ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Manufacturer:	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Product Name:	MD102 MOUSE
Brand Name:	ASUS
Model No.:	MD102
Report Number:	TERF2406001600ER
FCC ID	MSQ-MS-MD102
Date of EUT Received:	Jun. 04, 2024
Date of Test:	Jun. 05, 2024～Jun. 12, 2024
Issue Date:	Jul. 11, 2024

Approved By _____
Jim Chang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.249.

The results of this report relate only to the sample identified in this report.

Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2406001600ER	00	Original.	Jul. 04, 2024	Yami Kuo	
TERF2406001600ER	01	Revise frequency range	Jul. 11, 2024	Yami Kuo	*

Note:

1、 The remark "*" indicates modification of the report upon requests from certification body.

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	MD102 MOUSE
Brand Name:	ASUS
Model No.:	MD102
Hardware Version:	V04
Firmware Version:	V59
EUT Series No.:	MA0001411582
Power Supply:	1.5Vdc from AA battery
Test Software (Name/Version)	default (put the button to transmit)

1.2 RF Specification

Radio Technology:	2.4GHz Short Range Radio
Frequency Range:	2403 – 2480MHz
Channel number:	16 channels
Modulation type:	GFSK
Transmit Power:	93.66 dBuV/m at 3m (Peak) 61.00 dBuV/m at 3m (Avg)

1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)
Copper trace antenna	DEXIN	MD102-Mouse	2400-2500	1.91

Note:

1. Antenna information is provided by the applicant.

1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.249
ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		
Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.				

1.6 Special Accessories

There are no special accessories used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

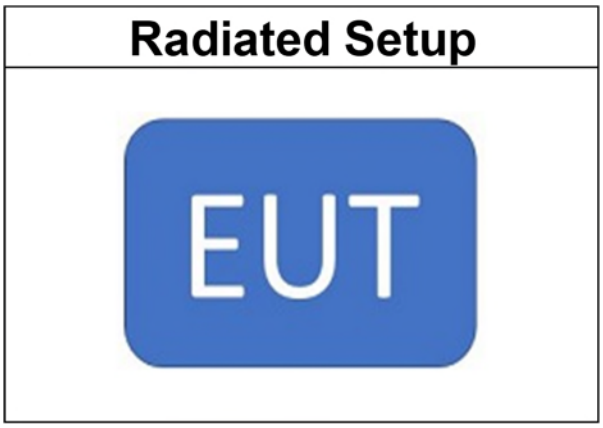
2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.
There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

2.5 Test Configuration



2.6 Control Unit(s)

N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Not applicable
§15.205 §15.249(a)(e) §15.209	Radiated Emission	Compliant
§15.215(c)	Emission Bandwidth	Not applicable
§15.203	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 Operating Frequencies

Channel	Frequency
1	2403
2	2426
3	2441
4	2463
5	2407
6	2422
7	2445
8	2466
9	2414
10	2436
11	2459
12	2473
13	2419
14	2439
15	2453
16	2480

5 THE WORST TEST MODES AND CHANNEL DETAILS

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

RADIATED EMISSION TEST:

TRANSMIT RADIATED EMISSION TEST (BELOW 1 GHz)				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
SRD	1 to 16	3	GFSK	2
TRANSMIT RADIATED EMISSION TEST (ABOVE 1 GHz)				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
SRD	1 to 16	1,3,16	GFSK	2

Note: The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

6 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
AC Power Line Conducted Emission	+/-	1.54	dB
Emission Bandwidth	+/-	1.38	Hz
Conducted emission measurement	+/-	0.77	dB
Temperature	+/-	0.6	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.15**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.02**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Radiated Spurious Emission	**+/-**	**2**	**dB**	33GHz-50GHz
	+/-	**1.59**	**dB**	50GHz-60GHz
	+/-	**1.7**	**dB**	60GHz-90GHz
	+/-	**1.64**	**dB**	90GHz-140GHz
	+/-	**3.83**	**dB**	140GHz-220GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

7 MEASUREMENT EQUIPMENT USED

7.1 Emission from AC power line

N/A

7.2 Conducted Measurement

N/A

7.3 Radiated Measurement

Radiated Emission Test Site: SAC 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
4G High Pass Filter	WI	WHKX4.0	22	12/12/2023	12/11/2024
Attenuator	Mini-Circuits	BW-S10W2+	16	12/12/2023	12/11/2024
Band Reject Filter 2400-2483.5	EWT	EWT-54-0038	M2	12/12/2023	12/11/2024
Bi-log Antenna	SCHWARZBECK	VULB9168	378	08/09/2023	08/08/2024
Coaxial Cables	EMCI+Huber Suhner	EMC107-SM-SM-1000+EMC107-SM-SM-1500+EMC107-SM-SM-8000+SUCOFLEX 104PEA	RX Cable 9K-18G (221110+221106+221212+MY4251/4PEA)	08/31/2023	08/30/2024
Coaxial Cables	Huber Suhner	SUCOFLEX 102	RX Cable 18G-40G MY2630/2+805062/2	08/31/2023	08/30/2024
EMI Test Receiver	R&S	ESCI 7	100759	08/21/2023	08/20/2024
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY63440386	02/06/2024	02/05/2025
Horn Antenna	RF SPIN	DRH0844	LE2D05A0844	07/03/2023	07/02/2024
Horn Antenna	SCHWARZBECK	BBHA9120D	1441	09/23/2023	09/22/2024
Loop Antenna	COM-POWER	AL-130R	10160104	12/04/2023	12/03/2024
Pre-Amplifier	EMCI	EMC118A45SEE	980868	08/31/2023	08/30/2024
Pre-Amplifier	EMCI	EMC184045B	980135	08/31/2023	08/30/2024
Pre-Amplifier	HP	8447D	2944A07676	08/31/2023	08/30/2024
Site Cal	SGS	SAC 3	N/A	08/31/2023	08/30/2024
Test Software	Audix	e3	Ver. 9.210616	N.C.R	N.C.R

NOTE: *N.C.R refers to Not Calibrated Required.*

8 AC POWER LINE CONDUCTED EMISSION TEST

8.1 Applicable Standard:

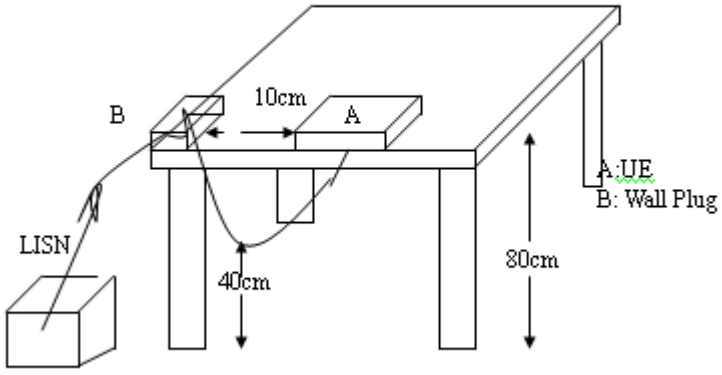
Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits (dBuV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

8.2 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120-240Vac/60Hz power source.

8.3 Test Setup



8.4 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

8.5 Measurement Result:

N/A; Powered from AA battery.

9 RADIATED EMISSION TEST

9.1 Applicable Standard

1. Only spurious emissions are permitted in any of the frequency bands listed in §15.205.
2. The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.
3. Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in §15.209, whichever is less stringent.

9.2 Measurement Procedure

9.2.1 Duty Factor

1. Place the EUT on the table and set it in transmitting mode.
2. Set span = Zero
3. RBW = 8MHz, VBW = 8MHz,
4. Detector = Peak

9.2.2 Radiated Emission

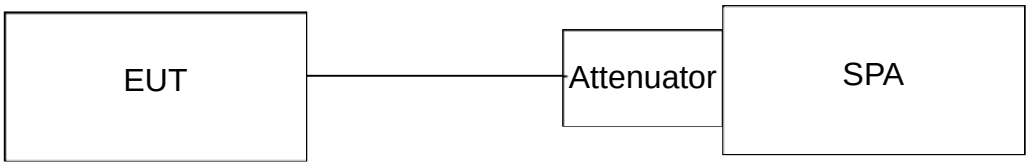
1. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Set the spectrum analyzer as RBW=100 kHz and VBW=300 kHz for Peak Detector (PK) at frequency between 30MHz and 1 GHz.
5. Use receiver mode as RBW=120 kHz for Quasi-peak (QP) at frequency between 30MHz and 1 GHz.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Maximum Emission Measurements at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Emission Measurements at frequency above 1 GHz.
8. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

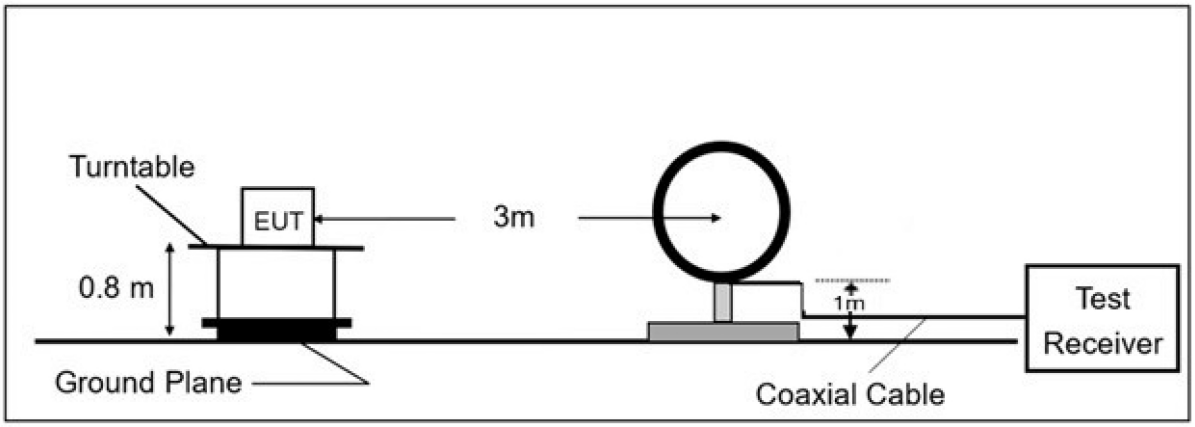
11. Repeat above procedures until all default test channel measured were complete.

9.3 Test Setup

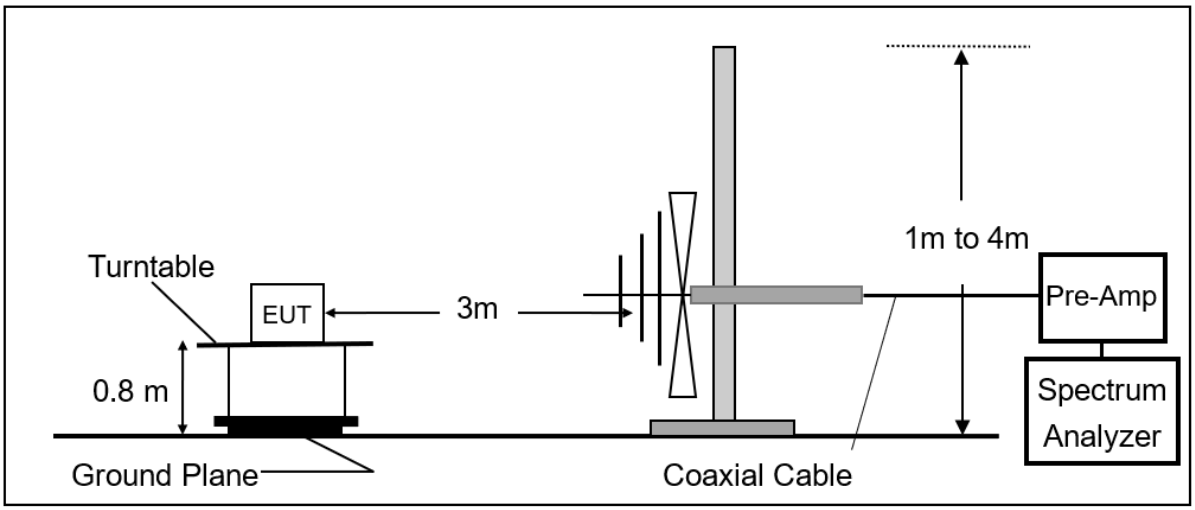
9.3.1 Duty Factor



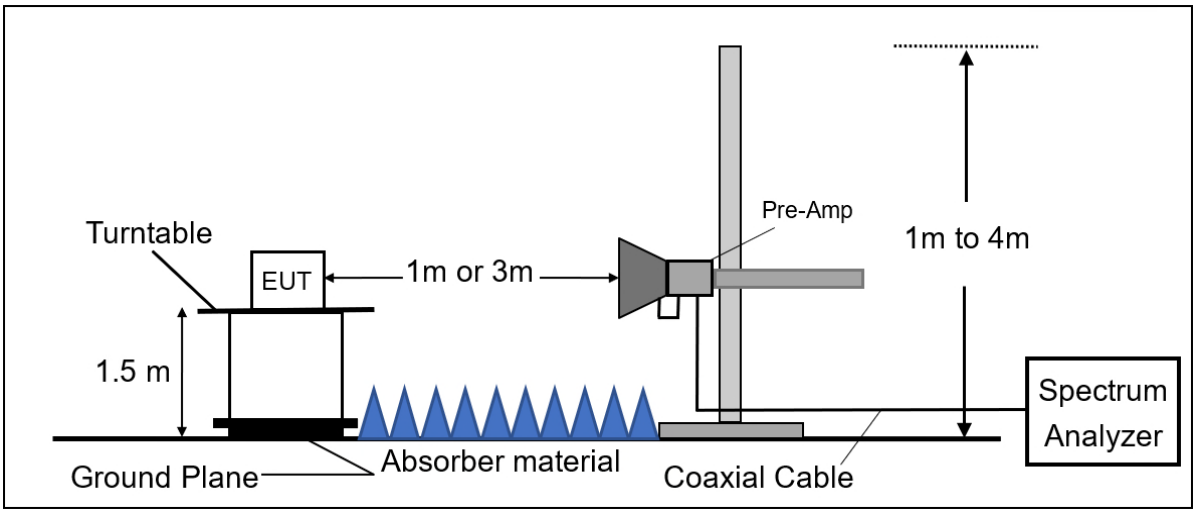
9.3.2 Radiated Emission Test Set-Up, Frequency Below 30MHz.



9.3.3 Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



9.3.4 Radiated Emission Test Set-Up, Frequency Above 1GHz.



9.4 Field Strength Calculation

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

FS = RA + AF + CL - AG

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

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)
Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

9.5 Measurement Result

9.6 Duty Factor:

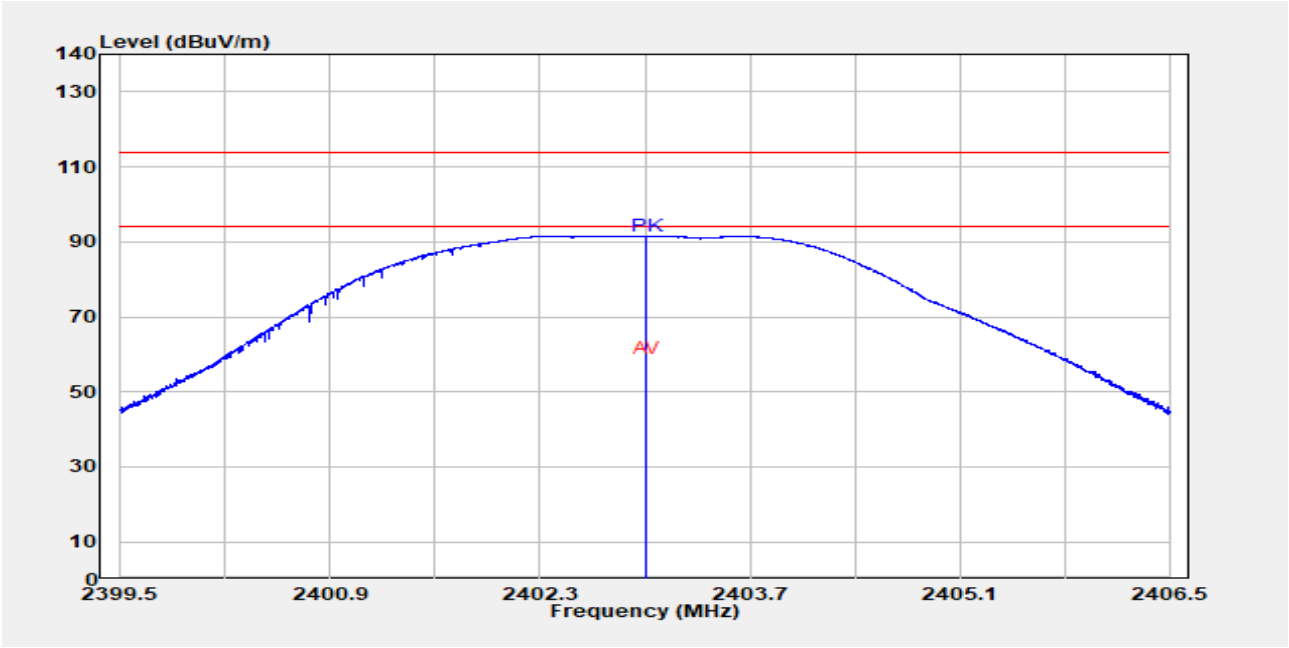
SRD_2441MHz

Time ON of 100ms: 2.328 ms
Duty Cycle=2.328ms / 100ms= 0.02328
Duty Cycle correction factor=20 LOG 0.02328 = -32.66 dB

100ms

9.6.1 Field Strength of the Fundamental Signal

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

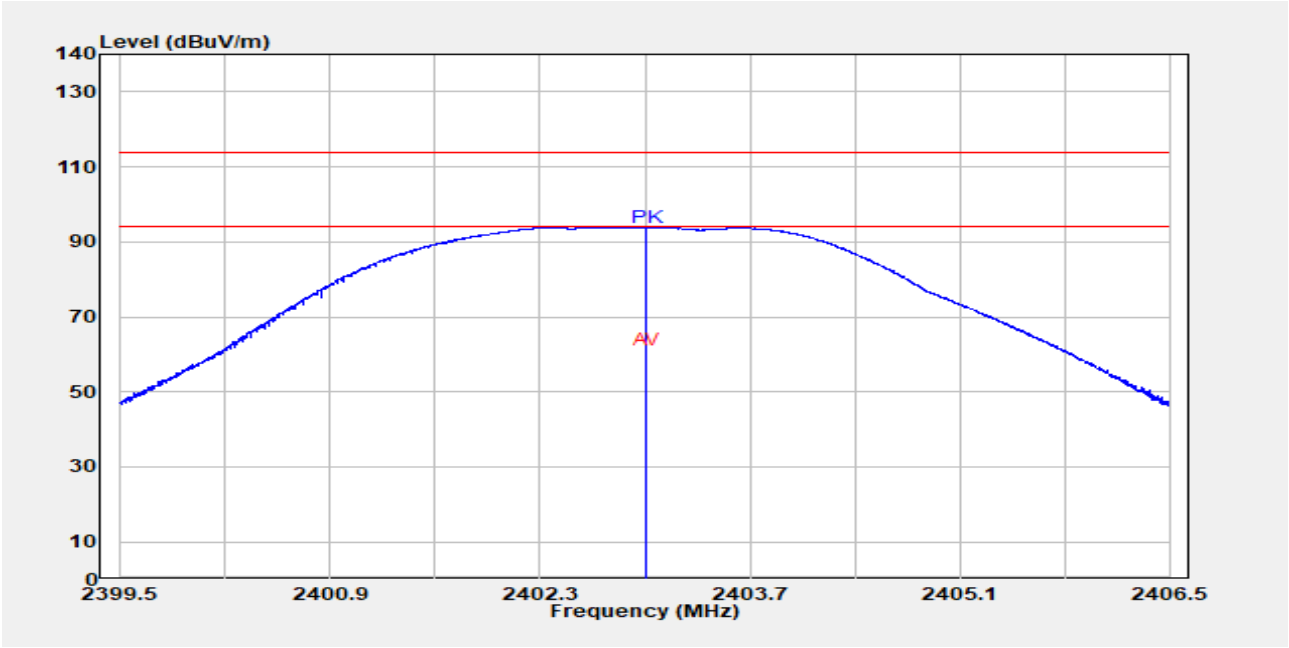


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2403.00	Peak	96.12	-4.66	91.46	114.00	-22.54
2403.00	Average	-	-	58.80	94.00	-35.20

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin

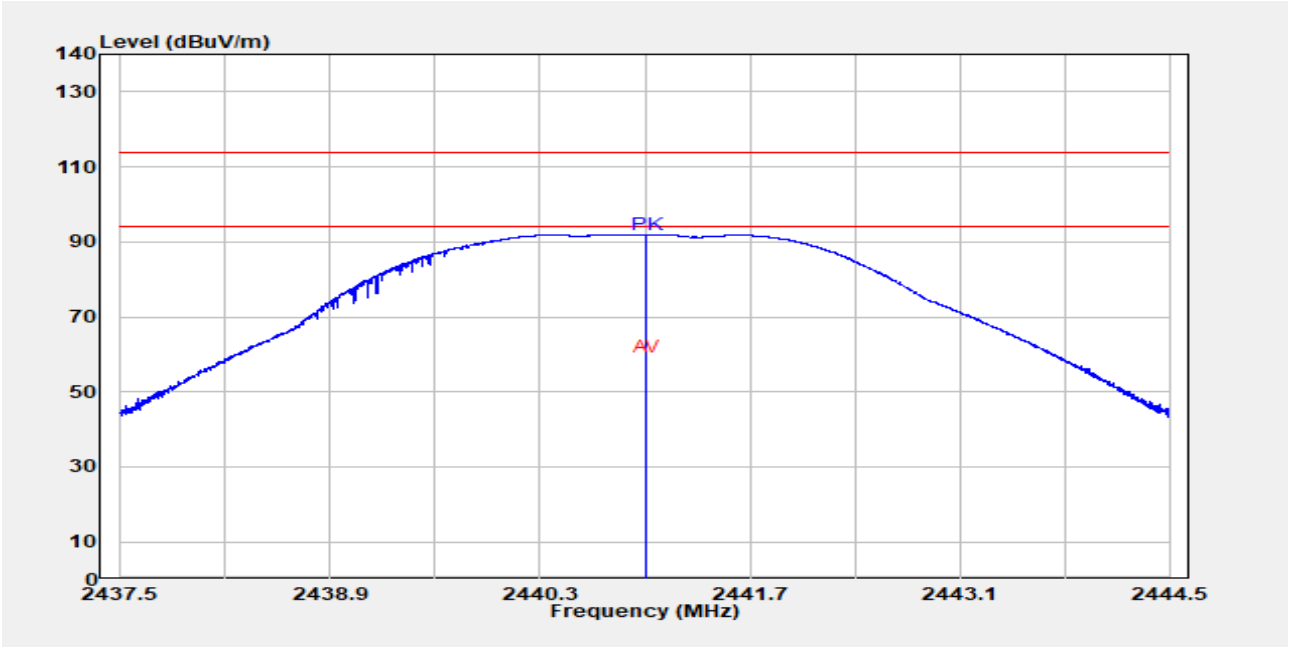


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2403.00	Peak	98.32	-4.66	93.66	114.00	-20.34
2403.00	Average	-	-	61.00	94.00	-33.00

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

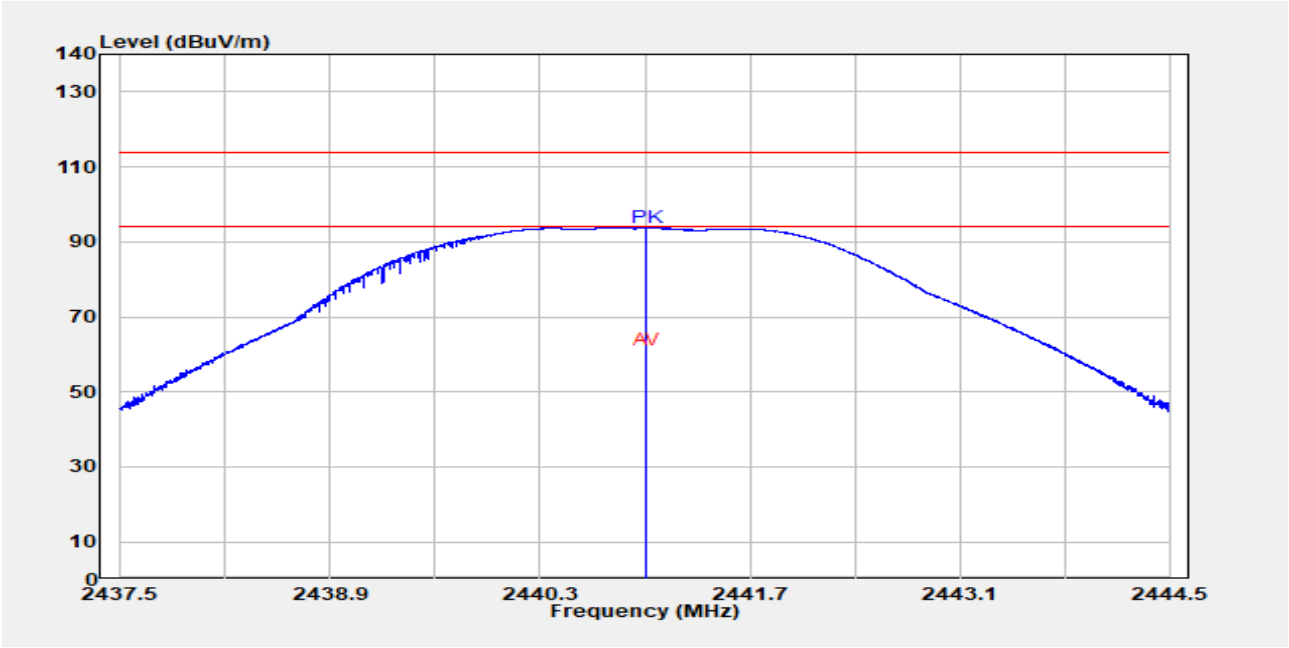


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2441.00	Peak	96.63	-4.85	91.78	114.00	-22.22
2441.00	Average	-	-	59.12	94.00	-34.88

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin

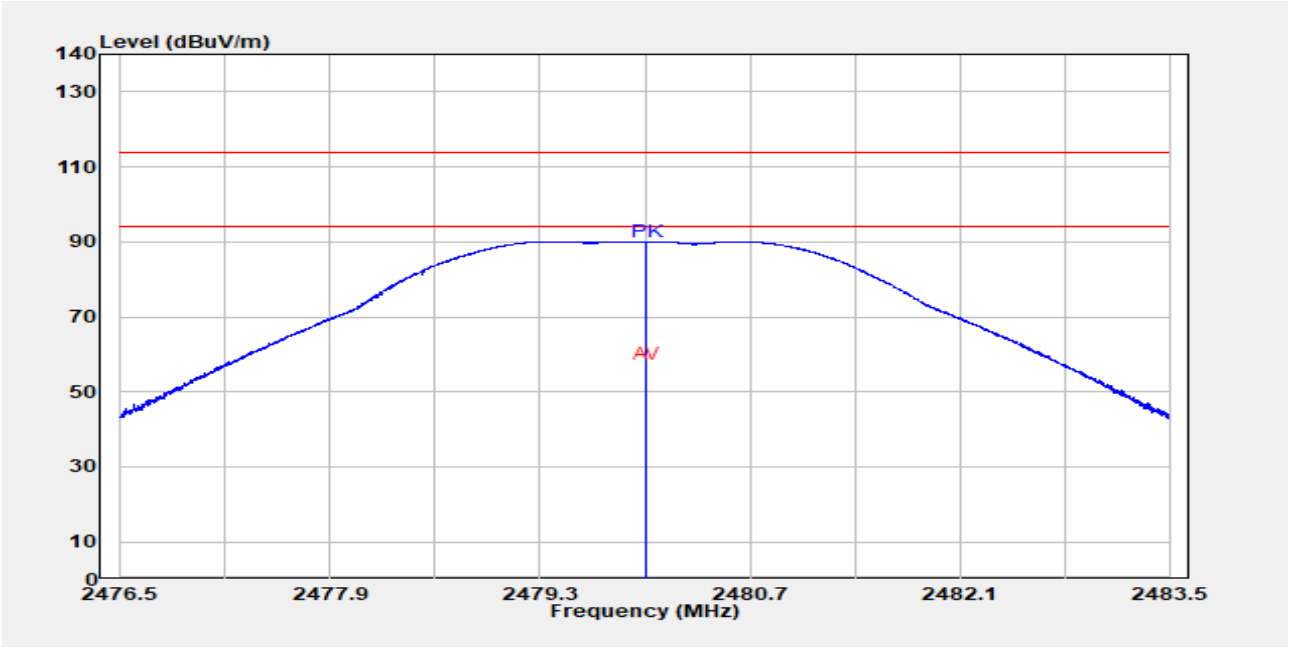


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2441.00	Peak	98.44	-4.85	93.59	114.00	-20.41
2441.00	Average	-	-	60.93	94.00	-33.07

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

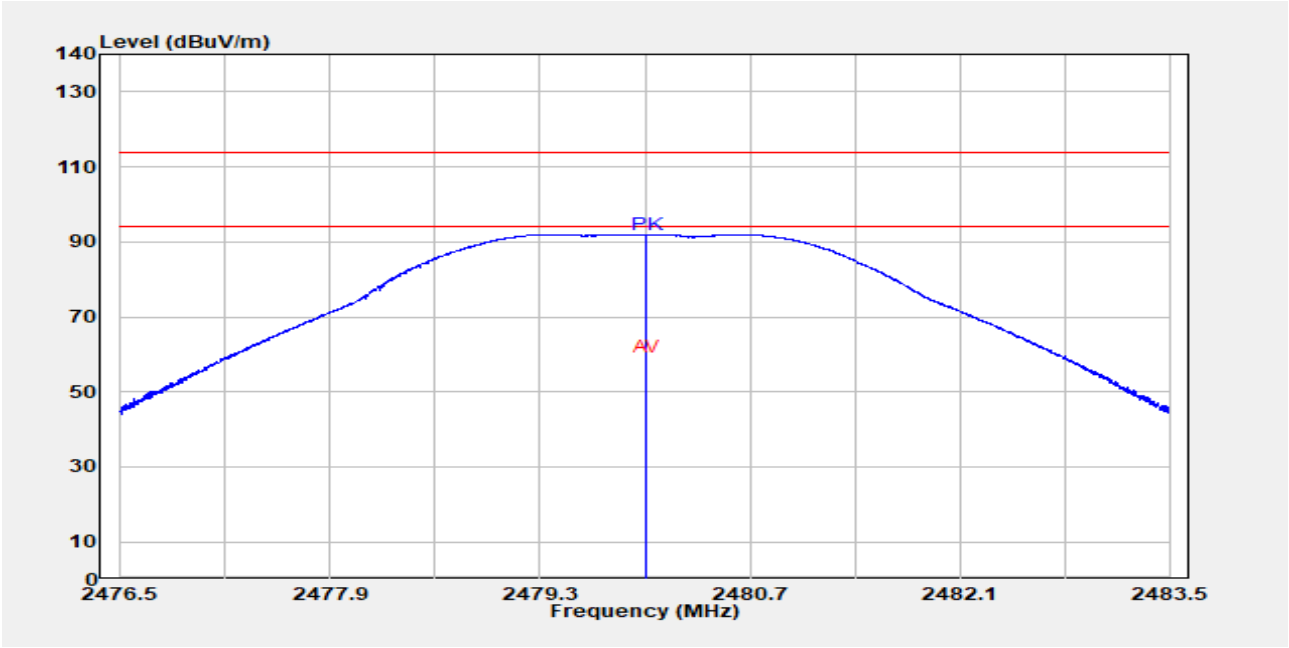


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2480.00	Peak	94.92	-4.85	90.07	114.00	-23.93
2480.00	Average	-	-	57.41	94.00	-36.59

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Main	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin



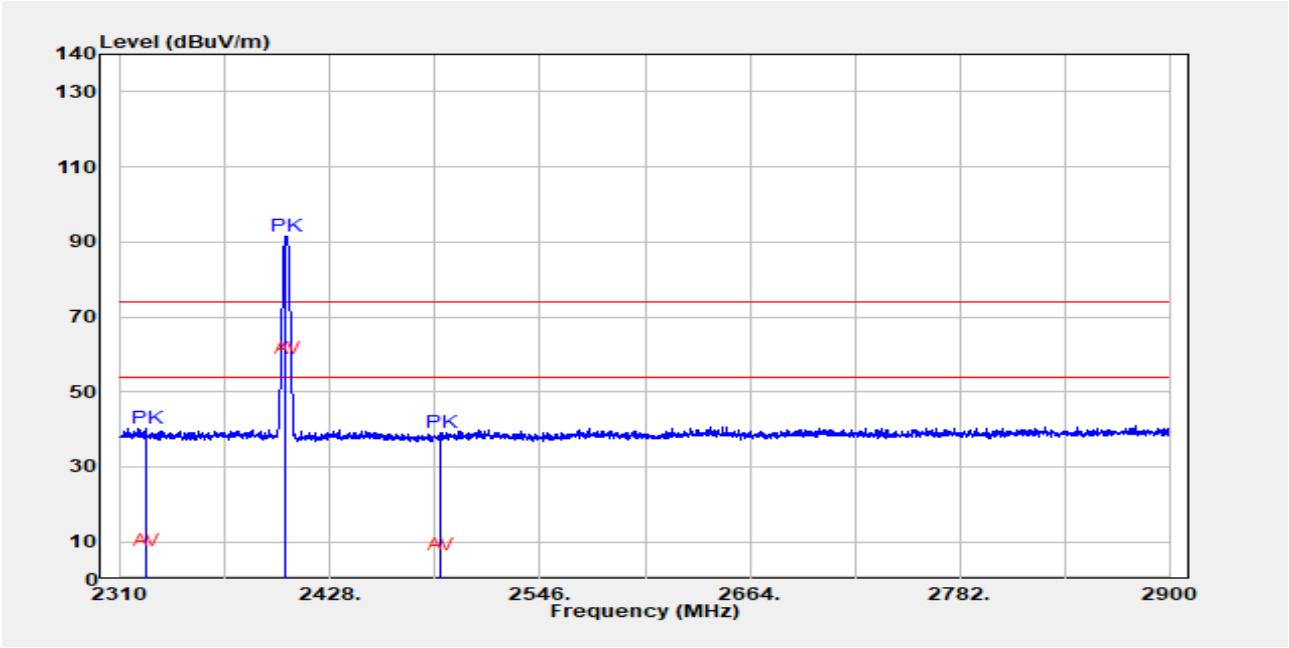
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2480.00	Peak	96.80	-4.85	91.95	114.00	-22.05
2480.00	Average	-	-	59.29	94.00	-34.71

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

9.6.2 Restricted bands around fundamental frequency

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

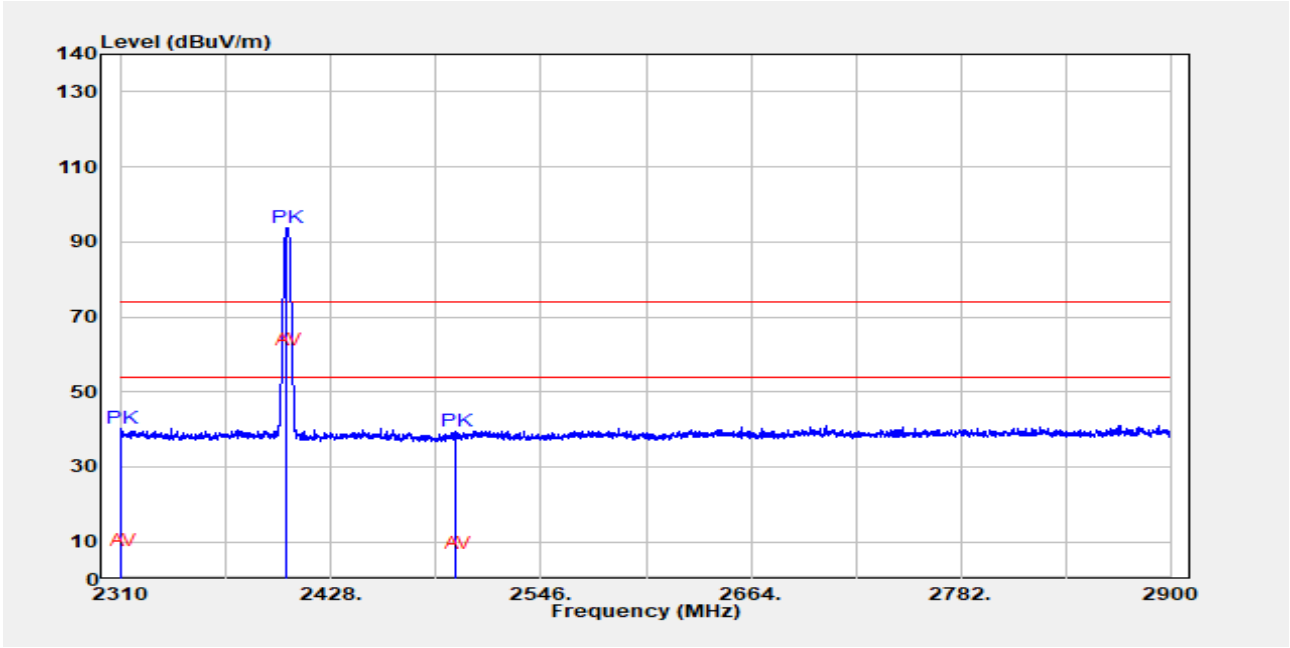


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
2324.17	Peak	44.85	-4.50	40.35	74.00	-33.65
2324.17	Average	-	-	7.69	54.00	-46.31
2403.00	Peak	96.12	-4.66	91.46	-	-
2403.00	Average	-	-	58.80	-	-
2489.81	Peak	43.89	-4.84	39.05	74.00	-34.95
2489.81	Average	-	-	6.39	54.00	-47.61

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Bandedge	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin

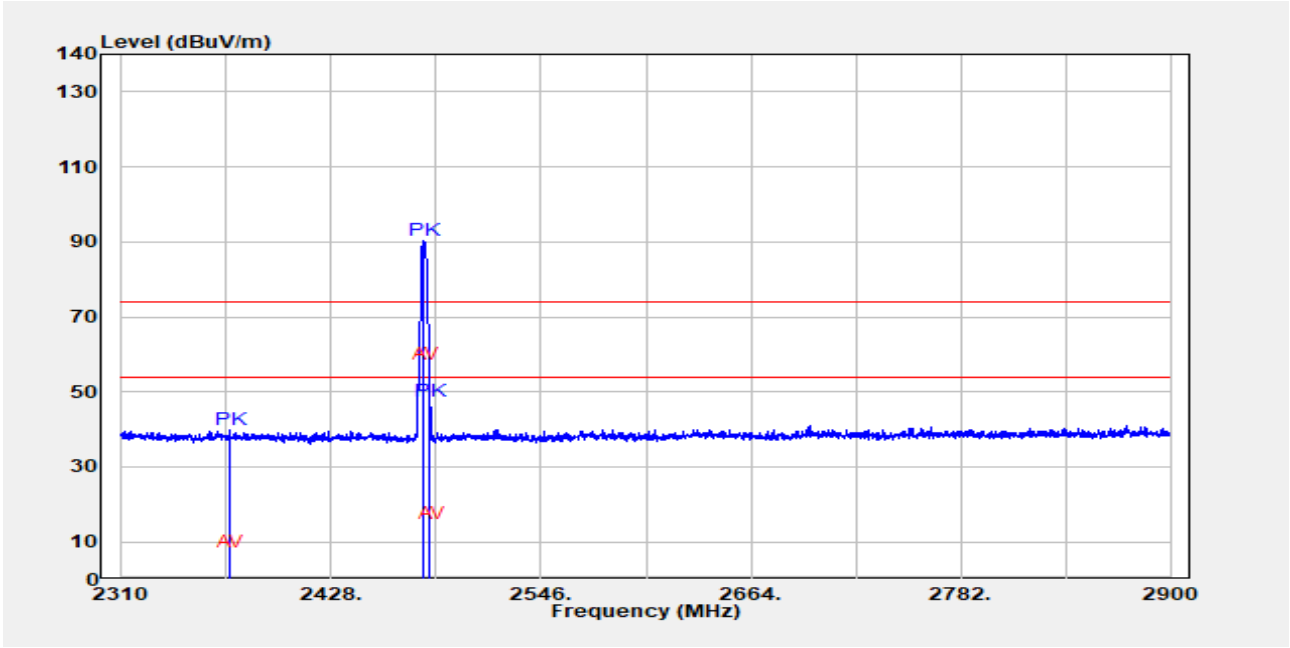


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
2310.00	Peak	44.87	-4.48	40.39	74.00	-33.61
2310.00	Average	-	-	7.73	54.00	-46.27
2403.00	Peak	98.33	-4.66	93.67	-	-
2403.00	Average	-	-	61.01	-	-
2498.27	Peak	44.29	-4.83	39.46	74.00	-34.54
2498.27	Average	-	-	6.80	54.00	-47.20

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

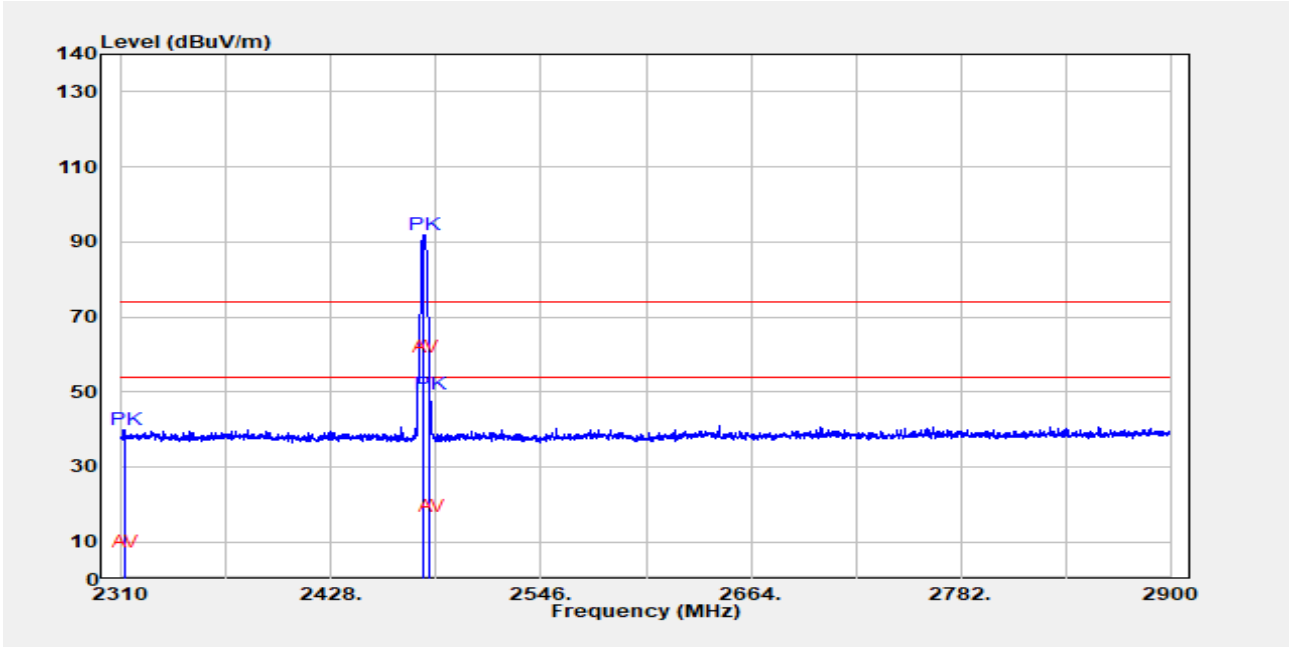


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
2370.79	Peak	44.51	-4.59	39.92	74.00	-34.08
2370.79	Average	-	-	7.26	54.00	-46.74
2480.00	Peak	94.99	-4.85	90.14	-	-
2480.00	Average	-	-	57.48	-	-
2483.52	Peak	52.28	-4.85	47.43	74.00	-26.57
2483.52	Average	-	-	14.77	54.00	-39.23

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Bandedge	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin



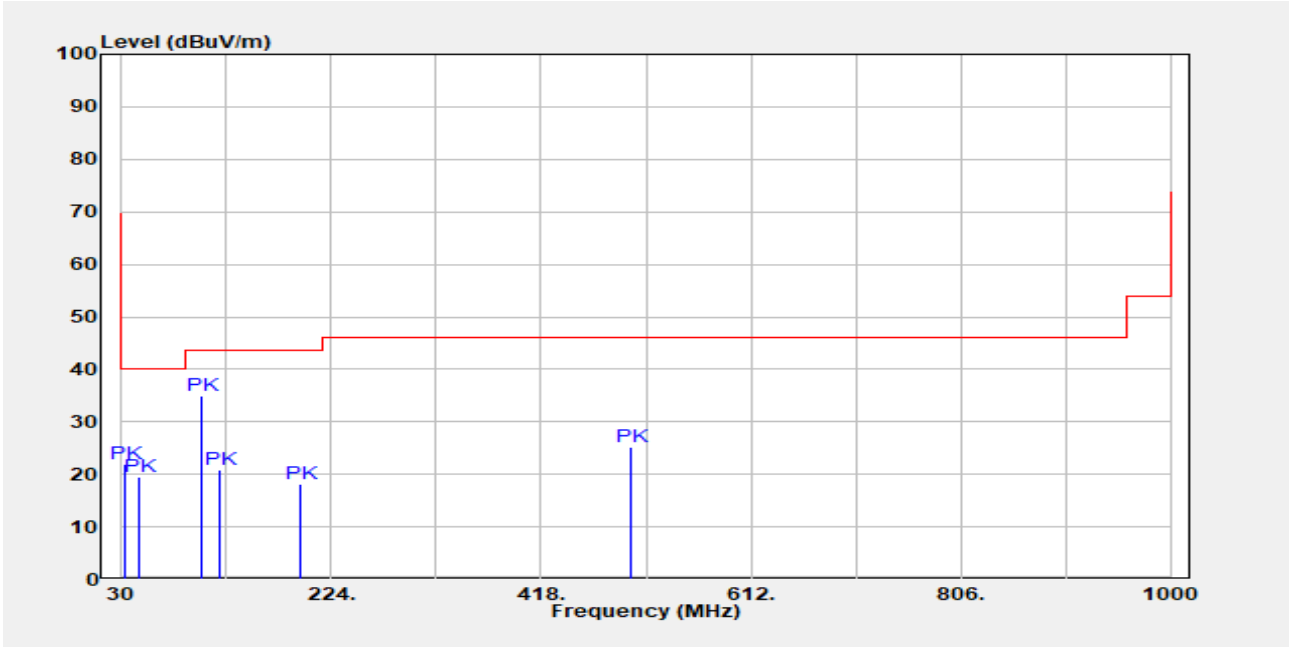
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
2311.38	Peak	44.30	-4.48	39.82	74.00	-34.18
2311.38	Average	-	-	7.16	54.00	-46.84
2480.00	Peak	96.81	-4.85	91.96	-	-
2480.00	Average	-	-	59.30	-	-
2483.52	Peak	54.15	-4.85	49.30	74.00	-24.70
2483.52	Average	-	-	16.64	54.00	-37.36

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

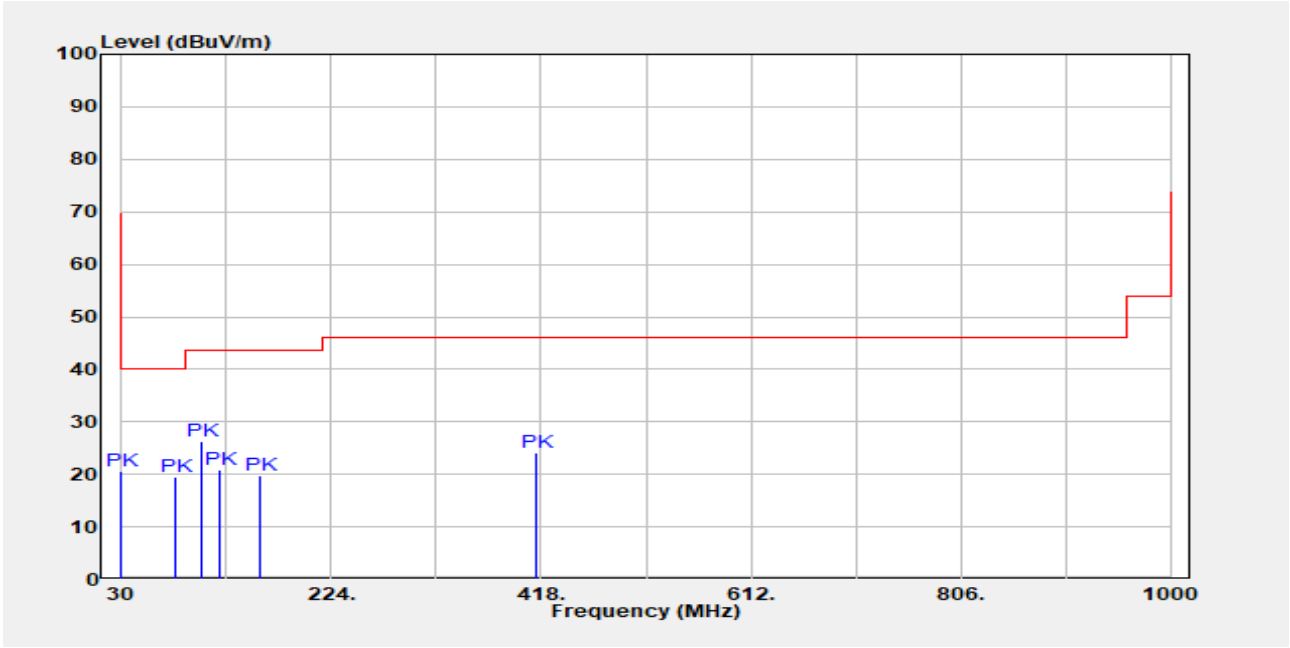
9.6.3 Radiated Spurious Emission Measurement Result

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin



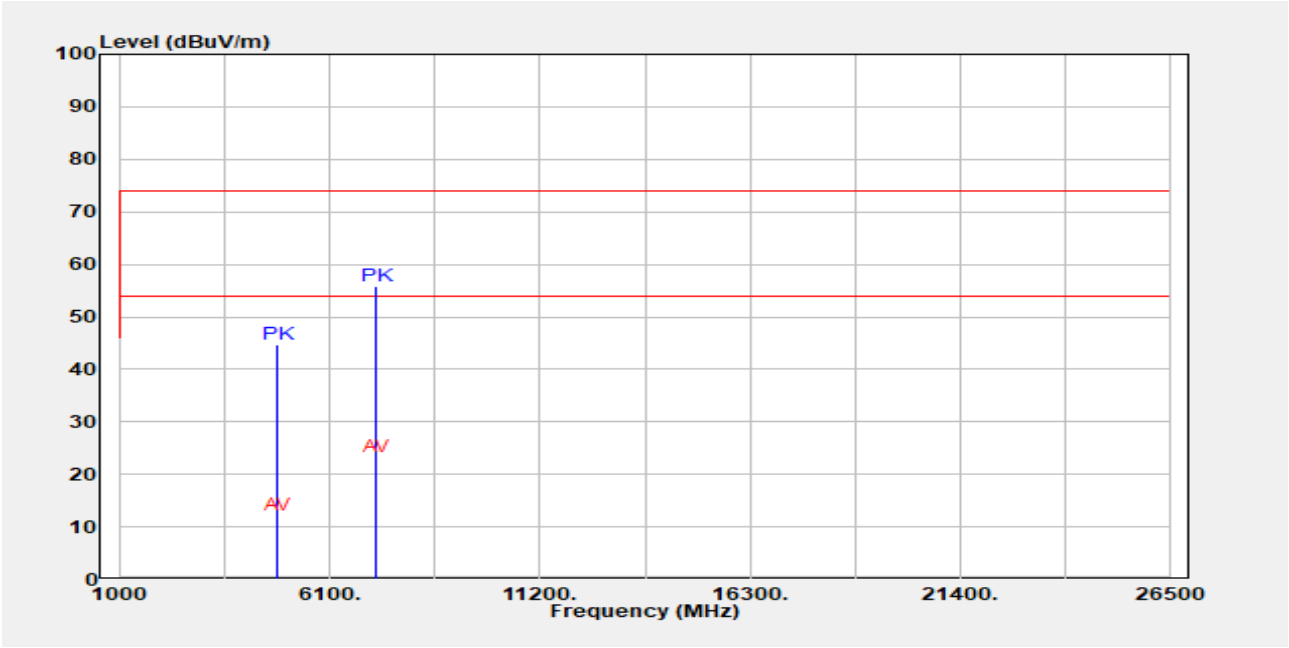
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
32.91	Peak	32.01	-9.92	22.09	40.00	-17.91
46.49	Peak	28.37	-8.83	19.54	40.00	-20.46
103.72	Peak	47.48	-12.48	35.00	43.50	-8.50
121.18	Peak	31.43	-10.51	20.92	43.50	-22.58
194.90	Peak	28.82	-10.60	18.22	43.50	-25.28
500.45	Peak	28.31	-3.18	25.13	46.00	-20.87

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	30.56	-10.10	20.46	40.00	-19.54
79.47	Peak	32.28	-12.82	19.46	40.00	-20.54
103.72	Peak	38.76	-12.48	26.28	43.50	-17.22
120.21	Peak	31.54	-10.61	20.93	43.50	-22.57
157.07	Peak	27.78	-8.03	19.75	43.50	-23.75
414.12	Peak	28.90	-4.72	24.18	46.00	-21.82

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

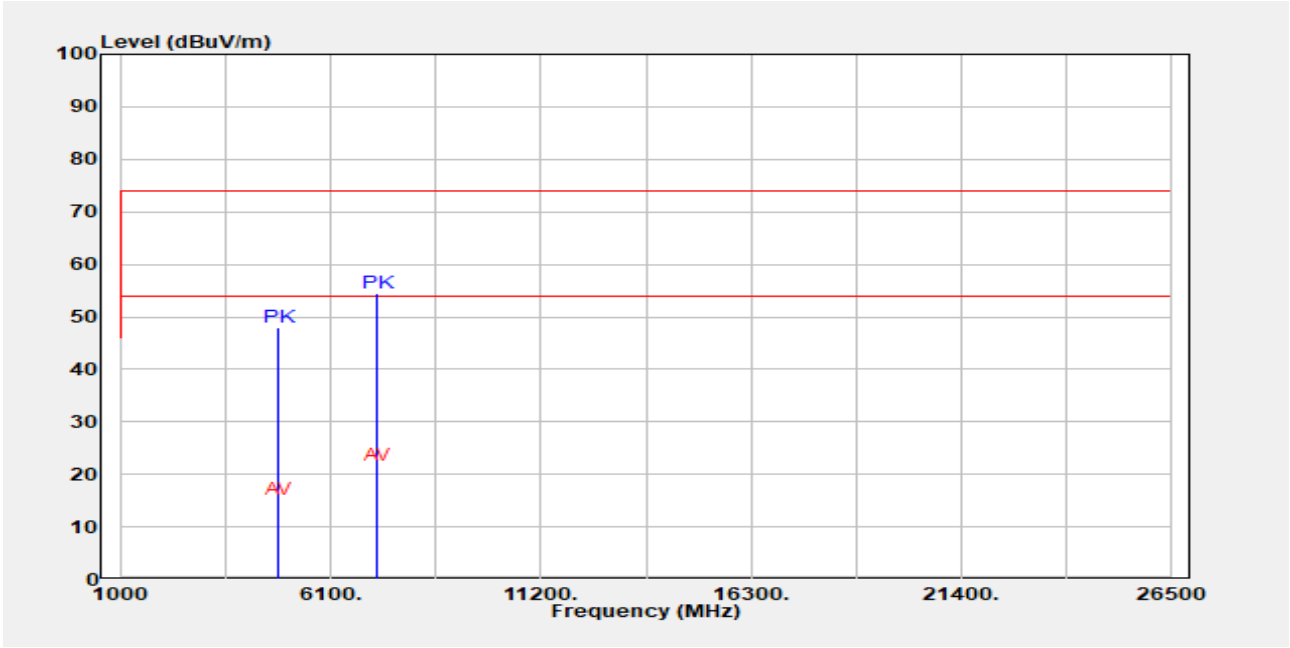


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4806.00	Peak	44.44	0.36	44.80	74.00	-29.20
4806.00	Average	-	-	12.14	54.00	-41.86
7209.00	Peak	50.48	5.43	55.91	74.00	-18.09
7209.00	Average	-	-	23.25	54.00	-30.75

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2403 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin

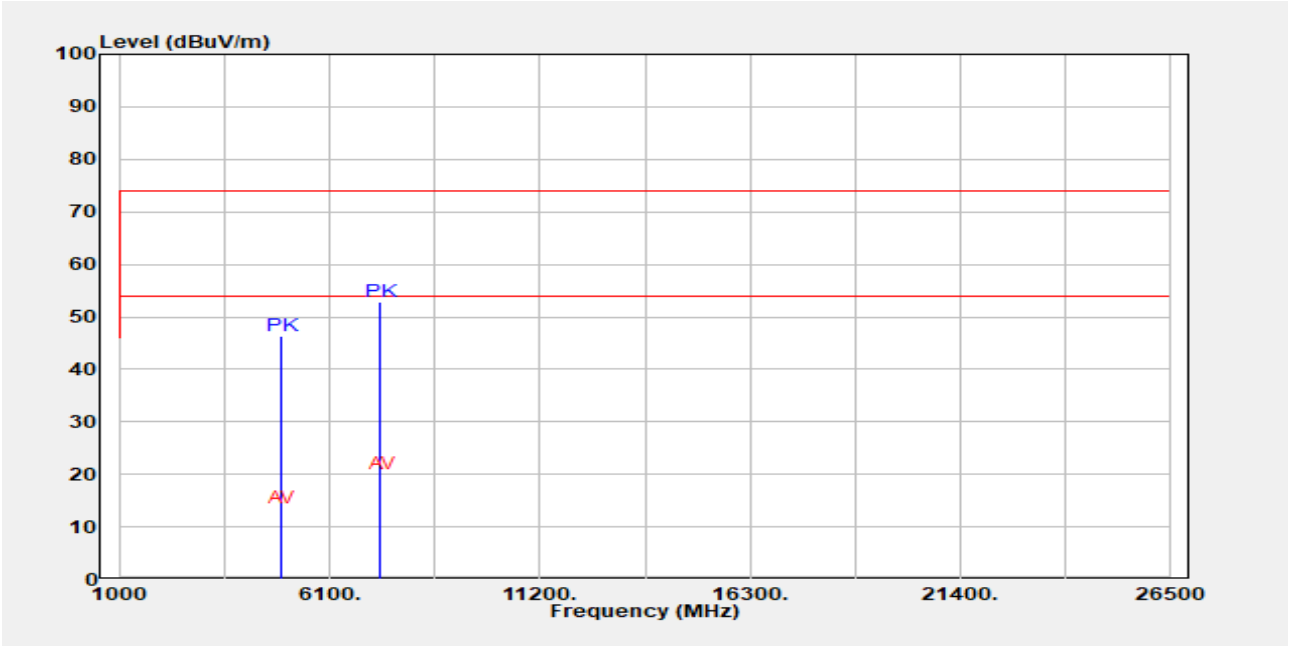


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4806.00	Peak	47.49	0.36	47.85	74.00	-26.15
4806.00	Average	-	-	15.19	54.00	-38.81
7209.00	Peak	49.01	5.43	54.44	74.00	-19.56
7209.00	Average	-	-	21.78	54.00	-32.22

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

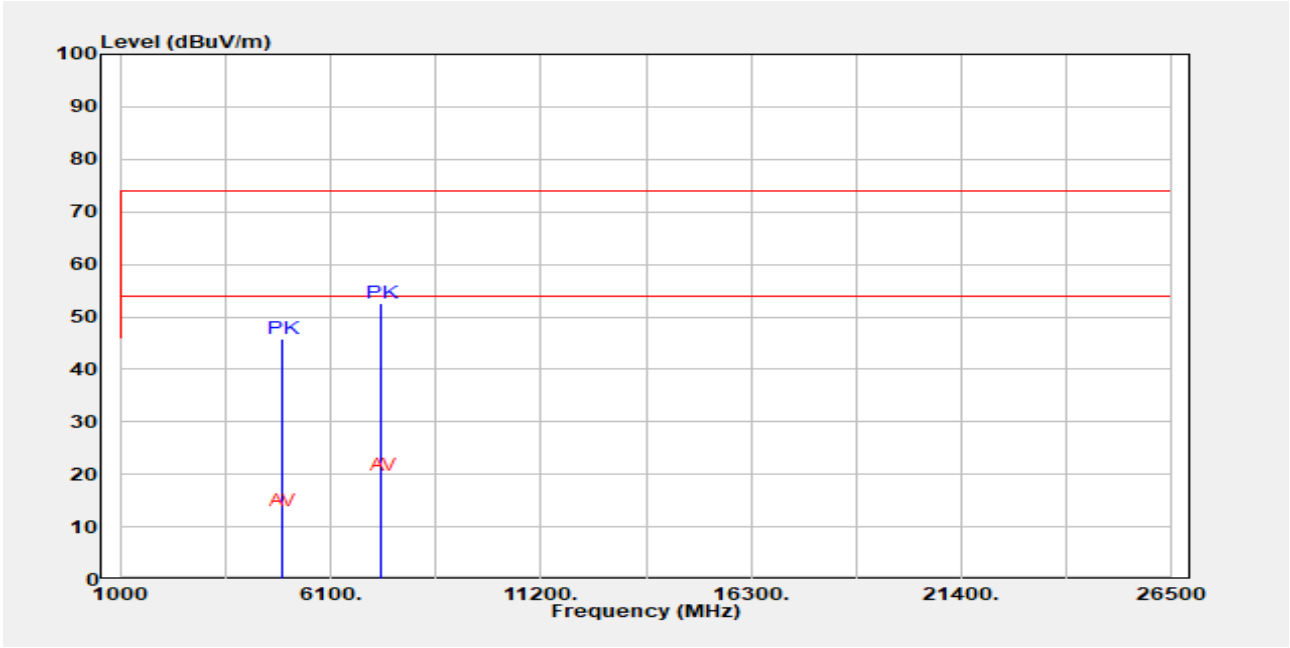


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4882.00	Peak	46.23	0.06	46.29	74.00	-27.71
4882.00	Average	-	-	13.63	54.00	-40.37
7323.00	Peak	47.01	5.77	52.78	74.00	-21.22
7323.00	Average	-	-	20.12	54.00	-33.88

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2441 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin

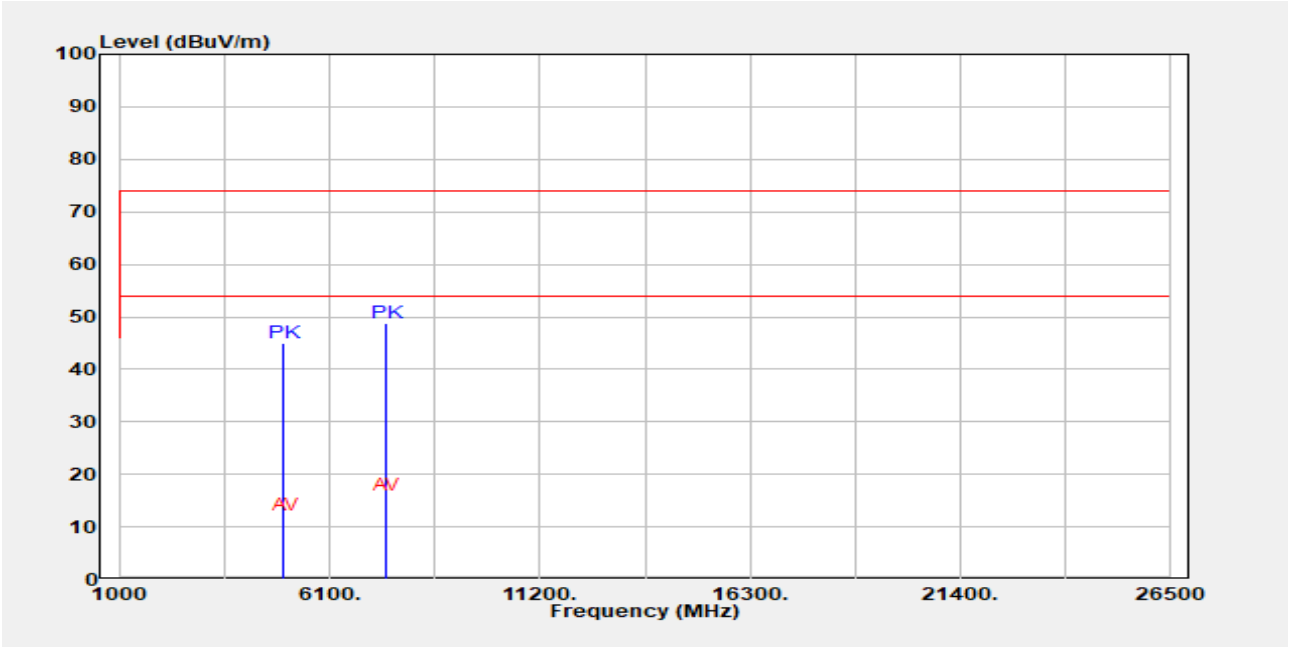


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4882.00	Peak	45.71	0.06	45.77	74.00	-28.23
4882.00	Average	-	-	13.11	54.00	-40.89
7323.00	Peak	46.70	5.77	52.47	74.00	-21.53
7323.00	Average	-	-	19.81	54.00	-34.19

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin

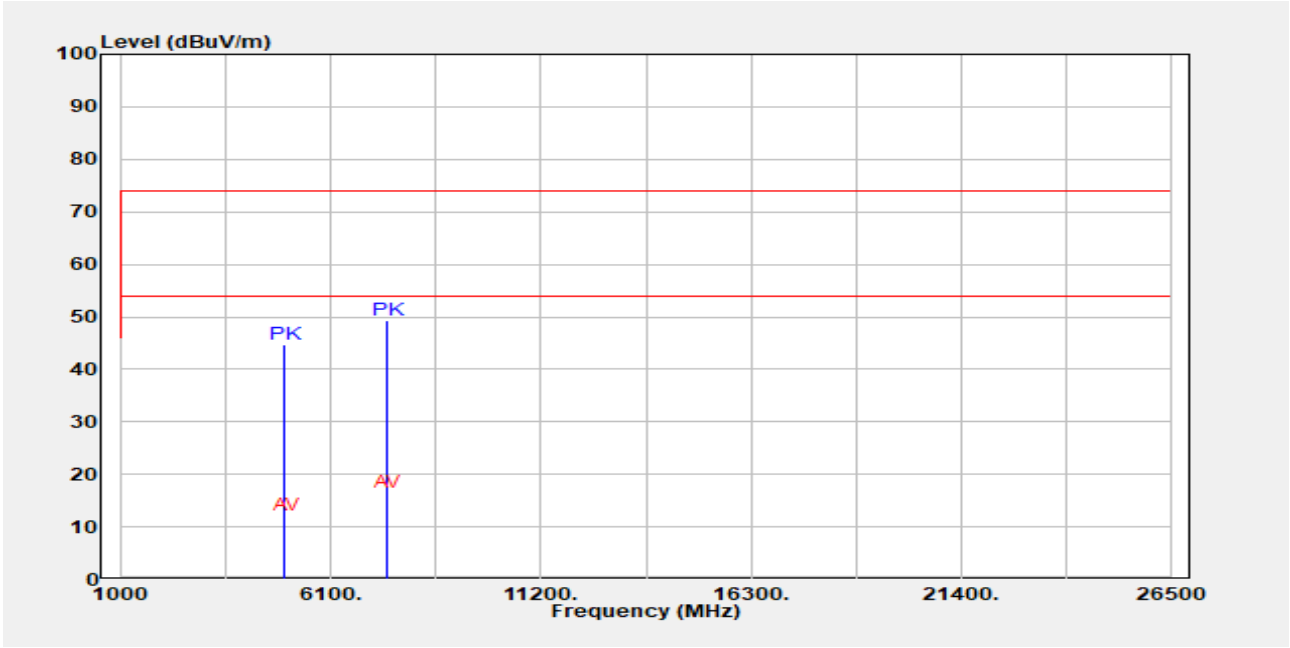


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4960.00	Peak	44.76	0.21	44.97	74.00	-29.03
4960.00	Average	-	-	12.31	54.00	-41.69
7440.00	Peak	43.04	5.73	48.77	74.00	-25.23
7440.00	Average	-	-	16.11	54.00	-37.89

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

Report Number	:TERF2406001600ER	Test Site	:SAC 3
Operation Mode	:SRD	Test Date	:2024-06-12
Test Frequency	:2480 MHz	Temp./Humi.	:23.6℃/64%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4960.00	Peak	44.59	0.21	44.80	74.00	-29.20
4960.00	Average	-	-	12.14	54.00	-41.86
7440.00	Peak	43.59	5.73	49.32	74.00	-24.68
7440.00	Average	-	-	16.66	54.00	-37.34

Average Duty Cycle Factor=-32.66 (dB)

Average Level= Peak Level+ Duty Cycle Factor

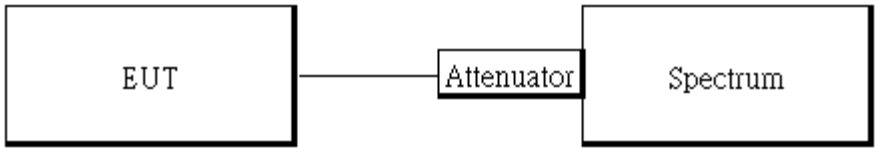
10 EMISSION BANDWIDTH

10.1 Applicable Standard

§2.1049 (h) & 15.215(c)

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

10.1 Test Setup



10.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as
   RBW=1% of the approximate emission bandwidth,
   VBW = 3 times RBW,
   Span= 2 to 5 times of the OBW.
   Sweep=auto
   Detector = Peak, and Max hold
4. Turn on the -20 dB Bandwidth function, max reading.(FCC)

10.3 Measurement Results:

N/A

8 ANTENNA REQUIREMENT

8.1 Standard Applicable:

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.

10.4 Antenna Connected Construction:

The antenna complies with this requirement and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~