



FCC TEST REPORT

FCC ID: 2AOV6-GRFWC1009

On Behalf of

Shenzhen Minsuo Industrial Co., Ltd

4 in 1 Foldable Wireless Charger

Model No.: GRFWC1009, MP-306

Prepared for : Shenzhen Minsuo Industrial Co., Ltd
Address : 12th floor, Block B, Tengyao Building, No.268 Gushu 2nd road, Xixiang
Town, Bao'an District, Shenzhen, Guangdong, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

Report Number : A2412256-C01-R01
Date of Receipt : December 24, 2024
Date of Test : December 24, 2024 – January 3, 2025
Date of Report : January 6, 2025
Version Number : V0
Test Result : Pass

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TEST REPORT DECLARATION

Applicant : Shenzhen Minsuo Industrial Co., Ltd
Address : 12th floor, Block B, Tengyao Building, No.268 Gushu 2nd road, Xixiang Town,
Bao'an District, Shenzhen, Guangdong, China
Manufacturer : Shenzhen Minsuo Industrial Co., Ltd
Address : 12th floor, Block B, Tengyao Building, No.268 Gushu 2nd road, Xixiang Town,
Bao'an District, Shenzhen, Guangdong, China
EUT Description : 4 in 1 Foldable Wireless Charger
(A) Model No. : GRFWC1009, MP-306
(B) Trademark : N/A

Measurement Standard Used:

FCC CFR Title 47 Part 15 Subpart C Section 15.209

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC CFR Title 47 Part 15 Subpart C Section 15.209 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:

Yannis Wen
Project Engineer

Yannis Wen

Approved by (name + signature).....:

Jack Xu
Project Manager

Jack Xu

Date of issue.....

January 6, 2025

Revision History

Revision	Issue Date	Revisions	Revised By
V0	January 6, 2025	Initial released Issue	Yannis Wen

1. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS
Occupied Bandwidth	§15.215 (c)	PASS

Note:

1. *PASS: Test item meets the requirement.*
2. *Fail: Test item does not meet the requirement.*
3. *N/A: Test case does not apply to the test object.*
4. *The test result judgment is decided by the limit of test standard.*

2. General Information

2.1. Description of Device (EUT)

EUT Name	: 4 in 1 Foldable Wireless Charger
Model No.	: GRFWC1009, MP-306
DIFF.	: There is no difference between the models except the appearance color. So all the test were performed on the model GRFWC1009.
Power supply	: Input: 9V DC, 3A MAX Output: 15W/10W/7.5W/5W Watch: 2W Earbuds: 3W
Radio Technology	: Wireless power transmission systems
Operation frequency	: 115~205KHz, 325KHz
Modulation	: MSK
Antenna Type	: Coil Antenna, Maximum Gain is 0dBi (This value is supplied by applicant).
Software version	: V1.0
Hardware version	: V1.0
Intend use environment	: Residential, commercial and light industrial environment

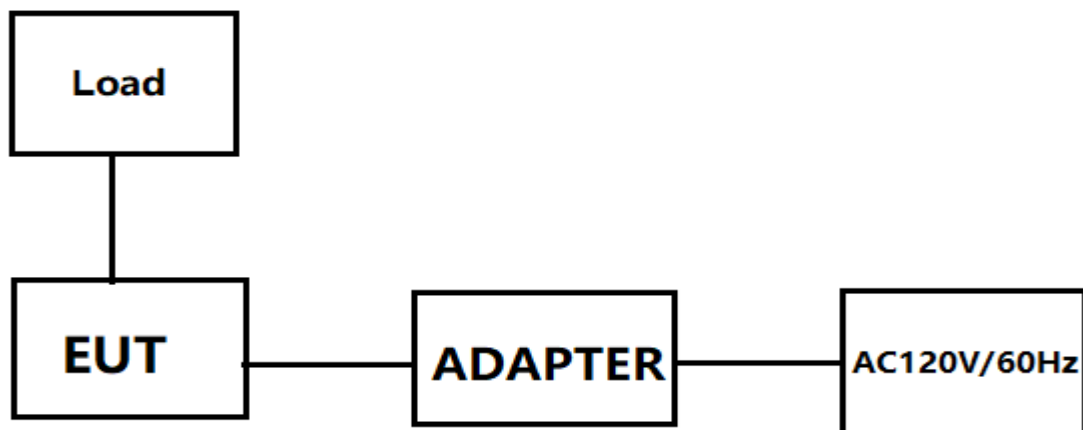
2.2. Accessories of Device (EUT)

Accessories1 : Cable
 Manufacturer : Shenzhen Minsuo Industrial Co., Ltd
 Model : /
 Ratings : /

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1	Load	YBZ	--	--	--
2	AC ADAPTER	Shenzhen HUONIU Technology Co., Ltd.	HNFCQC3024UU	--	--
3	earphone	--	--	--	--

2.4. Block Diagram of Connection between EUT and Simulators



2.5. Description of Test Modes

Mode	Frequency (KHz)
1	129
2	138
3	325
4	129+138+325

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	24°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

July 15, 2019 Certificated by IC

Registration Number: 12135A

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9. Test Equipment List

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.18	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2024.08.08	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2024.08.08	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2024.08.08	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2024.08.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2024.08.08	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2024.08.08	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2024.08.08	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2024.08.08	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2024.08.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2024.08.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2024.08.08	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	2Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2024.08.08	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2024.08.08	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2024.08.08	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2024.08.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2024.08.08	1 Year
Adjustable attenuator	MWRFTtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

3. Test Results and Measurement Data

3.1. Conducted Emission

3.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	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
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													
Test Setup:	Reference Plane E.U.T Adapter LISN Filter AC power EMI Receiver Test table/Insulation plane 40cm 80cm Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Transmitting Mode														
Test Procedure:	1. The E.U.T is connected to an adapter 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: 2013 on conducted measurement.														
Test Result:	PASS														

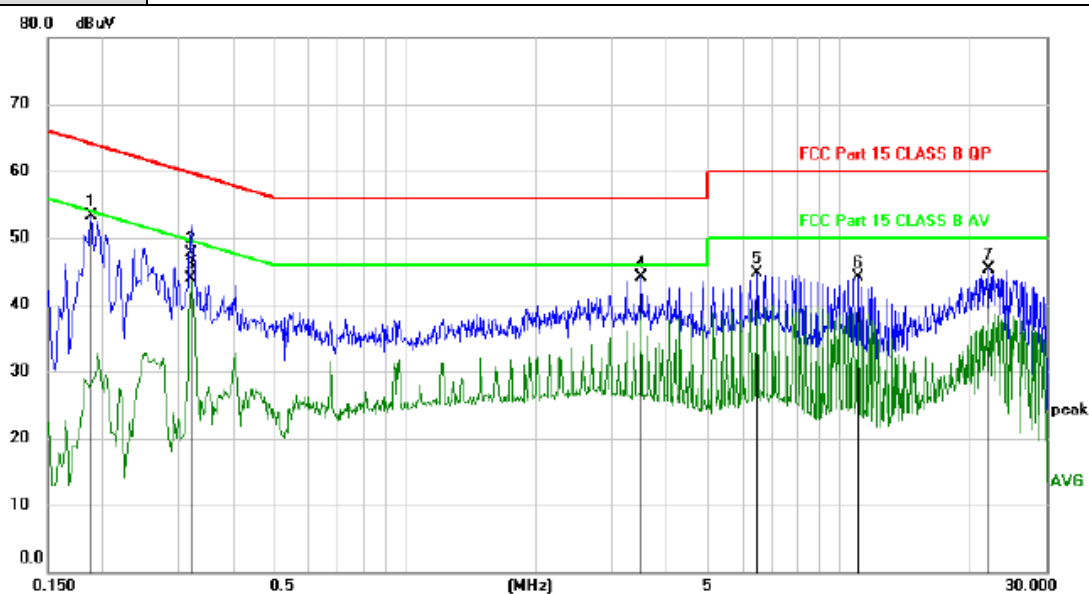
3.1.2. Test Data

Please refer to following diagram for individual

Test Mode	: TM1
Test Result	: PASS
Note:	The test results are listed in next pages. All test modes has been tested, this report only reflected the worst mode.(TM1) If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

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Line



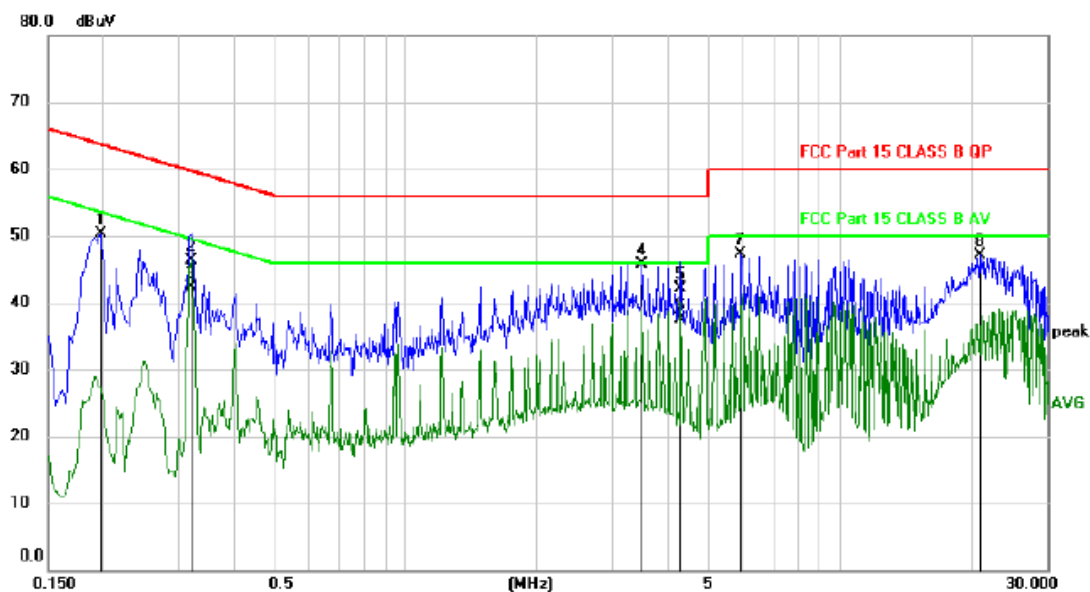
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	Comment
1		0.1890	43.36	9.92	53.28	64.08	-10.80	peak
2		0.3209	37.71	9.93	47.64	59.68	-12.04	QP
3	*	0.3209	33.99	9.93	43.92	49.68	-5.76	AVG
4		3.5010	34.17	9.96	44.13	56.00	-11.87	peak
5		6.4650	34.66	10.10	44.76	60.00	-15.24	peak
6		11.0460	33.82	10.23	44.05	60.00	-15.95	peak
7		22.0770	34.76	10.46	45.22	60.00	-14.78	peak

*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1980	40.44	9.92	50.36	63.69	-13.33	peak	
2		0.3209	36.30	9.93	46.23	59.68	-13.45	QP	
3	*	0.3209	32.47	9.93	42.40	49.68	-7.28	AVG	
4		3.5010	35.80	9.96	45.76	56.00	-10.24	peak	
5		4.3110	32.06	9.99	42.05	56.00	-13.95	QP	
6		4.3110	27.51	9.99	37.50	46.00	-8.50	AVG	
7		5.9220	37.29	10.08	47.37	60.00	-12.63	peak	
8		21.0120	36.58	10.46	47.04	60.00	-12.96	peak	

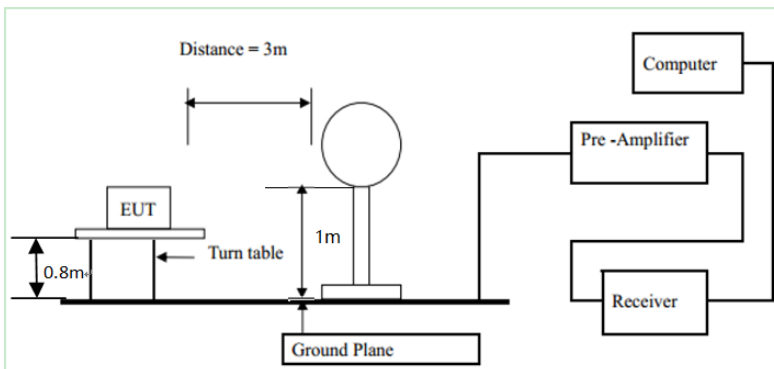
*:Maximum data x:Over limit !:over margin

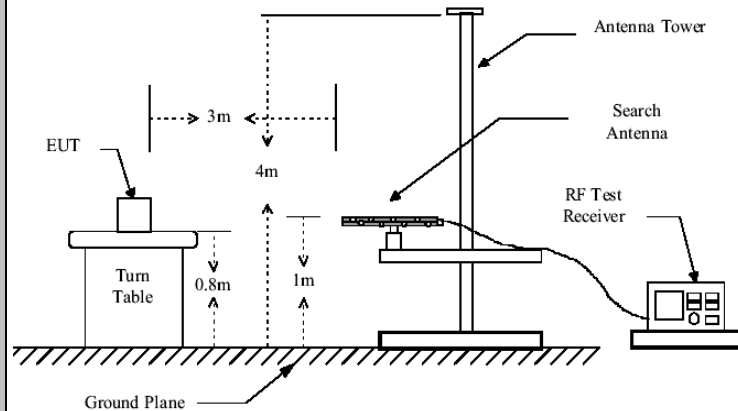
(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

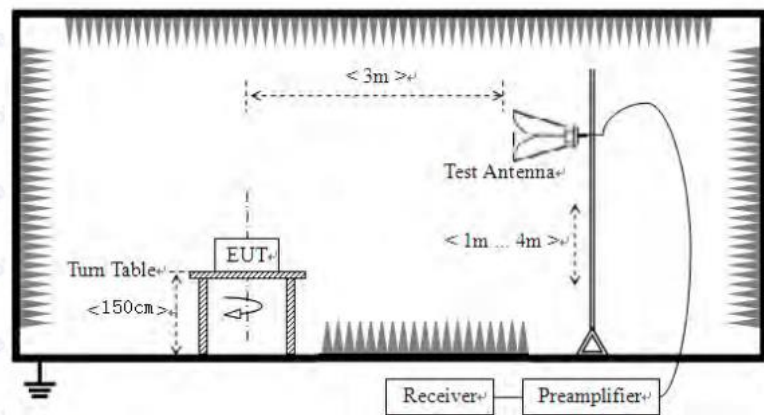
3.2. Radiated Spurious Emission Measurement

3.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10: 2013				
Frequency Range:	9 kHz to 25 GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Refer to item 4.1				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz-150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit:	Frequency		Field Strength (microvolts/meter)		Measurement Distance (meters)
	0.009-0.490		2400/F(KHz)		300
	0.490-1.705		24000/F(KHz)		30
	1.705-30		30		30
	30-88		100		3
	88-216		150		3
	216-960		200		3
	Above 960		500		3
	Frequency		Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
	Above 1GHz		500	3	Average
		5000	3	Peak	
Test setup:	For radiated emissions below 30MHz				
					
	30MHz to 1GHz				



Above 1GHz



Test Procedure:

1. For the radiated emission test below 1GHz:

The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.

For the radiated emission test above 1GHz:

Place the measurement antenna on a turntable with 1.5 meter above ground, which is 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.

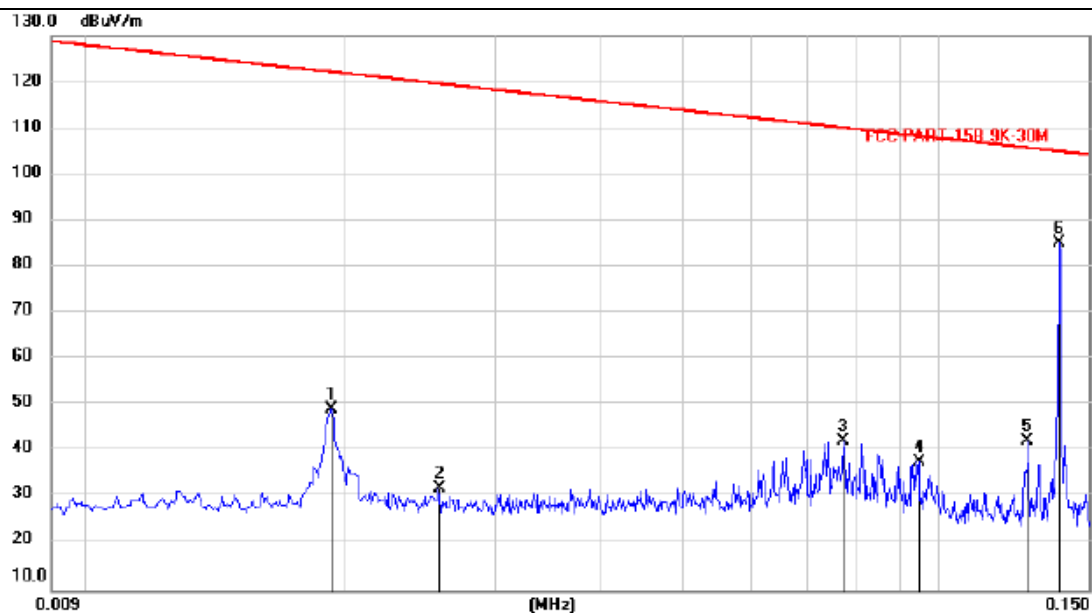
2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using

	the quasi-peak detector and reported. 4. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Test mode:	Refer to section 4.1 for details
Test results:	PASS

3.2.2. Test Data

Please refer to following diagram for individual

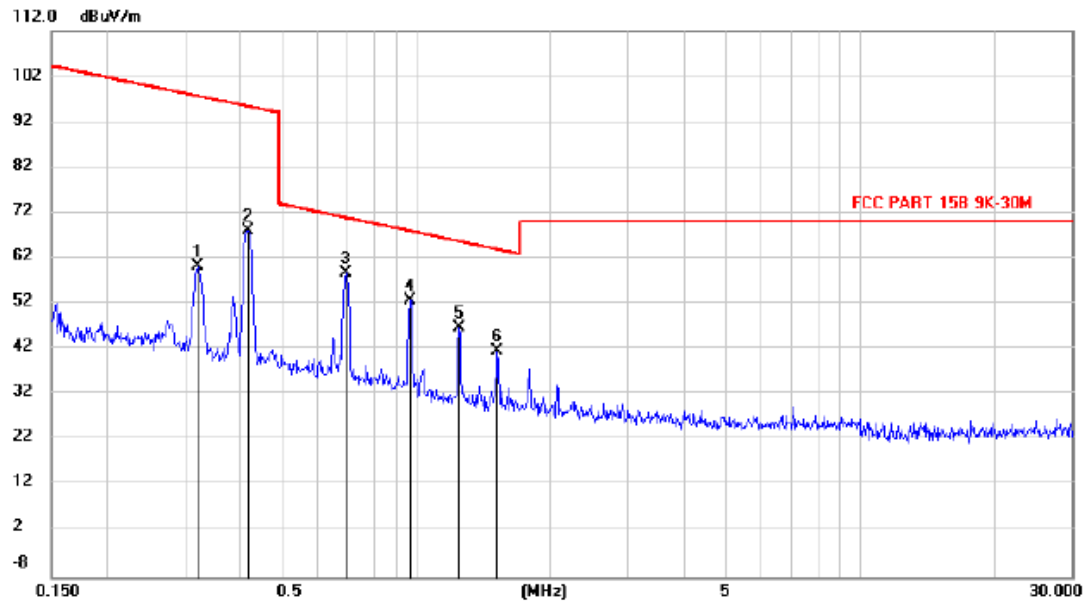
Frequency Range	: 9KHz~30MHz
Polarization	: Coaxial
Test Mode	: TX: 138kHz
Test Results	: PASS
Note:	1. The test results are listed in next pages. 2. This mode is worst case mode, so this report only reflected the worst mode. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		0.0192	27.93	21.27	49.20	122.1	-72.92	peak		
2		0.0258	11.00	21.10	32.10	119.5	-87.46	peak		
3		0.0771	22.04	20.09	42.13	110.0	-67.93	peak		
4		0.0946	17.81	19.85	37.66	108.2	-70.62	peak		
5		0.1272	22.41	19.87	42.28	105.7	-63.43	peak		
6	*	0.1385	64.98	20.03	85.01	104.9	-19.96	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		0.3206	40.20	19.96	60.16	97.68	-37.52	peak		
2		0.4151	48.34	19.82	68.16	95.44	-27.28	peak		
3	*	0.6933	38.97	19.82	58.79	70.94	-12.15	peak		
4		0.9679	32.81	19.98	52.79	67.99	-15.20	peak		
5		1.2462	26.66	20.06	46.72	65.77	-19.05	peak		
6		1.5222	21.45	20.13	41.58	64.00	-22.42	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

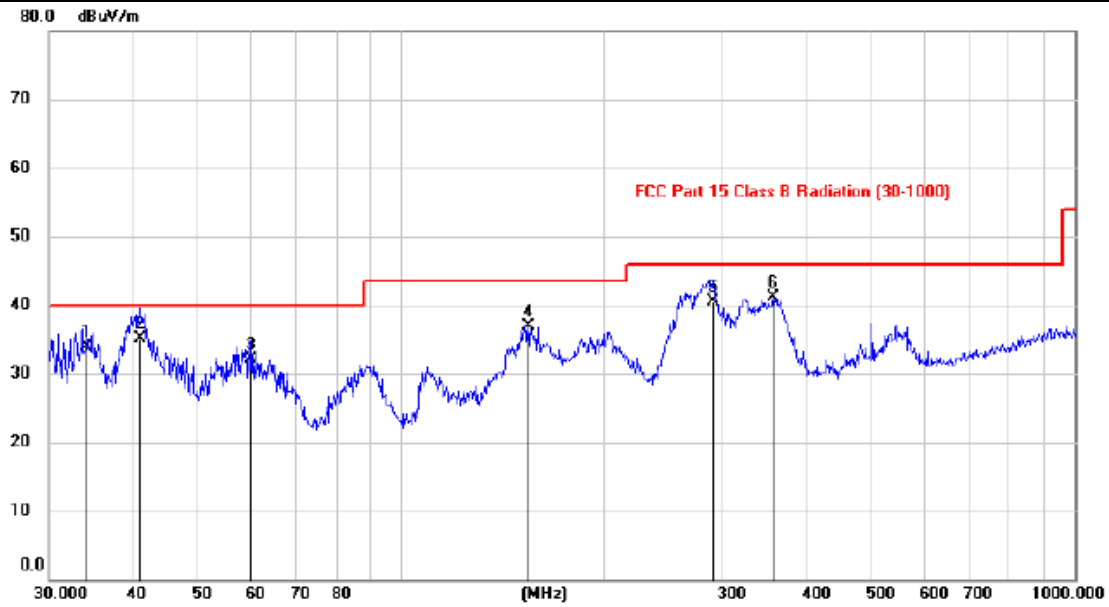
2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

Frequency Range	: 30MHz~1000MHz
Test Mode	: Full Load
Test Results	: PASS
Note:	1. The test results are listed in next pages. 2. All test modes has been tested, this report only reflected the worst mode. (Charging+5W) 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

Frequency Range		: Above 1GHz
EUT	: /	Test Date : /
M/N	: /	Temperature : /
Test Engineer	: /	Humidity : /
Test Mode : /		
Test Results : N/A		
Note:	1. The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang above 1GHz radiation test not applicable.	

30MHz-1GHz

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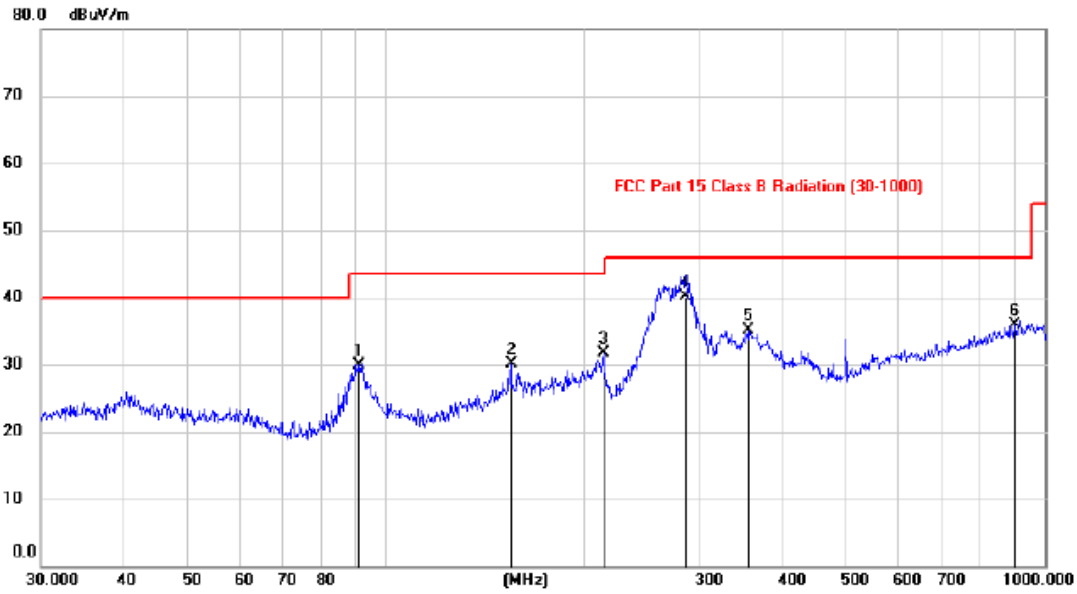


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		34.2240	20.27	13.71	33.98	40.00	-6.02	QP		
2	*	40.9977	20.72	14.34	35.06	40.00	-4.94	QP		
3		59.9219	18.93	13.25	32.18	40.00	-7.82	QP		
4		154.7843	21.84	15.05	36.89	43.50	-6.61	peak		
5		290.6281	26.68	13.89	40.57	46.00	-5.43	QP		
6		357.1764	25.67	15.37	41.04	46.00	-4.96	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Pol	Horizontal
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		90.8767	19.68	10.17	29.85	43.50	-13.65	peak		
2		155.0197	15.01	15.05	30.06	43.50	-13.44	peak		
3		214.2637	20.36	11.35	31.71	43.50	-11.79	peak		
4	*	285.0767	26.31	13.73	40.04	46.00	-5.96	QP		
5		354.3074	19.70	15.32	35.02	46.00	-10.98	peak		
6		900.1474	11.89	24.04	35.93	46.00	-10.07	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

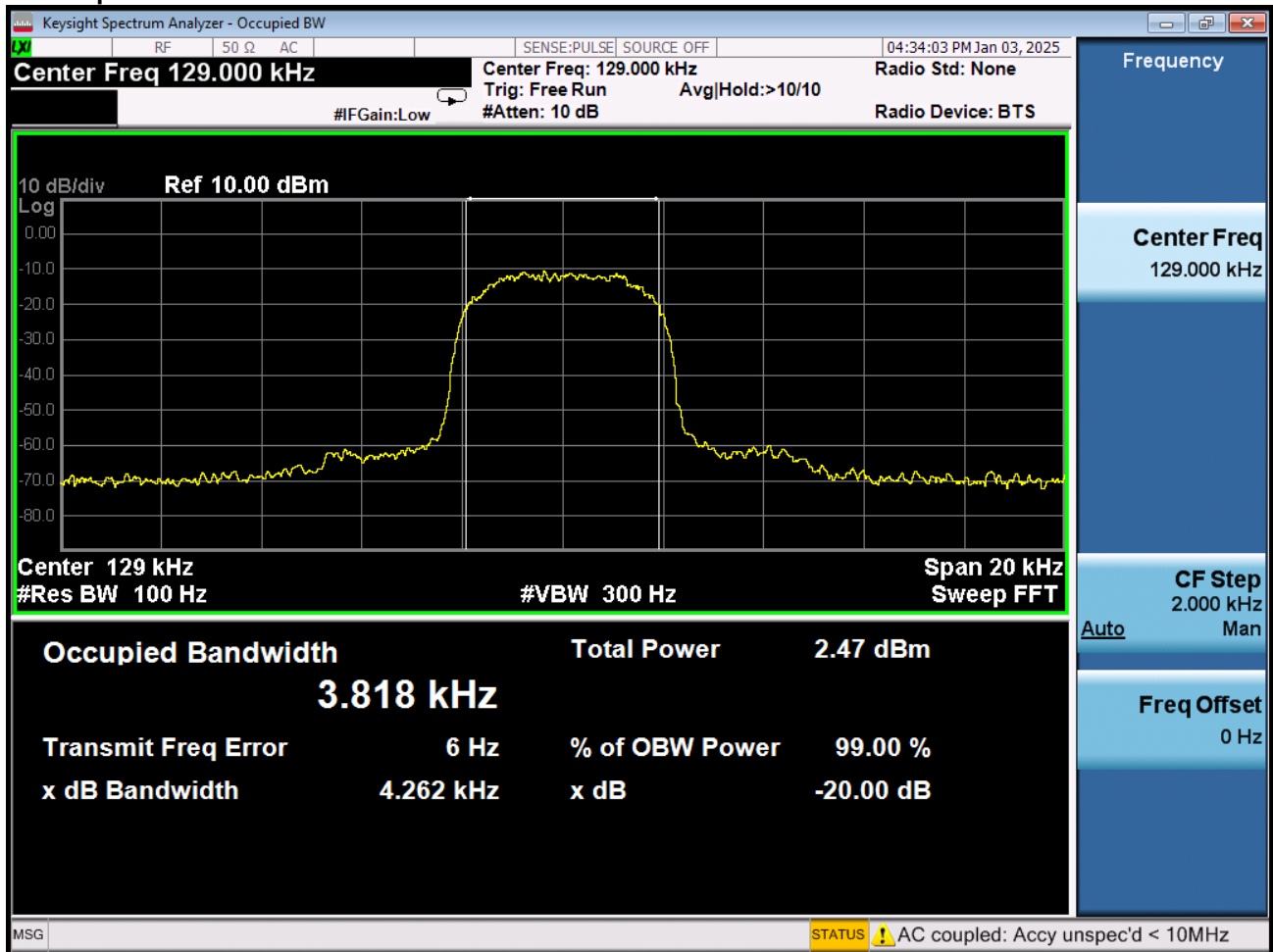
3.3. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW$\geq$1% of the 20 dB bandwidth; VBW$\geq$RBW; Sweep = auto; Detector function = peak; Trace = max hold. 4. Measure and record the results in the test report.
Test setup:	 The diagram illustrates the test setup. On the left is a green Spectrum Analyzer with a blue screen. A cable connects it to a small white rectangular component, which is then connected to a yellow rectangular component labeled 'EUT' (Equipment Under Test).
Test Mode:	Refer to section 4.1 for details
Test results:	PASS

3.3.1. Test Data

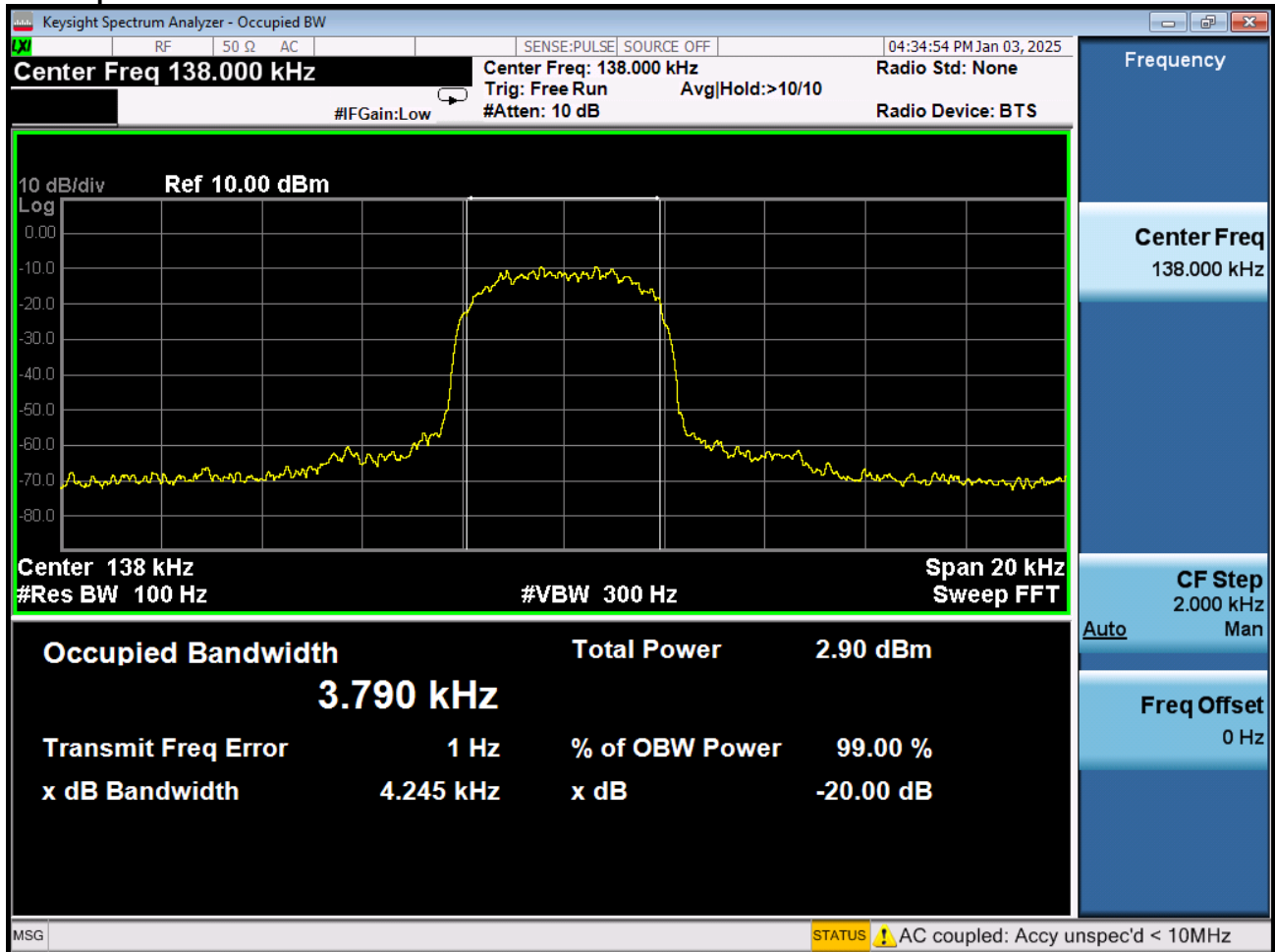
Frequency(KHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
129	4.262	---	PASS

Test plots as follows:



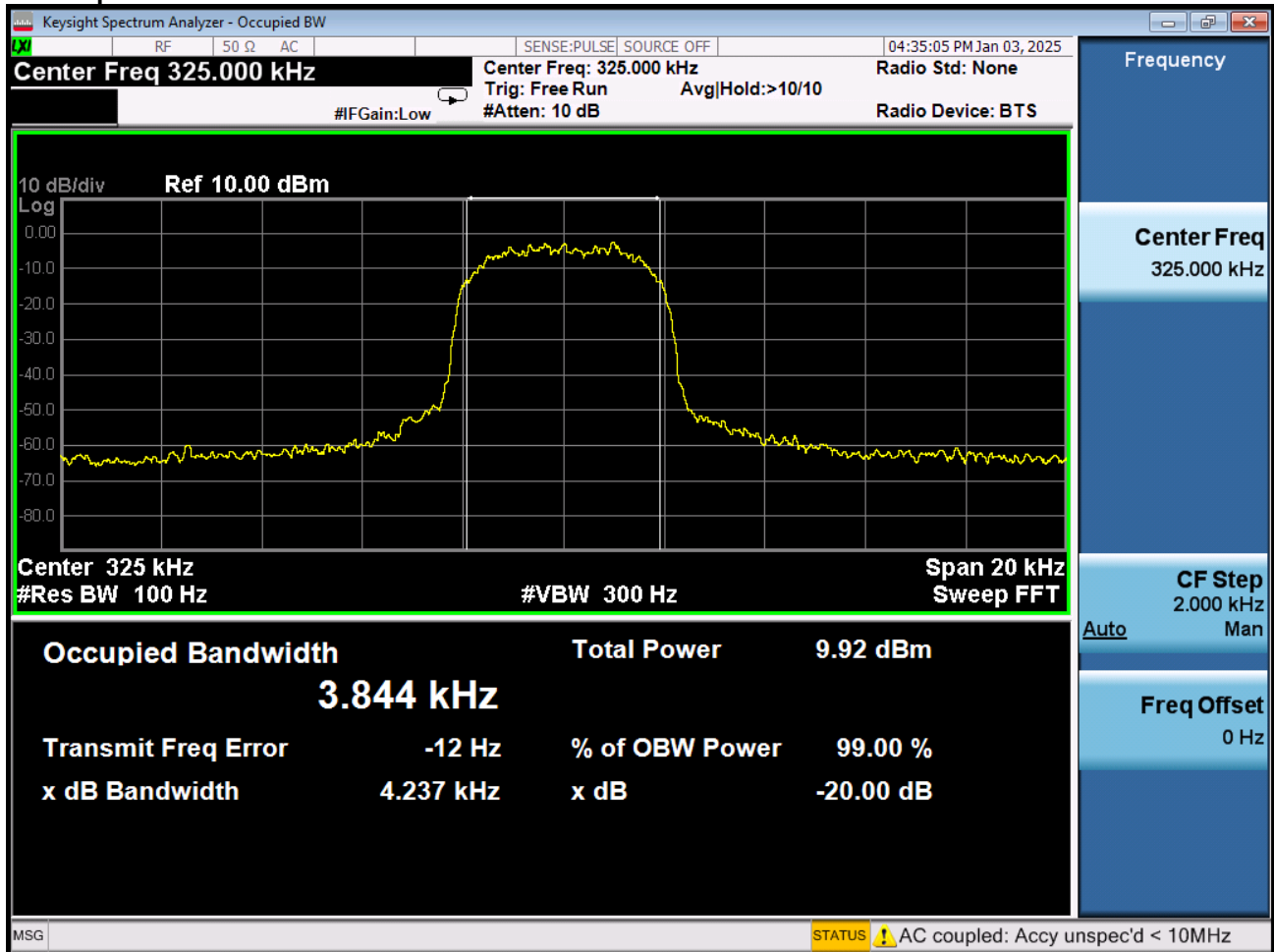
Frequency(KHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
138	4.245	---	PASS

Test plots as follows:



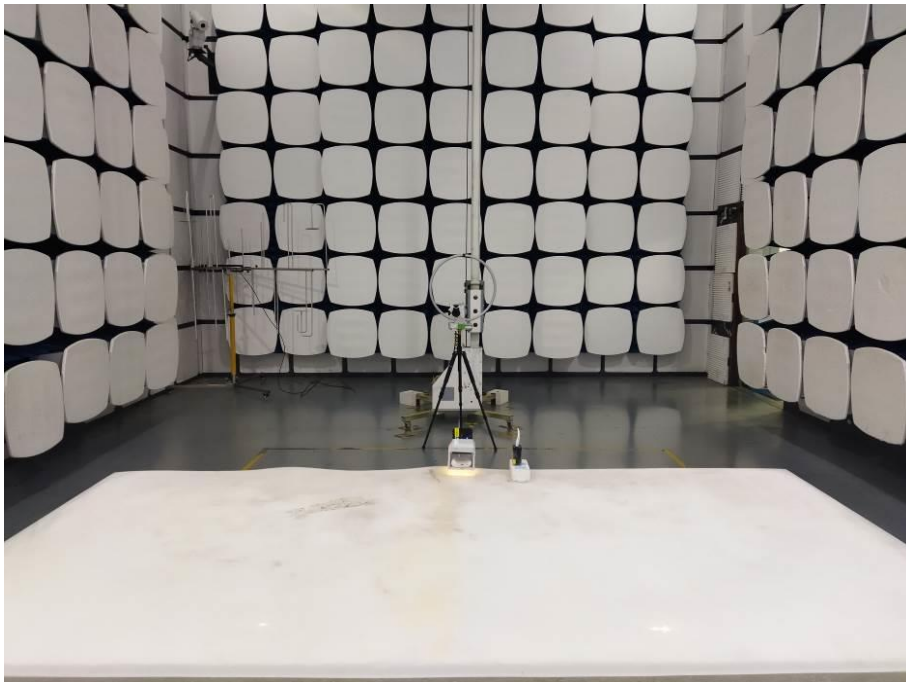
Frequency(KHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
325	4.237	---	PASS

Test plots as follows:



4. Photos of Test Setup

Radiated Emission



Conducted Emission



5. Photographs of EUT



