

APPLICATION FOR VERIFICATION
On Behalf of
Hornady Manufacturing Company

Hornady RAPiD Vehicle Safe

Model No.: 98210

FCC ID: 2AFJZ-98210

Prepared for : Hornady Manufacturing Company
Address : 3625 Old Potash Hwy Grand Island, United States, 68803

Prepared by : Shenzhen Accurate Technology Co., Ltd.
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Report No. : ATE20172226
Date of Test : Nov. 10, 2017--Nov. 21, 2017
Date of Report : Nov. 22, 2017

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Test Report Declaration

Applicant& address : Hornady Manufacturing Company
3625 Old Potash Hwy Grand Island, United States, 68803
Manufacturer& address : NINGBO YINZHOU RONGLI METAL PRODUCTS CO.,LTD
West End XiangYun Road, BinHai Industrial Zone, ZhanQi
Town, YinZhou District, NingBo, ZheJiang, China
Product : Hornady RAPiD Vehicle Safe
Model No. : 98210
Trade name : Hornady


Measurement Procedure Used:


FCC Rules and Regulations Part 15 Subpart C 15.209 ANSI C63.10: 2013

The device described above is tested by Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both radiated and conducted emissions. The measurement results are contained in this test report and Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Accurate Technology Co., Ltd.

Date of Test : Nov. 10, 2017--Nov. 21, 2017
Date of Report : Nov. 22, 2017

Prepared by : 
(Tim Hong Engineer)

Approved & Authorized Signer : 
(Sean Liu, Manager)

1. TEST RESULTS SUMMARY

Test Items	Test Standard	Test Results
Power Line Conducted Emission	FCC Part 15.207	N/A
Radiated Emission	FCC Part 15.209	Pass

Note: The power supply mode of the EUT is DC 12-24V, According to the FCC standard requirements, conducted emission is not applicable.

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

The submitted sample is wireless transmitter which declared TX channel frequency is 125kHz.

		Hornady RAPiD Vehicle Safe
Frequency	:	125kHz
Number of Channels	:	1
Modulation Type	:	ASK
Type of Antenna	:	Integral Antenna
Max antenna gain	:	5dBi
Power Supply	:	DC 12-24V(Powered by Vehicle charger)

2.2.Special Accessory and Auxiliary Equipment

N/A

2.3. Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

2.4. Measurement Uncertainty

Conducted emission expanded uncertainty	:	U=2.23dB, k=2
Power disturbance expanded uncertainty	:	U=2.92dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	:	U=3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	U=4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	:	U=4.06dB, k=2

3. MEASURING DEVICE AND TEST EQUIPMENT

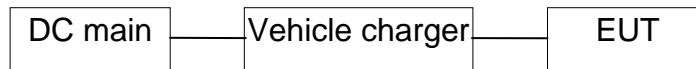
3.1. For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan.07, 2017	1 Year
2.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan.07, 2017	1 Year
3.	Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan.07, 2017	1 Year
4.	Test Receiver	Rohde& Schwarz	ESPI	100396/003	Jan.07, 2017	1 Year
5.	Test Receiver	Rohde& Schwarz	ESPI	101526/003	Jan.07, 2017	1 Year
6.	Test Receiver	Rohde& Schwarz	ESR	101817	Jan.07, 2017	1 Year
7.	Bilog Antenna	Schwarzbeck	VULB9163	9163-194	Jan.13, 2017	1 Year
8.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan.13, 2017	1 Year
9.	Log.-Per.Antenna	Schwarzbeck	VUSLP 9111B	9111B-074	Jan.13, 2017	1 Year
10.	Biconical Broad Band Antenna	Schwarzbeck	VHBB 9124+BBA 9106	9124-617	Jan.13, 2017	1 Year
11.	Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan.13, 2017	1 Year
12.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan.13, 2017	1 Year
13.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan.13, 2017	1 Year
14.	Vertical Active Monopole Antenna	Schwarzbeck	VAMP 9243	9243-370	Jan.13, 2017	1 Year
15.	RF Switching Unit+PreAMP	Compliance Direction	RSU-M2	38322	Jan.07, 2017	1 Year
16.	Pre-Amplifier	Agilent	8447D	294A10619	Jan.07, 2017	1 Year
17.	Pre-Amplifier	Rohde&Schwarz	CBLU11835 40-01	3791	Jan.07, 2017	1 Year
18.	50 Coaxial Switch	Anritsu Corp	MP59B	6200237248	Jan.07, 2017	1 Year
19.	50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.07, 2017	1 Year
20.	RF Coaxial Cable	Schwarzbeck	N-5m	No.1	Jan.07, 2017	1 Year
21.	RF Coaxial Cable	Schwarzbeck	N-1m	No.6	Jan.07, 2017	1 Year
22.	RF Coaxial Cable	Schwarzbeck	N-1m	No.7	Jan.07, 2017	1 Year
23.	RF Coaxial Cable	SUHNER	N-3m	No.8	Jan.07, 2017	1 Year
24.	RF Coaxial Cable	RESENBERGER	N-3.5m	No.9	Jan.07, 2017	1 Year
25.	RF Coaxial Cable	SUHNER	N-6m	No.10	Jan.07, 2017	1 Year
26.	RF Coaxial Cable	RESENBERGER	N-12m	No.11	Jan.07, 2017	1 Year
27.	RF Coaxial Cable	RESENBERGER	N-0.5m	No.12	Jan.07, 2017	1 Year
28.	RF Coaxial Cable	SUHNER	N-2m	No.13	Jan.07, 2017	1 Year
29.	RF Coaxial Cable	SUHNER	N-0.5m	No.15	Jan.07, 2017	1 Year
30.	RF Coaxial Cable	SUHNER	N-2m	No.16	Jan.07, 2017	1 Year
31.	RF Coaxial Cable	RESENBERGER	N-6m	No.17	Jan.07, 2017	1 Year

4. RADIATED EMISSION MEASUREMENT

4.1. Block Diagram of Test

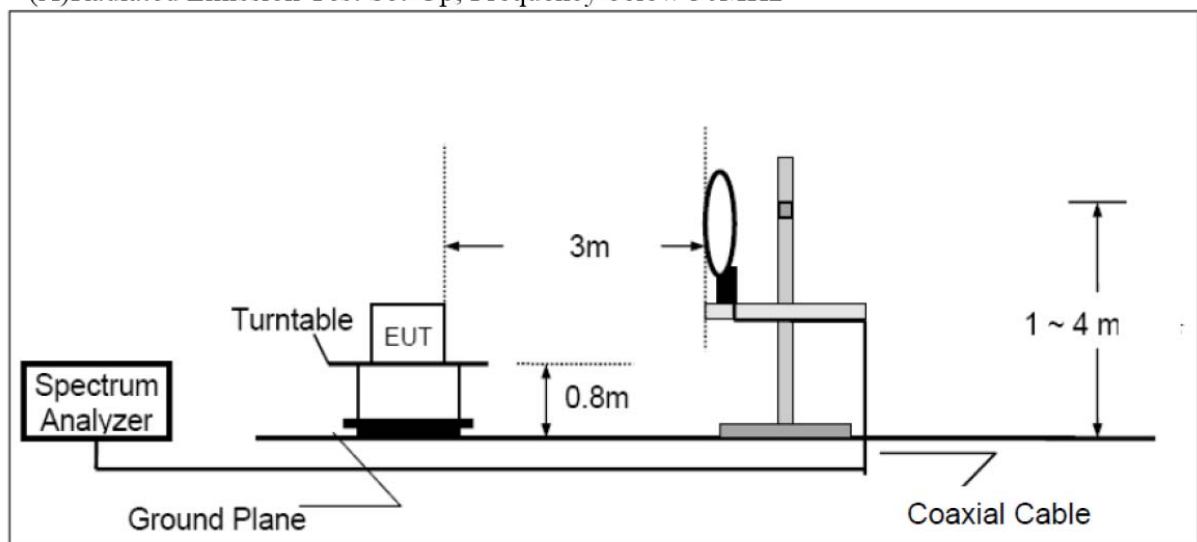
4.1.1. Block diagram of connection between the EUT and simulators



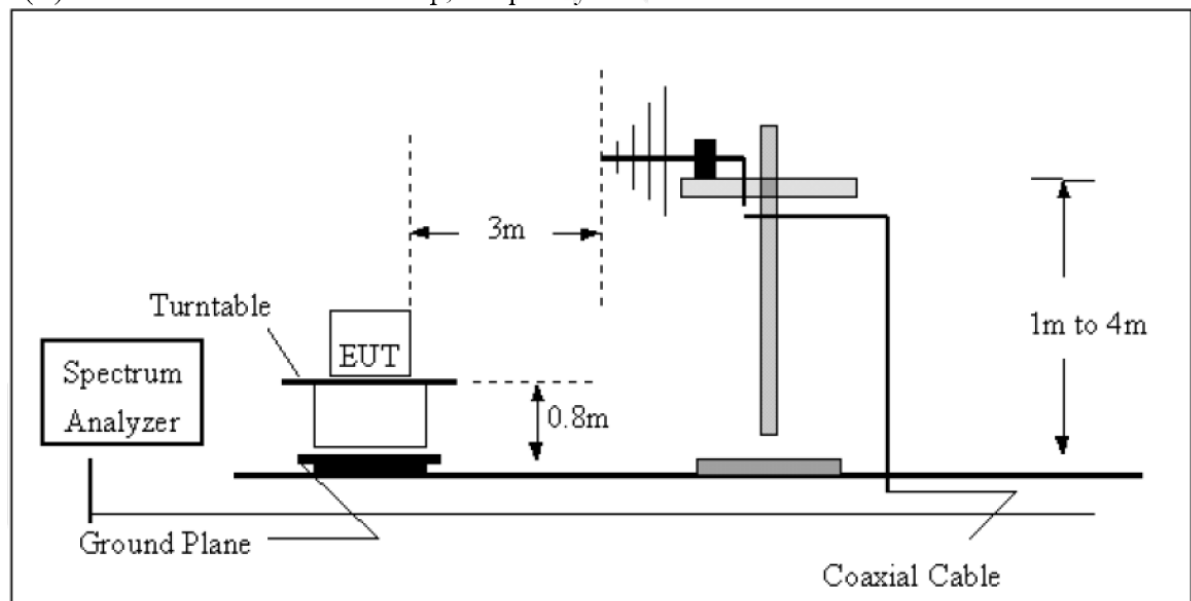
(EUT: Hornady RAPiD Vehicle Safe)

4.1.2. Block diagram of test setup (In chamber)

(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency 30-1000MHz



4.2.Radiated Emission Limit (Class B)

Frequency (MHz)	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

Limit: [2400/125=19.2uV/m@300m](#)

Distance Correction Factor=40log(test distance/specific distance)

4.3.Manufacturer

The following equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1.Hornady RAPiD Vehicle Safe (EUT)

Model Number: 98210

Manufacturer: NINGBO YINZHOU RONGLI METAL PRODUCTS CO.,LTD

4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

4.4.3.Let the EUT work in test mode and measure it.

4.5.DATA SAMPLE

Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
X.XX	49.83	-22.03	27.80	43.50	-15.70	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ V) = Uncorrected Analyzer/Receiver reading

Factor (dB/m)= Antenna factor + Cable Loss – Amplifier gain

Result(dB μ V/m) = Reading + Factor

Limit (dB μ V/m)= Limit stated in standard

Margin (dB) = Result(dB μ V/m) - Limit (dB μ V/m)

Calculation Formula:

$$\text{Margin(dB)} = \text{Result (dB}\mu\text{V/m)} - \text{Limit(dB}\mu\text{V/m)}$$
$$\text{Result(dB}\mu\text{V/m)} = \text{Reading(dB}\mu\text{V)} + \text{Factor(dB/m)}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

4.1. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated emission measurement.

From 9kHz to 30MHz at distance 3m The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

From 30MHz to 1000MHz at distance 3m The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The final measurement will be performed with an EMI Receiver set to Quasi Peak detector for the frequency bands 9kHz to 90kHz and 110 to 490 kHz where an average detector will be used according to Section 15.209(d)(2).

The final level, expressed in dBuV/m, is arrived at by taking the reading from the EMI receiver(Level dBuV) and adding the antenna correction factor and cable loss factor(Factor dB) to it. This result then has to be compared with the relevant FCC limit. The resolution bandwidth during the measurement is as follows:

9kHz – 150kHz: ResBW:200Hz

150kHz – 30MHz: ResBW:9kHz

The bandwidth of the EMI test receiver (R&S ESCS30) is set at 120kHz from 30MHz to 1000MHz.

4.2. Radiated Emission Noise Measurement Result

PASS.

From 9kHz to 30MHz

Frequency (MHz)	Quasi Peak (dB μ V/m)	Detector	Azimuth	Height (cm)	Limit @3m (dB μ V/m)	Margin (dB)
0.125	96.12	AV	176	128	105.7	-9.58
2.21	37.20	QP	375	155	69.5	-32.3
2.59	36.42	QP	228	201	69.5	-33.08
0.125	87.39	AV	208	142	105.7	-18.31
2.66	32.31	QP	375	157	69.5	-37.19
3.56	35.38	QP	38	146	69.5	-34.12

Part 15 Section 15.31(f)(2) (9kHz-30MHz)

Limit at 3m=Limit at 300m-40*log(3(m)/300(m))

Limit at 3m=Limit at 30m-40*log(3(m)/30(m))

From 30MHz to 1000MHz



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Job No.: frank2017 #1563

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Hornady RAPID Vehicle Safe

Mode: TX 125kHz

Model: 98210

Manufacturer: NINGBO YINZGOU RONGLI METAL PRODUCTS

Polarization: Horizontal

Power Source: DC 12V

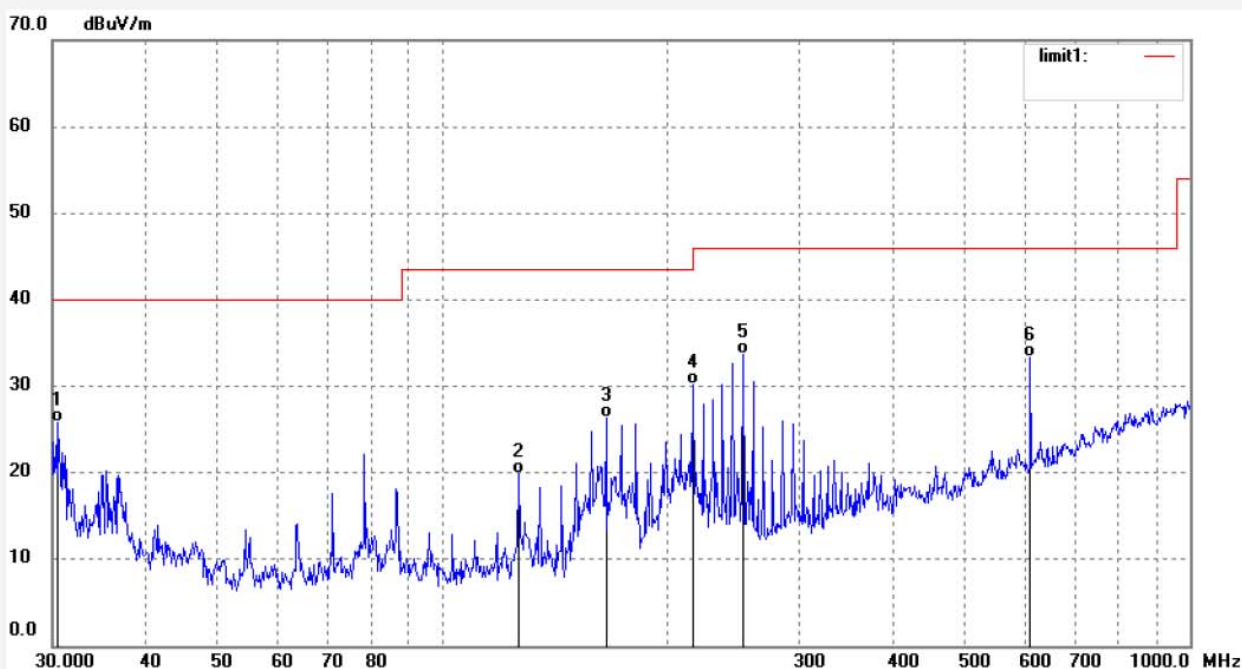
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Time: 14/44/49

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172226



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.4246	46.19	-20.31	25.88	40.00	-14.12	QP	200	183	
2	126.2486	47.52	-27.62	19.90	43.50	-23.60	QP	200	79	
3	165.4715	52.74	-26.48	26.26	43.50	-17.24	QP	200	349	
4	216.1196	54.22	-24.05	30.17	46.00	-15.83	QP	200	128	
5	252.2522	57.21	-23.51	33.70	46.00	-12.30	QP	200	248	
6	611.4623	46.76	-13.45	33.31	46.00	-12.69	QP	200	134	



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Job No.: frank2017 #1564

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Hornady RAPID Vehicle Safe

Mode: TX 125kHz

Model: 98210

Manufacturer: NINGBO YINZGOU RONGLI METAL PRODUCTS

Polarization: Vertical

Power Source: DC 12V

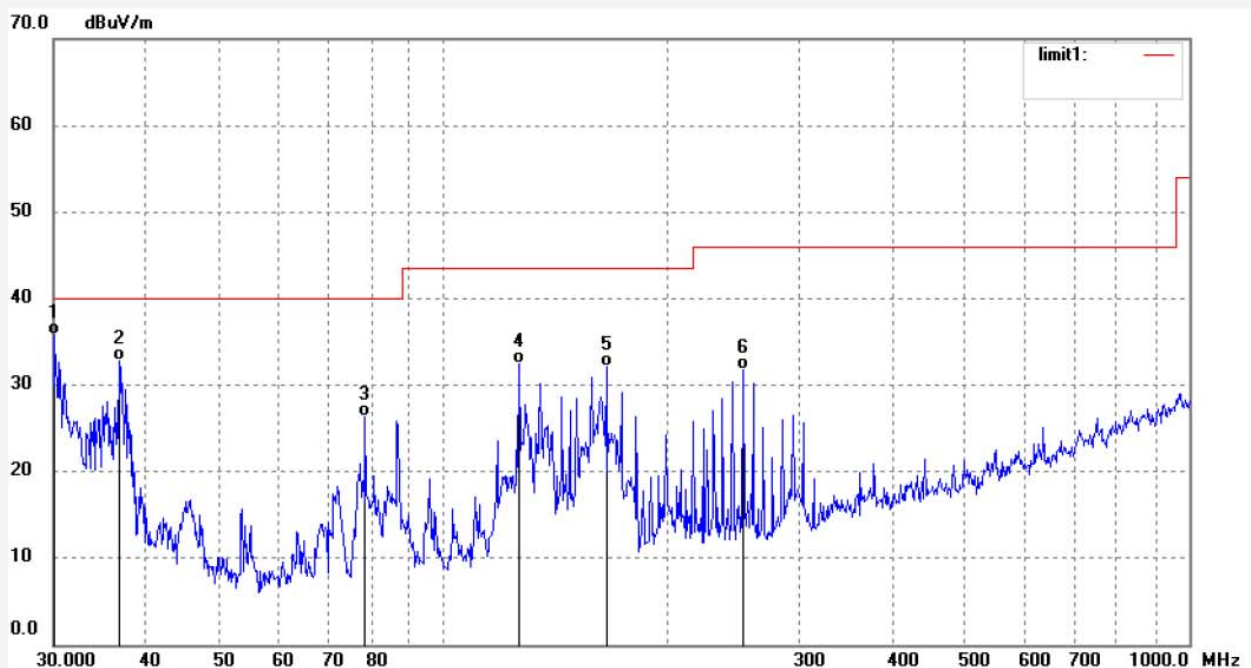
Date: 17/11/20/

Time: 14/45/34

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172226



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.0000	56.01	-20.20	35.81	40.00	-4.19	QP	100	112	
2	36.7811	55.00	-22.21	32.79	40.00	-7.21	QP	100	137	
3	78.5644	53.80	-27.49	26.31	40.00	-13.69	QP	100	119	
4	126.2486	60.14	-27.62	32.52	43.50	-10.98	QP	100	159	
5	165.4715	58.51	-26.48	32.03	43.50	-11.47	QP	100	40	
6	252.2522	55.23	-23.51	31.72	46.00	-14.28	QP	100	358	

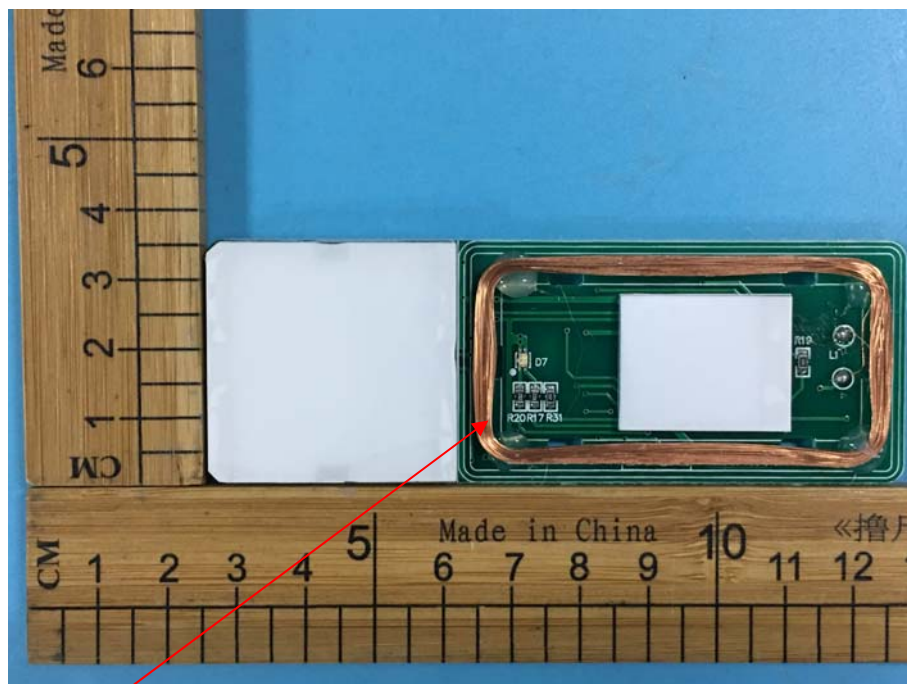
5. ANTENNA REQUIREMENT

5.1.The Requirement

According to 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.

5.2.Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The max Antenna gain of EUT is 5dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna