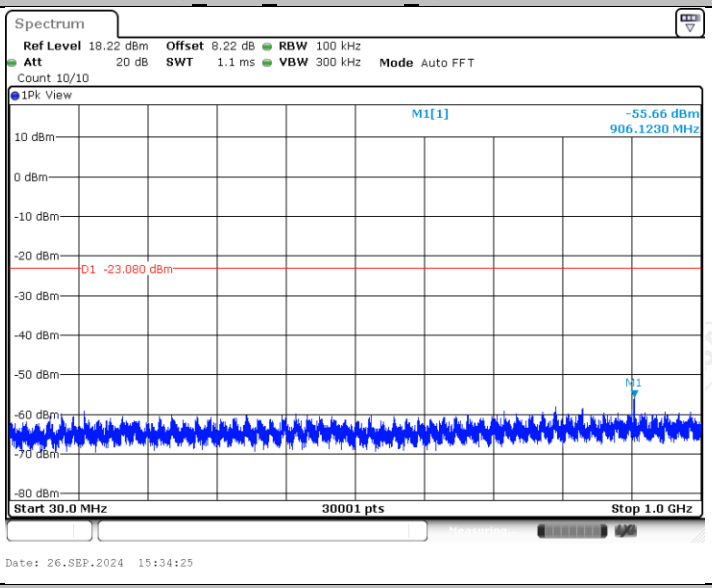
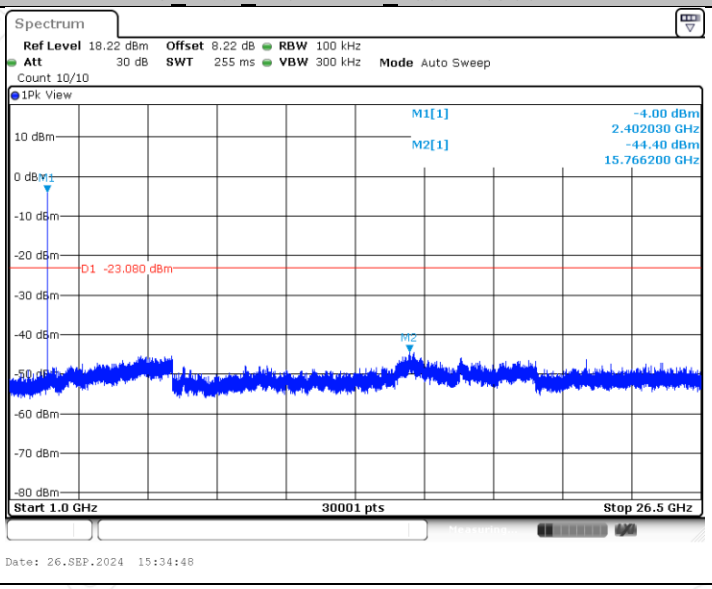
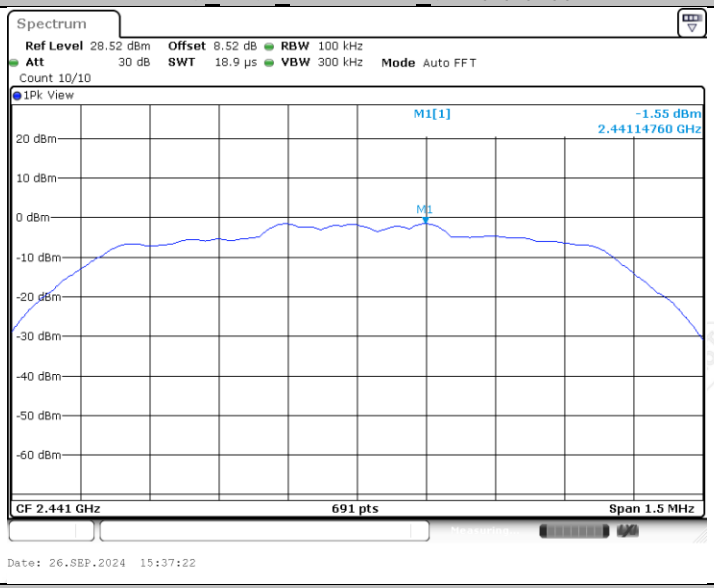
2DH5_Ant1_2402 MHz _30~1000 MHz



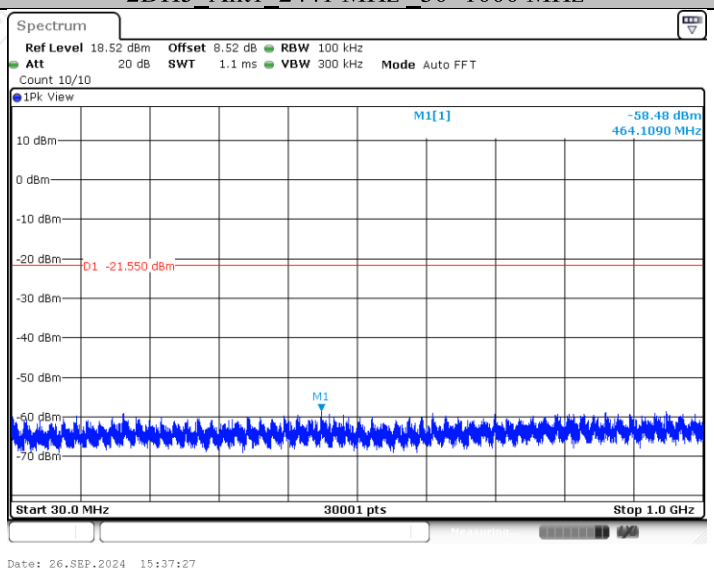
2DH5_Ant1_2402 MHz _1000~26500 MHz

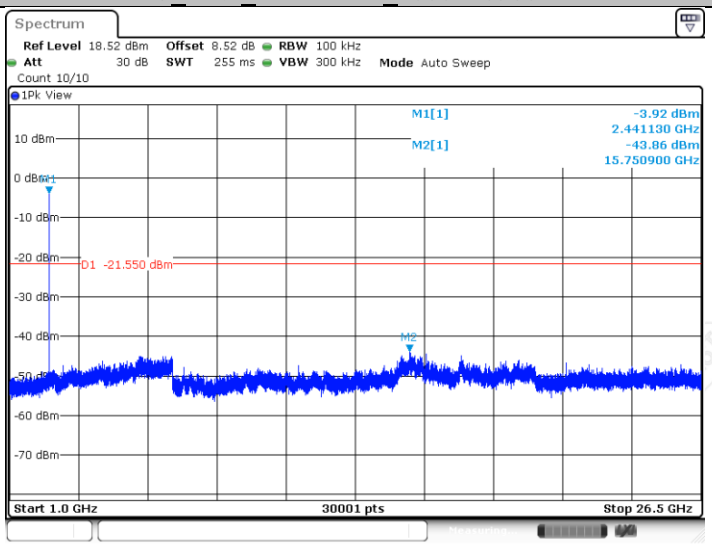
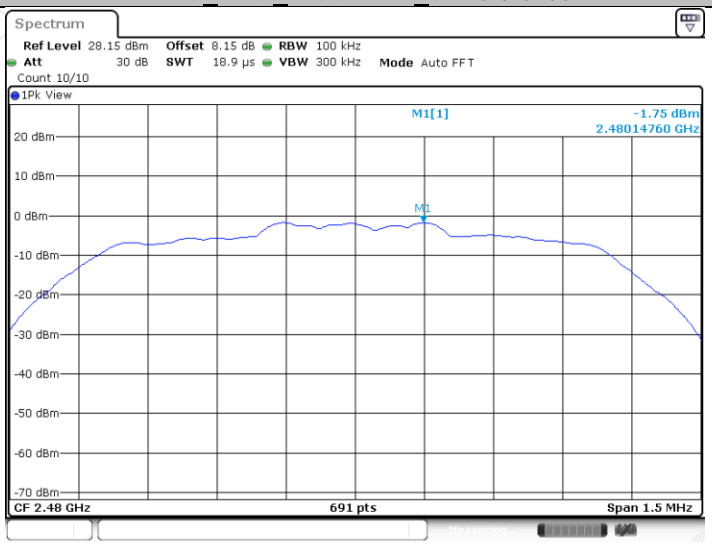


2DH5_Ant1_2441 MHz _0~Reference

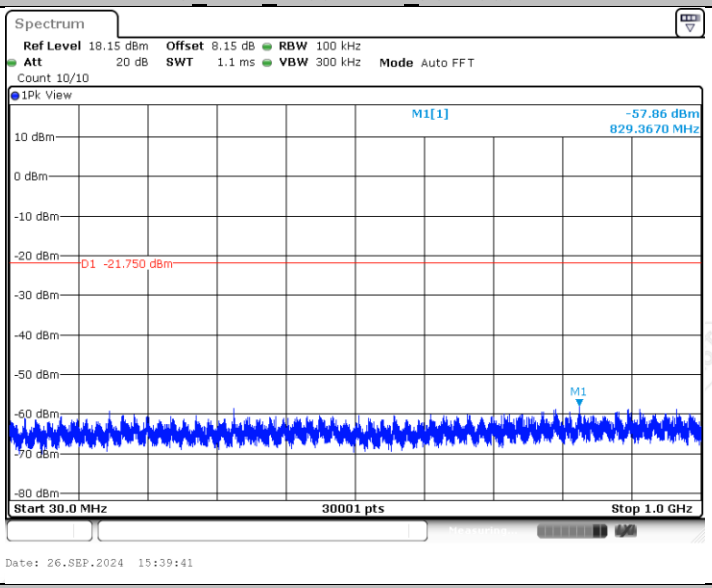


2DH5_Ant1_2441 MHz _30~1000 MHz

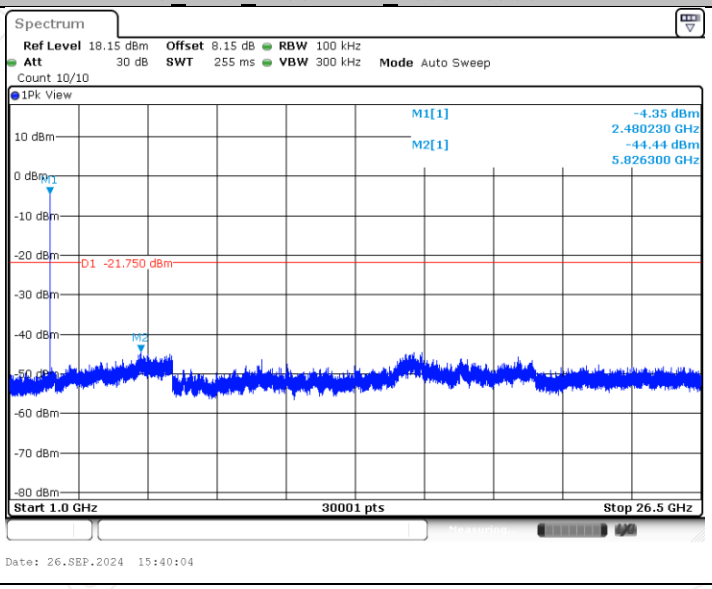


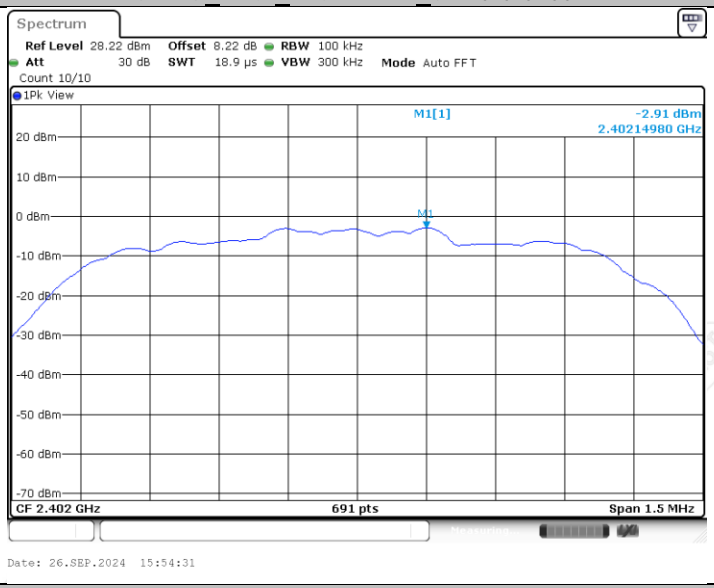
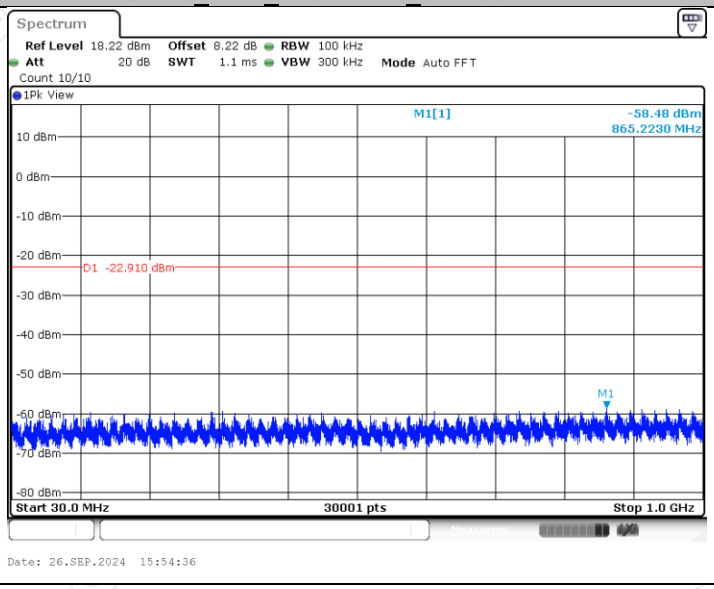
2DH5_Ant1_2441 MHz _1000~26500 MHz

2DH5_Ant1_2480 MHz _0~Reference


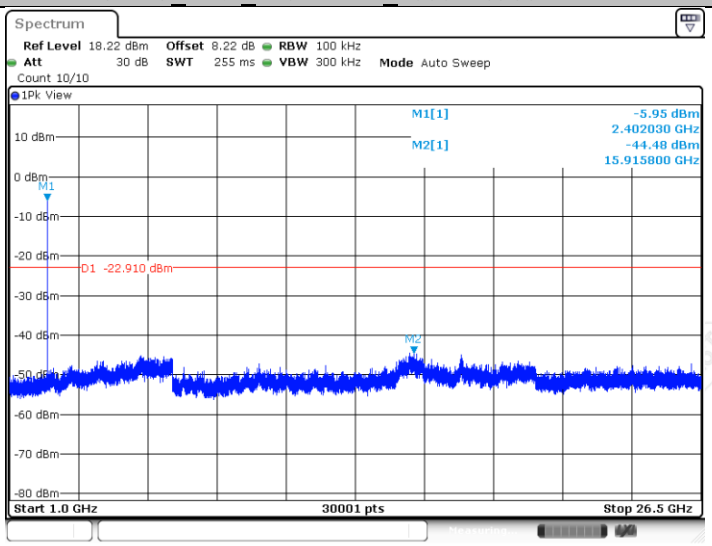
2DH5_Ant1_2480 MHz _30~1000 MHz

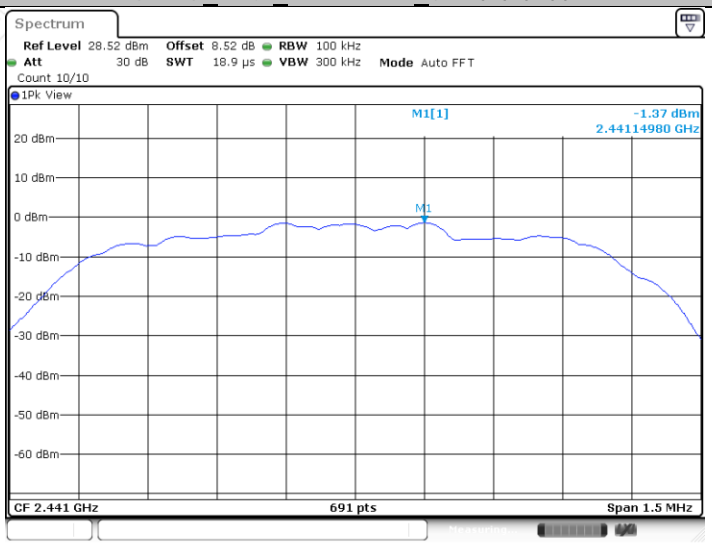


2DH5_Ant1_2480 MHz _1000~26500 MHz

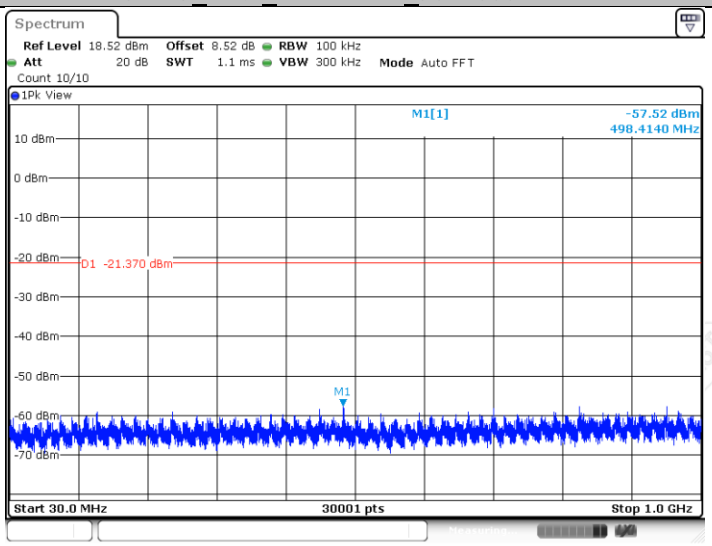


3DH5_Ant1_2402 MHz _0~Reference

3DH5_Ant1_2402 MHz _30~1000 MHz


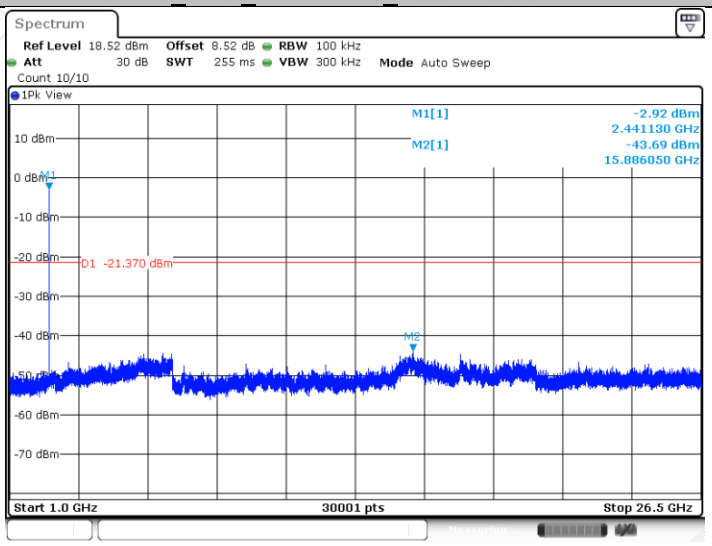
3DH5_Ant1_2402 MHz _1000~26500 MHz


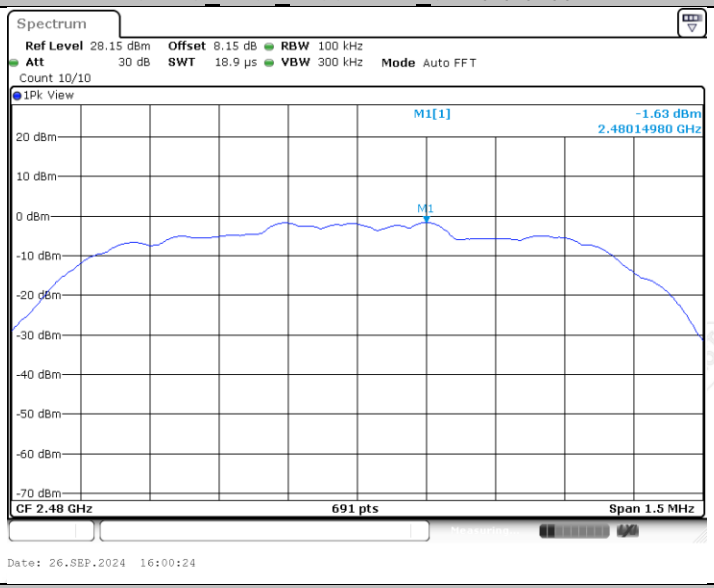
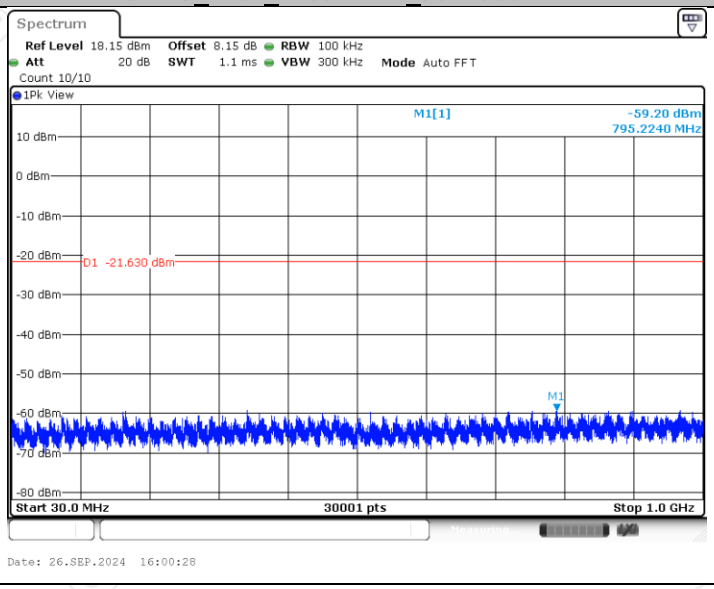
3DH5_Ant1_2441 MHz _0~Reference


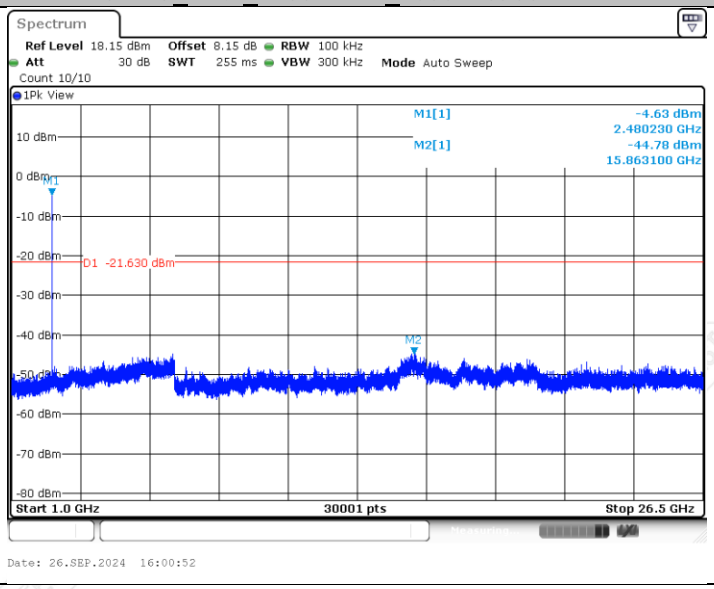
3DH5_Ant1_2441 MHz _30~1000 MHz



3DH5_Ant1_2441 MHz _1000~26500 MHz



3DH5_Ant1_2480 MHz _0~Reference

3DH5_Ant1_2480 MHz _30~1000 MHz


3DH5_Ant1_2480 MHz _1000~26500 MHz


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12. RADIATED SPURIOUS EMISSIONS

12.1 LIMITS

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE:

(1) The emission limits for the ranges 9-90kHz and 110-490kHz are based on measurements employing a linear average detector.

(2) The lower limit shall apply at the transition frequencies.

(3) Above 18GHz test distance is 1m, so the Peak Limit=74+20*log(3/1)=83.54 (dBμV/m). The Avg Limit=54+20*log(3/1)=63.54 (dBμV/m).

12.2 TEST PROCEDURES

1) Sequence of testing 9kHz to 30MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 360°.

--- The antenna height is 1.0 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30MHz to 1GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 360°.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0° to 360°and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1GHz to 18GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 360°.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 4 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0° to 360° and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18GHz
Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

NOTE:
(a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak&AVG), RBW=300Hz(for Peak&AVG). the frequency from 150kHz to 30MHz, Set RBW=9kHz, RBW=9kHz, (for QP Detector).
(b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, RBW=300kHz, (for QP Detector).
(c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz, RBW=3MHz.

(d).The frequency above 1GHz, for Avg detector: Set RBW=1MHz, if the EUT is configured to transmit with duty cycle ≥98%， set VBW≤RBW/100 (i.e.,10kHz) but not less than 10 Hz. if the EUT duty cycle is ＜98%， set VBW≥1/T, Where T is defined in section 2.8.

12.3 TEST SETUP

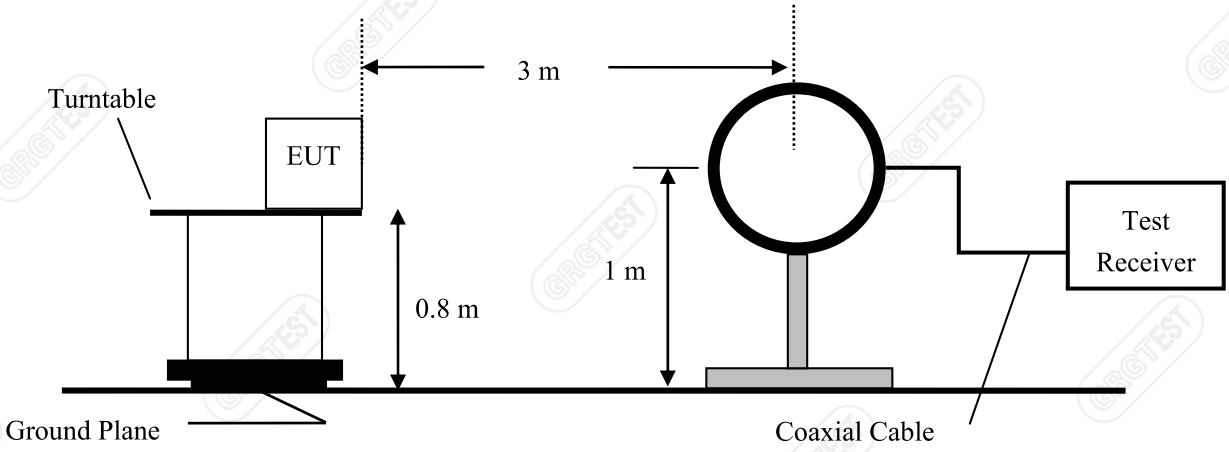

Figure 1. 9kHz to 30MHz radiated emissions test configuration

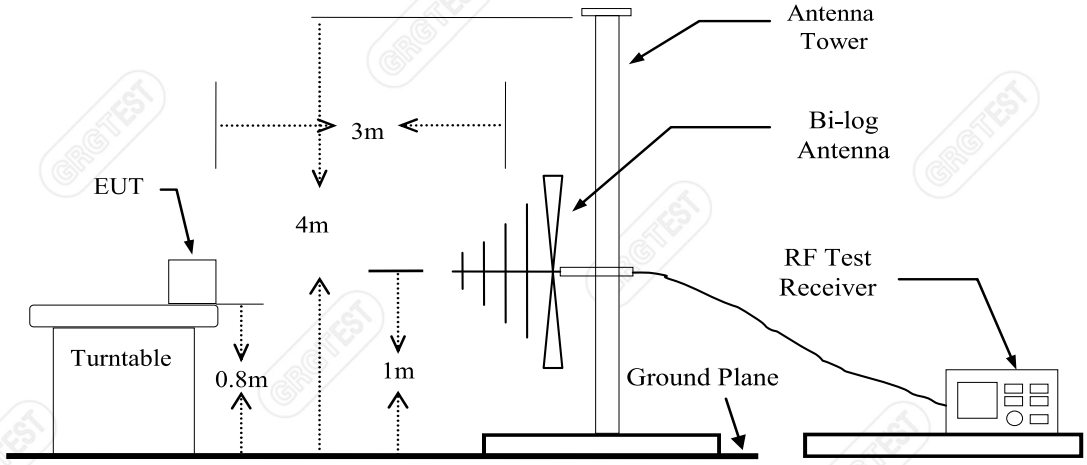

Figure 2. 30MHz to 1GHz radiated emissions test configuration

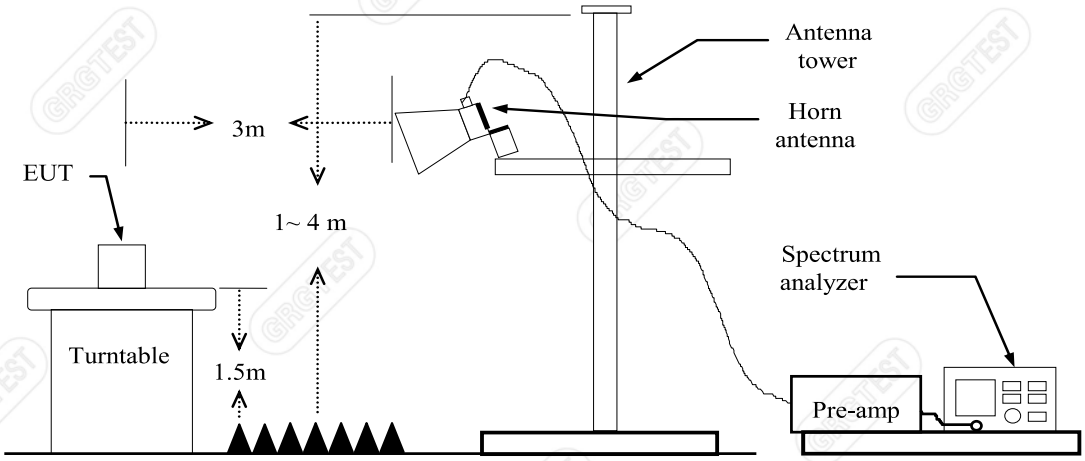

Figure 3. 1GH to 18GHz radiated emissions test configuration

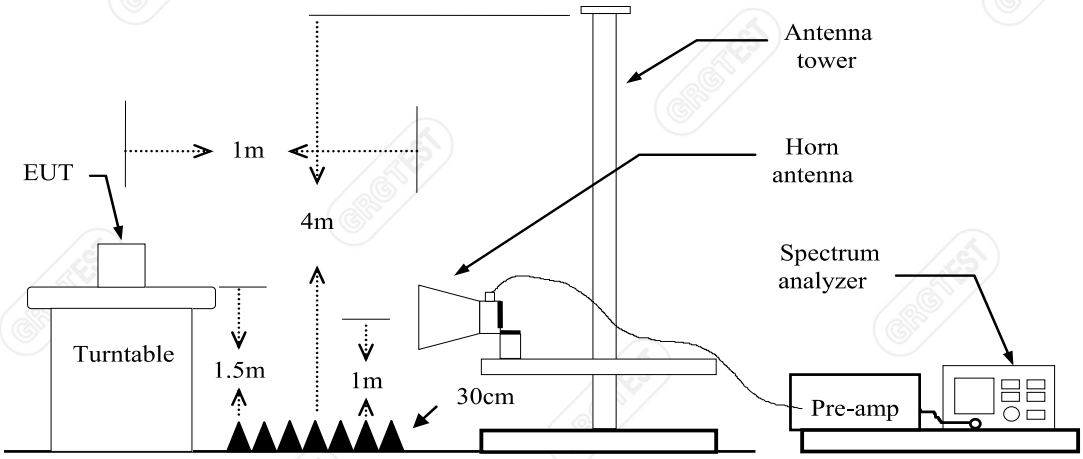

Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

12.4 DATA SAMPLE

30MHz to 1GHz

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
xxx	xxx	56.35	27.07	-29.28	40.00	12.93	QP	100	20	Horizontal	PASS

Frequency (MHz) = Emission frequency in MHz

Reading (dBµV/m) = Uncorrected Analyzer / Receiver reading

Factor (dB) = Antenna factor + Cable loss – Amplifier gain

Level (dBuV/m) = Reading (dBµV/m) + Factor (dB)

Limit (dBuV/m) = Limit stated in standard

Margin (dB) = Limit (dBuV/m) - Level (dBuV/m)

QP = Quasi-peak Reading

1GHz-18GHz

No.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
xxx	xxxx	78.01	55.30	-22.71	74.00	18.70	100	50	Horizontal	Peak
xxx	xxxx	66.37	43.66	-22.71	54.00	10.34	100	50	Horizontal	AVG

Above 18GHz

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
xxx	xxxx	54.49	42.38	32.84	-12.11	74	41.16	100	211	Horizontal	Peak
xxx	xxxx	43.99	31.88	22.34	-12.11	54	31.66	100	211	Horizontal	AVG

Frequency (MHz) = Emission frequency in MHz

Reading (dBuV/m) = Uncorrected Analyzer / Receiver reading

Factor (dB) = Antenna factor + Cable loss – Amplifier gain

Level for 1m (dBuV/m) = Reading (dBuV/m) + Factor (dB)

Level for 3m (dBuV/m) = Level for 1m (dBuV/m) + 20*log(1/3)

Limit (dBuV/m) = Limit stated in standard

Margin (dB) = Limit (dBuV/m) – Level (dBuV/m)

Polarity = Antenna polarization

Peak = Peak Reading

AVG = Average Reading

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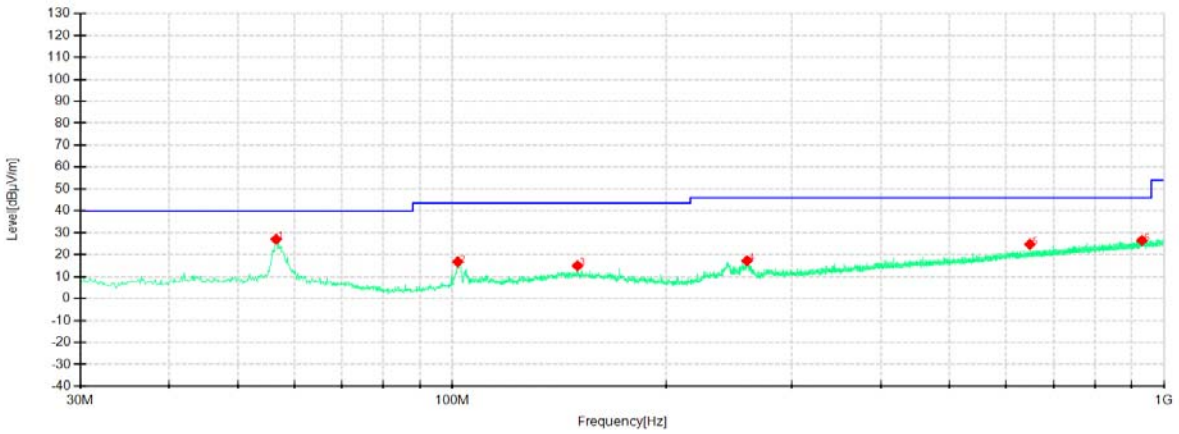
12.5 TEST RESULTS

Below 1GHz: All models were pretested and only the worst modes and channels were recorded in this report(3DH5_2441MHz).

2441MHz
Environment:24.8℃/62%RH/101.0kPa
Test Engineer:Zhao yaru

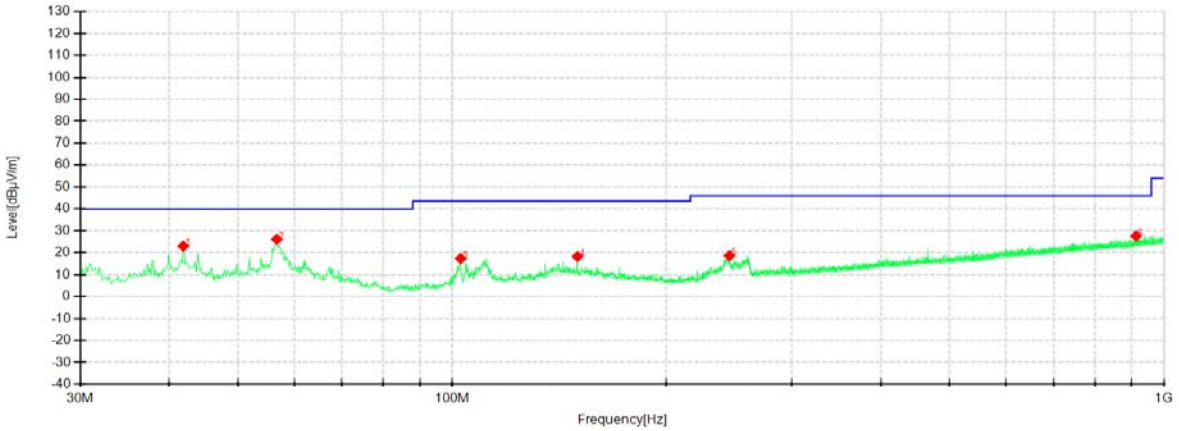
Date: 2024-09-29
Test Voltage: DC 12V
Polarity:Horizontal



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
1	56.5571	56.35	27.07	-29.28	40.00	12.93	QP	100	20	Horizontal	PASS
2	101.7890	48.49	16.79	-31.70	43.50	26.71	QP	100	333	Horizontal	PASS
3	149.9312	43.14	14.98	-28.16	43.50	28.52	QP	200	274	Horizontal	PASS
4	259.4337	46.48	17.23	-29.25	46.00	28.77	QP	100	101	Horizontal	PASS
5	647.9672	43.57	24.79	-18.78	46.00	21.21	QP	100	358	Horizontal	PASS
6	931.1214	41.38	26.50	-14.88	46.00	19.50	QP	100	20	Horizontal	PASS

2441MHz
Environment:24.8℃/62%RH/101.0kPa
Test Engineer:Zhao yaru

Date: 2024-09-29
Test Voltage: DC 12V
Polarity: Vertical



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
1	41.8840	52.21	23.00	-29.21	40.00	17.00	QP	200	174	Vertical	PASS
2	56.6783	55.43	26.14	-29.29	40.00	13.86	QP	100	279	Vertical	PASS
3	102.7591	48.95	17.38	-31.57	43.50	26.12	QP	100	125	Vertical	PASS
4	149.9312	46.43	18.27	-28.16	43.50	25.23	QP	100	343	Vertical	PASS
5	245.1244	48.23	18.70	-29.53	46.00	27.30	QP	100	72	Vertical	PASS
6	913.4167	42.91	27.63	-15.28	46.00	18.37	QP	200	121	Vertical	PASS

Remark:

1 No emission found between lowest internal used/generated frequency to 30MHz.
2 Pre-scan all mode and recorded the worst case results in this report.
3 Measuring frequencies from 9kHz to the 1GHz.
4 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Peak/Quasi-peak detector mode.
5 Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
6 The IF bandwidth of SPA between 30MHz to 1GHz was 120kHz.

Above 1GHz:
All models were pretested and only the worst modes 3DH5 test results were recorded in this report.

Mode: 3DH5
Lowest Frequency (2402MHz) Date: 2024-09-29
Environment:24.8℃/62%RH/101.0kPa Test Voltage: DC 12V
Test Engineer: Zhao yaru

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2500.8000	47.78	47.37	-0.41	74.00	26.63	200	304	Horizontal
2	3141.0000	60.51	47.51	-13.00	74.00	26.49	100	134	Horizontal
3	5700.0000	56.01	50.72	-5.29	74.00	23.28	200	212	Horizontal
4	6750.0000	48.43	47.98	-0.45	74.00	26.02	200	117	Horizontal
5	7272.0000	46.56	47.87	1.31	74.00	26.13	200	148	Horizontal
6	9900.0000	40.82	49.30	8.48	74.00	24.70	200	148	Horizontal
7	2471.2000	37.27	36.63	-0.64	54.00	17.37	100	305	Horizontal
8	3157.5000	52.81	39.79	-13.02	54.00	14.21	100	134	Horizontal
9	5700.0000	46.87	41.58	-5.29	54.00	12.42	200	212	Horizontal
10	6750.0000	41.13	40.68	-0.45	54.00	13.32	200	117	Horizontal
11	7336.5000	37.06	38.72	1.66	54.00	15.28	200	164	Horizontal
12	9966.0000	30.76	39.50	8.74	54.00	14.50	200	164	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2093.4000	49.34	45.30	-4.04	74.00	28.70	200	99	Vertical
2	2494.0000	47.25	46.74	-0.51	74.00	27.26	100	20	Vertical
3	3154.5000	54.51	41.14	-13.37	74.00	32.86	100	242	Vertical
4	5730.0000	53.74	49.00	-4.74	74.00	25.00	200	146	Vertical
5	6750.0000	46.86	46.61	-0.25	74.00	27.39	100	226	Vertical
6	9960.0000	40.27	48.92	8.65	74.00	25.08	200	146	Vertical
7	2071.8000	37.44	33.42	-4.02	54.00	20.58	200	162	Vertical
8	2500.4000	36.61	36.22	-0.39	54.00	17.78	100	302	Vertical
9	3157.5000	46.76	33.40	-13.36	54.00	20.60	100	34	Vertical
10	5728.5000	44.93	40.17	-4.76	54.00	13.83	200	146	Vertical
11	6750.0000	38.95	38.70	-0.25	54.00	15.30	100	226	Vertical
12	9822.0000	29.00	37.68	8.68	54.00	16.32	200	162	Vertical

Mode: 3DH5
Lowest Frequency (2441MHz) Date: 2024-09-29
Environment:24.8℃/62%RH/101.0kPa Test Voltage: DC 12V
Test Engineer: Zhao yaru

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2467.0000	47.08	46.40	-0.68	74.00	27.60	100	113	Horizontal
2	3157.5000	61.98	48.96	-13.02	74.00	25.04	100	123	Horizontal
3	5701.5000	57.64	52.36	-5.28	74.00	21.64	200	199	Horizontal
4	6721.5000	44.50	43.87	-0.63	74.00	30.13	200	153	Horizontal
5	7341.0000	45.90	47.59	1.69	74.00	26.41	200	153	Horizontal
6	10027.5000	40.45	49.12	8.67	74.00	24.88	200	137	Horizontal
7	2494.8000	36.81	36.39	-0.42	54.00	17.61	100	20	Horizontal
8	3157.5000	52.85	39.83	-13.02	54.00	14.17	100	123	Horizontal
9	5770.5000	46.91	42.30	-4.61	54.00	11.70	200	199	Horizontal
10	6750.0000	41.77	41.32	-0.45	54.00	12.68	200	106	Horizontal
11	7311.0000	36.87	38.33	1.46	54.00	15.67	200	168	Horizontal
12	9942.0000	31.07	39.93	8.86	54.00	14.07	200	153	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2501.4000	47.58	47.16	-0.42	74.00	26.84	100	179	Vertical
2	3363.0000	54.59	41.54	-13.05	74.00	32.46	200	197	Vertical
3	5719.5000	54.30	49.44	-4.86	74.00	24.56	100	171	Vertical
4	6750.0000	46.09	45.84	-0.25	74.00	28.16	100	140	Vertical
5	9342.0000	40.76	47.94	7.18	74.00	26.06	200	308	Vertical
6	12697.5000	36.86	49.01	12.15	74.00	24.99	100	338	Vertical
7	2502.6000	36.82	36.34	-0.48	54.00	17.66	100	247	Vertical
8	3358.5000	45.95	32.87	-13.08	54.00	21.13	200	197	Vertical
9	5722.5000	44.47	39.65	-4.82	54.00	14.35	200	152	Vertical
10	6750.0000	39.25	39.00	-0.25	54.00	15.00	100	210	Vertical
11	9304.5000	29.62	36.68	7.06	54.00	17.32	100	210	Vertical
12	12676.5000	25.68	37.71	12.03	54.00	16.29	100	308	Vertical

Mode: 3DH5
Lowest Frequency (2480MHz) Date: 2024-09-29
Environment:24.8℃/62%RH/101.0kPa Test Voltage: DC 12V
Test Engineer: Zhao yaru

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2493.2000	47.42	46.99	-0.43	74.00	27.01	100	82	Horizontal
2	3157.5000	60.09	47.07	-13.02	74.00	26.93	100	118	Horizontal
3	5712.0000	56.78	51.60	-5.18	74.00	22.40	200	212	Horizontal
4	6750.0000	48.57	48.12	-0.45	74.00	25.88	200	164	Horizontal
5	7447.5000	45.51	47.12	1.61	74.00	26.88	200	149	Horizontal
6	9898.5000	40.94	49.42	8.48	74.00	24.58	200	149	Horizontal
7	2480.0000	39.96	39.40	-0.56	54.00	14.60	100	303	Horizontal
8	3157.5000	52.59	39.57	-13.02	54.00	14.43	100	118	Horizontal
9	5731.5000	46.97	41.99	-4.98	54.00	12.01	200	212	Horizontal
10	6750.0000	41.66	41.21	-0.45	54.00	12.79	200	116	Horizontal
11	7306.5000	36.89	38.31	1.42	54.00	15.69	200	164	Horizontal
12	9753.0000	30.77	39.54	8.77	54.00	14.46	200	164	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1894.6000	47.77	43.96	-3.81	74.00	30.04	200	21	Vertical
2	2496.0000	47.53	47.06	-0.47	74.00	26.94	100	84	Vertical
3	3349.5000	55.49	42.35	-13.14	74.00	31.65	200	182	Vertical
4	5731.5000	53.94	49.23	-4.71	74.00	24.77	200	150	Vertical
5	6750.0000	46.25	46.00	-0.25	74.00	28.00	100	230	Vertical
6	10174.5000	38.77	48.17	9.40	74.00	25.83	200	24	Vertical
7	1899.0000	37.44	33.73	-3.71	54.00	20.27	200	147	Vertical
8	2480.0000	41.01	40.17	-0.84	54.00	13.83	200	289	Vertical
9	3357.0000	45.52	32.42	-13.10	54.00	21.58	200	182	Vertical
10	5722.5000	44.21	39.39	-4.82	54.00	14.61	200	150	Vertical
11	6750.0000	39.71	39.46	-0.25	54.00	14.54	100	230	Vertical
12	9936.0000	28.92	37.68	8.76	54.00	16.32	100	214	Vertical

Remark:

1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2 The amplitude of 18GHz to 26.5GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

3 Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

4 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

5 Spectrum setting:
a. Peak Setting 1GHz–26.5GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.
b. AV Setting 1GHz–26.5GHz, Set RBW=1MHz, if the EUT is configured to transmit with duty cycle ≥98%,set VBW≤RBW/100 (i.e.,10kHz) but not less than 10 Hz. if the EUT duty cycle is＜98%,set VBW≥1/T, Where T is defined in section 2.8.

Test result: The unit does meet the requirements.

———— The following blanks ————

Above 18GHz:
All models were pretested and only the worst modes were recorded in this report(3DH5_2402MHz).

Mode: 3DH5
Lowest Frequency (2402MHz) Date: 2024-10-02
Environment:26.5℃/57%RH/101.0kPa Test Voltage: DC 12V
Test Engineer: Zhao yaru

Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18878.4750	48.80	32.78	23.24	-16.02	74	50.76	100	182	Horizontal
2	19689.3750	48.71	32.85	23.31	-15.86	74	50.69	200	302	Horizontal
3	20809.6750	47.29	32.14	22.6	-15.15	74	51.40	100	41	Horizontal
4	21811.8250	49.02	34.10	24.56	-14.92	74	49.44	100	344	Horizontal
5	23285.3000	46.59	32.59	23.05	-14.00	74	50.95	200	322	Horizontal
6	24695.0250	45.49	31.95	22.41	-13.54	74	51.59	100	302	Horizontal

Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18527	48.81	32.59	23.05	-16.22	74	50.95	100	82	Vertical
2	19366.375	49.63	34.14	24.6	-15.49	74	49.40	200	280	Vertical
3	20249.525	50.26	35.18	25.64	-15.08	74	48.36	100	102	Vertical
4	21466.3	48.63	34.14	24.6	-14.49	74	49.40	100	122	Vertical
5	22846.275	47.27	33.57	24.03	-13.70	74	49.97	200	102	Vertical
6	23998.45	45.81	32.48	22.94	-13.33	74	51.06	100	142	Vertical

Remark:

1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2 Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Above 18G test distance is 1m, so the Level for 3m= Level for 1m + 20*log(1/3)

13. RESTRICTED BANDS OF OPERATION

13.1 LIMITS

Section 15.247(d) In addition, Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

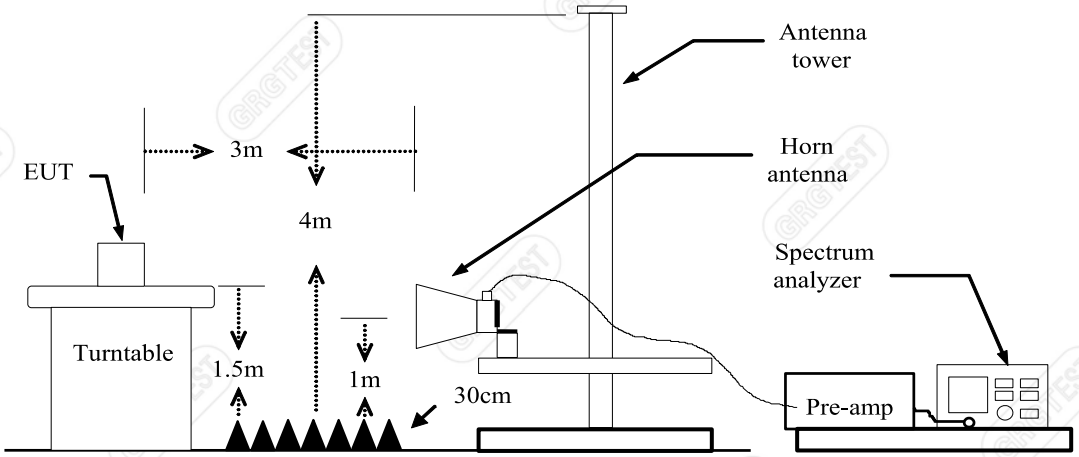
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	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			

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

13.2 TEST PROCEDURES

1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   a) PEAK: RBW=1MHz / VBW=1MHz / Sweep=AUTO.
   b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO. Where T is defined in section 2.8.
5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

13.3 TEST SETUP



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13.4 TEST RESULTS

All models were pretested and only the worst modes were recorded in this report.

DH5

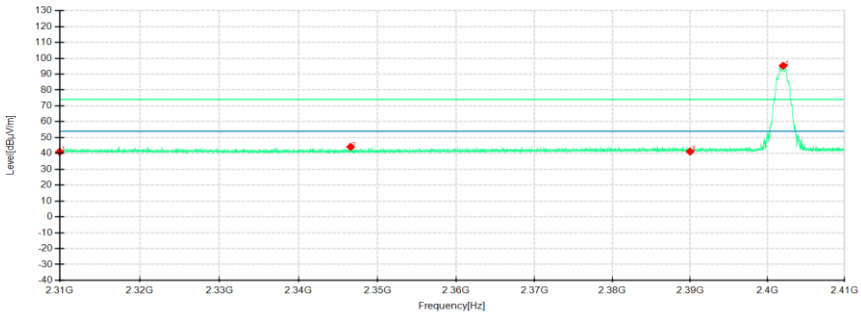
Lowest Channel

Frequency 2402MHz

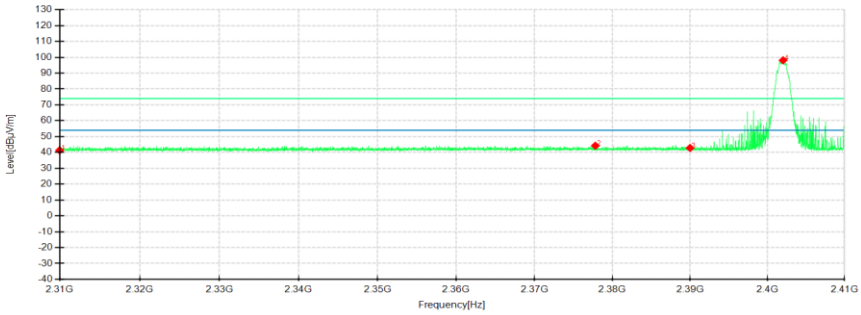
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V

Tested By: Zhao yaru Date: 2024-10-01

Detector mode: Peak Polarity: Horizontal

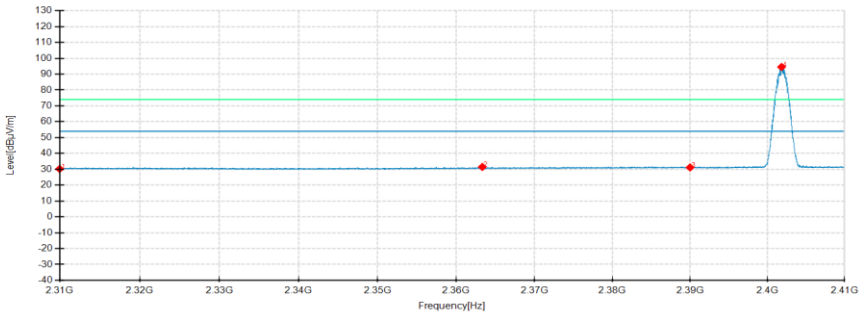


Detector mode: Peak Polarity: Vertical

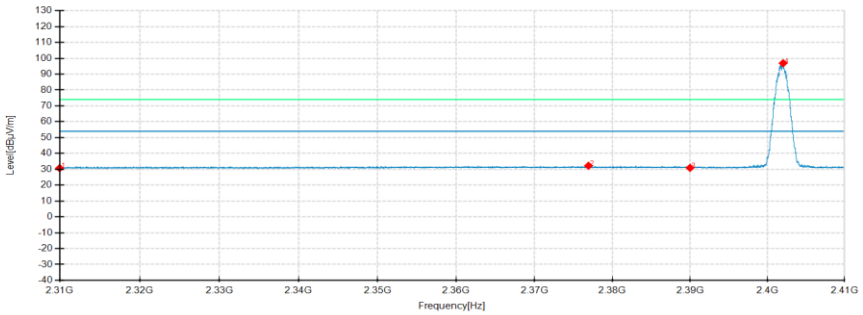


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	46.52	41.04	-5.48	74.00	32.96	200	112	Horizontal	/
2	2346.5875	49.94	44.10	-5.84	74.00	29.90	200	214	Horizontal	/
3	2390.0000	46.60	41.21	-5.39	74.00	32.79	100	326	Horizontal	/
4	2402.0375	100.53	95.29	-5.24	74.00	-21.29	100	312	Horizontal	No limit
1	2310.0000	46.66	41.34	-5.32	74.00	32.66	200	175	Vertical	/
2	2377.8000	49.69	44.22	-5.47	74.00	29.78	200	225	Vertical	/
3	2390.0000	48.28	42.81	-5.47	74.00	31.19	200	251	Vertical	/
4	2402.0375	103.57	98.11	-5.46	74.00	-24.11	200	314	Vertical	No limit

Lowest Channel
Frequency 2402MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Average Polarity: Horizontal

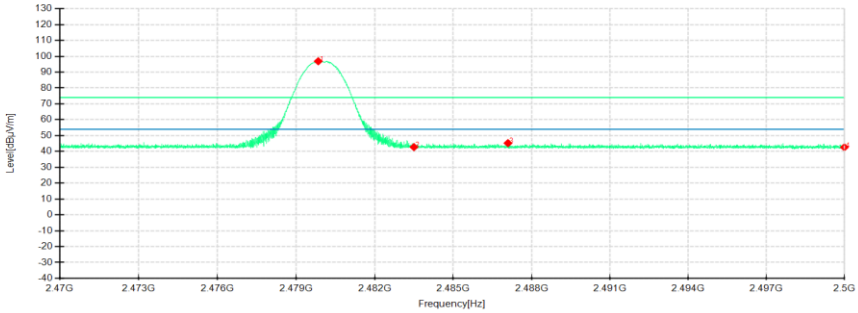


Detector mode: Average Polarity: Vertical

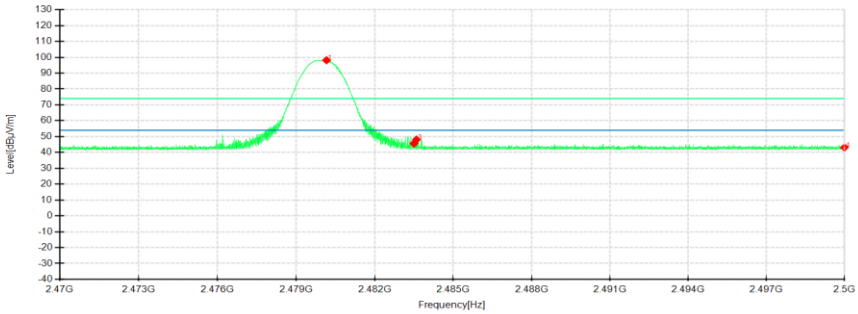


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	35.73	30.25	-5.48	54.00	23.75	100	21	Horizontal	/
2	2363.3375	37.21	31.50	-5.71	54.00	22.50	100	124	Horizontal	/
3	2390.0000	36.56	31.17	-5.39	54.00	22.83	100	290	Horizontal	/
4	2401.8375	99.75	94.51	-5.24	54.00	-40.51	100	314	Horizontal	No limit
1	2310.0000	36.07	30.75	-5.32	54.00	23.25	100	43	Vertical	/
2	2376.9250	37.71	32.24	-5.47	54.00	21.76	200	164	Vertical	/
3	2390.0000	36.39	30.92	-5.47	54.00	23.08	200	150	Vertical	/
4	2402.0375	102.36	96.90	-5.46	54.00	-42.90	200	314	Vertical	No limit

Highest Channel
Frequency 2480MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Peak Polarity: Horizontal

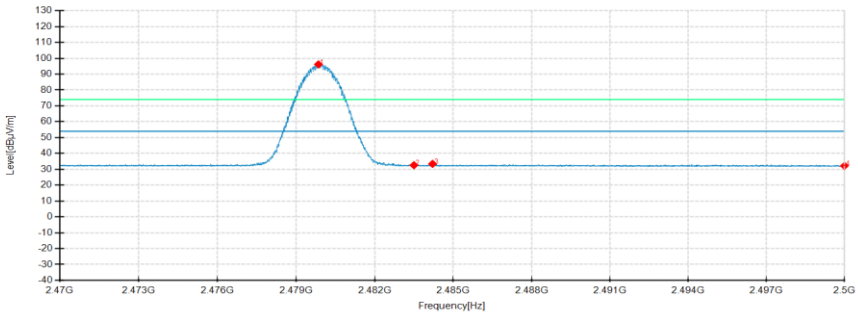


Detector mode: Peak Polarity: Vertical

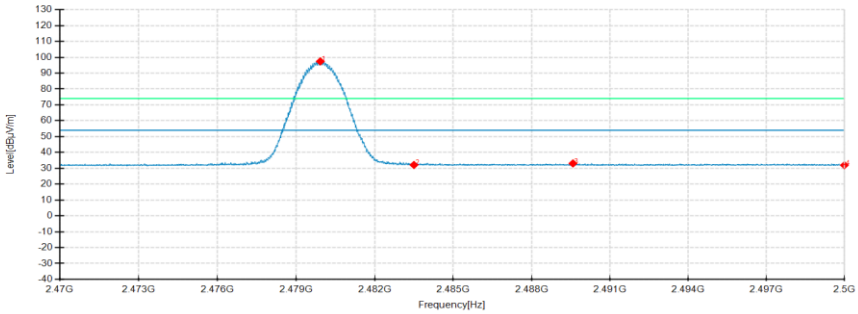


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.8475	101.67	96.86	-4.81	74.00	-22.86	100	316	Horizontal	No limit
2	2483.5000	47.59	42.76	-4.83	74.00	31.24	200	46	Horizontal	/
3	2487.0963	50.12	45.25	-4.87	74.00	28.75	100	112	Horizontal	/
4	2500.0000	47.60	42.61	-4.99	74.00	31.39	200	111	Horizontal	/
1	2480.1625	103.21	98.12	-5.09	74.00	-24.12	200	315	Vertical	No limit
2	2483.5000	50.72	45.65	-5.07	74.00	28.35	200	302	Vertical	/
3	2483.5975	53.15	48.08	-5.07	74.00	25.92	200	289	Vertical	/
4	2500.0000	48.11	43.12	-4.99	74.00	30.88	200	201	Vertical	/

Highest Channel
Frequency 2480MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Average Polarity: Horizontal

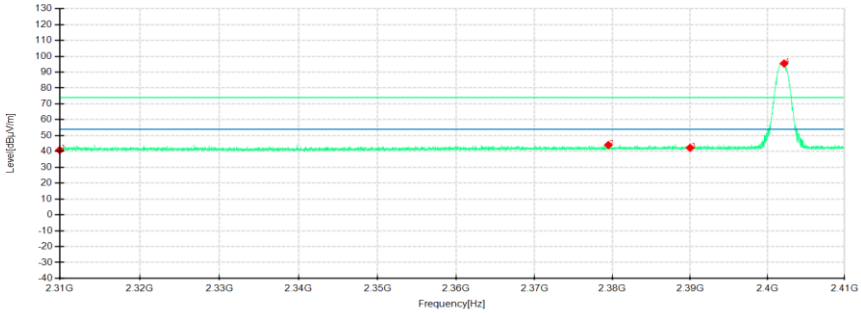


Detector mode: Average Polarity: Vertical

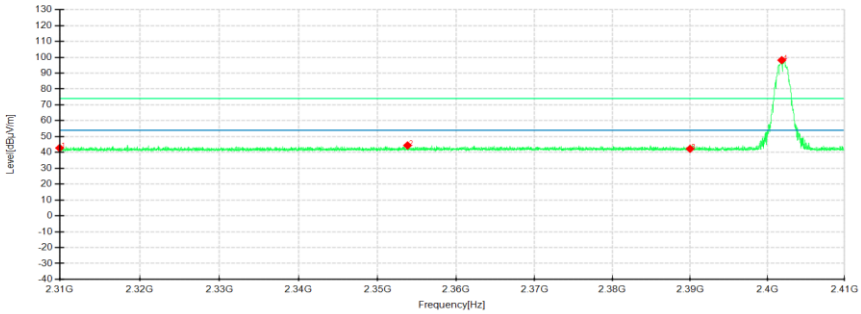


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.8550	100.97	96.16	-4.81	54.00	-42.16	100	314	Horizontal	No limit
2	2483.5000	37.40	32.57	-4.83	54.00	21.43	100	73	Horizontal	/
3	2484.2125	38.26	33.42	-4.84	54.00	20.58	100	60	Horizontal	/
4	2500.0000	37.16	32.17	-4.99	54.00	21.83	100	328	Horizontal	/
1	2479.9263	102.51	97.42	-5.09	54.00	-43.42	200	302	Vertical	No limit
2	2483.5000	37.18	32.11	-5.07	54.00	21.89	200	340	Vertical	/
3	2489.5825	38.13	33.09	-5.04	54.00	20.91	200	239	Vertical	/
4	2500.0000	36.95	31.96	-4.99	54.00	22.04	200	0	Vertical	/

3DH5
Lowest Channel
Frequency 2402MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Peak Polarity: Horizontal

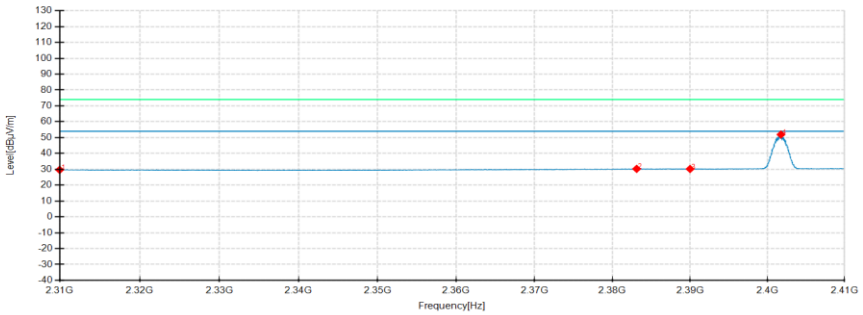


Detector mode: Peak Polarity: Vertical

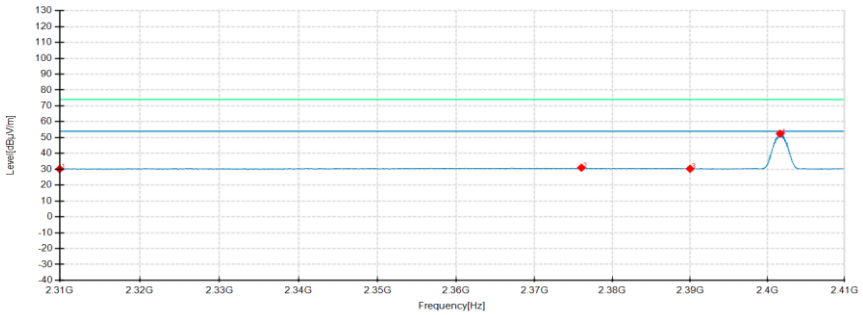


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	46.33	40.85	-5.48	74.00	33.15	100	341	Horizontal	/
2	2379.4750	49.58	44.06	-5.52	74.00	29.94	100	134	Horizontal	/
3	2390.0000	47.66	42.27	-5.39	74.00	31.73	100	21	Horizontal	/
4	2402.1625	100.70	95.47	-5.23	74.00	-21.47	100	302	Horizontal	No limit
1	2310.0000	48.11	42.79	-5.32	74.00	31.21	200	184	Vertical	/
2	2353.8125	49.90	44.43	-5.47	74.00	29.57	200	340	Vertical	/
3	2390.0000	47.76	42.29	-5.47	74.00	31.71	200	287	Vertical	/
4	2401.8625	103.64	98.18	-5.46	74.00	-24.18	200	315	Vertical	No limit

Lowest Channel
Frequency 2402MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Average Polarity: Horizontal

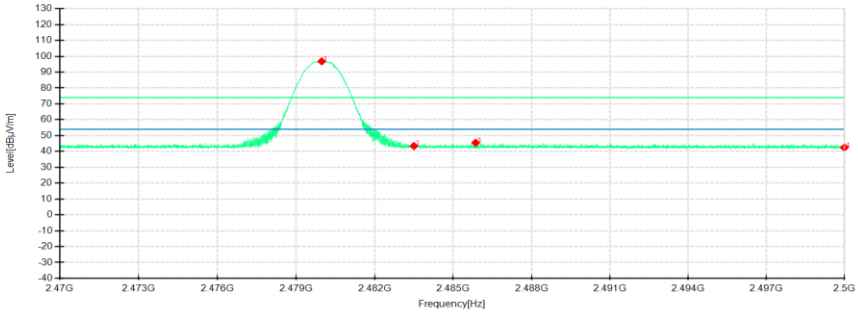


Detector mode: Average Polarity: Vertical

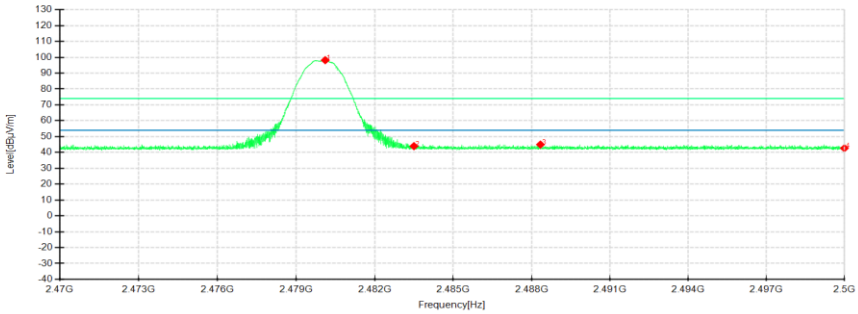


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	35.13	29.65	-5.48	54.00	24.35	100	136	Horizontal	/
2	2383.1125	35.75	30.28	-5.47	54.00	23.72	200	120	Horizontal	/
3	2390.0000	35.61	30.22	-5.39	54.00	23.78	100	99	Horizontal	/
4	2401.7625	57.18	51.93	-5.25	54.00	2.07	100	302	Horizontal	No limit
1	2310.0000	35.52	30.20	-5.32	54.00	23.80	200	162	Vertical	/
2	2376.0125	36.46	30.99	-5.47	54.00	23.01	200	162	Vertical	/
3	2390.0000	35.80	30.33	-5.47	54.00	23.67	200	162	Vertical	/
4	2401.6500	57.91	52.44	-5.47	54.00	1.56	200	301	Vertical	No limit

Highest Channel
Frequency 2480MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Peak Polarity: Horizontal

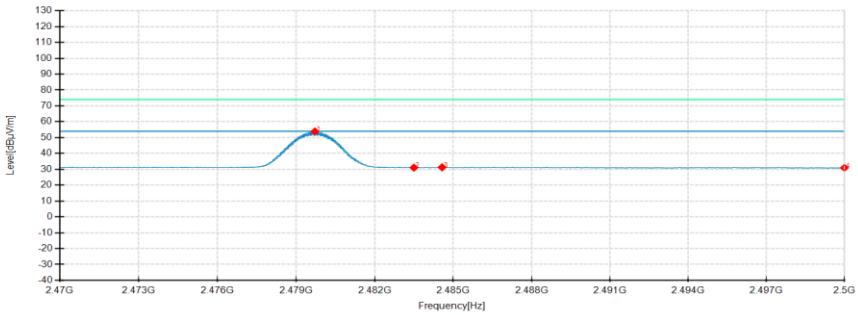


Detector mode: Peak Polarity: Vertical

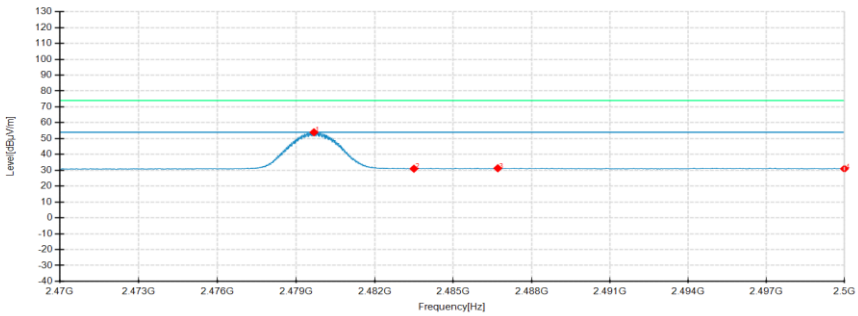


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.9788	101.62	96.81	-4.81	74.00	-22.81	100	326	Horizontal	No limit
2	2483.5000	48.24	43.41	-4.83	74.00	30.59	200	251	Horizontal	/
3	2485.8588	50.34	45.48	-4.86	74.00	28.52	100	326	Horizontal	
4	2500.0000	47.40	42.41	-4.99	74.00	31.59	100	4	Horizontal	/
1	2480.1138	103.27	98.18	-5.09	74.00	-24.18	200	314	Vertical	No limit
2	2483.5000	49.03	43.96	-5.07	74.00	30.04	200	291	Vertical	/
3	2488.3375	50.04	44.99	-5.05	74.00	29.01	100	302	Vertical	/
4	2500.0000	47.65	42.66	-4.99	74.00	31.34	100	174	Vertical	/

Highest Channel
Frequency 2480MHz
Environment: 25.7℃/59%RH/101.0kPa Voltage: DC 12V
Tested By: Zhao yaru Date: 2024-10-01
Detector mode: Average Polarity: Horizontal



Detector mode: Average Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.7200	58.65	53.84	-4.81	54.00	0.16	100	314	Horizontal	No limit
2	2483.5000	35.89	31.06	-4.83	54.00	22.94	100	314	Horizontal	/
3	2484.5763	36.13	31.28	-4.85	54.00	22.72	100	123	Horizontal	/
4	2500.0000	35.90	30.91	-4.99	54.00	23.09	100	84	Horizontal	/
1	2479.6825	59.04	53.95	-5.09	54.00	0.05	200	314	Vertical	No limit
2	2483.5000	36.09	31.02	-5.07	54.00	22.98	200	215	Vertical	/
3	2486.7063	36.34	31.29	-5.05	54.00	22.71	200	202	Vertical	/
4	2500.0000	35.96	30.97	-4.99	54.00	23.03	100	210	Vertical	/

Remark: Max field strength in 3m distance. No any other emission which falls in restricted bands can be detected and be reported.

APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM

Please refer to the attached document E202409184352-test setup photo.

APPENDIX B. PHOTOGRAPH OF THE EUT

Please refer to the attached document E202409184352-EUT photo.

———— End of Report ————