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TEST REPORT

of

FCC Part 95 Subpart C
IC RSS-210 Issue 10 and RSS-Gen Issue 5

FCC ID: SWN-TD11UT
IC Certification: 12166A-TD11UT

Equipment Under Test	:	DOG TRAINING DEVICE
Model Name	:	CUE
Variant Model Name(s)	:	-
Applicant	:	Dogtra Co., Ltd.
Manufacturer	:	Dogtra Co., Ltd.
Date of Receipt	:	2022.08.02
Date of Test(s)	:	2022.08.05 ~ 2022.08.18
Date of Issue	:	2022.08.19

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by: Teo Kim

Technical Manager: Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

INDEX

Table of Contents Page

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil. Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

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1.2. Details of Applicant

Applicant : Dogtra Co., Ltd.
Address : 35, Namdongdong-ro 33beon-gil, Namdong-gu, Incheon, South Korea, 21694
Contact Person : Yong-Byeong, Chae
Phone No. : +82 32 812 2449

1.3. Details of Manufacturer

Company : Same as Applicant
Address : Same as Applicant

1.4. Description of EUT

Kind of Product	DOG TRAINING DEVICE
Model Name	CUE
Serial Number	Conducted: 001 Radiated: 002
Power Supply	DC 5.0 V
Frequency Range	27.195 ㎒
Modulation Type	FSK
Number of Channel	1
Antenna Type	Coil Antenna
Antenna Gain※	0.50 ㏈i
H/W Version	Rev1.0
S/W Version	CUE_TxRev00

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMBV100A	255834	May 25, 2022	Annual	May 25, 2023
Spectrum Analyzer	R&S	FSV30	103453	Sep. 29, 2021	Annual	Sep. 29, 2022
DC Power Supply	Agilent	U8002A	MY49030063	Jan. 25, 2022	Annual	Jan. 25, 2023
Attenuator	MCLI	FAS-23-20	23835	Dec. 07, 2021	Annual	Dec. 07, 2022
Preamplifier	H.P.	8447F	2944A03909	Aug. 04, 2022	Annual	Aug. 04, 2023
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 23, 2021	Biennial	Aug. 23, 2023
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB 9163	01126	Feb. 07, 2022	Biennial	Feb. 07, 2023
Test Receiver	R&S	ESU26	100109	Jan. 18, 2022	Annual	Jan. 18, 2023
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38 330516/L	N.C.R.	N/A	N.C.R.
Antenna Mast	Innco systems GmbH	MA4640-XP-ET	MA4640/536/38 330516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Apr. 04, 2022	Semi-Annual	Oct. 04, 2022
Coaxial Cable	micro-coax UTiflex	142A SERIES 502839-8 (10 m)	90000034	Apr. 04, 2022	Semi-Annual	Oct. 04, 2022
Coaxial Cable	RFONE	PL360P-292M292M-1.5 M-A	20200324002	Feb. 18, 2022	Semi-annual	Aug. 18, 2022

1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 95 Subpart C, RSS-210 Issue 10 and RSS-Gen Issue 5			
Section in FCC	**Section in IC**	**Test Item(s)**	**Result**
95.767 (b)	RSS-210 Issue 10 Annex A.2.1(c)	RF Output Power	Complied
95.773	RSS-210 Issue 10 Annex A.2.1(e)	Occuiped Bandwidth	Complied
95.779 (a)(1)(2)	RSS-210 Issue 10 Annex A.2.1(g)	Emission Mask	Complied
95.779 (a)(3)	RSS-210 Issue 10 Annex A.2.1(g)	Unwanted Emissions	Complied
95.765 (b)	RSS-210 Issue 10 Annex A.2.1(f)	Frequency Accuracy	Complied

1.7. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
RF Output Power	0.32 dB	
Occupied Bandwidth	3.90 ㎑	
Frequency Accuracy	5.97 ㎑	
Radiated Emission, 9 ㎑ to 30 ㎒	H	3.30 dB
	V	3.30 dB
Radiated Emission, below 1 ㎓	H	4.80 dB
	V	5.20 dB

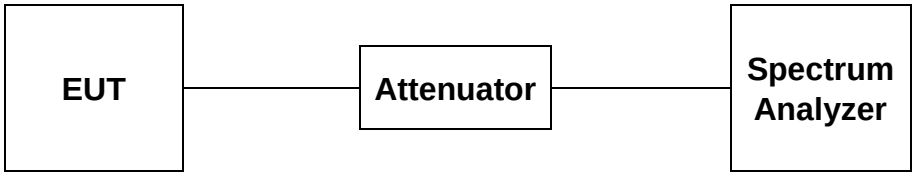
All measurement uncertainty values are shown with a coverage factor of *k*=2 to indicate a 95 % level of confidence.

1.8. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL003365	2022.08.19	Initial

2. RF Output Power

2.1. Test Setup



2.2. Limit

2.2.1. FCC

According to §95.767 (b), 26-28 ㎒ frequency band. For an RCRS transmitter operating on 26.995, 27.045, 27.095, 27.145, or **27.195** ㎒, the mean transmitter output power must not exceed 4 Watts.

2.2.2. IC

According to RSS-210 Issue 10 Annex A.2.1(c), For double sideband (DSB), digital or frequency modulation (FM), the transmitter unmodulated carrier power shall not exceed 4 W.

2.3. Test Procedures

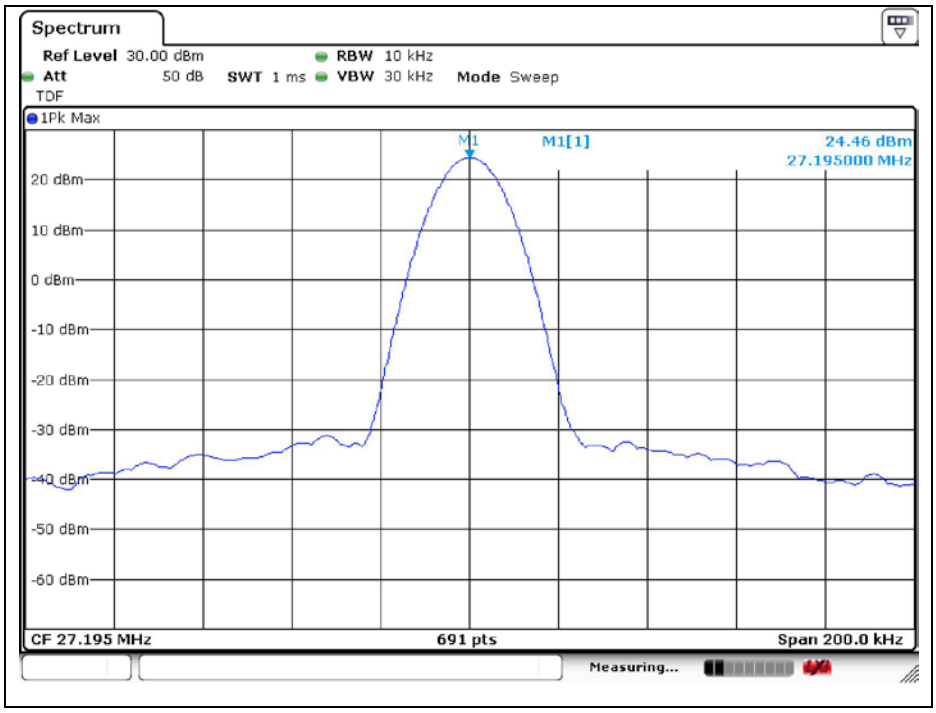
1. The equipment under test is connected to the spectrum analyzer.
2. The spectrum anlyzer is set to the as follow;
   RBW : 10 ㎑
   VBW : 3 x RBW
   Detector function : Peak
   Trace : Max hold
3. The output power of fundamental frequency was measured and recorded.

2.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

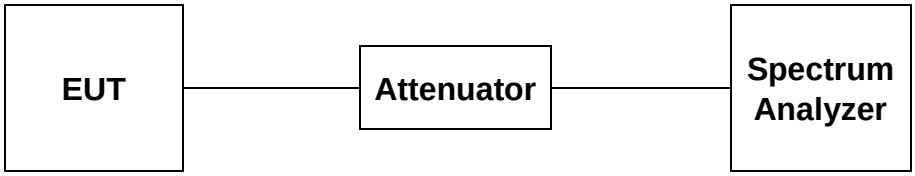
Frequency (㎒)	Measured Level		Limit (W)	Margin (W)
	(dB m)	(W)		
27.195	24.46	0.28	4	3.72

- Test plot



3. Occupied Bandwidth

3.1. Test Setup



3.2. Limit

3.2.1 FCC

According to §95.773, Each RCRS transmitter type must be designed such that the occupied bandwidth does not exceed 8 ㎑ for any emission type.

3.2.2 IC

According to RSS-210 Issue 10 Annex A.2.1(e), The authorized bandwidth is 8 ㎑ for DSB, digital or FM, and 4 ㎑ for SSB modulations. For SSB modulations, either upper or lower sideband may be used.

3.3. Test Procedure

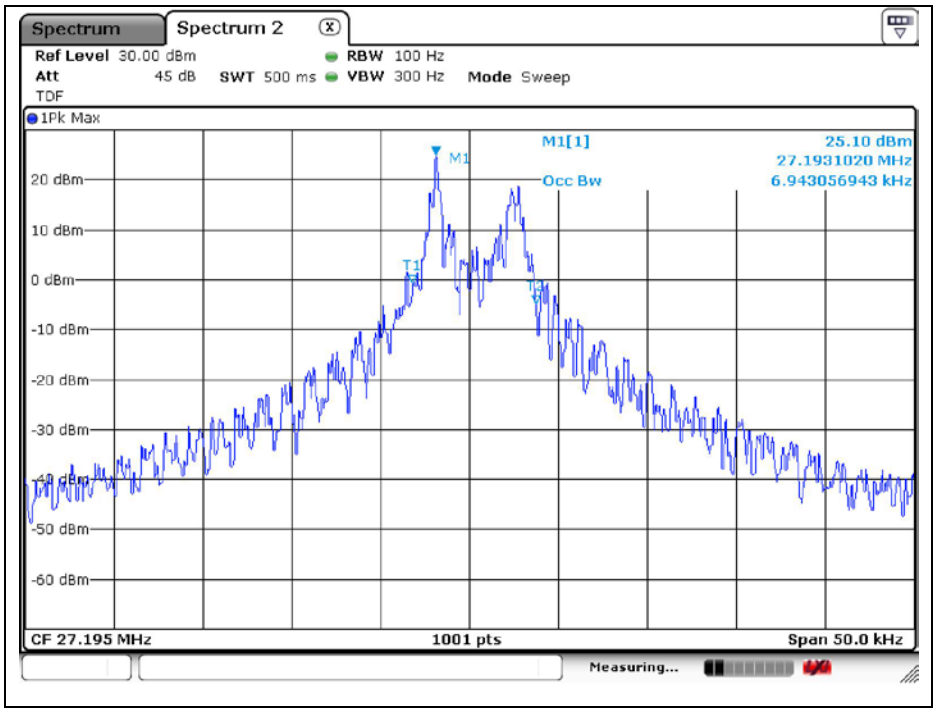
1. The equipment under test is connected to the spectrum analyzer.
2. The spectrum anlyzer is set to the as follow;
   RBW : 1 ~ 5 % of 99 % Occupied bandwidth
   VBW : 3 x RBW
   Detector function : Peak
   Trace : Max hold
3. The 99%occupied bandwidth of fundamental frequency was measured and recorded.

3.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

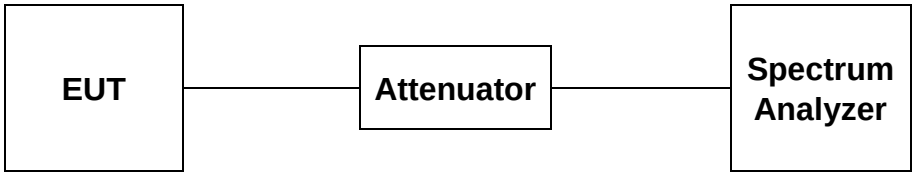
Frequency (㎒)	99 % Occupied Bandwidth (㎑)	Limit (㎑)	Test result
27.195	6.94	8	Compliance

- Test plot



4. Emission Mask

4.1. Test Setup



4.2. Limit

4.2.1 FCC

According to §95.779(a), 26 – 28 ㎒ frequency band. For an RCRS transmitter operating in the 26-28 ㎒ frequency band, the power of unwanted emissions mustbe attenuated below the transmitter output power in Watts (P) by at least:

(1) 25 ㏈ (decibels) in the frequency band 4 ㎑ to 8 ㎑ removed from the channel center frequency;
(2) 35 ㏈ in the ferquency band 8 ㎑ to 20 ㎑ removed from the channel center frequency;

4.2.2 IC

According to RSS-210 Issue 10 Annex A.2.1(g), The average power of unwanted emissions, measured with a resolution bandwidth of 300 ㎐ for (i) and (ii), and 3 ㎑ for (iii), shall be less than the mean transmitter power, P_{mean} (dBW), by at least:

(i) 25 dB on any frequency removed from the centre of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth.
(ii) 35 dB on any frequency removed from the centre of the authorized bandwidth by more than 100%, up to and including 250% of the authorized bandwidth.

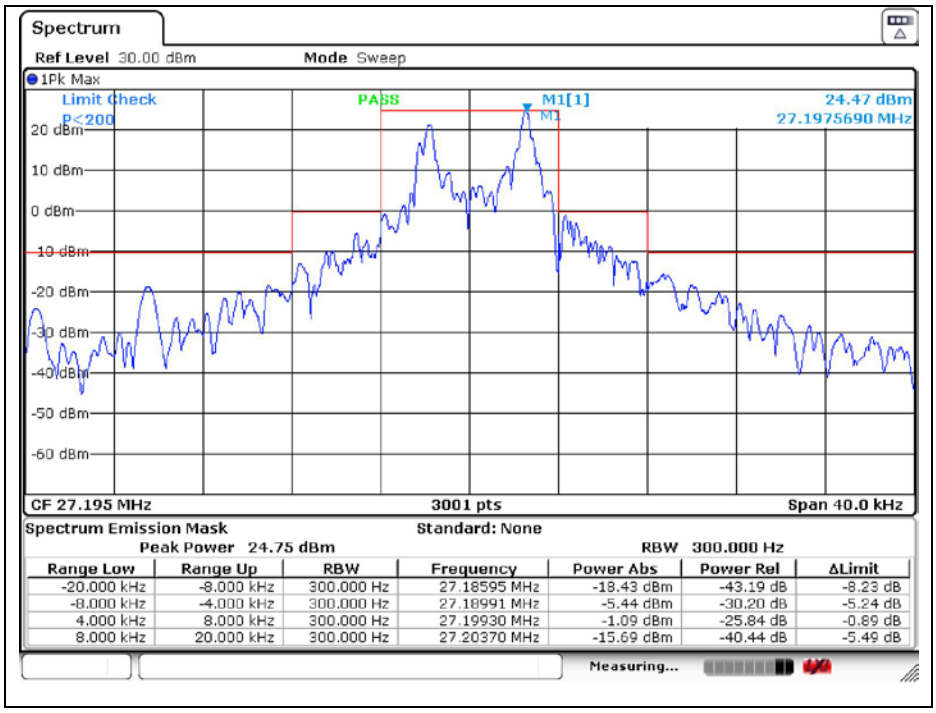
4.3. Test Procedure

1. The equipment under test is connected to the spectrum analyzer.
2. The spectrum anlyzer is set to the as follow;
   Span : 40 ㎑
   RBW : 300 ㎐
   VBW : 1 ㎑
   Detector function : Peak
   Trace : Max hold
3. The fundamental frequency was measured and recorded.

4.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

- Test plot

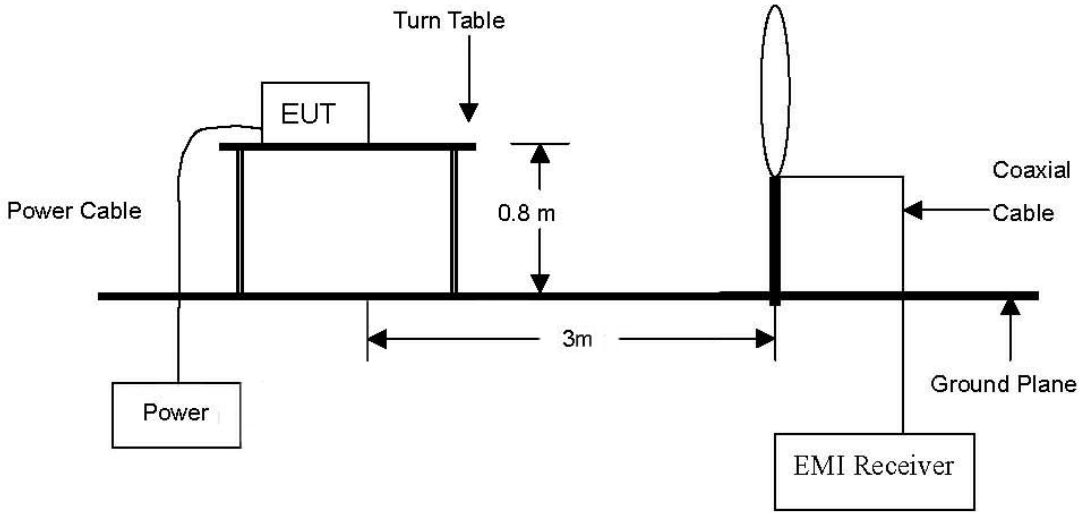


5. Transmitter Unwanted Emissions

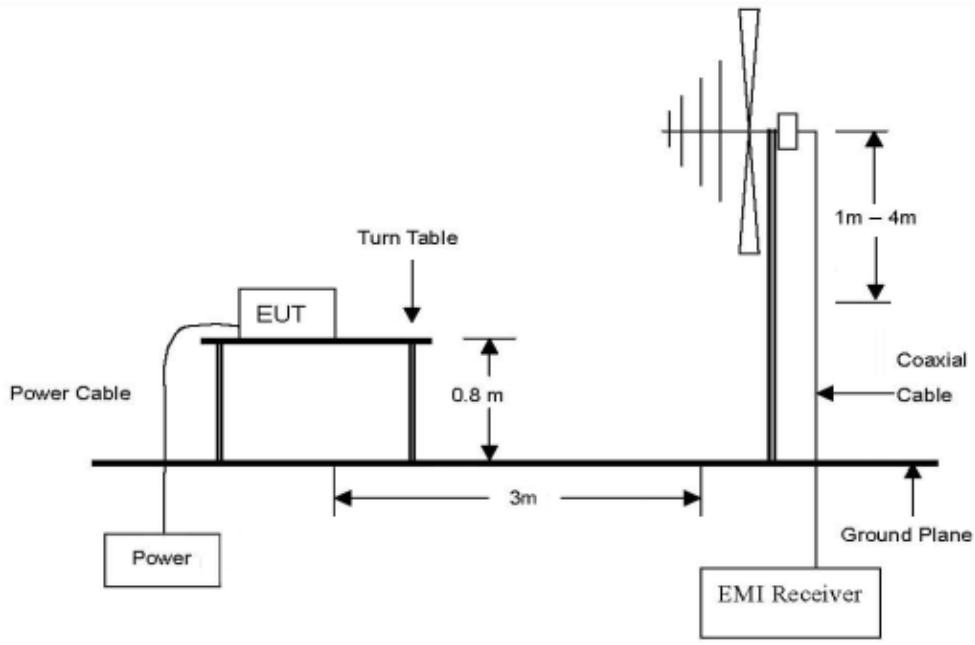
5.1. Test Setup

5.1.1. Radiated

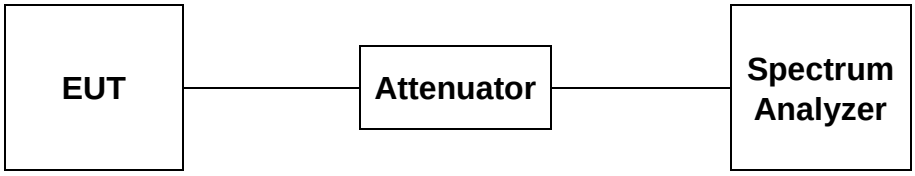
The diagram below shows the test setup that is utilized to make the measurements for emission below 30 ㎒.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓.



5.1.2. Conducted



5.2. Limit

5.2.1 FCC

According to §95.779(a), 26 – 28 ㎒ frequency band. For an RCRS transmitter operating in the 26-28 ㎒ frequency band, the power of unwanted emissions mustbe attenuated below the transmitter output power in Watts (P) by at least:

(3) 43 + 10 log(P) ㏈ in any frequency band removed from the channel center frequency by more than 20㎑.

5.2.2 IC

According to RSS-210 Issue 10 Annex A.2.1(g), The average power of unwanted emissions, measured with a resolution bandwidth of 300㎐ for (i) and (ii), and 3㎑ for (iii), shall be less than the mean transmitter power, P_{mean} (dBW), by at least:

(iii) 43 + 10 log10 p_{mean} (watts) dB or to the general field strength limits specified in RSS-Gen, whichever is less stringent, on any frequency removed from the centre of the authorized bandwidth by more than 250% of the authorized bandwidth.

5.3. Test Procedure

5.3.1. Radiated

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10-2013.

5.3.1.1. Test Procedures for emission below 30 ㎒

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3.2.1. Test Procedures for emission from 30 ㎒ to 271.45 ㎒

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
c. The antenna is a broadband antenna, and its 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 and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

5.3.2. Conducted

1. The equipment under test is connected to the spectrum analyzer.
2. The spectrum anlyzer is set to the as follow;
   RBW : 100 ㎑
   VBW : 300 ㎑
   Detector function : Peak
   Trace : Max hold
3. The trace was measured and recorded.

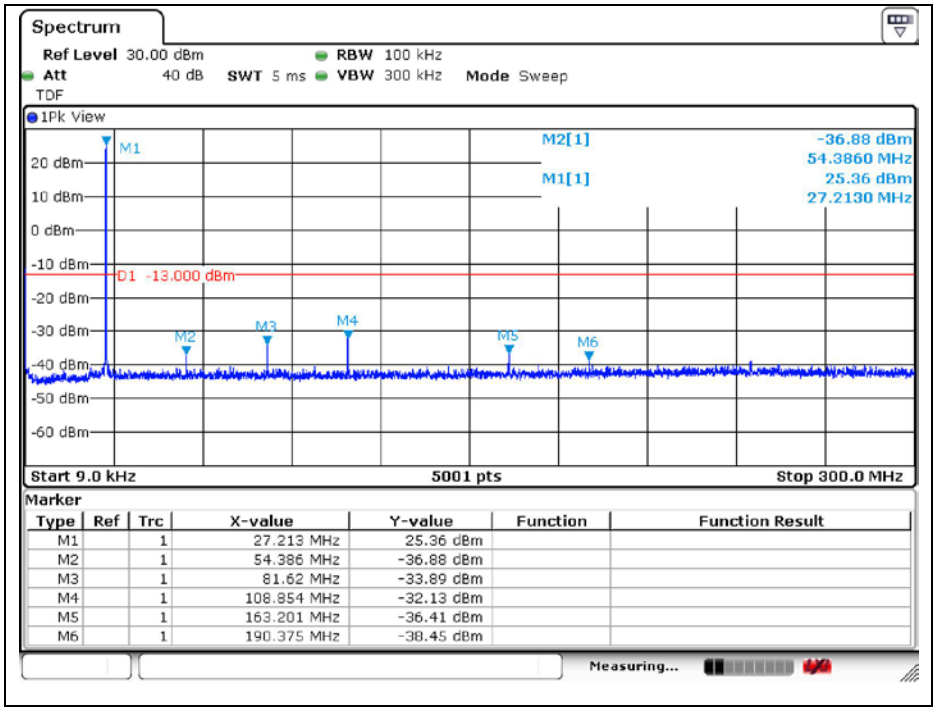
5.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

▪ Conducted

Frequency (㎒)	Level (dB m)	Limit (dB m)	Margin (dB)
54.39	-36.88	-13	23.88
81.62	-33.89	-13	20.89
108.85	-32.13	-13	19.13
163.20	-36.41	-13	23.41
190.38	-38.45	-13	25.45

- Test plot



▪ **Radiated**

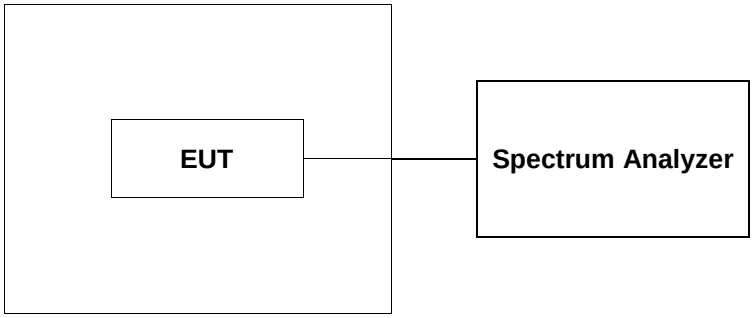
Frequency (㎒)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
0.02	33.30	H	18.38	0.01	51.69	-97.41	**-45.72**	-13	32.72
2.40	11.70	H	18.48	0.28	30.46	-97.41	-66.95	-13	53.95
81.53	33.70	H	13.31	-26.06	20.95	-97.41	-76.46	-13	63.46
244.73	41.20	H	18.29	-24.39	35.10	-97.41	-62.31	-13	49.31
271.89	48.80	H	18.38	-24.22	42.96	-97.41	-54.45	-13	41.45
299.05	44.90	H	19.10	-23.99	40.01	-97.41	-57.40	-13	44.40
516.70	46.10	V	23.43	-24.09	45.44	-97.41	-51.97	-13	38.97
707.06	39.00	H	25.50	-23.60	40.90	-97.41	-56.51	-13	43.51

Remark;

1. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.
2. E (dBμV/m) = Measured Level (dBμV) + Antenna Factor (dB/m) + AMP (dB) + Cable Loss (dB).
3. E.I.R.P. (dB m) = E (dBμV/m) + CF (dB).
4. E.R.P. (dB m) = E (dBμV/m) + CF (dB) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.
5. CF (dB) = 20 log D - 104.8; where D is the measurement distance in meters, According to ANSI C63.26-2015
6. The frequency spectrum is examined from 9 ㎑ to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

6. Frequency Accurcy

6.1. Test Setup



Temperature Chamber

6.2. Limit

6.2.1 FCC

According to §95.765(b), Except as allowed under paragraph (c) of this section, each RCRS transmitter type capable of transmitting in the 26-28 MHz frequency band must be designed such that the carrier frequencies remain within ±50 ppm of the channel center frequencies listed in § 95.763(a)during normal operating conditions.

6.2.2 IC

According to RSS-210 Issue 10 Annex A.2.1(f), The carrier frequency stability shall be maintained to ±50 ppm. However, devices with output powers of 2.5 W or less can have a frequency stability of ±100 ppm.

6.3. Test Procedure

1. The equipment under test is connected to a spectrum analyzer
2. The EUT is placed inside the temperature chamber.
3.. After the temperature stabilized for approximately 20 minutes, the frequency accuracy was recorded

6.4. Test Results

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Reference Frequency: 27.195 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	5.0	-90	-14.708
40		-70	-13.973
30		20	-10.664
20(Ref.)		310	-
10		170	-5.148
0		280	-1.103
-10		-270	-21.327
-20		40	-9.928
-30		80	-8.457
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	5.75 (115%)	310	0.000
	4.25 (85%)	320	0.368

- End of the Test Report -