



Test report No:
2590822R.702B

FCC TEST REPORT

Product Name	Barcode Scanner
Model and /or type reference	1972
Trademark	Honeywell
FCC ID	HD5-1972
Applicant's name / address	HONEYWELL INTERNATIONAL INC 9680 OLD BAILES RD FORT MILL SC 29707.USA
Test method requested, standard	47 CFR FCC Part 15 (Section 15.247) ANSI C63.10: 2020
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Jun Xu/ Project Engineer 
Approved by (name / position & signature)	Frank He/Technical Manager 
Date of issue	2025-12-23
Report Version	V1.1
Report template No	Template_FCC Part 15C-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Sep. 28, 2025
Date (start test)	Oct. 09, 2025
Date (finish test)	Oct. 26, 2025

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2590822R.702B	V1.0	Initial issue of report.	2025-11-24
2590822R.702B	V1.1	Page10 modified the antenna gain. (Test report 2590822R.702B V1.1 replaces test report 2590822R.702B V1.0, and test report 2590822R.702B V1.0 is invalid.)	2025-12-23

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with 47 CFR FCC Part 15 (Section 15.247).
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Channel List.

USED EQUIPMENT

Conducted Test/ TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
Wireless Connectivity Tester	R&S	CMW 270	102593	2025.05.10	2026.05.09	V 4.0.60	N/A
Coaxial Cable	N/A	N/A	2477	2025.06.10	2026.06.09	N/A	N/A
Coaxial Cable	N/A	N/A	2478	2025.06.10	2026.06.09	N/A	N/A
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2025.03.16	2026.03.15	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF07	2025.06.17	2026.06.16	N/A	N/A
Test system							
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
Spectrum Analyzer	Agilent	N9010A	MY48030494	2025.09.20	2026.09.19	A.14.03	N/A
RF Control Unit	Tonscend	JS0806-2	22G8060594	2025.01.26	2026.01.25	N/A	N/A
Vector Signal Genertor	R&S	SMM 100A	101853	2025.09.20	2026.09.19	5.00.166.23	N/A
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2025.05.10	2026.05.09	B.01.95	N/A
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A	N/A	V3.0.22

Radiated Emission(9KHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Versiom	Software version
EMI Test Receiver	R&S	ESCI	100573	2025.01.11	2026.01.10	4.42 SP3	N/A
Loop Antenna	R&S	HFH2-Z2E	101149	2025.04.16	2026.04.15	N/A	N/A
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2025.03.24	2026.03.23	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2025.06.17	2026.06.16	N/A	N/A
Coaxial Cable	Huber+Suhner	RTS-1909	THM-021	2025.04.30	2026.04.29	N/A	N/A
Anechoic chamber	Quietek	9m*6m*6m	AC2	2024.07.07	2029.07.06	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

Radiated Emission (1GHz-40GHz) / AC6

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Version	Software version
Signal analyzer	Agilent	N9020A	MY49100159	2025.05.10	2026.05.09	A 08.54	N/A
Power Amplifier	MVE	MPC1018.50	C30002D	2025.05.17	2026.05.16	N/A	N/A
DRG Horn Antenna	RFSPIN	DRH18-E	CE2C07A18EN	2024.12.07	2025.12.06	N/A	N/A
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	750	2024.11.24	2025.11.23	N/A	N/A
Pre-Amplifier	Schwarzbeck	BBV 9721	00114	2025.05.17	2026.05.16	N/A	N/A
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9168	1231	2025.05.28	2026.05.27	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF04	2025.06.17	2026.06.16	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2025.06.17	2026.06.16	N/A	N/A
Anechoic chamber	Quietek	9m*5.5m*5.5m	AC6	2024.06.30	2029.06.29	N/A	N/A
Test Software	Tonscend	JS36	JS36-RSE	N/A	N/A	N/A	5.0.0

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95% .

Test item Test Location	Uncertainty
AC Power Line Conducted Emission	± 2.92 dB
Peak Power Output	± 1.13 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 4.60 dB 200MHz~1GHz: 4.10 dB Vertical: 30MHz~200MHz: 4.80 dB 200MHz~1GHz: 4.10 dB
Radiated Emission(1GHz~40GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~40GHz: 4.70 dB Vertical: 18GHz~40GHz: 4.60 dB
RF antenna conducted test	± 1.13 dB
Radiated Emission Band Edge	± 5.00 dB
DTS Bandwidth	± 279 Hz
Occupied Bandwidth	± 279 Hz
Power Density	± 1.13 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name:	Barcode Scanner					
Model Name:	1972					
Trademark.:	Honeywell					
FCC ID:	HD5-1972					
Power Supply:	3.635Vdc					
Hardware Version:	N/A					
Software Version:	N/A					
Manufacturer:	HONEYWELL INTERNATIONAL INC					
Manufacturer Address:	9680 OLD BAILES RD FORT MILL SC 29707.USA					
Test Matrix/ IMEI:	RF Conducted	#1				
	RSE	#2				
Wireless specification:	Bluetooth (LE)					
Operating frequency range(s):	2402~2480MHz					
Type of Modulation:	GFSK					
PHYs:	☒	LE 1M	☐	LE 2M	☐	LE Coded S=2/8
Data Rate:	☒	1Mbit/s	☐	2Mbit/s	☐	500/125 Kbit/s
Antenna Type:	Chip Antenna					
Antenna Gain:	1.66dBi					

Remark:

As above information is provided and confirmed by the applicant. DEKRA is not liable to the accuracy, suitability, reliability or/and integrity of the information.

1.2 Channel List

Bluetooth Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	2480 MHz

Note: The General Description of the Item, Channel List in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Auxiliary equipment /Accessories/Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) N/A	N/A	N/A	N/A
(2) N/A	N/A	N/A	N/A
(3) N/A	N/A	N/A	N/A
software	Type / Version		
N/A	N/A		

2.2 Power setting in test

Mode	Channel	Frequency (MHz)	Power setting
LE_1M	00	2402	default
	19	2440	default
	39	2480	default

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
CFR 47, FCC Part 15 C	2024	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Requirement – Test Item of FCC	Standard(s)	Verdict	Remark
DTS Bandwidth	FCC 15.247(a)(2)	PASS	Test data please refer to Appendix A
Maximum conducted output power	15.247 (b)(3)	PASS	Test data please refer to Appendix B
Maximum power spectral density	FCC 15.247(e)	PASS	Test data please refer to Appendix C
Band edge measurements	FCC 15.247(d) FCC 15.205 FCC 15.209	PASS	Test data please refer to Appendix D
Conducted Spurious Emission	FCC 15.247(d), FCC 15.209	PASS	Test data please refer to Appendix E
Duty cycle	ANSI C63.10:2020	PASS	Test data please refer to Appendix F
Emissions in Restricted Bands	FCC 15.205 FCC 15.209	PASS	Test data please refer to Appendix G
AC Power Line Conducted Emission	FCC 15.207	N/A	Not applicable, EUT is battery operated.
Antenna Requirement	FCC 15.203	PASS	---
Note: The radiation measurement is pre tested under X, Y, and Z axis positioning to find the worst placement for final testing.			

3.4 Test Facility

Tset Location : FCC Designation Number: CN1199

4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

4.1 DTS Bandwidth

VERDICT: PASS

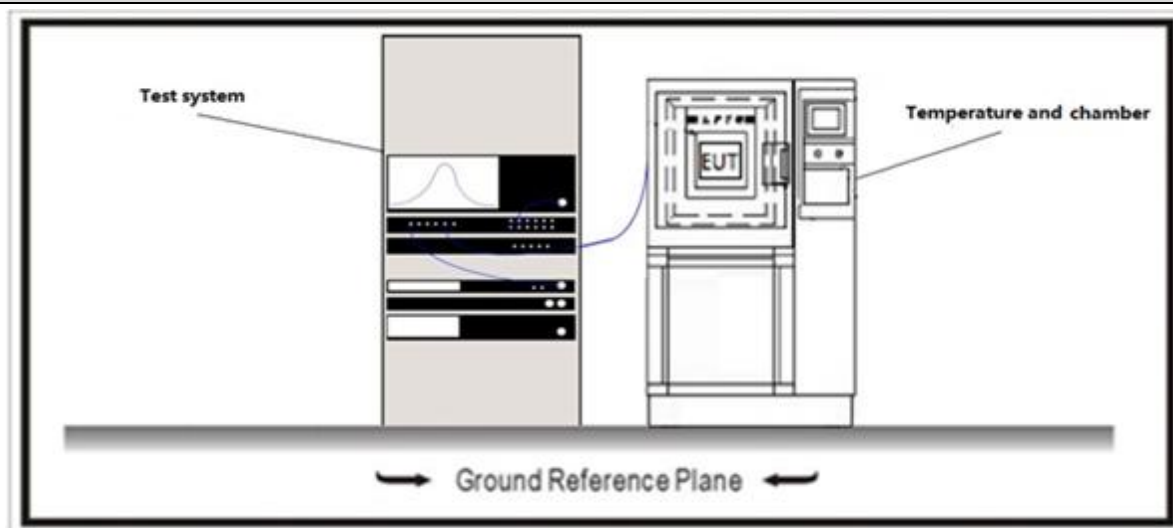
4.1.1 Limit

Standard

FCC Part 15 Subpart C Paragraph 15.247 (a)(2);

Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

4.1.2 Test Setup



4.1.3 Test Procedure

	Reference Rule	Chapter	Description
☒	ANSI C63.10	11.8	DTS bandwidth
☐	ANSI C63.10	11.8.1	Option 1
☒	ANSI C63.10	11.8.2	Option 2

4.2 Occupied Channel Bandwidth

VERDICT: PASS

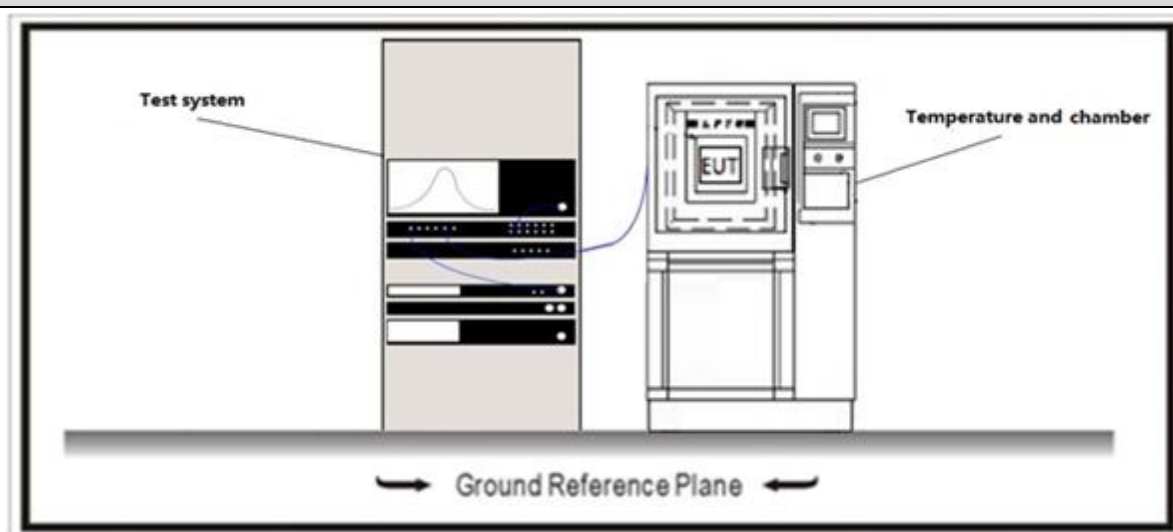
4.2.1 Limit

Standard

RSS-Gen Issue 5 Paragraph 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs

4.2.2 Test Setup



4.2.3 Test Procedure

	Reference Rule	Chapter	Description
☒	ANSI C63.10	6.9	Occupied bandwidth tests
☐	ANSI C63.10	6.9.2	Option 1
☒	ANSI C63.10	6.9.3	Option 2

4.3 Maximum Conducted Output Power

VERDICT: PASS

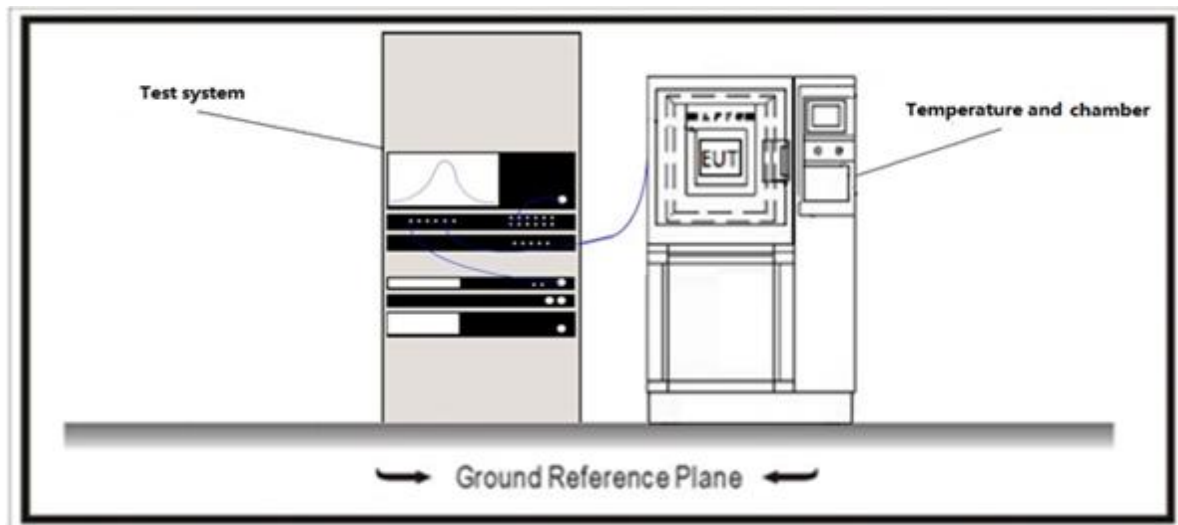
4.3.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247 (b)(3);
☒	GTX < 6dBi	Pout ≤ 30dBm
☐	GTX > 6dBi	
☐	Non-Fix point-point	Pout ≤ 30 - (GTX - 6)
☐	Fix point-point	Pout ≤ 30 - [(GTX - 6)]/3
☐	Point-to-multipoint	Pout ≤ 30 - (GTX - 6)
☐	Overlap Beams	Pout ≤ 30 - [(GTX - 6)]/3
☐	Aggregate power transmitted simultaneously on all beams	Pout ≤ 30 - [(GTX - 6)]/3
☐	single directional beam	Pout ≤ 30 - [(GTX - 6)]/3 + 8dB

Note 1 : GTX directional gain of transmitting antennas.

Note 2 : Pout is maximum peak conducted output power .

4.3.2 Test Setup



4.3.3 Test Procedure

	References Rule			Chapter	Description		
☒	ANSI C63.10			11.9	Fundamental emission output power		
	☒	ANSI C63.10			11.9.1	Maximum peak conducted output power	
		☐	ANSI C63.10	11.9.1.1	RBW ≥ DTS bandwidth		
		☐	ANSI C63.10	11.9.1.2	Integrated band power method		
		☐	ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method		
	☐	ANSI C63.10			11.9.2	Maximum conducted (average) output power	
		☐	ANSI C63.10			11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle ≥98%)	
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle ≥98%)	
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle ≤98%)	
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle ≤98%)	
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3	
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A	
		☐	ANSI C63.10			11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10	11.9.2.3.1	Method AVGPM	
			☐	ANSI C63.10	11.9.2.3.2	Method AVGPM-G	

4.4 Maximum Power Spectral Density

VERDICT: PASS

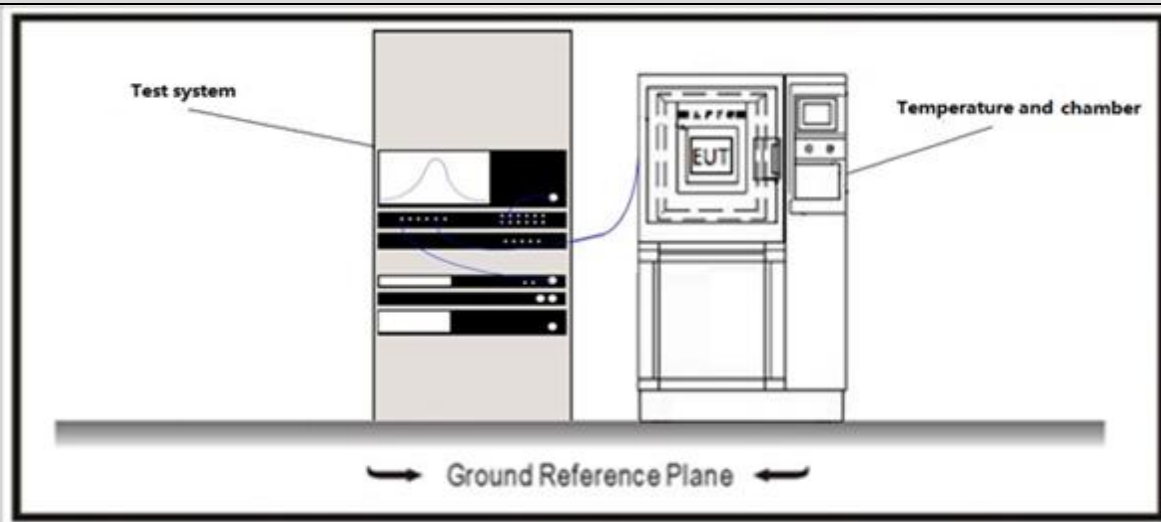
4.4.1 Limit

Standard

FCC Part 15 Subpart C Paragraph 15.247 (b)(3);

Power Spectral Density $\leq 8\text{dBm}/3\text{kHz}$

4.4.2 Test Setup



4.4.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle $\geq 98\%$)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle $\geq 98\%$)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle $< 98\%$)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle $< 98\%$)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

4.5 Band Edge Measurements

VERDICT: PASS

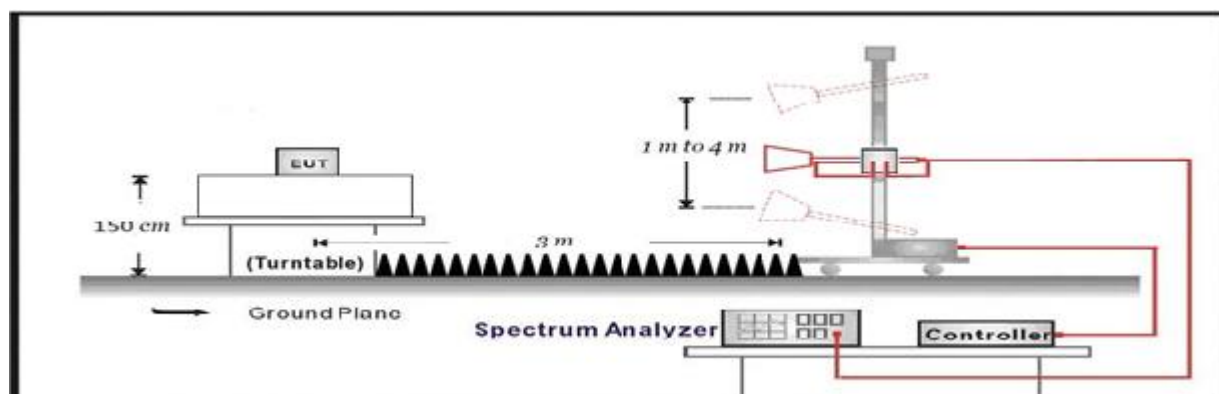
4.5.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209;		
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (MHz)	Distance (m)
2310-2390	PK	74	1	3
2483.5-2500	AV	54	1	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

4.5.2 Test Setup

Above 1GHz Test Setup:



4.5.3 Test Procedure

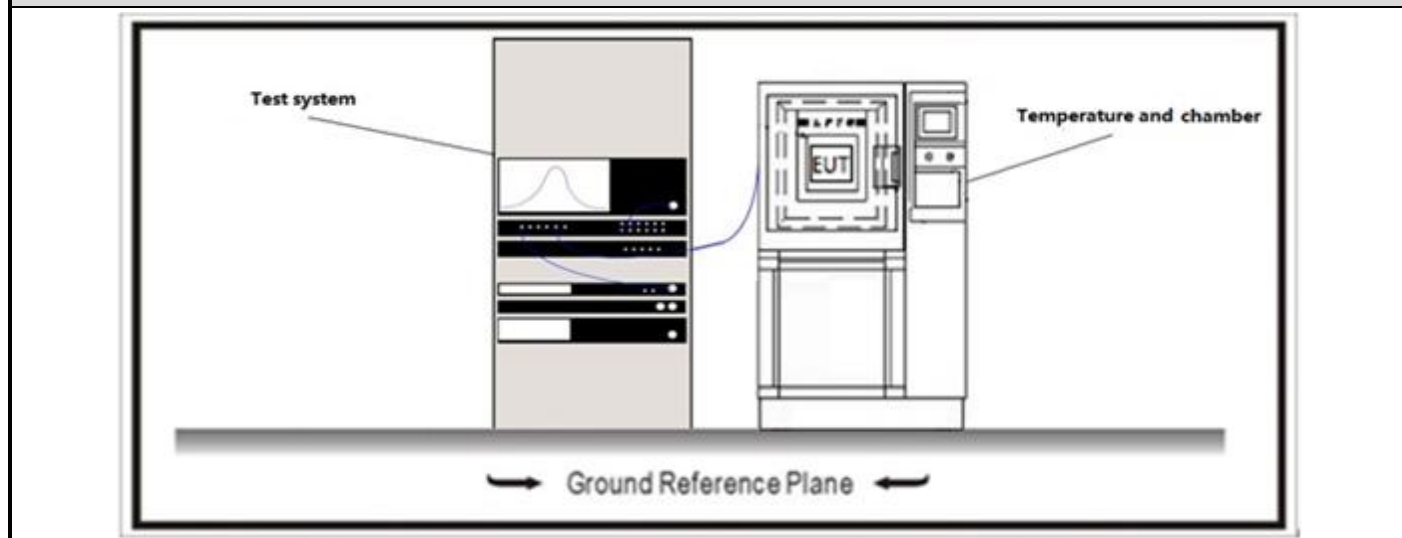
	References Rule	Chapter	Description
☒	ANSI C63.10	6.10	Band-edge testing
☒	ANSI C63.10	6.10.5	Restricted-band band-edge measurements
☐	ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10	11.12	Emissions in restricted frequency bands
☒	ANSI C63.10	11.12.1	Radiated emission measurements
☒	ANSI C63.10	11.12.2.7	Radiated spurious emission test
☐	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.6 Conducted Spurious Emission**VERDICT: PASS****4.6.1 Limit**

Standard	FCC Part 15 Subpart C Paragraph 15.247(d);
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

4.6.2 Test Setup**4.6.3 Test Procedure**

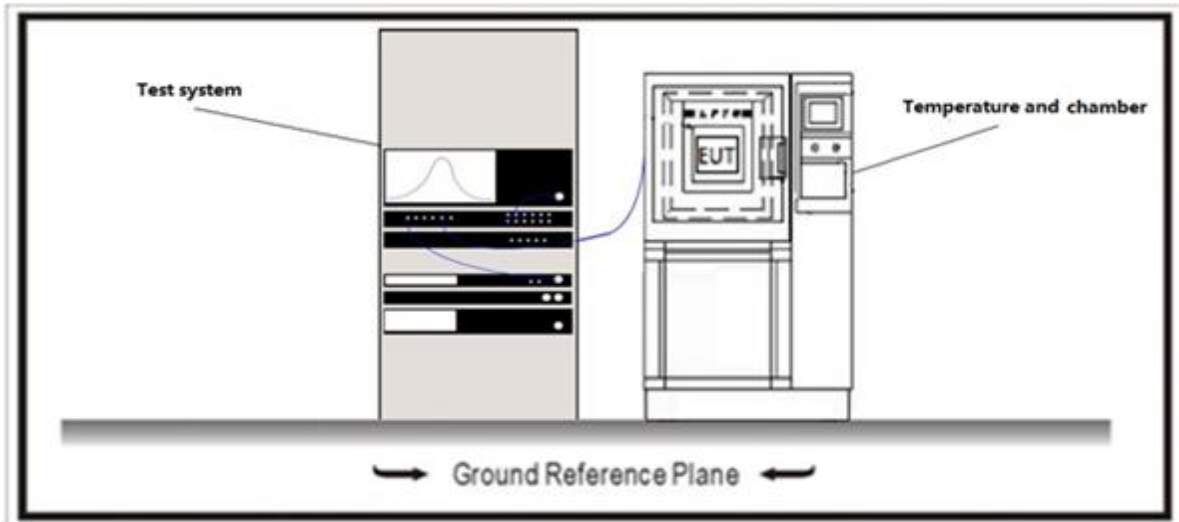
References Rule	Chapter	Description
☒ ANSI C63.10	11.11	Emissions in non-restricted frequency bands
☒ ANSI C63.10	11.11.1	General
☒ ANSI C63.10	11.11.2	Reference level measurement
☒ ANSI C63.10	11.11.3	Emission level measurement

4.7 Duty cycle	VERDICT: PASS
-----------------------	----------------------

4.7.1 Limit

N/A

4.7.2 Test Setup



4.7.3 Test Procedure

References Rule	Chapter	Description
☒ ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

4.8 Emissions in Restricted Bands**VERDICT: PASS****4.8.1 Limit****Standard**

FCC Part 15 Subpart C Paragraph 15.205

Restricted Bands of operation

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

Restricted Band Emissions Limit

FCC Part 15 Subpart C Paragraph 15.209

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)

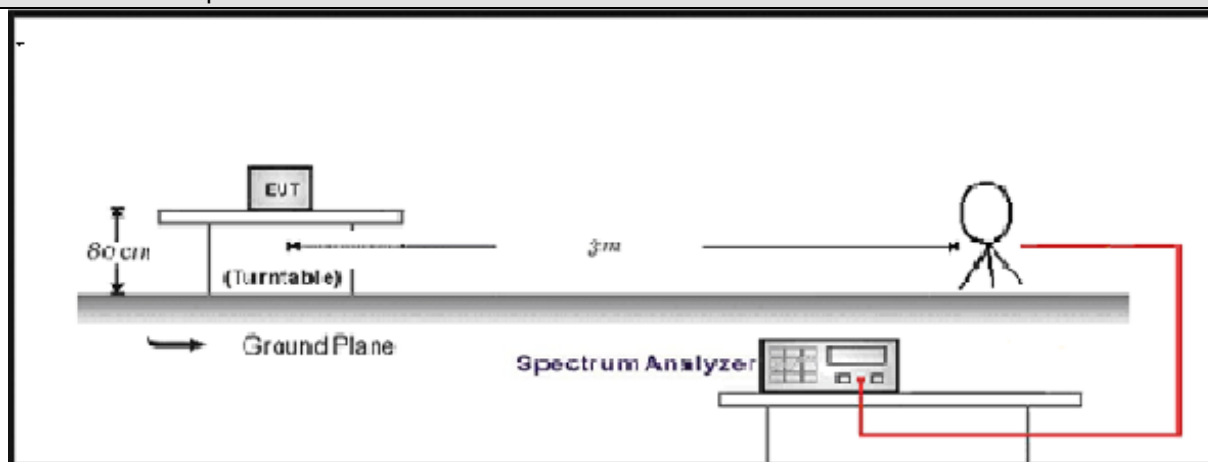
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two 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).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be

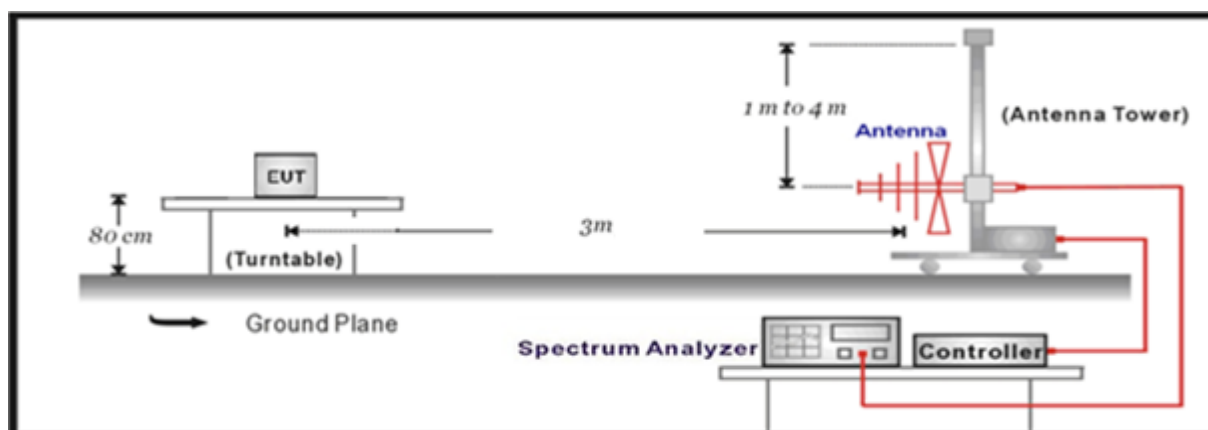
performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.8.2 Test Setup

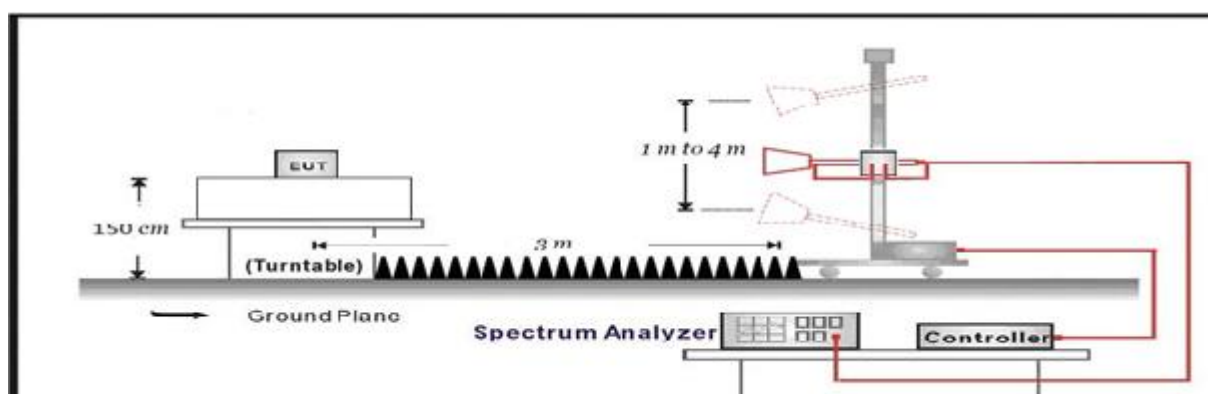
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.8.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10	11.12.1	Radiated emission measurements
	☒	ANSI C63.10	11.12.2.7	Radiated spurious emission test
	☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.9 AC Power Line Conducted Emission

VERDICT: N/A

4.9.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.207 ;	
Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾]	Limit: AV [dB(μV) ¹⁾]
0,15 - 0,50	66 - 56 ²⁾	56 - 46 ²⁾
0,50 - 5,0	56	46
5,0 - 30	60	50

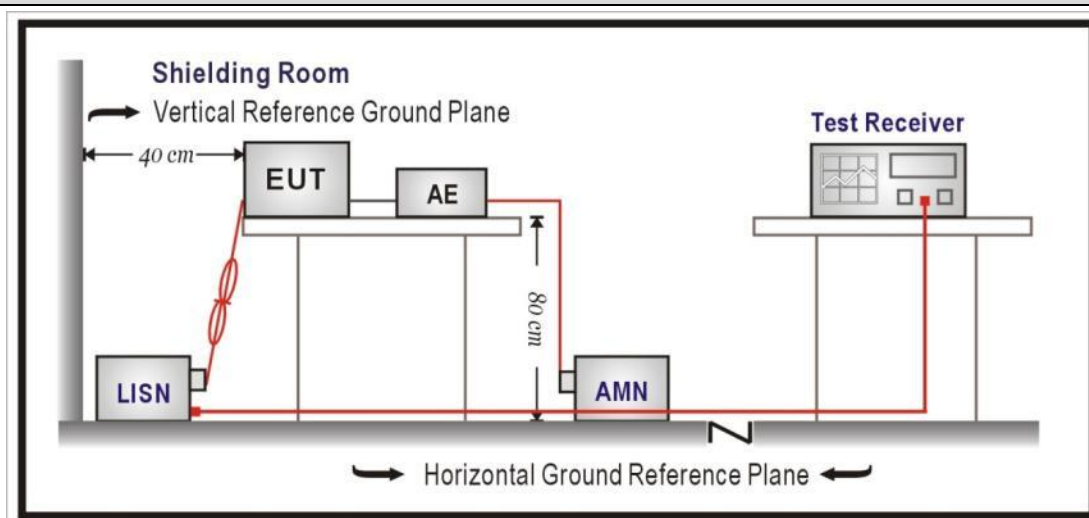
¹⁾ At the transition frequency, the lower limit applies.

²⁾ The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.9.2 Test Setup



4.9.3 Test Procedure

	References Rule	Chapter	Item
☐	ANSI C63.10	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.10 Antenna Requirement**VERDICT: PASS****4.10.1 Limit:****Standard**

FCC Part 15 Subpart C Paragraph 15.203;

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

4.10.2 Antenna Connector Construction:

The use of a permanently attached antenna



The antenna use of a unique coupling to the intentional radiator



The use of a nonstandard antenna jack or electrical connector

Please refer to the attached document "Internal Photograph" to show the antenna connector.

5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

6 TEST RESULT

Appendix A: DTS Bandwidth

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.672	2401.672	2402.344	0.5	PASS
		2440	0.712	2439.652	2440.364	0.5	PASS
		2480	0.712	2479.648	2480.360	0.5	PASS

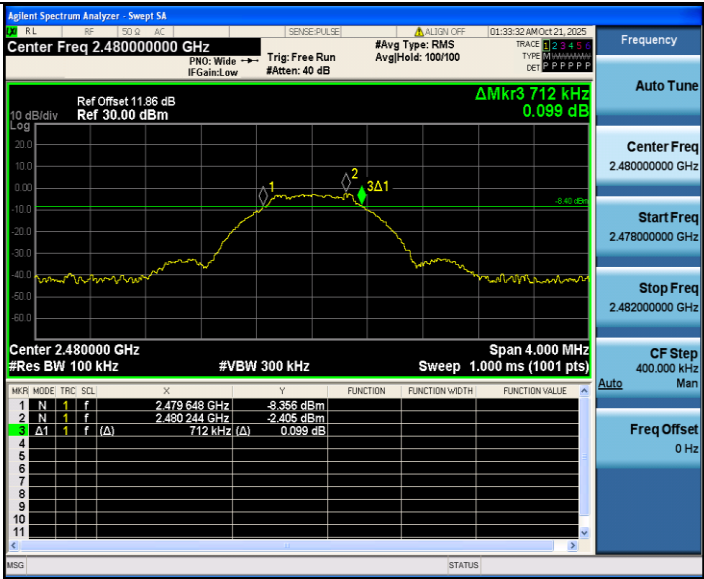
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



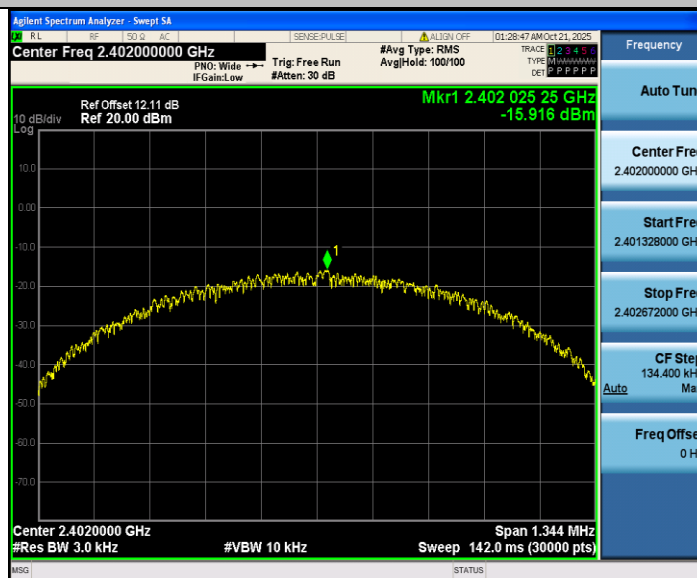
Appendix B: Maximum conducted output power

Test Mode	Frequency (MHz)	Measured Avg Power (dBm)	Measured Peak Power (dBm)	Conducted Limit[dBm]
LE_1M	2402	1.76	2.25	≤ 30
	2440	1.18	1.59	≤ 30
	2480	0.19	0.47	≤ 30

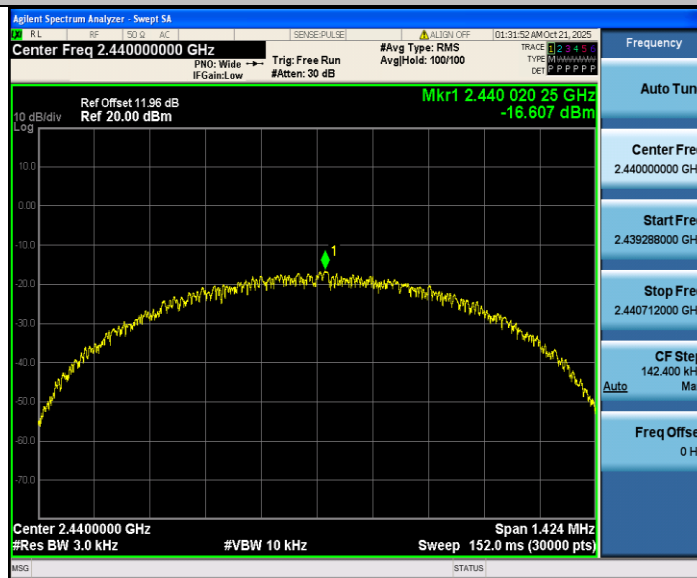
Appendix C: Maximum power spectral density

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.92	≤8.00	PASS
		2440	-16.61	≤8.00	PASS
		2480	-17.73	≤8.00	PASS

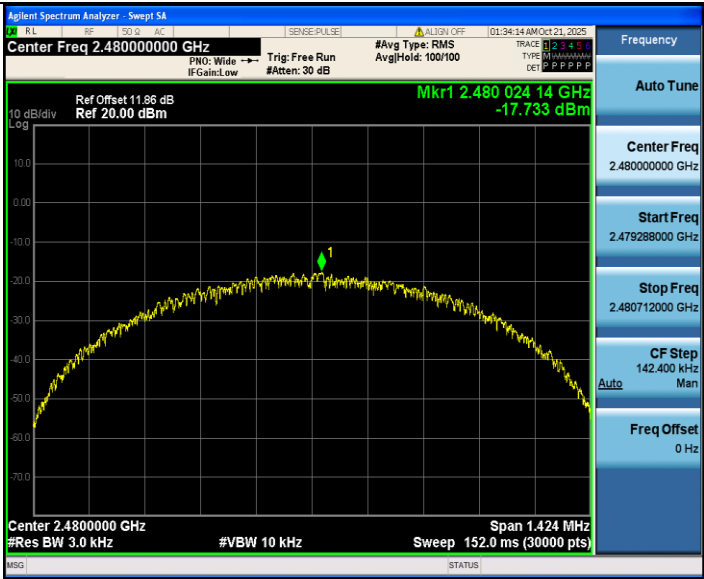
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

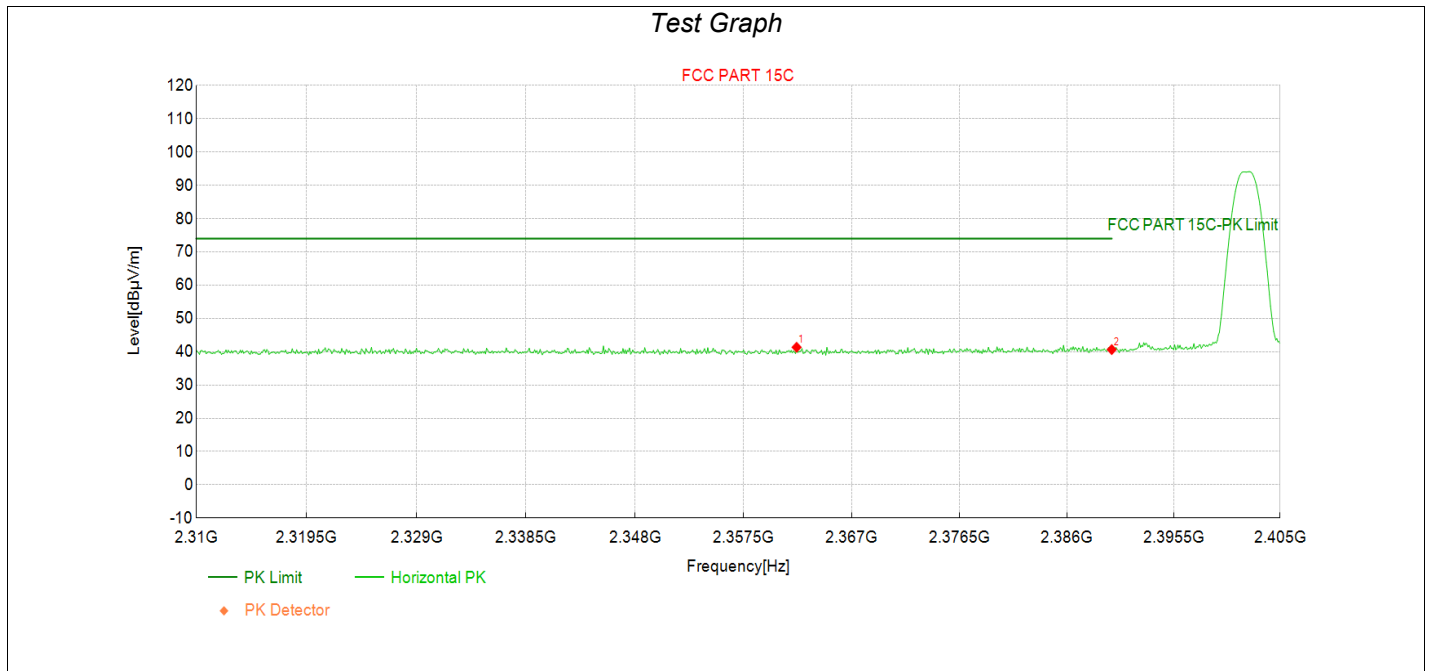


BLE_1M_Ant1_2480



Appendix D: Band edge measurements

Transmit at 2402MHz by LE_1Mbps

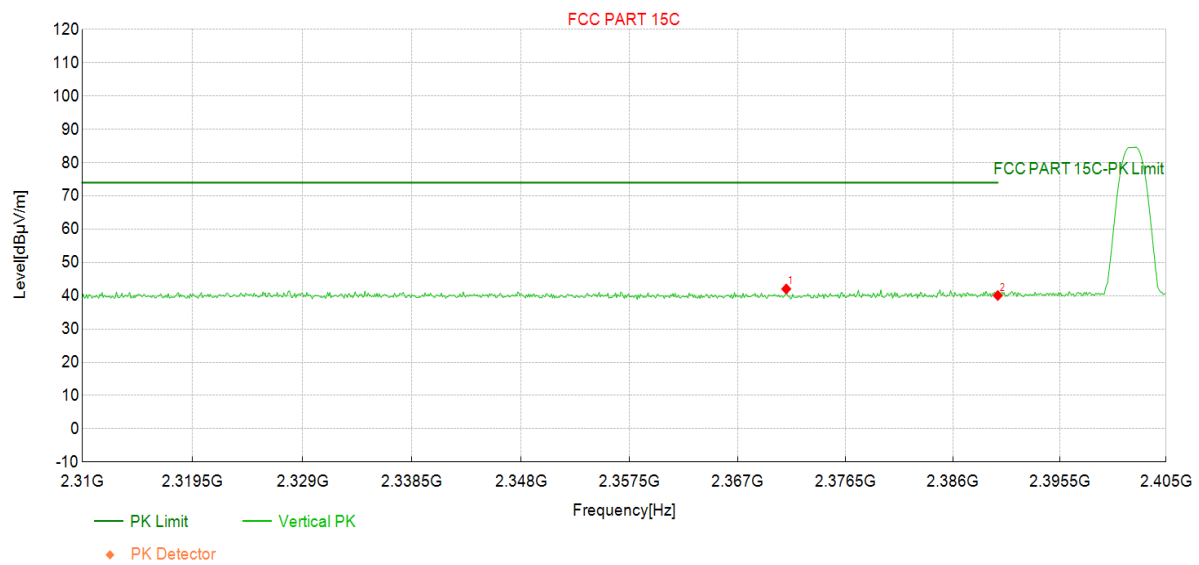


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2362.16	41.5	41.34	-0.120	74.00	32.66	PK	Horizo	PASS
2	2390.00	40.7	40.64	-0.050	74.00	33.36	PK	Horizo	PASS

Transmit at 2402MHz by LE_1Mbps

Test Graph

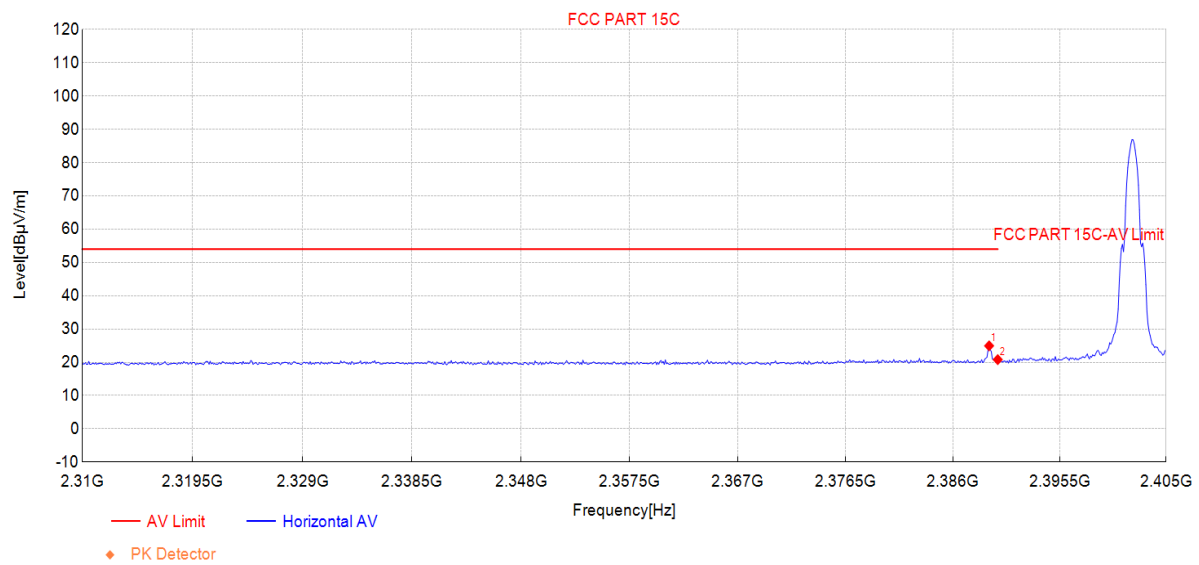


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2371.28	42.1	42.04	-0.100	74.00	31.96	PK	Vertic	PASS
2	2390.00	40.1	40.06	-0.050	74.00	33.94	PK	Vertic	PASS

Transmit at 2440MHz by LE_1Mbps

Test Graph

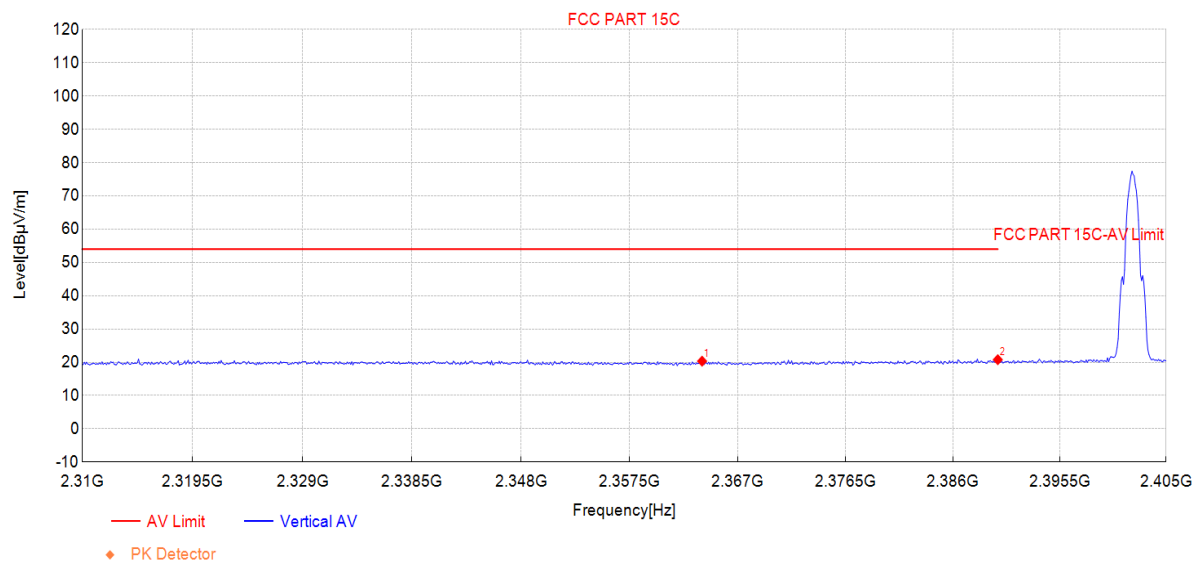


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2389.23	25.0	24.94	-0.060	54.00	29.06	AV	Horizo	PASS
2	2390.00	20.8	20.79	-0.050	54.00	33.21	AV	Horizo	PASS

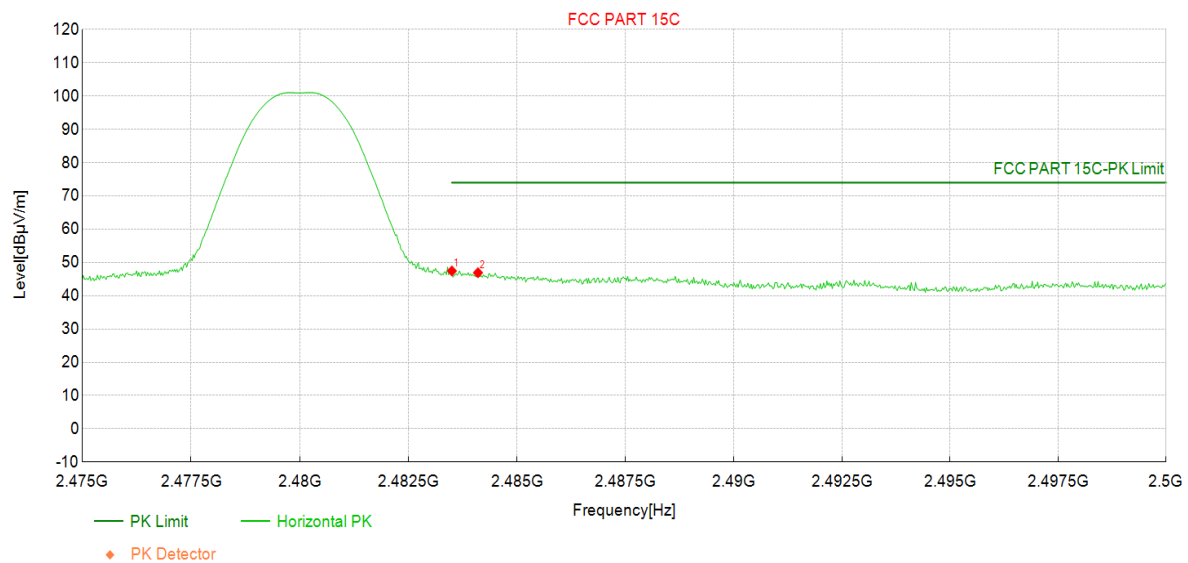
Transmit at 2440MHz by LE_1Mbps

Test Graph

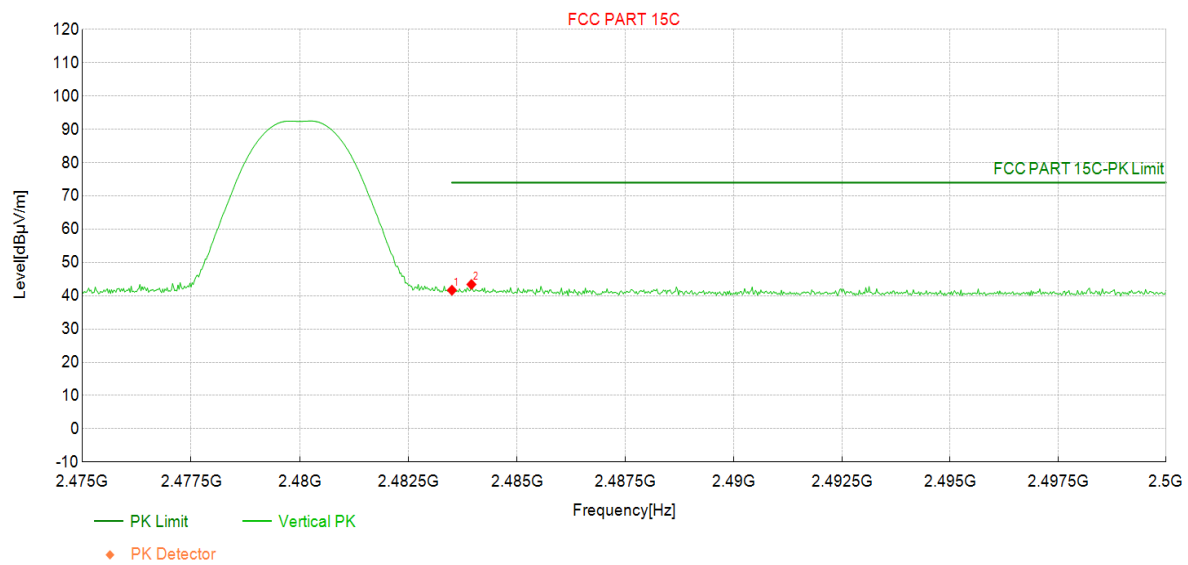


Data List

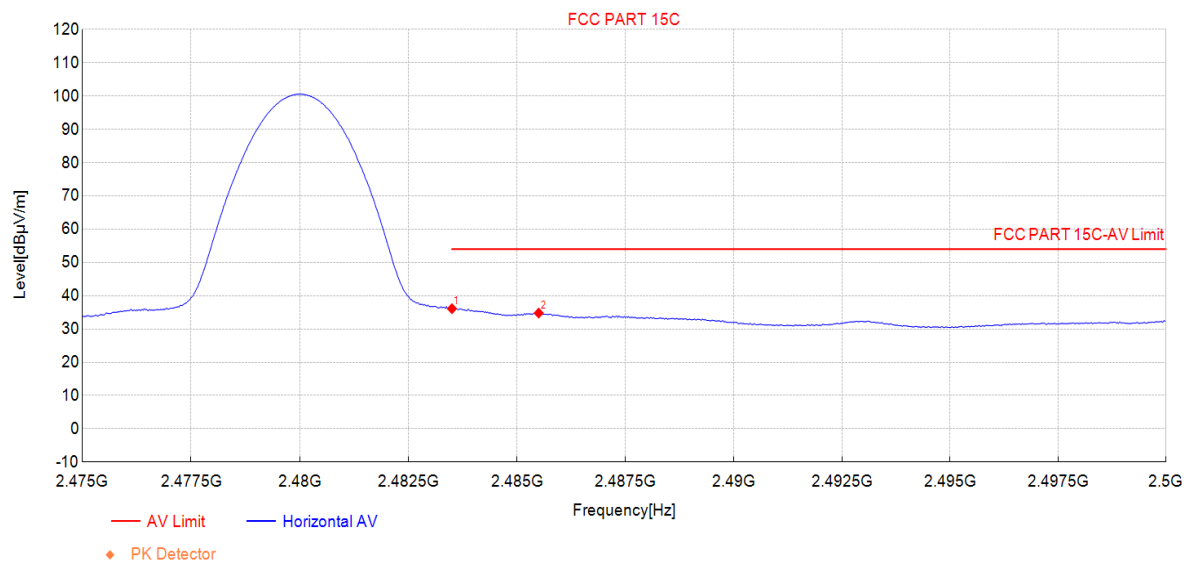
NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2363.87	20.4	20.33	-0.110	54.00	33.67	AV	Vertic	PASS
2	2390.00	20.8	20.77	-0.050	54.00	33.23	AV	Vertic	PASS

Transmit at 2480MHz by LE_1Mbps*Test Graph***Data List**

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2483.50	47.2	47.44	0.270	74.00	26.56	PK	Horizo	PASS
2	2484.10	46.6	46.91	0.270	74.00	27.09	PK	Horizo	PASS

Transmit at 2480MHz by LE_1Mbps*Test Graph***Data List**

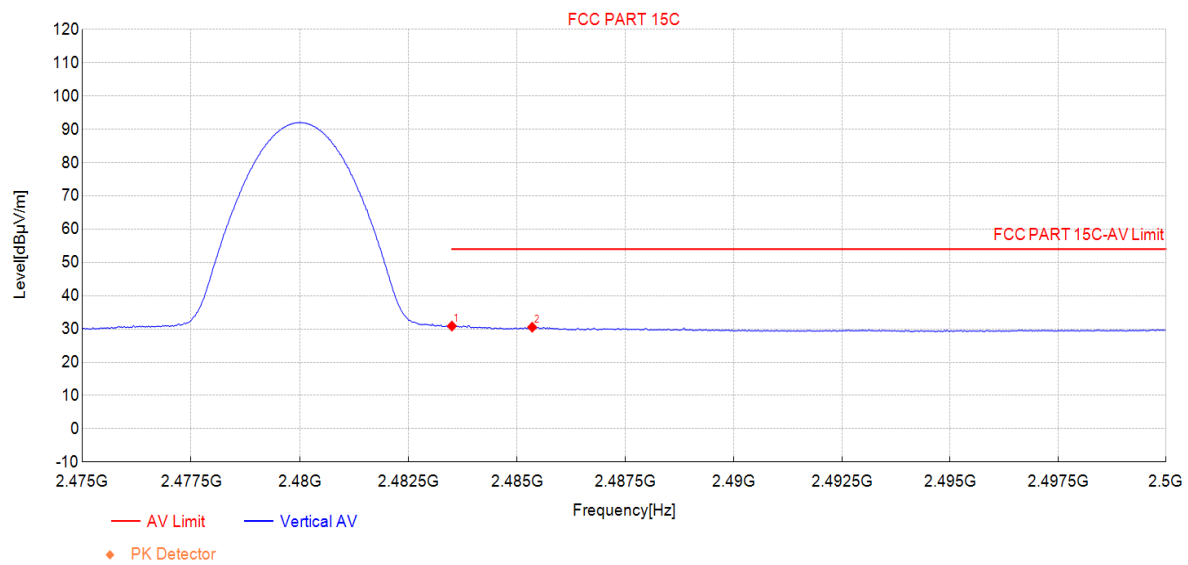
NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2483.50	41.4	41.64	0.270	74.00	32.36	PK	Vertic	PASS
2	2483.95	43.1	43.40	0.270	74.00	30.60	PK	Vertic	PASS

Transmit at 2480MHz by LE_1Mbps*Test Graph***Data List**

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2483.50	35.8	36.11	0.270	54.00	17.89	AV	Horizo	PASS
2	2485.50	34.5	34.79	0.290	54.00	19.21	AV	Horizo	PASS

Transmit at 2480MHz by LE_1Mbps

Test Graph



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	2483.50	30.6	30.88	0.270	54.00	23.12	AV	Vertic	PASS
2	2485.35	30.2	30.52	0.290	54.00	23.48	AV	Vertic	PASS

Note:

1. Level = Reading + Factor

2. Margin = Limit - Level

Appendix E: Conducted Spurious Emission

Reference level measurement :

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

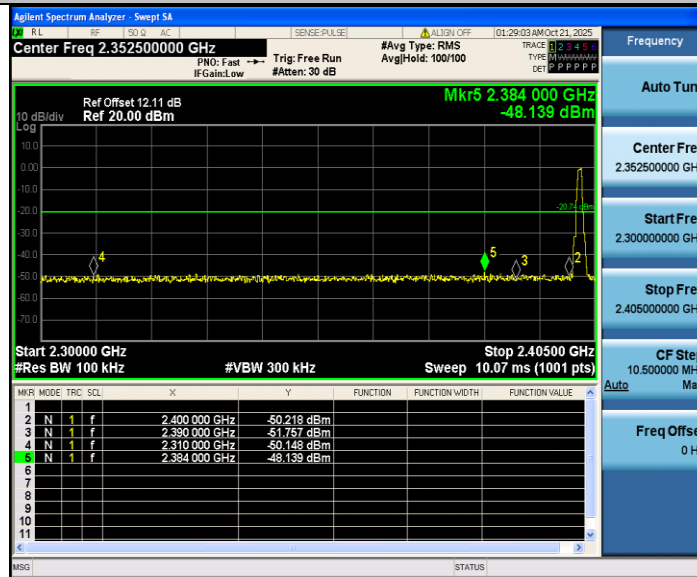


BLE_1M_Ant1_2480

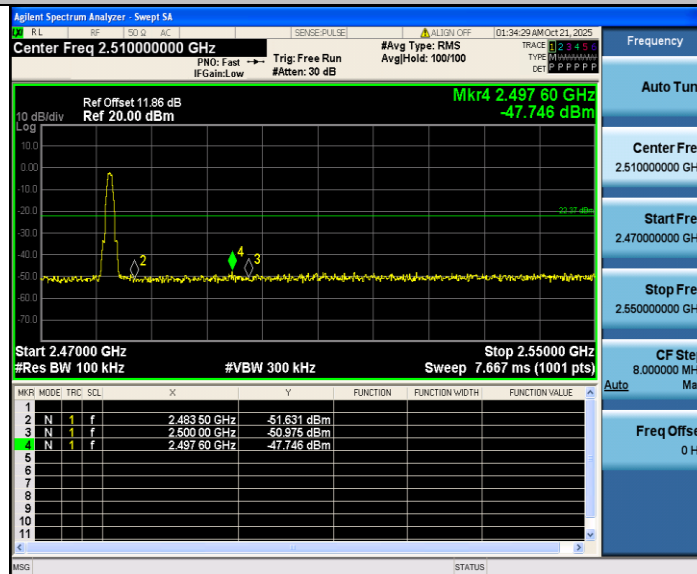


Band edge measurements :

BLE_1M_Ant1_Low_2402

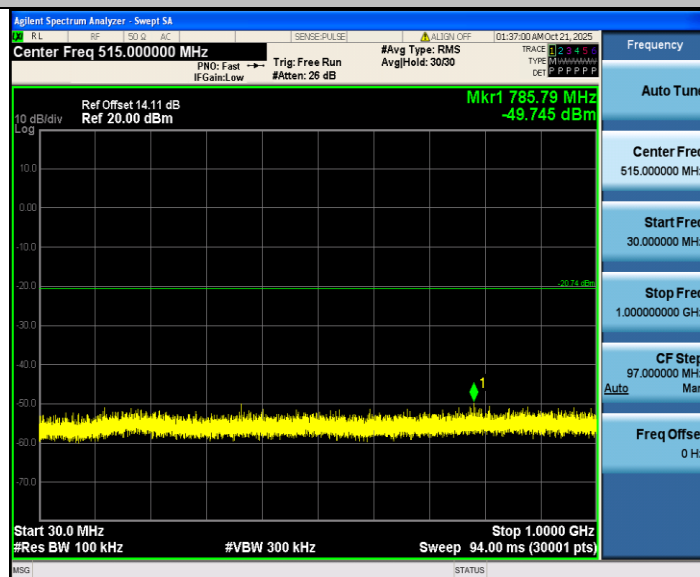


BLE_1M_Ant1_High_2480



Conducted Spurious Emission :

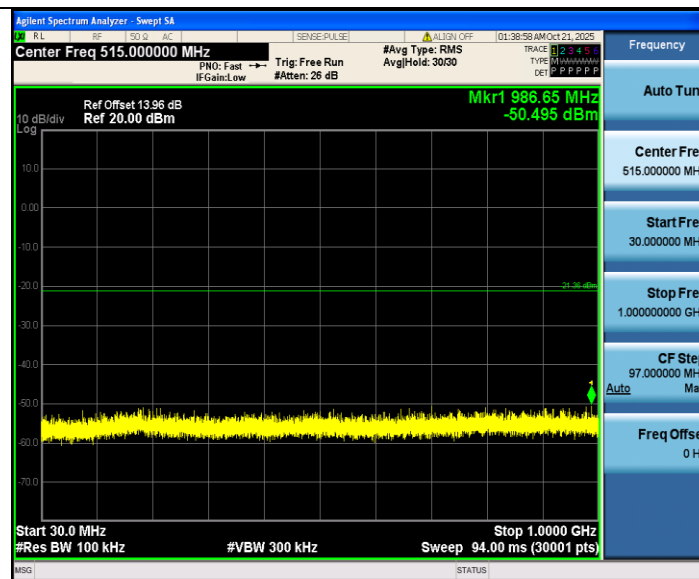
BLE_1M_Ant1_2402_30~1000



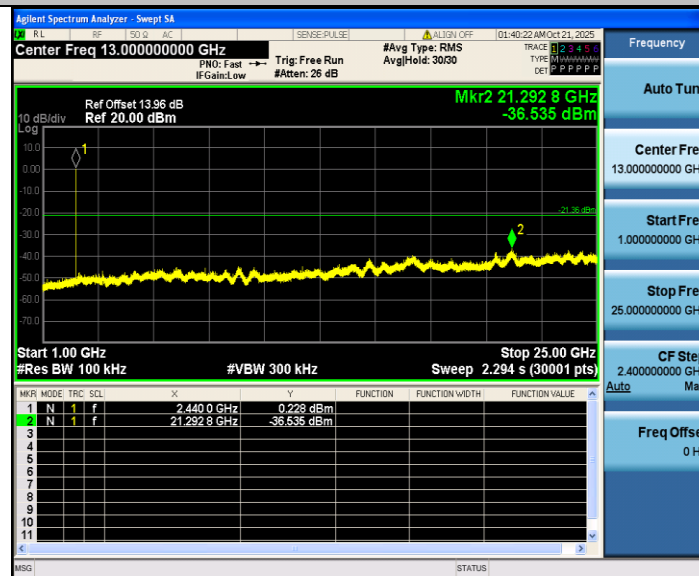
BLE_1M_Ant1_2402_1000~25000



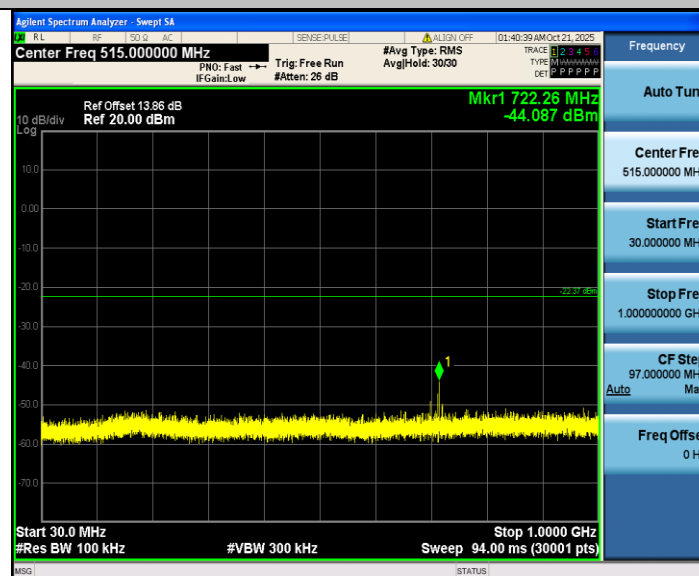
BLE_1M_Ant1_2440_30~1000



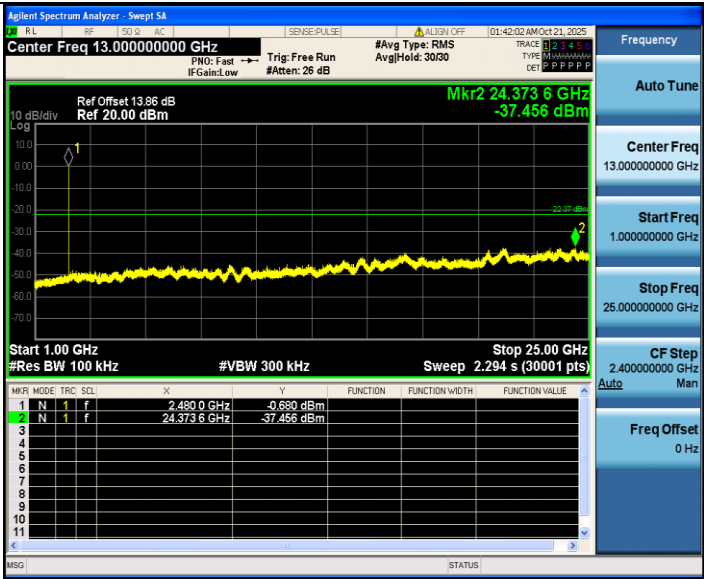
BLE_1M_Ant1_2440_1000~25000



BLE_1M_Ant1_2480_30~1000



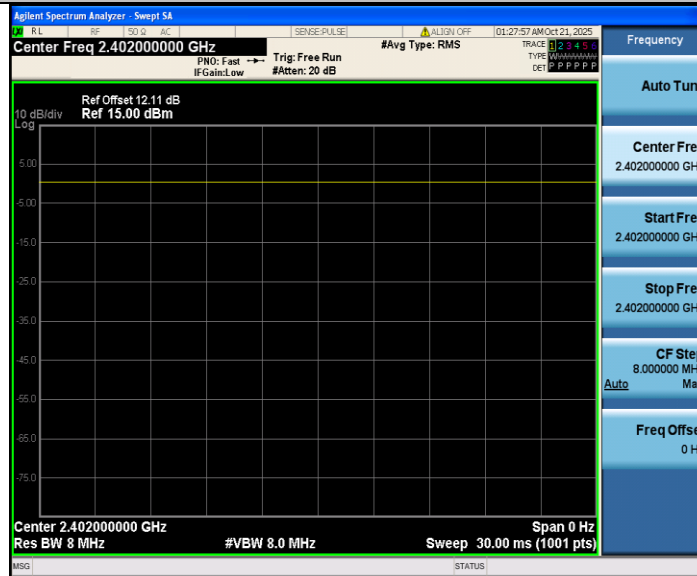
BLE_1M_Ant1_2480_1000~25000



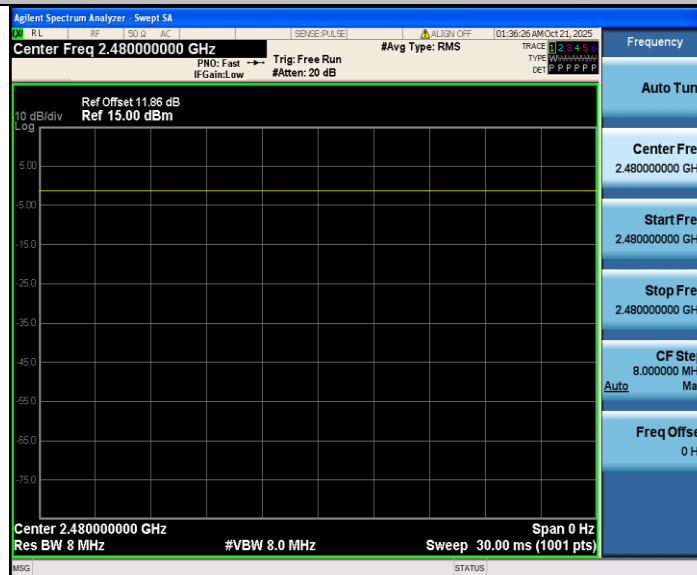
Appendix F: Duty Cycle

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]
BLE_1M	Ant1	2402	30.00	30.00	100
		2480	30.00	30.00	100

BLE_1M_Ant1_2402

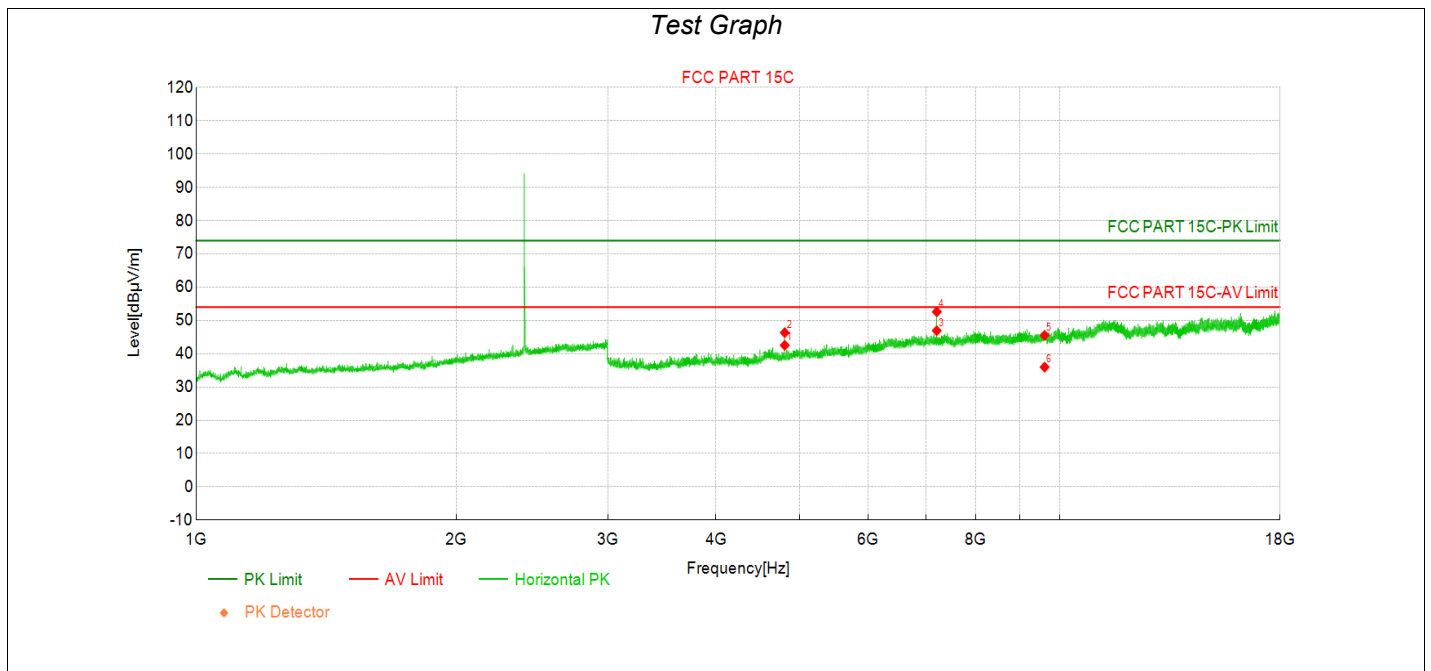


BLE_1M_Ant1_2480



Appendix G: Emissions in Restricted Bands

Transmit at 2402MHz by LE_1Mbps

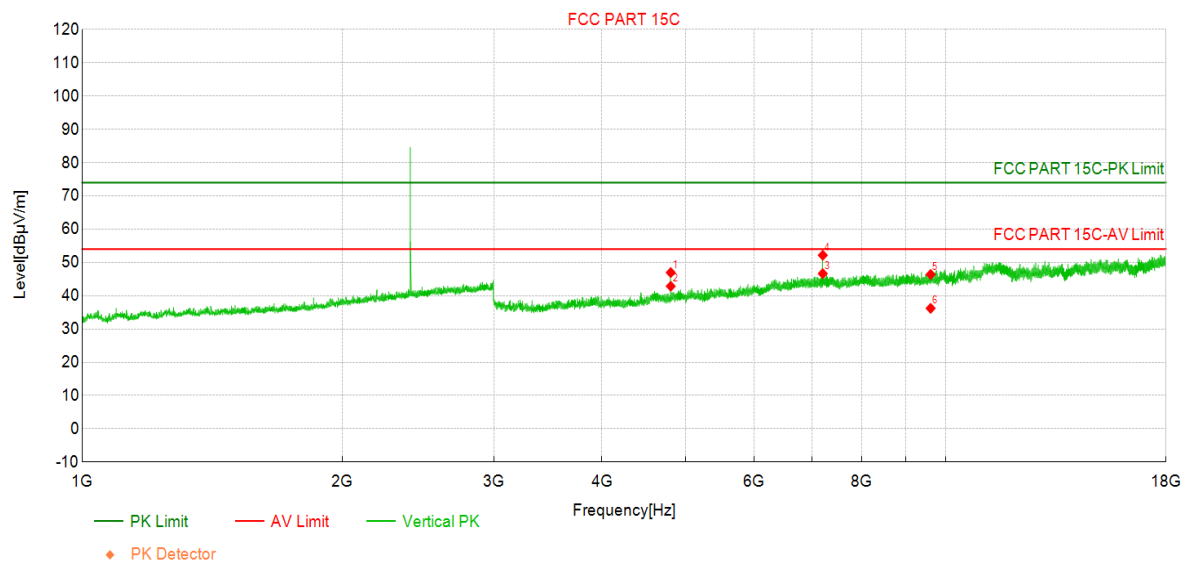


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4804.50	51.0	42.53	-8.480	54.00	11.47	AV	Horizo	PASS
2	4804.50	54.8	46.35	-8.480	74.00	27.65	PK	Horizo	PASS
3	7206.00	48.5	46.92	-1.620	54.00	7.08	AV	Horizo	PASS
4	7206.75	54.2	52.59	-1.620	74.00	21.41	PK	Horizo	PASS
5	9608.00	44.2	45.53	1.380	74.00	28.47	PK	Horizo	PASS
6	9608.00	34.6	35.97	1.380	54.00	18.03	AV	Horizo	PASS

Transmit at 2402MHz by LE_1Mbps

Test Graph

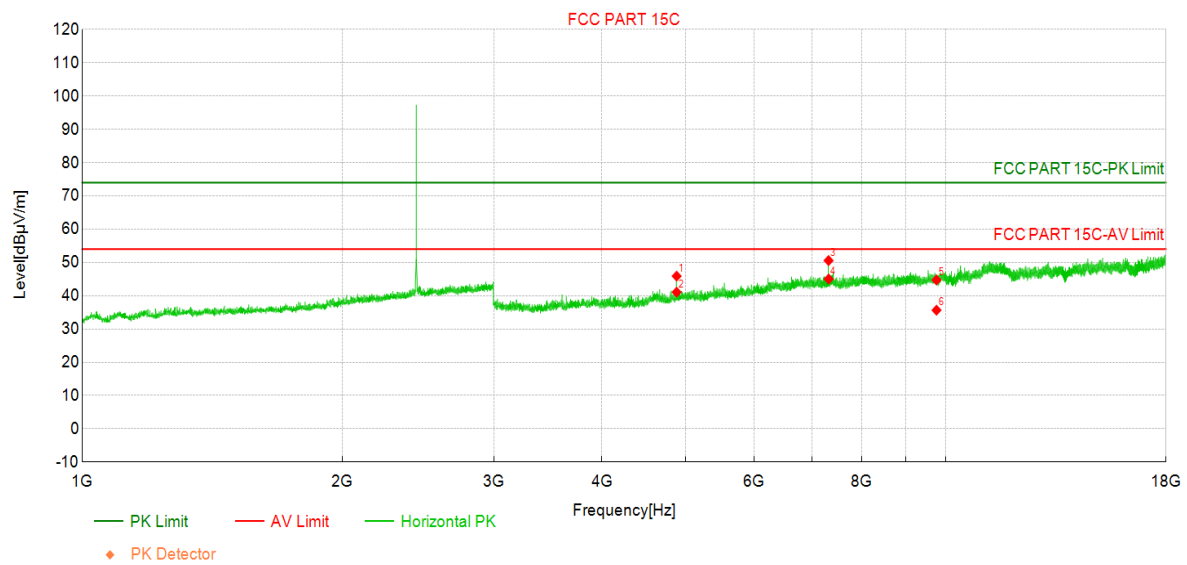


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4804.50	55.4	46.96	-8.480	74.00	27.04	PK	Vertic	PASS
2	4804.50	51.3	42.85	-8.480	54.00	11.15	AV	Vertic	PASS
3	7206.00	48.3	46.64	-1.620	54.00	7.36	AV	Vertic	PASS
4	7206.75	53.8	52.16	-1.620	74.00	21.84	PK	Vertic	PASS
5	9608.00	45.0	46.40	1.380	74.00	27.60	PK	Vertic	PASS
6	9608.00	34.8	36.20	1.380	54.00	17.80	AV	Vertic	PASS

Transmit at 2440MHz by LE_1Mbps

Test Graph

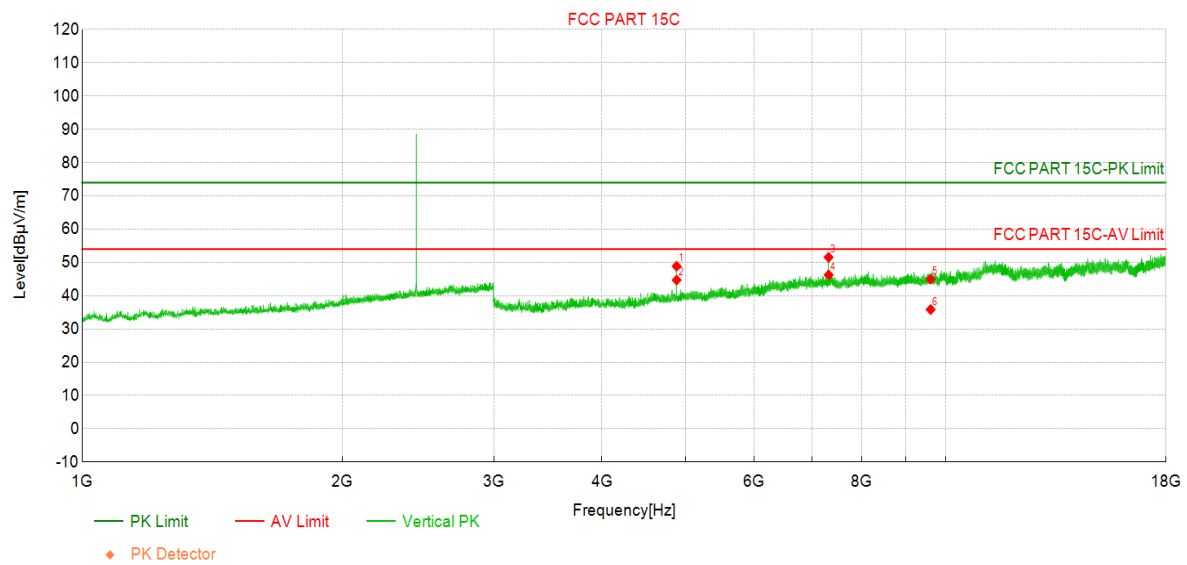


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4881.00	54.0	45.88	-8.150	74.00	28.12	PK	Horizo	PASS
2	4881.00	49.2	41.07	-8.150	54.00	12.93	AV	Horizo	PASS
3	7319.25	52.0	50.57	-1.450	74.00	23.43	PK	Horizo	PASS
4	7320.75	46.5	45.02	-1.440	54.00	8.98	AV	Horizo	PASS
5	9760.00	43.3	44.73	1.450	74.00	29.27	PK	Horizo	PASS
6	9760.00	34.2	35.65	1.450	54.00	18.35	AV	Horizo	PASS

Transmit at 2440MHz by LE_1Mbps

Test Graph

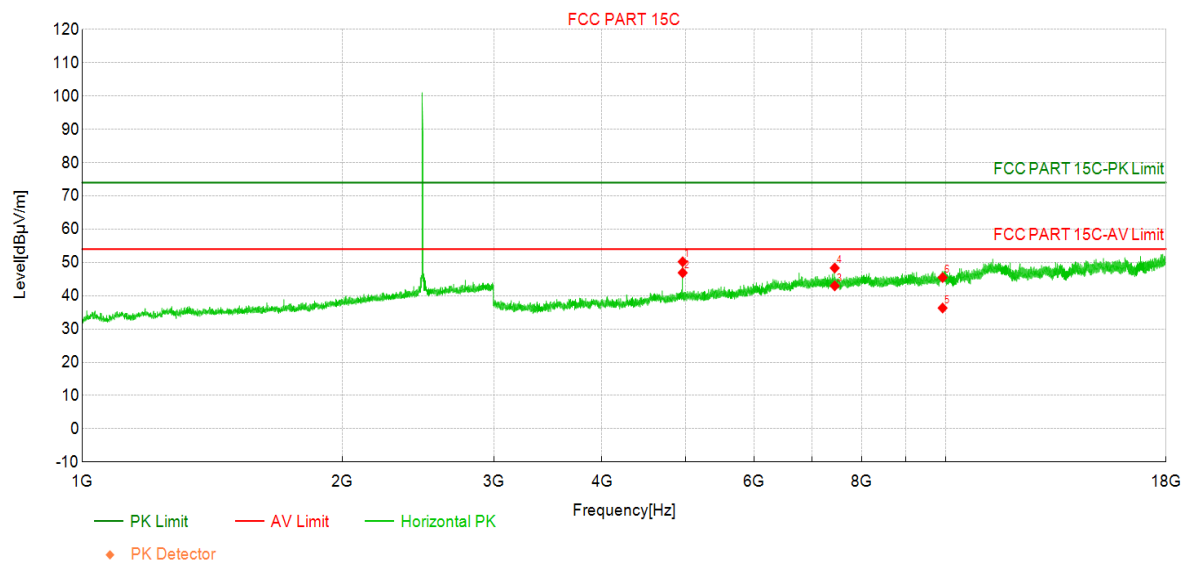


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4880.25	57.0	48.87	-8.160	74.00	25.13	PK	Vertic	PASS
2	4881.00	52.9	44.70	-8.150	54.00	9.30	AV	Vertic	PASS
3	7319.25	53.0	51.54	-1.450	74.00	22.46	PK	Vertic	PASS
4	7320.75	47.7	46.25	-1.440	54.00	7.75	AV	Vertic	PASS
5	9608.00	43.6	44.96	1.380	74.00	29.04	PK	Vertic	PASS
6	9608.00	34.5	35.84	1.380	54.00	18.16	AV	Vertic	PASS

Transmit at 2480MHz by LE_1Mbps

Test Graph

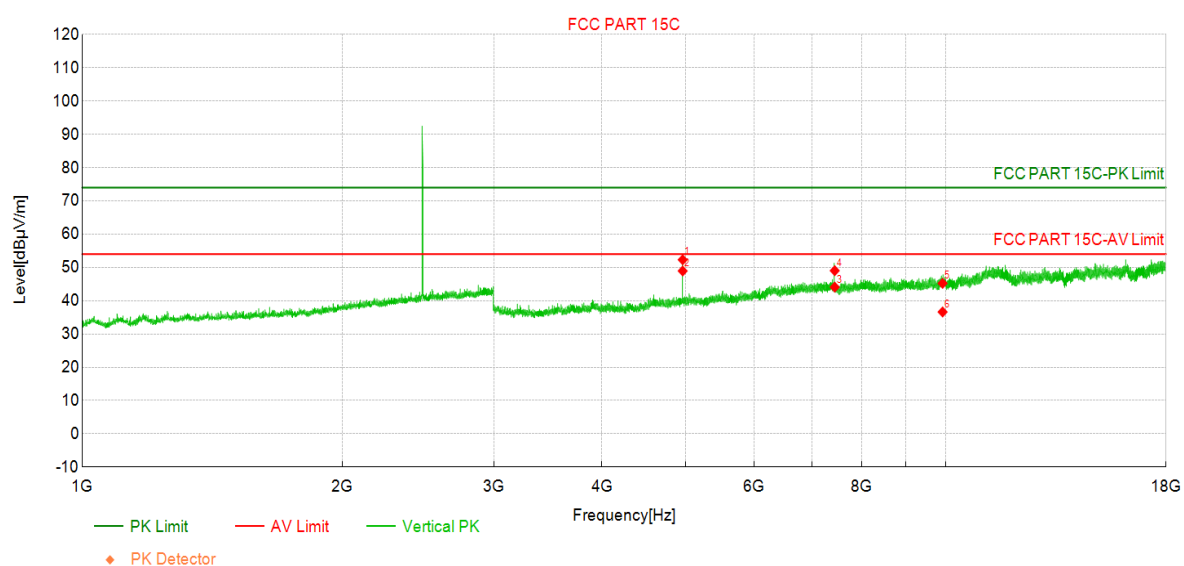


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4960.00	58.0	50.20	-7.830	74.00	23.80	PK	Horizo	PASS
2	4960.00	54.7	46.90	-7.830	54.00	7.10	AV	Horizo	PASS
3	7440.00	44.3	42.96	-1.300	54.00	11.04	AV	Horizo	PASS
4	7440.00	49.6	48.33	-1.300	74.00	25.67	PK	Horizo	PASS
5	9920.00	34.0	36.31	2.350	54.00	17.69	AV	Horizo	PASS
6	9920.00	43.1	45.47	2.350	74.00	28.53	PK	Horizo	PASS

Transmit at 2480MHz by LE_1Mbps

Test Graph



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	4960.00	60.1	52.31	-7.830	74.00	21.69	PK	Vertic	PASS
2	4960.00	56.8	48.94	-7.830	54.00	5.06	AV	Vertic	PASS
3	7440.00	45.4	44.09	-1.300	54.00	9.91	AV	Vertic	PASS
4	7440.00	50.3	49.03	-1.300	74.00	24.97	PK	Vertic	PASS
5	9920.00	42.9	45.22	2.350	74.00	28.78	PK	Vertic	PASS
6	9920.00	34.3	36.62	2.350	54.00	17.38	AV	Vertic	PASS

Note:

1. Level = Reading + Factor

2. Margin = Limit - Level

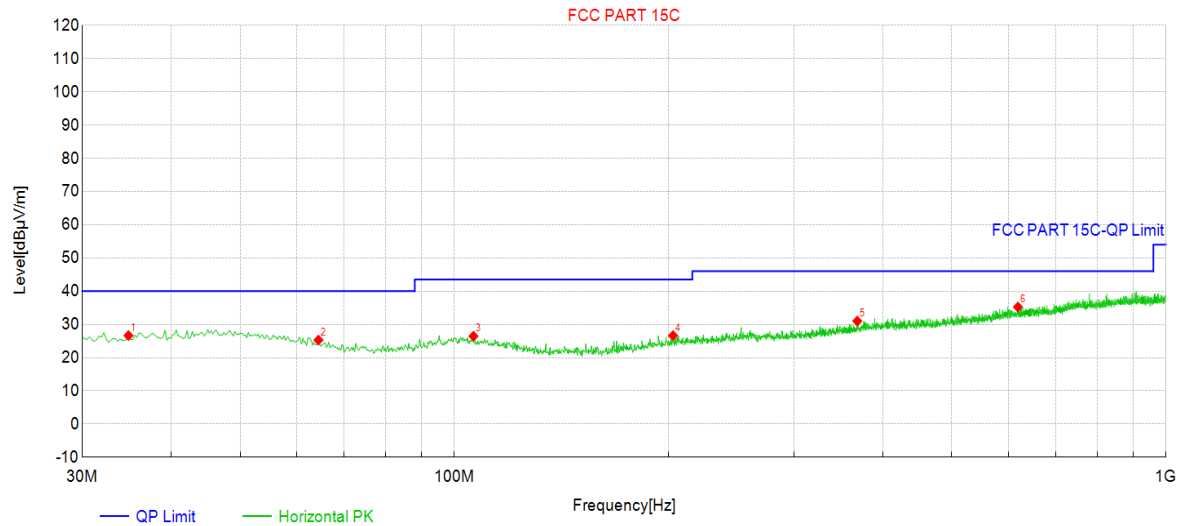
3. The test frequency range, 9kHz~30MHz, worst case are at least 20dB below the limits, therefore no data appear in the report.

4. The test frequency range, 18GHz~26GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.

The worst case of Radiated Emission below 1GHz :

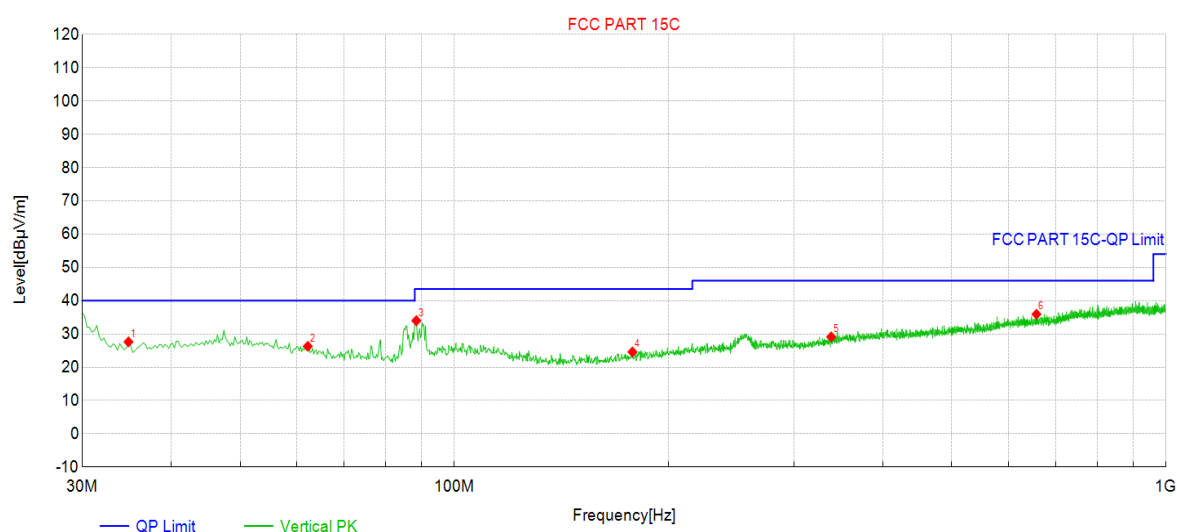
Transmit at 2402MHz by LE_1Mbps

Test Graph



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	34.85	13.5	26.65	13.170	40.00	13.35	PK	Horizo	PASS
2	64.44	13.6	25.29	11.670	40.00	14.71	PK	Horizo	PASS
3	106.39	14.1	26.46	12.390	43.50	17.04	PK	Horizo	PASS
4	202.90	14.6	26.64	12.020	43.50	16.86	PK	Horizo	PASS
5	368.29	15.3	31.00	15.710	46.00	15.00	PK	Horizo	PASS
6	619.28	15.3	35.25	19.980	46.00	10.75	PK	Horizo	PASS

Transmit at 2402MHz by LE_1Mbps**Test Graph****Data List**

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	34.85	14.5	27.63	13.170	40.00	12.37	PK	Vertic	PASS
2	62.25	14.1	26.29	12.230	40.00	13.71	PK	Vertic	PASS
3	88.44	23.1	33.99	10.930	43.50	9.51	PK	Vertic	PASS
4	177.93	14.2	24.60	10.430	43.50	18.90	PK	Vertic	PASS
5	338.46	14.0	29.14	15.120	46.00	16.86	PK	Vertic	PASS
6	657.59	15.7	35.95	20.210	46.00	10.05	PK	Vertic	PASS

Note:

1. All Readings below 1GHz are PK, PK as an alternative to CISPR quasi-peak measurements or average measurements.
2. Level=Reading+Factor.

The End