



Report No.: FR361918

RADIO TEST REPORT

FCC ID : 2AI5IMTP2

Equipment : PROBE

Brand Name : MEATER

Model Name : MT-PR20, MT-PR21, MT-PR22, MT-PR23, MT-PR24

Applicant : Apption Labs Limited

66 Commercial Square, Leicester, LE2 7SR United

Kingdom

Manufacturer (1) : AboCom Systems, Inc.

No. 77, Yu-Yih Rd, Chu-Nan Chen, Miao-Lih

Hsuan, Taiwan, R.O.C.

Manufacturer (2) : Jin Yeong Hann Technology CO., LTD

No. 6, Lane 187, Sec. 2, Chung Cheng Rd, Hu Kou

Hsiang, Hsin Chu Hsieh, Taiwan, R.O.C.

Standard : 47 CFR FCC Part 15.247

The product was received on Jun. 20, 2023, and testing was started from Sep. 07, 2023 and completed on Sep. 19, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A10_6 Ver1.3

Page Number : 1 of 24

Issued Date : Oct. 25, 2023

Report Version : 01

Table of Contents

Histo	ry of this test report	3
Sumr	mary of Test Result	4
1	General Description	5
1.1	Information	5
1.2	Applicable Standards	7
1.3	Testing Location Information	7
1.4	Measurement Uncertainty	7
2	Test Configuration of EUT	8
2.1	Test Channel Mode	8
2.2	The Worst Case Measurement Configuration	8
2.3	EUT Operation during Test	9
2.4	Accessories	9
2.5	Support Equipment	9
2.6	Test Setup Diagram	10
3	Transmitter Test Result	12
3.1	DTS Bandwidth	12
3.2	Maximum Conducted Output Power	13
3.3	Power Spectral Density	16
3.4	Emissions in Non-restricted Frequency Bands	18
3.5	Emissions in Restricted Frequency Bands	19
4	Test Equipment and Calibration Data	23

Appendix A. Test Results of DTS Bandwidth

Appendix B. Test Results of Maximum Conducted Output Power

Appendix C. Test Results of Power Spectral Density

Appendix D. Test Results of Emissions in Non-restricted Frequency Bands

Appendix E. Test Results of Emissions in Restricted Frequency Bands

Appendix F. Test Photos

Photographs of EUT v01

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A10_6 Ver1.3

Page Number : 2 of 24

Issued Date : Oct. 25, 2023

Report No. : FR361918

Report Version : 01

History of this test report

Report No. : FR361918

Report No.	Version	Description	Issued Date
FR361918	01	Initial issue of report	Oct. 25, 2023

TEL: 886-3-656-9065 Page Number : 3 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

Summary of Test Result

Report No.: FR361918

Clause	Test Items	Result (PASS/FAIL)	Remark
15.203	Antenna Requirement	PASS	-
15.207	AC Power-line Conducted Emissions	N/A	Note
15.247(a)	DTS Bandwidth	PASS	-
15.247(b)	Maximum Conducted Output Power	PASS	-
15.247(e)	Power Spectral Density	PASS	-
15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
15.247(d)	Emissions in Restricted Frequency Bands	PASS	-
	15.207 15.247(a) 15.247(b) 15.247(e) 15.247(d) 15.247(d)	15.207 AC Power-line Conducted Emissions 15.247(a) DTS Bandwidth 15.247(b) Maximum Conducted Output Power 15.247(e) Power Spectral Density 15.247(d) Emissions in Non-restricted Frequency Bands 15.247(d) Emissions in Restricted Frequency Bands	15.207 AC Power-line Conducted Emissions N/A 15.247(a) DTS Bandwidth PASS 15.247(b) Maximum Conducted Output Power PASS 15.247(e) Power Spectral Density PASS 15.247(d) Emissions in Non-restricted Frequency Bands PASS

Note: The EUT was powered by battery; it's not necessary to apply to AC Power-line Conducted Emissions test.

Conformity Assessment Condition:

- 1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- 2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Sophia Shiung

TEL: 886-3-656-9065 Page Number : 4 of 24 FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Report No.: FR361918

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz BT-LE(1Mbps)		1.0	1TX

Note:

- Bluetooth LE uses a GFSK modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	Apptionlabs	G2 ANT	PCB Antenna	N/A	1.8

Note 1: The above information was declared by manufacturer.

Note 2: For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving functions.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

Note:

- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

 TEL: 886-3-656-9065
 Page Number : 5 of 24

 FAX: 886-3-656-9085
 Issued Date : Oct. 25, 2023

1.1.4 EUT Operational Condition

EUT Power Type	From Battery (1.5V)			
Function	⊠ Point-to-multipoint □ Point-to-point			
Test Software Version	SmartRF Studio 7 Version 2.13.1			
	LE 1M PHY: 1 Mb/s			
Support Mode	LE Coded PHY (S=2): 500 Kb/s			
Support Mode	LE Coded PHY (S=8): 125 Kb/s			
	LE 2M PHY: 2 Mb/s			

Report No.: FR361918

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
MT-PR20	
MT-PR21	
MT-PR22	All the models are identical, the different model names served as marketing strate
MT-PR23	
MT-PR24	

Note 1: From the above models, model: MT-PR20 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

TEL: 886-3-656-9065 Page Number : 6 of 24 FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Report No.: FR361918

- 47 CFR FCC Part 15.247
- ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 558074 D01 v05r02
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information

Test Lab.: Sporton International Inc. Hsinchu Laboratory

Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085

Test site Designation No. TW3787 with FCC.

Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Eason Chen	24.3~25.1 / 62~68	Sep. 19, 2023
Radiated < 1GHz	03CH06-CB	Ederson Huang	22.5~23.9 / 59~61	Sep. 07, 2023
Radiated > 1GHz	03CH02-CB	Gordon Hung	22~23.5 / 58~63	Sep. 18, 2023

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	3.1 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.1 dB	Confidence levels of 95%
Bandwidth Measurement	2.2%	Confidence levels of 95%

TEL: 886-3-656-9065 Page Number: 7 of 24
FAX: 886-3-656-9085 Issued Date: 0ct. 25, 2023

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	5
2440MHz	5
2480MHz	5

Report No. : FR361918

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands		
Test Condition	Conducted measurement at transmit chains	

Th	The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands			
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.			
	Normal Link			
Operating Mode < 1GHz	The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at X axis. Thus, the measurement will follow this same test configuration.			
4				
1	EUT in X axis_Charge mode			
2	EUT in X axis_Standby mode			
For operating mode 2 is th	e worst case and it was record in this test report.			
	СТХ			
Operating Mode > 1GHz	The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Y axis. Thus, the measurement will follow this same test configuration.			
1	EUT in Y axis_Standby mode			
Mode 1 has been evaluated to be the worst case after evaluating. Consequently, measurement will follow this same test mode.				

TEL: 886-3-656-9065 Page Number : 8 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories
Charger*1
Battery (For Charger use)*1

Report No.: FR361918

2.5 Support Equipment

For Radiated (below 1GHz):

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	iPad	Apple	A1430	N/A	

For Radiated (above 1GHz):

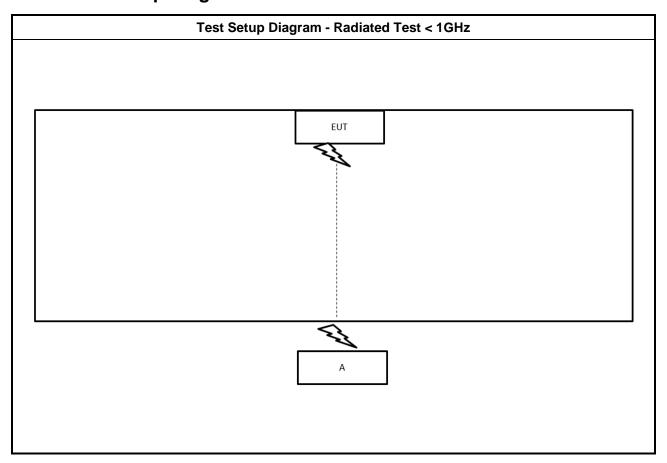
	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Notebook	DELL	E4300	N/A	
В	Fixture	T1	LAUNCHXL-CC2640R2	N/A	

For RF Conducted:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	Notebook	DELL	E4300	N/A		
В	Fixture	T1	LAUNCHXL-CC2640R2	N/A		

TEL: 886-3-656-9065 Page Number : 9 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

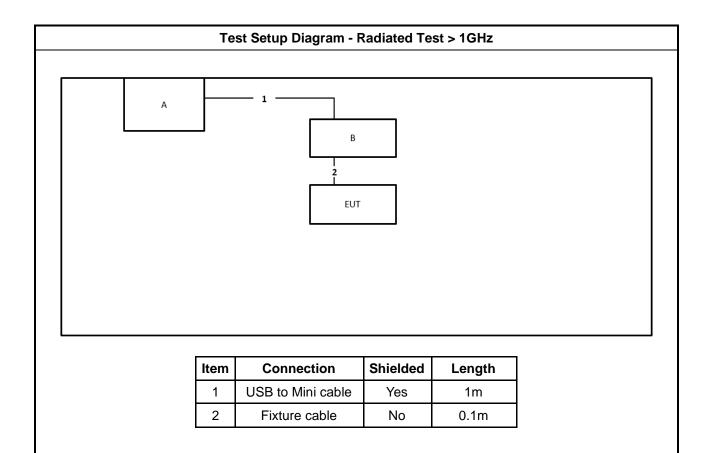
2.6 Test Setup Diagram



Report No. : FR361918

TEL: 886-3-656-9065 Page Number : 10 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

Report No. : FR361918



 TEL: 886-3-656-9065
 Page Number : 11 of 24

 FAX: 886-3-656-9085
 Issued Date : Oct. 25, 2023

3 Transmitter Test Result

3.1 DTS Bandwidth

3.1.1 6dB Bandwidth Limit

6dB Bandwidth Limit		
Systems using digital modulation techniques:		
■ 6 dB bandwidth ≥ 500 kHz.		

Report No. : FR361918

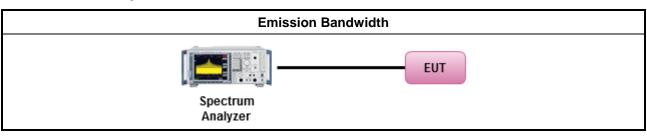
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

	Test Method				
•	For the emission bandwidth shall be measured using one of the options below:				
	\boxtimes	Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.			
		Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.			
		Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.			

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

TEL: 886-3-656-9065 Page Number : 12 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit

- If $G_{TX} \le 6$ dBi, then $P_{Out} \le 30$ dBm (1 W)
- Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)$ dBm
- Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
- Smart antenna system (SAS):
 - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3 + 8$ dB dBm

Report No.: FR361918

 P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.

3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

TEL: 886-3-656-9065 Page Number : 13 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

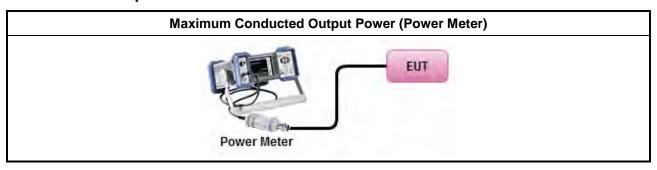
3.2.3 Test Procedures

	Test Method				
•	Max	mum Peak Conducted Output Power			
		Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).			
		Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).			
•	Max	mum Conducted Output Power			
	[duty	v cycle ≥ 98% or external video / power trigger]			
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.			
		Refer as FCC KDB 558074, clause $8.3.2.2$ & C63.10 clause $11.9.2.2.3$ Method AVGSA-1A. (alternative)			
	duty	cycle < 98% and average over on/off periods with duty factor			
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.			
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)			
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3			
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)			
	Mea	surement using a power meter (PM)			
		Refer as FCC KDB 558074, clause $8.3.2.3$ & C63.10 clause $11.9.2.3.1$ Method AVGPM (using an RF average power meter).			
		Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.2$ Method AVGPM-G (using an gate RF average power meter).			
•	For	conducted measurement.			
	•	If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.			
	•	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n \\ \text{(calculated in linear unit [mW] and transfer to log unit [dBm])} \\ \text{EIRP}_{total} = P_{total} + DG$			

Report No. : FR361918

TEL: 886-3-656-9065 Page Number : 14 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

3.2.4 Test Setup



Report No. : FR361918

3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

TEL: 886-3-656-9065 Page Number : 15 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023



3.3 Power Spectral Density

3.3.1 Power Spectral Density Limit

Power Spectral Density Limit ■ Power Spectral Density (PSD)≤8 dBm/3kHz

Report No. : FR361918

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

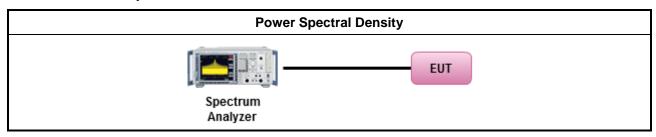
	Test Method			
•	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).			
	Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.			
	[duty cycle ≥ 98% or external video / power trigger]			
•	For conducted measurement.			
	If The EUT supports multiple transmit chains using options given below:			
	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.			
	Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,			
	Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit			

 TEL: 886-3-656-9065
 Page Number: 16 of 24

 FAX: 886-3-656-9085
 Issued Date: Oct. 25, 2023



3.3.4 Test Setup



Report No. : FR361918

3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

TEL: 886-3-656-9065 Page Number : 17 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

3.4 Emissions in Non-restricted Frequency Bands

3.4.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit		
RF output power procedure	Limit (dBc)	
Peak output power procedure	20	
Average output power procedure	30	

Report No.: FR361918

- Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
- Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

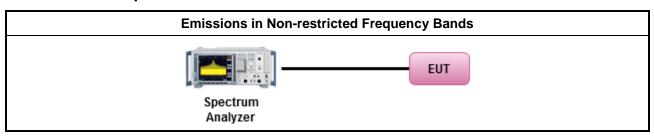
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
 Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands. 	

3.4.4 Test Setup



3.4.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D

TEL: 886-3-656-9065 Page Number : 18 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

3.5 Emissions in Restricted Frequency Bands

3.5.1 Emissions in Restricted Frequency Bands Limit

	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									

Report No.: FR361918

- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the FLIT
- Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

TEL: 886-3-656-9065 Page Number : 19 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

3.5.3 Test Procedures

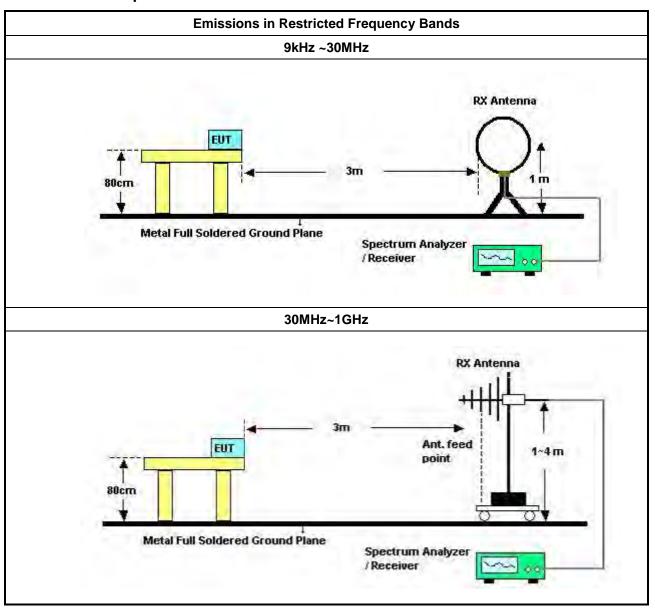
		Test Method
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
•		er as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency and highest frequency channel within the allowed operating band.
•	For	the transmitter unwanted emissions shall be measured using following options below:
	•	Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).
		Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
•	For	the transmitter band-edge emissions shall be measured using following options below:
	•	Refer as FCC KDB 558074 clause 8.7 & c63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	•	Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	•	Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
	•	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
	•	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

Report No. : FR361918

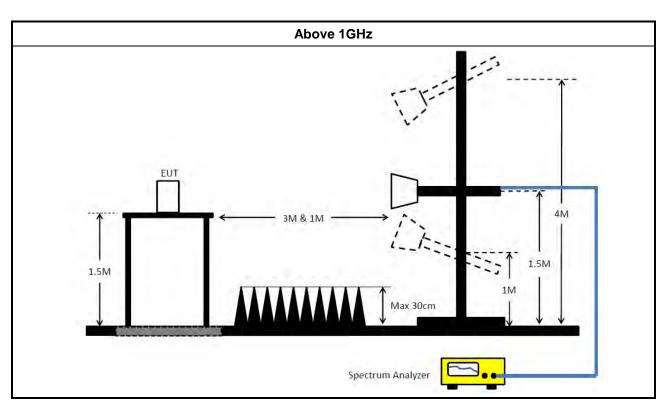
TEL: 886-3-656-9065 Page Number : 20 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

ADIO TEST REPORT Report No. : FR361918

3.5.4 Test Setup



TEL: 886-3-656-9065 Page Number : 21 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023



Report No.: FR361918

3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.5.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.5.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix E

TEL: 886-3-656-9065 Page Number : 22 of 24
FAX: 886-3-656-9085 Issued Date : Oct. 25, 2023

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 23, 2023	Mar. 22, 2024	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 03, 2023	Aug. 02, 2024	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Jul. 30, 2023	Jul. 29, 2024	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 04, 2022	Nov. 03, 2023	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 21, 2022	Dec. 20, 2023	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-24+68	30MHz~1GHz	Aug. 15, 2023	Aug. 14, 2024	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M 03CH02-C		1GHz ~18GHz	Mar. 25, 2023	Mar. 24, 2024	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH02-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSU	100015	9kHz~26GHz	Dec. 05, 2022	Dec. 04, 2023	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 29, 2023	May 28, 2024	Conducted (TH01-CB)

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A10_6 Ver1.3

Page Number : 23 of 24 Issued Date : Oct. 25, 2023

Report No. : FR361918

Report Version : 01

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Switch	SPTCB	SP-SWI	SWI-01	1 GHz –26.5 GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 22, 2023	Feb. 21, 2024	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 22, 2023	Feb. 21, 2024	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Report No. : FR361918

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

NCR means Non-Calibration required.

 TEL: 886-3-656-9065
 Page Number : 24 of 24

 FAX: 886-3-656-9085
 Issued Date : Oct. 25, 2023



Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	-	-	=	-	-
BT-LE(1Mbps)	716.25k	1.07M	1M07F1D	706.25k	1.058M

 $Max\text{-N} \ dB = Maximum \ 6dB \ down \ bandwidth; \ Max\text{-OBW} = Maximum \ 99\% \ occupied \ bandwidth; \ Min\text{-OBW} = Minimum \ 99\% \ oc$

Sporton International Inc. Hsinchu Laboratory

Page No. : 1 of 4

Report No. : FR361918



Result

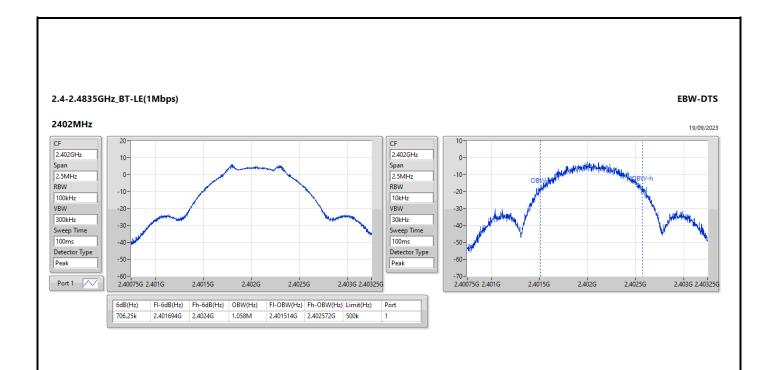
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	
		(Hz)	(Hz)	(Hz)	
BT-LE(1Mbps)	-	=	-	-	
2402MHz	Pass	500k	706.25k	1.058M	
2440MHz	Pass	500k	715k	1.066M	
2480MHz	Pass	500k	716.25k	1.07M	

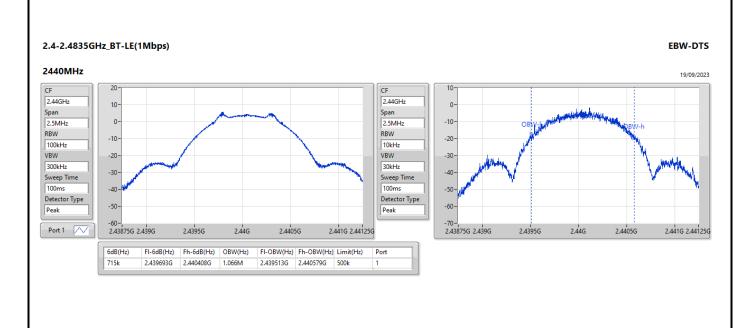
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth

Sporton International Inc. Hsinchu Laboratory

Page No. : 2 of 4

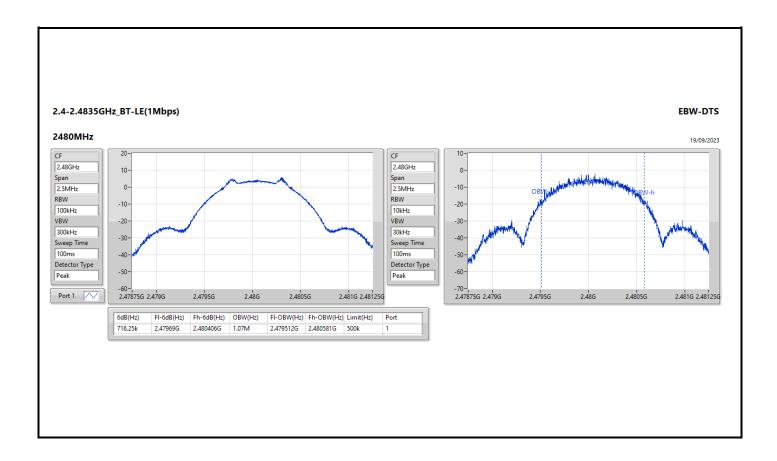
Report No. : FR361918





Page No. : 3 of 4

Report No. : FR361918



Page No. : 4 of 4

Report No. : FR361918



Average Power-DTS

Appendix B

Summary

Mode	Total Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	5.55	0.00359

Sporton International Inc. Hsinchu Laboratory

Page No. : 1 of 2 Report No. : FR361918



Average Power-DTS

Appendix B

Result

Mode	Result	DG	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.80	5.55	30.00
2440MHz	Pass	1.80	5.23	30.00
2480MHz Pass		1.80	5.13	30.00

DG = Directional Gain; Port X = Port X output power

Page No. : 2 of 2 Report No. : FR361918



PSD-DTS Appendix C

Summary

Mode	PD				
	(dBm/RBW)				
2.4-2.4835GHz	-				
BT-LE(1Mbps)	-3.94				

RBW = 3kHz;

Sporton International Inc. Hsinchu Laboratory

Page No. : 1 of 4

Report No. : FR361918



Appendix C **PSD-DTS**

Result

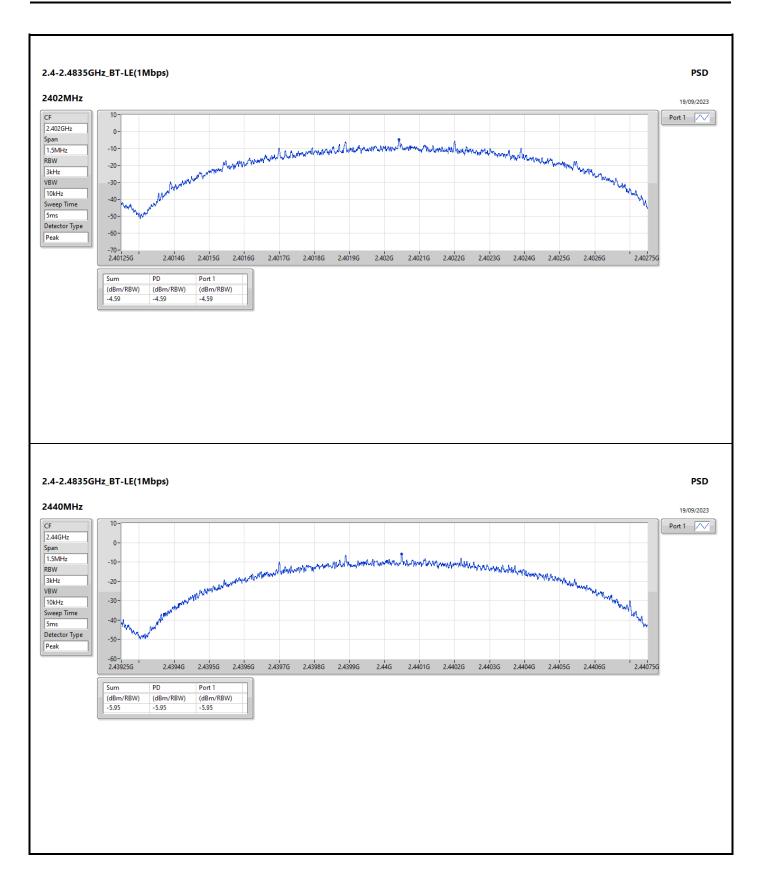
Mode	Result	DG	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	
BT-LE(1Mbps)	-	-	-	-	
2402MHz	Pass	1.80	-4.59	8.00	
2440MHz	Pass	1.80	-5.95	8.00	
2480MHz	Pass	1.80	-3.94	8.00	

Sporton International Inc. Hsinchu Laboratory Page No. Report No. : FR361918

DG = Directional Gain; RBW = 3kHz; PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

Appendix C

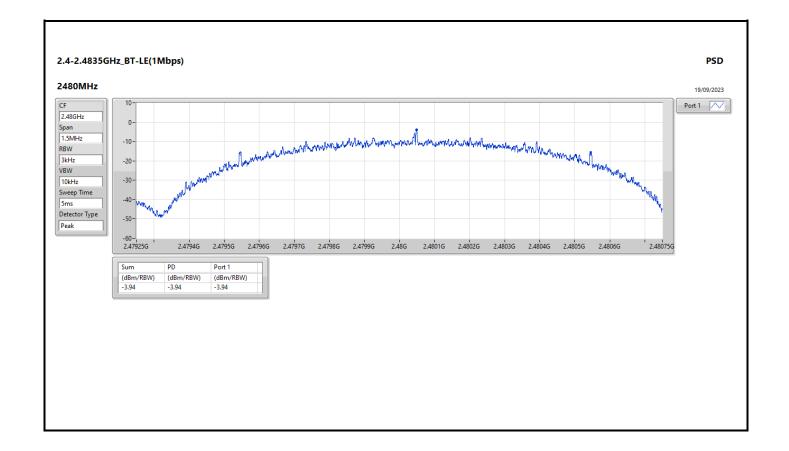




Page No. : 3 of 4

Report No. : FR361918

PSD-DTS Appendix C



Page No. : 4 of 4

Report No. : FR361918



CSE NdB-DTS Appendix D

Summary

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.40217G	5.38	-24.62	1.90413G	-54.73	2.4G	-45.11	2.4G	-43.10	2.50298G	-50.23	21.67895G	-47.13	1

Sporton International Inc. Hsinchu Laboratory Page No. Report No.

: FR361918



CSE NdB-DTS Appendix D

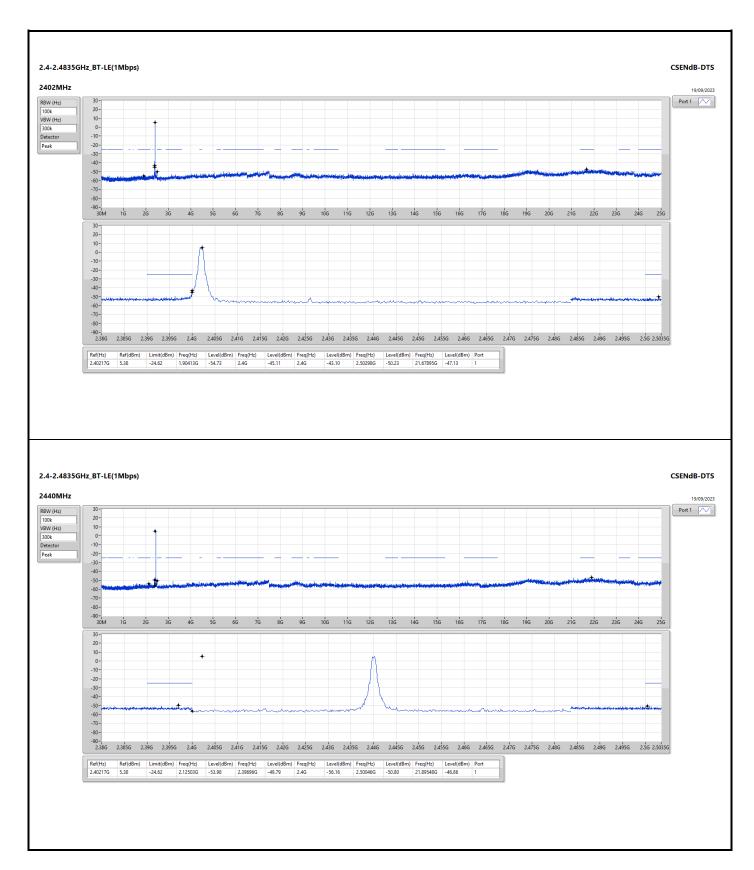
Result

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40217G	5.38	-24.62	1.90413G	-54.73	2.4G	-45.11	2.4G	-43.10	2.50298G	-50.23	21.67895G	-47.13	1
2440MHz	Pass	2.40217G	5.38	-24.62	2.12503G	-53.98	2.39696G	-49.79	2.4G	-56.16	2.50046G	-50.80	21.89548G	-46.86	1
2480MHz	Pass	2.40217G	5.38	-24.62	57.03M	-52.74	2.3968G	-50.32	2.4G	-56.34	2.50058G	-51.01	21.75488G	-47.34	1

Sporton International Inc. Hsinchu Laboratory Page No. Report No.

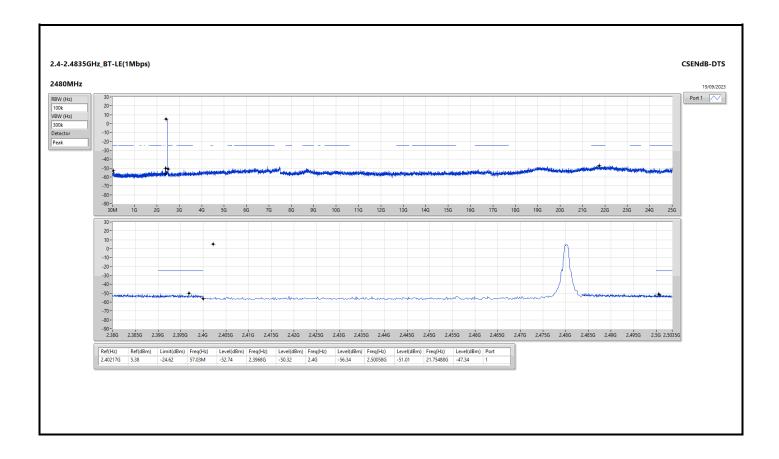
: FR361918





Page No. : 3 of 4

Report No. : FR361918



Page No. : 4 of 4

Report No. : FR361918



Radiated Emissions below 1GHz

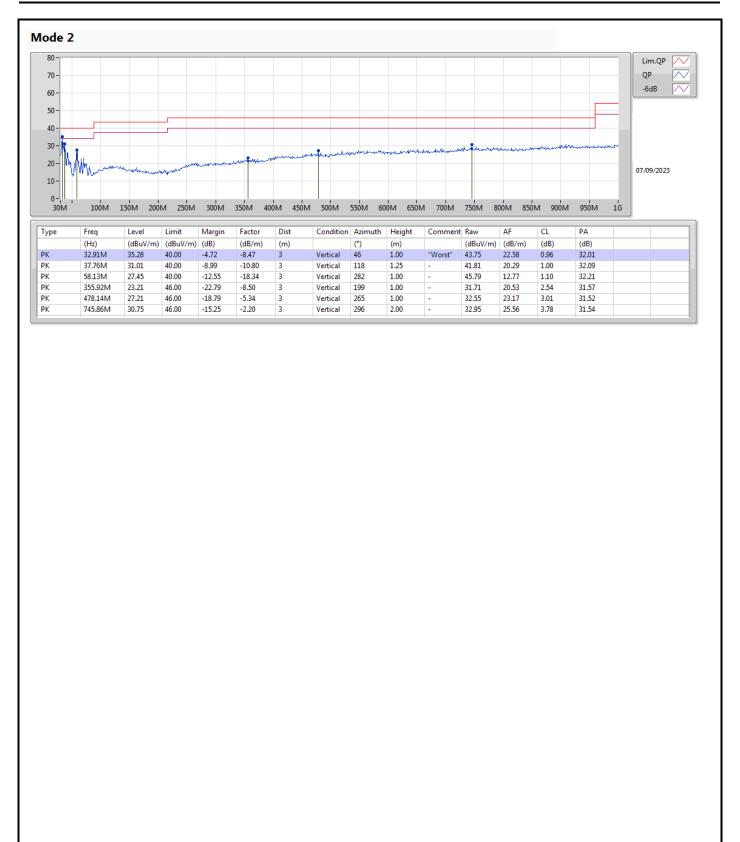
Appendix E.1

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	PK	32.91M	35.28	40.00	-4.72	Vertical

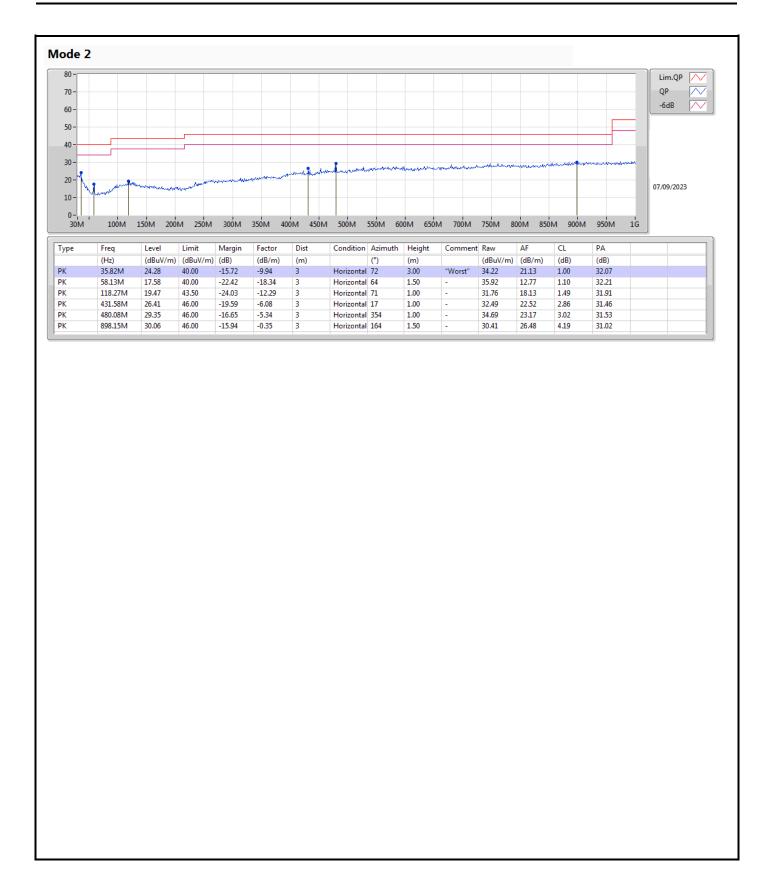
Sporton International Inc. Hsinchu Laboratory Page No. Report No.

: FR361918



Page No. : 2 of 3

Report No. : FR361918



Page No. : 3 of 3

Report No. : FR361918



RSE TX above 1GHz

Appendix E.2

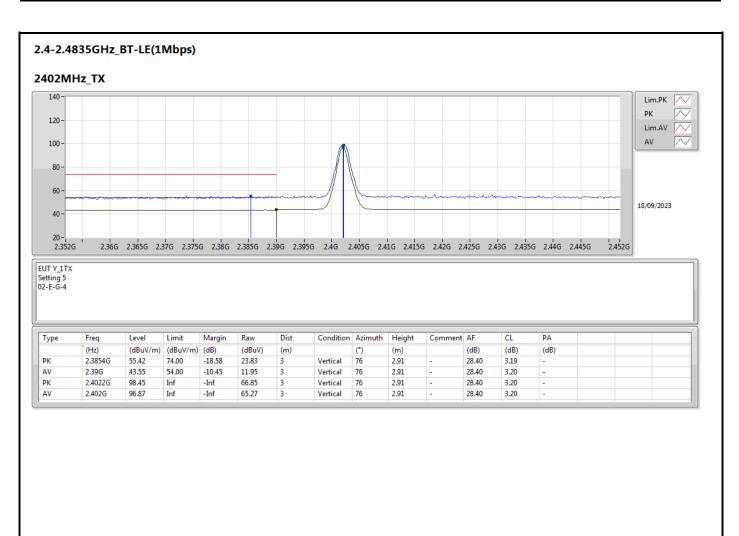
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-		-	-
BT-LE(1Mbps)	Pass	AV	4.9601G	51.68	54.00	-2.32	3	Vertical	305	2.95	-

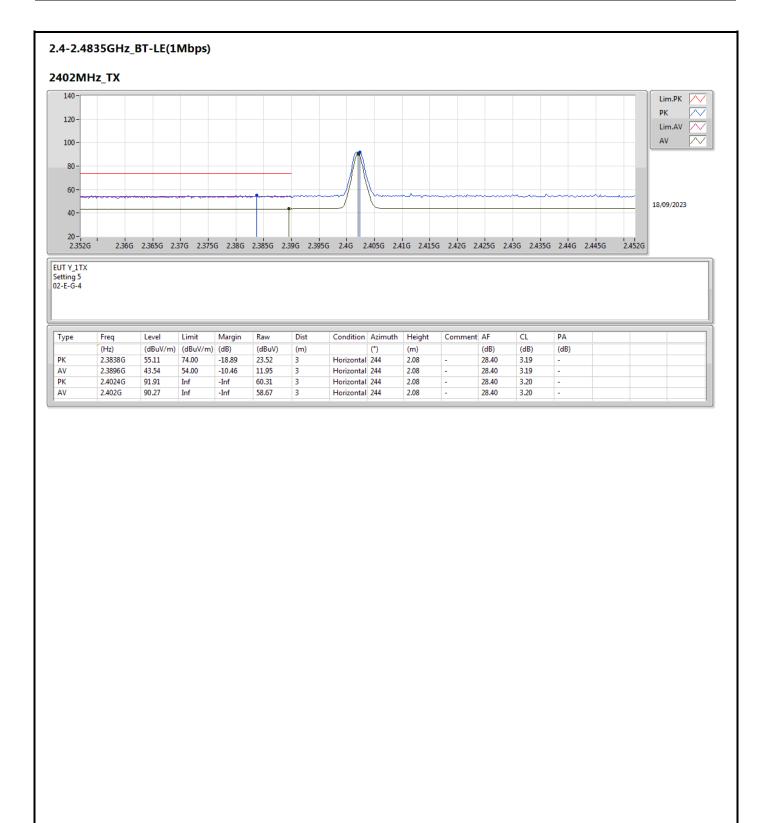
Sporton International Inc. Hsinchu Laboratory Page No. : 1 of 13 Report No.

: FR361918

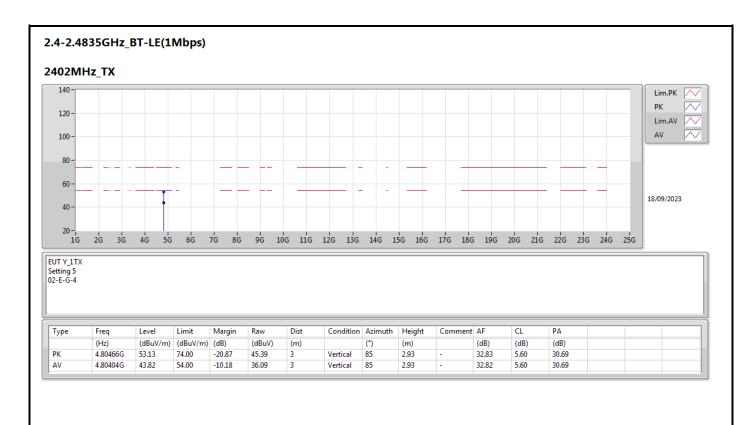






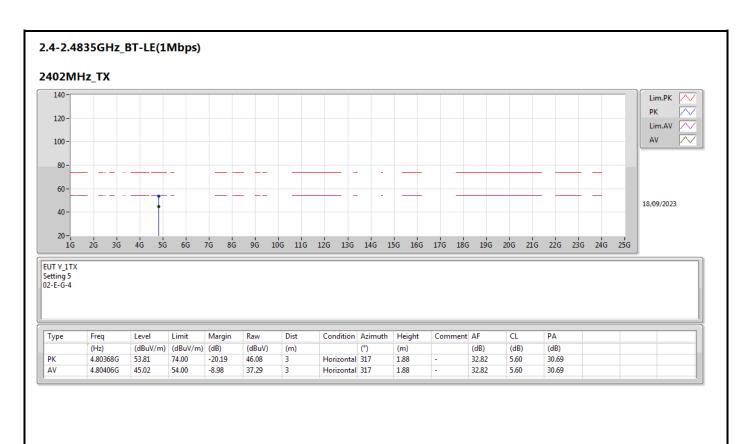






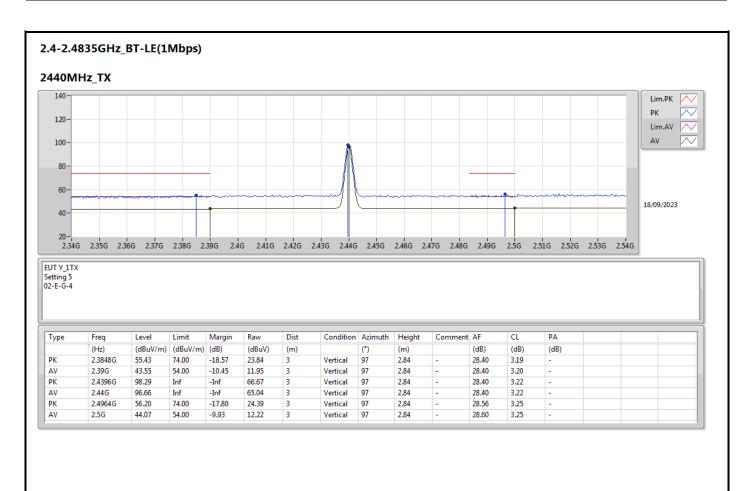
Page No. : 4 of 13 Report No. : FR361918





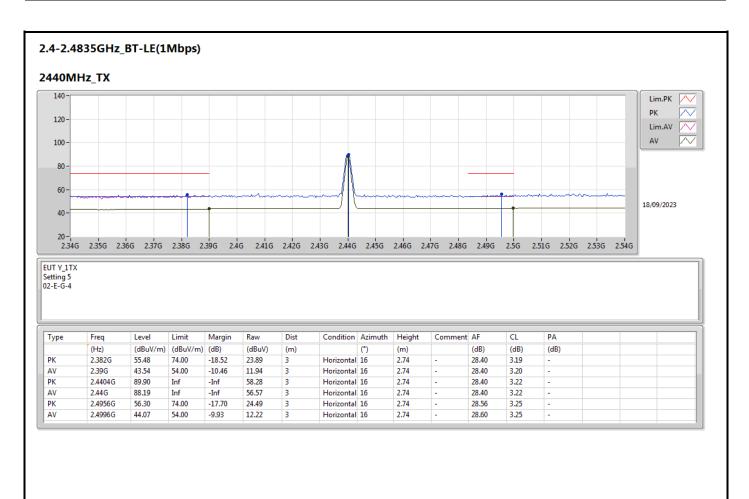
Page No. : 5 of 13 Report No. : FR361918





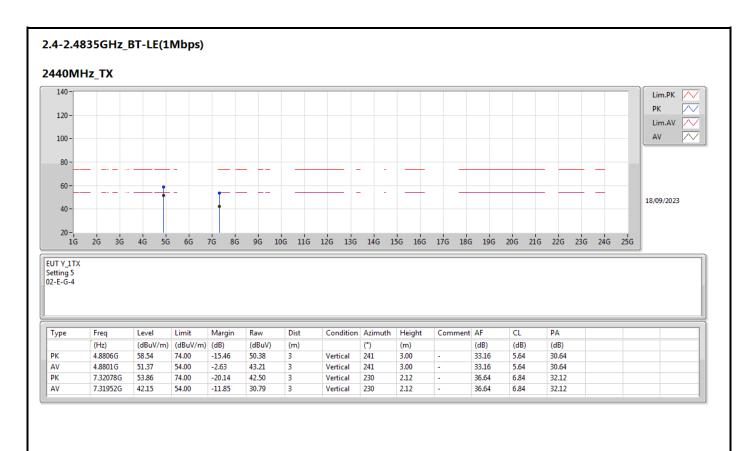
Page No. : 6 of 13 Report No. : FR361918





Page No. : 7 of 13 Report No. : FR361918





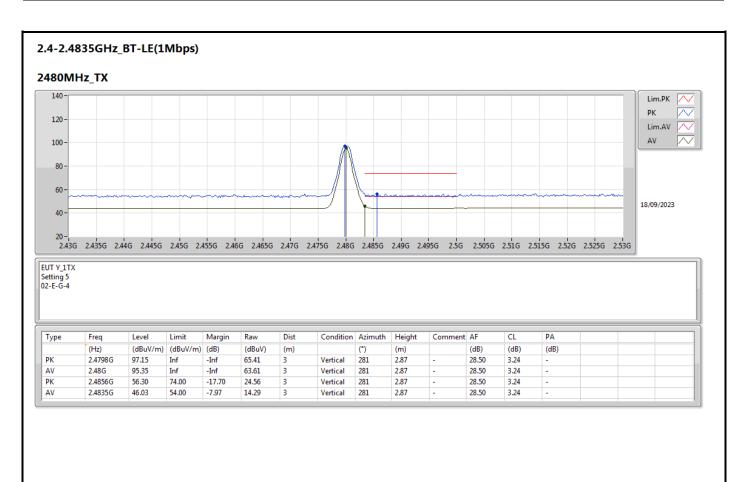
Page No. : 8 of 13 Report No. : FR361918





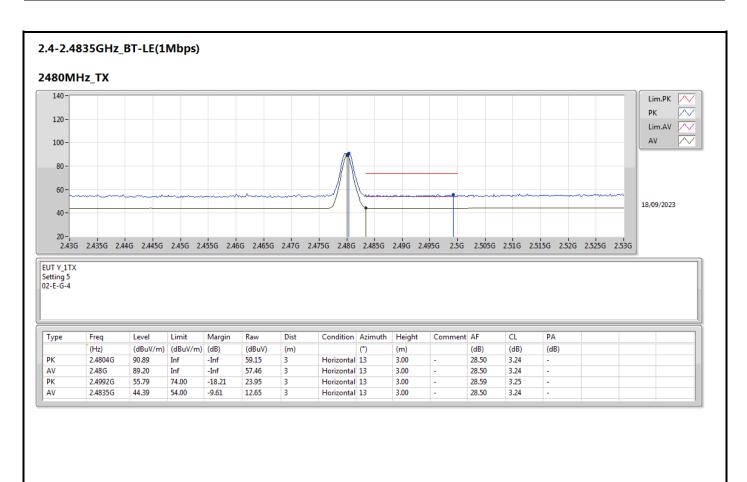
Page No. : 9 of 13 Report No. : FR361918





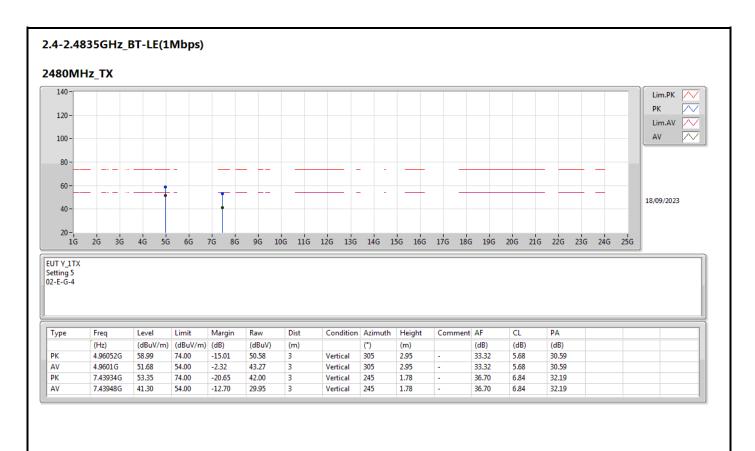
Page No. : 10 of 13 Report No. : FR361918





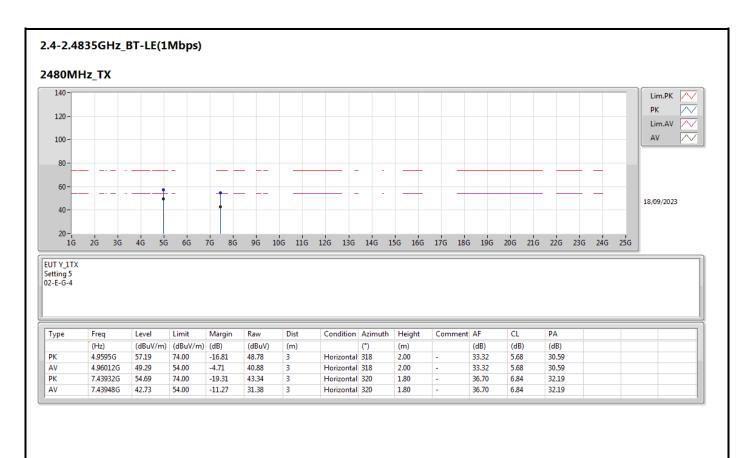
Page No. : 11 of 13 Report No. : FR361918





Page No. : 12 of 13 Report No. : FR361918





Page No. : 13 of 13 Report No. : FR361918