

TEST REPORT

Product : Presence Switch H2 US (2 Buttons, 1 Channel),
Presence Switch H2 US (2 Buttons, 2 Channels),
Presence Switch H2 US (4 Buttons, 3 Channels)
Trade mark : Aqara
Model/Type reference : WS-K22D, WS-K03D, WS-K04D
Serial Number : N/A
Report Number : EED32R81695401
FCC ID : 2AKIT-WSK04D
Date of Issue : Oct. 11, 2025
Test Standards : 47 CFR Part 15 Subpart C (Section 15.249)
Test result : PASS

Prepared for:

Lumi United Technology Co., Ltd
Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370,
Liuxian Avenue, Fuguang Community, Taoyuan Residential District,
Nanshan District, Shenzhen, China

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Date:

Oct. 11, 2025



Check No.: 5242110925

1 Version

Version No.	Date	Description
00	Oct. 11, 2025	Original

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.249(a)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.249(a) & Section 15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.249(a) & Section 15.205	ANSI C63.10-2013	PASS
99% Occupied Bandwidth	47 CFR Part 2 Subpart J Section 2.1049	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.215(c)	ANSI C63.10-2013	PASS

Remark:

Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

Model No.: WS-K22D, WS-K03D, WS-K04D

The equipment (Model: WS-K22D, WS-K03D) is electronically/electrically identical to the EUT (Model: WS-K04D) and that the results of the Spurious Emissions test continue to be representative of and applicable to it. This provides more choices to users.

The differences list as below:

Location	Model: WS-K22D	Model: WS-K03D	Model: WS-K04D
AC-B board	Please refer to Annex for the EUT	Please refer to Annex for the EUT	Please refer to Annex for the EUT
AC-A board	Please refer to Annex for the EUT	Please refer to Annex for the EUT	Please refer to Annex for the EUT
DC-C board	Please refer to Annex for the EUT	Please refer to Annex for the EUT	Please refer to Annex for the EUT
External Photos	Please refer to Annex for the EUT	Please refer to Annex for the EUT	Please refer to Annex for the EUT

1. The WS-K22D and WS-K03D have 2 Buttons, and the WS-K04D has 4 Buttons.
2. Some circuits of AC-B board and AC-A board are different. WS- K22D is 1 Channel 2 Buttons, WS-K03D is 2 Channel 2 Buttons, and WS-K04D 4 Channel 3 Buttons.
3. The DC-C board buttons are different, but the circuit is the same.

The differences in components on the above PCB board do not involve modifications to the RF module, Modifications that do not change the fundamental RF characteristics.

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4 General Information

4.1 Client Information

Applicant:	Lumi United Technology Co., Ltd
Address of Applicant:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Manufacturer:	Lumi United Technology Co., Ltd
Address of Manufacturer:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

4.2 General Description of EUT

Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Operation Frequency:	24.00GHz to 24.25GHz
Number of Channel:	1
Center Frequency:	24.13GHz
Modulation Type:	FMCW
Antenna Type:	Patch Antenna
Antenna Gain:	3.90dBi
Power Supply:	120VAC,60Hz
Test Voltage:	120VAC
Sample Received Date:	Sep, 11. 2025
Sample tested Date:	Sep, 11. 2025 to Oct. 10, 2025

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

4.4 Description of Support Units

The EUT has been tested independently.

4.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Hongwei Industrial Park, Zone 70, Bao'an District, Shenzhen, Guangdong, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

Designation Number: CN1164

Test Firm Registration Number: 260439

ISED test site number: 7408A, CAB identifier number : CN0037

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

4.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-18GHz)
		3.4dB (18GHz-40GHz)
		4.62dB (40GHz-60GHz)
		4.80dB (60GHz-90GHz)
		4.90dB (90GHz-140GHz)
		5.11dB (140GHz-220GHz)
4	Conduction emission	5.14dB (220GHz-325GHz)
		3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

5 Equipment List

Conducted Emissions Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
Receiver	R&S	ESCI	100435	2025-04-08	2026-04-07
LISN	R&S	ENV216	100098	2024-09-14 2025-09-13	2025-09-13 2026-09-12
Capacitive voltage probe	Schwarzbeck	CVP 9222C	00124	2025-06-07	2026-06-06
ISN	TESEQ	ISN T800	30297	2024-12-05	2025-12-04
Barometer	Changchun	DYM3	1188	---	---
Temperature/ Humidity Indicator	Defu	TH128	---	2025-03-31	2026-03-30
Test software	Fara	EZ-EMC	EMC-CON 3A1.1	---	---

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
3M Chamber & Accessory Equipment	TDK	SAC-3	---	2024-01-13	2027-01-12
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	2025-05-14	2026-05-13
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	2025-04-07	2026-04-06
Receiver	R&S	ESCI7	100938-003	2025-09-03	2026-09-02
Multi device Controller	maturo	NCD/070/107 11112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804186	2025-05-26	2026-05-25
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	2025-01-04	2026-01-03
Spectrum Analyzer	Keysight	N9020B	MY57111112	2025-01-14	2026-01-13
Spectrum Analyzer	Keysight	N9030B	MY57140871	2025-01-14	2026-01-13
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	2025-04-12	2026-04-11
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	2025-04-12	2026-04-11
Horn Antenna	ETS-LINDGREN	3117	00057407	2025-06-29	2026-06-28
Preamplifier	EMCI	EMC001330	980563	2025-03-03	2026-03-02
Preamplifier	Tonscend	TAP-011858	AP21B806112	2025-07-07	2026-07-06
Preamplifier	Tonscend	EMC051845SE	980380	2024-12-05	2025-12-04
Temperature/Humidity Indicator	biaozhi	GM1360	EE1186631	2025-03-31	2026-03-30
Fully Anechoic Chamber	TDK	FAC-3	---	2024-01-09	2027-01-08
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---
Spectrum Analyzer	R&S	FSV3044	101509	2025-02-14	2026-02-13
Spectrum Analyzer	R&S	FSW43	102978	2025-08-11	2026-08-10
Receive unit	R&S	TC-RSE60	100729	N/A	N/A
Receive unit	R&S	TC-RSE90	100721	N/A	N/A
Receive unit	R&S	TC-RSE140	101254	N/A	N/A
Receive unit	R&S	TC-RSE220	100716	N/A	N/A
Receive unit	R&S	TC-RSE325	100638	N/A	N/A

Note:

N/A:Calibrated by the equipment manufacturer.

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
15.203 requirement: 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, 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.	
EUT Antenna:	Please see Internal photos
The antenna is Patch Antenna. The best case gain of the antenna is 3.90dBi.	

6.2 Conducted Emissions

Test Requirement: 47 CFR Part 15C Section 15.207
Test Method: ANSI C63.10-2020
Test Frequency Range: 150kHz to 30MHz

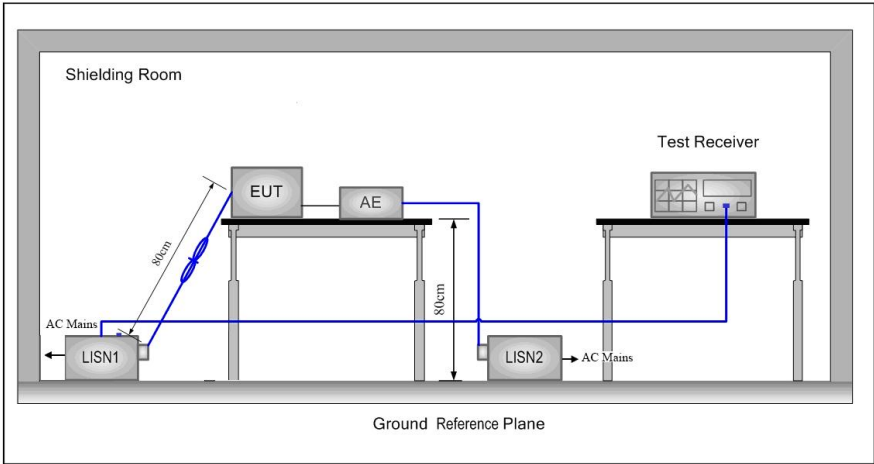
Limit:

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

- * Decreases with the logarithm of the frequency.
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

Test Procedure:

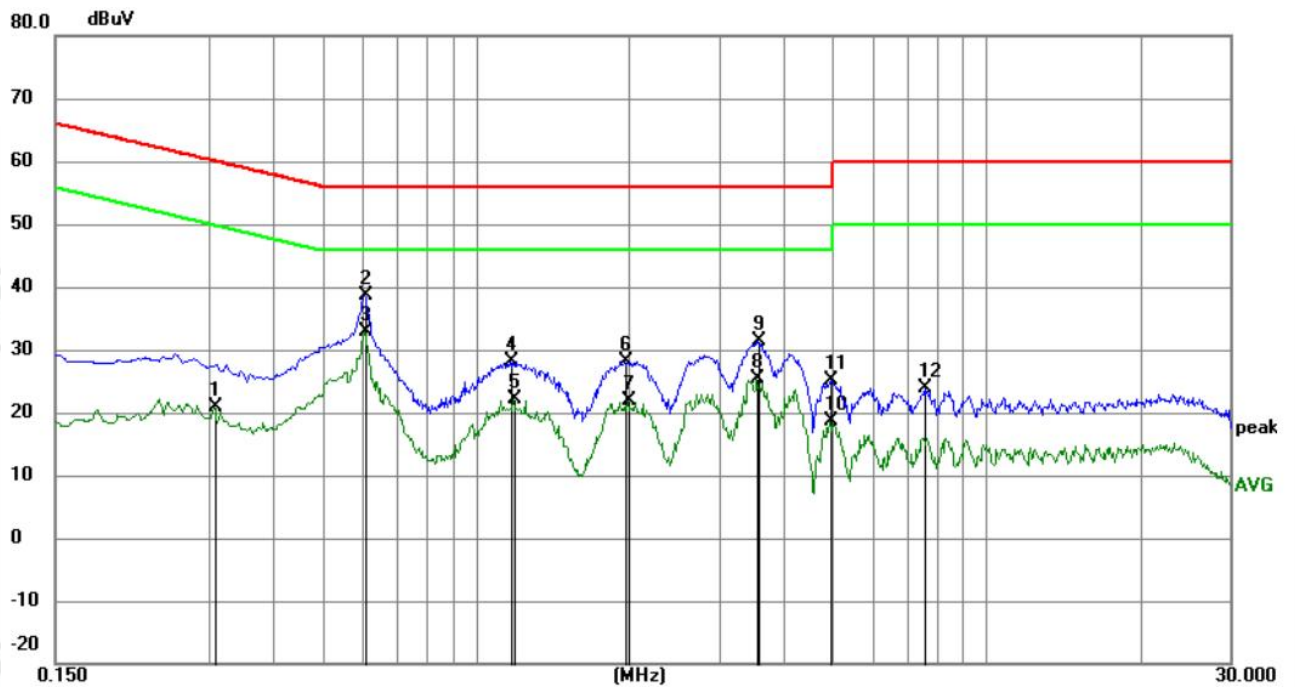
Test Setup:



Test Mode: Transmitter mode
Test Results: Pass

Measurement Data of WS-K02D

Live line:

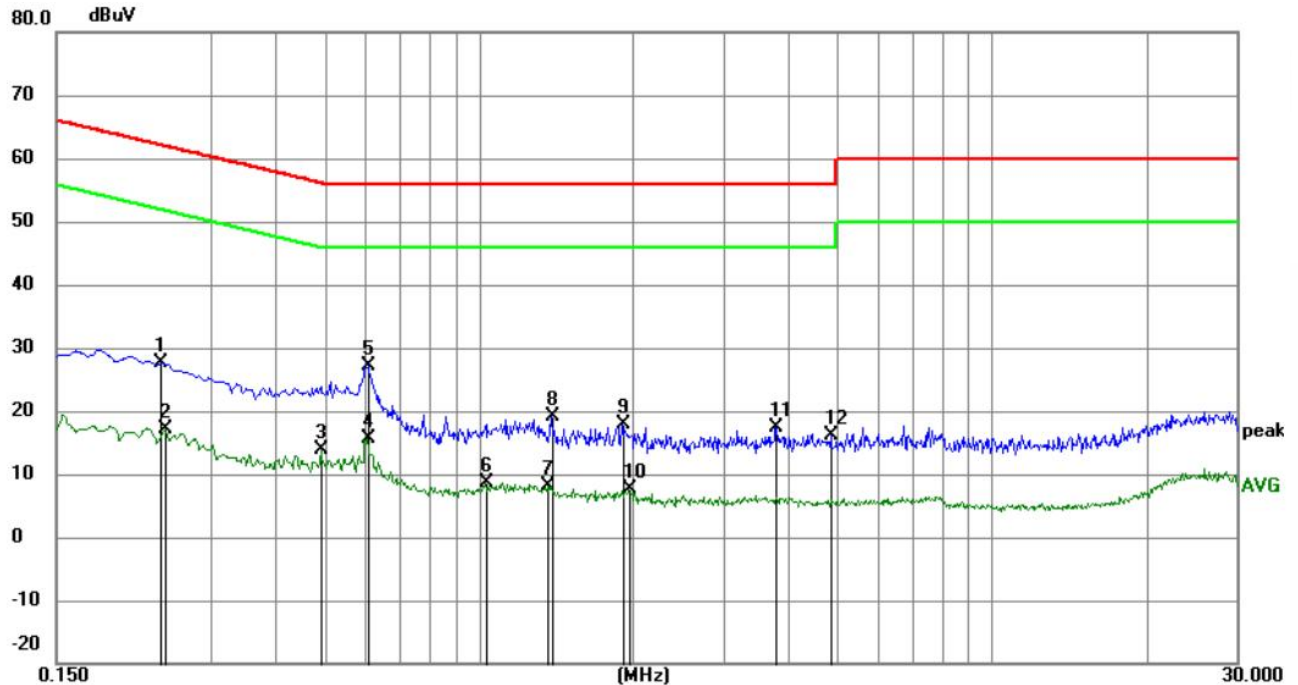


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.3075	10.64	10.13	20.77	50.04	-29.27	AVG	
2		0.6045	28.59	10.10	38.69	56.00	-17.31	QP	
3	*	0.6045	22.72	10.10	32.82	46.00	-13.18	AVG	
4		1.1670	17.89	10.18	28.07	56.00	-27.93	QP	
5		1.1849	11.97	10.18	22.15	46.00	-23.85	AVG	
6		1.9635	17.94	10.17	28.11	56.00	-27.89	QP	
7		1.9815	11.60	10.17	21.77	46.00	-24.23	AVG	
8		3.5520	15.16	10.11	25.27	46.00	-20.73	AVG	
9		3.5835	21.19	10.11	31.30	56.00	-24.70	QP	
10		4.9515	8.55	10.06	18.61	46.00	-27.39	AVG	
11		4.9560	15.00	10.06	25.06	56.00	-30.94	QP	
12		7.5840	13.89	10.01	23.90	60.00	-36.10	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:



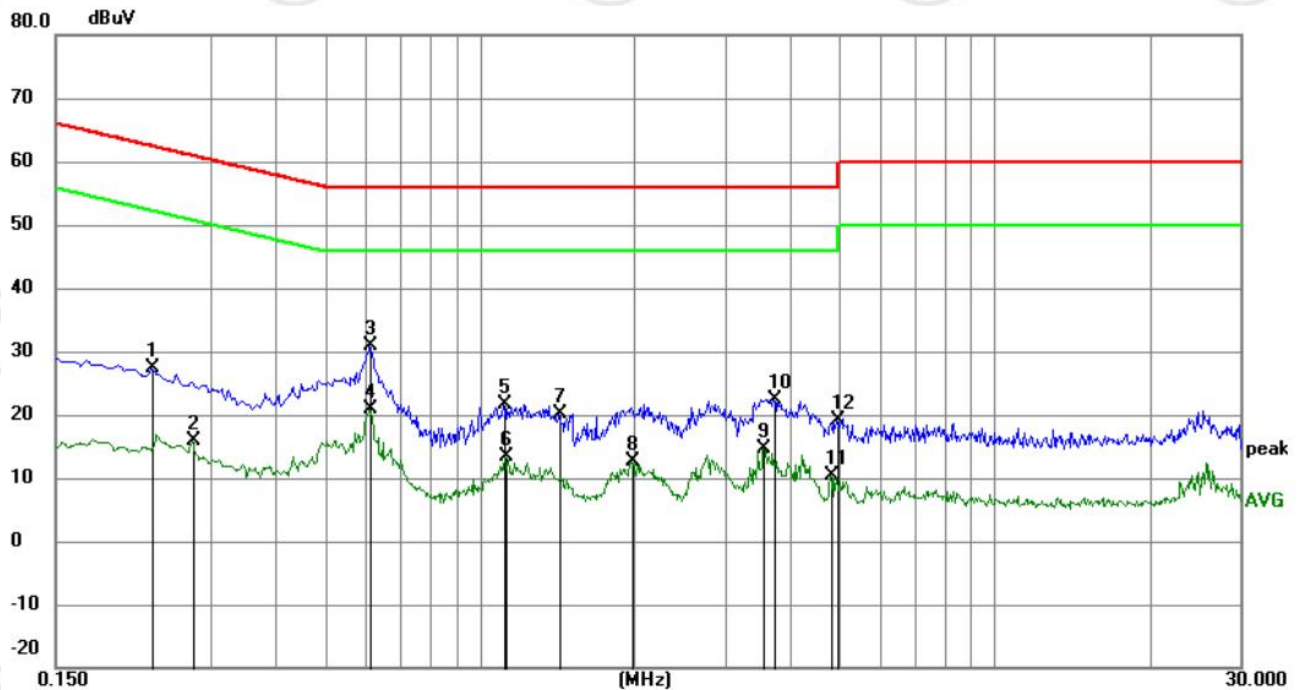
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2400	17.50	10.18	27.68	62.10	-34.42	QP	
2		0.2445	7.03	10.17	17.20	51.94	-34.74	AVG	
3		0.4920	3.69	10.08	13.77	46.13	-32.36	AVG	
4		0.6045	5.54	10.10	15.64	46.00	-30.36	AVG	
5	*	0.6090	16.91	10.10	27.01	56.00	-28.99	QP	
6		1.0275	-1.62	10.18	8.56	46.00	-37.44	AVG	
7		1.3650	-2.04	10.18	8.14	46.00	-37.86	AVG	
8		1.3875	8.89	10.18	19.07	56.00	-36.93	QP	
9		1.9050	7.75	10.17	17.92	56.00	-38.08	QP	
10		1.9635	-2.63	10.17	7.54	46.00	-38.46	AVG	
11		3.7905	7.29	10.10	17.39	56.00	-38.61	QP	
12		4.8615	6.07	10.07	16.14	56.00	-39.86	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Measurement Data of WS-K03D

Live line:

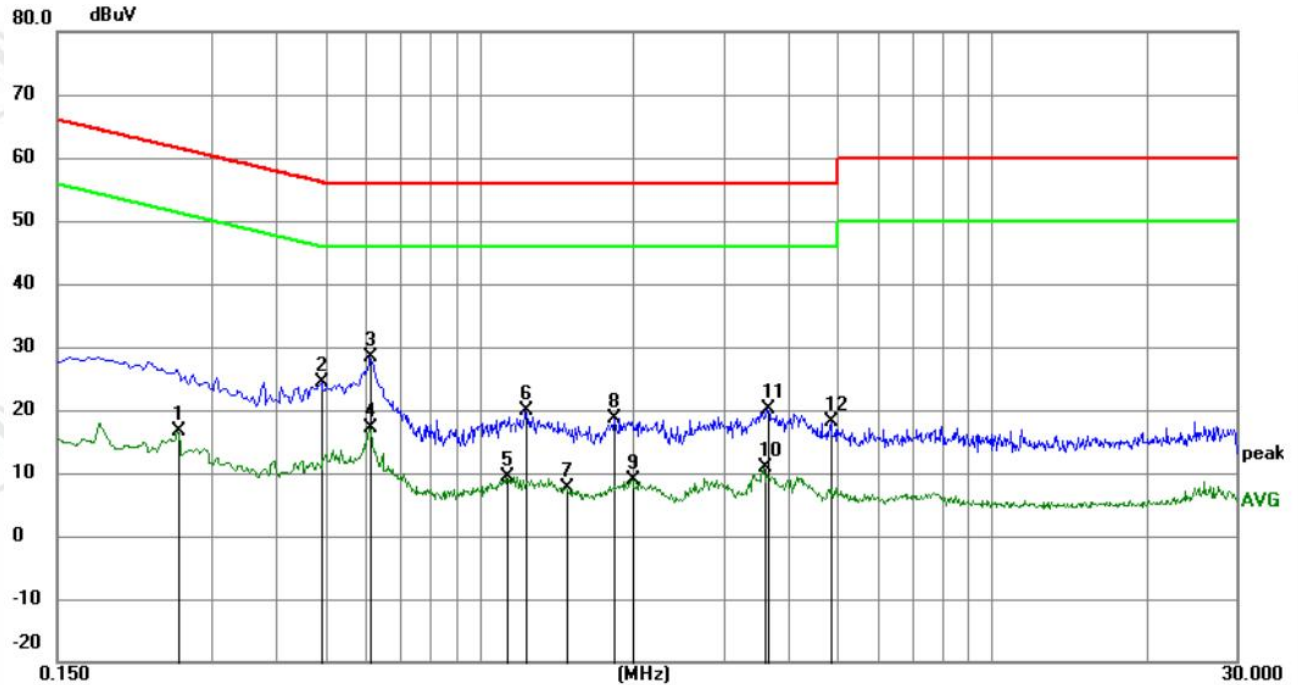


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2310	17.14	10.19	27.33	62.41	-35.08	QP	
2		0.2760	5.68	10.15	15.83	50.94	-35.11	AVG	
3	*	0.6134	20.79	10.10	30.89	56.00	-25.11	QP	
4		0.6134	10.67	10.10	20.77	46.00	-25.23	AVG	
5		1.1130	11.43	10.18	21.61	56.00	-34.39	QP	
6		1.1174	3.08	10.18	13.26	46.00	-32.74	AVG	
7		1.4325	9.96	10.18	20.14	56.00	-35.86	QP	
8		1.9770	2.34	10.17	12.51	46.00	-33.49	AVG	
9		3.5475	4.60	10.11	14.71	46.00	-31.29	AVG	
10		3.7320	12.31	10.11	22.42	56.00	-33.58	QP	
11		4.8210	0.24	10.07	10.31	46.00	-35.69	AVG	
12		4.9515	9.11	10.06	19.17	56.00	-36.83	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:



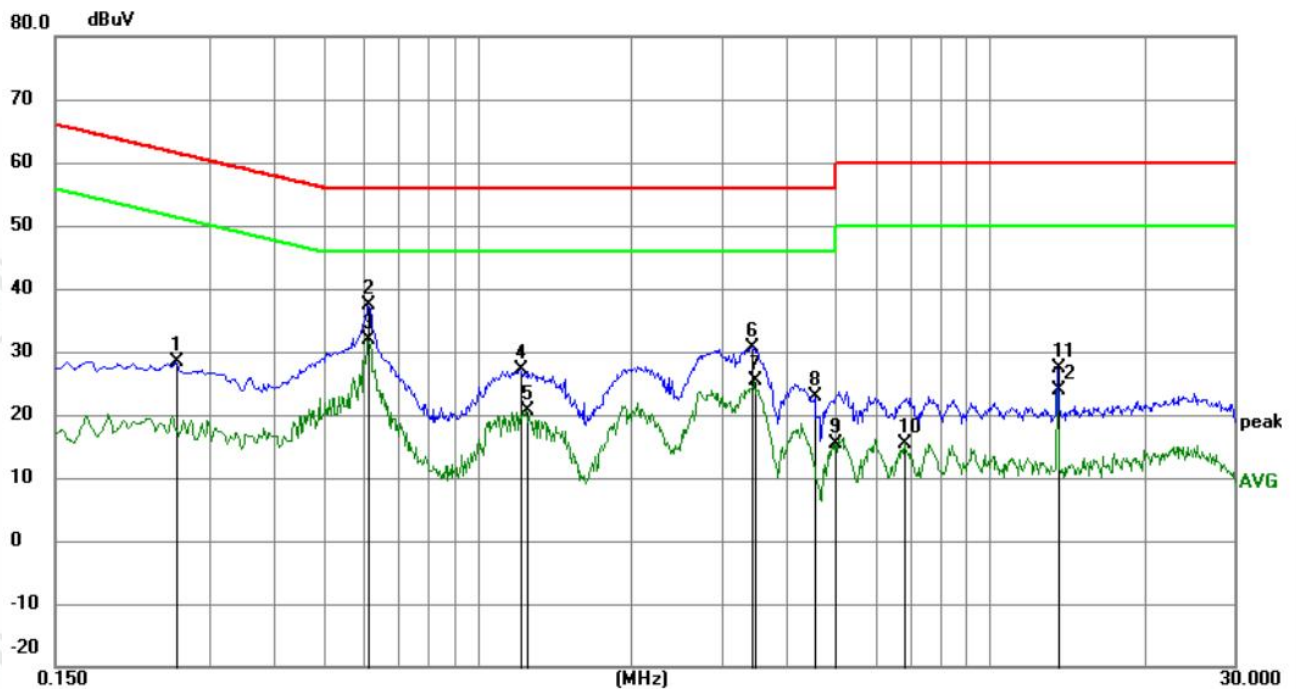
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2580	6.36	10.16	16.52	51.50	-34.98	AVG	
2		0.4920	14.39	10.08	24.47	56.13	-31.66	QP	
3	*	0.6134	18.18	10.10	28.28	56.00	-27.72	QP	
4		0.6134	6.93	10.10	17.03	46.00	-28.97	AVG	
5		1.1310	-0.73	10.18	9.45	46.00	-36.55	AVG	
6		1.2345	9.73	10.18	19.91	56.00	-36.09	QP	
7		1.4775	-2.48	10.18	7.70	46.00	-38.30	AVG	
8		1.8330	8.57	10.17	18.74	56.00	-37.26	QP	
9		1.9815	-1.21	10.17	8.96	46.00	-37.04	AVG	
10		3.6015	0.88	10.11	10.99	46.00	-35.01	AVG	
11		3.6600	9.92	10.11	20.03	56.00	-35.97	QP	
12		4.8525	8.08	10.07	18.15	56.00	-37.85	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Measurement Data of WS-K04D

Live line:

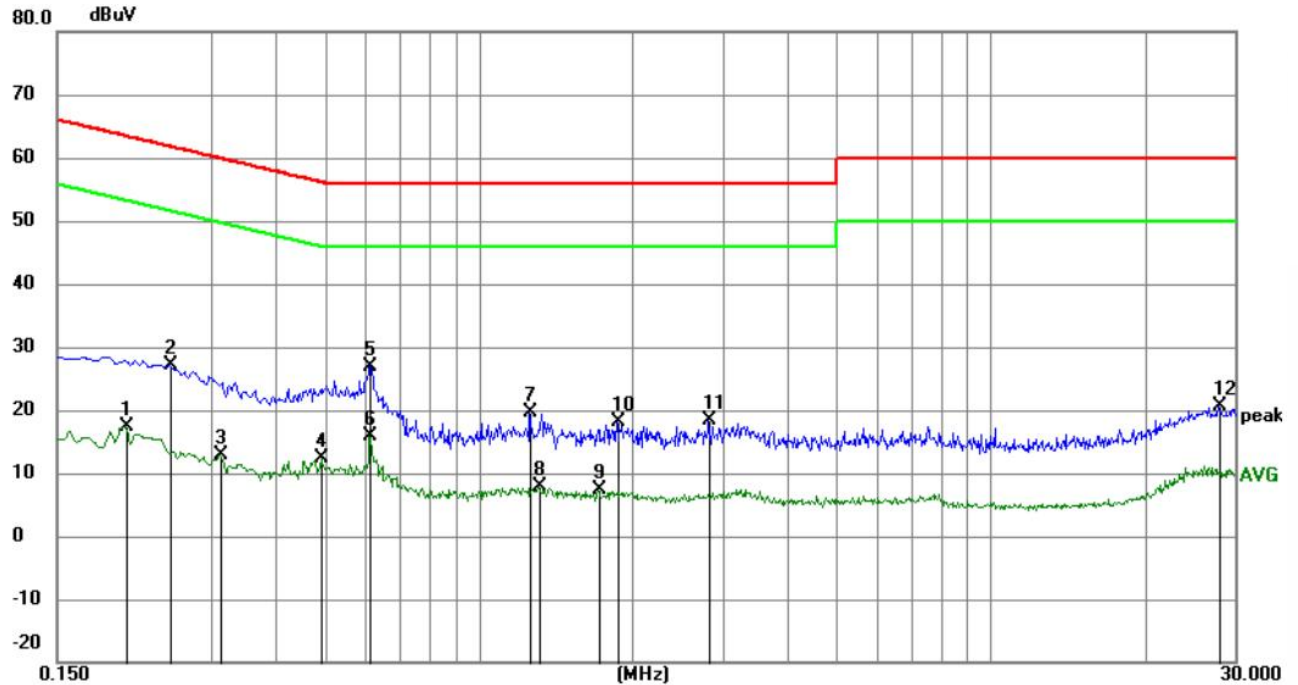


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.2580	18.14	10.16	28.30	61.50	-33.20	QP	
2		0.6134	27.39	10.10	37.49	56.00	-18.51	QP	
3	*	0.6134	21.70	10.10	31.80	46.00	-14.20	AVG	
4		1.2120	16.86	10.18	27.04	56.00	-28.96	QP	
5		1.2435	10.38	10.18	20.56	46.00	-25.44	AVG	
6		3.4305	20.52	10.12	30.64	56.00	-25.36	QP	
7		3.4800	15.34	10.12	25.46	46.00	-20.54	AVG	
8		4.5734	12.81	10.08	22.89	56.00	-33.11	QP	
9		4.9920	5.25	10.06	15.31	46.00	-30.69	AVG	
10		6.8370	5.47	10.03	15.50	50.00	-34.50	AVG	
11		13.5600	17.51	9.89	27.40	60.00	-32.60	QP	
12		13.5600	14.03	9.89	23.92	50.00	-26.08	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.2040	7.22	10.21	17.43	53.45	-36.02	AVG	
2		0.2490	16.89	10.17	27.06	61.79	-34.73	QP	
3		0.3120	2.76	10.13	12.89	49.92	-37.03	AVG	
4		0.4920	2.40	10.08	12.48	46.13	-33.65	AVG	
5	*	0.6134	16.83	10.10	26.93	56.00	-29.07	QP	
6		0.6134	5.72	10.10	15.82	46.00	-30.18	AVG	
7		1.2615	9.47	10.18	19.65	56.00	-36.35	QP	
8		1.3154	-2.41	10.18	7.77	46.00	-38.23	AVG	
9		1.7160	-2.78	10.17	7.39	46.00	-38.61	AVG	
10		1.8645	7.85	10.17	18.02	56.00	-37.98	QP	
11		2.8140	8.35	10.14	18.49	56.00	-37.51	QP	
12		27.9870	10.71	9.82	20.53	60.00	-39.47	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

6.3 Radiated Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.249 & Section 15.209 & Section 15.205

Test Method: ANSI C63.10 : 2013

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10kHz	Average

Limit:
(Spurious
Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dB μ V/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Limit:
(Field strength of the
Fundamental and
harmonics signal)

Frequency (GHz)	Field strength of fundamental Limit (dB μ V/m @3m)	Field strength of harmonics Limit (dB μ V/m @3m)	Remark
24.0 to 24.25	107.96	67.96	Average Value
	127.96	87.96	Peak Value

Test Setup:

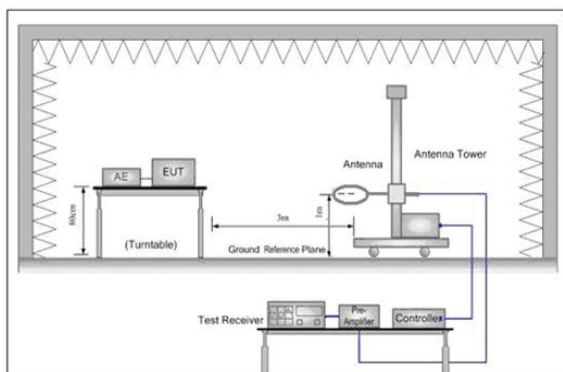


Figure 1. Below 30MHz

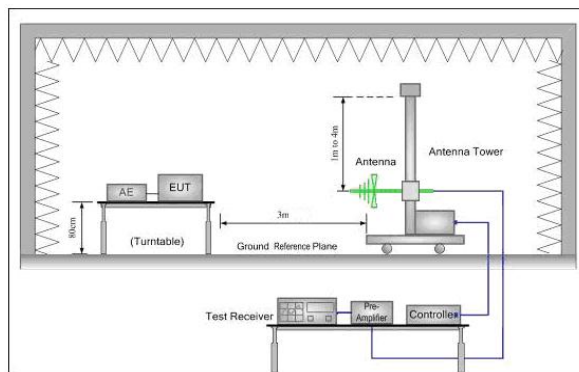


Figure 2. 30MHz to 1GHz

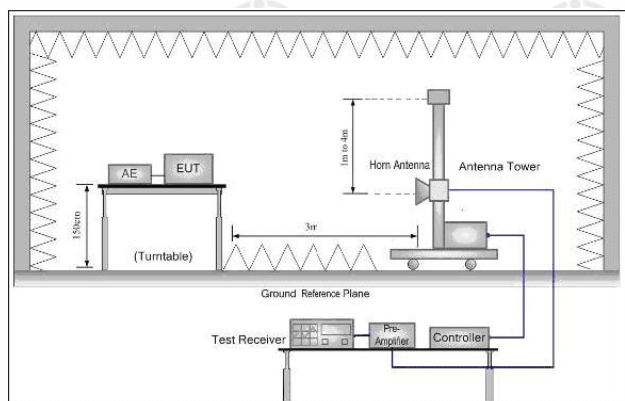


Figure 3. Above 1GHz

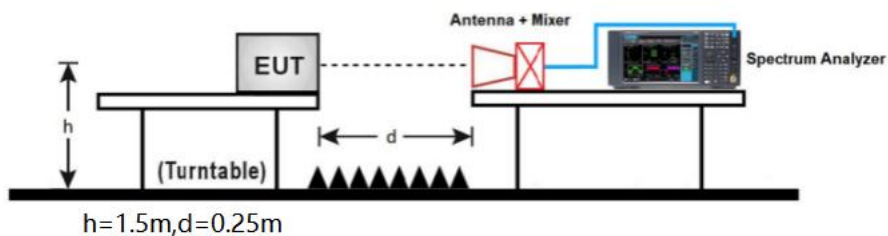


Figure 4. Above 41GHz

Test Procedure:**Below 1GHz test procedure as below:**

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

Different from above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change from table 0.8 metre to 1.5 metre (Above 18GHz the distance is 1 meter and table is 1.5 metre).

Above 41GHz test procedure as below:

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

The EUT was set 0.25 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test the EUT in the only channel.

The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which is the worst case.

Repeat above procedures until all frequencies measured were complete.

Note: According to RSS-Gen Issue 5 February 2021 Section §6.13.2, If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Test Mode:

Transmitting mode

Test Results:

Pass

Report No. : EED32R81695401
Measurement Data

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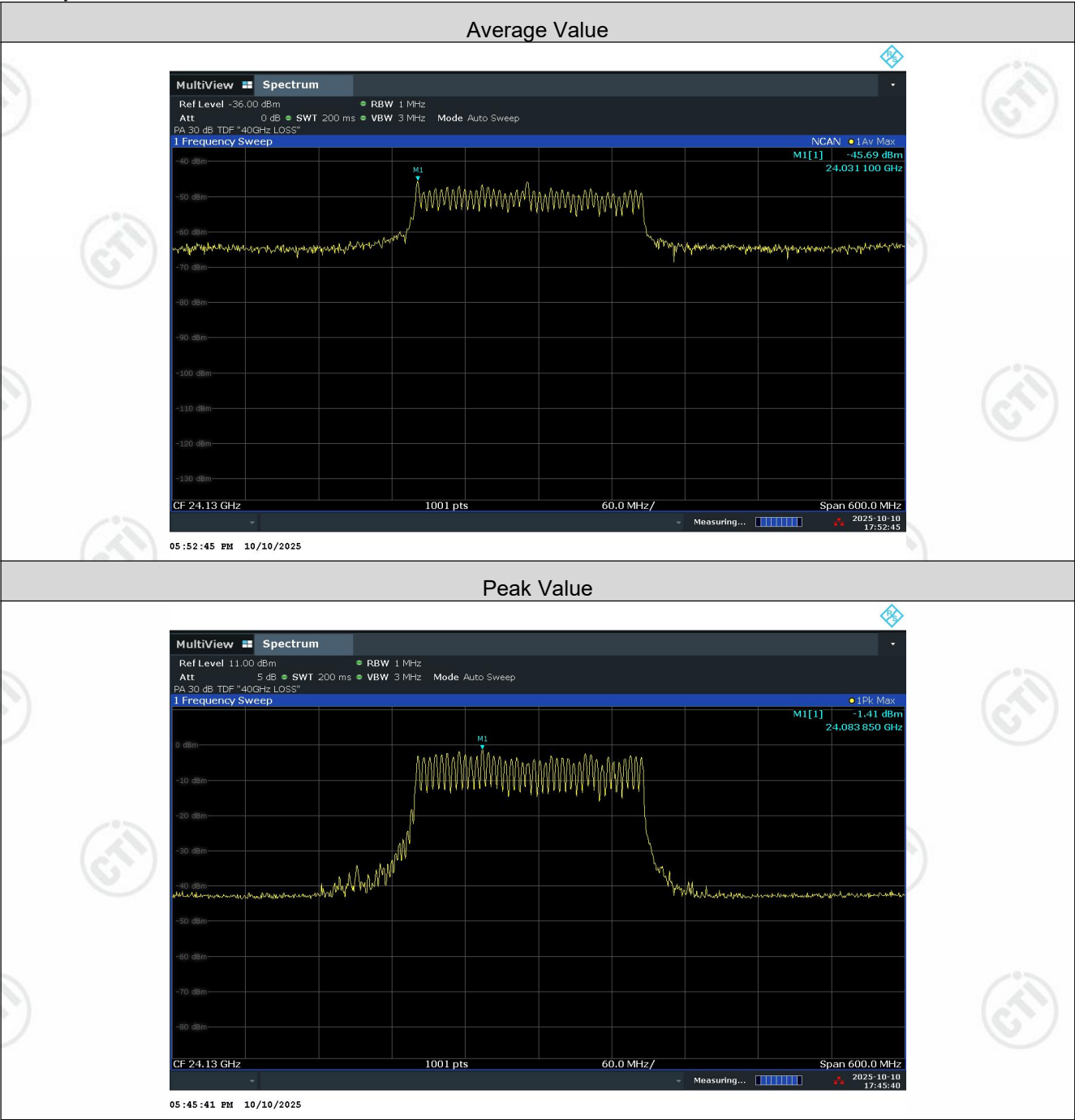
Field Strength Of The Fundamental Signal:

Test frequency (GHz)	EIRP (dBm)	Field strength of fundamental (dBμV/m @3m)	Field strength of fundamental Limit (dBμV/m @3m)	Results	Remark
24.13	-45.69	49.54	147.96	Pass	Average Value
	-1.41	93.82	167.96	Pass	Peak Value

Note:

- ① Only the worst case data of horizontal of WS-K04D was recorded in the report.
- ② Field strength of fundamental (dBμV/m @3m)=EIRP(dBm)+95.23;

Test plot as follows:

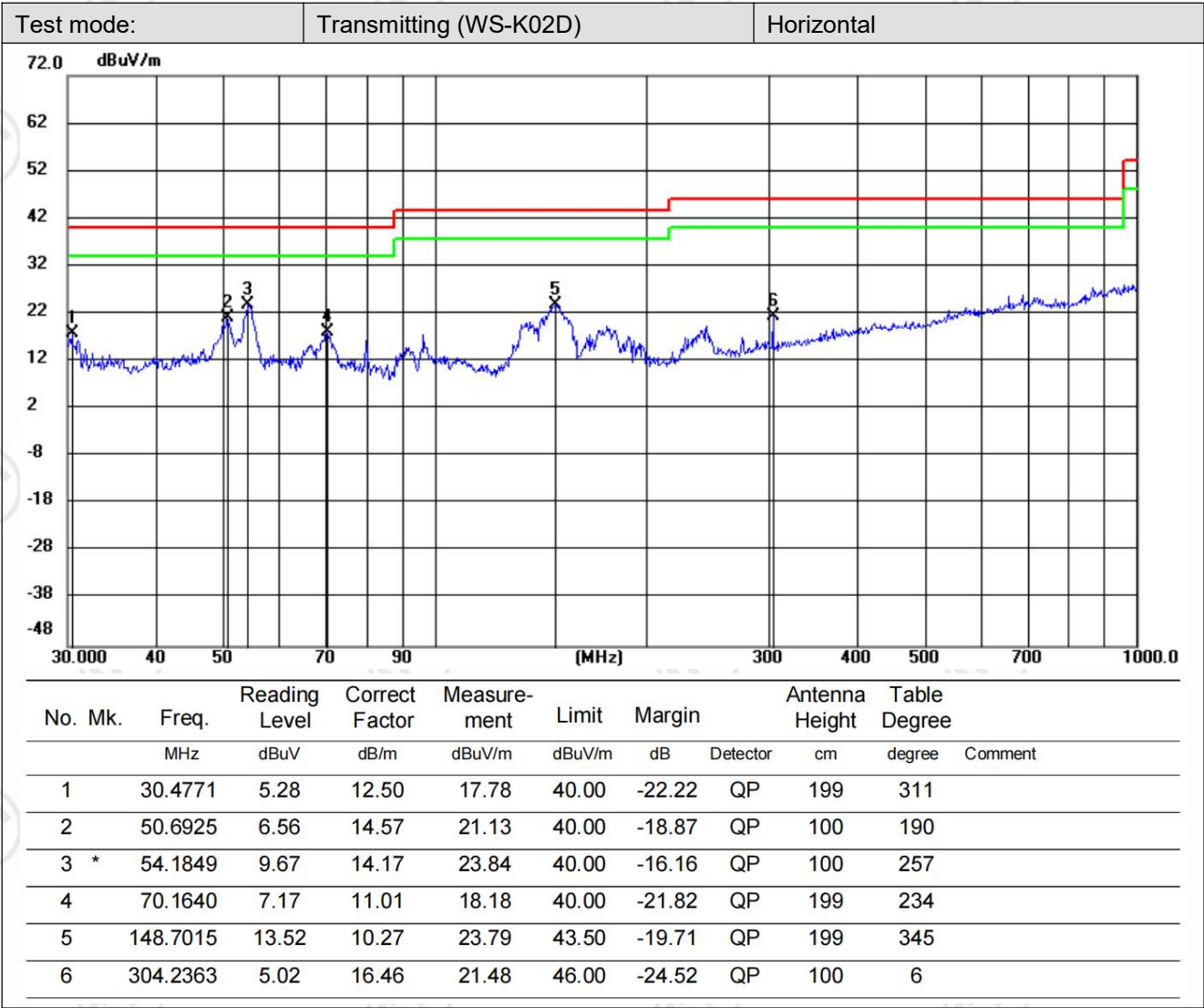


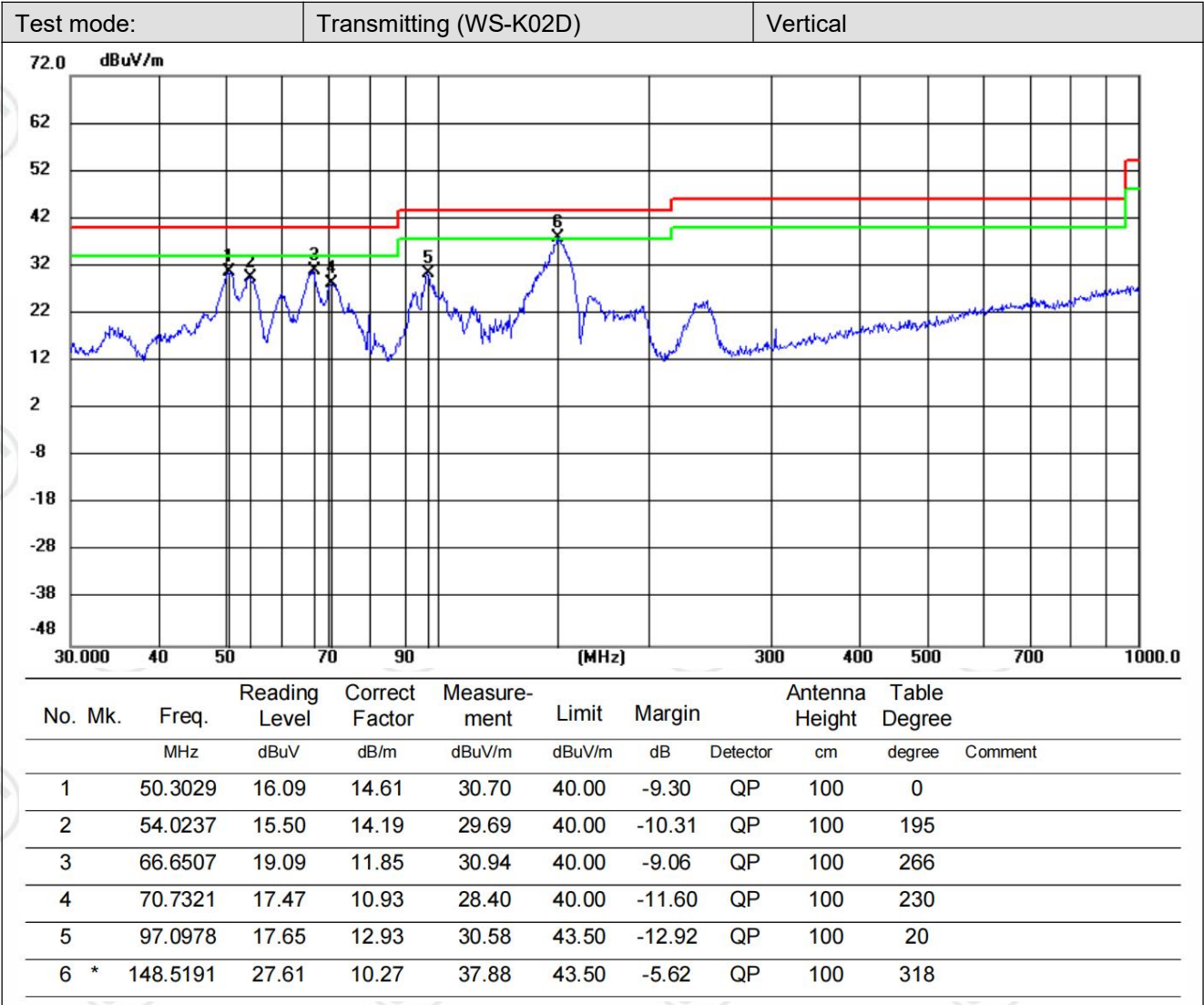
Spurious Emissions:

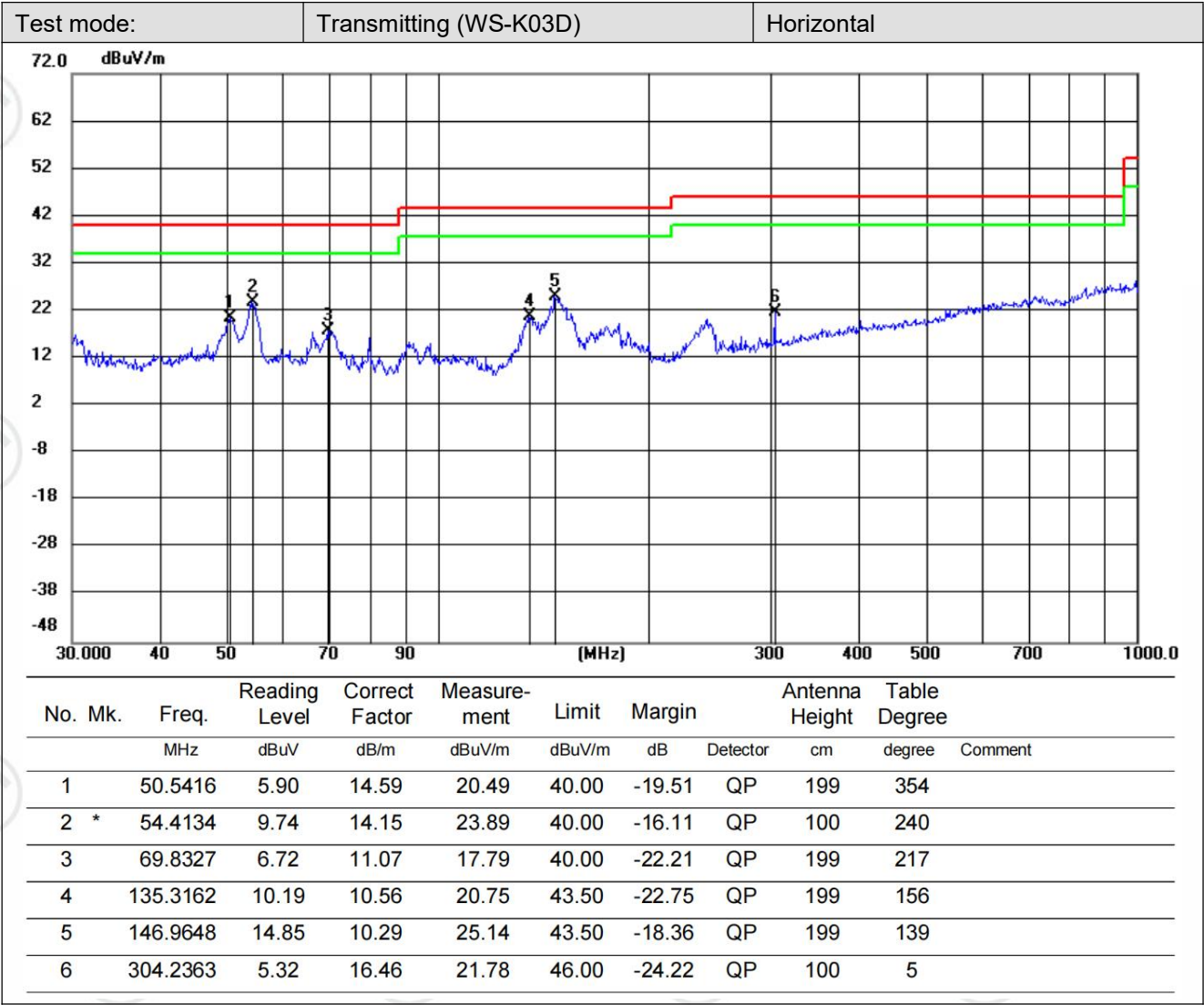
9kHz-30MHz:

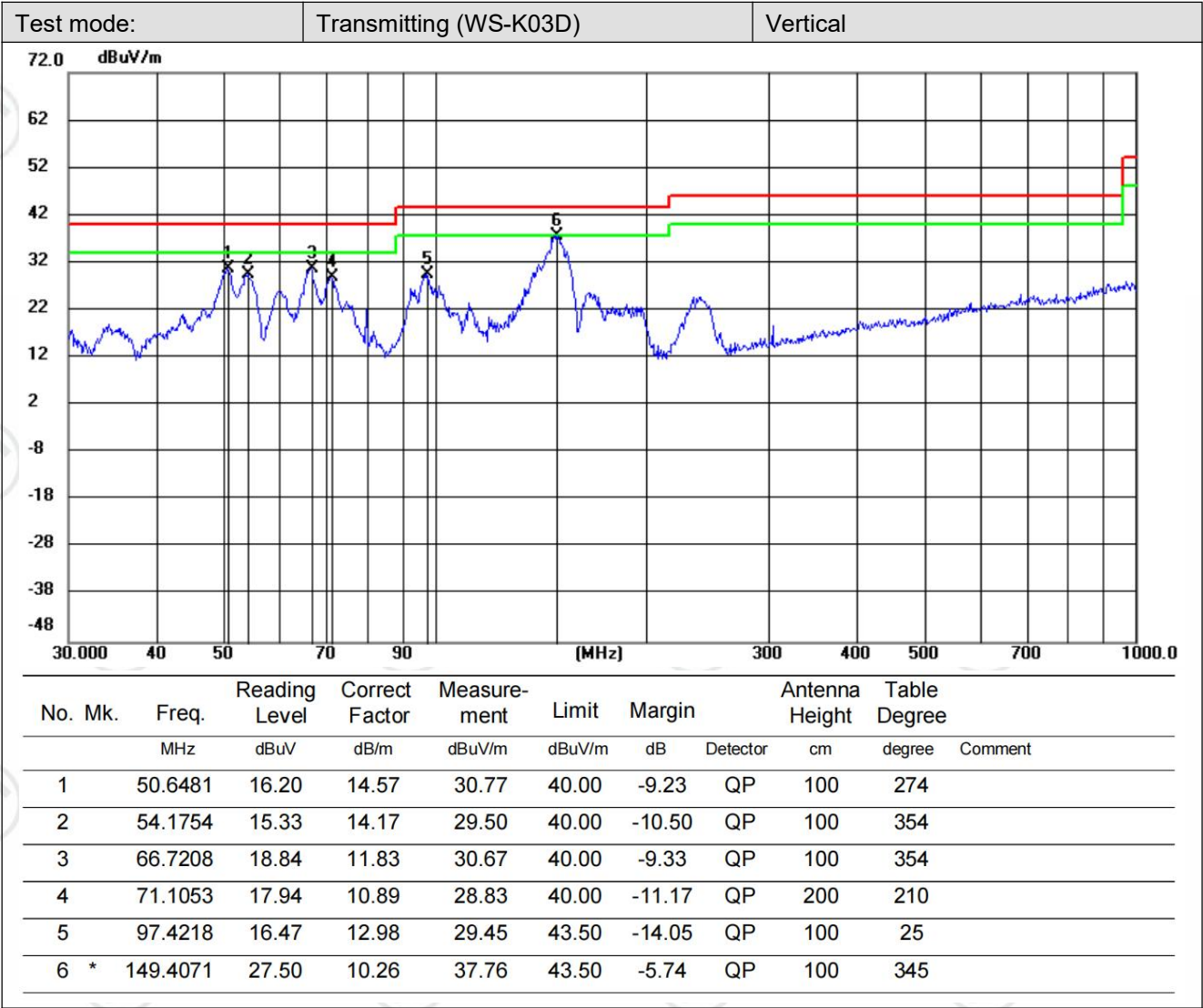
9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

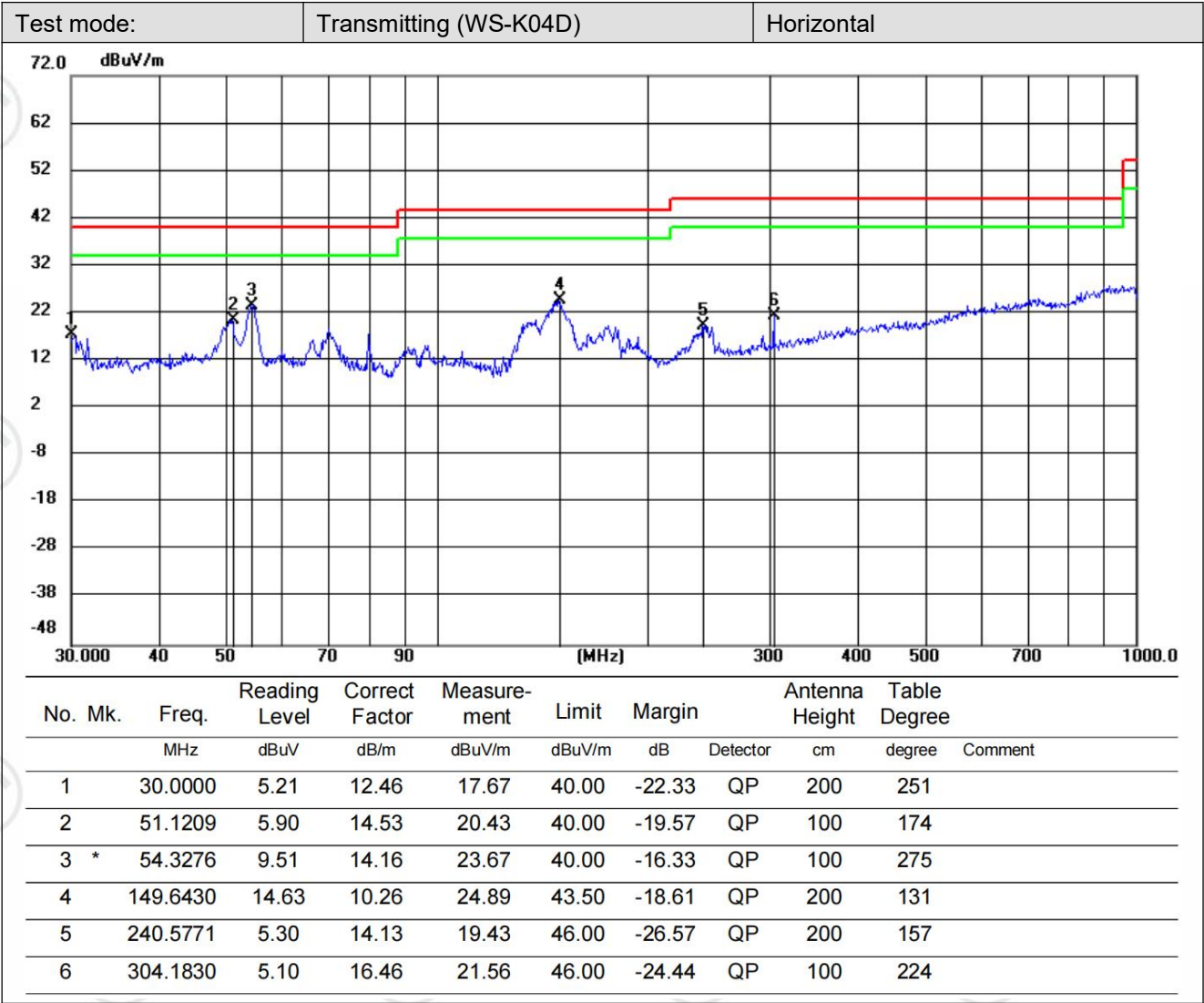
30MHz-1GHz:

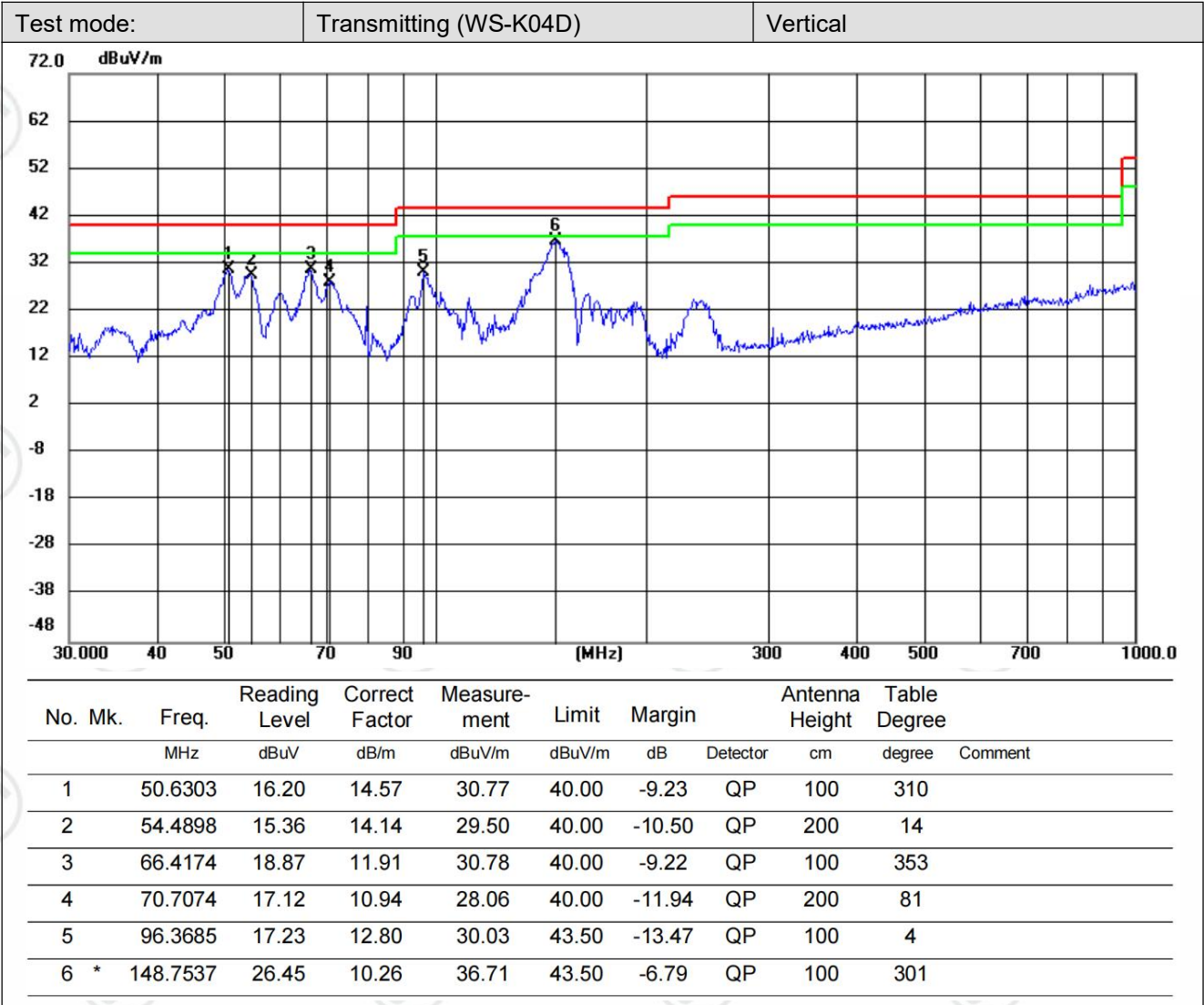












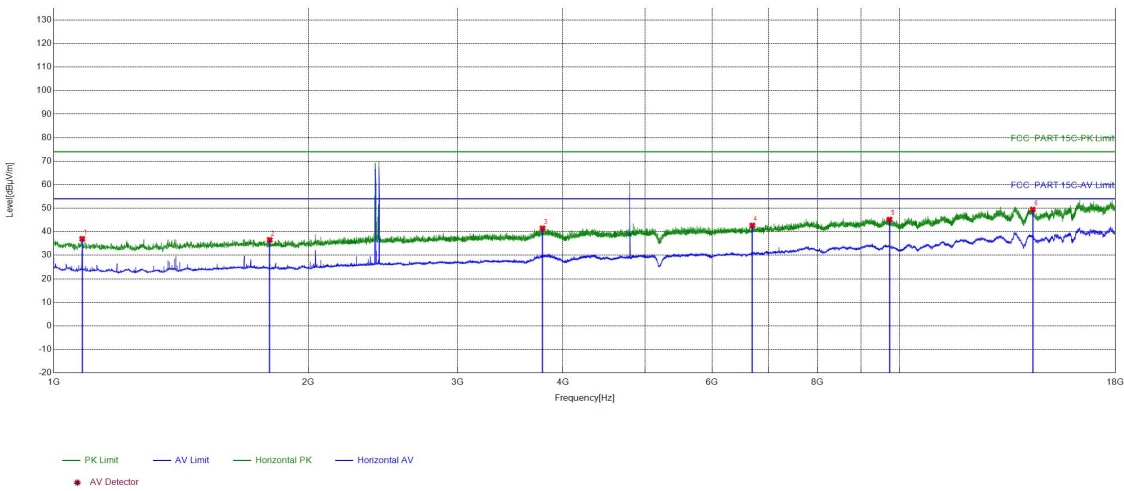
Note:

- ①Measurement(dBuV/m)=Reading Level(dBuV)+Correct Factor(dB);
- ②Margin(dB)=Measurement(dBuV/m)-Limit(dBuV/m);

Above 1GHz:

Test_Mode	TX	Test_Frequency	24.13GHz
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Test Graph

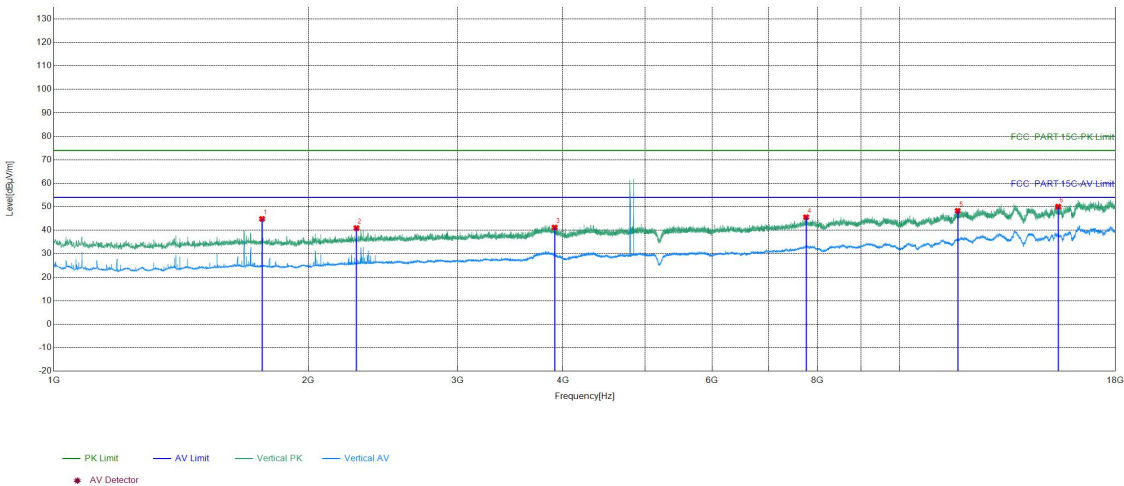


Suspected List

NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1080.5081	-22.73	59.72	36.99	74.00	37.01	PASS	Horizontal	PK
2	1800.08	-20.12	56.69	36.57	74.00	37.43	PASS	Horizontal	PK
3	3783.2783	-12.90	54.37	41.47	74.00	32.53	PASS	Horizontal	PK
4	6698.4698	-3.36	46.05	42.69	74.00	31.31	PASS	Horizontal	PK
5	9729.973	1.29	43.92	45.21	74.00	28.79	PASS	Horizontal	PK
6	14370.8371	9.28	40.16	49.44	74.00	24.56	PASS	Horizontal	PK

Test_Mode	TX	Test_Frequency	24.13GHz
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Test Graph



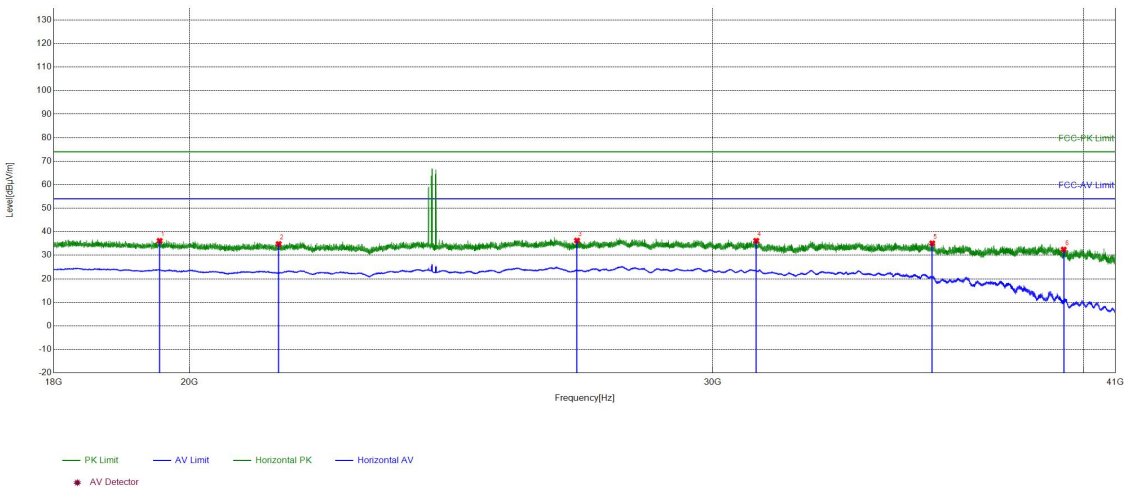
Suspected List

NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1763.0763	-20.39	65.24	44.85	74.00	29.15	PASS	Vertical	PK
2	2279.628	-18.29	59.21	40.92	74.00	33.08	PASS	Vertical	PK
3	3910.291	-12.18	53.38	41.20	74.00	32.80	PASS	Vertical	PK
4	7753.3753	-1.48	47.04	45.56	74.00	28.44	PASS	Vertical	PK
5	11716.1716	2.58	45.70	48.28	74.00	25.72	PASS	Vertical	PK
6	15400.5401	11.43	38.65	50.08	74.00	23.92	PASS	Vertical	PK

Above 18GHz:

Test_Mode	TX	Test_Frequency	24.13GHz
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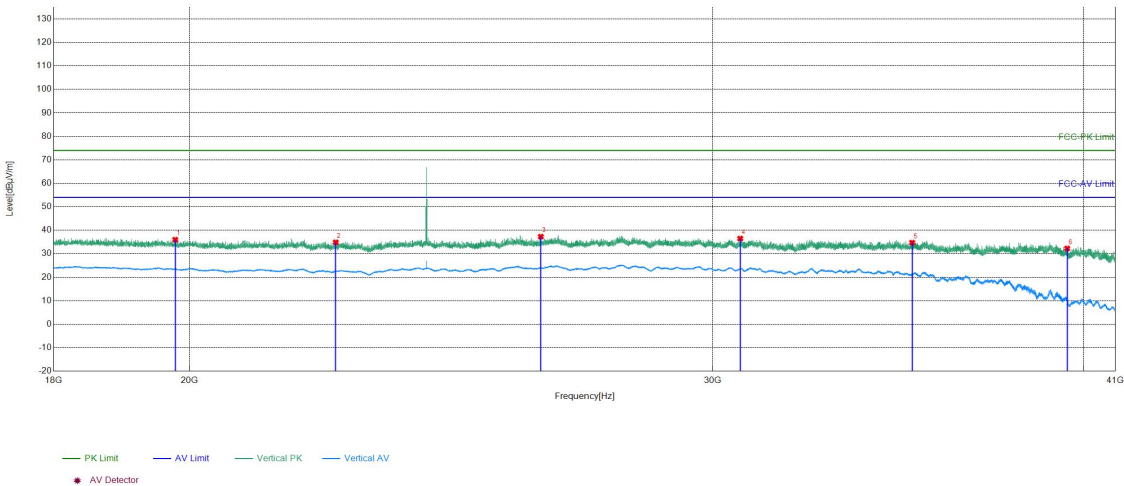
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	19539.2216	-25.60	61.75	36.15	74.00	37.85	PASS	Horizontal	PK
2	21428.9772	-25.86	60.66	34.80	74.00	39.20	PASS	Horizontal	PK
3	27006.2402	-21.83	58.08	36.25	74.00	37.75	PASS	Horizontal	PK
4	31033.2413	-19.44	55.61	36.17	74.00	37.83	PASS	Horizontal	PK
5	35569.9428	-16.15	51.25	35.10	74.00	38.90	PASS	Horizontal	PK
6	39388.0955	-13.91	46.36	32.45	74.00	41.55	PASS	Horizontal	PK

Test_Mode	TX	Test_Frequency	24.13GHz
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Test Graph



Suspected List

NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	19777.5111	-25.27	61.24	35.97	74.00	38.03	PASS	Vertical	PK
2	22398.6959	-25.10	59.95	34.85	74.00	39.15	PASS	Vertical	PK
3	26259.1704	-21.30	58.58	37.28	74.00	36.72	PASS	Vertical	PK
4	30650.506	-20.35	56.82	36.47	74.00	37.53	PASS	Vertical	PK
5	35021.6009	-16.08	50.81	34.73	74.00	39.27	PASS	Vertical	PK
6	39494.8198	-13.88	46.13	32.25	74.00	41.75	PASS	Vertical	PK

41GHz-100GHz:

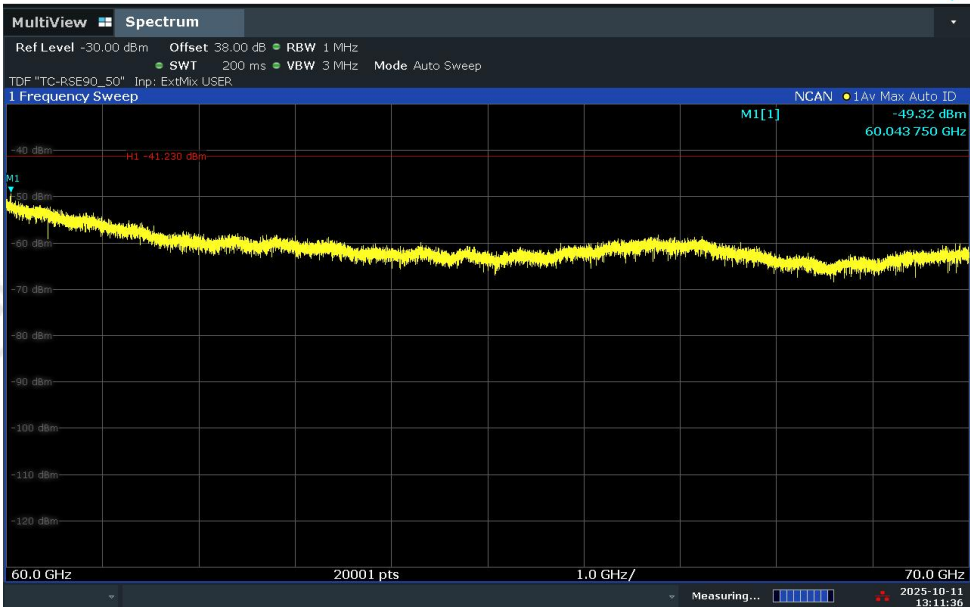
Test Frequency (GHz)	Polarity	EIRP (dBm)	Radiated Spurious Emissions (dBuV/m)	Limit of Radiated Spurious Emissions (dBuV/m)	Margin (dB)	Result
41.013720	Horizontal	-46.55	48.68	54.0	-5.32	Pass
50.311730	Horizontal	-50.64	44.59	54.0	-9.41	Pass
60.035750	Horizontal	-50.16	45.07	54.0	-8.93	Pass
70.588220	Horizontal	-59.21	36.02	54.0	-17.98	Pass
89.949250	Horizontal	-65.85	29.38	54.0	-24.62	Pass
99.478280	Horizontal	-53.70	41.53	54.0	-12.47	Pass
41.013720	Vertical	-46.55	48.68	54.0	-5.32	Pass
50.311730	Vertical	-50.64	44.59	54.0	-9.41	Pass
60.035750	Vertical	-50.16	45.07	54.0	-8.93	Pass
70.588220	Vertical	-59.21	36.02	54.0	-17.98	Pass
89.949250	Vertical	-65.85	29.38	54.0	-24.62	Pass
99.478280	Vertical	-53.70	41.53	54.0	-12.47	Pass

Note:

- ① Radiated Spurious Emissions(dBuV/m)=EIRP(dBm)+95.23;
- ② Margin(dB)=Radiated Spurious Emissions(dBuV/m)-Limit of Radiated Spurious Emissions(dBuV/m);
- ③ EIRP(dBm) has added free space loss of 0.25cm distance.
- ④ Only the worst case data of WS-K04D was recorded in the report.

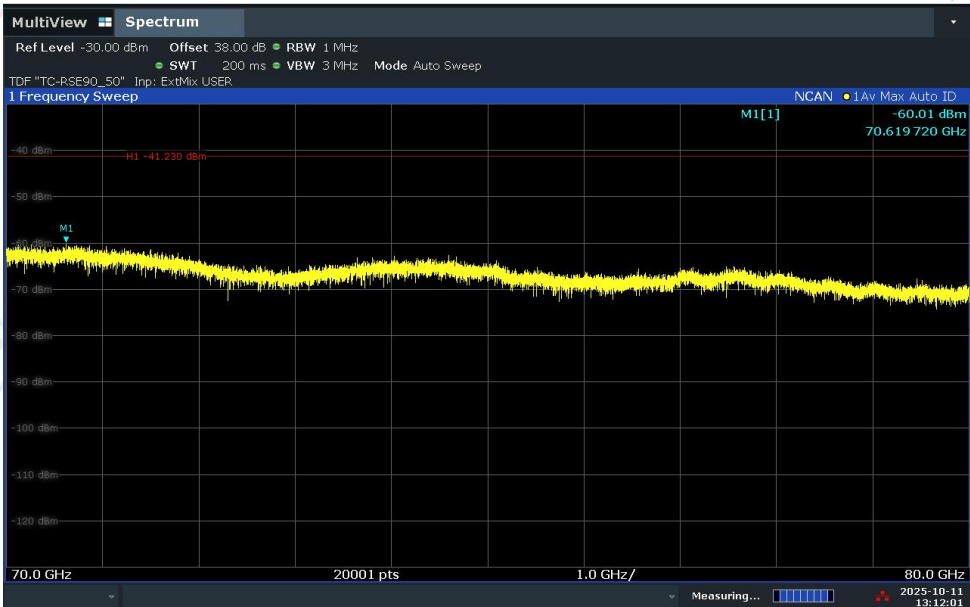
Test Graph





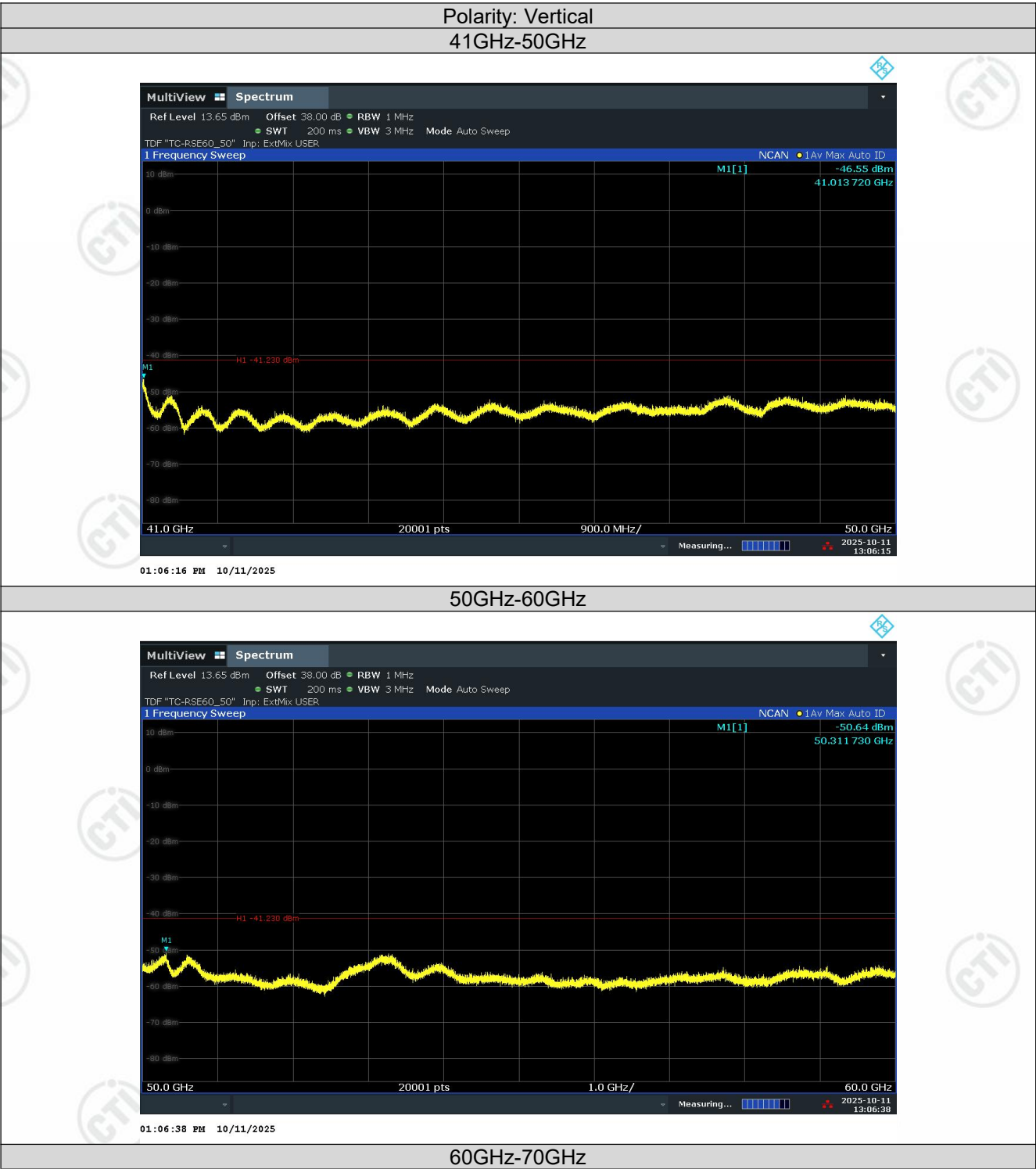
01:11:37 PM 10/11/2025

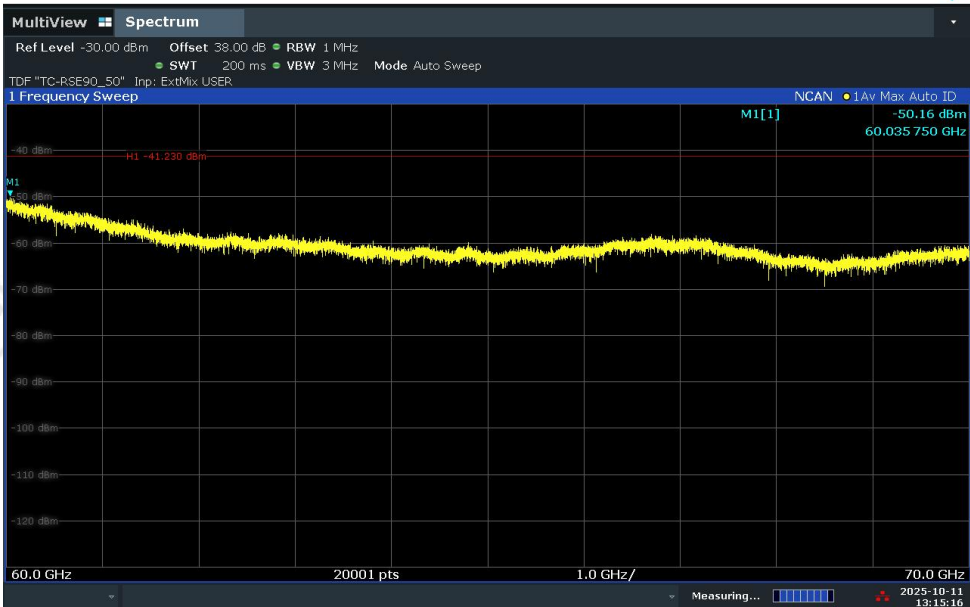
70GHz-80GHz



01:12:01 PM 10/11/2025

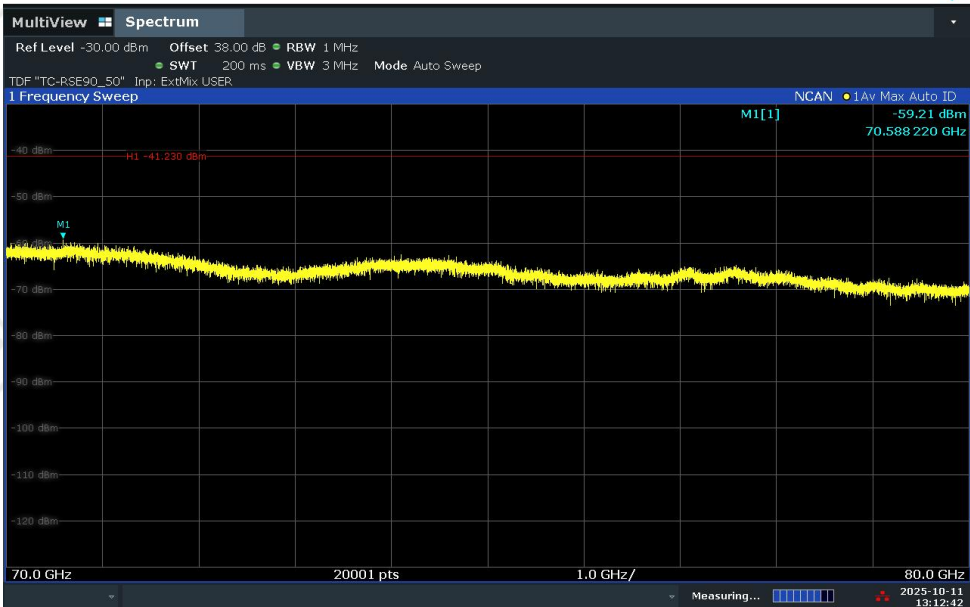
80GHz-90GHz





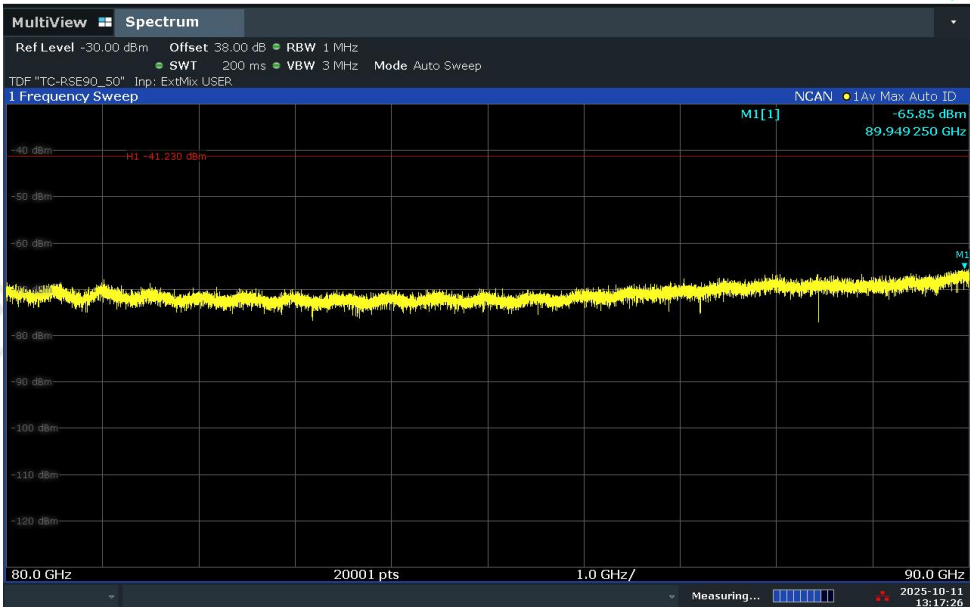
01:15:16 PM 10/11/2025

70GHz-80GHz

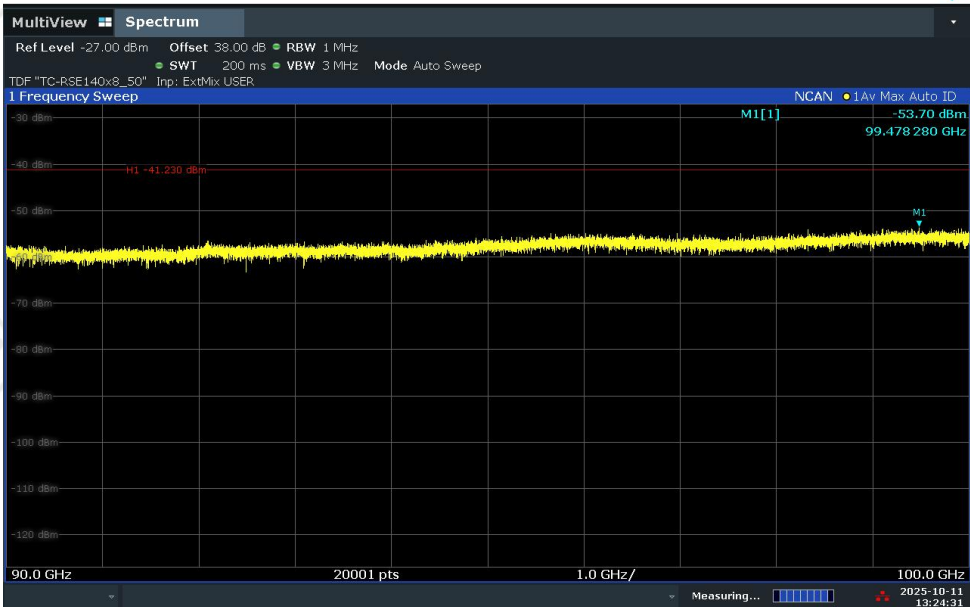


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80GHz-90GHz



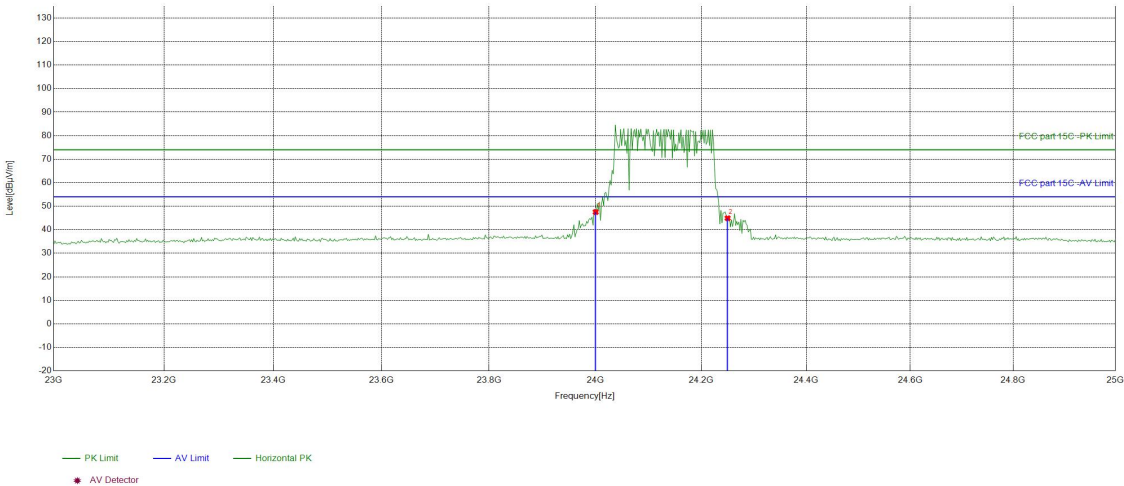
90GHz-100GHz



Restricted bands

Test_Mode	TX	Test_Frequency	24.13GHz
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Test Graph

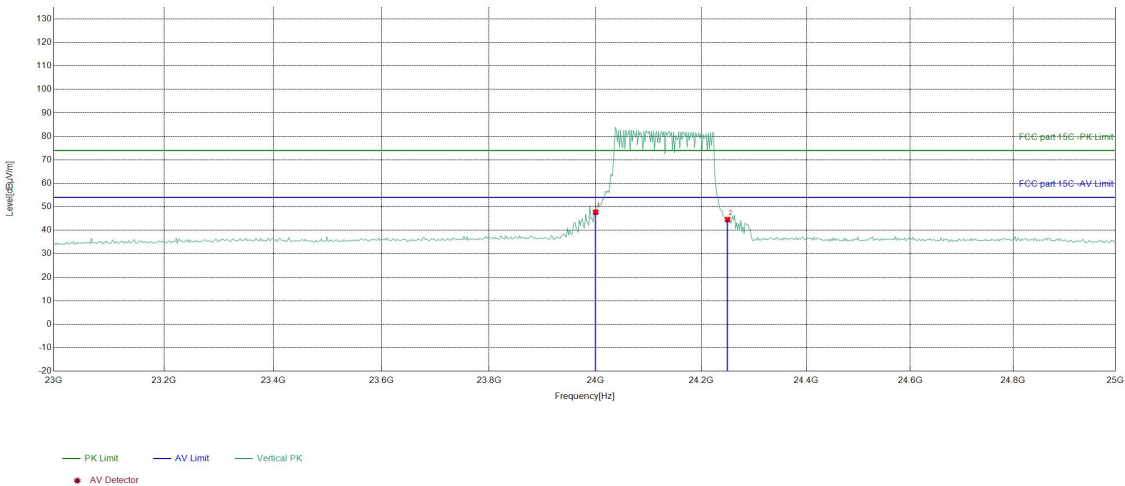


Suspected List

NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	24000	-21.94	69.47	47.53	74.00	26.47	PASS	Horizontal	PK
2	24250	-22.39	67.30	44.91	74.00	29.09	PASS	Horizontal	PK

Test_Mode	TX	Test_Frequency	24.13GHz
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Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	24000	-21.94	69.62	47.68	74.00	26.32	PASS	Vertical	PK
2	24250	-22.39	66.93	44.54	74.00	29.46	PASS	Vertical	PK

Remark:

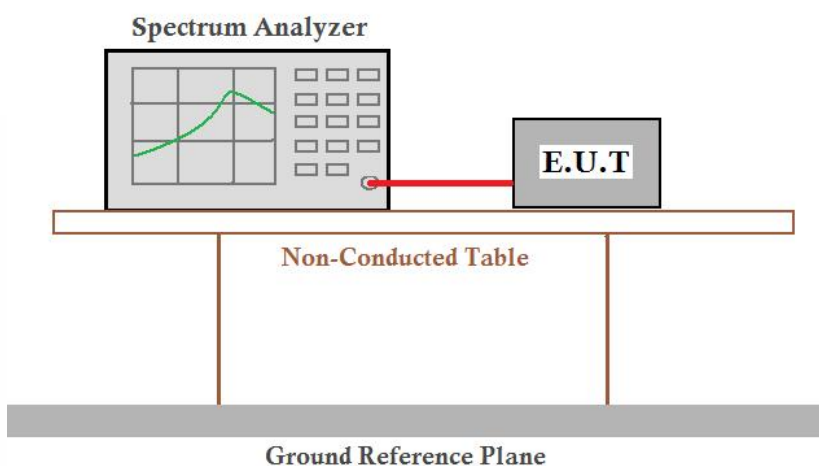
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Correct Factor;
Correct Factor =Antenna Factor + Cable Factor - Preamplifier Factor;

6.4 99% Occupied Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.215

Test Method: ANSI C63.10-2020

Test Setup:



Remark: Offset=Cable loss+ attenuation factor.

Test Procedure:

- 1) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 2) Set to the maximum power setting and enable the EUT transmit continuously.
- 3) Use the following spectrum analyzer settings for 99% Occupied Bandwidth measurement.
Span = approximately 2 to 5 times the 99% Occupied Bandwidth, centered on a test channel; $1\% \leq RBW \leq 5\%$ of the 99% Occupied Bandwidth; $VBW \geq 3RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
- 4) Measure and record the results in the test report.

Limit:

N/A

Test Mode:

Transmitter mode

Test Results:

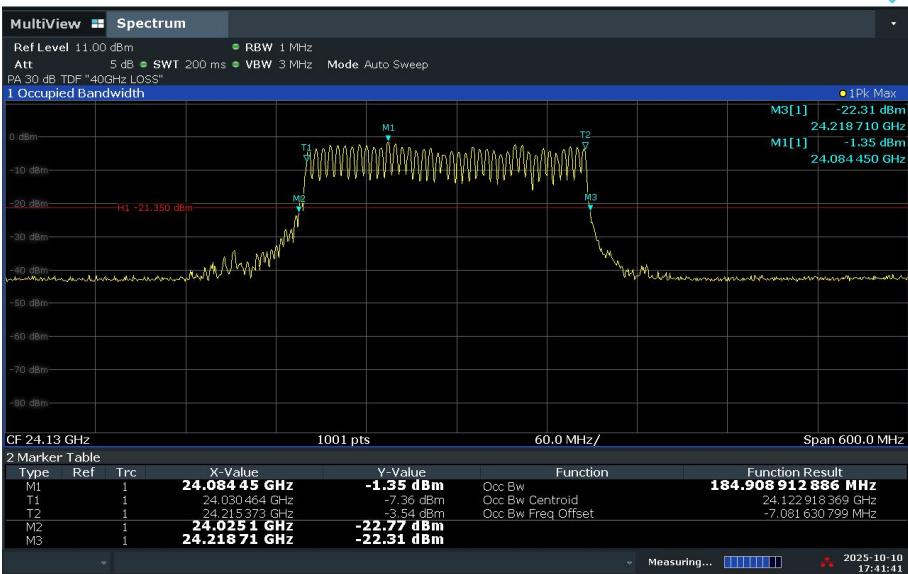
Pass

Measurement Data

Test Frequency (GHz)	99% Occupied Bandwidth (MHz)	Results
24.13	184.908912886	Pass

Note:Only the worst case data of WS-K04D was recorded in the report.

Test plot as follows:

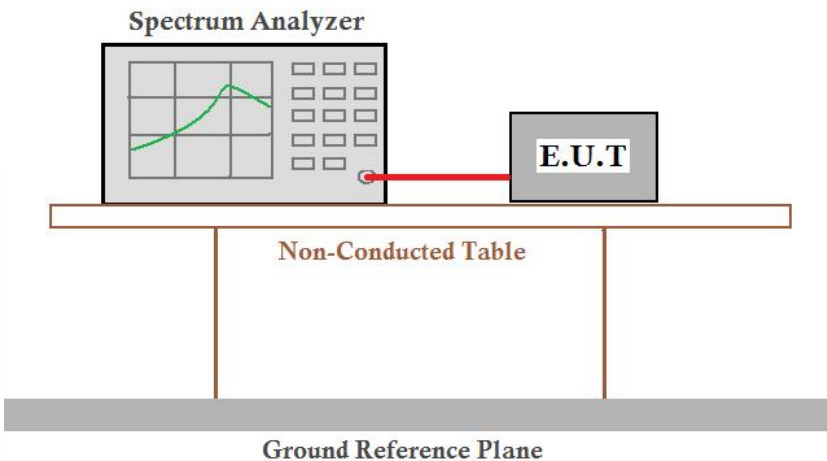


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6.5 20dB Occupied Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.215
Test Method: ANSI C63.10-2020

Test Setup:



Test Procedure:

Remark: Offset=Cable loss+ attenuation factor.
1) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2) Set to the maximum power setting and enable the EUT transmit continuously.
3) Use the following spectrum analyzer settings for 20dB Occupied Bandwidth measurement.
Span = approximately 2 to 5 times the 20dB Occupied Bandwidth, centered on a test channel; $1\% \leq RBW \leq 5\%$ of the 20dB Occupied Bandwidth; $VBW \geq 3RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
4) Measure and record the results in the test report.

Limit: N/A
Test Mode: Transmitter mode
Test Results: Pass

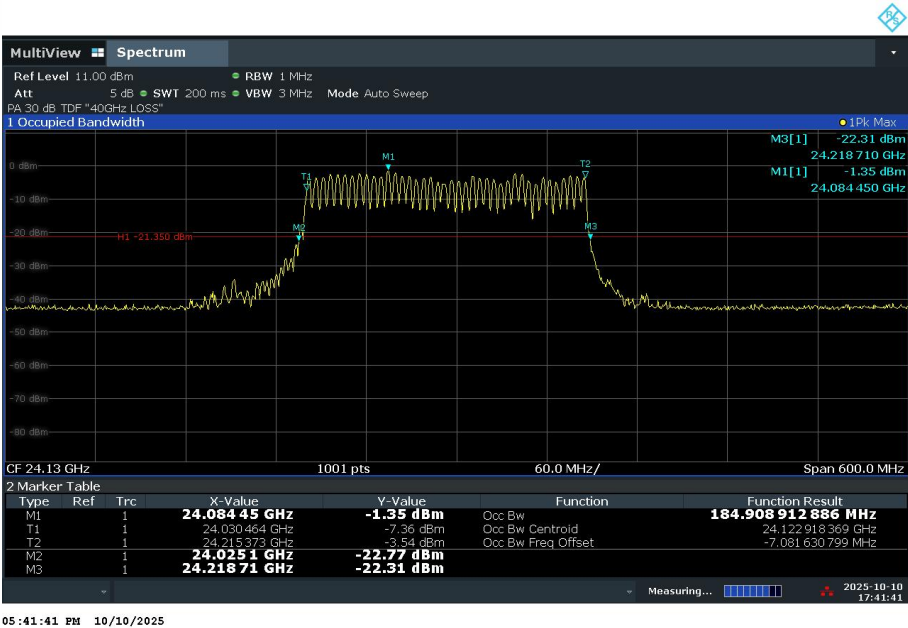
Measurement Data

Test Frequency (GHz)	20dB Occupied Bandwidth (MHz)	Results
24.13	193.61	Pass

Note:

- ① 20dB Occupied Bandwidth (MHz)=(Frequency(M3)-Frequency(M2))*1000=(24.21871-24.0251)*1000
=0.19361*1000=193.61MHz
- ② Only the worst case data of WS-K04D was recorded in the report.

Test plot as follows:



APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Please refer to the report of EED32R81695401 Appendix: Test set up photos.

APPENDIX 2 PHOTOGRAPHS OF EUT

Please refer to the report of EED32R81695401 Appendix: EUT photos of WS-K22D ,
EED32R81695401 Appendix: EUT photos of WS-K03D and EED32R81695401
Appendix: EUT photos of WS-K04D .

Statement

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule stated in ILAC-G8:09/2019/CNAS-GL015:2022;
5. Without written approval of CTI, this report can't be reproduced except in full;

*** End of Report ***