

11. CONDUCTED EMISSION MEASUREMENT

11.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz~0.5MHz	66~56	56~46
0.5MHz~5MHz	56	46
5MHz~30MHz	60	50

11.2 TEST PROCEDURES

Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

- 1) Place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

- 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

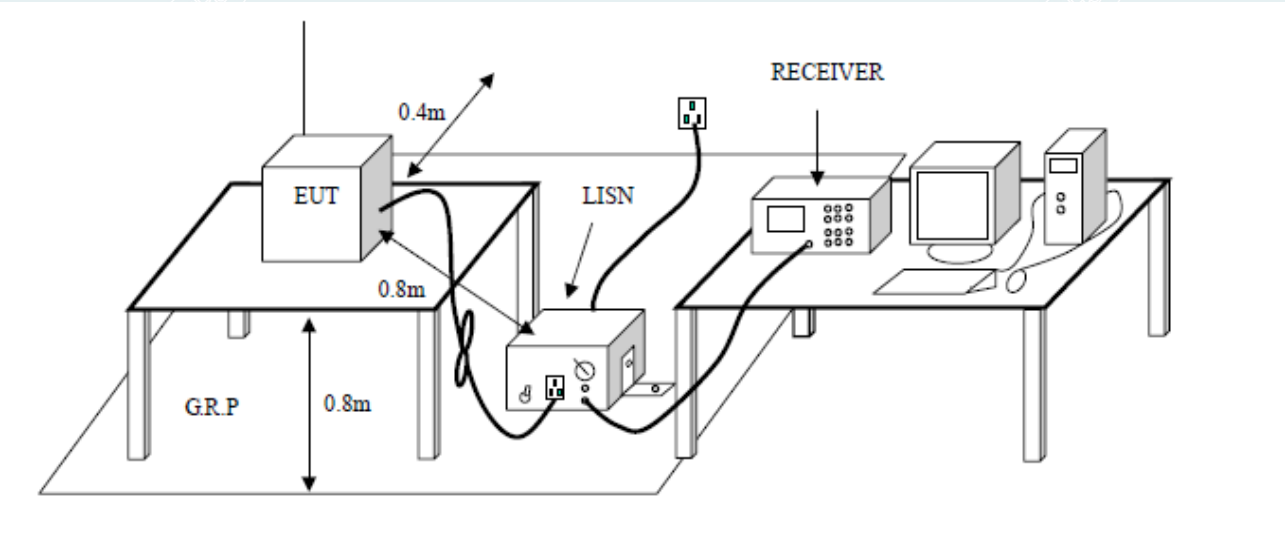
The test mode(s) described in Item 2.5 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.5 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

11.3 TEST SETUP



11.4 DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

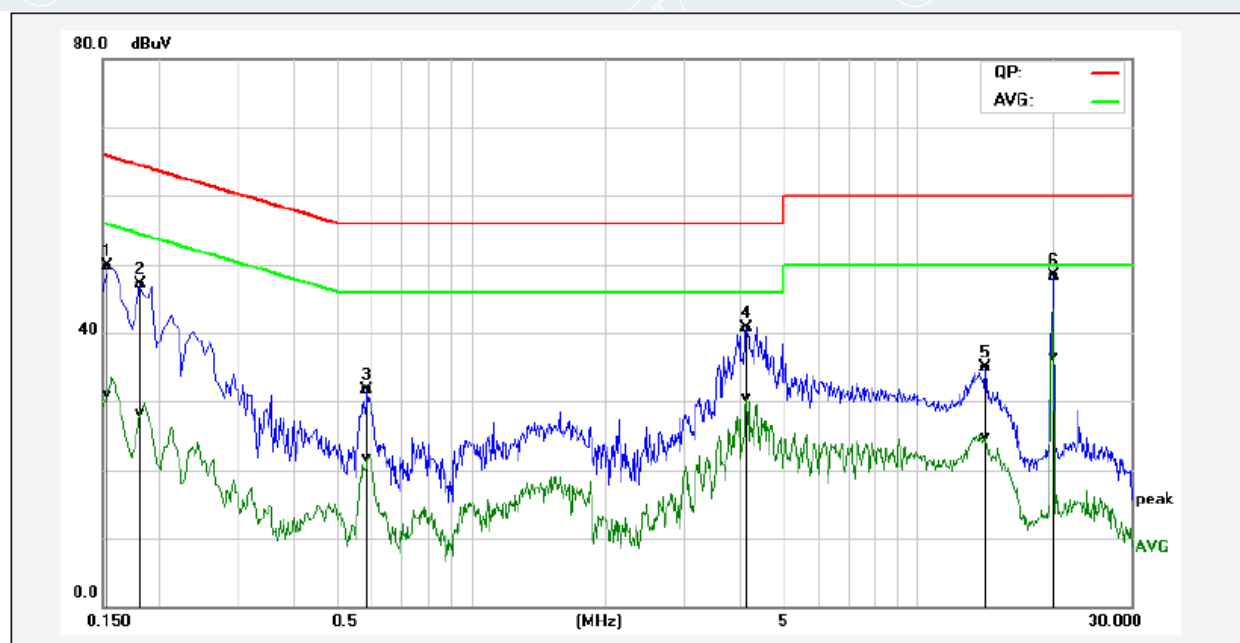
Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)

11.5 TEST RESULTS

Left earbuds

EUT Name	Wireless Earbuds	Model	E508A
Environmental Conditions	22.5°C/45%RH/101.0kPa	Test Mode	DH5 2480MHz
Tested By	Tang Shenghui	Line	L
Tested Date	2022-10-18	Test Voltage	AC120V/60Hz

(The chart below shows the highest readings taken from the final data.)



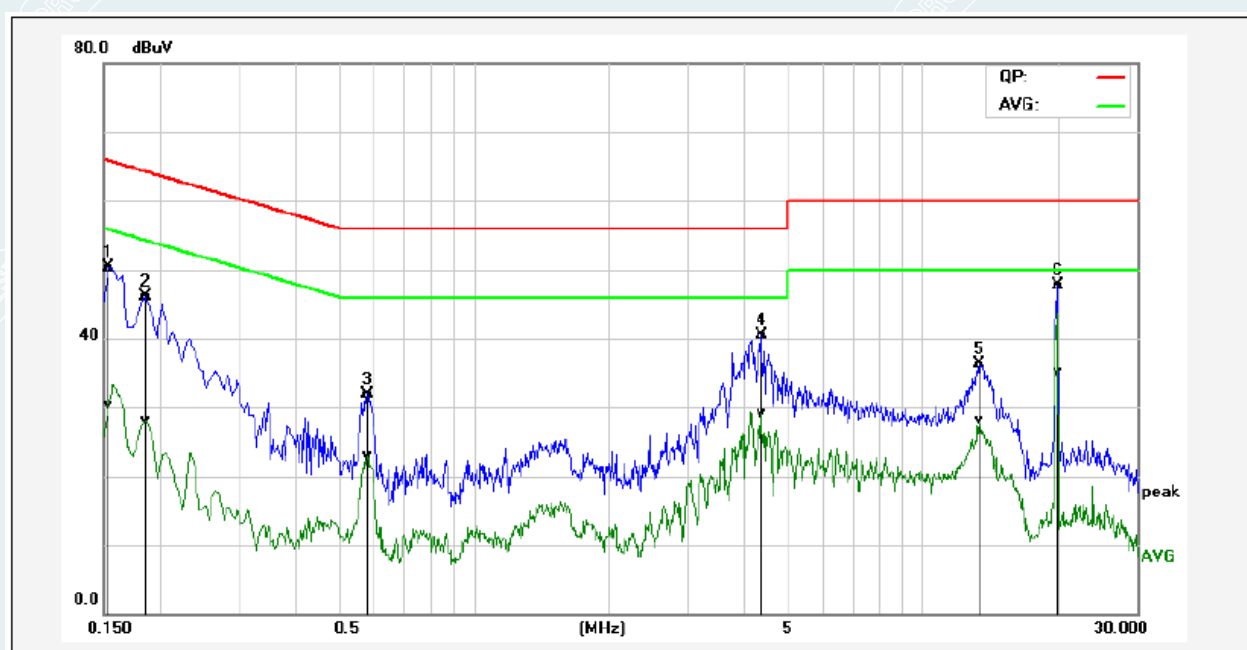
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1539	40.10	21.35	9.61	49.71	30.96	65.78	55.79	-16.07	-24.83	Pass
2	0.1819	37.43	18.80	9.60	47.03	28.40	64.39	54.40	-17.36	-26.00	Pass
3	0.5860	22.06	12.17	9.60	31.66	21.77	56.00	46.00	-24.34	-24.23	Pass
4	4.1540	31.13	20.90	9.66	40.79	30.56	56.00	46.00	-15.21	-15.44	Pass
5	14.2060	25.12	15.03	9.74	34.86	24.77	60.00	50.00	-25.14	-25.23	Pass
6*	20.1940	38.49	26.65	9.86	48.35	36.51	60.00	50.00	-11.65	-13.49	Pass

REMARKS: L = Live Line

Pre-scan all mode and recorded the worst case results in this report (TX-High Channel(DH5))

EUT Name	Wireless Earbuds	Model	E508A
Environmental Conditions	22.5°C/45%RH/101.0kPa	Test Mode	DH5 2480MHz
Tested By	Tang Shenghui	Line	N
Tested Date	2022-10-18	Test Voltage	AC120V/60Hz

(The chart below shows the highest readings taken from the final data.)



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1539	40.77	20.62	9.60	50.37	30.22	65.78	55.79	-15.41	-25.57	Pass
2	0.1860	36.57	18.51	9.59	46.16	28.10	64.21	54.21	-18.05	-26.11	Pass
3	0.5820	22.41	13.27	9.59	32.00	22.86	56.00	46.00	-24.00	-23.14	Pass
4	4.3740	30.84	19.45	9.65	40.49	29.10	56.00	46.00	-15.51	-16.90	Pass
5	13.3940	26.43	18.41	9.78	36.21	28.19	60.00	50.00	-23.79	-21.81	Pass
6*	19.9940	37.87	25.30	9.89	47.76	35.19	60.00	50.00	-12.24	-14.81	Pass

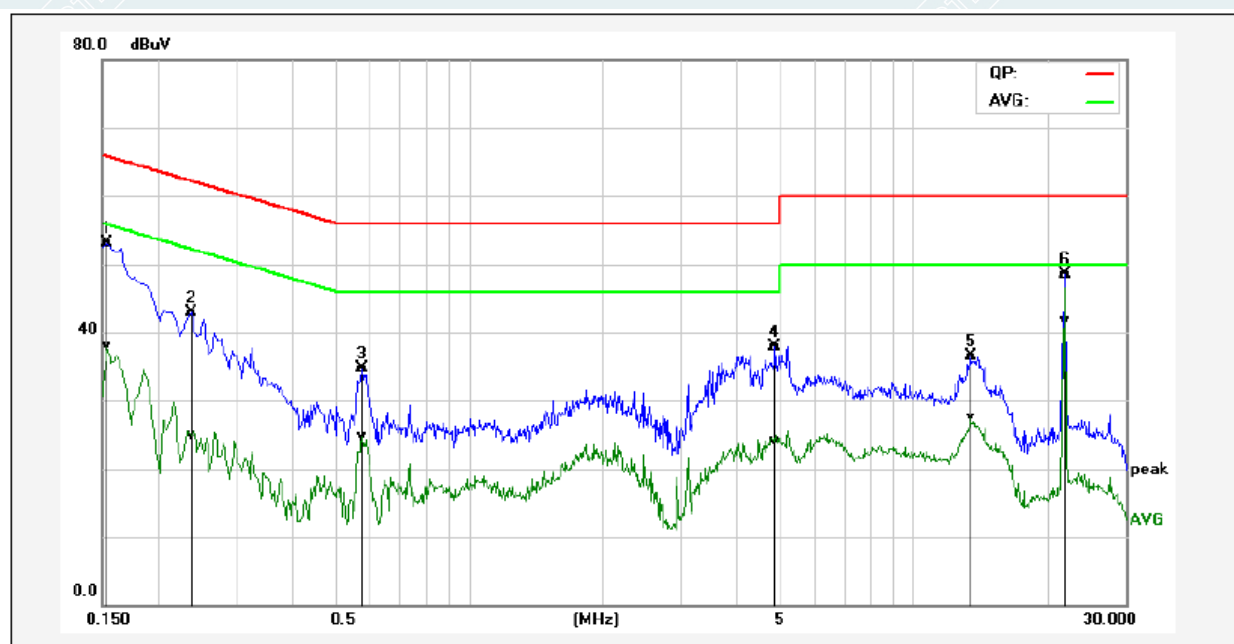
REMARKS: N = Neutral Line.

Pre-scan all mode and recorded the worst case results in this report (TX-High Channel(DH5))

Right earbuds

EUT Name	Wireless Earbuds	Model	E508A
Environmental Conditions	22.5°C/45%RH/101.0kPa	Test Mode	DH5 2441MHz
Tested By	Tang Shenghui	Line	L
Tested Date	2022-10-18	Test Voltage	AC120V/60Hz

(The chart below shows the highest readings taken from the final data.)



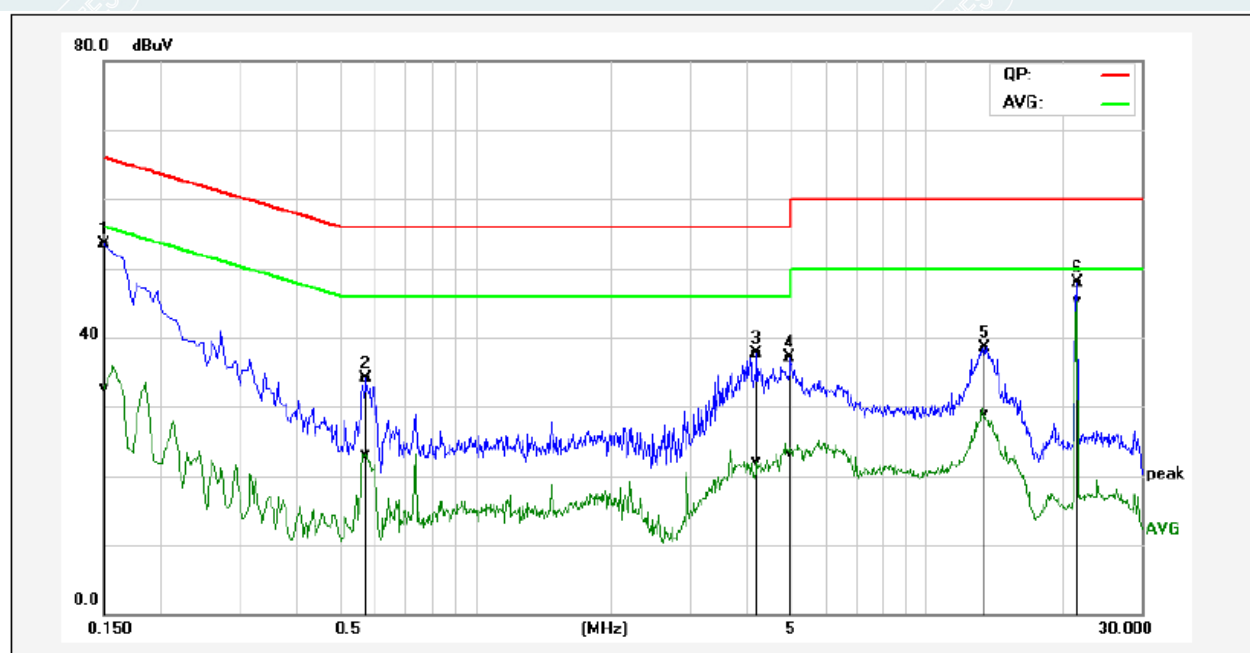
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1539	43.49	28.23	9.61	53.10	37.84	65.78	55.79	-12.68	-17.95	Pass
2	0.2380	33.38	15.39	9.60	42.98	24.99	62.16	52.17	-19.18	-27.18	Pass
3	0.5780	25.06	15.01	9.60	34.66	24.61	56.00	46.00	-21.34	-21.39	Pass
4	4.8780	28.30	14.35	9.66	37.96	24.01	56.00	46.00	-18.04	-21.99	Pass
5	13.4140	26.72	17.70	9.73	36.45	27.43	60.00	50.00	-23.55	-22.57	Pass
6*	22.0180	38.55	31.93	9.87	48.42	41.80	60.00	50.00	-11.58	-8.20	Pass

REMARKS: L = Live Line

Pre-scan all mode and recorded the worst case results in this report (TX- Middle Channel(DH5))

EUT Name	Wireless Earbuds	Model	E508A
Environmental Conditions	22.5°C/45%RH/101.0kPa	Test Mode	DH5 2441MHz
Tested By	Tang Shenghui	Line	N
Tested Date	2022-10-18	Test Voltage	AC120V/60Hz

(The chart below shows the highest readings taken from the final data.)



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	43.82	23.07	9.60	53.42	32.67	65.99	56.00	-12.57	-23.33	Pass
2	0.5740	24.54	13.43	9.59	34.13	23.02	56.00	46.00	-21.87	-22.98	Pass
3	4.2100	27.98	12.37	9.65	37.63	22.02	56.00	46.00	-18.37	-23.98	Pass
4	4.9980	27.37	13.66	9.66	37.03	23.32	56.00	46.00	-18.97	-22.68	Pass
5	13.4540	28.74	19.13	9.78	38.52	28.91	60.00	50.00	-21.48	-21.09	Pass
6*	21.6380	38.03	35.42	9.93	47.96	45.35	60.00	50.00	-12.04	-4.65	Pass

REMARKS: N = Neutral Line.

Pre-scan all mode and recorded the worst case results in this report (TX- Middle Channel(DH5))

12. MAXIMUM PEAK OUTPUT POWER

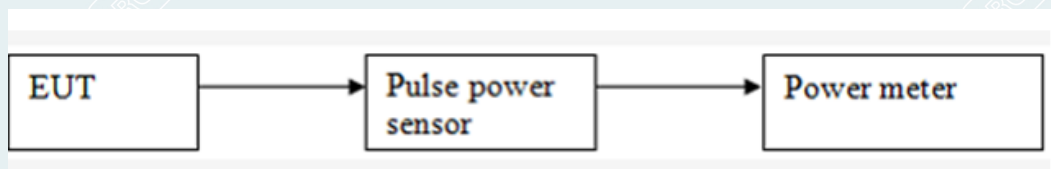
12.1 LIMITS

Regulation 15.247 (b)(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

12.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the power meter and enable the EUT transmit continuously.
- 2) Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

12.3 TEST SETUP



12.4 TEST RESULTS

Environment: 25.0°C/45%RH/101.0kPa
Tested By: Qin Tingting

Voltage: DC 3.8V
Date: 2022-10-10

Left earbuds

DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.44	20.97	Peak	Pass
Middle	2.441	11.69			Pass
Highest	2.480	11.78			Pass

2DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.43	20.97	Peak	Pass
Middle	2.441	11.68			Pass
Highest	2.480	11.76			Pass

3DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.41	20.97	Peak	Pass
Middle	2.441	11.66			Pass
Highest	2.480	11.74			Pass

Test result: The unit does meet the FCC requirements.

Right earbuds**DH5**

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.52	20.97	Peak	Pass
Middle	2.441	11.93			Pass
Highest	2.480	12.20			Pass

2DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.58	20.97	Peak	Pass
Middle	2.441	11.98			Pass
Highest	2.480	12.25			Pass

3DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/Average	Pass/Fail
Lowest	2.402	11.51	20.97	Peak	Pass
Middle	2.441	11.91			Pass
Highest	2.480	12.17			Pass

Test result: The unit does meet the FCC requirements.

13. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

13.1 LIMITS

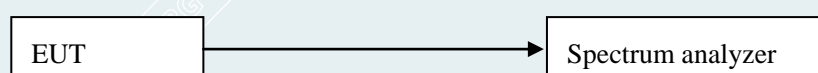
In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the 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.

13.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v05r02.

- 1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW =100kHz; VBW =300kHz, Frequency range = 30MHz to 26.5GHz; Sweep = auto; Detector Function = Peak. Trace = Max, hold.
- 3) Measure and record the results in the test report.
- 4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

13.3 TEST SETUP



13.4 TEST RESULTS

Environment: 25.0°C/45%RH/101.0kPa
Tested By: Qin Tingting

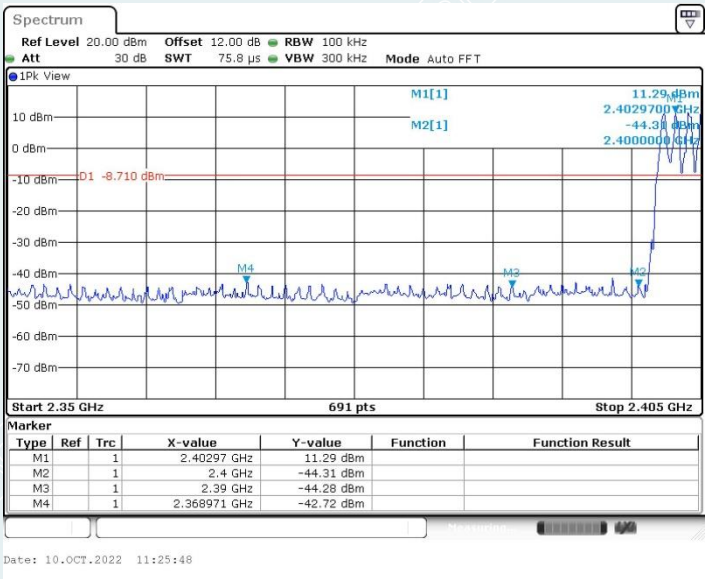
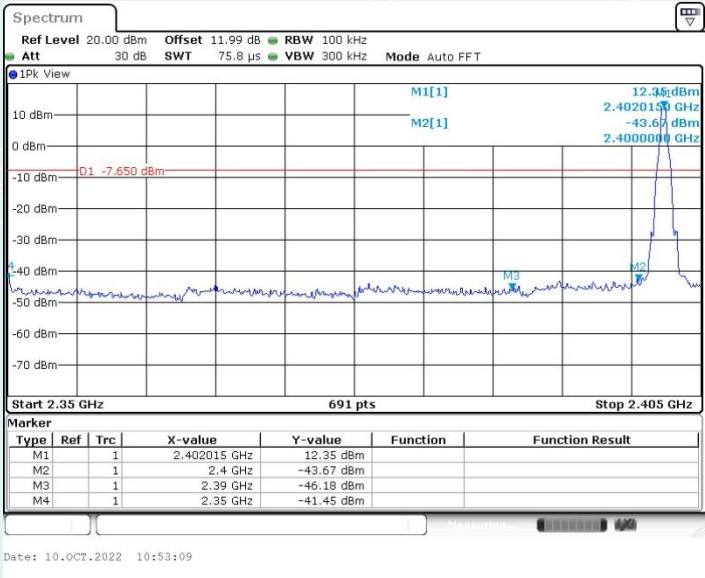
Voltage: DC 3.8V
Date: 2022-10-10~2022-10-12

Left earbuds

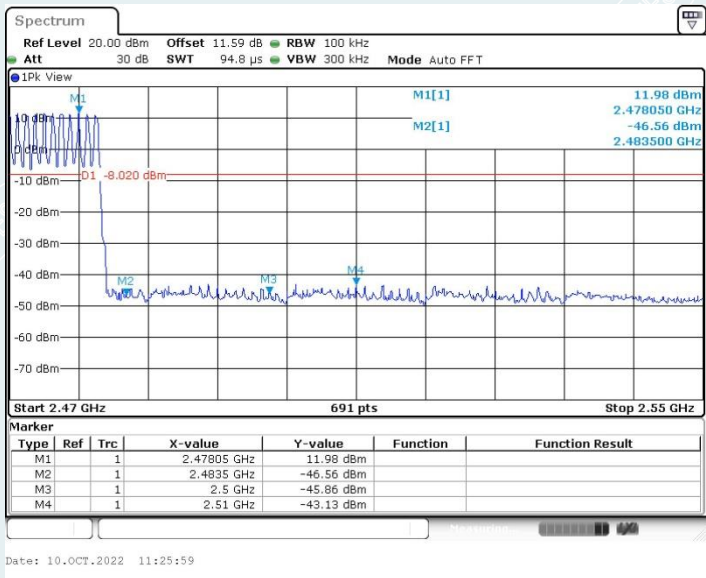
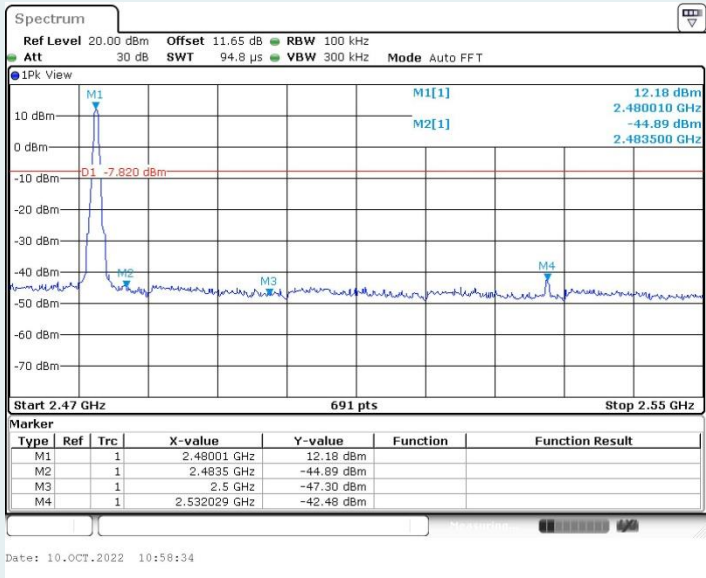
Test result plot as follows:

Band Edges
DH5

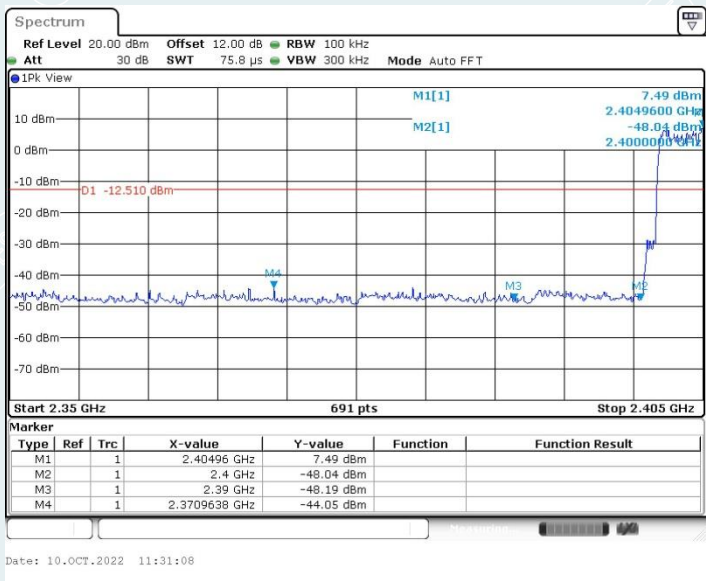
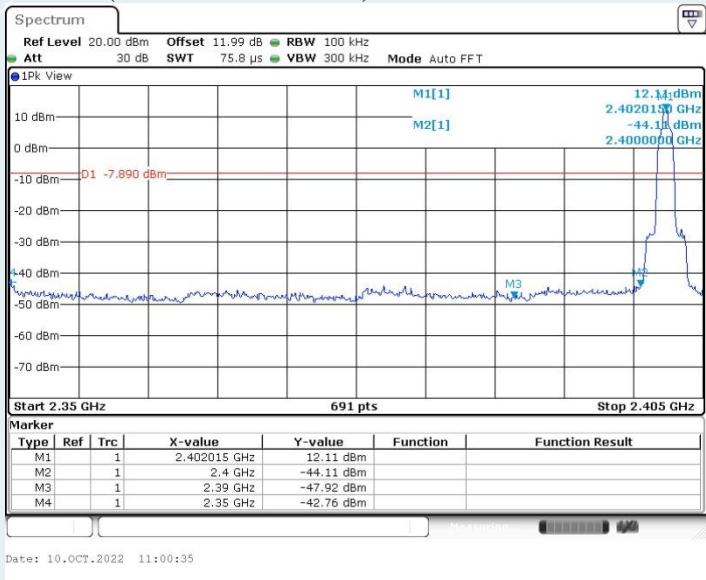
CH Low (2.35GHz ~2.405GHz)



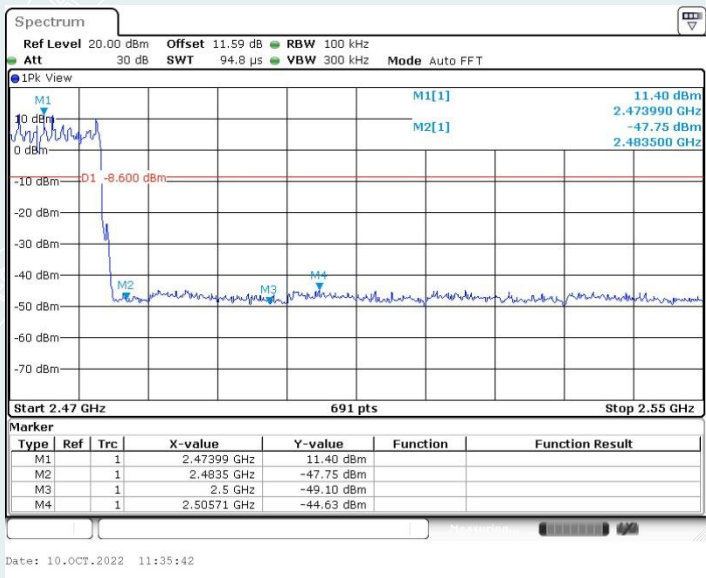
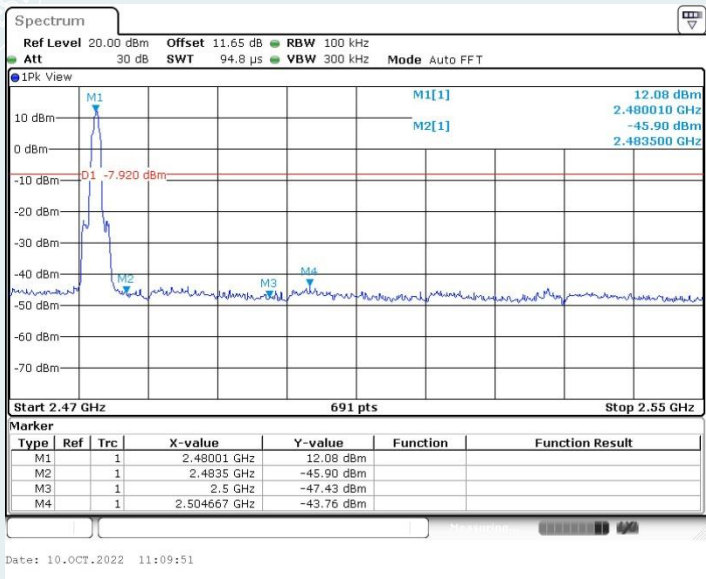
CH High (2.47GHz ~ 2.55GHz)



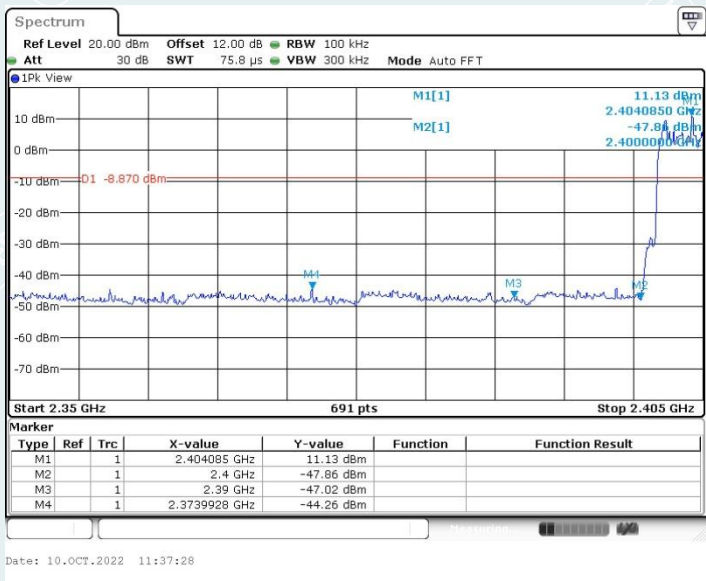
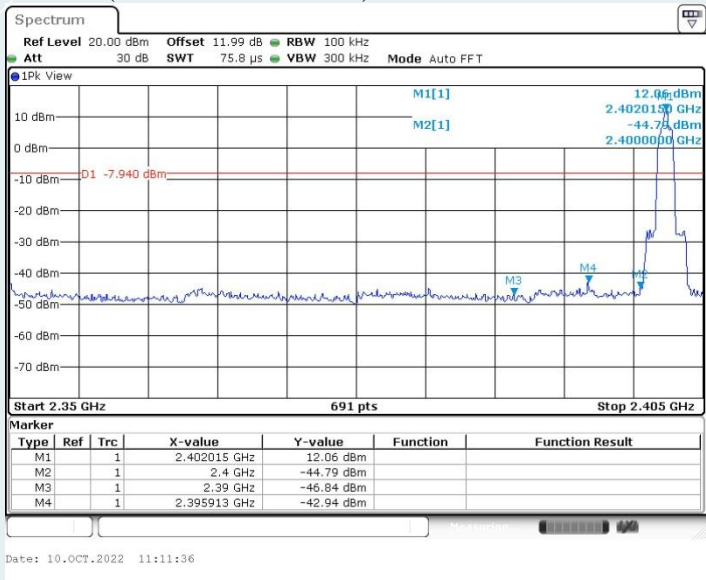
2DH5
CH Low (2.35GHz ~2.405GHz)



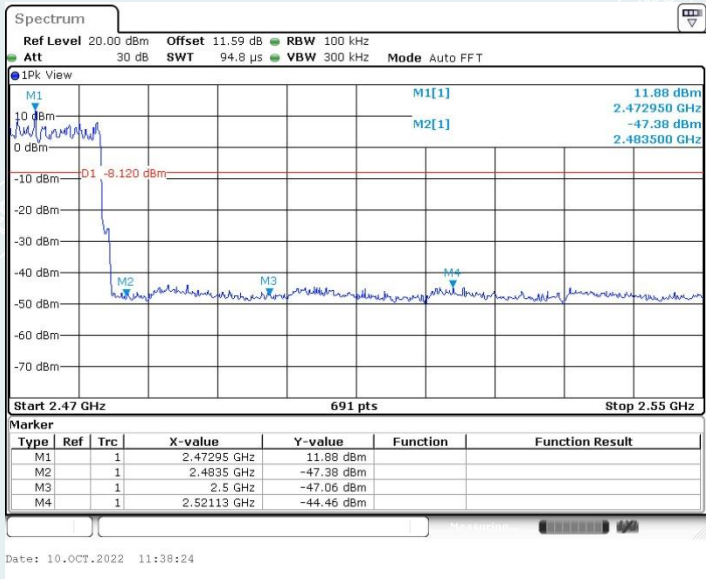
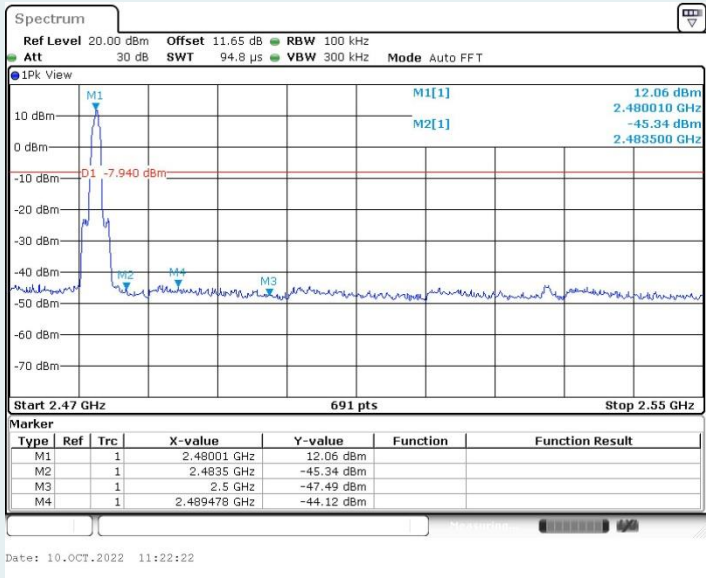
CH High (2.47GHz ~ 2.55GHz)



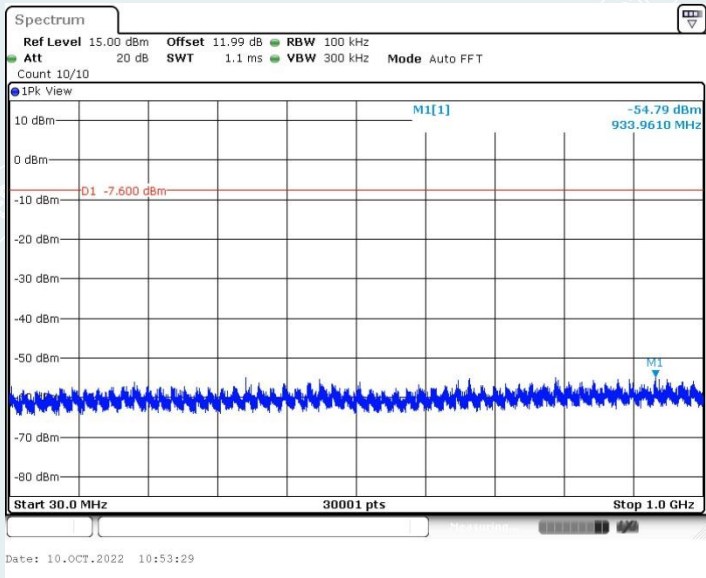
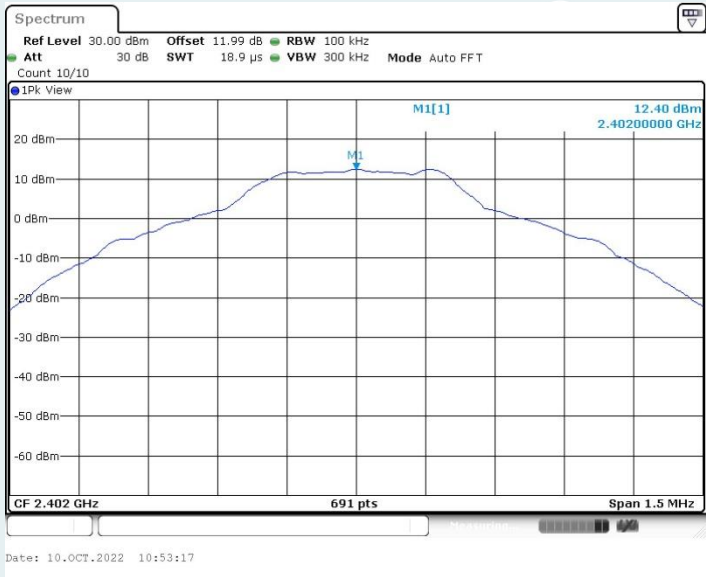
3DH5
CH Low (2.35GHz ~2.405GHz)

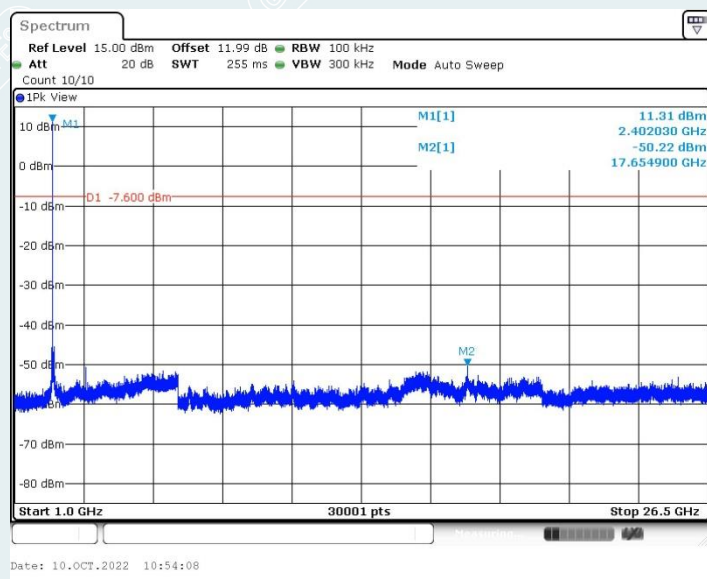


CH High (2.47GHz ~ 2.55GHz)



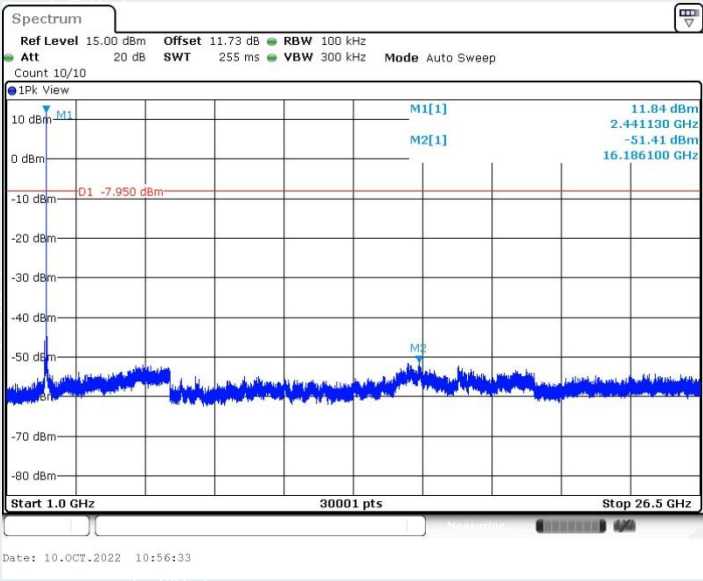
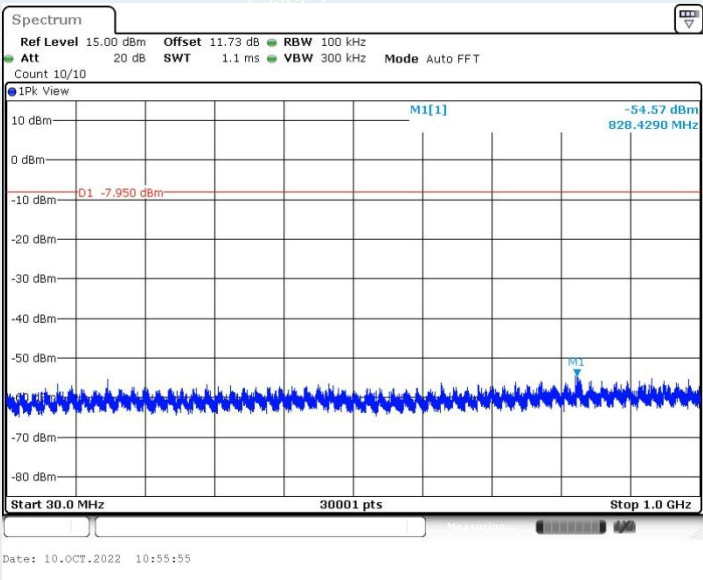
Spurious Emissions
DH5
CH Low



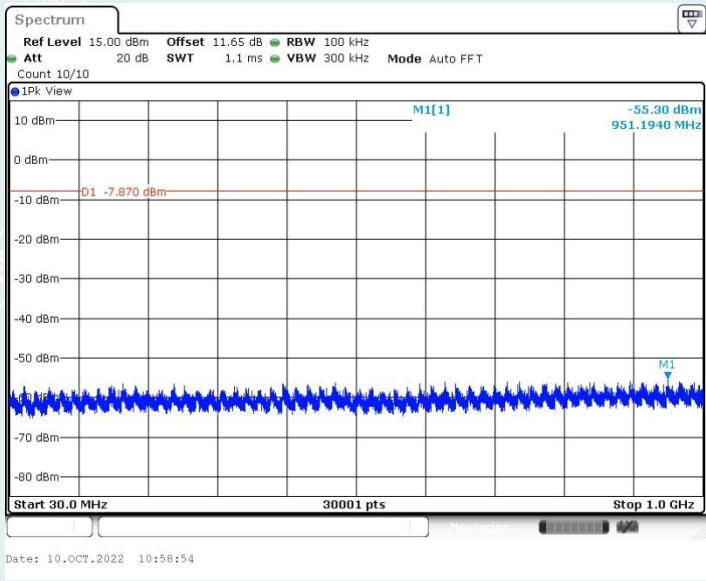
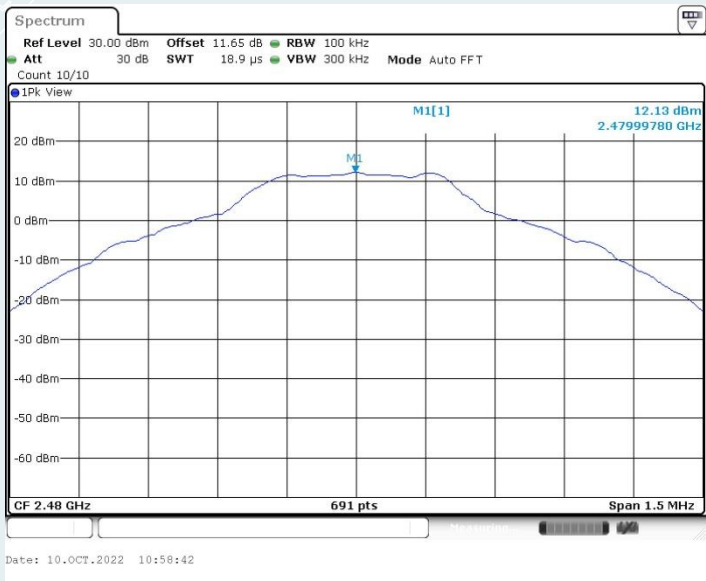


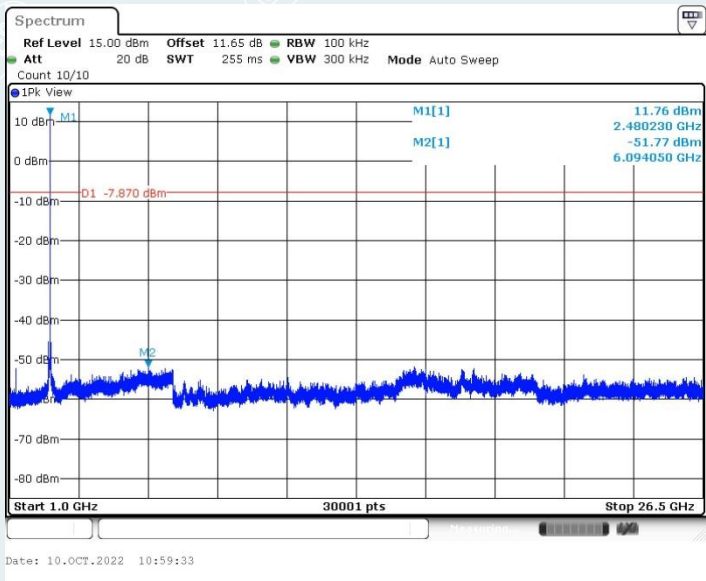
CH Mid



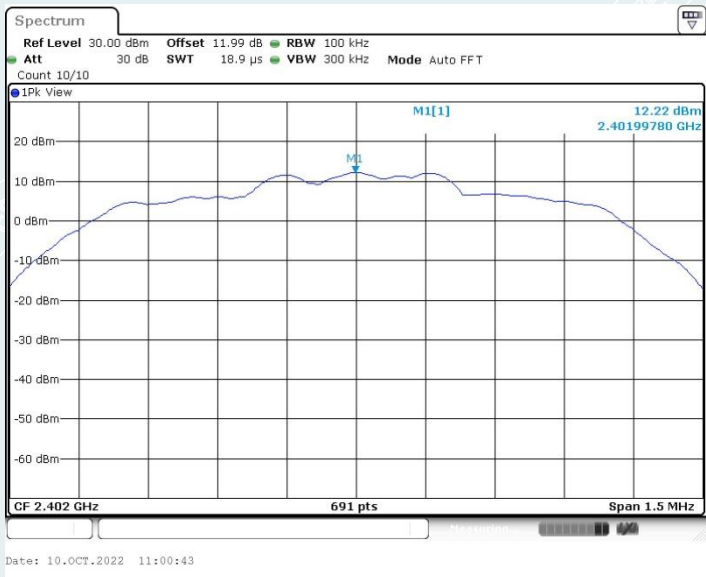


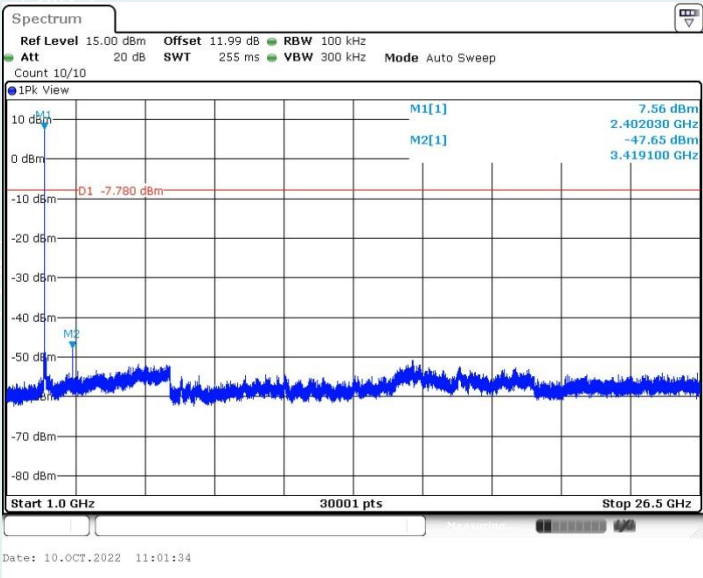
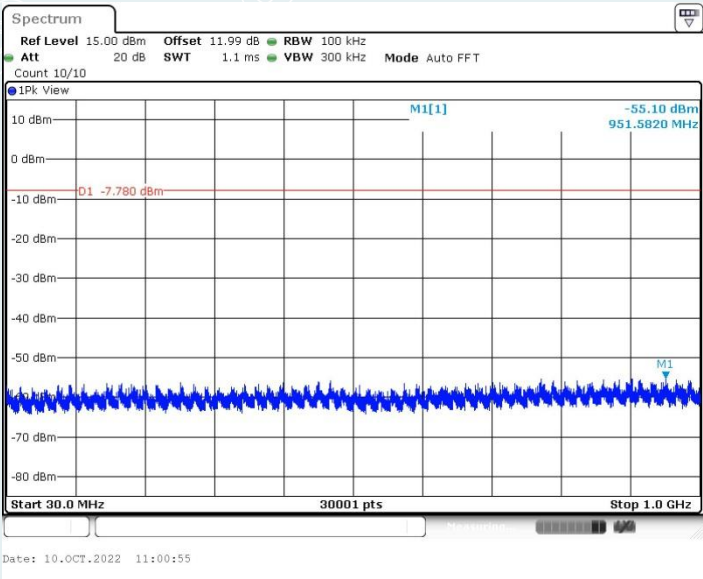
CH High



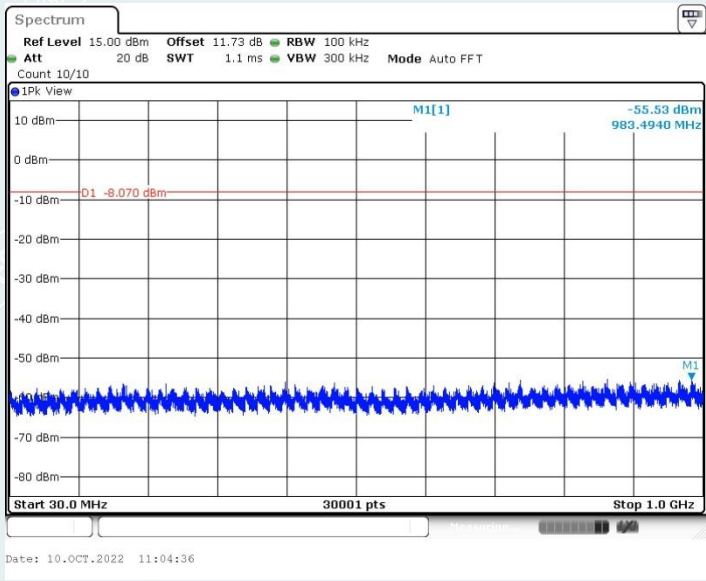
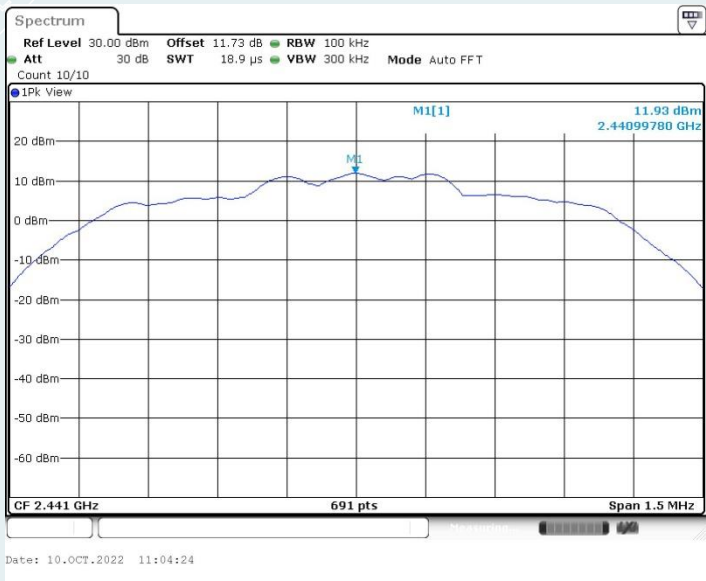


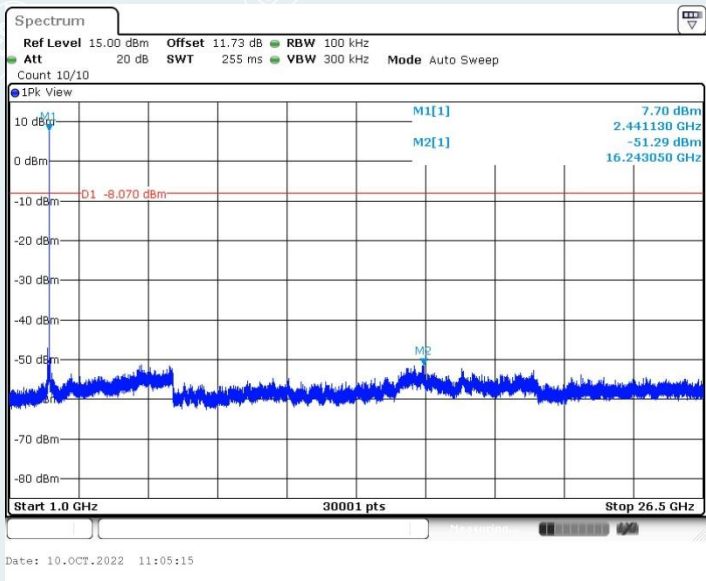
2DH5
CH Low



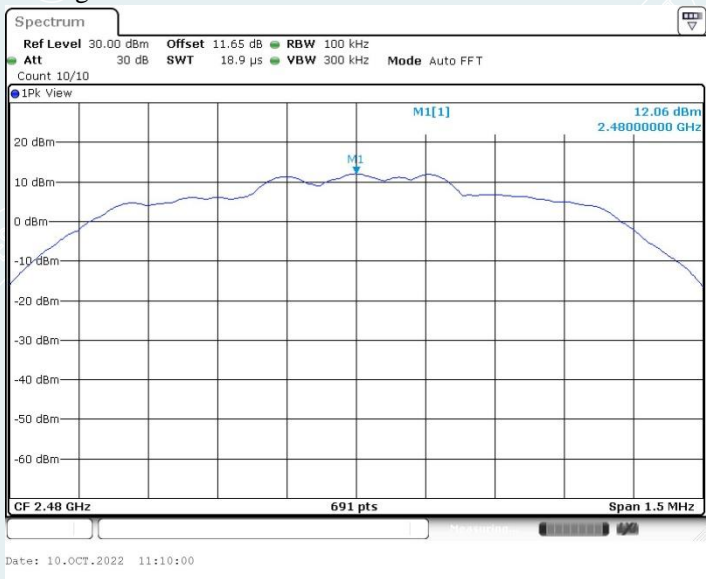


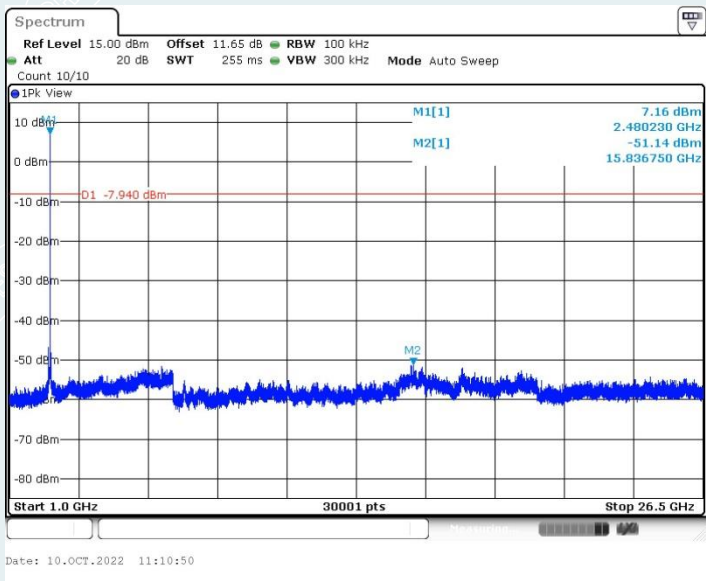
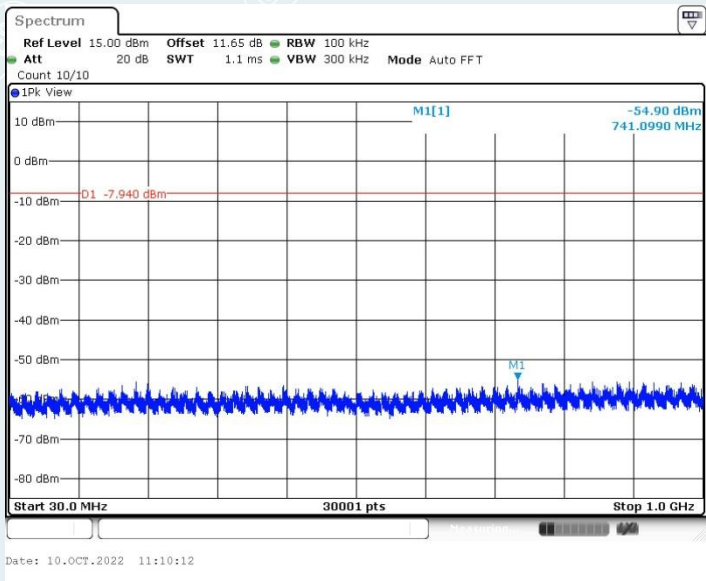
CH Mid



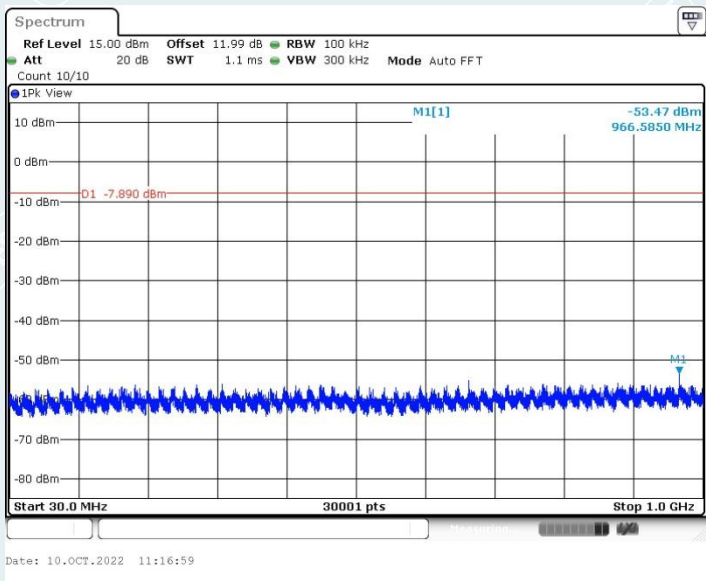
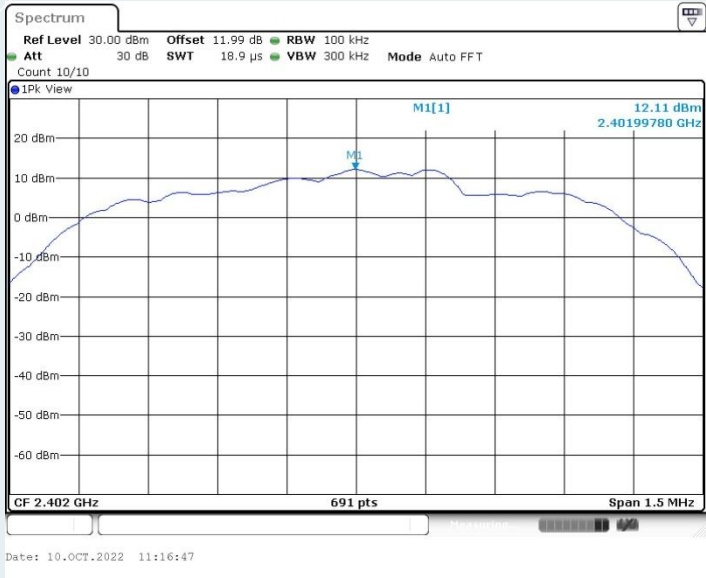


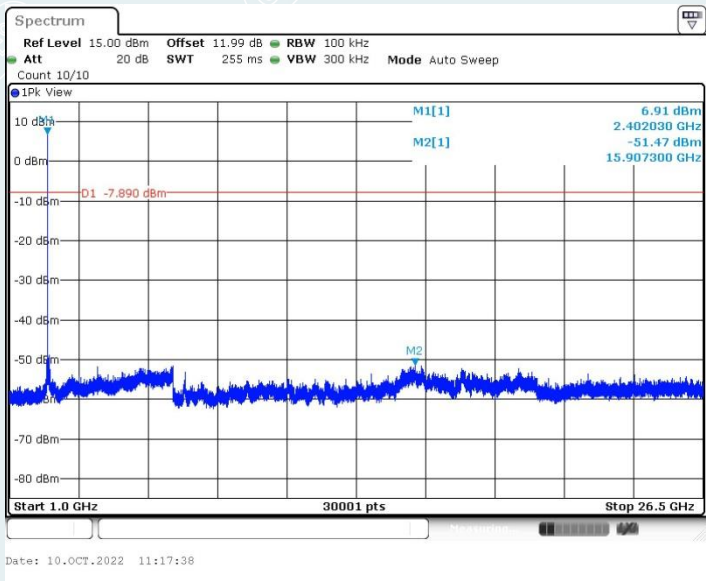
CH High



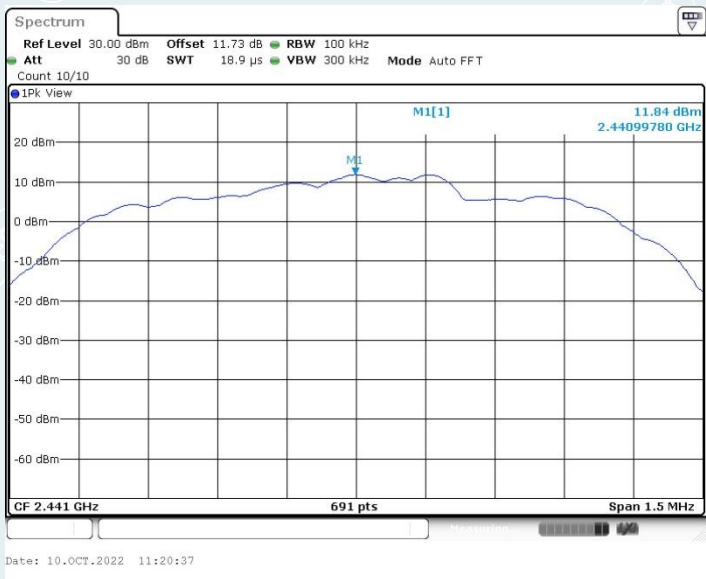


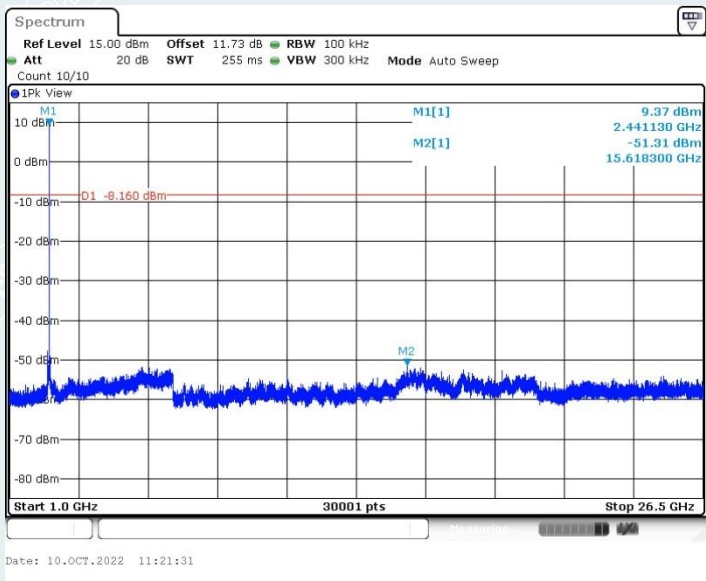
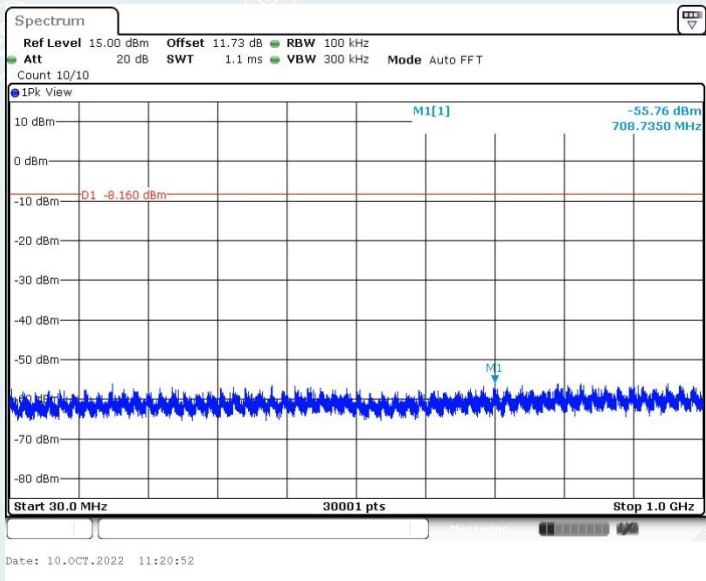
3DH5
CH Low



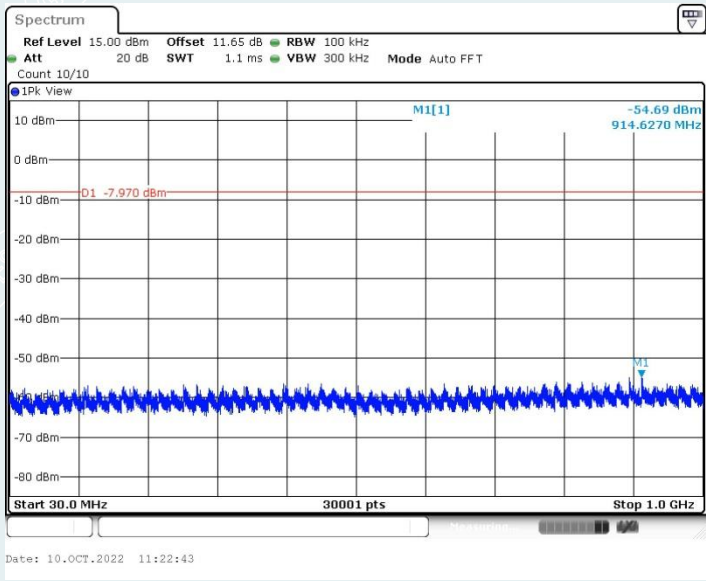
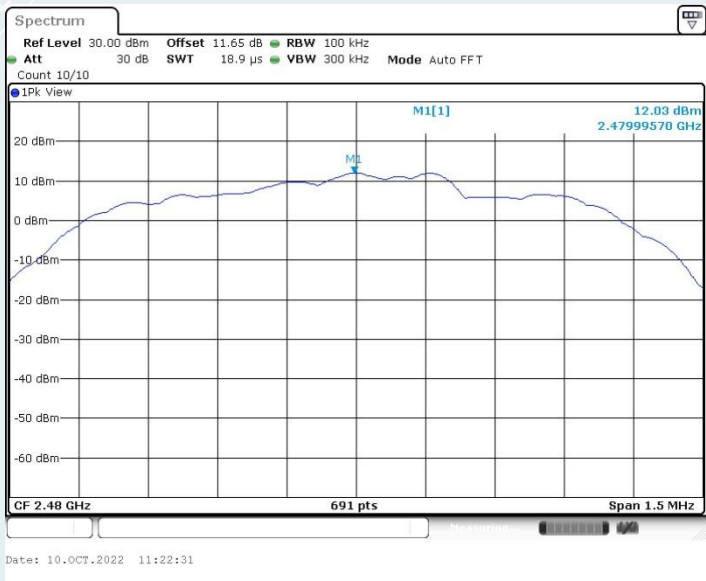


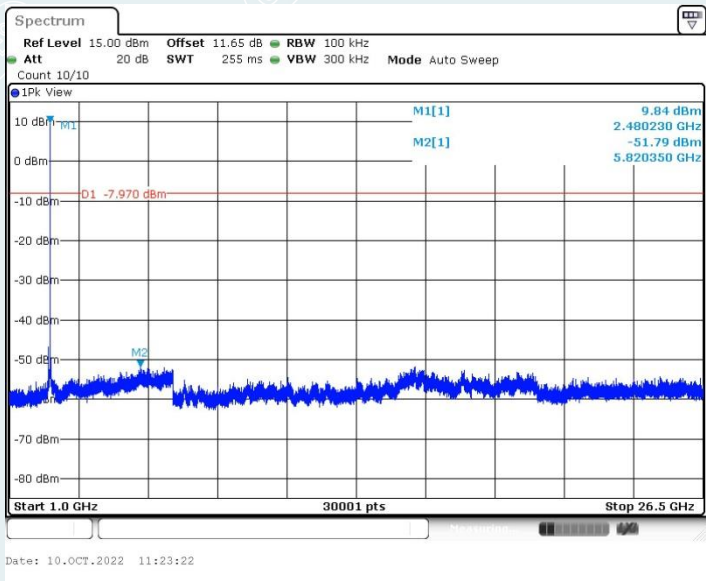
CH Mid





CH High





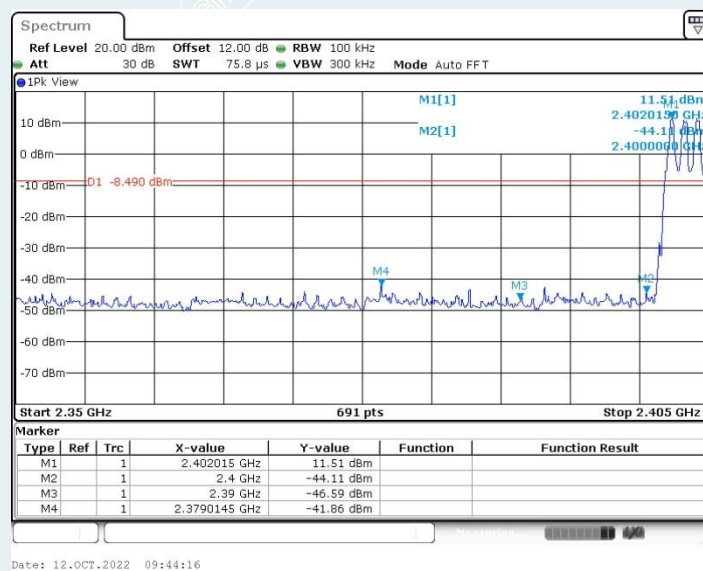
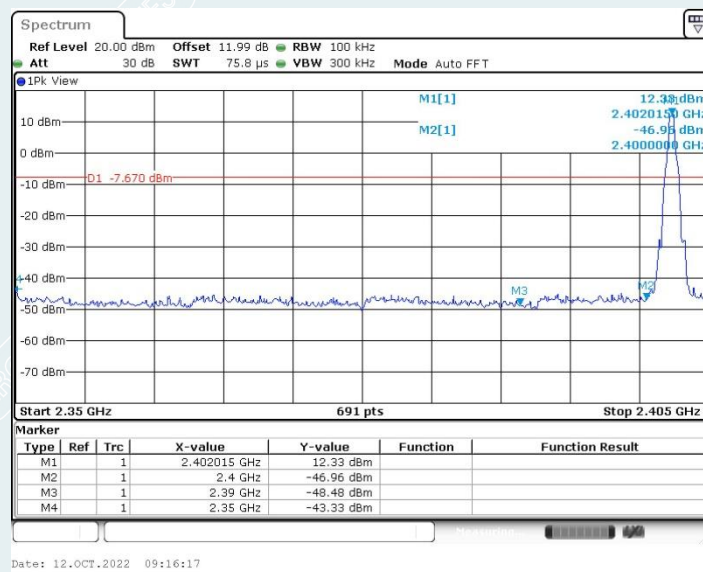
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Right earbuds

Test result plot as follows:

Band Edges**DH5**

CH Low (2.35GHz ~2.405GHz)



CH High (2.47GHz ~ 2.55GHz)

