

FCC Test Report

Applicant : Hunan Zennze Technology Limited

Address : Apartment 501, Xianglu International Garden
: II Hotel No. 61 Lufeng Road, High-tech
Development Zone, Changsha, China

Product Name : NON-CONTACT SLEEP MONITOR

Report Date : Aug. 03, 2023

Shenzhen Anbotech Compliance Laboratory Limited



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TEST REPORT

Applicant : Hunan Zennze Technology Limited

Manufacturer : Hunan Zennze Technology Limited

Product Name : NON-CONTACT SLEEP MONITOR

Model No. : KUN-DC1000

Trade Mark :



ZENNZE TECHNOLOGY

正申科技

銀护卫
KUN GUARDRating(s) : Input: 5V $\overline{\text{---}}$ 2000mA

Test Standard(s) : FCC Part15 Subpart F, Section 15.517

Test Method(s) : ANSI C63.10: 2020

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 the FCC Part 15 Subpart F 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

Jun. 30, 2023

Date of Test

Jun. 30 ~ Jul. 14, 2023

Prepared By

Tu Tu Hong

(TuTu Hong)

Approved & Authorized Signer

Kingkong Jin

(Kingkong Jin)

Shenzhen Anbotek Compliance Laboratory Limited

Code:AB-RF-05-b

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Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 03, 2023





1. General Information

1.1. Client Information

Applicant	:	Hunan Zennze Technology Limited
Address	:	Apartment 501, Xianglu International Garden II Hotel No. 61 Lufeng Road, High-tech Development Zone, Changsha, China
Manufacturer	:	Hunan Zennze Technology Limited
Address	:	Apartment 501, Xianglu International Garden II Hotel No. 61 Lufeng Road, High-tech Development Zone, Changsha, China
Factory	:	Hunan Zennze Technology Limited
Address	:	No.187, Tongzipo West Road, Yuelu District, Changsha

1.2. Description of Device (EUT)

Product Name	:	NON-CONTACT SLEEP MONITOR
Model No.	:	KUN-DC1000
Trade Mark	:	 ZENNZE TECHNOLOGY 正申科技  鯤护卫 KUN GUARD
Test Power Supply	:	AC 120V, 60Hz for Adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	Model: GA-0502000 Inout: 100-240V~50/60 0.6A Output: 5.0V= 2000mA
RF Specification		
Operation Frequency	:	6.5~8.1GHz
Number of Channel	:	1 Channel
Modulation Type	:	Pulse Doppler
Antenna Type	:	PCB antenna
Antenna Gain(Peak)	:	6.977dBi (Provided by customer)
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		



1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
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1.4. Description of Test Configuration

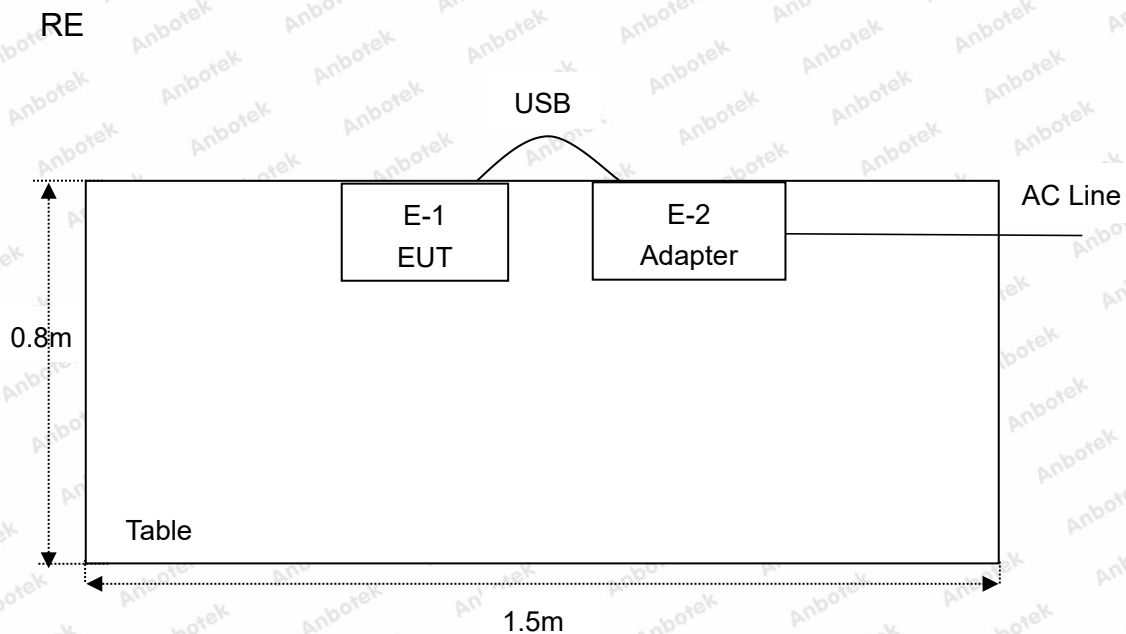
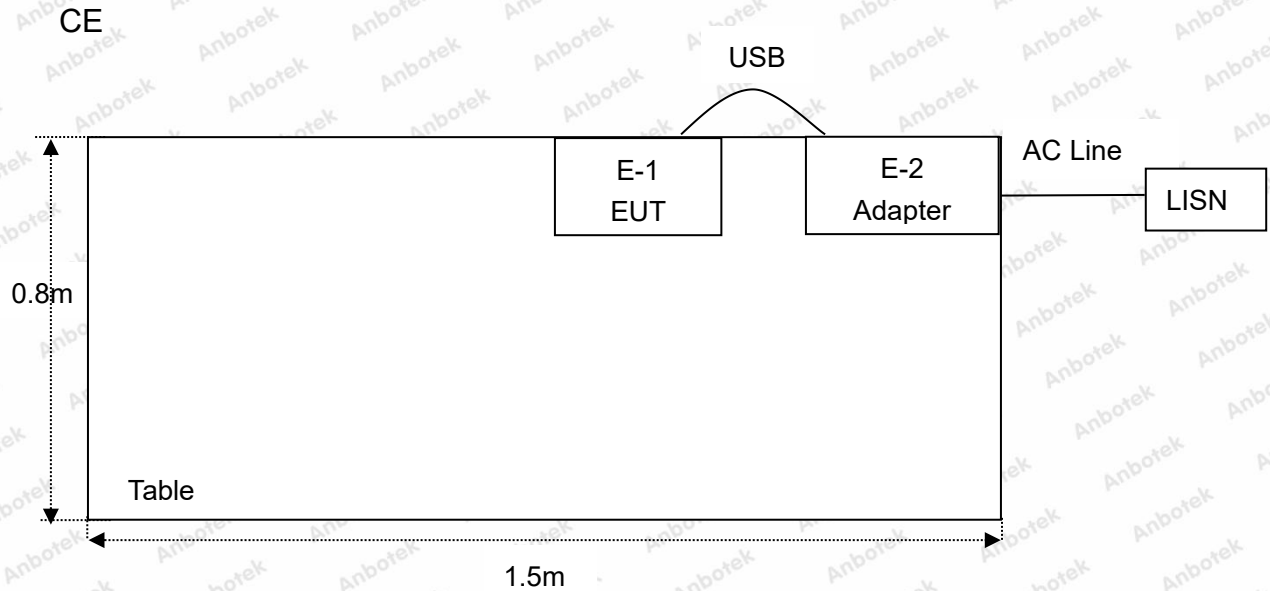
Channel	Freq. (MHz)						
01	7200						

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.



1.5. Description Of Test Setup



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2023	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
5.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
6.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 13, 2022	1 Year
7.	EMI Preamplifier	SKET Electronic	LNPA-0118G -45	SKET-PA-002	Oct. 13, 2022	1 Year
8.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
10.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 23, 2022	1 Year
11.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Oct. 23, 2022	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
13.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
14.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 13, 2022	1 Year
15.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 13, 2022	1 Year
16.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 13, 2022	1 Year
17.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2022	1 Year
18.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 19, 2022	1 Year
19.	Power Meter	Agilent	N1914A	MY50001102	Oct.26, 2022	1 Year



1.7. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

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. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



2. Summary of Test Results

Standard Section	Test Item	Result
15.203/15.517(a)	Antenna Requirement	PASS
15.207(a)	Conducted Emission	PASS
15.209/ 15.517(c)(d)	Radiated Emissions	PASS
15.503 (a)(d), 15.517(b)	UWB Operation bandwidth	PASS
15.517(e)	Peak Emission in a 50 MHz bandwidth	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		



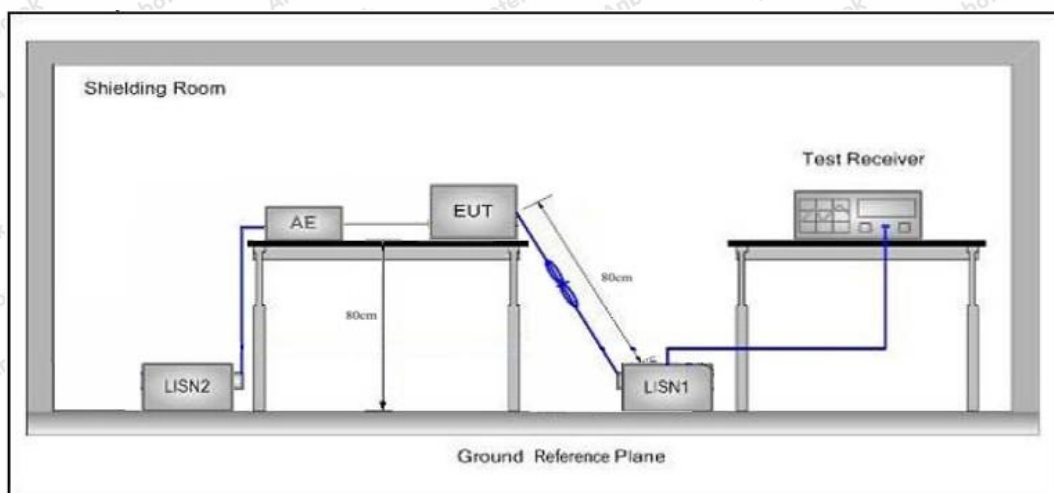
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207(a)		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark:(1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

During the test, pre-scan all modes, only the worst case is recorded in the report.

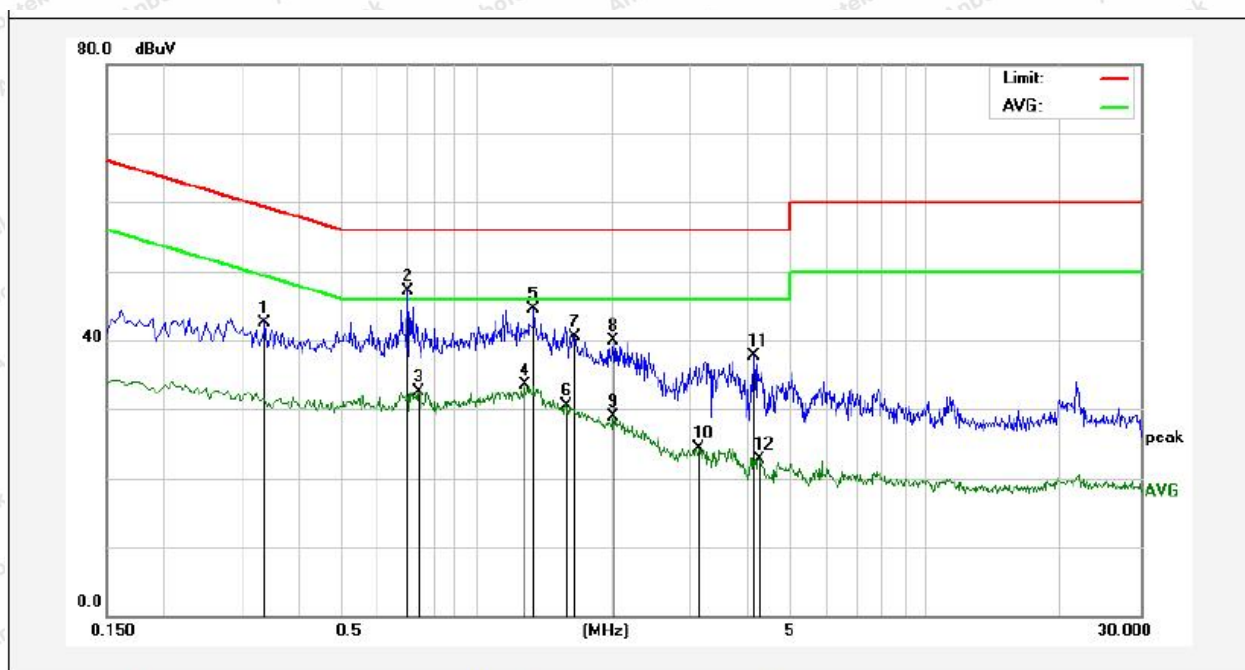
AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/60Hz modes, recorded worst case AC 120V/60Hz.

Please to see the following pages.



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 7200MHz
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Temp.(°C)/Hum.(%RH): 22.1°C/52%RH

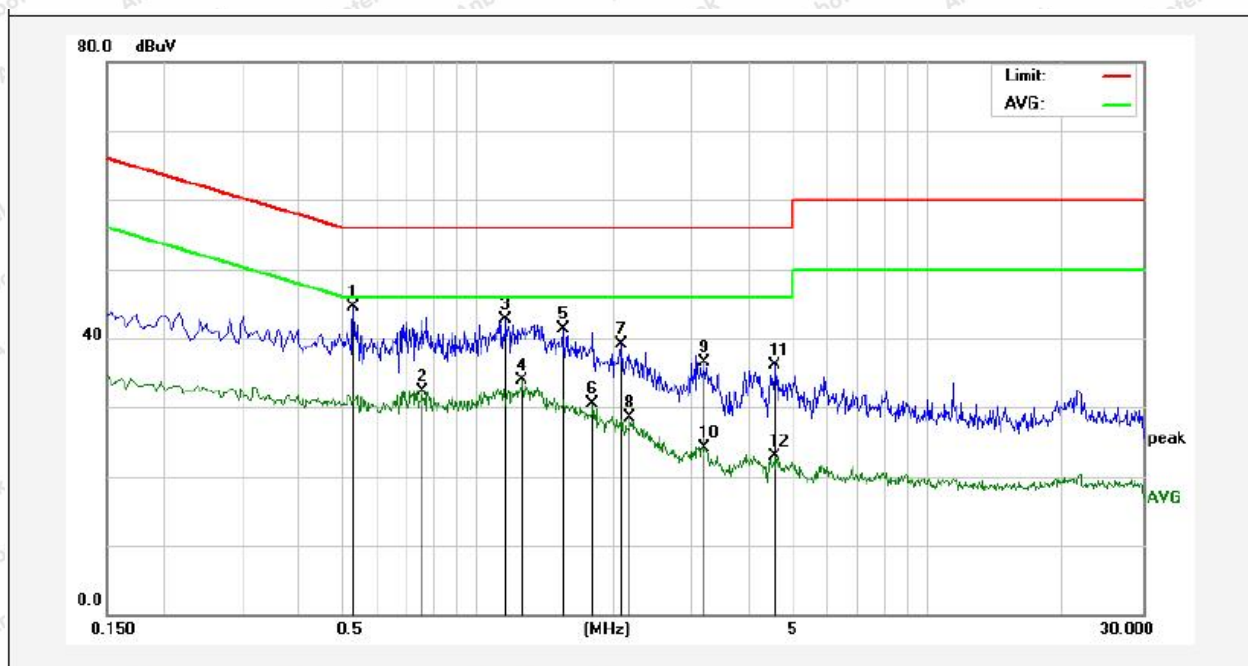


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.3379	22.77	19.83	42.60	59.25	-16.65	QP	
2	0.7019	27.32	19.87	47.19	56.00	-8.81	QP	
3	0.7460	12.65	19.87	32.52	46.00	-13.48	AVG	
4	1.2780	13.65	19.86	33.51	46.00	-12.49	AVG	
5	1.3420	24.73	19.86	44.59	56.00	-11.41	QP	
6	1.5900	10.56	19.85	30.41	46.00	-15.59	AVG	
7	1.6540	20.72	19.85	40.57	56.00	-15.43	QP	
8	2.0140	20.05	19.85	39.90	56.00	-16.10	QP	
9	2.0140	9.01	19.85	28.86	46.00	-17.14	AVG	
10	3.1220	4.48	19.85	24.33	46.00	-21.67	AVG	
11	4.1420	17.85	19.85	37.70	56.00	-18.30	QP	
12	4.2420	2.91	19.85	22.76	46.00	-23.24	AVG	



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 7200MHz
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Temp.(°C)/Hum.(%RH): 22.1°C/52%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.5299	24.58	19.86	44.44	56.00	-11.56	QP	
2	0.7539	12.51	19.87	32.38	46.00	-13.62	AVG	
3	1.1580	22.91	19.86	42.77	56.00	-13.23	QP	
4	1.2579	13.97	19.86	33.83	46.00	-12.17	AVG	
5	1.5460	21.40	19.85	41.25	56.00	-14.75	QP	
6	1.8020	10.57	19.86	30.43	46.00	-15.57	AVG	
7	2.0980	19.33	19.85	39.18	56.00	-16.82	QP	
8	2.1860	8.59	19.85	28.44	46.00	-17.56	AVG	
9	3.1900	16.62	19.85	36.47	56.00	-19.53	QP	
10	3.2139	4.16	19.85	24.01	46.00	-21.99	AVG	
11	4.5780	16.27	19.86	36.13	56.00	-19.87	QP	
12	4.5780	2.97	19.86	22.83	46.00	-23.17	AVG	



4. Radiation Spurious Emission

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Standard	FCC Part15 C Section 15.517(c)(d)	
Test Limit	Frequency (MHz)	EIRP in dBm
	960~1610	-75.3
	1610~1990	-53.3
	1990~3100	-51.3
	3100~10600	-41.3
	Above 10600	-51.3

Test Standard	FCC Part15 C Section 15.517(d)	
Test Limit	Frequency (MHz)	EIRP in dBm
	1164~1240	-85.3
	1559~1610	-85.3



4.2. Test Setup

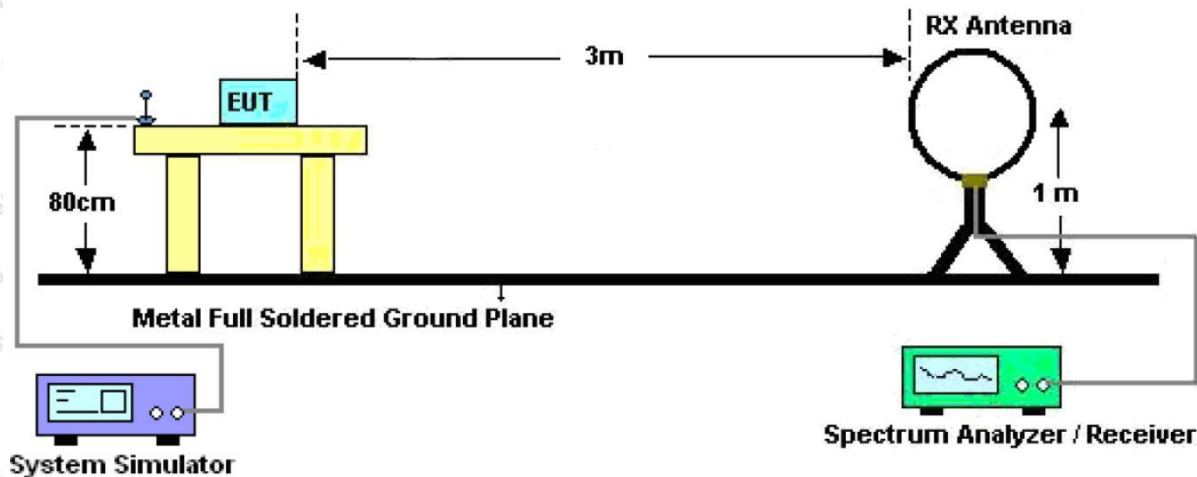


Figure 1. Below 30MHz

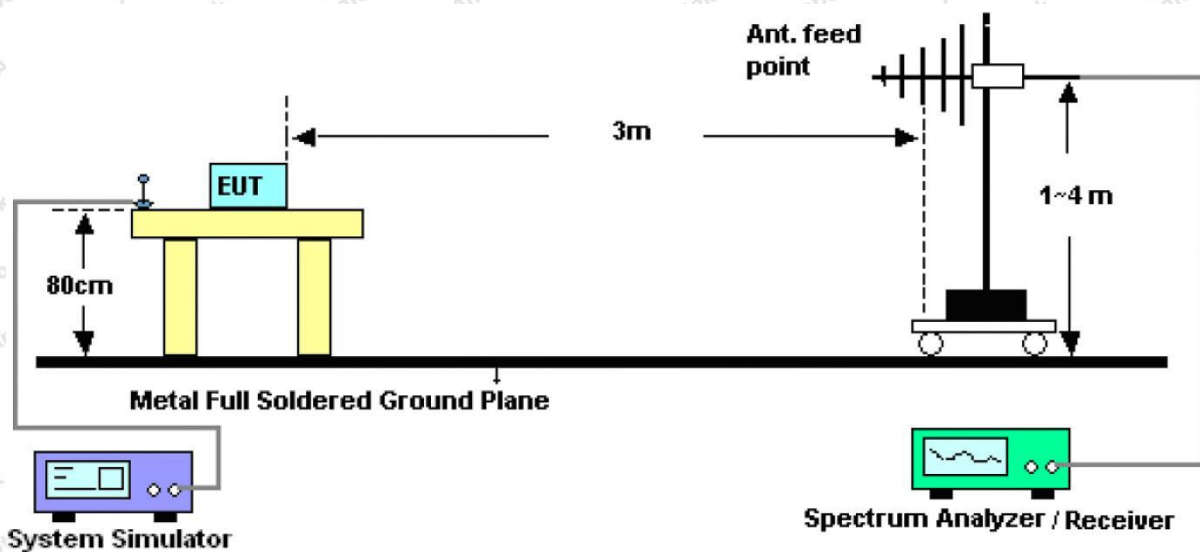


Figure 2. 30MHz to 1GHz



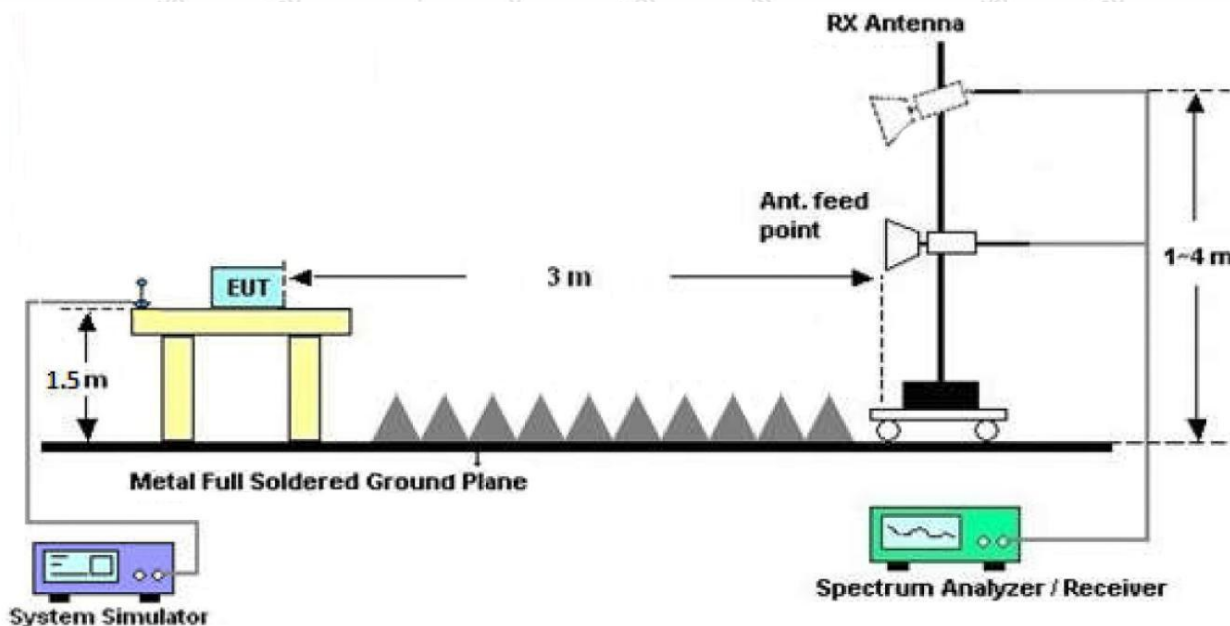


Figure 3. Above 1 GHz

4.3. Test Procedure

Refer to the ANSI C63.10: 2020 Section 10.2 & 10.3.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

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

During the test, pre-scan all modes, only the worst case is recorded in the report.



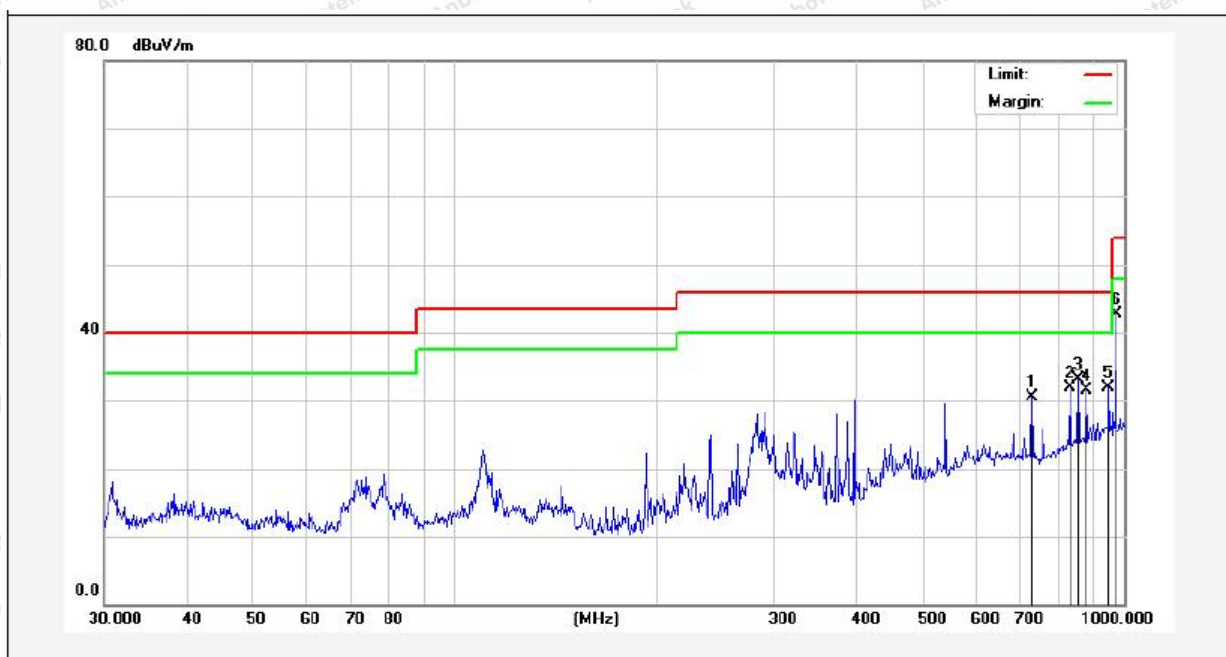
Test Results (30~1000MHz)

Test Mode: 7200MHz

Power Source: AC 120V, 60Hz for adapter

Polarization: Horizontal

Temp.(°C)/Hum.(%RH): 22.5°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	729.3583	39.98	-9.52	30.46	46.00	-15.54	QP			
2	830.4002	39.73	-7.80	31.93	46.00	-14.07	QP			
3	854.0247	40.51	-7.39	33.12	46.00	-12.88	QP			
4	878.3214	38.32	-6.77	31.55	46.00	-14.45	QP			
5	948.7610	37.51	-5.65	31.86	46.00	-14.14	QP			
6	972.3374	47.97	-5.26	42.71	54.00	-11.29	QP			



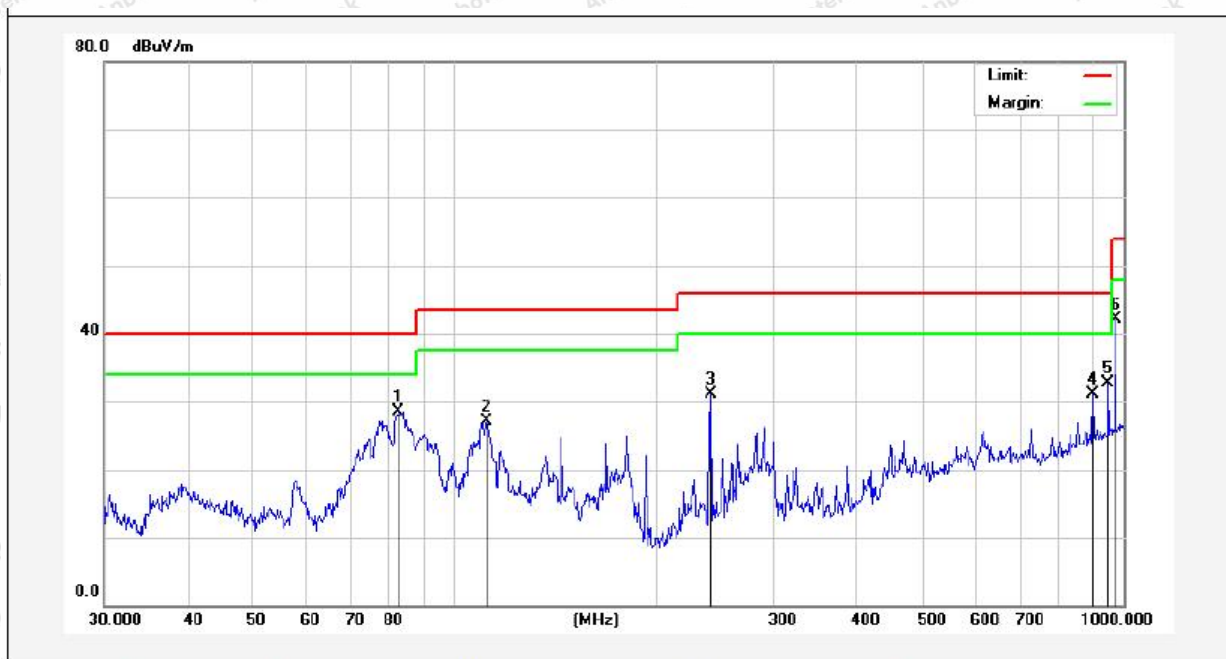
Test Results (30~1000MHz)

Test Mode: 7200MHz

Power Source: AC 120V, 60Hz for adapter

Polarization: Vertical

Temp.(°C)/Hum.(%RH): 22.5°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	82.6482	47.44	-18.90	28.54	40.00	-11.46	QP			
2	111.7380	45.61	-18.49	27.12	43.50	-16.38	QP			
3	241.6763	49.25	-18.23	31.02	46.00	-14.98	QP			
4	900.1474	37.25	-6.22	31.03	46.00	-14.97	QP			
5	948.7610	38.33	-5.65	32.68	46.00	-13.32	QP			
6	972.3374	47.30	-5.26	42.04	54.00	-11.96	QP			



Spurious radiated emission above 960MHz in non GPS band:

Average value:				
Frequency (MHz)	Mea EIRP (dBm)	EIRP Limit (dBm)	Over Limit (dBm)	polarization
1259.35	-80.24	-75.3	-4.94	Vertical
1850.40	-79.60	-53.3	-26.30	Vertical
2918.92	-78.08	-51.3	-26.78	Vertical
5749.36	-81.96	-41.3	-40.66	Vertical
10842.32	-79.97	-51.3	-28.67	Vertical
1489.83	-80.82	-75.3	-5.52	Horizontal
1942.76	-80.98	-53.3	-27.68	Horizontal
3014.24	-80.06	-51.3	-28.76	Horizontal
9916.33	-82.42	-41.3	-41.12	Horizontal
10787.91	-80.27	-51.3	-28.97	Horizontal



Spurious radiated emission in GPS band:

Frequency	Reading	Corrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	Type	
1205.42	-94.32	-5.80	-88.52	-85.30	-3.22	AV	Vertical
1203.52	-95.84	-5.80	-90.04	-85.30	-4.74	AV	Horizontal
1572.36	-92.41	-3.56	-88.85	-85.30	-3.55	AV	Vertical
1576.93	-94.36	-3.56	-90.80	-85.30	-5.50	AV	Horizontal

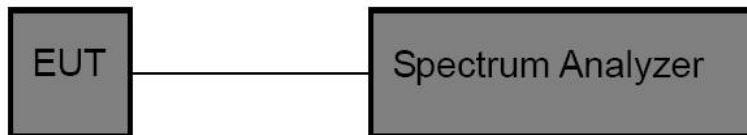


5. UWB Operation Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.503 (a)(d), 15.517(b)
Test Limit	<p>15.503(a): UWB bandwidth. For the purpose of this subpart, the UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated fH and the lower boundary is designated fL. The frequency at which the highest radiated emission occurs is designated fM.</p> <p>15.503(d): Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.</p> <p>15.517(b) The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.</p>

5.2. Test Setup



5.3. Test Procedure

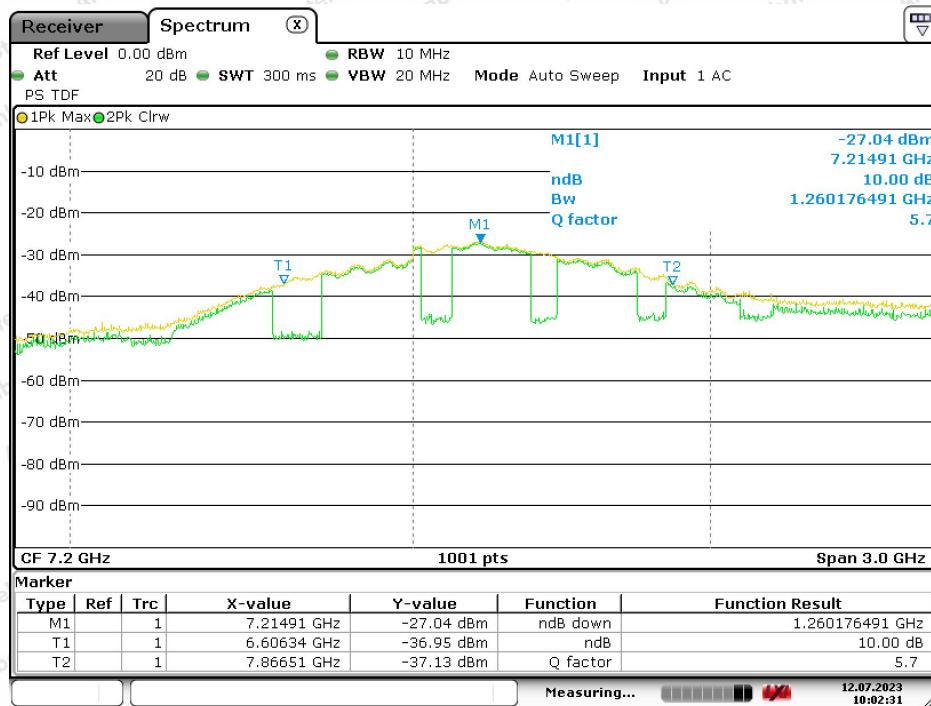
Refer to the ANSI C63.10: 2020 Section 10.1

5.4. Test Data

Pass



Item		Result	Limit (MHz)
f_M (MHz)	The highest emission frequency	7214.91	/
f_L (MHz)	10dB below the highest emission	6606.34	>3100
f_H (MHz)	10dB above the highest emission	7866.51	<10600
f_C (MHz)	$(f_H + f_L)/2$	7236.43	/
10dB bandwidth(MHz)	$f_H - f_L$	1260.17	≥ 500
Fractional bandwidth	$2(f_H - f_L) / (f_H + f_L)$	0.174	/



Date: 12 JUL 2023 10:02:32

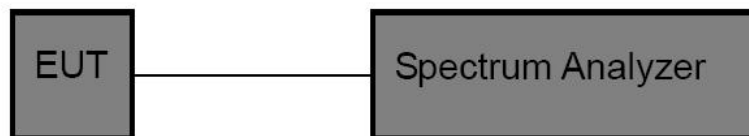


6. Peak Emission in a 50 MHz Bandwidth Test

6.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.517(e)
Test Limit	There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_m . That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in § 15.521.

6.2. Test Setup



6.3. Test Procedure

Refer to the ANSI C63.10: 2020 Section 10.3.5.

6.4. Test Data

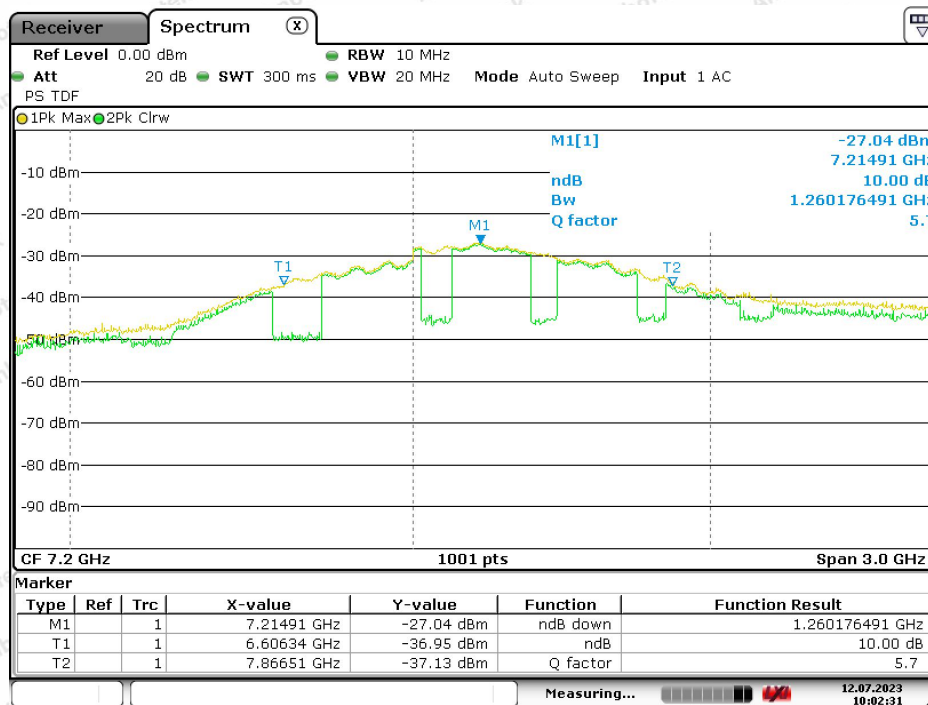
Pass



Frequency (MHz)	EIRP (dBm/10MHz)	EIRP (dBm/50MHz)	Limit dBm/50MHz
7200	-27.04	-13.06	0

Note: the correct factor of RBW 10MHz to 50MHz is $20 \log(50\text{MHz}/10\text{MHz}) = 13.98$

The antenna factor, cable loss and preamplifier gain have been entered into the analyzer as the transducer factor.



Date: 12.JUL.2023 10:02:32



7. Antenna Requirement

7.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203/15.517(a)
Requirement	<p>1) 15.203 requirement:</p> <p>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>2) 15.517(a) requirement:</p> <p>(a) Operation under the provisions of this section is limited to UWB transmitters employed solely for indoor operation.</p> <p>(1) Indoor UWB devices, by the nature of their design, must be capable of operation only indoors. The necessity to operate with a fixed indoor infrastructure, e.g., a transmitter that must be connected to the AC power lines, may be considered sufficient to demonstrate this.</p> <p>(2) The emissions from equipment operated under this section shall not be intentionally directed outside of the building in which the equipment is located, such as through a window or a doorway, to perform an outside function, such as the detection of persons about to enter a building.</p> <p>(3) The use of outdoor mounted antennas, e.g., antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.</p> <p>(4) Field disturbance sensors installed inside of metal or underground storage tanks are considered to operate indoors provided the emissions are directed towards the ground.</p> <p>(5) A communications system shall transmit only when the intentional radiator is sending information to an associated receiver.</p>

7.2. Antenna Connected Construction

The antenna is a PCB antenna which permanently attached, and the best case gain of the antenna is 6.977dBi . It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

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

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

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

