FCC TEST REPORT
for
Xiamen Xindeco IOT Technology Ltd.

RFID Device
Model No.: XDUR-840

Prepared for	:	Xiamen Xindeco IOT Technology Ltd.
Address	:	2/F, Xinda Optoelectronics Building, No.610, Lingdou West Road, Siming District, Xiamen, China

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	R011412882E
Date of Test	:	Jan. 05~ 29, 2015
Date of Report	:	Jan. 30, 2015

TABLE OF CONTENTS

Description

Page

Test Report

TEST REPORT

Applicant	:	Xiamen Xindeco IOT Technology Ltd.
Manufacturer	:	Xiamen Xindeco IOT Technology Ltd.
EUT	:	RFID Device
Model No.	:	XDUR-840
Trade Mark	:	XINDECO
Rating	:	100-240V~, 50/60Hz, 1A

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.247 & 15.209

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.
This report applies to above tested sample only and shall not be reproduced in part without
written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Jan. 05~ 29, 2015

Prepared by : (Tested Engineer / Kebo Zhang)

Reviewer : (Project Manager / Amy Ding)

Approved & Authorized Signer : (Manager / Tom Chen)

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	RFID Device
Model Number	:	XDUR-840
Test Power Supply	:	AC 120V/60Hz
Frequency	:	902.75~927.25MHz
No. of Channels	:	50 Channels (500kHz/channel)
Antenna Specification	:	External Antenna: 12dBi for each antenna (Note: The EUT has 4 antennas, but the 4 antennas are work one by one, can't work with each other at the same time. I.e. when the EUT is transmitting, only one antenna is working.)
Modulation	:	PR-ASK
Applicant	:	Xiamen Xindeco IOT Technology Ltd.
Address	:	2/F, Xinda Optoelectronics Building, No.610, Lingdou West Road, Siming District, Xiamen, China
Manufacturer	:	Xiamen Xindeco IOT Technology Ltd.
Address	:	2/F, Xinda Optoelectronics Building, No.610, Lingdou West Road, Siming District, Xiamen, China
Factory	:	Xiamen Xindeco IOT Technology Ltd.
Address	:	2/F, Xinda Optoelectronics Building, No.610, Lingdou West Road, Siming District, Xiamen, China
Date of receipt	:	Jan. 05, 2015
Date of Test	:	Jan. 05~ 29, 2015

1.2 Auxiliary Equipment Used during Test

N/A

1.3 Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503
Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021
Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

IC-Registration No.: 8058A-1
Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, February 22, 2013.

Test Location
All Emissions tests were performed at
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.4 Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

2. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

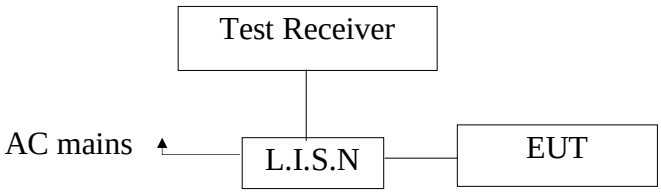
Example:
Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.
When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

3. Conducted Emission Test

3.1 Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



3.2 Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3 Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4 Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

3.4.2. Turn on the power of all equipment.

3.4.3. Let the EUT work in test mode (ON) and measure it.

3.5 Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

3.6 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 22, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 22, 2014	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 22, 2014	1 Year

3.7 Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150KHz to 30 MHz is investigated.

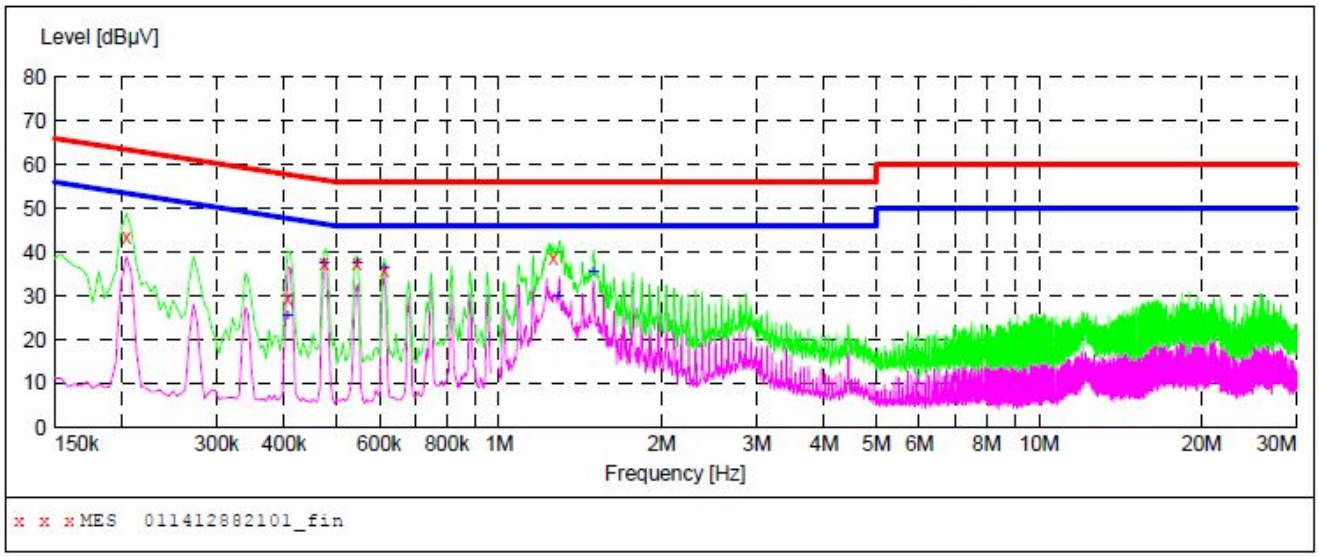
Please refer the following pages.

CONDUCTED EMISSION TEST DATA

Test Site:	1# Shielded Room
Operating Condition:	ON
Test Specification:	AC 120V/60Hz
Comment:	Live Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"

Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "011412882101_fin"

1/7/2015 10:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	43.30	20.1	63	20.1	QP	L1	GND
0.406500	29.40	20.1	58	28.3	QP	L1	GND
0.474000	37.60	20.1	56	18.8	QP	L1	GND
0.546000	37.60	20.1	56	18.4	QP	L1	GND
0.613500	36.00	20.1	56	20.0	QP	L1	GND
1.261000	38.60	20.2	56	17.4	QP	L1	GND

MEASUREMENT RESULT: "011412882101_fin2"

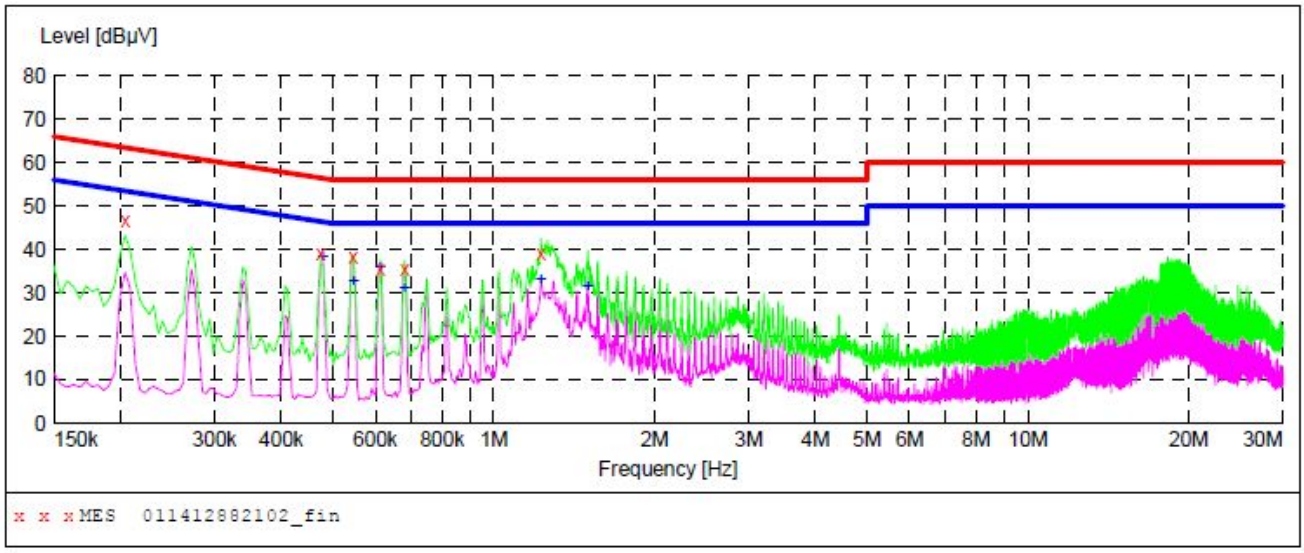
1/7/2015 10:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.406500	25.50	20.1	48	22.2	AV	L1	GND
0.474000	37.60	20.1	46	8.8	AV	L1	GND
0.546000	37.70	20.1	46	8.3	AV	L1	GND
0.613500	36.20	20.1	46	9.8	AV	L1	GND
1.288000	29.80	20.2	46	16.2	AV	L1	GND
1.495000	35.30	20.3	46	10.7	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site:	1# Shielded Room
Operating Condition:	ON
Test Specification:	AC 120V/60Hz
Comment:	Neutral Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"
Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "011412882102_fin"

1/7/2015 10:18AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	46.70	20.1	63	16.7	QP	N	GND
0.474000	38.90	20.1	56	17.5	QP	N	GND
0.546000	38.30	20.1	56	17.7	QP	N	GND
0.613500	35.40	20.1	56	20.6	QP	N	GND
0.681000	35.40	20.1	56	20.6	QP	N	GND
1.225000	38.90	20.2	56	17.1	QP	N	GND

MEASUREMENT RESULT: "011412882102_fin2"

1/7/2015 10:18AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.478500	38.30	20.1	46	8.1	AV	N	GND
0.546000	32.80	20.1	46	13.2	AV	N	GND
0.613500	35.80	20.1	46	10.2	AV	N	GND
0.681000	31.20	20.1	46	14.8	AV	N	GND
1.225000	33.30	20.2	46	12.7	AV	N	GND
1.499500	31.30	20.3	46	14.7	AV	N	GND

4. Radiation Interference

4.1 Requirements (15.247, 15.209):

4.1.1. Test Limits (< 30 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

4.1.2. Test Limits (≥ 30 MHz)

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz	40 dBuV/m
902-928 MHZ		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dBμV/m @3m	54 dBμV/m @3m	ABOVE 960 MHz	54dBuV/m

For range 9KHz~30MHz, The measured value is really too low to be recorded.

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.

4.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber.

For 30MHz to 1000MHz:
Set the spectrum analyzer as:
RBW = 120kHz, VBW =120kHz,
Detector= Quasi-Peak
Trace mode= Max hold.
Sweep- auto couple.

For Above 1GHz (Peak Measurement):
Set the spectrum analyzer as:
RBW = 1MHz, VBW =3MHz,
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

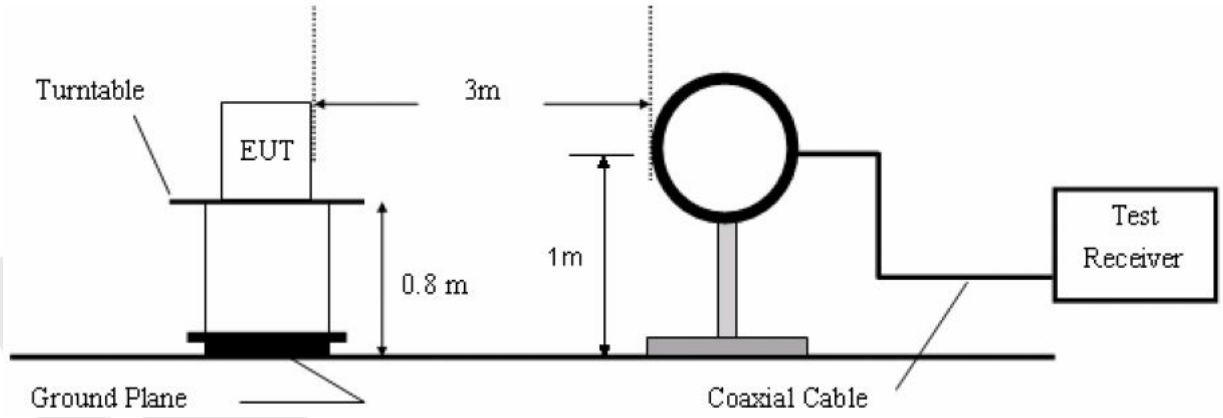
For Above 1GHz (Average Measurement):
Set the spectrum analyzer as:
RBW =1MHz, VBW =10Hz
Detector=Average
Trace mode= Max hold.
Sweep- auto couple.

Test Equipment

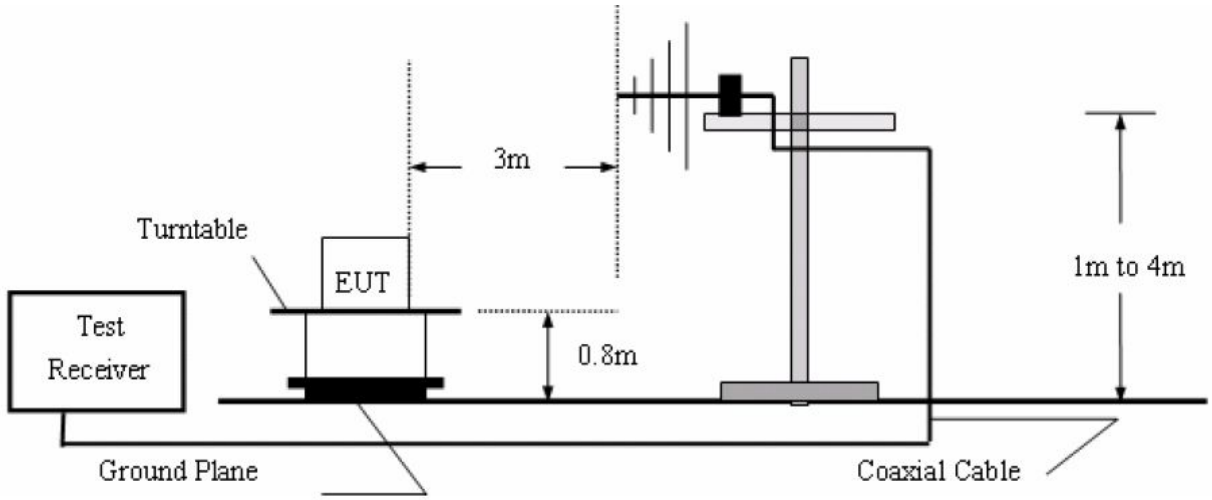
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 08, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 08, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 04, 2014	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

4.3 Test Configuration

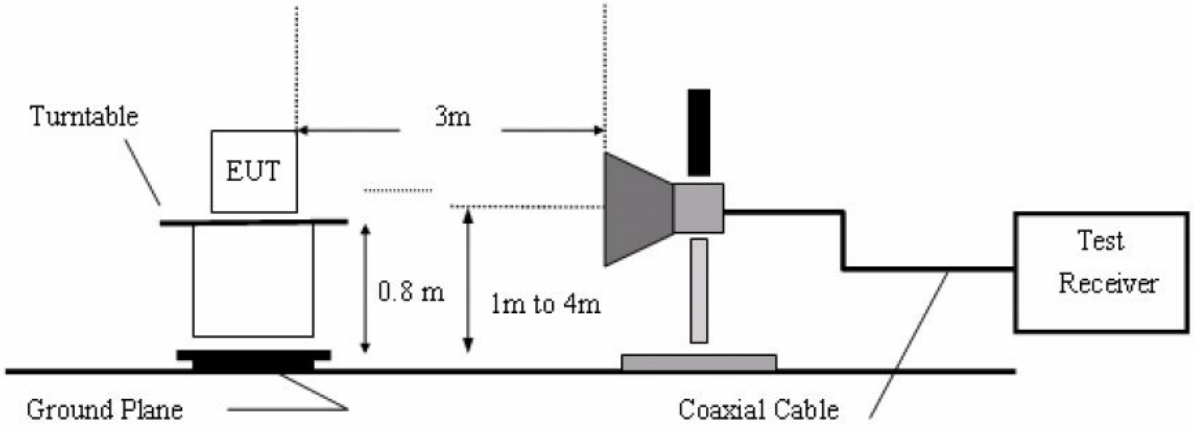
4.3.1. 9k to 30MHz emissions:



4.3.2. 30M to 1G emissions:



4.3.3. 1G to 40G emissions:



4.4 Test Results

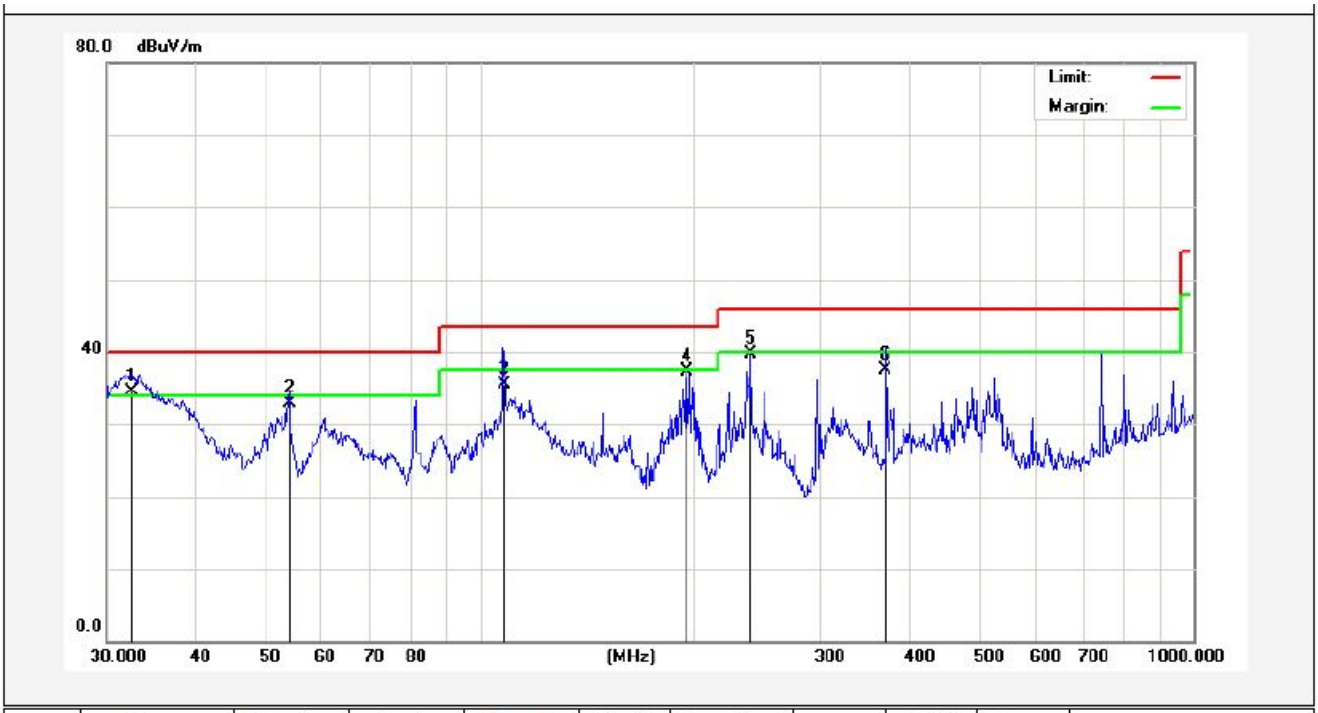
PASS.

Please refer the following pages.

Job No.:	**011412882E**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15C _3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (30~1000MHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**ON**	**Distance:**	**3m**

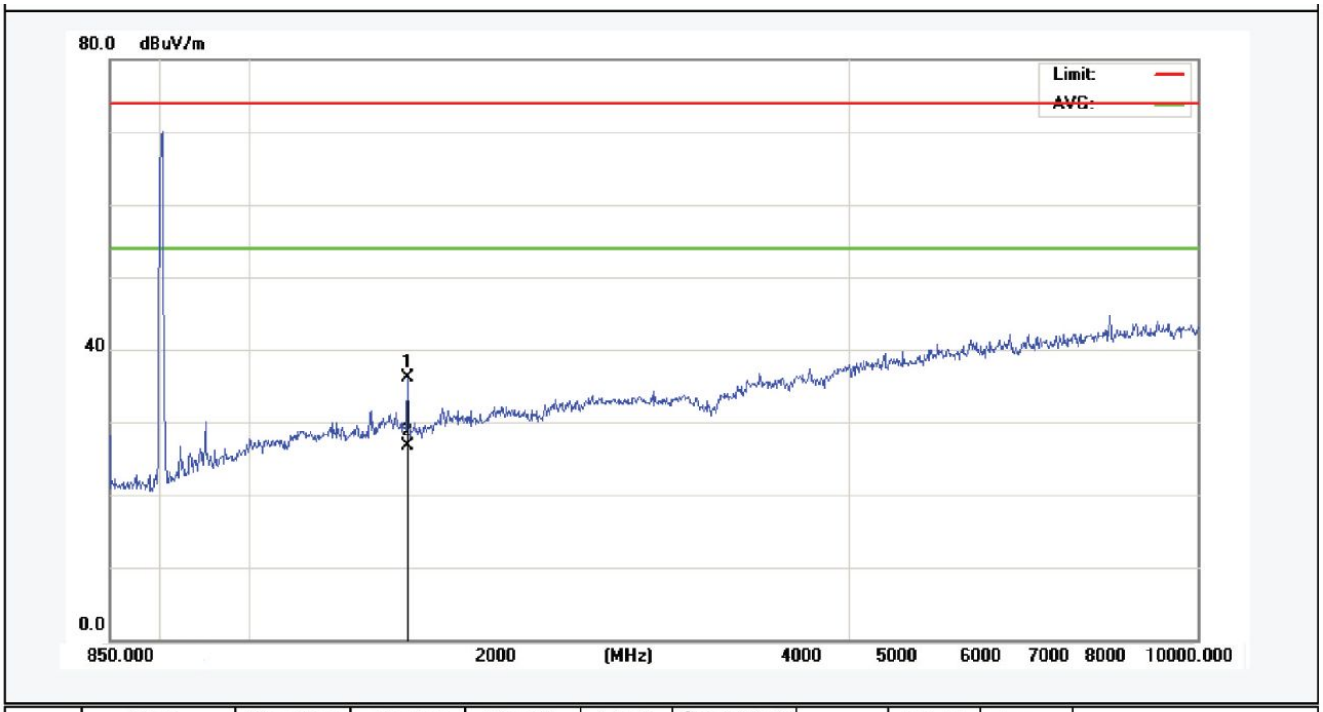
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.0706	46.90	-16.38	30.52	40.00	-9.48	peak			
2	197.2001	47.02	-20.89	26.13	43.50	-17.37	peak			
3	250.3012	51.24	-18.56	32.68	46.00	-13.32	peak			
4	370.7023	48.55	-13.45	35.10	46.00	-10.90	peak			
5	490.7447	47.34	-11.23	36.11	46.00	-9.89	peak			
6	801.7863	46.33	-6.54	39.79	46.00	-6.21	peak			

Job No.:	**011412882E**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15C _3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (30~1000MHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**ON**	**Distance:**	**3m**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.5198	50.11	-15.61	34.50	40.00	-5.50	QP	100	360	
2	54.0711	47.77	-14.87	32.90	40.00	-7.10	QP	100	0	
3	108.2677	51.23	-15.65	35.58	43.50	-7.92	QP	100	360	
4	195.1365	53.22	-15.89	37.33	43.50	-6.17	peak			
5	239.9874	53.86	-14.09	39.77	46.00	-6.23	peak			
6	370.7023	50.04	-12.45	37.59	46.00	-8.41	QP	100	0	

Job No.:	**011412882E**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(902.75 MHz)**	**Distance:**	**3m**

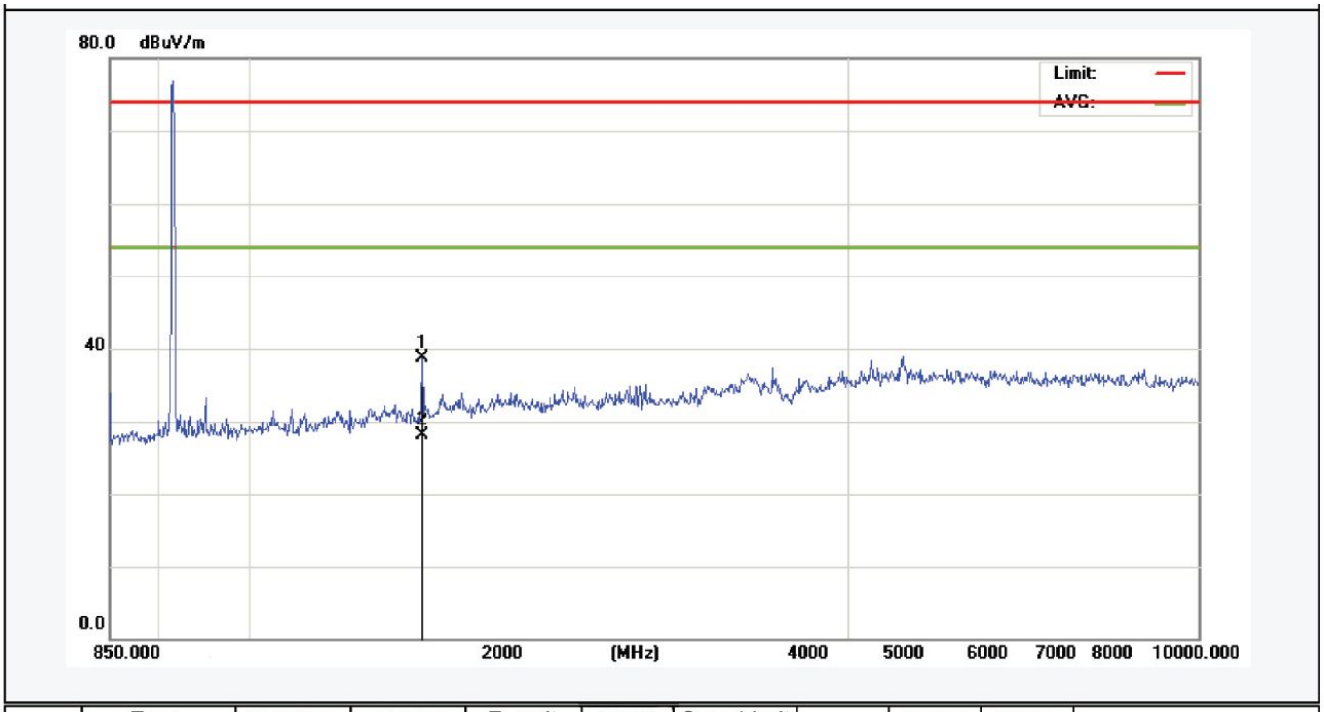


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1805.852	43.21	-7.14	36.07	74.00	-37.93	peak			
2	1805.852	33.88	-7.14	26.74	54.00	-27.26	AVG			

Job No.:	**011412882E**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(902.75 MHz)**	**Distance:**	**3m**

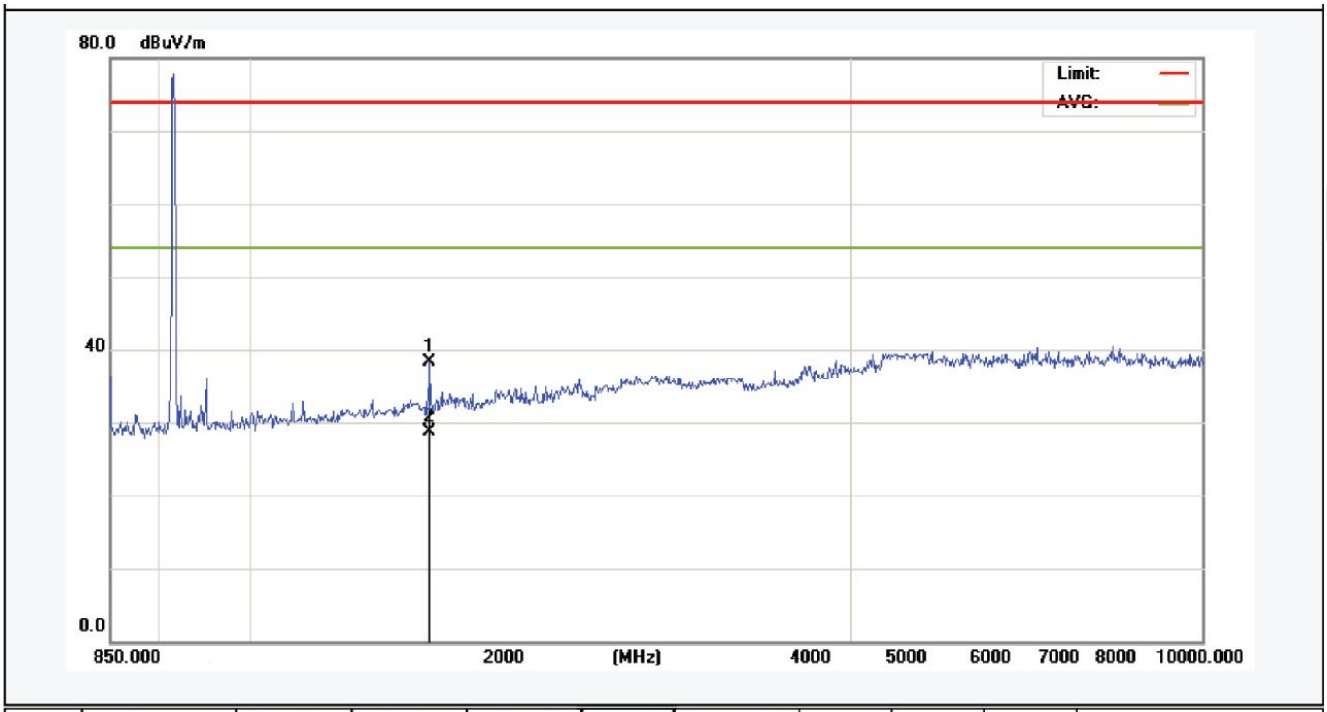
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1805.317	44.51	-7.20	37.31	74.00	-36.69	peak			
2	1805.317	35.05	-7.20	27.85	54.00	-26.15	AVG			

Job No.:	**011412882E**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(915.25 MHz)**	**Distance:**	**3m**



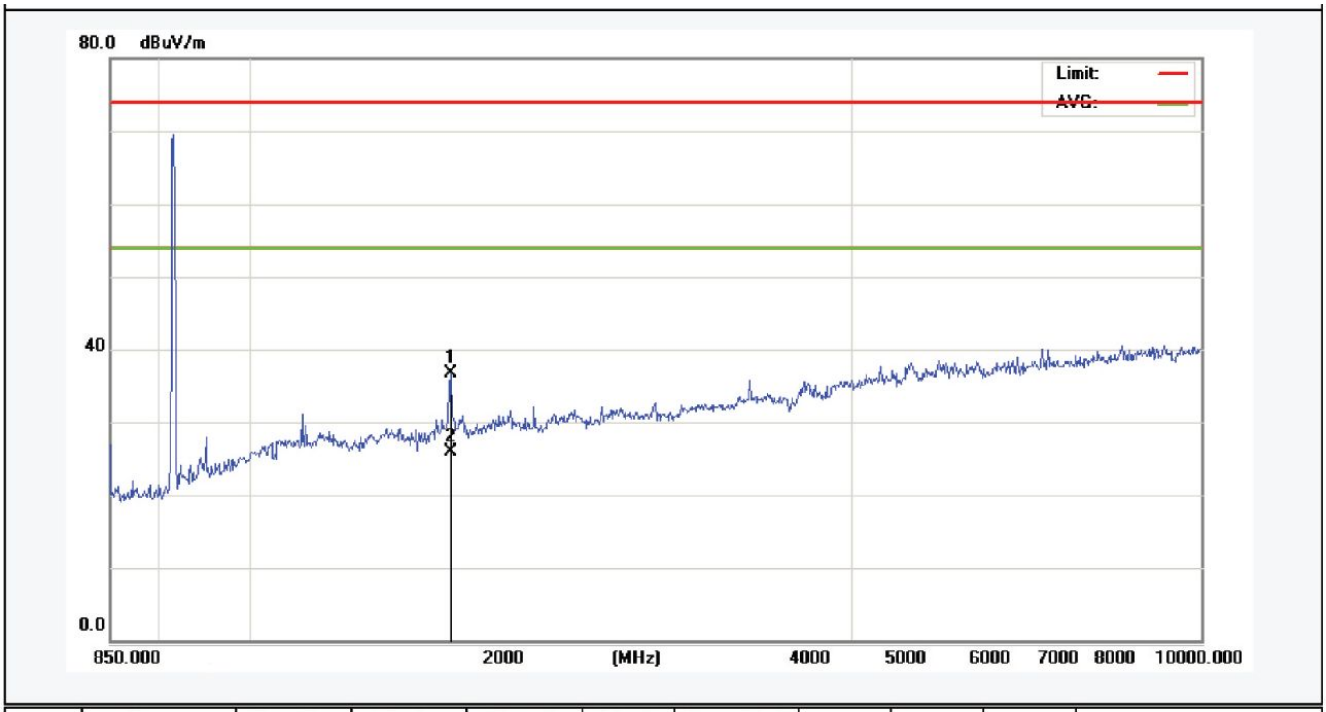
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1829.701	43.82	-5.02	38.80	74.00	-35.20	peak			
2	1829.701	33.20	-5.02	28.18	54.00	-25.82	AVG			

Job No.:	**011412882E**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(915.25 MHz)**	**Distance:**	**3m**



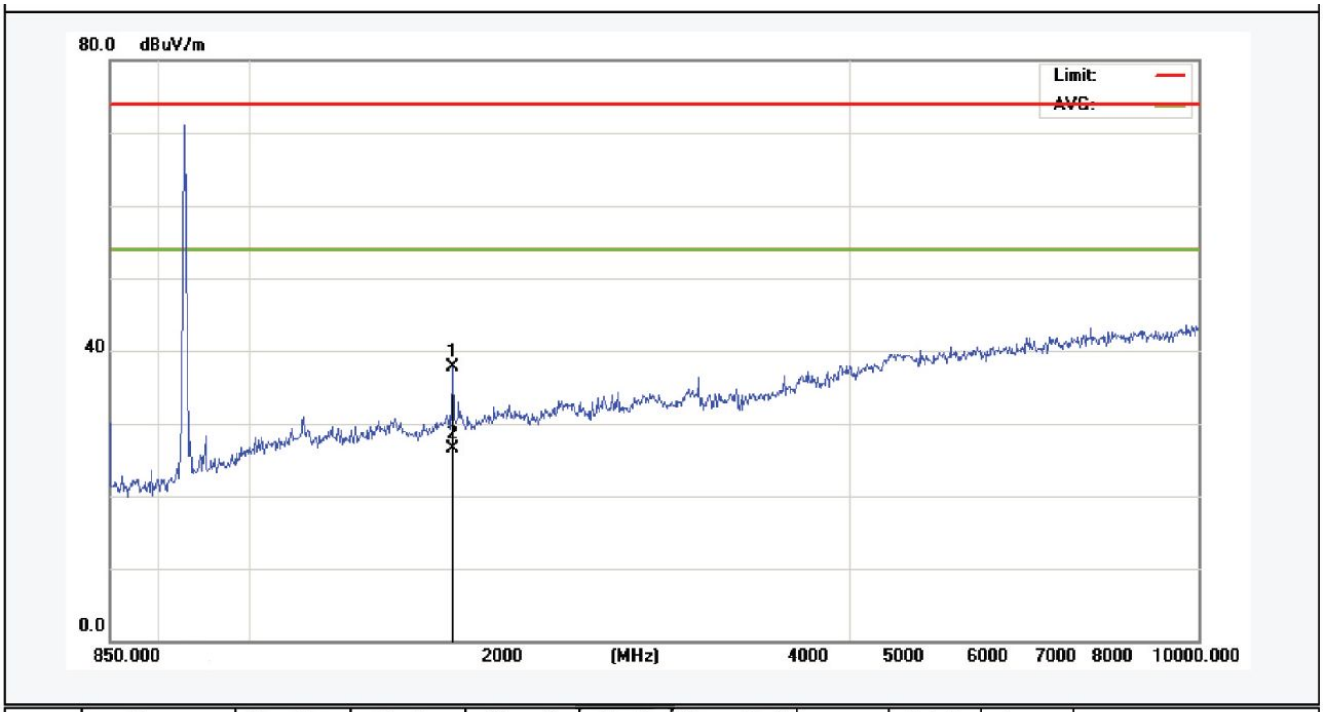
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1829.973	42.01	-3.66	38.35	74.00	-38.65	peak			
2	1829.973	32.30	-3.66	28.64	54.00	-25.36	AVG			

Job No.:	**011412882E**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(927.25 MHz)**	**Distance:**	**3m**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1854.391	44.40	-7.65	36.75	74.00	-37.25	peak			
2	1854.391	33.52	-7.65	25.87	54.00	-28.13	AVG			

Job No.:	**011412882E**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15C_Class B_3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test (Above 1GHz)**	**Temp.(C)/Hum.(%RH):**	**24.3(C)/55%RH**
Test Mode:	**TX(927.25 MHz)**	**Distance:**	**3m**



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1854.577	43.91	-6.30	37.61	74.00	-36.39	peak			
2	1854.577	32.87	-6.30	26.57	54.00	-27.43	AVG			

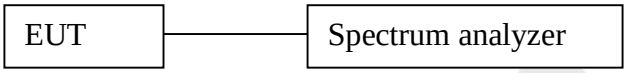
5. CHANNEL SEPARATION TEST

5.1 Measurement Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:

1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

5.2 Test SET-UP



5.3 Test Equipment

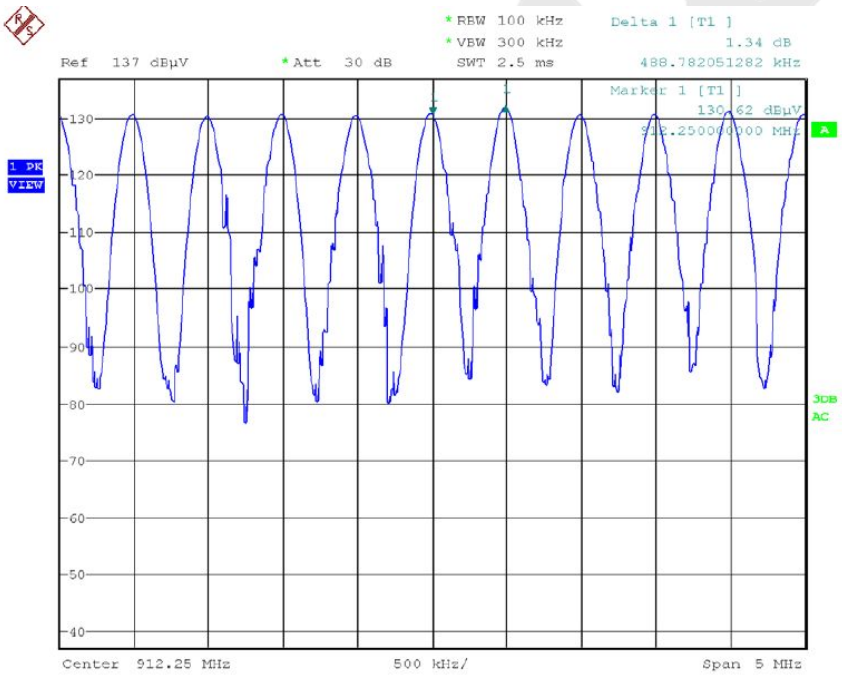
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 08, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 08, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 04, 2014	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

5.4 Test Results

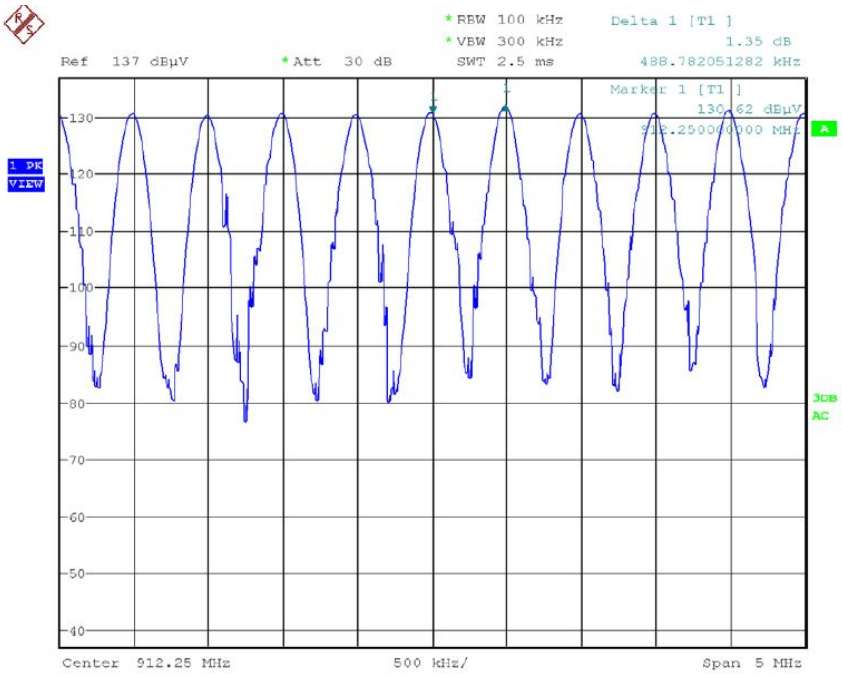
Test Item	:	Frequency Separation	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Antenna	Separation Read Value (kHz)	Limit (Max. 20dB BW) (kHz)	Result
ANT 1	488.7821	82.00	PASS
ANT 2	488.7821	82.00	PASS
ANT 3	488.7821	82.00	PASS
ANT 4	488.7821	82.00	PASS

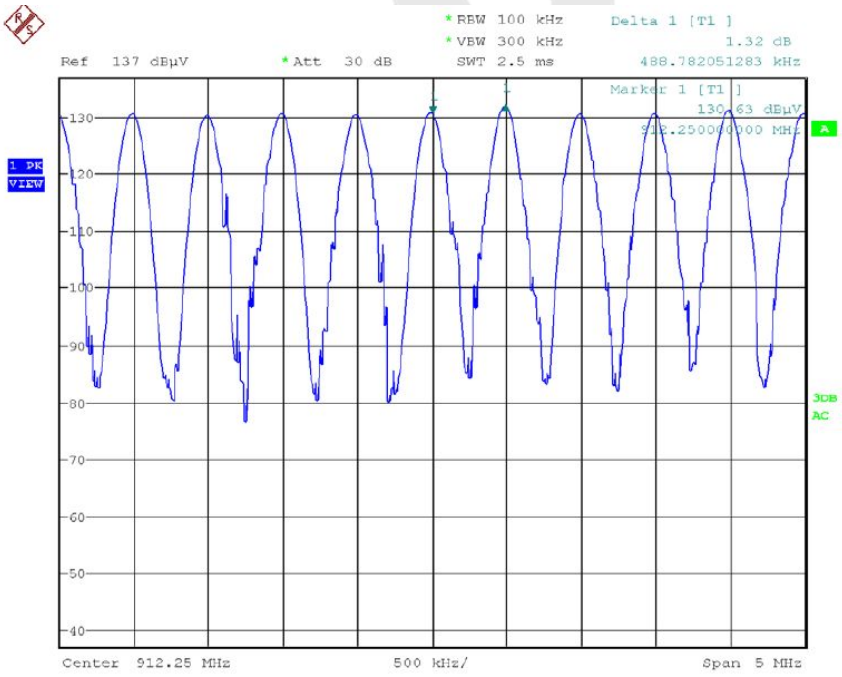
ANT 1:



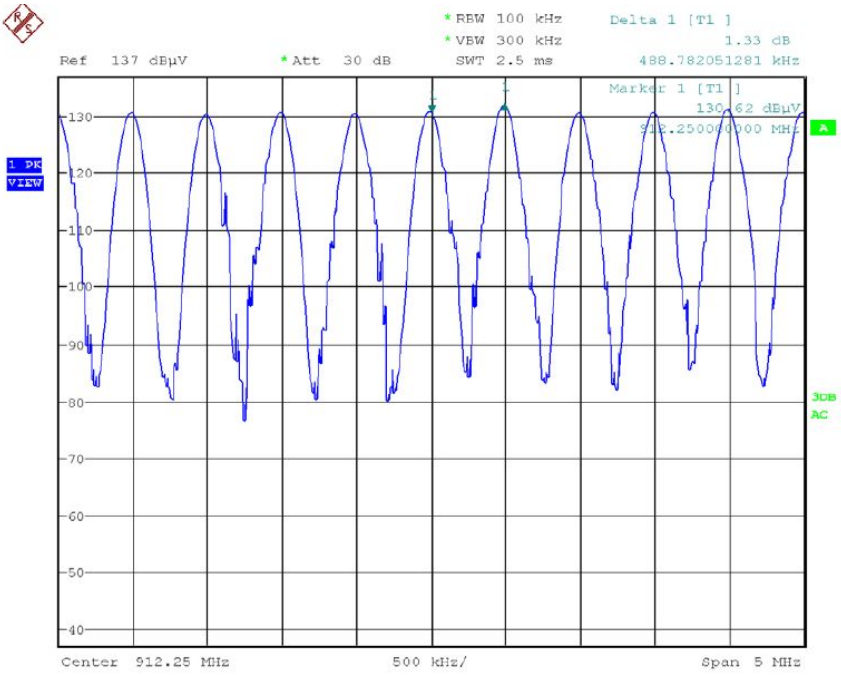
ANT 2:


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
1.35 dB
488.782051282 kHz
Ref 137 dBµV
Att 30 dB
Marker 1 [T1]
130.62 dBµV
912.250000000 MHz
1 PK VIEW
3DB AC
Center 912.25 MHz
500 kHz/
Span 5 MHz

ANT 3:


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
1.32 dB
488.782051283 kHz
Ref 137 dBµV
Att 30 dB
Marker 1 [T1]
130.63 dBµV
912.250000000 MHz
1 PK VIEW
3DB AC
Center 912.25 MHz
500 kHz/
Span 5 MHz

ANT 4:

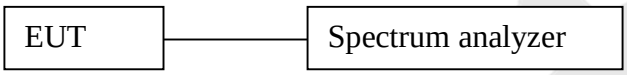

RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
1.33 dB
488.782051281 kHz
Ref 137 dBµV
Att 30 dB
Marker 1 [T1]
130.62 dBµV
912.250000000 MHz
1 PK
VIEW
3DB
AC
130
120
110
100
90
80
70
60
50
40
Center 912.25 MHz
500 kHz/
Span 5 MHz

6. 20DB BANDWIDTH TEST

6.1 Measurement Procedure

Using the following spectrum analyzer settings:
1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
2. Set the RBW = 30 kHz.
3. Set the VBW = 100 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

6.2 Test SET-UP



6.3 Test Equipment

Same as the equipment listed in 5.3.

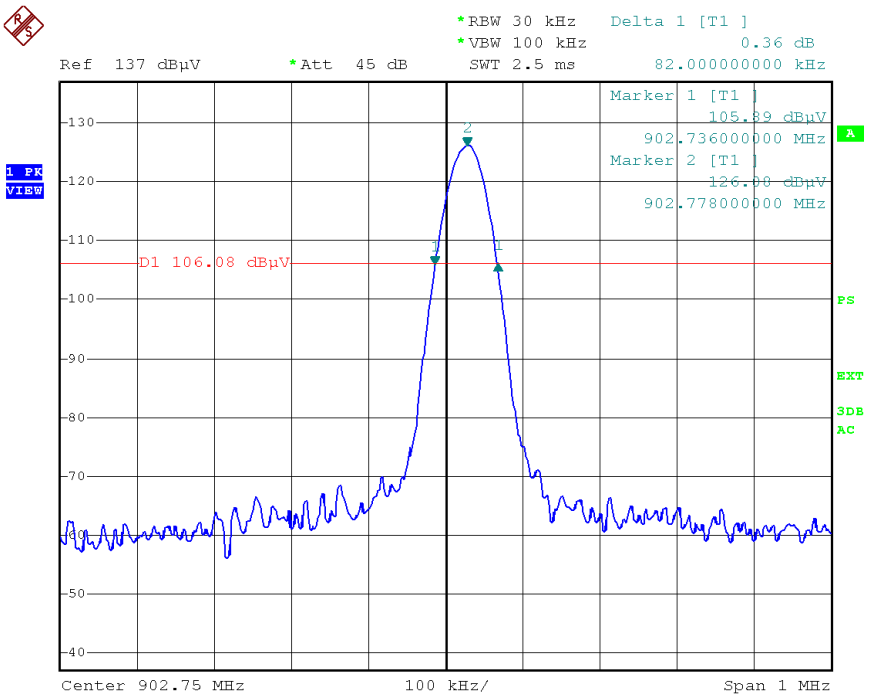
6.4 Test Results

Test Item	:	20dB BW	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

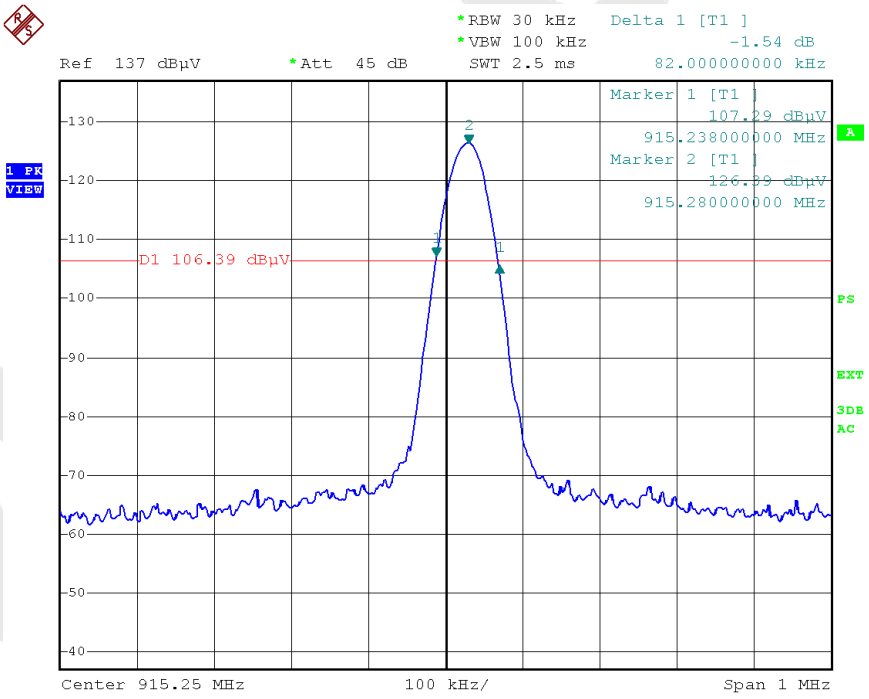
Channel	Frequency (MHz)	20dB Down BW(kHz)	Remark
Low	902.75	82.00	ANT 1
Mid	915.25	82.00	ANT 1
High	927.25	82.00	ANT 1
Low	902.75	82.00	ANT 2
Mid	915.25	82.00	ANT 2
High	927.25	82.00	ANT 2
Low	902.75	82.00	ANT 3
Mid	915.25	82.00	ANT 3
High	927.25	82.00	ANT 3
Low	902.75	82.00	ANT 4
Mid	915.25	82.00	ANT 4
High	927.25	82.00	ANT 4

ANT 1:

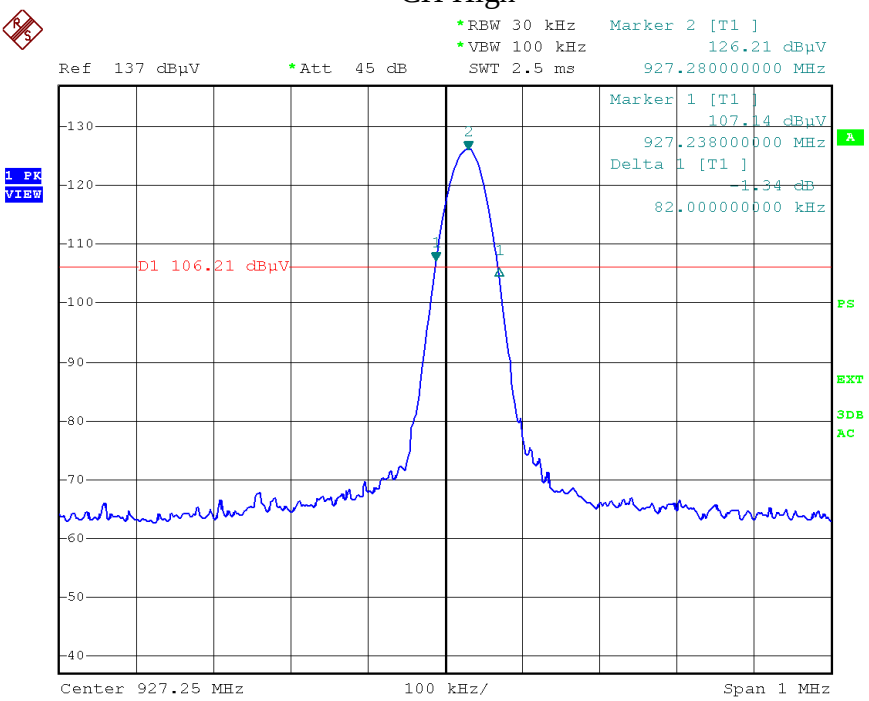
CH Low



CH Middle

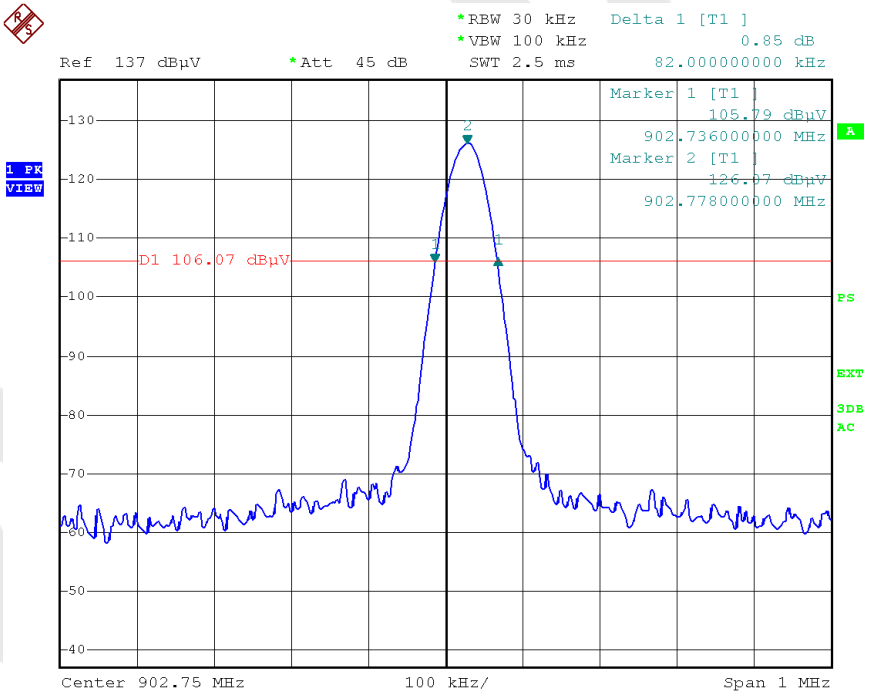


CH High

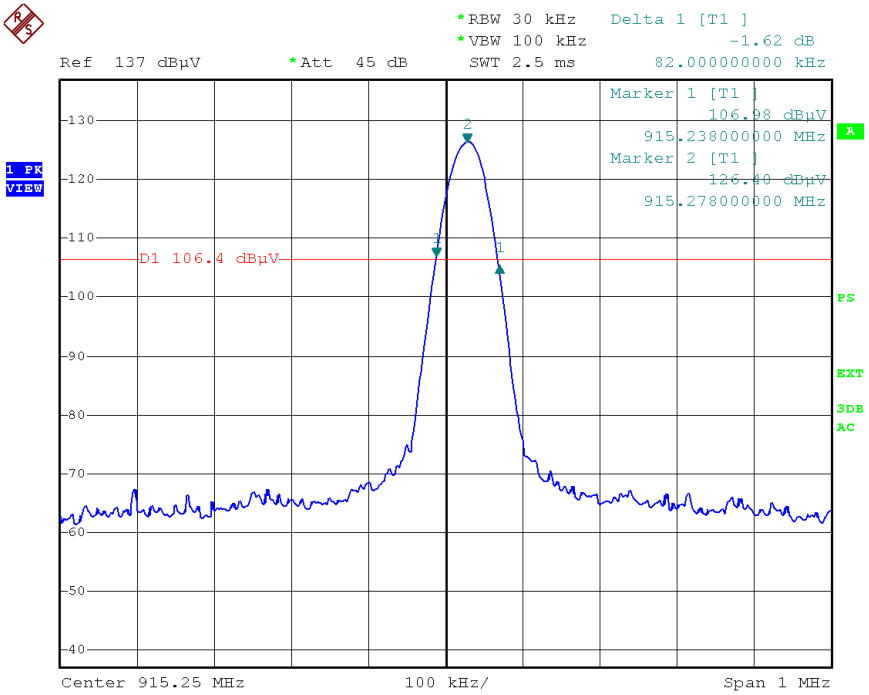


ANT 2:

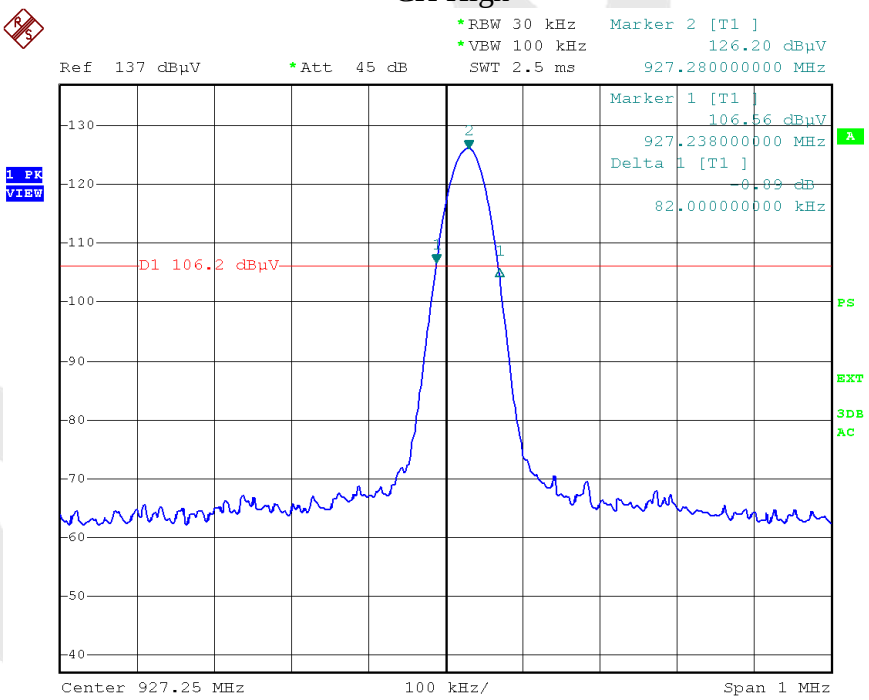
CH Low



CH Middle

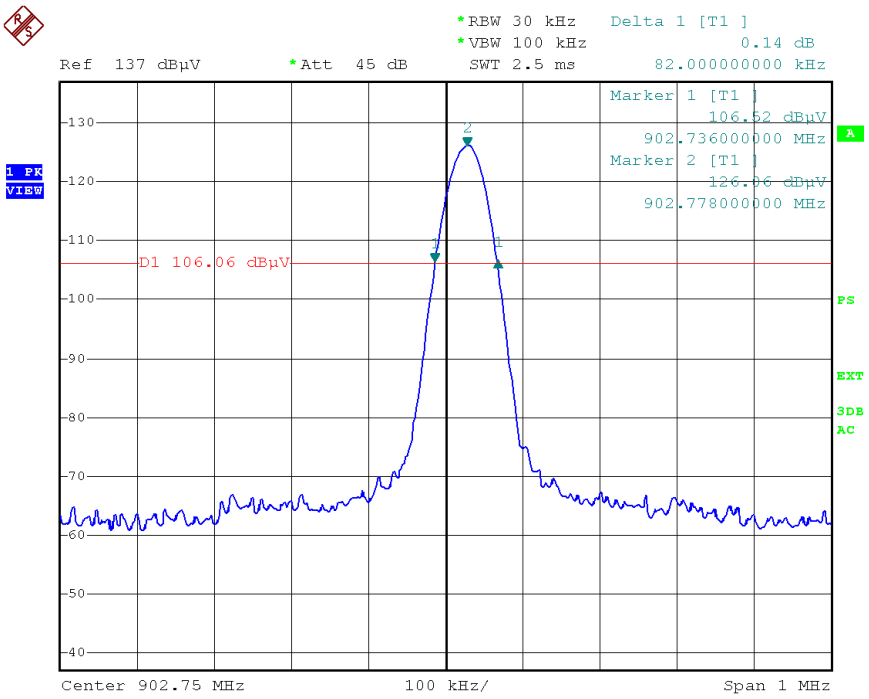


CH High

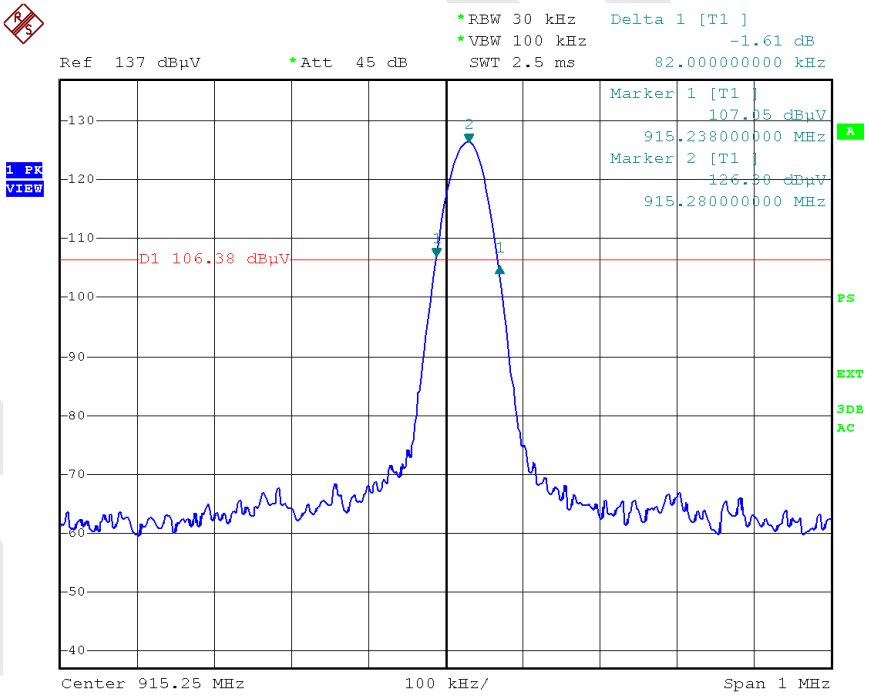


ANT 3:

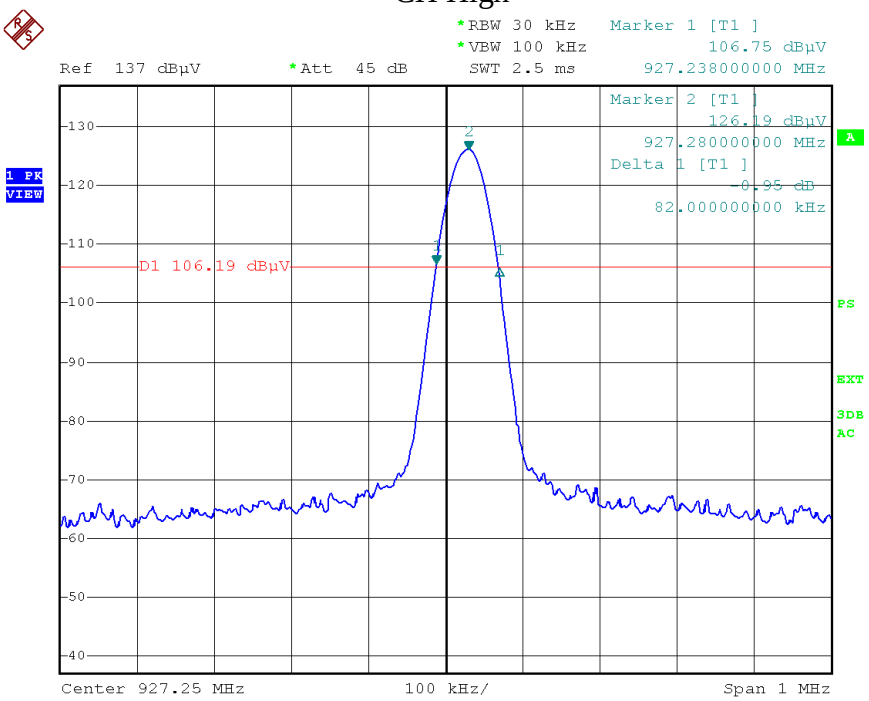
CH Low



CH Middle

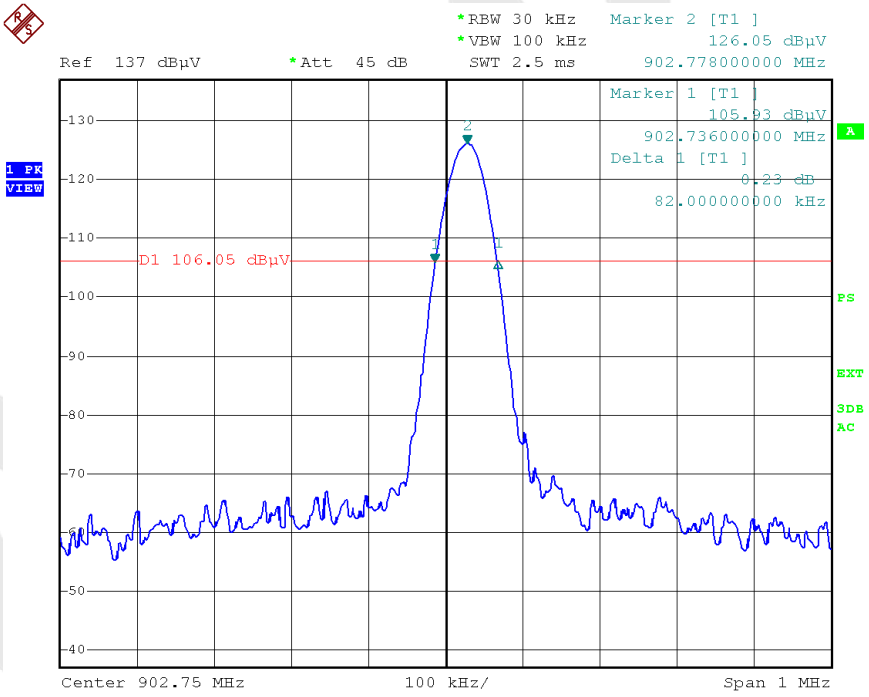


CH High

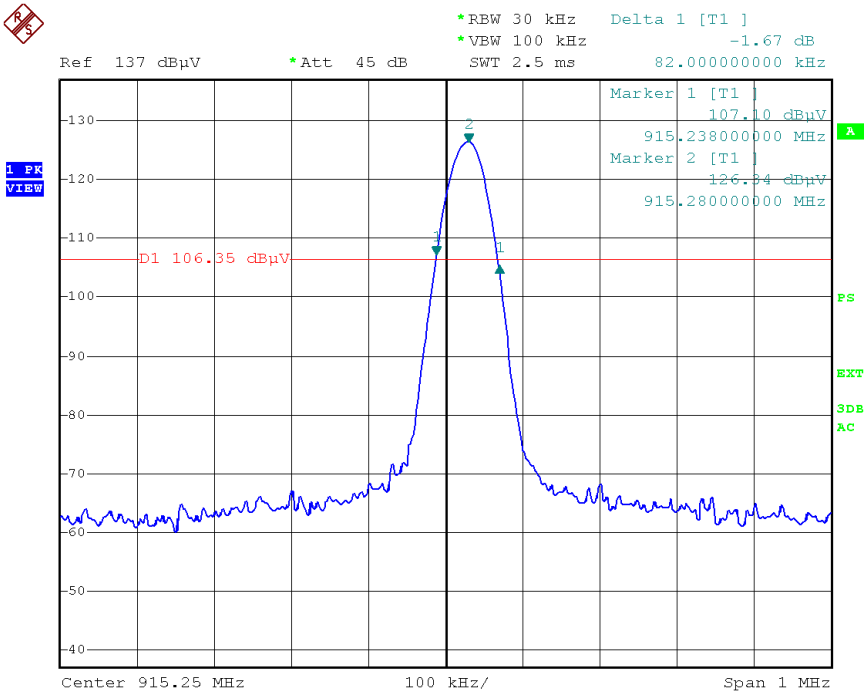


ANT 4:

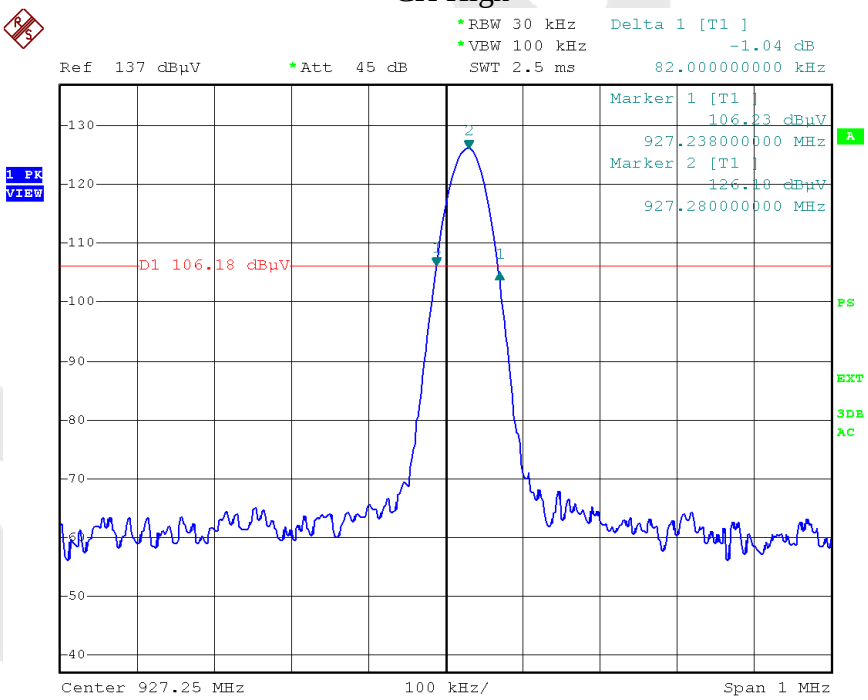
CH Low



CH Middle



CH High

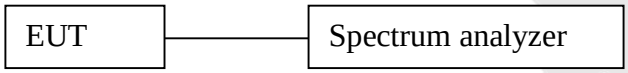


7. QUANTITY OF HOPPING CHANNEL TEST

7.1 Measurement Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:
1. Span= the frequency band of operation
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

7.2 Test SET-UP



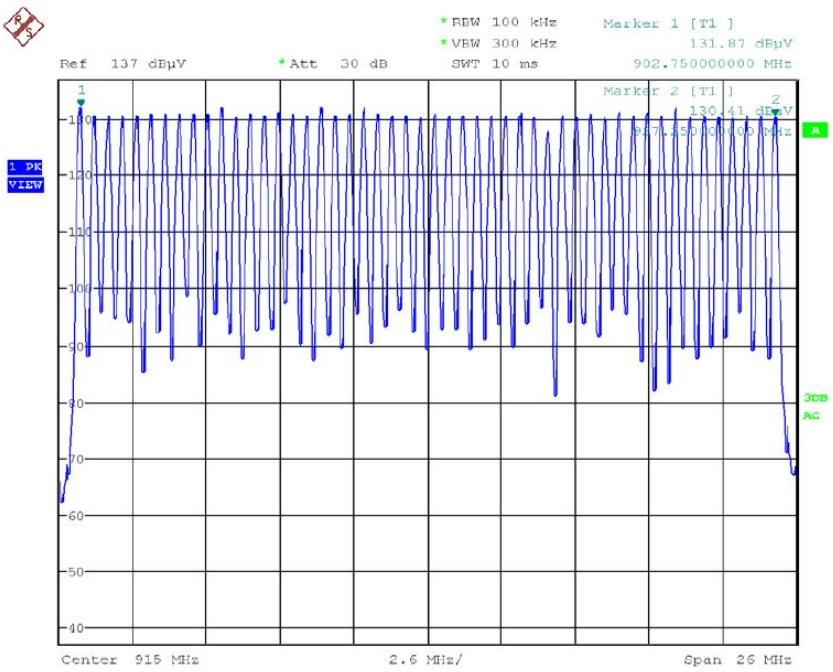
7.3 Test Equipment

Same as the equipment listed in 5.3.

7.4 Test Results

Test Item	:	Number of Hopping Frequency	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel
902-928	50	≥50


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
131.87 dBµV
902.750000000 MHz
Marker 2 [T1]
130.41 dBµV
Ref 137 dBµV
Att 30 dB
1 PK
VIEW
3DB
Center 915 MHz
2.6 MHz/
Span 26 MHz

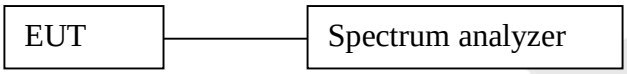
8. DWELL TIME TEST

8.1 Measurement Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW = 1 MHz.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

8.2 Test SET-UP



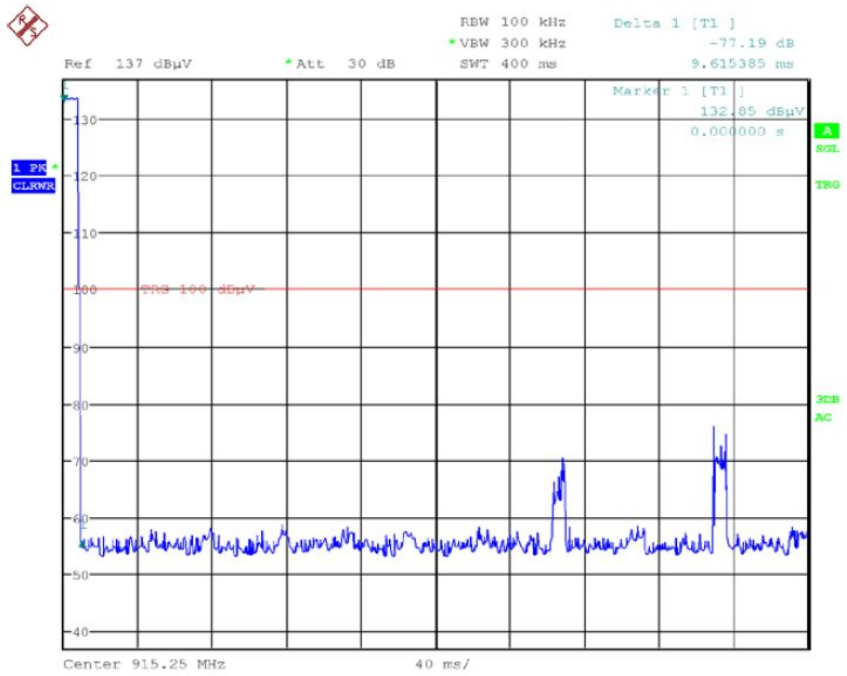
8.3 Test Equipment

Same as the equipment listed in 5.3.

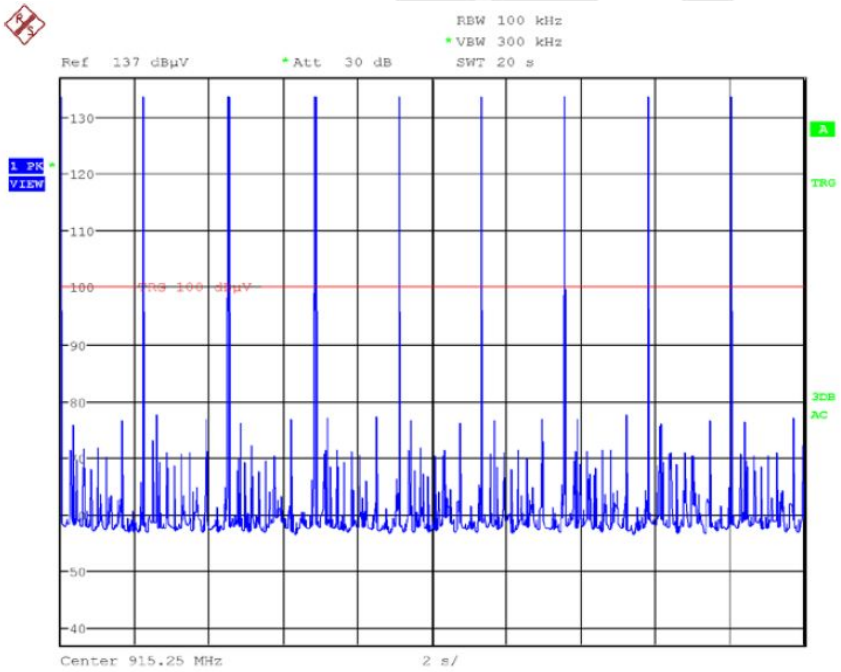
8.4 Test Results

Test Item	:	Time of Occupancy	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Channel (MHz)	Pulse width (ms)	Pulse width within a 20 second period (ms)	Limit (ms)	Result
915.25MHz	9.62	86.58	400	PASS



Time of 1 pulse= 9.62ms



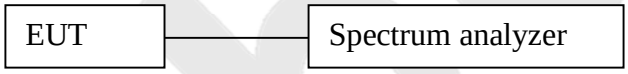
Remark: The average time of occupancy on any frequency shall not be greater than 0.4 seconds (400ms) within a 20 second period.
This device was found to occupy the frequency for 86.58ms (9.62ms*9 pulses).

9. MAX IMUM PEAK OUTPUT POWER TEST

9.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.
d. Measure the captured power within the band and recording the plot.
e. Repeat above procedures until all frequencies required were complete.
Using the following spectrum analyzer settings:
1. Span= approximately 5 times the 20dB bandwidth, centered on a hopping channel
2. Set the RBW = 300 kHz.
3. Set the VBW = 1MHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

9.2 Test SET-UP



9.3 Test Equipment

Same as the equipment listed in 5.3.

9.4 Test Results

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

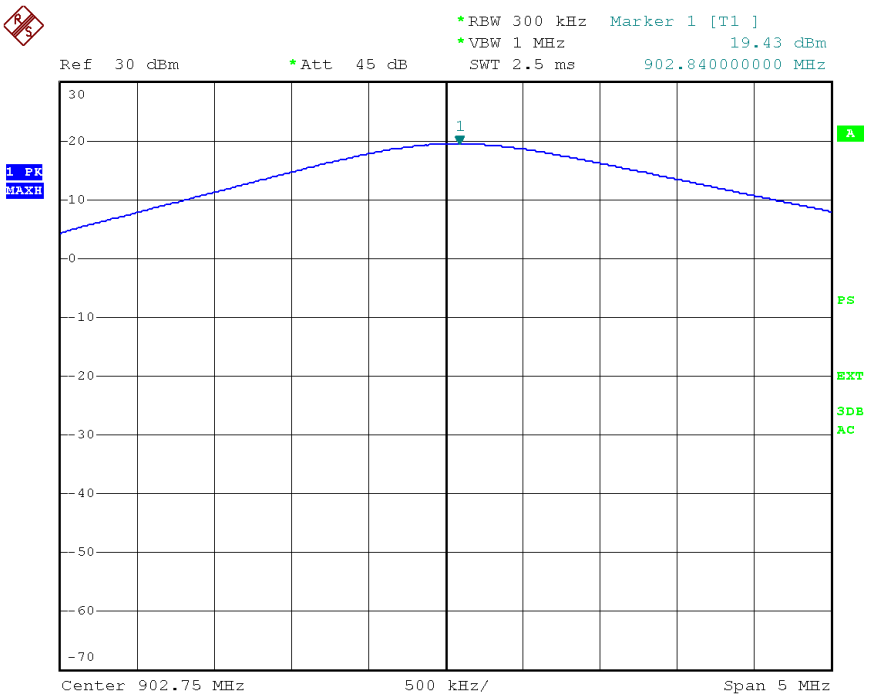
Channel Frequency (MHz)	Peak Output Power (mW)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Results	Remark
902.75	87.70	19.43	24	PASS	ANT 1
915.25	**96.61**	**19.85**	24	PASS	ANT 1
927.25	93.11	19.69	24	PASS	ANT 1
902.75	87.30	19.41	24	PASS	ANT 2
915.25	96.61	19.85	24	PASS	ANT 2
927.25	92.68	19.67	24	PASS	ANT 2
902.75	87.30	19.41	24	PASS	ANT 3
915.25	95.72	19.81	24	PASS	ANT 3
927.25	92.26	19.65	24	PASS	ANT 3
902.75	87.30	19.41	24	PASS	ANT 4
915.25	95.72	19.81	24	PASS	ANT 4
927.25	92.47	19.66	24	PASS	ANT 4

Remark:
1) The EUT has 4 antennas, but the 4 antennas are work one by one, can't work with each other at the same time. I.e. when the EUT is transmitting, only one antenna is working.

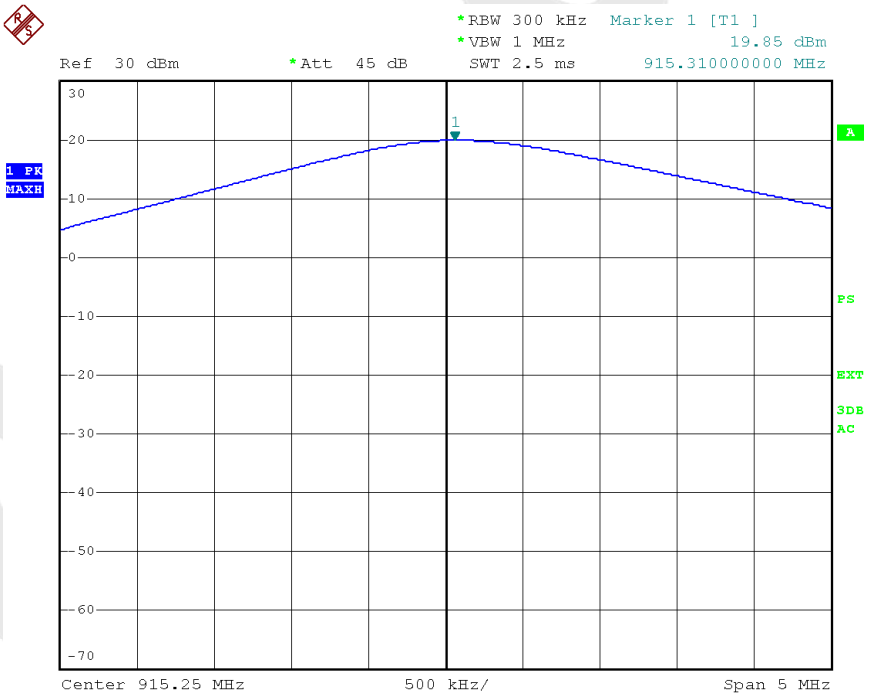
2) The antenna gain is 12dBi which is greater than 6dBi, according to the FCC rules, the limit reduced as follows:
Antenna Gain:
12dBi- 6dBi= 6dBi
Limit: 30- 6= 24dBm

ANT 1:

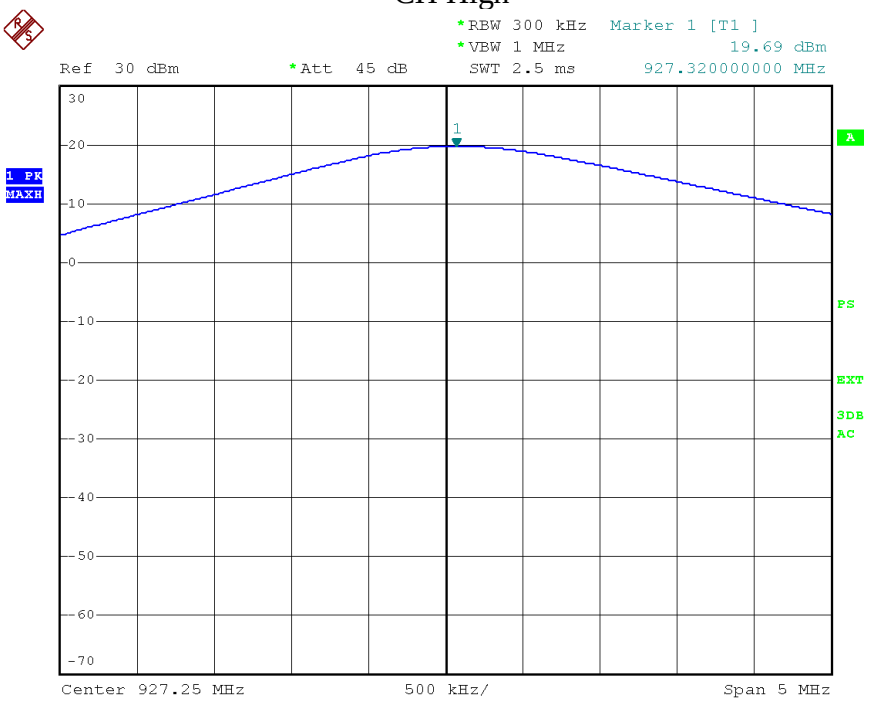
CH Low



CH Mid

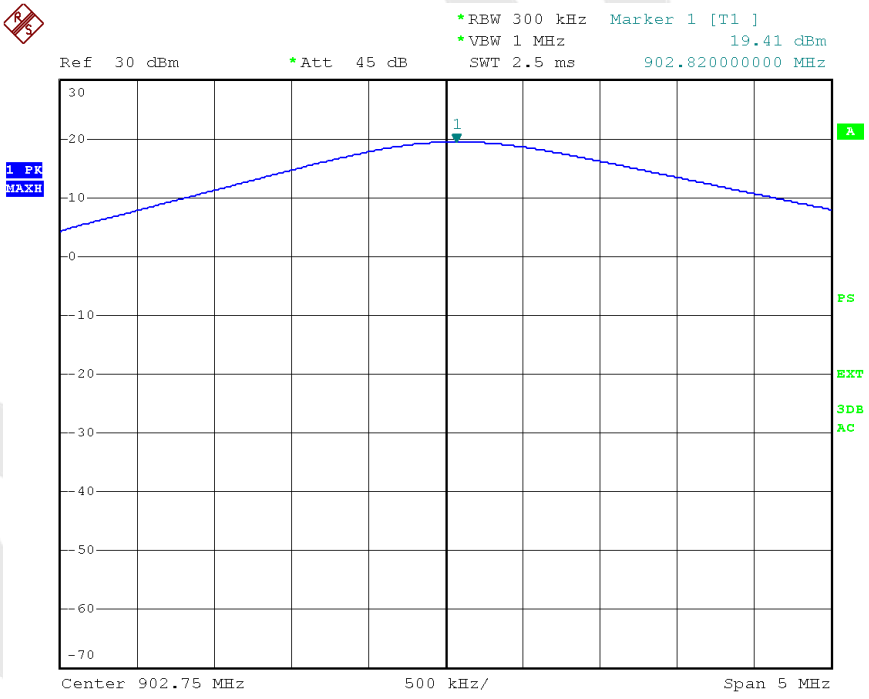


CH High

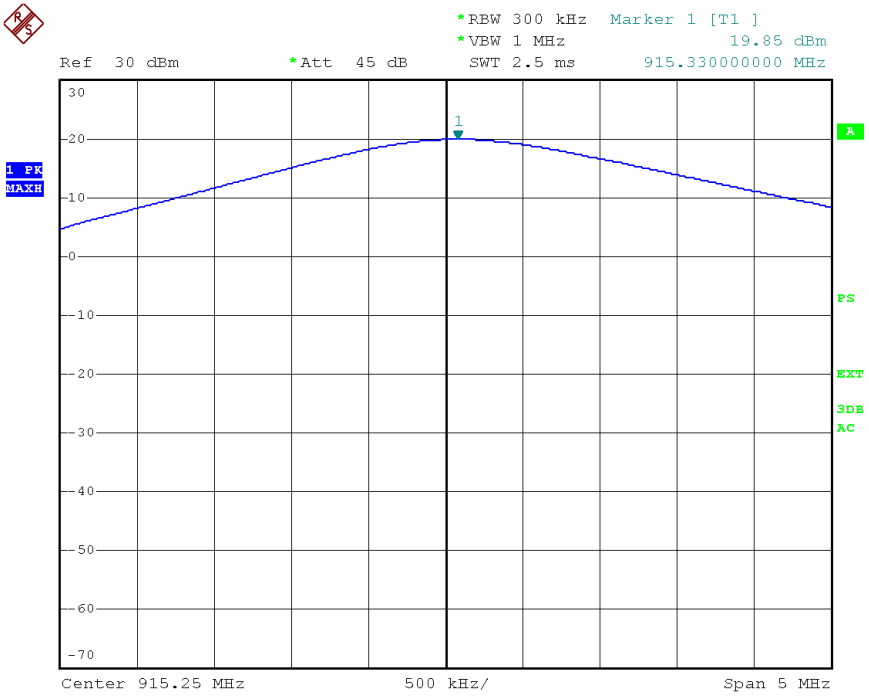


ANT 2:

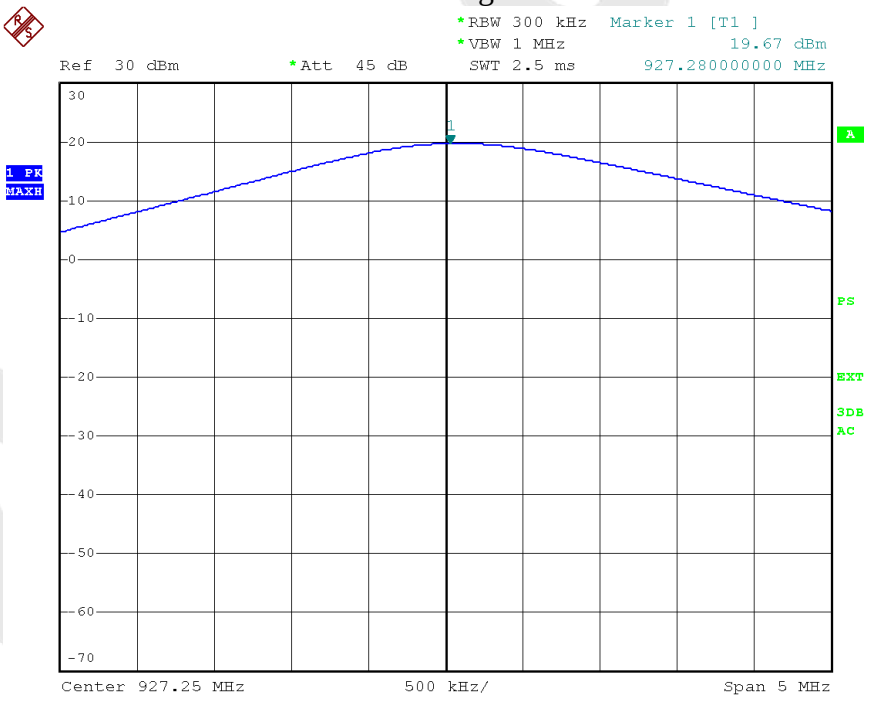
CH Low



CH Mid

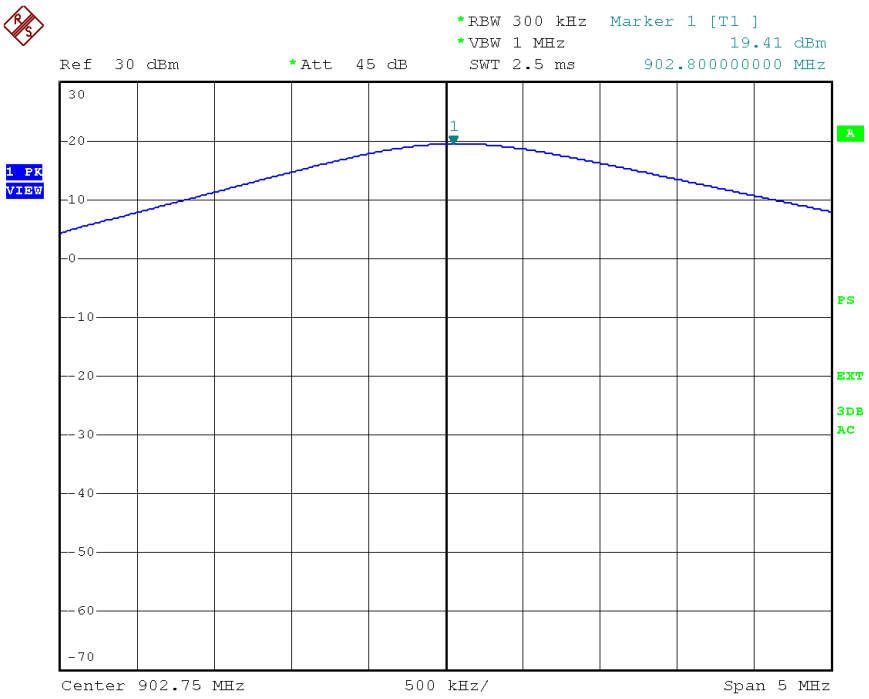


CH High

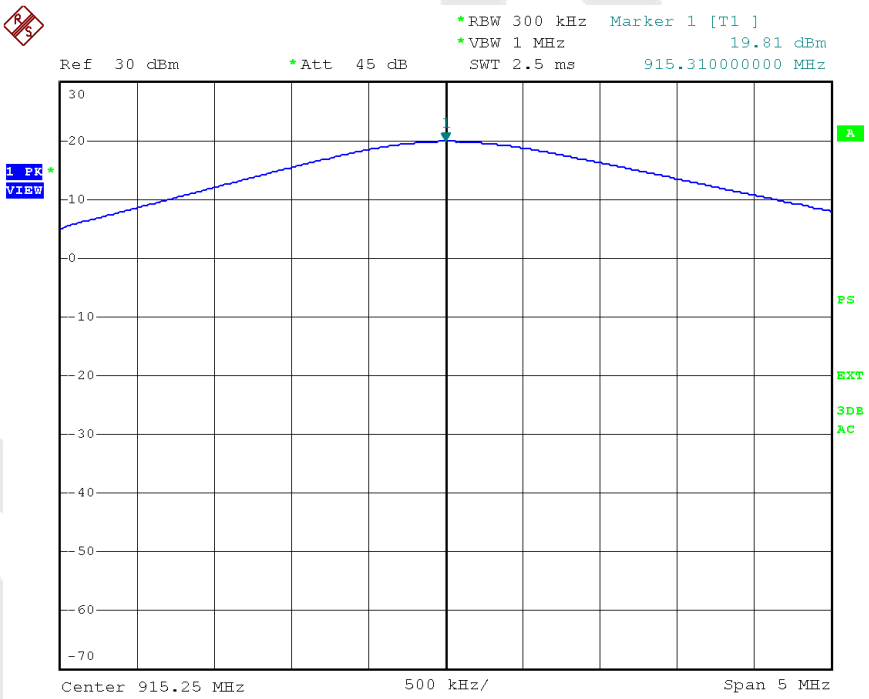


ANT 3:

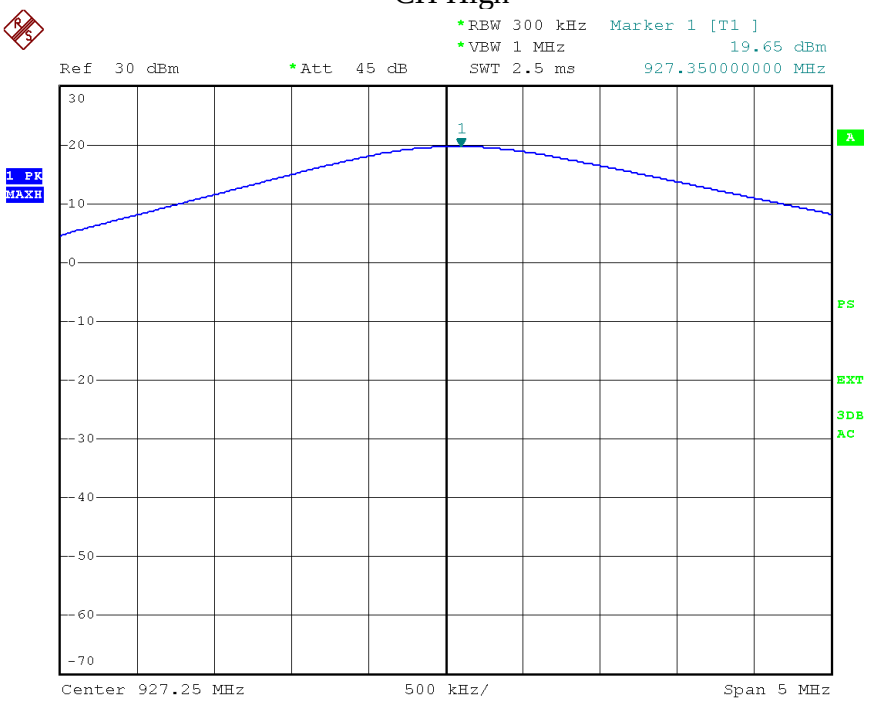
CH Low



CH Mid

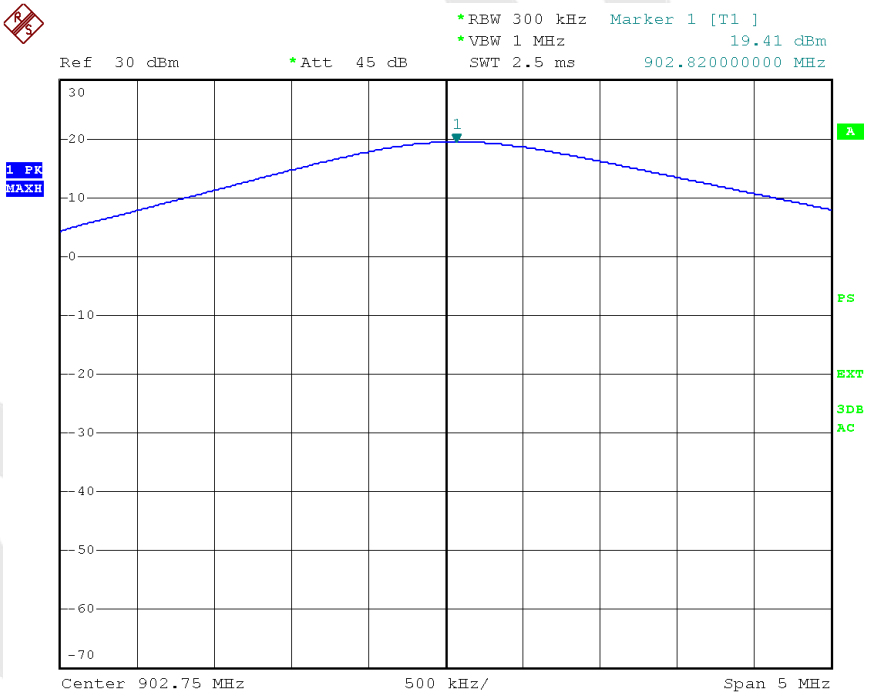


CH High

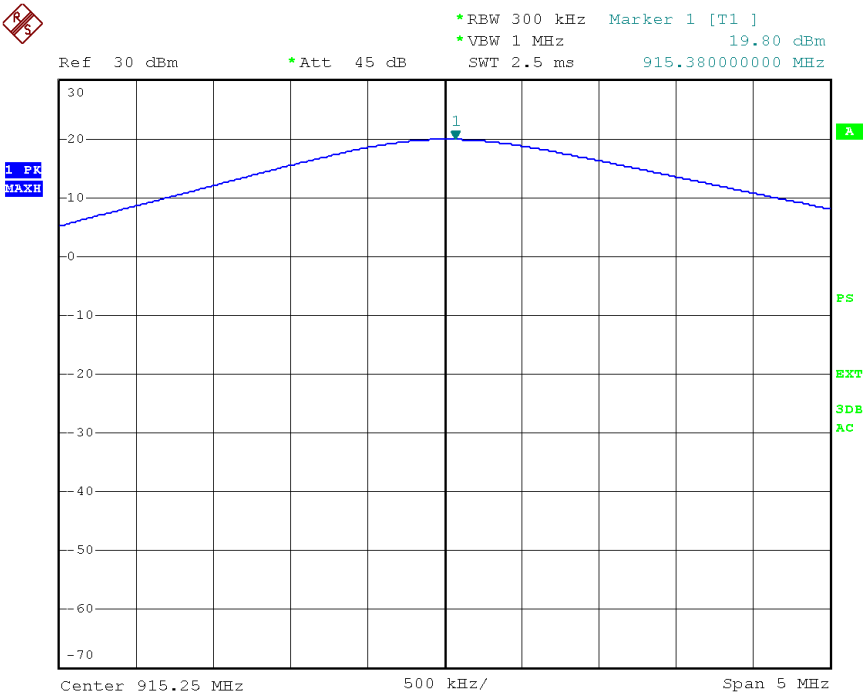


ANT 4:

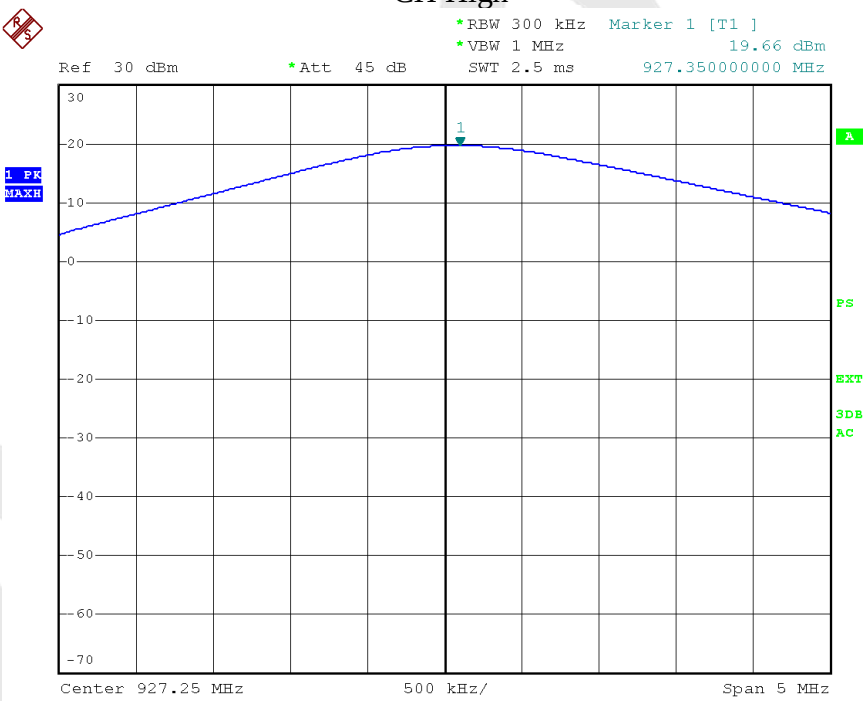
CH Low



CH Mid



CH High

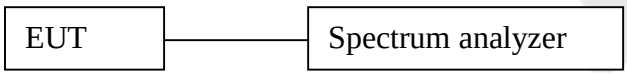


10. BAND EDGE TEST

10.1 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW= 1 MHz, VBW= 3 MHz.
4. Measurement the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Report above procedures until all measured frequencies were complete.

10.2 Test SET-UP



10.3 Test Equipment

Same as the equipment listed in 5.3.

10.4 Test Results

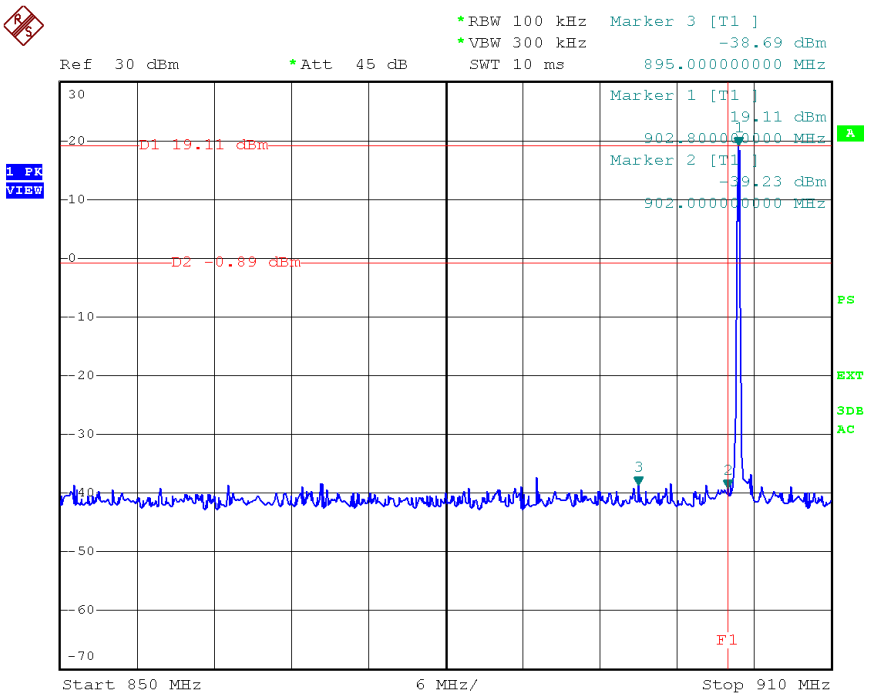
Pass.

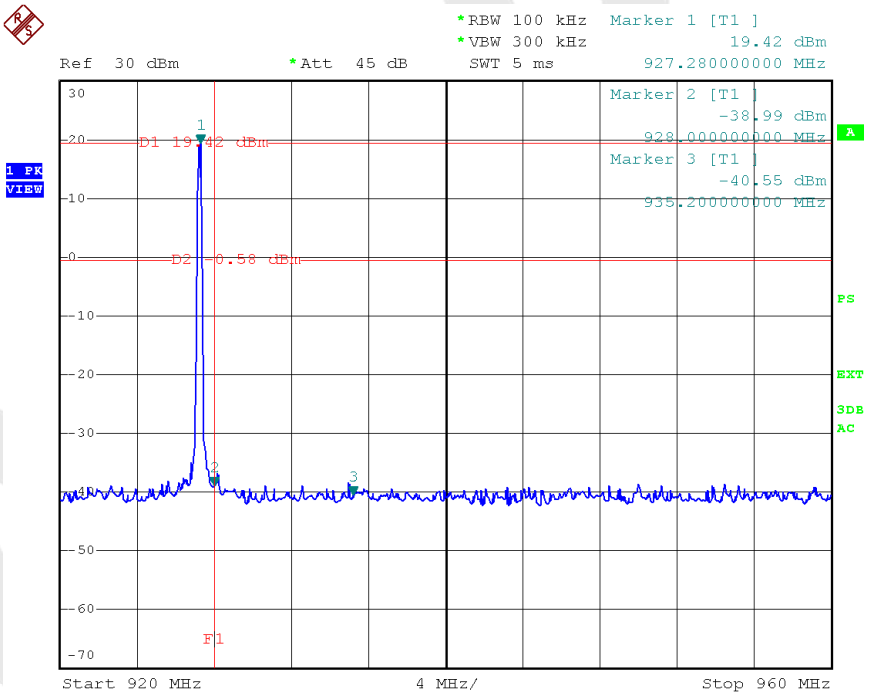
Please refer the following data.

Test Item	:	Band eadge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

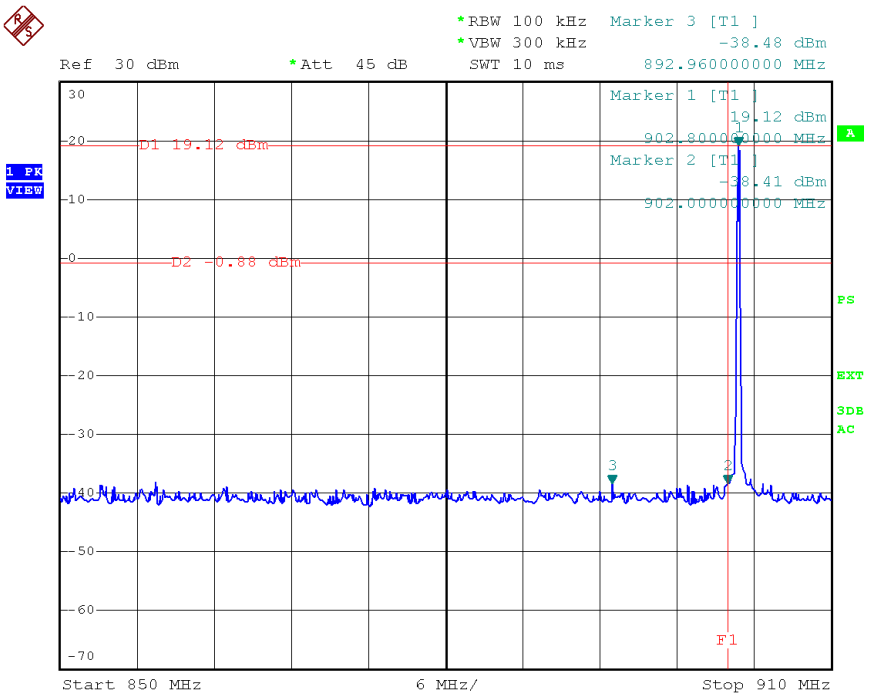
For Hopping Mode:

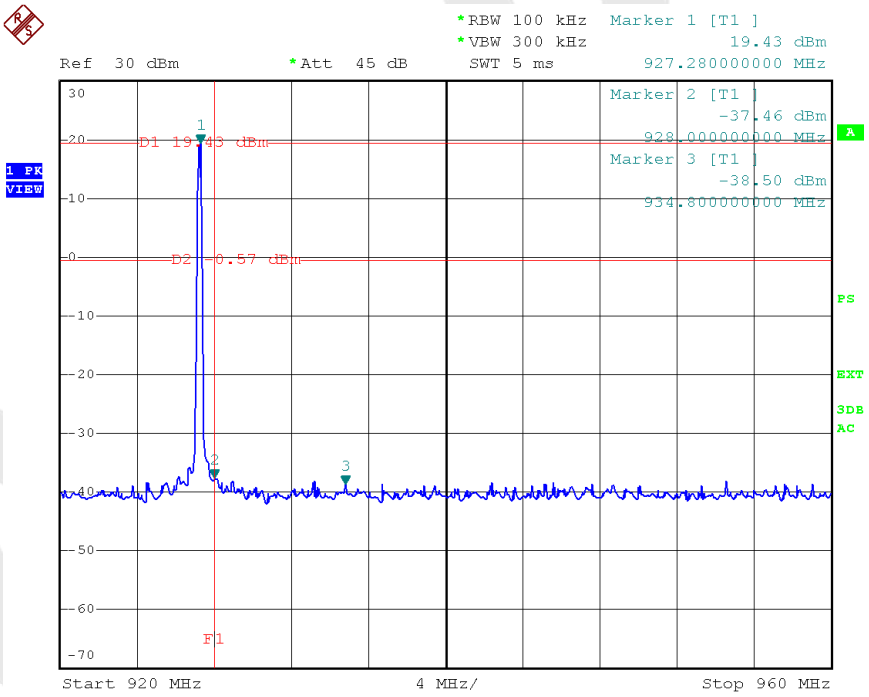
ANT 1:


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Marker 3 [T1]
-38.69 dBm
895.000000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 1 [T1]
19.11 dBm
902.800000000 MHz
Marker 2 [T1]
-39.23 dBm
902.000000000 MHz
D1 19.11 dBm
D2 -0.89 dBm
1 PK VIEW
PS
EXT
3DB
AC
F1
Start 850 MHz
6 MHz/
Stop 910 MHz

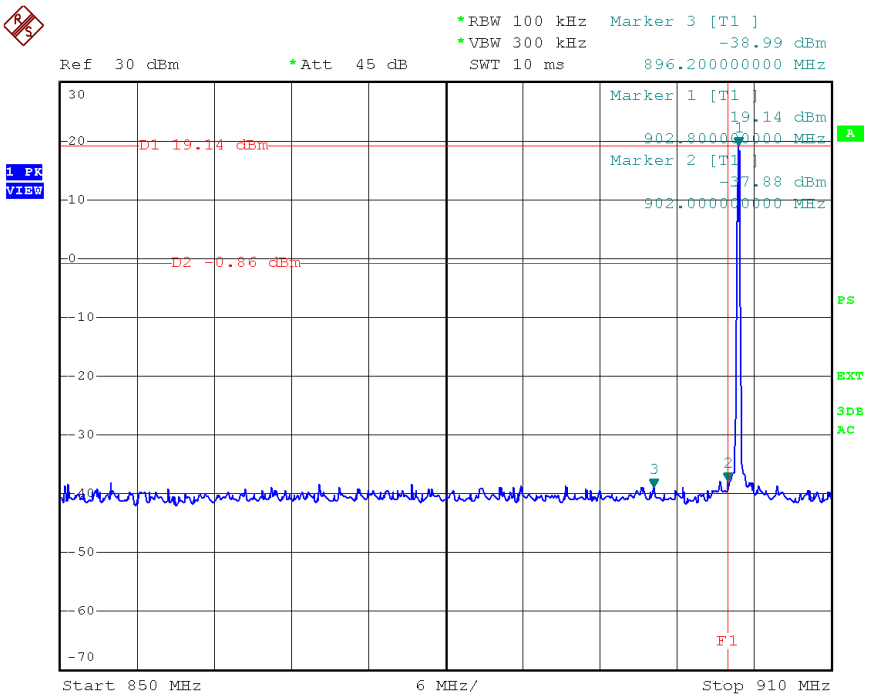

*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
19.42 dBm
927.280000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 2 [T1]
-38.99 dBm
928.000000000 MHz
Marker 3 [T1]
-40.55 dBm
935.200000000 MHz
D1 19.42 dBm
D2 -0.58 dBm
1 PK VIEW
PS
EXT
3DB
AC
F1
Start 920 MHz
4 MHz/
Stop 960 MHz

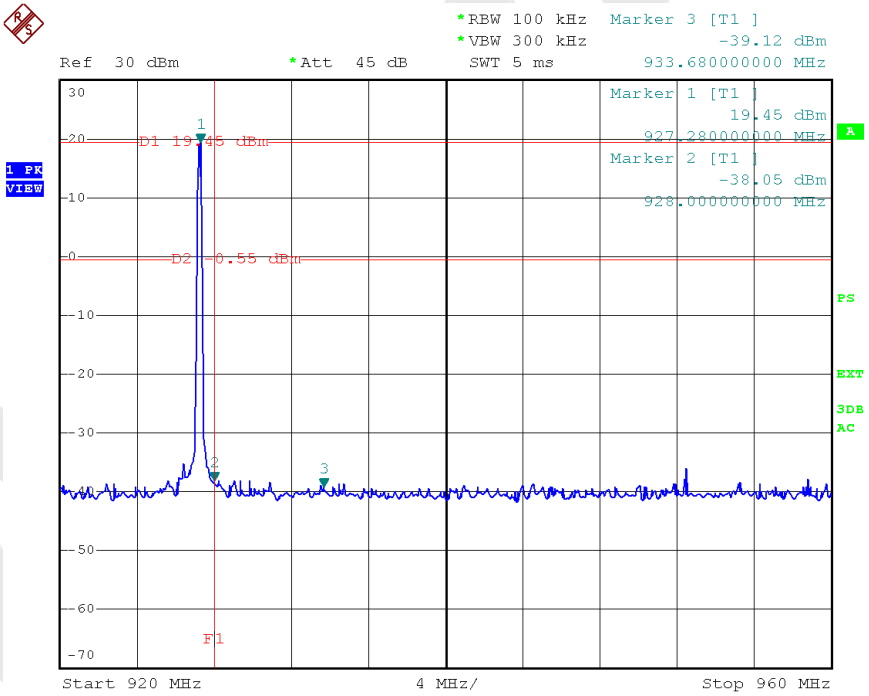
ANT 2:


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Marker 3 [T1]
-38.48 dBm
892.960000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 1 [T1]
19.12 dBm
902.800000000 MHz
Marker 2 [T1]
-38.41 dBm
902.000000000 MHz
D1 19.12 dBm
D2 -0.88 dBm
1 PK VIEW
A
PS
EXT
3DB
AC
F1
Start 850 MHz
6 MHz/
Stop 910 MHz

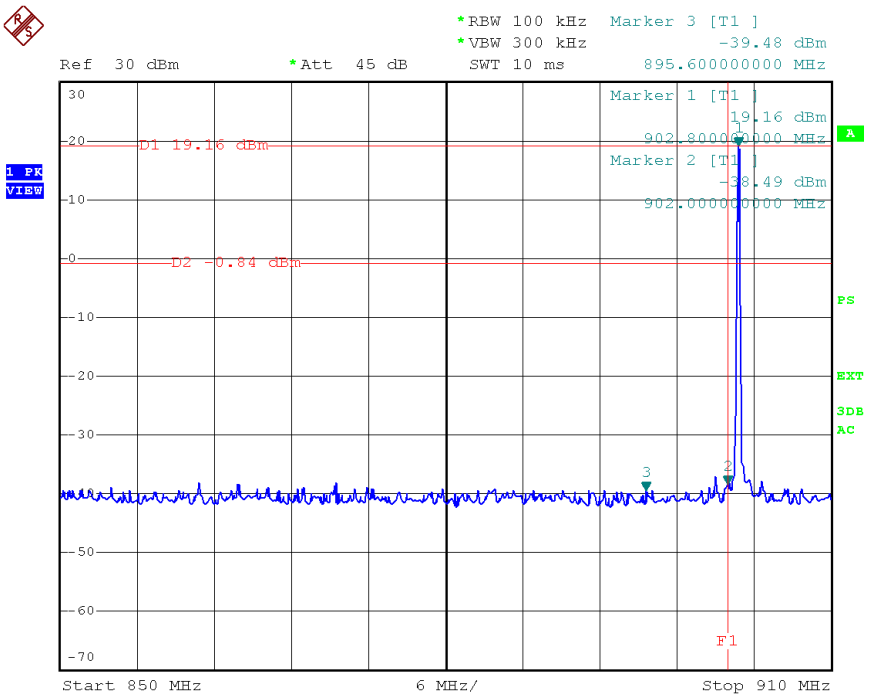

*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
19.43 dBm
927.280000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 2 [T1]
-37.46 dBm
928.000000000 MHz
Marker 3 [T1]
-38.50 dBm
934.800000000 MHz
D1 19.43 dBm
D2 -0.57 dBm
1 PK VIEW
A
PS
EXT
3DB
AC
F1
Start 920 MHz
4 MHz/
Stop 960 MHz

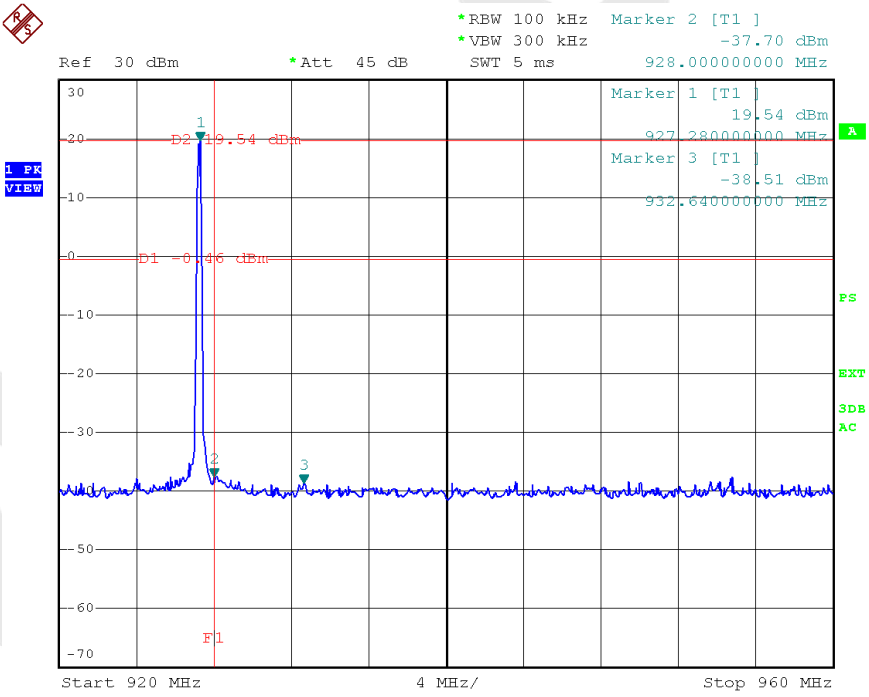
ANT 3:


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Marker 3 [T1]
-38.99 dBm
896.200000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 1 [T1]
19.14 dBm
902.800000000 MHz
Marker 2 [T1]
-37.88 dBm
902.000000000 MHz
D1 19.14 dBm
D2 -0.86 dBm
1 PK VIEW
A
PS
EXT
3DB AC
F1
Start 850 MHz
6 MHz/
Stop 910 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 3 [T1]
-39.12 dBm
933.680000000 MHz
Ref 30 dBm
*Att 45 dB
Marker 1 [T1]
19.45 dBm
927.280000000 MHz
Marker 2 [T1]
-38.05 dBm
928.000000000 MHz
D1 19.45 dBm
D2 -0.55 dBm
1 PK VIEW
A
PS
EXT
3DB AC
F1
Start 920 MHz
4 MHz/
Stop 960 MHz

ANT 4:


*RBW 100 kHz
*VBW 300 kHz
Ref 30 dBm
*Att 45 dB
SWT 10 ms
Marker 3 [T1]
-39.48 dBm
895.600000000 MHz
Marker 1 [T1]
19.16 dBm
902.800000000 MHz
Marker 2 [T1]
-38.49 dBm
902.000000000 MHz
D1 19.16 dBm
D2 -0.84 dBm
1 PK
VIEW
A
PS
EXT
3DB
AC
F1
Start 850 MHz
6 MHz/
Stop 910 MHz


*RBW 100 kHz
*VBW 300 kHz
Ref 30 dBm
*Att 45 dB
SWT 5 ms
Marker 2 [T1]
-37.70 dBm
928.000000000 MHz
Marker 1 [T1]
19.54 dBm
927.280000000 MHz
Marker 3 [T1]
-38.51 dBm
932.640000000 MHz
D2 19.54 dBm
D1 -0.46 dBm
1 PK
VIEW
A
PS
EXT
3DB
AC
F1
Start 920 MHz
4 MHz/
Stop 960 MHz

Test Item	:	Band eadge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Radiated Bandedge Emission Test (The worst situation)

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)	Band edge Limit (dBuV/m)	Remark
608~614	H	33.12	46	Restricted Band
	V	32.29	46	
614~902	H	35.33	46	Outside the frequency
	V	35.01	46	
928~960	H	37.66	46	Outside the frequency
	V	38.54	46	

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Remark
		PK	AV	PK	AV	
960~1240	H	54.45	37.84	74.00	54.00	Restricted Band
	V	52.19	36.95	74.00	54.00	

11. ANTENNA APPLICATION

11.1 Antenna requirement

The EUT'S antenna should meet the requirement of FCC part 15C 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.

Antenna requirement must meet at least one of the following:

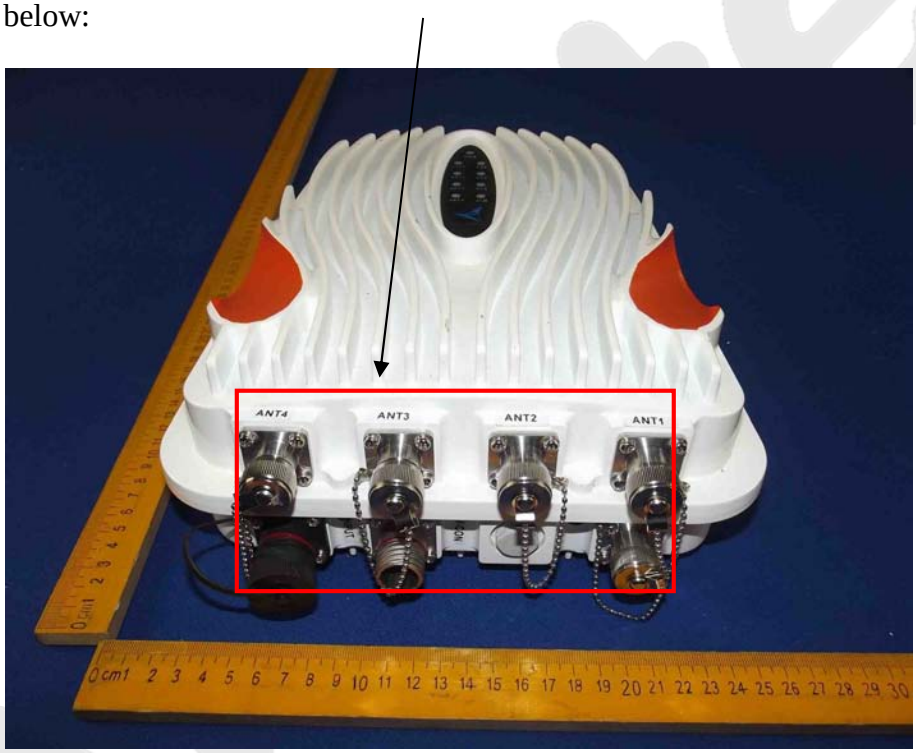
1) Antenna must be permanently attached to device.

2) The antenna must use a unique type of connector to attach to the device.

3) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.

11.2 Result

The antenna is attached permanently to the PCB inside the EUT, which meets the requirement, see the below:



12. PHOTOGRAPH

12.1 Photo of Conducted Emission Test

12.2 Photo of Radiation Emission Test


DELL

APPENDIX I (EXTERNAL PHOTOS)

Figure 1
The EUT-Overall View

Figure 2
The EUT-Top View

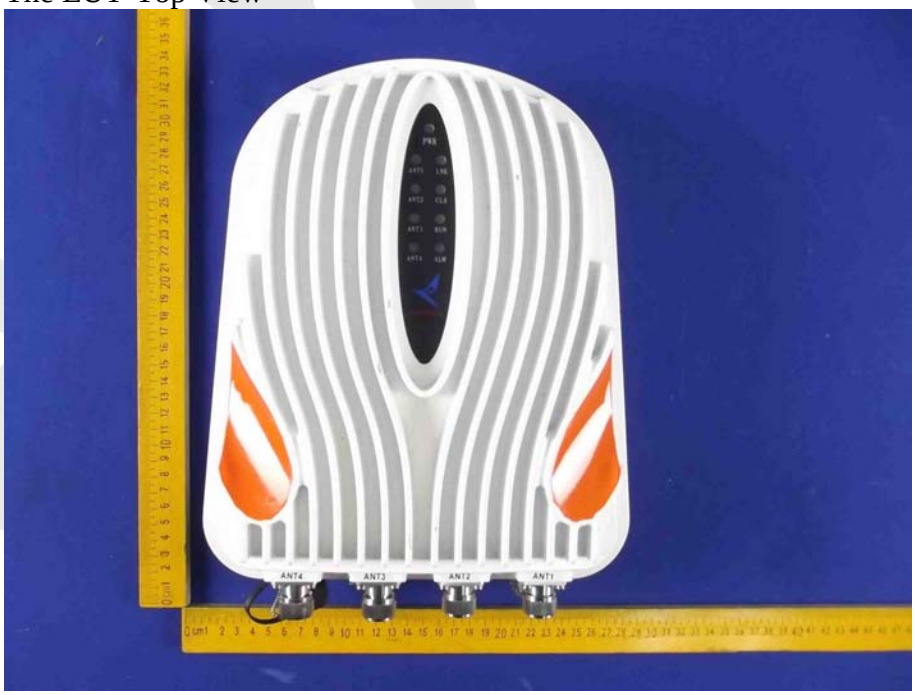


Figure 3
The EUT-Bottom View

Figure 4
The EUT-Front View

Figure 5
The EUT-Back View

Figure 6
The EUT-Right View

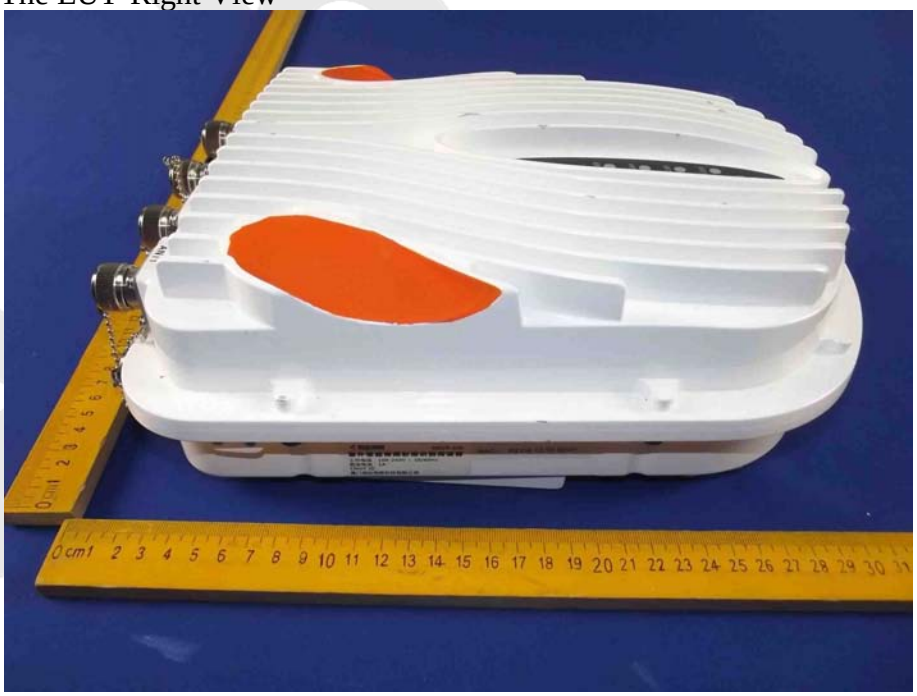


Figure 7
The EUT-Left View

APPENDIX Ⅱ(INTERNAL PHOTOS)

Figure 8
The EUT-Inside View

Figure 9
The EUT-Inside View

Figure 10
The EUT-Inside View

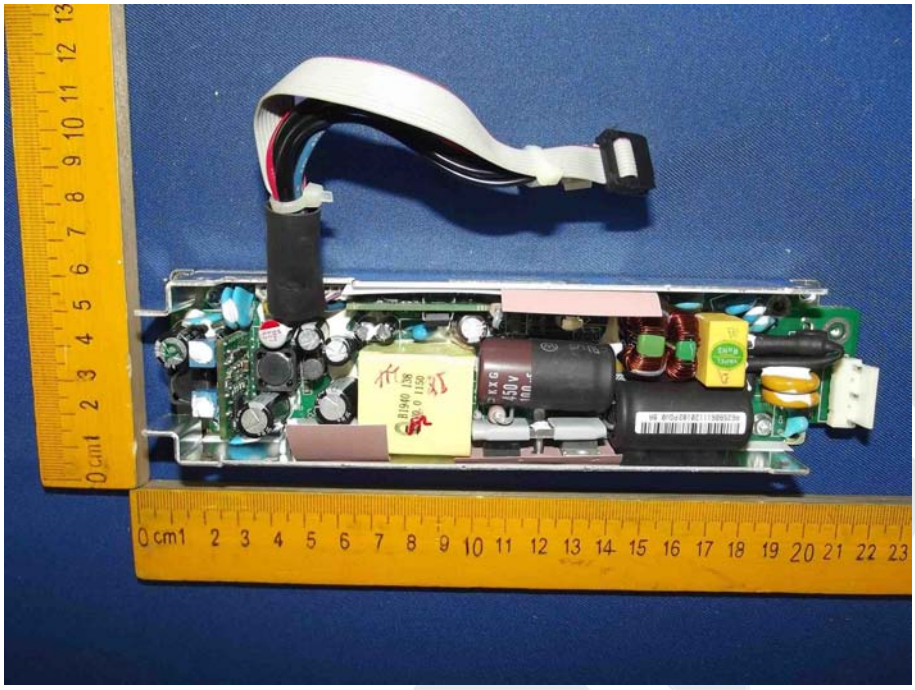


Figure 11
PCB of the EUT-Front View

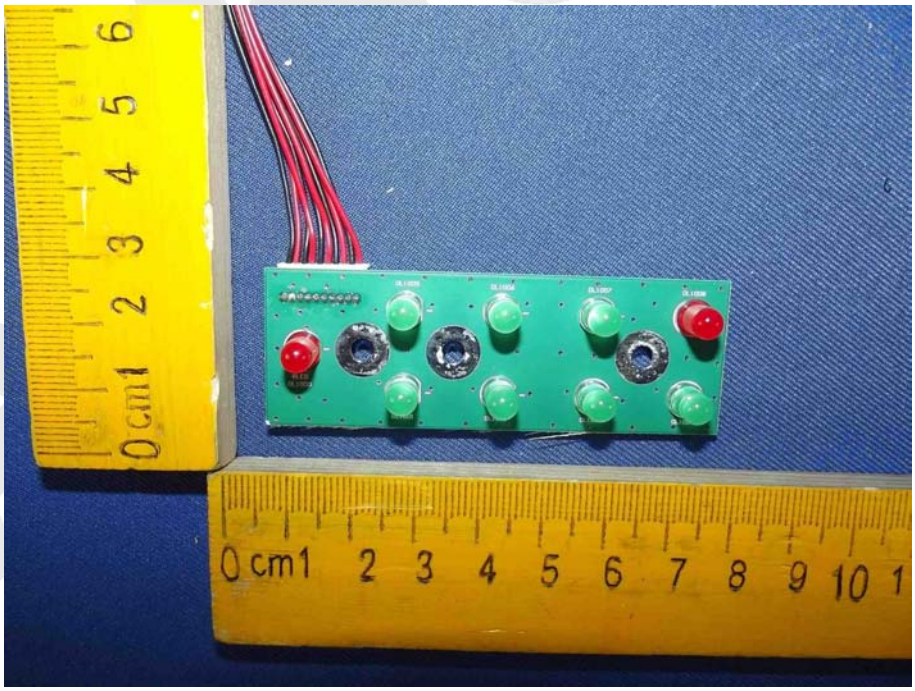


Figure 12
PCB of the EUT-Back View

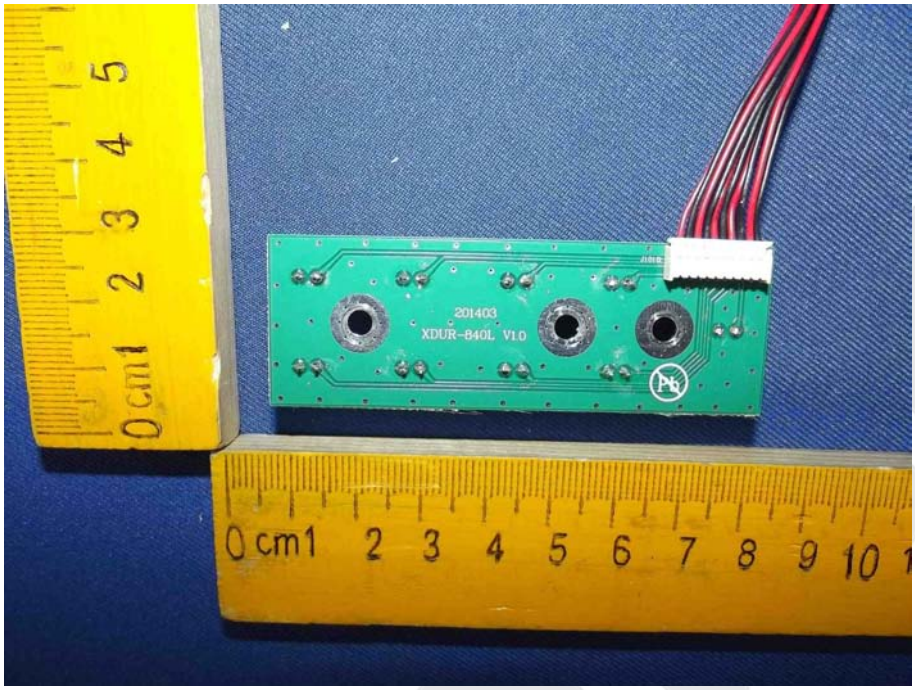


Figure 13
PCB of the EUT-Front View

Figure 14
PCB of the EUT-Back View

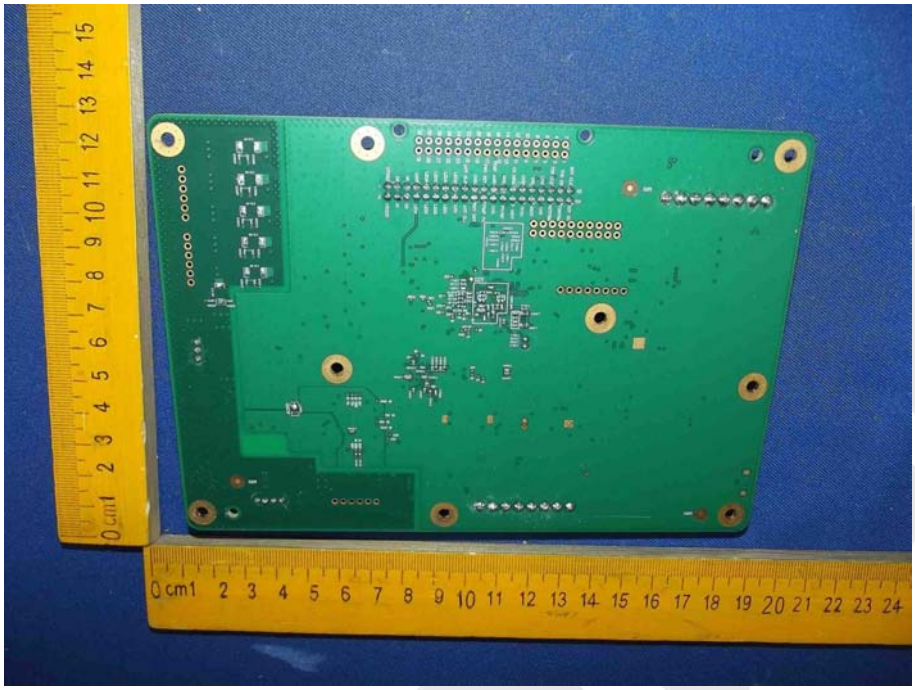


Figure 15
PCB of the EUT-Front View

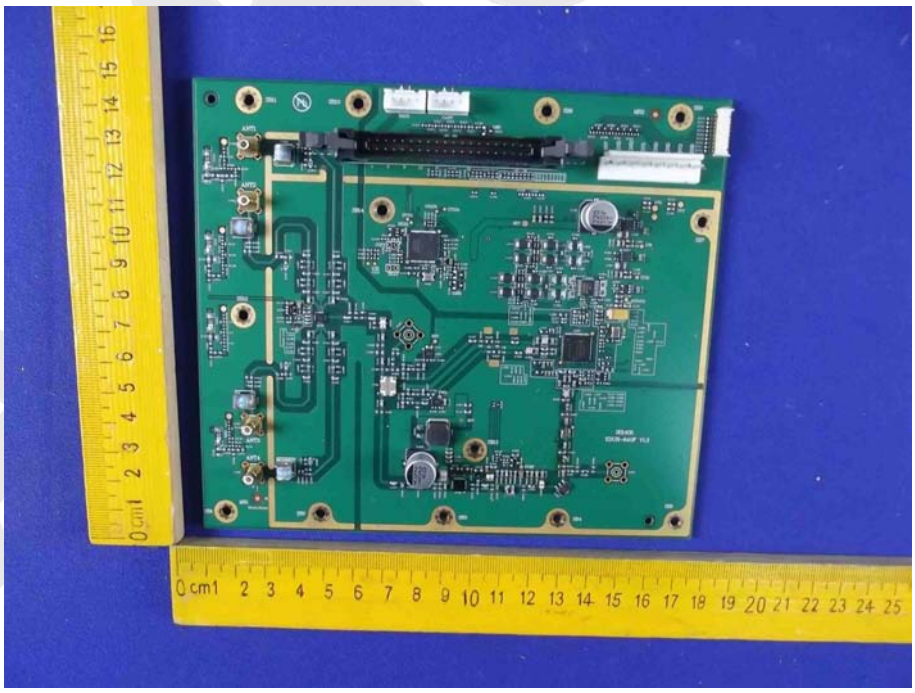


Figure 16
PCB of the EUT-Back View

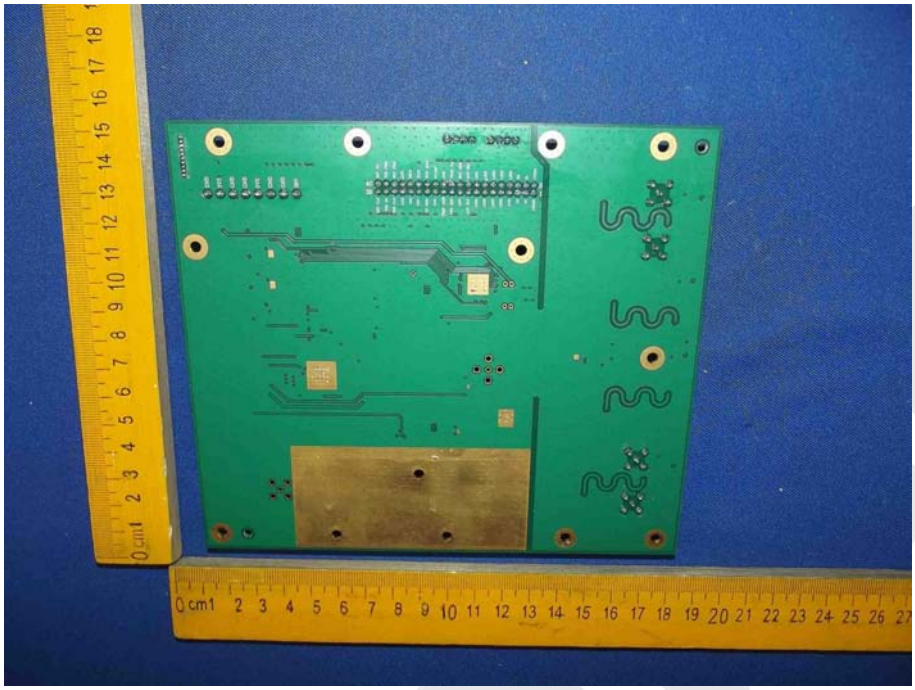


Figure 17
PCB of the EUT-Module View