



TEST REPORT

Reference No..... : WTX22X1101005W
FCC ID..... : 2A89G-Y016
Applicant : Nanyangshiyuankangzhengtaishangmaoyouxiangongsi
Address : Nan yang shi wo long qu che zhan bei lu han lin hua fu 8 hao lou 1505 shi
Product Name : Wireless Presenter
Test Model..... : Y016
Standards : FCC Part 15.249
Date of Receipt sample : October 20, 2022
Date of Test : October 20, 2022 to November 03, 2022
Date of Issue : November 03, 2022
Test Result..... : Pass

Remarks:

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

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TABLE OF CONTENTS

1. GENERAL INFORMATION	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2 TEST STANDARDS	5
1.3 TEST METHODOLOGY	5
1.4 TEST FACILITY	5
1.5 EUT SETUP AND TEST MODE	6
1.6 MEASUREMENT UNCERTAINTY	7
1.7 TEST EQUIPMENT LIST AND DETAILS	7
2. SUMMARY OF TEST RESULTS	9
3. ANTENNA REQUIREMENTS	10
3.1 STANDARD APPLICABLE	10
3.2 TEST RESULT	10
4. RADIATED EMISSIONS	11
4.1 STANDARD APPLICABLE	11
4.2 TEST PROCEDURE	11
4.3 CORRECTED AMPLITUDE & MARGIN CALCULATION	14
4.4 SUMMARY OF TEST RESULTS/PLOTS	14
5. OUT OF BAND EMISSIONS	19
5.1 STANDARD APPLICABLE	19
5.2 TEST PROCEDURE	19
5.3 CORRECTED AMPLITUDE & MARGIN CALCULATION	19
5.4 SUMMARY OF TEST RESULTS/PLOTS	19
6. EMISSION BANDWIDTH	22
6.1 STANDARD APPLICABLE	22
6.2 TEST PROCEDURE	22
6.3 SUMMARY OF TEST RESULTS/PLOTS	22
7. CONDUCTED EMISSIONS	24
7.1 TEST PROCEDURE	24
7.2 BASIC TEST SETUP BLOCK DIAGRAM	24
7.3 TEST RECEIVER SETUP	24
7.4 SUMMARY OF TEST RESULTS/PLOTS	24
APPENDIX PHOTOGRAPHS	25

**Report version**

Version No.	Date of issue	Description
Rev.00	November 03, 2022	Original
/	/	/

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Nanyangshiyuankangzhengtaishangmaoyouxiangongsi
Address of applicant: Nan yang shi wo long qu che zhan bei lu han lin hua fu 8 hao lou 1505 shi

Manufacturer: Nanyangshiyuankangzhengtaishangmaoyouxiangongsi
Address of manufacturer: Nan yang shi wo long qu che zhan bei lu han lin hua fu 8 hao lou 1505 shi

General Description of EUT

Product Name:	Wireless Presenter
Trade Name:	/
Model No.:	Y016
Adding Model:	/
Rated Voltage:	DC 1.5V(AAA) from Battery
Battery capacity:	/
Power Adaptor:	/
Serial Number:	/
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT

Frequency Range:	2402MHz-2476MHz
Max. Field Strength:	106.53dBuV/m
Modulation:	GFSK
Antenna Type:	PCB
Antenna Gain:	-6.93dBi
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	



1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.



1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

channel	Frequency (MHz)	channel	Frequency (MHz)	channel	Frequency (MHz)
1CH	2402 MHz	14CH	2428 MHz	27CH	2454 MHz
2CH	2404 MHz	15CH	2430 MHz	28CH	2456 MHz
3CH	2406 MHz	16CH	2432 MHz	29CH	2458 MHz
4CH	2408 MHz	17CH	2434 MHz	30CH	2460 MHz
5CH	2410 MHz	18CH	2436 MHz	31CH	2462 MHz
6CH	2412 MHz	19CH	2438 MHz	32CH	2464 MHz
7CH	2414 MHz	20CH	2440 MHz	33CH	2466 MHz
8CH	2416 MHz	21CH	2442 MHz	34CH	2468 MHz
9CH	2418 MHz	22CH	2444 MHz	35CH	2470 MHz
10CH	2420 MHz	23CH	2446 MHz	36CH	2472 MHz
11CH	2422 MHz	24CH	2448 MHz	37CH	2474 MHz
12CH	2424 MHz	25CH	2450 MHz	38CH	2476 MHz
13CH	2426 MHz	26CH	/	/	/

Test Mode List

Test Mode	Description	Remark
TM1	Low Channel	2402MHz
TM2	Middle Channel	2440MHz
TM3	High Channel	2476MHz

Test software (Fix the Tx frequency)

Power level(Testing)

Description	level
Fix the TX frequency via mouse button	Index

Test Conditions

Temperature:	22~25 °C
Relative Humidity:	45~55 %
ATM Pressure:	1019 mbar

EUT Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/



Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-27	2023-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-27	2023-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-27	2023-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-27	2023-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2022-03-27	2023-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-27	2023-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2022-03-27	2023-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2022-03-27	2023-03-26
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-27	2023-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-27	2023-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2022-04-12	2023-04-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2022-04-12	2023-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-19	2023-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-19	2023-03-18
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2022-04-27	2023-04-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-27	2023-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2022-03-27	2023-03-26
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2021-03-19	2023-03-18
SEMT-1096	Power Sensor	Agilent	U2021XA	MY54250019	2022-03-27	2023-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/



SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

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2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	N/A
§15.209(a)(f)	Radiated Spurious Emissions	Compliant
§15.249(a)	Field Strength of Emissions	Compliant
§15.249(d)	Out of Band Emission	Compliant
§15.215(c)	Emission Bandwidth	Compliant

N/A: Not applicable.

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3. Antenna Requirements

3.1 Standard Applicable

According to FCC Part 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.

3.2 Test Result

This product has a PCB antenna, fulfill the requirement of this section.

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4. Radiated Emissions

4.1 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

(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.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.

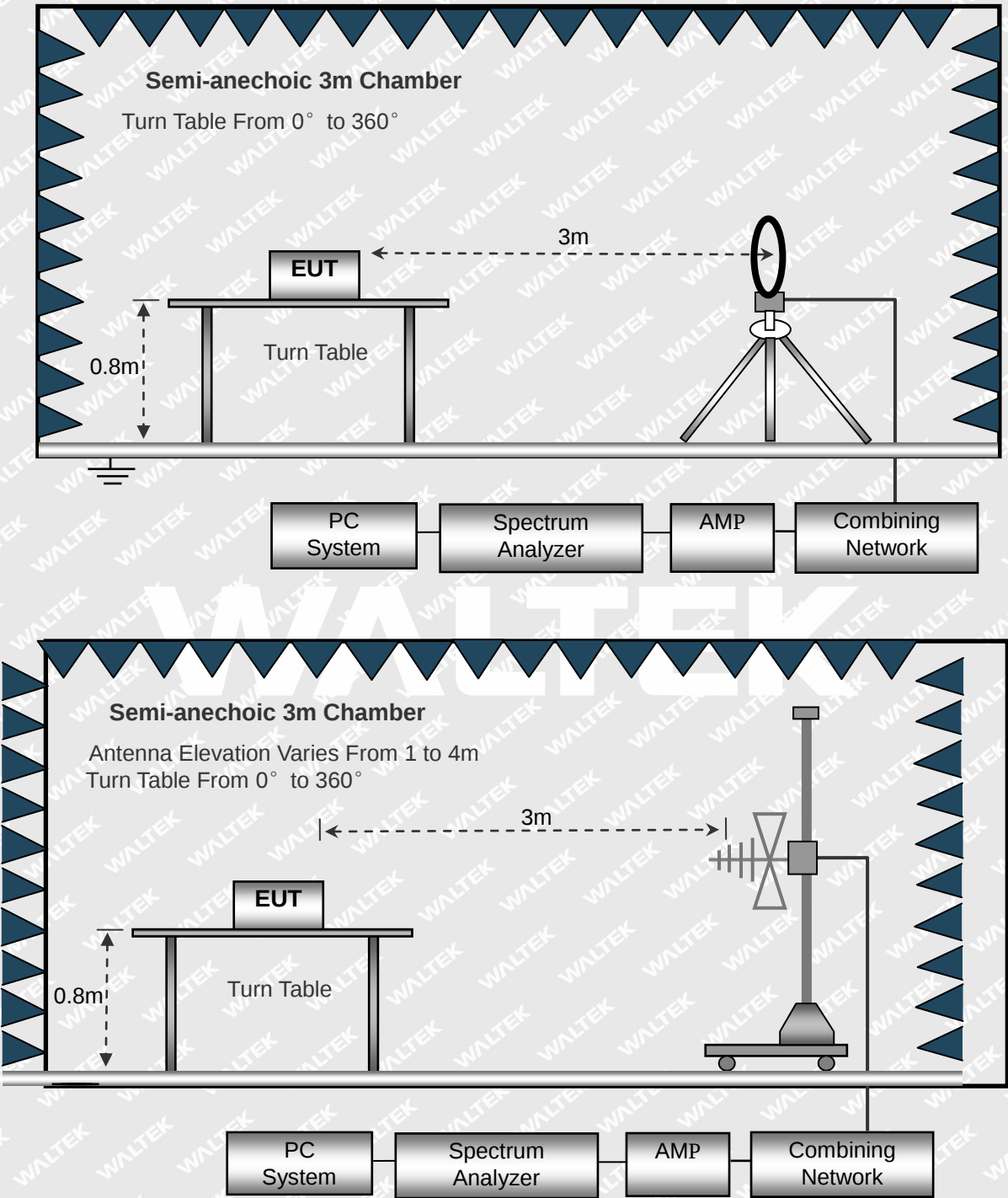
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.



The test setup for emission measurement below 30MHz.

The test setup for emission measurement from 30MHz to 1GHz.



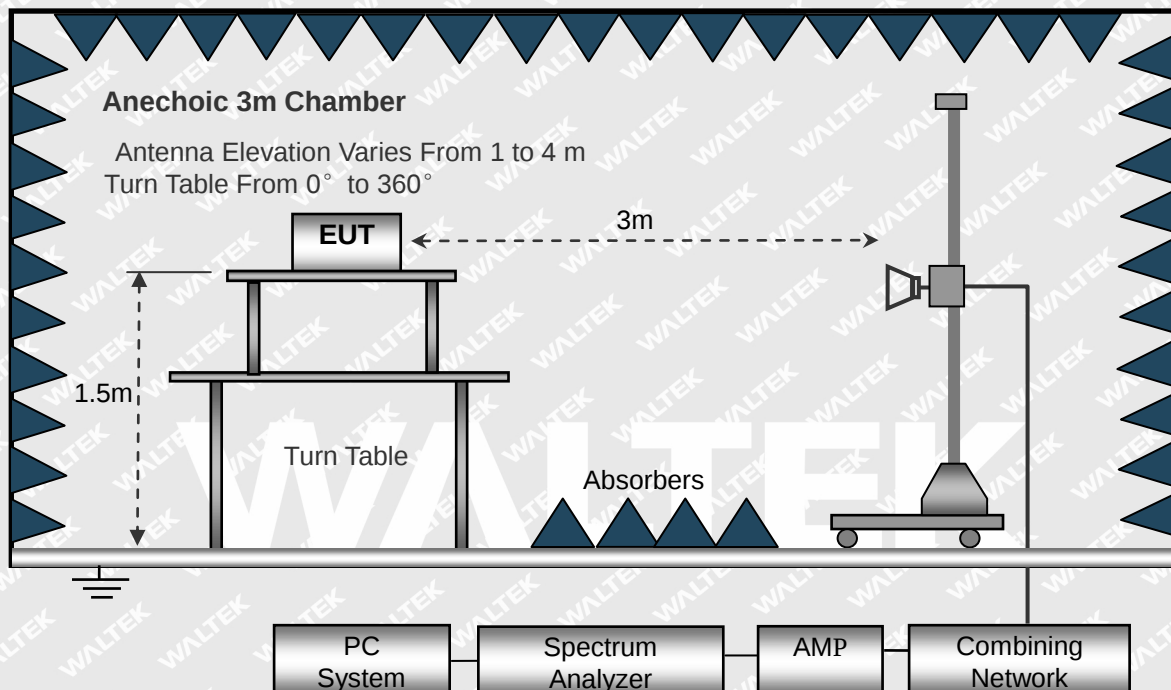


The test setup for emission measurement above 1GHz.

Frequency :9kHz-30MHz
RBW=10KHz,
VBW =30KHz
Sweep time= Auto
Trace = max hold
Detector function = peak

Frequency :30MHz-1GHz
RBW=120KHz,
VBW=300KHz
Sweep time= Auto
Trace = max hold
Detector function = peak, QP

Frequency :Above 1GHz
RBW=1MHz,
VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto
Trace = max hold
Detector function = peak, AV





4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\begin{aligned}\text{Result} &= \text{Indicated Reading} + \text{Correct} \\ \text{Correct} &= \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}\end{aligned}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Result} - \text{FCC Part 15C Limit}$$

4.4 Summary of Test Results/Plots

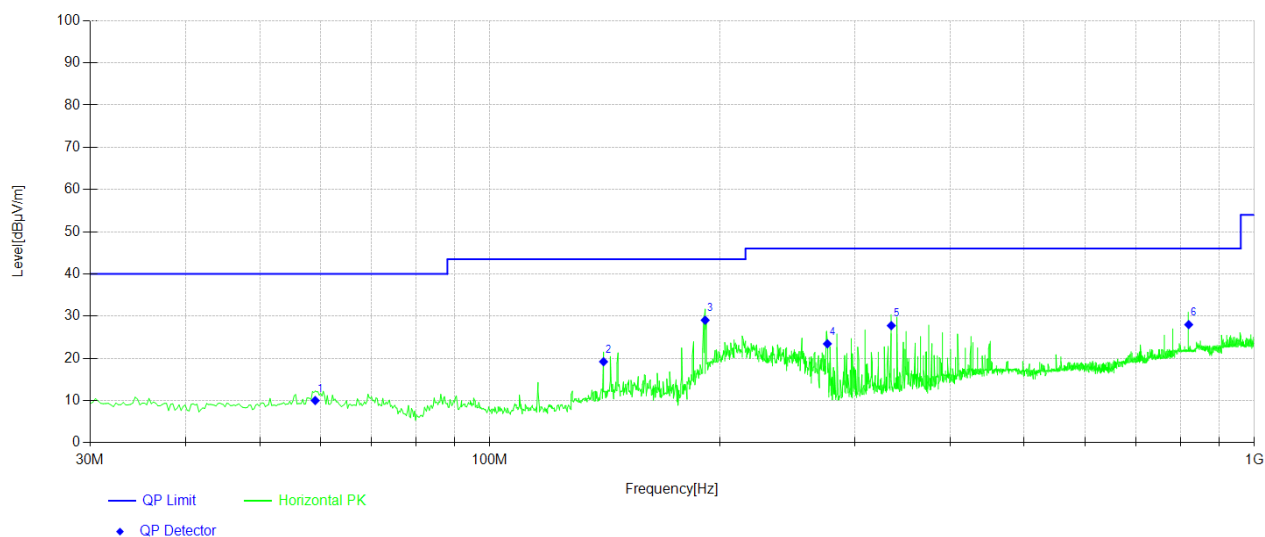
Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

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➤ Spurious Emissions Below 1GHz

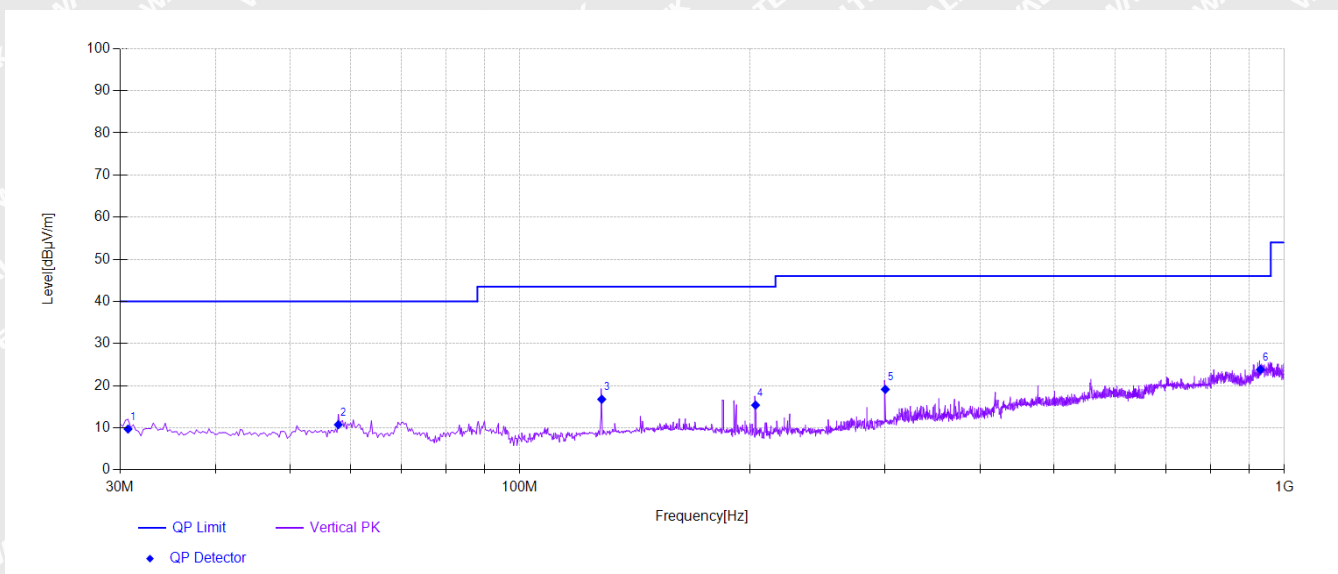
Test Channel	TX-Low channel	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading dBuV/m	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	59.10	27.86	-17.85	10.01	40.00	29.99	335	100	peak
2	140.82	35.75	-16.54	19.21	43.50	24.29	312	100	peak
3	191.26	47.23	-18.19	29.04	43.50	14.46	76	100	peak
4	276.38	39.61	-16.16	23.45	46.00	22.55	272	100	peak
5	335.07	42.27	-14.52	27.75	46.00	18.25	84	100	peak
6	820.55	32.12	-4.13	27.99	46.00	18.01	126	100	peak



Test Channel	TX-Low channel	Polarity:	Vertical
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No.	Frequency (MHz)	Reading dBuV/m	Correct dB/m	Result (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	30.73	28.02	-18.30	9.72	40.00	30.28	331	100	peak
2	57.89	28.66	-17.92	10.74	40.00	29.26	314	100	peak
3	127.97	34.16	-17.38	16.78	43.50	26.72	78	100	peak
4	203.39	34.15	-18.76	15.39	43.50	28.11	271	100	peak
5	300.63	34.56	-15.43	19.13	46.00	26.87	86	100	peak
6	930.40	26.3	-2.47	23.83	46.00	22.17	123	100	peak

**Spurious Emissions Above 1GHz**

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Poler	Detector
Low Channel-2402MHz							
2402.00	115.45	-9.48	105.97	114	8.03	H	PK
2402.00	101.34	-9.48	91.86	94	2.14	H	AV
4804.00	64.83	-4.42	60.41	74	13.59	H	PK
4804.00	45.13	-4.42	40.71	54	13.29	H	AV
7206.00	54.2	-2.13	52.07	74	21.93	H	PK
7206.00	45.77	-2.13	43.64	54	10.36	H	AV
2402.00	99.44	-9.48	89.96	114	24.04	V	PK
2402.00	89.45	-9.48	79.97	94	14.03	V	AV
4804.00	61.72	-4.42	57.3	74	16.7	V	PK
4804.00	44.74	-4.42	40.32	54	13.68	V	AV
7206.00	46.43	-2.13	44.3	74	29.7	V	PK
7206.00	42.2	-2.13	40.07	54	13.93	V	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Poler	Detector
Middle Channel-2440MHz							
2440.00	115.37	-9.45	105.92	114	8.08	H	PK
2440.00	100.86	-9.45	91.41	94	2.59	H	AV
4880.00	65.43	-4.42	61.01	74	12.99	H	PK
4880.00	45.59	-4.42	41.17	54	12.83	H	AV
7320.00	54.86	-2.13	52.73	74	21.27	H	PK
7320.00	45.29	-2.13	43.16	54	10.84	H	AV
2440.00	99.68	-9.45	90.23	114	23.77	V	PK
2440.00	89.69	-9.45	80.24	94	13.76	V	AV
4880.00	61.18	-4.42	56.76	74	17.24	V	PK
4880.00	44.45	-4.42	40.03	54	13.97	V	AV
7320.00	46.29	-2.13	44.16	74	29.84	V	PK
7320.00	42.25	-2.13	40.12	54	13.88	V	AV



Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Poler	Detector
High Channel-2476MHz							
2476.00	115.94	-9.41	106.53	114.00	7.47	H	PK
2476.00	100.99	-9.41	91.58	94.00	2.42	H	AV
4952.00	65.00	-4.42	60.58	74.00	13.42	H	PK
4952.00	45.30	-4.42	40.88	54.00	13.12	H	AV
7428.00	54.77	-2.13	52.64	74.00	21.36	H	PK
7428.00	45.06	-2.13	42.93	54.00	11.07	H	AV
2476.00	99.88	-9.45	90.43	114.00	23.57	V	PK
2476.00	89.41	-9.45	79.96	94.00	14.04	V	AV
4952.00	61.05	-4.42	56.63	74.00	17.37	V	PK
4952.00	44.07	-4.42	39.65	54.00	14.35	V	AV
7428.00	46.30	-2.13	44.17	74.00	29.83	V	PK
7428.00	41.96	-2.13	39.83	54.00	14.17	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 4th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The measurements greater than 20dB below the limit from 9kHz to 30MHz..

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5. Out of Band Emissions

5.1 Standard Applicable

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

5.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC rules.

5.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Result} = \text{Indicated Reading} + \text{Correct}$$

$$\text{Correct} = \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Result} - \text{FCC Part 15C Limit}$$

5.4 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.249 requirements.

Please refer to the test plots as below.



Test Channel	Low	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310	45.57	-9.66	35.91	54.00	18.09	Ave Detector
	2310	57.55	-9.66	47.89	74.00	26.11	Peak Detector
2	2390	49.13	-9.5	39.63	54.00	14.37	Ave Detector
	2390	60.63	-9.5	51.13	74.00	22.87	Peak Detector
3	2400	59.8	-9.48	50.32	54.00	3.68	Ave Detector
	2400	76.71	-9.48	67.23	74.00	6.77	Peak Detector
4	2402.1	100.43	-9.48	90.95	/	/	Ave Detector
	2402.5	116.39	-9.48	106.91	/	/	Peak Detector

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Test Channel	High	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2476.830	102.91	-9.34	93.57	/	/	Ave Detector
	2476.830	115.08	-9.33	105.75	/	/	Peak Detector
2	2483.500	53.61	-9.31	44.3	54.00	9.7	Ave Detector
	2483.500	69.4	-9.31	60.09	74.00	13.91	Peak Detector
3	2500	45.08	-9.28	35.8	54.00	18.2	Ave Detector
	2500	57.55	-9.28	48.27	74.00	25.73	Peak Detector

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6. Emission Bandwidth

6.1 Standard Applicable

According to 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. 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.

6.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Set span = 5MHz, centered on a transmitting channel

RBW $\geq 1\%$ 20dB Bandwidth, VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

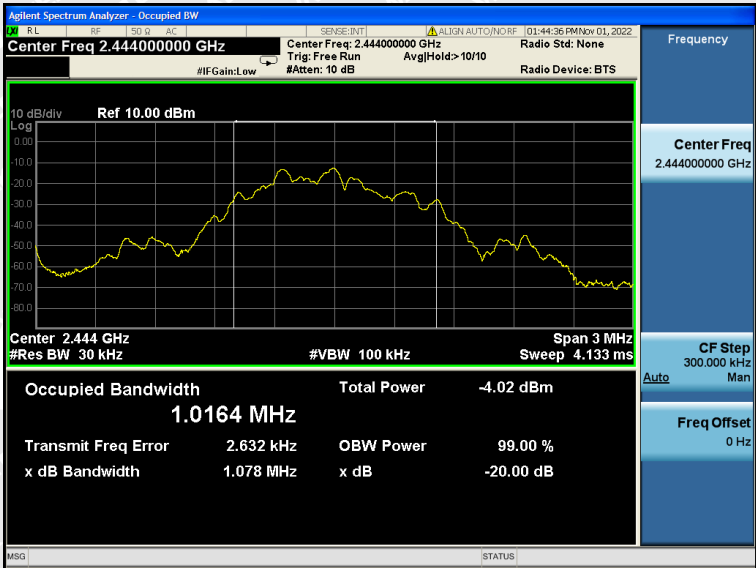
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

6.3 Summary of Test Results/Plots

Test Channel	20dB Bandwidth(MHz)
Low Channel	1.078
Middle Channel	1.078
High Channel	1.077

Please refer to the following test plots:



Low Channel	
Middle Channel	
High Channel	

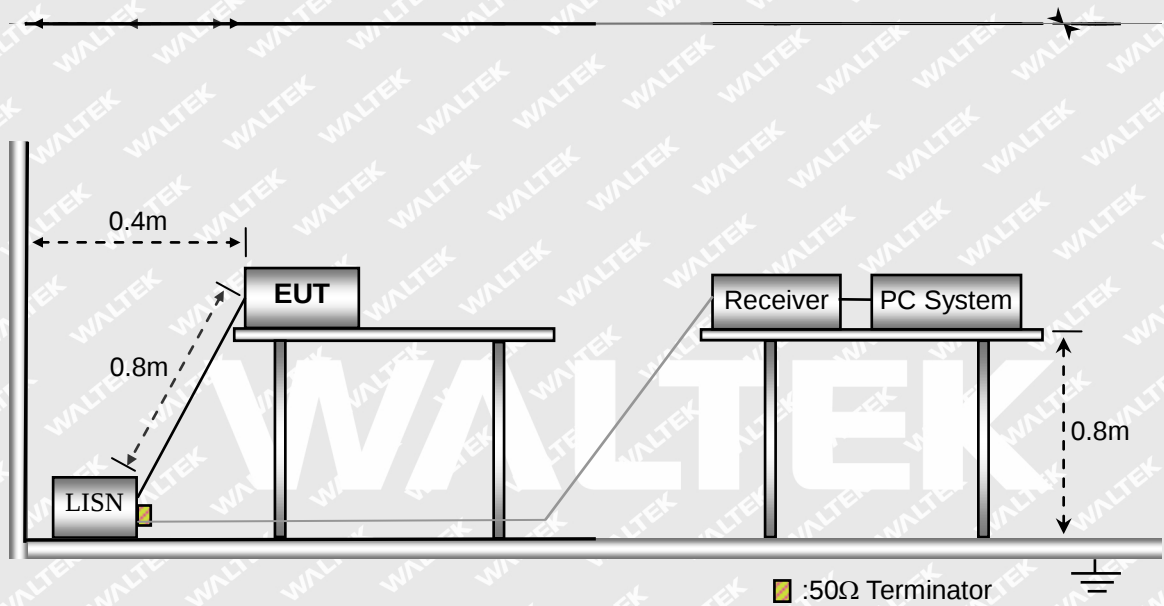


7. Conducted Emissions

7.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.
The spacing between the peripherals was 10cm.

7.2 Basic Test Setup Block Diagram



7.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Quasi-Peak Adapter Bandwidth	9kHz
Quasi-Peak Adapter Mode	Normal

7.4 Summary of Test Results/Plots

Note: The EUT is DC supply, so this item is not applicable.



APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

***** END OF REPORT *****

WALTEK