



# TEST REPORT

Applicant: Xiamen Topstar Co., Ltd

FCC: No.696 Meixi Road, Tongan District Xiamen City, Fujian

Address: Province, P.R.China

IC: No.696 Meixi Road, Tong'an District Xiamen City 361100 China

(Peoples Republic Of)

Product Name: AC Charger

FCC ID: 2A9FM-TSED240VT

IC: 29702-TSED240VT

TSED240V/80A2US-RGP, TSED240V/80A2US-RG,

HVIN: TSED240V/80A2US-RP, TSED240V/80A2US-R,

TSED240V/48A2US-RGP, TSED240V/48A2US-RG, TSED240V/48A2US-RP, TSED240V/48A2US-R

47 CFR Part 15, Subpart C(15.225)

ANSI C63.10-2013

Standard(s): RSS-210 Issue 11, June 25, 2024

RSS-Gen, Issue 5, February 2021 Amendment 2

Report Number: 2402A112039E-RF-00

**Report Date: 2025/1/22** 

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

Peobo Yun

Eany Xn

Reviewed By: Pedro Yun

Approved By: Gavin Xu

Title: Project Engineer

Title: **RF Supervisor** 

## Bay Area Compliance Laboratories Corp. (Dongguan)

No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China

Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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# **CONTENTS**

DOCUMENT REVISION HISTORY ······	
1. GENERAL INFORMATION ······	5
1.1 GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST ·····	5
1.2 ACCESSORY INFORMATION	
1.3 ANTENNA INFORMATION DETAIL	
1.4 EQUIPMENT MODIFICATIONS ·····	6
2. SUMMARY OF TEST RESULTS ······	
3. DESCRIPTION OF TEST CONFIGURATION ······	8
3.1 EUT OPERATION CONDITION	8
3.2 EUT EXERCISE SOFTWARE ·····	
3.3 SUPPORT EQUIPMENT LIST AND DETAILS	8
3.4 SUPPORT CABLE LIST AND DETAILS	8
3.5 BLOCK DIAGRAM OF TEST SETUP·····	9
3.6 TEST FACILITY · · · · · 1	0
3.7 MEASUREMENT UNCERTAINTY 1	10
4. REQUIREMENTS AND TEST RESULTS ······ 1	1
4.1 AC LINE CONDUCTED EMISSIONS 1	11
4.1.1 Applicable Standard · · · · · · · · · · · · · · · · · · ·	11
4.1.2 EUT Setup 1	13 13
4.1.3 EMI Test Receiver Setup 1 4.1.4 Test Procedure 1	14
4.1.5 Corrected Amplitude & Margin Calculation 14.1.6 Test Data 15.00 Test Data 16.00 Test Dat	14 15
4.2 RADIATED SPURIOUS EMISSIONS	32
4.2.1 Applicable Standard 4.2.2 EUT Setup 3	32
4.2.2 EUT Setup 4.2.3 EMI Test Receiver & Spectrum Analyzer Setup 3	32
4.2.4 Test Procedure	34
4.2.5 Corrected Result & Margin Calculation	34
4.2.6 Test Data 4.3 20 DB EMISSION BANDWIDTH 12	
4.3.1 Applicable Standard · · · · · · · · · · · · · · · · · · ·	
4.3.2 EUT Setup	24
4.3.3 Test Procedure	
4.3.4 Test Data 12 4.4 99% OCCUPIED BANDWIDTH: 12	
4.4.1 Applicable Standard	
4.4.2 EUT Setup	28
4.4.3 Test Procedure 12	28
4.4.4 Test Data And Result	

4.5.1 Applicable Standard · · · · · · · · · · · · · · · · · · ·	130
4.5.2 EUT Setup·····	
4.5.3 Test Procedure ·····	
4.5.4 Test Result ·····	132
4.6 ANTENNA REQUIREMENT ·····	133
4.6.1 Applicable Standard ·····	133
4.6.2 Judgment	133
EXHIBIT A - EUT PHOTOGRAPHS ······	134
EXHIBIT B - TEST SETUP PHOTOGRAPHS ······	135
EXHIBIT C - RF EXPOSURE EVALUATION	
RF Exposure Evaluation	136
Applicable Standard · · · · · · · · · · · · · · · · · · ·	
Calculation formula · · · · · · · · · · · · · · · · · · ·	136
Calculated Data:	137
ELECTRIC FIELD STRENGTH LEVELS, MAGNETIC FIELD ST	TRENGTH LEVELS AND POWER DENSITY
LEVELS (10 MHZ TO 300 GHZ) · · · · · · · · · · · · · · · · · · ·	138
Applicable Standard · · · · · · · · · · · · · · · · · · ·	138
MPE Calculation · · · · · · · · · · · · · · · · · · ·	

# DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402A112039E-RF-00	Original Report	2025/1/22

Report Template Version: FCC+IC-NFC-V1.3

# 1. GENERAL INFORMATION

# 1.1 General Description of Equipment under Test

EUT Name:	AC Charger		
EUT Model:	TSED240V/80A2US-RGP		
Multiple Model:	TSED240V/80A2US-RG, TSED240V/80A2US-RP, TSED240V/80A2US-R, TSED240V/48A2US-RGP, TSED240V/48A2US-RG, TSED240V/48A2US-RP, TSED240V/48A2US-R		
Operation Frequency:	13.56 MHz		
Modulation Type:	ASK		
Emission Designator	A1D		
Rated Input Voltage:	AC 208-240V/60Hz		
Serial Number:	2WFR-1 (TSED240V/80A2US-RGP) 2WFR-2 (TSED240V/48A2US-RGP) 2WFR-3 (TSED240V/80A2US-RG) 2WFR-4 (TSED240V/48A2US-RG) 2WFR-5 (TSED240V/80A2US-RP) 2WFR-6 (TSED240V/48A2US-RP) 2WFR-7 (TSED240V/80A2US-R) 2WFR-8 (TSED240V/48A2US-R)		
<b>EUT Received Date:</b>	2024/12/24		
<b>EUT Received Status:</b>	Good		
Note: The multiple models are electrically identical with the test model. Please refer to the declaration letter for			

Report No.: 2402A112039E-RF-00

Note: The multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer.

# **EUT Configuration:**

Configuration	Model	PLC Module	WWAN Module	Rated Current
1#	TSED240V/80A2US-RGP	$\sqrt{}$	$\sqrt{}$	80A
2#	TSED240V/80A2US-RG	×	$\sqrt{}$	80A
3#	TSED240V/80A2US-RP	$\sqrt{}$	×	80A
4#	TSED240V/80A2US-R	×	×	80A
5#	TSED240V/48A2US-RGP	$\sqrt{}$	$\sqrt{}$	48A
6#	TSED240V/48A2US-RG	×	$\sqrt{}$	48A
7#	TSED240V/48A2US-RP	V	×	48A
8#	TSED240V/48A2US-R	×	×	48A

#### Note:

- 1. All models have NFC and WiFi/BT function.
- $2.\ The\ WiFi/BT\ module\ was\ certified,\ Model:\ ESP32-WROOM-32U,\ FCC\ ID:\ 2AC7Z-ESP32WROOM32U,\ IC:21098-ESPWROOM32U.$
- 3. The WWAN module was certified, model: EC25-AFXD, FCC ID: XMR202008EC25AFXD, IC:10224A-022EC25AFXD
- 4. PLC Module is without Radio function.
- 5. 80A/48A Rated Current is difference in power cable.
- 6. 80A/48A Appearance is difference in material.

## 1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

# **1.3 Antenna Information Detail** ▲

Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain	
Xiamen Topstar Co., Ltd	Loop	50	13.56MHz	Unknown	
The design of compliance with §15.203:					
☐ Unit uses a permanently attached antenna.					
Unit uses a unique coupling to the intentional radiator.					
Unit was professionally installed, and installer shall be responsible for verifying that the correct					
antenna is employed with the unit.					

Report No.: 2402A112039E-RF-00

# 1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

Report No.: 2402A112039E-RF-00

# 2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.207 (a) RSS-Gen Clause 8.8	AC Line Conducted Emissions	Compliant
§15.225 §15.209; §15.205 RSS-Gen Clause 8.9 RSS-210 Annex B.6 (a)	Radiated Spurious Emissions	Compliant
§15.225(e) RSS-210 Annex B.6 (b)	Frequency Stability	Compliant
§15.215(c)	20 dB Bandwidth	Compliant
RSS-Gen Clause 6.7	99% Occupied Bandwidth	Compliant
FCC§15.203 RSS-Gen Clause 6.8	Antenna Requirement	Compliant
FCC§1.1310, §2.1091 RSS-102, Clause 5.3.2	RF Exposure	Compliant

# 3. DESCRIPTION OF TEST CONFIGURATION

# 3.1 EUT Operation Condition

The system was configured for testing in Engineering Mode, which was provided by the manufacturer. During the test, the EUT was operation in its maximum Rated Current, which was controlled by the Vehicle Simulator Load.

Report No.: 2402A112039E-RF-00

### 3.2 EUT Exercise Software

No EUT software is used for testing.

## 3.3 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
D-Link	Router	DGS-1100-08PD	S01Z1H000012
GuangLuDa	Vehicle Simulator Load	GROADA-AC380V- 32A-R	GROADA-FZX24051701
GuangLuDa	Vehicle Simulator Load	GROADA-AC380V- 32A-R	GROADA-FZX24051702

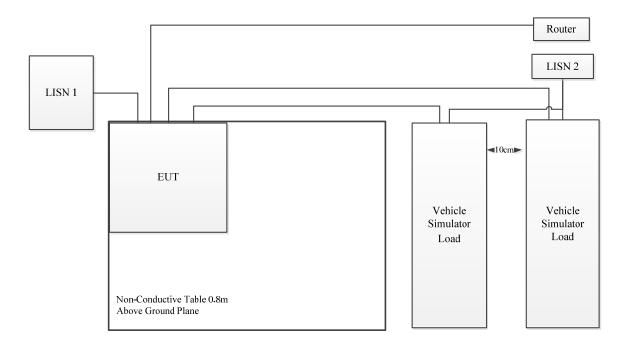
# 3.4 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	То
AC Cable	No	No	1.5	EUT	LISN 1/AC Mains
RJ45 Cable	Yes	No	10	EUT	Router

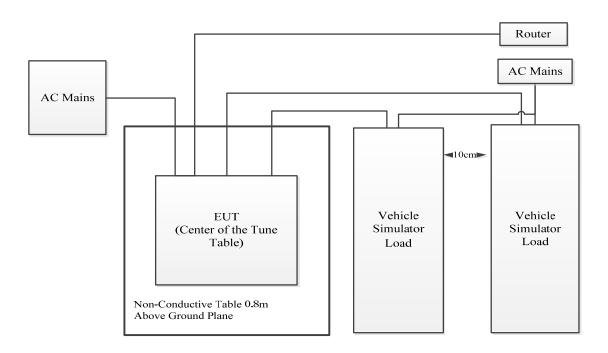
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# 3.5 Block Diagram of Test Setup

AC Line Conducted Emission:



## Radiated Emission:



### 3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

Report No.: 2402A112039E-RF-00

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

## 3.7 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
	9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz:
Unwanted Emissions, radiated	5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB,
	18GHz~26.5GHz:5.47 dB, 26.5GHz~40GHz:5.63 dB
Unwanted Emissions, conducted	±2.47 dB
Temperature	±1 °C
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 0.4\%$
Duty Cycle	1%
AC Power Lines Conducted Emission	3.11 dB (150 kHz to 30 MHz)

Report Template Version: FCC+IC-NFC-V1.3

Page 10 of 139

# 4. REQUIREMENTS AND TEST RESULTS

#### 4.1 AC Line Conducted Emissions

## 4.1.1 Applicable Standard

FCC§15.207(a).

(a) 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  $50 \,\mu\text{H}/50$  ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Report No.: 2402A112039E-RF-00

	Conducted limit (dBµV)	
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

<sup>\*</sup>Decreases with the logarithm of the frequency.

- (b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:
- (1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- (2) For all other carrier current systems: 1000  $\mu V$  within the frequency band 535-1705 kHz, as measured using a 50  $\mu H/50$  ohms LISN.
- (3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.
- (c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Report Template Version: FCC+IC-NFC-V1.3

#### RSS-Gen Clause 8.8

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50  $\mu H$  / 50  $\Omega$  line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT. For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Report No.: 2402A112039E-RF-00

 Frequency (MHz)
 Conducted limit (dBμV)

 0.15 - 0.5
 Quasi-peak
 Average

 0.5 - 5
 56 to 46¹
 56 to 46¹

 5 - 30
 60
 50

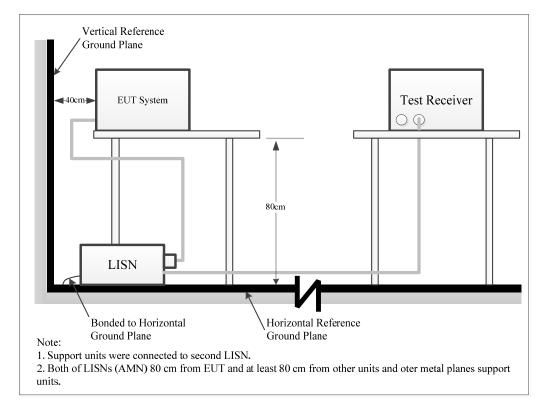
Table 4 – AC power-line conducted emissions limits

Note 1: The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 kHz and 30 MHz, the AC power-line conducted emissions must be measured using the following configurations:

- (a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.
- (b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

## 4.1.2 EUT Setup



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207, RSS-Gen limits.

The spacing between the peripherals was 10 cm.

## **4.1.3 EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

Frequency Range	IF B/W		
150 kHz – 30 MHz	9 kHz		

#### 4.1.4 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

Report No.: 2402A112039E-RF-00

According FCC publication number 174176, for a device with a permanent antenna operating at or below 30 MHz, the measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

### 4.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor = attenuation caused by cable loss& Attenuator + voltage division factor of AMN

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit - Result

### 4.1.6 Test Data

Serial Number:	2WFR-1, 2WFR-2, 2WFR-3, 2WFR-4, 2WFR-5, 2WFR-6, 2WFR-7, 2WFR-8	Test Date:	2025/1/2 ~2025/1/17
Test Site:	Chamber 10m	Test Mode:	Transmitting
Tester:	Yukin Qiu, Lane Sun	Test Result:	Pass

Report No.: 2402A112039E-RF-00

### **Environmental Conditions:**

Temperature: (°C) 21.5~22.8 Relative H	midity: (%) 35~50 ATM Pressure: (kPa) 101.2~101.7
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## **Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2024/9/5	2025/9/4
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-03	2024/9/5	2025/9/4
JFW	Coaxial Attenuator	50FH-006-100	F-08-EM007	2024/9/5	2025/9/4
T-08-EM041	R&S	EMI Test Receiver	ESCI	100035	2024/8/26
Audix	Test Software	E3	191218 V9	N/A	N/A
SCHWARZBECK	LISN 1	NNLK 8130	8130-00446	2024/9/23	2025/9/23
COM-POWER	LISN 2	LI-3P-132	20200003	2024/9/6	2025/9/5

<sup>\*</sup> Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

#### **Test Data:**

The test used AC 208V/60Hz voltage.

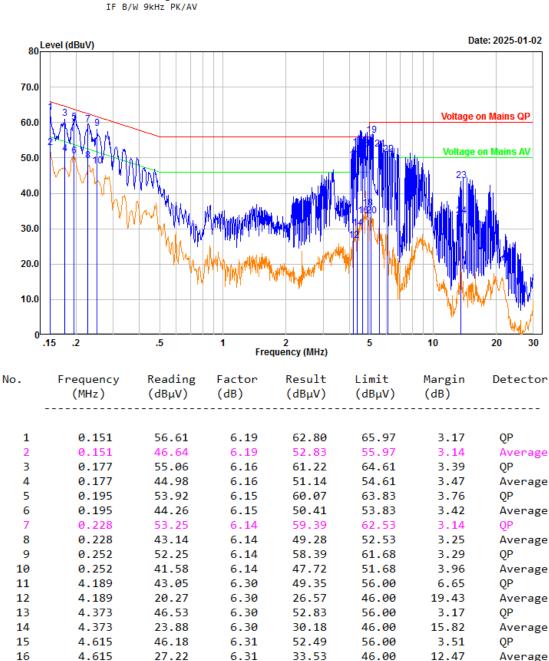
Report Template Version: FCC+IC-NFC-V1.3

#### **Configuration 1#:**

Project No.: 2402A112039E-RF
Port: line1
Test Mode: Transmitting
TF B/W 9kHz PK/AV

Serial No.: 2WFR-1 Tester: Yukin Qiu

Note:



4.882

4.882

5.075

5.075

5.545

6.080

13.560

13.560

46.03

29.51

50.05

27.26

46.07

44.66

36.98

26.98

6.32

6.32

6.32

6.32

6.33

6.35

6.58

6.58

52.35

35.83

56.37

33.58

52.40

51.01

43.56

33.56

56.00

46.00

60.00

50.00

60.00

60.00

60.00

50.00

3.65

10.17

3.63

16.42

7.60

8.99

16.44

16.44

QΡ

QΡ

QΡ

QΡ

QΡ

Average

Average

Average

17

18

19

20

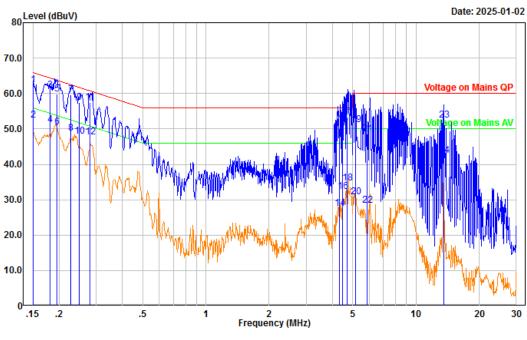
21

22 23

24

Serial No.: 2WFR-1 Tester: Yukin Qiu

Note:

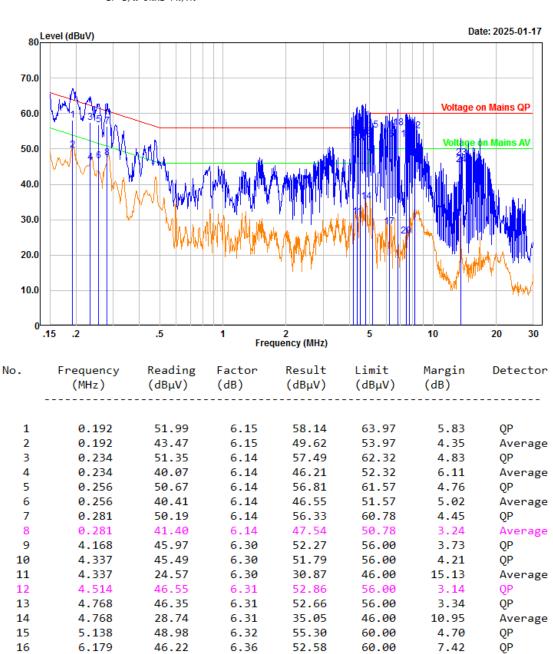


No.	Frequency (MHz)	Reading (dBμV)		Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.150	56.16	6.18	62.34	65.98	3.64	QP
2	0.150	46.21	6.18	52.39	55.98	3.59	Average
3	0.181	54.86	6.15	61.01	64.46	3.45	QP
4	0.181	44.92	6.15	51.07	54.46	3.39	Average
5	0.195	53.74	6.13	59.87	63.81	3.94	QP
6	0.195	44.39	6.13	50.52	53.81	3.29	Average
7	0.227	53.43	6.13	59.56	62.56	3.00	QP
8	0.227	42.74	6.13	48.87	52.56	3.69	Average
9	0.249	51.23	6.13	57.36	61.80	4.44	QP
10	0.249	41.76	6.13	47.89	51.80	3.91	Average
11	0.280	51.27	6.13	57.40	60.81	3.41	QP
12	0.280	41.66	6.13	47.79	50.81	3.02	Average
13	4.324	43.69	6.31	50.00	56.00	6.00	QP
14	4.324	21.20	6.31	27.51	46.00	18.49	Average
15	4.469	45.01	6.31	51.32	56.00	4.68	QP
16	4.469	26.10	6.31	32.41	46.00	13.59	Average
17	4.690	46.58	6.31	52.89	56.00	3.11	QP
18	4.690	28.34	6.31	34.65	46.00	11.35	Average
19	5.156	44.88	6.32	51.20	60.00	8.80	QP
20	5.156	24.48	6.32	30.80	50.00	19.20	Average
21	5.847	42.13	6.34	48.47	60.00	11.53	QP
22	5.847	22.02	6.34	28.36	50.00	21.64	Average
23	13.560	45.96	6.59	52.55	60.00	7.45	QP
24	13.560	35.96	6.59	42.55	50.00	7.45	Average

#### **Configuration 2#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-2 Tester: Lane Sun

Note:



6.179

6.827

7.430

7.430

7.694

8.209

13.514

13.514

21.71

49.59

46.19

18.98

49.25

48.52

40.94

38.86

6.36

6.44

6.46

6.46

6.47

6.46

6.58

6.58

28.07

56.03

52.65

25.44

55.72

54.98

47.52

45.44

50.00

60.00

60.00

50.00

60.00

60.00

60.00

50.00

21.93

3.97

7.35

24.56

4.28

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4.56

12.48

17

18

19

20

21

22 23

24

Average

Average

Average

QΡ

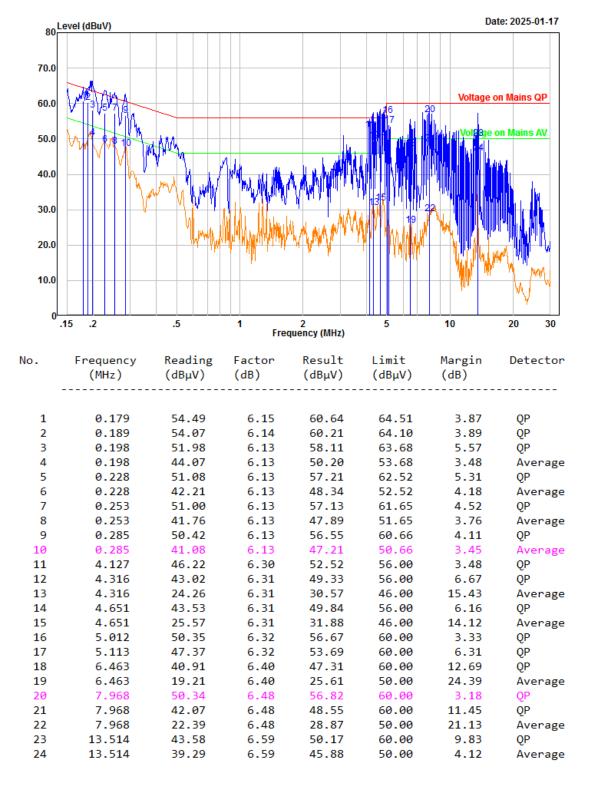
QΡ

QΡ

QΡ

QΡ

Serial No.: 2WFR-2 Tester: Lane Sun Note:



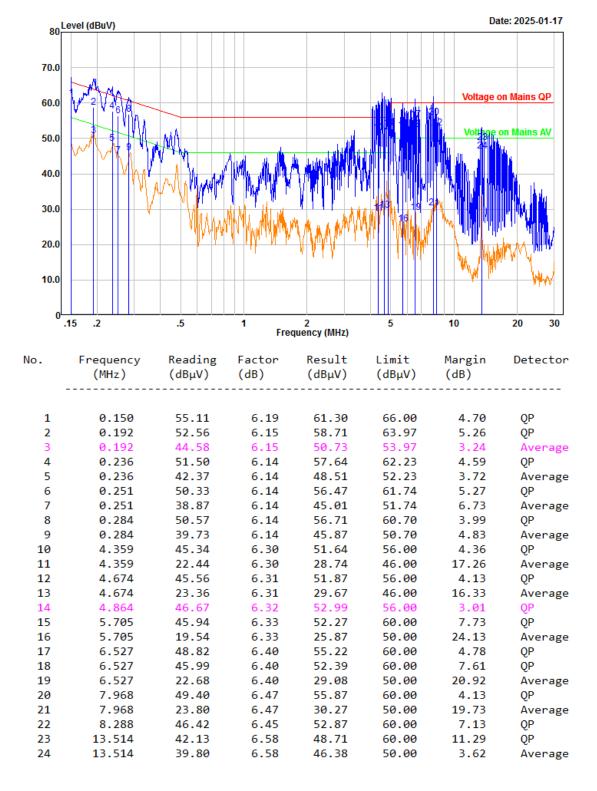
#### **Configuration 3#:**

 Project No.: 2402A112039E-RF
 Serial No.: 2WFR-3

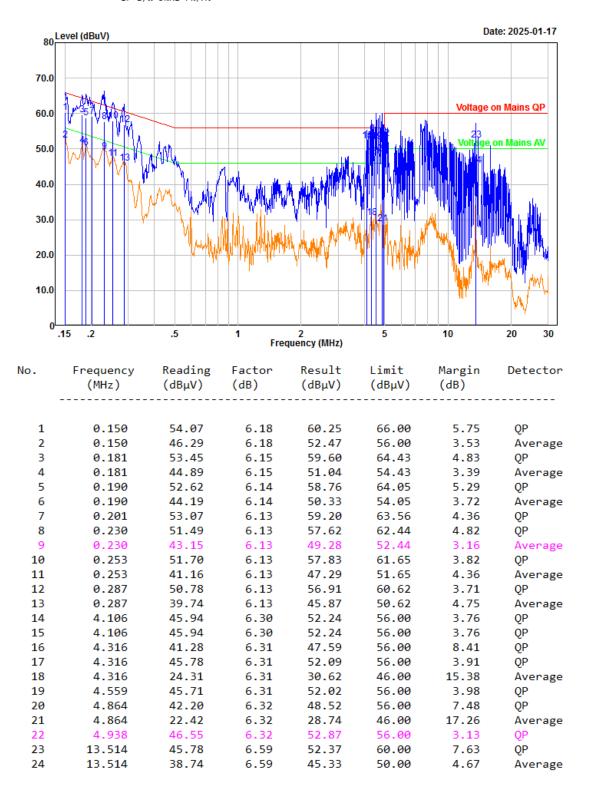
 Port: line1
 Tester: Lane Sun

 Test Mode: Transmitting
 Note:

 IF B/W 9kHz PK/AV



Serial No.: 2WFR-3 Tester: Lane Sun Note:



# **Configuration 4#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-4 Tester: Lane Sun Note:

80 Level (dBuV)

70.0

60.0

40.0

30.0

20.0

10.0

1.5 .2

1.5 .2

1.5 .1

1.7 .2

1.5 .2

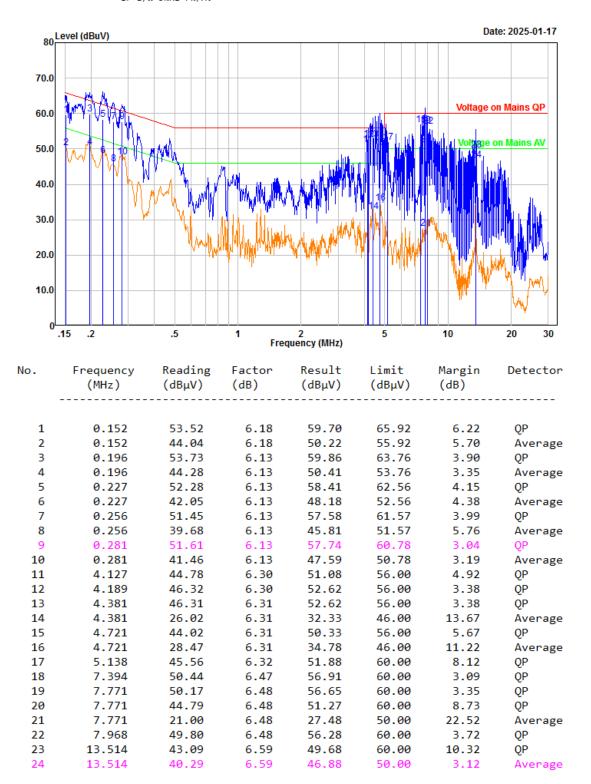
1.5 .1

2.7 .5

1.0 .20 .30

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.193	51.06	6.15	57.21	63.89	6.68	QP
2	0.193	44.46	6.15	50.61	53.89	3.28	Average
3	0.204	53.32	6.14	59.46	63.43	3.97	QP
4	0.228	51.34	6.14	57.48	62.52	5.04	QP
5	0.228	39.32	6.14	45.46	52.52	7.06	Average
6	0.257	50.55	6.14	56.69	61.53	4.84	QP
7	0.257	38.01	6.14	44.15	51.53	7.38	Average
8	0.278	50.70	6.14	56.84	60.87	4.03	QP
9	0.278	38.71	6.14	44.85	50.87	6.02	Average
10	4.086	46.24	6.29	52.53	56.00	3.47	QP
11	4.337	44.96	6.30	51.26	56.00	4.74	QP
12	4.337	25.17	6.30	31.47	46.00	14.53	Average
13	4.628	46.13	6.31	52.44	56.00	3.56	QP
14	4.628	25.83	6.31	32.14	46.00	13.86	Average
15	4.768	46.25	6.31	52.56	56.00	3.44	QP
16	4.913	46.54	6.32	52.86	56.00	3.14	QP
17	5.113	49.96	6.32	56.28	60.00	3.72	QP
18	6.057	43.20	6.35	49.55	60.00	10.45	QP
19	6.179	50.15	6.36	56.51	60.00	3.49	QP
20	6.827	49.68	6.44	56.12	60.00	3.88	QP
21	7.468	49.97	6.46	56.43	60.00	3.57	QP
22	8.209	46.28	6.46	52.74	60.00	7.26	QP
23	13.581	45.51	6.58	52.09	60.00	7.91	QP
24	13.581	35.51	6.58	42.09	50.00	7.91	Average

Serial No.: 2WFR-4 Tester: Lane Sun Note:



# **Configuration 5#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-5 Tester: Lane Sun Note:

80 Level (dBuV)

70.0

60.0

40.0

30.0

20.0

10.0

15 .2 .5 1 Frequency (MHz)

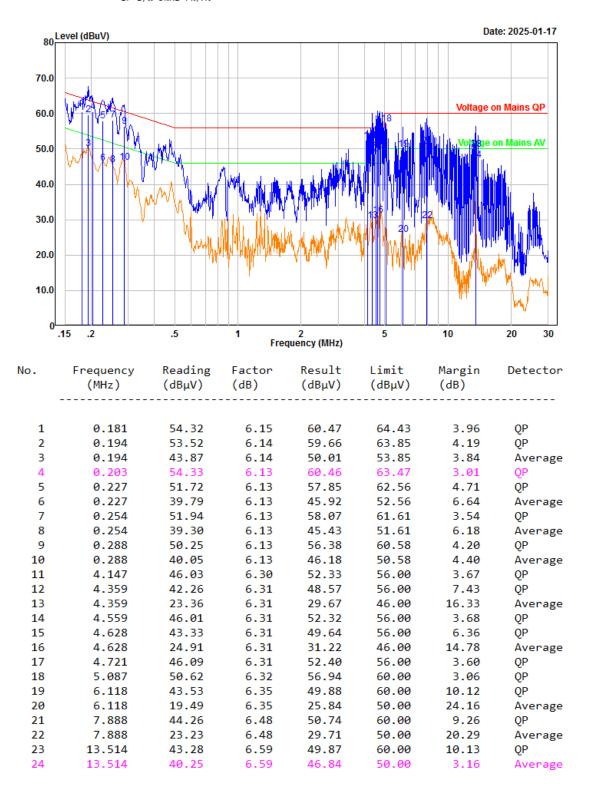
Date: 2025-01-17

Voltage on Mains AV

Frequency (MHz)

			Free	quency (MHz)			20 00
No.	Frequency		Factor	Result	Limit	Margin	Detector
	(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
4	0.450	F4 02	6.40	C1 11	66.00	4.80	O.D.
1	0.150	54.92	6.19	61.11	66.00	4.89	QP
2	0.195	51.37	6.14	57.51	63.81	6.30	QP
3	0.195	44.19	6.14	50.33	53.81	3.48	Average
4	0.228	52.00	6.14	58.14	62.52	4.38	QP
5	0.228	39.09	6.14	45.23	52.52	7.29	Average
6	0.254	52.03	6.14	58.17	61.61	3.44	QР
7	0.254	38.37	6.14	44.51	51.61	7.10	Average
8	0.287	50.48	6.14	56.62	60.62	4.00	QP
9	0.287	39.99	6.14	46.13	50.62	4.49	Average
10	4.316	44.01	6.30	50.31	56.00	5.69	QP
11	4.316	24.94	6.30	31.24	46.00	14.76	Average
12	4.559	45.79	6.31	52.10	56.00	3.90	QP
13	4.745	45.16	6.31	51.47	56.00	4.53	QP
14	4.745	32.40	6.31	38.71	46.00	7.29	Average
15	5.649	46.44	6.33	52.77	60.00	7.23	QP
16	5.649	23.15	6.33	29.48	50.00	20.52	Average
17	6.027	50.39	6.34	56.73	60.00	3.27	QP
18	6.527	45.06	6.40	51.46	60.00	8.54	QP
19	6.527	23.17	6.40	29.57	50.00	20.43	Äverage
20	7.394	49.71	6.46	56.17	60.00	3.83	QP
21	7.888	46.29	6.47	52.76	60.00	7.24	ÕР
22	7.888	23.40	6.47	29.87	50.00	20.13	Average
23	13.581	45.03	6.58	51.61	60.00	8.39	QP
24	13.581	35.03	6.58	41.61	50.00	8.39	Average
2-	13.301	55.05	0.50	41.01	50.00	0.55	Average

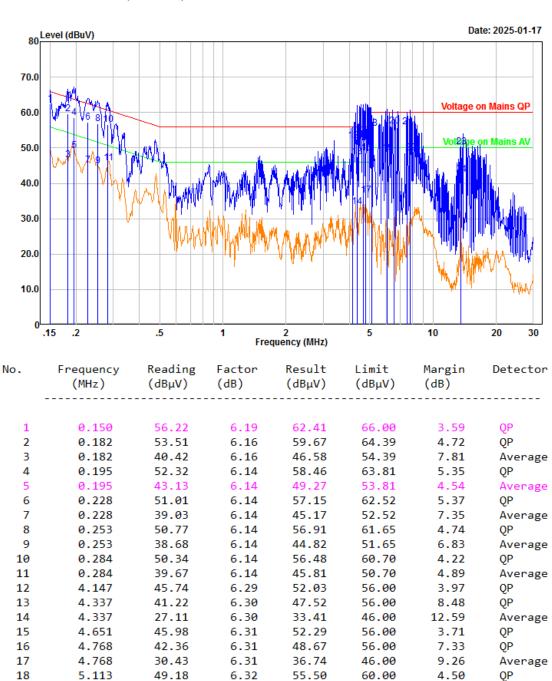
Serial No.: 2WFR-5 Tester: Lane Sun Note:



#### **Configuration 6#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-6 Tester: Lane Sun

Note:



6.057

6.527

7.505

7.771

13.560

13.560

42.12

49.77

49.57

42.10

43.82

35.81

6.35

6.40

6.47

6.47

6.58

6.58

48.47

56.17

56.04

48.57

50.40

42.39

60.00

60.00

60.00

60.00

60.00

50.00

11.53

3.83

3.96

11.43

9.60

7.61

19

20

21

22

23

24

QP

QP

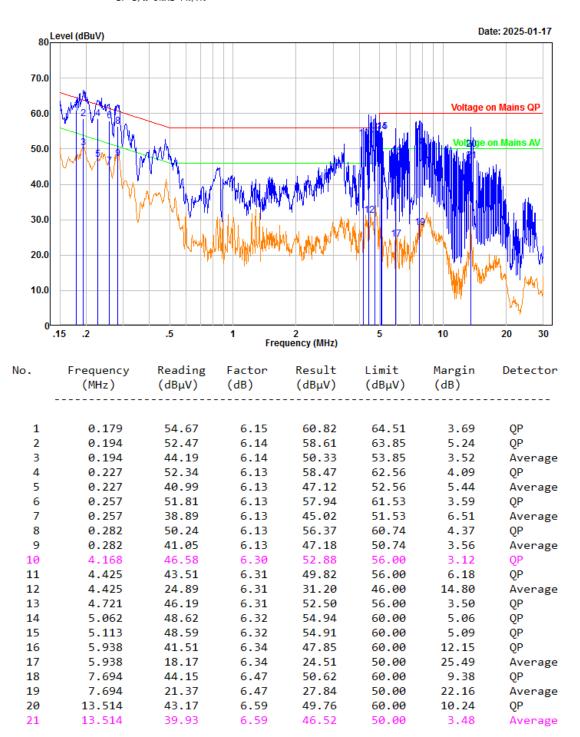
QΡ

QΡ

QΡ

Average

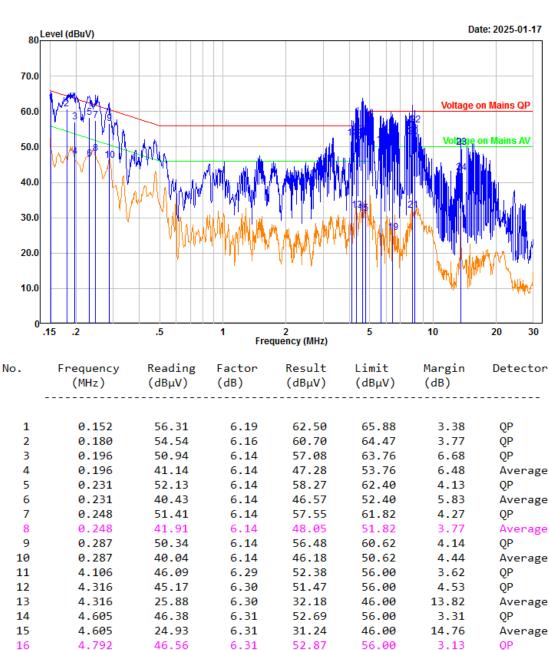
Serial No.: 2WFR-6 Tester: Lane Sun Note:



#### **Configuration 7#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-7 Tester: Lane Sun

Note:



5.649

6.430

6.430

7.968

7.968

8.169

13.581

13.581

44.14

46.39

19.45

46.50

25.58

49.80

43.38

36.08

6.33

6.39

6.39

6.47

6.47

6.46

6.58

6.58

50.47

52.78

25.84

52.97

32.05

56.26

49.96

42.66

60.00

60.00

50.00

60.00

50.00

60.00

60.00

50.00

9.53

7.22

24.16

7.03

17.95

3.74

10.04

7.34

QΡ

QΡ

QΡ

OP

QΡ

Average

Average

Average

17

18

19

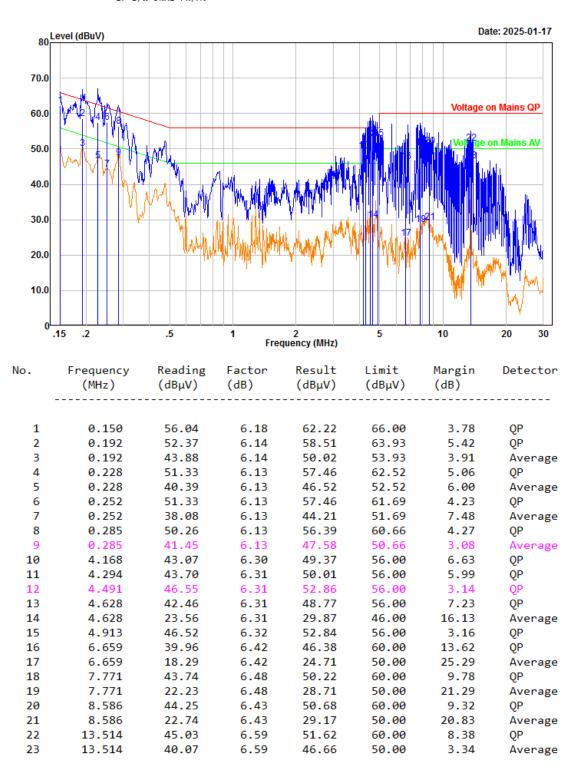
20

21

22 23

24

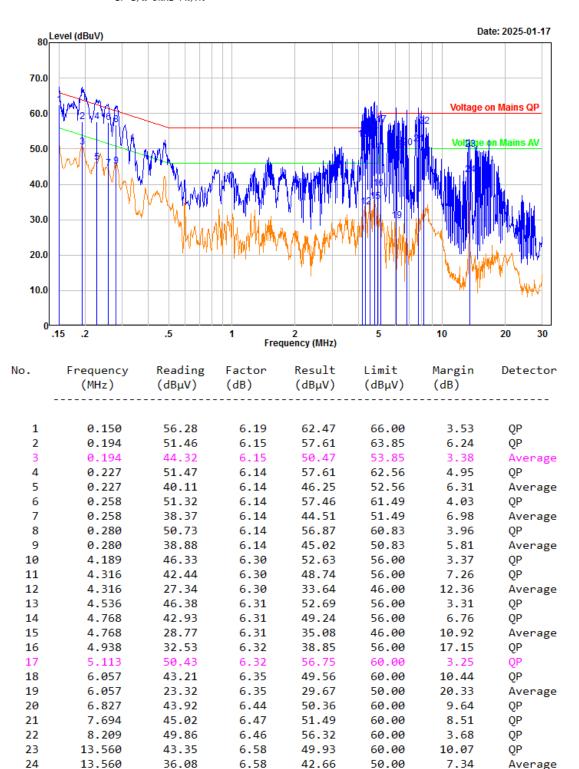
Serial No.: 2WFR-7 Tester: Lane Sun Note:



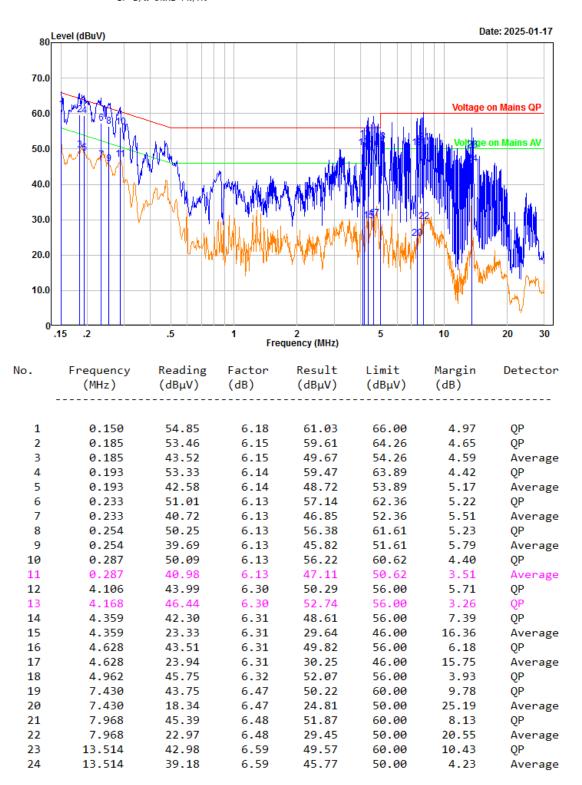
#### **Configuration 8#:**

Project No.: 2402A112039E-RF Port: line1 Test Mode: Transmitting IF B/W 9kHz PK/AV Serial No.: 2WFR-8 Tester: Lane Sun

Note:



Serial No.: 2WFR-8 Tester: Lane Sun Note:



## 4.2 Radiated Spurious Emissions

#### 4.2.1 Applicable Standard

FCC Part 15.225

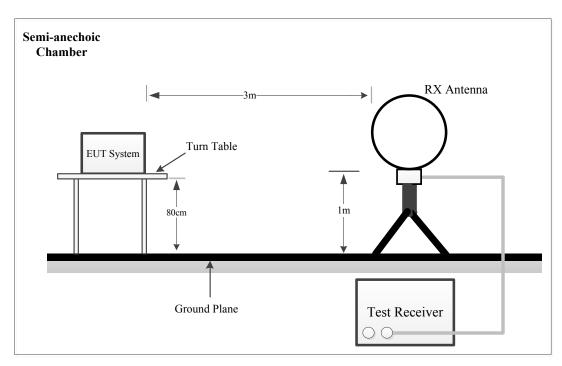
- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

RSS-210 B.6(a)

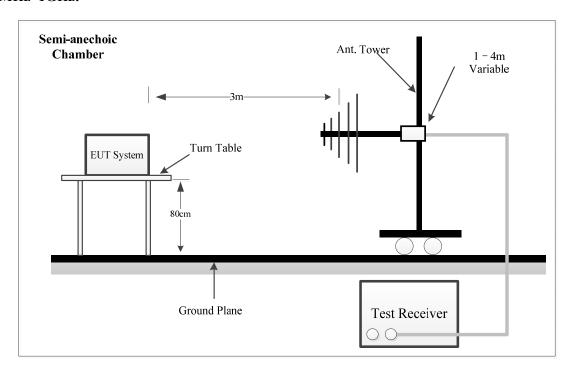
- (a) the field strength of any emission shall not exceed the following limits:
- (i) 15.848 mV/m (84 dB $\mu$ V/m) at 30 m, within the band 13.553-13.567 MHz
- (ii) 334  $\mu$ V/m (50.5 dB $\mu$ V/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz
- (iii) 106  $\mu$ V/m (40.5 dB $\mu$ V/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz
- (iv) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

### 4.2.2 EUT Setup

#### 9kHz~30MHz:



#### 30MHz~1GHz:



The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013.

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

The spacing between the peripherals was 10 cm.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

### 4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 1 GHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/AV
150 kHz – 30 MHz	9 kHz	30 kHz	9 kHz	QP/AV
30 MHz – 1000 MHz	100 kHz	300 kHz	/	PK
30 MHZ - 1000 MHZ	/	/	120 kHz	QP

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP measurement

#### **4.2.4 Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Report No.: 2402A112039E-RF-00

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9-90 kHz, 110-490 kHz, employing an average detector.

## 4.2.5 Corrected Result & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit - Result

The limit of Magnetic field strength for 9 kHz-30MHz in RSS-Gen requirement was converted to E-Filed by add 51,5dB, which was identical with FCC Limits.

Report Template Version: FCC+IC-NFC-V1.3

## 4.2.6 Test Data

Serial Number:	2WFR-1, 2WFR-2, 2WFR-3, 2WFR-4, 2WFR-5, 2WFR-6, 2WFR-7, 2WFR-8	Test Date:	2025/1/16
Test Site:	Chamber10m	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Report No.: 2402A112039E-RF-00

Environmental Conditions:					
Temperature: $(^{\circ}\mathbb{C})$	21.5	Relative Humidity: (%)	3 /	ATM Pressure: 1 (kPa)	02

#### **Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24
Sunol Sciences	Hybrid Antenna	ЈВ3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	185914	2024/8/26	2025/8/25
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25
Audix	Test Software	E3	191218 V9	N/A	N/A

<sup>\*</sup> Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

#### **Test Data:**

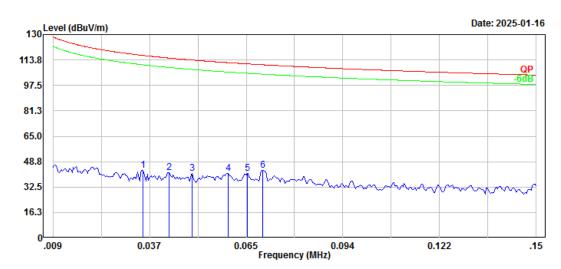
Please refer to the below table and plots. The test used AC 208V/60Hz voltage.

## 1) 9kHz~30MHz **Configuration 1#:** Parallel

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



Serial No.: 2WFR-1

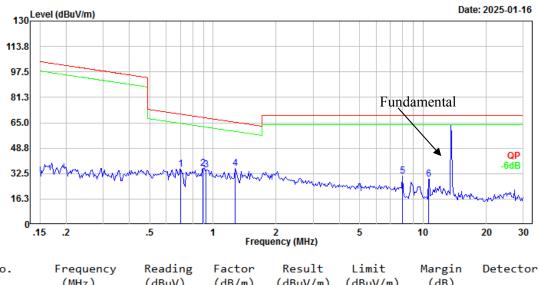
Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.035	-3.60	46.62	43.02	116.67	73.65	Peak
2	0.043	-3.44	45.29	41.85	114.97	73.12	Peak
3	0.050	-2.96	44.12	41.16	113.69	72.53	Peak
4	0.060	-1.25	42.33	41.08	112.04	70.96	Peak
5	0.066	0.05	41.34	41.39	111.26	69.87	Peak
6	0.070	2.75	40.56	43.31	110.68	67.37	Peak

Project No.: 2402A112039E-RF
Polarization: Parallel
Test Mode: Transmitting
Note:

RBW:10kHz VBW:30kHz

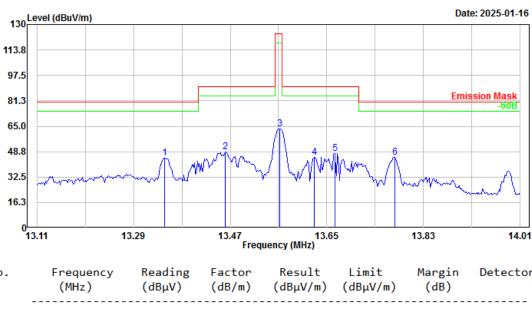
Serial No.: 2WFR-1 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.705	14.00	21.42	35.42	70.58	35.16	Peak
2	0.899	17.39	18.58	35.97	68.42	32.45	Peak
3	0.928	17.00	18.00	35.00	68.13	33.13	Peak
4	1.276	20.34	15.34	35.68	65.31	29.63	Peak
5	7.977	25.81	5.09	30.90	69.54	38.64	Peak
6	10.620	24.29	4.79	29.08	69.54	40.46	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-1
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

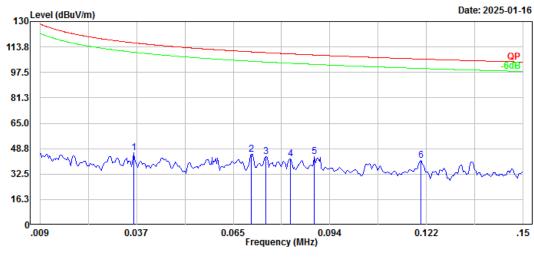


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.348	40.27	4.57	44.84	80.51	35.67	Peak
2	13.461	44.10	4.55	48.65	90.47	41.82	Peak
3	13.562	58.77	4.53	63.30	124.00	60.70	Peak
4	13.627	40.85	4.52	45.37	90.47	45.10	Peak
5	13.664	43.03	4.51	47.54	90.47	42.93	Peak
6	13.776	40.46	4.51	44.97	80.51	35.54	Peak

# Perpendicular

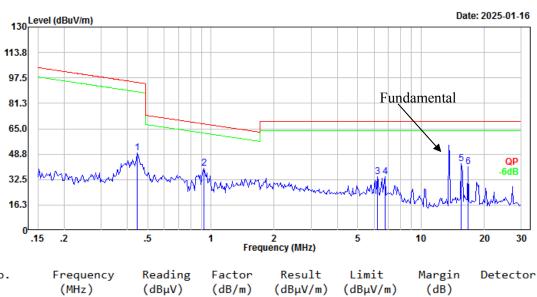
Project No.: 2402A112039E-RF Serial No.: 2WFR-1
Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.036	-0.15	46.42	46.27	116.39	70.12	Peak
2	0.071	4.89	40.46	45.35	110.61	65.26	Peak
3	0.075	3.92	39.75	43.67	110.10	66.43	Peak
4	0.082	3.61	38.56	42.17	109.32	67.15	Peak
5	0.089	6.15	37.30	43.45	108.61	65.16	Peak
6	0.120	6.68	34.29	40.97	106.01	65.04	Peak

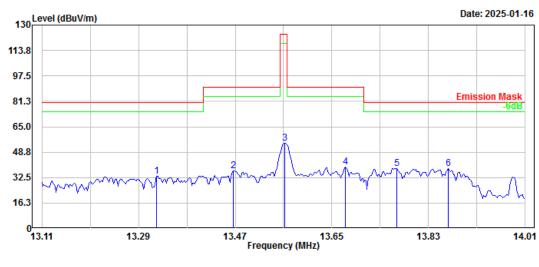
Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting Note: Serial No.: 2WFR-1 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.447	25.71	23.67	49.38	94.60	45.22	Peak
2	0.928	21.50	18.00	39.50	68.13	28.63	Peak
3	6.186	28.35	5.81	34.16	69.54	35.38	Peak
4	6.733	28.89	5.60	34.49	69.54	35.05	Peak
5	15.552	38.15	4.46	42.61	69.54	26.93	Peak
6	16.750	36.31	4.38	40.69	69.54	28.85	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting Note:

Serial No.: 2WFR-1 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.324	28.90	4.57	33.47	80.51	47.04	Peak
2	13.466	32.16	4.55	36.71	90.47	53.76	Peak
3	13.562	49.86	4.53	54.39	124.00	69.61	Peak
4	13.675	34.51	4.51	39.02	90.47	51.45	Peak
5	13.771	33.99	4.51	38.50	80.51	42.01	Peak
6	13.866	33.54	4.49	38.03	80.51	42.48	Peak

#### **Ground Parallel**

6

0.089

3.40

37.35

40.75

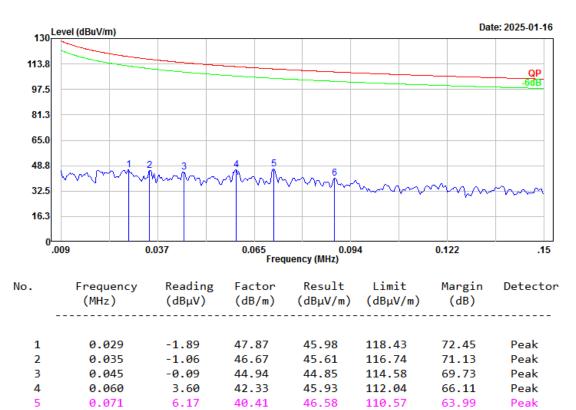
108.64

67.89

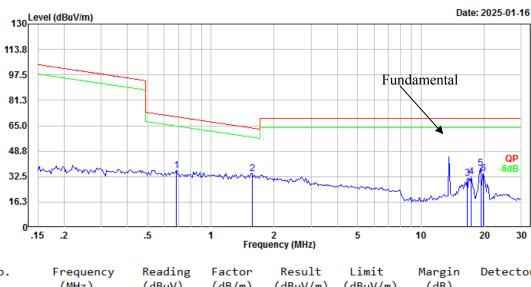
Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-1
Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting Note:



Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting Note: Serial No.: 2WFR-1 Tester: Zoo Zou

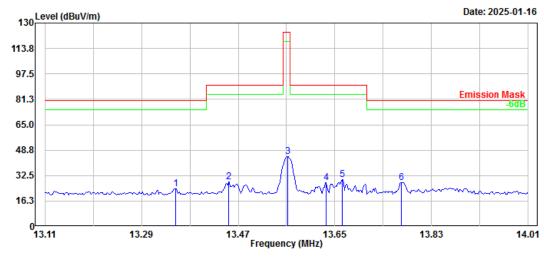


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.683	14.83	21.64	36.47	70.86	34.39	Peak
2	1.577	20.33	13.99	34.32	63.43	29.11	Peak
3	16.573	26.98	4.40	31.38	69.54	38.16	Peak
4	17.291	28.24	4.32	32.56	69.54	36.98	Peak
5	19.224	33.32	4.24	37.56	69.54	31.98	Peak
6	19.845	30.12	4.18	34.30	69.54	35.24	Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-1 Tester: Zoo Zou



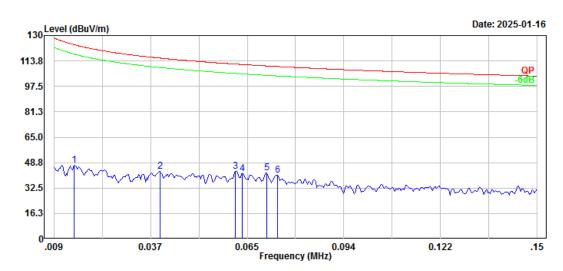
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.353	19.46	4.57	24.03	80.51	56.48	Peak
2	13.452	23.70	4.55	28.25	90.47	62.22	Peak
3	13.562	39.97	4.53	44.50	124.00	79.50	Peak
4	13.634	23.25	4.52	27.77	90.47	62.70	Peak
5	13.664	25.25	4.51	29.76	90.47	60.71	Peak
6	13.774	23.66	4.51	28.17	80.51	52.34	Peak

### **Configuration 2#:** Parallel

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



Serial No.: 2WFR-2 Tester: Zoo Zou

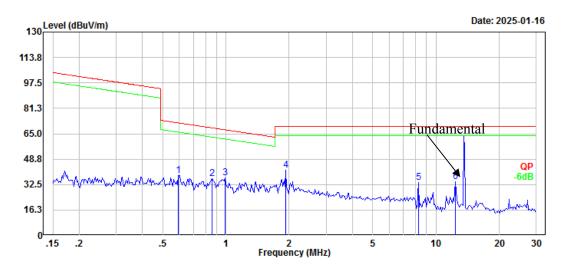
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-4.51	51.47	46.96	124.13	77.17	Peak
2	0.040	-2.79	45.77	42.98	115.56	72.58	Peak
3	0.062	1.17	41.99	43.16	111.75	68.59	Peak
4	0.064	0.06	41.64	41.70	111.48	69.78	Peak
5	0.071	1.60	40.41	42.01	110.57	68.56	Peak
6	0.074	0.64	39.90	40.54	110.20	69.66	Peak

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

RBW:10kHz VBW:30kHz

Note:

Serial No.: 2WFR-2 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.595	15.69	22.52	38.21	72.08	33.87	Peak
2	0.862	16.98	19.32	36.30	68.79	32.49	Peak
3	0.989	19.98	16.78	36.76	67.57	30.81	Peak
4	1.928	29.43	12.44	41.87	69.54	27.67	Peak
5	8.235	28.71	5.04	33.75	69.54	35.79	Peak
6	12.318	29.41	4.69	34.10	69.54	35.44	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-2 Polarization: Parallel Tester: Zoo Zou

Test Mode: Transmitting Note:

13.562

13.637

13.661

13.772

40.99

41.97

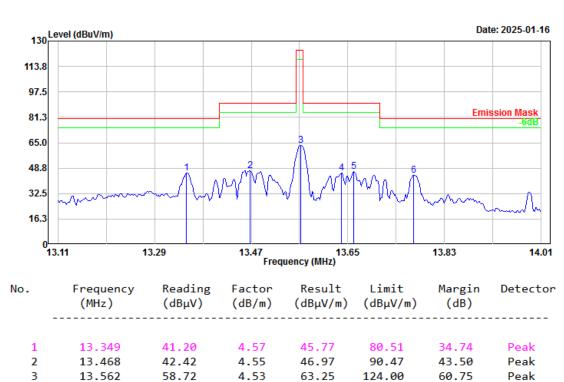
39.83

4

5

6

RBW:10kHz VBW:30kHz



45.51

46.48

44.34

4.52

4.51

4.51

90.47

90.47

80.51

Peak

Peak

Peak

Peak

44.96

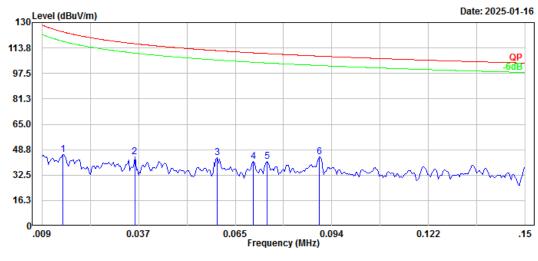
43.99

36.17

# Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-2 Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-5.52	51.38	45.86	123.97	78.11	Peak
2	0.036	-2.10	46.47	44.37	116.46	72.09	Peak
3	0.060	1.22	42.33	43.55	112.04	68.49	Peak
4	0.071	0.61	40.46	41.07	110.61	69.54	Peak
5	0.075	1.32	39.80	41.12	110.14	69.02	Peak
6	0.090	6.80	37.15	43.95	108.53	64.58	Peak

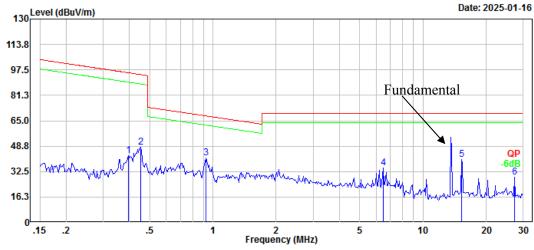
Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

RBW:10kHz VBW:30kHz

Note:

Serial No.: 2WFR-2 Tester: Zoo Zou

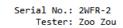
130 Level (dBuV/m)

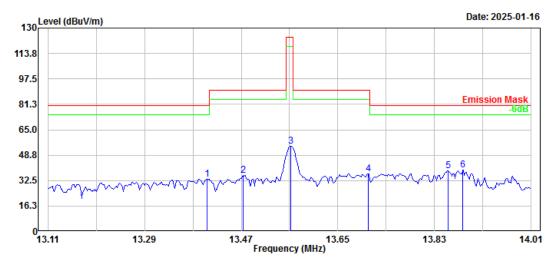


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
_							
1	0.398	18.73	23.80	42.53	95.61	53.08	Peak
2	0.452	24.55	23.65	48.20	94.51	46.31	Peak
3	0.928	23.42	18.00	41.42	68.13	26.71	Peak
4	6.454	29.25	5.71	34.96	69.54	34.58	Peak
5	15.226	35.74	4.45	40.19	69.54	29.35	Peak
6	27.271	24.85	4.16	29.01	69.54	40.53	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:





No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.407	28.85	4.55	33.40	80.51	47.11	Peak
2	13.474	31.34	4.55	35.89	90.47	54.58	Peak
3	13.562	49.89	4.53	54.42	124.00	69.58	Peak
4	13.706	32.49	4.51	37.00	90.47	53.47	Peak
5	13.855	34.48	4.49	38.97	80.51	41.54	Peak
6	13.882	34.92	4.48	39.40	80.51	41.11	Peak

#### **Ground Parallel**

6

0.078

2.94

39.20

42.14

109.72

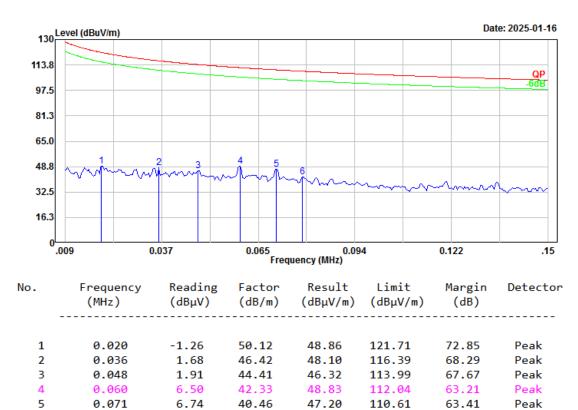
67.58

Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-2 Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

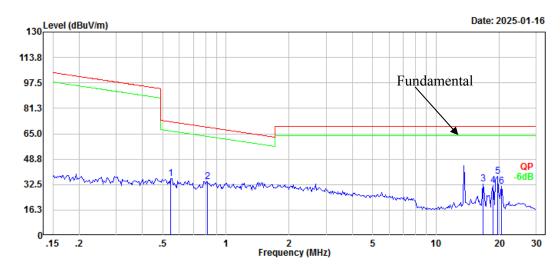
Note:



Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-2 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.546	13.43	23.03	36.46	72.83	36.37	Peak
2	0.817	14.26	20.21	34.47	69.26	34.79	Peak
3	16.750	28.29	4.38	32.67	69.54	36.87	Peak
4	18.622	27.55	4.28	31.83	69.54	37.71	Peak
5	19.635	33.33	4.20	37.53	69.54	32.01	Peak
6	20.486	27.02	4.17	31.19	69.54	38.35	Peak

13.83

14.01

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

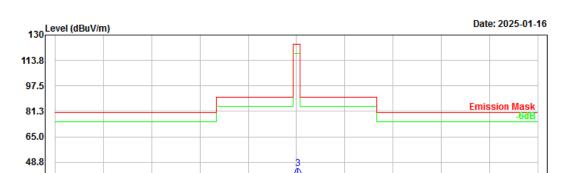
Note:

32.5 16.3

> 0 13.11

RBW:10kHz VBW:30kHz

13.29



Serial No.: 2WFR-2 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.438	21.66	4.55	26.21	90.47	64.26	Peak
2	13.459	24.29	4.55	28.84	90.47	61.63	Peak
3	13.562	40.08	4.53	44.61	124.00	79.39	Peak
4	13.627	23.81	4.52	28.33	90.47	62.14	Peak
5	13.666	24.40	4.51	28.91	90.47	61.56	Peak
6	13.677	26.00	4.51	30.51	90.47	59.96	Peak

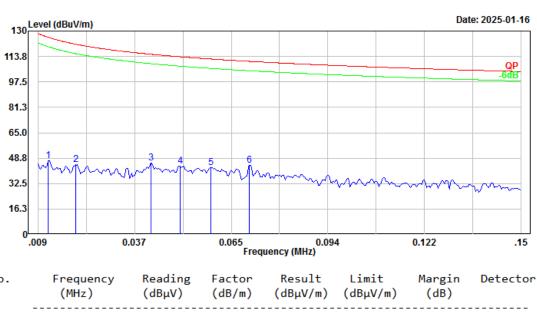
13.47 13.65 Frequency (MHz)

# Configuration 3#: Parallel

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Parallel Tester: Zoo Zou

Test Mode: Transmitting

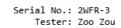
Note:

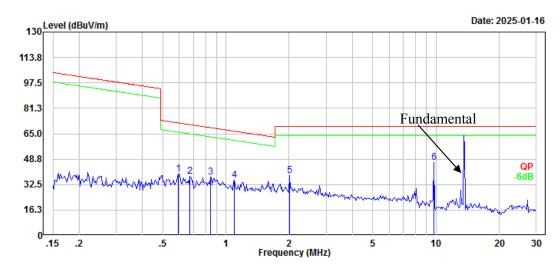


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.012	-5.17	52.26	47.09	125.95	78.86	Peak
2	0.020	-5.24	50.04	44.80	121.58	76.78	Peak
3	0.042	0.11	45.42	45.53	115.14	69.61	Peak
4	0.050	-0.36	43.97	43.61	113.55	69.94	Peak
5	0.059	0.45	42.43	42.88	112.12	69.24	Peak
6	0.071	3.69	40.46	44.15	110.61	66.46	Peak

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:





No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.595	16.64	22.52	39.16	72.08	32.92	Peak
2	0.675	16.02	21.71	37.73	70.95	33.22	Peak
3	0.844	17.69	19.68	37.37	68.98	31.61	Peak
4	1.100	19.03	16.12	35.15	66.63	31.48	Peak
5	2.012	25.97	12.09	38.06	69.54	31.48	Peak
6	9.757	41.71	4.83	46.54	69.54	23.00	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

58.91

42.74

40.88

38.26

Note:

3

4

5

6

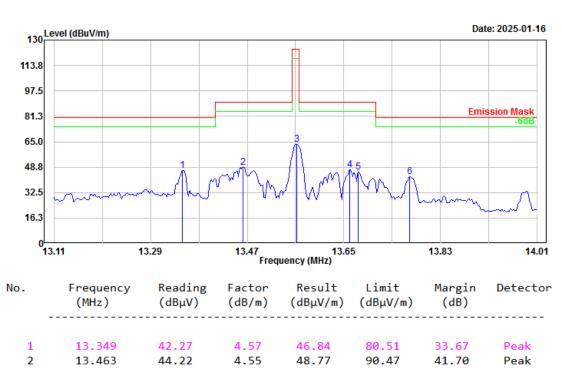
13.562

13.661

13.677

13.772

RBW:10kHz VBW:30kHz



4.53

4.51

4.51

4.51

63.44

47.25

45.39

42.77

124.00

90.47

90.47

80.51

60.56

43.22

45.08

37.74

Peak

Peak

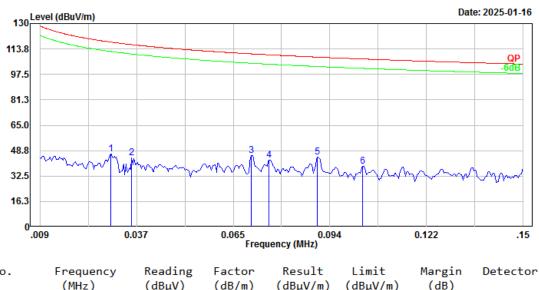
Peak

Peak

# Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Perpendicular Tester: Zoo Zou

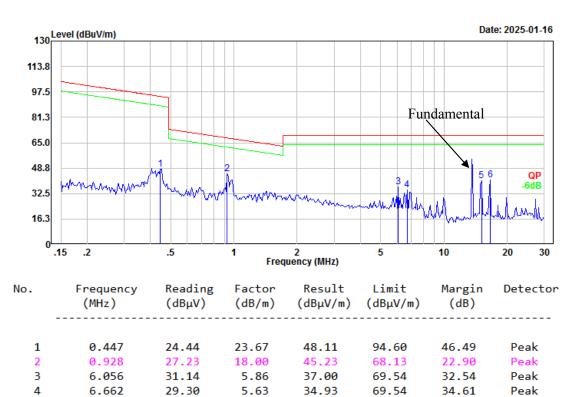
Test Mode: Transmitting Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.030	-1.13	47.66	46.53	118.18	71.65	Peak
2	0.036	-2.28	46.53	44.25	116.53	72.28	Peak
3	0.071	5.03	40.46	45.49	110.61	65.12	Peak
4	0.076	3.03	39.62	42.65	110.01	67.36	Peak
5	0.090	7.69	37.15	44.84	108.53	63.69	Peak
6	0.103	3.69	35.22	38.91	107.33	68.42	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note: RBW:10kHz VBW:30kHz



Serial No.: 2WFR-3

Tester: Zoo Zou

5

6

15.066

16.573

36.13

36.60

4.44

4.40

40.57

41.00

69.54

69.54

28.97

28.54

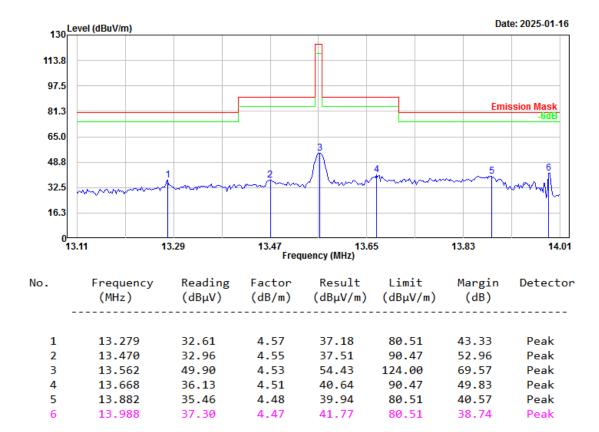
Peak

Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:





#### **Ground Parallel**

5

6

0.071

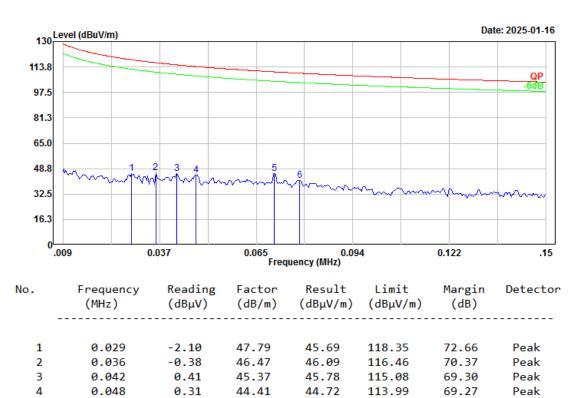
0.078

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



45.49

41.26

40.46

39.24

5.03

2.02

110.61

109.75

65.12

68.49

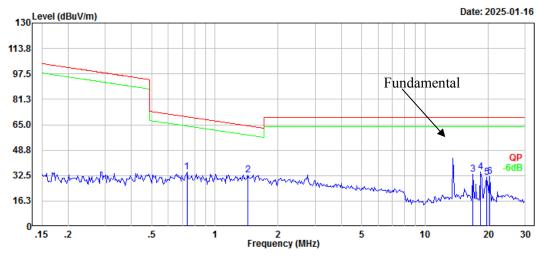
Peak

Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Serial No.: 2WFR-3 Tester: Zoo Zou

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.735	13.68	21.15	34.83	70.20	35.37	Peak
2	1.433	18.17	14.64	32.81	64.28	31.47	Peak
3	16.928	29.04	4.36	33.40	69.54	36.14	Peak
4	18.426	30.52	4.28	34.80	69.54	34.74	Peak
5	19.635	27.40	4.20	31.60	69.54	37.94	Peak
6	20.270	27.58	4.16	31.74	69.54	37.80	Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

5

6

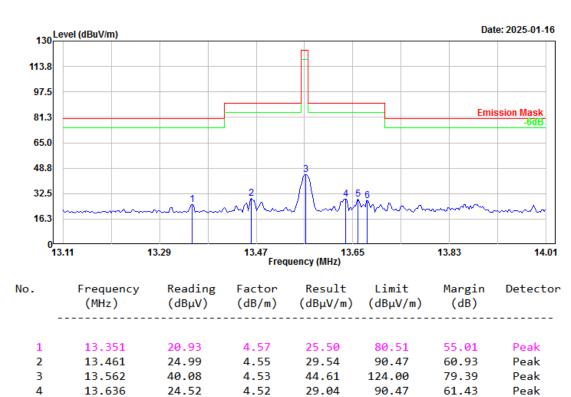
13.659

13.677

24.49

23.58

RBW:10kHz VBW:30kHz



4.51

4.51

29.00

28.09

90.47

90.47

61.47

62.38

Peak

Peak

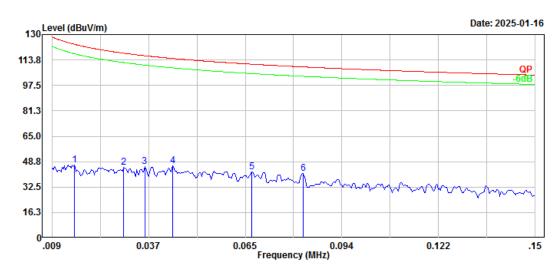
Serial No.: 2WFR-3

Tester: Zoo Zou

# Configuration 4#: Parallel

Project No.: 2402A112039E-RF Serial No.: 2WFR-4
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:



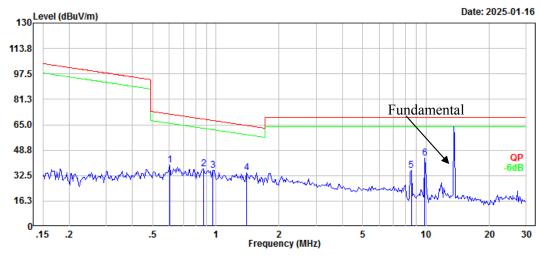
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-4.52	51.31	46.79	123.81	77.02	Peak
2	0.030	-2.38	47.58	45.20	118.10	72.90	Peak
3	0.036	-0.74	46.47	45.73	116.46	70.73	Peak
4	0.044	0.92	45.04	45.96	114.69	68.73	Peak
5	0.067	1.03	41.06	42.09	111.03	68.94	Peak
6	0.082	2.57	38.51	41.08	109.29	68.21	Peak

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-4 Tester: Zoo Zou



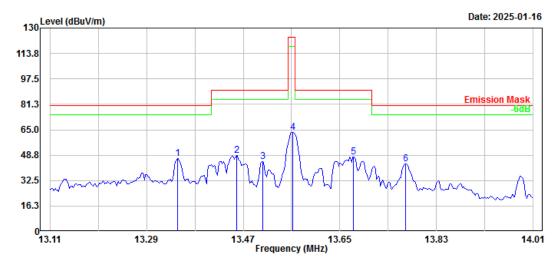
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.601	16.57	22.45	39.02	71.99	32.97	Peak
2	0.871	17.68	19.14	36.82	68.70	31.88	Peak
3	0.968	18.65	17.19	35.84	67.76	31.92	Peak
4	1.403	19.59	14.77	34.36	64.47	30.11	Peak
5	8.501	30.80	5.01	35.81	69.54	33.73	Peak
6	9.861	38.66	4.82	43.48	69.54	26.06	Peak

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

St Mode: Transmitting Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-4 Tester: Zoo Zou



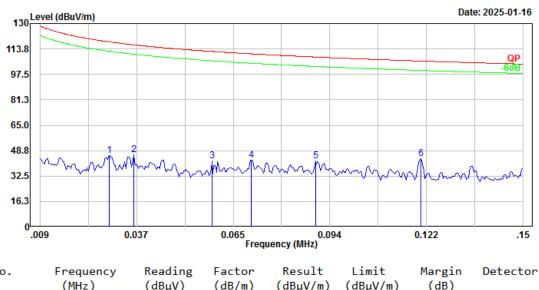
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.348	41.87	4.57	46.44	80.51	34.07	Peak
2	13.457	44.25	4.55	48.80	90.47	41.67	Peak
3	13.506	40.23	4.53	44.76	90.47	45.71	Peak
4	13.562	58.93	4.53	63.46	124.00	60.54	Peak
5	13.675	43.31	4.51	47.82	90.47	42.65	Peak
6	13.772	38.79	4.51	43.30	80.51	37.21	Peak

# Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-4
Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting

Note:



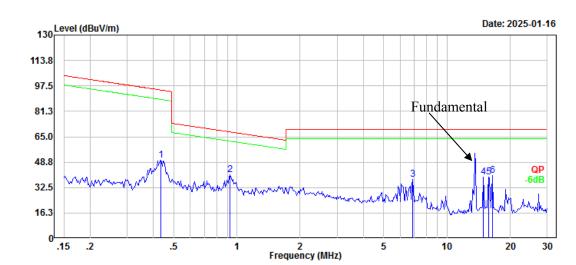
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.029	-2.30	47.72	45.42	118.27	72.85	Peak
2	0.036	-0.33	46.42	46.09	116.39	70.30	Peak
3	0.059	-0.40	42.48	42.08	112.16	70.08	Peak
4	0.071	2.40	40.46	42.86	110.61	67.75	Peak
5	0.089	5.03	37.25	42.28	108.58	66.30	Peak
6	0.120	9.18	34.29	43.47	106.01	62.54	Peak

RBW:10kHz VBW:30kHz

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

Serial No.: 2WFR-4 Tester: Zoo Zou



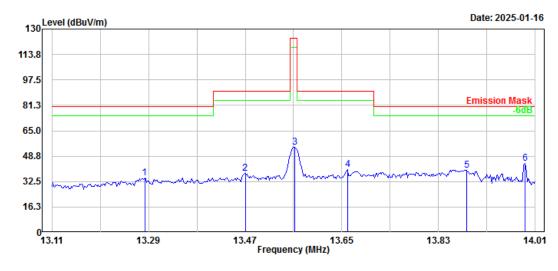
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
		05.43	02.70	50.43	04.00		
1	0.433	26.43	23.70	50.13	94.88	44.75	Peak
2	0.928	22.87	18.00	40.87	68.13	27.26	Peak
3	6.878	32.25	5.54	37.79	69.54	31.75	Peak
4	14.907	34.65	4.45	39.10	69.54	30.44	Peak
5	15.718	34.86	4.47	39.33	69.54	30.21	Peak
6	16.398	35.63	4.43	40.06	69.54	29.48	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

RBW:10kHz VBW:30kHz

Note:

Serial No.: 2WFR-4 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
-							
1	13.283	30.08	4.57	34.65	80.51	45.86	Peak
2	13.470	33.05	4.55	37.60	90.47	52.87	Peak
3	13.562	49.84	4.53	54.37	124.00	69.63	Peak
4	13.661	35.60	4.51	40.11	90.47	50.36	Peak
5	13.882	35.31	4.48	39.79	80.51	40.72	Peak
6	13.990	39.48	4.47	43.95	80.51	36.56	Peak

#### **Ground Parallel**

5

6

0.070

0.082

Project No.: 2402A112039E-RF Serial No.: 2WFR-4
Polarization: Ground-Parallel Tester: Zoo Zou

3.26

1.76

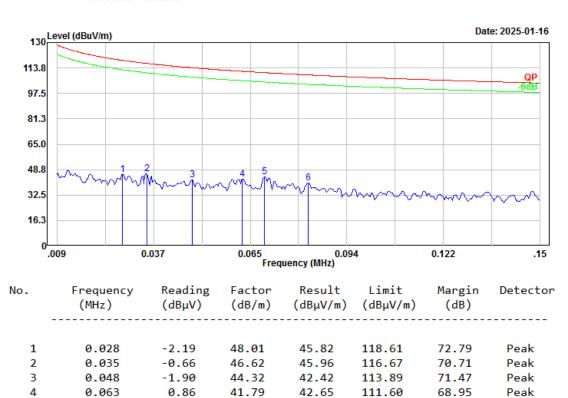
40.65

38.51

Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



110.75

109.29

66.84

69.02

Peak

Peak

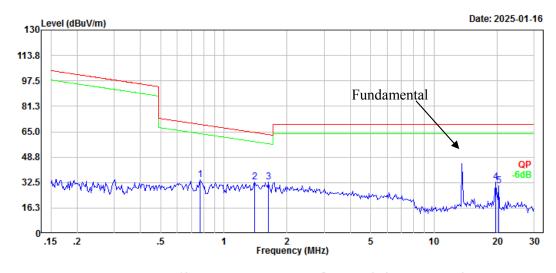
43.91

40.27

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-4 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.767	13.42	20.86	34.28	69.83	35.55	Peak
2	1.403	17.92	14.77	32.69	64.47	31.78	Peak
3	1.628	19.04	13.77	32.81	63.15	30.34	Peak
4	19.635	28.69	4.20	32.89	69.54	36.65	Peak
5	20.270	26.08	4.16	30.24	69.54	39.30	Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

4

5

6

13.668

13.693

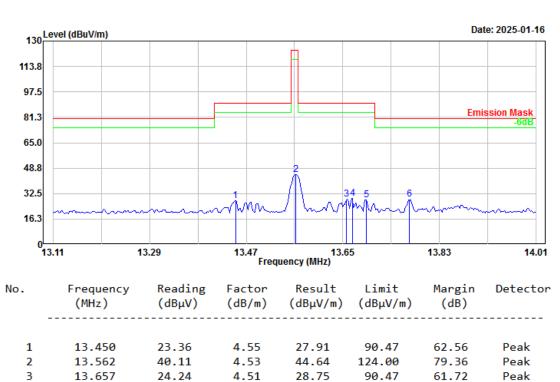
13.774

24.89

23.98

24.19

RBW:10kHz VBW:30kHz



29.40

28.49

28.70

4.51

4.51

4.51

90.47

90.47

80.51

61.07

61.98

51.81

Peak

Peak

Peak

Serial No.: 2WFR-4 Tester: Zoo Zou

0.122

.15

### **Configuration 5#:** Parallel

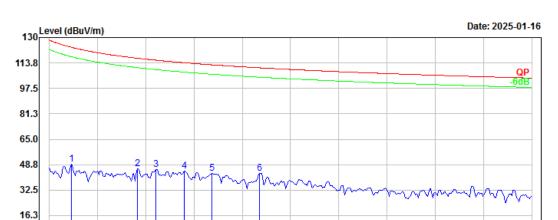
Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

.009

RBW:300Hz VBW:1kHz

0.037



Serial No.: 2WFR-5 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-2.30	51.31	49.01	123.81	74.80	Peak
2	0.035	-0.76	46.67	45.91	116.74	70.83	Peak
3	0.040	-0.24	45.72	45.48	115.50	70.02	Peak
4	0.048	0.44	44.32	44.76	113.89	69.13	Peak
5	0.057	0.06	42.91	42.97	112.54	69.57	Peak
6	a a7a	2 89	40 51	13 10	110 64	67 24	Poak

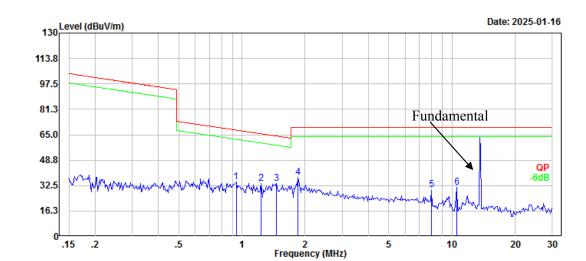
0.065 0.094 Frequency (MHz)

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

RBW:10kHz VBW:30kHz

Note:

Serial No.: 2WFR-5 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.938	16.93	17.80	34.73	68.04	33.31	Peak
2	1.236	18.54	15.51	34.05	65.59	31.54	Peak
3	1.464	19.43	14.50	33.93	64.09	30.16	Peak
4	1.848	24.80	12.79	37.59	69.54	31.95	Peak
5	7.977	24.59	5.09	29.68	69.54	39.86	Peak
6	10.508	26.44	4.79	31.23	69.54	38.31	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-5
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

58.96

42.62

38.44

40.83

Note:

3

4

5

6

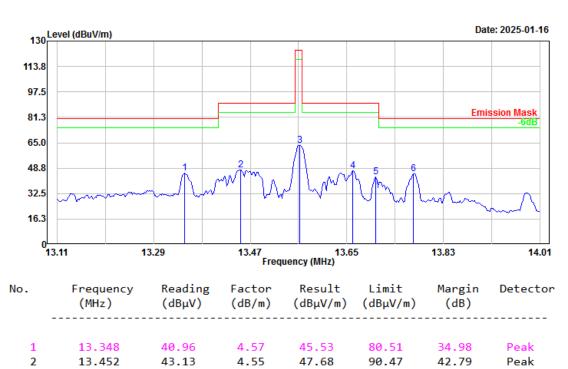
13.562

13.661

13.704

13.774

RBW:10kHz VBW:30kHz



4.53

4.51

4.51

4.51

63.49

47.13

42.95

45.34

124.00

90.47

90.47

80.51

60.51

43.34

47.52

35.17

Peak

Peak

Peak

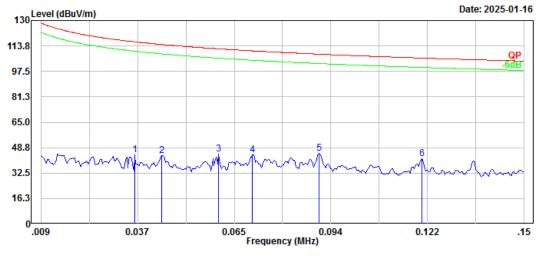
Peak

## Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-5 Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:

RBW:300Hz VBW:1kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.036	-2.44	46.42	43.98	116.39	72.41	Peak
2	0.044	-1.21	45.04	43.83	114.69	70.86	Peak
3	0.061	2.44	42.19	44.63	111.91	67.28	Peak
4	0.071	3.76	40.46	44.22	110.61	66.39	Peak
5	0.090	7.80	37.10	44.90	108.50	63.60	Peak
6	0.120	7.44	34.29	41.73	106.01	64.28	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

4

5

6

6.878

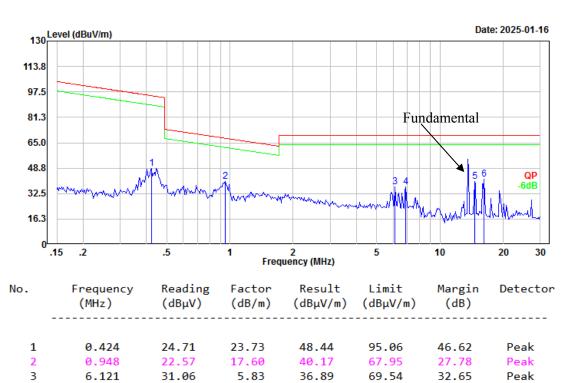
14.594

16.226

Note:

Serial No.: 2WFR-5 Tester: Zoo Zou

RBW:10kHz VBW:30kHz



5.54

4.46

4.45

31.27

35.85

37.04

36.81

40.31

41.49

69.54

69.54

69.54

Peak

Peak

Peak

32.73

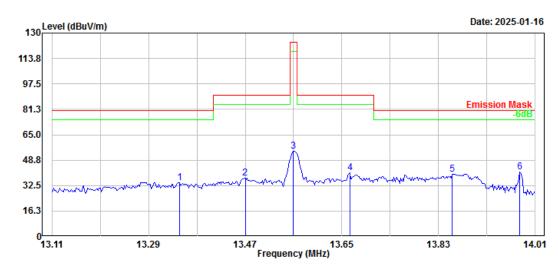
29.23

28.05

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

Serial No.: 2WFR-5 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
-							
1	13.348	29.70	4.57	34.27	80.51	46.24	Peak
2	13.470	32.73	4.55	37.28	90.47	53.19	Peak
3	13.560	50.02	4.53	54.55	124.00	69.45	Peak
4	13.664	36.03	4.51	40.54	90.47	49.93	Peak
5	13.855	35.33	4.49	39.82	80.51	40.69	Peak
6	13.981	36.83	4.47	41.30	80.51	39.21	Peak

# **Ground Parallel**

4

5

6

0.074

0.079

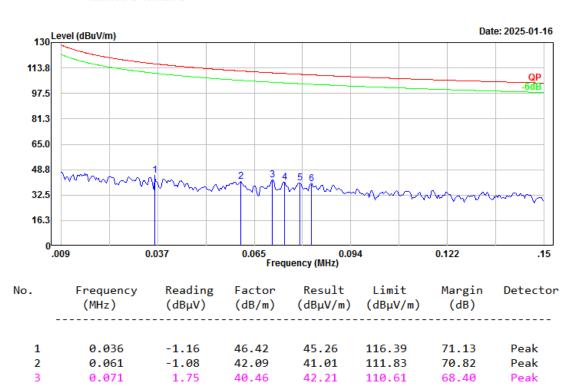
0.082

Project No.: 2402A112039E-RF Serial No.: 2WFR-5
Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



39.90

39.15

38.56

0.92

0.93

1.42

40.82

40.08

39.98

110.20

109.69

109.32

69.38

69.61

69.34

Peak

Peak

Peak

10

30

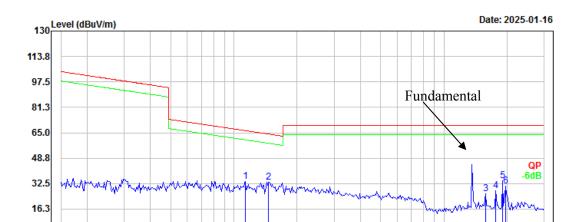
20

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

.15

RBW:10kHz VBW:30kHz



Serial No.: 2WFR-5 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1.135	17.70	15.96	33.66	66.35	32.69	Peak
2	1.464	18.66	14.50	33.16	64.09	30.93	Peak
3	15.718	21.48	4.47	25.95	69.54	43.59	Peak
4	17.661	23.49	4.30	27.79	69.54	41.75	Peak
5	19.021	29.95	4.27	34.22	69.54	35.32	Peak
6	19.635	26.63	4.20	30.83	69.54	38.71	Peak

2 Frequency (MHz)

1

62.79

60.55

63.26

52.48

Peak

Peak

Peak

Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

3

4

5

6

13.663

13.675

13.695

13.776

23.17

25.41

22.70

23.52

RBW:10kHz VBW:30kHz



4.51

4.51

4.51

4.51

27.68

29.92

27.21

28.03

90.47

90.47

90.47

80.51

Serial No.: 2WFR-5 Tester: Zoo Zou

0.122

.15

# Configuration 6#: Parallel

32.5 16.3

.009

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz

0.037



Serial No.: 2WFR-6 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.018	-5.57	50.67	45.10	122.63	77.53	Peak
2	0.038	-2.04	46.11	44.07	116.00	71.93	Peak
3	0.046	-0.85	44.70	43.85	114.31	70.46	Peak
4	0.051	-0.82	43.88	43.06	113.45	70.39	Peak
5	0.061	0.93	42.19	43.12	111.91	68.79	Peak
6	0.071	1.60	40.41	42.01	110.57	68.56	Peak

0.065 0.094 Frequency (MHz) Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

6

12.060

26.84

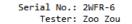
4.73

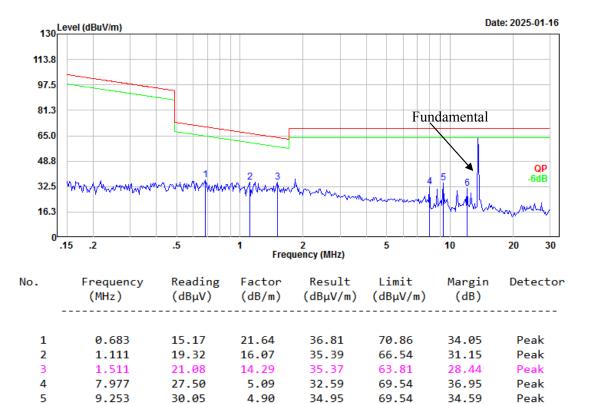
31.57

69.54

37.97

Peak





Project No.: 2402A112039E-RF Serial No.: 2WFR-6
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

5

6

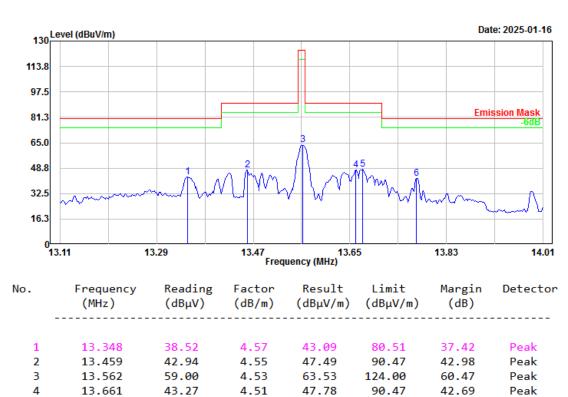
13.673

13.774

43.47

37.79

RBW:10kHz VBW:30kHz



4.51

4.51

47.98

42.30

90.47

80.51

42.49

38.21

Peak

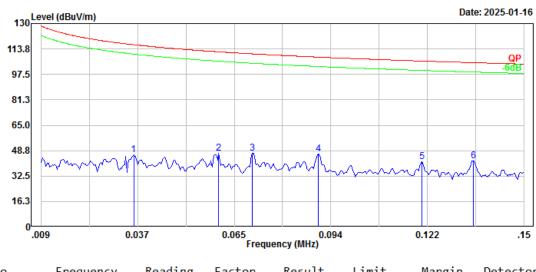
Peak

## Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-6
Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:

RBW:300Hz VBW:1kHz



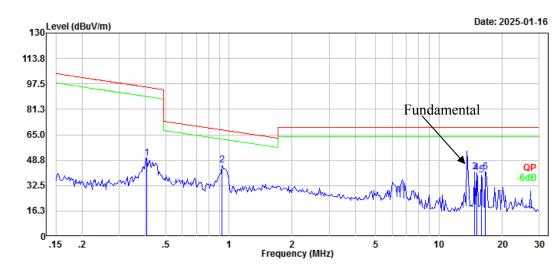
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.036	-0.59	46.47	45.88	116.46	70.58	Peak
2	0.061	4.95	42.19	47.14	111.91	64.77	Peak
3	0.071	6.73	40.46	47.19	110.61	63.42	Peak
4	0.090	9.67	37.15	46.82	108.53	61.71	Peak
5	0.120	7.34	34.29	41.63	106.01	64.38	Peak
6	0.135	8.92	33.46	42.38	104.99	62.61	Peak

RBW:10kHz VBW:30kHz

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

Serial No.: 2WFR-6 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.406	26.42	23.78	50.20	95.43	45.23	Peak
2	0.928	27.51	18.00	45.51	68.13	22.62	Peak
3	14.750	36.73	4.45	41.18	69.54	28.36	Peak
4	15.066	36.20	4.44	40.64	69.54	28.90	Peak
5	15.885	34.70	4.48	39.18	69.54	30.36	Peak
6	16.573	36.82	4.40	41.22	69.54	28.32	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

3

4

5

6

13.562

13.673

13.853

13.979

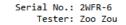
RBW:10kHz VBW:30kHz

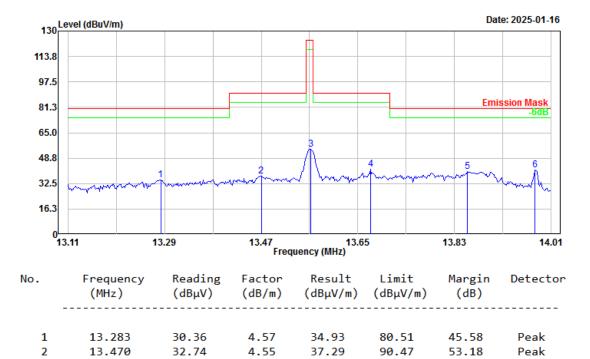
49.88

37.32

35.59

36.84





4.53

4.49

4.51

4.47

54.41 124.00

90.47

80.51

80.51

41.83

40.08

41.31

69.59

48.64

40.43

39.20

Peak

Peak

Peak

Peak

#### **Ground Parallel**

6

0.077

1.92

39.43

41.35

109.88

68.53

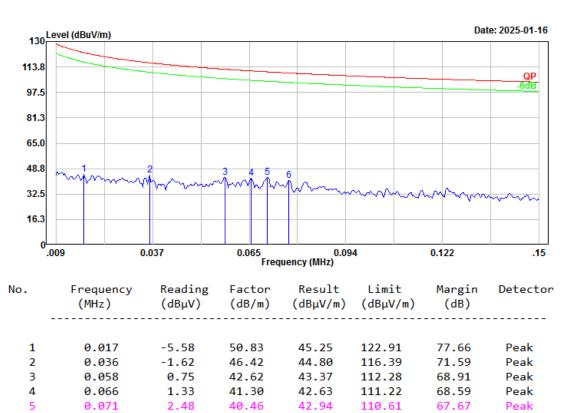
Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-6
Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

Note:

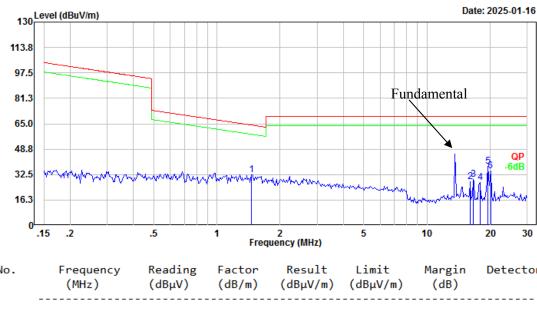
RBW:300Hz VBW:1kHz



Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

Serial No.: 2WFR-6 Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1.464	18.01	14.50	32.51	64.09	31.58	Peak
2	16.055	23.54	4.47	28.01	69.54	41.53	Peak
3	16.573	25.24	4.40	29.64	69.54	39.90	Peak
4	17.849	22.99	4.29	27.28	69.54	42.26	Peak
5	19.428	33.44	4.22	37.66	69.54	31.88	Peak
6	20.056	30.43	4.16	34.59	69.54	34.95	Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Serial No.: 2WFR-6 Tester: Zoo Zou

Note:

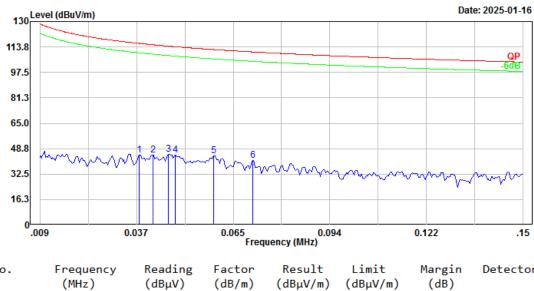


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	13.427	22.93	4.55	27.48	90.47	62.99	Peak
2	13.461	23.62	4.55	28.17	90.47	62.30	Peak
3	13.562	40.34	4.53	44.87	124.00	79.13	Peak
4	13.621	23.29	4.53	27.82	90.47	62.65	Peak
5	13.661	25.64	4.51	30.15	90.47	60.32	Peak
6	13.778	22.78	4.51	27.29	80.51	53.22	Peak

#### **Configuration 7#:** Parallel

Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting



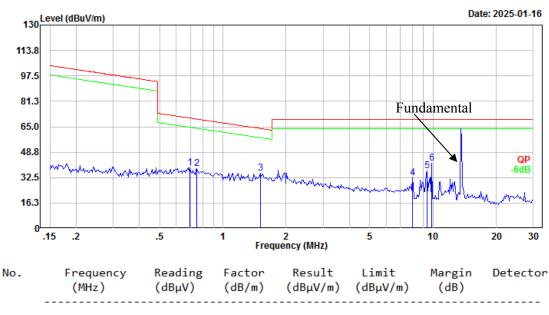


Serial No.: 2WFR-7

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.038	-1.24	46.11	44.87	116.00	71.13	Peak
2	0.042	-0.73	45.42	44.69	115.14	70.45	Peak
3	0.047	0.46	44.64	45.10	114.25	69.15	Peak
4	0.048	0.56	44.32	44.88	113.89	69.01	Peak
5	0.060	1.76	42.38	44.14	112.08	67.94	Peak
6	0.071	0.76	40.41	41.17	110.57	69.40	Peak

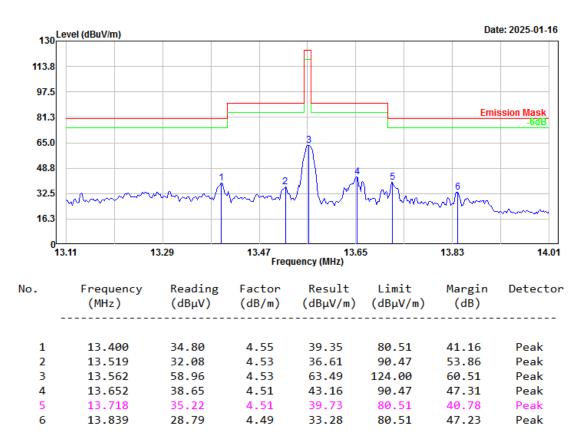
Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:



Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

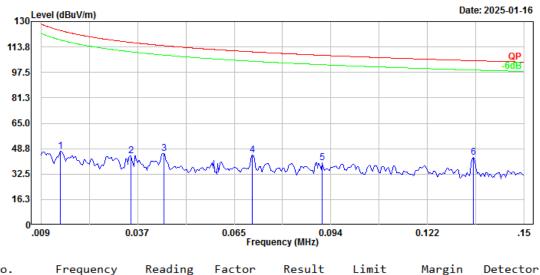


## Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-7 Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:

RBW:300Hz VBW:1kHz

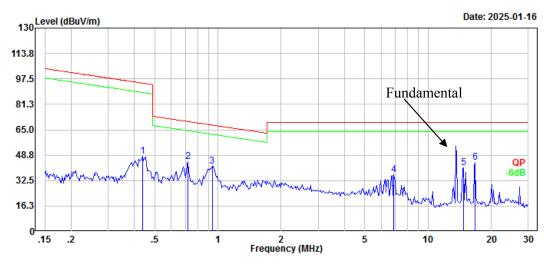


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-4.43	51.55	47.12	124.29	77.17	Peak
2	0.035	-2.45	46.62	44.17	116.67	72.50	Peak
3	0.045	0.86	44.94	45.80	114.58	68.78	Peak
4	0.071	4.21	40.46	44.67	110.61	65.94	Peak
5	0.091	2.95	36.95	39.90	108.42	68.52	Peak
6	0.135	9.61	33.46	43.07	104.99	61.92	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

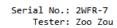
Serial No.: 2WFR-7 Tester: Zoo Zou

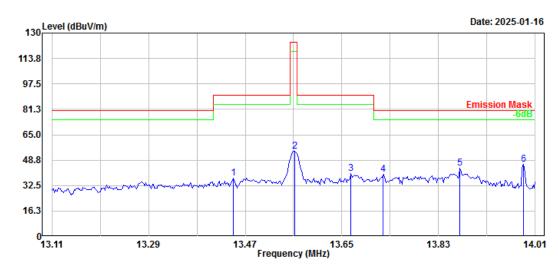


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.437	24.38	23.69	48.07	94.79	46.72	Peak
2	0.720	23.36	21.29	44.65	70.39	25.74	Peak
3	0.938	24.08	17.80	41.88	68.04	26.16	Peak
4	6.878	30.99	5.54	36.53	69.54	33.01	Peak
5	14.750	36.19	4.45	40.64	69.54	28.90	Peak
6	16.750	39.80	4.38	44.18	69.54	25.36	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

St Mode: Transmitting Note:





No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
-							
1	13.448	32.88	4.55	37.43	90.47	53.04	Peak
2	13.562	50.06	4.53	54.59	124.00	69.41	Peak
3	13.666	35.75	4.51	40.26	90.47	50.21	Peak
4	13.727	35.20	4.51	39.71	80.51	40.80	Peak
5	13.870	38.94	4.49	43.43	80.51	37.08	Peak
6	13.988	41.64	4.47	46.11	80.51	34.40	Peak

# **Ground Parallel**

5

6

0.082

0.089

1.85

0.26

38.61

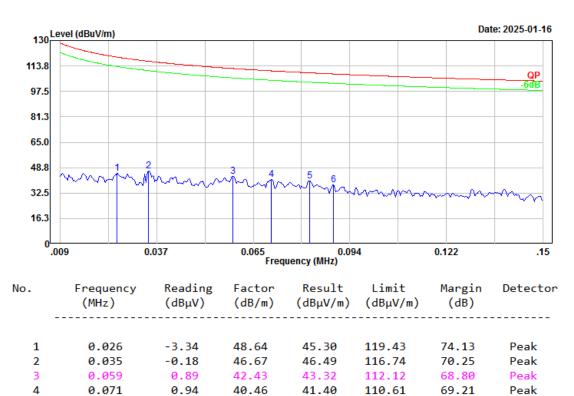
37.35

Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



40.46

37.61

109.35

108.64

Peak

Peak

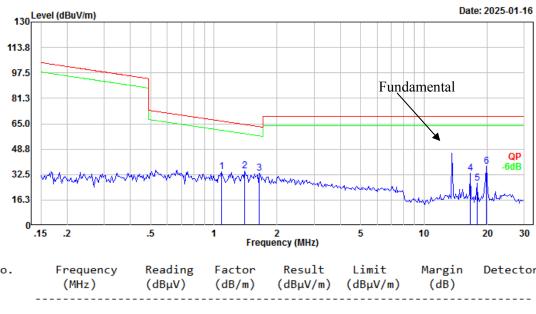
68.89

71.03

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz



Serial No.: 2WFR-7 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1.088	18.07	16.17	34.24	66.72	32.48	Peak
2	1.403	19.93	14.77	34.70	64.47	29.77	Peak
3	1.645	19.43	13.70	33.13	63.06	29.93	Peak
4	16.573	29.08	4.40	33.48	69.54	36.06	Peak
5	17.849	22.59	4.29	26.88	69.54	42.66	Peak
6	19 845	33 69	4 18	37 87	69 54	31 67	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Ground-Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

5

6

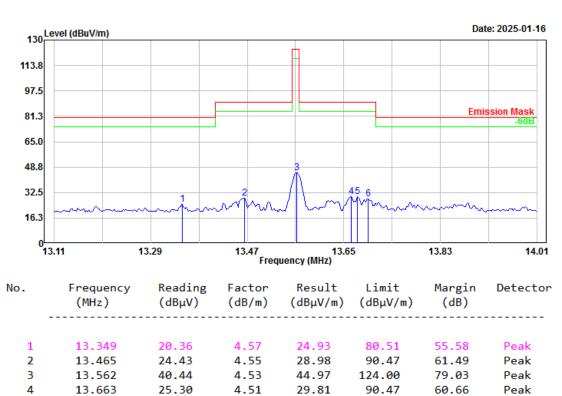
13.675

13.695

25.17

24.14

RBW:10kHz VBW:30kHz



4.51

4.51

29.68

28.65

90.47

90.47

60.79

61.82

Peak

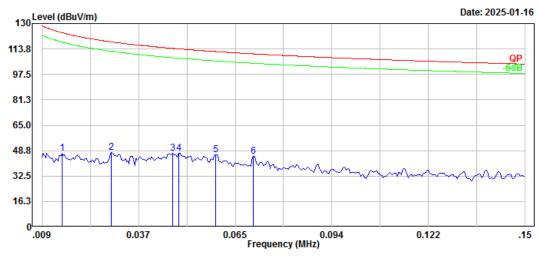
Peak

# Configuration 8#: Parallel

Project No.: 2402A112039E-RF Serial No.: 2WFR-8
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

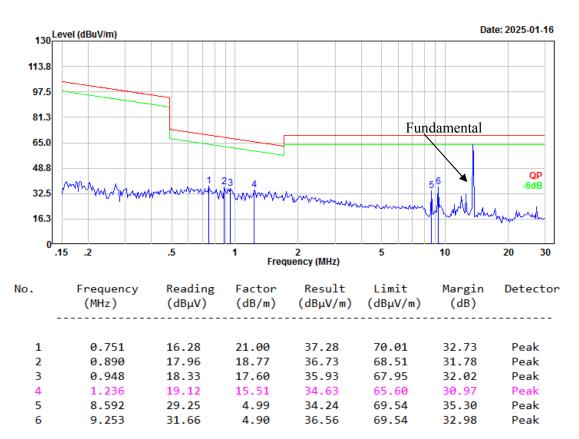
RBW:300Hz VBW:1kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.015	-4.57	51.47	46.90	124.13	77.23	Peak
2	0.029	-0.21	47.72	47.51	118.27	70.76	Peak
3	0.047	2.58	44.55	47.13	114.15	67.02	Peak
4	0.049	2.81	44.21	47.02	113.79	66.77	Peak
5	0.060	3.90	42.38	46.28	112.08	65.80	Peak
6	0.071	4.92	40.46	45.38	110.61	65.23	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-8
Polarization: Parallel Tester: Zoo Zou
Test Mode: Transmitting

Note:

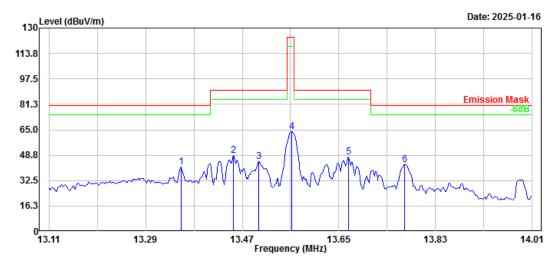


Project No.: 2402A112039E-RF Polarization: Parallel Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-8 Tester: Zoo Zou



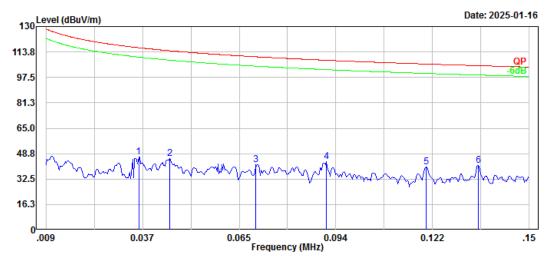
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
_							
1	13.357	36.44	4.57	41.01	80.51	39.50	Peak
2	13.454	44.01	4.55	48.56	90.47	41.91	Peak
3	13.501	40.15	4.53	44.68	90.47	45.79	Peak
4	13.562	59.01	4.53	63.54	124.00	60.46	Peak
5	13.668	43.02	4.51	47.53	90.47	42.94	Peak
6	13.772	38.05	4.51	42.56	80.51	37.95	Peak

## Perpendicular

Project No.: 2402A112039E-RF Serial No.: 2WFR-8 Polarization: Perpendicular Tester: Zoo Zou

Test Mode: Transmitting Note:

RBW:300Hz VBW:1kHz

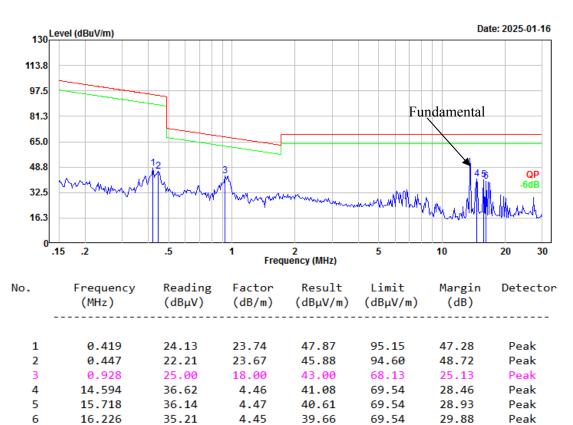


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.036	0.06	46.47	46.53	116.46	69.93	Peak
2	0.045	0.50	44.89	45.39	114.52	69.13	Peak
3	0.070	1.26	40.56	41.82	110.68	68.86	Peak
4	0.091	6.55	37.00	43.55	108.44	64.89	Peak
5	0.120	5.75	34.31	40.06	106.03	65.97	Peak
6	0.135	7.80	33.46	41.26	104.99	63.73	Peak

Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting Note:

Tester: Zoo Zou

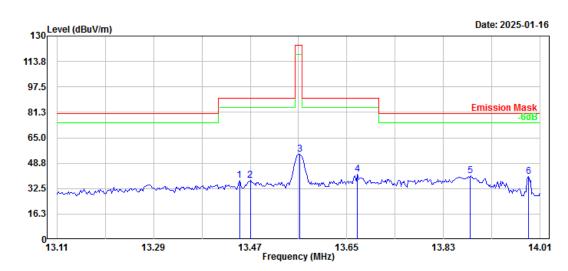
Serial No.: 2WFR-8



Project No.: 2402A112039E-RF Polarization: Perpendicular Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz



Serial No.: 2WFR-8 Tester: Zoo Zou

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
_							
1	13.450	33.08	4.55	37.63	90.47	52.84	Peak
2	13.470	33.03	4.55	37.58	90.47	52.89	Peak
3	13.562	49.89	4.53	54.42	124.00	69.58	Peak
4	13.670	37.05	4.51	41.56	90.47	48.91	Peak
5	13.880	36.01	4.48	40.49	80.51	40.02	Peak
6	13.988	35.72	4.47	40.19	80.51	40.32	Peak

#### **Ground Parallel**

3

4

5

6

0.052

0.070

0.082

0.119

-1.86

2.89

1.49

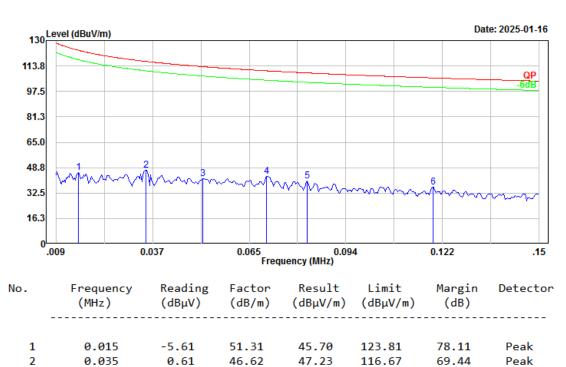
2.10

Project No.: 2402A112039E-RF Serial No.: 2WFR-8 Polarization: Ground-Parallel Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:300Hz VBW:1kHz



43.73

40.51

38.51

34.36

41.87

43.40

40.00

36.46

113.31

110.64

109.29

106.09

71.44

67.24

69.29

69.63

Peak

Peak

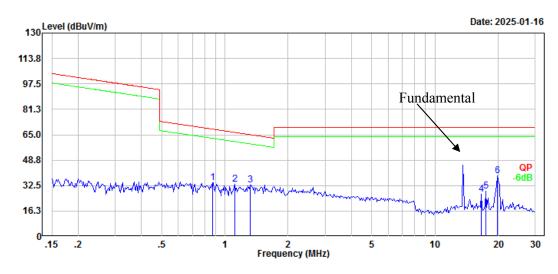
Peak

Peak

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting Note:

RBW:10kHz VBW:30kHz

Serial No.: 2WFR-8 Tester: Zoo Zou



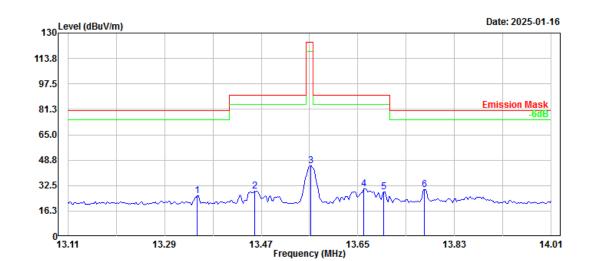
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	0.871	15.17	19.14	34.31	68.70	34.39	Peak
2	1.111	17.41	16.07	33.48	66.54	33.06	Peak
3	1.317	17.72	15.15	32.87	65.03	32.16	Peak
4	16.573	22.44	4.40	26.84	69.54	42.70	Peak
5	17.475	24.58	4.32	28.90	69.54	40.64	Peak
6	19.845	34.76	4.18	38.94	69.54	30.60	Peak

RBW:10kHz VBW:30kHz

Project No.: 2402A112039E-RF Polarization: Ground-Parallel Test Mode: Transmitting

Note:

Serial No.: 2WFR-8 Tester: Zoo Zou



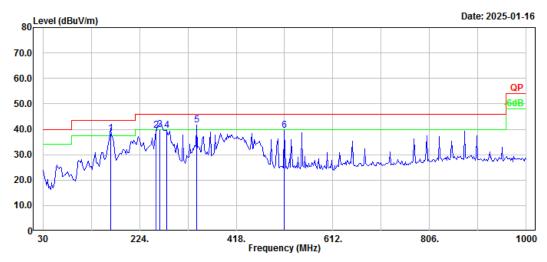
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
-							
1	13.351	21.40	4.57	25.97	80.51	54.54	Peak
2	13.457	24.50	4.55	29.05	90.47	61.42	Peak
3	13.562	40.53	4.53	45.06	124.00	78.94	Peak
4	13.661	26.02	4.51	30.53	90.47	59.94	Peak
5	13.699	24.09	4.51	28.60	90.47	61.87	Peak
6	13.774	25.44	4.51	29.95	80.51	50.56	Peak

# 2) 30MHz-1GHz

# **Configuration 1#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-1 Polarization: Horizontal Test Mode: Transmitting Tester: Zoo Zou

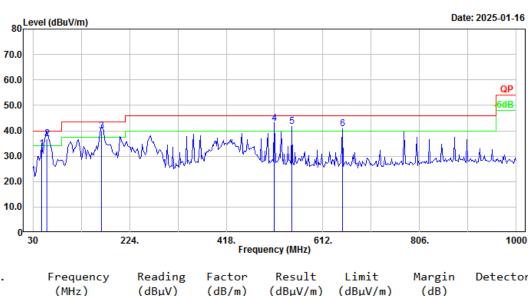
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	165.80	49.89	-11.51	38.38	43.50	5.12	QP
2	256.98	50.64	-11.22	39.42	46.00	6.58	Peak
3	264.74	50.61	-10.63	39.98	46.00	6.02	QP
4	278.32	49.48	-9.79	39.69	46.00	6.31	Peak
5	338.46	50.30	-8.75	41.55	46.00	4.45	QP
6	515.00	43.56	-4.02	39.54	46.00	6.46	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-1
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



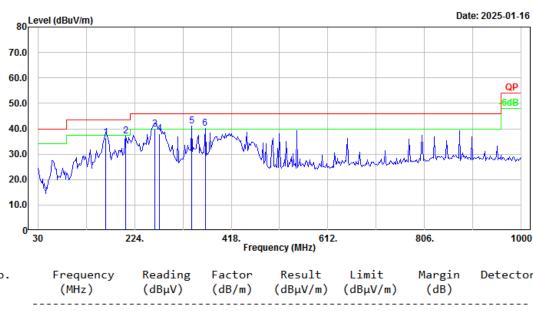
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector 
1	47.46	48.00	-15.04	32.96	40.00	7.04	QP
2	59.10	53.59	-16.63	36.96	40.00	3.04	QP
3	167.74	51.40	-11.64	39.76	43.50	3.74	QP
4	515.00	46.80	-4.02	42.78	46.00	3.22	QP
5	549.92	45.10	-3.43	41.67	46.00	4.33	QP
6	650.80	42.70	-1.86	40.84	46.00	5.16	OP

# **Configuration 2#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-2
Polarization: Horizontal Tester: Zoo Zou

Test Mode: Transmitting

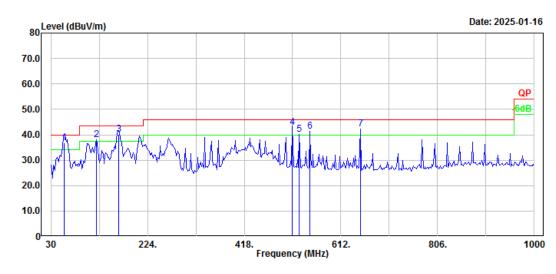
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	165.80	48.09	-11.51	36.58	43.50	6.92	QP
2	206.54	49.41	-12.21	37.20	43.50	6.30	Peak
3	264.74	50.61	-10.63	39.98	46.00	6.02	QP
4	274.44	47.90	-9.92	37.98	46.00	8.02	QP
5	338.46	49.70	-8.75	40.95	46.00	5.05	QP
6	365.62	48.20	-8.16	40.04	46.00	5.96	QP

Project No.: 2402A112039E-RF Serial No.: 2WFR-2
Polarization: Vertical Tester: Zoo Zou

Test Mode: Transmitting Note:

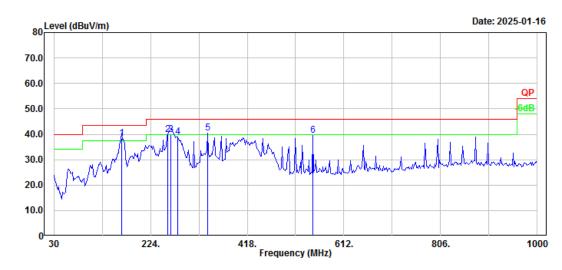


No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	57.16	53.50	-16.59	36.91	40.00	3.09	QP
2	121.18	48.11	-9.94	38.17	43.50	5.33	QP
3	165.80	51.69	-11.51	40.18	43.50	3.32	QP
4	515.00	47.00	-4.02	42.98	46.00	3.02	QP
5	528.58	43.90	-3.79	40.11	46.00	5.89	QP
6	549.92	44.70	-3.43	41.27	46.00	4.73	QP
7	650.80	44.20	-1.86	42.34	46.00	3.66	QР

# **Configuration 3#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Horizontal Tester: Zoo Zou

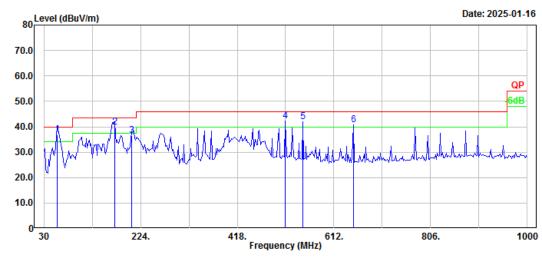
Test Mode: Transmitting Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	165.80	49.89	-11.51	38.38	43.50	5.12	QP
2	258.92	51.10	-11.15	39.95	46.00	6.05	Peak
3	264.74	50.51	-10.63	39.88	46.00	6.12	QP
4	278.32	48.81	-9.79	39.02	46.00	6.98	Peak
5	338.46	49.20	-8.75	40.45	46.00	5.55	QP
6	549.92	42.88	-3.43	39.45	46.00	6.55	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-3
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	57.16	53.30	-16.59	36.71	40.00	3.29	QP
2	171.62	51.70	-11.87	39.83	43.50	3.67	QP
3	206.54	48.60	-12.21	36.39	43.50	7.11	QP
4	515.00	46.19	-4.02	42.17	46.00	3.83	QP
5	549.92	45.50	-3.43	42.07	46.00	3.93	QP
6	650.80	42.60	-1.86	40.74	46.00	5.26	QP

# **Configuration 4#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-4
Polarization: Horizontal Tester: Zoo Zou

Test Mode: Transmitting

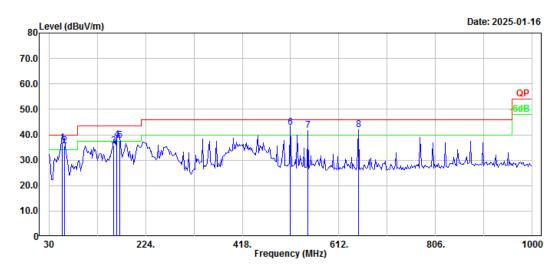
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detecto
1	165.80	49.89	-11.51	38.38	43.50	5.12	QP
2	264.74	50.61	-10.63	39.98	46.00	6.02	QP
3	338.46	49.20	-8.75	40.45	46.00	5.55	QP
4	365.62	47.39	-8.16	39.23	46.00	6.77	Peak
5	549.92	42.88	-3.43	39.45	46.00	6.55	Peak
6	875.84	37.80	1.16	38.96	46.00	7.04	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-4
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	57.16	53.40	-16.59	36.81	40.00	3.19	QP
2	61.04	52.29	-16.62	35.67	40.00	4.33	QP
3	159.98	46.90	-11.15	35.75	43.50	7.75	QP
4	165.80	49.49	-11.51	37.98	43.50	5.52	QP
5	171.62	49.60	-11.87	37.73	43.50	5.77	QP
6	515.00	46.90	-4.02	42.88	46.00	3.12	QP
7	549.92	45.10	-3.43	41.67	46.00	4.33	QP
8	650.80	43.80	-1.86	41.94	46.00	4.06	OP

# Configuration 5#:

Project No.: 2402A112039E-RF Serial No.: 2WFR-5 Polarization: Horizontal Tester: Zoo Zou

Test Mode: Transmitting

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Detector
-							
1	165.80	48.89	-11.51	37.38	43.50	6.12	QP
2	206.54	48.97	-12.21	36.76	43.50	6.74	Peak
3	266.68	51.31	-10.43	40.88	46.00	5.12	QP
4	338.46	48.90	-8.75	40.15	46.00	5.85	QP
5	549.92	42.77	-3.43	39.34	46.00	6.66	Peak
6	875.84	38.42	1.16	39.58	46.00	6.42	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-5
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:

2

3

4

5

6

165.80

169.68

515.00

549.92

650.80

50.49

48.70

46.60

43.70

40.30

-11.51

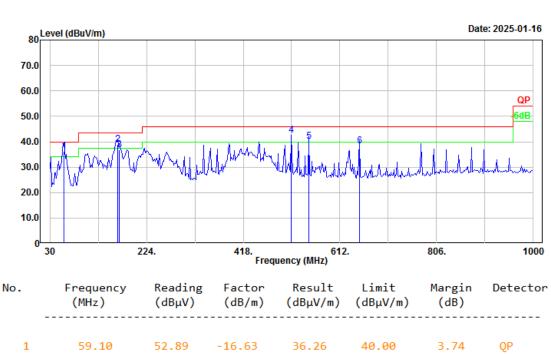
-11.76

-4.02

-1.86

-3.43

RBW:100kHz VBW:300kHz



38.98

36.94

42.58

40.27

38.44

43.50

43.50

46.00

46.00

46.00

4.52

6.56

3.42

5.73

7.56

QP

QΡ

QP

QΡ

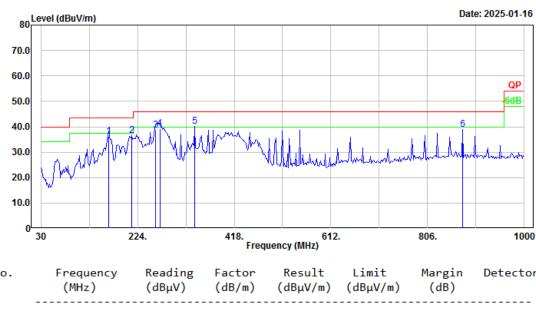
QP

# **Configuration 6#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-6
Polarization: Horizontal Tester: Zoo Zou

Test Mode: Transmitting

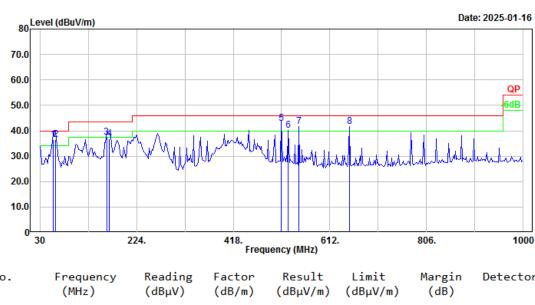
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	165.80	47.69	-11.51	36.18	43.50	7.32	QP
2	212.36	49.02	-12.55	36.47	43.50	7.03	Peak
3	260.86	49.61	-11.04	38.57	46.00	7.43	QP
4	268.62	49.50	-10.22	39.28	46.00	6.72	QP
5	338.46	48.90	-8.75	40.15	46.00	5.85	QP
6	875.84	37.64	1.16	38.80	46.00	7.20	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-6
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



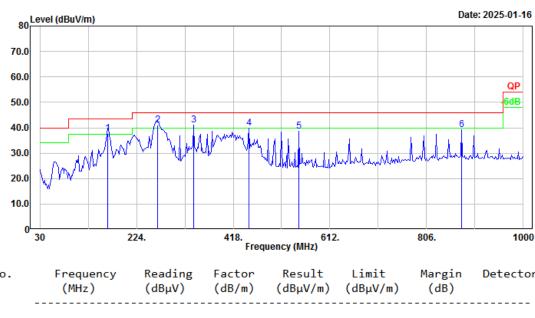
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	57.16	53.10	-16.59	36.51	40.00	3.49	QP
2	61.04	53.29	-16.62	36.67	40.00	3.33	QP
3	163.86	48.70	-11.39	37.31	43.50	6.19	QP
4	169.68	48.60	-11.76	36.84	43.50	6.66	QP
5	515.00	46.80	-4.02	42.78	46.00	3.22	QP
6	528.58	44.00	-3.79	40.21	46.00	5.79	QP
7	549.92	45.10	-3.43	41.67	46.00	4.33	QP
8	650.80	43.60	-1.86	41.74	46.00	4.26	OP

# **Configuration 7#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Horizontal Tester: Zoo Zou

Test Mode: Transmitting

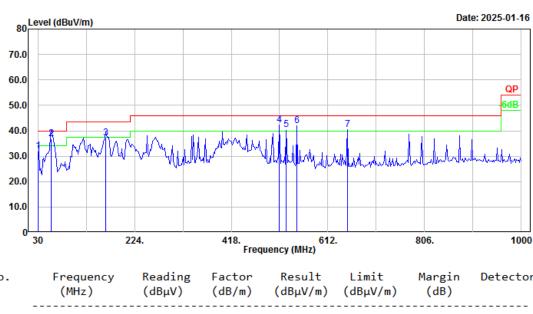
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detecto
1	165.80	49.29	-11.51	37.78	43.50	5.72	QP
2	266.68	51.41	-10.43	40.98	46.00	5.02	QP
3	338.46	49.90	-8.75	41.15	46.00	4.85	QP
4	449.04	45.38	-5.51	39.87	46.00	6.13	Peak
5	549.92	42.21	-3.43	38.78	46.00	7.22	Peak
6	875.84	37.95	1.16	39.11	46.00	6.89	Peak

Project No.: 2402A112039E-RF Serial No.: 2WFR-7
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



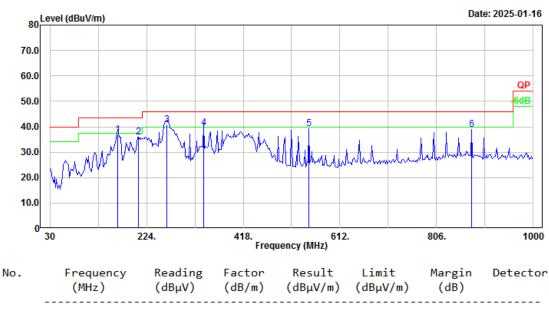
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.00	35.80	-3.80	32.00	40.00	8.00	QP
2	57.16	53.40	-16.59	36.81	40.00	3.19	QP
3	165.80	48.69	-11.51	37.18	43.50	6.32	QP
4	515.00	46.40	-4.02	42.38	46.00	3.62	QP
5	528.58	44.10	-3.79	40.31	46.00	5.69	QP
6	549.92	45.40	-3.43	41.97	46.00	4.03	QP
7	650.80	42.40	-1.86	40.54	46.00	5.46	OP

#### **Configuration 8#:**

Project No.: 2402A112039E-RF Serial No.: 2WFR-8 Polarization: Horizontal Tester: Zoo Zou

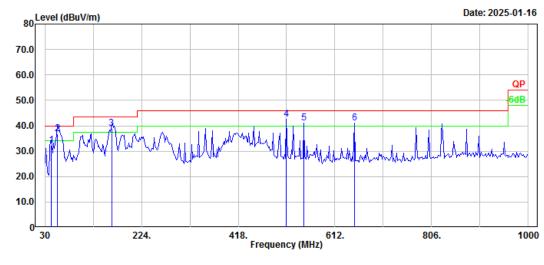
Test Mode: Transmitting

Note:



Project No.: 2402A112039E-RF Serial No.: 2WFR-8
Polarization: Vertical Tester: Zoo Zou
Test Mode: Transmitting

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.58	45.30	-12.88	32.42	40.00	7.58	QP
2	55.22	53.30	-16.55	36.75	40.00	3.25	QP
3	163.86	50.40	-11.39	39.01	43.50	4.49	QP
4	515.00	46.69	-4.02	42.67	46.00	3.33	QP
5	549.92	44.50	-3.43	41.07	46.00	4.93	QP
6	650.80	42.90	-1.86	41.04	46.00	4.96	QP

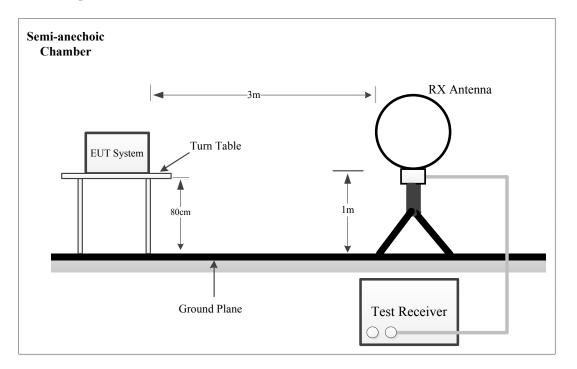
#### 4.3 20 dB Emission Bandwidth

#### 4.3.1 Applicable Standard

FCC §15.215

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.

#### 4.3.2 EUT Setup



## 4.3.3 Test Procedure

According to ANSI C63.10-2013 Section 6.9.2

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target

- "-xx dB down" requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to max hold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the "-xx dB down amplitude" using [(reference value) -xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "-xx dB down amplitude" determined in step h). If a marker is below this "-xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "-xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
- k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

# 4.3.4 Test Data

Serial Number:	2WFR-1	Test Date:	2025/1/17
Test Site:	Chamber 10m	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Environmental Conditions:					
Temperature: (°C)	Relative Humidity: (%)	ATM Pressure:101.9 (kPa)			

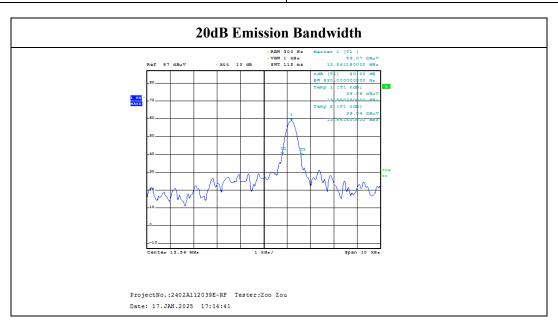
#### **Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	185914	2024/8/26	2025/8/25
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25

<sup>\*</sup> Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### **Test Data:**

Test Frequency (MHz)	20 dB Emission Bandwidth (kHz)
13.56	0.82



# 4.4 99% Occupied Bandwidth:

#### 4.4.1 Applicable Standard

RSS-Gen Clause 6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs. In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

Report No.: 2402A112039E-RF-00

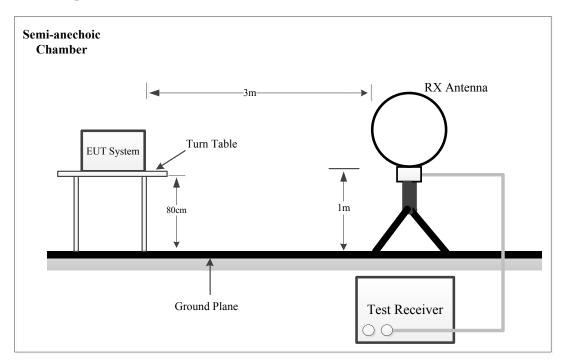
The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth: The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

#### 4.4.2 EUT Setup



#### 4.4.3 Test Procedure

According to ANSI C63.10-2013 Section 6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
  e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

#### 4.4.4 Test Data And Result

Serial Number:	2WFR-1	Test Date:	2025/1/17
Test Site:	Chamber 10m	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Environmental Conditions:						
Temperature: $(^{\circ}\mathbb{C})$	21.1	Relative Humidity: (%)		ATM Pressure: (kPa)	101.9	

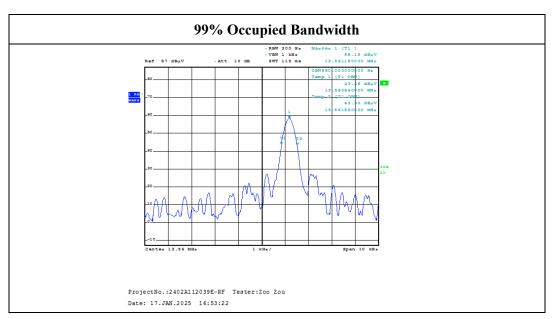
#### **Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	185914	2024/8/26	2025/8/25
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25

<sup>\*</sup> Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

#### **Test Data:**

Test Frequency (MHz)	99% Occupied Bandwidth (kHz)
13.56	0.680



#### 4.5 Frequency Stability

#### 4.5.1 Applicable Standard

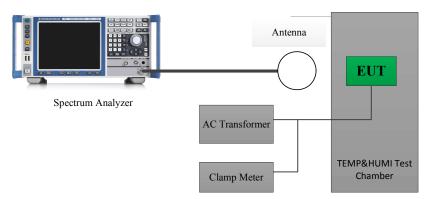
#### FCC Part 15.225:

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

#### RSS-210 B.6:

(b) the carrier frequency stability shall not exceed  $\pm 100$  ppm

#### 4.5.2 EUT Setup



#### 4.5.3 Test Procedure

According to ANSI C63.10-2013 Section 6.8

#### Frequency stability with respect to ambient temperature

- a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.
- b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.

- c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

Report No.: 2402A112039E-RF-00

- f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- g) Measure the frequency at each of frequencies specified in 5.6.
- h) Switch OFF the EUT but do not switch OFF the oscillator heater.
- i) Lower the chamber temperature by not more that 10 °C, and allow the temperature inside the chamber to stabilize.
- j) Repeat step f) through step i) down to the lowest specified temperature.

#### Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25 °C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

- a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn
  ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.
   NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.
- b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- c) Measure the frequency at each of the frequencies specified in 5.6.
- d) Repeat the above procedure at 85% and 115% of the nominal supply voltage as described in 5.13.

Report Template Version: FCC+IC-NFC-V1.3

#### 4.5.4 Test Result

Serial Number:	2WFR-1	Test Date:	2025/1/17
Test Site:	RF	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Environmental Conditions:					
Temperature: $(^{\circ}\mathbb{C})$	21.1	Relative Humidity: (%)	33	ATM Pressure: (kPa)	101.9

#### **Test Equipment List and Details:**

	Too Equipment and and a comment					
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24	
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30	
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25	
All-sun	Clamp Meter	EM305A	8348897	2024/8/16	2025/8/15	
Daoxiang	AC Transformer	TDGC2-5KVA	F-08-EM011	N/A	N/A	
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30173	2024/9/6	2025/9/5	

<sup>\*</sup> Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

## **Test Data:**

$f_0 = 13.56 \text{ MHz}$								
Temperature	Voltage	Measured frequency	Frequency Error	Limit				
C	V <sub>AC</sub>	MHz	Hz	Hz				
-20		13.56085	850	±1356				
-10		13.56091	13.56091 910					
0	208	13.56101 1010		±1356				
10		13.56107	1070	±1356				
20		13.56118	1180	±1356				
30		13.56114	1140	±1356				
40		13.56102	1020	±1356				
50		13.56097	970	±1356				
20	240	13.56109	1090	±1356				

Note: the voltage range was declared by manufacturer▲.

#### 4.6 Antenna Requirement

#### 4.6.1 Applicable Standard

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, 15.221, or §15.236. 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.

Report No.: 2402A112039E-RF-00

#### RSS-Gen §6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

#### 4.6.2 Judgment

Please refer to the Antenna Information detail in Section 1.3.

# **EXHIBIT A - EUT PHOTOGRAPHS**

Please refer to the attachment 2402A112039E-RF-EXP EUT external photographs and 2402A112039E-RF-INP EUT internal photographs.

Report Template Version: FCC+IC-NFC-V1.3 Page 134 of 139

# **EXHIBIT B - TEST SETUP PHOTOGRAPHS**

Please refer to the attachment 2402A112039E-RF-00-TSP test setup photographs.

Report Template Version: FCC+IC-NFC-V1.3 Page 135 of 139

# **EXHIBIT C - RF EXPOSURE EVALUATION**

# **RF Exposure Evaluation**

# **Applicable Standard**

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Report No.: 2402A112039E-RF-00

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure								
Frequency Range (MHz)	Electric Field Strength (V/m)	Power Density (mW/cm²)	Averaging Time (minutes)					
0.3-1.34	614	1.63	*(100)	30				
1.34–30	824/f	2.19/f	*(180/f²)	30				
30–300	27.5	0.073	0.2	30				
300-1500	/	/	f/1500	30				
1500-100,000	/	/	1.0	30				

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

#### Calculation formula

Prediction of power density at the distance of the applicable MPE limit

 $S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>); P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_{i} \frac{S_{i}}{S_{Limit,i}} \le 1$$

#### **Calculated Data:**

WiFi/BT Module WiFi 2412-2462 2.33 1.71 15.9 38.90 20.00 0.0132 1.0  BT 2402-2480 2.33 1.71 2.79 1.90 20.00 0.0006 1.0  BLE 2402-2480 2.33 1.71 1.08 1.28 20.00 0.0004 1.0  WCDMA Band II 1850-1910 2.00 1.58 25 316.23 20.00 0.0998 1.0  WCDMA Band IV WCDMA Band V LTE Band 2 1850-1910 2.00 1.58 25 316.23 20.00 0.0998 1.0  LTE Band 4 1710-1755 2.00 1.58 25 316.23 20.00 0.0998 1.0  LTE Band 5 824-849 2.00 1.58 25 316.23 20.00 0.0998 1.0  LTE Band 6 699-716 2.00 1.58 25 316.23 20.00 0.0998 1.0  LTE Band 6 699-716 2.00 1.58 25 316.23 20.00 0.0998 0.55  LTE Band 13 777-787 2.00 1.58 25 316.23 20.00 0.0998 0.55  LTE Band 6 1710-1780 2.00 1.58 25 316.23 20.00 0.0998 0.52  LTE Band 66 1710-1780 2.00 1.58 25 316.23 20.00 0.0998 0.53  LTE Band 663-698 2.00 1.58 25 316.23 20.00 0.0998 0.53  LTE Band 663-698 2.00 1.58 25 316.23 20.00 0.0998 0.53	Radio	Operation Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm²)	MPE Limit (mW/cm²)
WiF/BT Module         BT         2402-2480         2.33         1.71         2.79         1.90         20.00         0.0006         1.0           WWDMA Band II         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band IV         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band V         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 12         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 3         777-787         2.00         1.58         25         316.23 <th></th> <th></th> <th>(dBi)</th> <th>(numeric)</th> <th>(dBm)</th> <th>(mW)</th> <th></th> <th></th> <th></th>				(dBi)	(numeric)	(dBm)	(mW)			
Module         B1         2402-2480         2.33         1.71         2.79         1.90         20.00         0.0006         1.0           BLE         2402-2480         2.33         1.71         1.08         1.28         20.00         0.0004         1.0           WCDMA Band II         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band V         824-849         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band V         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998<	WiFi/RT		2412-2462		1.71	15.9	38.90	20.00	0.0132	
WCDMA Band II         1850-1910         2.00         1.58         25         316.23         20.00         0.0004         1.0           WCDMA Band II         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band IV         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band V         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998<		BT	2402-2480							
WCDMA Band IV         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band IV         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band V         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998 <td>Wioduic</td> <td></td> <td>2402-2480</td> <td>2.33</td> <td>1.71</td> <td>1.08</td> <td>1.28</td> <td>20.00</td> <td>0.0004</td> <td>1.0</td>	Wioduic		2402-2480	2.33	1.71	1.08	1.28	20.00	0.0004	1.0
Band IV         1/10-1/55         2.00         1.58         25         316.23         20.00         0.0998         1.0           WCDMA Band V         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998         0.53           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.099			1850-1910	2.00	1.58	25	316.23	20.00	0.0998	1.0
WWAN Module         Band V         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 2         1850-1910         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998         0.53           LTE Band 71         663-698         2.00         1.58         25         316.23         20.00         0.0998         0.45			1710-1755	2.00	1.58	25	316.23	20.00	0.0998	1.0
WWAN Module         LTE Band 4         1710-1755         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 5         824-849         2.00         1.58         25         316.23         20.00         0.0998         0.55           LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 66         788-798         2.00         1.58         25         316.23         20.00         0.0998         0.53           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 71         663-698         2.00         1.58         25         316.23         20.00         0.0998         0.45			824-849	2.00	1.58	25	316.23	20.00	0.0998	0.55
WWAN Module         LTE Band 5		LTE Band 2	1850-1910	2.00	1.58	25	316.23	20.00	0.0998	1.0
WWAN Module         LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 14         788-798         2.00         1.58         25         316.23         20.00         0.0998         0.53           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 71         663-698         2.00         1.58         25         316.23         20.00         0.0998         0.45		LTE Band 4	1710-1755	2.00	1.58	25	316.23	20.00	0.0998	1.0
Module         LTE Band 12         699-716         2.00         1.58         25         316.23         20.00         0.0998         0.47           LTE Band 13         777-787         2.00         1.58         25         316.23         20.00         0.0998         0.52           LTE Band 14         788-798         2.00         1.58         25         316.23         20.00         0.0998         0.53           LTE Band 66         1710-1780         2.00         1.58         25         316.23         20.00         0.0998         1.0           LTE Band 71         663-698         2.00         1.58         25         316.23         20.00         0.0998         0.45	W/W/AN	LTE Band 5	824-849	2.00	1.58	25	316.23	20.00	0.0998	0.55
13     777-787     2.00     1.38     25     316.23     20.00     0.0998     0.32       LTE Band 14     788-798     2.00     1.58     25     316.23     20.00     0.0998     0.53       LTE Band 66     1710-1780     2.00     1.58     25     316.23     20.00     0.0998     1.0       LTE Band 71     663-698     2.00     1.58     25     316.23     20.00     0.0998     0.45			699-716	2.00	1.58	25	316.23	20.00	0.0998	0.47
14			777-787	2.00	1.58	25	316.23	20.00	0.0998	0.52
66     1/10-1/80     2.00     1.58     25     316.23     20.00     0.0998     1.0       LTE Band 71     663-698     2.00     1.58     25     316.23     20.00     0.0998     0.45			788-798	2.00	1.58	25	316.23	20.00	0.0998	0.53
71 663-698 2.00 1.58 25 316.23 20.00 0.0998 0.45			1710-1780	2.00	1.58	25	316.23	20.00	0.0998	1.0
NFC NFC 13.56 / / -31.66 0.0007 20.00 <<0.001 0.98			663-698	2.00	1.58	25	316.23	20.00	0.0998	0.45
11.20 13.50 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	NFC	NFC	13.56	/	/	-31.66	0.0007	20.00	<< 0.001	0.98

Note:

The device built in a certified BT/WiFi module, FCC ID: 2AC7Z-ESP32WROOM32U.

The device built in a certified WWAN module, FCC ID: XMR202008EC25AFXD.

#### Note

1. The Conducted output power including Tune-up Tolerance provided by manufacturer

2. EIRP(dBm)=E(dBuV/m)-95.2 for 3 meters distance NFC E Field =63.54dBuV/m@3m

==> EIRP= -31.66dBm

#### **Simultaneous transmission:**

BT and 2.4G WiFi can't transmit simultaneously, WiFi/BT, WWAN Module and NFC can transmit simultaneously:

$$\sum_{i} \frac{S_{i}}{S_{Limit,i}} \leq 1$$

 $S_{WiFi}/S_{limit\text{-}WiFi} + S_{WWAN}/S_{limit\text{-}WWAN} + S_{NFC}/S_{limit\text{-}NFC}$ 

=0.0132/1.0+0.0998/0.45

=0.23

< 1.0

Result: Compliant. The device compliant RF Exposure at 20cm distances.

# Electric field strength levels, magnetic field strength levels and power density levels (10 MHz to 300 GHz)

Report No.: 2402A112039E-RF-00

#### **Applicable Standard**

RSS-102, Issue 6, Clause 5.3.2:

The electric and magnetic field strength reference levels, power density reference levels, and associated reference period for devices employed by the general public (uncontrolled environment) and controlled-use devices (controlled environment) are specified in table 7 and table 8. Note that the power density limits specified in these tables apply to whole body exposure conditions.

Table 7: RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V <sub>RMS</sub> /m)	Magnetic field (A <sub>RMS</sub> /m)		
10-20	27.46	0.0728	2	6
20-48	58.07 / f <sup>0.25</sup>	0.1540 / f <sup>0.25</sup>	8.944 / f <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	0.02619 f <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/f <sup>1.2</sup>
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	616000/f <sup>1.2</sup>

Note: f is frequency in MHz.

#### **MPE Calculation**

Predication of MPE limit at a given distance

 $S = PG/4\pi R^2 = power density (in appropriate units, e.g. mW/cm^2);$ 

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_{i} \frac{S_{i}}{S_{Limit,i}} \le 1$$

#### **Calculated Data:**

Radio	Operation Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (W/m <sup>2</sup> )	MPE Limit (W/m²)
			(dBi)	(numeric)	(dBm)	(mW)			
WiFi/BT	WiFi	2412-2462	2.33	1.71	15.9	38.90	20.00	0.132	5.37
Module	BT	2402-2480	2.33	1.71	2.79	1.90	20.00	0.006	5.35
Wioduic	BLE	2402-2480	2.33	1.71	1.08	1.28	20.00	0.004	5.35
	WCDMA Band II	1850-1910	2.00	1.58	25	316.23	20.00	0.998	4.48
	WCDMA Band IV	1710-1755	2.00	1.58	25	316.23	20.00	0.998	4.24
	WCDMA Band V	824-849	2.00	1.58	25	316.23	20.00	0.998	2.58
	LTE Band 2	1850-1910	2.00	1.58	25	316.23	20.00	0.998	4.48
337337 A NT	LTE Band 4	1710-1755	2.00	1.58	25	316.23	20.00	0.998	4.24
WWAN	LTE Band 5	824-849	2.00	1.58	25	316.23	20.00	0.998	2.58
Module	LTE Band 12	699-716	2.00	1.58	25	316.23	20.00	0.998	2.30
	LTE Band 13	777-787	2.00	1.58	25	316.23	20.00	0.998	2.47
	LTE Band 66	1710-1780	2.00	1.58	25	316.23	20.00	0.998	4.24
	LTE Band 71	663-698	2.00	1.58	25	316.23	20.00	0.998	2.22
NFC	NFC	13.56	/	/	-31.66	0.0007	20.00	<<0.01	2.0

The device built in a certified BT/WiFi module, IC: 21098-ESPWROOM32U. The device built in a certified WWAN module, IC: 10224A-022EC25AFXD.

# Note:

The Conducted output power including Tune-up Tolerance provided by manufacturer
 EIRP(dBm)=E(dBuV/m)-95.2 for 3 meters distance
 NFC E Field =63.54dBuV/m@3m

==> EIRP= -31.66dBm

#### Simultaneous transmission:

BT and 2.4G WiFi can't transmit simultaneously, WiFi/BT, WWAN Module and NFC can transmit simultaneously:

$$\sum_{i} \frac{S_{i}}{S_{Limit,i}} \le 1$$

 $S_{WiFi}/S_{limit\text{-}WiFi} + S_{WWAN}/S_{limit\text{-}WWAN} + S_{NFC}/S_{limit\text{-}NFC}$ 

=0.132/5.37+0.998/2.22

=0.47

< 1.0

Result: Compliant. The device compliant RF Exposure at 20cm distances.

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