

Project No: TM-2505000232P
Report No.: TMWK2505002042KR

FCC ID: P27K0402

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Rev.: 01

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

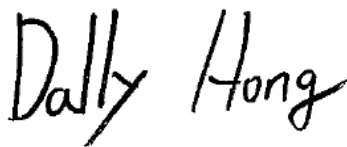
Test Standard	FCC Part 15.247
Product name	All-in-one Access Control Reader
Brand Name	Kisi Inc.
Model No.	K0402
Test Result	Pass
Statements of Conformity	Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory)

Approved by:



Dally Hong
Sr. Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 27, 2025	Initial Issue	ALL	Peggy Tsai
01	July 7, 2025	See the following Note Rev. (01)	P.5, 13	Peggy Tsai

Note:

Rev. (01)

1. Modify antenna gain in section 1.3.
2. Modify the worst mode of measurement in section 3.2.

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan
Manufacturer	Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan
Equipment	All-in-one Access Control Reader
Model No.	K0402
Model Discrepancy	N/A
Trade Name	Kisi Inc.
Received Date	May 20, 2025
Date of Test	May 27 ~ 28, 2025
Power Operation	Powered from PoE (Not for sell) aruba / POE60U-1BT-5 I/P: 100-240Vac, 1.5A, 50-60Hz O/P: 56Vdc, 0.535A
HW Version	V10
FW Version	V3.1.02

Remark:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	GFSK for BLE 1 Mbps
Number of channel	40 Channels

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	☐ PIFA ☐ PCB ☐ Dipole ☒ Chip Antenna
Antenna Brand / Model	PSA / RFECA3216060A4T
Antenna Gain	3.37 dBi

Notes:

1. The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 2.21 dB
Channel Bandwidth	+/- 2.79 dB
RF output power (Power Meter + Power sensor)	+/- 0.24 dB
Power Spectral density	+/- 2.74 dB
Conducted Bandedge	+/- 2.74 dB
Conducted Spurious Emission	+/- 2.74 dB
Radiated Emission_9kHz-30MHz	+/- 3.492 dB
Radiated Emission_30MHz-200MHz	+/- 3.62 dB
Radiated Emission_200MHz-1GHz	+/- 3.899 dB
Radiated Emission_1GHz-6GHz	+/- 5.063 dB
Radiated Emission_6GHz-18GHz	+/- 5.122 dB
Radiated Emission_18GHz-26GHz	+/- 3.032 dB
Radiated Emission_26GHz-40GHz	+/- 3.271 dB

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Ben Yang	-
Radiation	Tony Chao	-
RF Conducted	David Li	-

Remark: 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. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

Conducted FCC/IC/NCC (All)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Signal Analyzer	Keysight	N9010A	MY53400256	2024-11-19	2025-11-18
Power Sensor	Anritsu	MA2411B	1911387	2024-08-30	2025-08-29
Power Sensor	Anritsu	MA2411B	1911386	2024-07-19	2025-07-18
Power Meter	Anritsu	ML2496A	2136002	2024-07-19	2025-07-18
DC Blocks	Marvelous Microwave	MVE6411	MVE-001	2024-08-08	2025-08-07
Software	Radio Test Software Ver. 21				

966A Radiated					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	KEYSIGHT	N9010A	MY52220817	2025-03-05	2026-03-04
Active Loop Antenna	COM-POWER	AL-130	121051	2025-02-18	2026-02-17
Thermo-Hygro Meter	WISEWIND	1206	D07	2024-11-26	2025-11-25
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2024-07-12	2025-07-11
Preamplifier	EMEC	EM330	060609	2025-02-20	2026-02-19
Cable	Huber+Suhner	104PEA	20995+21000+182330	2024-08-07	2025-08-06
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2024-12-20	2025-12-19
Preamplifier	HP	8449B	3008A00965	2024-12-18	2025-12-17
Cable	EMCI	EMC101G	221012+230205+250412	2025-04-24	2026-04-23
Attenuator	Mini-Circuits	BW-S9W5	BWS9W5-09-966A-01	2025-02-06	2026-02-05
Site Validation	CCS	966A	N/A	2024-08-03	2025-08-02
High Pass Filters	Titan Microwave	T04H30001800070S01	22011402-4	2024-06-12	2025-06-11
Pre-Amplifier	EMCI	EMC184045SE	980860	2024-12-02	2025-12-01
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2024-12-06	2025-12-05
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

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AC Mains Conduction					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI	100064	2024-06-14	2025-06-13
LISN	TESEQ	LN2-16N	22012	2025-02-23	2026-02-22
Cable	Woken	RFC-SMA-100-NMR-084SFL402	MFR-2Y194	2025-03-21	2026-03-20
Software	e3 V9-210616c				

Remark:

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

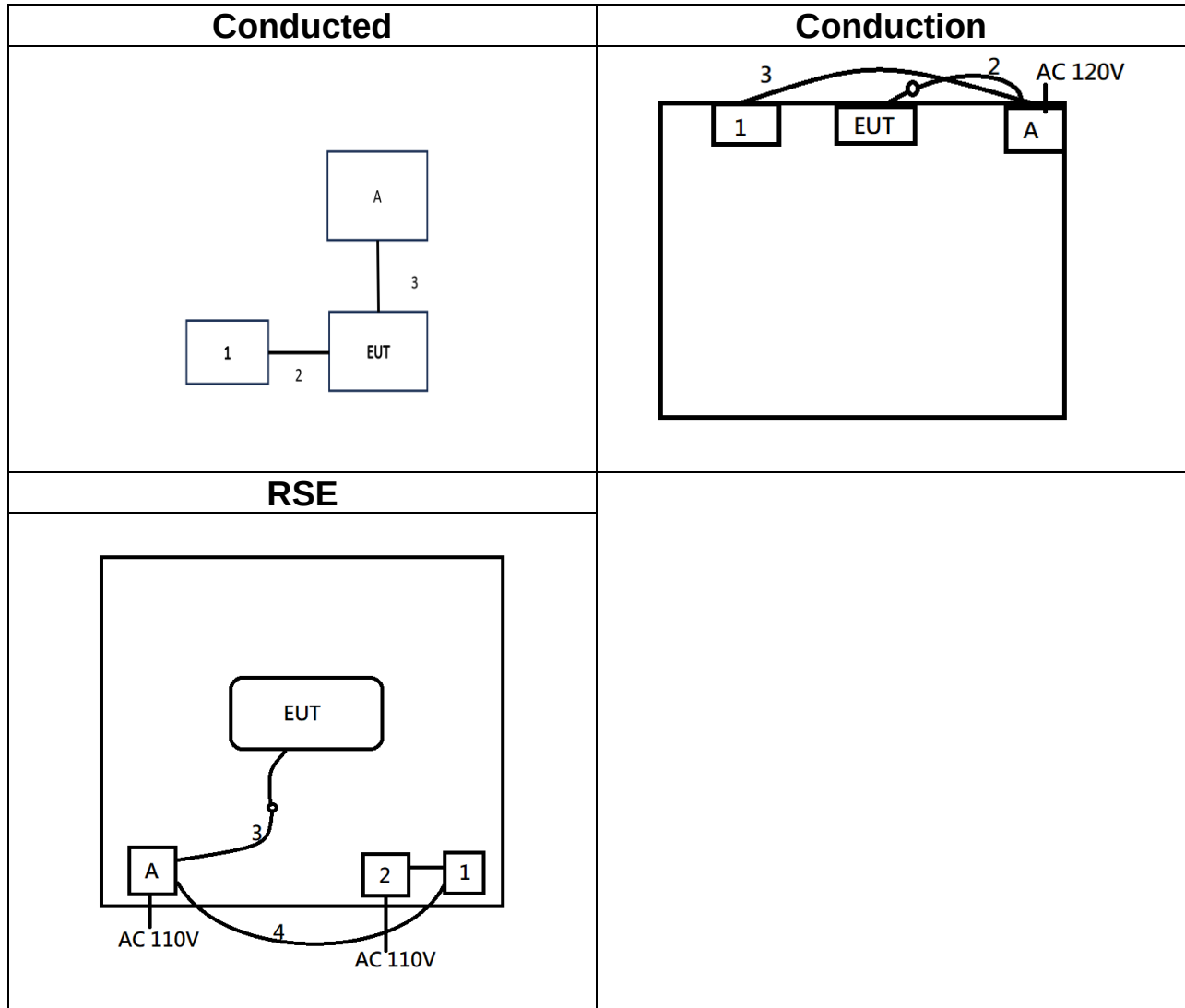
EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment (Conducted)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(B)	Lenovo	X260	N/A	N/A
2	RJ 45	TEKSOURCE	142707-2	N/A	N/A
3	RJ 45	TEKSOURCE	142707-2	N/A	N/A
A	PoE	aruba	POE60U-1BT-5	N/A	N/A

Support Equipment (Conduction)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
2	RJ 45	atake	AC6-FL10	202108270206	N/A
3	RJ 45	RASTO	R-PCC004	21070001	N/A
A	PoE	aruba	POE60U-1BT-5	N/A	N/A

Support Equipment (RSE)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
2	Adapter	Lenovo	ADLX45DLC3A	N/A	N/A
3	RJ 45	atake	AC6-FL10	202108270206	N/A
4	RJ 45	RASTO	R-PCC004	21070001	N/A
A	PoE	aruba	POE60U-1BT-5	N/A	N/A

1.8 TEST SET UP DIAGRAM



1.9 TEST PROGRAM

The EUT connection corresponds to the surrounding fixture control board.
This EUT uses background web page to load command to set the frequency, modulation, and power to allow the sample to continuously transmit.

1.10 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074.

2. TEST SUMMERY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	Pass
15.247(a)(2)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)(3)	4.3	Output Power Measurement	Pass
15.247(e)	4.4	Power Spectral Density	Pass
15.247(d)	4.5	Conducted Band Edge	Pass
15.247(d)	4.5	Conducted Spurious Emission	Pass
15.247(d) 15.205, 15.209	4.6	Radiation Band Edge	Pass
15.247(d) 15.205, 15.209	4.6	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	BLE Mode (1Mbps)
Test Channel Frequencies	1.Lowest Channel : 2402MHz 2.Middle Channel : 2442MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conduction Emission	
Test Condition	AC Power line conduction emission for line and neutral
Power supply Mode	Mode 1: EUT power by POE
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by PoE
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☒ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by PoE
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. AC power line conducted emission were performed the EUT transmit at the highest output power channel as worse case.
3. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Y-Plane) were recorded in this report

3.3 EUT DUTY CYCLE

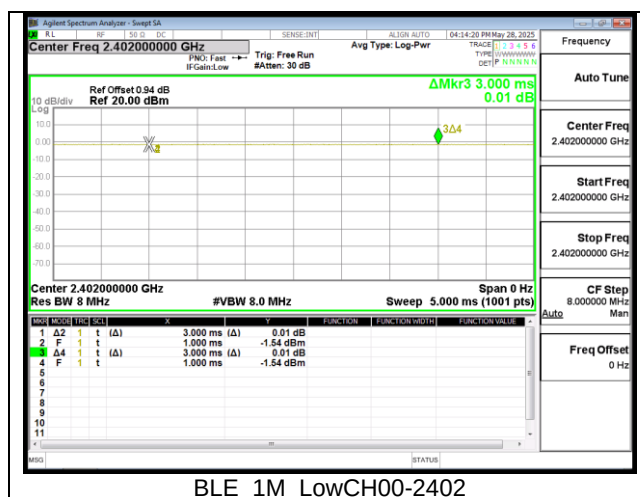
Temperature: 26.1°C

Test date: May 28, 2025

Humidity: 57% RH

Tested by: David Li

Mode	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
BLE 1M	100.00	0.00	0.00	0.01



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dB μ V)	
	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

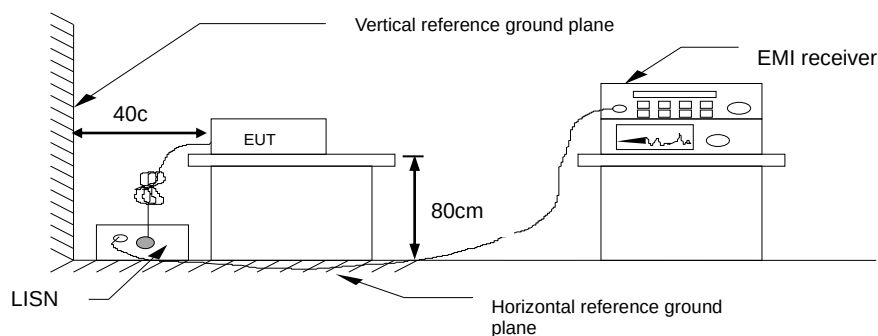
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

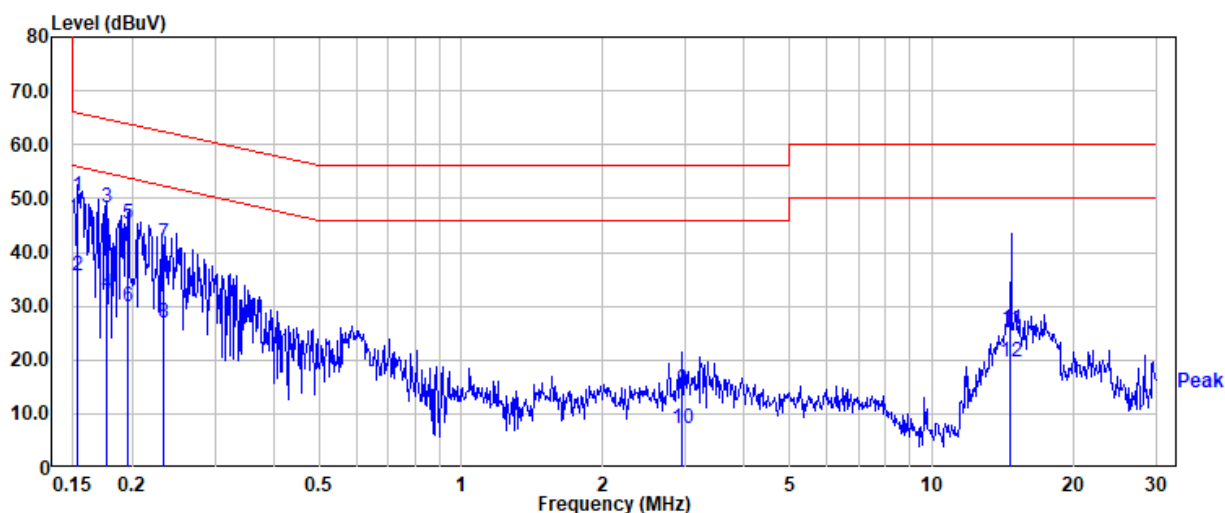
4.1.3 Test Setup



4.1.4 Test Result

Project No : TM-2505000232P
Operation Band : BLE
Test Chamber : Conduction
Probe : Line
Note :

Test Date : 2025-05-27
Temp./Humi. : 25°C / 65%
Engineer : Ben.Yang
Test Voltage : AC 120V/60Hz



Freq	Read Level	Factor	Actual FS	Limit	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV	dBuV	dB	PK/QP/AV
0.153	50.34	0.09	50.43	65.82	-15.39	QP
0.153	35.43	0.09	35.52	55.82	-20.30	Average
0.177	48.16	0.08	48.24	64.63	-16.39	QP
0.177	32.15	0.08	32.23	54.63	-22.40	Average
0.197	45.24	0.08	45.32	63.75	-18.43	QP
0.197	29.77	0.08	29.85	53.75	-23.90	Average
0.233	41.46	0.08	41.54	62.35	-20.81	QP
0.233	26.92	0.08	27.00	52.35	-25.35	Average
2.951	14.47	0.12	14.59	56.00	-41.41	QP
2.951	7.17	0.12	7.29	46.00	-38.71	Average
14.763	25.50	0.29	25.79	60.00	-34.21	QP
14.763	19.41	0.29	19.70	50.00	-30.30	Average

Note: 1. Actual FS= Spectrum Read Level + Factor

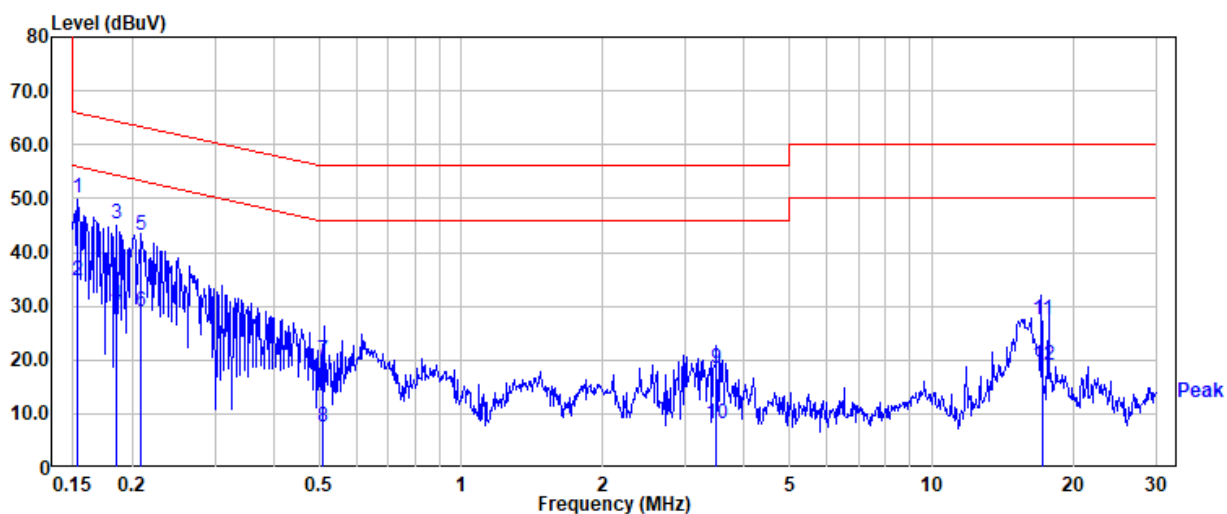
Note: 2. Margin= Actual FS - Limit

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Project No : TM-2505000232P
Operation Band : BLE
Test Chamber : Conduction
Probe : Neutral
Note :

Test Date : 2025-05-27
Temp./Humi. : 25°C / 65%
Engineer : Ben.Yang
Test Voltage : AC 120V/60Hz



Freq	Read	Factor	Actual	Limit	Margin	Detector
-----	Level	-----	FS	-----	-----	Mode
MHz	dBuV	dB	dBuV	dBuV	dB	PK/QP/AV
0.154	50.12	0.10	50.22	65.80	-15.58	QP
0.154	34.75	0.10	34.85	55.80	-20.95	Average
0.185	45.28	0.10	45.38	64.26	-18.88	QP
0.185	30.21	0.10	30.31	54.26	-23.95	Average
0.209	43.05	0.10	43.15	63.26	-20.11	QP
0.209	28.84	0.10	28.94	53.26	-24.32	Average
0.511	19.93	0.08	20.01	56.00	-35.99	QP
0.511	7.47	0.08	7.55	46.00	-38.45	Average
3.494	18.29	0.15	18.44	56.00	-37.56	QP
3.494	8.00	0.15	8.15	46.00	-37.85	Average
17.220	27.30	0.32	27.62	60.00	-32.38	QP
17.220	18.73	0.32	19.05	50.00	-30.95	Average

Note: 1. Actual FS= Spectrum Read Level + Factor

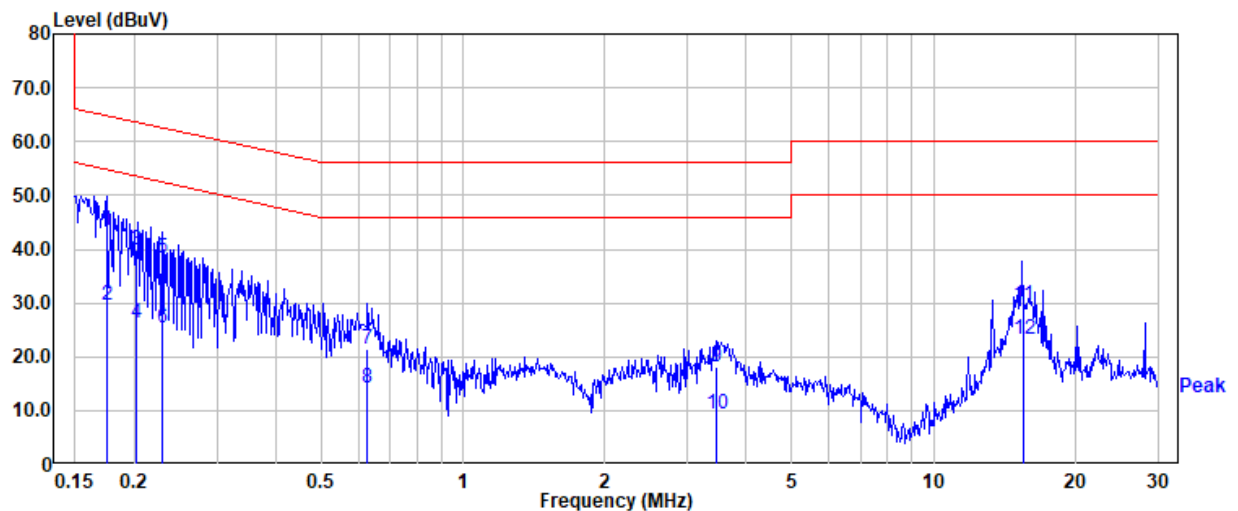
Note: 2. Margin= Actual FS - Limit

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Project No : TM-2505000232P
Operation Band : BLE
Test Chamber : Conduction
Probe : Line
Note :

Test Date : 2025-05-27
Temp./Humi. : 25°C / 65%
Engineer : Ben.Yang
Test Voltage : AC 230V/60Hz



Freq	Read Level	Factor	Actual FS	Limit	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV	dBuV	dB	PK/QP/AV
0.176	43.54	0.08	43.62	64.69	-21.07	QP
0.176	29.58	0.08	29.66	54.69	-25.03	Average
0.203	39.66	0.08	39.74	63.48	-23.74	QP
0.203	26.24	0.08	26.32	53.48	-27.16	Average
0.230	38.27	0.08	38.35	62.44	-24.09	QP
0.230	25.23	0.08	25.31	52.44	-27.13	Average
0.627	21.28	0.07	21.35	56.00	-34.65	QP
0.627	14.25	0.07	14.32	46.00	-31.68	Average
3.451	17.84	0.13	17.97	56.00	-38.03	QP
3.451	9.10	0.13	9.23	46.00	-36.77	Average
15.528	29.41	0.30	29.71	60.00	-30.29	QP
15.528	22.86	0.30	23.16	50.00	-26.84	Average

Note: 1. Actual FS= Spectrum Read Level + Factor

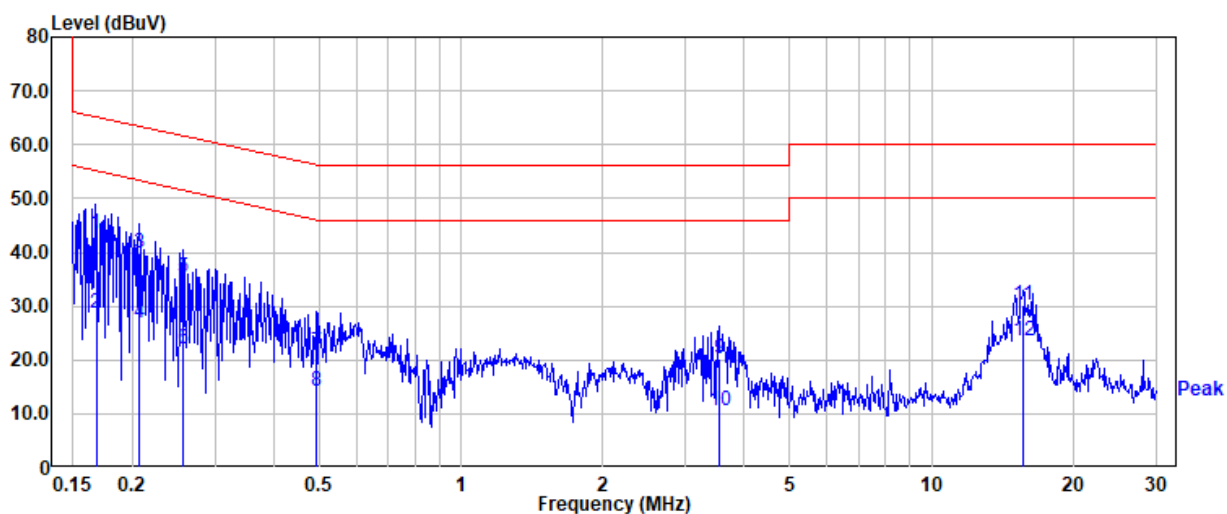
Note: 2. Margin= Actual FS - Limit

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Project No : TM-2505000232P
Operation Band : BLE
Test Chamber : Conduction
Probe : Neutral
Note :

Test Date : 2025-05-27
Temp./Humi. : 25°C / 65%
Engineer : Ben.Yang
Test Voltage : AC 230V/60Hz



Freq	Read		Actual			Detector
-----	Level	Factor	FS	Limit	Margin	Mode
MHz	dBuV	dB	dBuV	dBuV	dB	PK/QP/AV
0.168	43.30	0.10	43.40	65.06	-21.66	QP
0.168	28.71	0.10	28.81	55.06	-26.25	Average
0.208	39.75	0.10	39.85	63.29	-23.44	QP
0.208	26.77	0.10	26.87	53.29	-26.42	Average
0.257	35.34	0.09	35.43	61.52	-26.09	QP
0.257	21.88	0.09	21.97	51.52	-29.55	Average
0.492	21.41	0.08	21.49	56.14	-34.65	QP
0.492	13.98	0.08	14.06	46.14	-32.08	Average
3.541	20.18	0.15	20.33	56.00	-35.67	QP
3.541	10.40	0.15	10.55	46.00	-35.45	Average
15.630	29.97	0.31	30.28	60.00	-29.72	QP
15.630	23.11	0.31	23.42	50.00	-26.58	Average

Note: 1. Actual FS= Spectrum Read Level + Factor

Note: 2. Margin= Actual FS - Limit

4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth :

Limit	Shall be at least 500kHz
-------	--------------------------

Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 2013 clause 6.9.2.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup

Refer to section 1.8.

4.2.4 Test Result

Temperature: 26.1°C Test date: May 28, 2025
Humidity: 57% RH Tested by: David Li

6dB BANDWIDTH

BLE 1M mode

Frequency (MHz)	6dB BW (MHz)	Required BW (MHz)	Result
2402	0.7188	≥ 0.5	PASS
2442	0.7154	≥ 0.5	PASS
2480	0.6824	≥ 0.5	PASS

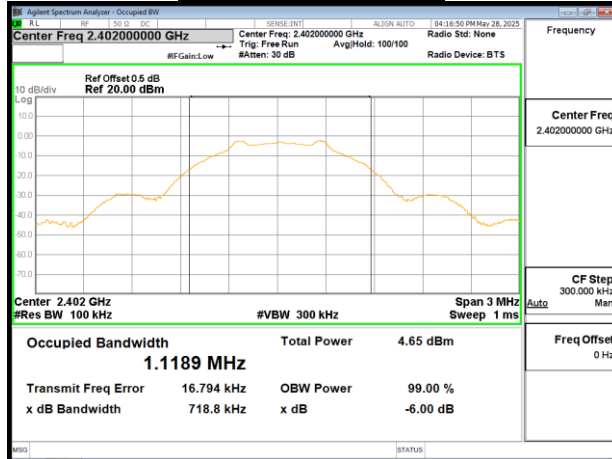
BANDWIDTH 99%

BLE 1M mode

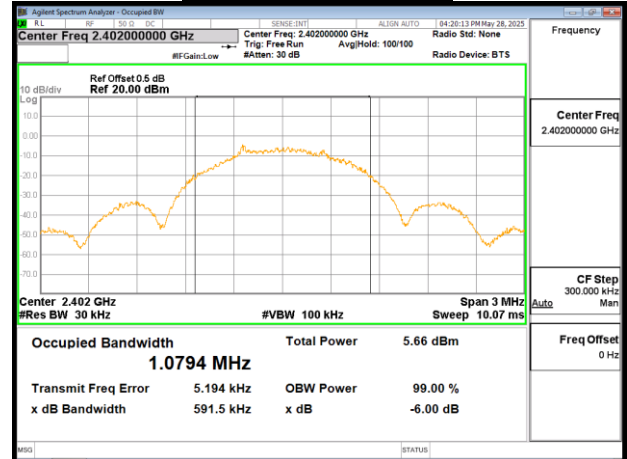
Frequency (MHz)	99%Bandwidth (MHz)
2402	1.0794
2442	1.1019
2480	1.0908

Test Data

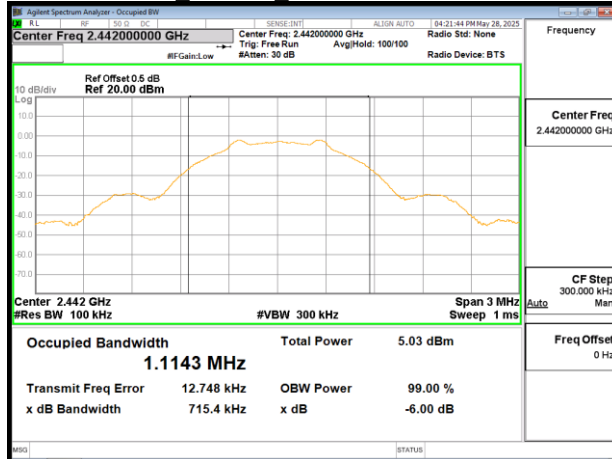
6dB BANDWIDTH



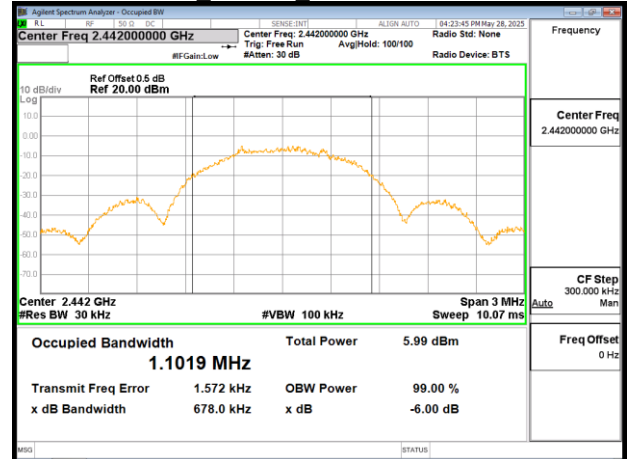
BANDWIDTH 99%



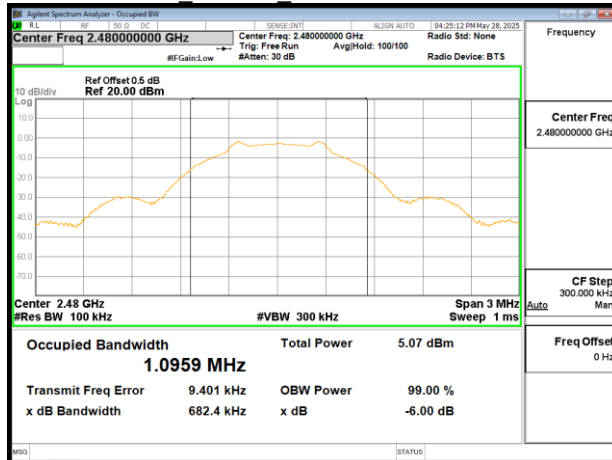
OBW_BLE 1M_LowCH00-2402MHz



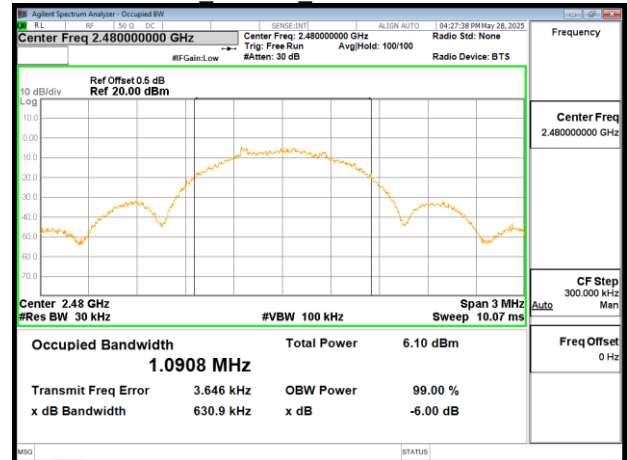
IC OBW_BLE 1M_LowCH00-2402MHz



OBW_BLE 1M_MidCH20-2442MHz



IC OBW_BLE 1M_MidCH20-2442MHz



OBW_BLE 1M_HighCH39-2480MHz

IC OBW_BLE 1M_HighCH39-2480MHz

4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(b)(3),

Peak output power :

FCC

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than 6 dBi [Limit = 30 – (DG – 6)] ☐ Point-to-point operation
-------	---

Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup

Refer to section 1.8.

4.3.4 Test Result

Temperature: 26.1°C

Test date: May 28, 2025

Humidity: 57% RH

Tested by: David Li

Peak & Average output power :

BLE 1M mode:

CH	Frequency (MHz)	Power Setting	Peak Output Power (dBm)	Required Limit (dBm)
0	2402	default	-1.64	30
20	2442	default	-1.86	30
39	2480	default	-2.07	30
CH	Frequency (MHz)	Power Setting	Avg. Output Power (dBm)	Required Limit (dBm)
0	2402	default	-1.72	30
20	2442	default	-1.94	30
39	2480	default	-2.14	30

***Note:**

1.Measured by power meter, cable loss 0.5 dB + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Limit	☒ Antenna not exceed 6 dBi : 8dBm ☐ Antenna with DG greater than 6 dBi [Limit = 8 – (DG – 6)] ☐ Point-to-point operation :
-------	---

4.4.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 10kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss was compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup

Refer to section 1.8.

4.4.4 Test Result

Temperature: 26.1°C **Test date:** May 28, 2025
Humidity: 57% RH **Tested by:** David Li

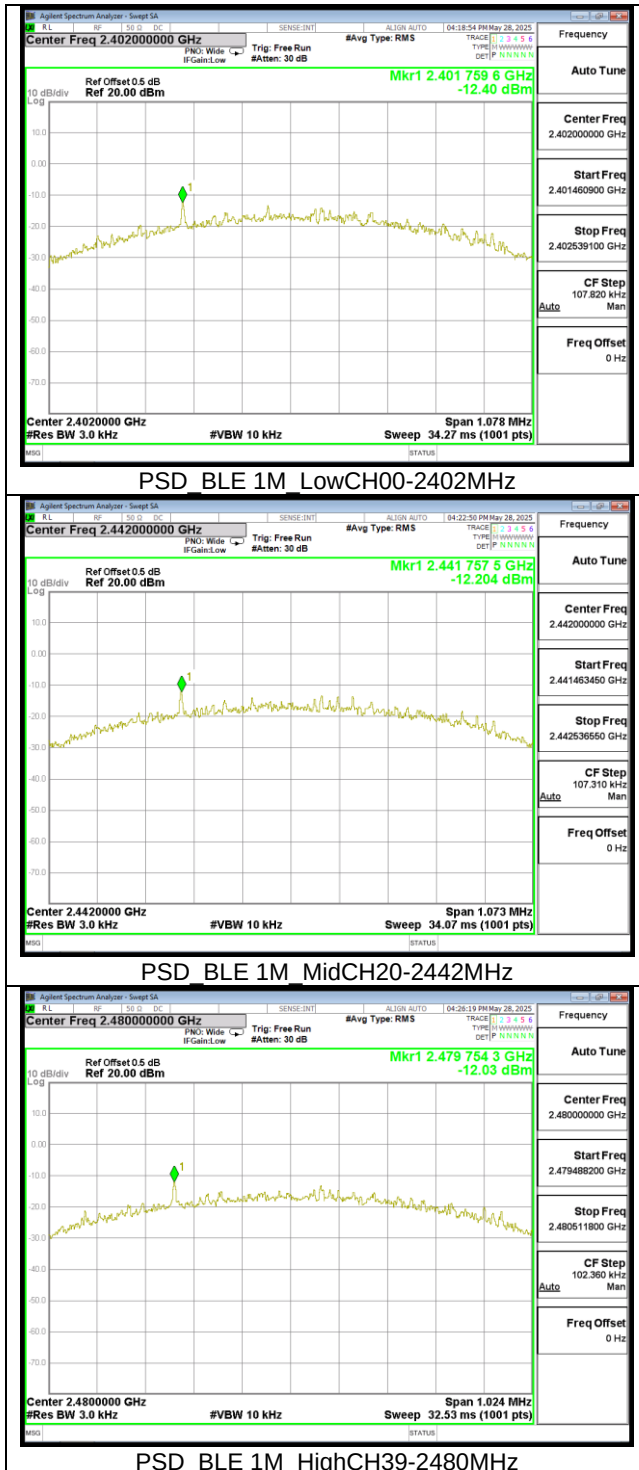
BLE 1M mode

Frequency (MHz)	RF Power Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2402	-12.40	8	PASS
2442	-12.204	8	PASS
2480	-12.03	8	PASS

***Note:**

1.cable loss as 0.5dB that offsets in the spectrum

Test Data



4.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.247(d),

FCC: In any 100 kHz bandwidth outside the authorized frequency band, Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

4.5.2 Test Procedure

Test method Refer as KDB 558074 D01

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.5.3 Test Setup

Refer to section 1.8.

4.5.4 Test Result

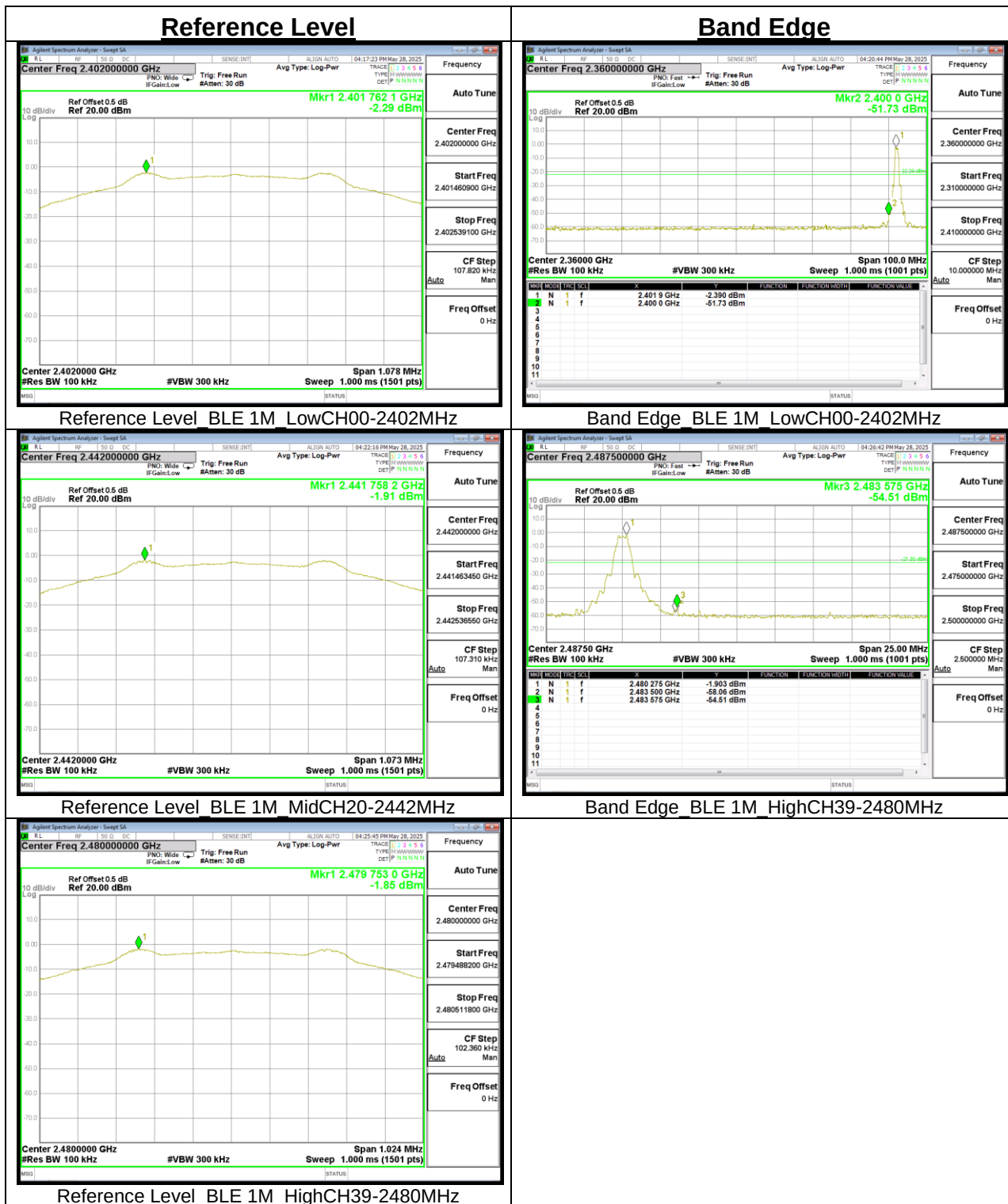
Temperature: 26.1°C

Test date: May 28, 2025

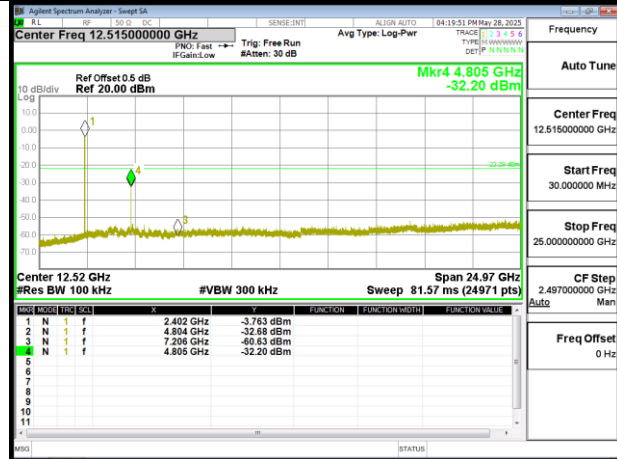
Humidity: 57% RH

Tested by: David Li

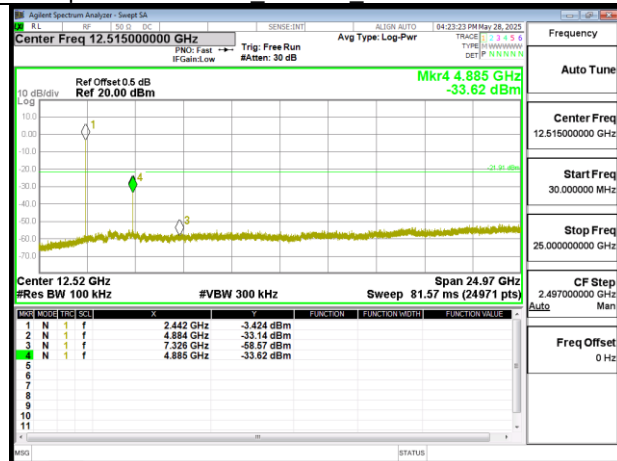
Test Data



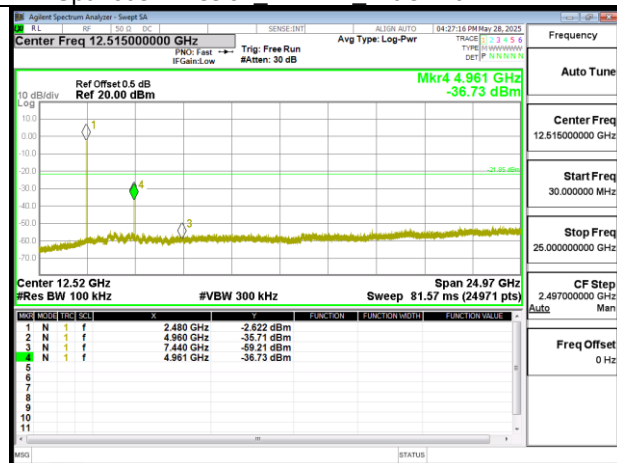
Spurious Emission



Spurious Emission BLE 1M LowCH00-2402MHz



Spurious Emission BLE 1M MidCH20-2442MHz



Spurious Emission BLE 1M HighCH39-2480MHz

4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

4.6.2 Test Procedure

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9KHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz).

Radiated emission below 30MHz is measured in a 9m*6m*6m semi-ane choic 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.

5. The SA setting following :

- (1) Below 30MHz :

(1.1) 9KHz-490KHz : RBW=200Hz / VBW=1kHz / Sweep=AUTO

(1.2) 490KHz-30MHz : RBW=10kHz / VBW=30kHz / Sweep=AUTO

- (2) 30MHz to 1GHz : RBW = 100kHz, VBW $\geq 3 \times$ RBW, Sweep = Auto,

Detector = Peak, Trace = Max hold.

- (3) Above 1GHz :

(3.1) For Peak measurement : RBW = 1MHz, VBW $\geq 3 \times$ RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(3.2) For Average measurement : RBW = 1MHz, VBW

·If Duty Cycle $\geq 98\%$, VBW=10Hz.

·If Duty Cycle $< 98\%$, VBW=1/T.

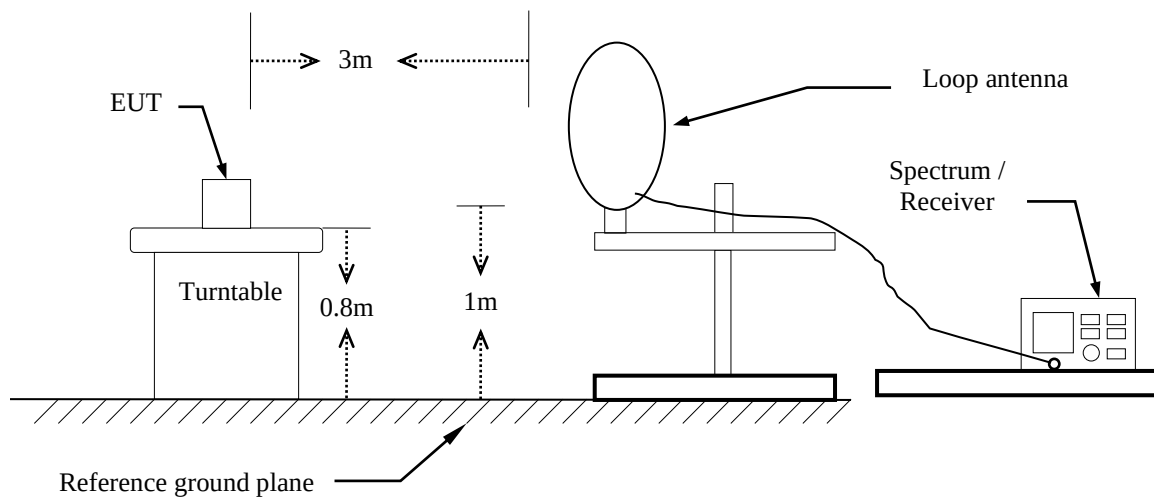
6. Data result :

Actual FS=Spectrum Reading Level + Factor

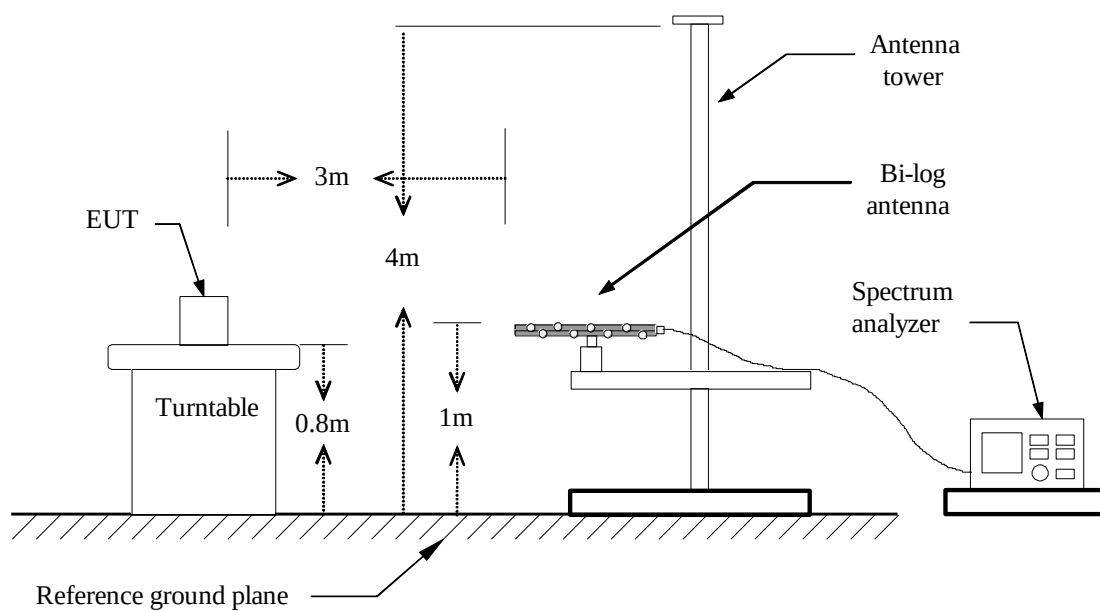
Margin=Actual FS- Limit

4.6.3 Test Setup

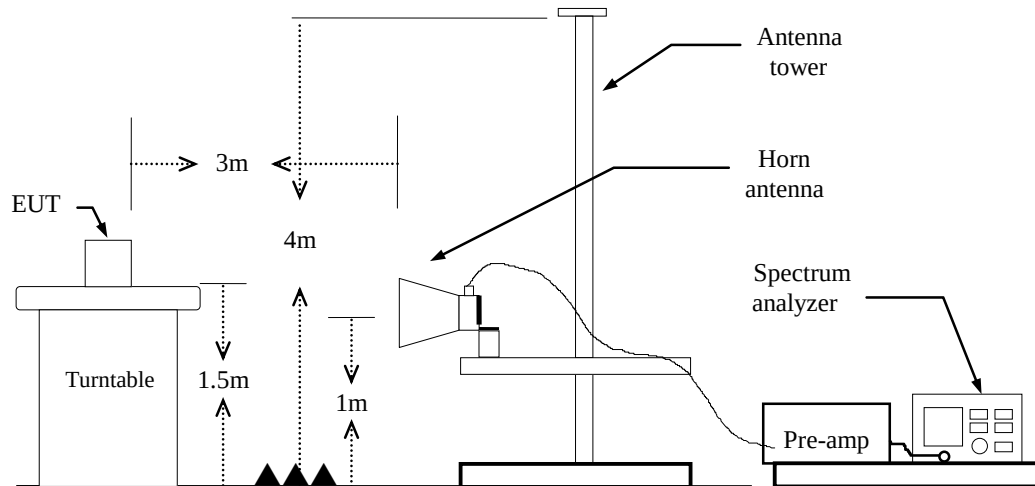
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz

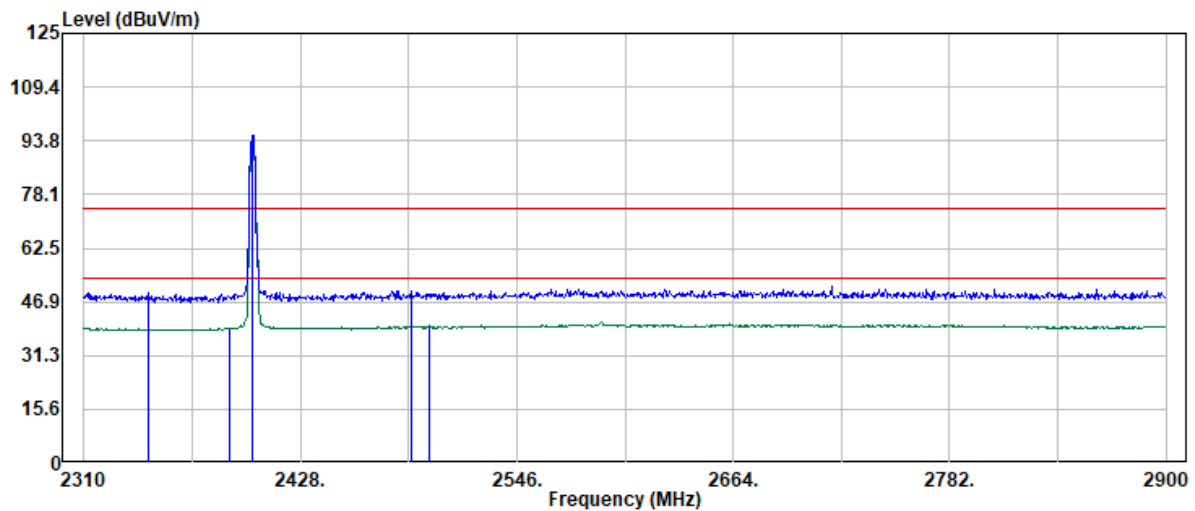


4.6.4 Test Result

Band Edge Test Data

Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2402 MHz
Operation Mode : Bandedge
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : Vertical
Engineer : Tony.Chao
Test Chamber : 966A



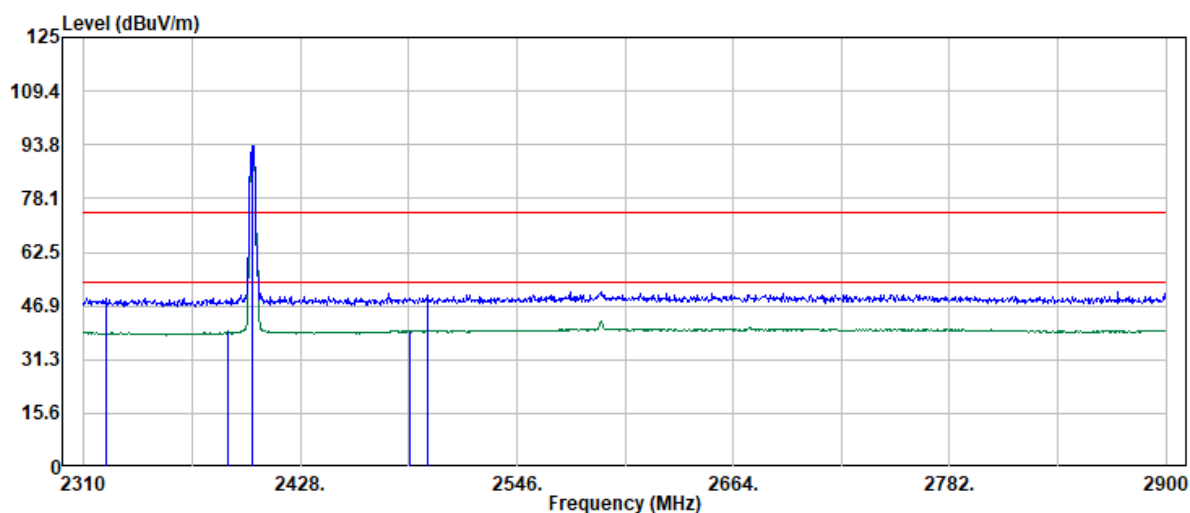
Trace: 1						
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
2344.97	43.40	6.13	49.53	74.00	-24.47	Peak
2389.43	32.91	6.32	39.23	54.00	-14.77	Average
2402.00	89.08	6.38	95.46	--	--	Peak
2402.00	88.75	6.38	95.13	--	--	Average
2488.35	43.15	6.81	49.96	74.00	-24.04	Peak
2498.34	33.06	6.81	39.87	54.00	-14.13	Average

Project No: TM-2505000232P
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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2402 MHz
Operation Mode : Bandedge
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



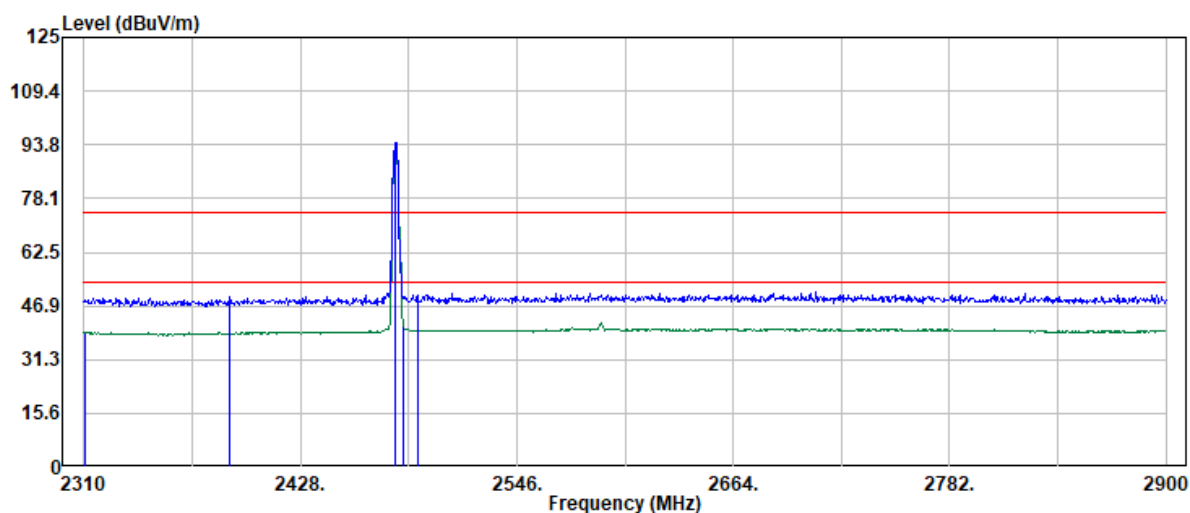
Trace: 1						
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
2321.99	43.01	6.26	49.27	74.00	-24.73	Peak
2388.93	33.08	6.32	39.40	54.00	-14.60	Average
2402.00	87.06	6.38	93.44	--	--	Peak
2402.00	86.75	6.38	93.13	--	--	Average
2487.85	32.92	6.81	39.73	54.00	-14.27	Average
2497.84	43.14	6.81	49.95	74.00	-24.05	Peak

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2480 MHz
Operation Mode : Bandedge
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



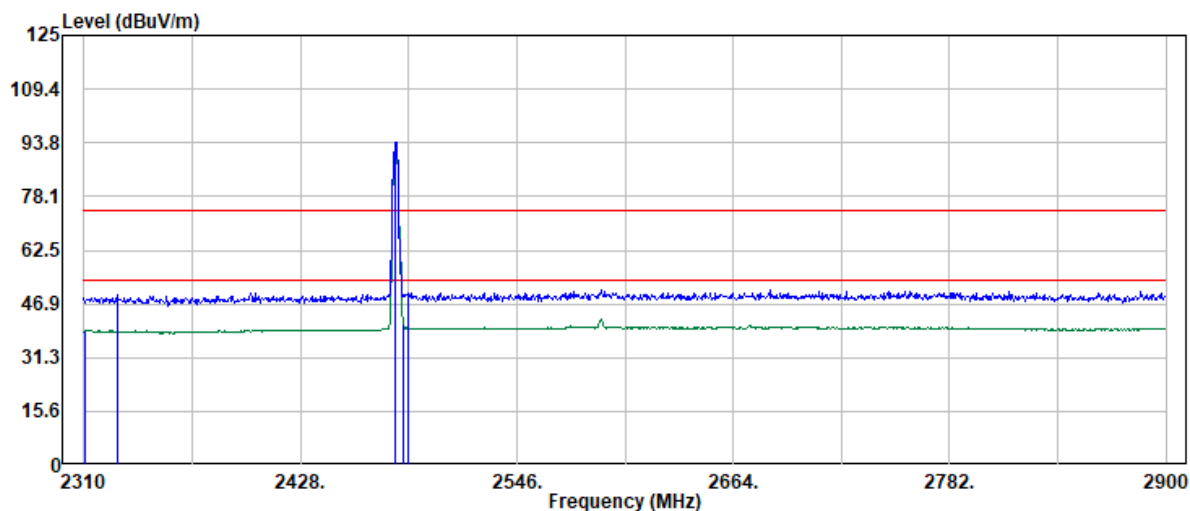
Trace: 1						
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
2311.00	32.82	6.38	39.20	54.00	-14.80	Average
2389.43	42.97	6.32	49.29	74.00	-24.71	Peak
2480.00	87.80	6.73	94.53	--	--	Peak
2480.00	87.57	6.73	94.30	--	--	Average
2483.85	34.21	6.77	40.98	54.00	-13.02	Average
2491.85	43.18	6.82	50.00	74.00	-24.00	Peak

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Report No.: TMWK2505002042KR

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2480 MHz
Operation Mode : Bandedge
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



Trace: 1						
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
2311.00	32.83	6.38	39.21	54.00	-14.79	Average
2327.99	43.31	6.24	49.55	74.00	-24.45	Peak
2480.00	87.18	6.73	93.91	--	--	Peak
2480.00	86.93	6.73	93.66	--	--	Average
2483.85	34.04	6.77	40.81	54.00	-13.19	Average
2486.85	43.05	6.80	49.85	74.00	-24.15	Peak

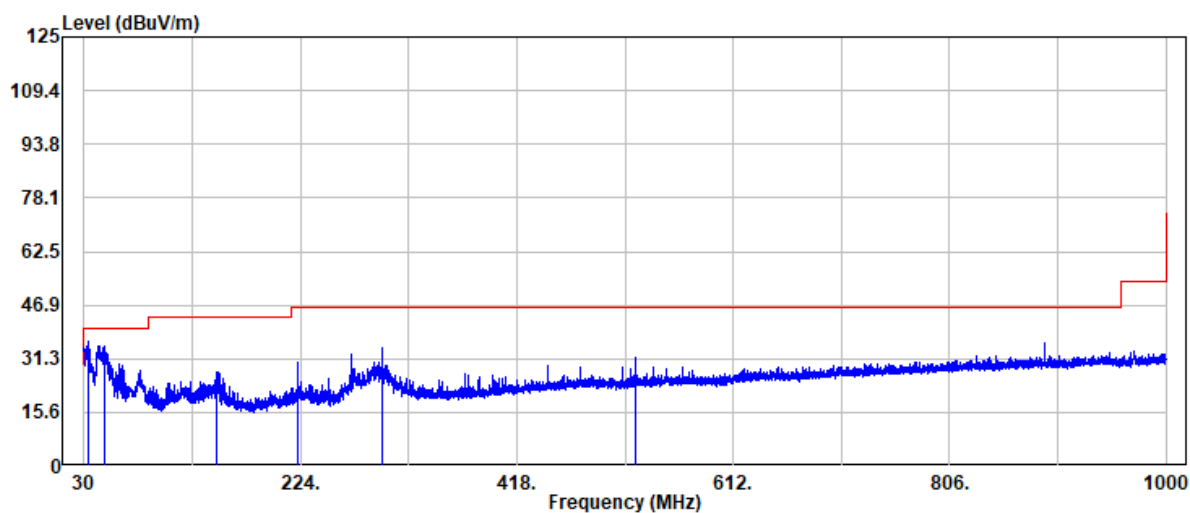
Project No: TM-2505000232P
Report No.: TMWK2505002042KR

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TX Test Data

Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2442 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



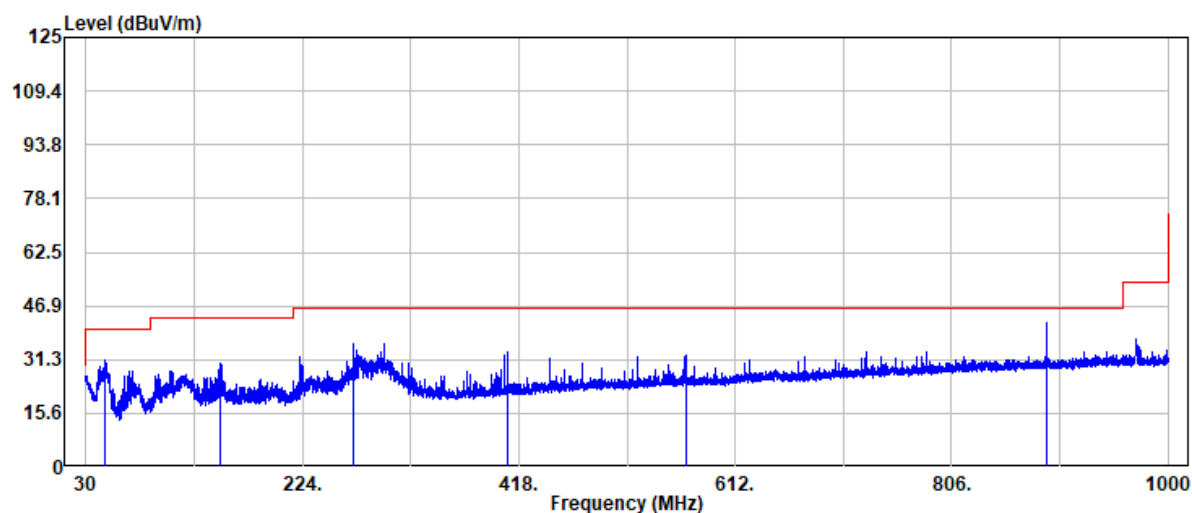
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
34.20	42.35	-5.82	36.53	40.00	-3.47	Peak
48.20	50.21	-15.17	35.04	40.00	-4.96	Peak
149.00	38.41	-11.04	27.37	43.50	-16.13	Peak
221.20	42.60	-12.51	30.09	46.00	-15.91	Peak
297.00	43.89	-9.45	34.44	46.00	-11.56	Peak
525.00	35.73	-4.22	31.51	46.00	-14.49	Peak

Project No: TM-2505000232P
Report No.: TMWK25050002042KR

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2442 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



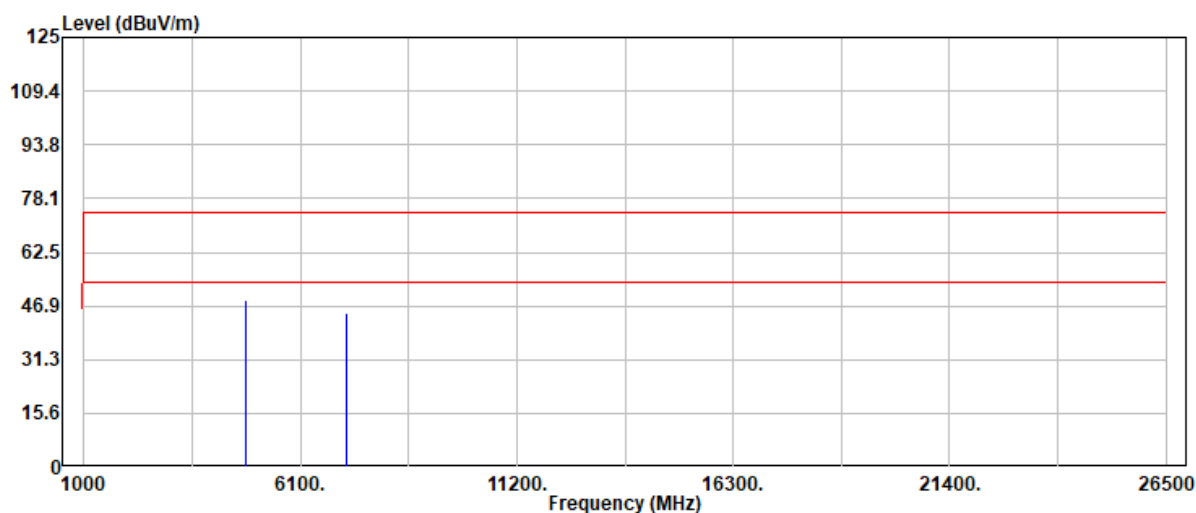
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
47.30	46.16	-14.88	31.28	40.00	-8.72	Peak
151.00	41.30	-10.94	30.36	43.50	-13.14	Peak
270.40	45.49	-9.68	35.81	46.00	-10.19	Peak
408.40	40.16	-6.48	33.68	46.00	-12.32	Peak
567.90	35.74	-3.34	32.40	46.00	-13.60	Peak
891.00	40.49	1.46	41.95	46.00	-4.05	Peak

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Report No.: TMWK2505002042KR

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2402 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



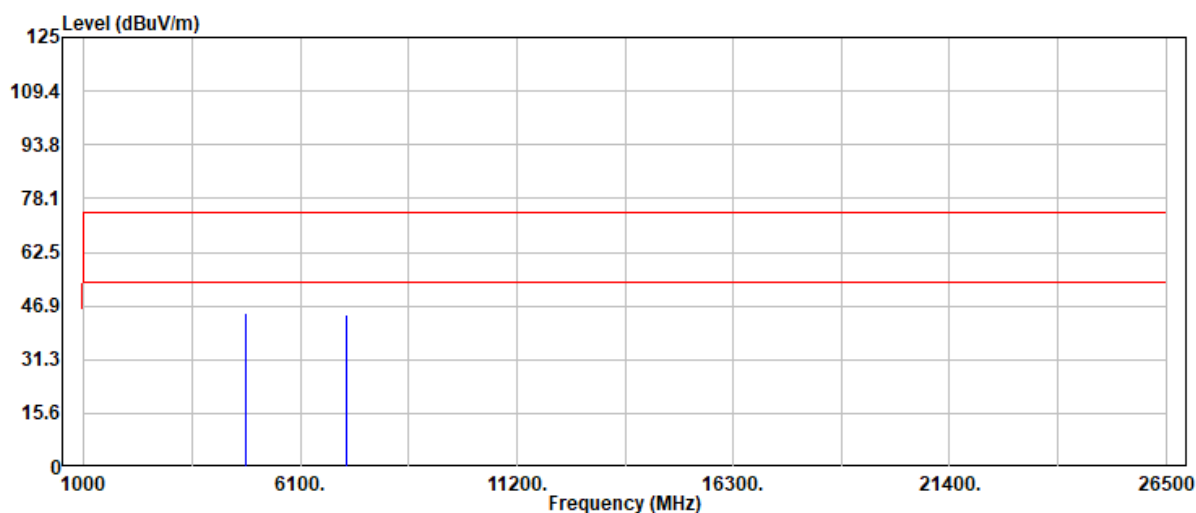
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4804.00	46.10	2.40	48.50	74.00	-25.50	Peak
4804.00	42.33	2.40	44.73	54.00	-9.27	Average
7206.00	35.73	8.96	44.69	74.00	-29.31	Peak
7206.00	26.50	8.96	35.46	54.00	-18.54	Average

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Report No.: TMWK2505002042KR

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Rev.: 01

Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2402 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



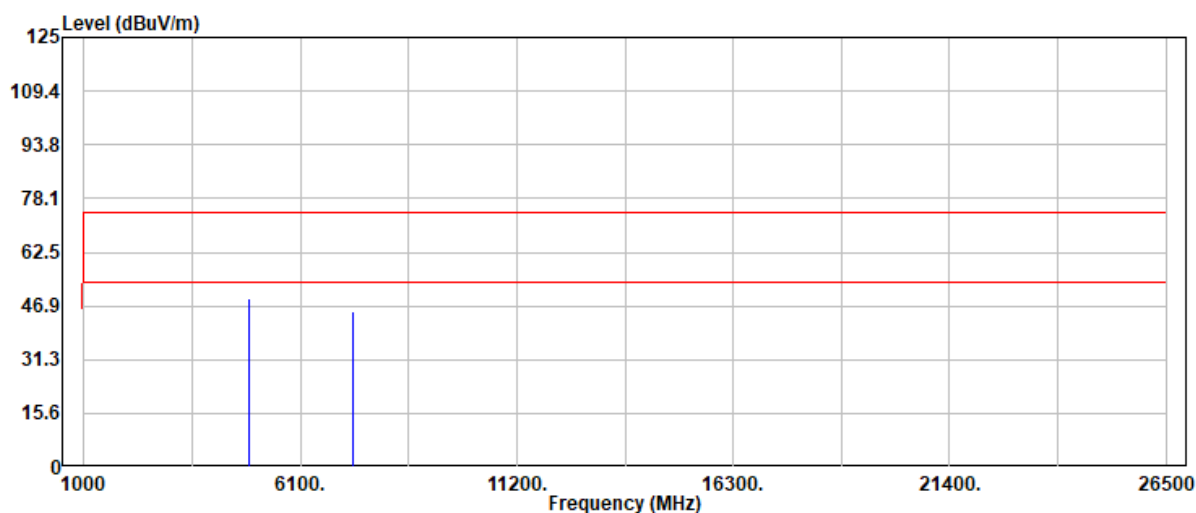
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4804.00	42.58	2.40	44.98	74.00	-29.02	Peak
4804.00	37.41	2.40	39.81	54.00	-14.19	Average
7206.00	35.17	8.96	44.13	74.00	-29.87	Peak
7206.00	26.52	8.96	35.48	54.00	-18.52	Average

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Report No.: TMWK2505002042KR

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2442 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



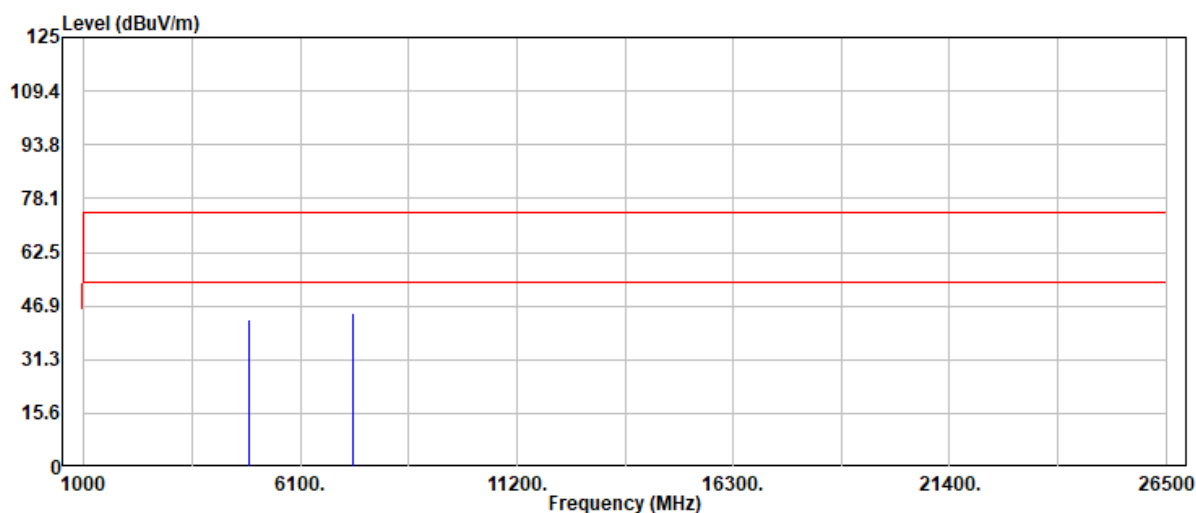
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4884.00	46.48	2.70	49.18	74.00	-24.82	Peak
4884.00	43.53	2.70	46.23	54.00	-7.77	Average
7326.00	35.98	9.39	45.37	74.00	-28.63	Peak
7326.00	26.54	9.39	35.93	54.00	-18.07	Average

Project No: TM-2505000232P
Report No.: TMWK2505002042KR

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Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2442 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



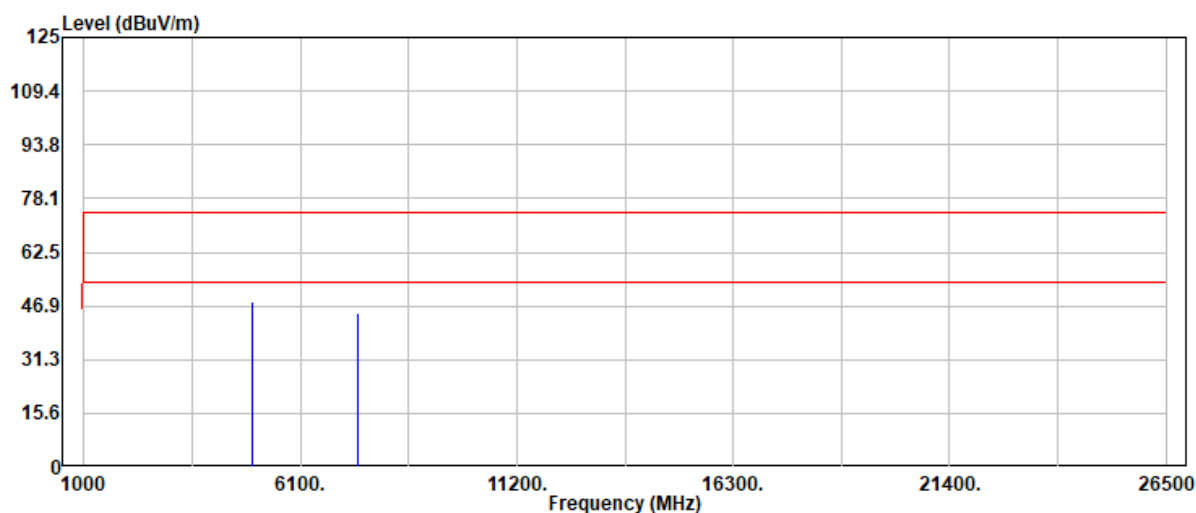
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4884.00	40.43	2.70	43.13	74.00	-30.87	Peak
4884.00	37.29	2.70	39.99	54.00	-14.01	Average
7326.00	35.35	9.39	44.74	74.00	-29.26	Peak
7326.00	26.49	9.39	35.88	54.00	-18.12	Average

Project No: TM-2505000232P
Report No.: TMWK2505002042KR

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Rev.: 01

Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2480 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : VERTICAL
Engineer : Tony.Chao
Test Chamber : 966A



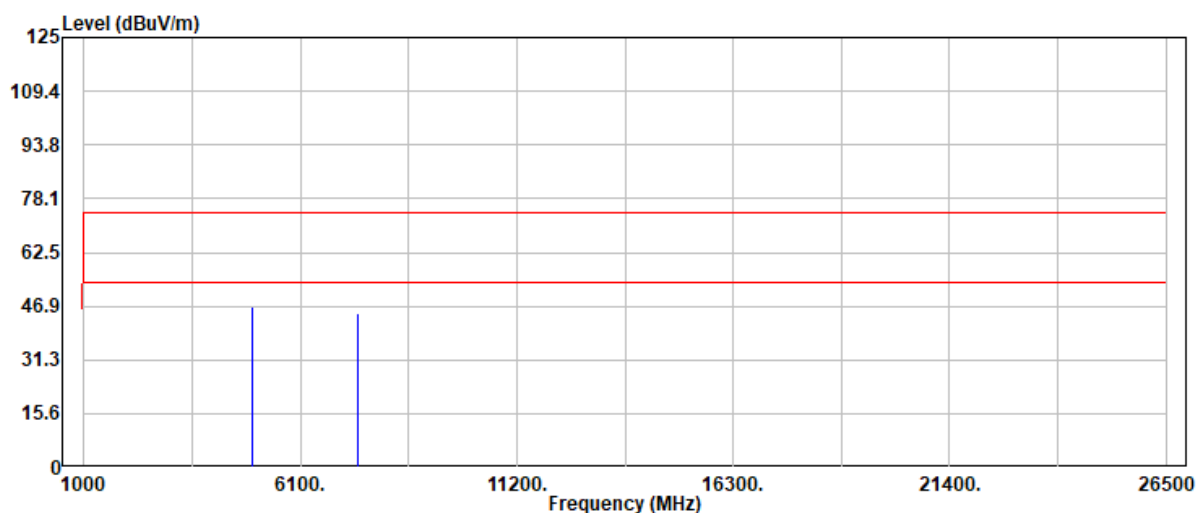
Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4960.00	44.60	3.52	48.12	74.00	-25.88	Peak
4960.00	39.75	3.52	43.27	54.00	-10.73	Average
7440.00	35.47	9.46	44.93	74.00	-29.07	Peak
7440.00	26.32	9.46	35.78	54.00	-18.22	Average

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Rev.: 01

Project No : TM-2505000232P
Operation Band : BLE_1M
Frequency : 2480 MHz
Operation Mode : TX
EUT Pol : E1
Setting :

Test Date : 2025-05-27
Temp./Humi. : 24.5/58
Antenna Pol. : HORIZONTAL
Engineer : Tony.Chao
Test Chamber : 966A



Freq	Read Level	Factor	Actual FS	Limit @3m	Margin	Detector Mode
-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	PK/QP/AV
4960.00	42.97	3.52	46.49	74.00	-27.51	Peak
4960.00	37.40	3.52	40.92	54.00	-13.08	Average
7440.00	35.27	9.46	44.73	74.00	-29.27	Peak
7440.00	26.33	9.46	35.79	54.00	-18.21	Average

- End of Test Report -