

The Coleman Company, Inc.

TEST REPORT

SCOPE OF WORK

EMC TESTING-4010060395

REPORT NUMBER

180531084GZU-001

ISSUE DATE

10-July-2018

[REVISED DATE]

[-----]

PAGES

18

DOCUMENT CONTROL NUMBER

FCC Part 15:2017-c

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TEST REPORT

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Intertek Report No: 180531084GZU-001

Test standards

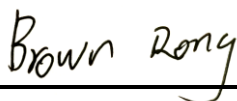
CFR 47, FCC Part 15, Subpart B:2017

Sample Description

Product : Power bank
Model No. : 4010060395
Electrical Rating : Input Micro USB: 5V DC 2A
Output: USB x 2: 5V DC 2.1A(Total); 5V DC 2.1A (Each port)
Serial No. : Not Labeled
Date Received : 31 May 2018
Date Test : 31 May 2018-10 July 2018
Conducted

Prepared and Checked By

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Classification of EUT: Class B

Test Item	Standard	Result
Conducted disturbance voltage at mains ports	CFR 47, FCC Part 15, Subpart B	Pass
Radiated emission (30 MHz–1 GHz)	CFR 47, FCC Part 15, Subpart B	Pass
Radiated emission (Above 1 GHz)	CFR 47, FCC Part 15, Subpart B	N/A
Remark: Reference publication is used for methods of measurement: ANSI C63.4:2014		

Remark:

1. The symbol "N/A" in above table means Not Applicable.
2. When determining the test results, measurement uncertainty of tests has been considered.

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2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to FCC part 15 performed on the Power bank, Model: 4010060395.

We tested the Power bank, Model: 4010060395, to determine if it was in compliance with the relevant standards as marked on the Test Results Summary. We found that the unit met the requirement of FCC part 15 standard when tested as received. The worst case's test data was presented in this test report.

The production units are required to conform to the initial sample as received when the units are placed on the market.

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3. LABORATORY MEASUREMENTS

Configuration Information

Support Equipment: N/A

Equipment	Model No.	Rating	Supplier
Adapter	A1401	100-240~, 50/60Hz, 0.5A	Intertek
Cement resistance	-	5Ω, 10W	Intertek
Cement resistance	-	5Ω, 10W	Intertek
Micro-USB cable	-	0.8m	Intertek

Rated Voltage and frequency under test: DC 5V 2A
 Condition of Environment: Temperature: 22~28°C
 Relative Humidity:35~60%
 Atmosphere Pressure:86~106kPa

Notes:

1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications. An attempt had been made to maximize the emission by varying the configuration of the EUT.

2. Test Facility accreditation:
 A2LA Certificate Number 0078.10
 Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

3. Test Location:
 Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
 All tests were performed at:
 Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China
 Except Radiated Emissions was performed at:
 Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

4. Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission (9 kHz-150 kHz)	2.51 dB
2	Conduction Emission (150 kHz-30 MHz)	2.69 dB
3	Disturbance Power (30 MHz-300 MHz)	3.21 dB
4	Radiated Emission (30 MHz-1 GHz)	4.79 dB
5	Radiated Emission (1 GHz-6 GHz)	5.02 dB
6	Radiated Emission (6 GHz-18 GHz)	5.17 dB

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The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

The measurement uncertainty is given with a confidence of 95%, $k=2$.

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4. EQUIPMENT USED DURING TEST

Conducted Disturbance-Mains Terminal(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	18/07/2019	1Y
EM006-05	LISN	ENV216	R&S	06/06/2019	1Y
SA047-112	Digital Temperature-Humidity Recorder	RS210	YIJIE	03/11/2018	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	07/01/2019	1Y

Radiated Disturbance (30 MHz-1 GHz)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m3	ETS-LINDGREN	06/05/2019	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	03/11/2019	1Y
EM033-01	TRILOG Super Broadband test Antenna (30 MHz-3 GHz)	VULB 9163	SCHWARZBECK	19/09/2018	1Y
EM031-02-01	Coaxial cable	/	R&S	06/05/2019	1Y
EM036-01	Common-mode absorbing clamp	CMAD 20B	TESEQ	15/07/2019	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	17/07/2019	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A

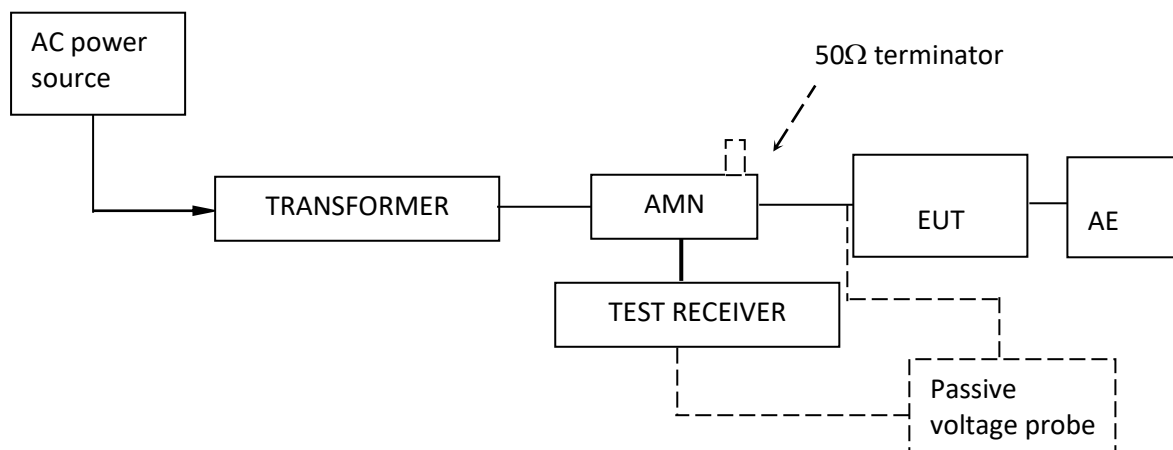
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5. EMI TEST

5.1 Conducted Disturbance Voltage at mains ports

Test Result: Pass

5.1.1 Block Diagram of Test Setup



5.1.2 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT. During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

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5.1.3 Limit

Frequency range MHz	AC mains terminals dB (uV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Note 1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.
Note 2: The lower limit is applicable at the transition frequency.

5.1.4 Test Data and curve

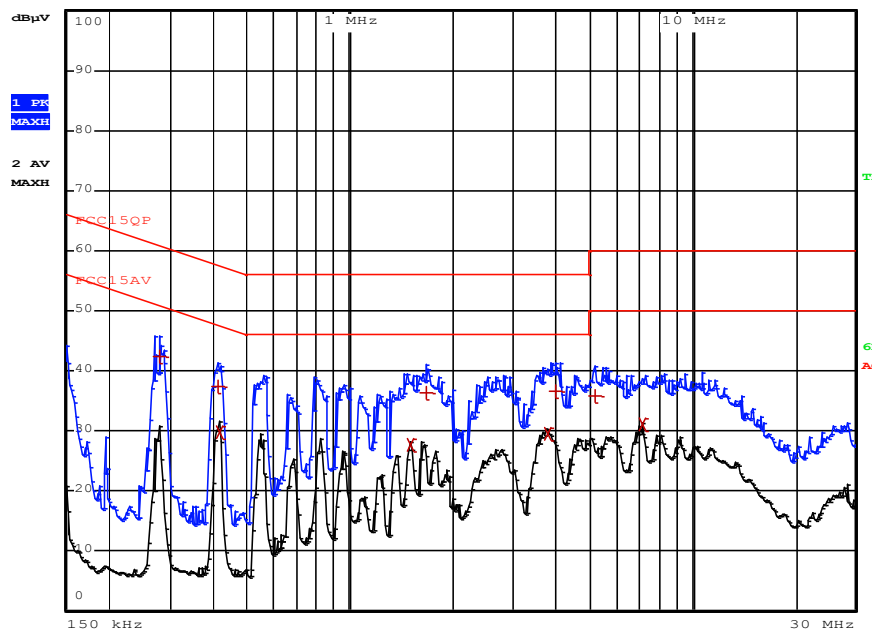
At mains terminal:

Tested Wire: Live

Operation Mode: Discharging + charging



RBW 9 kHz
MT 1 s
Att 10 dB
PREAMP OFF



EDIT PEAK LIST (Final Measurement Results)			
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
Trace1:	FCC15QP		
Trace2:	FCC15AV		
Trace3:	---		
1 Quasi Peak	278 kHz	42.26 L1	-18.61
1 Quasi Peak	410 kHz	37.51 L1	-20.13
2 Average	414 kHz	29.81 L1	-17.75
2 Average	1.506 MHz	27.63 L1	-18.36
1 Quasi Peak	1.682 MHz	36.34 L1	-19.65
2 Average	3.786 MHz	29.46 L1	-16.53
1 Quasi Peak	4.006 MHz	36.51 L1	-19.48
1 Quasi Peak	5.19 MHz	35.90 L1	-24.09
2 Average	7.15 MHz	30.98 L1	-19.01

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Remark:

1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dB μ V) = Corr. (dB) + Read Level (dB μ V)
3. Delta Limit (dB) = Level (dB μ V)-Limit (dB μ V)

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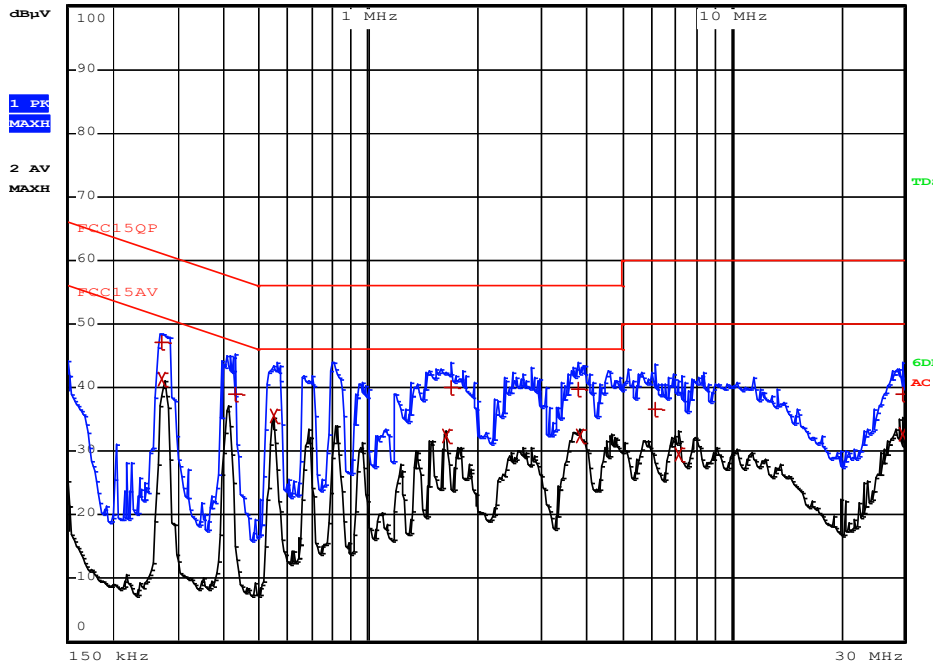
Tested Wire: Neutral

Operation Mode: Discharging + charging



RBW 9 kHz
MT 1 s
PREAMP OFF

Att 10 dB



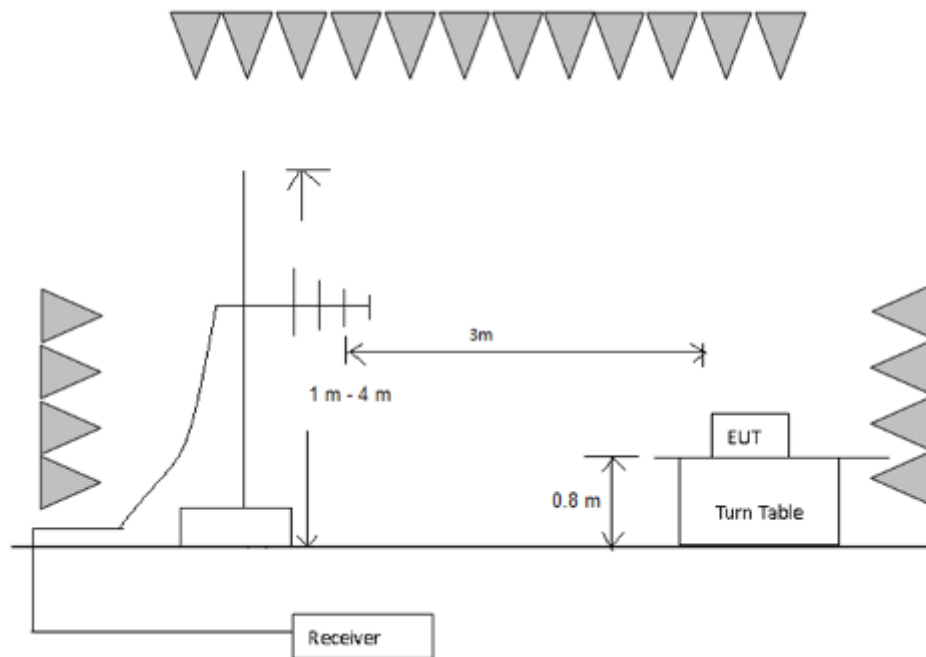
EDIT PEAK LIST (Final Measurement Results)				
Trace1:		FCC15QP		
Trace2:		FCC15AV		
Trace3:		---		
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	270 kHz	47.16 L1	-13.95
2	Average	274 kHz	41.22 L1	-9.77
1	Quasi Peak	430 kHz	39.05 L1	-18.19
2	Average	550 kHz	35.53 L1	-10.46
2	Average	1.634 MHz	32.54 L1	-13.45
1	Quasi Peak	1.686 MHz	39.98 L1	-16.01
1	Quasi Peak	3.802 MHz	39.81 L1	-16.19
2	Average	3.822 MHz	32.35 L1	-13.64
1	Quasi Peak	6.19 MHz	36.50 L1	-23.49
2	Average	7.174 MHz	29.53 L1	-20.46
2	Average	29.614 MHz	32.54 L1	-17.45
1	Quasi Peak	29.618 MHz	38.95 L1	-21.04

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5.2 Radiated Emission 30 MHz -1000 MHz

Test Result: Pass

5.2.1 Block Diagram of Test Setup



5.2.2 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8 m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4 requirement during radiated test.

The bandwidth setting on R&S Test Receiver was 120 kHz.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

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Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper Frequency of Radiated Measurement
Below 1.705 MHz	30MHz
1.705 MHz – 108 MHz	1 GHz
108 MHz – 500 MHz	2 GHz
500 MHz – 1 GHz	5 GHz
Above 1 GHz	5th harmonic of the highest frequency or 40 GHz, whichever is lower.
At transitional frequencies the lower limit applies.	

Remark: Radiated Emission was performed from 30 MHz to 1 GHz.

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5.2.3 Limit

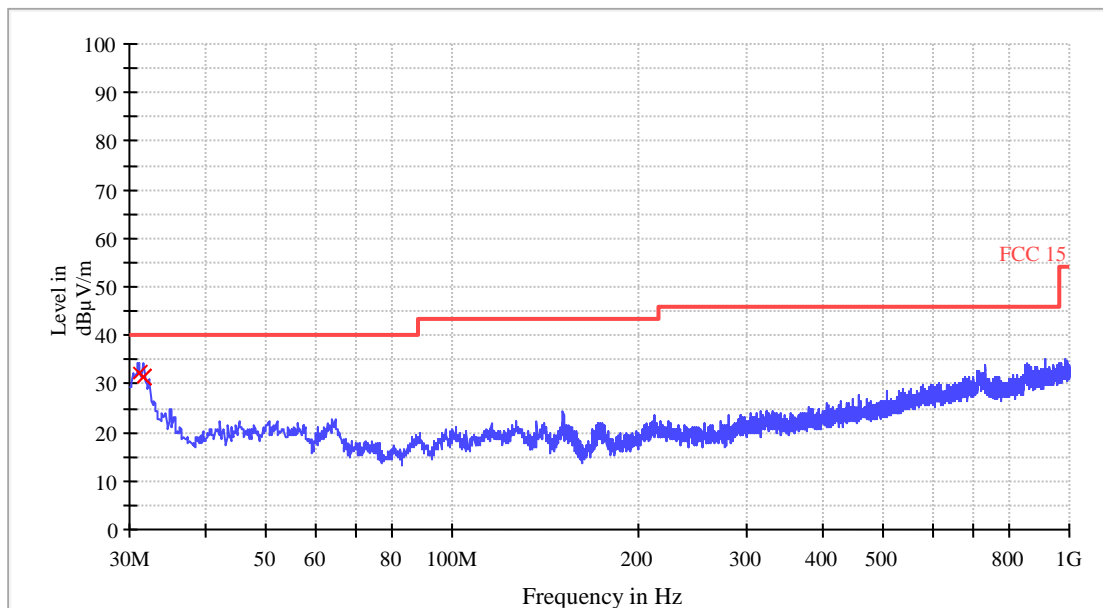
Class B limit at 3m test distance:

Frequency range MHz	Quasi-peak limits dB (μV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54
At transitional frequencies the lower limit applies.	

5.2.4 Test Data and Curve

Operation Mode: **charging +discharging Mode**

Horizontal



QP

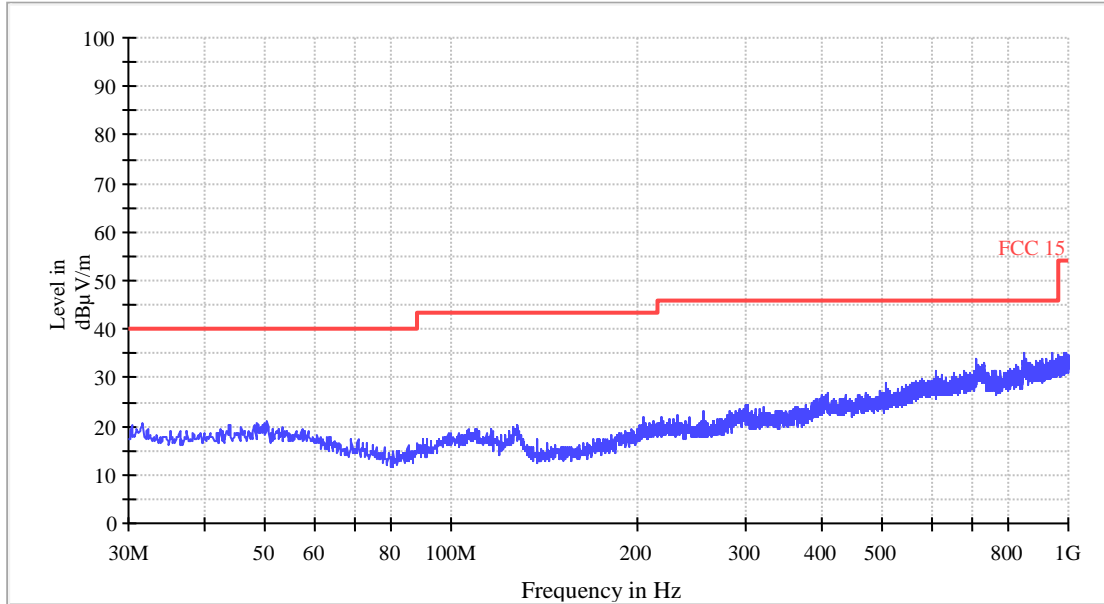
Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
31.080000	32.0	120.000	V	11.6	8.0	40.0
31.680000	31.6	120.000	V	11.6	8.4	40.0

Remark:

1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dBμV/m) = Corr. (dB) + Read Level (dBμV)
3. Margin (dB) = Limit QPK (dBμV/m) – Quasi Peak (dBμV/m)

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Vertical



All emission levels are more than 6 dB below the limit.

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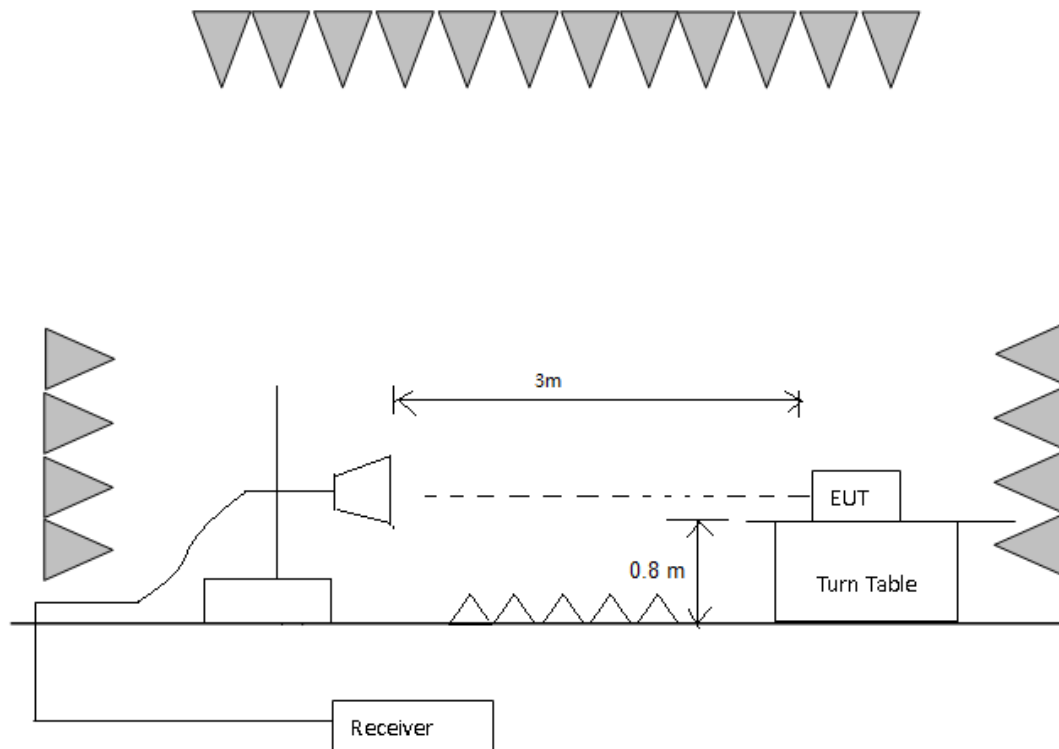
5.3 Radiated Emission above 1 GHz

Test Result: Not Applicable

Remark:

The highest internal source of the EUT is not more than 108 MHz, so the measurement above 1000 MHz is not applicable.

5.3.1 Block Diagram of Test Setup



5.3.2 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber with absorbing material placed on the ground. The EUT were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turntable varied every 30 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna pole. The antenna was set as same as the height of the radiation centre of the EUT.

Horn antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated during radiated test.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below

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the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest Frequency Generated or Used in Device	Upper Frequency of Radiated Measurement
Below 1.705 MHz	30MHz
1.705 MHz – 108 MHz	1 GHz
108 MHz – 500 MHz	2 GHz
500 MHz – 1 GHz	5 GHz
Above 1 GHz	5th harmonic of the highest frequency or 40 GHz, whichever is lower.
At transitional frequencies the lower limit applies.	

5.3.3 Limit

Class B limit at 3m test distance:

Frequency range MHz	Linear Average Detector dB ($\mu\text{V}/\text{m}$)	Peak Detector dB ($\mu\text{V}/\text{m}$)
> 1000	54	74
At transitional frequencies the lower limit applies.		

*****End of Report*****