

FCC Test Report

Client Name : Smart Systems Distribution Sarl

Client Address : Avenue Edmond-Vaucher 15B, 1219
Chatelaine, 123022 Switzerland

Product Name : Z-Wave.Me mPCle adaptor Z-Wave &
Zigbee/Thread mPCle extension board

Report Date : Feb. 15, 2023

Shenzhen Anbotek Compliance Laboratory Limited



Shenzhen Anbotek Compliance Laboratory Limited

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel: (86) 0755-26066440 Fax: (86) 0755-26014772 Email: service@anbotek.com

Code: AB-RF-05-b



Hotline

400-003-0500

www.anbotek.com.cn



Contents

1. General Information	6
1.1. Client Information	6
1.2. Description of Device (EUT)	6
1.3. Auxiliary Equipment Used During Test	7
1.4. Description of Test Configuration	7
1.5. Description Of Test Setup	8
1.6. Test Equipment List	8
1.7. Measurement Uncertainty	10
1.8. Description of Test Facility	10
2. Summary of Test Results	11
3. Conducted Emission Test	12
3.1. Test Standard and Limit	12
3.2. Test Setup	12
3.3. Test Procedure	12
3.4. Test Data	12
4. Radiation Spurious Emission and Band Edge	15
4.1. Test Standard and Limit	15
4.2. Test Setup	15
4.3. Test Procedure	16
4.4. Test Data	17
5. Maximum Peak Output Power Test	23
5.1. Test Standard and Limit	23
5.2. Test Setup	23
5.3. Test Procedure	23
5.4. Test Data	23
6. 6DB Occupy Bandwidth Test	24
6.1. Test Standard and Limit	24
6.2. Test Setup	24
6.3. Test Procedure	24
6.4. Test Data	24
7. Power Spectral Density Test	26
7.1. Test Standard and Limit	26
7.2. Test Setup	26
7.3. Test Procedure	26
7.4. Test Data	26
8. 100kHz Bandwidth of Frequency Band Edge Requirement	28



8.1. Test Standard and Limit	28
8.2. Test Setup	28
8.3. Test Procedure	28
8.4. Test Data	28
9. Antenna Requirement	31
9.1. Test Standard and Requirement	31
9.2. Antenna Connected Construction	31
APPENDIX I -- TEST SETUP PHOTOGRAPH	32
APPENDIX II -- EXTERNAL PHOTOGRAPH	32
APPENDIX III -- INTERNAL PHOTOGRAPH	32



TEST REPORT

Applicant : Smart Systems Distribution Sarl
Manufacturer : Smart Systems Distribution Sarl
Product Name : Z-Wave.Me mPCIe adaptor Z-Wave & Zigbee/Thread mPCIe extension board
Model No. : ZME_mPCIe_ZW_ZB
Trade Mark : Z-Wave.Me
Rating(s) : Input: 3V==

Test Standard(s) : FCC Part15 Subpart, Section 15.247

Test Method(s) : ANSI C63.10: 2020, KDB 558074 D01 15.247 Meas Guidance v05r02

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of receipt

Dec. 20, 2022

Date of Test

Dec. 20, 2022~Jan. 10, 2023

Prepared By

Ella Liang

(Ella Liang)

Approved & Authorized Signer

Kingkong Jin

(Kingkong Jin)



Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Feb. 15, 2023



1. General Information

1.1. Client Information

Applicant	:	Smart Systems Distribution Sarl
Address	:	Avenue Edmond-Vaucher 15B, 1219 Chatelaine, 123022 Switzerland
Manufacturer	:	Smart Systems Distribution Sarl
Address	:	Avenue Edmond-Vaucher 15B, 1219 Chatelaine, 123022 Switzerland
Factory	:	Smart Systems Distribution Sarl
Address	:	Avenue Edmond-Vaucher 15B, 1219 Chatelaine, 123022 Switzerland

1.2. Description of Device (EUT)

Product Name	:	Z-Wave.Me mPCle adaptor Z-Wave & Zigbee/Thread mPCle extension board
Model No.	:	ZME_mPCle_ZW_ZB
Trade Mark	:	Z-Wave.Me
Test Power Supply	:	AC 120V, 60Hz
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N.A.
RF Specification		
Operation Frequency	:	908.42~921.00MHz
Number of Channel	:	4 Channels
Modulation Type	:	GFSK
Antenna Type	:	External antenna (Provided by LAB)
Antenna Gain(Peak)	:	1.5dBi (Provided by LAB)
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		



1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
acer:	Model: N19W3 Input: 19V/3.42A;20V/3.25A CMIIT ID:2020AJ3862
Adapter	Model: PA-1650-58 Input: AC100-240~50/60Hz, 1.6A CMIIT KP06503020

1.4. Description of Test Configuration

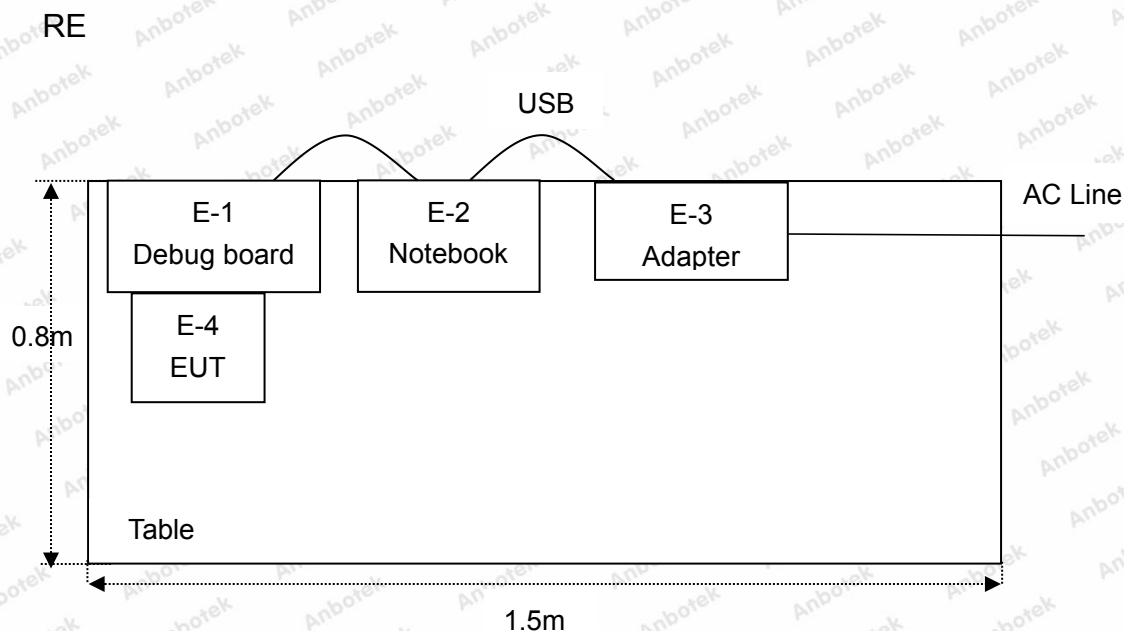
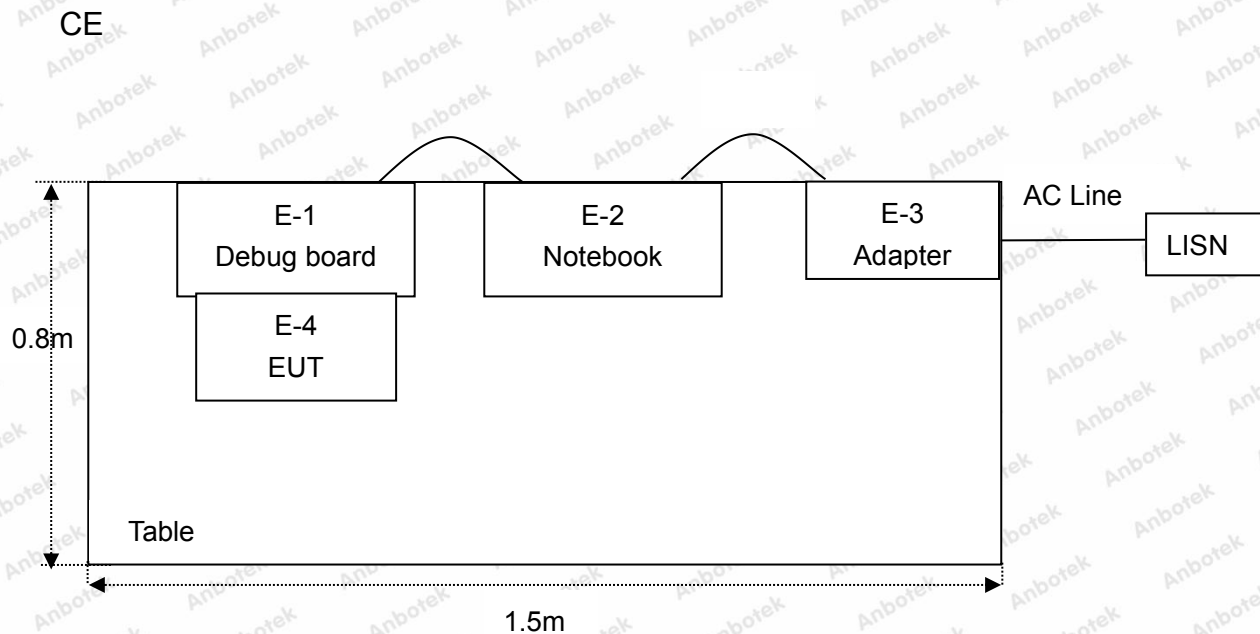
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	908.42								
2	916.00								
3	912.00								
4	921.00								

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT was tested with Channel 1, 2 and 4.



1.5. Description Of Test Setup



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2022	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
5.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
6.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 13, 2022	1 Year
7.	EMI Preamplifier	SKET Electronic	LNPA-0118G -45	SKET-PA-002	Oct. 13, 2022	1 Year
8.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 23, 2022	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 23, 2022	1 Year
11.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Oct. 23, 2022	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
13.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
14.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 13, 2022	1 Year
15.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 13, 2022	1 Year
16.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 13, 2022	1 Year
17.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2022	1 Year
18.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 19, 2022	1 Year



1.7. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, 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 our files. Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



2. Summary of Test Results

Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.247(b)(3)	Conducted Peak Output Power	PASS
15.247(a)(2)	6dB Occupied Bandwidth	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Band Edge	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		



3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

Shielding Room

Test Receiver

EUT

AE

LISN2

LISN1

80cm

Ground Reference Plane

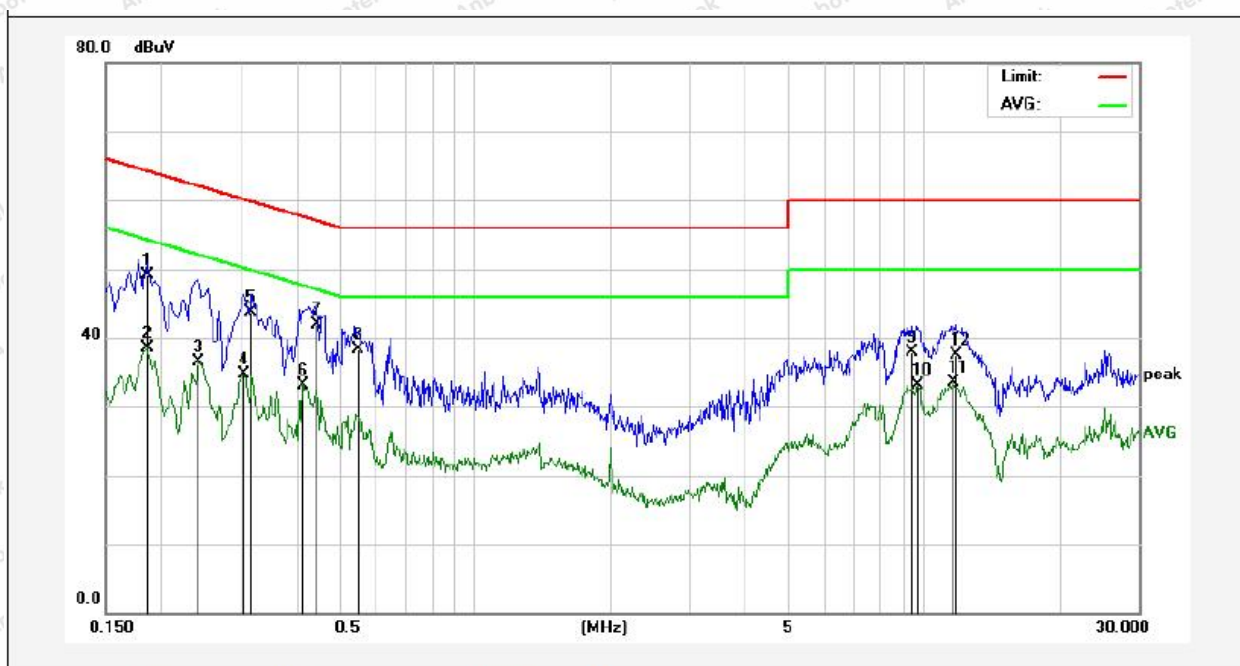
The frequency range from 150kHz to 30MHz is checked.

Please to see the following pages.



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 908.42MHz
Test Specification: AC 120V, 60Hz
Comment: Live Line
Temp.(°C)/Hum.(%RH): 22.1°C/52%RH

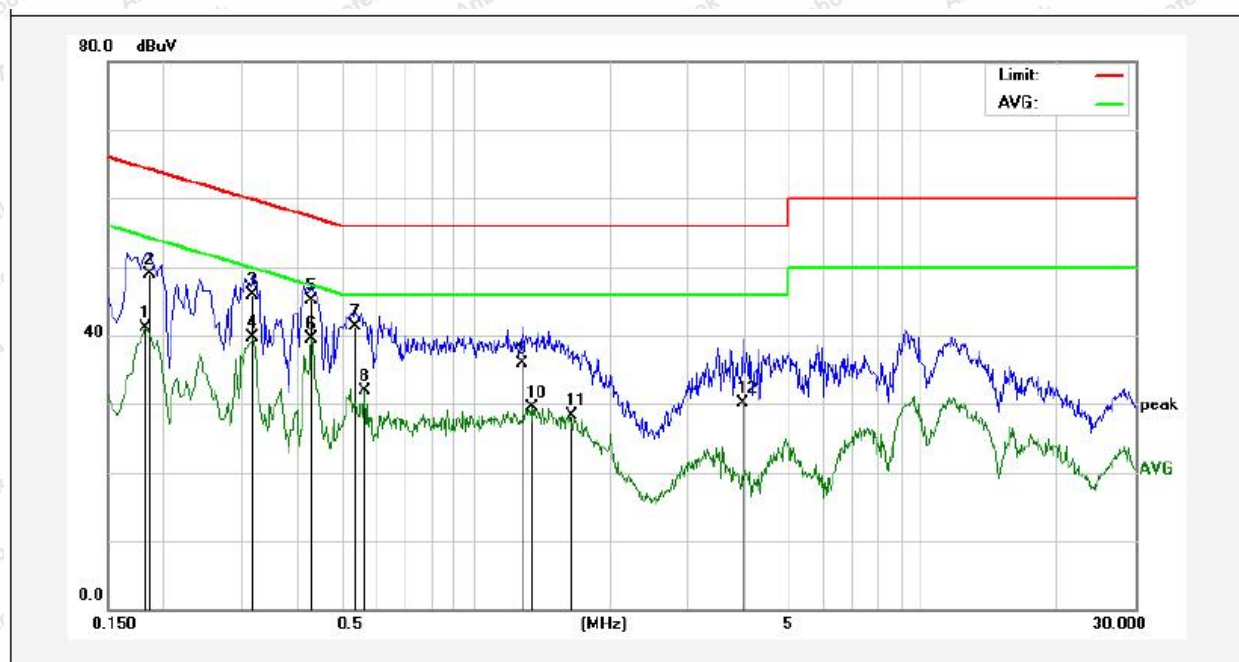


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1860	39.26	9.83	49.09	64.21	-15.12	QP	
2	0.1860	28.62	9.83	38.45	54.21	-15.76	AVG	
3	0.2420	26.59	9.83	36.42	52.02	-15.60	AVG	
4	0.3060	24.95	9.83	34.78	50.08	-15.30	AVG	
5	0.3180	33.91	9.83	43.74	59.76	-16.02	QP	
6	0.4140	23.38	9.82	33.20	47.57	-14.37	AVG	
7	0.4460	32.16	9.83	41.99	56.95	-14.96	QP	
8	0.5500	28.54	9.85	38.39	56.00	-17.61	QP	
9	9.3700	28.00	9.96	37.96	60.00	-22.04	QP	
10	9.6940	23.17	9.97	33.14	50.00	-16.86	AVG	
11	11.6420	23.52	10.05	33.57	50.00	-16.43	AVG	
12	11.7860	27.39	10.05	37.44	60.00	-22.56	QP	



Conducted Emission Test Data

Test Site: 1# Shielded Room
 Operating Condition: 908.42MHz
 Test Specification: AC 120V, 60Hz
 Comment: Neutral Line
 Temp.(°C)/Hum.(%RH): 22.1°C/52%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1819	31.23	9.83	41.06	54.39	-13.33	AVG	
2	0.1860	39.04	9.83	48.87	64.21	-15.34	QP	
3	0.3180	36.16	9.83	45.99	59.76	-13.77	QP	
4	0.3180	29.82	9.83	39.65	49.76	-10.11	AVG	
5	0.4300	35.30	9.82	45.12	57.25	-12.13	QP	
6	0.4300	29.63	9.82	39.45	47.25	-7.80	AVG	
7	0.5380	31.54	9.85	41.39	56.00	-14.61	QP	
8	0.5660	22.09	9.86	31.95	46.00	-14.05	AVG	
9	1.2740	26.05	9.84	35.89	56.00	-20.11	QP	
10	1.3340	19.58	9.84	29.42	46.00	-16.58	AVG	
11	1.6340	18.53	9.84	28.37	46.00	-17.63	AVG	
12	3.9700	20.27	9.85	30.12	56.00	-25.88	QP	

The EUT received input Voltage DC 3V from Debug board, and the Debug board via Notebook received input Voltage AC 120V/60Hz from Adapter.



4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

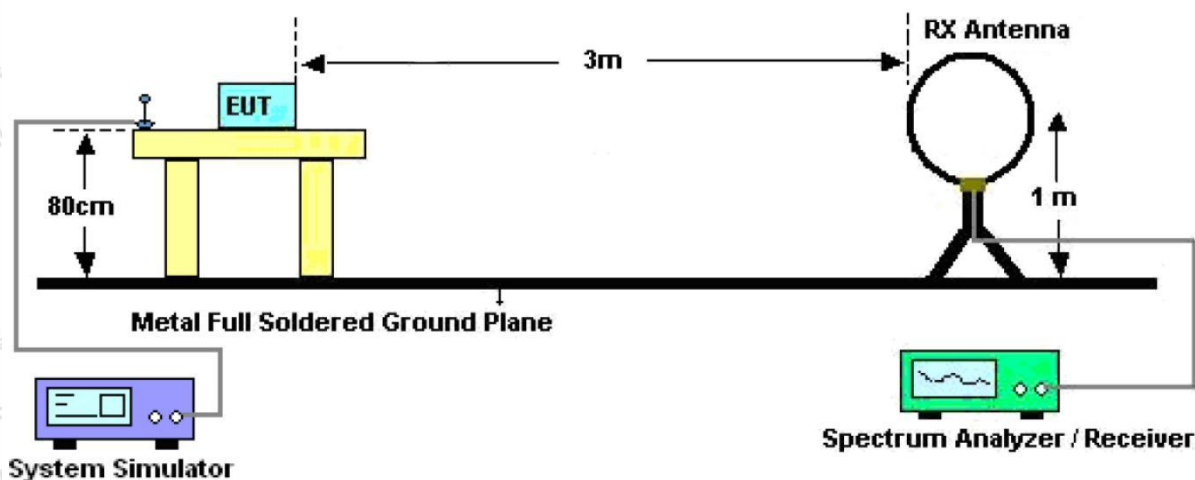


Figure 1. Below 30MHz



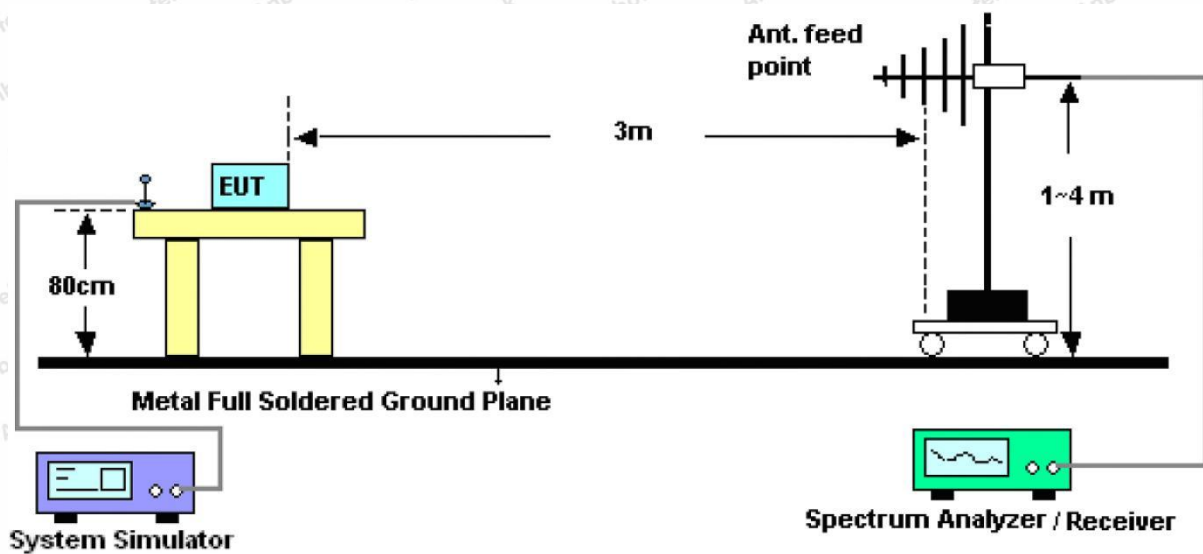


Figure 2. 30MHz to 1GHz

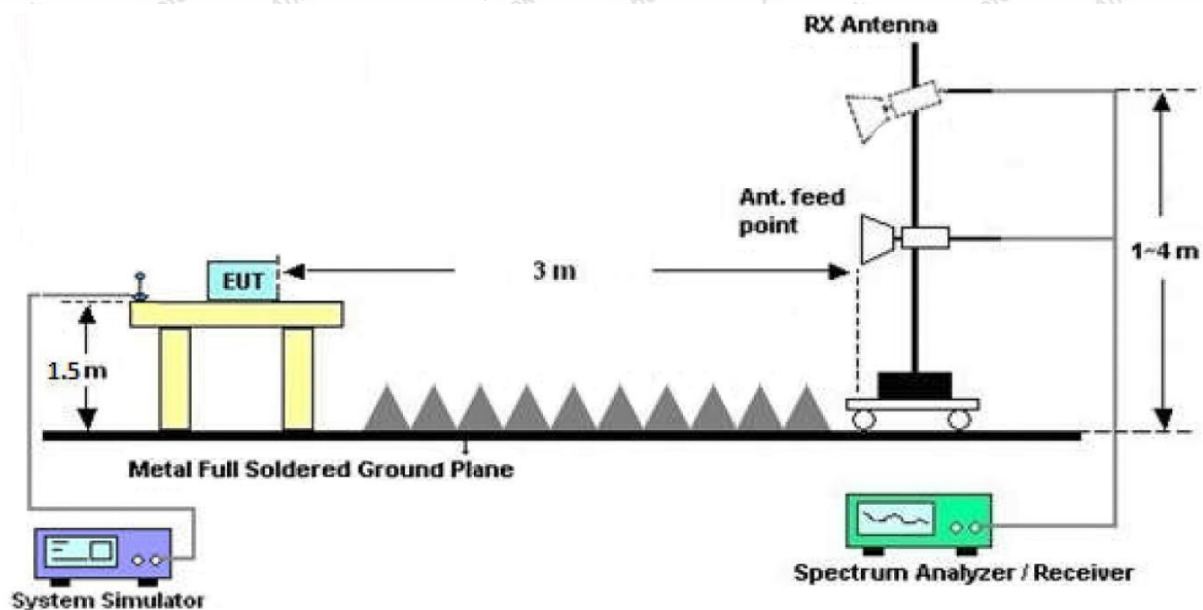


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.



For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

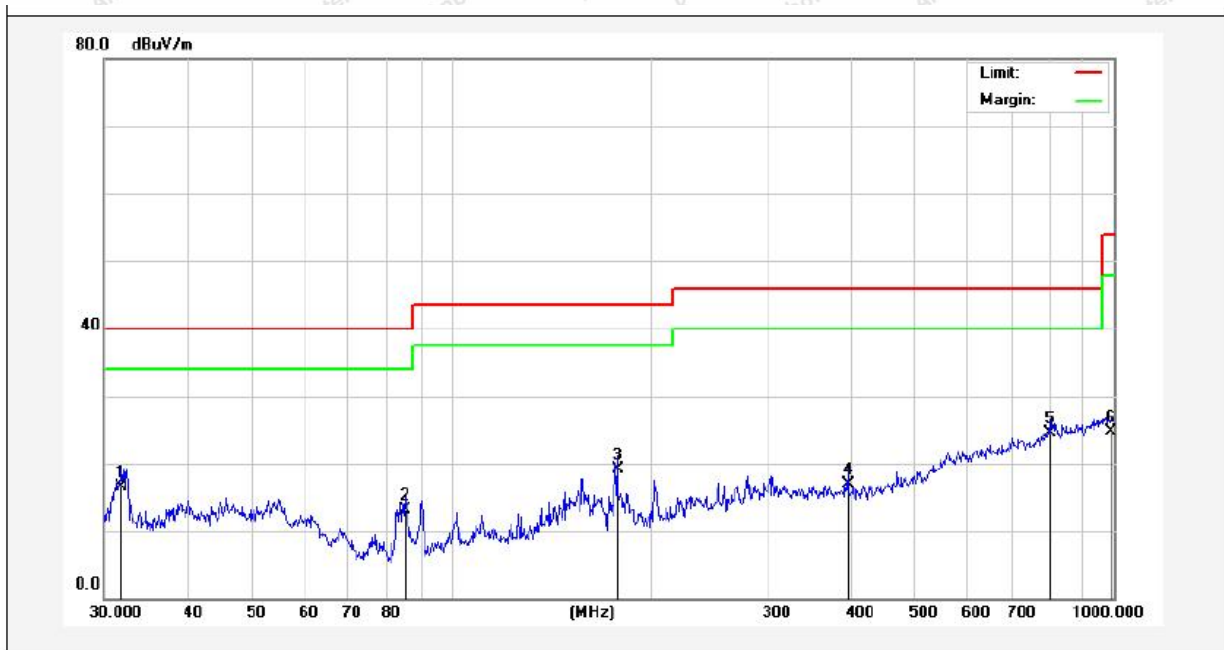
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, only the worst case is recorded in the report.



Test Results (30~1000MHz)

Test Mode: 908.42MHz
Power Source: AC 120V, 60Hz
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 22.5°C/50%RH

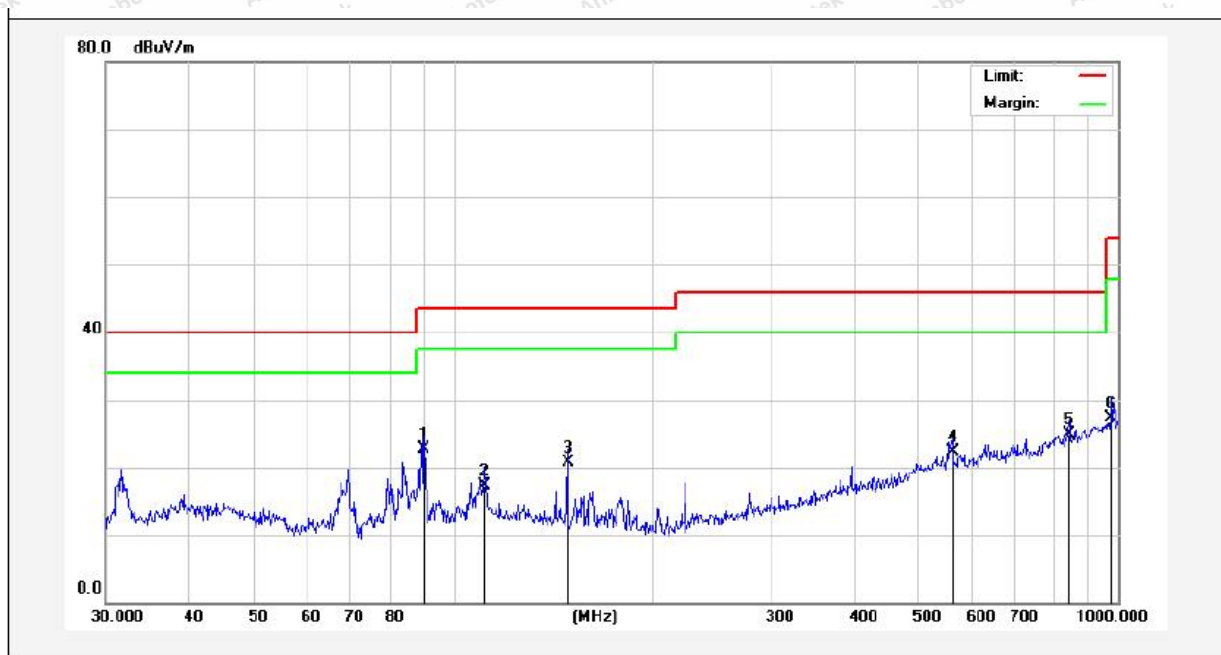


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.8427	36.01	-19.59	16.42	40.00	-23.58	QP			
2	85.2980	35.01	-21.97	13.04	40.00	-26.96	QP			
3	178.1327	42.31	-23.26	19.05	43.50	-24.45	QP			
4	396.2415	33.04	-16.13	16.91	46.00	-29.09	QP			
5	798.9797	32.83	-8.27	24.56	46.00	-21.44	QP			
6	989.5355	29.75	-4.95	24.80	54.00	-29.20	QP			



Test Results (30~1000MHz)

Test Mode: 908.42MHz
Power Source: AC 120V, 60Hz
Polarization: Vertical
Temp.(°C)/Hum.(%RH): 22.5°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	90.2205	40.18	-17.56	22.62	43.50	-20.88	QP			
2	111.3468	35.73	-18.42	17.31	43.50	-26.19	QP			
3	148.4410	42.85	-22.10	20.75	43.50	-22.75	QP			
4	562.6624	33.83	-11.46	22.37	46.00	-23.63	QP			
5	842.1295	32.59	-7.61	24.98	46.00	-21.02	QP			
6	975.7528	32.53	-5.19	27.34	54.00	-26.66	QP			

The EUT received input Voltage DC 3V from Debug board, and the Debug board via Notebook received input Voltage AC 120V/60Hz from Adapter.



Test Results (1GHz-25GHz)

Test channel: Lowest						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1816.84	29.32	17.31	46.63	74.00	-27.37	Vertical
2725.26	29.24	20.70	49.94	74.00	-24.06	Vertical
3633.68	30.38	22.46	52.84	74.00	-21.16	Vertical
4542.10	*			74.00		Vertical
5450.52	*			74.00		Vertical
1816.84	28.91	17.31	46.22	74.00	-27.78	Horizontal
2725.26	30.08	20.70	50.78	74.00	-23.22	Horizontal
3633.68	28.48	22.46	50.94	74.00	-23.06	Horizontal
4542.10	*			74.00		Horizontal
5450.52	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
1816.84	17.59	17.31	34.90	54.00	-19.10	Vertical
2725.26	18.29	20.70	38.99	54.00	-15.01	Vertical
3633.68	19.85	22.46	42.31	54.00	-11.69	Vertical
4542.10	*			54.00		Vertical
5450.52	*			54.00		Vertical
1816.84	17.24	17.31	34.55	54.00	-19.45	Horizontal
2725.26	19.11	20.70	39.81	54.00	-14.19	Horizontal
3633.68	17.99	22.46	40.45	54.00	-13.55	Horizontal
4542.10	*			54.00		Horizontal
5450.52	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test channel: Middle

Peak value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1832.00	28.87	17.42	46.29	74.00	-27.71	Vertical
2748.00	29.21	20.76	49.97	74.00	-24.03	Vertical
3664.00	29.88	22.47	52.35	74.00	-21.65	Vertical
4580.00	*			74.00		Vertical
5496.00	*			74.00		Vertical
1832.00	28.72	17.42	46.14	74.00	-27.86	Horizontal
2748.00	29.95	20.76	50.71	74.00	-23.29	Horizontal
3664.00	28.20	22.47	50.67	74.00	-23.33	Horizontal
4580.00	*			74.00		Horizontal
5496.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	
1832.00	17.68	17.42	35.10	54.00	-18.90	polarization
2748.00	18.15	20.76	38.91	54.00	-15.09	Vertical
3664.00	19.70	22.47	42.17	54.00	-11.83	Vertical
4580.00	*			54.00		Vertical
5496.00	*			54.00		Vertical
1832.00	17.35	17.42	34.77	54.00	-19.23	Vertical
2748.00	19.46	20.76	40.22	54.00	-13.78	Horizontal
3664.00	18.29	22.47	40.76	54.00	-13.24	Horizontal
4580.00	*			54.00		Horizontal
5496.00	*			54.00		Horizontal



Test Results (1GHz-25GHz)

Test channel: Highest						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1842.00	29.00	17.53	46.53	74.00	-27.47	Vertical
2763.00	29.37	20.85	50.22	74.00	-23.78	Vertical
3684.00	30.58	22.49	53.07	74.00	-20.93	Vertical
4605.00	*			74.00		Vertical
5526.00	*			74.00		Vertical
1842.00	28.86	17.53	46.39	74.00	-27.61	Horizontal
2763.00	30.16	20.85	51.01	74.00	-22.99	Horizontal
3684.00	28.58	22.49	51.07	74.00	-22.93	Horizontal
4605.00	*			74.00		Horizontal
5526.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
1842.00	18.80	17.53	36.33	54.00	-17.67	Vertical
2763.00	19.42	20.85	40.27	54.00	-13.73	Vertical
3684.00	20.35	22.49	42.84	54.00	-11.16	Vertical
4605.00				54.00		Vertical
5526.00				54.00		Vertical
1842.00	18.53	17.53	36.06	54.00	-17.94	Horizontal
2763.00	20.26	20.85	41.11	54.00	-12.89	Horizontal
3684.00	18.44	22.49	40.93	54.00	-13.07	Horizontal
4605.00	*			54.00		Horizontal
5526.00	*			54.00		Horizontal

Remark:

1.Result =Reading + Factor

2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

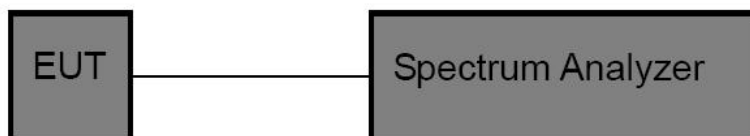


5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(3)
Test Limit	1W (30dBm)

5.2. Test Setup



5.3. Test Procedure

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

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

5.4. Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V	Temperature	:	23.6℃
Test Result	:	PASS	Humidity	:	53 %

Test Channel	Peak Power output (dBm)	Limit (dBm)	Results
Low	9.317	30	PASS
Middle	9.236	30	PASS
High	9.200	30	PASS

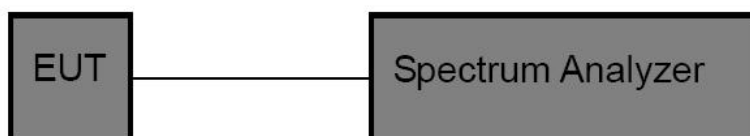


6. 6DB Occupy Bandwidth Test

6.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(2)
Test Limit	>500kHz

6.2. Test Setup



6.3. Test Procedure

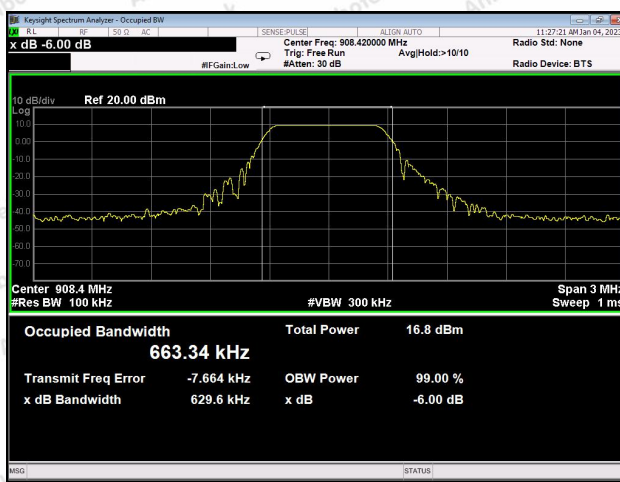
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW = 100kHz, VBW $\geq$ 3*RBW
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

6.4. Test Data

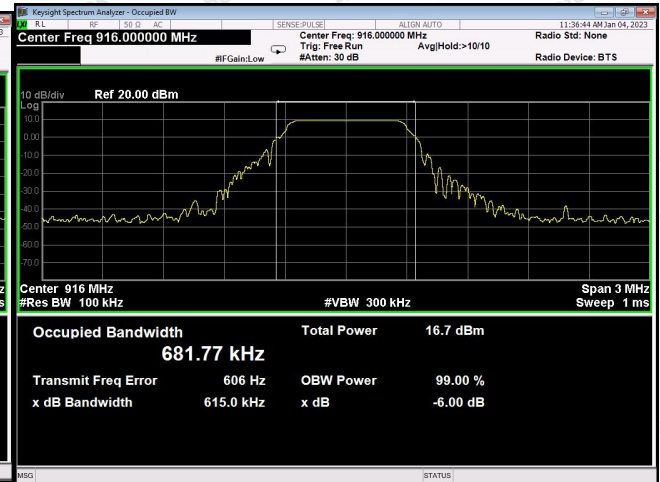
Test Item	: 6dB Bandwidth	Test Mode	: CH Low ~ CH High
Test Voltage	: DC 3V	Temperature	: 23.6°C
Test Result	: PASS	Humidity	: 53 %

Channel	Bandwidth (kHz)	Limit (kHz)	Results
Low	629.6	>500	PASS
Middle	615.0	>500	PASS
High	638.4	>500	PASS

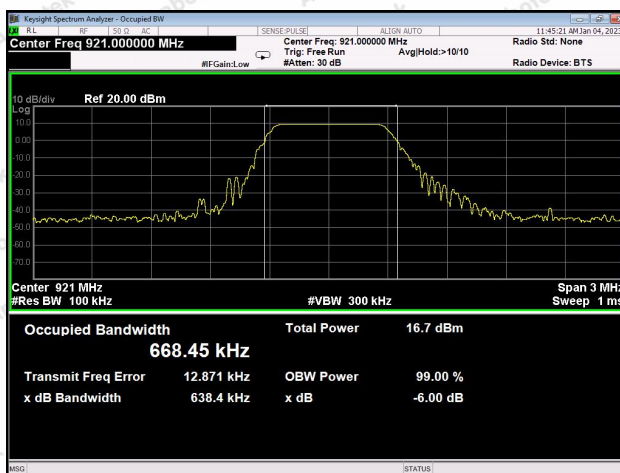




Low Channel



Mid Channel



High Channel

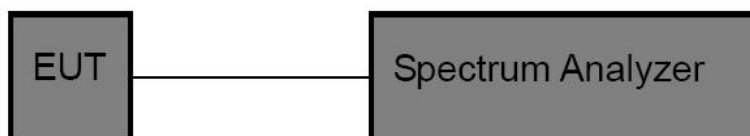


7. Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (e)
Test Limit	8dBm/3KHz

7.2. Test Setup



7.3. Test Procedure

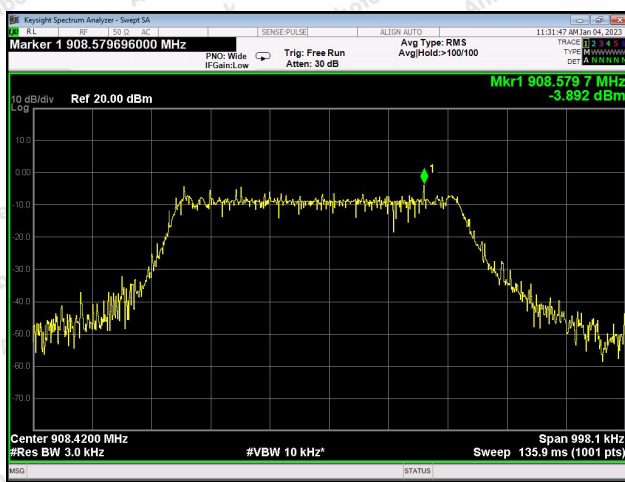
1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5xDTS BW
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

7.4. Test Data

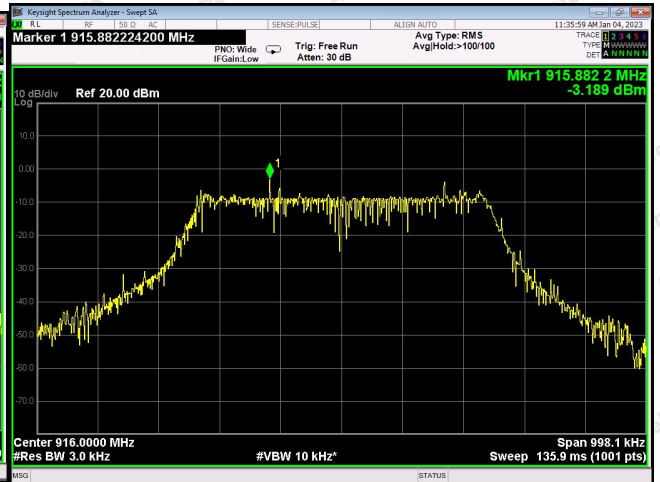
Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V	Temperature	:	23.6℃
Test Result	:	PASS	Humidity	:	53 %

Channel	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
Low	-3.892	8.00	PASS
Middle	-3.189	8.00	PASS
High	-3.137	8.00	PASS

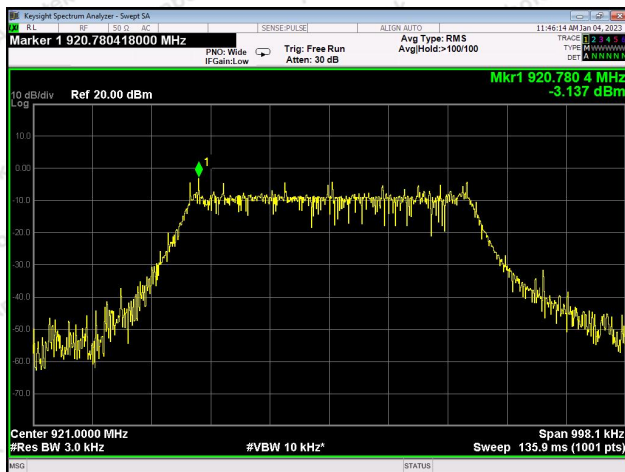




Low Channel



Mid Channel



High Channel

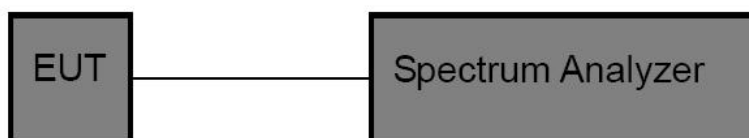


8. 100kHz Bandwidth of Frequency Band Edge Requirement

8.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is 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, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

8.2. Test Setup



8.3. Test Procedure

Using the following spectrum analyzer setting:

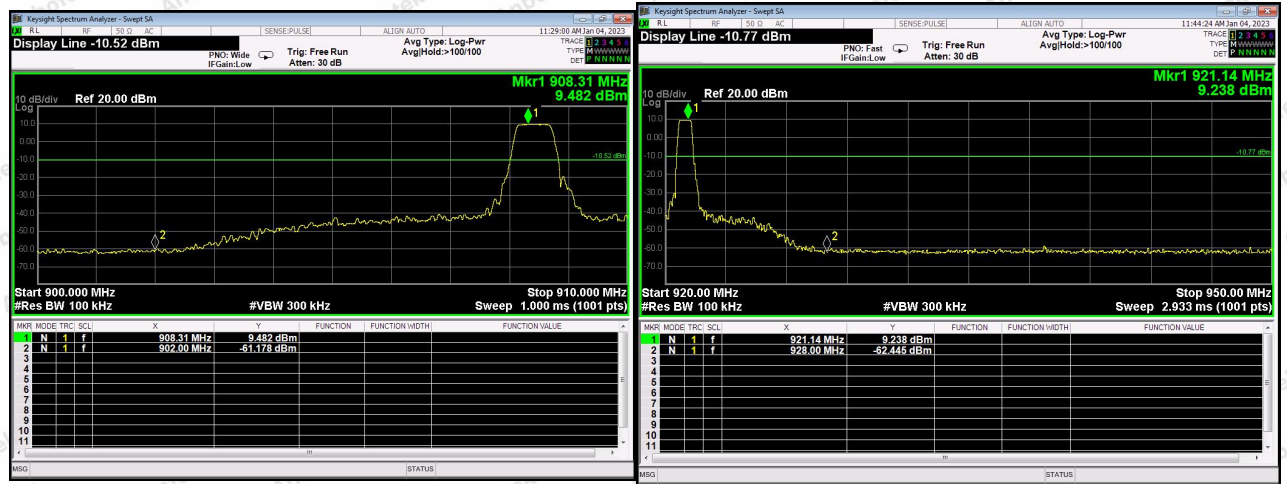
1. Set the RBW = 100KHz.
2. Set the VBW = 300KHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

8.4. Test Data

Test Item	:	Band edge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V	Temperature	:	23.6℃
Test Result	:	PASS	Humidity	:	53 %



Band edge measurements

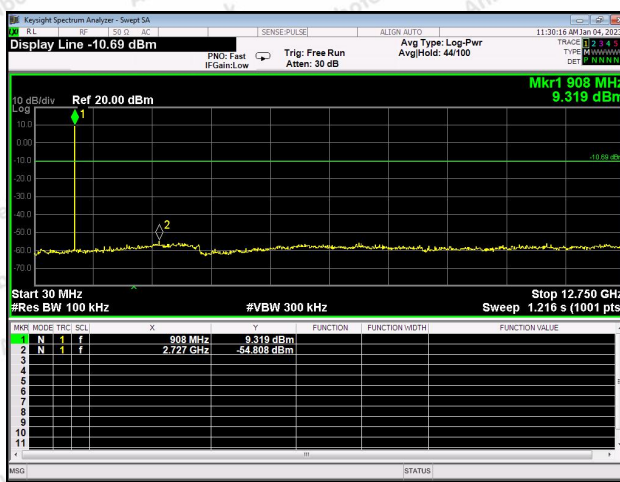


Lowest

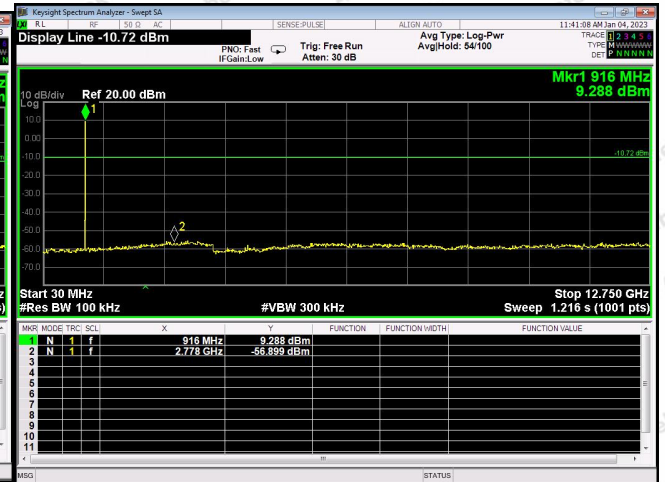
Highest



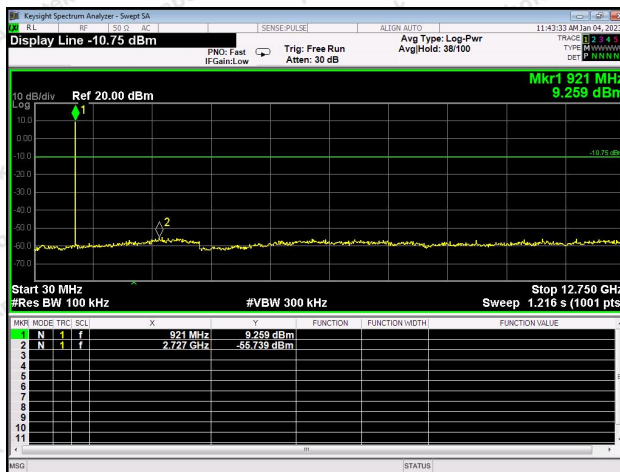
Conducted Emission Method



Low Channel



Mid Channel



High Channel



9. Antenna Requirement

9.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	1) 15.203 requirement: 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. 2) 15.247(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

9.2. Antenna Connected Construction

The antenna is a External antenna which permanently attached, and the best case gain of the antenna is 1.5dBi dBi. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

