



**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

**TEST REPORT  
FCC Rules and Regulations Part PART 15.249**

Report Reference No.: GTS20190521016-1-4

FCC ID: 2ATEO-DT102

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Date of issue.....: May 21, 2019

**Testing Laboratory Name .....** **Shenzhen Global Test Service Co., Ltd.**  
Address.....: No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China

**Applicant's name .....** **Dongguan Dogreat Electronic Technology Co., Ltd**  
Address .....

**Standard .....** **FCC Rules and Regulations Part PART 15.249**

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**Test item description .....** Remote dog training collar  
Trade Mark .....

**Manufacturer .....** **DONGGUAN DOGREAT ELECTRONIC TECHNOLOGY CO., LTD**  
Model/Type reference.....: DT102  
Listed Models .....

DT101, DT103, DT530, DT540, DT740, DT750, DT760, AT868, AT888  
Ratings .....

DC 3.7 V From Battery  
Modulation .....

ASK  
Frequency.....: 915MHz  
Result.....: **PASS**



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## **1. TEST STANDARDS**

The tests were performed according to following standards:

**FCC Rules Part 15.249:** Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

**ANSI C63.10:2013 :** American National Standard for Testing Unlicensed Wireless Devices

**ANSI C63.4: 2014:** –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz  
Range of 9 kHz to 40GHz

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	May 02, 2019
Testing commenced on	:	May 02, 2019
Testing concluded on	:	May 21, 2019

### 2.2. Product Description

Name of EUT	Remote dog training collar
Model Number	DT102
List Model:	DT101, DT103, DT530, DT540, DT740, DT750, DT760, AT868, AT888
Power Rating	DC 3.7 V From Battery
Adapter(Auxiliary equipment provided by the laboratory)	Model: AS5010B Input: 100-240V~, 50/60Hz 0.15A Output:DC5V---1000m A
Operation frequency	915MHz
Modulation	ASK
Antenna Type	Internal antenna

### 2.3. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 3.7 V

### 2.4. Short description of the Equipment under Test (EUT)

This is a Remote dog training collar

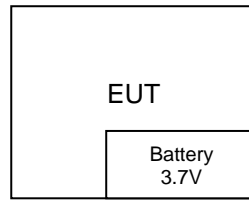
For more details, refer to the user's manual of the EUT.

### 2.5. EUT operation mode

The Applicant provides test software to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 1 channels provided to the EUT. Channel 00 was selected to test.

Channel	Frequency(MHz)
00	915

## 2.6. Block Diagram of Test Setup



## 2.7. Modifications

No modifications were implemented to meet testing criteria.

### 3. TEST ENVIRONMENT

#### 3.1. TEST FACILITY

Test Firm : Shenzhen Global Test Service Co., Ltd.

Address No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

#### 3.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

#### 3.3. Summary of measurement results

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.209	Band edge	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	PASS
FCC Part 15.203	Antenna Requirement	PASS

#### 3.4. Statement of the measurement uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

### 3.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2018/09/20	2019/09/19
LISN	R&S	ESH2-Z5	893606/008	2018/09/20	2019/09/19
Bilog Antenna	Schwarzbeck	VULB9163	976	2018/09/20	2019/09/19
EMI Test Receiver	R&S	ESC17	101102	2018/09/20	2019/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2018/09/20	2019/09/19
Spectrum Analyzer	R&S	FSP40	100019	2018/06/05	2019/06/04
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2018/09/20	2019/09/19
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2018/09/20	2019/09/19
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	971	2018/09/20	2019/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2018/09/20	2019/09/19
Amplifier	EMCI	EMC051845B	980355	2018/09/20	2019/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2018/09/20	2019/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2018/09/20	2019/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2018/09/20	2019/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2018/09/20	2019/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2018/09/20	2019/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2018/09/20	2019/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2018/09/20	2019/09/19
EMI Test Software	R&S	ES-K1	V1.7.1	2018/09/20	2019/09/19
EMI Test Software	JS Tonscend	JS32-RE	2.0.1.5	2018/09/20	2019/09/19

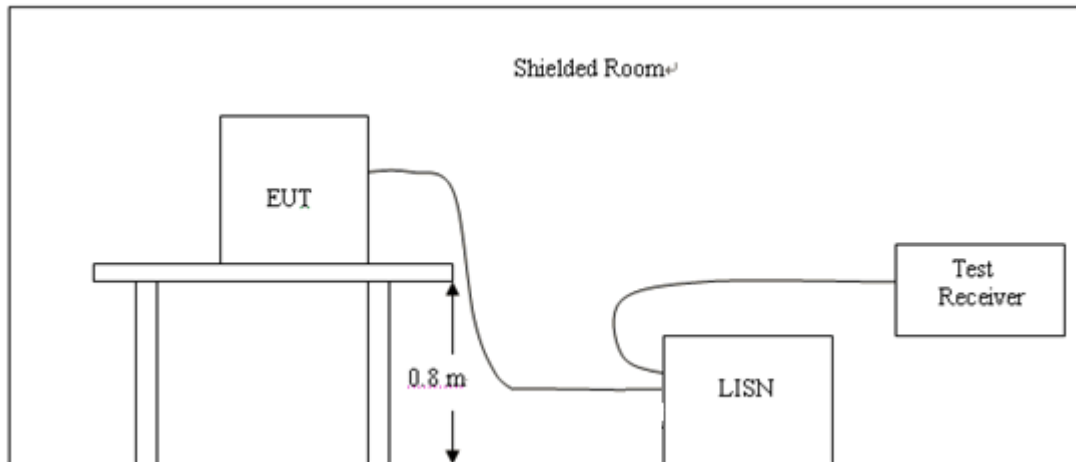
Note: The Cal.Interval was one year.



## 4. TEST CONDITIONS AND RESULTS

### 4.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

#### AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

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

\* Decreases with the logarithm of the frequency.

#### TEST RESULTS

Remark : Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:

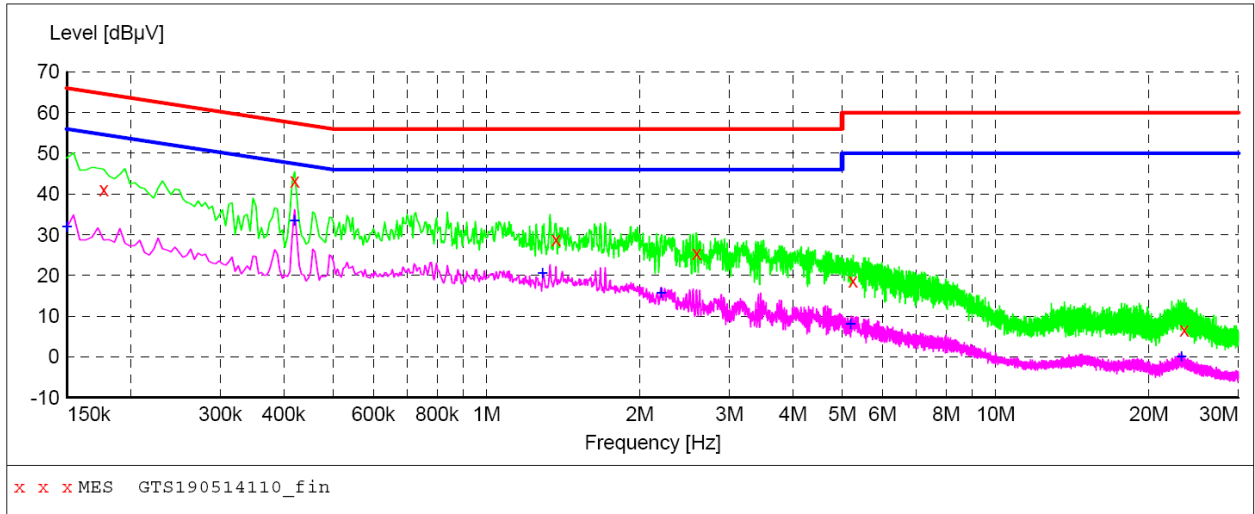
DC 5V from Adapter  
AC 120V/60Hz

Polarization

L

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "GTS190514110\_fin"**

5/14/2019 11:11AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	41.10	10.0	65	23.5	QP	L1	GND
0.420000	43.30	9.8	57	14.1	QP	L1	GND
1.369500	28.90	9.6	56	27.1	QP	L1	GND
2.589000	25.50	9.5	56	30.5	QP	L1	GND
5.248500	18.70	9.3	60	41.3	QP	L1	GND
23.473500	6.60	7.0	60	53.4	QP	L1	GND

**MEASUREMENT RESULT: "GTS190514110\_fin2"**

5/14/2019 11:11AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	32.00	10.1	56	24.0	AV	L1	GND
0.420000	33.40	9.8	47	14.0	AV	L1	GND
1.288500	20.60	9.6	46	25.4	AV	L1	GND
2.206500	15.70	9.5	46	30.3	AV	L1	GND
5.190000	8.10	9.3	50	41.9	AV	L1	GND
23.203500	0.00	7.0	50	50.0	AV	L1	GND

Power supply:

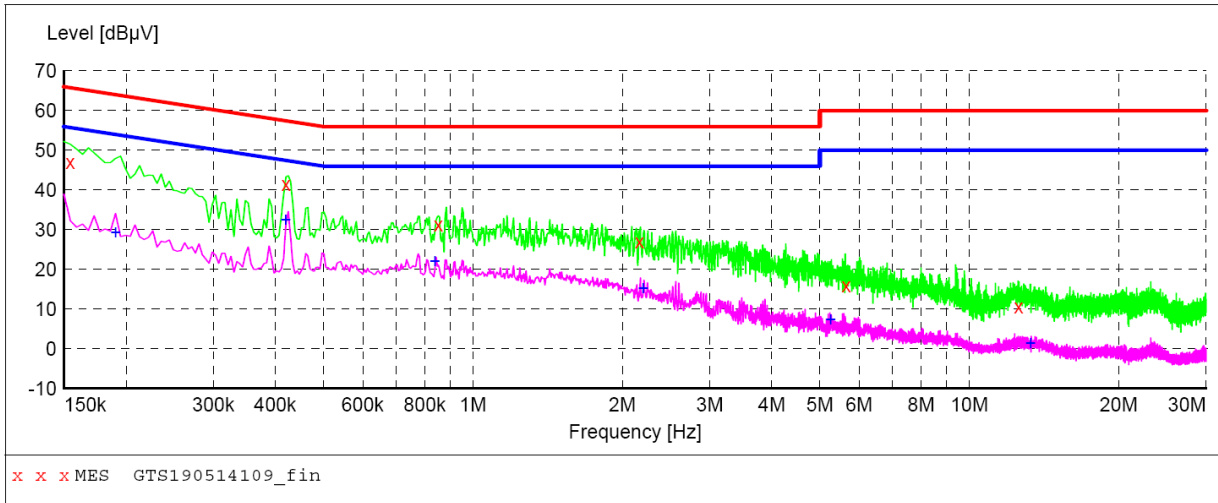
DC 5V from Adapter  
AC 120V/60Hz

Polarization

N

**SCAN TABLE: "Voltage (9K-30M) FIN"**

Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "GTS190514109\_fin"**

5/14/2019 11:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	46.90	10.1	66	18.9	QP	N	GND
0.420000	41.50	9.8	57	15.9	QP	N	GND
0.852000	31.30	9.6	56	24.7	QP	N	GND
2.166000	27.00	9.5	56	29.0	QP	N	GND
5.649000	15.80	9.2	60	44.2	QP	N	GND
12.574500	10.50	8.5	60	49.5	QP	N	GND

**MEASUREMENT RESULT: "GTS190514109\_fin2"**

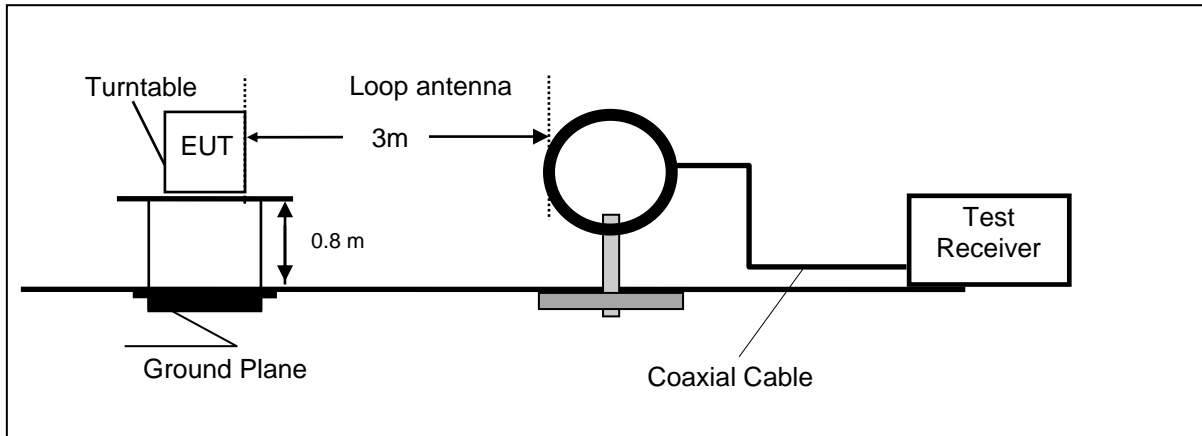
5/14/2019 11:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190500	29.40	10.0	54	24.6	AV	N	GND
0.420000	32.50	9.8	47	14.9	AV	N	GND
0.838500	22.10	9.6	46	23.9	AV	N	GND
2.206500	15.30	9.5	46	30.7	AV	N	GND
5.257500	7.30	9.3	50	42.7	AV	N	GND
13.290000	1.40	8.4	50	48.6	AV	N	GND

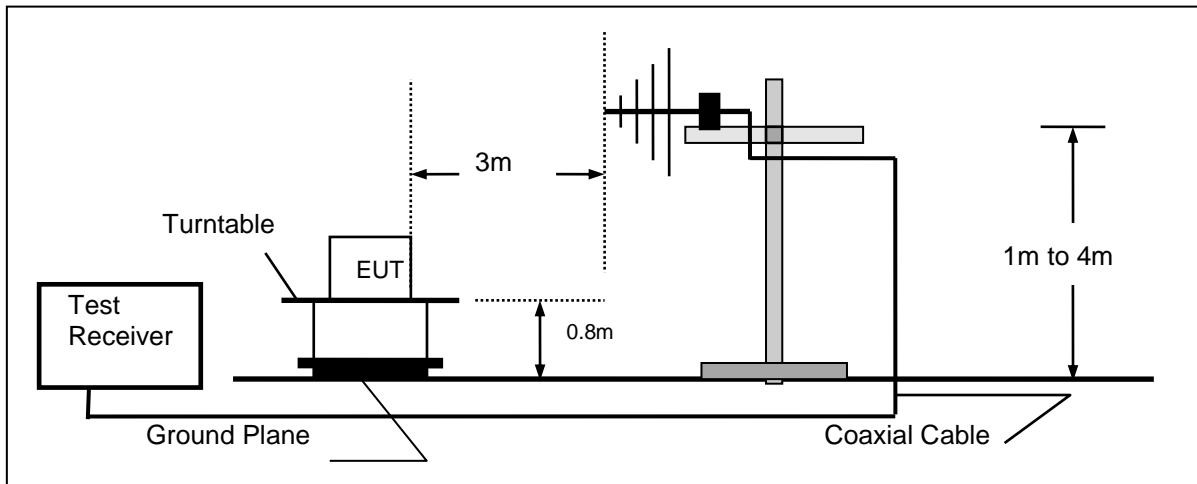
## 4.2. Radiated Emission and Band Edges

### TEST CONFIGURATION

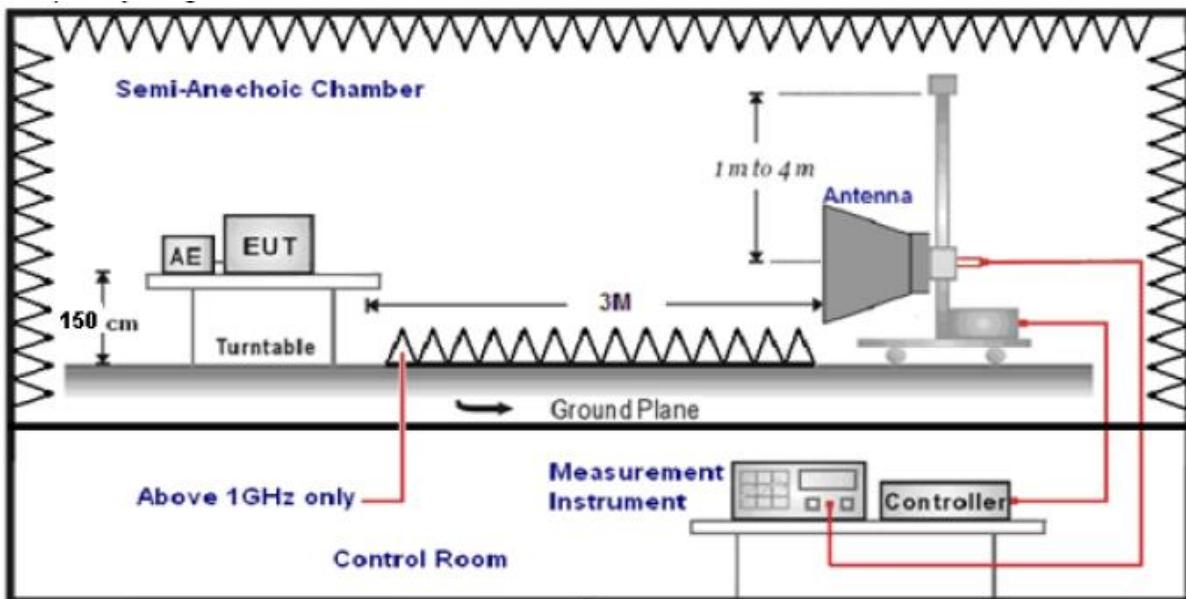
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



**TEST PROCEDURE**

- The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –25GHz.
- Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- The EUT minimum operation frequency was 26MHz and maximum operation frequency was 1910MHz.so radiated emission test frequency band from 9KHz to 25GHz.
- The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

- Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

**Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

$$\text{Transd} = \text{AF} + \text{CL} - \text{AG}$$

**RADIATION LIMIT**

According to 15.249, the field strength of emissions from intentional radiators operated within 902MHz-928 MHz shall not exceed 94dB $\mu$ V/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

**Radiated emission limits**

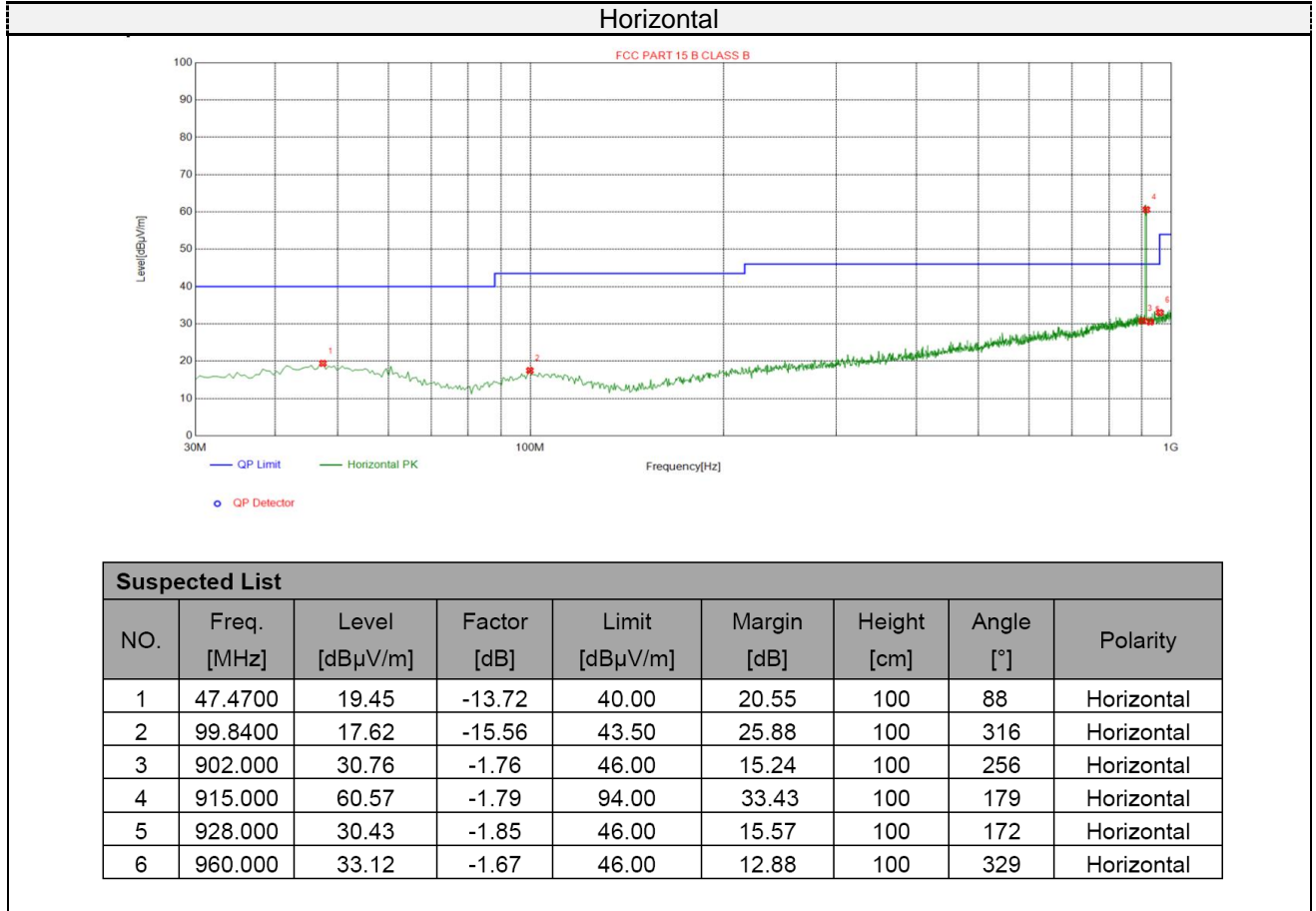
Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

**TEST RESULTS**

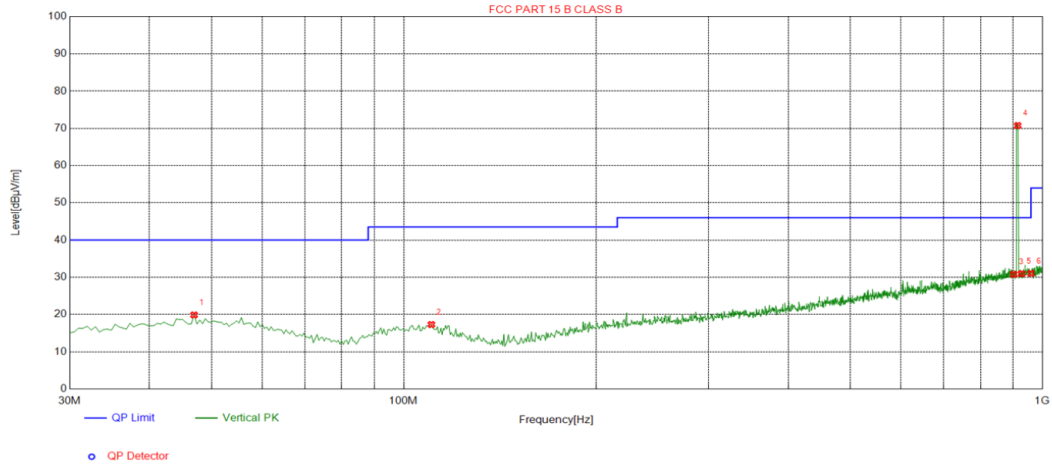
**For 9 KHz-30MHz**

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.38	46.62	96.01	49.39	QP	PASS
1.55	52.05	63.80	11.75	QP	PASS
19.68	57.08	69.54	12.46	QP	PASS
24.62	41.07	69.54	28.47	QP	PASS

**For 30MHz-1GHz**



**Vertical**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.9820	19.79	-13.72	40.00	20.21	100	136	Vertical
2	110.450	17.46	-15.63	43.50	26.04	100	8	Vertical
3	902.000	30.85	-1.76	46.00	15.15	100	143	Vertical
4	915.000	70.69	-1.79	94.00	23.31	100	337	Vertical
5	928.000	30.91	-1.85	46.00	15.09	100	292	Vertical
6	960.000	31.07	-1.67	46.00	14.93	100	175	Vertical

## For 1GHz to 25GHz

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
1240	57.61	-9.08	48.53	74	-25.47	peak
1240	42.75	-9.08	33.67	54	-20.33	AVG
1830	61.59	-8.79	52.8	74	-21.2	peak
1830	46.71	-8.79	37.92	54	-16.08	AVG
2745	57.62	-4.05	53.57	74	-20.43	peak
2745	43.51	-4.05	39.46	54	-14.54	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

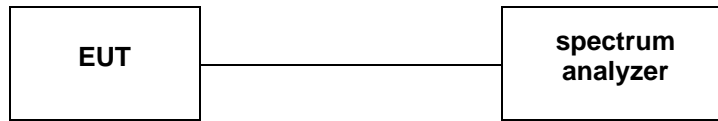
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
1240	58.72	-9.08	49.64	74	-24.36	peak
1240	43.29	-9.08	34.21	54	-19.79	AVG
1830	62.71	-8.79	53.92	74	-20.08	peak
1830	45.35	-8.79	36.56	54	-17.44	AVG
2745	55.89	-4.05	51.84	74	-22.16	peak
2745	43.08	-4.05	39.03	54	-14.97	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



### 4.3. Occupied Bandwidth Measurement

#### TEST CONFIGURATION



#### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100KHz RBW and 300KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### LIMIT

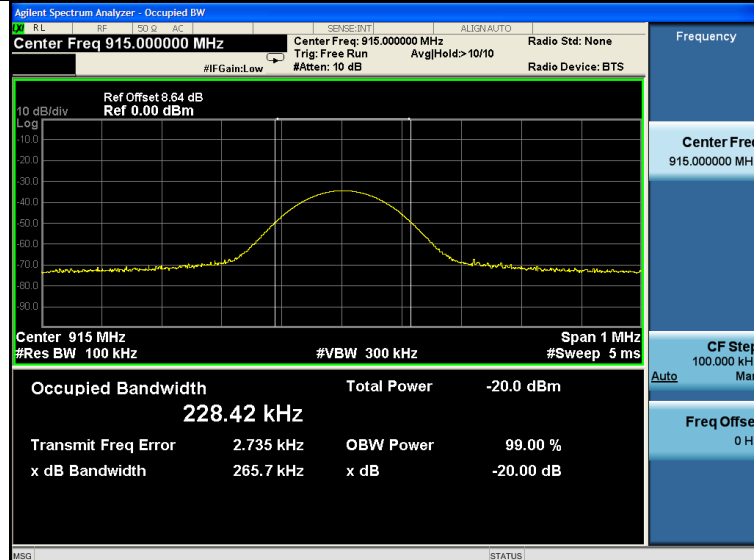
N/A

#### TEST RESULTS

Modulation	Channel	99% OBW (kHz)	20dB bandwidth (kHz)	Result
ASK	CH00	224.82	260.9	Pass

Note: 1.The test results including the cable lose.

### ASK Modulation



CH00

#### **4.4. Antenna Requirement**

##### **Standard Applicable**

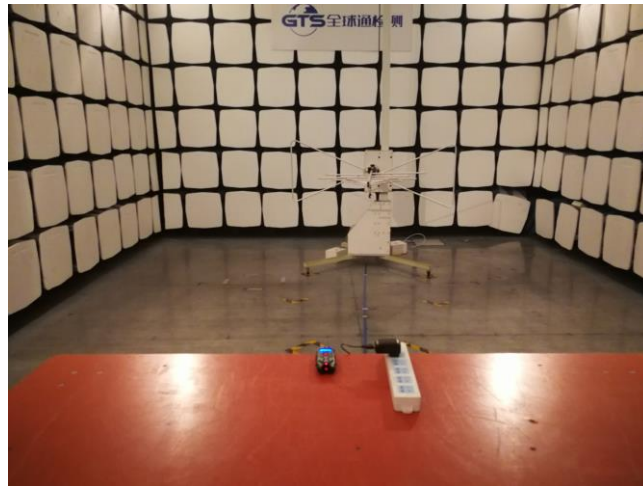
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

##### **Antenna Information**

The directional gains of antenna used for transmitting is 0.00 dBi.

## 5. Test Setup Photos of the EUT



.....End of Report.....