
FCC Test Report

Report No.: AGC01101220201FE03

FCC ID : VMK-RP05

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : TPMS Repeater

BRAND NAME : N/A

MODEL NAME : RP05, RP02, RP03, RP04, RP08, RP09, TM520

APPLICANT : Gobiz Electronics Ltd.

DATE OF ISSUE : Feb. 22, 2022

STANDARD(S) : FCC Part 15 Rules

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Feb. 22, 2022	Valid	Initial Release

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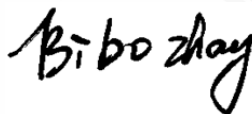
1. VERIFICATION OF CONFORMITY

Applicant	Gobiz Electronics Ltd.
Address	Rm 201, 2/F, Hi-Tech Centre, 9 Choi Yuen Road, Sheung Shui, N.T., Hong Kong, China
Manufacturer	Gobiz Electronics Ltd.
Address	Rm 201, 2/F, Hi-Tech Centre, 9 Choi Yuen Road, Sheung Shui, N.T., Hong Kong, China
Factory	Gobiz Electronics Ltd.
Address	Rm 201, 2/F, Hi-Tech Centre, 9 Choi Yuen Road, Sheung Shui, N.T., Hong Kong, China
Product Designation	TPMS Repeater
Brand Name	N/A
Test Model	RP05
Series Model	RP02, RP03, RP04, RP08, RP09, TM520
Difference Description	Different in shape, color and model number only.
Date of test	Feb. 17, 2022 to Feb. 22, 2022
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-SRD/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.231.

Prepared By



Bibo Zhang
(Project Engineer)

Feb. 22, 2022

Reviewed By



Calvin Liu
(Reviewer)

Feb. 22, 2022

Approved By



Max Zhang
(Authorized Officer)

Feb. 22, 2022

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	433.92MHz
Field Strength(3m)	433.92MHz: 91.16dBuV/m(PK)@3m 433.92MHz: 84.77dBuV/m(AV)@3m
Modulation	ASK
Number of channels	1
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	Spring antenna
Antenna Gain	3dBi
Power Supply	DC 5-24V

2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: VMK-RP05** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.4. SPECIAL ACCESSORIES

Refer to section 5.1.

2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB
- Uncertainty of Occupied Channel Bandwidth, $U_c = \pm 2$ %

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Charging mode with adapter
Note: 1. EUT is only 120V/60Hz powered. 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.	

5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	TPMS Repeater	RP05	VMK-RP05	EUT

5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.231(a)(1)	Activated Manually	Compliant
§15.231(b)	Average Factor	Compliant
§15.231(b) & §15.209	Field Strength of Fundamental and Spurious Emission	Compliant
15.207	Conducted Emission	Not applicable

Note: This product function cannot be transferred while charging.

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	Rohde & Schwarz	ESCI	10096	Apr. 14, 2021	Apr. 13, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Nov. 17, 2021	Nov. 16, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 08, 2021	Jan. 07, 2023
Test software	FARA	EZ-EMC(Ver.RA-03A)	N/A	N/A	N/A

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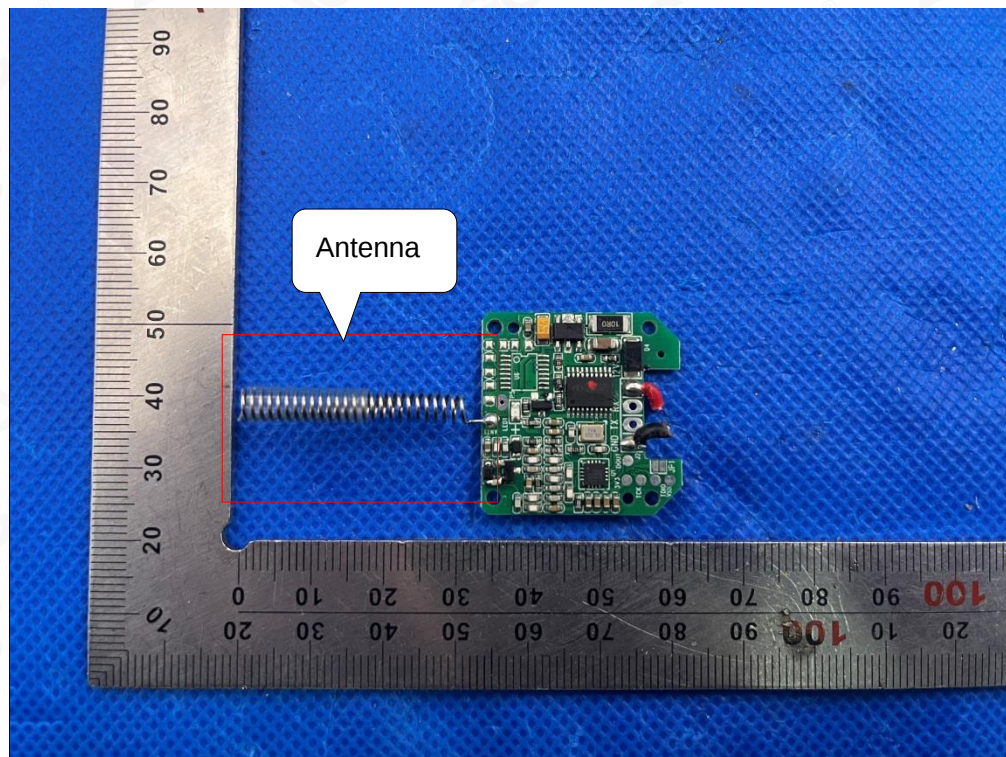
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7. ANTENNA REQUIREMENT

According to §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 EUT has Fixed antenna, which accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.



The requirements of section 15.203 are **FULFILLED**.

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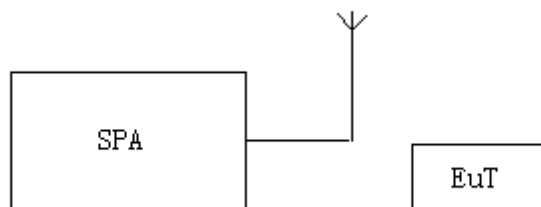


8. PROVISION FOR MOMENTARY OPERATION

8.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=1MHz, VBW=3MHz
Span: 0Hz
Sweep time: 10S
2. Set the EUT to transmit by manually operated. Use the “View” function of SPA to find the transmission time of being released.
3. Record the data and Reported.

8.2 TEST SETUP



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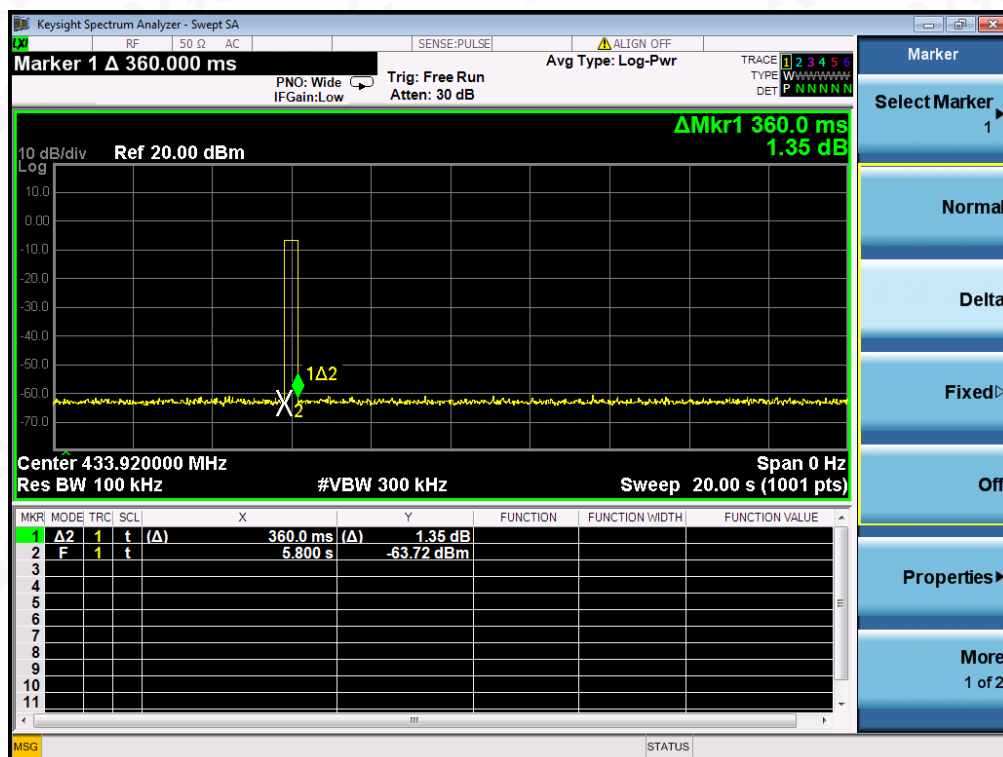
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8.3 TEST RESULT

Test Mode: EUT @ 433.92MHz for RF Transmitter

EUT is a manually activated transmitter – so release time (button no longer pressed) is test case	Limit (s)
0.36	5.00



RESULT: PASS

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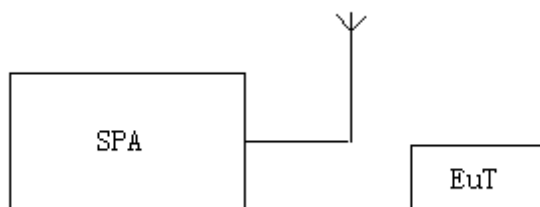


9. DUTY CYCLE CORRECTION FACTOR

9.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=1MHz, VBW=3MHz
Span: 0Hz
Sweep time: more than two pulse trains or more than each type of pulse occupancy time
2. Set the EUT to transmit by manually operated. Use the “Delta mark” function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

9.2 TEST SETUP



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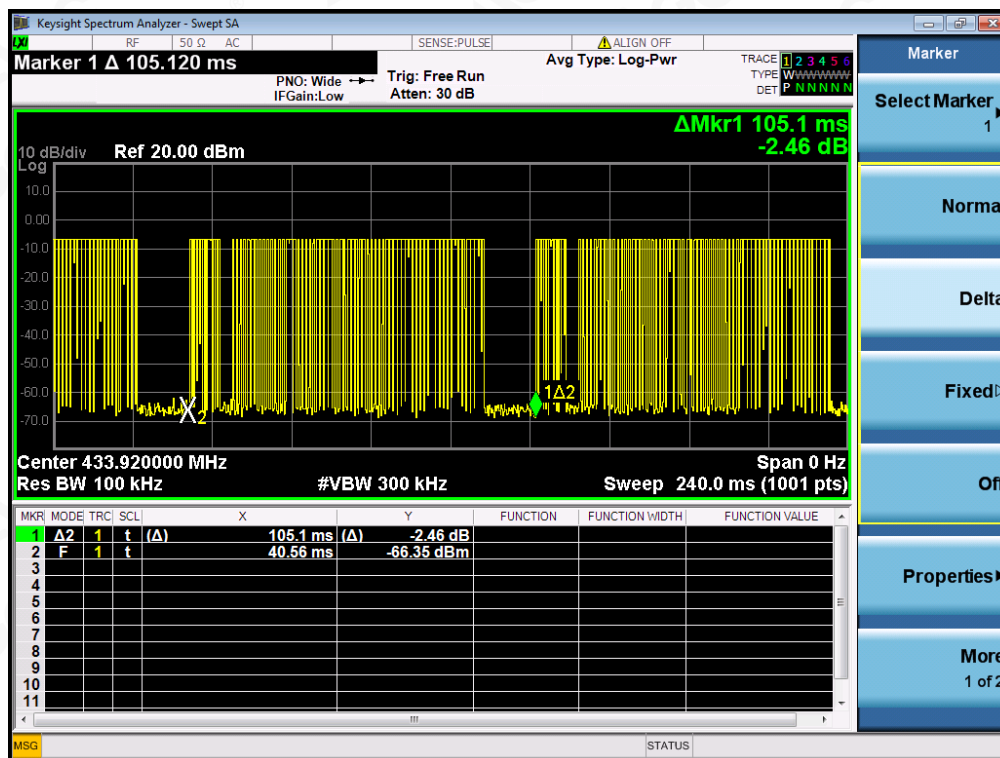
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9.3 TEST RESULT

Test Mode: EUT @ 433.92MHz for RF Transmitter

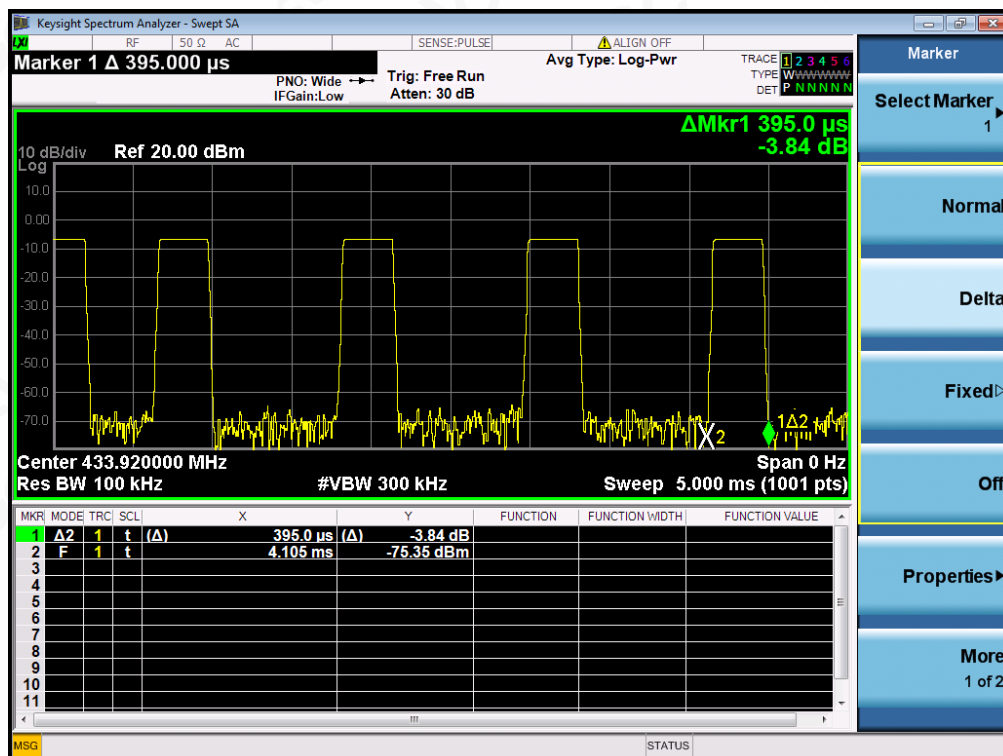
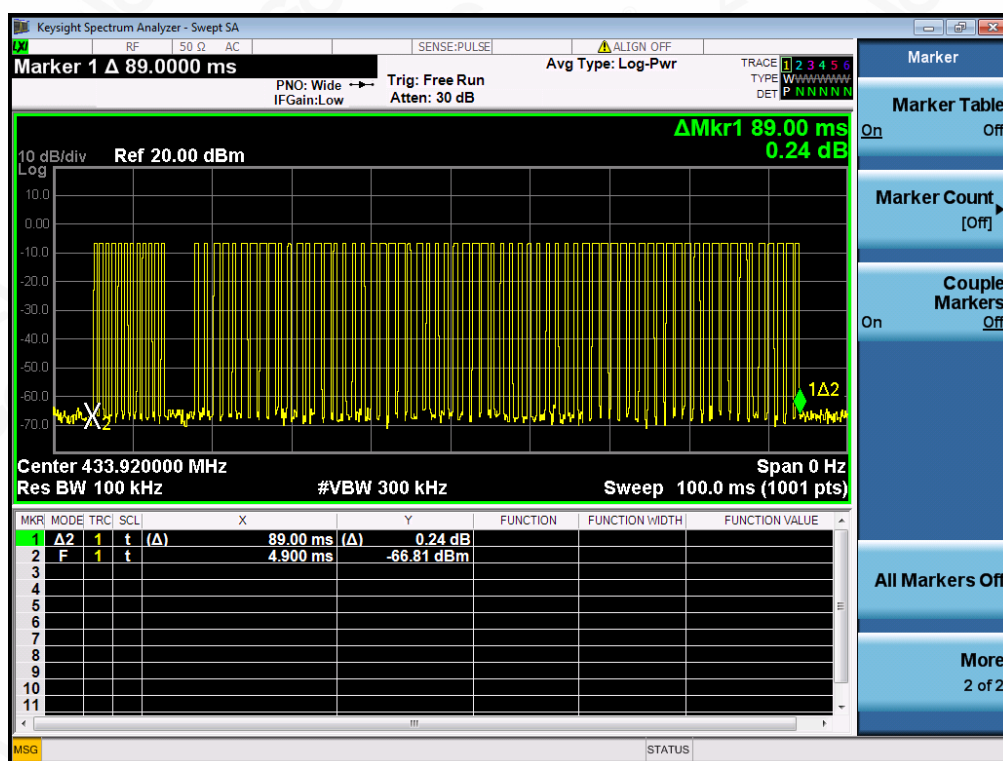
Duty Cycle:	$(0.84 \times 42 + 0.395 \times 32) \text{ms} / 100 \text{ms} = 0.4792$
Duty Cycle Correction Factor:	$20 \lg(0.4792) = -6.3897 \text{dB}$



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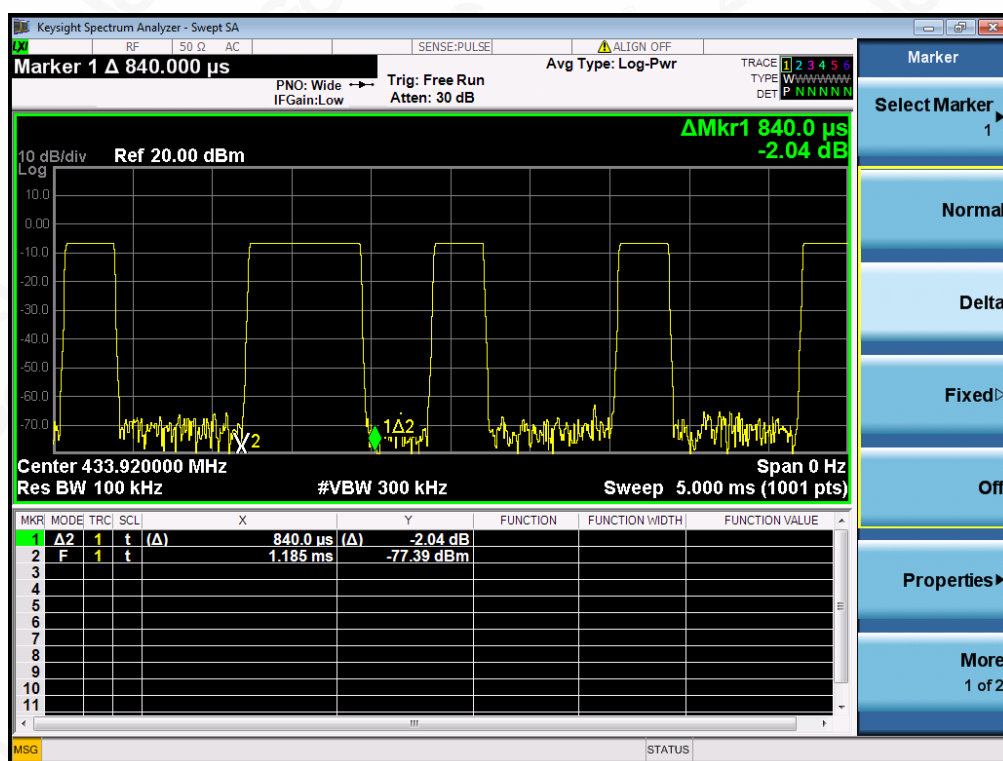




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10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and VBW $\geq$ 3RBW for QP reading.
7. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
8. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
9. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
10. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
11. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
12. Only the worst case is reported.

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The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

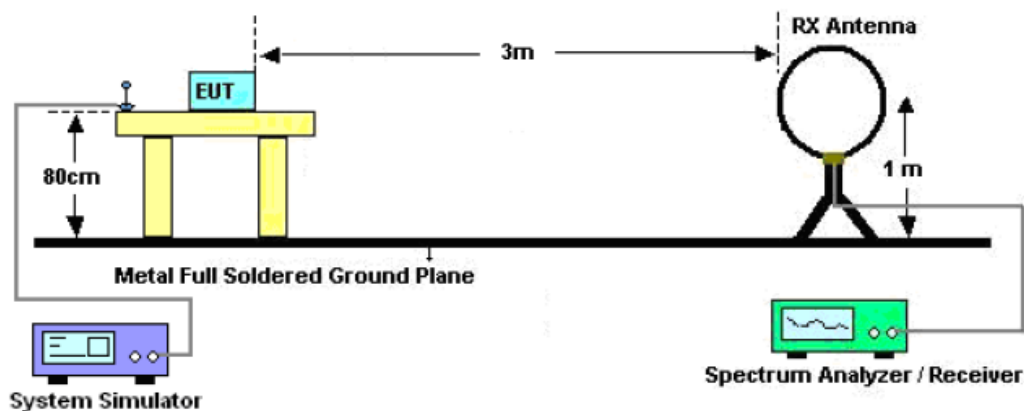
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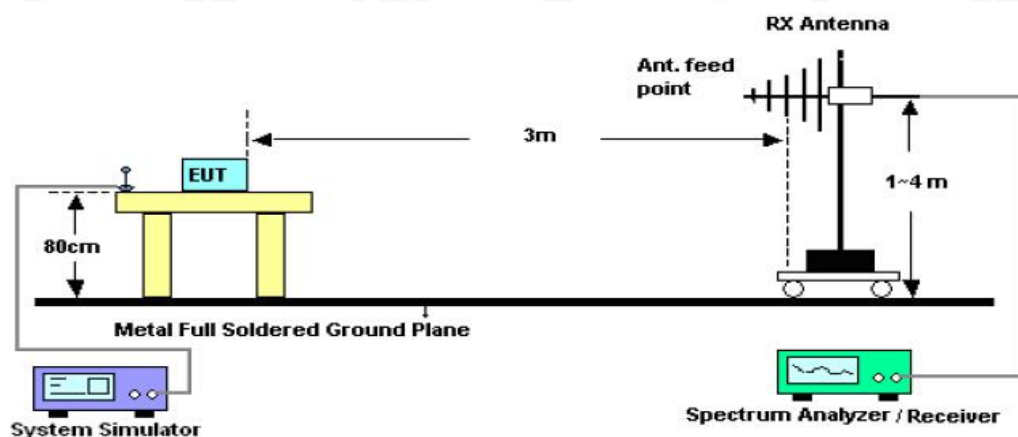


10.2. TEST SETUP

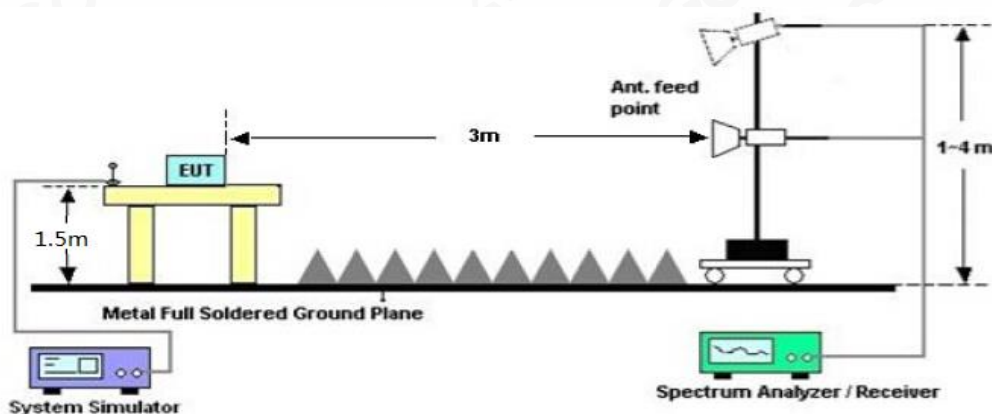
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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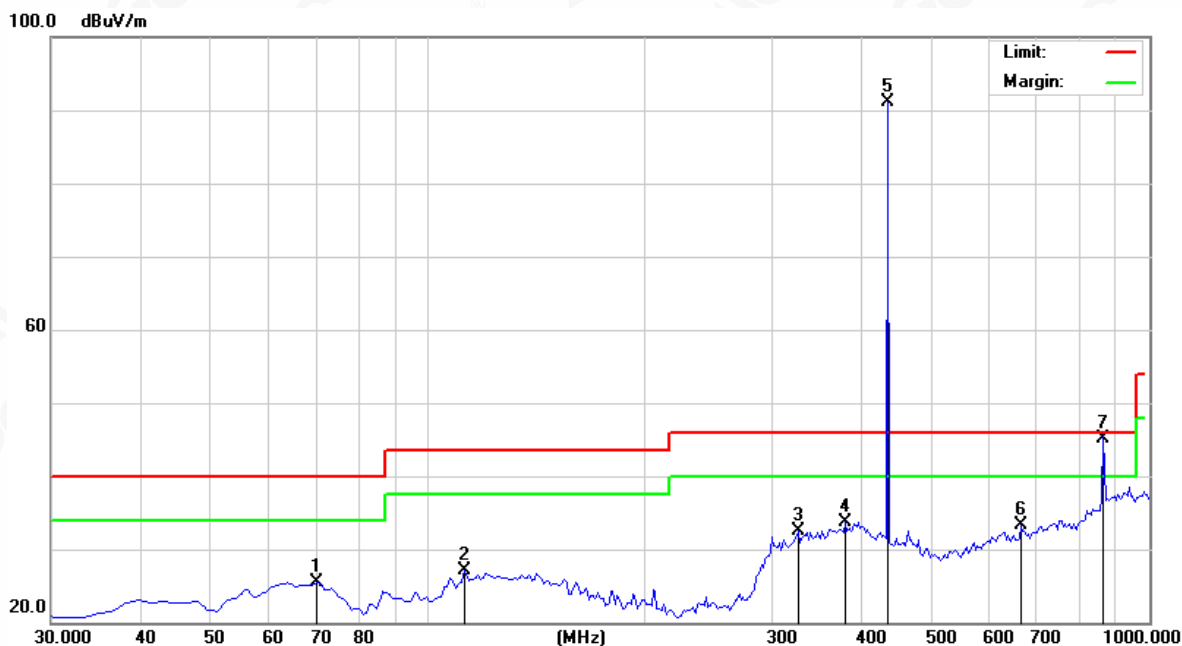
10.3. TEST RESULT

Test Mode: EUT @ 433.92MHz for RF Transmitter

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		70.4167	13.57	11.94	25.51	40.00	-14.49	peak
2		112.4500	15.39	11.72	27.11	43.50	-16.39	peak
3		327.4667	15.51	17.06	32.57	46.00	-13.43	peak
4		380.8167	15.52	18.25	33.77	46.00	-12.23	peak
5	*	434.1667	74.08	17.08	91.16	46.00	45.16	peak
6		666.9667	15.54	17.75	33.29	46.00	-12.71	peak
7	!	867.8450	23.31	21.76	45.07	46.00	-0.93	QP

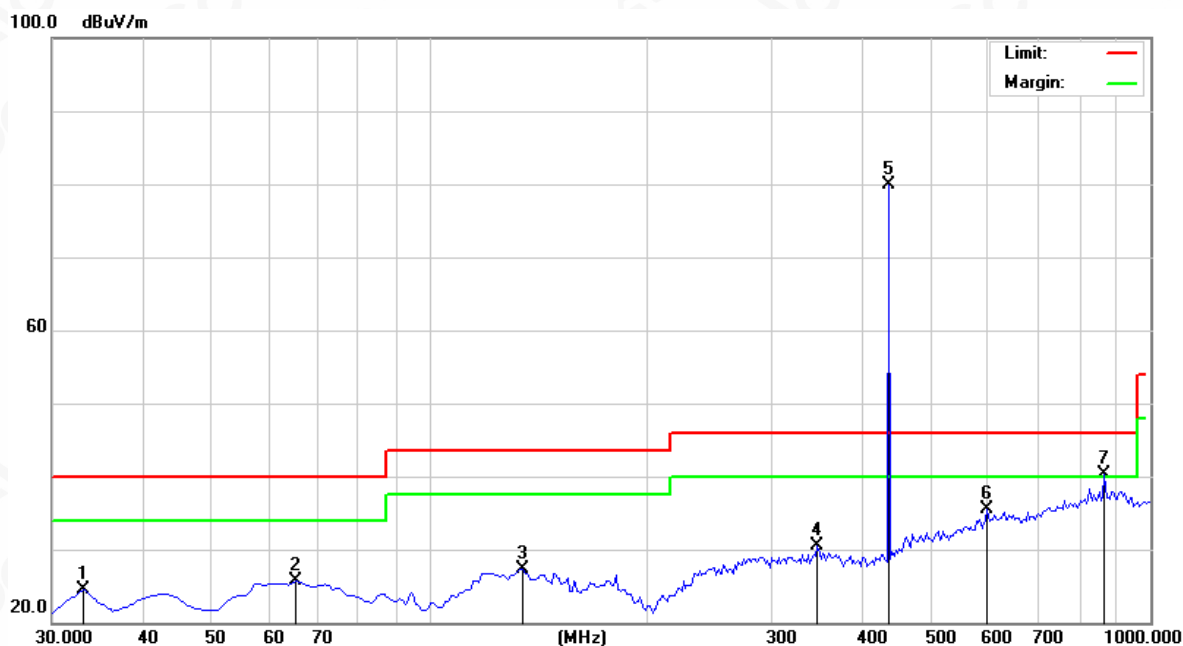
AV data list

Freq. [MHz]	Peak Level (dBuV/m)	Duty cycle factor(dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
433.9200	91.16	-6.3897	84.77	80.82	3.95	Horizontal
868.0800	45.07	-6.3897	38.68	60.82	-22.14	Horizontal

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RADIATED EMISSION BELOW 1GHZ-Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		33.2333	17.25	7.27	24.52	40.00	-15.48	peak
2		65.5667	13.71	12.00	25.71	40.00	-14.29	peak
3		135.0833	14.15	13.17	27.32	43.50	-16.18	peak
4		345.2500	16.24	14.25	30.49	46.00	-15.51	peak
5	*	434.1667	64.80	15.01	79.81	46.00	33.81	peak
6		597.4500	15.55	19.87	35.42	46.00	-10.58	peak
7	!	867.4333	17.83	22.57	40.40	46.00	-5.60	peak

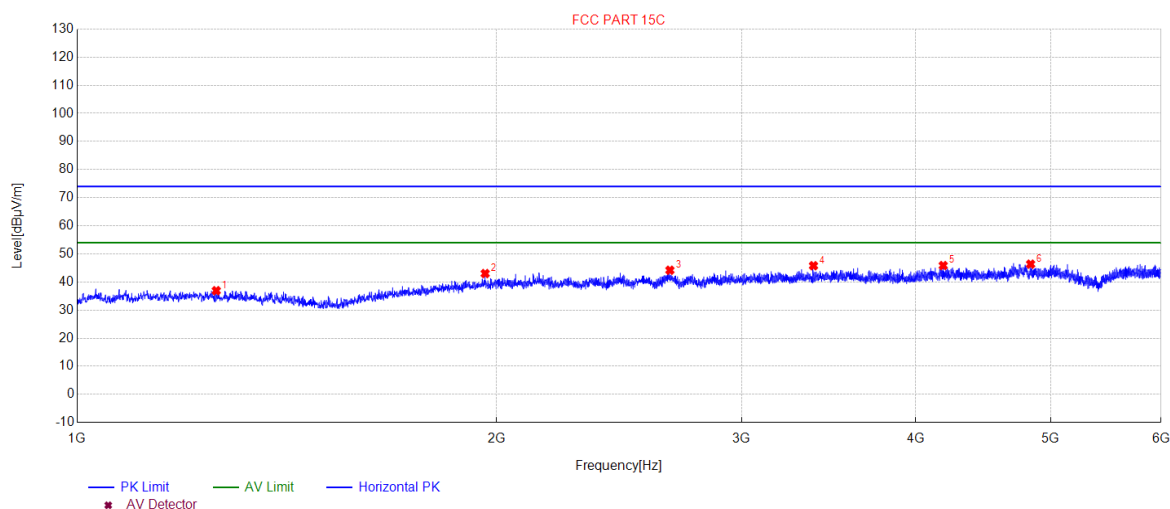
AV data list

Freq. [MHz]	Peak Level (dBuV/m)	Duty cycle factor(dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
433.9200	79.81	-6.3897	73.42	80.82	-7.40	Vertical
868.0800	40.40	-6.3897	34.01	60.82	-26.81	Vertical

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RADIATED EMISSION ABOVE 1GHZ-Horizontal



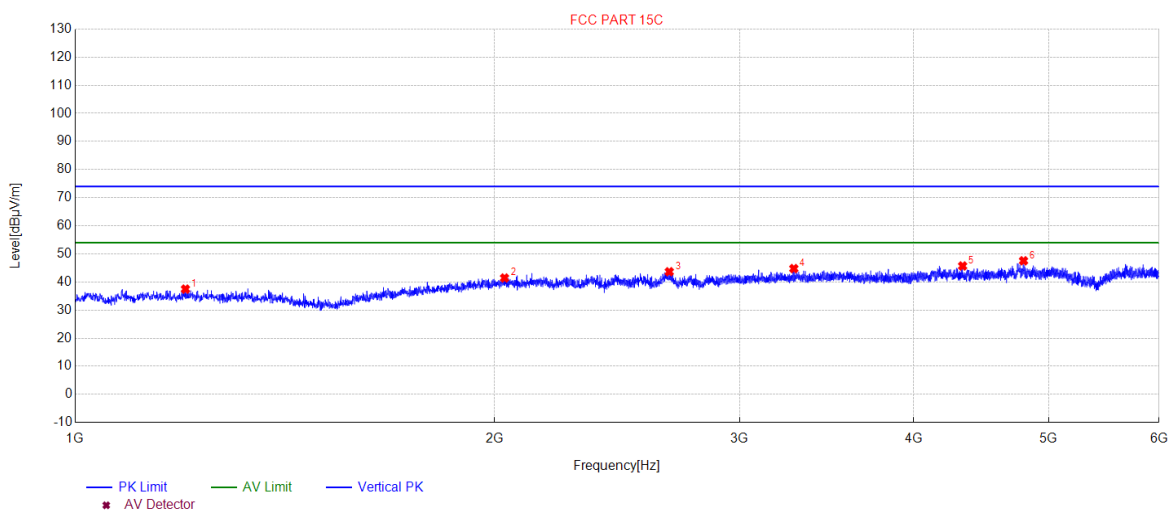
NO	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1258.5259	36.90	-16.89	74.00	37.10	150	240	Horizontal
2	1963.0963	43.00	-12.21	74.00	31.00	150	80	Horizontal
3	2664.1664	44.18	-9.59	74.00	29.82	150	140	Horizontal
4	3377.7378	45.78	-8.02	74.00	28.22	150	320	Horizontal
5	4185.8186	45.84	-6.02	74.00	28.16	150	120	Horizontal
6	4836.3836	46.34	-4.88	74.00	27.66	150	110	Horizontal

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RADIATED EMISSION ABOVE 1GHZ-Vertical



NO	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1200.02	37.46	-16.84	74.00	36.54	150	230	Vertical
2	2033.6034	41.41	-11.68	74.00	32.59	150	10	Vertical
3	2670.167	43.64	-9.59	74.00	30.36	150	220	Vertical
4	3280.7281	44.76	-8.36	74.00	29.24	150	210	Vertical
5	4336.3336	45.69	-5.63	74.00	28.31	150	180	Vertical
6	4795.8796	47.53	-4.92	74.00	26.47	150	210	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. The PK test value is less than the AV limit, so the AV value is not tested.

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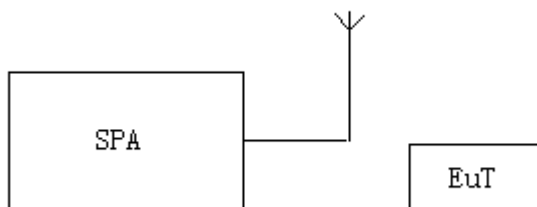


11. BANDWIDTH

11.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=0.3KHz
VBW=1.0KHz
Span: 60kHz
Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

11.2. TEST SETUP



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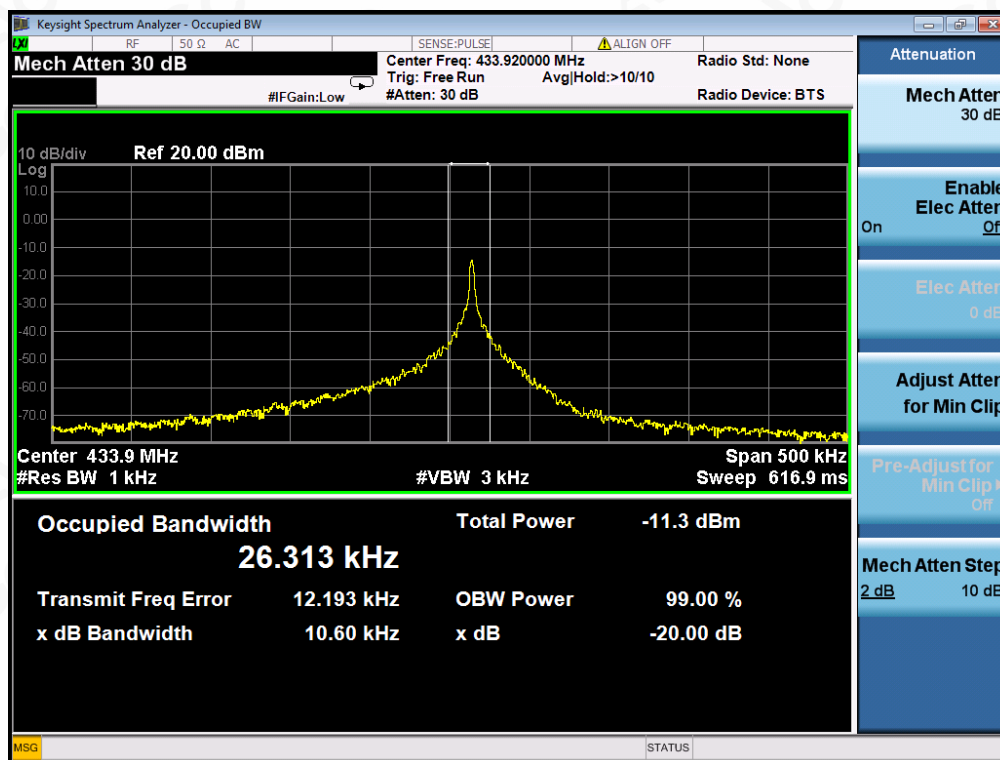
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11.3. TEST RESULT

Test Mode: EUT @ 433.92MHz for RF Transmitter

-20dB bandwidth	LIMIT	RESULT
10.60KHz	1084.8KHz	Pass
Note: Limit= Operation Frequency x0.25%		



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12. FCC LINE CONDUCTED EMISSION TEST

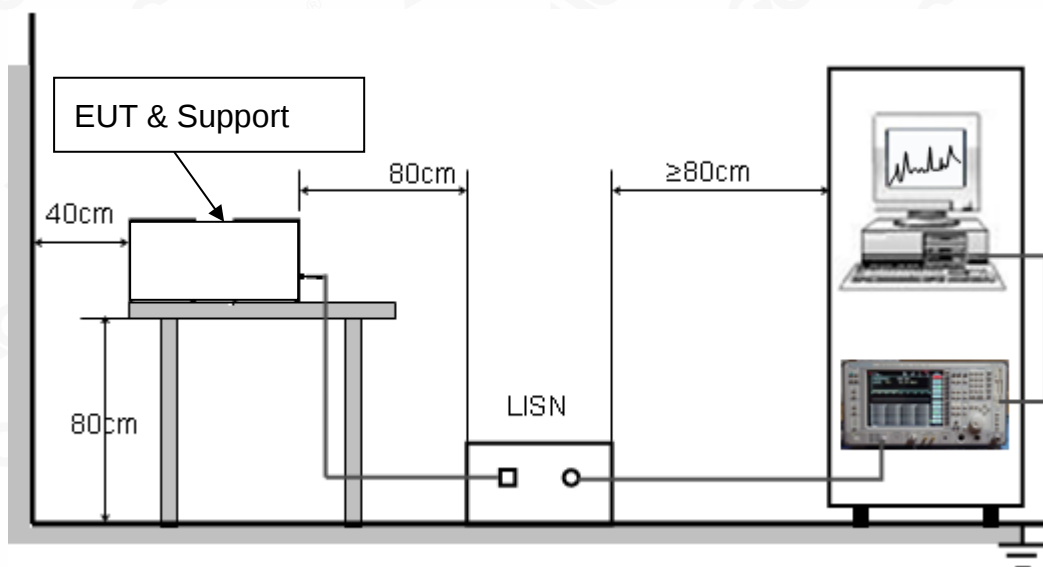
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received power from control board which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

Note: This product function cannot be transferred while charging.



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC01101220201AP01

APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC01101220201AP02

-----END OF REPORT-----

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1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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