

FCC RADIO TEST REPORT For FCC ID: 2ALTX-TFMTKAW01216

Report Reference No..... 18EFAS10049 41 Date of issue: 2018-10-15 Address.....: Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China Applicant's name..... TrekStor GmbH Address...... Berliner Ring 7, 64625 Bensheim, Germany Manufacturer..... Heyuan Vastking Electronic Co., Ltd. **Test specification:** Test item description.....: TrekStor Surftab theatre K13

Trade Mark	TREKSTOR
Model/Type reference:	TFMTKAW01216
Ratings:	INPUT: 100-240V~ 50/60HZ 0.45A, OUTPUT: DC5V 3A
	DC 3.8V 10000mAh Li-polymer Battery

Responsible Engineer :

Smile Wong

Authorized Signatory:

King Wang



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TEST REPORT DECLARE

Applicant	:	TrekStor GmbH
Address	:	Berliner Ring 7, 64625 Bensheim, Germany
Equipment under Test	:	TrekStor Surftab theatre K13
Model No	:	TFMTKAW01216
Trade Mark	:	TREKSTOR
Manufacturer	:	Heyuan Vastking Electronic Co., Ltd.
Address	:	No.13, Hepu Avenue, Yuancheng District, Heyuan City, Guangdong

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Test Standard Used: FCC Rules and Regulations Part 15 Subpart C (15.247)

Test procedure used: ANSI C63.10:2013, 558074 V05.

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these

tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	18EFAS10049 41		
Date of Test:	2018-10-15	Date of Report:	2018-10-19

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of DongGuan ShuoXin Electronic Technology Co., Ltd.



1. Summary of test Standards and results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
6dB Bandwidth And 99% Occupied Bandwidth	FCC Part 15.247 (a)(2)	PASS
Peak Output Power	FCC Part 15.247(b)(3)	PASS
Power Spectral Density	FCC Part 15.247(e)	PASS
Spurious Emissions at Antenna Port	FCC Part 15.247(d)	PASS
Spurious Emissions	FCC Part 15.205, 15.209, FCC Part 15.247(d)	PASS
100 kHz Bandwidth of Frequency Band Edge	FCC Part 15.247(d)	PASS
AC Line Conducted Emissions	FCC Part 15.207 (a)	PASS
Antenna requirement	FCC Part 15: 15.203	PASS



2. GENERAL TEST INFORMATION

2.1. Description of EUT

EUT* Name	:	TrekStor Surftab theatre K13
Model Number	:	TFMTKAW01216
Trade Mark	:	TREKSTOR
EUT function description	:	TrekStor Surftab theatre K13 with WiFi & BT function.
Dower owneb.		INPUT: 100-240V~ 50/60HZ 0.45A, OUTPUT: DC5V 3A
Power supply	•	DC 3.8V 10000mAh Li-polymer Battery
Adaptor		JHD-AP015U-050300BA-C
Radio Specification	:	BT V4.0 BLE
Operation frequency	:	2.402 ~2.480 GHz
Modulation	:	GFSK
Antenna Type	:	FPCB Antenna
FVIN		NA
Date of Receipt	:	2018/10/14
Sample Type	:	N/A

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

Description of Accessorie s	Manufacturer	Model number or Type	Other
Adapter	Shen Zhen Jihongda Power Co., Ltd	JHD-AP015U-050300BA-C	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
	/	/	/



2.4. Block diagram of EUT configuration for test



EUT was connected to control to a special test jig provided by manufacturer which has a standard RSS-232 connector to connect to Notebook, and the Notebook will run a special test software "MP_v1.1.1" provided by manufacturer to control EUT work in test mode as blow table.

Tested mode, channel, and data rate information				
Mode	data rate (Mpbs) Channel Frequency			
	(see Note)		(MHz)	
	1	Low :CH00	2402	
BLE	1	Middle: CH19	2440	
	1	High: CH39	2480	

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25 ℃
Humidity range:	40-75%
Pressure range:	86-106kPa



2.6. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Upportainty for Padiation Emission tast (20MHz 200MHz)	4.60 dB (Polarize: V)
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: H)
Uncertainty for Padiation Emission test (200MU - 40U-)	6.10 dB (Polarize: V)
Uncertainty for Radiation Emission test (200MHz-1GHz)	5.08 dB (Polarize: H)
Uncertainty for Dediction Emission fact (4011- 0011-)	5.01 dB (Polarize: V)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: H)
Uncertainty for Dediction Emission test (COUR 49001-)	5.26 dB (Polarize: V)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: H)
Uncertainty for Dediction Emission test (1901) - 4001-	5.06 dB (Polarize: V)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: H)
Uncertainty for radio frequency	±0.048kHz
Uncertainty for conducted RF Power	±0.32dB

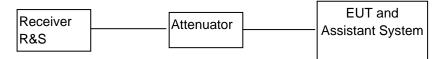
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 6dB Bandwidth and 99% Occupied Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	05/25/2019	05/26/2018
2	Attenuator	Mini-Circuits	BW-S10W2	101109	12/17/2018	12/18/2017
3	RF Cable	Micable	C10-01-01-1	100309	12/17/2018	12/18/2017
4	Spectrum analyzer	R&S	FSV40	101470	06/28/2019	06/29/2018

3.2. Block diagram of test setup



3.3. Limits

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 KHz

3.4. Test Procedure

- (1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- (2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- (3) Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
- (4) Repeat above procedures until all frequencies measured were complete.

3.. Test Result

EUT Set	CH or	6 dB bandwidth	99% dB bandwidth	Limt	Conclusion
Mode	Frequency	Result (MHz)	Result (MHz)	>500KHz	PASS
	CH 00	0.702	/		PASS
BLE	CH 19	0.689	/	>500KHz	PASS
	CH 39	0.699	/		PASS



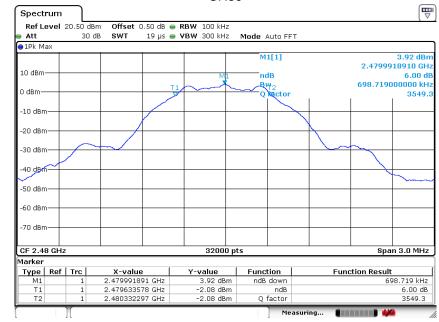
3.6. Original test data CH00 ₽ Spectrum Offset 0.50 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Ref Level 20.50 dBm Att 30 dB Mode Auto FFT 😑 1Pk Max M1[1] 3.64 dBm 2.4019932030 GHz 10 dBm ndB 6.00 dE Bwy2 701.625000000 kHz 0 dBm 3423.5 ctor -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.402 GHz 32000 pts Span 3.0 MHz Marker X-value 2.401993203 GHz 2.401641172 GHz Y-value 3.64 dBm -2.36 dBm Function ndB down Type Ref Trc Function Result 701.625 kHz Μ1 6.00 dB 3423.5 Τ1 ndB Τ2 2.402342797 GHz 2.36 dBm Q factor Measuring... (....) 🥠 CH19 Spectrum Ref Level 20.50 dBm Offset 0.50 dB 👄 RBW 100 kHz Att 30 dB SWT 19 µs 👄 **VBW** 300 kHz Mode Auto FFT ●1Pk Ma> M1[1] 3.31 dBr 2.4399926410 GH 10 dBm ndB 6.00 dE nu. Bw2 Vactor 688.78100000 kHz 0 dBm 3542.5 -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.44 GHz 32000 pts Span 3.0 MHz Marker X-value 2.439992641 GHz 2.439636672 GHz 2.440325453 GHz **Y-value** 3.31 dBm -2.69 dBm -2.69 dBm Type Ref Trc Function Function Result 688.781 kHz M1 ndB down ndB Q factor 6.00 dB 3542.5 т2 Measuring... 📲 📕 🚧 1



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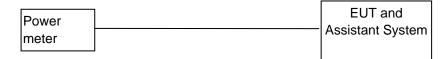


4. Maximum Peak Output Power

4.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Power meter	Agilent	E4417A	MY45100473	05/26/2019	05/27/2018
2	Wireband Power sensor	Agilent	E4427A	MY5100041	12/17/2018	12/18/2017
3	RF Cable	Micable	C10-01-01-1	100309	12/17/2018	12/18/2017
4	Spectrum analyzer	R&S	FSV40	101470	06/28/2019	06/29/2018

4.2. Block diagram of test setup



4.3. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

- 1. Place the EUT on a bench and set it in transmitting mode. .
- 2. A wide band power meter with a matched thermocouple detector was used to directly measure the output power from the RF output port of the EUT in continuously transmitting mode.
- 3. The measurement shall be repeated at the lowest, the middle, and the highest channel of the stated frequency range.

4.5. TEST RESULT

EUT Set Mode	СН	Result(dBm)	Result(dBm) Total Power		Conclusion
LOT Set Mode	GIT	Peak	(dBm)	Limit	Conclusion
BLE	CH 00	4.87	/	30dBm	PASS
	CH 19	4.36	/	30dBm	PASS
	CH 39	4.06	/	30dBm	PASS

5. Power Spectral Density

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	05/26/2019	05/27/2018
2	Attenuator	Mini-Circuits	BW-S10W2	101109	12/17/2018	12/18/2017
3	RF Cable	Micable	C10-01-01-1	100309	12/17/2018	12/18/2017
4	Spectrum analyzer	R&S	FSV40	101470	06/28/2019	06/29/2018

5.2. Block diagram of test setup

Receiver	EUT and
KEYSIGHT	Assistant System

5.3. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.



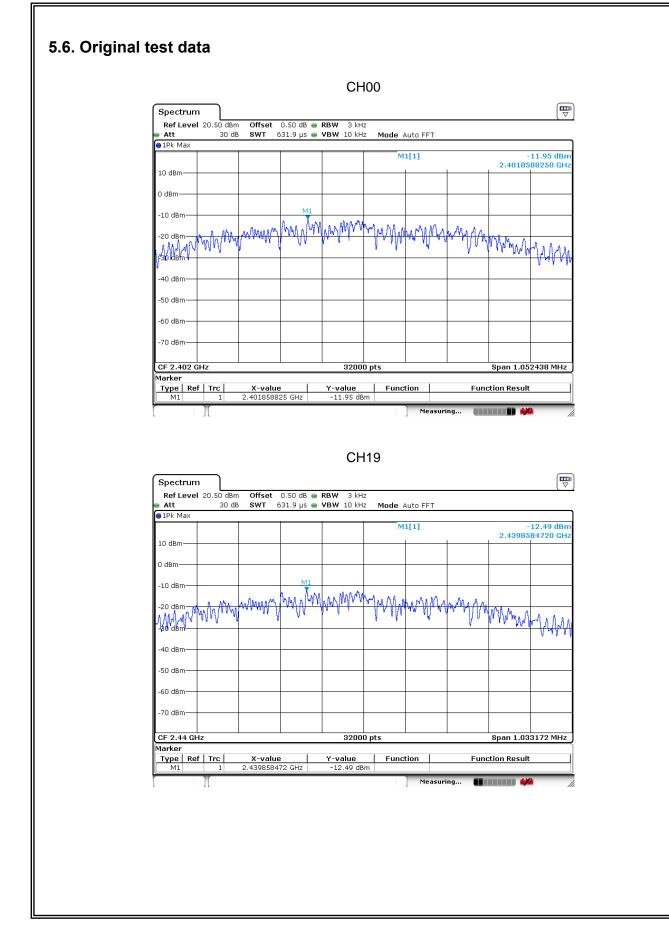
5.4. TEST PROCEDURE

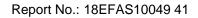
- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generatorl.
- 2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range
- 3. According to KDB 558074 D01 DTS Meas Guidance v05, set the RBW = 3 kHz, VBW = 30 kHz, Set the span to 1.5 times the DTS channel bandwidth.
- 4.Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW

5.5. Test Result

EUT Set Mode	СН	Result(dBm)	Total (dBm)	Limit (dBm)	Conclusion
BLE	CH 00	-11.95	/	8	PASS
	CH 19	-12.49	/	8	PASS
	CH 39	-11.71	/	8	PASS

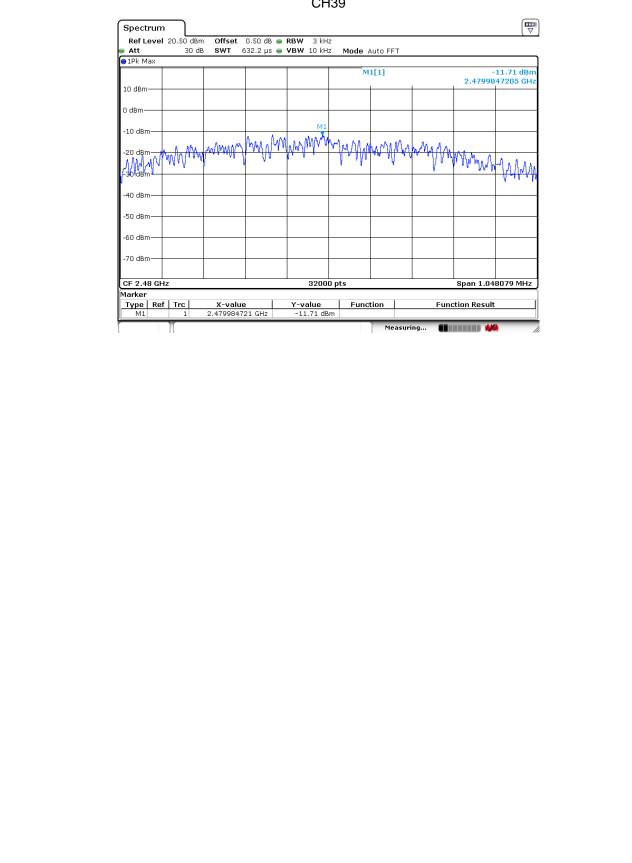














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6. Spurious Emissions

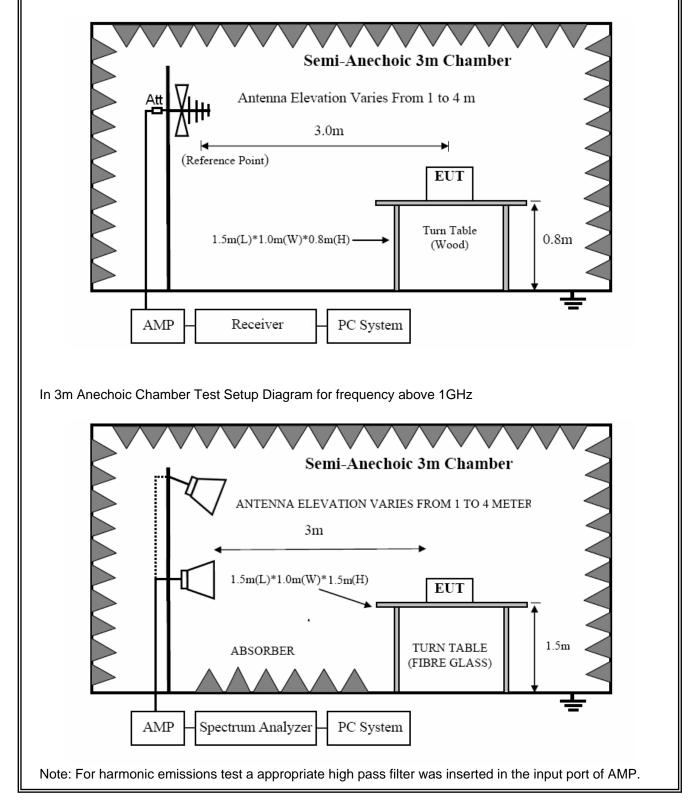
6.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	EMI Test Receiver	R&S	ESCI	101307	12/17/2018	12/18/2017
2	Spectrum analyzer	Agilent	E4407B	US40240708	07/04/2019	07/05/2018
3	Trilog Broadband Antenna	Schwarzbeck	VULB9168	VULB9168 -192	03/04/2019	03/05/2018
4	Double Ridged Horn Antenna	SCHWARZBEC K	BBHA 9120D1065	100276	12/17/2018	12/18/2017
5	Double Ridged Horn Antenna	SCHWARZBEC K	BBHA 9120D1065	100546	12/17/2018	12/18/2017
6	Dipole antenna	Schwarzbeck	UHAP	1101	12/17/2018	12/18/2017
7	Dipole antenna	Schwarzbeck	VHAP	1118	12/17/2018	12/18/2017
8	Pre-Amplifier	CY	EMC011830	980136	12/17/2018	12/18/2017
9	Pre-amplifier	HP	8447F	3113A05680	12/17/2018	12/18/2017
10	RF Cable	R&S	R01	10403	12/17/2018	12/18/2017
11	RF Cable	R&S	R02	10512	12/17/2018	12/18/2017
12	RF Cable	R&S	R01	10454	12/17/2018	12/18/2017
13	RF Cable	R&S	R02	10343	12/17/2018	12/18/2017
14	6 dB Attenuator	EMEC	ATT6000-6-N N	N/A	11/21/2018	11/22/2017
15	Turn Table	UC	UC3000	N/A	N/A	N/A
16	Antenna Mast	UC	UC3000	N/A	N/A	N/A
17	MeasurementSoft ware	Farad	EZ-EMC (Ver.ATT-03 A)	N/A	N/A	N/A
18	Spectrum analyzer	R&S	FSV40	101470	06/28/2019	06/29/2018



6.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz





6.3. Limit

6.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)

6.3.2 FCC 15.209 Limit

FREQUENCY	DISTANCE	FIELD STRENG	FIELD STRENGTHS LIMIT	
MHz	Meters	μV/m	dB(µV)/m	
30 ~ 88	3	100	40.0	
88 ~ 216	3	150	43.5	
216 ~ 960	3	200	46.0	
960 ~ 1000	3	500	54.0	
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)		

6.3.3 Limit for this EUT

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the

ANSI C63.10:2013. The specification used was the FCC 15.209, and FCC 15.247 limits.



6.4. TEST PROCEDURE

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
- (a) Change work frequency or channel of device if practicable.
- (b) Change modulation type of device if practicable.
- (c) Change power supply range from 85% to 115% of the rated supply voltage
- (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna

height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7)For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, Detector is at PK; RBW is set at 1MHz, VBW is set at 3MHz for Average measure, Detector is at RMS..



6.5. TEST RESULT

Below 30M

EUT:	TrekStor Surftab theatre K13	Model No.:	TFMTKAW01216
Temperature:	24°C	Relative Humidity:	55%
Distance:	3m	Test Power:	120V/60Hz
Polarization:		Test Result:	Pass
Test Mode:	Keep TX Mode	Test By:	smile

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				Р
				Р

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =20 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor



Between 30M - 1000 MHz

EUT:		Con Caritab and	eatre K13	Model No.:		FMTKAWO	51210
Temperature:	24			Relative Humi		55%	
Distance:	3m			Test Power:		20V/60Hz	
Polarization:	Vertic			Test Result:		Pass	
Standard:		CC PART 15	class B 3m	Test By:	5	smile	
Test Mode:	Keep	TX Mode					
).0 dBuV/m							
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30.000 40	50 60 70		(MHz)		300 400 re-	500 600) 700 1000.00
	50 60 70	0 80	(MHz)	Measu	300 400 re-	500 600) 700 1000.00
30.000 40	50 60 70 Freq.	0 80 Reading Level	(MH2) g Correct Factor	Measur	300 400 re- Limi	500 600 t Over	700 1000.00
30.000 40	50 60 70	0 80 Reading	(MHz) g Correct	Measu	300 400 re- Limi	500 600 t Over) 700 1000.00
30.000 40	50 60 70 Freq.	0 80 Reading Level dBuV	(MH2) g Correct Factor	Measur	300 400 re- Limi	500 600 t Over	700 1000.00 r Detector
30.000 40 No. Mk.	50 60 70 Freq. MHz 39.0245	0 80 Reading Level dBuV 27.27	(MH₂) g Correct Factor dB -6.32	Measur ment dBuV/m 20.95	300 400 re- Limi n dBuV/ 40.00	500 600 t Over m dB) -19.0	700 1000.00 r Detector 5 QP
30.000 40 No. Mk.	50 60 70 Freq. MHz	0 80 Reading Level dBuV 27.27	(MHz) g Correct Factor dB	Measur ment dBuV/m	300 400 re- Limi 1 dBuV/	500 600 t Over m dB) -19.0	700 1000.00 r Detector 5 QP
30.000 40 No. Mk.	50 60 70 Freq. MHz 39.0245 60.4919	0 80 Reading Level dBuV 27.27 27.89	(MH₂) g Correct Factor dB -6.32 -7.58	Measur ment dBuV/m 20.95 20.31	300 400 re- Limi 1 dBuV/ 40.00 40.00	500 600 t Over m dB) -19.0) -19.6	700 1000.00 r Detector 5 QP 9 QP
30.000 40 No. Mk.	50 60 70 Freq. MHz 39.0245	0 80 Reading Level dBuV 27.27 27.89	(MH₂) g Correct Factor dB -6.32 -7.58	Measur ment dBuV/m 20.95	300 400 re- Limi 1 dBuV/ 40.00 40.00	500 600 t Over m dB) -19.0) -19.6	700 1000.00 r Detector 5 QP 9 QP
30.000 40 No. Mk. 1 2 3	50 60 70 Freq. MHz 39.0245 60.4919 114.9168	0 80 Reading Level dBuV 27.27 27.89 25.55	(MHz) g Correct Factor dB -6.32 -7.58 -8.35	Measur ment dBuV/m 20.95 20.31 17.20	300 400 re- Limi dBuV/ 40.00 40.00 43.50	t Over m dB) -19.0) -26.3	700 1000.00 r Detector 5 QP 9 QP 0 QP
30.000 40 No. Mk. 1 2 3	50 60 70 Freq. MHz 39.0245 60.4919	0 80 Reading Level dBuV 27.27 27.89 25.55	(MH₂) g Correct Factor dB -6.32 -7.58	Measur ment dBuV/m 20.95 20.31	300 400 re- Limir dBuV/ 40.00 40.00 43.50	t Over m dB) -19.0) -26.3	700 1000.00 r Detector 5 QP 9 QP 0 QP
30.000 40 No. Mk. 1 2 3 4	50 60 70 Freq. MHz 39.0245 60.4919 114.9168 241.6762	0 80 Reading Level dBuV 27.27 27.89 25.55 36.58	(MHz) g Correct Factor dB -6.32 -7.58 -8.35 -6.51	Measur ment dBuV/m 20.95 20.31 17.20 30.07	300 400 re- Limi dBuV/ 40.00 40.00 43.50 46.00	t Over m dB) -19.0) -26.3) -15.9	700 1000.00 r Detector 5 QP 9 QP 0 QP 3 QP
30.000 40 No. Mk. 1 2 3 4 5	50 60 70 Freq. MHz 39.0245 60.4919 114.9168	0 80 Reading Level dBuV 27.27 27.89 25.55 36.58 26.07	(MHz) g Correct Factor dB -6.32 -7.58 -8.35 -6.51	Measur ment dBuV/m 20.95 20.31 17.20	300 400 re- Limi 1 dBuV/ 40.00 40.00 43.50 46.00	500 600 t Over m dB) -19.0) -26.3) -26.3) -15.9) -19.2	700 1000.00 r Detector 5 QP 9 QP 0 QP 3 QP 0 QP

(1) Result = Reading + Correct Factor

(2) Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain + Attenuator

(3) Margin = Result - Limit



EUT:		Trek	Stor Su	ırftab	theat	tre K13	Мо	del No.:	:		TFN	MTK	۹W0	1216		
Temperatu	ire:	24					Re	ative H	umidity	<i>/</i> :	55%					
Distance:		3m						st Powe			120)V/60)Hz			
Polarizatio	on:	Horiz	zontal				Tes	st Resul	lt:		Pas	SS				
Standard:		(RE)	FCC P/	ART	15 cla	ass B 3m	Tes	st By:			smi	ile				
Test Mode):	Keep	o TX Mo	ode												
0 dBuV/m								×						mit: argin:		
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0.000 44	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		70 80	I pdumenter	Marina	-	3 **//**/~*/	enter Au	300	^a whw.ynh 4	DO			,		h 100. 0
			70 80			2 71-2010-2-49/19/1 71-2010-2-49/19/19/1 (MI-	lz)		300	W	00	*****	least langer of			
	0 50		70 80 Re	plumin plumin eadi	ing	2 Airanna an Anna	Iz)	Meas	300 Sure-	W		500	least langer of			
0.000 40	0 50	60	70 80 Re	eadi	ing əl	2 The age of the state of the state (MI Corre	Iz)	Meas	300 sure- nt	4	nit	500	600	700		00.0
0.000 40	o 50 1k.	60 Freq.	70 80 Re	eadi	ing el V	(MI Corre Fact	ect or	Meas	300 sure- nt '/m	4 Lim	nit //m	500	600 ver	700 De	10	00.0
0.000 40 No. M	0 50 1k. 36	60 Freq. MHz	70 80 Re L	eadi .eve dBu\	ing el V	(MI Corre Fact dB	iz) ect or 6	Meas mei dBuV	300 Sure- nt 11	4 Lim	nit //m)0	500 01 -15	600 Ver 1B	700 De	10 etect 2P 2P	00.0
0.000 40 No. N	0 50 /lk. 36 124	60 Freq. MHz .2541	70 80 Re L	eadi .eve dBu\ 27.4	ing el V 7	Corre Fact dB -3.3	ect or 6	Meas mei dBuV 24.1	300 sure- nt //m 11	4 Lim dBu 40.0	nit //m 00	500 500 -15 -26	600 ver 1B 5.89	700 De	10 etect	00.0
0.000 40 No. M	0 50 /lk. 36 124 166	60 Freq. MHz .2541 .5690	70 80 Re L	eadi eve dBu\ 27.4	ing el 7 60	Corre Fact dB -3.3	ect or 6 4	Meas mei dBuV 24.1	300 sure- nt //m 11 76 55	4 Lim dBuv 40.0 43.5	nit //m 00 50	500 07 -15 -26 -16	600 ver 1B 5.89 5.74	700 De	10 etect 2P 2P	00.0
0.000 40 No. N 1 2 3	0 50 /lk. 36 124 166 241	60 Freq. MHz .2541 .5690 .0680	70 80 Re L 2 2 3 3 4	eadi eve dBu\ 27.4 24.6 34.0	ing el 7 60 04	2 (мн Согге Fact dB -3.3 -7.8 -7.4	2) ect or 6 4 9	Meas mei dBuV 24.1 16.7 26.5	300 sure- nt 76 55 39	4 Lim 40.0 43.5 43.5	nit //m i0 i0 i0	500 500 -15 -26 -16 -9	600 ver 1B 5.89 5.74 5.95	700 De	10 etect 2P 2P	00.0

The test result is calculated as the following:

(1) Result = Reading + Correct Factor

(2) Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain + Attenuator

(3) Margin = Result - Limit

Between 1000M – 25000 MHz

Test Site	:	3m Chamber			
EUT	:	TrekStor Surftab theatre K13	Tested By	:	Smile
Power Supply	:	3.8 Vdc	Model Number	:	TFMTKAW01216
Condition	:	Temp:24.5'C,Humi:55%, Press:100.1kPa	Test Mode	:	Tx mode
Memo	:	BLE	Antenna/Distanc e	:	

Frequency	Receiver		Rx Ant	tenna	Corrected Amplitude	FCC 15.24	7
(MHz)	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)	(dBµV/m)	Limit (dBµV/m)	Margin (dB)
		Lov	w Chann	el (2402)			
2390	41.19	PK	Н	-5.79	35.4	74	-38.6
2390	30.35	AV	Н	-5.79	24.56	54	-29.44
2390	41.89	PK	V	-5.79	36.1	74	-37.9
2390	30.75	AV	V	-5.79	24.96	54	-29.04
4804	42.2	PK	н	5.06	47.26	74	-26.74
4804	30.39	AV	Н	5.06	35.45	54	-18.55
4804	40.56	PK	V	5.06	45.62	74	-28.38
4804	30.18	AV	V	5.06	35.24	54	-18.76
		Mido	lle Chan	nel (2440))		
4880	41.68	PK	Н	5.14	46.82	74	-27.18
4880	30.38	AV	Н	5.14	35.52	54	-18.48
4880	42.8	PK	V	5.14	47.94	74	-26.06
4880	30.21	AV	V	5.14	35.35	54	-18.65
		Hig	h Chann	el (2480)	-		
2483.5	40.25	PK	Н	-4.98	35.27	74	-38.73
2483.5	30.27	AV	Н	-4.98	25.29	54	-28.71
2483.5	41.51	PK	V	-4.98	36.53	74	-37.47
2483.5	30.06	AV	V	-4.98	25.08	54	-28.92
4960	41.07	PK	Н	5.22	46.29	74	-27.71
4960	30.43	AV	Н	5.22	35.65	54	-18.35
4960	40.85	PK	V	5.22	46.07	74	-27.93
4960	30.16	AV	V	5.22	35.38	54	-18.62

The test result is calculated as the following:

(1) Corrected Amplitude = Read Level + Antenna Factor + Cable loss - Amplifier Gain

(2) Margin= Corrected Amplitude-Limit



7. 100 kHz Bandwidth of Frequency Band Edge

7.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	05/25/2019	05/26/2018
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	12/17/2018	12/18/2017
. 3	RF Cable	Micable	C10-01-01-1	100309	12/17/2018	12/18/2017

7.2. Block diagram of test setup



7.3. Limit

In any 100 kHz 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 20 dB below that in the 100 kHz 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 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(c)).



7.4. Test Procedure

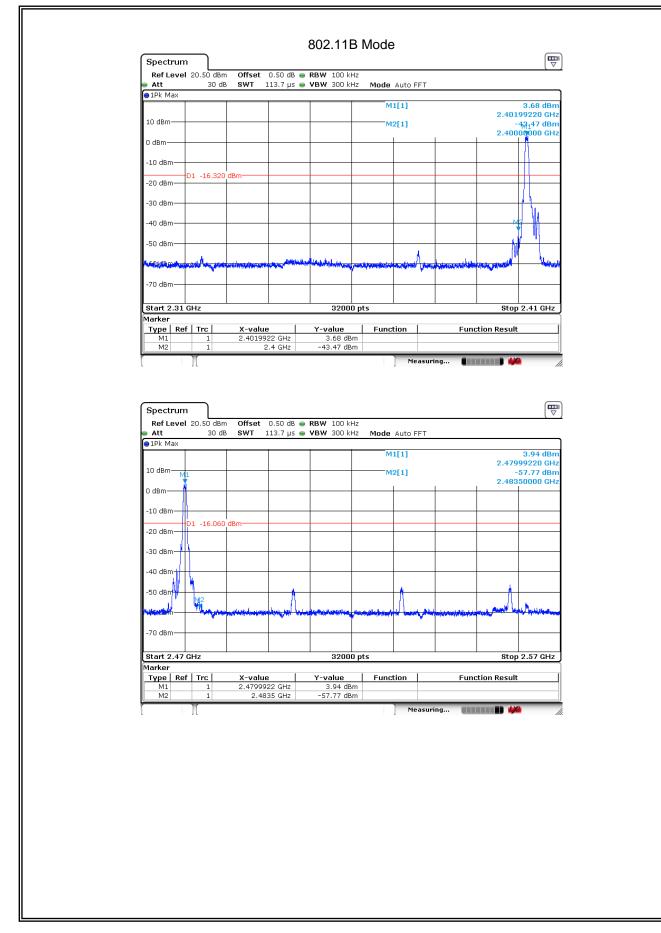
- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
- 3.Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.

7.5. Test result

Frequency Band	Delta Peak to band emission (dBc)	>Limit (dBc)	Result
	BLE Mdoe		
2390	47.15	20	Pass
2483.5	61.71	20	Pass

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8. Conducted Spurious Emissions

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	05/26/2019	05/27/2018
2	Attenuator	Mini-Circuits	BW-S10W2	101109	12/17/2018	12/18/2017
3	RF Cable	Micable	C10-01-01-1	100309	12/17/2018	12/18/2017
4	Spectrum analyzer	R&S	FSV40	101470	06/28/2019	06/29/2018

8.2. Limit

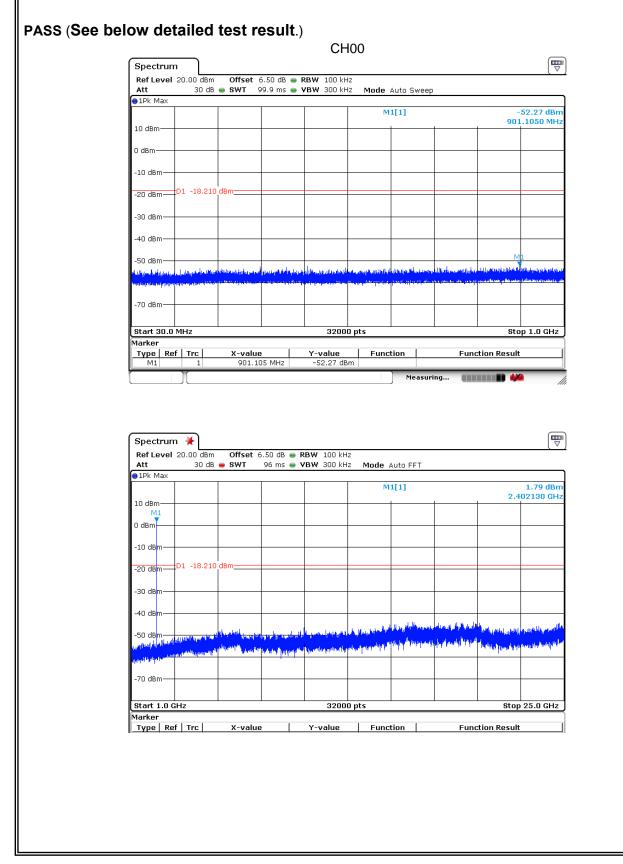
In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired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

8.3. Test Procedure

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.



8.4. Test result



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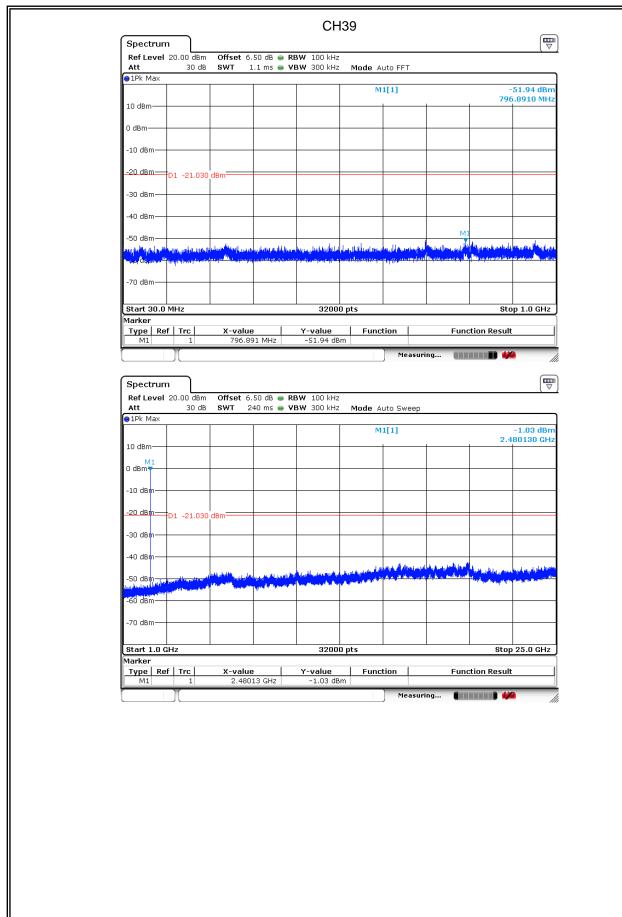
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Spectrum Image: Spectrum Spectrum Ref Level 20.00 dbm Offset 6.50 db @ RBW 100 kHz Mode Auto FFT ● 1Pk Max S1.49 db M1[1] S1.49 db 10 dbm 0 dbm 0 lb M1[1] S1.49 db 10 dbm 0 lb M1[1] S1.49 db S1.47 db 10 dbm 0 lb 0 lb Image: Start 30.0 lb S1.49 db 20 dbm 10 dbm 10 lb Image: Start 30.0 lb Image: Start 30.
Att 30 dB SWT 1.1 ms VBW 300 kHz Mode Auto FFT @1Pk Max M1[1] -51.49 dl 810.7740 M 0 dD -51.49 dl 810.7740 M 0 dBm 0 dBm 0 dBm 0 dBm 0 dBm 0 dBm -10 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -30 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -50 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -50 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -0.1 -20.010 dBm -70 dBm -51.49 dBm -51.49 dBm Function Function Function Result M1 1 610.774 MHz -51.49 dBm Made Auto Sweep -0.01 dI @1Pk Max M1[1] -0.01 dBm -0.01 dBm -0.01 dI 0 dBm M1 0 dBm M1[1] -0.01 dI 0 dBm M1 -20.010 dBm M1[1] -0.01 dI <
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-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -70
-20-80m 01 - 20.010 dBm
-20-80m 01 - 20.010 dBm
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-40 dBm
-50 dBm N1 1 million dependent of the data of the strength rescing 4 public to the data of the strength of the strengt of the streng of the strength of the strength of the st
50 dBm Image: Image
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-70 dBm 32000 pts Stop 1.0 GH Marker Type Ref Trc X-value Y-value Function M1 1 810.774 MHz -51.49 dBm Measuring Measuring Measuring Spectrum Ref Level 20.00 dBm Offset 6.50 dB RBW 100 kHz Att 30 dB SWT 240 ms VBW 300 kHz Mode Auto Sweep I D dBm 1 0 dBm 1 -0.01 dl 2.441130 G 10 dBm 1 0 dBm 1 -0.01 dl 1 -10 dBm 1 -20.010 dBm 01 -20.010 dBm 1 -20.010 dBm
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Spectrum (1) Ref Level 20.00 dBm Offset 6.50 dB • RBW 100 kHz Mode Auto Sweep • 1Pk Max • 0.01 dl • 0.01 dl 10 dBm • 0.01 dl • 0.01 dl • 10 dBm • 0.01 dl • 0.01 dl • 10 dBm • 0.01 dl • 0.01 dl
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10 dBm M1 -10 dBm -20 dBm 01 -20.010 dBm
0 dBm -10 dBm -20 dBm D1 -20.010 dBm
-30 08/m
-60 dBm
-70 dBm
Start 1.0 GHz 32000 pts Stop 25.0 GH Marker
Type Ref Trc X-value Y-value Function Function Result M1 1 2.44113 GHz -0.01 dBm
Measuring

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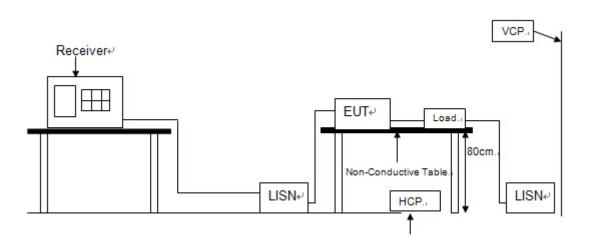


9 Power Line Conducted Emission

9.1 Test equipment

Item	Kind of Equipment	Manufacturer	Туре No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/17/2018
2	EMI Test Receiver	R&S	ESCI	101308	12/17/2018
3	LISN	AFJ	LS16	16011103219	12/17/2018
4	LISN	Schwarzbeck	NSLK 8127	8127-432	12/17/2018
5	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A
6	MeasurementSoftware	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

9.2 Block diagram of test setup



9.3 Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.



9.4 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the 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, Neutral and Line, 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.

The bandwidth of test receiver is set at 9 KHz.

9.5 Test Result

PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: "-----" means peak detection; "-----" mans average detection

EUT:		K13		ab theatre			FMTKAW	••=••
Temp	erature:	23℃			Relative Hum	idity:	52%	
					Test Power:	-	AC 120V/6	0Hz
Probe):	Ν			Test Result:	F	Pass	
Test T	Time:		-10-17		Test By:			
Stand			FCC PAR	T 15 class B_QF				
Test N	lode:	ТХ						
Note:								
).0 dBu	v							Limit: —
								AVG: —
0			Ă					
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0.150	[№] Щф 1 Мк.			ng Correct I Factor		e-	Over dB	30.000
0.150	[™] ₩₩ ₩₩₩ Mk.	Freq.	Leve	ng Correct el Factor dB	ment	e- Limit	dB	30.000
0.150 No.		Freq. MHz	Leve dBuV	ng Correct el Factor / dB 3 9.96	ment dBu∨	re- Limit	dB -3.41	30.000 Detector
0 0.150 No.		Freq. MHz 0.7900	Leve dBuV 42.63	ng Correct Factor dB 3 9.96 0 9.96	ment dBu∨ 52.59	e- Limit dBu∨ 56.00 46.00	dB -3.41	30.000 Detector QP
0 0.150 No. 1 2		Freq. MHz 0.7900 0.7900	Leve dBuV 42.63 31.80	ng Correct Factor dB 3 9.96 0 9.96 1 9.99	ment dBu∨ 52.59 41.76	e- Limit dBu∨ 56.00 46.00 56.00	dB -3.41 -4.24	Detector QP AVG QP
0.150 No. 1 2 3		Freq. MHz 0.7900 0.7900 1.9980	Leve dBuV 42.63 31.80 36.01	ng Correct Factor / dB 3 9.96 0 9.96 1 9.99 1 10.00	ment dBu∨ 52.59 41.76 46.00	e- Limit dBu∨ 56.00 46.00 56.00 46.00	dB -3.41 -4.24 -10.00	Detector QP AVG QP

(2) Correct Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss +Attenuator

(3) Margin = Result - Limit

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EUT:		K13	Stor Surftab 1	theatre	Model No.:		FMTKAW	/01216
Tem	perature:	23°C			Relative Humic	lity:	52%	
Tenn		200			Test Power:	,	AC 120V/6	0Hz
Prob	e:	L1			Test Result:		Pass	
	Time:		-10-17		Test By:			
Stan	dard:		FCC PART 15		.			
Test	Mode:	TX						
Note	:							
).O dB	uΨ							
								Limit: — AVG: —
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0.150	MK	_	Reading	Correct	Measure-	5	/ ^m ///////////////////////////////////	
0.150	MK.	Freq.	Level	Correct Factor	Measure- ment	5 Limit	Over	30.000
0.150	MK.	_	-	Correct	Measure-	5	Over dB	
0.150		Freq.	Level	Correct Factor	Measure- ment	5 Limit		30.000
0.150 No.	(Freq. MHz	Level dBu∨	Correct Factor dB	Measure- ment dBuV	5 5 Limit dBu∨	dB	30.000 Detector
0.150 No.	* (Freq. MHz D.7660	Level dBuV 36.49	Correct Factor dB 9.97	Measure- ment dBuV 46.46	5 5 Limit dBu∨ 56.00	dB -9.54 -8.70	Detector QP
0.150 No. 1 2	* (Freq. MHz 0.7660 0.7740	Level dBuV 36.49 27.33	Correct Factor dB 9.97 9.97	Measure- ment dBuV 46.46 37.30	5 5 Limit dBu∨ 56.00 46.00	dB -9.54 -8.70 -17.42	Detector QP AVG
0.150 No. 1 2 3	* (Freq. MHz 0.7660 0.7740 1.9660	Level dBuV 36.49 27.33 28.59	Correct Factor dB 9.97 9.97 9.99	Measure- ment dBu∨ 46.46 37.30 38.58	Limit dBu∨ 56.00 46.00 46.00	dB -9.54 -8.70 -17.42	Detector QP AVG QP

(1) Result = Reading + Correct Factor

(2) Correct Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss +Attenuator

(3) Margin = Result - Limit



10. Antenna Requirements

10.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. Result

The antennas used for this product are built-in undetachable FPCB antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 1dBi. The EUT has an internal antenna, the directional gain of antenna is 1 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.