

Appendix A.1: Spurious Emissions of Bluetooth operation Low Channel

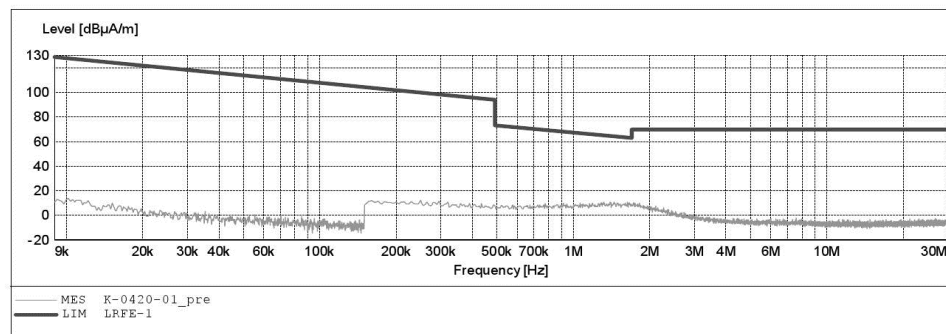
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: X
 Start of Test: 2015-4-20 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



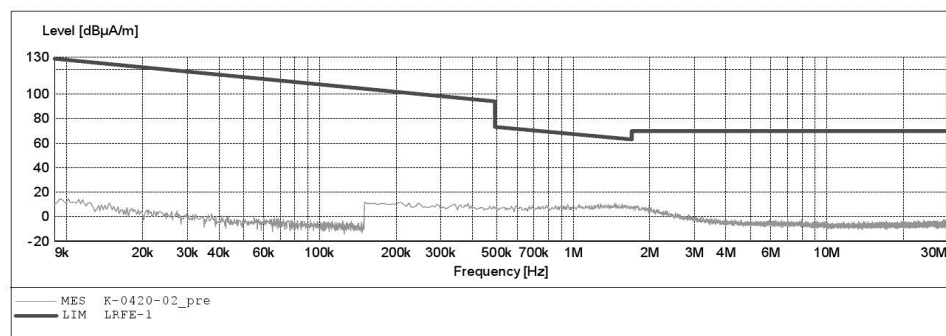
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Y
 Start of Test: 2015-4-20 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



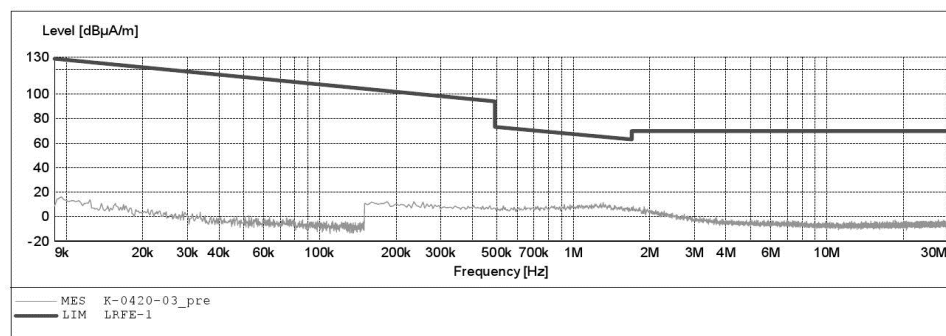
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FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Z
 Start of Test: 2015-4-20 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M





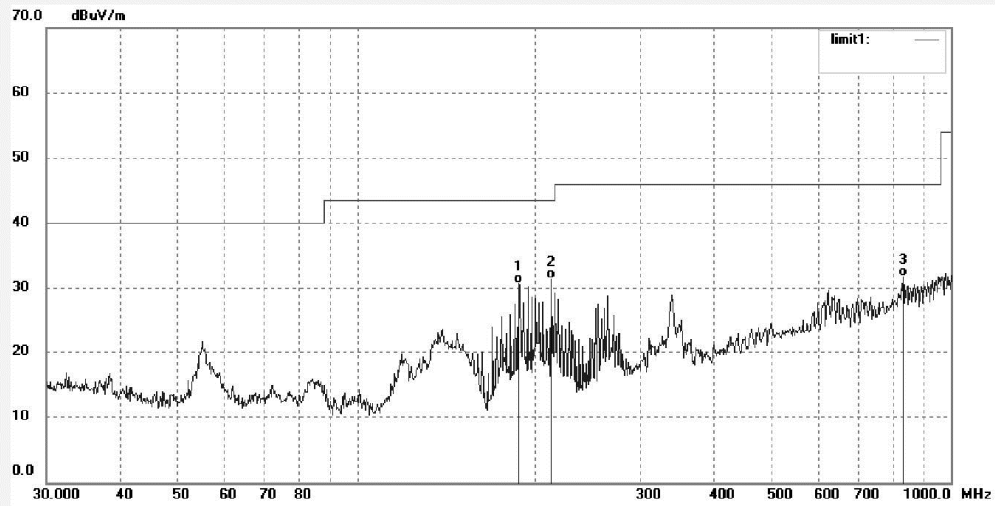
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #426	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/17/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	187.0956	43.33	-12.69	30.64	43.50	-12.86	QP			
2	212.2693	43.46	-12.04	31.42	43.50	-12.08	QP			
3	830.4002	31.18	0.54	31.72	46.00	-14.28	QP			

Produkte
Products



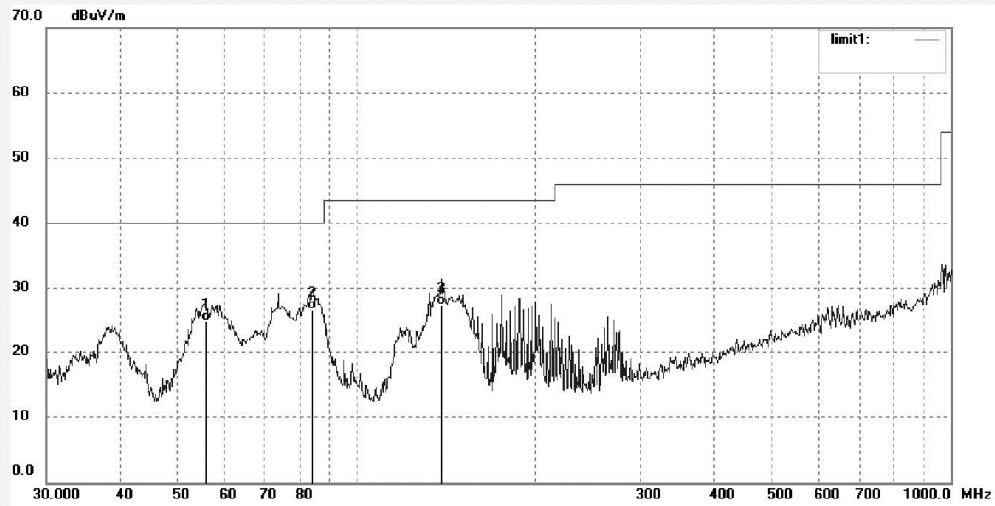
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #427	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/17/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	55.8046	38.04	-13.13	24.91	40.00	-15.09	QP			
2	84.1098	42.34	-15.59	26.75	40.00	-13.25	QP			
3	138.3873	42.31	-14.87	27.44	43.50	-16.06	QP			

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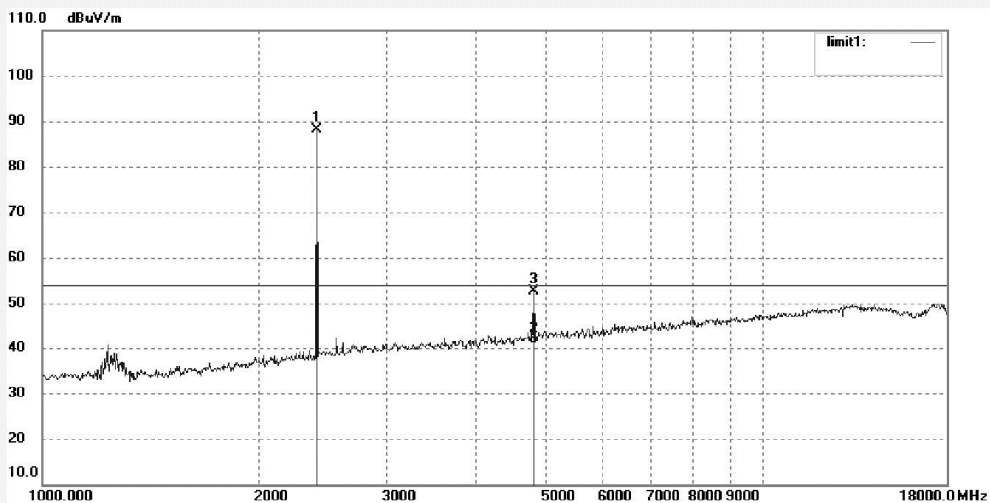
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #438
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: TX 2402MHz
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/18/
Time:
Engineer Signature:
Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	95.62	-7.45	88.17	/	/	peak			
2	4804.010	41.29	-0.30	40.99	54.00	-13.01	AVG			
3	4804.010	52.98	-0.30	52.68	74.00	-21.32	peak			

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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #439

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: ThinkPad Stack Bluetooth Speaker

Mode: TX 2402MHz

Model: S123

Manufacturer: Lenovo

Polarization: Vertical

Power Source: AC 120V/60Hz

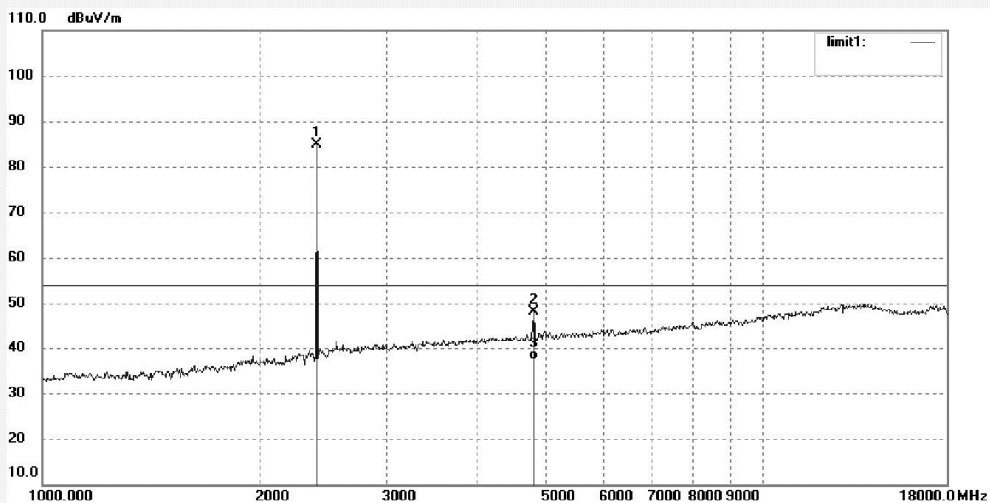
Date: 15/04/18/

Time:

Engineer Signature:

Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	92.33	-7.45	84.88	/	/	peak			
2	4804.024	48.45	-0.30	48.15	74.00	-25.85	peak			
3	4804.024	37.57	-0.30	37.27	54.00	-16.73	AVG			

Produkte
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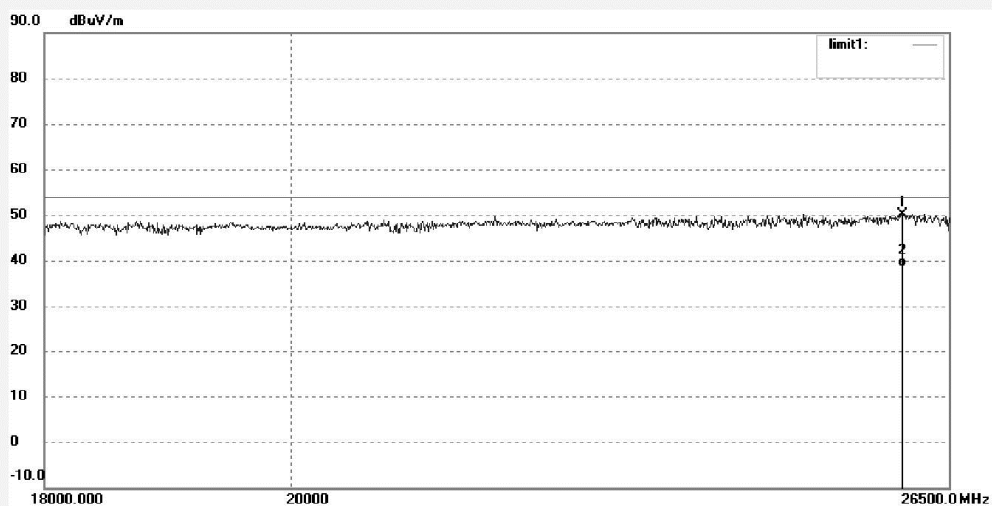
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #506	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	25982.398	33.00	17.24	50.24	74.00	-23.76	peak			
2	25982.398	21.42	17.24	38.66	54.00	-15.34	AVG			

Produkte
Products



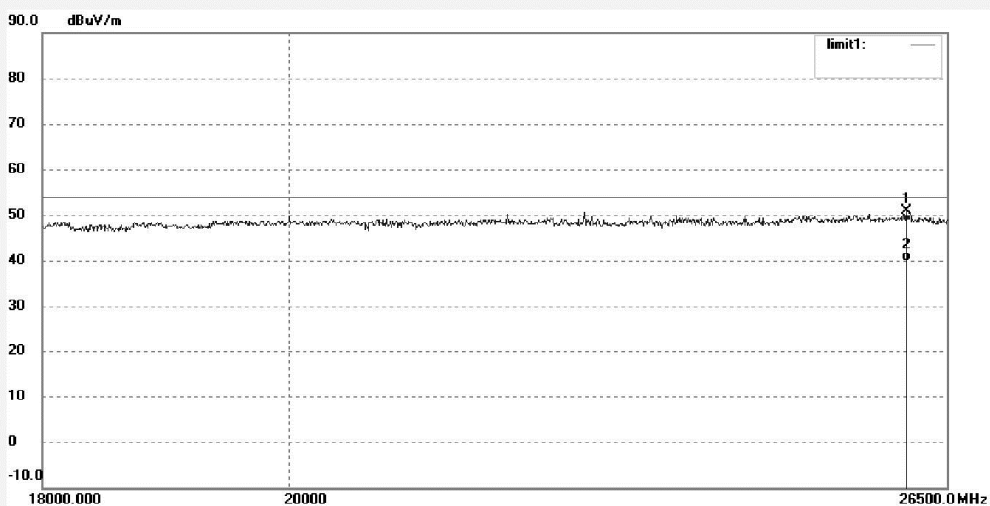
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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #507	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	26042.764	33.62	17.20	50.82	74.00	-23.18	peak			
2	26042.764	22.64	17.20	39.84	54.00	-14.16	AVG			

Middle Channel

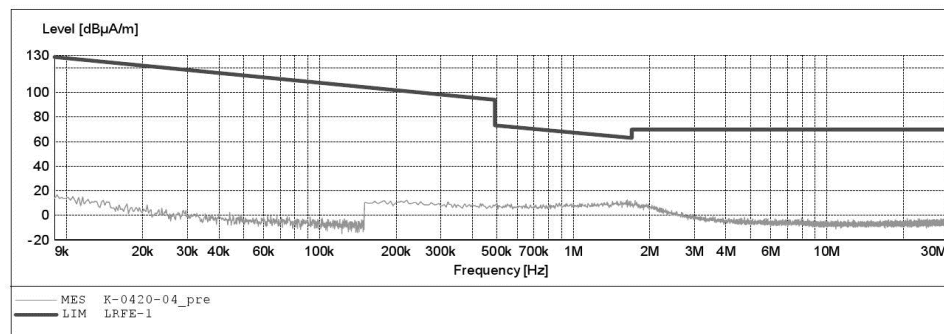
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2441MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: X
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



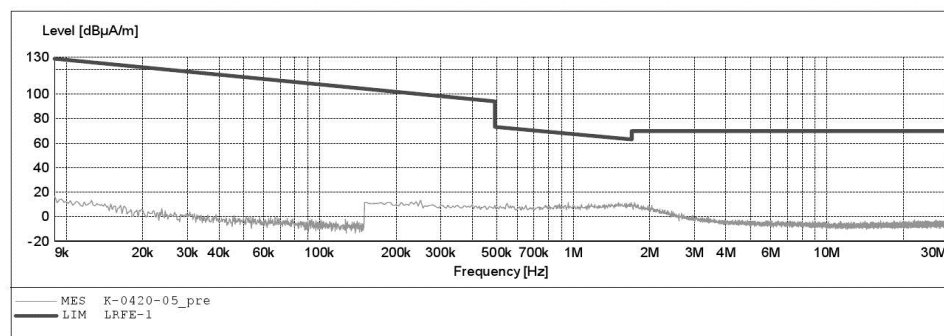
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2441MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Y
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



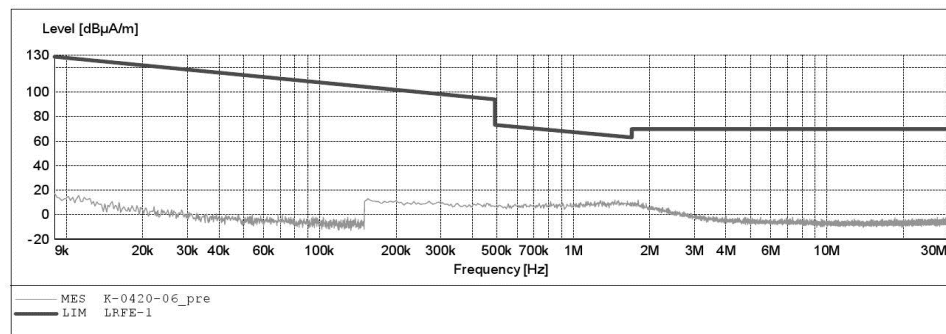
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2441MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Z
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



Produkte
Products



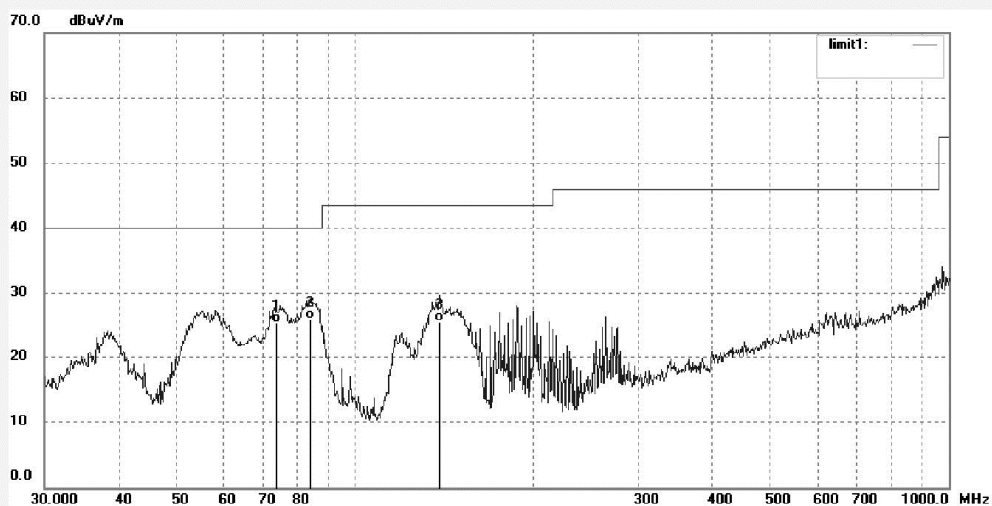
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #428	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/17/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	73.6170	42.07	-16.58	25.49	40.00	-14.51	QP			
2	84.1099	41.65	-15.59	26.06	40.00	-13.94	QP			
3	138.3873	40.50	-14.87	25.63	43.50	-17.87	QP			

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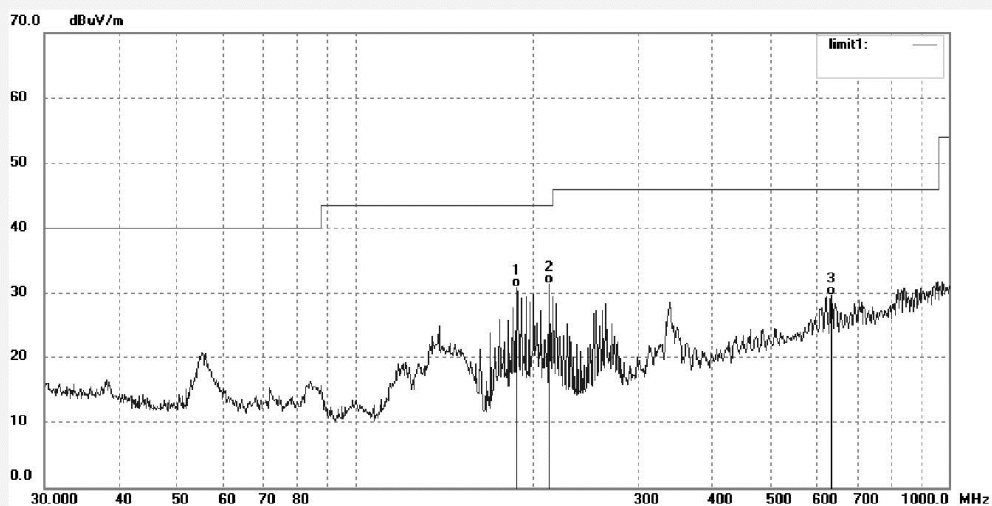
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #429
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: TX 2441MHz
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/17/
Time:
Engineer Signature:
Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	187.0956	43.54	-12.69	30.85	43.50	-12.65	QP			
2	212.2694	43.41	-12.04	31.37	43.50	-12.13	QP			
3	633.9072	32.26	-2.56	29.70	46.00	-16.30	QP			

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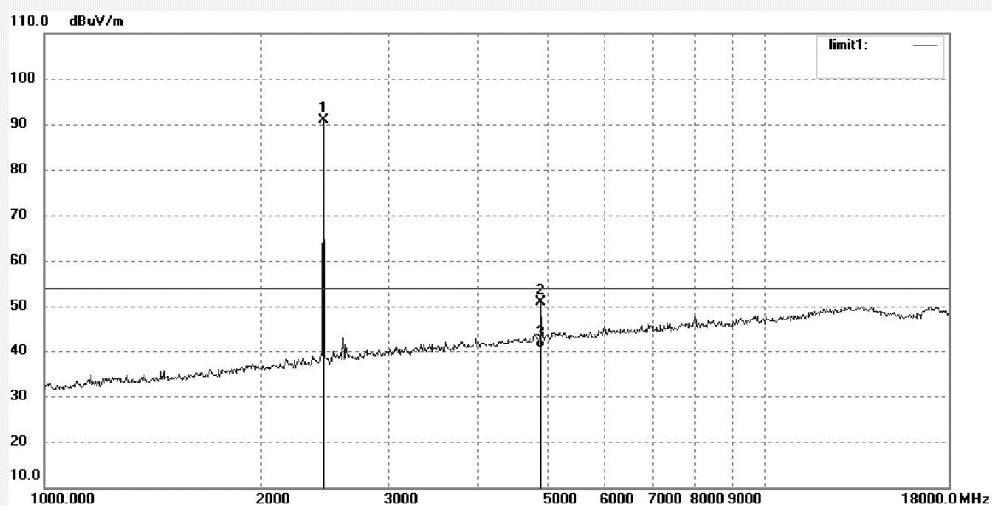
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #442
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: TX 2441MHz
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/18/
Time:
Engineer Signature:
Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	98.11	-7.35	90.76	/	/	peak			
2	4882.015	50.81	0.14	50.95	74.00	-23.05	peak			
3	4882.015	40.37	0.14	40.51	54.00	-13.49	AVG			

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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #443

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: ThinkPad Stack Bluetooth Speaker

Mode: TX 2441MHz

Model: S123

Manufacturer: Lenovo

Polarization: Vertical

Power Source: AC 120V/60Hz

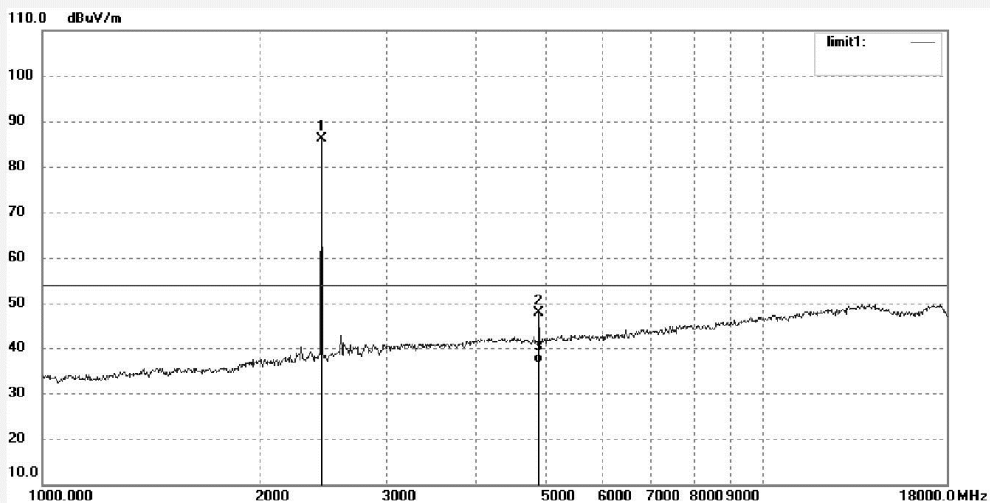
Date: 15/04/18/

Time:

Engineer Signature:

Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	93.41	-7.35	86.06	/	/	peak			
2	4882.011	47.72	0.14	47.86	74.00	-26.14	peak			
3	4882.011	36.45	0.14	36.59	54.00	-17.41	AVG			

Produkte
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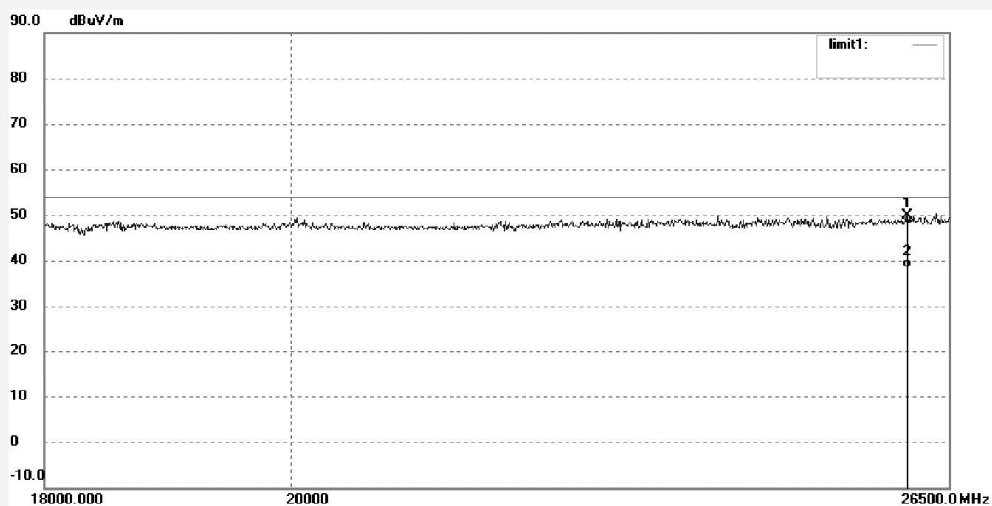
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #508	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	26032.693	32.75	17.21	49.96	74.00	-24.04	peak			
2	26032.693	21.08	17.21	38.29	54.00	-15.71	AVG			

Produkte
Products



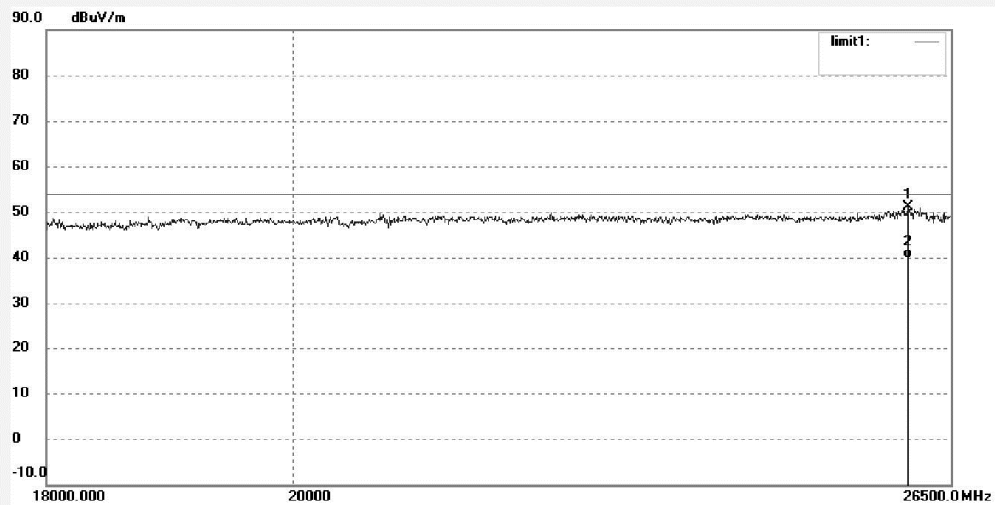
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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #509	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	26012.563	33.90	17.22	51.12	74.00	-22.88	peak			
2	26012.563	22.57	17.22	39.79	54.00	-14.21	AVG			

High Channel

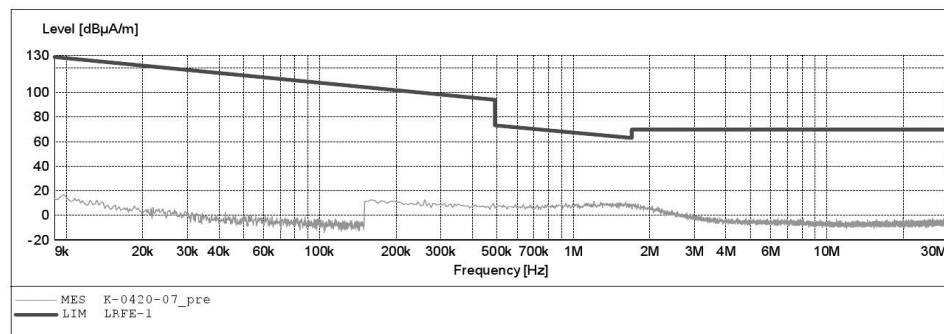
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: X
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



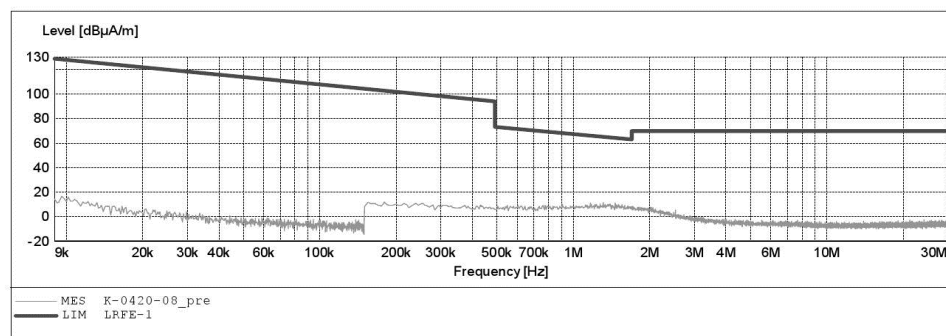
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Y
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



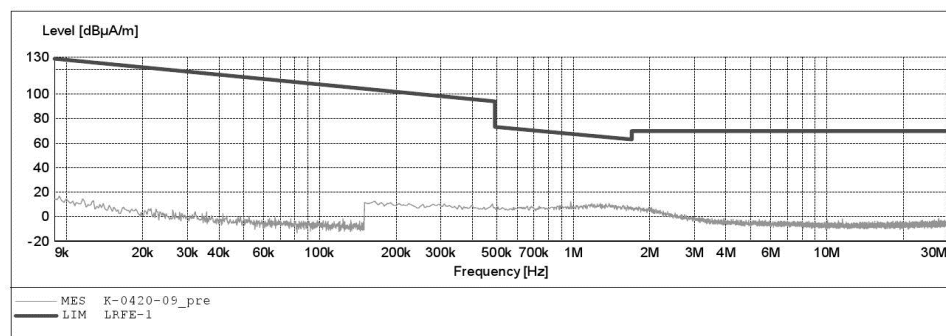
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3m Radiated

EUT: ThinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: LAN
 Test Specification: AC 120V/60Hz
 Comment: Z
 Start of Test: 2015-4-21 /

SCAN TABLE: "LFRE Fin"

Short Description:			SUB STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



Produkte
Products



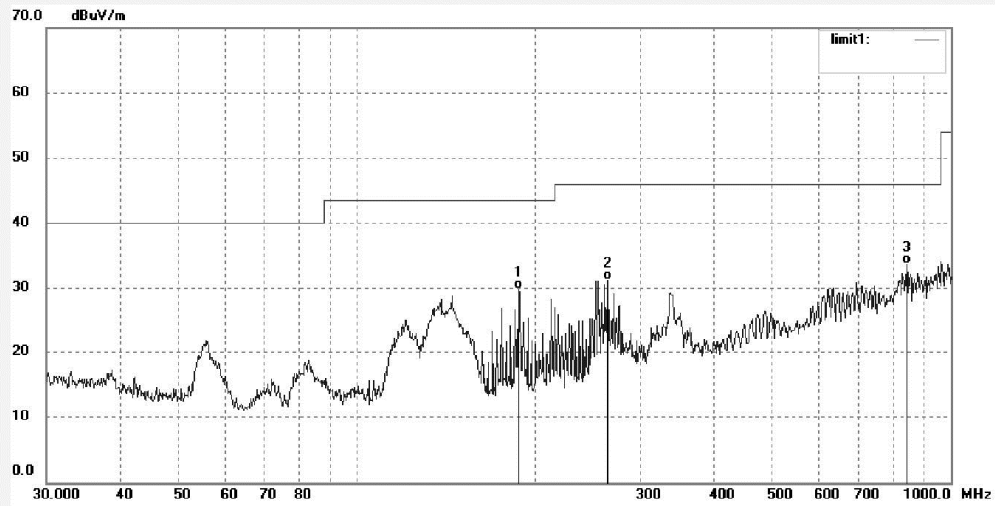
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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #430	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	187.0956	42.53	-12.69	29.84	43.50	-13.66	QP			
2	264.7456	41.72	-10.44	31.28	46.00	-14.72	QP			
3	842.1295	32.99	0.66	33.65	46.00	-12.35	QP			

Produkte
Products



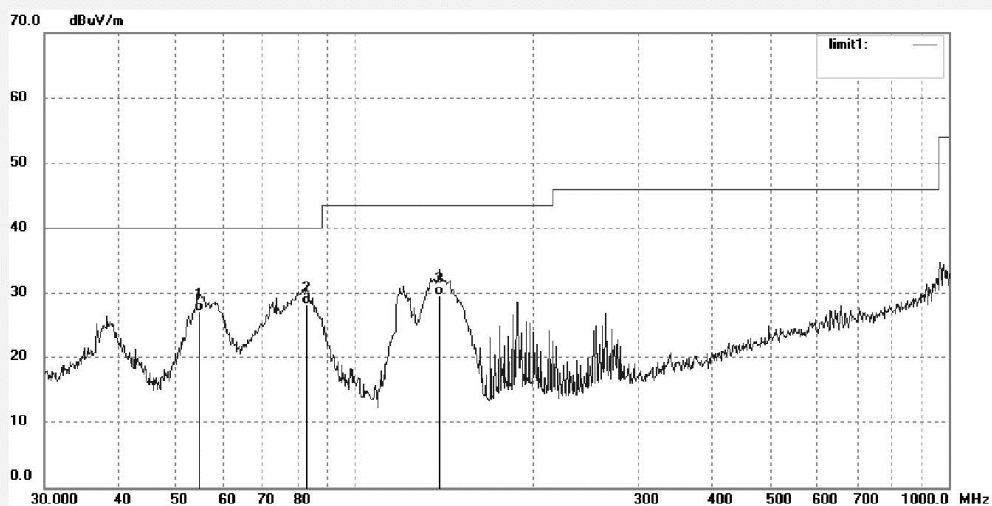
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Fax:+86-0755-26503396

Job No.: lenovo #431	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	54.6428	40.15	-12.95	27.20	40.00	-12.80	QP			
2	82.9385	44.02	-15.84	28.18	40.00	-11.82	QP			
3	138.3873	44.52	-14.87	29.65	43.50	-13.85	QP			

Produkte
Products



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Fax:+86-0755-26503396

Job No.: lenovo #444

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: ThinkPad Stack Bluetooth Speaker

Mode: TX 2480MHz

Model: S123

Manufacturer: Lenovo

Polarization: Vertical

Power Source: AC 120V/60Hz

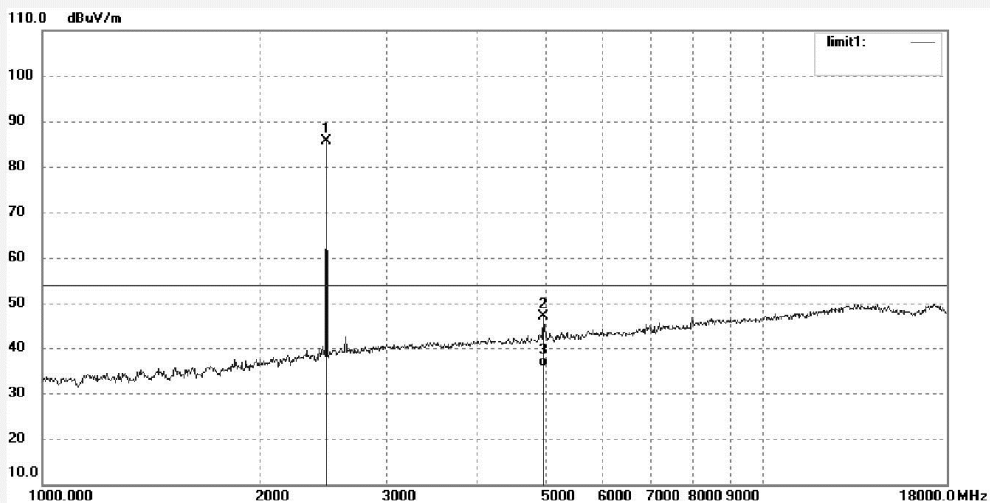
Date: 15/04/18/

Time:

Engineer Signature:

Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	93.10	-7.37	85.73	/	/	peak			
2	4960.007	46.60	0.52	47.12	74.00	-26.88	peak			
3	4960.007	35.41	0.52	35.93	54.00	-18.07	AVG			

Produkte
Products



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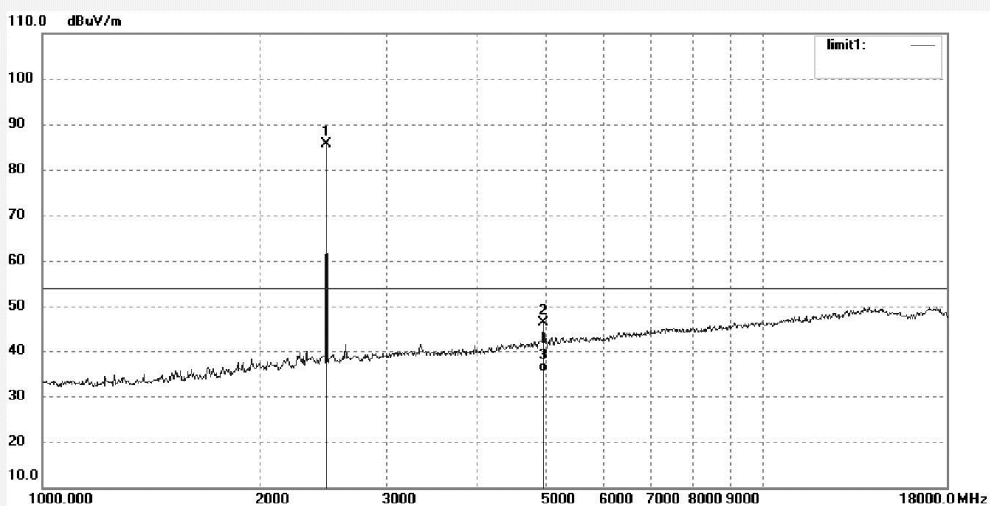
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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #445
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: TX 2480MHz
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/18/
Time:
Engineer Signature:
Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	93.06	-7.37	85.69	/	/	peak			
2	4960.013	45.95	0.52	46.47	74.00	-27.53	peak			
3	4960.013	34.82	0.52	35.34	54.00	-18.66	AVG			

Produkte
Products



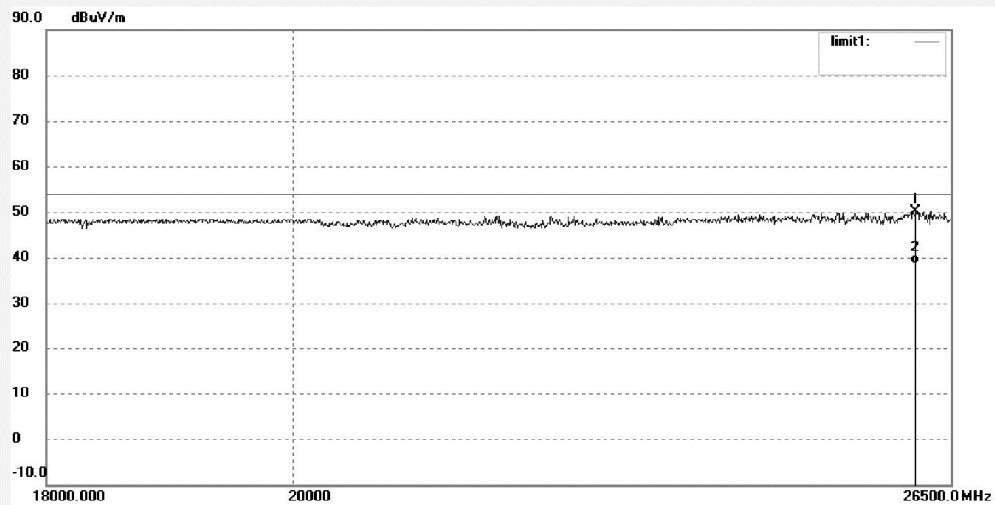
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Fax:+86-0755-26503396

Job No.: lenovo #510	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	26103.270	32.94	17.16	50.10	74.00	-23.90	peak			
2	26103.270	21.55	17.16	38.71	54.00	-15.29	AVG			

Produkte
Products



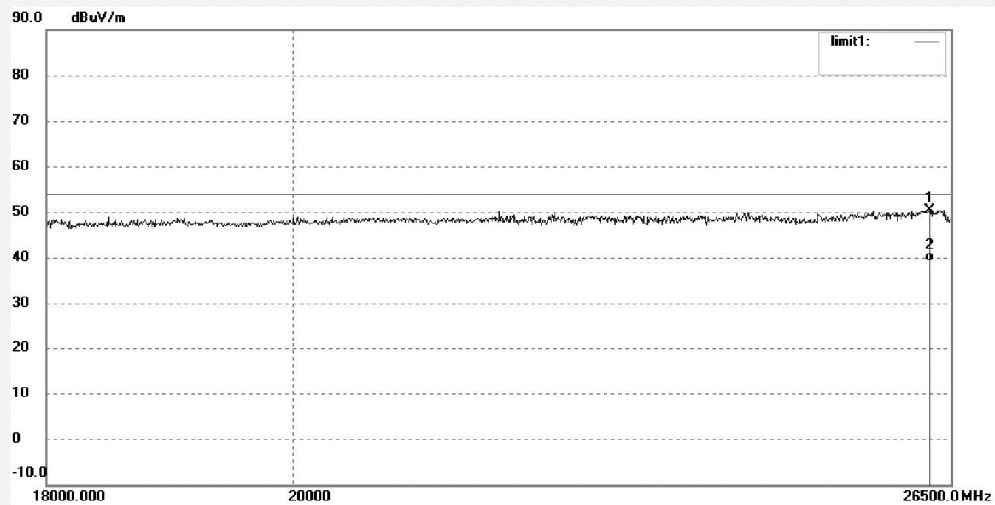
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Job No.: lenovo #511	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	26255.151	33.34	17.06	50.40	74.00	-23.60	peak			
2	26255.151	22.05	17.06	39.11	54.00	-14.89	AVG			

Produkte
Products

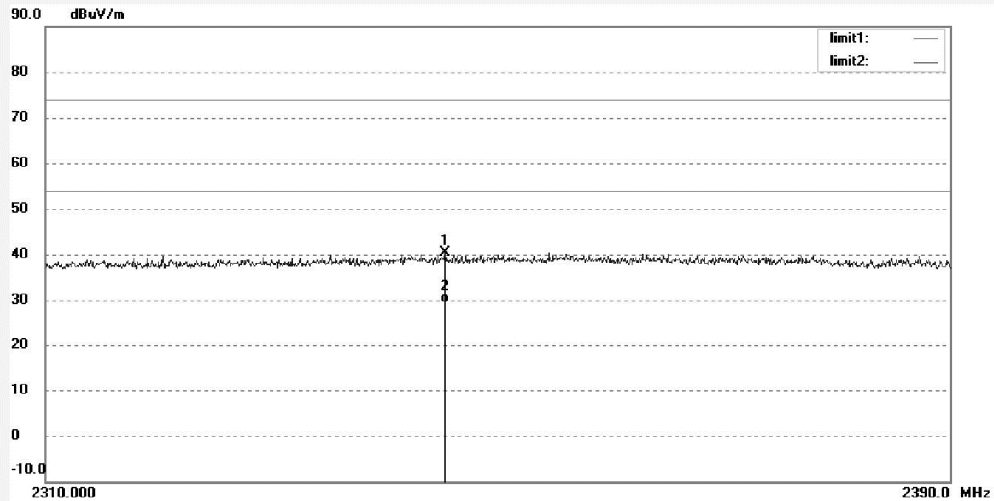
Appendix A.2: Radiated Emissions in Restricted Bands Low Channel



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Job No.: lenovo #440	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	
Note: Bluetooth 3.0	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2345.040	48.17	-7.79	40.38	74.00	-33.62	peak			
2	2345.040	37.05	-7.79	29.26	54.00	-24.74	AVG			

Produkte
Products



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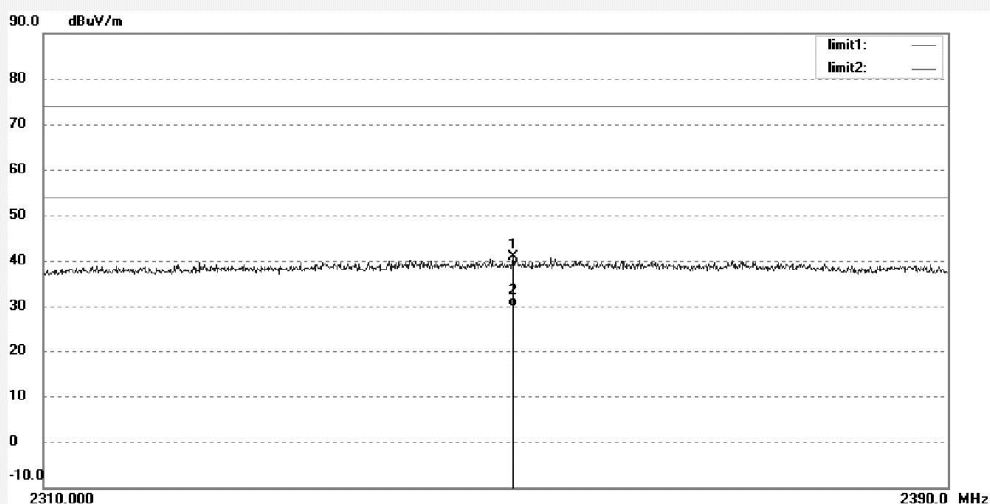
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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo #441
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: TX 2402MHz
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/18/
Time:
Engineer Signature:
Distance: 3m

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2351.200	48.70	-7.79	40.91	74.00	-33.09	peak			
2	2351.200	37.69	-7.79	29.90	54.00	-24.10	AVG			

Produkte
Products

High Channel

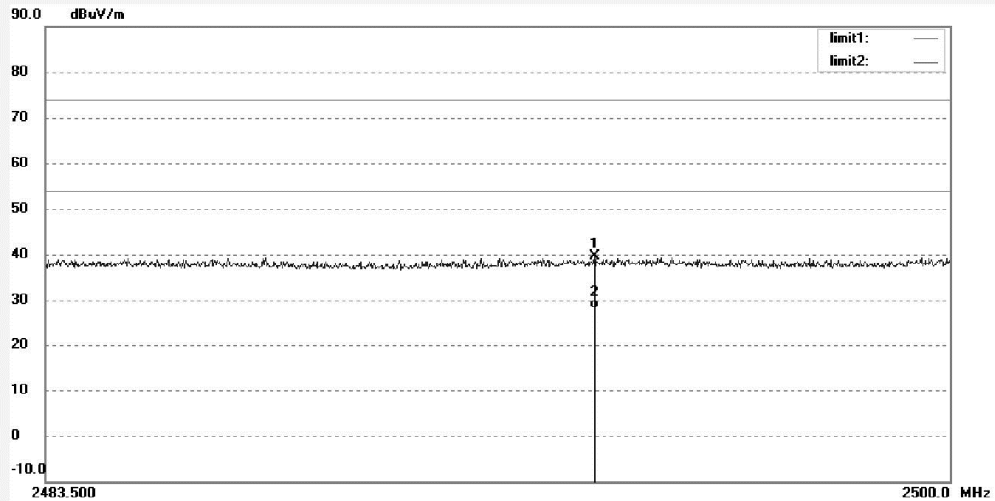


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Job No.: lenovo #446	Polarization: Horizontal
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	
Note: Bluetooth 3.0	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2493.515	46.90	-7.39	39.51	74.00	-34.49	peak			
2	2493.515	35.52	-7.39	28.13	54.00	-25.87	AVG			

Produkte
Products



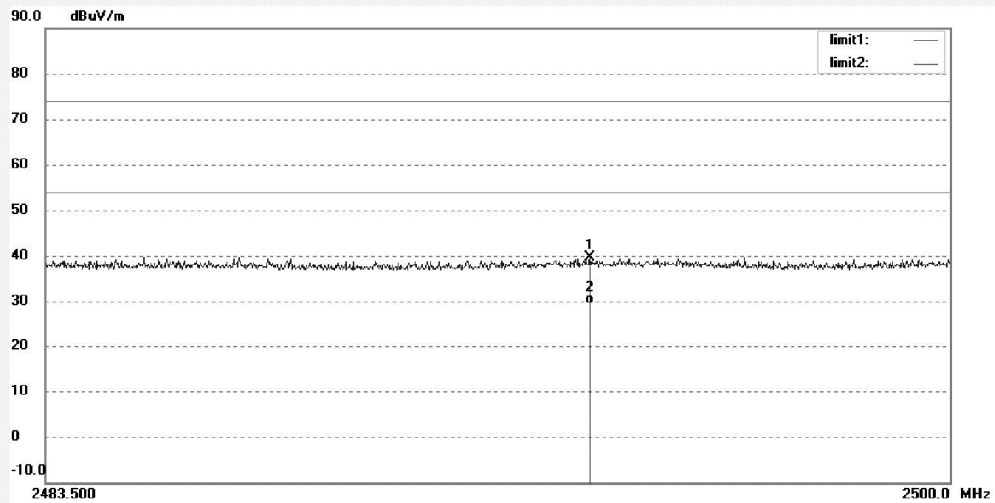
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Fax:+86-0755-26503396

Job No.: lenovo #447	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 15/04/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: ThinkPad Stack Bluetooth Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: S123	
Manufacturer: Lenovo	

Note: Bluetooth 3.0



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2493.433	47.00	-7.39	39.61	74.00	-34.39	peak			
2	2493.433	36.75	-7.39	29.36	54.00	-24.64	AVG			

Produkte
Products

Appendix A.3: Radiated Emissions

Aux in playing with battery



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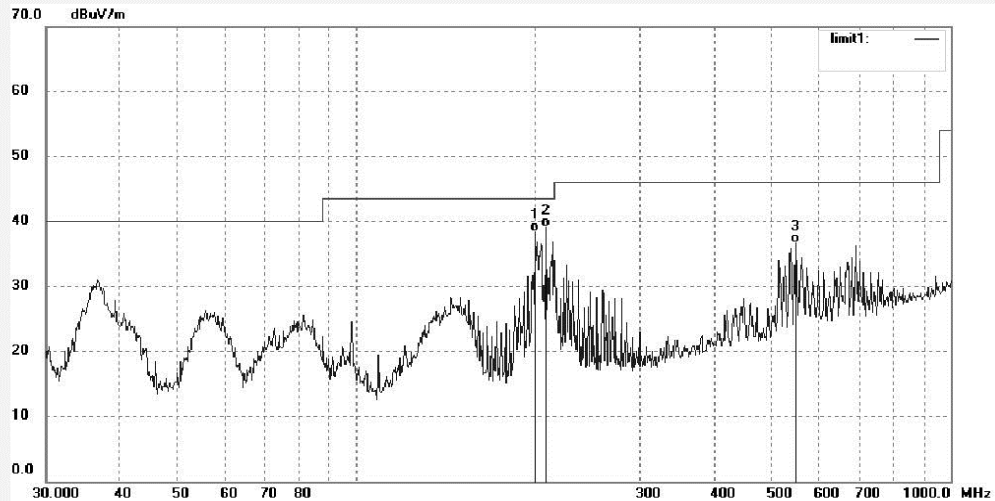
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Tel:+86-0755-26503290
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Job No.: lenovo 1#03
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Vertical
Power Source: DC 3.7V
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	200.0432	50.78	-12.44	38.34	43.50	-5.16	QP			
2	208.6579	51.25	-12.21	39.04	43.50	-4.46	QP			
3	548.3600	40.40	-3.67	36.73	46.00	-9.27	QP			

Produkte
Products



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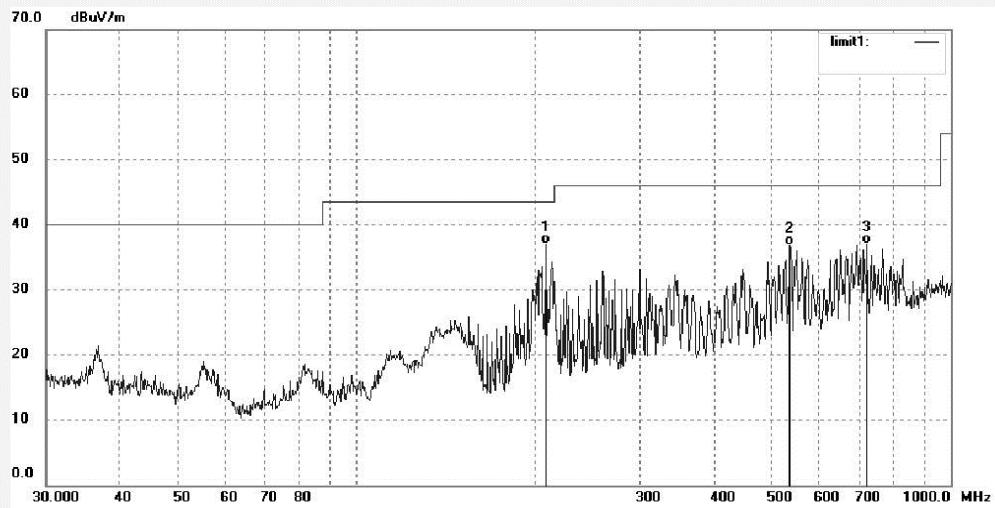
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo 1#04
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: DC 3.7V
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	208.6579	49.28	-12.21	37.07	43.50	-6.43	QP			
2	536.9208	40.73	-3.91	36.82	46.00	-9.18	QP			
3	723.7930	38.45	-1.43	37.02	46.00	-8.98	QP			

Produkte
Products



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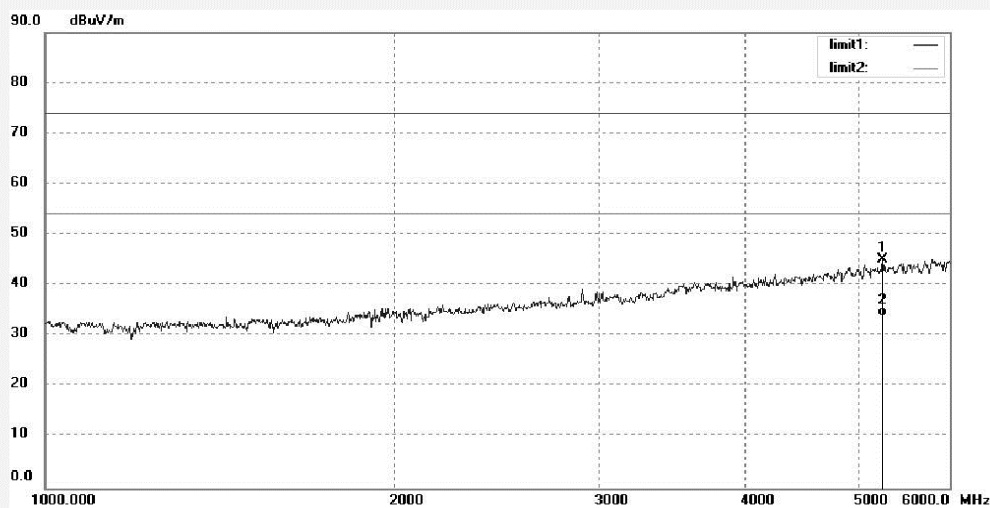
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Tel:+86-0755-26503290
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Job No.: lenovo 1#05
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Vertical
Power Source: DC 3.7V
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5254.944	44.24	0.87	45.11	74.00	-28.89	peak			
2	5254.944	33.01	0.87	33.88	54.00	-20.12	AVG			

Produkte
Products



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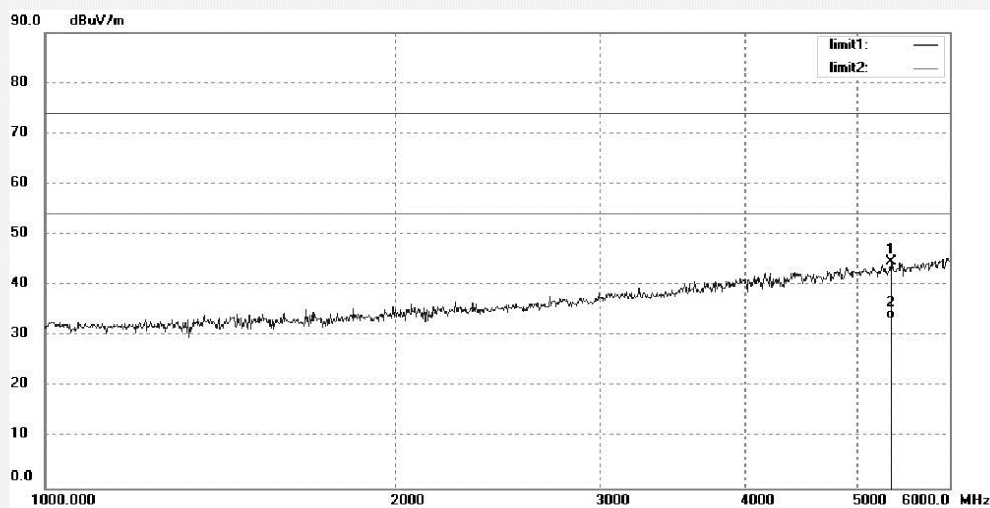
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Job No.: lenovo 1#06
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: DC 3.7V
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5340.371	43.75	0.88	44.63	74.00	-29.37	peak			
2	5340.371	32.56	0.88	33.44	54.00	-20.56	AVG			

Produkte
Products

Aux in playing with AC/DC adapter



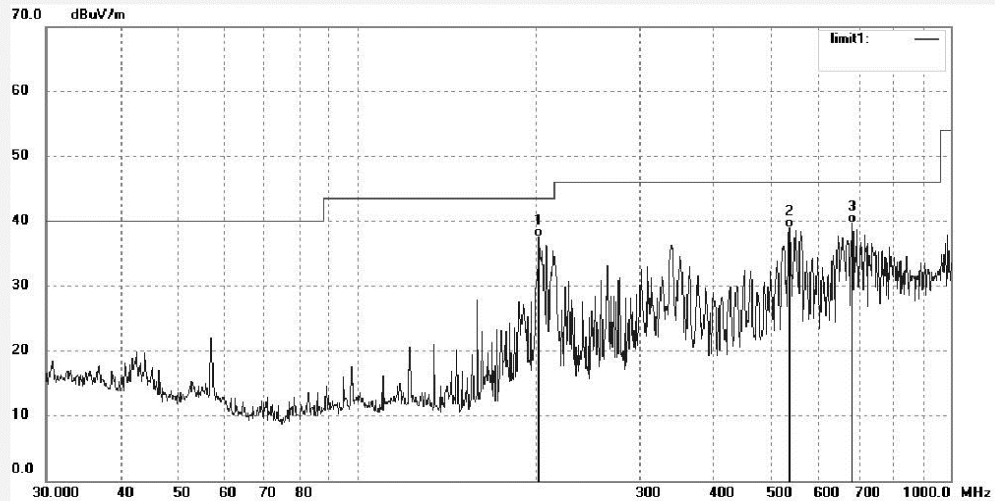
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Site: 2# Chamber
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Fax:+86-0755-26503396

Job No.: lenovo 1#01
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	202.8103	49.84	-12.35	37.49	43.50	-6.01	QP			
2	535.7073	42.90	-3.92	38.98	46.00	-7.02	QP			
3	682.3484	41.57	-2.00	39.57	46.00	-6.43	QP			

Produkte
Products



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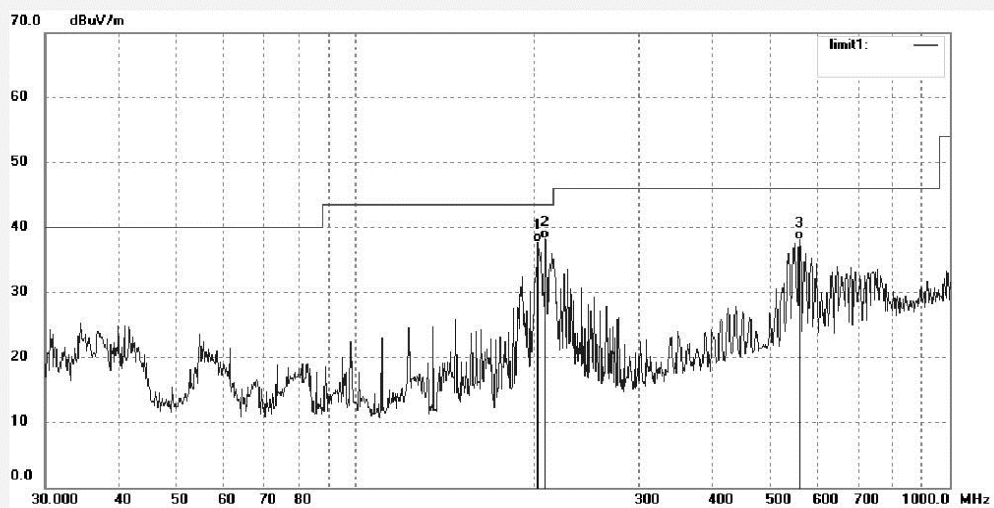
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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: lenovo 1#02
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	202.8103	50.10	-12.35	37.75	43.50	-5.75	QP			
2	208.5801	50.45	-12.21	38.24	43.50	-5.26	QP			
3	558.7301	41.46	-3.47	37.99	46.00	-8.01	QP			

Produkte
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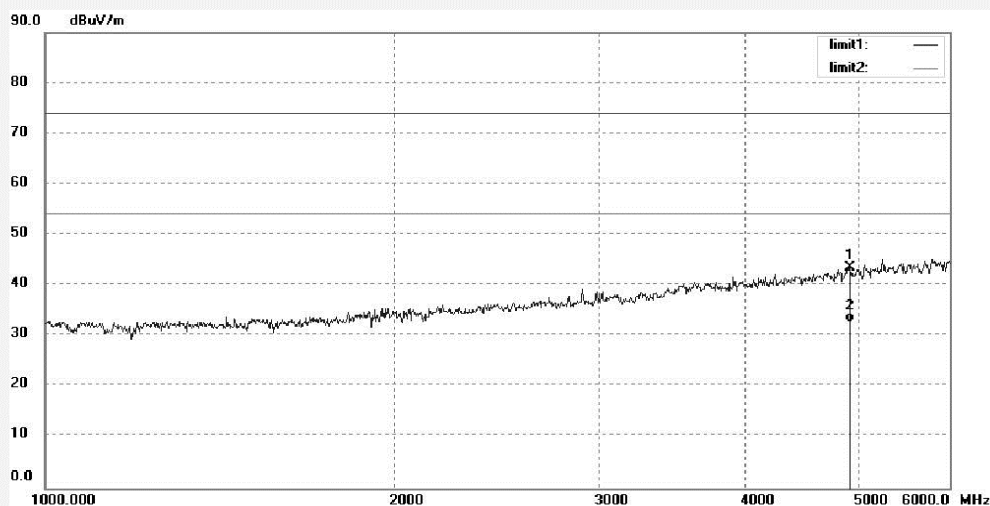
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Tel:+86-0755-26503290
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Job No.: lenovo 1#07
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4926.683	43.22	0.37	43.59	74.00	-30.41	peak			
2	4926.683	32.45	0.37	32.82	54.00	-21.18	AVG			

Produkte
Products



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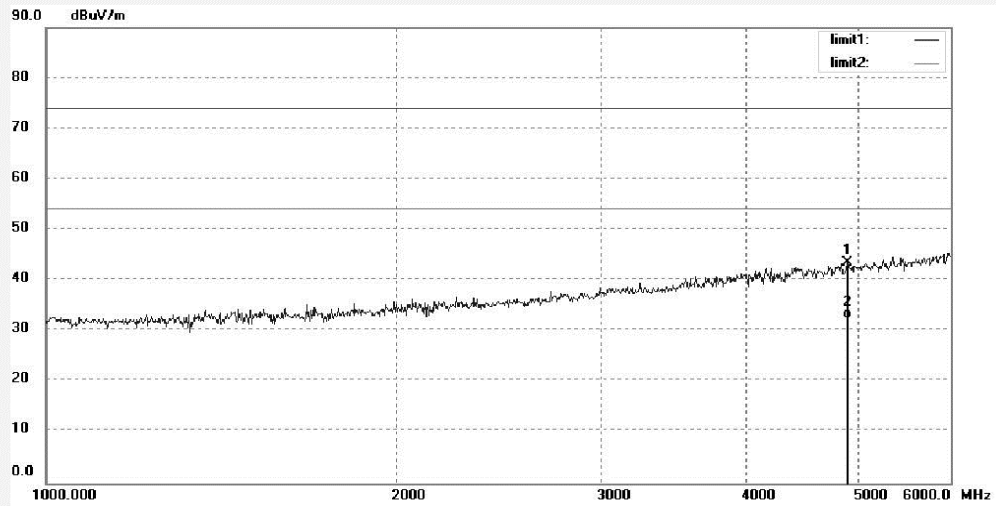
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Site: 2# Chamber
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Fax:+86-0755-26503396

Job No.: lenovo 1#08
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: ThinkPad Stack Bluetooth Speaker
Mode: Aux in
Model: S123
Manufacturer: Lenovo

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/04/20/
Time:
Engineer Signature:
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4891.499	43.40	0.20	43.60	74.00	-30.40	peak			
2	4891.499	32.37	0.20	32.57	54.00	-21.43	AVG			

Appendix A.4: Conducted Emissions

Bluetooth playing with charging

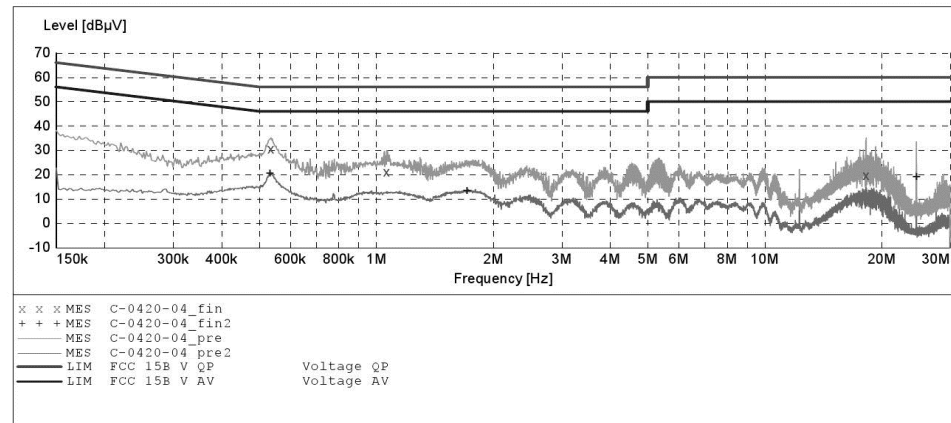
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: TinkPad Stack Bluetooth Speaker M/N:S123
Manufacturer: Lenovo
Operating Condition: On with Bluetooth
Test Site: 1#Shielding Room
Operator: LAN
Test Specification: N 120V/60Hz
Comment: Mains Port
Start of Test: 2015-4-20 /

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "C-0420-04_fin"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.536000	30.50	11.5	56	25.5	QP	N	GND
1.064000	21.00	11.6	56	35.0	QP	N	GND
18.263000	19.60	11.9	60	40.4	QP	N	GND

MEASUREMENT RESULT: "C-0420-04_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.532000	20.50	11.5	46	25.5	AV	N	GND
1.710000	13.20	11.6	46	32.8	AV	N	GND
24.576500	19.10	12.0	50	30.9	AV	N	GND

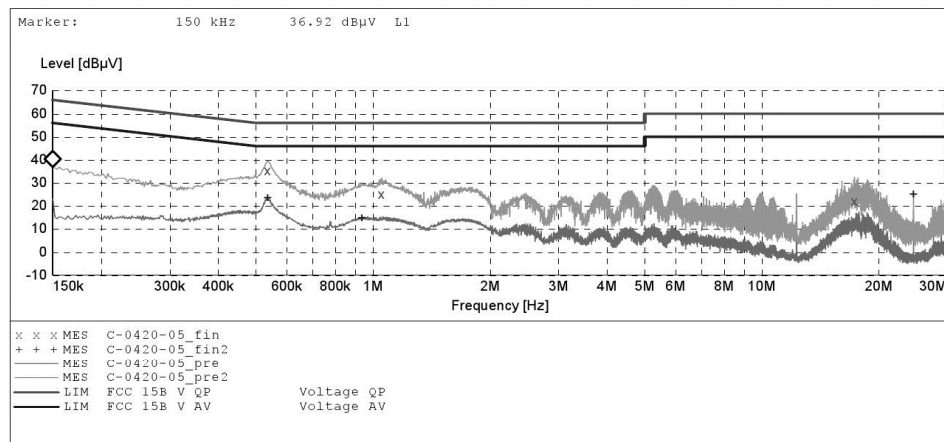
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: TinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: On with Bluetooth
 Test Site: 1#Shielding Room
 Operator: LAN
 Test Specification: L 120V/60Hz
 Comment: Mains Port
 Start of Test: 2015-4-20 /

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "C-0420-05_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.536000	35.20	11.5	56	20.8	QP	L1	GND
1.052000	24.90	11.6	56	31.1	QP	L1	GND
17.336000	21.90	11.9	60	38.1	QP	L1	GND

MEASUREMENT RESULT: "C-0420-05_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.536000	23.40	11.5	46	22.6	AV	L1	GND
0.936000	14.70	11.6	46	31.3	AV	L1	GND
24.576500	25.10	12.0	50	24.9	AV	L1	GND

Aux in playing with charging

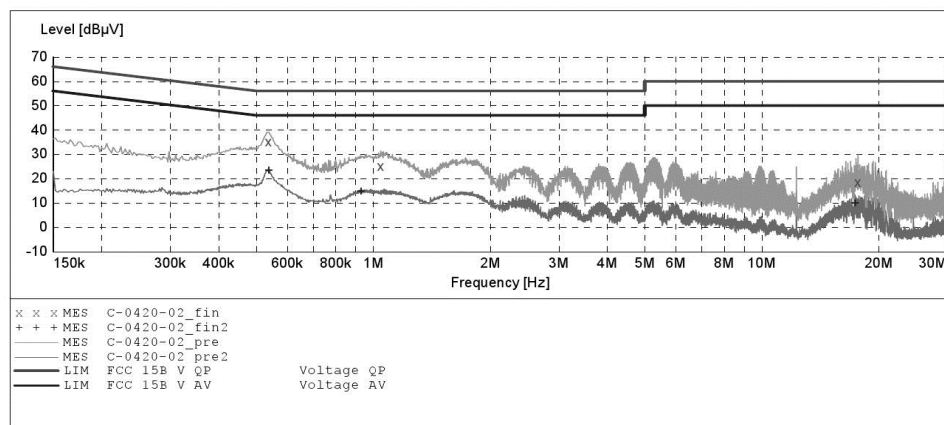
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: TinkPad Stack Bluetooth Speaker M/N:S123
Manufacturer: Lenovo
Operating Condition: Aux in
Test Site: 1#Shielding Room
Operator: LAN
Test Specification: L 120V/60Hz
Comment: Mains Port
Start of Test: 2015-4-20 /

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "C-0420-02_fin"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.538000	35.00	11.5	56	21.0	QP	L1	GND
1.046000	25.10	11.6	56	30.9	QP	L1	GND
17.696000	18.50	11.9	60	41.5	QP	L1	GND

MEASUREMENT RESULT: "C-0420-02_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.538000	23.30	11.5	46	22.7	AV	L1	GND
0.930000	14.80	11.6	46	31.2	AV	L1	GND
17.381000	9.80	11.9	50	40.2	AV	L1	GND

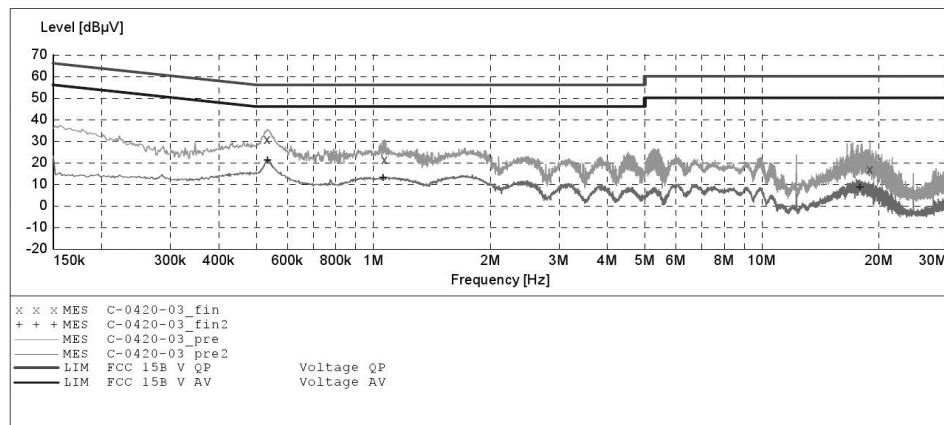
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: TinkPad Stack Bluetooth Speaker M/N:S123
 Manufacturer: Lenovo
 Operating Condition: Aux in
 Test Site: 1#Shielding Room
 Operator: LAN
 Test Specification: N 120V/60Hz
 Comment: Mains Port
 Start of Test: 2015-4-20 /

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "C-0420-03_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.534000	30.70	11.5	56	25.3	QP	N	GND
1.070000	21.40	11.6	56	34.6	QP	N	GND
19.014500	16.70	11.9	60	43.3	QP	N	GND

MEASUREMENT RESULT: "C-0420-03_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.534000	20.90	11.5	46	25.1	AV	N	GND
1.060000	12.90	11.6	46	33.1	AV	N	GND
17.880500	8.60	11.9	50	41.4	AV	N	GND

Appendix B

Test Results of RF Exposure

APPENDIX B.1: RF EXPOSURE COMPLIANCE	2
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Appendix B.1: RF Exposure Compliance

Radio Frequency Exposure Compliance

RESULT:

Passed

Test standard : FCC 1.1310
RSS-102 Issue 5

This device is mobile device, and the applicant declares that the minimum separation distance is greater than 20cm. Therefore MPE measurement or computational modeling should be used to determine compliance.

MPE Calculation
According to the formula

$$Pd = \frac{P_{out} * G}{4R^2\pi}$$

Where

Pd = power density in mW/cm² or W/m²

Pout = output power to antenna in mW or W

G = Antenna gain in numeric

π = 3.14159

R = Distance between observation point and the center of radiator in cm or m

In here

Pout = 3.58dBm = 2.28mW

G = -0.13dBi = 0.97 (numeric)

R = 20cm

For Bluetooth operation:

$$Pd = \frac{P_{out} * G}{4R^2\pi} = \frac{2.28 * 0.97}{4 * 20^2 * 3.14159} = 0.00044 \text{ mW} / \text{cm}^2 < 1 \text{ mW/cm}^2 \text{ for FCC limit}$$

$$Pd = \frac{P_{out} * G}{4R^2\pi} = \frac{0.00228 * 0.97}{4 * 0.2^2 * 3.14159} = 0.0044 \text{ W} / \text{m}^2 < 5.4 \text{ W/m}^2 \text{ for IC limit}$$

The summed maximum permissible exposure (MPE) level is 0.00044mW/cm² and 0.0044W/m². It is less than MPE limit 1mW/cm² for FCC and 5.4W/m² for IC, therefore the device compliance with MPE limit.