Test Report No.:
FCC2023-0024-RF1/R1

RF Test Report

EUT	:	**Soundbar speaker**
MODEL	:	**TAB7568/37**
ADDITIONAL MODEL		**See section 2.1**
BRAND NAME	:	**PHILIPS**
APPLICANT	:	**MMD Hong Kong Holding Limited**
Classification Of Test	:	**N/A**

CVC Testing Technology Co., Ltd.

Client	**Name : MMD Hong Kong Holding Limited** **Address : Units 1208-11, 12th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong**
Manufacturer	**Name : MMD Hong Kong Holding Limited** **Address : Units 1208-11, 12th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong**
Equipment Under Test	**Name : Soundbar speaker** **Model/Type: TAB7568/37** **Additional Model: See section 2.1** **Brand : PHILIPS** **Serial NO.: N/A** **Sampe NO.:4-1**

Date of Receipt.	**2023.02.10**	Date of Testing	**2023.02.10～2023.03.15**

Test Specification	**Test Result**
FCC Part 15, Subpart C, Section 15.247	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC **Issue Date: 2023.06.06**

Tested by:	Reviewed by:	Approved by:
Xu ZhenFei	**Liu YongHai**	**Chen HuaWen**
Name Signature	Name Signature	Name Signature

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0024-RF1	Original release.	2023.05.08
FCC2023-0024-RF1/R1	Add test equipment information and auxiliary equipment information	2023.06.06

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
FCC STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(a)(1)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
	Occupied Bandwidth Measurement	Pass	Reference only
15.247(a)(1)	Hopping Channel Separation	PASS	Meet the requirement of limit.
15.247(a)(1)	Dell Time of Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	20dB EMISSION BANDWIDTH	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output Power	PASS	Meet the requirement of limit.
15.247(d), 15.209,15.205	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.203 14.247(b)	Antenna Requirement	PASS	No antenna connector is used.

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. interval	Cal. Due
Conducted emission					/	/
EMI Test Receiver	ESW44	103123	EM-000698	R&S	1 year	2023-06-17
EMI Test Receiver	ESR3	102394	VGDY-0705	R&S	1 year	2023-03-04
EMI Test Receiver	ESR3	102394	VGDY-0705	R&S	1 year	2024-02-22
LISN	NSLK 8127	8127644	VGDY-0150	SCHWARZBECK	1 year	2023-09-03
LISN	NSLK 8128	8128-316	VGDY-0149	SCHWARZBECK	1 year	2023-09-03
DC LISN	PVDC8301-017	PVDC8301#17	VGDY-0692	SCHWARZBECK	1 year	2023-10-07
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	1 year	2023-03-03
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	1 year	2024-02-22
Plus Limiter（#1）	VTSD 9561 F-N	00515	VGDY-0808	SCHWARZBECK	1 year	2023-03-03
Plus Limiter（#1）	VTSD 9561 F-N	00515	VGDY-0808	SCHWARZBECK	1 year	2024-03-03
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	1 year	2023-09-03
Impedance Stabilization Network	NTFM8158	8158-0092	VGDY-0356	SCHWARZBECK	1 year	2023-06-06
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	1 year	2023-06-06
Voltage Probe	TK9420	9420-499	VGDY-0128	SCHWARZBECK	1 year	2023-03-04
Voltage Probe	TK9420	9420-499	VGDY-0128	SCHWARZBECK	1 year	2024-02-22
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNER	1 year	2023-08-31
Video Signal Generator	GV-798+	151064920001	VGDS-0215	PROMAX	1 year	2023-05-29
AudioSignalGenerator	GAG-810	EK871591	EM-000309	GW	1 year	2023-12-06
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	3 year	2024-08-07
WIFI & Bluetooth Test System 1						/
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR44301	VGDS-0700	CRT	3 year	2024/04/24
Spectrum Analyzer	N9030A	MY53310374	EM-000395	Agilent	1 year	2023/06/05
Comprehensive Test Instrument	CMW270	100304	DZ-000240-1	R&S	1 year	2023/12/06
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	1 year	2023/06/05
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	1 year	2023/06/05
RF Radio Frequency Switch	JS0806-2	19H9080187	`	Tonscend	1 year	2023/06/06
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	1 year	2023/04/21
Radiation SpuriousTest System						/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	3 year	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	1 year	2023/03/02
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	1 year	2024/02/22
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	1 year	2023/03/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	1 year	2024/02/22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	1 year	2023/06/25
Loop Antenna	HLA 6121	540046	EM-000546	TESEQ	1 year	2023/03/04
Loop Antenna	HLA 6121	540046	EM-000546	TESEQ	1 year	2024/02/24
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	1 year	2023/07/31
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	1 year	2023/06/05
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	1 year	2023/06/05
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	1 year	2024/06/05
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	851770	DZ-000186	WI	1 year	2023/12/06
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	1 year	2023/12/06

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted Emissions	9kHz~30MHz	±2.66dB
2	Radiated Spurious Emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China
Post Code：510663 Tel：020-32293888
FAX：020-32293889 E-mail：office@cvc.org.cn

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

Product	Soundbar speaker
Model	TAB7568/37
Additional Model	TAB7568, TAB7568/12, TAB7568/98, TAB7568/yy(yy=00-99 or Nil ,for country code)
FCC ID	2AR2STAB7568
Status of EUT	Engineering Prototype
Power Supply Rating	Soundbar: AC 110~240V~, 50~60Hz, 43W Subwoofer: AC 110~240V~, 50~60Hz, 70W
Modulation Type	GFSK, π/4 DQPSK, 8DPSK for FHSS
Transfer Rate	1Mbps, 2Mbps, 3Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	79
Output Power（Peak）	4.499dBm
Antenna Type	PCB Antenna
Antenna Gain	1dBi
Antenna Connector	N/A
Accessory Device	AC Cable:1.5m*2, Remote Control*1, Battery AAA 1.5V*2, HDMI Cable 1.5m*1; RCA Cable 5.05m*2.

Note:

1. Please refer to the EUT photo document (Reference No.:FCC2023-0024-E) for detailed product photo.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
3. Model difference: All models are identical except model name and country destination for marketing purpose.

2.2 OTHER INFORMATION

Operation frequency each of channel.

Operation Frequency Each of Channel							
For BT (GFSK, π/4 DQPSK, 8 DPSK)							
CHANNEL	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**	**CHANNEL**	**FREQ. (MHz)**
0	**2402**	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	**78**	**2480**
19	2421	**39**	**2441**	59	2461		

1. By means of test software which provided by manufacture, the power levels during the tests were set according to the following codes:

GFSK		π/4-DQPSK		8DPSK	
CHANNEL	**POWER SETTING**	**CHANNEL**	**POWER SETTING**	**CHANNEL**	**POWER SETTING**
0	default	**0**	default	**0**	default
39	default	**39**	default	**39**	default
78	default	**78**	default	**78**	default

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

The worst case was found when positioned on xaxis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RSE<1G	RSE≥1G	PLC	APCM	
A	√	√	√	√	BT LINK

Where **RSE<1G:** Radiated Emission below 1GHz. **RSE≥1G:** Radiated Emission above 1GHz.
PLC: Power Line Conducted Emission. **APCM:** Antenna Port Conducted Measurement.

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0	FHSS	GFSK	DH5

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0, 39, 78	FHSS	GFSK	DH5
A	0, 39, 78	FHSS	8DPSK	3DH5

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
-	BT Link

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0, 39, 78	FHSS	GFSK	DH5
A	0, 39, 78	FHSS	8DPSK	3DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RSE<1G	25deg. C, 55%RH	AC 120V	Liu shiwei
RSE≥1G	25deg. C, 55%RH	AC 120V	Liu shiwei
PLC	25deg. C, 55%RH	AC 120V	Liu shiwei
APCM	25deg. C, 60%RH	AC 120V	Liu shiwei

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment					
NO	Description	Brand	Model No.	Serial Number	Supplied by
1	DTV Signal Generator	XinQY	DSG-T1000B	/	Lab
2	Notebook	DELL	Latitude 5300	/	Lab
3	Mobile Phone	SAMSUNG	SCH-I699	801A2A38	Lab

Support Cable							
NO	Description	Quantity (Number)	Length (m)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	USB serial cable	N/A	1.2	Yes	No	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
NOTE: 1. The lower limit shall apply at the transition frequencies. NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

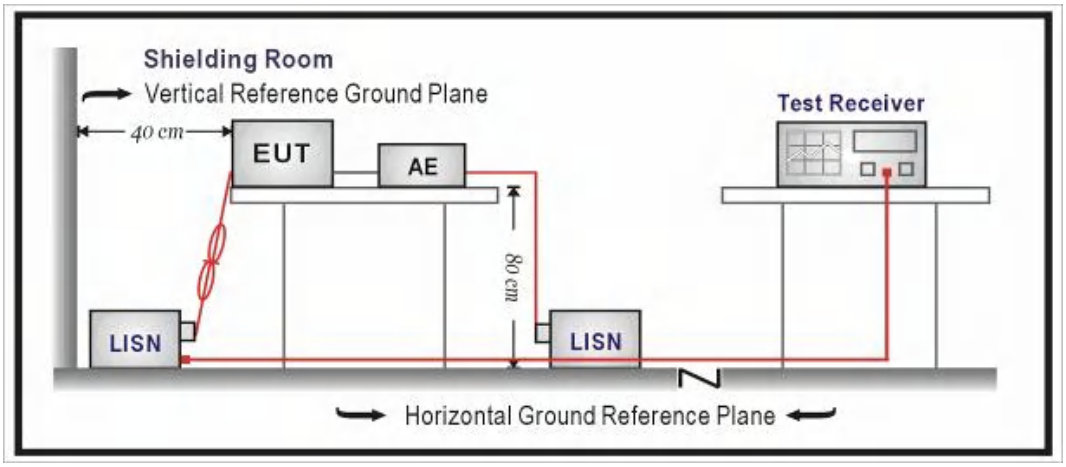
3.1.2 Measurement procedure

a. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.The equipment under test shall be placed on a support of non-metallic material, the height of which shall be1.5m above the ground,

b. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

c. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

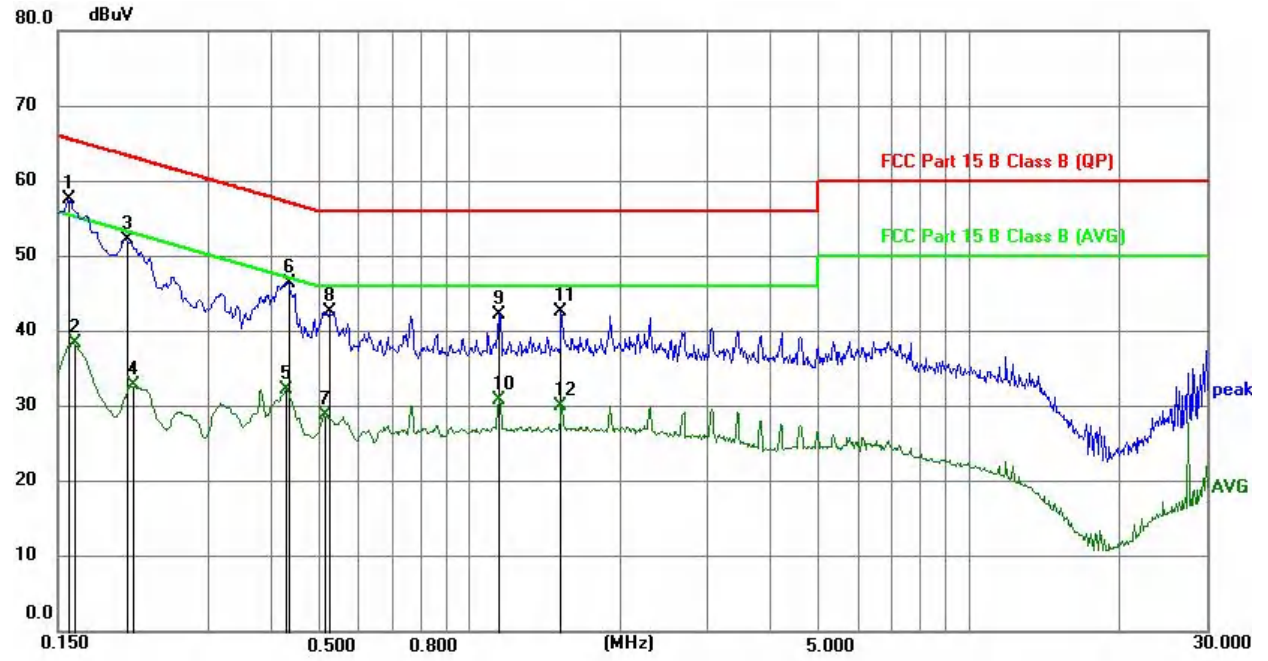
3.1.3 Test setup



3.1.4 Test results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase of Power: Line (L)



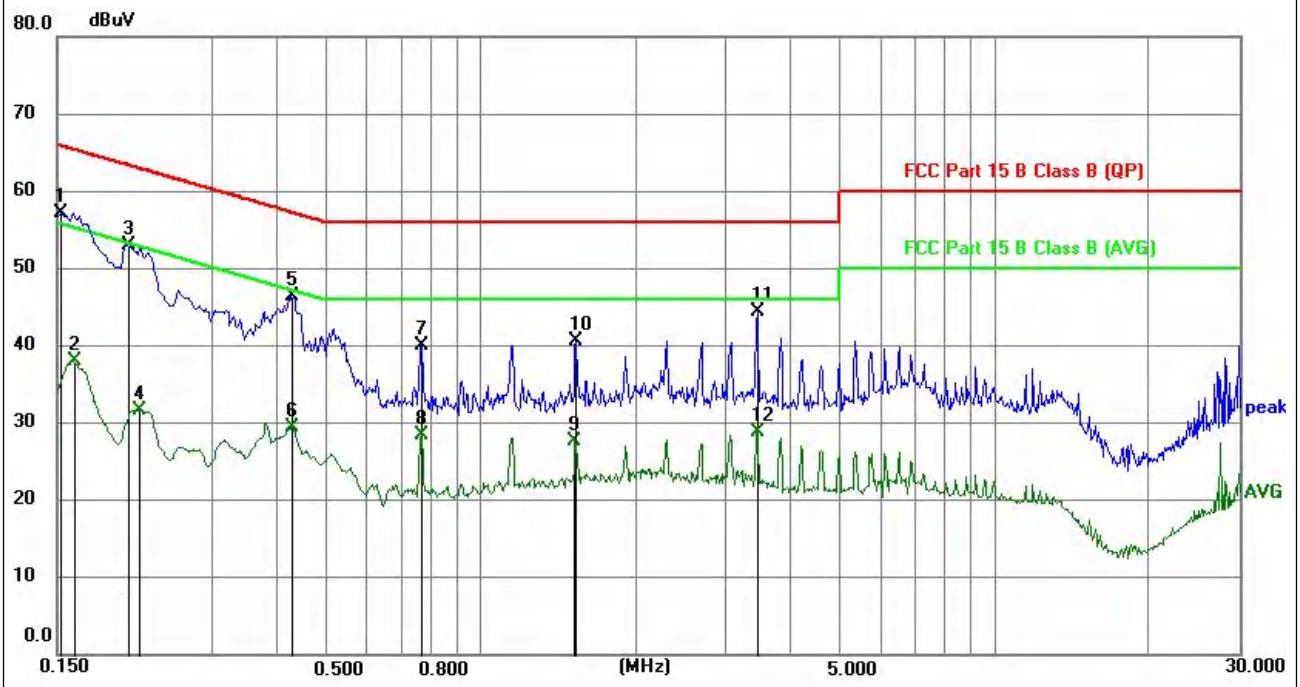
No	Frequency	Reading	Correction Factor	Emission Level	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	Detector
1	0.1568	47.38	10.17	57.55	65.63	-8.08	1
2	0.1613	28.27	10.17	38.44	55.40	-16.96	2
3	0.2040	42.03	10.14	52.17	63.45	-11.28	3
4	0.2108	22.57	10.15	32.72	53.17	-20.45	4
5	0.4312	22.12	10.10	32.22	47.23	-15.01	5
6	0.4357	36.31	10.10	46.41	57.14	-10.73	6
7	0.5144	18.66	10.10	28.76	46.00	-17.24	7
8	0.5257	32.55	10.10	42.65	56.00	-13.35	8
9	1.1512	32.08	10.05	42.13	56.00	-13.87	9
10	1.1512	20.68	10.05	30.73	46.00	-15.27	10
11	1.5337	32.56	10.07	42.63	56.00	-13.37	11
12	1.5337	19.98	10.07	30.05	46.00	-15.95	12

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase of Power: Neutral (N)



No.	Frequency	Reading	Correction Factor	Emission Level	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	Detector
1	0.1522	47.02	10.18	57.20	65.88	-8.68	peak
2	0.1613	27.85	10.17	38.02	55.40	-17.38	AVG
3	0.2040	42.90	10.14	53.04	63.45	-10.41	peak
4	0.2153	21.48	10.15	31.63	53.00	-21.37	AVG
5	0.4290	36.35	10.09	46.44	57.27	-10.83	peak
6	0.4312	19.31	10.09	29.40	47.23	-17.83	AVG
7	0.7687	29.88	10.09	39.97	56.00	-16.03	peak
8	0.7687	18.31	10.09	28.40	46.00	-17.60	AVG
9	1.5337	17.58	10.08	27.66	46.00	-18.34	AVG
10	1.5360	30.46	10.08	40.54	56.00	-15.46	peak
11	3.4552	34.28	10.10	44.38	56.00	-11.62	peak
12	3.4552	18.80	10.10	28.90	46.00	-17.10	AVG

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

3.2 RADIATED EMISSIONS

3.2.1 Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/Meter)	MEASUREMENT DISTANCE (Meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Measurement procedure

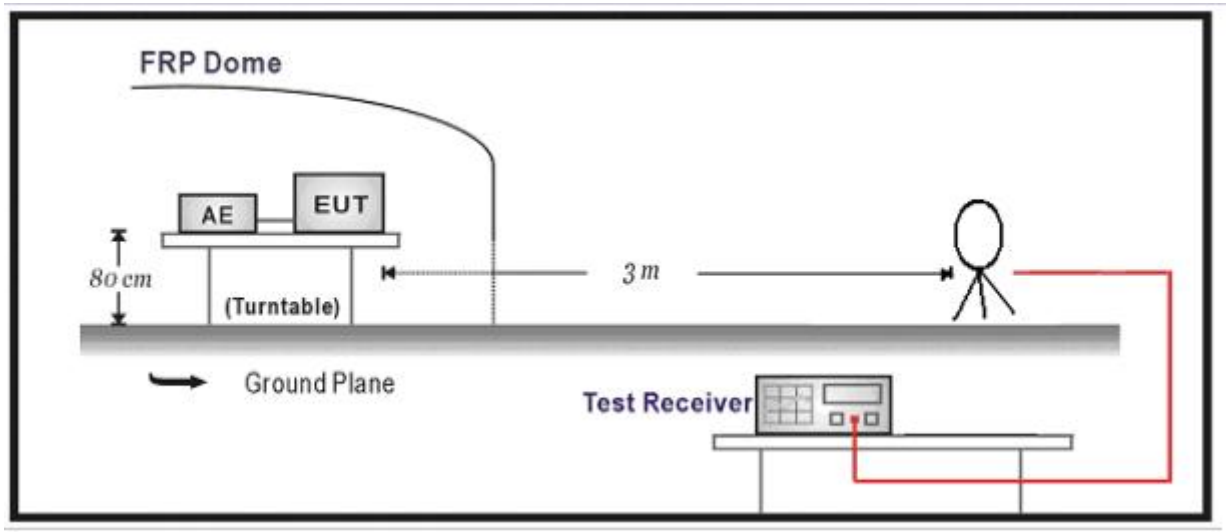
a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its 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 and the rotatable 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. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

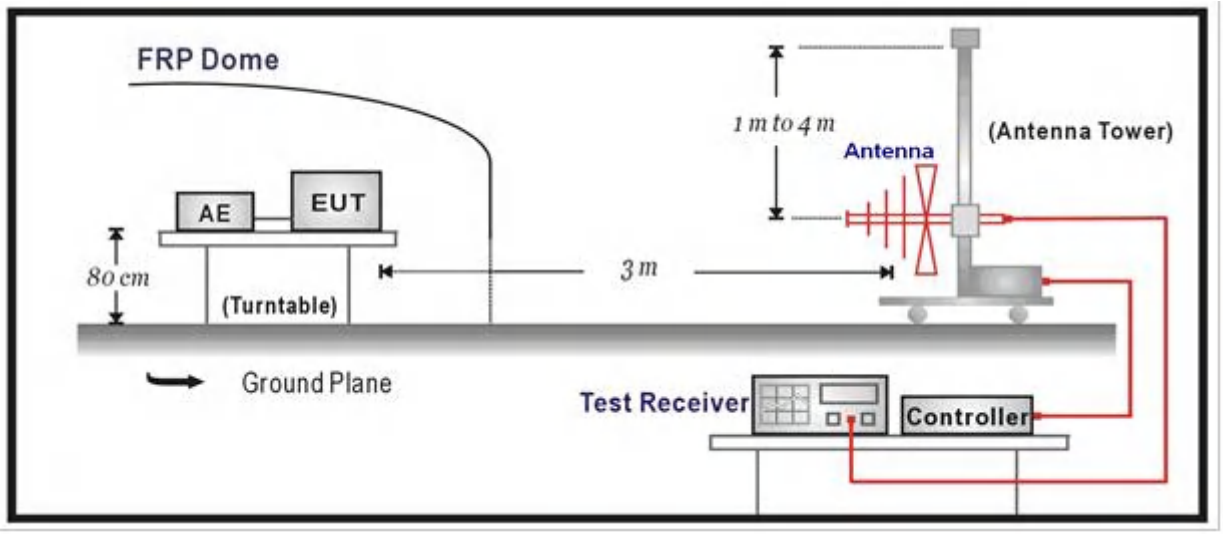
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

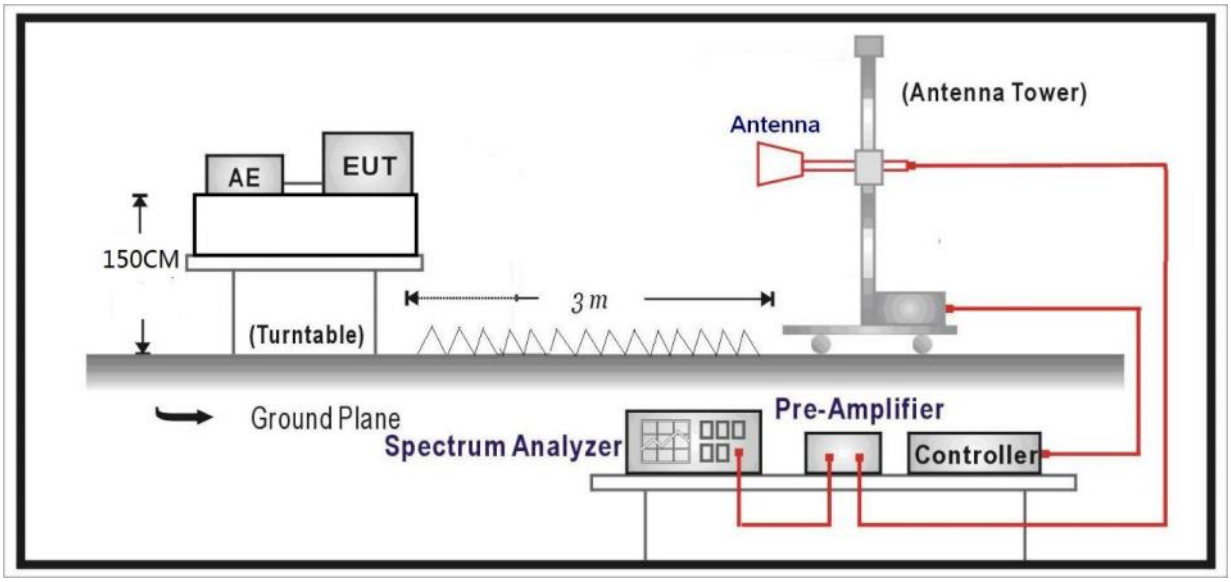
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



3.2.4 Test results

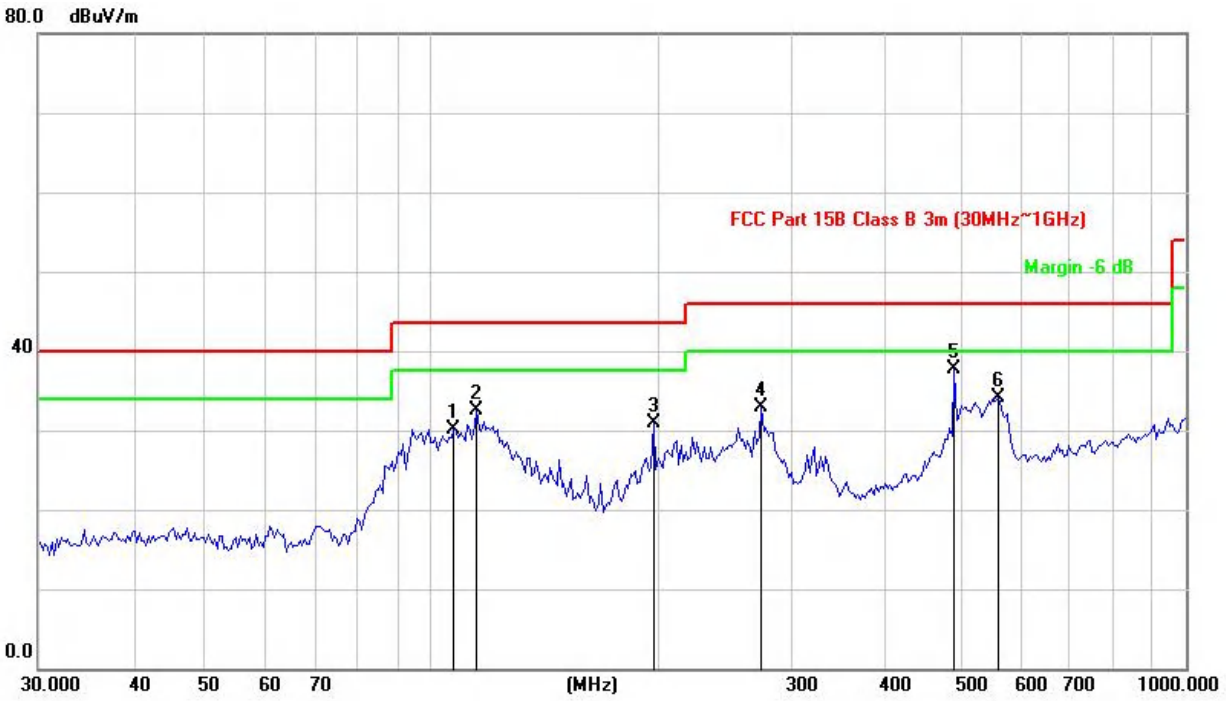
9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1GHz Worst-Case Data:

Frequency Range	30MHz ~ 1GHz	Detector Function	Peak (PK) Quasi-peak (QP)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Horizontal at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	106.7587	47.53	-17.37	30.16	43.50	-13.34	peak	215	326
2	114.5146	49.09	-16.62	32.47	43.50	-11.03	peak	220	117
3	196.5098	47.78	-16.95	30.83	43.50	-12.67	peak	176	201
4	273.2341	46.87	-13.87	33.00	46.00	-13.00	peak	200	103
5 *	492.4685	44.59	-6.88	37.71	46.00	-8.29	peak	210	132
6	562.6624	39.66	-5.64	34.02	46.00	-11.98	peak	150	192

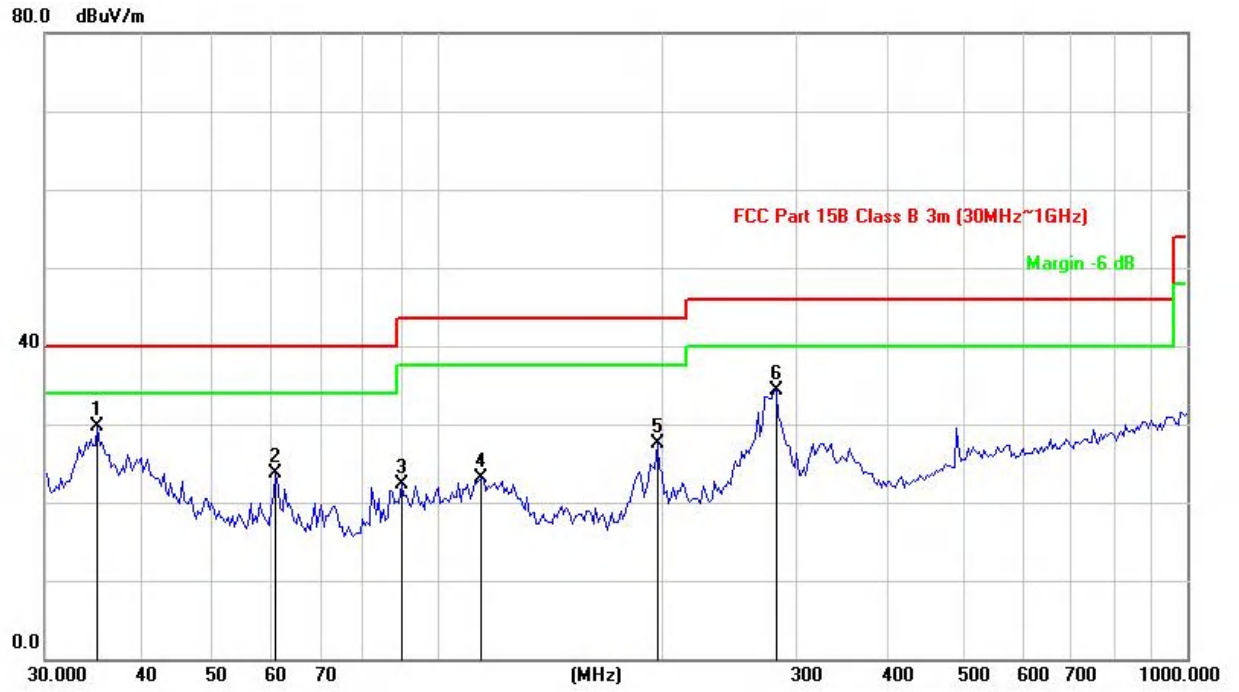
Remarks:

1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)

2.Margin value = Emission level – Limit value

Frequency Range	30MHz ~ 1GHz	Detector Function	Peak (PK) Quasi-peak (QP)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1 *	35.2512	45.18	-15.49	29.69	40.00	-10.31	peak	102	215
2	60.9176	39.96	-16.25	23.71	40.00	-16.29	peak	117	136
3	89.5899	41.70	-19.40	22.30	43.50	-21.20	peak	135	236
4	114.5146	39.78	-16.62	23.16	43.50	-20.34	peak	120	332
5	196.5098	44.45	-16.95	27.50	43.50	-16.00	peak	119	218
6	282.9852	47.77	-13.49	34.28	46.00	-11.72	peak	100	142

Remarks:

1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)

2. Margin value = Emission level – Limit value

Above 1GHz Data:

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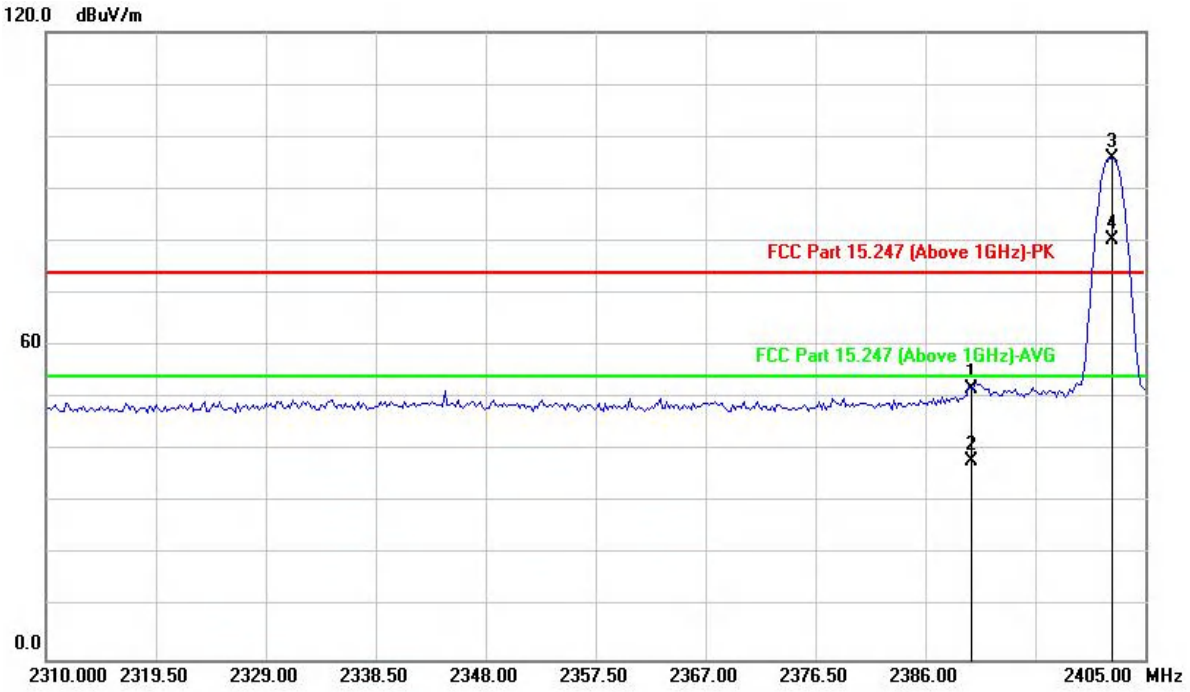
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Horizontal at 3 m



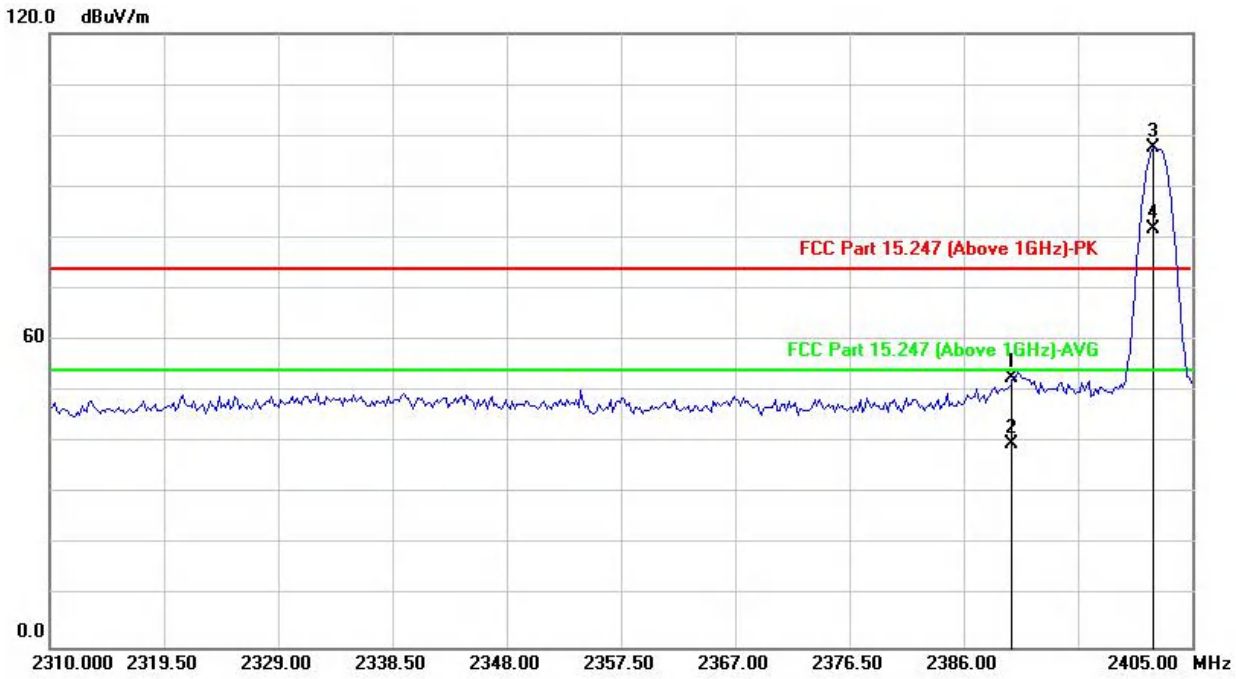
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2390.000	50.94	0.76	51.70	74.00	-22.30	peak	100	147
2	2390.000	37.15	0.76	37.91	54.00	-16.09	AVG	100	147
3 #	2402.144	95.09	0.74	95.83			peak	100	147
4 #	2402.144	79.52	0.74	80.26			AVG	100	147
5	4804.000	43.06	7.27	50.33	74.00	-23.67	peak	100	155
6	4804.000	32.83	7.27	40.10	54.00	-13.90	AVG	100	155
7	7206.000	43.03	10.75	53.78	74.00	-20.22	peak	100	131
8	7206.000	32.03	10.75	42.78	54.00	-11.22	AVG	100	131

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2402MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2390.000	51.98	0.76	52.74	74.00	-21.26	peak	100	136
2	2390.000	39.04	0.76	39.80	54.00	-14.20	AVG	100	136
3 #	2401.764	96.79	0.75	97.54			peak	100	136
4 #	2401.764	81.05	0.75	81.80			AVG	100	136
5	4804.000	45.54	7.27	52.81	74.00	-21.19	peak	100	145
6	4804.000	33.59	7.27	40.86	54.00	-13.14	AVG	100	145
7	7206.000	42.22	10.75	52.97	74.00	-21.03	peak	100	164
8	7206.000	31.29	10.75	42.04	54.00	-11.96	AVG	100	164

Remarks:

1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
Margin value = Emission level – Limit value

2.#2402MHz: Fundamental frequency.

3.The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 39		

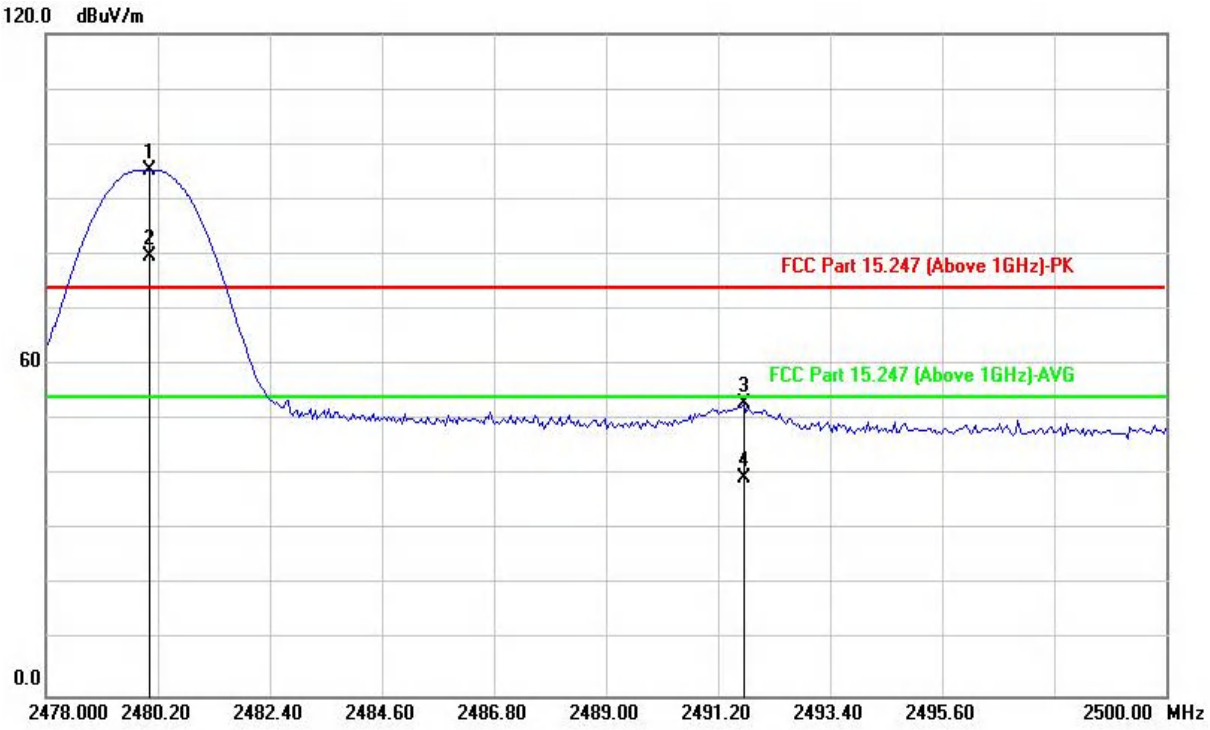
Antenna Polarity & Test Distance: Horizontal at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1 #	2440.000	94.51	0.69	95.20			peak	300	166
2 #	2440.000	78.56	0.69	79.25			AVG	300	166
3	4880.000	43.66	7.60	51.26	74.00	-22.74	peak	100	125
4	4880.000	33.76	7.60	41.36	54.00	-12.64	AVG	100	125
5	7320.000	41.20	10.92	52.12	74.00	-21.88	peak	100	165
6	7320.000	29.73	10.92	40.65	54.00	-13.35	AVG	100	165
Antenna Polarity & Test Distance: Vertical at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1 #	2440.000	95.53	0.69	96.22			peak	100	232
2 #	2440.000	79.63	0.69	80.32			AVG	100	232
3	4880.000	44.85	7.60	52.45	74.00	-21.55	peak	150	165
4	4880.000	32.96	7.60	40.56	54.00	-13.44	AVG	150	165
5	7320.000	41.40	10.92	52.32	74.00	-21.68	peak	100	210
6	7320.000	30.34	10.92	41.26	54.00	-12.74	AVG	100	210

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2441MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 78		

Antenna Polarity & Test Distance: Horizontal at 3 m



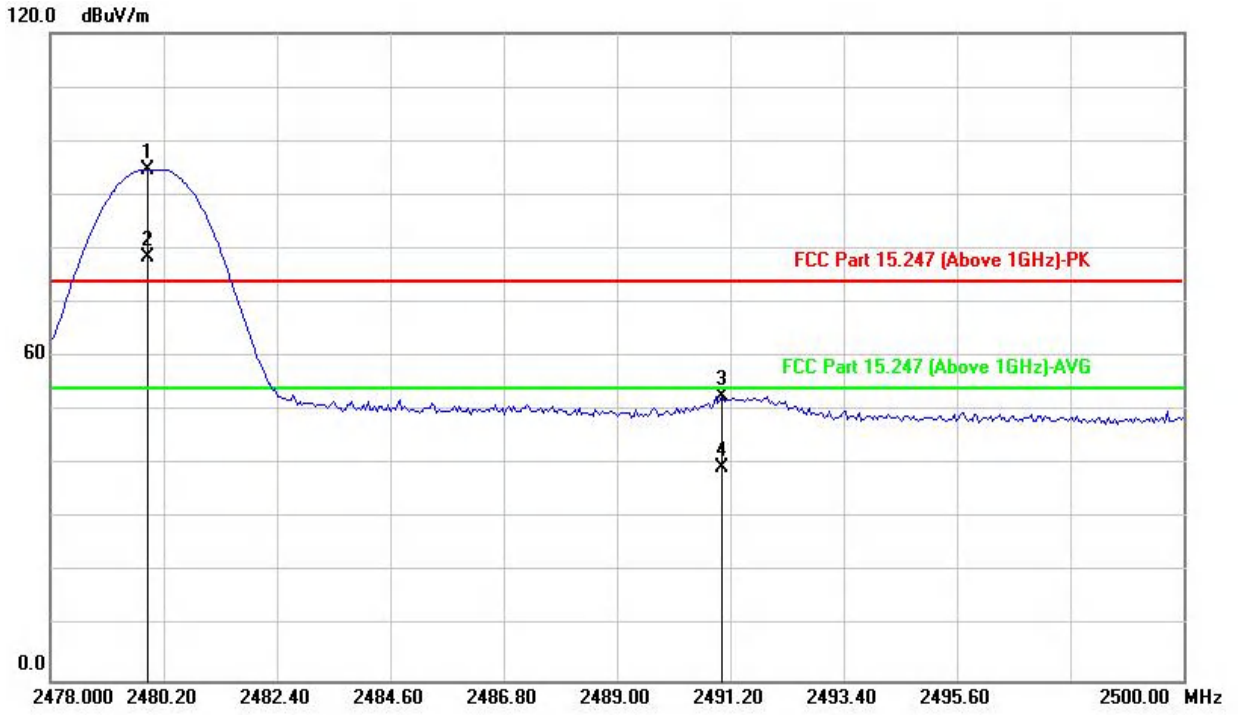
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2480.028	94.75	0.64	95.39			peak	100	135
2#	2480.028	79.03	0.64	79.67			AVG	100	135
3	2491.711	52.37	0.62	52.99	74.00	-21.01	peak	100	135
4	2491.711	38.97	0.62	39.59	54.00	-14.41	AVG	100	135
5	4960.000	45.02	7.94	52.96	74.00	-21.04	peak	100	144
6	4960.000	33.38	7.94	41.32	54.00	-12.68	AVG	100	144
7	7440.000	41.04	11.09	52.13	74.00	-21.87	peak	100	155
8	7440.000	29.54	11.09	40.63	54.00	-13.37	AVG	100	155

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2480MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 78		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2479.896	94.09	0.64	94.73			peak	100	55
2#	2479.896	77.81	0.64	78.45			AVG	100	55
3	2491.050	52.12	0.62	52.74	74.00	-21.26	peak	100	55
4	2491.050	38.95	0.62	39.57	54.00	-14.43	AVG	100	55
5	4960.000	45.11	7.94	53.05	74.00	-20.95	peak	100	153
6	4960.000	33.04	7.94	40.98	54.00	-13.02	AVG	100	153
7	7440.000	40.26	11.09	51.35	74.00	-22.65	peak	100	125
8	7440.000	29.24	11.09	40.33	54.00	-13.67	AVG	100	125

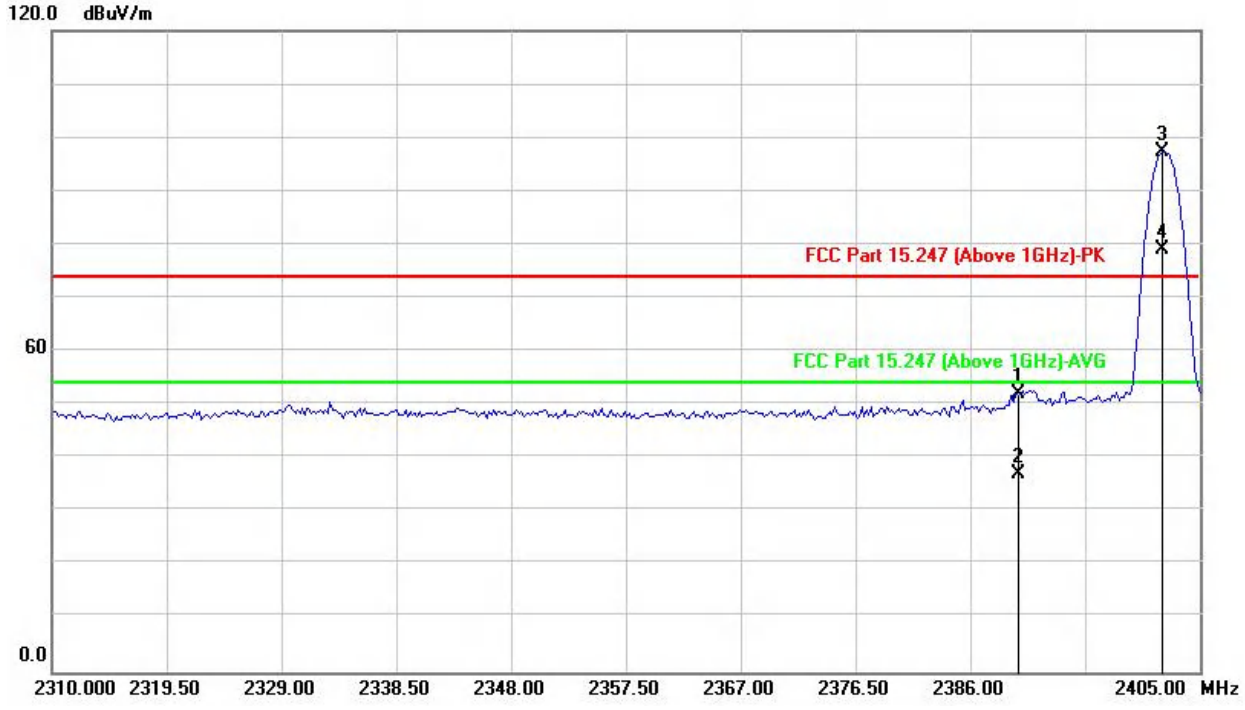
Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2480MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

8DPSK

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Horizontal at 3 m



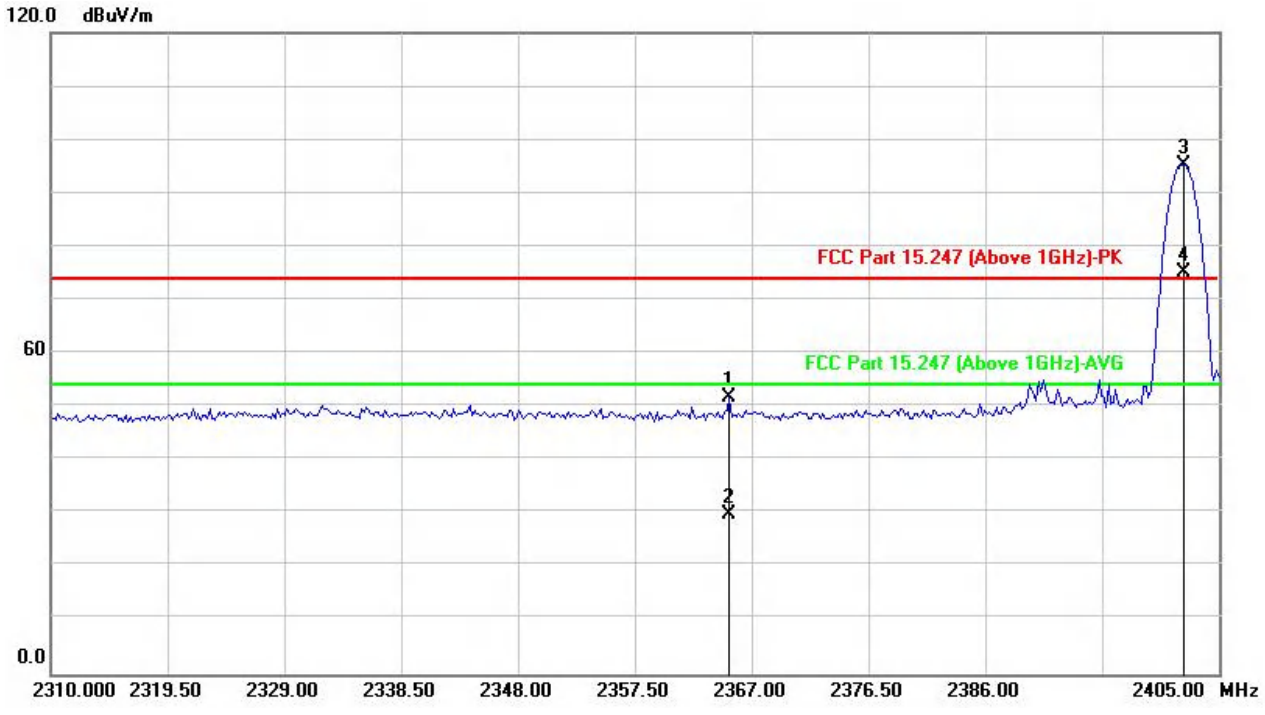
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2390.000	51.35	0.76	52.11	74.00	-21.89	peak	155	115
2	2390.000	36.35	0.76	37.11	54.00	-16.89	AVG	155	115
3#	2401.954	96.59	0.75	97.34			peak	155	115
4#	2401.954	78.36	0.75	79.11			AVG	155	115
5	4804.000	43.09	7.27	50.36	74.00	-23.64	peak	100	136
6	4804.000	33.58	7.27	40.85	54.00	-13.15	AVG	100	136
7	7206.000	42.75	10.75	53.50	74.00	-20.50	peak	120	163
8	7206.000	32.45	10.75	43.20	54.00	-10.80	AVG	120	163

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2402MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2365.210	50.87	0.80	51.67	74.00	-22.33	peak	100	125
2	2365.210	28.93	0.80	29.73	54.00	-24.27	AVG	100	125
3#	2402.144	94.52	0.74	95.26			peak	100	125
4#	2402.144	74.40	0.74	75.14			AVG	100	125
5	4804.000	44.38	7.27	51.65	74.00	-22.35	peak	100	152
6	4804.000	34.05	7.27	41.32	54.00	-12.68	AVG	100	152
7	7206.000	39.48	10.75	50.23	74.00	-23.77	peak	100	145
8	7206.000	30.30	10.75	41.05	54.00	-12.95	AVG	100	145

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2402MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 39		

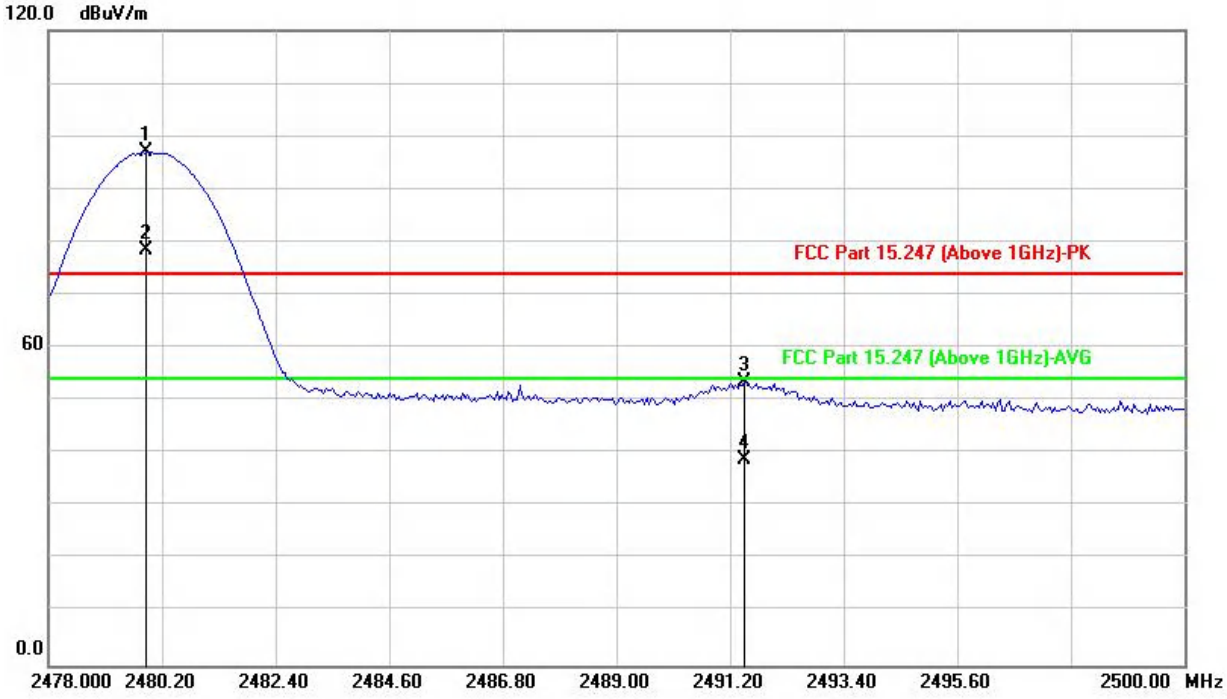
Antenna Polarity & Test Distance: Horizontal at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecte r	Antenna Height (cm)	Table Angle (Degree)
1#	2440.000	96.41	0.69	97.10			peak	150	210
2#	2440.000	78.27	0.69	78.96			AVG	150	210
3	4880.000	43.85	7.60	51.45	74.00	-22.55	peak	120	165
4	4880.000	32.96	7.60	40.56	54.00	-13.44	AVG	120	165
5	7320.000	41.21	10.92	52.13	74.00	-21.87	peak	100	135
6	7320.000	31.14	10.92	42.06	54.00	-11.94	AVG	100	135
Antenna Polarity & Test Distance: Vertical at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2440.000	94.19	0.69	94.88			peak	100	166
2#	2440.000	74.61	0.69	75.30			AVG	100	166
3	4880.000	43.66	7.60	51.26	74.00	-22.74	peak	100	230
4	4880.000	33.05	7.60	40.65	54.00	-13.35	AVG	100	230
5	7320.000	40.19	10.92	51.11	74.00	-22.89	peak	100	156
6	7320.000	30.04	10.92	40.96	54.00	-13.04	AVG	100	156

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2441MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 78		

Antenna Polarity & Test Distance: Horizontal at 3 m



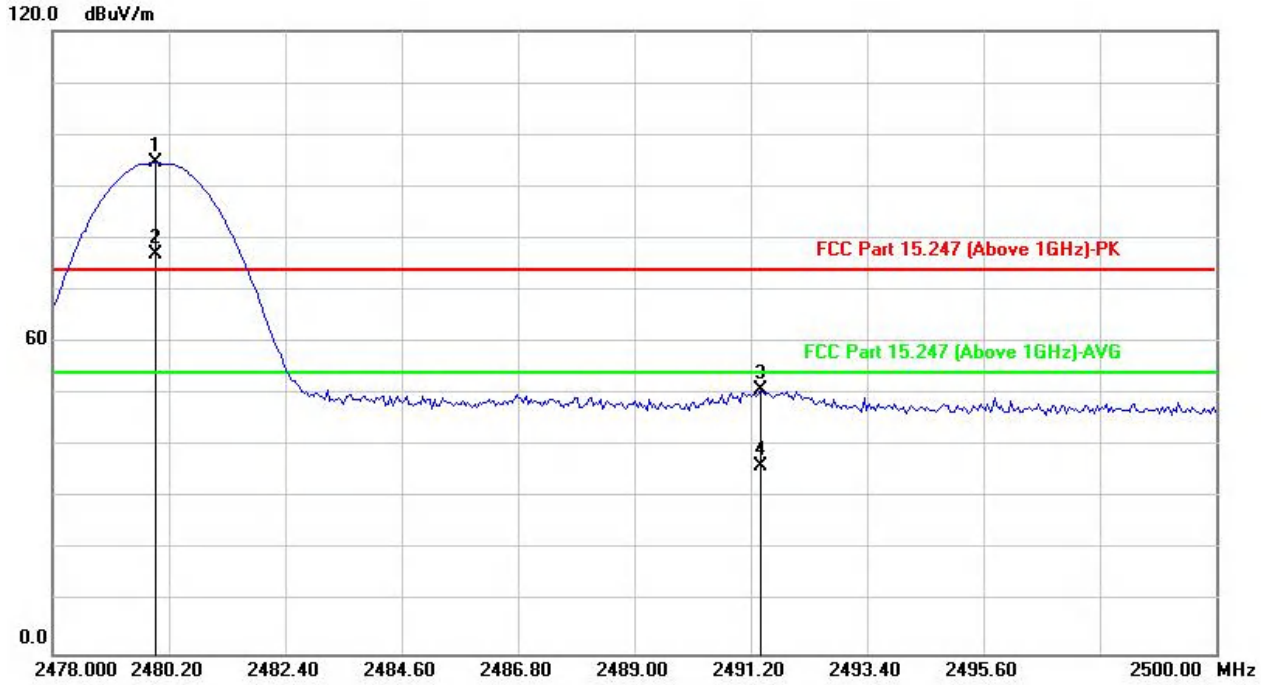
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2479.896	96.45	0.64	97.09			peak	202	128
2#	2479.896	77.93	0.64	78.57			AVG	202	128
3	2491.491	53.05	0.62	53.67	74.00	-20.33	peak	202	128
4	2491.491	38.30	0.62	38.92	54.00	-15.08	AVG	202	128
5	4960.000	44.39	7.94	52.33	74.00	-21.67	peak	100	136
6	4960.000	33.01	7.94	40.95	54.00	-13.05	AVG	100	136
7	7440.000	40.27	11.09	51.36	74.00	-22.64	peak	100	152
8	7440.000	30.11	11.09	41.20	54.00	-12.80	AVG	100	152

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2480MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 78		

Antenna Polarity & Test Distance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2479.940	94.01	0.64	94.65			peak	108	135
2#	2479.940	76.17	0.64	76.81			AVG	108	135
3	2491.403	50.16	0.62	50.78	74.00	-23.22	peak	108	135
4	2491.403	35.68	0.62	36.30	54.00	-17.70	AVG	108	135
5	4960.000	44.01	7.94	51.95	74.00	-22.05	peak	100	152
6	4960.000	32.62	7.94	40.56	54.00	-13.44	AVG	100	152
7	7440.000	39.60	11.09	50.69	74.00	-23.31	peak	100	165
8	7440.000	29.16	11.09	40.25	54.00	-13.75	AVG	100	165

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. #2480MHz: Fundamental frequency.
3. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

3.3 NUMBER OF HOPPING FREQUENCY USED

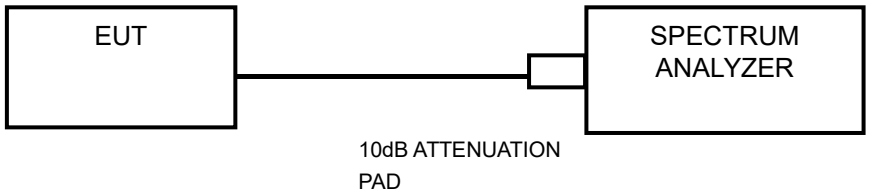
3.3.1 Limits

At least 15 channels frequencies, and should be equally spaced.

3.3.2 Measurement procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were completed.

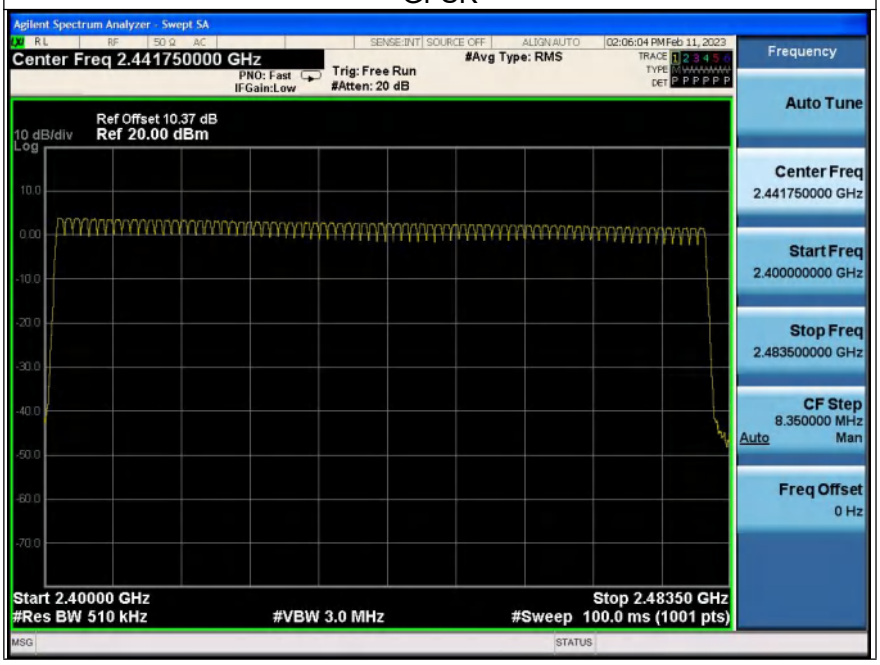
3.3.3 Test setup



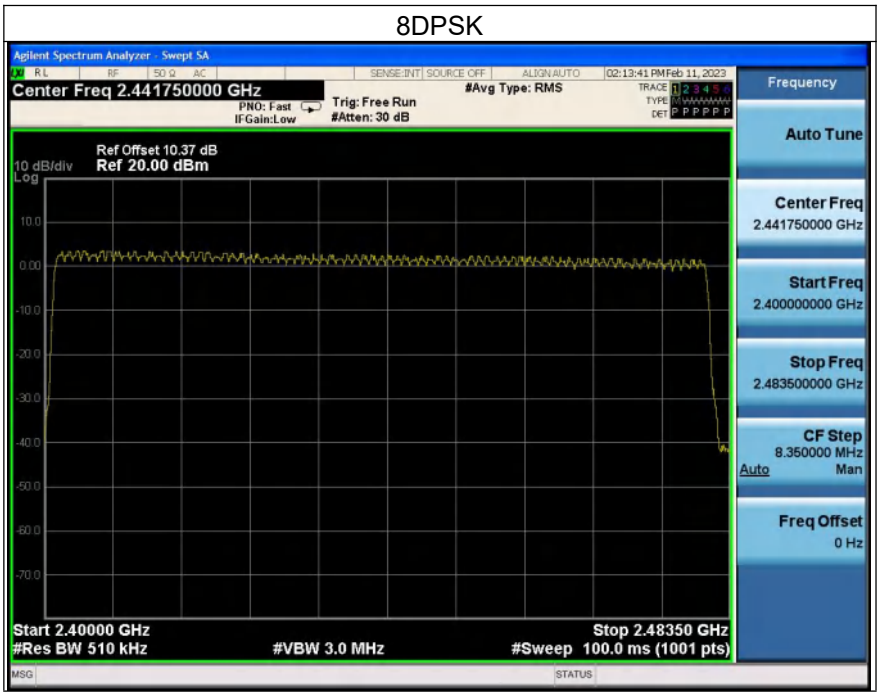
3.3.4 Test result

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

GFSK



8DPSK



3.4 DWELL TIME ON EACH CHANNEL

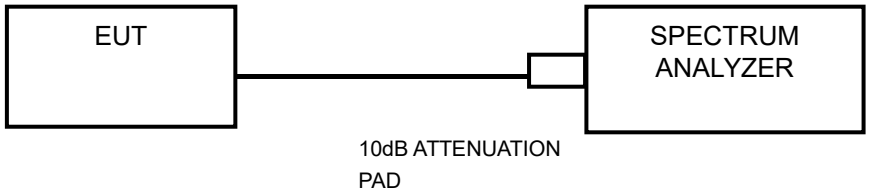
3.4.1 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.4.2 Measurement procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

3.4.3 Test setup



3.4.4 Test result

GFSK

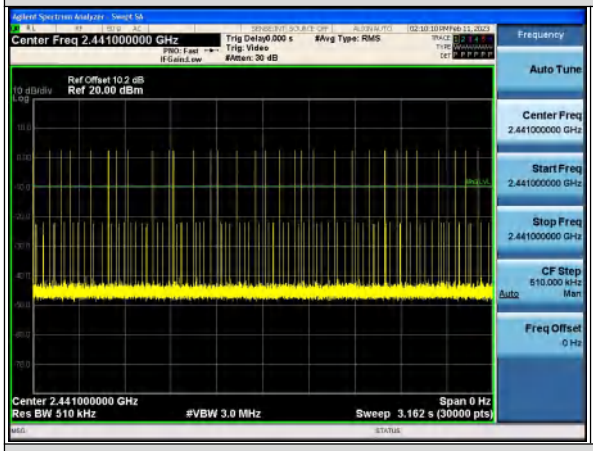
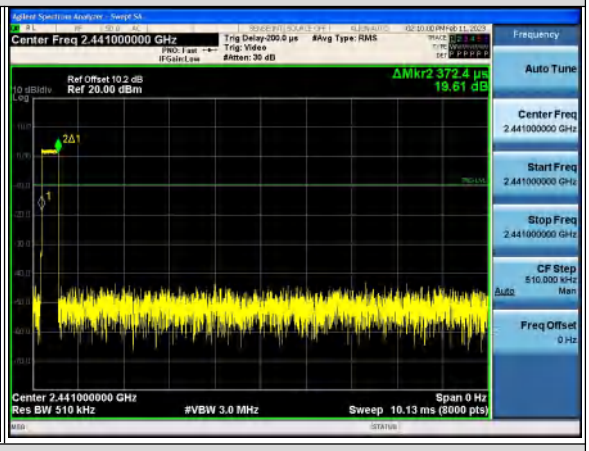
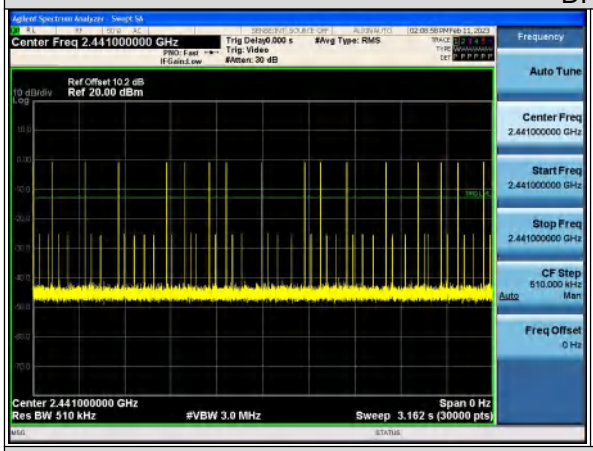
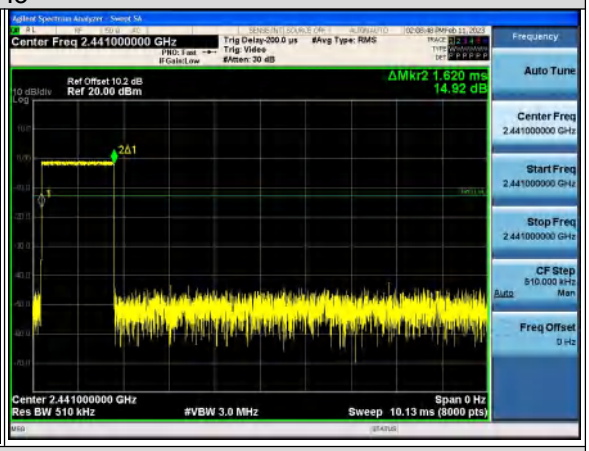
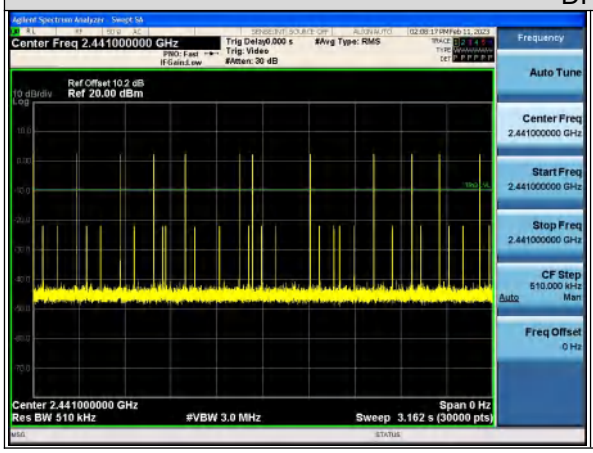
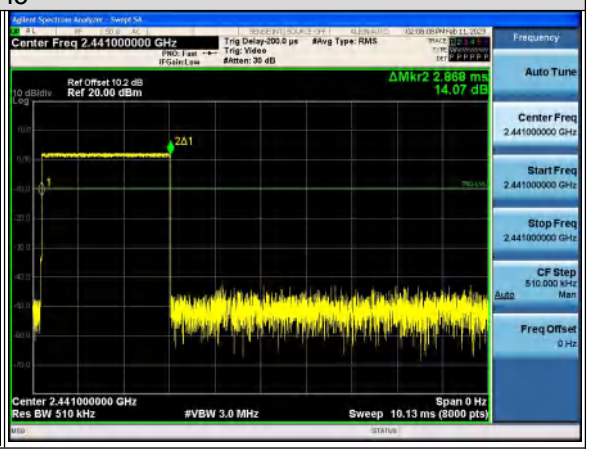
Mode	Number of Hopping Channel	Number of transmision in a period (channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	Verdict
		Period (sec)	Sweep time (sec)	times in a sweep	times in a period				
DH1	79	31.6	3.16	32	320	0.372	119.168	400	Pass
DH3	79	31.6	3.16	17	170	1.620	275.400	400	Pass
DH5	79	31.6	3.16	12	120	2.868	344.160	400	Pass

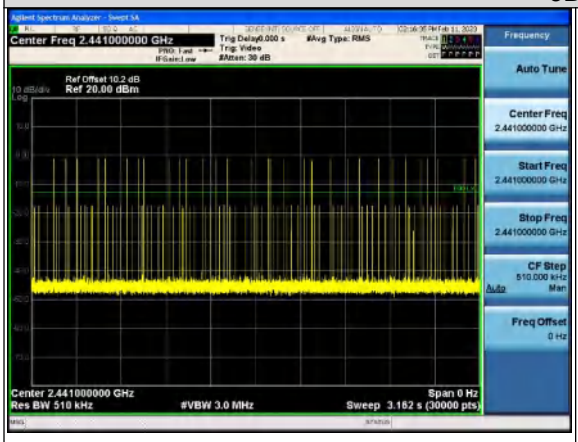
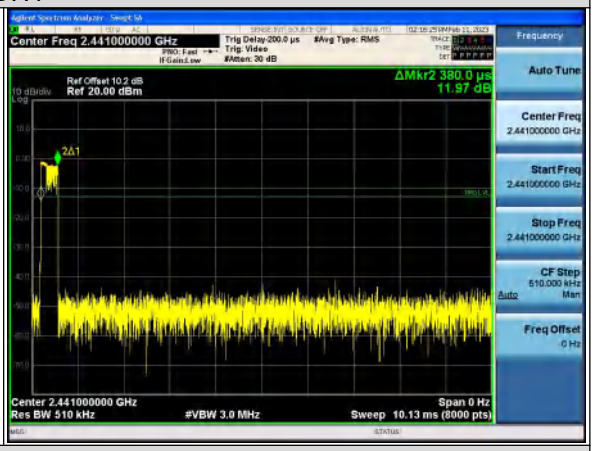
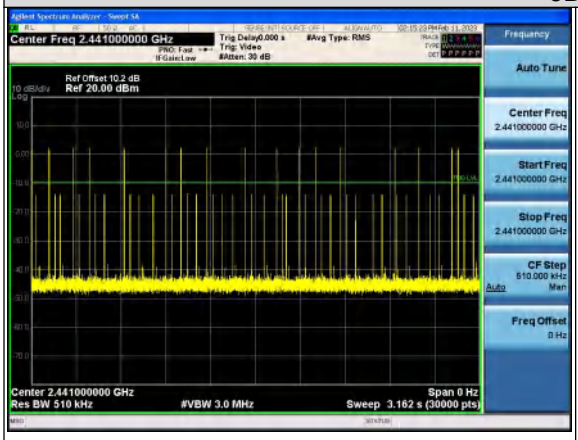
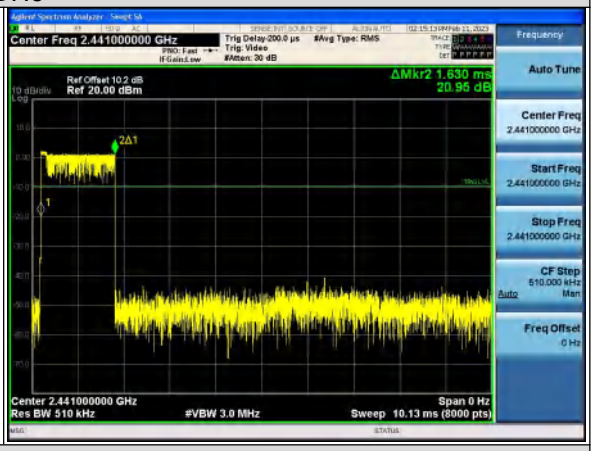
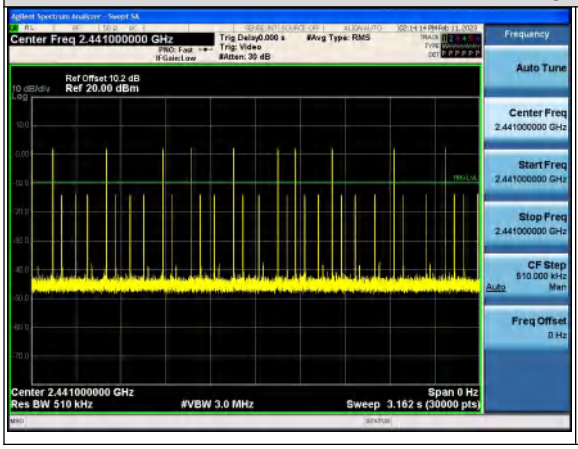
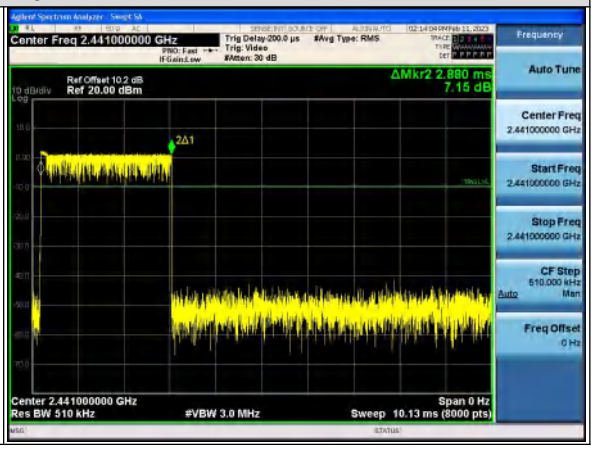
Note: Test plots of the transmitting time slot are shown as below.

8DPSK

Mode	Number of Hopping Channel	Number of transmision in a period (channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	Verdict
		Period (sec)	Sweep time (sec)	times in a sweep	times in a period				
3DH1	79	31.6	3.16	32	320	0.380	121.600	400	Pass
3DH3	79	31.6	3.16	17	170	1.630	277.100	400	Pass
3DH5	79	31.6	3.16	11	110	2.880	316.800	400	Pass

Note: Test plots of the transmitting time slot are shown as below.

GFSK	
DH1	
	
DH3	
	
DH5	
	

8DPSK	
3DH1	
	
3DH3	
	
3DH5	
	

3.5 20dB EMISSION BANDWIDTH

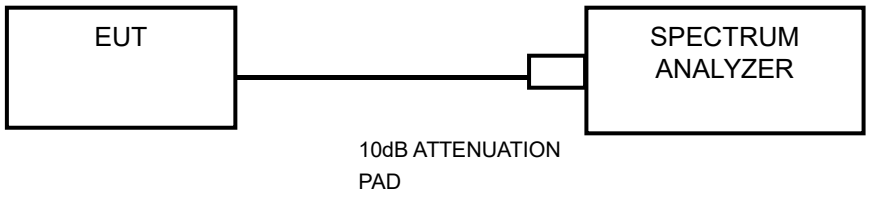
3.5.1 Limits

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation

3.5.2 Measurement procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

3.5.3 Test setup



3.5.4 Test result

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	
		GFSK	8DPSK
0	2402	0.951	1.263
39	2441	0.951	1.257
78	2480	0.945	1.302

GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

3.6 Occupied Bandwidth Measurement

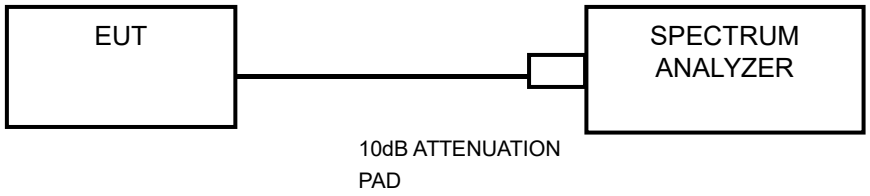
3.6.1 Limits

Report Only

3.6.2 Measurement procedure

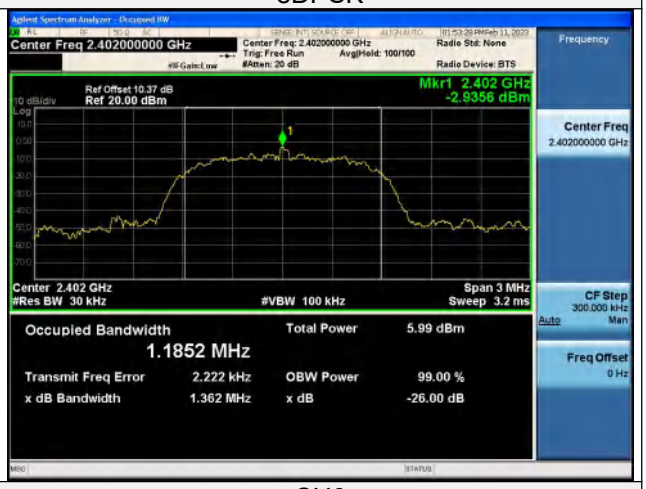
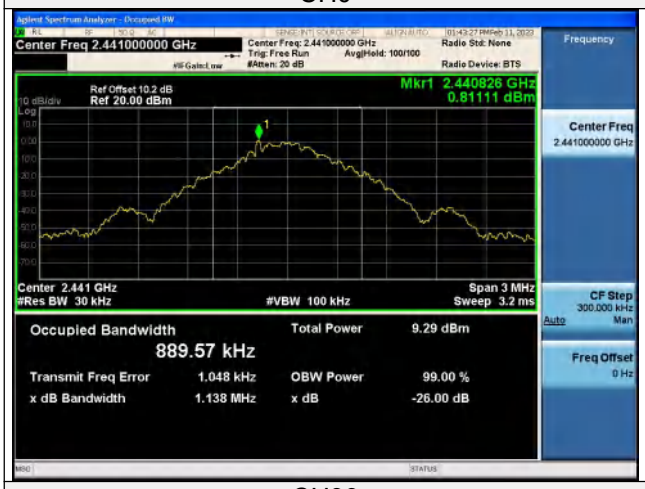
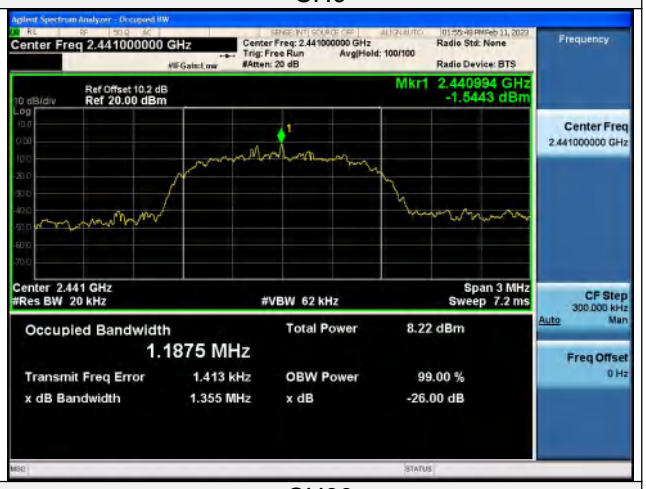
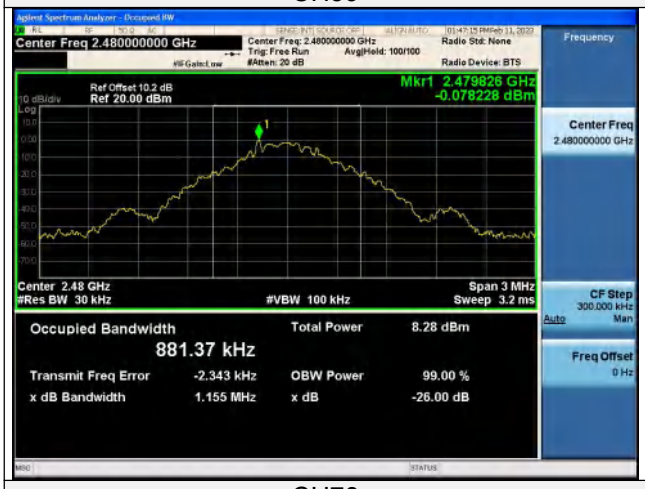
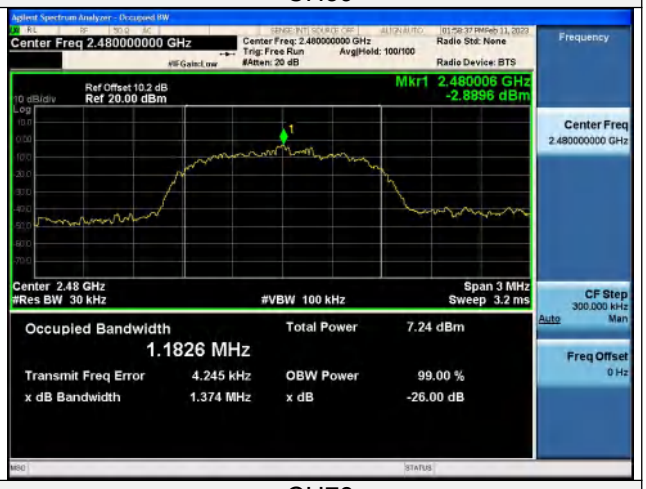
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5%of the total mean power of a given emission.

3.6.3 Test setup



3.6.4 Test result

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		GFSK	8DPSK
0	2402	0.8976	1.1852
39	2441	0.8896	1.1875
78	2480	0.8814	1.1826

GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

3.7 HOPPING CHANNEL SEPARATION

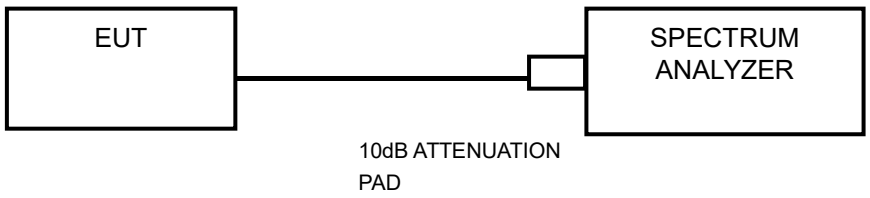
3.7.1 Limits

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

3.7.2 Measurement procedure

a. Span: Wide enough to capture the peaks of two adjacent channels.
b. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
c. Video (or average) bandwidth (VBW) ⩾ RBW.
d. Sweep: Auto.
e. Detector function: Peak.
f. Trace: Max hold.
g. Allow the trace to stabilize.

3.7.3 Test setup



3.7.4 Test result

Channel No.	Frequency (MHz)	Adjacent Channel Separation (MHz)		Minimum Limit (MHz)		Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK	
0	2402	1.002	1.002	0.634	0.842	Pass
39	2441	1.008	0.999	0.634	0.838	Pass
78	2480	0.990	0.993	0.630	0.868	Pass

Note: The minimum limit is two-third 20 dB bandwidth.

GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

3.8 CONDUCTED OUTPUT POWER

3.8.1 Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

3.8.2 Measurement procedure

☒ Measurement using a spectrum analyzer (SA)，Selection of test method：

☒ Maximum peak conducted output power

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW > DTS bandwidth.

b) Set VBW> [3 x RBW]

c) Set span > [3 x RBW]

d) Sweep time = auto couple.

e) Detector = peak

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use peak marker function to determine the peak amplitude level.

☒ Maximum conducted (average) output power

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b) Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c) SA Setting:

1)* Set span to at least 1.5 times the OBW

2)* Set sweep trigger to "free run."

3)* Set RBW= 1% to 5% of the OBW. not to exceed 1MHz.

4)* Set VBW ≥ 3 x RBW

5)* Number of points in sweep≥ 2 x span /RBW. (This gives bin-to-bin spacing ≤ RBW / 2. so that narrowband signals are not lost between frequency bins).

6)* Sweep time ≤ (number of points in sweep) x T. where T is defined in 11.6. If this gives a sweep time less than the auto sweep time of the instrument. then method AVGSA-3 shall not be used (use AVGSA-3A). The purpose of this step is so that the averaging time in each bin is less than or equal to the minimum time of a transmission.

7)* Detector =RMS (power averaging).

8)* Trace mode =Max hold.

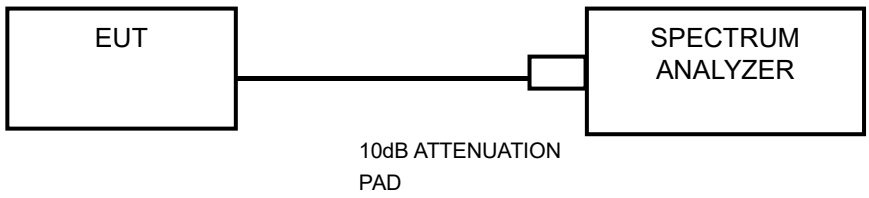
9)* Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.

10)* Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function. then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW.

d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

3.8.3 Test setup



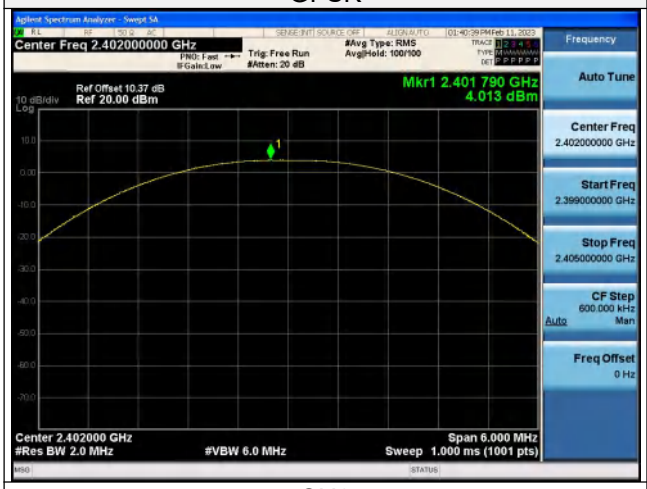
3.8.4 Test result

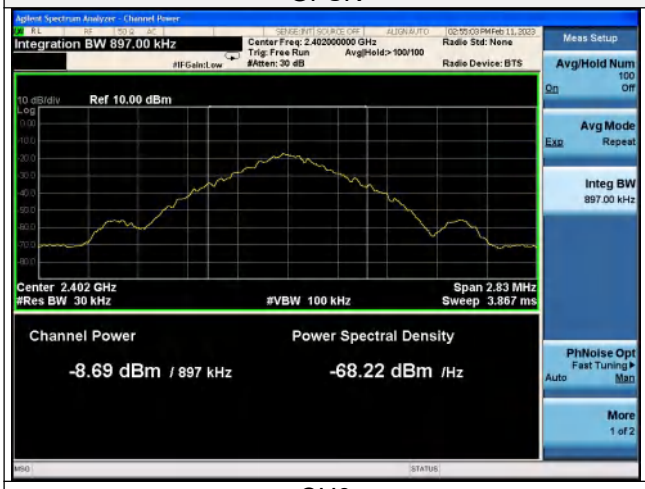
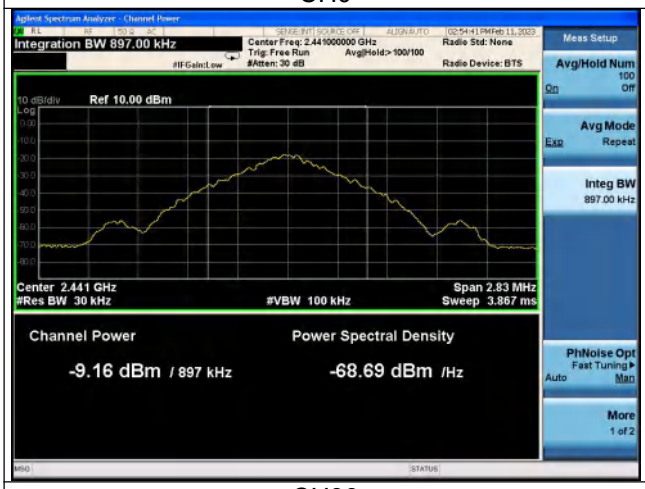
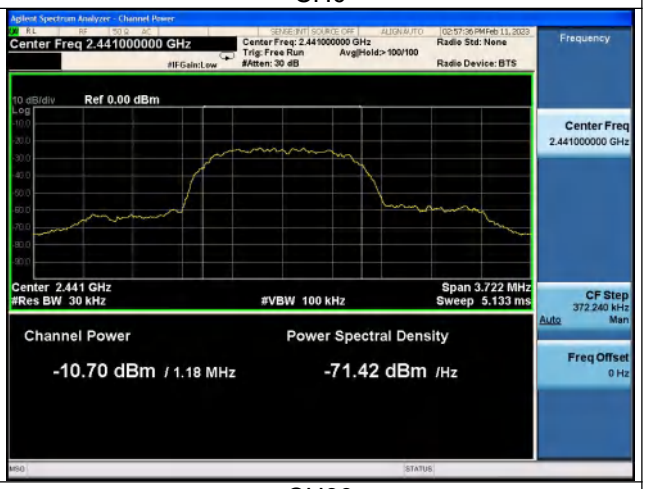
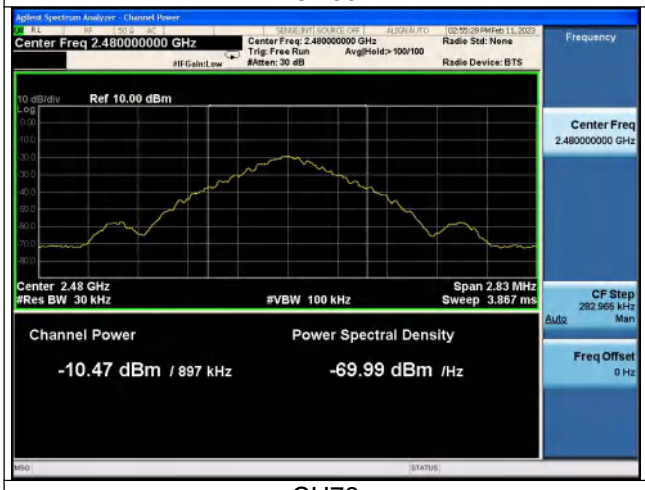
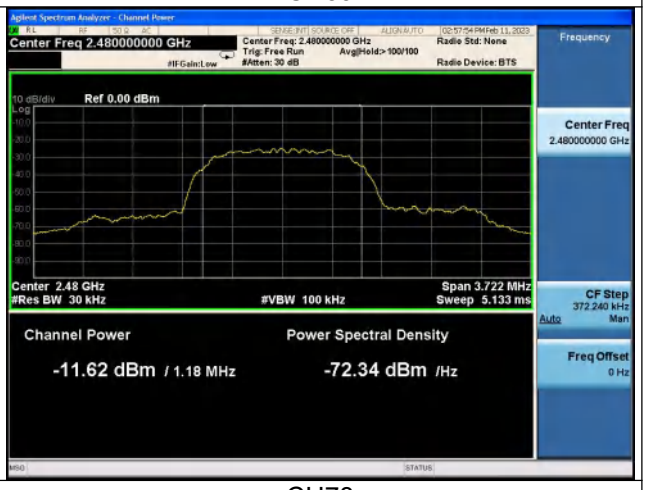
Peak power

Channel No.	Freq. (MHz)	Output Power (dBm)		Output Power (mW)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	4.013	**4.499**	2.519	2.818	125	Pass
39	2441	2.740	3.389	1.879	2.182	125	Pass
78	2480	1.558	2.320	1.432	1.706	125	Pass

Average power

Channel No.	Freq. (MHz)	Output Power (dBm)		Output Power (mW)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	-8.69	-9.69	0.135	0.107	125	Pass
39	2441	-9.16	-10.7	0.121	0.085	125	Pass
78	2480	-10.47	-11.62	0.090	0.069	125	Pass

Peak Power Spectrum Plot	
GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

Average Power Spectrum Plot	
GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

3.9 OUT OF BAND EMISSION MEASUREMENT

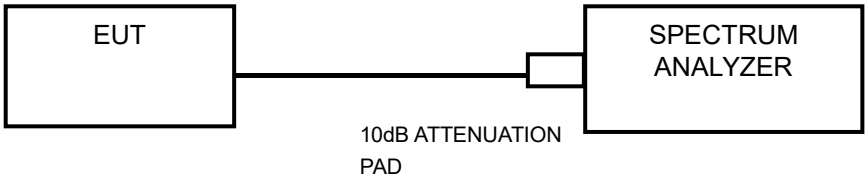
3.9.1 Limits

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

3.9.2 Measurement procedure

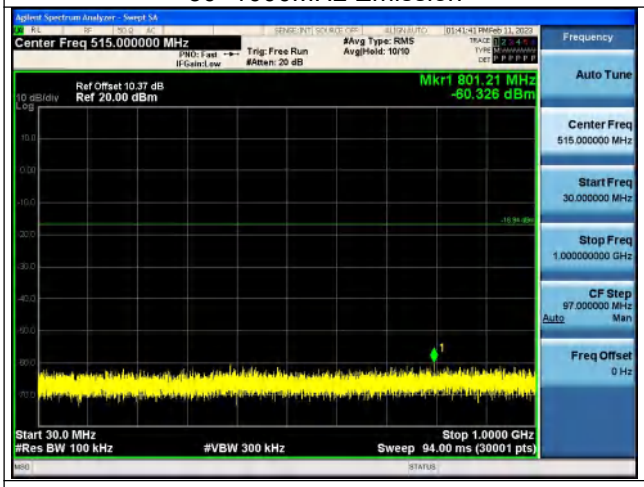
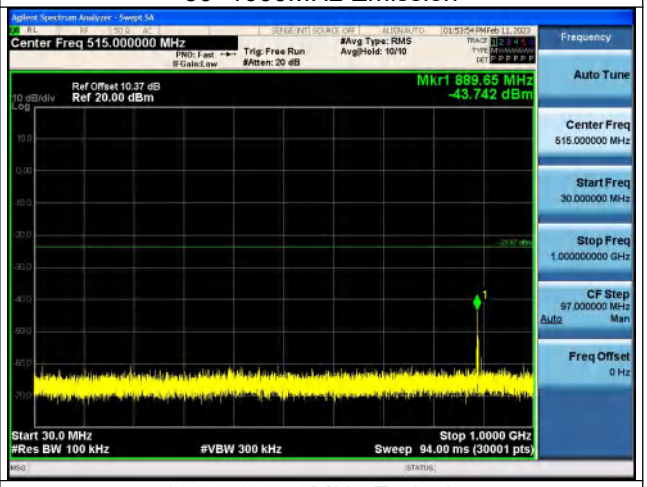
The transmitter output was connected to the spectrum analyzer via a low loss cable. of Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

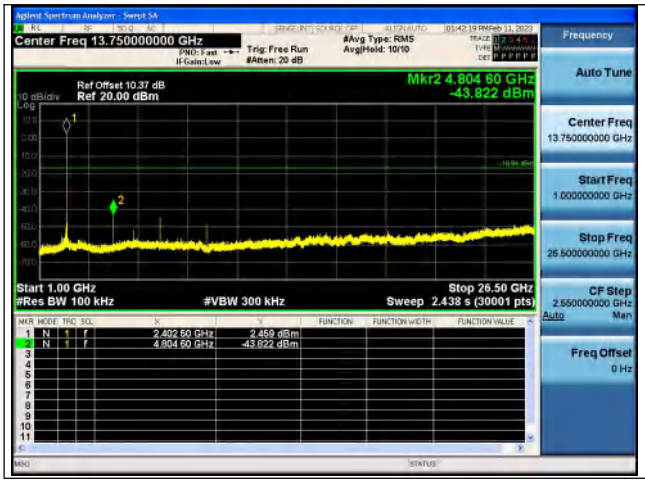
3.9.3 Test setup

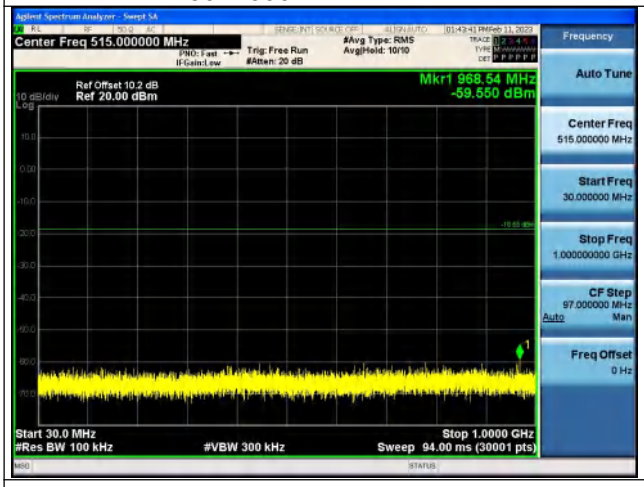
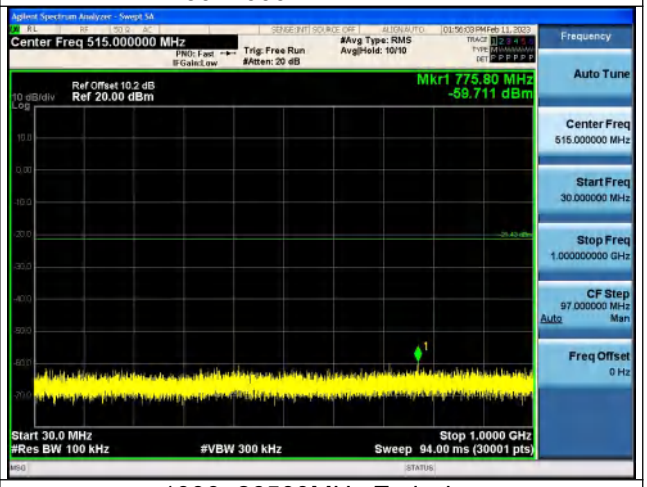


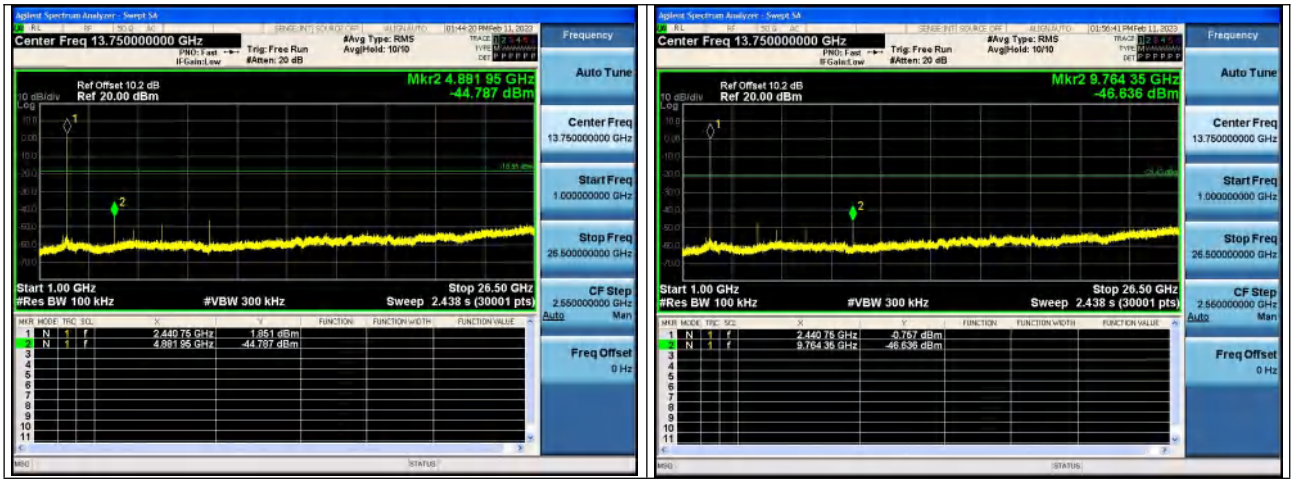
3.9.4 Test result

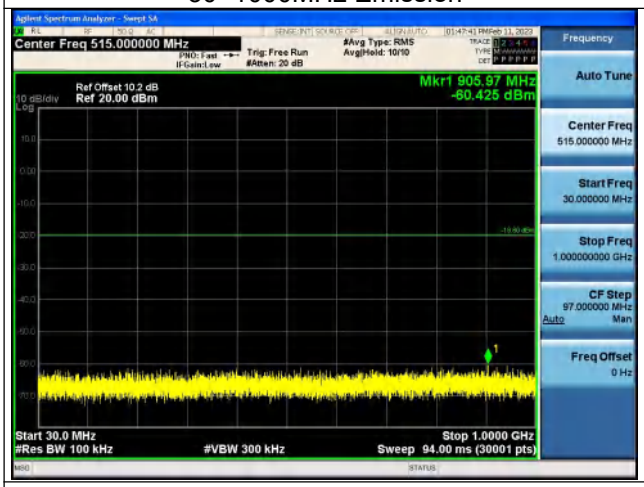
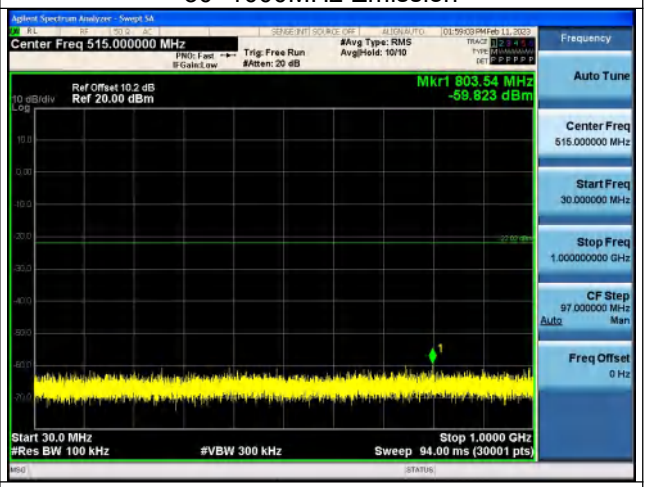
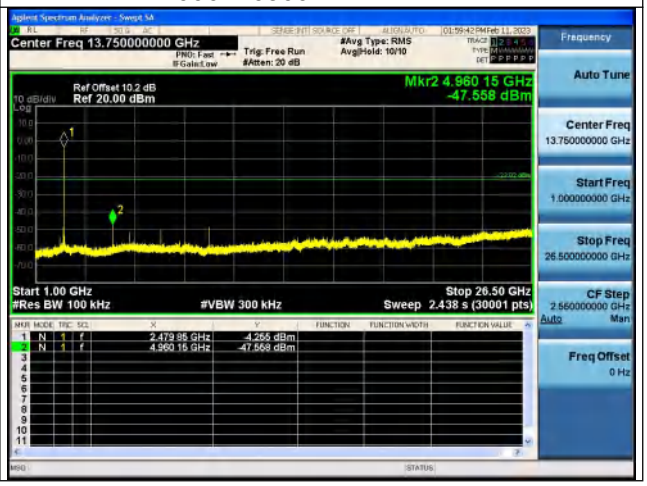
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

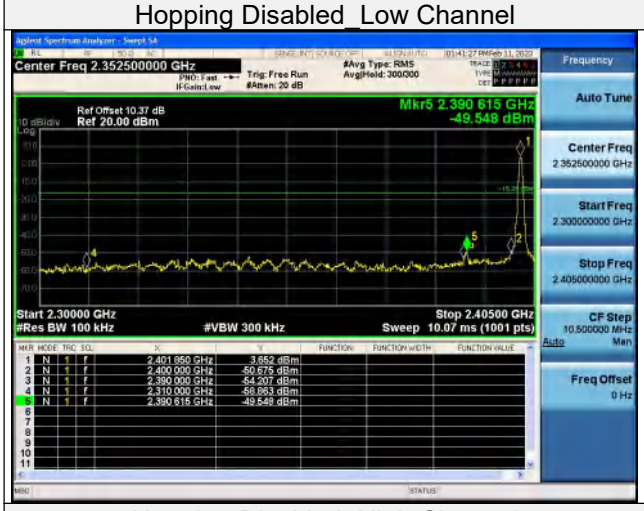
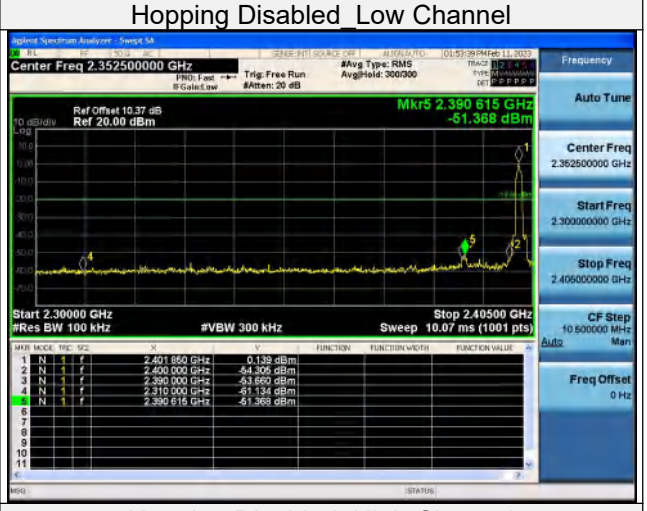
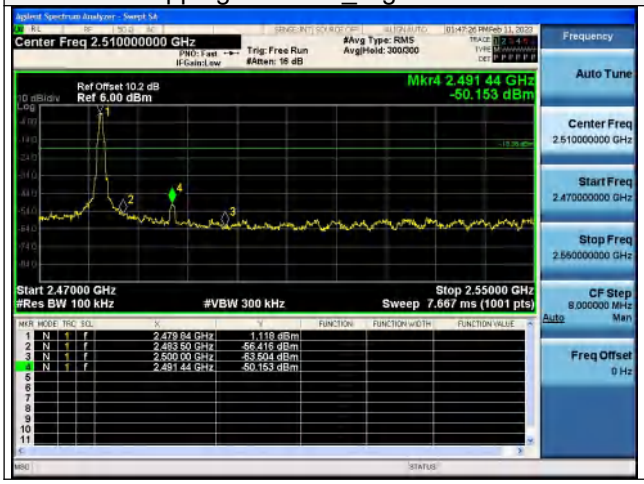
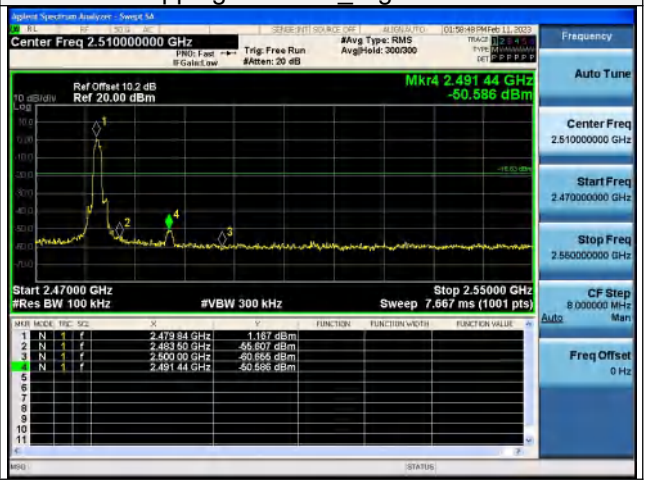
GFSK	8DPSK
Hopping Disabled_Low Channel	Hopping Disabled_Low Channel
Reference Level	Reference Level
	
30~1000MHz Emission	30~1000MHz Emission
	
1000~26500MHz Emission	1000~26500MHz Emission

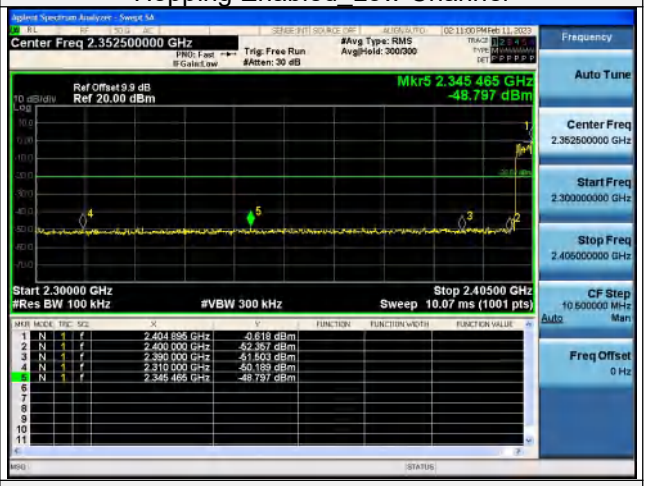
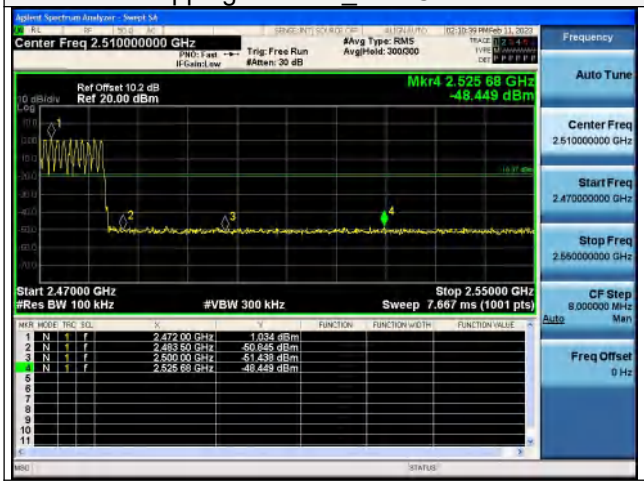
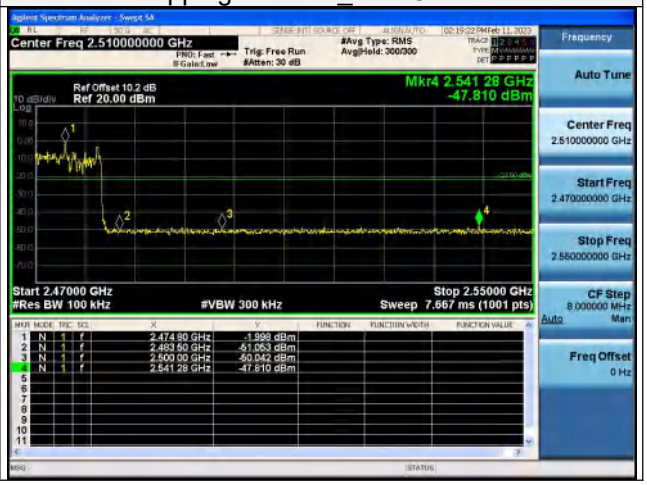


GFSK	8DPSK
Hopping Disabled_Middle Channel	Hopping Disabled_Middle Channel
Reference Level	Reference Level
	
30~1000MHz Emission	30~1000MHz Emission
	
1000~26500MHz Emission	1000~26500MHz Emission


Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 10/10
Frequency
Auto Tune
Ref Offset 10.2 dB
10 dB/div
Ref 20.00 dBm
Mkr2 4.881 95 GHz
-44.787 dBm
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N 1 f 2.440 75 GHz 1.851 dBm
2 N 1 f 4.881 95 GHz -44.787 dBm
Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 10/10
Frequency
Auto Tune
Ref Offset 10.2 dB
10 dB/div
Ref 20.00 dBm
Mkr2 9.764 35 GHz
-46.636 dBm
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N 1 f 2.440 75 GHz -9.767 dBm
2 N 1 f 9.764 35 GHz -46.636 dBm

GFSK	8DPSK
Hopping Disabled_High Channel	Hopping Disabled_High Channel
Reference Level	Reference Level
	
30~1000MHz Emission	30~1000MHz Emission
	
1000~26500MHz Emission	1000~26500MHz Emission
	

Bandedge	
GFSK	8DPSK
Hopping Disabled_Low Channel	Hopping Disabled_Low Channel
	
Hopping Disabled_High Channel	Hopping Disabled_High Channel
	

Bandedge	
GFSK	8DPSK
Hopping Enabled_Low Channel	Hopping Enabled_Low Channel
	
Hopping Enabled_Low Channel	Hopping Enabled_Low Channel
	

4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).

5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

Important

(1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.

(2) The test report is invalid if altered.

(3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.

(4) Objections to the test report must be submitted to the laboratory within 15 days.

(5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:
CVC Testing Technology Co., Ltd.
Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China
Post Code：510663 Tel：020-32293888
FAX：020-32293889 E-mail：office@cvc.org.cn