FCC RF TEST REPORT

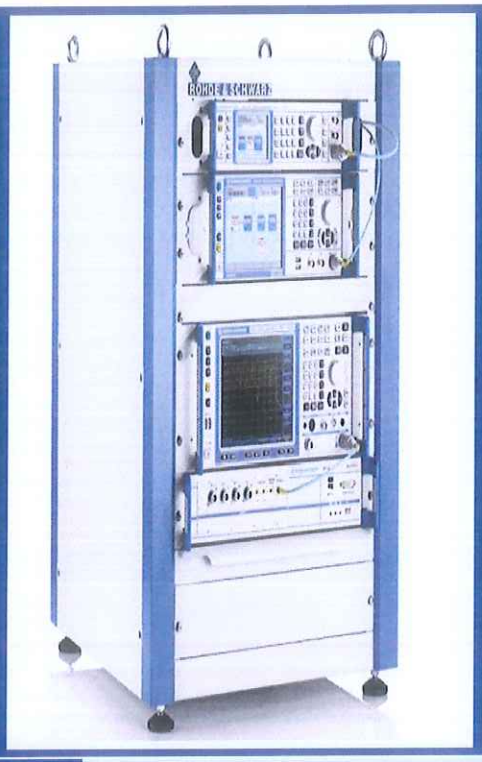
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

TRANSMITTER

ISSUED TO
IdentiFind, LLC

1504 Penny Ln. Keller, TX 76248 USA.



Prepared by: Zhengmuyi
Zheng Muyi
(Engineer)
Date Jul. 09. 2017

Approved by:
Liao Jianming
(Technical Director)
Date Jul. 09. 2017

Report No.:	BL-SZ1750270-601
EUT Name:	TRANSMITTER
Model Name:	IF-212
Brand Name:	IdentiFind
Test Standard:	47 CFR Part 15 Subpart C
FCC ID:	2AMCHIF212
Test conclusion:	Pass
Test Date:	Jun. 23, 2017 ~ Jun. 29, 2017
Date of Issue:	Jul. 09, 2017

Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
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Revision History

Version	Issue Date	Revisions
Rev. 01	Jul. 10, 2017	Initial Issue

TABLE OF CONTENTS

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

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 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 Announce

(1) The test report reference to the report template version v5.3.

(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

Applicant	IdentiFind, LLC
Address	1504 Penny Ln. Keller, TX 76248 USA.

2.2 Manufacturer

Manufacturer	Huizhou tendetel industrial development co., ltd
Address	14D, Heqing Business building, Dongping District, Donghu West Road No.168, Huizhou City, Guangdong Province, China.

2.3 Factory Information

Manufacturer	Huizhou tendetel industrial development co., ltd
Address	14D, heqingbusiness building, huizhou city, Guangond province, China

2.4 General Description for Equipment under Test (EUT)

EUT Name	TRANSMITTER
Model Name	IF-212
Hardware Version	N/A
Software Version	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	TMK
	Serial No.	N/A
	Capacitance	2500 mAh
	Rated Voltage	3 V
	Limit Charge Voltage	N/A
Ancillary Equipment 2	Shell	

2.6 Technical Information

Modulation Type	ASK
Product Type	☒ Portable
Operating Frequency	315 MHz.
Antenna Type	PCB Antenna
Antenna Gain	0 dBi

All channel was listed on the following table:

Channel number	Freq. (MHz)
0	**315**

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-15 Edition)	Intentional Radiators
4	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	--	Pass Note 1
2	Conducted Emission	15.207	ANNEX A.1	Pass Note 2
3	20 dB Bandwidth	15.231(c)	ANNEX A.2	Pass
4	Duty Cycle	15.35	ANNEX A.3	Pass
5	Field Strength of Fundamental Emissions	15.231(b)	ANNEX A.4	Pass
6	Radiated Emissions	15.209 15.231(b)	ANNEX A.5	Pass
7	Transmitting Time	15.231(a)	ANNEX A.6	Pass
Note 1: Please refer to section 5.1. Note 2: The EUT is powered by the battery, so the Conducted Emission is not applicable.				

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℃ to +25℃
Working Voltage of the EUT	NV (Normal Voltage)	3 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2017.06.22	2018.06.21
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2017.06.22	2018.06.21
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2016.11.08	2017.11.07
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2017.06.22	2018.06.21
LISN	SCHWARZBECK	NSLK 8127	8127-687	2017.06.22	2018.06.21
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2017.06.22	2018.06.21
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2017.06.22	2018.06.21
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2017.06.22	2018.06.21
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2017.06.22	2018.06.21
Test Antenna-Rod(9 kHz-30 MHz)	SCHWARZBECK	VAMP 9243	9243-556	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	EMC TECHNOLOGY LTD	21.1m*11.6m*7.35m	N/A	2016.08.09	2018.08.08
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

4.3 Measurement Uncertainty

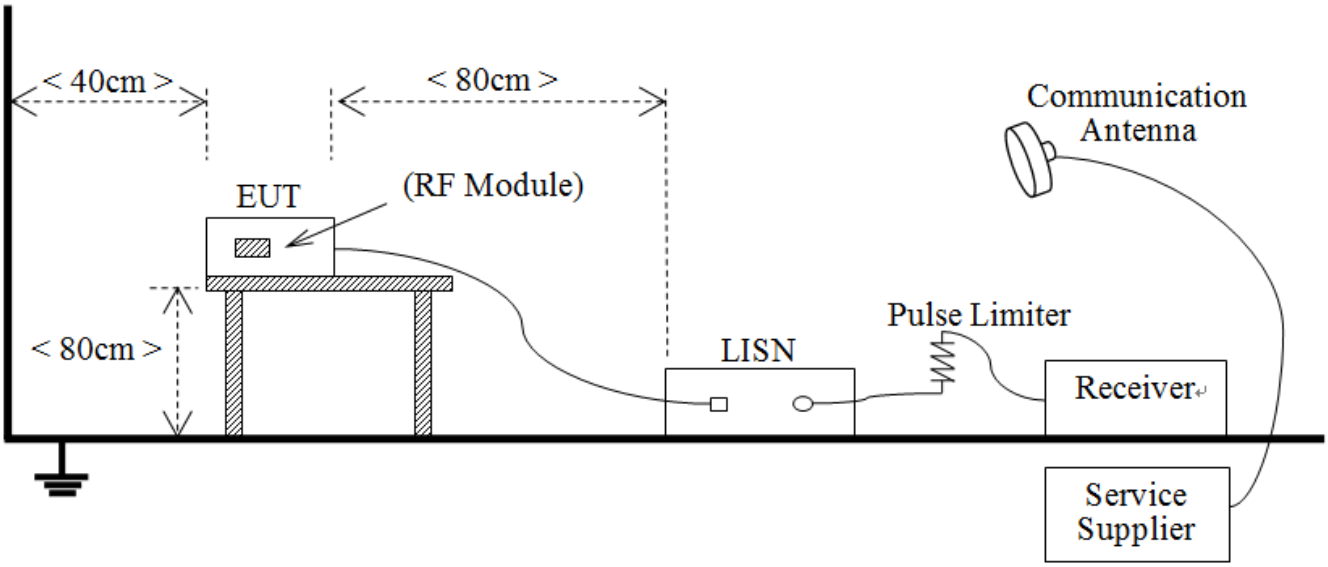
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.4 dB
Power Spectral Density, conducted	±2.5 dB
Unwanted Emissions, conducted	±2.8 dB
All emissions, radiated	±5.4 dB
Temperature	±1°C
Humidity	±4%

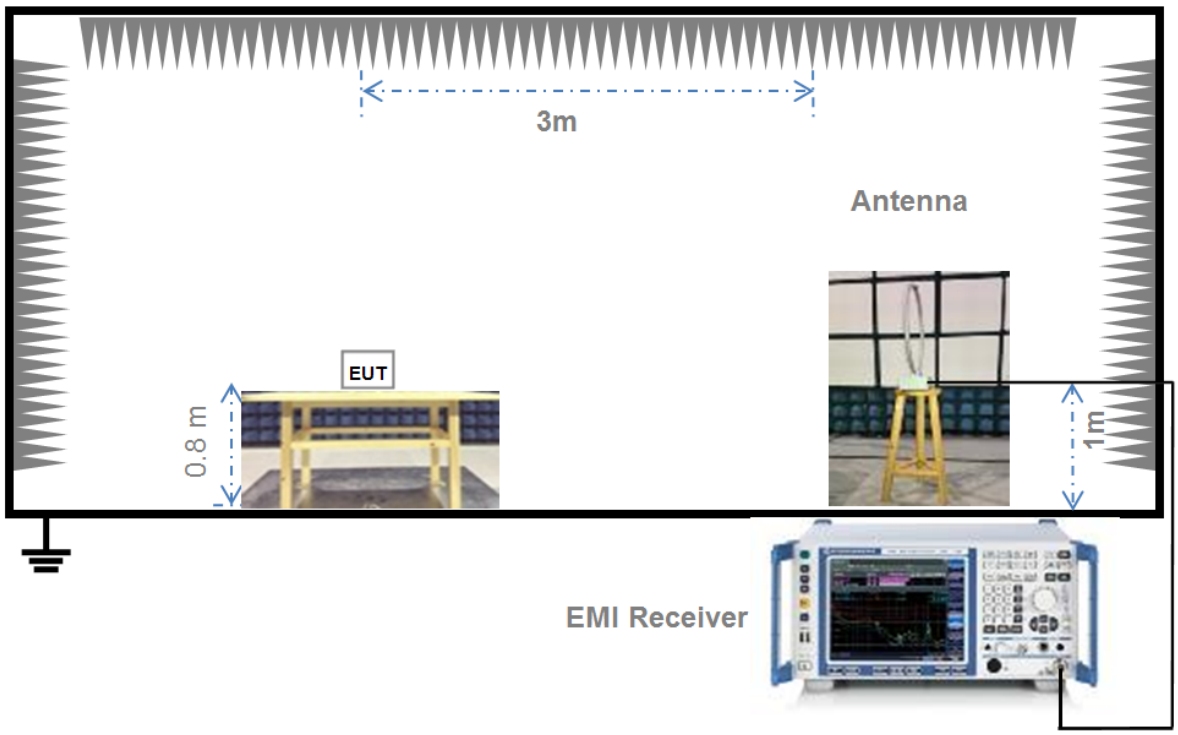
4.4 Description of Test Setup

4.4.1 For AC Power Supply Port Test



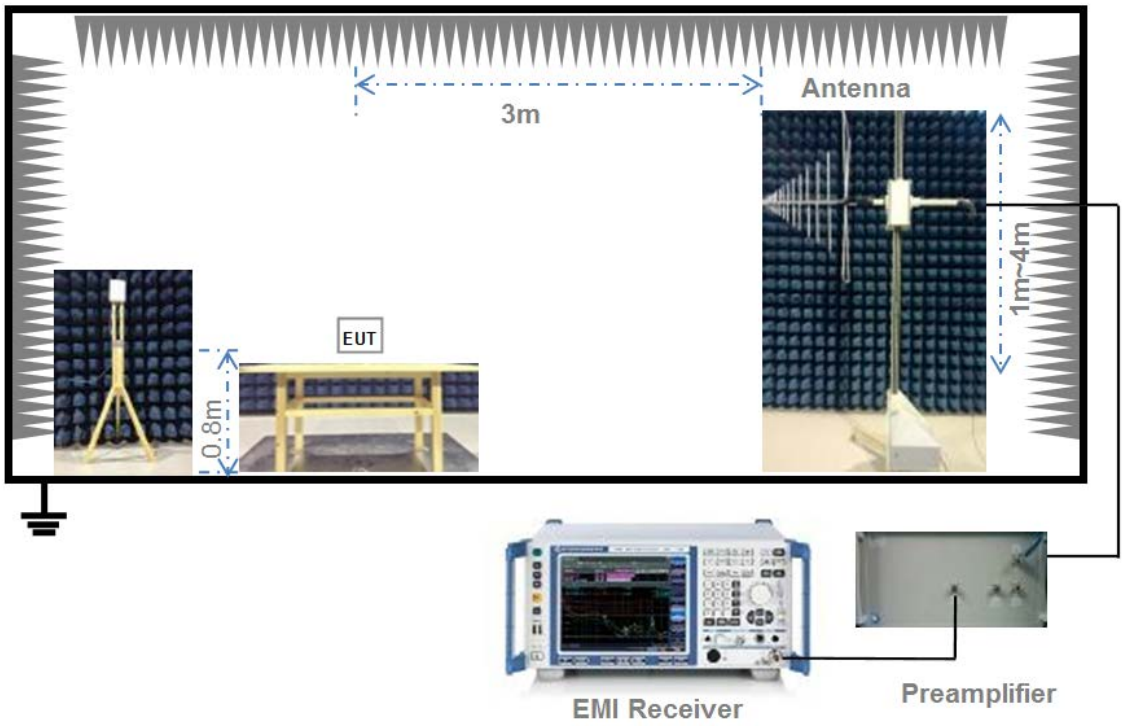
(Diagram 1)

4.4.2 For Radiated Test (Below 30 MHz)



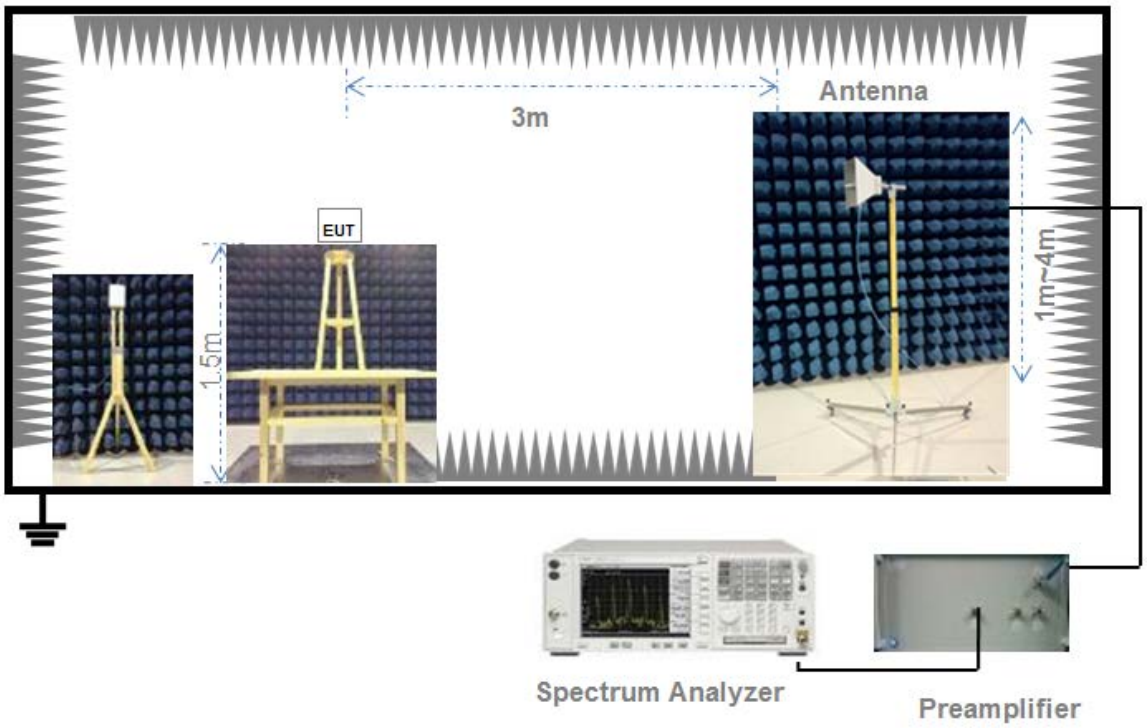
(Diagram 2)

4.4.3 For Radiated Test (30 MHz-1 GHz)



(Diagram 3)

4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Standard Applicable

FCC §15.203 & 15.247(b)

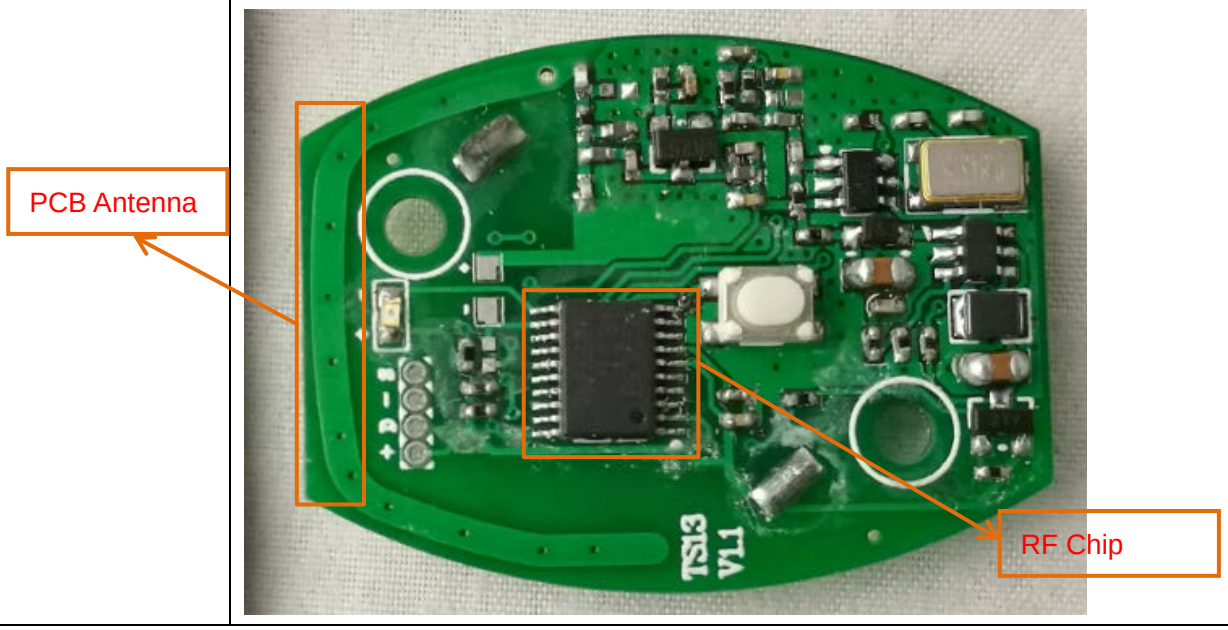
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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	

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 Conducted Emission

5.2.1 Limit

FCC §15.207

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 50μH/50Ω line impedance stabilization network (LISN).

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

5.2.2 Test Setup

See section 4.4.1 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.2.3 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.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 20 dB Bandwidth

5.3.1 Limit

FCC §15.231

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.3.2 Test Setup

See section 4.4.3 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth

RBW = 100 kHz

VBW ≥ 300 kHz

Sweep = auto

Detector function = peak

Trace = max hold

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Field Strength of Fundamental Emissions and Radiated Emissions

5.4.1 Limit

FCC §15.231 & §15.209

According to FCC section 15.231(b), In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	[1]1250 to 3750	125 to 375
174-260	3750	375
260-470	[1]3750 to 12500	375 to 1250
Above 470	12500	1250
[1]Linear interpolations.		

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 (μV/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:

1. 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.

2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.4.2 Test Setup

See section 4.4.2 to 4.4.4 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The measurement frequency range is from 30 MHz 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 ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.4.4 Test Result

Please refer to ANNEX A.4 & A.5.

5.5 Transmitting Time

5.5.1 Limit

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

5.5.2 Test Setup

See section 4.4.3 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The EUT transmitter was activated, the spectrum analyzer single sweep was triggered while a command on the EUT was activated and plots were captured

5.5.4 Test Result

Please refer to ANNEX A.6.

ANNEX A TEST RESULT

A.1 Conducted Emission

Note: Not Applicable.

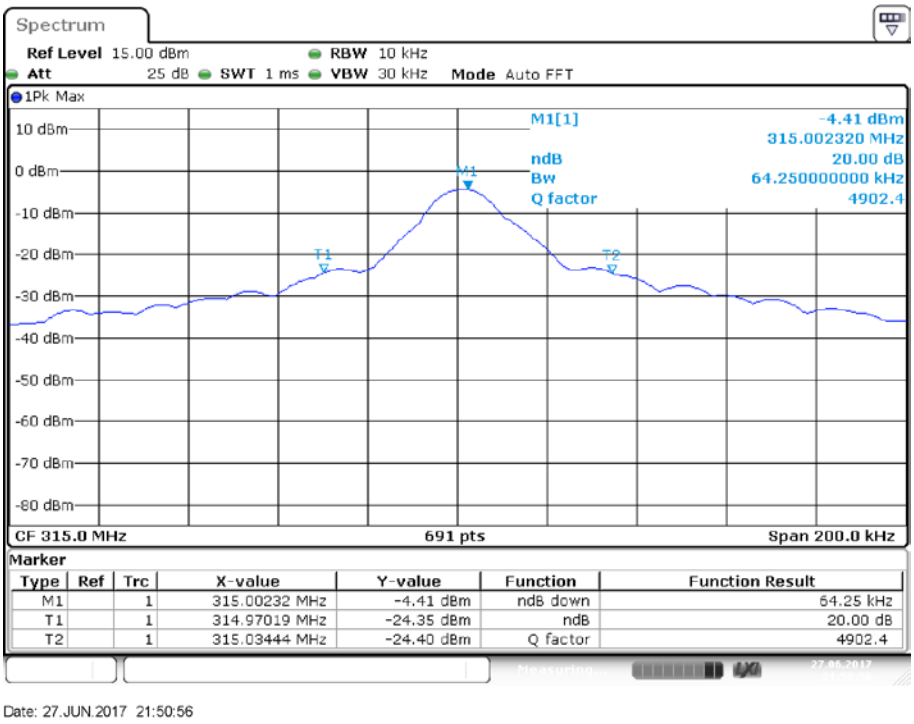
A.2 20 dB Bandwidth

Test Data

Frequency (MHz)	20 dB Bandwidth (MHz)	Limit (MHz)	Verdict
315	0.5181	0.7875	Pass

Test plots

20 dB Bandwidth



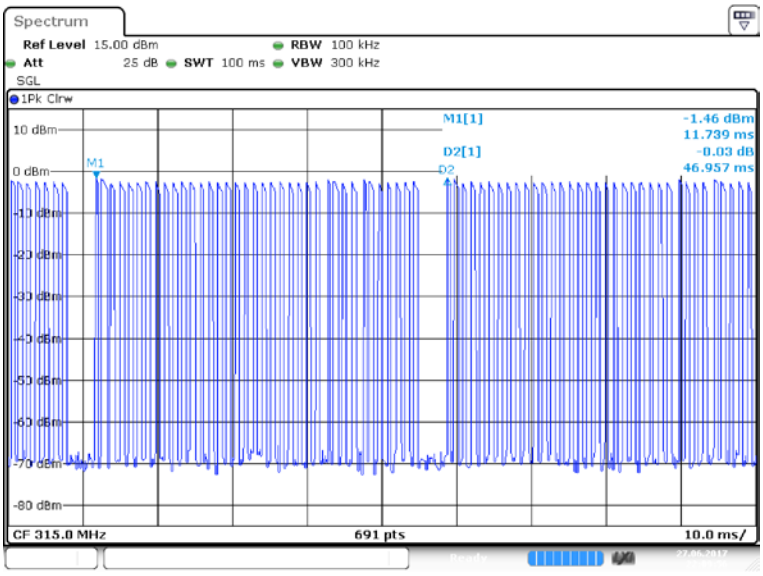
Date: 27.JUN.2017 21:50:56

A.3 Duty cycle

Test Data and Plot

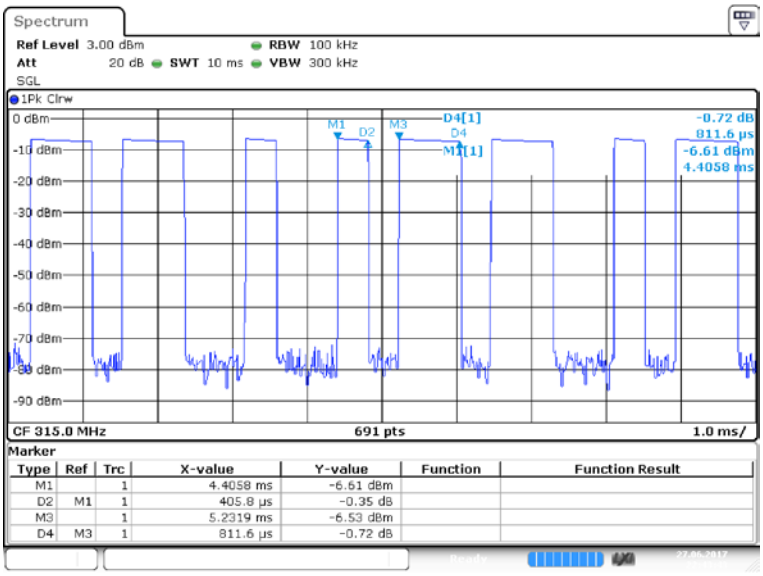
Data Transmissions		Number of pulses
The number of pulses Group		2
Long pulse duration	0.8116 ms	22
Short pulse duration	0.4058 ms	15
Total transmissions duration	0.8116*22 + 0.4058*15=23.9422 ms	--
On time within 100 msec	23.9422*2=47.8844 ms	
Duty cycle correction factor	10*log(47.8844/100)= -3.198 dB	

Number of Packet/100 ms



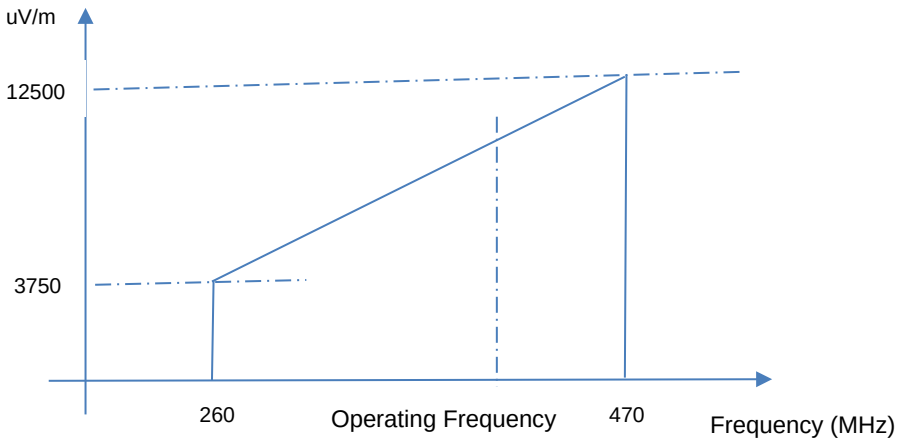
Date: 27.JUN.2017 22:09:56

Number of Pulses/Packet



Date: 27.JUN.2017 22:43:44

A.4 Field Strength of Fundamental Emissions



According to the linear relation of Field Strength of Fundamental Emissions as above, get the linear relation:

$$y = 20\lg\left[\frac{1}{3}\ (125 * F_c + 21250)\right]$$

Where,
y is Field Strength of Fundamental Emission in dBuV/m
F_c is Fundamental Frequency in MHz

The Field Strength of Fundamental Emissions (Operating Frequency) is 315 MHz,

Field Strength of Fundamental (dBuV/m) = $y = 20\lg\left[\frac{1}{3}\ (125 * 315 + 21250)\right] = 75.6$ dBuV/m

75.6 dBuV/m is the Average limit, Peak limit = (Average + 20) = 95.6 dBuV/m

Test Data

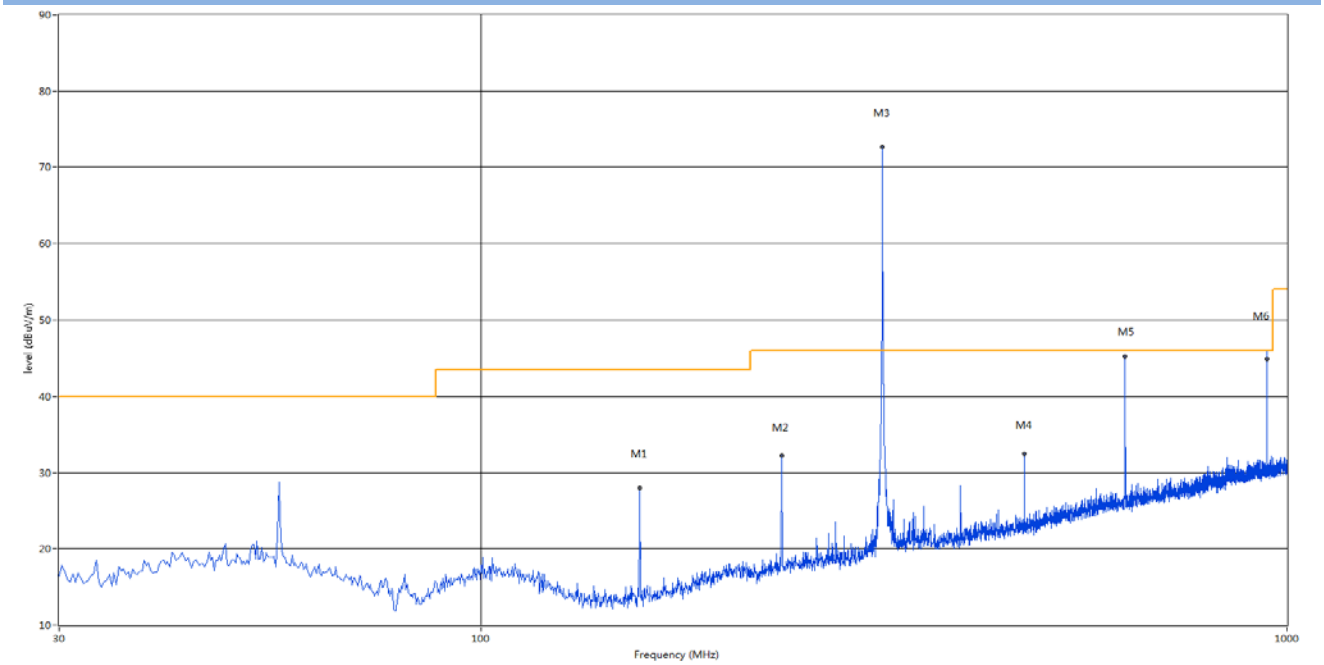
Field Strength of Fundamental Emissions and Field strength of spurious emissions Value					
Operating Frequency (MHz)	Field Strength (dBuV/m)	Detector	Limit @3m (dBuV/m)	Margin (dB)	Antenna
315	72.69	PEAK	95.6	22.91	Vertical
	77.09	PEAK	95.6	18.51	Horizontal
	69.492	AVERAGE	75.6	6.108	Vertical
	73.892	AVERAGE	75.6	1.708	Horizontal
630	45.2	PEAK	75.6	30.400	Vertical
	44.99	PEAK	75.6	30.610	Horizontal
	42.002	AVERAGE	55.6	13.598	Vertical
	41.792	AVERAGE	55.6	13.808	Horizontal

A.5 Radiated Emissions

Note [1]: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

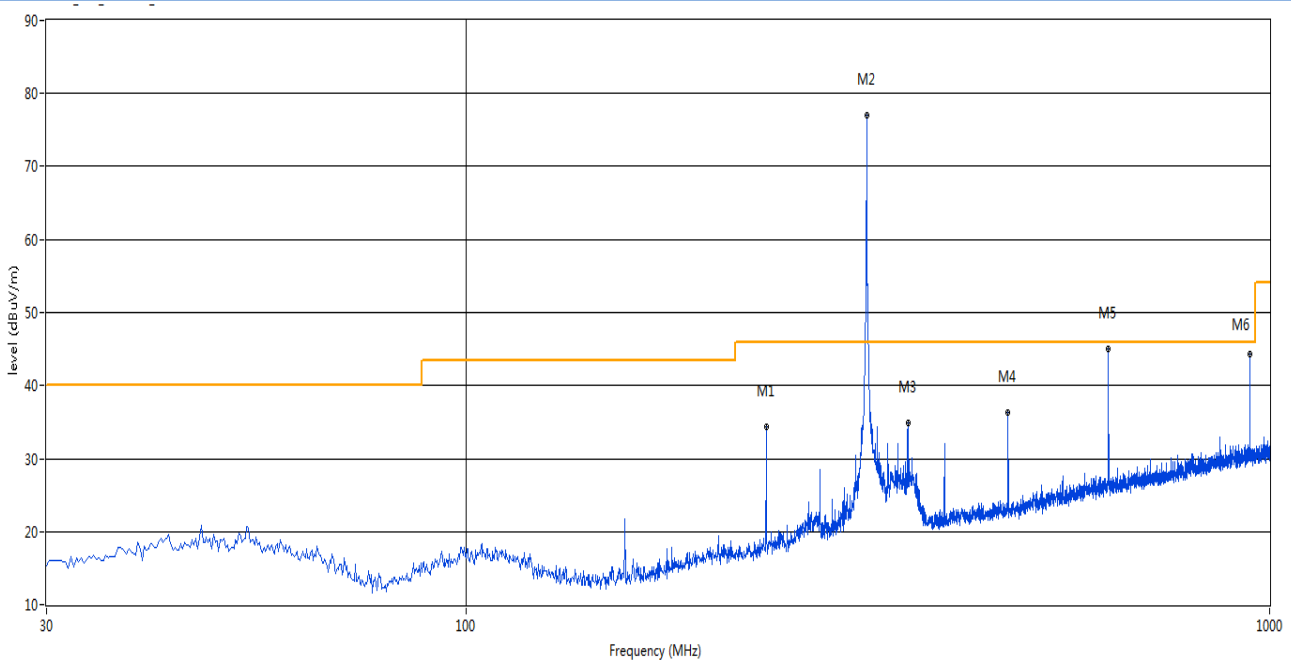
Test Data and Plots (30 MHz ~ 10th Harmonic)

30 MHz to 1 GHz, ANT V



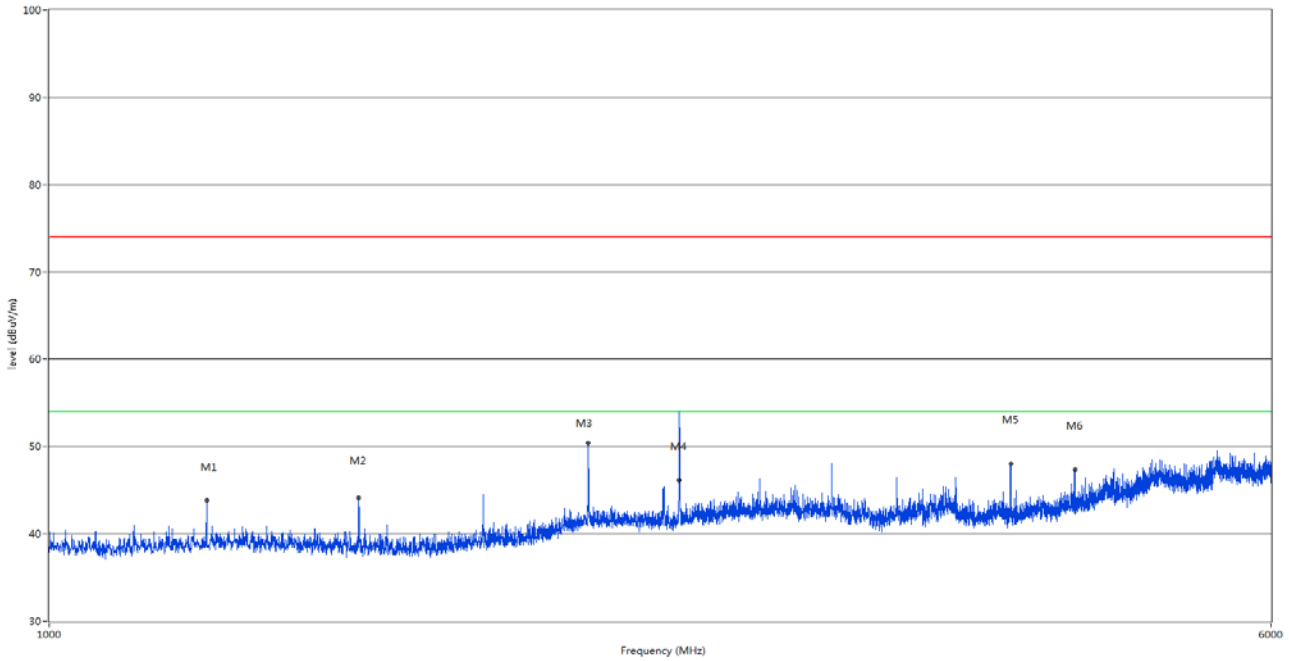
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	157.555	23.65	-24.84	43.5	19.85	Peak	29.30	100	Vertical	Pass
2	236.367	32.19	-21.04	46.0	13.81	Peak	267.90	100	Vertical	Pass
3	314.938	72.69	-18.99	95.6	22.91	Peak	267.90	100	Vertical	Pass
4	472.562	32.45	-15.58	46.0	13.55	Peak	233.70	100	Vertical	Pass
5	629.945	45.20	-11.85	46.0	0.80	Peak	0.00	100	Vertical	Pass
6	944.984	48.22	-6.62	46.0	-2.22	Peak	56.30	107	Vertical	Pass

30 MHz to 1 GHz, ANT H



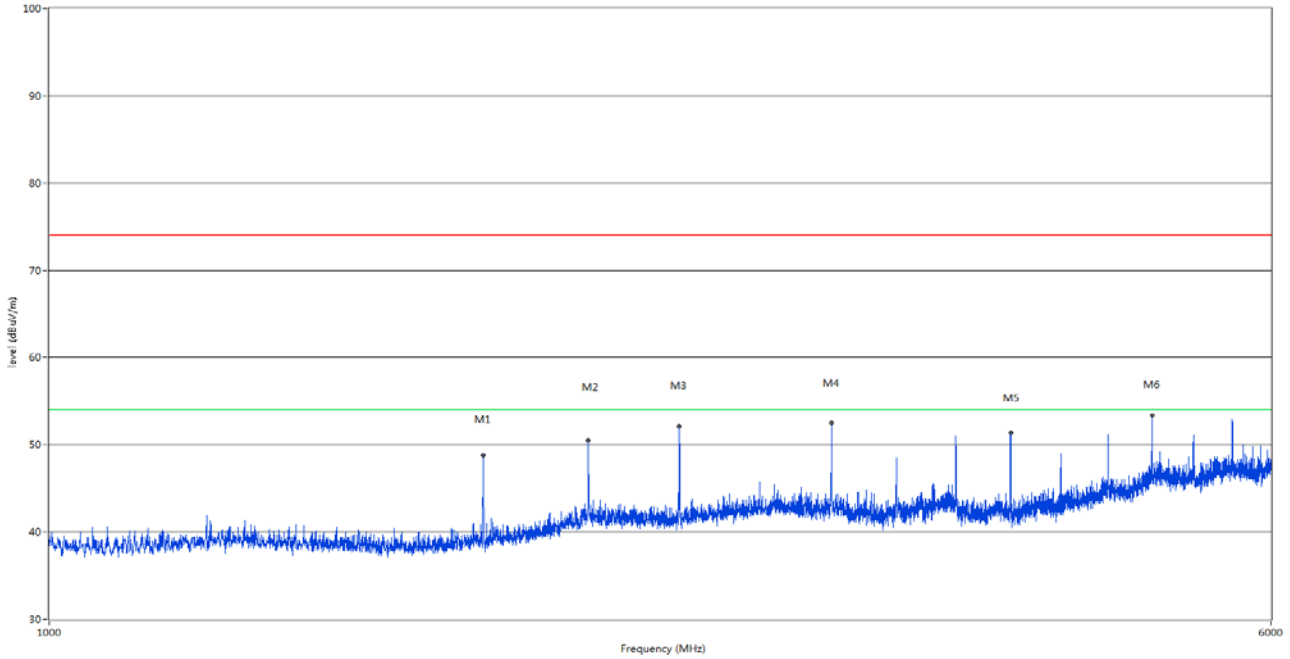
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	236.37	34.41	-21.04	46.0	11.59	Peak	58.00	100	Horizontal	Pass
2	315.18	77.09	-18.99	95.6	18.51	Peak	291.00	100	Horizontal	Pass
3	354.46	34.92	-17.79	46.0	11.08	Peak	0.00	100	Horizontal	Pass
4	472.56	36.30	-15.58	46.0	9.70	Peak	2.00	100	Horizontal	Pass
5	629.95	44.99	-11.85	46.0	1.01	Peak	36.00	100	Horizontal	Pass
6	944.95	44.35	-6.62	46.0	1.65	Peak	20.00	100	Horizontal	Pass

1 GHz to 6 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1260.000	43.81	-6.41	74.0	30.19	Peak	301.80	150	Vertical	Pass
2	1575.000	44.11	-5.96	74.0	29.89	Peak	296.90	150	Vertical	Pass
3	2205.000	50.39	-2.48	74.0	23.61	Peak	277.20	150	Vertical	Pass
4	2519.947	54.5	-2.24	74.0	19.5	Peak	336.30	150	Vertical	Pass
4**	2519.947	51.302	-2.24	54.0	2.698	AV	336.30	150	Vertical	Pass
5	4096.500	48.03	8.33	74.0	25.97	Peak	354.00	150	Vertical	Pass
6	4500.000	47.35	9.24	74.0	26.65	Peak	345.30	150	Vertical	Pass

1 GHz to 6 GHz, ANT H



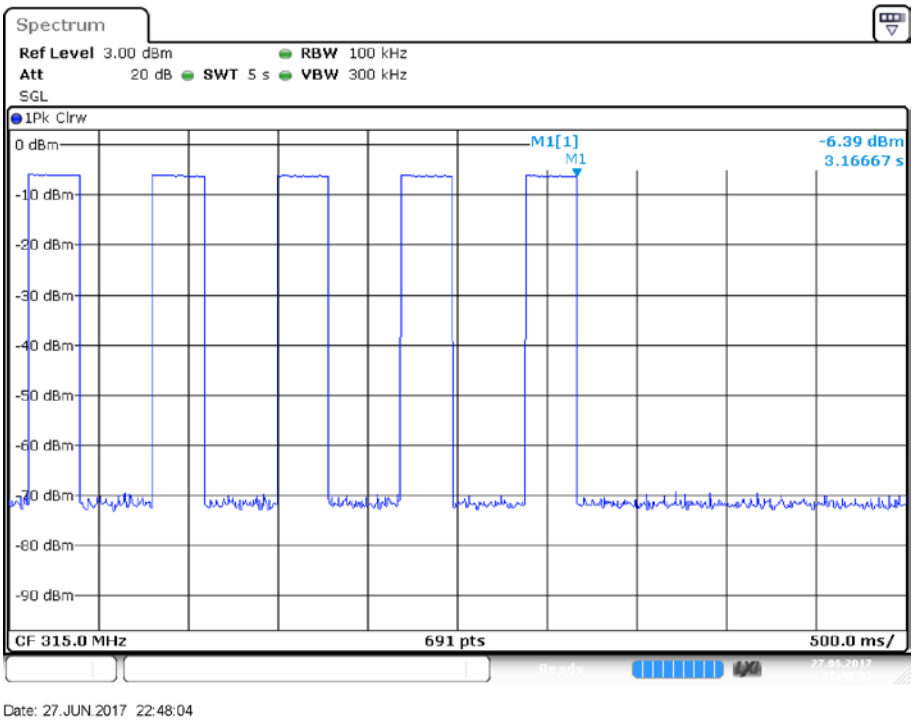
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1890.000	48.77	-5.04	74.0	25.23	Peak	101.30	150	Horizontal	Pass
2	2205.000	50.53	-2.48	74.0	23.47	Peak	288.40	150	Horizontal	Pass
3	2520.000	52.12	-2.24	74.0	21.88	Peak	298.20	150	Horizontal	Pass
4	3150.000	52.52	6.44	74.0	21.48	Peak	355.60	150	Horizontal	Pass
5	4095.750	51.35	8.35	74.0	22.65	Peak	338.80	150	Horizontal	Pass
6	5040.000	53.39	10.92	74.0	20.61	Peak	334.20	150	Horizontal	Pass

A.6 Transmitter Time

Test Data and Plot

The active time is less than 5 seconds

Active time



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ1750270-AR 1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ1750270-AW 1.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ1750270-AI 1.PDF”.

--END OF REPORT--