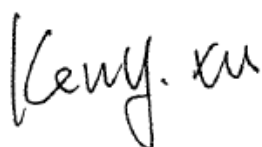


TEST REPORT

Application No.: SZEM1906015694CR
Applicant: SHENZHEN DNS INDUSTRIES CO., LTD.
Address of Applicant: 23/F Building A, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian, Shenzhen, 518026 China
Manufacturer: SHENZHEN DNS INDUSTRIES CO., LTD.
Address of Manufacturer: 23/F Building A, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian, Shenzhen, 518026 China
Factory: HUIZHOU D&S CABLE CO., LTD.
Address of Factory: Longjin Dongjiang Industry Zone, Shuikou, Huicheng, Huizhou, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Wireless Charger
Model No.: Please refer to section 2 ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark: DNS, mbest, Tech. inc, goji, maxell
FCC ID: ZBCWD210
Standard(s) : 47 CFR Part 15, Subpart C
Date of Receipt: 2019-06-27
Date of Test: 2019-06-29 to 2019-07-22
Date of Issue: 2019-07-24

Test Result:	Pass*
---------------------	--------------

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




Keny Xu
 EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-07-24		Original

Authorized for issue by:			
			
		<hr/> Powell Bao /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.9.2	47 CFR Part 15, Subpart C 15.215	Pass
Restricted Bands	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205	Pass
Radiated Emissions (9kHz-30MHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Remark:

Model No.: WD-210AA, WD-210A, WD-210C, WD-210E, WD-210F, ITM1907-000218, ITM1907-000399, G5WC20, WRS-CHR, 851300, WP-PD21BK, WP-PD21WH, WP-PD21PK, WP-PD21NY, WP-PD21XX (X=A-Z for different colour)

Only the model WD-210AA was tested fully, and the model WD-210E, was performed the Radiated Emissions (9kHz-30MHz) and Radiated Emissions (30MHz-1GHz) for discrepancy, since the electrical circuit design, PCB layout, components used and internal wiring were identical for the above models, with only difference on trade mark, model No, overvoltage protection circuit, NTC design, details as below see:

Trade Mark	Model No.	NTC design	Enclosure shape code
DNS, mbest	WD-210AA	SMD	A
	WD-210A	SMD	A
	WD-210C	SMD	B
	WD-210E	Bonding wire	A
	WD-210F	Bonding wire	B
Tech. inc	ITM1907-000218	SMD	A
	ITM1907-000399	SMD	A
goji	G5WC20	Bonding wire	A
maxell	WRS-CHR	SMD	B
	851300	SMD	B
	WP-PD21BK	SMD	B
	WP-PD21WH	SMD	B
	WP-PD21PK	SMD	B
	WP-PD21NY	SMD	B
	WP-PD21XX (X=A-Z for different colour)	SMD	B



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8.2 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS).....33



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4 General Information

4.1 Details of E.U.T.

Power supply:	Input: DC5V/2A Output: DC5V/1A(5W)
Antenna Type:	Loop Antenna
Modulation Type:	Load Modulation
Operation Frequency:	112.50kHz to 141.67kHz
Software version:	V1.0
Hardware version:	HH11A1 TX1.1
Remark:	Tests were conducted in H/M/L different load modes and the worst case(H load) is reported only.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
USB cable:100cm unshielded	Supplied by SGS	N/A	REF. No.:SEA0700
E-loading	Supplied by client	N/A	5W
Adapter	Apple	A1357 W010A051	REF. No.:SEA0500
iPhone 8	Apple	A1863	F4GVQ656JC6D

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Conduction Emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
3	Occupied Bandwidth	$\pm 3\%$
4	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
5	Temperature test	$\pm 1^\circ\text{C}$
6	Humidity test	$\pm 3\%$
7	Supply voltages	$\pm 1.5\%$
8	Time	$\pm 3\%$



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2020-05-09
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018-07-12	2019-07-11
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018-09-25	2019-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2019-04-01	2020-03-31
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019-04-01	2020-03-31

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Restricted Bands Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Radiated Emissions (9kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018-07-12	2019-07-11



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EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019-04-01	2020-03-31
Trilog-Broadband Antenna(30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2019-04-12	2020-04-11
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

Radiated Emissions (30MHz-1GHz)

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018-07-12	2019-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019-04-01	2020-03-31
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2019-04-12	2020-04-11
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

General used equipment

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement.

Antenna location: Refer to Internal photos.



7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
 Test Method: ANSI C63.10 (2013) Section 6.2
 Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

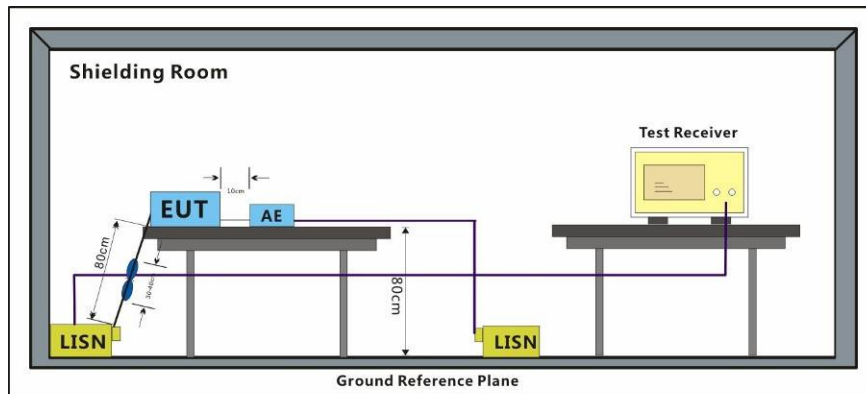
*Decreases with the logarithm of the frequency.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 51 % RH Atmospheric Pressure: 1005 mbar
 Test mode c: TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



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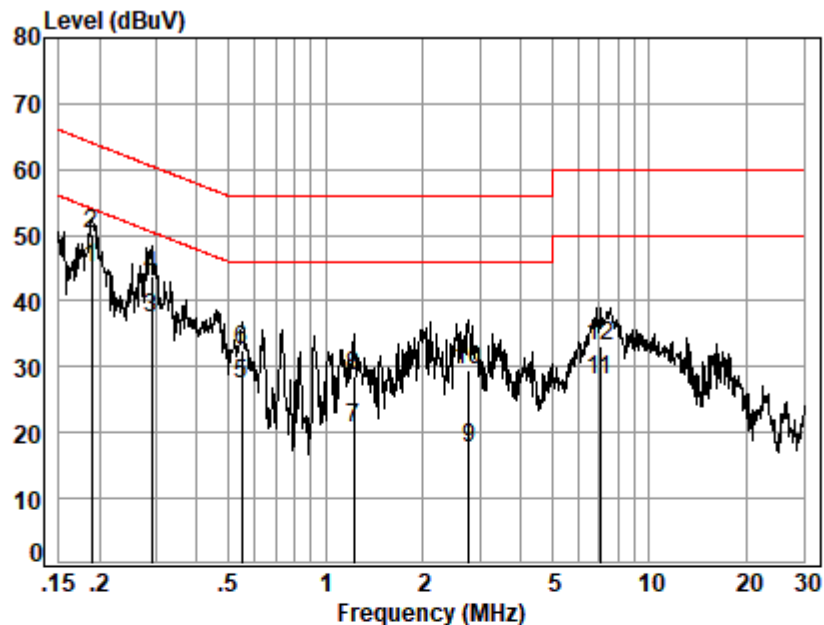
7.1.3 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) 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 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



Mode:c; Line:Live Line



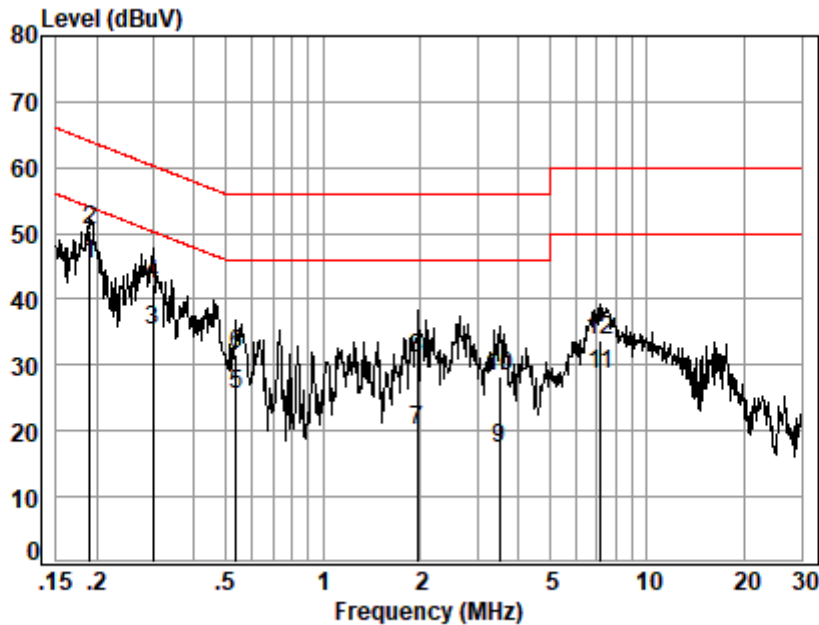
Site : Shielding Room
 Condition: Line
 Job No. : 15694CR
 Test mode: c

	Freq	Cable Loss	LISN Factor	Read Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.1894	0.02	9.66	35.20	54.06	-9.18	Average
2	0.1894	0.02	9.66	40.59	64.06	-13.79	QP
3	0.2893	0.04	9.67	27.84	50.54	-12.99	Average
4	0.2893	0.04	9.67	34.05	60.54	-16.78	QP
5	0.5493	0.06	9.67	17.58	46.00	-18.69	Average
6	0.5493	0.06	9.67	22.71	56.00	-23.56	QP
7	1.2226	0.11	9.73	10.94	46.00	-25.22	Average
8	1.2226	0.11	9.73	18.76	56.00	-27.40	QP
9	2.7794	0.16	9.71	7.90	46.00	-28.23	Average
10	2.7794	0.16	9.71	19.76	56.00	-26.37	QP
11	7.0622	0.17	9.78	18.11	50.00	-21.94	Average
12	7.0622	0.17	9.78	23.36	60.00	-26.69	QP



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Mode:c; Line:Neutral Line



Site : Shielding Room
 Condition: Neutral
 Job No. : 15694CR
 Test mode: c

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1904	0.02	9.64	35.51	45.17	54.02	-8.85	Average
2	0.1904	0.02	9.64	40.81	50.47	64.02	-13.55	QP
3	0.2987	0.04	9.64	25.63	35.31	50.28	-14.97	Average
4	0.2987	0.04	9.64	32.69	42.37	60.28	-17.91	QP
5	0.5378	0.06	9.64	15.80	25.50	46.00	-20.50	Average
6	0.5378	0.06	9.64	21.94	31.64	56.00	-24.36	QP
7	1.9593	0.16	9.69	10.32	20.17	46.00	-25.83	Average
8	1.9593	0.16	9.69	21.08	30.93	56.00	-25.07	QP
9	3.5092	0.16	9.69	7.57	17.42	46.00	-28.58	Average
10	3.5092	0.16	9.69	18.39	28.24	56.00	-27.76	QP
11	7.2135	0.17	9.77	18.64	28.58	50.00	-21.42	Average
12	7.2135	0.17	9.77	23.82	33.76	60.00	-26.24	QP



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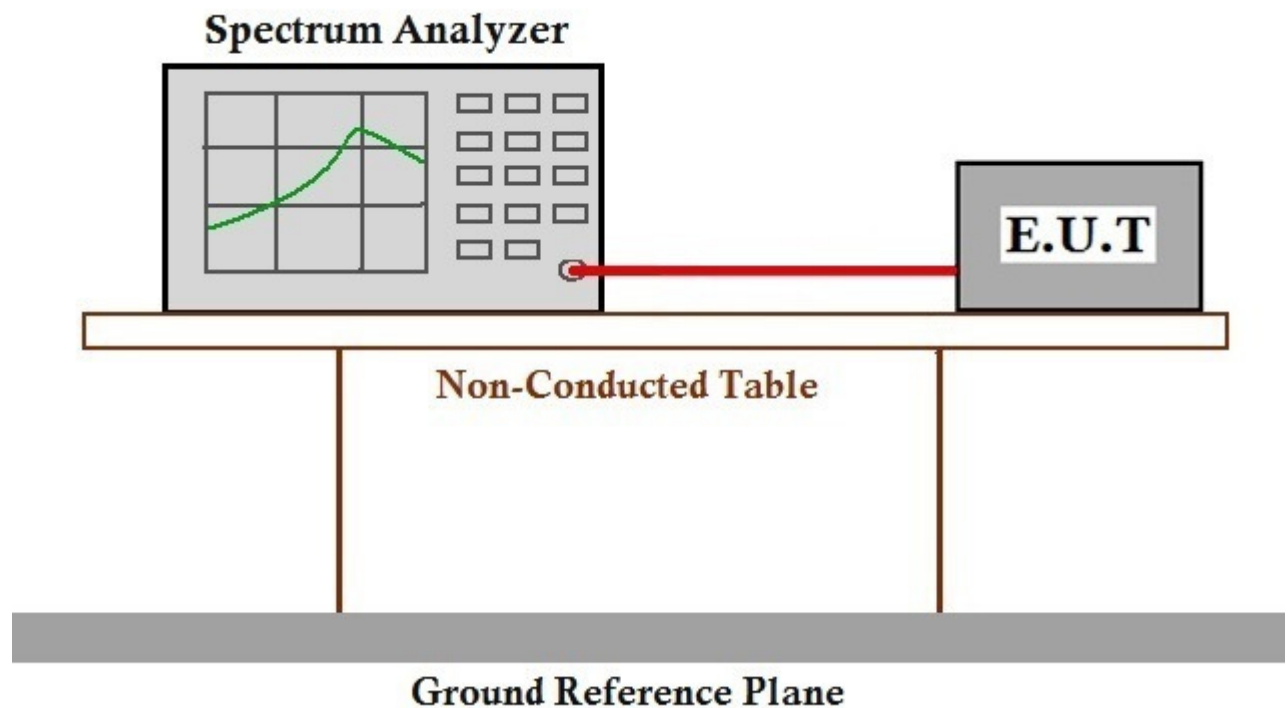
7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215
 Test Method: ANSI C63.10 (2013) Section 6.9.2
 Limit: N/A

7.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 23 °C Humidity: 53 % RH Atmospheric Pressure: 1005 mbar
 Test mode c: TX mode_Keep the EUT in transmitting with modulation mode.

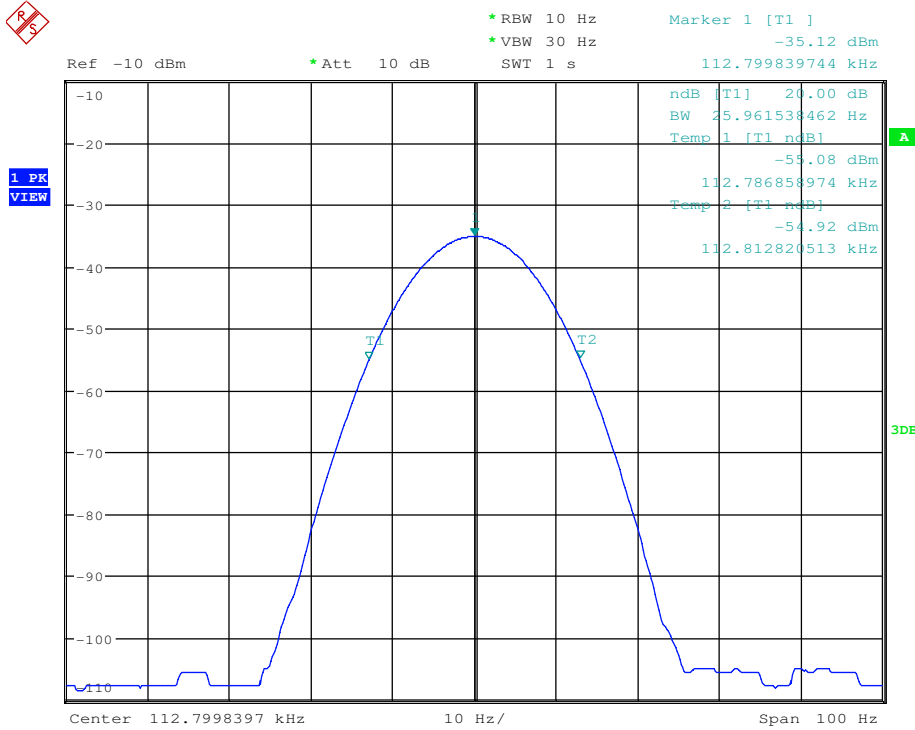
7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

Test Frequency(KHz)	20dB bandwidth (KHz)	Limit (KHz)	Results
112.80	0.026	N/A	Pass





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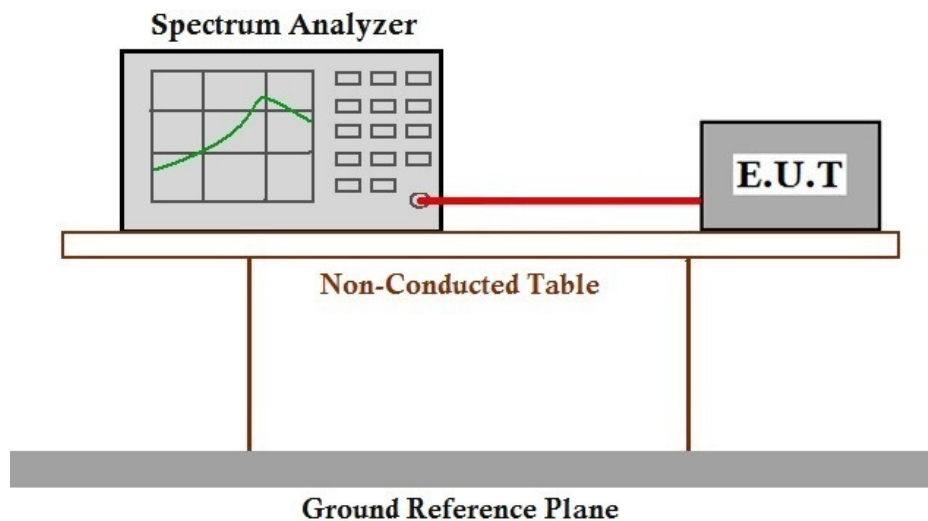
7.3 Restricted Bands

Test Requirement 47 CFR Part 15, Subpart C 15.205
 Test Method: ANSI C63.10 (2013) Section 6.10.5
 Limit: The fundamental wave can not fall in the restricted band 90KHz-110KHz

7.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 56.3 °C Humidity: 58.6 % RH Atmospheric Pressure: 1020 mbar
 Test mode c: TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



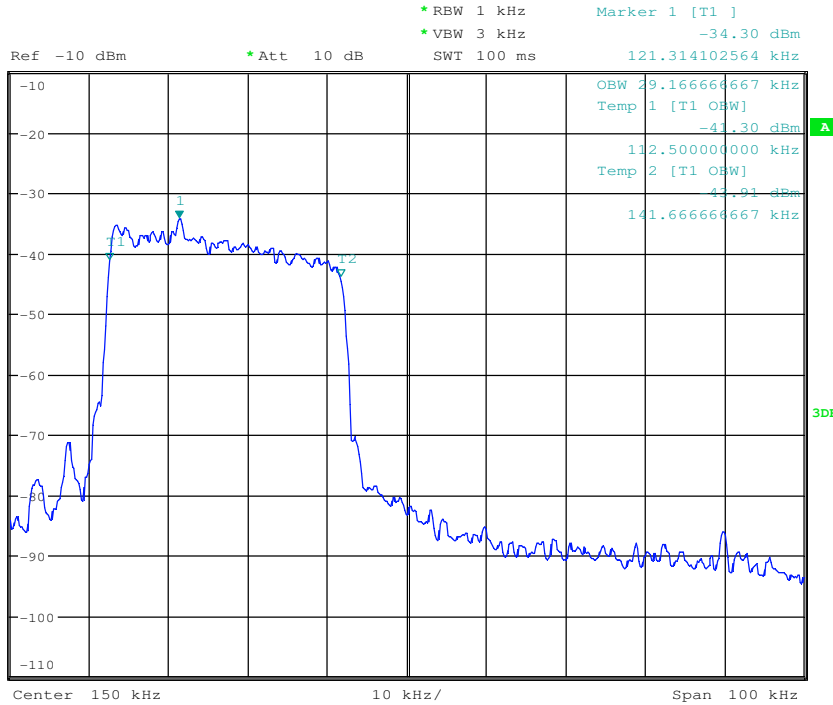
7.3.3 Measurement Procedure and Data



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1 PK
VIEW



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7.4 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2013) Section 6.4
 Measurement Distance: 3m
 Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than $\lambda/2\pi$ and the limit distance is greater than $\lambda/2\pi$, the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the $\lambda/2\pi$ distance, and at a 20 dB/decade of distance rate beyond $\lambda/2\pi$. This shall be accomplished using Equation (2):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(near\ field)}/d_{(10m)}\} + 20\log\{d_{(30/300m)}/d_{(near\ field)}\} \quad (2)$$

If the single point measured is at a distance greater than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (3):

$$FS_{(10m)} = FS_{(30/300m)} + 20\log\{d_{(30/300m)}/d_{(10m)}\} \quad (3)$$

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(30/300m)}/d_{(10m)}\} \quad (4)$$

Remark:

$$d_{near\ field} = 47.77 / f_{MHz}$$

where f_{MHz} is the frequency of the emission being measured in MHz.



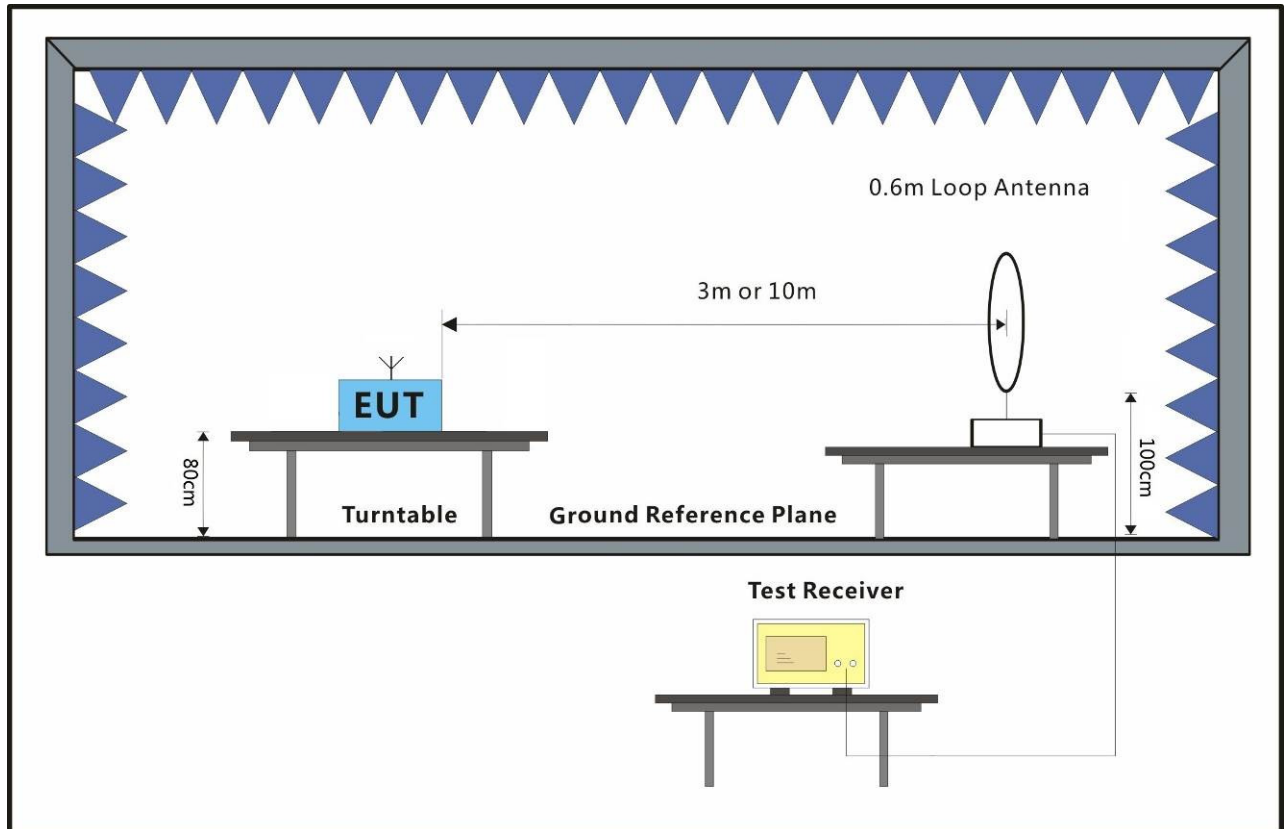
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1005 mbar

Test mode c: TX mode_Keep the EUT in transmitting with modulation mode.

7.4.2 Test Setup Diagram



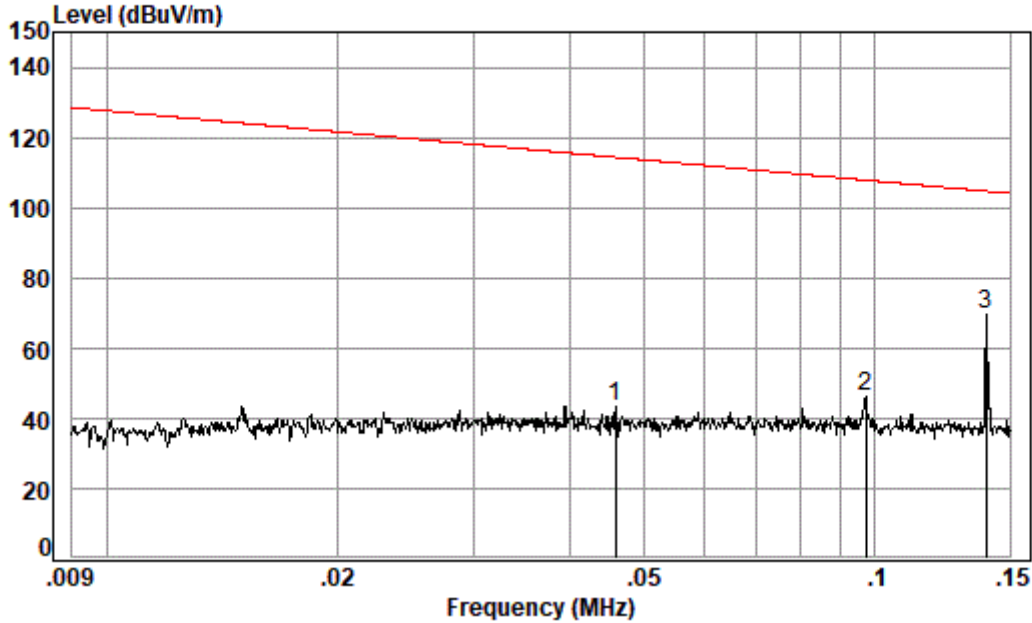
7.4.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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WD-210AA

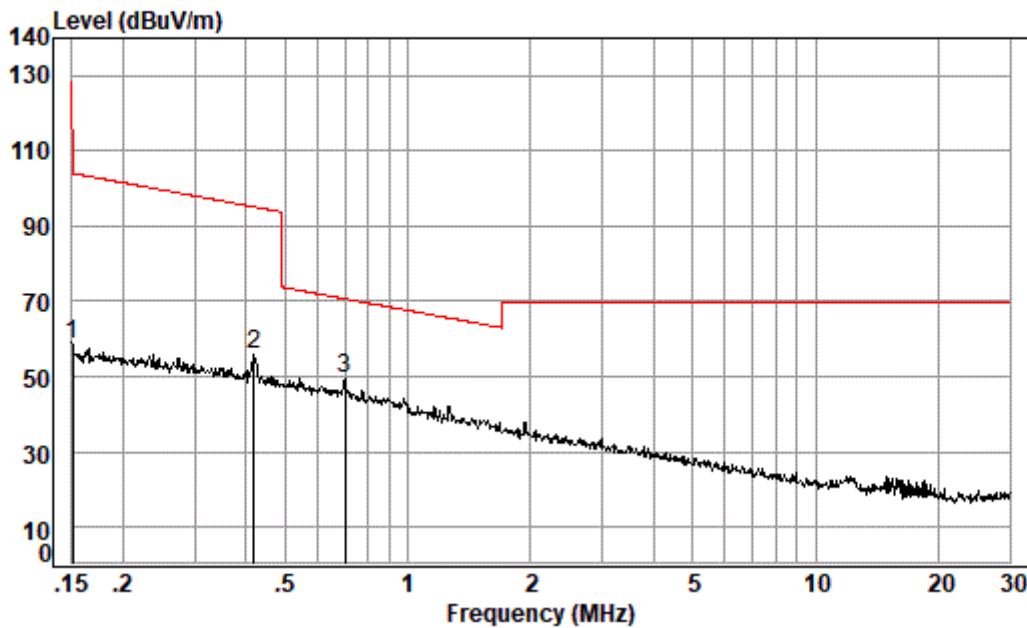


Condition: 3m
 Job No. : 15694CR
 Test Mode: c
 : WD-210AA

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0.05	0.13	12.64	32.56	63.05	43.26	114.35 -71.09
2	0.10	0.05	12.01	32.56	66.66	46.16	107.85 -61.69
3 pp	0.14	0.06	11.75	32.56	90.24	69.49	104.69 -35.20



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Condition: 3m
 Job No. : 15694CR
 Test Mode: c

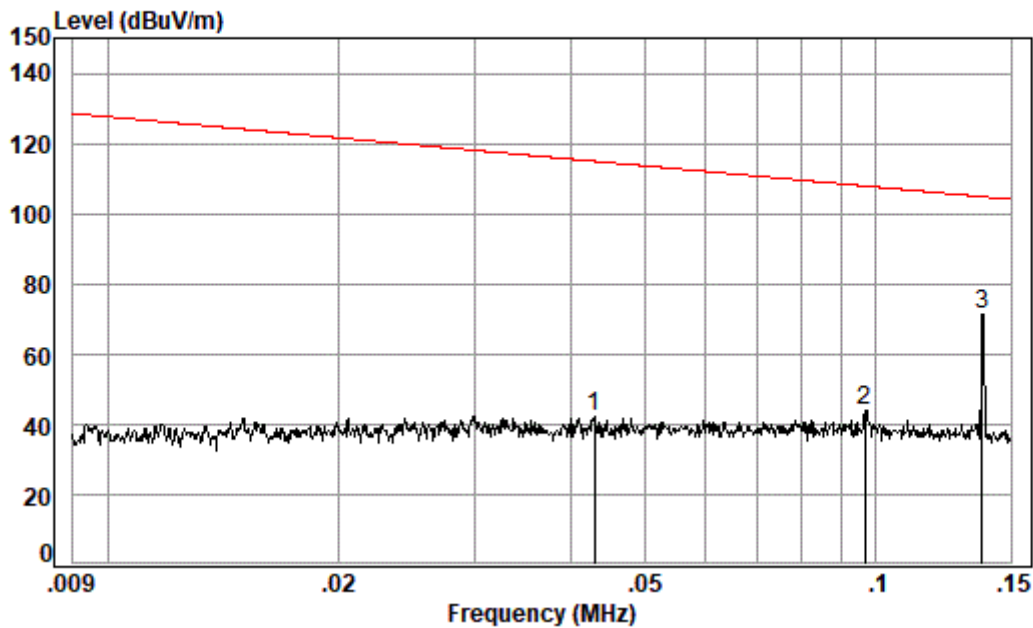
: WD-210AA

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0.15	0.00	11.70	32.56	79.63	58.77	104.04	-45.27
2	0.42	0.00	11.78	32.56	76.77	55.99	95.15	-39.16
3 pp	0.70	0.00	11.95	32.56	69.99	49.38	70.69	-21.31



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WD-210AB

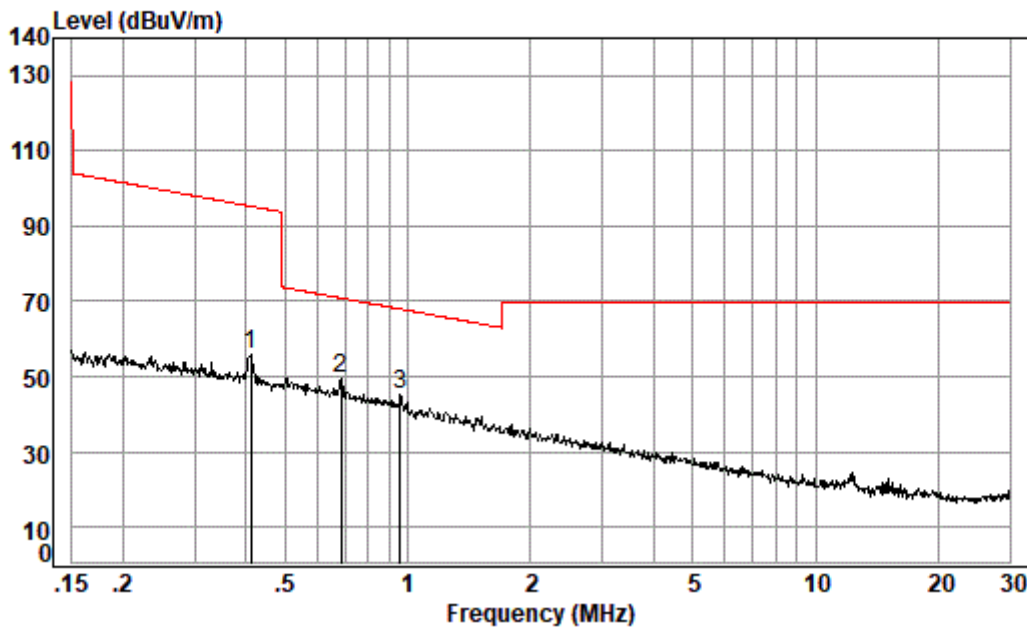


Condition: 3m
 Job No. : 15694CR
 Test Mode: c
 : WD-210AB

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0.04	0.14	12.83	32.56	61.95	42.36	114.93	-72.57
2	0.10	0.05	12.01	32.56	64.64	44.14	107.89	-63.75
3 pp	0.14	0.06	11.76	32.56	92.19	71.45	104.84	-33.39



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Condition: 3m
 Job No. : 15694CR
 Test Mode: c
 : WD-210AB

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	
1	0.00	11.78	32.56	76.69	55.91	95.29	-39.38
2 pp	0.00	11.93	32.56	70.30	49.67	70.87	-21.20
3	0.00	12.00	32.56	65.67	45.11	67.98	-22.87



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7.5 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2013) Section 6.5
 Measurement Distance: 10m
 Limit:

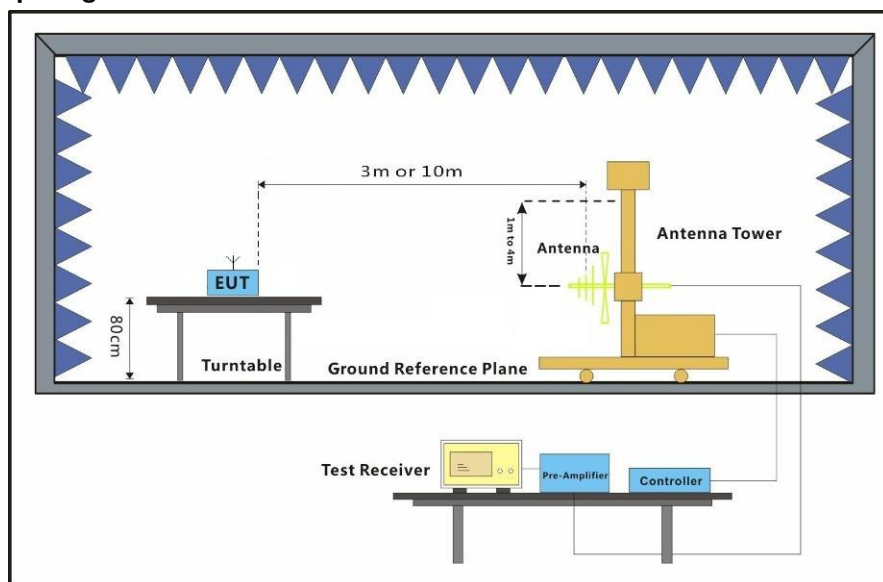
Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.5.1 E.U.T. Operation

Operating Environment:
 Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1005 mbar
 Test mode c: TX mode_Keep the EUT in transmitting with modulation mode.

7.5.2 Test Setup Diagram



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7.5.3 Measurement Procedure and Data

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- g. Test the EUT in the lowest channel,the middle channel,the Highest channel
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.
- i. Repeat above procedures until all frequencies measured was complete.

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



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The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$$L_3 / L_{10} = D_{10} / D_3$$

Note:

L₃: Level @ 3m distance. Unit: uV/m;

L₁₀: Level @ 10m distance. Unit: uV/m;

D₃: 3m distance. Unit: m

D₁₀: 10m distance. Unit: m

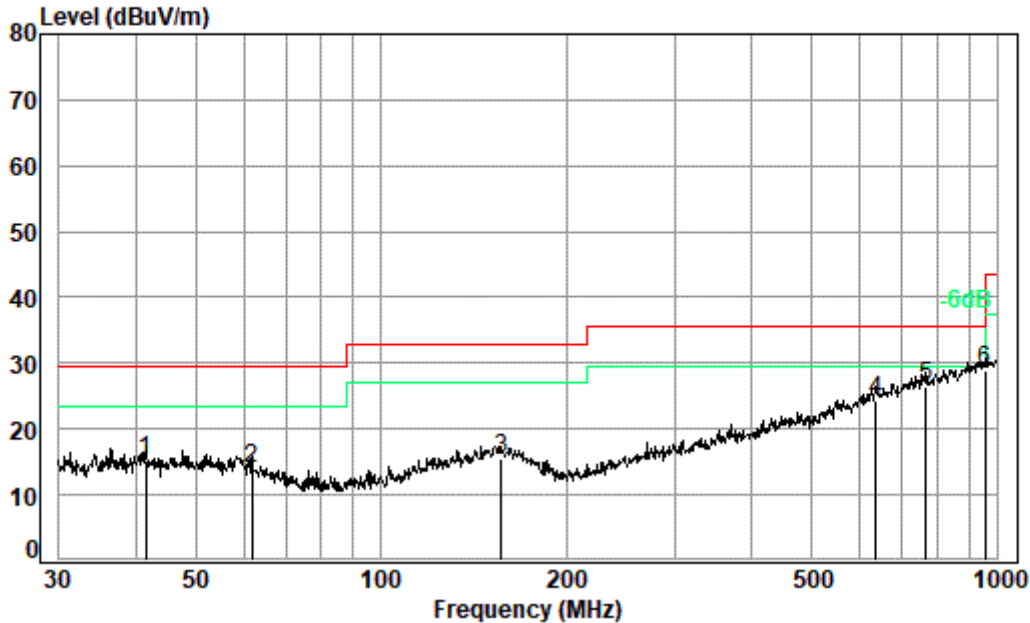
The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
33.56	19.83	9.81	32.69	30.29	40.00	-9.71	V
56.00	17.16	7.21	24.04	27.62	40.00	-12.38	V
104.54	19.82	9.79	32.65	30.28	43.50	-13.22	V
136.46	21.72	12.19	40.63	32.18	43.50	-11.32	V
768.75	26.81	21.90	73.01	37.27	46.00	-8.73	V
965.54	29.31	29.21	97.36	39.77	54.00	-14.23	V
41.57	15.29	5.81	19.38	25.75	40.00	-14.25	H
61.78	13.95	4.98	16.61	24.41	40.00	-15.59	H
157.01	15.48	5.94	19.81	25.94	43.50	-17.56	H
636.13	24.40	16.60	55.32	34.86	46.00	-11.14	H
766.06	26.53	21.21	70.69	36.99	46.00	-9.01	H
955.44	28.79	27.51	91.70	39.25	46.00	-6.75	H



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Mode c ; Horizontal



Condition: 10m HORIZONTAL

Job No. : 15694CR

Test Mode: c

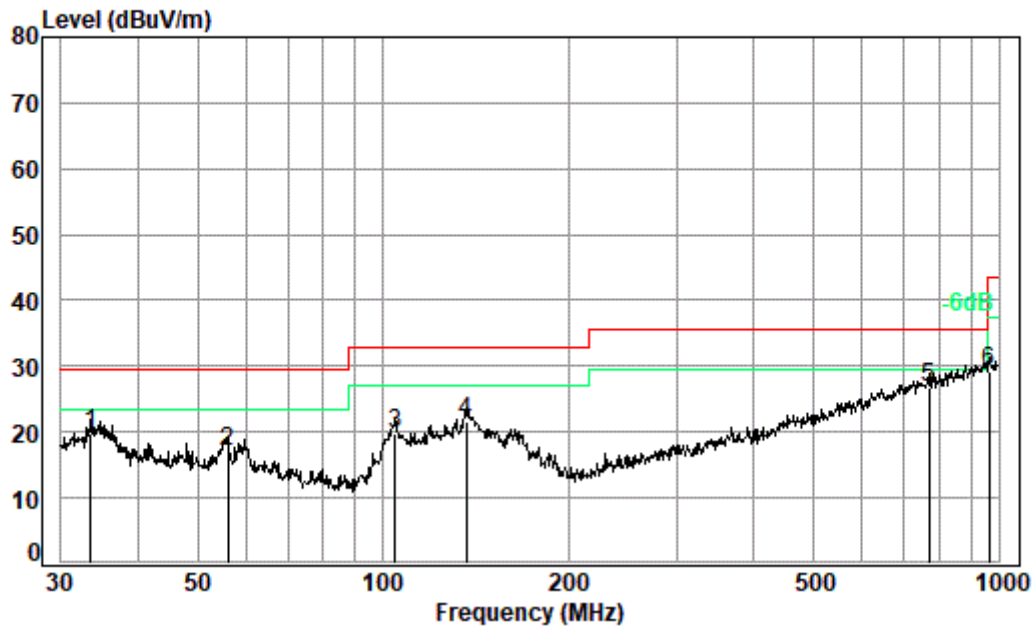
: WD-210AA

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	41.57	6.84	13.18	32.46	27.73	15.29	29.50	-14.21
2	61.78	7.00	11.63	32.46	27.78	13.95	29.50	-15.55
3	157.01	7.47	13.40	32.42	27.03	15.48	33.00	-17.52
4	636.13	8.96	19.36	32.35	28.43	24.40	35.60	-11.20
5	766.06	9.22	20.96	32.21	28.56	26.53	35.60	-9.07
6 pp	955.44	9.54	22.75	31.12	27.62	28.79	35.60	-6.81



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Mode c ;Vertical



Condition: 10m VERTICAL

Job No. : 15694CR

Test Mode: c

: WD-210AA

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.56	6.75	12.59	32.47	32.96	19.83	29.50 -9.67
2	56.00	6.98	12.30	32.45	30.33	17.16	29.50 -12.34
3	104.54	7.22	9.85	32.47	35.22	19.82	33.00 -13.18
4	136.46	7.38	12.51	32.44	34.27	21.72	33.00 -11.28
5 pp	768.75	9.23	20.99	32.20	28.79	26.81	35.60 -8.79
6	965.54	9.55	22.78	31.04	28.02	29.31	43.50 -14.19



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The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$$L_3 / L_{10} = D_{10} / D_3$$

Note:

L₃: Level @ 3m distance. Unit: uV/m;

L₁₀: Level @ 10m distance. Unit: uV/m;

D₃: 3m distance. Unit: m

D₁₀: 10m distance. Unit: m

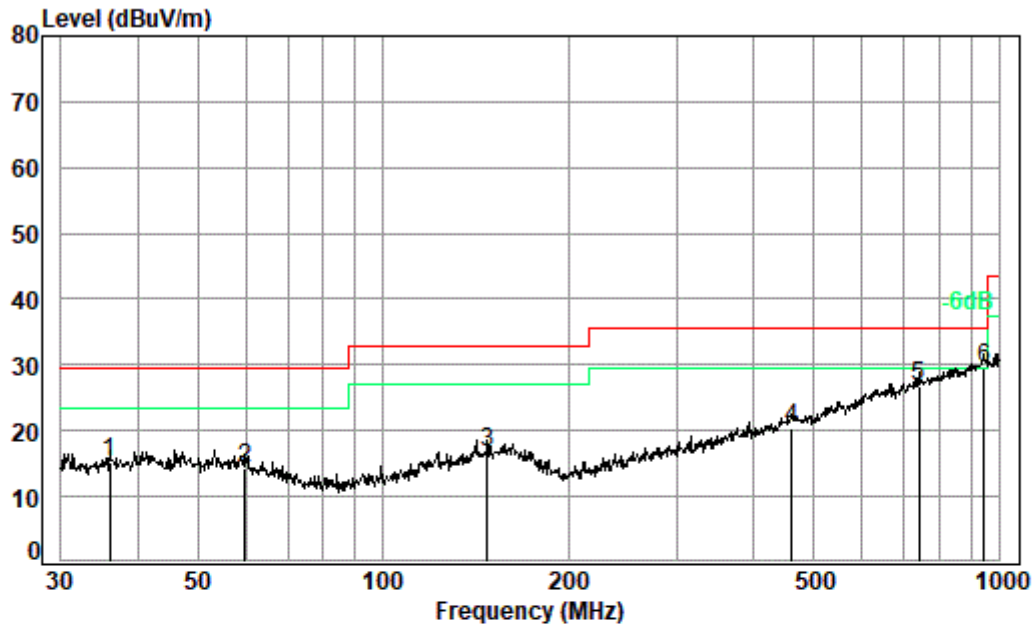
The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
34.52	19.92	9.91	33.03	30.38	40.00	-9.62	V
55.22	17.69	7.66	25.55	28.15	40.00	-11.85	V
104.54	19.62	9.57	31.91	30.08	43.50	-13.42	V
135.51	21.12	11.38	37.92	31.58	43.50	-11.92	V
782.35	27.69	24.24	80.79	38.15	46.00	-7.85	V
965.54	29.26	29.04	96.80	39.72	54.00	-14.28	V
36.00	15.08	5.68	18.92	25.54	40.00	-14.46	H
59.65	14.44	5.27	17.57	24.90	40.00	-15.10	H
147.92	16.62	6.78	22.59	27.08	43.50	-16.42	H
460.73	20.39	10.46	34.86	30.85	46.00	-15.15	H
742.26	26.77	21.80	72.67	37.23	46.00	-8.77	H
945.44	29.58	30.13	100.43	40.04	46.00	-5.96	H



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Mode c ; Horizontal



Condition: 10m HORIZONTAL

Job No. : 15694CR

Test Mode: c

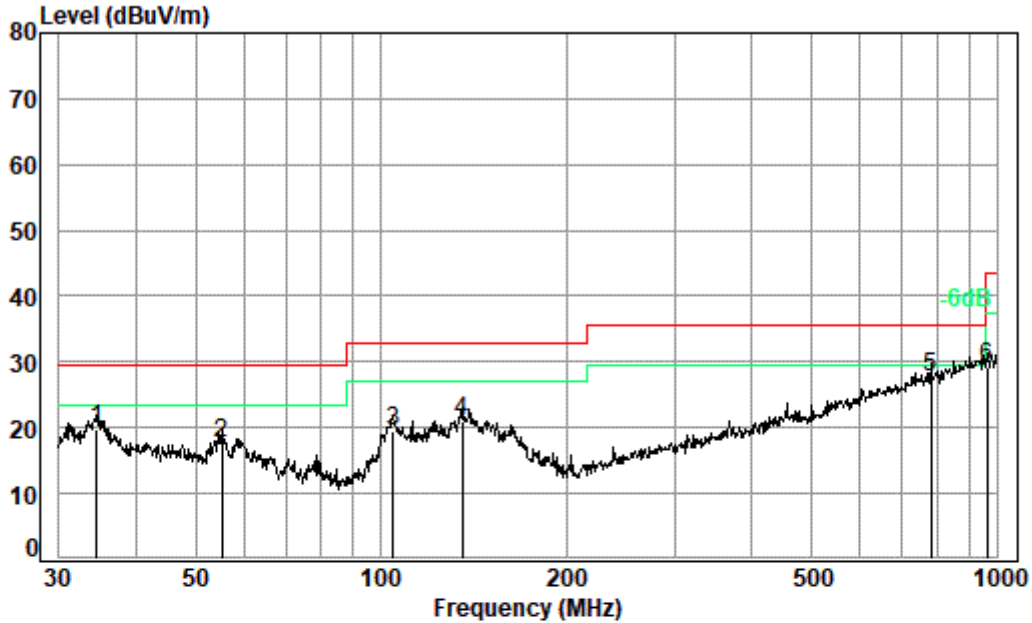
: WD-210AB

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m		
1	36.00	6.78	12.78	32.47	27.99	15.08	29.50	-14.42
2	59.65	7.02	12.03	32.46	27.85	14.44	29.50	-15.06
3	147.92	7.43	13.28	32.43	28.34	16.62	33.00	-16.38
4	460.73	8.49	16.30	32.35	27.95	20.39	35.60	-15.21
5	742.26	9.17	20.68	32.24	29.16	26.77	35.60	-8.83
6 pp	945.44	9.53	22.70	31.21	28.56	29.58	35.60	-6.02



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Mode c ;Vertical



Condition: 10m VERTICAL
 Job No. : 15694CR
 Test Mode: c

: WD-210AB

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	34.52	6.76	12.62	32.47	33.01	19.92	29.50 -9.58
2	55.22	6.97	12.36	32.45	30.81	17.69	29.50 -11.81
3	104.54	7.22	9.85	32.47	35.02	19.62	33.00 -13.38
4	135.51	7.38	12.44	32.44	33.74	21.12	33.00 -11.88
5 pp	782.35	9.25	21.11	32.19	29.52	27.69	35.60 -7.91
6	965.54	9.55	22.78	31.04	27.97	29.26	43.50 -14.24



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8 Photographs

8.1 Test Setup

Please refer to setup photos.

8.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -

