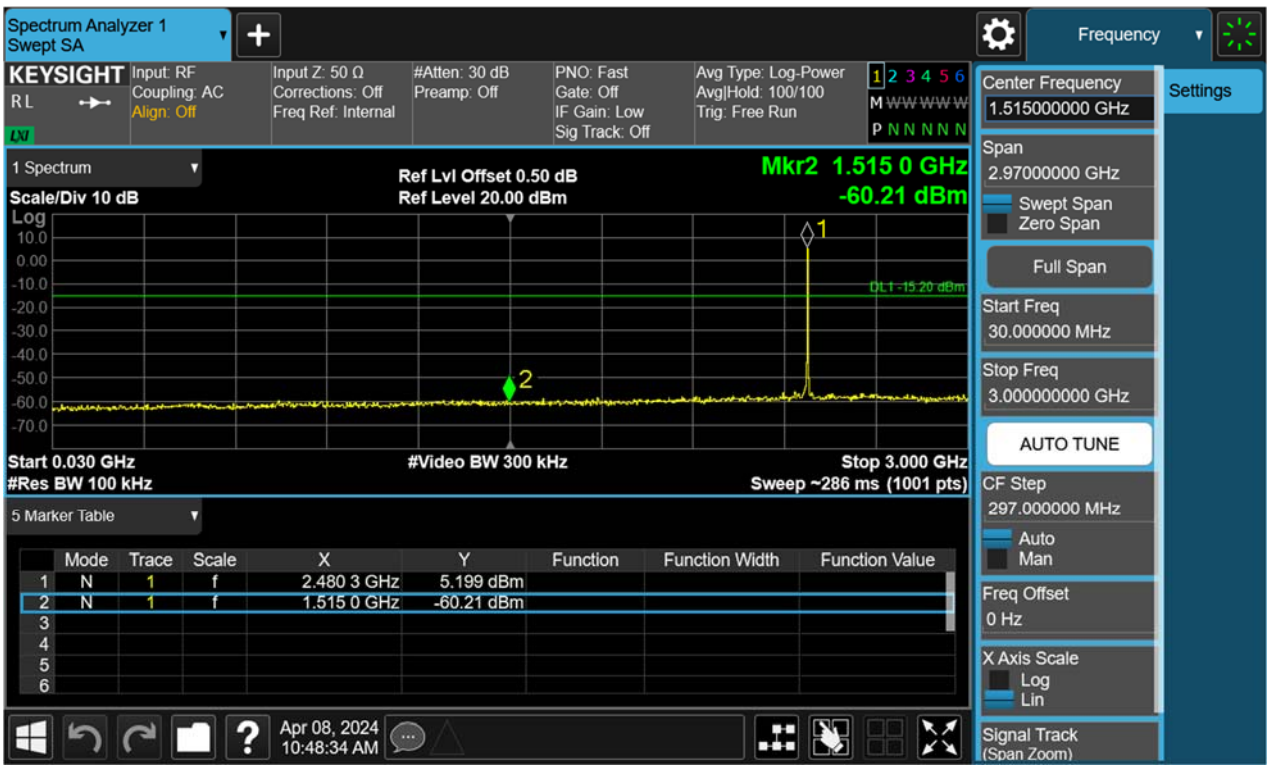
Band Edge

Conducted spurious emissions 30MHz-25GHz



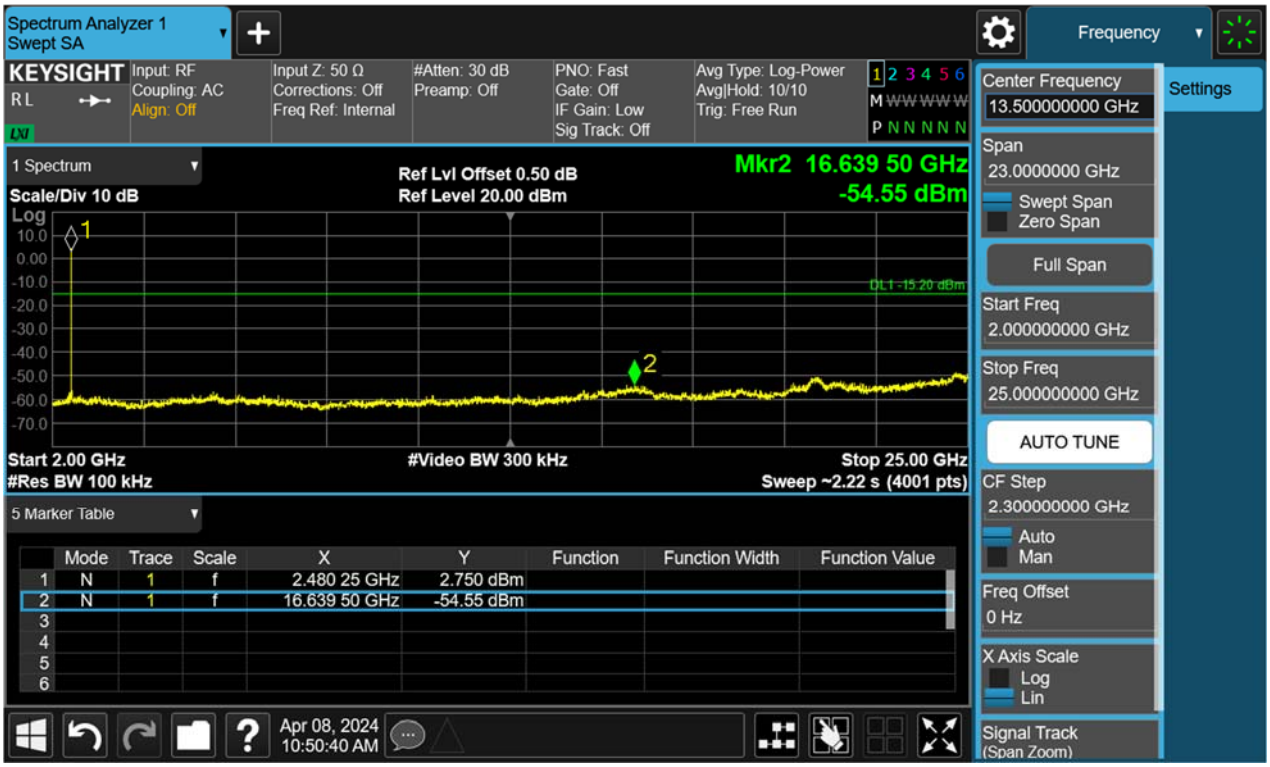
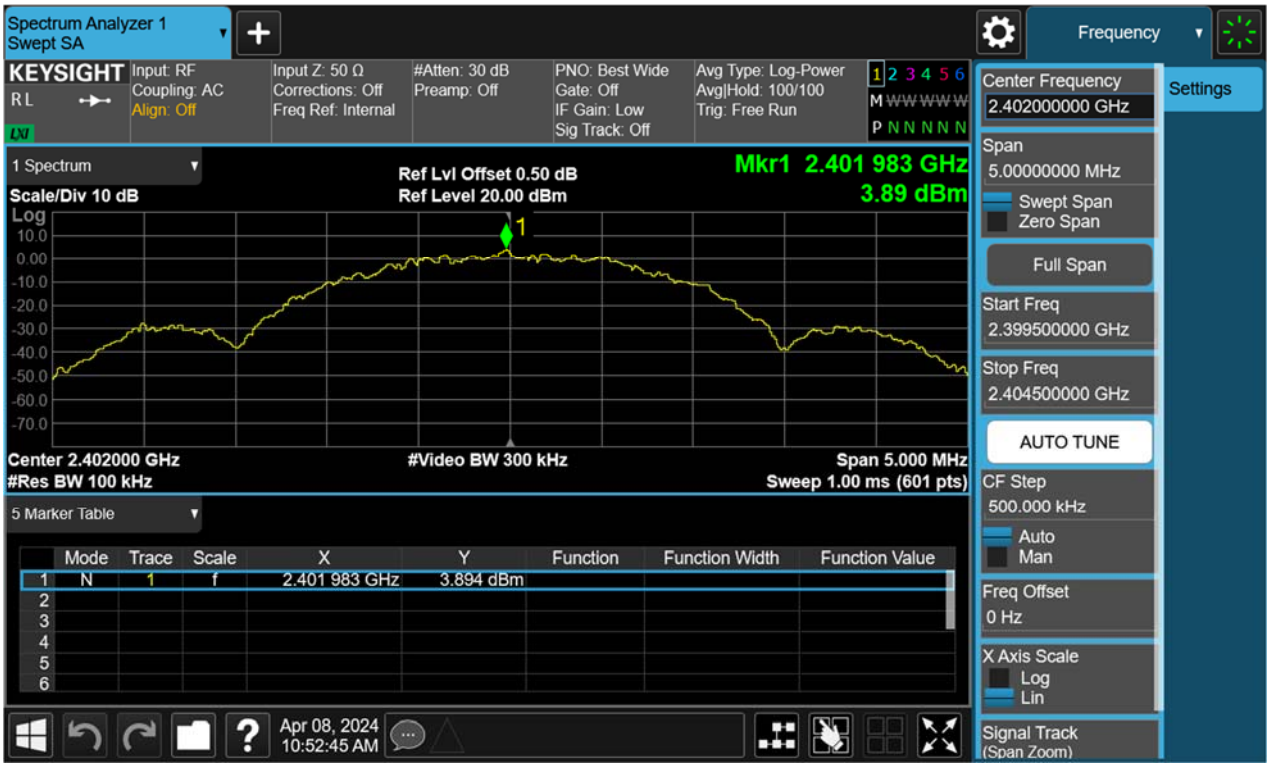
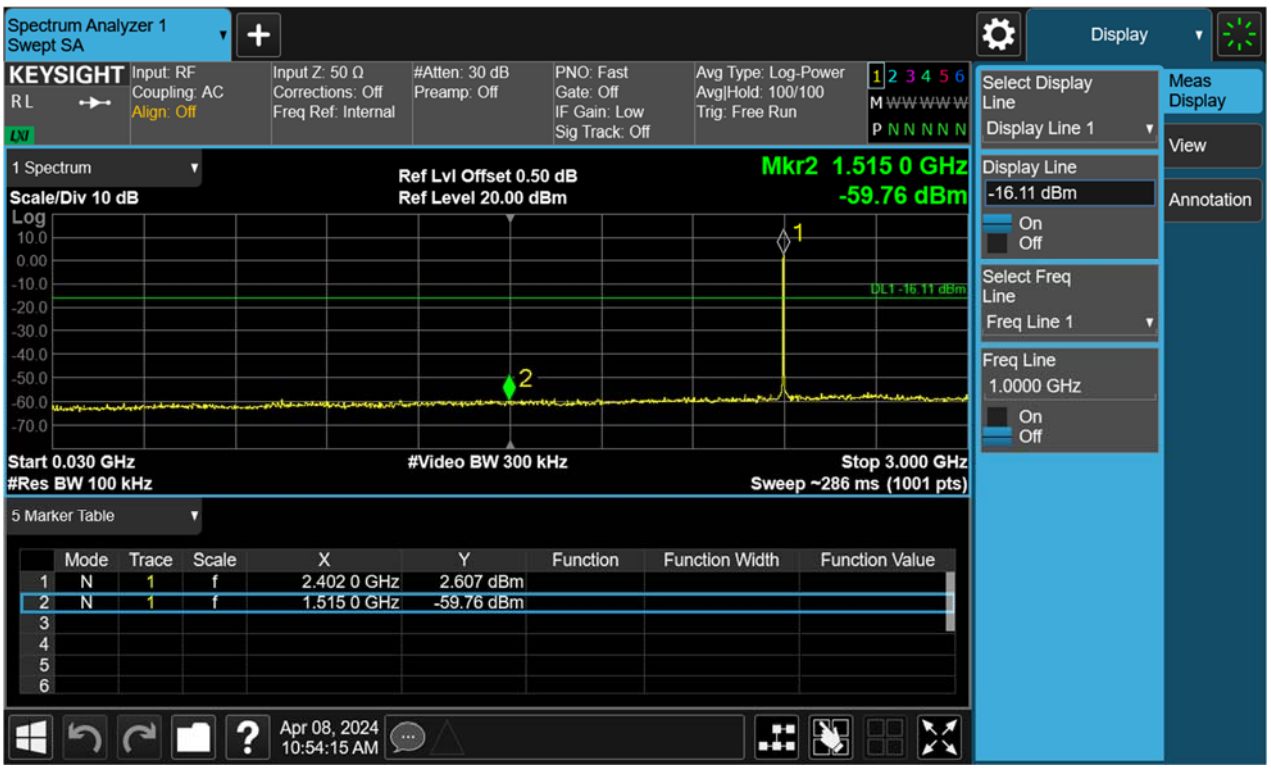


Figure 70: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE-2Mbps Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz



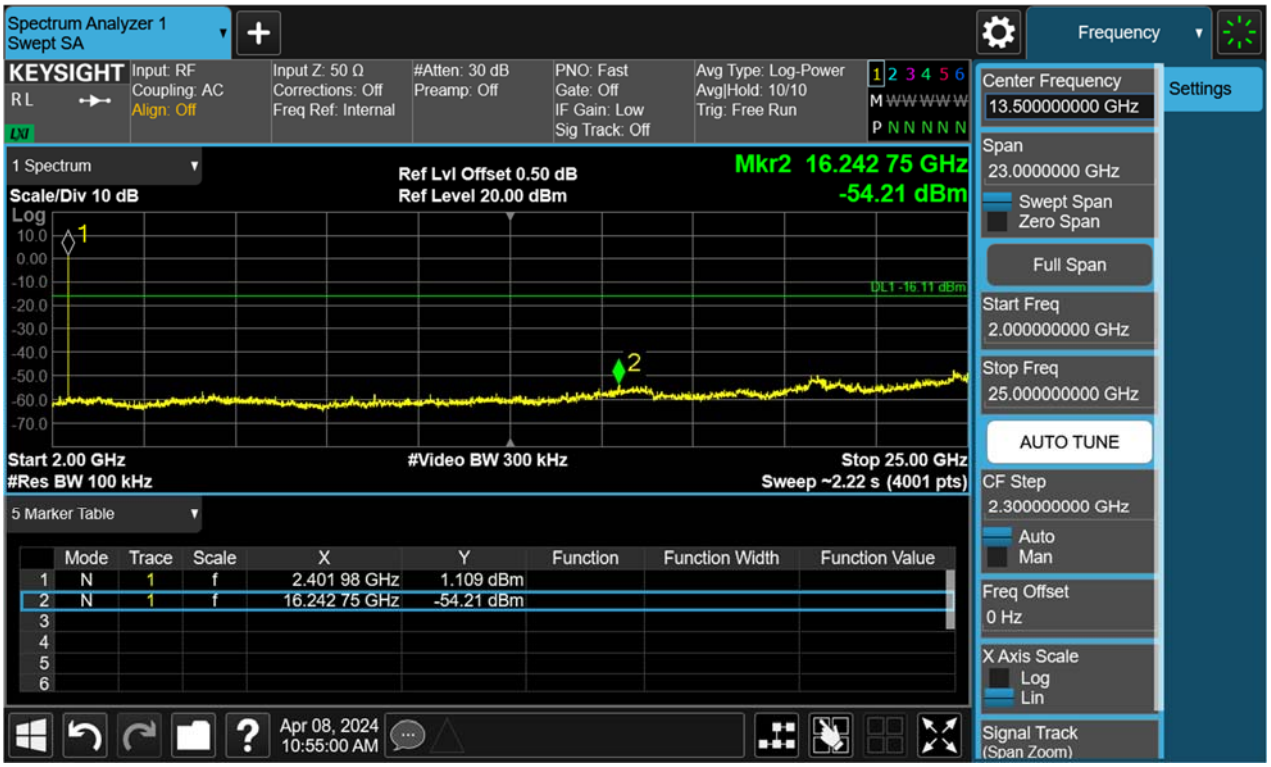
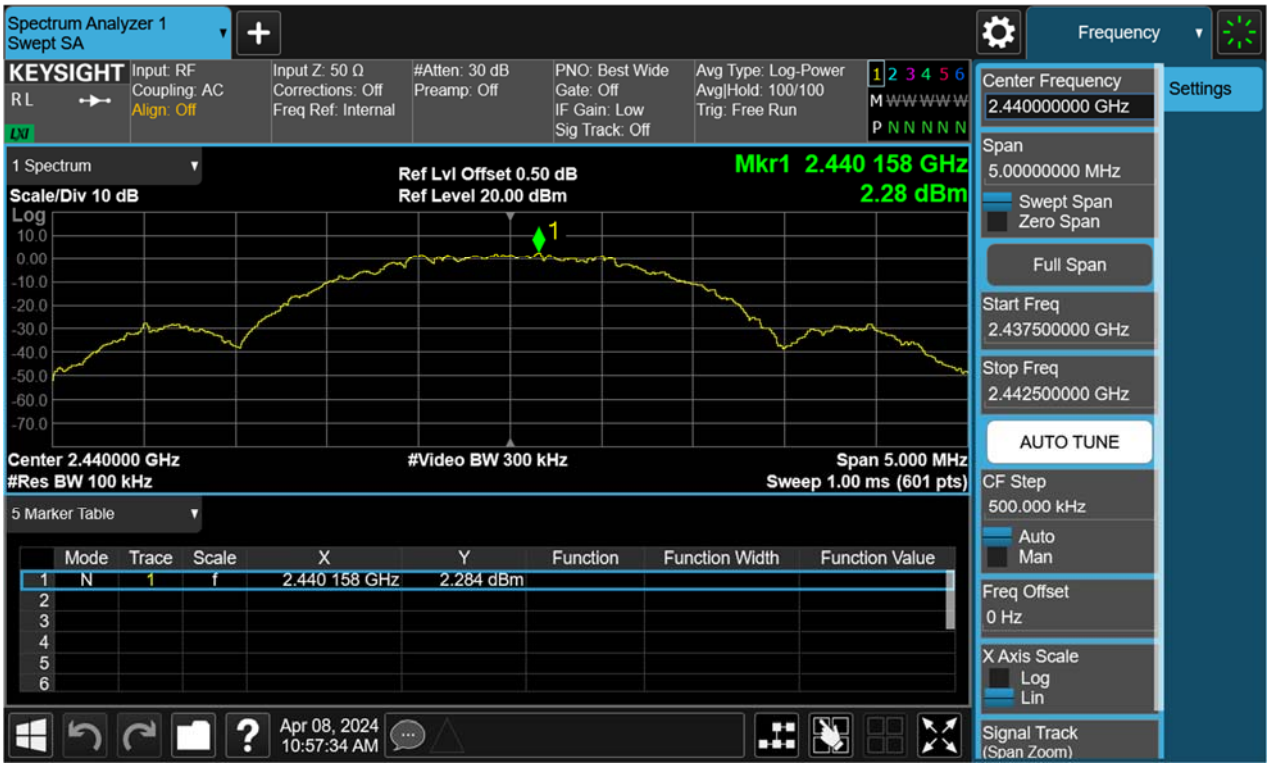


Figure 71: Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE-2Mbps Carrier Level



Conducted spurious emissions 30MHz-25GHz

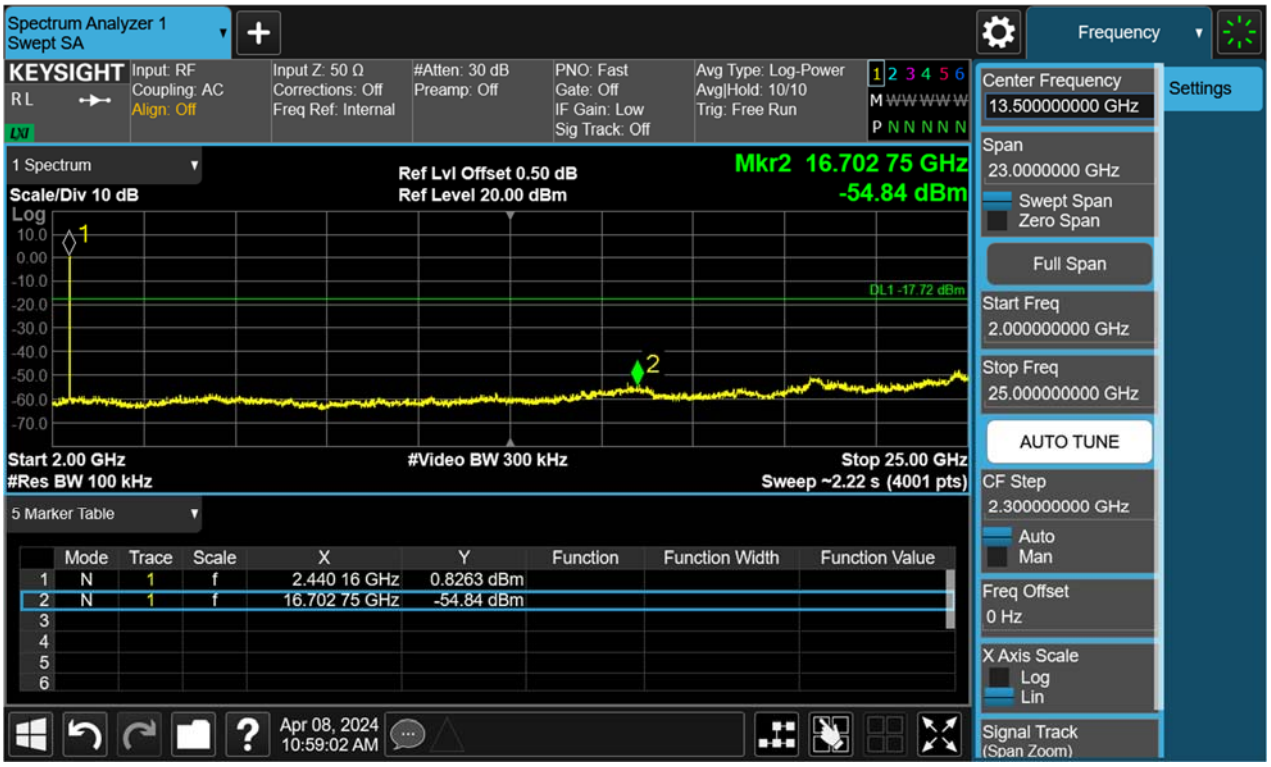
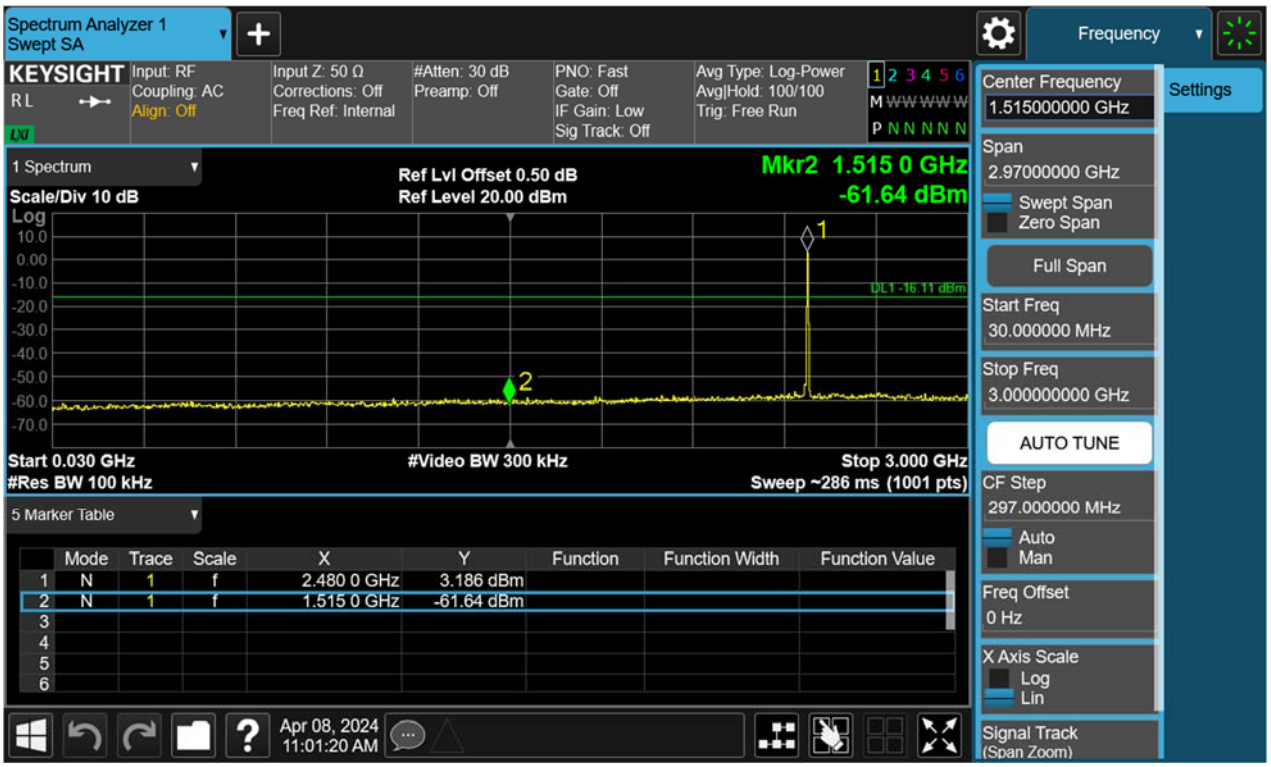


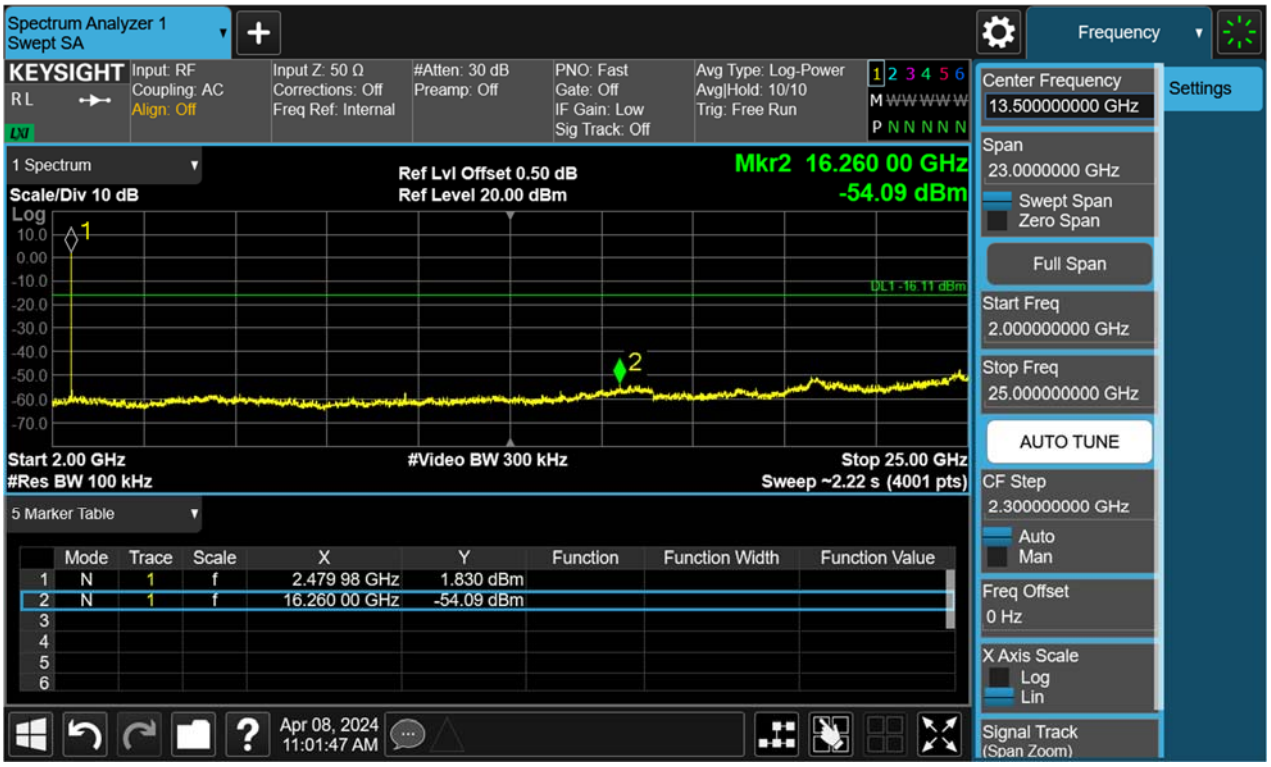
Figure 72: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE-2Mbps

Carrier Level

Band Edge

Conducted spurious emissions 30MHz-25GHz





4.1.6 Radiated Emission

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013 clause 11.12, KDB 558074 D01 v05r02, Clause 8.6
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A
Ambient temperature	:	21°C
Relative humidity	:	50%

Notes

01. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (CC2642R1F) BLE1 Antenna".

02. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (CC2642R1F) BLE2 Antenna".

03. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (RTL8720DN) BLE ".

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported. In addition, During 30MHz to 1GHz test frequency range, only the worst mode data was reported in this report.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

4.1.7 Band Edge (Restricted-band band-edge)

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013 clause 11.13, KDB 558074 D01 v05r02, Clause 8.7
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1
Ambient temperature	:	21°C
Relative humidity	:	50%

Notes

01. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (CC2642R1F) BLE1 Antenna".

02. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (CC2642R1F) BLE2 Antenna".

03. Test plots please refer to the annex document "SHE24030088-01AE DATA BLE-TX EXHIBIT A of (RTL8720DN) BLE ".

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	:	FCC Part 15.207(a)
Requirement	:	ANSI C63.10-2013, Clause 6.2
Kind of test site	:	Shielded room

Test setup

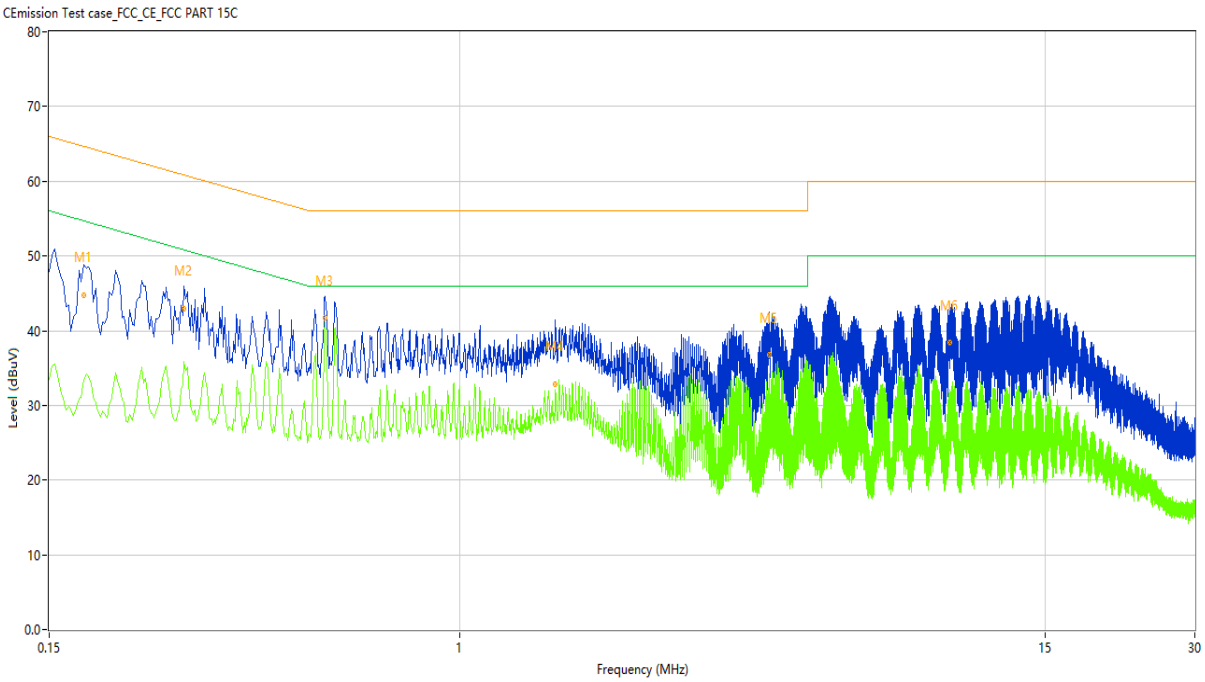
Input Voltage	:	which received AC 120V, 60Hz Power
Operation Mode	:	A.1.a
Earthing	:	Connected to GND
Ambient temperature	:	22.2°C
Relative humidity	:	50%

For details refer to following test plot.

Note：The all configurations were tested respectively, but only the worst data (at low channel) shown here.

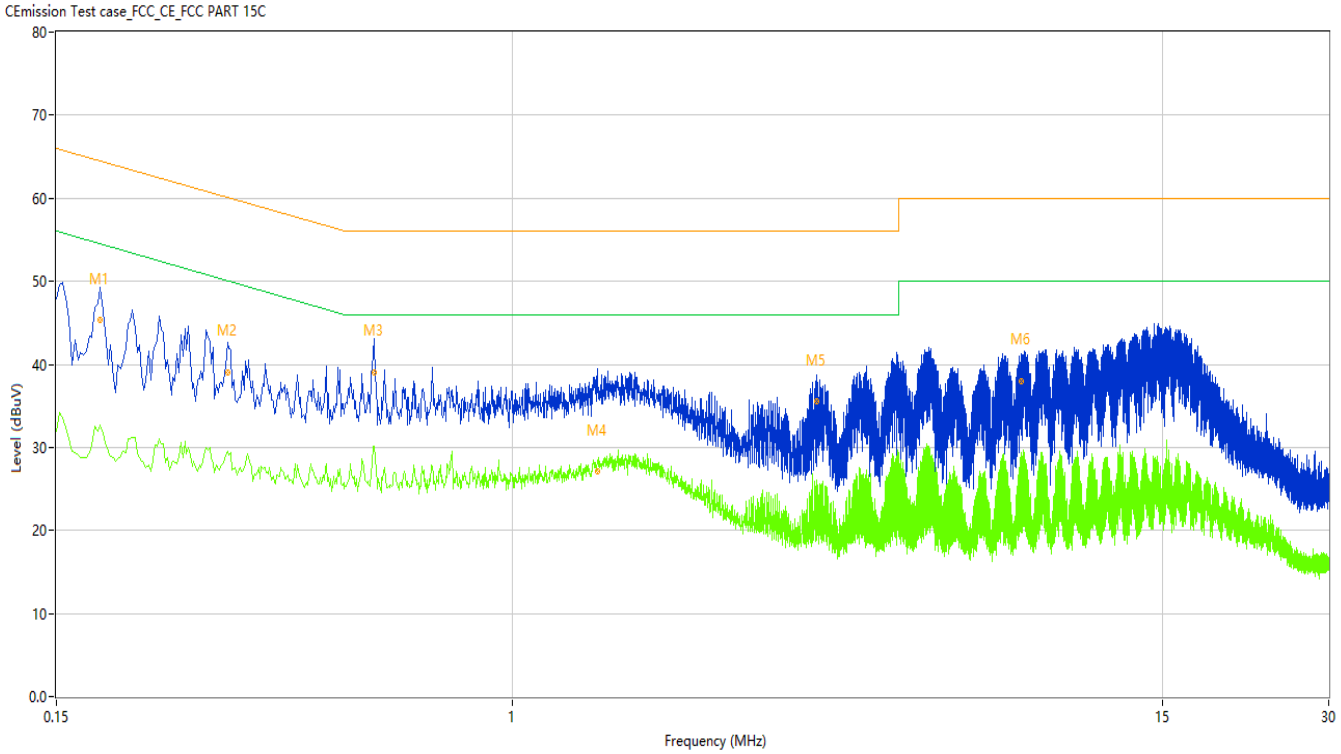
USB Input:

Figure 73: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.176	47.87	9.93	64.67	16.80	Peak	L	Pass
1*	0.176	44.75	9.93	64.67	19.92	QP	L	Pass
1**	0.176	33.39	9.93	54.67	21.28	AV	L	Pass
2	0.280	46.34	9.97	60.82	14.48	Peak	L	Pass
2*	0.280	42.93	9.97	60.82	17.89	QP	L	Pass
2**	0.280	35.80	9.97	50.82	15.02	AV	L	Pass
3	0.538	43.62	9.96	56.00	12.38	Peak	L	Pass
3*	0.538	41.67	9.96	56.00	14.33	QP	L	Pass
3**	0.538	41.11	9.96	46.00	4.89	AV	L	Pass
4	1.560	37.02	9.85	56.00	18.98	Peak	L	Pass
4*	1.560	32.87	9.85	56.00	23.13	QP	L	Pass
4**	1.560	32.12	9.85	46.00	13.88	AV	L	Pass
5	4.198	41.39	9.82	56.00	14.61	Peak	L	Pass
5*	4.198	36.71	9.82	56.00	19.29	QP	L	Pass
5**	4.198	34.23	9.82	46.00	11.77	AV	L	Pass
6	9.670	43.20	9.69	60.00	16.80	Peak	L	Pass
6*	9.670	38.42	9.69	60.00	21.58	QP	L	Pass
6**	9.670	32.07	9.69	50.00	17.93	AV	L	Pass

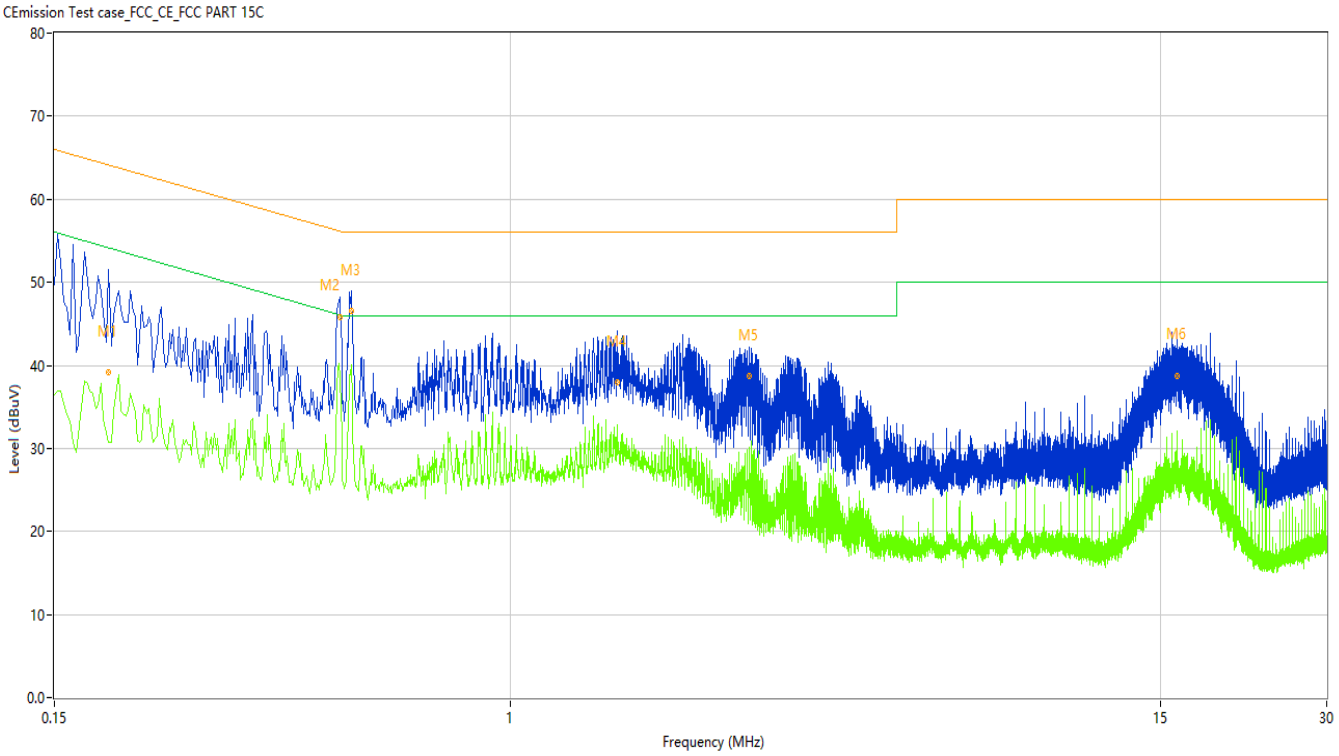
Figure 74: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.180	47.64	10.02	64.49	16.85	Peak	N	Pass
1*	0.180	45.28	10.02	64.49	19.21	QP	N	Pass
1**	0.180	32.76	10.02	54.49	21.73	AV	N	Pass
2	0.306	42.21	10.06	60.08	17.87	Peak	N	Pass
2*	0.306	39.08	10.06	60.08	21.00	QP	N	Pass
2**	0.306	29.56	10.06	50.08	20.52	AV	N	Pass
3	0.564	42.04	10.06	56.00	13.96	Peak	N	Pass
3*	0.564	38.96	10.06	56.00	17.04	QP	N	Pass
3**	0.564	30.07	10.06	46.00	15.93	AV	N	Pass
4	1.426	35.53	9.94	56.00	20.47	Peak	N	Pass
4*	1.426	27.19	9.94	56.00	28.81	QP	N	Pass
4**	1.426	27.97	9.94	46.00	18.03	AV	N	Pass
5	3.550	38.15	9.89	56.00	17.85	Peak	N	Pass
5*	3.550	35.61	9.89	56.00	20.39	QP	N	Pass
5**	3.550	25.90	9.89	46.00	20.10	AV	N	Pass
6	8.330	41.29	9.80	60.00	18.71	Peak	N	Pass
6*	8.330	37.91	9.80	60.00	22.09	QP	N	Pass
6**	8.330	28.80	9.80	50.00	21.20	AV	N	Pass

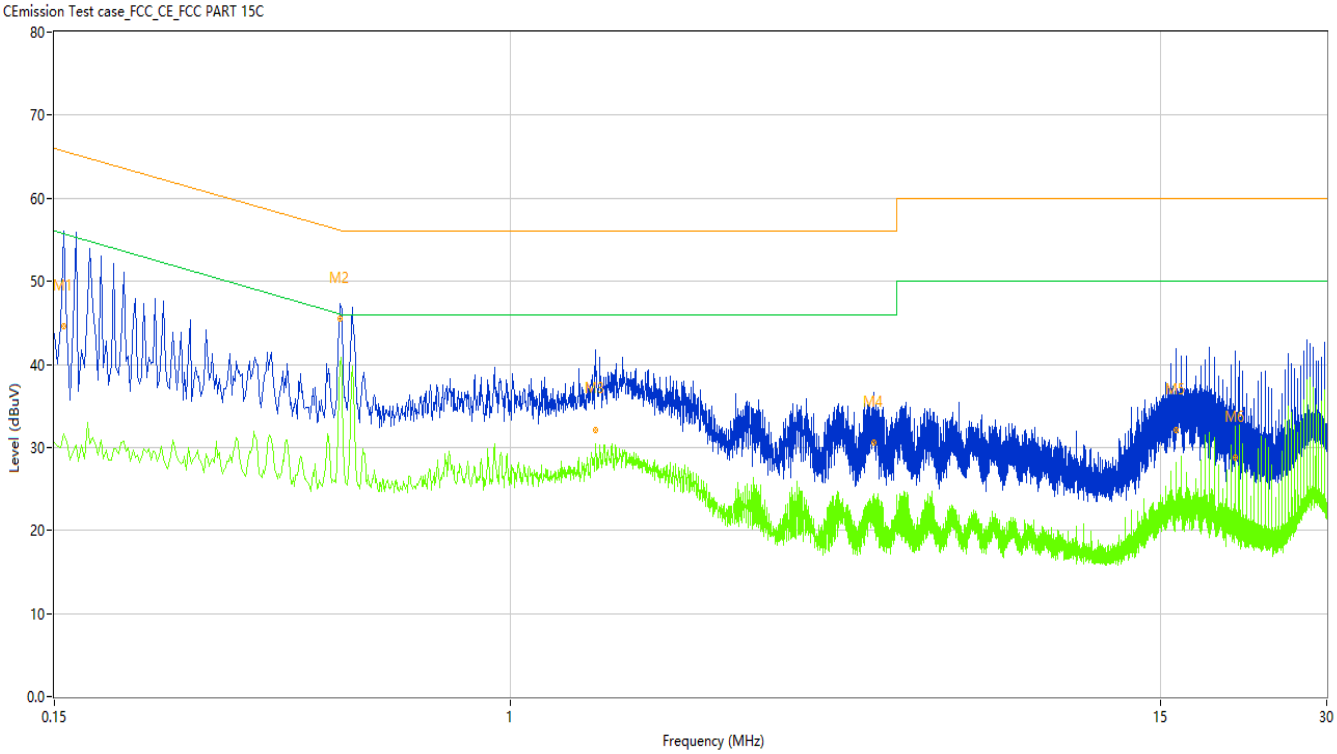
POE Input:

Figure 75: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.188	52.82	9.94	64.12	11.30	Peak	L	Pass
1*	0.188	39.19	9.94	64.12	24.93	QP	L	Pass
1**	0.188	30.81	9.94	54.12	23.31	AV	L	Pass
2	0.492	48.92	9.96	56.13	7.21	Peak	L	Pass
2*	0.492	45.85	9.96	56.13	10.28	QP	L	Pass
2**	0.492	38.78	9.96	46.13	7.35	AV	L	Pass
3	0.516	49.11	9.96	56.00	6.89	Peak	L	Pass
3*	0.516	46.54	9.96	56.00	9.46	QP	L	Pass
3**	0.516	40.07	9.96	46.00	5.93	AV	L	Pass
4	1.562	42.41	9.85	56.00	13.59	Peak	L	Pass
4*	1.562	37.95	9.85	56.00	18.05	QP	L	Pass
4**	1.562	32.80	9.85	46.00	13.20	AV	L	Pass
5	2.712	41.61	9.84	56.00	14.39	Peak	L	Pass
5*	2.712	38.73	9.84	56.00	17.27	QP	L	Pass
5**	2.712	29.30	9.84	46.00	16.70	AV	L	Pass
6	16.100	44.93	9.50	60.00	15.07	Peak	L	Pass
6*	16.100	38.72	9.50	60.00	21.28	QP	L	Pass
6**	16.100	31.41	9.50	50.00	18.59	AV	L	Pass

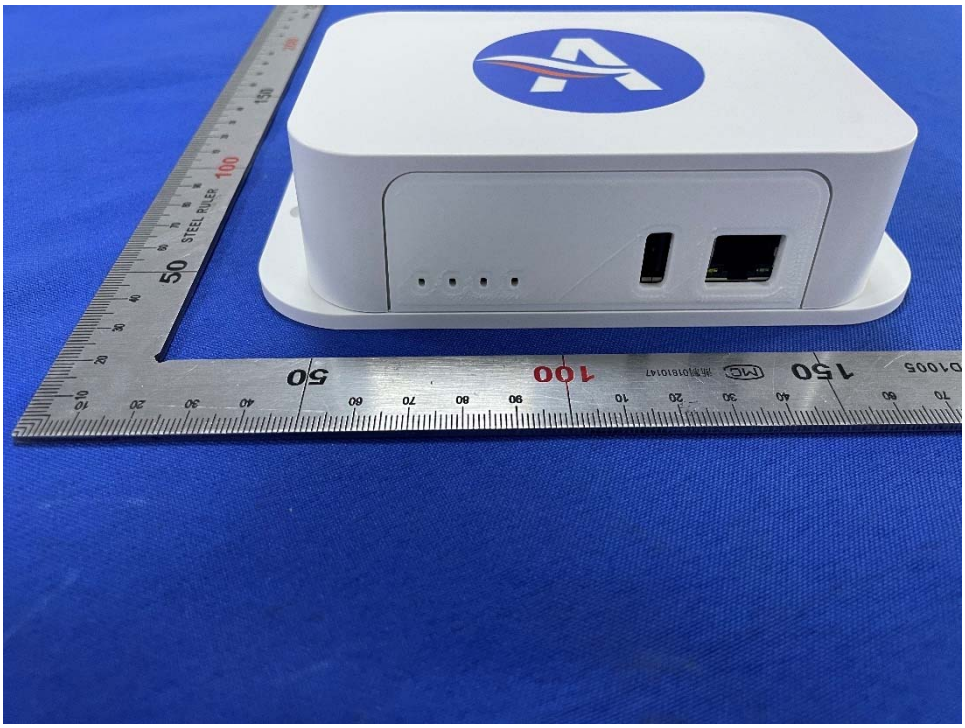
Figure 76: Conducted Emission on AC Mains, N Phase



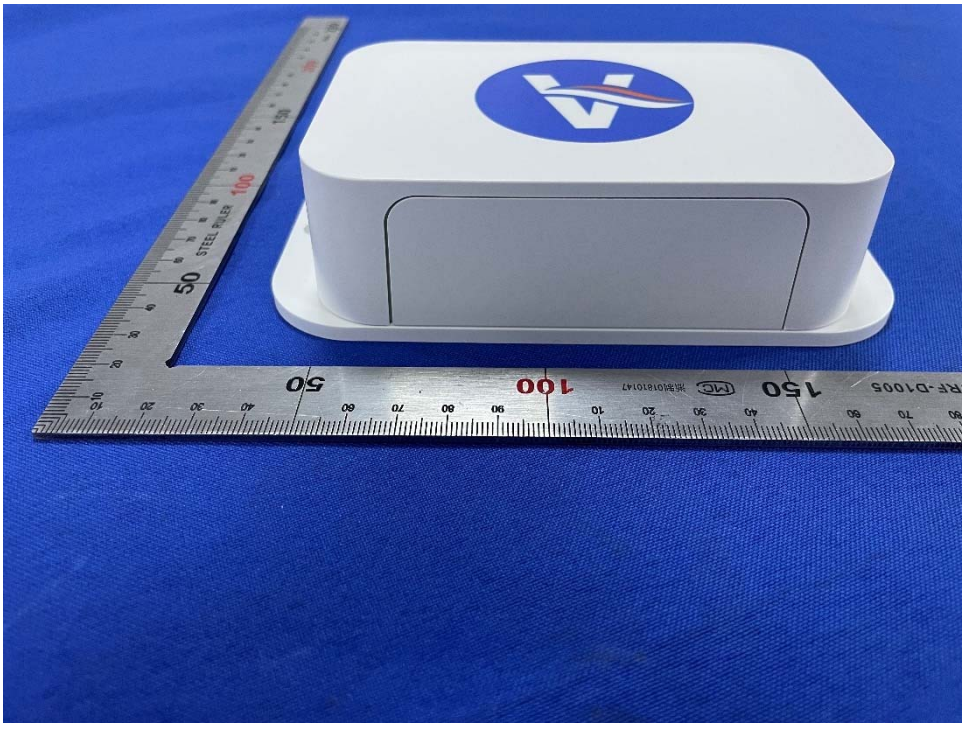
No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.156	57.98	10.03	65.67	7.69	Peak	N	Pass
1*	0.156	44.60	10.03	65.67	21.07	QP	N	Pass
1**	0.156	31.68	10.03	55.67	23.99	AV	N	Pass
2	0.492	47.94	10.07	56.13	8.19	Peak	N	Pass
2*	0.492	45.52	10.07	56.13	10.61	QP	N	Pass
2**	0.492	39.86	10.07	46.13	6.27	AV	N	Pass
3	1.426	37.54	9.94	56.00	18.46	Peak	N	Pass
3*	1.426	32.12	9.94	56.00	23.88	QP	N	Pass
3**	1.426	29.26	9.94	46.00	16.74	AV	N	Pass
4	4.548	34.88	9.79	56.00	21.12	Peak	N	Pass
4*	4.548	30.66	9.79	56.00	25.34	QP	N	Pass
4**	4.548	21.43	9.79	46.00	24.57	AV	N	Pass
5	16.036	37.33	9.57	60.00	22.67	Peak	N	Pass
5*	16.036	32.05	9.57	60.00	27.95	QP	N	Pass
5**	16.036	27.14	9.57	50.00	22.86	AV	N	Pass
6	20.476	34.79	9.42	60.00	25.21	Peak	N	Pass
6*	20.476	28.81	9.42	60.00	31.19	QP	N	Pass
6**	20.476	31.53	9.42	50.00	18.47	AV	N	Pass

5 Appendixes

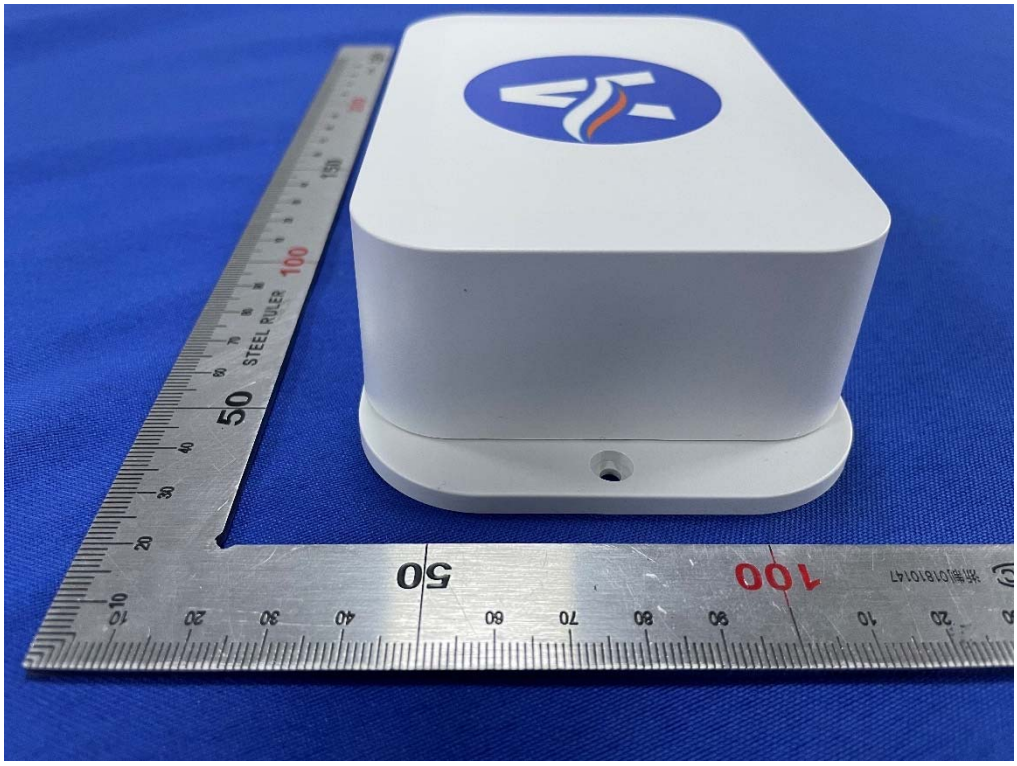
5.1 Photographs of the Sample



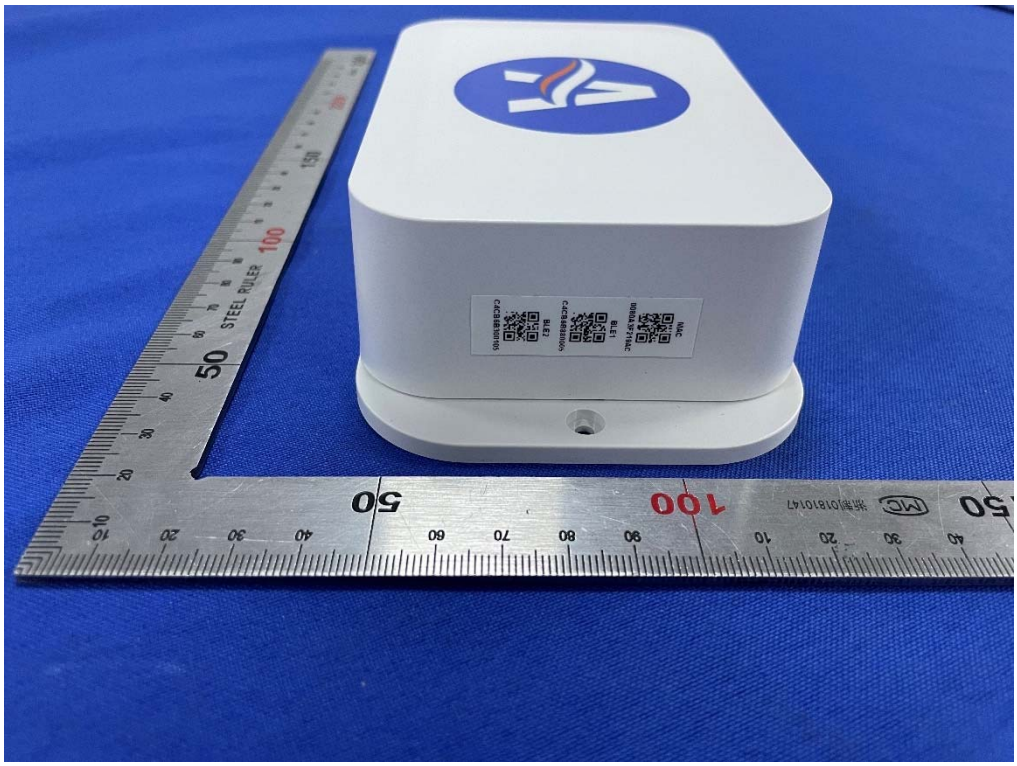
Front of the sample



Rear of the sample



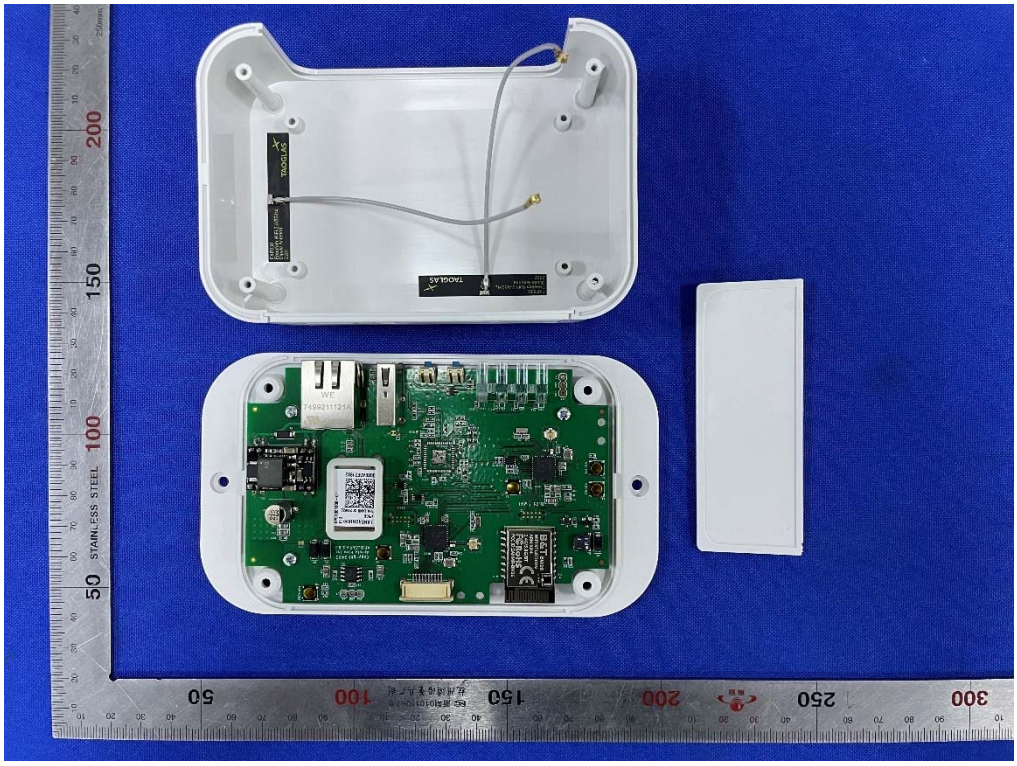
Left of the sample



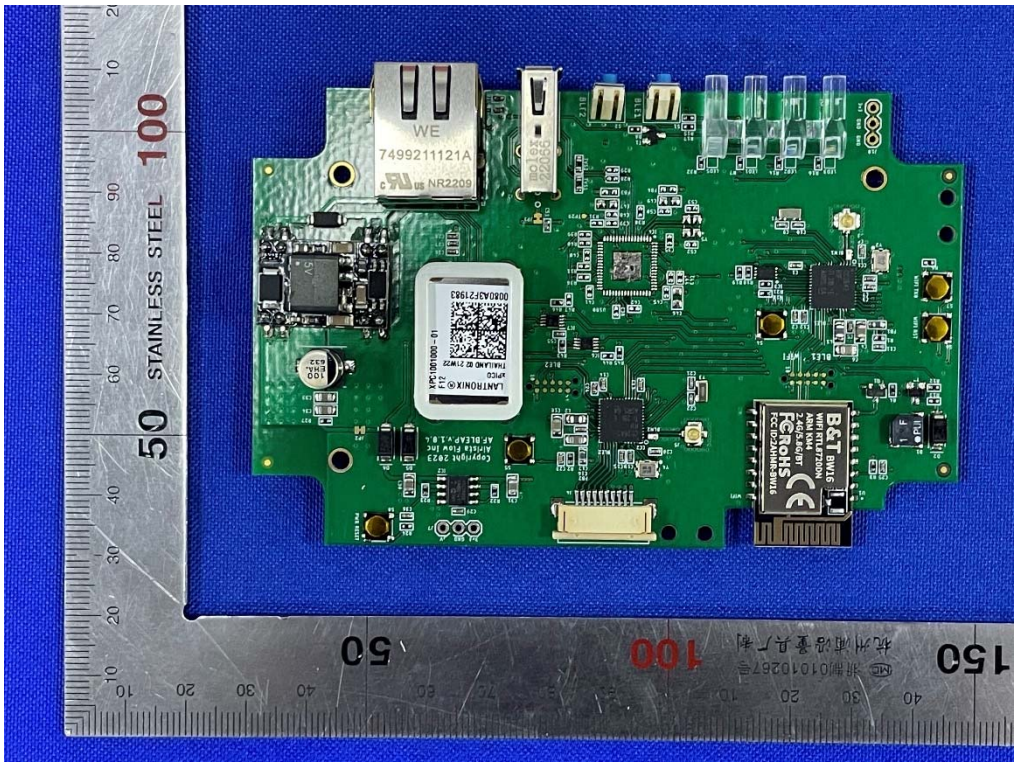
Right of the sample

Top of the sample

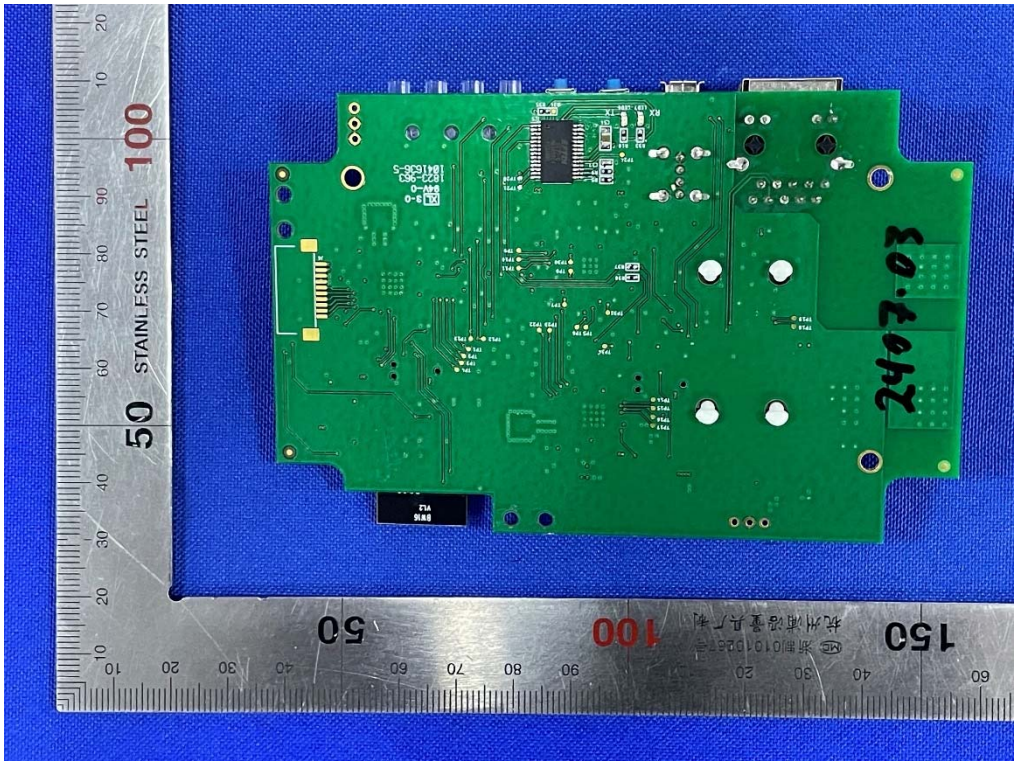
Bottom of the sample



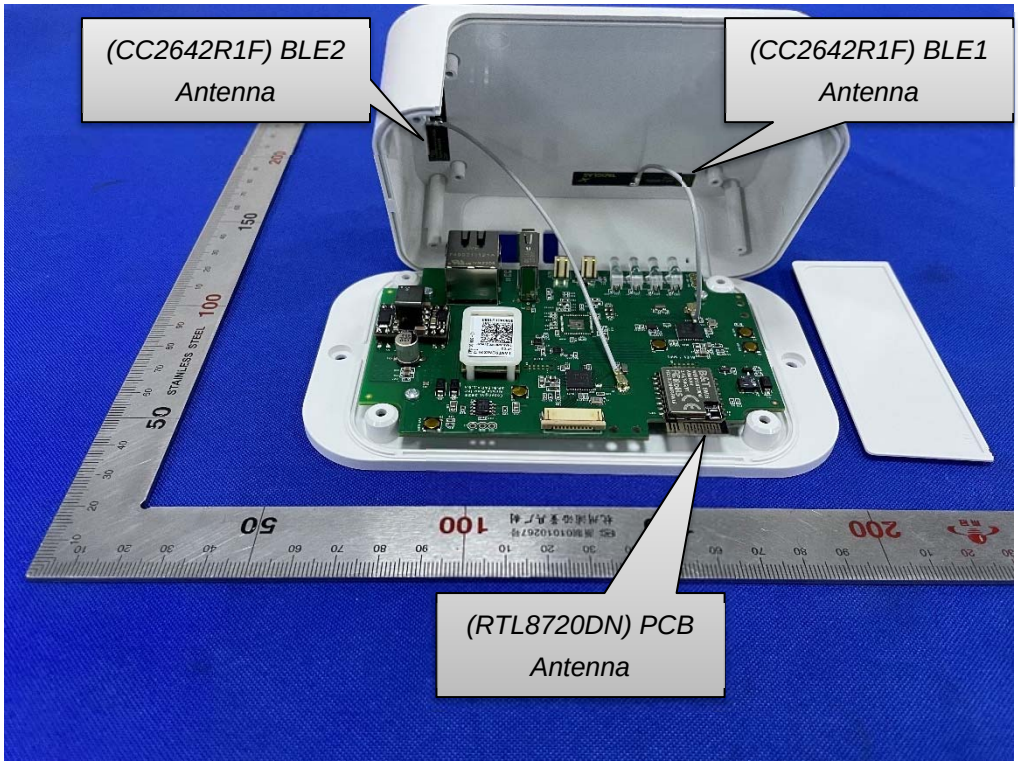
Open of the sample



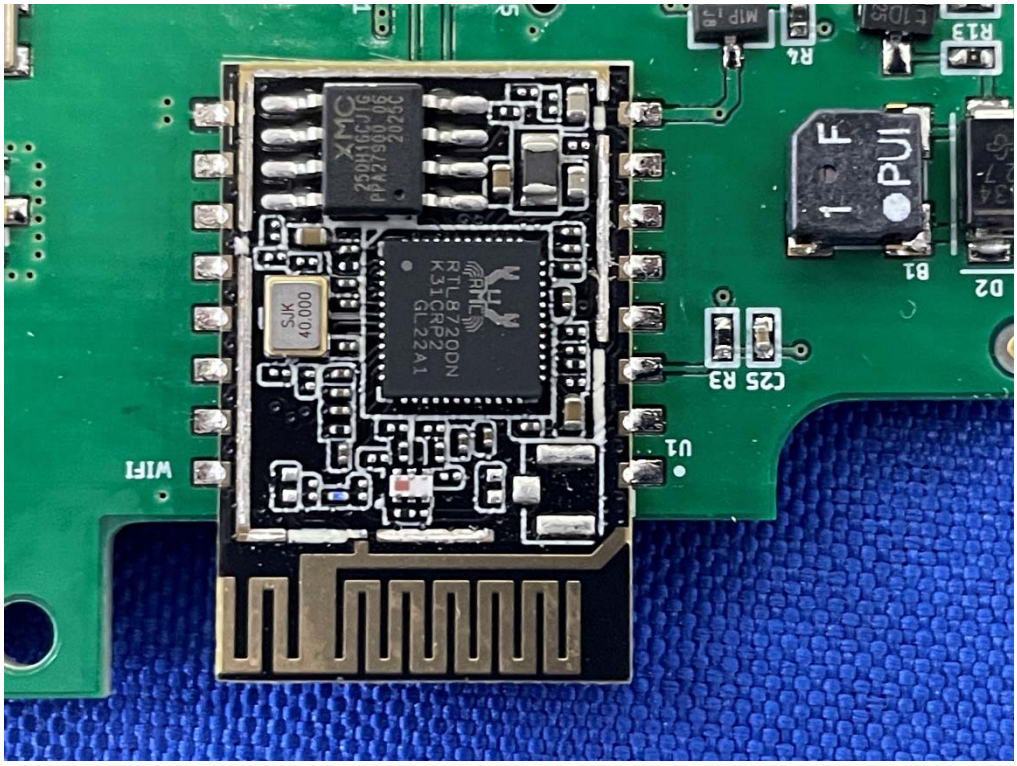
Internal-1 of the sample



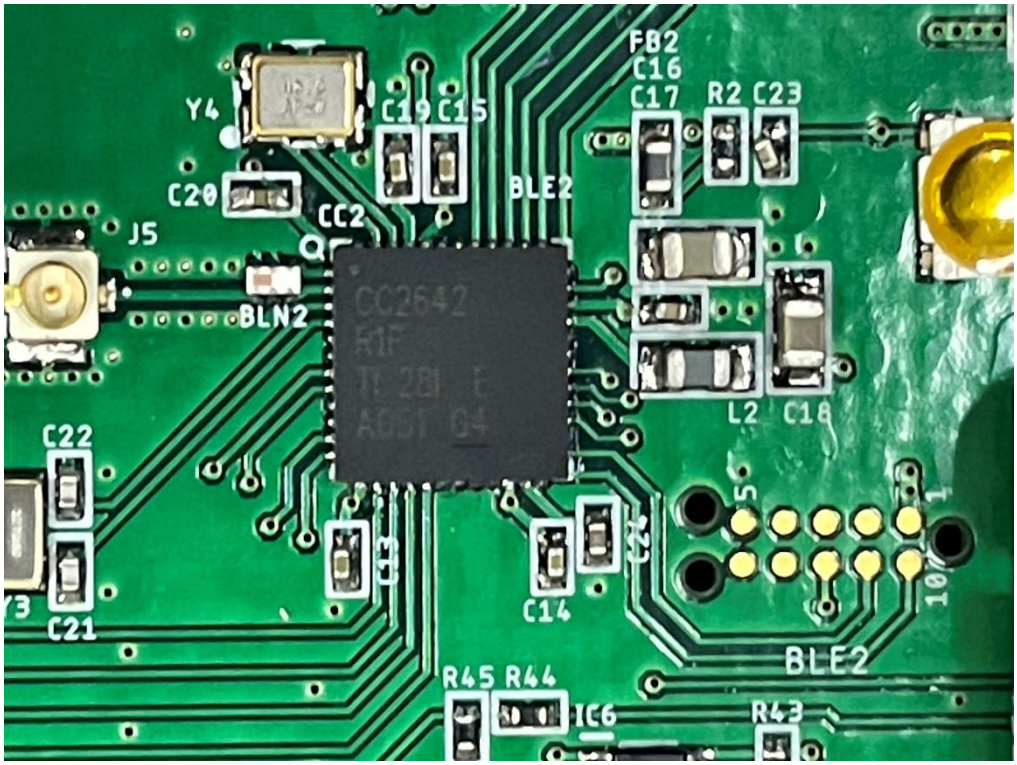
Internal-2 of the sample



Antenna Position


XMC
RTL8720DN
WIFI
U1
C25 R3
B1
D2
R13
R4

Chip-1


Y4
C19 C15
C20
CC2
J5
BLN2
BLE2
FB2
C16
C17
R2 C23
L2 C18
C22
C21
C14
R45 R44
IC6
R43
BLE2

Chip-2

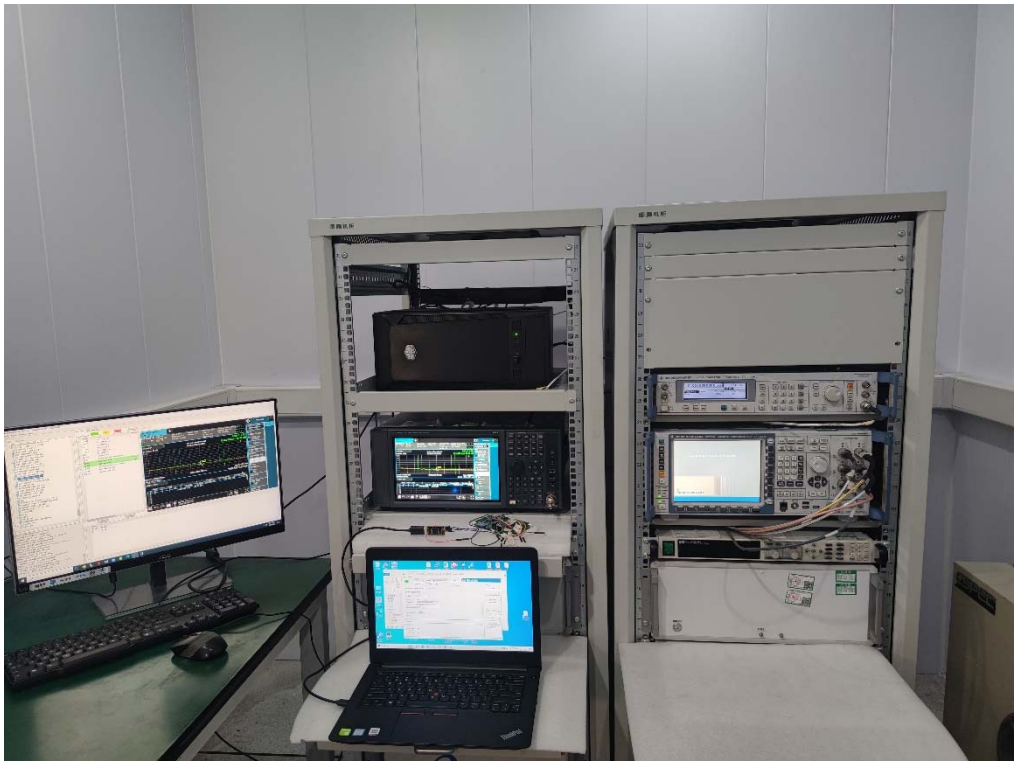
5.2 Set-up for Conducted Emissions

USB Input

POE Input

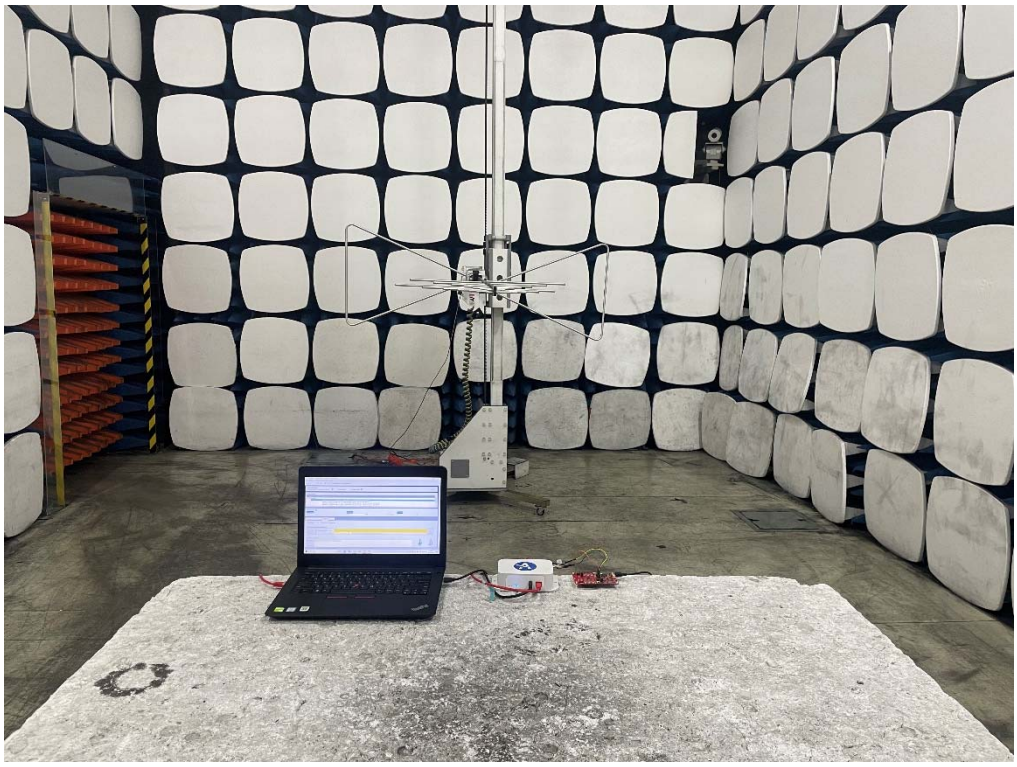
5.3 Set-up for Conducted RF test at Antenna Port

CC2642R1F-Chip

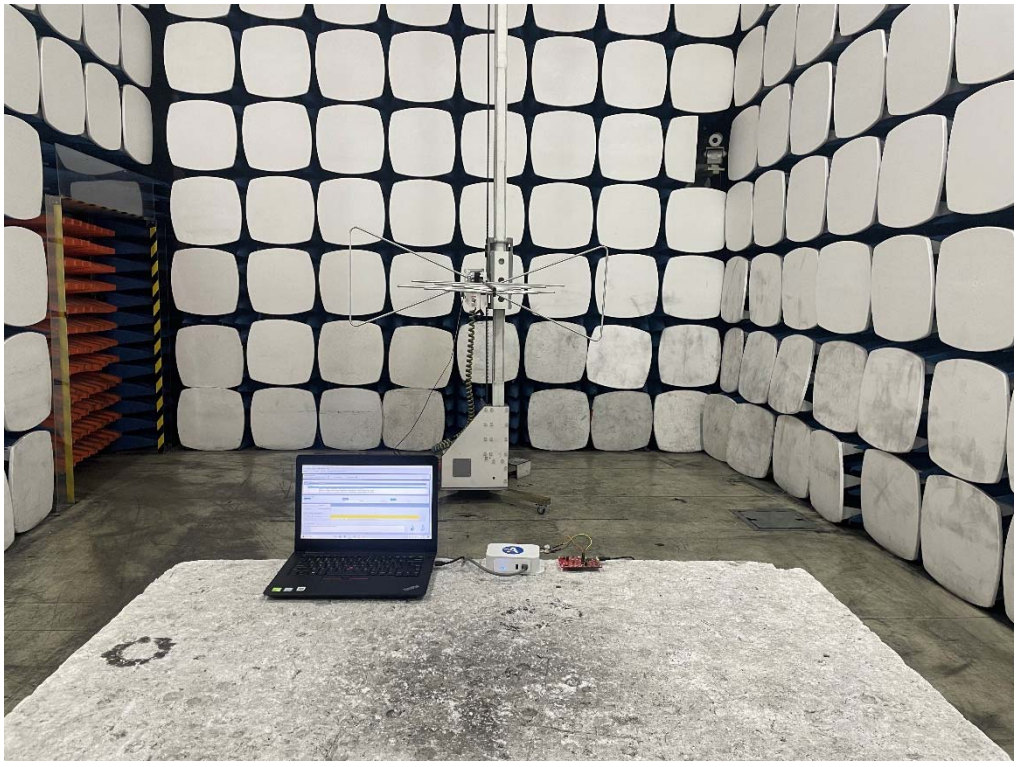


RTL8720DN-Chip

5.4 Set-up for Spurious Emissions below 1GHz

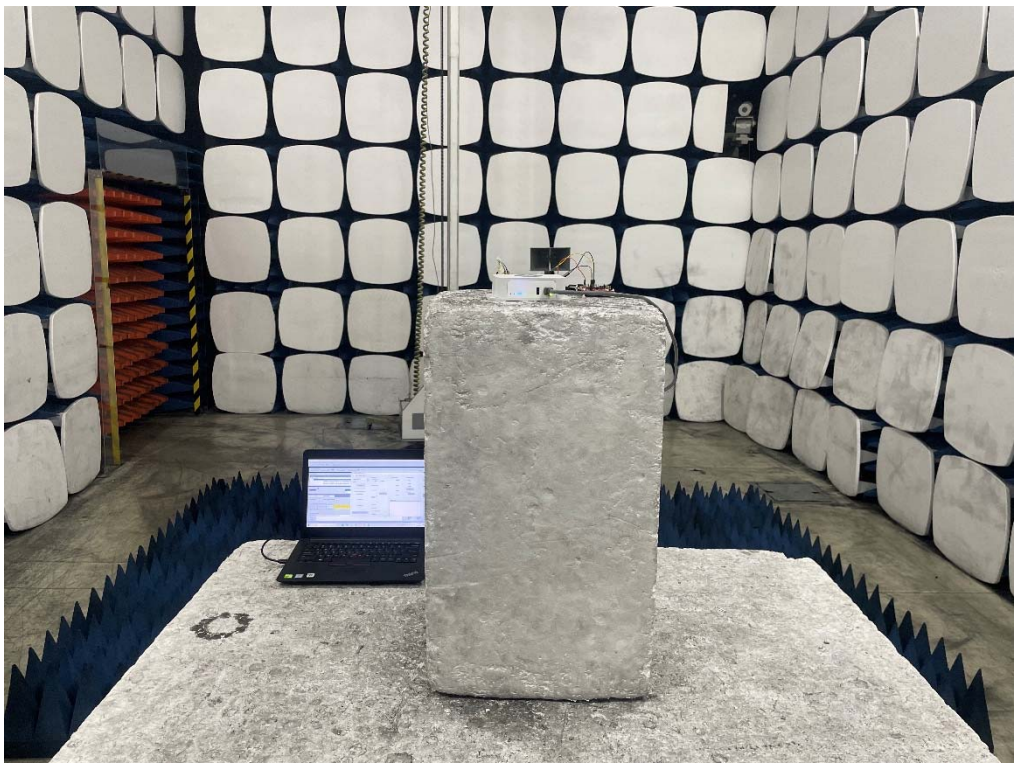


USB Input



POE Input

5.5 Set-up for Spurious Emissions above 1GHz



End of the report