


TEST REPORT

Application No.: BTEK231103010AE
Applicant: ZAGG INC.
Address of Applicant: 910 West Legacy Center Way Midvale Utah United States
Manufacturer: ZAGG INC.
Address of Manufacturer: 910 West Legacy Center Way Midvale Utah United States
Factory: NA
Address of Factory: NA
Equipment Under Test (EUT):
EUT Name: ZAGG Wireless Charging Desk Mat
Model No.: ZMATUNIWC61
Trade Mark:  ZAGG
Standard(s) : 47 CFR Part 15 Subpart C
Date of Receipt: 2023-11-14
Date of Test: 2023-11-14 to 2023-12-08
Date of Issue: 2023-12-08

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Damon Su
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-12-08		Original

Authorized for issue by			
			
		<hr/>	
		Carl Yang /Project Engineer	
			
		<hr/>	
		Elma Yang /Reviewer	



2 Test Summary

Item	Document Title
47 CFR Part 15, Subpart C	Intentional Radiators
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Item	Standard	Result
Antenna Requirements	15.203	Pass
20dB Occupied Bandwidth	2.1049	Pass
AC Power Line Conducted Emissions	15.207	Pass
Spurious Emissions	15.209	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Declaration of EUT Family Grouping:

Model No.: ZMATUNIWC61

According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions of other models are identical for the above models, with only difference on colour.



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4 General Information

4.1 Details of E.U.T.

Power Supply	Input: DC 5V/2A, 9V/2A Wireless Output: 5W, 7.5W, 10W
Modulation Type	FSK
Frequency Range	The frequency block is 110.0KHz to 205.0KHz.
Antenna Type	Coil antenna
Sample No.:	BTEK231103010AE-01
Remark: The information in this section is provided by the applicant or manufacturer, BANTEK is not liable to the accuracy, suitability, reliability or/and integrity of the information.	

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
WPC charging load	EESON	2S	--
adapter	Shenzhen Aoda Power Technology Co.,Ltd	A829-200150C-EU4	--

4.3 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 and TR100 028-1/-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	69 KHz
RF output power, conducted	0.87 dB
Power Spectral Density, conducted	0.69 dB
Unwanted Emissions, conducted	0.94 dB
All emissions, radiated(<1GHz)	4.12 dB
All emissions, radiated(>1GHz)	4.16 dB
Temperature	0.82 °C
Humidity	4.1 %



4.4 Test Location

All tests were performed at:

Shenzhen BANTEK Testing Co., Ltd.

A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

Tel: +86 0755-2334 4200 Fax: +86 0755-2334 4200

FCC Registration Number: 264293

Designation Number: CN1356

No tests were sub-contracted.

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Method Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Shielding Room	YIHENG ELECTRONIC	5.5*3.1*3	YH-BT-220304-03	2022-03-03	2025-03-02
EXA Signal Analyzer	KEYSIGHT	N9020A	MY54230486	2023-06-12	2024-06-11
DC Power Supply	E3632A	E3642A	KR75304416	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-6dB	N/A	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-3dB	N/A	2023-06-12	2024-06-11
RF Control Unit	Techy	TR1029-1	N/A	2023-06-12	2024-06-11
RF Sensor Unit	Techy	TR1029-2	N/A	2023-06-12	2024-06-11
MXG Vector Signal Generator	Agilent	N5182A	US46240522	2023-06-12	2024-06-11
Programmable Temperature&Humidity Chamber	GRT	GR-HWX1000	GR22051001	2023-06-12	2024-06-11
Measurement Software	TACHOY	RF TestSoft	N/A	2023-06-12	2024-06-11

Radiated Method Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
3m Semi-Anechoic Chamber	YIHENG ELECTRONIC	966	YH-BT-220304-01	2022-05-06	2025-05-05
EMI Test Receiver	Rohde&Schwarz	ESCI	100694	2023-06-12	2024-06-11
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	01324	2022-06-15	2025-06-14
Pre-Amplifier	Schwarzbeck	BBV 9745	#180	2023-06-12	2024-06-11
Loop antenna	Schwarzbeck	FMZB1519B	00056	2023-06-12	2024-06-11
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	N/A	N/A

Conducted disturbance Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Shielding Room	YIHENG ELECTRONIC	9*5*3.3	YH-BT-220304-04	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	101021	2023-06-12	2024-06-11
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	N/A	N/A
LISN	Rohde&Schwarz	ENV216	101472	2023-06-12	2024-06-11
LISN	Schwarzbeck	NSLK 8128	05127	2023-06-12	2024-06-11



General used equipment					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2023-06-12	2024-06-11
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2023-06-12	2024-06-11



6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

Test Requirement FCC §15.203; RSS-247, 5.4(f)

6.1.2 Conclusion

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with

§ 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.



7 Radio Spectrum Matter Test Results

7.1 20dB Occupied Bandwidth

Test Requirement FCC Part 2.1049

Test Method:

Limit:

7.1.1 E.U.T. Operation

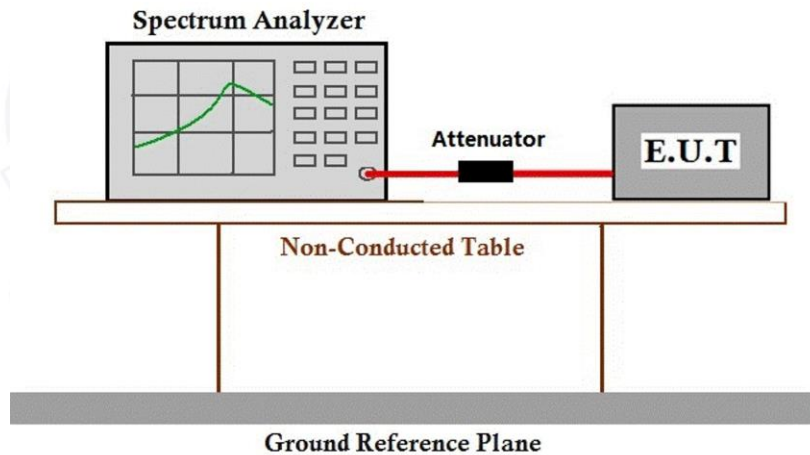
Operating Environment:

Temperature: 20.5 °C Humidity: 50.0 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Charge+TX mode_Keep the EUT in continuously transmitting mode with FSK modulation.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

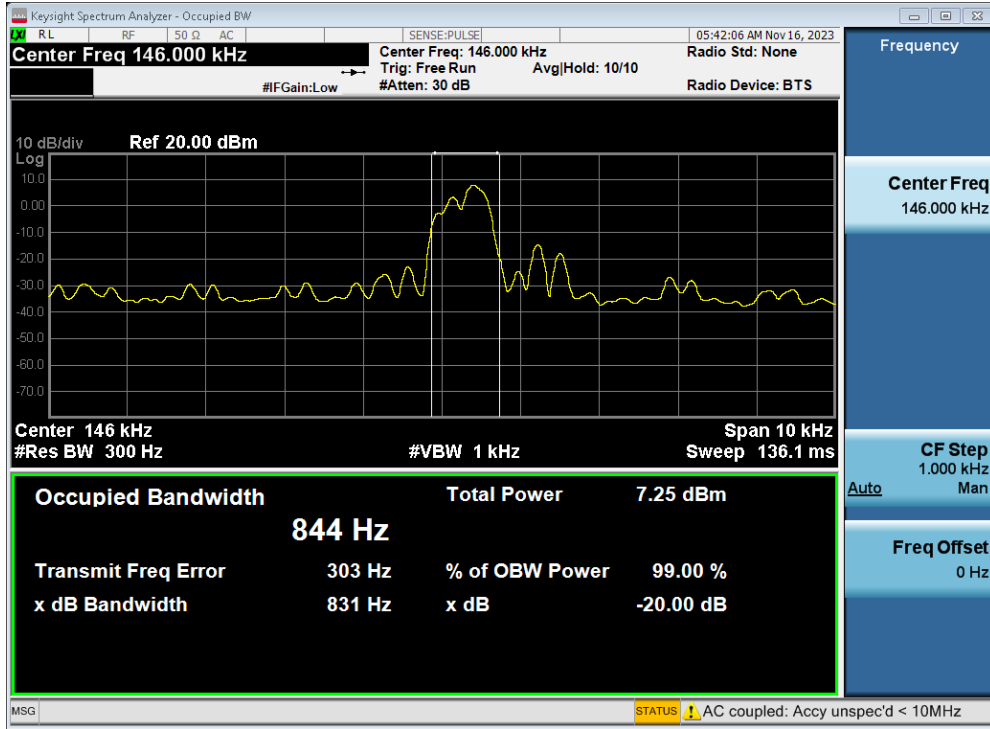
cable loss=0.9

- The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings:
 - Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
 - RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW
 - Sweep = auto, Detector function = peak, Trace = max hold
- Measure and record the results in the test report.



Test Mode: 00; Modulation:FSK

Freq. (kHz)	20 dB bandwidth Result (kHz)	Conclusion
146	0.831	PASS



7.2 AC Power Line Conducted Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method:

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	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.
 Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.2 °C

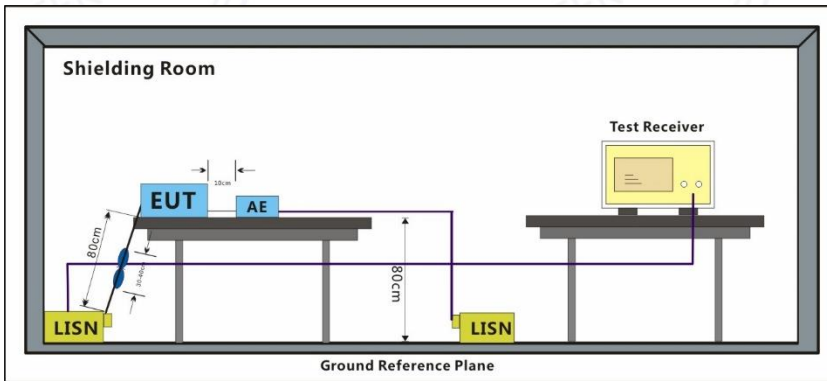
Humidity: 60.5 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Charge+TX mode_Keep the EUT in continuously transmitting mode with FSK modulation.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

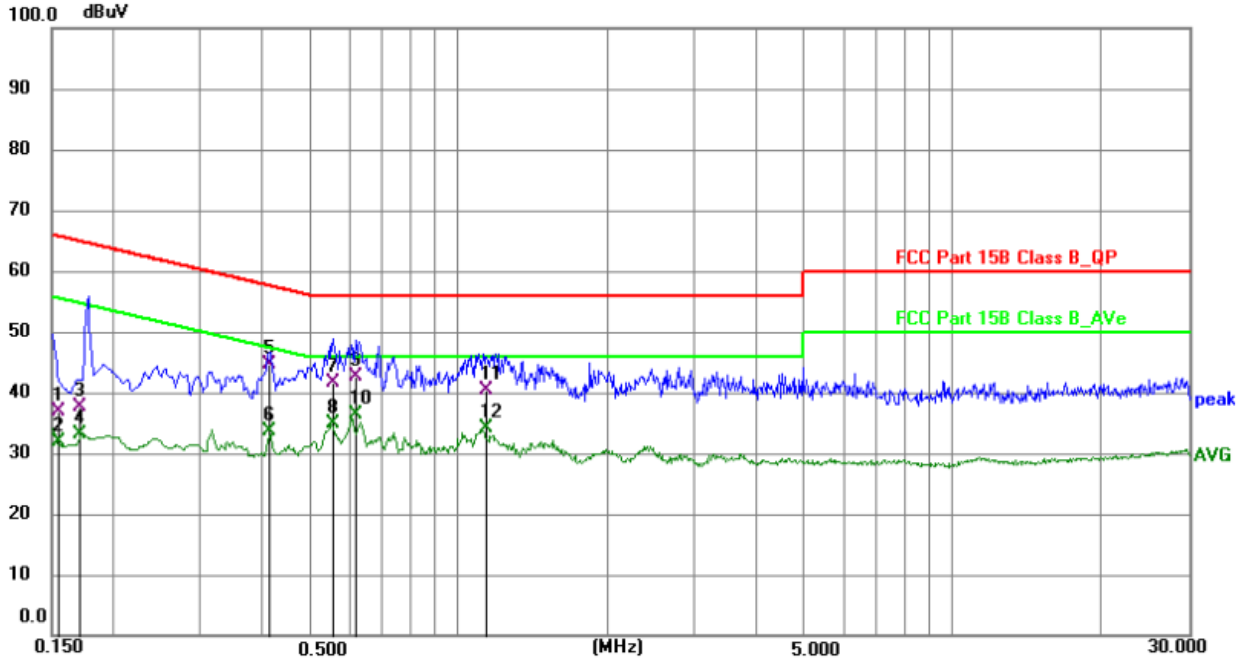
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

Note:Level (dBuV) = Reading (dBuV) + Factor (dB)



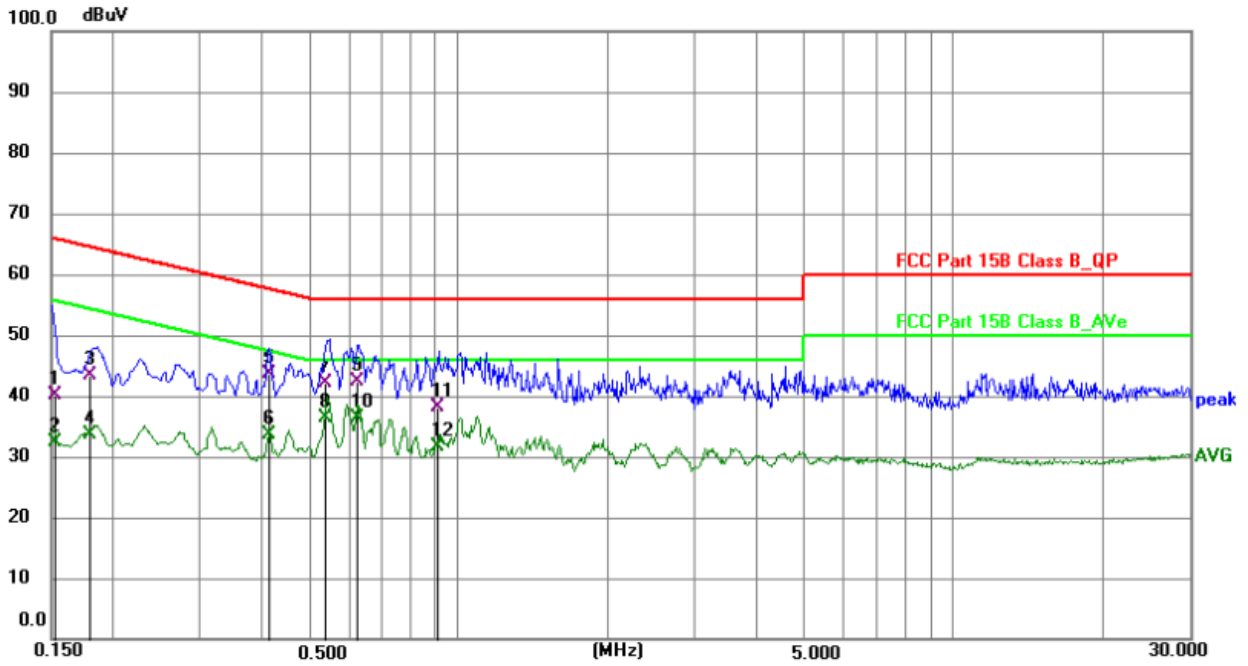
Test Mode: 00; Line: Live line; Modulation:FSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1547	17.13	19.75	36.88	65.74	-28.86	QP	P	
2	0.1547	12.15	19.75	31.90	55.74	-23.84	AVG	P	
3	0.1720	17.85	19.78	37.63	64.86	-27.23	QP	P	
4	0.1720	13.37	19.78	33.15	54.86	-21.71	AVG	P	
5	0.4128	24.69	19.82	44.51	57.59	-13.08	QP	P	
6	0.4128	13.73	19.82	33.55	47.59	-14.04	AVG	P	
7	0.5582	21.67	19.86	41.53	56.00	-14.47	QP	P	
8	0.5582	15.09	19.86	34.95	46.00	-11.05	AVG	P	
9	0.6200	22.78	19.87	42.65	56.00	-13.35	QP	P	
10 *	0.6200	16.42	19.87	36.29	46.00	-9.71	AVG	P	
11	1.1366	20.37	20.02	40.39	56.00	-15.61	QP	P	
12	1.1366	14.06	20.02	34.08	46.00	-11.92	AVG	P	



Test Mode: 00; Line: Neutral Line; Modulation:FSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1526	20.39	19.77	40.16	65.86	-25.70	QP	P	
2	0.1526	12.70	19.77	32.47	55.86	-23.39	AVG	P	
3	0.1800	23.64	19.80	43.44	64.49	-21.05	QP	P	
4	0.1800	13.81	19.80	33.61	54.49	-20.88	AVG	P	
5	0.4141	23.82	19.83	43.65	57.57	-13.92	QP	P	
6	0.4141	13.73	19.83	33.56	47.57	-14.01	AVG	P	
7	0.5395	22.18	19.85	42.03	56.00	-13.97	QP	P	
8	0.5395	16.42	19.85	36.27	46.00	-9.73	AVG	P	
9	0.6249	22.46	19.88	42.34	56.00	-13.66	QP	P	
10 *	0.6249	16.54	19.88	36.42	46.00	-9.58	AVG	P	
11	0.9090	18.15	19.99	38.14	56.00	-17.86	QP	P	
12	0.9090	11.75	19.99	31.74	46.00	-14.26	AVG	P	



7.3 Radiated Spurious Emissions

Test Requirement FCC §15.209

Test Method:

Limit:

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a). According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	($\mu\text{V}/\text{m}$)	Dist	($\mu\text{V}/\text{m}$)	(dB $\mu\text{V}/\text{m}$)
0.009 – 0.490	$2400 / F(\text{KHz})$	300m	$10000 * 2400/F(\text{KHz})$	$20\log 2400/F(\text{KHz}) + 80$
0.490 – 1.705	$24000 / F(\text{KHz})$	30m	$100 * 24000/F(\text{KHz})$	$20\log 24000/F(\text{KHz}) + 40$
1.705 – 30.00	30	30m	$100 * 30$	$20\log 30 + 40$
30.0 – 88.0	100	3m	100	$20\log 100$
88.0 – 216.0	150	3m	150	$20\log 150$
216.0 – 960.0	200	3m	200	$20\log 200$
Above 960.0	500	3m	500	$20\log 500$

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.3.1 E.U.T. Operation

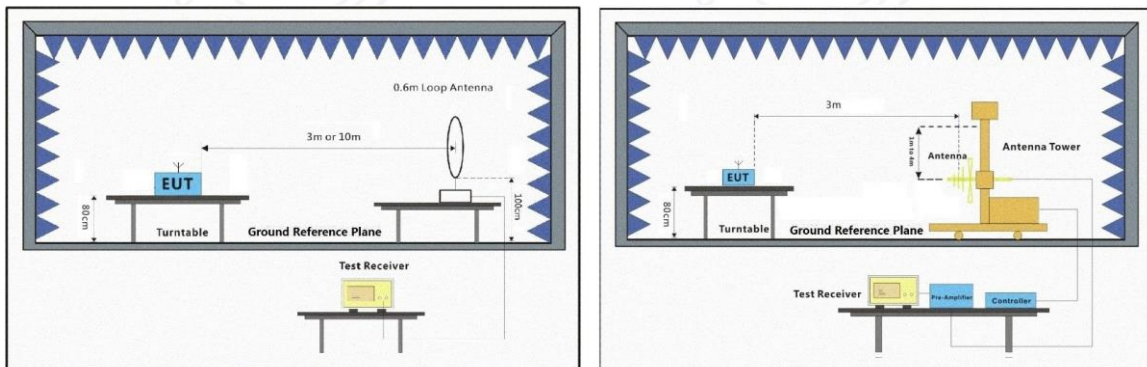
Operating Environment:

Temperature: 25.5 °C Humidity: 68.6 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Charge+TX mode_Keep the EUT in continuously transmitting mode with FSK modulation.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.



9 kHz ~ 30 MHz

Polarization: coaxial

Freq (MHz)	Cable - Loss (dB)	Antenna Factor (dB/m)	Preamp Gain (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector
0.0247	2.24	17.8	31.53	76.54	65.05	120.49	-55.44	QP
0.0369	2.32	17.8	32.43	79.88	67.57	116.04	-48.47	QP
0.1222	2.32	17.8	32.43	79.98	67.67	105.86	-38.19	QP
0.7456	2.46	17.8	31.67	45.64	34.23	70.60	-36.37	QP
1.2254	3.06	27.53	33.76	28.17	25.00	69.54	-44.54	QP
2.6073	3.11	29.26	33.52	28.77	27.62	69.54	-41.92	QP
7.6045	3.25	28.72	33.94	26.89	24.92	69.54	-44.62	QP

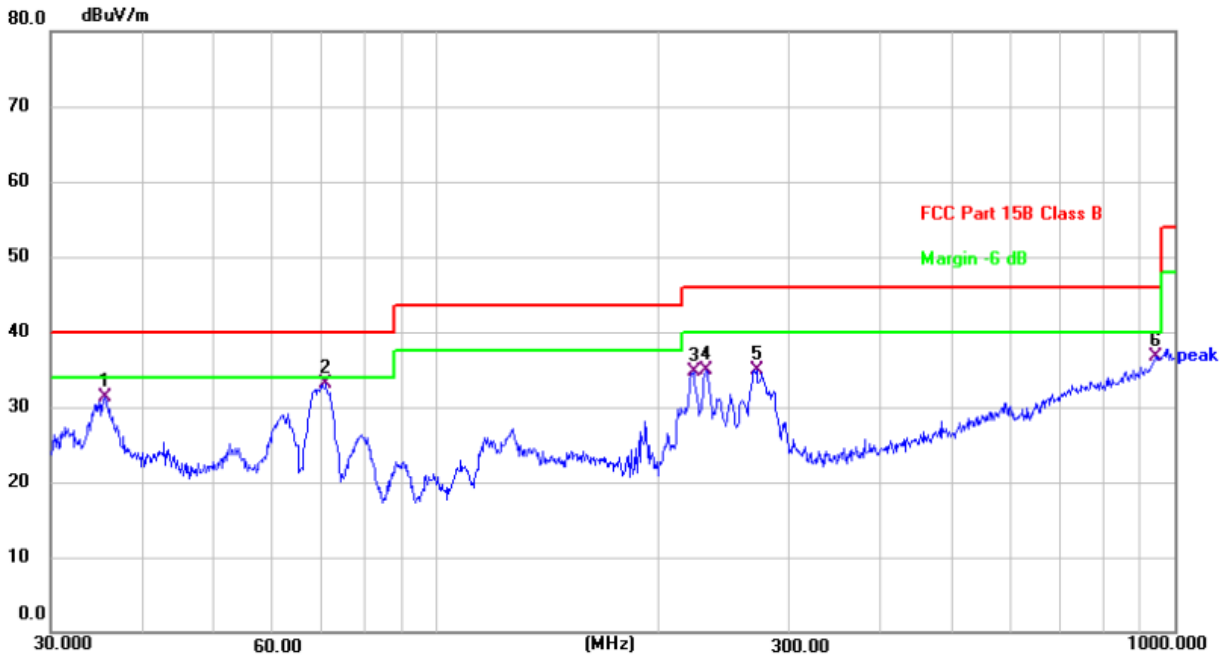
Note:

- 1). $\text{Level(dBuV/m)} = \text{Reading(dBuV)} + \text{Factor(dB/m)}$
- 2). $\text{Factor(dB/m)} = \text{Antenna Factor(dB/m)} + \text{Cable loss(dB)} - \text{Pre Amplifier gain(dB)}$
- 3). $\text{Margin(dB)} = \text{Limit(dBuV/m)} - \text{Level(dBuV/m)}$



30 MHz ~ 1GHz

Test Mode: 00; Polarity: Horizontal; Modulation:FSK



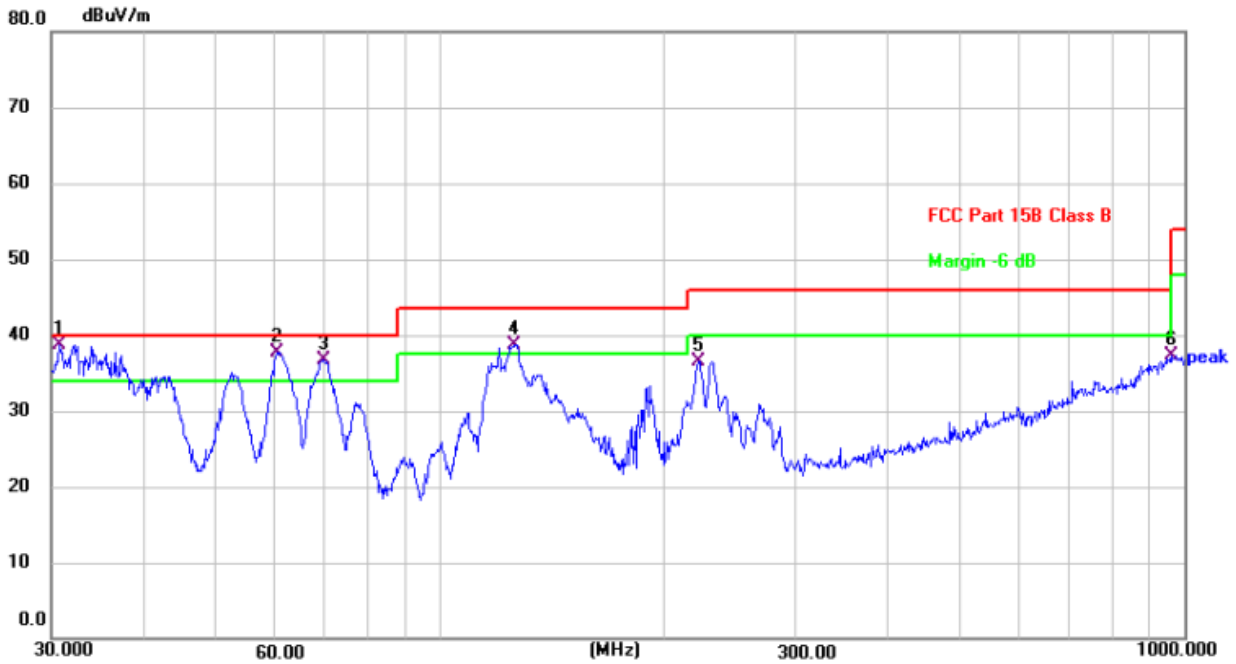
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	35.6240	48.73	-17.50	31.23	40.00	-8.77	QP	100	209	P	
2 *	70.8315	53.36	-20.26	33.10	40.00	-6.90	QP	300	189	P	
3	222.9502	54.53	-19.90	34.63	46.00	-11.37	QP	100	283	P	
4	231.7179	54.37	-19.50	34.87	46.00	-11.13	QP	300	13	P	
5	271.3246	53.53	-18.54	34.99	46.00	-11.01	QP	200	347	P	
6	942.1305	43.86	-7.11	36.75	46.00	-9.25	QP	200	347	P	

Note:

- 1). $Level(dBuV/m) = Reading(dBuV) + Factor(dB/m)$
- 2). $Margin(dB) = Limit(dBuV/m) - Level(dBuV/m)$



Test Mode: 00; Polarity: Vertical; Modulation:FSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	30.7455	56.70	-17.95	38.75	40.00	-1.25	QP	100	186	P	
2 !	60.2801	55.90	-18.11	37.79	40.00	-2.21	QP	199	12	P	
3 !	69.6005	56.83	-20.10	36.73	40.00	-3.27	QP	100	322	P	
4 !	125.4457	57.15	-18.39	38.76	43.50	-4.74	QP	100	0	P	
5	222.1698	56.46	-19.94	36.52	46.00	-9.48	QP	100	273	P	
6	958.7943	44.07	-6.83	37.24	46.00	-8.76	QP	300	347	P	

Note:

- 1). $Level(dBuV/m) = Reading(dBuV) + Factor(dB/m)$
- 2). $Margin(dB) = Limit(dBuV/m) - Level(dBuV/m)$



8 Test Setup Photo

Please refer to the Appendix test setup Photos.

9 EUT Constructional Details (EUT Photos)

Please refer to the Appendix EUT Photos.

- End of the Report -

