

TEST REPORT

Report No.: 8327EU012403W2

Applicant: SANWA LIMITED

Address: Room 1005, 10/F, Tower 2, Silvercord 30 Canton Road,
Tsim Sha Tsui, Kowloon Hong Kong China

Product Name: Dual-mode multimedia control mouse

Model No.: GMAWBT204BK

Trademark: SANWA

FCC ID: 2AMSUGMAWBT204BK

Test Standard(s): 47 CFR Part 15 Subpart C

Test Result: Pass

Date of Receipt: Feb. 24, 2025

Test Date: Feb. 24, 2025 – Apr. 02, 2025

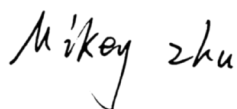
Date of Issue: Apr. 17, 2025

ISSUED BY:

SHENZHEN EU TESTING LABORATORY LIMITED



Prepared by:



Mikey Zhu/ Engineer

Reviewed and Approved by:



Sally Zhang/ Manager

Revision Record

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2 General Information

2.1 Applicant Information

Applicant	SANWA LIMITED
Address	Room 1005, 10/F, Tower 2, Silvercord 30 Canton Road, Tsim Sha Tsui, Kowloon Hong Kong China

2.2 Manufacturer Information

Manufacturer	SANWA LIMITED
Address	Room 1005, 10/F, Tower 2, Silvercord 30 Canton Road, Tsim Sha Tsui, Kowloon Hong Kong China

2.3 Factory Information

Factory	Dongguan ShangGui Electronics Co.,Ltd
Address	No.7, 7th Str. YinCheng Rd., Xiabian Village, Chang'an Town, Dongguan City, G.D, China. P.C.523876

2.4 General Description of E.U.T.

Product Name	Dual-mode multimedia control mouse
Model No. Under Test	GMAWBT204BK
List Model No.	N/A
Description of Model differentiation	N/A
Rating(s)	Input: 5V $\overline{=}$ 200mA Battery Capacity: 3.7VDC, 300mAh, 1.11Wh
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Test Sample No.	-1/2(Normal Sample), -2/2(Engineering Sample)
Hardware Version	N/A
Software Version	N/A
Remark	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.5 Technical Information of E.U.T.

Network and Wireless Connectivity	Bluetooth Low Energy (BLE) 2.4G ISM Proprietary Band
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The requirement for the following technical information of the EUT was tested in this report:

Technology	2.4G ISM Proprietary Band
Modulation Type	GFSK
Operating Frequency	2409-2470MHz
Test Channel	Low (2409 MHz), Middle (2440 MHz), High (2470 MHz)
Number of Channel	8
Antenna Type	Ceramic Antenna
Antenna Gain(Peak)	3.00 dBi
Remark	The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant.

All channels were listed on the following table:

No.	Freq. (MHz)
01	2409
02	2413
03	2422
04	2430
05	2440
06	2450
07	2460
08	2470

3 Test Summary

3.1 Test Standard

The tests were performed according to following standards:

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Intentional radiators of radio frequency equipment
2	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices

Remark:

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

3.2 Test Verdict

No.	Description	FCC Part No.	Channel	Verdict	Remark
1	Antenna Requirement	15.203	N/A	Pass	Note ¹
2	Conducted Emission at AC Power Line	15.207	Low/Middle/High	Pass	--
3	20 dB and 99% Bandwidth	15.215(c)	Low/Middle/High	Pass	--
4	Band Edge (Restricted frequency bands)	15.249(a) 15.249(d)	Low/High	Pass	--
5	Field Strength of Fundamental & Radiated Spurious Emission	15.249(a)	Low/Middle/High	Pass	--

Note ¹: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note ²: N/A" denotes test is not applicable in this test report.

3.3 Test Laboratory

Test Laboratory	Shenzhen EU Testing Laboratory Limited
Address	101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Designation Number	CN1368
Test Firm Registration Number	952583

4 Test Configuration

4.1 Test Environment

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	30% to 60%	
Atmospheric Pressure	86 kPa to 106 kPa	
Temperature	NT (Normal Temperature)	+15°C to +35°C
Working Voltage of the EUT	NV (Normal Voltage)	120VAC, 60Hz for adapter 3.7VDC battery inside

4.2 Test Equipment

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	EE-004	2025/01/08	2026/01/07
EMI Test Receiver	Rohde & Schwarz	ESCI	EE-005	2025/01/08	2026/01/07
Test Software	Farad	EZ-EMC	EE-014	N.C.R	N.C.R

Radiated Emission and RF Test					
Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE & SCHWARZ	ESPI	EE-006	2025/01/08	2026/01/07
Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	EE-007	2023/01/14	2026/01/13
Double Ridged Horn Antenna	A-INFOMW	LB-10180-NF	EE-008	2023/01/12	2026/01/11
Pre-amplifier	Agilent	8447D	EE-009	2025/01/08	2026/01/07
Pre-amplifier	Agilent	8449B	EE-010	2025/01/08	2026/01/07
MXA Signal Analyzer	Agilent	N9020A	EE-011	2025/01/08	2026/01/07
MXG RF Vector Signal Generator	Agilent	N5182A	EE-012	2025/01/08	2026/01/07
Test Software	Farad	EZ-EMC	EE-015	N.C.R	N.C.R
MIMO Power Measurement Module	TSTPASS	TSPS 2023R	EE-016	2025/01/08	2026/01/07
RF Test Software	TSTPASS	TS32893 V2.0	EE-017	N.C.R	N.C.R
Antenna Mast	TOP Precision	TPBAM-4	EE-306	N.C.R	N.C.R
Wideband Radio Communication Tester	ROHDE & SCHWARZ	CMW500	EE-402	2025/02/14	2026/02/13
Loop Antenna	TESEQ	HLA6121	EE-403	2025/02/14	2026/02/13
MXG RF Analog Signal Generator	Agilent	N5181A	EE-406	2025/02/14	2026/02/13
DRG Horn Antenna	SCHWARZBECK	BBHA 9170	EE-410	2025/02/14	2026/02/13
Pre-amplifier	SKET	LNPA-1840-50	EE-411	2025/02/14	2026/02/13
Power Meter	Anritsu	ML2495A	EE-416	2025/02/14	2026/02/13
Constant Temperature Humidity Chamber	Guangxin	GXP-401	ES-002	2024/07/30	2025/07/29

4.3 Description of Support Unit

No.	Title	Manufacturer	Model No.	Serial No.
1	Notebook	Lenovo	Xiaoxin Air 14ALC 2021	EMC-PJ-052
2	Adapter	MI	A232-050200U-CN2	EMC-PJ-004

4.4 Test Mode

No.	Test Modes	Description
TM1	2.4G TX Mode	Keep the EUT connect to AC power line and works in continuously 2.4GHz transmitting mode.

4.5 Description of Calculation

4.5.1. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS \text{ (dBuV/m)} = RA \text{ (dBuV)} + AF \text{ (dB/m)} + CL \text{ (dB)} - AG \text{ (dB)}$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

4.5.2. Disturbance Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$CD \text{ (dBuV)} = RA \text{ (dBuV)} + PL \text{ (dB)} + CL \text{ (dB)}$$

Where CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

4.6 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Test Item	Measurement Uncertainty
Conducted Emission	2.64 dB
Occupied Channel Bandwidth	2.8 %
RF output power, conducted	0.68 dB
Power Spectral Density, conducted	1.37 dB
Unwanted Emissions, conducted	1.84 dB
Radiated Emission (9kHz- 30MHz)	Ur = 2.50 dB
Radiated Emission (30MHz- 1GHz)	Ur = 2.70 dB (Horizontal)
	Ur = 2.70 dB (Vertical)
Radiated Emission (1GHz- 18GHz)	Ur = 3.50 dB (Horizontal)
	Ur = 3.50 dB (Vertical)
Radiated Emission (18GHz- 40GHz)	Ur = 5.15 dB (Horizontal)
	Ur = 5.24 dB (Vertical)
Temperature	0.8°C
Humidity	4%

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Condition

None.

5 Test Items

5.1 Antenna requirement

5.1.1 Test Requirement

Test Requirement	According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.
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5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

5.1.3 Antenna Gain

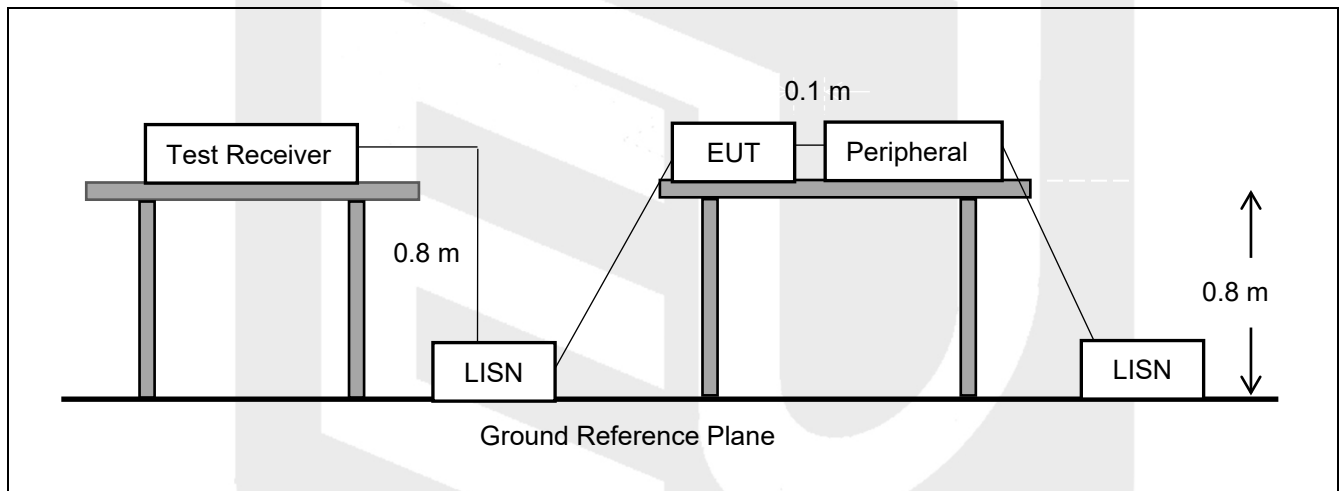
The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Conducted Emission at AC Power Line

5.2.1 Test Requirement

Test Requirement	Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	*Decreases with the logarithm of the frequency.		
Test Method	ANSI C63.10-2020 section 6.2		

5.2.2 Test Setup Diagram



5.2.3 Test Procedure

The EUT is put on the plane 0.8 m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipment. Both sides of AC line are investigated to find out the maximum conducted emission according to the test standard regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz in 150kHz~30MHz.

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

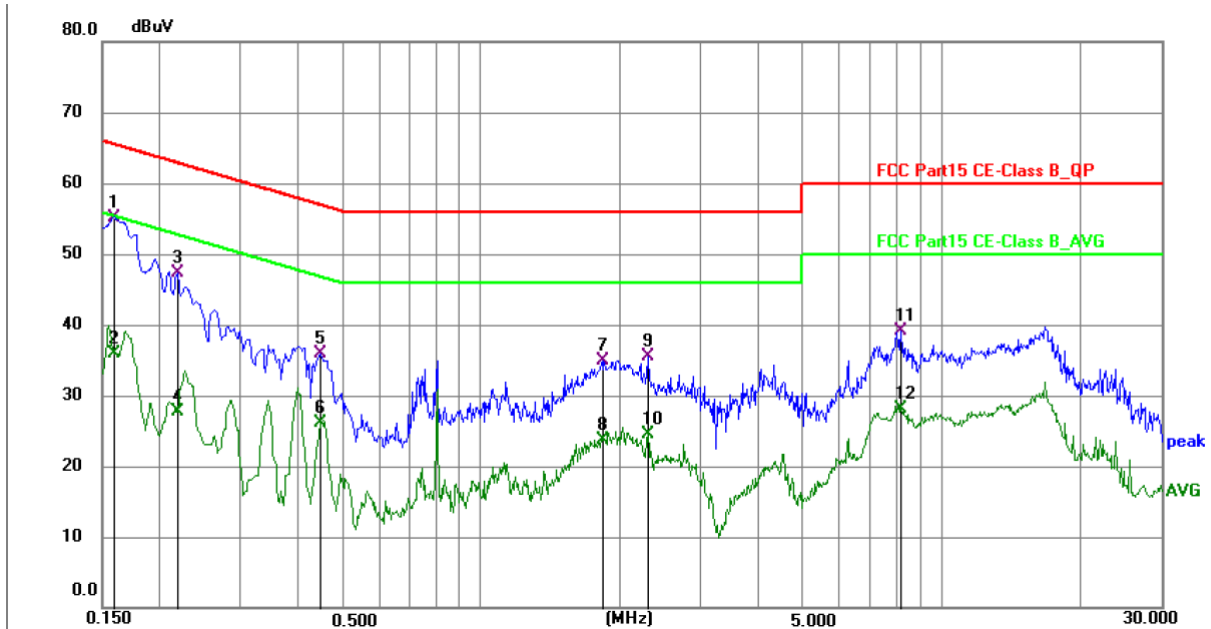
5.2.4 Test Data

PASS.

Only the worst case data was showed in the report, please to see the following pages.

Conducted Emission Test Data

Test Site: Shielded Room #1
Test Mode: TM1/ CH Middle
Comments: Live Line

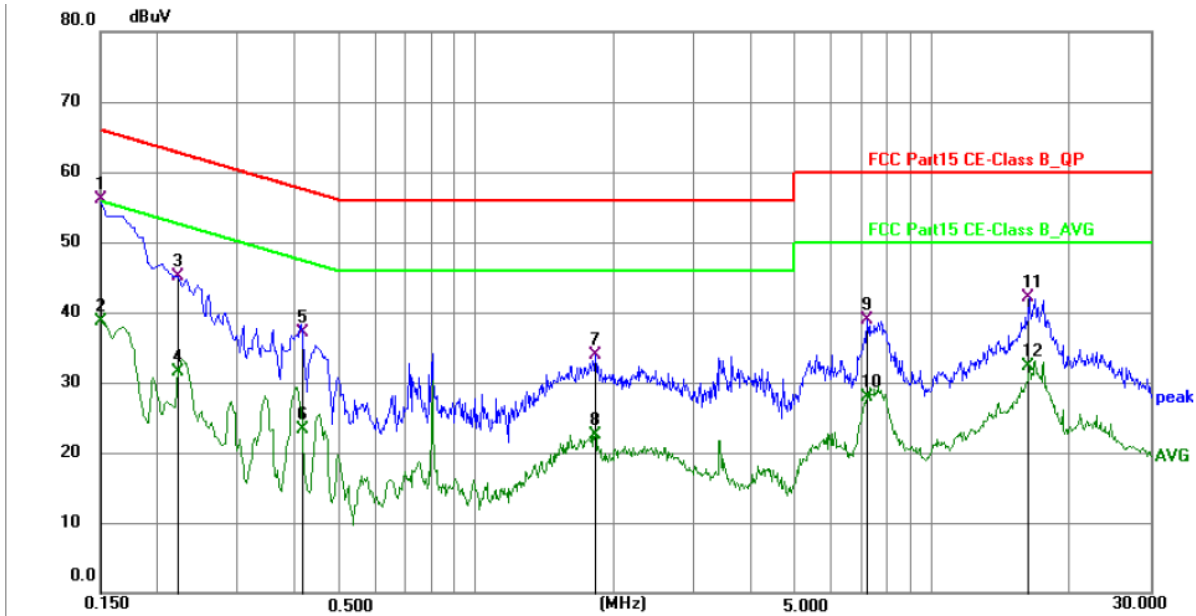


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1590	45.24	9.96	55.20	65.52	-10.32	QP	P	
2	0.1590	25.87	9.96	35.83	55.52	-19.69	AVG	P	
3	0.2175	37.26	9.97	47.23	62.91	-15.68	QP	P	
4	0.2175	17.73	9.97	27.70	52.91	-25.21	AVG	P	
5	0.4470	25.88	10.02	35.90	56.93	-21.03	QP	P	
6	0.4470	16.14	10.02	26.16	46.93	-20.77	AVG	P	
7	1.8330	24.90	10.02	34.92	56.00	-21.08	QP	P	
8	1.8330	13.61	10.02	23.63	46.00	-22.37	AVG	P	
9	2.3055	25.55	10.03	35.58	56.00	-20.42	QP	P	
10	2.3055	14.38	10.03	24.41	46.00	-21.59	AVG	P	
11	8.1780	29.05	9.99	39.04	60.00	-20.96	QP	P	
12	8.1780	18.17	9.99	28.16	50.00	-21.84	AVG	P	

Note: Level = Reading + Factor Margin = Level - Limit

Conducted Emission Test Data

Test Site: Shielded Room #1
Test Mode: TM1/ CH Middle
Comments: Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1500	46.04	9.97	56.01	66.00	-9.99	QP	P	
2	0.1500	28.67	9.97	38.64	56.00	-17.36	AVG	P	
3	0.2220	35.02	9.99	45.01	62.74	-17.73	QP	P	
4	0.2220	21.42	9.99	31.41	52.74	-21.33	AVG	P	
5	0.4148	26.99	10.05	37.04	57.55	-20.51	QP	P	
6	0.4148	13.27	10.05	23.32	47.55	-24.23	AVG	P	
7	1.8195	23.92	10.07	33.99	56.00	-22.01	QP	P	
8	1.8195	12.40	10.07	22.47	46.00	-23.53	AVG	P	
9	7.2060	28.84	10.03	38.87	60.00	-21.13	QP	P	
10	7.2060	17.88	10.03	27.91	50.00	-22.09	AVG	P	
11	16.2959	32.01	10.01	42.02	60.00	-17.98	QP	P	
12	16.2959	22.37	10.01	32.38	50.00	-17.62	AVG	P	

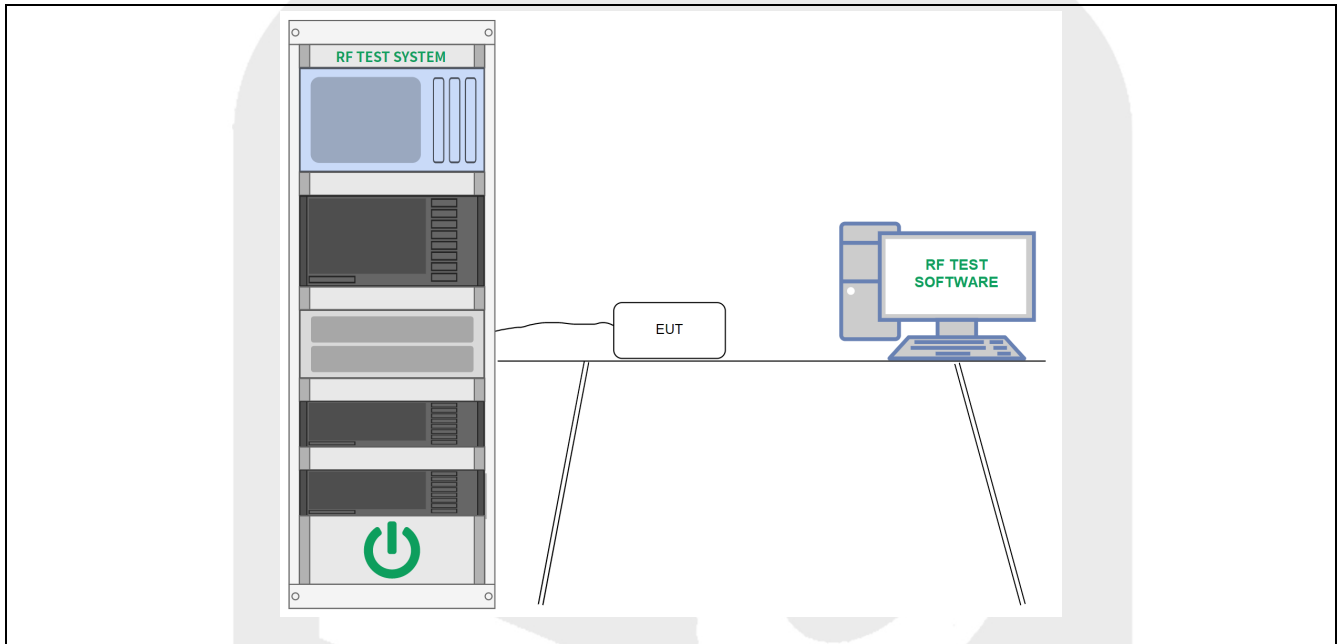
Note: Level = Reading + Factor Margin = Level - Limit

5.3 20 dB and 99% Bandwidth

5.3.1 Test Requirement

Test Requirement	Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method	ANSI C63.10-2020

5.3.2 Test Setup Diagram



5.3.3 Test Procedure

Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW $\geq$ 1% of the 20 dB bandwidth
VBW $\geq$ RBW
Sweep = auto
Detector function = peak
Trace = max hold

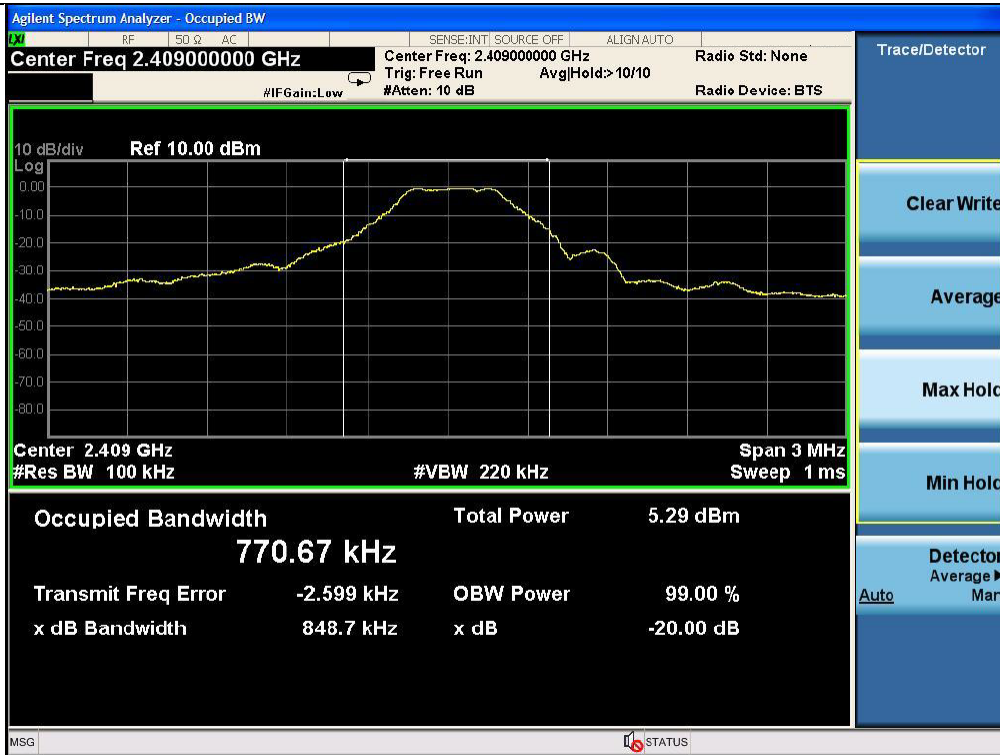
5.3.4 Test Data

PASS.

Frequency (MHz)	20 dB Bandwidth (kHz)	Verdict
2409	848.7	Pass
2440	1181.0	Pass
2470	1330.0	Pass

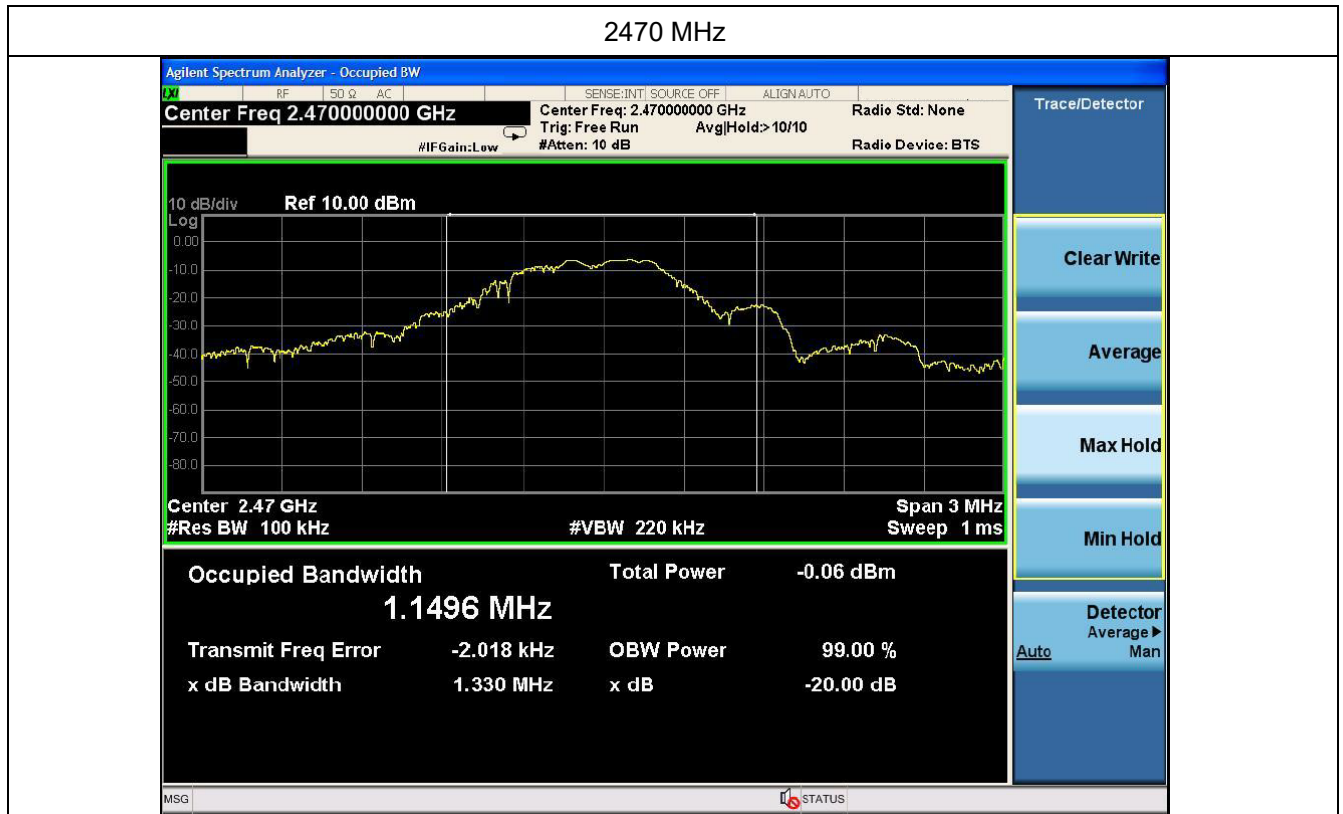
Test Plot

2409 MHz



2440 MHz



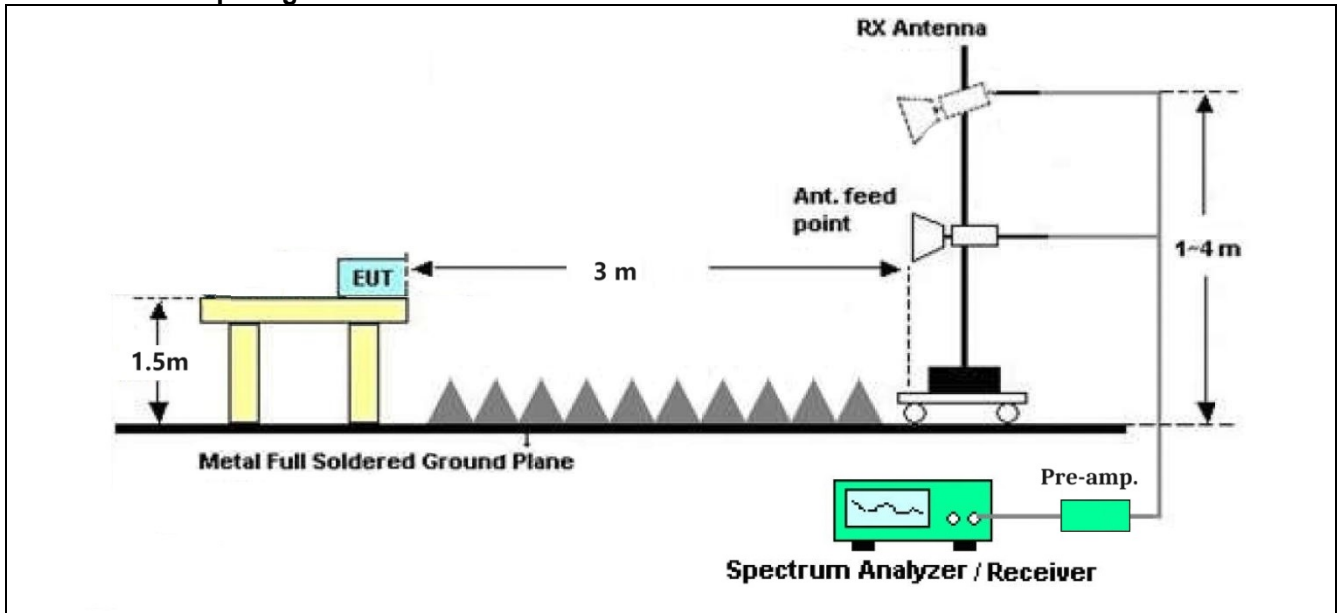


5.4 Band Edge Emissions (Restricted frequency bands)

5.4.1 Test Requirement

Test Requirement	Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).			
Test Limit	Frequency (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	
	** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
	Restricted frequency bands:			
	MHz	MHz	MHz	GHz
	0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
	0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
	2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
	4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
	4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
	4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
	6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
	6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
	6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2	
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4	
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12	
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0	
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8	
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5	
12.57675-12.57725	322-335.4	3600-4400		
13.36-13.41				
Note: 1) Field Strength (dBµV/m) = 20*log[Field Strength (µV/m)]. 2) In the emission tables above, the tighter limit applies at the band edges. 3) For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit. 4) For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).				
Test Method	ANSI C63.10-2020 section 6.6.4			

5.4.2 Test Setup Diagram



5.4.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold.

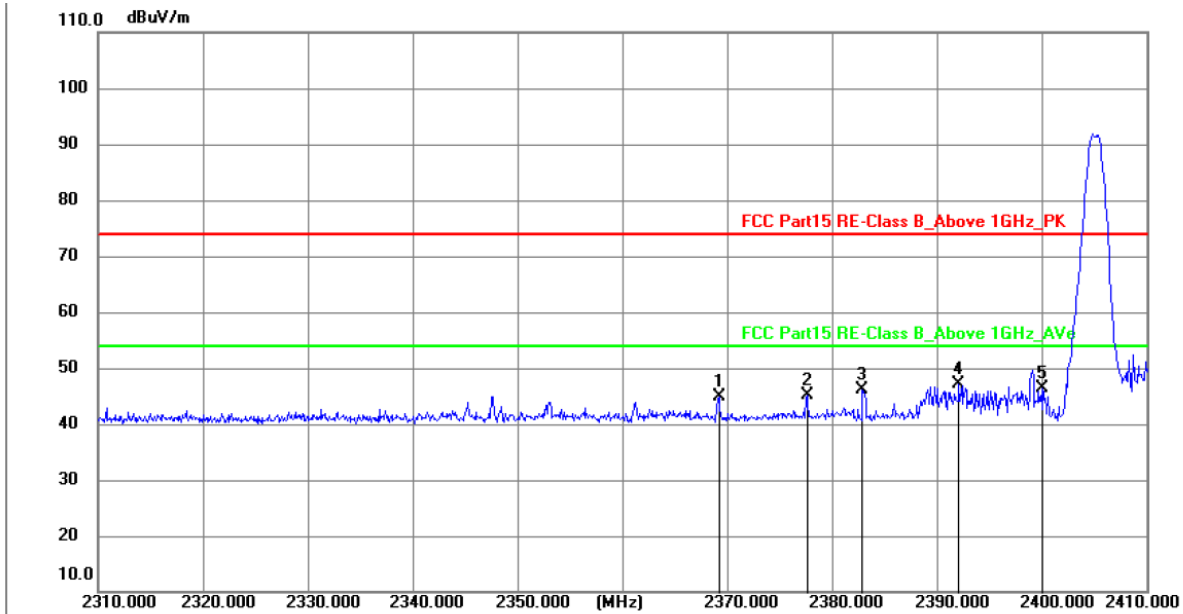
5.4.4 Test Data

PASS.

Please refer to the following pages.

Band Edge Emissions (Restricted frequency bands):

Test Site:	966 Chamber #1	Test Mode:	Low Channel
Distance:	3m	Polarization:	Horizontal



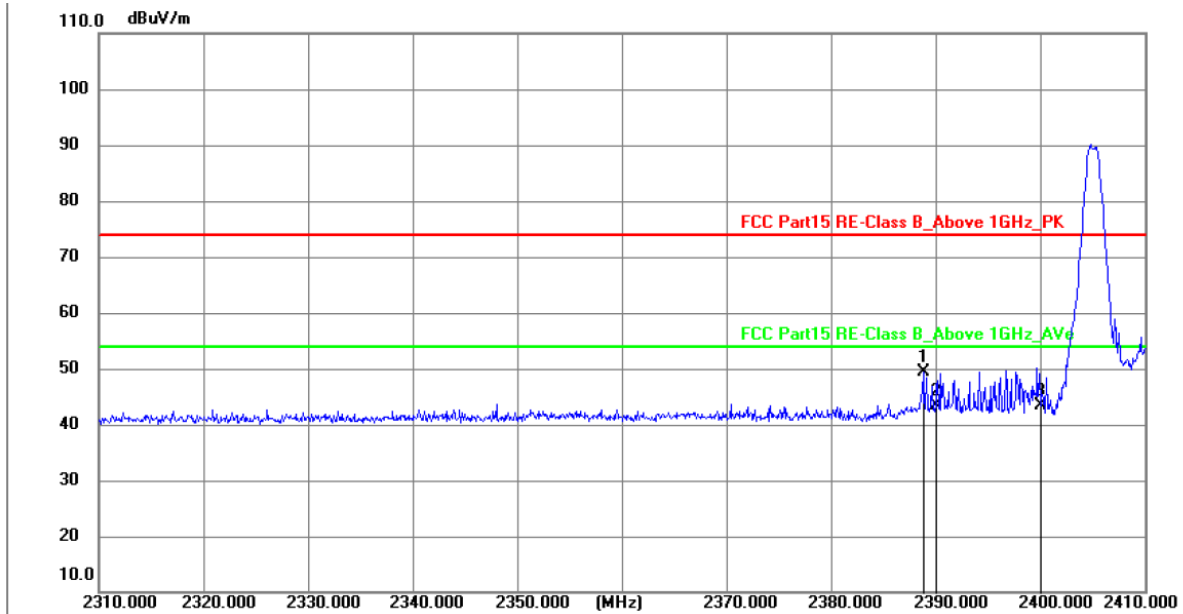
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2369.200	47.11	-2.30	44.81	74.00	-29.19	peak			P	
2	2377.600	47.37	-2.29	45.08	74.00	-28.92	peak			P	
3	2382.900	48.44	-2.28	46.16	74.00	-27.84	peak			P	
4 *	2392.100	49.47	-2.26	47.21	74.00	-26.79	peak			P	
5	2400.000	48.73	-2.24	46.49	74.00	-27.51	peak			P	

Note: Level = Reading + Factor
Margin = Level - Limit

Band Edge Emissions (Restricted frequency bands):
Test Site: 966 Chamber #1

Test Mode: Low Channel

Distance: 3m

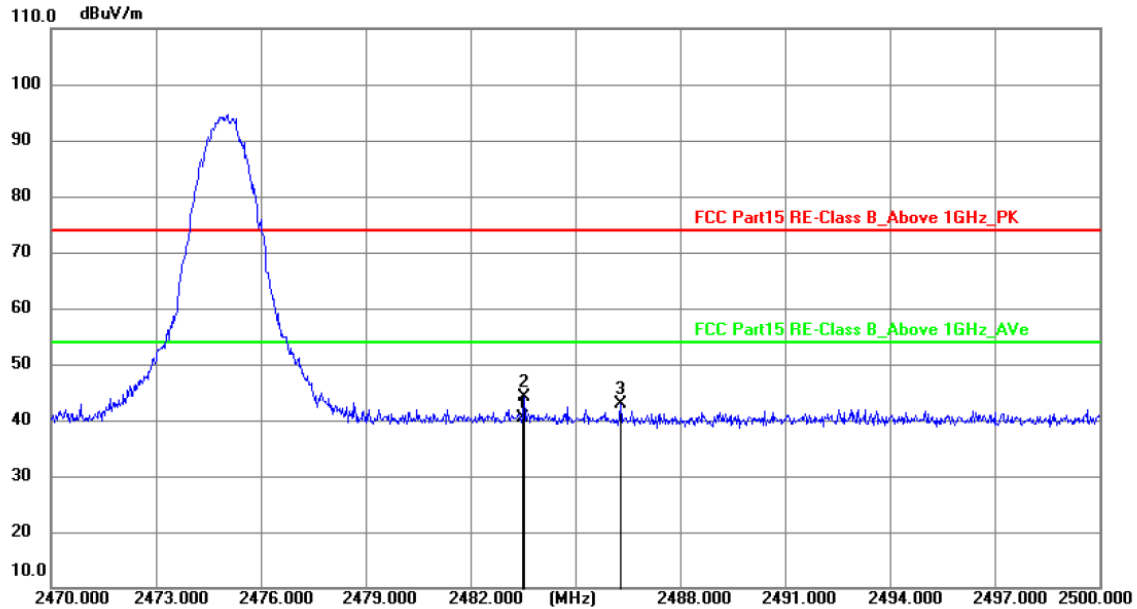
Polarization: Vertical


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2388.800	51.70	-2.26	49.44	74.00	-24.56	peak	150	360	P	
2	2390.000	45.76	-2.26	43.50	74.00	-30.50	peak	150	360	P	
3	2400.000	45.66	-2.24	43.42	74.00	-30.58	peak			P	

Note: Level = Reading + Factor
Margin = Level - Limit

Band Edge Emissions (Restricted frequency bands):

Test Site:	966 Chamber #1	Test Mode:	High Channel
Distance:	3m	Polarization:	Horizontal

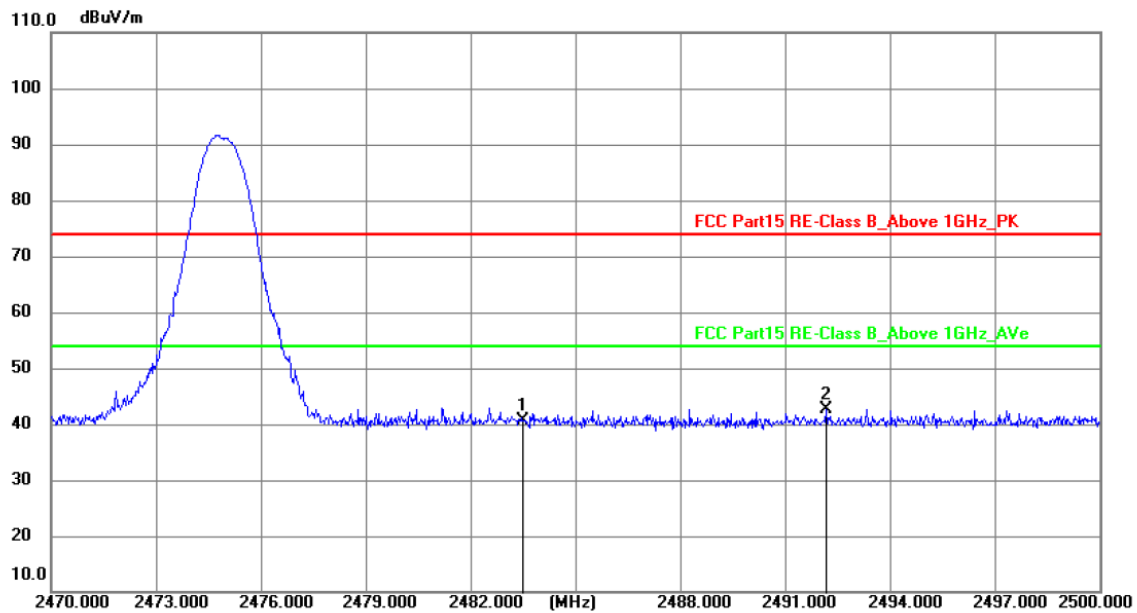


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	42.40	-2.07	40.33	74.00	-33.67	peak	150	0	P	
2 *	2483.530	46.14	-2.07	44.07	74.00	-29.93	peak	150	0	P	
3	2486.290	45.07	-2.07	43.00	74.00	-31.00	peak	150	0	P	

Note: Level = Reading + Factor
Margin = Level - Limit

Band Edge Emissions (Restricted frequency bands):

Test Site:	966 Chamber #1	Test Mode:	High Channel
Distance:	3m	Polarization:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	42.68	-2.07	40.61	74.00	-33.39	peak	150	0	P	
2 *	2492.170	44.65	-2.05	42.60	74.00	-31.40	peak	150	0	P	

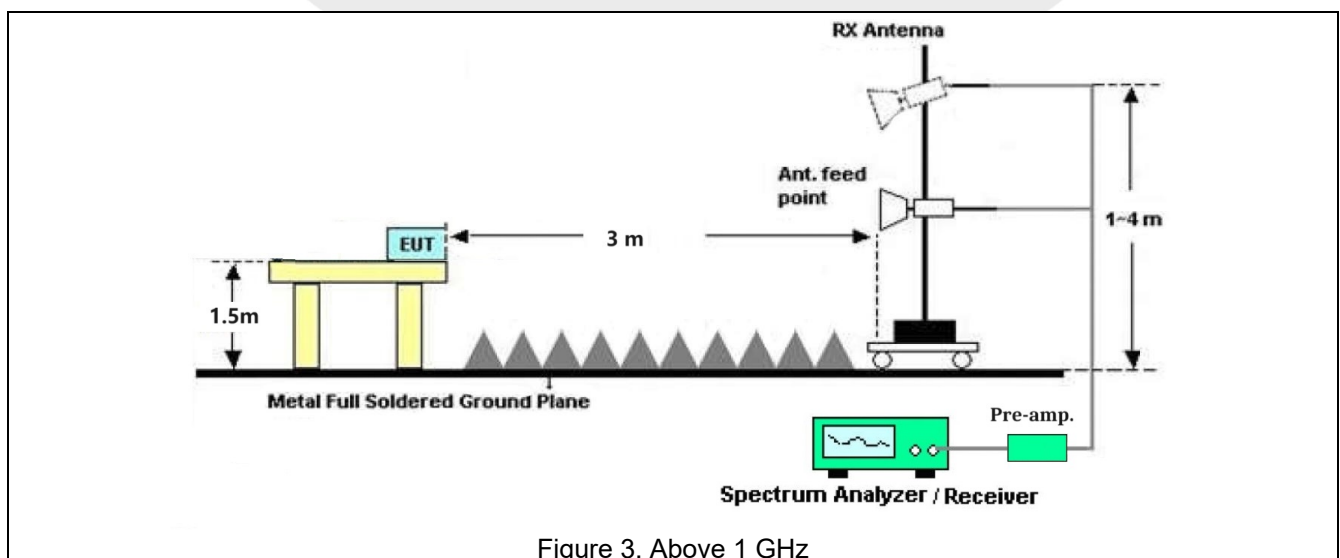
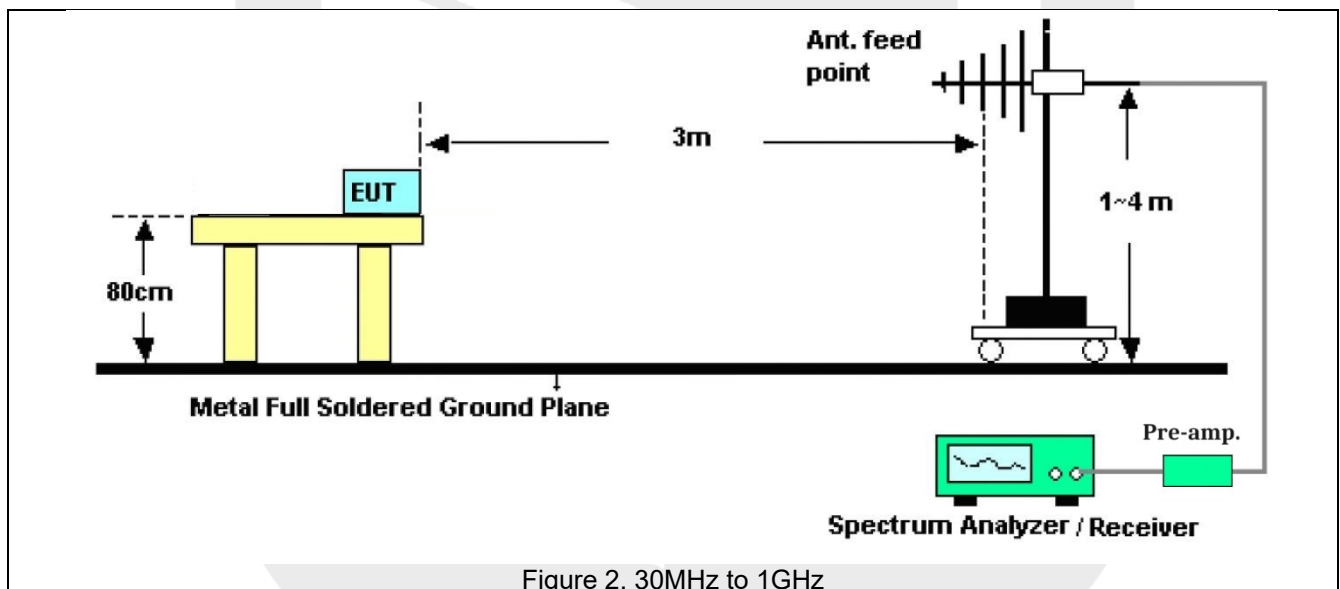
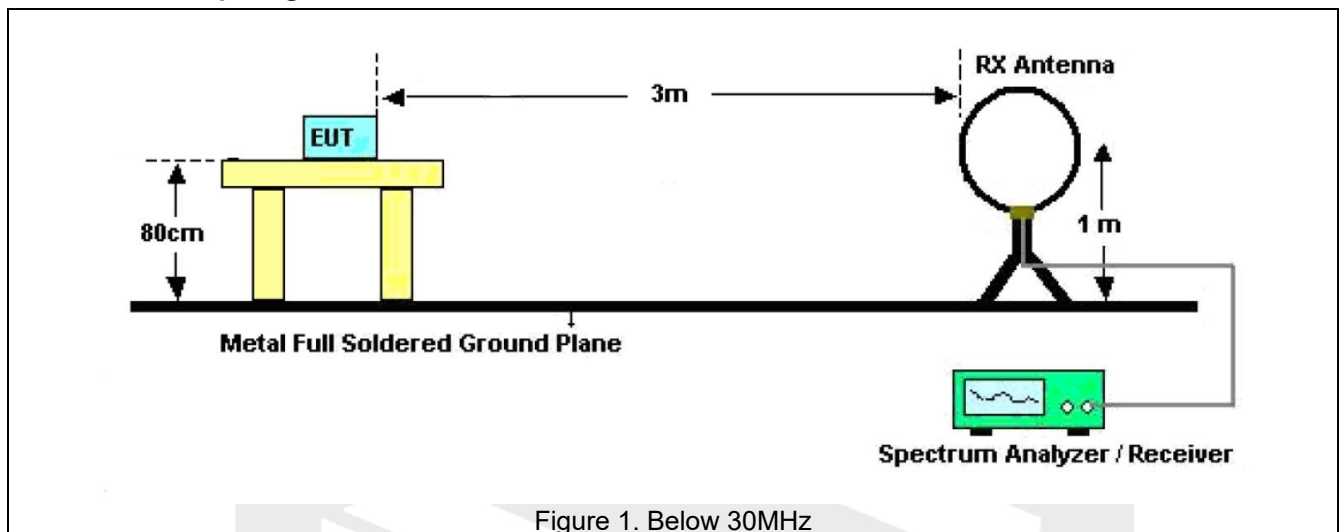
Note: Level = Reading + Factor
Margin = Level - Limit

5.5 Fundamental and Radiated Spurious Emission

5.5.1 Test Requirement

Test Requirement	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).		
Test Limit	§ 15.249 (a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:		
	Fundamental frequency	Field strength of fundamental emissions (mV/m)	Field strength of harmonics emissions (microvolts/meter)
	902-928 MHz	50	500
	2400-2483.5 MHz	50	500
	5725-5875 MHz	50	500
	24.0-24.25 GHz	250	2500
	Field strength limits are specified at a distance of 3 meters.		
	§ 15.209:		
	Frequency (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	
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Note:			
1) Field Strength (dBµV/m) = 20*log[Field Strength (µV/m)].			
2) In the emission tables above, the tighter limit applies at the band edges.			
3) For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.			
4) For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).			
Test Method	ANSI C63.10-2020 section 6.6.4		

5.5.2 Test Setup Diagram



5.5.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power.

Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW = 1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9kHz, VBW = 30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW = 300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW = 1MHz, VBW = 1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW = 1MHz, VBW = 10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.5.4 Test Data

PASS.

Please to see the following pages.

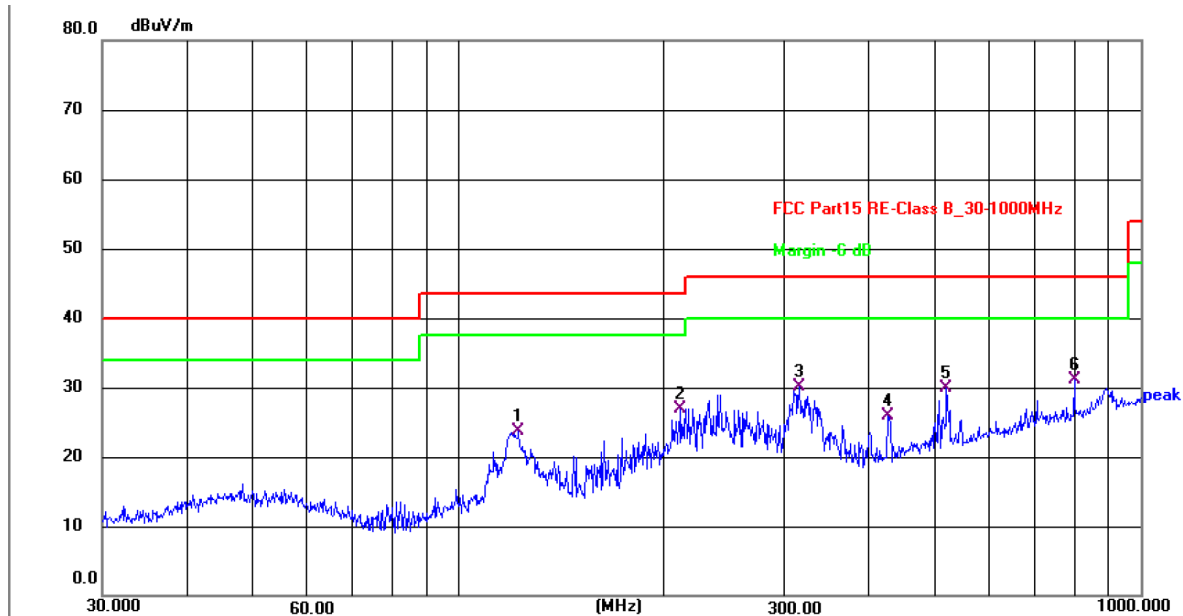
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

For test of 30MHz-1GHz, during the test, pre-scan all modes, only the worst case is recorded in the report.

Radiated Emission Test Data (30-1000MHz)
Test Site: 966 Chamber #1

Polarization: Horizontal

Distance: 3m

Test Mode: TM1/ CH High


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	122.4040	40.74	-17.06	23.68	43.50	-19.82	QP	P	
2	211.5265	41.66	-14.66	27.00	43.50	-16.50	QP	P	
3	315.4808	41.77	-11.66	30.11	46.00	-15.89	QP	P	
4	425.0280	35.49	-9.53	25.96	46.00	-20.04	QP	P	
5	519.0649	38.00	-8.04	29.96	46.00	-16.04	QP	P	
6 *	798.9797	35.04	-3.98	31.06	46.00	-14.94	QP	P	

Note: Level = Reading + Factor
Margin = Level - Limit

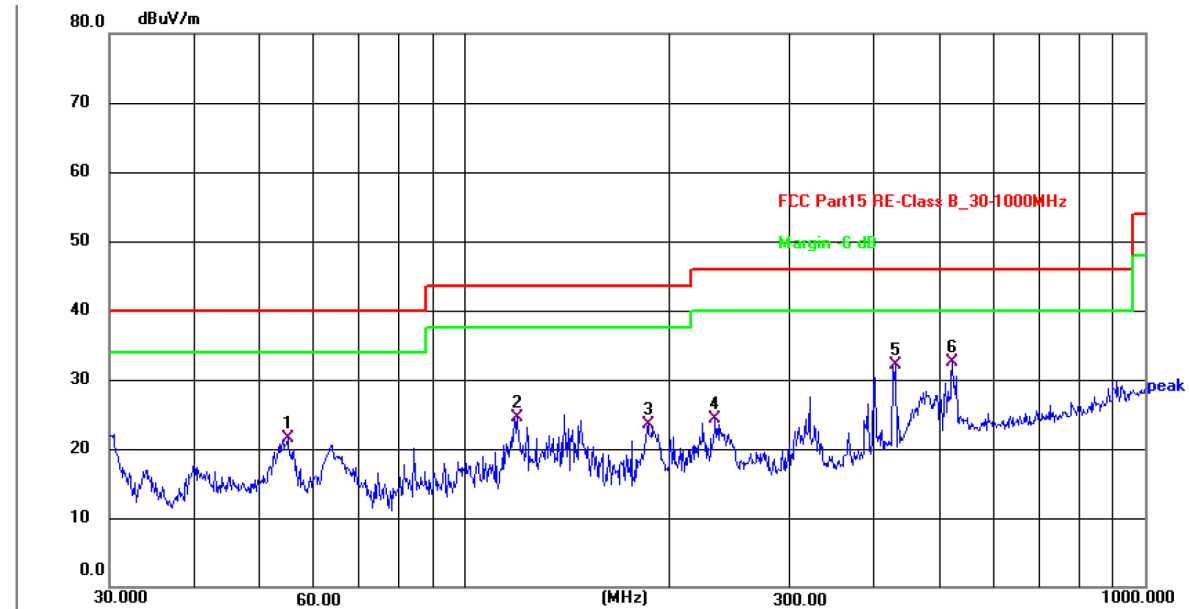
Radiated Emission Test Data (30-1000MHz)

Test Site: 966 Chamber #1

Polarization: Vertical

Distance: 3m

Test Mode: TM1/ CH High



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	54.8348	35.91	-14.50	21.41	40.00	-18.59	QP	P	
2	119.4361	41.33	-16.88	24.45	43.50	-19.05	QP	P	
3	185.7882	39.60	-16.10	23.50	43.50	-20.00	QP	P	
4	233.3487	38.36	-14.02	24.34	46.00	-21.66	QP	P	
5	429.5228	41.65	-9.46	32.19	46.00	-13.81	QP	P	
6 *	520.8882	40.39	-7.89	32.50	46.00	-13.50	QP	P	

Note: Level = Reading + Factor

Margin = Level - Limit

Field strength of the Fundamental signal Test Data

Test Mode: GFSK										
Pol.	Freq. (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
H	2409	94.13	31.21	2.17	35.30	92.21	114.00	-21.79	PK	PASS
H	2409	84.98	31.21	2.17	35.30	83.06	94.00	-10.94	AV	PASS
V	2409	93.36	31.21	2.17	35.30	91.44	114.00	-22.56	PK	PASS
V	2409	83.38	31.21	2.17	35.30	81.46	94.00	-12.54	AV	PASS
H	2440	94.44	31.21	2.17	35.30	92.52	114.00	-21.48	PK	PASS
H	2440	82.03	31.21	2.17	35.30	80.11	94.00	-13.89	AV	PASS
V	2440	96.52	31.21	2.17	35.30	94.60	114.00	-19.40	PK	PASS
V	2440	85.83	31.21	2.17	35.30	83.91	94.00	-10.09	AV	PASS
H	2470	96.45	31.21	2.17	35.30	94.53	114.00	-19.47	PK	PASS
H	2470	82.85	31.21	2.17	35.30	80.93	94.00	-13.07	AV	PASS
V	2470	94.88	31.21	2.17	35.30	92.96	114.00	-21.04	PK	PASS
V	2470	82.46	31.21	2.17	35.30	80.54	94.00	-13.46	AV	PASS

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH Low: 2405 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4810.69	41.78	4.92	46.70	74.00	-27.30	PK	PASS
V	7215.76	34.78	9.83	44.61	74.00	-29.40	PK	PASS
V	9620.36	31.00	13.22	44.22	74.00	-29.78	PK	PASS
V	12025.73	*	*	*	74.00	*	PK	PASS
V	14430.34	*	*	*	74.00	*	PK	PASS
V	16835.24	*	*	*	74.00	*	PK	PASS
H	4810.16	41.28	4.92	46.20	74.00	-27.81	PK	PASS
H	7215.37	33.82	9.83	43.65	74.00	-30.36	PK	PASS
H	9620.90	29.83	13.22	43.05	74.00	-30.96	PK	PASS
H	12025.86	*	*	*	74.00	*	PK	PASS
H	14430.03	*	*	*	74.00	*	PK	PASS
H	16835.97	*	*	*	74.00	*	PK	PASS
V	4810.43	32.72	4.92	37.64	54.00	-16.36	AV	PASS
V	7215.82	23.80	9.83	33.63	54.00	-20.37	AV	PASS
V	9620.33	17.31	13.22	30.53	54.00	-23.48	AV	PASS
V	12025.99	*	*	*	54.00	*	AV	PASS
V	14430.93	*	*	*	54.00	*	AV	PASS
V	16835.77	*	*	*	54.00	*	AV	PASS
H	4810.16	32.13	4.92	37.05	54.00	-16.95	AV	PASS
H	7215.37	22.10	9.83	31.93	54.00	-22.07	AV	PASS
H	9620.90	17.74	13.22	30.96	54.00	-23.05	AV	PASS
H	12025.86	*	*	*	54.00	*	AV	PASS
H	14430.03	*	*	*	54.00	*	AV	PASS
H	16835.97	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH Middle: 2440 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4880.07	41.75	4.92	46.67	74.00	-27.34	PK	PASS
V	7320.52	34.73	9.83	44.56	74.00	-29.44	PK	PASS
V	9760.77	28.24	13.22	41.46	74.00	-32.54	PK	PASS
V	12200.69	*	*	*	74.00	*	PK	PASS
V	14640.06	*	*	*	74.00	*	PK	PASS
V	17080.37	*	*	*	74.00	*	PK	PASS
H	4880.68	41.85	4.92	46.77	74.00	-27.23	PK	PASS
H	7320.23	34.16	9.83	43.99	74.00	-30.02	PK	PASS
H	9760.38	29.97	13.22	43.19	74.00	-30.81	PK	PASS
H	12200.27	*	*	*	74.00	*	PK	PASS
H	14640.55	*	*	*	74.00	*	PK	PASS
H	17080.06	*	*	*	74.00	*	PK	PASS
V	4880.06	30.35	4.92	35.27	54.00	-18.74	AV	PASS
V	7320.32	22.89	9.83	32.72	54.00	-21.29	AV	PASS
V	9760.12	18.53	13.22	31.75	54.00	-22.25	AV	PASS
V	12200.25	*	*	*	54.00	*	AV	PASS
V	14640.58	*	*	*	54.00	*	AV	PASS
V	17080.45	*	*	*	54.00	*	AV	PASS
H	4880.68	30.83	4.92	35.75	54.00	-18.26	AV	PASS
H	7320.23	23.97	9.83	33.80	54.00	-20.21	AV	PASS
H	9760.38	17.29	13.22	30.51	54.00	-23.50	AV	PASS
H	12200.27	*	*	*	54.00	*	AV	PASS
H	14640.55	*	*	*	54.00	*	AV	PASS
H	17080.06	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH High: 2475 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4950.59	43.00	5.17	48.17	74.00	-25.83	PK	PASS
V	7425.10	36.00	9.83	45.83	74.00	-28.18	PK	PASS
V	9900.68	30.16	13.27	43.43	74.00	-30.57	PK	PASS
V	12375.34	*	*	*	74.00	*	PK	PASS
V	14850.44	*	*	*	74.00	*	PK	PASS
V	17325.49	*	*	*	74.00	*	PK	PASS
H	4950.57	41.48	5.17	46.65	74.00	-27.36	PK	PASS
H	7425.09	34.18	9.83	44.01	74.00	-30.00	PK	PASS
H	9900.82	29.35	13.27	42.62	74.00	-31.39	PK	PASS
H	12375.73	*	*	*	74.00	*	PK	PASS
H	14850.13	*	*	*	74.00	*	PK	PASS
H	17325.43	*	*	*	74.00	*	PK	PASS
V	4950.87	32.17	5.17	37.34	54.00	-16.66	AV	PASS
V	7425.24	22.37	9.83	32.20	54.00	-21.80	AV	PASS
V	9900.39	17.96	13.27	31.23	54.00	-22.77	AV	PASS
V	12375.85	*	*	*	54.00	*	AV	PASS
V	14850.67	*	*	*	54.00	*	AV	PASS
V	17325.51	*	*	*	54.00	*	AV	PASS
H	4950.57	30.11	5.17	35.28	54.00	-18.73	AV	PASS
H	7425.09	22.90	9.83	32.73	54.00	-21.28	AV	PASS
H	9900.82	17.31	13.27	30.58	54.00	-23.42	AV	PASS
H	12375.73	*	*	*	54.00	*	AV	PASS
H	14850.13	*	*	*	54.00	*	AV	PASS
H	17325.43	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

ANNEX A TEST SETUP PHOTOS

Please refer to the document "8327EU012403W-AA.PDF"

ANNEX B EXTERNAL PHOTOS

Please refer to the document "8327EU012403W-AB.PDF"

ANNEX C INTERNAL PHOTOS

Please refer to the document "8327EU012403W-AC.PDF"



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--- End of Report ---