

Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

Guangdong Yinrun Industry Co., LTD.

Product description: Sideways Tumbler

Model No.: 8028

FCC ID: XHT8028-27M

Prepared for: Guangdong Yinrun Industry CO., LTD.

Yinrun Ind. Garden, Laimei Zone, Chenghai, Shantou City,
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant: **Guangdong Yinrun Industry CO., LTD.**
Address of applicant: Yinrun Ind, Garden, Laimei Zone, Chenghai, Shantou City, Guangdong, China
Manufacturer: **Guangdong Yinrun Industry CO., LTD.**
Address of manufacturer: Yinrun Ind, Garden, Laimei Zone, Chenghai, Shantou City, Guangdong, China

EUT Description:	Sideways Tumbler
Trade Name:	N/A
Model No.:	8028
Rated Voltage	DC 9V laminated battery for transmitter
Frequency range	27.145MHz
Number of channels	1
Channel Separation	None
Product Class:	Low Power Communication Device Transmitter
Measurement Procedure	ANSI C63.4-2003

Remark: * The test data gathered are from the production sample provided by the manufacturer.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.227 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, 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 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

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

FCC – Registration No.: 338263

Bontek Compliance Testing Laboratory 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 338263, March 24, 2008.

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2008.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 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 Section 7.1 of ANSI C63.4-2003. 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 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 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 Section 13.1.4.1 of ANSI C63.4-2003.

2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2009-2-21	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2009-2-21	1 Year
3	Amplifier	HP	8447D	1937A024 92	2009-2-21	1 Year
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2009-2-21	1 Year
5	3 phase Artificial Mains (L.I.S.N)	SCHWARZBECK	NSLK 8128	8128247	2009-2-26	1 Year
6	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2009-2-21	1 Year
7	Horn Antenna	SCHWARZBECK	BBHA9120A	D69250	2009-2-26	1 Year
8	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2008-9-03	1 Year
9	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2008-9-03	1 Year
10	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2008-9-03	1 Year
11	Power Clamp	SCHWARZBECK	MDS-21	3812	2009-2-21	1 Year
12	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2009-2-21	1 Year
13	Teo Line Single Phase Module	FCC	FCC-LISN-50-25-2-01	06061	2009-3-30	1 Year

3. SUMMARY OF TEST RESULTS

EUT Fundamental Frequency	FCC Rules	Description of Test	Result
27.145MHz	15.207	Disturbance Voltage at The Mains Terminals	N/A, without AC power supply
	15.227	Radiation Emission	Pass
	15.227	Emissions within Band Edges	Pass

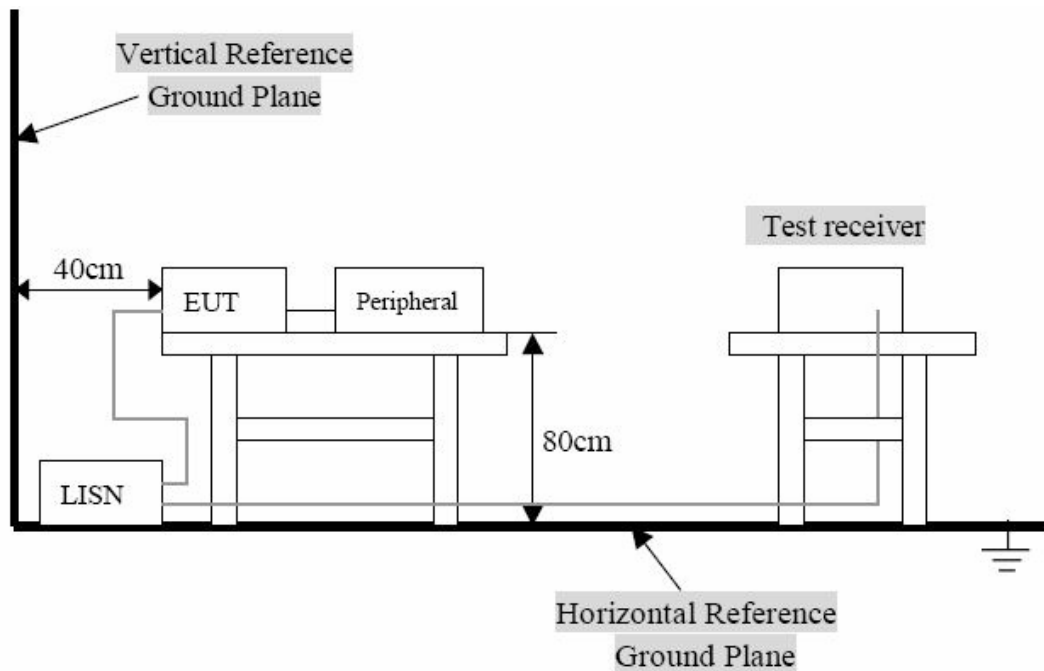
4. TEST OF CONDUCTED EMISSION

4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the 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 below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

4.2 Test Setup Diagram



- Remark: 1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.
2. The EUT is excluded from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by DC 9V laminated battery. According to the Section 15.207(d), measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

5- RADIATED EMISSIONS

5.1 Limit of Radiated Emissions

Limit of Field Strength of Fundamental Emissions (FCC 47CFR 15.227):

Frequency Range (MHz)	Field Strength of Fundamental Emission (Peak) ($\mu\text{V/m}$)	Field Strength of Fundamental Emission (Average) ($\mu\text{V/m}$)
26.96-27.28	100,000 $\mu\text{V/m}$ (100dB $\mu\text{V/m}$)	10,000 $\mu\text{V/m}$ (80dB $\mu\text{V/m}$)

Limits of Spurious Emissions (FCC 47 CFR 15.209 Class B):

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu\text{V/m}$)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

- (2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

5.2 EUT Setup

Radiated Measurement Setup

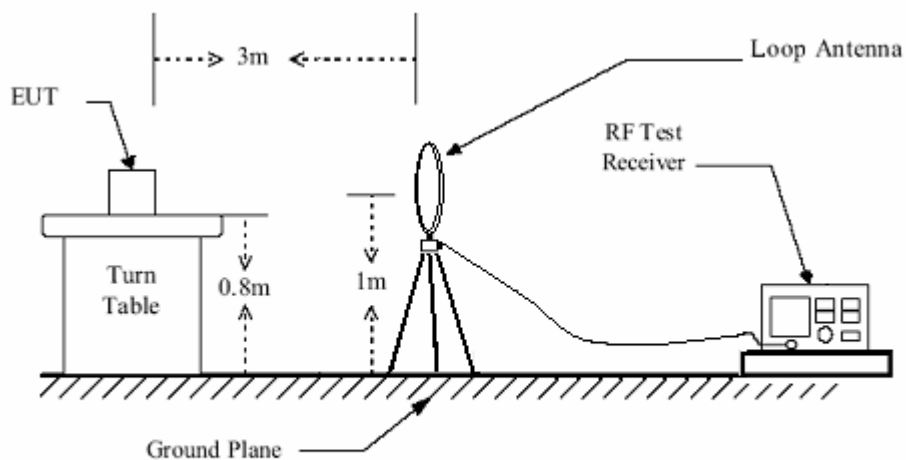


Figure 2 : Frequencies measured below 30 MHz configuration

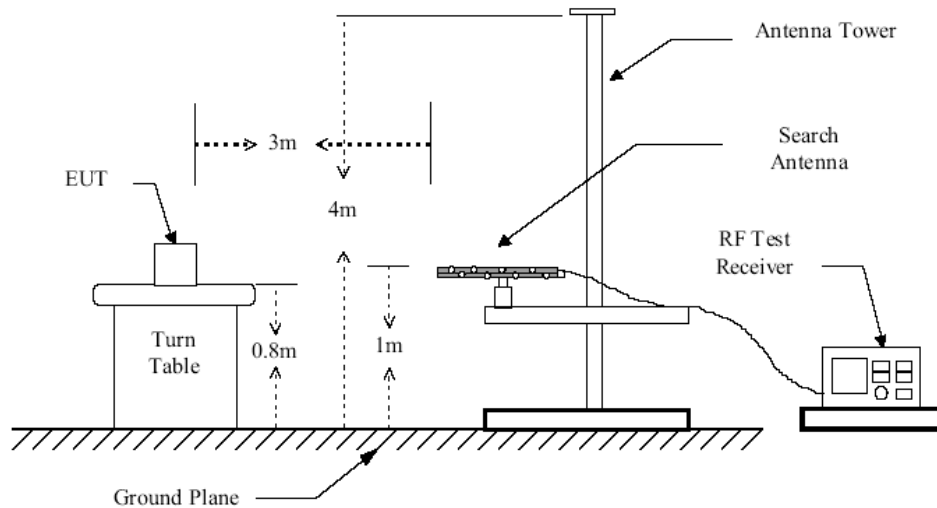


Figure 1 : Frequencies measured below 1 GHz configuration

5.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). For Spurious Emissions test, The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 6). For Field Strength of Fundamental Emissions test, Positioned the loop antenna with its plane vertical at the specified distance of 3 meters between its center and the EUT. The center of the loop antenna is set with 1m above the grounded plane. Then rotated about its vertical axis for finding out the maximum emission level of the EUT.

5.4 Test Result

Temperature (°C) : 23~24	EUT: Sideways Tumbler
Humidity (%RH) : 50~55	M/N: 8028
Barometric Pressure (mbar) : 950~1000	Operation Condition: Continuous Transmitting

Fundamental Emission Test Data

Peak Measurement					
Test Frequency (MHz)	Measuring Level (dB μ V/m)		Limits (dB μ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.1460	76.41	69.97	100	30.03	23.59
Average Measurement					
27.1460	72.45	66.22	80	13.78	7.55

Result: The field strength of any emission within the operation band did not exceed 80(dB μ V/m) for average value and 100 dB(dB μ V/m)for peak value.

Average

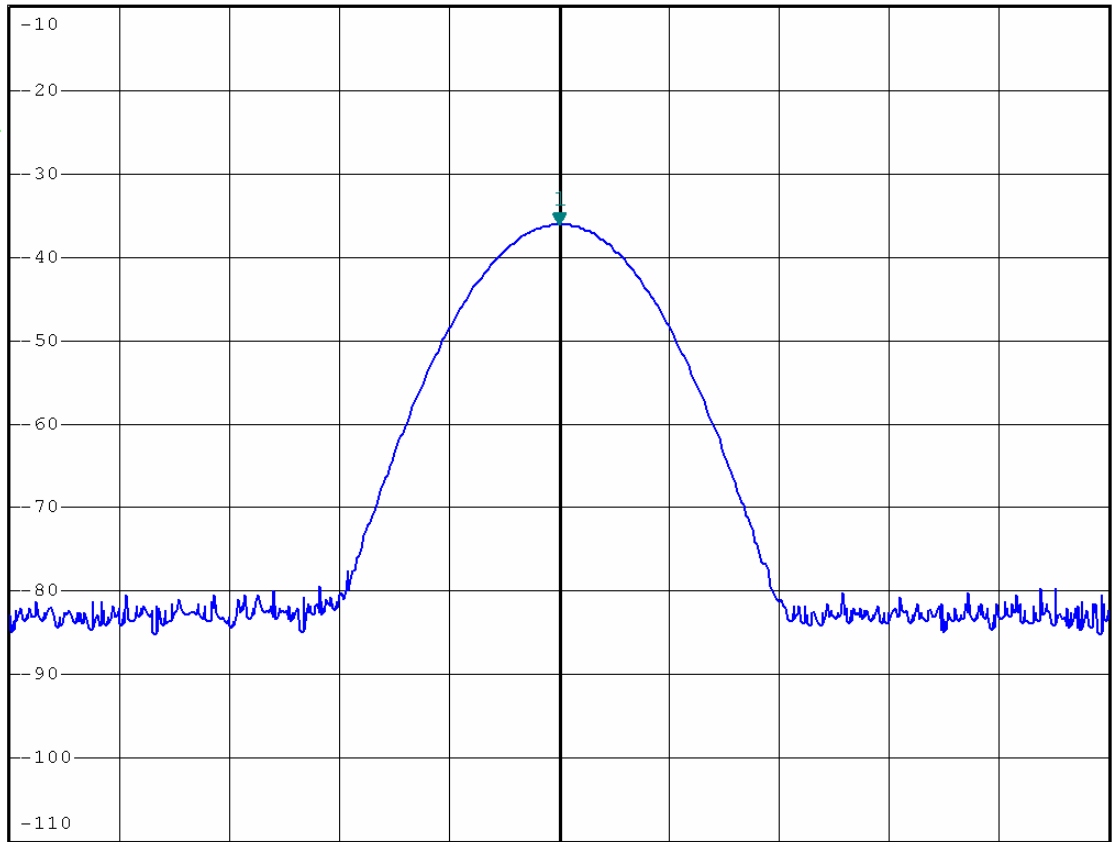


*RBW 100 kHz Marker 1 [T1]
VBW 1 MHz -36.12 dBm
SWT 2.5 ms 27.14600000 MHz

Ref -10 dBm

*Att 10 dB

1 AV +
VIEW



Center 27.146 MHz

100 kHz/

Span 1 MHz

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PEAK

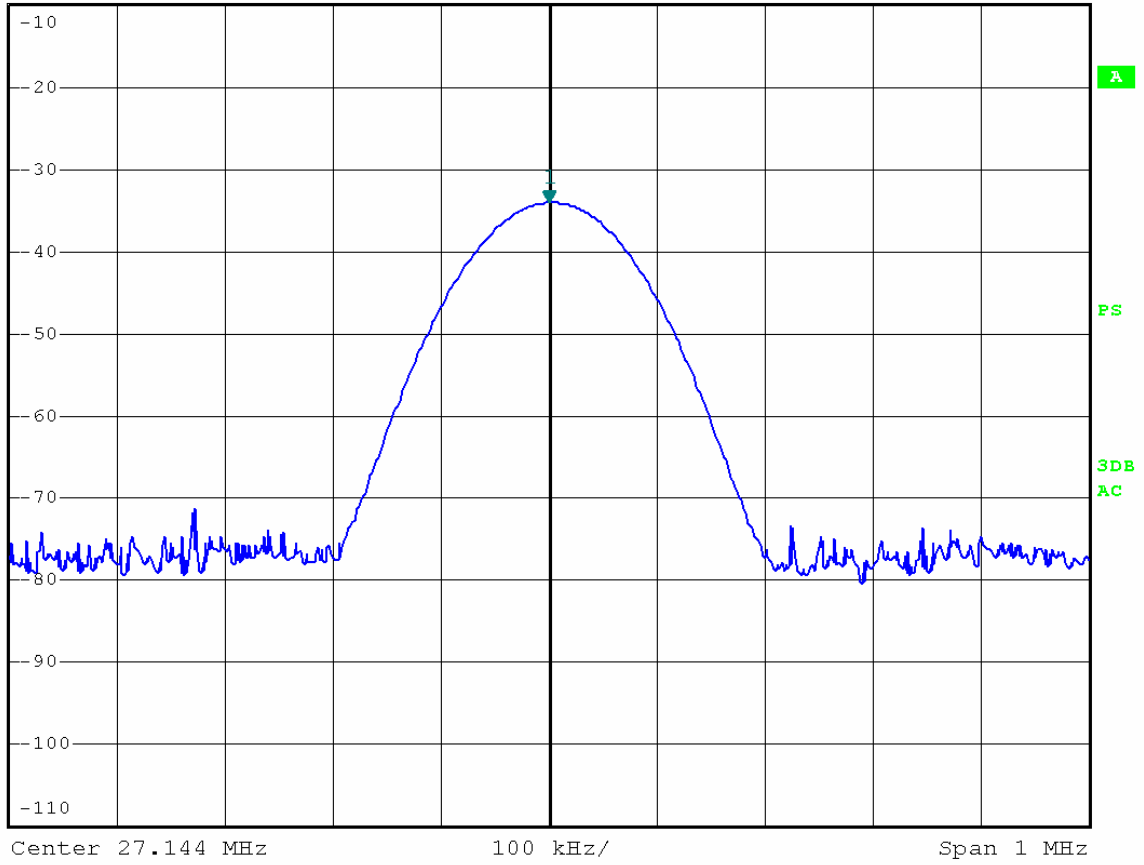


*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz -34.09 dBm
SWT 2.5 ms 27.14400000 MHz

Ref -10 dBm

*Att 10 dB

1 PK
VIEW

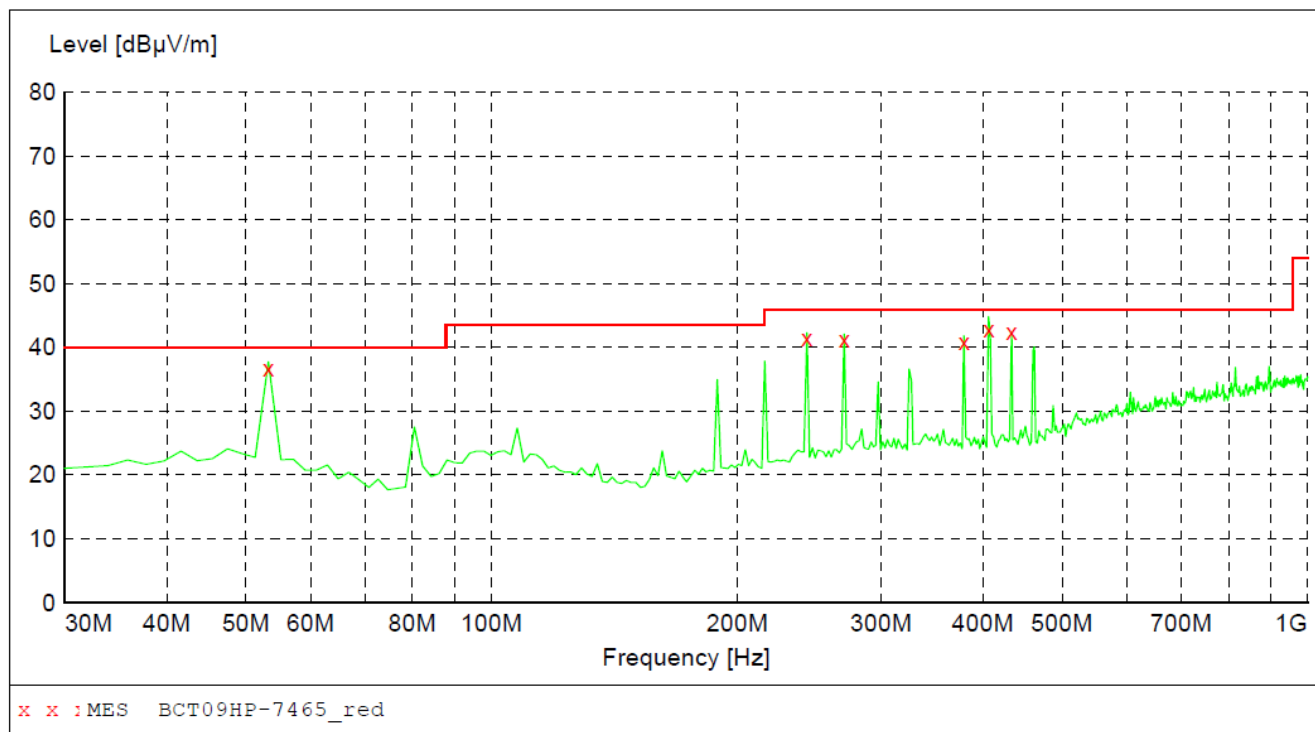


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Harmonics & Spurious Emission

RADIATED EMISSION TEST DATA

EUT: Sideways Tumbler
 Operating Condition: ON
 Test Site: 3m CHAMBER
 Operator: Jimmy
 Test Specification: DC 9.0V from Transmitter
 Comment: Polarization: Horizontal



MEASUREMENT RESULT: "BCT09HP-7465_red"

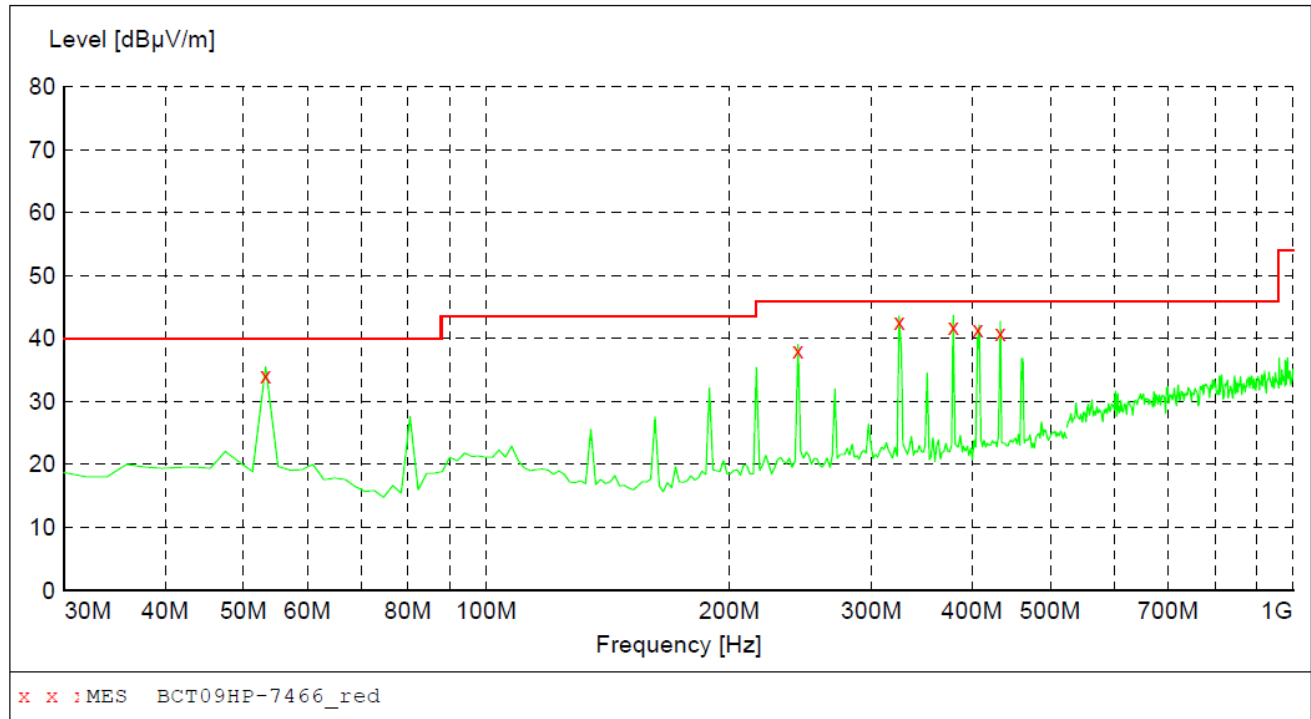
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Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	37.70	16.6	40.0	3.3	QP	100.0	0.00	VERTICAL
243.400000	42.30	18.3	46.0	3.7	QP	100.0	0.00	VERTICAL
270.560000	42.10	19.1	46.0	3.9	QP	100.0	0.00	VERTICAL
379.200000	41.80	20.6	46.0	4.2	QP	100.0	0.00	VERTICAL
406.360000	43.80	20.8	46.0	3.8	QP	100.0	0.00	VERTICAL
433.520000	43.40	21.3	46.0	3.6	QP	100.0	0.00	VERTICAL

Harmonics & Spurious Emission

RADIATED EMISSION TEST DATA

EUT: Sideways Tumbler
 Operating Condition: ON
 Test Site: 3m CHAMBER
 Operator: Jimmy
 Test Specification: DC 9.0V from Transmitter
 Comment: Polarization: Vertical



MEASUREMENT RESULT: "BCT09HP-7466_red"

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Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	36.80	18.3	40.0	5.2	QP	100.0	0.00	HORIZONTAL
243.400000	40.80	18.3	46.0	7.2	QP	100.0	0.00	HORIZONTAL
324.880000	45.30	20.4	46.0	3.7	QP	100.0	0.00	HORIZONTAL
379.200000	44.40	20.6	46.0	4.6	QP	100.0	0.00	HORIZONTAL
406.360000	44.00	20.8	46.0	5.0	QP	100.0	0.00	HORIZONTAL
433.520000	43.50	21.3	46.0	5.5	QP	100.0	0.00	HORIZONTAL

6- EMISSIONS WITHIN BAND EDGES

6.1 Limit of Emissions within Band Edges

According to the section 15.227 of FCC Part 15 Subpart C, The field strength of any emission within this band shall not exceed 10,000 microvolts/ meter at 3 meter. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

6.2 Test Procedure

Positioned the loop antenna with its plane vertical at the specified distance of 3 meters between its center and the EUT. The center of the loop antenna is set with 1m above the grounded plane. Then rotated about its vertical axis for finding out the maximum emission level of the EUT. (Details refer to the relevant sections of the standard ANSI C63.4-2003 'Methods of Measurement of Radio Noise Emissions from Low -Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz'.)

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

6.3 Emissions within Band Edges Test Result

Temperature (°C) : 23~25	EUT: Sideways Tumbler
Humidity (%RH) : 50~55	M/N: 8028
Barometric Pressure (mbar) : 950~1000	Operation Condition: Continuous Transmitting

Test plots see following:

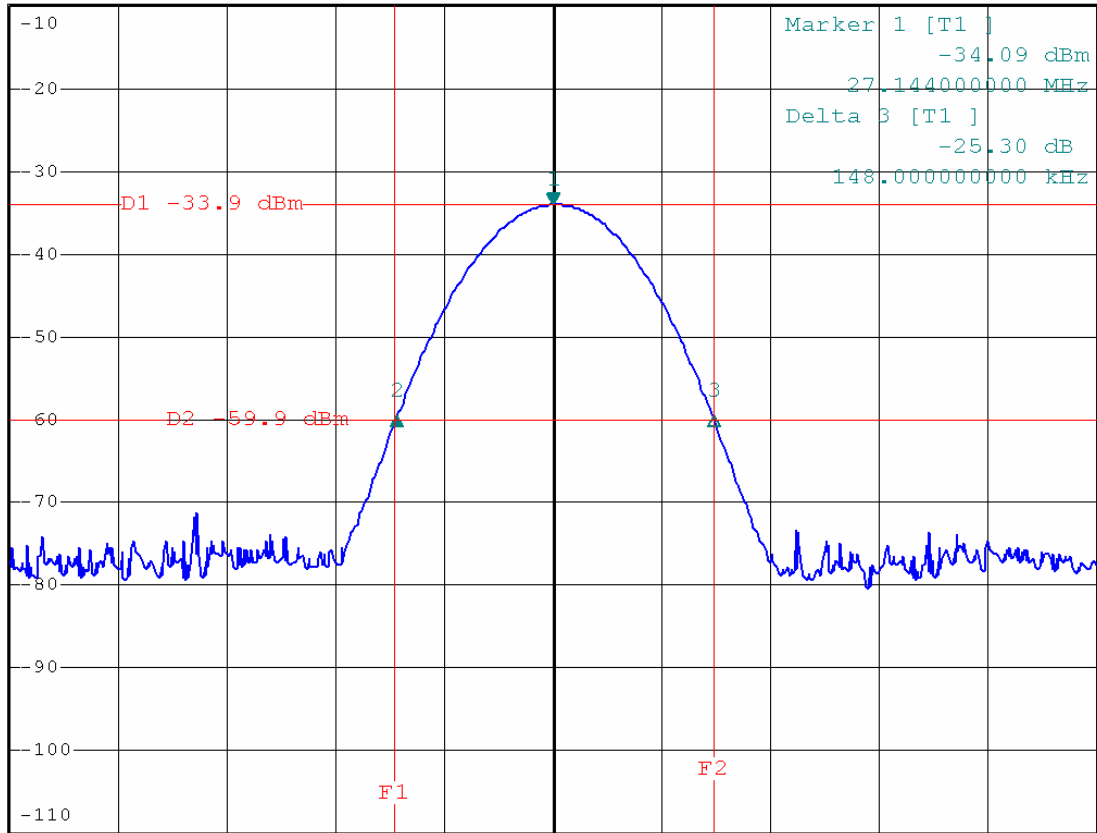


*RBW 100 kHz Delta 2 [T1]
VBW 300 kHz -25.48 dB
SWT 2.5 ms -144.000000000 kHz

Ref -10 dBm

*Att 10 dB

1 PK
VIEW



Center 27.144 MHz 100 kHz/ Span 1 MHz

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7. ANTENNA REQUIREMENT

7.1 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.

7.2 Antenna Connected Construction

The antenna is a 26.5cm long non-telescoping wire. It is connected with a fixable screw in the PCB. It is compliance with the requirement of unique coupling to the intentional radiator.