

FCC Radio Test Report

FCC ID : 2AXZJ-CTX0710W3
Equipment : Telematics Control Unit
Brand Name : Lucid USA, Inc
Model Name : P11-K290G0-02
Applicant : Lucid USA, Inc
Lucid Motors, Inc 7373 Gateway Blvd,
Newark, California, United States, 94560
Manufacturer : Lucid USA, Inc
Lucid Motors, Inc 7373 Gateway Blvd,
Newark, California, United States, 94560
Standard : 47 CFR FCC Part 15.407

The product was received on Aug. 05, 2024, and testing was started from Sep. 11, 2024 and completed on Sep. 26, 2024. We, SPORTON INTERNATIONAL INC. Hsinhua 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Jackson Tsai

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History of this test report

Report No.	Version	Description	Issued Date
FR152404-04AN	01	Initial issue of report	Oct. 30, 2024
FR152404-04AN	02	Revised typo (This report is the latest version replacing for the report issued on Oct. 30, 2024.ver.01)	Oct. 30, 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	15.407(a)	Maximum Conducted Output Power	PASS	-
3.2	15.407(b)	Unwanted Emissions	PASS	-

Declaration of Conformity:

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

Comments and explanations:

None

Reviewed by: Ryan Hsiao

Report Producer: Ann Hou

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20), ax (HEW20)	5180-5240	36-48 [4]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40), ax (HEW40)	5190-5230	38-46 [2]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80), ax (HEW80)	5210	42 [1]
5725-5850		5775	155 [1]

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	1TX(Port 2)
5.15-5.25GHz	802.11ax HEW80	80	2TX

Note:

- ♦ 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- ♦ VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- ♦ HEW20, HEW40, HEW80 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- ♦ BWch is the nominal channel bandwidth.
- ♦ Evaluated HEW20/HEW40/HEW80 mode only due to the similar modulation. The power setting of HT20/HT40/VHT20/VHT40/VHT80 mode are the same or lower than HEW20/HEW40/HEW80.

1.1.2 Antenna Information

SKU	Ant.	Brand	Model Name	Antenna Type	Connector	Support
1	1	Amphenol	P11-J67E00-02	FPC	FARKA	2.4G+5G
	2	Amphenol	P11-J67200-02	FPC	FARKA	2.4G+5G
	3	nextium	P11-J44000-00	FPC	FARKA	WWAN 2G/3G/4G
	4	nextium	P11-J44100-00	FPC	FARKA	WWAN 2G/3G/4G
2	5	NMBTC	P21-J29200-01	FPC	FARKA	2.4G+5G
	6	NMBTC	P21-J29300-01	FPC	FARKA	2.4G+5G
	7	NMBTC	P21-J40000-01	FPC	FARKA	WWAN 2G/3G/4G
	8	NMBTC	P21-J40100-01	FPC	FARKA	WWAN 2G/3G/4G

Ant.	Port	2.4G Gain (dBi)						Remark (Note. 1)
		2400	2420	2440	2460	2480	2500	
1	1	3.1	3.0	2.8	2.9	3.0	3.5	w/o cable
		0.6	0.5	0.3	0.4	0.5	1.0	with cable
5	1	2.16	2.16	2.16	2.16	2.16	2.16	w/o cable
		0.36	0.36	0.36	0.36	0.36	0.36	with cable

Ant.	Port	5G Gain (dBi)				Remark (Note. 2)
		5150	5250	5750	5850	
1	1	1.5	2.2	4.1	4.3	w/o cable
		-1.8	-1.1	0.7	0.9	with cable
2	2	1.7	2.3	3.9	4.1	w/o cable
		-1.6	-1.0	0.5	0.7	with cable
5	1	2.87	2.87	2.64	2.64	w/o cable
		0.67	0.67	0.34	0.34	with cable
6	2	2.87	2.87	2.64	2.64	w/o cable
		0.67	0.67	0.34	0.34	with cable

Ant.	Port	WWAN 2G/3G Gain (dBi)					Remark (Note. 3)
		GSM 850	PCS 1900	WCDMA Band 2	WCDMA Band 4	WCDMA Band 5	
3~4	1~2	1.0	4.5	4.5	4.5	1.0	w/o cable
		-0.2	2.7	2.7	2.7	-0.2	with cable
7~8	1~2	0.62	3.85	3.85	3.85	0.62	w/o cable
		-0.88	2.15	2.15	2.15	-0.88	with cable

Ant.	Port	WWAN 4G Gain (dBi)						Remark (Note. 3)
		LTE Band 2	LTE Band 4/66	LTE Band 5	LTE Band 7	LTE Band 12	LTE Band 13	
3~4	1~2	4.5	4.5	1.0	5.7	1.0	1.0	w/o cable
		2.7	2.7	-0.2	2.7	-0.2	-0.2	with cable
7~8	1~2	3.85	3.85	0.62	3.85	0.62	0.62	w/o cable
		2.15	2.15	-0.88	2.05	-0.78	-0.78	with cable

<SKU 1>

Note 1: WLAN 2.4G cable loss = 2.5 dB.

Note 2: WLAN 5GHz Band 1 cable loss = 3.3 dB, and 5GHz Band 4 cable loss = 3.4 dB.

Note 3: WWAN cable loss = 1.2 dB (GSM 850, FDD V, LTE Band 5, 12, 13)

WWAN cable loss = 1.8 dB (PCS 1900, FDD II, FDD IV, LTE Band 2, 4/66)

WWAN cable loss = 3.0 dB (LTE Band 7).

<SKU 2>

Note 4: WLAN 2.4G cable loss = 1.8 dB.

Note 5: WLAN 5GHz Band 1 cable loss = 2.2 dB, and 5GHz Band 4 cable loss = 2.3 dB.

Note 6: WWAN cable loss = 1.4 dB (LTE Band 12, LTE Band 13)

WWAN cable loss = 1.5 dB (GSM 850, FDD V, LTE Band 5)

WWAN cable loss = 1.7 dB (PCS 1900, FDD II, FDD IV, LTE Band 2, LTE Band 4/66)

WWAN cable loss = 1.8 dB (LTE Band 7).

Note 7: The EUT has four TX antenna (2 sets).

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (1TX/1RX)

Ant. 1 (port 1) or Ant. 5 (port 1) could transmit/receive.

For 5GHz function:

For IEEE 802.11 a mode (1TX/1RX)

Support diversity function and pre-tested on each single chain, the worst case was Ant. 2(port 2), Ant. 6(port 2) and it was recored in this test report.

For IEEE 802.11 n/ac/ax mode (2TX/2RX)

Ant. 1 (port 1), Ant. 2 (port 2) or Ant. 5 (port 1), Ant. 6 (port 2) could transmit/receive simultaneously.

For WWAN 2G function (1TX/1RX):

Ant. 3 (port 1) or Ant. 7 (port 1) could transmit/receive.

For WWAN 3G/4G function (1TX/2RX):

Ant. 3 (port 1) or Ant. 7 (port 1) could transmit, and Ant. 3 (port 1), Ant. 4 (port 2) or Ant. 7 (port 1), Ant. 8 (port 2) could receive simultaneously.

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From DC Power supply		
EUT Function	☒	Outdoor AP	☐ Indoor AP
	☐	Fixed P2P AP	☐ Client
Beamforming Function	☐	With beamforming	☒ Without beamforming
Resource Unit	☒	Full RU	☐ Partial RU
	☐	MRU(static preamble puncturing)	☐ MRU(dynamic preamble puncturing)
Type of EUT			
☒	Stand-alone		
☐	Combined (EUT where the radio part is fully integrated within another device)		
	Combined Equipment - Brand Name / Model No.:		...
☐	Plug-in radio (EUT intended for a variety of host systems)		
	Host System - Brand Name / Model No.:		
☐	Other:		

1.1.4 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR152404-03AN
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding new second source for WiFi and WWAN and GNSS antenna. 2. Adding below EMI components for second source: DDR4, eMMC, Reset IC, Common choke, diode, clock IC(Non-RF), and PMIC.	Maximum Conducted Output Power and Radiated Spurious Emission for above 1G were evaluated.

1.1.5 Table for Multiple Listing

Component	Original component	2nd source component	BOM. Qty
WiFi antenna	Amphenol,P11-J67E00-02, WiFi LH	NMBTC,P21-J29200-01, WiFi LH	1
WiFi antenna	Amphenol,P11-J67200-02, WiFi RH	NMBTC,P21-J29300-01,WiFi RH	1
LTE antenna	nextium, P11-J44000-00, LTE LH	NMBTC,P21-J40000-01, LTE LH	1
LTE antenna	nextium, P11-J44100-00, LTE RH	NMBTC,P21-J40100-01, LTE RH	1
GNSS antenna	Amphenol, P11-J67B00-01	Amphenol, P21-J8500-00	1
DDR4	DDR4,SMD,MT40A1G8SA-062EAAT:E,F BGA 78,8Gbit,1024M*8bit,3200MT/S,2.5V,MICRON,RoHS,AEC-Q100	DDR4,SMD,MT40A1G8AG-062EAAT:R,F BGA 78,8Gbit,1024M*8bit,3200MT/S,2.5V,(fck=1600MHz),MICRON,RoHS,AEC-Q100	5
eMMC	eMMC NAND Flash (TLC),SMD,MTFC64GAZAQHD-AAT,VFB GA153,64GB,200MHz,1.8/3.3V,MICRON,RoHS,AEC-Q100	eMMC NAND Flash (TLC),SMD,MTFC64GBCAQTC-AAT,LFB GA153,64GB,200MHz,1.8/3.3V,MICRON,RoHS,AEC-Q100	1
Reset IC	IC_RESET,SMD,SGM803-RXN3L/TR,SO T23-3,Vreset=2.63V,SGMICRO,RoHS	IC_RESET,SMD,SGM803B-RXN3LG/TR, SOT23-3,Vreset=2.63V,SGMICRO,RoHS	1
Common Choke	Common Choke,SMD,ACT1210G-800-2P-TL05,-,80uH,+50%-30%,70mA,2.4Ω,TDK,RoHS,AEC-Q200	Common Choke,SMD,ACT1210G-800-2P-TL10,-,80uH,+50%-30%,70mA,2.6Ω,TDK,HF;RoHS,AEC-Q200	1
Diode	Diode(standard),SMD,RR2LAM6STFTR, SODJ128-2,Vrrm/Vz=600V,If=2A,ROHM,RoHS,AEC-Q101	Diode(standard),SMD,GS2JAF-C-AU_R1_000A1,SMAF-C2,Vrrm/Vz=600V,If=2A,P ANJIT,HF;RoHS,AEC-Q101	3
Clock IC	IC_Clock Gen.,SMD,5P49V60A503NLG28,VFQFP N24,1.71~3.465V,IDT,RoHS,AEC-Q100	IC_Clock Gen.,SMD,5P49V60B503NLG28,VFQFP N24,1.71~3.465V,RENESAS,RoHS,AEC-Q100	1
PMIC	IC Power Manage,SMD,MC33PF8200CXES,HVQFN56,DC,2.7~5.5V,2.5A,NXP(PHILIPS),RoHS,AEC-Q100	IC Power Manage,SMD,MC33PF8200A0ES,HVQFN56,DC,2.7~5.5V,2.5A,NXP(PHILIPS),RoHS,AEC-Q100	1

1.2 Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013
- ♦ KDB 789033 D02 v02r01

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

- ♦ KDB 662911 D01 v02r01
- ♦ KDB 414788 D01 v01r01

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH07-HY	Xun Hsieh	23.5~23.9°C / 55~58%	11/Sep/2024
Radiated	03CH02-HY	Simon Cheng	22.1~23.1°C / 51~53%	26/Sep/2024
Radiated (Co-location)	03CH02-HY	Simon Cheng	22.1~23.1°C / 51~53%	17/Sep/2024
☐ Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		FAX: 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				

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
Maximum Conducted Output Power	2 dB	Confidence levels of 95%
Unwanted Emissions	4.8 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Test Software Version	PutTY Release 0.72
Mode	Power Setting
802.11a_Nss1,(6Mbps)_1TX(Port2)	-
5180MHz	20
5200MHz	22
5240MHz	20.5
802.11ax HEW80_Nss1,(MCS0)_2TX	-
5210MHz	14

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Maximum Conducted Output Power
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Unwanted Emissions
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode > 1GHz	CTX
1	DC Power Supply mode
Orthogonal Planes of EUT	Z Plane
	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	CTX
1	WLAN 2.4G +WWAN
2	WLAN 5G + WWAN
Refer to Sporton Test Report No.: FA152404-04 for Co-location RF Exposure Evaluation and Appendix C for Radiated Emission Co-location.	

2.3 Accessories

Accessories		
DC Power Cable	Signal Line	2.0 meter, non-shielded cable, w/o ferrite core
APTIV Cable	Signal Line	2.0 meter, shielded cable, w/o ferrite core
Antenna Cable 1 (WiFi*2)	Signal Line	2.5 meter, shielded cable, w/o ferrite core
Antenna Cable 2 (WiFi*2)	Signal Line	1.0 meter, shielded cable, w/o ferrite core
Antenna Cable 1 (LTE L & R)	Signal Line	2.5 meter, shielded cable, w/o ferrite core
Antenna Cable 2 (LTE*2)	Signal Line	1.0 meter, shielded cable, w/o ferrite core
GPS Cable 1	Signal Line	2.0 meter, shielded cable, w/o ferrite core
GPS Cable 2	Signal Line	3.0 meter, shielded cable, w/o ferrite core

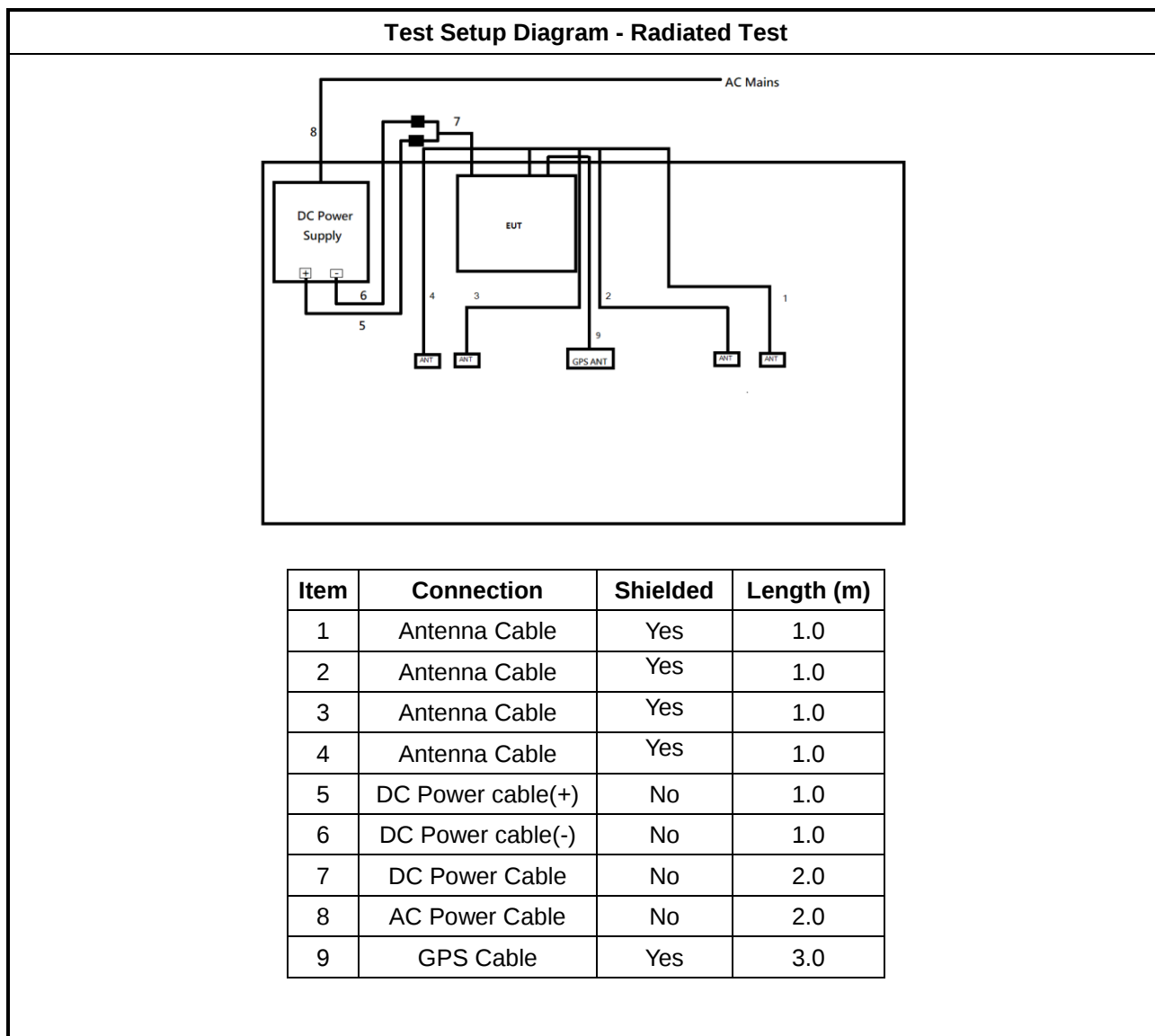
Reminder: Regarding to more detail and other information, please refer to user manual.

2.4 Support Equipment

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	DC power supply	GW	GPS-3030DD	-	-
2	DC Power cable(+)	MiSUMi	WTN1229-RAD	-	-
3	DC Power cable(-)	MiSUMi	WTN1229-BLACK	-	-

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 Maximum Conducted Output Power

3.1.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
UNII Devices	
☒ For the 5.15-5.25 GHz band:	
☐	Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$. e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]
☐	Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
☐	Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed 1 W. If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$.
☐	Mobile or Portable Client: the maximum conducted output power (P_{Out}) shall not exceed 250 mW. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$.
☐ For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$.	
☐ For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$.	
☒ For the 5.725-5.85 GHz band:	
☐	Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$.
☐	Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed 1 W.
P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

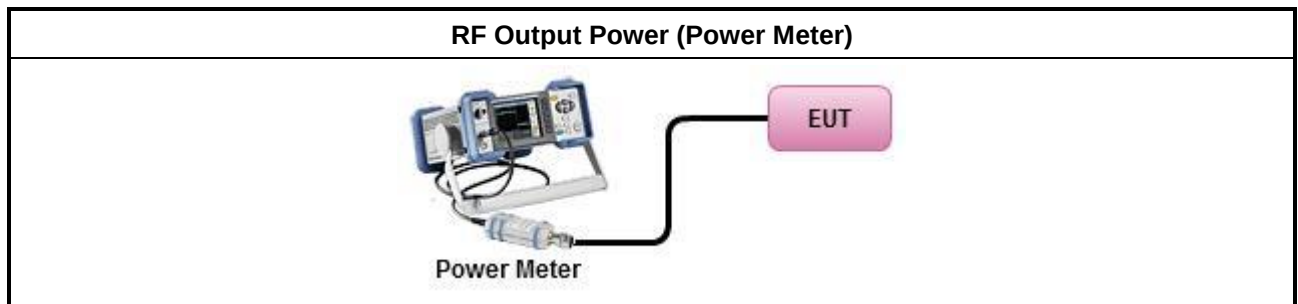
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
Maximum Conducted Output Power	
	Duty cycle $\geq 98\%$
☐	Refer as KDB 789033, clause E Method SA-2 (spectral trace averaging).
	Duty cycle $< 98\%$
☐	Refer as KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
☒	Refer as KDB 789033, clause E Method PM (using an RF average power meter).
For conducted measurement.	
	If the EUT supports multiple transmit chains using options given below: Refer as 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: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Refer as Appendix A

3.2 Unwanted Emissions

3.2.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.85 GHz	5.650-5700 GHz: e.i.r.p. -27 ~ 10 dBm [68.2 ~ 105.2 dBuV/m@3m] 5.700-5720 GHz: e.i.r.p. 10 ~ 15.6 dBm [105.2 ~ 110.8 dBuV/m@3m] 5.720-5725 GHz: e.i.r.p. 15.6 ~ 27 dBm [110.8 ~ 122.2 dBuV/m@3m] 5.850-5.855 GHz: e.i.r.p. 27 ~ 15.6 dBm [122.2 ~ 110.8 dBuV/m@3m] 5.855-5.875 GHz: e.i.r.p. 15.6 ~ 10 dBm [110.8 ~ 105.2 dBuV/m@3m] 5.875-5.925 GHz: e.i.r.p. 10 ~ -27 dBm [105.2 ~ 68.2dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

Note 1: 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).

3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

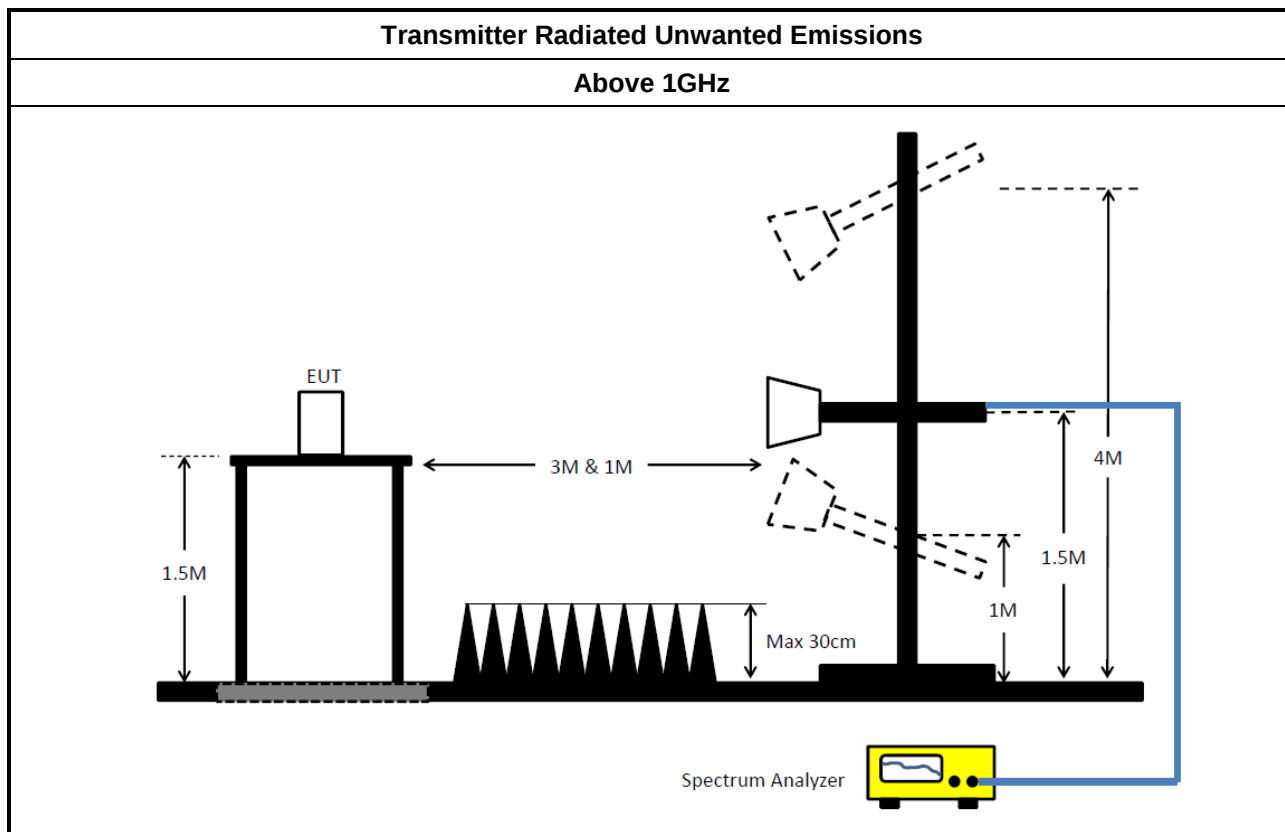
Test Method	
Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. 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).	
The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].	
For the transmitter unwanted emissions shall be measured using following options below:	
	Refer as KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.
	Refer as KDB 789033, clause G)1) for unwanted emissions into restricted bands.
	☒ Refer as KDB 789033, G)6) Method VB (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW.
	☒ Refer as KDB 789033, clause G)5) (ANSI C63.10, clause 4.1.4.2.2), measurement procedure peak limit.
For radiated measurement.	
	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
The any unwanted emissions level shall not exceed the fundamental emission level.	
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.	
Use the following spectrum analyzer settings:	
	Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
	Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.
KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.	
	Based on FCC 15.31(f)(2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

3.2.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.2.5 Test Setup



3.2.6 Test Result of Transmitter Unwanted Emissions

Refer as Appendix B



4 Test Equipment and Calibration Data

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101515	9kHz~40GHz	02/Feb/2024	01/Feb/2025
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	20/Oct/2023	19/Oct/2024
Power Meter	Anritsu	ML2495A	1517010	300MHz~40GHz	15/Dec/2023	14/Dec/2024
Pulse Sensor	Anritsu	MA2411B	1339407	300MHz~40GHz	15/Dec/2023	14/Dec/2024
SENSE-15407_NII	Sporton	V5.11.20	N/A	N/A	N/A	N/A

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz~18GHz 3m	14/Jul/2024	13/Jul/2025
Signal Analyzer	R&S	FSP 40	100593	9kHz~40GHz	11/Mar/2024	10/Mar/2025
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1534	1GHz~18GHz	21/Mar/2024	20/Mar/2025
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170154	18GHz~40GHz	04/Jun/2024	03/Jun/2025
RF Cable-R03m	HUBER+SUHNER	SUCOFLEX 104	03CH02-cable-01	1GHz~40GHz	15/Feb/2024	14/Feb/2025
Amplifier	EM	EM01G18G	060870	1GHz~18GHz	12/Aug/2024	11/Aug/2025
Microwave Preamplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~40GHz	19/Apr/2024	18/Apr/2025
SENSE-15407-NII	Sporton	V5.11.20	N/A	NA	N/A	NA



Average Power

Appendix A

Summary

Mode	Total Power (dBm)	Total Power (W)	EIRP (dBm)	EIRP (W)
5.15-5.25GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX(Port2)	16.98	0.04989	17.65	0.05821
802.11ax HEW80_Nss1,(MCS0)_2TX	11.83	0.01524	12.50	0.01778



Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11a_Nss1,(6Mbps)_1TX(Port2)	-	-	-	-	-	-	-	-
5180MHz	Pass	0.67	-	15.10	15.10	30.00	15.77	36.00
5200MHz	Pass	0.67	-	16.98	16.98	30.00	17.65	36.00
5240MHz	Pass	0.67	-	16.10	16.10	30.00	16.77	36.00
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	0.67	8.21	9.35	11.83	30.00	12.50	36.00

DG = Directional Gain; Port X = Port X output power
Inf = There's no restriction for the limit.



Summary

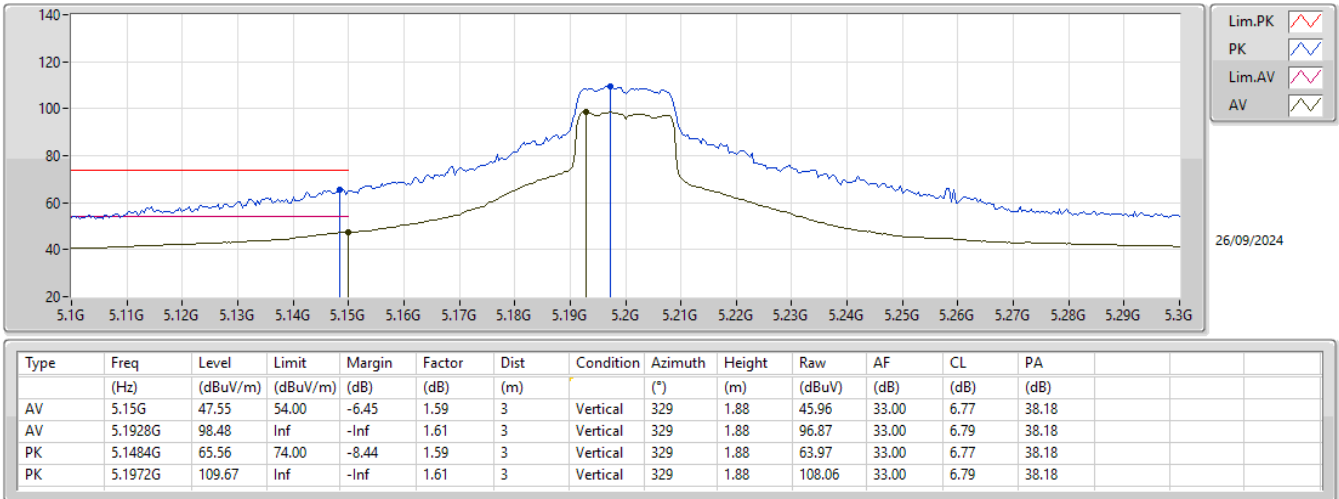
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX(Port2)	Pass	AV	5.15G	47.55	54.00	-6.45	3	Vertical	329	1.88

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
802.11a_Nss1,(6Mbps)_1TX(Port2)	-	-	-	-	-	-	-	-	-	-
5200MHz	Pass	AV	5.15G	47.55	54.00	-6.45	3	Vertical	329	1.88
5200MHz	Pass	AV	5.1928G	98.48	Inf	-Inf	3	Vertical	329	1.88
5200MHz	Pass	PK	5.1484G	65.56	74.00	-8.44	3	Vertical	329	1.88
5200MHz	Pass	PK	5.1972G	109.67	Inf	-Inf	3	Vertical	329	1.88
5200MHz	Pass	AV	5.15G	46.66	54.00	-7.34	3	Horizontal	190	1.50
5200MHz	Pass	AV	5.1928G	97.25	Inf	-Inf	3	Horizontal	190	1.50
5200MHz	Pass	PK	5.1488G	65.13	74.00	-8.87	3	Horizontal	190	1.50
5200MHz	Pass	PK	5.1968G	108.97	Inf	-Inf	3	Horizontal	190	1.50
5200MHz	Pass	AV	15.59352G	34.98	54.00	-19.02	3	Vertical	231	1.50
5200MHz	Pass	PK	10.39952G	57.49	68.20	-10.71	3	Vertical	220	1.33
5200MHz	Pass	PK	15.60552G	49.47	74.00	-24.53	3	Vertical	231	1.50
5200MHz	Pass	AV	15.595G	34.15	54.00	-19.85	3	Horizontal	199	2.91
5200MHz	Pass	PK	10.3996G	56.84	68.20	-11.36	3	Horizontal	208	1.50
5200MHz	Pass	PK	15.60342G	48.13	74.00	-25.87	3	Horizontal	199	2.91

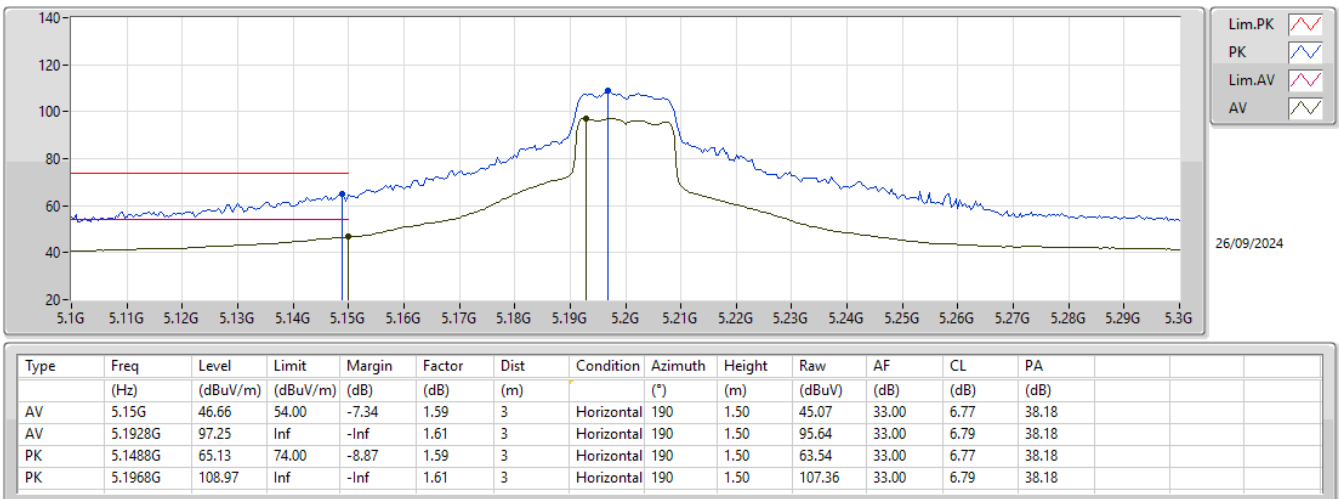
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5200MHz_TX



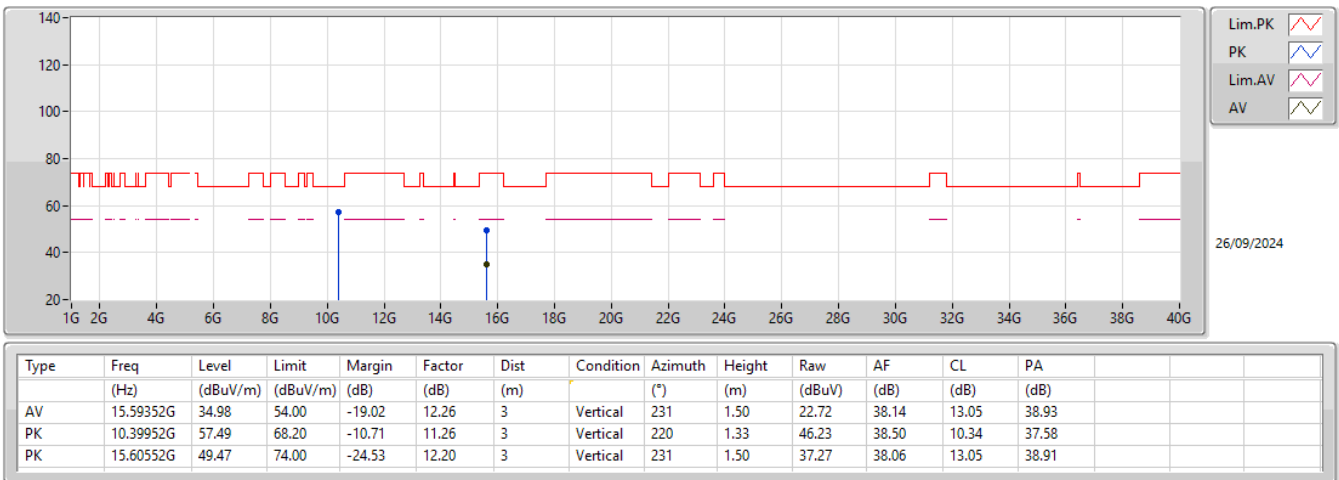
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5200MHz_TX



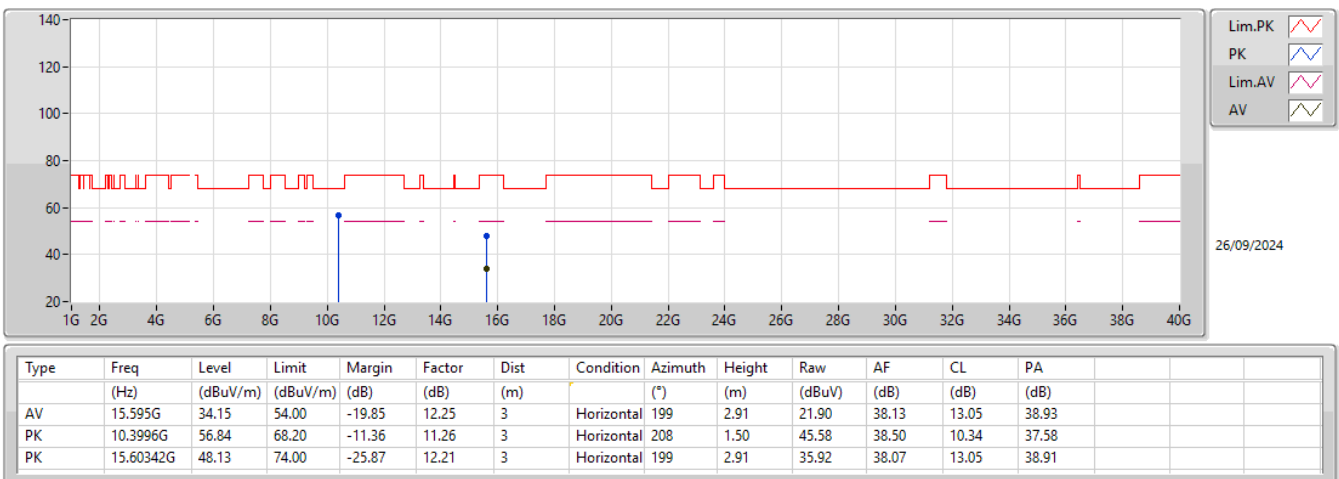
5.15-5.25GHz_802.11a_Nss1,(6Mbps)_1TX(Port2)

5200MHz_TX



5.15-5.25GHz_802.11a_Nss1,(6Mbps)_1TX(Port2)

5200MHz_TX





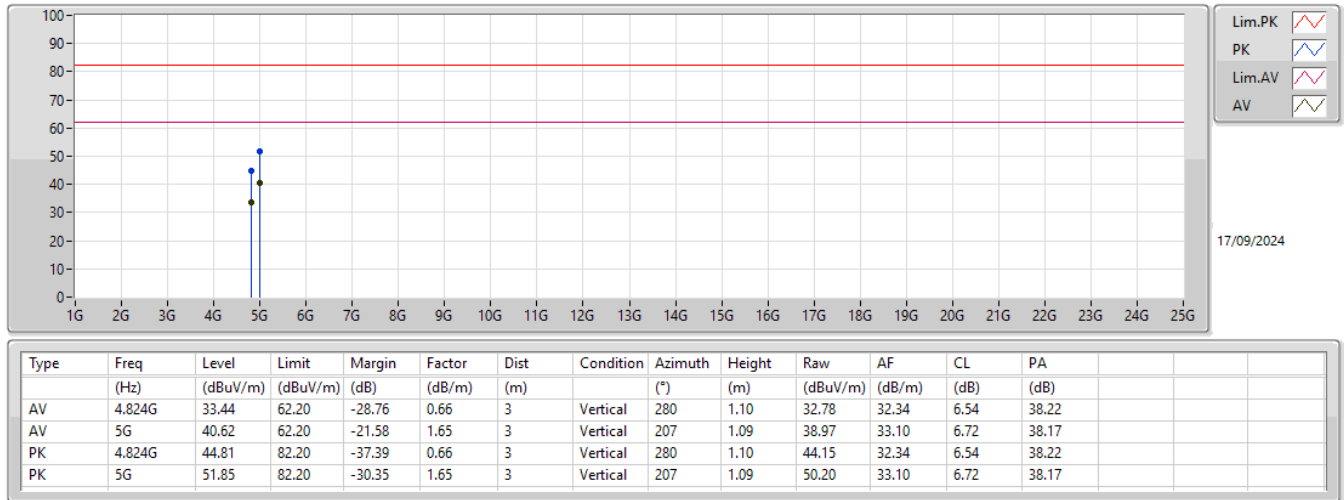
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	5G	40.62	62.20	-21.58	Vertical
Mode 2	Pass	AV	11.54055G	43.37	62.20	-18.83	Vertical

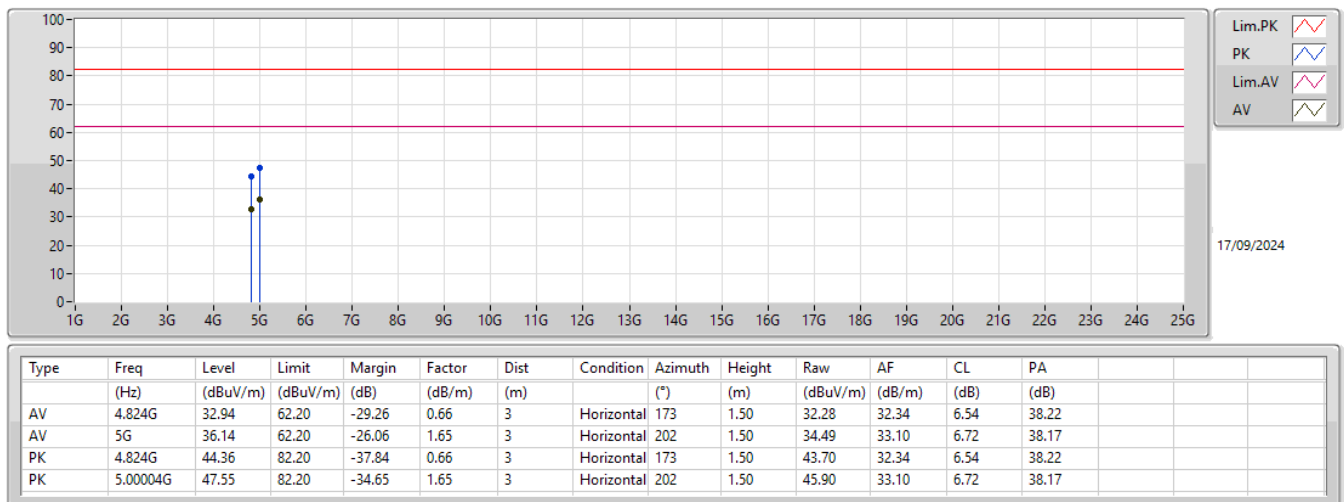
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Mode 1	Pass	AV	4.824G	33.44	62.20	-28.76	3	Vertical	280	1.10
Mode 1	Pass	AV	5G	40.62	62.20	-21.58	3	Vertical	207	1.09
Mode 1	Pass	PK	4.824G	44.81	82.20	-37.39	3	Vertical	280	1.10
Mode 1	Pass	PK	5G	51.85	82.20	-30.35	3	Vertical	207	1.09
Mode 1	Pass	AV	4.824G	32.94	62.20	-29.26	3	Horizontal	173	1.50
Mode 1	Pass	AV	5G	36.14	62.20	-26.06	3	Horizontal	202	1.50
Mode 1	Pass	PK	4.824G	44.36	82.20	-37.84	3	Horizontal	173	1.50
Mode 1	Pass	PK	5.00004G	47.55	82.20	-34.65	3	Horizontal	202	1.50
Mode 2	Pass	AV	5G	40.51	62.20	-21.69	3	Vertical	201	1.18
Mode 2	Pass	AV	11.54055G	43.37	62.20	-18.83	3	Vertical	184	1.95
Mode 2	Pass	PK	5G	52.05	82.20	-30.15	3	Vertical	201	1.18
Mode 2	Pass	PK	11.54062G	54.84	82.20	-27.36	3	Vertical	184	1.95
Mode 2	Pass	AV	5G	37.44	62.20	-24.76	3	Horizontal	204	1.50
Mode 2	Pass	AV	11.5489G	43.15	62.20	-19.05	3	Horizontal	195	1.00
Mode 2	Pass	PK	5.00013G	48.95	82.20	-33.25	3	Horizontal	204	1.50
Mode 2	Pass	PK	11.5496G	54.76	82.20	-27.44	3	Horizontal	195	1.00

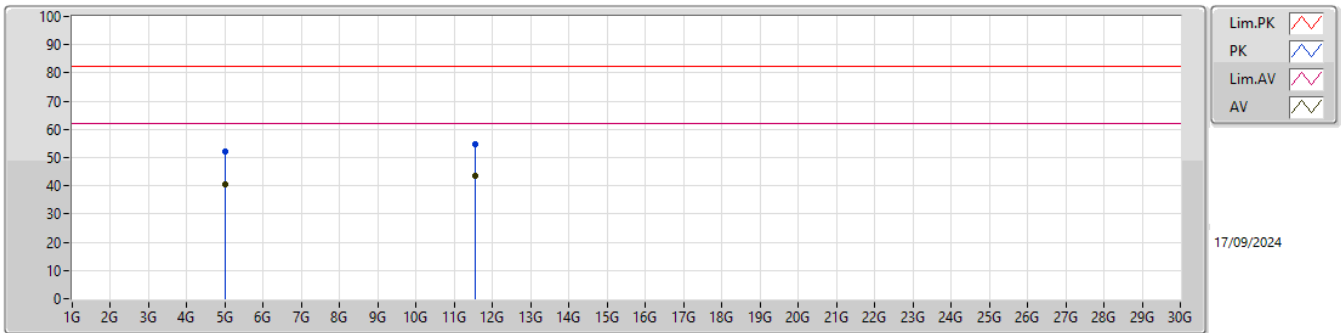
Radiated Emissions above 1GHz_Mode 1



Radiated Emissions above 1GHz_Mode 1

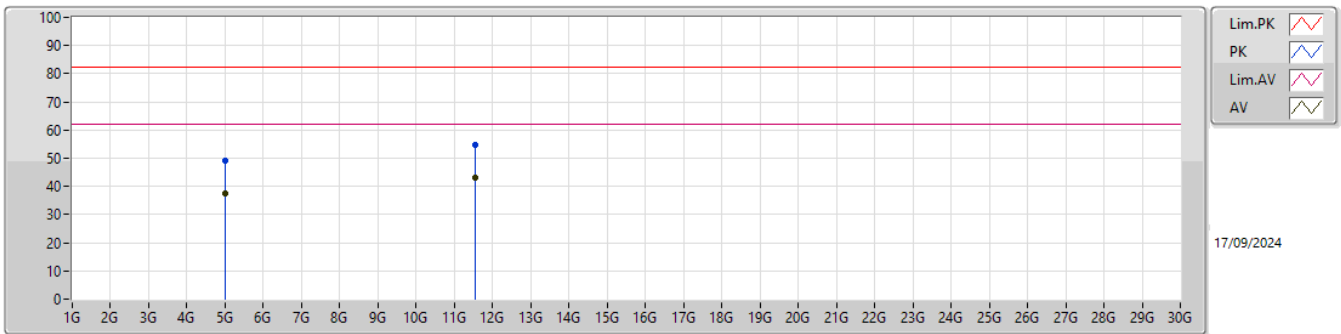


Radiated Emissions above 1GHz_Mode 2



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
AV	5G	40.51	62.20	-21.69	1.65	3	Vertical	201	1.18	38.86	33.10	6.72	38.17
AV	11.54055G	43.37	62.20	-18.83	11.49	3	Vertical	184	1.95	31.88	38.62	10.60	37.73
PK	5G	52.05	82.20	-30.15	1.65	3	Vertical	201	1.18	50.40	33.10	6.72	38.17
PK	11.54062G	54.84	82.20	-27.36	11.49	3	Vertical	184	1.95	43.35	38.62	10.60	37.73

Radiated Emissions above 1GHz_Mode 2



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
AV	5G	37.44	62.20	-24.76	1.65	3	Horizontal	204	1.50	35.79	33.10	6.72	38.17
AV	11.5489G	43.15	62.20	-19.05	11.47	3	Horizontal	195	1.00	31.68	38.60	10.61	37.74
PK	5.00013G	48.95	82.20	-33.25	1.65	3	Horizontal	204	1.50	47.30	33.10	6.72	38.17
PK	11.5496G	54.76	82.20	-27.44	11.47	3	Horizontal	195	1.00	43.29	38.60	10.61	37.74