



FCC REPORT

Report Reference No.: **TRE1612017406** R/C.....: 95076

FCC ID: VUJAT870N

Applicant's name: ATID Co., Ltd.

Address: #1211 Byuksan/Kyungin Digitalvalley 11, 184, Gasan digital 2-ro, Geumcheon-gu, Seoul, Korea

Manufacturer.....: ATID Co., Ltd.

Address.....: #1211 Byuksan/Kyungin Digitalvalley 11, 184, Gasan digital 2-ro, Geumcheon-gu, Seoul, Korea

Test item description.....: Industrial PDA

Trade Mark: Atid

Model/Type reference.....: AT870N

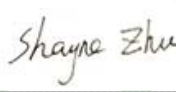
Standard.....: 47 CFR Part 15 Subpart C ; ANSI C63.10-2013


Date of receipt of test sample.....: July. 14, 2016


Date of testing.....: Aug. 28, 2016 - Jan. 18, 2017

Date of issue.....: Jan. 18, 2017

Result: **Pass**

Compiled by
(position+printed name+signature).....: File administrators Shayne Zhu 

Supervised by
(position+printed name+signature).....: Project Engineer Lion Cai 

Approved by
(position+printed name+signature).....: Manager Hans Hu 

Testing Laboratory Name: **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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Change History		
Issue	Date	Reason for change
1.0	2017.01.18	First edition

1. General Information

1.1. EUT Description

EUT Type	Industrial PDA
Hardware Version	AT870N_MA_V3.0.1
Software Version	ENGSTD_0576_512_R4
Power Supply	5.0Vdc(adapter or host equipment) 3.7Vdc(Li-ion battery)
Frequency Range	902MHz~928MHz
Operating Range	902.75MHz~927.25MHz
Number of channel	50
Modulation Type	A1D
Antenna Type	Circularly Polarized Patch Antenna
Antenna Gain	0dBi

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2013	Radio Frequency Devices
2	ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Standard(s) Section	Description	Result
	FCC		
1	15.203	Antenna Requirement	PASS
2	15.247(a)	Number of Hopping Frequency	PASS
3	15.247(b)	Peak Output Power	PASS
4	15.247(a)	Bandwidth	PASS
5	15.247(a)	Carrier Frequency Separation	PASS
6	15.247(a)	Time of Occupancy (Dwell time)	PASS
7	15.247(d)	Conducted Spurious Emission	PASS
8	15.247(d)	Conducted Band Edge	PASS
9	15.207	Conducted Emission	PASS
10	15.209 15.247(c)	Radiated Band Edges and Spurious Emission	PASS

Note 1: The test of Radiated Emission was performed according to the method of measurements prescribed in ANSI C63.10 2013.

1.3. Description of Test Mode

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	902.75	26	915.25
2	903.25	27	915.75
3	903.75	28	916.25
4	904.25	29	916.75
5	904.75	30	917.25
6	905.25	31	917.75
7	905.75	32	918.25
8	906.25	33	918.75
9	906.75	34	919.25
10	907.25	35	919.75
11	907.75	36	920.25
12	908.25	37	920.75
13	908.75	38	921.25
14	909.25	39	921.75
15	909.75	40	922.25
16	910.25	41	922.75
17	910.75	42	923.25
18	911.25	43	923.75
19	911.75	44	924.25
20	912.25	45	924.75
21	912.75	46	925.25
22	913.25	47	925.75
23	913.75	48	926.25
24	914.25	49	926.75
25	914.75	50	927.25

Test channel: 1channel, 26 channel, 50channel

1.4. Facilities and Accreditations

1.4.1. Facilities

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered 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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

1.4.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

And according to FCC 47 CFR Section 15.247(c), 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.

2.1.2. Antenna Information

Antenna Category: PATCH Antenna

A PATCH Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Ant. Type	Gain(dBi)
1	Industrial PDA	Circularly Polarized Patch Antenna	0

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Number of Hopping Frequency

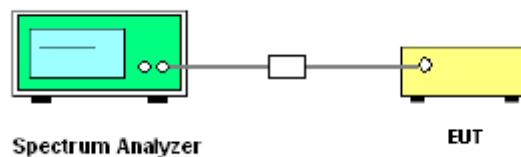
2.2.1. Limit of Number of Hopping Frequency

Frequency hopping systems operating in the 902MHz to 928MHz bands shall use at least 50 hopping frequencies.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



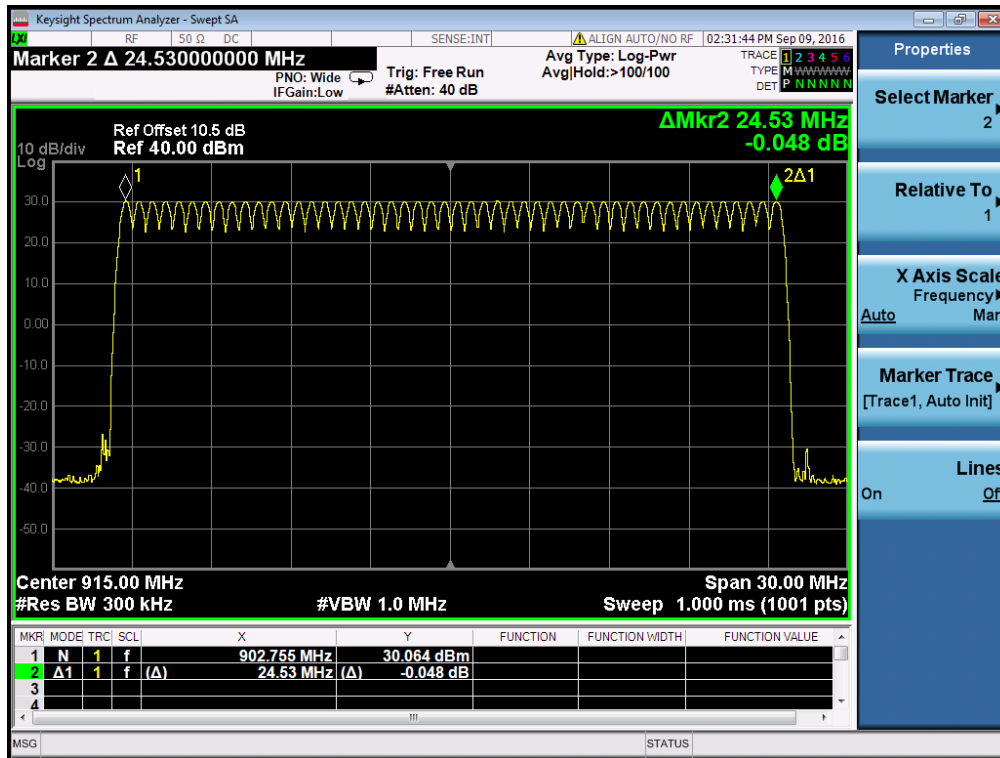
2.2.4. Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; $RBW \geq 100\text{KHz}$; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

2.2.5. Test Results of Number of Hopping Frequency

Frequency (MHz)	Measured Channel Numbers	Min. Limit	Verdict
902 - 928	50	50	PASS

2.2.6. Test Results (plots) of Number of Hopping Frequency



2.3. Peak Output Power

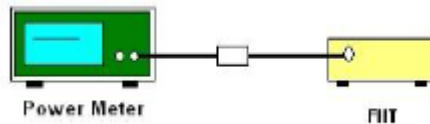
2.3.1. Limit of Peak Output Power

Section 15.247 (B)(2) For frequency hopping systems operating in the 902~928MHz band:1 watt for systems employing at least 50 hopping channels.

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

2.3.5. Test Result of Output Power

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limit (dBm)	Verdict
1	902.75	29.114	30	PASS
26	915.25	29.354		PASS
50	927.25	29.048		PASS

2.4. Bandwidth

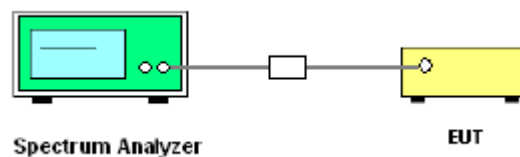
2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;

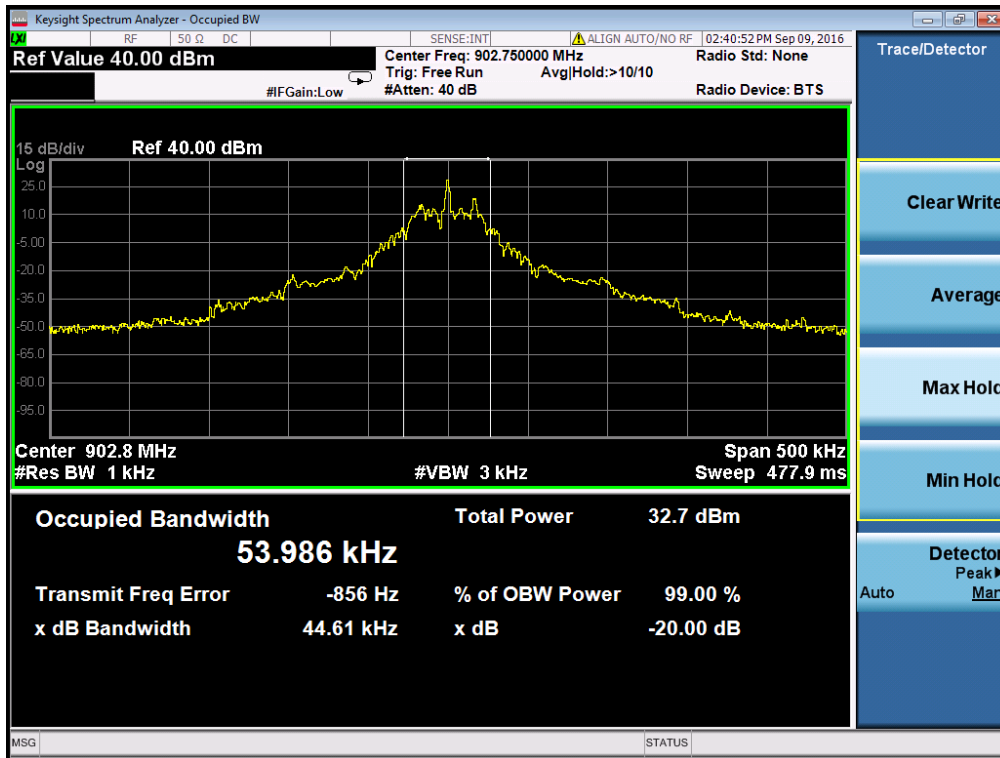
RBW \geq 1% of the 20 dB bandwidth; VBW \geq RBW; Sweep = auto; Detector function = peak;

Trace = max hold.
5. Measure and record the results in the test report.

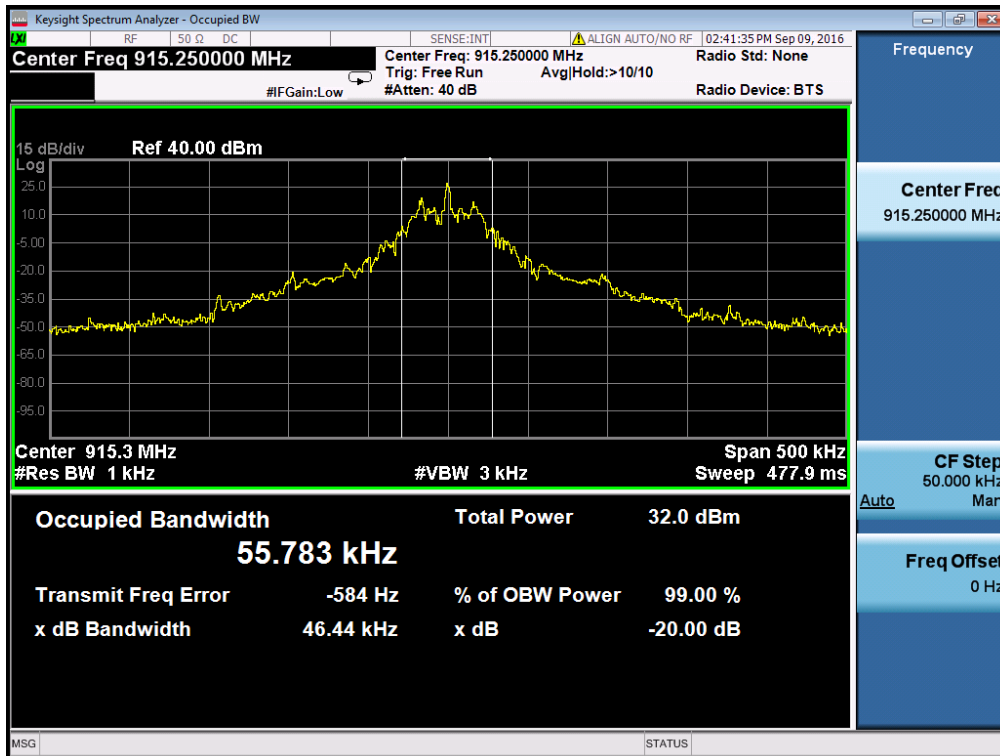
2.4.5. Test Results of 20dB Bandwidth

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	99% bandwidth (KHz)
1	902.75	44.61	53.99
26	915.25	46.44	55.78
50	927.25	45.55	55.94

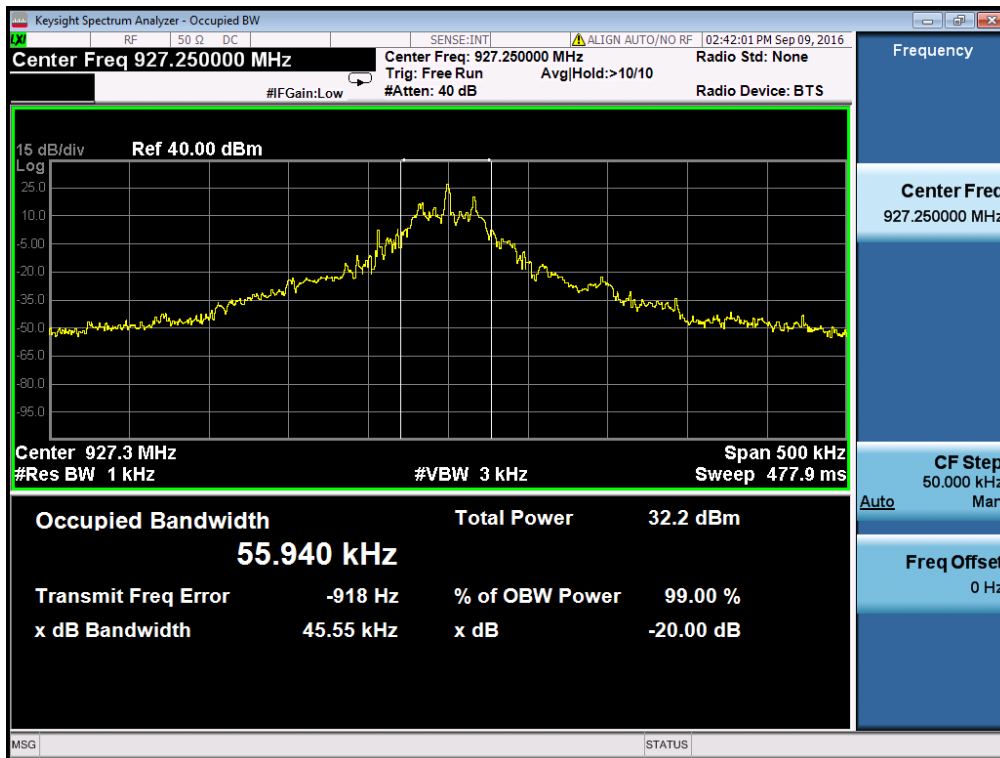
2.4.6. Test Results (plots) of Bandwidth



1 channel



26 channel



50 channel

2.5. Carried Frequency Separation

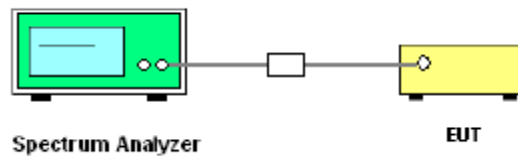
2.5.1. Limit of Carried Frequency Separation

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

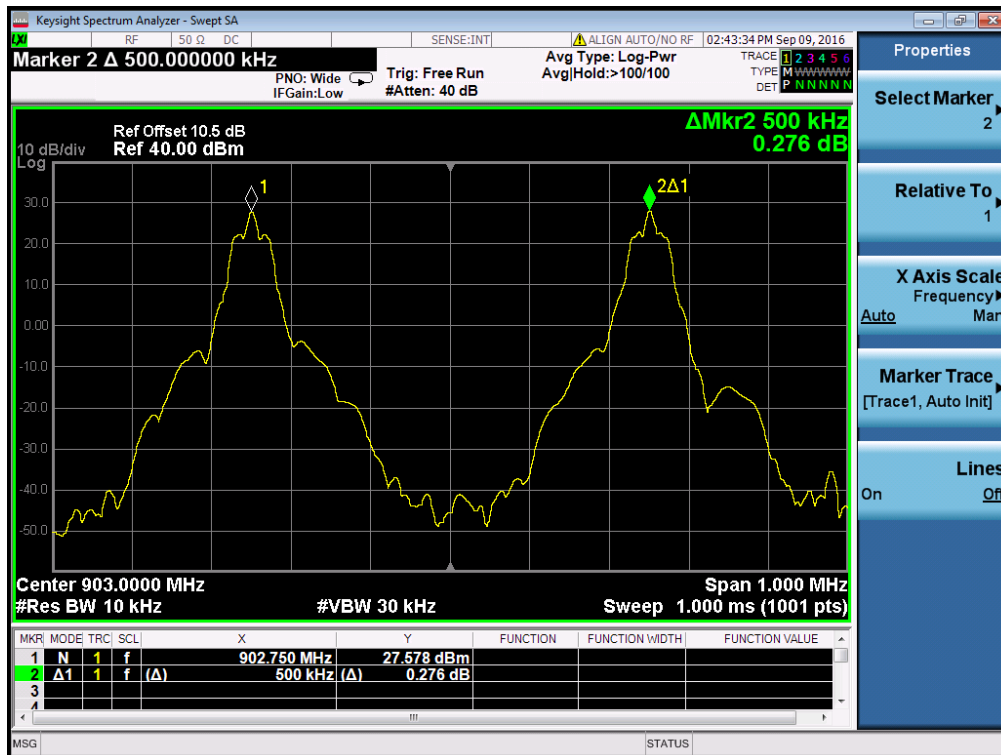
Span = wide enough to capture the peaks of two adjacent channels; $RBW \geq 1\%$ of the span;

 $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

2.5.5. Test Results of Carried Frequency Separation

Frequency Separation(kHz)	(2/3 of 20dB BW) Limits (kHz)	Verdict
500	29.74	PASS
500	30.96	PASS
500	30.37	PASS

2.5.6. Test Results (plots) of Carried Frequency Separation



L channel



M channel



H channel

2.6. Dwell time

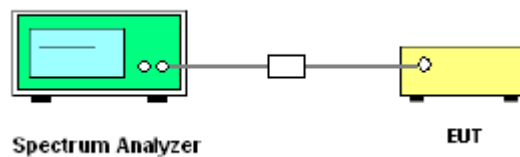
2.6.1. Limit of Dwell Time

Limit < 0.4 seconds within a 20 seconds period

2.6.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup



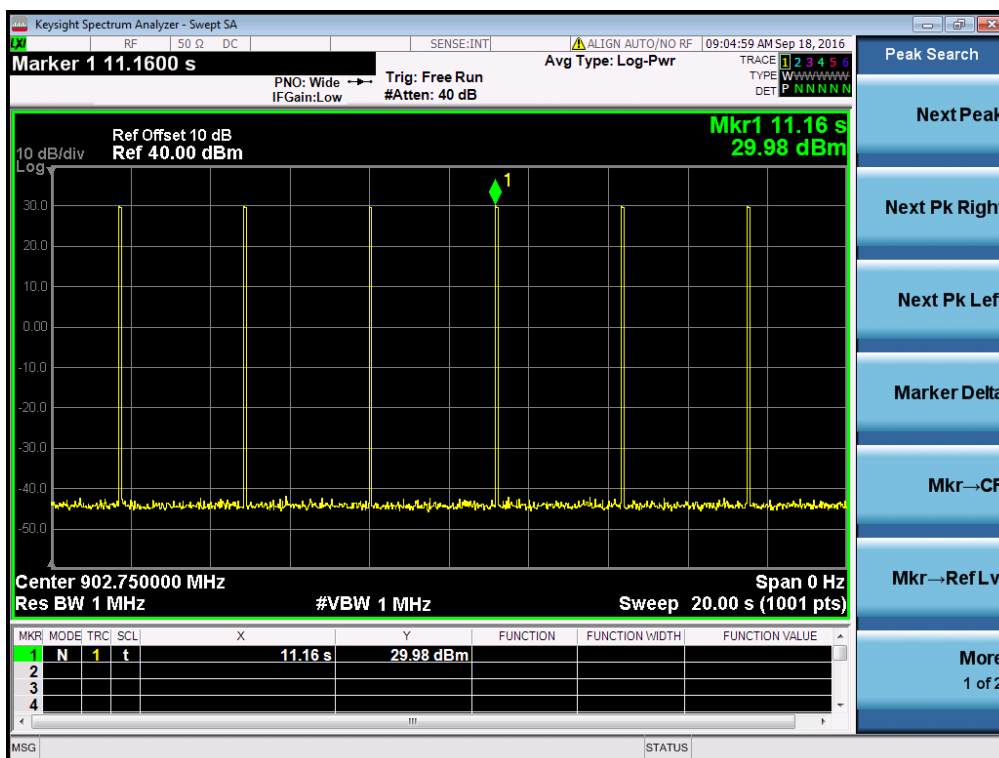
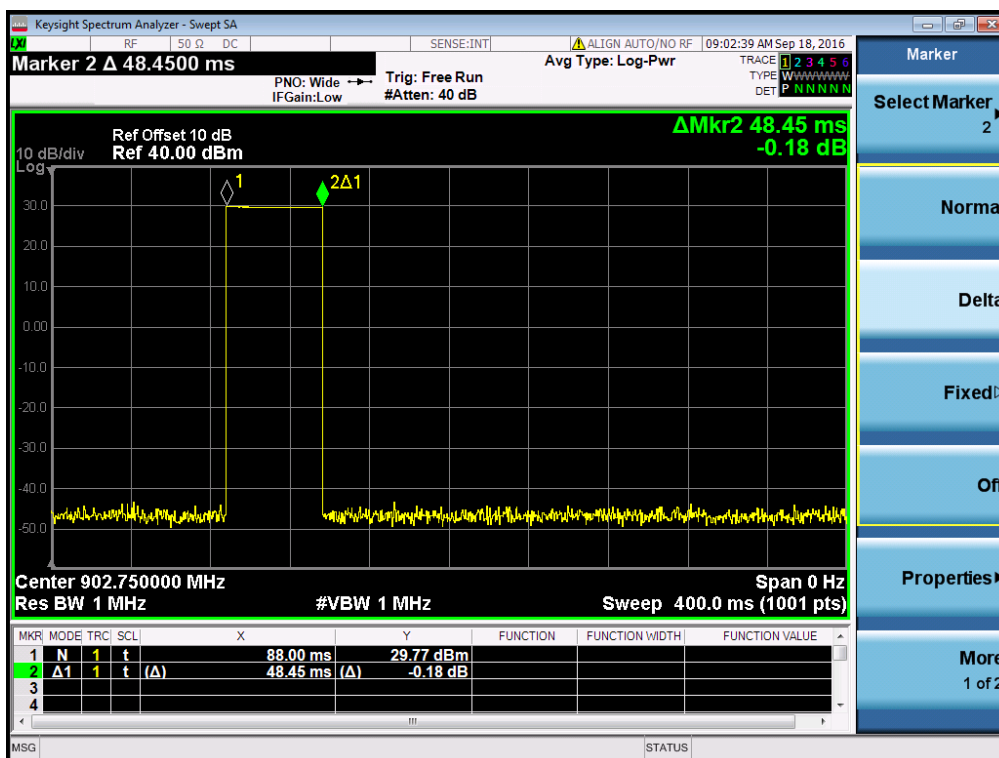
2.6.4. Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW \geq RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

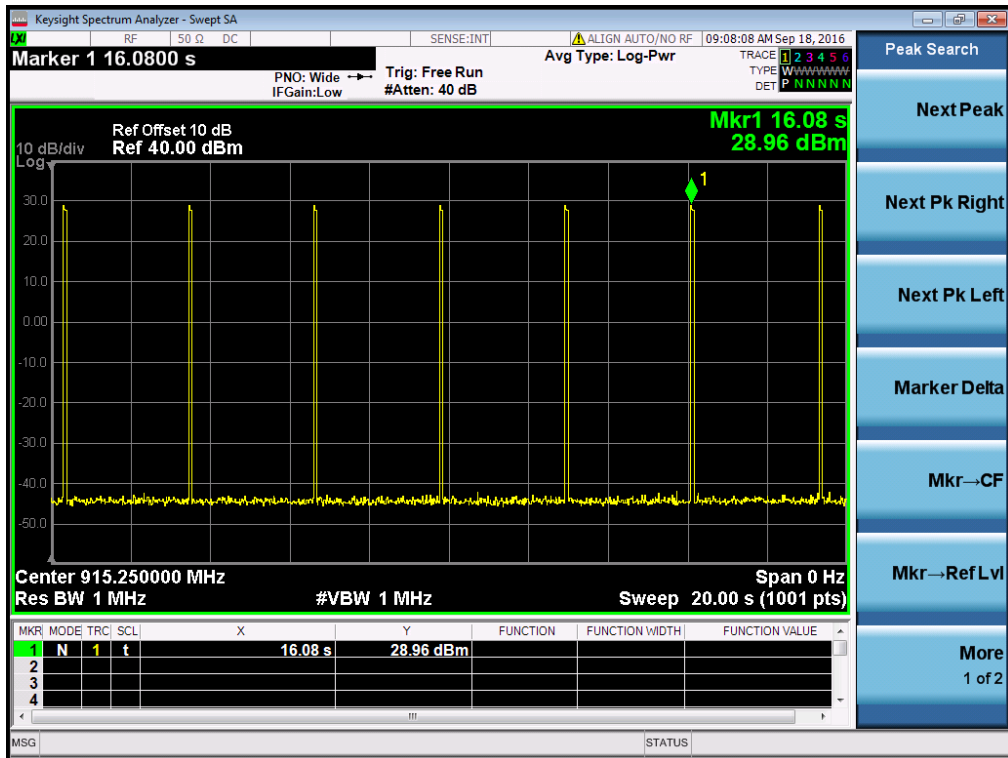
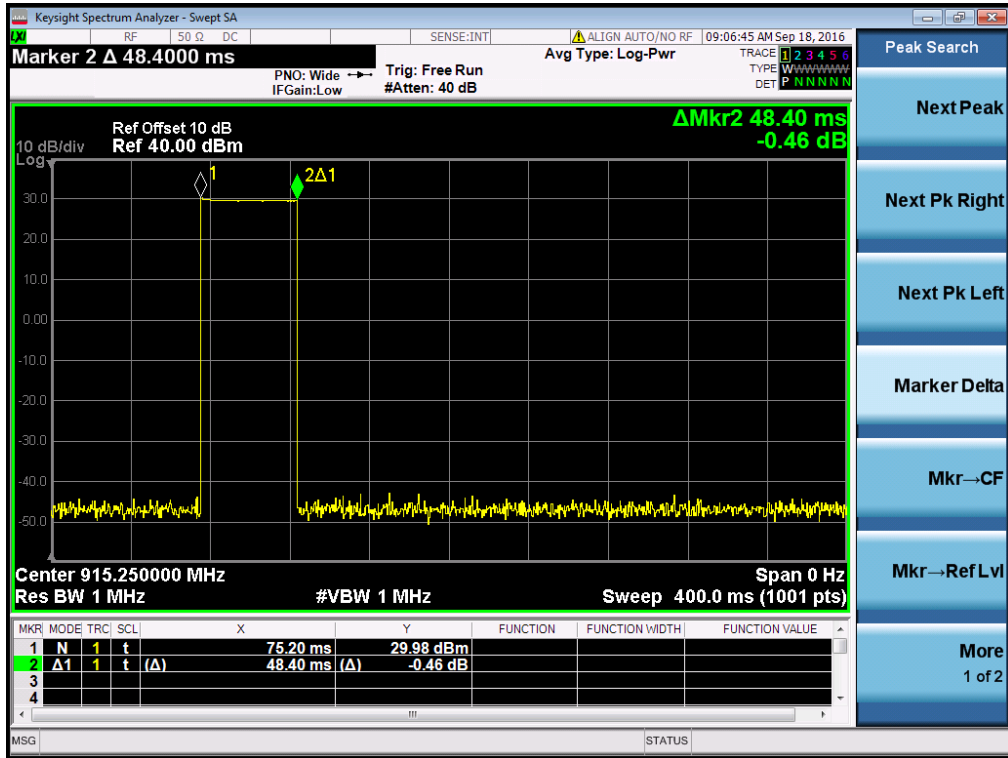
2.6.5. Test Results of Dwell Time

Frequency (MHz)	Length (ms)	Number	Dwell Time (ms)	Limit (ms)	Verdict
902.75	48.45	6	290.70	400	PASS
915.25	48.40	7	338.80		PASS
927.25	48.00	7	336.00		PASS

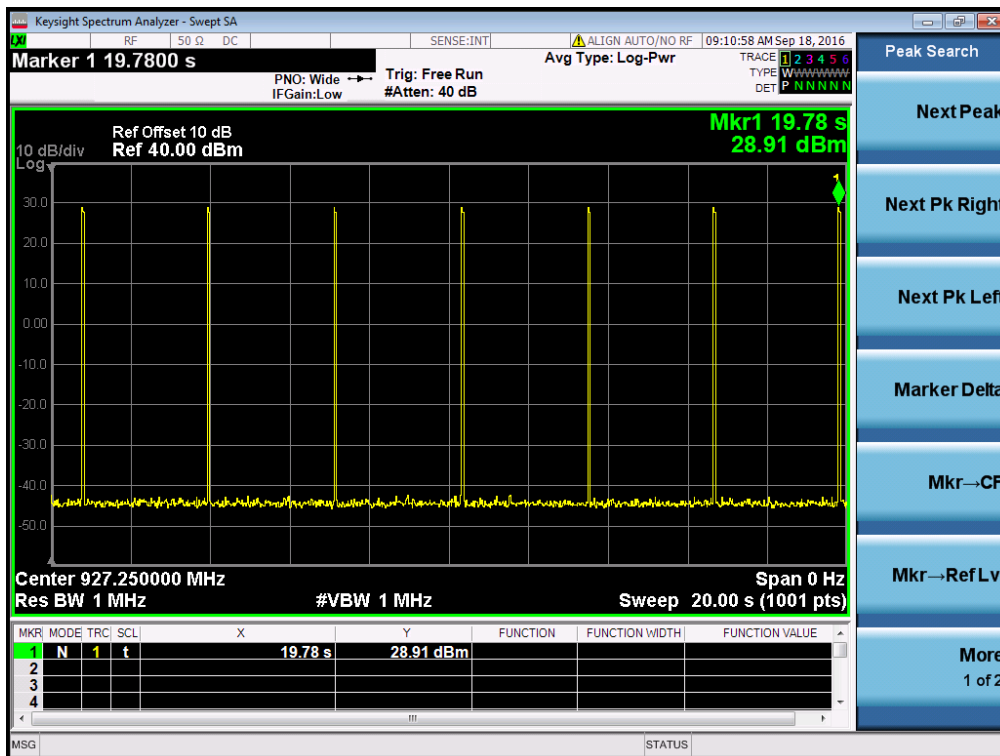
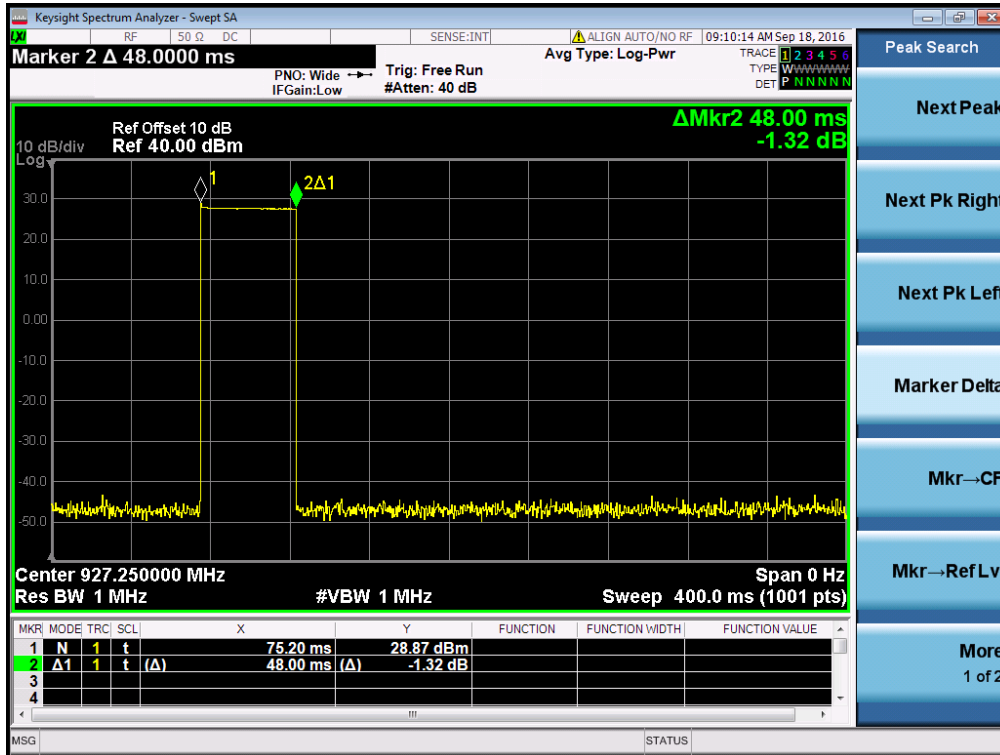
2.6.6. Test Results (plots) of Dwell Time



L channel



M channel



H channel

2.7. Conducted Spurious Emissions

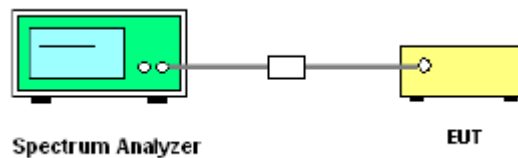
2.7.1. Limit of Spurious Emission

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

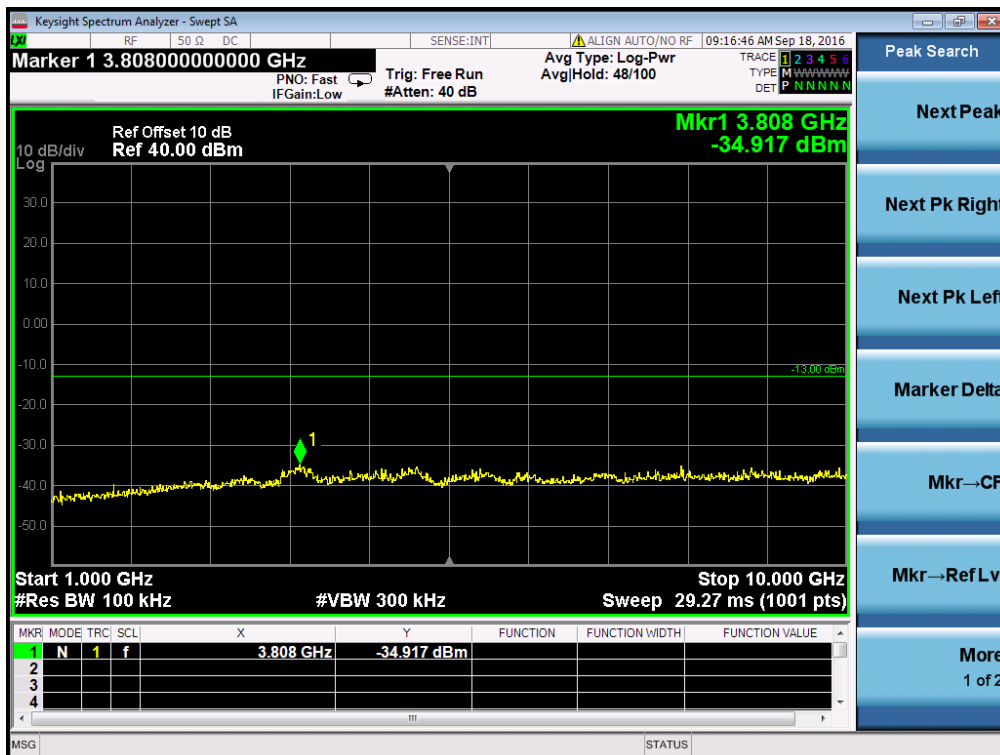
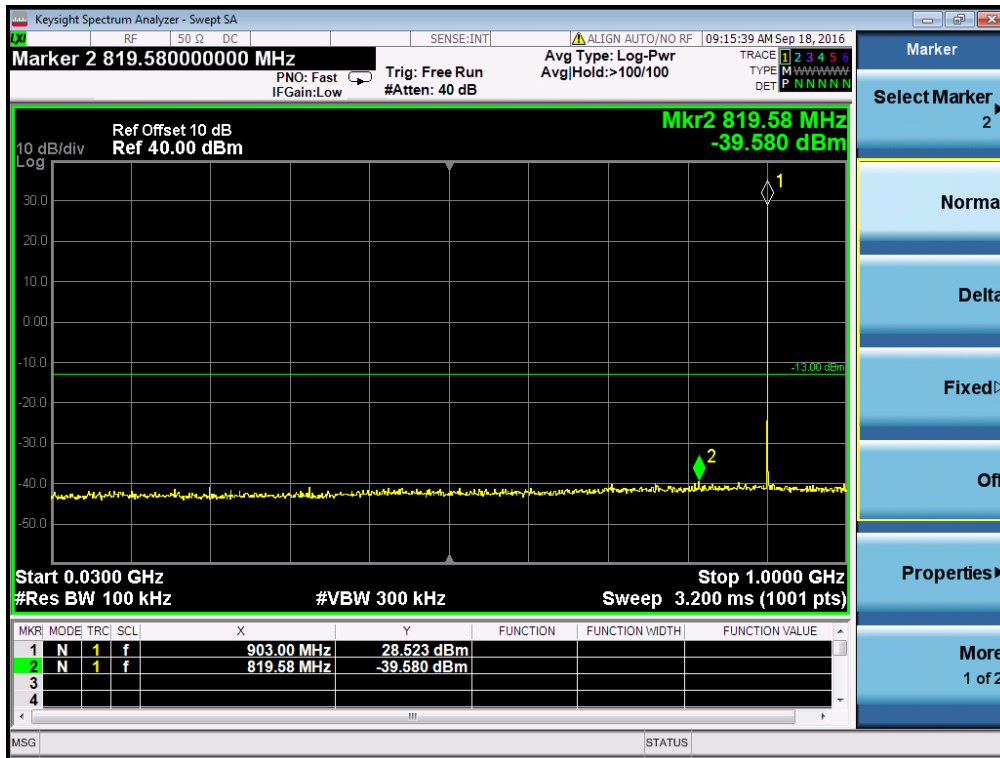
2.7.3. Test Setup



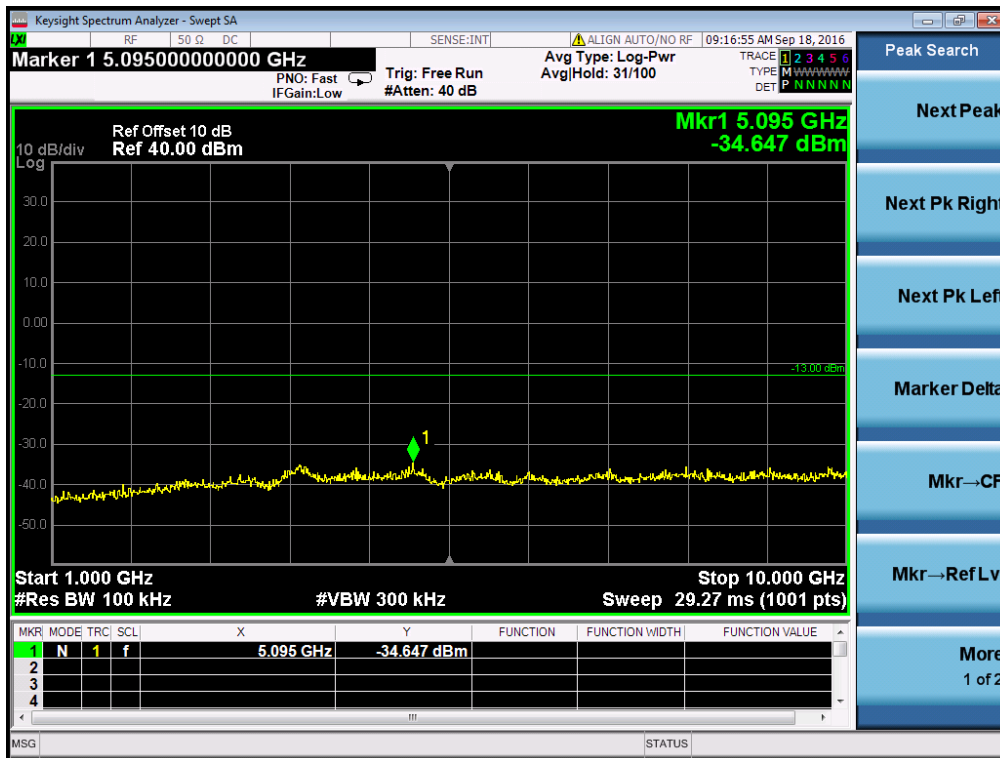
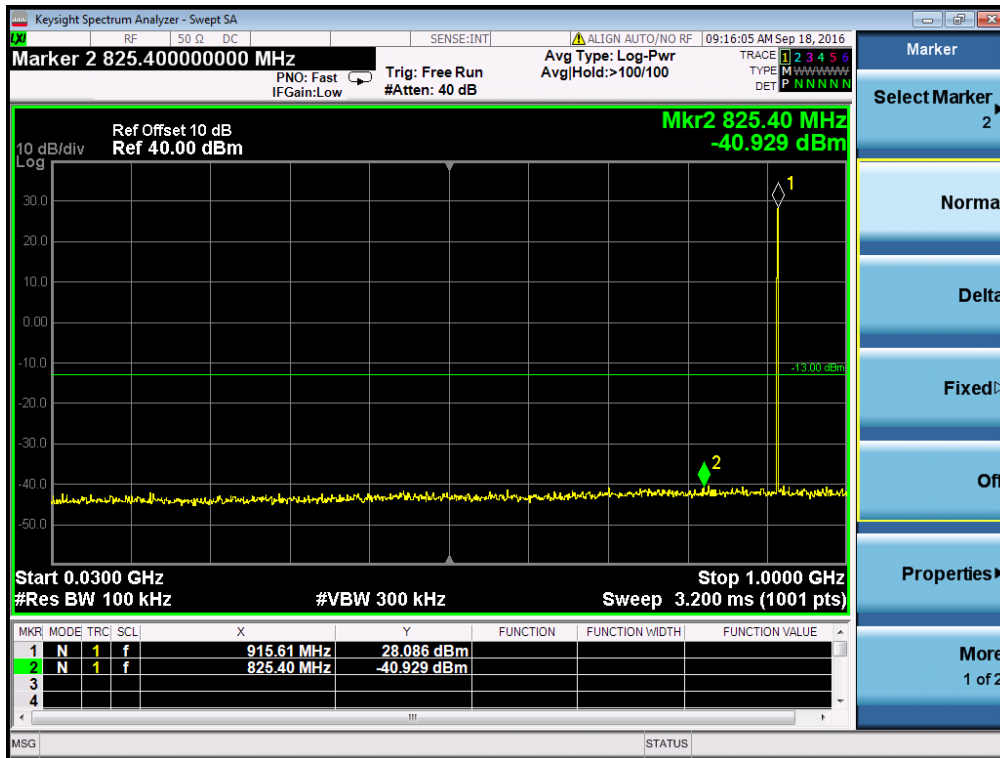
2.7.4. Test Procedure

1. The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

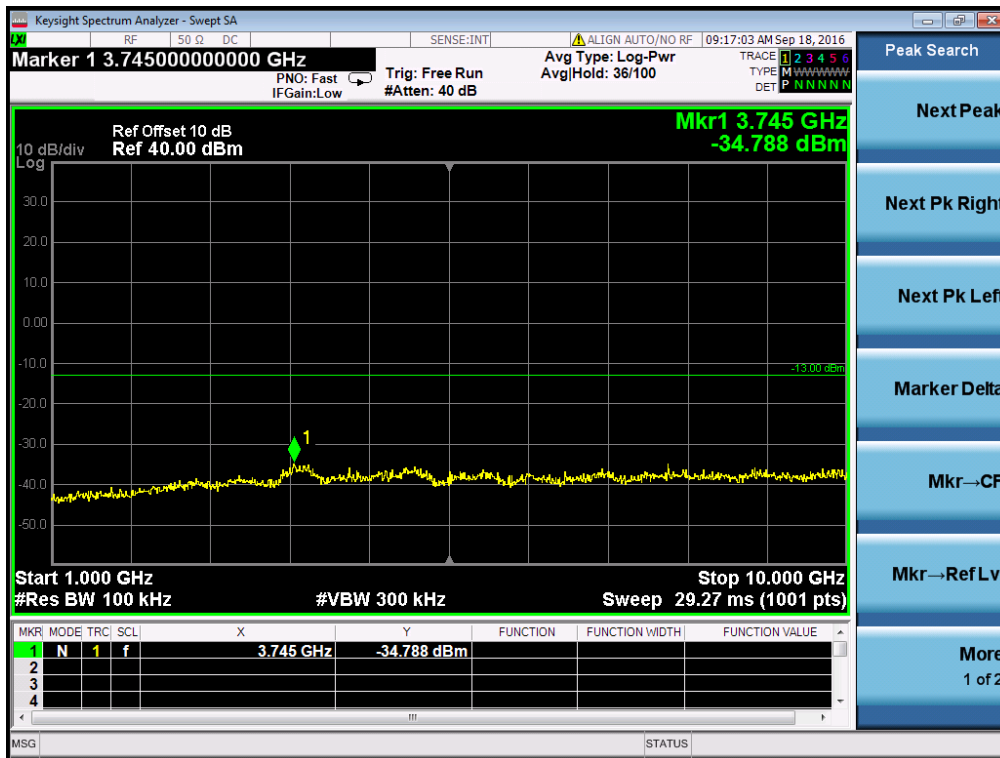
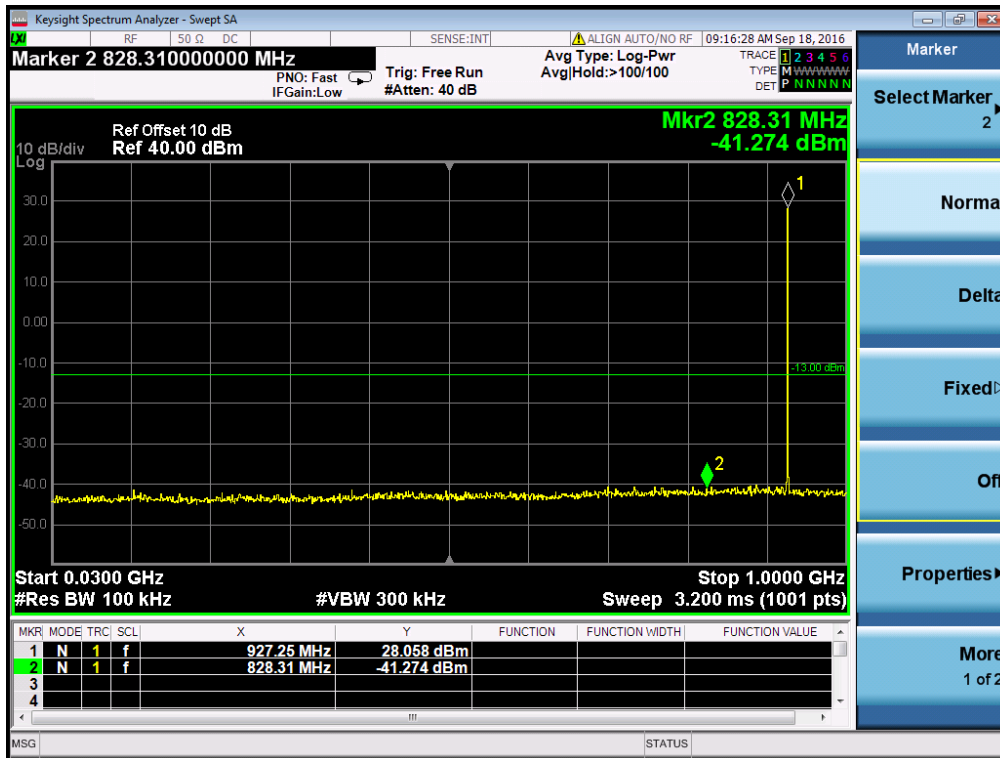
2.7.5. Test Results of Conducted Spurious Emissions



L channel



M channel



H channel

2.8. Conducted Band Edge

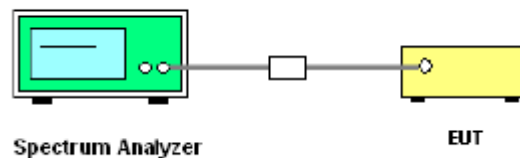
2.8.1. Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

2.8.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

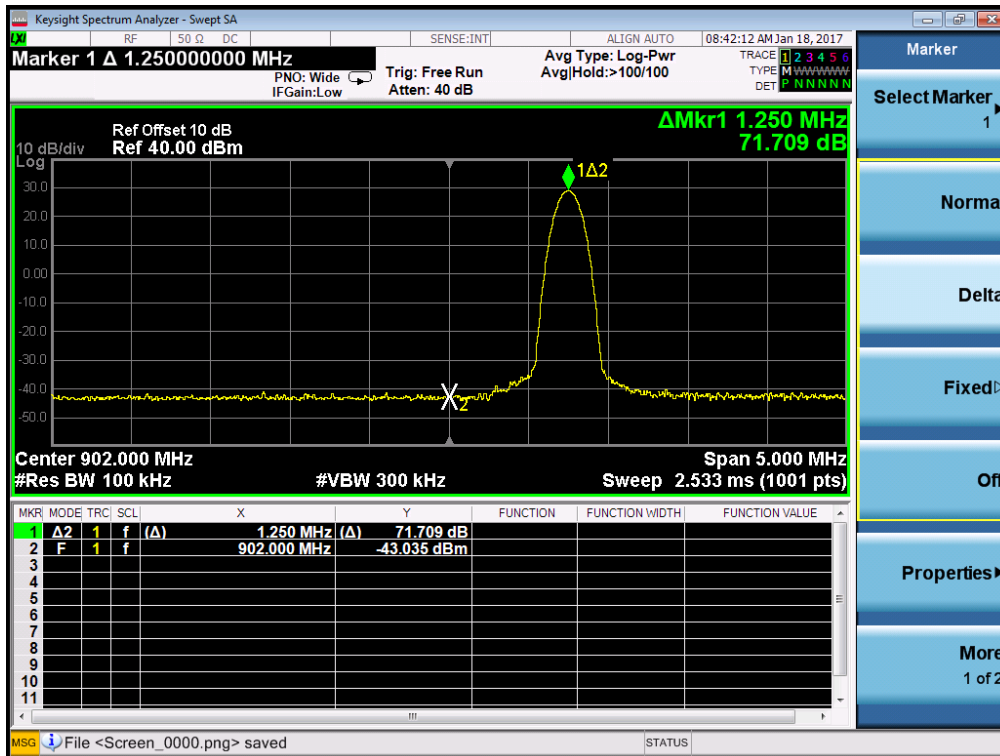
2.8.3. Test Setup



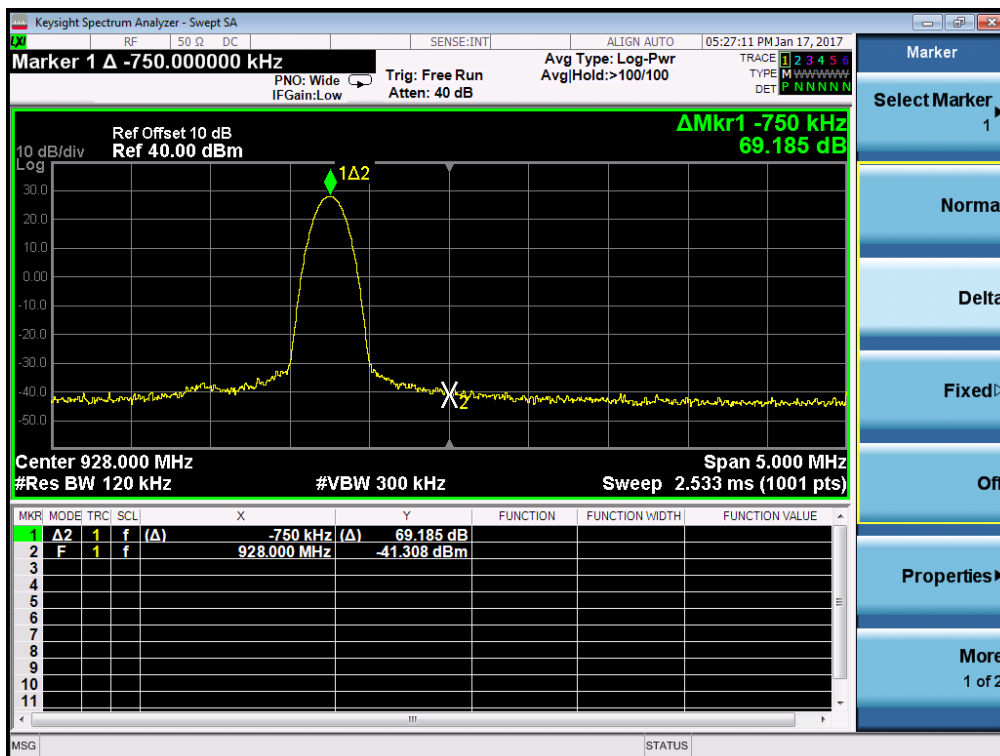
2.8.1. Test Procedure

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set $RBW = 100\text{kHz}$ ($\geq 1\%$ span=10MHz), $VBW = 300\text{kHz}$ ($\geq RBW$). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

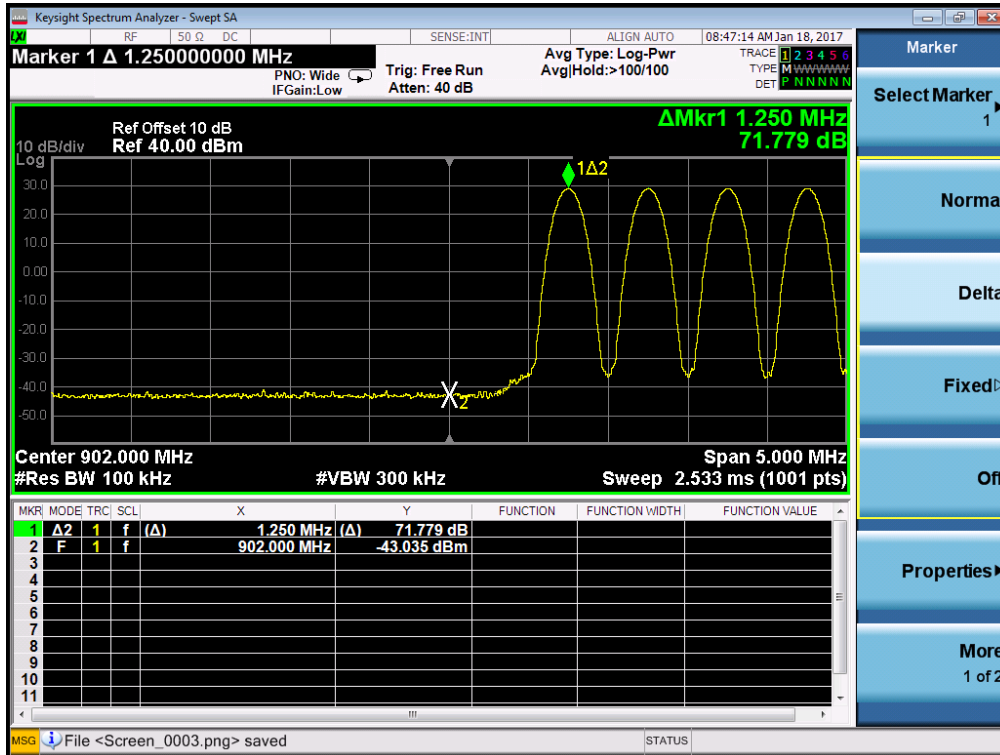
2.8.2. Test Results of Conducted Band Edge



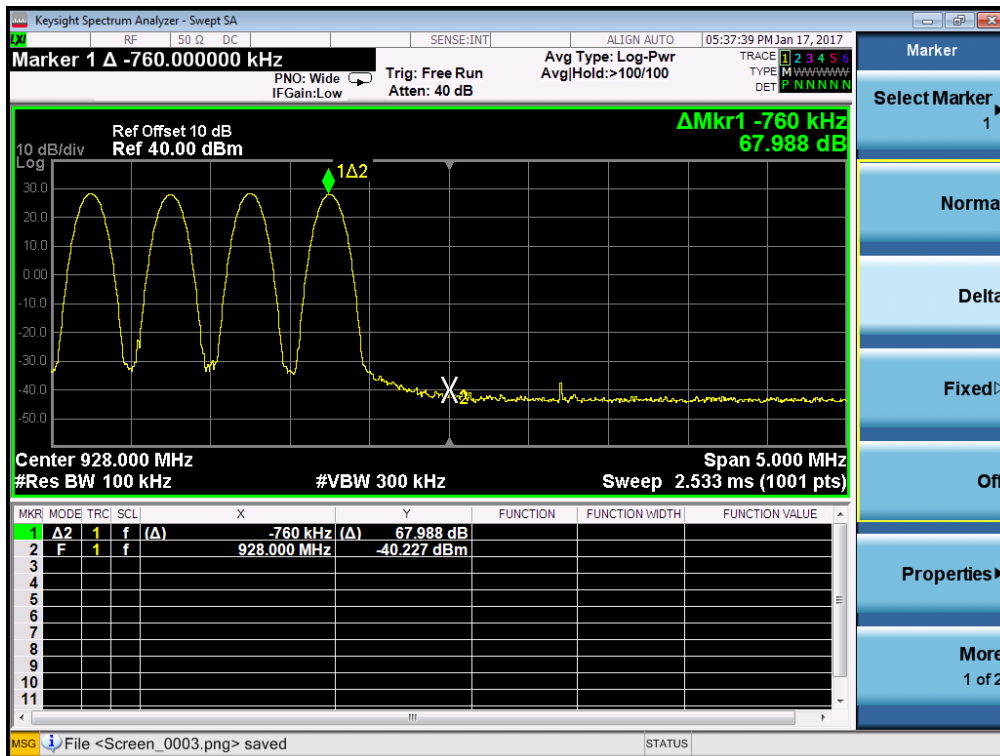
L channel



H channel



L(Hopping Mode)



H(Hopping Mode)

2.9. Conducted Emission

2.9.1. Limit of Conducted Emission

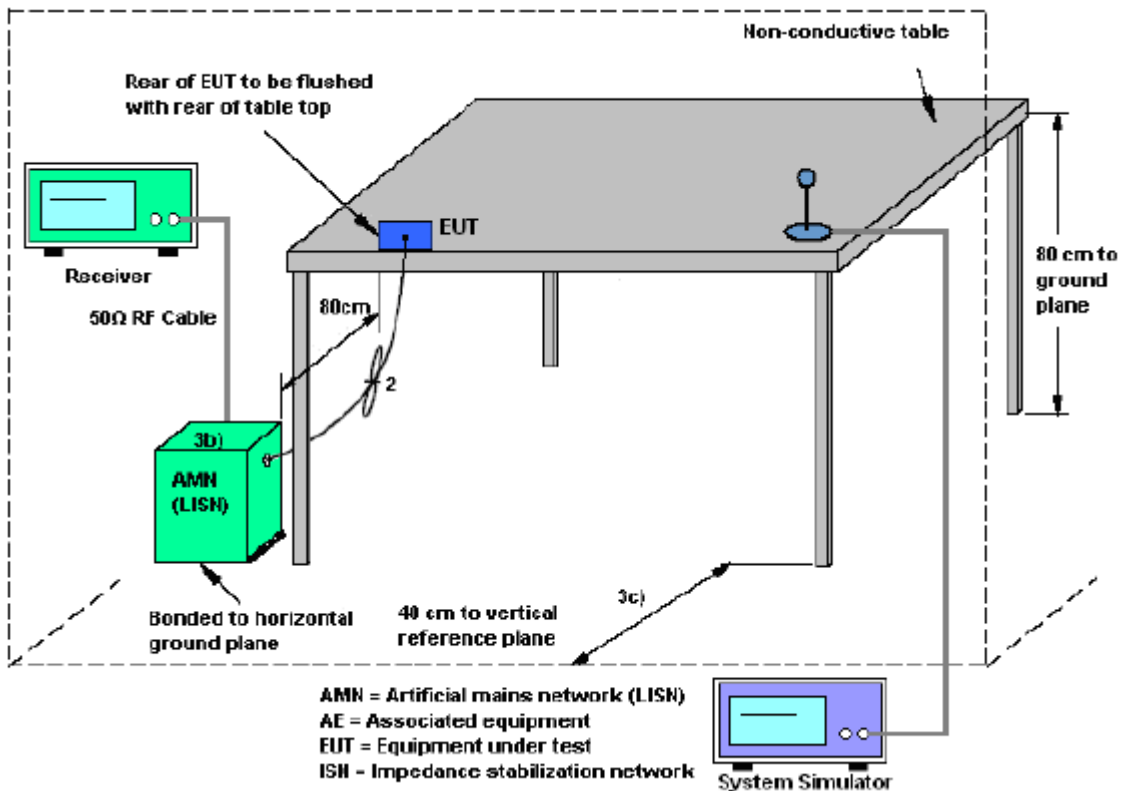
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

2.9.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.9.3. Test Setup

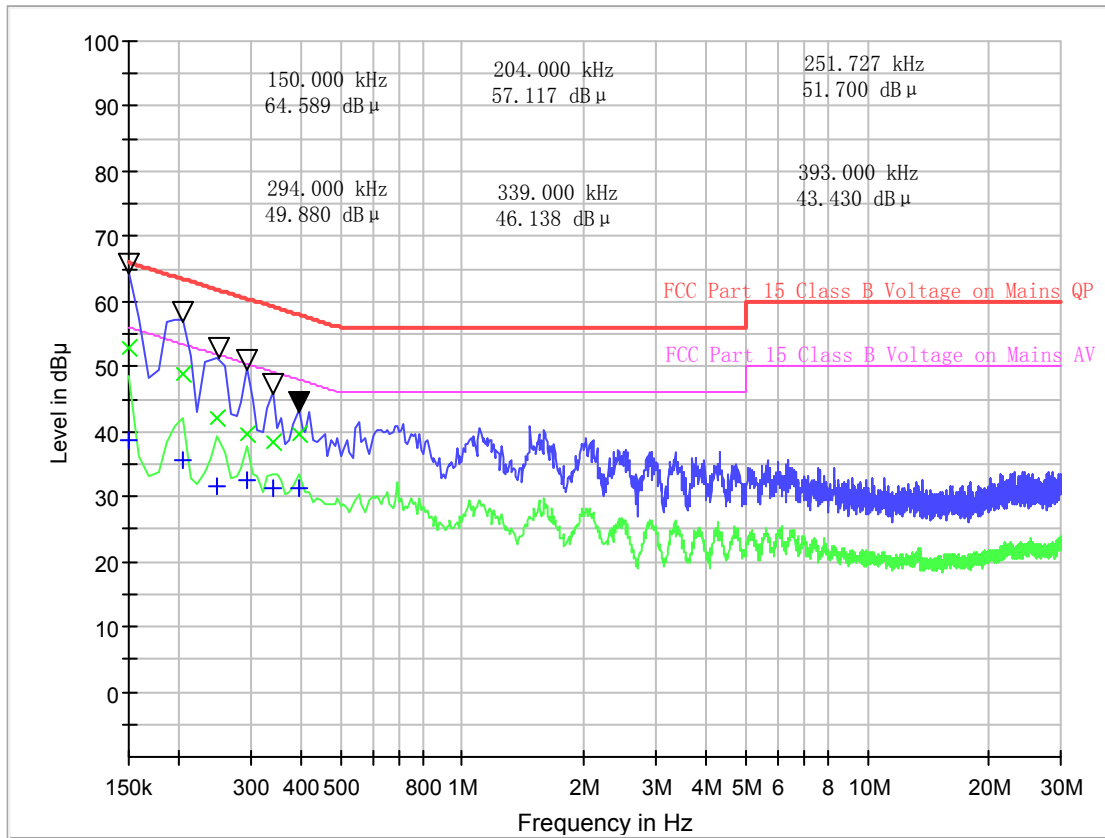


2.9.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.9.3. Test Results of Conducted Emission

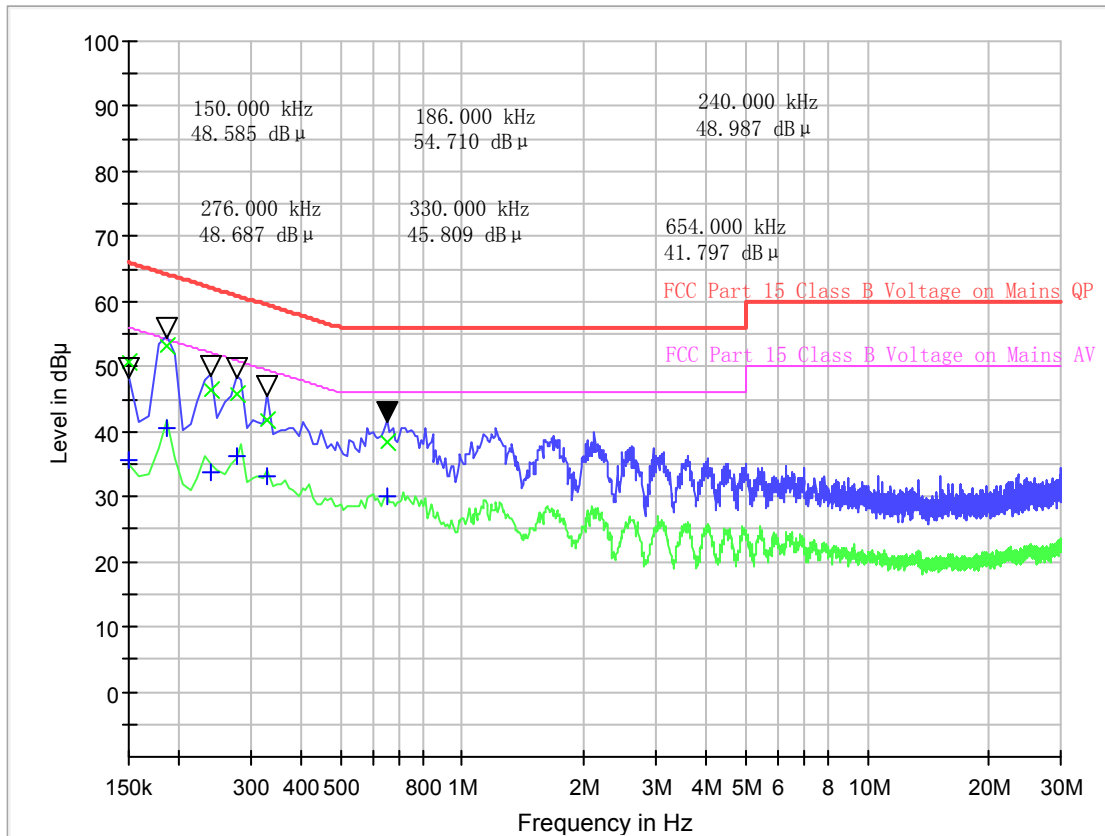
FCC Part 15 Class B Voltage Test



(Plot A: L Phase)

Conducted Disturbance at Mains Terminals					
L Test Data					
QP			AV		
Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)
0.150000	66.0	52.79	0.150000	56.0	38.53
0.204000	63.4	48.81	0.204000	53.4	35.65
0.249000	61.8	42.11	0.249000	51.8	31.71
0.294000	60.4	39.60	0.294000	50.4	32.53
0.339000	59.2	38.35	0.339000	49.2	31.43
0.393000	66.0	39.49	0.393000	56.0	31.36

FCC Part 15 Class B Voltage Test



(Plot B: N Phase)

Conducted Disturbance at Mains Terminals					
N Test Data					
QP			AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.150000	66.0	50.82	0.150000	56.0	35.69
0.186000	64.2	53.05	0.186000	54.2	40.68
0.240000	62.1	46.35	0.240000	52.1	33.87
0.276000	60.9	45.75	0.276000	50.9	36.28
0.330000	59.5	41.74	0.330000	49.5	33.19
0.654000	66.0	38.50	0.654000	56.0	29.91

2.10. Radiated Band Edges and Spurious Emission

2.10.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

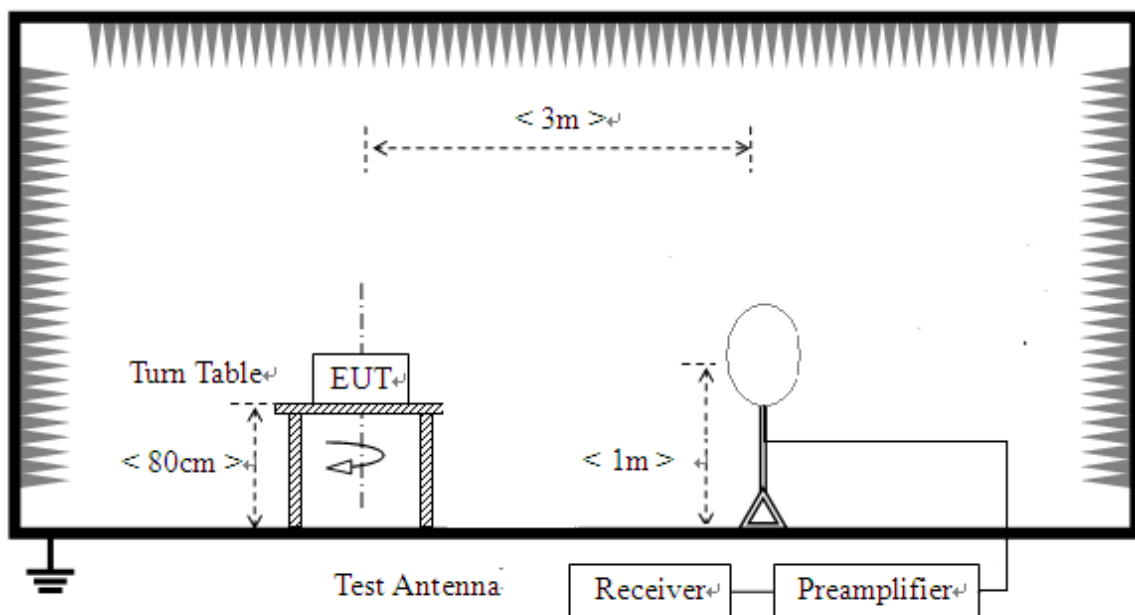
Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

2.10.2. Measuring Instruments

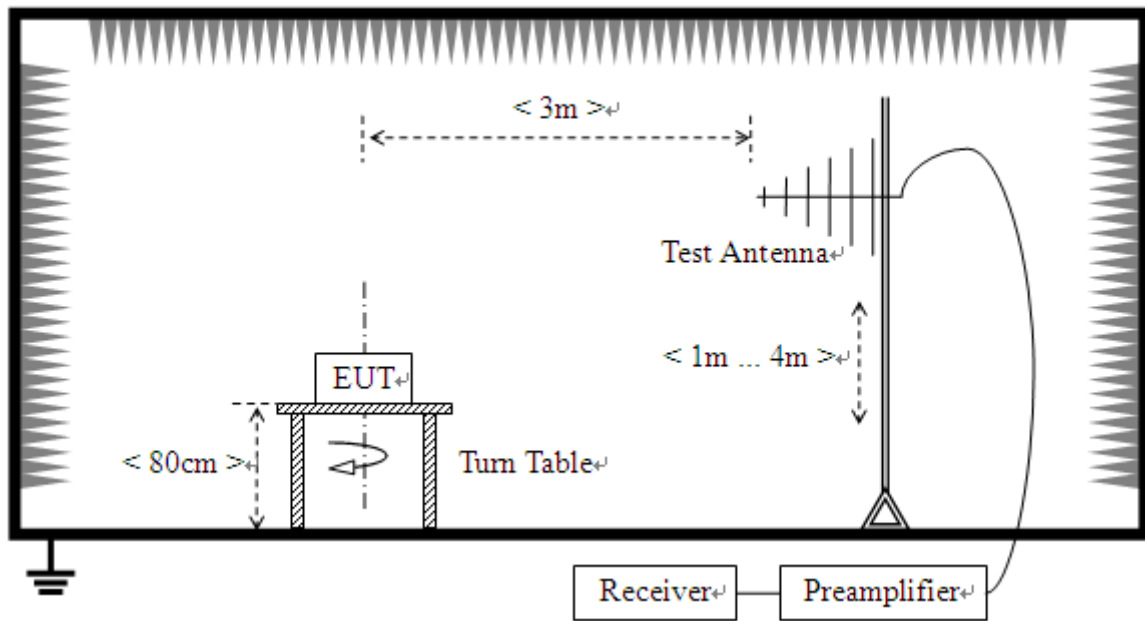
The measuring equipment is listed in the section 3 of this test report.

2.10.3. Test Setup

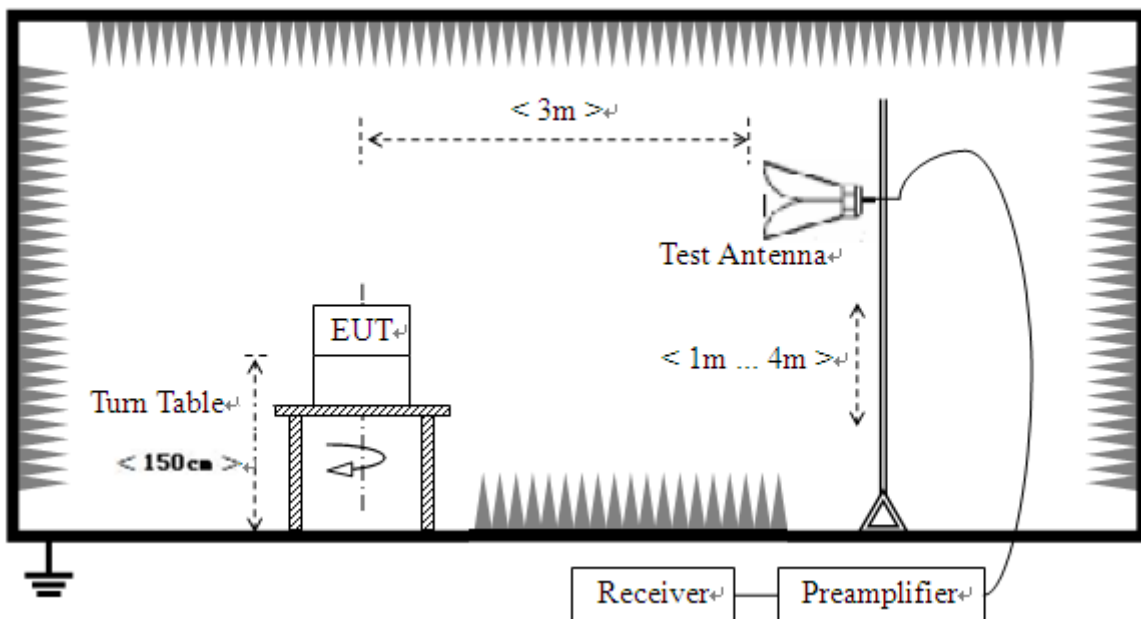
- 1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



2.10.4. Test Procedure

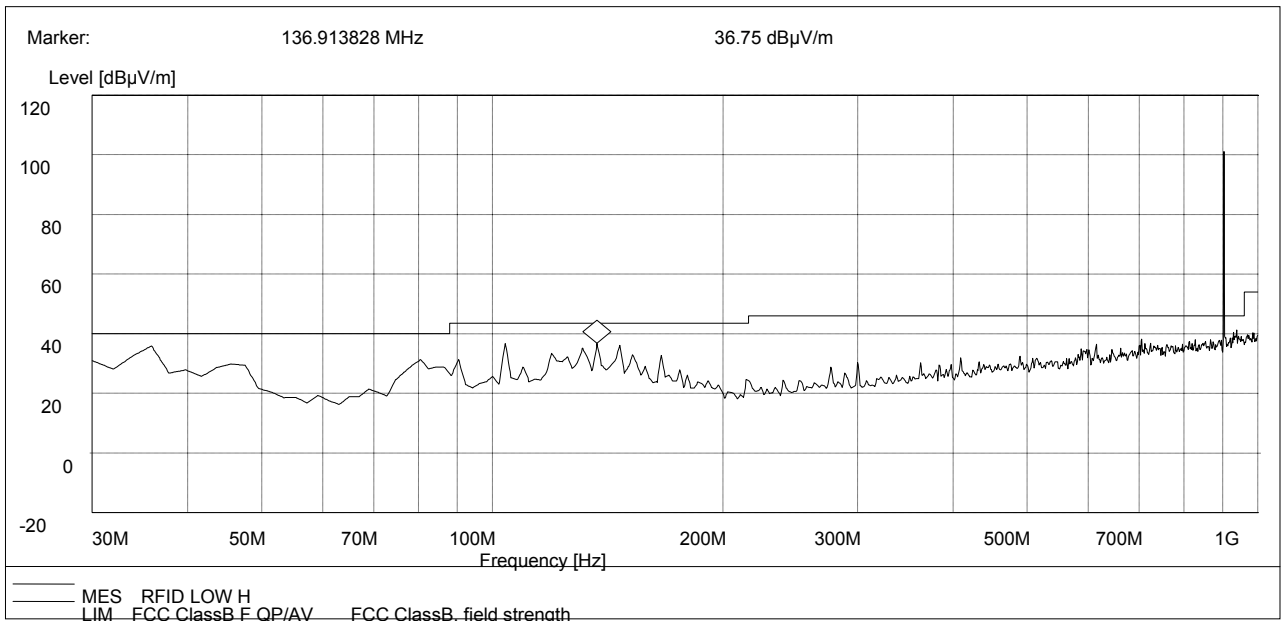
1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. The EUT was placed on a turntable with 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) 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. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz, RBW=1MHz for $f > 1$ GHz ; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{N_{n-1}} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

2.10.5. Test Results of Radiated Band Edge and Spurious Emission

For 9 KHz to 30MHz

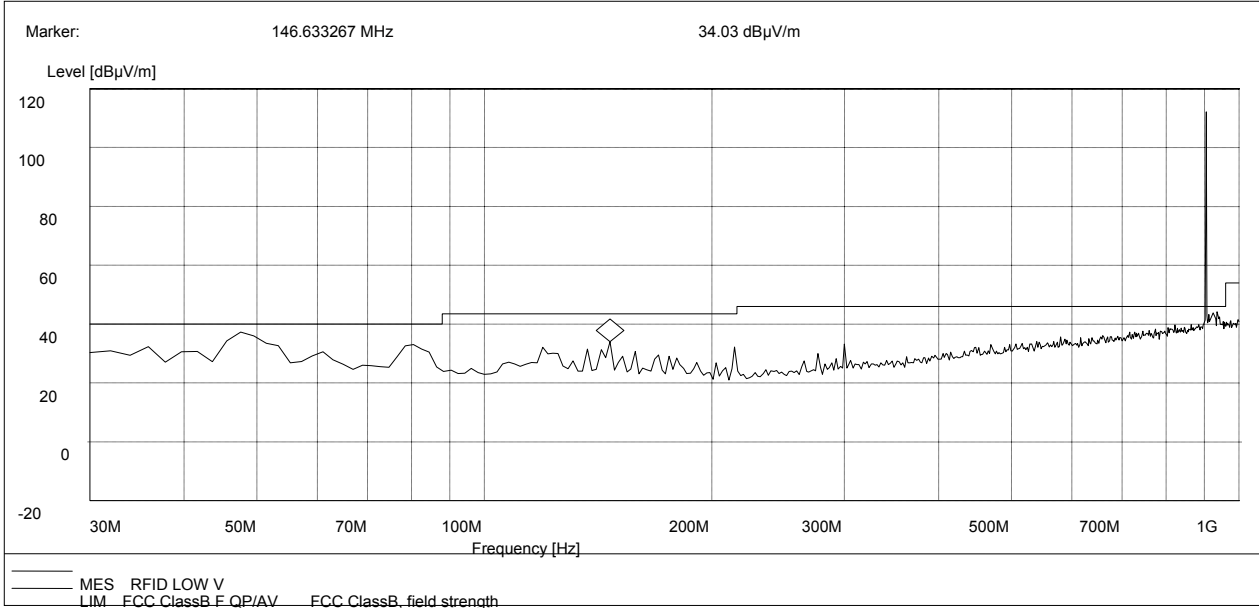
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000MHz



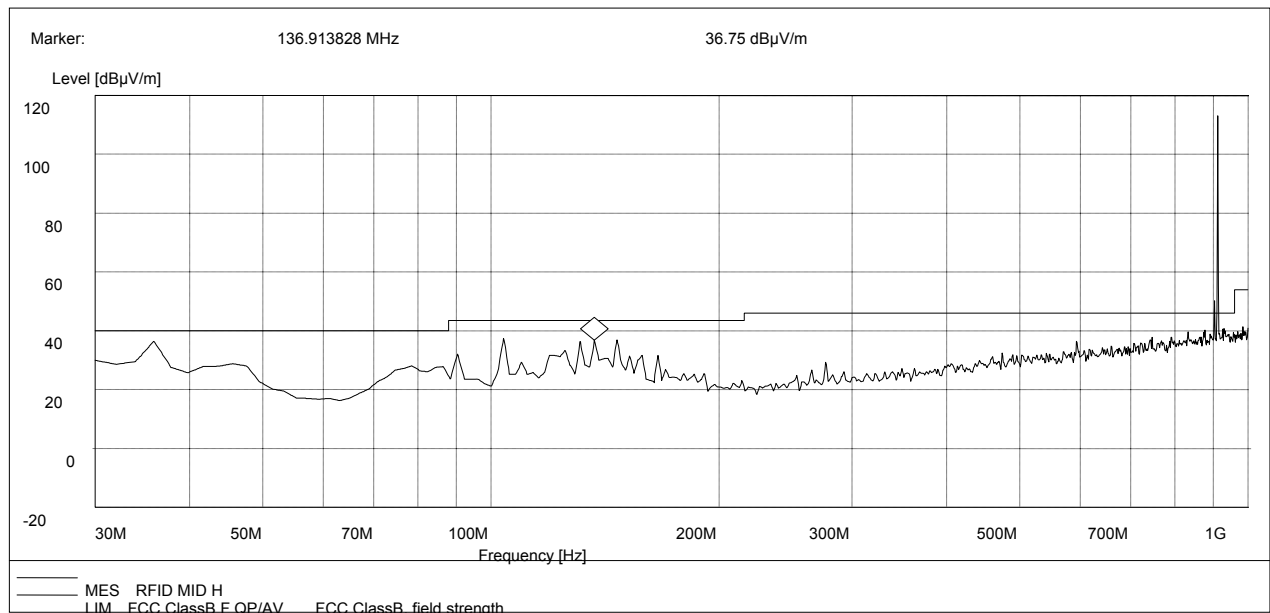
Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB µ V/m)	Antenna	Verdict
35.810	33.89	120.000	100.0	40.0	Horizontal	Pass
103.860	34.72	120.000	100.0	43.5	Horizontal	Pass
136.910	34.85	120.000	100.0	43.5	Horizontal	Pass

(Low Channel, 30MHz to 1GHz, Antenna Horizontal)



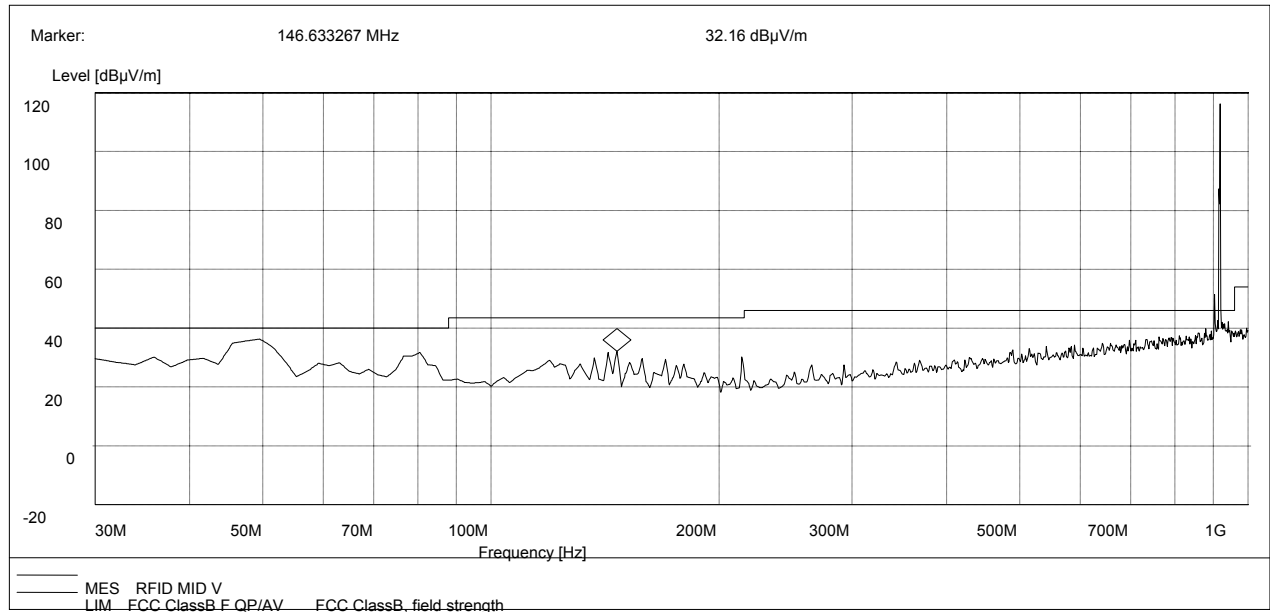
Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
47.780	35.67	120.000	100.0	40.0	Vertical	Pass
80.540	30.60	120.000	100.0	40.0	Vertical	Pass
146.630	32.07	120.000	100.0	43.5	Vertical	Pass

(Low Channel, 30MHz to 1GHz, Antenna Vertical)



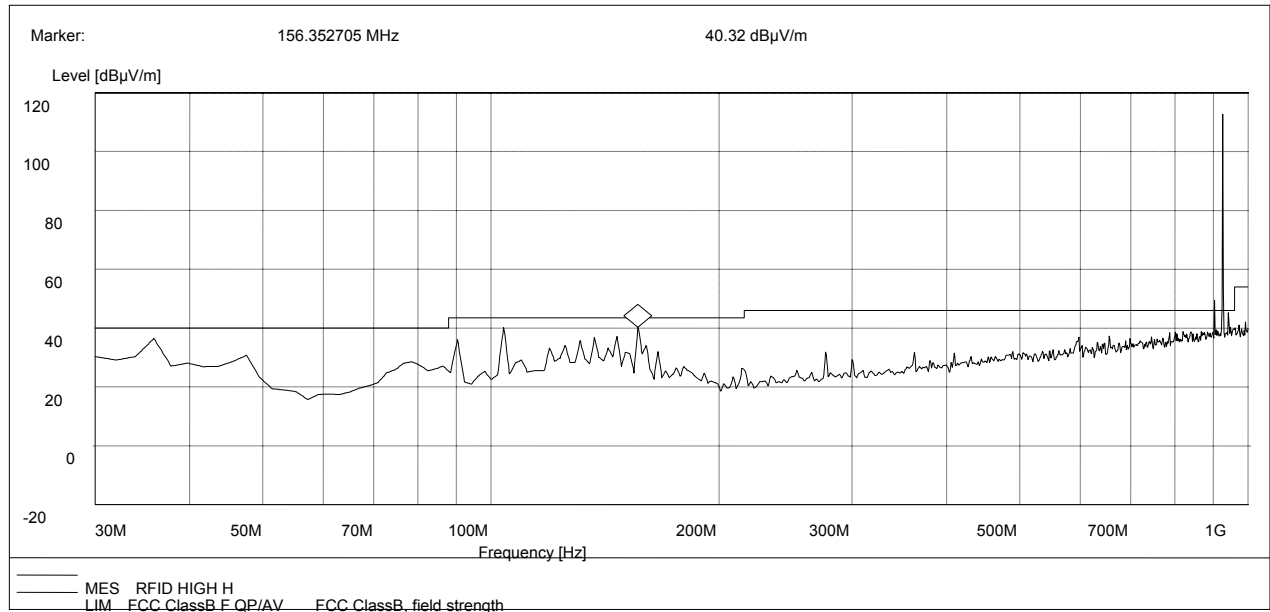
Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
35.830	34.45	120.000	100.0	40.0	Horizontal	Pass
103.860	35.44	120.000	100.0	43.5	Horizontal	Pass
136.910	35.17	120.000	100.0	43.5	Horizontal	Pass

(Middle Channel, 30MHz to 1GHz, Antenna Horizontal)



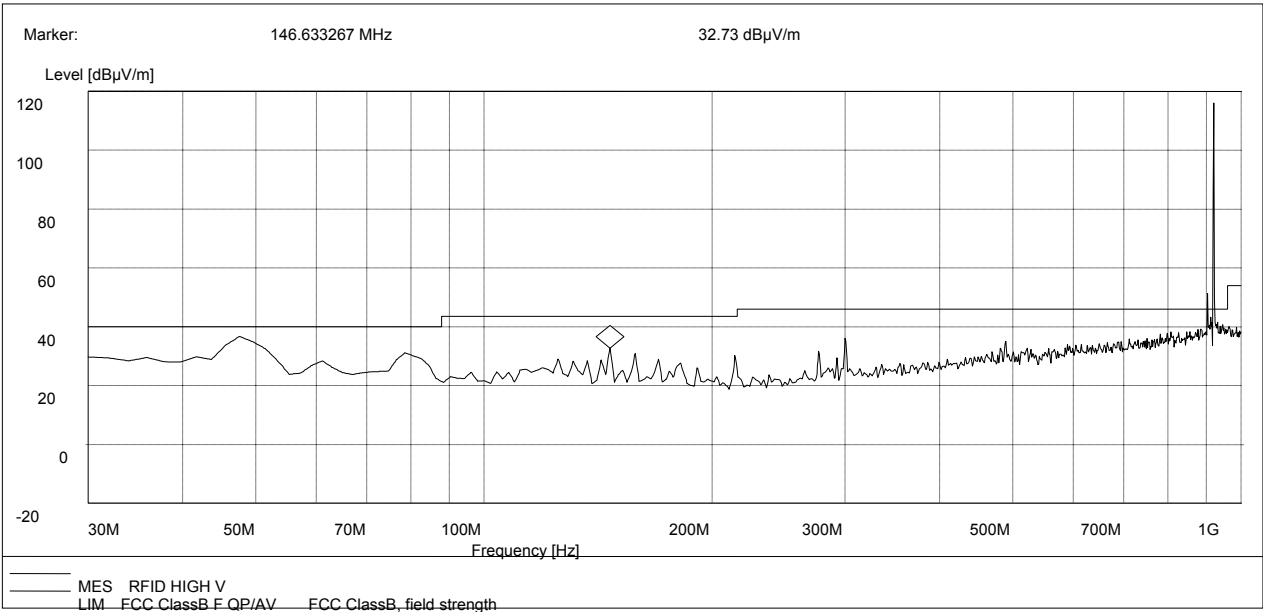
Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
49.440	34.27	120.000	100.0	40.0	Vertical	Pass
80.540	29.86	120.000	100.0	40.0	Vertical	Pass
146.630	31.58	120.000	100.0	43.5	Vertical	Pass

(Middle Channel, 30MHz to 1GHz, Antenna Vertical)



Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
35.830	34.58	120.000	100.0	40.0	Horizontal	Pass
103.890	38.98	120.000	100.0	43.5	Horizontal	Pass
156.350	39.14	120.000	100.0	43.5	Horizontal	Pass

(High Channel, 30MHz to 1GHz, Antenna Horizontal)



Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
47.440	34.68	120.000	100.0	40.0	Vertical	Pass
78.590	29.14	120.000	100.0	40.0	Vertical	Pass
146.630	30.99	120.000	100.0	43.5	Vertical	Pass

(High Channel, 30MHz to 1GHz, Antenna Vertical)

Above 1GHz Data:

Channel	TX Channel 1	Detector Function	Peak(PK)
Frequency Range	1GHz ~ 10GHz		Average(AV)

Antenna Polarity & Test Distance : Horizontal AT 3M											
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1805.50	52.38	PK	74.0	-21.62	1.51H	14	52.08	0.3	4.5	32.20
2	1805.50	42.75	AV	54.0	-11.25	1.51H	14	42.45	0.3	4.5	32.20
3	2708.25	53.66	PK	74.0	-20.34	1.50H	15	49.86	3.8	6.1	31.50
4	2708.25	43.50	AV	54.0	-10.50	1.50H	15	39.7	3.8	6.1	31.50
5	3611.00	54.54	PK	74.0	-19.46	1.51H	13	49.69	4.85	6.3	31.50
6	3611.00	44.28	AV	54.0	-9.72	1.51H	13	39.43	4.85	6.3	31.50

Antenna Polarity & Test Distance : Vertical AT 3M											
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1805.50	52.24	PK	74.00	-21.76	1.50V	45	51.94	0.3	4.5	32.20
2	1805.50	42.25	AV	54.00	-11.75	1.50V	45	41.95	0.3	4.5	32.20
3	2708.25	53.54	PK	74.00	-20.46	1.53V	35	49.74	3.8	6.1	31.50
4	2708.25	43.29	AV	54.00	-10.71	1.53V	35	39.49	3.8	6.1	31.50
5	3611.00	54.34	PK	74.00	-19.66	1.50V	12	49.49	4.85	6.3	31.50
6	3611.00	44.22	AV	54.00	-9.78	1.50V	12	39.37	4.85	6.3	31.50

Channel	TX Channel 26	Detector Function	Peak(PK)
Frequency Range	1GHz ~ 10GHz		Average(AV)

Antenna Polarity & Test Distance : Horizontal AT 3M

No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1830.50	52.68	PK	74.0	-21.32	1.50H	50	52.38	0.3	4.5	32.20
2	1830.50	42.52	AV	54.0	-11.48	1.50H	50	42.22	0.3	4.5	32.20
3	2745.75	53.57	PK	74.0	-20.43	1.51H	37	49.77	3.8	6.1	31.50
4	2745.75	43.50	AV	54.0	-10.5	1.51H	37	39.7	3.8	6.1	31.50
5	3661.00	54.69	PK	74.0	-19.31	1.51H	30	49.84	4.85	6.3	31.50
6	3661.00	43.65	AV	54.0	-10.35	1.51H	30	38.8	4.85	6.3	31.50

Antenna Polarity & Test Distance : Vertical AT 3M

No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1830.50	52.41	PK	74.00	-21.59	1.50V	50	52.11	0.3	4.5	32.20
2	1830.50	42.52	AV	54.00	-11.48	1.50V	50	42.22	0.3	4.5	32.20
3	2745.75	53.38	PK	74.00	-20.62	1.50V	45	49.58	3.8	6.1	31.50
4	2745.75	43.44	AV	54.00	-10.56	1.50V	45	39.64	3.8	6.1	31.50
5	3661.00	54.21	PK	74.00	-19.79	1.50V	38	49.36	4.85	6.3	31.50
6	3661.00	43.63	AV	54.00	-10.37	1.50V	38	38.78	4.85	6.3	31.50

Channel	TX Channel 50	Detector Function	Peak(PK)
Frequency Range	1GHz ~ 10GHz		Average(AV)

Antenna Polarity & Test Distance : Horizontal AT 3M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1854.50	52.72	PK	74.0	-21.28	1.50H	30	52.42	0.3	4.5	32.20
2	1854.50	42.64	AV	54.0	-11.36	1.50H	30	42.34	0.3	4.5	32.20
3	2781.75	53.52	PK	74.0	-20.48	1.51H	42	49.72	3.8	6.1	31.50
4	2781.75	43.46	AV	54.0	-10.54	1.51H	42	39.66	3.8	6.1	31.50
5	3709.00	54.48	PK	74.0	-19.52	1.50H	38	49.63	4.85	6.3	31.50
6	3709.00	43.58	AV	54.0	-10.42	1.50H	38	38.73	4.85	6.3	31.50

Antenna Polarity & Test Distance : Vertical AT 3M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amplifier (dB)
1	1854.50	52.18	PK	74.00	-21.82	1.51V	34	51.88	0.3	4.5	32.20
2	1854.50	42.36	AV	54.00	-11.64	1.51V	34	42.06	0.3	4.5	32.20
3	2781.75	53.48	PK	74.00	-20.52	1.50V	34	49.68	3.8	6.1	31.50
4	2781.75	43.32	AV	54.00	-10.68	1.50V	34	39.52	3.8	6.1	31.50
5	3709.00	54.27	PK	74.00	-19.73	1.52V	25	49.42	4.85	6.3	31.50
6	3709.00	43.42	AV	54.00	-10.58	1.52V	25	38.57	4.85	6.3	31.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. This device tested in a engineer 'steady-state' CW mode.

3. List of measuring equipment

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	11/13/2016
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	11/13/2016
3	EMI TEST Software	Audix	E3	N/A	N/A
4	TURNTABLE	ETS	2088	2149	N/A
5	ANTENNA MAST	ETS	2075	2346	N/A
6	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
7	HORNANTENNA	ShwarzBeck	9120D	1011	11/13/2016
8	Amplifer	Sonoma	310N	E009-13	11/13/2016
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5 A	F201504	11/13/2016
10	High pass filter	Compliance Direction systems	BSU-6	34202	11/13/2016
11	HORNANTENNA	ShwarzBeck	9120D	1012	11/13/2016
12	Amplifer	Compliance Direction systems	PAP1-4060	120	11/13/2016
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	11/13/2016
14	TURNTABLE	MATURO	TT2.0	----	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	11/13/2016
17	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	11/13/2016

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	11/13/2016
2	Spectrum Analyzer	Keysight	N9030A	ATO-67098	07/19/2016
3	Power Meter	Anritsu	ML2480B	100798	11/13/2016
4	Power Sensor	Anritsu	MA2411B	100258	11/13/2016

AC Conducted Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde & Schwarz	ESCI	100106	11/13/2016
2	ARTIFICIAL MAINS	Rohde & Schwarz	ESH2-Z5	100028	11/13/2016
3	PULSE LIMITER	Rohde & Schwarz	ESHSZ2	100044	11/13/2016
4	EMI TEST SOFTWARE	Rohde & Schwarz	ES-K1	N/A	N/A

4. Uncertainty of Evaluation

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2

Measurement	Frequency	Uncertainty
AC Conducted emissions	9kHz~30MHz	3.39 dB
Radiated emissions	9KHz~40GHz	2.20dB
RF Conducted	9KHz~40GHz	1.60 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

**** END OF REPORT ****