

Prüfbericht-Nr.: <i>Test report no.:</i>	CN21AHBU 001	Auftrags-Nr.: <i>Order no.:</i>	168308485	Seite 1 von 17 Page 1 of 17	
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2021-03-08		
Auftraggeber: <i>Client:</i>	Hangzhou Hikvision Digital Technology Co., Ltd. No.555 Qianmo Road, Binjiang District, Hangzhou 310052 Zhejiang, P.R. China				
Prüfgegenstand: <i>Test item:</i>	Wireless Smoke Detector				
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	DS-PDSMK-E-WB, DS-PDSMK-E-WBUHK, DS-PDSMK-E-WBCKV, DS-PDSMK-E-WBUVS, DS-PDSMK-E-WBKVO, DS-PDSMK-E-WBHUN				
Auftrags-Inhalt: <i>Order content:</i>	Test Report				
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15.203 FCC 47 CFR Part 15.231 FCC 47 CFR Part 2.1093				
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-03-10	Refer to Photo Documentation			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003010414-008				
Prüfzeitraum: <i>Testing period:</i>	2021-03-10 to 2021-06-02				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von: <i>tested by:</i>	<input checked="" type="checkbox"/> <u>Hardy Suo</u>	genehmigt von: <i>authorized by:</i>	<input checked="" type="checkbox"/> <u>Andy Yan</u>		
Datum: <i>Date:</i>	2021-06-09	Ausstellungsdatum: <i>Issue date:</i>	2021-06-09		
Stellung / Position:	Sachverständige(r) / Expert	Stellung / Position:	Sachverständige(r) / Expert		
Sonstiges / Other:	FCC ID: 2ADTD-D1700991 FCC 47 CFR Part 2.1093 is not in the A2LA accreditation scope, because the product complies with requirements of test standard FCC 47 CFR Part 2.1093 by calculated method, not involves testing.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable	5 = poor N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

TEST SUMMARY

- 5.1.1 Antenna Requirement
RESULT: Pass
- 5.1.2 Deactivation of the Transmission
RESULT: Pass
- 5.1.3 Periodic Transmissions
RESULT: Pass
- 5.1.4 20dB Emission Bandwidth
RESULT: Pass
- 5.1.5 Field strength of fundamental and Unwanted Emissions in the Spurious Domain
RESULT: Pass
- 5.1.6 Radio Frequency Exposure Compliance
RESULT: Pass

CONTENTS

1. GENERAL REMARKS	4
1.1 COMPLEMENTARY MATERIALS	4
1.2 TEST STANDARD(S)	4
2. TEST SITES	4
2.1 TEST FACILITIES	4
2.2 TEST DATE	4
2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS	5
2.4 TRACEABILITY	6
2.5 CALIBRATION	6
2.6 LOCATION OF ORIGINAL DATA	6
2.7 STATUS OF FACILITY USED FOR TESTING	6
3. GENERAL PRODUCT INFORMATION	7
3.1 PRODUCT FUNCTION AND INTENDED USE	7
3.2 RATINGS AND SYSTEM DETAILS	7
3.3 INDEPENDENT OPERATION MODES	7
3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS	8
3.5 SUBMITTED DOCUMENTS	8
4. TEST SET-UP AND OPERATION MODES	9
4.1 PRINCIPLE OF CONFIGURATION SELECTION	9
4.2 TEST OPERATION AND TEST SOFTWARE	9
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
4.4 COUNTERMEASURES TO ACHIEVE ERM COMPLIANCE	9
4.5 TEST SETUP DIAGRAM	10
5. TEST RESULTS	11
5.1 ESSENTIAL REQUIREMENTS OF STANDARD	11
5.1.1 Antenna Requirement	11
5.1.2 Deactivation of the Transmission	12
5.1.3 Periodic Transmissions	13
5.1.4 20dB Emission Bandwidth	14
5.1.5 Field strength of fundamental and Unwanted Emissions in the Spurious Domain	15
5.1.6 Radio Frequency Exposure Compliance	16
6. SYSTEM MEASUREMENT UNCERTAINTY	17
7. LIST OF TABLES	17

1. GENERAL REMARKS

1.1 COMPLEMENTARY MATERIALS

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of radio spectrum

Appendix B: Photographs of the Test Set-Up

1.2 TEST STANDARD(S)

Applied Rules: FCC 47 CFR Part 15.203
FCC 47 CFR Part 15.231
FCC 47 CFR Part 2.1093

Test Method: ANSI C63.10:2013

2. TEST SITES

2.1 TEST FACILITIES

Test Facilities: TÜV Rheinland (Shenzhen) Co., Ltd.

Address:

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, P.R. China

2.2 TEST DATE

Date: 2021-03-10 to 2021-06-02

2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (TS8997)				
Equipment	Manufacturer	Model	Serial No.	Cal. until
Signal Analyzer	R&S	FSV 40	101441	2021-08-10
OSP	R&S	OSP 150	101017	2021-12-10
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	R&S	WMS32 (V11.00.00)	N/A	N/A
Power Meter	R&S	NRP2	107105	2021-12-10
Wideband Power Sensor	R&S	NRP-Z81	105677	2021-09-10
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2021-07-23
Unwanted Emission Testing (TS9975)				
Equipment	Manufacturer	Model	Serial No.	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	2021-08-11
Signal Analyzer	R&S	FSV 40	101439	2021-08-10
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	2021-08-10
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2021-08-10
Amplifier	R&S	SCU-18F	180070	2021-08-10
Amplifier	R&S	SCU40A	100475	2021-09-10
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2022-08-08
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2022-08-08
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2022-08-08
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2022-09-13
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	2021-09-02
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2021-07-06

Prüfbericht- Nr.: CN21AHBU 001
*Test Report No.***Seite 6 von 17**
Page 6 of 17

2.4 TRACEABILITY

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.5 CALIBRATION

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.6 LOCATION OF ORIGINAL DATA

The original copies of all test data taken during actual testing were attached at Appendix A of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 STATUS OF FACILITY USED FOR TESTING

The TÜV Rheinland (Shenzhen) Co., Ltd. facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

Prüfbericht- Nr.: CN21AHBU 001
Test Report No.
Seite 7 von 17
Page 7 of 17

3. GENERAL PRODUCT INFORMATION

3.1 PRODUCT FUNCTION AND INTENDED USE

The EUT is a Wireless Smoke Detector.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 RATINGS AND SYSTEM DETAILS

Table 2: Technical Characteristics of EUT

General Information of EUT	Description
Kind of Equipment:	Wireless Smoke Detector
Type Designation:	DS-PDSMK-E-WB, DS-PDSMK-E-WBUHK, DS-PDSMK-E-WBCKV, DS-PDSMK-E-WBUVS, DS-PDSMK-E-WBKVO, DS-PDSMK-E-WBHUN
FCC ID:	2ADTD-D1700991
Operating Frequency Band:	433.05 - 433.75MHz
Operating Frequencies:	433.1MHz, 433.2MHz, 433.3MHz, 433.4MHz, 433.5MHz, 433.6MHz, 433.7MHz
Modulation Type:	FSK
Antenna Type:	Integral Antenna
Antenna Number and Gain:	Antenna number: 1 Antenna Gain: -6dBi
Operating Voltage:	DC 3V, Battery (CR123A x 1)
Operating Temperature Range:	-10°C ~ +55°C
<p>*Remark:</p> <p>1) As declared by manufacturer, DS-PDSMK-E-WB, DS-PDSMK-E-WBUHK, DS-PDSMK-E-WBCKV, DS-PDSMK-E-WBUVS, DS-PDSMK-E-WBKVO, DS-PDSMK-E-WBHUN are identical in electronics/electrical designs, including software & firmware, PCB layout . The only difference are model name. Hence the product with model DS-PDSMK-E-WB is chosen for testing.</p> <p>2) According to ANSI C63.10 section 5.6, the frequency range is less than 1MHz, hence middle operating frequency 433.4MHz located in middle range is set for testing.</p>	

3.3 INDEPENDENT OPERATION MODES

The basic operation modes are:

- A. Transmitting with operating frequency 433.4MHz
- B. Idle

Prüfbericht- Nr.: CN21AHBU 001
Test Report No.**Seite 8 von 17**
Page 8 of 17

3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS

Refer to the Circuit Diagram.

3.5 SUBMITTED DOCUMENTS

- | | |
|---|--|
| <input checked="" type="checkbox"/> User Manual | <input checked="" type="checkbox"/> Rating Label |
| <input checked="" type="checkbox"/> Circuit Diagram | <input type="checkbox"/> PCB Layout |
| <input checked="" type="checkbox"/> Block Diagram | <input checked="" type="checkbox"/> Photo Document |
| <input checked="" type="checkbox"/> Schematics | <input checked="" type="checkbox"/> Parts List |
| <input type="checkbox"/> Model Difference Letter | |

4. TEST SET-UP AND OPERATION MODES

4.1 PRINCIPLE OF CONFIGURATION SELECTION

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 TEST OPERATION AND TEST SOFTWARE

Test operation refers to test setup in chapter 5.

Table 3: Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage (Battery)	Relative Humidity
Normal (NTNV)	24°C	3V	Ambient
LTLV	-	-	-
LTHV	-	-	-
HTLV	-	-	-
HTHV	-	-	-

4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT

The EUT was tested together with the following accessories:

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
--	--	--	--

4.4 COUNTERMEASURES TO ACHIEVE ERM COMPLIANCE

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF). No additional measures were employed to achieve compliance.

4.5 TEST SETUP DIAGRAM

Diagram of Measurement Configuration for Radiation Test

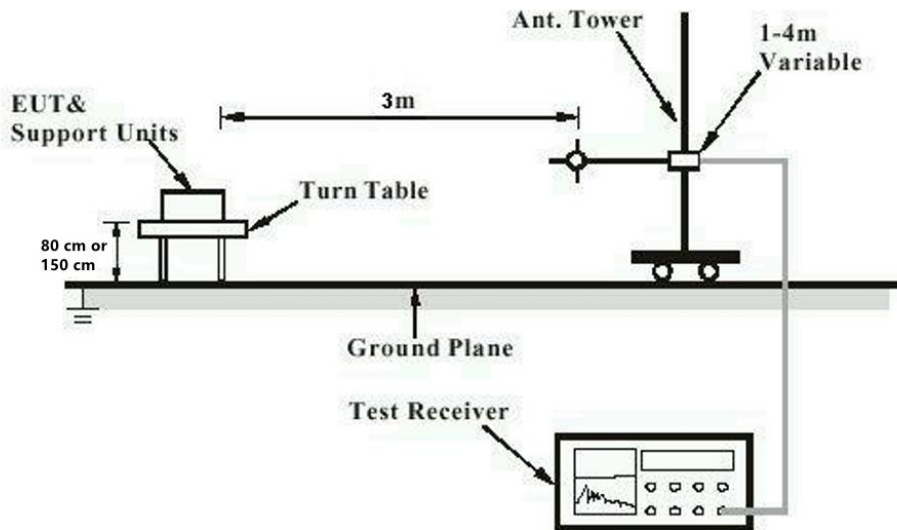
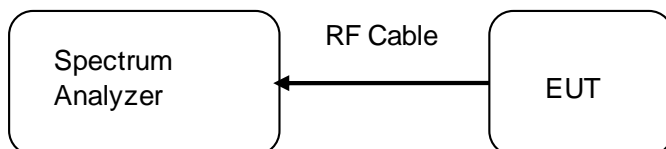


Diagram of Measurement Equipment Configuration for Transmitter Measurement



5. TEST RESULTS

5.1 Essential Requirements of Standard

5.1.1 Antenna Requirement

RESULT: **Pass**

Test standard	:	CFR47 FCC Part 15.203
Limit	:	CFR47 FCC Part 15.203
Kind of test site	:	Shielding Room

Test Setup

Date of testing	:	2021-03-10 to 2021-06-02
Input voltage	:	3V
Test environment	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	24°C
Relative humidity	:	55%
Atmospheric pressure	:	101.0 kPa

According to the manufacturer declared, the EUT has an integral antenna, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to compliance the provision.

Refer to EUT photo for details.

Prüfbericht - Nr.: CN21AHBU 001
Test Report No.**Seite 12 von 17**
Page 12 of 17

5.1.2 Deactivation of the Transmission

RESULT: **Pass****Test Specification**

Test standard	:	CFR47 FCC Part 15.231
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (a)(1)
Limit	:	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
Test suite	:	Shielding Room

Test Setup

Date of testing	:	2021-03-10 to 2021-06-02
Test environment:	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	24°C
Relative humidity	:	55%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

Prüfbericht- Nr.: CN21AHBU 001
Test Report No.**Seite 13 von 17**
Page 13 of 17

5.1.3 Periodic Transmissions

RESULT: **Pass****Test Specification**

Test standard	:	CFR47 FCC Part 15.231
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (a)(3)
Limit	:	Total duration of transmissions does not exceed more than two seconds per hour.
Test suite	:	Shielding Room

Test Setup

Date of testing	:	2021-03-10 to 2021-06-02
Test environment:	:	Normal test conditions
Operation mode	:	B
Ambient temperature	:	24°C
Relative humidity	:	55%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

Prüfbericht- Nr.: CN21AHBU 001
Test Report No.**Seite 14 von 17**
Page 14 of 17

5.1.4 20dB Emission Bandwidth

RESULT:**Pass****Test Specification**

Test standard	:	CFR47 FCC Part 15.231
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (c)
Limit	:	CFR47 FCC Part 15.231 (c)
Test suite	:	3m Semi Anechoic Room

Test Setup

Date of testing	:	2021-03-10 to 2021-06-02
Test environment:	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	24°C
Relative humidity	:	55%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

Prüfbericht- Nr.: CN21AHBU 001
Test Report No.**Seite 15 von 17**
Page 15 of 17

5.1.5 Field strength of fundamental and Unwanted Emissions in the Spurious Domain

RESULT: **Pass****Test Specification**

Test standard : CFR47 FCC Part 15.231
CFR47 FCC Part 15.205
CFR47 FCC Part 15.209

Basic standard : ANSI C 63.10:2013

Test requirement : CFR47 FCC Part 15.231 (b)(1)(2)(3)

Limit : CFR47 FCC Part 15.231 (b)

Test suite : 3m Semi Anechoic Room

Test Setup

Date of testing : 2021-03-10 to 2021-06-02

Test environment: : Normal test conditions

Operation mode : A

Ambient temperature : Refer to test data.

Relative humidity : Refer to test data.

Atmospheric pressure : 101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

Prüfbericht - Nr.: CN21AHBU 001
Test Report No.**Seite 16 von 17**
Page 16 of 17

5.1.6 Radio Frequency Exposure Compliance

RESULT: Pass**Test Specification**

Test standard : CFR47 FCC Part 2.1093

Limit : FCC KDB Publication 447498 D01 v06

Measurement Record for CFR47 FCC Part 2.1093

The minimum distance for the EUT is less than 5mm.

The maximum specified e.r.p.: 68.64dBuV/m@3m=-26.59dBm=0.002mW

According to KDB 447498 D01 v06 appendix A

Exempted Power for this device: 22mW, hence the EUT is compliance with the RF exposure.

6. System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 5: System Measurement Uncertainty

Items		Extended Uncertainty
RE	Radiated emission 9 kHz - 30 MHz	±3.97 dB
	Radiated emission 30 MHz - 1 GHz	±4.30 dB
Remark: 95% Confidence Levels, K=2.		

7. LIST OF TABLES

Table 1: List of Test and Measurement Equipment.....	5
Table 2: Technical Characteristics of EUT.....	7
Table 3: Test Environments.....	9
Table 4: List of Accessories and Auxiliary Equipment.....	9
Table 5: System Measurement Uncertainty.....	17

Appendix A

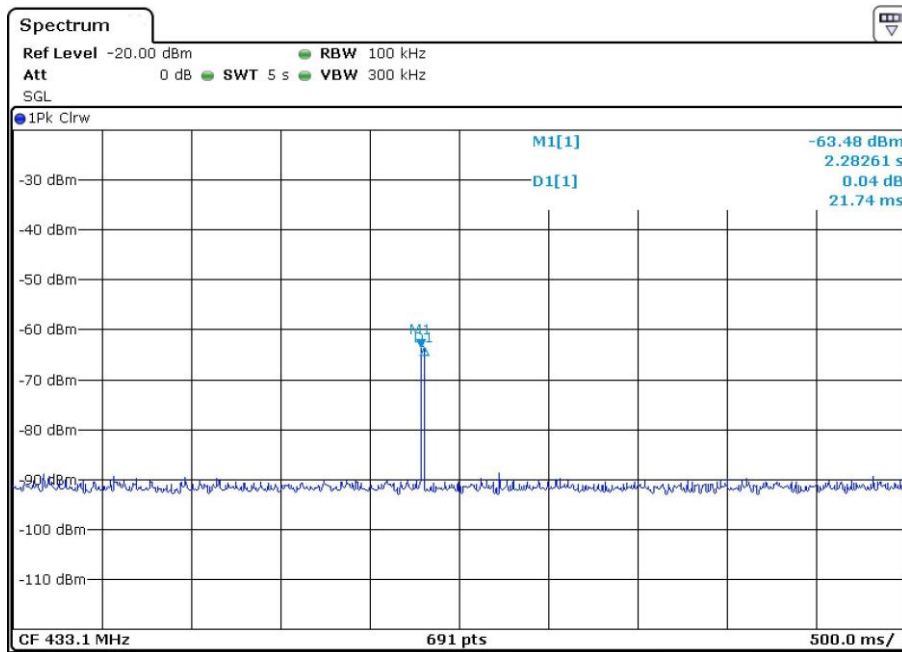
Test Results

APPENDIX A.1: TEST RESULTS OF DEACTIVATION OF THE TRANSMISSION	2
APPENDIX A.2: TEST RESULTS OF PERIODIC TRANSMISSIONS	3
APPENDIX A.3: TEST RESULTS OF 20dB EMISSION BANDWIDTH.....	4
APPENDIX A.4: TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL AND UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN.....	5
A.4.1 BELOW 1GHZ.....	5
A.4.2 ABOVE 1GHZ	7

APPENDIX A.1: TEST RESULTS OF DEACTIVATION OF THE TRANSMISSION

Test Results

Operation Mode	Duration Time (S)	Limit (S)	Result
A	0.022	5	Pass

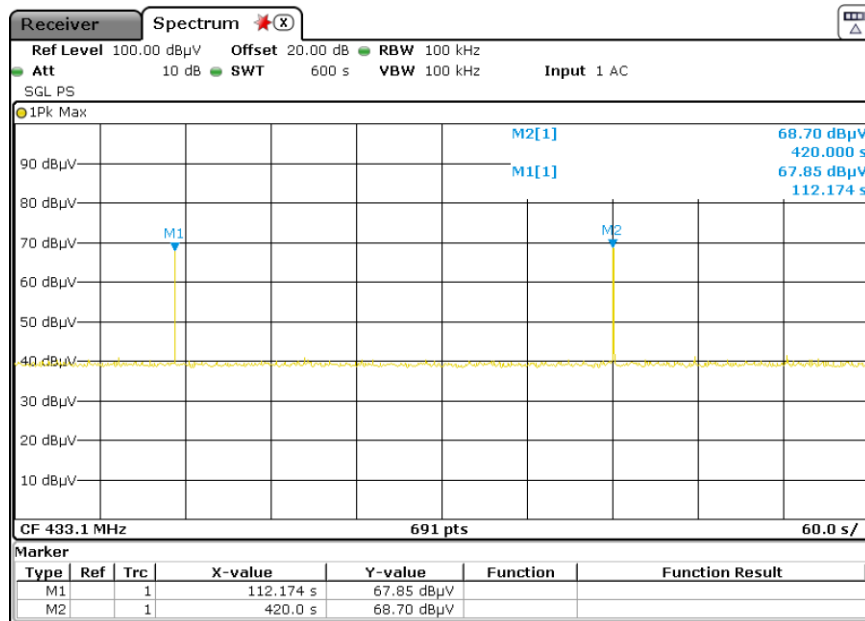
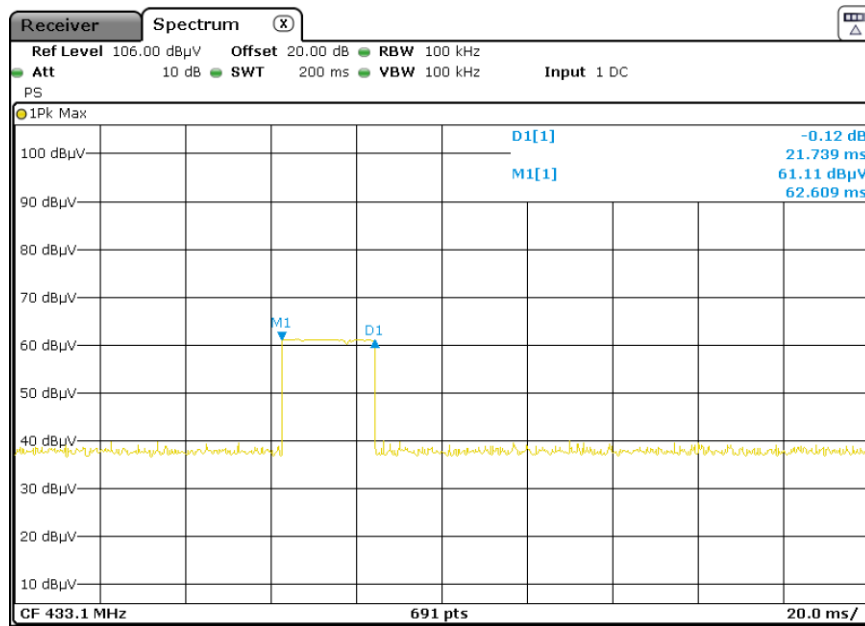


APPENDIX A.2: TEST RESULTS OF PERIODIC TRANSMISSIONS

Test Results

Operation Mode	Duration Time (S)	Limit	Result
B	0.261	2s/ 1 Hour	Pass

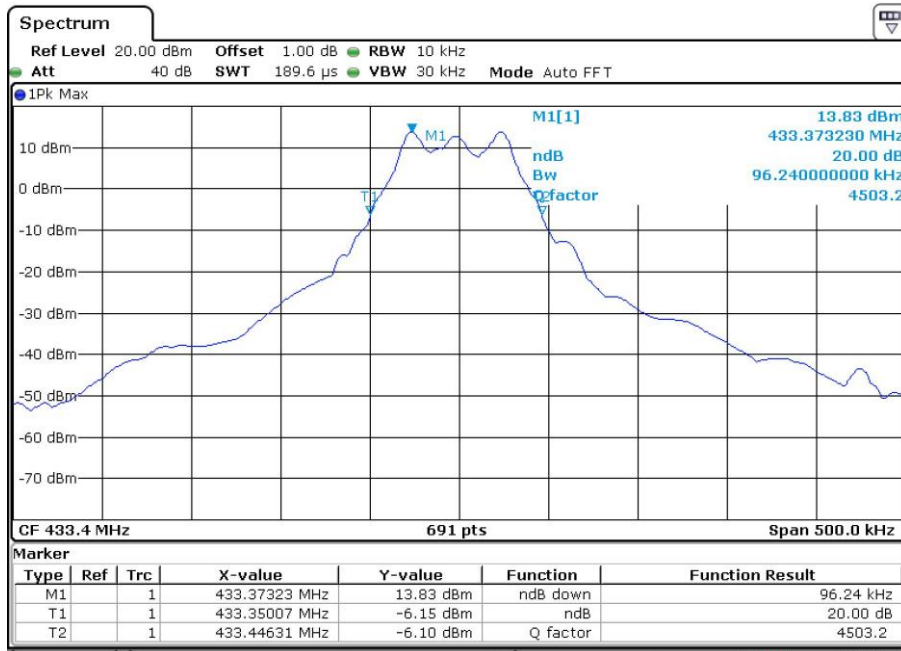
As declared by manufacturer, the EUT transmits an identical data package to the Host per 5 minutes, hence in one hour, the EUT transmits 12 data packages to the Host, and the duration time = 21.739ms * 12 = 0.261s.



APPENDIX A.3: TEST RESULTS OF 20dB EMISSION BANDWIDTH

Test Results

Operation Frequency (MHz)	20dB Emission Bandwidth (MHz)	Limit (MHz)	Result
433.4	0.096	1.084	Pass

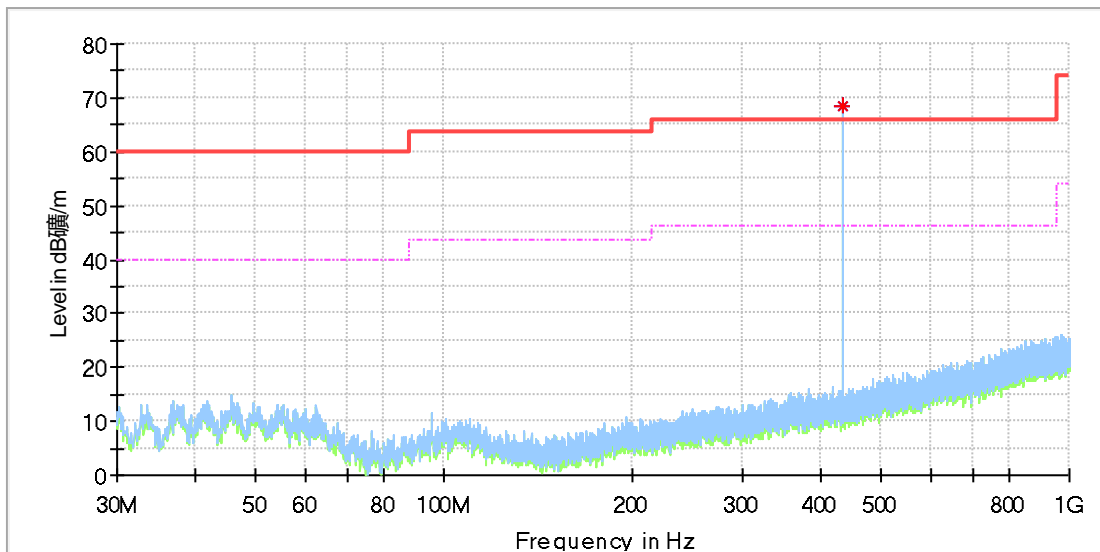


APPENDIX A.4: TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL AND UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

A.4.1 Below 1GHz

EUT Information

EUT Name:	Wireless Smoke Detector
Model:	DS-PDSMK-E-WB
Test Mode:	433MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC Part 15C
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical Freqs

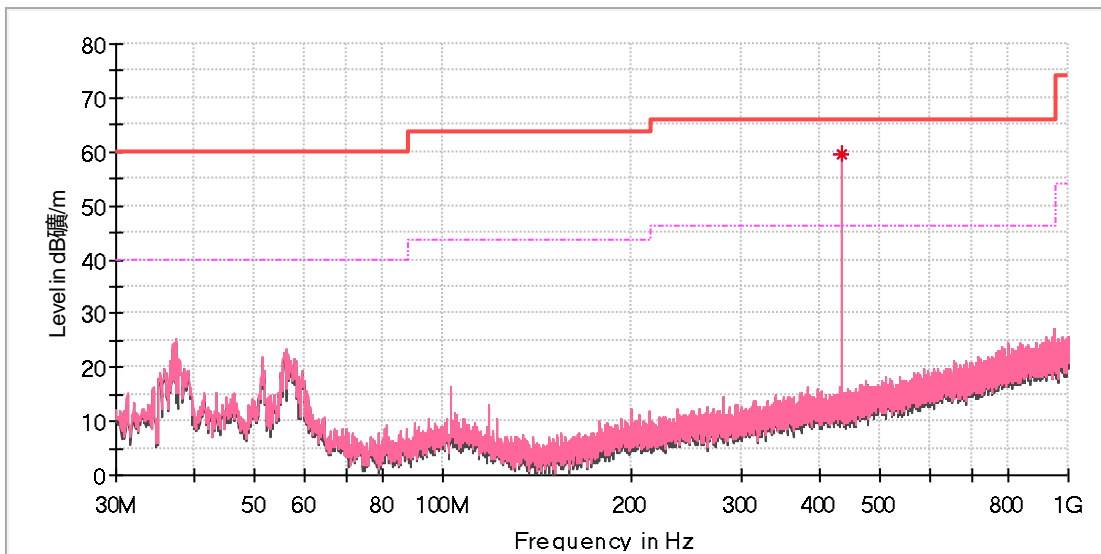
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
433.374500	68.64		66.00	-2.64	100.0	H	0.0	-13.3
433.423000	--	68.33	46.00	-22.33	100.0	H	0.0	-13.3

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
--	--	--	--	--		--	--

EUT Information

EUT Name: Wireless Smoke Detector
 Model: DS-PDSMK-E-WB
 Test Mode: 433MHz
 Test Voltage:: Battery
 Remark: Temp 24 Humi:47%
 Test Standard: FCC Part 15C
 Tested By: Kei Zhang
 Reviewed By: Terry Yin



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
433.423000	59.69		66.00	6.31	100.0	V	266.0	-13.3
433.423000	--	59.46	46.00	-13.46	100.0	V	266.0	-13.3

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
--	--	--	--	--		--	--

