

FCC ID TEST REPORT

Prepared for.....:	Shanghai So-Fun Sports Equipment Co., Ltd
Address.....:	Room 208, No. 1, Lane 881, Mingzhong Road, Songjiang District, Shanghai, China
Equipment Under Test(E.U.T.):	Electric Skateboard (Remote)
Model.....:	ESL1
FCC ID.....:	2AD4EESL1
Applicable Standards.....:	FCC CFR Title 47 Part 15 Subpart C Section 15.249:2013
Test Date.....:	05 January 2015 to 26 January 2015
Issued Date.....:	27 January 2015
Report Number.....:	POCE14121733JRF
Test Engineer.....:	<i>Bill Jiang</i>
Reviewed By.....:	<i>Michael</i>
Prepared By.....:	Shenzhen POCE Technology Co., Ltd. H Building, Hongfa Science and Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, China Tel: 86-755-2911 3252 Fax: 86-755-2911 3135

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1.0 General Information

1.1 Client Details

Applicant:	Shanghai So-Fun Sports Equipment Co., Ltd
Address:	Room 208, No. 1, Lane 881, Mingzhong Road, Songjiang District, Shanghai, China
Manufacturer:	Shanghai So-Fun Sports Equipment Co., Ltd
Address:	Room 208, No. 1, Lane 881, Mingzhong Road, Songjiang District, Shanghai, China

1.2 Test Lab Details

Name :	Shenzhen POCE Technology Co.,Ltd.
Address:	Room 502, Bldg. 1, Xinghua Garden, Baoan Road Xixiang, Baoan District, Shenzhen, China
Telephone:	86-755-29113252
Fax:	86-755-29113135

Site Listed with Federal Communication Commission

Registration Number: 222278

For 3m chamber

1.3 Description of E.U.T.

Product:	Electric Skateboard (Remote)
Model No.:	ESL1
Additional Model No.	N.A.
Brand Name:	N.A.
Rating:	DC 3.7V by battery
Modulation Type:	MSK
Channel number:	79
Channel Spacing:	1 MHz
Operation Frequency	2402 MHz-2480 MHz
Antenna Designation	An integral antenna and the maximum gain is 0 dBi

Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461		

Remark: All tests were conducted in three channels: Low channel: 2402MHz, Middle channel: 2441MHz, High channel: 2480MHz

1.4 AE used during the test

Equipment type	Model	Manufacturer	FCC Approval
N.A.			
N.A.			
N.A.			

2.0 Test Summary

Section in CFR 47	Test Item	Result
15.203	Antenna Requirement	Complies
15.207	AC Power LineConducted Emission	Complies
15.249(a), (d) /15.209	Radiated Emission Test	Complies
15.249/15.205	Band Edge	Complies
15.215(c)	20 dB OccupiedBandwidth	Complies

3.0 E.U.T. Modification

No modification by *Shenzhen POCE Technology Co., Ltd.*

4.0 Measurement Uncertainty

(95% confidence levels, k=2)

No.	Item	MU
1.	Radio Frequency	$\pm 1 \times 10^{-9}$
2.	Temperature	$\pm 0.1^{\circ}\text{C}$
3.	Humidity	$\pm 1.0\%$
4.	RF power, conducted	$\pm 0.34\text{dB}$
5.	Spurious emissions, conducted	$\pm 2.72\text{dB}$
6.	All emissions, radiated	$\pm 3.84\text{dB}$

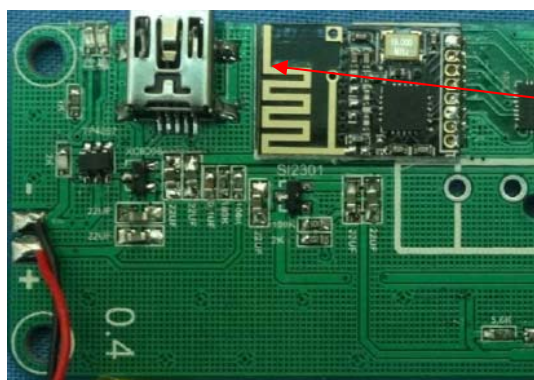
5.0 Antenna Requirement

5.1 Applicable Standard

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

5.2 Antenna Specification

The E.U.T. has An integral antenna and no consideration of replacement. Therefore the E.U.T. is considered sufficient to comply with the provision.



Antenna.

6.0 Power Line Conducted Emission Test

6.1 Test Equipment

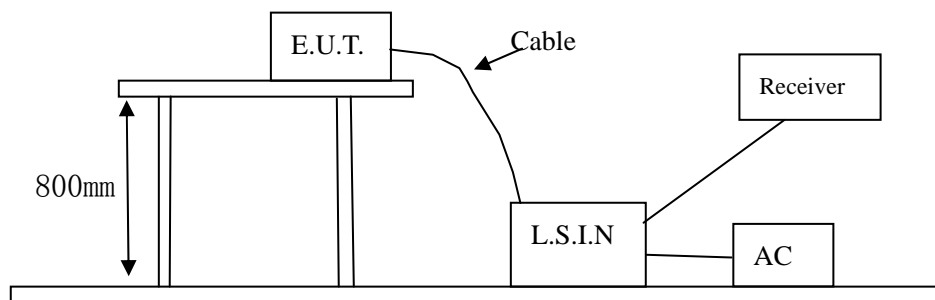
Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
EMI Test Receiver	ESCI	1166.590.03	R&S	Nov. 09, 2014	Nov. 08, 2015
LISN	ESH3-Z5	831.5518.52	R&S	Nov. 09, 2014	Nov. 08, 2015

6.2 Test Method and test Procedure

The E.U.T. was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 E.U.T. Operating Condition

Operating condition is according to ANSI C63.10 -2009

- 1) Setup the E.U.T. and simulators as shown on the following
- 2) Enable AF signal and confirm E.U.T. active to normal condition

6.4 Power line conducted Emission Limit according to Paragraph 15.207

Frequency(MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes:
1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

6.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 51% Atmospheric pressure: 103kPa

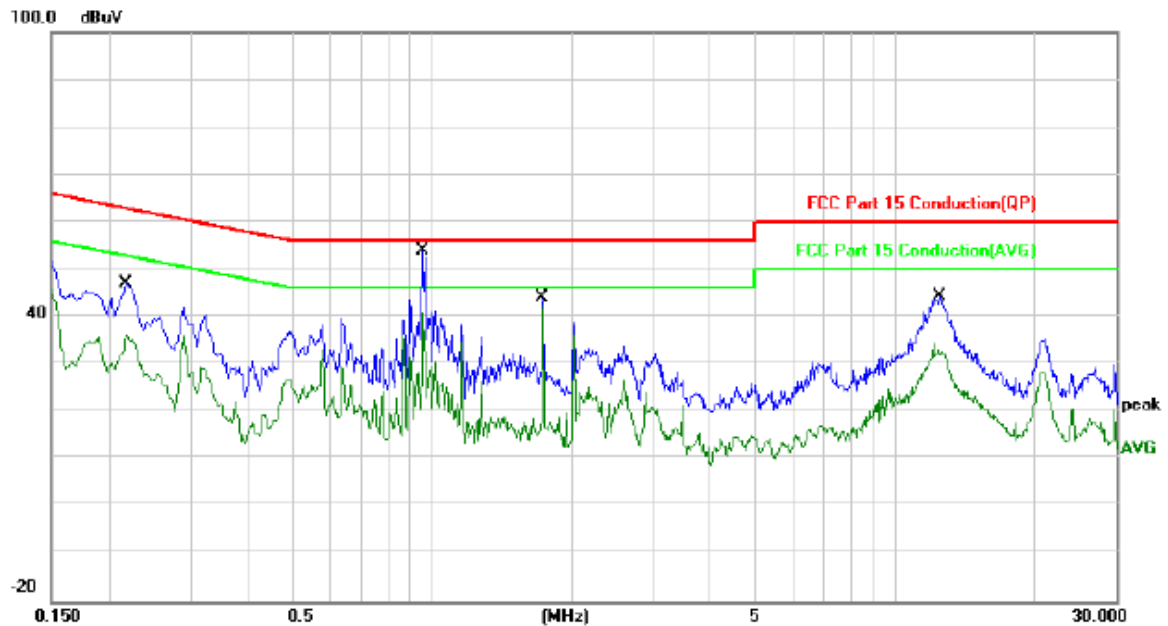
6.6 Test Result:

Pass

Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

E.U.T. Description:	Electric Skateboard (Remote)
Operation Mode:	Tx mode
Tested By:	Bill
Test Date:	06 January 2015

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

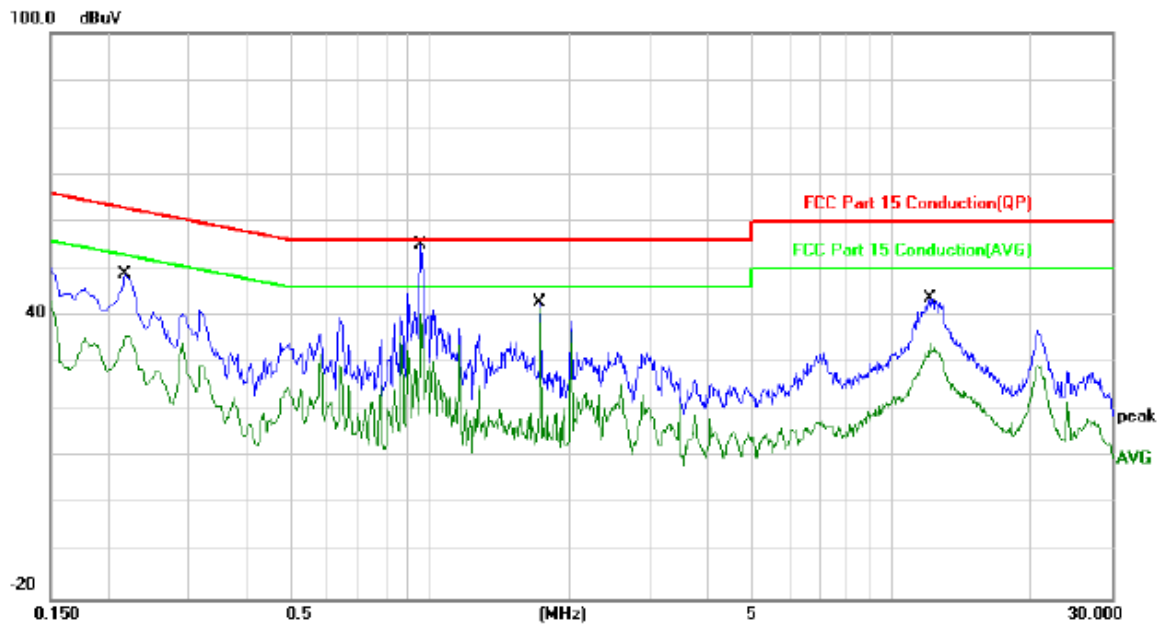


Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Line		Neutral			
	Quasi-peak	Average	Quasi-peak	Average		
0.2205	50.35	35.65	--	--	62.80	52.80
0.9538	50.88	35.93	--	--	56.00	46.00
1.7338	42.81	34.62	--	--	56.00	46.00
12.4912	40.68	31.42	--	--	60.00	50.00
			--	--		
			--	--		

Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

E.U.T. Description:	Electric Skateboard (Remote)
Operation Mode:	Tx mode
Tested By:	Bill
Test Date:	06 January 2015

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral		Quasi-peak	Average
	Quasi-peak	Average	Quasi-peak	Average		
0.2184	--	--	46.36	32.65	62.88	52.88
0.9529	--	--	50.61	34.05	56.00	46.00
1.7356	--	--	41.74	32.66	56.00	46.00
12.0715	--	--	39.92	33.55	60.00	50.00
	--	--				
	--	--				

7.0 Radiated Emission Test

7.1 Test Equipment

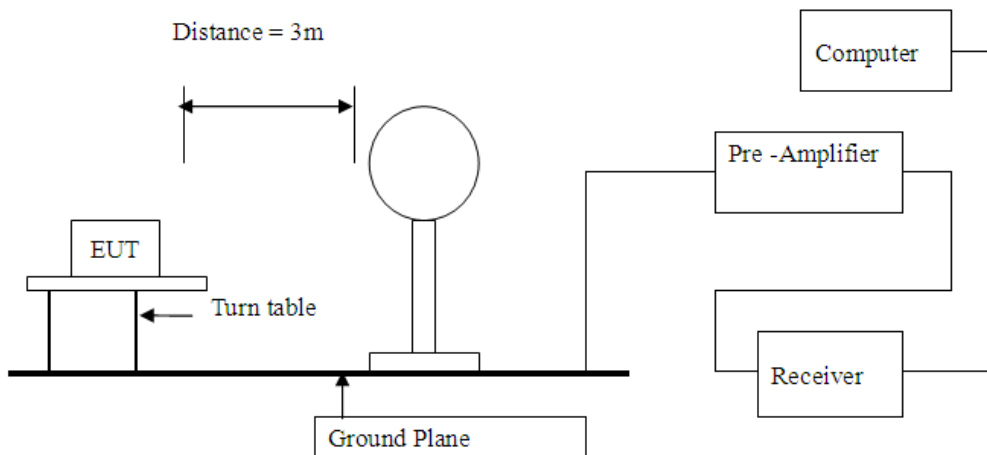
Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
ESPI Test Receiver	ESPI 3	100379	ROHDE&SCHWARZ	Nov. 09, 2014	Nov. 08, 2015
Spectrum Analyzer	FSEM	848597/001	ROHDE&SCHWARZ	Nov. 09, 2014	Nov. 08, 2015
Pre-amplifier	LNA6900	--	Teseq	Aug. 20, 2014	Aug. 19, 2015
Pre-amplifier	8447D	83153007374	Agilent	Aug. 20, 2014	Aug. 19, 2015
Pre-amplifier	8449B	3008A01738	Agilent	Aug. 20, 2014	Aug. 19, 2015
Loop antenna	PLA-1030/B	1029	A.R.A.	Aug. 20, 2014	Aug. 19, 2015
Ultra Broadband ANT	HL562	100157	ROHDE&SCHWARZ	Aug. 20, 2014	Aug. 19, 2015
Horn Antenna	3117	--	ETS LINDGREN	Aug. 20, 2014	Aug. 19, 2015
Horn Antenna	3160	--	ETS LINDGREN	Aug. 20, 2014	Aug. 19, 2015

7.2 Test Method and test Procedure:

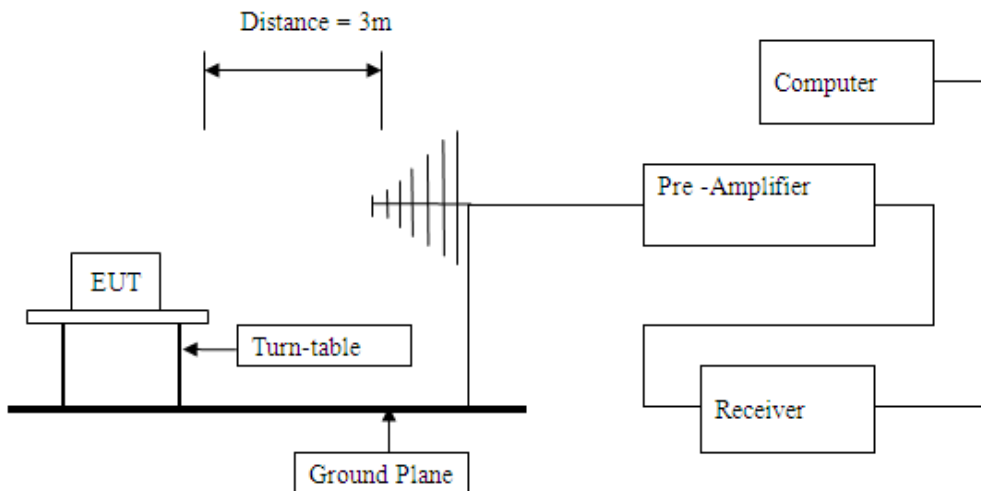
- 1) The E.U.T. was tested according to ANSI C63.10 –2009.
- 2) The E.U.T., peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
- 3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- 4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- 5) The antenna polarization: Vertical polarization and Horizontal polarization.

7.3 Block diagram of test setup

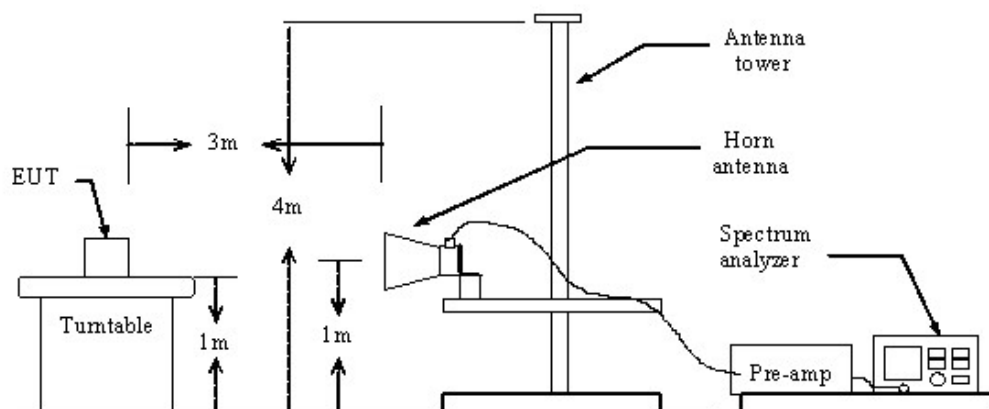
Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency from 30MHz to 1GHz



Block diagram of Test setup for frequency above 1GHz



7.4 E.U.T. Operating Condition

Operating condition is according to ANSI C63.10-2009 & ANSI C63.4-2003

7.5 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

FCC Part 15:2013 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field Strength of Harmonics (3m)		
	mV/m	dBuV/m		uV/m	dBuV/m
2400-2483.5	50	94 (Average)	114 (Peak)	500	54 (Average) 74 (Peak)

Note: 1) RF Field Strength (dBuV) = 20 log RF Voltage (uV)

- 2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- 3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	$20\log 2400/F$ (kHz) + 80
0.490-1.705	3	$20\log 24000/F$ (kHz) + 40
1.705-30	3	$20\log 30 + 40$
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1) RF Voltage (dBuV) = 20 log RF Voltage (uV)

- 2) In the Above Table, the tighter limit applies at the band edges.
- 3) Distance refers to the distance in meters between the measuring instrument antenna and the E.U.T.
- 4) This is a handheld device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.
- 5) All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz. Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector
- 6) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula $Ld1 = Ld2 * (d2/d1)$

7.6 Test specification:

Environmental conditions: Temperature 24° C Humidity: 51% Atmospheric pressure: 103kPa

7.7 Test result

Radiated Emission (9 kHz----30 MHz)

Result: Pass

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1) Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Radiated Emission (30MHz----1000MHz)

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp (dB)	Final Level (dBuV/m)	Limit (dBuV/m)	Antenna Polarity
43.9586	33.64	13.22	0.35	26.68	20.53	40.00	Horizontal
65.8751	31.42	14.52	0.46	26.84	19.56	40.00	Horizontal
95.1294	28.39	14.86	0.51	26.72	17.04	43.50	Horizontal
107.9336	26.39	15.24	0.58	26.81	15.40	43.50	Horizontal
256.2579	35.62	16.82	0.84	26.91	26.37	46.00	Horizontal
880.3460	40.28	19.67	1.76	26.75	34.96	46.00	Horizontal
36.8506	32.16	13.52	0.33	26.54	19.47	40.00	Vertical
42.1369	29.76	13.94	0.42	26.82	17.30	40.00	Vertical
105.1627	27.11	14.86	0.59	26.91	15.65	43.50	Vertical
240.1056	36.37	16.64	0.78	26.34	27.45	46.00	Vertical
642.1326	39.52	18.53	0.92	26.75	32.22	46.00	Vertical
883.9823	43.61	19.81	1.76	26.88	38.30	46.00	Vertical

Remark: Final Level= Read Level+Antenna Factor+Cable Loss-Preamp

Radiated Emission (1000MHz-25000MHz)

Low channel: 2402 MHz							
Frequency (MHz)	Read Level PK/AV (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Final Level (dBuV/m)	Limits PK/AV (dBuV/m)	Antenna Polarity
2402	87.62	28.43	2.76	32.26	86.55(PK)	114/94	Horizontal
4804	47.31	30.56	5.60	33.53	49.94(PK)	74/54	Horizontal
7206					--	74/54	Horizontal
9608					--	74/54	Horizontal
12010					--	74/54	Horizontal
14412					--	74/54	Horizontal
16814					--	74/54	Horizontal
19216					--	74/54	Horizontal
21618					--	74/54	Horizontal
24020					--	74/54	Horizontal
2402	80.75	28.43	2.76	32.26	79.68(PK)	114/94	Vertical
4804	45.62	30.56	5.60	33.53	48.25(PK)	74/54	Vertical
7206					--	74/54	Vertical
9608					--	74/54	Vertical
12010					--	74/54	Vertical
14412					--	74/54	Vertical
16814					--	74/54	Vertical
19216					--	74/54	Vertical
21618					--	74/54	Vertical
24020					--	74/54	Vertical

Middle channel: 2441 MHz

Frequency (MHz)	Read Level PK/AV (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Final Level (dBuV/m)	Limits PK/AV (dBuV/m)	Antenna Polarity
2441	86.91	28.48	2.96	32.64	85.71(PK)	114/94	Horizontal
4882	45.69	30.69	5.82	33.78	48.42(PK)	74/54	Horizontal
7323					--	74/54	Horizontal
9764					--	74/54	Horizontal
12205					--	74/54	Horizontal
14646					--	74/54	Horizontal
17087					--	74/54	Horizontal
19528					--	74/54	Horizontal
21969					--	74/54	Horizontal
24410					--	74/54	Horizontal
2441	79.62	28.48	2.96	32.64	78.42(PK)	114/94	Vertical
4882	44.71	30.69	5.82	33.78	47.44(PK)	74/54	Vertical
7323					--	74/54	Vertical
9764					--	74/54	Vertical
12205					--	74/54	Vertical
14646					--	74/54	Vertical
17087					--	74/54	Vertical
19528					--	74/54	Vertical
21969					--	74/54	Vertical
24410					--	74/54	Vertical

Middle channel: 2480 MHz

Frequency (MHz)	Read Level PK/AV (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Final Level (dBuV/m)	Limits PK/AV (dBuV/m)	Antenna Polarity
2480	85.19	28.29	2.67	32.88	83.27(PK)	114/94	Horizontal
4960	43.62	30.37	5.81	33.85	45.95(PK)	74/54	Horizontal
7440					--	74/54	Horizontal
9920					--	74/54	Horizontal
12400					--	74/54	Horizontal
14880					--	74/54	Horizontal
17360					--	74/54	Horizontal
19840					--	74/54	Horizontal
22320					--	74/54	Horizontal
24800					--	74/54	Horizontal
2480	78.46	28.29	2.67	32.88	76.54(PK)	114/94	Vertical
4960	40.28	30.37	5.81	33.85	42.61(PK)	74/54	Vertical
7440					--	74/54	Vertical
9920					--	74/54	Vertical
12400					--	74/54	Vertical
14880					--	74/54	Vertical
17360					--	74/54	Vertical
19840					--	74/54	Vertical
22320					--	74/54	Vertical
24800					--	74/54	Vertical

Remark:

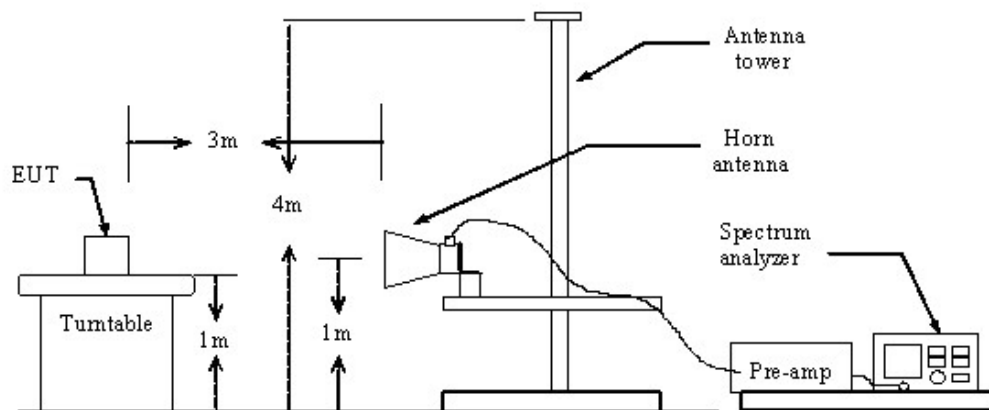
- 1) According to section 15.35(b), the peak limit is 20dB higher than the average limit
- 2) If the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
- 3) "--" means this data is too weak to be able to test.
- 4) The emission levels of other frequencies are very lower than the limit and not shown in the report.

8.0 Band Edge

8.1 Test Equipment

Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
Spectrum Analyzer	FSEM	848597/001	ROHDE&SCHWARZ	Nov. 09, 2014	Nov. 08, 2015
Pre-amplifier	8449B	3008A01738	Agilent	Aug. 20, 2014	Aug. 19, 2015
Horn Antenna	3117	--	ETS LINDGREN	Aug. 20, 2014	Aug. 19, 2015

8.2 Block diagram of test setup



8.3 Band Edge Limit

- 1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.
- 2) For Emissions in Restricted band, the limit is below the general radiated emission limits in Section 15.209. The provisions in Section 15.35 apply to these measurements.

8.4 Test Produce

According to KDB 913591:

- 1) Perform an in-band field strength measurement of the fundamental emission using the RBW and detector function for the frequency being measured, as required by C63.4 and FCC Rules.
- 2) Choose the span that encompasses both the peak of the fundamental emission and the band edge emission under investigation. Set the analyzer RBW to 1% of the total span (but never less than 30 kHz) with a video bandwidth equal to or greater than the RBW. Observe the amplitude delta between the peak of the fundamental and the peak of the band edge emission and record.
- 3) Subtract the delta measured in step 2) from the field strengths measured in step 1). The resultant field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band edge compliance as required by Section 15.205.

8.5 Test Result

Low channel: 2402 MHz							
Frequency (MHz)	Read Level PK/AV (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Final Level (dBuV/m)	Limits PK/AV (dBuV/m)	Antenna Polarity
2310	41.93	27.34	2.32	32.14	39.45	74	Horizontal
2378.36	48.64	28.29	2.45	32.33	47.05	74	Horizontal
2390	52.31	28.29	2.45	32.33	50.72	74	Horizontal
2310	40.39	27.34	2.32	32.14	37.91	74	Vertical
2378.36	45.66	28.29	2.45	32.33	44.07	74	Vertical
2390	48.94	28.29	2.45	32.33	47.35	74	Vertical
High channel: 2480 MHz							
Frequency (MHz)	Read Level PK/AV (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Final Level (dBuV/m)	Limits PK/AV (dBuV/m)	Antenna Polarity
2483.5	54.48	28.29	2.67	32.33	53.11	74	Horizontal
2494.19	48.75	28.29	2.67	32.33	47.38	74	Horizontal
2500	43.88	28.29	2.67	32.33	42.51	74	Horizontal
2483.5	51.51	28.29	2.67	32.33	50.14	74	Vertical
2494.19	45.67	28.29	2.67	32.33	44.30	74	Vertical
2500	40.23	28.29	2.67	32.33	38.86	74	Vertical

Remark:

- 1) According to section 15.35(b), the peak limit is 20dB higher than the average limit
- 2) If the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
- 3) The emission levels of other frequencies are very lower than the limit and not shown in the report.

9.0 20dB Bandwidth Measurement

9.1 Test Equipment

Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
ESPI Test Receiver	ESPI 3	100379	ROHDE&SCHWARZ	Nov. 09, 2014	Nov. 08, 2015

9.2 Test specification:

Environmental conditions: Temperature 24° C Humidity: 52% Atmospheric pressure: 103kPa

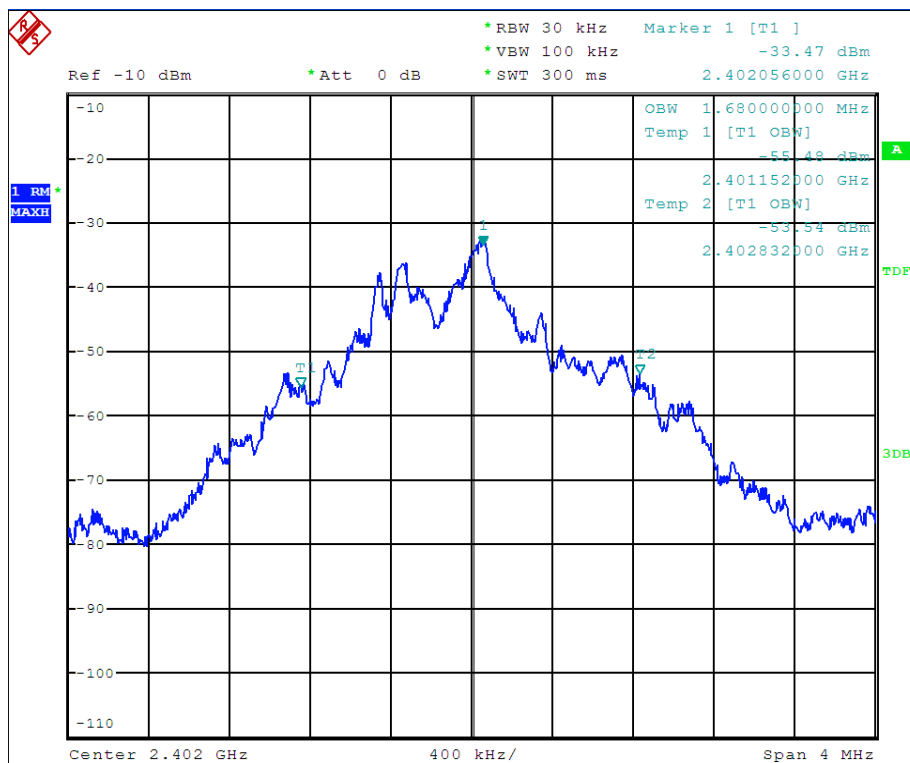
9.3 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

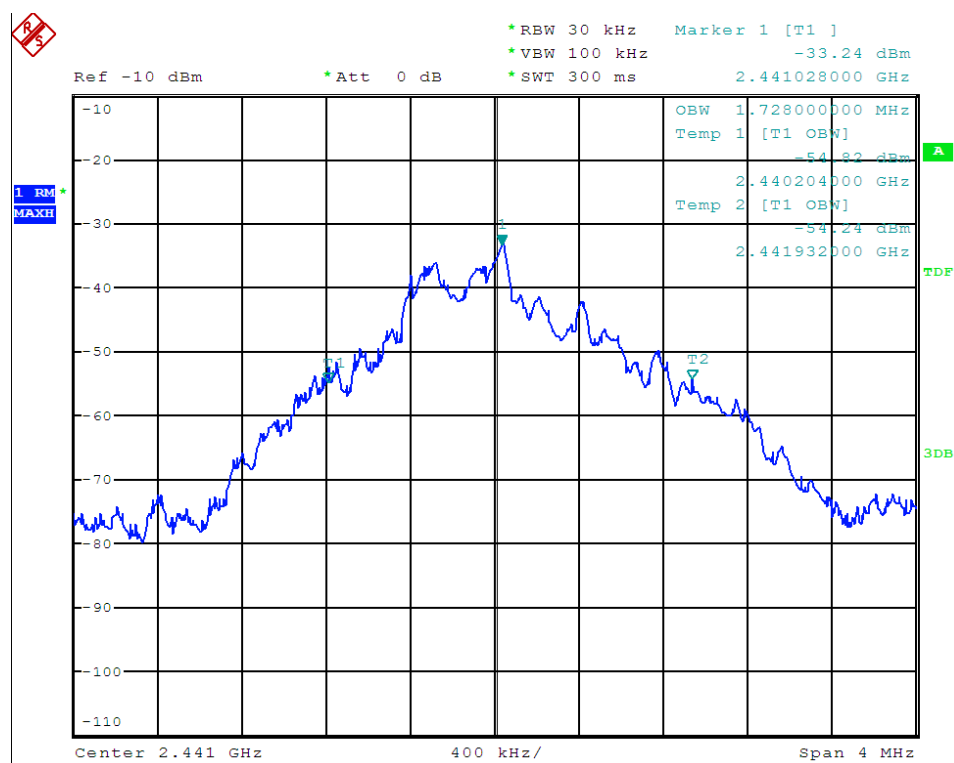
9.4 Test Result:

Channel number	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
(Low)	1680.0	---	PASS
(Middle)	1728.0	---	PASS
(High)	1660.0	---	PASS

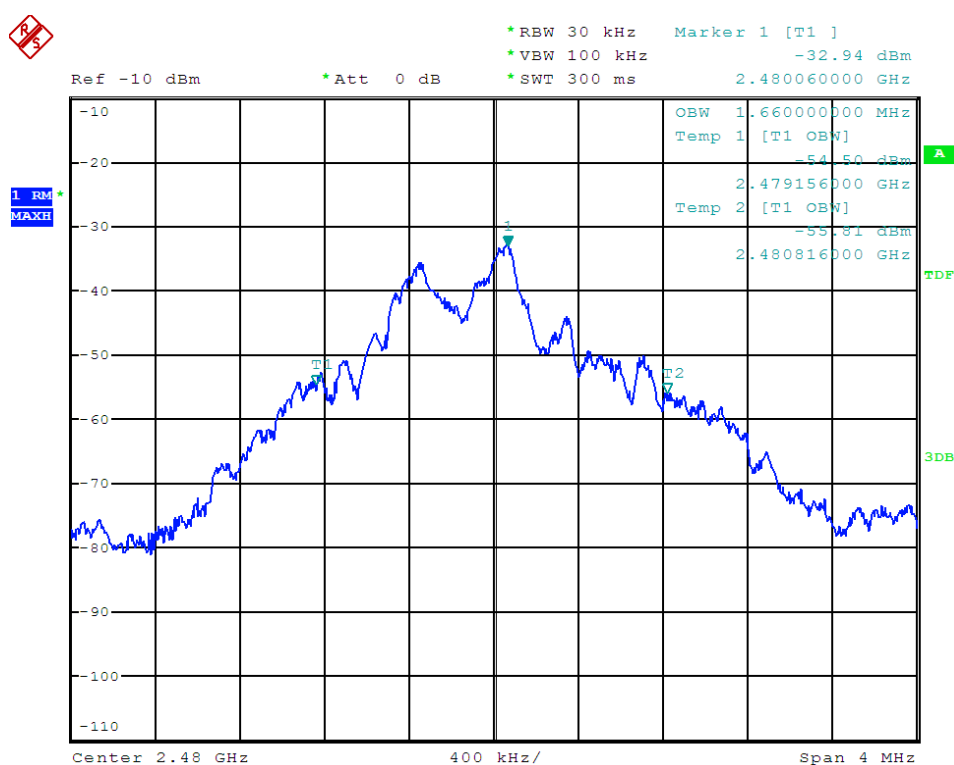
Low channel: 2402 MHz



Middle channel: 2441 MHz



High channel: 2480 MHz



*****END OF REPORT*****