

# **TEST REPORT**

Report No.: BCTC2101367830-1E

Applicant: Fortyfour group LLC

Product Name: BT Speaker Plus Wireless Charging

Model/Type Ref.: Temblor

Tested Date: 2021-01-15 to 2021-02-03

Issued Date: 2021-02-04

Shenzhen BETC Testing Co., Ltd.

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## **FCC ID: 2AWVU-TEMBLOR**

Product Name: BT Speaker Plus Wireless Charging

Trademark: N/A

Model/Type Ref.: Temblor

Prepared For: Fortyfour group LLC

Address: 600 San Ramon Valley Blvd Suite 200 Danville CA 94526

Manufacturer: Fortyfour group LLC

Address: 600 San Ramon Valley Blvd Suite 200 Danville CA 94526

Prepared By: Shenzhen BCTC Testing Co., Ltd.

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan

Address: 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District,

Shenzhen, Guangdong, China

Sample Received Date: 2021-01-14

Sample tested Date: 2021-01-15 to 2021-02-03

Issue Date: 2021-02-04

Report No.: BCTC2101367830-1E

Test Standards FCC Part15.209

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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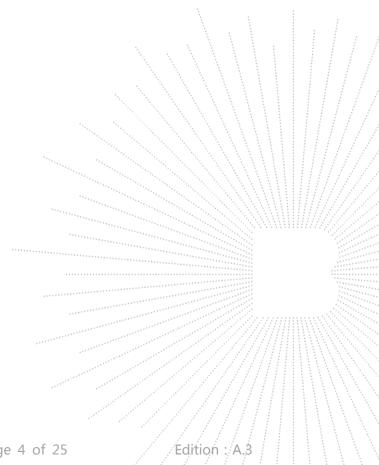
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(Note: N/A means not applicable)



## 1. VERSION

Report No. Issue Date		Description	Approved
BCTC2101367830-1E	BCTC2101367830-1E 2021-02-04		Valid



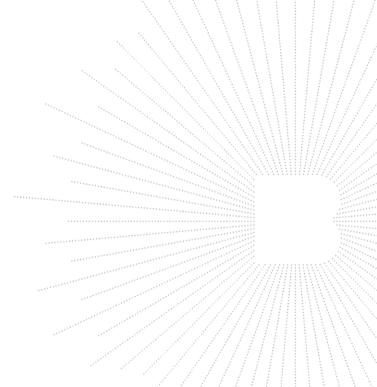
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## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Conducted Emission	15.207	PASS
2	Radiated Emission	15.209	PASS
3	20dB Bandwidth	15.215	PASS
4	Antenna Requirement	15.203	PASS



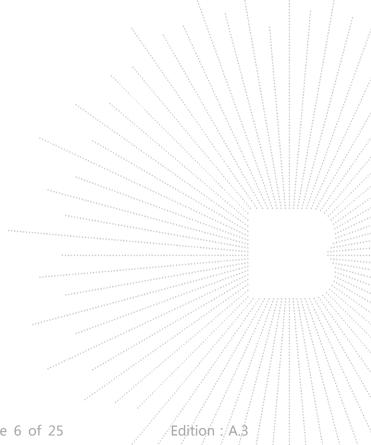
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## 3. MEASUREMENT UNCERTAINTY

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	3m camber Radiated spurious emission(9kHz-30MHz)	U=3.7dB
2	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	Conducted Emission (150kHz-30MHz)	U=3.2dB
5	humidity uncertainty	U=5.3%
6	Temperature uncertainty	U=0.59℃
7	Bandwidth	0.9%



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### 4. PRODUCT INFORMATION AND TEST SETUP

#### 4.1 Product Information

Model/Type Ref.: Temblor

Model differences: N/A

Product Description: BT Speaker Plus Wireless Charging

Operation Frequency: 115kHz-220kHz
Antenna installation: loop coil antenna

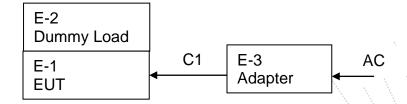
Ratings: DC 3.7V From Battery

DC 5V/2A From adapter Wireless charging:5W

## 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.	Data Cable	Remark
E-1	BT Speaker Plus Wireless Charging	N/A	Temblor	N/A	N/A	EUT
E-2	Dummy load	N/A	DL01	N/A	N/A	Auxiliary
E-3	Adapter	N/A	BCTC-002	N/A	N/A	Auxiliary

#### 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.

#### 4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Modes1	keeping TX+Charging mode(full load) *
Test Modes2	keeping TX+Charging mode(half load)
Test Modes3	keeping TX+Charging mode(null load)

#### Note:

All test mode were tested and passed, only Conducted Emissions, Radiated Emissions shows (\*) is the worst case mode which were recorded in this report.

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## 5. 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.

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

### 5.2 Test Instrument Used

Conducted emissions Test									
Equipment	Equipment Manufacturer Model# Serial# Last Cal.								
Receiver	R&S	ESR3	102075	Jun. 08, 2020	Jun. 07, 2021				
LISN	R&S	ENV216	101375	Jun. 04, 2020	Jun. 03, 2021				
ISN	HPX	ISN T800	S1509001	Jun. 04, 2020	Jun. 03, 2021				
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\				

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Report No.: BCTC2101307030-11							
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	ESR3	102075	Jun. 08, 2020	Jun. 07, 2021		
Receiver	R&S	ESRP	101154	Jun. 08, 2020	Jun. 07, 2021		
Amplifier	Schwarzbeck	BBV9718	9718-309	Jun. 04, 2020	Jun. 03, 2021		
Amplifier	Schwarzbeck	BBV9744	9744-0037	Jun. 04, 2020	Jun. 03, 2021		
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163- 942	Jun. 08, 2020	Jun. 07, 2021		
Horn Antenna	SCHWARZBEC K	BBHA9120 D	1201	Jun. 10, 2020	Jun. 09, 2021		
Horn Antenna (18GHz-40 GHz)	SCHWARZBE CK	BBHA9170	822	Jun. 10, 2020	Jun. 09, 2021		
Amplifier (18GHz-40 GHz)	MITEQ	TTA1840-3 5-HG	2034381	Jun. 08, 2020	Jun. 07, 2021		
Loop Antenna (9KHz-30M Hz)	SCHWARZBE CK	FMZB1519 B	014	Jun. 08, 2020	Jun. 07, 2021		
RF cables1 (9kHz-30MH z)	Huber+Suhnar	9kHz-30M Hz	B1702988- 0008	Jun. 08, 2020	Jun. 07, 2021		
RF cables2 (30MHz-1G Hz)	Huber+Suhnar	30MHz-1G Hz	1486150	Jun. 08, 2020	Jun. 07, 2021		
RF cables3 (1GHz-40G Hz)	Huber+Suhnar	1GHz-40G Hz	1607106	Jun. 08, 2020	Jun. 07, 2021		
Power Metter	Keysight	E4419B	7	Jun. 08, 2020	Jun. 07, 2021		
Power Sensor (AV)	Keysight	E9 300A	\	Jun. 08, 2020	Jun. 07, 2021		
Signal Analyzer 20kHz-26.5 GHz	KEYSIGHT	N9020A	MY491000 60	Jun. 04, 2020	Jun. 03, 2021		
Spectrum Analyzer 9kHz-40G Hz	Agilent	FSP40	100363	Jun. 13, 2020	Jun. 12, 2021		
Software	Frad	EZ-EMC	FA-03A2 RE				

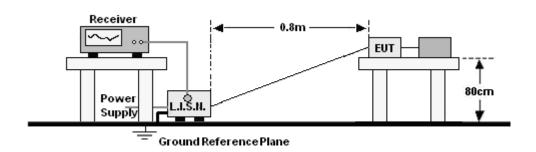
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6. CONDUCTED EMISSIONS

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## 6.1 Block Diagram Of Test Setup



#### 6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)		
FREQUENCT (MHZ)	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:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. 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

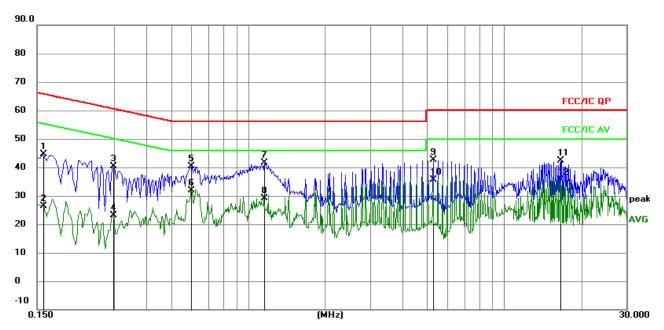
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

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#### 6.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1(The Worst mode)



#### Remark:

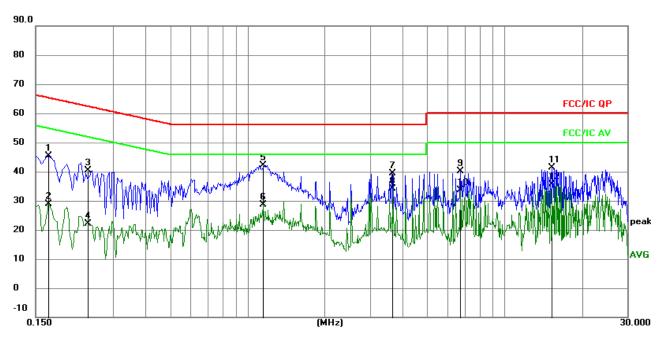
- All readings are Quasi-Peak and Average values.
   Factor = Insertion Loss + Cable Loss.

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz		dB	dBuV	dBuV	dB	Detector
1	0.1590	35.20	9.51	44.71	65.52	-20.81	QP
2	0.1590	16.89	9.51	26.40	55.52	-29.12	AVG
3	0.2985	30.81	9.58	40.39	60.28	-19.89	QP
4	0.2985	13.49	9.58	23.07	50.28	-27.21	AVG
5	0.6000	30.26	10.00	40.26	56.00	-15.74	QP
6 *	0.6000	21.84	10.00	31.84	46.00	-14.16	AVG
7	1.1535	31.96	9.57	41.53	56.00	-14.47	QP
8	1.1535	19.50	9.57	29.07	46.00	-16.93	AVG
9	5.2845	32.81	9.79	42.60	60.00	-17.40	QP
10	5.2845	25.76	9.79	35.55	50.00	-14.45	AVG
11	16.5390	32.66	9.73	42.39	60.00	-17.61	QP
12	16.5390	25.84	9.73	35.57	50.00	-14.43	AVG

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Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Ν
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1(The Worst mode)



#### Remark:

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

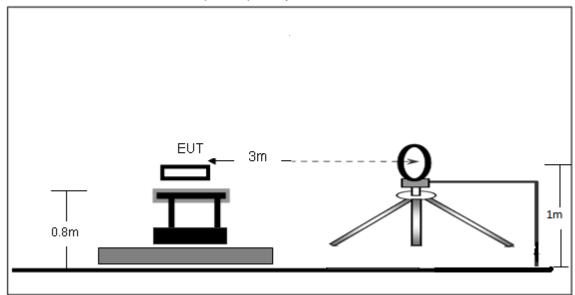
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1677	35.97	9.50	45.47	65.07	-19.60	QP
2		0.1677	19.48	9.50	28.98	55.07	-26.09	AVG
3		0.2391	30.87	9.51	40.38	62.13	-21.75	QP
4		0.2391	12.69	9.51	22.20	52.13	-29.93	AVG
5		1.1473	32.66	9.57	42.23	56.00	-13.77	QP
6		1.1473	19.15	9.57	28.72	46.00	-17.28	AVG
7		3.6418	29.68	9.70	39.38	56.00	-16.62	QP
8	*	3.6418	24.47	9.70	34.17	46.00	-11.83	AVG
9		6.7333	30.36	9.73	40.09	60.00	-19.91	QP
10		6.7333	23.95	9.73	33.68	50.00	-16.32	AVG
11		15.3070	31.67	9.71	41.38	60.00	-18.62	QP
12		15.3070	26.00	9.71	35.71	50.00	-14.29	AVG



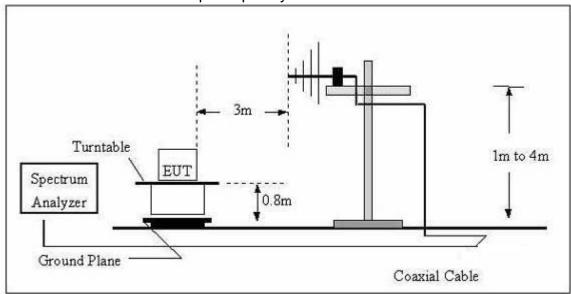
## 7. RADIATED EMISSIONS

## 7.1 Block Diagram Of Test Setup

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



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



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7.2 Limit

FCC §15.209; §15.205.

Test Standard	FCC Part15 C Section 15.209 and 15.205							
	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)			
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300			
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30			
	1.705MHz-30MHz	30	-	-	30			
Test Limit	30MHz~88MHz	100	40.0	Quasi-peak	3			
	88MHz~216MHz	150	43.5	Quasi-peak	3			
	216MHz~960MHz	200	46.0	Quasi-peak	3			
	960MHz~1000MHz	500	54.0	Quasi-peak	3			
	A1 1000MT	500	54.0	Average	3			
	Above 1000MHz				_			

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### 7.3 Test procedure

Setting
Auto
RBW 200Hz for QP
RBW 9kHz for QP
RBW 120kHz for QP

74.0

Peak

#### Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic 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 (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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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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.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle 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.

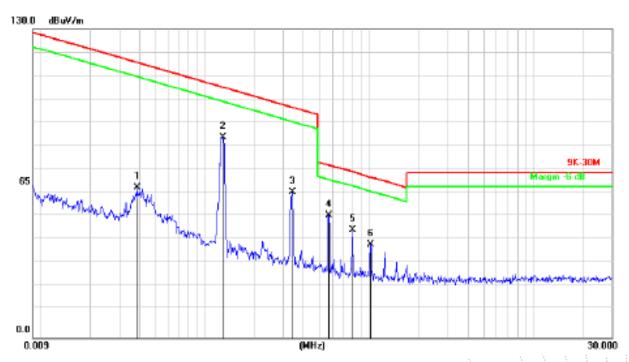
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## 7.4 Test Result

#### 9kHz-30MHz

Temperature:	26℃	Relative Humidtity:	24%
Pressure:	101 kPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Mode 1(the worst data)	Polarization:	



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Data at a Time
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
0.0388	43.74	19.52	63.26	135.83	-72.57	PK
0.0388	42.86	19.52	62.38	115.83	-53.45	AV
0.1297	64.55	19.75	84.3	125.35	-41.05	PK
0.1297	64.00	19.75	83.75	105.35	-21.6	AV
0.3405	41.56	19.78	61.34	116.96	-55.62	PK
0.3405	40.97	19.78	60.75	96.96	-36.21	AV
0.5681	31.83	19.82	51.65	72.52	-20.87	QP
0.7923	25.47	19.88	45.35	69.63	-24.28	QP
1.0187	19.26	19.95	39.21	67.44	-28.23	QP

Pre-scan in the all of mode, the worst case in of was recorded.

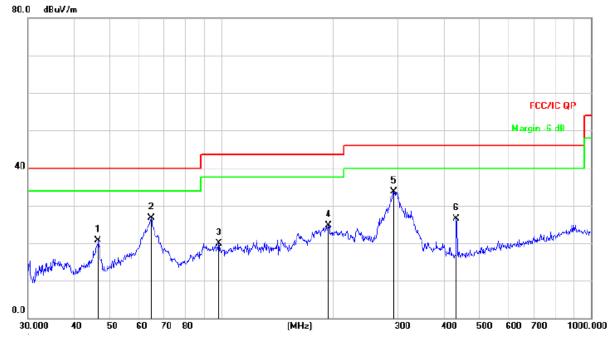
Factor = antenna factor + cable loss – pre-amplifier. Margin = Emission Level- Limit.

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Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidtity:	54%
Pressure:	101 kPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Mode 1(the worst data)	Polarization :	Horizontal



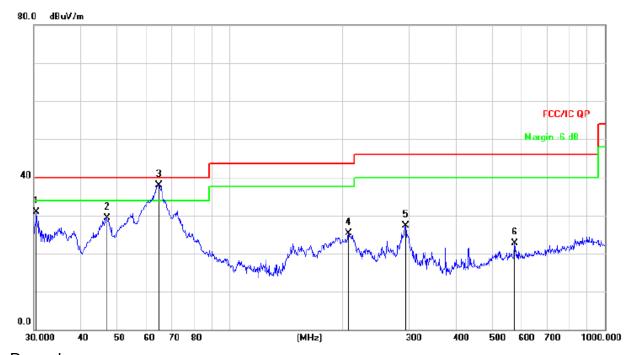
Remark:

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

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		46.5030	35.14	-14.38	20.76	40.00	-19.24	QP
2		64.6594	42.61	-15.86	26.75	40.00	-13.25	QP
3		98.4866	35.65	-15.78	19.87	43.50	-23.63	QP
4		195.1365	40.36	-15.60	24.76	43.50	-18.74	QP
5	*	293.0842	46.38	-12.65	33.73	46.00	-12.27	QP
6		432.5457	35.55	-8.99	26.56	46.00	-19.44	QP



Temperature:	26℃	Relative Humidtity:	54%
Pressure:	101 kpa	Test Voltage:	AC 120V/60Hz
Test Mode:	Mode 1(the worst data)	Polarization :	Vertical



Remark:

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

-	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
	1		30.5306	47.01	-16.05	30.96	40.00	-9.04	QP
	2		46.9948	43.71	-14.34	29.37	40.00	-10.63	QP
	3	*	64.6594	53.78	-15.86	37.92	40.00	-2.08	QP
	4	:	207.1226	40.39	-15.11	25.28	43.50	-18.22	QP
	5	:	294.1137	39.89	-12.62	27.27	46.00	-18.73	QP
	6	;	574.6258	28.47	-5.68	22.79	46.00	-23.21	QP



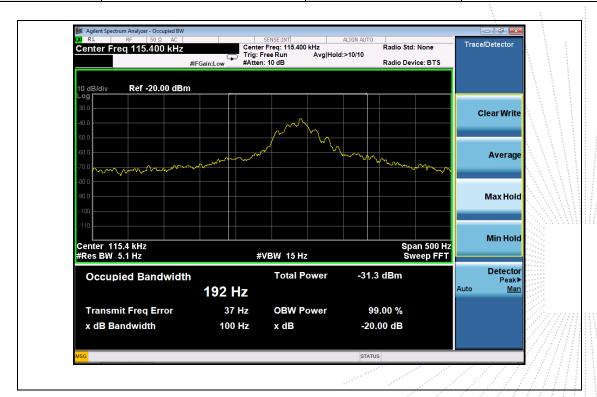
#### 8. BANDWIDTH TEST

- 1. Set RBW = 1%~5% OBW.
- 2. Set the video bandwidth (VBW)  $\geq$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

#### **TEST SETUP**

EUT SPECTRUM ANALYZER

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101kPa		

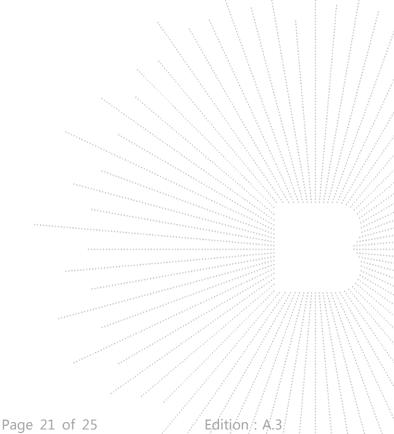


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## 9. ANTENNA REQUIREMENTS

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. 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. The antenna used for this product is Inductive loop coil antenna.



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## 10. EUT PHOTOGRAPHS

## **EUT Photo 1**



## **EUT Photo 2**





## 11. EUT TEST SETUP PHOTOGRAPHS

## **Conducted emissions**



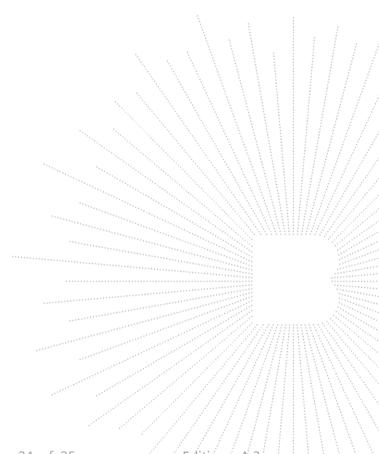
## **Radiated Measurement Photos**



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## **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.

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