Test Report No.:
FCC2023-0049-RF1

RF Test Report

EUT	:	**Micro Music System**
MODEL	:	**TAM8905/37**
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.

Applicant	**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 : Micro Music System** **Model/Type: TAM8905/37** **Additional Model: See section 2.1** **Brand : PHILIPS** **Serial NO.: N/A** **Sample NO.: HS2306280027**

Date of Receipt.	**2023-06-28**	Date of Testing	**2023-07-01 ~ 2023-07-20**

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: 2023-07-21**

Tested by:	Reviewed by:	Approved by:
Lu WeiJi	Xu Zhenfei	Chen Huawen
Lu WeiJi Name Signature	**Xu ZhenFei** Name Signature	**Chen HuaWen** Name Signature

Other Aspects: NONE.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0049-RF1	Original release	2023-07-21

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)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
FCC 15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
FCC 15.247(a)(1)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
--	Occupied Bandwidth Measurement	Pass	Reference only
FCC 15.247(a)(1)	Hopping Channel Separation	PASS	Meet the requirement of limit.
FCC 15.247(a)(1)	Dell Time of Each Channel	PASS	Meet the requirement of limit.
FCC 15.247(a)(1)	20dB EMISSION BANDWIDTH	PASS	Meet the requirement of limit.
FCC 15.247(b)	Conducted Output Power	PASS	Meet the requirement of limit.
FCC 15.247(d), FCC 15.209,15.205	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit.
FCC 15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
FCC 15.203 FCC 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
WIFI & Bluetooth Test System 1						/
Communication Shielded Room 3	4m*3m*3m	CRTDSWKSR 44301	VGDS-0702	CRT	3 year	2024/04/24
Bluetooth BQB test system	/	/	DZ-000338	CTTL	1 year	/
Bluetooth system integration	/	/	-	Tonscend	1 year	/
Wifi radiation system upgrade	/	/	-	Tonscend	1 year	/
Spectrum Analyzer	N9030A	MY53310374	EM-000395	Agilent	1 year	2024/04/22
Comprehensive Test Instrument	CMW270	100659	EM-000491	R&S	1 year	2023/12/06
Analog Signal Generator	N5173B	MY53270588	EM-000487-2	KEYSIGHT	1 year	2023/12/06
Vector Signal Generator	N5172B	MY53051933	EM-000487-1	KEYSIGHT	1 year	2023/12/06
Radiation Spurious Test 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	2024/02/22
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	2024/06/10
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	1 year	2024/02/24
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	1 year	2023/07/31
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	1 year	2024/06/04
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
Conducted emission						/
EMI Test Receiver	ESW44	103123	EM-000698	R&S	1 year	2024-02-22
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	2024-02-22
Plus Limiter（#1）	VTSD 9561 F-N	00515	VGDY-0808	SCHWARZBECK	1 year	2024-03-03
Plus Limiter（#2）	VTSD 9561	9561-F017	VGDY-0152	SCHWARZBECK	1 year	2024-09-03
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	2024-05-29
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	1 year	2024-05-29
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	2024-05-23
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
Shielding Room(#2)	GP1A	002	WKNF-0006	LEINING	3 year	2024-08-07
Current probe	EZ-17	0816.2063.02	EM-000567	R&S	1 year	2024-01-07
LISN	NNHV8123-200	8123200-020	EM-000385	SCHWARZBECK	1 year	2024-02-22
LISN	NNHV8123-200	8123200-021	EM-000386	SCHWARZBECK	1 year	2024-02-22

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	Measurement 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
Remark: 95% Confidence Levels, k=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	Micro Music System
Model	TAM8905/37
Additional Model	TAM8905,M8905,TAM8905/10,TAM8905/12,TAM8905/98,TAM8905/67,M8905/37,TAM8905x/yy, M8905x/yy (x = A-Z or blank, for different color or package; yy = 00 - 99, for country code)
FCC ID	2AR2STAM8905
Status of EUT	Engineering Prototype
Power Supply Rating	AC 120V,60Hz
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)	7.35 dBm
Antenna Type and Gain (Remark 4)	PIFA Antenna, with 2.50dBi gain
Antenna Connector	N/A
HW	VER 0.0
SW	FS2340-0000-0501
Accessory Device	Remote Control*1， subwoofer*2

Note:

1. Please refer to the EUT photo document (Reference No.:FCC2023-0049-EUT) 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.
4. Please refer to the antenna report.

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		

The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore, only the data of the test channels were recorded in this report.

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, 54%RH	AC 120V,60Hz	Li YueAo
RSE≥1G	25deg. C, 54%RH	AC 120V,60Hz	Li YueAo
PLC	25deg. C, 56%RH	AC 120V,60Hz	Li YueAo
APCM	25deg. C, 53%RH	AC 120V,60Hz	Li YueAo

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	Mobile Phone	SAMSUNG	SCH-I699	801A2A38	Lab
2	Mobile Phone	Mi	MI 4LTE	47626332	Lab
3	USB Driver 3.0(32G)	Kingston	DTSE9	N/A	Lab
4	SFU	R/S	SFU	100410	Lab
5	Earphone	EDIFIER	H180Plus	N/A	Lab

Support Cable							
NO	Description	Quantity (Number)	Length (m)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	Audio cable	1	1.5	Yes	No	N/A	Lab
2	Earphone	1	1.1	Yes	No	N/A	Lab

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.		

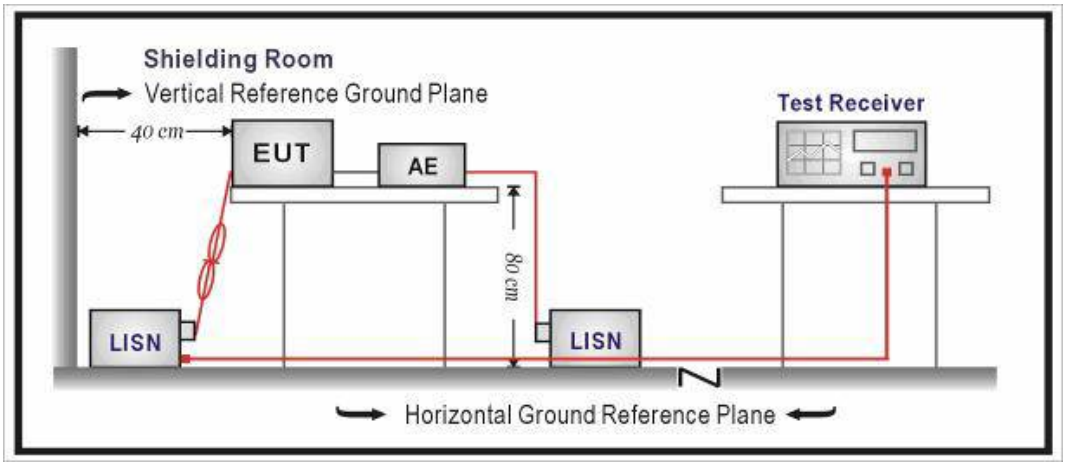
3.1.2 Measurement procedure

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.

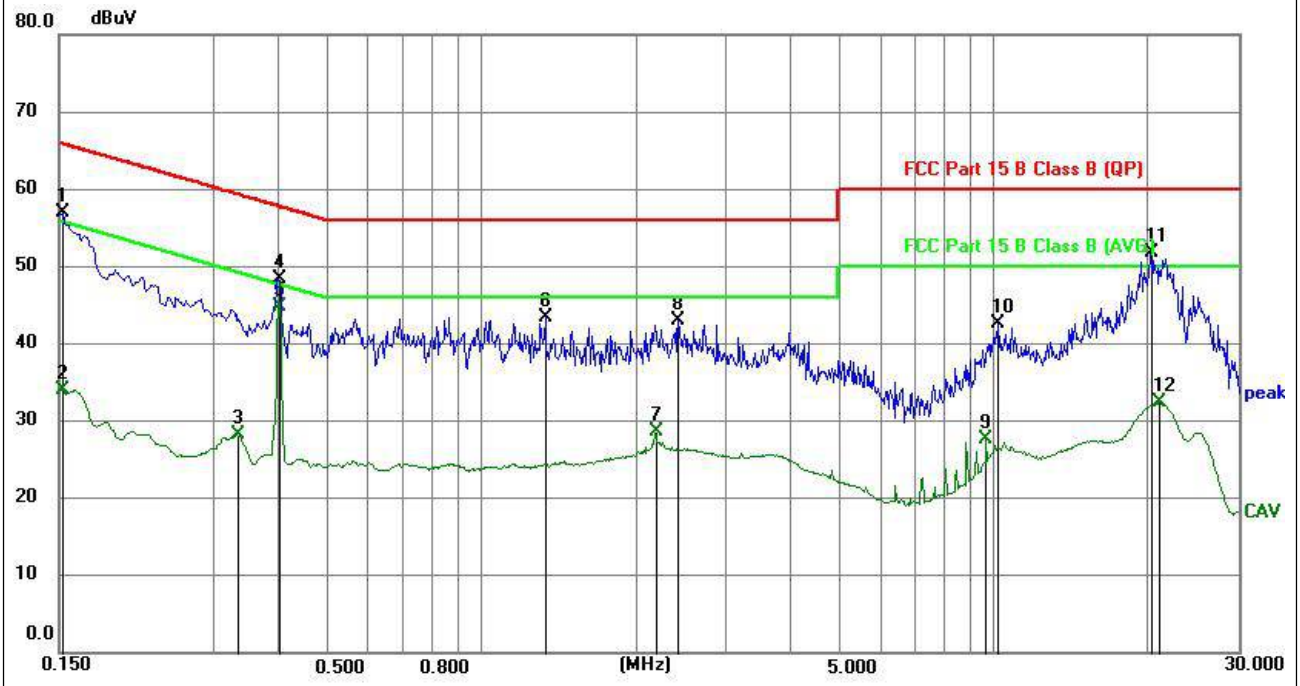
3.1.3 Test setup



3.1.4 Test results

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

Phase of Power: Line (L)



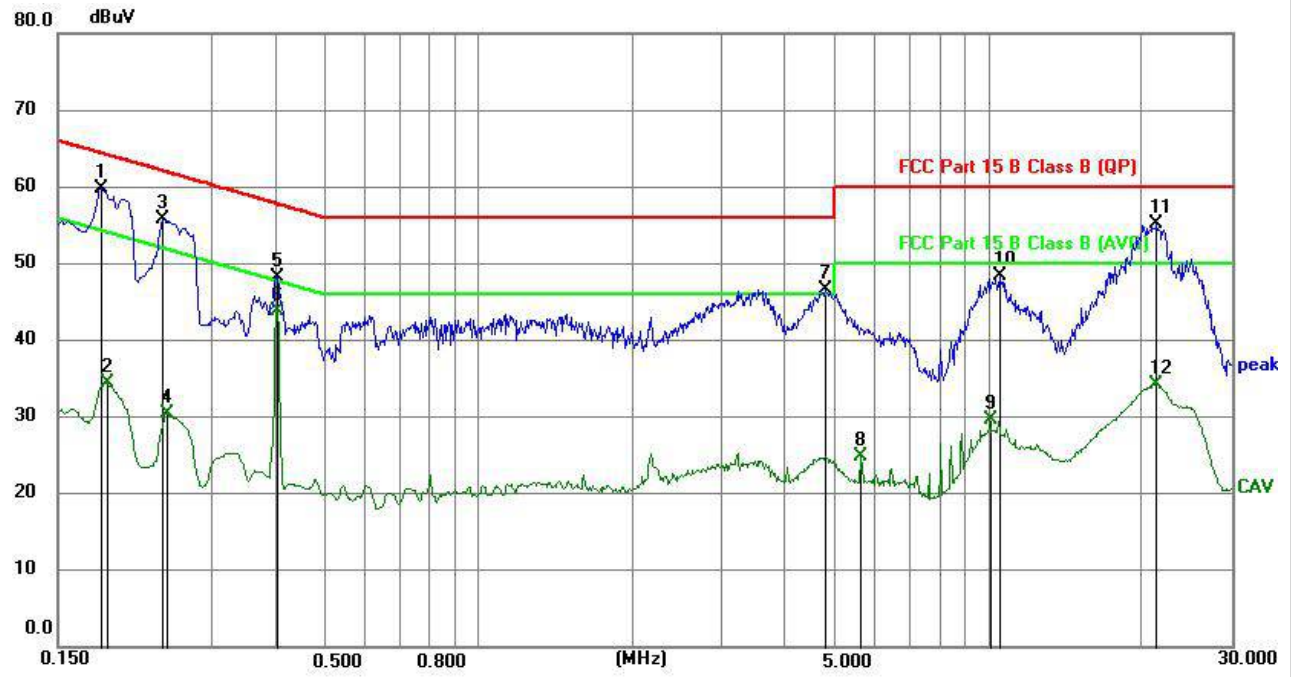
No.	Frequency	Reading	Correction Factor	Emissions Level	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	Detecter
1	0.1522	46.73	10.18	56.91	65.88	-8.97	peak
2	0.1522	23.91	10.18	34.09	55.88	-21.79	AVG
3	0.3344	18.04	10.17	28.21	49.34	-21.13	AVG
4	0.4019	38.26	10.11	48.37	57.81	-9.44	peak
5	**0.4042**	**34.74**	**10.11**	**44.85**	**47.77**	**-2.92**	**AVG**
6	1.3312	33.36	10.05	43.41	56.00	-12.59	peak
7	2.1885	18.44	10.09	28.53	46.00	-17.47	AVG
8	2.4315	32.83	10.09	42.92	56.00	-13.08	peak
9	9.6720	17.44	10.10	27.54	50.00	-22.46	AVG
10	10.2299	32.39	10.11	42.50	60.00	-17.50	peak
11	20.2110	41.46	10.39	51.85	60.00	-8.15	peak
12	21.0006	22.07	10.37	32.44	50.00	-17.56	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

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

Phase of Power: Neutral (N)



No.	Frequency	Reading	Correction Factor	Emissions Level	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	Detecter
1	0.1815	49.69	10.15	59.84	64.42	-4.58	peak
2	0.1860	24.31	10.15	34.46	54.21	-19.75	AVG
3	0.2400	45.70	10.16	55.86	62.10	-6.24	peak
4	0.2445	20.19	10.16	30.35	51.94	-21.59	AVG
5	0.4020	38.12	10.09	48.21	57.81	-9.60	peak
6	0.4042	33.78	10.09	43.87	47.77	-3.90	AVG
7	4.8029	36.61	10.06	46.67	56.00	-9.33	peak
8	5.6490	14.77	10.01	24.78	50.00	-25.22	AVG
9	10.0883	19.45	10.11	29.56	50.00	-20.44	AVG
10	10.5090	38.28	10.13	48.41	60.00	-11.59	peak
11	21.4755	44.71	10.39	55.10	60.00	-4.90	peak
12	21.4755	23.85	10.39	34.24	50.00	-15.76	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

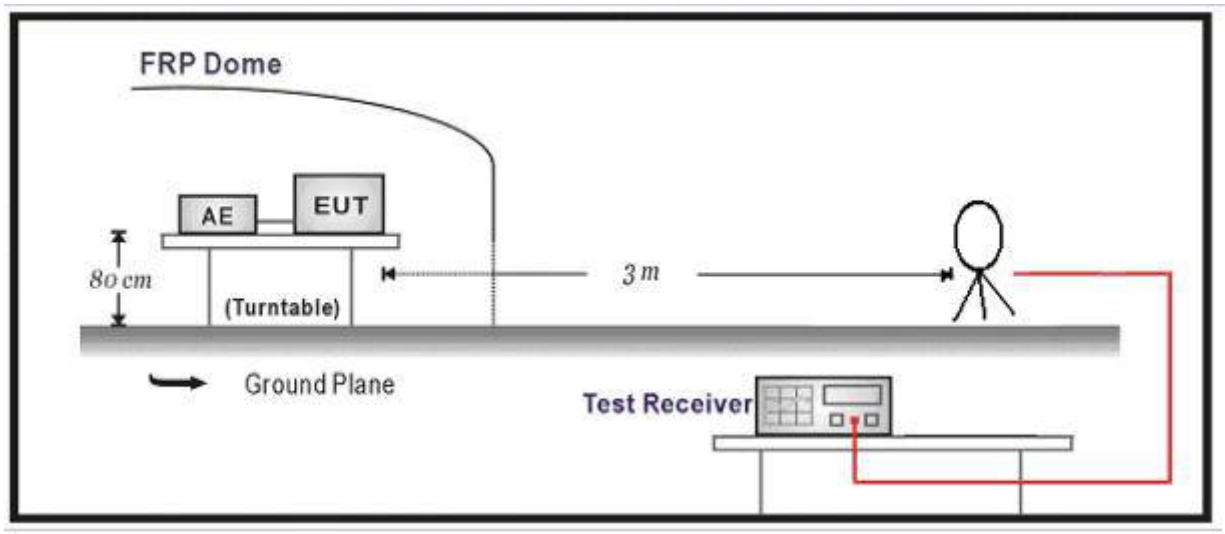
a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving 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:

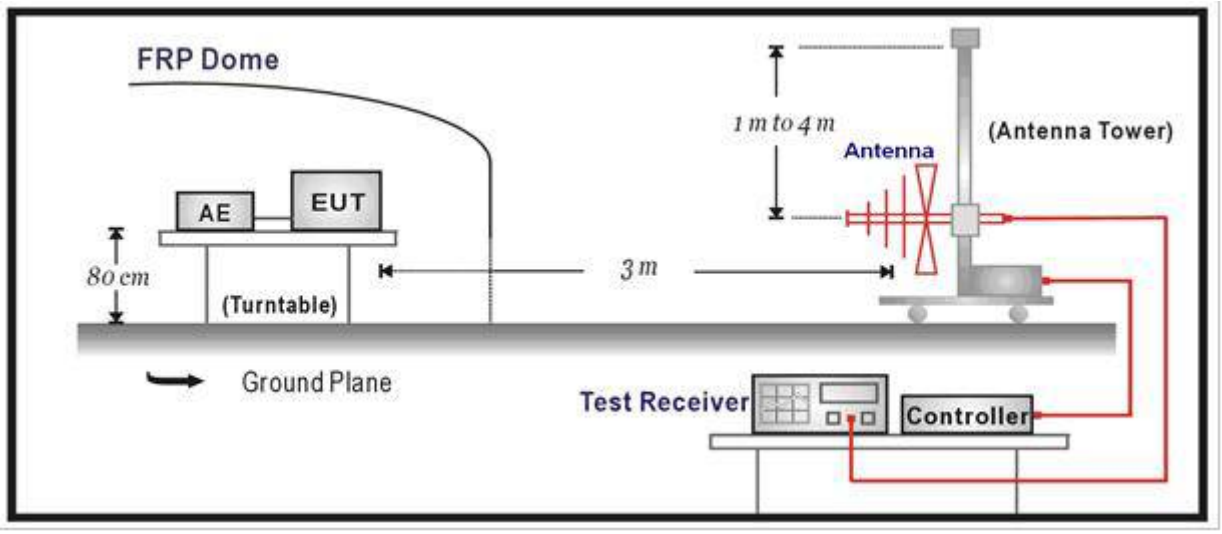
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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

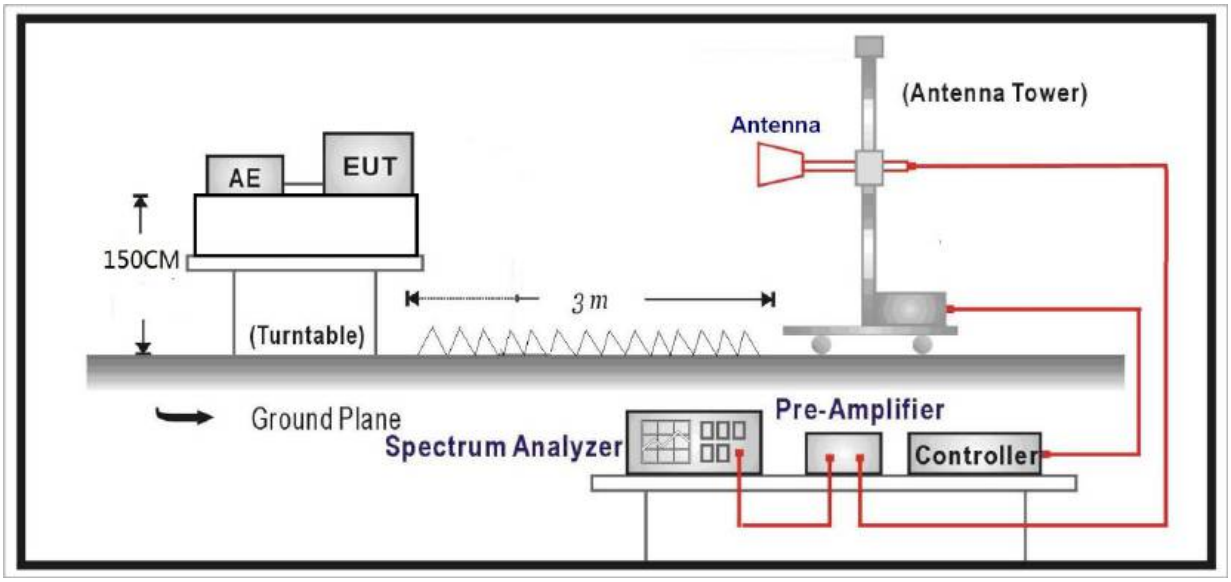
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



3.2.4 Test results

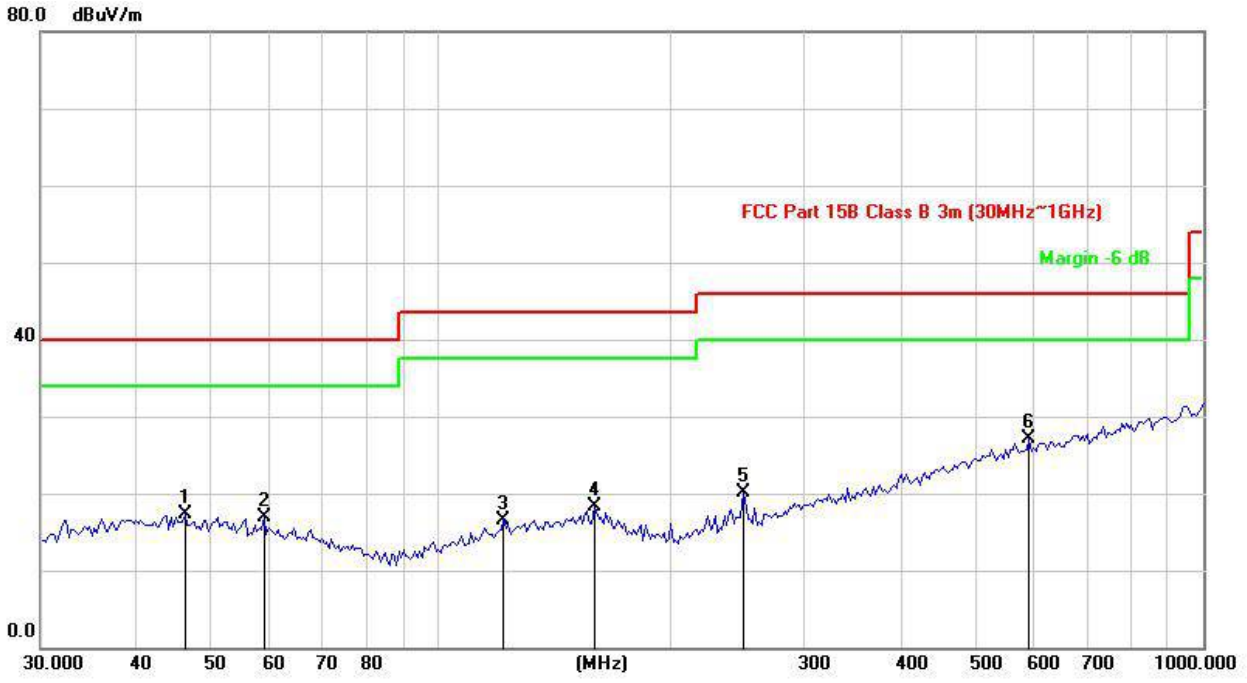
9 kHz ~ 30 MHz Data:

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	46.3402	32.77	-15.46	17.31	40.00	-22.69	peak	221	175
2	58.8185	33.47	-16.57	16.90	40.00	-23.10	peak	235	336
3	121.1231	33.26	-16.66	16.60	43.50	-26.90	peak	200	233
4	159.2251	33.09	-14.75	18.34	43.50	-25.16	peak	158	58
5	249.4250	35.37	-15.20	20.17	46.00	-25.83	peak	174	342
6 *	590.9737	32.49	-5.38	27.11	46.00	-18.89	peak	265	199

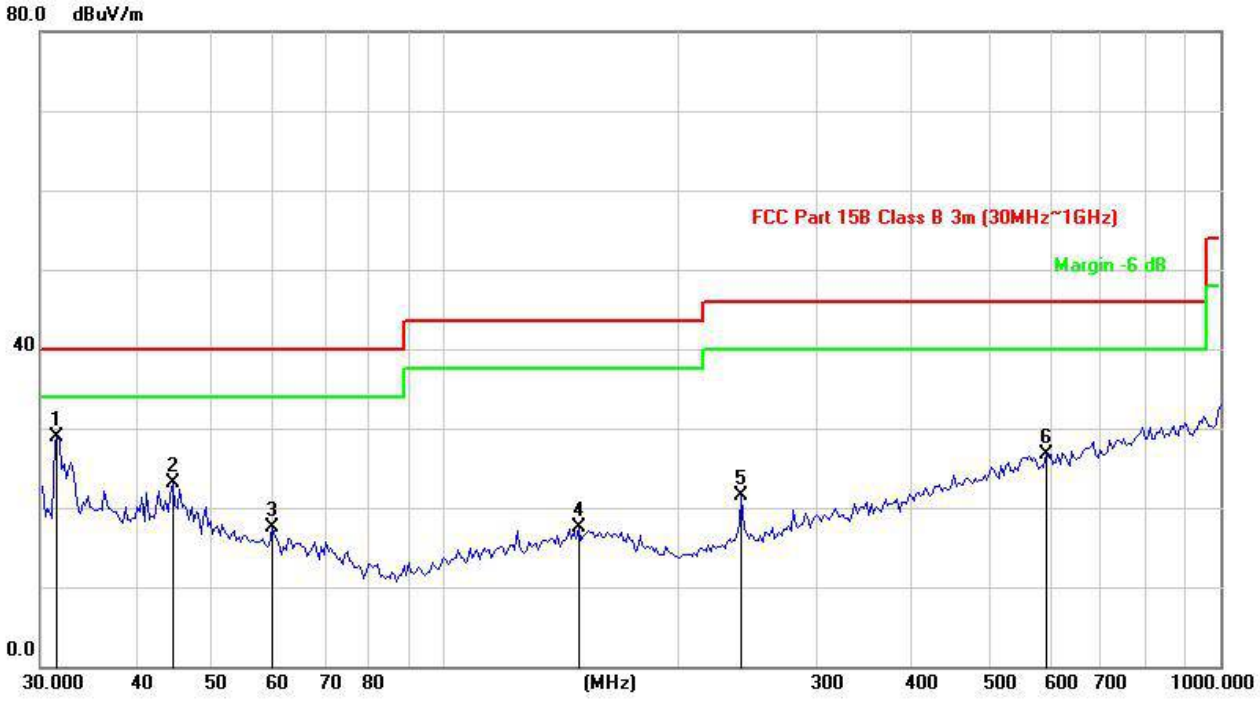
Remarks:

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 *	31.5095	45.60	-16.67	28.93	40.00	-11.07	peak	115	72
2	44.4308	38.56	-15.41	23.15	40.00	-16.85	peak	132	216
3	59.6493	34.23	-16.66	17.57	40.00	-22.43	peak	105	334
4	148.4410	32.67	-15.20	17.47	43.50	-26.03	peak	114	104
5	240.8304	36.81	-15.33	21.48	46.00	-24.52	peak	126	54
6	595.1329	32.09	-5.30	26.79	46.00	-19.21	peak	144	57

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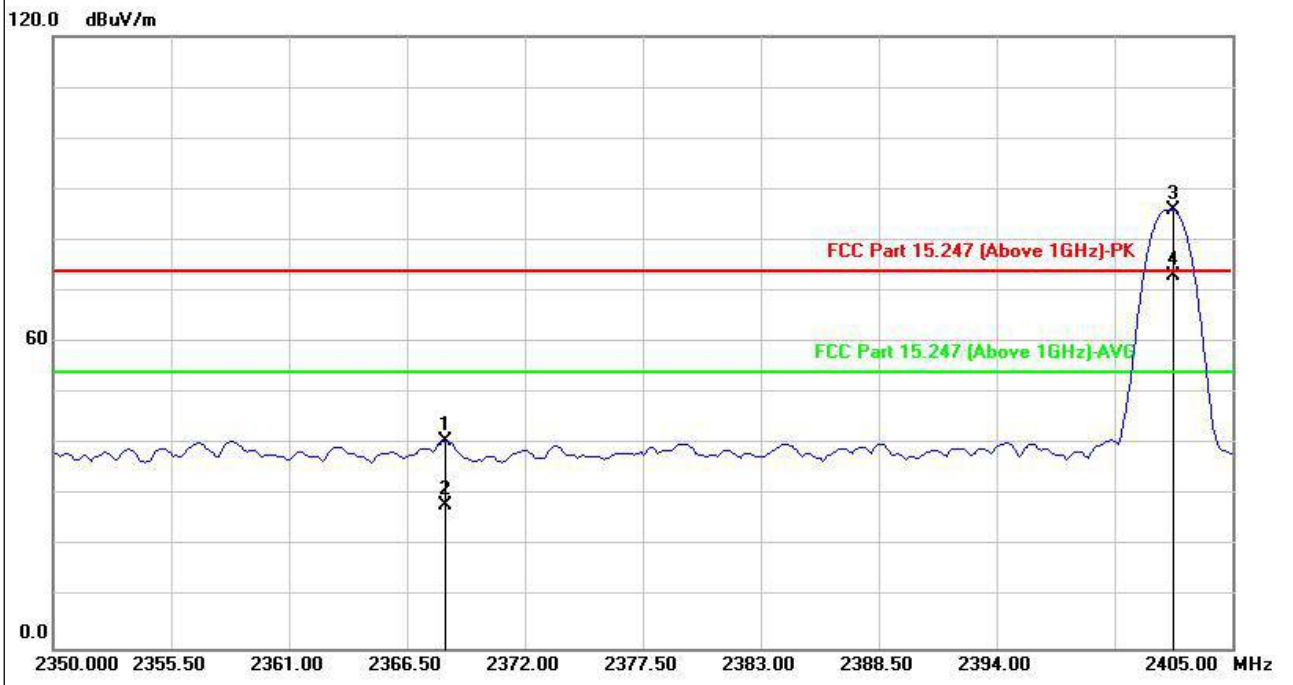
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Horizontal at 3 m



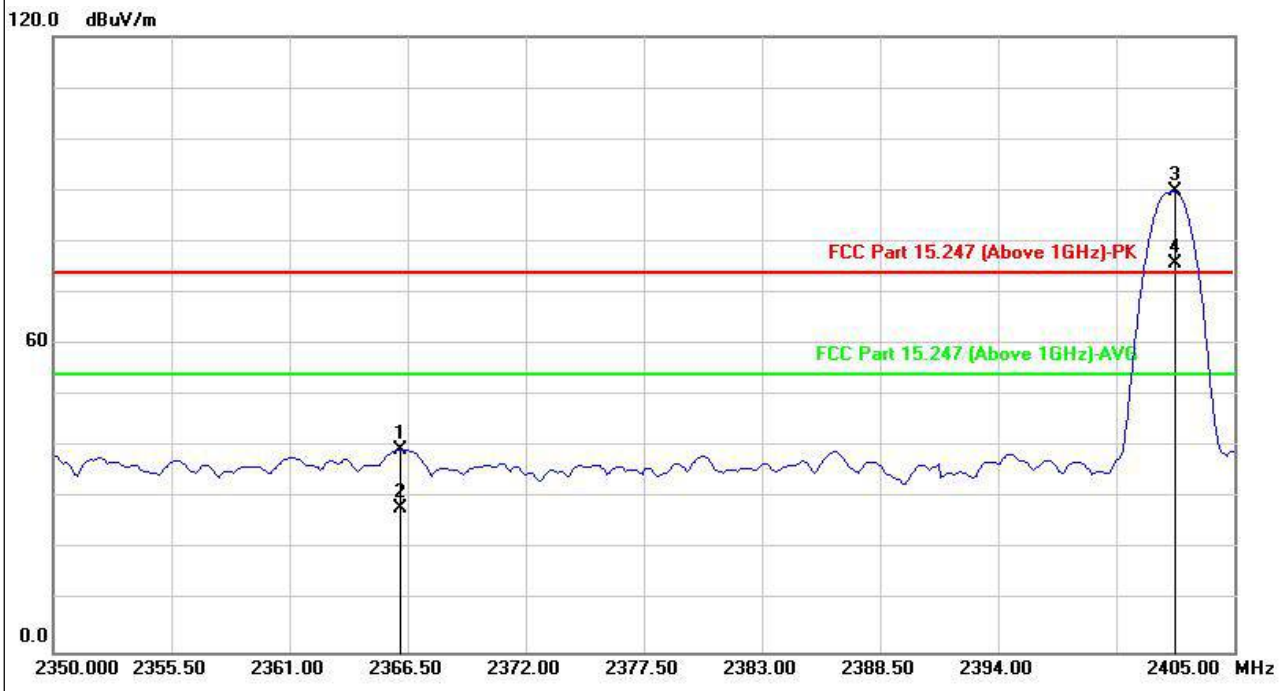
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2368.297	39.96	0.81	40.77	74.00	-33.23	peak	371	232
2	2368.297	27.17	0.81	27.98	54.00	-26.02	AVG	371	232
3 #	2402.244	85.20	0.83	86.03			peak	371	232
4 #	2402.244	72.09	0.83	72.92			AVG	371	232
5	4804.000	42.20	6.60	48.80	74.00	-25.20	peak	130	328
6	4804.000	28.71	6.60	35.31	54.00	-18.69	AVG	130	328
7	7206.000	40.15	10.08	50.23	74.00	-23.77	peak	129	332
8	7206.000	28.68	10.08	38.76	54.00	-15.24	AVG	129	332

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	2366.202	38.77	0.82	39.59	74.00	-34.41	peak	177	181
2	2366.202	27.24	0.82	28.06	54.00	-25.94	AVG	177	181
3 #	2402.244	88.93	0.83	89.76			peak	177	181
4 #	2402.244	75.04	0.83	75.87			AVG	177	181
5	4804.000	41.48	6.60	48.08	74.00	-25.92	peak	100	26
6	4804.000	28.71	6.60	35.31	54.00	-18.69	AVG	100	26
7	7206.000	40.74	10.08	50.82	74.00	-23.18	peak	100	347
8	7206.000	28.67	10.08	38.75	54.00	-15.25	AVG	100	347

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		

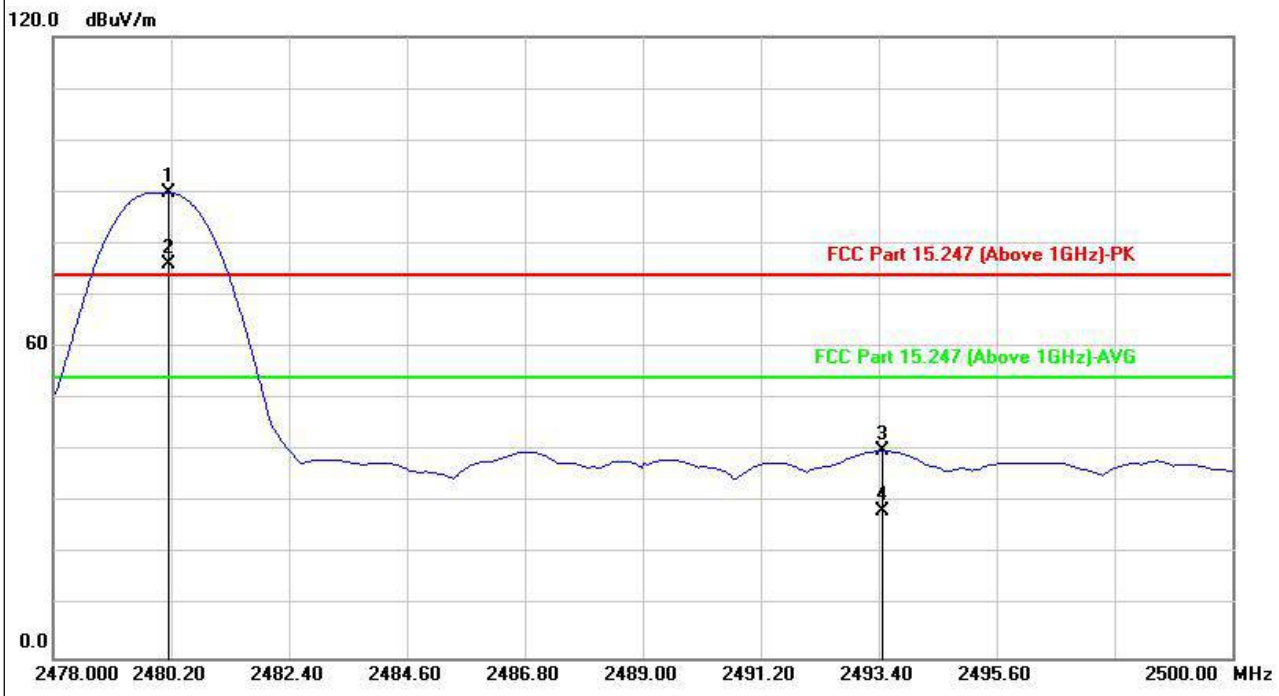
Antenna Polarity & Test Distance: Horizontal at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	4882.000	41.92	6.77	48.69	74.00	-25.31	peak	245	304
2	4882.000	28.43	6.77	35.20	54.00	-18.80	AVG	245	304
3	7323.000	41.28	10.37	51.65	74.00	-22.35	peak	185	265
4	7323.000	28.51	10.37	38.88	54.00	-15.12	AVG	185	265
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	4882.000	42.69	6.77	49.46	74.00	-24.54	peak	100	207
2	4882.000	28.43	6.77	35.20	54.00	-18.80	AVG	100	207
3	7323.000	42.41	10.37	52.78	74.00	-21.22	peak	102	113
4	7323.000	28.50	10.37	38.87	54.00	-15.13	AVG	102	113

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. 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



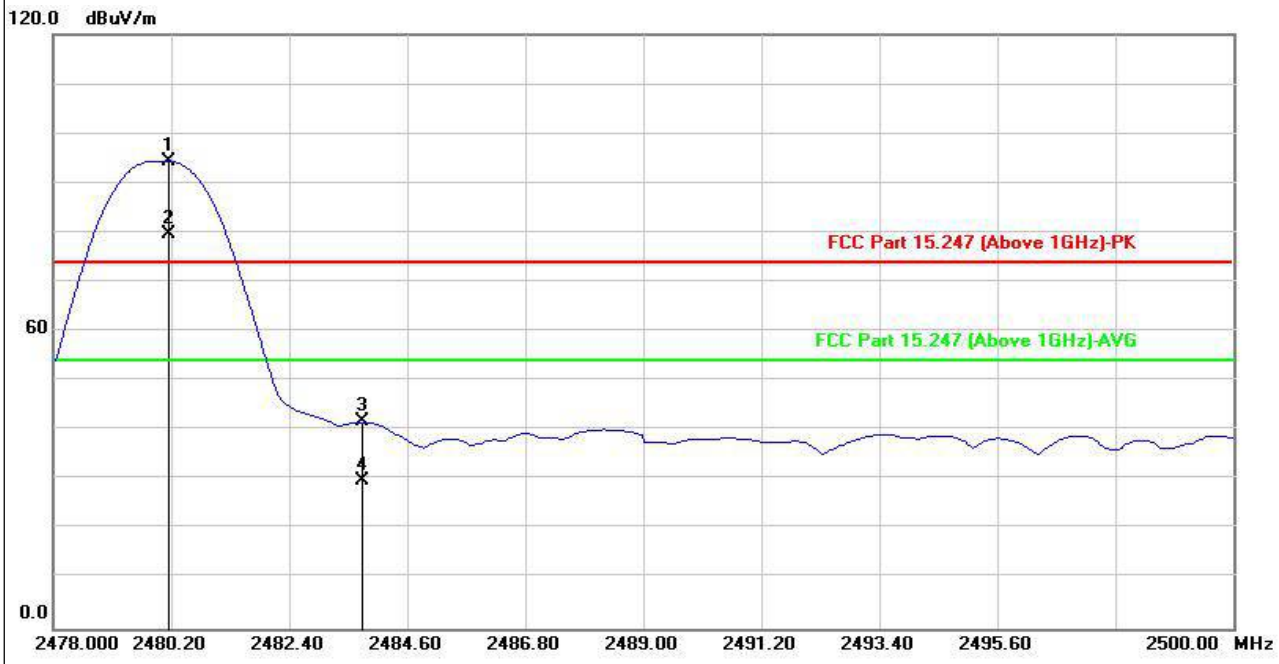
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2480.160	89.01	0.85	89.86			peak	100	236
2#	2480.160	75.27	0.85	76.12			AVG	100	236
3	2493.475	39.12	0.86	39.98	74.00	-34.02	peak	100	236
4	2493.475	27.49	0.86	28.35	54.00	-25.65	AVG	100	236
5	4960.000	42.12	6.93	49.05	74.00	-24.95	peak	137	225
6	4960.000	28.54	6.93	35.47	54.00	-18.53	AVG	137	225
7	7440.000	41.80	10.67	52.47	74.00	-21.53	peak	204	149
8	7440.000	28.34	10.67	39.01	54.00	-14.99	AVG	204	149

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#	2480.160	93.49	0.85	94.34			peak	100	154
2#	2480.160	78.80	0.85	79.65			AVG	100	154
3	2483.776	40.85	0.85	41.70	74.00	-32.30	peak	100	154
4	2483.776	28.87	0.85	29.72	54.00	-24.28	AVG	100	154
5	4960.000	42.31	6.93	49.24	74.00	-24.76	peak	100	137
6	4960.000	28.59	6.93	35.52	54.00	-18.48	AVG	100	137
7	7440.000	40.95	10.67	51.62	74.00	-22.38	peak	106	227
8	7440.000	28.31	10.67	38.98	54.00	-15.02	AVG	106	227

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.

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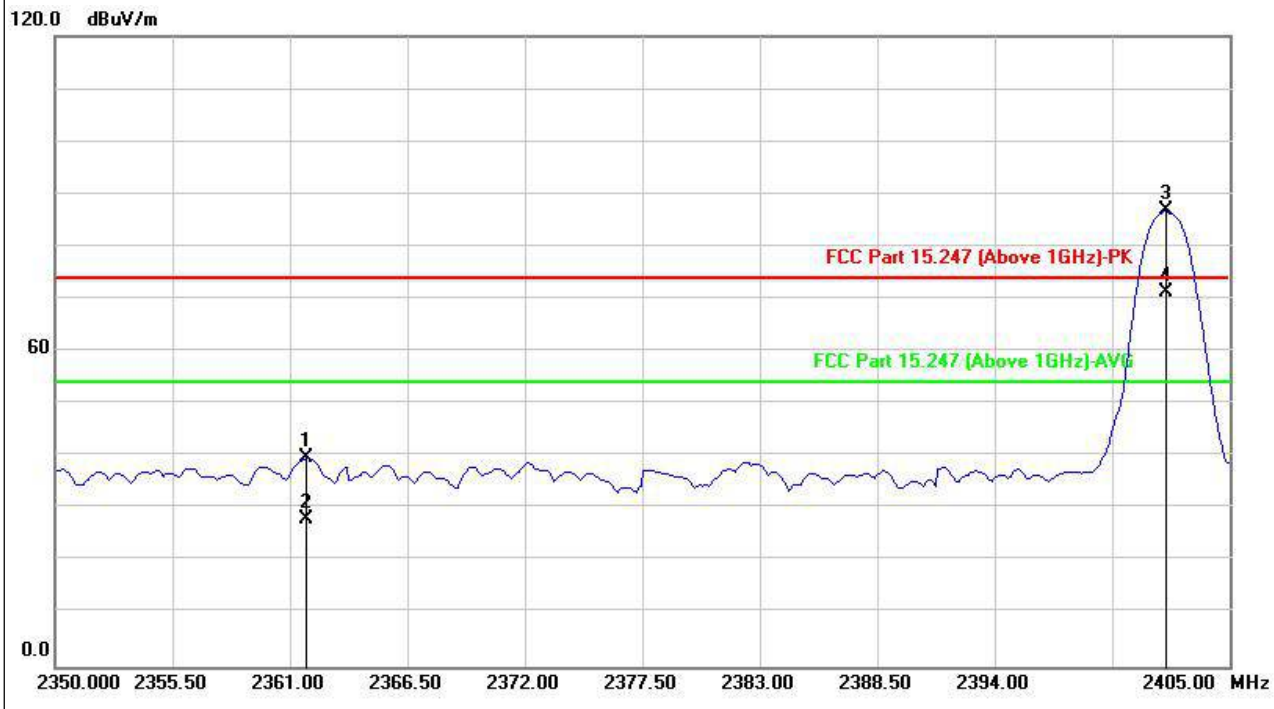
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AVG)
Test Channel	Channel 0		

Antenna Polarity & Test Distance: Horizontal at 3 m



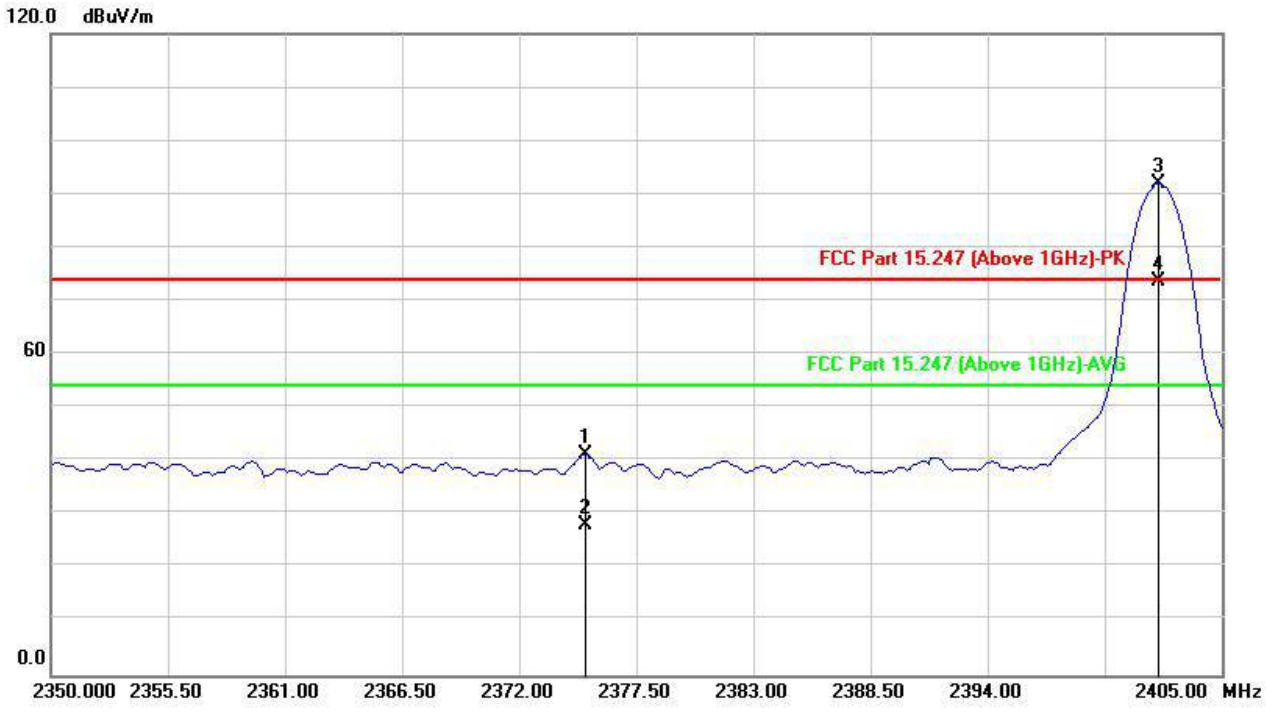
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1	2361.794	38.82	0.81	39.63	74.00	-34.37	peak	111	228
2	2361.794	27.17	0.81	27.98	54.00	-26.02	AVG	111	228
3#	2402.024	85.99	0.83	86.82			peak	111	228
4#	2402.024	70.40	0.83	71.23			AVG	111	228
5	4804.000	41.11	6.60	47.71	74.00	-26.29	peak	186	310
6	4804.000	28.76	6.60	35.36	54.00	-18.64	AVG	186	310
7	7206.000	41.36	10.08	51.44	74.00	-22.56	peak	119	248
8	7206.000	28.66	10.08	38.74	54.00	-15.26	AVG	119	248

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	2375.130	40.44	0.81	41.25	74.00	-32.75	peak	144	178
2	2375.130	27.22	0.81	28.03	54.00	-25.97	AVG	144	178
3#	2402.024	91.11	0.83	91.94			peak	144	178
4#	2402.024	72.68	0.83	73.51			AVG	144	178
5	4804.000	41.73	6.60	48.33	74.00	-25.67	peak	225	133
6	4804.000	28.71	6.60	35.31	54.00	-18.69	AVG	225	133
7	7206.000	41.40	10.08	51.48	74.00	-22.52	peak	188	120
8	7206.000	28.85	10.08	38.93	74.00	-35.07	peak	188	120

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		

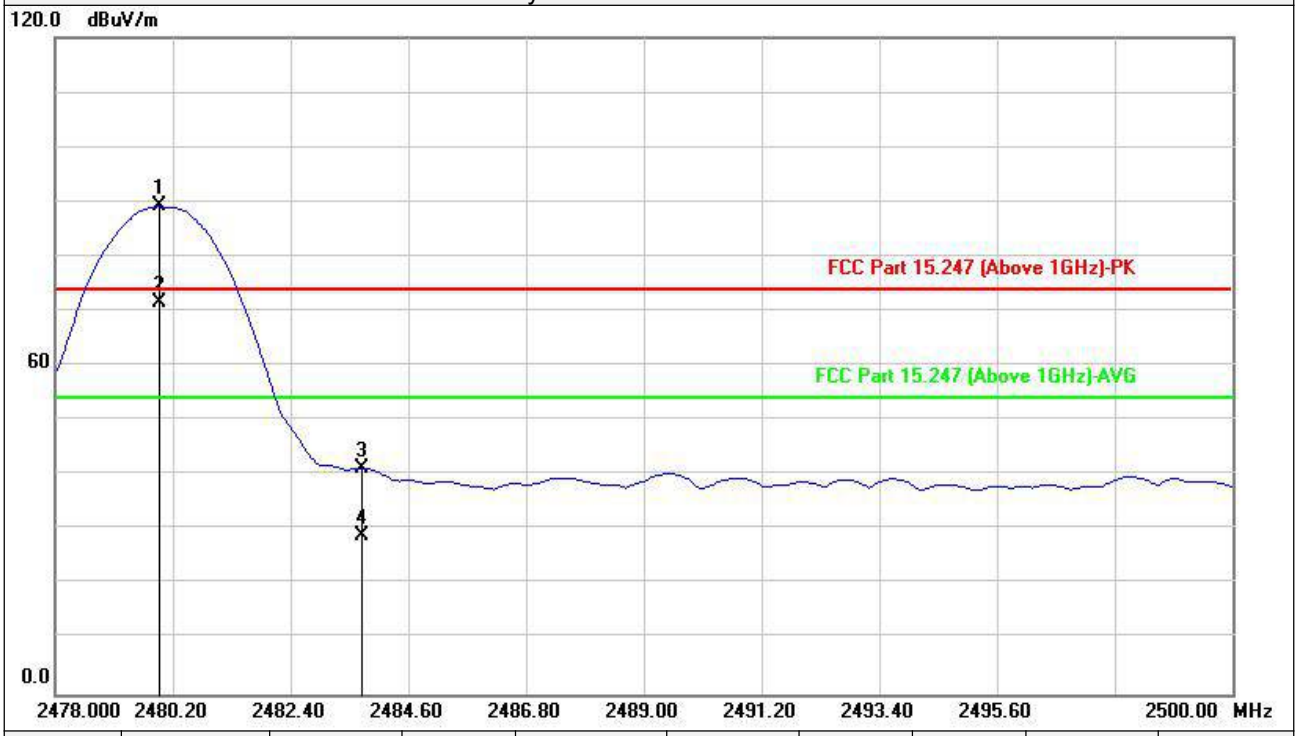
Antenna Polarity & Test Distance: Horizontal at 3 m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecte r	Antenna Height (cm)	Table Angle (Degree)
1	4882.000	40.84	6.77	47.61	74.00	-26.39	peak	201	177
2	4882.000	28.47	6.77	35.24	54.00	-18.76	AVG	201	177
3	7323.000	41.14	10.37	51.51	74.00	-22.49	peak	187	245
4	7323.000	28.49	10.37	38.86	54.00	-15.14	AVG	187	245
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	4882.000	42.63	6.77	49.40	74.00	-24.60	peak	230	166
2	4882.000	28.46	6.77	35.23	54.00	-18.77	AVG	230	166
3	7323.000	40.25	10.37	50.62	74.00	-23.38	peak	215	255
4	7323.000	28.51	10.37	38.88	54.00	-15.12	AVG	215	255

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
   Margin value = Emission level – Limit value
2. 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



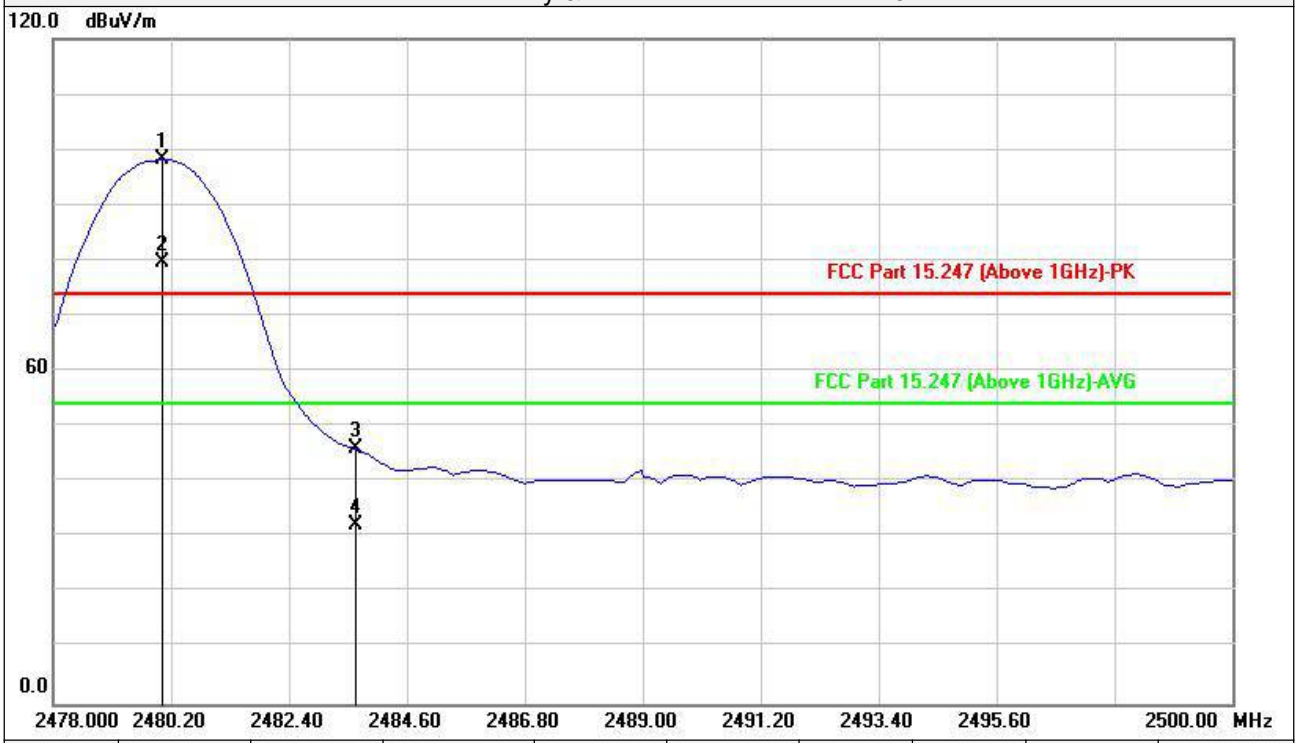
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)
1#	2479.940	88.27	0.85	89.12			peak	193	189
2#	2479.940	70.71	0.85	71.56			AVG	193	189
3	2483.731	40.46	0.85	41.31	74.00	-32.69	peak	193	189
4	2483.731	27.96	0.85	28.81	54.00	-25.19	AVG	193	189
5	4960.000	40.94	6.93	47.87	74.00	-26.13	peak	125	200
6	4960.000	28.62	6.93	35.55	54.00	-18.45	AVG	125	200
7	7440.000	40.23	10.67	50.90	74.00	-23.10	peak	114	275
8	7440.000	28.73	10.67	39.40	54.00	-14.60	AVG	114	275

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#	2480.028	97.38	0.85	98.23			peak	193	189
2#	2480.028	78.79	0.85	79.64			AVG	193	189
3	2483.643	45.18	0.85	46.03	74.00	-27.97	peak	193	189
4	2483.643	31.47	0.85	32.32	54.00	-21.68	AVG	193	189
5	4960.000	38.33	6.93	45.26	74.00	-28.74	peak	112	214
6	4960.000	28.33	6.93	35.26	54.00	-18.74	AVG	115	214
7	7440.000	37.86	10.67	48.53	74.00	-25.47	peak	158	199
8	7440.000	27.78	10.67	38.45	54.00	-15.55	AVG	158	199

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

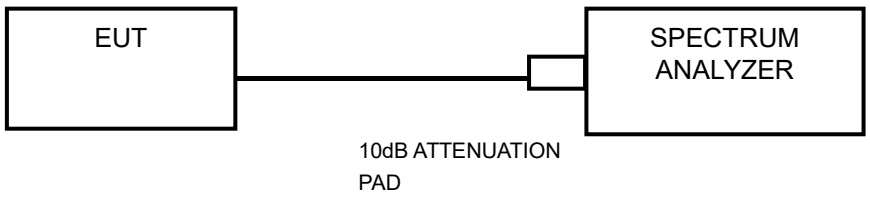
3.3.1 Limits

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.

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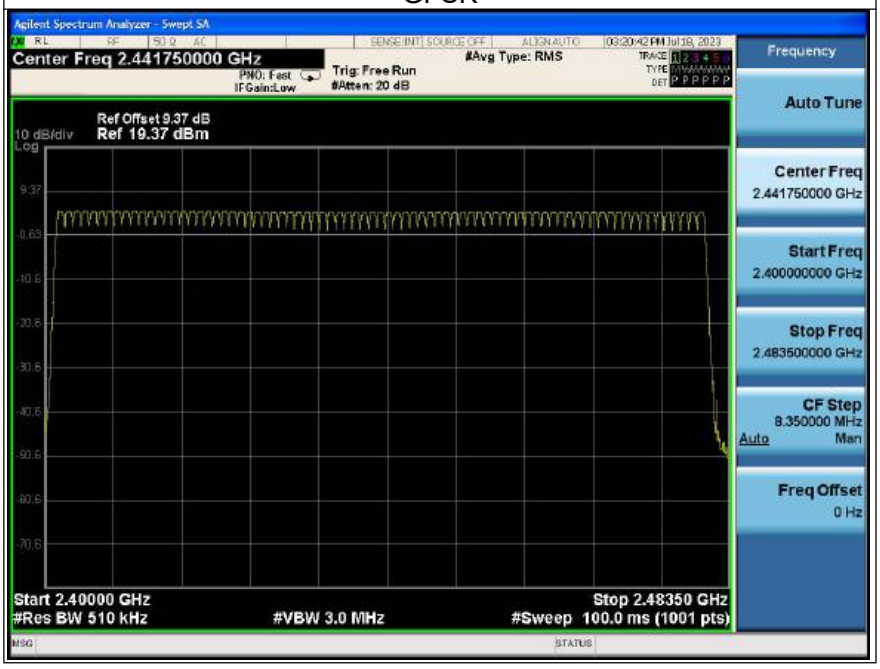

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3.4 DWELL TIME ON EACH CHANNEL

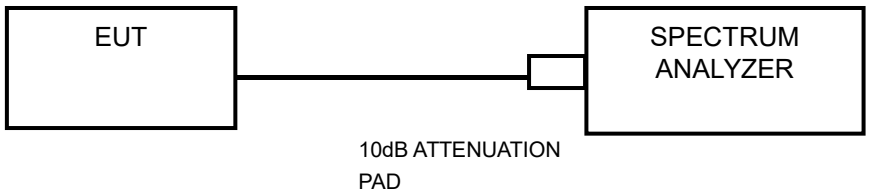
3.4.1 Limits

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

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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	31	310	0.383	118.575	400	Pass
DH3	79	31.6	3.16	15	150	1.640	246.000	400	Pass
DH5	79	31.6	3.16	9	90	2.888	259.920	400	Pass

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

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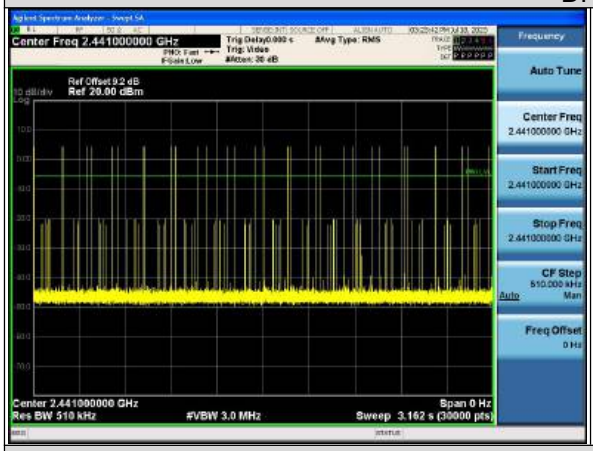
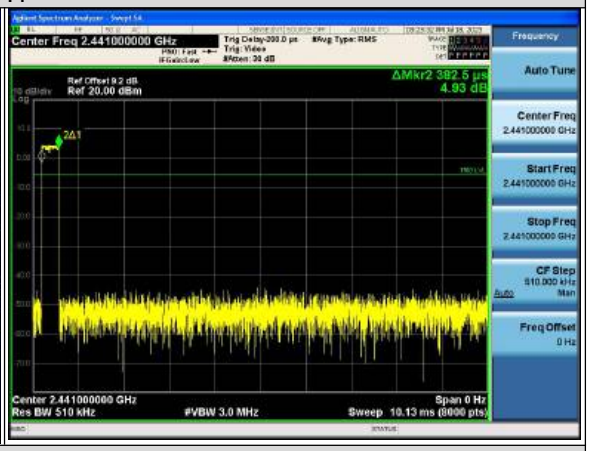
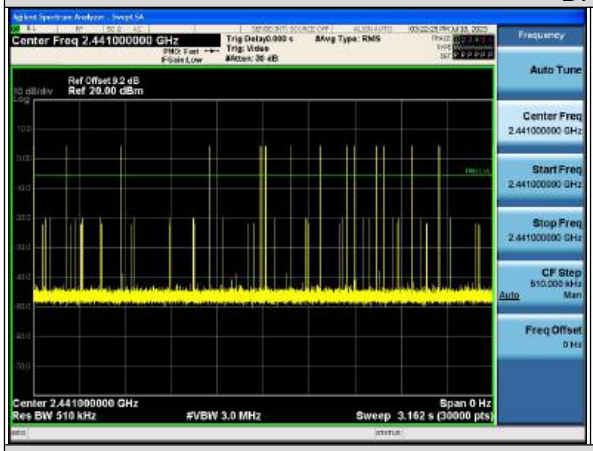
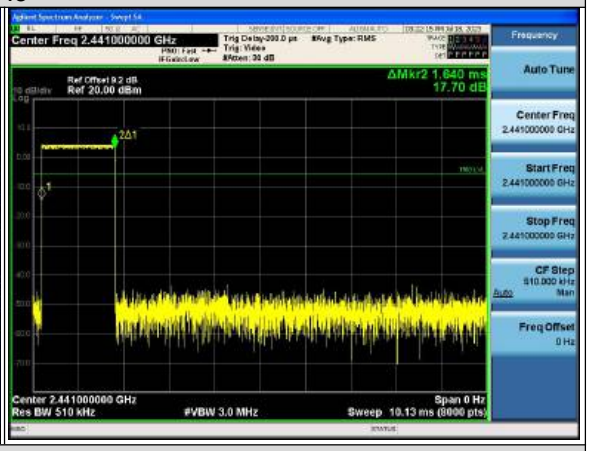
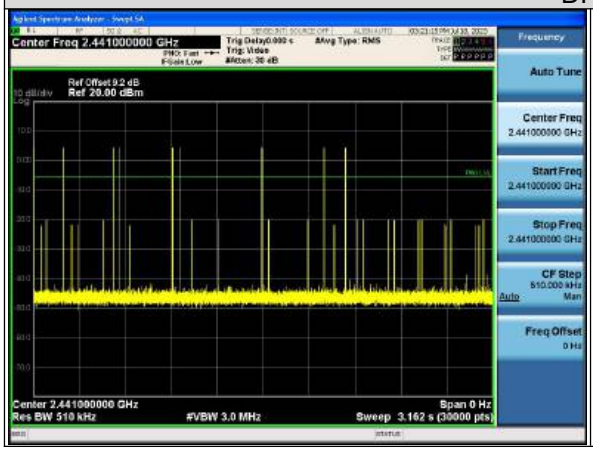
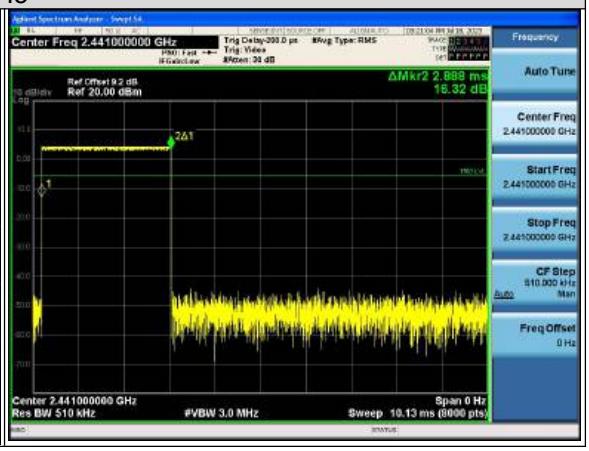
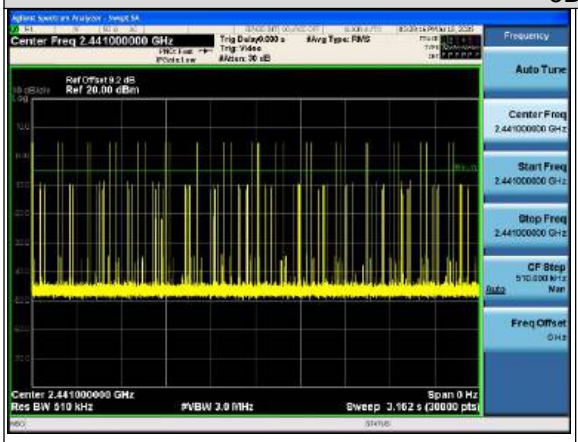
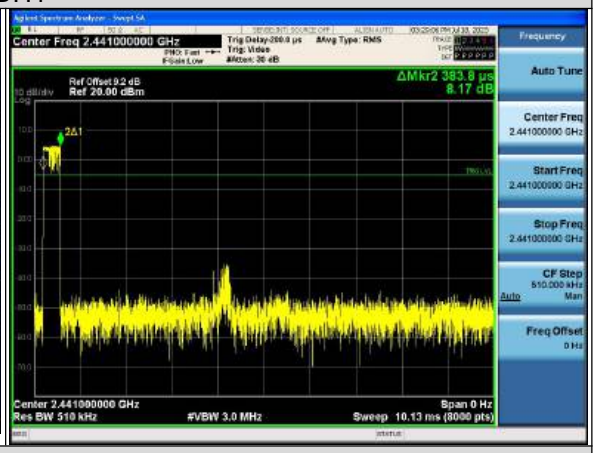
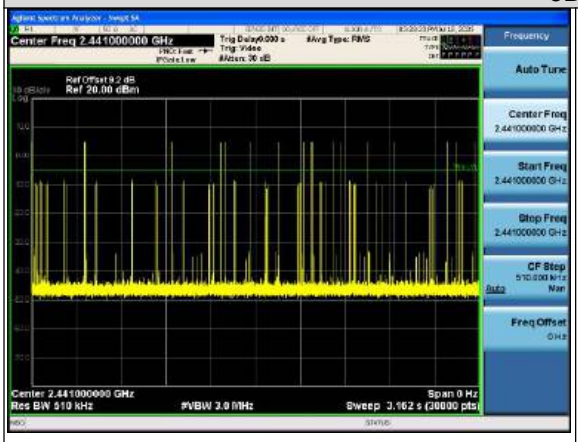
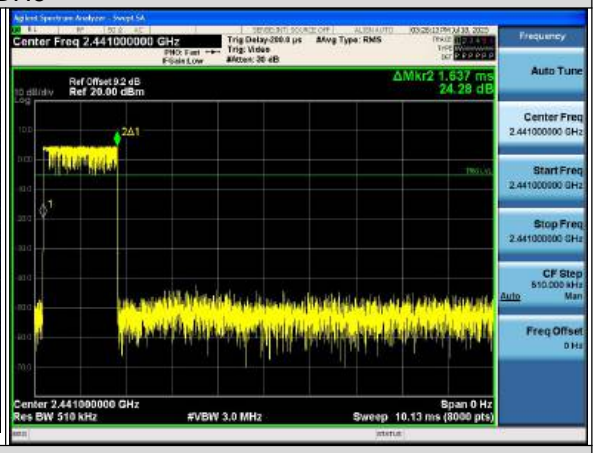
Mode	Number of Hopping Channel	Number of transmision in a period (channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	Verdict
		Period (sec)	Sweep time (sec)	times in a sweep	times in a period				
3DH1	79	31.6	3.16	30	300	0.384	115.140	400	Pass
3DH3	79	31.6	3.16	16	160	1.637	261.920	400	Pass
3DH5	79	31.6	3.16	11	110	2.885	317.350	400	Pass

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

GFSK	
DH1	
	
DH3	
	
DH5	
	

8DPSK	
3DH1	
	
3DH3	
	
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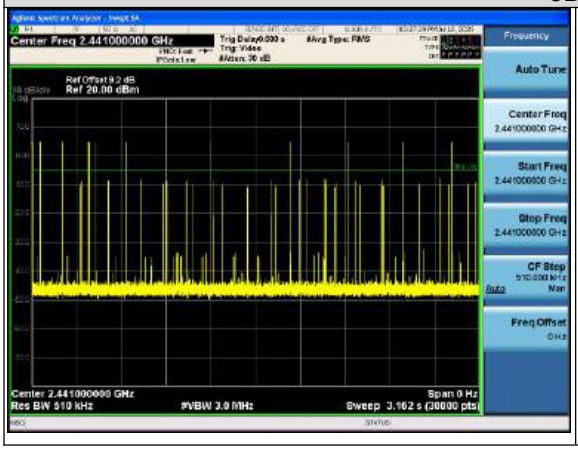
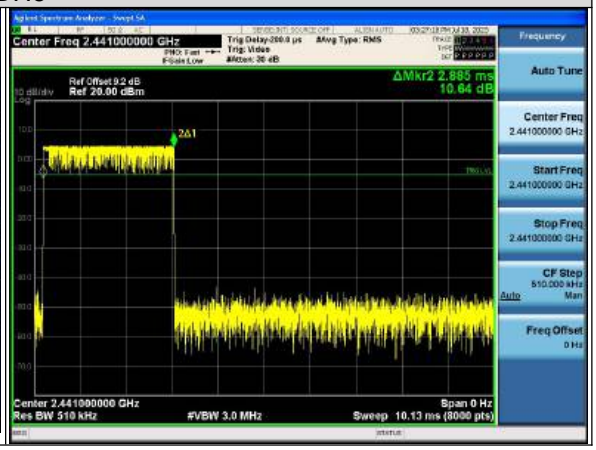
	

3.5 20DB EMISSION BANDWIDTH

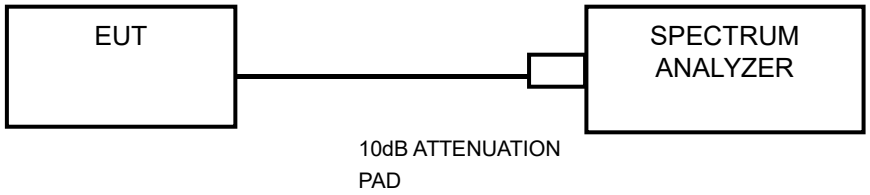
3.5.1 Limits

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)		Limit
		GFSK	8DPSK	
0	2402	0.993	1.317	>25kHz
39	2441	1.080	1.296	>25kHz
78	2480	0.978	1.317	>25kHz

GFSK	8DPSK
	
CH0	CH0
	
CH39	CH39
	
CH78	CH78

3.6 OCCUPIED BANDWIDTH MEASUREMENT

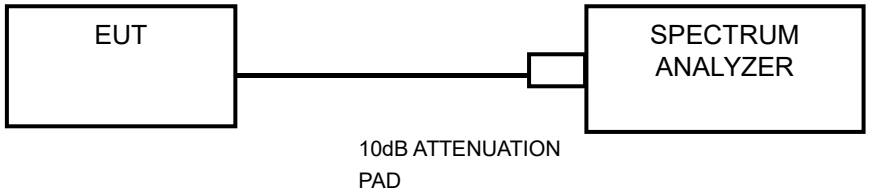
3.6.1 Limits

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

GFSK						
Operation Channel	Frequency	Occupied Bandwidth (MHz)		Measured of Frequencies (MHz)		
	(MHz)	Result	Limit	F_L	F_H	Limit
0	2402	0.8632	--	2401.505	2402.498	2400~2483.5
78	2480	0.8801	--	2479.499	2480.477	2400~2483.5

8DPSK						
Operation Channel	Frequency	Occupied Bandwidth (MHz)		Measured of Frequencies (MHz)		
	(MHz)	Result	Limit	F_L	F_H	Limit
0	2402	1.1771	--	2401.334	2402.651	2400~2483.5
78	2480	1.1912	--	2479.328	2480.645	2400~2483.5

3.7 HOPPING CHANNEL SEPARATION

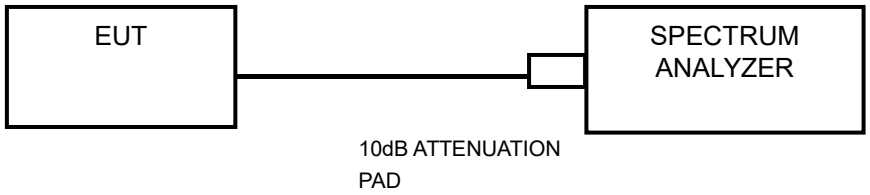
3.7.1 Limits

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

GFSK			
Hopping Channel	Frequency (MHz)	Channel Separation (MHz)	Minimum Limit (MHz)
0	2402	0.921	0.655
39	2441	1.046	0.173
78	2480	0.933	0.645

8DPSK			
Hopping Channel	Frequency (MHz)	Channel Separation (MHz)	Minimum Limit (MHz)
0	2402	0.999	0.869
39	2441	1.002	0.855
78	2480	0.996	0.869

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.

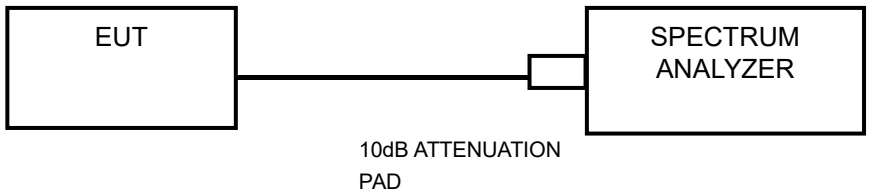
9)* Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.

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

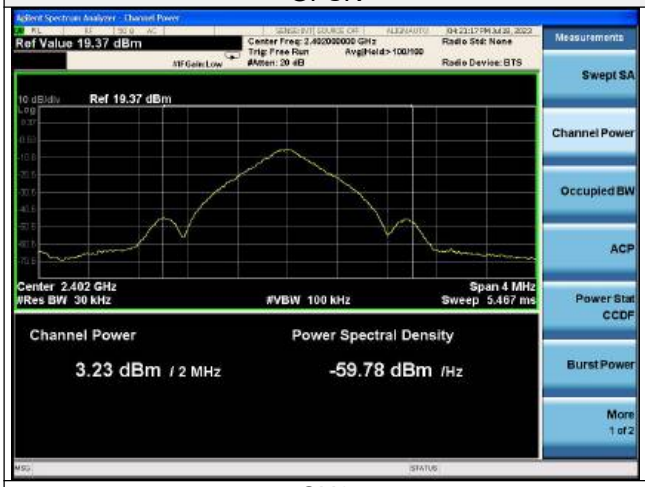
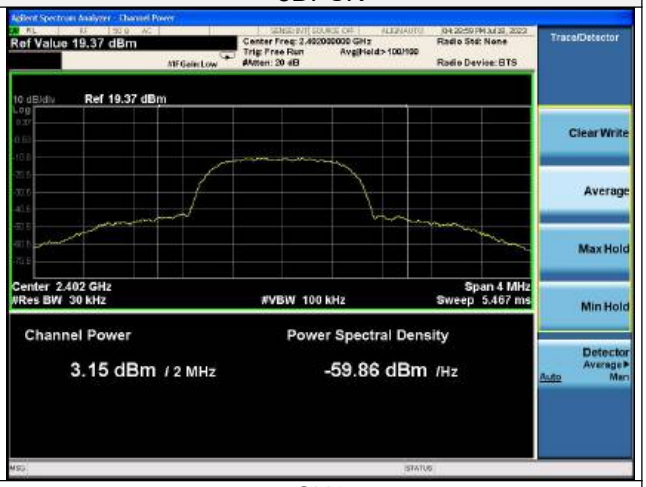
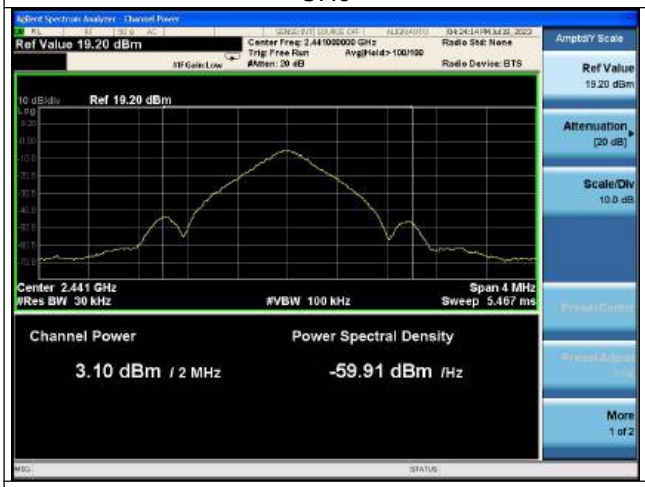
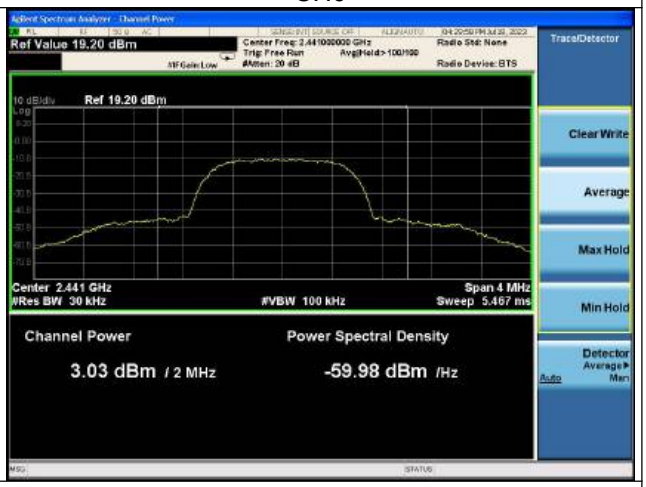
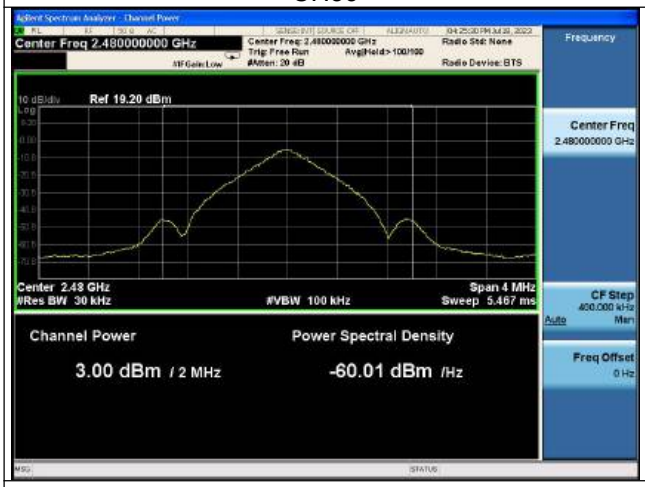


3.8.4 Test result

Peak Power							
RF Output Power						Power Limit	Verdict
Channel	Freq.	(dBm)		(mW)		(mW)	
No.	(MHz)	GFSK	Π/4DQPSK	GFSK	8DPSK		
0	2402	4.650	7.350	2.917	5.433	<125	Pass
39	2441	4.260	6.930	2.667	4.932	<125	Pass
78	2480	4.220	6.890	2.642	4.887	<125	Pass

Average Power							
RF Output Power						Power Limit	Verdict
Channel	Freq.	(dBm)		(mW)		(mW)	
No.	(MHz)	GFSK	Π/4DQPSK	GFSK	8DPSK		
0	2402	3.230	3.150	2.104	2.065	<125	Pass
39	2441	3.100	3.030	2.042	2.009	<125	Pass
78	2480	3.000	2.770	1.995	1.892	<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

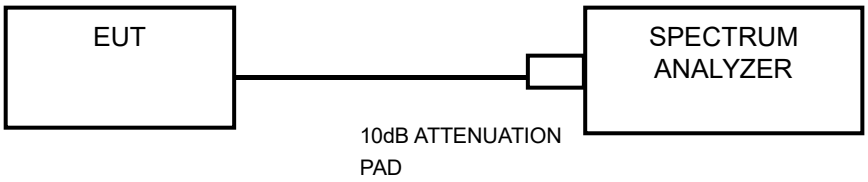
3.9.1 Limits

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.

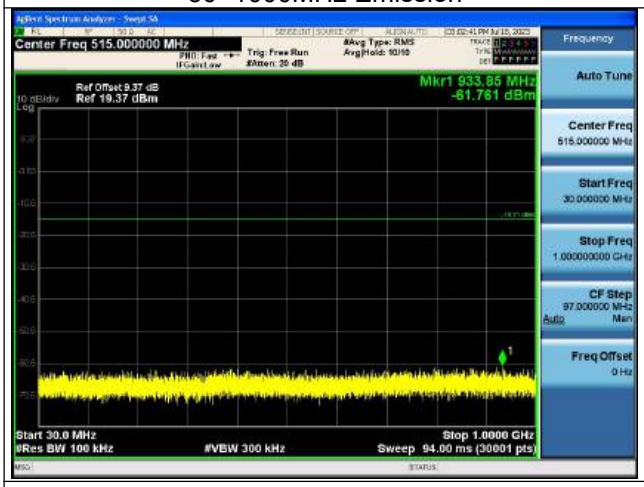
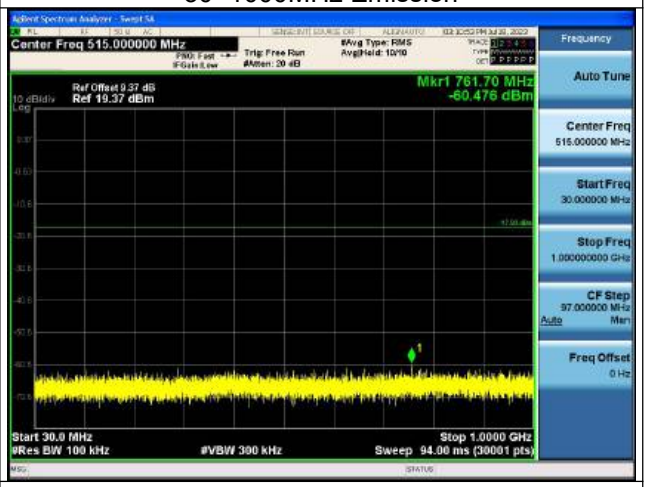
3.9.3 Test setup

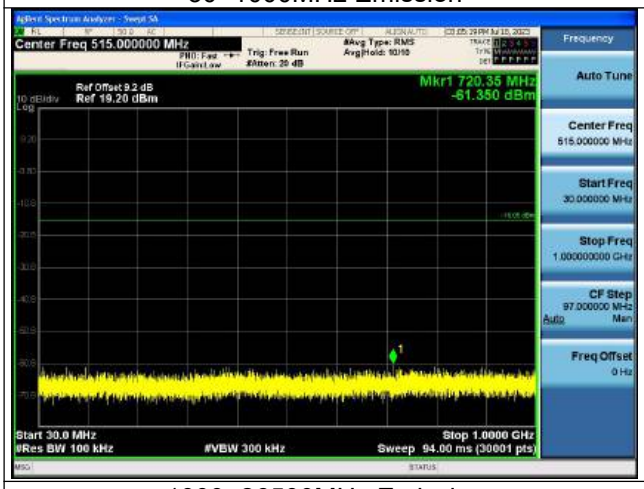
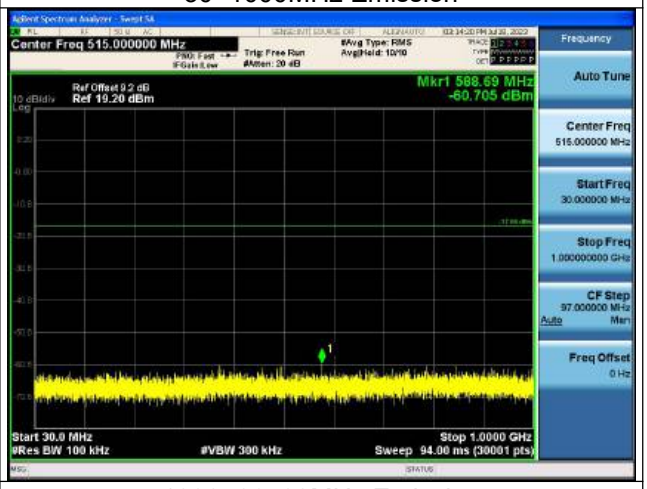


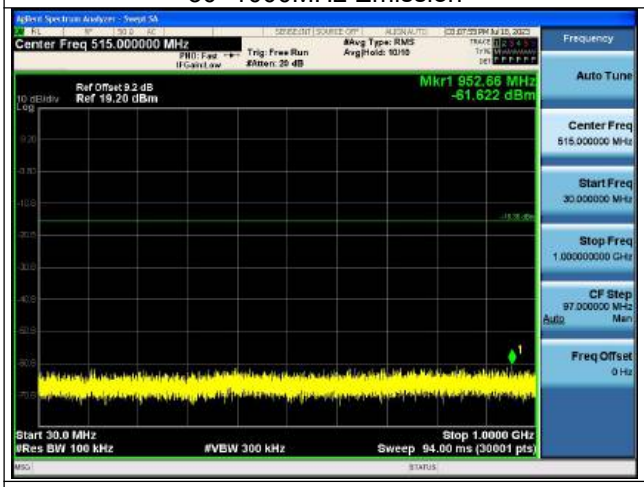
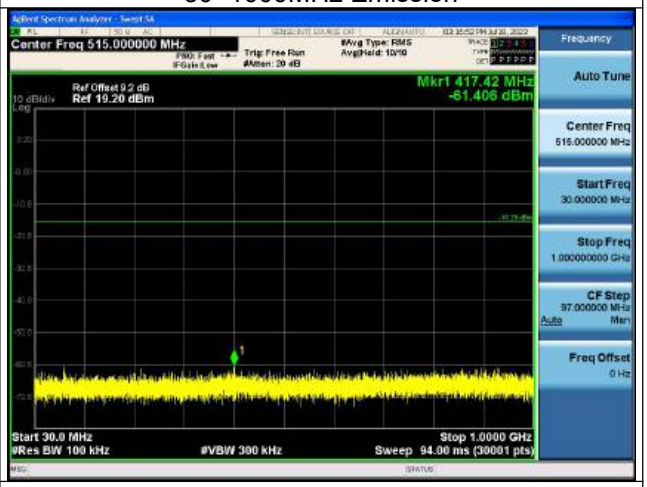
3.9.4 Test result

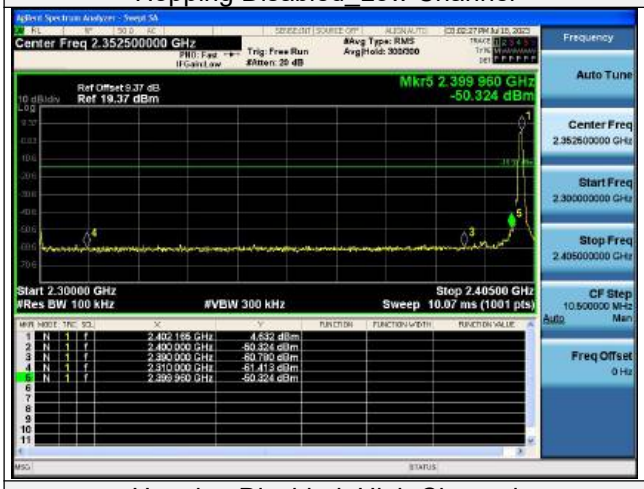
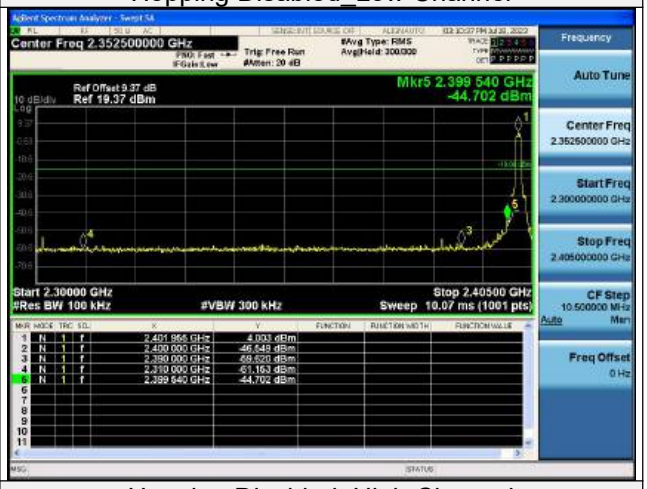
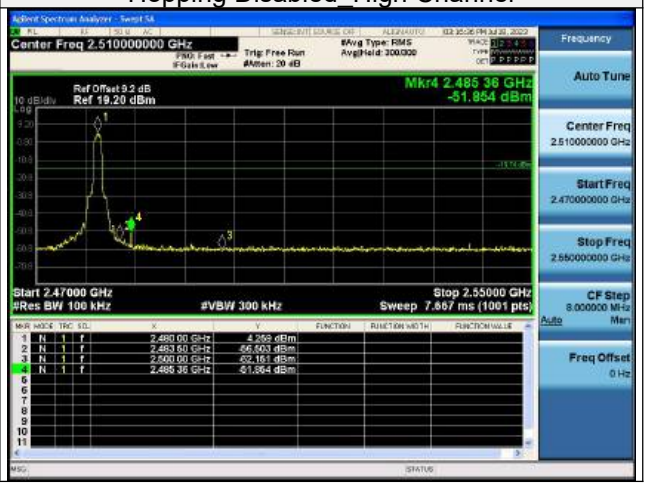
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	4.29	4.29	---	PASS
			30~1000	4.29	-61.76	≤-15.71	PASS
			1000~26500	4.29	-49.52	≤-15.71	PASS
		2441	Reference	3.95	3.95	---	PASS
			30~1000	3.95	-61.35	≤-16.05	PASS
			1000~26500	3.95	-49.76	≤-16.05	PASS
		2480	Reference	3.64	3.64	---	PASS
			30~1000	3.64	-61.62	≤-16.36	PASS
			1000~26500	3.64	-48.86	≤-16.36	PASS
3DH5	Ant1	2402	Reference	2.07	2.07	---	PASS
			30~1000	2.07	-60.48	≤-17.93	PASS
			1000~26500	2.07	-49.67	≤-17.93	PASS
		2441	Reference	2.35	2.35	---	PASS
			30~1000	2.35	-60.71	≤-17.65	PASS
			1000~26500	2.35	-49.57	≤-17.65	PASS
		2480	Reference	3.71	3.71	---	PASS
			30~1000	3.71	-61.41	≤-16.29	PASS
			1000~26500	3.71	-49.42	≤-16.29	PASS

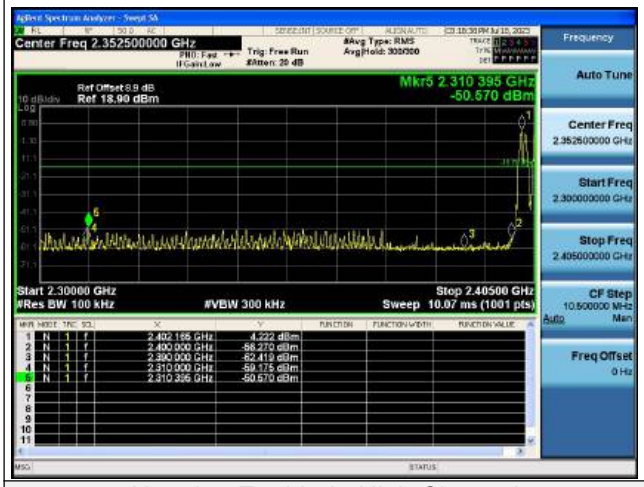
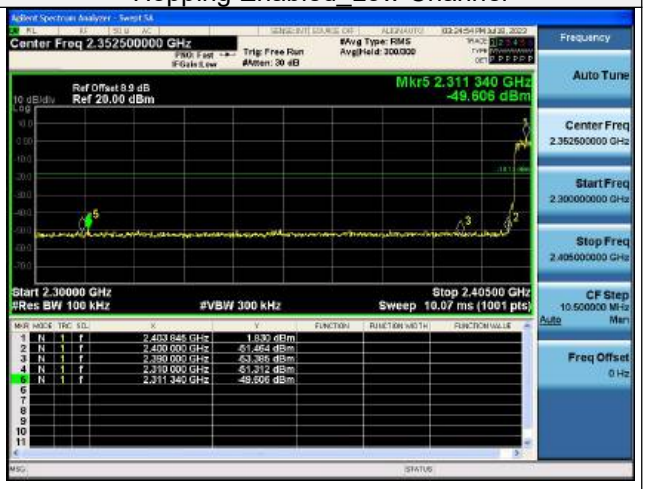
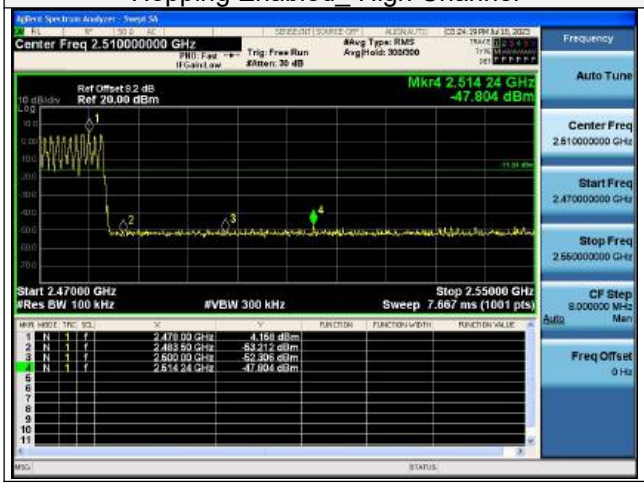
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	4.63	-50.32	≤-15.37	PASS
		High	2480	4.16	-54.54	≤-15.84	PASS
		Low	Hop_2402	4.22	-50.57	≤-15.78	PASS
		High	Hop_2480	4.16	-47.8	≤-15.84	PASS
3DH5	Ant1	Low	2402	4.00	-44.7	≤-16	PASS
		High	2480	4.26	-51.85	≤-15.74	PASS
		Low	Hop_2402	1.83	-49.61	≤-18.17	PASS
		High	Hop_2480	3.22	-49.33	≤-16.78	PASS

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
	

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_ High Channel	Hopping Enabled_ High 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).

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

Important

(1) The test report is valid without the official stamp of CVC;

(2) Any part photocopies of the test report are forbidden without the written permission from CVC;

(3) The test report is invalid without the signatures of Approval and Reviewer;

(4) The test report is invalid if altered;

(5) Objections to the test report must be submitted to CVC within 15 days.

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

(7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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