

TEST REPORT

Applicant: DALS Lighting, Inc

Address of Applicant: 80 De La Seigneurie East, Blainville, Quebec, J7C 4N1, Canada

Manufacturer/Factory: Meko Lighting Company Limited

Address of Manufacturer/Factory: No.2, Songlin East Road, Zeng Tian Village, Xin An District, Chang An Town Dongguan Guangdong 523883 China (Peoples Republic Of)

Equipment Under Test (EUT)

Product Name: Axis Digital Stick

Model No.: SM-STTL20-XX, SM-STFL50-XX
(XX stands for color finishes)

Trade Mark: DALS

FCC ID: 2AQSN-SMSTKD

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10:2013

Date of sample receipt: March 6, 2023

Date of Test: March 21~29, 2023

Date of report issued: March 29, 2023

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Luo

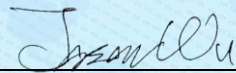
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	2023-3-29	Original

Prepared By:




Project Engineer

Date:

2023-3-29

Check By:



Reviewer

Date:

2023-3-29

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (b)(4)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013 and RSS-Gen.s

Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	1×10^{-7}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	3dB
6	Conducted Spurious emissions	2.58dB
7	AC Power Line Conducted Emission	3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	3.1dB (9kHz-30MHz)
		3.8039dB (30MHz-200MHz)
		3.9679dB (200MHz-1GHz)
		4.29dB (1GHz-18GHz)
		3.30dB (18GHz-40GHz)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Axis Digital Stick
Model No.:	SM-STTL20-XX, SM-STFL50-XX (XX stands for color finishes)
Test Model No.:	SM-STTL20-BK, SM-STFL50-BK
Test sample(s) ID:	GTSL2023030488-1(SM-STTL20-BK), GTSL2023030488-2(SM-STFL50-BK)
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware Version:	V1.0
Software Version:	1.0.18
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Internal antenna
Antenna Gain:	0dBi
Power Supply:	DC 12V (Powered by adapter)
Adapter Information:	Manufacturer: XING YUAN ELECTRONICS CO., LTD MODEL NO.: XY24SE-120150VQ-UW INPUT: 100-240V~ 50/60Hz 0.5A Max OUTPUT: 12.0V $\overline{\text{---}}$ 1.5A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

Test Item	Software	Description
Conducted RF Testing and Radiated testing	Beken Wi-Fi Test Tool V1.6.0	Set the EUT to different modulation and channel

Output power setting table:

Test Mode	Set Tx Output Power	Data Rate
BLE	4	1Mbps

Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<p><i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i></p>	

5.2 Description of Support Units

None.

5.3 Deviation from Standards

None.

5.4 Abnormalities from Standard Conditions

None.

5.5 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC—Registration No.: 381383 Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. ● IC —Registration No.: 9079A CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing ● NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).
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5.6 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 02, 2020	July 01, 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 22, 2022	April 21, 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 20, 2023	March 19, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June 12, 2022	June 11, 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 23, 2022	June 22, 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	April 22, 2022	April 21, 2023
9	Coaxial Cable	GTS	N/A	GTS211	April 22, 2022	April 21, 2023
10	Coaxial cable	GTS	N/A	GTS210	April 22, 2022	April 21, 2023
11	Coaxial Cable	GTS	N/A	GTS212	April 22, 2022	April 21, 2023
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April 22, 2022	April 21, 2023
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 23, 2022	June 22, 2023
14	Band filter	Amindeon	82346	GTS219	June 23, 2022	June 22, 2023
15	Power Meter	Anritsu	ML2495A	GTS540	June 23, 2022	June 22, 2023
16	Power Sensor	Anritsu	MA2411B	GTS541	June 23, 2022	June 22, 2023
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 22, 2022	April 21, 2023
18	Splitter	Agilent	11636B	GTS237	June 23, 2022	June 22, 2023
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 22, 2022	April 21, 2023
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 16, 2022	Oct. 15, 2023
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 16, 2022	Oct. 15, 2023
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 16, 2022	Oct. 15, 2023
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June 23, 2022	June 22, 2023
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 22, 2022	April 21, 2023

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 22, 2022	April 21, 2023
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 22, 2022	April 21, 2023
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 22, 2022	April 21, 2023
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 22, 2022	April 21, 2023
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 22, 2022	April 21, 2023
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 22, 2022	April 21, 2023
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 22, 2022	April 21, 2023
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 22, 2022	April 21, 2023

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 25, 2022	April 24, 2023
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(b)(4)
<p>15.203 requirement:</p> <p>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b)(4) requirement:</p> <p>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, 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 in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<p>E.U.T Antenna:</p> <p><i>The antenna is Internal antenna, the best case gain of the is 0dBi, reference to the appendix II for details</i></p>	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150kHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9kHz, VBW=30kHz, Sweep time=auto					
Limit:	Frequency range (MHz)	Limit (dBuV)				
		Quasi-peak		Average		
	0.15-0.5	66 to 56*		56 to 46*		
	0.5-5	56		46		
	5-30	60		50		
* Decreases with the logarithm of the frequency.						
Test setup:	<p><i>Remark</i> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>Test table height=0.1m</i></p>					
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement. 					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

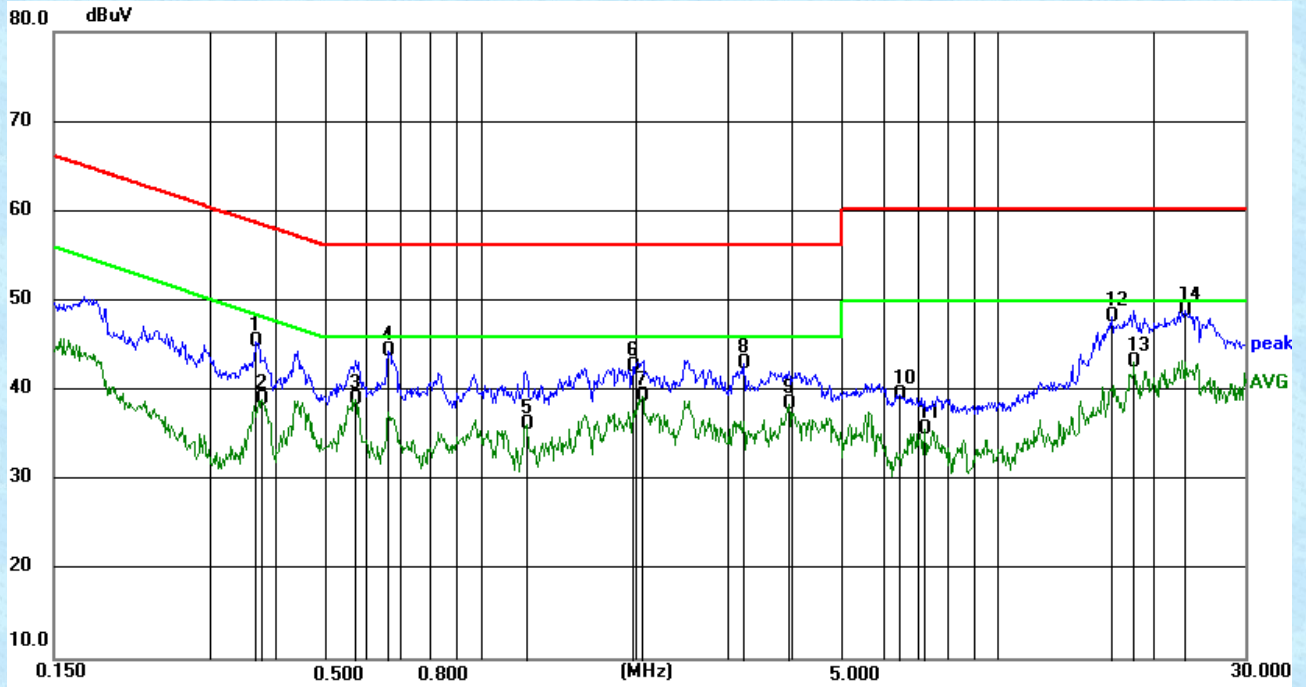
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data

Pre-scan all test modes, found worst case at 2402MHz, and so only show the test result of 2402MHz

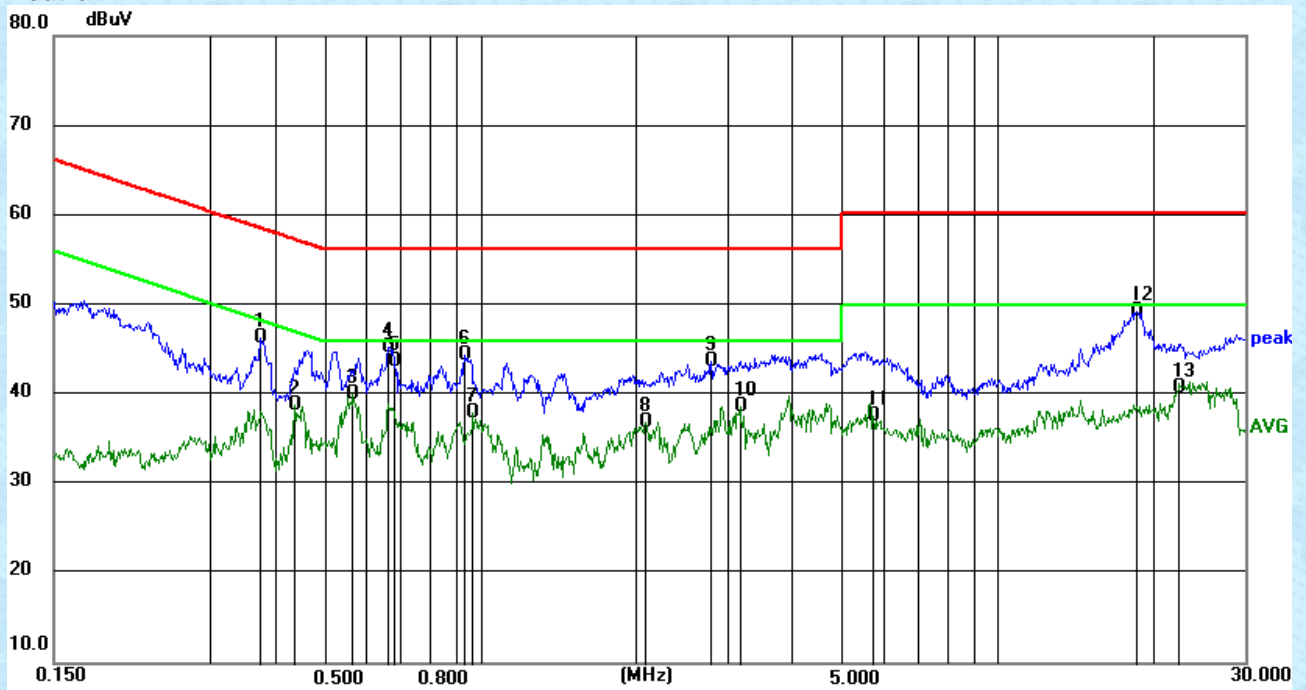
SM-STTL20-BK

Line:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.3689	35.42	10.01	45.43	58.53	13.1	QP
0.379	28.97	10.01	38.98	48.3	9.32	AVG
0.5731	29.04	10.02	39.06	46	6.94	AVG
0.6643	34.31	10.02	44.33	56	11.67	QP
1.2291	26.23	10.04	36.27	46	9.73	AVG
1.9696	32.51	10.06	42.57	56	13.43	QP
2.0548	29.34	10.06	39.4	46	6.6	AVG
3.2238	32.83	10.1	42.93	56	13.07	QP
3.9428	28.3	10.12	38.42	46	7.58	AVG
6.4537	29.37	10.19	39.56	60	20.44	QP
7.2134	25.5	10.22	35.72	50	14.28	AVG
16.5731	37.81	10.41	48.22	60	11.78	QP
18.3277	32.68	10.45	43.13	50	6.87	AVG
23.0181	37.45	11.53	48.98	60	11.02	QP

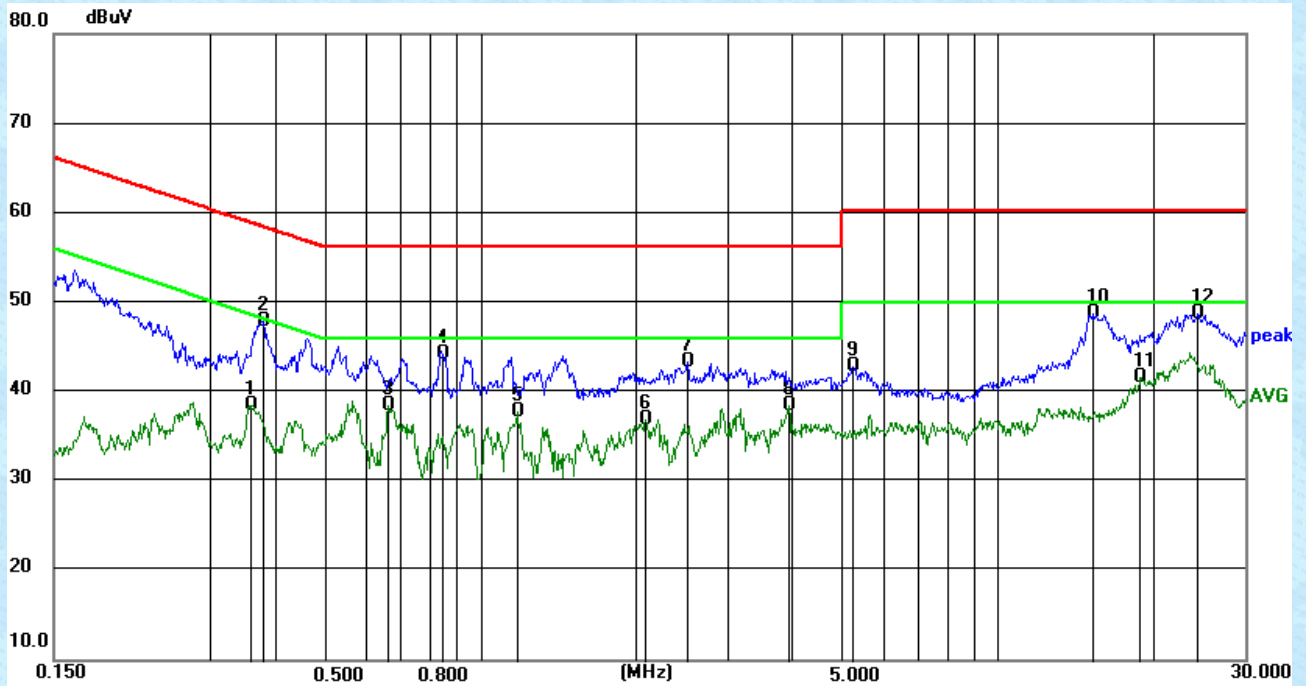
Neutral:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.375	36.24	10.01	46.25	58.39	12.14	QP
0.4374	28.74	10.01	38.75	47.11	8.36	AVG
0.5664	29.95	10.02	39.97	46	6.03	AVG
0.6643	35.31	10.02	45.33	56	10.67	QP
0.6824	33.76	10.02	43.78	56	12.22	QP
0.9331	34.41	10.03	44.44	56	11.56	QP
0.9683	27.87	10.03	37.9	46	8.1	AVG
2.0878	26.86	10.06	36.92	46	9.08	AVG
2.7942	33.55	10.08	43.63	56	12.37	QP
3.173	28.54	10.09	38.63	46	7.37	AVG
5.7437	27.4	10.17	37.57	50	12.43	AVG
18.5228	38.75	10.45	49.2	60	10.8	QP
22.2972	30.28	10.52	40.8	50	9.2	AVG

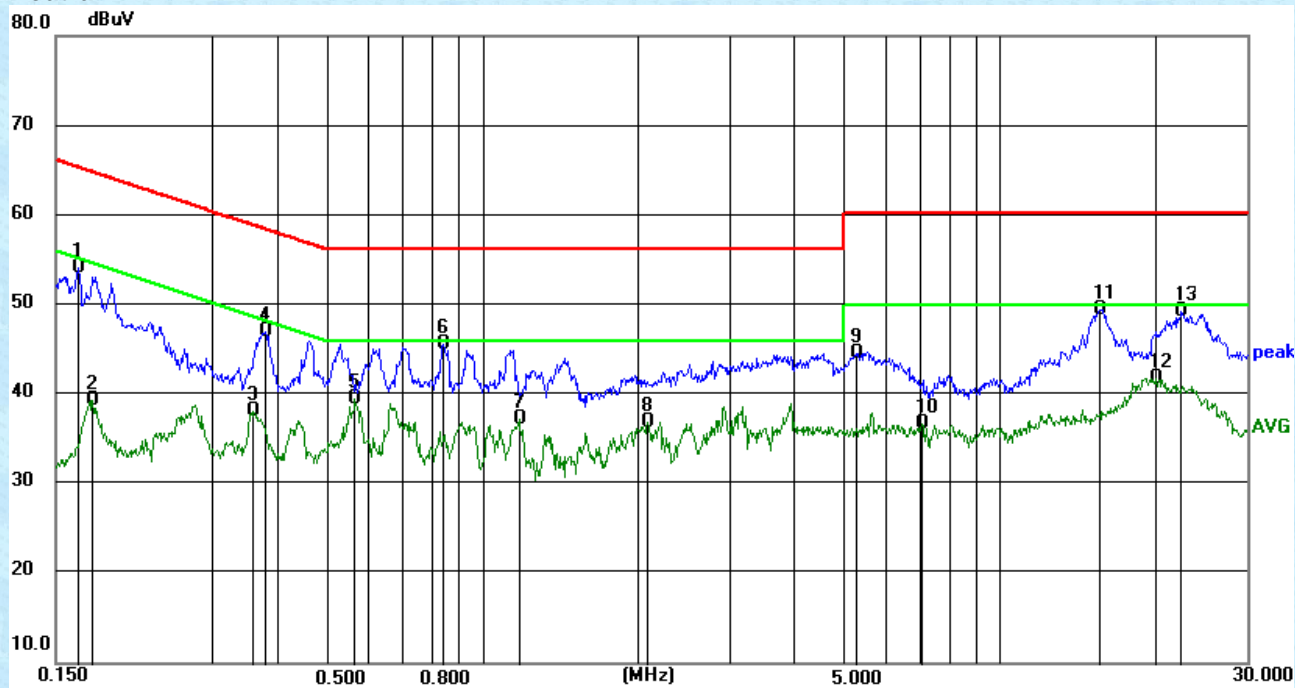
SM-STFL50-BK

Line:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.3613	28.54	10.01	38.55	48.7	10.15	AVG
0.381	37.92	10.01	47.93	58.26	10.33	QP
0.6643	28.52	10.02	38.54	46	7.46	AVG
0.8437	34.17	10.03	44.2	56	11.8	QP
1.1774	27.69	10.04	37.73	46	8.27	AVG
2.0878	26.86	10.06	36.92	46	9.08	AVG
2.5131	33.21	10.08	43.29	56	12.71	QP
3.9428	28.3	10.12	38.42	46	7.58	AVG
5.2488	32.66	10.16	42.82	60	17.18	QP
15.2261	38.39	10.39	48.78	60	11.22	QP
18.8201	31.17	10.45	41.62	50	8.38	AVG
24.27	38.19	10.55	48.74	60	11.26	QP

Neutral:

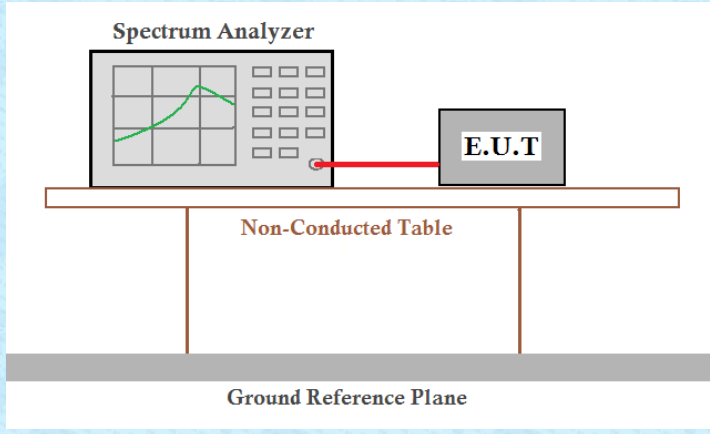


Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1658	44.2	10	54.2	65.17	10.97	QP
0.1766	29.37	10.01	39.38	54.64	15.26	AVG
0.3613	28.04	10.01	38.05	48.7	10.65	AVG
0.381	36.92	10.01	46.93	58.26	11.33	QP
0.5664	29.45	10.02	39.47	46	6.53	AVG
0.8393	35.61	10.02	45.63	56	10.37	QP
1.1774	27.19	10.04	37.23	46	8.77	AVG
2.0878	26.86	10.06	36.92	46	9.08	AVG
5.2769	34.44	10.16	44.6	60	15.4	QP
7.0621	26.53	10.21	36.74	50	13.26	AVG
15.5518	39.12	10.4	49.52	60	10.48	QP
19.95	31.34	10.47	41.81	50	8.19	AVG
22.4161	38.76	10.52	49.28	60	10.72	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Conducted Peak Output Power

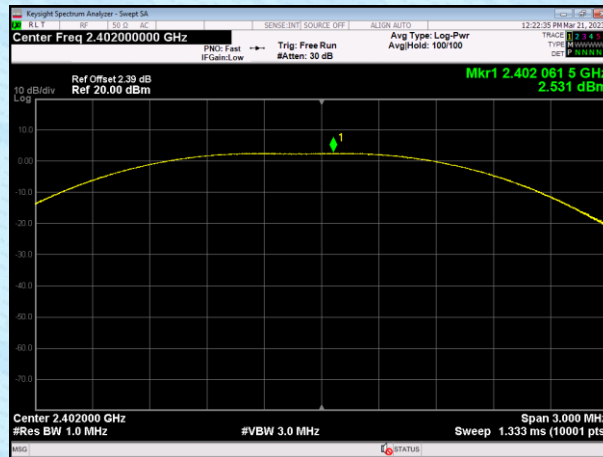
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

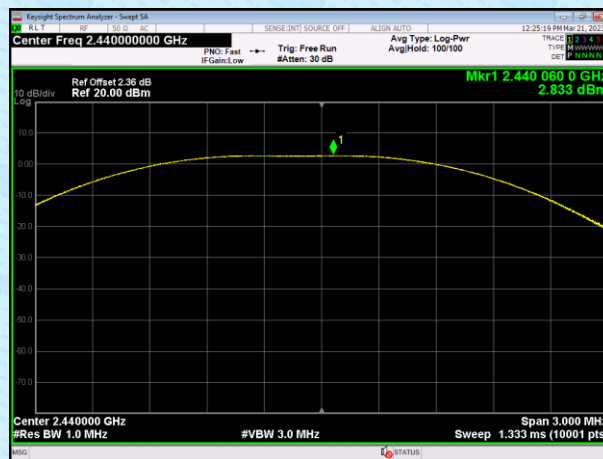
Test channel	Peak Output Power (dBm)	EIRP (dBm)	Output Power Limit(dBm)	EIRP Limit(dBm)	Result
Lowest	2.531	2.531	30.00	36.00	Pass
Middle	2.833	2.833	30.00	36.00	Pass
Highest	0.604	0.604	30.00	36.00	Pass

Test plot as follows:

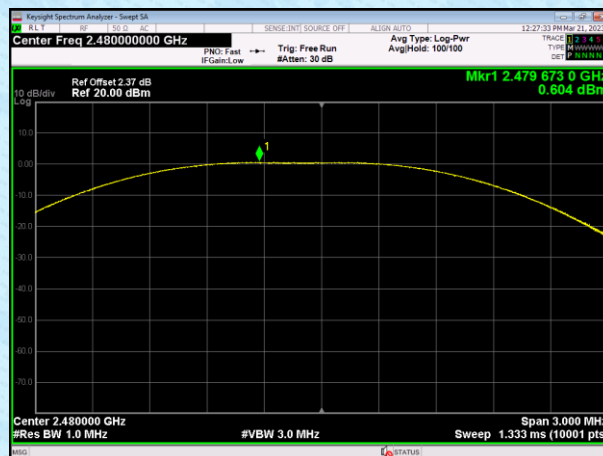
Lowest channel



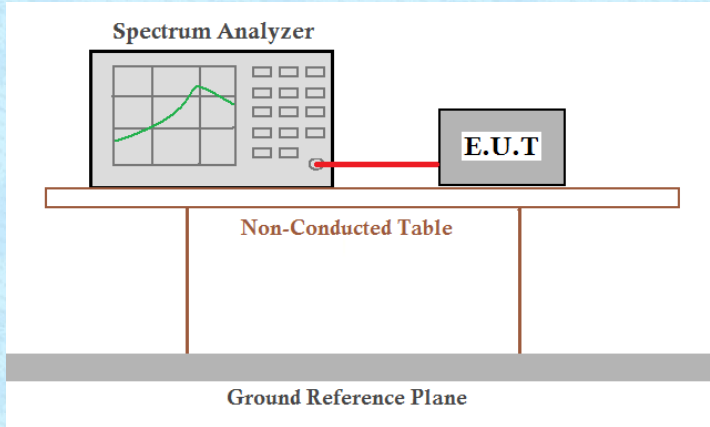
Middle channel



Highest channel



7.4 Channel Bandwidth & 99% Occupancy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

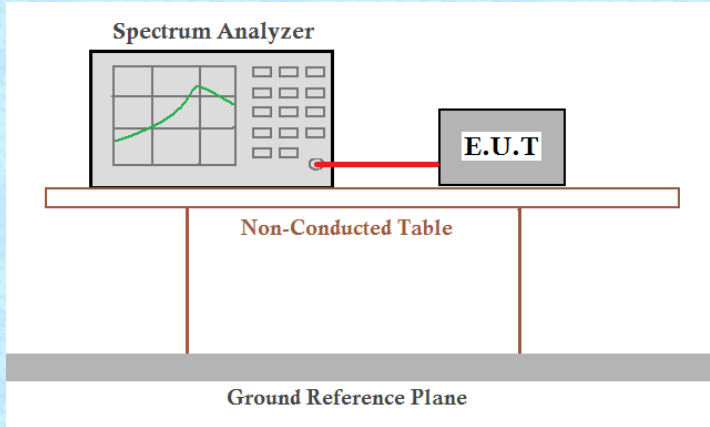
Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
Lowest	0.677	>500	Pass
Middle	0.673		
Highest	0.700		

Test channel	99% Bandwidth (MHz)	Result
Lowest	1.033	Pass
Middle	1.037	
Highest	1.033	

Test plot as follows:



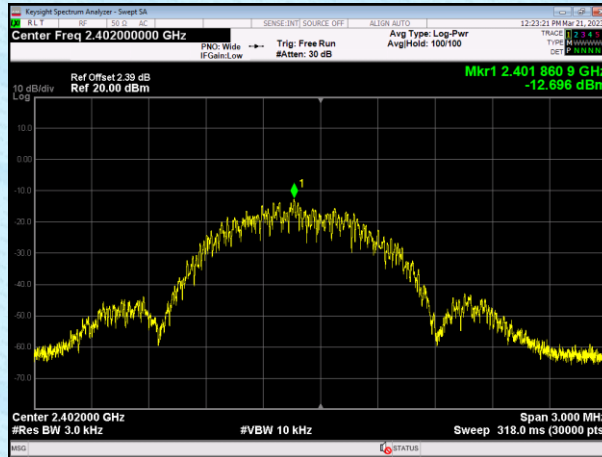
7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is positioned above a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

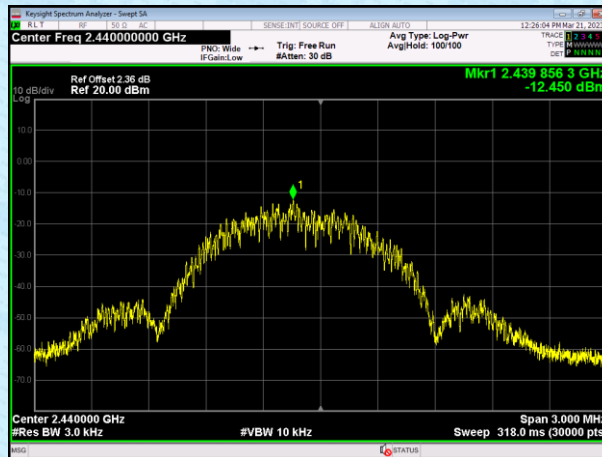
Measurement Data

Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-12.696	8.00	Pass
Middle	-12.45		
Highest	-14.621		

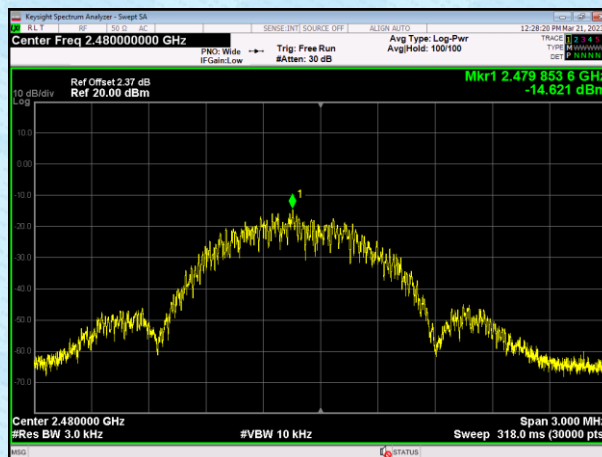
Test plot as follows:



Lowest channel



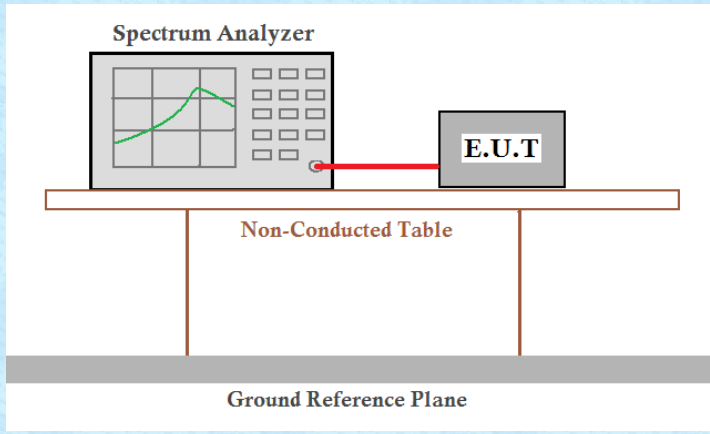
Middle channel



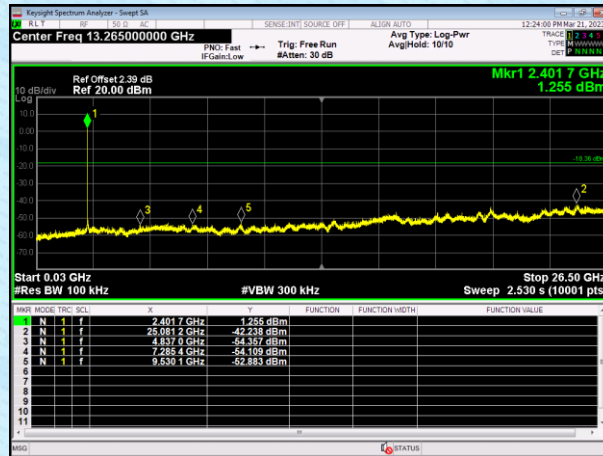
Highest channel

7.6 Spurious Emission in Non-restricted & restricted Bands

7.6.1 Conducted Emission Method

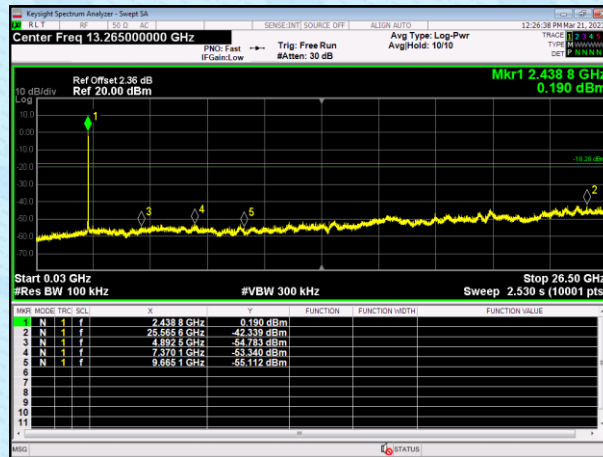
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional 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.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:
Lowest channel



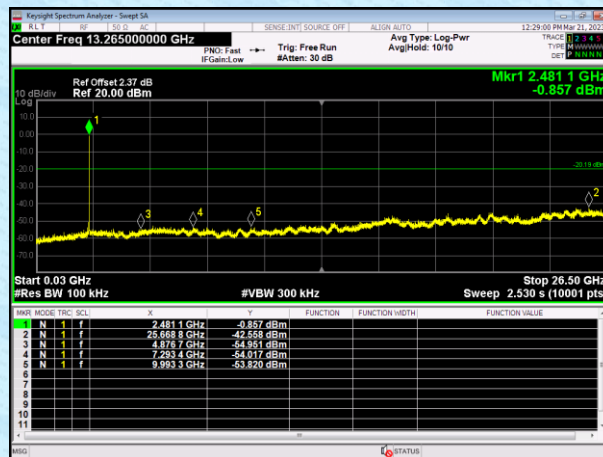
30MHz~26.5GHz

Middle channel



30MHz~26.5GHz

Highest channel



30MHz~26.5GHz

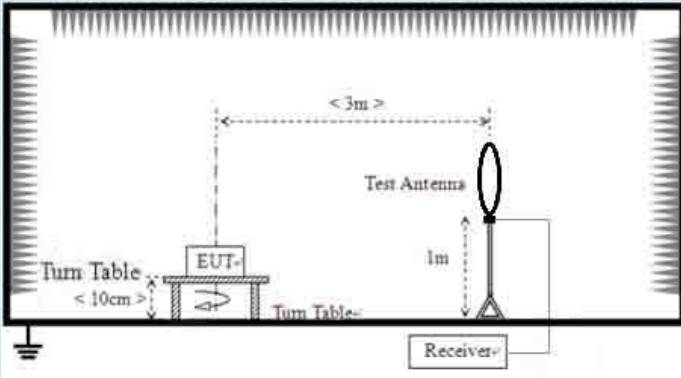
Test plot as follows:

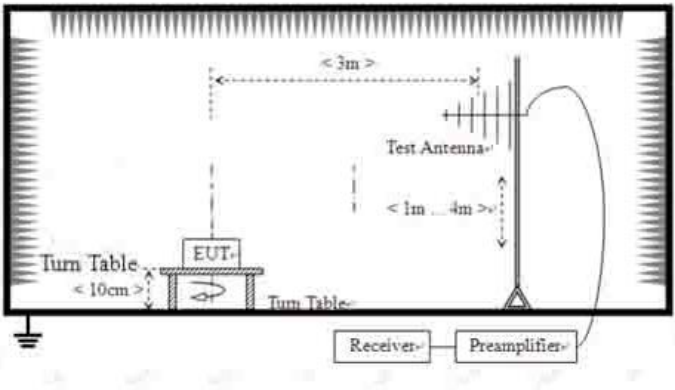
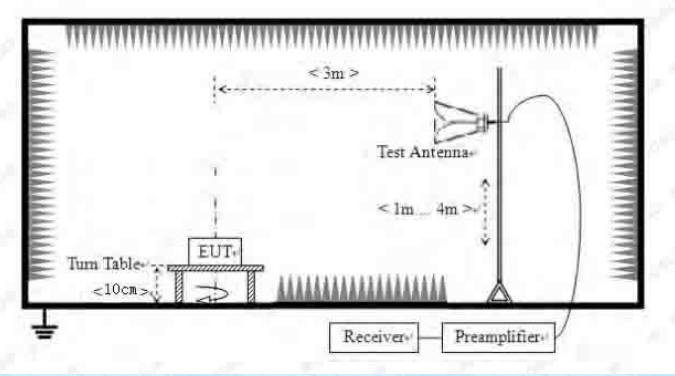


Lowest channel

Highest channel

7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013 & RSS-Gen				
Test Frequency Range:	9kHz to 26.5GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
5000		Peak			
Test setup:	For radiated emissions from 9kHz to 30MHz				
					

	<p>For radiated emissions from 30MHz to 1GHz</p>  <p>For radiated emissions above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.1m) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>

Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	26 °C	Humid.:	54%	Press.:	1012mbar
Test voltage:	AC 120V/60Hz					
Test results:	Pass					

Measurement data:

Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. Both high and low voltages have been tested to show only the worst low voltage test data.

■ 9kHz~30MHz

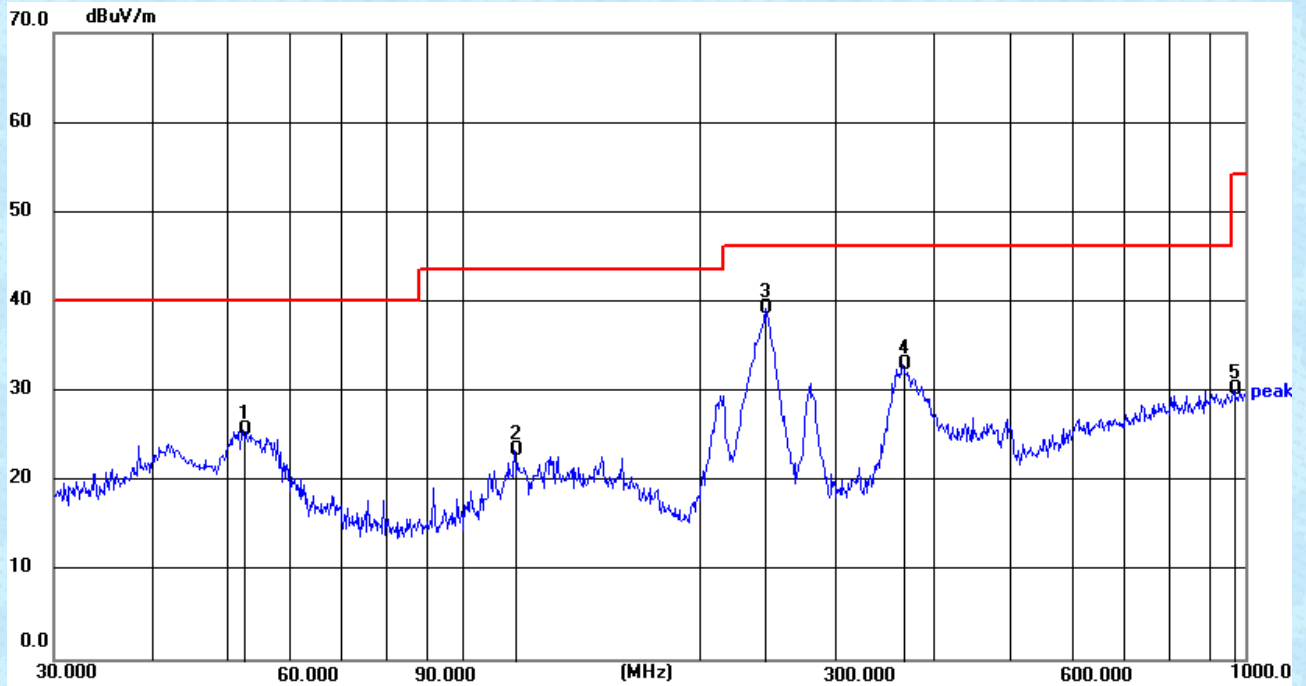
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

SM-STTL20-BK

Below 1GHz

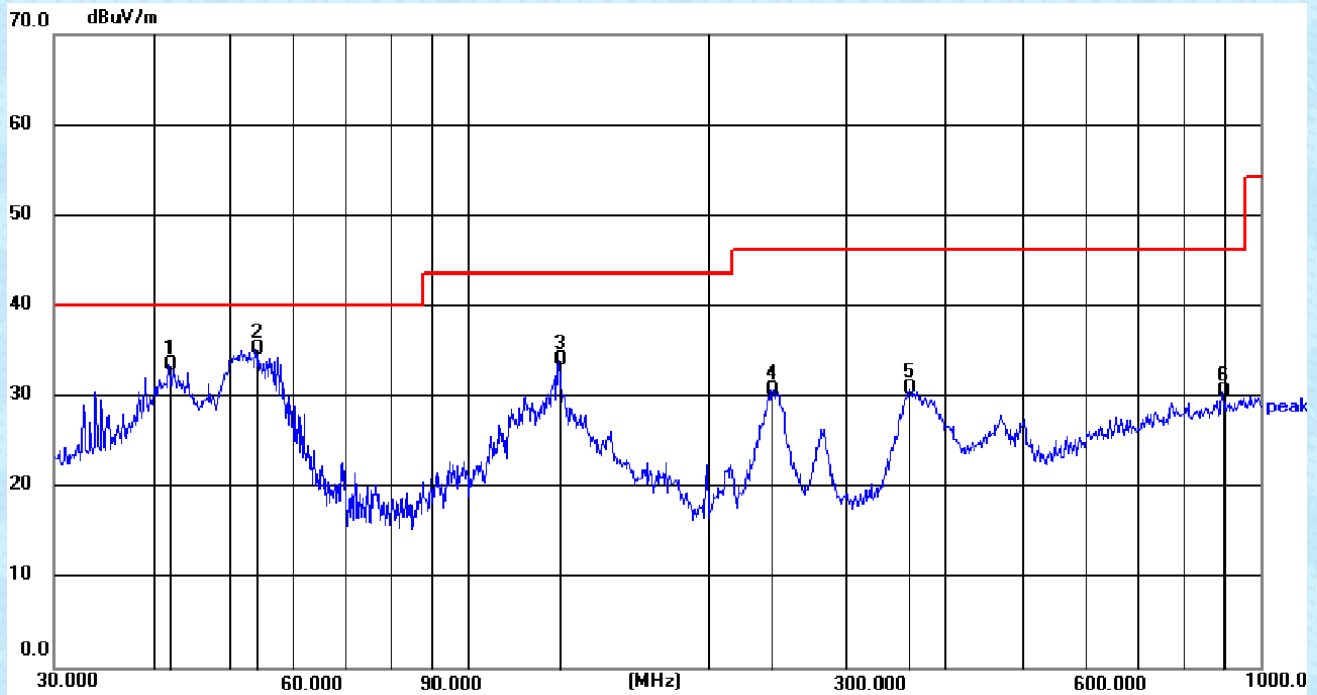
Pre-scan all test modes, found worst case at 2402MHz, and so only show the test result of 2402MHz

Horizontal:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
52.3912	11.23	14.39	25.62	40.00	14.38	QP
116.5401	9.70	13.67	23.37	43.50	20.13	QP
243.3772	25.81	13.41	39.22	46.00	6.78	QP
365.5391	16.80	16.14	32.94	46.00	13.06	QP
965.5421	5.52	24.64	30.16	54.00	23.84	QP

Vertical:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
41.8596	19.29	14.15	33.44	40.00	6.56	QP
53.8818	20.90	14.29	35.19	40.00	4.81	QP
129.9226	19.37	14.61	33.98	43.50	9.52	QP
240.8304	17.35	13.37	30.72	46.00	15.28	QP
360.4476	14.86	16.03	30.89	46.00	15.11	QP
893.8567	6.62	23.99	30.61	46.00	15.39	QP

Remark:

1. An initial pre-scan was performed on the Horizontal and Vertical with peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. Level = Reading + Factor
4. Factor = Antenna Gain + Cable Loss – Amplifier Gain



Unwanted Emissions in non-restricted Frequency Bands

Above 1GHz

Test mode:	BLE	Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	35.74	31.62	8.58	32.11	43.83	74	-30.17	Vertical
4804	37.76	31.62	8.58	32.11	45.85	74	-28.15	Horizontal

Test mode:	BLE	Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880	36.06	31.92	8.71	32.11	44.58	74	-29.42	Vertical
4880	36.81	31.92	8.71	32.11	45.33	74	-28.67	Horizontal

Test mode:	BLE	Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	35.83	31.96	8.75	32.3	44.24	74	-29.76	Vertical
4960	37.72	31.96	8.75	32.3	46.13	74	-27.87	Horizontal

Test mode:	BLE	Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310	48.51	27.14	6.19	42.04	39.8	74	-34.2	Horizontal
2390	53.05	27.37	6.31	42.11	44.62	74	-29.38	Horizontal
2310	48.26	27.14	6.19	42.04	39.55	74	-34.45	Vertical
2390	57.12	27.37	6.31	42.11	48.69	74	-25.31	Vertical

Test mode:	BLE	Test channel:	Highest
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Peak value:

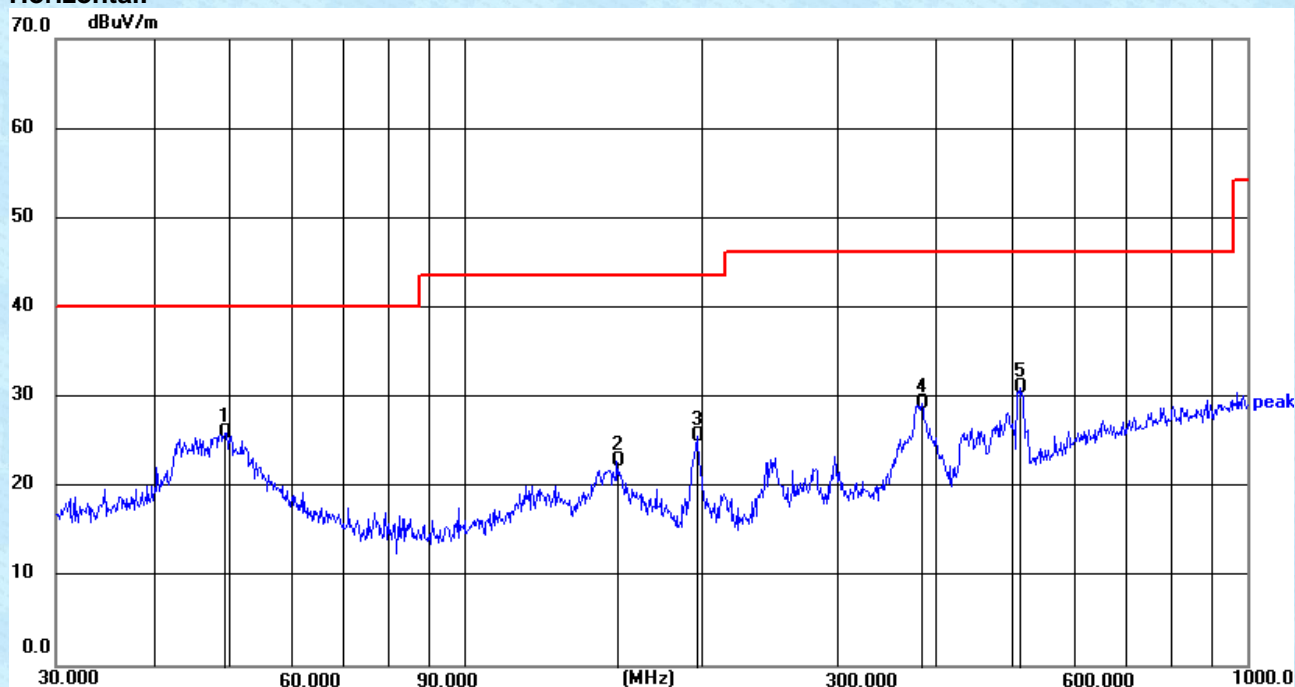
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	59.81	27.66	6.45	42.01	51.91	74	-22.09	Horizontal
2500	51.49	27.7	6.47	42	43.66	74	-30.34	Horizontal
2483.5	57.96	27.66	6.45	42.01	50.06	74	-23.94	Vertical
2500	53.77	27.7	6.47	42	45.94	74	-28.06	Vertical

SM-STFL50-BK

Below 1GHz

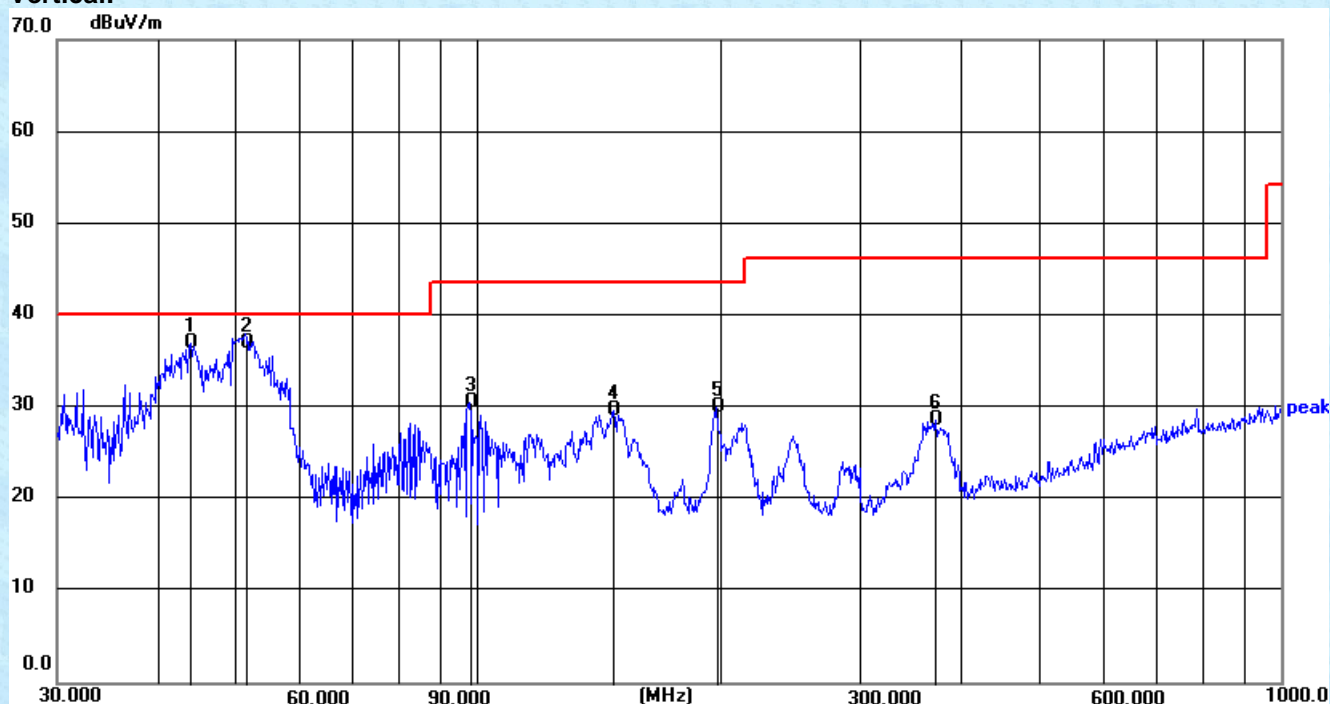
Pre-scan all test modes, found worst case at 2402MHz, and so only show the test result of 2402MHz

Horizontal:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
49.3594	11.41	14.54	25.95	40.00	14.05	QP
156.4578	6.90	15.99	22.89	43.50	20.61	QP
197.8928	13.86	11.90	25.76	43.50	17.74	QP
383.9318	12.78	16.49	29.27	46.00	16.73	QP
511.8352	12.16	18.84	31.00	46.00	15.00	QP

Vertical:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
43.9658	22.55	14.42	36.97	40.00	3.03	QP
51.4807	22.51	14.44	36.95	40.00	3.05	QP
97.7983	18.84	11.75	30.59	43.50	12.91	QP
147.9214	14.12	15.55	29.67	43.50	13.83	QP
198.5880	18.21	11.86	30.07	43.50	13.43	QP
372.0045	12.31	16.27	28.58	46.00	17.42	QP

Remark:

1. An initial pre-scan was performed on the Horizontal and Vertical with peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. Level = Reading + Factor
5. Factor = Antenna Gain + Cable Loss – Amplifier Gain

Unwanted Emissions in non-restricted Frequency Bands

Above 1GHz

Test mode:	BLE	Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	35.14	31.62	8.58	32.11	43.23	74	-30.77	Vertical
4804	37.37	31.62	8.58	32.11	45.46	74	-28.54	Horizontal

Test mode:	BLE	Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880	36.96	31.92	8.71	32.11	45.48	74	-28.52	Vertical
4880	37.51	31.92	8.71	32.11	46.03	74	-27.97	Horizontal

Test mode:	BLE	Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	35.54	31.96	8.75	32.3	43.95	74	-30.05	Vertical
4960	37.46	31.96	8.75	32.3	45.87	74	-28.13	Horizontal

Test mode:	BLE	Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310	48.01	27.14	6.19	42.04	39.3	74	-34.7	Horizontal
2390	52.3	27.37	6.31	42.11	43.87	74	-30.13	Horizontal
2310	47.93	27.14	6.19	42.04	39.22	74	-34.78	Vertical
2390	56.29	27.37	6.31	42.11	47.86	74	-26.14	Vertical

Test mode:	BLE	Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	59.37	27.66	6.45	42.01	51.47	74	-22.53	Horizontal
2500	51.15	27.7	6.47	42	43.32	74	-30.68	Horizontal
2483.5	57.44	27.66	6.45	42.01	49.54	74	-24.46	Vertical
2500	52.85	27.7	6.47	42	45.02	74	-28.98	Vertical

Remark.

1. $Level = Reading\ Level + Antenna\ factor + Cable\ Loss - Amplifier\ factor$
2. *other emissions are attenuated 20dB below the limits, so it does not reported.*

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----