



## TEST REPORT

Product Name: Multifunctional sofa (massage) controller  
FCC ID: 2BP9Y-SDK17XX  
Trademark: SANDE  
Model Number: SDK17-XX  
Prepared For: Changzhou Sande Electrical Appliance Co., Ltd.  
Address: Hutang Science&Technology Industrial Park B2 3F, Changzhou City, Jiangsu Province, China  
Manufacturer: Changzhou Sande Electrical Appliance Co., Ltd.  
Address: Hutang Science&Technology Industrial Park B2 3F, Changzhou City, Jiangsu Province, China  
Prepared By: Shenzhen CTB Testing Technology Co., Ltd.  
Address: 1&2/F., Building A, No.26, Xinghe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China  
Sample Received Date: May. 19, 2025  
Sample tested Date: May. 19, 2025 to Jun. 10, 2025  
Issue Date: Jun. 10, 2025  
Report No.: CTB25051906801RF01  
Test Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249  
ANSI C63.10:2020  
Test Results: PASS  
Remark: This is 2.4GHz radio test report.

Compiled by:

Reviewed by:

Approved by:

Zhou kui

Arron Liu

Bin Mei

Zhou Kui

Arron Liu

Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "\*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

**TABLE OF CONTENT**

Test Report Declaration	Page
<b>1. VERSION</b> .....	<b>3</b>
<b>2. TEST SUMMARY</b> .....	<b>4</b>
<b>3. MEASUREMENT UNCERTAINTY</b> .....	<b>5</b>
<b>4. PRODUCT INFORMATION AND TEST SETUP</b> .....	<b>6</b>
4.1 Product Information .....	6
4.2 Test Setup Configuration .....	6
4.3 Support Equipment .....	6
4.4 Channel List .....	6
4.5 Test Mode .....	7
4.6 Test Environment .....	7
<b>5. TEST FACILITY AND TEST INSTRUMENT USED</b> .....	<b>8</b>
5.1 Test Facility .....	8
5.2 Test Instrument Used.....	8
<b>6. AC POWER LINE CONDUCTED EMISSION</b> .....	<b>11</b>
6.1 Block Diagram Of Test Setup.....	11
6.2 Limit.....	11
6.3 Test procedure .....	11
6.4 Test Result .....	13
<b>7. RADIATED SPURIOUS EMISSION</b> .....	<b>14</b>
7.1 Block Diagram Of Test Setup.....	14
7.2 Limit.....	14
7.3 Test procedure .....	15
7.4 Test Result .....	16
<b>8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS</b> .....	<b>21</b>
8.1 Block Diagram Of Test Setup.....	21
8.2 Limit.....	21
8.3 Test procedure .....	22
8.4 Test Result .....	23
<b>9. BANDWIDTH TEST</b> .....	<b>25</b>
9.1 Block Diagram Of Test Setup.....	25
9.2 Limit.....	25
9.3 Test procedure .....	25
9.4 Test Result .....	25
<b>10. ANTENNA REQUIREMENT</b> .....	<b>27</b>
<b>11. EUT TEST SETUP PHOTOGRAPHS</b> .....	<b>28</b>

(Note: N/A means not applicable)

**1. VERSION**

Report No.	Issue Date	Description	Approved
CTB25051906801RF01	Jun. 10, 2025	Original	Valid



## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.215	20dB Bandwidth	PASS	
15.249	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

Remark:

Test according to ANSI C63.10-2020.

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m chamber Radiated spurious emission(9KHz-30MHz)	4.8dB
3m chamber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10 <sup>-7</sup>
Conducted Emission (150KHz-30MHz)	3.2 dB
Radiated Emission(30MHz ~ 1000MHz)	4.8 dB
Radiated Emission(1GHz ~6GHz)	4.9 dB

**4. PRODUCT INFORMATION AND TEST SETUP**

4.1 Product Information

Model(s): SDK17-XX  
 Model Description: N/A  
 Hardware Version: SDK17-6R-230104  
 Software Version: SDK17-6R-V1.0

Operation Frequency: 2401-2482MHz  
 Type of Modulation: GFSK  
 Antenna installation: PCB Antenna  
 Antenna Gain: 1.0dBi  
 Ratings: DC 3V

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

4.4 Channel List

CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)
0	2401	1	2402	2	2403	3	2404
4	2405	5	2406	6	2407	7	2408
8	2409	9	2410	10	2411	11	2412
12	2413	13	2414	14	2415	15	2416
16	2417	17	2418	18	2419	19	2420
20	2421	21	2422	22	2423	23	2424
24	2425	25	2426	26	2427	27	2428
28	2429	29	2430	30	2431	31	2432
32	2433	33	2434	34	2435	35	2436
36	2437	37	2438	38	2439	39	2440
40	2441	41	2442	42	2443	43	2444



CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)
44	2445	45	2446	46	2447	47	2448
48	2449	49	2450	50	2451	51	2452
52	2453	53	2454	54	2455	55	2456
56	2457	57	2458	58	2459	59	2460
60	2461	61	2462	62	2463	63	2464
64	2465	65	2466	66	2467	67	2468
68	2469	69	2470	70	2471	71	2472
72	2473	73	2474	74	2475	75	2476
76	2477	77	2478	78	2479	79	2480
80	2481	81	2482	/	/	/	/

#### 4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting GFSK	2401MHz	2441MHz	2482MHz

#### 4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3V
Normal Temperature(°C)	23
Low Temperature(°C)	0
High Temperature(°C)	40

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinxhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: CN1276

### 5.2 Test Instrument Used

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2025/6/28
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2025/6/28
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2025/6/28
4	Communication test set	R&S	CMW500	108058	V3.5.80	2025/6/28
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2025/6/28
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2025/6/28
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 (E1962B)	2025/6/28
9	2.4 GHz Filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	/	2025/6/30
10	5 GHz Filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	/	2025/6/30
11	Filter	Xingbo	XBLBQ-DZA 120	190821-1-1	/	2025/6/30
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2025/6/28
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2025/6/28
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2027/6/21
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
18	Amplifier	HP	8447E	2945A02747	/	2025/6/28
19	Amplifier	Agilent	8449B	3008A01838	/	2025/6/28
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/28
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2025/6/28



22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/28
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2025/6/28
26	Amplifier	AEROFLEX	Aeroflex	097	/	2025/6/28
27	Power Metter	KEYSIGHT	N1912AP	N/A	A.05.00	2025/6/28

### Continuous disturbance

No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2027/6/21
2	AMN	ROHDE&SCHWARZ	ESH3-Z5	831551852	/	2025/6/30
3	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	/	2025/6/28
4	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428	V4.42.SP3	2025/6/30
5	Coaxial cable	ZDECL	Z302S	18091904	/	2025/6/30
6	ISN	Schwarzbeck	NTFM8158	183	/	2025/6/30
7	Voltage sensor	Schwarzbeck	TK 9420	01189	/	2025/10/25
8	EZ-EMC	Frad	EMC-con3A1.1	/	/	/
9	Current Probe	FCC	F-52B	199453	/	2025/5/27
10	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
11	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

### Radiated emission(No.1 Chamber)

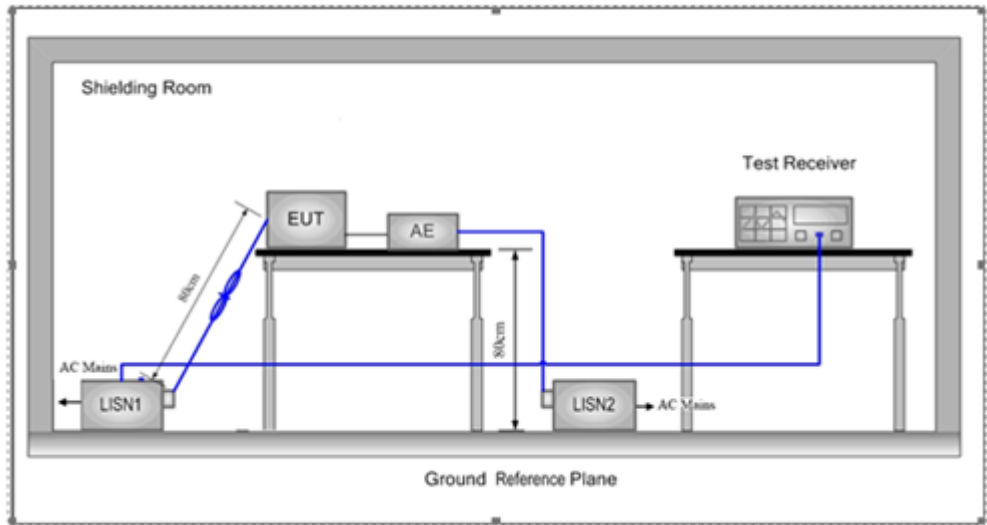
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/7/06
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/29
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/30
5	Amplifier	HP	8447E	2945A02747	/	2025/6/28
6	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/29
7	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
8	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
9	Coaxial cable	ETS	RFC-SNS-100-NMS-80	/	/	2025/6/28
10	Coaxial cable	ETS	RFC-SN-100-NMS-20	/	/	2025/6/28

11	Coaxial cable	ETS	RFC-SNS-100-SMS-20	/	/	2025/6/28
12	Coaxial cable	ETS	RFC-NNS-100-NMS-300	/	/	2025/6/28
13	EMI test software	Frad	EZ-EMC	Ver/ FA-03A2 RE	/	/
14	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

Radiated emission(No.2 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2026/11/14
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2026/7/07
3	Broadband Antenna	Schwarzbeck	VULB 9168	1471	/	2025/7/06
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/30
5	Preamplifier	Schwarzbeck	BBV 9743 B	00500	/	2025/5/23
6	EMI TEST RECEIVER	R&S	ESC17	100861	/	2025/10/25
7	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
8	EMI test software	Farad	EZ-EMC	/	Ver. FARAD-3A1+	/
9	Coaxial cable	Rosenberg	8m	/	/	2025/10/25
10	Coaxial cable	Times	2m	/	/	2025/10/25
11	Coaxial cable	Times	2m	/	/	2025/10/25
12	Coaxial cable	Times	1m	/	/	2025/10/25
13	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/29
14	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

## 6. AC POWER LINE CONDUCTED EMISSION

### 6.1 Block Diagram Of Test Setup



### 6.2 Limit

**Table 4 - AC power-line conducted emissions limits**

Frequency (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 <sup>Note 1</sup>	56 to 46 <sup>Note 1</sup>
0.5 - 5	56	46
5 - 30	60	50

**Note 1:** The level decreases linearly with the logarithm of the frequency.

\* Decreasing linearly with the logarithm of the frequency

### 6.3 Test procedure

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a  $50\Omega/50\mu\text{H} + 5\Omega$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.



This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
- 6) All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.
- 7) If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.

#### 6.4 Test Result

N/A

NOTE: This EUT is powered by DC power only, this test item is not applicable.

## 7. RADIATED SPURIOUS EMISSION

### 7.1 Block Diagram Of Test Setup

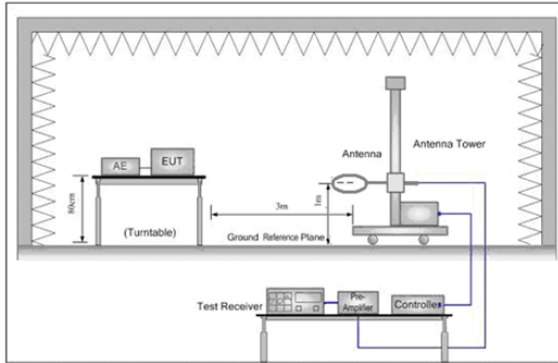


Figure 1. Below 30MHz

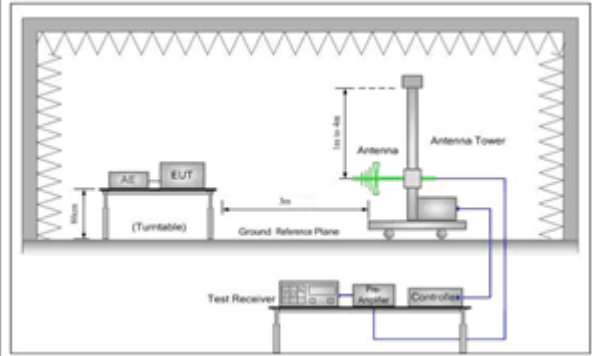
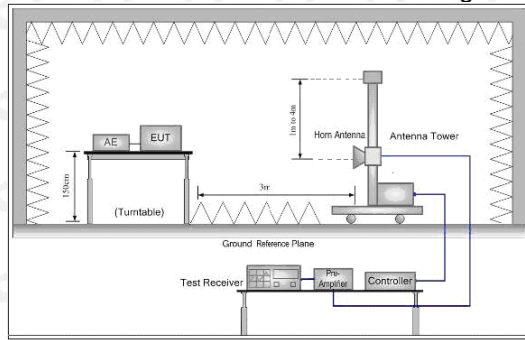


Figure 2. 30MHz to 1GHz



### 7.2 Limit

Spurious Emissions:

Frequency	Field strength (microvolt/meter)	Limit (dB $\mu$ V/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-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 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.



7.3 Test procedure

**Below 1GHz test procedure as below:**

- a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c.The antenna height 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.
- d.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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

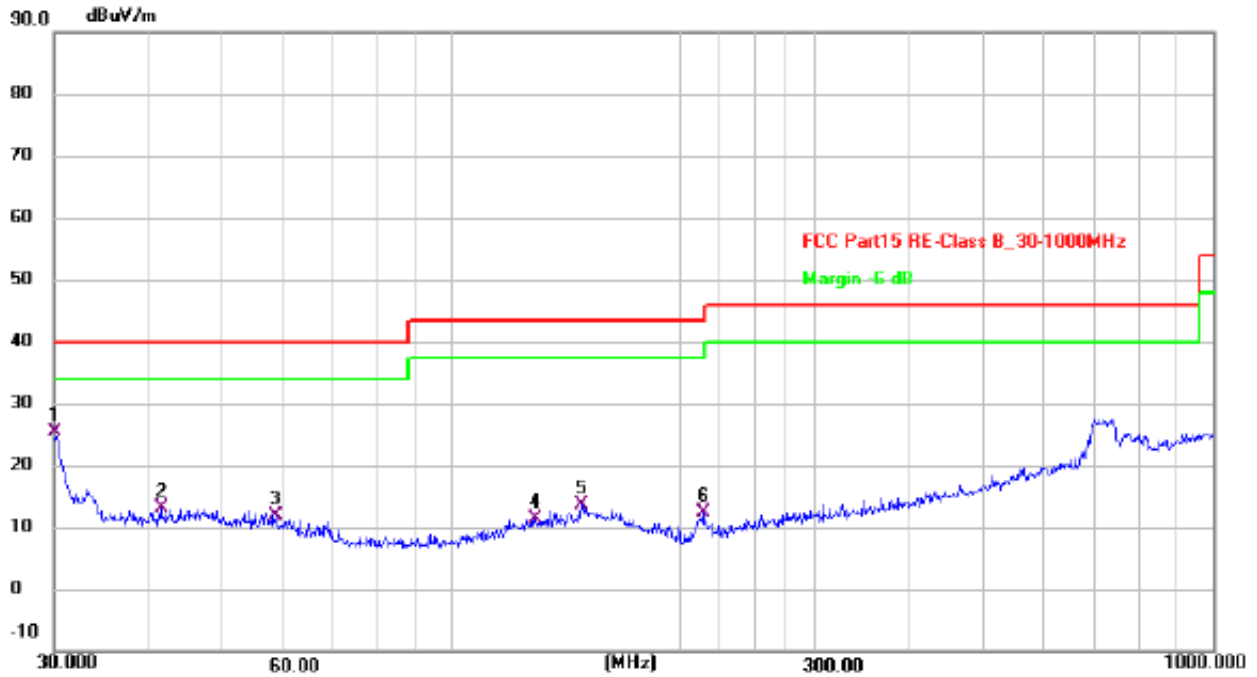
- g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j.Repeat above procedures until all frequencies measured was complete.
- j. Full battery is used during test.

Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

7.4 Test Result

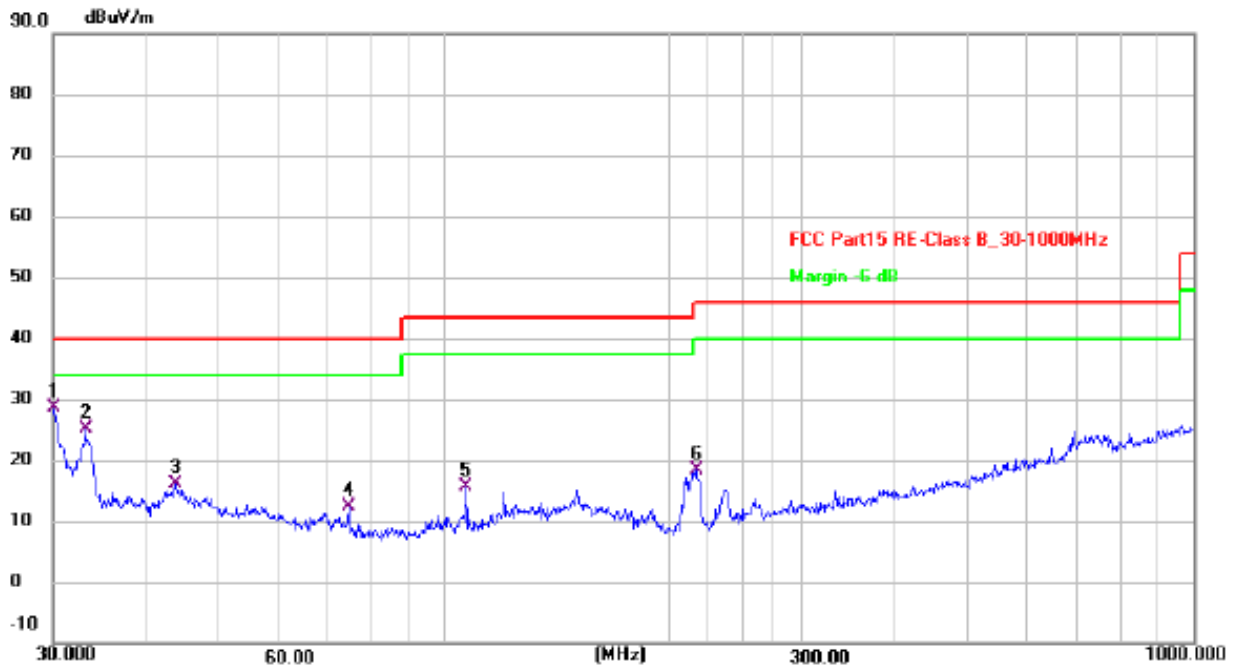
Below 1GHz Test Results:  
Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.0000	39.19	-13.75	25.44	40.00	-14.56	QP
2	41.4215	26.44	-13.39	13.05	40.00	-26.95	QP
3	58.6126	26.50	-14.64	11.86	40.00	-28.14	QP
4	128.5630	26.04	-14.72	11.32	43.50	-32.18	QP
5	147.9214	26.70	-13.04	13.66	43.50	-29.84	QP
6	213.7634	28.83	-16.47	12.36	43.50	-31.14	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

Antenna polarity: V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.0000	42.43	-13.75	28.68	40.00	-11.32	QP
2	33.0950	38.86	-13.80	25.06	40.00	-14.94	QP
3	43.6584	29.66	-13.45	16.21	40.00	-23.79	QP
4	74.3955	29.80	-17.44	12.36	40.00	-27.64	QP
5	106.7587	32.71	-17.15	15.56	43.50	-27.94	QP
6	216.7828	34.77	-16.33	18.44	46.00	-27.56	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit



CH Low (2401MHz)  
Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2401	108.50	-5.84	102.66	114	-11.34	peak
2401	94.60	-5.84	88.76	94	-5.24	AVG
4802	56.46	-3.64	52.82	74	-21.18	peak
4802	47.48	-3.64	43.84	54	-10.16	AVG
7203	61.07	-0.95	60.12	74	-13.88	peak
7203	50.11	-0.95	49.16	54	-4.84	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2401	109.17	-5.84	103.33	114	-10.67	peak
2401	92.05	-5.84	86.21	94	-7.79	AVG
4802	56.92	-3.64	53.28	74	-20.72	peak
4802	48.32	-3.64	44.68	54	-9.32	AVG
7203	60.16	-0.95	59.21	74	-14.79	peak
7203	49.53	-0.95	48.58	54	-5.42	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

CH Middle (2441MHz)  
Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2441	107.43	-5.71	101.72	114	-12.28	peak
2441	92.28	-5.71	86.57	94	-7.43	AVG
4882	55.16	-3.51	51.65	74	-22.35	peak
4882	46.60	-3.51	43.09	54	-10.91	AVG
7323	57.78	-0.82	56.96	74	-17.04	peak
7323	46.95	-0.82	46.13	54	-7.87	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2441	107.66	-5.71	101.95	114	-12.05	peak
2441	91.33	-5.71	85.62	94	-8.38	AVG
4882	54.49	-3.51	50.98	74	-23.02	peak
4882	46.67	-3.51	43.16	54	-10.84	AVG
7323	56.12	-0.82	55.30	74	-18.70	peak
7323	47.65	-0.82	46.83	54	-7.17	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

CH High (2482MHz)  
Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2482	106.58	-5.65	100.93	114	-13.07	peak
2482	91.85	-5.65	86.20	94	-7.80	AVG
4964	56.05	-3.43	52.62	74	-21.38	peak
4964	47.44	-3.43	44.01	54	-9.99	AVG
7446	55.48	-0.75	54.73	74	-19.27	peak
7446	47.16	-0.75	46.41	54	-7.59	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2482	107.34	-5.65	101.69	114	-12.31	peak
2482	92.09	-5.65	86.44	94	-7.56	AVG
4964	55.82	-3.43	52.39	74	-21.61	peak
4964	46.51	-3.43	43.08	54	-10.92	AVG
7446	55.27	-0.75	54.52	74	-19.48	peak
7446	46.95	-0.75	46.20	54	-7.80	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1). Measuring frequencies from 9KHz to the 25 GHz.
- (2). All modes of GFSK were test at Low, Middle, and High channel, only the worst result of GFSK Low Channel was reported for below 1GHz test.
- (3). For 2.4G above 1GHz test all modes of GFSK were test at Low, Middle, and High channel, only the worst result of GFSK Low Channel was reported.
- (4). By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
- (5). Radiated emission test from 9kHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9kHz to 30MHz and not recorded in this report.



## 8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS

### 8.1 Block Diagram Of Test Setup

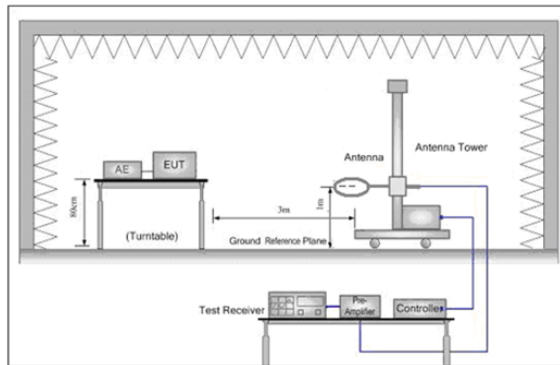


Figure 1. Below 30MHz

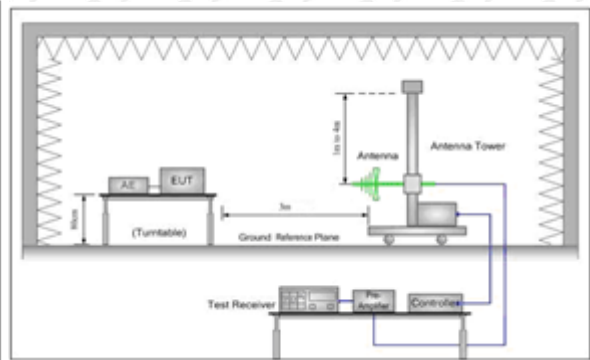
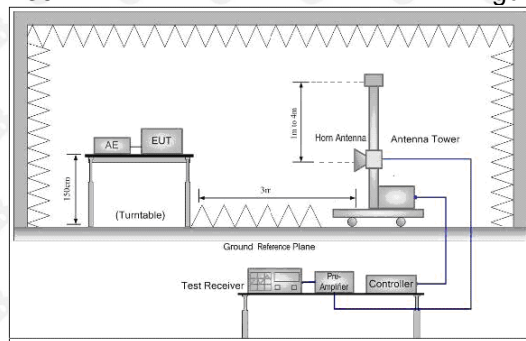


Figure 2. 30MHz to 1GHz



### 8.2 Limit

Spurious Emissions:

Frequency	Field strength (microvolt/meter)	Limit (dB $\mu$ V/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-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 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.

8.3 Test procedure

- a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c.The antenna height 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.
- d.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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Frequency	Detector	RBW	VBW	Remark
2310MHz-2400MHz	peak	1MHz	3MHz	peak
2483.5MHz-2500MHz	peak	1MHz	3MHz	peak

## 8.4 Test Result

 CH Low:  
 Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.0558	27.53	-4.32	23.21	54	-30.79	peak
2	2343.9359	31.63	-4.27	27.36	54	-26.64	peak
3	2378.012	31.62	-4.43	27.20	54	-26.80	peak
4	2389.9067	25.82	-4.87	20.95	54	-33.05	peak
5	2439.7189	29.60	-3.96	25.65	54	-28.35	peak

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2309.9832	28.16	-4.27	23.89	54	-30.11	peak
2	2343.7892	30.16	-4.31	25.84	54	-28.16	peak
3	2378.026	29.92	-4.42	25.50	54	-28.50	peak
4	2390.0051	27.57	-4.95	22.61	54	-31.39	peak
5	2439.9324	30.43	-3.94	26.49	54	-27.51	peak

 CH High:  
 Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.7422	32.99	-4.29	28.70	54	-25.30	peak
2	2488.6971	29.86	-4.35	25.51	54	-28.49	peak
3	2490.063	32.40	-4.41	27.98	54	-26.02	peak
4	2493.4823	32.73	-4.93	27.80	54	-26.20	peak
5	2495.6595	30.42	-4.00	26.42	54	-27.58	peak

Vertical:

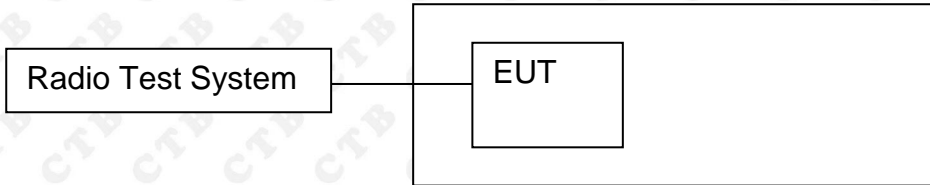
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.7792	32.67	-4.31	28.36	54	-25.64	peak
2	2488.6807	32.89	-4.27	28.62	54	-25.38	peak



3	2490.1663	33.98	-4.45	29.53	54	-24.47	peak
4	2493.3256	33.57	-4.91	28.66	54	-25.34	peak
5	2495.9336	30.14	-4.00	26.14	54	-27.86	peak

## 9. BANDWIDTH TEST

### 9.1 Block Diagram Of Test Setup



### 9.2 Limit

FCC Part15 (15.249) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.249	Bandwidth	2402-2483.5	PASS

### 9.3 Test procedure

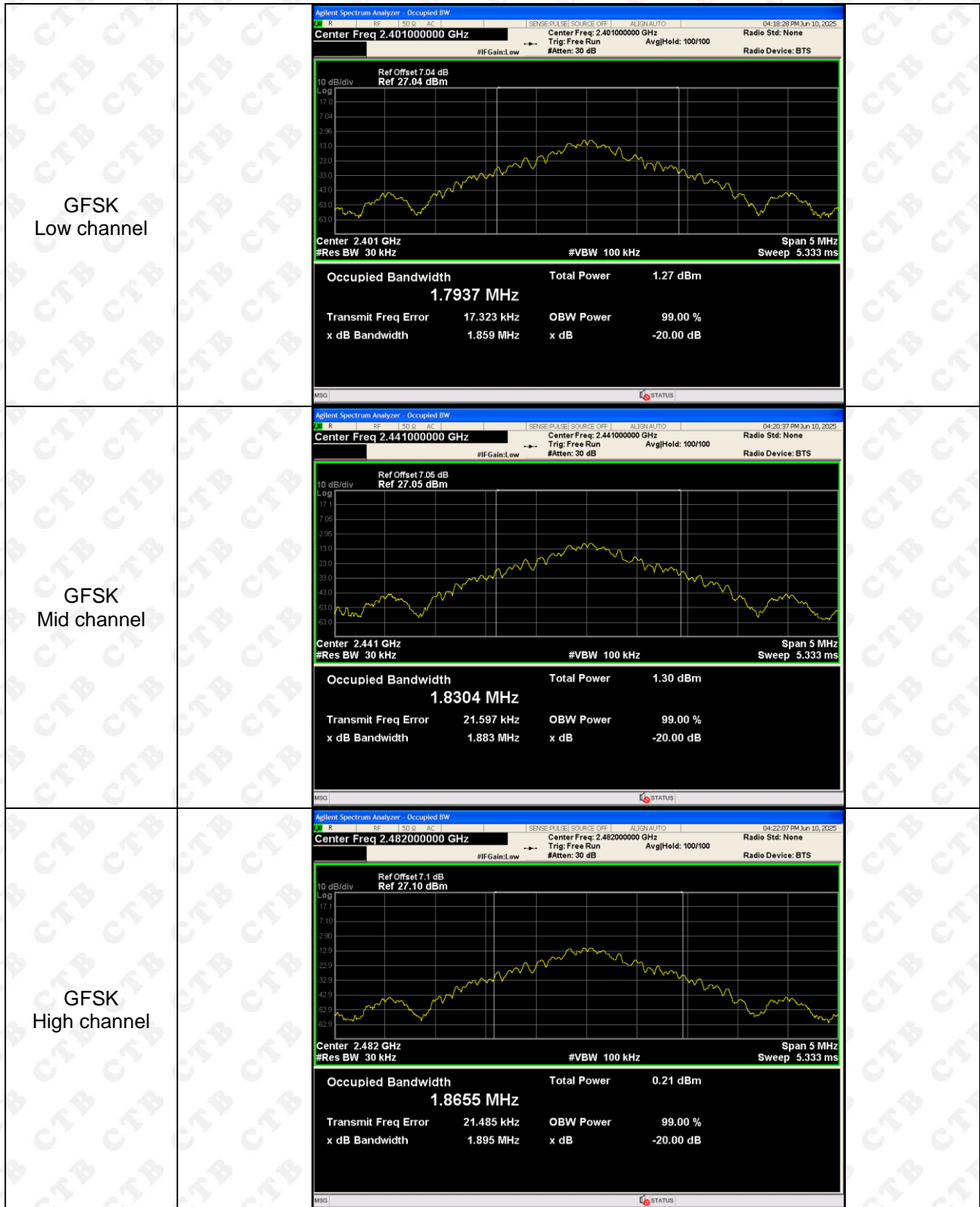
1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

### 9.4 Test Result

Test Mode	Frequency (MHz)	20dB Bandwidth (MHz)	Result
GFSK	Low channel	1.859	PASS
	Mid channel	1.883	PASS
	High channel	1.895	PASS

Note: All modes of operation were Pre-scan and the worst-case emissions are reported.

Test Graph:





## 10. ANTENNA REQUIREMENT

### 15.203 requirement:

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.

### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

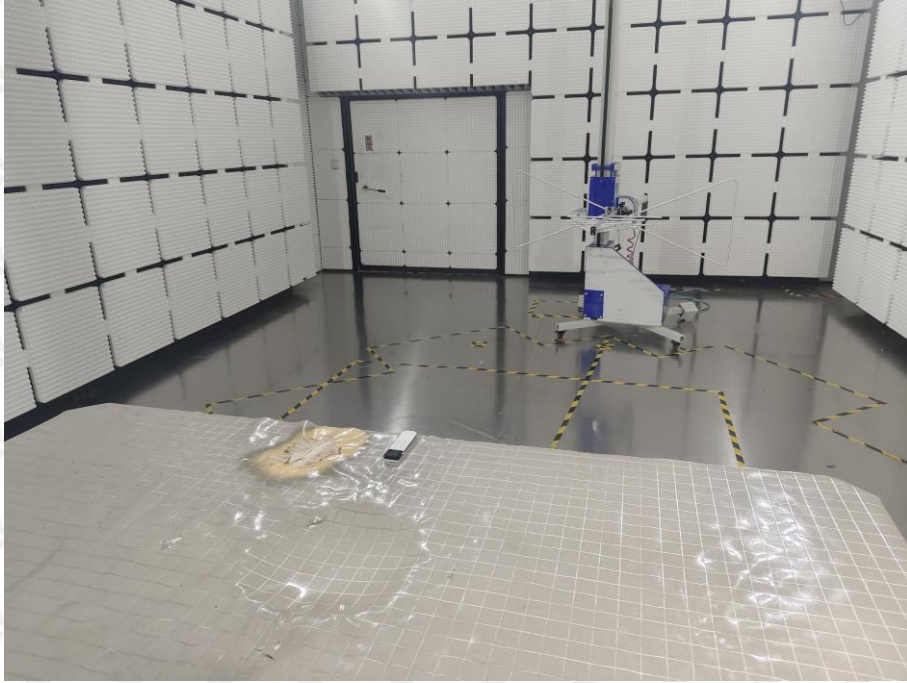
### EUT Antenna:

The antenna is PCB Antenna. The best case gain of the antenna is 1.0dBi.

## 11. EUT TEST SETUP PHOTOGRAPHS

### Radiated Emissions

Below 1G



Above 1G



\*\*\*\*\* END OF REPORT \*\*\*\*\*