



TEST REPORT OF PART15C FOR FCC

On Behalf of

Shenzhen DIST Technology limited

FCC ID: 2AL5I-ML-DT-RT-01GT

Product Description: Dog Training Collar

Test Model: ML-DT-RT-01G

Supplement Model: ML-DT-RT-01Y, ML-DT-RT-01H, ML-DT-RT-01X,
ML-DT-RT-02G, ML-DT-RT-02Y, ML-DT-RT-02H,
ML-DT-RT-02X, ML-DT-RT-01Z

Applicant: **Shenzhen DIST Technology limited**
A2-6F, 3 Building, B-118 Xijing Rd., Gushu,Baoan, Shenzhen,
China

Manufacturer: **Shenzhen DIST Technology limited**
A2-6F, 3 Building, B-118 Xijing Rd., Gushu,Baoan, Shenzhen,
China

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Test by: **Reviewed By:**

Owen Li

Edmund Zou



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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **Shenzhen DIST Technology limited**
Address of applicant: A2-6F, 3 Building, B-118 Xijing Rd., Gushu,Baoan, Shenzhen, China
Manufacturer: **Shenzhen DIST Technology limited**
Address of manufacturer: A2-6F, 3 Building, B-118 Xijing Rd., Gushu,Baoan, Shenzhen, China

General Description of E.U.T

Items	Description
EUT Description:	Dog Training Collar (TX Part)
Test Model:	ML-DT-RT-01G
Supplement Model:	ML-DT-RT-01Y, ML-DT-RT-01H, ML-DT-RT-01X, ML-DT-RT-02G, ML-DT-RT-02Y, ML-DT-RT-02H, ML-DT-RT-02X, ML-DT-RT-01Z
Trade mark:	N/A
Type of Modulation:	ASK
Frequency Band:	433.92MHz
Model Difference	N/A
Number of Channels	1
Antenna Type:	Internal antenna, fixed on PCB
Antenna Gain:	2.5dBi
Rated Voltage:	5DCV from USB port and battery

Note:

* The test data gathered are from the production sample provided by the manufacturer,
All above models in the table are the same just different with the feature and colour.



1.2 Test Facility

All measurement required was performed at laboratory of Centre Testing International (ShenZhen) Corporation ,Location at Building C, Sienific Innovation Park,Tiegang Reservoir, Xixiang, Baoan District, Shenzhen, Guangdong, The site and apparatus are constructed in conformance with the requirements of ANSI C63.10, CISPR 16-1-1 and other equivalent standards.

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

FCC – Registration No.: 565659

Centre Testing International (Shenzhen) Co., Ltd. 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 565659, expiration date is 01/27/2017.

IC Registration No.: 7408B

The 3m alternate test site of CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7408B on December 29, 2009.

CNAS - Registration No.: L1910

CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION,. 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.The acceptance letter from the CNAS is maintained in our files: Registration:L1910,January 12,2010.

1.3 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Conducted Emission Expanded Uncertainty	2.23
Radiated emission expanded uncertainty(9kHz-30MHz)	3.08
Radiated emission expanded uncertainty(30MHz-1000MHz)	4.42
Radiated emission expanded uncertainty(Above 1GHz)	4.06



2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.10-2013 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10-2013 and FCC CFR 47 Part 15 Subpart C Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m/10m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10-2013 and FCC CFR 47 Part 15 Subpart C.



2.4 List of Measuring Equipments

Test equipments list of CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION.

Shielding Room No. 1 - Conducted disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	R&S	ESCI	100009	08/19/2017
LISN	ETS-LINDGREN	3850/2	00051952	08/19/2017
LISN	R&S	ENV216	100098	08/19/2017
Voltage Probe	R&S	ESH2-Z3	100042	08/19/2017
Current Probe	R&S	EZ17	100106	08/19/2017
ISN	TESEQ GmbH	ISN T800	30297	09/04/2017

Control Room - Conducted disturbance Test (10m part)				
Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	R&S	ESCI	100435	08/19/2017
LISN	schwarzbeck	NNLK8121	8121-529	08/19/2017
Transient Limiter	ELECTRO-METRICS	EM-7600	806	08/19/2017
Voltage Probe	R&S	ESH2-Z3	100042	08/19/2017
Current Probe	R&S	EZ17	100106	08/19/2017
ISN	TESEQ GmbH	ISN T800	30297	09/04/2017
Horn Antenna	ETS-LINGREN	3117	00057407	08/19/2017

3M Semi-anechoic Chamber - Radiated disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	09/09/2017
Spectrum Analyzer	Agilent	E4440A	MY46185649	09/07/2017
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	08/21/2017
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	08/19/2017
Microwave Preamplifier	Agilent	8449B	3008A02425	08/29/2017

10M Semi-anechoic Chamber - Radiated disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
10M Chamber & Accessory Equipment	Rainford	--	--	09/06/2017
Receiver	R&S	ESCI	100435	08/19/2017
Spectrum Analyzer	R&S	FSP40	100416	09/06/2017
EMI test receiver	R&S	ESIB40	2023282915	08/24/2017



TRILOG Broadband Antenna	schwarzbeck	VULB 9163	484	08/21/2017
Horn Antenna	ETS-LINGREN	3117	00044562	09/07/2017
Microwave Preamplifier	Agilent	11909A	186871	09/06/2017
Microwave Preamplifier	HP	HP 8447F	2805A03379	09/06/2017
Microwave Preamplifier	CD	PAP-1G18G	2001	08/29/2017

Shielding Room No. 2 - Harmonic / Flicker Test (EN 61000-3-2) / (EN 61000-3-3)

Equipment	Manufacturer	Model	Serial No.	Due Date
5KVA AC POWER SOURCE	California instruments	5001iX-400-413	57344	08/29/2017
Flicker & Harmonic Tester	California instruments	PACS-1	72492	08/29/2017

Shielding Room No. 3 - ESD Test (IEC 61000-4-2)

Equipment	Manufacturer	Model	Serial No.	Due Date
ESD Simulator	EM TEST	ESD30C	V0603101091	08/30/2017
ESD Simulator	TESEQ	NSG437	478	08/22/2017

3M Full-anechoic Chamber - Radio-frequency electromagnetic field Immunity Test (IEC 61000-4-3)

Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	09/09/2017
ESG Vector signal generators	Agilent	E4438C	MY45095744	09/07/2017
Power Amplifier	AR	150W1000	0322288	08/29/2017
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	08/29/2017
Temperature & Humidity Chamber	ESPEC	DSW0540	ER-009	08/29/2017

Shielding Room No. 3 - EFT / Surges Test (IEC 61000-4-4) (IEC 61000-4-5)

Equipment	Manufacturer	Model	Serial No.	Due Date
Compact Generator	EM-Test	UCS500M/6B	V0603101093	09/19/2017
Capacitive Clamp	EM-Test	C Clamp HFK	0306-43	08/29/2017
CDN for Telecom Port	EM-Test	CNV504S1	V0603101094	08/29/2017
EFT Generator	SCHAFFNER	NSG 2025	19878	08/19/2017
SURGE Generator	SCHAFFNER	NSG 2050	200313-135AR	08/19/2017
CDN	SCHAFFNER	CDN-131/133	34397	08/29/2017

Shielding Room No. 2 - Radio-frequency continuous conducted Immunity Test (IEC 61000-4-6)

Equipment	Manufacturer	Model	Serial No.	Due Date
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Signal Generator	IFR	2023B	202307/883	09/07/2017
Power Amplifier	AR	75A 250A	320297	08/19/2017
Attenuator	EM-Test	ATT6/75	0320837	08/19/2017
CDN	EM-Test	CDN M2/M3	0204-01	08/19/2017
EM-Clamp	EM-Test	EM101	35770	08/19/2017

Shielding Room No. 2 - Power-frequency magnetic fields Immunity Test (IEC 61000-4-8)

Compact Generator	EM-Test	UCS500M/6B	V0603101093	08/19/2017
Induction Coil	EM-Test	MS100	0106-47	08/19/2017
Current Transformer	EM-Test	MC2630	0106-02	08/19/2017

Shielding Room No. 2 -Voltage dips and interruptions Test (IEC 61000-4-11)

Equipment	Manufacturer	Model	Serial No.	Due Date
5KVA AC POWER SOURCE	California instruments	5001iX-400-413	57344	08/19/2017
Electronic output switch	California instruments	EOS-1	72616	08/19/2017



3. SUMMARY OF TEST RESULTS

Test Rules	Description of Test	Result
FCC Part15.207(a)	Condcuted Emission	Pass
FCC Part15.231(a)	Electric Field Strength of Fundamental Emission	Pass
FCC Part15.231(a)	Electric Field Strength of Spurious Emission	Pass
FCC Part15.231(b)	Duty Cycle	Pass
FCC Part15.231(c)	20dB bandwidth & 99% bandwidth	Pass
FCC Part15.231(a)	Deactivation Time	Pass
FCC Part15.203	Antenna Requirement	Pass



4. Conducted Emission

4.1 Applicable Standard

for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

4.2 Limits

Limits for Class A digital devices

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60

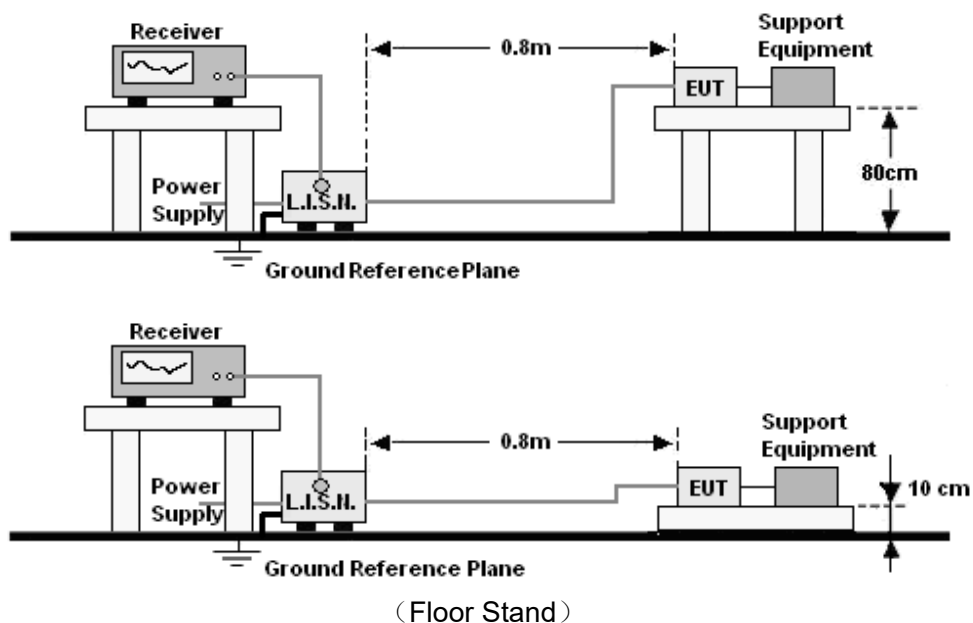
NOTE: The lower limit shall apply at the transition frequency.

Limits for Class B digital devices

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

4.3 EUT Test Setup



4.4 Procedure Of Conducted Emission Test

- a. The Product was placed on a nonconductive table above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

4.5 Test Result

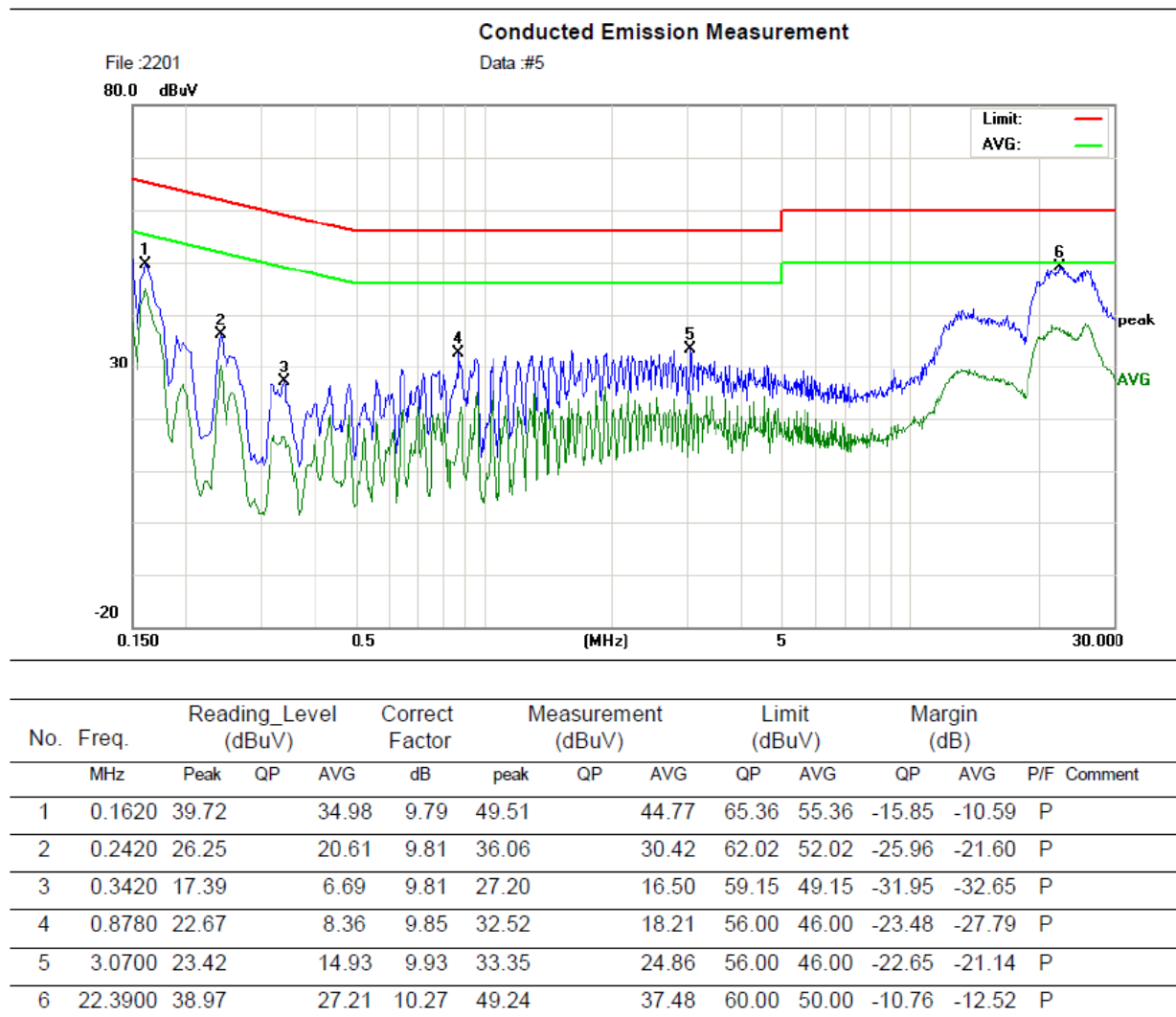
Temperature (°C) : 22~23	EUT: Dog Training Collar
Humidity (%RH) : 50~54	M/N: ML-DT-RT-01G
Barometric Pressure (mbar) : 950~1000	Operation Condition: Charging





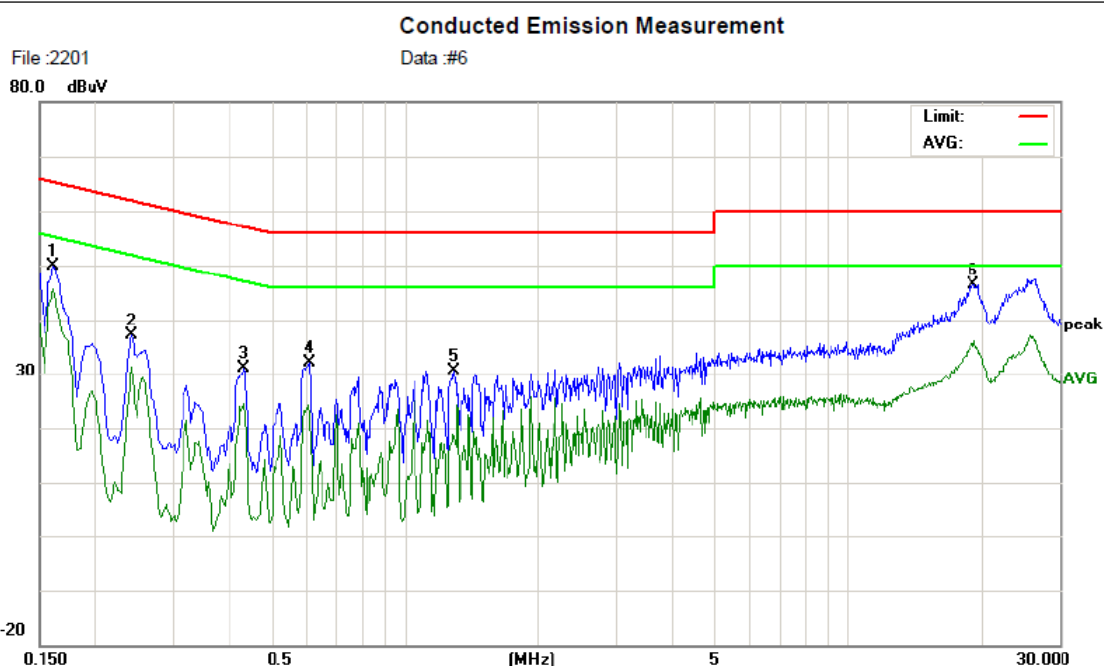
The Test Data Of Conducted Emission

EUT: Dog Training Collar
M/N: ML-DT-RT-01G
Operating Condition: Charging
Test Site: CHAMBER
Operator: Owen Li
Comment: Line:L
Tem:23℃ Hum:50%



The Test Data Of Conducted Emission

EUT: Dog Training Collar
M/N: ML-DT-RT-01G
Operating Condition: Charging
Test Site: CHAMBER
Operator: Owen Li
Comment: Line:N
Tem:23℃ Hum:50%



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	39.99		35.83	9.79	49.78		45.62	65.36	55.36	-15.58	-9.74	P	
2	0.2420	27.43		21.49	9.81	37.24		31.30	62.02	52.02	-24.78	-20.72	P	
3	0.4340	21.24		14.77	9.81	31.05		24.58	57.18	47.18	-26.13	-22.60	P	
4	0.6100	22.20		13.09	9.83	32.03		22.92	56.00	46.00	-23.97	-23.08	P	
5	1.2940	20.75		8.64	9.87	30.62		18.51	56.00	46.00	-25.38	-27.49	P	
6	19.1299	36.23		25.04	10.12	46.35		35.16	60.00	50.00	-13.65	-14.84	P	

5. Spurious Radiated Emission

5.1 Applicable Standard

For intentional device, according to 15.209(a), the general requirement of field strength of radiated emission from intentional radiators shall not exceed the following tables.

Limits for Class B digital devices

Frequency (MHz)	limits at 3m dB(μ V/m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

- NOTE:**
1. The lower limit shall apply at the transition frequency.
 2. The limits shown above are based on measuring equipment employing a CISPR quasi-peak detector function for frequencies below or equal to 1000MHz.
 3. The limits shown above are based on measuring equipment employing an average detector function for frequencies above 1000MHz.

Limits for Class B digital devices

Frequency (MHz)	limits at 10m dB(μ V/m)
30-88	30.0
88-216	33.5
216-960	56.0
Above 960	64.0

- NOTE:**
1. The lower limit shall apply at the transition frequency.
 2. The limits shown above are based on measuring equipment employing a CISPR quasi-peak detector function for frequencies below or equal to 1000MHz.
 3. The limits shown above are based on measuring equipment employing an average detector function for frequencies above 1000MHz.

In addition to the provisions of 15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

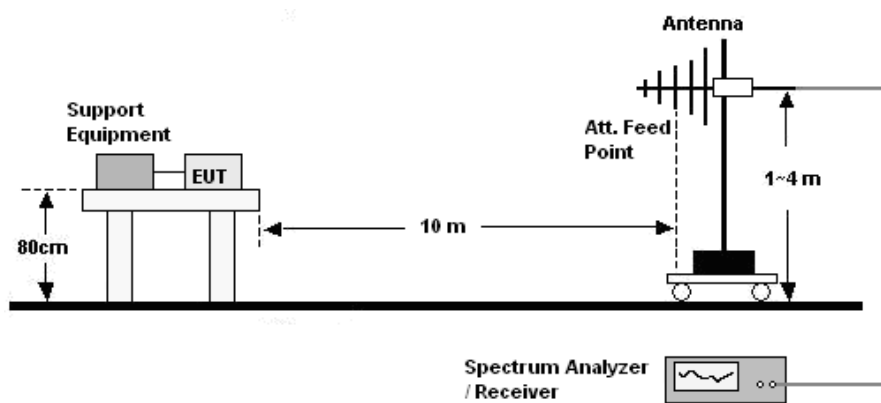
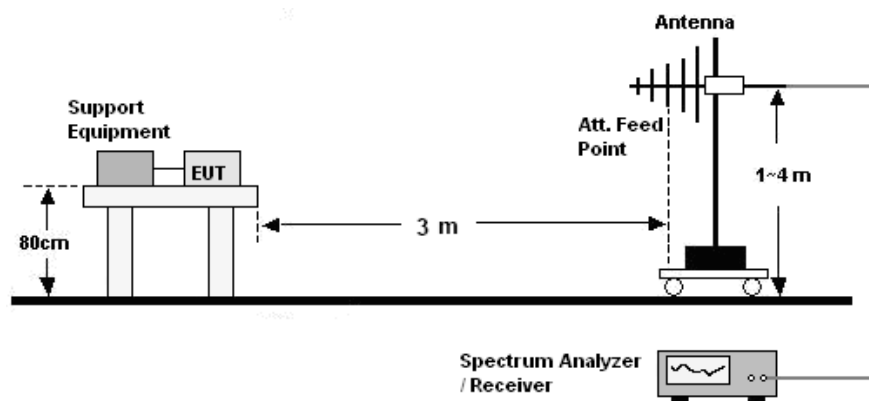
Funda- mental fre- quency (MHz)	Field strength of funda- mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70.	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

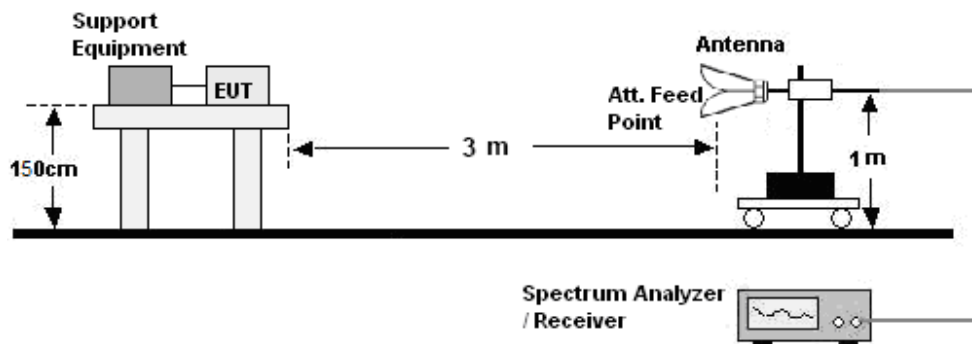
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

5.2 Radiated Measurement Setup

30MHz ~ 1GHz:



Above 1GHz:



5.3 Test Equipment List and Details

See section 2.4.

5.4 Radiated Measurement Test Procedure

30MHz ~ 1GHz:

- The Product was placed on the non-conductive turntable 0.8/0.1 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

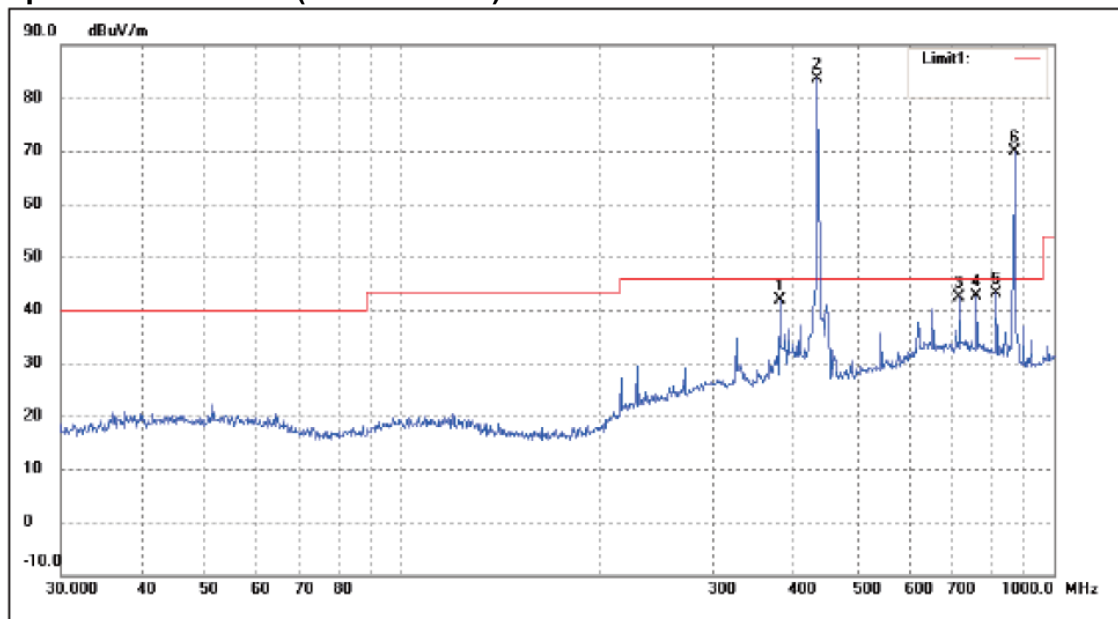
Above 1GHz:

- The Product was placed on the non-conductive turntable 1.5/0.1 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

5.5 Test Result

Temperature (°C) : 22~23	EUT: Dog Training Collar
Humidity (%RH) : 50~54	M/N: ML-DT-RT-01G
Barometric Pressure (mbar) : 950~1000	Operation Condition: Continuous Transmission
Test Site: 3m Chamber	

The Spurious Emission (30~1000MHz) Of Horizontal

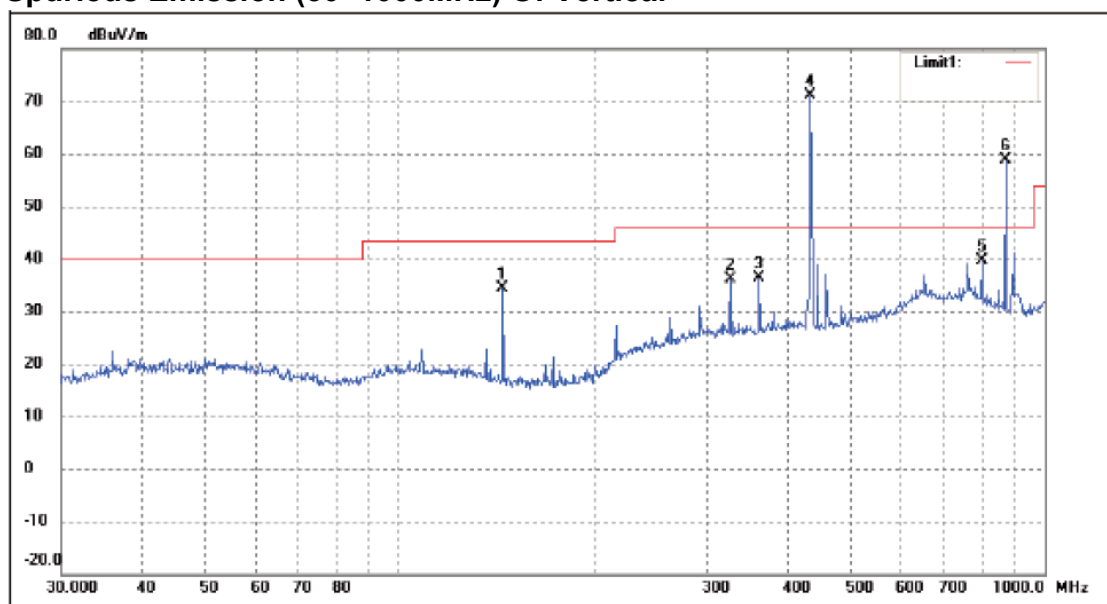


No.	Frequency MHz	Reading dBuV/m	Corr. (dB)	Dutycycle Factor (dB)	Result dBuV/m	Limit dBuV/m	Margin (dB)	Deg. (°)	Height (cm)	Remark
1	379.9141	29.98	11.79	N/A	41.77	46.00	-4.23	175	100	peak
4	433.9200	73.83	-3.09	N/A	83.74	100.83	-17.09	145	100	peak
	433.9200	/	/	-12.18	71.56	80.83	-9.37	300	100	Ave
3	716.6820	24.77	17.70	N/A	42.47	46.00	-3.53	200	100	peak
4	760.7036	24.47	18.10	N/A	42.57	46.00	-3.43	310	100	peak
5	815.9678	27.42	15.80	N/A	43.22	46.00	-2.78	205	100	peak
6	867.8400	53.97	15.94	N/A	69.91	80.83	-8.08	212	100	peak
	867.8400	/	/	-12.18	57.73	60.83	-3.10	227	100	Ave

The Spurious Emission (Above 1GHz) Of Horizontal

No.	Frequency MHz	Reading dBuV/m	Corr. Factor (dB)	Dutycycle Factor (dB)	Result dBuV/m	Limit dBuV/m	Margin dB	Deg. (°)	Height (cm)	Remark
1	1301.7600	71.49	-13.14	N/A	58.35	80.83	-22.48	210	150	Peak
2	1735.6800	65.25	-9.34	N/A	52.66	80.83	--28.17	180	150	Peak
3	2169.6000	64.16	-2.86	N/A	61.30	80.83	-19.53	210	150	Peak
	1301.7600	/	/	-12.18	46.17	60.83	-14.66	123	150	Ave
	1735.6800	/	/	-12.18	40.48	60.83	-20.35	228	150	Ave
	2169.6000	/	/	-12.18	49.12	60.83	-11.71	159	150	Ave

The Spurious Emission (30~1000MHz) Of Vertical



No.	Frequency MHz	Reading dBuV/m	Corr. (dB)	Dutycycle Factor (dB)	Result dBuV/m	Limit dBuV/m	Margin (dB)	Deg. (°)	Height (cm)	Remark
1	144.8418	31.40	2.96	N/A	34.36	43.50	-9.14	310	100	peak
2	325.5958	24.42	11.77	N/A	36.19	46.00	-9.81	172	100	peak
3	361.7139	24.37	11.90	N/A	36.27	46.00	-9.73	190	100	peak
4	434.0651	58.83	12.31	N/A	71.14	100.83	-29.69	256	100	peak
	433.9200	/	/	-12.18	58.96	80.83	-21.93	321	100	Ave
5	798.9796	23.22	16.34	N/A	39.56	46.00	-6.44	241	100	peak
6	867.8400	43.03	15.94	N/A	58.97	80.83	-21.94	89	100	peak
	867.8400	/	/	-12.18	46.79	60.83	-14.04	178	100	Ave

The Spurious Emission (Above 1GHz) Of Vertical

No.	Frequency MHz	Reading dBuV/m	Corr. (dB)	Dutycycle Factor (dB)	Result dBuV/m	Limit dBuV/m	Margin dB	Deg. (°)	Height (cm)	Remark
1	1301.7600	71.53	-13.14	N/A	58.39	80.83	-22.44	211	150	Peak
2	1735.6800	62.01	-9.35	N/A	52.66	80.83	-28.17	123	150	Peak
3	2169.6000	61.34	-2.79	N/A	58.55	80.83	-22.28	256	150	Peak
	1301.7600	/	/	-12.18	46.21	60.83	-14.62	143	150	Ave
	1735.6800	/	/	-12.18	40.48	60.83	-20.35	258	150	Ave
	2169.6000	/	/	-12.18	46.37	60.83	-14.46	149	150	Ave

Note:

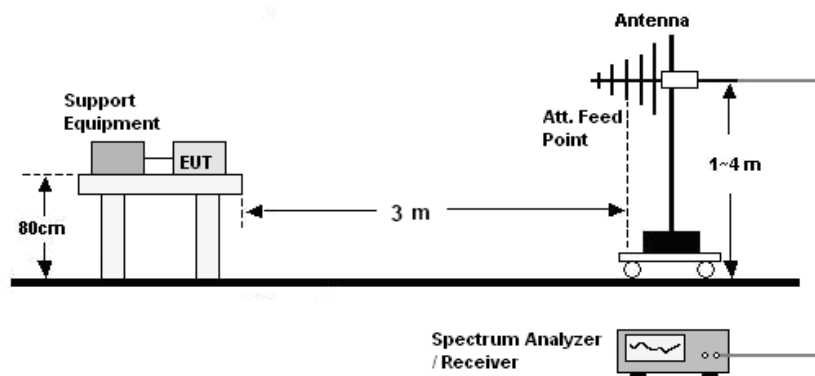
- Testing is carried out with frequency rang 9kHz to the tenth harmoinics,other than listed in the table above are attenuated more than 20dB below the permitted limits or the field strength is too small to be measured.
- Calculation of result is:
Measurement value(dBμV/m) = Reading Value(dBμV/m) + Correction Factor (dB)
- The Measurement value must be less than limit,the result is Pass.

6. Duty Cycle

6.1 Applicable Standard

According to FCC Part 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

6.2 EUT Setup



6.3 Test Equipment List and Details

See section 2.4.

6.4 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

6.5 Test Result

Type Of Pulse	Width Of Pulse (ms)	Quantity Of Pulse	Transmission Time (ms)	Total Time(T _{on}) (ms)
Pulse 1(Wide)	1.18	4	4.72	12.70
Pulse 2(Narrow)	0.38	21	7.98	

Test Period(T _p) (ms)	Total Time(T _{on}) (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
51.60	12.70	24.61	-12.18

Note:

Pulse Desensitization Correction Factor calculation:

Pulse Width(PW)=12.70ms

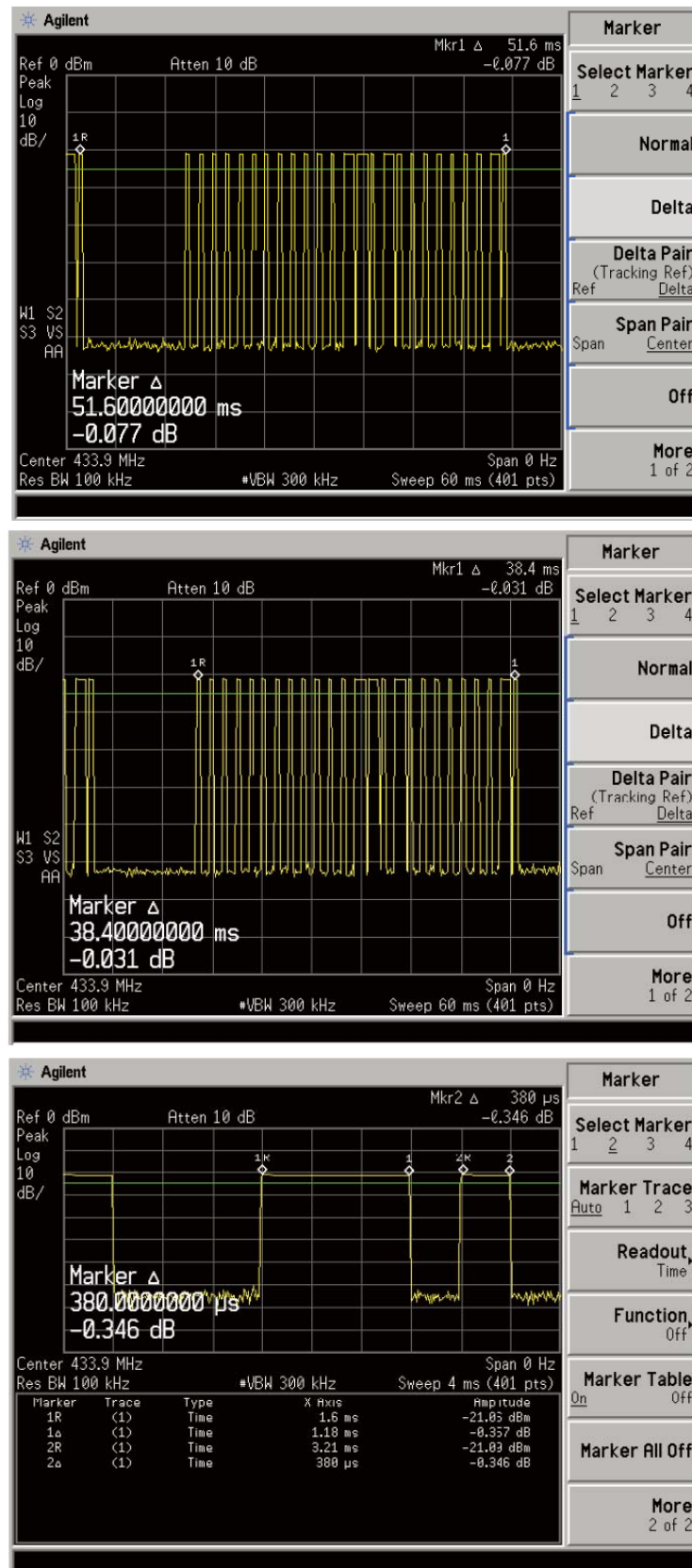
$2/PW=2/12.7\text{ms}=0.157\text{KHz}$

$RMB(100\text{kHz}) > 2/PW(0.157\text{kHz})$

Therefore PDCF conclude is not required.



The spectrum analyzer plots are attached as below:

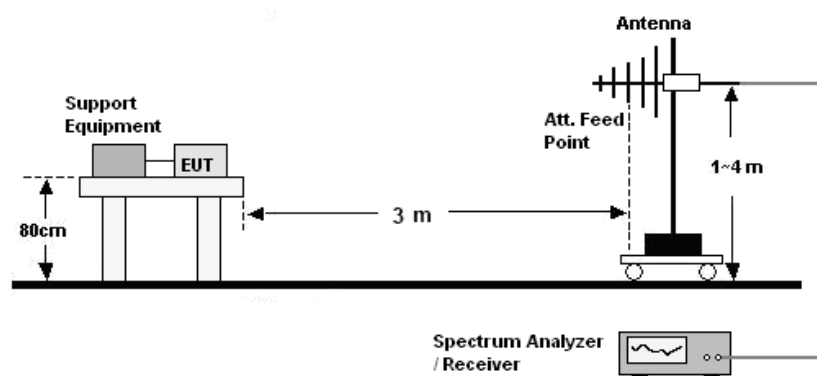


7. Occupied Bandwidth Measurement

7.1 Applicable Standard

According to 47 CFR 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

7.2 EUT Setup



7.3 Test Equipment List and Details

See section 2.4.

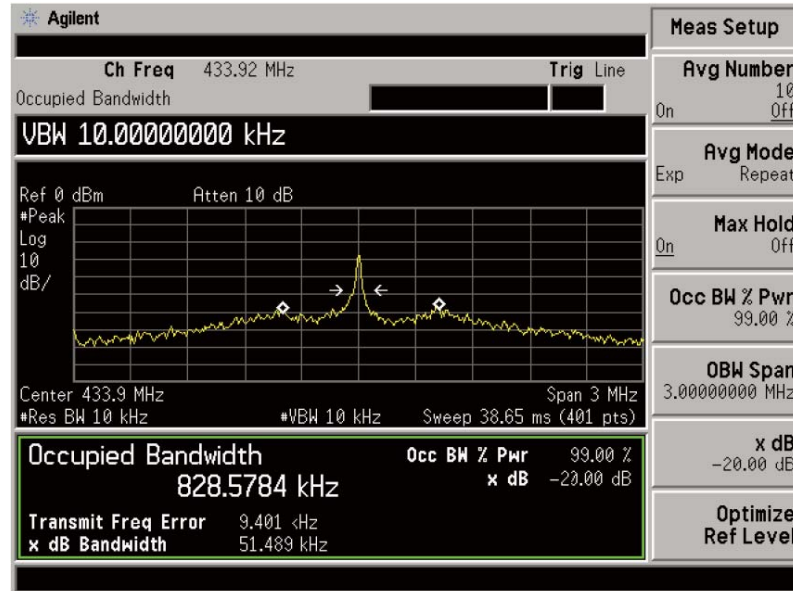
7.4 Test Procedure

- The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode
- The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.5 Test Result

Channel Frequency (MHz)	Modulation	20dB bandwidth (KHz)	Limit (KHz)	Result
433.92MHz	ASK	51.489	$433.92 \times 0.25\% = 1084.8$	Pass

The spectrum analyzer plots are attached as below:

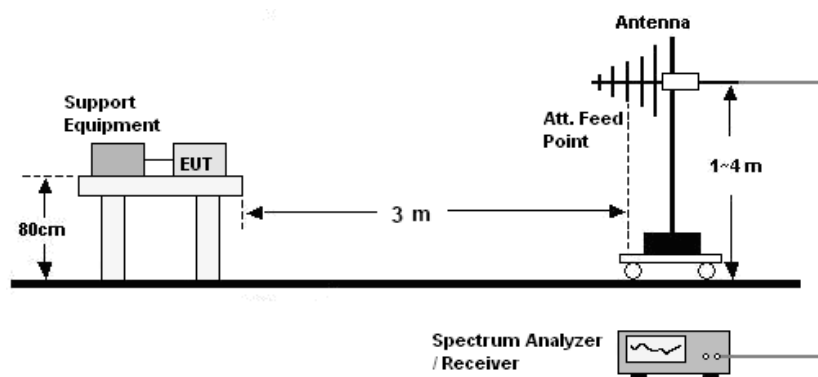


8. Deactivation Time

8.1 Applicable Standard

According to FCC §15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

8.2 EUT Setup



8.3 Test Equipment List and Details

See section 2.4.

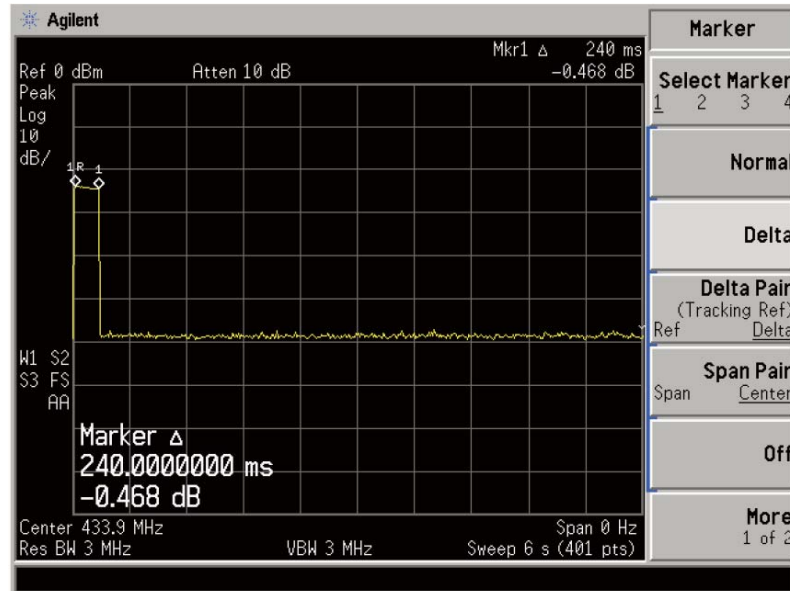
8.4 Test Procedure

- The EUT was placed on a wooded table which is 0.8m height and close to receiver antenna of spectrum analyzer
- The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

8.5 Test Result

Transmission Type	Test Frequency (MHz)	Transmission Time (s)	Limit (s)	Result
Manually	433.92	0.240	5	Pass

The spectrum analyzer plots are attached as below:



9. ANTENNA REQUIREMENT

9.1 Standard Applicable

Section 15.203:

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 shall be considered sufficient to comply with the provisions of this Section. 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.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak 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 used in this product is complied with Standard. The maximum Gain of the antenna lower than 6.0dBi and the antenna is integrated, fixed by enclosure, can not be changed except take apart the product.

Antenna



APPENDIX A - External Photographs

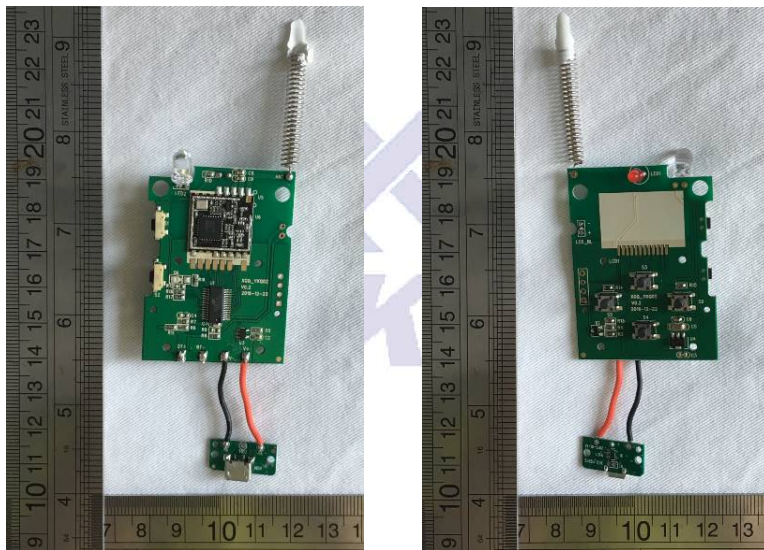


APPENDIX B - Internal Photographs

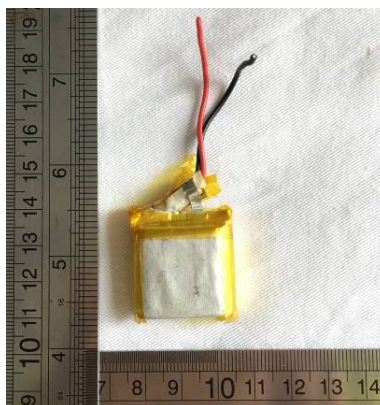
EUT –Uncovered View



EUT –PCB View



EUT –Battery View



APPENDIX C - Test Setup Photographs

Conducted Emission Test



Radiated Emission Test

