



TEST REPORT

Report Number : TZ0120250703FRF20
Product Name : Wireless signal lights
Model/Type reference : Z-T50, Z-T033, Z-T212, Z-T28, Z-T30, Z-T42, Z-T43, Z-T46, AG-T28, AG-T033, AG-T312, AG-TL-002-A, AG-T42, AG-T42-C
FCC ID : 2A5DQ-Z-T50
Prepared for : J-Well Technology(GuangZhou) Co.,Ltd
Room 201, building 8, No. 194, pinglong Road Huashan Town, Huadu District, Guangzhou, China

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Standards : FCC CFR Title 47 Part 15 Subpart C, ANSI C63.10: 2020
Date of Test : 2025-07-28~ 2025-08-07
Date of Issue : 2025-08-08

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(Authorized Officer)



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**** Report Revise Record ****

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2025-08-08	Valid	Initial release





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1. GENERAL INFORMATION

1.1. Client Information

Applicant	: J-Well Technology(GuangZhou) Co.,Ltd
Address	: Room 201, building 8, No. 194, pinglong Road Huashan Town, Huadu District, Guangzhou, China
Manufacturer	: J-Well Technology(GuangZhou) Co.,Ltd
Address	: Room 201, building 8, No. 194, pinglong Road Huashan Town, Huadu District, Guangzhou, China

1.2. Description of Device (EUT)

Product Name	: Wireless signal lights
Trade Mark	: 
Model Number	: Z-T50, Z-T033, Z-T212, Z-T28, Z-T30, Z-T42, Z-T43, Z-T46, AG-T28, AG-T033, AG-T312, AG-TL-002-A, AG-T42, AG-T42-C
Test Model	: Z-T50
Difference description	: All the same except for the model name
Power Supply	: DC 12-24V
Hardware version	: V1.0
Software version	: V1.0

1.3. Wireless Function Tested in this Report

Short Range Device	
Operation Frequency	: 2420-2464MHz
Channel Separation	: 1MHz
Modulation Technology	: GFSK
Antenna Type and Gain	: Detachable Antenna with a reverse SMA connector, 3dBi

Note 1: Antenna position refer to EUT Photos.

Note 2: the above information was supplied by the applicant.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2420	24	2443
2	2421	---	---
3	2422	---	---
---	---	63	2462
---	---	64	2463
22	2441	65	2464
23	2442		



**Test Frequency List**

Type	Test Frequency					
	Lowest		Middle		Highest	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
SRD	01	2420	23	2442	65	2464

1.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● supplied by the manufacturer

○ supplied by the lab

○		Model:	/
		Input:	/
		Output:	/

1.5. Description of Test Facility**FCC**

Designation Number: CN1275

Test Firm Registration Number: 167722

Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA

Certificate Number: 5463.01

Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC

ISED#: 22033

CAB identifier: CN0099

Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4 and CISPR 16-1-4:2010





1.6. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Shenzhen Tongzhou Testing Co.,Ltd’s quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.7. Measurement Uncertainty

Test Item		Uncertainty	Note
Radiation Uncertainty(9KHz~30MHz)	:	$\pm 3.26\text{dB}$	(1)
Radiation Uncertainty(30MHz~1000MHz)	:	$\pm 3.92\text{dB}$	(1)
Radiation Uncertainty(1GHz~40GHz)	:	$\pm 5.62\text{dB}$	(1)
Conduction Uncertainty	:	$\pm 2.71\text{dB}$	(1)
Occupied Channel Bandwidth	:	$\pm 3.0\%$	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.8. Description of Test Modes

The EUT has been tested under operating condition.

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

Test Modes:		
Mode 1	Transmitting at Low Channel	Record
Mode 2	Transmitting at Middle Channel	Record
Mode 3	Transmitting at High Channel	Record





2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen Tongzhou Testing Co.,Ltd

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209, 15.249 under the FCC Rules Part 15 Subpart C.

2.3. Test Sample

Sample ID	Description
TZ0120250703-1#	Normal sample





3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes
/	/	/	/	/	/	/	/

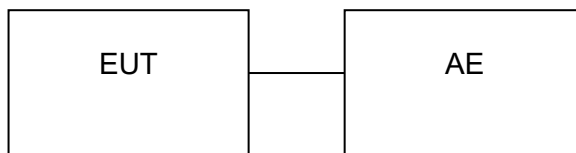
3.3. Block Diagram/Schematics

Please refer to the related document

3.4. Equipment Modifications

Shenzhen Tongzhou Testing Co.,Ltd has not done any modification on the EUT.

3.5. Configuration of Tested System





4. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Sample ID	Result
§15.249(a)	Field Strength of Fundamental	TZ0120250703-1#	Compliant
§15.209&§15.249(a)	Radiated Emission	TZ0120250703-1#	Compliant
§15.209&§15.249(d)	Band Edge Emission	TZ0120250703-1#	Compliant
/	-20dB Bandwidth	TZ0120250703-1#	Compliant
/	Duty Cycle	TZ0120250703-1#	Compliant
§15.207(a)	Conducted Emissions	TZ0120250703-1#	N/A (Note 1)
§15.203	Antenna Requirements	TZ0120250703-1#	Compliant

Note 1: Since the EUT is powered by a vehicle battery and does not interface with mains power, power line conducted testing is not performed.

Remark: The measurement uncertainty is not included in the test result.





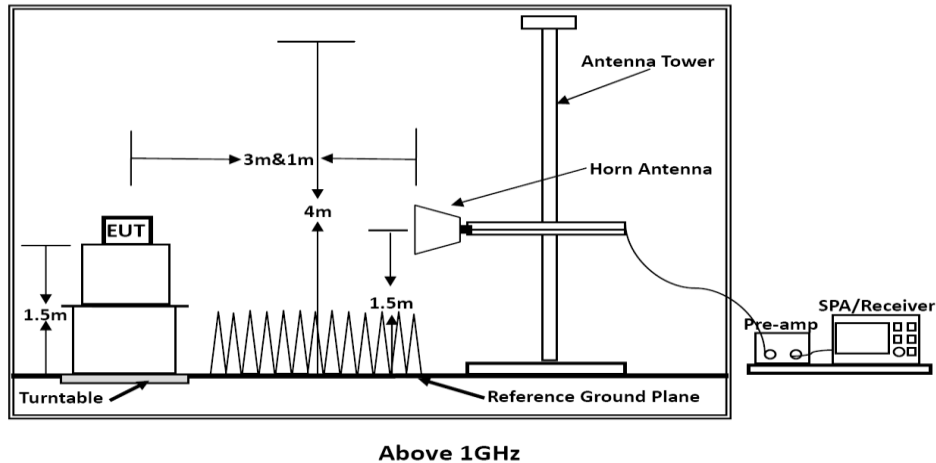
5. TEST RESULT

5.1. Bandwidth Measurement

5.1.1. Standard Applicable

Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.1.2. Block Diagram of Test Setup



5.1.3. Test Procedures

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=30kHz, VBW=100kHz
4. Span: 4MHz
5. Sweep time: Auto
6. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the "N dB down" function of SPA to define the bandwidth.
7. Record the plots and Reported.

5.1.4. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.





5.1.5. Test Result

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	TX Mode
Test Voltage	DC 12V	/	/

Mode	Freq (MHz)	-20dB Bandwidth (MHz)	Limit (MHz)	Conclusion
Mode 1	2420	1.369	/	PASS
Mode 2	2442	1.594	/	PASS
Mode 3	2464	1.509	/	PASS

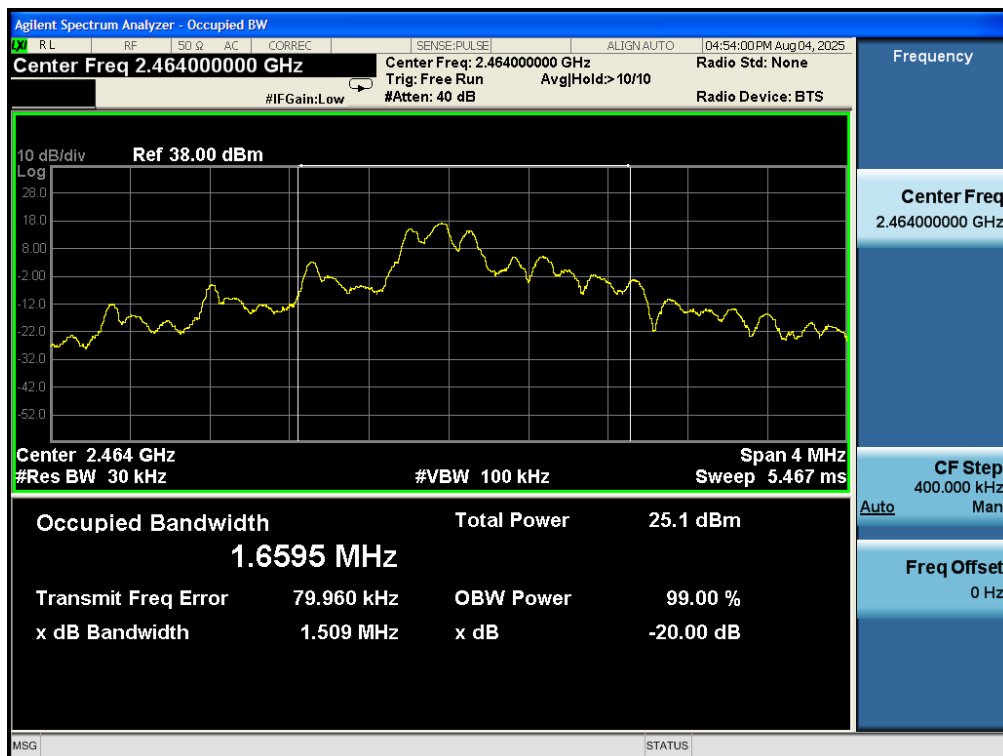


Low Channel





Middle Channel



High Channel



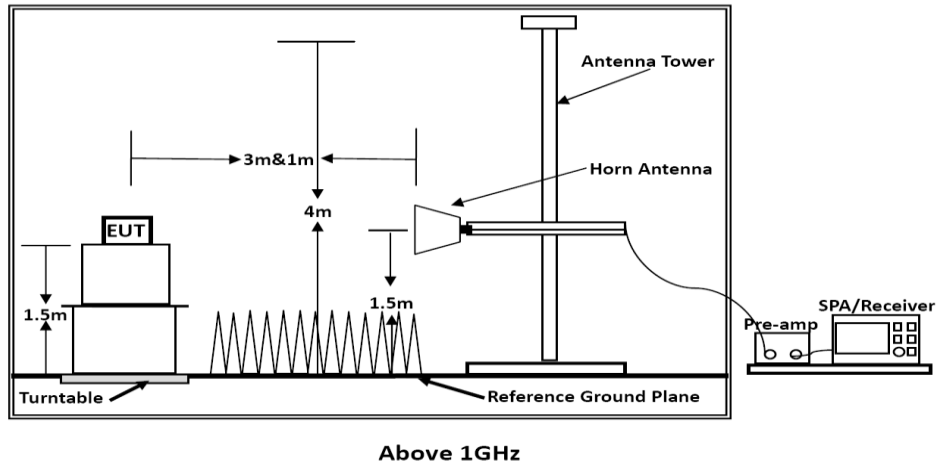


5.2. On Time and Duty Cycle

5.2.1. Standard Applicable

None. for reporting purpose only.

5.2.2. Block Diagram of Test Setup



5.2.3. Test Procedures

1. Set the center frequency of the spectrum analyzer to the transmitting frequency.
2. Set the span=0MHz, RBW to the largest available value, VBW $\geq$ RBW
3. Detector = peak.
4. Trace mode = Single hold.

5.2.4. EUT Operation during Test

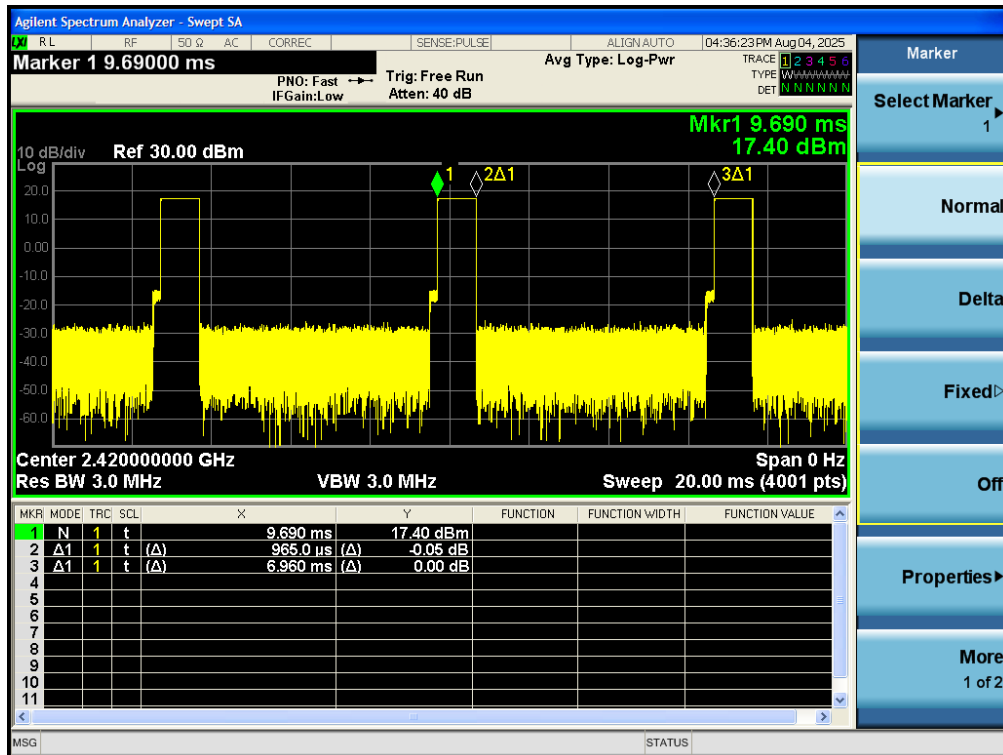
The EUT was programmed to be in continuously transmitting mode.

5.2.5. Test Result

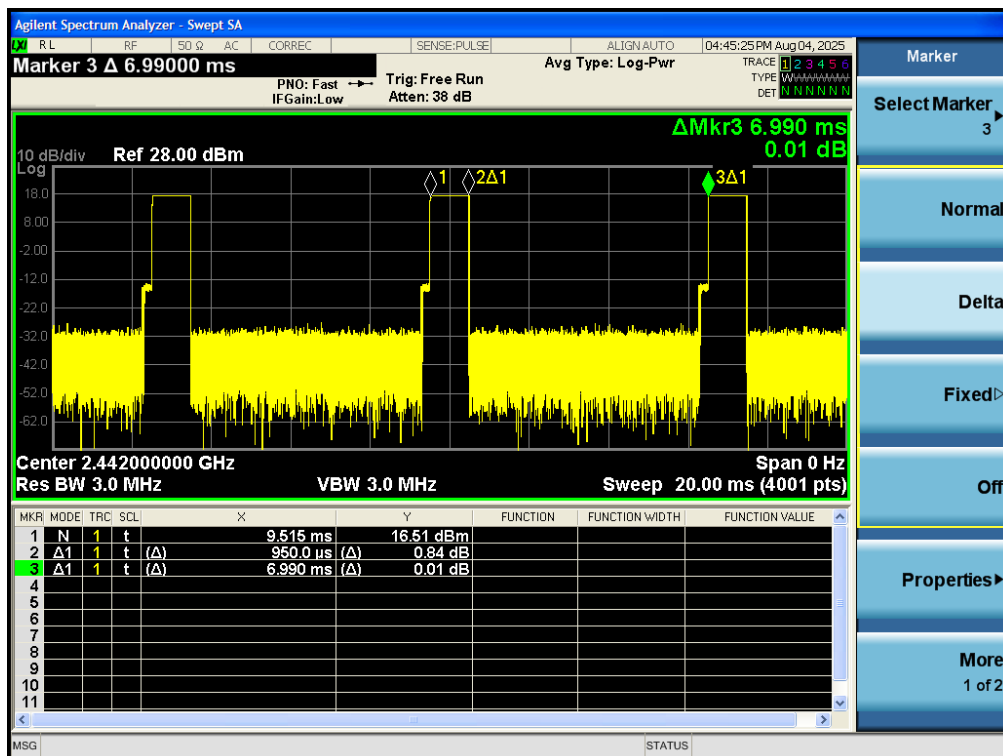
Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	TX Mode
Test Voltage	DC 12V	/	/

Mode	Freq (MHz)	Duty Cycle	Duty Cycle Factor(dB)
Mode 1	2420	13.86%	-17.16
Mode 2	2442	13.59%	-17.34
Mode 3	2464	13.57%	-17.35



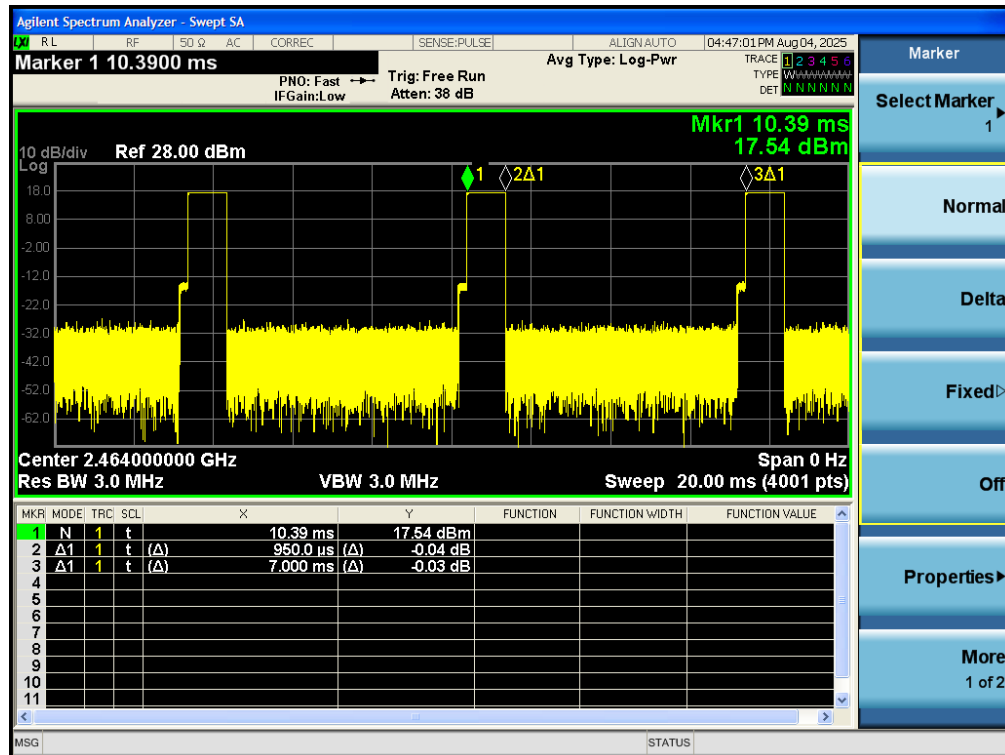


Low Channel



Middle Channel





High Channel





5.3. Radiated Emissions Measurement

5.3.1. Standard Applicable

15.249 (a)

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(1) The above field strength limits are specified at a distance of 3 meters.

(2) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(3) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

15.209(a):

Frequencies (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





5.3.2. Measuring Instruments and Setting

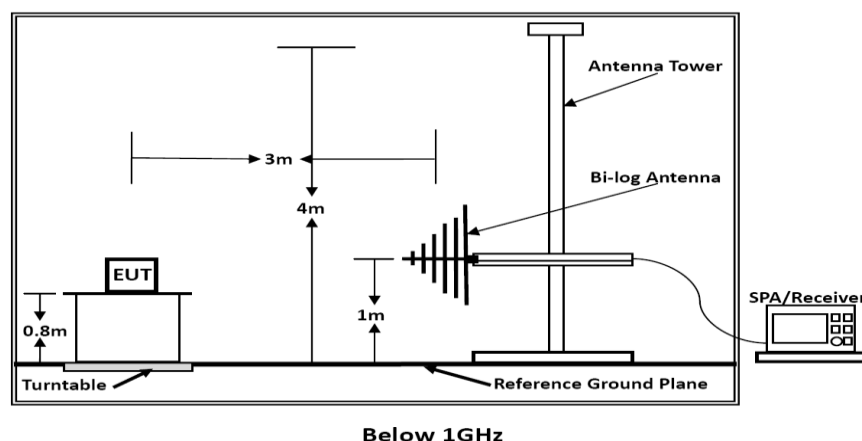
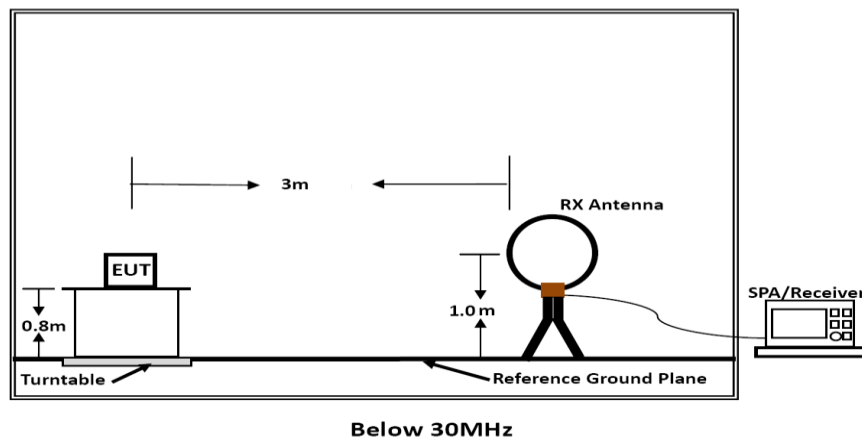
The following table is the setting of spectrum analyzer and receiver.

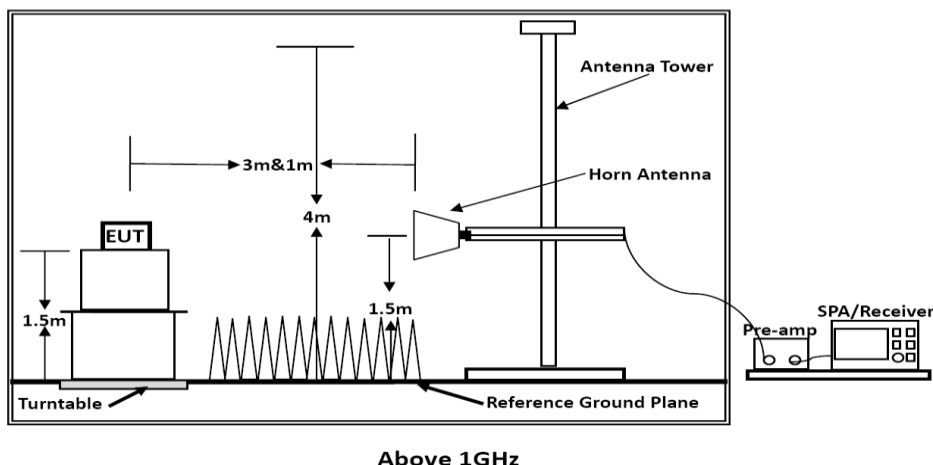
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 3 MHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 3 MHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

5.3.3. Block Diagram of Test Setup

For radiated emissions below 30MHz





5.3.4. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.0 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find





the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 40 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meters. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.





5.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.3.6. Test Results

Results of Radiated Emissions (9 KHz~30MHz)

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	Mode 1
Test Voltage	DC 12V	/	/

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB).

Limit line = specific limits (dBuV) + distance extrapolation factor.

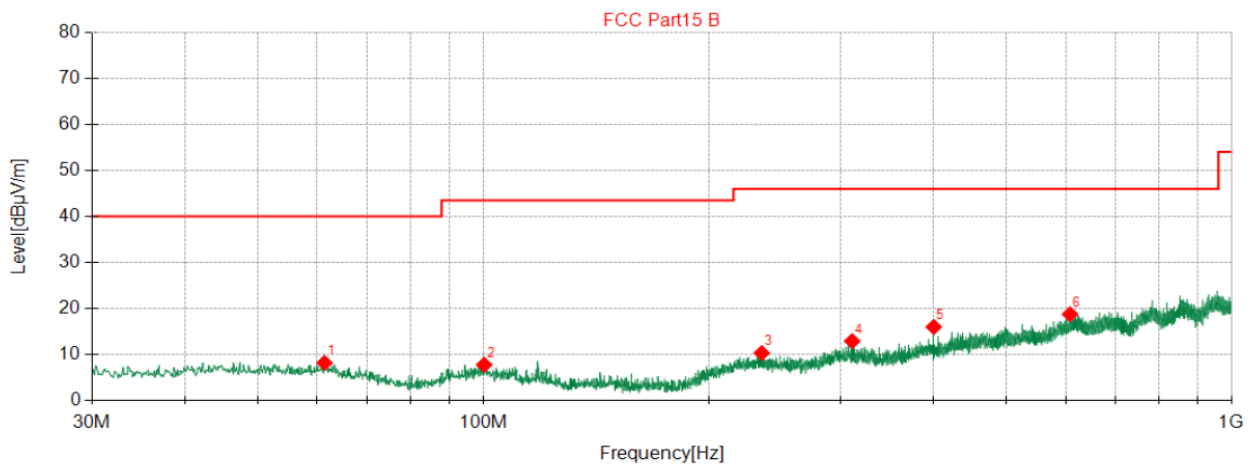




Results of Radiated Emissions (30MHz~1GHz)

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	Mode 1
Test Voltage	DC 12V	/	/

Vertical



◆ QP Detector

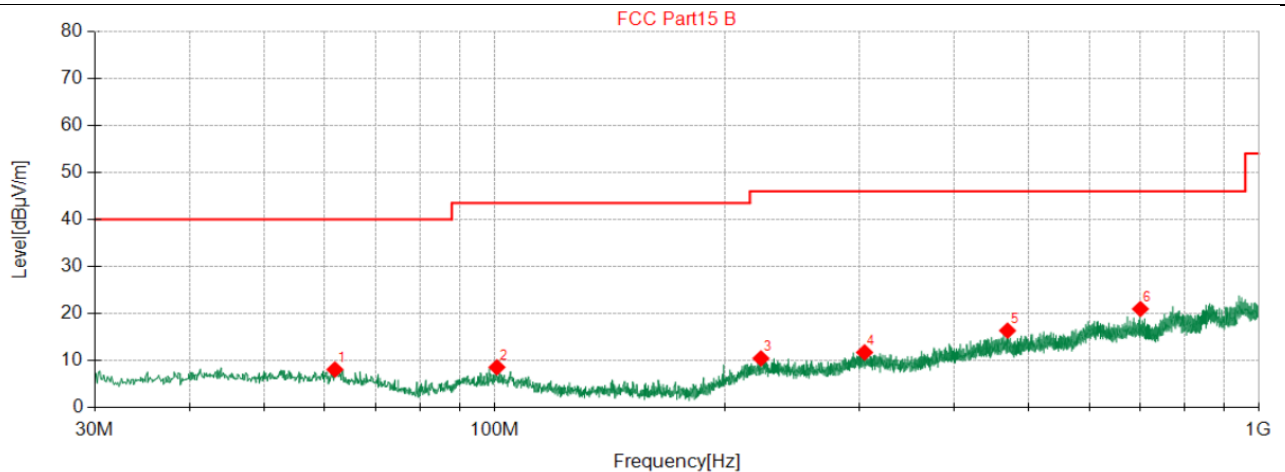
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	61.40	24.22	-16.00	8.22	40.00	31.78	100	10	Vertical
2	100.3	23.80	-15.98	7.82	43.50	35.68	100	84	Vertical
3	235.6	24.69	-14.32	10.37	46.00	35.63	100	358	Vertical
4	311.1	25.46	-12.50	12.96	46.00	33.04	100	177	Vertical
5	399.9	26.08	-10.04	16.04	46.00	29.96	100	253	Vertical
6	608.2	24.29	-5.49	18.80	46.00	27.20	100	358	Vertical

***Note:

1. Level [dBμV/m] = Reading [dBμV] + Factor [dB/m]
2. Margin [dB] = Limit [dBμV/m] - Level [dBμV/m]



**Horizontal**

◆ QP Detector

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	61.88	24.27	-16.13	8.14	40.00	31.86	100	47	Horizontal
2	100.8	24.59	-15.98	8.61	43.50	34.89	100	223	Horizontal
3	223.2	25.20	-14.70	10.50	46.00	35.50	100	197	Horizontal
4	304.9	24.44	-12.67	11.77	46.00	34.23	100	2	Horizontal
5	469.1	25.06	-8.66	16.40	46.00	29.60	100	271	Horizontal
6	700.0	25.35	-4.35	21.00	46.00	25.00	100	101	Horizontal

***Note:

1. Level [dBμV/m] = Reading [dBμV] + Factor [dB/m]

2. Margin [dB] = Limit [dBμV/m] - Level [dBμV/m]





Results of Radiated Emissions (1GHz-25GHz)

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	TX Mode
Test Voltage	DC 12V	/	/

Channel 01 / 2422 MHz

Freq. MHz	Reading dBμV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Remark	Pol.
4840.00	63.28	33.06	35.04	3.94	65.24	74.00	8.76	Peak	Horizontal
4840.00	46.12	33.06	35.04	3.94	48.08	54.00	5.92	Average	Horizontal
4840.00	66.15	33.06	35.04	3.94	68.11	74.00	5.89	Peak	Vertical
4840.00	48.99	33.06	35.04	3.94	50.95	54.00	3.05	Average	Vertical

Channel 23 / 2442MHz

Freq. MHz	Reading dBμV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Remark	Pol.
4884.00	64.14	33.16	35.15	3.96	66.11	74.00	7.89	Peak	Horizontal
4884.00	46.80	33.16	35.15	3.96	48.77	54.00	5.23	Average	Horizontal
4884.00	65.45	33.16	35.15	3.96	67.42	74.00	6.58	Peak	Vertical
4884.00	48.11	33.16	35.15	3.96	50.08	54.00	3.92	Average	Vertical

Channel 65 / 2464 MHz

Freq. MHz	Reading dBμV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Remark	Pol.
4928.00	62.18	33.26	35.14	3.98	64.28	74.00	9.72	Peak	Horizontal
4928.00	44.83	33.26	35.14	3.98	46.93	54.00	7.07	Average	Horizontal
4928.00	64.19	33.26	35.14	3.98	66.29	74.00	7.71	Peak	Vertical





		6							
4928.00	46.84	33.2 6	35.14	3.98	48.94	54.00	5.06	Average	Vertical

Notes:

1. Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
2. Radiated emissions measured in frequency range from 9 KHz ~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. $\text{Level} = \text{Reading} + \text{Ant. Fac} - \text{Pre. Fac} + \text{Cab. Loss} - \text{Margin} = \text{Limit} - \text{Level}$.



**Results of Field Strength of Fundamental**

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	TX Mode
Test Voltage	DC 12V	/	/

Frequency (MHz)	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Duty cycle factor(dB)	Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Polarization
2420	108.42	114	5.58	-17.16	91.26	94	2.74	Vertical
2420	104.66	114	9.34	-17.16	87.50	94	6.50	Horizontal
2442	109.01	114	4.99	-17.34	91.67	94	2.33	Vertical
2442	105.02	114	8.98	-17.34	87.68	94	6.32	Horizontal
2464	109.81	114	4.19	-17.35	92.46	94	1.54	Vertical
2464	105.44	114	8.56	-17.35	88.09	94	5.91	Horizontal

Note:

1. Peak Margin [dB] = Peak Limit [dBμV/m] - Peak Level [dBμV/m]
2. Average Level [dBμV/m] = Peak Level [dBμV/m] + Duty cycle factor [dB]
3. Average Margin [dB] = Average Limit [dBμV/m] - Average Level [dBμV/m]
4. RBW=2MHz/VBW=6MHz





Results of Band Edge Emission

Temperature	22.5℃	Humidity	56%
Test Engineer	Tony Luo	Configurations	TX Mode
Test Voltage	DC 12V	/	/

Channel 01 / 2420 MHz									
Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
1	2400.00	36.34	27.9	3.3	67.54	74	6.46	Peak	Horizontal
1	2400.00	20.12	27.9	3.3	51.32	54	2.68	AV ^[1]	Horizontal
2	2400.00	38.22	27.9	3.3	69.42	74	4.58	Peak	Vertical
2	2400.00	20.58	27.9	3.3	51.78	54	2.22	AV ^[1]	Vertical

Channel 65 / 2464 MHz									
Item (Mark)	Freq. MHz	Reading dBμV	Ant. Fac. dB/m	Cable Loss dB	Level dBμV/m	Limit dBμV/m	Margin dB	Detector	Pol.
3	2483.50	36.29	28.1	3.5	67.89	74	6.11	Peak	Horizontal
3	2483.50	19.72	28.1	3.5	51.32	54	2.68	AV ^[1]	Horizontal
4	2483.50	38.34	28.1	3.5	69.94	74	4.06	Peak	Vertical
4	2483.50	20.54	28.1	3.5	52.14	54	1.86	AV ^[1]	Vertical
5	2488.68	33.68	28.1	3.5	65.28	74	8.72	Peak	Horizontal
5	2489.24	16.63	28.1	3.5	48.23	54	5.77	AV ^[1]	Horizontal
6	2496.42	27.48	28.1	3.5	59.08	74	14.92	Peak	Vertical
6	2496.23	13.27	28.1	3.5	44.87	54	9.13	AV ^[1]	Vertical

Remark:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. Margin = Limit - Emission Level.
4. The average measurement was not performed when the peak measured data under the limit of average detection.





5.4. AC Power line conducted emissions

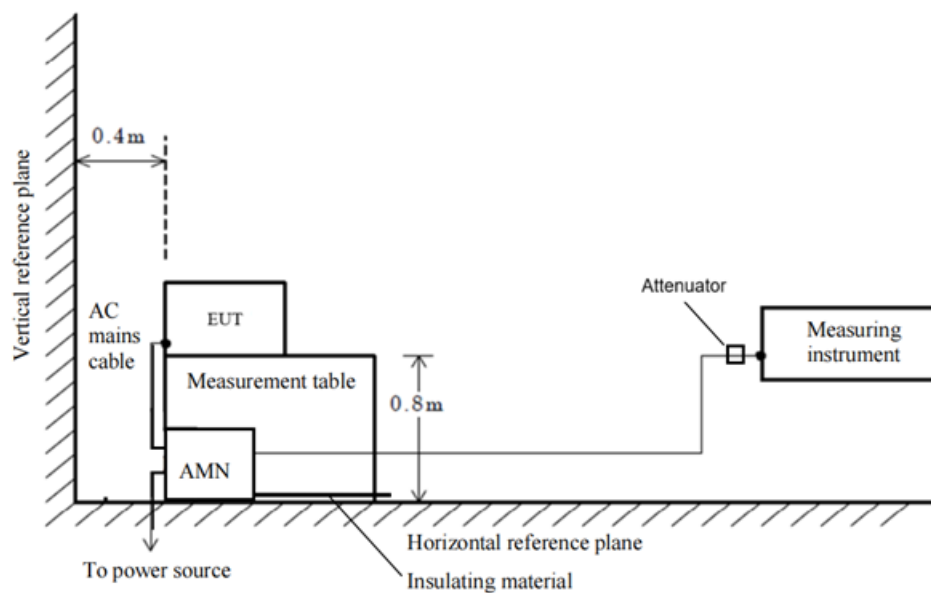
5.4.1. Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.4.2. Block Diagram of Test Setup



Note: the distance between LISN and Vertical reference plane is 40 cm and the distance between LISN and EUT is 80 cm.

5.4.3. Test Results

Since the EUT is powered by a vehicle battery and does not interface with mains power, power line conducted testing is not performed.





5.5. Antenna Requirements

5.5.1. Standard Applicable

According to antenna requirement of §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. 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 re-placed 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.

5.5.2. Antenna Connected Construction

The antenna is Detachable Antenna with a reverse SMA connector and no consideration of replacement. Please see EUT photo for details.

5.5.3. Results

Compliance





6. LIST OF MEASURING EQUIPMENTS

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2024-12-31	2025-12-30
2	Power Sensor	Agilent	U2021XA	MY5365004	2024-12-31	2025-12-30
3	Power Meter	Agilent	U2531A	TW53323507	2024-12-31	2025-12-30
4	Loop Antenna	schwarzbeck	FMZB1519 B	00023	2022-11-13	2025-11-12
5	Wideband Antenna	schwarzbeck	VULB 9163	958	2022-11-13	2025-11-12
6	Horn Antenna	schwarzbeck	BBHA 9120D	01989	2022-11-13	2025-11-12
7	EMI Test Receiver	R&S	ESCI	100849/003	2024-12-31	2025-12-30
8	Controller	MF	MF7802	N/A	N/A	N/A
9	Amplifier	schwarzbeck	BBV 9743	209	2024-12-31	2025-12-30
10	Amplifier	Tonscend	TSAMP-05 18SE	--	2024-12-31	2025-12-30
11	RF Cable(below 1GHz)	HUBER+SUHNER	RG214	N/A	2024-12-31	2025-12-30
12	RF Cable(above 1GHz)	HUBER+SUHNER	RG214	N/A	2024-12-31	2025-12-30
13	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2024-12-31	2025-12-30
14	Amplifier	Chengyi	EMC18404 5SE	980508	2024-09-20	2025-09-19
15	Horn Antenna	A-INFO	LB-180400-KF	J211020657	2023-10-12	2025-10-11
16	Spectrum Analyzer	R&S	FSV40	101321	2025-07-14	2026-07-13
17	Fixed Attenuator	Mini circuits	BW-S6-2W 263A+	N/A	2024-12-31	2025-12-30

Test software used:

Item	Test Software	Manufacturer	Name	Version
1	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71
2	RE test software	Tonscend	JS32-RE	V5.0.0.0
3	Test Software	Tonscend	JS1120-3	V3.2.22





7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT-----

