TEST REPORT

Applicant:	SHENZHEN DELUXE AV ELECTRONICS CO.,LTD
Address of Applicant:	BUILDING A,TIANXIN INDUSTRIAL PARK, GUSHU, BAO'AN DISTRICT, SHENZHEN, CHINA
Manufacturer/Factory:	Shenzhen DuoLeSheng electronics Co.,Ltd
Address of Manufacturer/Factory:	the first floor to the fifth floor of Building A Tianxin Industrial Zone,Gushu second crossing,Xixiang,Bao'an District Shenzhen

Equipment Under Test (EUT)

Product Name:	Karaoke machine
Model No.:	AP-G552, AP-2401, Q61, AP-G568
Trade Mark:	VEVOR
FCC ID:	2BOAE-AP-G552
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	Mar. 17, 2025
Date of Test:	Mar. 17, 2025 to Mar. 20, 2025
Date of report issued:	Mar. 20, 2025
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

深圳市环球众一科技有限公司 Global United Technology Services Co., Ltd. 检验检测专用章 Inspection&Testing Services

Robinson Luo

Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*Mar. 20, 2025*	*Original*

Prepared By: ***Date:*** *Mar. 20, 2025*

Project Engineer

Check By: ***Date:*** *Mar. 20, 2025*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not applicable.*
3. *Test according to ANSI C63.10:2013*

4.1 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25\times10^{-8}$
2	Duty cycle	±0.37%
3	Occupied Bandwidth	±3%
4	RF conducted power	±0.75dB
5	RF power density	±3dB
6	Conducted Spurious emissions	±2.58dB
7	AC Power Line Conducted Emission	±3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	±3.1dB (9kHz-30MHz)
		±3.8039dB (30MHz-200MHz)
		±3.9679dB (200MHz-1GHz)
		±4.29dB (1GHz-18GHz)
		±3.30dB (18GHz-40GHz)
9	Temperature test	±1°C
10	Humidity test	±3%
11	Time	±3%

5 General Information

5.1 General Description of EUT

Product Name:	Karaoke machine
Model No.:	AP-G552, AP-2401, Q61, AP-G568
Test Model No.:	AP-G552
All model's the function, software and electric circuit are the same, only with a product color and model named different.	
Serial No.:	AP-2401, Q61, AP-G568
Test sample(s) ID:	GTSL2025040189-1
Sample(s) Status	Engineered sample
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Modulation type:	GFSK, π /4 DQPSK, 8DPSK
Antenna Type:	PCB Antenna
Antenna gain:	-0.58dBi(declare by applicant)
Power supply:	DC 5.0V from adapter or DC 7.4V from Li-battery

Remark:
1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402	21	2423	42	2444	63	2465
01	2403	22	2424	43	2445	64	2466
02	2404	23	2425	44	2446	65	2467
03	2405	24	2426	45	2447	66	2468
04	2406	25	2427	46	2448	67	2469
05	2407	26	2428	47	2449	68	2470
06	2408	27	2429	48	2450	69	2471
07	2409	28	2430	49	2451	70	2472
08	2410	29	2431	50	2452	71	2473
09	2411	30	2432	51	2453	72	2474
10	2412	31	2433	52	2454	73	2475
11	2413	32	2434	53	2455	74	2476
12	2414	33	2435	54	2456	75	2477
13	2415	34	2436	55	2457	76	2478
14	2416	35	2437	56	2458	77	2479
15	2417	36	2438	57	2459	78	2480
16	2418	37	2439	58	2460		
17	2419	38	2440	59	2461		
18	2420	39	2441	60	2462		
19	2421	40	2442	61	2463		
20	2422	41	2443	62	2464		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: New battery is used during all test.	

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

● **ISED —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Apr. 11, 2025	Apr. 10, 2026
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Apr. 12, 2025	Apr. 11, 2026
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Apr. 12, 2025	Apr. 11, 2026
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jul. 02, 2024	Jul. 01, 2025
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.16, 2024	Nov.15, 2025
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2025	Apr. 10, 2026
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2025	Apr. 10, 2026
10	Horn Antenna (18GH-40GHz)	Schwarzbeck	BBHA 9170	GTS691	Apr. 11, 2025	Apr. 10, 2026
11	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 11, 2025	Mar. 10, 2026
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2025	Apr. 10, 2026
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 13, 2024	Nov. 12, 2025
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2025	Apr. 10, 2026
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 15, 2025	Apr. 14, 2026
16	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
17	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
18	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
23	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 11, 2025	Apr. 10, 2026
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 15, 2025	Apr. 14, 2026
6	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 12, 2025	Apr. 11, 2026
7	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 11, 2025	Apr. 10, 2026
8	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 11, 2025	Apr. 10, 2026
9	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 11, 2025	Apr. 10, 2026
10	EMI Test Software	AUDIX	E3-6.100622	GTS726	N/A	N/A
11	Current probe	CYBERTEK	EM5011	GTS698	Jan. 13, 2025	Jan. 12, 2026

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	Apr. 11, 2025	Apr. 10, 2026
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	Apr. 11, 2025	Apr. 10, 2026
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	Apr. 11, 2025	Apr. 10, 2026
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Power Meter	Keysighte	N1924A	GTS673	Apr. 11, 2025	Apr. 10, 2026
7	USB RF Power Sensor	DARE	RPR3006W	GTS569	Apr. 11, 2025	Apr. 10, 2026
8	RF Switch Box	Shongyi	RFSW3003328	GTS571	Apr. 11, 2025	Apr. 10, 2026
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	Apr. 11, 2025	Apr. 10, 2026
10	Thermo meter	JINCHUANG	GSP-8A	GTS641	Apr. 15, 2025	Apr. 14, 2026

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	KUMAO	SF132	GTS647	Aug. 17, 2024	Aug. 16, 2025

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
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.	
EUT Antenna:	
The antenna is PCB antenna, reference to the appendix II for details.	

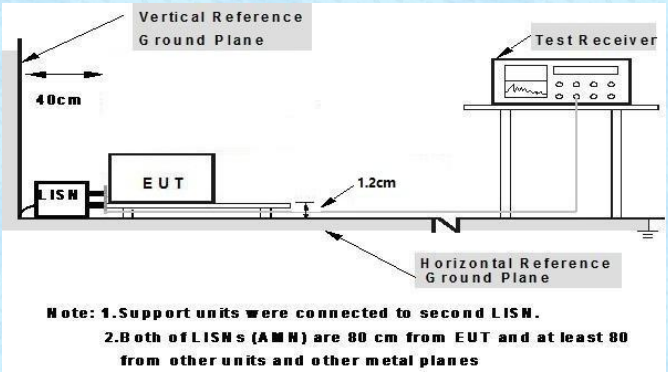
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	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 setup:



Test procedure:

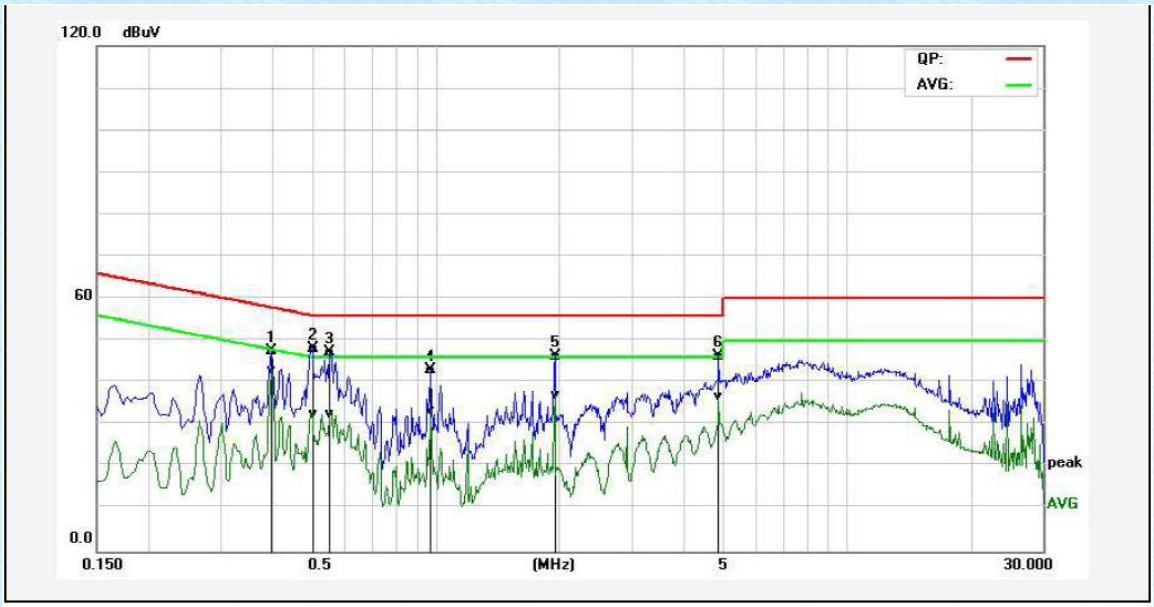
1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remark:
1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. All modes were test at Low, Middle, and High channel, only the worst result of 8DPSK Middle Channel was reported.

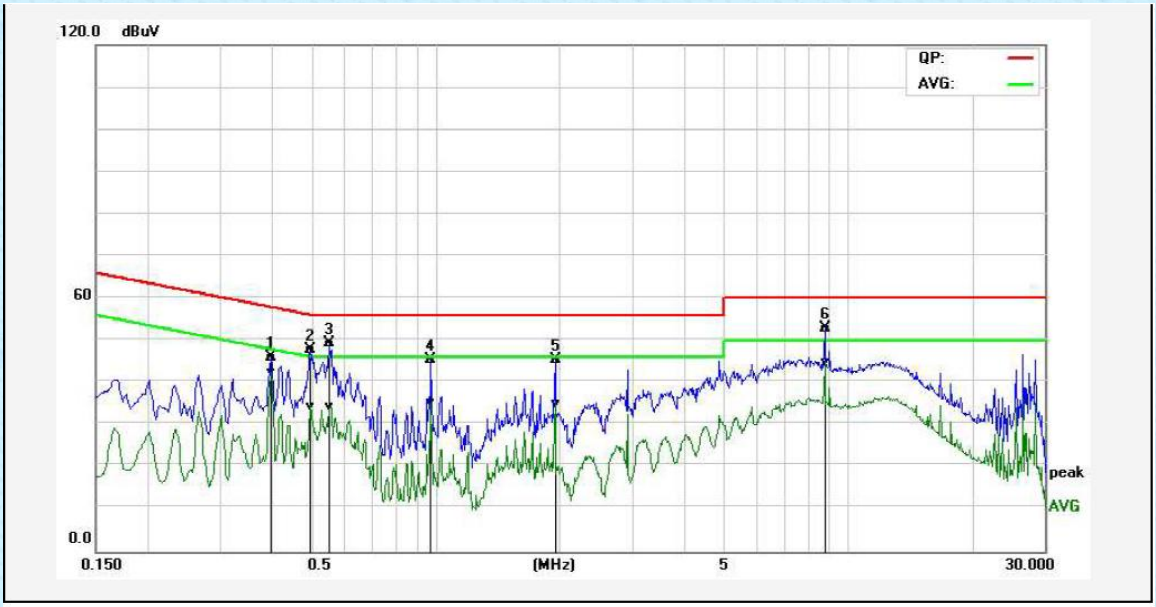
Measurement data

Line:



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.3980	37.29	32.82	10.12	47.41	42.94	57.89	47.90	-10.48	-4.96	Pass
2P	0.5020	37.93	22.41	10.08	48.01	32.49	56.00	46.00	-7.99	-13.51	Pass
3P	0.5540	37.10	22.52	10.08	47.18	32.60	56.00	46.00	-8.82	-13.40	Pass
4P	0.9740	33.00	23.28	10.13	43.13	33.41	56.00	46.00	-12.87	-12.59	Pass
5P	1.9500	36.12	26.86	10.19	46.31	37.05	56.00	46.00	-9.69	-8.95	Pass
6P	4.8780	35.91	26.26	10.45	46.36	36.71	56.00	46.00	-9.64	-9.29	Pass

Neutral:



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.3980	35.91	32.24	10.12	46.03	42.36	57.89	47.90	-11.86	-5.54	Pass
2P	0.4980	37.69	24.42	10.08	47.77	34.50	56.03	46.03	-8.26	-11.53	Pass
3P	0.5540	39.29	24.15	10.08	49.37	34.23	56.00	46.00	-6.63	-11.77	Pass
4P	0.9740	35.30	25.01	10.13	45.43	35.14	56.00	46.00	-10.57	-10.86	Pass
5P	1.9540	35.33	24.88	10.19	45.52	35.07	56.00	46.00	-10.48	-10.93	Pass
6*	8.7780	42.42	34.30	10.57	52.99	44.87	60.00	50.00	-7.01	-5.13	Pass

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Note: For Duty cycle ⩾ 98%, average detector set as above, For Duty cycle < 98%, average detector set as below: VBW ⩾ 1 / T

Limit:
(Field strength of the fundamental signal)

Frequency	imit (dBuV/m @3m)	Remark
2400 Hz-2483.5MHz	94.00	Avera e Value
	11 00	Peak Va ue

Limit:
(Spurious Emissions)

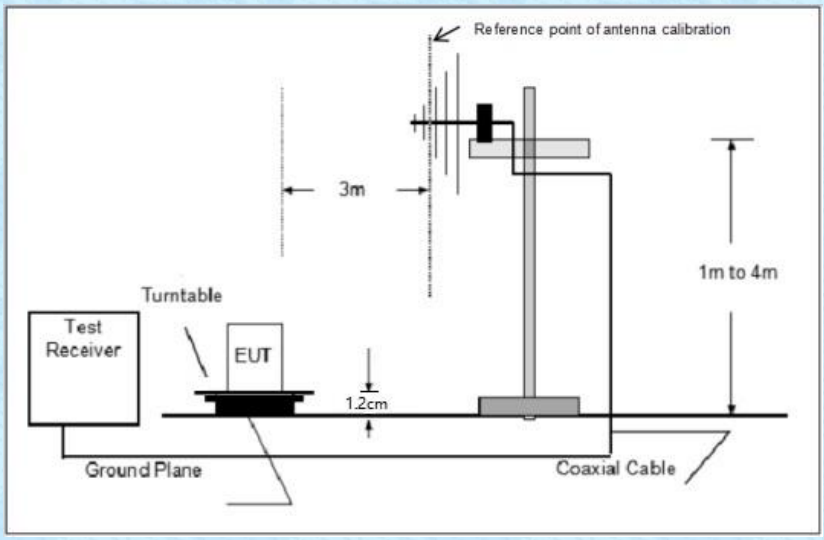
Fre uency	Limit (V/m)	Remark
0.009MH -0.490MHz	2400 F(Hz) @300m	Quasi-peak Value
0.490MHz-1.705MHz	24000/F(kHz) @30m	Quasi-peak Value
1.705MHz-30.0MHz	30 @30m	Quasi-peak Value
30MHz-88MHz	100 @3m	Quasi-peak Value
88MHz-216MHz	150 @3m	Quasi-peak Value
216MHz-960MHz	200 @3m	Quasi-peak Value
960MHz-1GHz	500 @3m	Quasi-peak Value
Above 1GHz	500 @3m	Average Value
	5000 @3m	Peak Value

Limit:
(band edge)

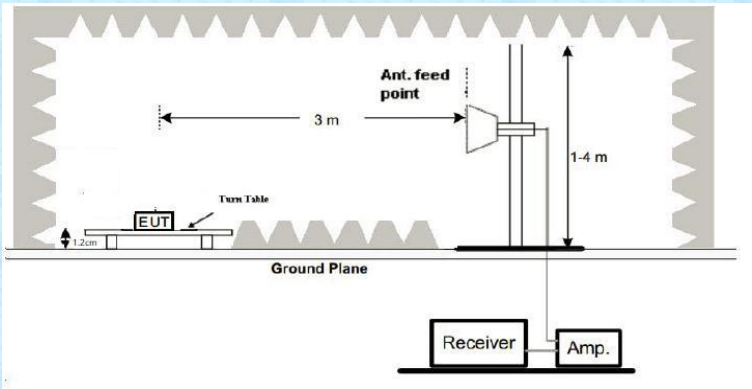
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test setup:

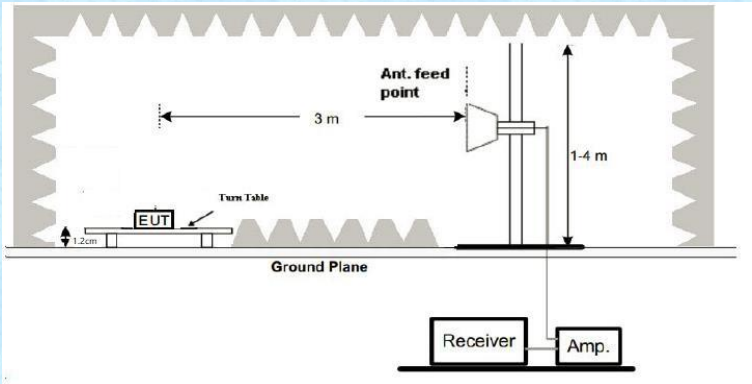
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (1.2cm for below 1GHz and 1.2cm for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

GFSK:

Test frequency (MHz)	Fundamental Frequency (MHz)	Field strength of fundamental level (dBμV/m)		Limit (dBuV)		Result	Antenna Pole (H/V)
		AVG	Peak	AVG	Peak		
2402	2401.789	78.55	98.95	94	114	Pass	H
	2401.864	78.42	98.72	94	114	Pass	V
2441	2440.923	79.18	99.25	94	114	Pass	H
	2440.888	78.62	98.92	94	114	Pass	V
2480	2479.814	78.73	99.08	94	114	Pass	H
	2479.921	78.6	98.91	94	114	Pass	V

π/4 DQPSK:

Test frequency (MHz)	Fundamental Frequency (MHz)	Field strength of fundamental level (dBμV/m)		Limit (dBuV)		Result	Antenna Pole (H/V)
		AVG	Peak	AVG	Peak		
2402	2401.821	78.35	98.56	94	114	Pass	H
	2402.923	77.99	98.2	94	114	Pass	V
2441	2440.816	78.44	98.94	94	114	Pass	H
	2440.785	78.47	98.73	94	114	Pass	V
2480	2480.036	78.41	98.77	94	114	Pass	H
	2480.017	78.33	98.61	94	114	Pass	V

8DPSK:

Test frequency (MHz)	Fundamental Frequency (MHz)	Field strength of fundamental level (dBμV/m)		Limit (dBuV)		Result	Antenna Pole (H/V)
		AVG	Peak	AVG	Peak		
2402	2401.853	78.39	98.91	94	114	Pass	H
	2401.781	78.27	98.71	94	114	Pass	V
2441	2440.927	78.83	99.27	94	114	Pass	H
	2440.909	78.76	99.04	94	114	Pass	V
2480	2479.882	78.96	99.13	94	114	Pass	H
	2479.879	78.63	98.91	94	114	Pass	V

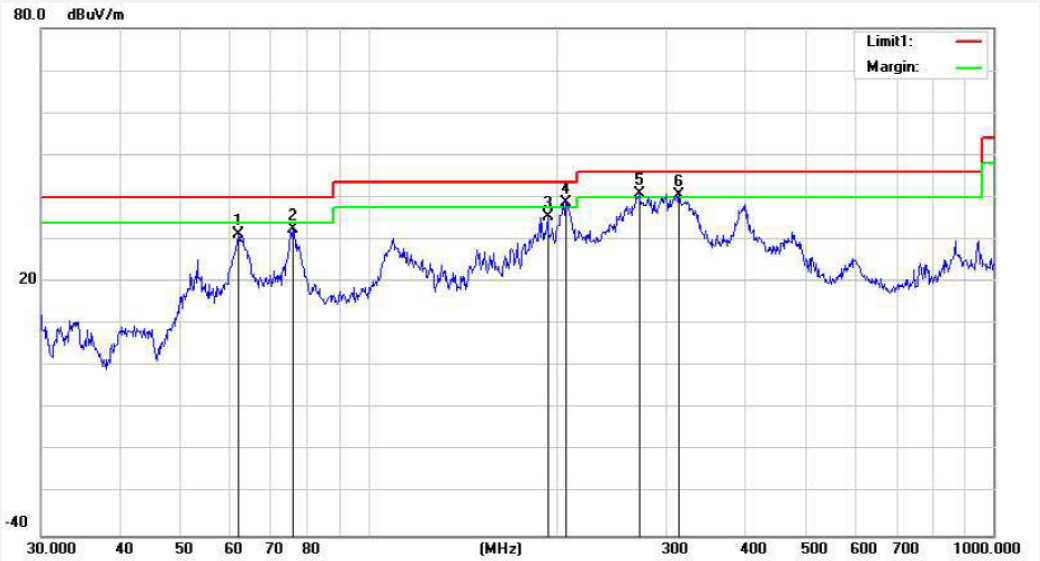
7.3.2 Spurious emissions

■ **Below 30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

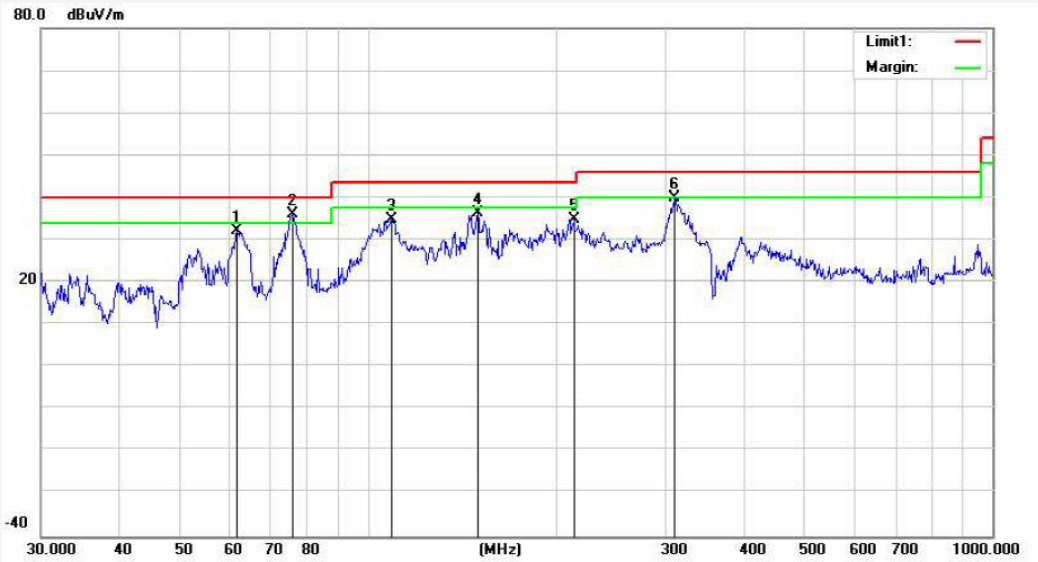
■ **Below 1GHz**

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	61.9951	57.87	-26.68	31.19	40.00	-8.81	136	100	QP
2	75.7114	58.52	-26.07	32.45	40.00	-7.55	155	100	QP
3	193.7728	57.43	-21.97	35.46	43.50	-8.04	182	100	QP
4*	207.1226	60.52	-21.85	38.67	43.50	-4.83	177	100	QP
5!	271.3246	60.06	-19.18	40.88	46.00	-5.12	119	100	QP
6!	314.3765	60.12	-19.49	40.63	46.00	-5.37	143	100	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	61.7781	58.88	-26.70	32.18	40.00	-7.82	172	100	QP
2*	75.7112	62.16	-26.07	36.09	40.00	-3.91	138	100	QP
3	109.0284	57.67	-22.90	34.77	43.50	-8.73	164	100	QP
4	150.0107	57.15	-20.83	36.32	43.50	-7.18	155	100	QP
5	213.7632	56.71	-21.78	34.93	43.50	-8.57	120	100	QP
6!	309.9977	59.51	-19.49	40.02	46.00	-5.98	141	100	QP

Remark:
All modes were test at Low, Middle, and High channel, only the worst result of 8DPSK Middle Channel was reported for below 1GHz test.

Above 1GHz
GFSK Modulation:
CH00 (2402MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	104.79	-5.84	98.95	114	-15.05	PK
2402	84.39	-5.84	78.55	94	-15.45	AV
4804	61.59	-3.64	57.95	74	-16.05	PK
4804	41.48	-3.64	37.84	54	-16.16	AV
7206	58.44	-0.95	57.49	74	-16.51	PK
7206	38.2	-0.95	37.25	54	-16.75	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	104.56	-5.84	98.72	114	-15.28	PK
2402	84.26	-5.84	78.42	94	-15.58	AV
4804	61.56	-3.64	57.92	74	-16.08	PK
4804	41.42	-3.64	37.78	54	-16.22	AV
7206	58.28	-0.95	57.33	74	-16.67	PK
7206	37.79	-0.95	36.84	54	-17.16	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH39 (2441MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.96	-5.71	99.25	114	-14.75	PK
2441	84.89	-5.71	79.18	94	-14.82	AV
4882	62.03	-3.51	58.52	74	-15.48	PK
4882	41.97	-3.51	38.46	54	-15.54	AV
7323	58.93	-0.82	58.11	74	-15.89	PK
7323	38.6	-0.82	37.78	54	-16.22	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.63	-5.71	98.92	114	-15.08	PK
2441	84.33	-5.71	78.62	94	-15.38	AV
4882	61.63	-3.51	58.12	74	-15.88	PK
4882	41.44	-3.51	37.93	54	-16.07	AV
7323	58.39	-0.82	57.57	74	-16.43	PK
7323	37.88	-0.82	37.06	54	-16.94	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH78 (2480MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	104.73	-5.65	99.08	114	-14.92	PK
2480	84.38	-5.65	78.73	94	-15.27	AV
4960	61.7	-3.43	58.27	74	-15.73	PK
4960	41.56	-3.43	38.13	54	-15.87	AV
7440	58.62	-0.75	57.87	74	-16.13	PK
7440	38.26	-0.75	37.51	54	-16.49	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	104.54	-5.63	98.91	114	-15.09	PK
2480	84.25	-5.65	78.6	94	-15.4	AV
4960	61.57	-3.43	58.14	74	-15.86	PK
4960	41.38	-3.43	37.95	54	-16.05	AV
7440	58.24	-0.75	57.49	74	-16.51	PK
7440	37.79	-0.75	37.04	54	-16.96	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

π/4 DQPSK Modulation:
CH00 (2402MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	104.4	-5.84	98.56	114	-15.44	PK
2402	84.19	-5.84	78.35	94	-15.65	AV
4804	61.34	-3.64	57.7	74	-16.3	PK
4804	41.3	-3.64	37.66	54	-16.34	AV
7206	58.26	-0.95	57.31	74	-16.69	PK
7206	37.93	-0.95	36.98	54	-17.02	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	104.04	-5.84	98.2	114	-15.8	PK
2402	83.83	-5.84	77.99	94	-16.01	AV
4804	61.11	-3.64	57.47	74	-16.53	PK
4804	40.87	-3.64	37.23	54	-16.77	AV
7206	57.8	-0.95	56.85	74	-17.15	PK
7206	37.64	-0.95	36.69	54	-17.31	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH39 (2441MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.65	-5.71	98.94	114	-15.06	PK
2441	84.15	-5.71	78.44	94	-15.56	AV
4882	61.35	-3.51	57.84	74	-16.16	PK
4882	41.28	-3.51	37.77	54	-16.23	AV
7323	58.3	-0.82	57.48	74	-16.52	PK
7323	37.95	-0.82	37.13	54	-16.87	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.44	-5.71	98.73	114	-15.27	PK
2441	84.18	-5.71	78.47	94	-15.53	AV
4882	61.49	-3.51	57.98	74	-16.02	PK
4882	41.25	-3.51	37.74	54	-16.26	AV
7323	58.15	-0.82	57.33	74	-16.67	PK
7323	37.68	-0.82	36.86	54	-17.14	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH78 (2480MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	104.42	-5.65	98.77	114	-15.23	PK
2480	84.12	-5.65	78.47	94	-15.53	AV
4960	61.38	-3.43	57.95	74	-16.05	PK
4960	41.32	-3.43	37.89	54	-16.11	AV
7440	58.3	-0.75	57.55	74	-16.45	PK
7440	38.03	-0.75	37.28	54	-16.72	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	104.24	-5.63	98.61	114	-15.39	PK
2480	83.98	-5.65	78.33	94	-15.67	AV
4960	61.25	-3.43	57.82	74	-16.18	PK
4960	41.01	-3.43	37.58	54	-16.42	AV
7440	57.97	-0.75	57.22	74	-16.78	PK
7440	37.44	-0.75	36.69	54	-17.31	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

8DPSK Modulation:
CH00 (2402MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	104.75	-5.84	98.91	114	-15.09	PK
2402	84.23	-5.84	78.39	94	-15.61	AV
4804	61.45	-3.64	57.81	74	-16.19	PK
4804	41.36	-3.64	37.72	54	-16.28	AV
7206	58.31	-0.95	57.36	74	-16.64	PK
7206	38.07	-0.95	37.12	54	-16.88	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	104.55	-5.84	98.71	114	-15.29	PK
2402	84.11	-5.84	78.27	94	-15.73	AV
4804	61.54	-3.64	57.9	74	-16.1	PK
4804	41.3	-3.64	37.66	54	-16.34	AV
7206	58.2	-0.95	57.25	74	-16.75	PK
7206	37.76	-0.95	36.81	54	-17.19	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH39 (2441MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.98	-5.71	99.27	114	-14.73	PK
2441	84.54	-5.71	78.83	94	-15.17	AV
4882	61.71	-3.51	58.2	74	-15.8	PK
4882	41.5	-3.51	37.99	54	-16.01	AV
7323	58.63	-0.82	57.81	74	-16.19	PK
7323	38.34	-0.82	37.52	54	-16.48	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2441	104.75	-5.71	99.04	114	-14.96	PK
2441	84.47	-5.71	78.76	94	-15.24	AV
4882	61.82	-3.51	58.31	74	-15.69	PK
4882	41.55	-3.51	38.04	54	-15.96	AV
7323	58.48	-0.82	57.66	74	-16.34	PK
7323	37.97	-0.82	37.15	54	-16.85	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

CH78 (2480MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	104.78	-5.65	99.13	114	-14.87	PK
2480	84.61	-5.65	78.96	94	-15.04	AV
4960	62.05	-3.43	58.62	74	-15.38	PK
4960	41.98	-3.43	38.55	54	-15.45	AV
7440	59.01	-0.75	58.26	74	-15.74	PK
7440	38.73	-0.75	37.98	54	-16.02	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	104.54	-5.63	98.91	114	-15.09	PK
2480	84.29	-5.65	78.64	94	-15.36	AV
4960	61.53	-3.43	58.1	74	-15.9	PK
4960	41.35	-3.43	37.92	54	-16.08	AV
7440	58.3	-0.75	57.55	74	-16.45	PK
7440	37.77	-0.75	37.02	54	-16.98	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Emission Level – Limit						

Remark:
1. Measuring frequencies from 1 GHz to the 25 GHz.
2. “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
3. * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
4. 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.
5. The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120kHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10kHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
6. When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
7. For fundamental frequency, RBW >20dB BW, VBW>=3XRBW, PK detector for PK value, AV detector for AV value.

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case 8DPSK was exhibited.

Test channel:	Lowest channel

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	58.72	-5.81	52.91	74	-21.09	PK
2310	/	-5.81	/	54	/	AV
2390	58.85	-5.84	53.01	74	-20.99	PK
2390	/	-5.84	/	54	/	AV
2400	58.76	-5.84	52.92	74	-21.08	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	58.55	-5.81	52.74	74	-21.26	PK
2310	/	-5.81	/	54	/	AV
2390	58.62	-5.84	52.78	74	-21.22	PK
2390	/	-5.84	/	54	/	AV
2400	58.79	-5.84	52.95	74	-21.05	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Test channel:	Highest channel

Horizontal:

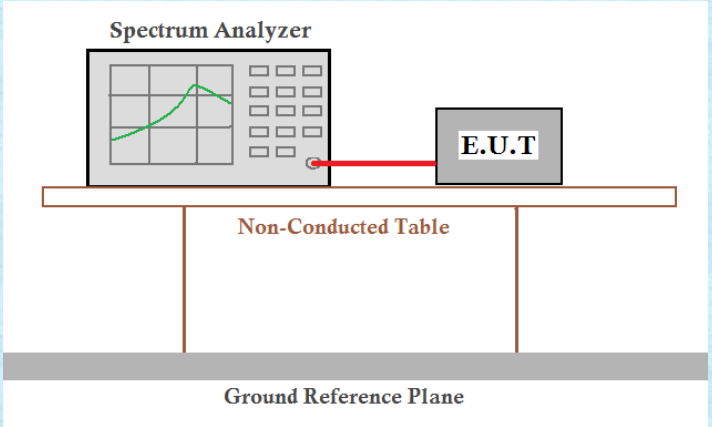
Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	57.69	-5.65	52.04	74	-21.96	PK
2483.5	/	-5.65	/	54	/	AV
2500	58.84	-5.72	53.12	74	-20.88	PK
2500	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	59.31	-5.65	53.66	74	-20.34	PK
2483.5	/	-5.65	/	54	/	AV
2500	58.8	-5.72	53.08	74	-20.92	PK
2500	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note:
1. Since the peak value is less than the average limit, the average value does not reflected in the report.

7.4 20dB Occupy Bandwidth

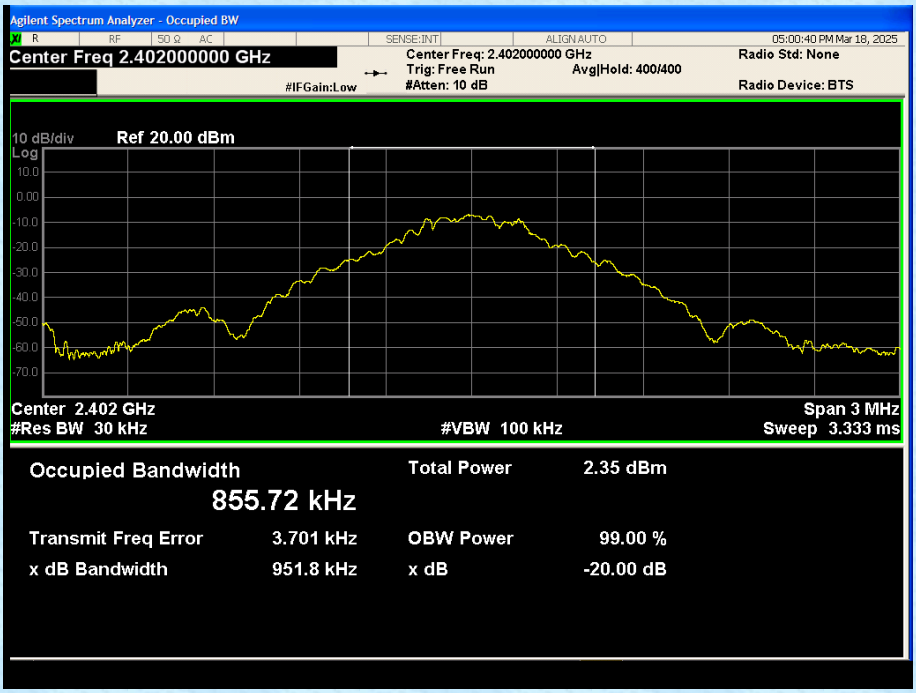
Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

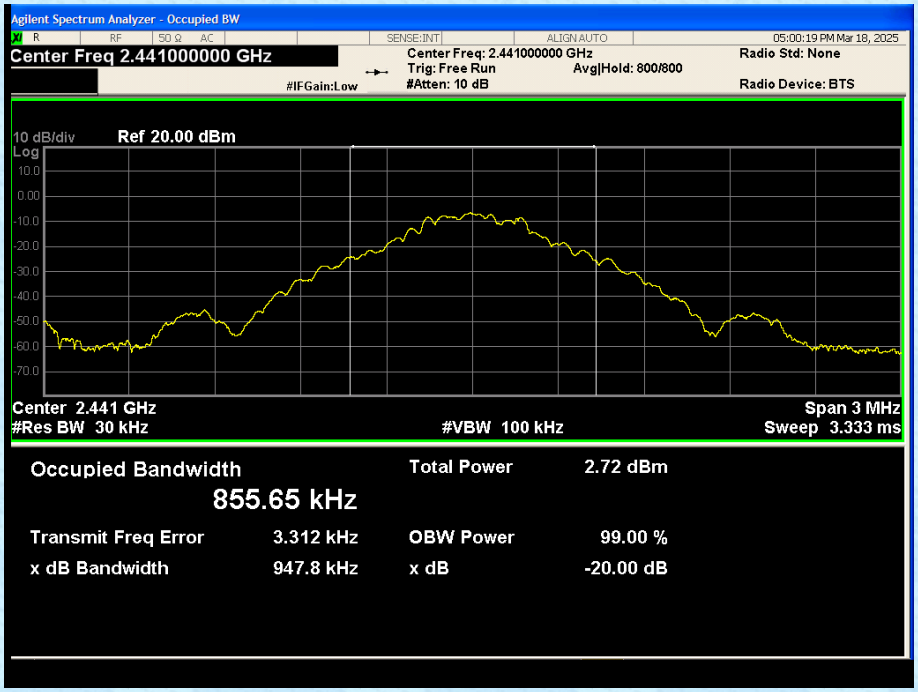
GFSK Modulation:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
CH00	2402	0.952	PASS
CH39	2441	0.948	PASS
CH78	2480	0.954	PASS

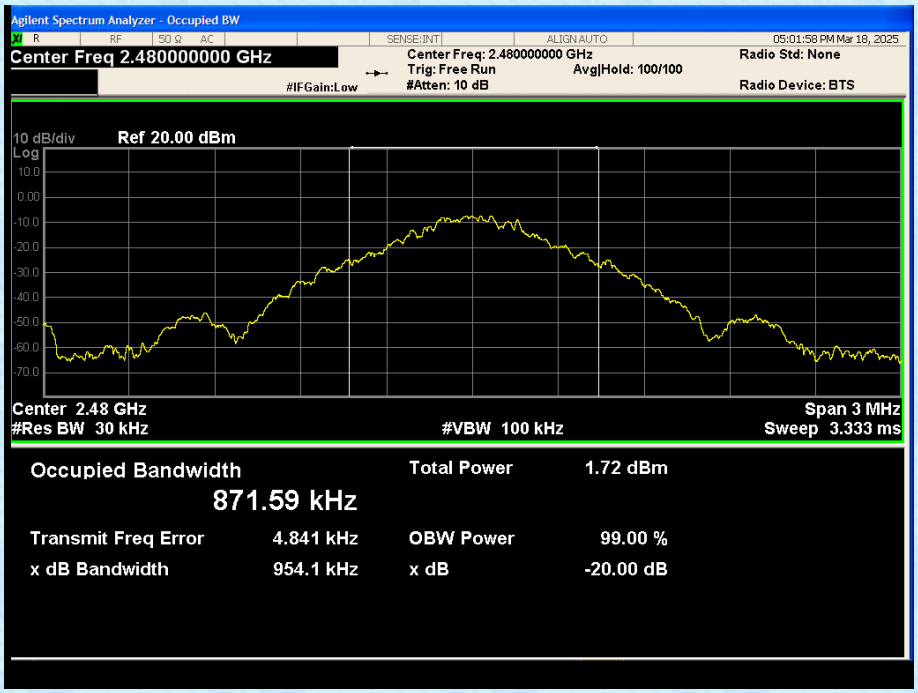
CH00: 2402MHz



CH39: 2441MHz



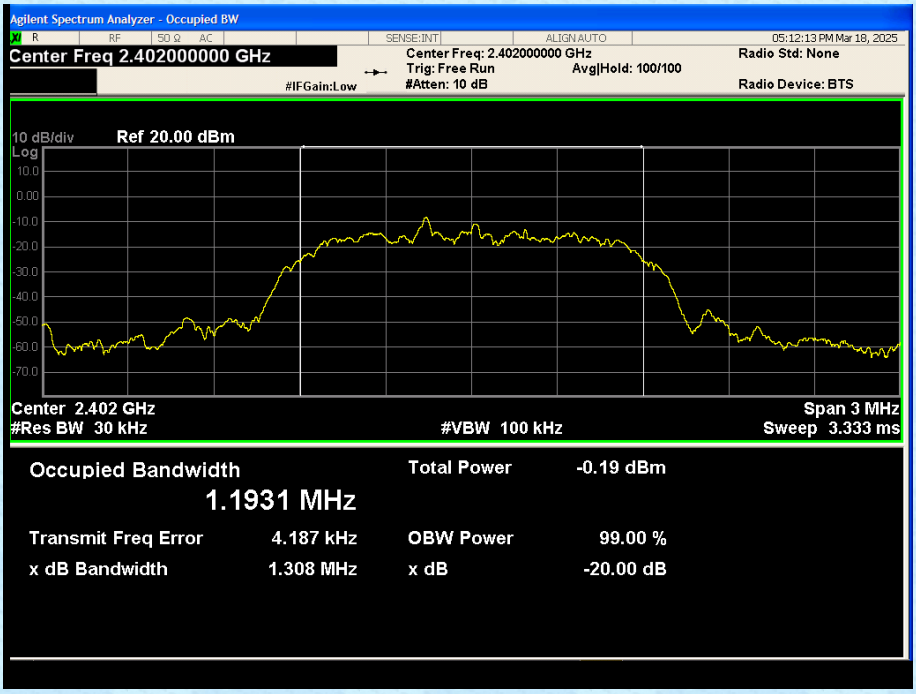
CH78: 2480MHz



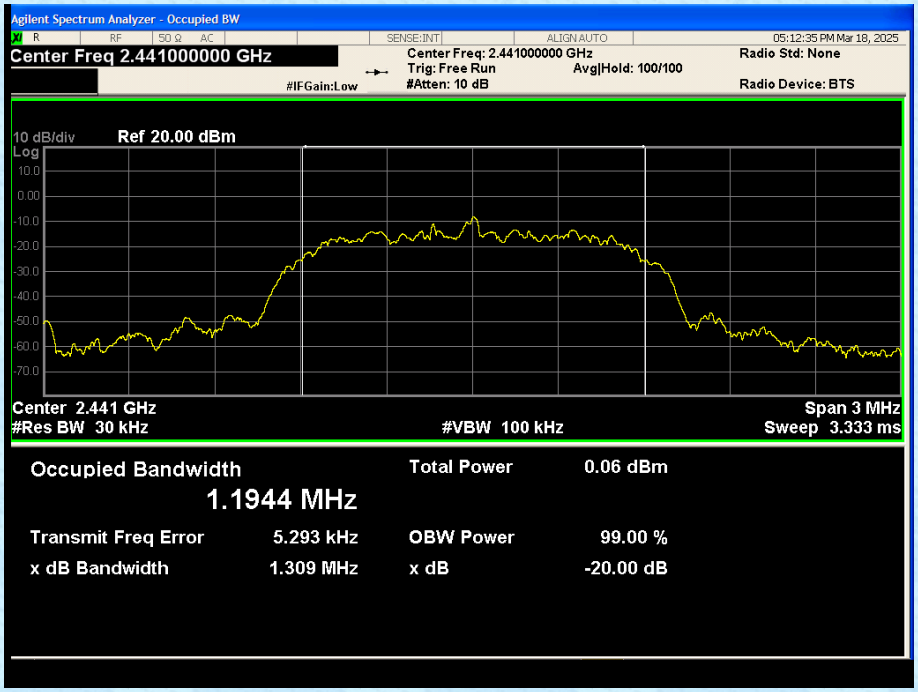
π/4 DQPSK Modulation:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
CH00	2402	1.308	PASS
CH39	2441	1.309	PASS
CH78	2480	1.279	PASS

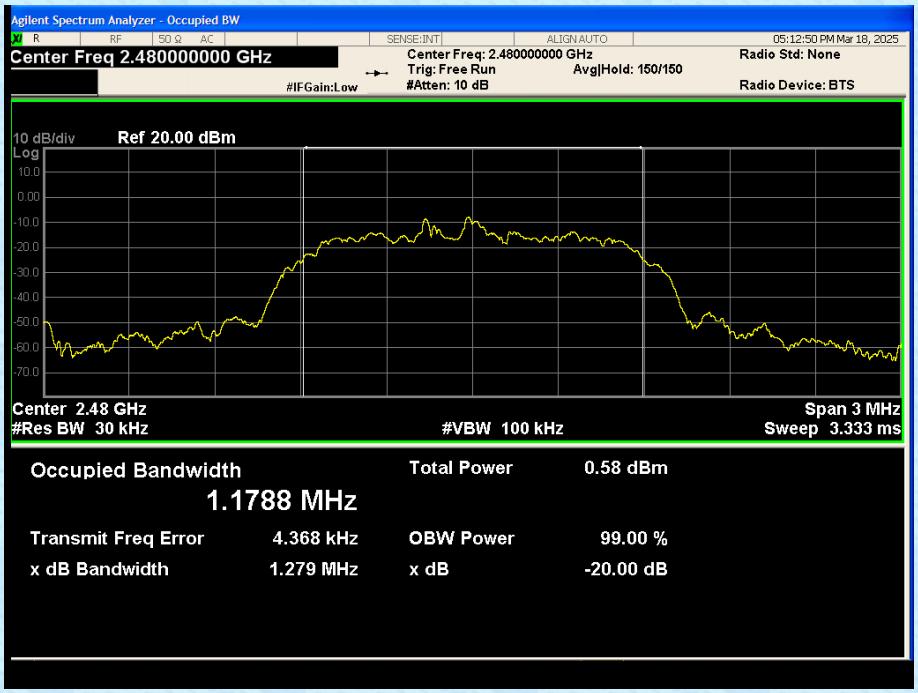
CH00: 2402MHz



CH39: 2441MHz



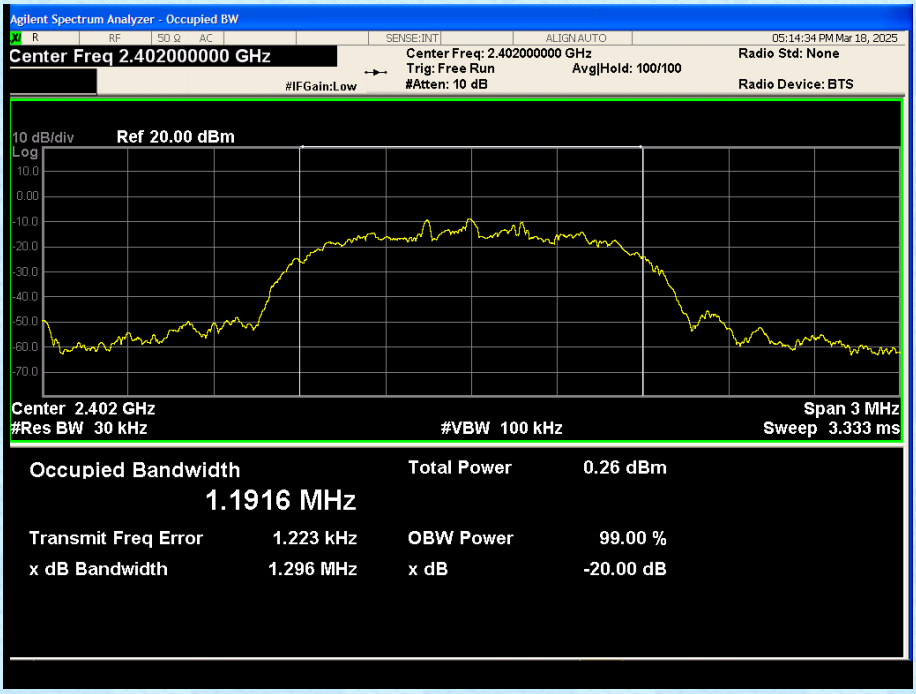
CH78: 2480MHz



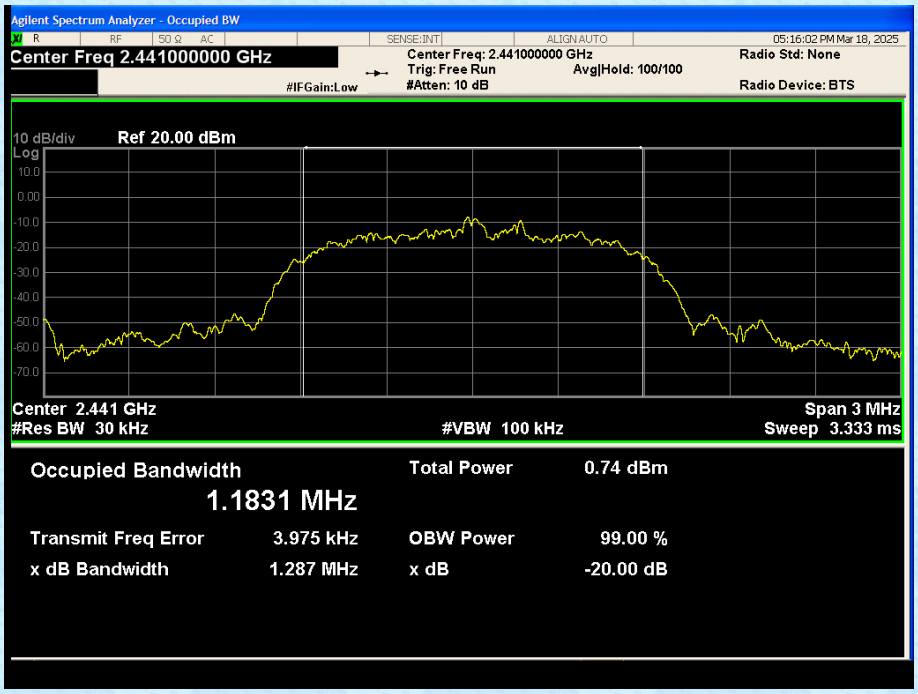
8DPSK Modulation:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
CH00	2402	1.296	PASS
CH39	2441	1.287	PASS
CH78	2480	1.295	PASS

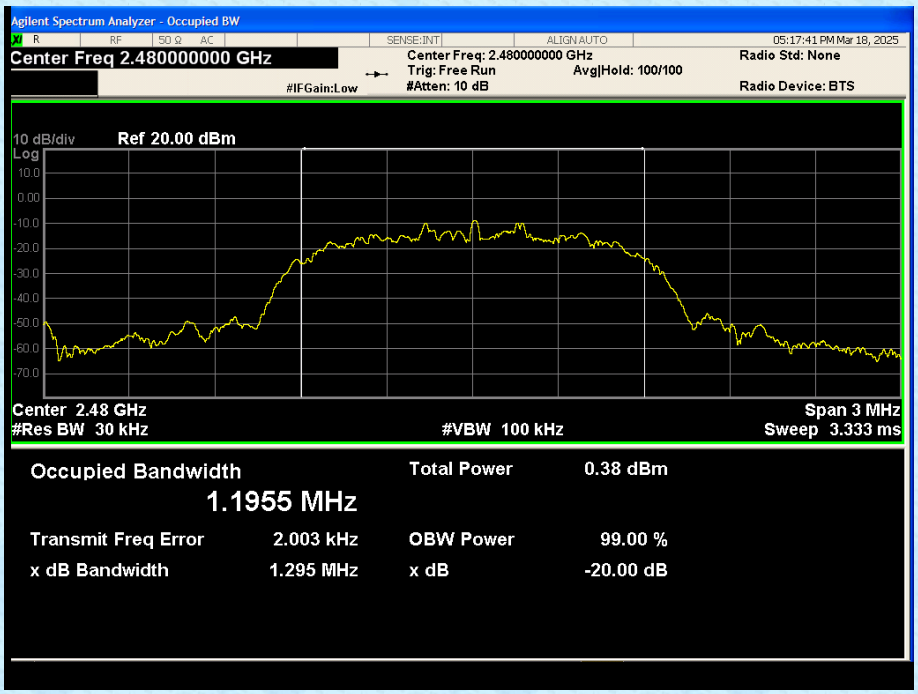
CH00: 2402MHz



CH39: 2441MHz



CH78: 2480MHz



8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------