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Report No.: 1608RSU00502
Report Version: V01
Issue Date: 10-23-2016

MEASUREMENT REPORT
FCC PART 15.249 / RSS-210

FCC ID:	DD4ULXD8X52
IC:	616A-ULXD8X52
APPLICANT:	Shure Incorporated
Application Type:	Certification
Product:	Wireless Gooseneck Transmitter
Model No.:	ULXD8 X52
Brand Name:	SHURE
FCC Classification:	Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s):	Part 15.249
IC Rule(s):	RSS-210 Issue 9, RSS-GEN Issue 4
Test Procedure(s):	ANSI C63.10 - 2013
Test Date:	August 06 ~ 27, 2016

Reviewed By Manager : Robin Wu
(Robin Wu)

Approved By CEO : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10 - 2013. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1608RSU00502	Rev. 01	Initial report	10-23-2016	Valid

CONTENTS

Description Page

§2.1033 General Information

Applicant:	Shure Incorporated
Applicant Address:	5800 West Touhy Avenue
Manufacturer:	Shure Incorporated
Manufacturer Address:	5800 West Touhy Avenue
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT FCC Registration No.:	809388
MRT IC Registration No.:	11384A
FCC Rule Part(s):	Part 15.249
IC Rule:	RSS-210 Issue 9, RSS-GEN Issue 4
FCC ID:	DD4ULXD8X52
IC:	616A-ULXD8X52
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Low Power Communication Device Transmitter (DXX)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

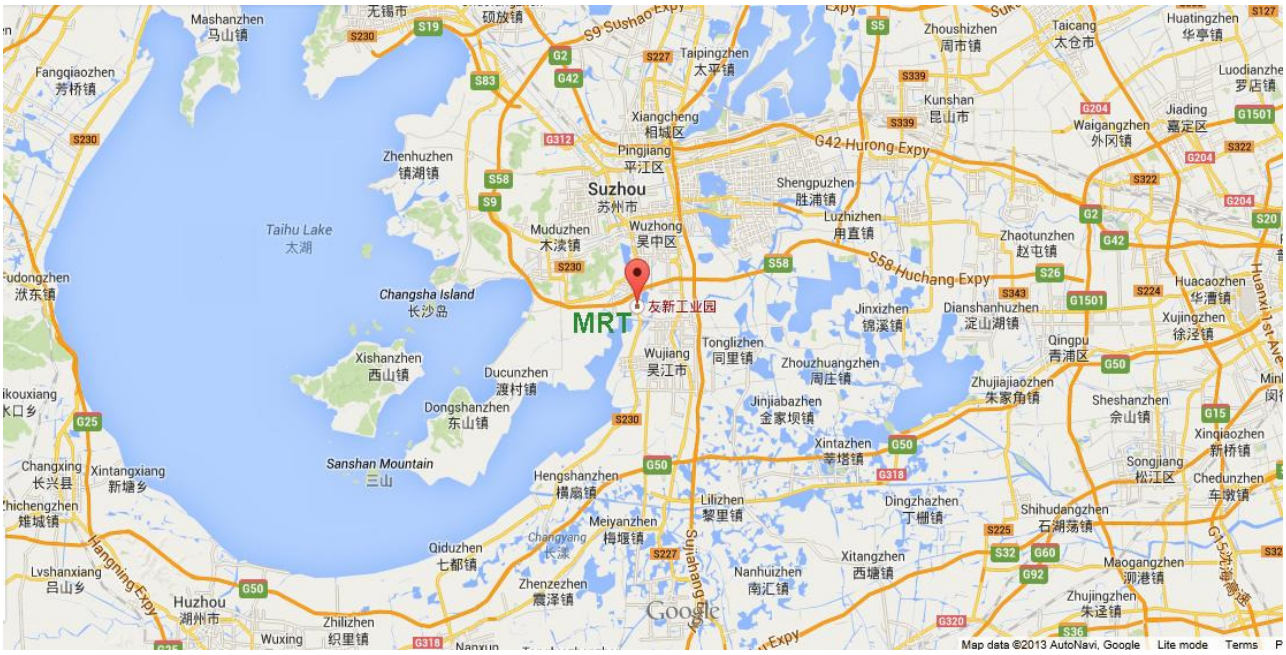
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Wireless Gooseneck Transmitter
Model No.	ULXD8 X52
Frequency Range	902 ~ 928 MHz
Working Mode	Normal Mode and HD Mode
Power Level	0.25mW & 10mW & 20mW
Antenna Type	PIFA
Antenna Gain	Max Peak Gain 1.45dBi
Components	
Rechargeable Li-ion Battery	Model: SB900A OUTPUT: 3.7Vdc, 1320mAh,4.88Wh

Note 1: The EUT has two working modes (Normal Mode & HD Mode) and two modes can be switched from the digital wireless receiver.

Note 2: Normal mode has three power levels (0.25mW & 10mW & 20mW). Power levels are switchable among these power levels. HD mode means high density mode and it only has 0.25mW power level.

Note 3: The EUT is capable of operating with AA alkaline batteries or with the Shure SB900A rechargeable battery pack.

2.2. Product Specification Subjective to this Report

Working Mode	HD Mode
Frequency Range	902 ~ 928 MHz
Power Level	0.25mW
Type of Modulation	8PSK
Channel Spacing	25kHz
Date Rate	93.75kbps

Note: For other features of this EUT, test report will be issued separately.

2.3. Operation Frequency and Channel List

X52 band

Channel	Frequency
LOW	902.4 MHz
…	…
MID	915.0 MHz
…	…
HIG	927.6 MHz

2.4. Test Configuration

The **Wireless Boundary Transmitter FCC ID: DD4ULXD8X52** was tested as described in this report is in compliance with the requirements limits of FCC Rules Part 15.207,15.209, 15.215 and 15.249. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.6. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

2.7. Test Software

The test utility software used during testing was “ttermpro.exe”.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10 - 2013), and the requirements provided in FCC 15.207, 15.209, 15.215 and 15.249 were performed in the report of the **Wireless Gooseneck Transmitter.**
Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.
The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.
An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10 - 2013 at Clause 4.3.
Line conducted emissions test results are shown in Section 7.2.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB BeamWidth of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the **Wireless Gooseneck Transmitter is permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Wireless Gooseneck Transmitter FCC ID: DD4ULXD8X52** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	101683	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	101684	1 year	2016/11/03
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	1 year	2016/12/20
Shielding Anechoic Chamber	MIX-BEP	Chamber-SR2	N/A	1 year	2017/05/10

Radiated Emission - AC1

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MY51210182	1 year	2017/08/03
Preamplifier	Agilent	83017A	MY52090106	1 year	2017/03/28
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2016/12/14
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2016/11/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2016/11/07
Digital Thermometer & Hygrometer	Yuhuaze	HTC-2	N/A	1 year	2016/12/20
Anechoic Chamber	TDK	Chamber-AC1	N/A	1 year	2017/05/10

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2016/12/20

Software	Version	Function
e3	V8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT 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.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Company Name: **Shure Incorporated**

Data Rate(s) Tested: **93.75kbps**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.2
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.3 & 7.4
15.215(c)	20dB Spectrum Bandwidth	20 dB bandwidth of the emission in the specific band	Conducted	Pass	Section 7.5

RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
RSS-Gen Clause 8.8	AC Conducted Emissions 150kHz - 30MHz	< RSS-Gen Clause 8.8 limits	Line Conducted	Pass	Section 7.2
RSS-210 Clause 8.9 Annex A2.9	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in clause 8.10	Radiated	Pass	Section 7.3 & 7.4
RSS-GEN Clause 6.6	99% Occupied Bandwidth	N/A	Conducted	Pass	Section 7.6

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

7.2. Conducted Emission

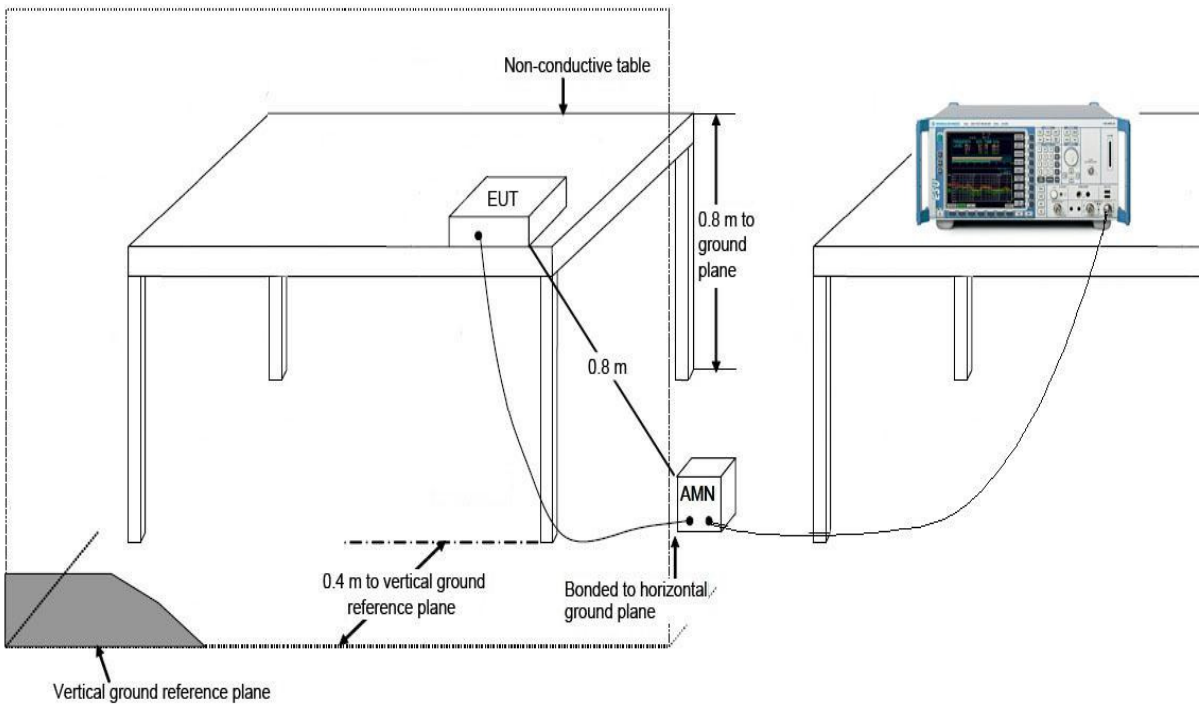
7.2.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

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

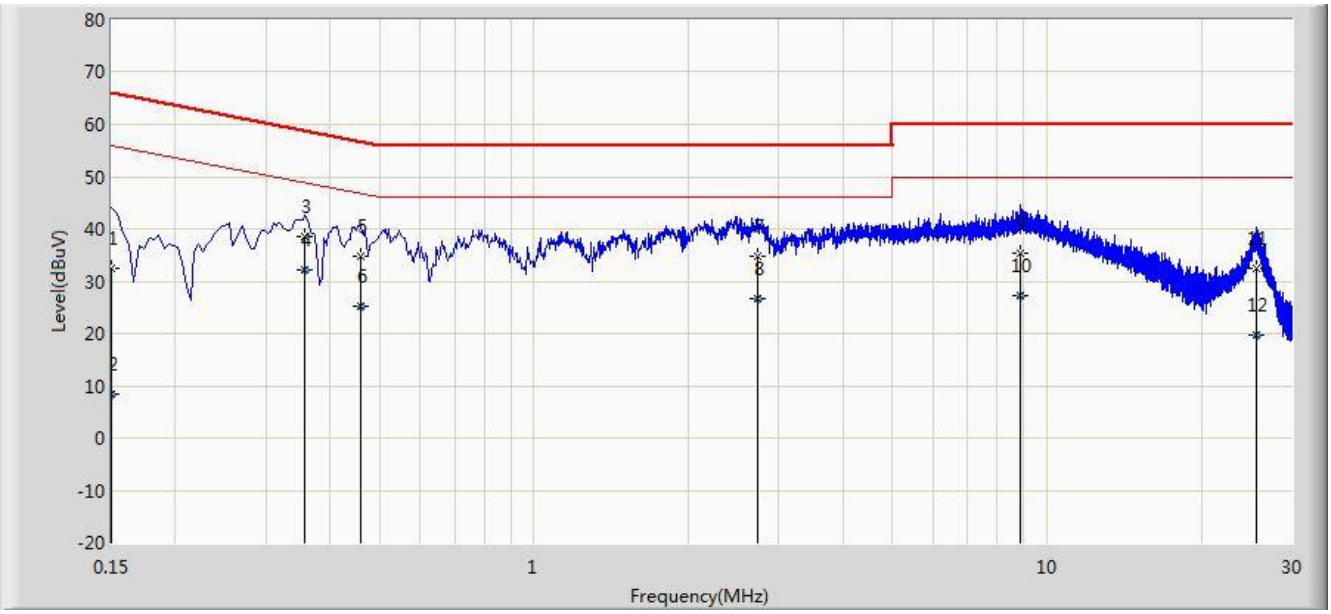
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

7.2.2. Test Setup



7.2.3. Test Result

Site: SR2	Time: 2016/08/24 - 00:06
Limit: FCC_Part15.207_CE_AC Power	Engineer: Lewis Huang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Wireless Gooseneck Transmitter	Power: AC 120V/60Hz
Worse Case Mode: Transmit at Channel 915MHz 0.25mW	

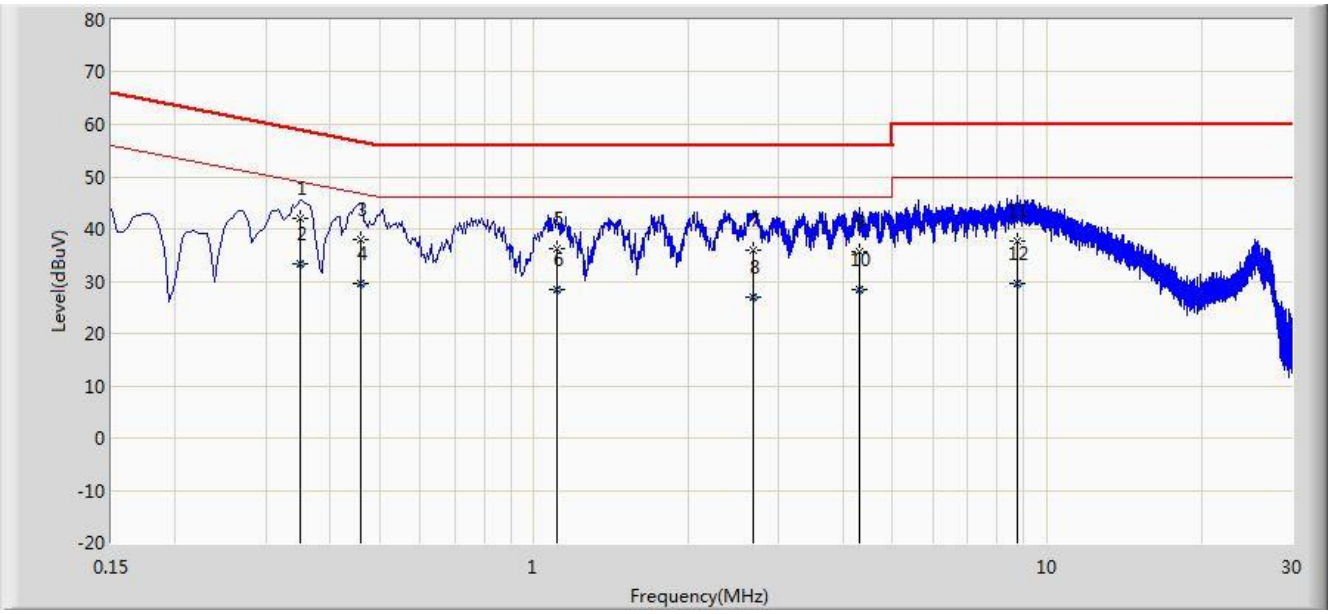


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	32.340	21.171	-33.660	66.000	11.168	QP
2			0.150	8.390	-2.779	-47.610	56.000	11.168	AV
3			0.358	38.500	28.449	-20.275	58.775	10.051	QP
4		*	0.358	32.109	22.058	-16.666	48.775	10.051	AV
5			0.458	34.895	24.763	-21.833	56.729	10.133	QP
6			0.458	25.257	15.125	-21.472	46.729	10.133	AV
7			2.722	34.844	24.995	-21.156	56.000	9.850	QP
8			2.722	26.535	16.685	-19.465	46.000	9.850	AV
9			8.886	35.407	25.254	-24.593	60.000	10.153	QP
10			8.886	27.271	17.118	-22.729	50.000	10.153	AV
11			25.626	32.386	22.163	-27.614	60.000	10.223	QP
12			25.626	19.796	9.573	-30.204	50.000	10.223	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2016/08/24 - 00:15
Limit: FCC_Part15.207_CE_AC Power	Engineer: Lewis Huang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Wireless Gooseneck Transmitter	Power: AC 120V/60Hz
Worse Case Mode: Transmit at Channel 915MHz 0.25mW	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.350	42.051	31.976	-16.911	58.962	10.074	QP
2		*	0.350	33.446	23.371	-15.517	48.962	10.074	AV
3			0.458	37.904	27.748	-18.825	56.729	10.156	QP
4			0.458	29.662	19.506	-17.067	46.729	10.156	AV
5			1.106	36.271	26.367	-19.729	56.000	9.904	QP
6			1.106	28.397	18.493	-17.603	46.000	9.904	AV
7			2.666	36.011	26.155	-19.989	56.000	9.856	QP
8			2.666	26.894	17.038	-19.106	46.000	9.856	AV
9			4.314	35.717	25.730	-20.283	56.000	9.987	QP
10			4.314	28.323	18.335	-17.677	46.000	9.987	AV
11			8.726	37.723	27.533	-22.277	60.000	10.191	QP
12			8.726	29.609	19.418	-20.391	50.000	10.191	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

7.3. Radiated Emission

7.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (uV/m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-80	100**	3
80-216	150**	3
216-960	200**	3
Above 960	500	3

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

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m).

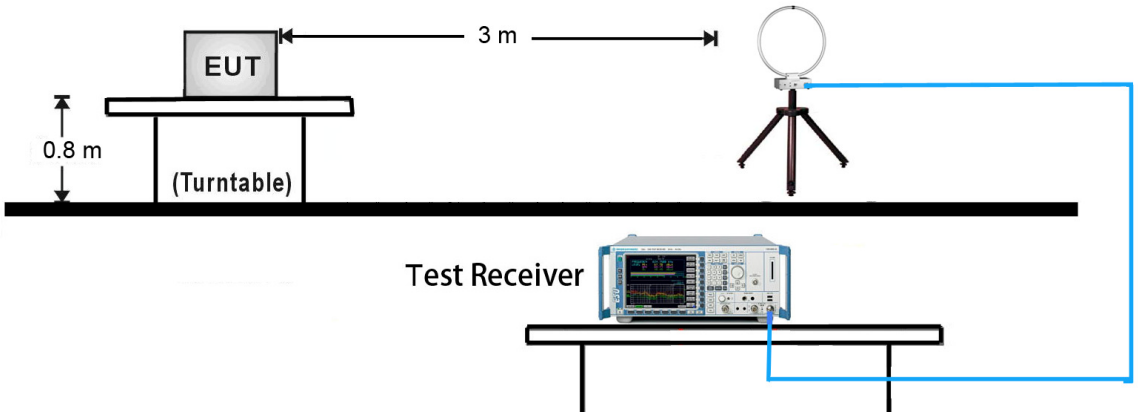
FCC Part 15 Subpart C Paragraph 15.249		
Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928(MHz)	50	500
2400-2483.5(MHz)	50	500
5725-5875(MHz)	50	500
24.0-24.25(GHz)	250	2500

FCC Part 15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general

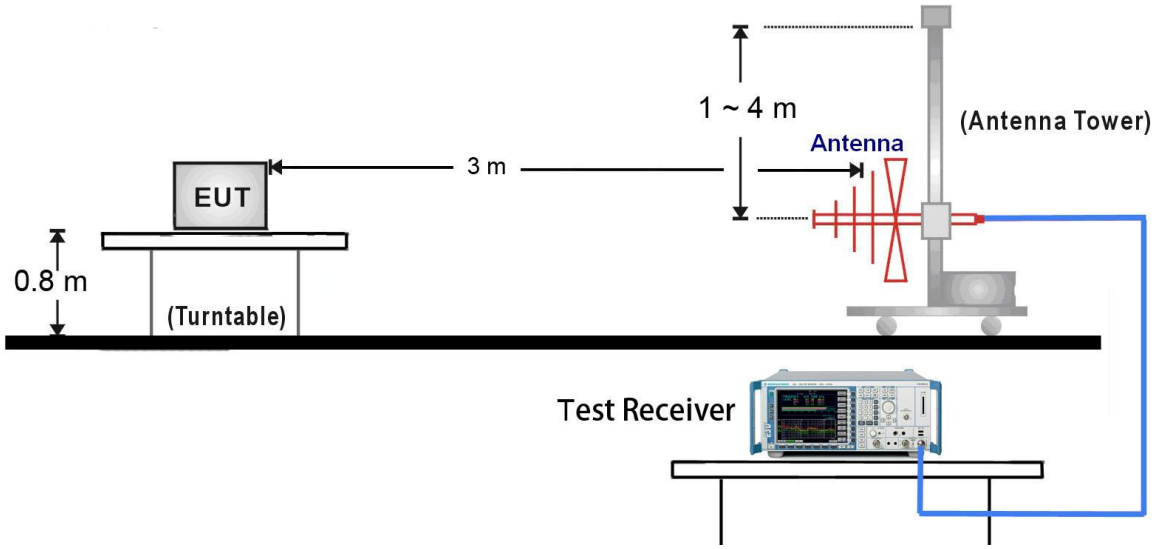
radiated emission limits in §15.209, whichever is the lesser attenuation.

7.3.2. Test Setup

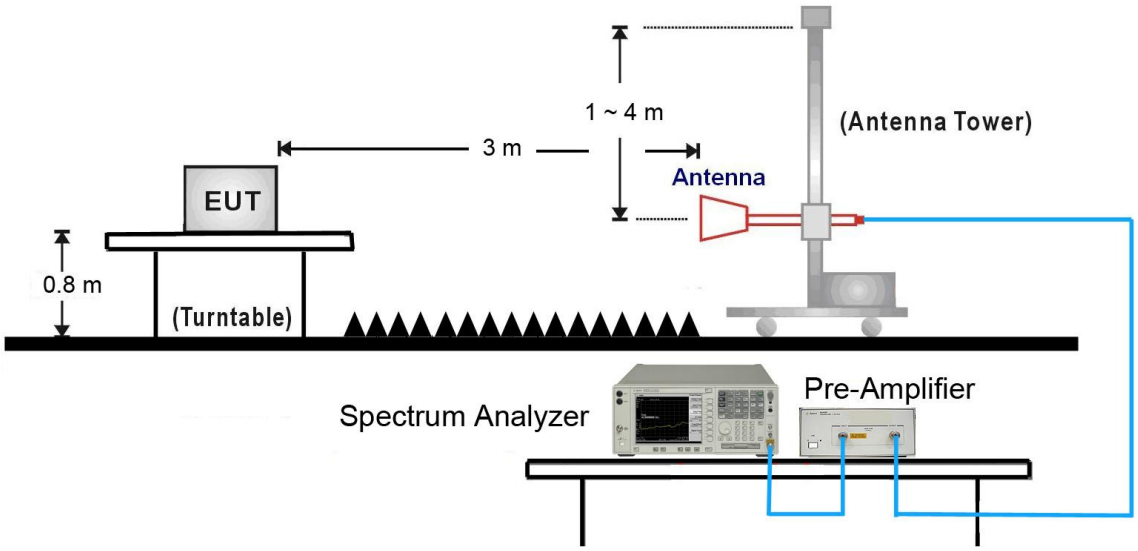
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 10GHz Test Setup:



7.3.3. Test Result

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Remark:	**Fundamental** Radiated Emission	Test Engineer:	Lewis Huang

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
902.4	65.06	24.38	89.44	114	-24.56	PK	Horizontal
	59.20	24.38	83.58	114	-30.42	PK	Vertical
915.0	63.62	24.57	88.00	114	-26.00	PK	Horizontal
	57.41	24.57	81.79	114	-32.21	PK	Vertical
927.6	62.28	24.73	86.66	114	-27.34	PK	Horizontal
	55.71	24.73	80.09	114	-33.91	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: All readings below 1GHz are peak, above 1GHz are performed with peak and/or average measurements as necessary.

Note 3: Average measurement was not performed when the peak level lower than average limit.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	902.4MHz	Test Engineer:	Lewis Huang
Remark:	**Harmonic** Radiated Emission		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
1804.8	39.3	-6.9	32.4	74.0	-41.6	PK	Horizontal
2707.2	38.0	-2.7	35.3	74.0	-38.7	PK	Horizontal
3609.6	35.1	-0.7	34.4	74.0	-39.6	PK	Horizontal
4512.0	35.4	1.7	37.1	74.0	-36.9	PK	Horizontal
1804.8	39.7	-6.9	32.8	74.0	-41.2	PK	Vertical
2707.2	37.8	-2.7	35.1	74.0	-38.9	PK	Vertical
3609.6	36.4	-0.7	35.7	74.0	-38.3	PK	Vertical
4512.0	35.4	1.7	37.1	74.0	-36.9	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	915MHz	Test Engineer:	Lewis Huang
Remark:	**Harmonic** Radiated Emission		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
1830.0	39.6	-6.8	32.8	74.0	-41.2	PK	Horizontal
2745.0	37.6	-2.5	35.1	74.0	-38.9	PK	Horizontal
3660.0	35.7	-0.6	35.1	74.0	-38.9	PK	Horizontal
4575.0	34.8	1.9	36.7	74.0	-37.3	PK	Horizontal
1830.0	40.2	-6.8	33.4	74.0	-40.6	PK	Vertical
2745.0	38.0	-2.5	35.5	74.0	-38.5	PK	Vertical
3660.0	35.4	-0.6	34.8	74.0	-39.2	PK	Vertical
4575.0	34.4	1.9	36.3	74.0	-37.7	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	927.6MHz	Test Engineer:	Lewis Huang
Remark:	**Harmonic** Radiated Emission		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
1855.2	38.3	-6.6	31.7	74.0	-42.3	PK	Horizontal
2782.8	37.8	-2.4	35.4	74.0	-38.6	PK	Horizontal
3710.4	35.5	-0.5	35.0	74.0	-39.0	PK	Horizontal
4638.0	34.6	2.1	36.7	74.0	-37.3	PK	Horizontal
1855.2	38.5	-6.6	31.9	74.0	-42.1	PK	Vertical
2782.5	37.6	-2.4	35.2	74.0	-38.8	PK	Vertical
3710.4	36.3	-0.5	35.8	74.0	-38.2	PK	Vertical
4638.0	34.9	2.1	37.0	74.0	-37.0	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	902.4MHz	Test Engineer:	Lewis Huang
Remark:	**The worst case of General Radiated Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
494.6	3.2	18.4	21.6	46.0	-24.4	QP	Horizontal
761.4	3.8	22.9	26.7	46.0	-19.3	QP	Horizontal
391.8	3.4	16.3	19.7	46.0	-26.3	QP	Vertical
616.9	2.8	20.8	23.6	46.0	-22.4	QP	Vertical
1374.0	43.8	-7.9	35.9	74.0	-38.1	PK	Horizontal
3720.0	37.6	-0.5	37.1	74.0	-36.9	PK	Horizontal
2232.5	41.2	-3.5	37.7	74.0	-36.3	PK	Vertical
4017.5	36.9	0.4	37.3	74.0	-36.7	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz), therefore no data appear in the report.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	915MHz	Test Engineer:	Lewis Huang
Remark:	**The worst case of General Radiated Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
367.1	3.0	15.8	18.8	46.0	-27.2	QP	Horizontal
528.1	3.1	19.0	22.1	46.0	-23.9	QP	Horizontal
328.3	2.7	15.1	17.8	46.0	-28.2	QP	Vertical
495.1	2.9	18.4	21.3	46.0	-24.7	QP	Vertical
2258.0	39.5	-3.4	36.1	74.0	-37.9	PK	Horizontal
3669.0	37.7	-0.6	37.1	74.0	-36.9	PK	Horizontal
2232.5	38.9	-3.5	35.4	74.0	-38.6	PK	Vertical
3949.5	36.3	0.3	36.6	74.0	-37.4	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz), therefore no data appear in the report.

Test Mode:	X52 Band 0.25mW	Test Site:	AC1
Frequency	927.6MHz	Test Engineer:	Lewis Huang
Remark:	**The worst case of General Radiated Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
408.3	2.7	16.7	19.4	46.0	-26.6	QP	Horizontal
642.1	2.3	21.3	23.6	46.0	-22.4	QP	Horizontal
368.0	4.6	15.8	20.4	46.0	-25.6	QP	Vertical
739.6	3.1	22.6	25.7	46.0	-20.3	QP	Vertical
2258.0	40.0	-3.4	36.6	74.0	-37.4	PK	Horizontal
4238.5	37.6	0.9	38.5	74.0	-35.5	PK	Horizontal
2266.5	39.0	-3.4	35.6	74.0	-38.4	PK	Vertical
3839.0	36.4	0.0	36.4	74.0	-37.6	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

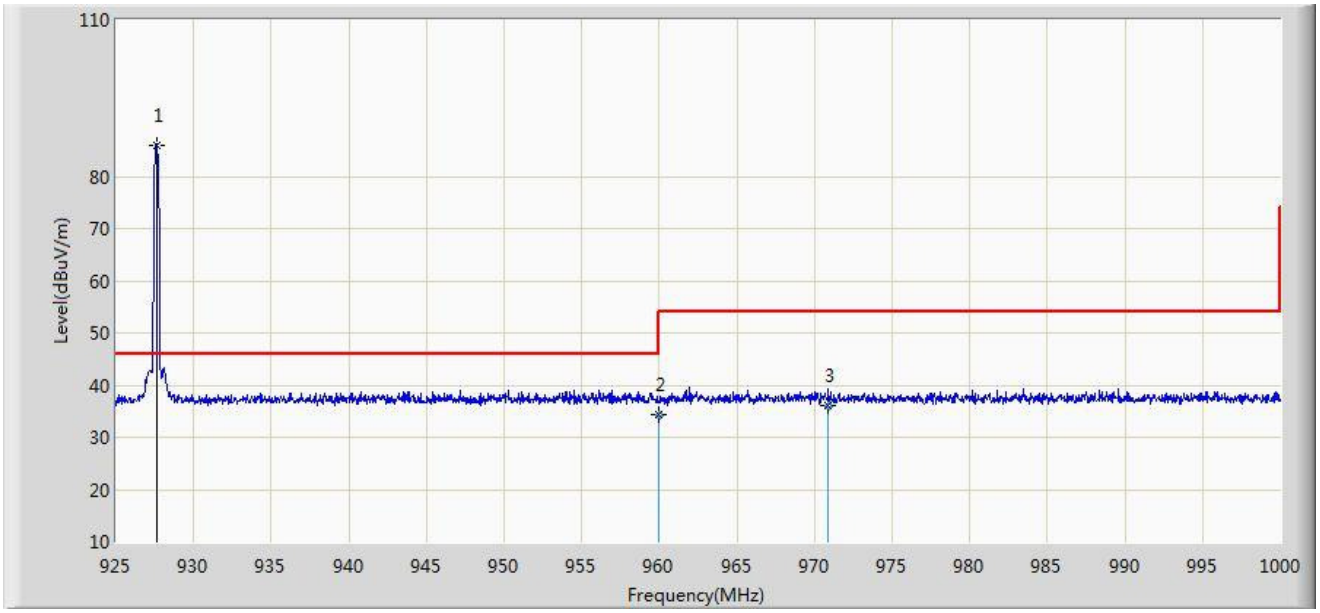
Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz), therefore no data appear in the report.

7.4. Radiated Restricted Band Edge Measurement

7.4.1. Test Result

Site: AC1	Time: 2016/08/22 - 20:07
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: Wireless Gooseneck Transmitter	Power: By Battery
Test Mode: Transmit by X52 Band at Channel 927.6MHz 0.25mW	

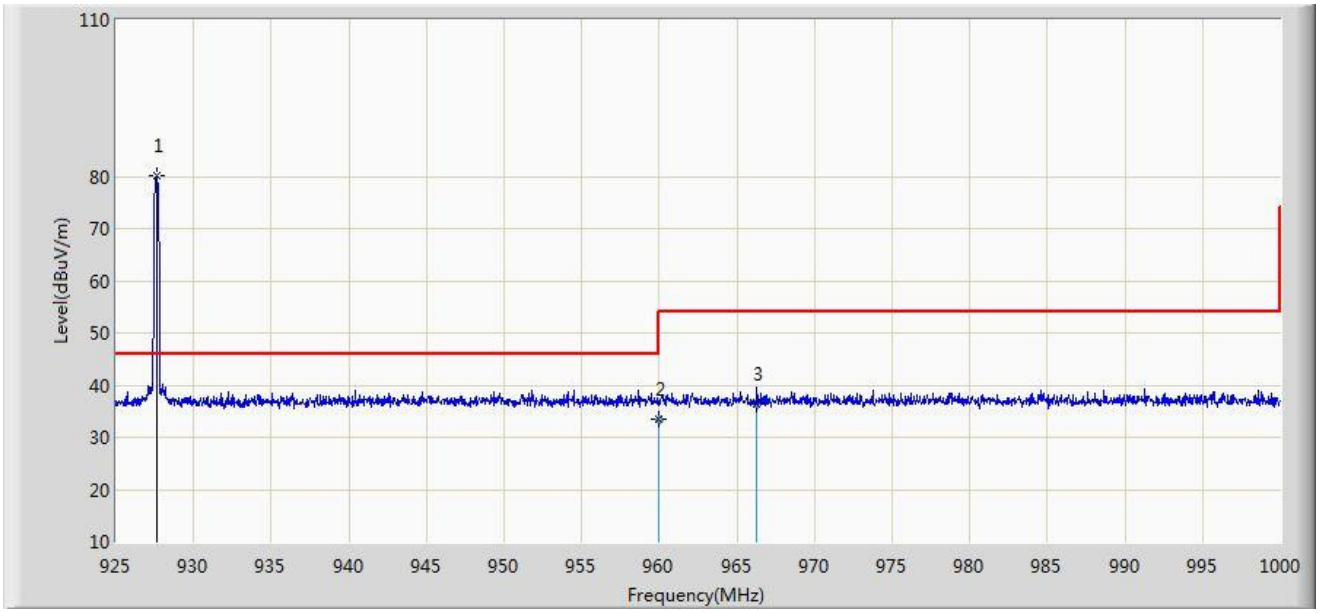


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	927.625	86.084	61.350	N/A	N/A	24.734	PK
2			960.000	34.226	9.280	-11.774	46.000	24.946	QP
3			970.862	36.215	11.210	-17.785	54.000	25.004	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2016/08/22 - 20:09
Limit: FCC_Part15.209_RE(3m)	Engineer: Lewis Huang
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: Wireless Gooseneck Transmitter	Power: By Battery
Test Mode: Transmit by X52 Band at Channel 927.6MHz 0.25mW	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	927.625	80.135	55.401	N/A	N/A	24.734	PK
2			960.000	33.526	8.580	-12.474	46.000	24.946	QP
3			966.287	36.277	11.290	-17.723	54.000	24.988	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.5. 20dB Spectrum Bandwidth Measurement

7.5.1. Test Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission in the specific band (902 ~ 928 MHz).

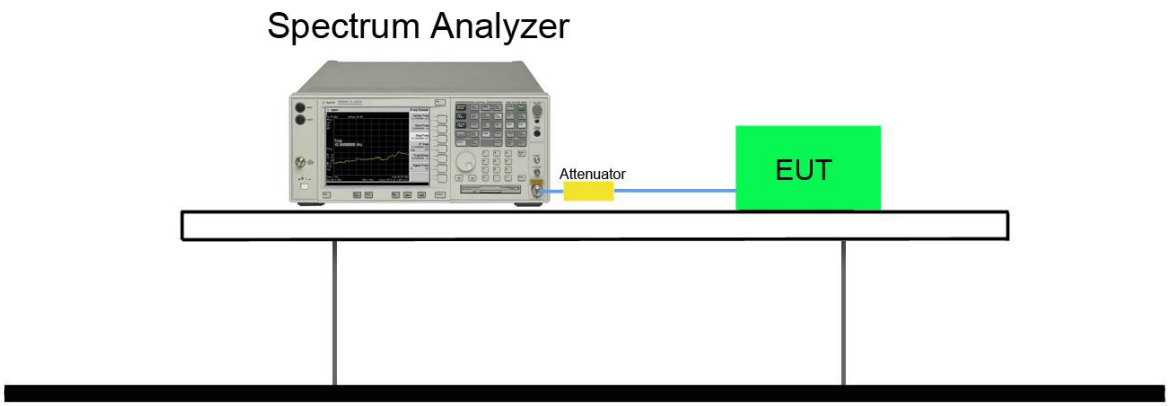
7.5.2. Test Procedure used

ANSI C63.10 Clause 6.9.2

7.5.3. Test Setting

1. Set the spectrum span range to overlap the nominal center frequency
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize and marker the highest level.
8. Determine the display level (the highest level - 20dB) and place two markers, one at the lowest frequency and the other at the highest frequency.

7.5.4. Test Setup

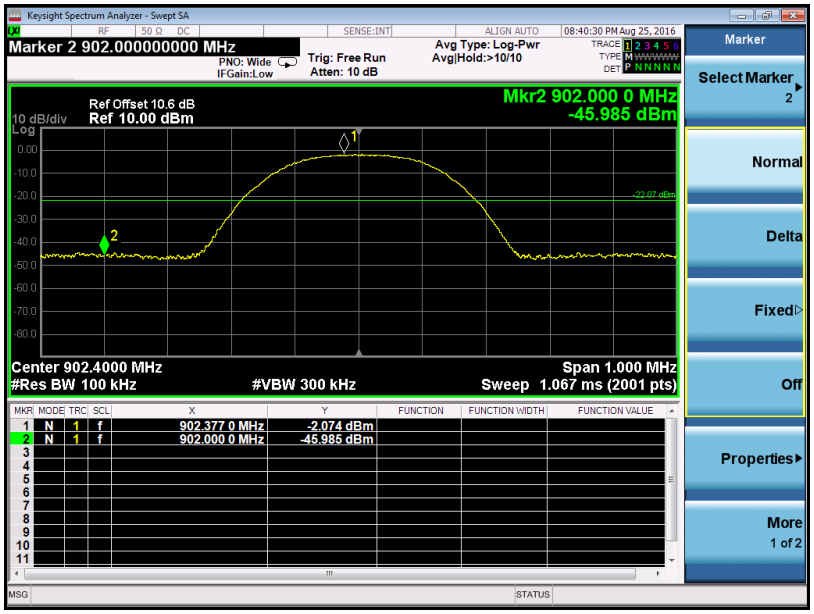


7.5.5. Test Result

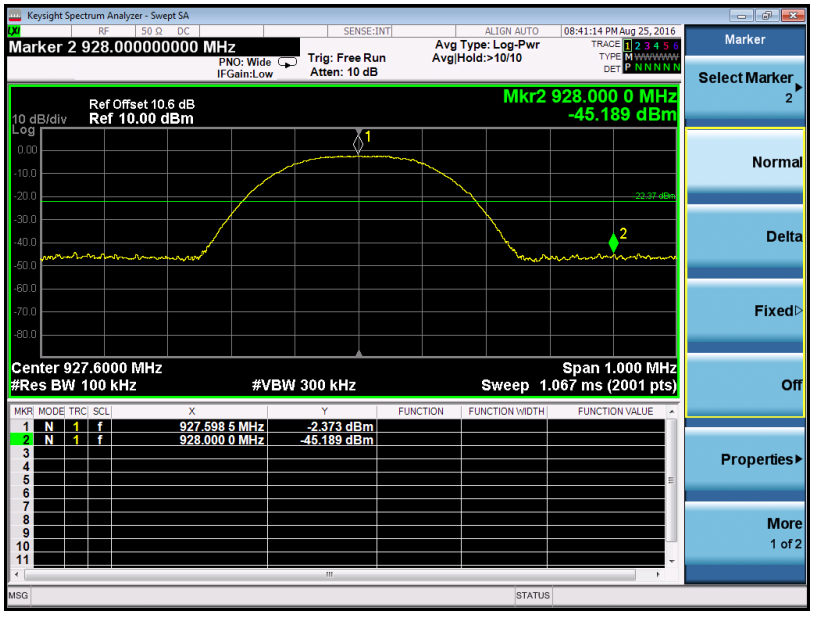
Power Level (mW)	Frequency (MHz)	Frequency Range F_L > 902MHz	Frequency Range F_H < 928MHz	Result
0.25	902.4	902.377	---	Pass
	927.6	---	927.599	Pass

X52 Band 0.25mW - 20dB Spectrum Bandwidth

902.4 MHz



927.6 MHz



7.6. 99% Bandwidth Measurement

7.6.1. Test Limit

N/A

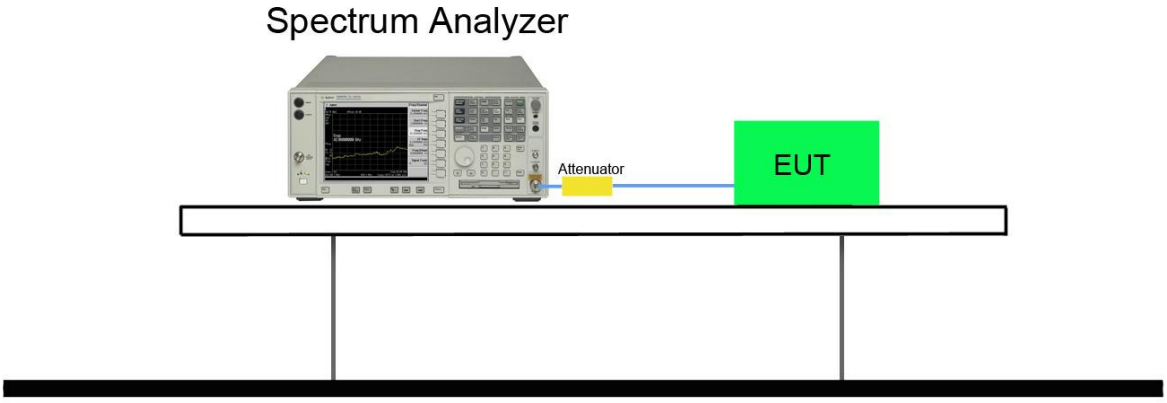
7.6.2. Test Procedure used

ANSI C63.10 Section 6.9

7.6.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 99% bandwidth measurement. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% to 5% of the OBW.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.

7.6.4. Test Setup

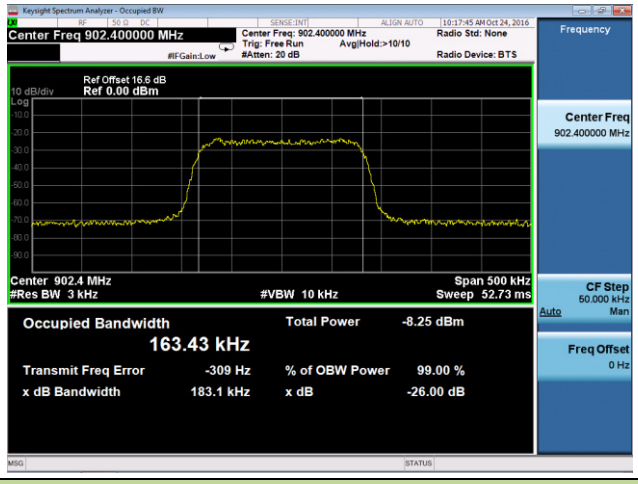


7.6.5. Test Result

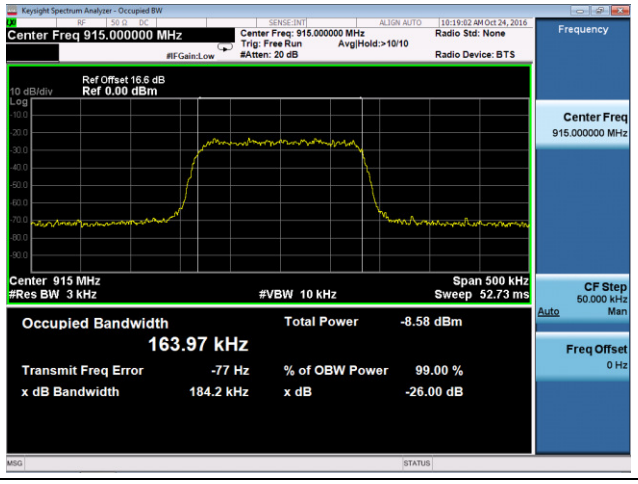
Power Level (mW)	Frequency (MHz)	99% Bandwidth (kHz)
0.25	902.4	163.43
0.25	915.0	163.97
0.25	927.6	163.33

99% Occupied Bandwidth

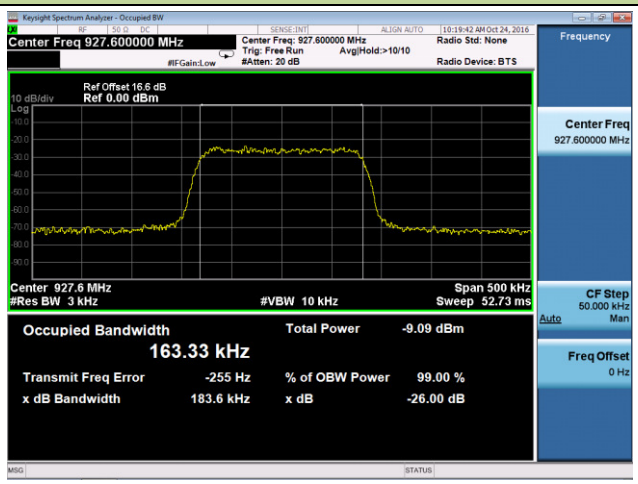
902.4 MHz



915.0 MHz



927.6 MHz



8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Wireless Gooseneck**

Transmitter FCC ID: DD4ULXD8X52 is in compliance with Part 15C of the FCC Rules.

The End