



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Motion Sensor

Test Model: SBM02

Environmental Conditions

Temperature:	23.5° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Jack Cheng
Supervised by:	Li Huan





A.1 6dB Bandwidth

Test Result

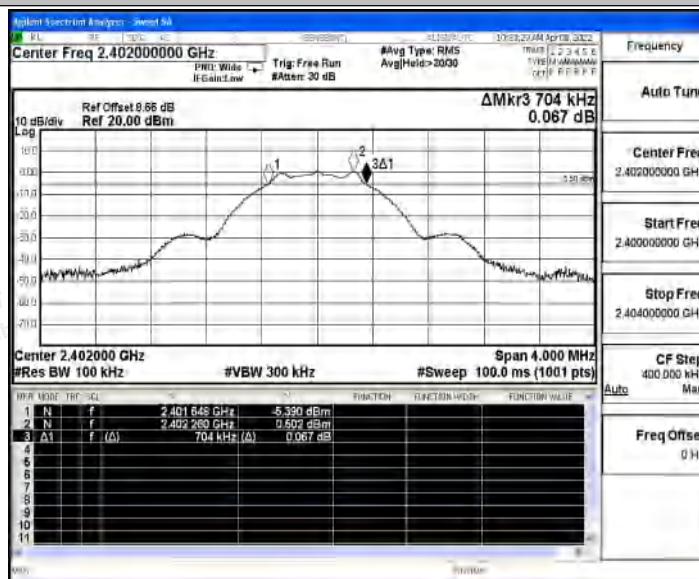
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.704	2401.648	2402.352	0.5	PASS
		2440	0.700	2439.644	2440.344	0.5	PASS
		2480	0.708	2479.640	2480.348	0.5	PASS
BLE_2M	Ant1	2402	1.136	2401.440	2402.576	0.5	PASS
		2440	1.140	2439.436	2440.576	0.5	PASS
		2480	1.144	2479.432	2480.576	0.5	PASS



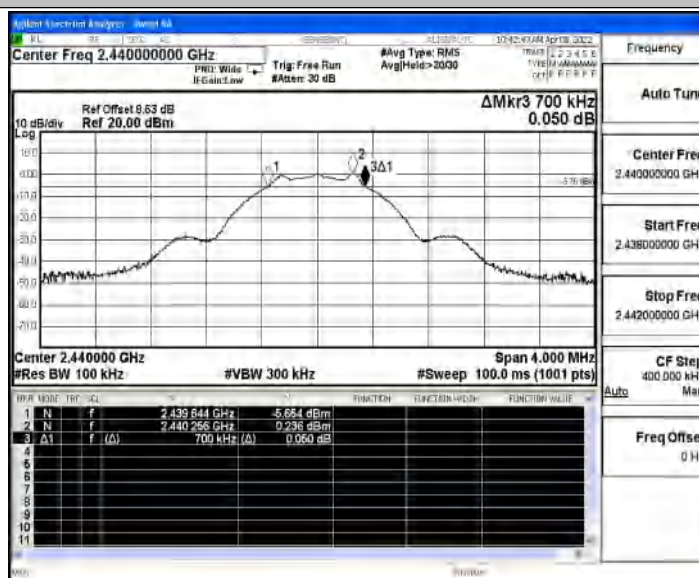


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

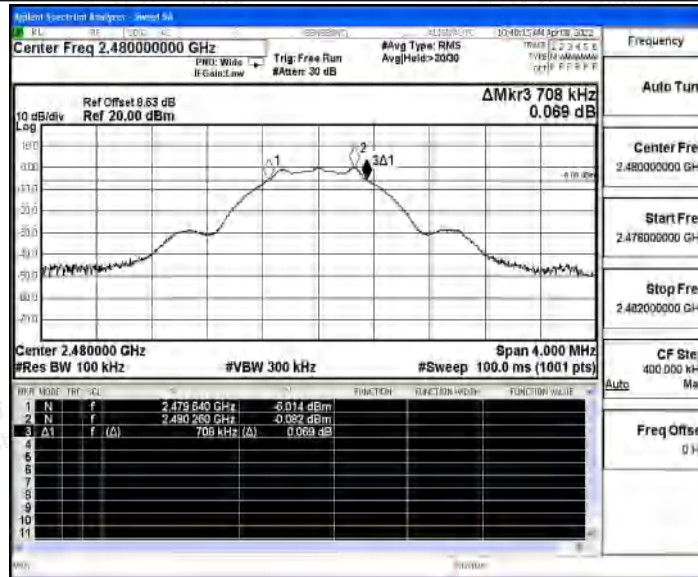


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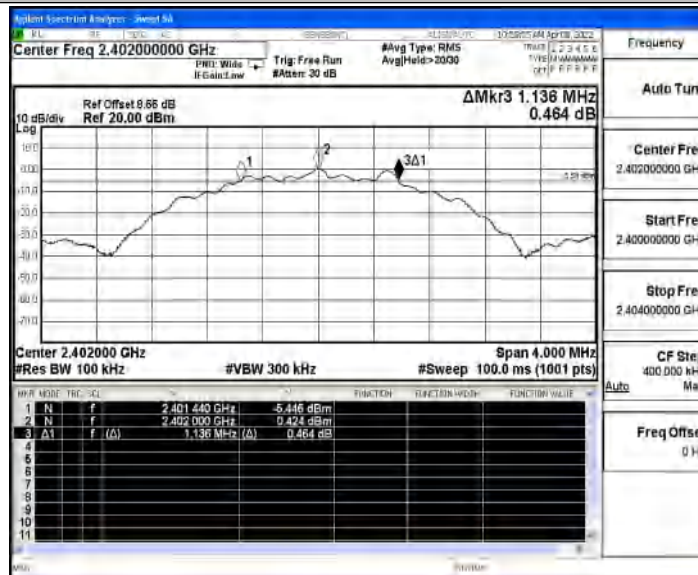
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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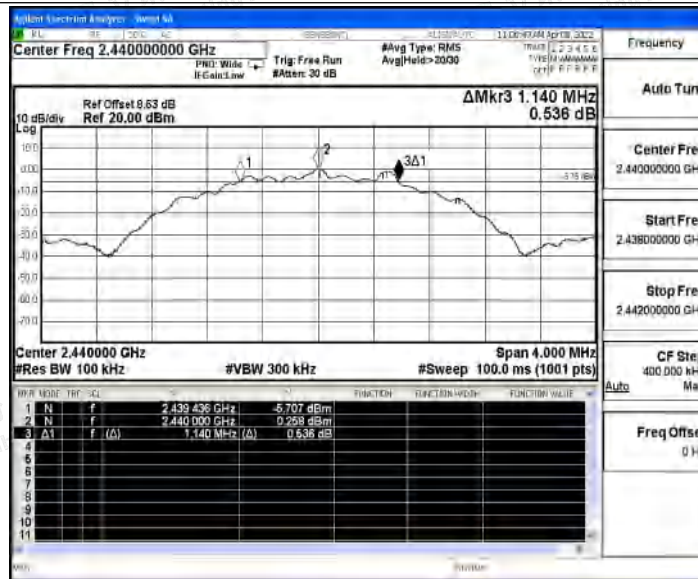


BLE_2M_Ant1_2402

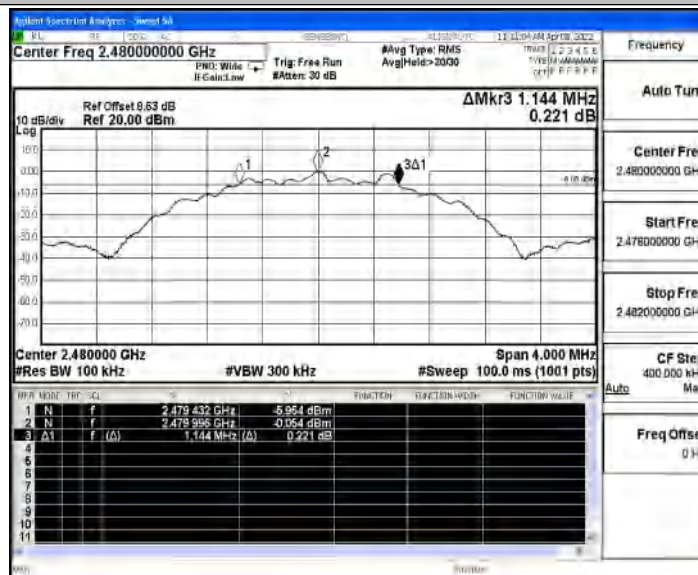


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480



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A.2 Maximum conducted output power

Test Result

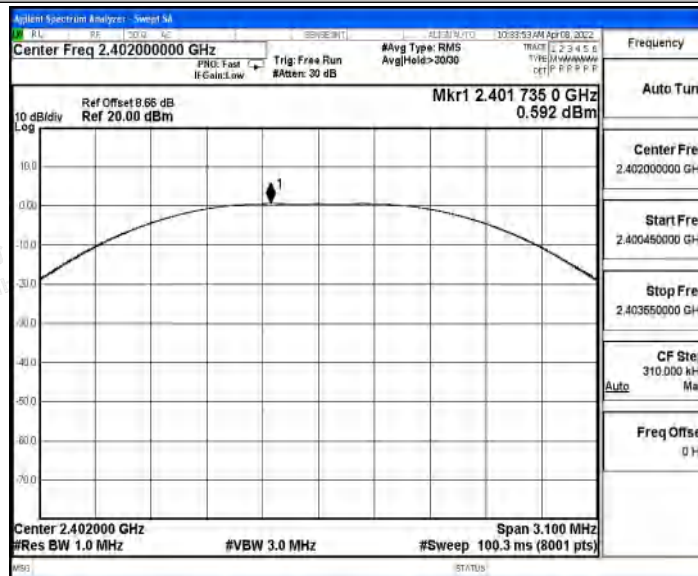
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.59	≤30	PASS
		2440	0.33	≤30	PASS
		2480	0.01	≤30	PASS
BLE_2M	Ant1	2402	0.6	≤30	PASS
		2440	0.44	≤30	PASS
		2480	0.13	≤30	PASS



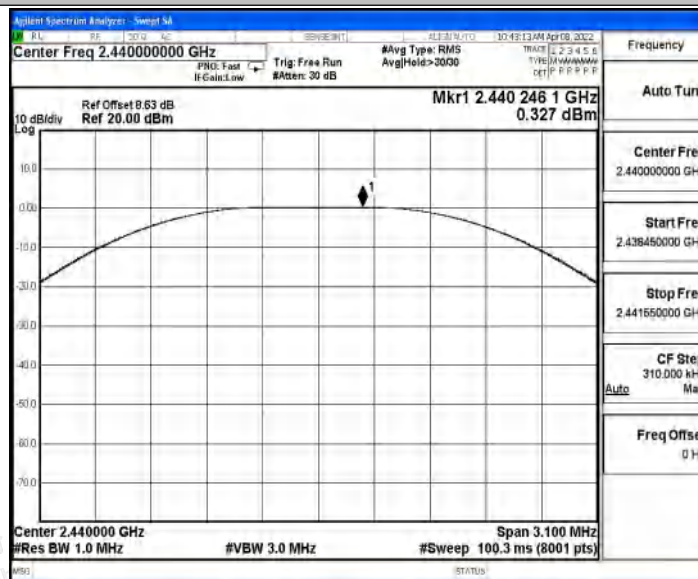


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

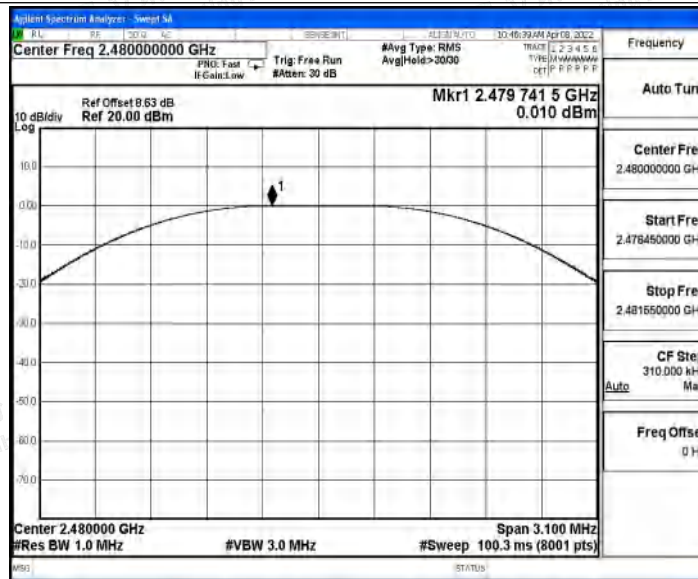


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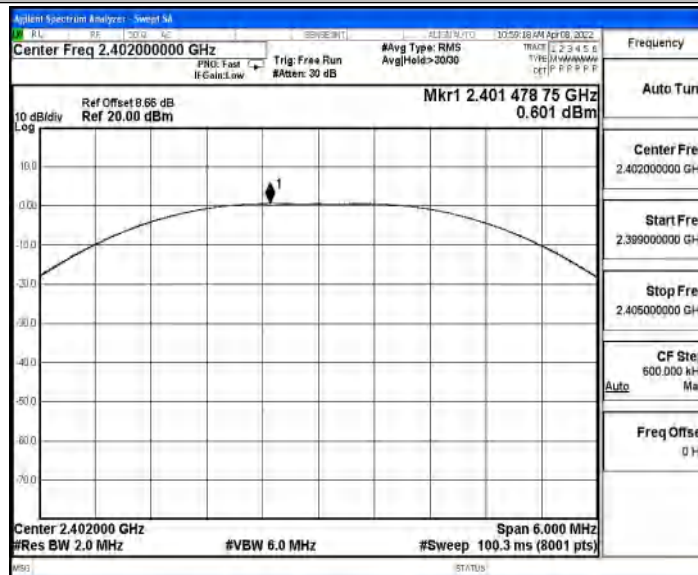
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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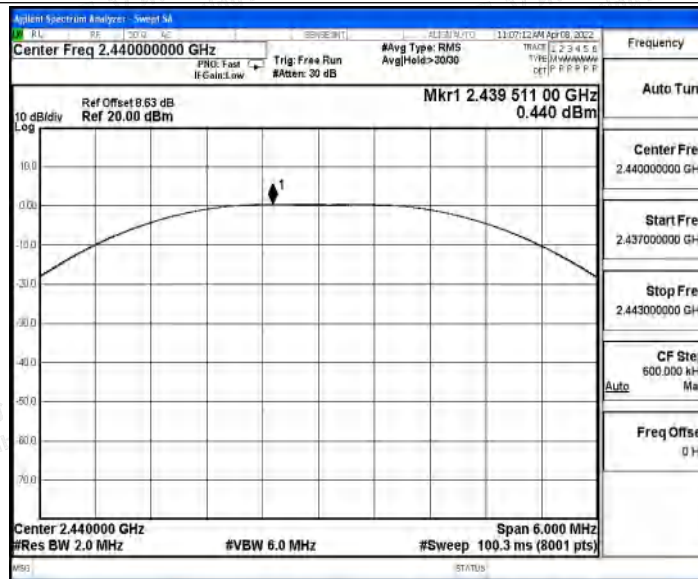


BLE_2M_Ant1_2402

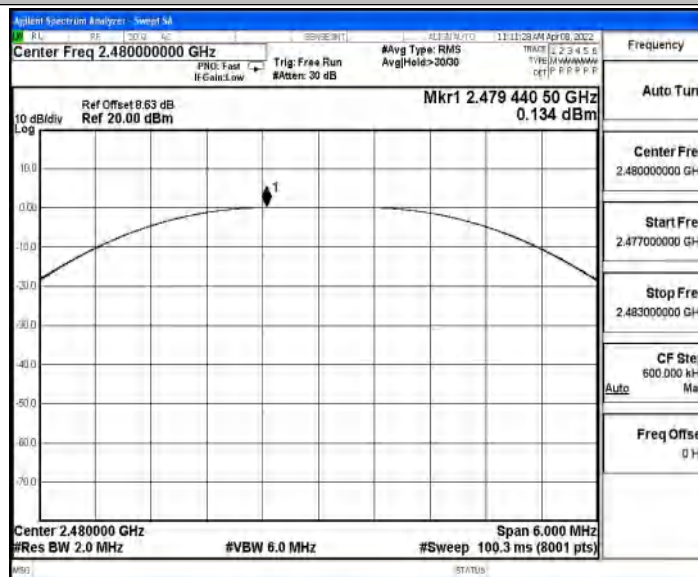


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480





A.3 Maximum power spectral density

Test Result

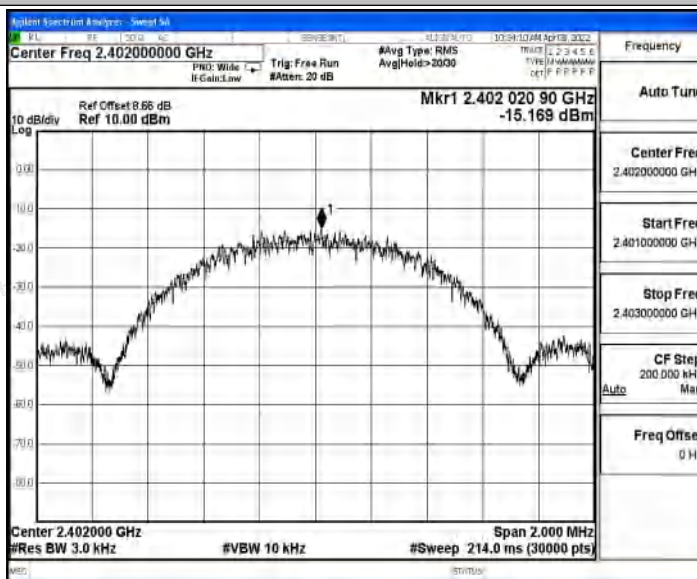
TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.17	≤8.00	PASS
		2440	-15.52	≤8.00	PASS
		2480	-15.73	≤8.00	PASS
BLE_2M	Ant1	2402	-17.2	≤8.00	PASS
		2440	-17.31	≤8.00	PASS
		2480	-17.9	≤8.00	PASS



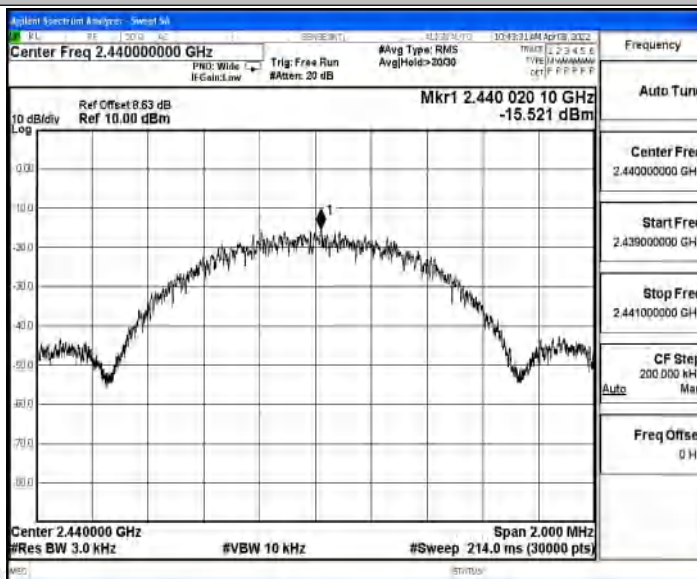


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

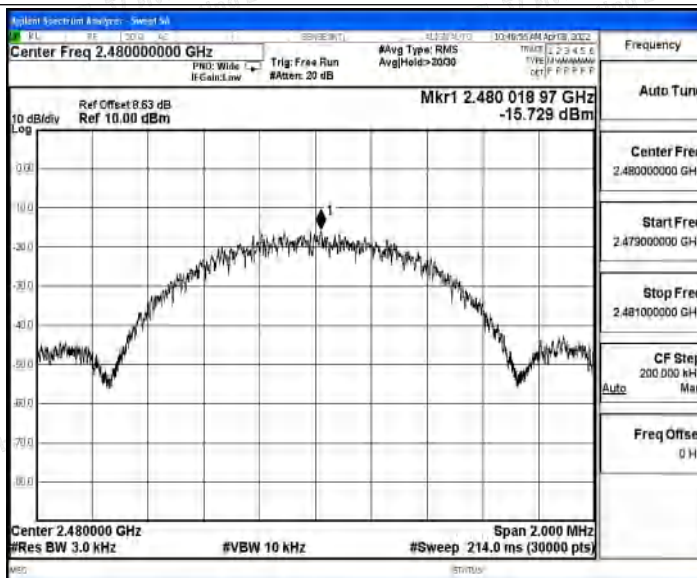


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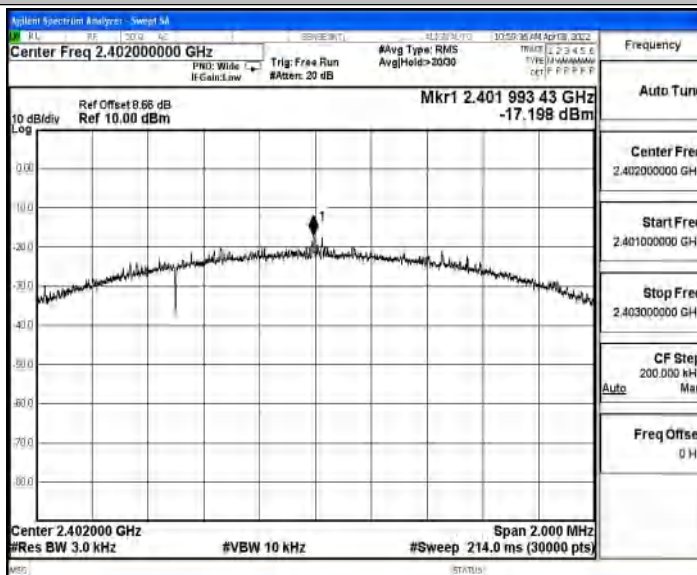
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BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

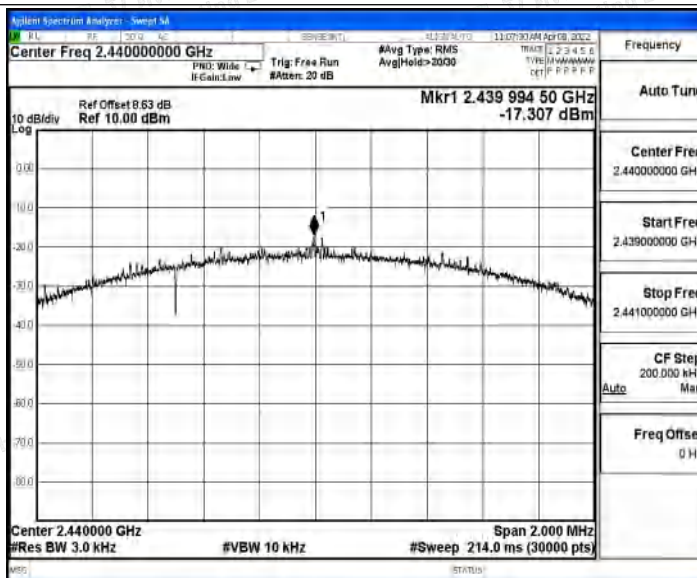


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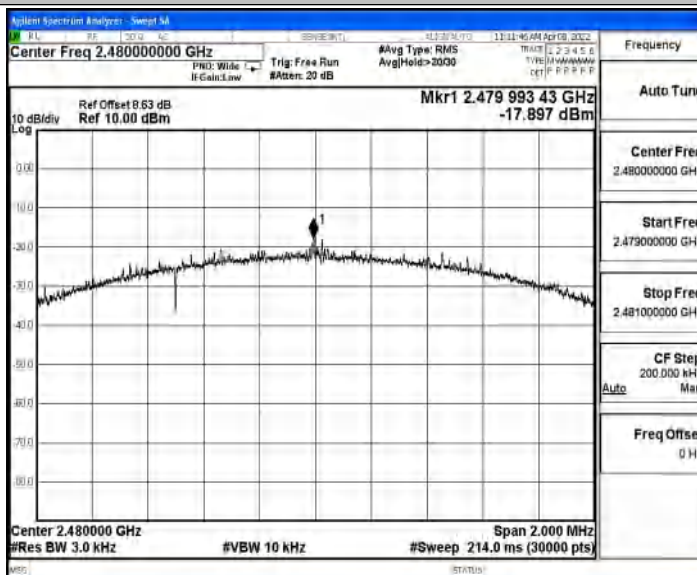
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BLE_2M_Ant1_2480



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A.4 Band edge measurements

Test Result

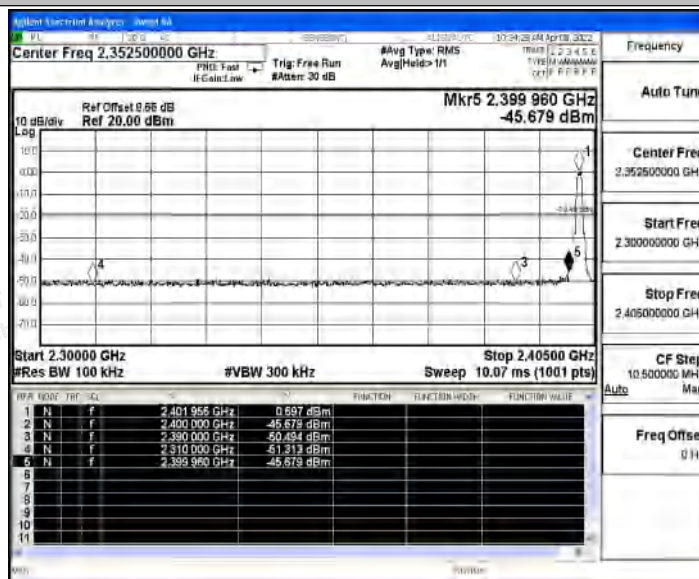
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.60	-45.68	≤-19.4	PASS
		High	2480	-0.04	-47.27	≤-20.04	PASS
BLE_2M	Ant1	Low	2402	0.14	-32.28	≤-19.86	PASS
		High	2480	-0.21	-47.62	≤-20.21	PASS



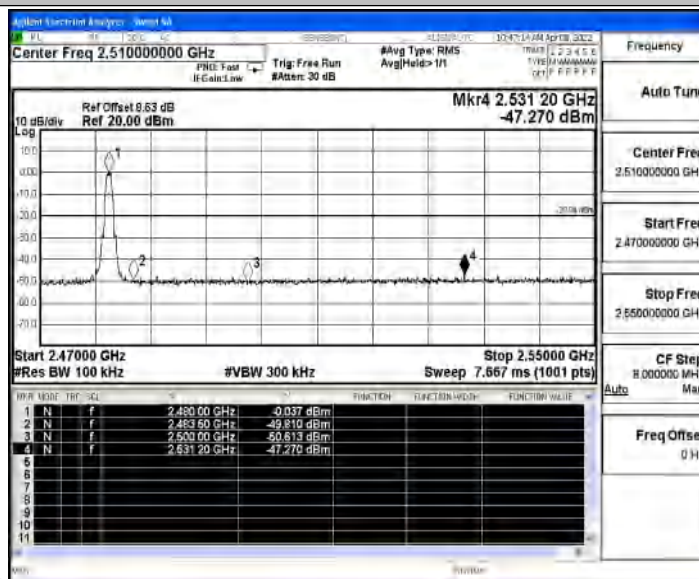


Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402

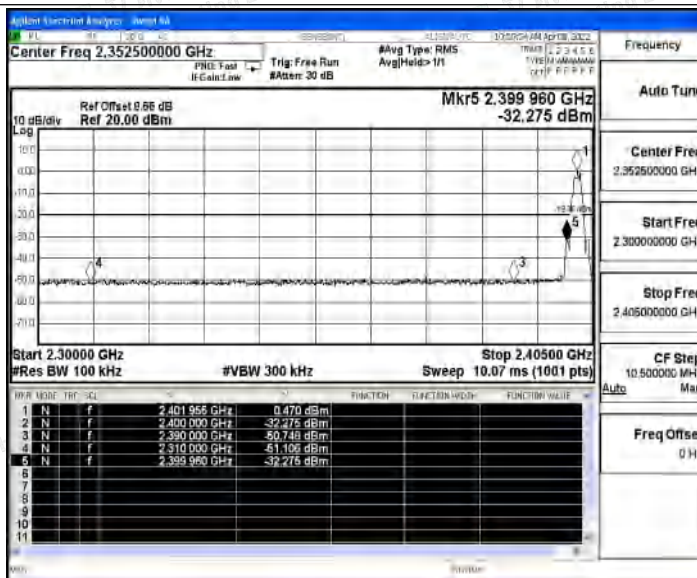


Shenzhen LCS Compliance Testing Laboratory Ltd.

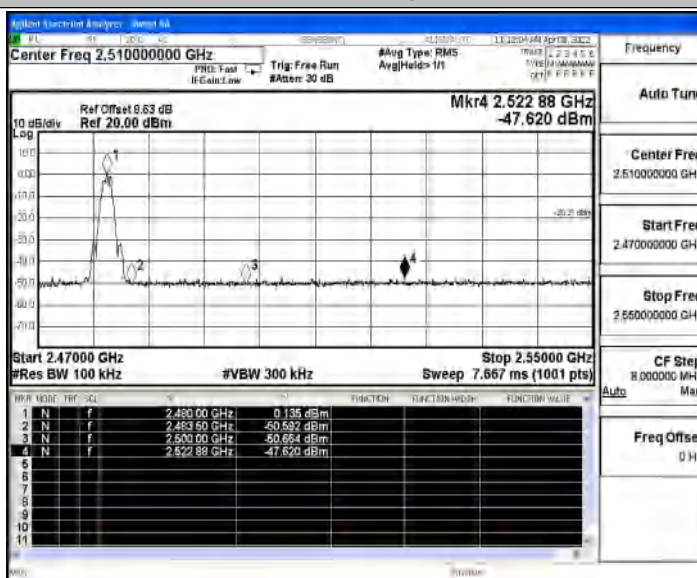
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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BLE_2M_Ant1_High_2480



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A.5 Conducted Spurious Emission

Test Result

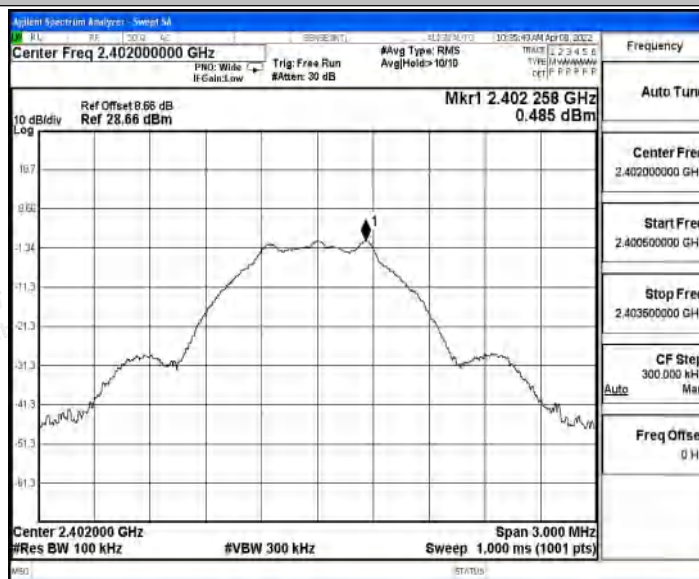
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	0.49	0.49	---	PASS
			30~1000	0.49	-58.89	≤-19.51	PASS
			1000~26500	0.49	-45.56	≤-19.51	PASS
		2440	Reference	0.24	0.24	---	PASS
			30~1000	0.24	-60.21	≤-19.76	PASS
			1000~26500	0.24	-45.68	≤-19.76	PASS
		2480	Reference	-0.10	-0.10	---	PASS
			30~1000	-0.10	-58.24	≤-20.1	PASS
			1000~26500	-0.10	-46.35	≤-20.1	PASS
BLE_2M	Ant1	2402	Reference	0.45	0.45	---	PASS
			30~1000	0.45	-59.85	≤-19.55	PASS
			1000~26500	0.45	-45.62	≤-19.55	PASS
		2440	Reference	0.28	0.28	---	PASS
			30~1000	0.28	-60.52	≤-19.72	PASS
			1000~26500	0.28	-46.39	≤-19.72	PASS
		2480	Reference	-0.12	-0.12	---	PASS
			30~1000	-0.12	-60.91	≤-20.12	PASS
			1000~26500	-0.12	-46.04	≤-20.12	PASS



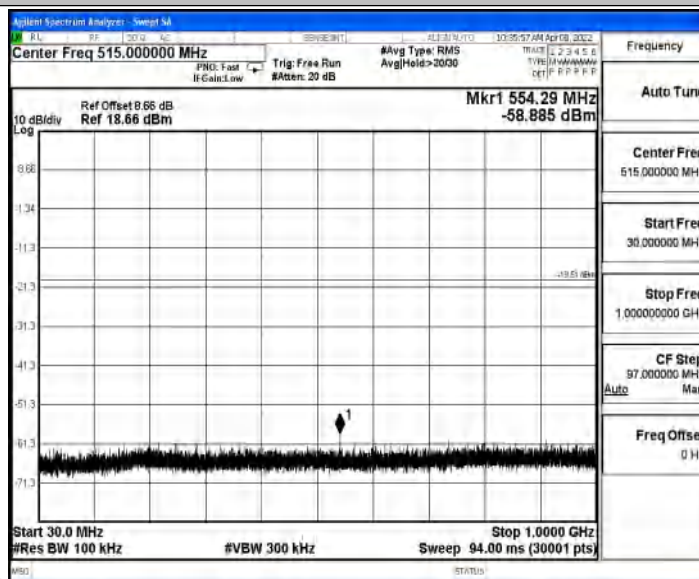


Test Graphs

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500

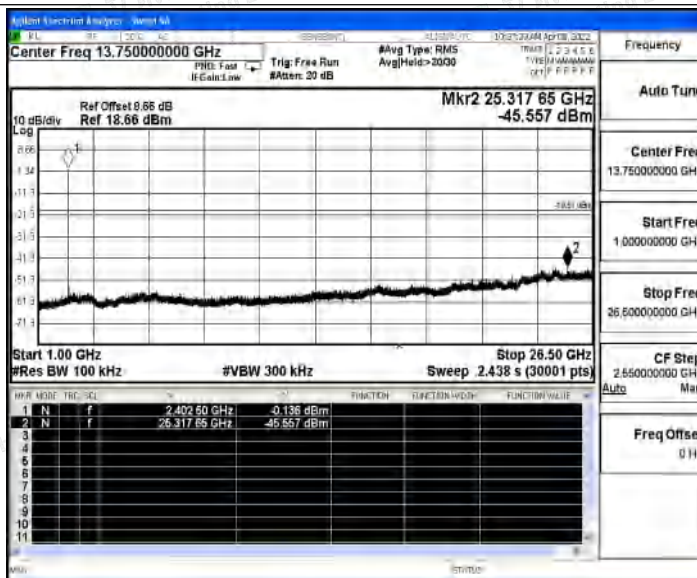


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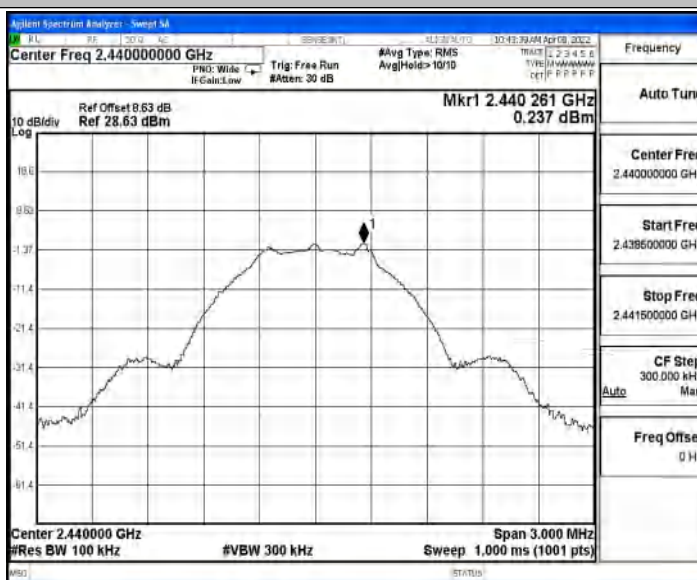
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000

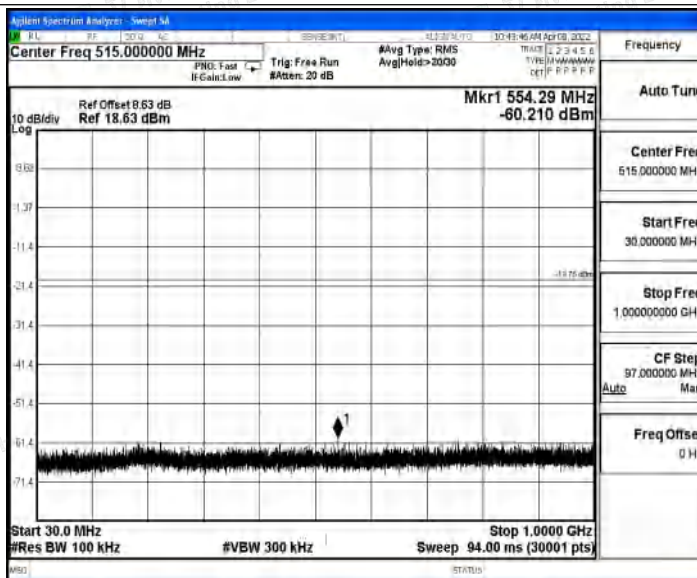


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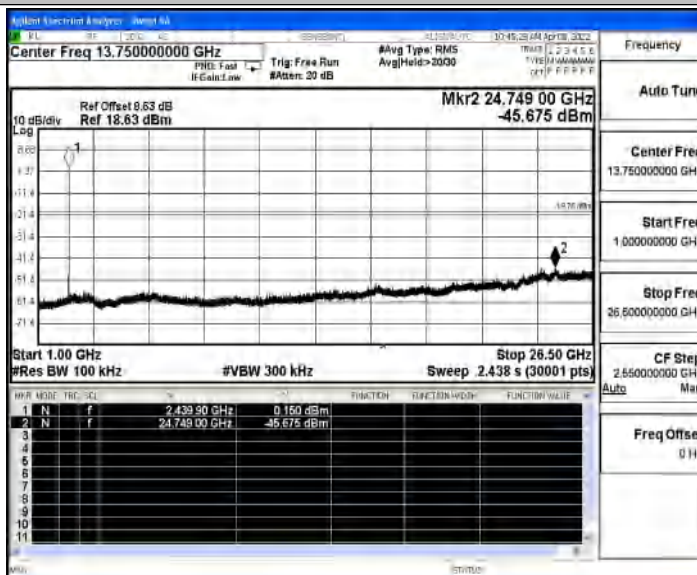
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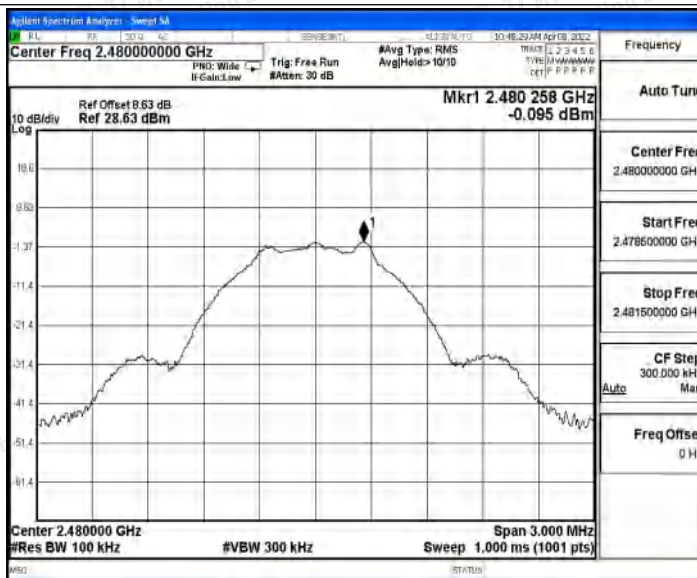


BLE_1M_Ant1_2440_1000~26500

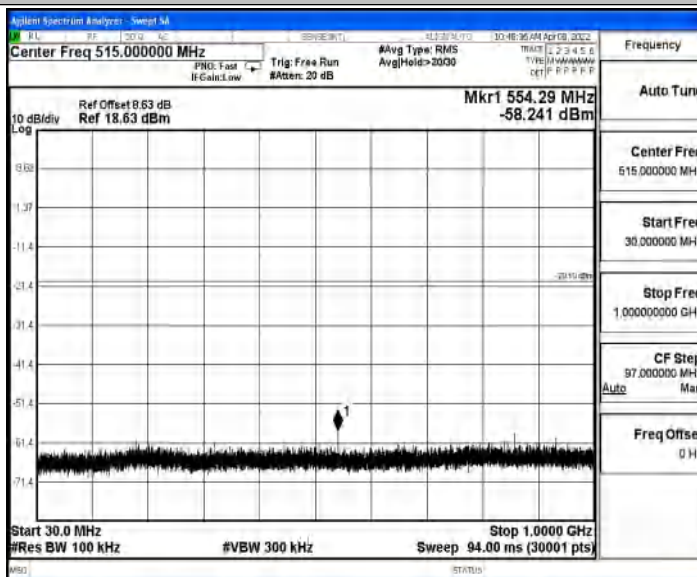


BLE_1M_Ant1_2480_0~Reference





BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500

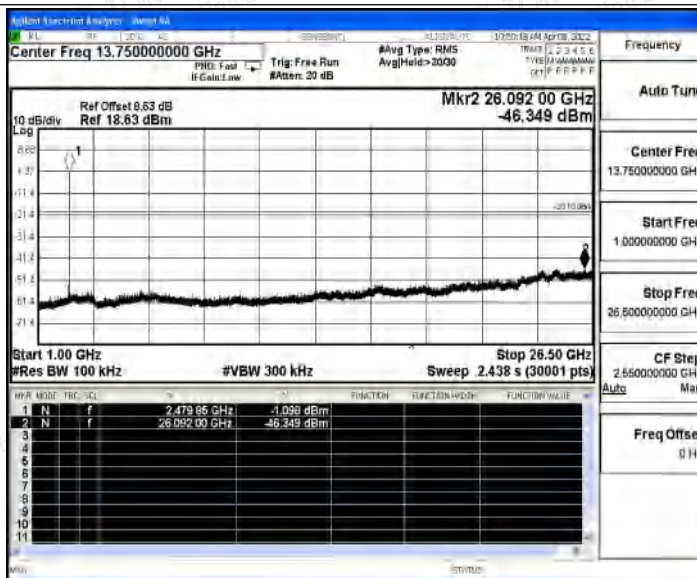


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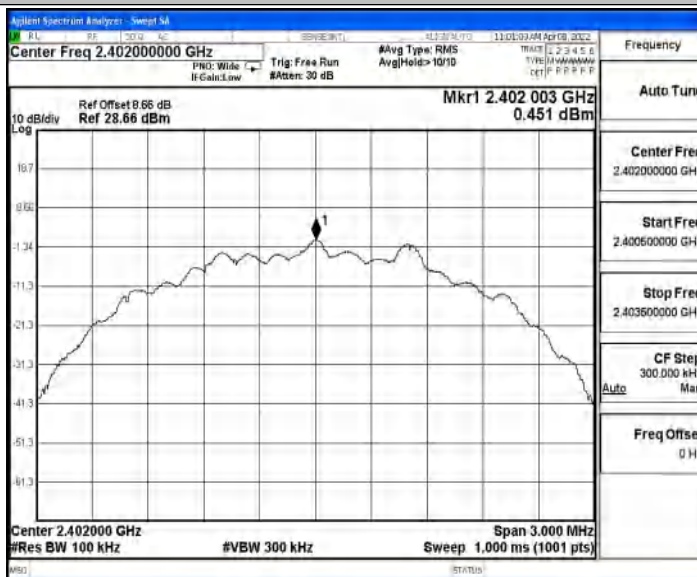
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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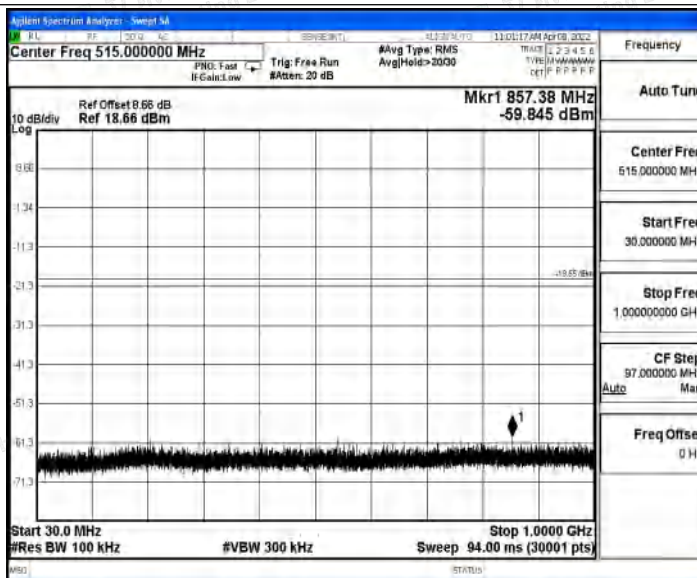


BLE_2M_Ant1_2402_0~Reference

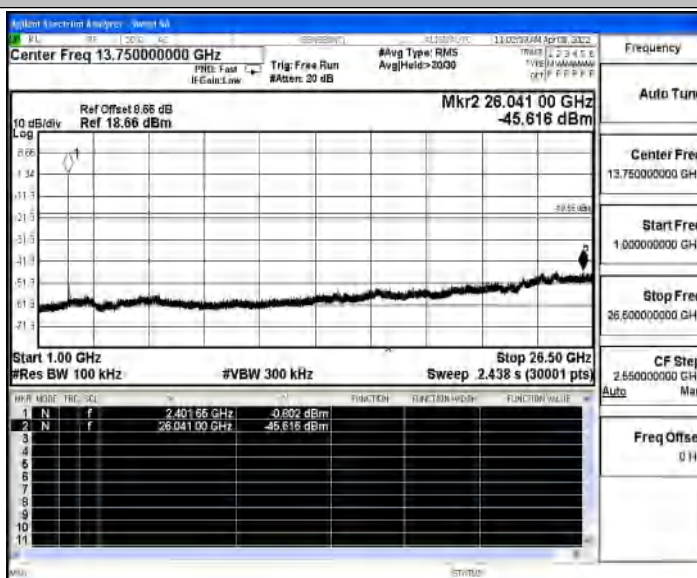


BLE_2M_Ant1_2402_30~1000



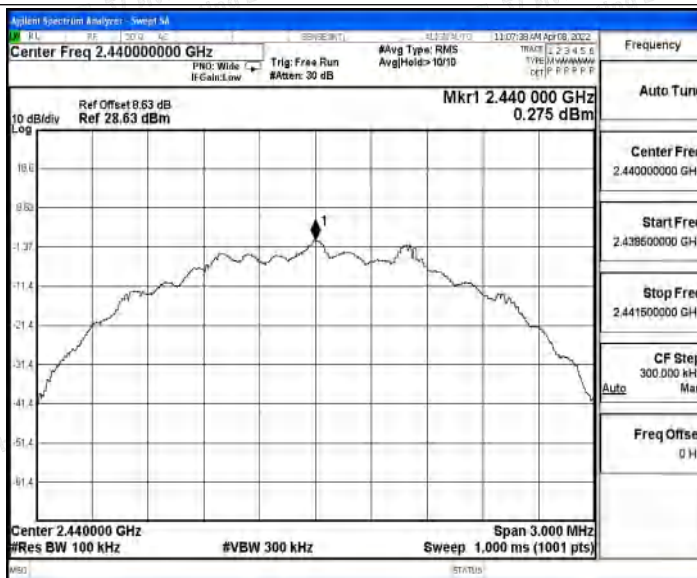


BLE_2M_Ant1_2402_1000~26500

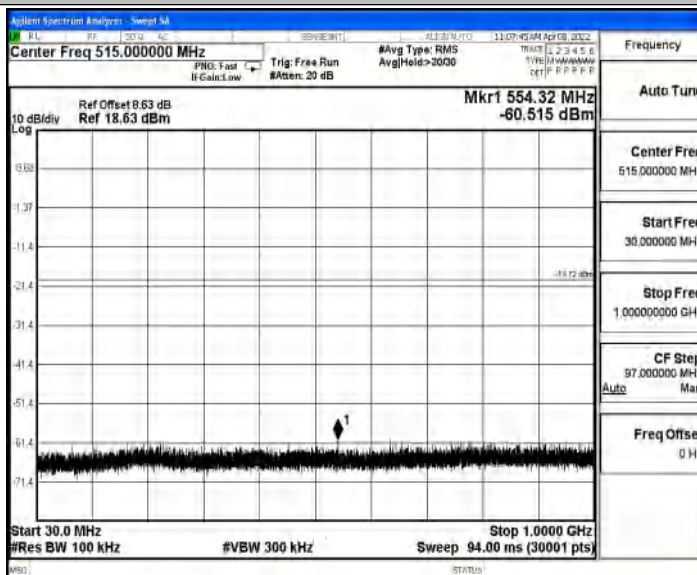


BLE_2M_Ant1_2440_0~Reference





BLE_2M_Ant1_2440_30~1000



BLE_2M_Ant1_2440_1000~26500

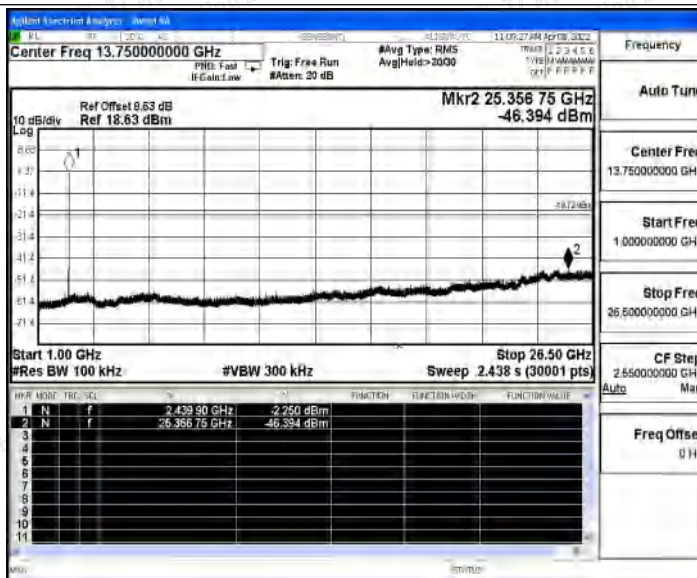


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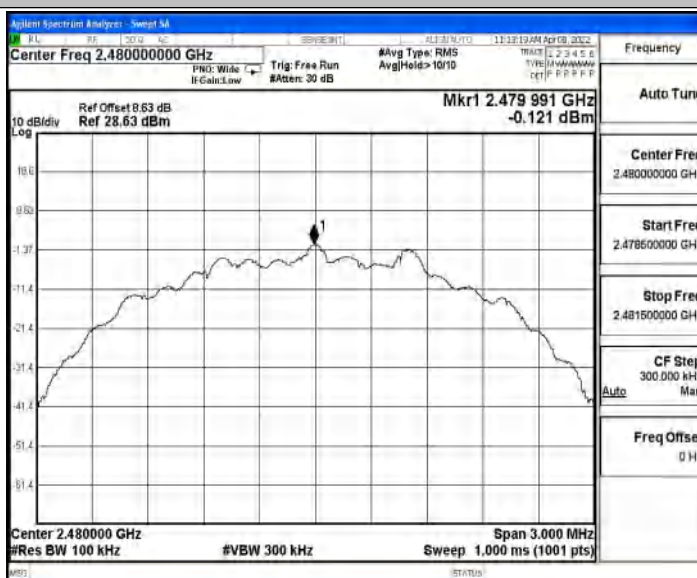
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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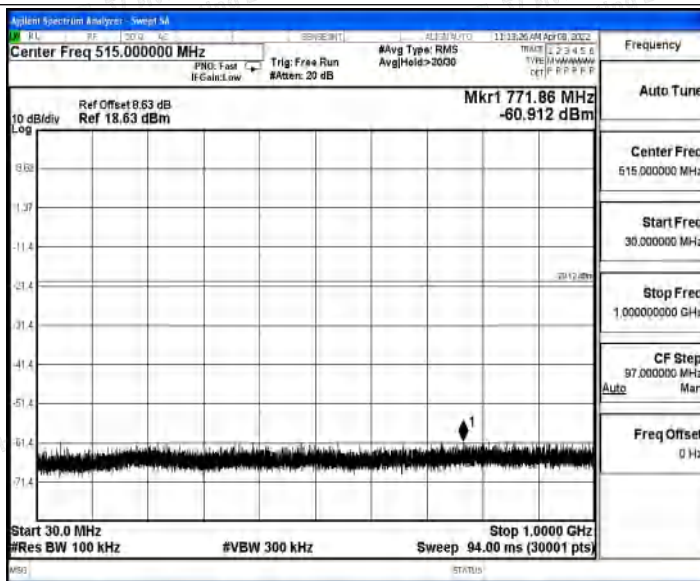


BLE_2M_Ant1_2480_0~Reference

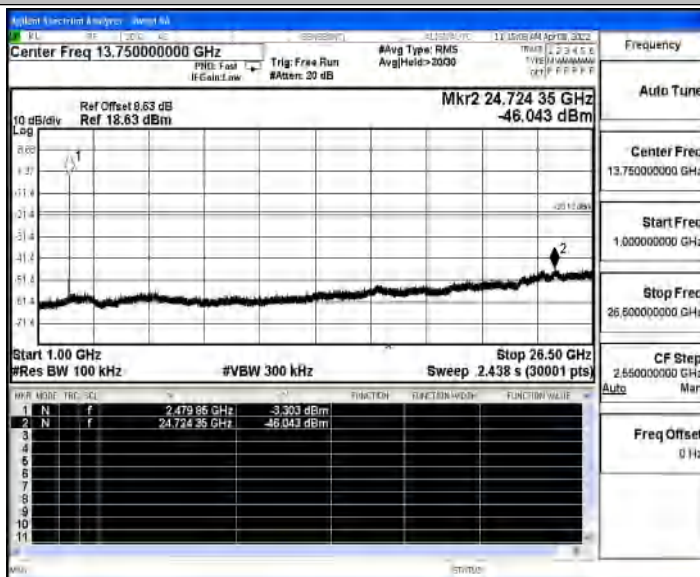


BLE_2M_Ant1_2480_30~1000





BLE_2M_Ant1_2480_1000~26500



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A.6 Duty Cycle

Test Result

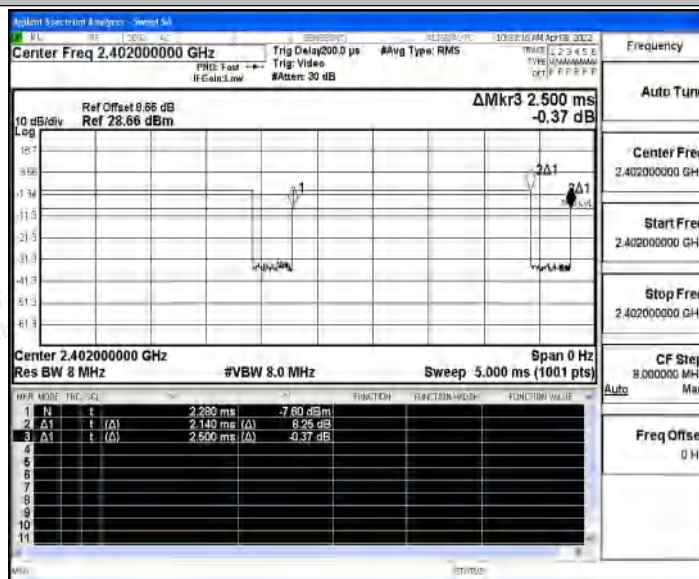
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	2.14	2.50	0.8560	85.60	0.68	---	---
		2440	2.14	2.50	0.8560	85.60	0.68	---	---
		2480	2.14	2.50	0.8560	85.60	0.68	---	---
BLE_2M	Ant1	2402	1.08	1.87	0.5775	57.75	2.38	---	---
		2440	1.08	1.87	0.5775	57.75	2.38	---	---
		2480	1.08	1.87	0.5775	57.75	2.38	---	---



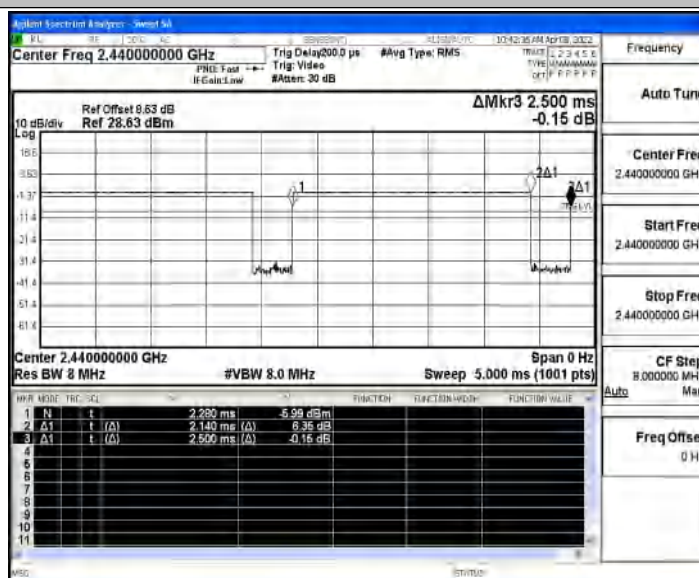


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

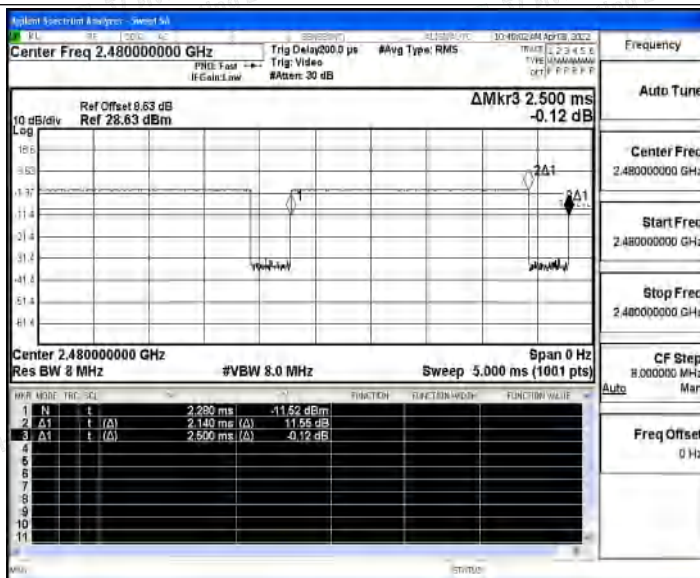


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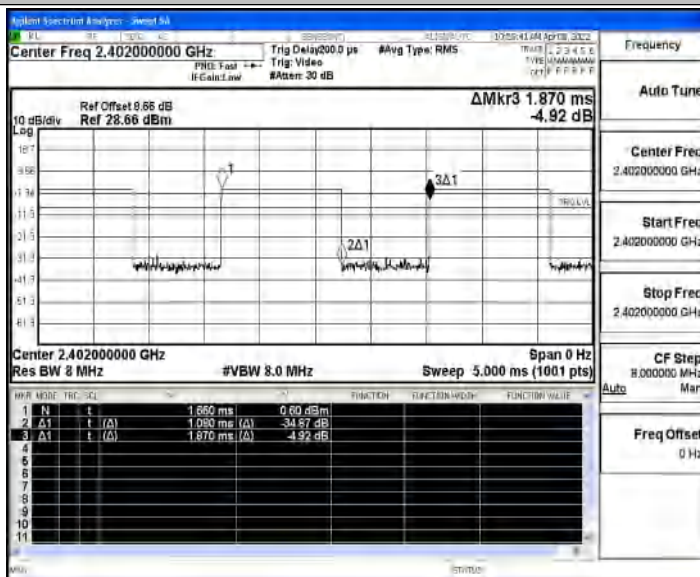
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

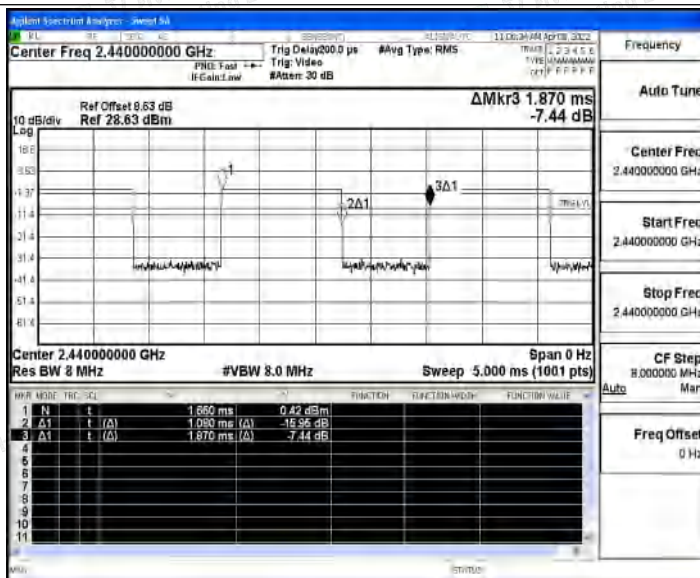


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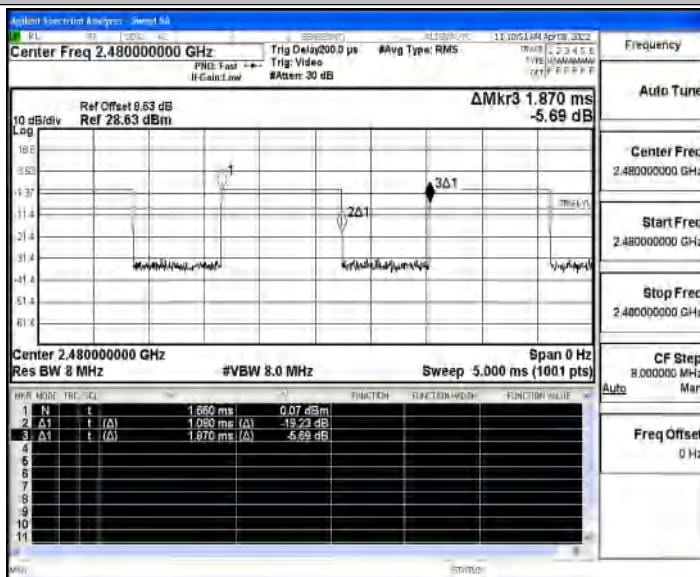
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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BLE_2M_Ant1_2480



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A.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-48.23	≤-41.20	46.97	≤54	PASS
				AV	2389.145	-47.66	≤-41.20	47.54	≤54	PASS
				AV	2390.000	-47.9	≤-41.20	47.30	≤54	PASS
				Peak	2310.000	-39.36	≤-21.20	55.84	≤74	PASS
				Peak	2375.390	-36.53	≤-21.20	58.67	≤74	PASS
				Peak	2390.000	-38.32	≤-21.20	56.88	≤74	PASS
		High	2480	AV	2483.500	-46.81	≤-41.20	48.39	≤54	PASS
				AV	2483.520	-46.8	≤-41.20	48.40	≤54	PASS
				AV	2500.000	-47.37	≤-41.20	47.83	≤54	PASS
				Peak	2483.500	-36.1	≤-21.20	59.10	≤74	PASS
				Peak	2483.600	-35.28	≤-21.20	59.92	≤74	PASS
				Peak	2500.000	-37.63	≤-21.20	57.57	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-47.85	≤-41.20	47.35	≤54	PASS
				AV	2370.455	-47.47	≤-41.20	47.73	≤54	PASS
				AV	2390.000	-47.77	≤-41.20	47.43	≤54	PASS
				Peak	2310.000	-38.9	≤-21.20	56.30	≤74	PASS
				Peak	2335.700	-36.84	≤-21.20	58.36	≤74	PASS
				Peak	2390.000	-38.74	≤-21.20	56.46	≤74	PASS
		High	2480	AV	2483.500	-44.86	≤-41.20	50.34	≤54	PASS
				AV	2483.520	-44.86	≤-41.20	50.34	≤54	PASS
				AV	2500.000	-47.02	≤-41.20	48.18	≤54	PASS
				Peak	2483.500	-36.92	≤-21.20	58.28	≤74	PASS
				Peak	2484.880	-35.97	≤-21.20	59.23	≤74	PASS
				Peak	2500.000	-37.99	≤-21.20	57.21	≤74	PASS

Note:

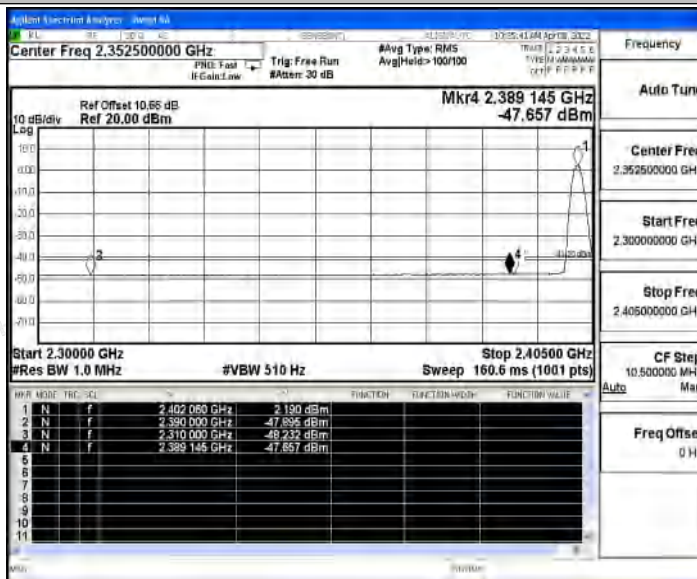
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



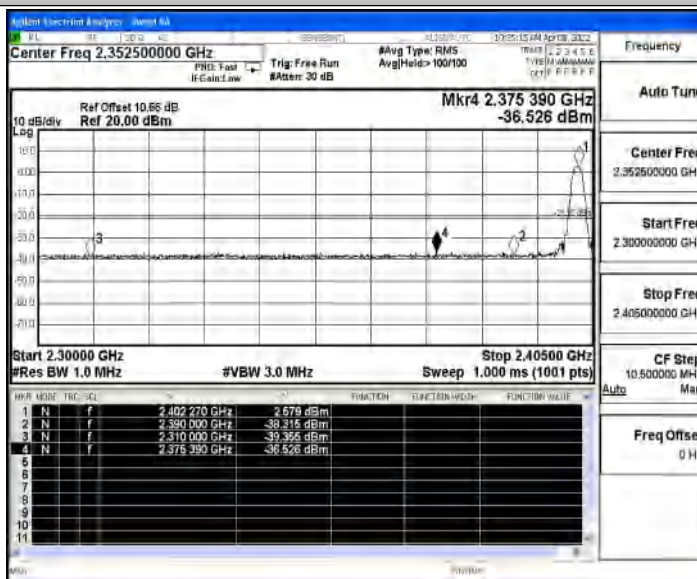


Test Graphs

BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV

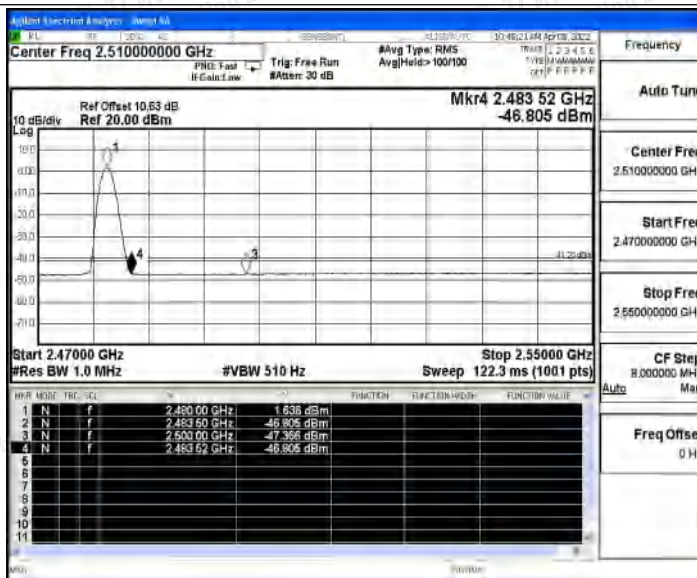


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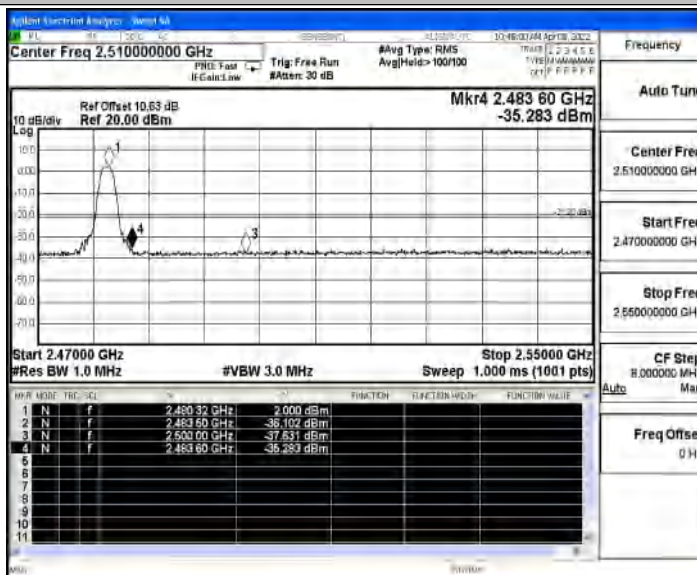
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity

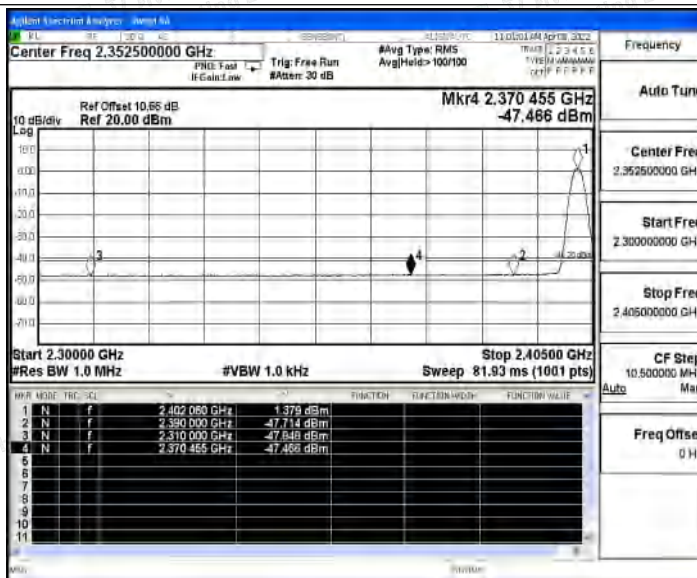


BLE_1M_Ant1_High_2480_Peak

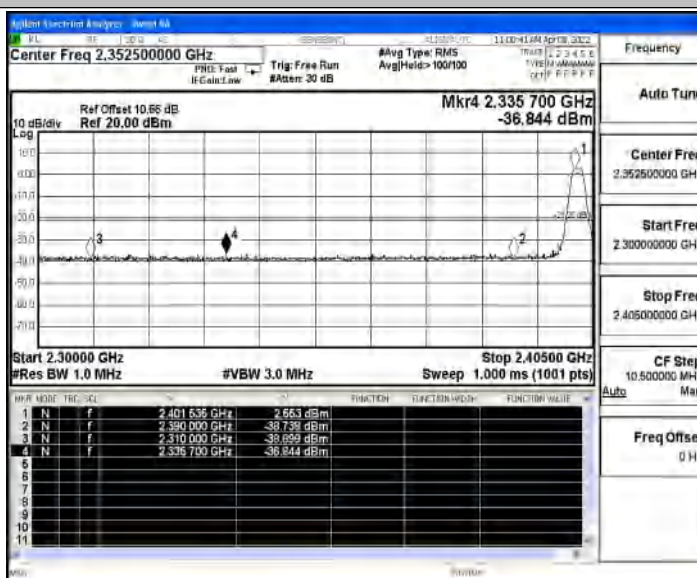


BLE_2M_Ant1_Low_2402_AV



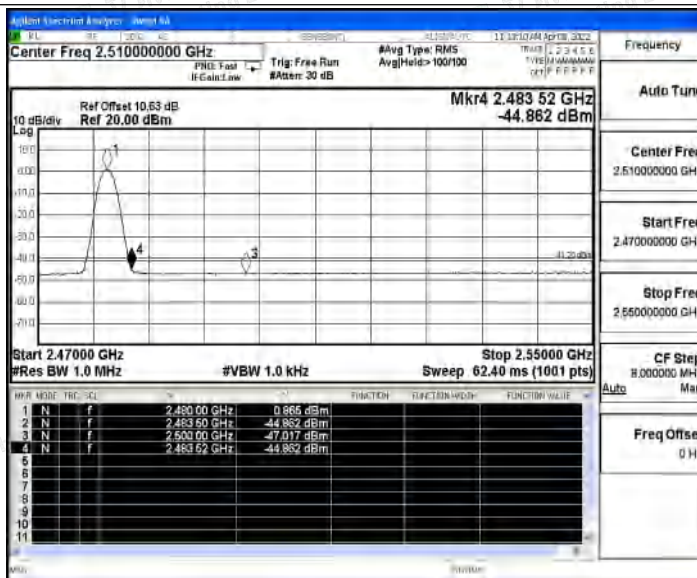


BLE_2M_Ant1_Low_2402_Peak

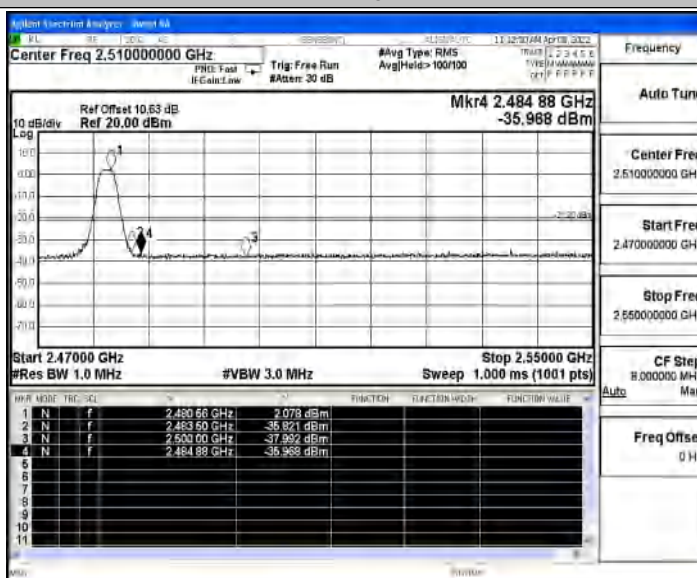


BLE_2M_Ant1_High_2480_AV





BLE_2M_Ant1_High_2480_Peak



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