SLG Asia Test Labs & Service (HK) Limited

Test Report

According to

FCC PART 15 Subpart C

FCC ID: LQP-WB007-9

Test Report Number: H1M21209-0513-P-15

SLG Asia Test Labs & Service (HK) Limited
26/F., Tamson Plaza, 161 Wai Yip Street
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SLG Asia Test Labs & Service (HK) Limited

TEST REPORT

Summary | FCC Part 15C

Test Report No. ..... :	H1M21209-0513-P-15
Date of issue..... :	15.10.2012
Testing Laboratory name ..... :	SLG Asia Test Labs & Service (HK) Limited
Address..... :	26/F., Tamson Plaza, 161 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Applicant's name ..... :	Smarthome Products Ltd.
Address..... :	Rm B808-809, 8/F., Blk B, Sea View Estate, 2-8 Watson Road, North Point, Hong Kong
Manufacturer's name ..... :	Smarthome Products Ltd.
Address..... :	Rm B808-809, 8/F., Blk B, Sea View Estate, 2-8 Watson Road, North Point, Hong Kong
Test specification	
Standard(s) applied ..... :	FCC Rules 47 CFR Part15 Subpart C (Section 15.231)
Test item description ..... :	Wireless door chime transmitter
Brand Name ..... :	---
Model and/or type reference..... :	WB007-9
Rating(s) ..... :	12 V battery (A23)

Summary of Test Results **Pass**

The Summary of Test Results based on a technical opinion belongs to the applied standard(s).

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Further details of testing are provided in particular chapters of this Test Report.
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1 General Information

1.1 Test Report

Tested by:

15.10.2012	Mr. Karl Lau	
Date	Test Engineer	Signature

Approved by:

15.10.2012	Mr. F. Schulz	
Date	Laboratory Manager	Signature

1.2 Test Location

All tests were carrying by personnel from:

Name: SLG Asia Test Labs & Service (HK) Limited
Address: 26/F., Tamson Plaza, 161 Wai Yip Street
Kwun Tong, Kowloon, Hong Kong

Telephone: +852 2389 2200
Fax: +852 2389 3073

The Test facility for radiated measurements is located at:

Name : Hong Kong Productivity Council
Address: EMC Centre, LG1, HKPC Building, 78 Tat Chee Avenue
Kowloon, Hong Kong

The Hong Kong Laboratory Accreditation Scheme (HOKLAS)
Reg. No.082

FCC registered measurement facility
Reg. No.90656

1.3 Details of applicant

Name: Smarthome Products Ltd.
Address: Rm B808-809, 8/F., Blk B, Sea View Estate, 2-8 Watson Road
North Point, Hong Kong

Contact: Ms. Stella Wong
Telephone: +852 2566 1832
Fax: +852 2510 8742

1.4 Manufacturer

Name: Smarthome Products Ltd.
Address: Rm B808-809, 8/F., Blk B, Sea View Estate, 2-8 Watson Road
North Point, Hong Kong

Contact: Ms. Stella Wong
Telephone: +852 2566 1832
Fax: +852 2510 8742

1.5 Application details

Date of receipt of application:	28.09.2012	
Date of receipt of test item:	28.09.2012	
Date (s) of performance of tests:	28.09.2012	- 15.10.2012

1.6 Test item

Description of test item:	Wireless door chime transmitter
Type identification:	WB007-9
Brand Name:	---
Equipment category:	Transmitter
Device Type:	Periodic Operation 15.231
Operation frequency range:	434 MHz
No of channels:	1
Emission designator:	L1D
Operation mode:	simplex
Type of antenna:	integral
Power supply:	12 V battery (A23)

All information was provided by the applicant)

Test configurations:

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT (Made on the PCB). One LED is located on the front appearance. This manually operated transmitter will continuously transmit signal during a time period of 2 seconds after the button is pressed. And it will deactivate after this 2s period till the button is pressed again.

1.7 General Test Conditions

Environmental reference conditions

If not defined otherwise by the Technical Committee responsible for the generic standard and/or the product standard the climatic conditions during the tests are to be within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C - 35 °C	30 % - 60 %	860 hPa - 1060 hPa

If explicitly required in the test base (basic) the climatic values are recorded and documented separately for the respective test.

Calibration of measurement and test equipment

All measurement and testing equipment that has a significant influence on the accuracy of qualitative measurements and tests is subject to a periodical in-house system of calibration and servicing that is part of the quality management system of the EMC laboratory of SLG Asia Test Labs & Service (HK) Limited.

Measurement uncertainties

All tests are subject to measurement uncertainties. The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability. This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).
The limits for emission measurements and the test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the basic standards.
All measurement and test results of the EMC laboratory of SLG Asia Test Labs & Service (HK) Limited fulfil the requirements for measurement uncertainties according to the standards applied.

2 Test result Summary

FCC Rules 47CFR PART 15.231

Requirements according standard:		
FCC Rule	**Test description**	**Verdict**
Section 15.231(b) 1	Field strength of Fundamental	**Pass**
Section 15.231(b) 2, 15.209	Field strength of spurious emission	**Pass**
Section 15.231(c)	Emission bandwidth	**Pass**
Section 15.231(a) 1	Automatically deactivation	**Pass**

Test case verdicts

P	*- Pass*	*Test item does meet the requirement*
F	*- Fail*	*Test item does not meet the requirement*
N.A.	*- Not Applicable*	*Test case does not apply to the test object*

3 Test results

3 Transmitter parameter

3.1 Field Strength of the Fundamental Wave

Test results

Calculation of test results:
Such factors like antenna factor and cable loss are already included in the provided measurement results. All results measured with average detector.

Calculation of Duty Cycle Correction Factors:
The pulse train timing plots as follows:
Each cycle is 18.2ms. For the duration 100ms, count 6 pulse trains,
Co efficiency = 20 log ((460/754.4 x 9.2)6 /100) = -9.46dB
The maximum average field strength should be 0.34 of the peak field strength measured for 100ms duration.

Frequency [MHz]	Antenna Polarization	Measuring Result (AV) [dBµV/m]	Duty Cycle Correction Factor [dBµV/m]	Result [dBµV/m]	Limit (AV) [dBµV/m]	Margin (dB)
433.926	Vertical	86.39	-9.46	76.93	80.8	3.87
433.926	Horizontal	75.83	-9.46	66.37	80.8	14.43

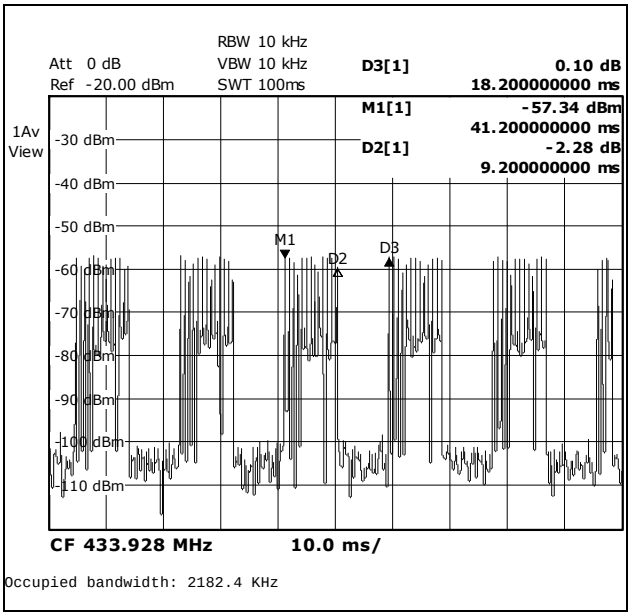
Limit 15.231(b)

Fundamental Frequency [MHz]	Limit	
434	[µV/m]	[dBµV/m]
	10,965	80.8

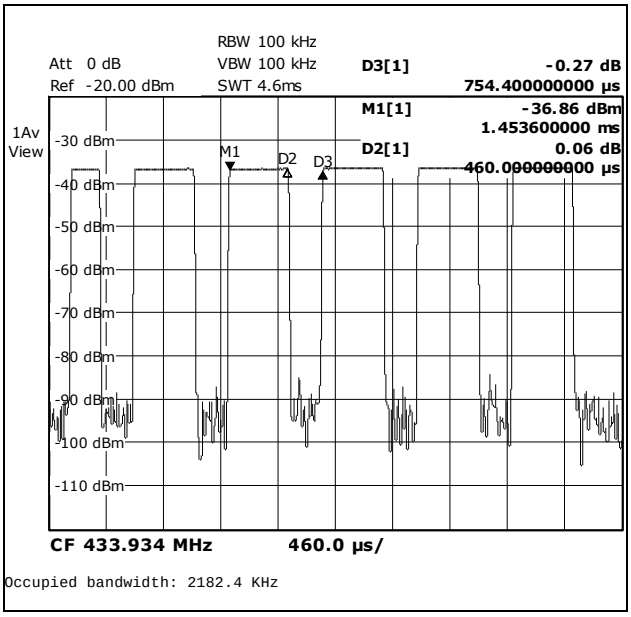
Fundamental Frequency [MHz]	Field strength of fundamental limit [µV/m]
40,66 – 40,70	2,250
70 - 130	1,250
130 - 174	1,250 to 3,750**
174 - 260	3,750
260 - 470	3,750 to 12,000**
Above 470	12,000

§15.35 When the field strength (or envelope power) is not constant or when it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 seconds, the average value (of field strength or output power) shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

Pulse Train Plot



Signal Pulse Train Plot



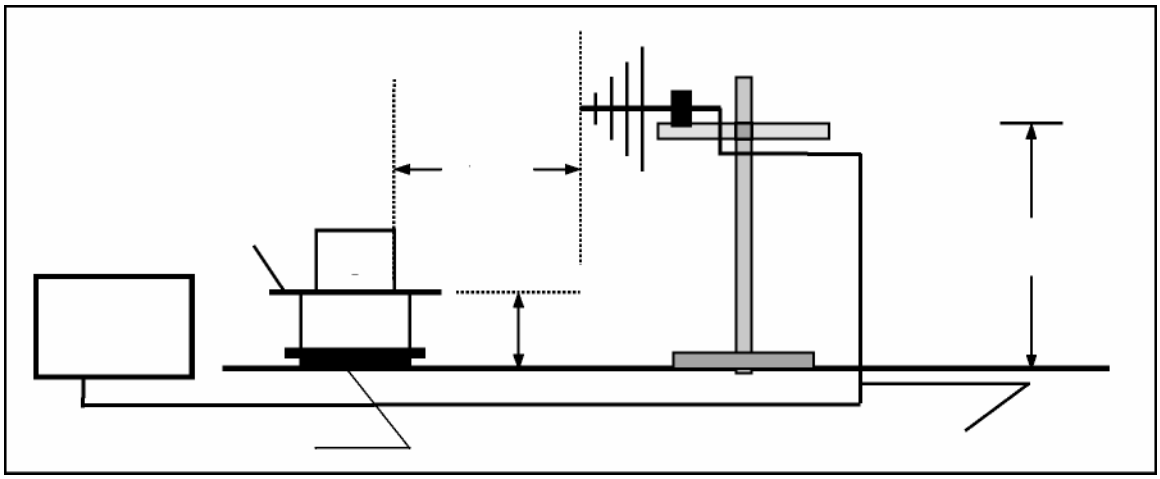
3.2 Field strength of Spurious Emissions

(a) Measurement up to 30 MHz

Note: No Relevant emissions are expected in the frequency range 9 kHz to 30 MHz. Nevertheless a check using a near field probe was performed. No relevant emissions have been observed. Consequently no final measurement was performed.

(b) Measurement above 30 MHz

Measurement Procedure



The equipment under test is placed on a non metallic table with 0.8 m height.
The power supply and the RF connection points are close to the equipment under test at the floor inside a connection box. The cables to this connection box are shielded and below the double floor. The receiving antenna is placed in a height at 1.0 m to 4.0 m and in a distance of 3 m.

Measurement Equipment Used:

Test equipment	Type	S/N	Manufacturer	Cal Due Date
Semi-anechoic Chamber	Nil	Nil	Frankonia	May 13
Test Receiver	ESU 26	100050	Rohde & Schwarz	Aug 13
Bi-conical Antenna	HK116	841489/016	Rohde & Schwarz	Mar 13
Log.-Periodic Antenna	HL223	841516/020	Rohde & Schwarz	Feb 13
Horn Antenna	3115	9002-3351	EMCO	Feb 13
Active Loop Antenna	6502	9107-2651	EMCO	Dec 12

Calculation of test results:
Such factors like antenna factor and cable loss are already included in the provided measurement results. All results measured with peak detector.

Test results:

Frequency [MHz]	Antenna Polarization	Result (PK) [dBµV/m]	Limit Field Strength [dBµV/m]	Margin (dB)
868.54	Vertical	41.18	60.8	19.62
868.54	Horizontal	41.76	60.8	19.04
1301*	Vertical	36.07	54	17.93
1301*	Horizontal	29.96	54	24.04
1733	Vertical	42.87	60.8	17.93
1733	Horizontal	40.85	60.8	19.95

* This frequency fall into the restricted band.

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics which above 5th Emissions 20dB lower than the limit are not reported.

Limits for Field strength of Spurious Emission:

1. Limit 15.231(b)

Fundamental Frequency [MHz]	Limit [dBμV/m]
434	60.8

Fundamental Frequency [MHz]	Field strength of Spurious Emission limit [μV/m]
40,66 – 40,70	225
70 - 130	125
130 - 174	125 to 375**
174 - 260	375
260 - 470	375 to 1,250**
Above 470	1,250

According to section 15.35(b), when average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

2. A radiated emission test applies to harmonic/spurs that fall in the restricted bands as listed in § 15.205(a). The maximum permitted QP (< 1GHz) and average (> 1GHz) field strength is listed in § 15.209(a).

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36-13.41			

3. FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency of Emission [MHz]	Field strength [μV/m]	Field Strength [dBμV/m]
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

3.3 Emission Bandwidth

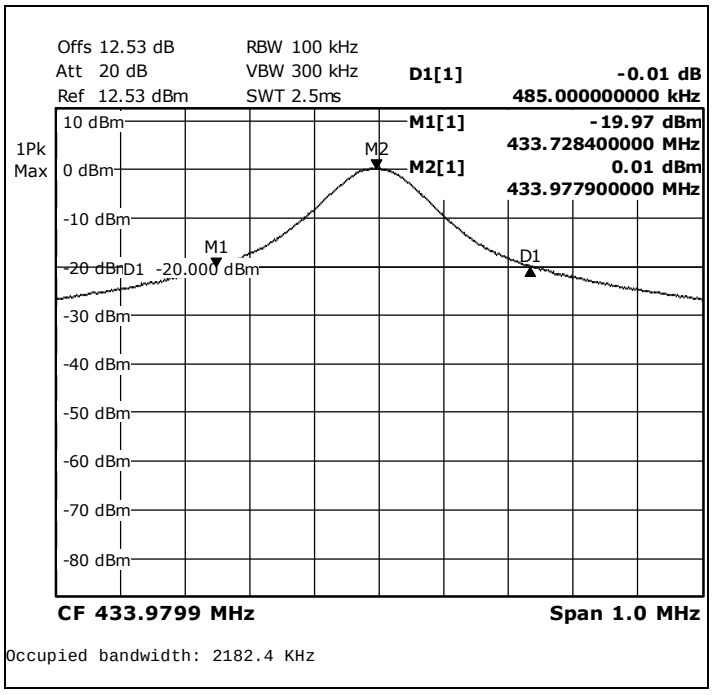
Limit

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

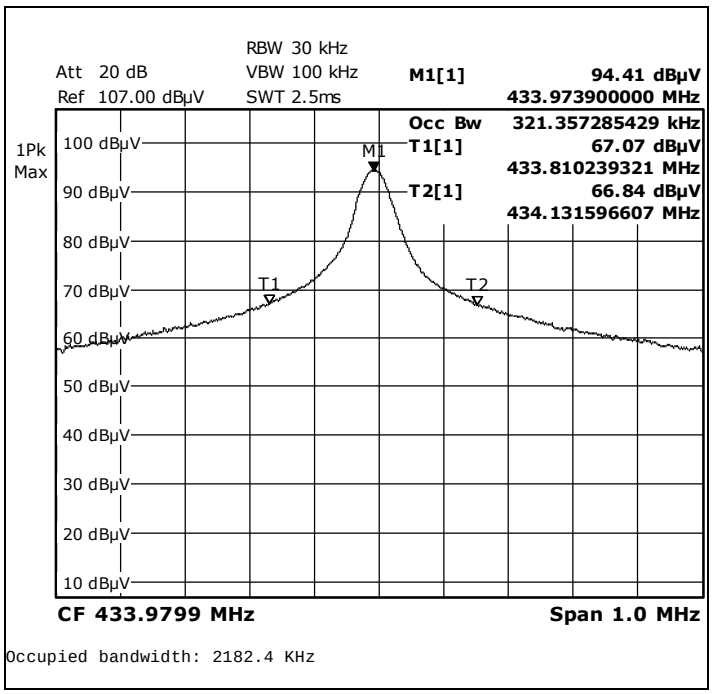
Test result

Measurement of Necessary Bandwidth (BN)

Used Frequency	Measured Bandwidth	Limit	Verdict
434 MHz	485 kHz	1085 kHz	Pass
Measurement uncertainty	<10Hz		



Emission Bandwidth



Occupied Bandwidth

3.4 Automatically Deactivation

This transmitter is activated manually by a switch and is deactivated automatically within 1 second after release the switch as measured.
It fulfills all requirements according Section 15.231(a).

Measured deactivation time: 0.186s

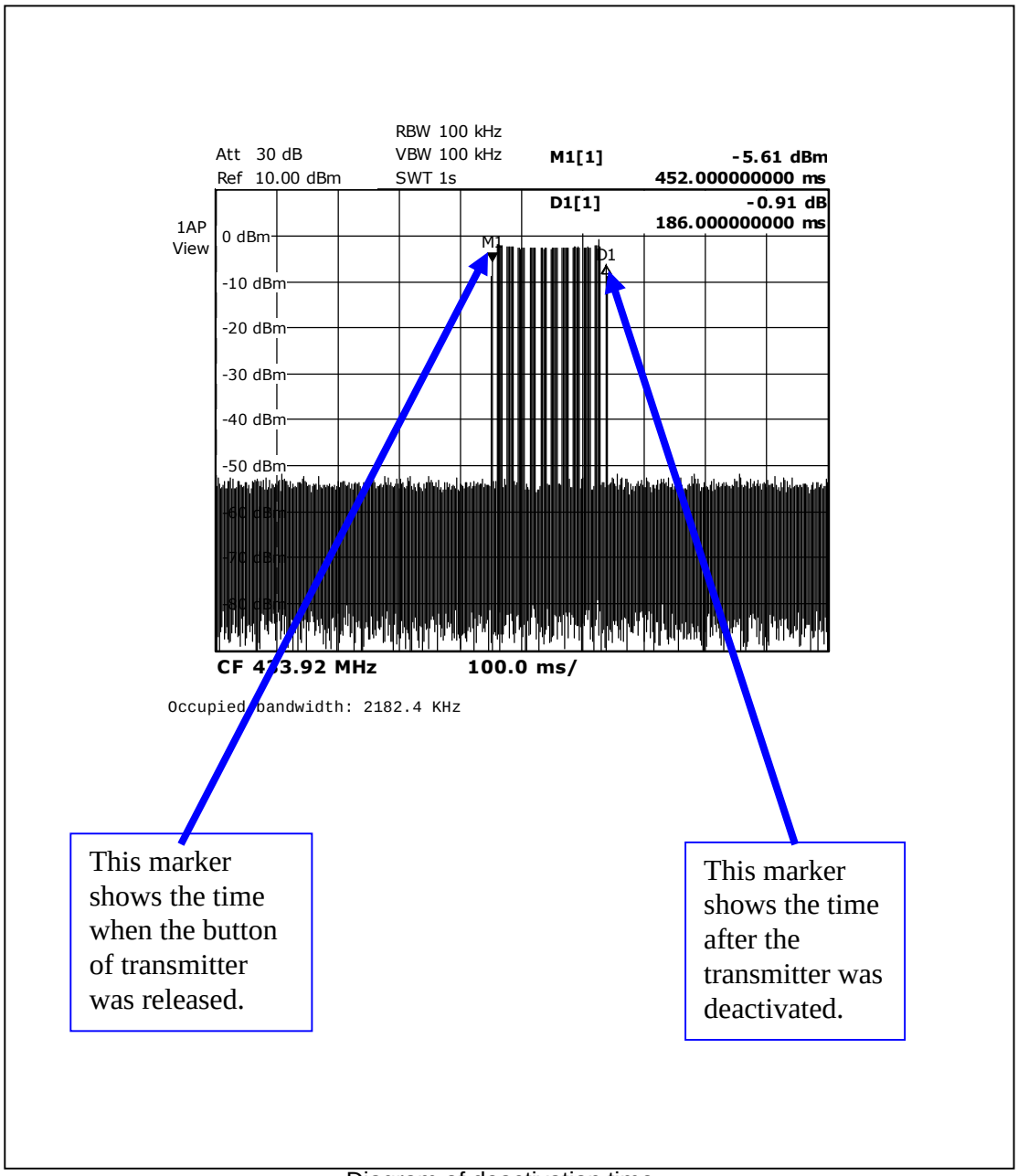


Diagram of deactivation time

4 Normative references

/1/ FCC Rules 47 CFR PART 15 Subpart: 2012
Radio Frequency Devises

/2/ ANSI C63.4-2009
Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

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5.1 Revision Notes

This revised Report replaces the all former Test Reports based on number H1M21209-0513-P-15. These former Test Reports are not longer valid. Every Revision of the original report is recorded below and identified by the ‖ symbol beside the text.

Revision No.	Revision
H1M21209-0513-P-15	Original Test Report