FCC TEST REPORT

Test report
On Behalf of
Dongguan Yinyan Electric Tech. Ltd.
For
EMAX E8 Transmitter
Model No.: EMAX E8 Transmitter

FCC ID: 2AL7Y-EMAXE8

Prepared for :	**Dongguan Yinyan Electric Tech. Ltd.** EMAX Industrial Park, Gao-Long Industrial Zone, Huanzhuli Village, Changpin Town,Dongguan, Guangdong Province, China
Prepared By :	**Shenzhen Tongzhou Testing Co.,Ltd** **1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China**
Date of Test:	**2021/9/20 ~ 2021/11/3**
Date of Report:	**2021/11/4**
Report Number:	**TZ210902562-EX**

The test report apply only to the specific sample(s) tested under stated test conditions
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

TEST RESULT CERTIFICATION

Applicant's name	:	**Dongguan Yinyan Electric Tech. Ltd.**
Address	:	EMAX Industrial Park, Gao-Long Industrial Zone, Huanzhuli Village, Changpin Town,Dongguan, Guangdong Province, China
Manufacture's Name	:	**Dongguan Yinyan Electric Tech. Ltd.**
Address	:	EMAX Industrial Park, Gao-Long Industrial Zone, Huanzhuli Village, Changpin Town,Dongguan, Guangdong Province, China

Product description

Trade Mark	:	EMAX
Product name	:	EMAX E8 Transmitter
Model and/or type reference	:	EMAX E8 Transmitter
Standards	:	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

Date of Test	:	
Date (s) of performance of tests	:	2021/9/20 ~ 2021/11/3
Date of Issue	:	2021/11/4
Test Result	:	**Pass**

Testing Engineer : Anna Hu

(Anna Hu)

Technical Manager : Hugo Chen

(Hugo Chen)

Authorized Signatory : Andy Zhang

(Andy Zhang)

Revision History

Revision	Issue Date	Revisions	Revised By
00	2021/11/4	Initial Issue	Andy Zhang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	EMAX E8 Transmitter
Model Number	:	EMAX E8 Transmitter
Model Declaration	:	N/A
Test Model	:	EMAX E8 Transmitter
Power Supply	:	N/A
Hardware version	:	V1.0
Software version	:	V1.0
Sample ID	:	TZ210902562–1#
SRD		
Channel Number	:	71 Channels(GFSK) 71 Channels(2-FSK)
Modulation Technology	:	GFSK, 2-FSK
Antenna Type And Gain		Internal Antenna /3 dBi(Max.)

Note: Antenna position refer to EUT Photos.

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
SUNUN	Adapter	SA18H-120150U	A18-124	N/A

1.3. External I/O Cable

I/O Port Description	Quantity	Cable
USB Port	1	N/A
Earphone Port	1	N/A

1.4. Description of Test Facility

FCC

Designation Number: CN1275

Test Firm Registration Number: 167722

Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA

Certificate Number: 5463.01

Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC

ISED#: 22033

CAB identifier: CN0099

Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Shenzhen Tongzhou Testing Co.,Ltd’s quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.08dB	(1)
		30MHz~1000MHz	±3.92dB	(1)
		1GHz~40GHz	±4.28dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±2.71dB	(1)

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

1.7. Description of Test Modes

The EUT has been tested under operating condition.
This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.

All test modes were tested, only the result of the worst case was recorded in the report.

Channel List & Frequency

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2404	36	2440
1	2405	37	2441
2	2406	---	---
---	---		
---	---	69	2474
34	3438	70	2474.8
35	2439	71	2475.8

MODULATION	CHANNELS USED
GFSK	0 TO 70
2-FSK	1 TO 71

Test Channel

GFSK-D8 Mode

Channel	Transmitting Frequency (MHz)
0	2404
36	2440
70	2474.8

GFSK-D16 Mode

Channel	Transmitting Frequency (MHz)
0	2404
36	2440
70	2474.8

2-FSK

Channel	Transmitting Frequency (MHz)
1	2405
36	2440
71	2475.8

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen Tongzhou Testing Co.,Ltd

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. EUT Exercise Software

The system was configured for testing in a continuous transmits condition and change test channels by Press a button and rocker provided by application, the channels can switch from Low, Middle and High channel as descripted in section 1.7 of this report.

3.3. Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen Tongzhou Testing Co.,Ltd has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart C		
FCC Rules	Description of Test	Result
/	Duty Cycle	Compliant
§15.249(a), §15.249(c), §15.249(e)	Field strength of fundamental	Compliant
§15.205, §15.249(d)	Emissions at Restricted Band	Compliant
§15.215(c)	20dB Bandwidth	Compliant
§15.207(a)	Conducted Emissions	Compliant
§15.203	Antenna Requirements	Compliant

5. TEST RESULT

5.1. On Time and Duty Cycle

5.1.1. Standard Applicable

None; for reporting purpose only.

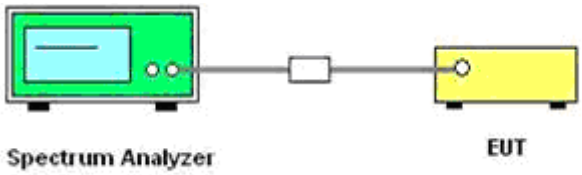
5.1.2. Measuring Instruments and Setting

Please refer to equipment's list in this report. The following table is the setting of the spectrum analyzer.

5.1.3. Test Procedures

1. Set the centre frequency of the spectrum analyzer to the transmitting frequency;
2. Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=100ms;
3. Detector = peak;
4. Trace mode = Single hold.

5.1.4. Test Setup Layout



5.1.5. EUT Operation during Test

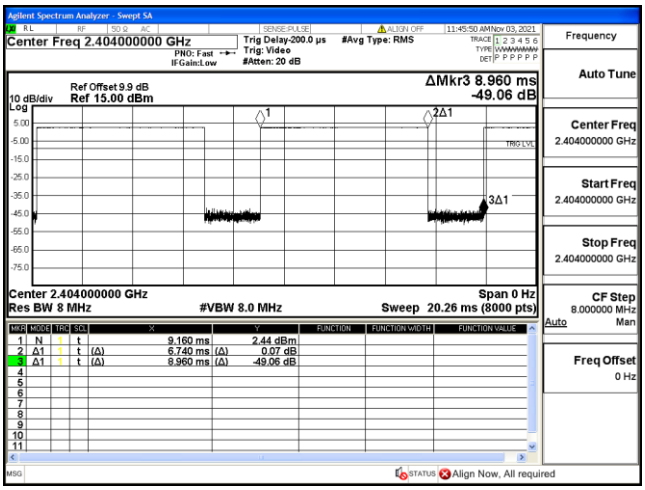
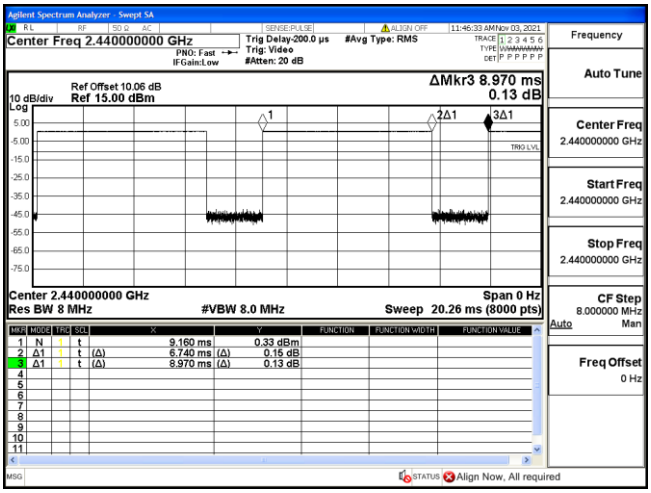
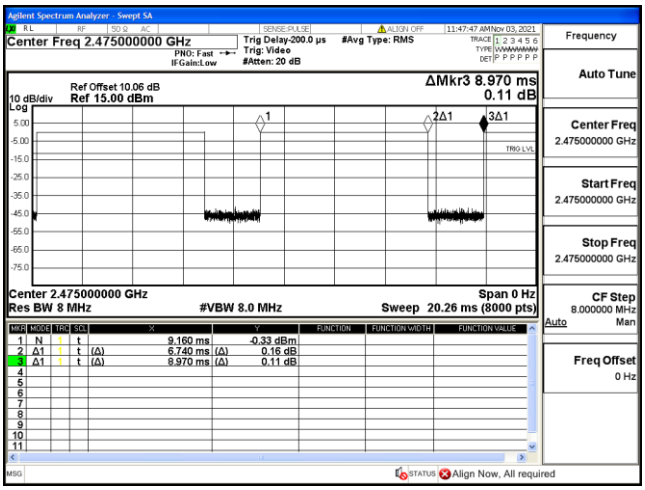
The EUT was programmed to be in continuously transmitting mode.

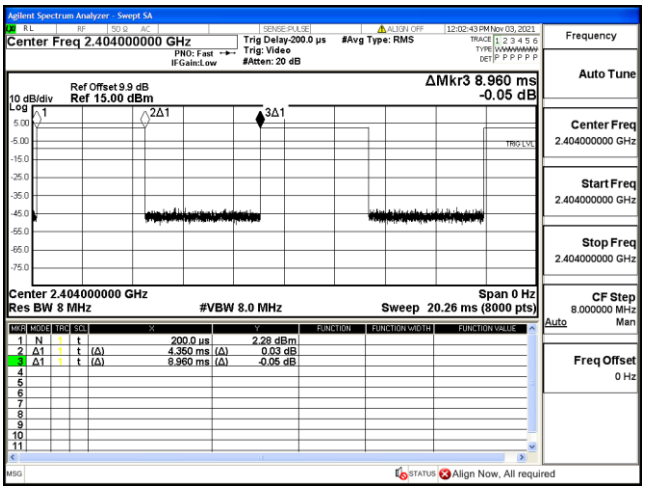
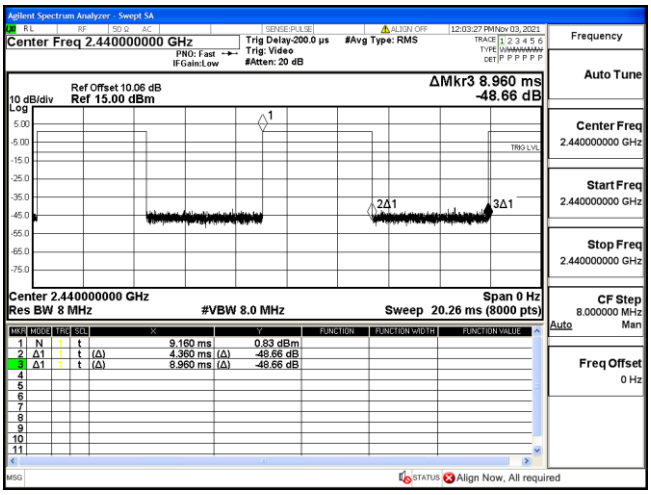
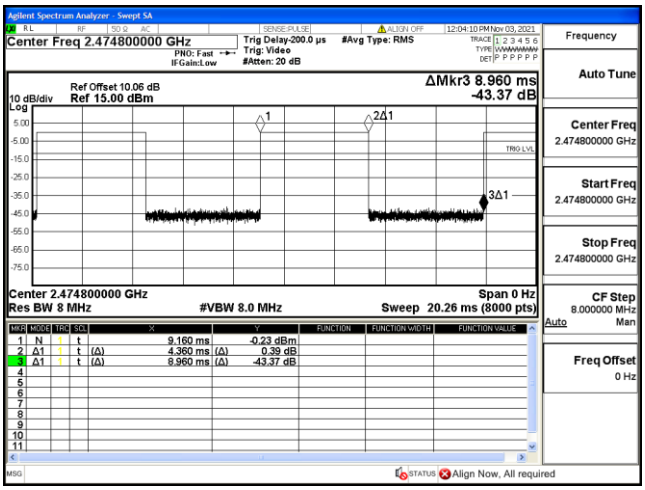
5.1.6. Test result

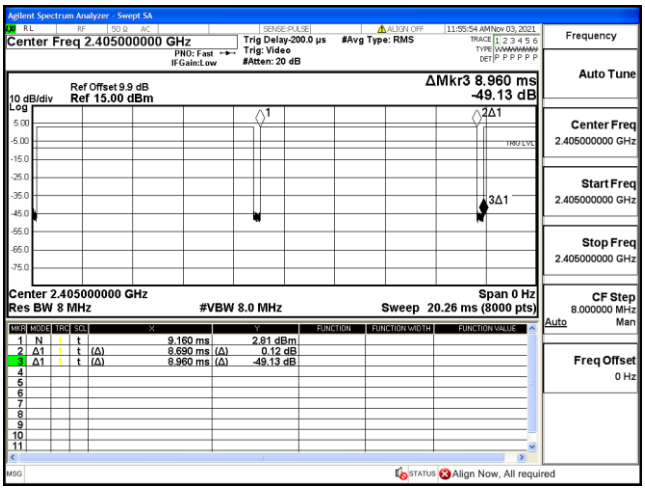
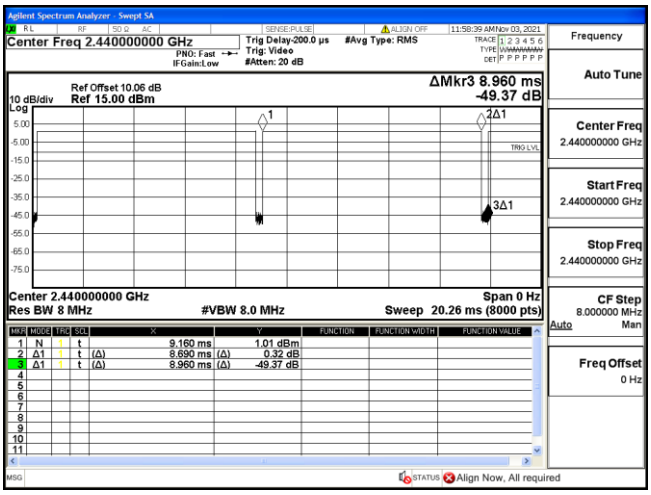
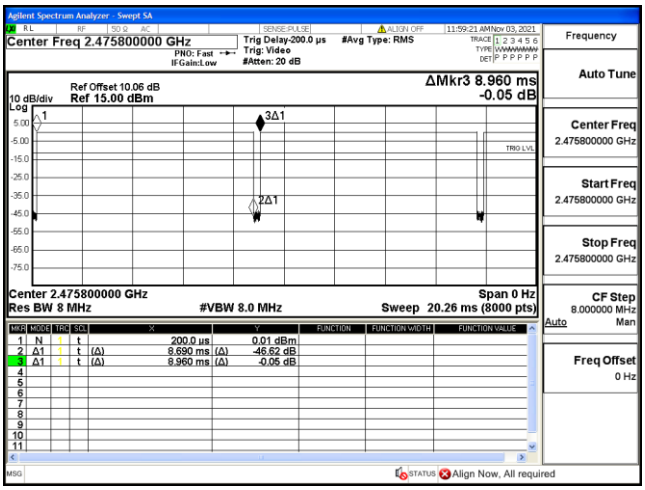
Temperature	24.9℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

Pass

Mode	Mode	On Time B (ms)	Period (ms)	Duty Cycle (%)	1/B Minimum VBW(KHz)
D8	2404	6.74	8.96	75.22	0.15
	2440	6.74	8.97	75.21	0.15
	2474.8	6.74	8.97	75.14	0.15
D16	2404	4.35	8.96	48.55	0.23
	2440	4.36	8.96	48.66	0.23
	2474.8	4.36	8.96	48.66	0.23
LBT	2405	8.69	8.96	96.99	0.11
	2440	8.69	8.96	96.99	0.11
	2475.8	8.69	8.96	96.99	0.11

On Time and Duty Cycle @D8 Mode	
	
2404MHz	2440MHz
	
2475MHz	

On Time and Duty Cycle @D16 Mode	
	
2404MHz	2440MHz
	
2475MHz	

On Time and Duty Cycle @LBT Mode	
	
2406MHz	2440MHz
	
2476MHz	

5.2. Radiated Emissions Measurement

5.2.1. Standard Applicable

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 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	(\2\)
13.36-13.41			

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

\2\ Above 38.6

According to §15.249 (d): Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation

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

According to §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		Field strength of harmonics	
	millivolts/meter	dBuV/m	microvolts/meter	dBuV/m
902-928 MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25 GHz	250	108	2500	68

As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any

condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth

5.2.2. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/Bnote1 kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/Bnote1 kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

Note1: if duty cycle >= 98%, then VB = 10Hz

5.2.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 1.5 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarizations of the antenna.

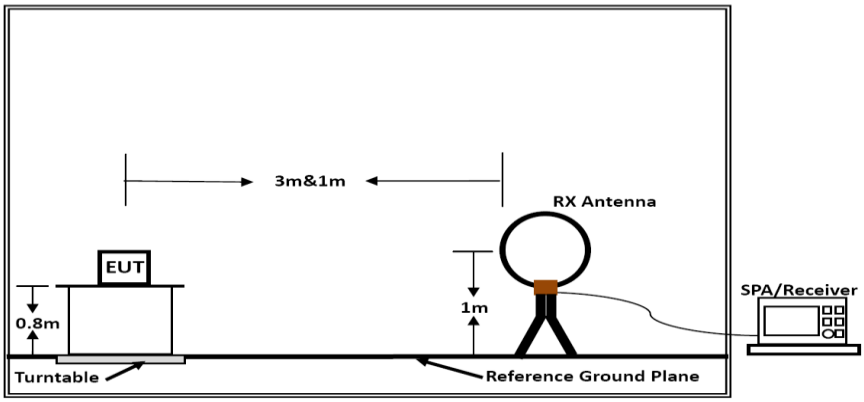
Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

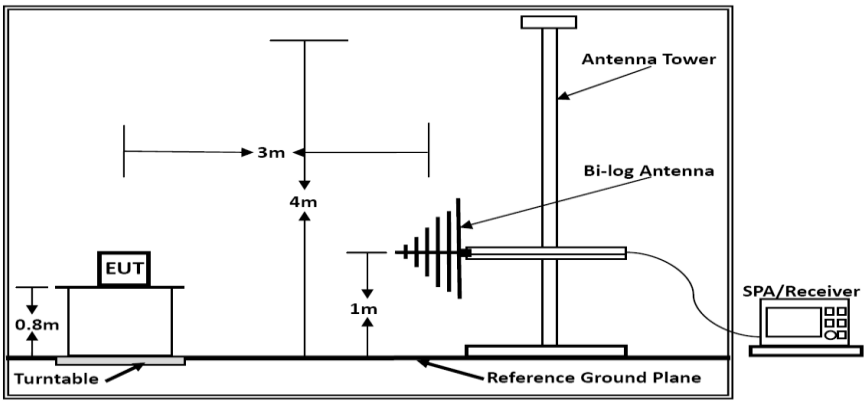
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

5.2.4. Test Setup Layout

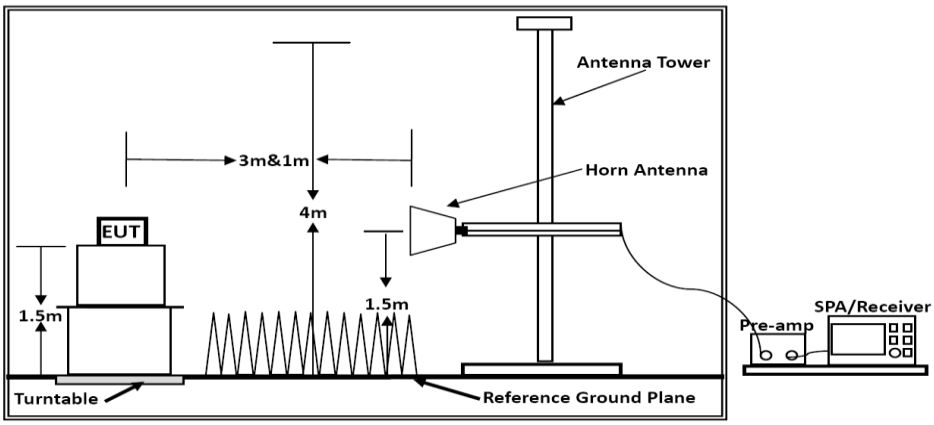
For radiated emissions below 30MHz



Below 30MHz



Below 1GHz



Above 1GHz

Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1m]) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

5.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.2.6. Radiated Emissions

Temperature	22.8℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

(i) Results of Radiated Emissions (9 kHz~30MHz)

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

PASS.

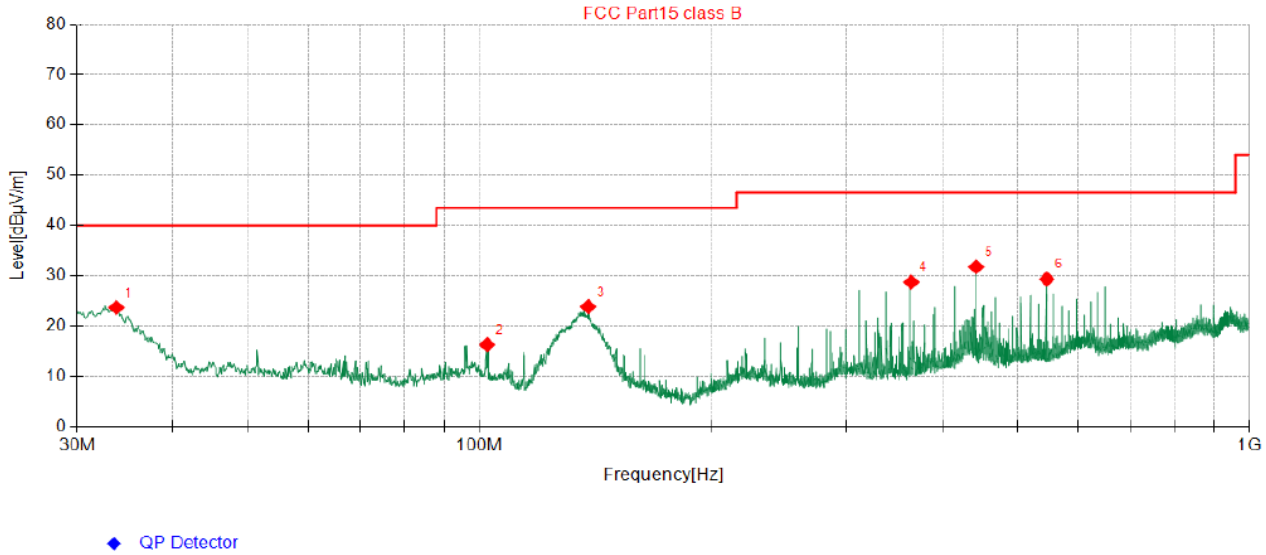
Only record the worst test result in this report.

The test data please refer to following page.

(ii) *Results of Radiated Emissions (30MHz ~1GHz)*

Below 1GHz (Worst case: D8, Middle Channel)

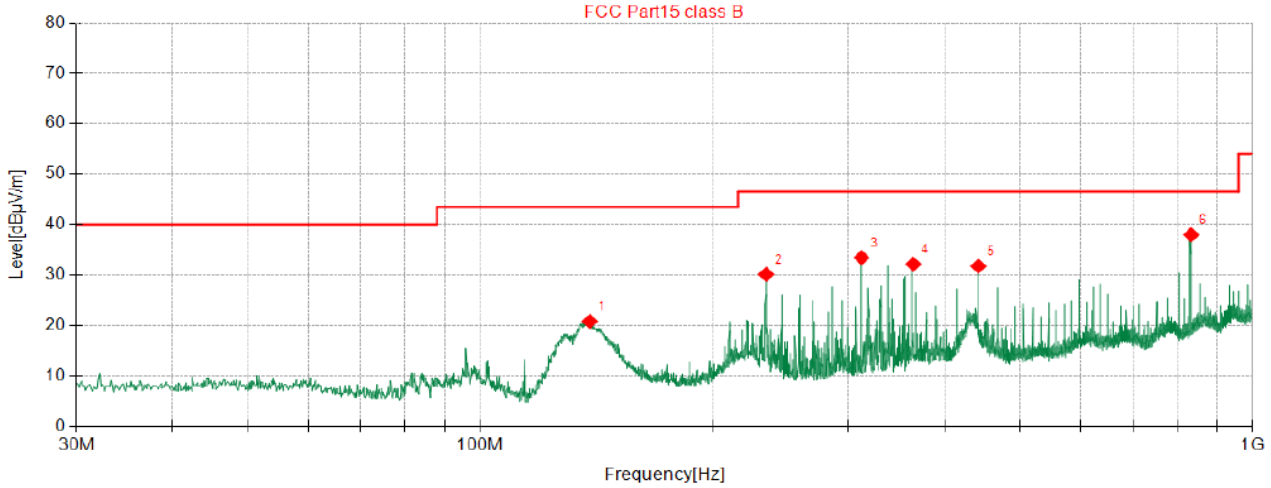
Vertical



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.75	39.24	-15.54	23.70	40.00	16.30	100	41	Vertical
2	102.3	31.73	-15.43	16.30	43.50	27.20	100	53	Vertical
3	138.5	42.22	-18.35	23.87	43.50	19.63	100	155	Vertical
4	364.0	39.58	-10.83	28.75	46.50	17.75	200	212	Vertical
5	442.0	41.20	-9.45	31.75	46.50	14.75	100	207	Vertical
6	546.0	36.86	-7.51	29.35	46.50	17.15	100	305	Vertical

****Note:*
1. Level [dBµV/m] = Reading [dBµV] + Factor [dB/m]
2. Margin [dB] = Limit [dBµV/m] - Level [dBµV/m]

Horizontal



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	138.7	40.26	-19.45	20.81	43.50	22.69	300	8	Horizontal
2	234.7	44.49	-14.35	30.14	46.50	16.36	100	254	Horizontal
3	312.0	45.91	-12.48	33.43	46.50	13.07	100	291	Horizontal
4	364.0	43.17	-11.04	32.13	46.50	14.37	100	81	Horizontal
5	442.0	40.95	-9.21	31.74	46.50	14.76	100	273	Horizontal
6	833.7	40.23	-2.27	37.96	46.50	8.54	100	54	Horizontal

****Note:*
1. Level [dBµV/m] = Reading [dBµV] + Factor [dB/m]
2. Margin [dB] = Limit [dBµV/m] - Level [dBµV/m]

(iii) Results for Radiated Emissions (1GHz – 25GHz)

D8 Mode:

Channel 0 / 2404 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2404	H	96.32	**87.15**	114	94	Pass
2404	V	92.12	84.11	114	94	Pass

Max EIRP=87.15 - 95.2=-8.05 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4808.0	62.33	38.08	46.84	2.40	55.97	68.20	12.23	Peak	Horizontal
4808.0	51.99	38.08	46.84	2.40	45.63	54.00	8.37	Average	Horizontal
4808.0	59.67	38.08	46.84	2.40	53.31	68.20	14.89	Peak	Vertical
4808.0	50.54	38.08	46.84	2.40	44.18	54.00	9.82	Average	Vertical

Channel 36 / 2440 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2440	H	94.29	**85.68**	114	94	Pass
2440	V	91.06	82.17	114	94	Pass

Max EIRP=85.68 - 95.2=-9.52 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.0	63.97	38.15	46.81	2.41	57.72	68.20	10.48	Peak	Horizontal
4880.0	52.01	38.15	46.81	2.41	45.76	54.00	8.24	Average	Horizontal
4880.0	63.65	38.15	46.81	2.41	57.40	68.20	10.80	Peak	Vertical
4880.0	50.87	38.15	46.81	2.41	44.62	54.00	9.38	Average	Vertical

Channel 70 / 2474.8 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2474.8	H	95.69	**86.75**	114	94	Pass
2474.8	V	92.14	84.16	114	94	Pass

Max EIRP=86.75 - 95.2=-8.45 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4949.6	60.18	38.34	46.74	2.43	54.21	68.20	13.99	Peak	Horizontal
4949.6	49.82	38.34	46.74	2.43	43.85	54.00	10.15	Average	Horizontal
4949.6	64.05	38.34	46.74	2.43	58.08	68.20	10.12	Peak	Vertical
4949.6	50.89	38.34	46.74	2.43	44.92	54.00	9.08	Average	Vertical

D16 Mode:

Channel 0 / 2404 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2404	H	95.14	**86.49**	114	94	Pass
2404	V	91.25	82.33	114	94	Pass

Max EIRP=86.49 - 95.2=-8.71 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4808.0	63.86	38.08	46.84	2.40	57.50	68.20	10.70	Peak	Horizontal
4808.0	48.47	38.08	46.84	2.40	42.11	54.00	11.89	Average	Horizontal
4808.0	63.42	38.08	46.84	2.40	57.06	68.20	11.14	Peak	Vertical
4808.0	49.52	38.08	46.84	2.40	43.16	54.00	10.84	Average	Vertical

Channel 36 / 2440 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2440	H	92.75	**84.04**	114	94	Pass
2440	V	89.36	81.16	114	94	Pass

Max EIRP=84.04 - 95.2=-11.16 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.0	59.52	38.15	46.81	2.41	53.27	68.20	14.93	Peak	Horizontal
4880.0	52.61	38.15	46.81	2.41	46.36	54.00	7.64	Average	Horizontal
4880.0	62.33	38.15	46.81	2.41	56.08	68.20	12.12	Peak	Vertical
4880.0	50.53	38.15	46.81	2.41	44.28	54.00	9.72	Average	Vertical

Channel 70 / 2474.8 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2474.8	H	94.65	**85.12**	114	94	Pass
2474.8	V	91.54	82.25	114	94	Pass

Max EIRP=85.12 - 95.2=-10.08 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4949.6	63.03	38.34	46.74	2.43	57.06	68.20	11.14	Peak	Horizontal
4949.6	48.59	38.34	46.74	2.43	42.62	54.00	11.38	Average	Horizontal
4949.6	60.71	38.34	46.74	2.43	54.74	68.20	13.46	Peak	Vertical
4949.6	48.17	38.34	46.74	2.43	42.20	54.00	11.80	Average	Vertical

LBT Mode:

Channel 0 / 2405 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2405	H	96.14	**87.36**	114	94	Pass
2405	V	92.25	84.11	114	94	Pass

Max EIRP=87.36 - 95.2=-7.84 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4810.0	60.90	38.08	46.84	2.40	54.54	68.20	13.66	Peak	Horizontal
4810.0	49.26	38.08	46.84	2.40	42.90	54.00	11.10	Average	Horizontal
4810.0	63.77	38.08	46.84	2.40	57.41	68.20	10.79	Peak	Vertical
4810.0	50.73	38.08	46.84	2.40	44.37	54.00	9.63	Average	Vertical

Channel 36 / 2440 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2440	H	93.26	**84.65**	114	94	Pass
2440	V	89.11	80.25	114	94	Pass

Max EIRP=84.65 - 95.2=-10.55 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.0	62.23	38.15	46.81	2.41	55.98	68.20	12.22	Peak	Horizontal
4880.0	52.91	38.15	46.81	2.41	46.66	54.00	7.34	Average	Horizontal
4880.0	60.66	38.15	46.81	2.41	54.41	68.20	13.79	Peak	Vertical
4880.0	51.97	38.15	46.81	2.41	45.72	54.00	8.28	Average	Vertical

Channel 70 / 2475.8 MHz

Field Strength Of Fundamental						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2475.8	H	93.11	**84.65**	114	94	Pass
2475.8	V	92.15	83.45	114	94	Pass

Max EIRP=84.65 - 95.2=-10.55 dBm

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4951.6	61.22	38.34	46.74	2.43	55.25	68.20	12.95	Peak	Horizontal
4951.6	47.97	38.34	46.74	2.43	42.00	54.00	12.00	Average	Horizontal
4951.6	59.85	38.34	46.74	2.43	53.88	68.20	14.32	Peak	Vertical
4951.6	49.10	38.34	46.74	2.43	43.13	54.00	10.87	Average	Vertical

Notes:

1. Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.

2. Radiated emissions measured in frequency range from 9 KHz ~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.

3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4.Measured = Reading + Ant. Fac - Pre. Fac. + Cab. Loss; Margin = Limit - Measured

5.3. 20dB Bandwidth Emissions

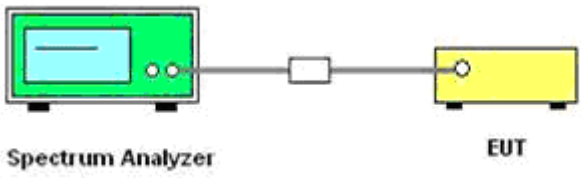
5.3.1 Limit

15.215(c) 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. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.3.2 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

5.3.4. Test Setup Layout



5.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

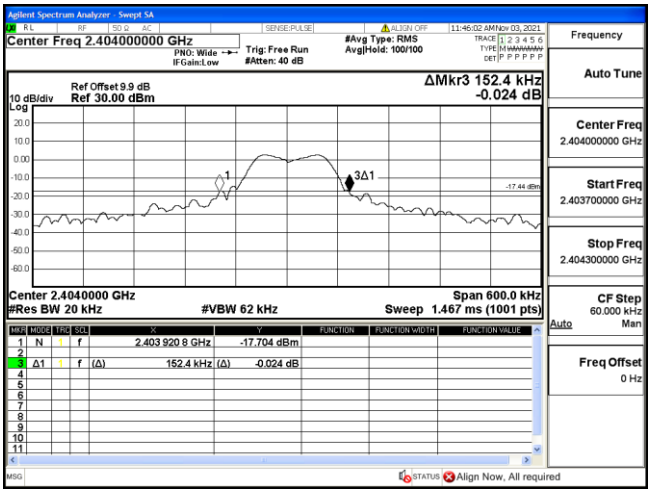
5.3.6 Test Result

Temperature	24.9℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

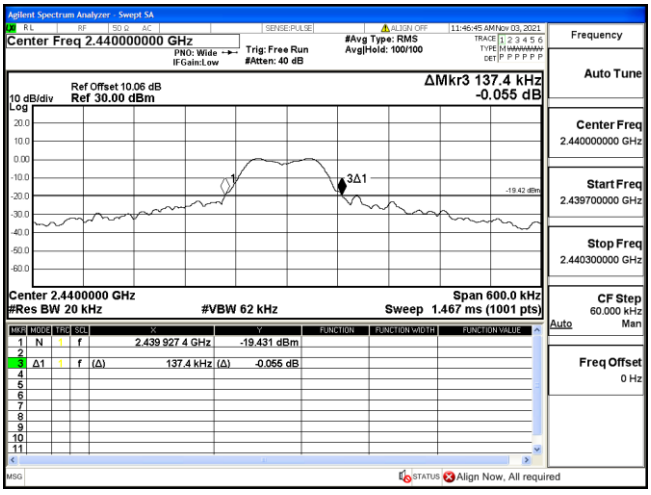
Pass

Mode	Freq. (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Conclusion
D8	2404	0.152	/	PASS
	2440	0.137	/	PASS
	2474.8	0.134	/	PASS
D16	2404	0.217	/	PASS
	2440	0.201	/	PASS
	2474.8	0.204	/	PASS
LBT	2405	0.625	/	PASS
	2440	0.333	/	PASS
	2475.8	0.337	/	PASS

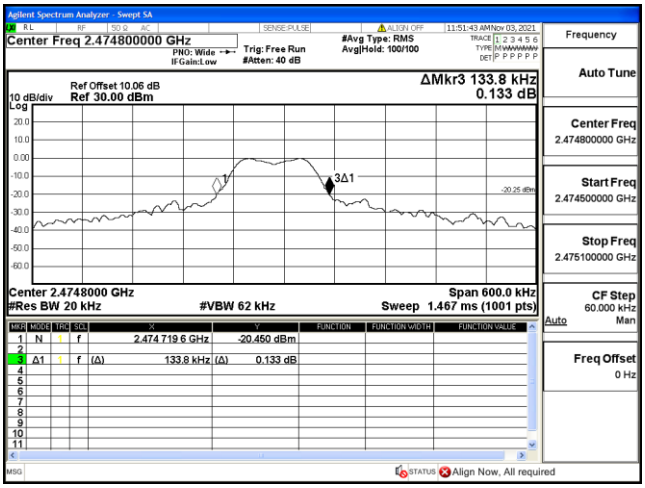
20dB Bandwidth@D8



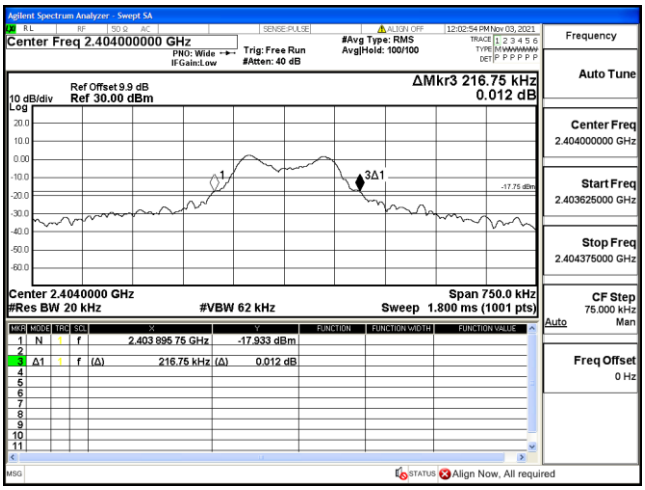
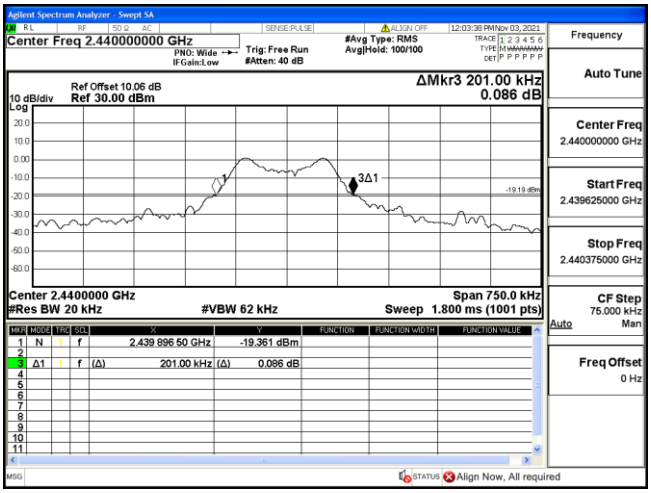
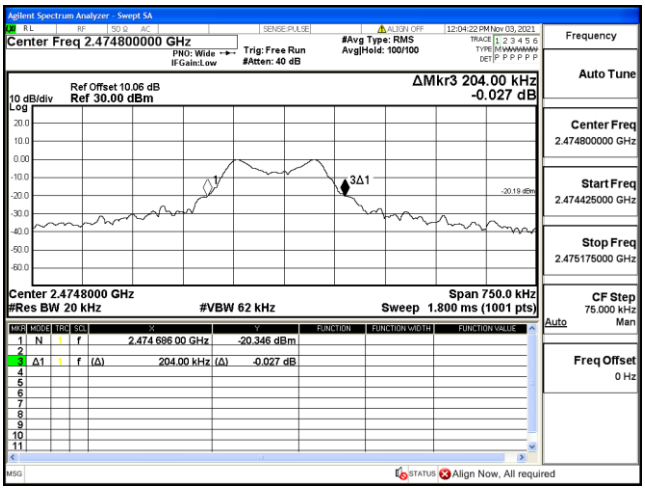
2404MHz



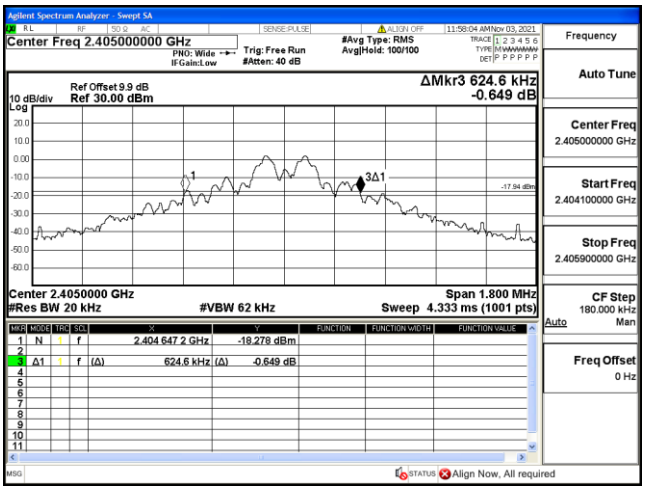
2440MHz



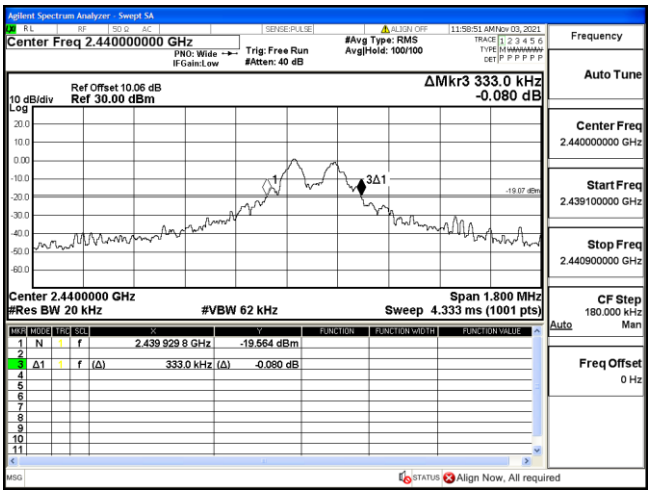
2474.8MHz

20dB Bandwidth@D16	
	
2404MHz	2440MHz
	
2474.8MHz	

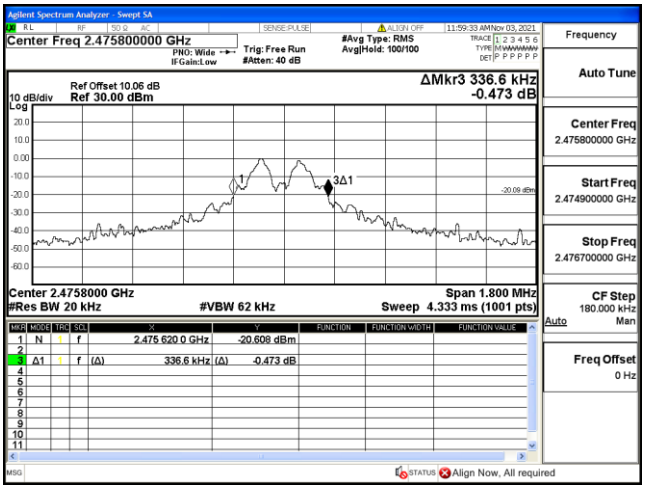
20dB Bandwidth@LBT



2405MHz



2440MHz



2475.8MHz

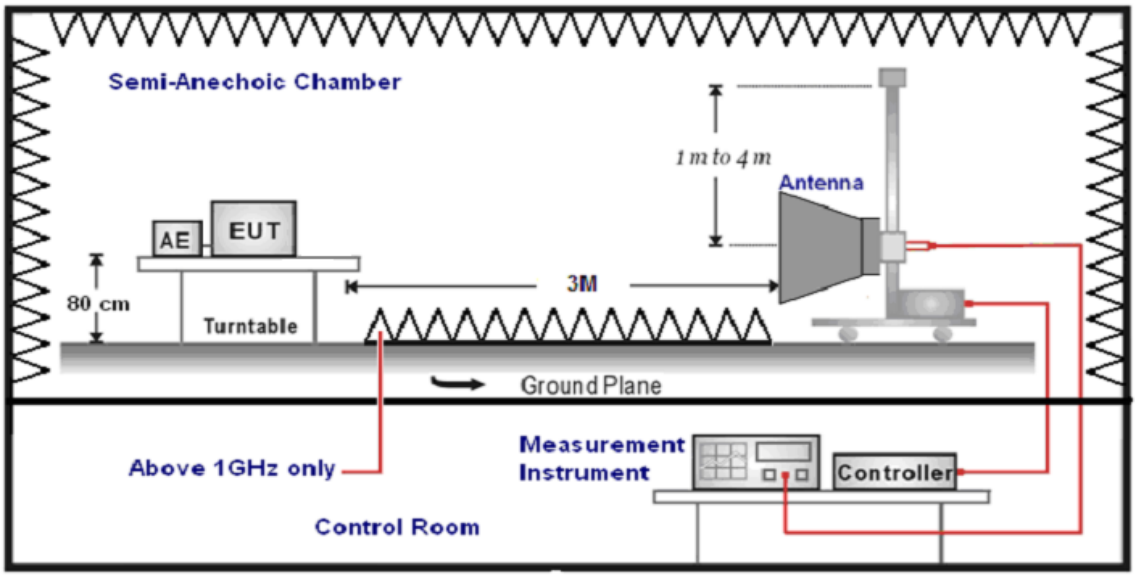
5.4. Band-edge measurements for radiated emissions

5.4.1 Standard Applicable

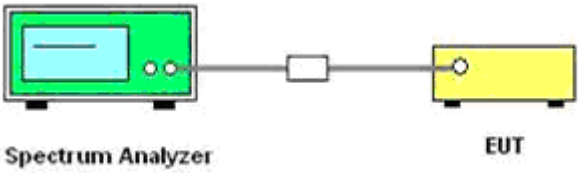
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).

5.4.2 Test Setup Layout

☒For Radiated



☐For Conducted



5.4.3. Test Procedures

☒Radiated Method:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT was 3 meter:

6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

☐**Conducted Method:**

According to KDB 558074 D01 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to an EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=1/B for AV detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Convert the result ant EIRP level to an equivalent electric field strength using the following relationship:

    E = EIRP – 20log D + 104.77=EIRP+95.23

    Where:
    E = electric field strength in dBμV/m,
    EIRP = equivalent isotropic radiated power in dBm
    D = specified measurement distance in meters.
11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
12. Per KDB662911 D01 section b) In cases where a combination of conducted measurements and cabinet radiated measurements are permitted to demonstrate compliance with absolute radiated out-of-band and spurious limits (e.g., KDB Publications 558074 for DTS and 789033 for U-NII), the conducted measurements must be combined with directional gain to compute the radiated levels of the out-of-band and spurious emissions as described in this section.
13. Compare the resultant electric field strength level to the applicable regulatory limit.
14. Perform radiated spurious emission test duress until all measured frequencies were complete.

5.4.4 Test Results

D8 Mode:

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	2390.00	56.71	29.99	30.21	8.35	64.84	74	9.16	Peak	Horizontal
1	2390.00	37.98	29.99	30.21	8.35	46.11	54	7.89	AV[1]	Horizontal
2	2390.00	56.21	29.99	30.21	8.35	64.34	74	9.66	Peak	Vertical
2	2390.00	36.78	29.99	30.21	8.35	44.91	54	9.09	AV[1]	Vertical
3	2483.50	53.14	30.25	30.25	8.5	61.64	74	12.36	Peak	Horizontal
3	2483.50	25.14	30.25	30.25	8.5	33.64	54	20.36	AV[1]	Horizontal
4	2483.50	53.05	30.25	30.25	8.5	61.55	74	12.45	Peak	Vertical
4	2483.50	26.19	30.25	30.25	8.5	34.69	54	19.31	AV[1]	Vertical
5	2488.70	54.75	30.25	30.25	8.5	63.25	74	10.75	Peak	Horizontal
5	2489.03	34.67	30.25	30.25	8.5	43.17	54	10.83	AV[1]	Horizontal
6	2497.41	51.88	30.25	30.25	8.5	60.38	74	13.62	Peak	Vertical
6	2498.58	37.18	30.25	30.25	8.5	45.68	54	8.32	AV[1]	Vertical

D16 Mode:

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	2390.00	57.83	29.99	30.21	8.35	65.96	74	8.04	Peak	Horizontal
1	2390.00	36.37	29.99	30.21	8.35	44.50	54	9.50	AV[1]	Horizontal
2	2390.00	55.26	29.99	30.21	8.35	63.39	74	10.61	Peak	Vertical
2	2390.00	40.19	29.99	30.21	8.35	48.32	54	5.68	AV[1]	Vertical
3	2483.50	56.33	30.25	30.25	8.5	64.83	74	9.17	Peak	Horizontal
3	2483.50	25.87	30.25	30.25	8.5	34.37	54	19.63	AV[1]	Horizontal
4	2483.50	52.86	30.25	30.25	8.5	61.36	74	12.64	Peak	Vertical
4	2483.50	24.32	30.25	30.25	8.5	32.82	54	21.18	AV[1]	Vertical
5	2485.87	58.25	30.25	30.25	8.5	66.75	74	7.25	Peak	Horizontal
5	2485.53	33.64	30.25	30.25	8.5	42.14	54	11.86	AV[1]	Horizontal
6	2498.80	49.60	30.25	30.25	8.5	58.10	74	15.90	Peak	Vertical
6	2499.14	36.50	30.25	30.25	8.5	45.00	54	9.00	AV[1]	Vertical

LBT Mode:

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	2390.00	55.37	29.99	30.21	8.35	63.50	74	10.50	Peak	Horizontal
1	2390.00	39.10	29.99	30.21	8.35	47.23	54	6.77	AV[1]	Horizontal
2	2390.00	57.15	29.99	30.21	8.35	65.28	74	8.72	Peak	Vertical
2	2390.00	36.84	29.99	30.21	8.35	44.97	54	9.03	AV[1]	Vertical
3	2483.50	56.89	30.25	30.25	8.5	65.39	74	8.61	Peak	Horizontal
3	2483.50	27.53	30.25	30.25	8.5	36.03	54	17.97	AV[1]	Horizontal
4	2483.50	50.53	30.25	30.25	8.5	59.03	74	14.97	Peak	Vertical
4	2483.50	24.30	30.25	30.25	8.5	32.80	54	21.20	AV[1]	Vertical
5	2488.19	55.99	30.25	30.25	8.5	64.49	74	9.51	Peak	Horizontal
5	2487.03	34.94	30.25	30.25	8.5	43.44	54	10.56	AV[1]	Horizontal
6	2498.77	48.27	30.25	30.25	8.5	56.77	74	7.23	Peak	Vertical
6	2497.88	38.52	30.25	30.25	8.5	47.02	54	6.98	AV[1]	Vertical

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. Margin= Limit - Emission Level.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

5.5. Power line conducted emissions

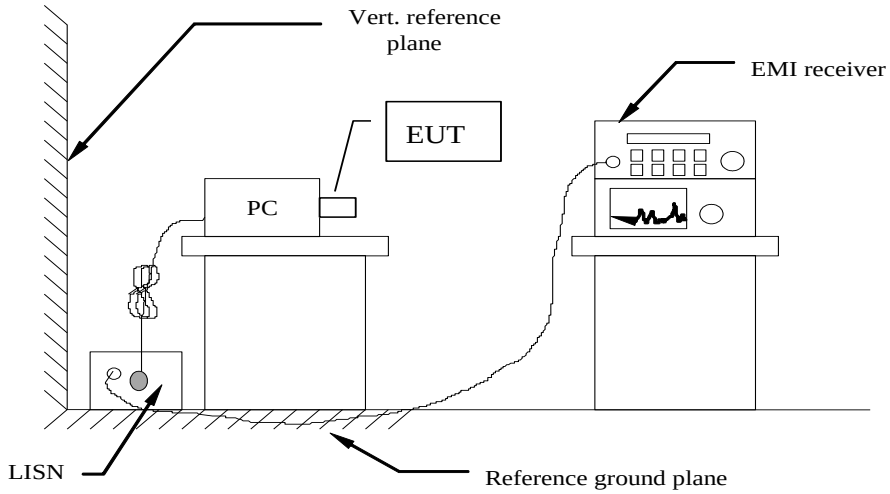
5.5.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.5.2 Block Diagram of Test Setup

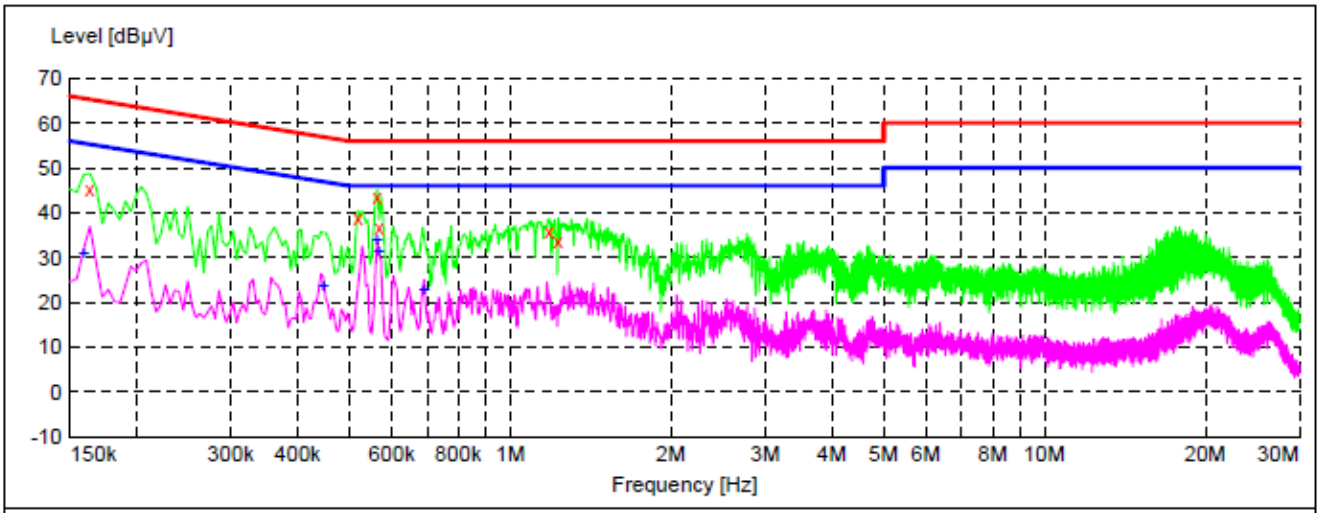


5.5.3 Test Results

Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	

Pass

Neutral Line



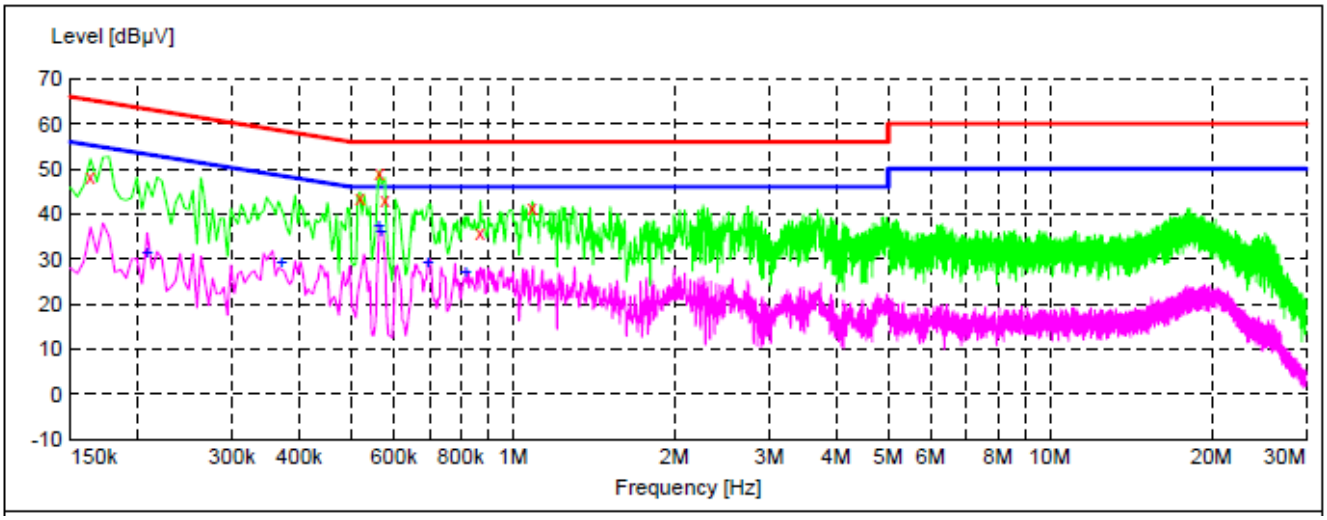
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	45.10	10.0	65	20.2	QP	N	GND
0.519000	38.70	9.9	56	17.3	QP	N	GND
0.564000	43.60	9.9	56	12.4	QP	N	GND
0.568500	36.60	9.9	56	19.4	QP	N	GND
1.185000	35.80	9.8	56	20.2	QP	N	GND
1.230000	33.70	9.8	56	22.3	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	30.90	10.0	56	24.6	AV	N	GND
0.447000	23.70	10.0	47	23.2	AV	N	GND
0.564000	34.00	9.9	46	12.0	AV	N	GND
0.568500	31.60	9.9	46	14.4	AV	N	GND
0.690000	22.90	9.9	46	23.1	AV	N	GND

Note:

1. Margin(dB)= Limit(dBµV) - -Level(dBµV)
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.
4. Pre-scan all modes and recorded the worst case results in this report

Live Line



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	48.00	10.0	65	17.3	QP	L1	GND
0.519000	43.70	9.9	56	12.3	QP	L1	GND
0.564000	48.90	9.9	56	7.1	QP	L1	GND
0.577500	43.20	9.9	56	12.8	QP	L1	GND
0.870000	35.80	9.8	56	20.2	QP	L1	GND
1.086000	41.20	9.8	56	14.8	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	31.60	10.6	53	21.7	AV	L1	GND
0.370500	29.20	10.1	49	19.3	AV	L1	GND
0.564000	37.30	9.9	46	8.7	AV	L1	GND
0.568500	36.20	9.9	46	9.8	AV	L1	GND
0.694500	29.30	9.9	46	16.7	AV	L1	GND
0.816000	27.10	9.8	46	18.9	AV	L1	GND

Note:

1. Margin(dB)= Limit(dBµV) - -Level(dBµV)
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.
4. Pre-scan all modes and recorded the worst case results in this report

5.6. Antenna Requirements

5.6.1. Standard Applicable

According to antenna requirement of §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 re-placed 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 Sections 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 Section 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.

5.6.2. Antenna Connected Construction

5.6.2.1. Standard Applicable

According to § 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.

5.6.2.2. Antenna Connector Construction

The directional gains of antenna used for transmitting refer to section 1.1 of this report, and the antenna is a Internal antenna connect to PCB board and no consideration of replacement. Please see EUT photo for details.

5.6.2.3. Results: Compliance.

6. LIST OF MEASURING EQUIPMENTS

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2021/1/4	2022/1/3
2	Power Sensor	Agilent	U2021XA	MY5365004	2021/1/4	2022/1/3
3	Power Meter	Agilent	U2531A	TW53323507	2021/1/4	2022/1/3
4	Loop Antenna	schwarzbeck	FMZB1519 B	00023	2019/11/16	2022/11/15
5	Wideband Antenna	schwarzbeck	VULB 9163	958	2019/11/16	2022/11/15
6	Horn Antenna	schwarzbeck	9120D-114 1	1574	2019/11/16	2022/11/15
7	EMI Test Receiver	R&S	ESCI	100849/003	2021/1/4	2022/1/3
8	Controller	MF	MF7802	N/A	N/A	N/A
9	Amplifier	schwarzbeck	BBV 9743	209	2021/1/4	2022/1/3
10	Amplifier	Tonscend	TSAMP-05 18SE	--	2021/1/4	2022/1/3
11	RF Cable(below 1GHz)	HUBER+SUHN ER	RG214	N/A	2021/1/4	2022/1/3
12	RF Cable(above 1GHz)	HUBER+SUHN ER	RG214	N/A	2021/1/4	2022/1/3
13	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2021/1/4	2022/1/3
14	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71	N/A	N/A
15	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
16	Test Software	Tonscend	JS1120-3	V2.5.77.0418	N/A	N/A
17	Horn Antenna	A-INFO	LB-180400-KF	J211020657	2020/10/12	2022/10/11
18	Amplifier	CDSA	PAP-1840	17021	2021/10/10	2022/10/09
19	Amplifier	CDSA	PAP-1840	17021	2020/10/10	2021/10/09

7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

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