FCC Test Report

Report No: FCS202111064W01

Issued for

Applicant:	Shenzhen AnniuSmart Innovation CO., LTD.
Address:	401/Room 401, 9th Building， Hongde Factory, No. 63, Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen， Guangdong， China
Product Name:	wireless doorbell
Brand Name:	N/A
Model Name:	LDB-D11
Series Model:	LDB-A11,LDB-A12,LDB-A21,LDB-A22,LDB-A31 LDB-A32,LDB-B11,LDB-B12,LDB-B21,LDB-B22 LDB-B31,LDB-B32,LDB-C11,LDB-C12,LDB-C21 LDB-C22,LDB-C31,LDB-C32,LDB-D12,LDB-D21 LDB-D22,LDB-D31,LDB-D32,LDB-E11,LDB-E12 LDB-E21,LDB-E22,LDB-E31,LDB-E32,LDB-F11 LDB-F12,LDB-F21,LDB-F22,LDB-F31,LDB-F32 LDB-G11,LDB-G12,LDB-G21,LDB-G22,LDB-G31 LDB-G32
FCC ID:	2A3V5-LDB-D11
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name..... :	Shenzhen AnniuSmart Innovation CO., LTD.
Address..... :	401/Room 401, 9th Building, Hongde Factory, No. 63, Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, Guangdong, China
Manufacture's Name..... :	Shenzhen AnniuSmart Innovation CO., LTD.
Address..... :	401/Room 401, 9th Building, Hongde Factory, No. 63, Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, Guangdong, China

Product Description

Product Name..... :	wireless doorbell
Brand Name .....:	N/A
Model Name..... :	LDB-D11
Series Model.....:	Refer to page 1
Test Standards.....:	FCC Rules and Regulations Part 15 Subpart C, Section 231
Test Procedure.....:	ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test.....:

Date (s) of performance of tests. :	23 Nov. 2021 ~ 26 Nov. 2021
Date of Issue.....:	29 Nov. 2021
Test Result..... :	Pass

Tested by : Scott shen
(Scott Shen)

Reviewed by : Duke Qian
(Duke Qian)

Approved by :
(Kait Chen)

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Revision History

Rev.	Issue Date	Effect Page	Contents
00	29 Nov. 2021	N/A	Initial Issue

1. SUMMARY OF TEST RESULTS

FCC Part 15.231,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	--
15.209, 15.231(b)	Radiated Emission	PASS	--
15.231(a) (1)	Transmitter time	PASS	--
15.231(c)	20dB Bandwidth	PASS	
15.231	Duty cycle	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

1.1 TEST LABORATORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
Laboray Accreditations	
FCC Test Firm Registration Number: 514908 CNAS Number： L15566 Designation number：CN0127 A2LA accreditation number：5545.01 ISED Number：25801	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ±**U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.98 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±3.2 dB
6	All emissions,radiated (1GHz -18GHz)	±3.66 dB
7	All emissions,radiated (18GHz -40GHz)	±4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	wireless doorbell
Trade Name	N/A
Model Name	LDB-D11
Series Model	Refer to page 1
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, only different color.
Frequency	433.92MHZ
Modulation	☑ASK
Antenna type	☐PCB antenna ☑Spring antenna
Power Supply	DC 3V
Battery	button cell DC 3V
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

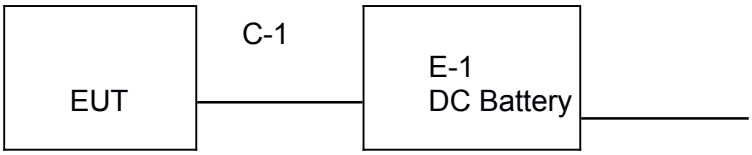
1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.
2. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Spring antenna	N/A	1.0 dBi	Antenna

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Configuration and peripherals



Test environment conditions
During the measurement the environmental conditions were within the listed ranges:
Temperature range: 21-25℃
Humidity range: 40-75%
Pressure range: 86-106kPa

Note：EUT use the new battery during the test

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2021.01.28	2022.01.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2021.01.28	2022.01.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2021.01.28	2022.01.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2021.01.28	2022.01.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2021.01.28	2022.01.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2021.01.28	2022.01.27
Pre-Amplifier(0.1M-3GHz)	EMCI	EM330N	FCS-E004	2021.01.28	2022.01.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2021.01.28	2022.01.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2021.01.28	2022.01.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2021.01.28	2022.01.27

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2021.01.28	2022.01.27
LISN	R&S	ENV216	FCS-E007	2021.01.28	2022.01.27
LISN	ETS	3810/2NM	FCS-E009	2021.01.28	2022.01.27
Temperature & Humidity	HTC-1	victor	FCS-E008	2021.01.28	2022.01.27

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2021.01.28	2022.01.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2021.01.28	2022.01.27
Spectrum Analyzer	R&S	FSV-40	101499	2021.01.28	2022.01.27

3 CONDUCTED EMISSION MEASUREMENT

3.1 LIMIT

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

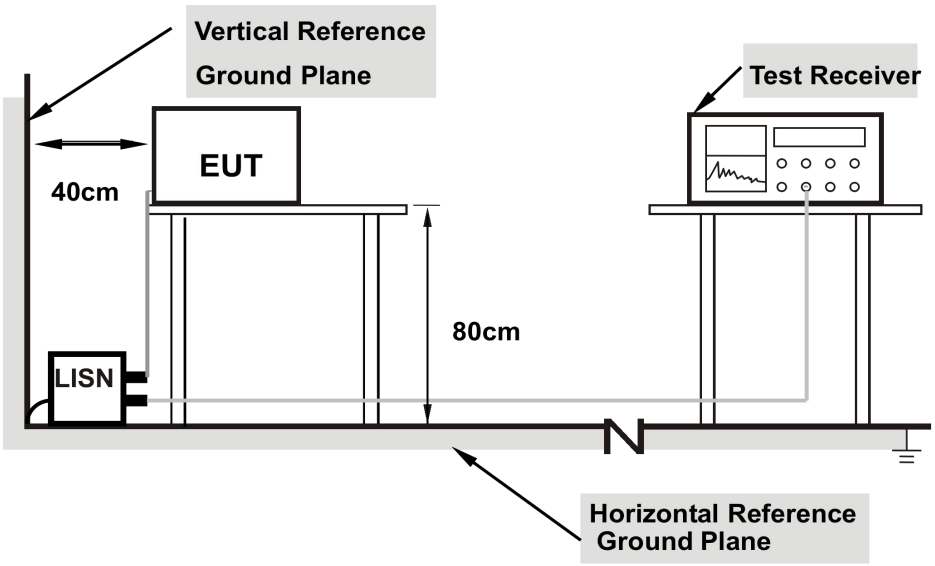
3.2 TEST PROCEDURE

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	50%
Test Mode:	N/A	Test Voltage:	N/A
Result:	N/A		

4. RADIATED EMISSION MEASUREMENT

4.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
433.92	100.83	80.83

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:
Limit3m(dBuV/m)= Limit300m(dBuV/m) + 40Log(300m/3m) = Limit300m(dBuV/m) + 80
Limit3m(dBuV/m)= Limit30m(dBuV/m) + 40Log(30m/3m) = Limit30m(dBuV/m) + 40

(3) Limit for this EUT
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions include fundamental emission shall not exceed FCC 15.231 section (b) limit of comply with FCC 15.209 limit which permit higher emission level.

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

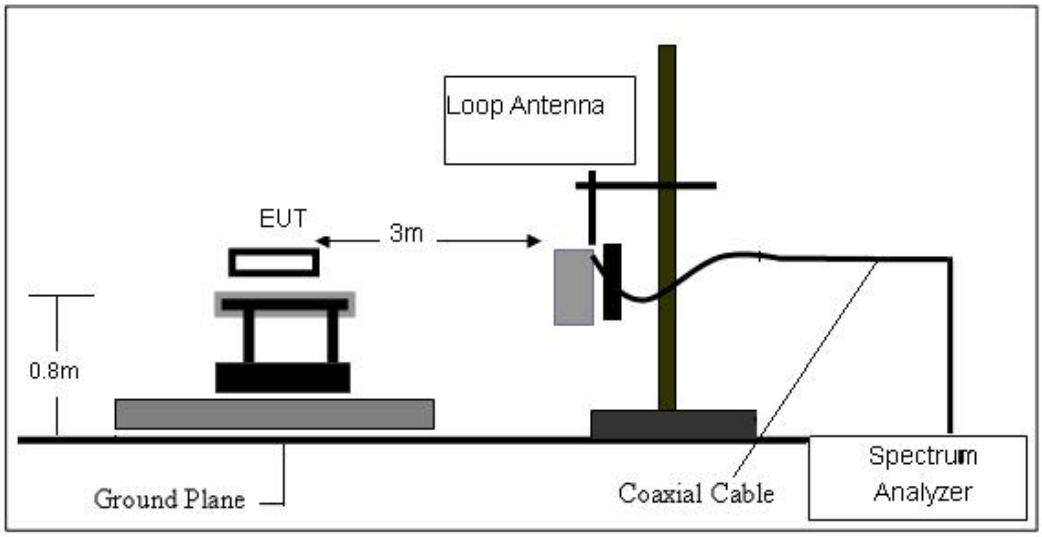
4.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

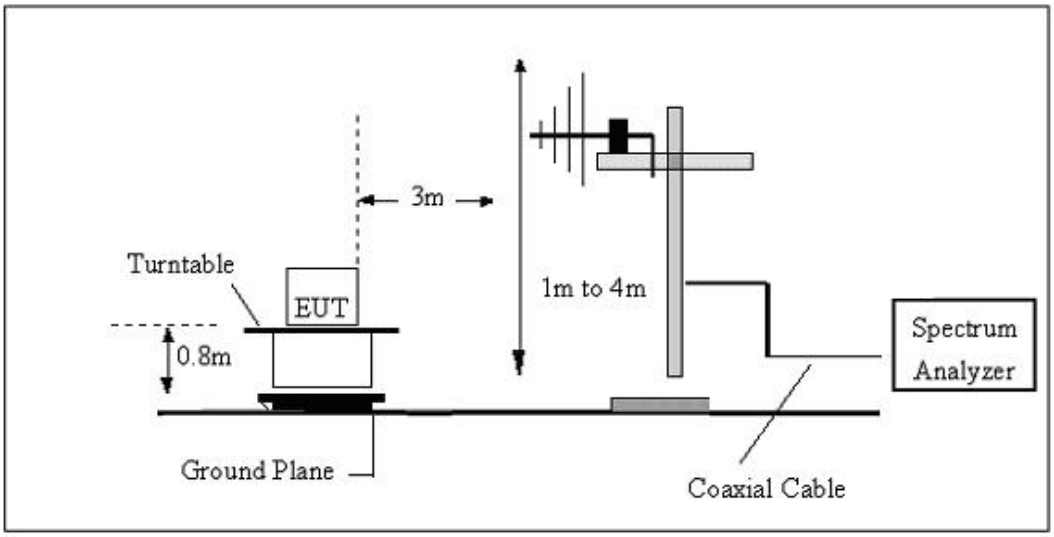
Note:
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.3 TEST SETUP

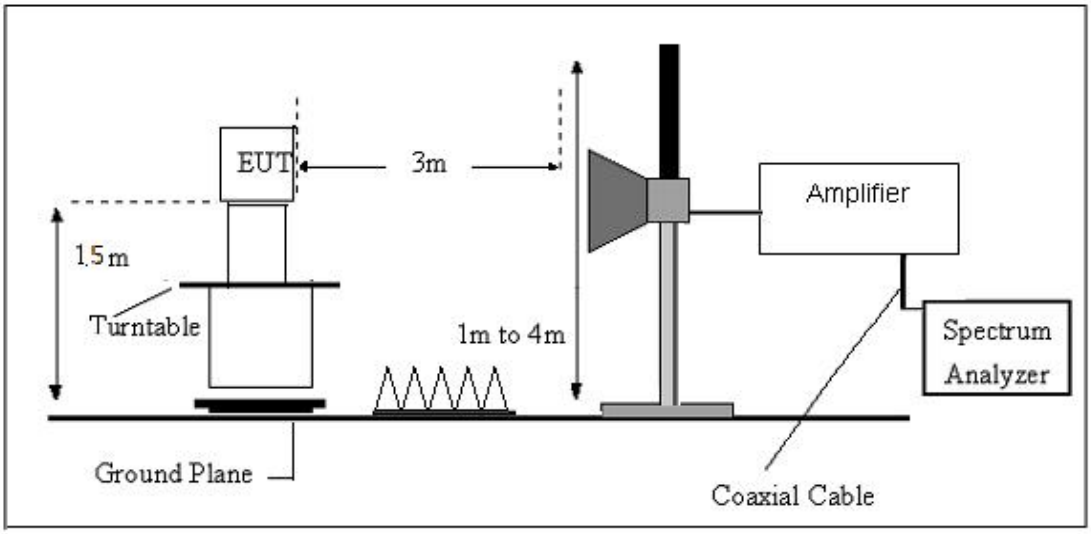
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



4.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	60%
Test Mode:	ASK	Test Voltage:	DC 3V

For field strength of the fundamental signal

Peak value

Frequency (MHz)	Peak Level(dBuV/m)	Peak limit (dBuV/m)	Over Limit(dB)	Polarization
433.92	78.83	100.83	-22.00	H
433.92	79.48	100.83	-21.35	V

Average value

Frequency (MHz)	AV Level (dBuV/m)	AV limit (dBuV/m)	Over Limit (dB)	Polarization
433.92	72.74	80.83	-8.09	H
433.92	73.39	80.83	-7.44	V

Note: av Level=pk level +PDCF
Duty cycle factor= -6.09dB

For spurious emission

(9KHz-30MHz)

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuv) + distance extrapolation factor.

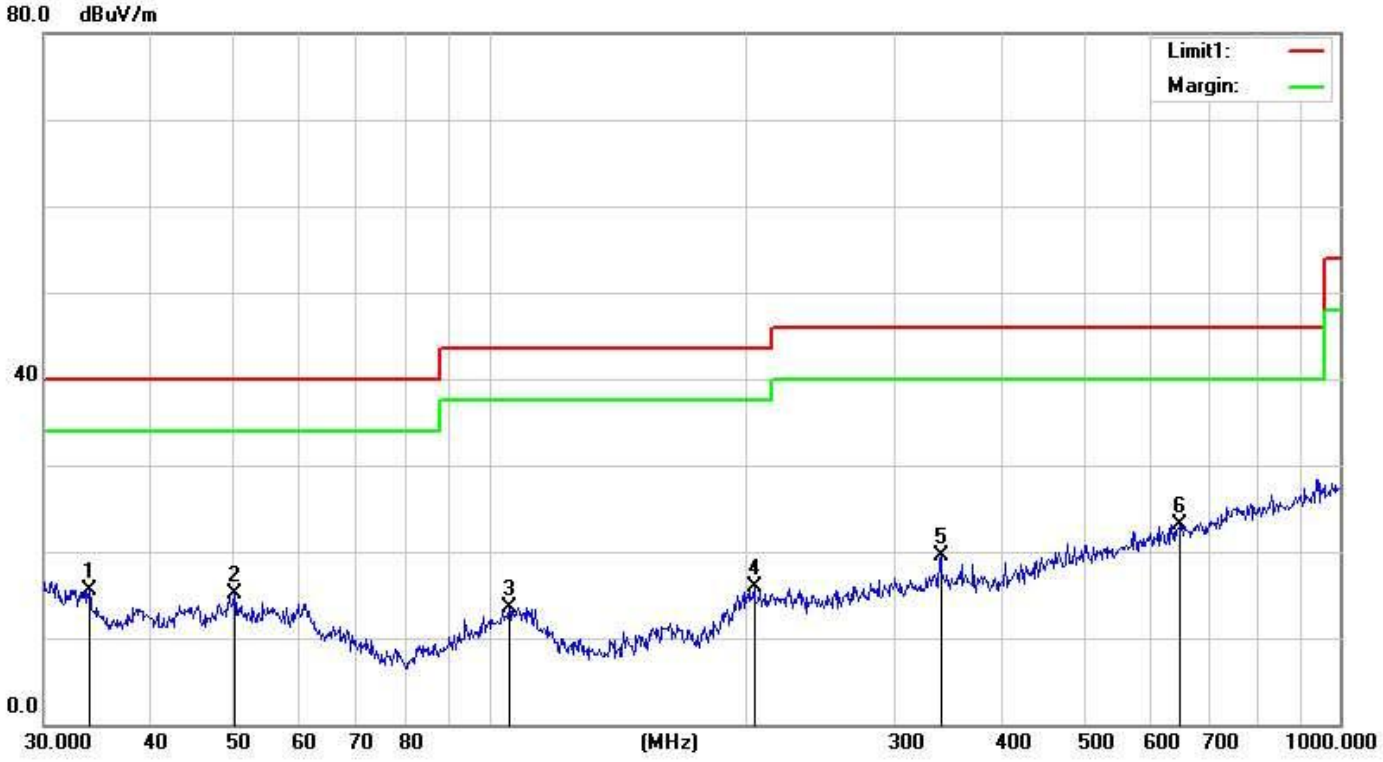
(30MHZ-1000MHZ)

Temperature:	23.7℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Phase:	Horizontal
Test Mode:	ASK		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	44.5868	31.06	-16.80	14.26	40.00	-25.74	QP
2	56.9912	31.42	-16.89	14.53	40.00	-25.47	QP
3	106.7587	30.76	-17.17	13.59	43.50	-29.91	QP
4	225.3080	31.46	-15.39	16.07	46.00	-29.93	QP
5	441.7426	31.11	-11.28	19.83	46.00	-26.17	QP
6	726.8052	30.11	-5.58	24.53	46.00	-21.47	QP

Temperature:	22.7℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Phase:	Vertical
Test Mode:	ASK		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	33.9174	40.78	-25.33	15.45	40.00	-24.55	QP
2	50.2324	44.50	-29.30	15.20	40.00	-24.80	QP
3	105.6415	42.39	-28.79	13.60	43.50	-29.90	QP
4	204.9551	42.12	-26.13	15.99	43.50	-27.51	QP
5	339.5888	45.76	-26.35	19.41	46.00	-26.59	QP
6	649.6597	47.35	-24.22	23.13	46.00	-22.87	QP



(1GHZ~5GHZ)

Freq.	Ant.PoL	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
1301.76	V	59.93	46.32	74	54	-14.07	-7.68
1735.68	V	56.07	42.46	80.82	60.82	-24.75	-11.54
2169.60	V	54.10	40.49	80.82	60.82	-26.72	-13.51
2603.52	V	50.40	36.79	80.82	60.82	-30.42	-17.21
1301.76	H	59.96	46.35	74	54	-14.04	-7.64
1735.68	H	57.74	44.13	80.82	60.82	-23.08	-9.87
2169.60	H	54.04	40.43	80.82	60.82	-26.78	-9.57
2603.52	H	52.82	39.59	80.82	60.82	-27.62	-14.41

Note: 1. Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

3. Measuring frequencies from 9k~10th harmonic , No emission found between lowest internal used/generated frequency to 30MHz.

4.Other emissions are attenuated 20dB below the limits, so it does not record

5. TRANSMITTER TIME

5.1 LIMIT

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

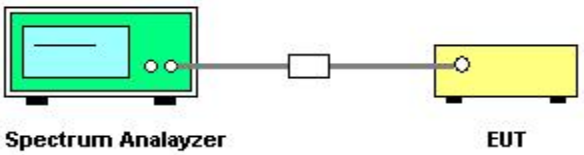
5.2 TEST PROCEDURE

a. The EUT's RF signal was coupled to spectrum analyzer by antenna connected to spectrum analyzer.

b. Set the spectrum to zero span mode, and centered of EUT frequency.

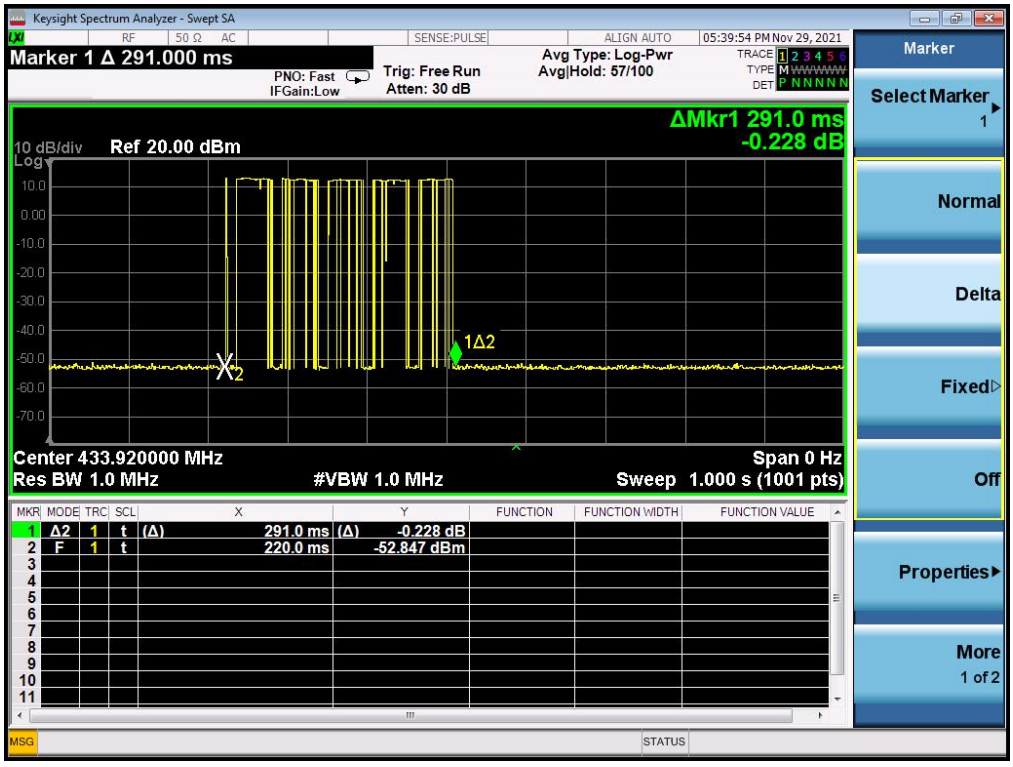
c. Measure the stop transmitting time after release EUT button

5.3 TEST SETUP



5.4 TEST RESULTS

Frequency(MHz)	Limit	Result
433.92	⩽5s	Pass



6. 20 DB BANDWIDTH TEST

6.1 LIMIT

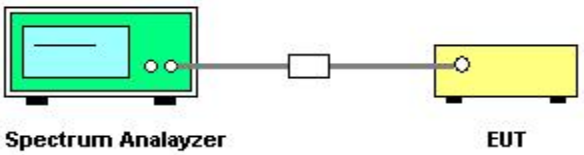
The bandwidth of the emission shall be no wider than 0.25% of the center frequency of devices operation above 70MHz and below 900MHz.

6.2 TEST PROCEDURE

a. Connect EUT's antenna output to spectrum analyzer by RF cable.

b. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3Hz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB

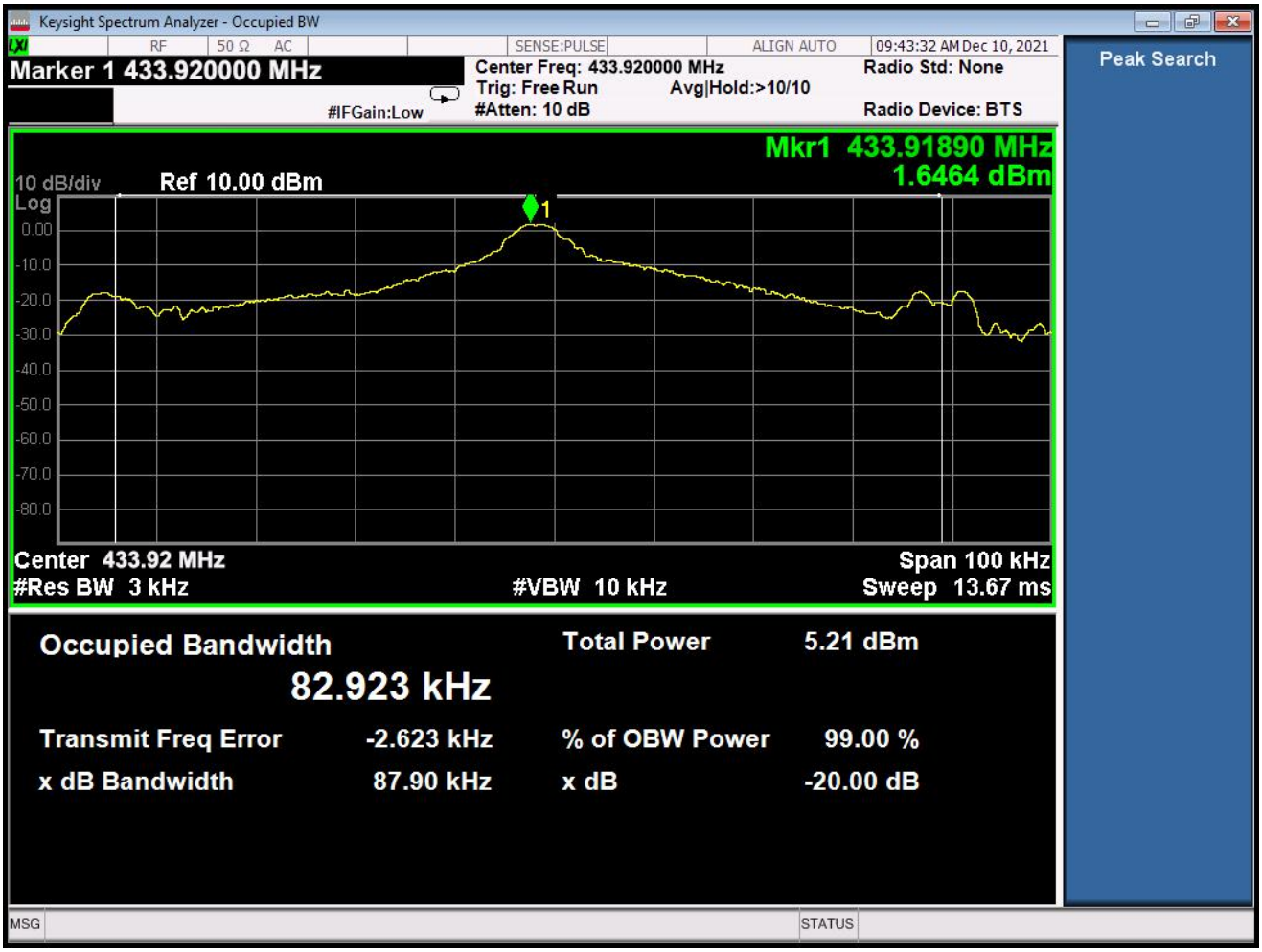
6.3 TEST SETUP



6.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	50%
Test Mode:	ASK	Test Voltage:	DC 3V

Frequency	20dB Bandwidth (KHz)	Result
433.92 MHz	87.90	PASS



7. DUTY CYCLE

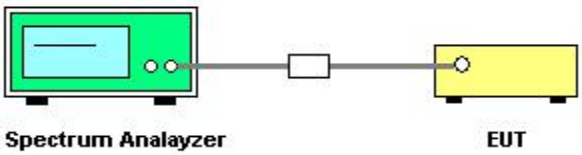
7.1 LIMIT

None: for reporting purposes only.

7.2 TEST PROCEDURE

a. Set the Centre frequency of the spectrum analyzer to the transmitting frequency;
Set the span=0Hz, RBW=100KHz, VBW=300KHz, Sweep time=200.00ms;
Trace mode = Single hold

7.3 TEST SETUP

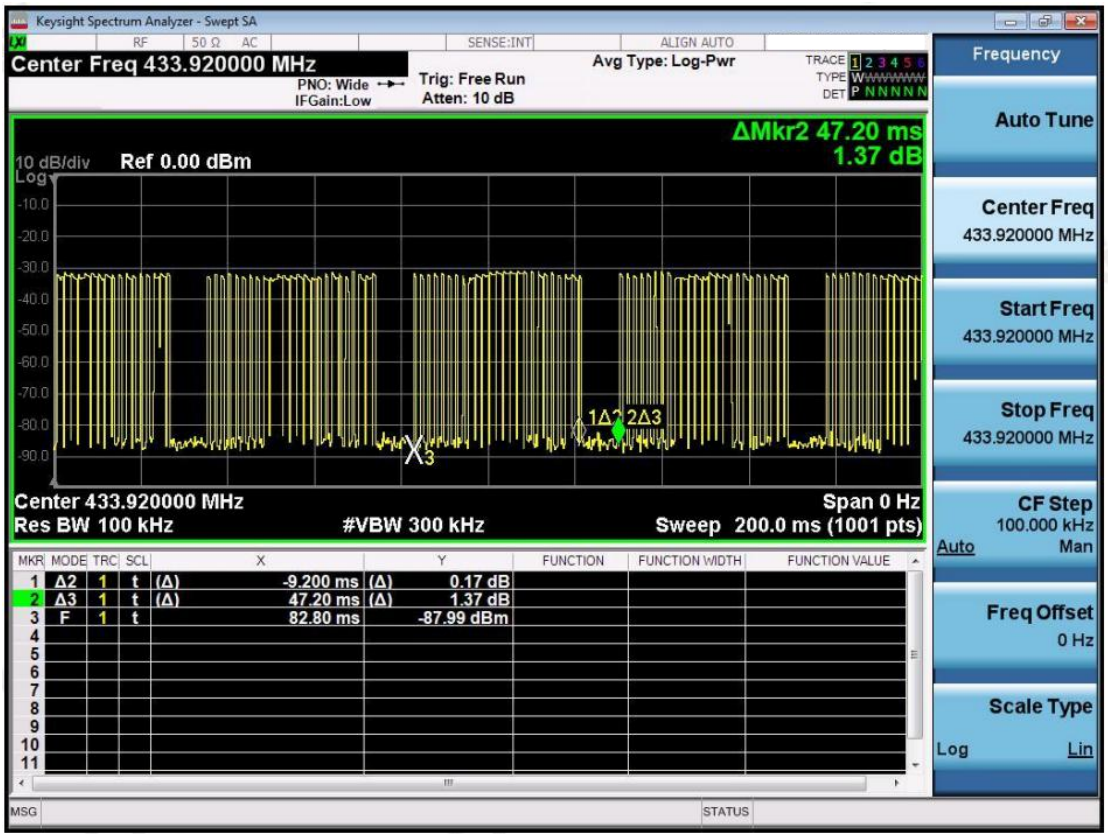


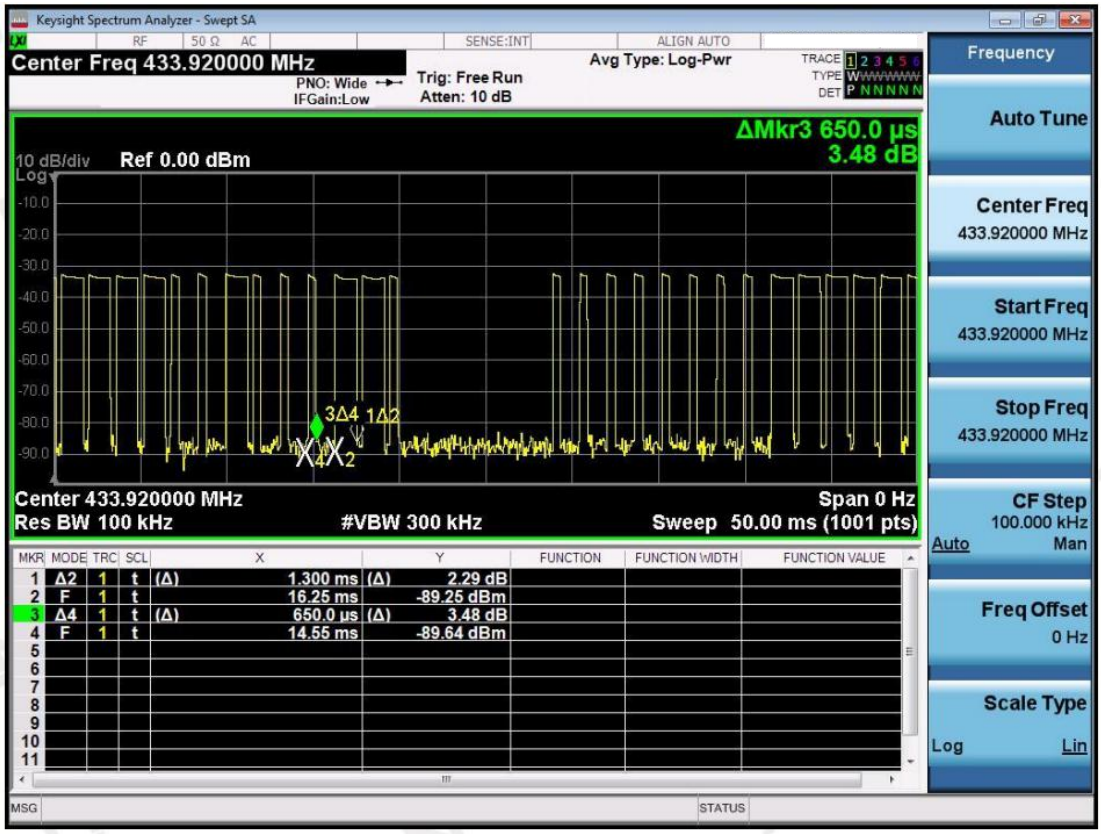
7.4 TEST RESULTS

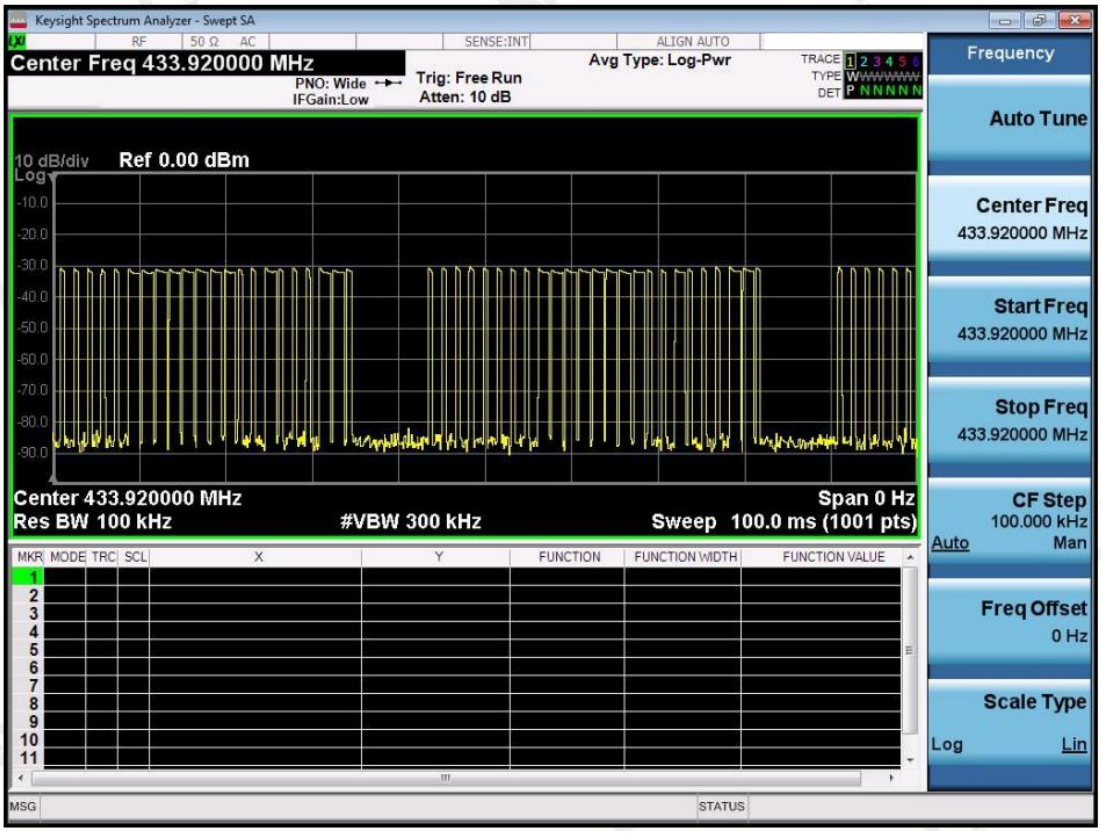
Frequency	Duty Cycle
433.92 MHz	49.68%

The duty cycle is simply the on time divided by the period:
The duration of one cycle = 47.20ms
Effective period of the cycle = 1.3*11+0.65*14=23.4ms
Duty Cycle = 22.4ms/47.20ms = 0.4968=49.58%
Duty Cycle Factor(dB)=20log (duty cycle(%))= -6.09dB

Original test data




Keysight Spectrum Analyzer - Swept SA
Center Freq 433.920000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
ΔMkr3 650.0 µs
3.48 dB
10 dB/div
Ref 0.00 dBm
Center 433.920000 MHz
Res BW 100 kHz
#VBW 300 kHz
Span 0 Hz
Sweep 50.00 ms (1001 pts)
1 Δ2 1 t (Δ) 1.300 ms (Δ) 2.29 dB
2 F 1 t 16.25 ms -89.25 dBm
3 Δ4 1 t (Δ) 650.0 µs (Δ) 3.48 dB
4 F 1 t 14.55 ms -89.64 dBm
Frequency
Auto Tune
Center Freq
433.920000 MHz
Start Freq
433.920000 MHz
Stop Freq
433.920000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin


Keysight Spectrum Analyzer - Swept SA
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Ref 0.00 dBm
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Res BW 100 kHz
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Span 0 Hz
Sweep 100.0 ms (1001 pts)
Frequency
Auto Tune
Center Freq
433.920000 MHz
Start Freq
433.920000 MHz
Stop Freq
433.920000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

8 . ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

8.2 EUT ANTENNA

The antennas used for this product are Spring antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0 dBi.

※※※※※END OF THE REPORT※※※※※