Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	ZQ6-AP6275P
Equipment	:	Wi-Fi/Bluetooth Module
Brand Name	:	AMPAK Technology Inc.
Model Name	:	AP6275P
Applicant	:	AMPAK Technology Inc. 3F, No. 1, Jen Al Road, Hsinchu Industrial Park,Hsinchu City 30352 , Taiwan (R.O.C.)
Manufacturer	:	BILLIONTON SYSTEMS INC. No. 21, Sui-Lih Rd., Hsin-Chu City 300, Taiwan (R.O.C.)
Standard	:	47 CFR FCC Part 15.247

The product was received on Jun. 17, 2024, and testing was started from Jun. 26, 2024 and completed on Aug. 09, 2024. 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.)

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History of this test report

Report No.	Version	Description	Issued Date
FR412213AD	01	Initial issue of report	Aug. 27, 2024

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	-

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: Cathy Chiu

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	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX
2.4-2.4835GHz	BT-LE(500Kb/s)	1.0	1TX
2.4-2.4835GHz	BT-LE(125Kb/s)	1.0	1TX
2.4-2.4835GHz	BT-LE(2Mbps)	2.0	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)
	2.4GHz	5GHz	Bluetooth					
1	1	1	1	PULSE ELECTRONICS PTE LTD	TZ2412W	Dipole	Reversed-SMA	Note1
2	2	2	-	PULSE ELECTRONICS PTE LTD	TZ2412W	Dipole	Reversed-SMA	

Note1:

Ant.	Antenna Gain (dBi)		
	WLAN 2.4GHz	WLAN 5GHz UNII 1~3	Bluetooth
1	3.68	4.65	3.68
2	3.68	4.65	-

Note2: The above information was declared by manufacturer.

Note3: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$
BF	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$

Ex.

Directional Gain (NSS1) formula : $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$

$NSS1(g1,1) = 10^{G1/20}$; $NSS1(g1,2) = 10^{G2/20}$; $NSS1(g1,2) = 10^{G3/20}$; $NSS1(g1,2) = 10^{G4/20}$

$gj,k = (Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2$

$DG = 10 \log[(Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2 / N_{ANT}] => 10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$

Where ;

2.4G G1= 3.68 dBi ;G2= 3.68 dBi ;

5G UNII-1 G1 = 4.65 dBi; G2 = 4.65 dBi;

5G UNII-2A G1 = 4.65 dBi; G2 = 4.65 dBi;

5G UNII-2C G1 = 4.65 dBi; G2 = 4.65 dBi;

5G UNII-3 G1 = 4.65 dBi; G2 = 4.65 dBi;

2.4G DG = 6.69 dBi

5G UNII-1 DG = 7.66 dBi

5G UNII-2A DG = 7.66 dBi

5G UNII-2C DG = 7.66 dB

5G UNII-3 DG = 7.66 dBi

For 2.4GHz function:
For IEEE 802.11b/g/n/ax (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:
For IEEE 802.11a/n/ac/ax (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.

For Bluetooth function (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)	0.606	2.18	378.75u	3k
BT-LE(2Mbps)	0.312	5.06	195u	10k

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

1.1.4 EUT Operational Condition

EUT Power Type	From host system			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	Broadcom BlueTool 1.9.7.4			
Support Mode	☒	LE 1M PHY: 1 Mb/s		
	☒	LE Coded PHY (S=2): 500 Kb/s		
	☒	LE Coded PHY (S=8): 125 Kb/s		
	☒	LE 2M PHY: 2 Mb/s		

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	TH02-CB	Mason Chen	22.2~25.7 / 61~66	Jun. 27, 2024~ Jun. 29, 2024
Radiated (below 1GHz)	03CH06-CB	Jackson Peng	21.9-22.4 / 55-58	Aug. 05, 2024
Radiated (above 1GHz)	03CH04-CB	Gordon Hung	22-23 / 55-58	Jun. 26, 2024~ Jun. 27, 2024
AC Conduction	CO01-CB	Ryan Huang	22~23 / 61~63	Aug. 09, 2024

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)	3.8 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.0 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	2.1 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode
BT-LE(1Mbps)
2402MHz
2440MHz
2480MHz
BT-LE(2Mbps)
2402MHz
2440MHz
2480MHz

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Normal Link or CTX
1	EUT + Bluetooth
2	EUT + WLAN 2.4GHz
3	EUT + WLAN 5GHz
For operating mode 3 is the worst case and it was record in this test report.	

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

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	Normal Link
1	EUT in Z axis + Bluetooth
2	EUT in Z axis + WLAN 2.4GHz
3	EUT in Z axis + WLAN 5GHz
For operating mode 3 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
After evaluating, the worst case was found at Z axis, so it was selected to perform test and its test result was written in the report.	
1	EUT in Z axis

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

N/A

2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	DELL	T420	N/A
B	Fixture	AMPAK Technology Inc.	AP6271P_EVB_V05	N/A
C	ExpressCard	AMPAK Technology Inc.	E2M V1.0	N/A
D	Earphone	SHYARO CHI	MIC-04	N/A
E	Mouse	HP	FM100	N/A
F	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A
G	AP Router	ASUS	RT-AX88U	MSQ-RTAXHP00
H	Adapter	Oppo	AK933GB	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	Lenovo	42T4430	N/A
B	Fixture	AMPAK Technology Inc.	AP6271P_EVB_V05	N/A
C	ExpressCard	AMPAK Technology Inc.	E2M V1.0	N/A
D	Earphone	e-Power	S90W	N/A
E	Mouse	Logitech	M-U0026	N/A
F	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A
G	AP Router	ASUS	RT-AX88U	N/A
H	Adapter	Apple	A1385	N/A

For Radiated (above 1GHz):

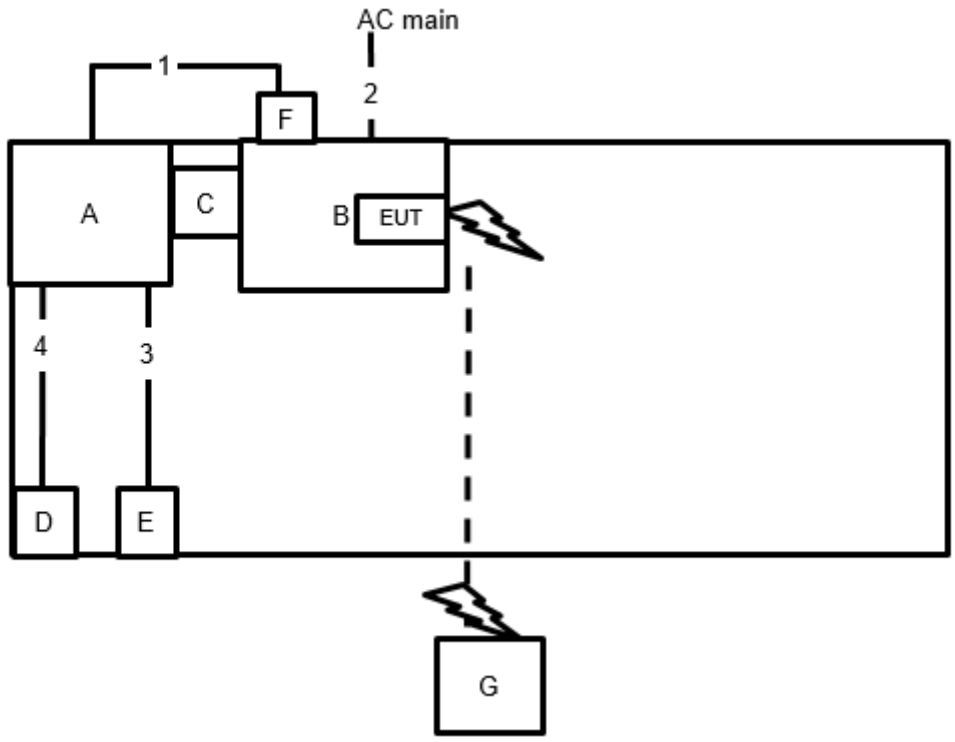
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	DC Power Supply	MOTECH	LPS-305	N/A
B	PC	AMPAK Technology Inc.	H81-PLUS	N/A
C	Fixture	AMPAK Technology Inc.	AP6271P_EVB_V05	N/A
D	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A

For RF Conducted:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PC	AMPAK Technology Inc.	H81-PLUS	N/A
B	Fixture	AMPAK Technology Inc.	AP6271P_EVB_V05	N/A
C	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A
D	DC Power Supply	MOTECH	LPS-305	N/A

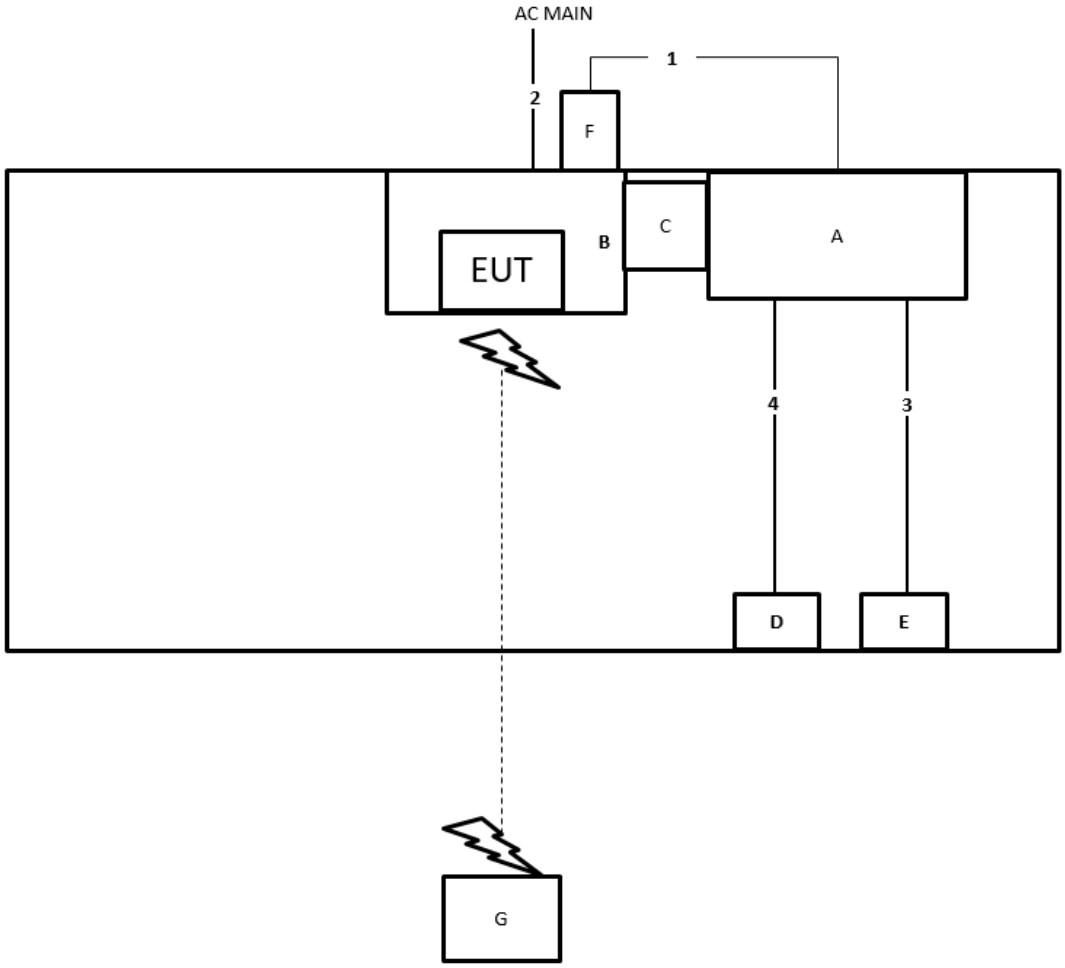
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



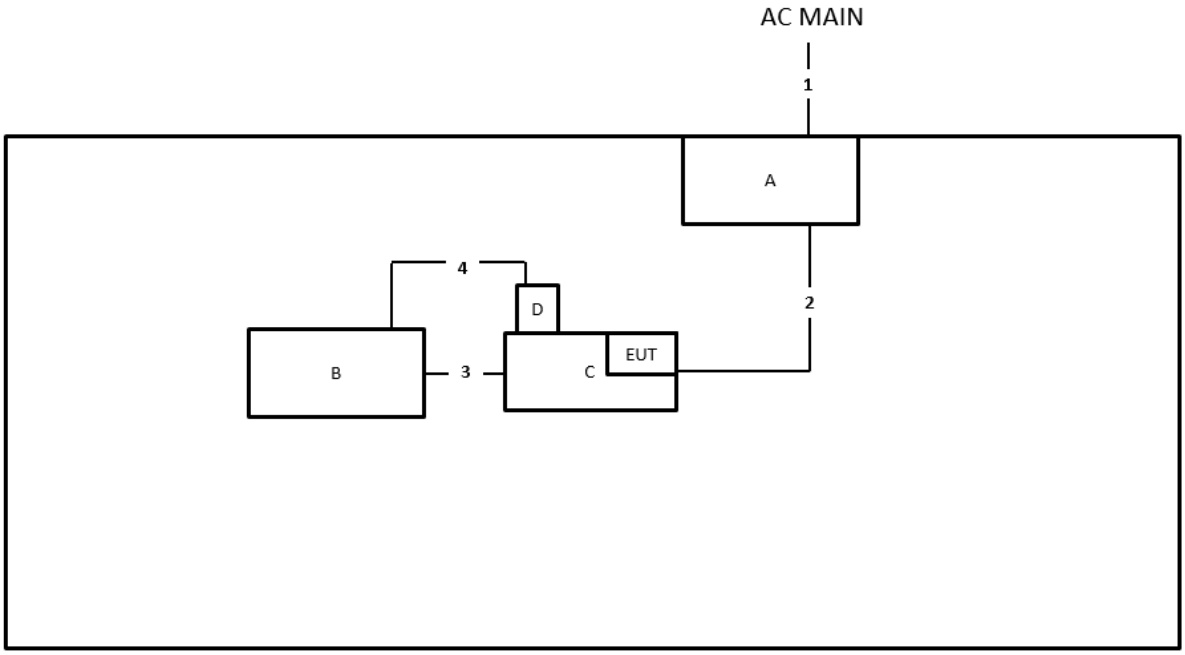
Item	Connection	Shielded	Length
1	Mini USB cable	No	0.8m
2	Power cable	No	0.8m
3	USB cable	Yes	1.8m
4	Audio cable	No	1.5m

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Mini USB cable	No	1m
2	Power cable	No	1.5m
3	USB cable	Yes	1m
4	Audio cable	No	1.5m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Crocodile clip cable*2	No	1.5m
3	Console cable	No	1m
4	USB to Mini cable	Yes	1m

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

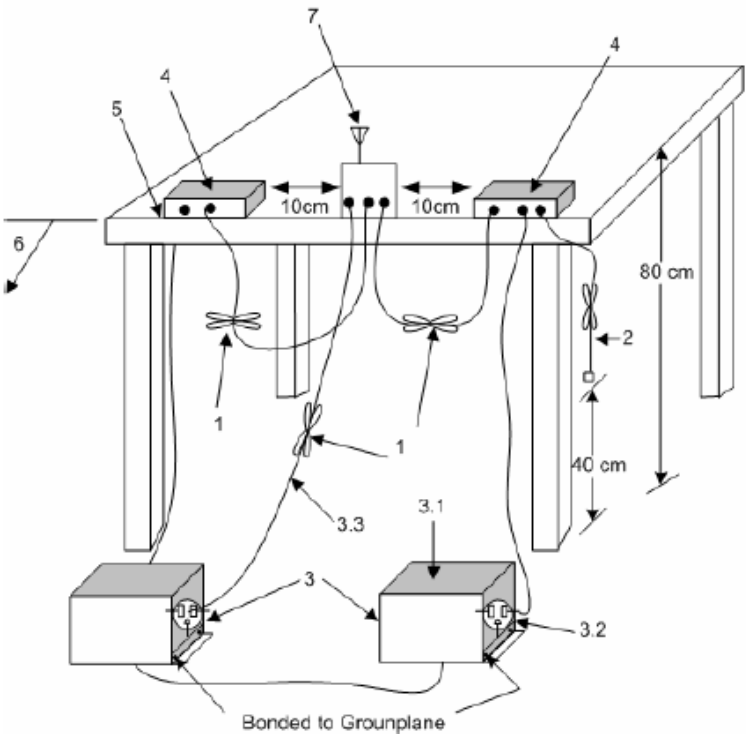
Refer a test equipment and calibration data table in this test report.

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

AC Power-line Conducted Emissions



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
3.1—All other equipment powered from additional LISN(s).
3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
3.3—LISN at least 80 cm from nearest part of EUT chassis.
4—Non-EUT components of EUT system being tested.
5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

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
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

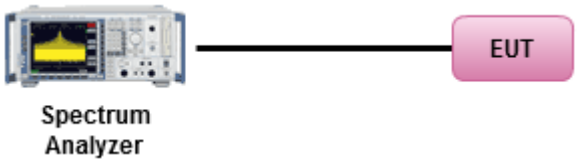
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ 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.

3.2.4 Test Setup

Emission Bandwidth


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		
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ 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
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
▪ Maximum 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).
▪ Maximum Conducted Output Power	
	[duty 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)
	Measurement 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: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)


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

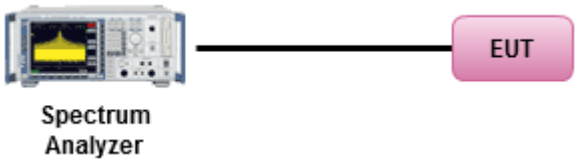
3.4.2 Measuring Instruments

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

3.4.3 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.

3.4.4 Test Setup

Power Spectral Density


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

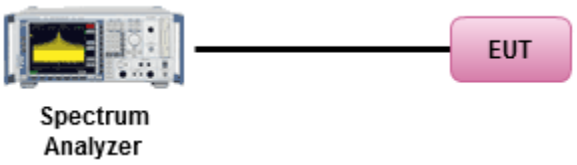
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

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

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands



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 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 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.

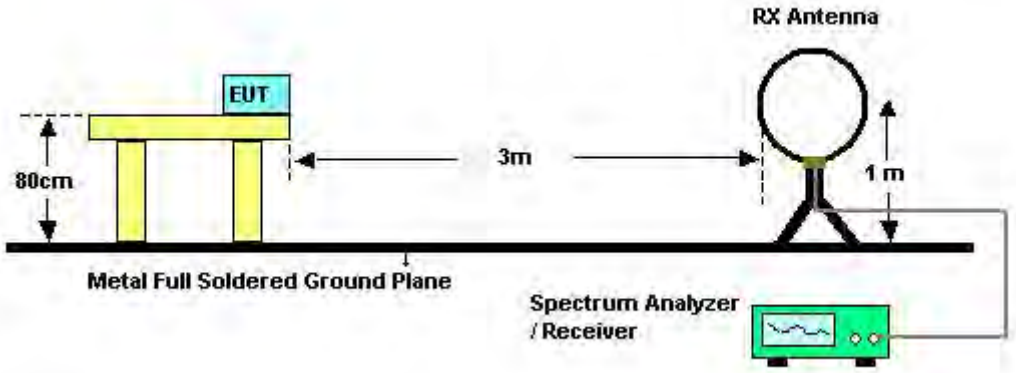
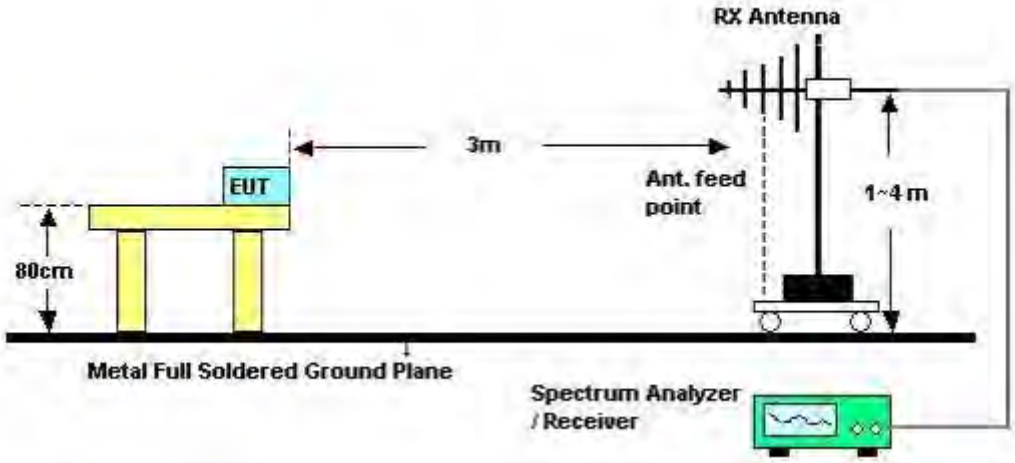
3.6.2 Measuring Instruments

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

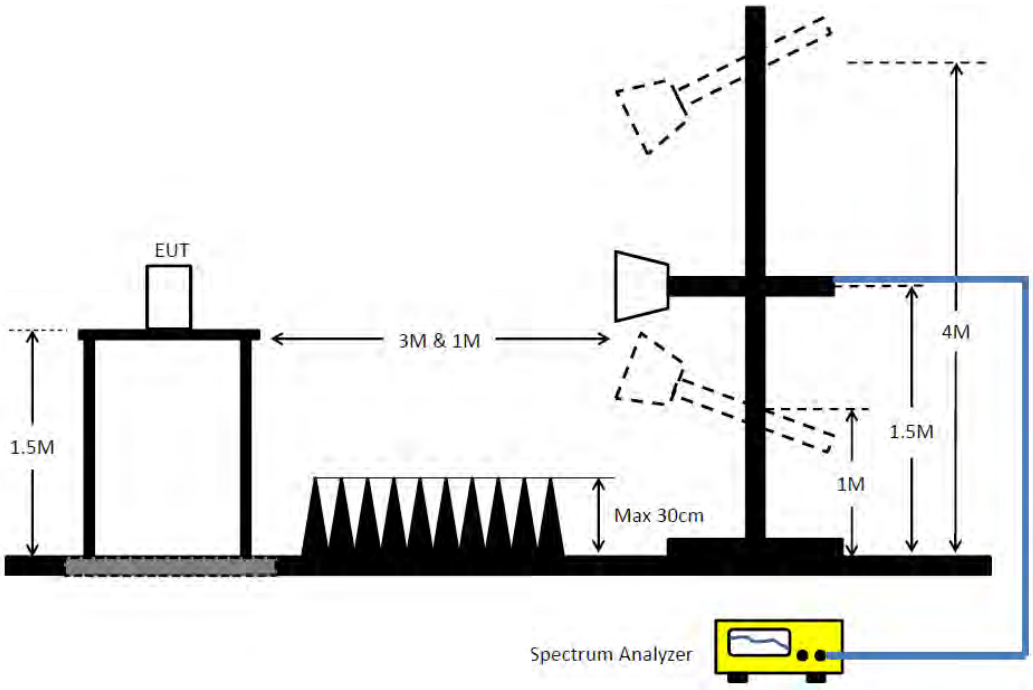
3.6.3 Test Procedures

Test Method			
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].			
▪ 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.			
▪ 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.		

3.6.4 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



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	Mar. 01, 2024	Feb. 28, 2025	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 19, 2024	Feb. 18, 2025	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 24, 2024	Apr. 23, 2025	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 08, 2024	Feb. 07, 2025	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO01-CB)
Test Software	SPORTON	SENSE-EMI	V5.11	150kHz-30MHz	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 02, 2024	Aug. 01, 2025	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Jul. 29, 2024	Jul. 28, 2025	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 03, 2023	Nov. 02, 2024	Radiation (03CH06-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2024	Apr. 25, 2025	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 20, 2023	Oct. 19, 2024	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-24+68	30MHz~1GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 22, 2024	Feb. 21, 2025	Radiation (03CH04-CB)
Horn Antenna	ETS·Lindgren	3115	00143147	750MHz~18GHz	Oct. 04, 2023	Oct. 03, 2024	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 19, 2024	Mar. 18, 2025	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH04-CB)

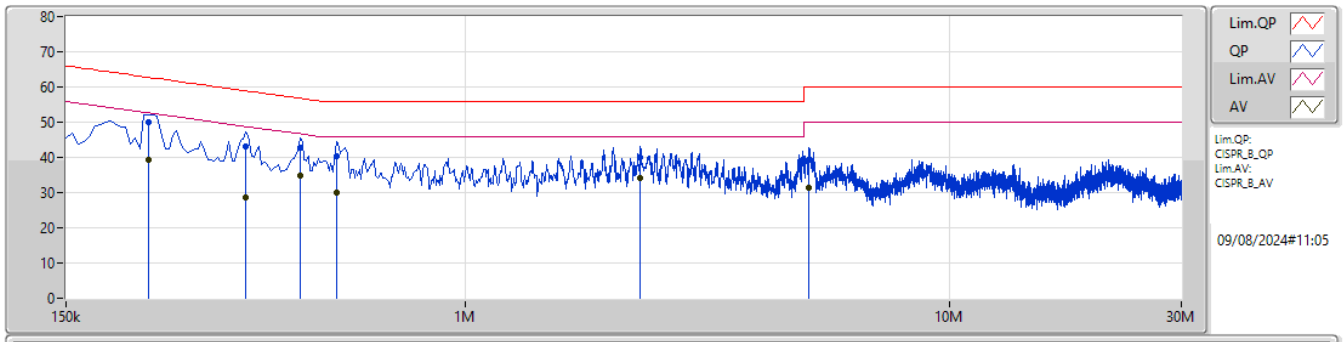
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Aug. 14, 2023	Aug. 13, 2024	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 19, 2023	Oct. 18, 2024	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 19, 2023	Oct. 18, 2024	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-03	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH02-CB)
Switch	SPTCB	SP-SWI	SWI-02	1 –26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

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

Summary

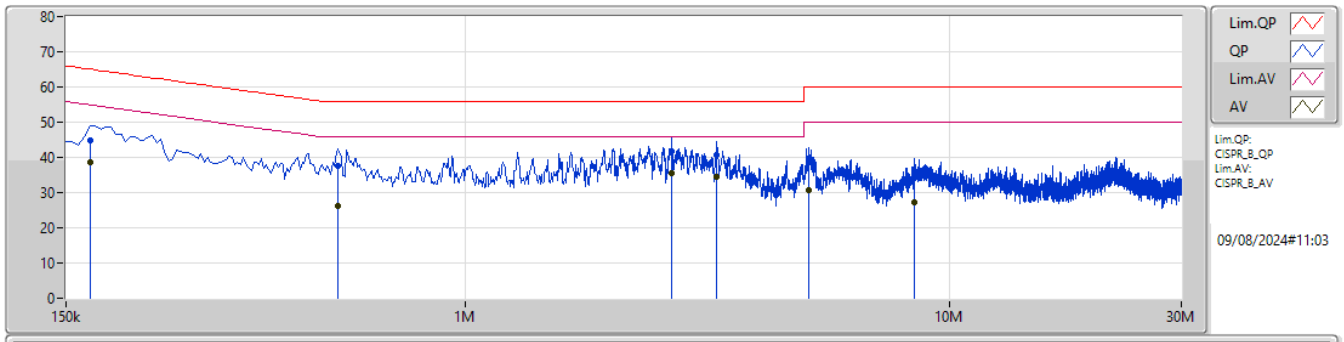
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 3	Pass	AV	2.666M	35.47	46.00	-10.53	Neutral

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	222k	49.88	62.75	-12.87	9.92	Line	-	39.96	0.04	0.02	9.86
AV	222k	39.37	52.75	-13.38	9.92	Line	-	29.45	0.04	0.02	9.86
QP	352.5k	43.04	58.91	-15.87	9.95	Line	-	33.09	0.05	0.02	9.88
AV	352.5k	28.75	48.91	-20.16	9.95	Line	-	18.80	0.05	0.02	9.88
QP	456k	42.62	56.76	-14.14	9.96	Line	-	32.66	0.05	0.02	9.89
AV	456k	34.96	46.76	-11.80	9.96	Line	"Worst"	25.00	0.05	0.02	9.89
QP	541.5k	40.27	56.00	-15.73	9.98	Line	-	30.29	0.06	0.02	9.90
AV	541.5k	30.03	46.00	-15.97	9.98	Line	-	20.05	0.06	0.02	9.90
QP	2.297M	39.86	56.00	-16.14	10.07	Line	-	29.79	0.10	0.08	9.89
AV	2.297M	34.03	46.00	-11.97	10.07	Line	-	23.96	0.10	0.08	9.89
QP	5.123M	39.46	60.00	-20.54	10.20	Line	-	29.26	0.16	0.14	9.90
AV	5.123M	31.39	50.00	-18.61	10.20	Line	-	21.19	0.16	0.14	9.90

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	168k	44.75	65.06	-20.31	9.94	Neutral	-	34.81	0.06	0.02	9.86
AV	168k	38.65	55.06	-16.41	9.94	Neutral	-	28.71	0.06	0.02	9.86
QP	546k	37.71	56.00	-18.29	9.99	Neutral	-	27.72	0.07	0.02	9.90
AV	546k	26.19	46.00	-19.81	9.99	Neutral	-	16.20	0.07	0.02	9.90
QP	2.666M	41.76	56.00	-14.24	10.10	Neutral	-	31.66	0.11	0.10	9.89
AV	2.666M	35.47	46.00	-10.53	10.10	Neutral	"Worst"	25.37	0.11	0.10	9.89
QP	3.3M	40.58	56.00	-15.42	10.14	Neutral	-	30.44	0.12	0.12	9.90
AV	3.3M	34.36	46.00	-11.64	10.14	Neutral	-	24.22	0.12	0.12	9.90
QP	5.123M	38.53	60.00	-21.47	10.20	Neutral	-	28.33	0.16	0.14	9.90
AV	5.123M	30.70	50.00	-19.30	10.20	Neutral	-	20.50	0.16	0.14	9.90
QP	8.444M	34.18	60.00	-25.82	10.27	Neutral	-	23.91	0.22	0.14	9.91
AV	8.444M	27.15	50.00	-22.85	10.27	Neutral	-	16.88	0.22	0.14	9.91

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)	691.25k	1.058M	1M06F1D	640k	1.041M
BT-LE(2Mbps)	1.183M	2.051M	2M05F1D	847.5k	2.038M

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

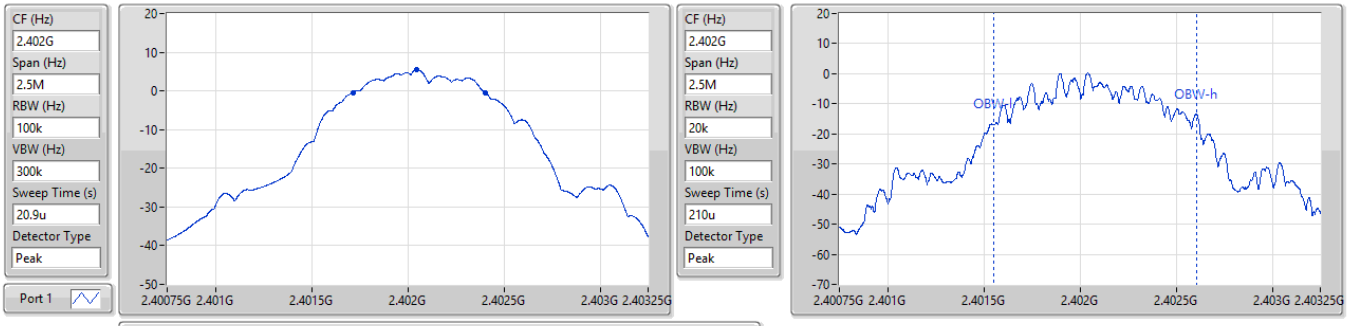
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	691.25k	1.058M
2440MHz	Pass	500k	640k	1.043M
2480MHz	Pass	500k	647.5k	1.041M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.183M	2.038M
2440MHz	Pass	500k	847.5k	2.051M
2480MHz	Pass	500k	975k	2.039M

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

2.4-2.4835GHz_BT-LE(1Mbps) **EBW-DTS**

2402MHz

27/06/2024

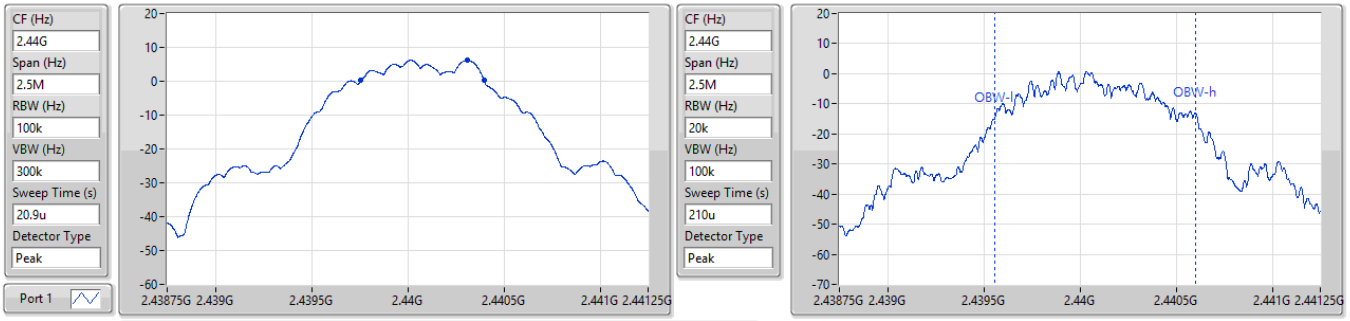


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
691.25k	2.401715G	2.402406G	1.058M	2.401552G	2.402609G	500k	1

2.4-2.4835GHz_BT-LE(1Mbps) **EBW-DTS**

2440MHz

27/06/2024

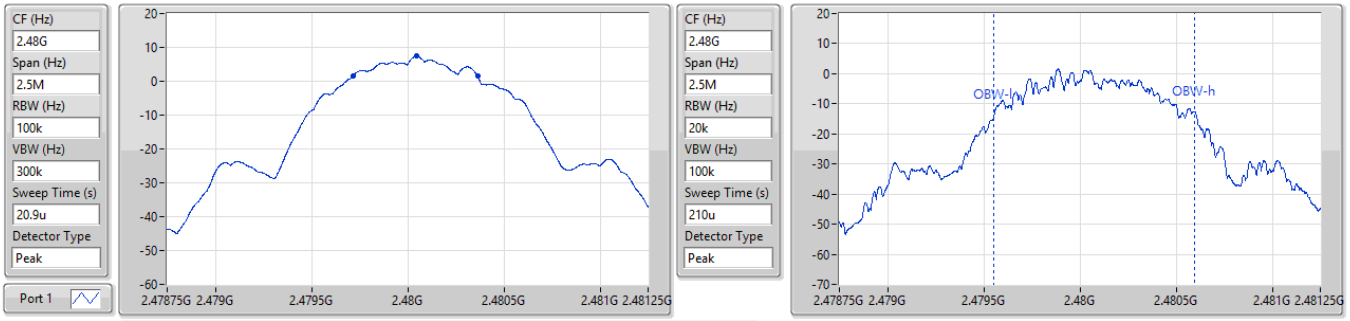


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
640k	2.439758G	2.440398G	1.043M	2.439558G	2.440602G	500k	1

2.4-2.4835GHz_BT-LE(1Mbps) **EBW-DTS**

2480MHz

27/06/2024

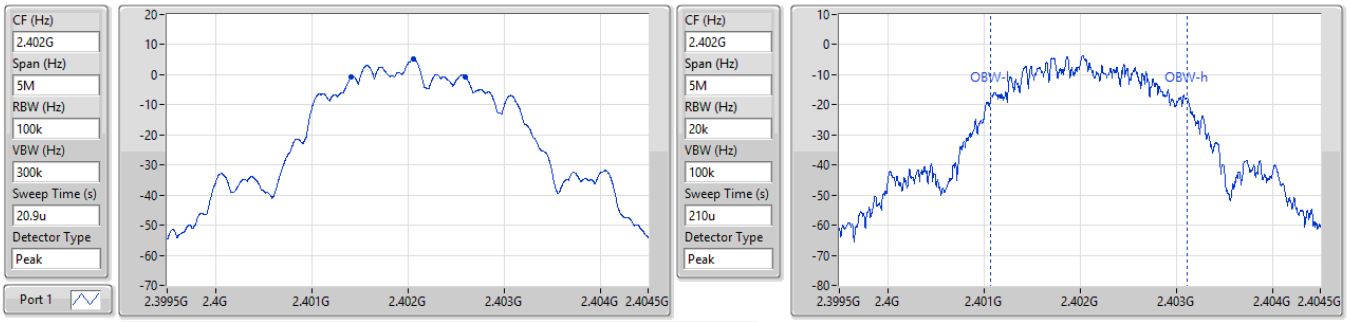


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
647.5k	2.479716G	2.480364G	1.041M	2.479554G	2.480595G	500k	1

2.4-2.4835GHz_BT-LE(2Mbps) **EBW-DTS**

2402MHz

27/06/2024

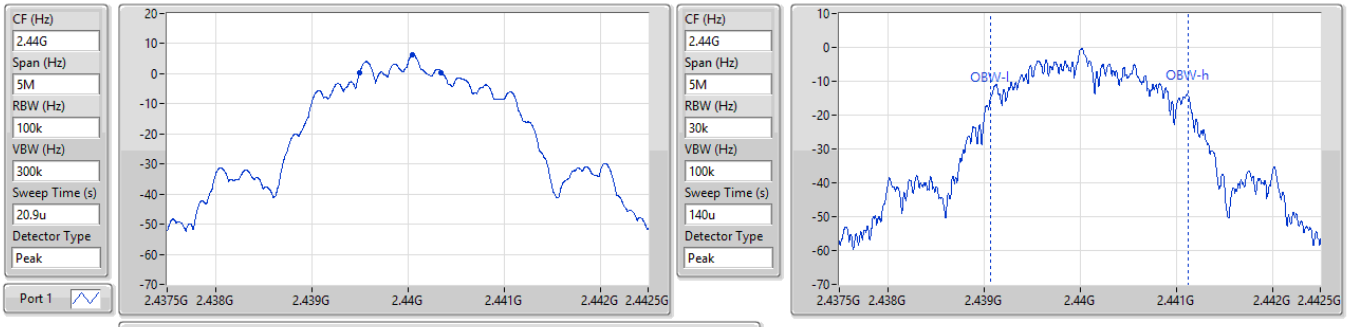


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.183M	2.401418G	2.4026G	2.038M	2.401074G	2.403111G	500k	1

2.4-2.4835GHz_BT-LE(2Mbps) **EBW-DTS**

2440MHz

27/06/2024

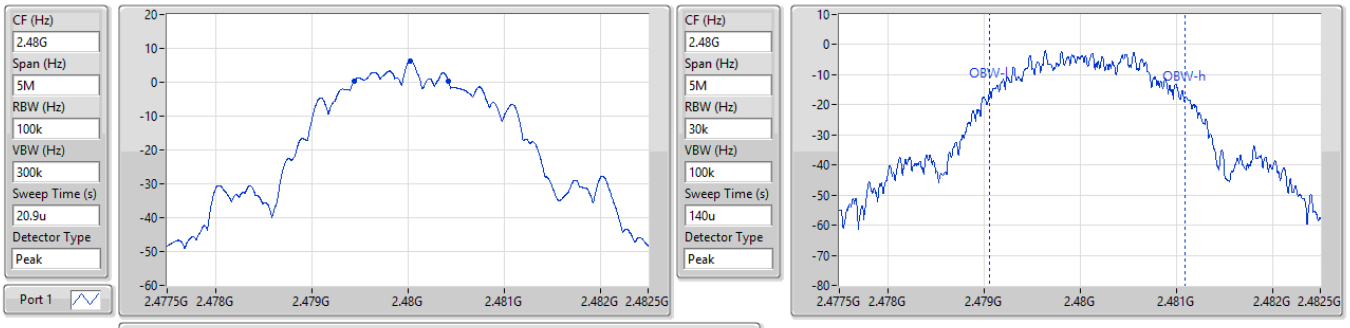


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
847.5k	2.439503G	2.44035G	2.051M	2.43907G	2.441122G	500k	1

2.4-2.4835GHz_BT-LE(2Mbps) **EBW-DTS**

2480MHz

27/06/2024



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
975k	2.479448G	2.480423G	2.039M	2.479055G	2.481094G	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.19	0.00659
BT-LE(2Mbps)	7.48	0.00560

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.68	6.33	30.00
2440MHz	Pass	3.68	7.14	30.00
2480MHz	Pass	3.68	8.19	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.68	5.96	30.00
2440MHz	Pass	3.68	6.56	30.00
2480MHz	Pass	3.68	7.48	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-7.47
BT-LE(2Mbps)	-10.65

RBW = 3kHz;

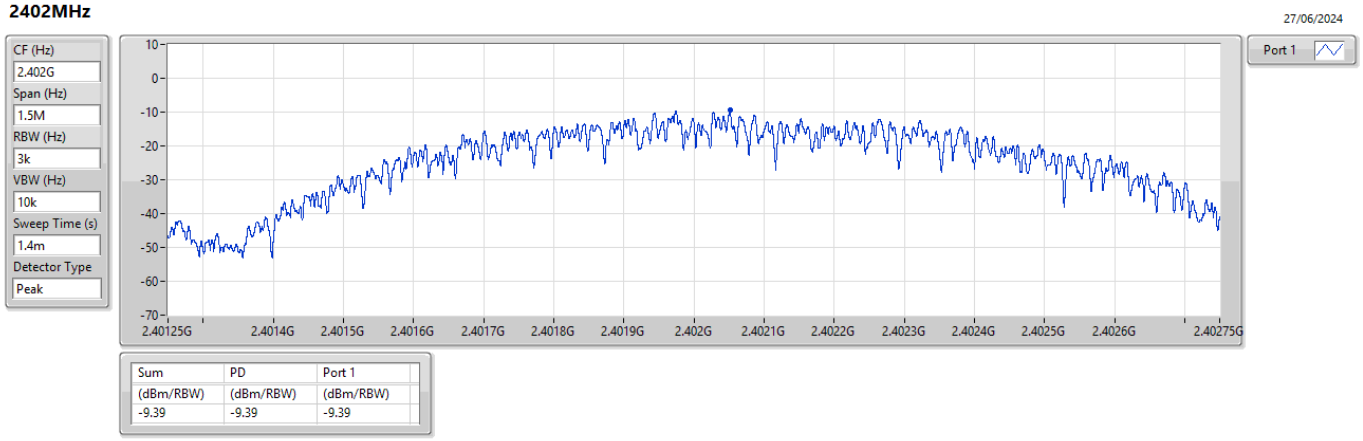
Result

Mode	Result	DG (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.68	-9.39	8.00
2440MHz	Pass	3.68	-8.23	8.00
2480MHz	Pass	3.68	-7.47	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.68	-14.02	8.00
2440MHz	Pass	3.68	-10.65	8.00
2480MHz	Pass	3.68	-11.21	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;

2.4-2.4835GHz_BT-LE(1Mbps) **PSD**

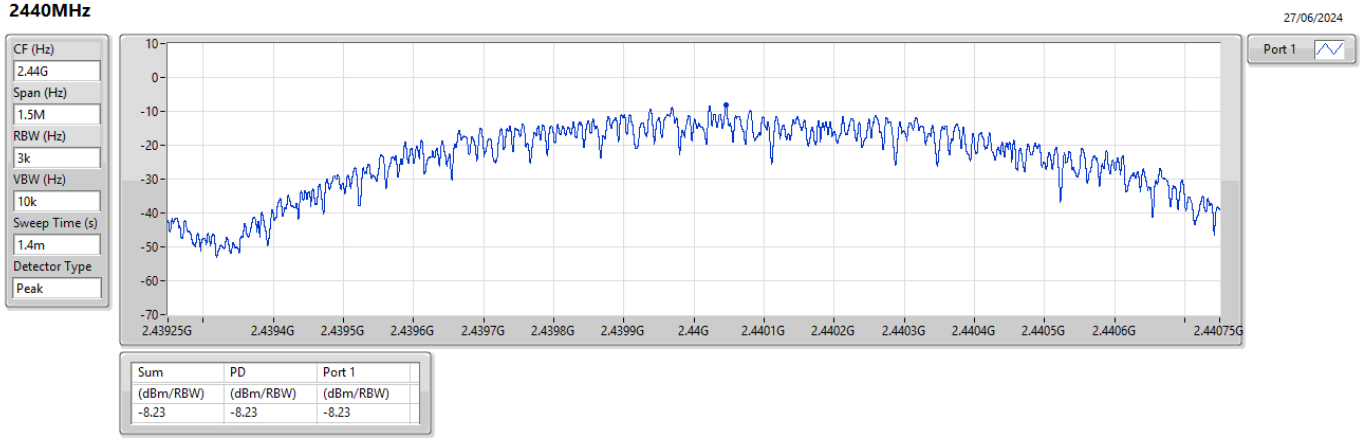
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.39	-9.39	-9.39

2.4-2.4835GHz_BT-LE(1Mbps) **PSD**

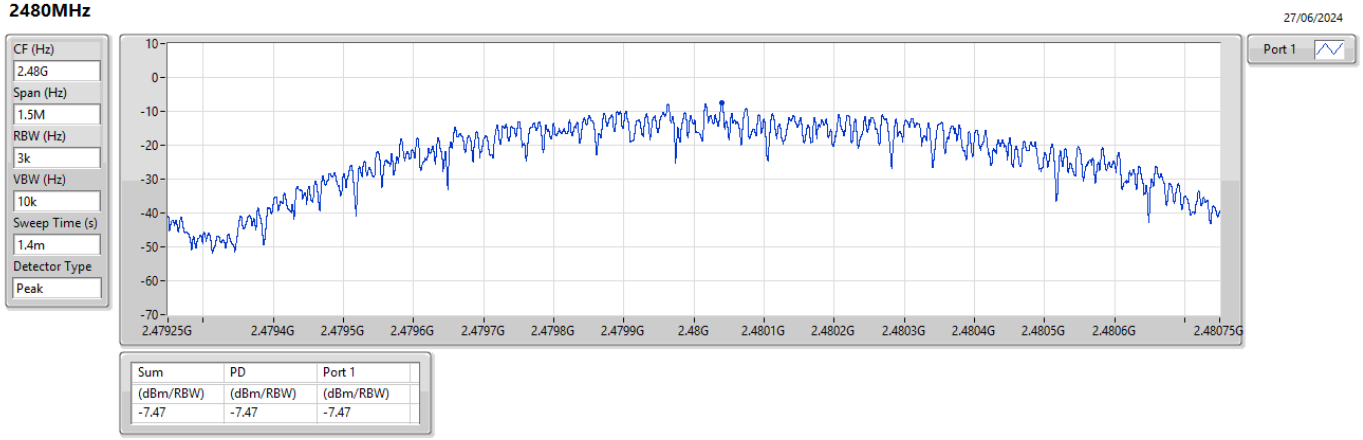
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.23	-8.23	-8.23

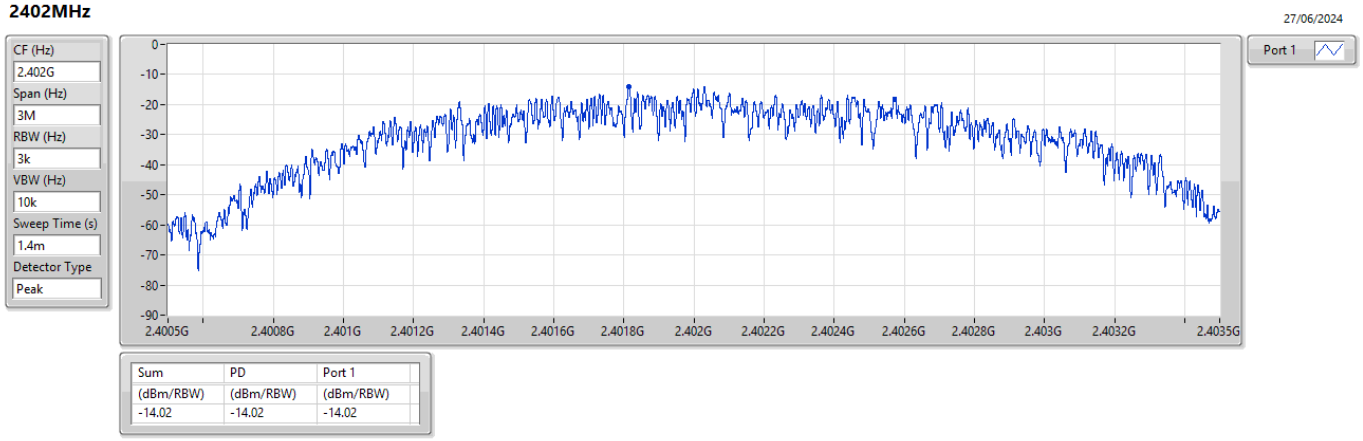
2.4-2.4835GHz_BT-LE(1Mbps) **PSD**

2480MHz



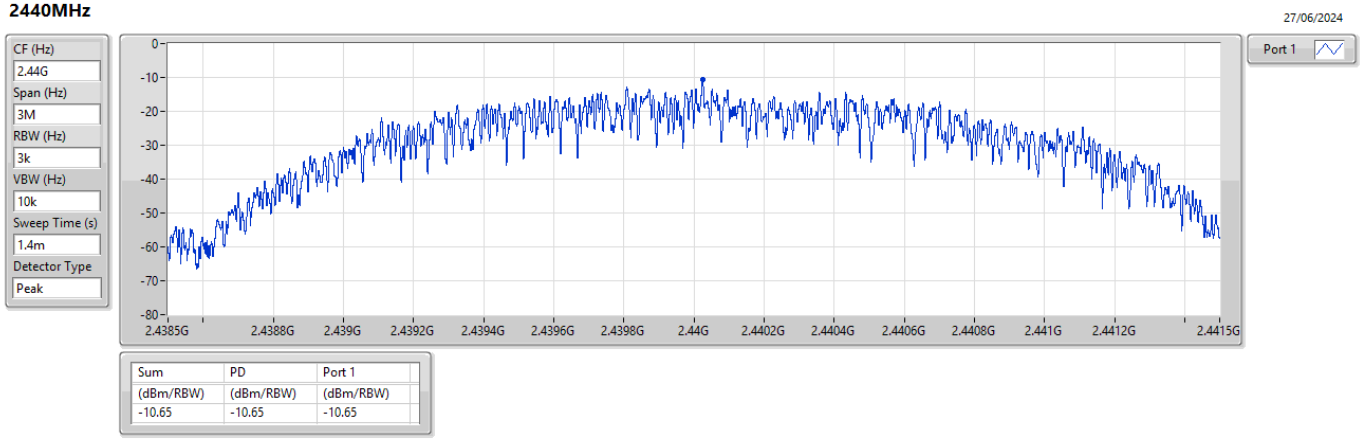
2.4-2.4835GHz_BT-LE(2Mbps) **PSD**

2402MHz



2.4-2.4835GHz_BT-LE(2Mbps) **PSD**

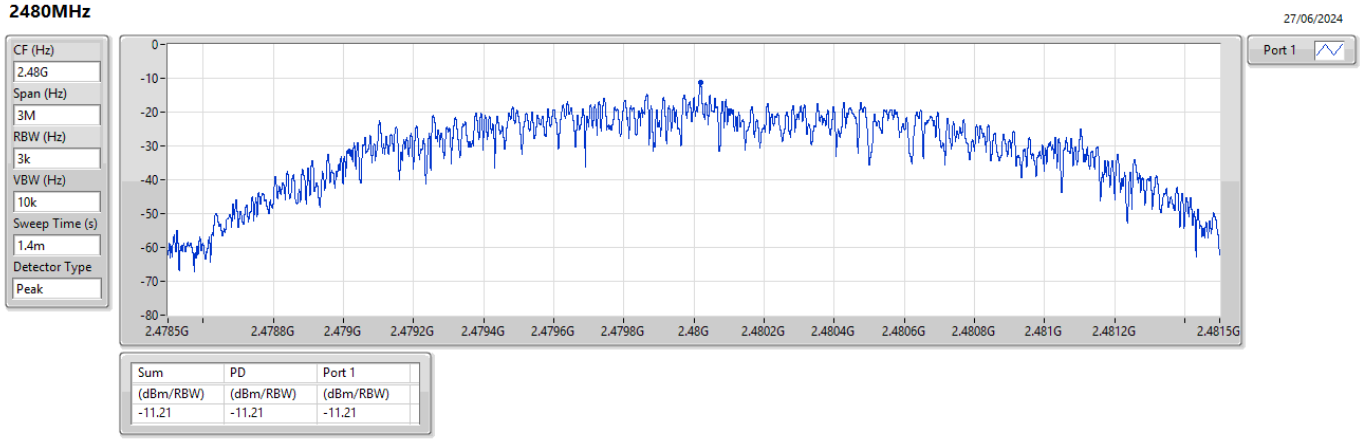
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.65	-10.65	-10.65

2.4-2.4835GHz_BT-LE(2Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.21	-11.21	-11.21

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	2.48016G	7.61	-22.39	2.17085G	-55.52	2.39088G	-51.44	2.4G	-58.09	2.5031G	-52.91	21.93485G	-47.85	1
BT-LE(2Mbps)	Pass	2.48016G	6.77	-23.23	1.79838G	-54.26	2.4G	-36.74	2.4G	-32.86	2.5025G	-52.92	21.97422G	-48.36	1

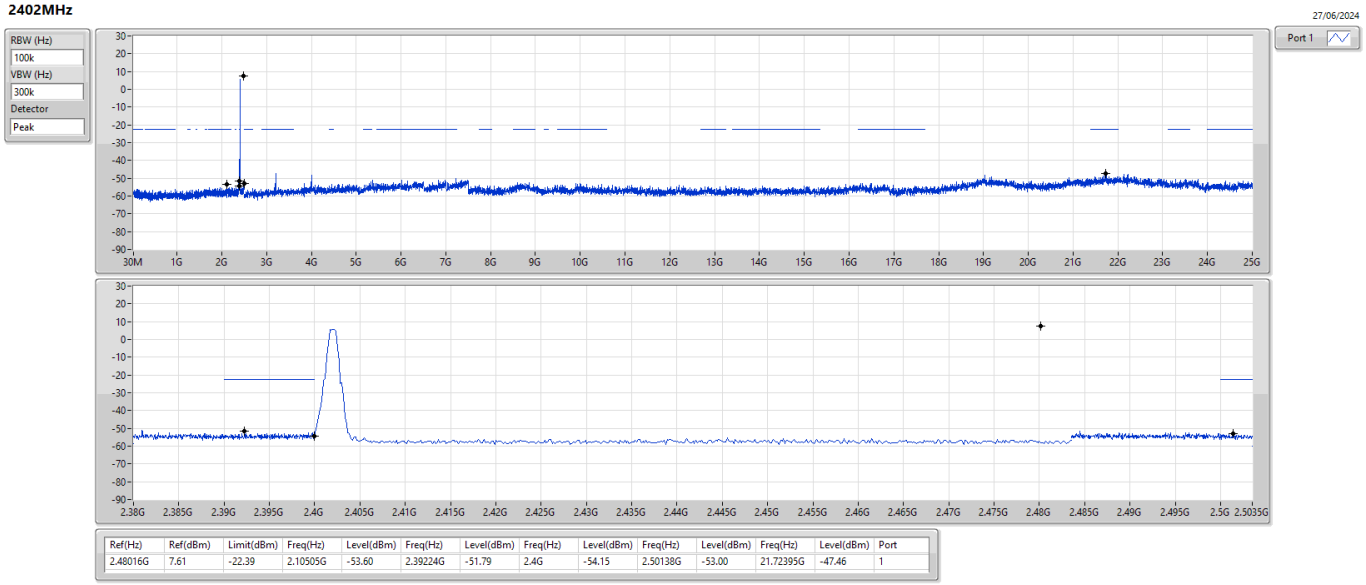
Result

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	2.48016G	7.61	-22.39	2.10505G	-53.60	2.39224G	-51.79	2.4G	-54.15	2.50138G	-53.00	21.72395G	-47.46	1
2440MHz	Pass	2.48016G	7.61	-22.39	2.17085G	-55.52	2.39088G	-51.44	2.4G	-58.09	2.5031G	-52.91	21.93485G	-47.85	1
2480MHz	Pass	2.48016G	7.61	-22.39	1.76078G	-54.38	2.39764G	-52.12	2.4G	-57.71	2.5033G	-52.02	21.84487G	-49.18	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.48016G	6.77	-23.23	1.79838G	-54.26	2.4G	-36.74	2.4G	-32.86	2.5025G	-52.92	21.97422G	-48.36	1
2440MHz	Pass	2.48016G	6.77	-23.23	1.79015G	-55.04	2.39956G	-53.07	2.4G	-57.53	2.50338G	-52.13	21.94048G	-48.41	1
2480MHz	Pass	2.48016G	6.77	-23.23	1.64093G	-54.78	2.3974G	-52.77	2.4G	-57.21	2.50234G	-53.02	21.77175G	-48.54	1

2.4-2.4835GHz_BT-LE(1Mbps)

CSENdB-DTS

2402MHz

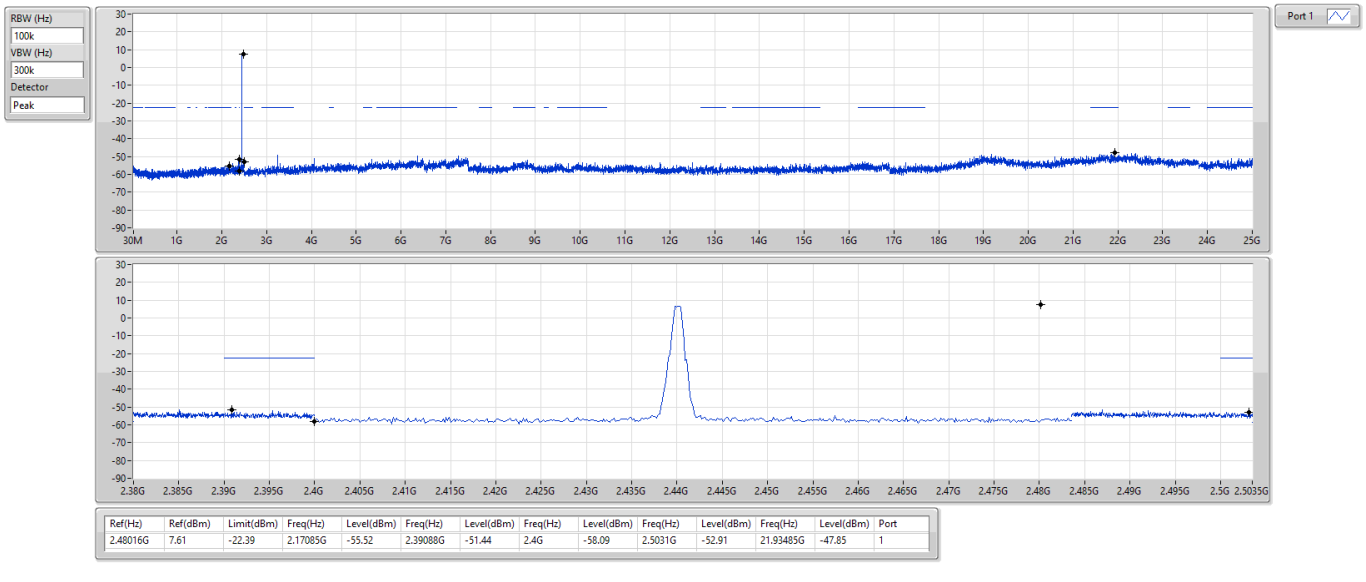


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.48016G	7.61	-22.39	2.10505G	-53.60	2.39224G	-51.79	2.4G	-54.15	2.50138G	-53.00	21.72395G	-47.46	1

2.4-2.4835GHz_BT-LE(1Mbps)

CSENdB-DTS

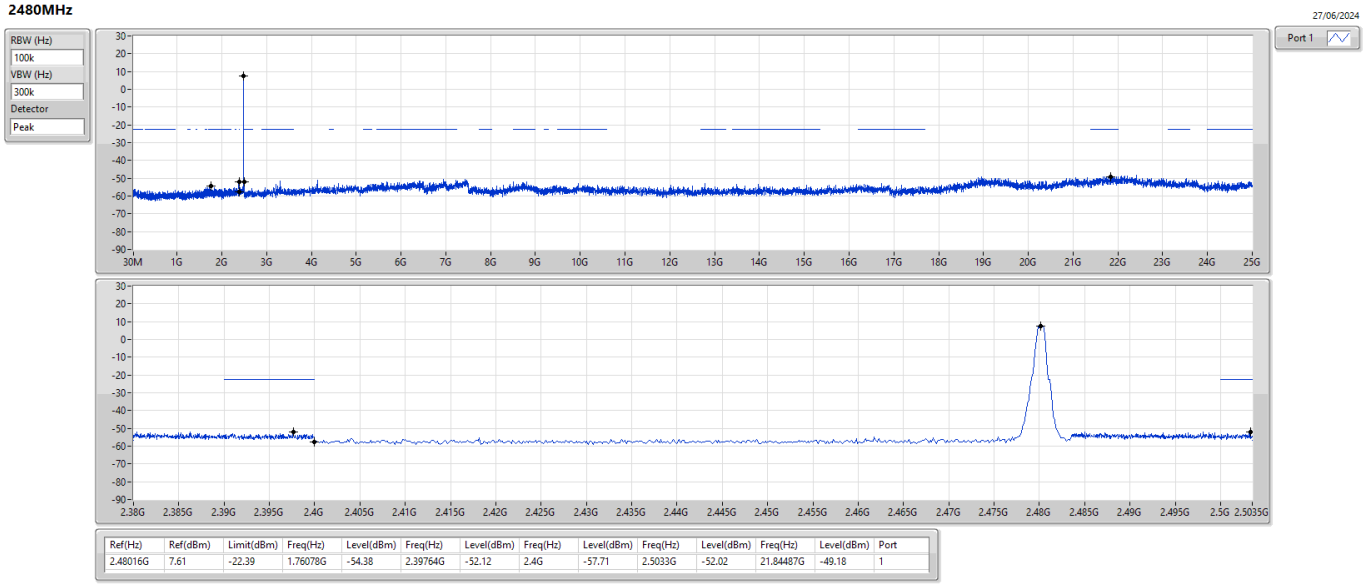
2440MHz



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
2.48016G	7.61	-22.39	2.17085G	-55.52	2.39088G	-51.44	2.4G	-58.09	2.5031G	-52.91	21.93485G	-47.85	1

2.4-2.4835GHz_BT-LE(1Mbps) CSENdB-DTS

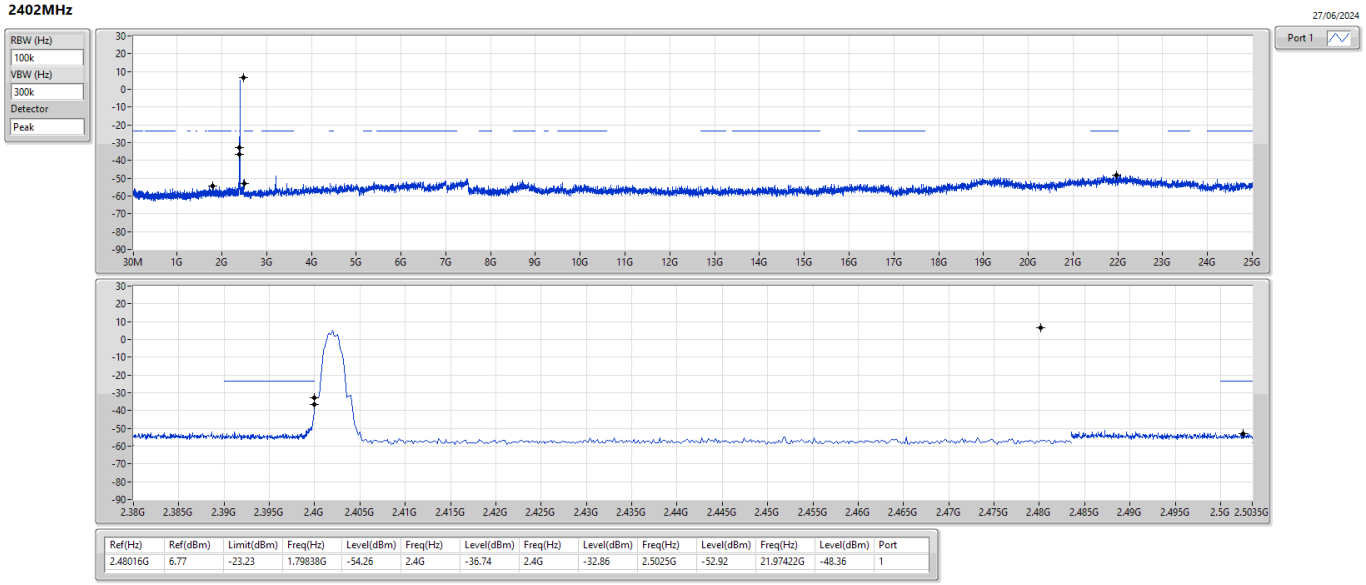
2480MHz



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
2.48016G	7.61	-22.39	1.76078G	-54.38	2.39764G	-52.12	2.4G	-57.71	2.5033G	-52.02	21.84487G	-49.18	1

2.4-2.4835GHz_BT-LE(2Mbps) CSENdB-DTS

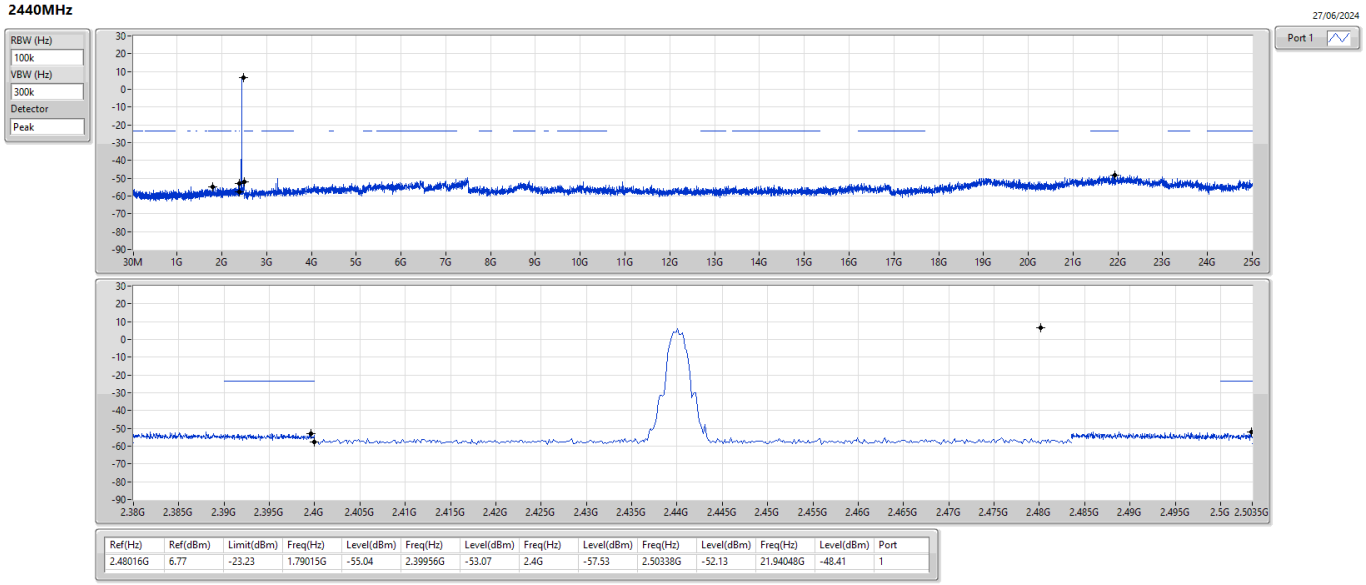
2402MHz



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
2.48016G	6.77	-23.23	1.79838G	-54.26	2.4G	-36.74	2.4G	-32.86	2.5025G	-52.92	21.97422G	-48.36	1

2.4-2.4835GHz_BT-LE(2Mbps) CSENdB-DTS

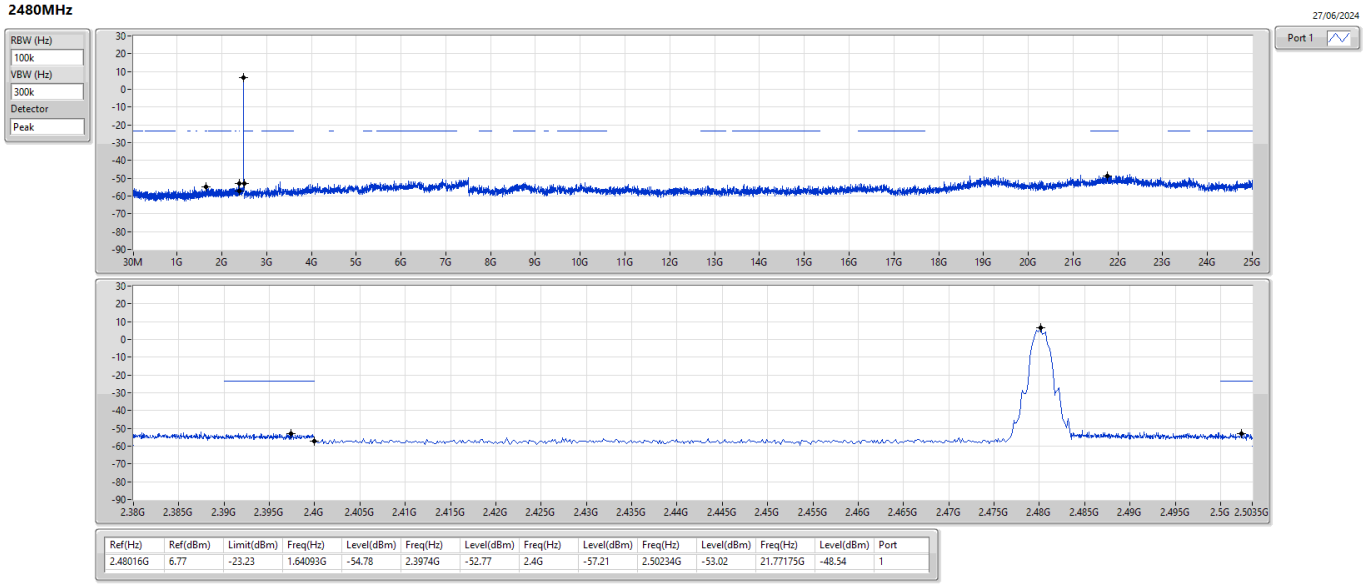
2440MHz



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
2.48016G	6.77	-23.23	1.79015G	-55.04	2.39956G	-53.07	2.4G	-57.53	2.50338G	-52.13	21.94048G	-48.41	1

2.4-2.4835GHz_BT-LE(2Mbps) CSENdB-DTS

2480MHz

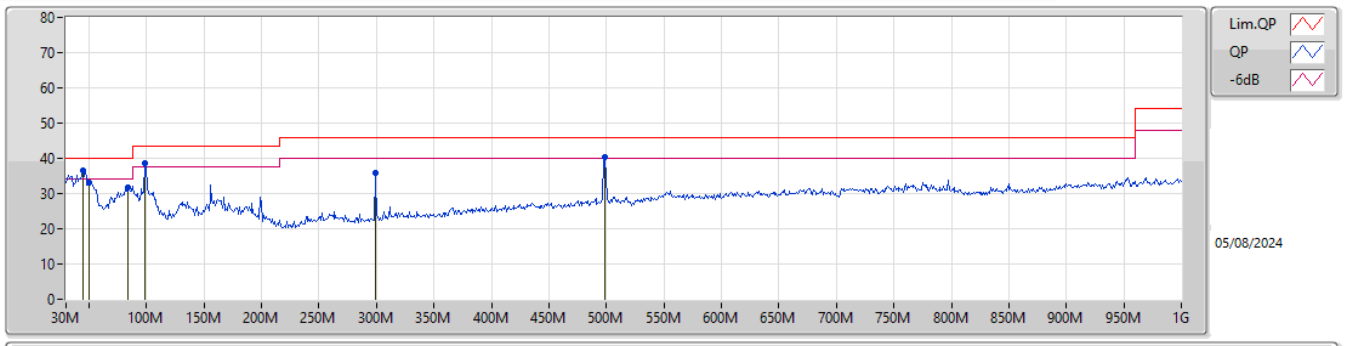


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.48016G	6.77	-23.23	1.64093G	-54.78	2.3974G	-52.77	2.4G	-57.21	2.50234G	-53.02	21.77175G	-48.54	1

Summary

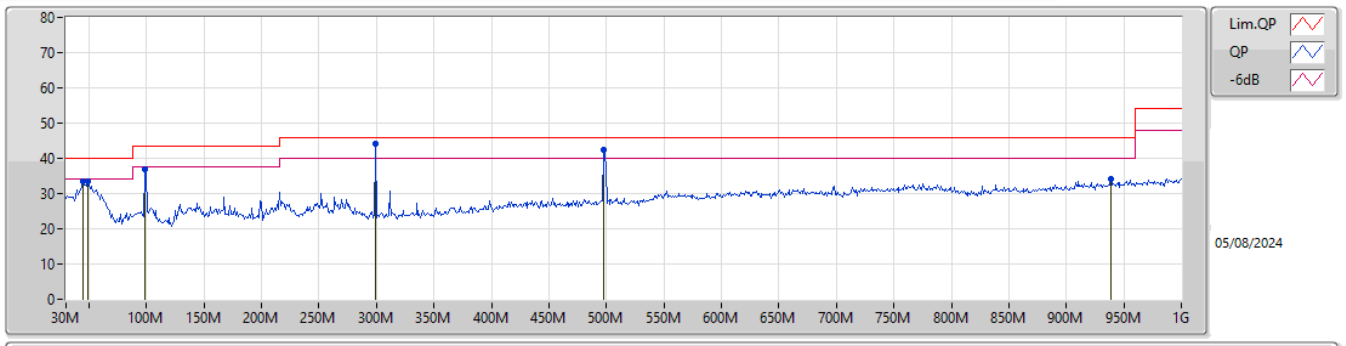
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	QP	299.66M	44.13	46.00	-1.87	Horizontal

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV)	(dB/m)	(dB)	(dB)
PK	44.55M	36.63	40.00	-3.37	-14.56	3	Vertical	98	1.00	"Worst"	51.19	16.50	1.30	32.36
PK	50.37M	33.05	40.00	-6.95	-17.04	3	Vertical	81	1.00	-	50.09	13.97	1.32	32.33
PK	84.32M	31.89	40.00	-8.11	-17.24	3	Vertical	73	1.00	-	49.13	13.55	1.59	32.38
PK	98.87M	38.53	43.50	-4.97	-14.24	3	Vertical	181	1.00	-	52.77	16.45	1.67	32.36
PK	298.69M	35.71	46.00	-10.29	-10.36	3	Vertical	165	1.50	-	46.07	19.01	2.59	31.96
PK	498.51M	40.29	46.00	-5.71	-5.54	3	Vertical	198	1.25	-	45.83	23.24	3.25	32.03

Mode 3



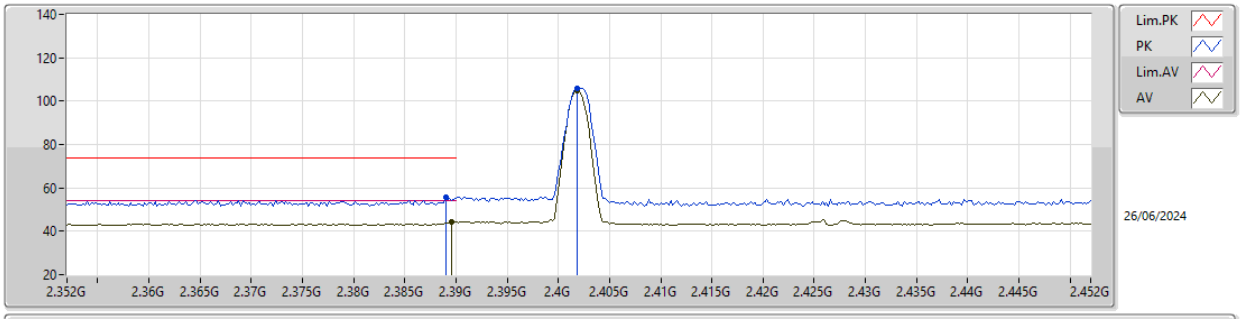
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV)	(dB/m)	(dB)	(dB)
PK	44.55M	33.39	40.00	-6.61	-14.56	3	Horizontal	3	1.25	-	47.95	16.50	1.30	32.36
PK	49.4M	33.51	40.00	-6.49	-16.67	3	Horizontal	340	1.50	-	50.18	14.34	1.32	32.33
PK	98.87M	37.00	43.50	-6.50	-14.24	3	Horizontal	9	3.00	-	51.24	16.45	1.67	32.36
QP	299.66M	44.13	46.00	-1.87	-10.34	3	Horizontal	212	1.25	"Worst"	54.47	19.02	2.59	31.95
PK	497.54M	42.41	46.00	-3.59	-5.57	3	Horizontal	318	1.00	-	47.98	23.22	3.24	32.03
PK	938.89M	34.17	46.00	-11.83	0.10	3	Horizontal	358	3.00	-	34.07	26.42	4.37	30.69

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(2Mbps)	Pass	AV	2.3896G	46.83	54.00	-7.17	3	Vertical	94	1.54	-

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

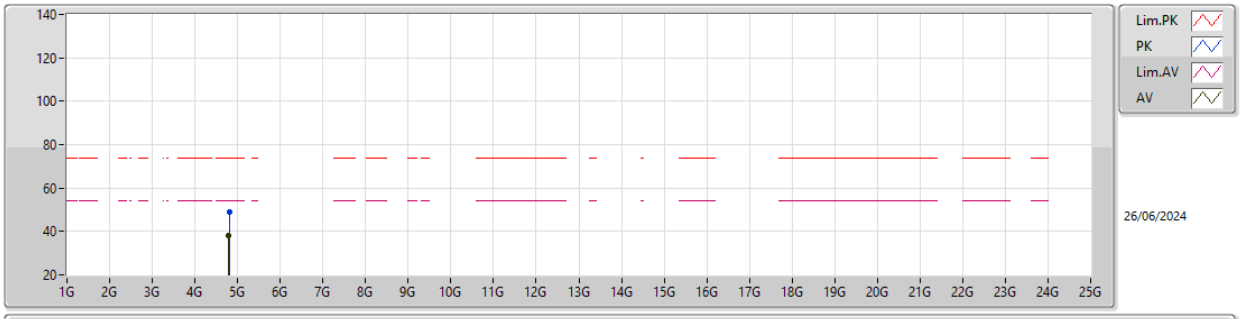


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.389G	55.67	74.00	-18.33	24.92	3	Vertical	90	1.51	-	27.40	3.35	-
AV	2.3896G	44.28	54.00	-9.72	13.53	3	Vertical	90	1.51	-	27.40	3.35	-
PK	2.4018G	105.83	Inf	-Inf	74.98	3	Vertical	90	1.51	-	27.50	3.35	-
AV	2.4018G	104.61	Inf	-Inf	73.76	3	Vertical	90	1.51	-	27.50	3.35	-

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

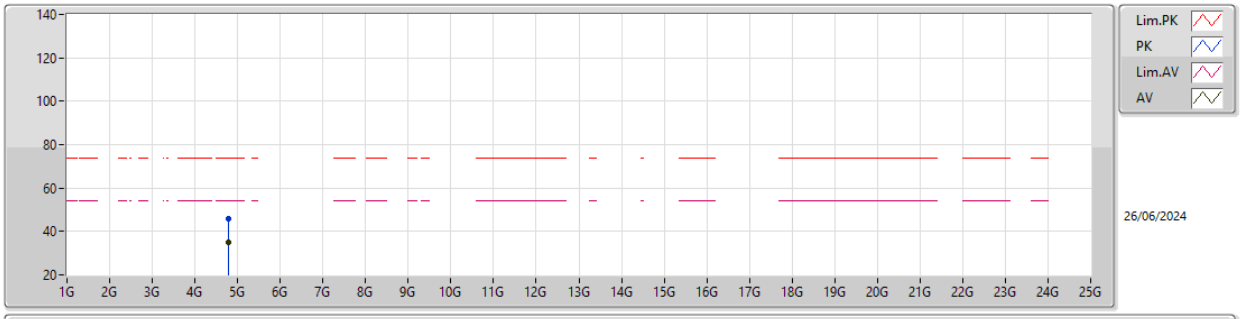


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.80596G	48.96	74.00	-25.04	54.93	3	Vertical	328	2.34	-	32.31	5.66	43.94
AV	4.79552G	37.97	54.00	-16.03	43.95	3	Vertical	328	2.34	-	32.31	5.65	43.94

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

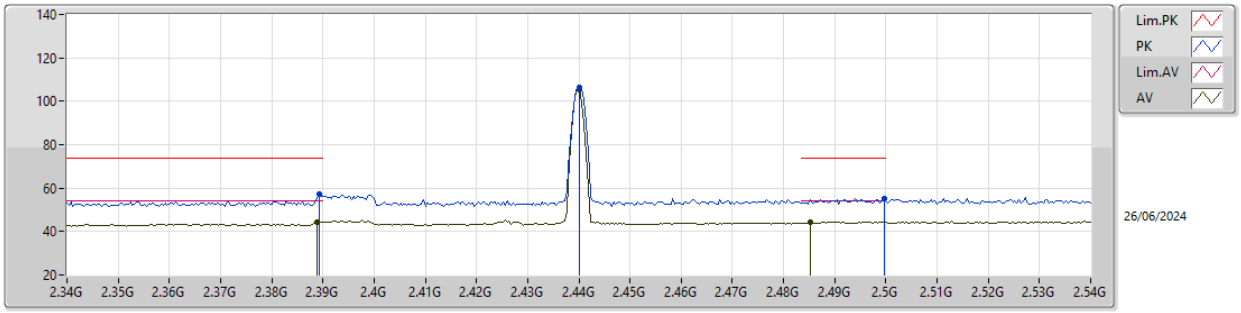


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.79436G	46.08	74.00	-27.92	52.06	3	Horizontal	287	2.08	-	32.31	5.65	43.94
AV	4.79652G	35.03	54.00	-18.97	41.01	3	Horizontal	287	2.08	-	32.31	5.65	43.94

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

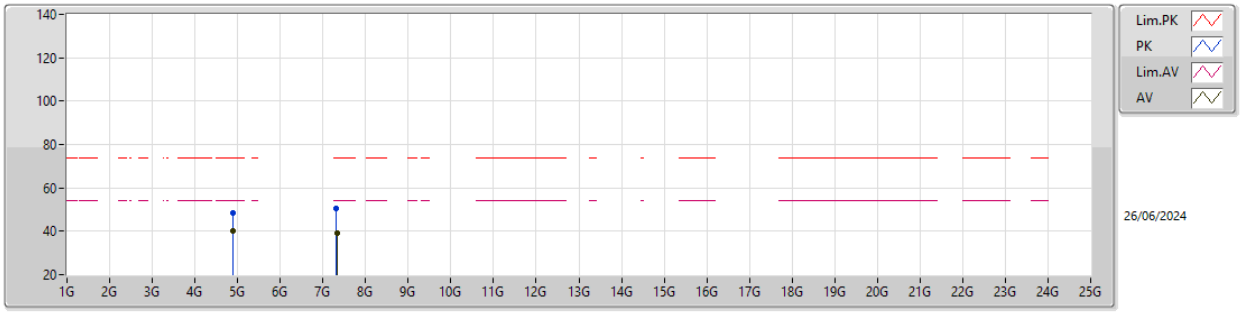


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3892G	57.13	74.00	-16.87	26.38	3	Vertical	100	1.50	-	27.40	3.35	-
AV	2.3888G	44.48	54.00	-9.52	13.73	3	Vertical	100	1.50	-	27.40	3.35	-
PK	2.44G	106.61	Inf	-Inf	75.64	3	Vertical	100	1.50	-	27.60	3.37	-
AV	2.44G	105.39	Inf	-Inf	74.42	3	Vertical	100	1.50	-	27.60	3.37	-
PK	2.4996G	55.07	74.00	-18.93	23.97	3	Vertical	100	1.50	-	27.70	3.40	-
AV	2.4852G	44.47	54.00	-9.53	13.42	3	Vertical	100	1.50	-	27.65	3.40	-

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

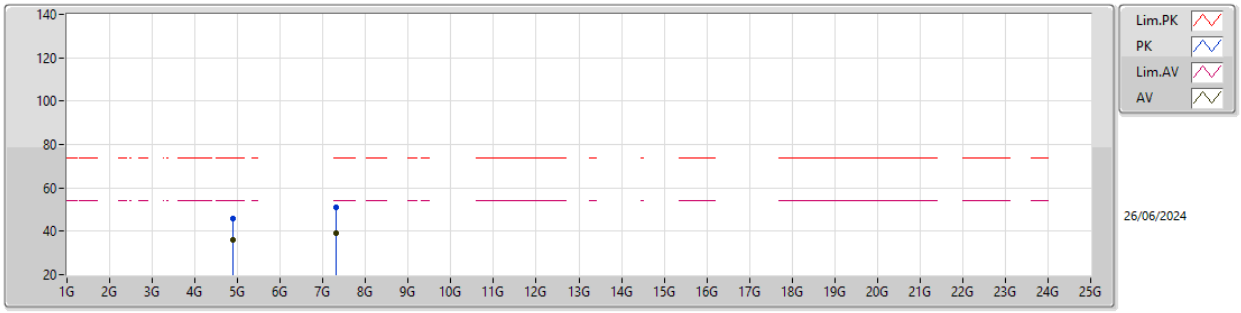


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.88048G	48.31	74.00	-25.69	53.99	3	Vertical	62	2.13	-	32.52	5.72	43.92
AV	4.87964G	40.30	54.00	-13.70	45.98	3	Vertical	62	2.13	-	32.52	5.72	43.92
PK	7.31876G	50.71	74.00	-23.29	49.16	3	Vertical	150	2.62	-	37.20	7.13	42.78
AV	7.32568G	39.13	54.00	-14.87	37.59	3	Vertical	150	2.62	-	37.20	7.13	42.79

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

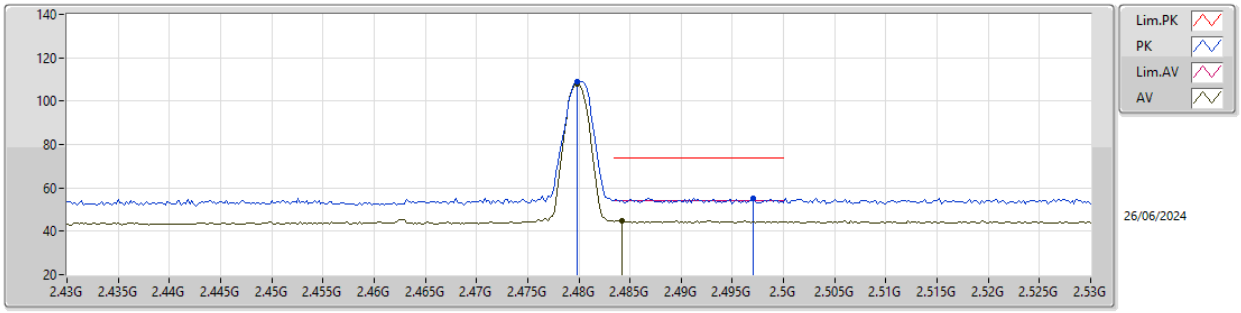


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.8796G	45.62	74.00	-28.38	51.30	3	Horizontal	87	1.44	-	32.52	5.72	43.92
AV	4.87956G	35.93	54.00	-18.07	41.61	3	Horizontal	87	1.44	-	32.52	5.72	43.92
PK	7.31124G	51.00	74.00	-23.00	49.44	3	Horizontal	255	2.31	-	37.20	7.12	42.76
AV	7.31044G	39.36	54.00	-14.64	37.80	3	Horizontal	255	2.31	-	37.20	7.12	42.76

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

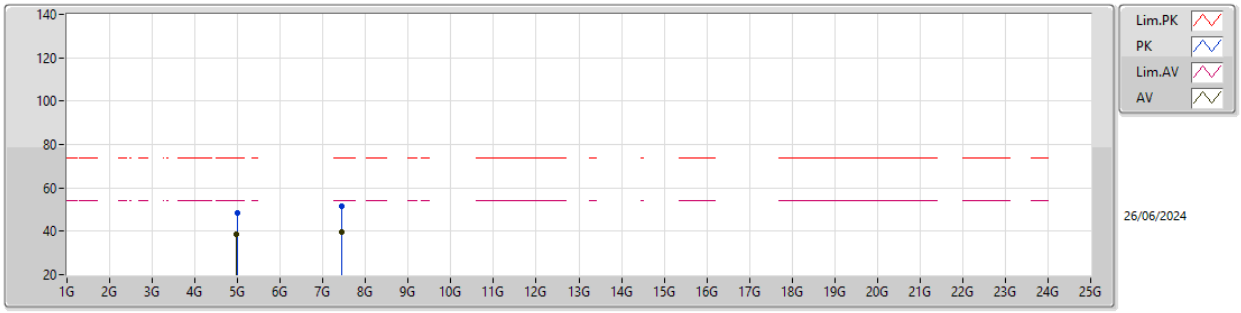


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.4798G	109.01	Inf	-Inf	78.02	3	Vertical	60	1.07	-	27.60	3.39	-
AV	2.4798G	107.86	Inf	-Inf	76.87	3	Vertical	60	1.07	-	27.60	3.39	-
PK	2.497G	55.23	74.00	-18.77	24.13	3	Vertical	60	1.07	-	27.70	3.40	-
AV	2.4842G	44.87	54.00	-9.13	13.83	3	Vertical	60	1.07	-	27.64	3.40	-

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

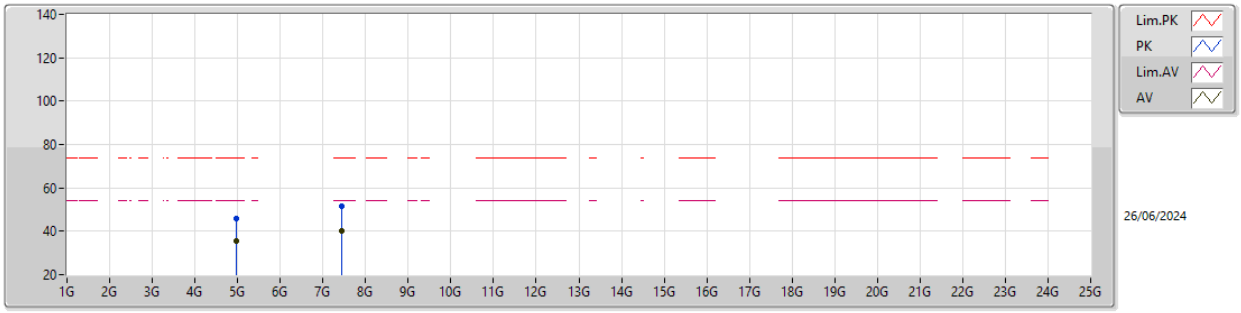


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.9988G	48.24	74.00	-25.76	53.60	3	Vertical	63	1.80	-	32.70	5.83	43.89
AV	4.9598G	38.55	54.00	-15.45	43.96	3	Vertical	63	1.80	-	32.70	5.79	43.90
PK	7.44692G	51.33	74.00	-22.67	49.87	3	Vertical	280	1.20	-	37.20	7.22	42.96
AV	7.44264G	39.89	54.00	-14.11	38.44	3	Vertical	280	1.20	-	37.20	7.21	42.96

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

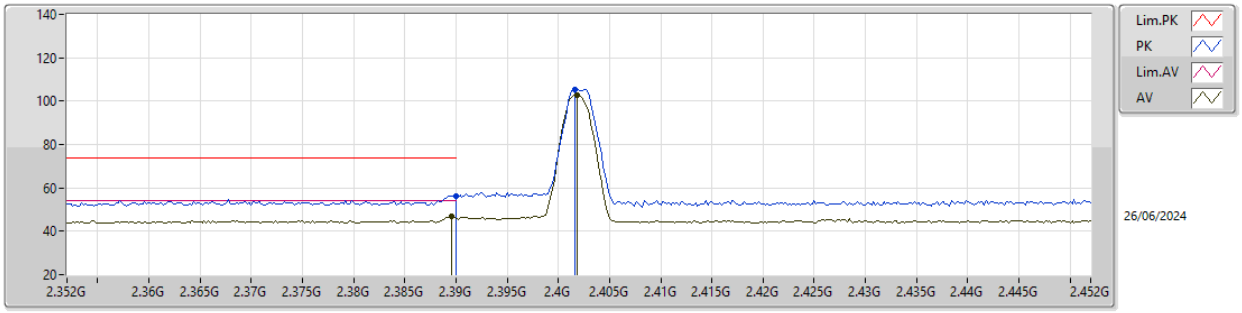


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.95972G	46.07	74.00	-27.93	51.48	3	Horizontal	98	1.00	-	32.70	5.79	43.90
AV	4.95972G	35.77	54.00	-18.23	41.18	3	Horizontal	98	1.00	-	32.70	5.79	43.90
PK	7.44476G	51.53	74.00	-22.47	50.07	3	Horizontal	102	1.80	-	37.20	7.22	42.96
AV	7.44264G	39.92	54.00	-14.08	38.47	3	Horizontal	102	1.80	-	37.20	7.21	42.96

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

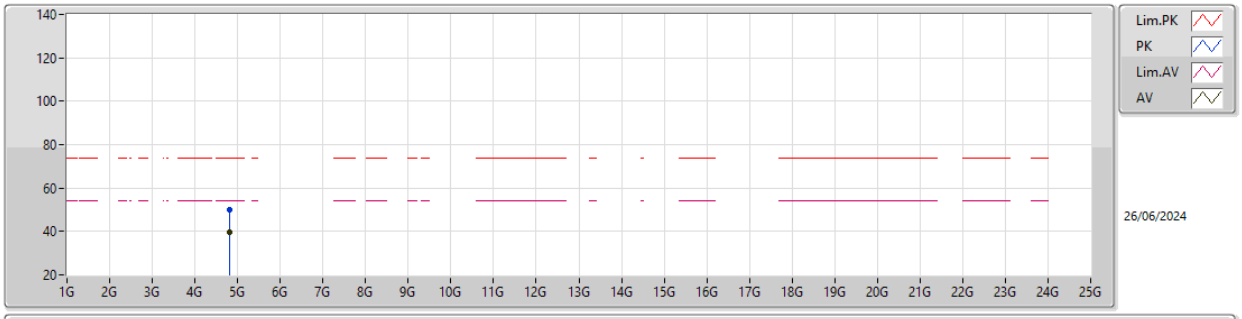


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.39G	56.43	74.00	-17.57	25.68	3	Vertical	94	1.54	-	27.40	3.35	-
AV	2.3896G	46.83	54.00	-7.17	16.08	3	Vertical	94	1.54	-	27.40	3.35	-
PK	2.4016G	105.50	Inf	-Inf	74.65	3	Vertical	94	1.54	-	27.50	3.35	-
AV	2.4018G	102.93	Inf	-Inf	72.08	3	Vertical	94	1.54	-	27.50	3.35	-

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

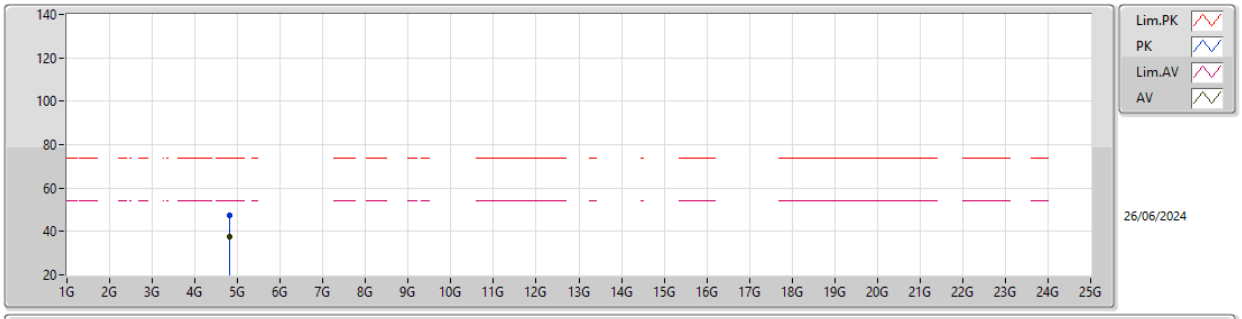


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.80348G	49.98	74.00	-24.02	55.96	3	Vertical	249	2.39	-	32.31	5.65	43.94
AV	4.7996G	39.65	54.00	-14.35	45.64	3	Vertical	249	2.39	-	32.30	5.65	43.94

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

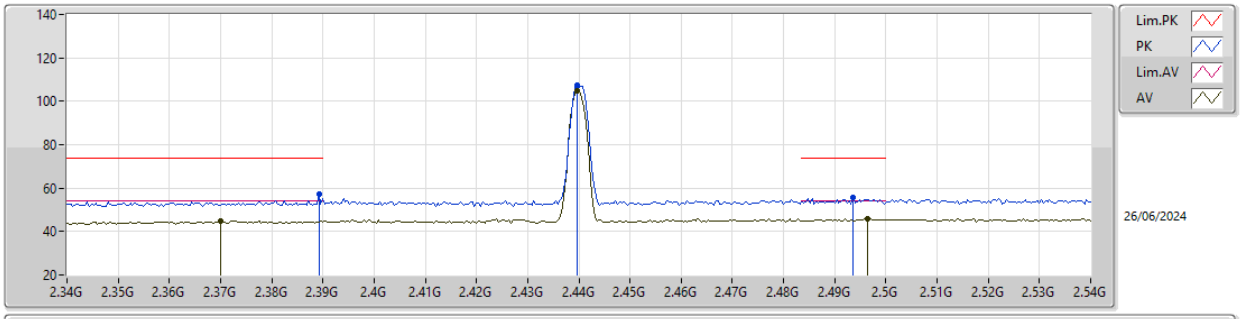


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.81252G	47.19	74.00	-26.81	53.14	3	Horizontal	157	2.31	-	32.33	5.66	43.94
AV	4.81332G	37.65	54.00	-16.35	43.60	3	Horizontal	157	2.31	-	32.33	5.66	43.94

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

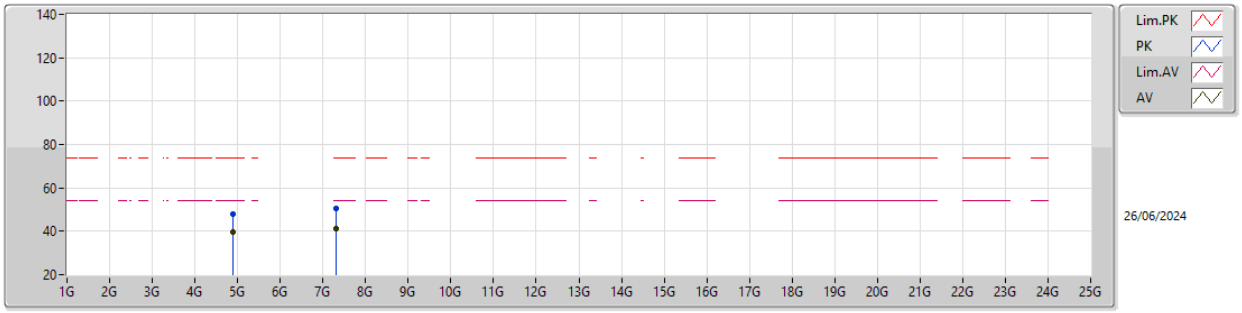


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3892G	57.35	74.00	-16.65	26.60	3	Vertical	56	1.24	-	27.40	3.35	-
AV	2.37G	44.68	54.00	-9.32	13.84	3	Vertical	56	1.24	-	27.50	3.34	-
PK	2.4396G	107.20	Inf	-Inf	76.23	3	Vertical	56	1.24	-	27.60	3.37	-
AV	2.4396G	104.61	Inf	-Inf	73.64	3	Vertical	56	1.24	-	27.60	3.37	-
PK	2.4936G	55.63	74.00	-18.37	24.53	3	Vertical	56	1.24	-	27.70	3.40	-
AV	2.4964G	45.66	54.00	-8.34	14.56	3	Vertical	56	1.24	-	27.70	3.40	-

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

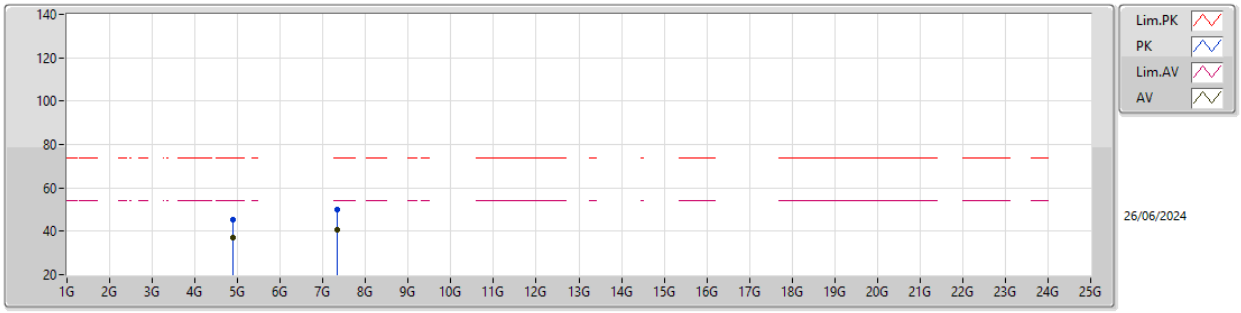


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.88072G	47.79	74.00	-26.21	53.47	3	Vertical	62	2.17	-	32.52	5.72	43.92
AV	4.879G	39.83	54.00	-14.17	45.51	3	Vertical	62	2.17	-	32.52	5.72	43.92
PK	7.31612G	50.39	74.00	-23.61	48.84	3	Vertical	192	2.22	-	37.20	7.12	42.77
AV	7.31128G	41.00	54.00	-13.00	39.44	3	Vertical	192	2.22	-	37.20	7.12	42.76

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

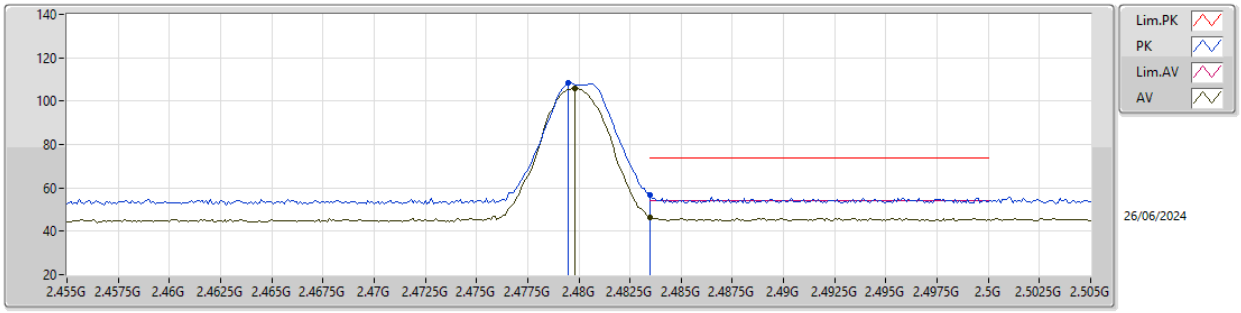


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.88124G	45.23	74.00	-28.77	50.91	3	Horizontal	347	1.65	-	32.52	5.72	43.92
AV	4.87904G	37.09	54.00	-16.91	42.77	3	Horizontal	347	1.65	-	32.52	5.72	43.92
PK	7.324G	50.22	74.00	-23.78	48.67	3	Horizontal	189	1.58	-	37.20	7.13	42.78
AV	7.32844G	40.65	54.00	-13.35	39.11	3	Horizontal	189	1.58	-	37.20	7.13	42.79

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX

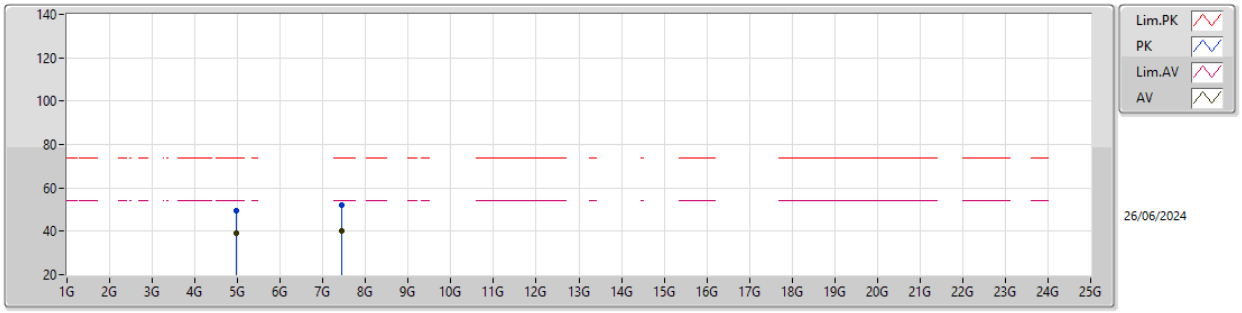


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.4795G	108.19	Inf	-Inf	77.20	3	Vertical	53	1.10	-	27.60	3.39	-
AV	2.4798G	105.72	Inf	-Inf	74.73	3	Vertical	53	1.10	-	27.60	3.39	-
PK	2.4835G	56.76	74.00	-17.24	25.72	3	Vertical	53	1.10	-	27.64	3.40	-
AV	2.4835G	46.37	54.00	-7.63	15.33	3	Vertical	53	1.10	-	27.64	3.40	-

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX

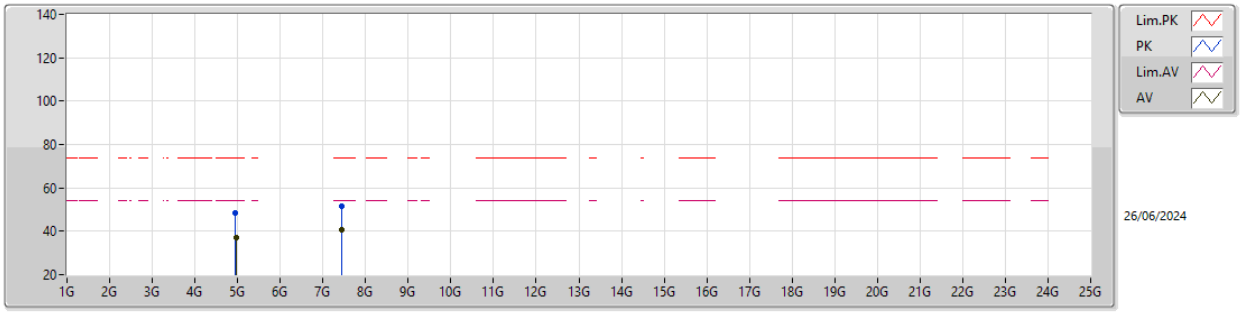


EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.95904G	49.57	74.00	-24.43	54.98	3	Vertical	60	1.80	-	32.70	5.79	43.90
AV	4.95896G	39.03	54.00	-14.97	44.44	3	Vertical	60	1.80	-	32.70	5.79	43.90
PK	7.44644G	51.91	74.00	-22.09	50.45	3	Vertical	1	2.41	-	37.20	7.22	42.96
AV	7.4496G	40.40	54.00	-13.60	38.95	3	Vertical	1	2.41	-	37.20	7.22	42.97

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX



EUT Z_1TX
Setting Default
04-M-J-8

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.95568G	48.70	74.00	-25.30	54.11	3	Horizontal	351	2.93	-	32.70	5.79	43.90
AV	4.95896G	37.02	54.00	-16.98	42.43	3	Horizontal	351	2.93	-	32.70	5.79	43.90
PK	7.43736G	51.36	74.00	-22.64	49.90	3	Horizontal	290	1.46	-	37.20	7.21	42.95
AV	7.44664G	40.49	54.00	-13.51	39.03	3	Horizontal	290	1.46	-	37.20	7.22	42.96