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# FCC 15.247 & RSS-247 2.4GHz Test Report

## for

# **Sunrex Technology Corp**

# No. 475, Sec. 4, Chang Ping Road, Daya Dist., Taichung City 428, Taiwan

:	Wireless Keyboard
:	TPA-S001K
:	hp
:	J75TPAS001K
:	7090A-TPAS001K
	: : : :

**Prepared by:** 

: AUDIX Technology Corporation, EMC Department



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

File Number: C1M2304156

Report Number: EM-F230226



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11. J	DEVIATION TO	O TEST SPECIFICATIONS	
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APPENDIX A TEST DATA AND PLOTS APPENDIX B TESTPHOTOGRAPHS

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# **TEST REPORT**

Applicant	:	Sunrex Technology Corp
Manufacturer	:	Sunrex Technology Corp
Factory	:	Jing Mold Electronics Technology (ShenZhen) Co., Ltd.
EUT Description		
(1) Product	:	Wireless Keyboard
(2) Model	:	TPA-S001K
(3) Brand	:	hp
(4) Power Suppl	y:	DC 1.5V (Battery AAAx2)

Applicable Standards:

Title 47 CFR FCC Part 15 Subpart C RSS-Gen (Issue 5), Amendment 2, February 2021 RSS-247 (Issue 2), February 2017 ANSI C63.10:2013

*Audix Technology Corp.* tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. *Audix Technology Corp.* does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report:	2023.05.05
Reviewed by:	Sahiver Ware
Approved by:	Johnny Hurch

(Sabrina Wang/Administrator)

(Johnny Hsueh/Section Manager)

Report Number: EM-F230226



# **1. REVISION RECORD OF TEST REPORT**

Edition No	Issued Date	Revision Summary	Report Number
0	2023. 05. 05	Original Report	EM-F230226

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# 2. SUMMARY OF TEST RESULTS

	Rule	Description	Degralta
FCC	IC	Description	Results
15.207	RSS-Gen §8.8	Conducted Emission	N/A
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	
15.247(a)(2)	RSS-247 §5.2(1)	DTS/Occupied Bandwidth	PASS
15.247(b)(3)	RSS-247 §5.4(4)	Maximum Peak Output Power	PASS
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	RSS-247 §5.2(2)	Peak Power Spectral Density	PASS
15.203		Antenna Requirement	Compliance
Note: 1. The u	ncertainties value is not	used in determining the result.	

2. N/A is an abbreviation for Not Applicable.

Note:

1. Decision rule according to the limit of the test standard chapter, the test value is lower than the limit specified in the test chapter, and it is judged as Pass.

2. The uncertainties value is not used in determining the result.

3. N/A is an abbreviation for Not Applicable.

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# **3. GENERAL INFORMATION**

#### **3.1. Description of Application**

Applicant	Sunrex Technology Corp
	No. 475, Sec. 4, Chang Ping Road, Daya Dist., Taichung City 428, Taiwan
Monufacturar	Sunrex Technology Corp
wanutacturer	No. 475, Sec. 4, Chang Ping Road, Daya Dist., Taichung City 428, Taiwan
Factory	Jing Mold Electronics Technology (ShenZhen) Co., Ltd.
Factory	Xinqiao 3rd Industrial Estate, Shajing, Baoan, Shenzhen, Guangdong, China
Product	Wireless Keyboard
Brand	hp
Model	TPA-S001K

#### **3.2. Description of EUT**

Test Model	TPA-S001K				
Serial Number	N/A				
Software Version	N/A				
Power Rating	DC 1.5V				
RF Features	<ul><li>(1)Wireless 2.4GHz: GFSK</li><li>(2)BLE: GFSK</li></ul>				
Transmit Type	2.4 GHz       Wireless 2.4GHz       1T1R				
	BLE	1T1R			
Sample Status	Trial sample				
Test Sample	Sample No.Test ItemFirmware01AC Conduction, RSE, Output PowerN/A				
Date of Receipt	2023. 04. 18				
Date of Test	2023. 04. 24 ~ 28				
Interface Ports of EUT	• None				
Accessories Supplied	Wireless Dongle				

Note: Pursuant ISO 17025:2017 section 7.8.2, Audix Technology Corp. does not assume responsibility for all EUT's information including RF features, transmit type, antenna information...etc are provided by customer.

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#### **3.3.** Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Gain(dBi)
1.	CW321	Unictron	Chip	2400-2500	0.6

#### **3.4. EUT Specifications Assessed in Current Report**

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
Wireless 2.4GHz	2402-2480	79	GFSK	1
BLE	2402-2480	40	GFSK	1

	Channel List							
			Wireless	2.4GHz				
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
Number	(MHz)	Number	(MHz)	Number	(MHz)	Number	(MHz)	
00	2402	20	2422	40	2442	60	2462	
01	2403	21	2423	41	2443	61	2463	
02	2404	22	2424	42	2444	62	2464	
03	2405	23	2425	43	2445	63	2465	
04	2406	24	2426	44	2446	64	2466	
05	2407	25	2427	45	2447	65	2467	
06	2408	26	2428	46	2448	66	2468	
07	2409	27	2429	47	2449	67	2469	
08	2410	28	2430	48	2450	68	2470	
09	2411	29	2431	49	2451	69	2471	
10	2412	30	2432	50	2452	70	2472	
11	2413	31	2433	51	2453	71	2473	
12	2414	32	2434	52	2454	72	2474	
13	2415	33	2435	53	2455	73	2475	
14	2416	34	2436	54	2456	74	2476	
15	2417	35	2437	55	2457	75	2477	
16	2418	36	2438	56	2458	76	2478	
17	2419	37	2439	57	2459	77	2479	
18	2420	38	2440	58	2460	78	2480	
19	2421	39	2441	59	2461			

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	Channel List							
	BLE							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
Number	(MHz)	Number	(MHz)	Number	(MHz)	Number	(MHz)	
37	2402	09	2422	18	2442	28	2462	
00	2404	10	2424	19	2444	29	2464	
01	2406	38	2426	20	2446	30	2466	
02	2408	11	2428	21	2448	31	2468	
03	2410	12	2430	22	2450	32	2470	
04	2412	13	2432	23	2452	33	2472	
05	2414	14	2434	24	2454	34	2474	
06	2416	15	2436	25	2456	35	2476	
07	2418	16	2438	26	2458	36	2478	
08	2420	17	2440	27	2460	39	2480	

#### 3.5. Descriptions of Key Components

Item	Supplier/Brand	Model	Specification
RF IC	PXI	PAR2852	<ul><li>(1)Wireless 2.4GHz: GFSK</li><li>(2)BLE: GFSK</li></ul>
Wireless Dongle	hp	TPA-S001D	Wireless 2.4GHz, DC 5V

Remark: For more detailed features description, please refer to the manufacturer's specifications or the user manual.

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### **3.6.** Test Configuration

Mode	TX <sub>on</sub> (ms)	TX <sub>on+off</sub> (ms)	1/ TX <sub>on</sub> (kHz)	Duty Cycle (x)	VBW(>1/ TX <sub>on</sub> ) (kHz)
Wireless 2.4GHz	0.200	0.600	5.000	0.333	5.1
BLE	0.390	0.670	2.564	0.582	2.7



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Item		Mode	Data Rate	Test Frequency
	Radiated Spurious Emission	Wireless 2.4GHz	1Mbps	2402
Radiated Test Case	(30MHz~1GHz)	BLE	1Mbps	2402
	Dedicted Dand Edge Notel	Wireless 2.4GHz	1Mbps	2402/2480
	Raulated Dalid Euge	BLE	1Mbps	2402/2480
	Radiated Spurious	Wireless 2.4GHz	1Mbps	2402/2441/2480
	Emission <sup>Note1 &amp; 2</sup>	BLE	1Mbps	2402/2440/2480

Item		Mode	Data Rate	Test Frequency
	DTS/Occupied	Wireless 2.4GHz	1Mbps	2402/2441/2480
	Bandwidth	BLE	1Mbps	2402/2440/2480
	Peak Outeut Demor	Wireless 2.4GHz	1Mbps	2402/2441/2480
Conducted Test Case	Peak Output Power	BLE	1Mbps	2402/2440/2480
	Dond Edge	Wireless 2.4GHz	1Mbps	2402/2480
	Dalid Edge	BLE	1Mbps	2402/2480
	Saurious Emission	Wireless 2.4GHz	1Mbps	2402/2441/2480
	Spurious Emission	BLE	1Mbps	2402/2440/2480
	Peak Damar Sneatral Dansita	Wireless 2.4GHz	1Mbps	2402/2441/2480
	Peak Power Spectral Density		1Mbps	2402/2440/2480

Note 1: Mobile Device Portable Device,

and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: Lie Side Stand Note 2: Low, mid, and high channels were measured, only the worst channel was presented in this report.

#### 3.7. Output Power Setting

Mode	Centre Frequency (MHz)	Power Setting
	2402	Default
Wireless 2.4GHz	2441	Default
	2480	Default
	2402	Default
BLE	2440	Default
	2480	Default

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#### 3.8. Tested Supporting System List

None

#### 3.9. Setup Configuration

3.9.1. EUT Configuration for Radiated Emission

Wireless Keyboard
(EUT)

3.9.2. EUT Configuration for RF Conducted Test Items

Wireless 2.4GHz Mode:



#### **3.10.Operating Condition of EUT**

#### Wireless 2.4GHz Mode:

Run the test program "PXI\_Link\_TOOL" via Wireless Dongle is used for enabling EUT Wireless 2.4GHz function under continues transmitting and choosing channel.

#### **BLE Mode:**

EUT used BLE function under continues transmitting and choosing data rate/ channel.

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#### **3.11.Description of Test Facility**

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	<ul> <li>The laboratory is accredited by following organizations under ISO/IEC 17025:2017</li> <li>(1) NVLAP(USA) NVLAP Lab Code 200077-0</li> <li>(2) TAF(Taiwan) No. 1724</li> </ul>
Test Facilities	<ul> <li>FCC OET Designation Number under APEC MRA by NCC is : TW1724</li> <li>ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724</li> <li>(1) No.1 3m Semi Anechoic Chamber</li> </ul>

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#### **3.12.Measurement Uncertainty**

The measurement	uncertainty	levels have	been estimated	d as specified i	n ETSI TR	100 028-2001
I ne measarement	anoortannej	ie eib nate	ocen estimates	a as speeniea i	IL DI DI III	100 020 2001

Test Items/Facilities		ems/Facilities	Frequency Range	Uncertainty
	No. 7 Shielded Room		9kHz-150kHz	±3.7dB
Conduction		No. / Silielded Room	150kHz-30MHz	±3.4dB
Test		No. 0 Chialdad Daam	9kHz-150kHz	±3.7dB
		No. 8 Shielded Room	150kHz-30MHz	±3.5dB
			30MHz-200MHz, 3m, Horizontal	±3.6dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
	$\square$	No.1 3m Semi	30MHz-200MHz, 3m, Vertical	±4.4dB
		Anechoic Chamber	200MHz-1000MHz, 3m, Vertical	±4.8dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
			30MHz-200MHz, 3m, Horizontal	±4.0dB
			200MHz-1000MHz, 3m, Horizontal	±4.4dB
		No.3 3m Semi	30MHz-200MHz, 3m, Vertical	±4.7dB
		Anechoic Chamber	200MHz-1000MHz, 3m, Vertical	±4.5dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
Radiation			30MHz-200MHz, 3m, Horizontal	±4.3dB
Test			200MHz-1000MHz, 3m, Horizontal	±4.2dB
		No.4 3m Semi	30MHz-200MHz, 3m, Vertical	±4.8dB
		Anechoic Chamber	200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.6dB
			6GHz-18GHz, 3m	±4.4dB
			30MHz-200MHz, 3m, Horizontal	±4.6dB
			200MHz-1000MHz, 3m, Horizontal	±4.4dB
		No.5 3m Semi	30MHz-200MHz, 3m, Vertical	±4.5dB
		Anechoic Chamber	200MHz-1000MHz, 3m, Vertical	±4.9dB
			1GHz-6GHz, 3m	±4.9dB
			6GHz-18GHz, 3m	±4.6dB
		Radiated emissions (18GHz-40GHz)	18GHz-40GHz, 3m	±3.4dB

Remark : Uncertainty =  $ku_c(y)$ 

Test Items	Uncertainty
6dB Bandwidth	$\pm 0.05$ kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

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# 4. MEASUREMENT EQUIPMENTLIST

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2022.08.24	1 Year
2.	Test Receiver	R&S	ESCS30	100038	2022.06.15	1 Year
3.	Amplifier	HP	8447D	2944A06305	2022.12.29	1 Year
4.	Microwave Amplifier	Agilent	8449B	3008A01284	2022.06.01	1 Year
5.	Microwave Amplifier	Keysight	83051A	MY56480113	2022.09.07	1 Year
6.	Loop Antenna	TESEQ	HLA 6121	60478	2023.02.21	1 Year
7.	Bilog Antenna	TESEQ	CBL6112D	33821	2022.07.01	1 Year
8.	Horn Antenna	EMCO	3115	9609-4927	2022.07.13	1 Year
9.	Horn Antenna	COM-POWER	AH-840	101092	2022.12.30	1 Year
10.	2.4GHz Notch Filter	K&L Microwave	7NSL10-2441.5/ E130.5-O/O	2	2022.07.23	1 Year
11.	3GHz Notch Filter	Microwave	H3G018G1	484796	2022.07.23	1 Year
12.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2023.01.07	1 Year
13.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 106	RE-14	2023.01.07	1 Year
14.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2022.08.22	1 Year
15.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2023.04.13	1 Year
16.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

#### 4.1. Radiated Emission Measurement

#### 4.2. RF Conducted Measurement

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9020B-544	MY57120357	2023.02.22	1 Year
2.	Digital Thermo-Hygro Meter	iMax	HTC-1	RF-03	2023.04.13	1 Year

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# 5. CONDUCTED EMISSION

The conducted disturbance voltage limits are not required for EUT which only employ DC battery for operation.

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# 6. RADIATED EMISSION

#### 6.1. Block Diagram of Test Setup

6.1.1. Block Diagram of EUT

Indicated as section 3.10

#### 6.1.2. Setup Diagram for 9kHz-30MHz



#### 6.1.3. Setup Diagram for 30-1000MHz



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6.1.4. Setup Diagram for above 1GHz



#### 6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance(m)	Limits		
Trequency (WITZ)	Distance(III)	dBµV/m	$\mu V/m$	
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz	
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz	
1.705 - 30	30	29.5	30	
30 - 88	3	40.0	100	
88-216	3	43.5	150	
216-960	3	46.0	200	
Above 960	3	54.0	500	
Above 1000	3	74.0 dBµV/m (F 54.0 dBµV/m (	Peak) Average)	

Remark : (1)  $dB\mu V/m = 20 \log (\mu V/m)$ 

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

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#### 6.3. Test Procedure

#### Frequency Range 9kHz~30MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)

Q.P. (490kHz-30MHz)

#### Frequency Range 30MHz ~ 25GHz:

The EUT setup on the turn table which has 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

#### Frequency below 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

(1)RBW = 120KHz

(2)VBW  $\geq$  3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

- Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.
- Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

# Frequency above 1GHz to 10th harmonic (up to 25 GHz): Peak Detector:

(1)RBW = 1MHz

(2)VBW  $\geq$  3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

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Average Detector: Option 1: (1)RBW = 1MHz (2)VBW > 1/T. (Duty Cycle < 98%, when duty cycle presented in section 3.7)

Modulation Type	VBW Setting (VBW $\geq 1/T$ )
Wireless 2.4GHz	5.1 kHz
BLE	2.7 kHz

(3)VBW = 10Hz (Duty Cycle  $\ge$  98%, when duty cycle presented in section 3.7)

(4)Detector = Peak.

(5)Sweep time = auto.

(6)Trace mode = max hold.

(7)Allow sweeps to continue until the trace stabilizes.

#### **Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

#### 6.4. Measurement Result Explanation

- Peak Emission Level( $dB\mu V/m$ )=Antenna Factor(dB/m) + Cable Loss (dB)– Preamp Gain (dB)+ Reading( $dB\mu V$ ).
- Average Emission Level( $dB\mu V/m$ )= Antenna Factor(dB/m) + Cable Loss (dB)– Preamp Gain (dB)+ Reading( $dB\mu V$ ).
- $\Box$ Average Emission Level(dBµV/m)= Peak Emission Level(dBµV/m)+ DCCF(dB) Duty Cycle Correction Factor (DCCF)(dB)= 20log(TX <sub>on</sub>/TX <sub>on+off</sub>) presented in section 3.7.

ERP(dBm)= Peak Emission Level(dBµV/m) -95.2dB-2.14dB

#### 6.5. Test Results

Please refer to Appendix A.

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# 7. DTS/OCCUPIED BANDWIDTH

#### 7.1. Block Diagram of Test Setup



#### **7.2.** Specification Limits

The minimum 6dB bandwidth shall be at least 500kHz.

#### 7.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

#### For DTS Bandwidth

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW)  $\ge$  3 × RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x to -6dB power to record the final bandwidth..

#### For 99% Occupied Bandwidth

- (1) Set Span range 1.5~5 times the OBW
- (2) Set RBW close to1% to 5% of OBW.
- (3) Set VBW≥3xRBW.
- (4) Detector = Peak.
- (5) Trace mode = Max hold
- (6) Sweep = Auto couple.
- (7) Allow the trace to stabilize.

#### 7.4. Test Results

Please refer to Appendix A

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# 8. MAXIMUM PEAK OUTPUT POWER

#### 8.1. Block Diagram of Test Setup



#### **8.2.** Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

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#### 8.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

#### **PKPM1** Peak power meter method:

EUT is connected to power sensor and record the maximum output power.

#### Maximum peak conducted output power method:

- (1) Set the RBW  $\geq$  DTS bandwidth
- (2) Set VBW  $\geq 3 \times RBW$
- (3) Set span  $\geq 3 \times \text{RBW}$ .
- (4) Sweep time = auto couple
- (5) Detector = peak.
- (6) Trace mode = max hold.
- (7) Allow trace to fully stabilize.
- (8) Use peak marker function to determine the peak amplitude level.

#### Method AVGPM (Measurement using an RF average power meter):

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

#### Method AVGSA-2 (Spectrum channel power)

- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 5% of OBW
- (3) Set the video bandwidth (VBW)  $\ge$  3 × RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

#### 8.4. Test Results

Please refer to Appendix A

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# 9. EMISSION LIMITATIONS

#### 9.1. Block Diagram of Test Setup



### 9.2. Specification Limits

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

#### 9.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

#### Reference Level

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW  $\geq$  3 × RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max PSD as reference level.

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#### Emission Level Measurement

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW  $\geq$  3 × RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max level.

#### 9.4. Test Results

Please refer to Appendix A

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# **10. POWER SPECTRAL DENSITY**

#### 10.1.Block Diagram of Test Setup



#### **10.2.Specification Limits**

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

#### **10.3.Test Procedure**

Following measurement procedure is reference to ANSI C63.10:2013:

#### Method PKPSD (peak PSD)

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 3 kHz  $\leq$  RBW  $\leq$  100 kHz.
- (4) Set the VBW  $\geq$  3 × RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize.
- (9) Use the peak marker function to determine the maximum amplitude level.
- (10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### Method AVGPSD-2

- (1) Using peak PSD procedure step 1 to step 4.
- (2) Detector= RMS detector
- (3) Sweep time = auto couple
- (4) Trace mode = trace averaging over a minimum of 100 traces
- (5) Use the peak marker function to determine the maximum amplitude level.
- (6) Duty cycle factor is added when duty cycle presented in section 3.7 < 98%.
- (7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### **10.4.Test Results**

Please refer to Appendix A

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# **11.DEVIATION TO TEST SPECIFICATIONS**

[NONE]

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# APPENDIX A

# TEST DATA AND PLOTS

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APPENDIX B

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# APPENDIX B

# **TEST PHOTOGRAPHS**

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