FCC Test Report

Report No.	:	**1812C60509812502**
Applicant	:	**Shenzhen Sperll Optoelectronic Technology Co., Ltd.**
Address	:	**4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District Shenzhen 518108 China**
Product Name	:	**LED Controller**
Report Date	:	**2026-10-15**

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Manufacturer	:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Product Name	:	LED Controller
Model No.	:	SP202E
Trade Mark	:	SPERLL
Rating(s)	:	Input: 5-48V
Test Standard(s)	:	**47 CFR Part 15.247** **KDB 558074 D01 15.247 Meas Guidance v05r02*** **ANSI C63.10-2020+Cor.1-2023+C63.10a-2024+Errata to C63.10a-2024***

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with above listed standard(s) requirements.
This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt: 2026-09-03

Date of Test: 2026-09-03 to 2026-09-20

Prepared By: Polly Mo

(Polly Mo)

Approved & Authorized Signer: Jules Guo

(Jules Guo)

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Revision History

Report Version	Description	Issued Date
R00	Original Issue.	2026-10-15

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1. General Information

1.1. Client Information

Applicant	:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Address	:	4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District Shenzhen 518108 China
Manufacturer	:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Address	:	4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District Shenzhen 518108 China
Factory	:	Shenzhen Sperll Optoelectronic Technology Co., Ltd.
Address	:	4th Floor, Building 3, NO.1059 Songbai Road, Nanshan District Shenzhen 518108 China

1.2. Description of Device (EUT)

Product Name	:	LED Controller
Model No.	:	SP202E
Trade Mark	:	SPERLL
Test Power Supply	:	AC 120V/60Hz for Adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Operation Frequency	:	2402MHz to 2480MHz
Number of Channel	:	40
Modulation Type	:	GFSK
Antenna Type	:	PCB Antenna
Antenna Gain(Peak)	:	2.14 dBi
Remark: (1) All of the RF specification are provided by customer. (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

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1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
AC/DC MEDICAL ADAPTOR	MEAN WELL ENTERPRISES CO., LTD.	GSM90A12	SC58468669
DC12V Dream-color LED Strip (SM16703)	/	SM16703	/

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1.4. Operation channel list

Operation Band:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (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

1.5. Description of Test Mode(s)

Test Mode(s)	Description(s)
TM1	Keep the EUT in continuously transmitting mode with GFSK modulation.

1.6. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	2.8dB
Occupied Bandwidth	552Hz
Conducted Output Power	0.84dB
Power Spectral Density	0.84dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.64dB; 6G-18GHz: 4.82dB 18G-40GHz: 5.62dB
Radiated emissions (Below 30MHz)	3.14dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 4.44dB; Vertical: 4.82dB
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

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1.7. Additional Instructions

Power level setup in software: FCC_Assist1.0.4
Operation Band:

Mode	Channel(MHz)	Power level	Transmitting type
BLE_1Mbps	2402	default	data pack TX
BLE_1Mbps	2440	default	data pack TX
BLE_1Mbps	2480	default	data pack TX

1.8. Test Summary

Test Items	Test Mode(s)	Status
Antenna requirement	/	P
Conducted Emission at AC power line	Mode1	P
6dB Bandwidth	Mode1	P
Maximum Conducted Output Power	Mode1	P
Power Spectral Density	Mode1	P
Emissions in non-restricted frequency bands	Mode1	P
Band edge emissions (Radiated)	Mode1	P
Emissions in restricted frequency bands (below 1GHz)	Mode1	P
Emissions in restricted frequency bands (above 1GHz)	Mode1	P
Note: P: Pass N: N/A, not applicable		

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1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.:279531
Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 279531.

Test Location
Shenzhen Anbotek Compliance Laboratory Limited.
Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

1.10. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The effect that the results relate only to the items tested.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
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7. The data in this report will be synchronized with the corresponding national market supervision and management departments and cross-border e-commerce platforms as required by regulatory agencies.
8. Unless otherwise specified, use the binary decision rule of simple acceptance (w=0) for conformity determination with reference to ILAC-G8:09/2019.
9. This report contains data that are not covered by the CNAS accreditation.The * items are not within the approved scope.

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1.11. Test Equipment List

Conducted Emission at AC power line					
Item	Equipment	Manufacturer	Model No.	Last Cal.	Cal.Due Date
1	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	2026-06-08	2027-06-07
2	Software Name EZ-EMC	Farad Technology	ANB-03A	/	/
3	EMI Test Receiver(CE2#)	Rohde & Schwarz	ESCI3	2025-12-29	2026-12-28
4	Three Phase V-type Artificial Power Network LISN 200A	EMtrace	PWL-50-3200A	2025-12-29	2026-12-28
5	10dB Attenuator	Emtrace	10dB100W	2025-12-29	2026-12-28
6	Pulse limiter	EMtrace	PL00903-2#	2025-12-29	2026-12-28

6dB Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands					
Item	Equipment	Manufacturer	Model No.	Last Cal.	Cal.Due Date
1	MXG RF Vector Signal Generator	Agilent	N5182A	2025-12-29	2026-12-28
2	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-HWHS80B	2026-06-08	2027-06-07
3	Signal Generator	Agilent	E4421B	2025-12-29	2026-12-28
4	DC Power Supply	IVYTECH	IV3605	2026-06-08	2027-06-07
5	RF Control Unit	Tonscend	JS0806-2	2026-06-08	2027-06-07
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	2025-12-29	2026-12-28
7	MXA Spectrum Analysis	KEYSIGHT	N9020A	2025-12-29	2026-12-28
8	RF Test software	Toscend	JS1120-3	/	/

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Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)					
Item	Equipment	Manufacturer	Model No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver(RE2/3#)	Rohde & Schwarz	ESR26	2025-12-30	2026-12-29
2	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	2025-12-30	2026-12-29
3	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	2025-10-27	2028-10-26
4	EMI Test Software EZ-EMC	SHURPLE	N/A	/	/
5	Horn Antenna	A-INFO	LB-180400-KF	2024-01-22	2027-01-21
6	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	2025-12-29	2026-12-28
7	Amplifier	Talent Microwave	TLLA18G40G-53-30	2026-01-05	2027-01-04

Emissions in frequency bands (below 1GHz)					
Item	Equipment	Manufacturer	Model No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver(RE2/3#)	Rohde & Schwarz	ESR26	2025-12-30	2026-12-29
2	Pre-amplifier	SONOMA	310N	2025-12-30	2026-12-29
3	Bilog Broadband Antenna	Schwarzbeck	VULB9163	2025-10-26	2028-10-25
4	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	2025-12-30	2026-12-29
5	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	2025-10-27	2028-10-26
6	Loop Antenna (9K-30M)	Schwarzbeck	FMZB1519B	2026-06-24	2029-06-23
7	EMI Test Software EZ-EMC	SHURPLE	N/A	/	/
8	MXG RF Vector Signal Generator	Agilent	N5182A	2025-12-29	2026-12-28
9	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-HWHS80B	2026-06-08	2027-06-07
10	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	2025-12-29	2026-12-28
11	High-Pass Filter	CDKMV	ZHPF-M3.5-18G-3834	2025-12-30	2026-12-29
12	MXA Spectrum Analysis	KEYSIGHT	N9020A	2026-06-08	2027-06-07

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2. Antenna requirement

Test Requirement:	Refer to 47 CFR Part 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.
Test Method:	---

2.1. Conclusion

The antenna is a **PCB antenna** which permanently attached, and the best case gain of the antenna is **2.14 dBi** . It complies with the standard requirement.

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3. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that 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 the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

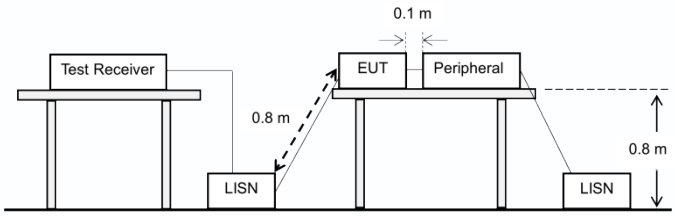
*Decreases with the logarithm of the frequency.

Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.2
Procedure:	Refer to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices Remark: Result(dBuV) = Reading(dBuV) + Factor(dB) Over Limit(dB) = Result(dBuV) - Limit(dBuV)

3.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

3.2. Test Setup



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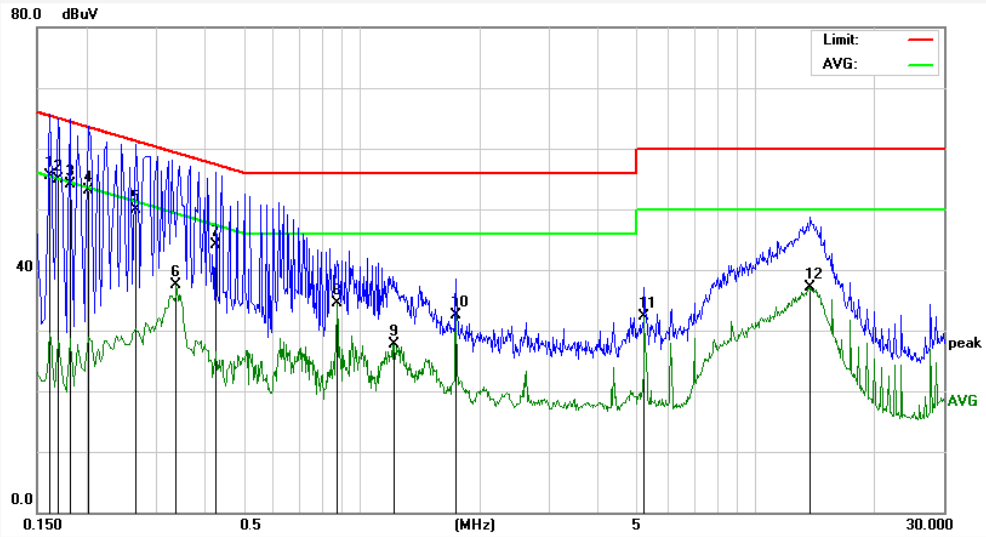
3.3. Test Data

Temperature:	22.1 °C	Humidity:	49 %	Atmospheric Pressure:	101 kPa

TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L

Test Power Supply: AC 120V/60Hz for Adapter



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1620	35.67	19.78	55.45	65.36	-9.91	QP	
2	0.1700	35.13	19.78	54.91	64.96	-10.05	QP	
3	0.1819	34.36	19.78	54.14	64.39	-10.25	QP	
4	0.2020	33.26	19.78	53.04	63.52	-10.48	QP	
5	0.2660	30.14	19.79	49.93	61.24	-11.31	QP	
6	0.3379	17.75	19.79	37.54	49.25	-11.71	AVG	
7	0.4260	24.36	19.80	44.16	57.33	-13.17	QP	
8	0.8700	14.71	19.84	34.55	46.00	-11.45	AVG	
9	1.2140	7.90	19.84	27.74	46.00	-18.26	AVG	
10	1.7420	12.64	19.84	32.48	46.00	-13.52	AVG	
11	5.2180	12.57	19.79	32.36	50.00	-17.64	AVG	
12	13.8340	17.21	19.88	37.09	50.00	-12.91	AVG	

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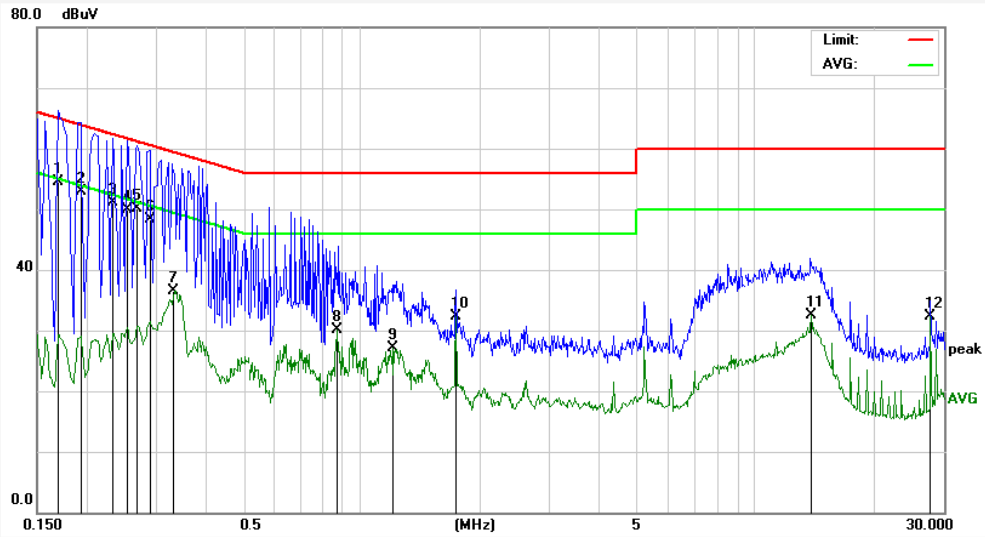
Temperature:	22.1 °C	Humidity:	49 %	Atmospheric Pressure:	101 kPa

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L

Test Power Supply: AC 120V/60Hz for Adapter



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1700	34.67	19.78	54.45	64.96	-10.51	QP	
2	0.1940	33.16	19.78	52.94	63.86	-10.92	QP	
3	0.2340	31.33	19.79	51.12	62.30	-11.18	QP	
4	0.2540	30.05	19.79	49.84	61.62	-11.78	QP	
5	0.2700	30.29	19.79	50.08	61.12	-11.04	QP	
6	0.2900	28.53	19.79	48.32	60.52	-12.20	QP	
7	0.3339	16.79	19.79	36.58	49.35	-12.77	AVG	
8	0.8700	10.26	19.84	30.10	46.00	-15.90	AVG	
9	1.2020	7.36	19.84	27.20	46.00	-18.80	AVG	
10	1.7380	12.44	19.84	32.28	46.00	-13.72	AVG	
11	13.9140	12.59	19.88	32.47	50.00	-17.53	AVG	
12	27.8260	12.50	19.83	32.33	50.00	-17.67	AVG	

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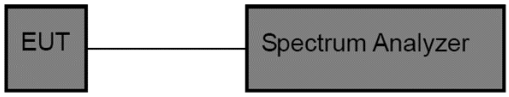
4. 6dB Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	11.8.1 Option 1 The steps for the first option are as follows: a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz. b) Set the VBW ≥ [3 × RBW]. c) Detector = peak. d) Trace mode = max-hold. e) Sweep = No faster than coupled (auto) time. f) Allow the trace to stabilize. g) Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “−6 dB down amplitude”. If a marker is below this “−6 dB down amplitude” value, then it shall be as close as possible to this value. 11.8.2 Option 2 The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

4.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

4.2. Test Setup



4.3. Test Data

Temperature:	23.2 °C	Humidity:	60 %	Atmospheric Pressure:	100.6 kPa

Please Refer to Appendix for Details.

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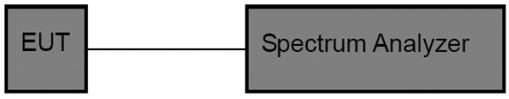
5. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 11.9.1 Maximum peak conducted output power

5.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

5.2. Test Setup



5.3. Test Data

Temperature:	23.2 °C	Humidity:	60 %	Atmospheric Pressure:	100.6 kPa

Please Refer to Appendix for Details.

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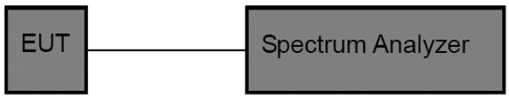
6. Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 11.10, Maximum power spectral density level in the fundamental emission

6.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

6.2. Test Setup



6.3. Test Data

Temperature:	23.2 °C	Humidity:	60 %	Atmospheric Pressure:	100.6 kPa

Please Refer to Appendix for Details.

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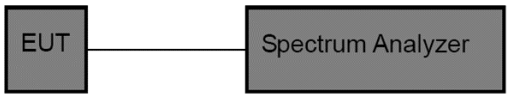
7. Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d)
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 Section 11.11.1, Section 11.11.2, Section 11.11.3

7.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

7.2. Test Setup



7.3. Test Data

Temperature:	23.2 °C	Humidity:	60 %	Atmospheric Pressure:	100.6 kPa

Please Refer to Appendix for Details.

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8. Band edge emissions (Radiated)

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.10
KDB 558074 D01 15.247 Meas Guidance v05r02</td></tr>
<tr><td>Procedure:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.10.5.2</td></tr>
</table>

8.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

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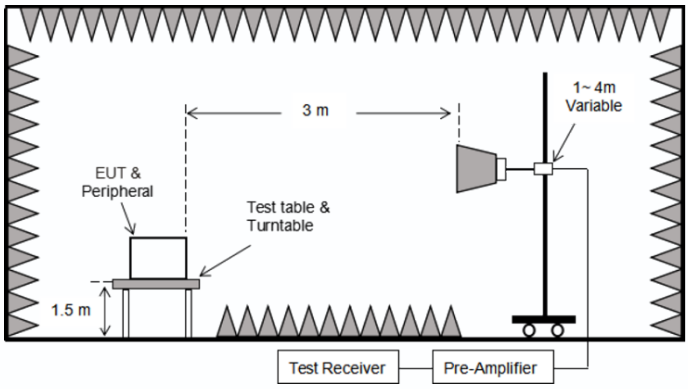
8.2. Test Setup



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8.3. Test Data

Temperature:	23.2 °C	Humidity:	60 %	Atmospheric Pressure:	100.6 kPa

TM1 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2390.000	38.46	9.73	48.19	74.00	-25.81	Vertical
2310.000	38.61	9.58	48.19	74.00	-25.81	Vertical
2390.000	27.69	9.73	37.42	74.00	-36.58	Horizontal
2310.000	33.21	9.58	42.79	74.00	-31.21	Horizontal
TM1 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
2483.500	31.67	9.91	41.58	74.00	-32.42	Vertical
2500.000	39.20	9.94	49.14	74.00	-24.86	Vertical
2483.500	32.49	9.91	42.40	74.00	-31.60	Horizontal
2500.000	38.64	9.94	48.58	74.00	-25.42	Horizontal
Note: Result=Reading+Factor, Over Limit=Result-Limit						

Remark:
1. When the PK measure result value is less than the AVG limit value, the AV measure result values test not applicable.
2. During the test, pre-scan all modes, the report only record the worse case mode.

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9. Emissions in restricted frequency bands (below 1GHz)

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.5.4
KDB 558074 D01 15.247 Meas Guidance v05r02</td></tr>
<tr><td>Procedure:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.5.4
Remark:
Result(dBuV) = Reading(dBuV) + Factor(dB)
Over Limit(dB) = Result(dBuV) - Limit(dBuV)</td></tr>
</table>

9.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

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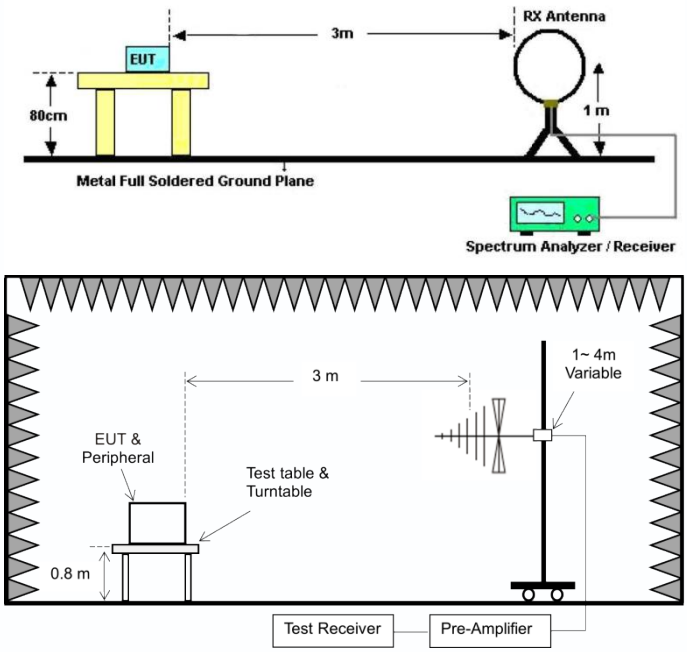
9.2. Test Setup



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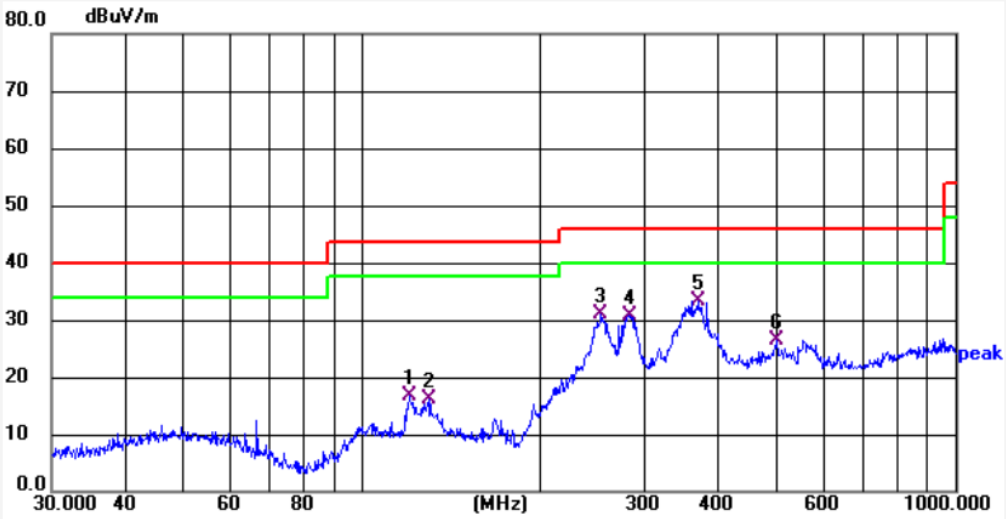
9.3. Test Data

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Temperature:	24.4 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L

Test Power Supply: AC 120V/60Hz for Adapter



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Remark
1	120.593	41.28	-24.47	16.81	43.50	-26.69	QP	
2	129.752	42.15	-26.10	16.05	43.50	-27.45	QP	
3	253.725	55.21	-24.21	31.00	46.00	-15.00	QP	
4	282.366	54.34	-23.57	30.77	46.00	-15.23	QP	
5	369.405	51.80	-18.49	33.31	46.00	-12.69	QP	
6	502.279	42.12	-15.63	26.49	46.00	-19.51	QP	

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Temperature:	24.4 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L

Test Power Supply: AC 120V/60Hz for Adapter

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Remark
1	30.799	43.01	-26.36	16.65	40.00	-23.35	QP	
2	52.437	43.15	-23.69	19.46	40.00	-20.54	QP	
3	120.488	39.23	-24.44	14.79	43.50	-28.71	QP	
4	251.842	49.30	-24.24	25.06	46.00	-20.94	QP	
5	283.233	50.21	-23.55	26.66	46.00	-19.34	QP	
6	480.106	44.98	-15.84	29.14	46.00	-16.86	QP	

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10. Emissions in restricted frequency bands (above 1GHz)

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), in addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
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</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
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<tr><td>Test Method:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.5.4
KDB 558074 D01 15.247 Meas Guidance v05r02</td></tr>
<tr><td>Procedure:</td><td>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.5.4</td></tr>
</table>

10.1. EUT Operation

Operating Environment:	
Test mode:	1:TX mode:Keep the EUT in continuously transmitting mode with GFSK modulation.

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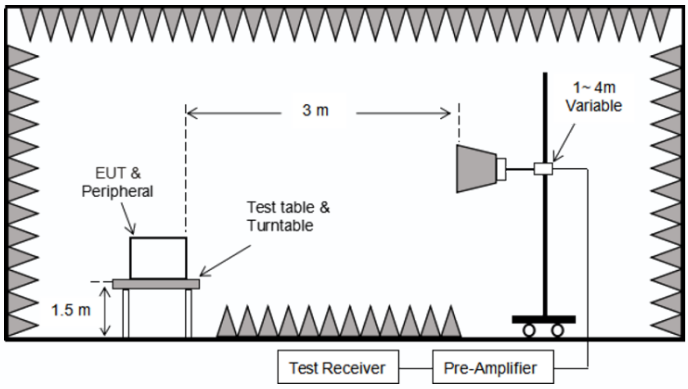
10.2. Test Setup



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10.3. Test Data

Temperature:	22.3 °C	Humidity:	52.6 %	Atmospheric Pressure:	101 kPa

TM1 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4804.00	30.03	15.27	45.30	74.00	-28.70	Vertical
7206.00	29.50	18.09	47.59	74.00	-26.41	Vertical
9608.00	30.57	23.76	54.33	74.00	-19.67	Vertical
12010.00	*			74.00		Vertical
14412.00	*			74.00		Vertical
4804.00	29.56	15.27	44.83	74.00	-29.17	Horizontal
7206.00	30.94	18.09	49.03	74.00	-24.97	Horizontal
9608.00	28.79	23.76	52.55	74.00	-21.45	Horizontal
12010.00	*			74.00		Horizontal
14412.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4804.00	18.30	15.27	33.57	54.00	-20.43	Vertical
7206.00	18.88	18.09	36.97	54.00	-17.03	Vertical
9608.00	20.69	23.76	44.45	54.00	-9.55	Vertical
12010.00	*			54.00		Vertical
14412.00	*			54.00		Vertical
4804.00	17.89	15.27	33.16	54.00	-20.84	Horizontal
7206.00	19.97	18.09	38.06	54.00	-15.94	Horizontal
9608.00	18.30	23.76	42.06	54.00	-11.94	Horizontal
12010.00	*			54.00		Horizontal
14412.00	*			54.00		Horizontal

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TM1 / CH: M						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4880.00	29.58	15.42	45.00	74.00	-29.00	Vertical
7320.00	29.80	18.02	47.82	74.00	-26.18	Vertical
9760.00	30.72	23.80	54.52	74.00	-19.48	Vertical
12200.00	*			74.00		Vertical
14640.00	*			74.00		Vertical
4880.00	29.37	15.42	44.79	74.00	-29.21	Horizontal
7320.00	30.81	18.02	48.83	74.00	-25.17	Horizontal
9760.00	28.51	23.80	52.31	74.00	-21.69	Horizontal
12200.00	*			74.00		Horizontal
14640.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4880.00	18.39	15.42	33.81	54.00	-20.19	Vertical
7320.00	18.74	18.02	36.76	54.00	-17.24	Vertical
9760.00	20.54	23.80	44.34	54.00	-9.66	Vertical
12200.00	*			54.00		Vertical
14640.00	*			54.00		Vertical
4880.00	18.00	15.42	33.42	54.00	-20.58	Horizontal
7320.00	20.32	18.02	38.34	54.00	-15.66	Horizontal
9760.00	18.60	23.80	42.40	54.00	-11.60	Horizontal
12200.00	*			54.00		Horizontal
14640.00	*			54.00		Horizontal

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TM1 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4960.00	29.71	15.58	45.29	74.00	-28.71	Vertical
7440.00	29.96	17.93	47.89	74.00	-26.11	Vertical
9920.00	31.42	23.83	55.25	74.00	-18.75	Vertical
12400.00	*			74.00		Vertical
14880.00	*			74.00		Vertical
4960.00	29.51	15.58	45.09	74.00	-28.91	Horizontal
7440.00	31.02	17.93	48.95	74.00	-25.05	Horizontal
9920.00	28.89	23.83	52.72	74.00	-21.28	Horizontal
12400.00	*			74.00		Horizontal
14880.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4960.00	19.51	15.58	35.09	54.00	-18.91	Vertical
7440.00	20.01	17.93	37.94	54.00	-16.06	Vertical
9920.00	21.19	23.83	45.02	54.00	-8.98	Vertical
12400.00	*			54.00		Vertical
14880.00	*			54.00		Vertical
4960.00	19.18	15.58	34.76	54.00	-19.24	Horizontal
7440.00	21.12	17.93	39.05	54.00	-14.95	Horizontal
9920.00	18.75	23.83	42.58	54.00	-11.42	Horizontal
12400.00	*			54.00		Horizontal
14880.00	*			54.00		Horizontal

Remark:
1. Result =Reading + Factor

2. Test frequency are from 1GHz to 25GHz, “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

3. Only the worst case is recorded in the report.

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APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_RF

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- EUT External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- EUT Internal Photograph

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

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