



Report Number: 709502230034-00

FCC/ISED TEST REPORT

Report Number : 709502230034-00 Date of Issue: June.28, 2023

Model : DD1554E

Product Type : Connector Mini Bridge

Applicant : NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD.

Address : No.168 Shengguang Road, Luotuo, Zhenhai, Ningbo ZHEJIANG,China

Production Facility : NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD.

Address : No.168 Shengguang Road, Luotuo, Zhenhai, Ningbo ZHEJIANG,China

Test Result : ☒ Positive ☐ Negative

Total pages including
Appendices : 20

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.
dc

1 Table of Contents

1	Table of Contents.....	2
2	Details about the Test Laboratory	3
3	Description of the Equipment Under Test	4
4	Summary of Test Standards	6
5	Summary of Test Results	7
6	General Remarks.....	8
7	Systems test configuration	9
8	Test Setups.....	10
9	Test Methodology	11
9.1	Conducted Emission.....	11
9.2	Radiated Emission.....	14
9.3	Bandwidth Measurement	17
9.4	Deactivation Time	18
10	Test Equipment List.....	19
11	System Measurement Uncertainty	20

2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
No.16 Lane, 1951 Du Hui Road,
Shanghai 201108,
P.R. China

Test Firm FCC
Registration
Number: 820234

Designation
number: CN1183

IC Company
Number: 25988

CAB identifier: CN0101

Telephone: +86 21 6141 0123
Fax: +86 21 6140 8600

3 Description of the Equipment Under Test

Product: Connector Mini Bridge

Model no./HVIN/PMN: DD1554E

FCC ID: VYY1554EV01

Rating: USB DC5V(type A)

RF Transmission Frequency: 802.11b/g/n(HT20): 2412~2462 MHz (Wi-Fi)
802.11n(HT40): 2422~2452 MHz (Wi-Fi)
Bluetooth LE:2402~2480 MHz
DSR:433.92MHz

Modulation: For 2.4GHz WIFI:
Direct Sequence Spread Spectrum (DSSS) for 802.11b
Orthogonal Frequency Division Multiplexing (OFDM) for 802.11g/n
For 2.4GHz BLE: GFSK
433.92MHz: GFSK

Antenna Type: PCB antenna for Wi-Fi and Bluetooth module
Chip antenna for 433.92MHz

Antenna Gain: Wi-Fi and Bluetooth module:3.26dBi
433.92MHz:0.79dBi

Channel list:

Bluetooth Low Energy							
Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

802.11b/g/n(HT20)/ax(HE20)					802.11n(HT40)		
Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)
1	2412	7	2442	3	2422	8	2447MHz
2	2417	8	2447	4	2427	9	2452MHz
3	2422	9	2452	5	2432		
4	2427	10	2457	6	2437		
5	2432	11	2462	7	2442		
6	2437						

Description of the EUT: The Equipment Under Test (EUT) is a Connector Mini Bridge with Wi-Fi and BLE function. It also has 433.92MHz transmitter. The Wi-Fi and Bluetooth module has been granted under the FCC ID listed. This report is only for 433.92MHz.

Test sample no.: SHA-67693-1

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to ANSI C63.10-2013.

5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Pages	Test Site	Test Result
§15.207	Conducted emission AC power port	10-13	Shield room	Pass
§15.205, §15.209, 15.35 (c)§15.231(b)	Radiated Emission, 30MHz to 4.5GHz	14-16	3m chamber	Pass
§15.231(c)	Bandwidth Measurement	17	Shield room	Pass
§15.231(a)(1)	Deactivation Time	18	Shield room	Pass
§15.203	Antenna requirement	--	See Note 2	Pass

Note 1: N/A=Not Applicable. Conducted emission is not apply for battery operated device.

Note 2: The EUT uses a PCB Antenna and Chip antenna, which gain is 3.26dBi and 0.79dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: VYY1554EV01, complies with Section 15.207, 15.205, 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - Not Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: September 14, 2022

Testing Start Date: September 21, 2022

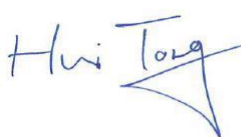
Testing End Date: September 26, 2022

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:





Hui TONG
EMC Section Manager

Jiaxi XU
EMC Project Engineer

Wang Yiquan
EMC Test Engineer

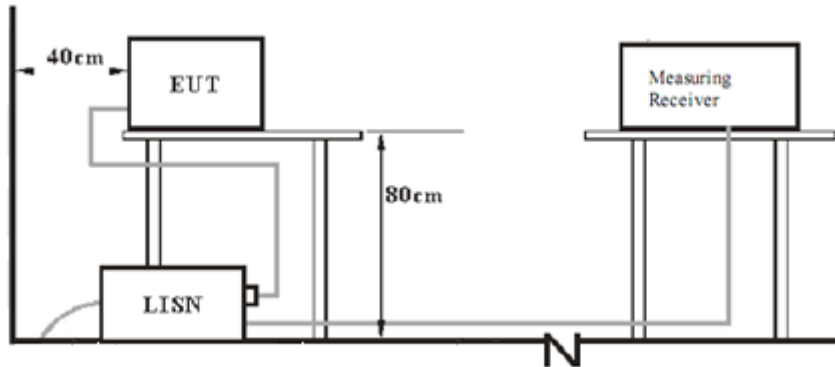
7 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenove	E470	PF-OU5TS7 17/09

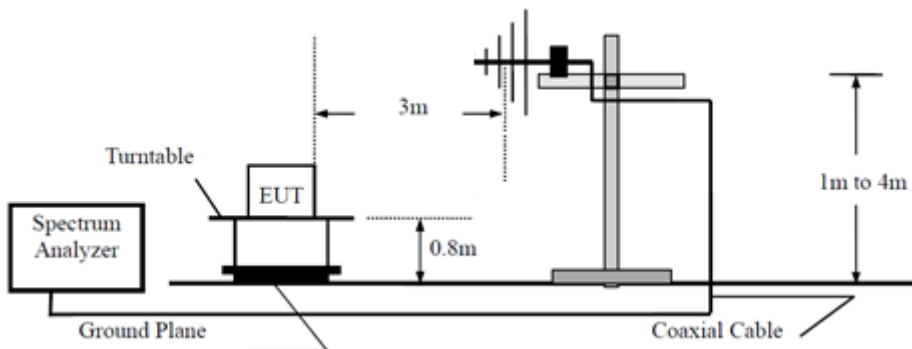
8 Test Setups

8.1 AC Power Line Conducted Emission test setups

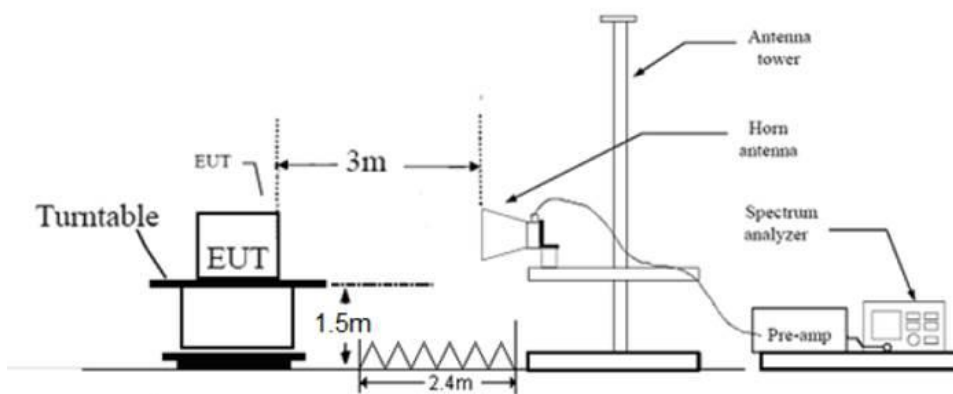


8.2 Radiated test setups

Below 1GHz



Above 1GHz



9 Test Methodology

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

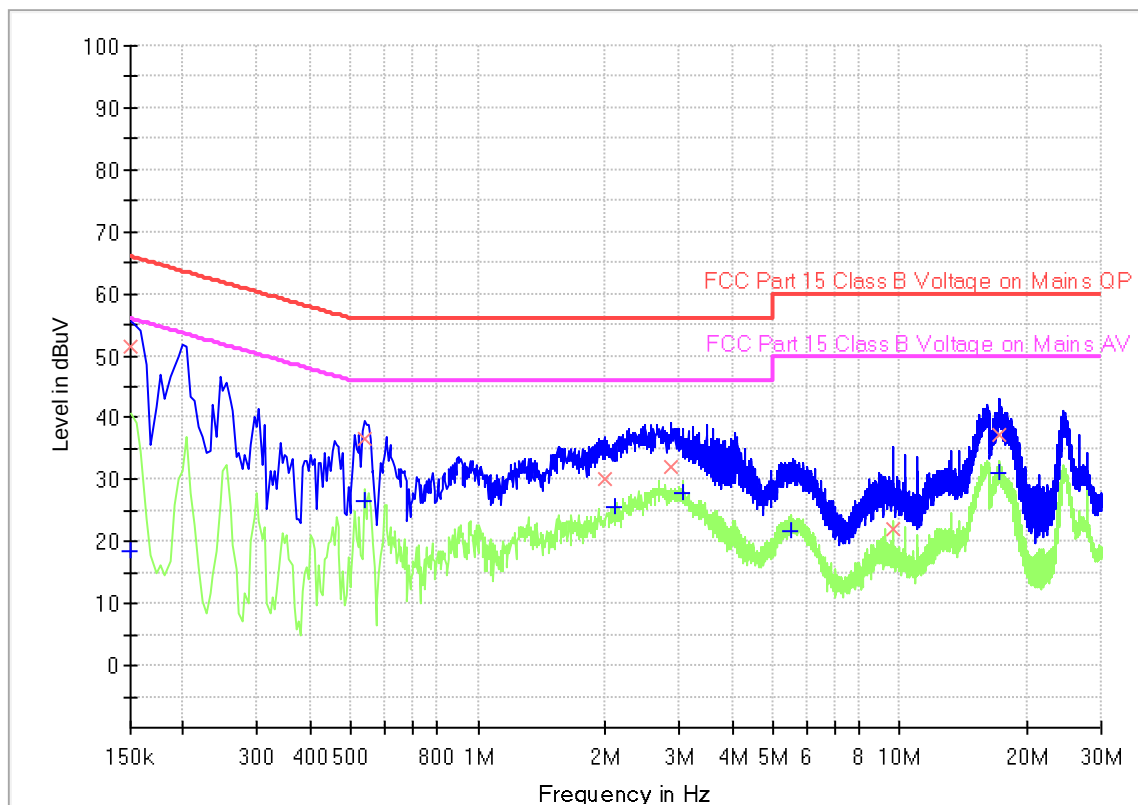
Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

Conducted Emission

Product Type : Connector Mini Bridge
 M/N : DD1554E
 Operating Condition : Mode 1: Tx_433.92MHz
 Test Specification : L-line
 Comment : DC 5V by laptop

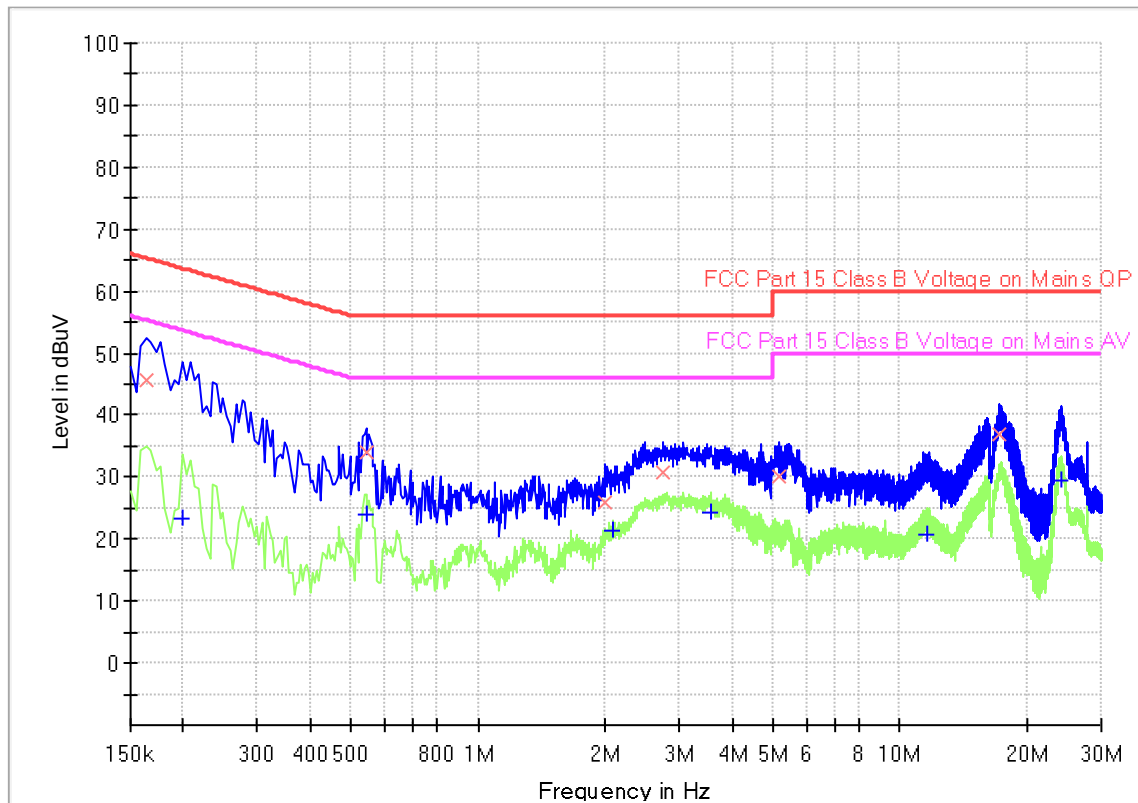


Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	18.55	56.00	37.45	1000.0	9.000	L1	19.5
0.150000	51.58	---	66.00	14.42	1000.0	9.000	L1	19.5
0.537000	---	26.50	46.00	19.50	1000.0	9.000	L1	19.5
0.537000	36.65	---	56.00	19.35	1000.0	9.000	L1	19.5
1.990500	30.23	---	56.00	25.77	1000.0	9.000	L1	19.5
2.112000	---	25.55	46.00	20.45	1000.0	9.000	L1	19.5
2.863500	32.14	---	56.00	23.86	1000.0	9.000	L1	19.6
3.070500	---	27.92	46.00	18.08	1000.0	9.000	L1	19.6
5.496000	---	21.55	50.00	28.45	1000.0	9.000	L1	19.6
9.591000	22.09	---	60.00	37.91	1000.0	9.000	L1	19.7
17.128500	---	30.95	50.00	19.05	1000.0	9.000	L1	19.8
17.178000	37.09	---	60.00	22.91	1000.0	9.000	L1	19.8

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

Product Type : Connector Mini Bridge
 M/N : DD1554E
 Operating Condition : Mode 1: Tx_433.92MHz
 Test Specification : N-line
 Comment : DC 5V by laptop



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.163500	45.51	---	65.28	19.77	1000.0	9.000	N	19.5
0.199500	---	23.46	53.63	30.17	1000.0	9.000	N	19.5
0.541500	---	23.90	46.00	22.10	1000.0	9.000	N	19.5
0.541500	34.07	---	56.00	21.93	1000.0	9.000	N	19.5
1.999500	25.89	---	56.00	30.11	1000.0	9.000	N	19.5
2.089500	---	21.53	46.00	24.47	1000.0	9.000	N	19.5
2.751000	30.84	---	56.00	25.16	1000.0	9.000	N	19.5
3.565500	---	24.27	46.00	21.73	1000.0	9.000	N	19.5
5.158500	29.99	---	60.00	30.01	1000.0	9.000	N	19.6
11.562000	---	20.81	50.00	29.19	1000.0	9.000	N	19.7
17.241000	37.01	---	60.00	22.99	1000.0	9.000	N	19.8
24.045000	---	29.59	50.00	20.41	1000.0	9.000	N	20.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

9.2 Radiated Emission

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
5. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. Use the following spectrum analyzer settings According to C63.10:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
 For average measurement:
 VBW = 10 Hz, when duty cycle is no less than 98 percent.
 VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
7. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.231 (b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter)	Field Strength of spurious emissions ((Microvolts /meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,370 *	125 to 3750 *
174-260	3,750	375
260-470 ✓	3,750 to 12, 500*	375 to 1,250*
Above 470	12,500	1,250

Limits for 15.209 Radiated emission limits; general requirements

Frequency (MHz)	Field strength (microvolts/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

Frequency	Limit at 3m (dBuV/m)
0.009 MHz – 0.490 MHz	128.5 to 93.8 ¹
0.490 MHz – 1.705 MHz	73.8 to 63 ¹
1.705 MHz – 30 MHz	69.5 ¹
30 MHz – 88 MHz	40.0 ¹
88 MHz – 216 MHz	43.5 ¹
216 MHz – 960 MHz	46.0 ¹
Above 960 MHz	54.0 ¹
Above 1000 MHz	54.0 ²
Above 1000 MHz	74.0 ³

¹Limit is with detector with bandwidths as defined in CISPR-16-1-1 except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz where an Average detector is used.

²Limit is with 1 MHz measurement bandwidth and using an Average detector

³Limit is with 1 MHz measurement bandwidth and using a Peak detector

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Radiated Emission								
Value	Emissions	E-Field	Field	Average	Net Field	Limit		Emission Type
	Frequency	Polarity	Strength at 3m	Factor	Strength at 3m		Margin	
	MHz		dBμV/m	dB	dBμV/m	dBμV/m	dB	
PK	433.91	H	67.55	/	67.55	80.80	13.25	Fundamental
PK	37.69	H	33.61	/	33.61	40.00	6.39	restricted band
PK	867.83	H	36.45	/	36.45	60.80	24.35	Spurious
PK	1598.50	H	39.68	/	39.68	60.80	21.12	restricted band
PK	433.91	V	65.34	/	65.34	80.80	15.46	Fundamental
PK	35.26	V	30.47	/	30.47	60.80	30.33	Spurious
PK	867.88	V	35.91	/	35.91	60.80	24.89	Spurious
PK	1301.76	V	37.87	/	37.87	60.80	22.93	restricted band

Remark:

- Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
- Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
- Corrected Reading = Original Receiver Reading + Correct Factor
- Only the worst data listed in this report, Other frequency was 20dB below the limit
- Because of the PK value was less than the AV limit, the duty cycle was not measured.

9.3 Bandwidth Measurement

Test Method

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. Use the following test receiver settings:
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
RBW =1% to 5% of the 20dB bandwidth of the emission being measured, VBW≥RBW,
Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
4. Repeat above procedures until all frequencies measured were complete.

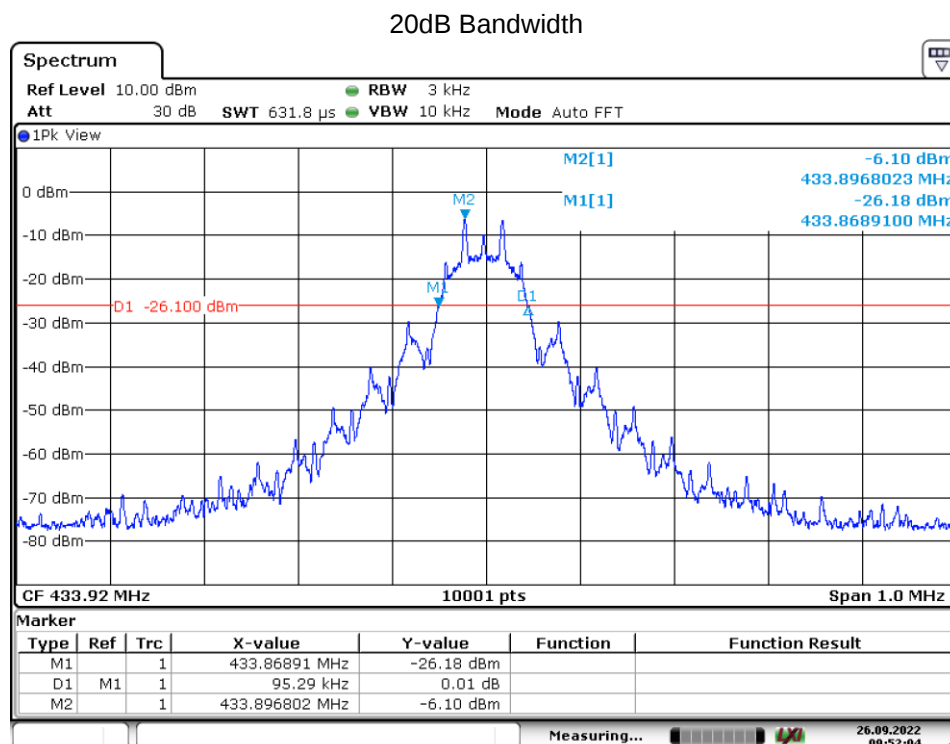
Limit

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

The limit for the EUT = 0.25% * 433.91 MHz = 1084 kHz

Test Result

Channel	20dB Bandwidth (KHz)	Limit (KHz)
1	95.29	1084



Date: 26.SEP.2022 09:52:03

9.4 Deactivation Time

Test Method

1. Set to the maximum power setting and enable the EUT in transmitting mode.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=120 KHz, VBW=1MHz, Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.

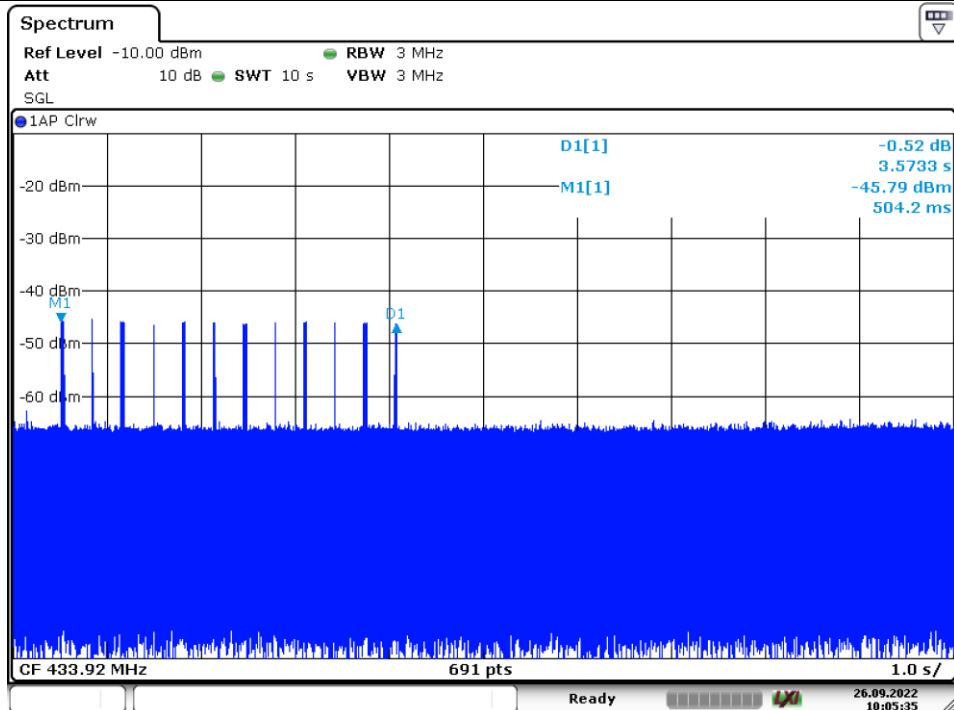
Limit

According to FCC Part 15.231 (a), the transmitter shall be complied the following requirements:

- (v) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

Test Result

Channel	Frequency	Deactivation Time	Result
1	433.92MHz	3.5733s	Pass



Date: 26.SEP.2022 10:05:35

10 Test Equipment List

List of Test Instruments

RF Test

Description	Manufacturer	Model no.	Serial no.	Calibration Date	Calibration Due
Signal and spectrum analyzer	R&S	FSV40	S1503003-YQ-EMC	2022-8-01	2023-7-31

Conducted Emission

Description	Model no.	Manufacturer	Equipment ID.	Calibration Date	Calibration Due
EMI test receiver	ESR3	R&S	S1503001-YQ-EMC	2022-8-01	2023-7-31
2-Line V-network	ENV216	R & S	S1503103-YQ-EMC	2022-8-01	2023-7-31

Radiated Emission Test

USED	Equipment Name	Model	Manufacturer	Equipment ID.	Calibration Date	Calibration Due
☒	EMI test receiver	ESR3	R&S	S1503109-YQ-EMC	2022-8-01	2023-7-31
☒	Trilog super broadband test antenna	SCHWARZBECK	VULB9168	S1808296-YQ-EMC	2021-9-23	2024-9-22
☒	Double-ridged waveguide horn antenna	HF907	R&S	S1503009-YQ-EMC	2021-4-13	2024-4-12
☒	Signal conditioning unit	SCU-18D	R&S	S1503012-YQ-EMC	2022-8-01	2023-7-31
☒	Signal and spectrum analyzer	FSV40	R&S	S1503003-YQ-EMC	2022-8-01	2023-7-31
☒	Loop antenna	HFH2-Z2	R&S	S1503013-YQ-EMC	2022-6-13	2023-6-12

11 System Measurement Uncertainty

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

Items	Extended Uncertainty
Conducted Disturbance	9kHz to 30MHz, 3.16dB (AMN)
Radiated Disturbance	9kHz to 30MHz, 3.52dB 30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical) 1GHz to 18GHz, 5.49dB 18GHz to 40GHz, 5.63dB

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.

-----End of Test Report-----