

TEST REPORT

Report No.: BCTC2106161903E

Applicant: Summit Electronics LLC

Product Name: True Wireless Rugged speaker

Model/Type Ref.: CSTW-43FD

Tested Date: 2021-07-01 to 2021-07-12

Issued Date: 2021-07-13

Shenzhen BCTC Testing Co., Ltd.



FCC ID: 2AMSOCSTW-43FD

Product Name: True Wireless Rugged speaker
Trademark: COBY
Model/Type Ref.: CSTW-43FD
Prepared For: Summit Electronics LLC
Address: 1 Rewe Street, Brooklyn New York 11211, United States
Manufacturer: Summit Electronics LLC
Address: 1 Rewe Street, Brooklyn New York 11211, United States
Prepared By: Shenzhen BCTC Testing Co., Ltd.
Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan
1st Road, Tangwei, Fuhai Subdistrict, Bao'an District,
Shenzhen, Guangdong, China
Sample Received Date: 2021-07-01
Sample tested Date: 2021-07-01 to 2021-07-12
Issue Date: 2021-07-13
Report No.: BCTC2106161903E
Test Standards FCC Part15.247
ANSI C63.10-2013
Test Results PASS

Tested by:



Eric Yang/Project Handler

Approved by:



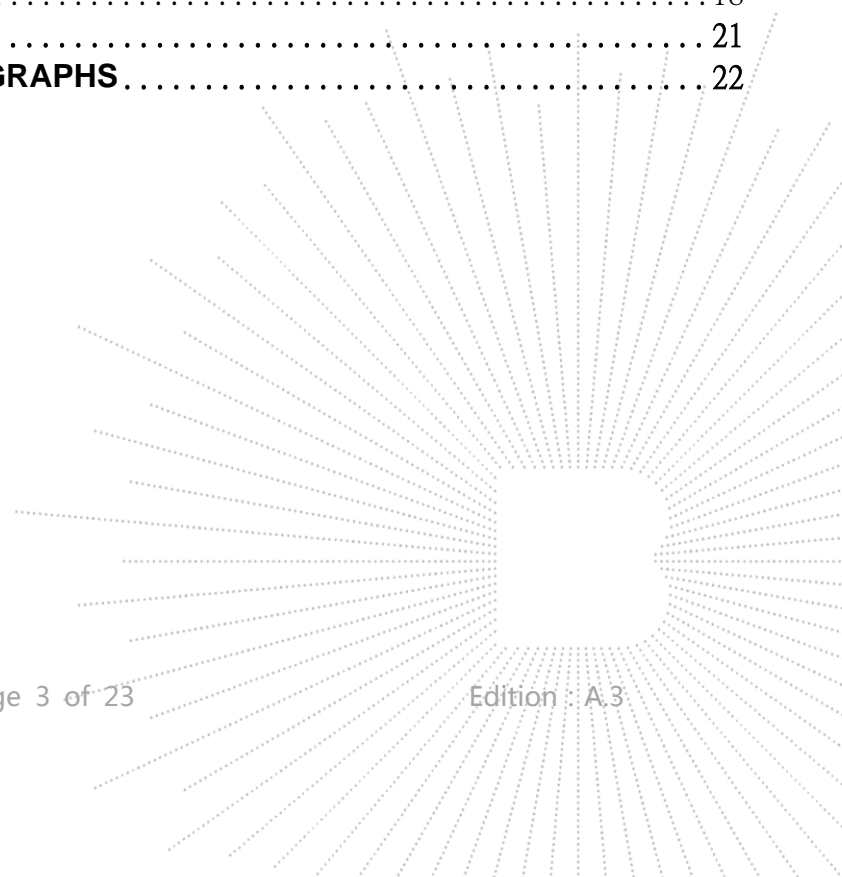
Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

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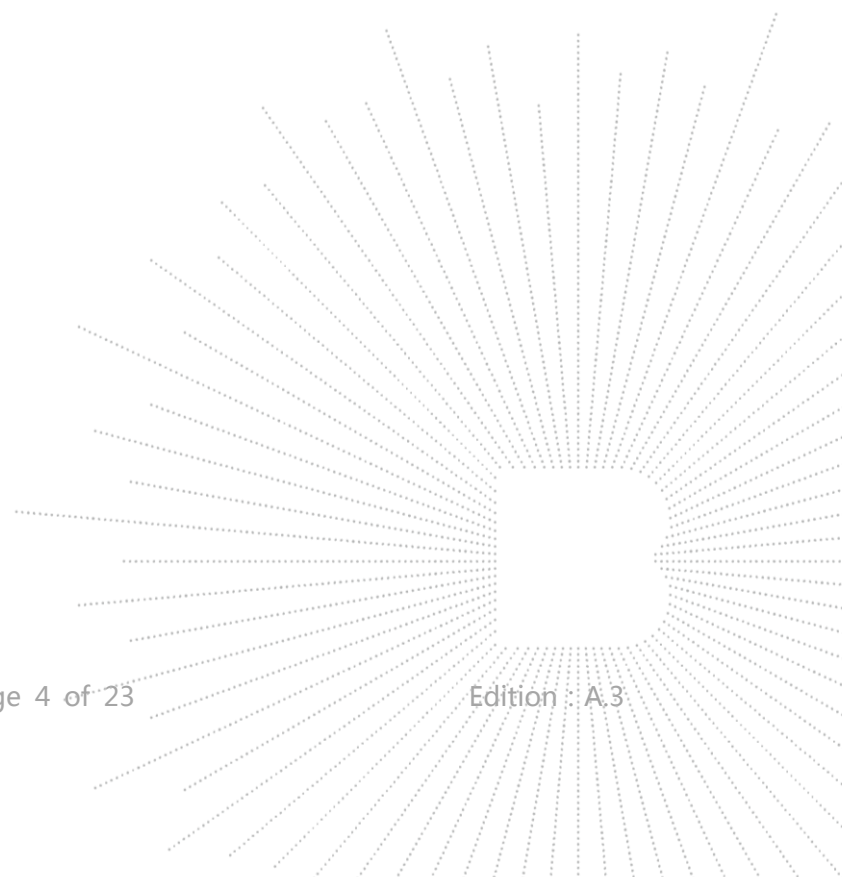
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(Note: N/A means not applicable)



1. VERSION

Report No.	Issue Date	Description	Approved
BCTC2106161903E	2021-07-13	Original	Valid



2. TEST SUMMARY

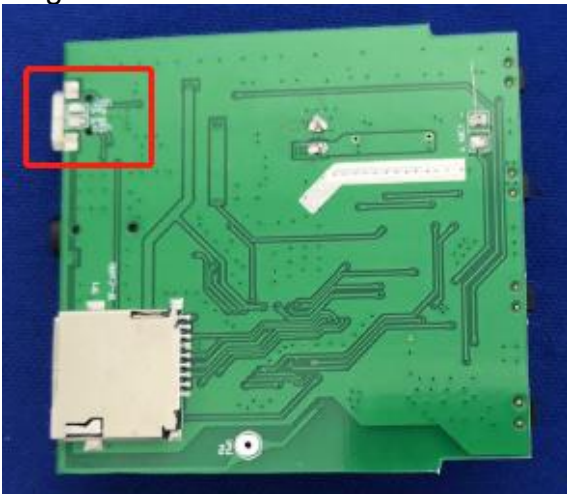
The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Conducted emissions	15.207	PASS
2	Radiated Emissions	15.209	PASS

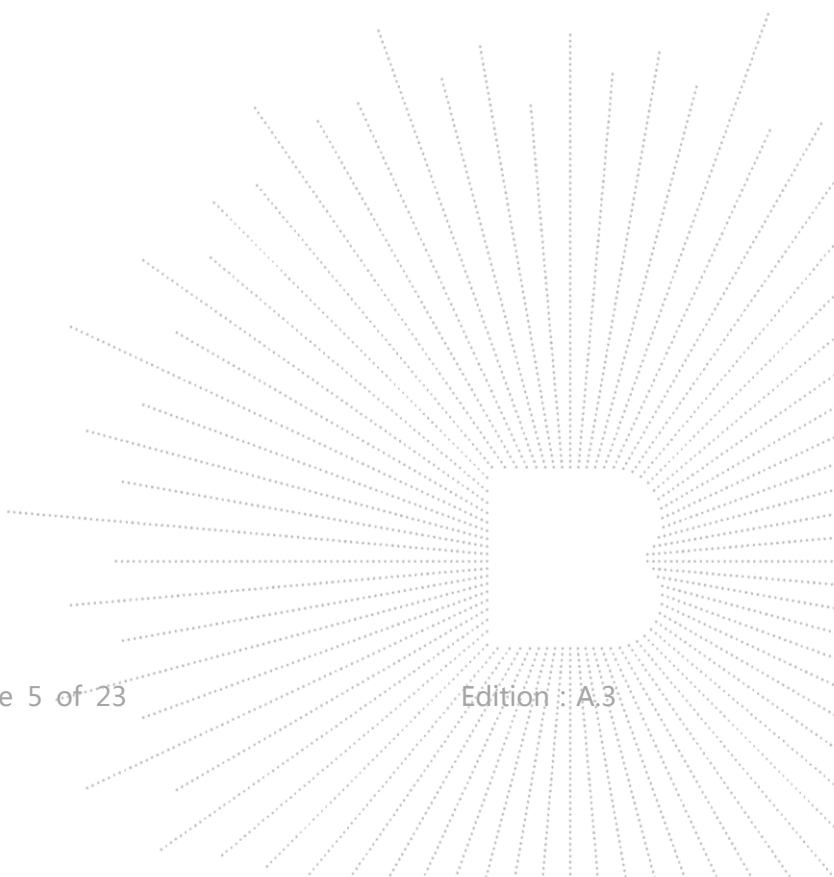
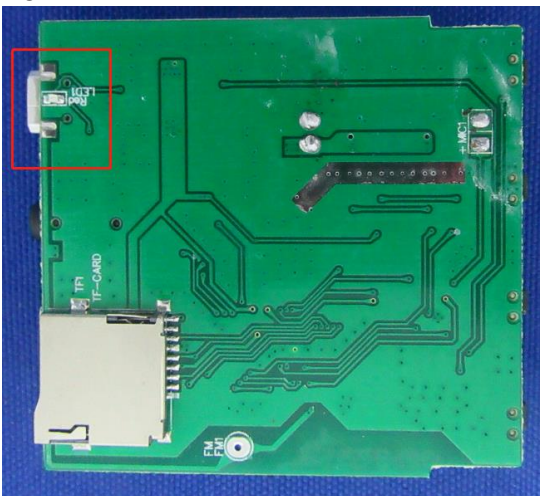
Remark: Based on the following changes in the product, the RF chip remains unchanged. So the report is only updated Conducted emissions and Radiated Emissions for the original report (BCTC2006001143E) .

Changes : The new product Delete a one LED.

Original:



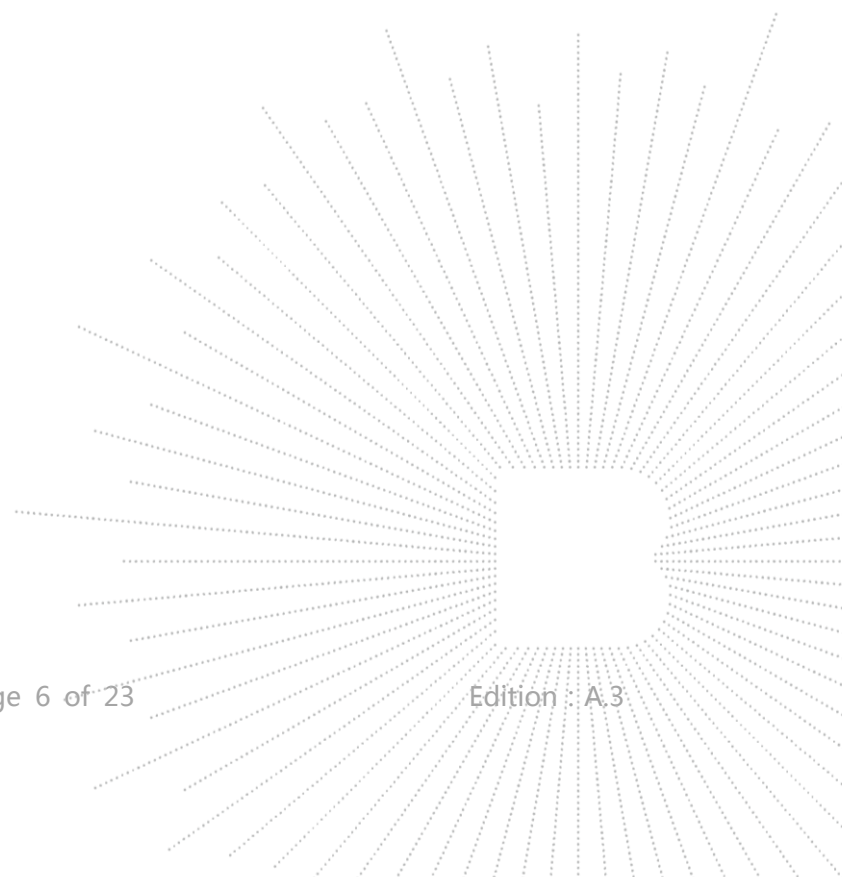
new



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 $k=2$.

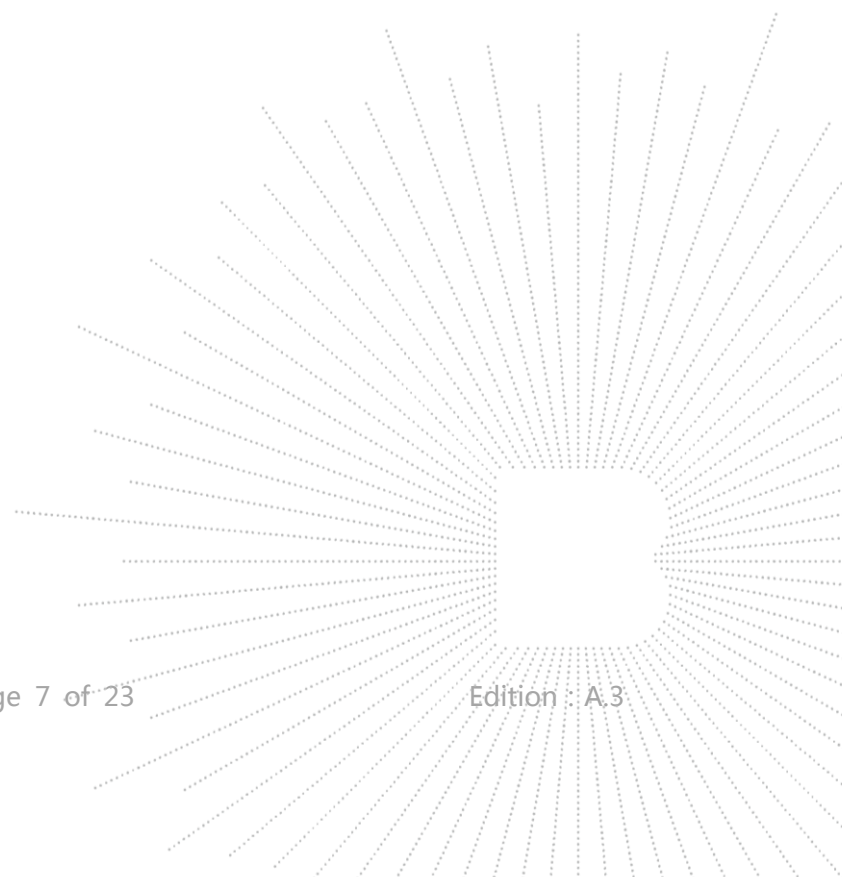
No.	Item	Uncertainty
1	humidity uncertainty	U=5.3%
2	Temperature uncertainty	U=0.59°C
3	Conducted Emission (150kHz-30MHz)	U=3.2dB
4	Radiated disturbance(30MHz-1000MHz)	U=4.8dB
5	Radiated disturbance(1GHz-6GHz)	U=4.9dB
6	Radiated disturbance(1GHz-18GHz)	U=5.0dB



3. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

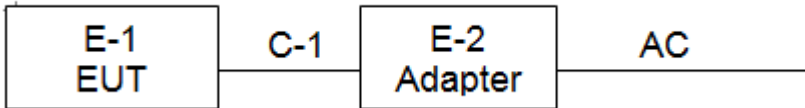
Model/Type Ref.:	CSTW-43FD
Model differences:	N/A
Operation Frequency:	2402-2480MHz
Type of Modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Number Of Channel	79CH
Antenna installation:	PCB antenna
Antenna Gain:	0dBi
Ratings:	DC 3.7V from Battery DC 5V from Adapter



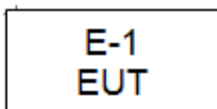
4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-2	Adapter	N/A	BCTC001	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.8M	DC cable unshielded

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

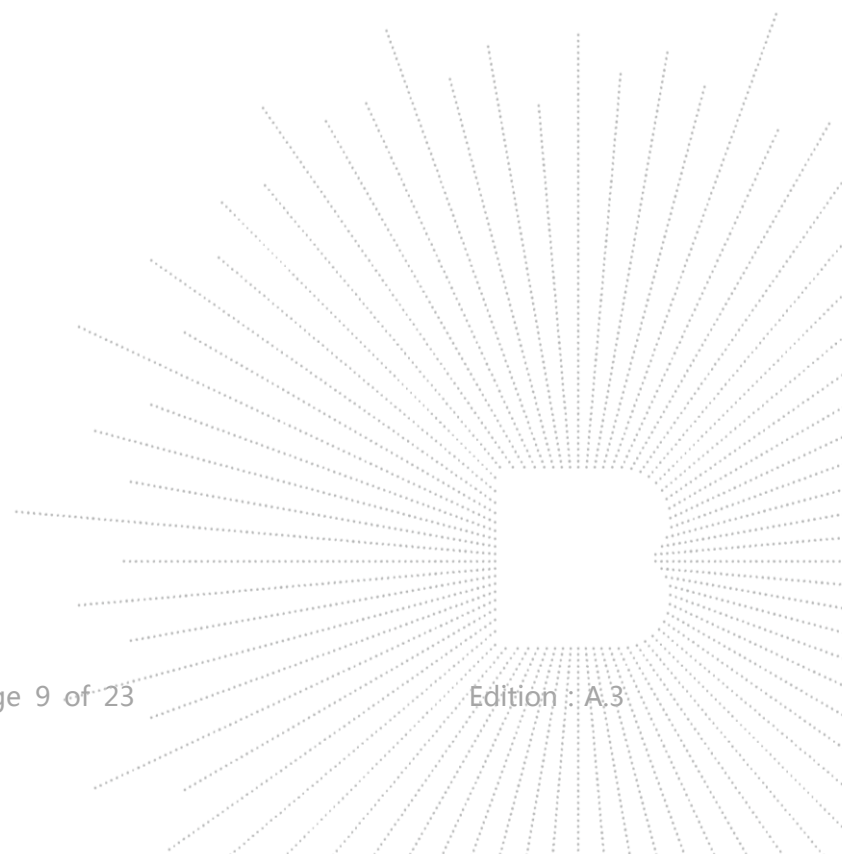
4.4 Channel List

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	79	/

4.5 Test Mode

Test mode	Test mode	Low channel	Middle channel	High channel
1	Link mode(conducted emission and Radiated emission)			



4. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

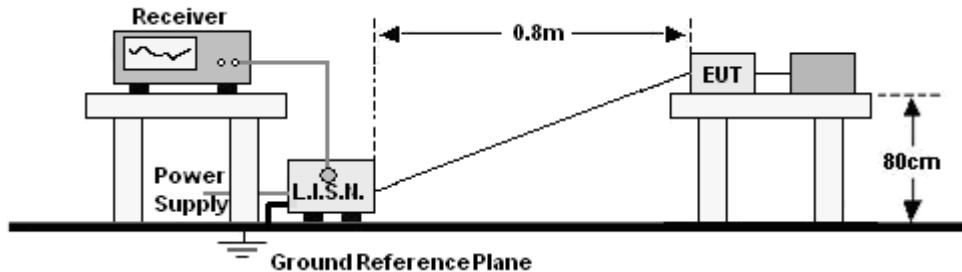
5.2 Test Instrument Used

Conducted emissions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
LISN	R&S	ENV216	101375	May 28, 2021	May 27, 2022
ISN	HPX	ISN T800	S1509001	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

Radiated emissions Test (966 chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESRP	101154	May 28, 2021	May 27, 2022
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
Amplifier	SKET	LAPA_01G 18G-45dB	\	May 28, 2021	May 27, 2022
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 28, 2021	May 27, 2022
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163- 942	Jun. 01, 2021	May 31, 2022
Horn Antenna	SCHWARZBE CK	BBHA9120 D	1541	Jun. 02, 2021	Jun. 01, 2022
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

5. CONDUCTED EMISSIONS

6.1 Block Diagram Of Test Setup



6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)	
	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Notes:

- *Decreasing linearly with logarithm of frequency.
- The lower limit shall apply at the transition frequencies.

6.3 Test procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The Product was placed on a nonconductive table 0.8 m 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.

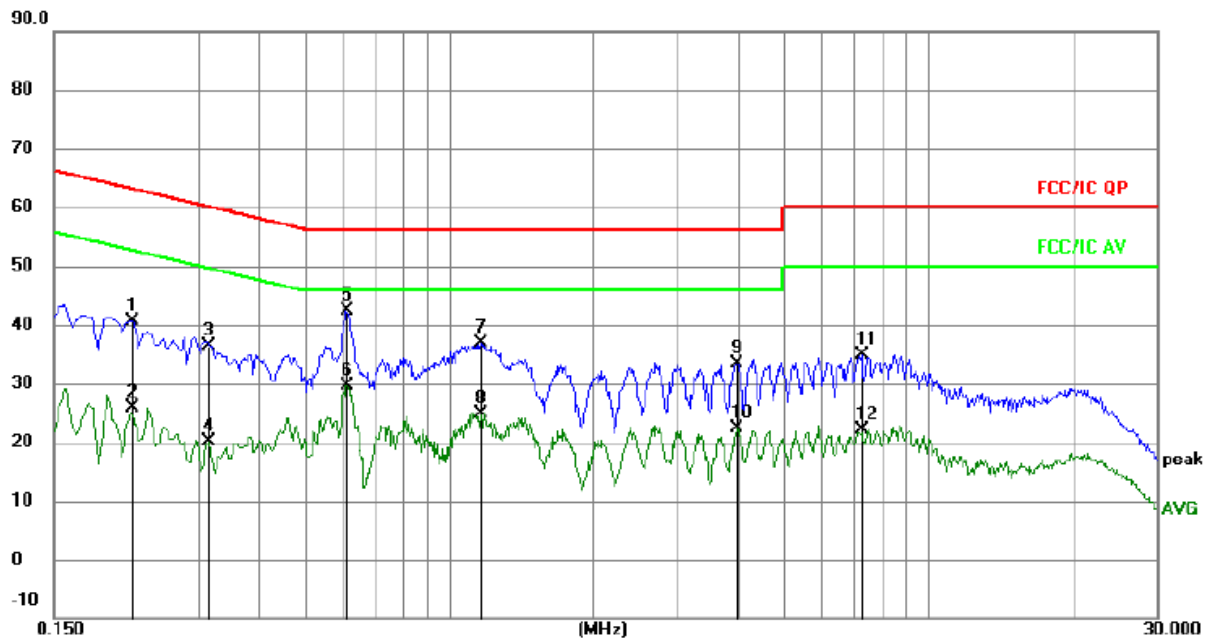
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

6.5 Test Result

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1
Test Model	CSTW-43FD		

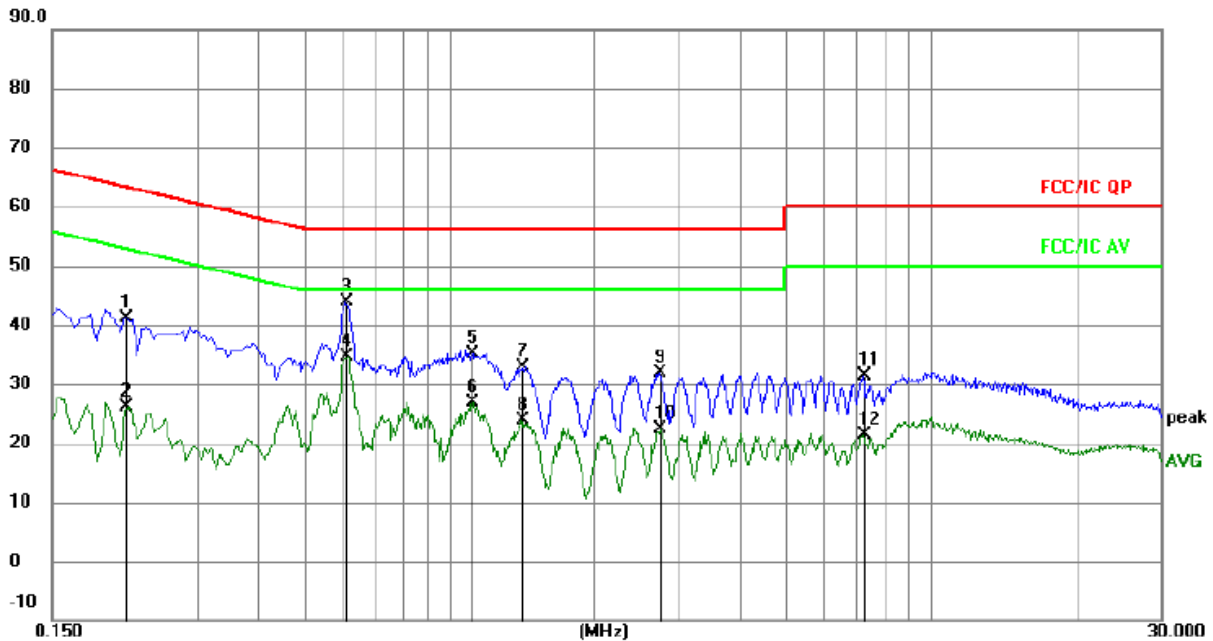


Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No. Mk.	Freq. MHz	Reading Level	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.2174	31.21	9.48	40.69	62.92	-22.23	QP
2	0.2174	16.47	9.48	25.95	52.92	-26.97	AVG
3	0.3149	26.73	9.57	36.30	59.84	-23.54	QP
4	0.3149	10.49	9.57	20.06	49.84	-29.78	AVG
5 *	0.6108	32.46	9.96	42.42	56.00	-13.58	QP
6	0.6108	19.60	9.96	29.56	46.00	-16.44	AVG
7	1.1657	27.27	9.57	36.84	56.00	-19.16	QP
8	1.1657	15.23	9.57	24.80	46.00	-21.20	AVG
9	3.9850	23.74	9.73	33.47	56.00	-22.53	QP
10	3.9850	12.75	9.73	22.48	46.00	-23.52	AVG
11	7.2518	25.20	9.72	34.92	60.00	-25.08	QP
12	7.2518	12.32	9.72	22.04	50.00	-27.96	AVG

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1
Test Model	CSTW-43FD		


Remark:

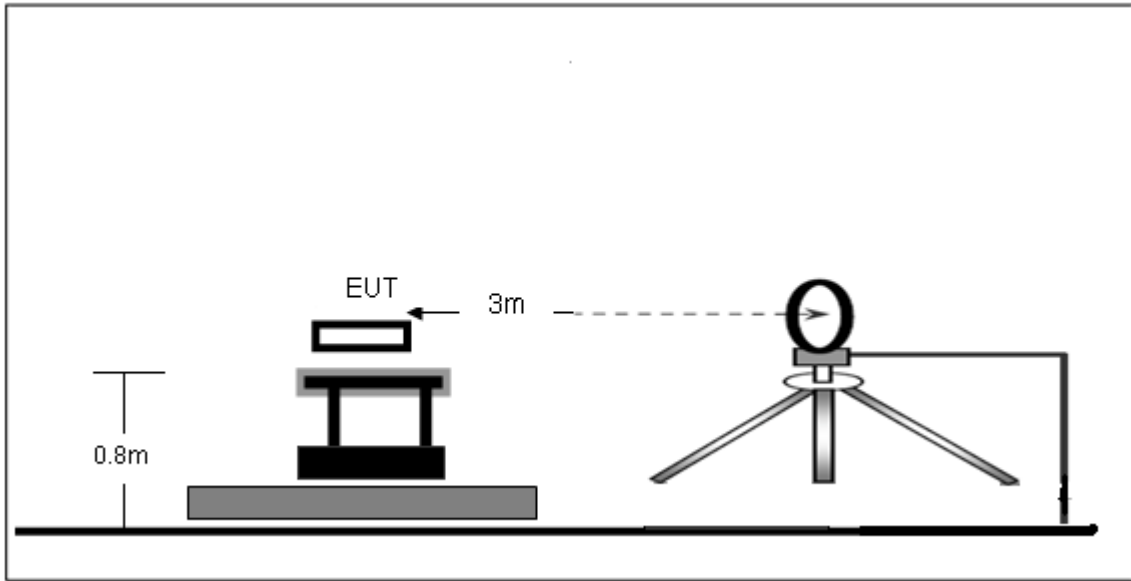
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No. Mk.	Freq. MHz	Reading Level	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.2130	31.75	9.48	41.23	63.09	-21.86	QP
2	0.2130	16.68	9.48	26.16	53.09	-26.93	AVG
3	0.6134	33.87	9.95	43.82	56.00	-12.18	QP
4 *	0.6134	24.72	9.95	34.67	46.00	-11.33	AVG
5	1.1130	25.65	9.57	35.22	56.00	-20.78	QP
6	1.1130	17.25	9.57	26.82	46.00	-19.18	AVG
7	1.4144	23.22	9.58	32.80	56.00	-23.20	QP
8	1.4144	14.32	9.58	23.90	46.00	-22.10	AVG
9	2.7285	22.16	9.64	31.80	56.00	-24.20	QP
10	2.7285	12.70	9.64	22.34	46.00	-23.66	AVG
11	7.2330	21.66	9.72	31.38	60.00	-28.62	QP
12	7.2330	11.61	9.72	21.33	50.00	-28.67	AVG

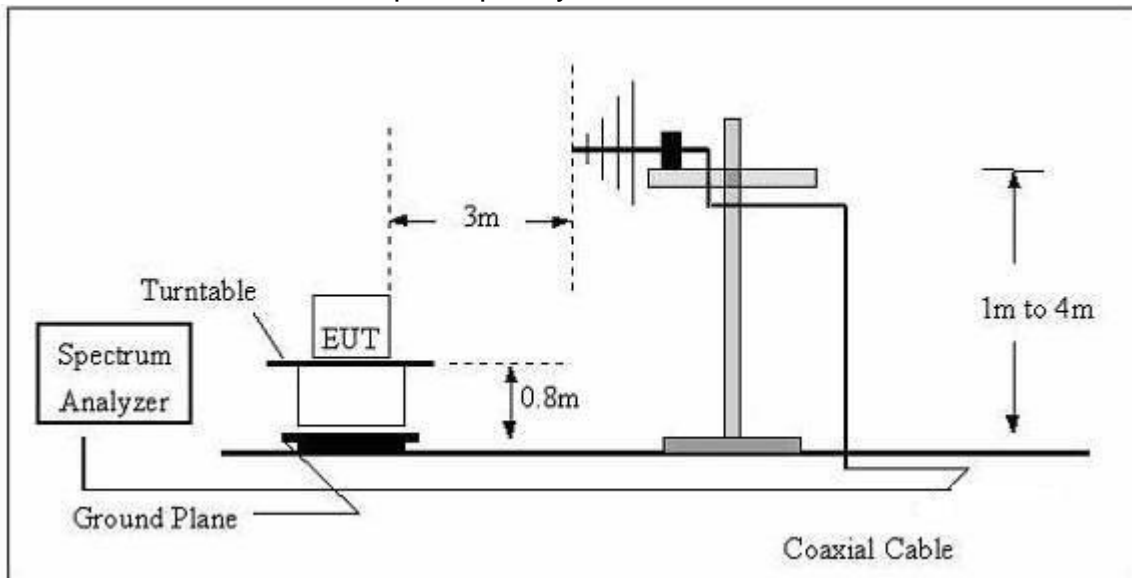
6. RADIATED EMISSIONS

7.1 Block Diagram Of Test Setup

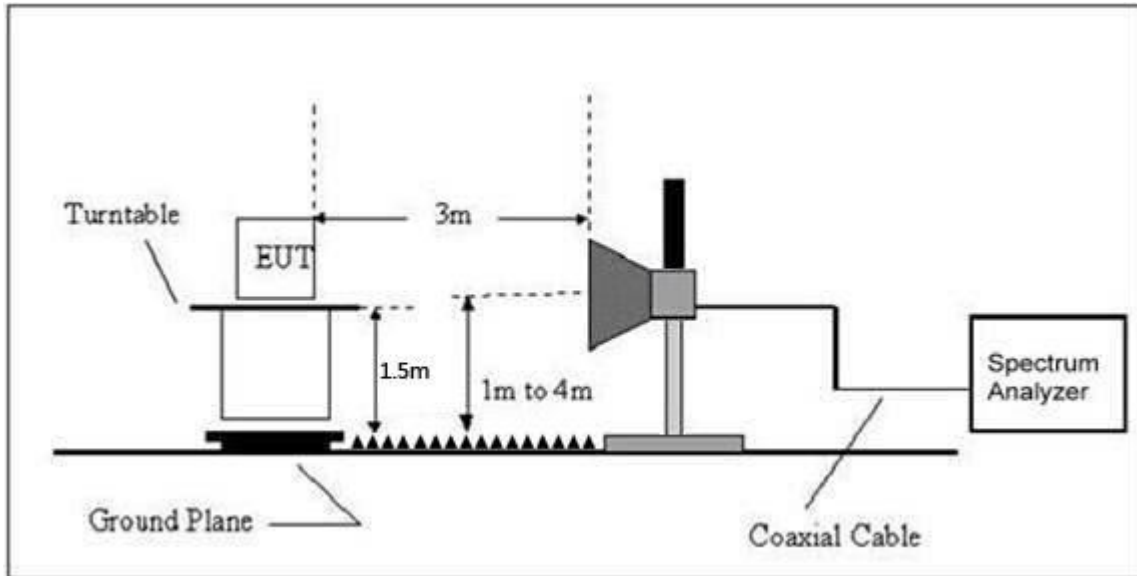
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



7.2 Limit

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Field Strength uV/m	Distance (m)	Field Strength Limit at 3m Distance	
			uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1)The limit for radiated test was performed according to FCC PART 15C.
- (2)The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

7.3 Test procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be

reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

a.The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g.Test the EUT in the lowest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

7.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

7.5 Test Result

Below 30MHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	Polarization :	--

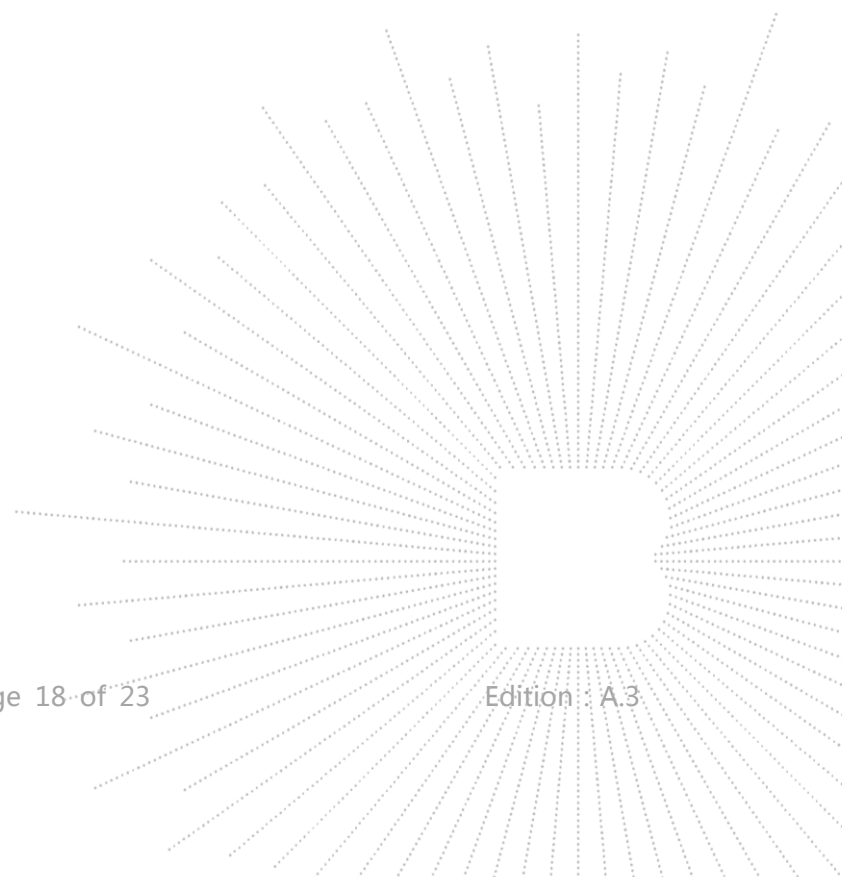
Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

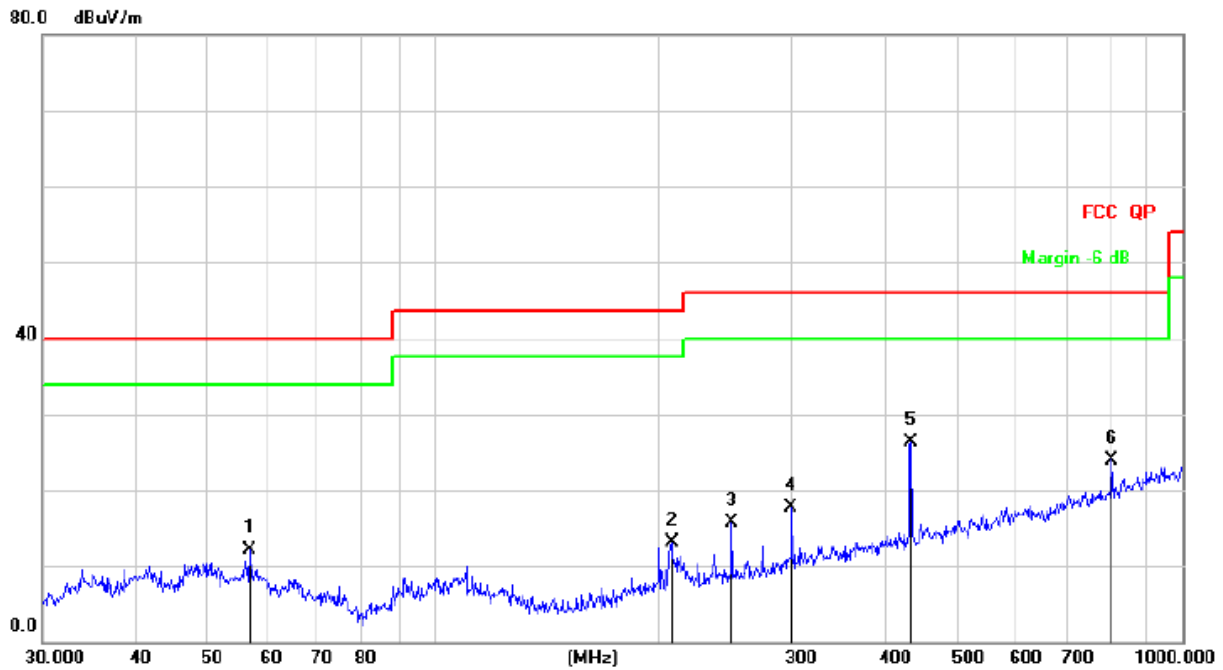
Distance extrapolation factor = $40 \log(\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



Between 30MHz – 1GHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	Polarization :	Horizontal
Test Model :	CSTW-43FD		

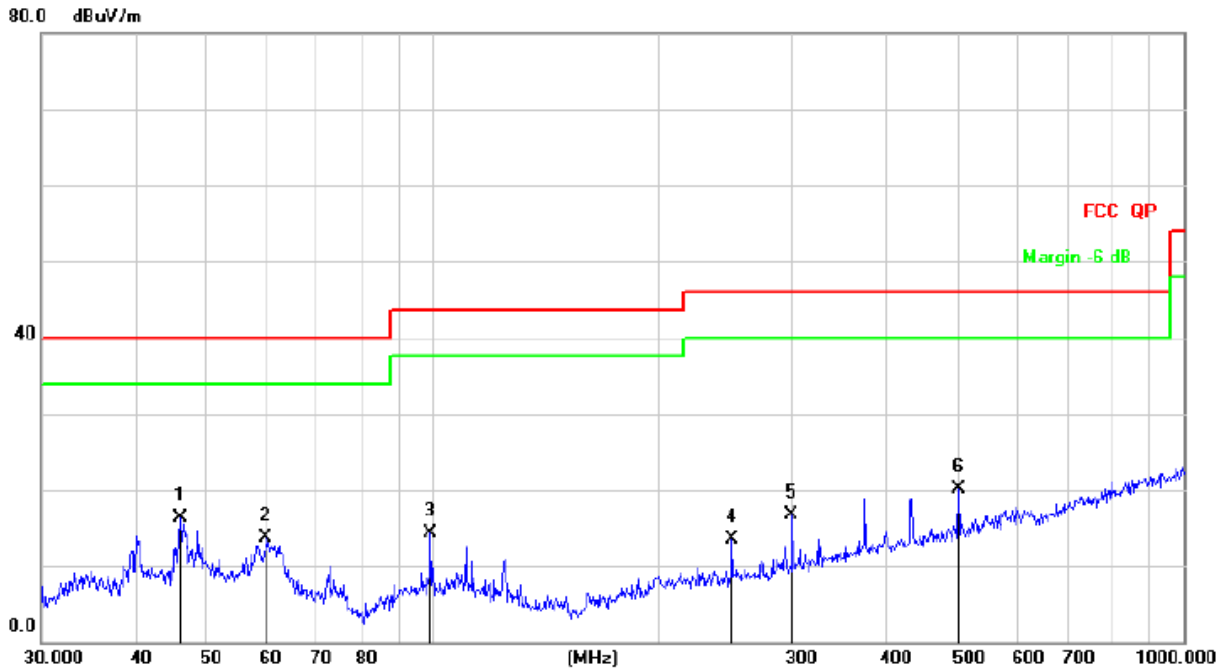


Remark:

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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	*	46.0164	31.43	-15.07	16.36	40.00	-23.64	QP
2		59.8588	29.68	-15.90	13.78	40.00	-26.22	QP
3		99.1797	30.66	-16.43	14.23	43.50	-29.27	QP
4		250.3012	28.68	-15.14	13.54	46.00	-32.46	QP
5		300.3672	30.20	-13.59	16.61	46.00	-29.39	QP
6		501.1790	28.95	-8.91	20.04	46.00	-25.96	QP

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	Polarization :	Vertical
Test Model :	CSTW-43FD		



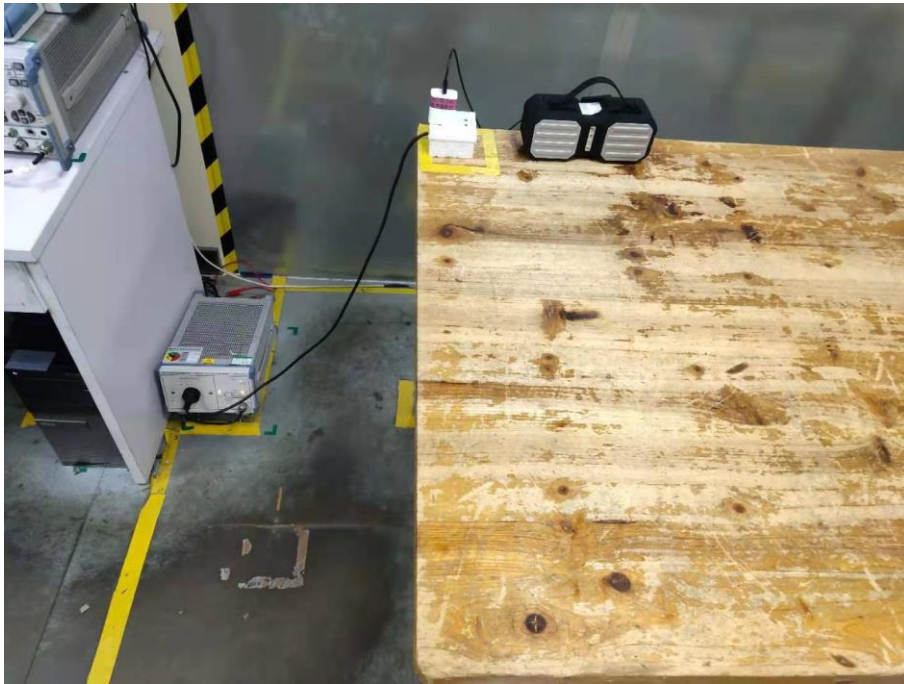
Remark:

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

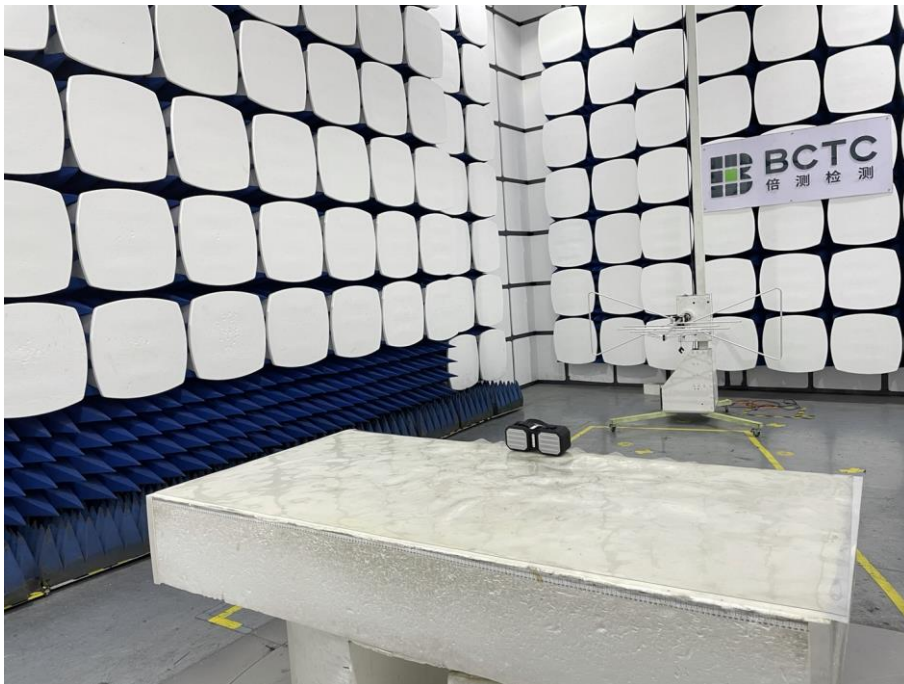
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dB/m	dB	
1	*	46.0164	31.43	-15.07	16.36	40.00	-23.64	QP
2		59.8588	29.68	-15.90	13.78	40.00	-26.22	QP
3		99.1797	30.66	-16.43	14.23	43.50	-29.27	QP
4		250.3012	28.68	-15.14	13.54	46.00	-32.46	QP
5		300.3672	30.20	-13.59	16.61	46.00	-29.39	QP
6		501.1790	28.95	-8.91	20.04	46.00	-25.96	QP

8. EUT TEST SETUP PHOTOGRAPHS

Conducted emissions



Radiated emission



STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

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***** END *****

