

FCC Radio Test Report

FCC ID: GDDMXU-270R

Report No. : BTL-FCCP-1-2207T124
Equipment : CHERRY KW X ULP Dongle
Model Name : MXU-270R
Brand Name : CHERRY
Applicant : Cherry Europe GmbH
Address : Cherryst. Auerbach_OPf. Germany 91275

Radio Function : Short Range Devices

FCC Rule Part(s) : FCC CFR Title 47, Part 15, Subpart C
Measurement : ANSI C63.10-2013
Procedure(s) :

Date of Receipt : 2022/8/2
Date of Test : 2022/8/2 ~ 2023/1/17
Issued Date : 2023/3/24

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by : Eric Lee
 Eric Lee, Engineer

Approved by : Jerry Chuang
 Jerry Chuang, Supervisor



BTL Inc.

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

Tel: +886-2-2657-3299

Fax: +886-2-2657-3331

Web: www.newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-1-2207T124	R00	Original Report.	2022/9/14	Invalid
BTL-FCCP-1-2207T124	R01	Revised report to address TCB's comments.	2022/10/4	Invalid
BTL-FCCP-1-2207T124	R02	Revised report to address TAF Audit's comments	2023/3/24	Valid

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	-----
15.205 15.209 15.249(a)(d)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	-----
15.215(c)	Bandwidth	APPENDIX D	Pass	-----

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.

☒ C05 ☐ CB08 ☐ CB11 ☐ CB15 ☐ CB16
☒ SR05

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.

☐ C06 ☒ CB21 ☐ CB22

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k = 2$, providing a level of confidence of approximately **95 %**.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test :

Test Site	Measurement Frequency Range	U,(dB)
CB21	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test :

Test Item	U,(dB)
Bandwidth	0.5334

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	22 °C, 50 %	AC 120V	Jay Tien
Radiated emissions below 1 GHz	23 °C, 59 %	DC 5V	Mark Wang
Radiated emissions above 1 GHz	24 °C, 58 %	DC 5V	Mark Wang
Bandwidth	24.6 °C, 67 %	DC 5V	Angela Wang

1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

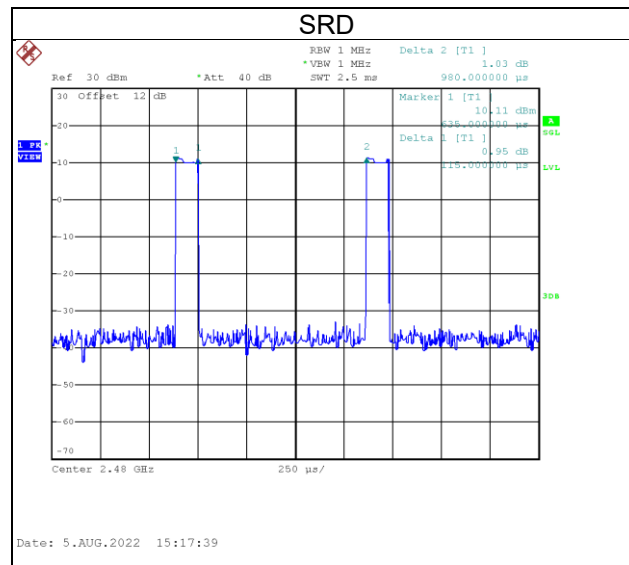
Test Software	SDHidCommand App			
Frequency	2403 MHz	2441 MHz	2480 MHz	Data Rate
SRD	DEF	DEF	DEF	2 Mbps

1.5 DUTY CYCLE

If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered.

Remark	Delta 1			Delta 2	On Time/Period
Mode	ON (ms)	Numbers (ON)	On Time (B) (ms)	Period (ON+OFF) (ms)	Duty Cycle (%)
SRD	0.115	1	0.115	0.980	11.73%



2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	CHERRY KW X ULP Dongle
Model Name	MXU-270R
Brand Name	CHERRY
Model Difference	N/A
Power Source	DC voltage supplied from USB Port.
Power Rating	DC 5V
Products Covered	1* RF module: NORDIC / nRF52820
Frequency Range	2400 MHz ~ 2483.5 MHz
Operation Frequency	2403 MHz ~ 2480 MHz
Modulation Technology	GFSK
Transfer Rate	2 Mbps
Field Strength	83.30 dBuV/m
Test Model	MXU-270R
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- (2) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2403	27	2429	53	2455
02	2404	28	2430	54	2456
03	2405	29	2431	55	2457
04	2406	30	2432	56	2458
05	2407	31	2433	57	2459
06	2408	32	2434	58	2460
07	2409	33	2435	59	2461
08	2410	34	2436	60	2462
09	2411	35	2437	61	2463
10	2412	36	2438	62	2464
11	2413	37	2439	63	2465
12	2414	38	2440	64	2466
13	2415	39	2441	65	2467
14	2416	40	2442	66	2468
15	2417	41	2443	67	2469
16	2418	42	2444	68	2470
17	2419	43	2445	69	2471
18	2420	44	2446	70	2472
19	2421	45	2447	71	2473
20	2422	46	2448	72	2474
21	2423	47	2449	73	2475
22	2424	48	2450	74	2476
23	2425	49	2451	75	2477
24	2426	50	2452	76	2478
25	2427	51	2453	77	2479
26	2428	52	2454	78	2480

(3) Table for Filed Antenna:

Ant.	Brand	Model	Antenna Type	Connector	Gain (dBi)
1		CW801S	Chip	N/A	-0.5

2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal/Idle	-	-
Transmitter Radiated Emissions (below 1GHz)	SRD	78	-
Transmitter Radiated Emissions (above 1GHz)	SRD	01/39/78	Fundamental
	SRD	01/39/78	Harmonic
Bandwidth	SRD	01/39/78	-

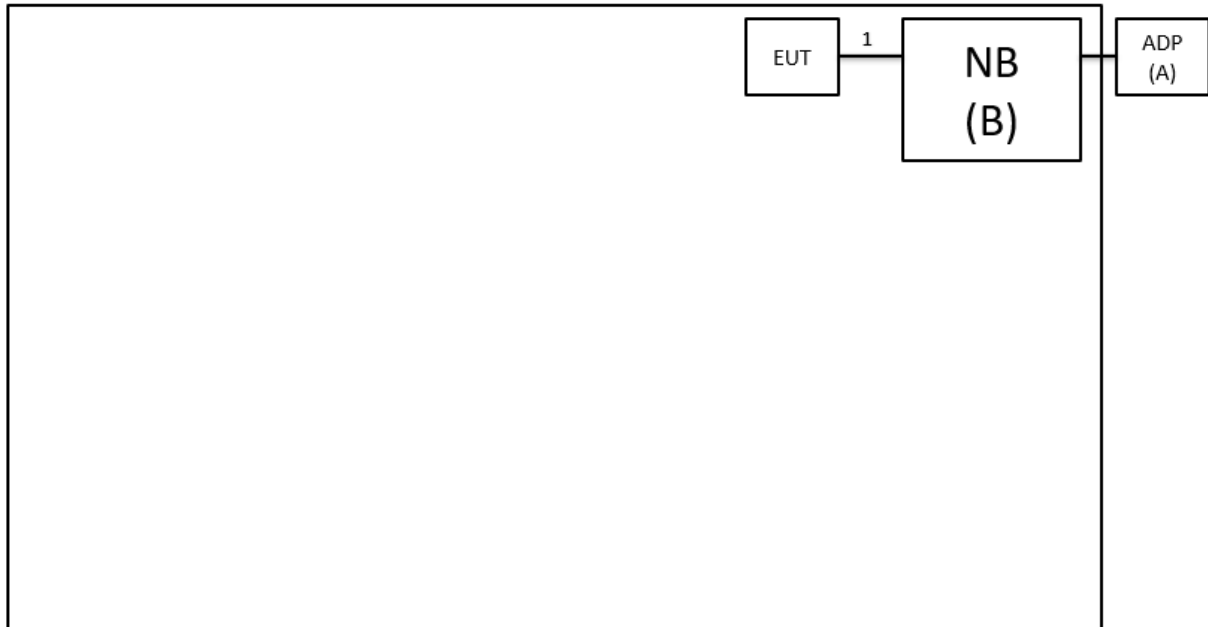
NOTE:

- (1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.
- (2) All X, Y and Z axes are evaluated, but only the worst case (Y axis) is recorded.
- (3) There were no emissions found below 30 MHz within 20 dB of the limit.

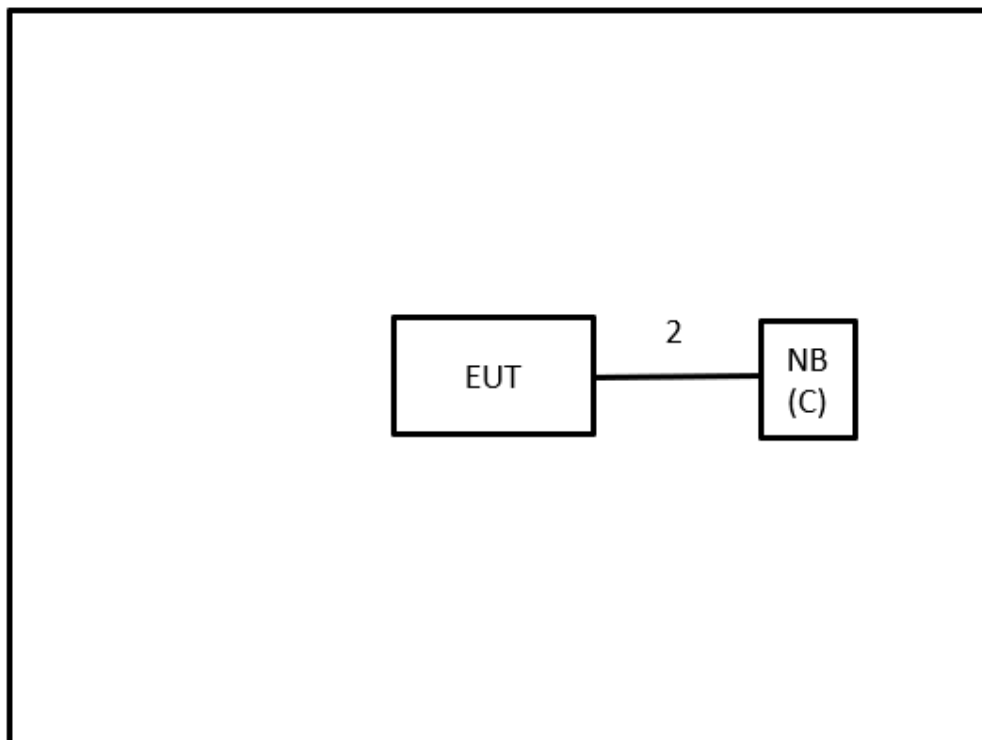
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.

AC Power Line Conducted Emissions Test



Radiated Emissions Test



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Adapter	ASUS	ADP-458WX	N/A	Furnished by test lab.
B	NB	ASUS	X555LN	N/A	Furnished by test lab.
C	NB	HP	TPN-I119	N/A	Furnished by test lab.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	NO	NO	1.8m	USB Cable	Furnished by test lab.
2	NO	NO	1m	USB extension Cable	Furnished by test lab.

3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
 Margin Level = Measurement Value – Limit Value
 Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
 All other support equipment were powered from an additional LISN(s).
 The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
 The end of the cable will be terminated, using the correct terminating impedance.
 The overall length shall not exceed 1 m.
- d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

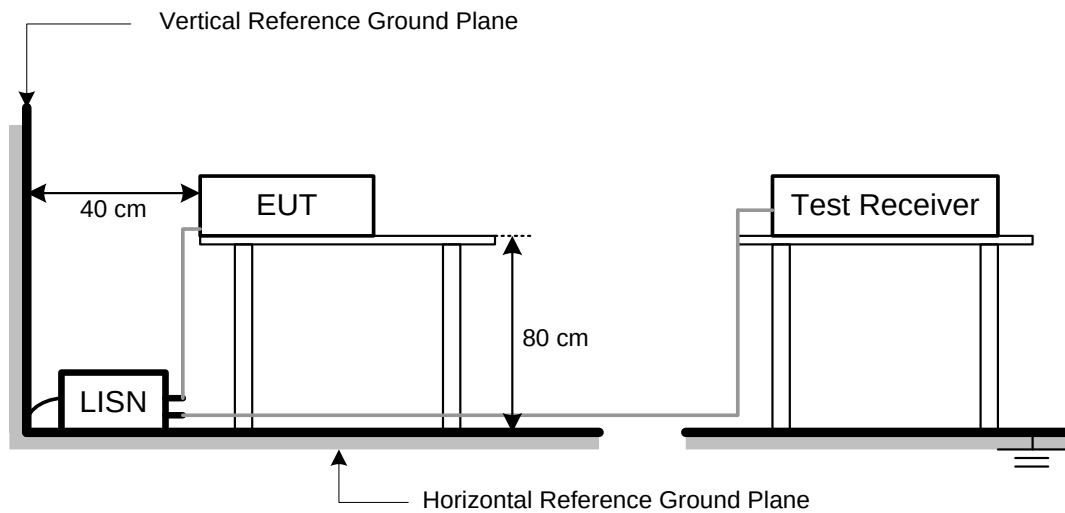
NOTE:

- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
 BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.

4 RADIATED EMISSIONS TEST

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated Emissions (dBuV/m)		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

NOTE:

- (1) The limit for radiated test was performed according to FCC Part 15, Subpart C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	=	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	54	=	-32.78

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2 TEST PROCEDURE

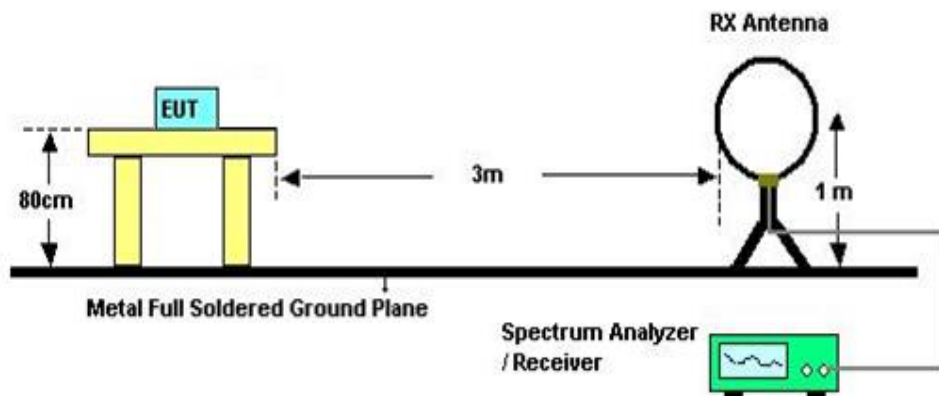
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

4.3 DEVIATION FROM TEST STANDARD

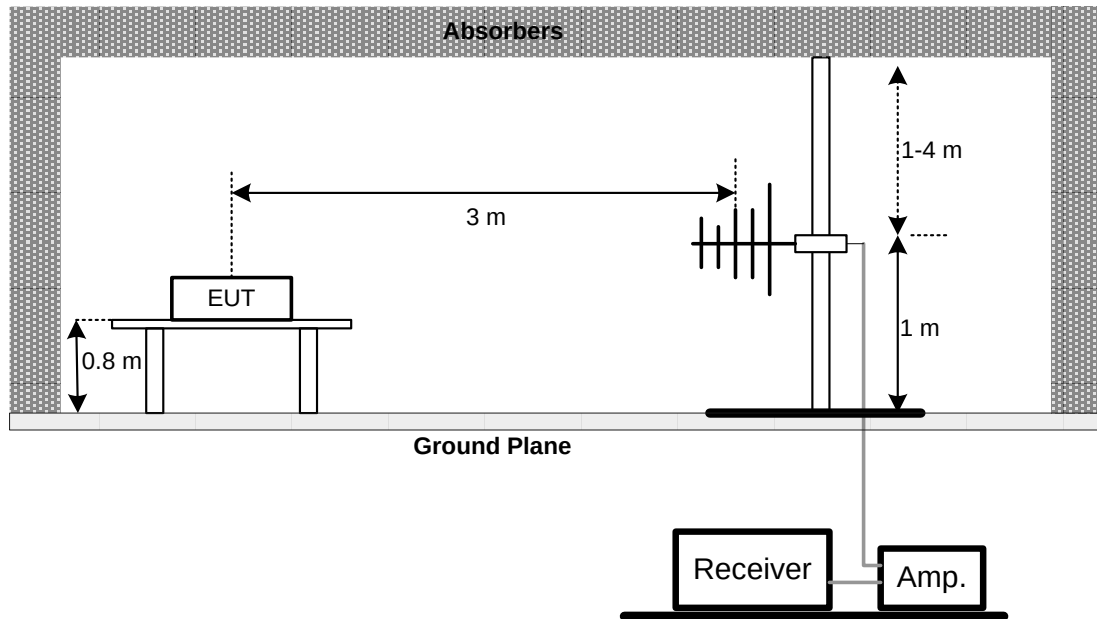
No deviation.

4.4 TEST SETUP

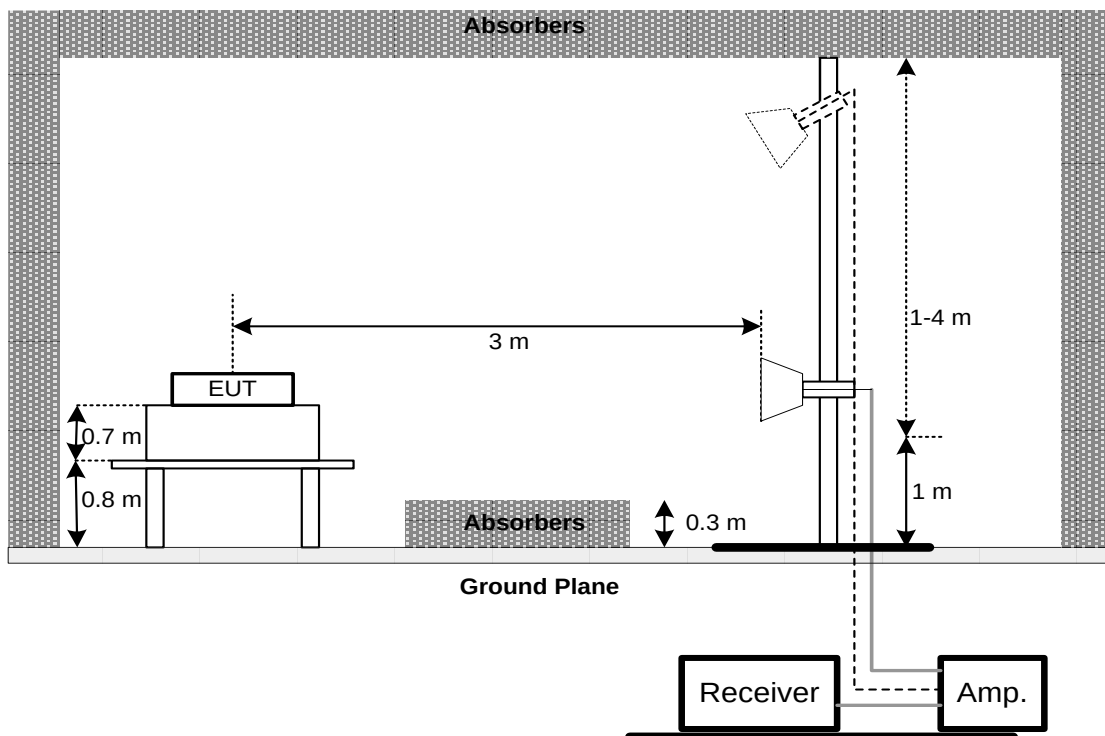
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.7 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

- (1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5 BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

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

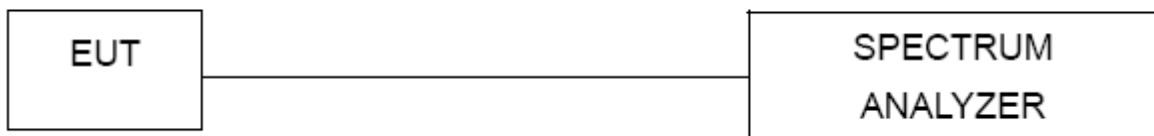
5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX D.

6 LIST OF MEASURING EQUIPMENTS

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101051	2022/6/15	2023/6/14
2	Test Cable	EMCI	EMCRG58-BM-BM-9000	210501	2022/5/2	2023/5/1
3	EMI Test Receiver	R&S	ESR 7	101433	2021/11/24	2022/11/23
4	Measurement Software	EZ	EZ EMC (Version NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC330N	980850	2021/9/23 2022/9/19	2022/9/22 2023/9/18
2	Preamplifier	EMCI	EMC118A45SE	980819	2022/3/8	2023/3/7
3	Preamplifier	EMCI	EMC001340	980555	2022/4/6	2023/4/5
4	Test Cable	EMCI	EMC104-SM-SM-1000	220319	2022/3/15	2023/3/14
5	Test Cable	EMCI	EMC104-SM-SM-3000	220322	2022/3/15	2023/3/14
6	Test Cable	EMCI	EMC104-SM-SM-7000	220324	2022/3/15	2023/3/14
7	EXA Signal Analyzer	keysight	N9020A	MY57120120	2022/3/7	2023/3/6
8	Loop Ant	Electro-Metrics	EMCI-LPA600	274	2022/6/28	2023/6/27
9	Horn Antenna	RFSPIN	DRH18-E	211202A18EN	2022/5/18	2023/5/17
10	Horn Ant	Schwarzbeck	BBHA 9170	340	2022/7/13	2023/7/12
11	Log-bicon Antenna	Schwarzbeck	VULB9168	1369	2022/5/20	2023/5/19
12	6dB Attenuator	EMCI	EMCI-N-6-06	AT-N0625	2022/5/20	2023/5/19
13	Measurement Software	EZ	EZ EMC (Version NB-03A1-01)	N/A	N/A	N/A

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP38	101139	2022/3/2	2023/3/1

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

7 EUT TEST PHOTO

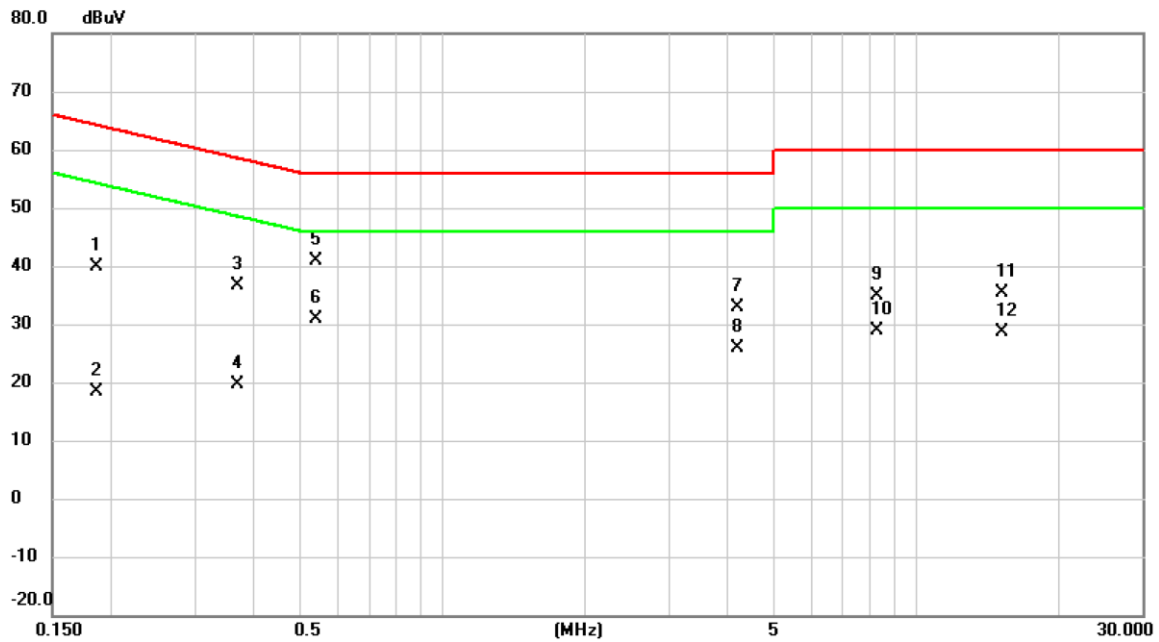
Please refer to document Appendix No.: TP-2207T124-FCCP-1 (APPENDIX-TEST PHOTOS).

8 EUT PHOTOS

Please refer to document Appendix No.: EP-2207T124-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

Test Mode	Normal	Tested Date	2022/8/10
Test Frequency	-	Phase	Line

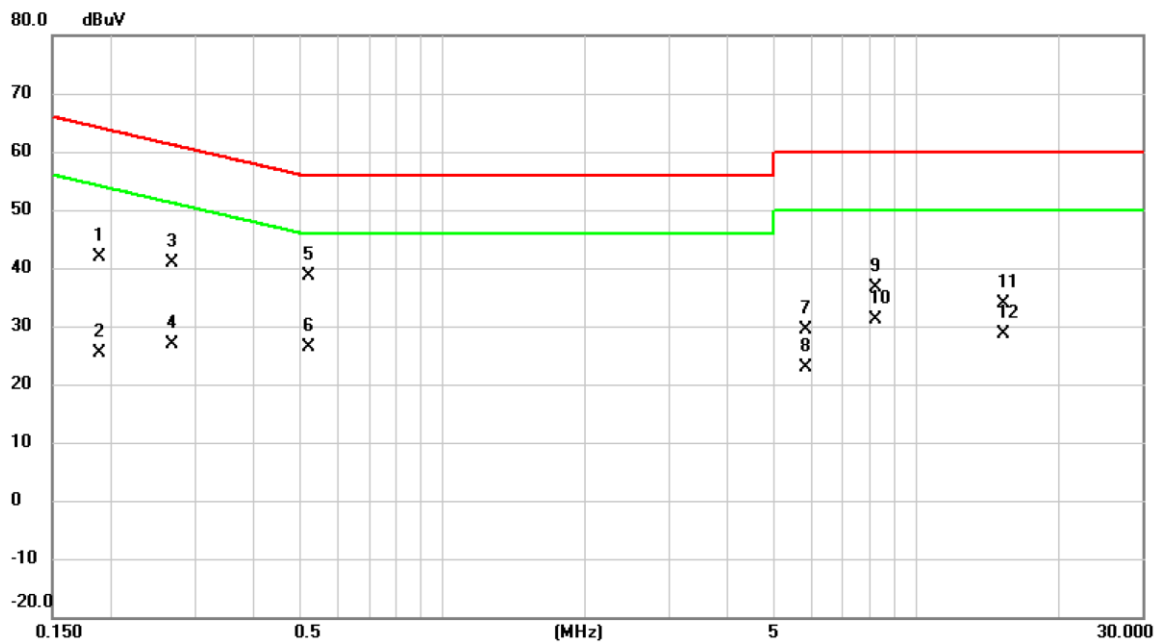


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	30.14	9.63	39.77	64.21	-24.44	QP	
2		0.1860	8.84	9.63	18.47	54.21	-35.74	AVG	
3		0.3682	26.89	9.62	36.51	58.54	-22.03	QP	
4		0.3682	9.91	9.62	19.53	48.54	-29.01	AVG	
5	*	0.5392	31.23	9.62	40.85	56.00	-15.15	QP	
6		0.5392	21.17	9.62	30.79	46.00	-15.21	AVG	
7		4.2022	23.20	9.74	32.94	56.00	-23.06	QP	
8		4.2022	16.19	9.74	25.93	46.00	-20.07	AVG	
9		8.2388	25.18	9.82	35.00	60.00	-25.00	QP	
10		8.2388	18.98	9.82	28.80	50.00	-21.20	AVG	
11		15.1440	25.51	9.84	35.35	60.00	-24.65	QP	
12		15.1440	18.76	9.84	28.60	50.00	-21.40	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	Normal	Tested Date	2022/8/10
Test Frequency	-	Phase	Neutral



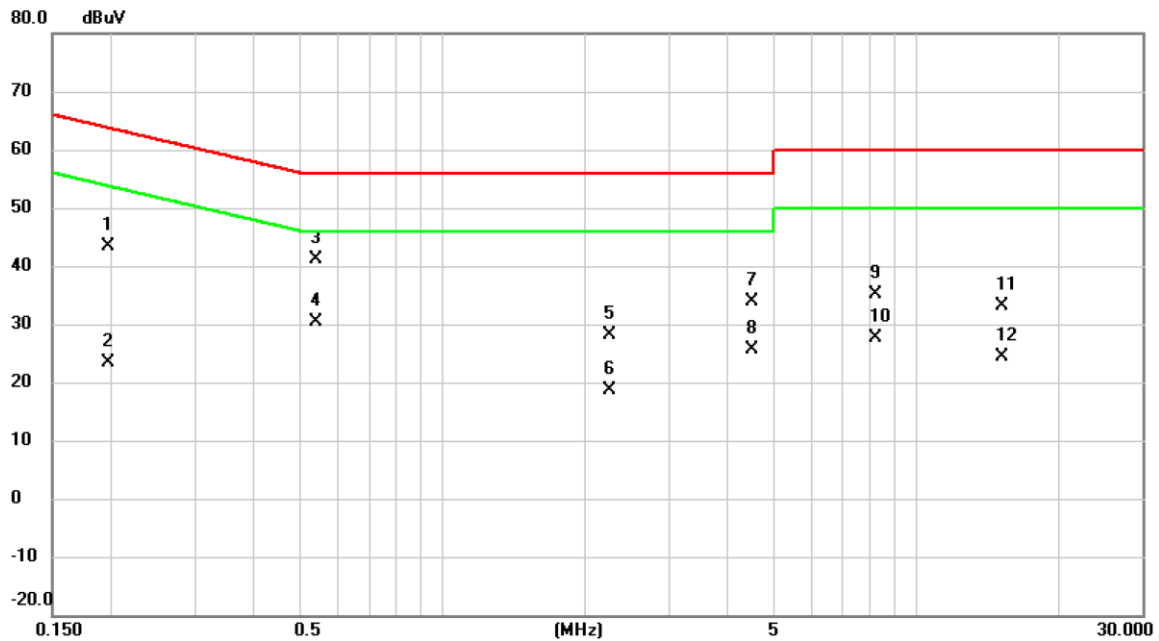
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1883	32.25	9.62	41.87	64.11	-22.24	QP	
2		0.1883	15.64	9.62	25.26	54.11	-28.85	AVG	
3		0.2692	31.38	9.62	41.00	61.14	-20.14	QP	
4		0.2692	17.23	9.62	26.85	51.14	-24.29	AVG	
5	*	0.5235	28.91	9.62	38.53	56.00	-17.47	QP	
6		0.5235	16.81	9.62	26.43	46.00	-19.57	AVG	
7		5.8358	19.61	9.78	29.39	60.00	-30.61	QP	
8		5.8358	13.15	9.78	22.93	50.00	-27.07	AVG	
9		8.2275	26.81	9.84	36.65	60.00	-23.35	QP	
10		8.2275	21.33	9.84	31.17	50.00	-18.83	AVG	
11		15.2655	24.06	9.92	33.98	60.00	-26.02	QP	
12		15.2655	18.63	9.92	28.55	50.00	-21.45	AVG	

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Idle	Tested Date	2022/8/10
Test Frequency	-	Phase	Line



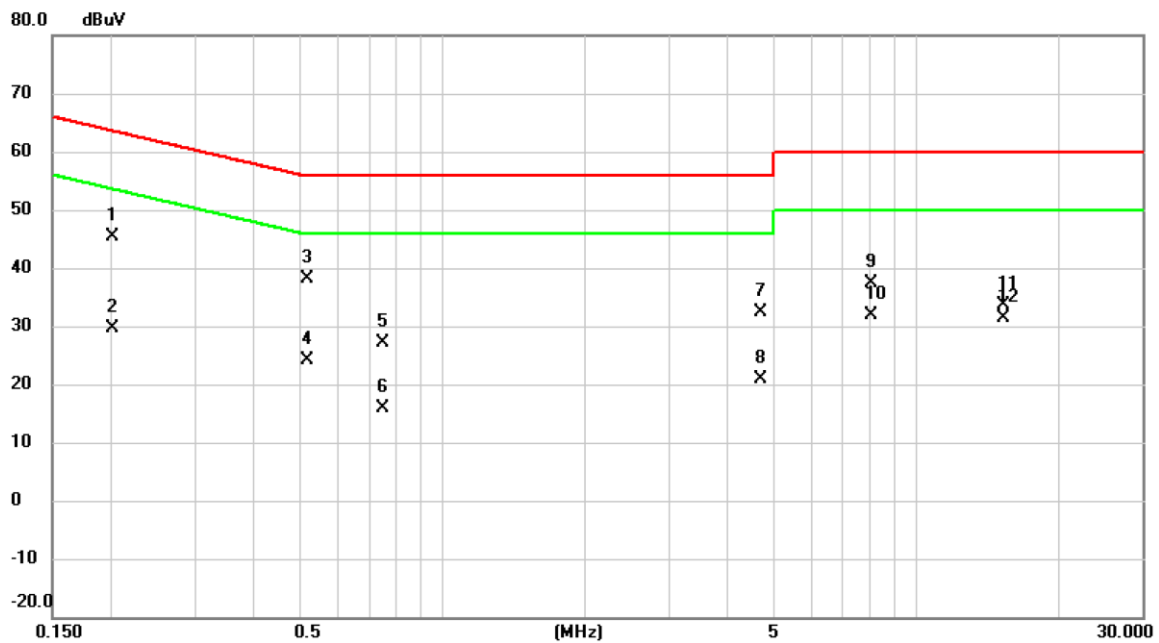
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1973	33.67	9.63	43.30	63.72	-20.42	QP	
2		0.1973	13.69	9.63	23.32	53.72	-30.40	AVG	
3	*	0.5415	31.41	9.62	41.03	56.00	-14.97	QP	
4		0.5415	20.87	9.62	30.49	46.00	-15.51	AVG	
5		2.2560	18.33	9.70	28.03	56.00	-27.97	QP	
6		2.2560	8.85	9.70	18.55	46.00	-27.45	AVG	
7		4.5104	24.22	9.75	33.97	56.00	-22.03	QP	
8		4.5104	15.94	9.75	25.69	46.00	-20.31	AVG	
9		8.2298	25.36	9.82	35.18	60.00	-24.82	QP	
10		8.2298	17.84	9.82	27.66	50.00	-22.34	AVG	
11		15.1440	23.34	9.84	33.18	60.00	-26.82	QP	
12		15.1440	14.52	9.84	24.36	50.00	-25.64	AVG	

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Idle	Tested Date	2022/8/10
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2017	35.69	9.62	45.31	63.54	-18.23	QP	
2		0.2017	19.94	9.62	29.56	53.54	-23.98	AVG	
3	*	0.5167	28.55	9.62	38.17	56.00	-17.83	QP	
4		0.5167	14.63	9.62	24.25	46.00	-21.75	AVG	
5		0.7507	17.59	9.65	27.24	56.00	-28.76	QP	
6		0.7507	6.34	9.65	15.99	46.00	-30.01	AVG	
7		4.6883	22.50	9.76	32.26	56.00	-23.74	QP	
8		4.6883	11.18	9.76	20.94	46.00	-25.06	AVG	
9		8.0115	27.61	9.83	37.44	60.00	-22.56	QP	
10		8.0115	22.17	9.83	32.00	50.00	-18.00	AVG	
11		15.2430	23.63	9.92	33.55	60.00	-26.45	QP	
12		15.2430	21.51	9.92	31.43	50.00	-18.57	AVG	

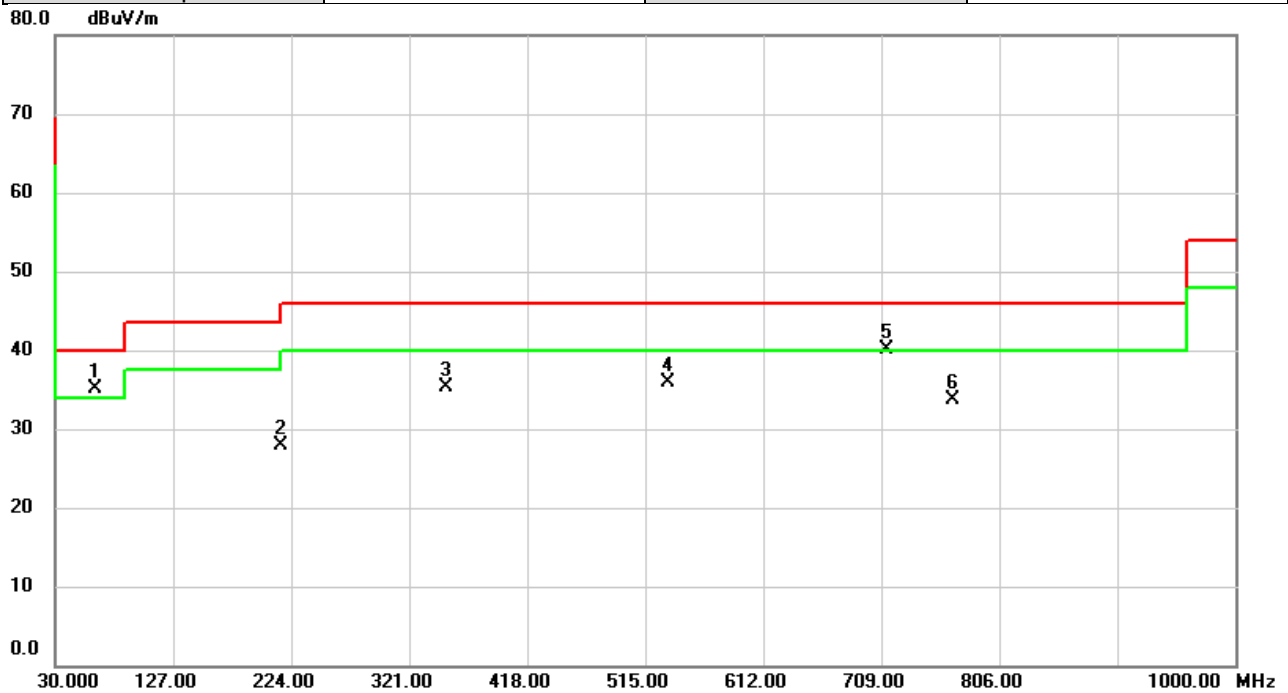
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

Test Mode	SRD	Test Date	2023/1/17
Test Frequency	2480MHz	Polarization	Vertical
Temp	23°C	Hum.	59%

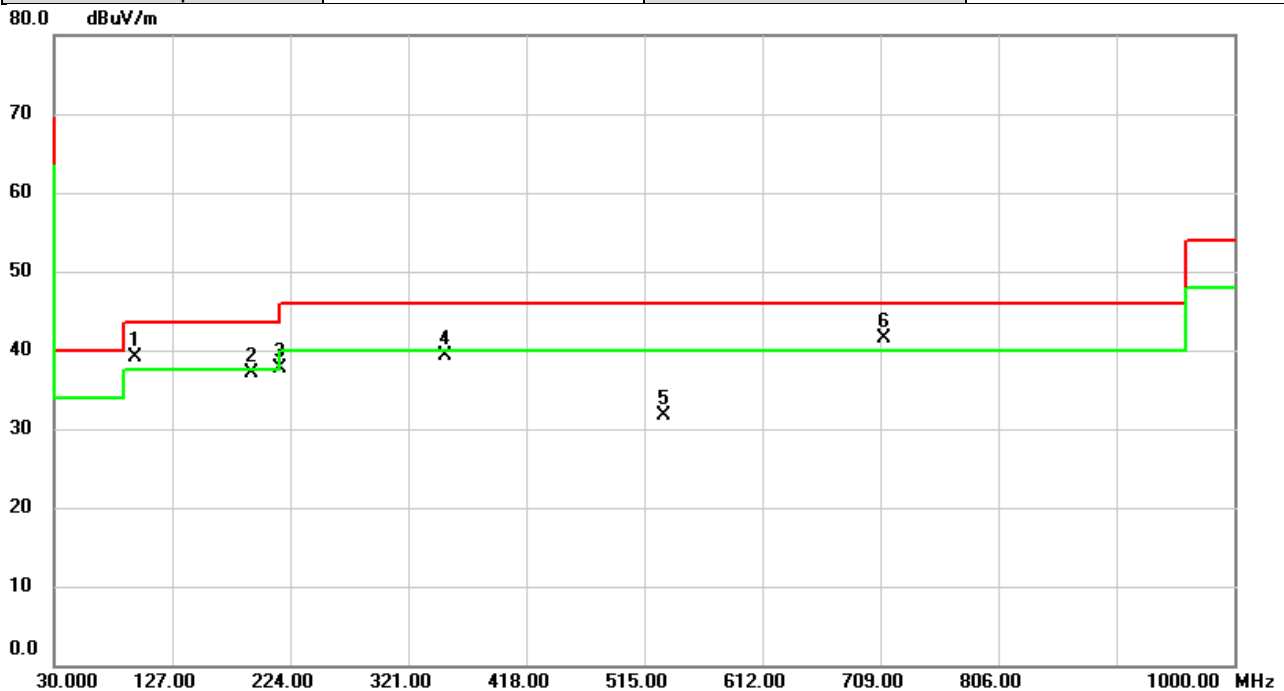


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	62.4627	47.51	-12.50	35.01	40.00	-4.99	peak	
2		216.1430	43.22	-15.39	27.83	46.00	-18.17	peak	
3		351.7167	45.65	-10.31	35.34	46.00	-10.66	peak	
4		533.2360	41.73	-5.91	35.82	46.00	-10.18	peak	
5	!	713.0740	42.61	-2.54	40.07	46.00	-5.93	peak	
6		768.0082	34.99	-1.37	33.62	46.00	-12.38	peak	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	SRD	Test Date	2023/1/17
Test Frequency	2480MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	96.0247	55.98	-16.82	39.16	43.50	-4.34	peak	
2		192.2163	51.88	-14.69	37.19	43.50	-6.31	peak	
3		216.0783	53.19	-15.39	37.80	46.00	-8.20	peak	
4		351.7813	49.60	-10.31	39.29	46.00	-6.71	peak	
5		530.8757	37.58	-5.95	31.63	46.00	-14.37	peak	
6	!	712.6213	44.00	-2.55	41.45	46.00	-4.55	peak	

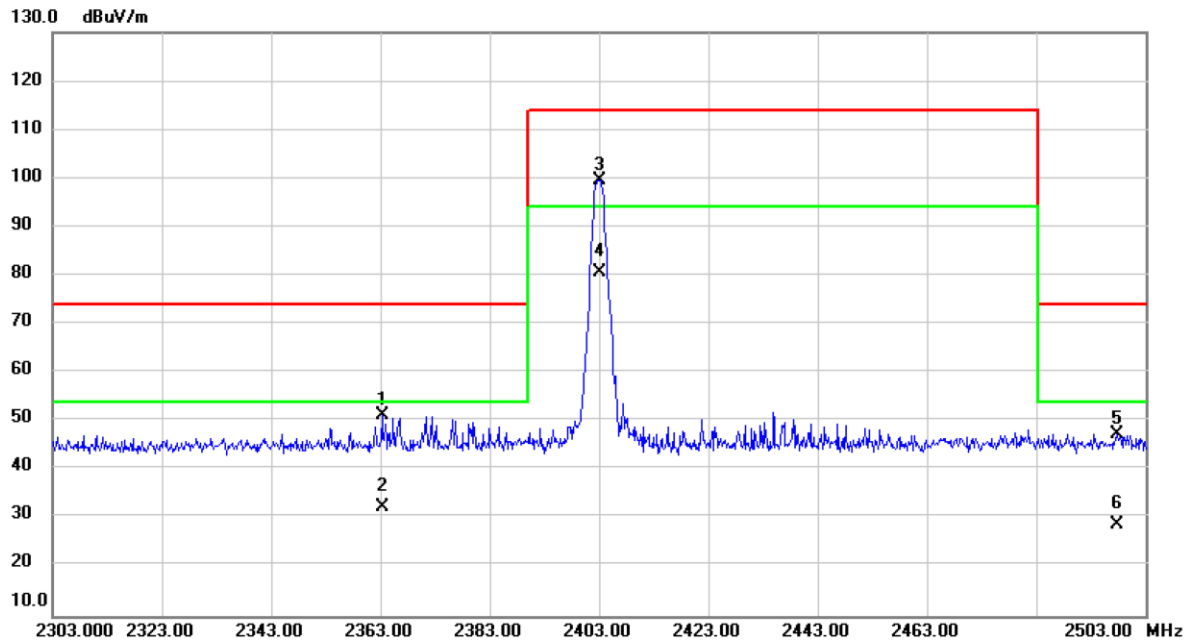
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2403MHz	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2363.367	56.94	-5.81	51.13	74.00	-22.87	peak	
2		2363.367	51.13	-18.74	32.39	54.00	-21.61	AVG	
3		2403.000	105.22	-5.75	99.47	114.00	-14.53	peak	
4	*	2403.000	99.47	-18.74	80.73	94.00	-13.27	AVG	
5		2497.840	53.09	-5.62	47.47	74.08	-26.61	peak	
6		2497.840	47.47	-18.74	28.73	54.02	-25.29	AVG	

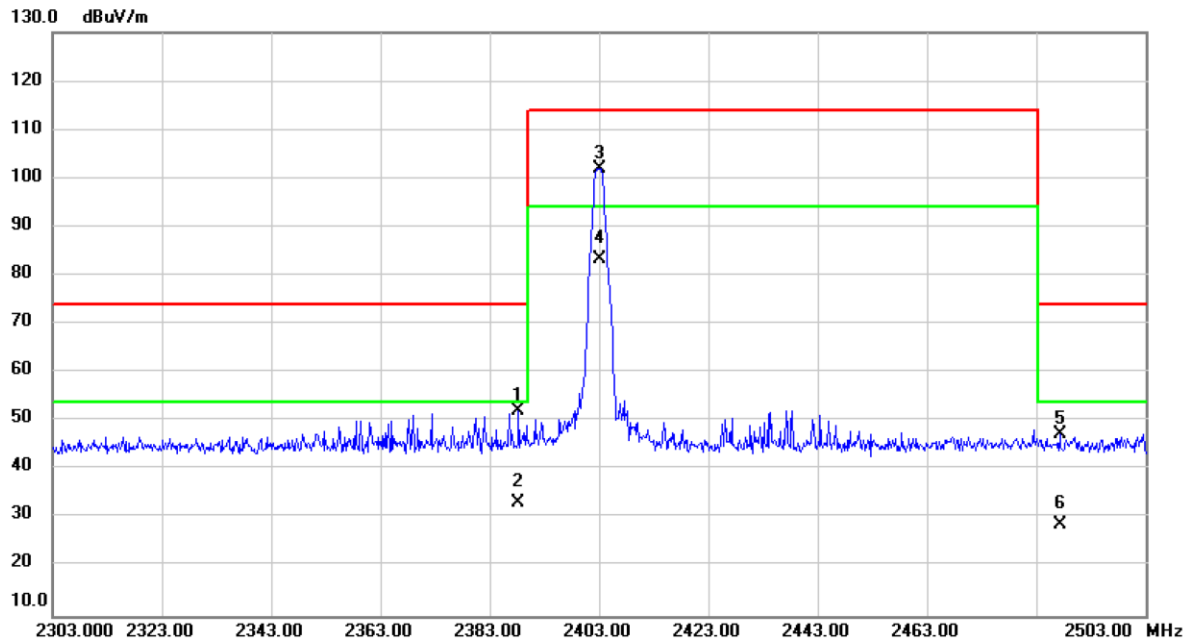
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

(3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2403MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2388.260	57.79	-5.77	52.02	74.00	-21.98	peak	
2		2388.260	52.02	-18.74	33.28	54.00	-20.72	AVG	
3		2403.000	107.79	-5.75	102.04	114.00	-11.96	peak	
4	*	2403.000	102.04	-18.74	83.30	94.00	-10.70	AVG	
5		2487.373	52.99	-5.63	47.36	74.02	-26.66	peak	
6		2487.373	47.36	-18.74	28.62	54.00	-25.38	AVG	

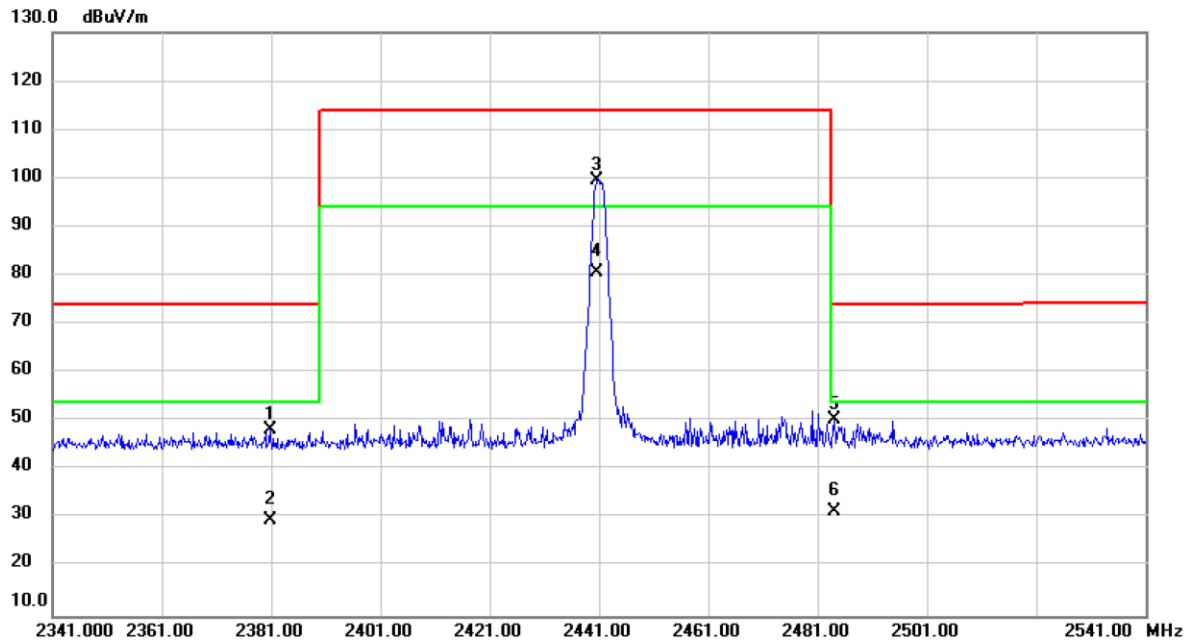
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

(3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2441MHz	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2380.767	54.18	-5.78	48.40	74.00	-25.60	peak	
2		2380.767	48.40	-18.74	29.66	54.00	-24.34	AVG	
3		2440.693	105.22	-5.70	99.52	114.00	-14.48	peak	
4	*	2440.693	99.52	-18.74	80.78	94.00	-13.22	AVG	
5		2484.107	55.88	-5.65	50.23	74.00	-23.77	peak	
6		2484.107	50.23	-18.74	31.49	54.00	-22.51	AVG	

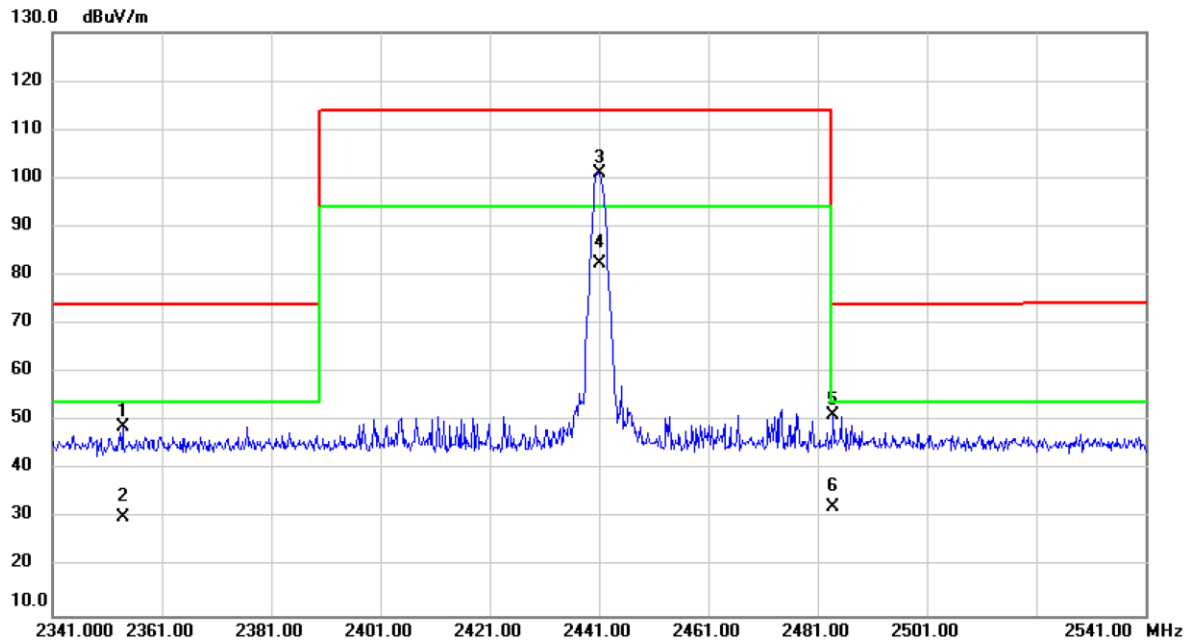
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

(3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2441MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2353.967	54.80	-5.82	48.98	74.00	-25.02	peak	
2		2353.967	48.98	-18.74	30.24	54.00	-23.76	AVG	
3		2441.000	106.80	-5.70	101.10	114.00	-12.90	peak	
4	*	2441.000	101.10	-18.74	82.36	94.00	-11.64	AVG	
5		2483.860	56.84	-5.65	51.19	74.00	-22.81	peak	
6		2483.860	51.19	-18.74	32.45	54.00	-21.55	AVG	

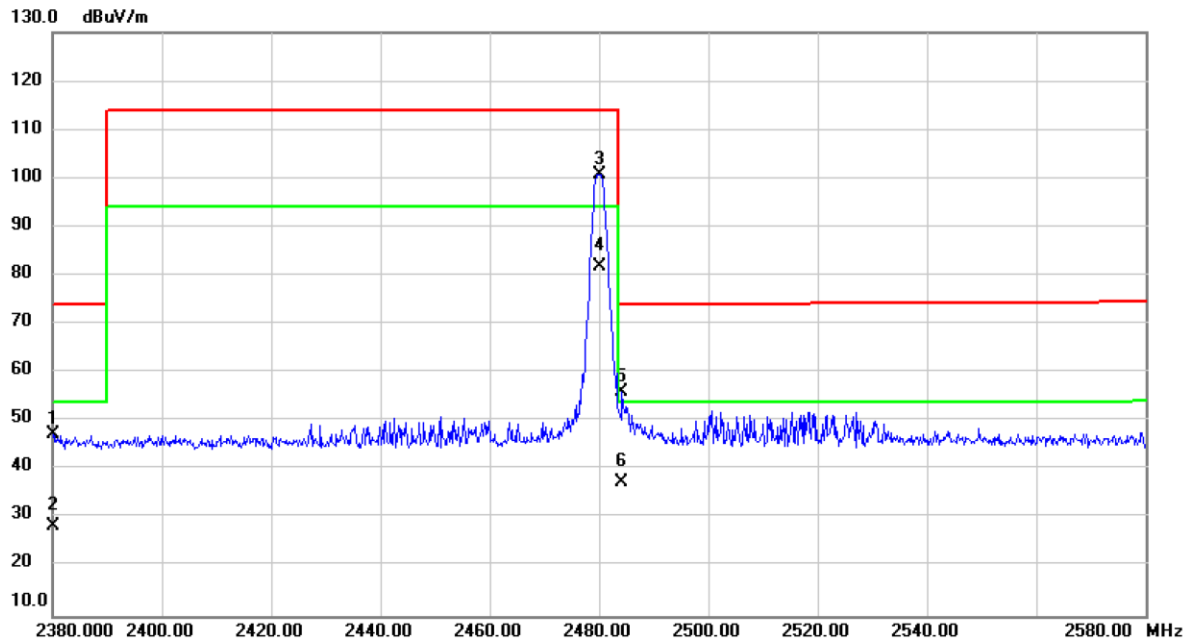
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

(3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2480MHz	Polarization	Vertical
Temp	24°C	Hum.	58%

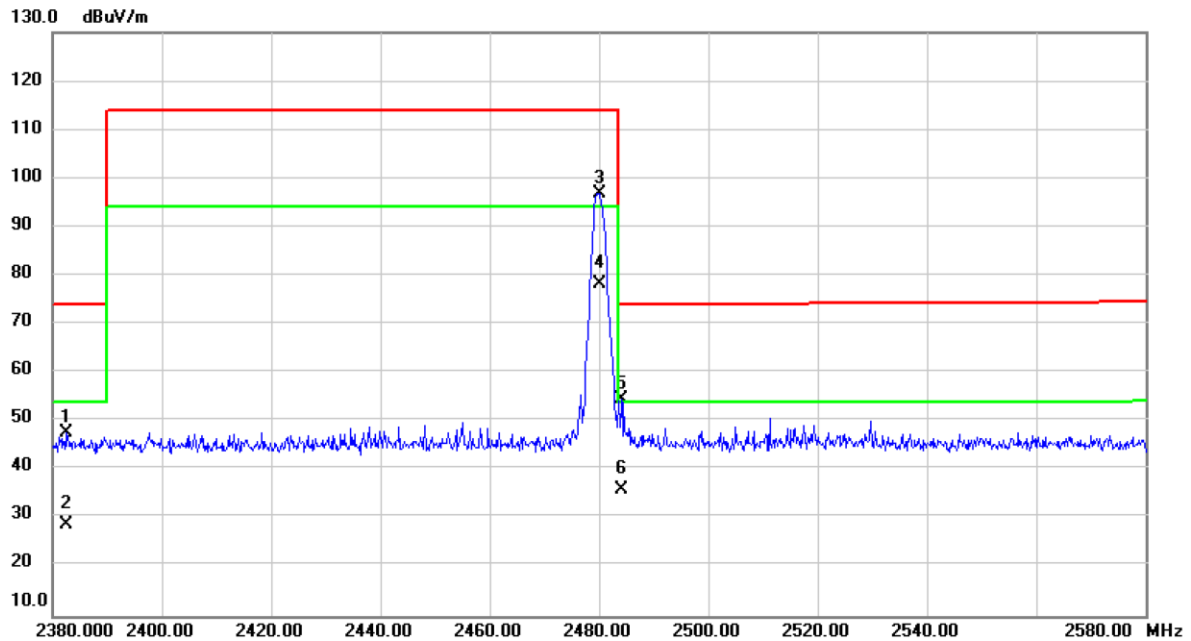


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2380.000	53.05	-5.79	47.26	74.00	-26.74	peak	
2		2380.000	47.26	-18.74	28.52	54.00	-25.48	AVG	
3		2480.000	106.35	-5.65	100.70	114.00	-13.30	peak	
4	*	2480.000	100.70	-18.74	81.96	94.00	-12.04	AVG	
5		2484.240	61.74	-5.65	56.09	74.00	-17.91	peak	
6		2484.240	56.09	-18.74	37.35	54.00	-16.65	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\text{Log}(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2480MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2382.513	53.36	-5.78	47.58	74.00	-26.42	peak	
2		2382.513	47.58	-18.74	28.84	54.00	-25.16	AVG	
3		2480.000	102.57	-5.65	96.92	114.00	-17.08	peak	
4	*	2480.000	96.92	-18.74	78.18	94.00	-15.82	AVG	
5		2484.120	60.25	-5.65	54.60	74.00	-19.40	peak	
6		2484.120	54.60	-18.74	35.86	54.00	-18.14	AVG	

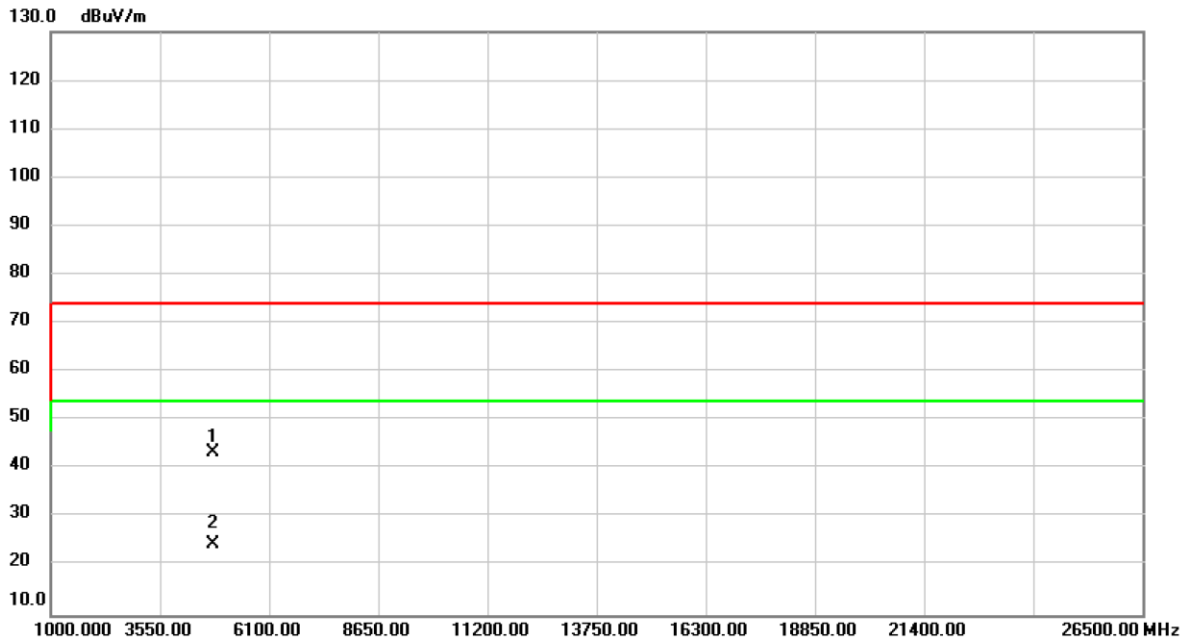
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

(3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2403MHz	Polarization	Vertical
Temp	24°C	Hum.	58%

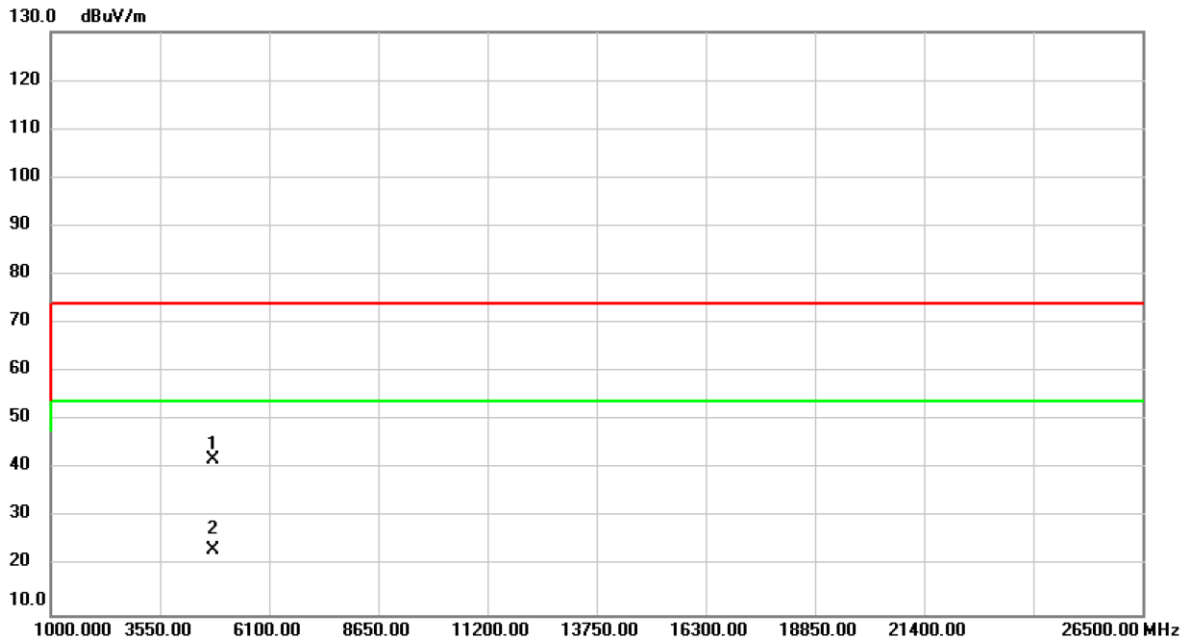


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4806.000	42.78	0.66	43.44	74.00	-30.56	peak	
2	*	4806.000	43.44	-18.74	24.70	54.00	-29.30	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2403MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%

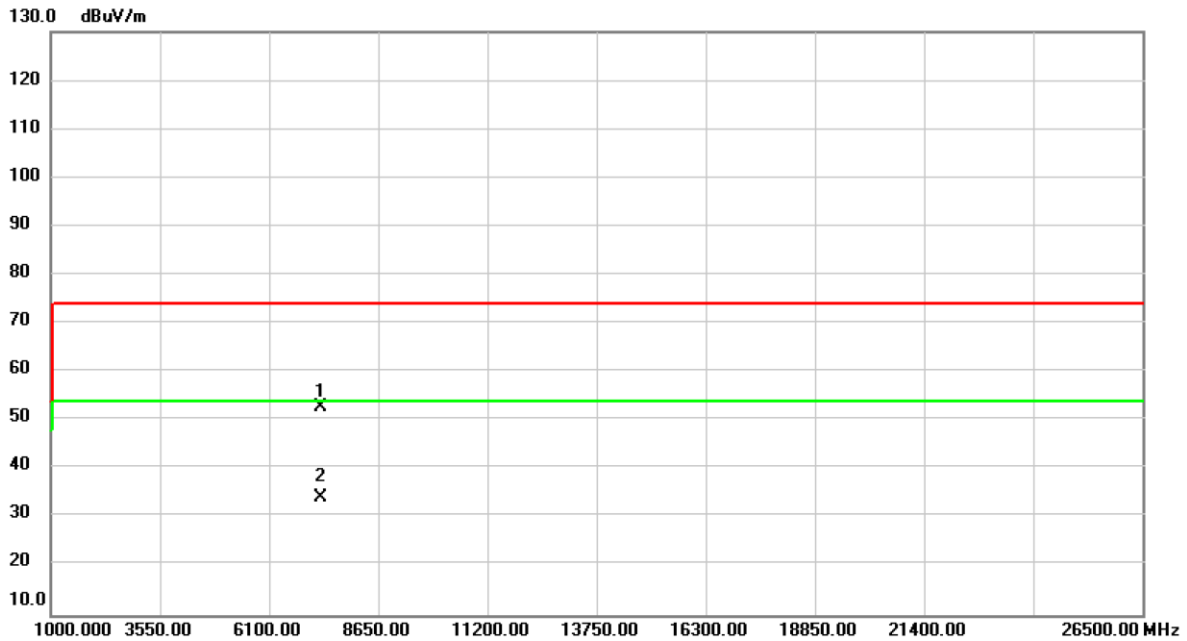


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4806.000	41.35	0.66	42.01	74.00	-31.99	peak	
2	*	4806.000	42.01	-18.74	23.27	54.00	-30.73	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2441MHz	Polarization	Vertical
Temp	24°C	Hum.	58%

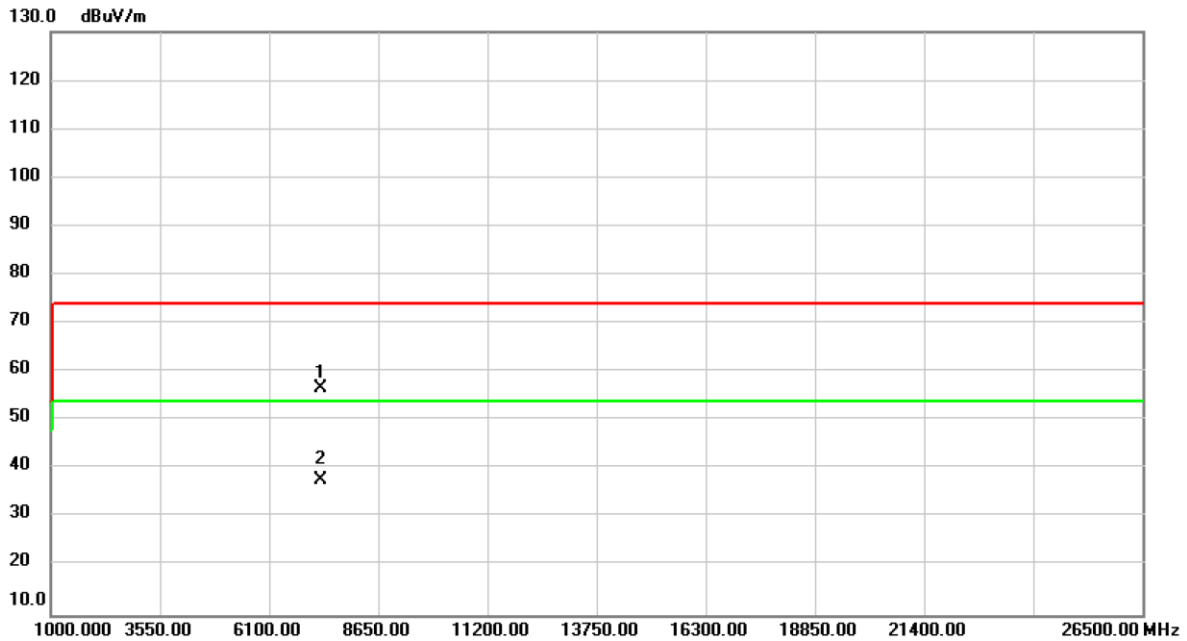


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		7323.000	47.24	5.56	52.80	74.00	-21.20	peak	
2	*	7323.000	52.80	-18.74	34.06	54.00	-19.94	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2441MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%

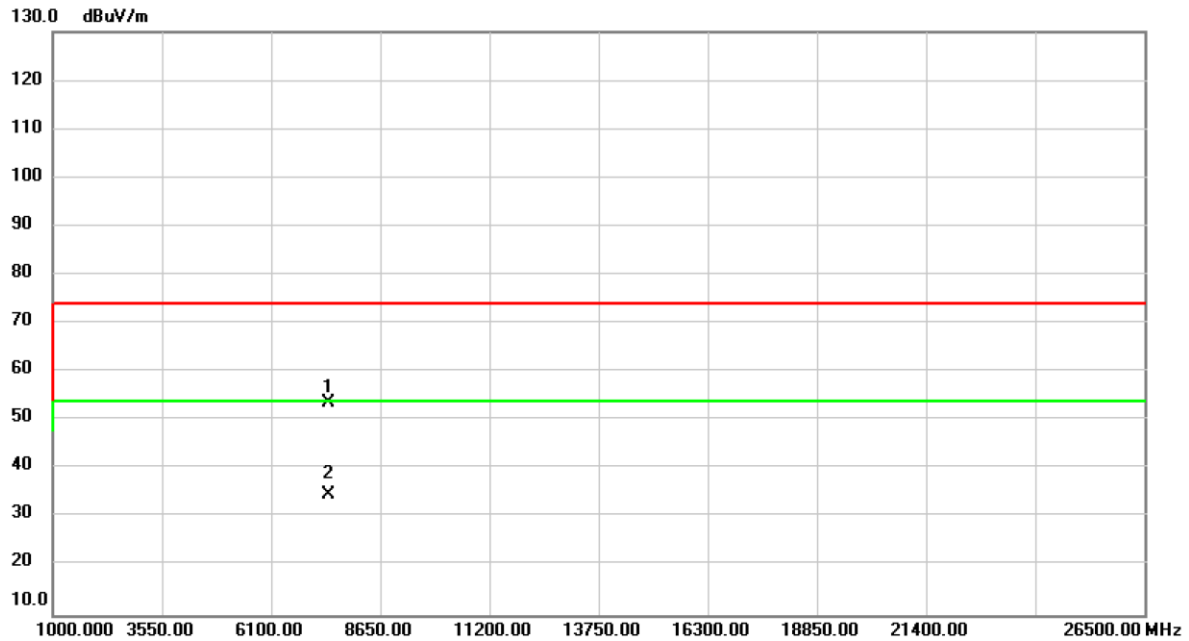


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		7323.000	50.99	5.56	56.55	74.00	-17.45	peak	
2	*	7323.000	56.55	-18.74	37.81	54.00	-16.19	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2480MHz	Polarization	Vertical
Temp	24°C	Hum.	58%

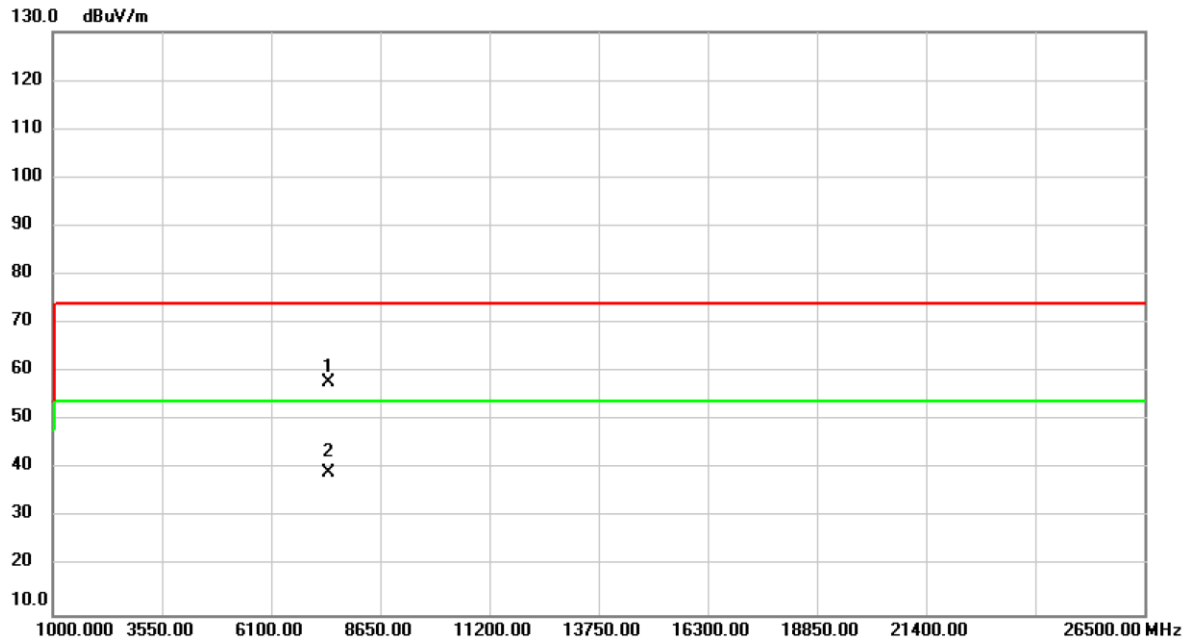


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		7440.000	47.92	5.60	53.52	74.00	-20.48	peak	
2	*	7440.000	53.52	-18.74	34.78	54.00	-19.22	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

Test Mode	SRD	Test Date	2022/8/9
Test Frequency	2480MHz	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		7440.000	52.28	5.60	57.88	74.00	-16.12	peak	
2	*	7440.000	57.88	-18.74	39.14	54.00	-14.86	AVG	

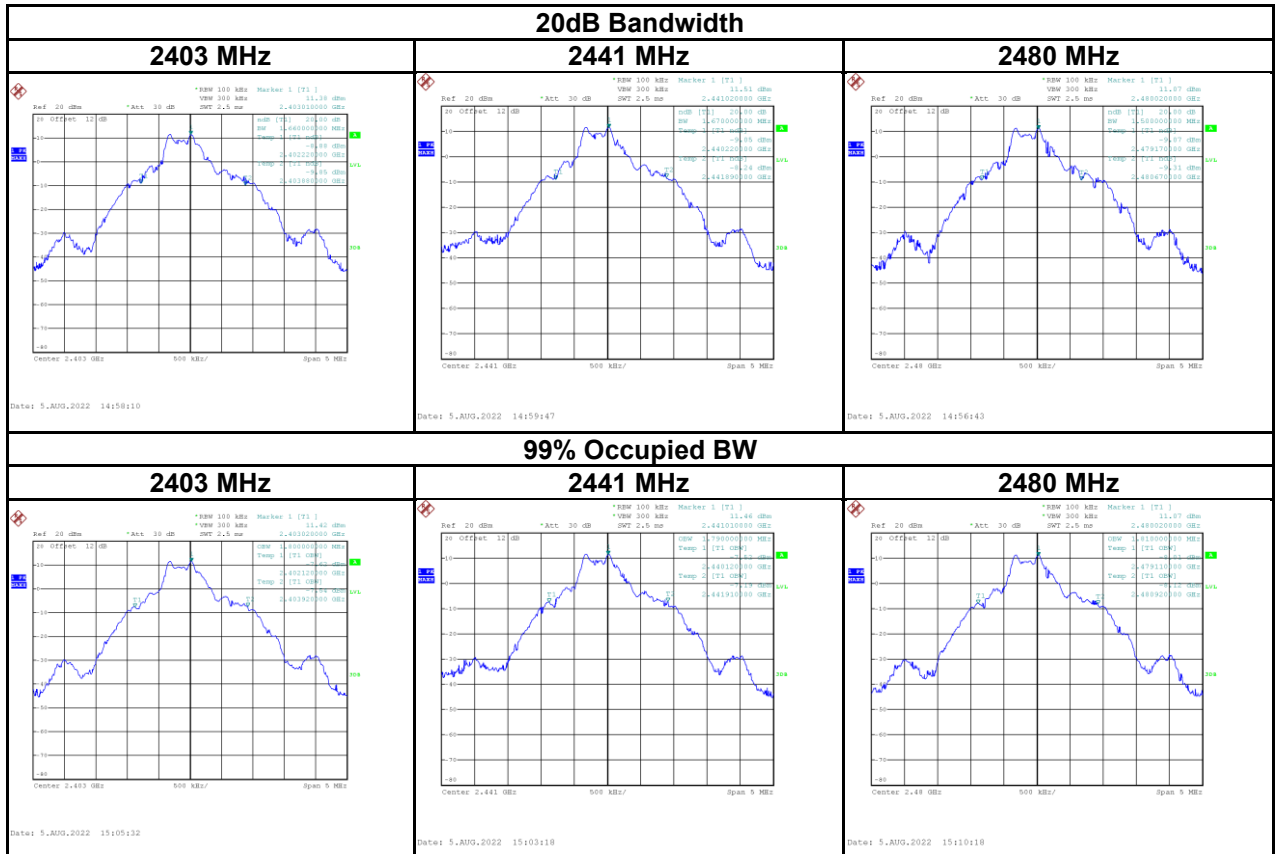
REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.
- (3) Average Correct Factor = $20\log(\text{duty cycle}) = 0$

APPENDIX D BANDWIDTH

Test Mode:	SRD
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2403	1.66	1.80	500	Pass
2441	1.67	1.79	500	Pass
2480	1.50	1.81	500	Pass



End of Test Report