

FCC Test Report

FCC ID : 2AV5ZGNLR1
Equipment : Cellular Tracker
Model No. : GNLR1
Brand Name : Cox2M
Applicant : Cox Communications, Inc.
Address : 6205 Peachtree Dunwoody Rd Attn Legal
Regulatory, Atlanta, Georgia, United States.
Standard : 47 CFR FCC Part 15.247
Received Date : Dec. 15, 2023
Tested Date : Jan. 09 ~ Jan. 22, 2024

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	7
1.3	Test Setup Chart	7
1.4	Test Equipment List and Calibration Data.....	8
1.5	Test Standards	9
1.6	Reference Guidance	9
1.7	Deviation from Test Standard and Measurement Procedure.....	9
1.8	Measurement Uncertainty	9
2	TEST CONFIGURATION.....	10
2.1	Testing Facility	10
2.2	The Worst Test Modes and Channel Details	10
3	TRANSMITTER TEST RESULTS	11
3.1	6dB and Occupied Bandwidth	11
3.2	Conducted Output Power	12
3.3	Power Spectral Density	13
3.4	Unwanted Emissions in Restricted Frequency Bands	14
3.5	Emissions in non-restricted Frequency Bands.....	16
4	TEST LABORATORY INFORMATION	17
Appendix A. 6dB and Occupied Bandwidth		
Appendix B. Conducted Output Power		
Appendix C. Power Spectral Density		
Appendix D. Unwanted Emissions into Restricted Frequency Bands		
Appendix E. Emissions in Non-Restricted Frequency Bands		

Release Record

Report No.	Version	Description	Issued Date
FR3D1504	Rev. 01	Initial issue	Mar. 22, 2024

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	Note ¹	N/A
15.247(d) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 2483.50MHz 46.24 (Margin -7.76dB) - AV	Pass
15.247(b)(3)	Conducted Output Power	Power [dBm]: 5.76	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass
N/A means Not Applicable. Note ¹ : The EUT consumes DC power from battery, so the test is not required.			

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Bluetooth Mode	Ch. Freq. (MHz)	Channel Number	Data Rate
2400-2483.5	LE	2402-2480	0-39 [40]	125 kbps
				500 kbps
				1 Mbps
				2 Mbps
Note: Bluetooth LE (Low energy) uses GFSK modulation.				

1.1.2 Antenna Details

Ant. No.	Type	Connector	Gain (dBi)
1	Chip	No	2

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.6Vdc from battery
--------------------------	---------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	Lithium battery	Brand: EVE Model: ER14505 Rating: 3.6Vdc

1.1.5 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	17	2440	27	2460	39	2480

1.1.6 Test Tool and Duty Cycle

Test Tool	nRF Connect, V4.3.0	
Modulation Mode	Duty Cycle Of Test Signal (%)	Duty Factor (dB)
BT-LE(125kbps)	98.05%	0.09
BT-LE(500kbps)	91.90%	0.37
BT-LE(1Mbps)	85.99%	0.66
BT-LE(2Mbps)	58.61%	2.32

1.1.7 Power Index of Test Tool

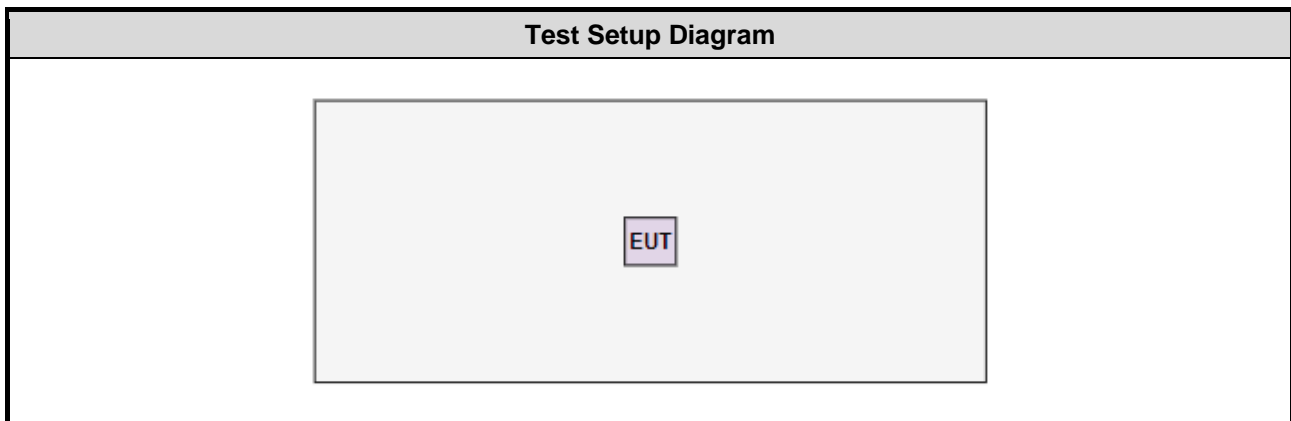
Modulation Mode	Test Frequency (MHz)		
	2402	2440	2480
BT-LE(125kbps)	8	8	8
BT-LE(500kbps)	8	8	8
BT-LE(1Mbps)	8	8	8
BT-LE(2Mbps)	8	8	8

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Laptop	DELL	Latitude 5400	DoC	---
2	Fixture	---	---	---	Provided by applicant.

Note: The above support units, were disconnected from EUT and were removed from testing table after sending command to EUT to transmit continuously.

1.3 Test Setup Chart



1.4 Test Equipment List and Calibration Data

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Jan. 09 ~ Jan. 16, 2024				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 03, 2023	Mar. 02, 2024
Spectrum Analyzer	R&S	FSV40	101498	Nov. 23, 2023	Nov. 22, 2024
Loop Antenna	R&S	HFH2-Z2	100330	Oct. 31, 2023	Oct. 30, 2024
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 31, 2023	Jul. 30, 2024
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Nov. 27, 2023	Nov. 26, 2024
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 30, 2023	Oct. 29, 2024
Preamplifier	EMC	EMC02325	980225	Jun. 28, 2023	Jun. 27, 2024
Preamplifier	EMC	EMC118A45SE	980898	Jul. 14, 2023	Jul. 13, 2024
Preamplifier	EMC	EMC184045SE	980903	Jul. 17, 2023	Jul. 16, 2024
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 03, 2023	Oct. 02, 2024
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 03, 2023	Oct. 02, 2024
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 03, 2023	Oct. 02, 2024
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 03, 2023	Oct. 02, 2024
RF Cable	EMC	EMC104-35M-35M- 8000	210920	Oct. 03, 2023	Oct. 02, 2024
RF Cable	EMC	EMC104-35M-35M- 3000	210922	Oct. 03, 2023	Oct. 02, 2024
Attenuator	Pasternack	PE7005-10	10-1	Oct. 05, 2023	Oct. 04, 2024
HIGHPASS FILTER 3.1-18G	WHK	WHK3.1/18G-10SS	39	Oct. 05, 2023	Oct. 04, 2024
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Measurement S/W	Sporton	SENSE-EMI	V5.10.8	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jan. 22, 2024				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV3044	101516	Jun. 27, 2023	Jun. 26, 2024
Power Meter	Anritsu	ML2495A	1241002	Nov. 21, 2023	Nov. 20, 2024
Power Sensor	Anritsu	MA2411B	1207366	Nov. 21, 2023	Nov. 20, 2024
Attenuator	Pasternack	PE7005-10	10-2	Oct. 05, 2023	Oct. 04, 2024
Measurement Software	Sporton	SENSE-15247_FS	V5.10.8	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.5 Test Standards

47 CFR FCC Part 15.247

ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.130 Hz
Conducted power	± 0.808 dB
Power density	± 0.583 dB
Conducted emission	± 2.715 dB
AC conducted emission	± 2.92 dB
Unwanted Emission ≤ 1 GHz	± 3.41 dB
Unwanted Emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

03CH01-WS

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Test Configuration
AC Power Line Conducted Emissions	BT-LE(1Mbps)	2402	---
Unwanted Emissions ≤ 1GHz	BT-LE(1Mbps)	2402	---
Unwanted Emissions > 1GHz	BT-LE(1Mbps) BT-LE(2Mbps)	2402, 2440, 2480	---
Conducted Output Power 6dB bandwidth Power spectral density	BT-LE(125kbps) BT-LE(500kbps) BT-LE(1Mbps) BT-LE(2Mbps)	2402, 2440, 2480	---

NOTE:

- The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 6dB and Occupied Bandwidth

3.1.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.1.2 Test Procedures

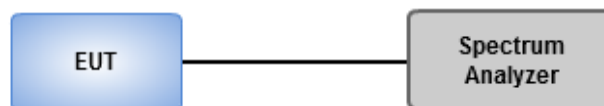
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.1.3 Test Setup



3.1.4 Test Results

Ambient Condition	22°C / 67%	Tested By	Roger Lu
--------------------------	------------	------------------	----------

Refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Limit of Conducted Output Power

Conducted power shall not exceed 1Watt.

Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.

3.2.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.2.3 Test Setup



3.2.4 Test Results

Ambient Condition	22°C / 67%	Tested By	Roger Lu
--------------------------	------------	------------------	----------

Refer to Appendix B.

3.3 Power Spectral Density

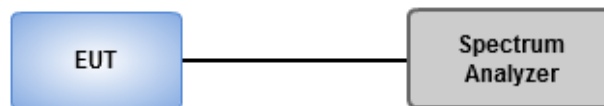
3.3.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.3.2 Test Procedures

1. Set the RBW = 3 kHz, VBW = 10 kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.3.3 Test Setup



3.3.4 Test Results

Ambient Condition	22°C / 67%	Tested By	Roger Lu
--------------------------	------------	------------------	----------

Refer to Appendix C.

3.4 Unwanted Emissions in Restricted Frequency Bands

3.4.1 Limit of Unwanted Emissions in Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Quasi-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.4.2 Test Procedures

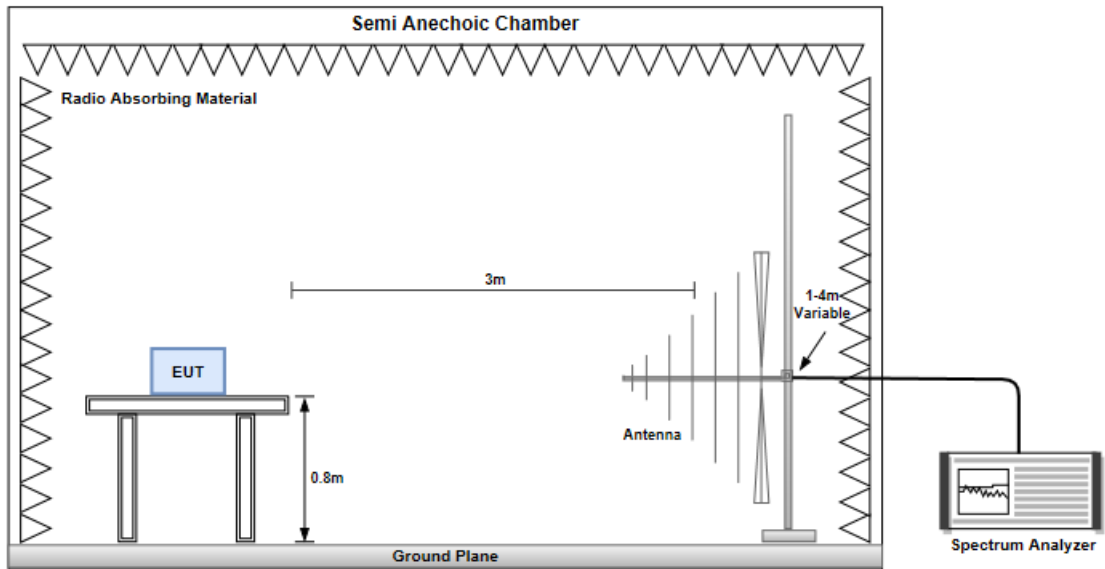
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

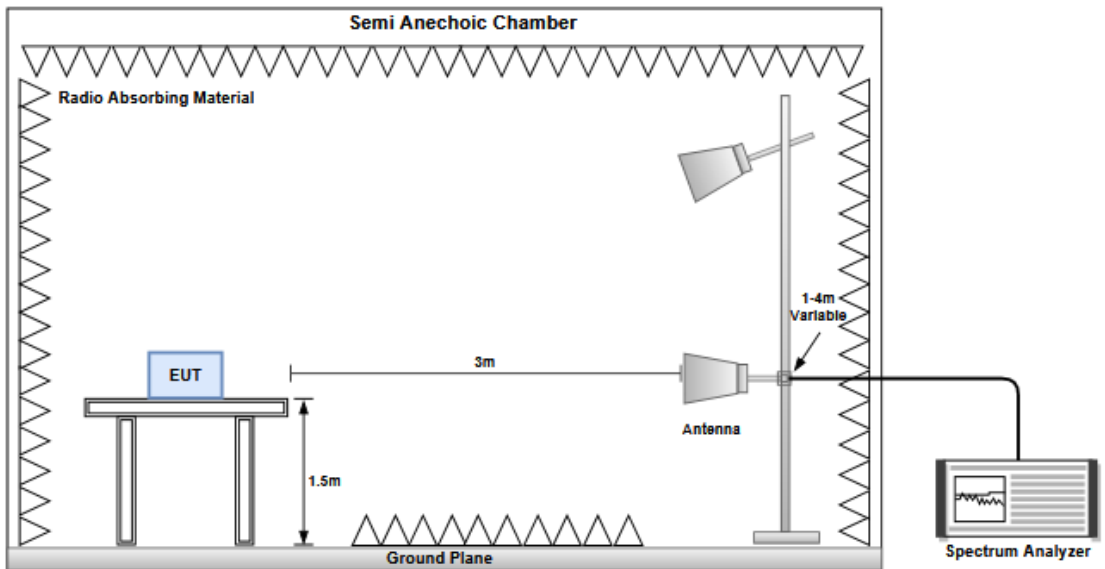
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.4.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.4.4 Test Results

Refer to Appendix D.

3.5 Emissions in non-restricted Frequency Bands

3.5.1 Emissions in non-restricted frequency bands limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.5.2 Test Procedures

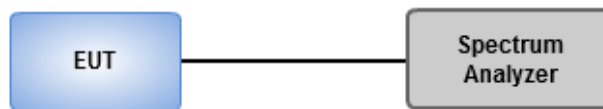
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.5.3 Test Setup



3.5.4 Test Results

Ambient Condition	22°C / 67%	Tested By	Roger Lu
--------------------------	------------	------------------	----------

Refer to Appendix E.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==

**Summary**

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(125kbps)	617.5k	1.08M	1M08F1D	613.75k	1.073M
BT-LE(500kbps)	701.25k	1.049M	1M05F1D	690k	1.04M
BT-LE(1Mbps)	696.25k	1.05M	1M05F1D	693.75k	1.044M
BT-LE(2Mbps)	1.168M	2.036M	2M04F1D	1.163M	2.023M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(125kbps)	-	-	-	-
2402MHz	Pass	500k	613.75k	1.073M
2440MHz	Pass	500k	617.5k	1.078M
2480MHz	Pass	500k	617.5k	1.08M
BT-LE(500kbps)	-	-	-	-
2402MHz	Pass	500k	701.25k	1.04M
2440MHz	Pass	500k	690k	1.042M
2480MHz	Pass	500k	690k	1.049M
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	696.25k	1.044M
2440MHz	Pass	500k	696.25k	1.05M
2480MHz	Pass	500k	693.75k	1.05M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.163M	2.023M
2440MHz	Pass	500k	1.165M	2.032M
2480MHz	Pass	500k	1.168M	2.036M

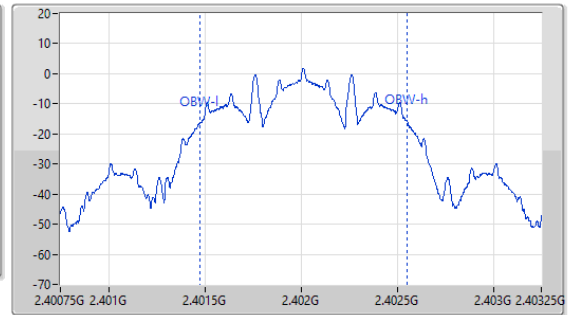
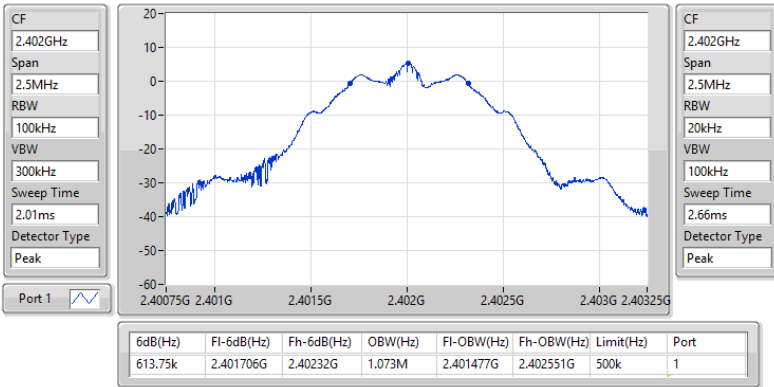
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth



2.4-2.4835GHz_BT-LE(125kbps)

EBW-DTS

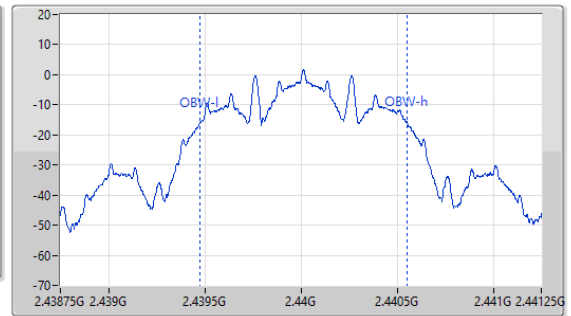
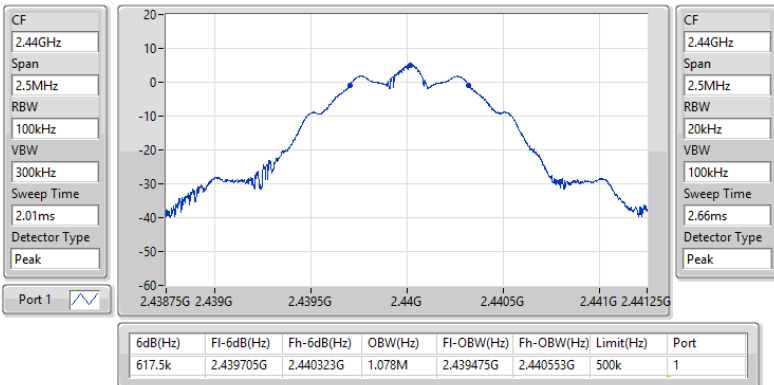
2402MHz



2.4-2.4835GHz_BT-LE(125kbps)

EBW-DTS

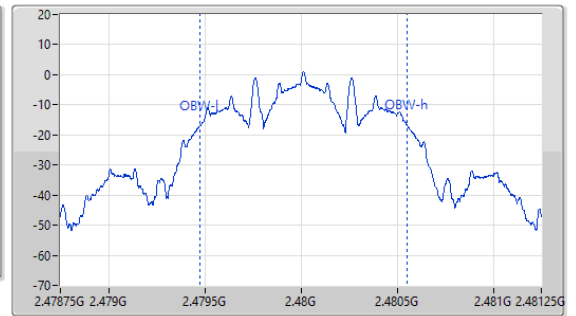
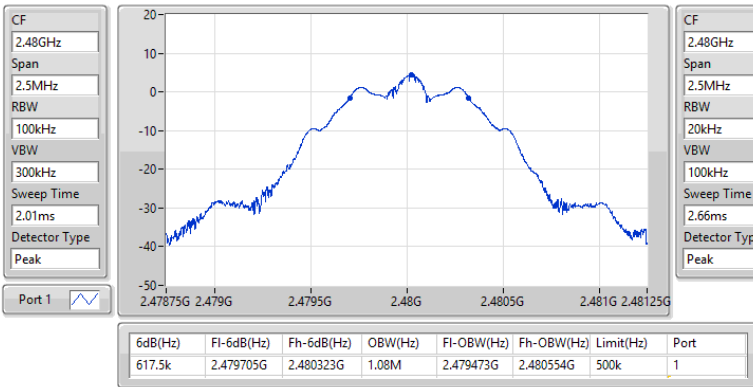
2440MHz



2.4-2.4835GHz_BT-LE(125kbps)

EBW-DTS

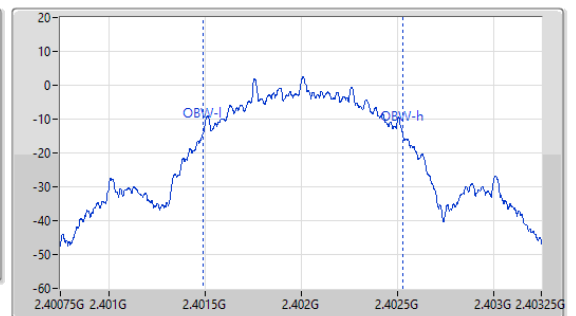
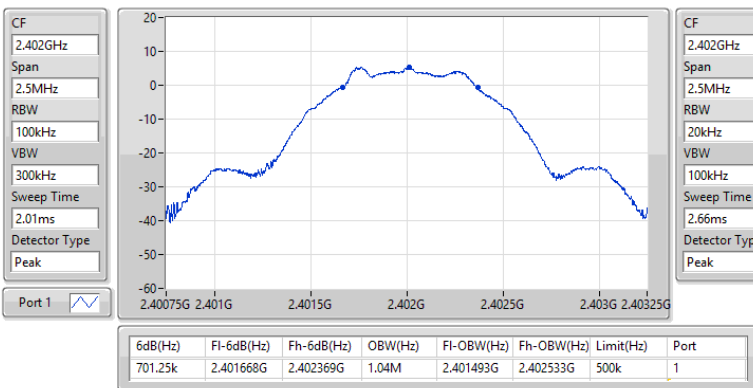
2480MHz



2.4-2.4835GHz_BT-LE(500kbps)

EBW-DTS

2402MHz

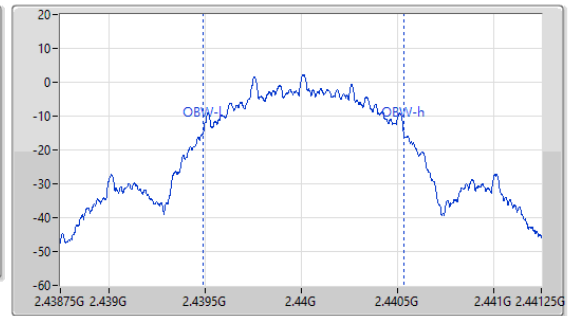
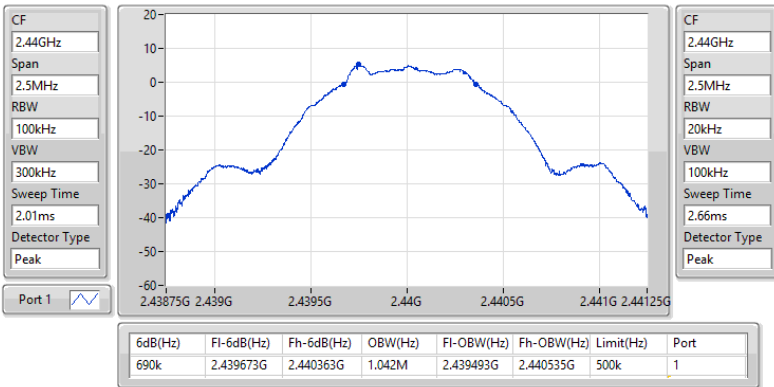




2.4-2.4835GHz_BT-LE(500kbps)

EBW-DTS

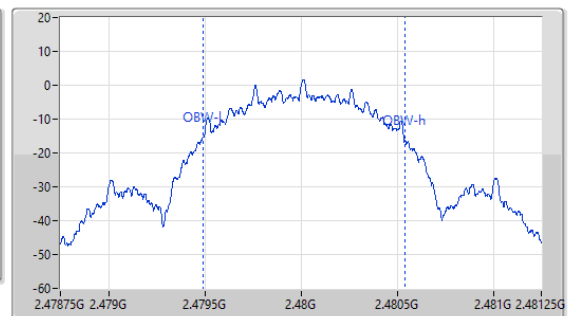
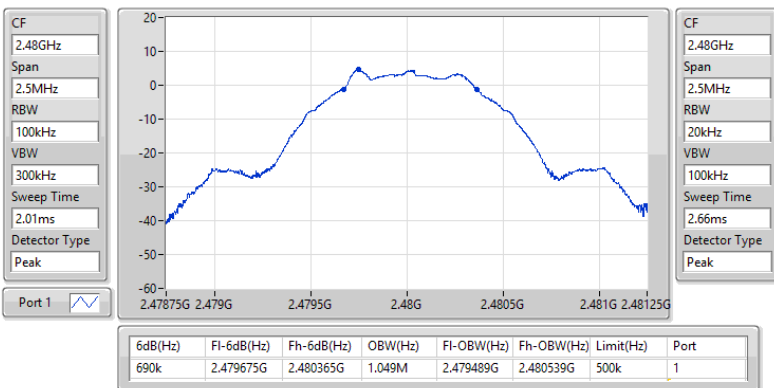
2440MHz



2.4-2.4835GHz_BT-LE(500kbps)

EBW-DTS

2480MHz

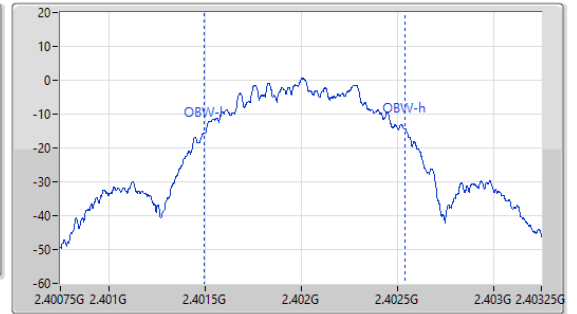
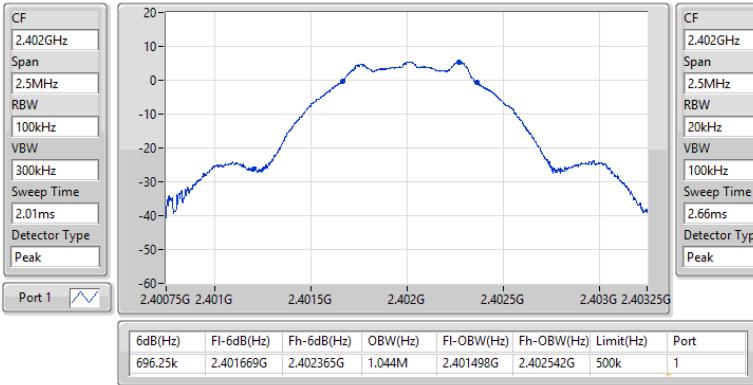




2.4-2.4835GHz_BT-LE(1Mbps)

EBW-DTS

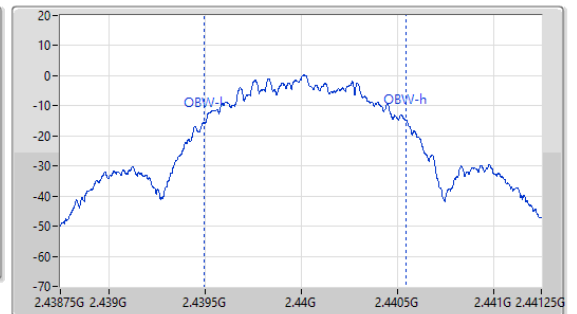
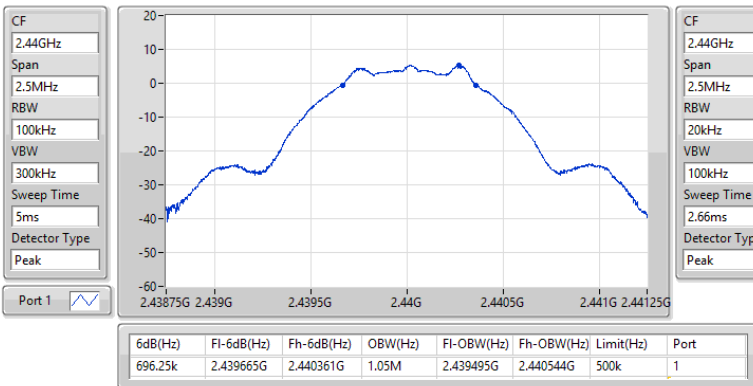
2402MHz



2.4-2.4835GHz_BT-LE(1Mbps)

EBW-DTS

2440MHz

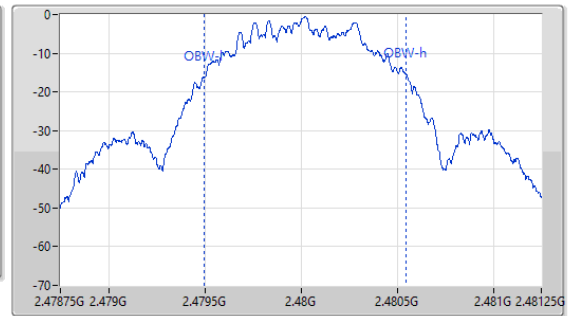
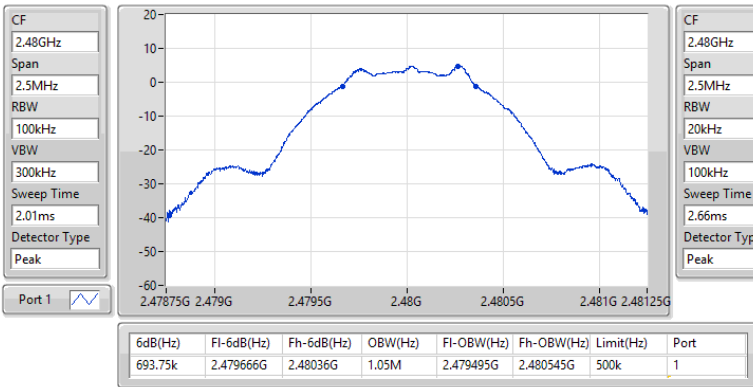




2.4-2.4835GHz_BT-LE(1Mbps)

EBW-DTS

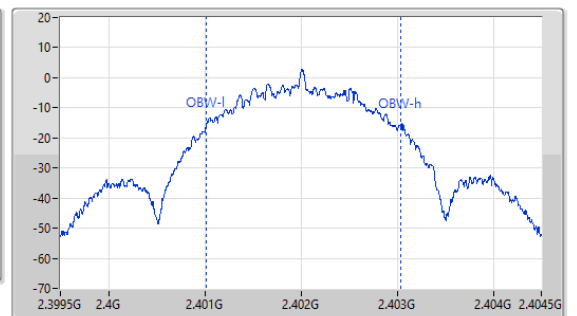
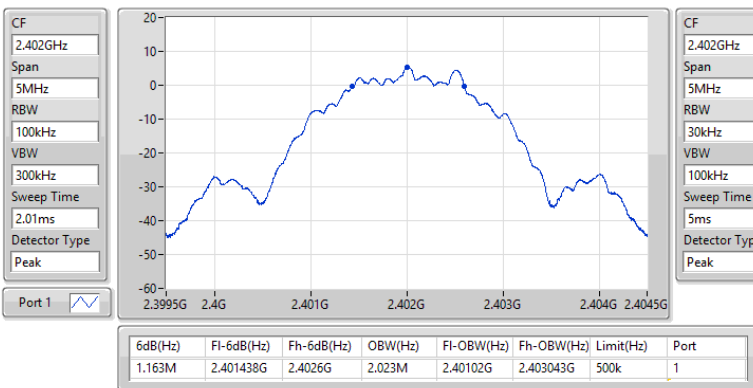
2480MHz



2.4-2.4835GHz_BT-LE(2Mbps)

EBW-DTS

2402MHz

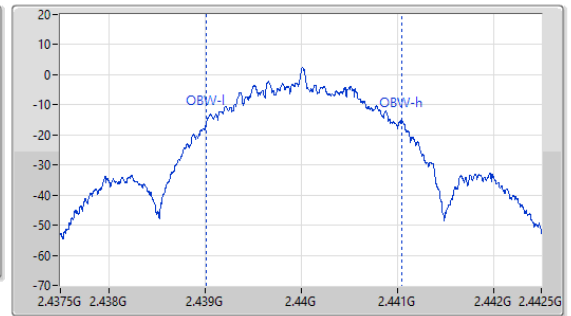
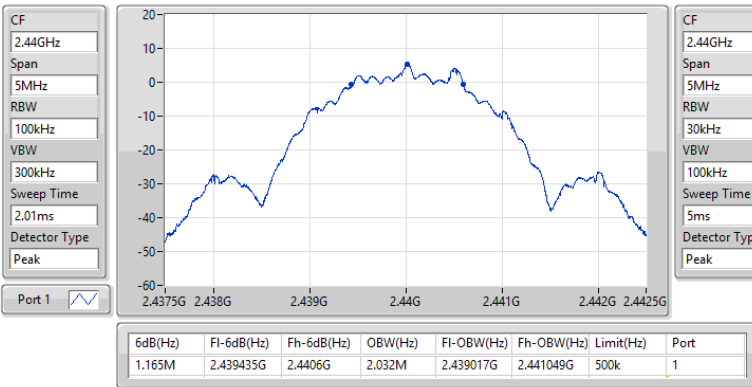




2.4-2.4835GHz_BT-LE(2Mbps)

EBW-DTS

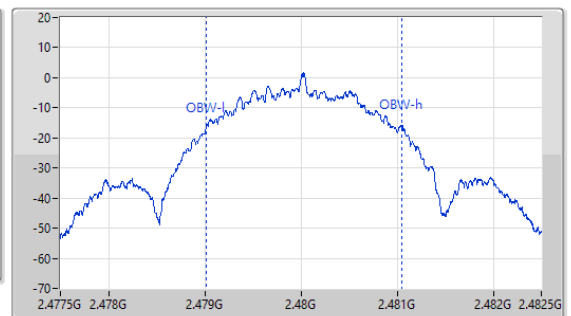
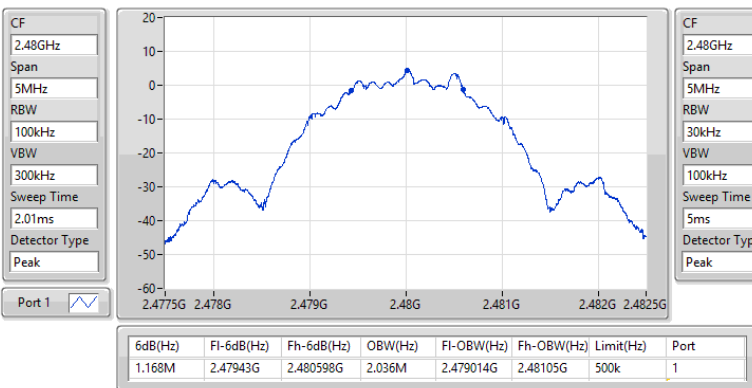
2440MHz



2.4-2.4835GHz_BT-LE(2Mbps)

EBW-DTS

2480MHz





Conducted Output Power (Peak)

Appendix B.1

Summary

Mode	Total Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(125kbps)	5.68	0.00370
BT-LE(500kbps)	5.62	0.00365
BT-LE(1Mbps)	5.76	0.00377
BT-LE(2Mbps)	5.72	0.00373

Result

Mode	Result	Antenna Gain (dBi)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
BT-LE(125kbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.68	30.00	7.68	36.00
2440MHz	Pass	2.00	5.36	30.00	7.36	36.00
2480MHz	Pass	2.00	5.03	30.00	7.03	36.00
BT-LE(500kbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.62	30.00	7.62	36.00
2440MHz	Pass	2.00	5.37	30.00	7.37	36.00
2480MHz	Pass	2.00	5.01	30.00	7.01	36.00
BT-LE(1Mbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.76	30.00	7.76	36.00
2440MHz	Pass	2.00	5.54	30.00	7.54	36.00
2480MHz	Pass	2.00	5.05	30.00	7.05	36.00
BT-LE(2Mbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.72	30.00	7.72	36.00
2440MHz	Pass	2.00	5.42	30.00	7.42	36.00
2480MHz	Pass	2.00	5.04	30.00	7.04	36.00



Conducted Output Power (Average)

Appendix B.2

Summary

Mode	Total Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(125kbps)	5.57	0.00361
BT-LE(500kbps)	5.51	0.00356
BT-LE(1Mbps)	5.66	0.00368
BT-LE(2Mbps)	5.61	0.00364

Result

Mode	Result	Antenna Gain (dBi)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
BT-LE(125kbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.57	-	7.57	-
2440MHz	Pass	2.00	5.24	-	7.24	-
2480MHz	Pass	2.00	4.92	-	6.92	-
BT-LE(500kbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.51	-	7.51	-
2440MHz	Pass	2.00	5.25	-	7.25	-
2480MHz	Pass	2.00	4.90	-	6.90	-
BT-LE(1Mbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.66	-	7.66	-
2440MHz	Pass	2.00	5.43	-	7.43	-
2480MHz	Pass	2.00	4.95	-	6.95	-
BT-LE(2Mbps)	-	-	-	-	-	-
2402MHz	Pass	2.00	5.61	-	7.61	-
2440MHz	Pass	2.00	5.30	-	7.30	-
2480MHz	Pass	2.00	4.93	-	6.93	-

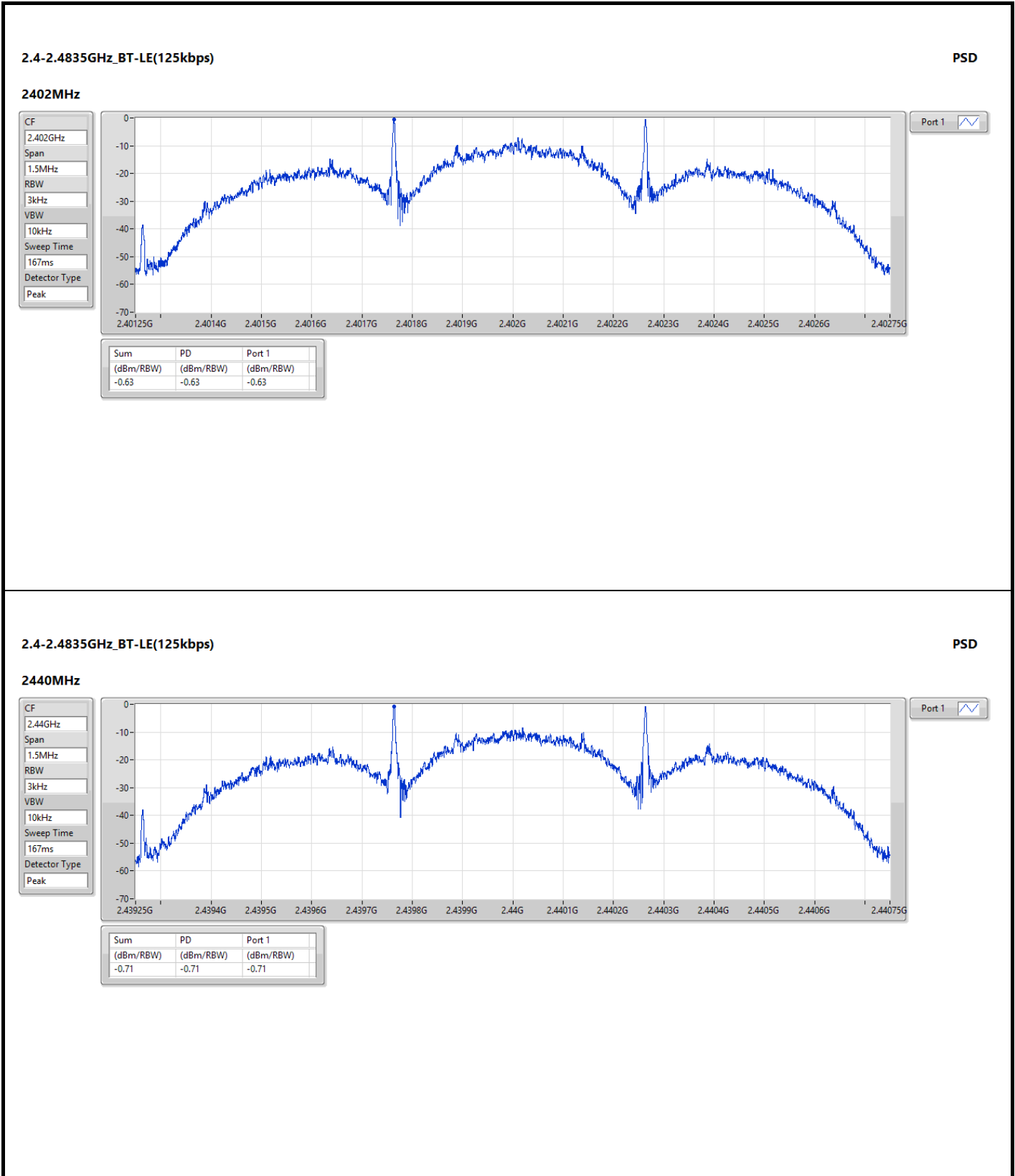


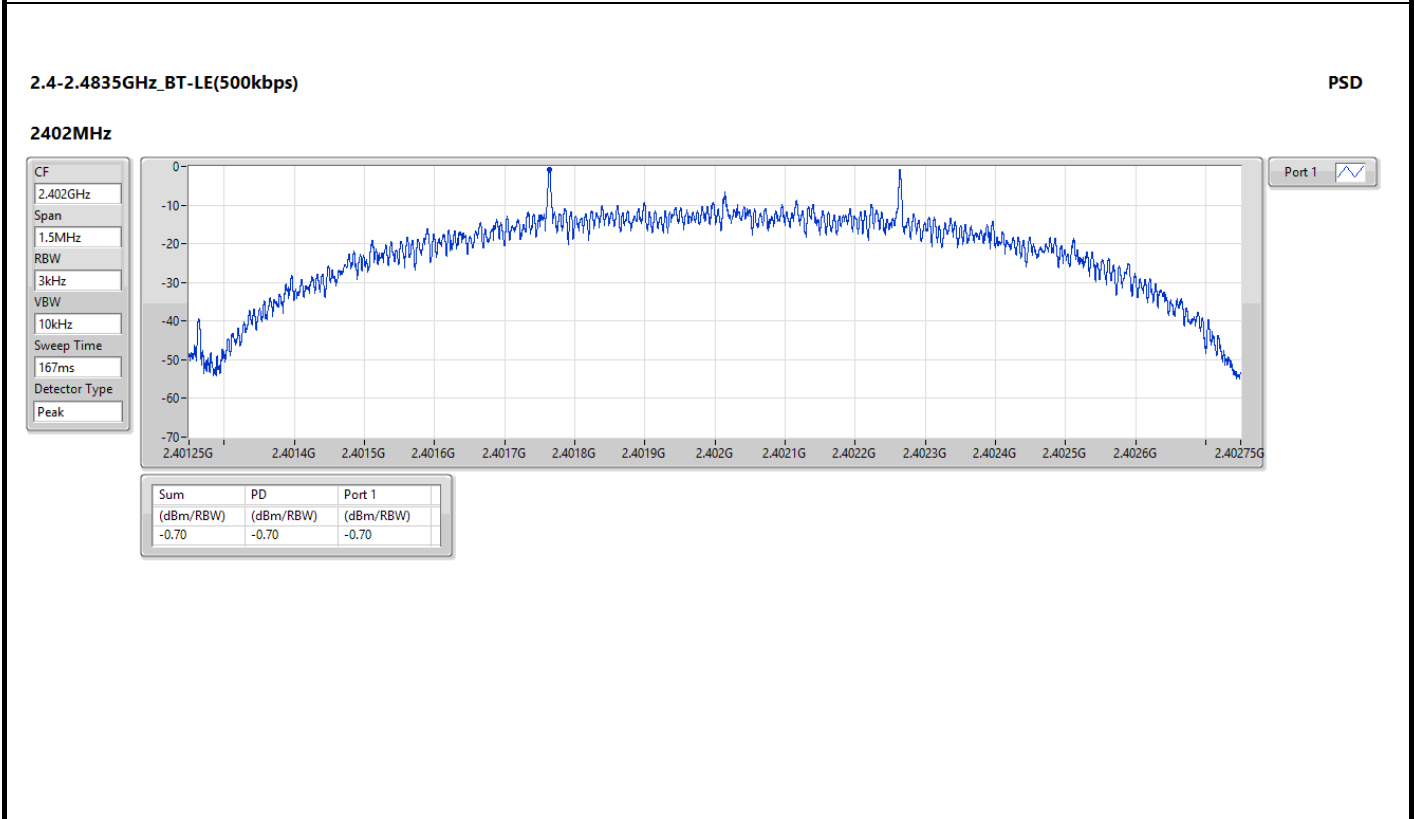
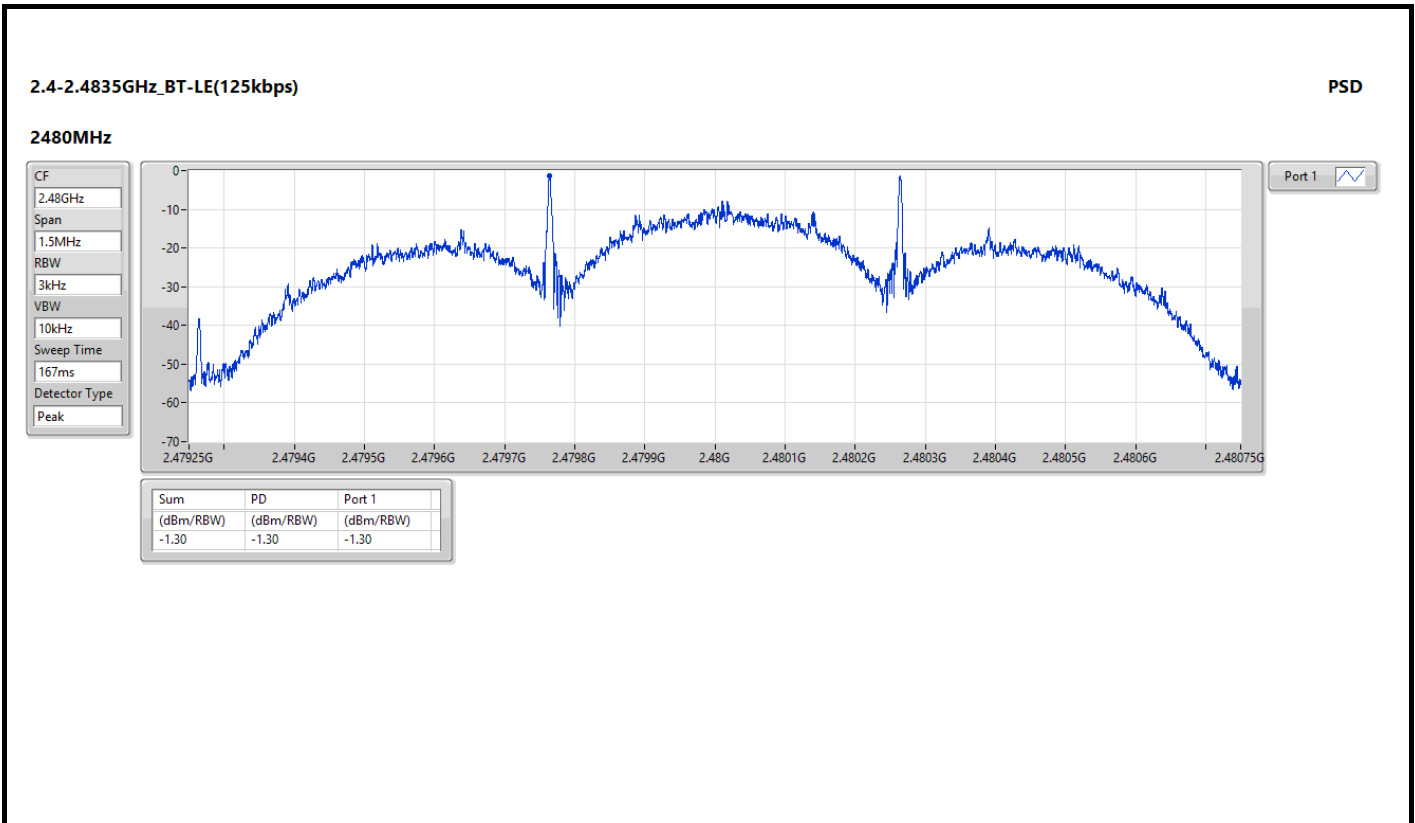
Summary

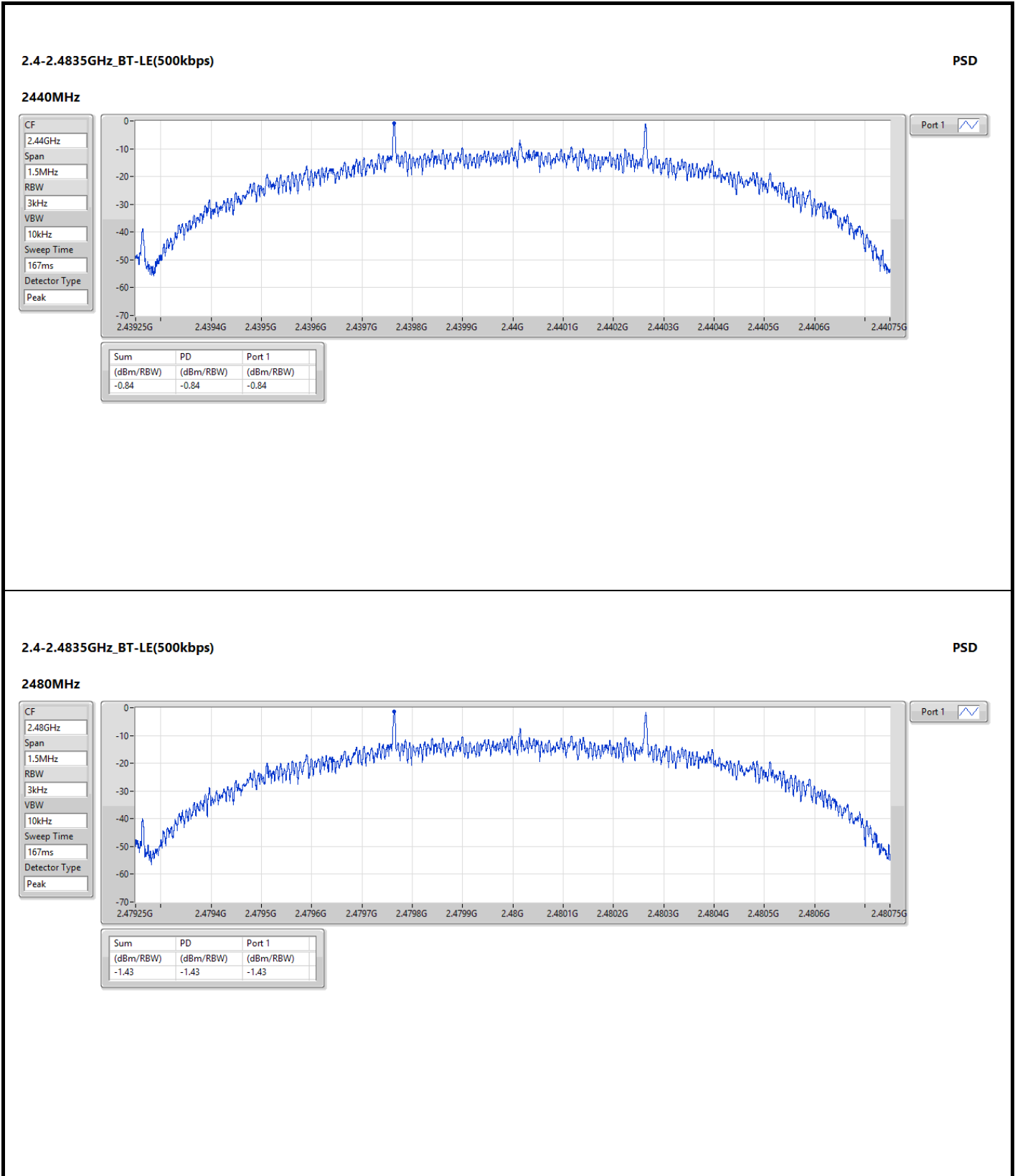
Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
BT-LE(125kbps)	-0.63
BT-LE(500kbps)	-0.70
BT-LE(1Mbps)	-10.64
BT-LE(2Mbps)	-12.56

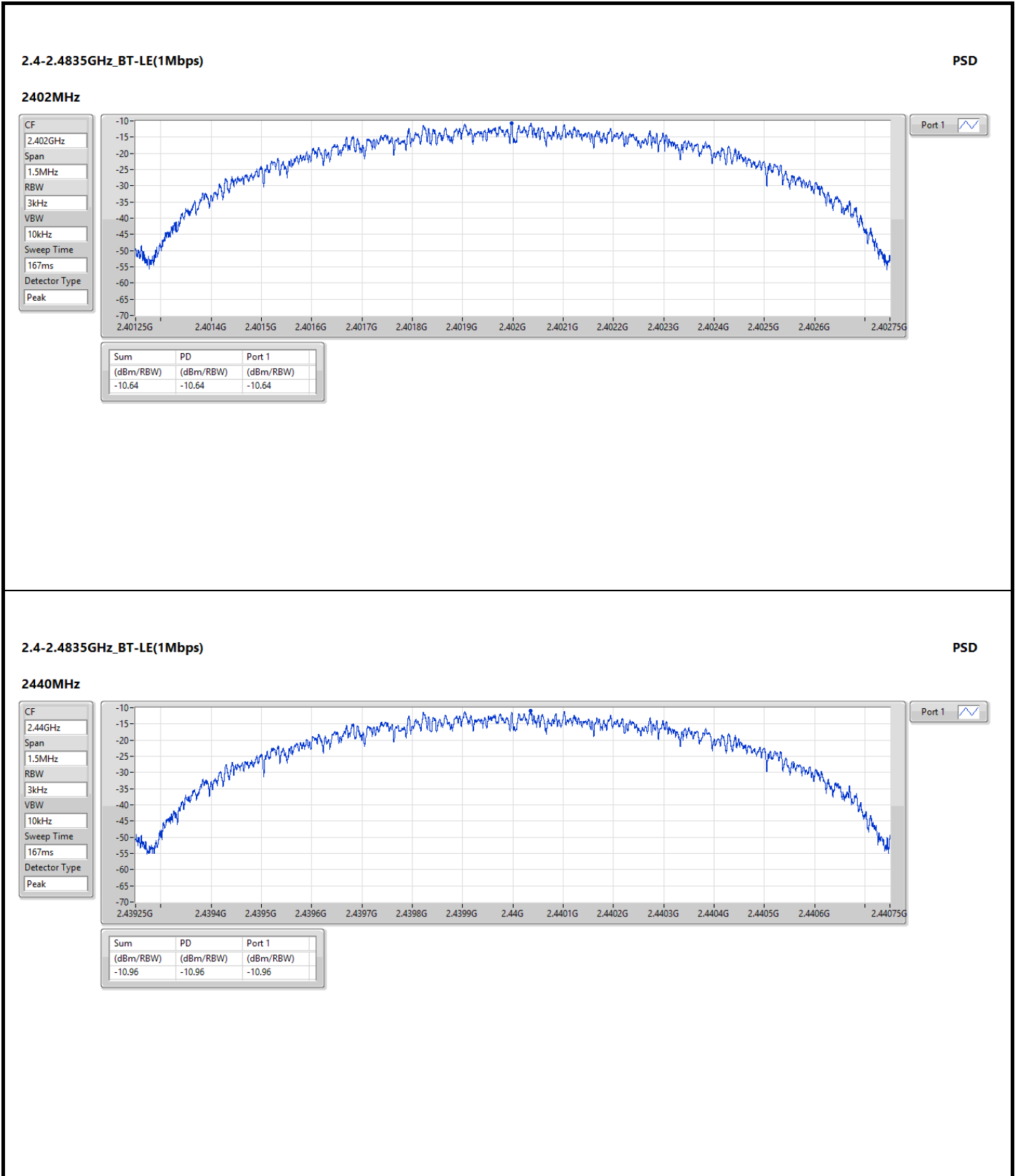
Result

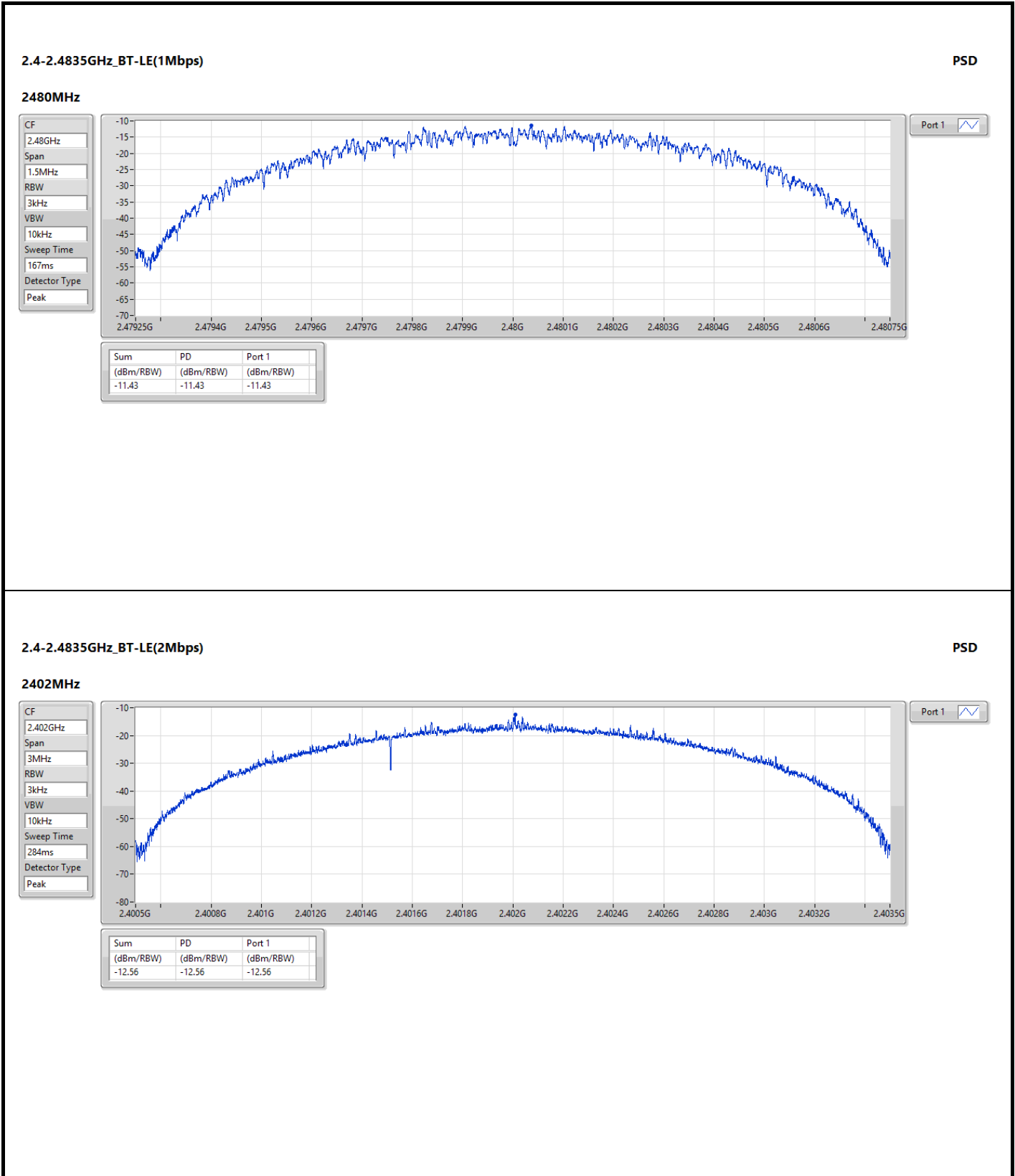
Mode	Result	Antenna Gain (dBi)	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)
BT-LE(125kbps)	-	-	-	-
2402MHz	Pass	2.00	-0.63	8.00
2440MHz	Pass	2.00	-0.71	8.00
2480MHz	Pass	2.00	-1.30	8.00
BT-LE(500kbps)	-	-	-	-
2402MHz	Pass	2.00	-0.70	8.00
2440MHz	Pass	2.00	-0.84	8.00
2480MHz	Pass	2.00	-1.43	8.00
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2.00	-10.64	8.00
2440MHz	Pass	2.00	-10.96	8.00
2480MHz	Pass	2.00	-11.43	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	2.00	-12.56	8.00
2440MHz	Pass	2.00	-12.99	8.00
2480MHz	Pass	2.00	-13.19	8.00

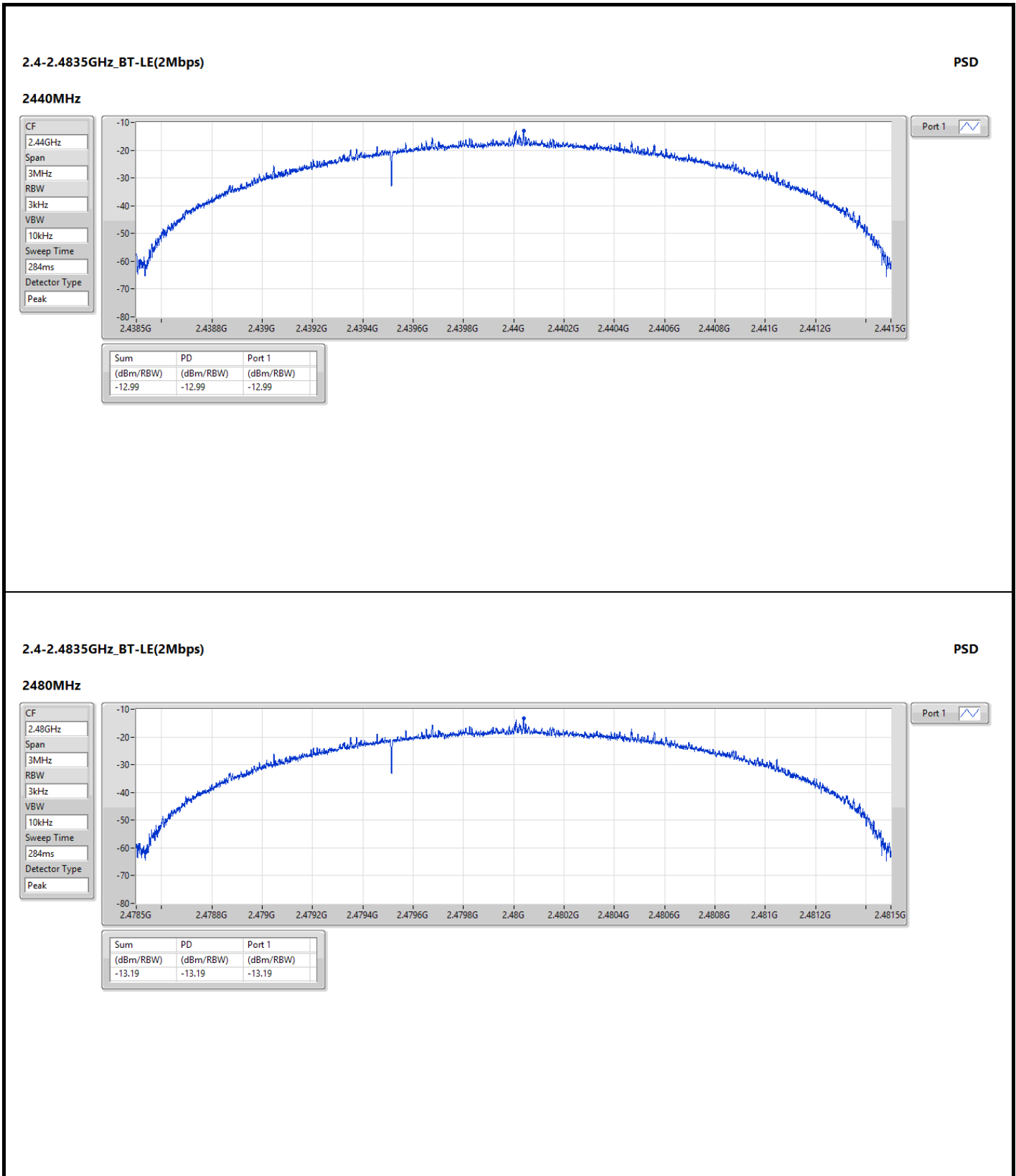










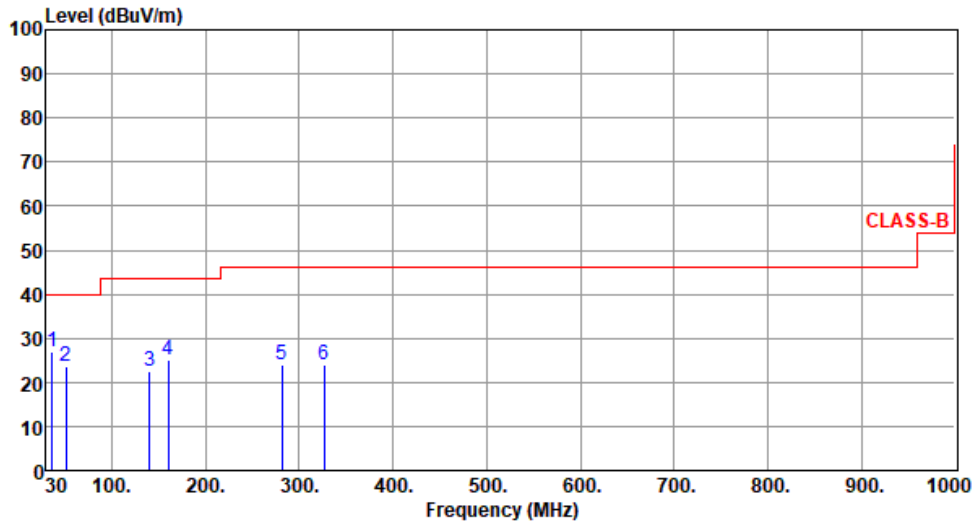




Unwanted Emissions (Below 1GHz)

Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	36.79	26.97	40.00	-13.03	36.29	-9.32	Peak	---	---
2	51.34	23.79	40.00	-16.21	31.66	-7.87	Peak	---	---
3	140.58	22.48	43.50	-21.02	31.71	-9.23	Peak	---	---
4	159.98	25.15	43.50	-18.35	33.89	-8.74	Peak	---	---
5	281.23	23.95	46.00	-22.05	32.51	-8.56	Peak	---	---
6	326.82	24.13	46.00	-21.87	31.38	-7.25	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

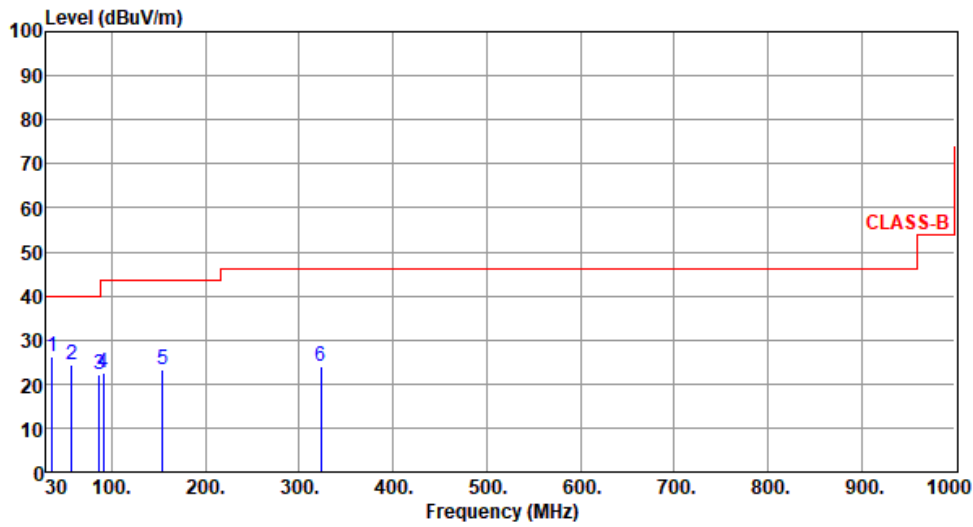
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	36.79	26.06	40.00	-13.94	35.38	-9.32	Peak	---	---
2	57.16	24.19	40.00	-15.81	32.57	-8.38	Peak	---	---
3	86.26	22.24	40.00	-17.76	36.86	-14.62	Peak	---	---
4	91.11	22.33	43.50	-21.17	36.75	-14.42	Peak	---	---
5	154.16	23.40	43.50	-20.10	32.03	-8.63	Peak	---	---
6	322.94	23.99	46.00	-22.01	31.33	-7.34	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

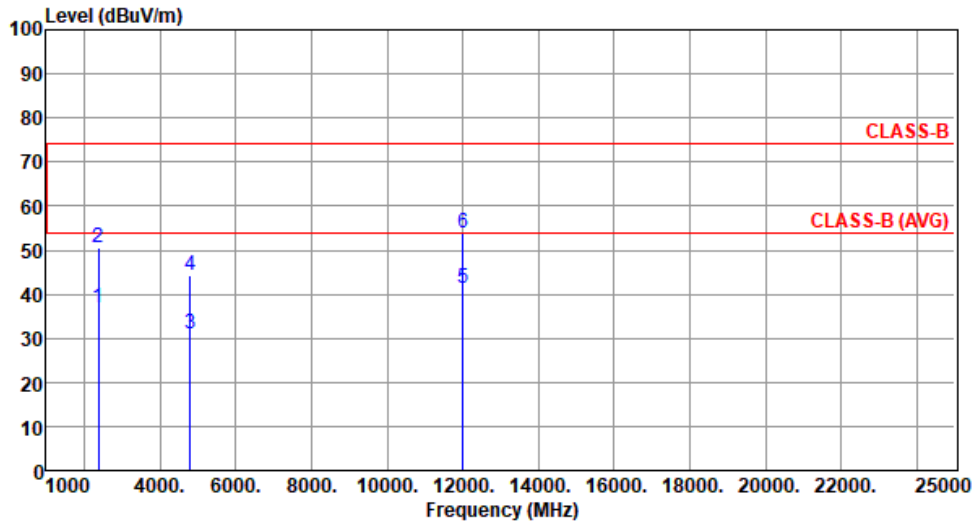
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Unwanted Emissions (Above 1GHz)

Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	36.74	54.00	-17.26	41.12	-4.38	Average	120	212
2	2390.00	50.70	74.00	-23.30	55.08	-4.38	Peak	120	212
3	4804.00	30.96	54.00	-23.04	31.34	-0.38	Average	100	49
4	4804.00	44.20	74.00	-29.80	44.58	-0.38	Peak	100	49
5	12010.00	41.48	54.00	-12.52	35.21	6.27	Average	100	177
6	12010.00	54.06	74.00	-19.94	47.79	6.27	Peak	100	177

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

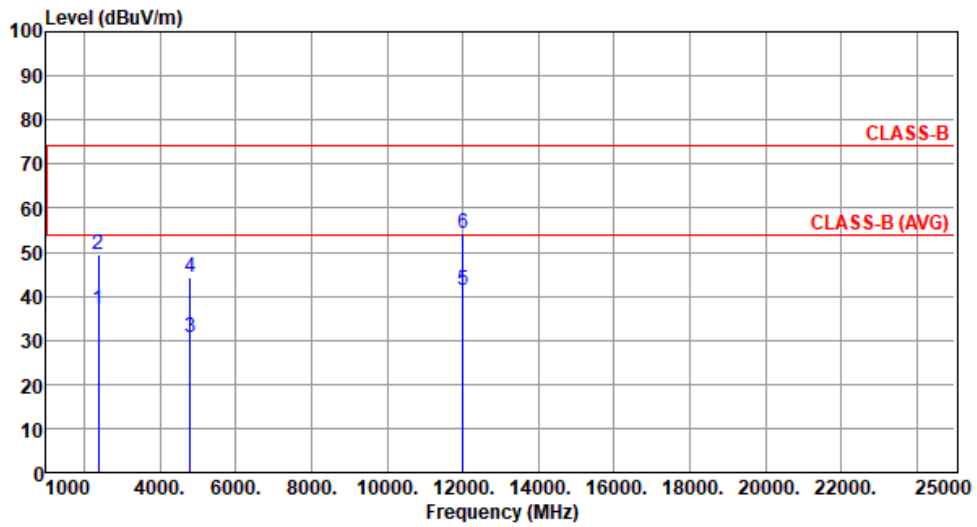
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	36.85	54.00	-17.15	41.23	-4.38	Average	118	78
2	2390.00	49.37	74.00	-24.63	53.75	-4.38	Peak	118	78
3	4804.00	30.72	54.00	-23.28	31.10	-0.38	Average	100	15
4	4804.00	44.35	74.00	-29.65	44.73	-0.38	Peak	100	15
5	12010.00	41.23	54.00	-12.77	34.96	6.27	Average	100	114
6	12010.00	54.42	74.00	-19.58	48.15	6.27	Peak	100	114

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

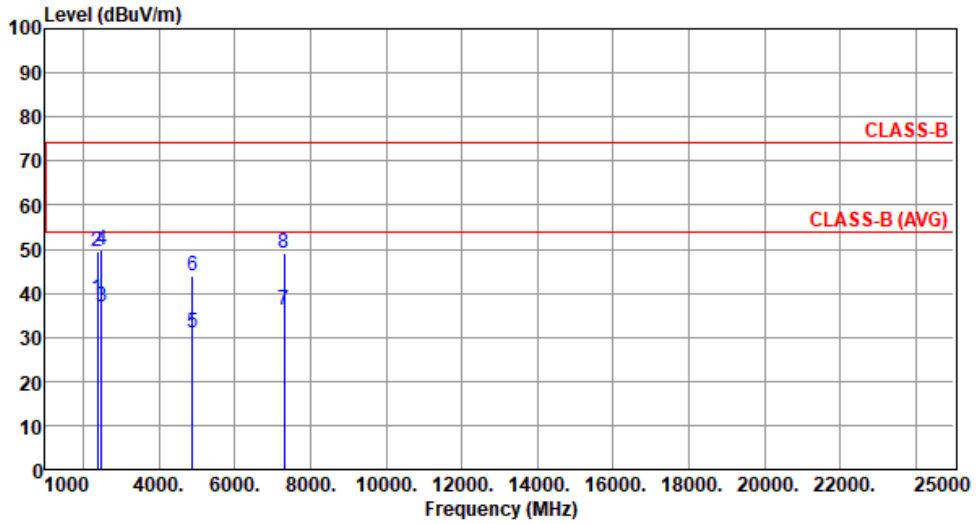
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2440
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.89	54.00	-15.11	43.27	-4.38	Average	101	169
2	2390.00	49.60	74.00	-24.40	53.98	-4.38	Peak	101	169
3	2483.50	36.90	54.00	-17.10	41.65	-4.75	Average	101	169
4	2483.50	49.65	74.00	-24.35	54.40	-4.75	Peak	101	169
5	4880.00	31.13	54.00	-22.87	31.64	-0.51	Average	100	102
6	4880.00	44.00	74.00	-30.00	44.51	-0.51	Peak	100	102
7	7320.00	36.28	54.00	-17.72	31.15	5.13	Average	101	293
8	7320.00	49.06	74.00	-24.94	43.93	5.13	Peak	101	293

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

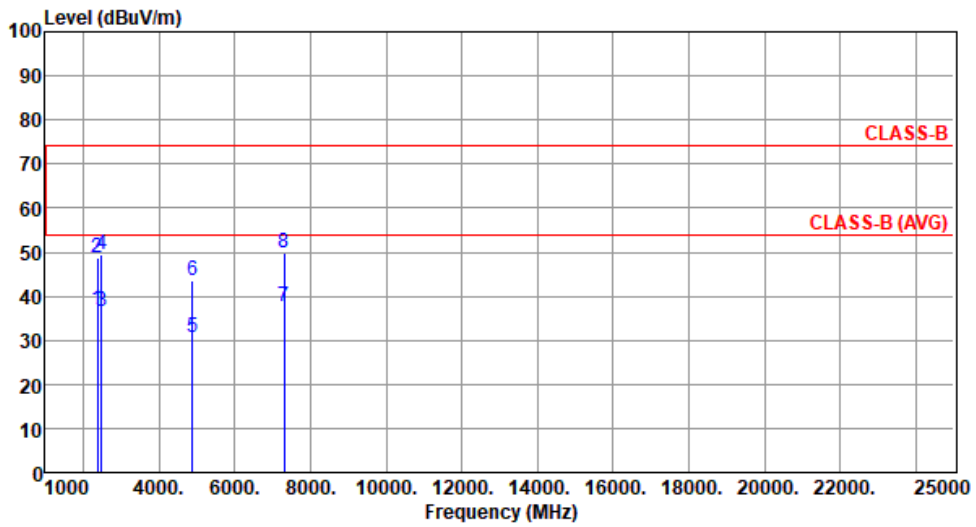
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2440
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	36.94	54.00	-17.06	41.32	-4.38	Average	311	51
2	2390.00	48.53	74.00	-25.47	52.91	-4.38	Peak	311	51
3	2483.50	36.41	54.00	-17.59	41.16	-4.75	Average	311	51
4	2483.50	49.37	74.00	-24.63	54.12	-4.75	Peak	311	51
5	4880.00	30.73	54.00	-23.27	31.24	-0.51	Average	100	76
6	4880.00	43.51	74.00	-30.49	44.02	-0.51	Peak	100	76
7	7320.00	37.60	54.00	-16.40	32.47	5.13	Average	100	125
8	7320.00	49.76	74.00	-24.24	44.63	5.13	Peak	100	125

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

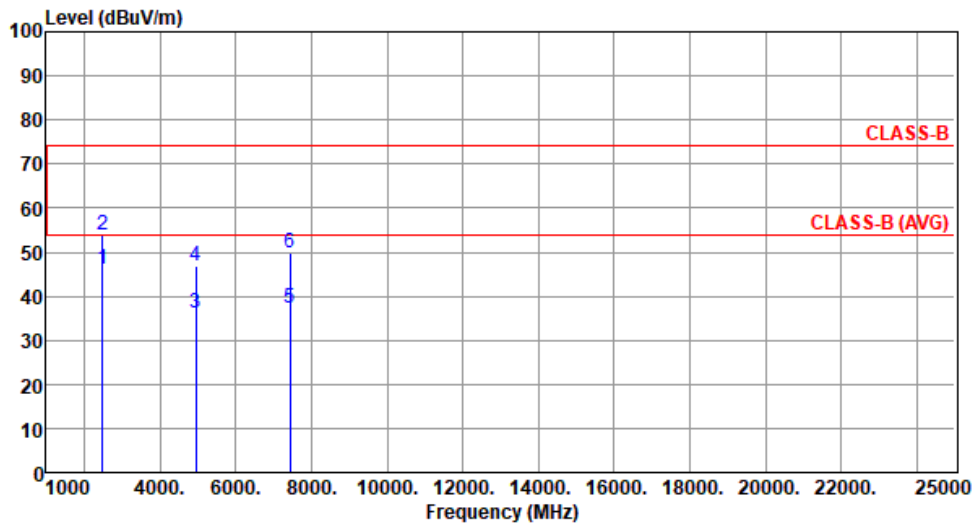
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	46.24	54.00	-7.76	50.99	-4.75	Average	174	176
2	2483.50	53.84	74.00	-20.16	58.59	-4.75	Peak	174	176
3	4960.00	36.04	54.00	-17.96	36.31	-0.27	Average	101	247
4	4960.00	46.90	74.00	-27.10	47.17	-0.27	Peak	101	247
5	7440.00	37.40	54.00	-16.60	32.17	5.23	Average	101	247
6	7440.00	49.97	74.00	-24.03	44.74	5.23	Peak	101	247

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

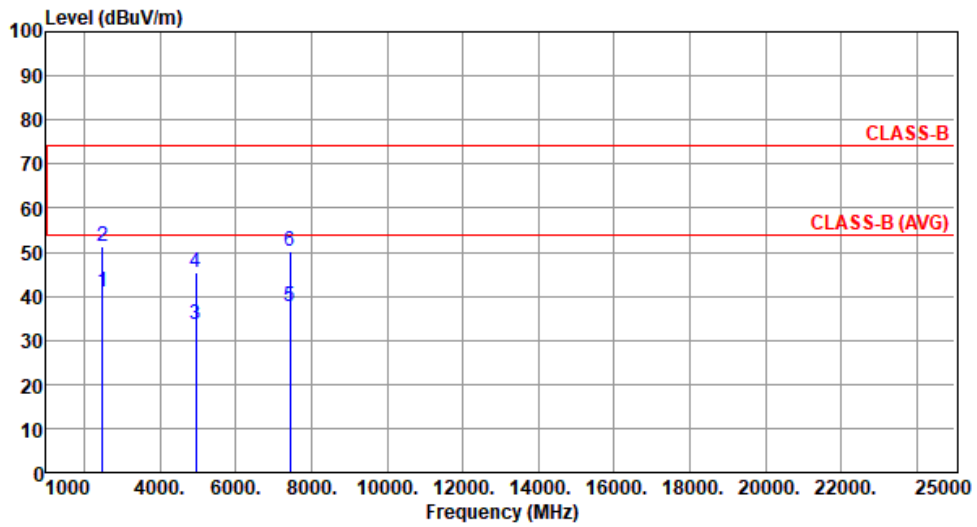
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	40.89	54.00	-13.11	45.64	-4.75	Average	147	47
2	2483.50	51.28	74.00	-22.72	56.03	-4.75	Peak	147	47
3	4960.00	33.61	54.00	-20.39	33.88	-0.27	Average	102	246
4	4960.00	45.21	74.00	-28.79	45.48	-0.27	Peak	102	246
5	7440.00	37.59	54.00	-16.41	32.36	5.23	Average	102	120
6	7440.00	50.36	74.00	-23.64	45.13	5.23	Peak	102	120

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m)

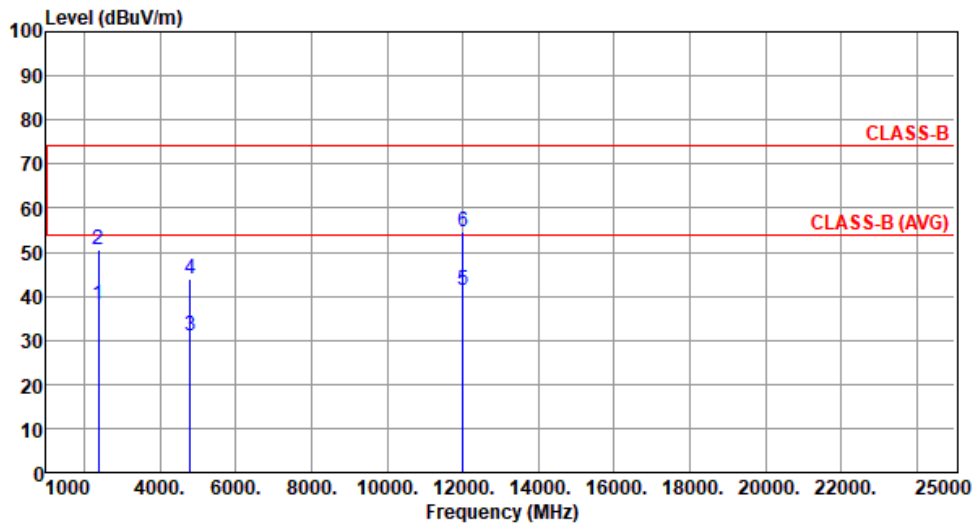
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.90	54.00	-16.10	42.28	-4.38	Average	234	175
2	2390.00	50.54	74.00	-23.46	54.92	-4.38	Peak	234	175
3	4804.00	31.01	54.00	-22.99	31.39	-0.38	Average	100	59
4	4804.00	43.81	74.00	-30.19	44.19	-0.38	Peak	100	59
5	12010.00	41.49	54.00	-12.51	35.22	6.27	Average	100	78
6	12010.00	54.52	74.00	-19.48	48.25	6.27	Peak	100	78

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

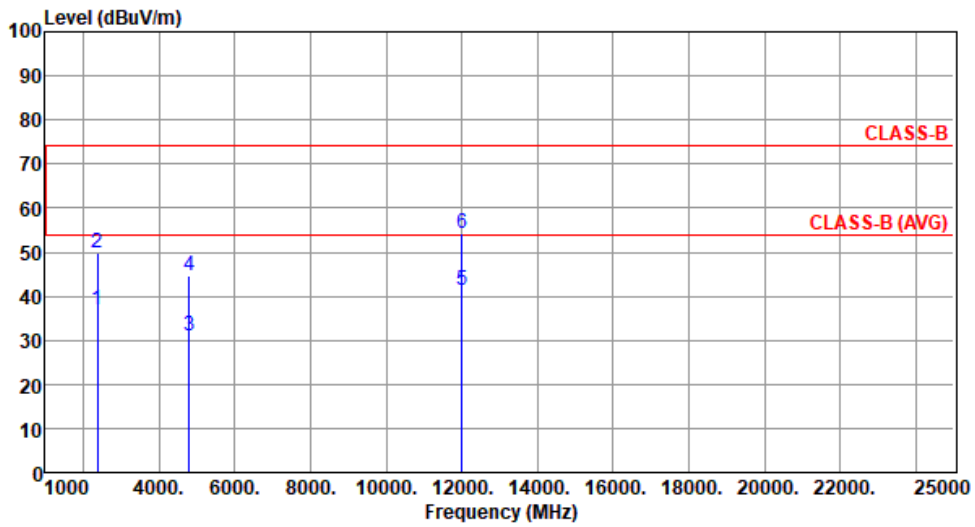
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	36.85	54.00	-17.15	41.23	-4.38	Average	186	46
2	2390.00	49.64	74.00	-24.36	54.02	-4.38	Peak	186	46
3	4804.00	30.82	54.00	-23.18	31.20	-0.38	Average	100	67
4	4804.00	44.75	74.00	-29.25	45.13	-0.38	Peak	100	67
5	12010.00	41.44	54.00	-12.56	35.17	6.27	Average	100	43
6	12010.00	54.27	74.00	-19.73	48.00	6.27	Peak	100	43

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

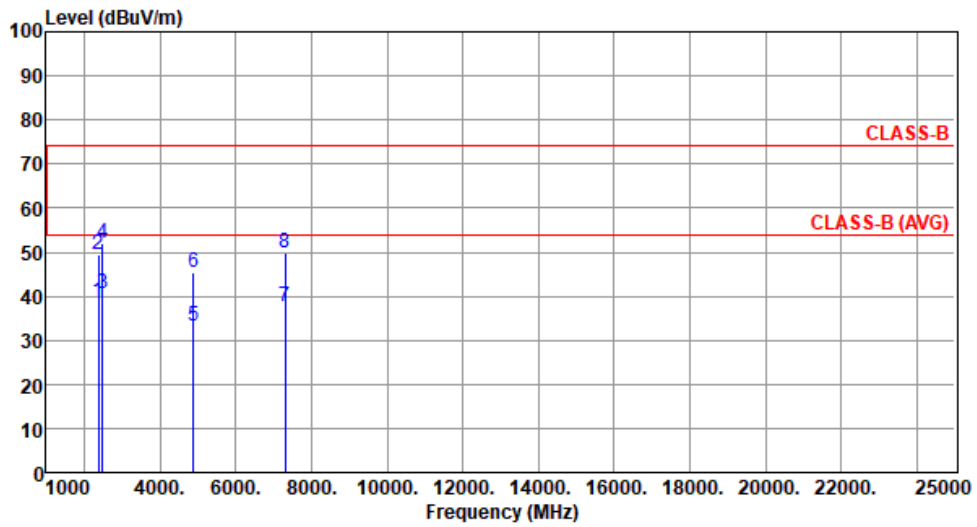
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2440
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.62	54.00	-15.38	43.00	-4.38	Average	101	182
2	2390.00	49.61	74.00	-24.39	53.99	-4.38	Peak	101	182
3	2483.50	40.71	54.00	-13.29	45.46	-4.75	Average	101	182
4	2483.50	52.04	74.00	-21.96	56.79	-4.75	Peak	101	182
5	4880.00	33.12	54.00	-20.88	33.63	-0.51	Average	295	210
6	4880.00	45.24	74.00	-28.76	45.75	-0.51	Peak	295	210
7	7320.00	37.50	54.00	-16.50	32.37	5.13	Average	116	23
8	7320.00	49.69	74.00	-24.31	44.56	5.13	Peak	116	23

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

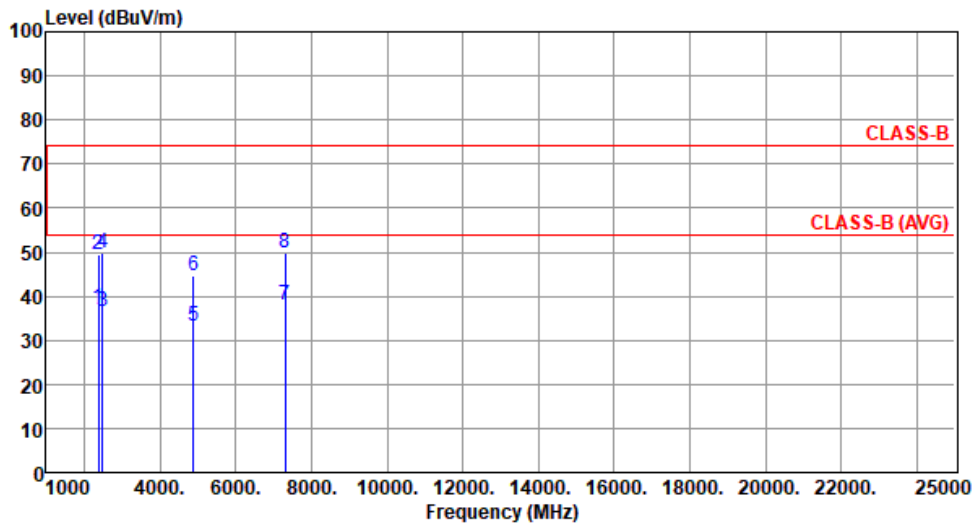
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2440
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.35	54.00	-16.65	41.73	-4.38	Average	304	37
2	2390.00	49.45	74.00	-24.55	53.83	-4.38	Peak	304	37
3	2483.50	36.70	54.00	-17.30	41.45	-4.75	Average	304	37
4	2483.50	49.82	74.00	-24.18	54.57	-4.75	Peak	304	37
5	4880.00	33.12	54.00	-20.88	33.63	-0.51	Average	101	125
6	4880.00	44.81	74.00	-29.19	45.32	-0.51	Peak	101	125
7	7320.00	37.84	54.00	-16.16	32.71	5.13	Average	116	241
8	7320.00	49.64	74.00	-24.36	44.51	5.13	Peak	116	241

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

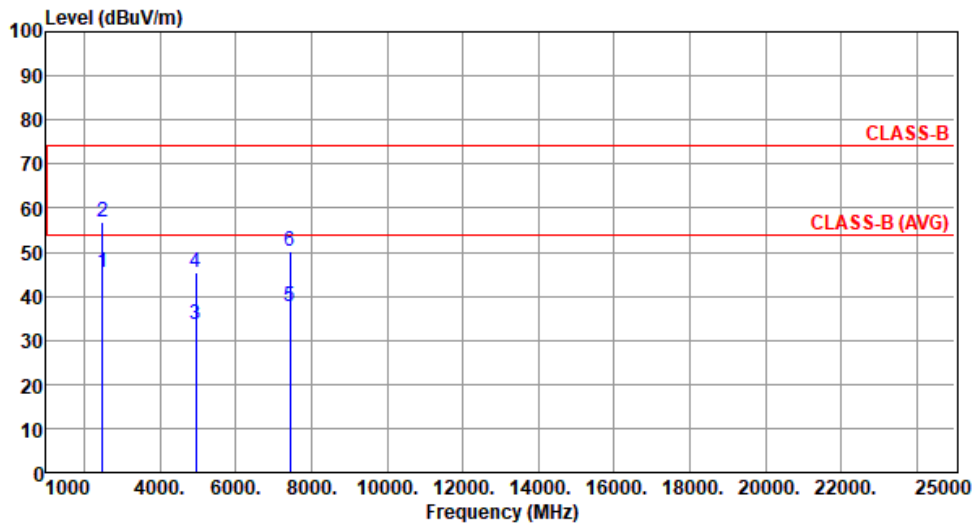
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	45.40	54.00	-8.60	50.15	-4.75	Average	172	180
2	2483.50	56.95	74.00	-17.05	61.70	-4.75	Peak	172	180
3	4960.00	33.68	54.00	-20.32	33.95	-0.27	Average	115	237
4	4960.00	45.52	74.00	-28.48	45.79	-0.27	Peak	115	237
5	7440.00	37.47	54.00	-16.53	32.24	5.23	Average	101	100
6	7440.00	50.32	74.00	-23.68	45.09	5.23	Peak	101	100

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

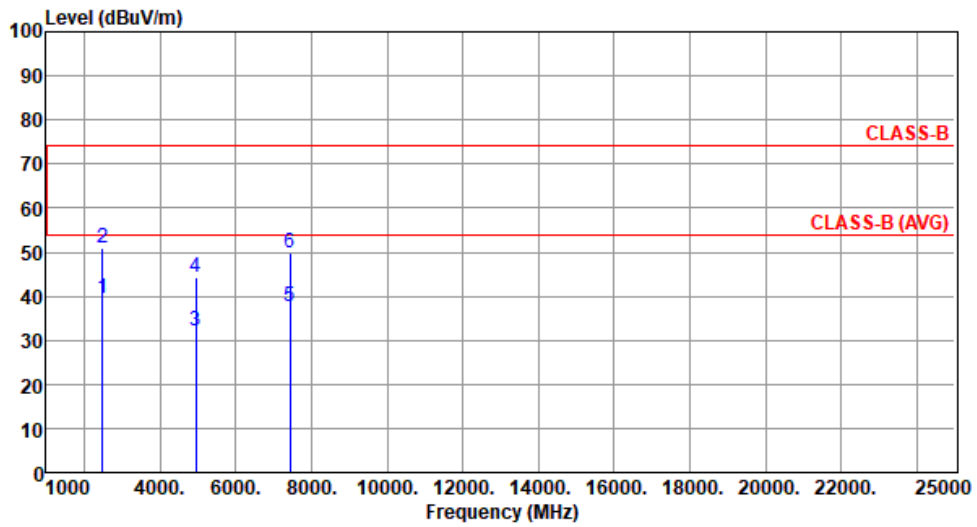
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (2Mbps)	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Paul Lin Temperature(°C):24 Humidity(%):65

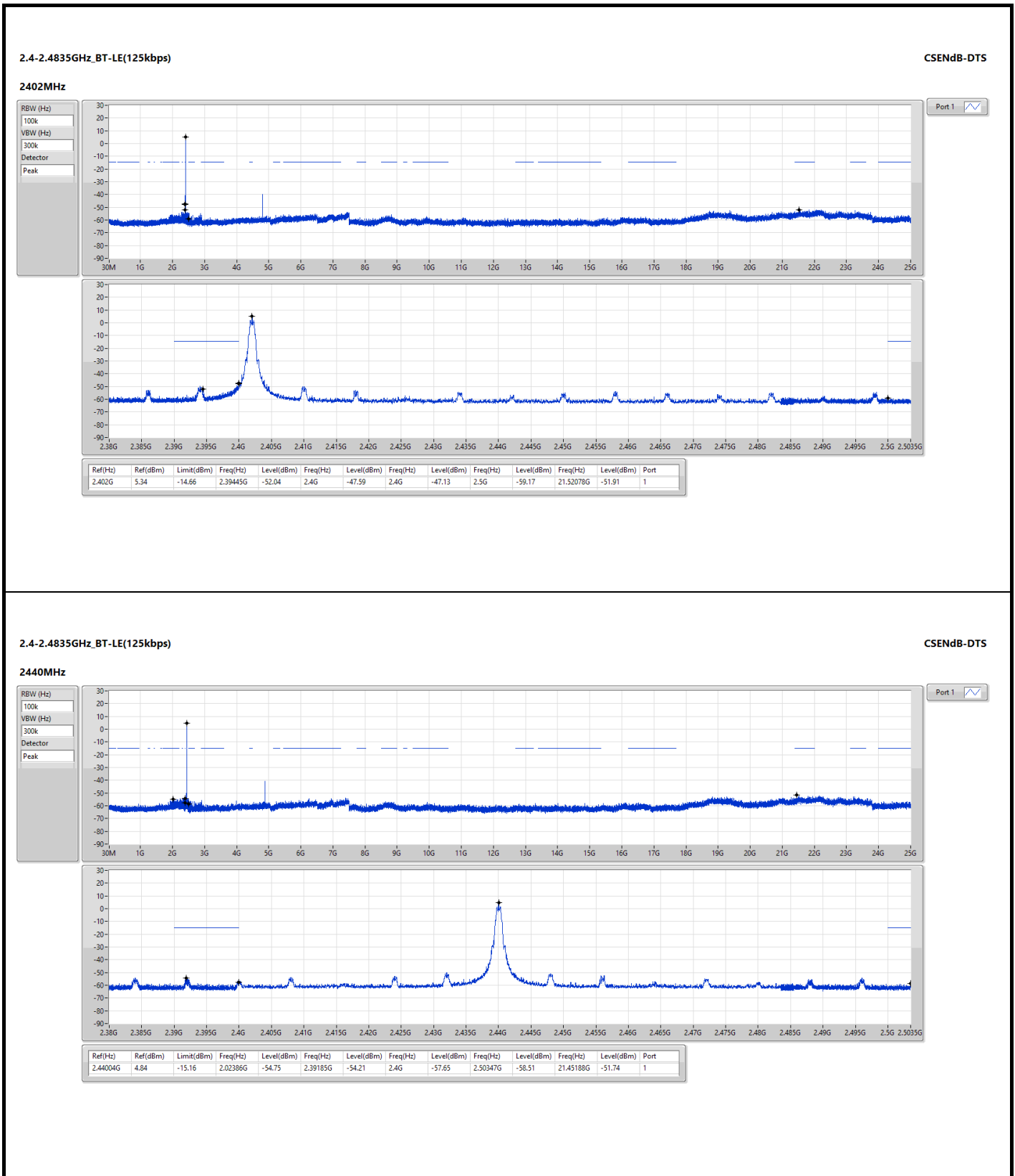


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	39.50	54.00	-14.50	44.25	-4.75	Average	101	54
2	2483.50	50.90	74.00	-23.10	55.65	-4.75	Peak	101	54
3	4960.00	32.19	54.00	-21.81	32.46	-0.27	Average	119	242
4	4960.00	44.26	74.00	-29.74	44.53	-0.27	Peak	119	242
5	7440.00	37.75	54.00	-16.25	32.52	5.23	Average	149	130
6	7440.00	49.65	74.00	-24.35	44.42	5.23	Peak	149	130

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).


2.4-2.4835GHz_BT-LE(125kbps)
CSENdB-DTS

RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak



Port 1

