



# TEST REPORT

## FCC ID: 2ACFQ2500TR

Product Name	: Wireless Barcode Scanner
Model Name	: <b>Nuscan 2500TR</b> , Nuscan 7000xx, Nuscan 7100CU, Nuscan 7200TU, Nuscan 1200U, Nuscan 2100U, Nuscan 7500xx, Nuscan 7600xx, Nuscan 7700xx, Nuscan 7800xx, Nuscan 7900xx, Nuscan 6000xx, Nuscan 6100xx, Nuscan 6200xx, Nuscan 6300xx, Nuscan 6400xx, Nuscan 6500xx ,Nuscan 4100xx ,Nuscan 5200xx, Nuscan 2400U, Nuscan 8000xx, Nuscan 8100xx, Nuscan 8200xx, Nuscan 8300xx, Nuscan 8400xx, Nuscan 8500xx, Nuscan 2500xx, Nuscan 3500xx, Nuscan 1500xx
Brand Name	: Adesso, Kodak, Gyration
Report No.	: PTC19070300103E-FC01

**Prepared for**

ADESSO INC.

160 Commerce Way Walnut, CA 91789, U.S.A.

**Prepared by**

DongGuan Precise testing &Certification Corp. Ltd

Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China



## 1 TEST RESULT CERTIFICATION

Applicant's name : ADESSO INC.  
Address : 160 Commerce Way Walnut, CA 91789, U.S.A.  
Manufacture's name : ADESSO ELECTRONICS INC.  
Address : No.5, ChengDa East St., Xiagang Community, Changan, DongGuan, China  
Product name : Wireless Barcode Scanner  
Model name : Nuscans 2500TR, Nuscan 7000xx, Nuscan 7100CU, Nuscan 7200TU, Nuscan 1200U, Nuscan 2100U, Nuscan 7500xx, Nuscan 7600xx, Nuscan 7700xx, Nuscan 7800xx, Nuscan 7900xx, Nuscan 6000xx, Nuscan 6100xx, Nuscan 6200xx, Nuscan 6300xx, Nuscan 6400xx, Nuscan 6500xx, Nuscan 4100xx, Nuscan 5200xx, Nuscan 2400U, Nuscan 8000xx, Nuscan 8100xx, Nuscan 8200xx, Nuscan 8300xx, Nuscan 8400xx, Nuscan 8500xx, Nuscan 2500xx, Nuscan 3500xx, Nuscan 1500xx  
Standards : FCC CFR47 Part 15 Section 15.249  
Test procedure : ANSI C63.10: 2013  
Test Date : August 8, 2019 to August 18, 2019  
Date of Issue : August 20, 2019  
Test Result : Pass

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager



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## 2 Test Summary

Test Items	Test Requirement	Result
AC Power Conducted Emission	15.207	N/A (Note 1)
20dB Bandwidth	15.215(c)	PASS
Field Strength of Fundamental Emissions	15.249(a) 15.249(c)	PASS
Radiated Spurious Emissions	15.205(a) 15.209(a)	PASS
Antenna Requirement	15.203	PASS

Note:

1. The EUT only powered by battery, no need to evaluate AC Power Conducted Emission.
2. The EUT is powered by new batteries during the test.



Report No.: PTC19070300103E-FC01

### **3 TEST FACILITY**

DongGuan Precise testing & Certification Corp. Ltd

Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China, Dongguan, 523129

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

Test Lab: Shenzhen BCTC Testing Co., Ltd.

Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

FCC Registered No.: 712850

IC Registration Number: 23583

Test items: Radiated Spurious Emission(18GHz to 25GHz)



## 4 General Information

### 4.1 General Description of E.U.T.

Product Name	:	Wireless Barcode Scanner
Model Name	:	<b>Nuscan 2500TR</b> , Nuscan 7000xx, Nuscan 7100CU, Nuscan 7200TU, Nuscan 1200U, Nuscan 2100U, Nuscan 7500xx, Nuscan 7600xx, Nuscan 7700xx, Nuscan 7800xx, Nuscan 7900xx, Nuscan 6000xx, Nuscan 6100xx, Nuscan 6200xx, Nuscan 6300xx, Nuscan 6400xx, Nuscan 6500xx ,Nuscan 4100xx ,Nuscan 5200xx, Nuscan 2400U, Nuscan 8000xx, Nuscan 8100xx, Nuscan 8200xx, Nuscan 8300xx, Nuscan 8400xx, Nuscan 8500xx, Nuscan 2500xx, Nuscan 3500xx, Nuscan 1500xx (Note: The samples are the same except appearance and model number. So Nuscan 2500TR was selected for full tested.)
Operating frequency	:	2407MHz-2477MHz
Numbers of Channel	:	59
Data Rate	:	1Mbps
Antenna Type	:	Internal Antenna
Antenna Gain	:	4dBi
Type of Modulation	:	GFSK
Power supply	:	DC 5V
Hardware Version	:	V1.0
Software Version	:	V1.0



## 4.2 Test Mode

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

For Radiated: The EUT's antenna was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y axis
Mode B	Y-Z axis
Mode C	X-Z axis

From the above modes, the worst case was found in Mode A, Therefore only the test data of the mode was recorded in this report.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>1</b>	<b>2407</b>	2	2408	<b>3</b>	2409	4	2410
5	2411	6	2412	7	2413	8	2414
9	2418	10	2419	11	2420	12	2421
13	2422	14	2423	15	2424	16	2425
17	2426	18	2427	19	2428	20	2429
21	2430	22	2434	23	2435	24	2436
25	2437	26	2438	27	2439	28	2440
29	2441	30	2442	31	2443	32	2444
<b>33</b>	<b>2445</b>	34	2446	35	2450	36	2451
37	2452	38	2453	39	2454	40	2455
41	2456	42	2457	43	2458	44	2459
45	2460	46	2461	47	2462	48	2466
49	2467	50	2468	51	2469	52	2470
53	2471	54	2472	55	2473	56	2474
57	2475	58	2476	<b>59</b>	<b>2477</b>		





The 3 channels of lower, middle and higher were chosen for test.

<b>Channel</b>	<b>Frequency(MHz)</b>
1	2407
33	2445
59	2477



## 5 Equipment During Test

### 5.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Sep.19, 2019
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Sep.19, 2019
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Sep.19, 2019
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Sep.19, 2019

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.19, 2019
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Sep.19, 2019
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Sep.19, 2019
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep.19, 2019
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep.19, 2019
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Sep.19, 2019
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Sep.19, 2019
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Sep.19, 2019
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Sep.19, 2019



Radiated Emission (Test Frequency from 18GHz-25GHz)

<b>Name of Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial No.</b>	<b>Characteristics</b>	<b>Calibration Due</b>
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-26.5GHz	2019.08.26
Test Receiver	R&S	ESPI	101396	9KHz-7GHz	2019.08.26
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	2019.09.02
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	2019.08.26
RF Cable	R&S	R204	R21X	1GHz-40GHz	2019.08.26



## 5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10 <sup>-6</sup>
Bandwidth	± 1.5 x 10 <sup>-6</sup>
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	



### 5.3 Description of Support Units

Equipment	Model No.	Series No.
N/A	N/A	N/A

## 6 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207
Test Method:	:	ANSI C63.10: 2013
Test Result:	:	PASS
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B

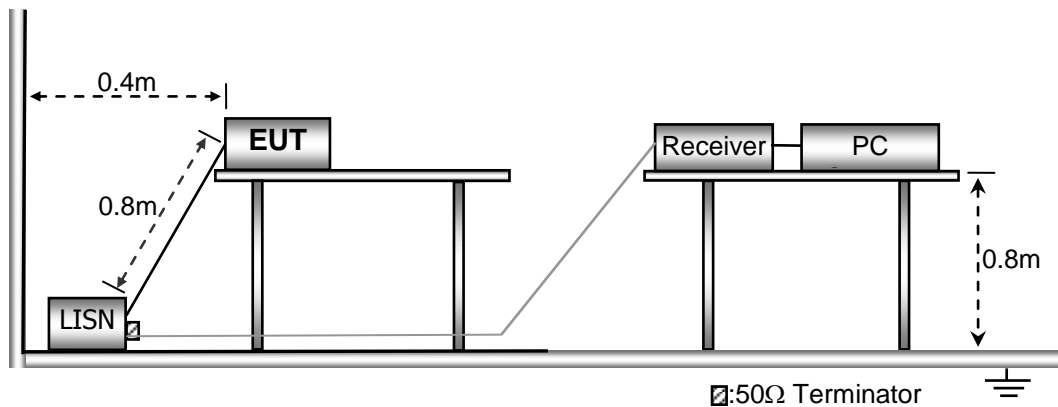
### 6.1 E.U.T. Operation

Operating Environment :

Temperature:	:	25.5 °C
Humidity:	:	51 % RH
Atmospheric Pressure:	:	101.2kPa

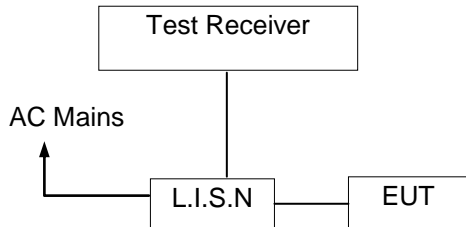
### 6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.





### 6.3 Test SET-UP (Block Diagram of Configuration)



### 6.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

### 6.5 Conducted Emission Limit

#### Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

#### Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 6.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 6.7 Conducted Emission Test Result

N/A.

The EUT only powered by battery, no need to evaluate AC Power Conducted Emission.



## 7 Field Strength of Fundamental Emission and Radiated Spurious Emissions

Test Requirement: : FCC Part C section 15.205 & 15.209 & 15.249  
 Test Method: : ANSI C63.10: 2013  
 Test Result: : PASS  
 Measurement Distance: : 3m  
 Limit: : See the follow table  
 15.209 limit:

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

Note: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

The field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

15.249(a) Limit:

Fundamental Frequency (MHz)	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68



### 7.1 EUT Operation

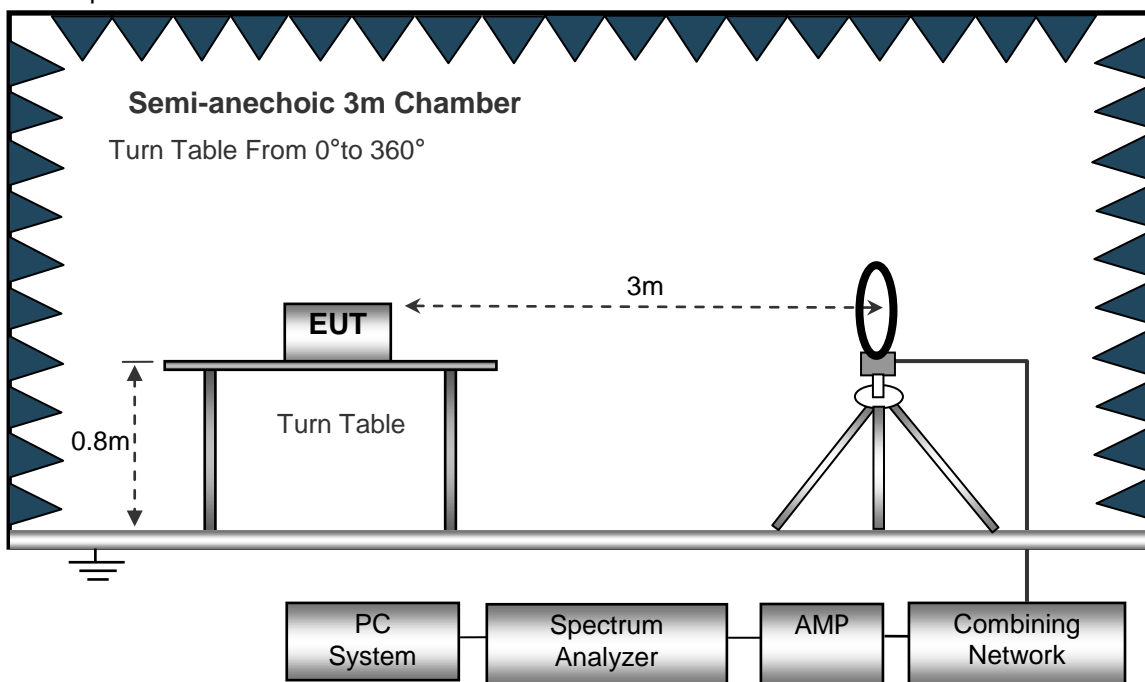
Operating Environment :

- Temperature: : 23.8 °C
- Humidity: : 50 % RH
- Atmospheric Pressure: : 101.12kPa
- Test Voltage : DC 5V

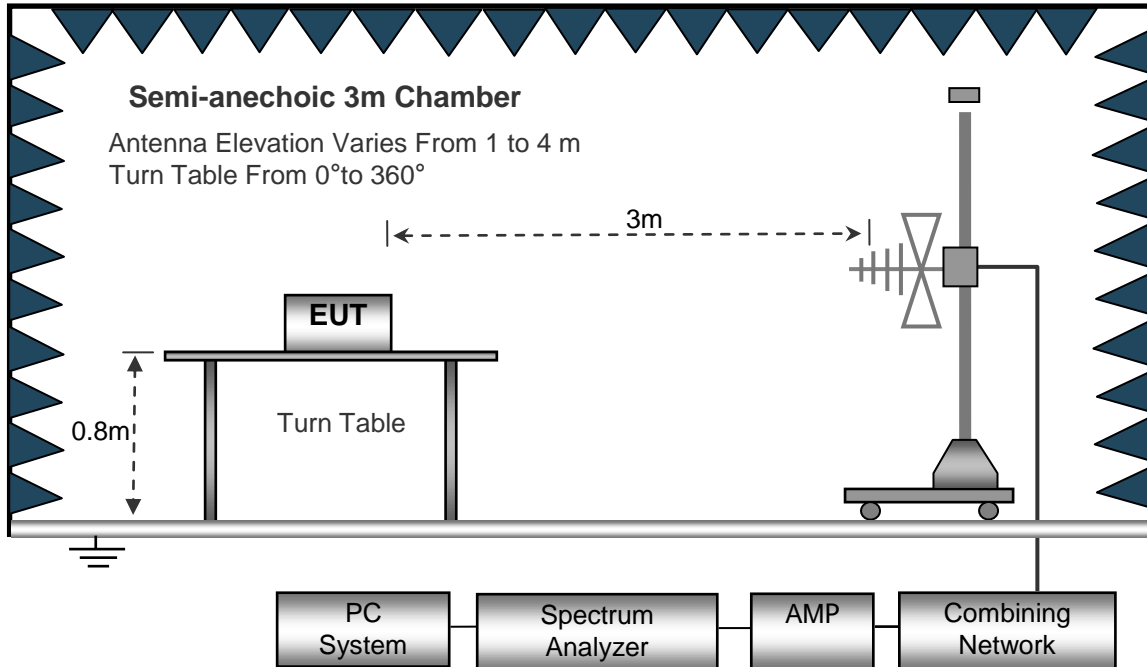
### 7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

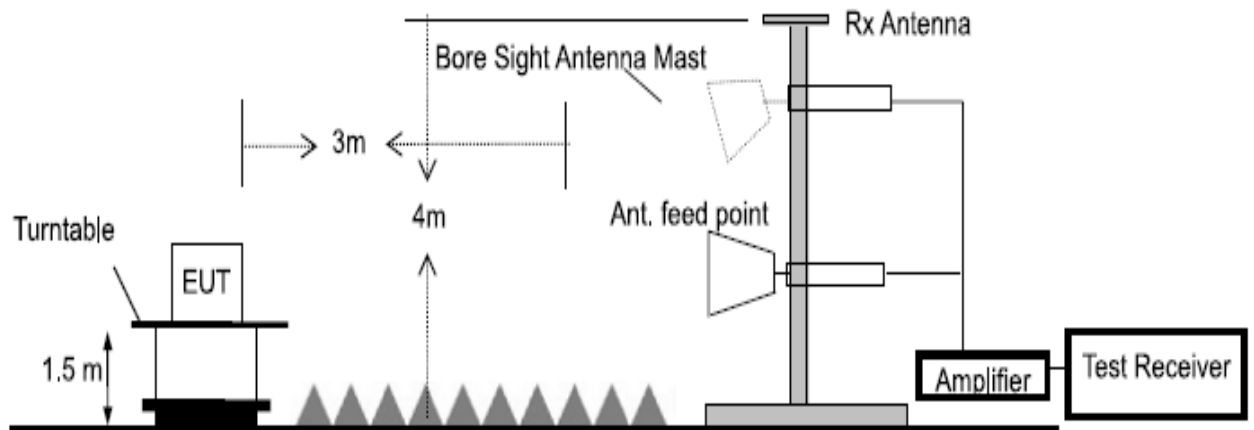
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.





### 7.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 7.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10: 2013.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Test Procedure of measurement (For Above 1GHz): Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.



## 7.5 Summary of Test Results

### Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

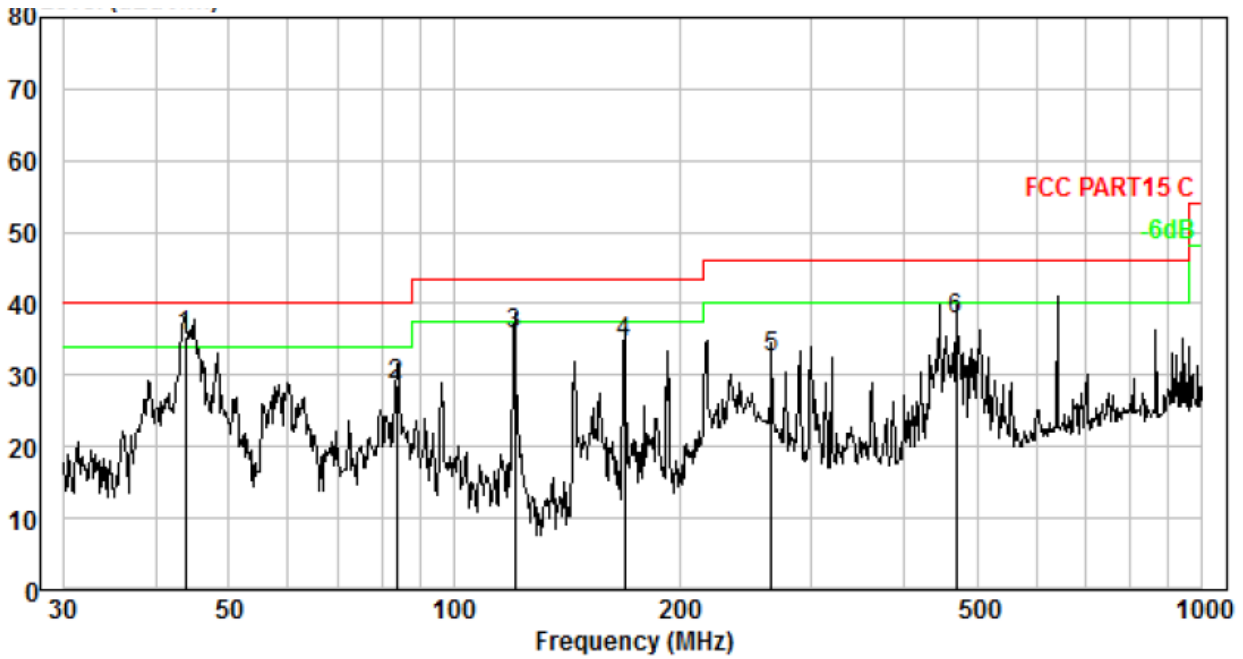
Distance extrapolation factor =  $40\log(\text{Specific distance} / \text{test distance})$  (dB);  
Limit line = Specific limits (dBuV) + distance extrapolation factor.

### Test Frequency: 30MHz ~ 1GHz

Remark: only the worst data were reported.



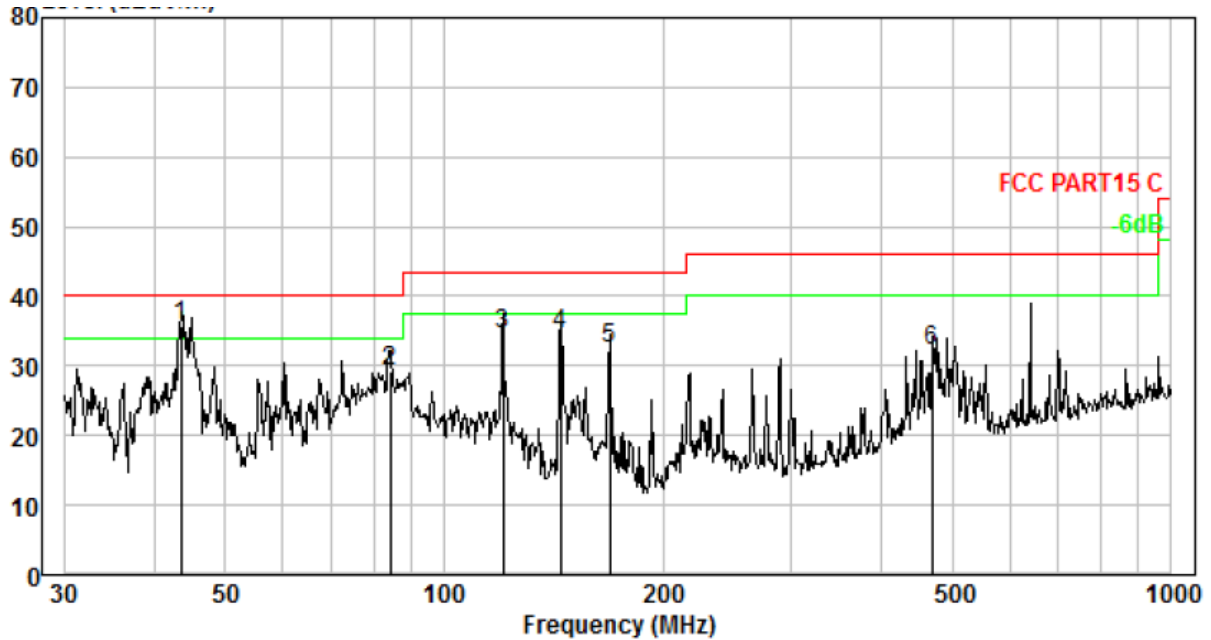
Test plot for Horizontal: 2407MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	43.659	1.85	13.37	50.19	30.10	35.31	40.00	-4.69	QP
2.	83.816	2.97	8.70	47.30	30.33	28.64	40.00	-11.36	QP
3.	120.699	3.60	12.07	50.42	30.45	35.64	43.50	-7.86	QP
4.	169.005	4.17	13.38	47.51	30.57	34.49	43.50	-9.01	QP
5.	265.676	4.95	12.33	45.87	30.73	32.42	46.00	-13.58	QP
6.	468.876	5.93	16.68	46.16	30.93	37.84	46.00	-8.16	QP



Test plot for Vertical: 2407MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	43.506	1.84	13.38	50.72	30.10	35.84	40.00	-4.16	QP
2.	84.405	2.98	8.69	47.92	30.33	29.26	40.00	-10.74	QP
3.	120.699	3.60	12.07	49.29	30.45	34.51	43.50	-8.99	QP
4.	144.842	3.91	13.63	47.40	30.52	34.42	43.50	-9.08	QP
5.	169.005	4.17	13.38	45.62	30.57	32.60	43.50	-10.90	QP
6.	468.876	5.93	16.68	40.55	30.93	32.23	46.00	-13.77	QP



**Test Frequency 1GHz-18GHz:**

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2407(F)	V	92.05	81.69	114	94	-21.95	-12.31
4814	V	57.14	48.25	74	54	-16.86	-5.75
7221	V	55.58	46.57	74	54	-18.42	-7.43
9628	V	53.62	44.18	74	54	-20.38	-9.82
12035	V	52.4	43.62	74	54	-21.6	-10.38
14442	V	50.28	42.08	74	54	-23.72	-11.92
16849	V	48.96	40.58	74	54	-25.04	-13.42
2407(F)	H	93.15	83.26	114	94	-20.85	-10.74
4814	H	56.28	47.92	74	54	-17.72	-6.08
7221	H	54.06	45.15	74	54	-19.94	-8.85
9628	H	52.69	43.26	74	54	-21.31	-10.74
12035	H	50.24	42.05	74	54	-23.76	-11.95
14442	H	45.85	41.25	74	54	-28.15	-12.75
16849	H	40.15	38.49	74	54	-33.85	-15.51

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2445(F)	V	93.48	83.62	114	94	-20.52	-10.38
4890	V	55.82	47.26	74	54	-18.18	-6.74
7335	V	54.15	43.62	74	54	-19.85	-10.38
9780	V	53.27	40.25	74	54	-20.73	-13.75
12225	V	51.09	38.15	74	54	-22.91	-15.85
14670	V	48.69	37.42	74	54	-25.31	-16.58
17115	V	44.58	35.06	74	54	-29.42	-18.94
2445(F)	H	92.14	82.47	114	94	-21.86	-11.53
4890	H	56.92	46.25	74	54	-17.08	-7.75
7335	H	54.08	44.18	74	54	-19.92	-9.82
9780	H	52.15	43.62	74	54	-21.85	-10.38
12225	H	50.29	40.28	74	54	-23.71	-13.72
14670	H	48.27	38.26	74	54	-25.73	-15.74
17115	H	42.69	37.49	74	54	-31.31	-16.51



Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2477(F)	V	91.28	80.47	114	94	-22.72	-13.53
4954	V	56.72	46.26	74	54	-17.28	-7.74
7431	V	54.05	41.27	74	54	-19.95	-12.73
9908	V	53.81	40.08	74	54	-20.19	-13.92
12385	V	52.05	37.26	74	54	-21.95	-16.74
14862	V	50.48	35.04	74	54	-23.52	-18.96
17339	V	48.24	33.28	74	54	-25.76	-20.72
2477(F)	H	90.68	81.57	114	94	-23.32	-12.43
4954	H	55.35	47.82	74	54	-18.65	-6.18
7431	H	54.04	44.16	74	54	-19.96	-9.84
9908	H	52.16	42.06	74	54	-21.84	-11.94
12385	H	50.24	40.68	74	54	-23.76	-13.32
14862	H	48.62	38.72	74	54	-25.38	-15.28
17339	H	43.92	36.29	74	54	-30.08	-17.71

**Test Frequency 18GHz-25GHz**

The measurements were more than 20dB below the limit and not reported.





## 8 20 dB Bandwidth Measurement

Test Method : ANSI C63.10: 2013

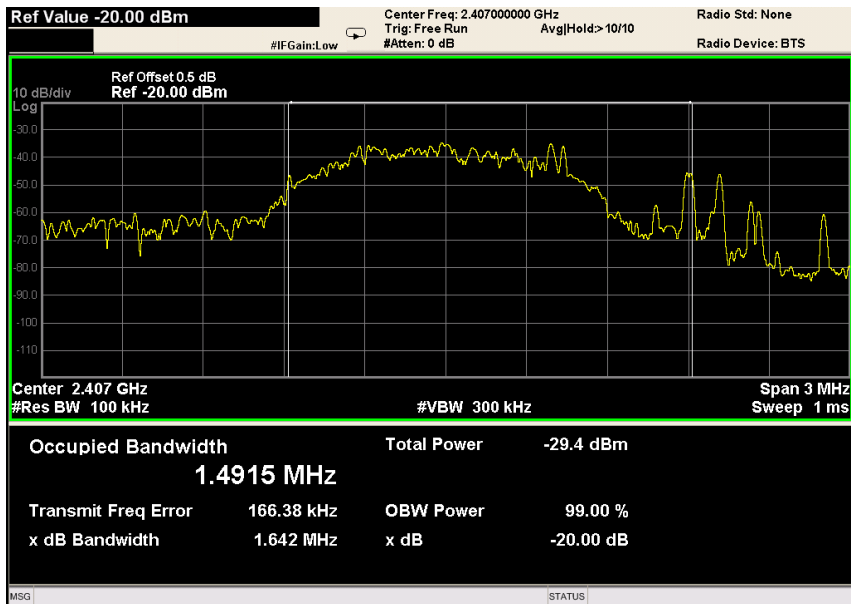
### 8.1 Test Procedure

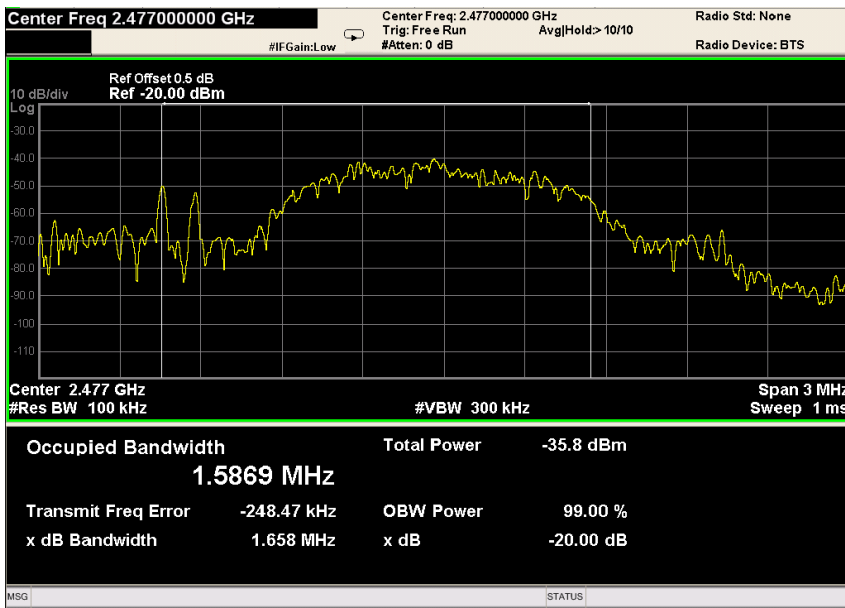
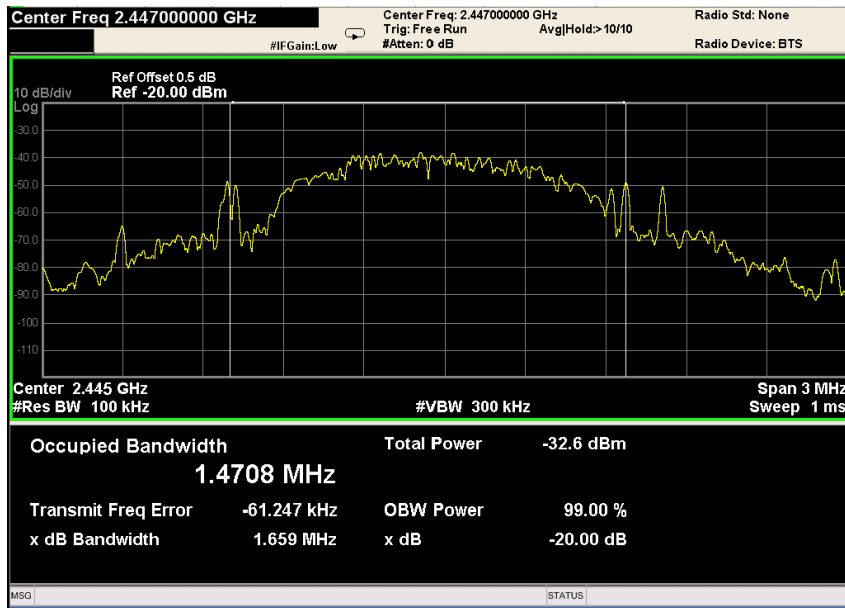
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Set the EUT work on the top, the middle and the bottom operation frequency individually.
3. Set Span= approximately 2 to 5 times the 20dB bandwidth, centered on a hopping channel

The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth(VBW) shall be approximately three times RBW; Sweep = auto; Detector function= peak

### 8.2 Test Result

Channel number	Channel frequency (MHz)	20dB Down BW(KHz)
01	2407	1642
33	2445	1659
59	2477	1658







## **9 Antenna Requirement**

### **9.1 Antenna Requirement**

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. And if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **9.2 Result**

The EUT'S antenna, permanent attached antenna, is internal antenna. The antenna's gain is 4dBi and meets the requirement.

## 10 TEST PHOTOS

Radiated Spurious Emissions  
From 30MHz-1000MHz

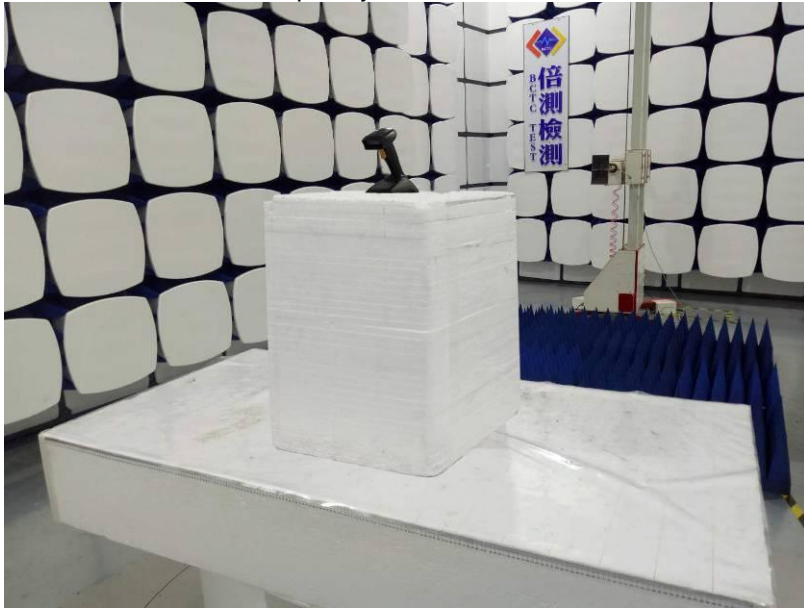


Test frequency from 1GHz-18GHz





Test frequency from 18GHz-25GHz



### 11 EUT PHOTOS

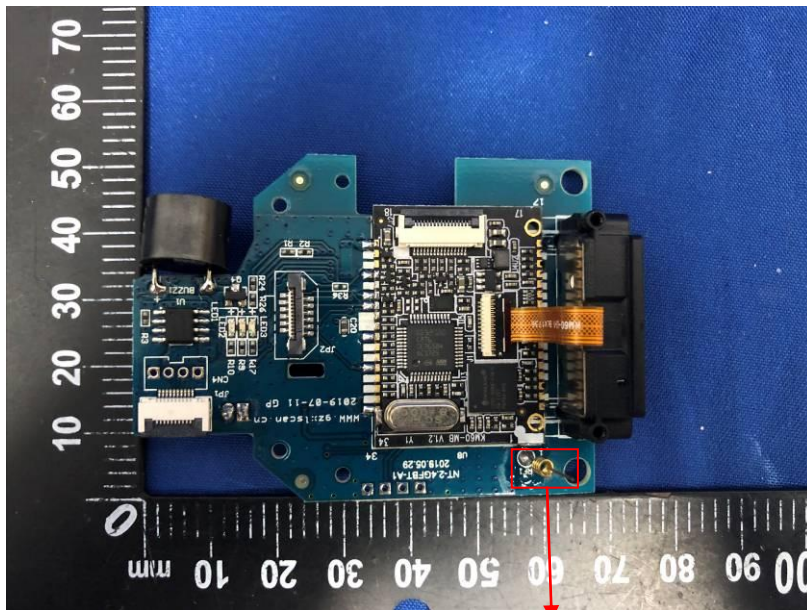




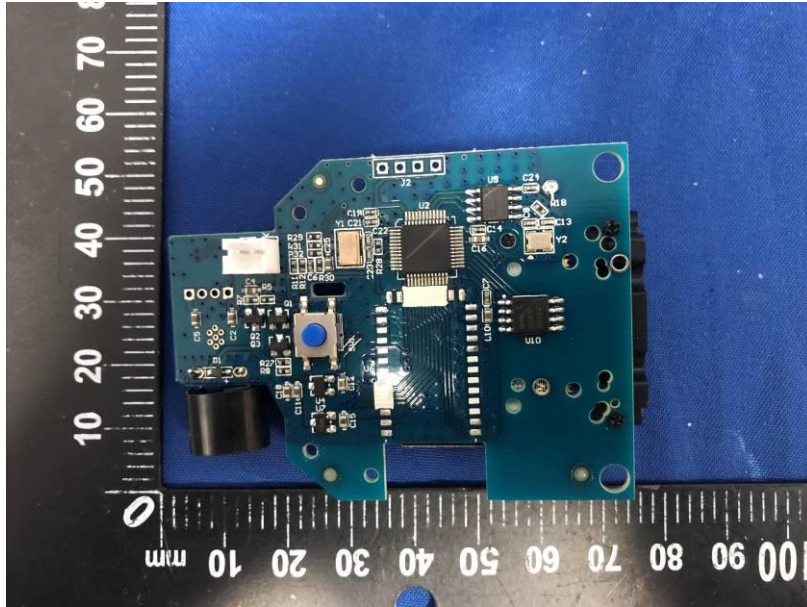


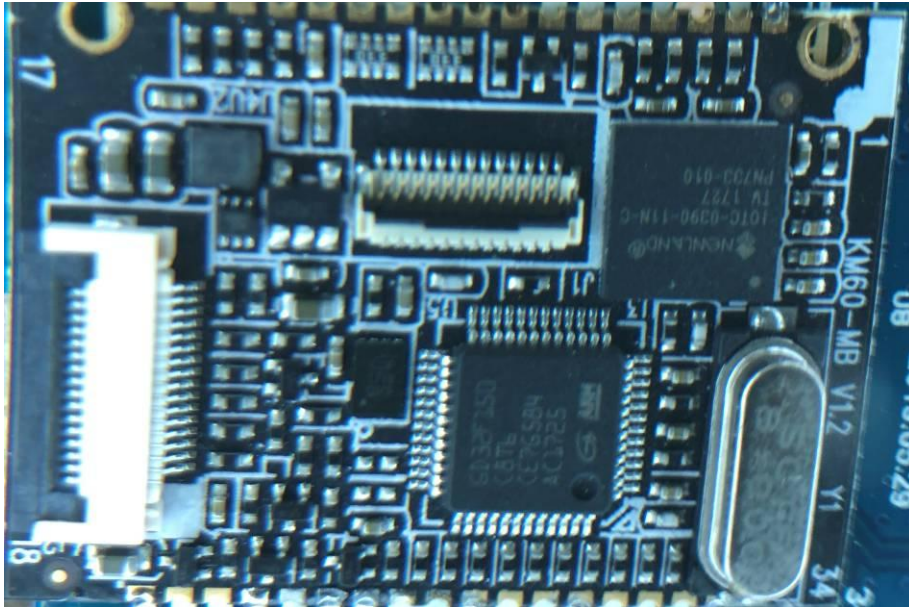






RF Antenna





\*\*\*\*\*THE END REPORT\*\*\*\*\*