Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	ZQ6-AP6275S
Equipment	:	Wi-Fi/Bluetooth Module
Brand Name	:	AMPAK Technology Inc.
Model Name	:	AP6275S
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. 24, 2024 and completed on Sep. 10, 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: Rex Liao

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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Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FR412214AD	01	Initial issue of report	Sep. 19, 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: Sophia Shiung

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	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.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	PULSE ELECTRONICS PTE LTD	TZ2412W	Dipole	Reversed-SMA	Note 1
2					

Note 1:

Ant.	Port			Gain (dBi)		
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	1	1	1	3.68	4.65	3.68
2	2	2	-	3.68	4.65	-

Note 2: The above information was declared by manufacturer.
Note 3: 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 : $Directiona\ lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$

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

Note 4: **For 2.4GHz function:**
For IEEE 802.11 b/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 802.11 a/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)	0.607	2.17	379.375u	3k
BT-LE(2Mbps)	0.313	5.04	195.625u	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	For Conducted: Terminal 3.6.2 For Radiated: 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	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH03-CB	Owen Hsu	23.7~25.1 / 57~61	Jun. 25, 2024~ Jun. 28, 2024
Radiated < 1GHz	03CH01-CB	Gordon_Hung	21.6~22.7 / 56~59	Aug. 26, 2024~ Sep. 04, 2024
	03CH04-CB		22.7~23.8 / 56~59	
Radiated > 1GHz	03CH03-CB	Gordon_Hung	21.4~22.5 / 55~58	Jun. 24, 2024~ Jun. 25, 2024
AC Conduction	CO01-CB	Ryan Huang	22~23 / 61~63	Aug. 27, 2024~ Sep. 10, 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
2478MHz
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
1	EUT_Bluetooth
2	EUT_WLAN 2.4GHz
3	EUT_WLAN 5GHz
For operating, mode 1 is the worst case and it was recorded 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
	The EUT was performed at X axis, Y axis and Z axis positions with each function at Radiated measurement > 1GH, and the worst cases were found at Z axis for WLAN 2.4GHz and 5GHz, and Y axis for Bluetooth. Thus, the measurement will follow these same test configurations.
1	EUT in Y axis_Bluetooth
2	EUT in Z axis_WLAN 2.4GHz
3	EUT in Z axis_WLAN 5GHz
For operating, mode 1 is the worst case and it was recorded in this test report.	
Operating Mode > 1GHz	CTX
	The EUT was performed at X axis, Y axis and Z axis positions, and the worst case was found at Y axis. Thus, the measurement will follow this same test configuration.
1	EUT in Y 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	EUT Fixture	AMPAK Technology Inc.	P6276S_EVB_V01	N/A
B	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A
C	Wireless Connectivity Tester	R&S	CMW270	N/A
D	Control NB	DELL	E6430	N/A
E	Earphone	SHYARO CHI	MIC-04	N/A
F	Mouse	HP	FM100	N/A

For Radiated < 1GHz:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	Lenovo	42T4430	N/A
B	EUT Fixture	AMPAK Technology Inc.	P6276S_EVB_V01	N/A
C	Earphone	e-Power	S90W	N/A
D	Mouse	Logitech	M-U0026	N/A
E	BT Connectivity Tester	Anritsu	MB8852B	N/A
F	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A

For Radiated > 1GHz:

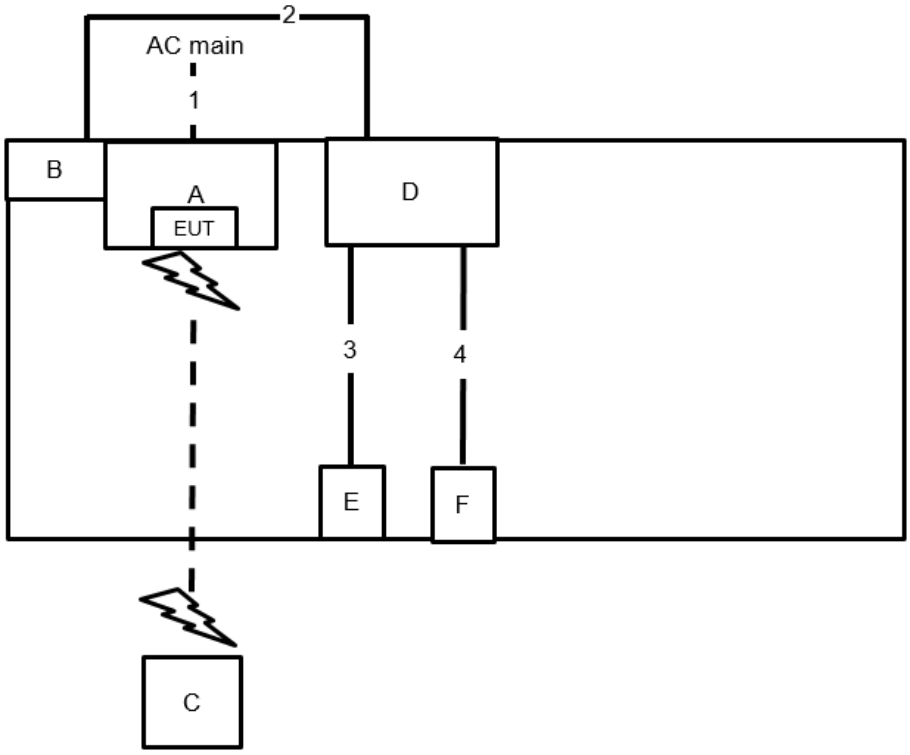
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	DC Power Supply	MOTECH	LPS-305	N/A
B	PC	AMPAK Technology Inc.	H81-PLUS	N/A
C	BT fixture	AMPAK Technology Inc.	UART_V06	N/A
D	EUT Fixture	AMPAK Technology Inc.	P6276S_EVB_V01	N/A

For RF Conducted:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PC	AMPAK Technology Inc.	H81-PLUS	N/A
B	EUT Fixture	AMPAK Technology Inc.	P6276S_EVB_V01	N/A
C	BT Fixture	AMPAK Technology Inc.	UART_V06	N/A
D	DC Power Supply	MOTECH	LPS-305	N/A

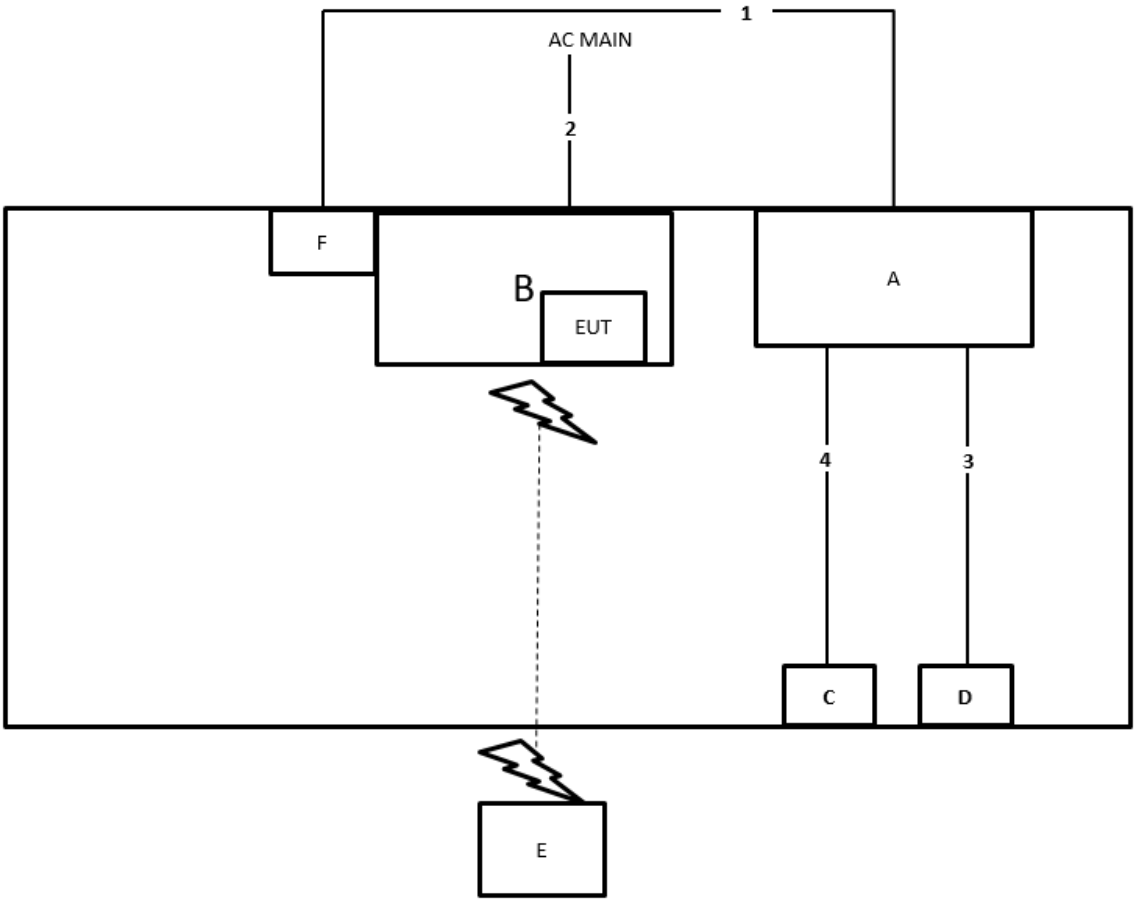
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



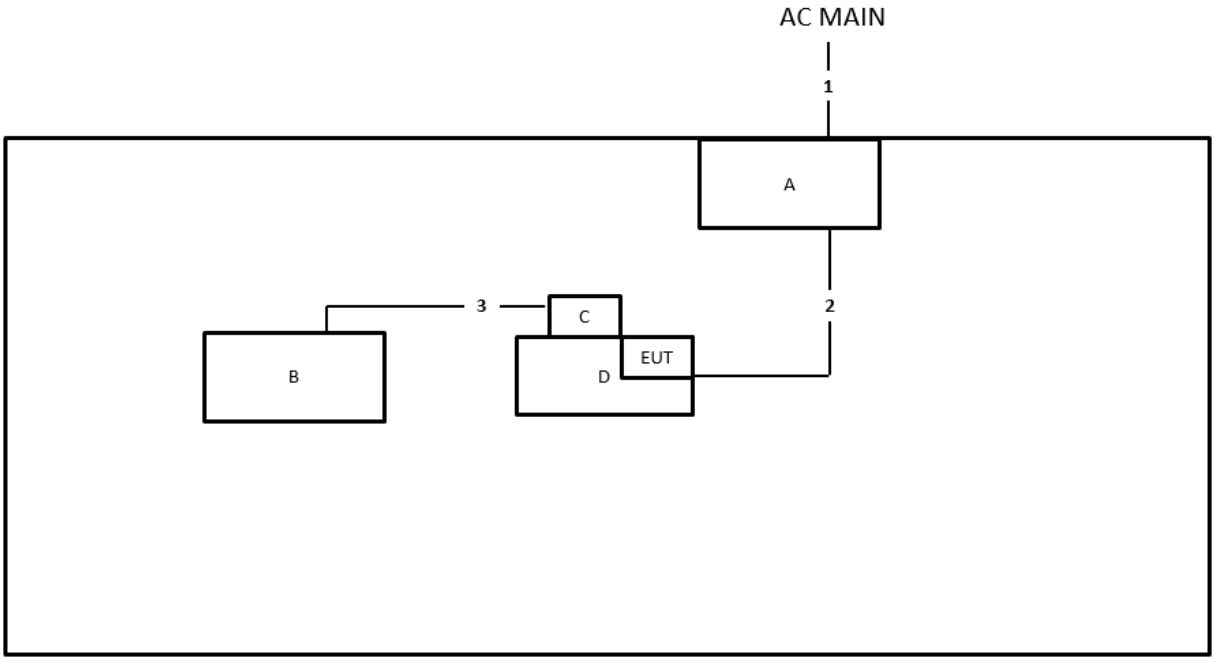
Item	Connection	Shielded	Length
1	Power cable	Yes	1m
2	Mini USB cable	Yes	1m
3	Audio cable	No	1.5m
4	USB cable	Yes	1.8m

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Mini USB cable	Yes	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	Power cable	No	1m
2	Crocodile clip cable*2	No	1m
3	USB to Mini cable	Yes	1.5m

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

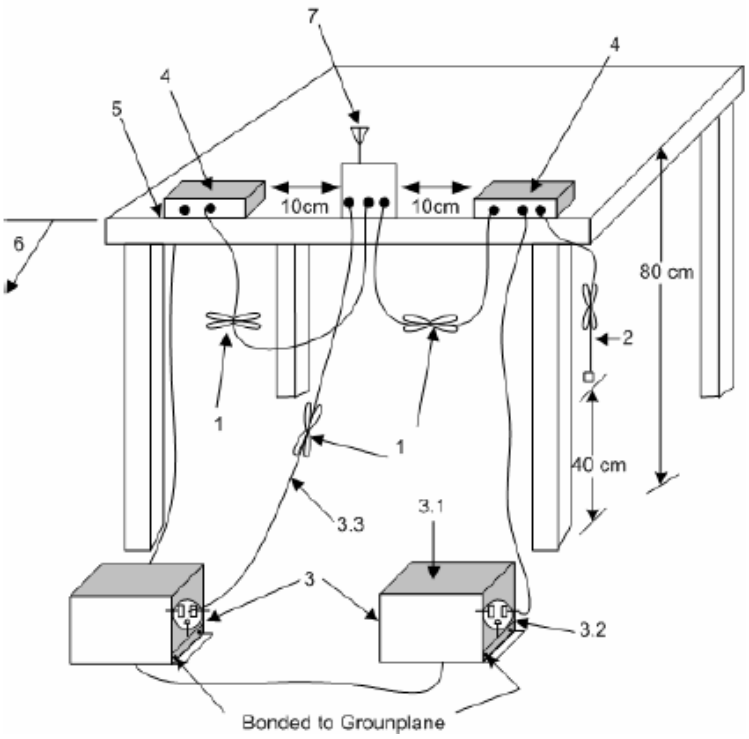
Refer a test equipment and calibration data table in this test report.

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

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.

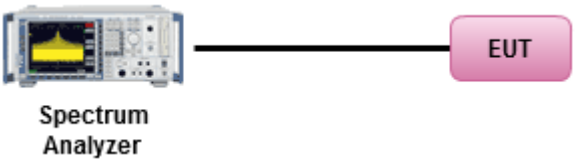
3.2.2 Measuring Instruments

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

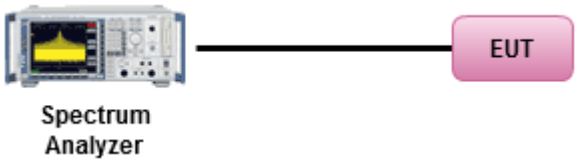
Refer a test equipment and calibration data table in this test report.

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

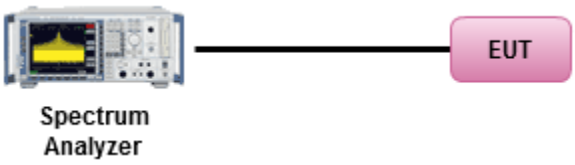
Refer a test equipment and calibration data table in this test report.

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.

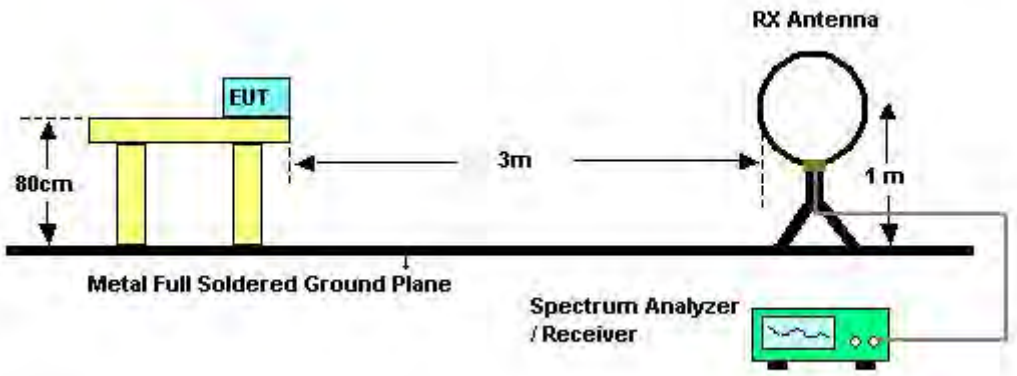
3.6.3 Test Procedures

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.		

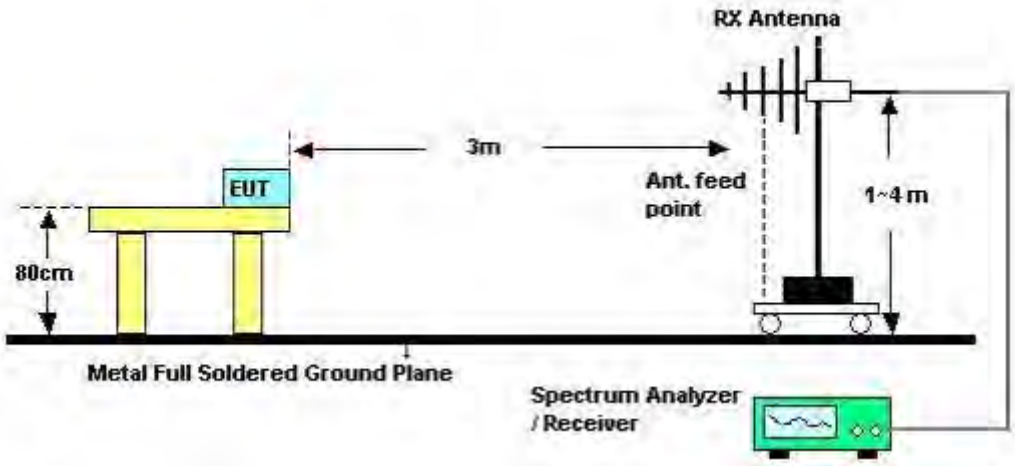
3.6.4 Test Setup

Emissions in Restricted Frequency Bands

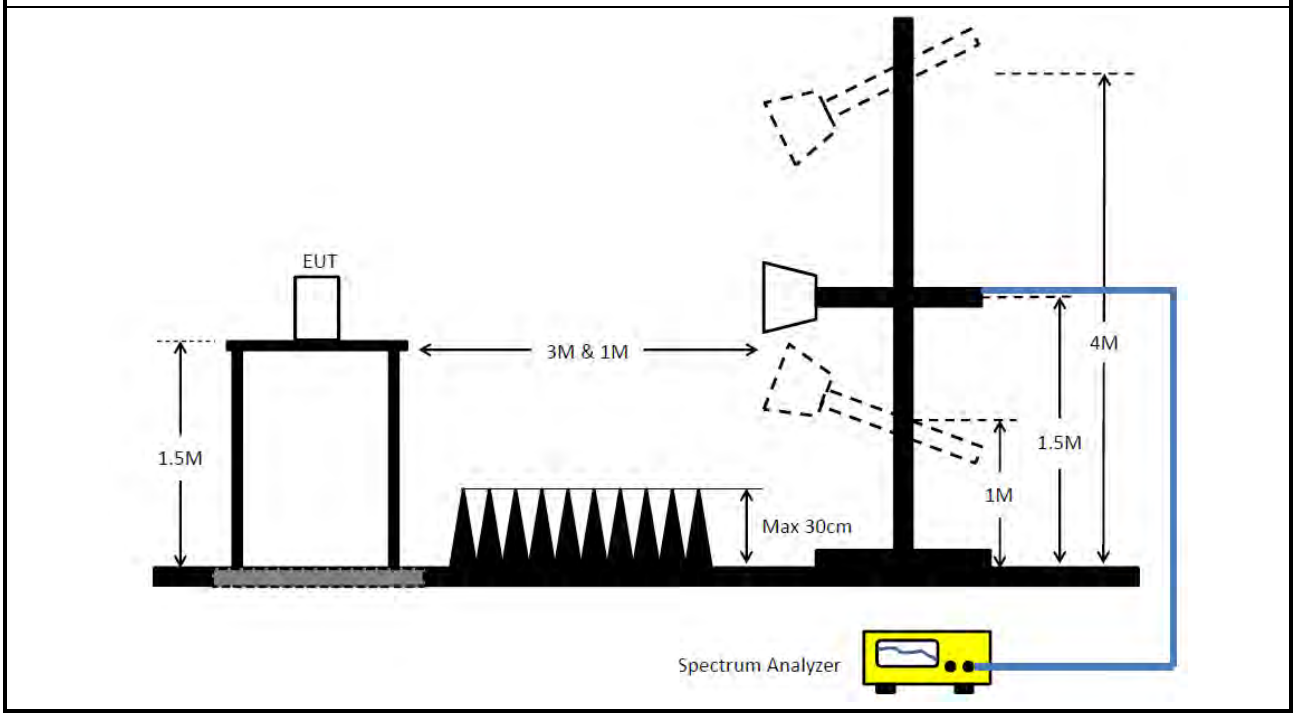
9kHz ~30MHz



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 (03CH01-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH01-CB	30MHz ~ 1GHz	Jan. 18, 2024	Jan. 17, 2025	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Feb. 18, 2024	Feb. 17, 2025	Radiation (03CH01-CB)
Pre-Amplifier	SGH	SGH0301	20230109-2	10M~1GHz	Jun. 22, 2024	Jun. 21, 2025	Radiation (03CH01-CB)
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 28, 2023	Nov. 27, 2024	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 20, 2023	Oct. 19, 2024	Radiation (03CH01-CB)
RF Cable-low	Woken	RG402	Low Cable-31+32	30MHz ~ 1GHz	Aug. 02, 2024	Aug. 01, 2025	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH04-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH04-CB	30MHz ~ 1GHz	Jul. 31, 2024	Jul. 30, 2025	Radiation (03CH04-CB)
BILOG ANTENNA with 6dB attenuator	Schaffner & EMCI	CBL6112B & N-6-06	22021&AT-N0607	30MHz ~ 1GHz	Oct. 07, 2023	Oct. 06, 2024	Radiation (03CH04-CB)
Pre-Amplifier	EMCI	EMC330N	980391	20MHz ~ 3GHz	May 22, 2024	May 21, 2025	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 19, 2024	Mar. 18, 2025	Radiation (03CH04-CB
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 20, 2023	Oct. 19, 2024	Radiation (03CH04-CB)
RF Cable-low	Woken	RG402	Low Cable-03+67	30MHz – 1GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH04-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 03, 2024	May 02, 2025	Radiation (03CH03-CB)
Horn Antenna	ETS・Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2024	Jan. 23, 2025	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 12, 2023	Jun. 11, 2024	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 11, 2024	Jun. 10, 2025	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Feb. 29, 2024	Feb. 28, 2025	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Feb. 29, 2024	Feb. 28, 2025	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE-15247 _FS	V5.11.18	2.4GHz-2.4835GHz	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Dec. 22, 2023	Dec. 21, 2024	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~40GHz	Sep. 04, 2023	Sep. 03, 2024	Conducted (TH03-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 04, 2023	Sep. 03, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-11	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-12	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-13	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
Switch	SPTCB	SP-SWI	SWI-03	1 ~26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH03-CB)
Test Software	SPORTON	SENSE-15247 _FS	V5.11.18	2.4GHz-2.4835GHz	N.C.R.	N.C.R.	Conducted (TH03-CB)

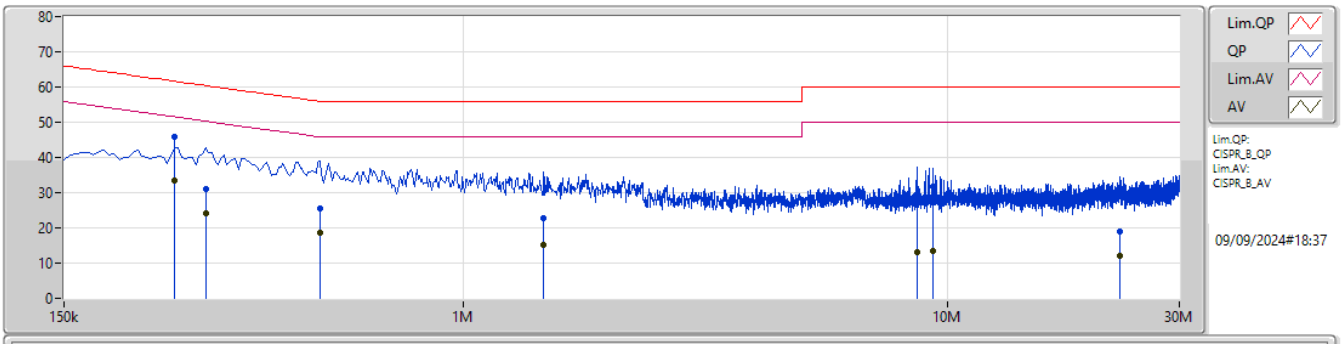
Note: Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.

Summary

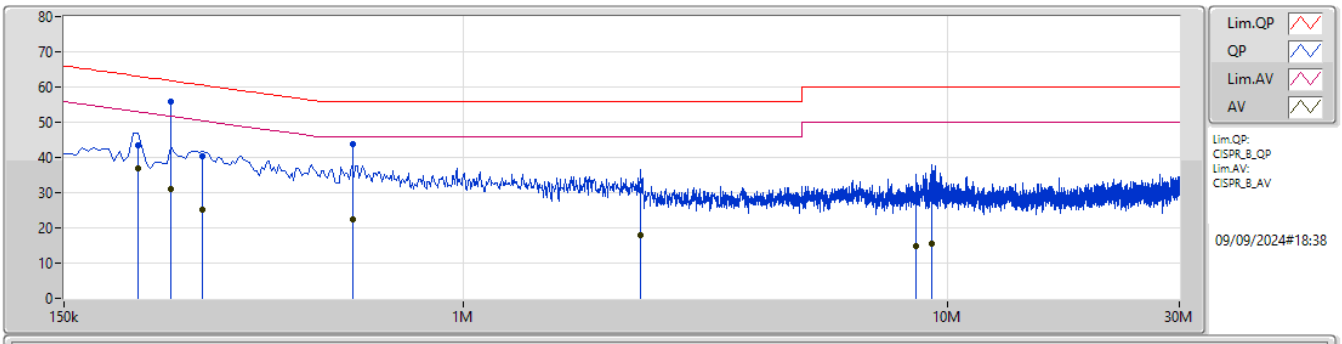
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	249k	55.72	61.79	-6.07	Neutral

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	253.5k	45.91	61.64	-15.73	9.92	Line	"Worst"	35.99	0.04	0.02	9.86
AV	253.5k	33.36	51.64	-18.28	9.92	Line	-	23.44	0.04	0.02	9.86
QP	294k	31.12	60.42	-29.30	9.94	Line	-	21.18	0.05	0.02	9.87
AV	294k	24.13	50.42	-26.29	9.94	Line	-	14.19	0.05	0.02	9.87
QP	505.5k	25.68	56.00	-30.32	9.98	Line	-	15.70	0.06	0.02	9.90
AV	505.5k	18.76	46.00	-27.24	9.98	Line	-	8.78	0.06	0.02	9.90
QP	1.464M	22.70	56.00	-33.30	10.02	Line	-	12.68	0.08	0.04	9.90
AV	1.464M	15.02	46.00	-30.98	10.02	Line	-	5.00	0.08	0.04	9.90
QP	8.637M	29.51	60.00	-30.49	10.26	Line	-	19.25	0.21	0.14	9.91
AV	8.637M	12.98	50.00	-37.02	10.26	Line	-	2.72	0.21	0.14	9.91
QP	9.33M	31.79	60.00	-28.21	10.27	Line	-	21.52	0.22	0.14	9.91
AV	9.33M	13.52	50.00	-36.48	10.27	Line	-	3.25	0.22	0.14	9.91
QP	22.637M	18.87	60.00	-41.13	10.60	Line	-	8.27	0.32	0.24	10.04
AV	22.637M	12.13	50.00	-37.87	10.60	Line	-	1.53	0.32	0.24	10.04

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	213k	43.30	63.09	-19.79	9.93	Neutral	-	33.37	0.06	0.02	9.85
AV	213k	36.81	53.09	-16.28	9.93	Neutral	-	26.88	0.06	0.02	9.85
QP	249k	55.72	61.79	-6.07	9.94	Neutral	"Worst"	45.78	0.06	0.02	9.86
AV	249k	31.09	51.79	-20.70	9.94	Neutral	-	21.15	0.06	0.02	9.86
QP	289.5k	40.25	60.53	-20.28	9.95	Neutral	-	30.30	0.06	0.02	9.87
AV	289.5k	25.28	50.53	-25.25	9.95	Neutral	-	15.33	0.06	0.02	9.87
QP	591k	43.83	56.00	-12.17	9.99	Neutral	-	33.84	0.07	0.02	9.90
AV	591k	22.44	46.00	-23.56	9.99	Neutral	-	12.45	0.07	0.02	9.90
QP	2.319M	30.67	56.00	-25.33	10.08	Neutral	-	20.59	0.11	0.08	9.89
AV	2.319M	18.07	46.00	-27.93	10.08	Neutral	-	7.99	0.11	0.08	9.89
QP	8.583M	27.87	60.00	-32.13	10.27	Neutral	-	17.60	0.22	0.14	9.91
AV	8.583M	14.70	50.00	-35.30	10.27	Neutral	-	4.43	0.22	0.14	9.91
QP	9.276M	31.78	60.00	-28.22	10.28	Neutral	-	21.50	0.23	0.14	9.91
AV	9.276M	15.54	50.00	-34.46	10.28	Neutral	-	5.26	0.23	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)	681.25k	1.052M	1M05F1D	600k	1.043M
BT-LE(2Mbps)	1.52M	2.077M	2M08F1D	1.335M	2.074M

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

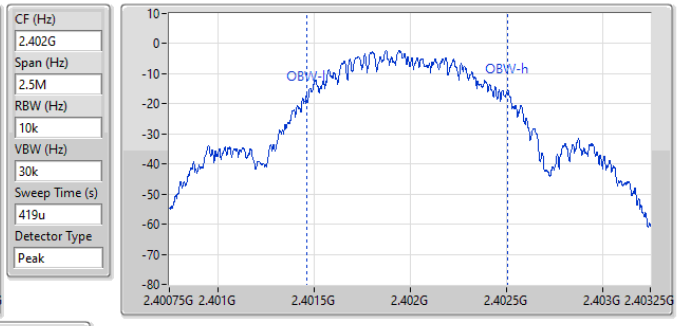
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	681.25k	1.043M
2440MHz	Pass	500k	600k	1.052M
2480MHz	Pass	500k	632.5k	1.046M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.38M	2.077M
2440MHz	Pass	500k	1.335M	2.074M
2480MHz	Pass	500k	1.52M	2.076M

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

25/06/2024

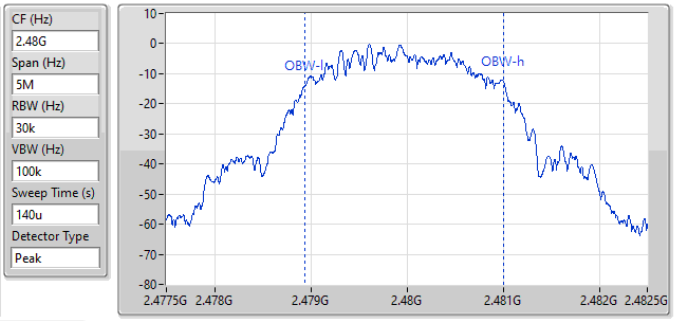


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
681.25k	2.401651G	2.402333G	1.043M	2.401467G	2.40251G	500k	1

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

2480MHz

25/06/2024



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.52M	2.479155G	2.480675G	2.076M	2.478934G	2.48101G	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.33	0.00681
BT-LE(2Mbps)	8.10	0.00646

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.68	8.07	30.00
2440MHz	Pass	3.68	8.33	30.00
2480MHz	Pass	3.68	7.83	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.68	7.72	30.00
2440MHz	Pass	3.68	8.10	30.00
2480MHz	Pass	3.68	7.52	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-7.22
BT-LE(2Mbps)	-10.01

RBW = 3kHz;

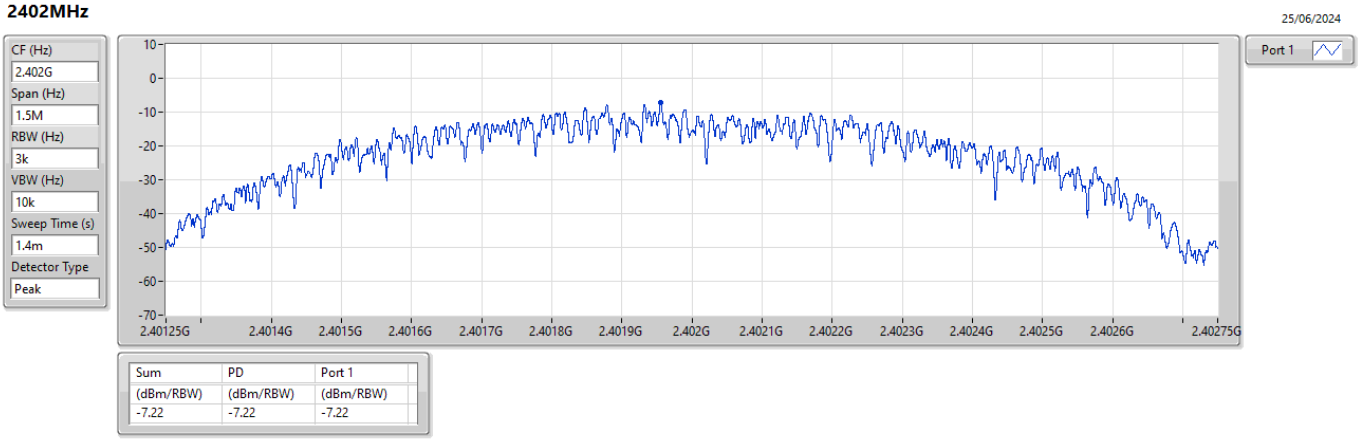
Result

Mode	Result	DG (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.68	-7.22	8.00
2440MHz	Pass	3.68	-7.64	8.00
2480MHz	Pass	3.68	-7.54	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	3.68	-10.57	8.00
2440MHz	Pass	3.68	-10.01	8.00
2480MHz	Pass	3.68	-10.83	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;

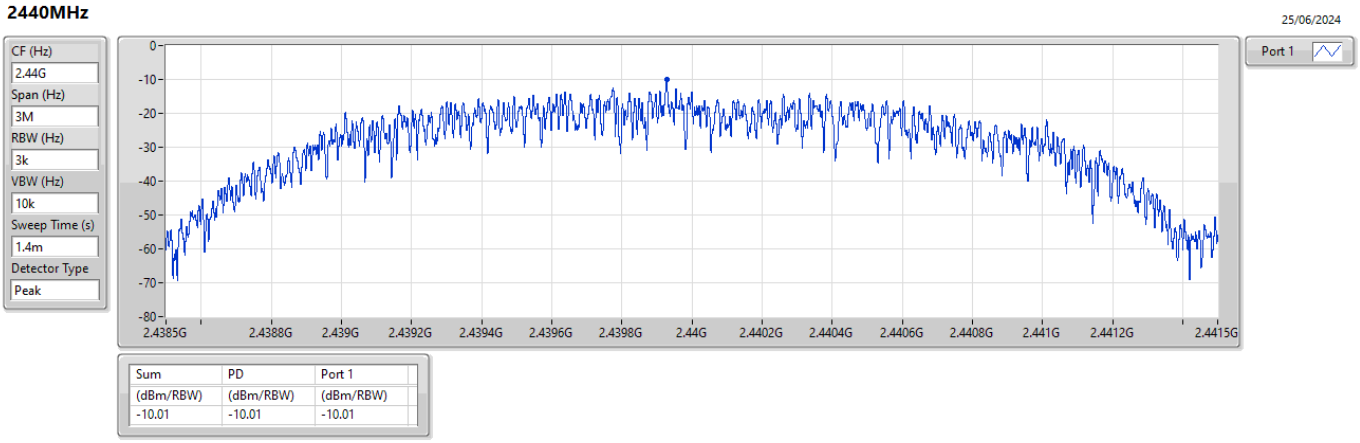
2.4-2.4835GHz_BT-LE(1Mbps) **PSD**

2402MHz



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

2440MHz



Summary

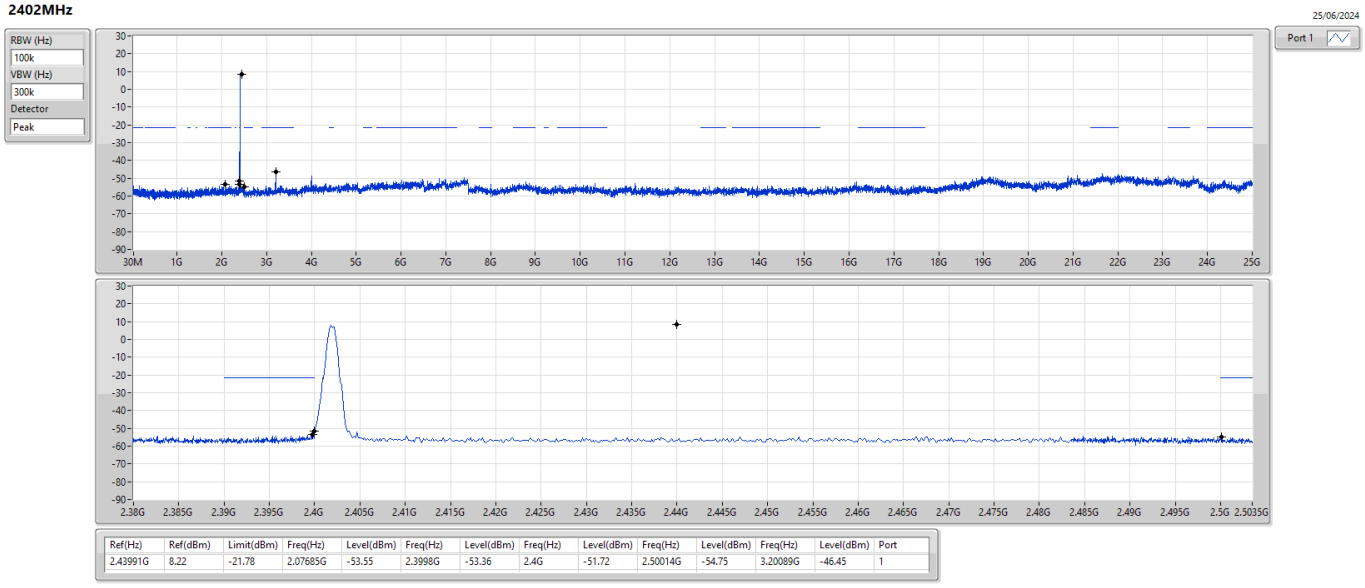
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.43991G	8.22	-21.78	2.07685G	-53.55	2.3998G	-53.36	2.4G	-51.72	2.50014G	-54.75	3.20089G	-46.45	1
BT-LE(2Mbps)	Pass	2.43991G	6.84	-23.16	2.14853G	-53.37	2.4G	-37.87	2.4G	-33.89	2.50142G	-54.83	3.20089G	-46.33	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	2.43991G	8.22	-21.78	2.07685G	-53.55	2.3998G	-53.36	2.4G	-51.72	2.50014G	-54.75	3.20089G	-46.45	1
2440MHz	Pass	2.43991G	8.22	-21.78	1.85948G	-53.80	2.39588G	-54.60	2.4G	-57.23	2.50186G	-54.46	21.81675G	-46.51	1
2480MHz	Pass	2.43991G	8.22	-21.78	34.7M	-54.32	2.39056G	-54.27	2.4G	-56.84	2.5027G	-55.09	21.69301G	-48.27	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.43991G	6.84	-23.16	2.14853G	-53.37	2.4G	-37.87	2.4G	-33.89	2.50142G	-54.83	3.20089G	-46.33	1
2440MHz	Pass	2.43991G	6.84	-23.16	34.7M	-54.09	2.39484G	-54.08	2.4G	-57.47	2.50322G	-55.22	21.72676G	-47.15	1
2480MHz	Pass	2.43991G	6.84	-23.16	2.3001G	-54.06	2.3968G	-55.01	2.4G	-57.23	2.50246G	-54.96	21.72395G	-47.78	1

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

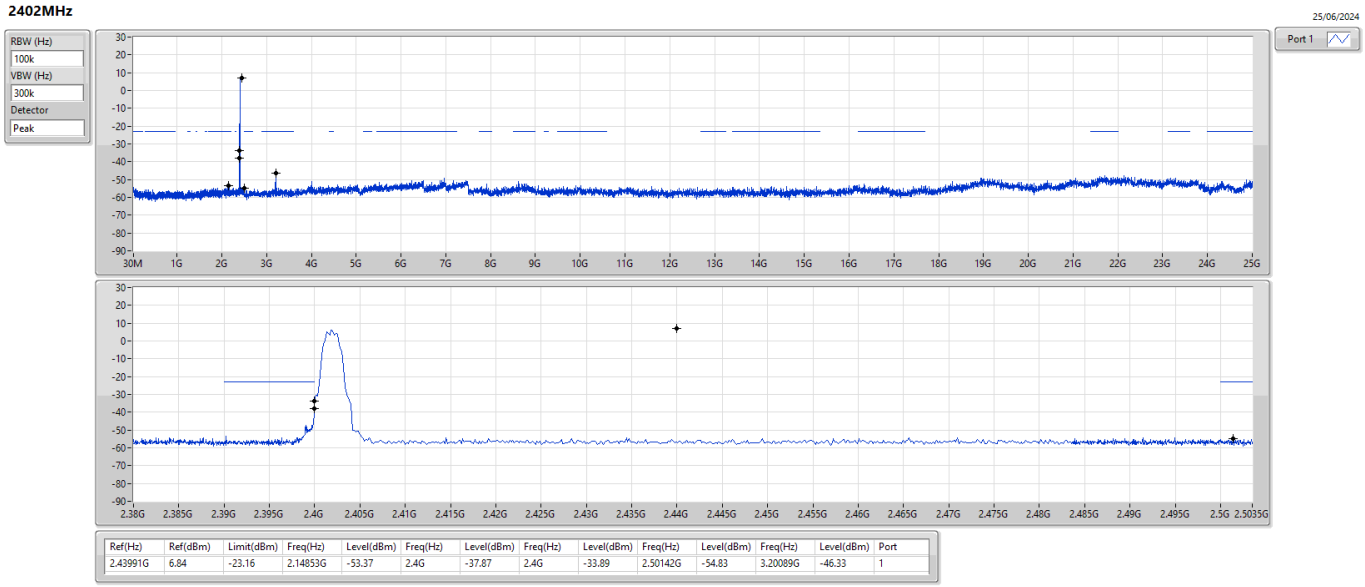
2402MHz



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
2.43991G	8.22	-21.78	2.07685G	-53.55	2.3998G	-53.36	2.4G	-51.72	2.50014G	-54.75	3.20089G	-46.45	1

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

2402MHz

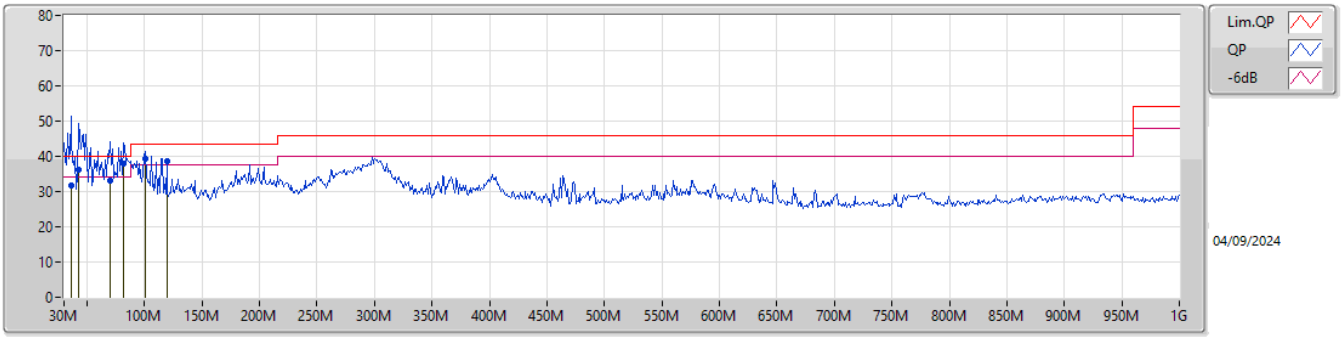


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43991G	6.84	-23.16	2.14853G	-53.37	2.4G	-37.87	2.4G	-33.89	2.50142G	-54.83	3.20089G	-46.33	1

Summary

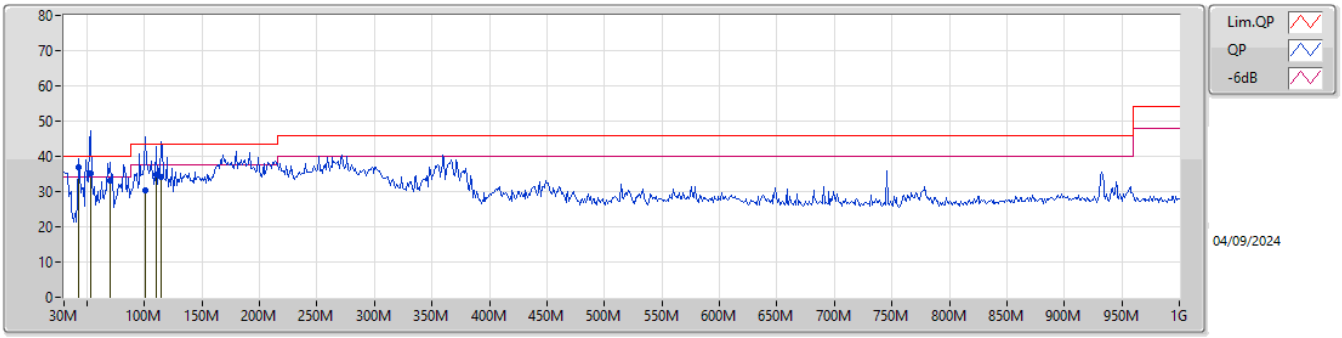
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	81.41M	37.80	40.00	-2.20	Vertical

Mode 1



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)
QP	35.82M	31.77	40.00	-8.23	-9.49	3	Vertical	346	1.50	-	41.26	20.79	0.37	30.65
QP	42.61M	36.20	40.00	-3.80	-13.05	3	Vertical	103	2.00	-	49.25	17.18	0.43	30.66
QP	69.77M	33.01	40.00	-6.99	-17.64	3	Vertical	281	2.00	-	50.65	12.45	0.65	30.74
QP	81.41M	37.80	40.00	-2.20	-16.95	3	Vertical	212	1.50	"Worst"	54.75	13.37	0.74	31.06
QP	100.81M	39.33	43.50	-4.17	-12.64	3	Vertical	238	1.50	-	51.97	17.23	0.82	30.69
PK	119.24M	38.45	43.50	-5.05	-11.61	3	Vertical	131	1.00	-	50.06	18.48	0.94	31.03

Mode 1



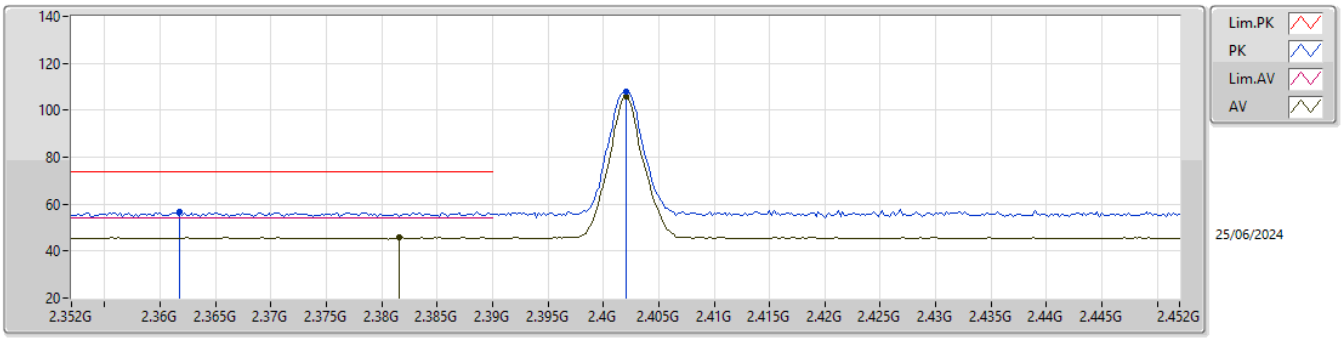
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV)	(dB/m)	(dB)	(dB)
QP	42.61M	36.74	40.00	-3.26	-13.05	3	Horizontal	320	2.00	"Worst"	49.79	17.18	0.43	30.66
QP	53.28M	35.22	40.00	-4.78	-17.39	3	Horizontal	185	1.50	-	52.61	13.14	0.55	31.08
QP	69.77M	33.22	40.00	-6.78	-17.64	3	Horizontal	352	2.00	-	50.86	12.45	0.65	30.74
QP	100.81M	30.34	43.50	-13.16	-12.64	3	Horizontal	251	2.00	-	42.98	17.23	0.82	30.69
QP	110.51M	34.86	43.50	-8.64	-11.88	3	Horizontal	267	3.00	-	46.74	18.11	0.88	30.87
QP	114.39M	34.06	43.50	-9.44	-11.73	3	Horizontal	261	3.00	-	45.79	18.30	0.91	30.94

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(1Mbps)	Pass	AV	2.4835G	52.93	54.00	-1.07	3	Vertical	266	1.92	-

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

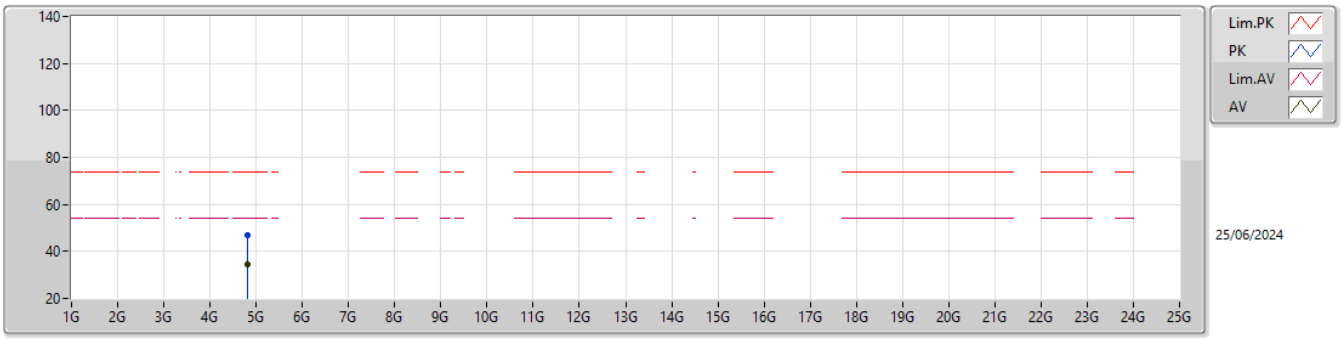


EUT Y_1TX
Setting Default
03-C-E-2

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	2.3618G	56.65	74.00	-17.35	24.11	3	Vertical	259	1.64	-	28.20	4.34	-
AV	2.3816G	45.78	54.00	-8.22	13.20	3	Vertical	259	1.64	-	28.22	4.36	-
PK	2.402G	107.69	Inf	-Inf	75.01	3	Vertical	259	1.64	-	28.30	4.38	-
AV	2.402G	105.79	Inf	-Inf	73.11	3	Vertical	259	1.64	-	28.30	4.38	-

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

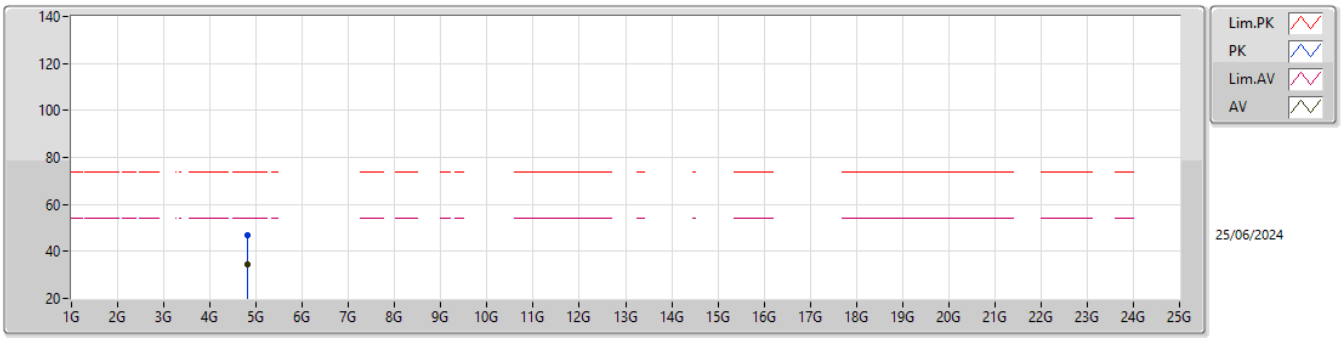


EUT Y_1TX
Setting Default
03-C-P-5

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	4.80448G	46.96	74.00	-27.04	42.16	3	Vertical	25	2.96	-	33.21	6.27	34.68
AV	4.8051G	34.44	54.00	-19.56	29.64	3	Vertical	25	2.96	-	33.21	6.27	34.68

2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX

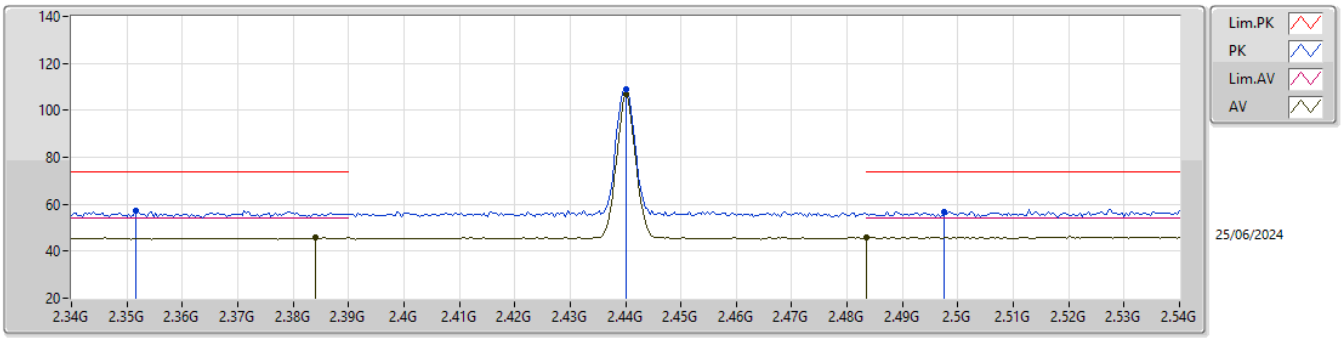


EUT Y_1TX
Setting Default
03-C-P-5

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	4.80062G	46.90	74.00	-27.10	42.11	3	Horizontal	236	1.24	-	33.20	6.26	34.67
AV	4.80604G	34.31	54.00	-19.69	29.51	3	Horizontal	236	1.24	-	33.21	6.27	34.68

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

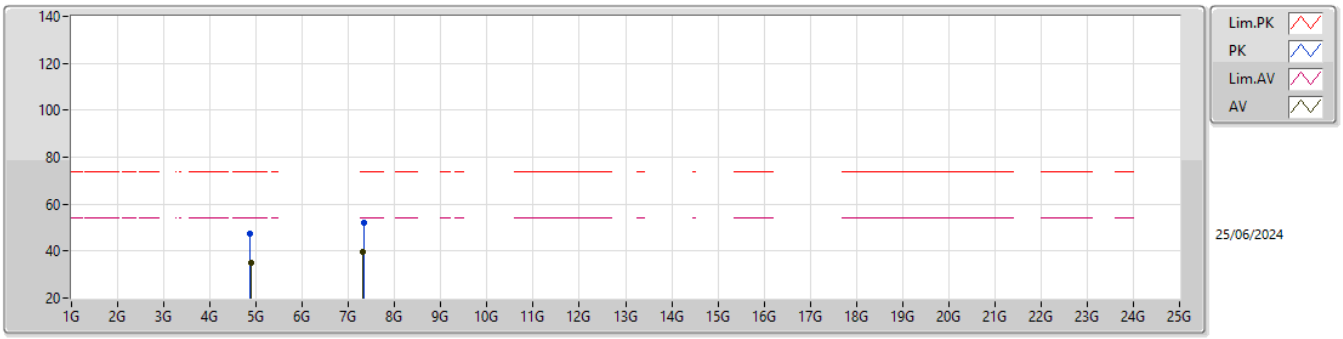


EUT Y_1TX
Setting Default
03-C-E-2

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	2.3516G	57.27	74.00	-16.73	24.82	3	Vertical	258	1.72	-	28.12	4.33	-
AV	2.384G	45.68	54.00	-8.32	13.08	3	Vertical	258	1.72	-	28.24	4.36	-
PK	2.44G	109.07	Inf	-Inf	76.36	3	Vertical	258	1.72	-	28.30	4.41	-
AV	2.44G	107.07	Inf	-Inf	74.36	3	Vertical	258	1.72	-	28.30	4.41	-
PK	2.4976G	56.89	74.00	-17.11	24.05	3	Vertical	258	1.72	-	28.40	4.44	-
AV	2.4835G	45.87	54.00	-8.13	13.10	3	Vertical	258	1.72	-	28.34	4.43	-

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

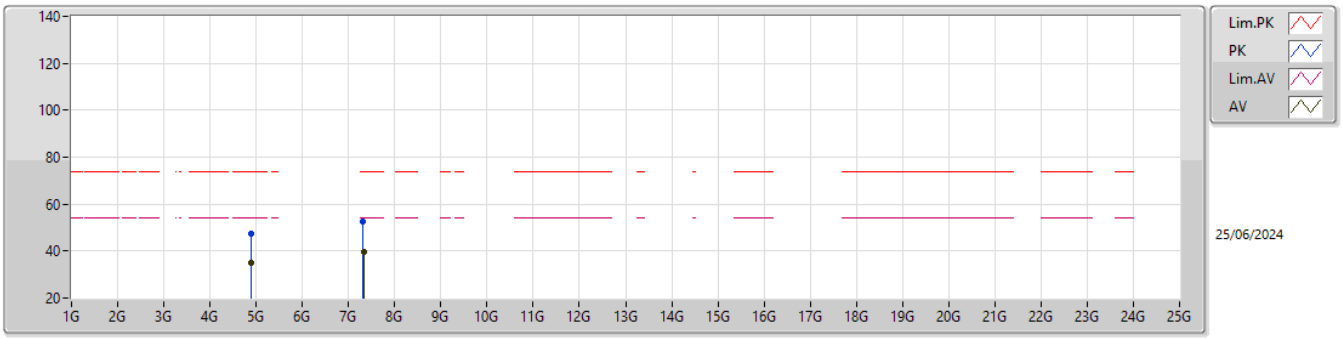


EUT Y_1TX
Setting Default
03-C-P-5

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	4.87536G	47.35	74.00	-26.65	42.36	3	Vertical	286	2.62	-	33.35	6.37	34.73
AV	4.87896G	34.96	54.00	-19.04	29.97	3	Vertical	286	2.62	-	33.36	6.37	34.74
PK	7.32474G	51.82	74.00	-22.18	41.91	3	Vertical	151	1.55	-	36.80	8.48	35.37
AV	7.3193G	39.73	54.00	-14.27	29.84	3	Vertical	151	1.55	-	36.78	8.48	35.37

2.4-2.4835GHz_BT-LE(1Mbps)

2440MHz_TX

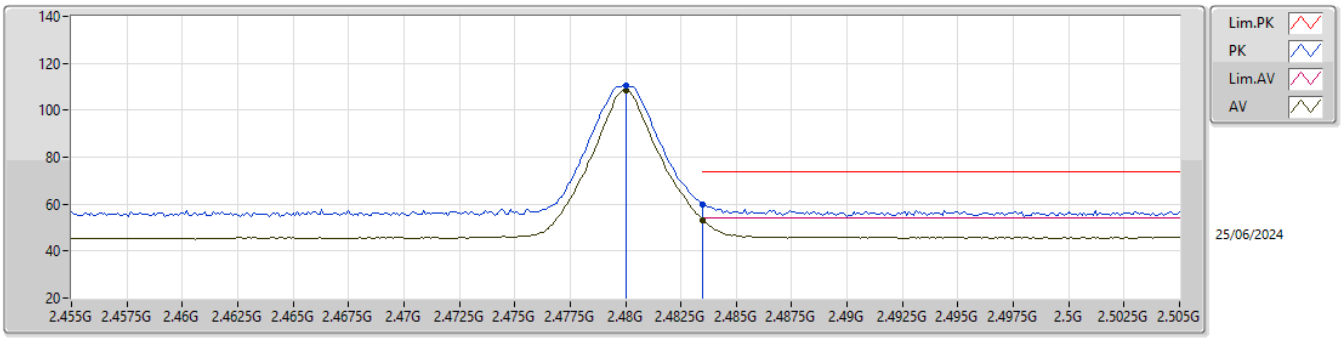


EUT Y_1TX
Setting Default
03-C-P-5

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	4.8787G	47.37	74.00	-26.63	42.38	3	Horizontal	321	1.35	-	33.36	6.37	34.74
AV	4.87932G	35.08	54.00	-18.92	30.09	3	Horizontal	321	1.35	-	33.36	6.37	34.74
PK	7.31688G	52.43	74.00	-21.57	42.56	3	Horizontal	49	2.81	-	36.77	8.48	35.38
AV	7.323G	39.88	54.00	-14.12	29.98	3	Horizontal	49	2.81	-	36.79	8.48	35.37

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

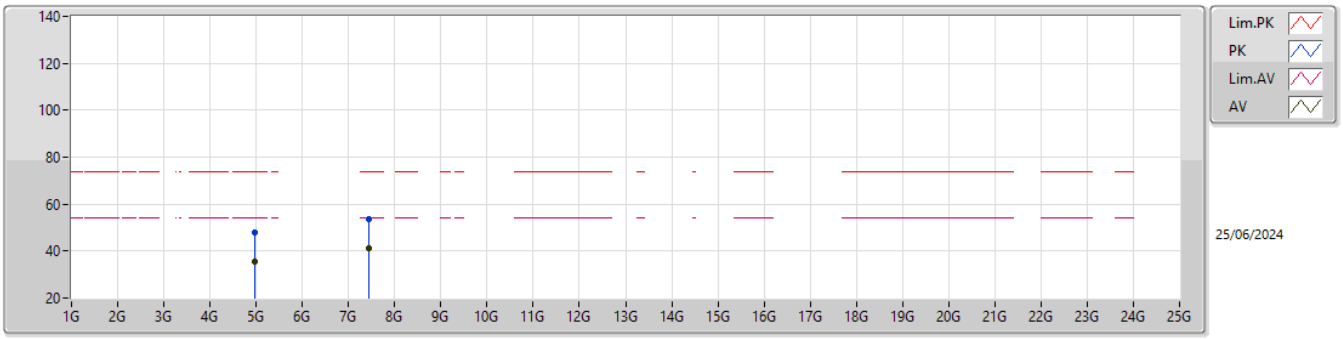


EUT Y_1TX
Setting Default
03-C-E-2

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	2.48G	110.36	Inf	-Inf	77.63	3	Vertical	266	1.92	-	28.30	4.43	-
AV	2.48G	108.50	Inf	-Inf	75.77	3	Vertical	266	1.92	-	28.30	4.43	-
PK	2.4835G	59.86	74.00	-14.14	27.09	3	Vertical	266	1.92	-	28.34	4.43	-
AV	2.4835G	52.93	54.00	-1.07	20.16	3	Vertical	266	1.92	-	28.34	4.43	-

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

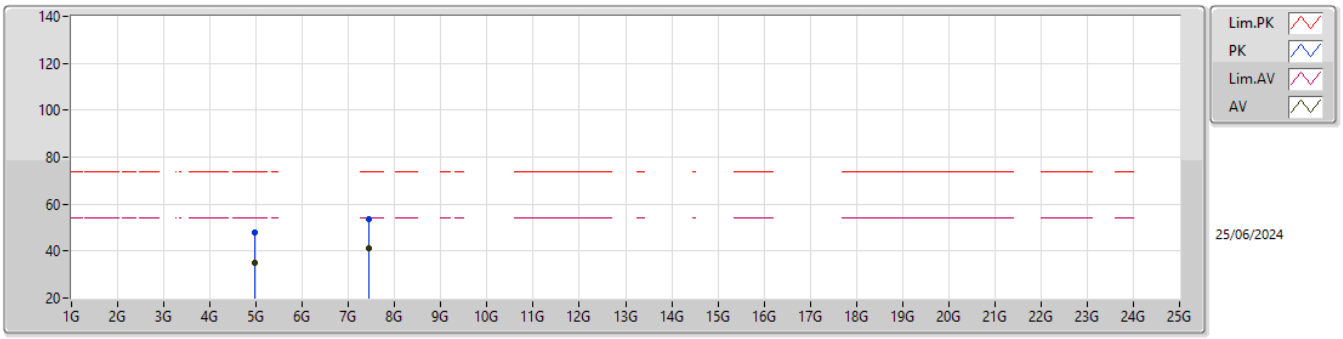


EUT Y_1TX
Setting Default
03-C-P-5

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	4.95848G	47.75	74.00	-26.25	42.47	3	Vertical	273	2.14	-	33.60	6.48	34.80
AV	4.95678G	35.28	54.00	-18.72	30.00	3	Vertical	273	2.14	-	33.60	6.48	34.80
PK	7.4448G	53.84	74.00	-20.16	43.79	3	Vertical	91	1.35	-	36.81	8.54	35.30
AV	7.43666G	41.08	54.00	-12.92	31.03	3	Vertical	91	1.35	-	36.83	8.53	35.31

2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

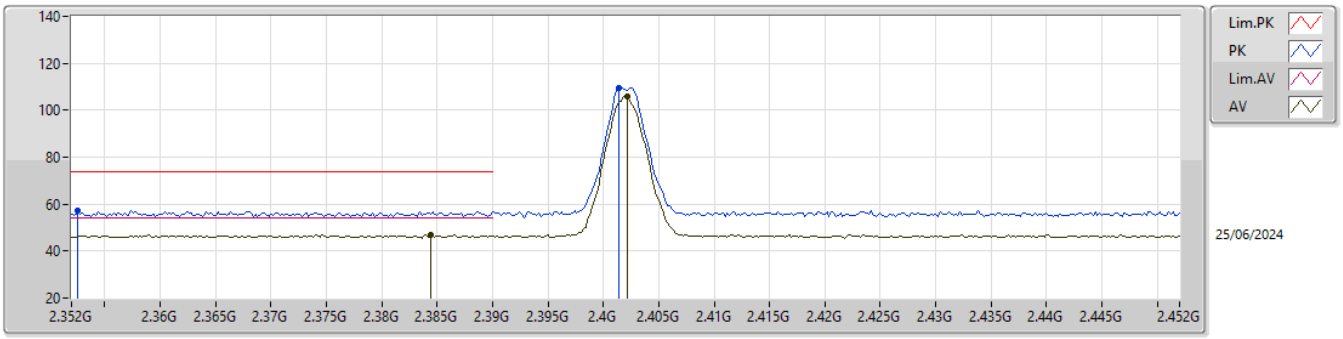


EUT Y_1TX
Setting Default
03-C-P-5

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	4.96486G	48.05	74.00	-25.95	42.76	3	Horizontal	8	2.73	-	33.60	6.49	34.80
AV	4.95918G	35.21	54.00	-18.79	29.93	3	Horizontal	8	2.73	-	33.60	6.48	34.80
PK	7.44208G	53.49	74.00	-20.51	43.44	3	Horizontal	331	1.58	-	36.82	8.53	35.30
AV	7.43612G	40.99	54.00	-13.01	30.94	3	Horizontal	331	1.58	-	36.83	8.53	35.31

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

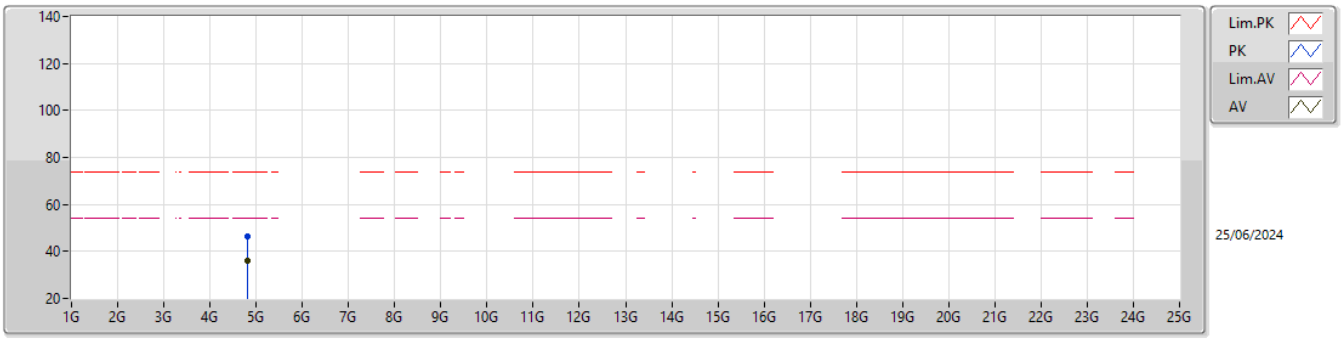


EUT Y_1TX
Setting Default
03-C-E-2

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	2.3526G	57.02	74.00	-16.98	24.56	3	Vertical	293	2.26	-	28.13	4.33	-
AV	2.3844G	46.77	54.00	-7.23	14.17	3	Vertical	293	2.26	-	28.24	4.36	-
PK	2.4014G	109.61	Inf	-Inf	76.93	3	Vertical	293	2.26	-	28.30	4.38	-
AV	2.4022G	105.72	Inf	-Inf	73.04	3	Vertical	293	2.26	-	28.30	4.38	-

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

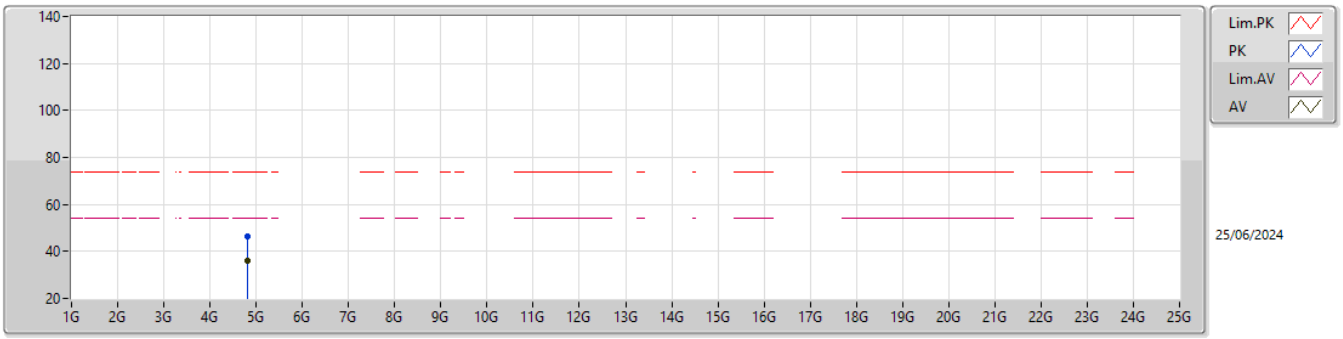


EUT Y_1TX
Setting Default
03-C-P-5

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	4.80544G	46.53	74.00	-27.47	41.73	3	Vertical	24	2.52	-	33.21	6.27	34.68
AV	4.80656G	36.20	54.00	-17.80	31.40	3	Vertical	24	2.52	-	33.21	6.27	34.68

2.4-2.4835GHz_BT-LE(2Mbps)

2402MHz_TX

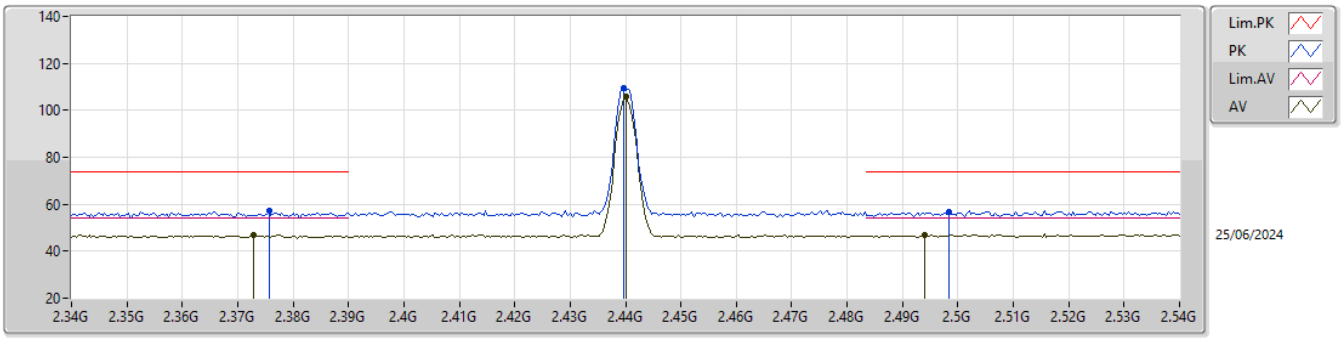


EUT Y_1TX
Setting Default
03-C-P-5

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	4.80504G	46.35	74.00	-27.65	41.55	3	Horizontal	210	2.35	-	33.21	6.27	34.68
AV	4.80014G	35.91	54.00	-18.09	31.12	3	Horizontal	210	2.35	-	33.20	6.26	34.67

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

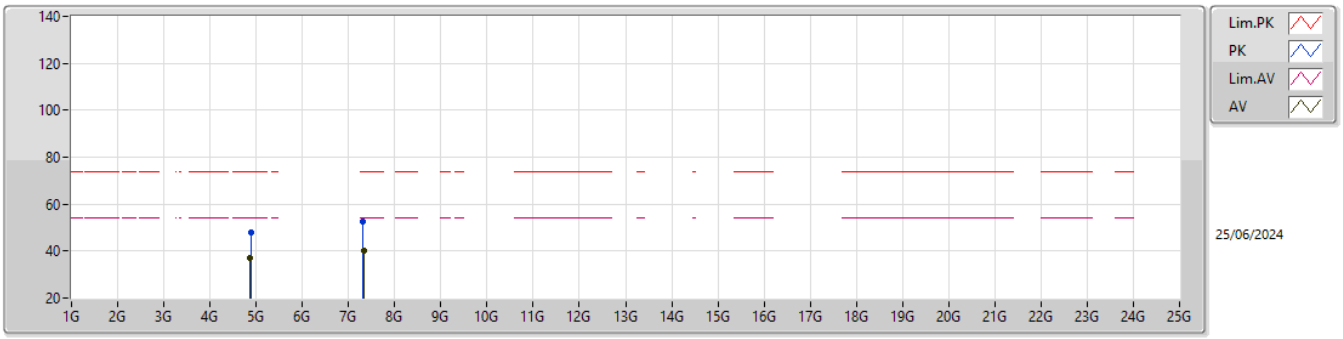


EUT Y_1TX
Setting Default
03-C-E-2

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	2.3756G	57.28	74.00	-16.72	24.73	3	Vertical	262	2.00	-	28.20	4.35	-
AV	2.3728G	47.10	54.00	-6.90	14.55	3	Vertical	262	2.00	-	28.20	4.35	-
PK	2.4396G	109.38	Inf	-Inf	76.67	3	Vertical	262	2.00	-	28.30	4.41	-
AV	2.44G	105.72	Inf	-Inf	73.01	3	Vertical	262	2.00	-	28.30	4.41	-
PK	2.4984G	56.57	74.00	-17.43	23.73	3	Vertical	262	2.00	-	28.40	4.44	-
AV	2.494G	46.83	54.00	-7.17	13.99	3	Vertical	262	2.00	-	28.40	4.44	-

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

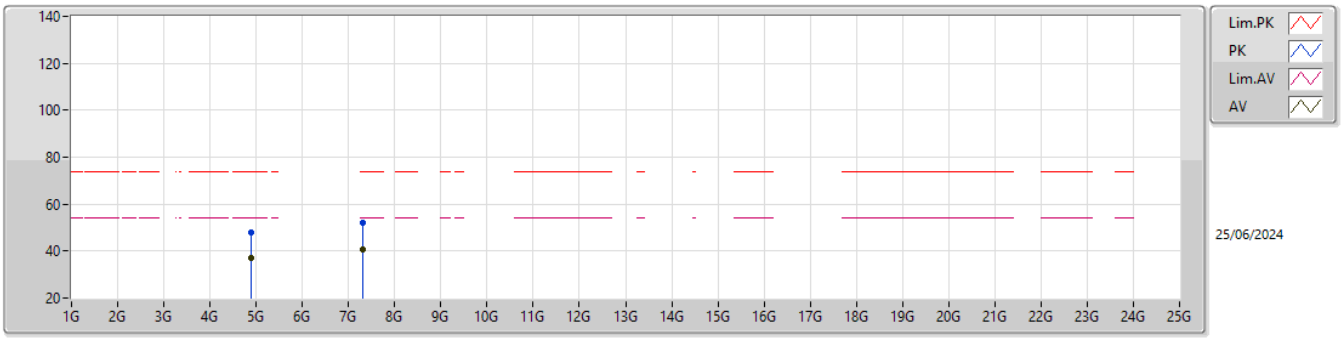


EUT Y_1TX
Setting Default
03-C-P-5

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	4.8811G	48.03	74.00	-25.97	43.04	3	Vertical	192	2.73	-	33.36	6.37	34.74
AV	4.87706G	36.88	54.00	-17.12	31.89	3	Vertical	192	2.73	-	33.35	6.37	34.73
PK	7.31638G	52.34	74.00	-21.66	42.47	3	Vertical	68	2.35	-	36.77	8.48	35.38
AV	7.32464G	40.26	54.00	-13.74	30.35	3	Vertical	68	2.35	-	36.80	8.48	35.37

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX

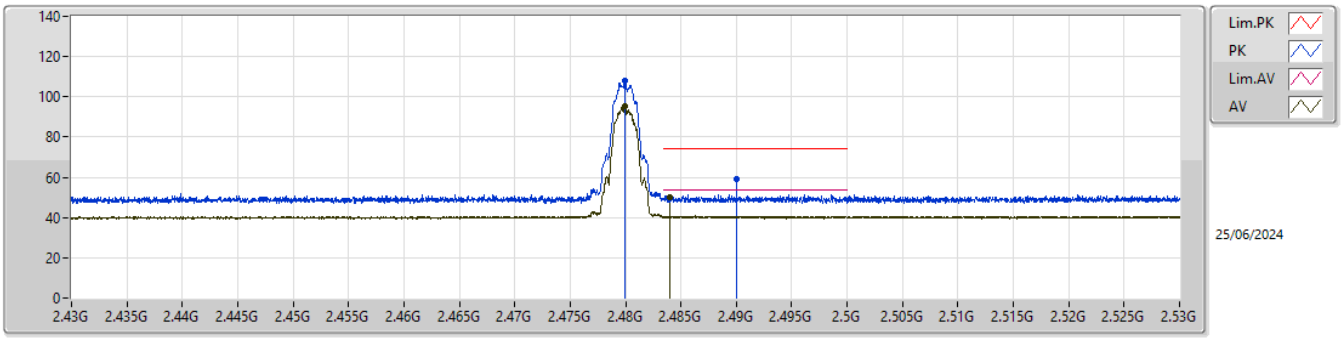


EUT Y_1TX
Setting Default
03-C-P-5

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	4.8839G	47.68	74.00	-26.32	42.67	3	Horizontal	255	1.17	-	33.37	6.38	34.74
AV	4.87936G	36.87	54.00	-17.13	31.88	3	Horizontal	255	1.17	-	33.36	6.37	34.74
PK	7.31688G	52.05	74.00	-21.95	42.18	3	Horizontal	19	1.46	-	36.77	8.48	35.38
AV	7.31626G	40.49	54.00	-13.51	30.62	3	Horizontal	19	1.46	-	36.77	8.48	35.38

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX

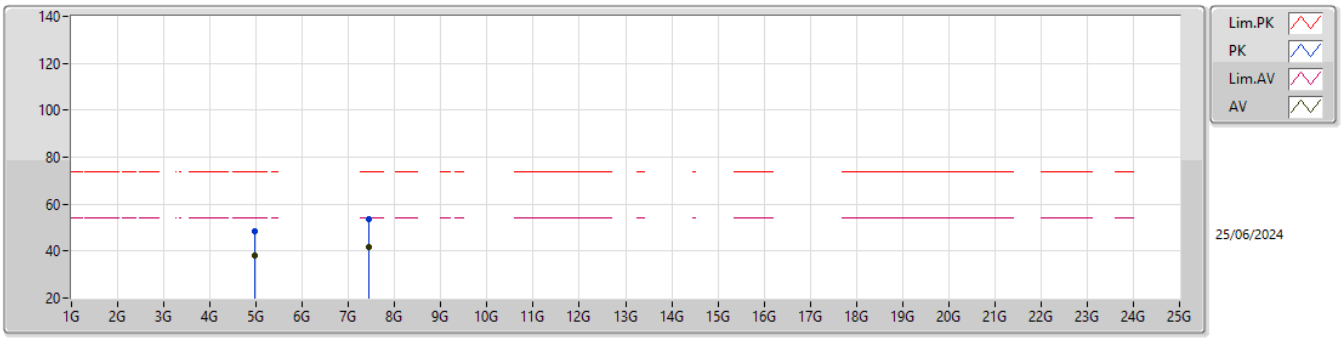


EUT Y_1TX
Setting Default
03-C-P-5

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	2.49G	58.91	74.00	-15.09	26.07	3	Vertical	75	1.77	BP 1MHz	28.40	4.44	-
PK	2.47995G	108.09	Inf	-Inf	75.36	3	Vertical	75	1.77	-	28.30	4.43	-
AV	2.484G	49.96	54.00	-4.04	17.19	3	Vertical	75	1.77	BP 1MHz	28.34	4.43	-
AV	2.47998G	95.18	Inf	-Inf	62.45	3	Vertical	75	1.77	-	28.30	4.43	-

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX

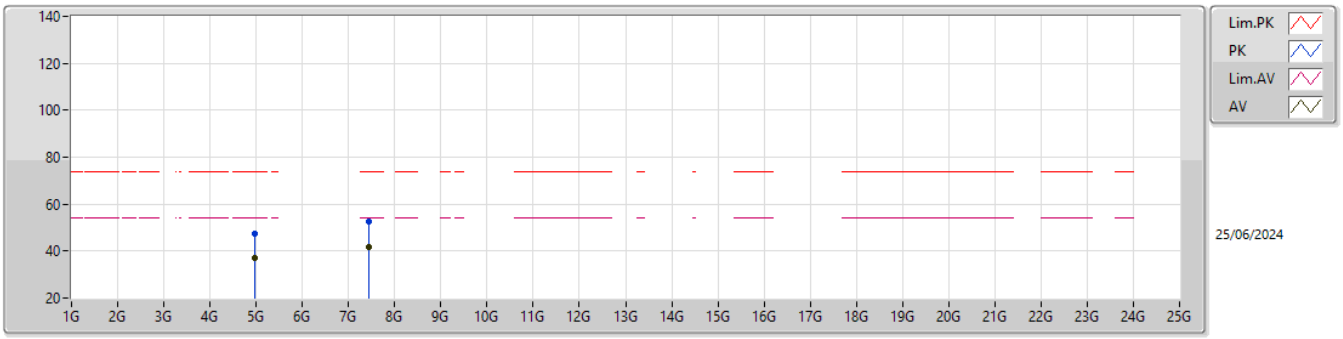


EUT Y_1TX
Setting Default
03-C-P-5

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	4.95892G	48.50	74.00	-25.50	43.22	3	Vertical	82	1.69	-	33.60	6.48	34.80
AV	4.96078G	38.29	54.00	-15.71	33.00	3	Vertical	82	1.69	-	33.60	6.49	34.80
PK	7.43698G	53.71	74.00	-20.29	43.66	3	Vertical	152	1.80	-	36.83	8.53	35.31
AV	7.43664G	41.59	54.00	-12.41	31.54	3	Vertical	152	1.80	-	36.83	8.53	35.31

2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX



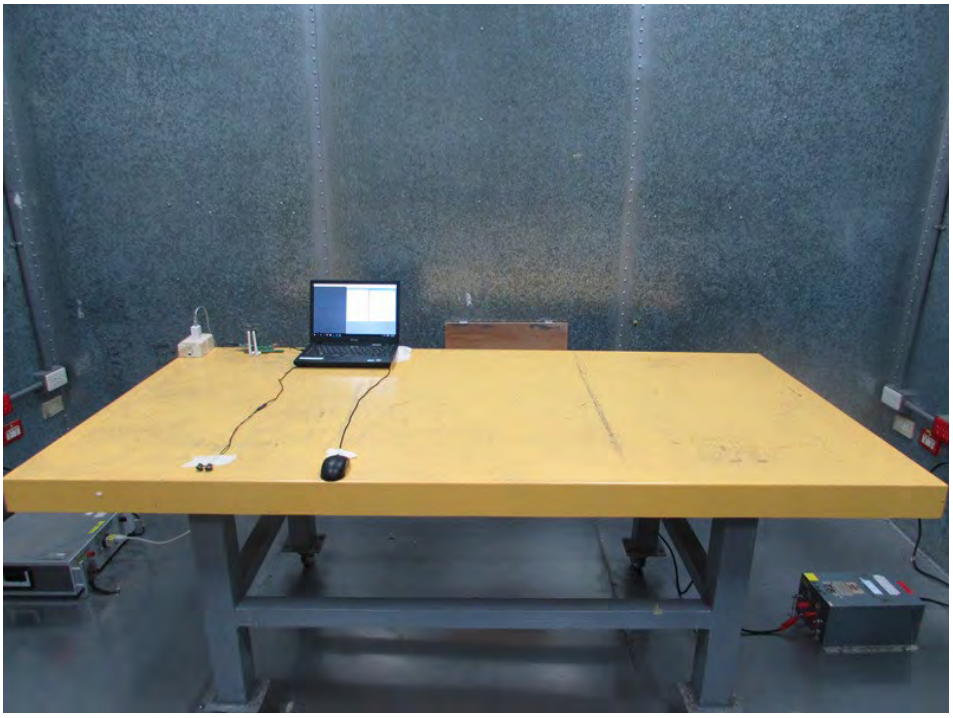
EUT Y_1TX
Setting Default
03-C-P-5

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	4.95986G	47.20	74.00	-26.80	41.92	3	Horizontal	311	2.73	-	33.60	6.48	34.80
AV	4.95976G	36.84	54.00	-17.16	31.56	3	Horizontal	311	2.73	-	33.60	6.48	34.80
PK	7.43606G	52.82	74.00	-21.18	42.77	3	Horizontal	238	1.99	-	36.83	8.53	35.31
AV	7.43732G	41.53	54.00	-12.47	31.48	3	Horizontal	238	1.99	-	36.83	8.53	35.31

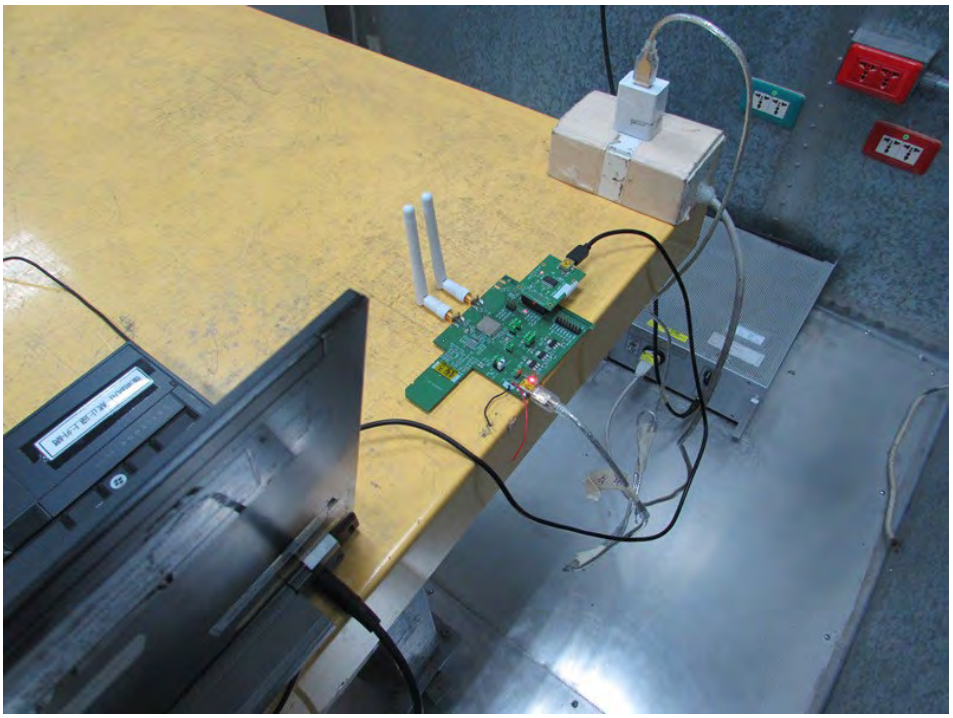
1. Photographs of Conducted Emissions Test Configuration

Test mode: Mode 1

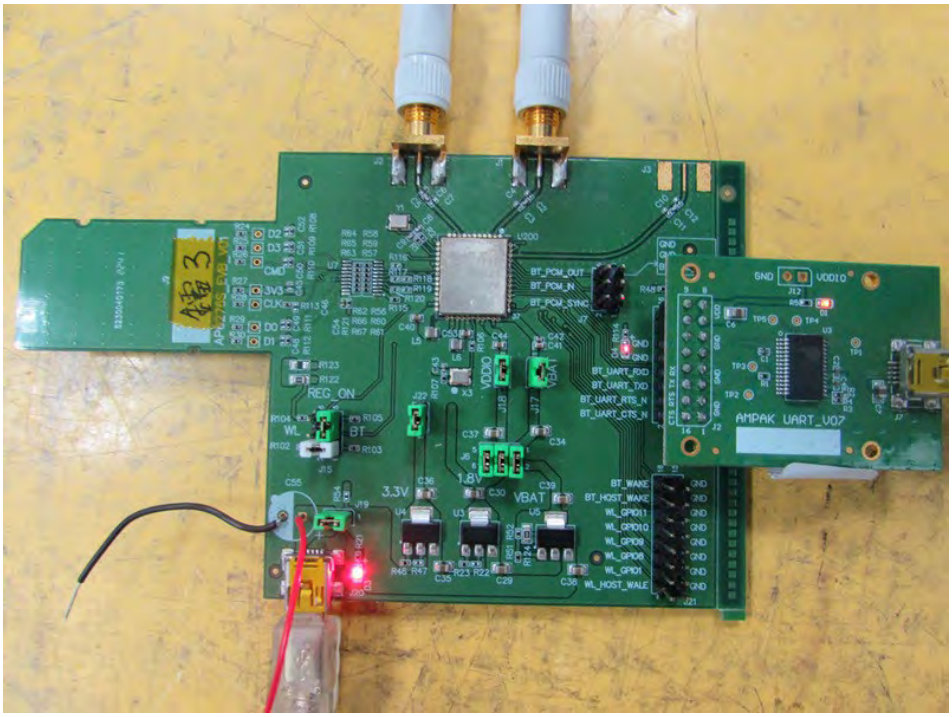
FRONT VIEW



REAR VIEW



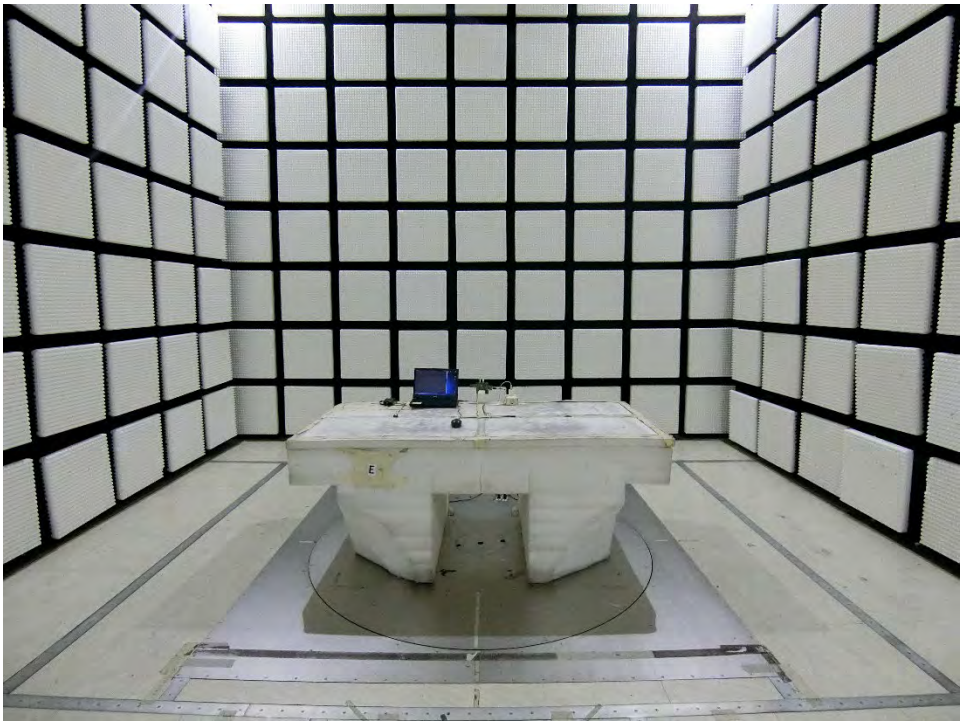
CLOSE-UP VIEW



2. Photographs of Radiated Emissions Test Configuration

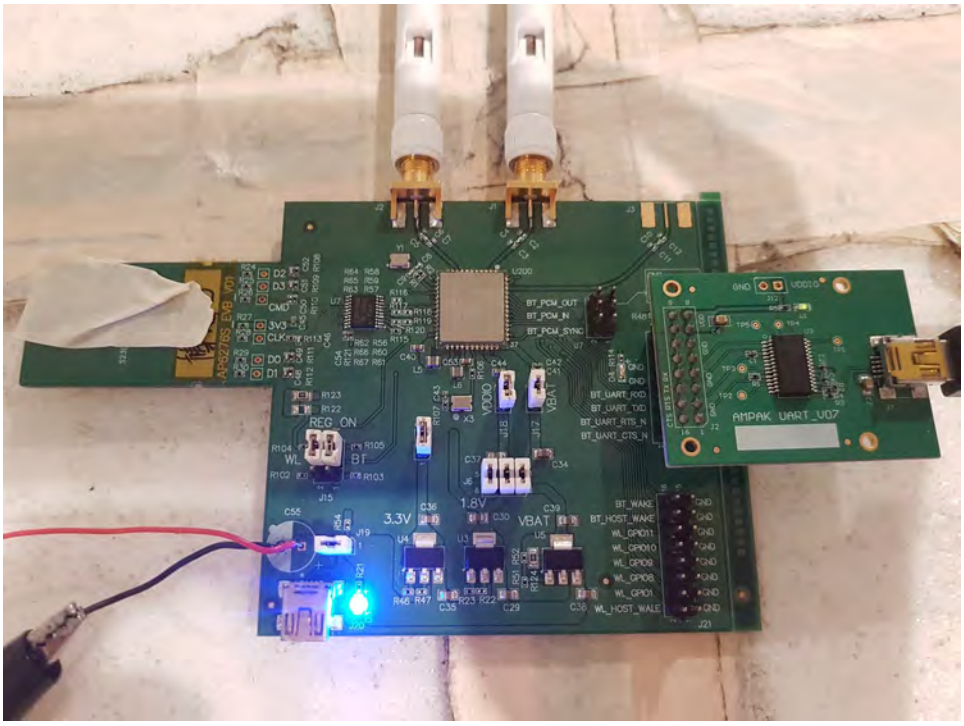
Test Configuration: 30MHz~1GHz / Test mode: Mode 1

FRONT VIEW



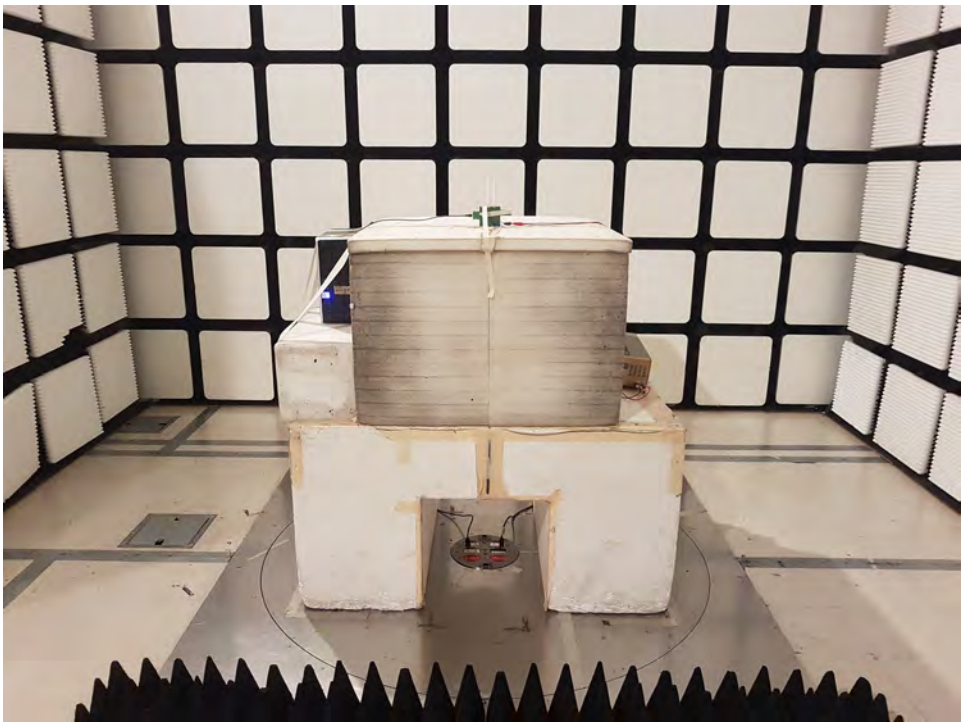
REAR VIEW

CLOSE-UP VIEW

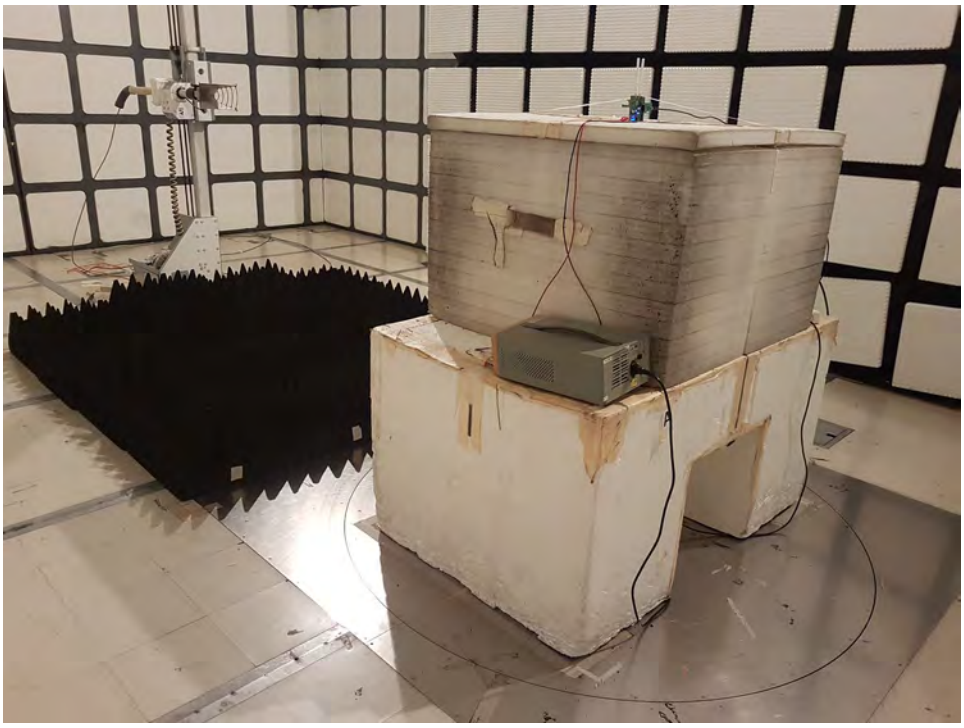


Test Configuration: Above 1GHz

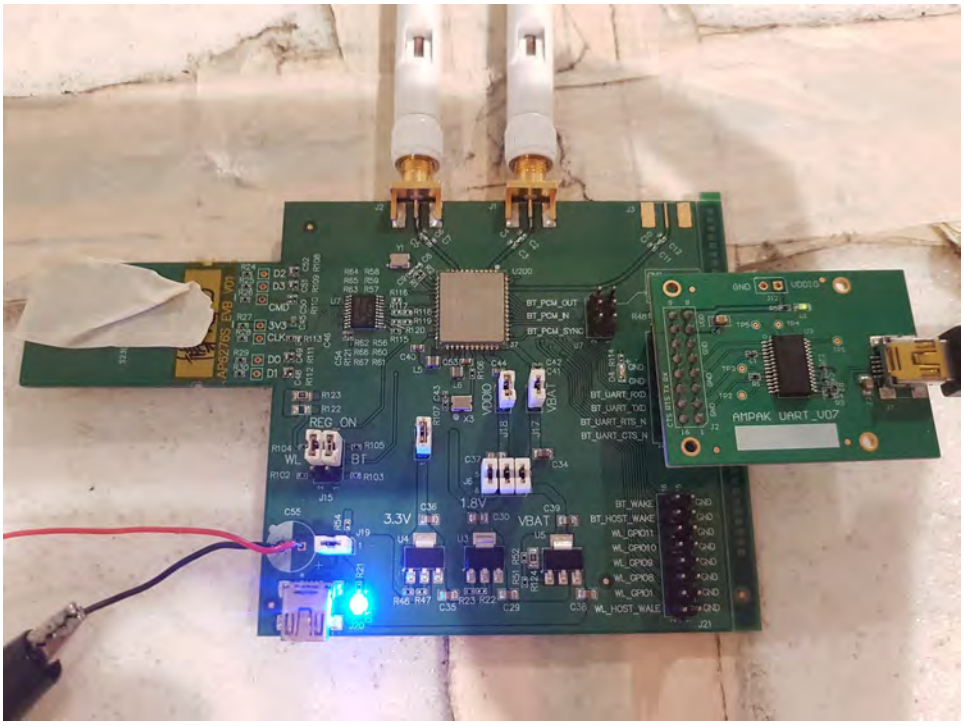
FRONT VIEW



REAR VIEW



CLOSE-UP VIEW



———THE END———