak	335.40	100	Vertical	Pass
5	440.21	30.82	-14.54	46.0	15.18	Peak	179.70	100	Vertical	Pass
6	747.38	31.47	-8.62	46.0	14.53	Peak	356.40	100	Vertical	Pass

30 MHz to 1 GHz, ANT Horizontal CONFIGURATION B+ C-P35 (Acbel)

RE Test case_FCC 15C 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	52.55	21.25	-18.66	40.0	18.75	Peak	245.80	100	Horizontal	Pass
2	118.49	22.98	-21.51	43.5	20.52	Peak	322.30	100	Horizontal	Pass
3	141.52	25.89	-23.65	43.5	17.61	Peak	0.90	100	Horizontal	Pass
4	191.71	24.93	-20.98	43.5	18.57	Peak	10.20	100	Horizontal	Pass
5	244.80	25.99	-19.00	46.0	20.01	Peak	54.90	100	Horizontal	Pass
6	436.33	33.19	-14.53	46.0	12.81	Peak	245.80	100	Horizontal	Pass

A.4 Frequency Stability

OPERATING FREQUENCY:	13560000 Hz
REFERENCE VOLTAGE:	3.8 V
DEVIATION LIMIT:	$\pm 0.01\% = 1356$ Hz

CONFIGURATION A + Battery 1 (Sunwoda Electronic Co., Ltd.)

VOLTAGE (%)	Test Conditions		Frequency(Hz)	Frequency Deviation (Hz)	Deviation Limit (Hz)	Verdict
	Power (VDC)	Temperature (°C)				
100	3.8	-20°C(Ref)	13560568	568	1356	Pass
100		-10	13560226	226	1356	
100		-5	13560234	234	1356	
100		0	13560486	486	1356	
100		+10	13560512	512	1356	
100		+20	13560635	635	1356	
100		+25	13560485	485	1356	
100		+30	13560215	215	1356	
100		+40	13560512	512	1356	
100		+50	13560684	684	1356	
Battery End Point	3.5	+20	13560615	615	1356	Pass
115	4.2	+20	13560693	693	1356	

CONFIGURATION A + Battery 2 (SCUD (Fujian) Electronics Co., Ltd.)

VOLTAGE (%)	Test Conditions		Frequency(Hz)	Frequency Deviation (Hz)	Deviation Limit (Hz)	Verdict
	Power (VDC)	Temperature (°C)				
100	3.8	-20°C(Ref)	13560415	415	1356	Pass
100		-10	13560326	326	1356	
100		-5	13560165	165	1356	
100		0	13560635	635	1356	
100		+10	13560451	451	1356	
100		+20	13560211	211	1356	
100		+25	13560620	620	1356	
100		+30	13560518	518	1356	
100		+40	13560423	423	1356	
100		+50	13560715	715	1356	
Battery End Point	3.5	+20	13560362	362	1356	Pass
115	4.2	+20	13560574	574	1356	

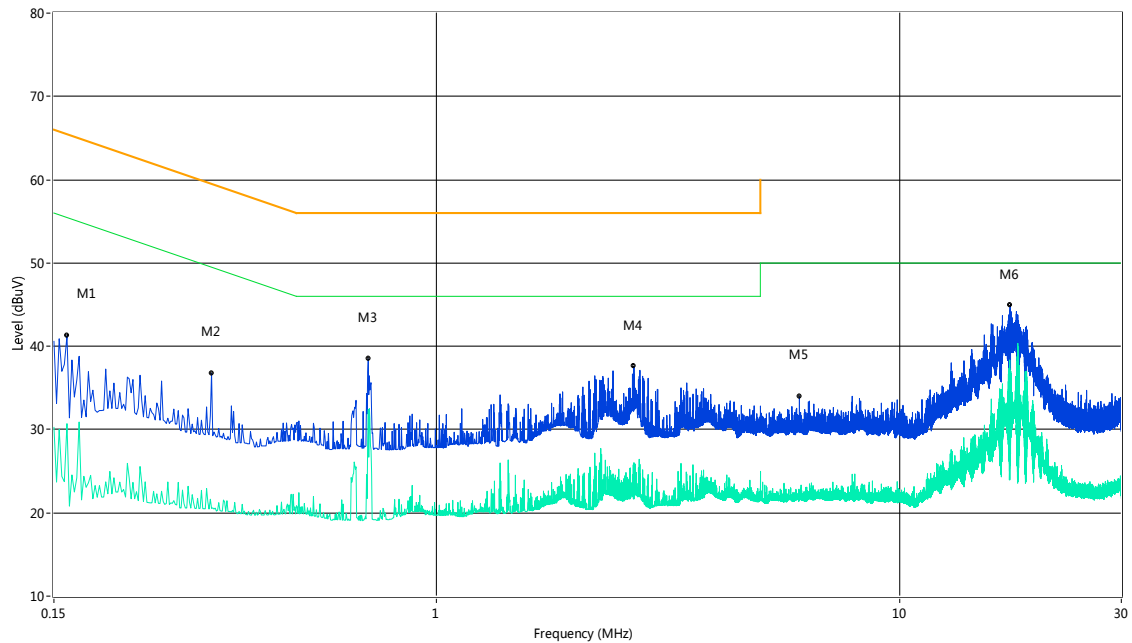
A.5 Conducted Emissions

Test Data and Plots

CONFIGURATION A+ C-P35 (Huntkey)

PHASE L

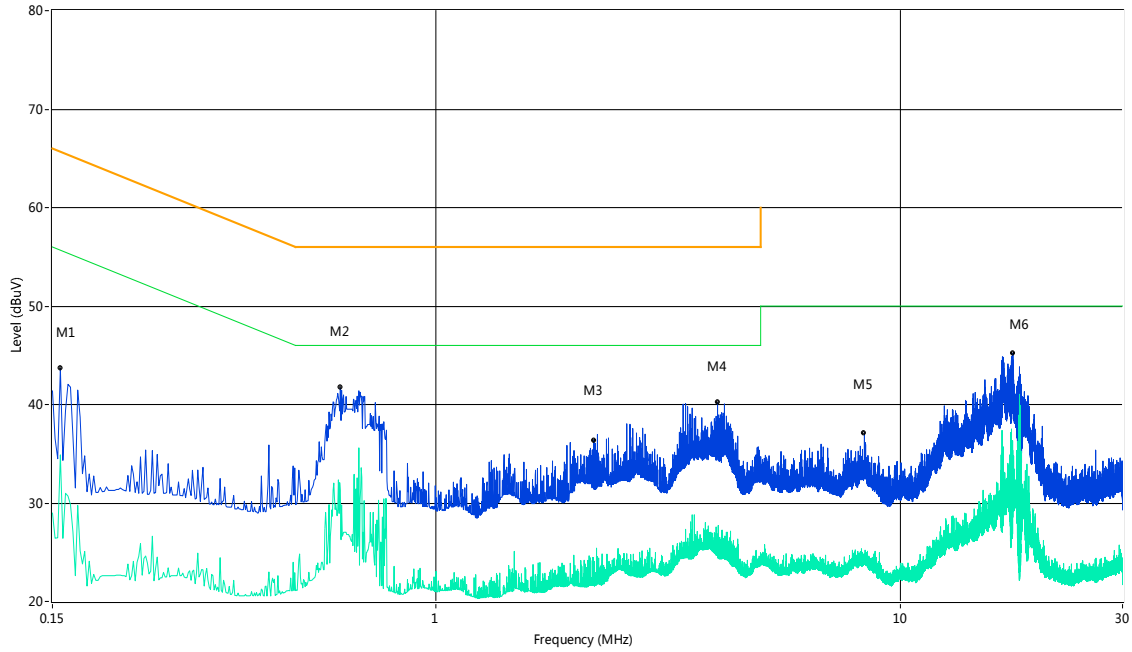
CE Test case_CE_FCC PART 15_ Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.16	41.2	13.00	65.7	24.50	Peak	L Line	Pass
1**	0.16	30.7	13.00	55.7	25.00	AV	L Line	Pass
2	0.33	36.8	13.00	60.9	24.10	Peak	L Line	Pass
2**	0.33	20.5	13.00	50.9	30.40	AV	L Line	Pass
3	0.71	38.5	13.00	56.0	17.50	Peak	L Line	Pass
3**	0.71	32.4	13.00	46.0	13.60	AV	L Line	Pass
4	2.67	37.6	13.00	56.0	18.40	Peak	L Line	Pass
4**	2.67	26.0	13.00	46.0	20.00	AV	L Line	Pass
5	6.07	33.9	13.00	60.0	26.10	Peak	L Line	Pass
5**	6.07	21.3	13.00	50.0	28.70	AV	L Line	Pass
6	17.29	44.9	13.00	60.0	15.10	Peak	L Line	Pass
6**	17.29	36.1	13.00	50.0	13.90	AV	L Line	Pass

PHASE N

CE Test case_CE_FCC PART 15_ Class B

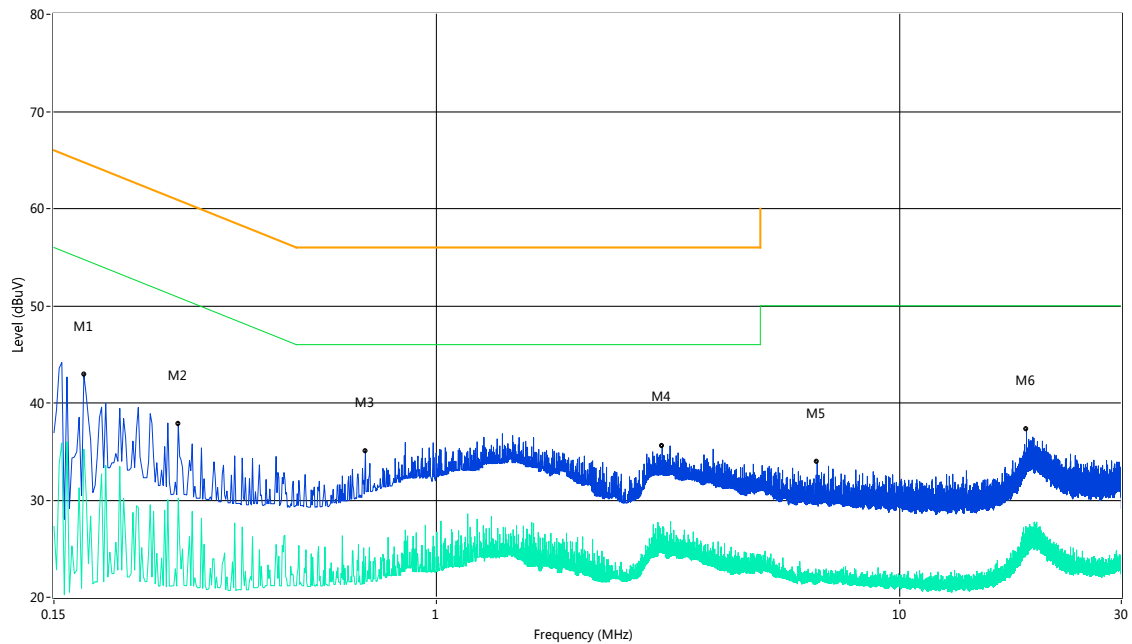


No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.16	43.7	13.00	65.8	22.10	Peak	N Line	Pass
1**	0.16	34.9	13.00	55.8	20.90	AV	N Line	Pass
2	0.62	41.7	13.00	56.0	14.30	Peak	N Line	Pass
2**	0.62	31.3	13.00	46.0	14.70	AV	N Line	Pass
3	2.19	36.4	13.00	56.0	19.60	Peak	N Line	Pass
3**	2.19	21.6	13.00	46.0	24.40	AV	N Line	Pass
4	4.04	40.2	13.00	56.0	15.80	Peak	N Line	Pass
4**	4.04	26.8	13.00	46.0	19.20	AV	N Line	Pass
5	8.36	37.1	13.00	60.0	22.90	Peak	N Line	Pass
5**	8.36	24.6	13.00	50.0	25.40	AV	N Line	Pass
6	17.43	45.2	13.00	60.0	14.80	Peak	N Line	Pass
6**	17.43	31.2	13.00	50.0	18.80	AV	N Line	Pass

CONFIGURATION B+ C-P35 (Acbel)

PHASE L

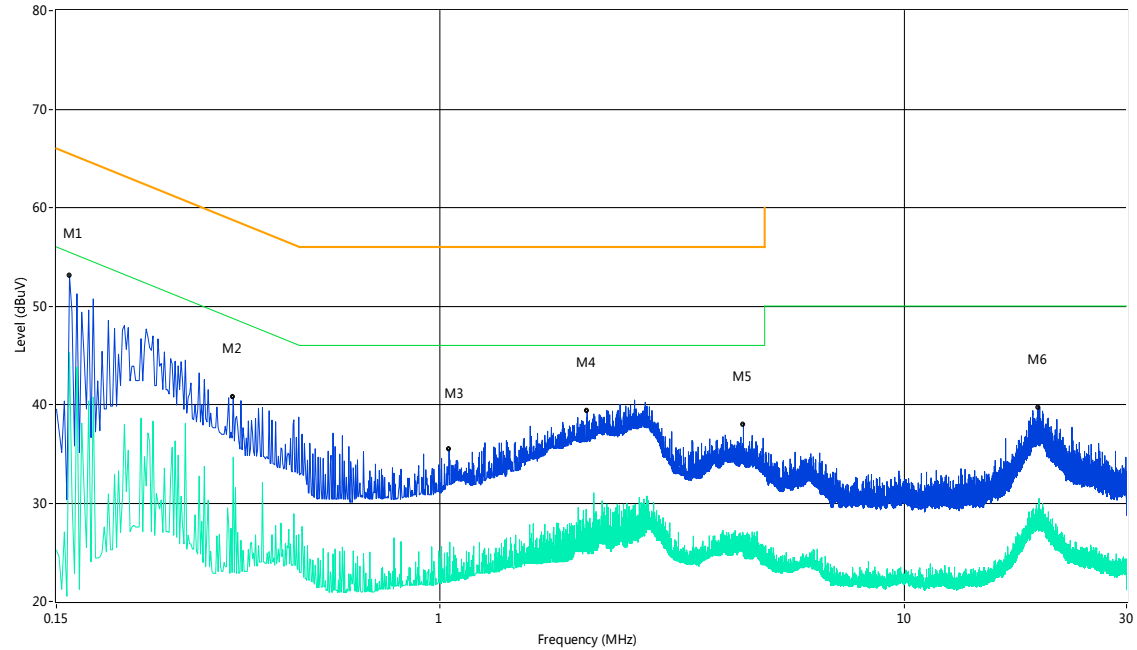
CE Test case_CE_FCC PART 15_ Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.17	42.9	13.00	65.3	22.40	Peak	L Line	Pass
1**	0.17	35.2	13.00	55.3	20.10	AV	L Line	Pass
2	0.28	37.8	13.00	62.3	24.50	Peak	L Line	Pass
2**	0.28	30.2	13.00	52.3	22.10	AV	L Line	Pass
3	0.70	35.1	13.00	56.0	20.90	Peak	L Line	Pass
3**	0.70	24.2	13.00	46.0	21.80	AV	L Line	Pass
4	3.07	35.5	13.00	56.0	20.50	Peak	L Line	Pass
4**	3.07	24.7	13.00	46.0	21.30	AV	L Line	Pass
5	6.63	33.9	13.00	60.0	26.10	Peak	L Line	Pass
5**	6.63	22.5	13.00	50.0	27.50	AV	L Line	Pass
6	18.74	37.3	13.00	60.0	22.70	Peak	L Line	Pass
6**	18.74	27.1	13.00	50.0	22.90	AV	L Line	Pass

PHASE N

CE Test case_CE_FCC PART 15_ Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.16	53.1	13.00	65.7	12.60	Peak	N Line	Pass
1**	0.16	45.3	13.00	55.7	10.40	AV	N Line	Pass
2	0.36	40.8	13.00	60.0	19.20	Peak	N Line	Pass
2**	0.36	34.7	13.00	50.0	15.30	AV	N Line	Pass
3	1.05	35.5	13.00	56.0	20.50	Peak	N Line	Pass
3**	1.05	24.5	13.00	46.0	21.50	AV	N Line	Pass
4	2.08	39.3	13.00	56.0	16.70	Peak	N Line	Pass
4**	2.08	27.7	13.00	46.0	18.30	AV	N Line	Pass
5	4.50	38.0	13.00	56.0	18.00	Peak	N Line	Pass
5**	4.50	25.9	13.00	46.0	20.10	AV	N Line	Pass
6	19.37	39.7	13.00	60.0	20.30	Peak	N Line	Pass
6**	19.37	28.1	13.00	50.0	21.90	AV	N Line	Pass

ANNEX C TEST SETUP PHOTOS

Please refer the document “BL-SZ1610062-AR2.PDF”.

ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL- SZ1610062--AW.PDF”.

ANNEX E EUT INTERNAL PHOTOS

Please refer the document “BL- SZ1610062--AI.PDF”.

--END OF REPORT--