



Report No: FCC1704179

File reference No: 2017-05-03

Applicant: Shenzhen A-OK Technology Grand Development Co., LTD

Product: Wall type emitter

Model No: AC135

Trademark: A-OK

Test Standards: FCC Part 15 Subpart C, Paragraph 15.231

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.231 for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: May 03, 2017

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

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Test Report Conclusion

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.
Address: Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone, Futian District,Shenzhen, Guangdong China
Telephone: (755) 83448688
Fax: (755) 83442996
Site on File with the Federal Communications Commission – United States
Registration Number: 899988
For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Shenzhen A-OK Technology Grand Development Co., LTD
Address: 3rd Fl,34 East Bldg, Chentian Industry District, Xi'xiang Town, Ban'an Zone, Shenzhen City, Guangdong, China
Telephone: 0086-755-27582809
Fax: 0086-755-27582185

1.3 Description of EUT

Product: Wall type emitter
Manufacturer: Shenzhen A-OK Technology Grand Development Co., LTD
Address: 3rd Fl,34 East Bldg, Chentian Industry District, Xi'xiang Town, Ban'an Zone, Shenzhen City, Guangdong, China
Brand Name: A-OK
Model Number: AC135
Additional Model Name: N/A
Additional Trade Name: N/A
Rating: Input: 3V (CR2032 button battery)
Operation Frequency: 433.92MHz
Modulation Type: OOK
Antenna Designation: PCB Antenna with Gain 0dBi

1.4 Submitted Sample

2 Samples

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1.5 Test Duration

2017-04-28 to 2017-05-03

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

A handwritten signature in black ink that reads "Terry Tang".

The sample tested by _____

Print Name: Terry Tang

Test Equipments					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2016-08-23	2017-08-22
System Controller	CT	SC100	-	2016-08-23	2017-08-22
Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2016-08-23	2017-08-22
3m OATS	--	--	N/A	2016-08-23	2017-08-22
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2016-08-23	2017-08-22
3m Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W) * 6.4(H)	--	2016-08-23	2017-08-22
RF Cable	SCHWARZBECK	--	--	2016-08-23	2017-08-22
Pre-Amplifier	HP	8447D	2727A05017	2016-08-05	2017-08-04
Pre-Amplifier	EM	EM30265	--	2016-08-05	2017-08-04

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna requirements	PASS	Compliant
FCC Part 15, Paragraph 15.207	Conducted Emission Test	N/A	Compliant
FCC Part 15, Paragraph 15.209	General Requirement	PASS	Compliant
FCC Part 15, Paragraph 15.231 (b)	Radiated Emission Test	PASS	Compliant
FCC Part 15, Paragraph 15.231 (c)	20dB Bandwidth Testing	PASS	Compliant
FCC Part 15, Paragraph 15.231 (a) (1)	Deactivate Testing	PASS	Compliant

3.2 Test Standards

FCC Part 15 Subpart C, Paragraph 15.231 , ANSI C63.4 :2014 and ANSI C63.10 :2013

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

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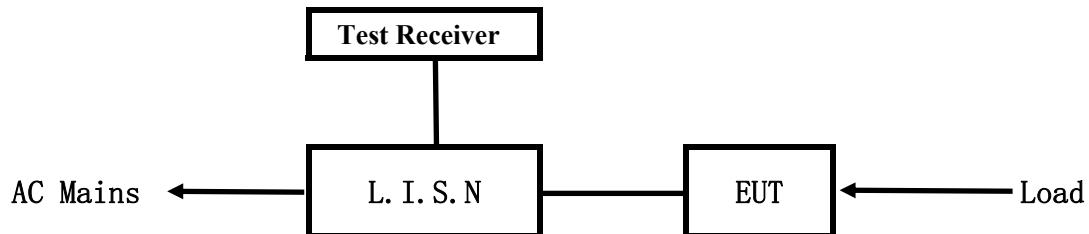
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

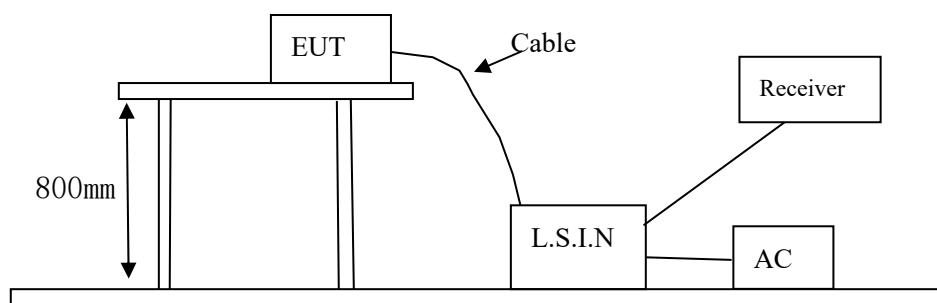


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014.

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
Wall type emitter	Shenzhen A-OK Technology Grand Development Co., LTD	AC135	YC5-AC135

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

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5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2014.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz. (The average detector is necessary when the Quasi-peak emission level beyond the average Limit.)

Note: Due to Battery operation, this test item not applicable.

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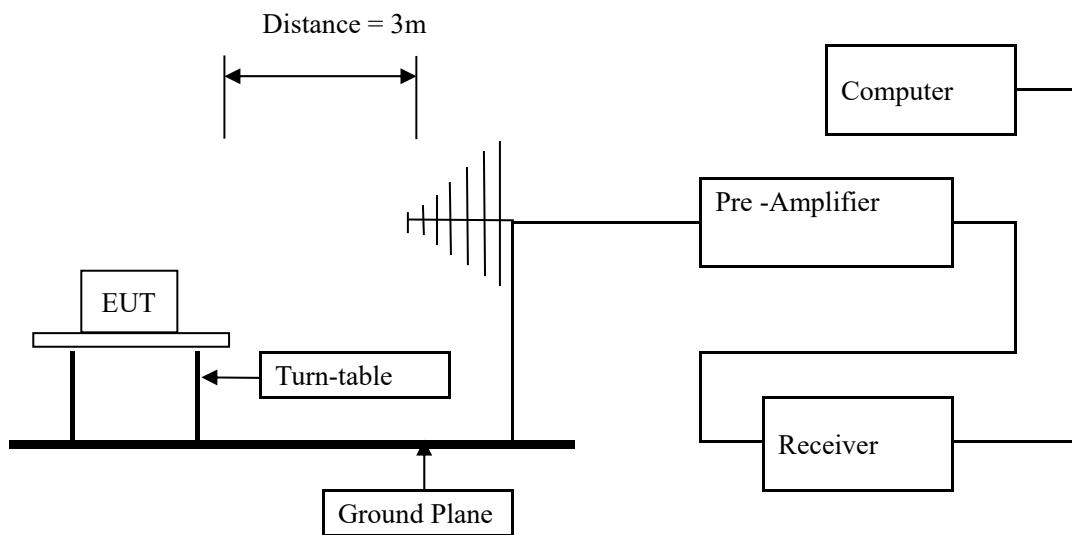


6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at TIMEWAY EMC Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 5 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- (4) The antenna height is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings were performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

A FCC Part 15 Subpart C Paragraph 15.231(a) Limit AND RSS-210 A1.1 Table A

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious Emission	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	1250-3750	61.94-71.48	125-375	41.94-51.48
174-260	3750	71.48	375	51.48
260-470	3750-12500	71.48-81.94	375-1250	51.48-61.94
Above 470	12500	81.94	1250	61.94

Note:

1. RF Field Strength (dBuV) = $20 \log_{10} \text{RF Voltage (uV)}$
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.
4. Linear interpolations for frequency ranges 130-174MHz and 260-470MHz
5. The above field strength limits are specified at a distance of 3-meters and the tighter limits apply at the band edges
6. New batteries were installed in the equipment under test for radiated emission testing.
7. This is a handheld device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand). After pre-test. It was found that the worse radiated emission was get at the lying position.

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B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage (dBuV) = $20 \log_{10}$ RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
 4. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz. As to 1G-5G, the final emission level got using PK detector. And Average = peak(dBuV/m) – duty cycle(dB)

6.5 Test result

A Fundamental and Harmonics Radiated emission data

Product:	Wall type emitter	Test Mode:	Keep Transmitting
Test Item:	Fundamental Radiated Emission and Spurious Emission Data	Temperature:	25°C
Test Voltage:	DC 3V	Humidity:	56%
Test Result:	Pass		
Frequency (MHz)	Emission PK/AV (dBuV/m)	Horiz / Vert	Limits PK/AV (dBuV/m)
433.92	83.76 (PK)/75.66 (AV)	H	100.8/80.8
433.92	82.94 (PK)/74.84 (AV)	V	100.8/80.8
867.84	47.24 (PK)	H	80.8/60.8
867.84	43.79 (PK)	V	80.8/60.8
1301.76	51.41 (PK)	H	74/54
1301.76	51.41 (PK)	V	74/54
1735.68	48.01 (PK)	H	80.8/60.8
1735.68	46.23 (PK)	V	80.8/60.8
2169.6	44.18 (PK)	H	80.8/60.8
2169.6	42.91 (PK)	V	80.8/60.8
2603.52	41.53 (PK)	H	80.8/60.8
2603.52	41.46 (PK)	V	80.8/60.8
3037.44	--	H/V	80.8/60.8
3471.36	--	H/V	80.8/60.8
3905.28	-	H/V	80.8/60.8
4339.2	--	H/V	80.8/60.8

Note: 1. Average = peak(dBuV/m) + duty cycle factor(dB), then AV = PK-8.1

H=Horizontal, V=Vertical

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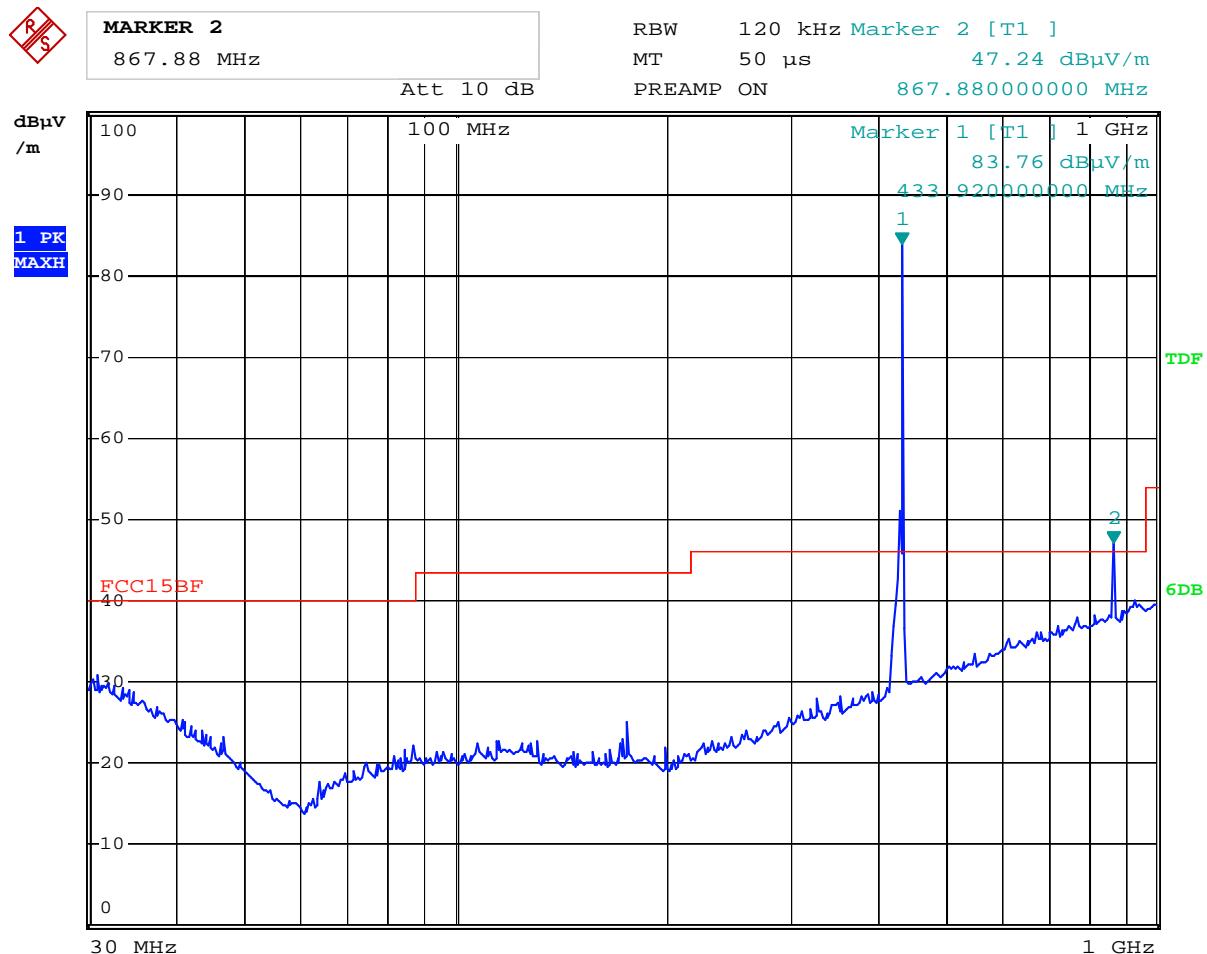
B. General Radiated Emission Data

Radiated Emission In Horizontal (30MHz---1000MHz)

EUT set Condition: Keep Transmitting

Results: **Pass**

Please refer to following diagram for individual



Date: 28.APR.2017 22:11:26

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	H	--

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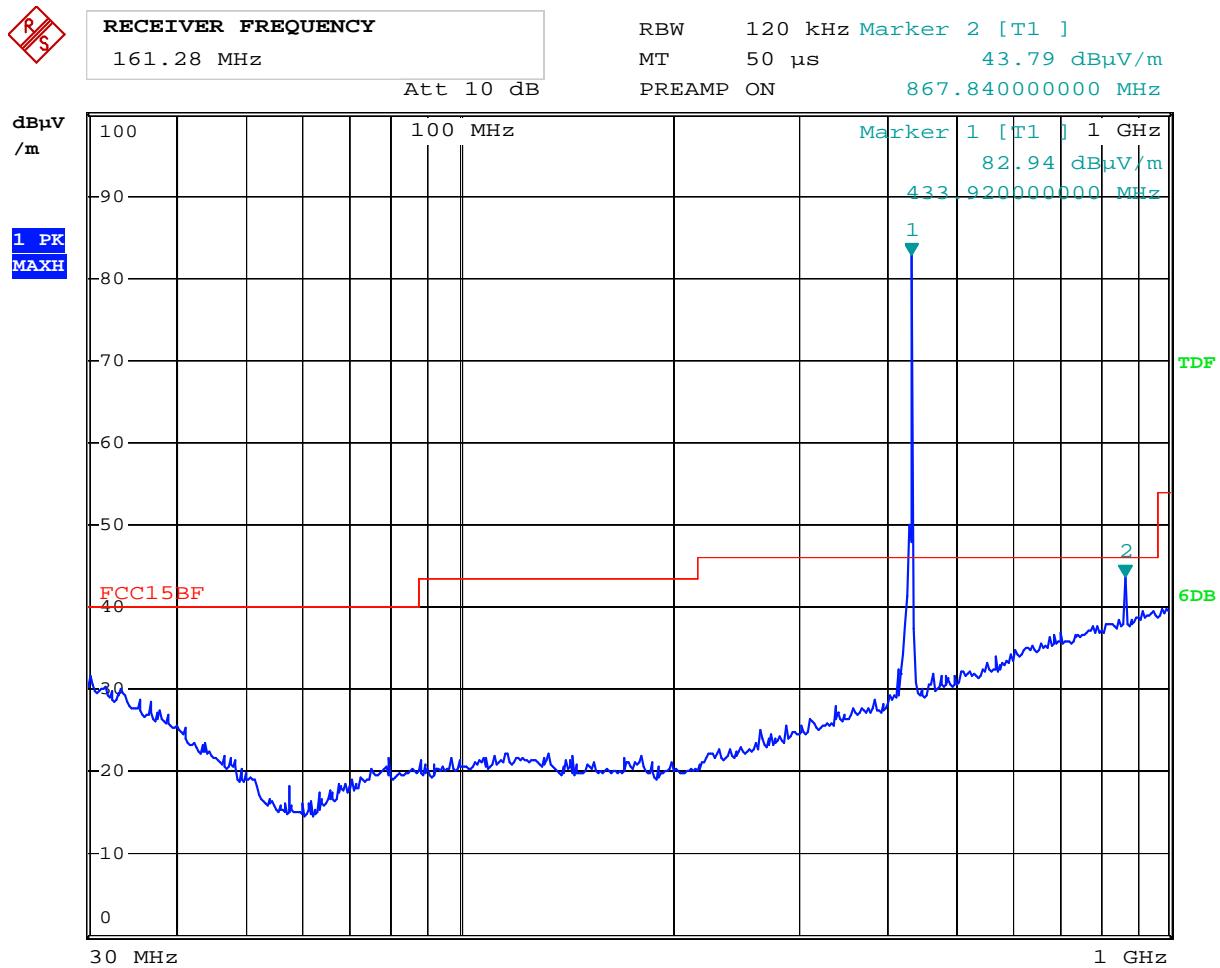
B. General Radiated Emission Data

Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

Results: Pass

Please refer to following diagram for individual



Date: 28.APR.2017 22:19:30

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	V	--

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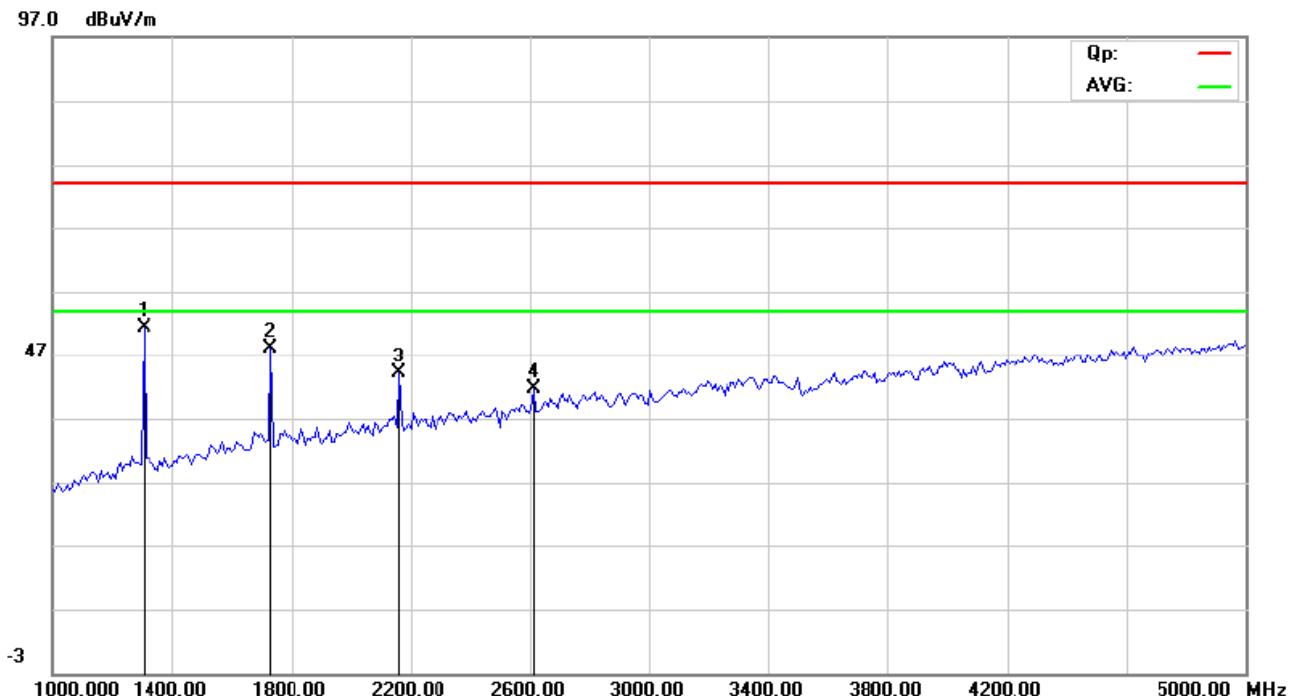
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Test Plot above 1G

Horizontal



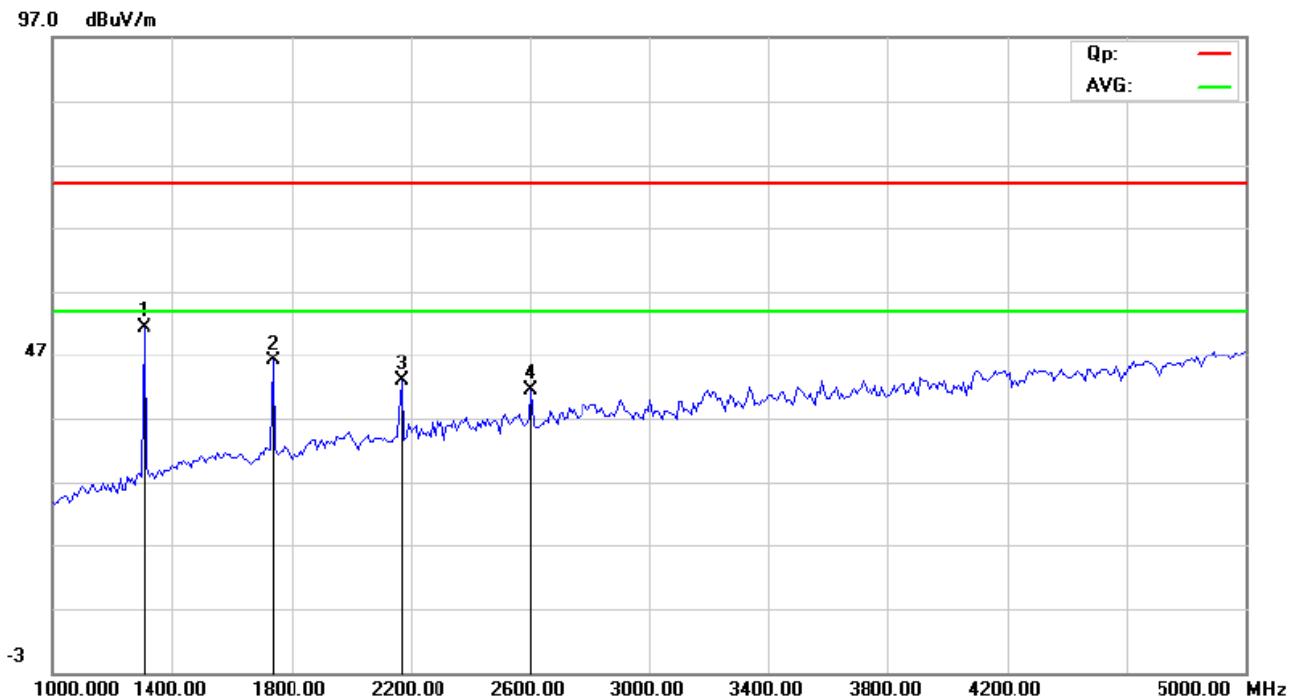
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Vertical



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7.0 20dB and 99% Bandwidth Testing

7.1 Requirement

Per 15.231(c) and RSS-210 A1, 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

7.2 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

7.3 Test Data

Frequency (MHz)	20dB Bandwidth Emission (kHz)	Limit (kHz)	Result
433.92	165	1084.80	Pass

Limit=Frequency x 0.25%=433.92x 0.25%=1084.80kHz

Refer to attached plots:

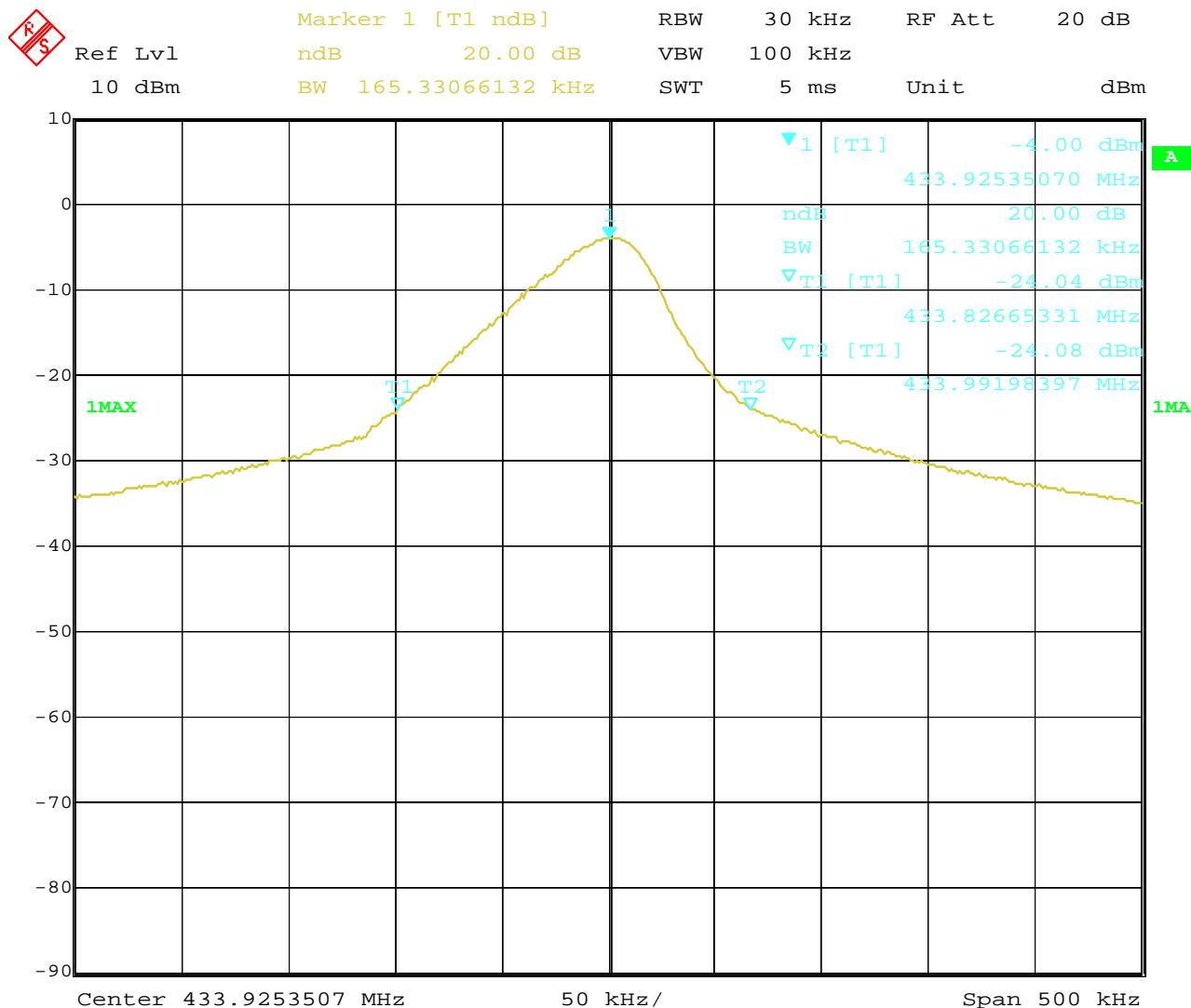
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20dB Bandwidth



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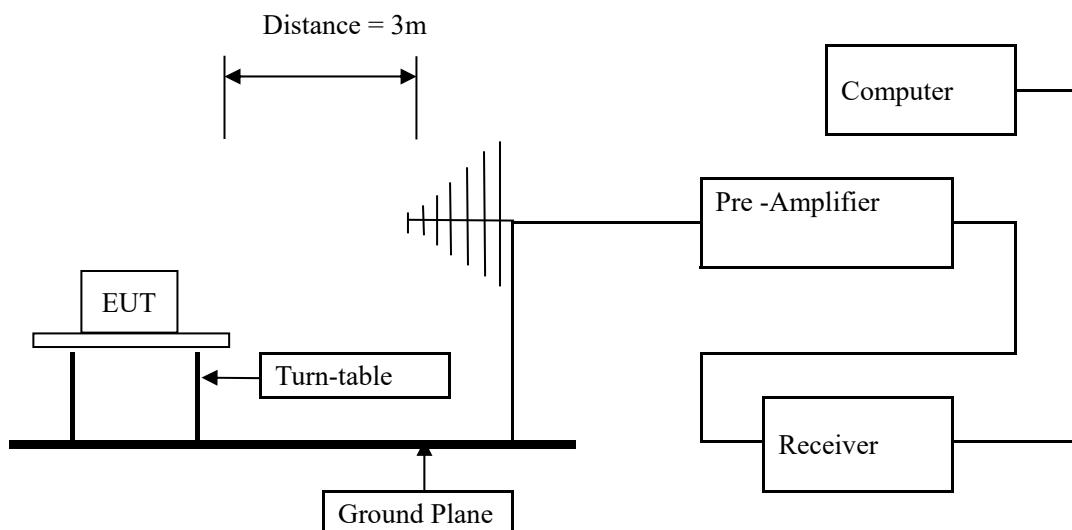
8.0 Deactivate Test

8.1 Requirement

Per 15.231(a)(1)

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

8.2 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing

The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.231(e) limits.

8.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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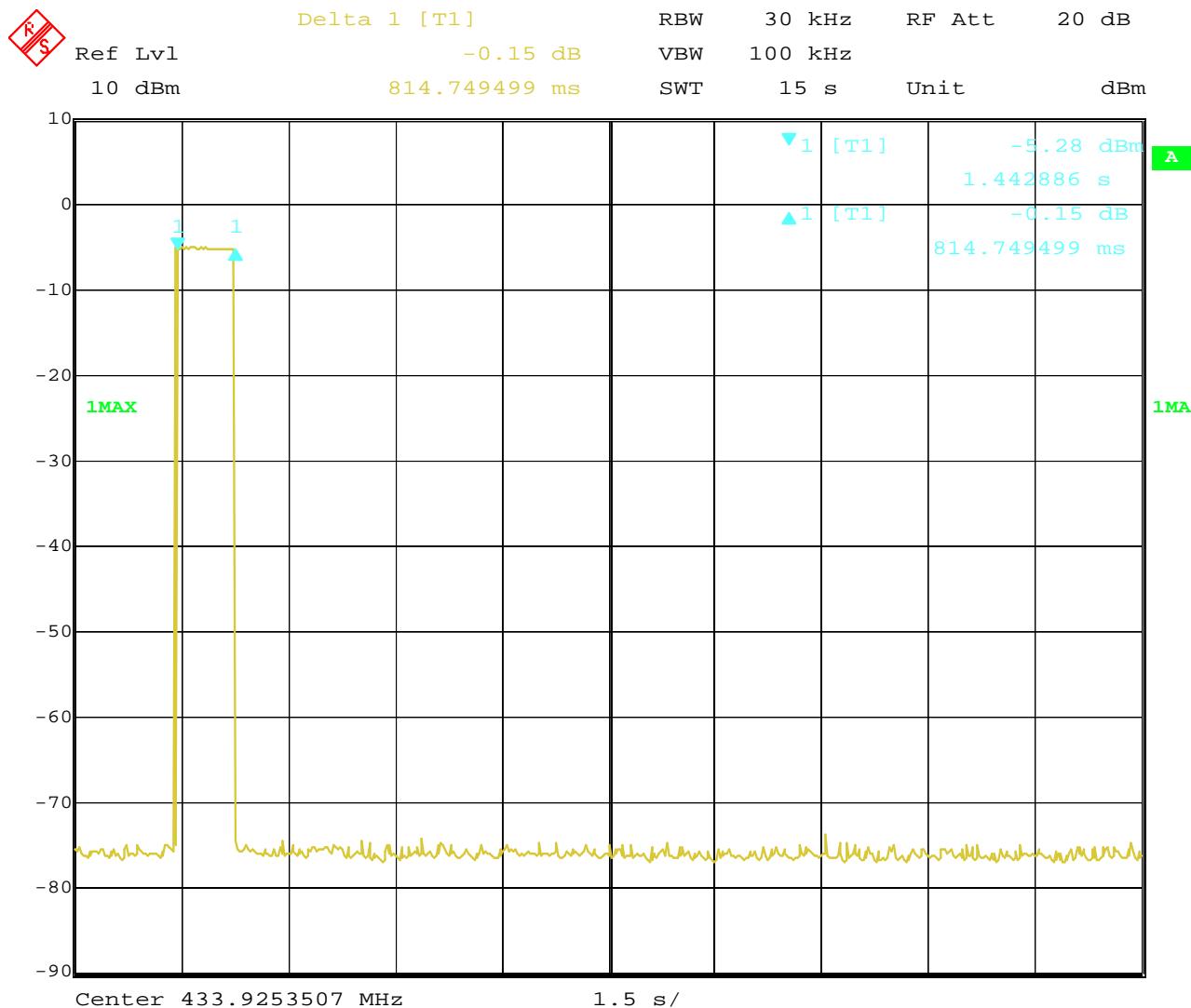
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8.4 Test Data

Refer to attached plots:



8.5 Test result

Pass

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9.0 Duty Cycle

9.1 Limit

No dedicated limit specified in the Rules

9.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100kHz, Span=0Hz, Adjust Sweep=100ms.
5. Repeat above procedures until all frequency measured were complete.

9.3 Test Data

Base on the worst case

$T_p = 100\text{ms}$

$T_{on1} = 0.261 * 47 = 12.267(\text{ms})$

$T_{on2} = 0.581 * 38 = 22.078(\text{ms})$

$T_{on3} = 5.01 * 1 = 5.01(\text{ms})$

Duty cycle = $T_{on}/T_p = 39.355/100 = 0.39355$

Duty cycle factor = $20 * \log(\text{duty cycle}) = 20 * \log(0.39355) = -8.10\text{dB}$

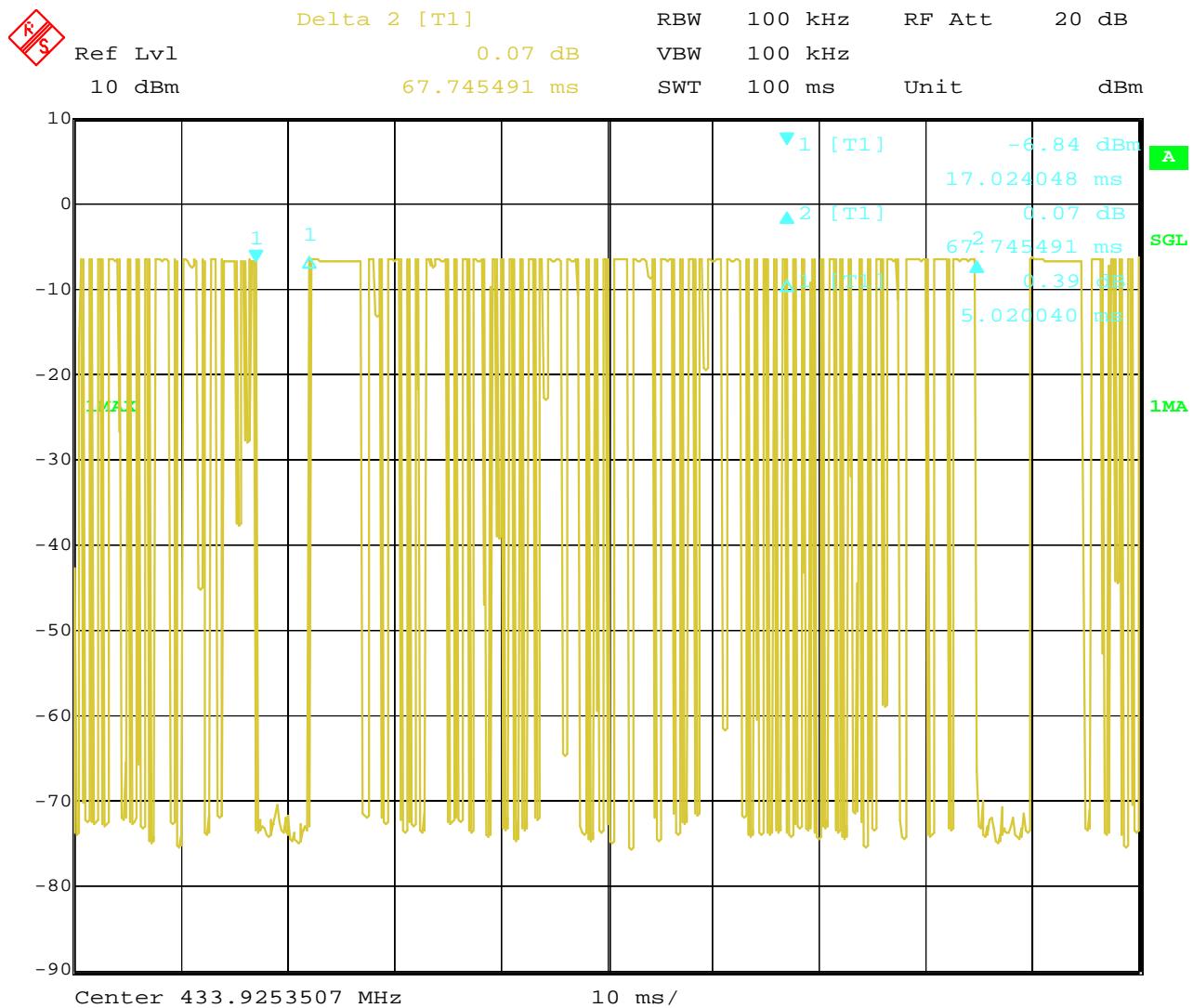
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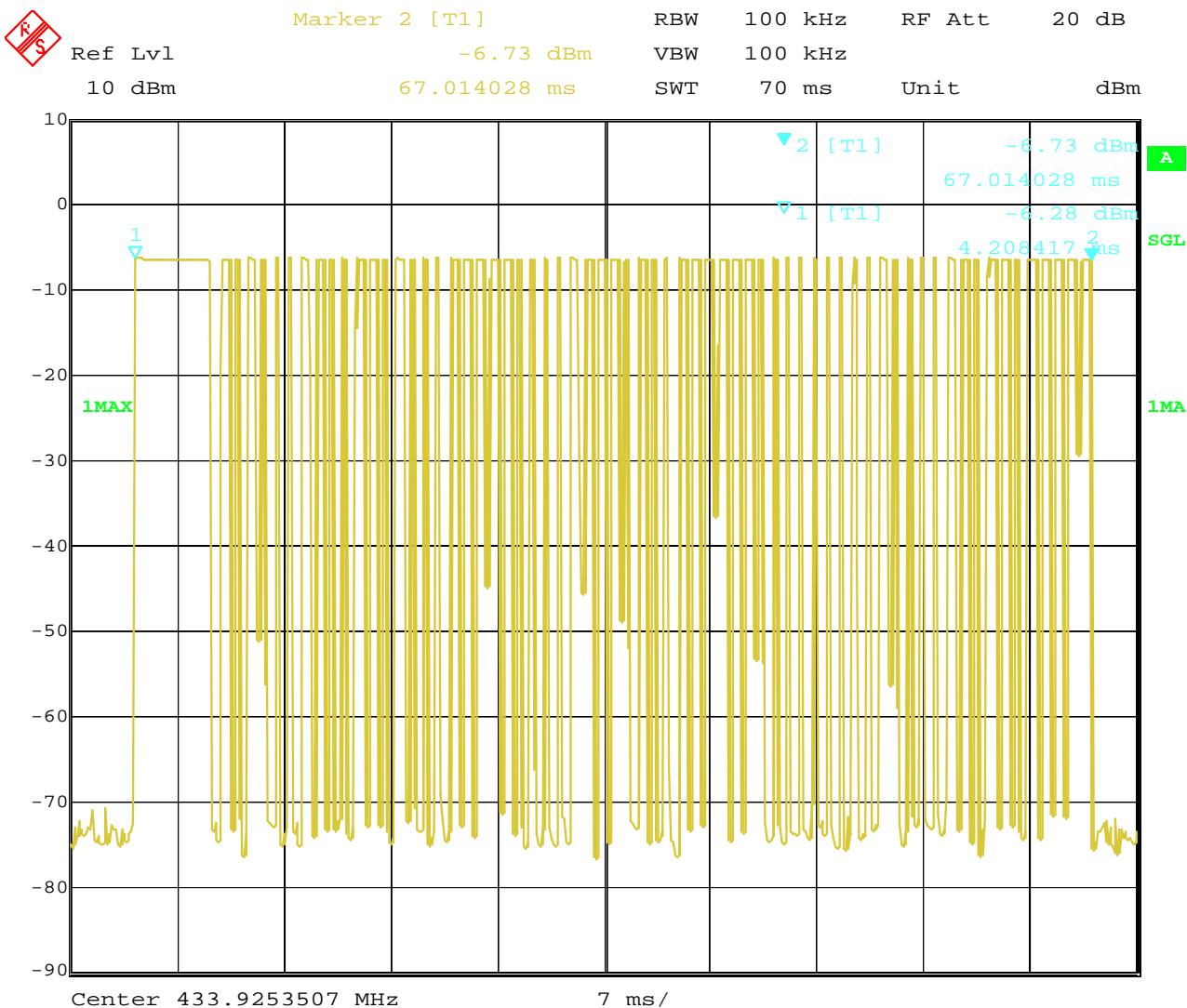
Testing Plots:



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Date: 28.APR.2017 12:08:29

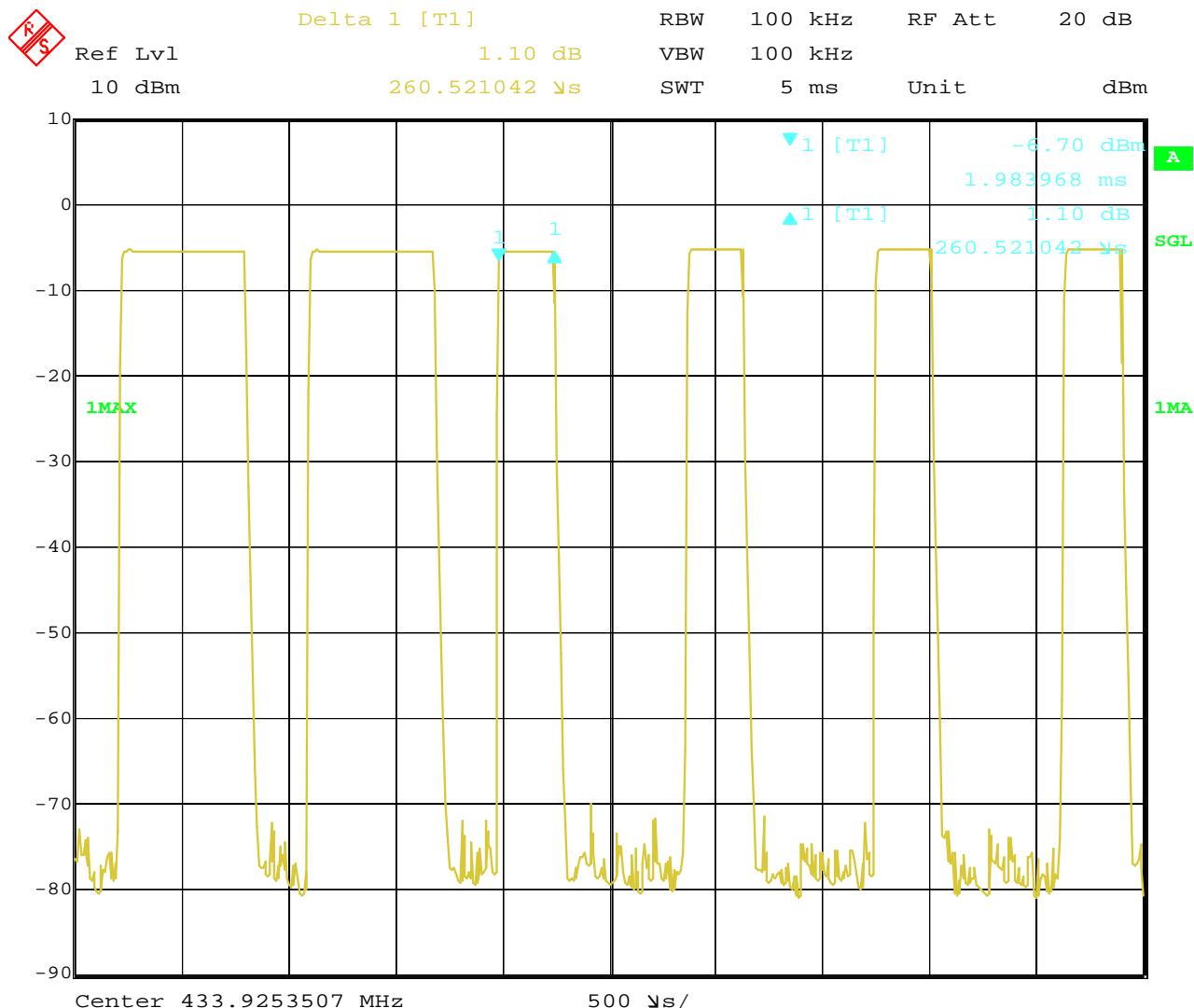
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T_{on1}



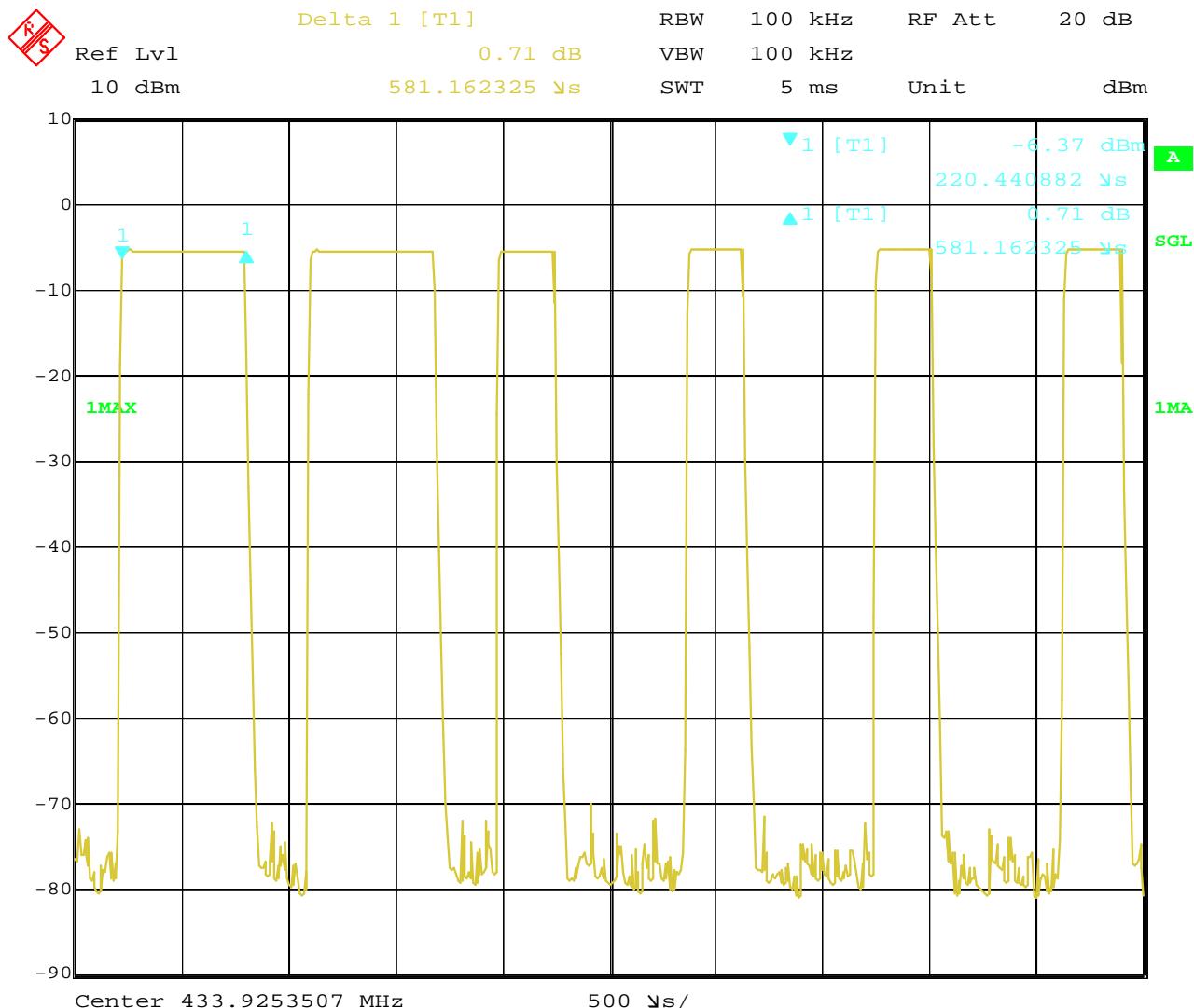
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T_{on2}



Date: 28.APR.2017 12:11:19

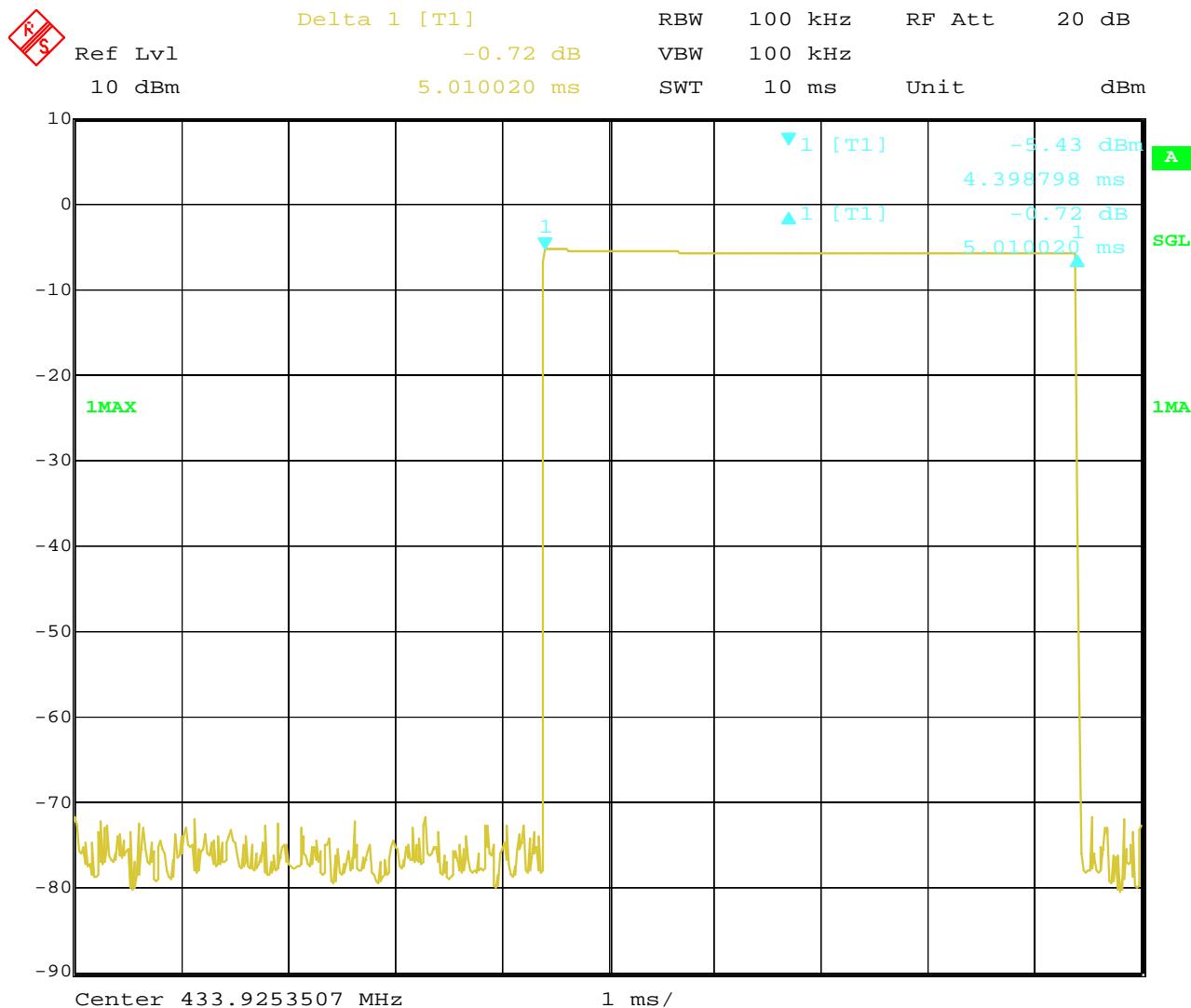
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T_{on3}



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10.0 Antenna Requirement

10.1 Standard Applicable

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 Sections 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 Section 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.

10.2 Antenna Connected constructions

The antenna is PCB Printed antenna which is built-in. The antenna gain is 0dBi. So it meets the requirement of 15.203

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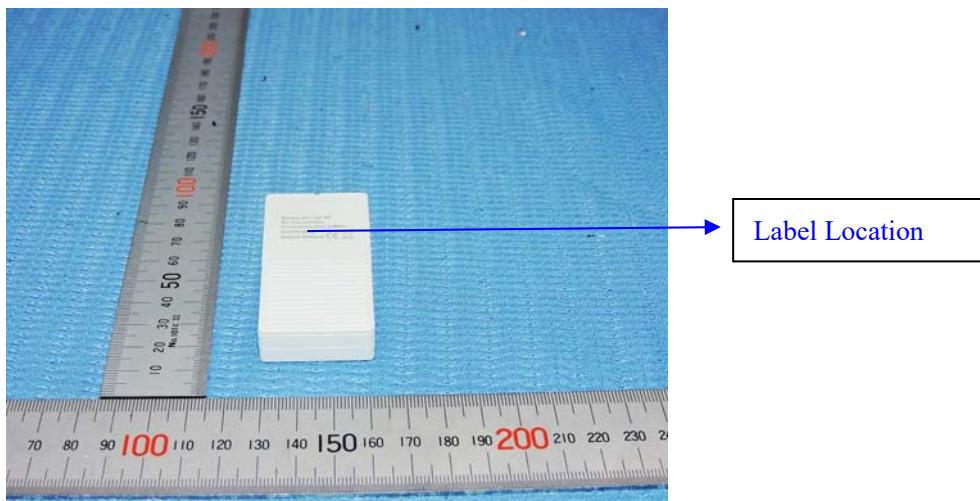


11.0 FCC ID Label

FCC ID: YC5-AC135

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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12.0. Photo of testing

12.1 Conducted test View—N/A

12.2 Radiated emission test view



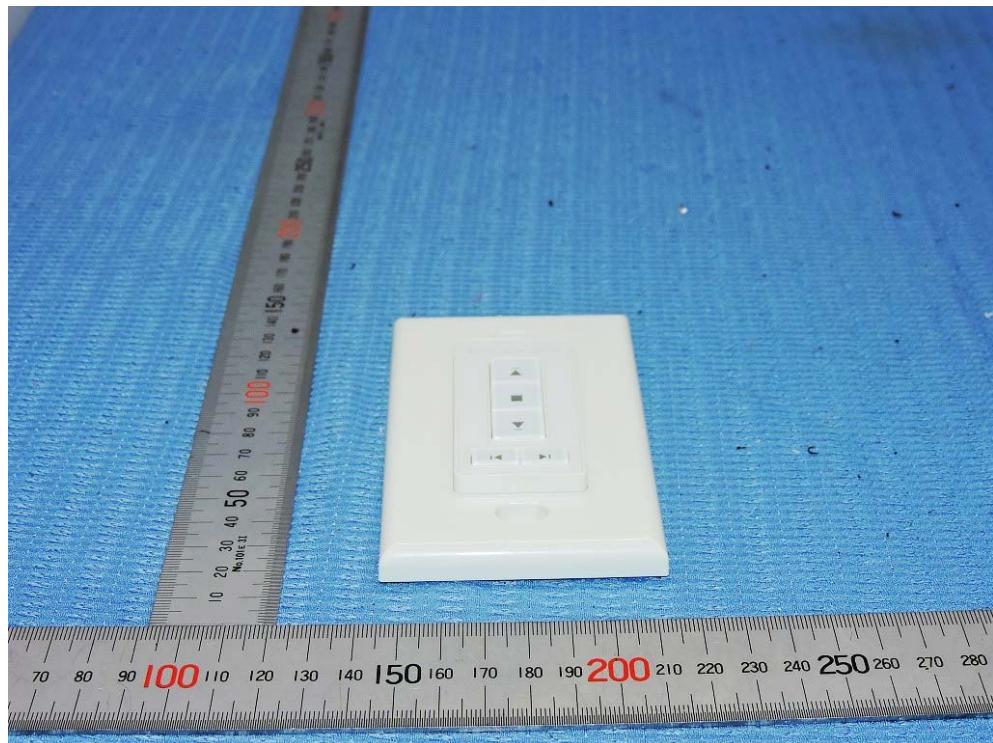
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Photo for the EUT



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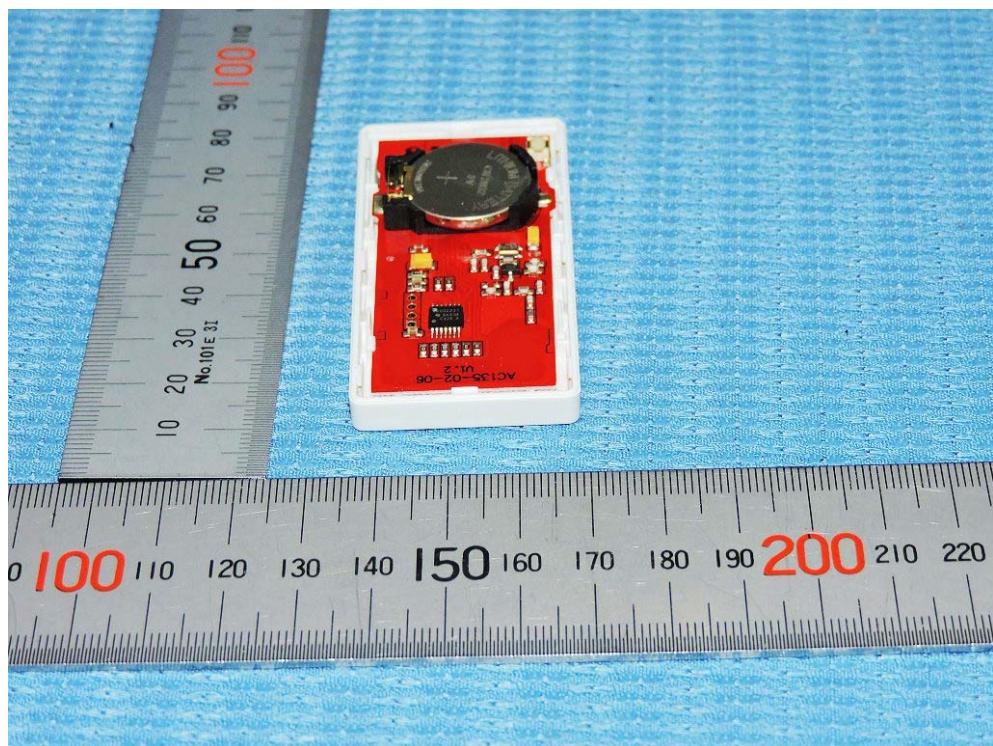
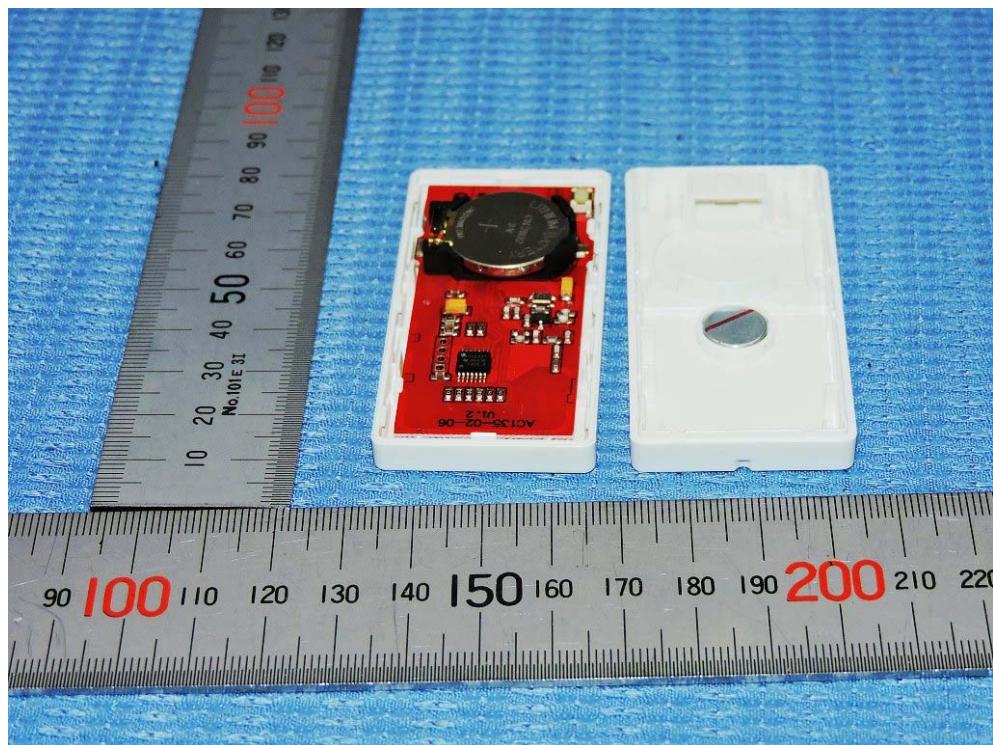
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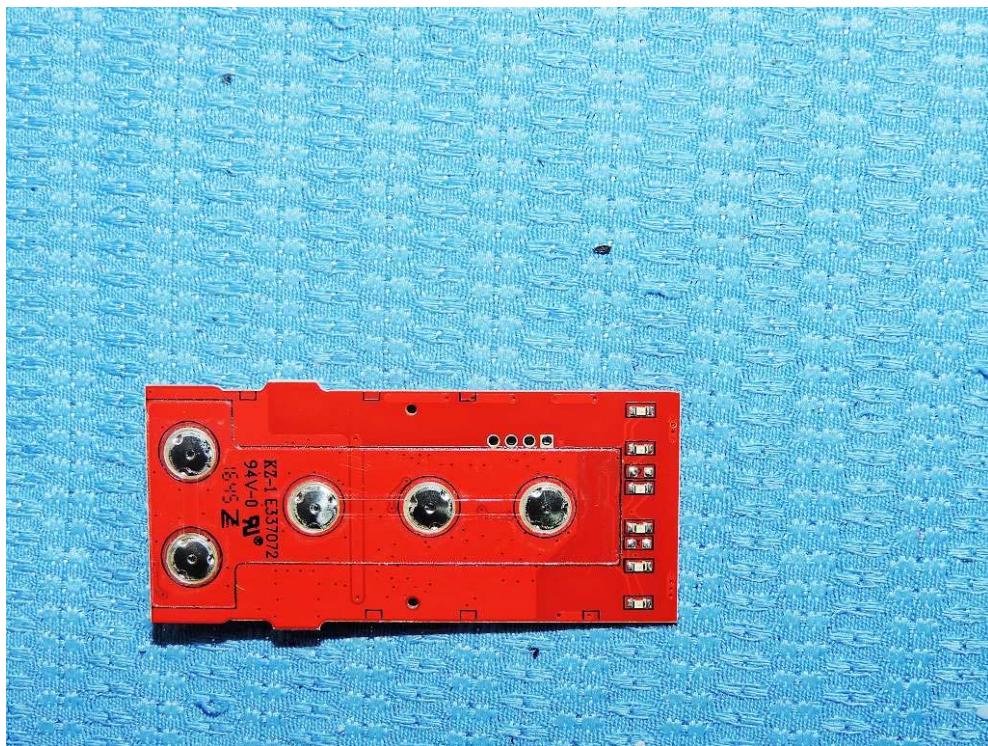
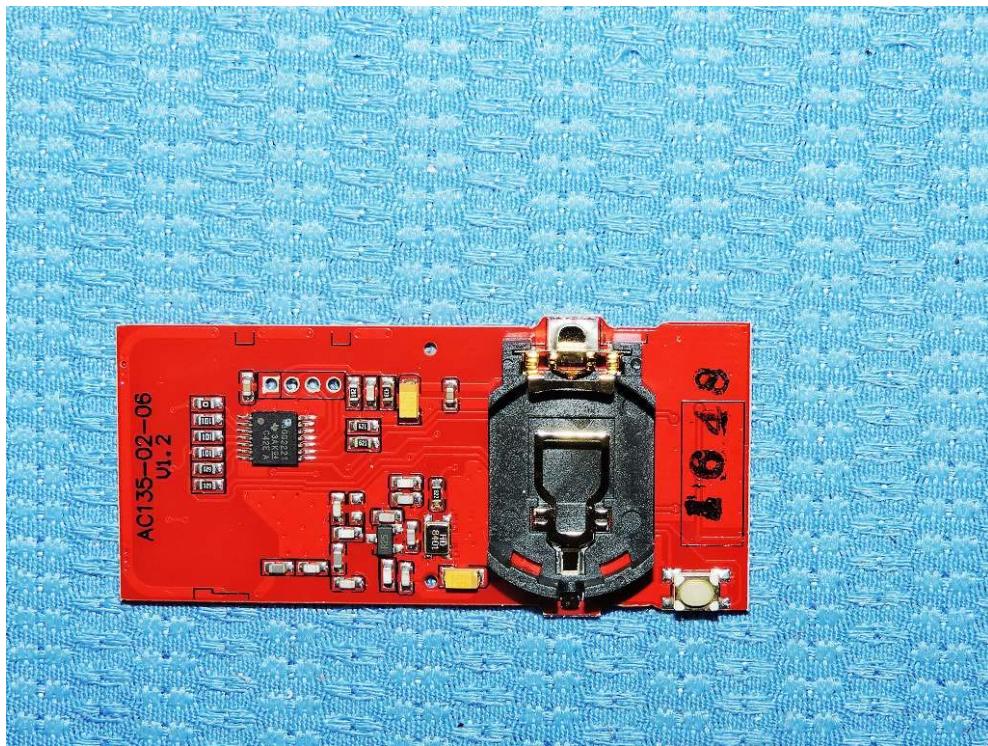
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Photo for the EUT



End of the report-

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