



# RADIO TEST REPORT

**FCC ID** : LDK-9160S2578  
**Equipment** : Catalyst Wireless 9166I Wi-Fi 6E Series Access Point ,  
Catalyst Wireless 9164I Wi-Fi 6E Series Access Point  
**Brand Name** : CISCO  
**Model Name** : CW9166I-B, CW9164I-B, CW9166I-MR, CW9164I-MR  
**Applicant** : Cisco Systems Inc  
125 West Tasman Drive San Jose California United  
States 95134-1706  
**Manufacturer** : Cisco Systems Inc  
125 West Tasman Drive San Jose California United  
States 95134-1706  
**Standard** : 47 CFR FCC Part 15.247

The product was received on Dec. 28, 2021, and testing was started from Jan. 22, 2022 and completed on May 13, 2022. 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.)



## Table of Contents

**History of this test report.....3**

**Summary of Test Result.....4**

**1 General Description .....5**

1.1 Information.....5

1.2 Applicable Standards .....11

1.3 Testing Location Information.....11

1.4 Measurement Uncertainty .....11

**2 Test Configuration of EUT .....12**

2.1 Test Channel Mode .....12

2.2 The Worst Case Measurement Configuration.....13

2.3 EUT Operation during Test .....16

2.4 Accessories .....16

2.5 Support Equipment.....16

2.6 Test Setup Diagram .....18

**3 Transmitter Test Result .....21**

3.1 AC Power-line Conducted Emissions .....21

3.2 DTS Bandwidth .....23

3.3 Maximum Conducted Output Power .....24

3.4 Power Spectral Density .....27

3.5 Emissions in Non-restricted Frequency Bands .....29

3.6 Emissions in Restricted Frequency Bands.....30

**4 Test Equipment and Calibration Data .....35**

**Appendix A. Test Results of AC Power-line Conducted Emissions**

**Appendix B. Test Results of DTS Bandwidth**

**Appendix C. Test Results of Maximum Conducted Output Power**

**Appendix D. Test Results of Power Spectral Density**

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

**Appendix F. Test Results of Emissions in Restricted Frequency Bands**

**Appendix G. Test Photos**

**Photographs of EUT v01**



## History of this test report

Report No.	Version	Description	Issued Date
FR1D2822-01AD	01	Initial issue of report	May 24, 2022
FR1D2822-01AD	02	Add a note of Table for Radio function	Jul. 13, 2022



### Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

**Declaration of Conformity:**

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

**Comments and Explanations:**

1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
2. 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.

**Reviewed by: Sam Chen**

**Report Producer: Vicky Huang**



# 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]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1
2.4-2.4835GHz	BT-LE(500Kb/s)	1.0	1
2.4-2.4835GHz	BT-LE(125Kb/s)	1.0	1
2.4-2.4835GHz	BT-LE(2Mbps)	2.0	1

Note:

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



**1.1.2 Antenna Information**

Ant.	Port						Bluetooth	Brand	Model Name	Ant. Type	Connector	Gain (dBi)
	R1: WLAN 2.4GHz	R1: WLAN 5GHz UNII 1~3	R2: WLAN 5GHz UNII 2C~3	R2: WLAN 6GHz UNII 5~8	R3: WLAN 2.4GHz /5GHz UNII 1~3/6GHz UNII 5~8							
1	3	4	-	-	-	-	CISCO	95XEAJ15.G04	Folded	I-PEX	Note2	
2	4	3	-	-	-	-	CISCO	95XEAJ15.G03	Folded	I-PEX		
3	2	2	-	-	-	-	CISCO	95XEAJ15.G05	Folded	I-PEX		
4	1	1	-	-	-	-	CISCO	95XEAJ15.G06	Folded	I-PEX		
5	-	-	4	4	-	-	CISCO	95XEAJ15.G12	H-POL Alford loop	I-PEX		
6	-	-	3	3	-	-	CISCO	95XEAJ15.G11	H-POL Alford loop	I-PEX		
7	-	-	1	1	-	-	CISCO	95XEAJ15.G09	H-POL Alford loop	I-PEX		
8	-	-	2	2	-	-	CISCO	95XEAJ15.G10	H-POL Alford loop	I-PEX		
9	-	-	-	-	1	-	CISCO	95XEAJ15.G07	PIFA	I-PEX		
10	-	-	-	-	2	-	CISCO	95XEAJ15.G08	PIFA	I-PEX		
11	-	-	-	-	-	1	CISCO	95XEAJ15.G13	PIFA	I-PEX		

Note1: R means Radio.

Note2:

Ant.	Antenna Gain (dBi)										Bluetooth	Remark
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8			
1	2.79	4.27	3.94	1.88	2.57	-	-	-	-	-	-	Radio 1
2	2.43	5.09	5.16	2.89	2.72	-	-	-	-	-	-	Radio 1
3	2.79	2.78	2.74	2.66	1.91	-	-	-	-	-	-	Radio 1
4	2.62	5.24	5.46	4.26	3.94	-	-	-	-	-	-	Radio 1
5	-	-	-	2.98	4.19	2.4	2.41	1.39	0.77	-	-	Radio 2
6	-	-	-	3.46	4.94	2.95	1.96	1.32	0.87	-	-	Radio 2
7	-	-	-	3.42	4.36	2.95	2.31	0.99	0.61	-	-	Radio 2
8	-	-	-	3.67	4.23	2.91	3.96	1.59	0.33	-	-	Radio 2
9	3.3	4.0				5.3				-	Radio 3	
10	3.3	4.0				5.3				-	Radio 3	
11	-	-	-	-	-	-	-	-	-	3.8	Radio 4	



Note3:

Item	Directional Gain (dBi)									Remark
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8	
2T1S	4.29	5.39	5.26	4.69	4.16	-	-	-	-	Radio 1
2T2S	1.28	2.99	2.99	2.02	1.65	-	-	-	-	
4T1S	6.92	6.99	7.25	6.62	5.97	-	-	-	-	
4T2S	3.92	5.24	5.46	4.26	3.94	-	-	-	-	
4T4S	0.93	1.09	1.55	0.94	0.27	-	-	-	-	
2T1S	-	-	-	5.82	5.21	5.38	4.47	4.13	3.08	Radio 2
2T2S	-	-	-	2.82	2.53	2.37	1.59	1.12	0.09	
4T1S	-	-	-	8.6	7.96	7.45	6.03	6.05	4.51	
4T2S	-	-	-	5.6	4.96	4.45	3.96	3.05	1.51	
4T4S	-	-	-	2.59	2.12	1.51	0.27	0.07	-1.19	

Note4: The above information (except gain of Radio 1 and Radio 2) was declared by manufacturer.

Note5: Radio 1 (WLAN 2.4/5GHz UNII 1~3), Radio 2 (5GHz UNII 2C~3/6GHz UNII 5~8): The directional gain is measured which follows the procedure of KDB 662911 D03. The antenna report is provided in the operational description for this application.

Note6: The EUT has eleven antennas.

**For WLAN 2.4GHz function (Radio 1):**

**For IEEE 802.11b/g/n/VHT/ax mode (1TX,2TX,4TX/4RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 4TX

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit simultaneously.

For 4RX

Port 1, Port 2, Port 3 and Port 4 can be used as receiving antennas.

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

**For WLAN 5GHz function (Radio 1 and Radio 2):**

**For IEEE 802.11a/n/ac/ax mode (1TX,2TX,4TX/4RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 4TX

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit simultaneously.

For 4RX

Port 1, Port 2, Port 3 and Port 4 can be used as receiving antennas.

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

**For 6GHz function (Radio 2):**

**For IEEE 802.11ax mode (1TX,2TX,4TX/4RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2TX

Only Port 1 and Port 2 can be use as transmitting antenna.

Port 1 and Port 2 could transmit simultaneously.

For 4TX

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting antenna.



Port 1, Port 2, Port 3 and Port 4 could transmit simultaneously.

For 4RX

Port 1, Port 2, Port 3 and Port 4 can be used as receiving antennas.

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

**For Scanning Radio 3:**

**For WLAN 2.4GHz function**

**For 802.11b/g/n/VHT/ax mode (1TX/2RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.

**For WLAN 5GHz function**

**For IEEE 802.11a/n/ac/ax mode (1TX/2RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.

**For 6GHz function:**

**For IEEE 802.11ax mode (1TX/2RX):**

For 1TX

Only Port 1 can be use as transmitting antenna.

For 2RX

Port 1 and Port 2 can be used as receiving antennas.

Port 1 and Port 2 could receive simultaneously.

**For Bluetooth function (Radio 4):**

**For Bluetooth mode (1TX/1RX):**

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

**1.1.3 Mode Test Duty Cycle**

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.871	0.6	2.178m	1k
BT-LE(2Mbps)	0.586	2.32	1.123m	1k

**Note:**

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





**1.1.4 EUT Operational Condition**

<b>EUT Power Type</b>	From Power Adapter or PoE	
<b>Test Software Version</b>	Tera team 4.75	
<b>Support Mode</b>	<input checked="" type="checkbox"/>	LE 1M PHY: 1 Mb/s
	<input checked="" type="checkbox"/>	LE Coded PHY (S=2): 500 Kb/s
	<input checked="" type="checkbox"/>	LE Coded PHY (S=8): 125 Kb/s
	<input checked="" type="checkbox"/>	LE 2M PHY: 2 Mb/s

Note: The above information was declared by manufacturer.

**1.1.5 Table for Multiple Listing**

Equipment Name	Model Name	SW	R1: 2.4GHz	R1: 5GHz Low Band or R1: 5GHz Full Band	R2: 5GHz High band or R2: 6GHz	R3: 2.4GHz/5GHz/6GHz	R4: Bluetooth
Catalyst Wireless 9166I Wi-Fi 6E Series Access Point	CW9166I-B	Cisco	√ (1/2/4TX +4RX)	√ (With 80+80MHz)	√	√	√
	CW9166I-MR	Meraki	√ (1/2/4TX +4RX)	√ (Without 80+80MHz)	√	√	√
Catalyst Wireless 9164I Wi-Fi 6E Series Access Point	CW9164I-B	Cisco	√ (1/2TX +2RX)	√ (5GHz Full Band only, with 80+80MHz)	√ (6GHz only)	√	√
	CW9164I-MR	Meraki	√ (1/2TX +2RX)	√ (5GHz Full Band only, without 80+80MHz)	√ (6GHz only)	√	√

Note1: From the above models, model: CW9166I-B was selected as representative model for the test and its data was recorded in this report.

Note2: The above information was declared by manufacturer.

**1.1.6 Table for Radio function**

Function Radio	WLAN 2.4GHz	WLAN 5GHz UNII 1~2A	WLAN 5GHz UNII 2C~3	WLAN 6GHz UNII 5~8	Bluetooth
1 (Iron Radio)	√	√	√	-	-
2 (Pine Radio)	-	-	√	√	-
3 (Scanning Radio)	√	√	√	√	-
4	-	-	-	-	√

Note1 : The above information was declared by manufacturer and

Note2 : The Radio 2 and Radio 3 can't operate simultaneously.



**1.1.7 Table for EUT Operation Function**

<b>Mode</b>	<b>Operation Function</b>
1	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth
2	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 5GHz+R4: Bluetooth
3	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 6GHz+R4: Bluetooth
4	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 2.4GHz+R4: Bluetooth
5	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 5GHz+R4: Bluetooth
6	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 6GHz+R4: Bluetooth

Note: The above information was declared by manufacturer.



### 1.2 Applicable Standards

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

- ♦ 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 (TAF: 3787)	ADD: 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 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	Owen Hsu	20.3~20.7 / 60~62	Jan. 22, 2022~ May 13, 2022
Radiated for below 1GHz	03CH05-CB	Eason Chen	23.3-24.4 / 57-59	Mar. 14, 2022~ Apr. 27, 2022
Radiated for cabinet	03CH04-CB	Simmon Cheng	23.8-24.9 / 55-58	Feb. 26, 2022~ Apr. 29, 2022
AC Conduction	CO01-CB	Joe Chu	20~22 / 60~62	Apr. 06, 2022~ Apr. 07, 2022

### 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
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	2.5 dB	Confidence levels of 95%
Output Power Measurement	1.3 dB	Confidence levels of 95%
Power Density Measurement	2.5 dB	Confidence levels of 95%
Bandwidth Measurement	0.9%	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	18
2440MHz	20
2480MHz	13
BT-LE(2Mbps)	-
2402MHz	18
2440MHz	20
2480MHz	11



## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
<b>Operating Mode</b>	Normal Link(WLAN), CTX(Bluetooth)
1	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+Adapter
2	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 5GHz+R4: Bluetooth+Adapter
3	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 6GHz+R4: Bluetooth+Adapter
4	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 2.4GHz+R4: Bluetooth+Adapter
5	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 5GHz+R4: Bluetooth+Adapter
6	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 6GHz+R4: Bluetooth+Adapter
Mode 1 has been evaluated to be the worst case among Mode 1~6, thus measurement for Mode 7 ~ 11 will follow this same test mode.	
7	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE1
8	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE2
9	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE3
10	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE4
11	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE5
For operating mode 7 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
<b>Test Condition</b>	Conducted measurement at transmit chains
1	R4: 1T1S



<b>The Worst Case Mode for Following Conformance Tests</b>	
<b>Tests Item</b>	Emissions in Restricted Frequency Bands
<b>Test Condition</b>	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.
<b>Operating Mode &lt; 1GHz</b>	Normal Link(WLAN), CTX(Bluetooth)
1	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+Adapter
2	EUT in Y axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+Adapter
3	EUT in X axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+Adapter
Mode 1 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 ~8 will follow this same test mode.	
4	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 5GHz+R4: Bluetooth+Adapter
5	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 6GHz+R4: Bluetooth+Adapter
6	EUT in Z axis-R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 2.4GHz+R4: Bluetooth+Adapter
7	EUT in Z axis-R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 5GHz+R4: Bluetooth+Adapter
8	EUT in Z axis-R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 6GHz+R4: Bluetooth+Adapter
Mode 1 has been evaluated to be the worst case among Mode 1~8, thus measurement for Mode 9 ~13 will follow this same test mode.	
9	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE1
10	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE2
11	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE3
12	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE4
13	EUT in Z axis-R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth+PoE5
For operating mode 1 is the worst case and it was record in this test report.	



The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains
Operating Mode > 1GHz	CTX(Harmonic and bandedge)
1	R4: 1T1S

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.
Operating Mode > 1GHz	CTX(Cabinet)
The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found as below. So the measurement will follow this same test configuration.	
1	For R4:1T1S_EUT in Z axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 2.4GHz+R4: Bluetooth
2	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 5GHz+R4: Bluetooth
3	R1: 2.4GHz/5GHz Low Band+R2: 5GHz High band+R3: 6GHz+R4: Bluetooth
4	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 2.4GHz+R4: Bluetooth
5	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 5GHz+R4: Bluetooth
6	R1: 2.4GHz/5GHz Full Band+R2: 6GHz+R3: 6GHz+R4: Bluetooth
Refer to Sporton Test Report No.: FA1D2822-01 for Co-location RF Exposure Evaluation.	

Note: The Adapter and PoEs are for measurement only, would not be marketed.

Adapter and PoEs information as below:

Power	Brand	Model
Adapter	UMEC	MA-PWR-50WAC
PoE 1	PHIHONG	POEA33U-1ATE
PoE 2	PHIHONG	POE60U-1BT-X
PoE 3	Delta	ADH-65AR B
PoE 4	Microchip	PD-9001GR/AT/AC
PoE 5	PHIHONG	POE29U-1AT



### 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

Wall-mounted rack\*1

### 2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	LAN PC	DELL	T3400	N/A
B	2.4G NB	DELL	E6430	N/A
C	Iron 5G NB	DELL	E6430	N/A
D	Pine NB	DELL	E6430	N/A
E	Flash disk3.0	Transcend	JetFlash-700	N/A
F	PoE 1	PHIHONG	POEA33U-1ATE	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	LAN PC	DELL	T3400	N/A
B	NB	DELL	E4300	N/A
C	2.4G WiFi NB	DELL	E4300	N/A
D	5G(Iron) WiFi NB	DELL	E4300	N/A
E	5G(Pine) WiFi NB	DELL	E4300	N/A
F	Flash disk3.0	Silicon Power	B06	N/A
D	Adapter	UMEC	MA-PWR-50WAC	N/A





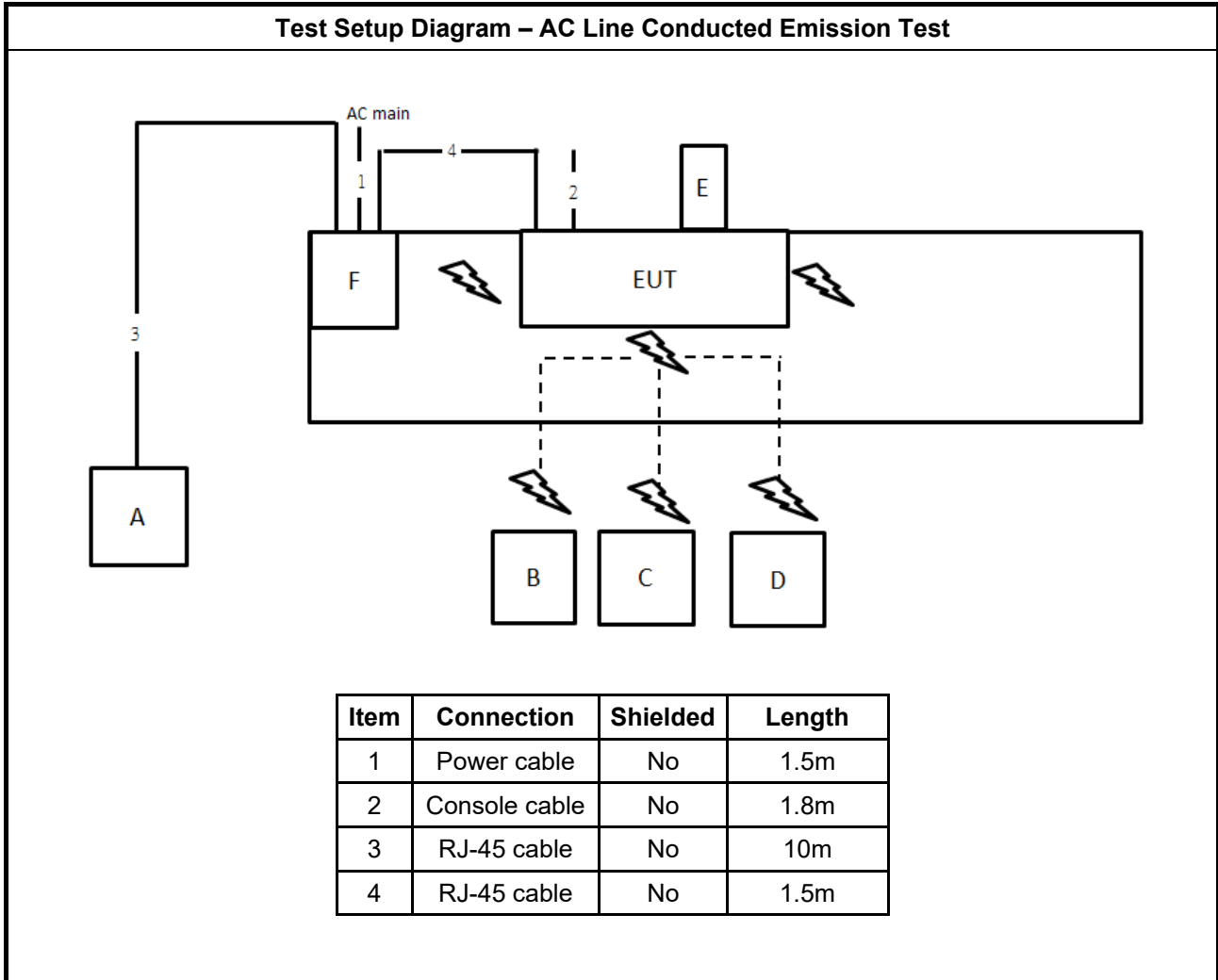
For Radiated (above 1GHz):  
For cabinet:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E4300	N/A
B	PoE 1	PHIHONG	POEA33U-1ATE	N/A

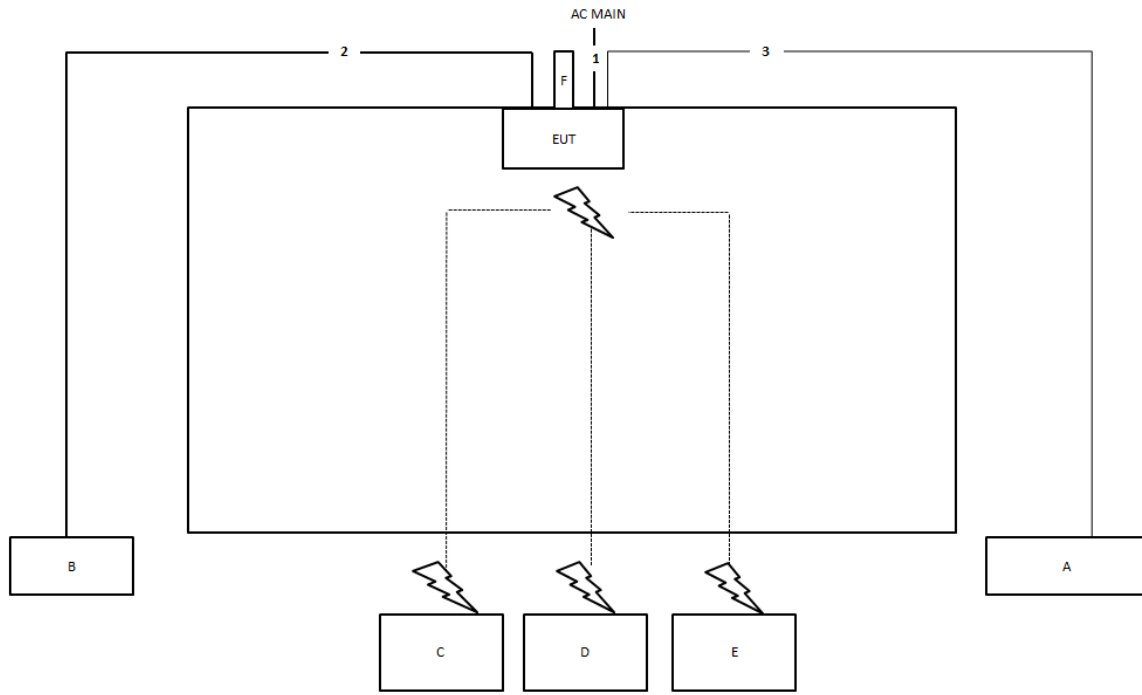
For RF Conducted:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E4300	N/A
B	PoE 1	PHIHONG	POEA33U-1ATE	N/A

## 2.6 Test Setup Diagram

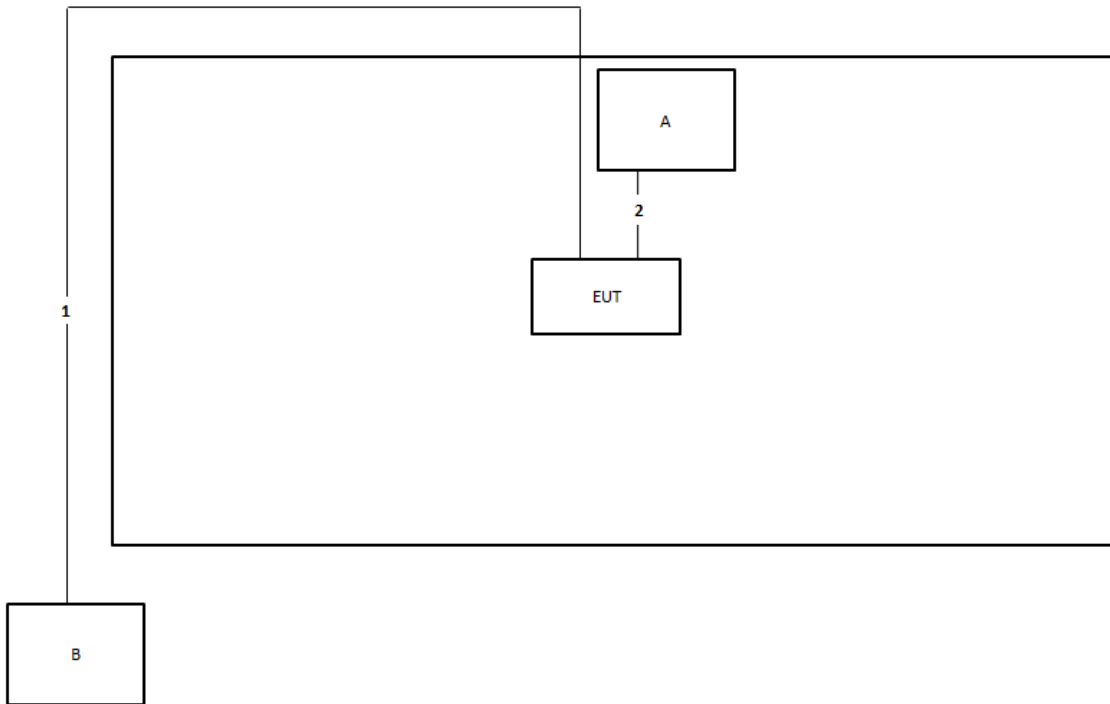


**Test Setup Diagram - Radiated Test < 1GHz**



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m

**Test Setup Diagram - Radiated Test > 1GHz**



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Console cable (RS-232 to RJ-45)	No	0.5m



### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

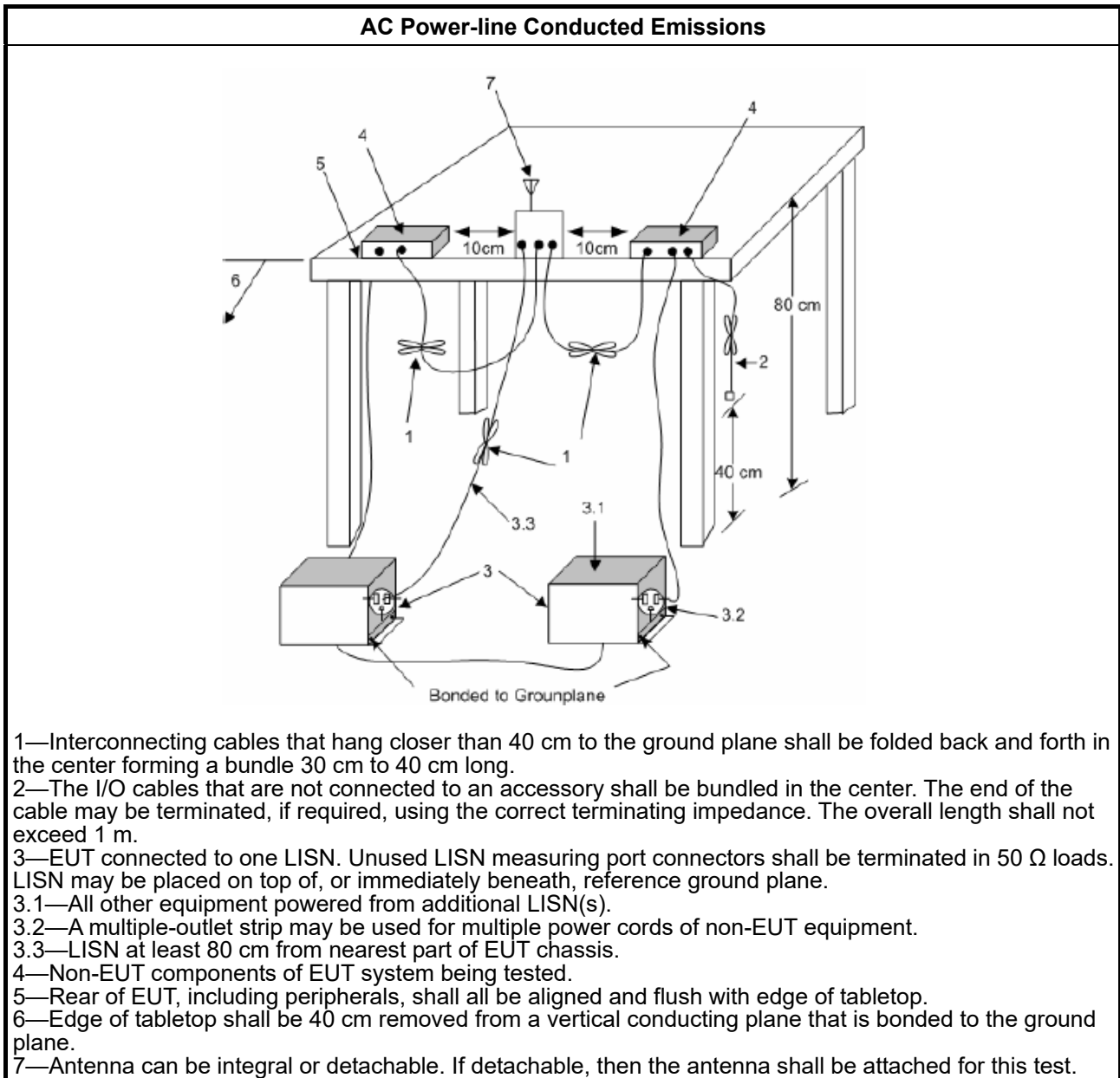
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

### 3.1.4 Test Setup



#### 1.1.1. Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

### 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

### 3.2 DTS Bandwidth

#### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
<b>Systems using digital modulation techniques:</b>
<ul style="list-style-type: none"> <li>▪ 6 dB bandwidth <math>\geq</math> 500 kHz.</li> </ul>

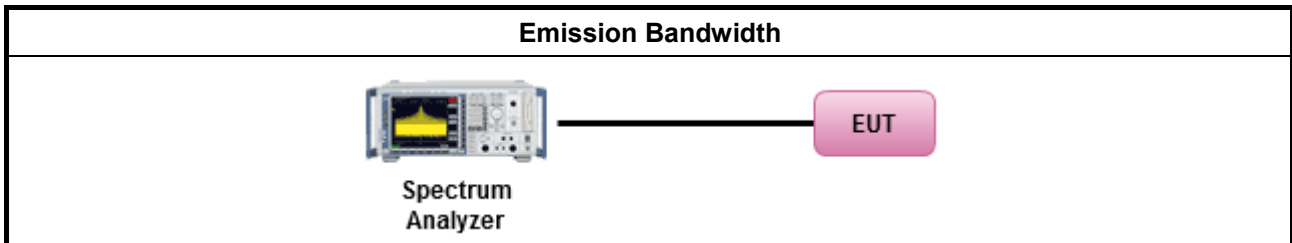
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>▪ For the emission bandwidth shall be measured using one of the options below:</li> </ul>
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

#### 3.2.4 Test Setup



#### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B



### 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	<ul style="list-style-type: none"> <li>▪ If <math>G_{TX} \leq 6</math> dBi, then <math>P_{Out} \leq 30</math> dBm (1 W)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-multipoint systems (P2M): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-point systems (P2P): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Smart antenna system (SAS):</li> </ul>
	<ul style="list-style-type: none"> <li>- Single beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Overlap beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Aggregate power on all beams: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3 + 8</math> dB dBm</li> </ul>
<p><math>P_{Out}</math> = maximum peak conducted output power or maximum conducted output power in dBm,  <math>G_{TX}</math> = the maximum transmitting antenna directional gain in dBi.</p>	

#### 3.3.2 Measuring Instruments

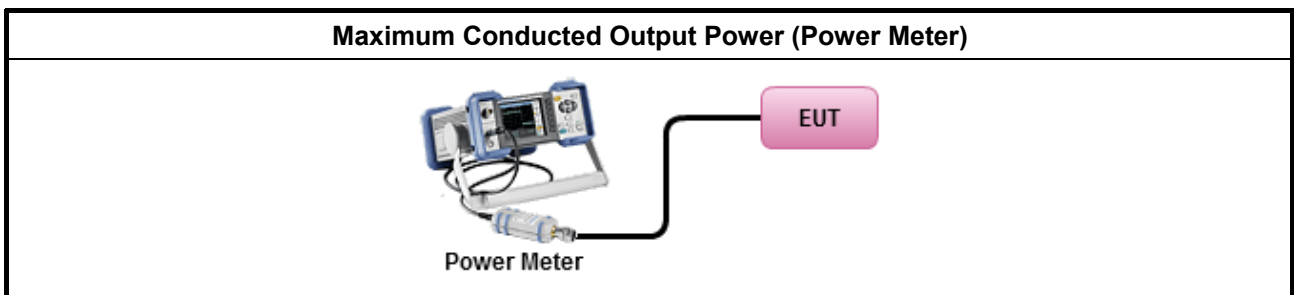
Refer a test equipment and calibration data table in this test report.



**3.3.3 Test Procedures**

<b>Test Method</b>	
<ul style="list-style-type: none"> <li>▪ Maximum Peak Conducted Output Power</li> </ul>	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
<ul style="list-style-type: none"> <li>▪ Maximum Conducted Output Power</li> </ul>	
[duty cycle ≥ 98% or external video / power trigger]	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
<input type="checkbox"/>	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	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
Measurement using a power meter (PM)	
<input type="checkbox"/>	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).
<input checked="" type="checkbox"/>	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).
<ul style="list-style-type: none"> <li>▪ For conducted measurement.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ 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.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ If multiple transmit chains, EIRP calculation could be following as methods:  <math display="block">P_{total} = P_1 + P_2 + \dots + P_n</math>                     (calculated in linear unit [mW] and transfer to log unit [dBm])  <math display="block">EIRP_{total} = P_{total} + DG</math> </li> </ul>	

**3.3.4 Test Setup**





### **3.3.5 Test Result of Maximum Conducted Output Power**

Refer as Appendix C



### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<ul style="list-style-type: none"> <li>Power Spectral Density (PSD) ≤ 8 dBm/3kHz</li> </ul>

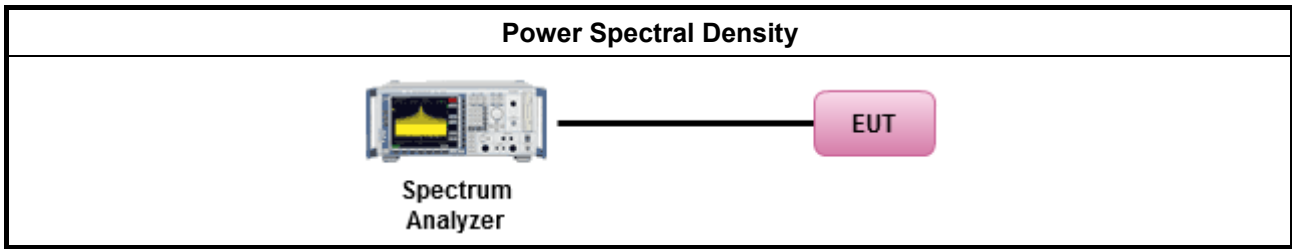
#### 3.4.2 Measuring Instruments

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

#### 3.4.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>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).</li> </ul>
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD. [duty cycle ≥ 98% or external video / power trigger]
<ul style="list-style-type: none"> <li>For conducted measurement.</li> </ul>
<ul style="list-style-type: none"> <li>If The EUT supports multiple transmit chains using options given below:           <ul style="list-style-type: none"> <li><input type="checkbox"/> 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.</li> <li><input type="checkbox"/> 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,</li> <li><input type="checkbox"/> 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.</li> </ul> </li> </ul>

### 3.4.4 Test Setup



### 3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

### 3.5 Emissions in Non-restricted Frequency Bands

#### 3.5.1 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

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.

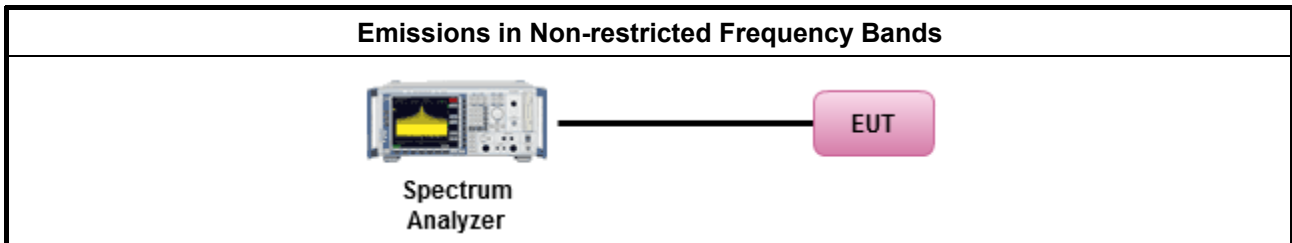
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.</li> </ul>

#### 3.5.4 Test Setup



#### 3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E



### 3.6 Emissions in Restricted Frequency Bands

#### 3.6.1 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

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 below 30 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 EUT.

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.

#### 3.6.2 Measuring Instruments

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



**3.6.3 Test Procedures**

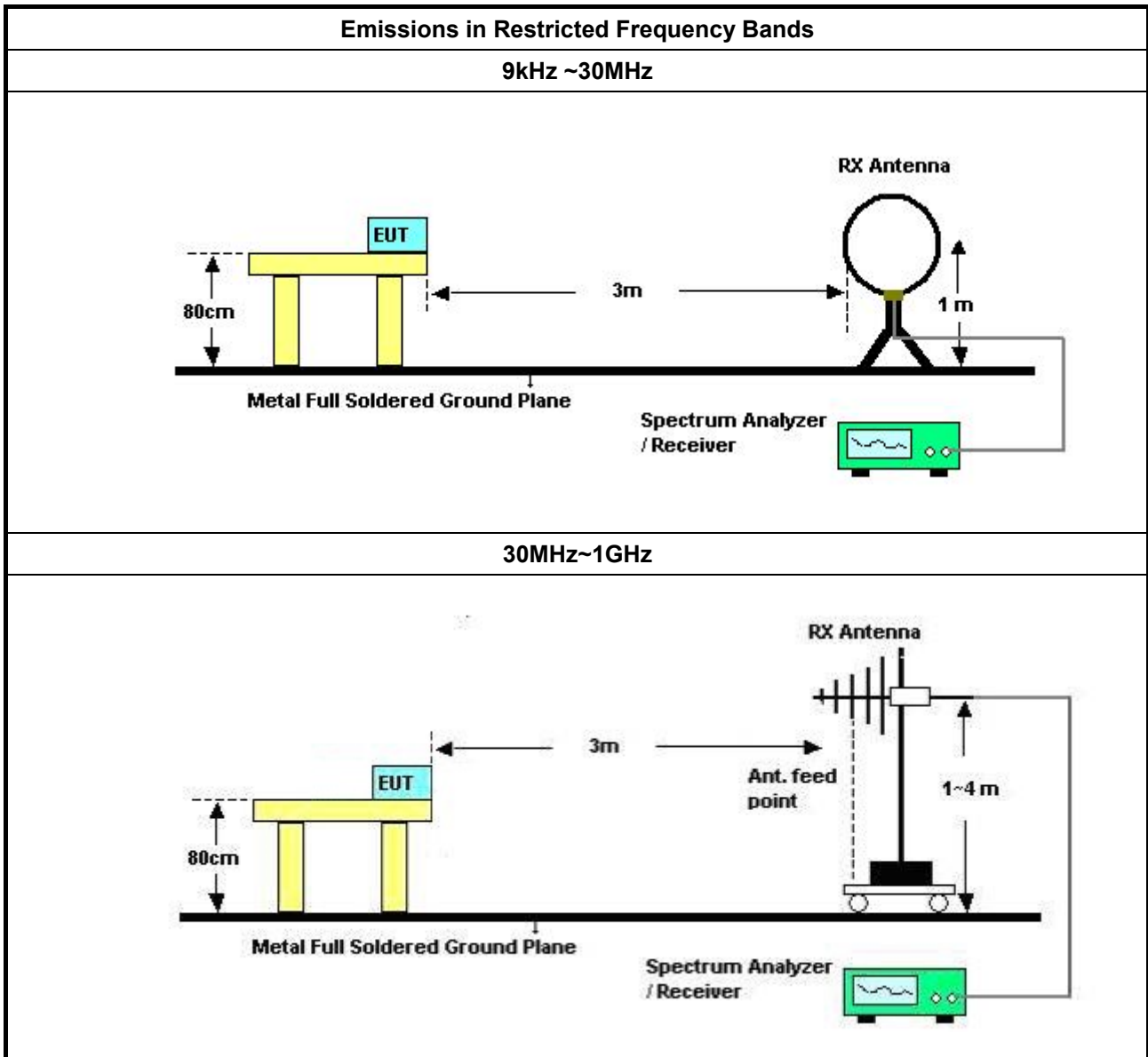
<b>Test Method</b>	
<ul style="list-style-type: none"> <li>▪ The average emission levels shall be measured in [duty cycle <math>\geq</math> 98 or duty factor].</li> </ul>	
<ul style="list-style-type: none"> <li>▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ For the transmitter unwanted emissions shall be measured using following options below:</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.</li> </ul>
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle $\geq$ 98%).
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW $\geq$ 1/T).
	<input type="checkbox"/> Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
<ul style="list-style-type: none"> <li>▪ For the transmitter band-edge emissions shall be measured using following options below:</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074 clause 8.7 &amp; 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.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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).</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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.</li> </ul>

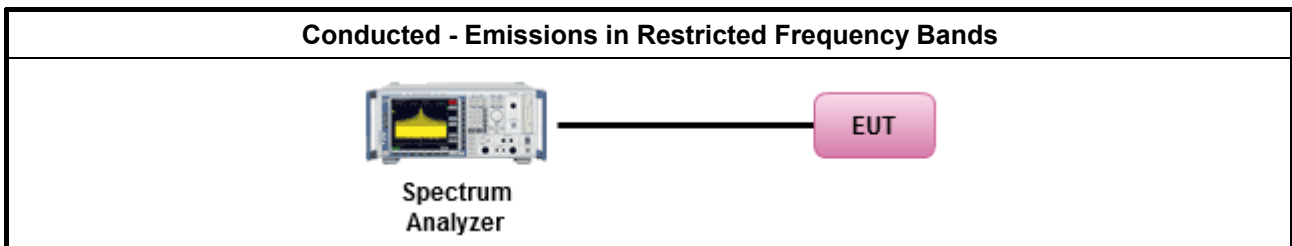
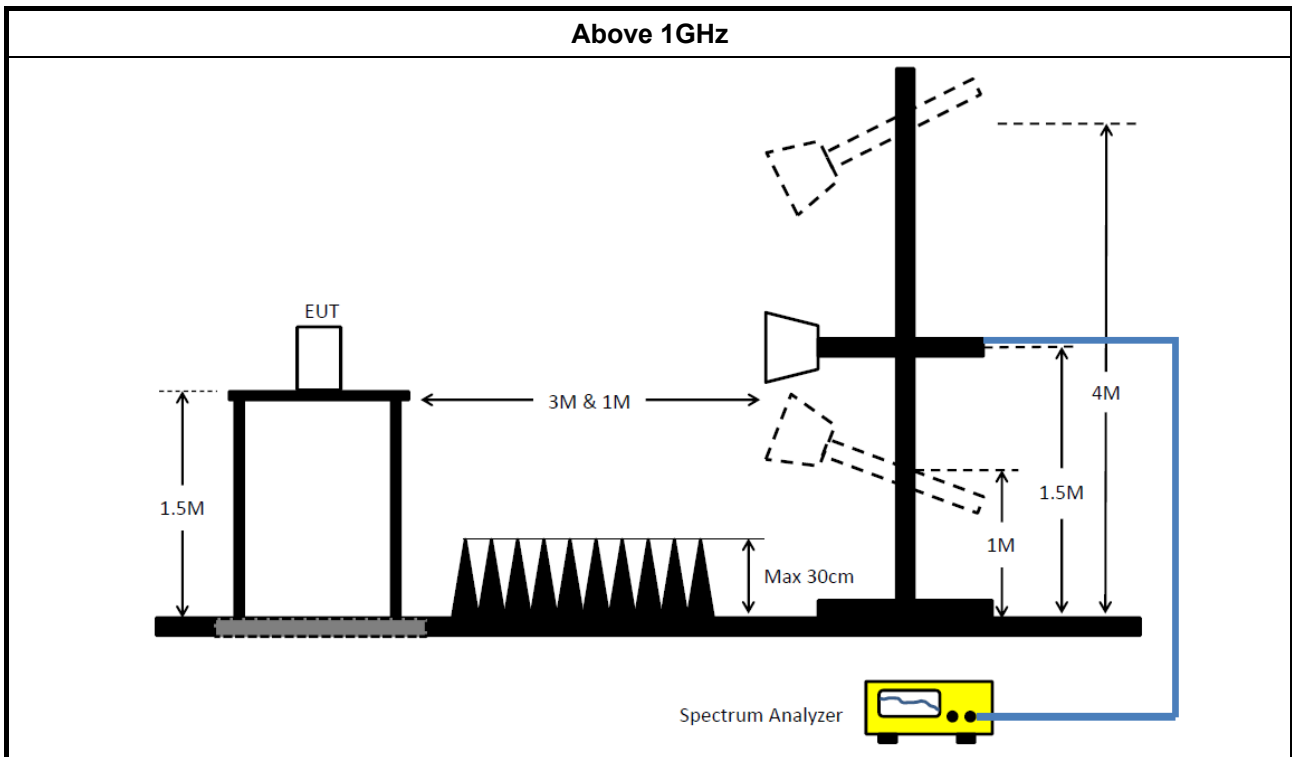


<b>Test Method</b>	
<ul style="list-style-type: none"><li>▪ For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 8.6 &amp; C63.10 clause 11.12.2.2.</li></ul>	
	<ul style="list-style-type: none"><li>▪ For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.</li></ul>
	<ul style="list-style-type: none"><li>▪ 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</li></ul>
	<ul style="list-style-type: none"><li>▪ 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.</li></ul>



**3.6.4 Test Setup**





### 3.6.5 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.

### 3.6.6 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.

### 3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F



## 4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Jan. 07, 2022	Jan. 06, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 19, 2021	May 18, 2022	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 09, 2021	Aug. 08, 2022	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 26, 2021	Mar. 25, 2022	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 27, 2021	Apr. 26, 2022	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 14, 2021	Apr. 13, 2022	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2022	Mar. 17, 2023	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 24, 2022	Feb. 23, 2023	Radiation (03CH04-CB)
Horn Antenna	ETS · Lindgren	3115	00143147	750MHz~ 18GHz	Oct. 25, 2021	Oct. 24, 2022	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Jul. 12, 2021	Jul. 11, 2022	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 13, 2021	Jul. 12, 2022	Radiation (03CH04-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 15, 2021	Apr. 14, 2022	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 28, 2022	Mar. 27, 2023	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 21, 2021	May 20, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz~ 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz~ 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz~ 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz~ 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz~ 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)



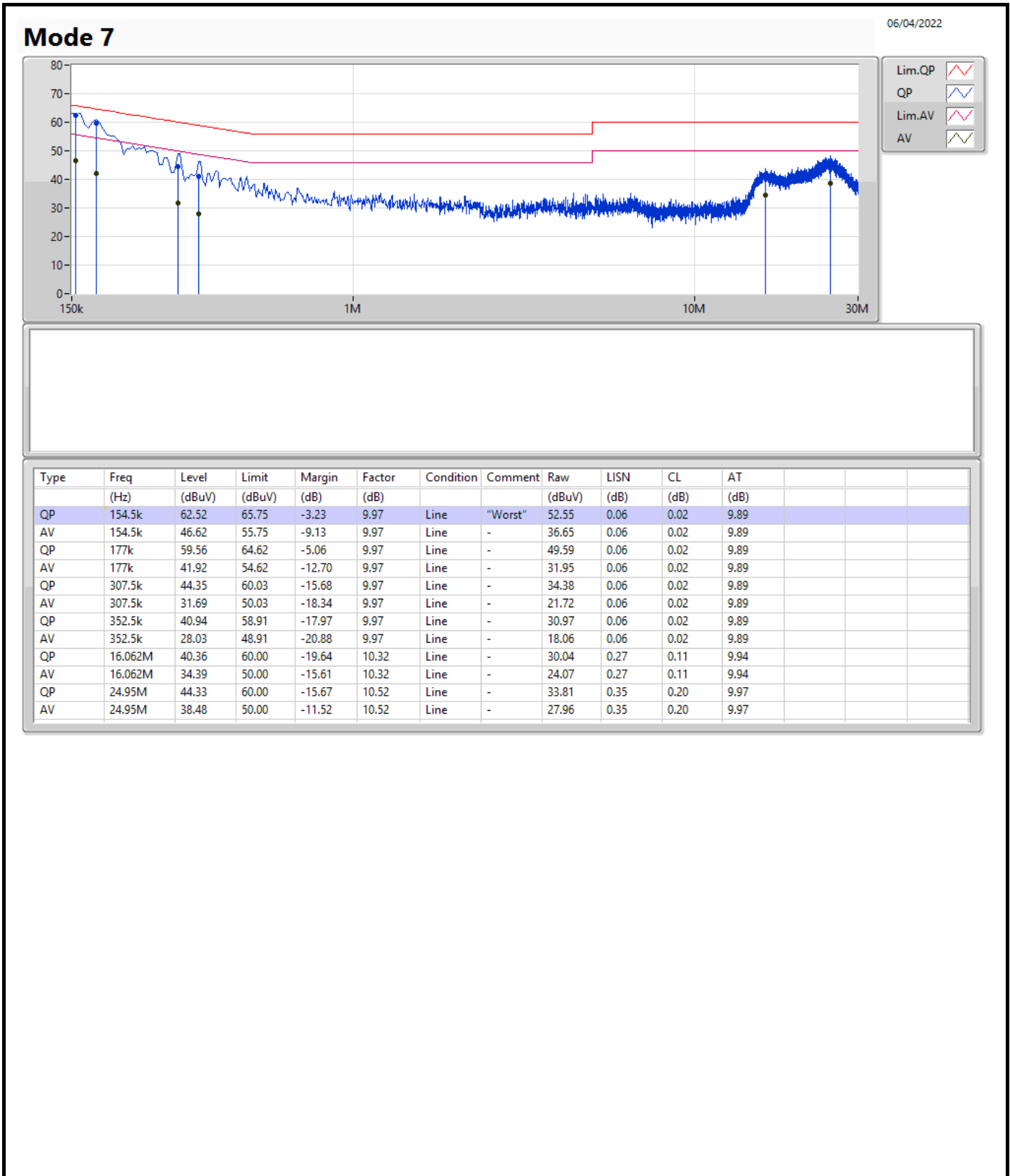
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-30	1 GHz– 26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
Switch	SPTCB	SP-SWI	SWI-01	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P1	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P2	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P3	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P4	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P5	1 GHz– 26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1339408	300MHz~ 40GHz	Sep. 06, 2021	Sep. 05, 2022	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1517009	300MHz~ 40GHz	Sep. 06, 2021	Sep. 05, 2022	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P5	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1339408	300MHz~40GHz	Sep. 06, 2021	Sep. 05, 2022	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1517009	300MHz~40GHz	Sep. 06, 2021	Sep. 05, 2022	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

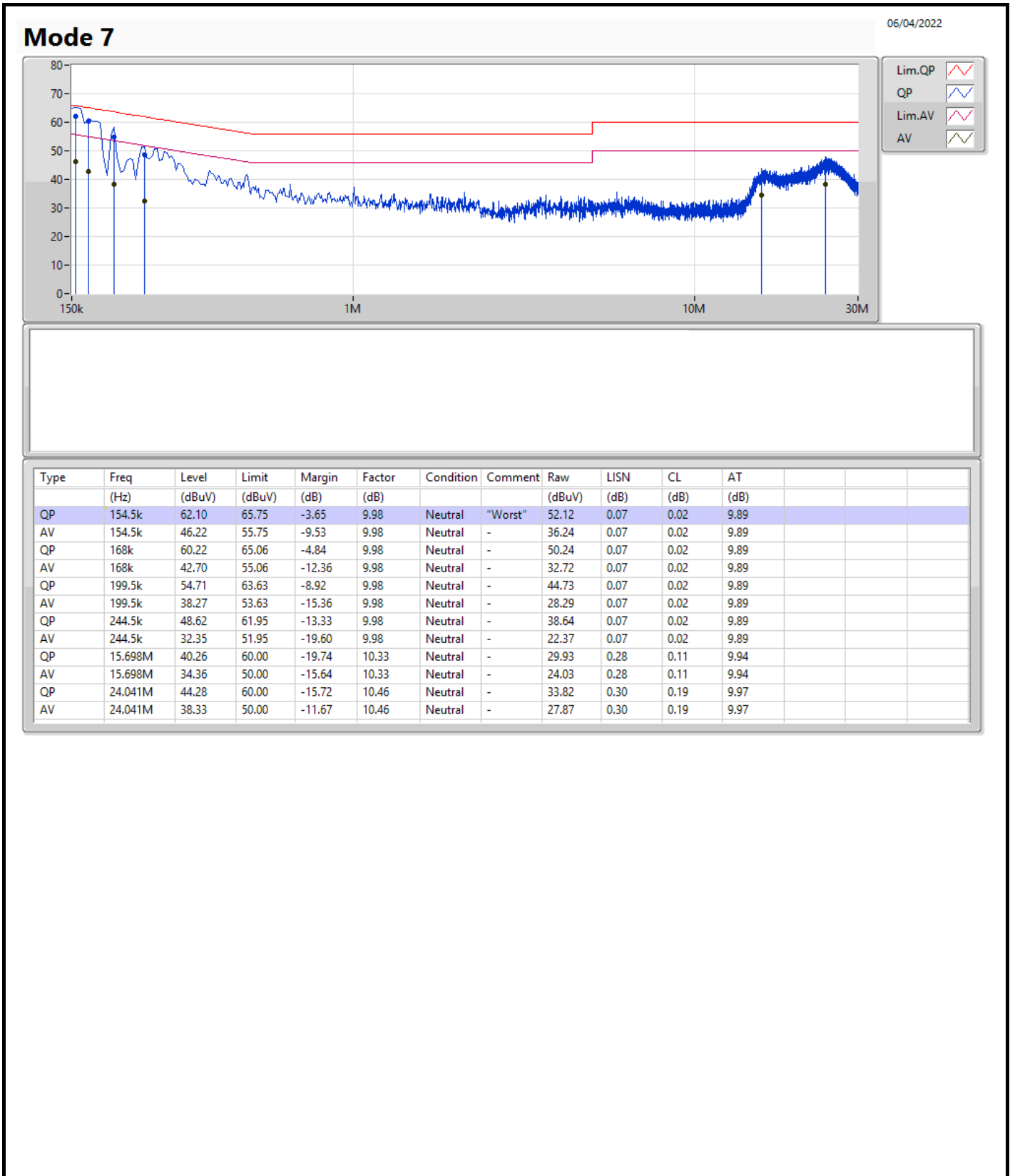
Note: Calibration Interval of instruments listed above is one year.  
NCR means Non-Calibration required.



**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 7	Pass	QP	154.5k	62.52	65.75	-3.23	Line









Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	640k	1.032M	1M03F1D	638.75k	1.028M
BT-LE(2Mbps)	1.085M	2.101M	2M10F1D	1.085M	2.076M

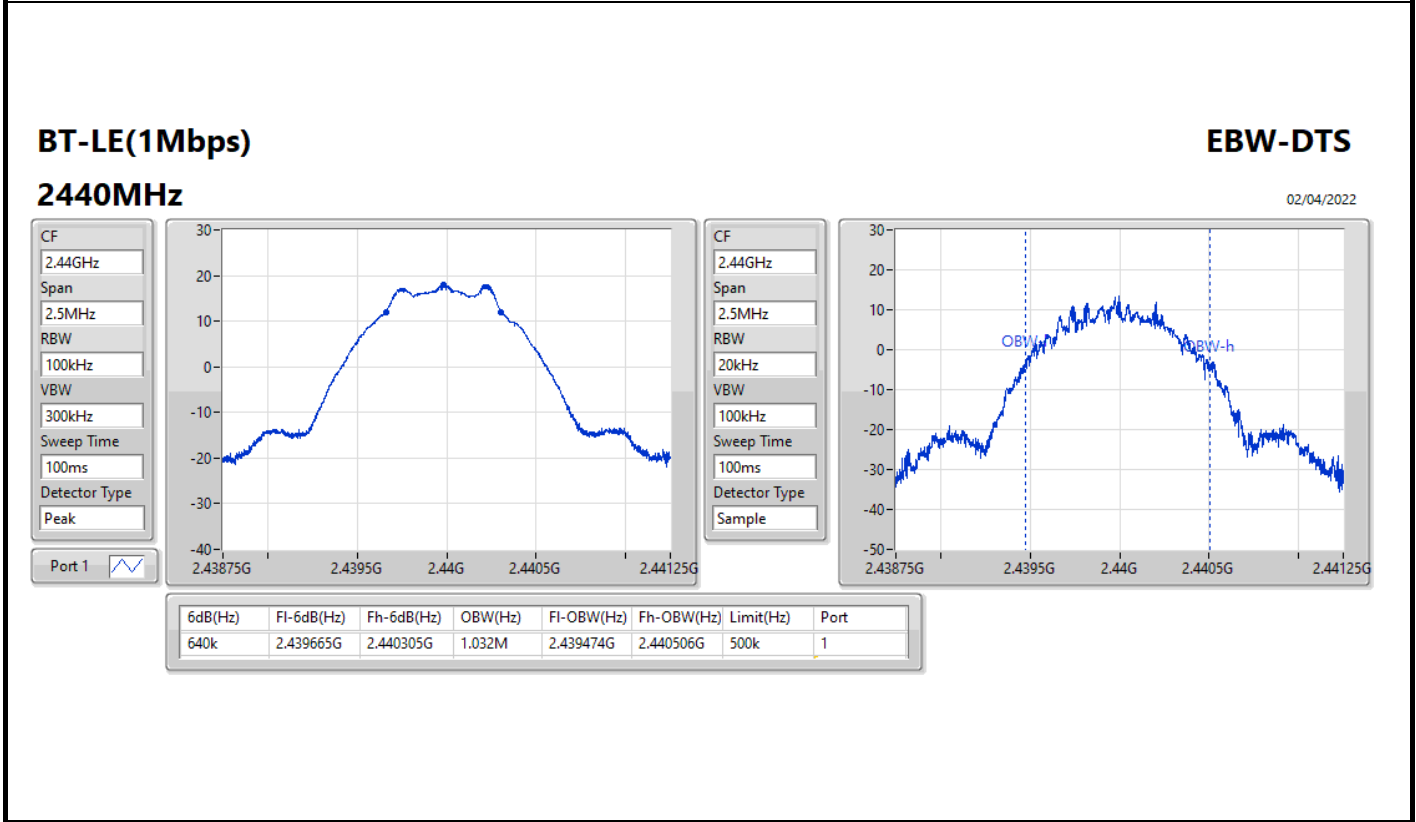
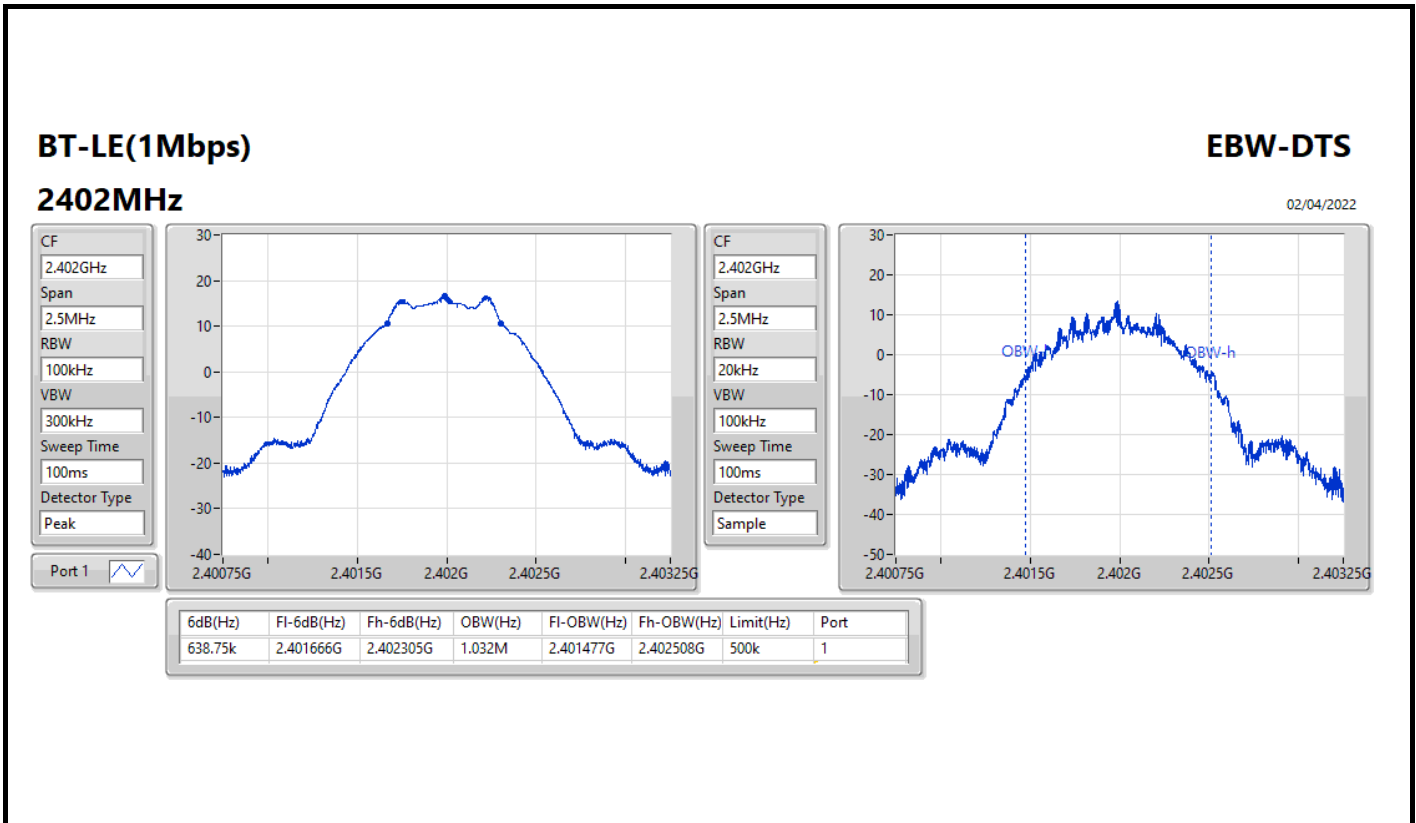
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;  
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

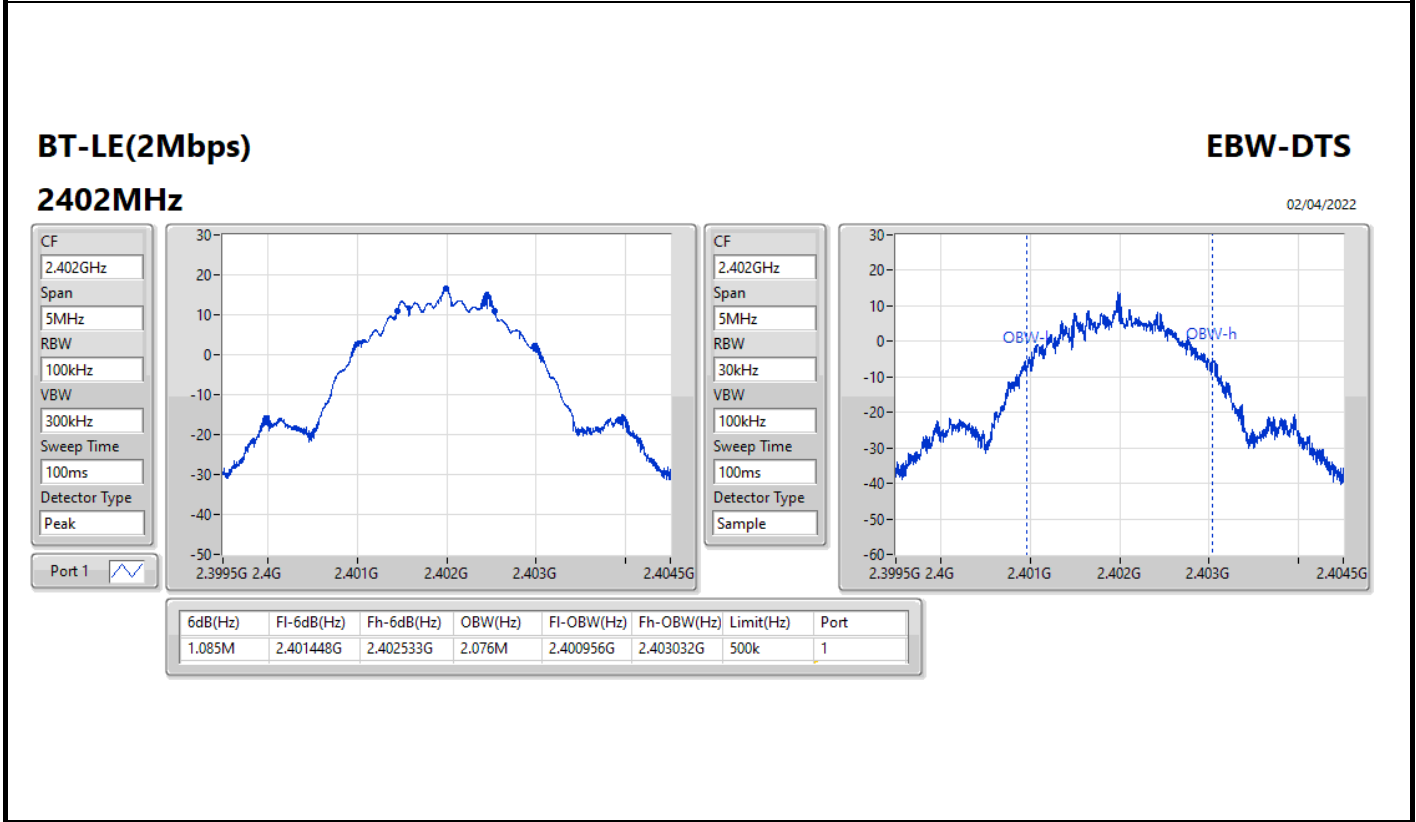
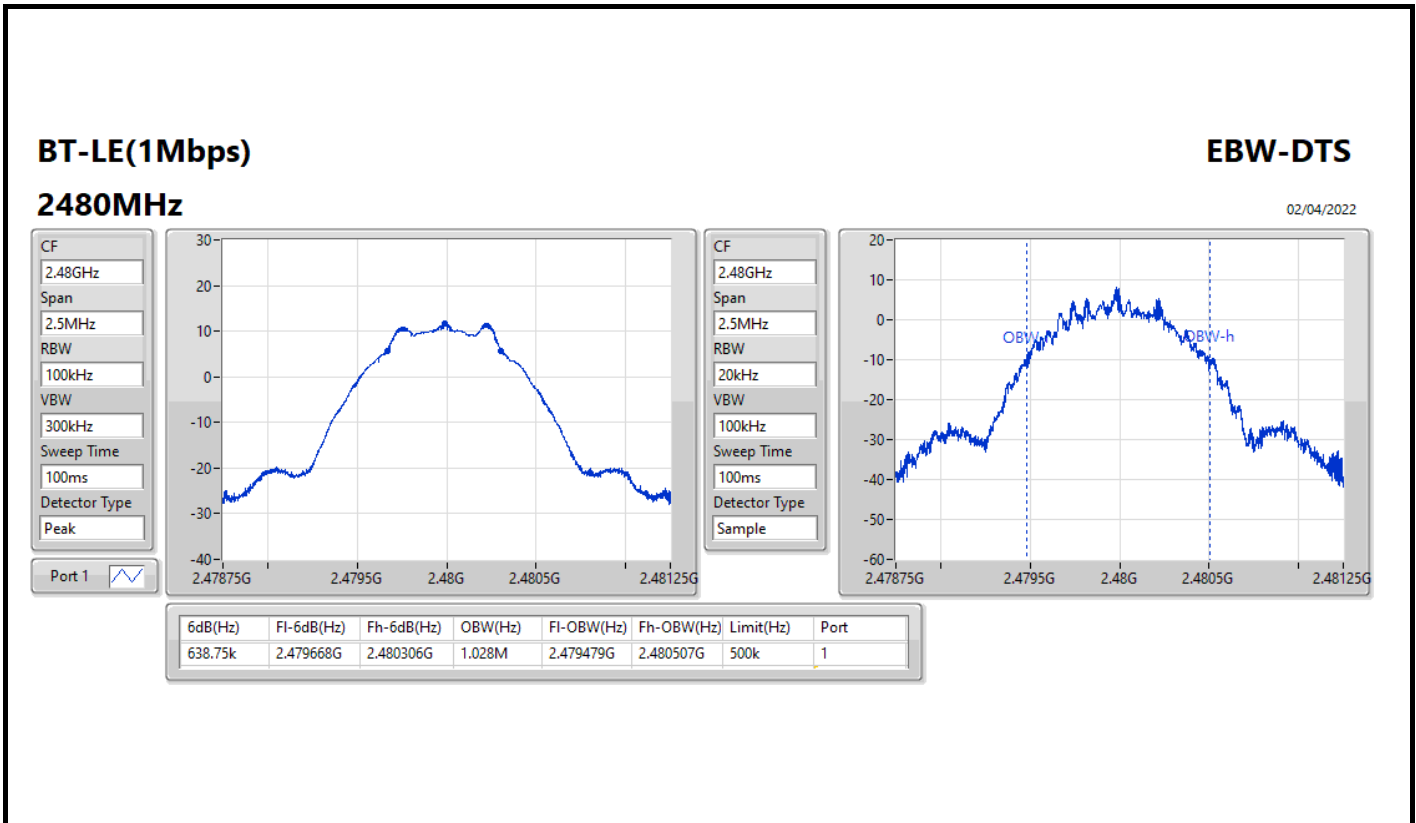


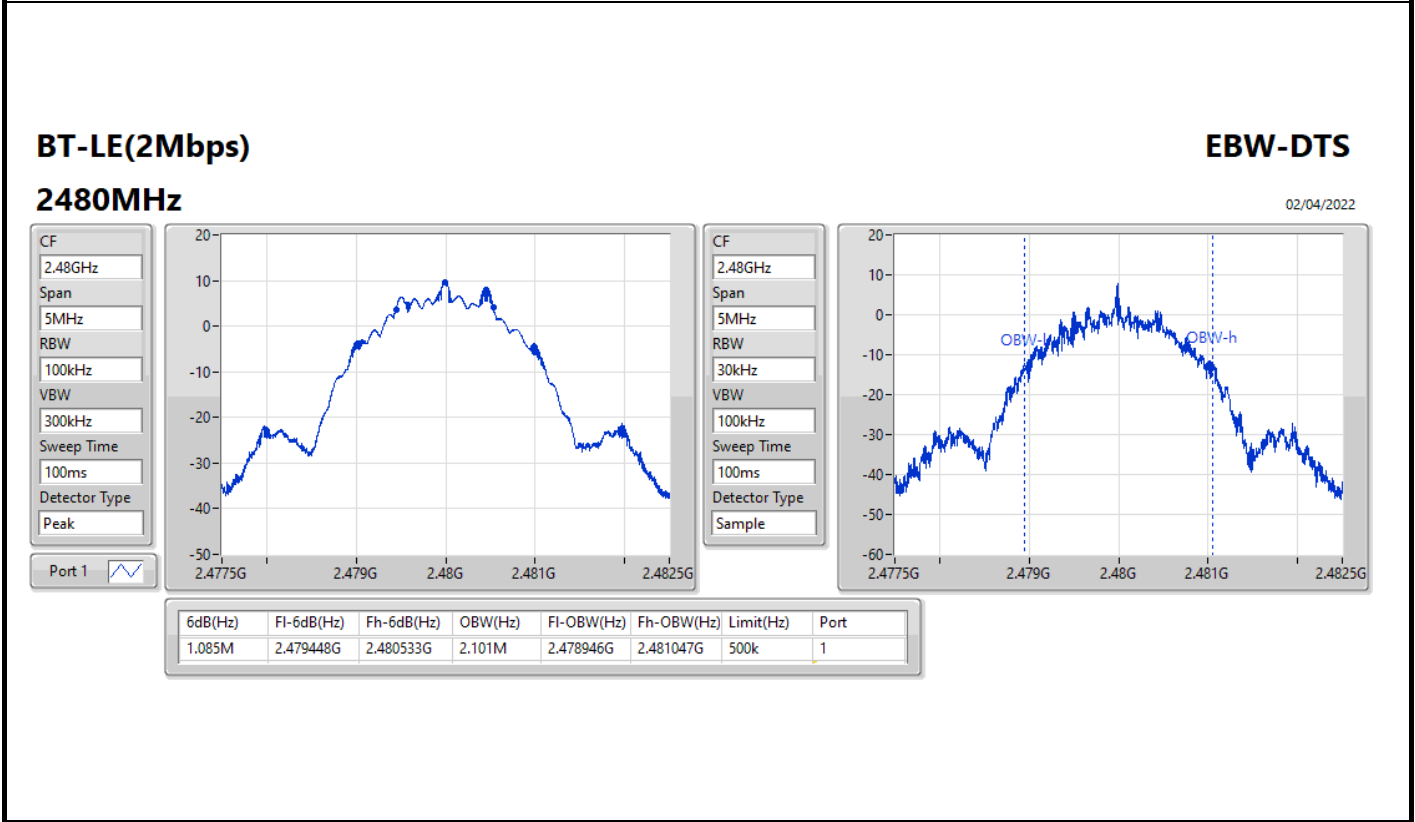
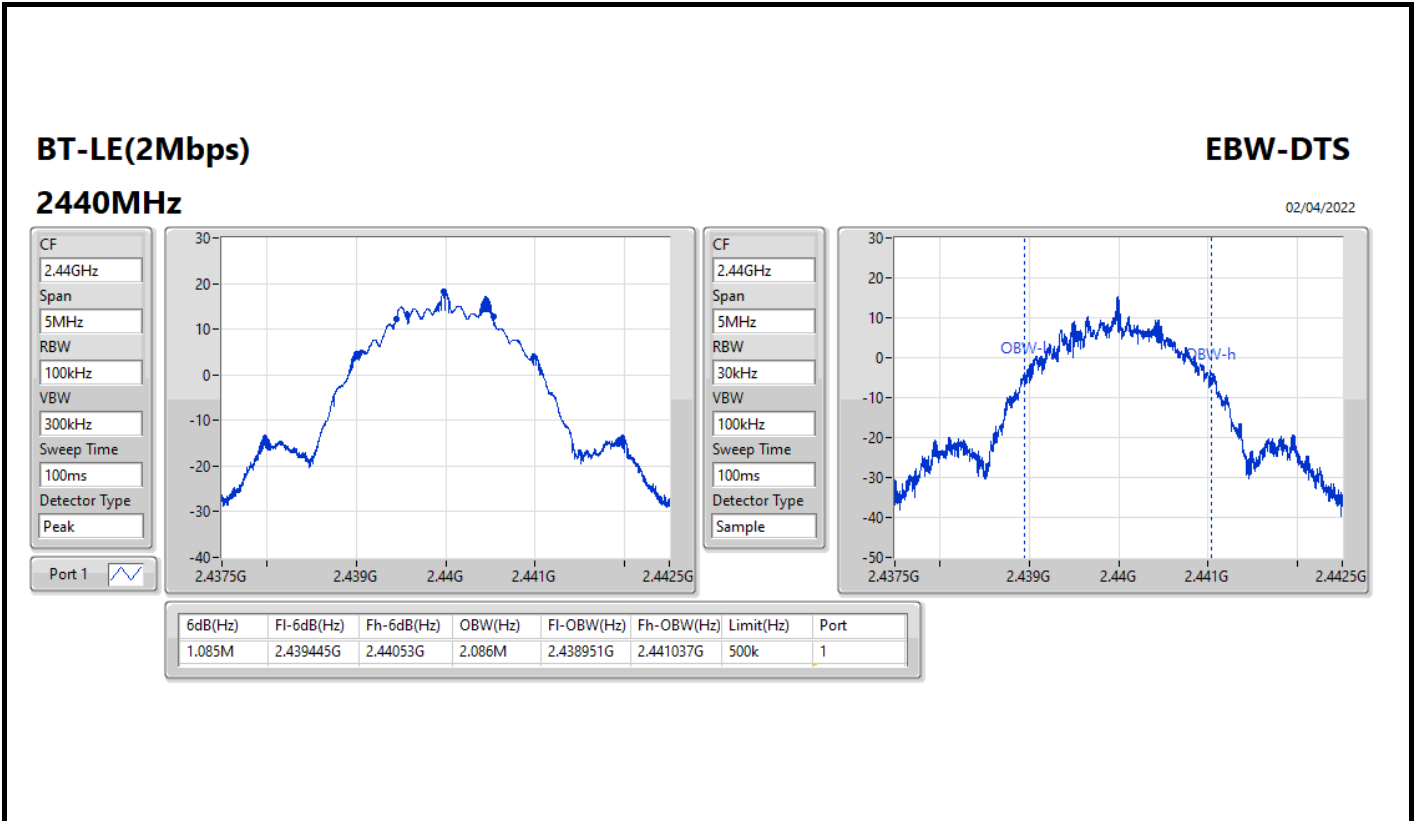
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	638.75k	1.032M
2440MHz	Pass	500k	640k	1.032M
2480MHz	Pass	500k	638.75k	1.028M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.085M	2.076M
2440MHz	Pass	500k	1.085M	2.086M
2480MHz	Pass	500k	1.085M	2.101M

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









**Summary**

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	18.46	0.07015
BT-LE(2Mbps)	18.37	0.06871



Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.80	17.09	30.00
2440MHz	Pass	3.80	18.46	30.00
2480MHz	Pass	3.80	12.08	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.80	17.04	30.00
2440MHz	Pass	3.80	18.37	30.00
2480MHz	Pass	3.80	10.05	30.00

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	2.02
BT-LE(2Mbps)	1.93

RBW = 3kHz;





Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.80	0.56	8.00
2440MHz	Pass	3.80	2.02	8.00
2480MHz	Pass	3.80	-4.35	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.80	0.08	8.00
2440MHz	Pass	3.80	1.93	8.00
2480MHz	Pass	3.80	-6.55	8.00

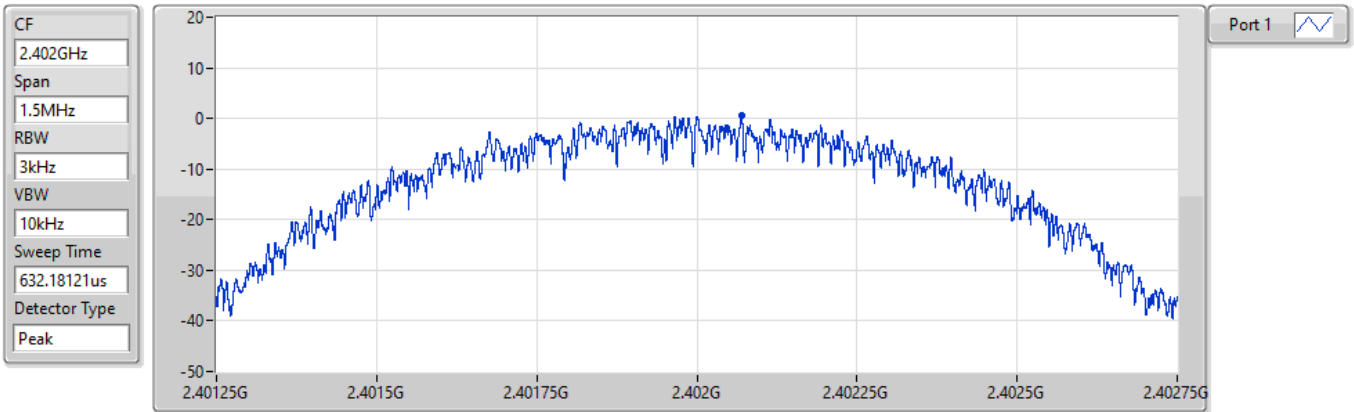
DG = Directional Gain; RBW = 3kHz;  
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

### BT-LE(1Mbps)

### PSD

#### 2402MHz

02/04/2022



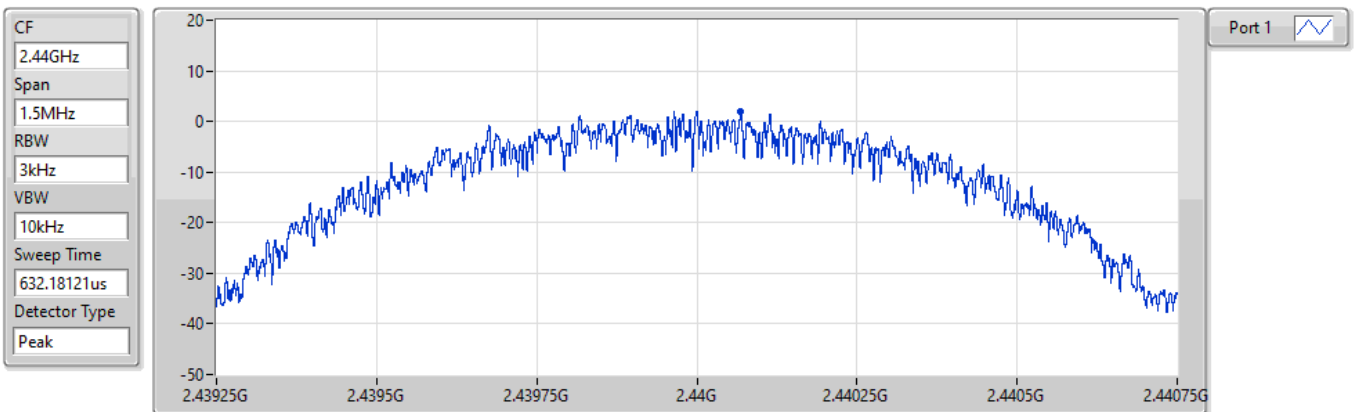
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.56	0.56	0.56

### BT-LE(1Mbps)

### PSD

#### 2440MHz

02/04/2022



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.02	2.02	2.02

### BT-LE(1Mbps)

### PSD

2480MHz

02/04/2022

CF  
2.48GHz

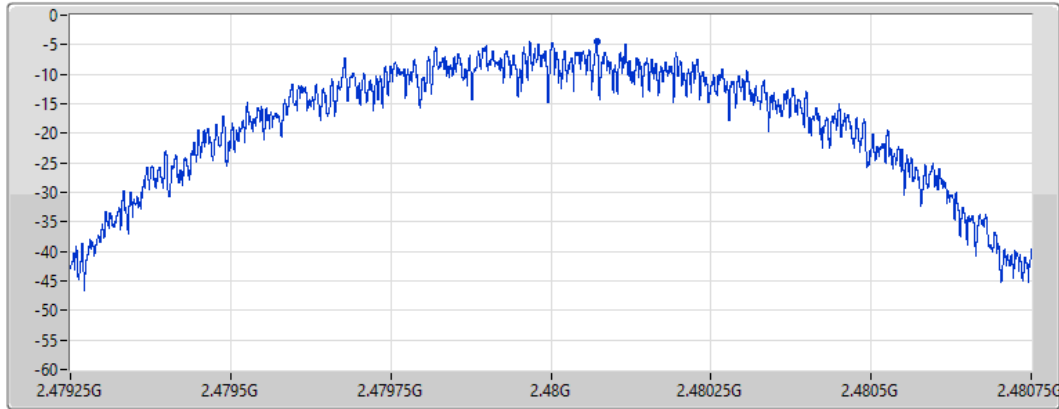
Span  
1.5MHz


RBW  
3kHz

VBW  
10kHz

Sweep Time  
632.18121us

Detector Type  
Peak



Port 1 

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.35	-4.35	-4.35

### BT-LE(2Mbps)

### PSD

2402MHz

02/04/2022

CF  
2.402GHz

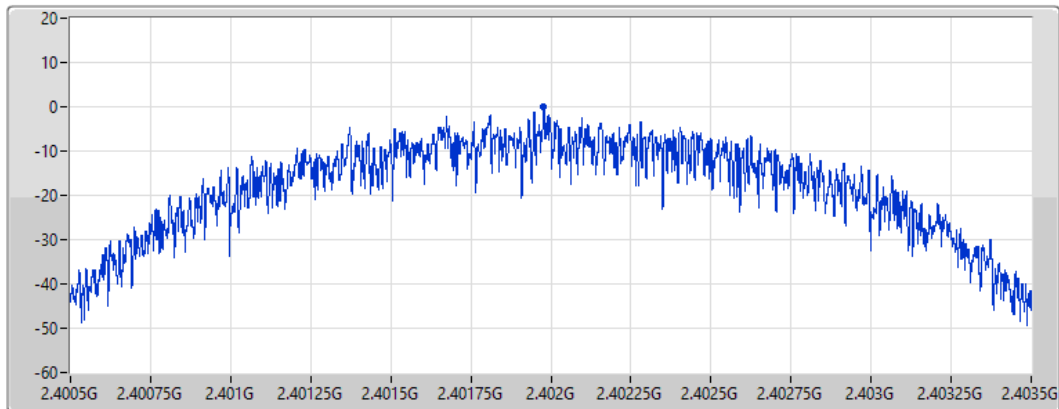
Span  
3MHz


RBW  
3kHz

VBW  
10kHz

Sweep Time  
632.01845us

Detector Type  
Peak



Port 1 

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.08	0.08	0.08

**BT-LE(2Mbps)**

**PSD**

**2440MHz**

02/04/2022

CF  
2.44GHz

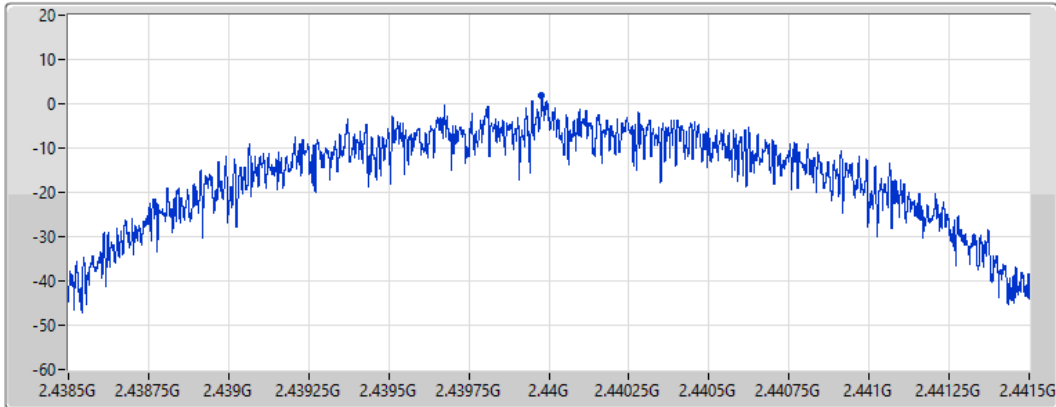
Span  
3MHz


RBW  
3kHz

VBW  
10kHz

Sweep Time  
632.01845us

Detector Type  
Peak



Port 1 

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.93	1.93	1.93

**BT-LE(2Mbps)**

**PSD**

**2480MHz**

02/04/2022

CF  
2.48GHz

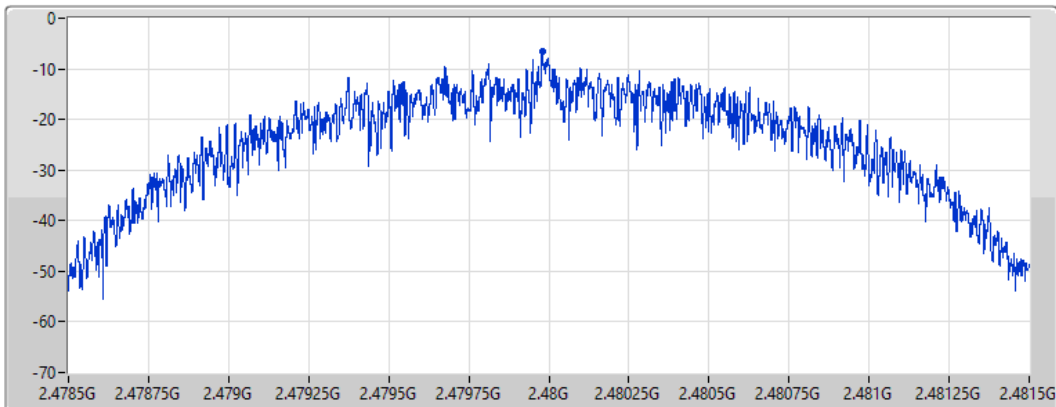
Span  
3MHz


RBW  
3kHz

VBW  
10kHz

Sweep Time  
632.01845us

Detector Type  
Peak



Port 1 

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.55	-6.55	-6.55



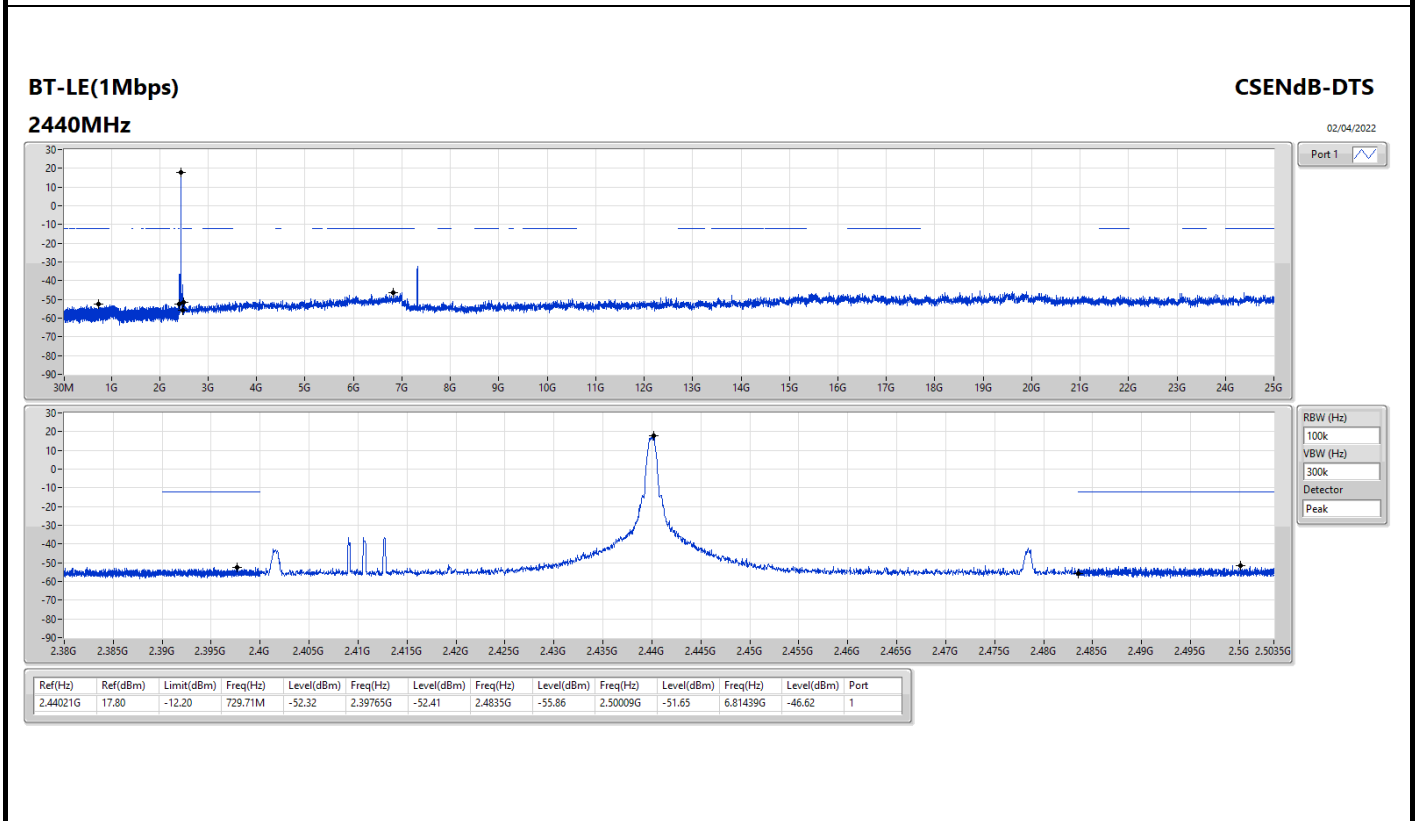
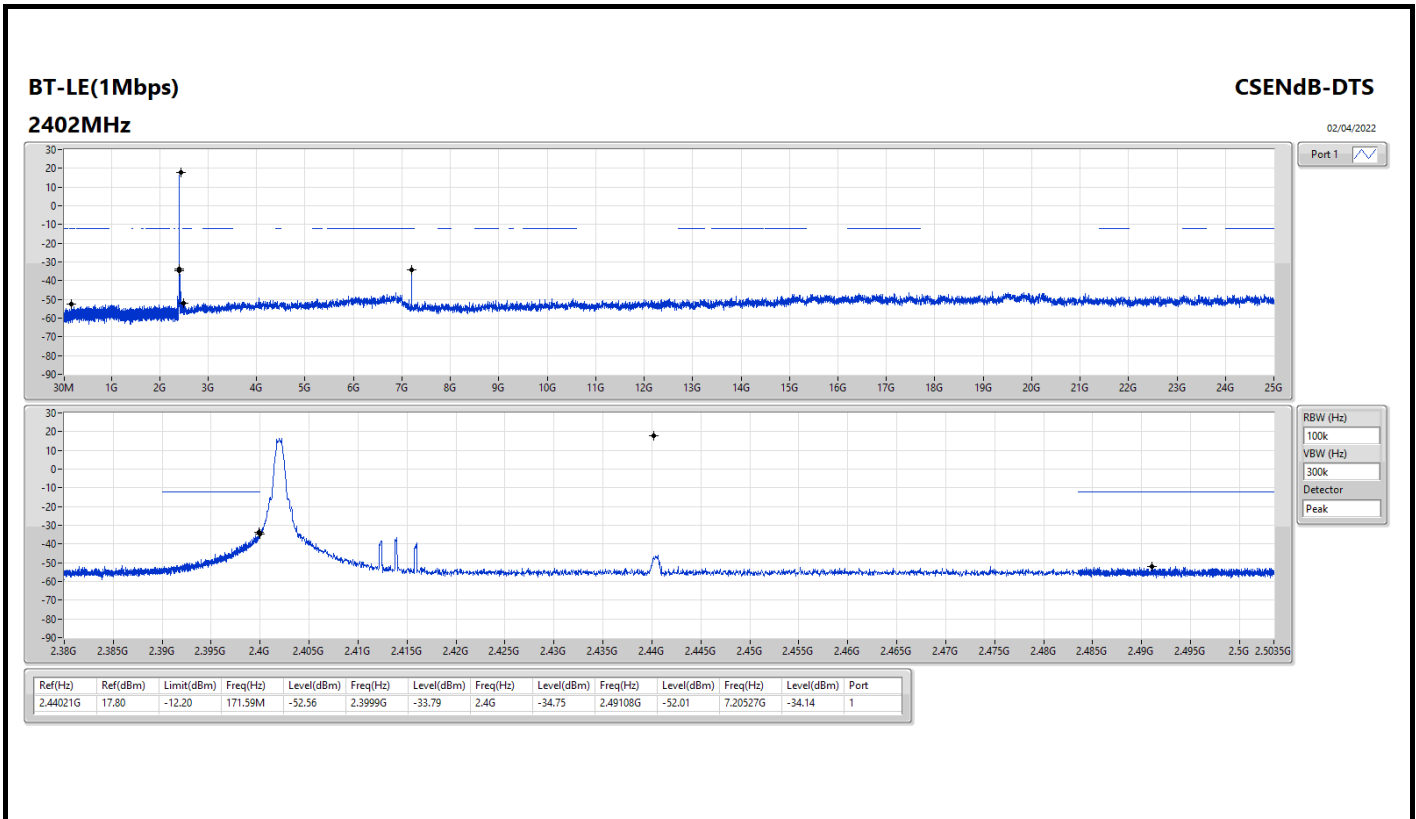
Summary

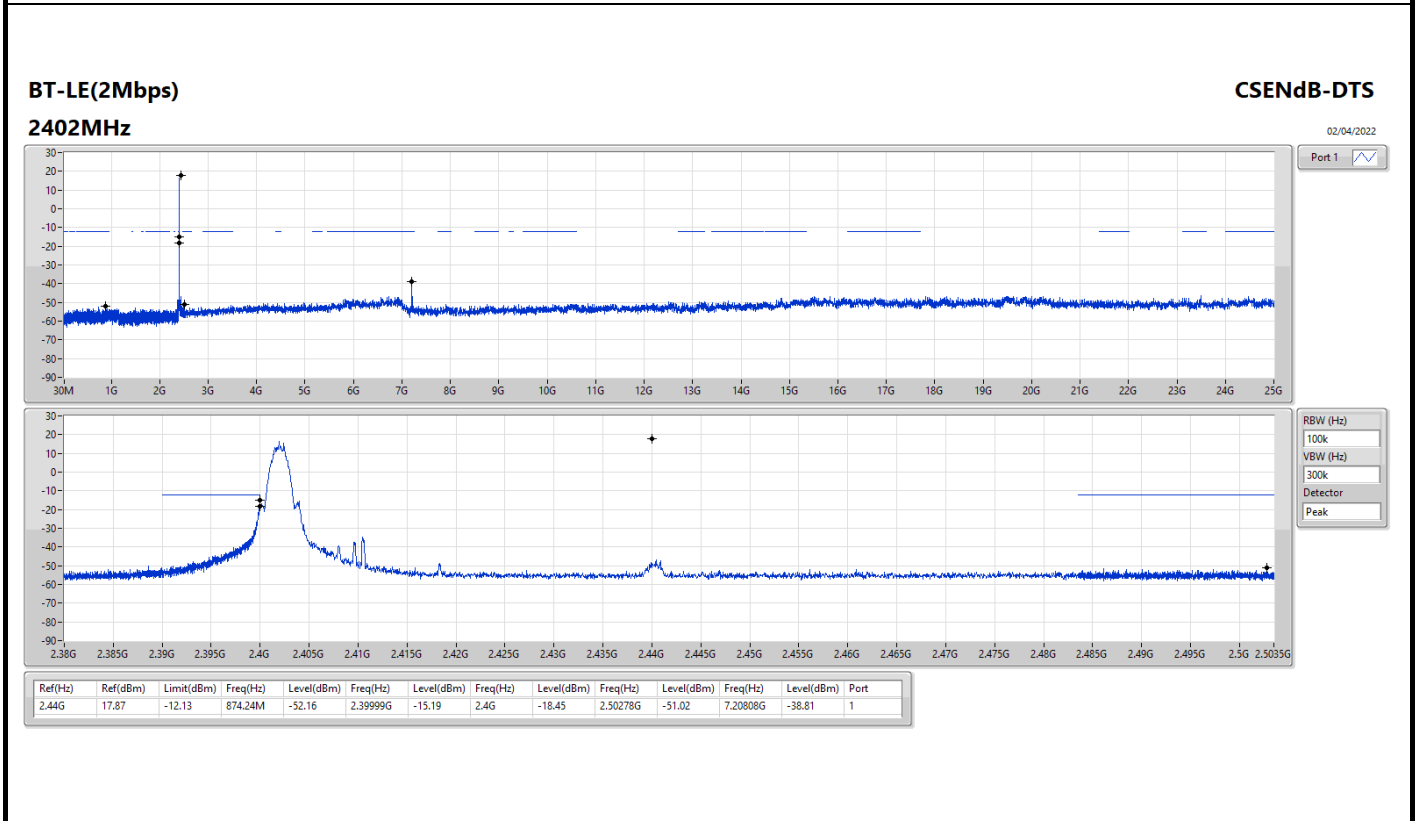
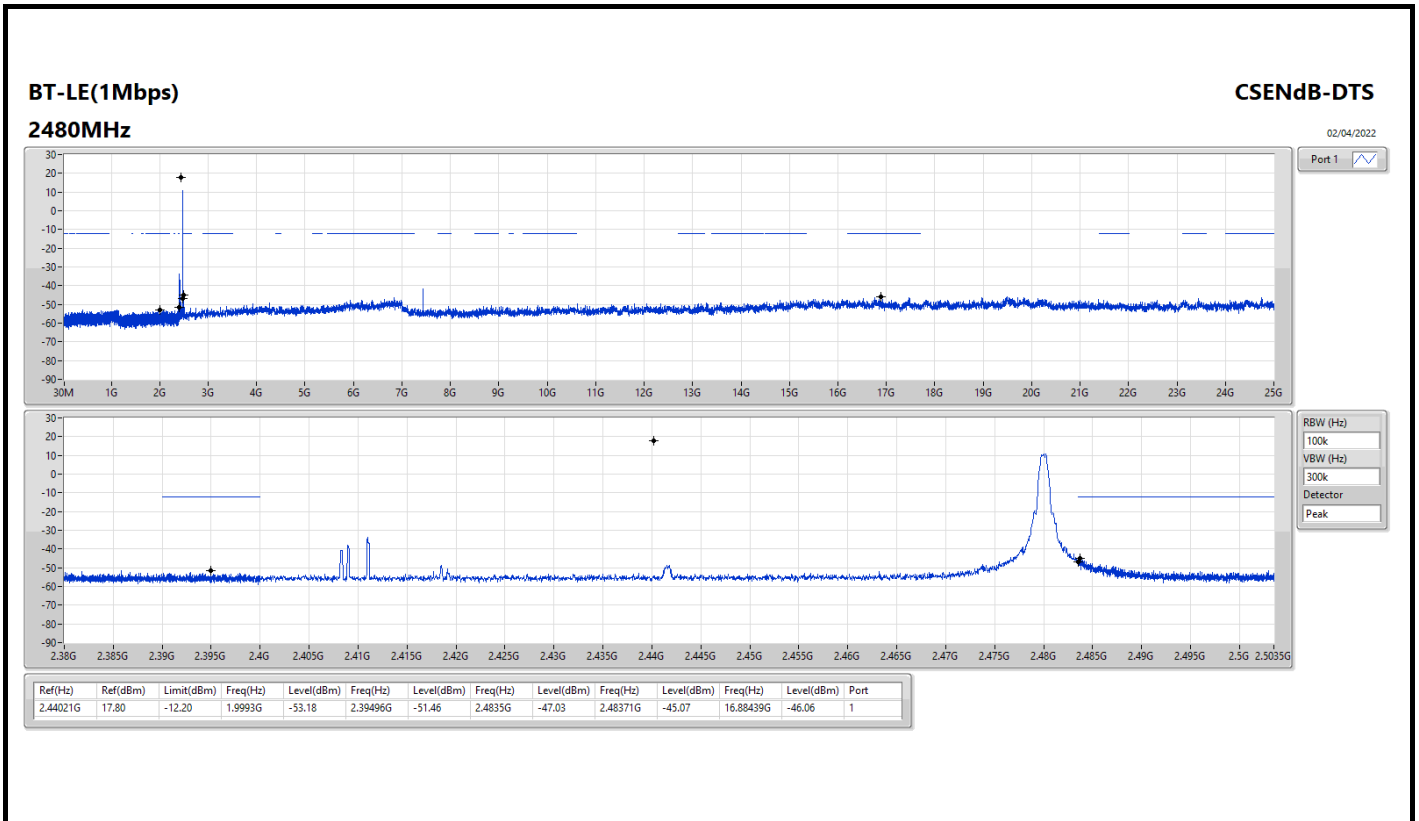
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44021G	17.80	-12.20	171.59M	-52.56	2.3999G	-33.79	2.4G	-34.75	2.49108G	-52.01	7.20527G	-34.14	1
BT-LE(2Mbps)	Pass	2.44G	17.87	-12.13	874.24M	-52.16	2.39999G	-15.19	2.4G	-18.45	2.50278G	-51.02	7.20808G	-38.81	1



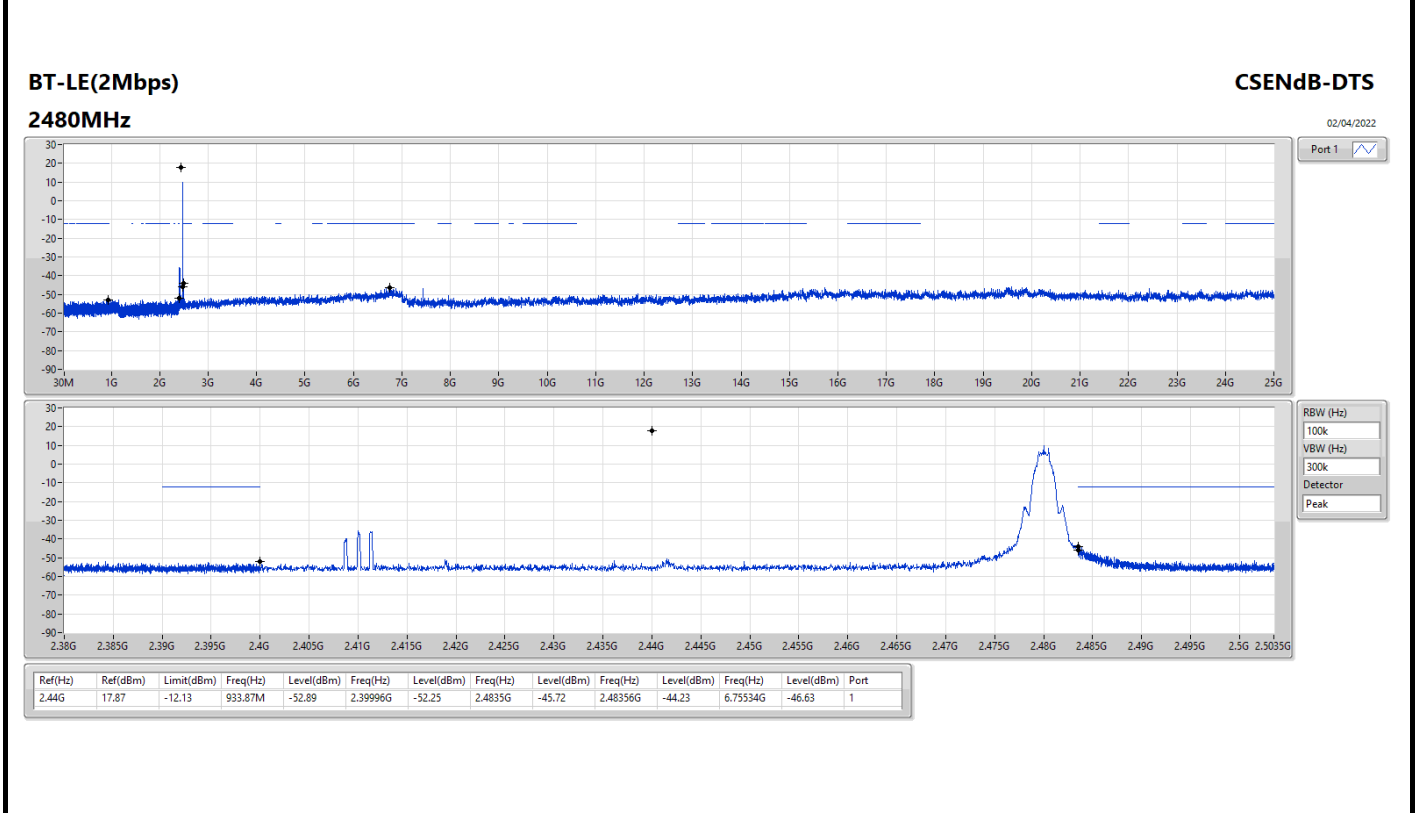
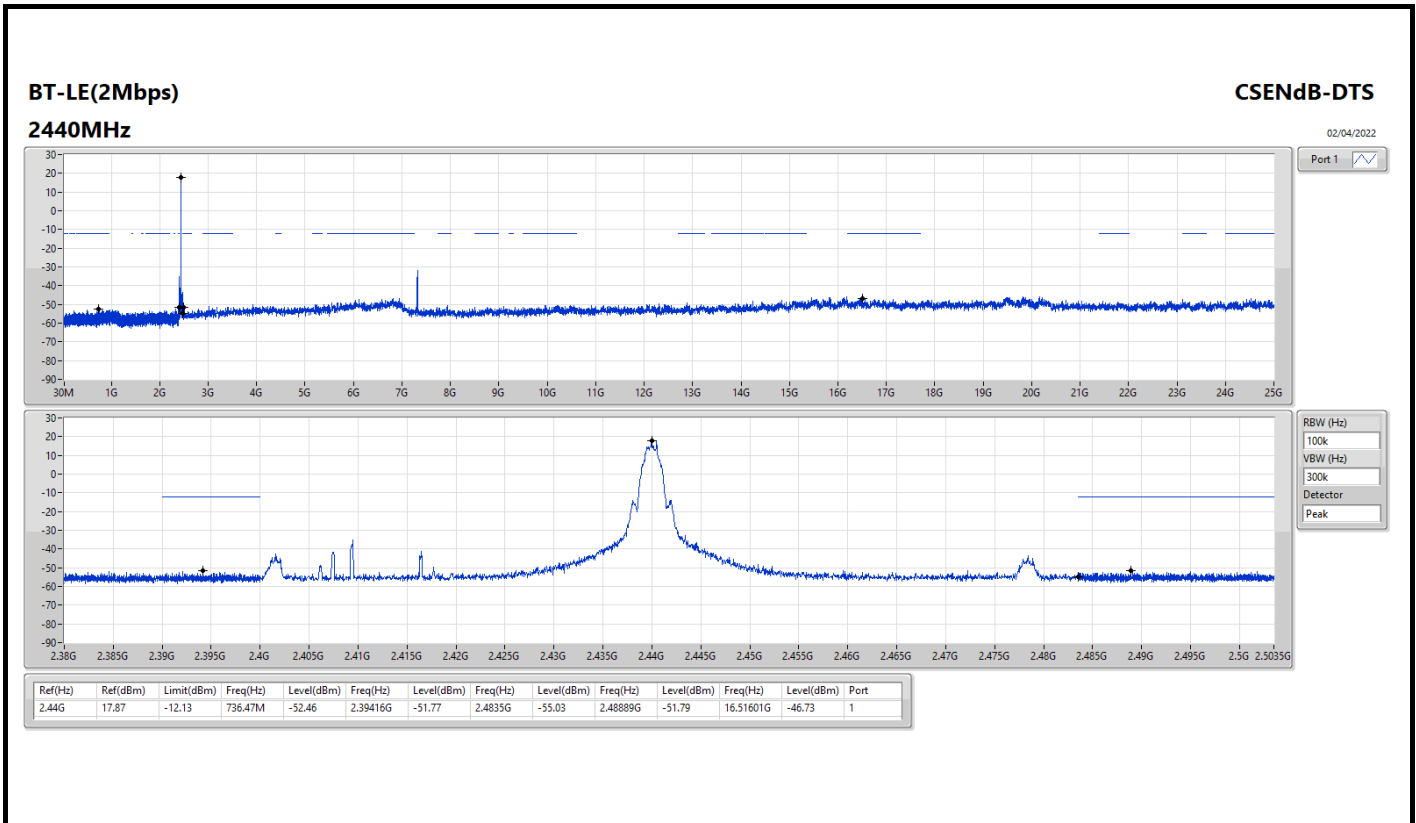
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44021G	17.80	-12.20	171.59M	-52.56	2.3999G	-33.79	2.4G	-34.75	2.49108G	-52.01	7.20527G	-34.14	1
2440MHz	Pass	2.44021G	17.80	-12.20	729.71M	-52.32	2.39765G	-52.41	2.4835G	-55.86	2.50009G	-51.65	6.81439G	-46.62	1
2480MHz	Pass	2.44021G	17.80	-12.20	1.9993G	-53.18	2.39496G	-51.46	2.4835G	-47.03	2.48371G	-45.07	16.88439G	-46.06	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44G	17.87	-12.13	874.24M	-52.16	2.39999G	-15.19	2.4G	-18.45	2.50278G	-51.02	7.20808G	-38.81	1
2440MHz	Pass	2.44G	17.87	-12.13	736.47M	-52.46	2.39416G	-51.77	2.4835G	-55.03	2.48889G	-51.79	16.51601G	-46.73	1
2480MHz	Pass	2.44G	17.87	-12.13	933.87M	-52.89	2.39996G	-52.25	2.4835G	-45.72	2.48356G	-44.23	6.75534G	-46.63	1











**Summary**

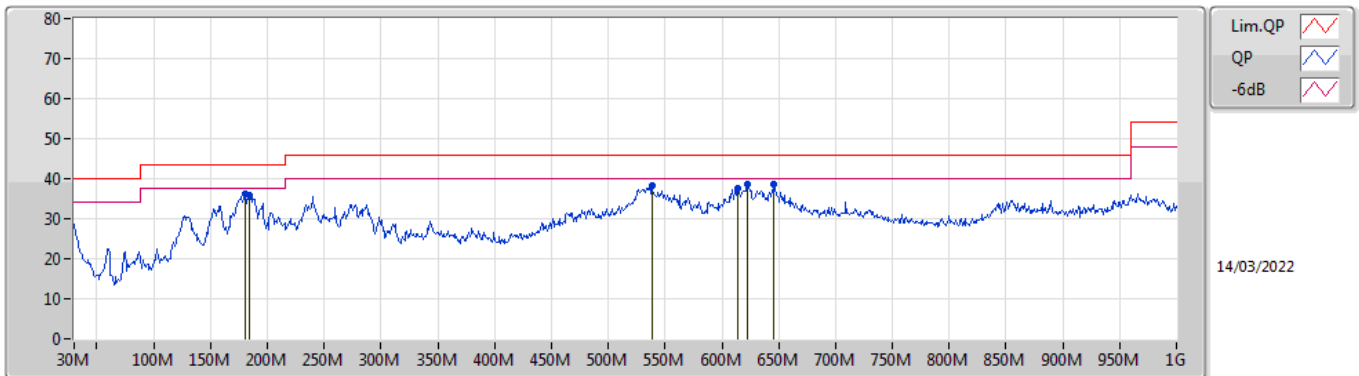
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	30M	36.99	40.00	-3.01	Vertical

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
QP	30M	36.99	40.00	-3.01	-6.49	3	Vertical	149	1.00	"Worst"	43.48	24.20	0.80	31.49
PK	50.37M	32.81	40.00	-7.19	-16.83	3	Vertical	45	1.25	-	49.64	13.83	1.10	31.76
PK	173.56M	37.59	43.50	-5.91	-14.66	3	Vertical	330	1.00	-	52.25	15.23	2.07	31.96
PK	185.2M	39.87	43.50	-3.63	-15.04	3	Vertical	260	1.00	-	54.91	14.80	2.13	31.97
PK	529.55M	39.65	46.00	-6.35	-5.38	3	Vertical	196	1.00	-	45.03	23.31	3.72	32.41
PK	609.09M	39.87	46.00	-6.13	-4.27	3	Vertical	169	1.00	-	44.14	24.20	4.04	32.51

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
PK	180.35M	36.24	43.50	-7.26	-14.91	3	Horizontal	95	1.25	-	51.15	14.95	2.10	31.96
PK	184.23M	36.00	43.50	-7.50	-15.03	3	Horizontal	103	2.00	-	51.03	14.82	2.12	31.97
PK	538.28M	38.29	46.00	-7.71	-4.84	3	Horizontal	91	2.00	-	43.13	23.85	3.75	32.44
PK	613.94M	37.48	46.00	-8.52	-4.19	3	Horizontal	56	2.00	-	41.67	24.26	4.06	32.51
PK	622.67M	38.74	46.00	-7.26	-3.96	3	Horizontal	47	2.00	-	42.70	24.47	4.09	32.52
PK	645.95M	38.77	46.00	-7.23	-3.77	3	Horizontal	169	2.00	"Worst"	42.54	24.59	4.18	32.54



Summary

Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	1G	2.38G	AV	2.36379G	3.80	-49.80	-46.00	-41.20	-4.80
BT-LE(2Mbps)	Pass	1G	2.38G	AV	2.36361G	3.80	-48.53	-44.73	-41.20	-3.53

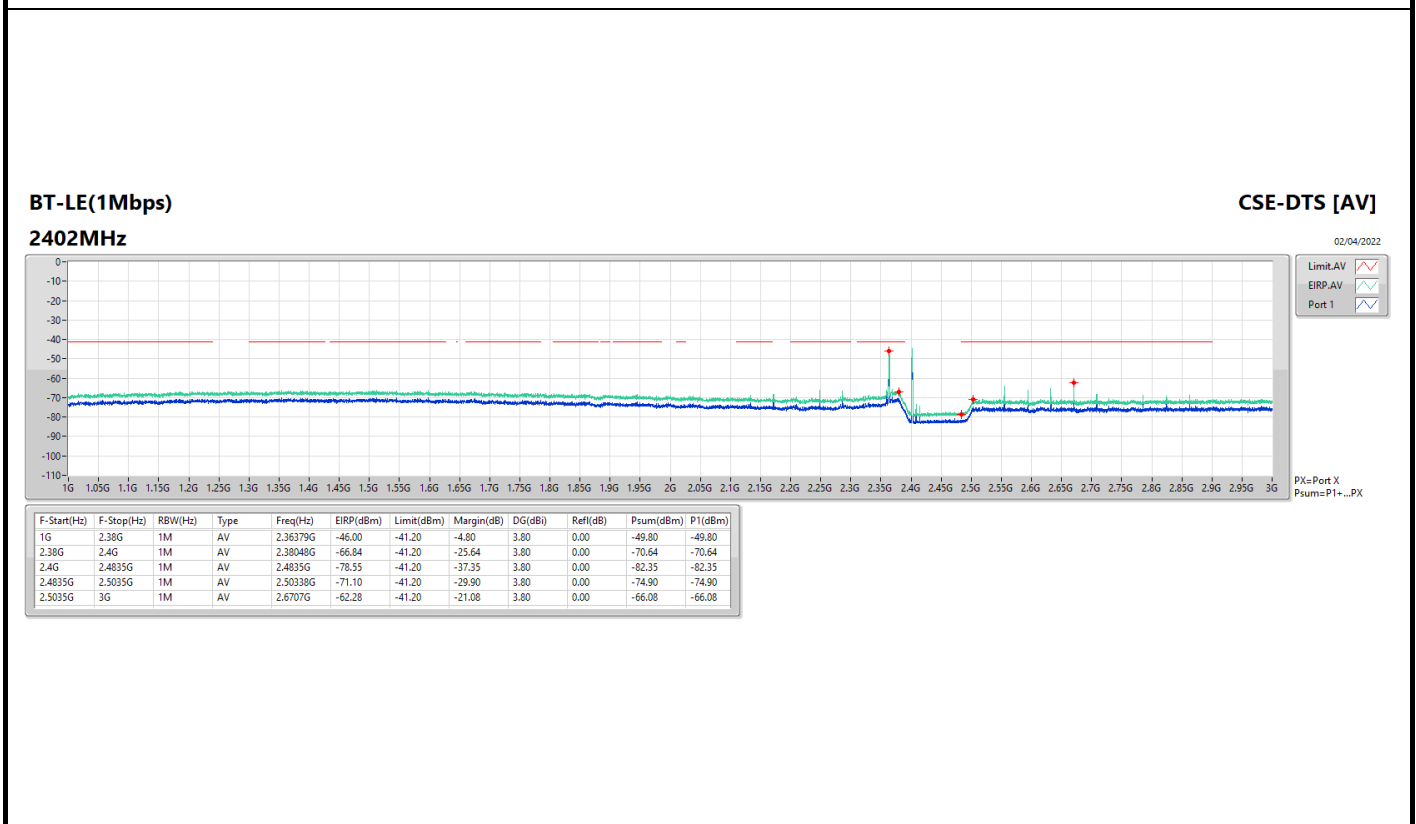
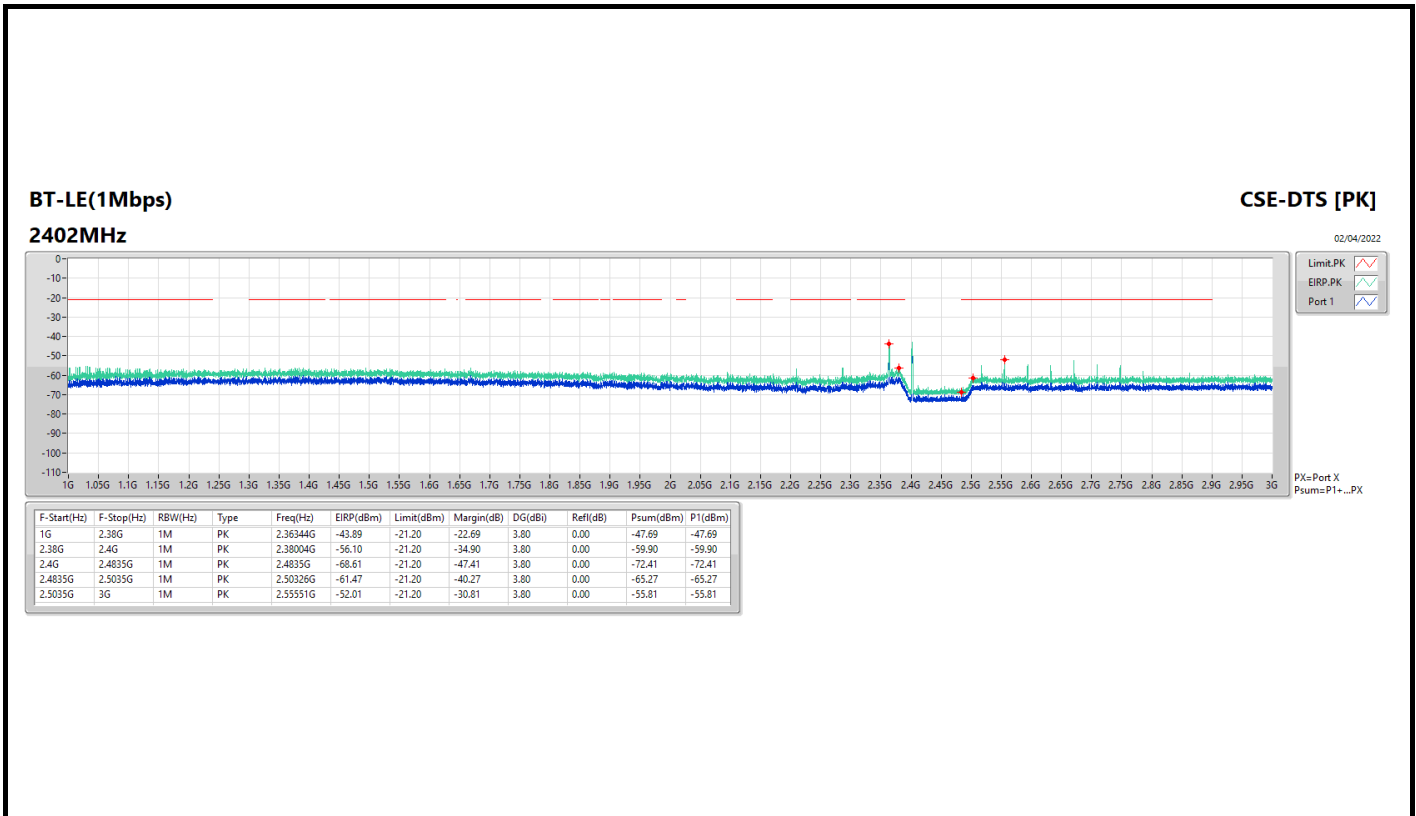
DG = Directional Gain ; PX=Port X; Psum=P1+P2+...PX

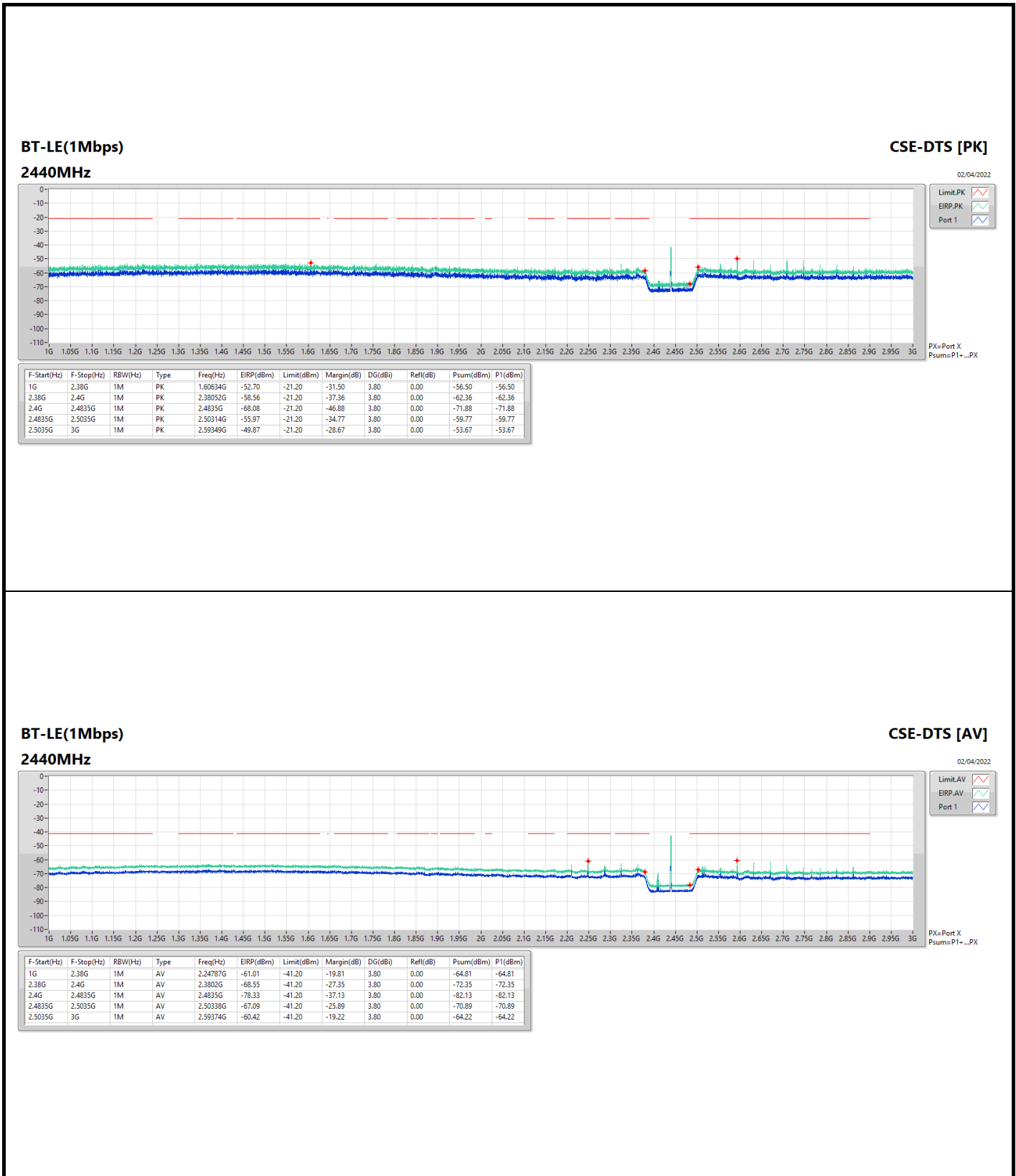


Result

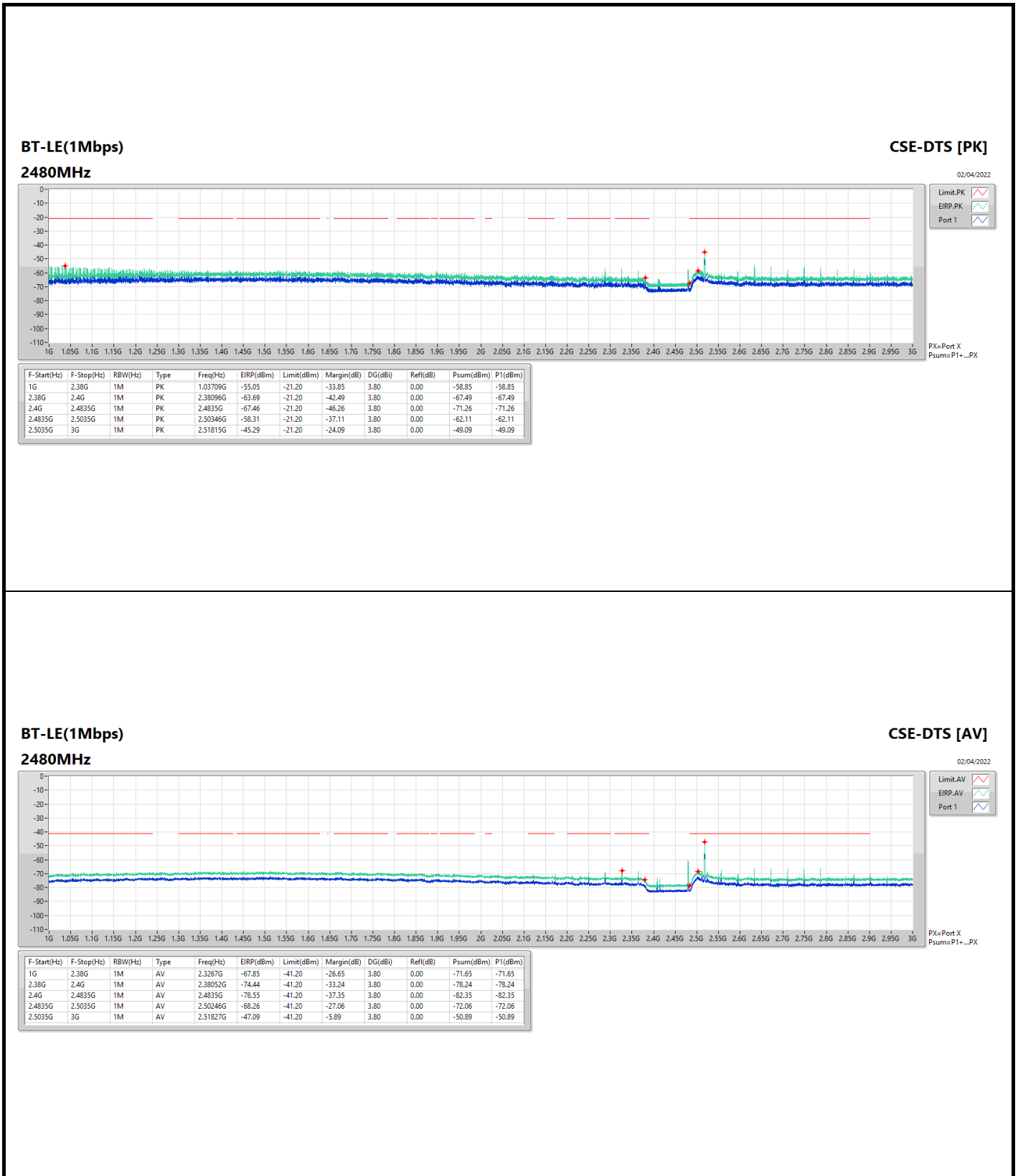
Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	1G	2.38G	AV	2.36379G	3.80	-49.80	-46.00	-41.20	-4.80
2402MHz	Pass	2.38G	2.4G	AV	2.38048G	3.80	-70.64	-66.84	-41.20	-25.64
2402MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-82.35	-78.55	-41.20	-37.35
2402MHz	Pass	2.4835G	2.5035G	AV	2.50338G	3.80	-74.90	-71.10	-41.20	-29.90
2402MHz	Pass	2.5035G	3G	AV	2.6707G	3.80	-66.08	-62.28	-41.20	-21.08
2402MHz	Pass	1G	2.38G	PK	2.36344G	3.80	-47.69	-43.89	-21.20	-22.69
2402MHz	Pass	2.38G	2.4G	PK	2.38004G	3.80	-59.90	-56.10	-21.20	-34.90
2402MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-72.41	-68.61	-21.20	-47.41
2402MHz	Pass	2.4835G	2.5035G	PK	2.50326G	3.80	-65.27	-61.47	-21.20	-40.27
2402MHz	Pass	2.5035G	3G	PK	2.55551G	3.80	-55.81	-52.01	-21.20	-30.81
2440MHz	Pass	1G	2.38G	AV	2.24787G	3.80	-64.81	-61.01	-41.20	-19.81
2440MHz	Pass	2.38G	2.4G	AV	2.3802G	3.80	-72.35	-68.55	-41.20	-27.35
2440MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-82.13	-78.33	-41.20	-37.13
2440MHz	Pass	2.4835G	2.5035G	AV	2.50338G	3.80	-70.89	-67.09	-41.20	-25.89
2440MHz	Pass	2.5035G	3G	AV	2.69374G	3.80	-64.22	-60.42	-41.20	-19.22
2440MHz	Pass	1G	2.38G	PK	1.60634G	3.80	-56.50	-52.70	-21.20	-31.50
2440MHz	Pass	2.38G	2.4G	PK	2.38052G	3.80	-62.36	-58.56	-21.20	-37.36
2440MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-71.88	-68.08	-21.20	-46.88
2440MHz	Pass	2.4835G	2.5035G	PK	2.50314G	3.80	-59.77	-55.97	-21.20	-34.77
2440MHz	Pass	2.5035G	3G	PK	2.59349G	3.80	-53.67	-49.87	-21.20	-28.67
2480MHz	Pass	1G	2.38G	AV	2.3267G	3.80	-71.65	-67.85	-41.20	-26.65
2480MHz	Pass	2.38G	2.4G	AV	2.38052G	3.80	-78.24	-74.44	-41.20	-33.24
2480MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-82.35	-78.55	-41.20	-37.35
2480MHz	Pass	2.4835G	2.5035G	AV	2.50246G	3.80	-72.06	-68.26	-41.20	-27.06
2480MHz	Pass	2.5035G	3G	AV	2.51827G	3.80	-50.89	-47.09	-41.20	-5.89
2480MHz	Pass	1G	2.38G	PK	1.03709G	3.80	-58.85	-55.05	-21.20	-33.85
2480MHz	Pass	2.38G	2.4G	PK	2.38096G	3.80	-67.49	-63.69	-21.20	-42.49
2480MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-71.26	-67.46	-21.20	-46.26
2480MHz	Pass	2.4835G	2.5035G	PK	2.50346G	3.80	-62.11	-58.31	-21.20	-37.11
2480MHz	Pass	2.5035G	3G	PK	2.51815G	3.80	-49.09	-45.29	-21.20	-24.09
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	1G	2.38G	AV	2.36361G	3.80	-48.53	-44.73	-41.20	-3.53
2402MHz	Pass	2.38G	2.4G	AV	2.38164G	3.80	-67.83	-64.03	-41.20	-22.83
2402MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-82.39	-78.59	-41.20	-37.39
2402MHz	Pass	2.4835G	2.5035G	AV	2.50342G	3.80	-74.11	-70.31	-41.20	-29.11
2402MHz	Pass	2.5035G	3G	AV	2.70942G	3.80	-67.09	-63.29	-41.20	-22.09
2402MHz	Pass	1G	2.38G	PK	2.36344G	3.80	-45.17	-41.37	-21.20	-20.17
2402MHz	Pass	2.38G	2.4G	PK	2.38036G	3.80	-57.28	-53.48	-21.20	-32.28
2402MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-72.25	-68.45	-21.20	-47.25
2402MHz	Pass	2.4835G	2.5035G	PK	2.50342G	3.80	-62.82	-59.02	-21.20	-37.82
2402MHz	Pass	2.5035G	3G	PK	2.55563G	3.80	-55.23	-51.43	-21.20	-30.23
2440MHz	Pass	1G	2.38G	AV	2.36327G	3.80	-64.36	-60.56	-41.20	-19.36
2440MHz	Pass	2.38G	2.4G	AV	2.38G	3.80	-72.17	-68.37	-41.20	-27.17
2440MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-81.88	-78.08	-41.20	-36.88
2440MHz	Pass	2.4835G	2.5035G	AV	2.5025G	3.80	-71.23	-67.43	-41.20	-26.23
2440MHz	Pass	2.5035G	3G	AV	2.74691G	3.80	-64.71	-60.91	-41.20	-19.71
2440MHz	Pass	1G	2.38G	PK	2.28668G	3.80	-55.54	-51.74	-21.20	-30.54
2440MHz	Pass	2.38G	2.4G	PK	2.38008G	3.80	-62.63	-58.83	-21.20	-37.63
2440MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-73.28	-69.48	-21.20	-48.28
2440MHz	Pass	2.4835G	2.5035G	PK	2.50314G	3.80	-61.39	-57.59	-21.20	-36.39
2440MHz	Pass	2.5035G	3G	PK	2.59361G	3.80	-53.12	-49.32	-21.20	-28.12
2480MHz	Pass	1G	2.38G	AV	1.51698G	3.80	-73.71	-69.91	-41.20	-28.71
2480MHz	Pass	2.38G	2.4G	AV	2.38072G	3.80	-79.52	-75.72	-41.20	-34.52
2480MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-81.96	-78.16	-41.20	-36.96
2480MHz	Pass	2.4835G	2.5035G	AV	2.50338G	3.80	-73.39	-69.59	-41.20	-28.39
2480MHz	Pass	2.5035G	3G	AV	2.5184G	3.80	-55.30	-51.50	-41.20	-10.30
2480MHz	Pass	1G	2.38G	PK	1.03071G	3.80	-58.99	-55.19	-21.20	-33.99
2480MHz	Pass	2.38G	2.4G	PK	2.38112G	3.80	-68.85	-65.05	-21.20	-43.85
2480MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-71.96	-68.16	-21.20	-46.96
2480MHz	Pass	2.4835G	2.5035G	PK	2.5017G	3.80	-61.53	-57.73	-21.20	-36.53
2480MHz	Pass	2.5035G	3G	PK	2.51777G	3.80	-51.03	-47.23	-21.20	-26.03

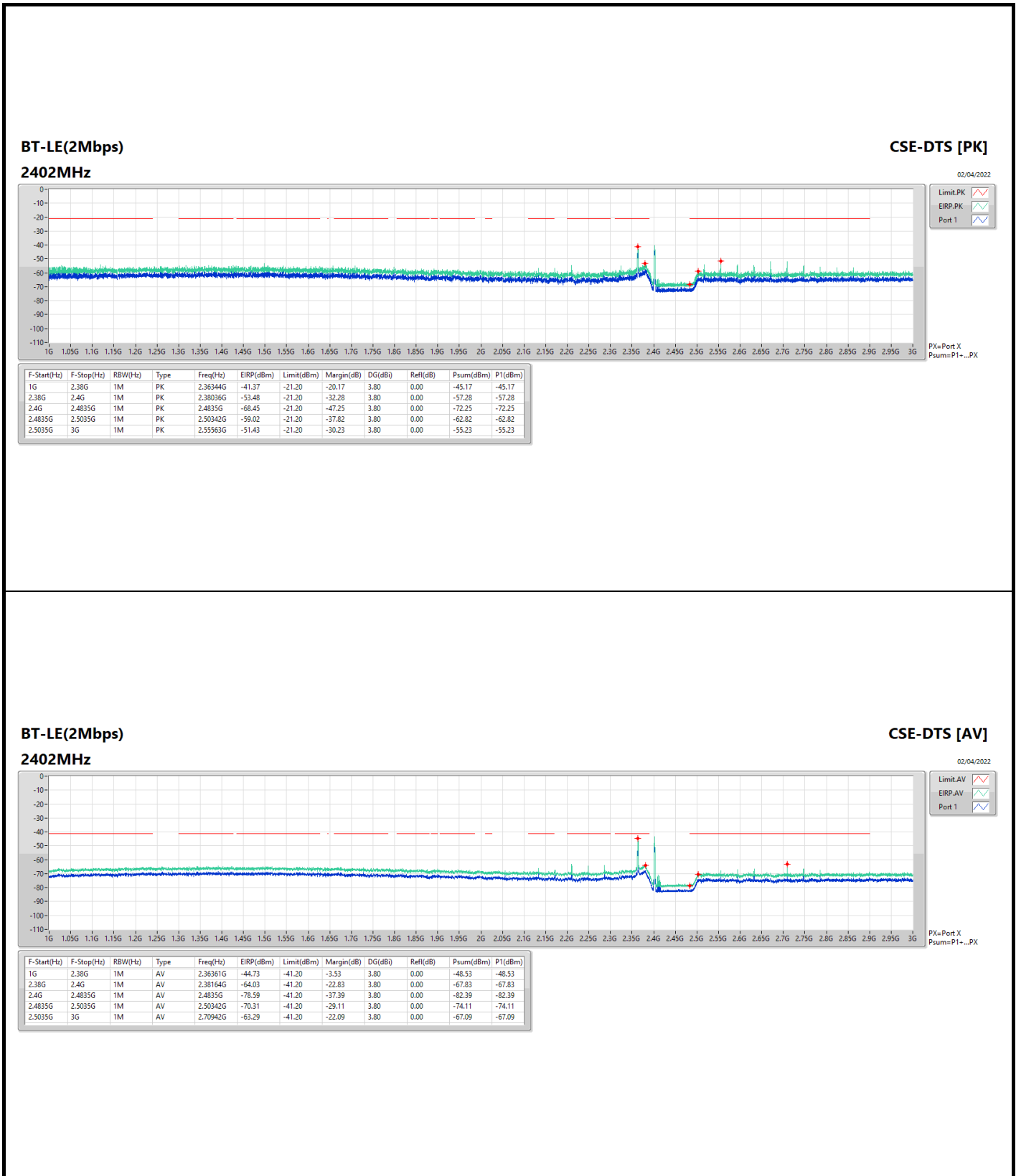
DG = Directional Gain ; PX=Port X; Psum=P1+P2+...PX







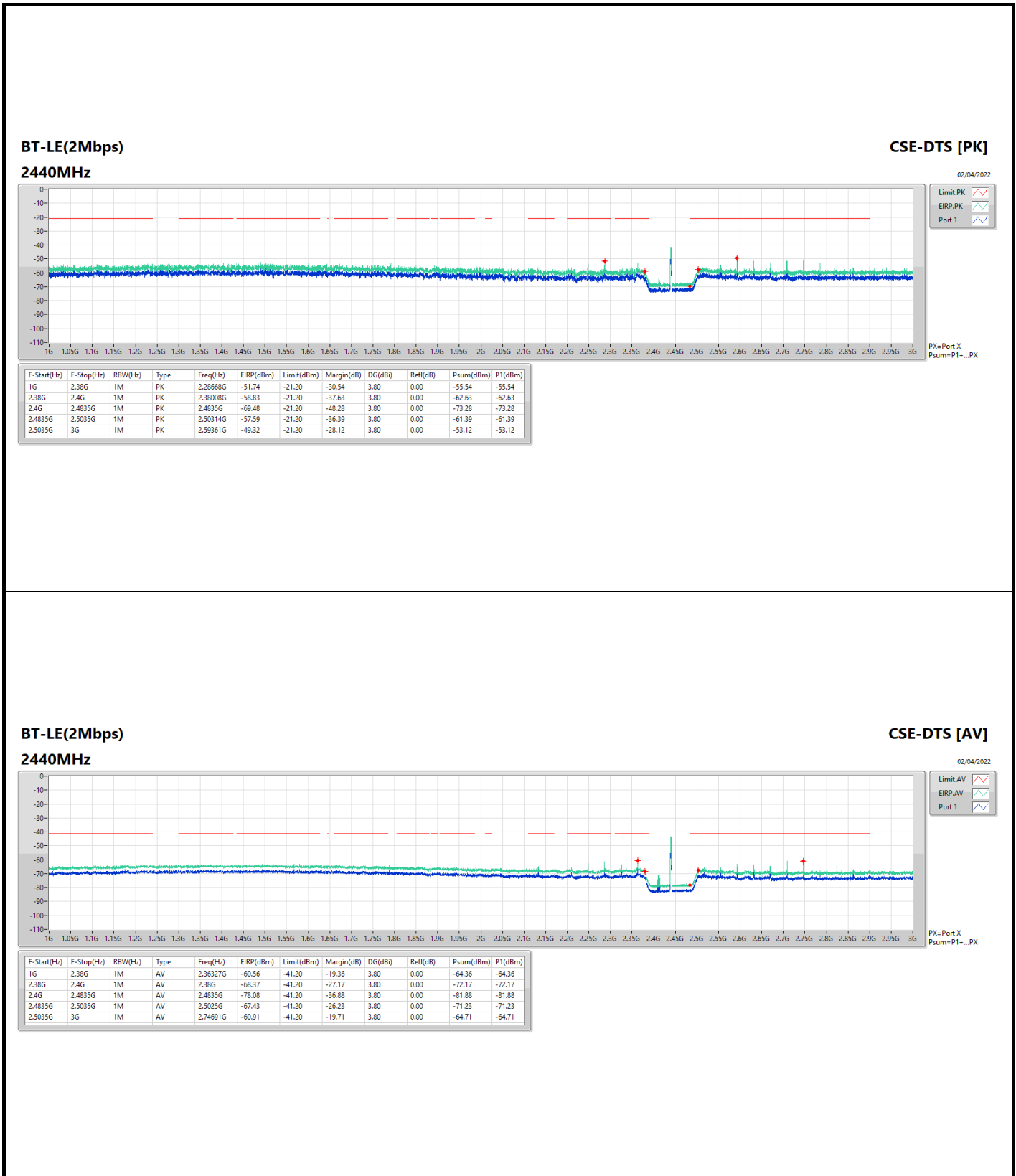




**BT-LE(2Mbps)**  
**2402MHz**

**CSE-DTS [AV]**

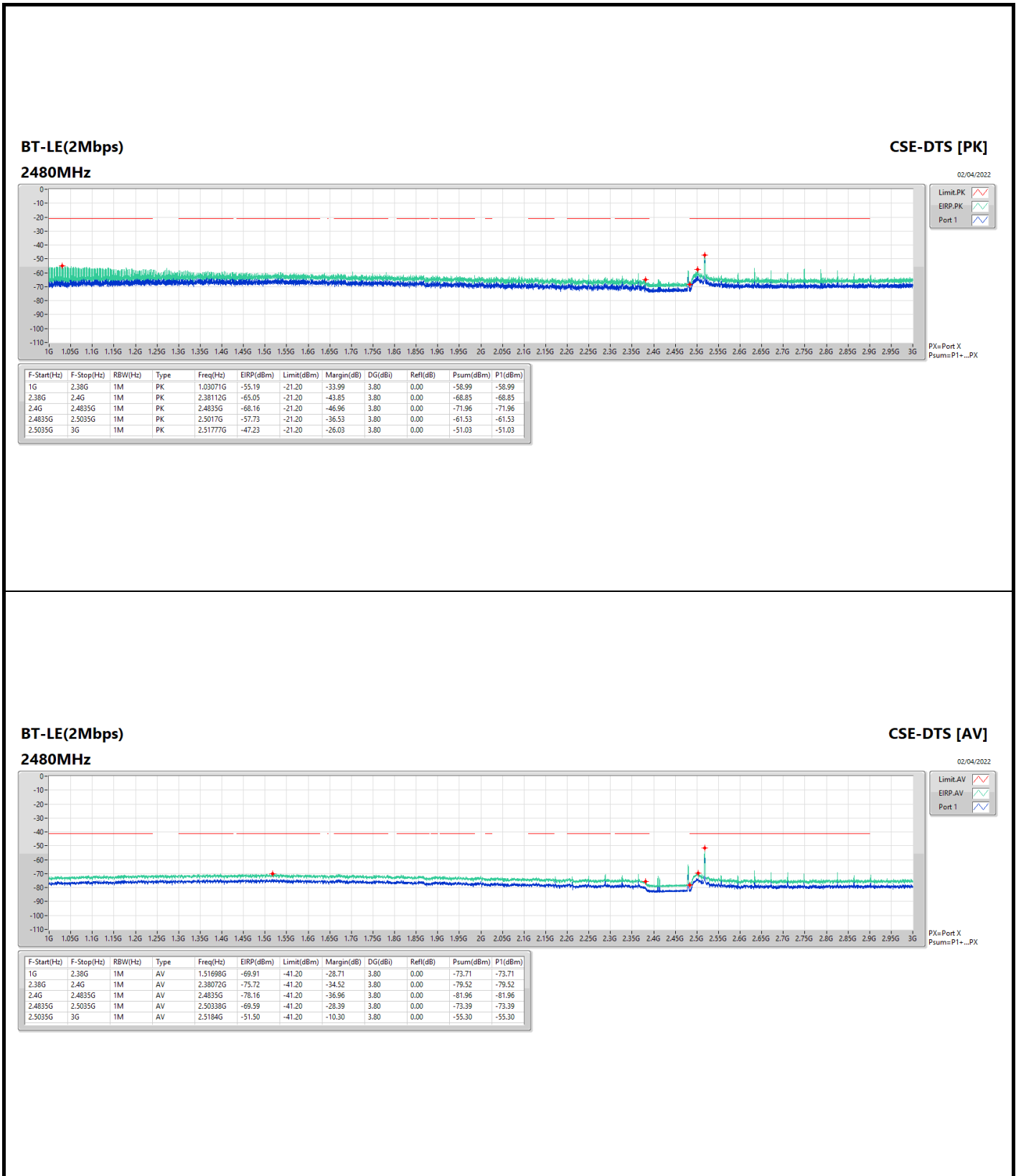
02/04/2022



**BT-LE(2Mbps)**  
**2440MHz**

**CSE-DTS [AV]**

02/04/2022





Summary

Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	3G	7.5G	AV	4.87988G	3.80	-52.84	-49.04	-41.20	-7.84
BT-LE(2Mbps)	Pass	3G	7.5G	AV	4.87988G	3.80	-55.63	-51.83	-41.20	-10.63

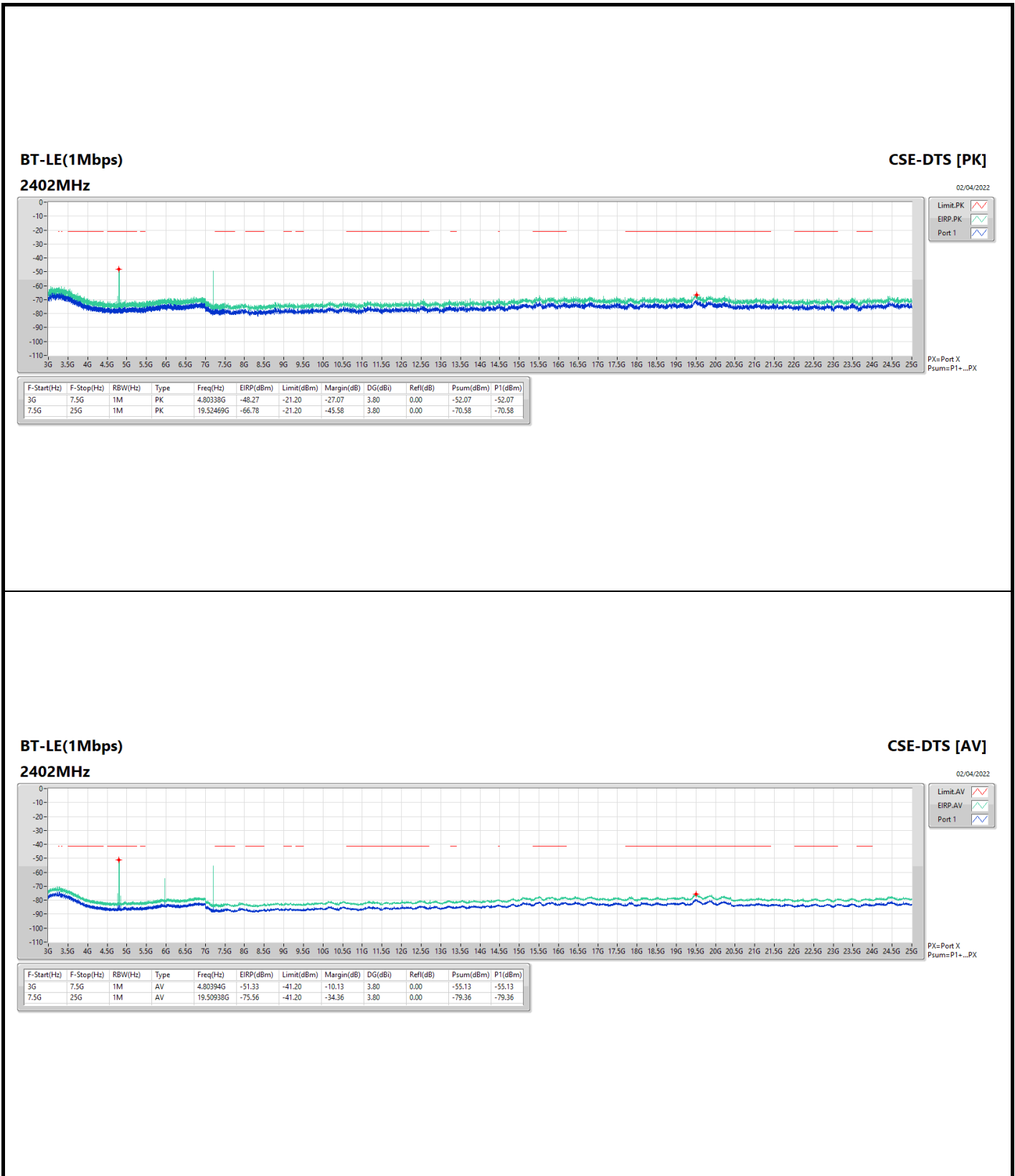
DG = Directional Gain ; PX=Port X; Psum=P1+P2+...PX

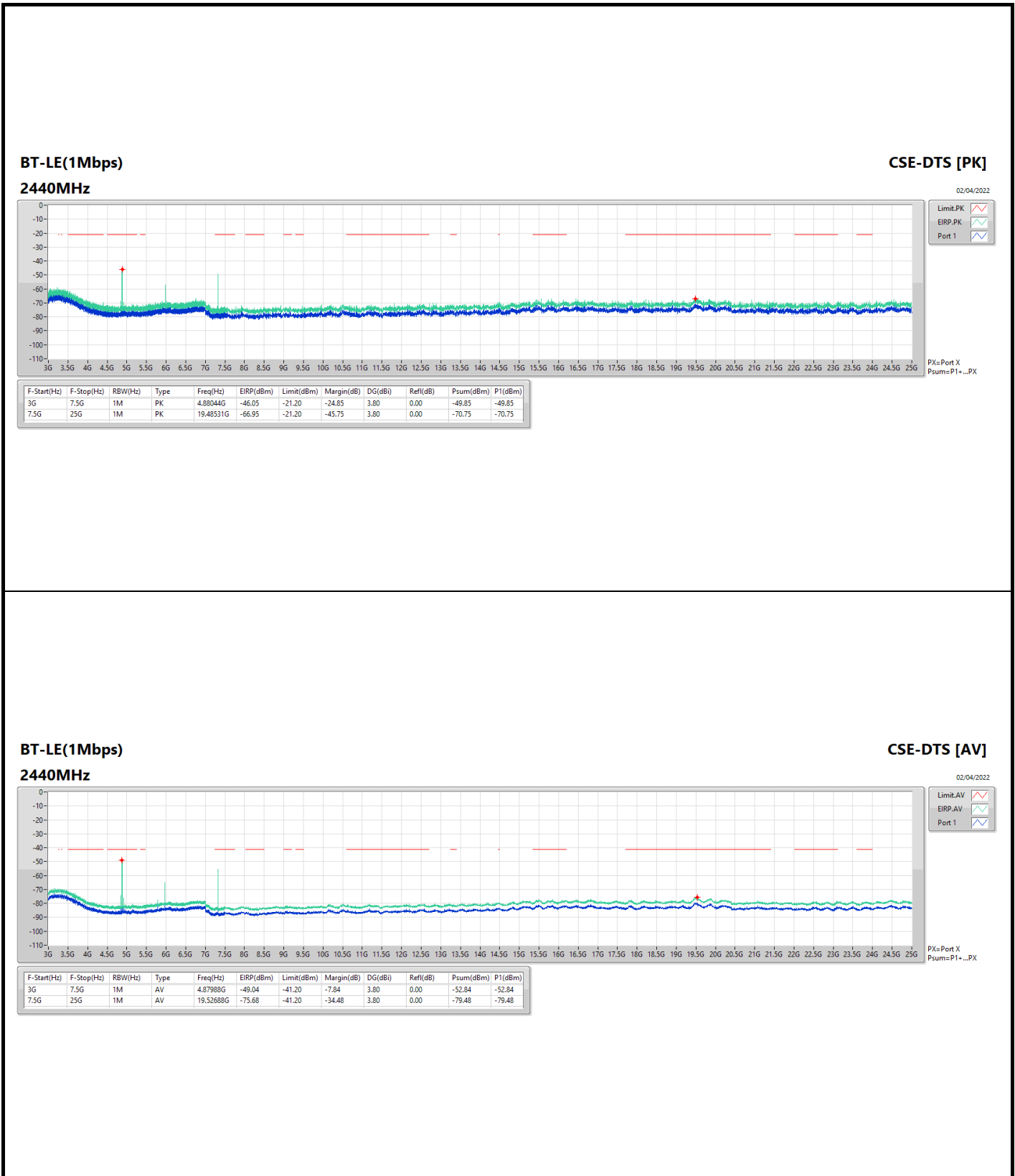


Result

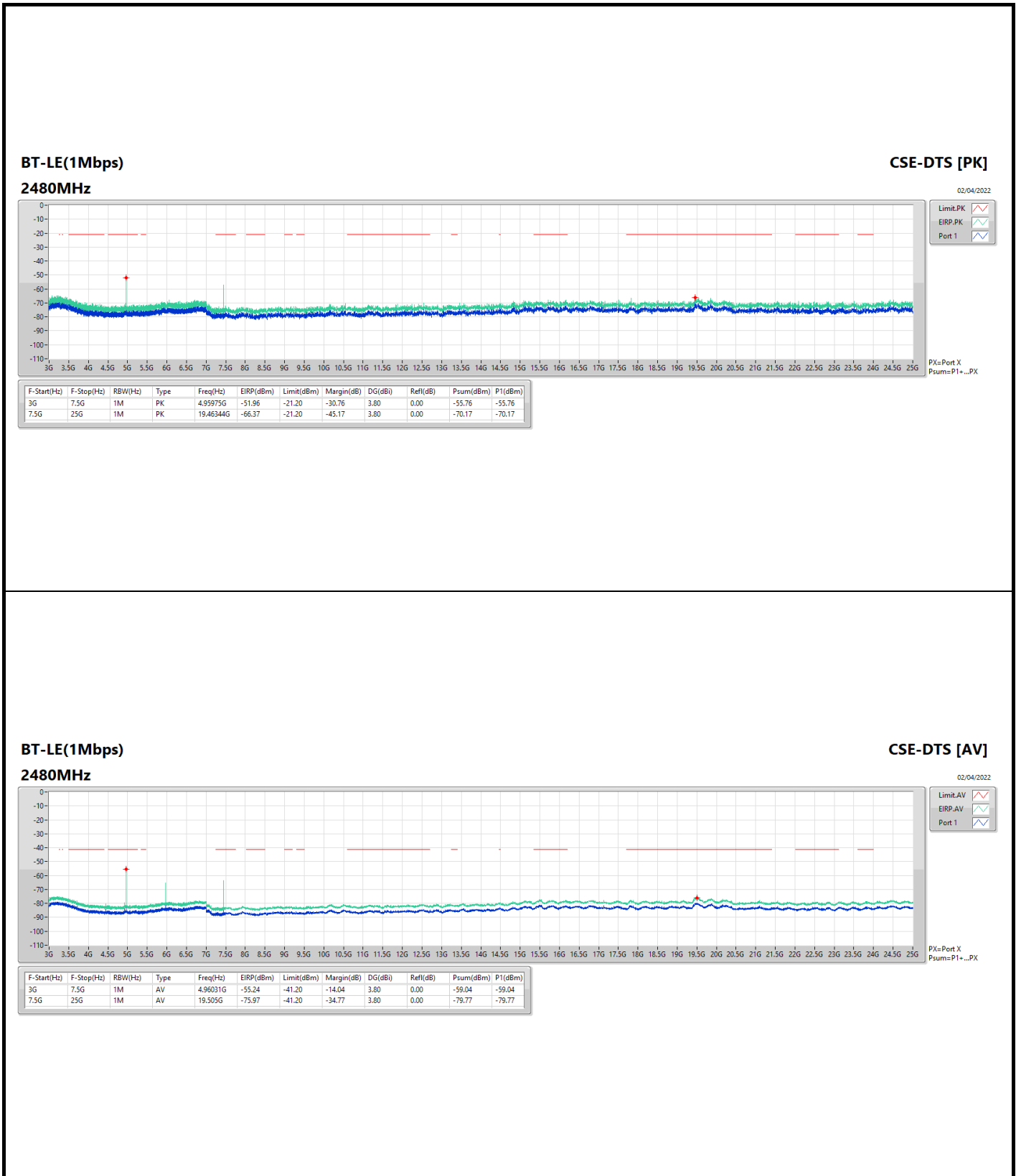
Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	3G	7.5G	AV	4.80394G	3.80	-55.13	-51.33	-41.20	-10.13
2402MHz	Pass	7.5G	25G	AV	19.50938G	3.80	-79.36	-75.56	-41.20	-34.36
2402MHz	Pass	3G	7.5G	PK	4.80338G	3.80	-52.07	-48.27	-21.20	-27.07
2402MHz	Pass	7.5G	25G	PK	19.52469G	3.80	-70.58	-66.78	-21.20	-45.58
2440MHz	Pass	3G	7.5G	AV	4.87988G	3.80	-52.84	-49.04	-41.20	-7.84
2440MHz	Pass	7.5G	25G	AV	19.52688G	3.80	-79.48	-75.68	-41.20	-34.48
2440MHz	Pass	3G	7.5G	PK	4.88044G	3.80	-49.85	-46.05	-21.20	-24.85
2440MHz	Pass	7.5G	25G	PK	19.48531G	3.80	-70.75	-66.95	-21.20	-45.75
2480MHz	Pass	3G	7.5G	AV	4.96031G	3.80	-59.04	-55.24	-41.20	-14.04
2480MHz	Pass	7.5G	25G	AV	19.505G	3.80	-79.77	-75.97	-41.20	-34.77
2480MHz	Pass	3G	7.5G	PK	4.95975G	3.80	-55.76	-51.96	-21.20	-30.76
2480MHz	Pass	7.5G	25G	PK	19.46344G	3.80	-70.17	-66.37	-21.20	-45.17
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	3G	7.5G	AV	4.80281G	3.80	-57.95	-54.15	-41.20	-12.95
2402MHz	Pass	3G	7.5G	AV	4.80338G	3.80	-59.42	-55.62	-41.20	-14.42
2402MHz	Pass	7.5G	25G	AV	19.49844G	3.80	-79.44	-75.64	-41.20	-34.44
2402MHz	Pass	3G	7.5G	PK	4.8045G	3.80	-52.55	-48.75	-21.20	-27.55
2402MHz	Pass	7.5G	25G	PK	19.4525G	3.80	-70.14	-66.34	-21.20	-45.14
2440MHz	Pass	3G	7.5G	AV	4.87988G	3.80	-55.63	-51.83	-41.20	-10.63
2440MHz	Pass	7.5G	25G	AV	19.50719G	3.80	-79.38	-75.58	-41.20	-34.38
2440MHz	Pass	3G	7.5G	PK	4.87875G	3.80	-50.21	-46.41	-21.20	-25.21
2440MHz	Pass	3G	7.5G	PK	4.881G	3.80	-50.44	-46.64	-21.20	-25.44
2440MHz	Pass	7.5G	25G	PK	19.57281G	3.80	-70.25	-66.45	-21.20	-45.25
2480MHz	Pass	3G	7.5G	AV	4.95863G	3.80	-64.09	-60.29	-41.20	-19.09
2480MHz	Pass	3G	7.5G	AV	4.95919G	3.80	-65.56	-61.76	-41.20	-20.56
2480MHz	Pass	7.5G	25G	AV	19.51375G	3.80	-79.57	-75.77	-41.20	-34.57
2480MHz	Pass	3G	7.5G	PK	4.95919G	3.80	-58.52	-54.72	-21.20	-33.52
2480MHz	Pass	7.5G	25G	PK	19.49188G	3.80	-70.19	-66.39	-21.20	-45.19

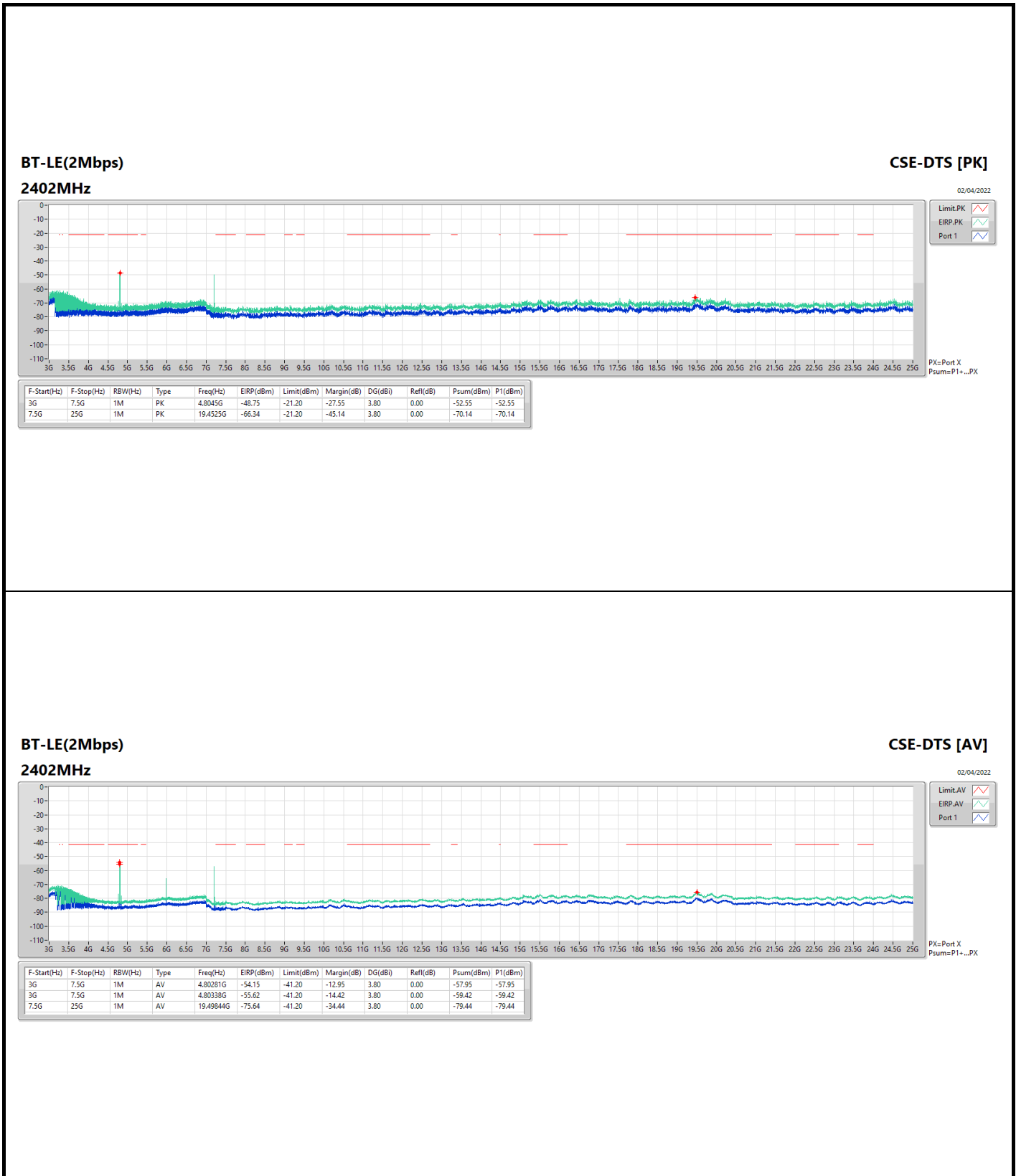
DG = Directional Gain ; PX=Port X; Psum=P1+P2+...PX

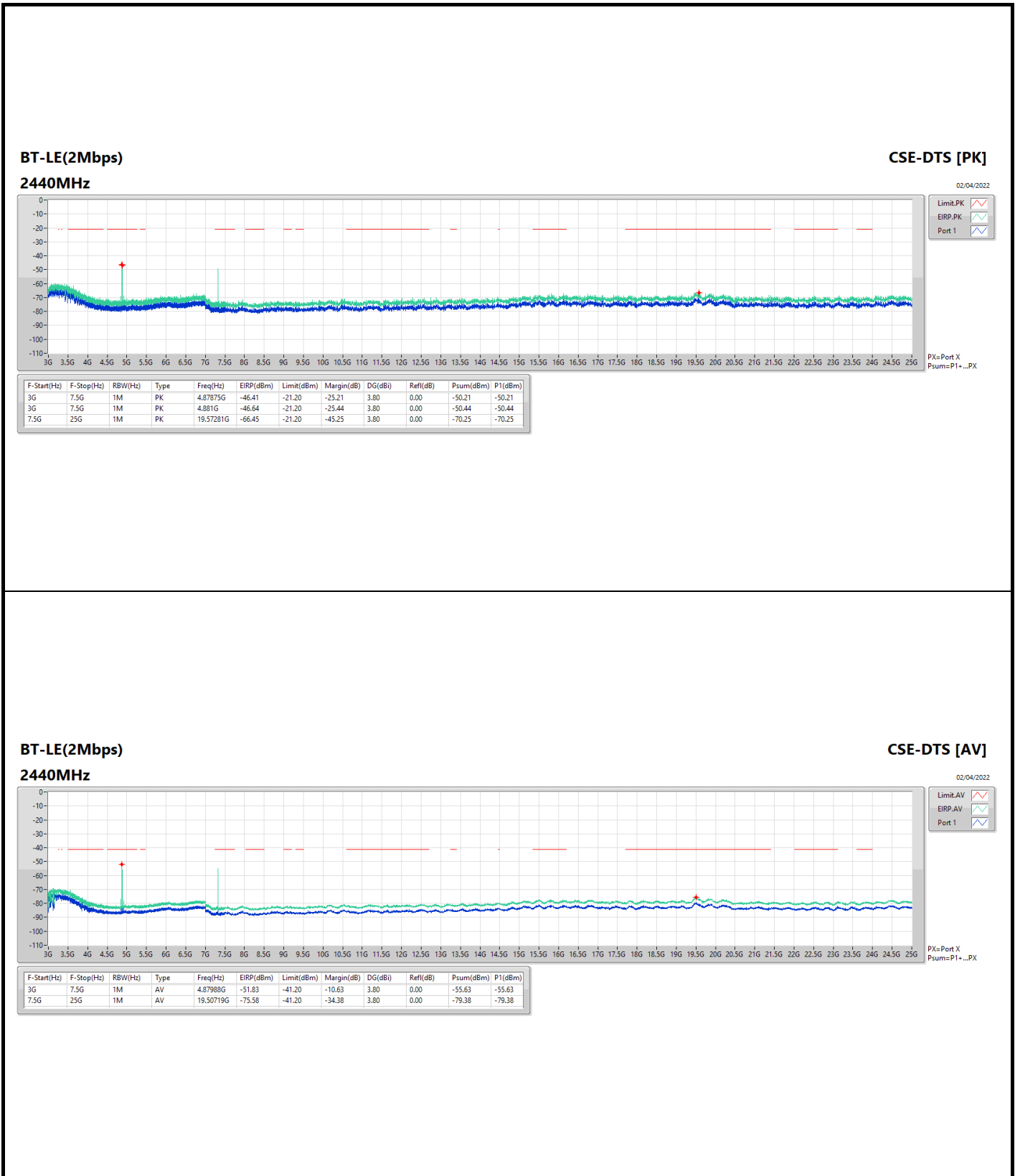


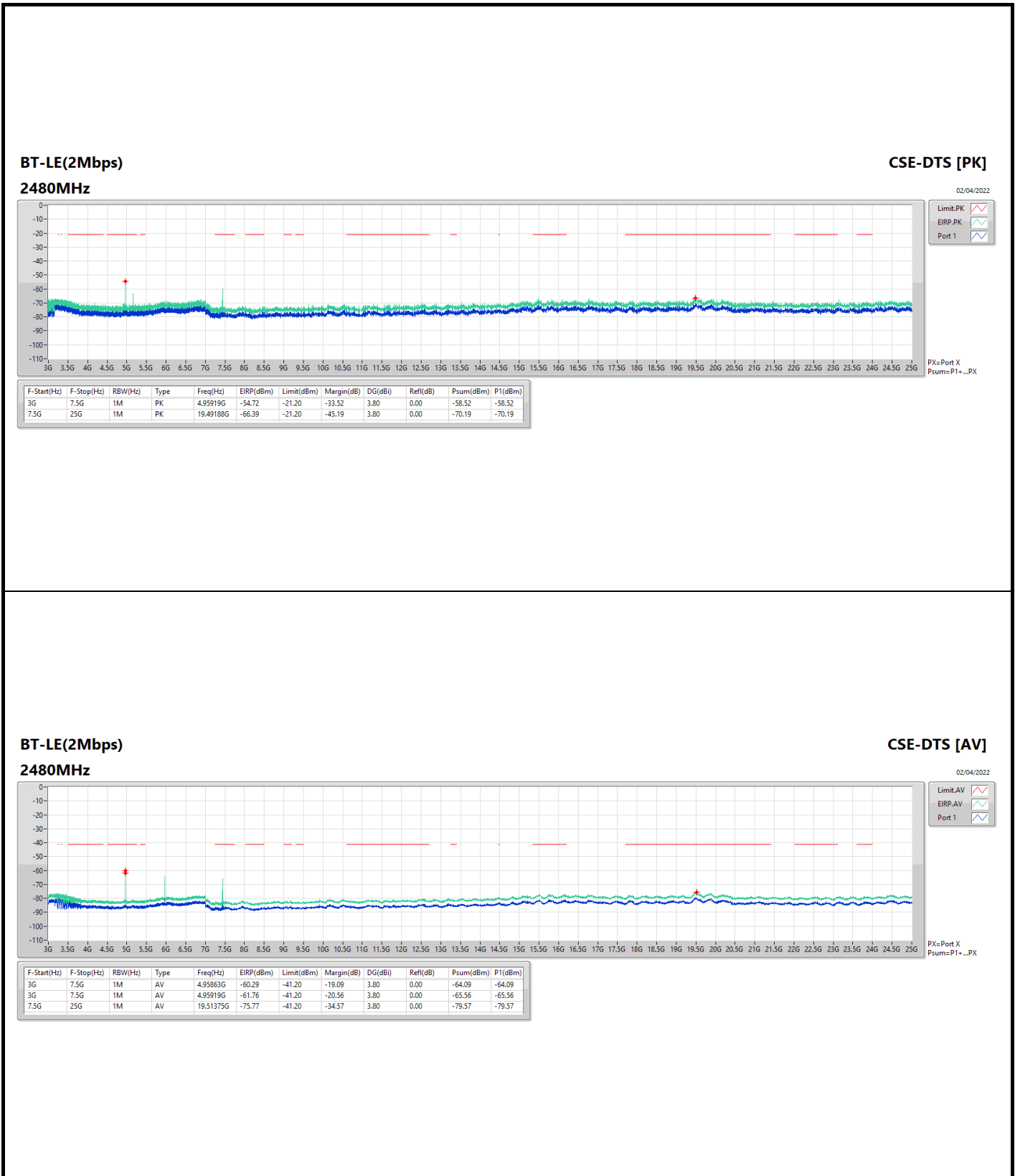














Summary

Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-46.17	-42.37	-41.20	-1.17
BT-LE(2Mbps)	Pass	2.4835G	2.5035G	AV	2.4835G	3.80	-45.11	-41.31	-41.20	-0.11

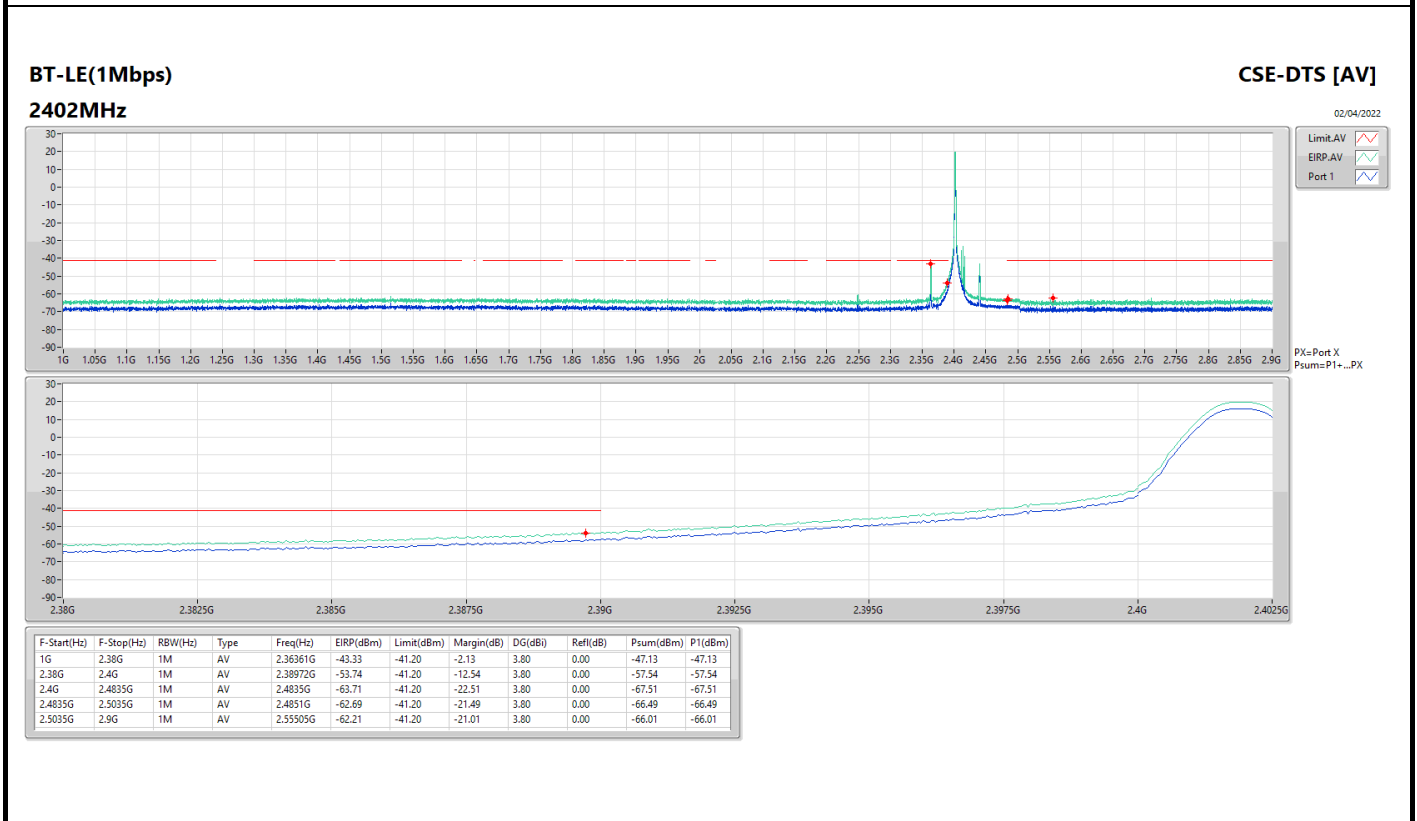
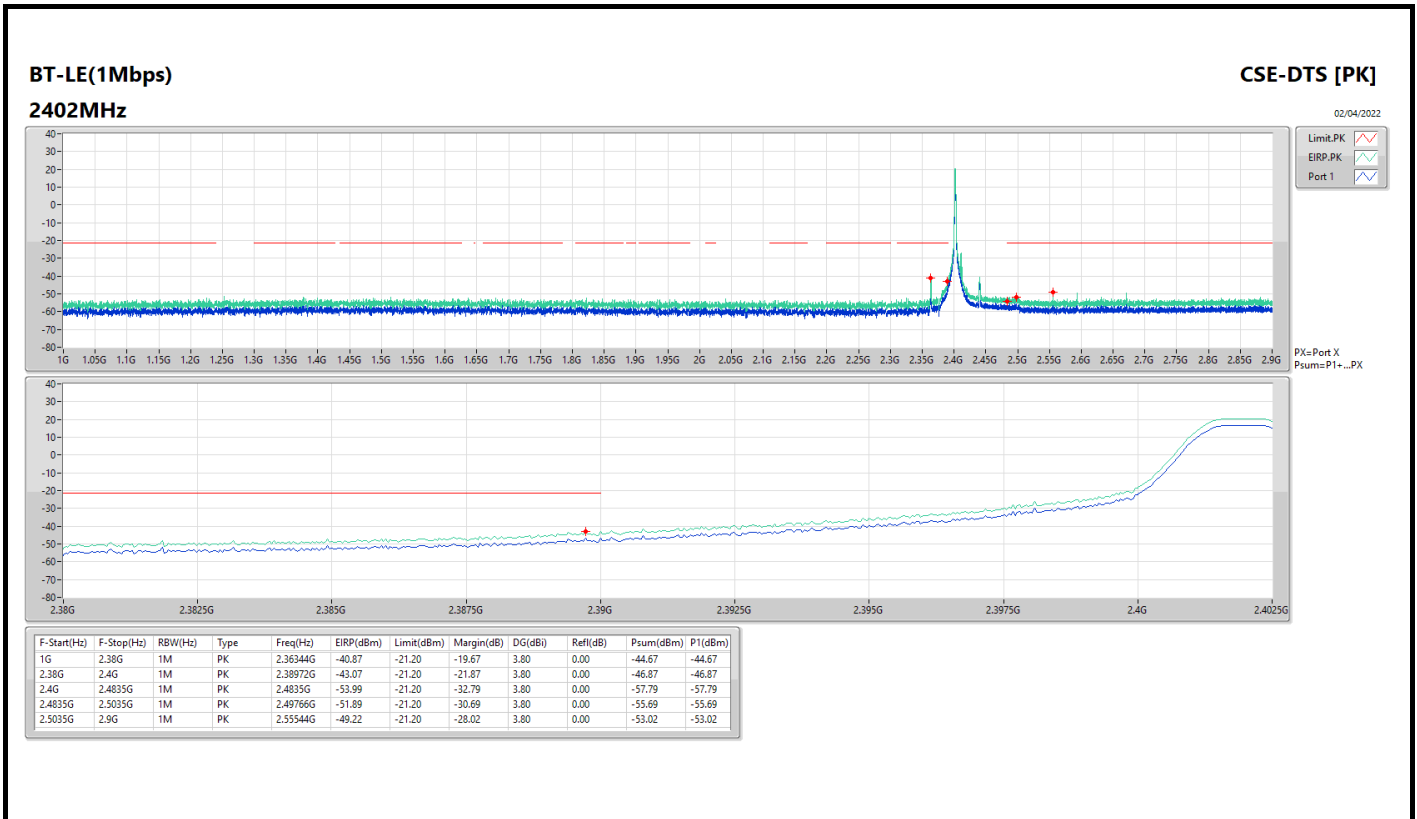
DG = Directional Gain ; PX=Port X; Psum=P1+P2+...PX

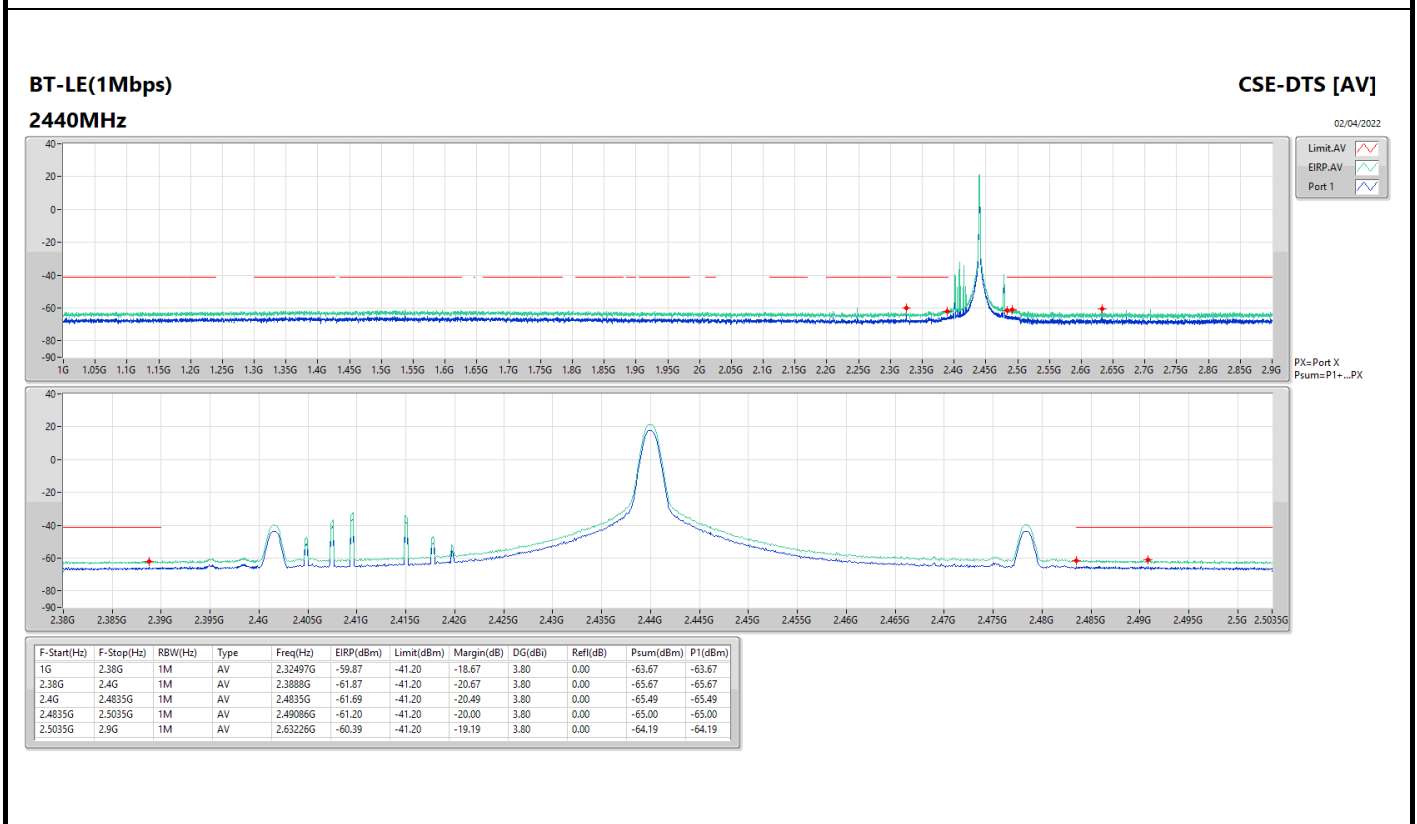
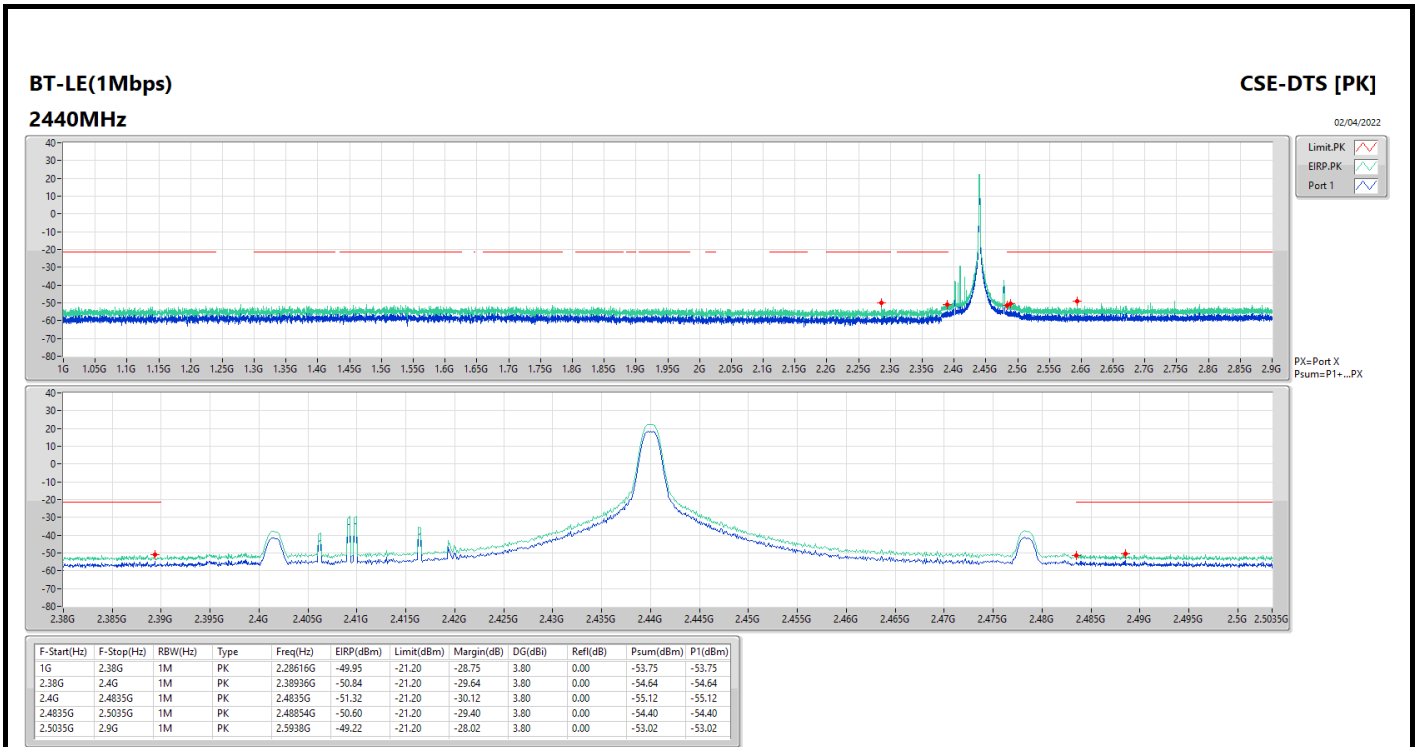


Result

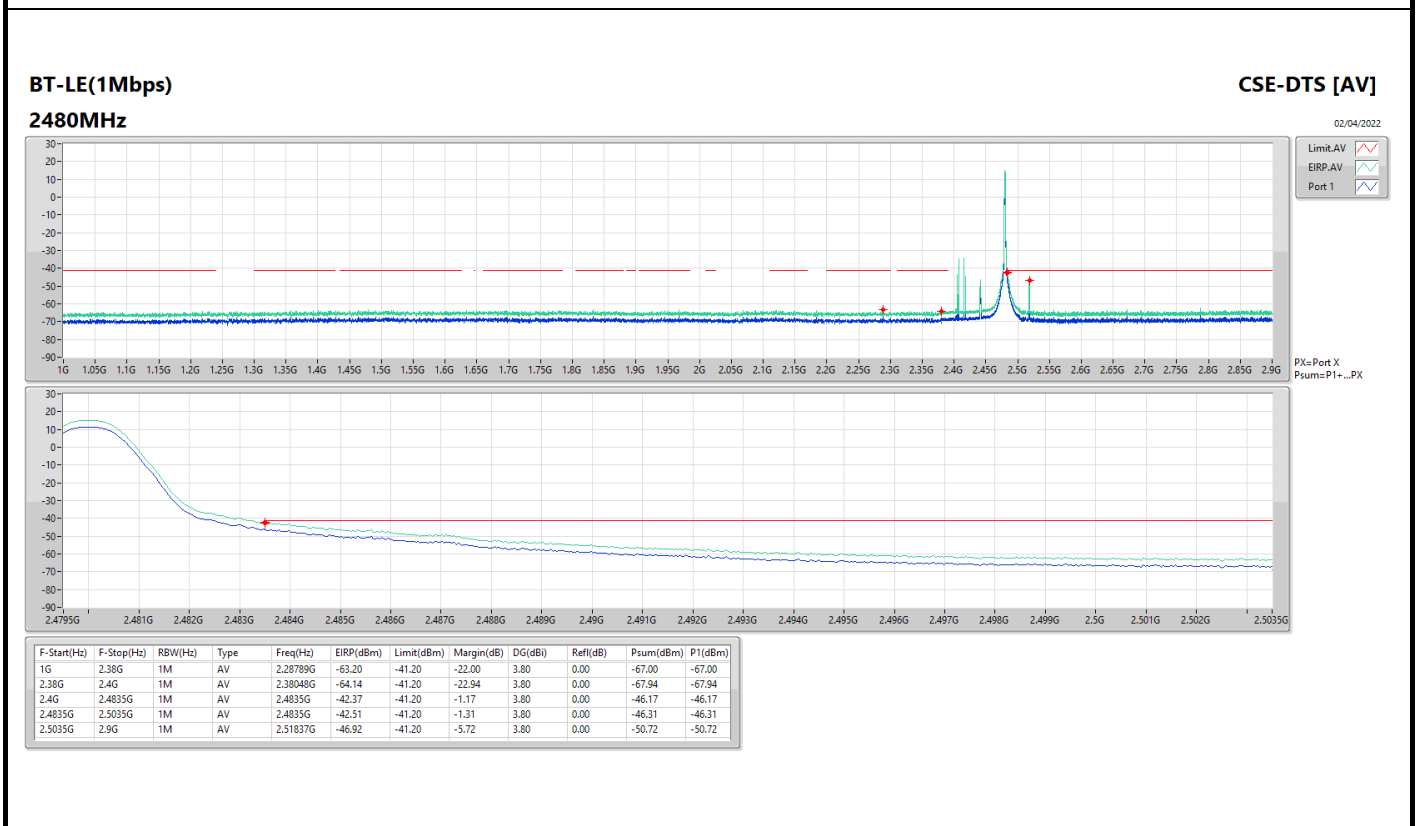
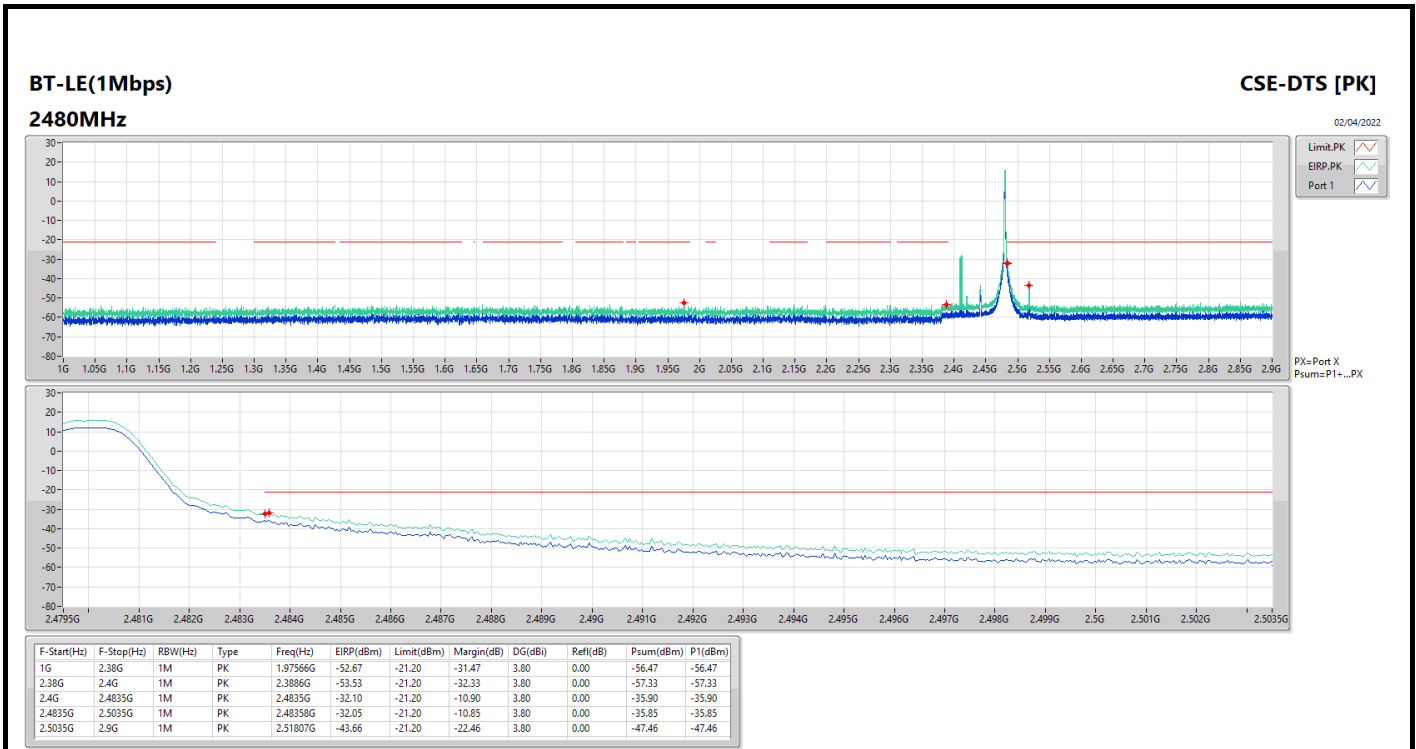
Mode	Result	F-Start (Hz)	F-Stop (Hz)	Type	Freq (Hz)	DG (dBi)	Psum (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	1G	2.38G	AV	2.36361G	3.80	-47.13	-43.33	-41.20	-2.13
2402MHz	Pass	2.38G	2.4G	AV	2.38972G	3.80	-57.54	-53.74	-41.20	-12.54
2402MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-67.51	-63.71	-41.20	-22.51
2402MHz	Pass	2.4835G	2.5035G	AV	2.4851G	3.80	-66.49	-62.69	-41.20	-21.49
2402MHz	Pass	2.5035G	2.9G	AV	2.55505G	3.80	-66.01	-62.21	-41.20	-21.01
2402MHz	Pass	1G	2.38G	PK	2.36344G	3.80	-44.67	-40.87	-21.20	-19.67
2402MHz	Pass	2.38G	2.4G	PK	2.38972G	3.80	-46.87	-43.07	-21.20	-21.87
2402MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-57.79	-53.99	-21.20	-32.79
2402MHz	Pass	2.4835G	2.5035G	PK	2.49766G	3.80	-56.69	-51.89	-21.20	-30.69
2402MHz	Pass	2.5035G	2.9G	PK	2.55544G	3.80	-53.02	-49.22	-21.20	-28.02
2440MHz	Pass	1G	2.38G	AV	2.32497G	3.80	-63.67	-59.87	-41.20	-18.67
2440MHz	Pass	2.38G	2.4G	AV	2.3888G	3.80	-65.67	-61.87	-41.20	-20.67
2440MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-65.49	-61.69	-41.20	-20.49
2440MHz	Pass	2.4835G	2.5035G	AV	2.49086G	3.80	-65.00	-61.20	-41.20	-20.00
2440MHz	Pass	2.5035G	2.9G	AV	2.63226G	3.80	-64.19	-60.39	-41.20	-19.19
2440MHz	Pass	1G	2.38G	PK	2.28616G	3.80	-53.75	-49.95	-21.20	-28.75
2440MHz	Pass	2.38G	2.4G	PK	2.38936G	3.80	-54.64	-50.84	-21.20	-29.64
2440MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-55.12	-51.32	-21.20	-30.12
2440MHz	Pass	2.4835G	2.5035G	PK	2.48854G	3.80	-54.40	-50.60	-21.20	-29.40
2440MHz	Pass	2.5035G	2.9G	PK	2.5938G	3.80	-53.02	-49.22	-21.20	-28.02
2480MHz	Pass	1G	2.38G	AV	2.28789G	3.80	-67.00	-63.20	-41.20	-22.00
2480MHz	Pass	2.38G	2.4G	AV	2.38048G	3.80	-67.94	-64.14	-41.20	-22.94
2480MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-46.17	-42.37	-41.20	-1.17
2480MHz	Pass	2.4835G	2.5035G	AV	2.4835G	3.80	-46.31	-42.51	-41.20	-1.31
2480MHz	Pass	2.5035G	2.9G	AV	2.51837G	3.80	-50.72	-46.92	-41.20	-5.72
2480MHz	Pass	1G	2.38G	PK	1.97566G	3.80	-56.47	-52.67	-21.20	-31.47
2480MHz	Pass	2.38G	2.4G	PK	2.3886G	3.80	-57.33	-53.53	-21.20	-32.33
2480MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-35.90	-32.10	-21.20	-10.90
2480MHz	Pass	2.4835G	2.5035G	PK	2.48358G	3.80	-35.85	-32.05	-21.20	-10.85
2480MHz	Pass	2.5035G	2.9G	PK	2.51807G	3.80	-47.46	-43.66	-21.20	-22.46
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	1G	2.38G	AV	2.36379G	3.80	-46.14	-42.34	-41.20	-1.14
2402MHz	Pass	2.38G	2.4G	AV	2.38992G	3.80	-53.70	-49.90	-41.20	-8.70
2402MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-66.84	-63.04	-41.20	-21.84
2402MHz	Pass	2.4835G	2.5035G	AV	2.48406G	3.80	-65.82	-62.02	-41.20	-20.82
2402MHz	Pass	2.5035G	2.9G	AV	2.67082G	3.80	-63.32	-59.52	-41.20	-18.32
2402MHz	Pass	1G	2.38G	PK	2.36327G	3.80	-42.86	-39.06	-21.20	-17.86
2402MHz	Pass	2.38G	2.4G	PK	2.3896G	3.80	-43.29	-39.49	-21.20	-18.29
2402MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-56.79	-52.99	-21.20	-31.79
2402MHz	Pass	2.4835G	2.5035G	PK	2.4937G	3.80	-55.45	-51.65	-21.20	-30.45
2402MHz	Pass	2.5035G	2.9G	PK	2.55564G	3.80	-52.02	-48.22	-21.20	-27.02
2440MHz	Pass	1G	2.38G	AV	2.24804G	3.80	-63.93	-60.13	-41.20	-18.93
2440MHz	Pass	2.38G	2.4G	AV	2.38628G	3.80	-65.36	-61.56	-41.20	-20.36
2440MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-65.65	-61.85	-41.20	-20.65
2440MHz	Pass	2.4835G	2.5035G	AV	2.49066G	3.80	-65.04	-61.24	-41.20	-20.04
2440MHz	Pass	2.5035G	2.9G	AV	2.5937G	3.80	-62.69	-58.89	-41.20	-17.69
2440MHz	Pass	1G	2.38G	PK	1.46817G	3.80	-54.83	-51.03	-21.20	-29.83
2440MHz	Pass	2.38G	2.4G	PK	2.38692G	3.80	-55.54	-51.74	-21.20	-30.54
2440MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-55.13	-51.33	-21.20	-30.13
2440MHz	Pass	2.4835G	2.5035G	PK	2.48358G	3.80	-54.12	-50.32	-21.20	-29.12
2440MHz	Pass	2.5035G	2.9G	PK	2.5936G	3.80	-52.89	-49.09	-21.20	-27.89
2480MHz	Pass	1G	2.38G	AV	1.52078G	3.80	-67.67	-63.87	-41.20	-22.67
2480MHz	Pass	2.38G	2.4G	AV	2.3874G	3.80	-68.15	-64.35	-41.20	-23.15
2480MHz	Pass	2.4G	2.4835G	AV	2.4835G	3.80	-45.57	-41.77	-41.20	-0.57
2480MHz	Pass	2.4835G	2.5035G	AV	2.4835G	3.80	-45.11	-41.31	-41.20	-0.11
2480MHz	Pass	2.5035G	2.9G	AV	2.51817G	3.80	-55.23	-51.43	-41.20	-10.23
2480MHz	Pass	1G	2.38G	PK	1.02415G	3.80	-56.60	-52.80	-21.20	-31.60
2480MHz	Pass	2.38G	2.4G	PK	2.38064G	3.80	-56.71	-52.91	-21.20	-31.71
2480MHz	Pass	2.4G	2.4835G	PK	2.4835G	3.80	-35.46	-31.66	-21.20	-10.46
2480MHz	Pass	2.4835G	2.5035G	PK	2.4837G	3.80	-34.10	-30.30	-21.20	-9.10
2480MHz	Pass	2.5035G	2.9G	PK	2.51758G	3.80	-49.92	-46.12	-21.20	-24.92

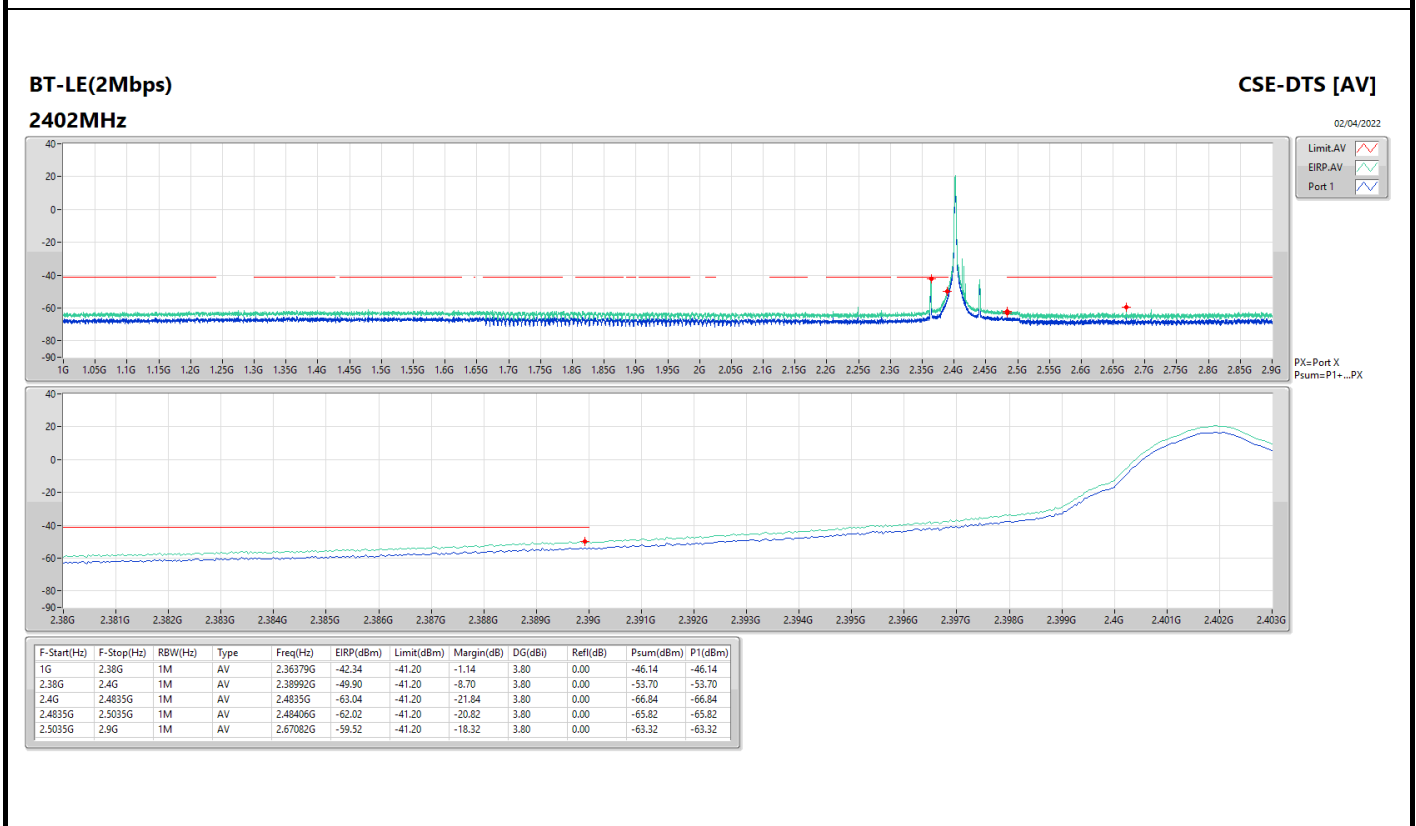
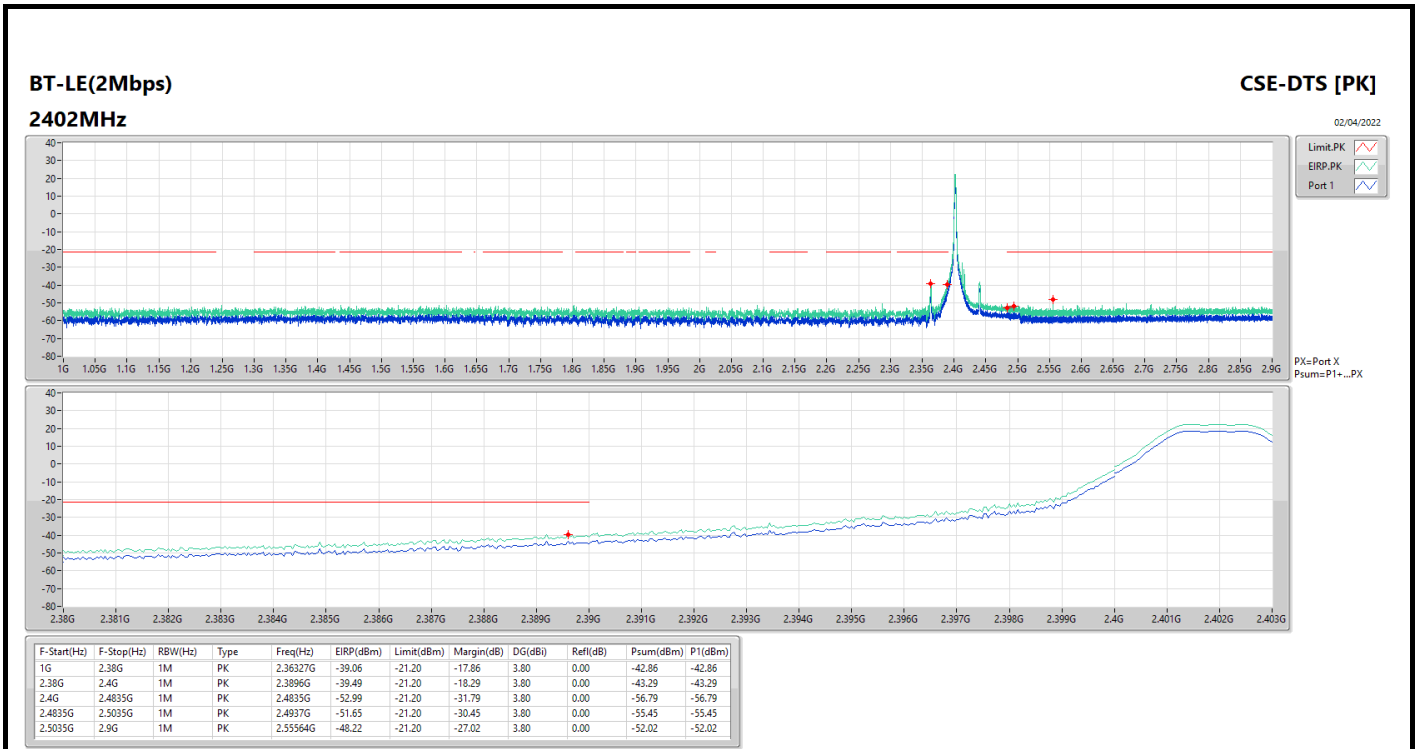
DG = Directional Gain ; PX=Port X ; Psum=P1+P2+...PX

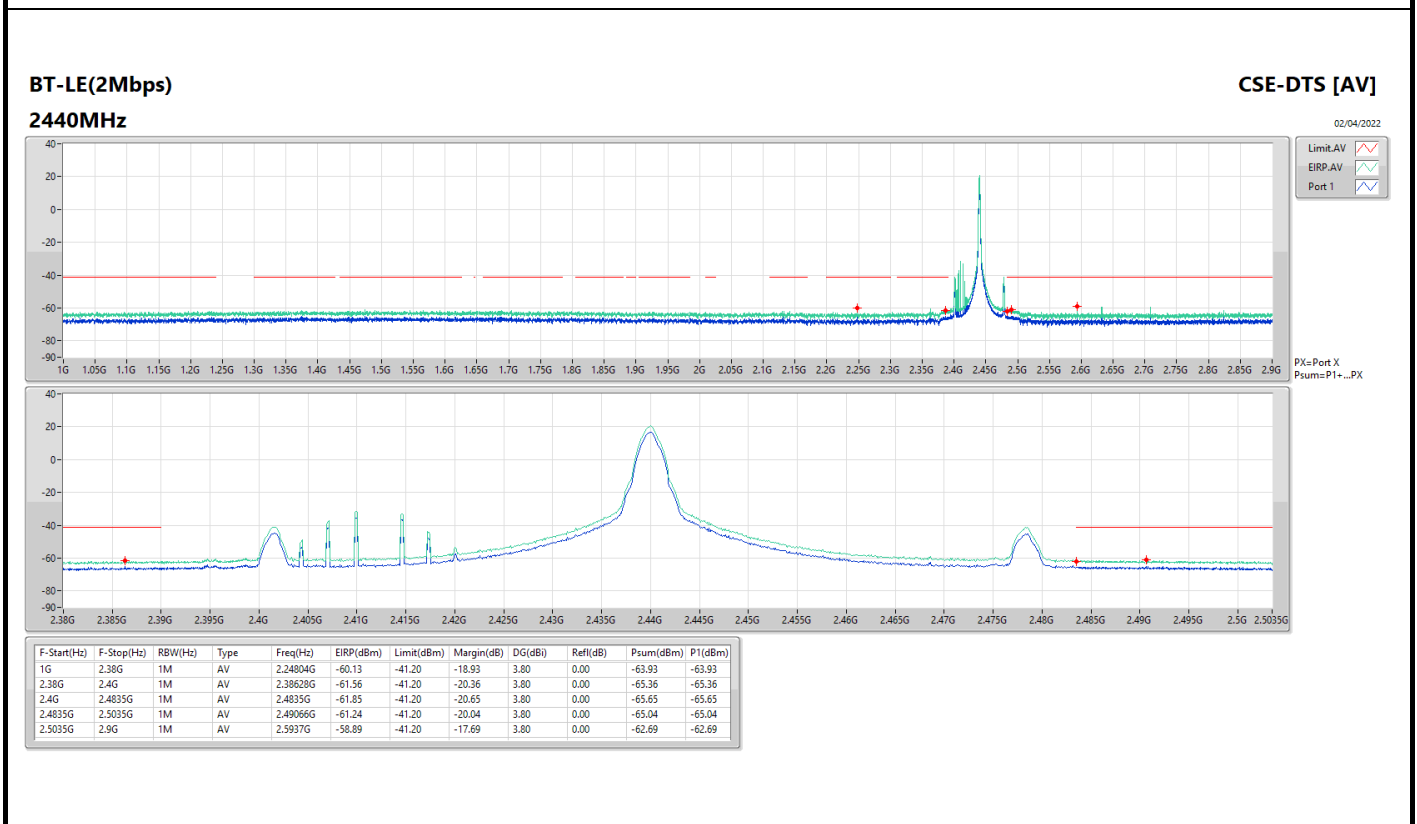
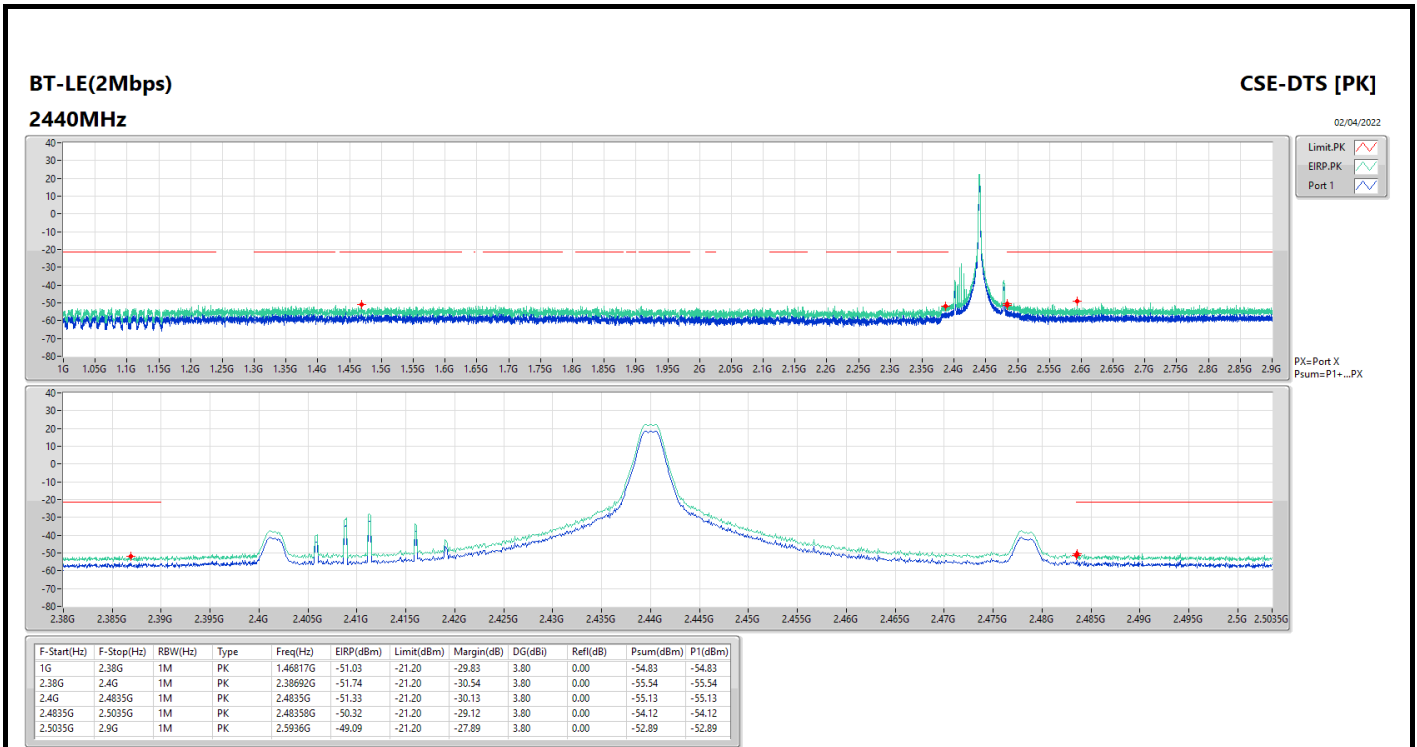


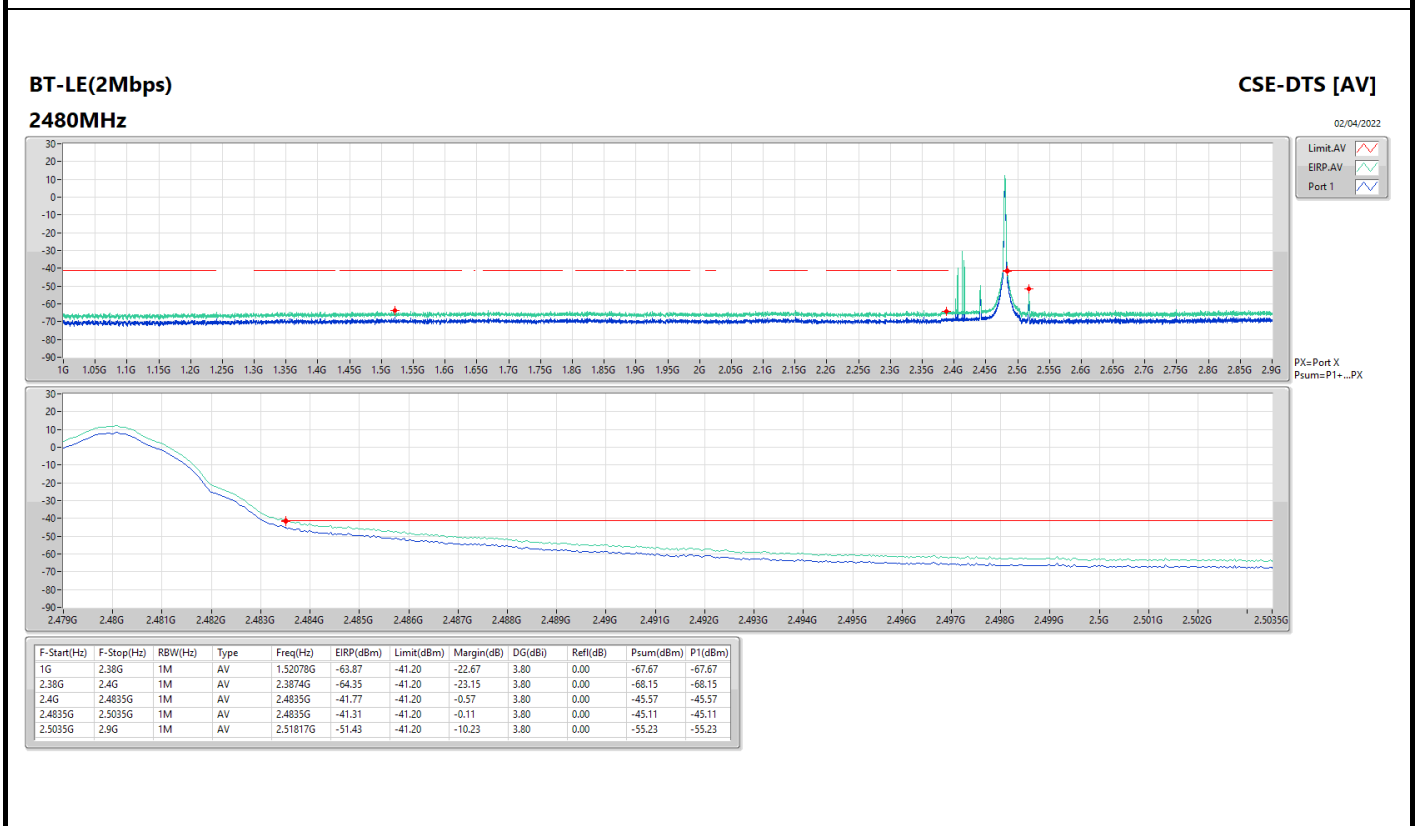
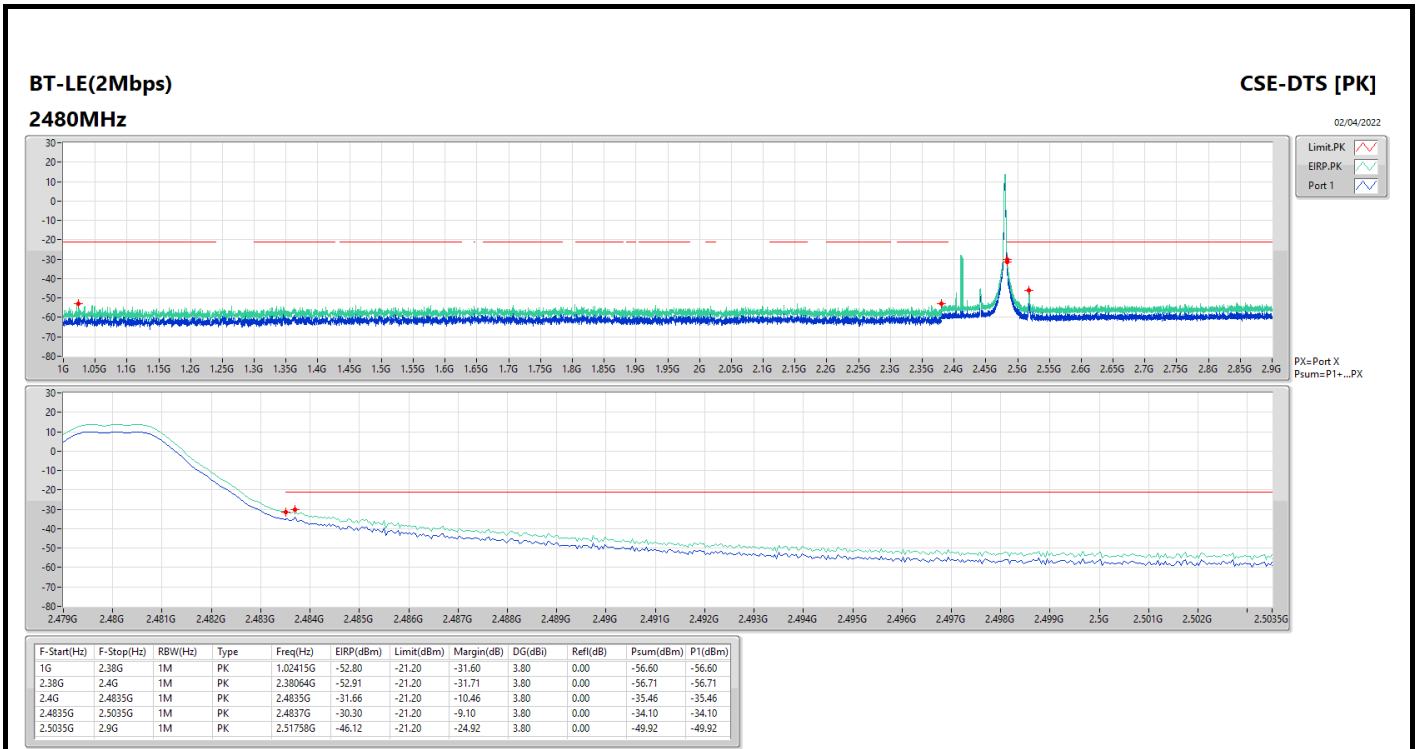












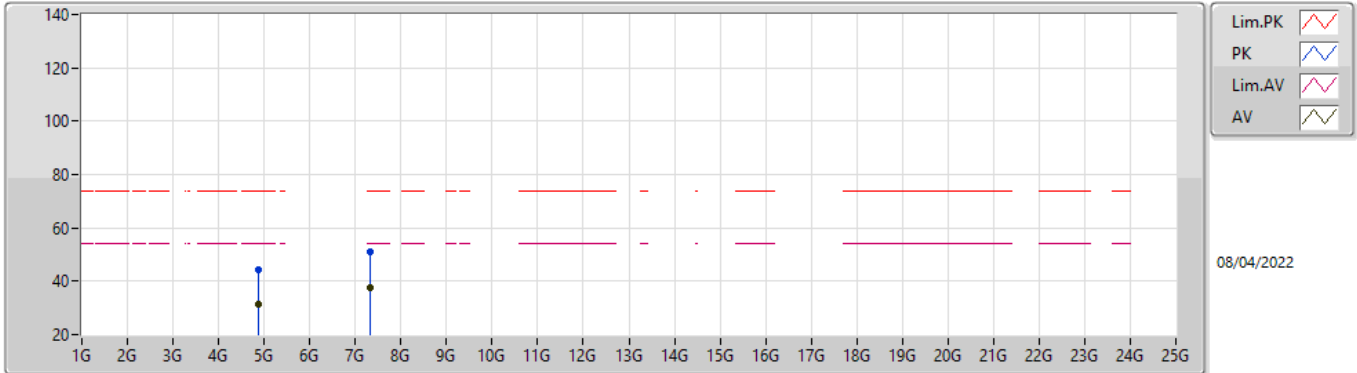


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT+LE.Z_Nss1_1TX	Pass	AV	7.31932G	38.16	54.00	-15.84	3	Horizontal	223	1.90	-

BT-LE,X\_Nss1\_1TX

2440MHz\_TX

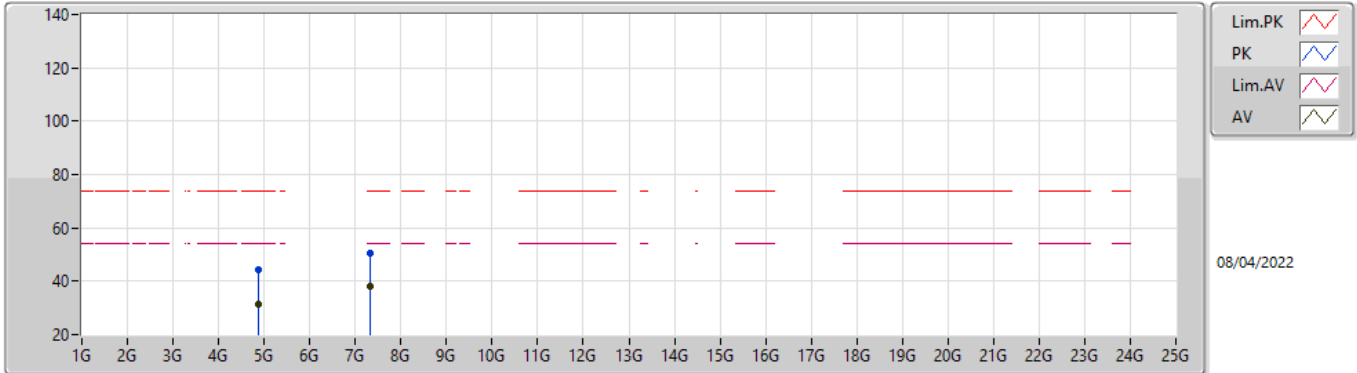


EUTX\_1TX  
Setting 20  
04-D-S-8

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88168G	44.46	74.00	-29.54	39.91	3	Vertical	137	1.56	-	32.93	4.84	33.22
AV	4.87688G	31.41	54.00	-22.59	26.88	3	Vertical	137	1.56	-	32.91	4.84	33.22
PK	7.31948G	51.24	74.00	-22.76	41.35	3	Vertical	289	2.74	-	37.50	6.06	33.67
AV	7.31978G	37.83	54.00	-16.17	27.94	3	Vertical	289	2.74	-	37.50	6.06	33.67

**BT-LE,X\_Nss1\_1TX**

**2440MHz\_TX**



EUTX\_1TX  
Setting 20  
04-D-S-8

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88396G	44.38	74.00	-29.62	39.82	3	Horizontal	12	2.56	-	32.94	4.84	33.22
AV	4.88112G	31.33	54.00	-22.67	26.79	3	Horizontal	12	2.56	-	32.92	4.84	33.22
PK	7.3183G	50.40	74.00	-23.60	40.51	3	Horizontal	154	2.44	-	37.50	6.06	33.67
AV	7.32044G	37.89	54.00	-16.11	28.00	3	Horizontal	154	2.44	-	37.50	6.06	33.67