FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Applicant :	**RM ACQUISITIONS LLC**
Address :	**9855 Woods Drive Skokie. IL 60077 U.S.A**
Product Name :	**RoadExplorer 70**
Model Name :	**RET70, TNDT70**
Brand Name :	**Rand Mcnally**
FCC ID :	**A4C10008A**
Report No. :	**MTE/SAL/A15020189**
Date of Issue :	**Feb. 09, 2015**

Issued by :	**Most Technology Service Co., Ltd.**
Address :	**No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China**
Tel :	**86-755-8602 6850**
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1. VERIFICATION OF CONFORMITY

Equipment Under Test:	RoadExplorer 70
Brand Name:	Rand Mcnally
Model Number:	RET70
Series Model Number:	TNDT70
FCC ID:	Only different in model name.
Applicant:	RM ACQUISITIONS LLC 9855 Woods Drive Skokie. IL 60077 U.S.A
Manufacturer:	Apical Technology Research（shenzhen）Co.,Ltd 9/F,B, Building, singhua Unis Infoport, Langshan Road, North District, Hi-tech Industrial park, Nanshan, Shenzhen
Technical Standards:	47 CFR Part 15 Subpart C
File Number:	MTE/SAL/A15020189
Date of test:	Jan.07-Feb. 06, 2015
Deviation:	None
Condition of Test Sample:	Normal
Test Result:	PASS

The above equipment was tested by *MOST* for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature): _____

Sophia Liu Jan. 06, 2015

Review by (+ signature): _____

Henry Chen Feb. 09, 2015

Approved by (+ signature): _____

Yvette Zhou(Manager) Feb. 09, 2015

2. GENERAL INFORMATION

2.1 Product Information

Description:	RoadExplorer 70
Model Name:	RET70
Series Number:	TNDT70
Model Difference description:	Only different in model name.
Frequency Range:	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels:	IEEE 802.11b/g/n(20MHz)mode:11 Channels IEEE 802.11n(40MHz)mode: 7 Channels
Modulation Technique:	IEEE 802.11b mode: DSSS IEEE 802.11g mode: OFDM 802.11n Standard-20 MHz Channel mode: OFDM 802.11n Standard-40 MHz Channel mode: OFDM
Antenna Type:	PCB
Antenna Gain:	0dBi
Power Supply:	DC 12V by Power Supply DC 3.7V by battery
Temperature Range:	-20°C ~ +40°C

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

Perform FCC Part 15 Subpart C tests for FCC Marking.

2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.247(a)(2)	6dB Bandwidth	PASS	2015-02-04
2	15.247(b)(3)	Peak Output Power	PASS	2015-02-04
3	15.247(d)	Band Edge	PASS	2015-01-30
4	15.247(e)	Power Spectral Density	PASS	2015-02-05
5	15.207	Conducted Emission	PASS	2015-01-27
6	15.247(d) 15.205 15.209	Radiated Emission	PASS	2015-01-08
7	15.247(d)	conducted spurious emission	PASS	2015-01-27
8	15.203	Antenna Requirement	PASS	2015-02-05

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

2.4 Environmental Conditions

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

- Temperature: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

2.5 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

The report uncertainty of measurement y±U, where expended uncertainly U is based on a standard uncertainty multiplied by a coverage factor of k=2,Providing a level of confidence of approximately 95%

- Uncertainty of Conducted Emission, Uc = ±1.8dB
- Uncertainty of Radiated Emission, Uc = ±3.2dB

3. TEST FACILITY

Test Site:	Most Technology Service Co., Ltd.
Location:	No.5, Nangshan 2nd Rd., North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 16 requirements. The FCC Registration Number is **490827.**
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.
558074 D01 DTS Meas Guidance v03r02：	provides Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under CFR Title 47 15.247

3.2 Test Conditions

The EUT has been tested under normal operating（TX）and standby（RX）condition.

The field strength of radiation emission was measured in the following position: EUT lie-down position (Y axis), stand-up position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

3.3 Channel List

Channel List for 802.11b/g/n(20MHz/40MHz)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412MHz	05	2432MHz	09	2452MHz
02	2417MHz	06	2437MHz	10	2457MHz
03	2422MHz	07	2442MHz	11	2462MHz
04	2427MHz	08	2447MHz		

3.4 Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level, Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively

Pre-test Mode	Description
Mode 1	802.11b CH01/CH06/CH11
Mode 2	802.11g CH01/CH06/CH11
Mode 3	802.11n(20MHz)CH01/CH06/CH11
Mode 4	802.11n(40MHz)CH03/CH06/CH09

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) The measurements are performed at all bit rate of transmitter, the worst data was reported.

3.5 Table of Parameters of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level, the RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN

Test software Version	Test Channels		
802.11b	2412MHz	2437MHz	2462MHz
802.11g	2412MHz	2437MHz	2462MHz
802.11n(20MHz)	2412MHz	2437MHz	2462MHz
802.11n(40MHz)	2422MHz	2437MHz	2452MHz

4. TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at MOST for testing. The equipment conforms to the CISPR 16-1/ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date	Calibration Interval
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2014/03/10	1 Year
2	Spectrum Analyzer	Agilent	E7405A	US44210471	2014/03/14	1 Year
3	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2014/03/10	1 Year
4	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2014/03/07	1 Year
5	Terminator	Hubersuhner	50Ω	No.1	2014/03/07	1 Year
6	RF Cable	SchwarzBeck	N/A	No.1	2014/03/07	1 Year
7	Test Receiver	Rohde & Schwarz	ESPI	101202	2014/03/10	1 Year
8	Bilog Antenna	Sunol	JB3	A121206	2014/03/14	1 Year
9	Horn Antenna	SCHWARZBECK	BBHA9120D	756	2014/03/14	1 Year
10	Horn Antenna	Penn Engineering	9034	8376	2014/03/14	1 Year
11	Cable	Resenberger	N/A	NO.1	2014/03/07	1 Year
12	Cable	SchwarzBeck	N/A	NO.2	2014/03/07	1 Year
13	Cable	SchwarzBeck	N/A	NO.3	2014/03/07	1 Year
14	DC Power Filter	DuoJi	DL2×30B	N/A	2014/03/07	1 Year
15	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2014/03/07	1 Year
16	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2014/03/07	1 Year
17	Test Receiver	Rohde & Schwarz	ESCI	100492	2014/03/10	1 Year
18	Absorbing Clamp	Luthi	MDS21	3635	2014/03/12	1 Year
19	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2014/03/07	1 Year
20	AC Power Source	Kikusui	AC40MA	LM003232	2014/03/10	1 Year
21	Test Analyzer	Kikusui	KHA1000	LM003720	2014/03/10	1 Year
22	Line Impendence Network	Kikusui	LIN40MA-PCR-L	LM002352	2014/03/10	1 Year
23	ESD Tester	Kikusui	KES4021	LM003537	2014/03/07	1 Year
24	EMCPRO System	EM Test	UCS-500-M4	V0648102026	2014/03/10	1 Year
25	Signal Generator	IFR	2032	203002/100	2014/03/10	1 Year
26	Amplifier	A&R	150W1000	301584	2014/03/14	1 Year
27	CDN	FCC	FCC-801-M2-25	47	2014/03/10	1 Year
28	CDN	FCC	FCC-801-M3-25	107	2014/03/10	1 Year
29	EM Injection Clamp	FCC	F-203I-23mm	403	2014/03/10	1 Year
30	RF Cable	MIYAZAKI	N/A	No.1/No.2	2014/03/10	1 Year
31	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2014/03/10	1 Year
32	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2014/03/10	1 Year
33	8 Loop Antenna	ARA	PLA-1030/B	1029	2014/02/19	1 Year
34	Power Meter	R&S	NRVS	100696	2014/07/06	1 Year
35	Power Sensor(AV)	R&S	URV5-Z4	0395.1619.05	2014/07/06	1 Year
36	COMOSAR DOSIMETRIC E FIELD PROBE	Satimo	SSE5	SN 17/14 EP221	2014/03/10	1 Year
37	COMOSAR 2450 MHz REFERENCE DIPOLE	Satimo	SID2450	SN 30/14 DIP2G450-335	2014/03/10	1 Year

NOTE: *Equipments listed above have been calibrated and are in the period of validation.*

5. 47 CFR Part 15 C 15.247 Requirements

5.1 6dB Bandwidth

5.1.1 Definition

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.1.2 Limit

FCC Part15(15.247)				
Section	Test Item	Limit	Frequency Range(MHz)	Result
15.247(a)(2)	Bandwidth	>=500KHz (6dB Bandwidth)	2400-2483.5	PASS

5.1. 3 Test Configuration

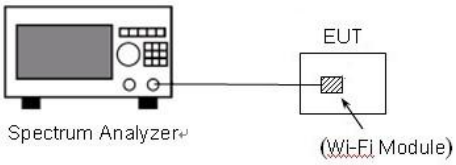


Figure 1: RF Test Setup

5.1.4 Test Procedure

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	>Measurement bandwidth or channel separation
RB	100kHz
VB	≧3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.

5.1.5 Test Result

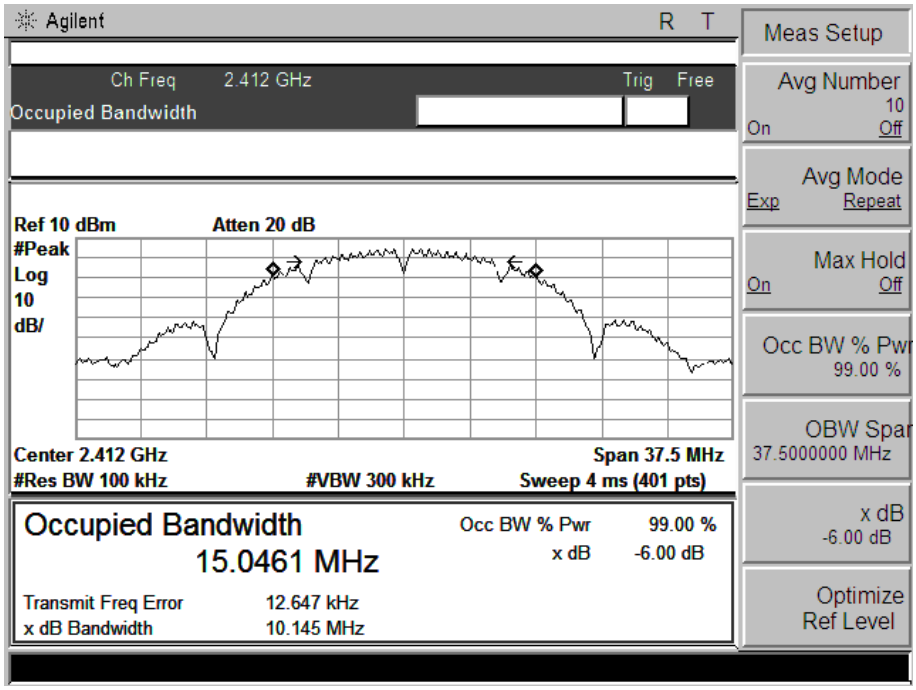
The lowest, Middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

5.1.5.1 802.11b Test Mode

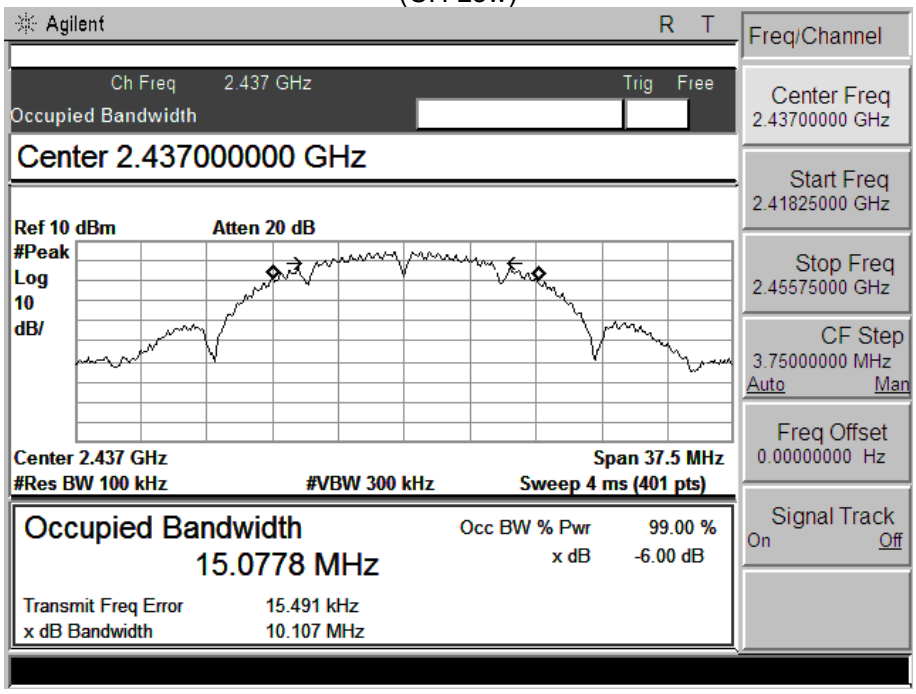
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	10.145	⩾500	PASS
6	2437	10.107	⩾500	PASS
11	2462	10.146	⩾500	PASS

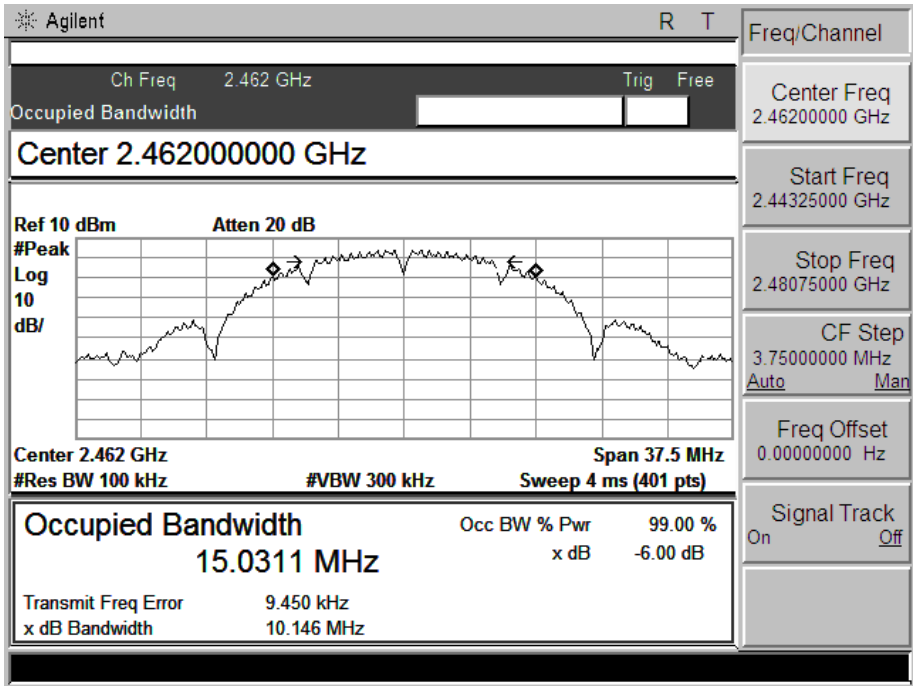
B. Test Plot:



(CH Low)



(CH Mid)



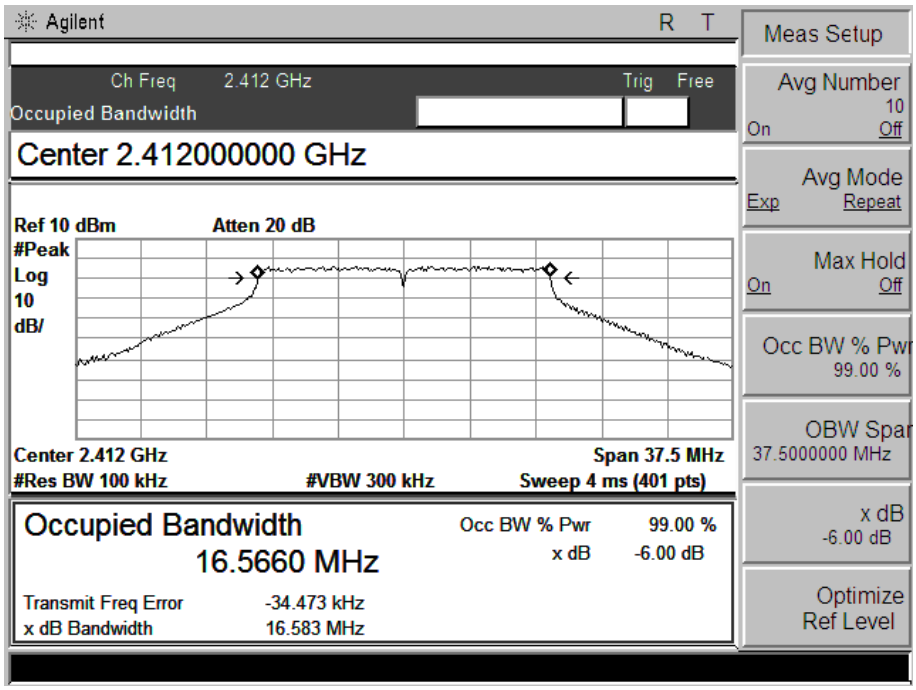
(CH High)

5.1.5.2 802.11g Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.583	⩾500	PASS
6	2437	16.597	⩾500	PASS
11	2462	16.587	⩾500	PASS

B. Test Plot:



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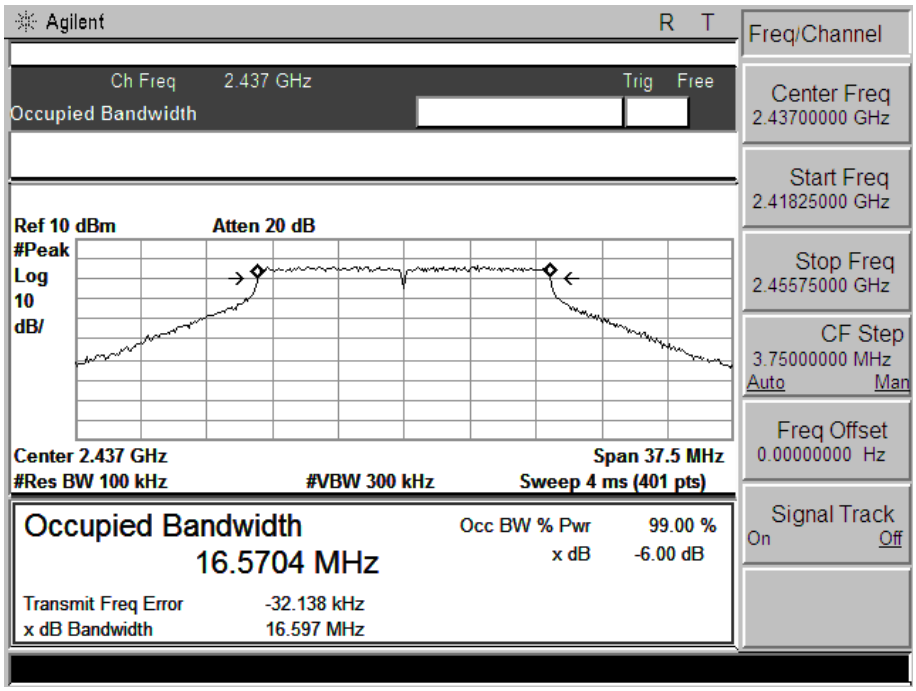

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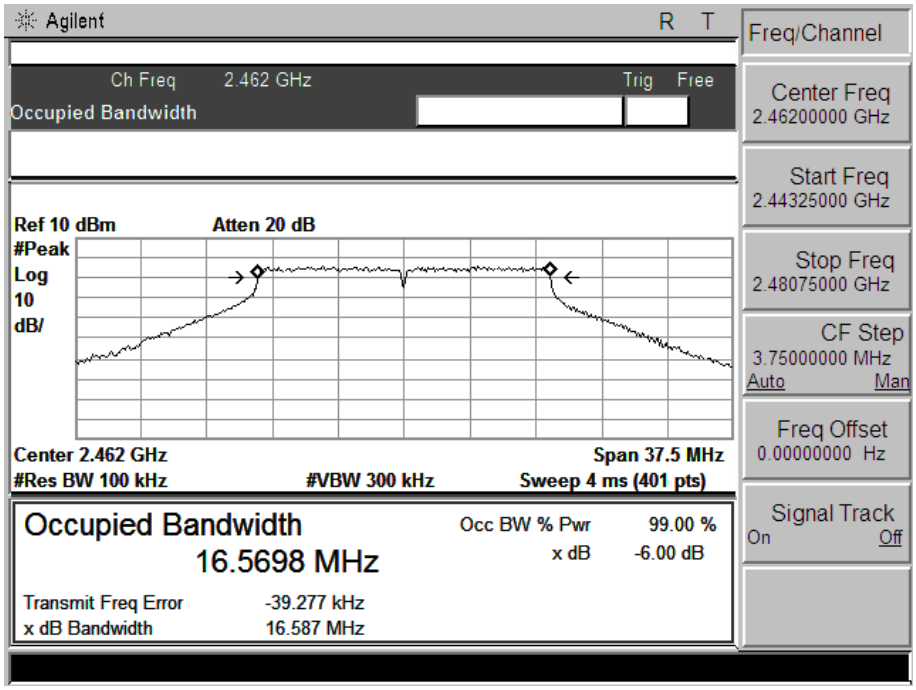


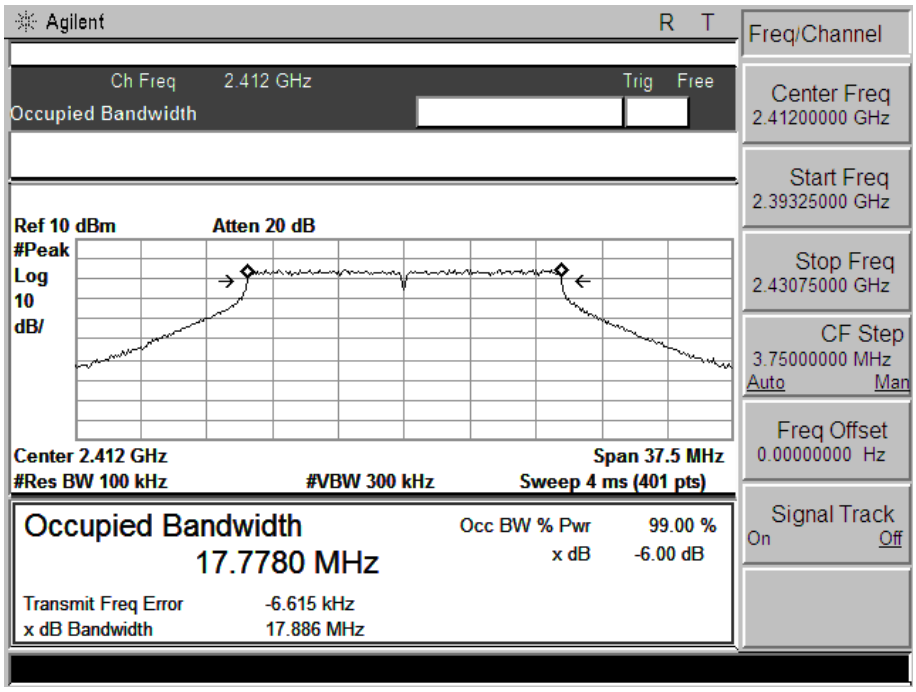
(CH High)

5.1.5.3 802.11n(20MHz) Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.886	⩾500	PASS
6	2437	17.889	⩾500	PASS
11	2462	17.845	⩾500	PASS

B. Test Plot:



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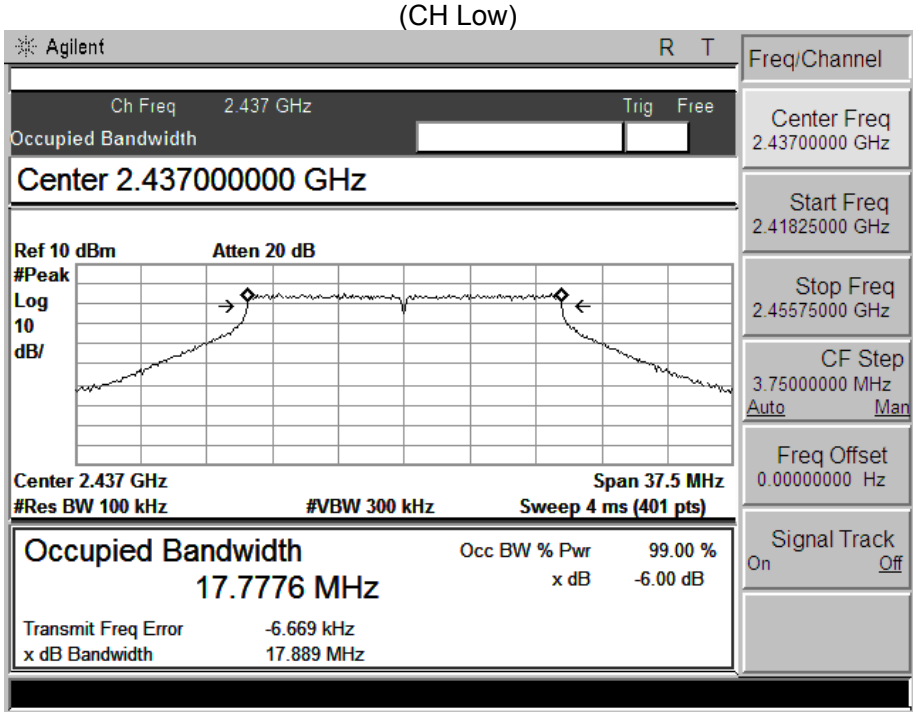
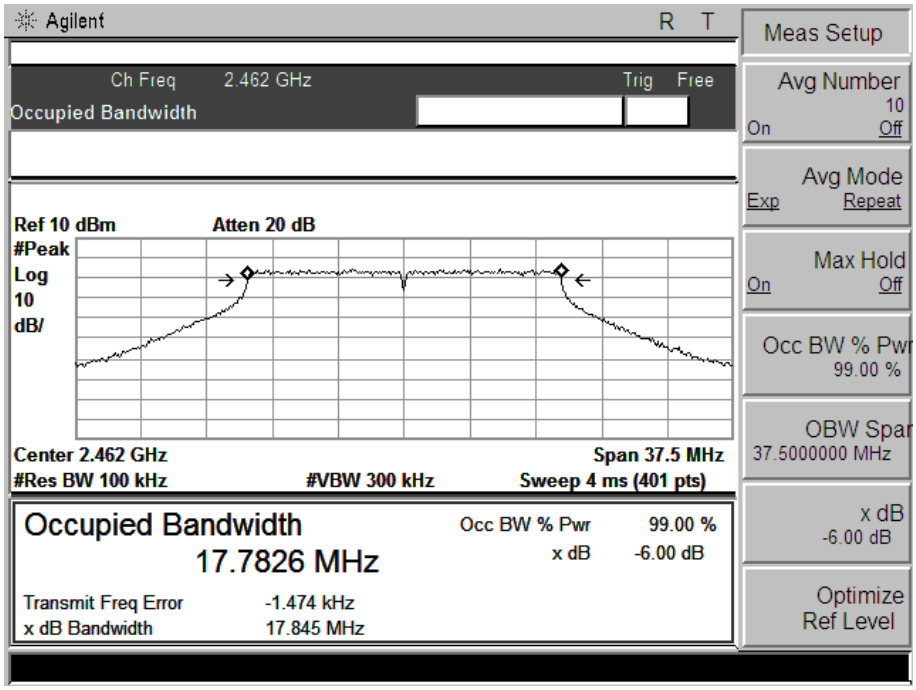


(CH Mid)



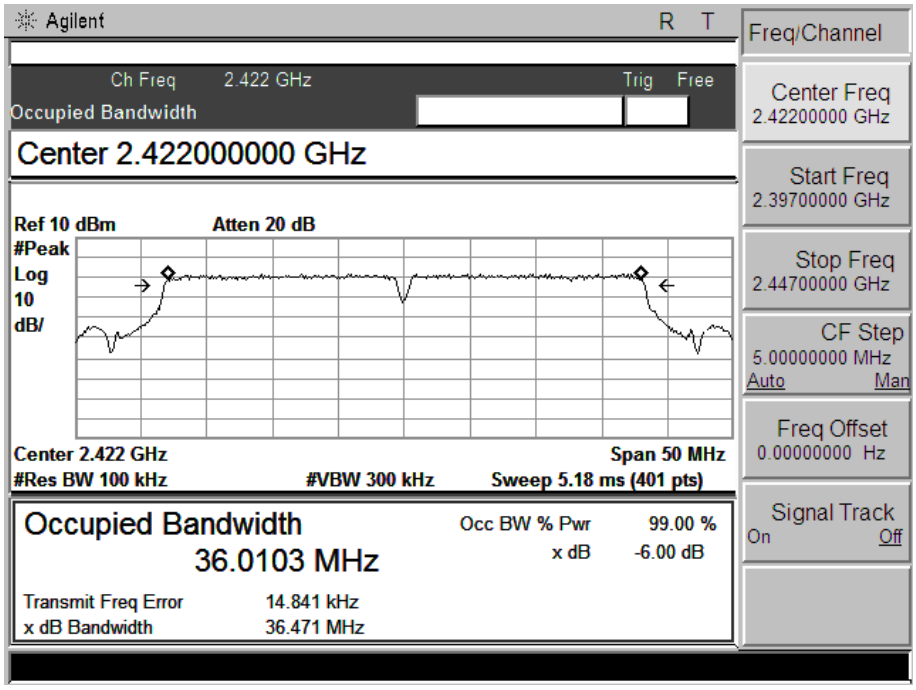
(CH High)

5.1.5.4 802.11n Test Mode(40MHz)

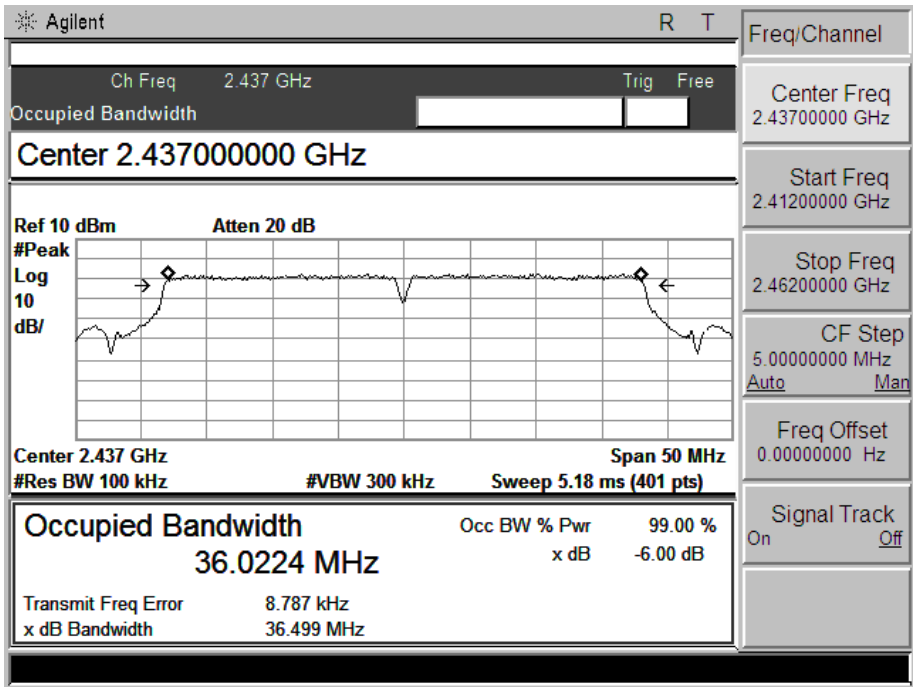
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	36.471	⩾500	PASS
6	2437	36.499	⩾500	PASS
9	2452	36.492	⩾500	PASS

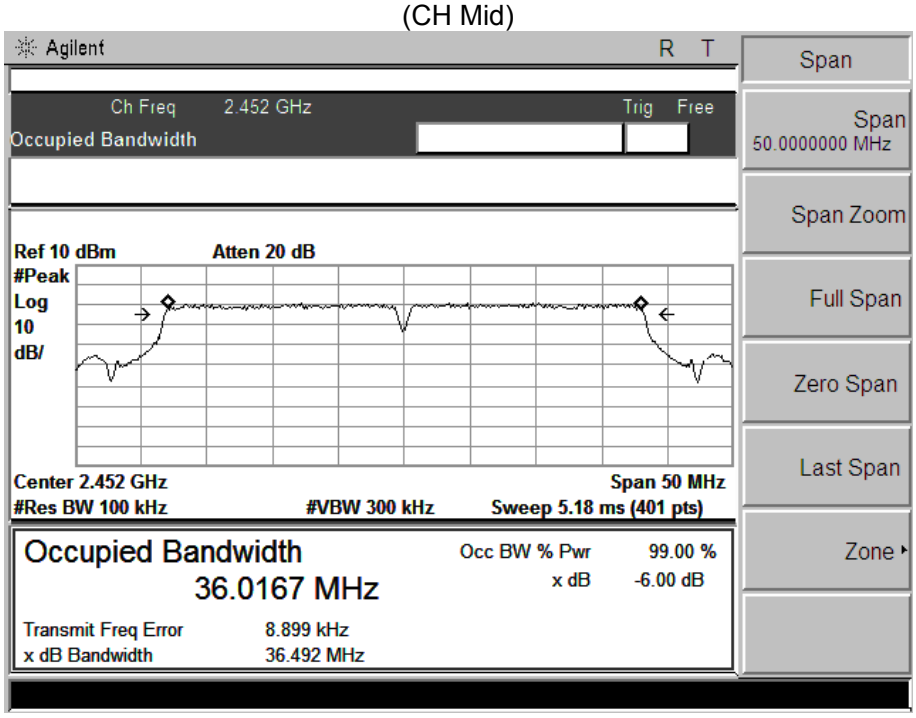
B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

5.2 Peak Output Power

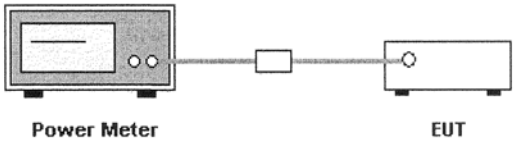
5.2.1 Definition

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

5.2.2 Limit

FCC Part15(15.247)				
Section	Test Item	Limit	Frequency Range(MHz)	Result
15.247(b)(1)	Peak Output Power	30dBm	2400-2483.5	PASS

5.2.3 Test Configuration



5.2.4 Test Procedure

The EUT which is powered by AC adapter, is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

5.2.5 Test Result

The EUT operates at maximum output power mode. The lowest, Middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

5.2.5.1 802.11b Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	Peak Output Power	Limit		Verdict
		dBm	dBm	W	
1	2412	14.79	30	1	PASS
6	2437	15.13			PASS
11	2462	15.12			PASS

5.2.5.2 802.11g Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	Peak Output Power	Limit		Verdict
		dBm	dBm	W	
1	2412	10.70	30	1	PASS
6	2437	11.77			PASS
11	2462	11.14			PASS

5.2.5.3 802.11n(20MHz) Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	Peak Output Power	Limit		Verdict
		dBm	dBm	W	
1	2412	9.92	30	1	PASS
6	2437	10.02			PASS
11	2462	10.20			PASS

5.2.5.4 802.11n Test Mode (40MHz)

B. Test Verdict:

Channel	Frequency (MHz)	Peak Output Power	Limit		Verdict
		dBm	dBm	W	
3	2422	11.34	30	1	PASS
6	2437	11.16			PASS
9	2452	11.22			PASS

5.3 Band Edge

5.3.1 Definition

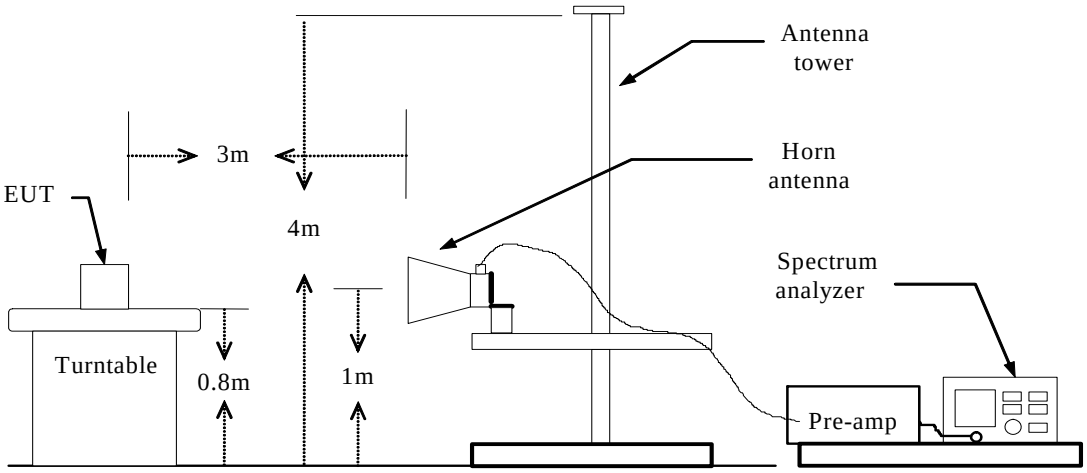
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

5.3.2 Test Description

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Above 1GHz: PEAK: RBW=VBW=1MHz / Sweep=AUTO
   AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

5.3.3 Test Configuration



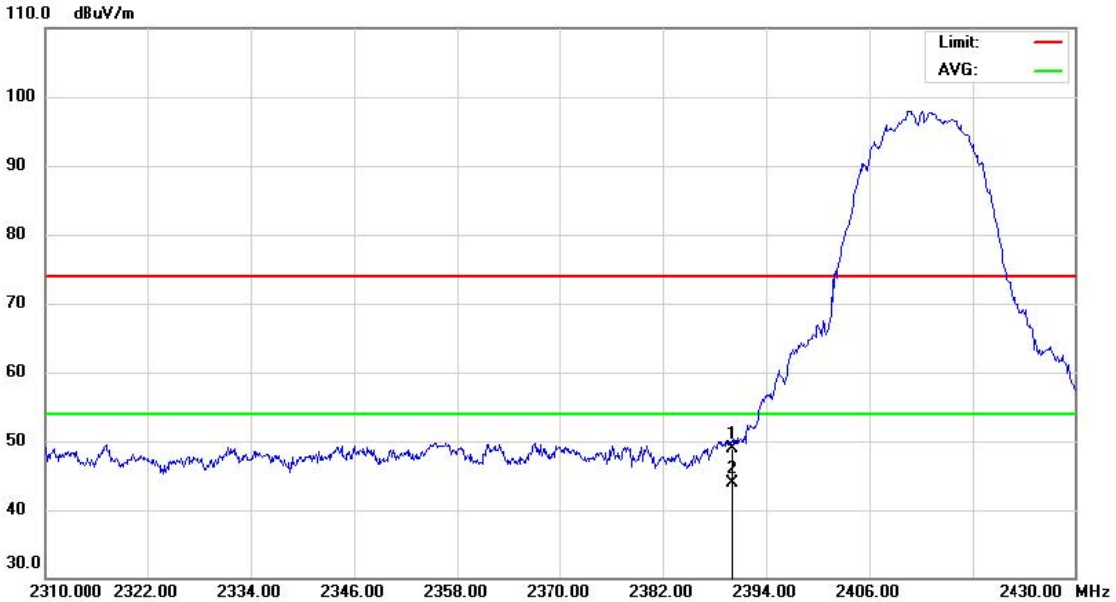
5.3.4 Test Result

The EUT operates at continuous transmit test mode. The lowest and highest channels are tested to verify the band edge emissions.

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#13 Date: 2015-1-30 Time: 13:31:51



Site site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11b

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	38.58	10.36	48.94	74.00	-25.06	peak			
2	*	2390.000	33.60	10.36	43.96	54.00	-10.04	AVG			

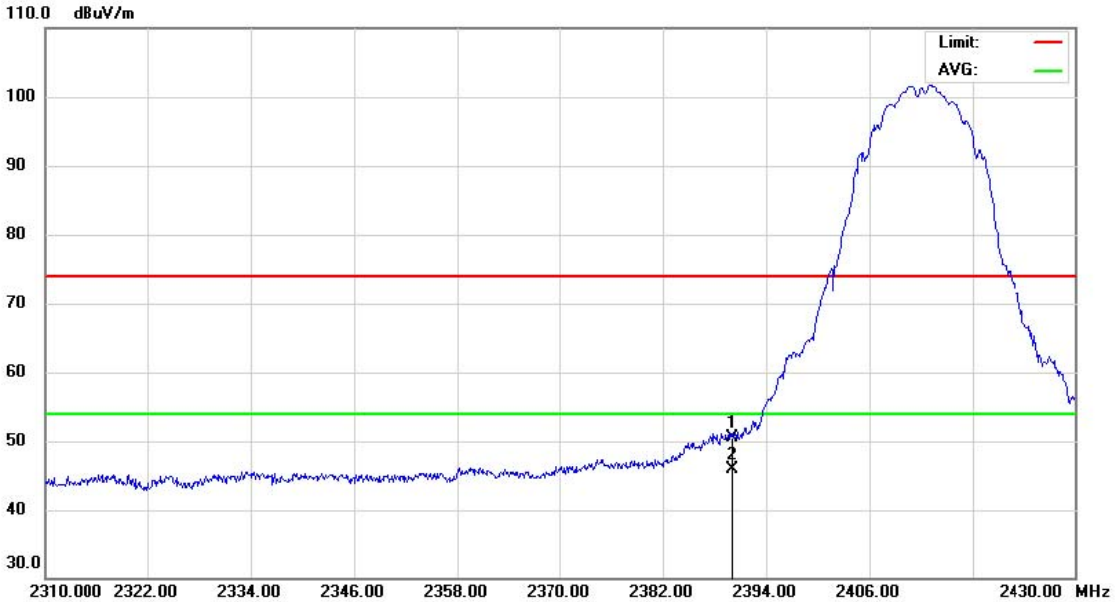
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#14 Date: 2015-1-30 Time: 13:45:06



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11b

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	40.21	10.36	50.57	74.00	-23.43	peak			
2	*	2390.000	35.54	10.36	45.90	54.00	-8.10	AVG			

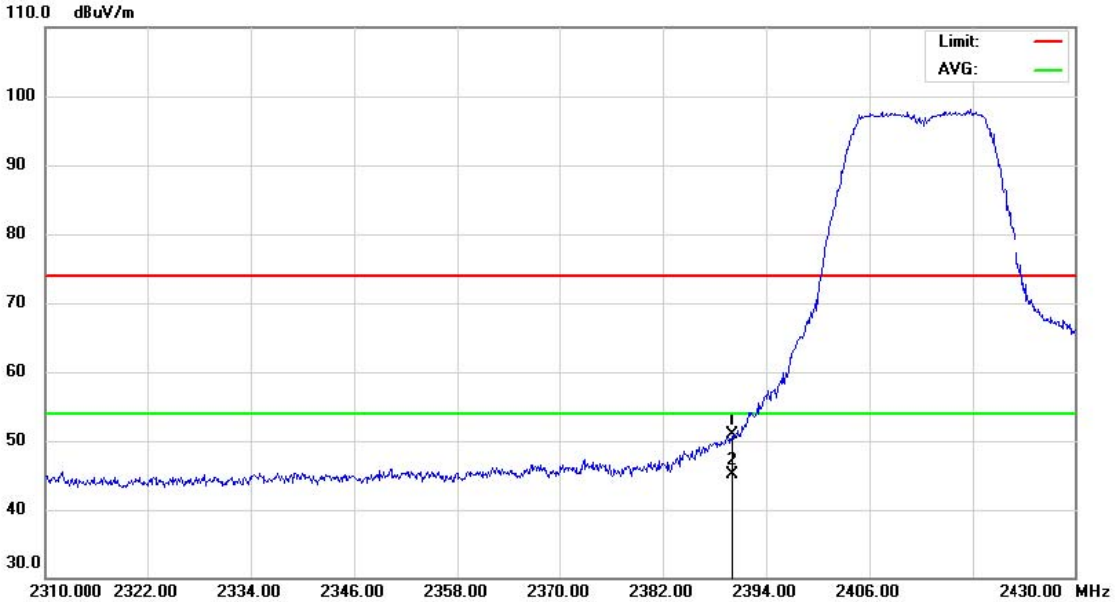
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District, Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File : TNDT70 Data : #15 Date: 2015-1-30 Time: 13:56:54



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11g

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	40.55	10.36	50.91	74.00	-23.09	peak			
2	*	2390.000	34.83	10.36	45.19	54.00	-8.81	AVG			

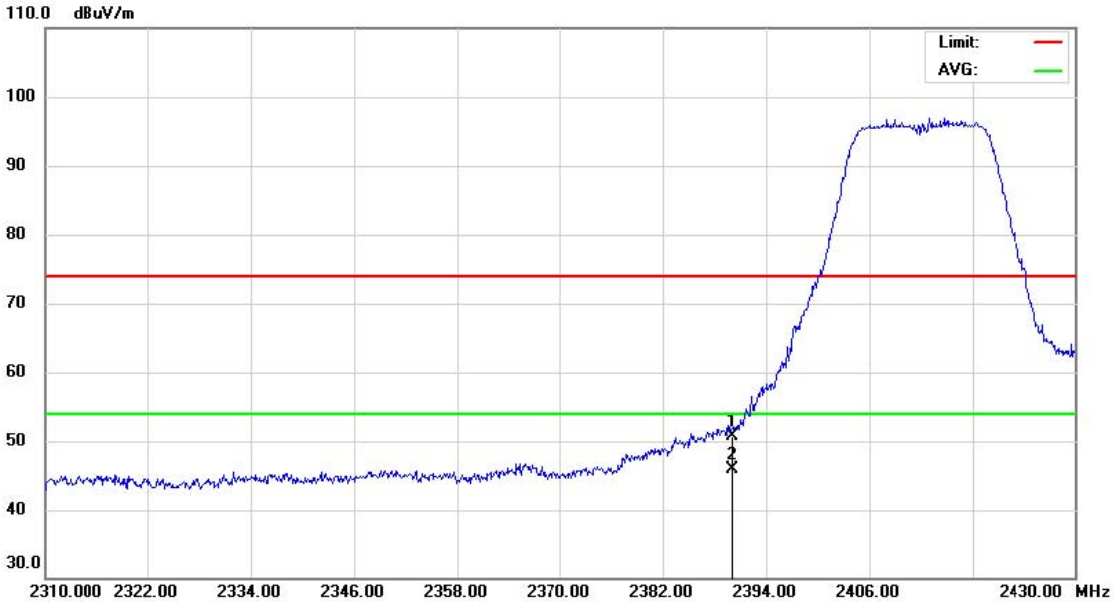
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#16 Date: 2015-1-30 Time: 14:04:43



Site site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %
EUT: RoadExplorer 70 Distance:
M/N: RET70
Mode: Low CH
Note: 802.11g

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	40.36	10.36	50.72	74.00	-23.28	peak			
2	*	2390.000	35.45	10.36	45.81	54.00	-8.19	AVG			

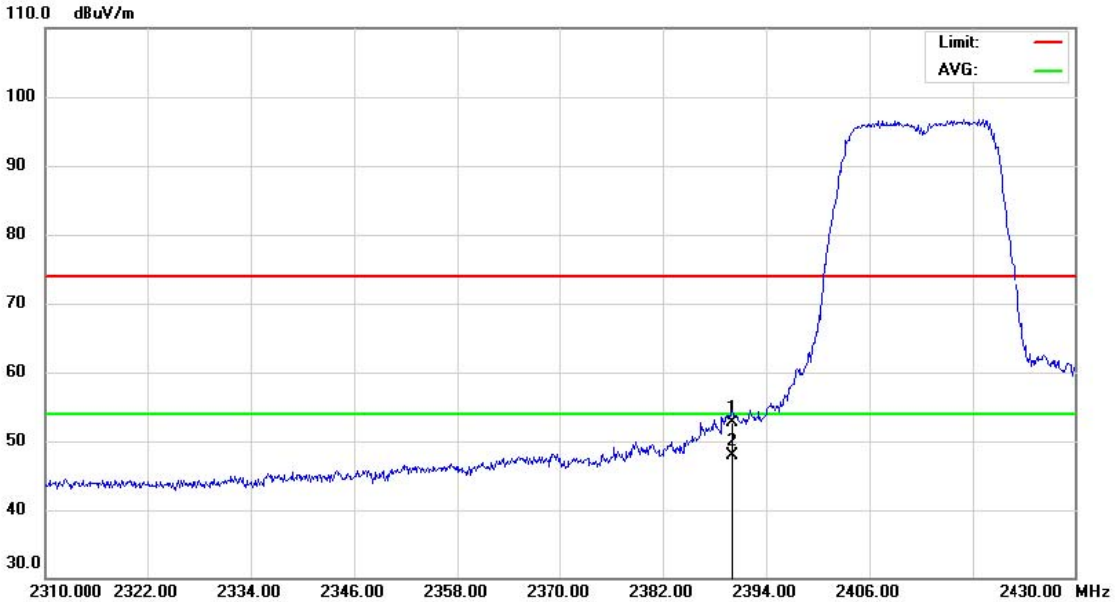
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#17 Date: 2015-1-30 Time: 14:15:23



Site site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11n-HT20

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	42.36	10.36	52.72	74.00	-21.28	peak			
2	*	2390.000	37.45	10.36	47.81	54.00	-6.19	AVG			

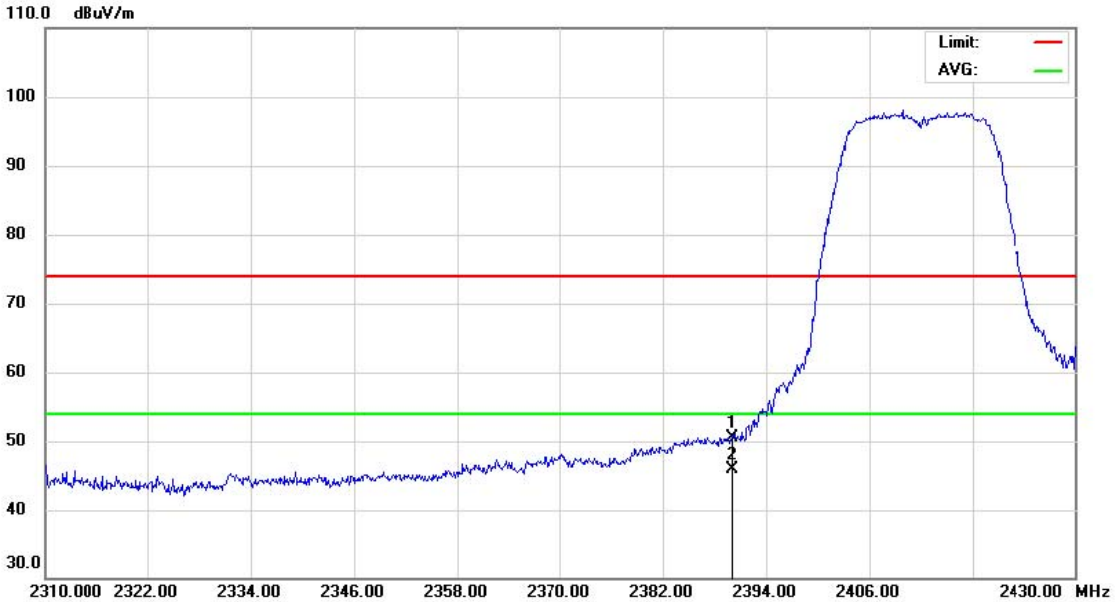
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#18 Date: 2015-1-30 Time: 14:24:52



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11n-HT20

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	40.23	10.36	50.59	74.00	-23.41	peak			
2	*	2390.000	35.54	10.36	45.90	54.00	-8.10	AVG			

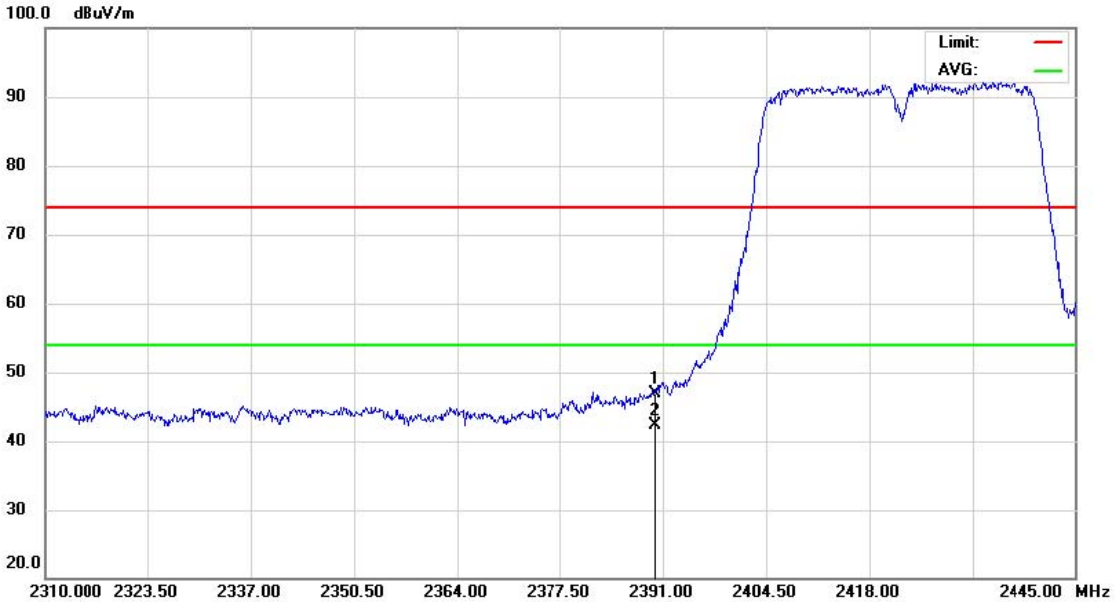
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#19 Date: 2015-1-30 Time: 14:39:56



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11n-HT40

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	36.54	10.36	46.90	74.00	-27.10	peak			
2	*	2390.000	31.96	10.36	42.32	54.00	-11.68	AVG			

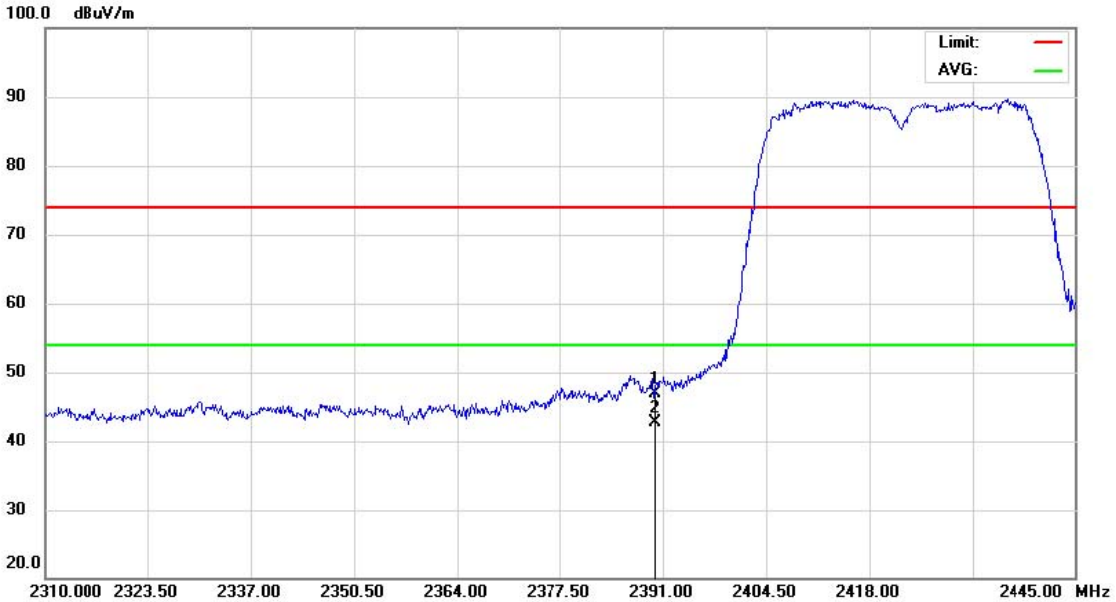
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#20 Date: 2015-1-30 Time: 14:43:11



Site site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: Low CH

Note: 802.11n-HT40

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	36.57	10.36	46.93	74.00	-27.07	peak			
2	*	2390.000	32.44	10.36	42.80	54.00	-11.20	AVG			

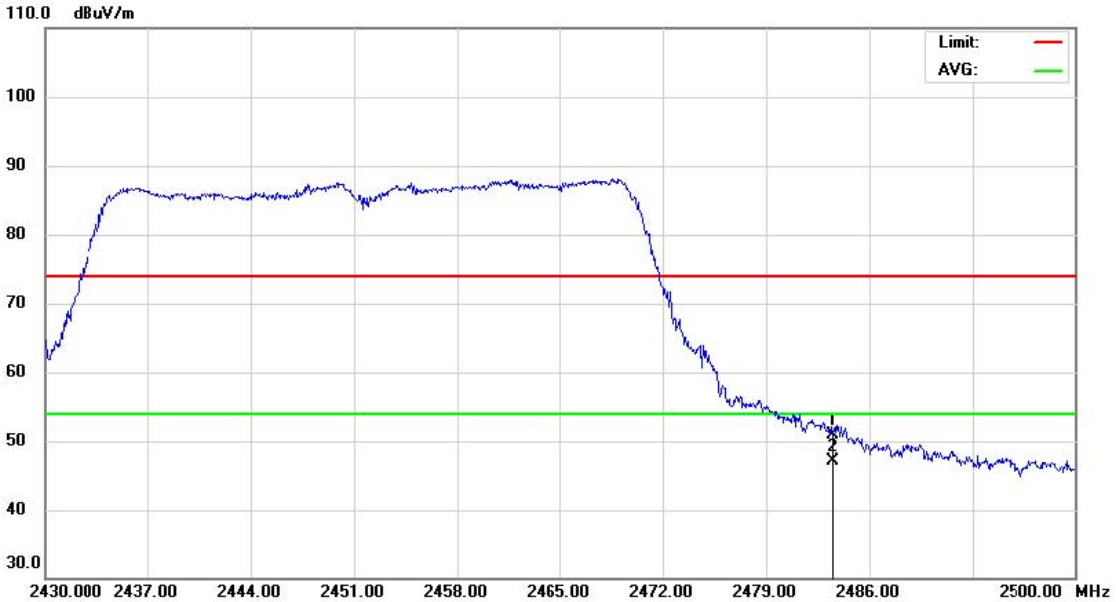
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#21 Date: 2015-1-30 Time: 14:49:51



Site site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %
EUT: RoadExplorer 70 Distance:
M/N: RET70
Mode: High CH
Note: 802.11n-HT40

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	40.23	10.73	50.96	74.00	-23.04	peak			
2	*	2483.500	36.44	10.73	47.17	54.00	-6.83	AVG			

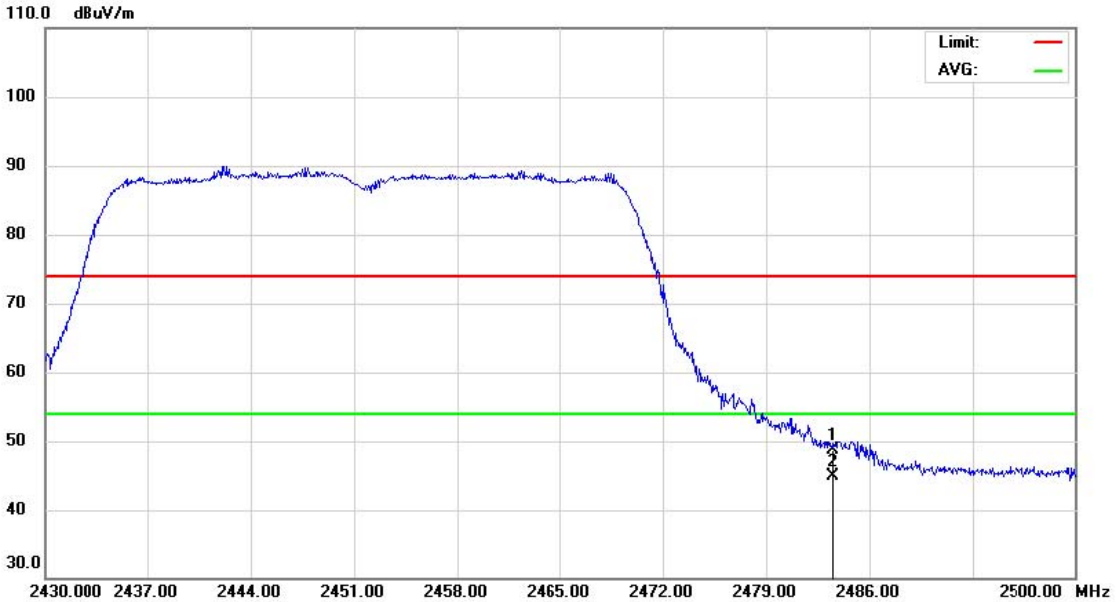
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#22 Date: 2015-1-30 Time: 14:54:54



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11n-HT40

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	37.98	10.73	48.71	74.00	-25.29	peak			
2	*	2483.500	34.24	10.73	44.97	54.00	-9.03	AVG			

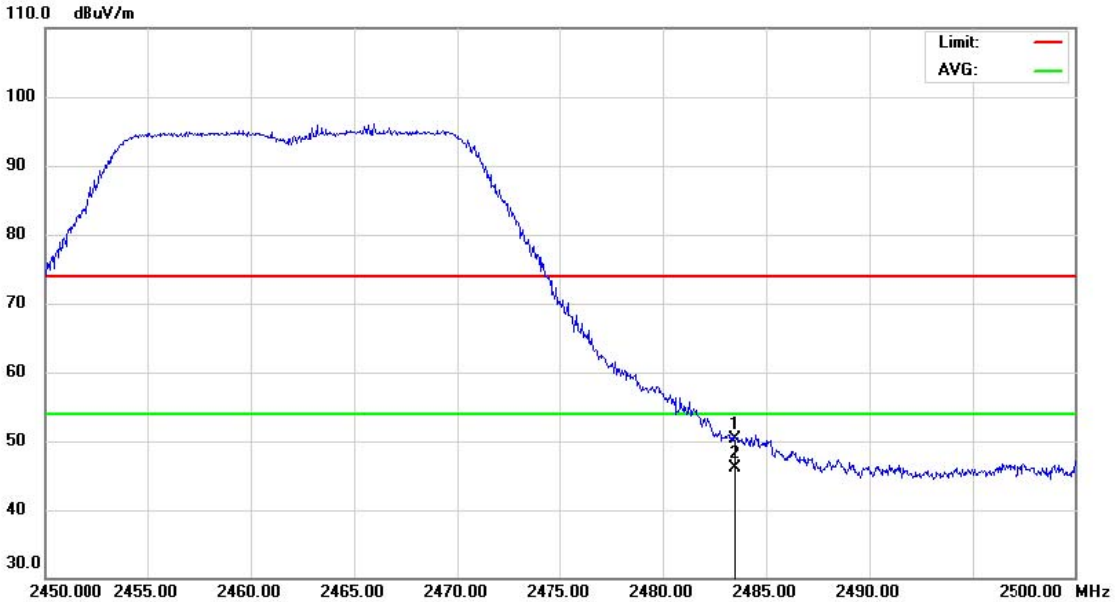
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#23 Date: 2015-1-30 Time: 15:02:15



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11n-HT20

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	39.54	10.73	50.27	74.00	-23.73	peak			
2	*	2483.500	35.42	10.73	46.15	54.00	-7.85	AVG			

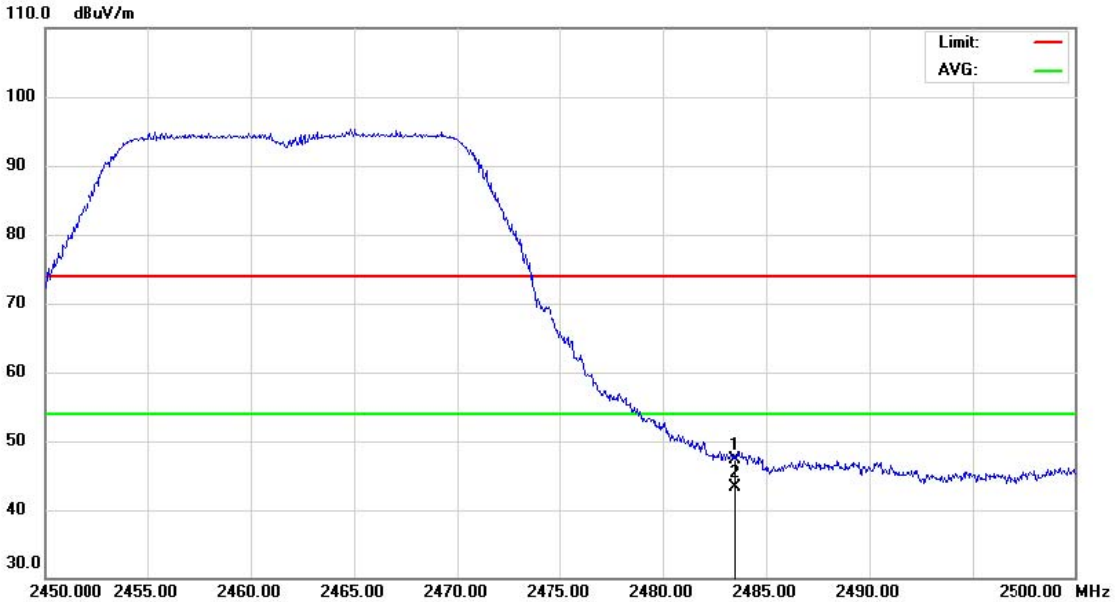
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#24 Date: 2015-1-30 Time: 15:09:31



Site site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11n-HT20

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	36.57	10.73	47.30	74.00	-26.70	peak			
2	*	2483.500	32.54	10.73	43.27	54.00	-10.73	AVG			

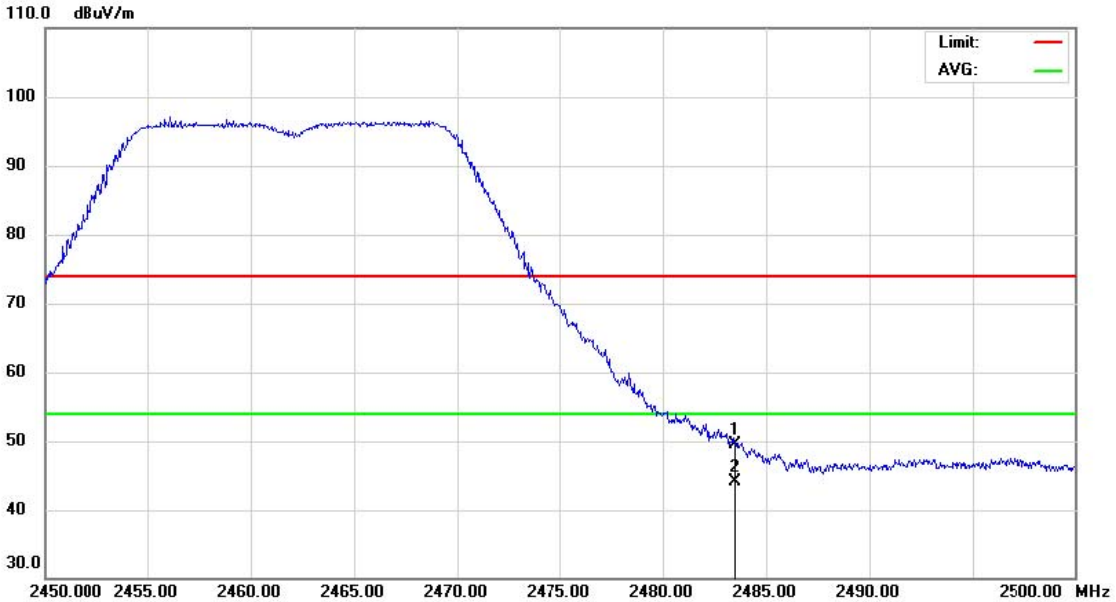
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#25 Date: 2015-1-30 Time: 15:17:33



Site site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11g

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	38.71	10.73	49.44	74.00	-24.56	peak			
2	*	2483.500	33.44	10.73	44.17	54.00	-9.83	AVG			

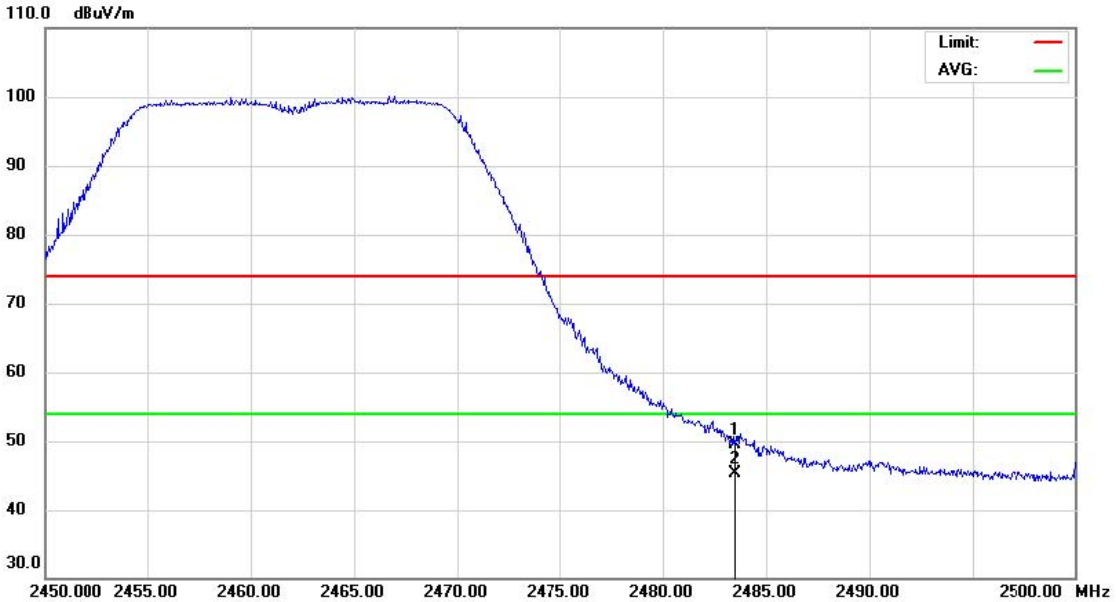
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan Shenzhen
Guangdong China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#26 Date: 2015-1-30 Time: 15:23:14



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11g

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	38.85	10.73	49.58	74.00	-24.42	peak			
2	*	2483.500	34.67	10.73	45.40	54.00	-8.60	AVG			

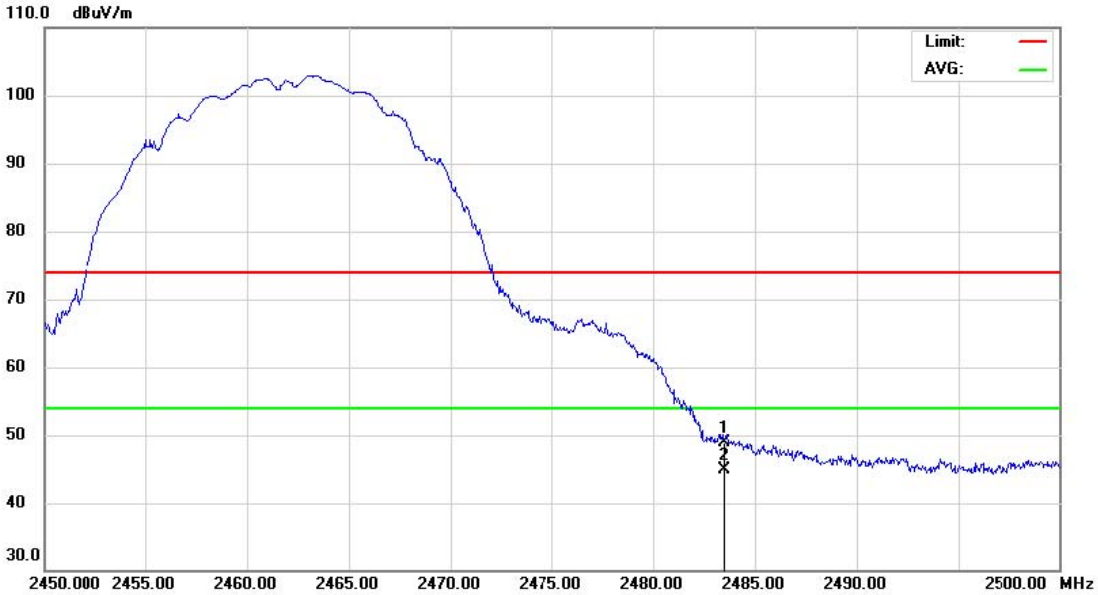
*:Maximum data x:Over limit l:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District, Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#27 Date: 2015-1-30 Time: 15:32:11



Site site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %
EUT: RoadExplorer 70 Distance:
M/N: RET70
Mode: High CH
Note: 802.11b

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	38.24	10.73	48.97	74.00	-25.03	peak			
2	*	2483.500	34.10	10.73	44.83	54.00	-9.17	AVG			

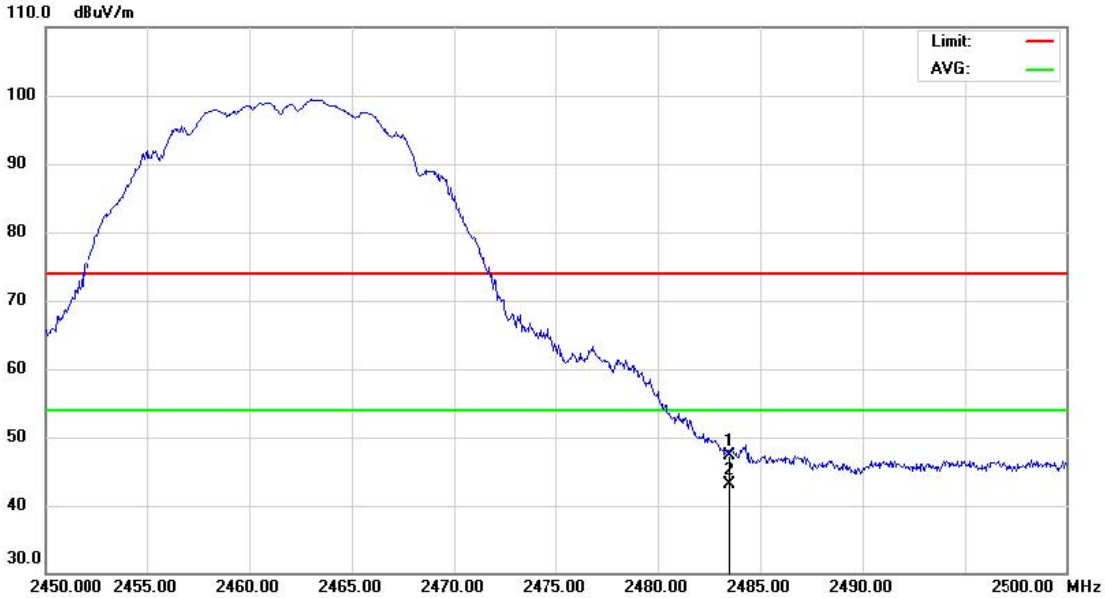
*:Maximum data x:Over limit !:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Nanshan District, Shenzhen
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#28 Date: 2015-1-30 Time: 15:41:06



Site site #1 Polarization: ***Horizontal*** Temperature: 26

Limit: FCC Part15 B Spurious Radiation(PEAK) Power: DC 5V by Car Charger Humidity: 61 %

EUT: RoadExplorer 70 Distance:

M/N: RET70

Mode: High CH

Note: 802.11b

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	36.54	10.73	47.27	74.00	-26.73	peak			
2	*	2483.500	32.40	10.73	43.13	54.00	-10.87	AVG			

*:Maximum data x:Over limit !:over margin

Engineer Signature:

5.4 Power Spectral Density (PSD)

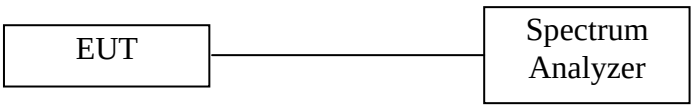
5.4.1 Definition

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

5.4.2 Limit

FCC Part15(15.247)				
Section	Test Item	Limit	Frequency Range(MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2402-2483.5	PASS

5.4.3 Test Configuration

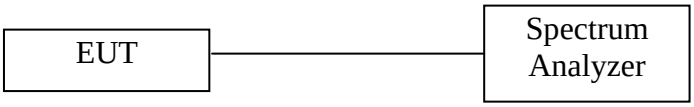


5.4.4 Test Description

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	1.5 DTS Bandwidth
RB	100kHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

a. Set analyzer center frequency to DTS Channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3kHz≤RBW≤100kHz.
d. Set the VBW≥3×RBW.
e. Detector=peak.
f. Sweep time=auto couple.
g. Trace mode=max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level with the RBW.
j. If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

5.4.5 Test Configuration



5.4.6 Operation Condition

The EUT tested system was configured as the statements of 2.1 unless otherwise a special operating condition is specified in the follows during the testing.

5.4.7 Test Result

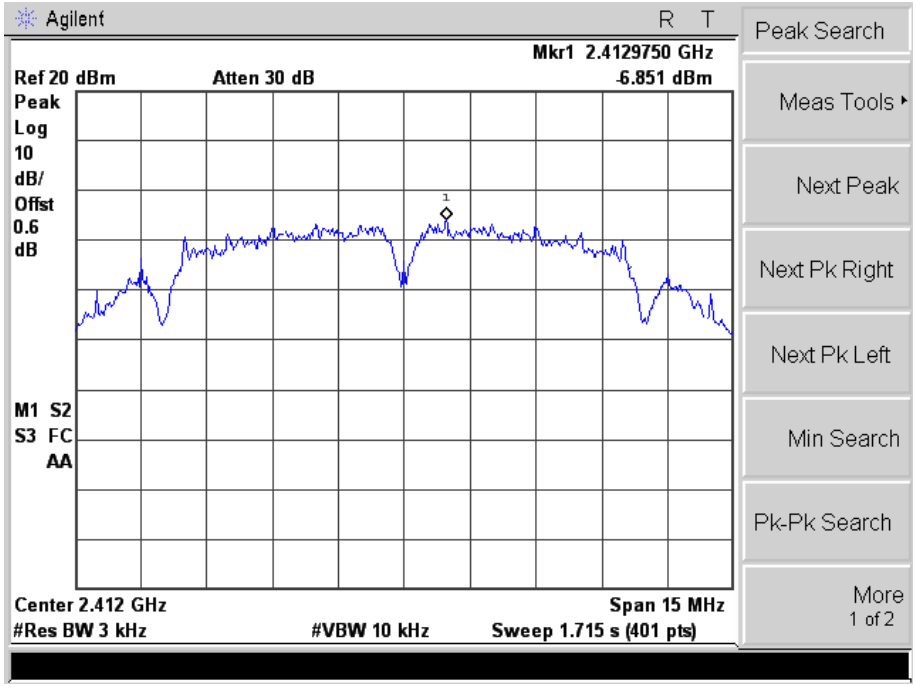
The lowest, middle and highest channels are tested to verify the power spectral density.

5.4.7.1 802.11b Test Mode

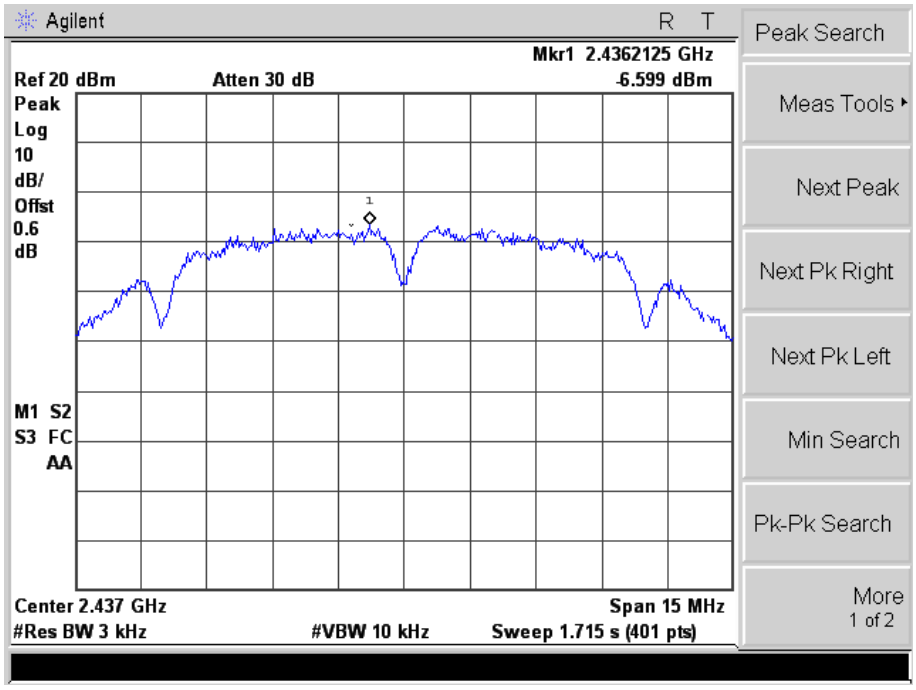
A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-6.851	≤8	PASS
6	2437	-6.599	≤8	PASS
11	2462	-6.645	≤8	PASS

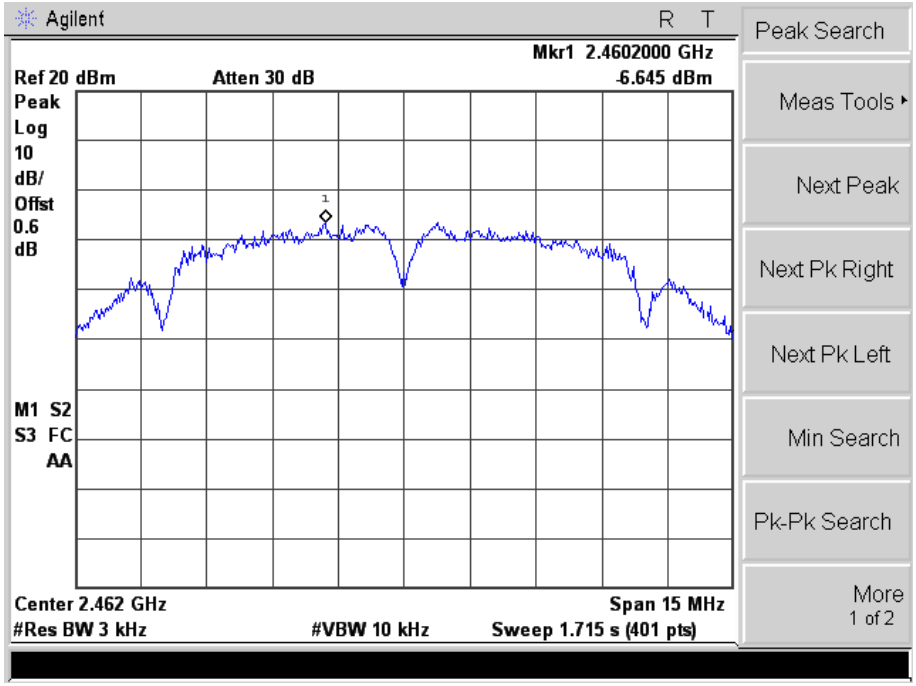
B. Test Plot:



(CH Low)



(CH Mid)



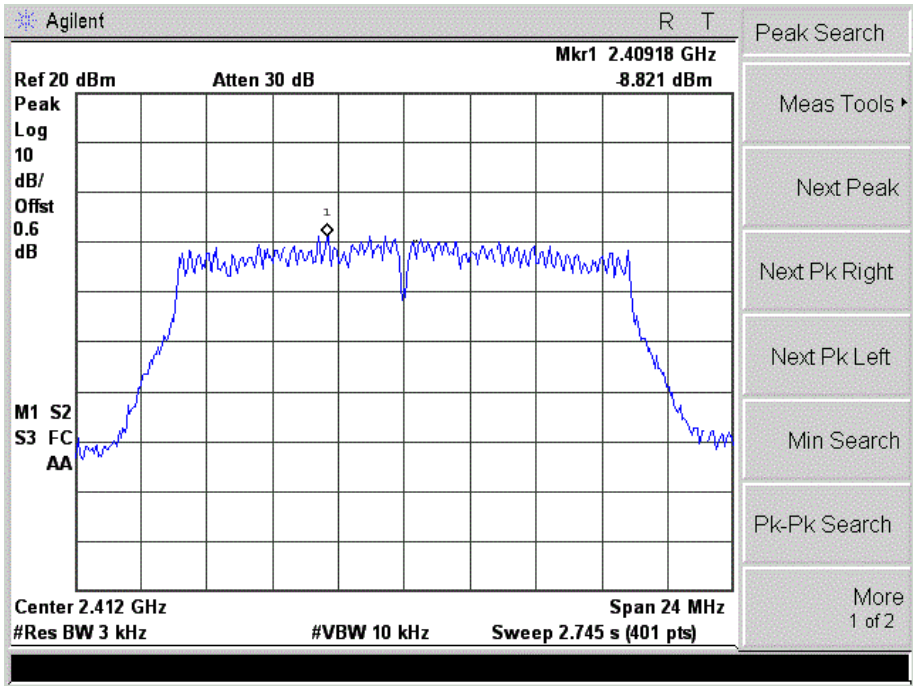
(CH High)

5.4.7.2 802.11g Test Mode

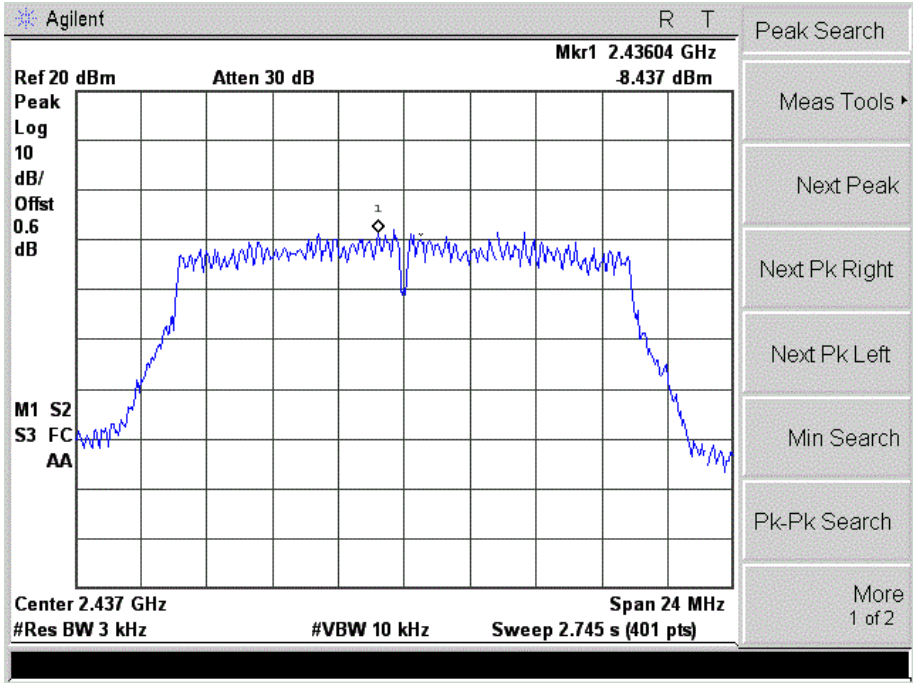
A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-8.821	≤8	PASS
6	2437	-8.437	≤8	PASS
11	2462	-8.645	≤8	PASS

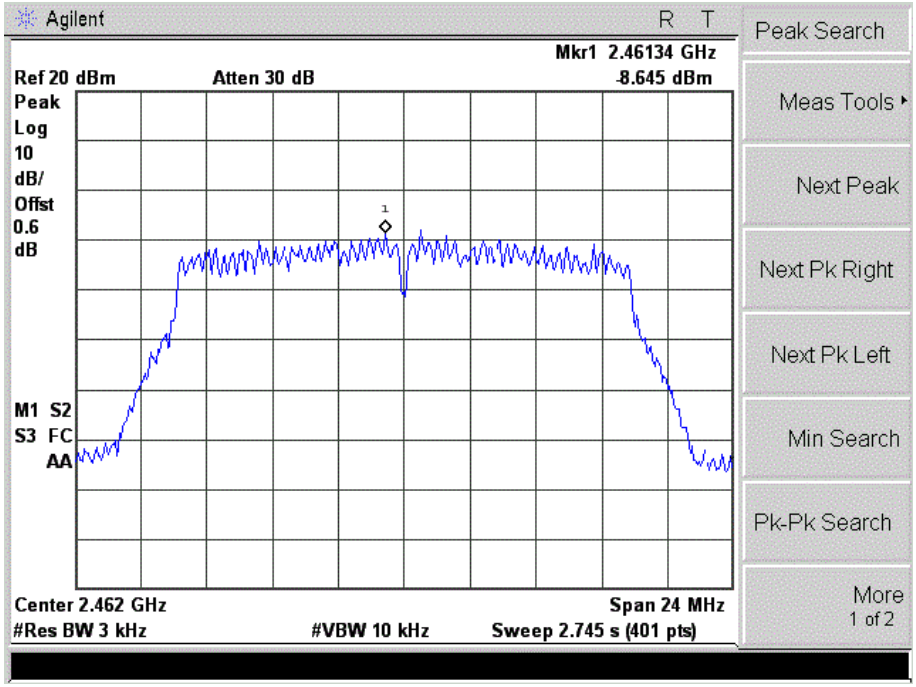
B. Test Plot:



(CH Low)



(CH Mid)



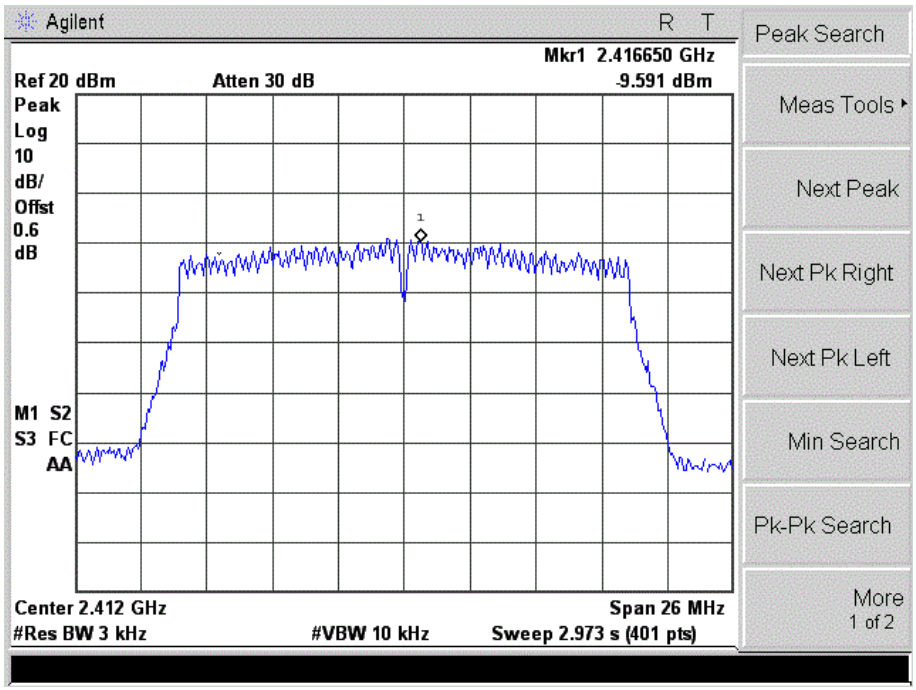
(CH High)

5.4.7.3 802.11n(20MHz) Test Mode

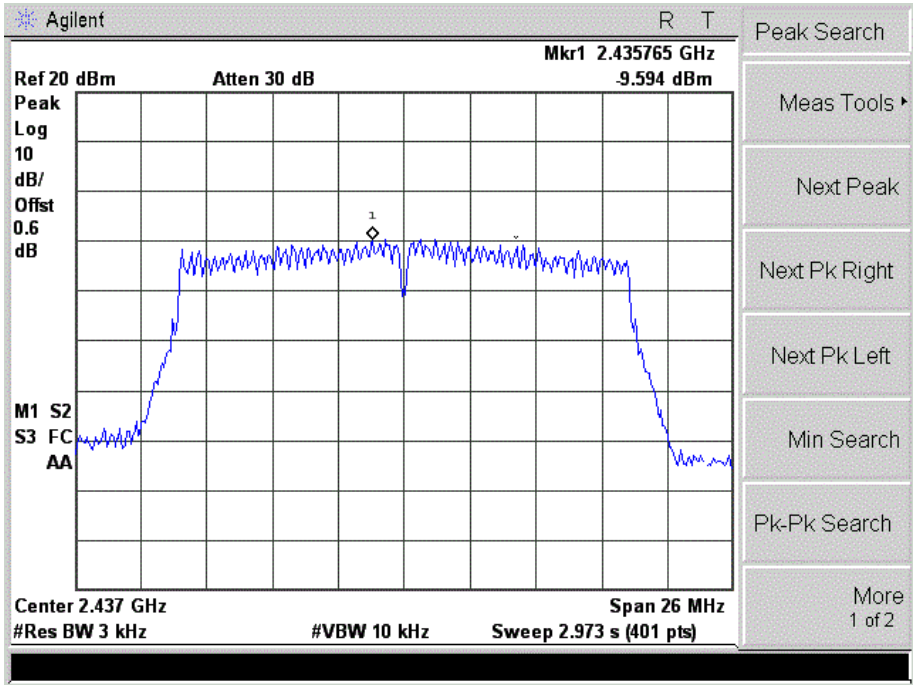
A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-9.591	≤8	PASS
6	2437	-9.594	≤8	PASS
11	2462	-9.111	≤8	PASS

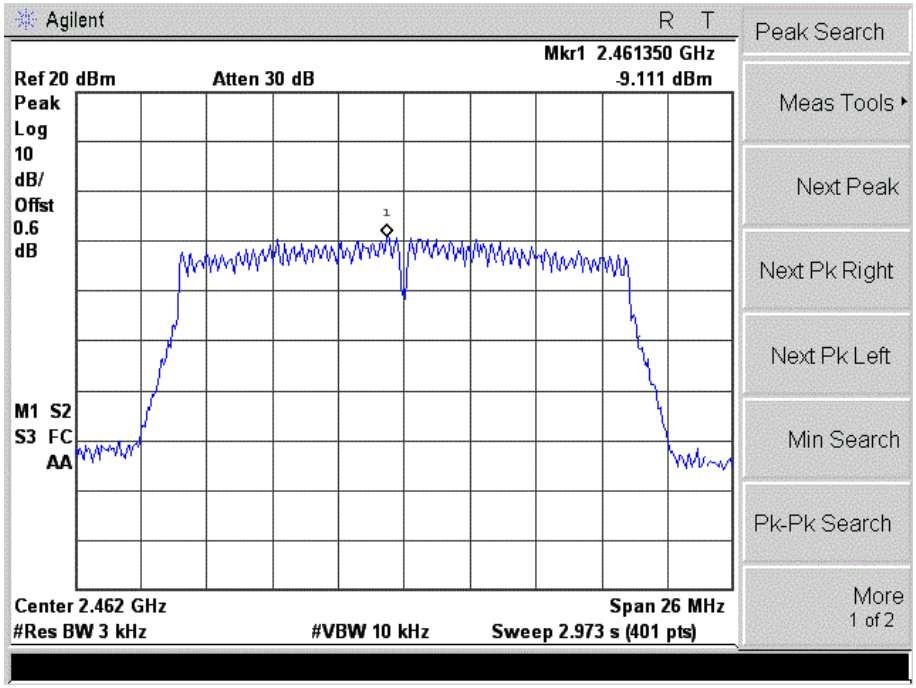
B. Test Plot:



(CH Low)



(CH Mid)



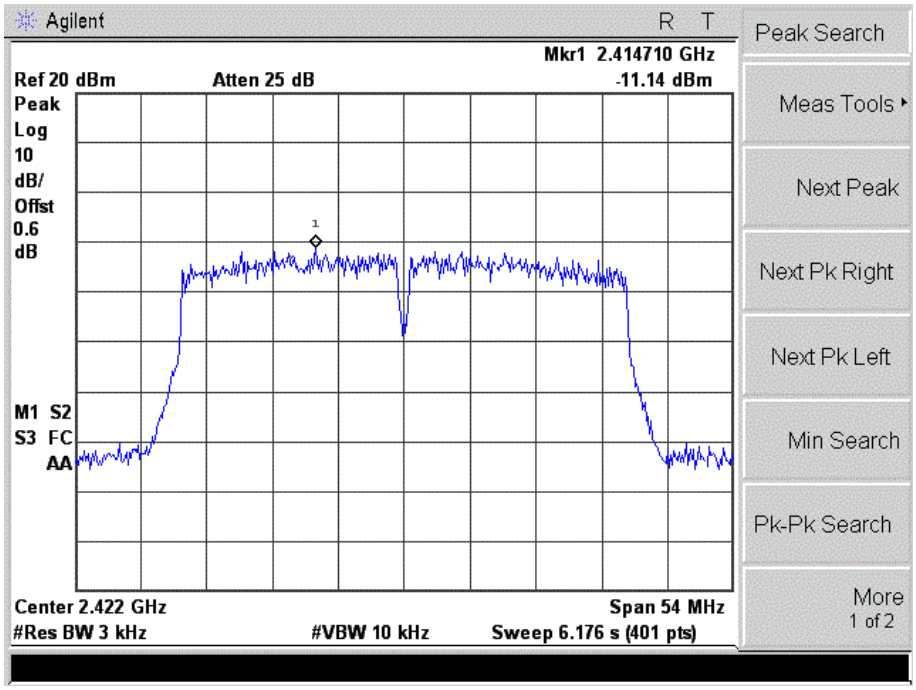
(CH High)

5.4.7.4 802.11n Test Mode (40MHz)

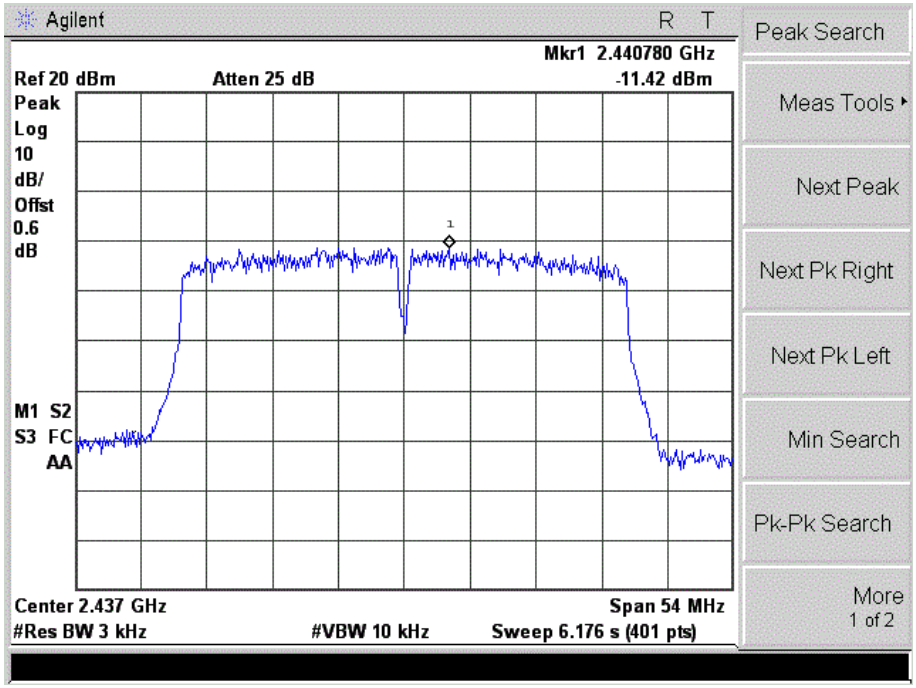
A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
3	2422	-11.14	≤8	PASS
6	2437	-11.42	≤8	PASS
9	2452	-10.67	≤8	PASS

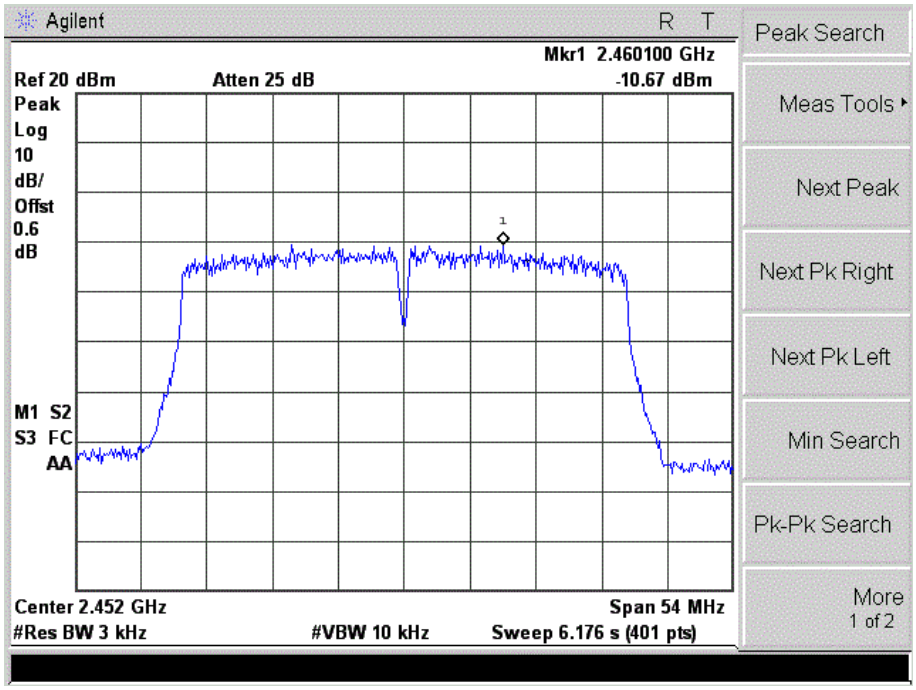
B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

5.5 Conducted Emission

5.5.1 Definition

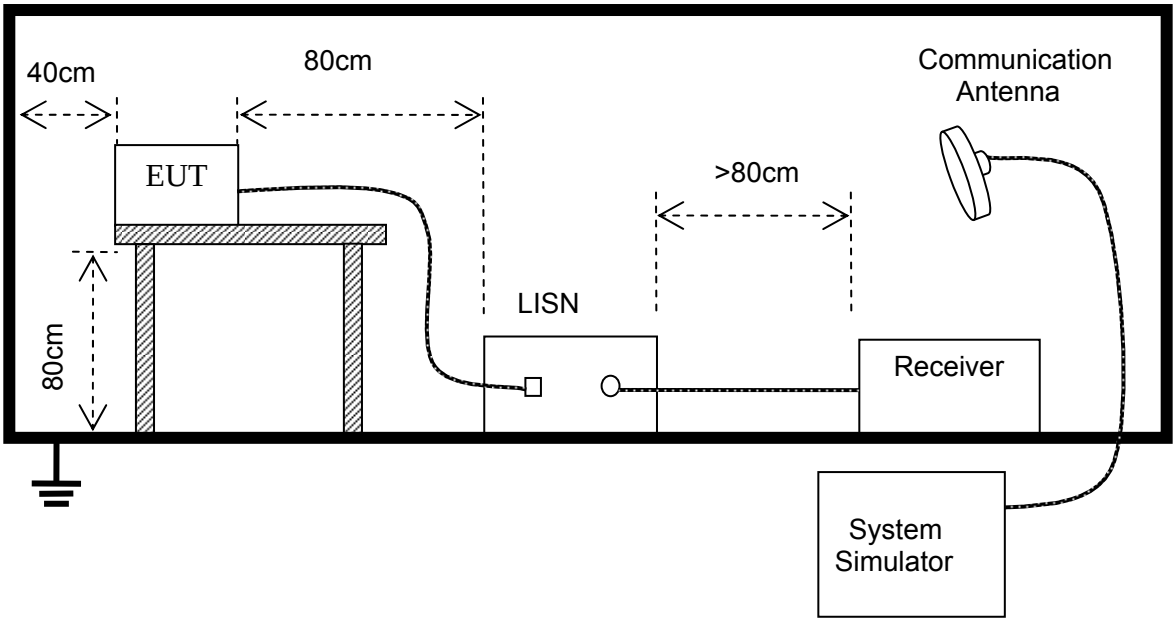
According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

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

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

5.5.2 Test Description

The EUT is powered by the Battery charged with the AC Adapter which is powered by 120V, 60Hz AC mains supply. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power.



5.5.3 Test Result

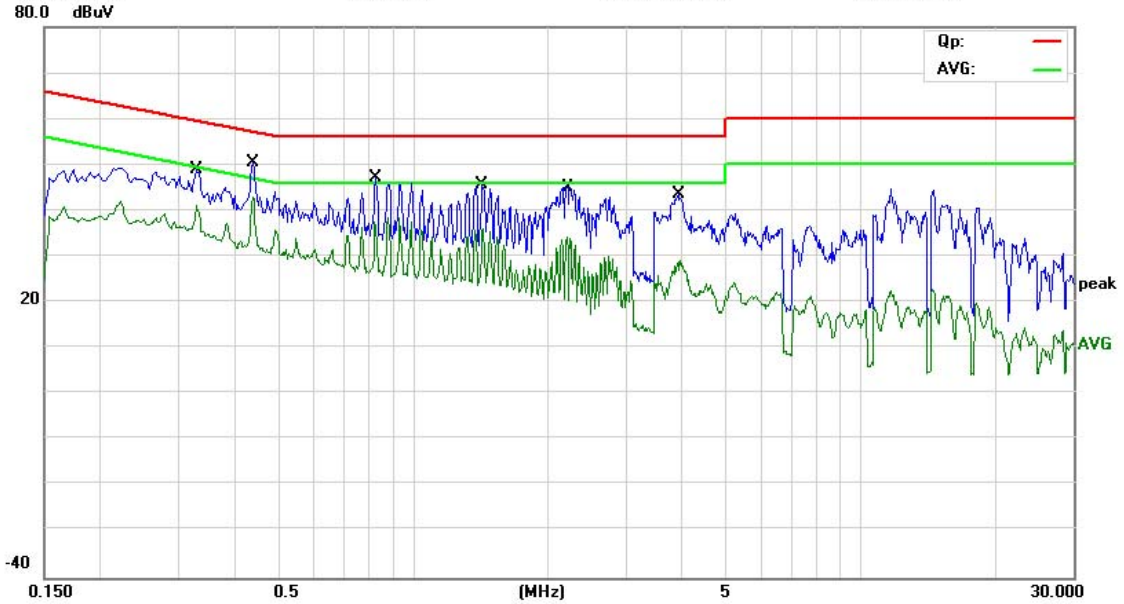
A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The Wifi model was carried out for 802.11b/g/n modulation types with two adapters, 802.11b High channel modulation type was the worst case condition, The test data was shown on the summary data page.

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Guangdong ,China
Tel: 0755-86026850 Fax: 0755-26013350

Conducted Emission Measurement

File :TNDT70 Data :#22 Date: 2015-1-27 Time: 9:42:00



Site MOST #1 Phase: N Temperature: 25.3
Limit: FCC Part15 B Class B QP Power: DC 5V by Car Charger Humidity: 48 %
EUT: RoadExplorer 70
M/N: RET70
Mode: WIFI+Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3334	34.02	11.11	45.13	59.37	-14.24	QP	
2		0.3334	28.38	11.11	39.49	49.37	-9.88	AVG	
3		0.4420	37.56	10.39	47.95	57.02	-9.07	QP	
4	*	0.4420	32.50	10.39	42.89	47.02	-4.13	AVG	
5		0.8308	33.67	10.00	43.67	56.00	-12.33	QP	
6		0.8308	26.04	10.00	36.04	46.00	-9.96	AVG	
7		1.4346	33.35	9.57	42.92	56.00	-13.08	QP	
8		1.4346	15.33	9.57	24.90	46.00	-21.10	AVG	
9		2.2021	32.60	9.20	41.80	56.00	-14.20	QP	
10		2.2021	24.90	9.20	34.10	46.00	-11.90	AVG	
11		3.9180	28.31	10.92	39.23	56.00	-16.77	QP	
12		3.9180	17.42	10.92	28.34	46.00	-17.66	AVG	

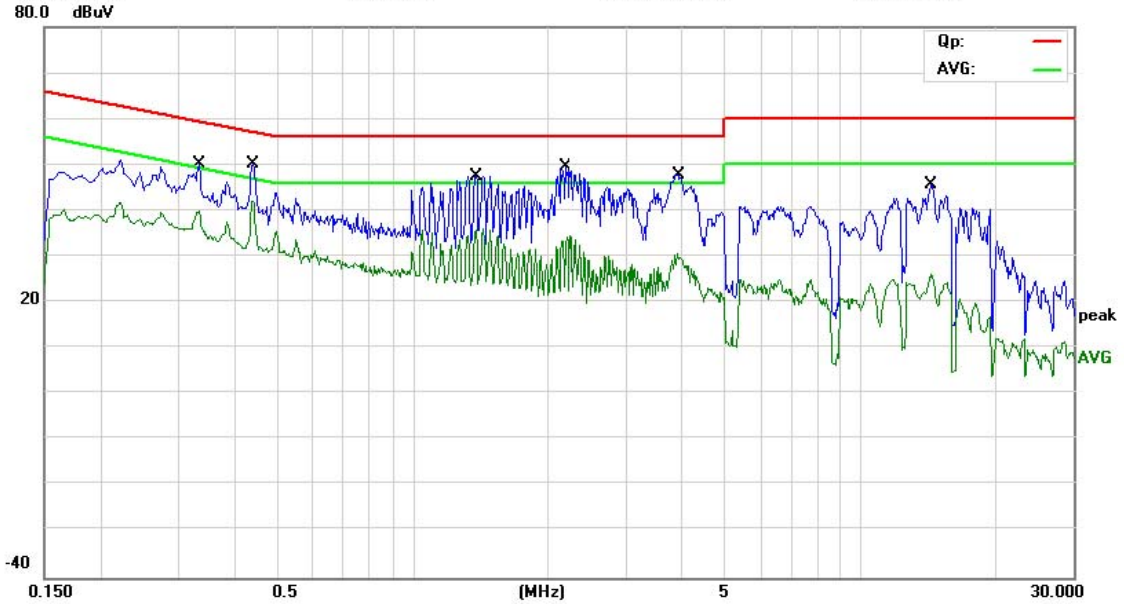
*:Maximum data x:Over limit !:over margin

Engineer Signature:

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Guangdong ,China
Tel: 0755-86026850 Fax: 0755-26013350

Conducted Emission Measurement

File :TNDT70 Data :#23 Date: 2015-1-27 Time: 9:51:09



Site MOST #1 Phase: L1 Temperature: 25.3
Limit: FCC Part15 B Class B QP Power: DC 5V by Car Charger Humidity: 48 %
EUT: RoadExplorer 70
M/N: RET70
Mode: WIFI+Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3337	34.88	11.11	45.99	59.36	-13.37	QP	
2		0.3337	27.94	11.11	39.05	49.36	-10.31	AVG	
3		0.4428	38.43	10.38	48.81	57.01	-8.20	QP	
4	*	0.4428	31.73	10.38	42.11	47.01	-4.90	AVG	
5		1.3813	35.91	9.62	45.53	56.00	-10.47	QP	
6		1.3813	17.73	9.62	27.35	46.00	-18.65	AVG	
7		2.2151	37.78	9.22	47.00	56.00	-9.00	QP	
8		2.2151	22.86	9.22	32.08	46.00	-13.92	AVG	
9		3.9316	33.10	10.93	44.03	56.00	-11.97	QP	
10		3.9316	17.68	10.93	28.61	46.00	-17.39	AVG	
11		14.3508	30.02	9.00	39.02	60.00	-20.98	QP	
12		14.3508	15.65	9.00	24.65	50.00	-25.35	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature:

5.6 Radiated Emission

5.6.1 Definition

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

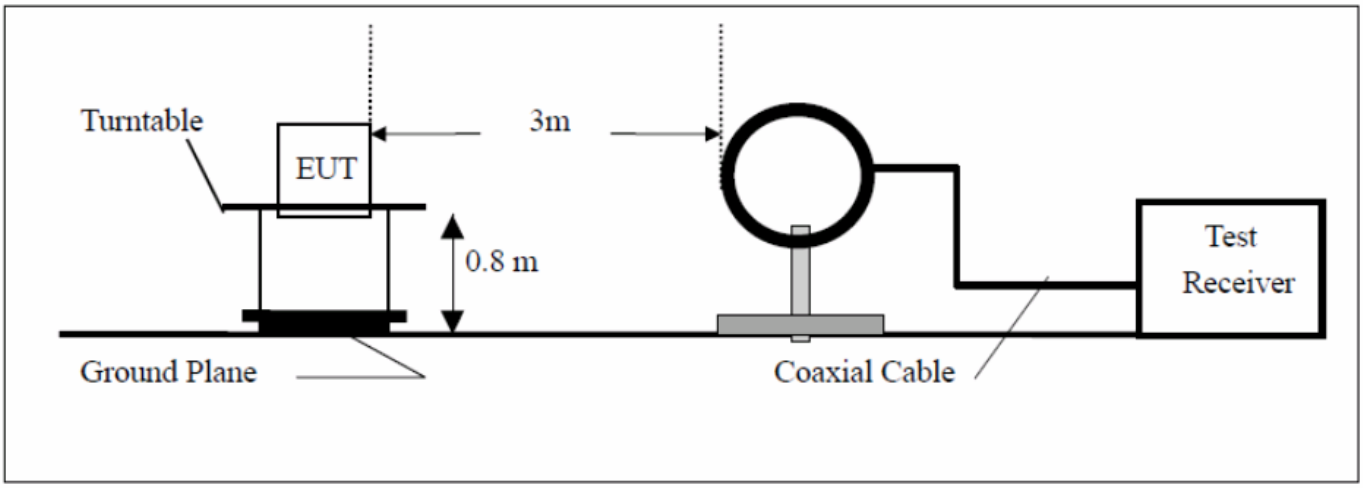
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

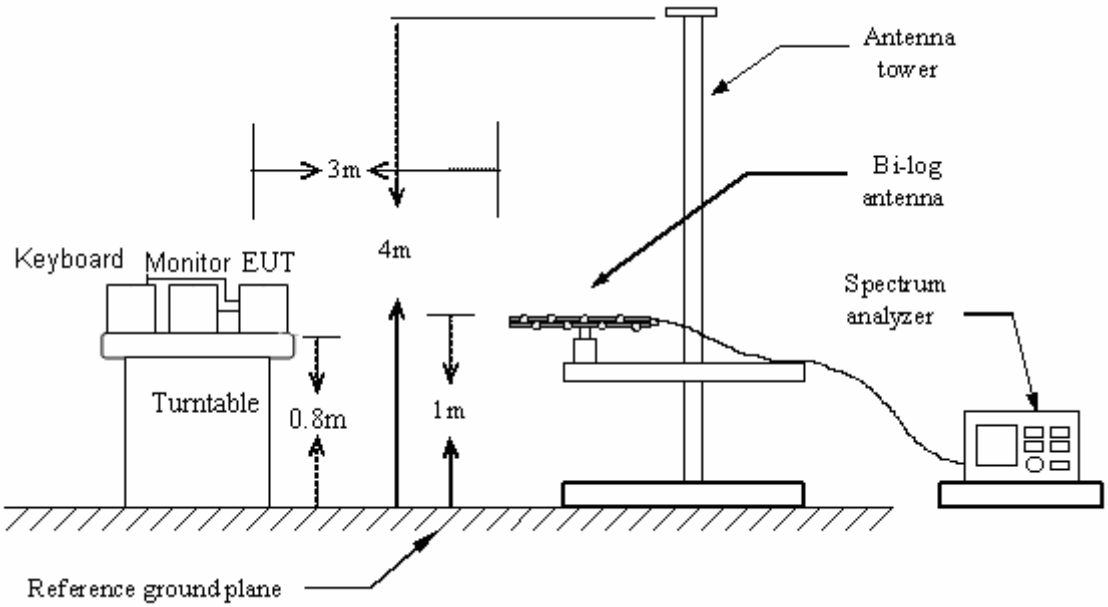
As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

5.6.2 Test Description

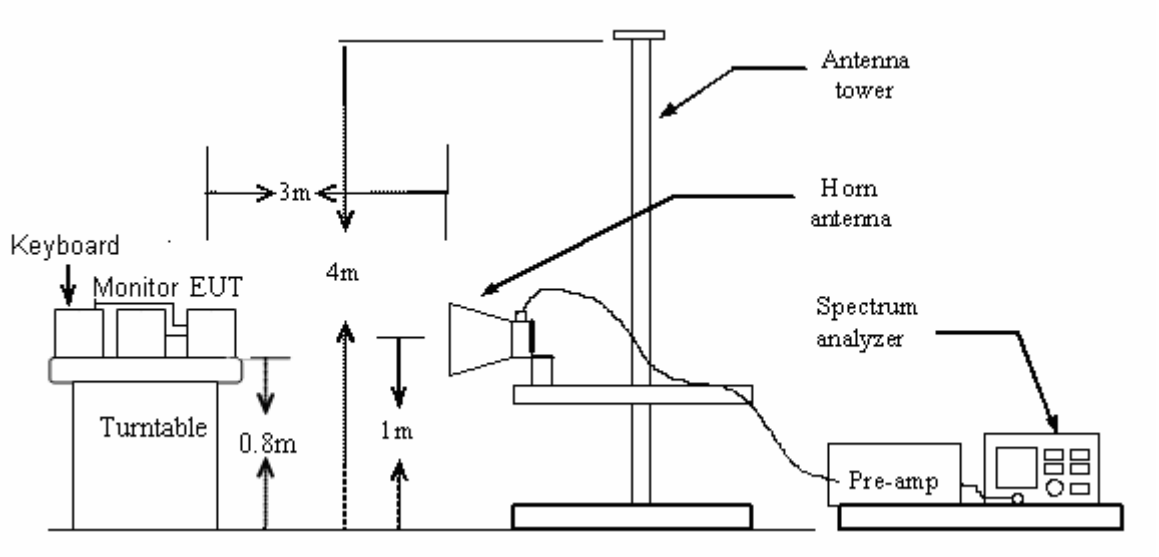
A. Test Configuration:



Below 1GHz:



Above 1GHz:



B. Test procedures

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz: PEAK: RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
   QP: RBW=120 kHz / Sweep=AUTO

   Above 1GHz: (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

   The final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
7. Repeat above procedures until the measurements for all frequencies are complete.

5.6.3 Test Result

The Wifi model was carried out for 802.11b/g/n modulation types with two adapters, 802.11b High channel modulation type was the worst case condition, The test data was shown on the summary data page.

From 30MHz to 30MHz:

EUT：	RoadExplorer 70	Model Name. ：	RET70
Temperature：	27.3 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

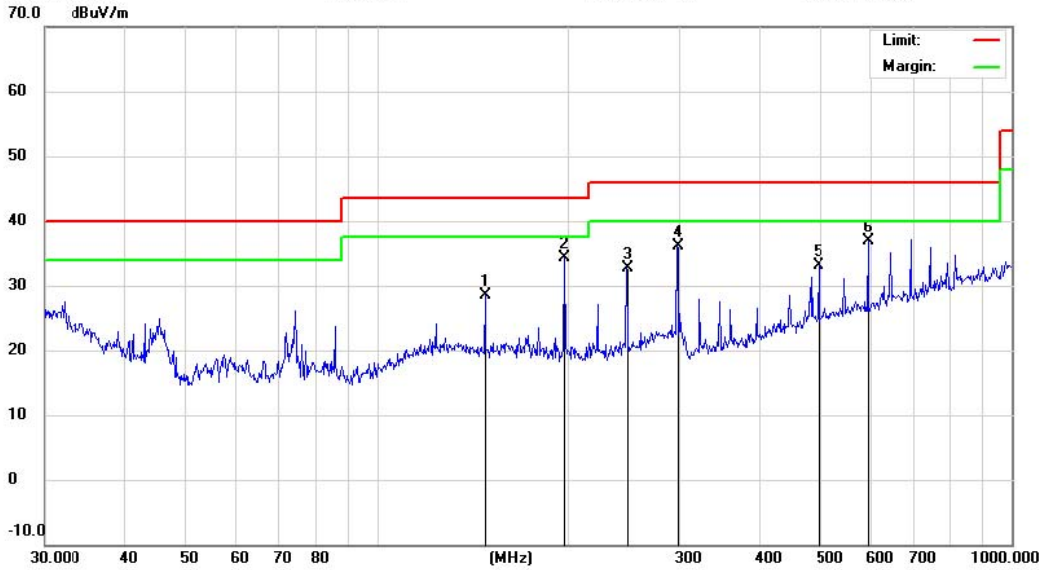
Conclusion: PASS

Below 1 GHz

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Guangdong ,China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#27 Date: 2015-1-8 Time: 12:08:00



Site Chamber #1 Polarization: *Vertical* Temperature: 25.4
Limit: FCC Part15 B 3M Radiation Power: DC 5V by Car Charger Humidity: 53 %
EUT: RoadExplorer 70 Distance: 3m
M/N: RET70
Mode: WIFI+Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		148.4410	11.81	16.61	28.42	43.50	-15.08	QP			
2		197.8928	17.08	17.23	34.31	43.50	-9.19	QP			
3		247.6819	15.36	17.35	32.71	46.00	-13.29	QP			
4		297.2241	16.69	19.33	36.02	46.00	-9.98	QP			
5		495.9344	11.51	21.52	33.03	46.00	-12.97	QP			
6	*	595.1329	13.93	22.90	36.83	46.00	-9.17	QP			

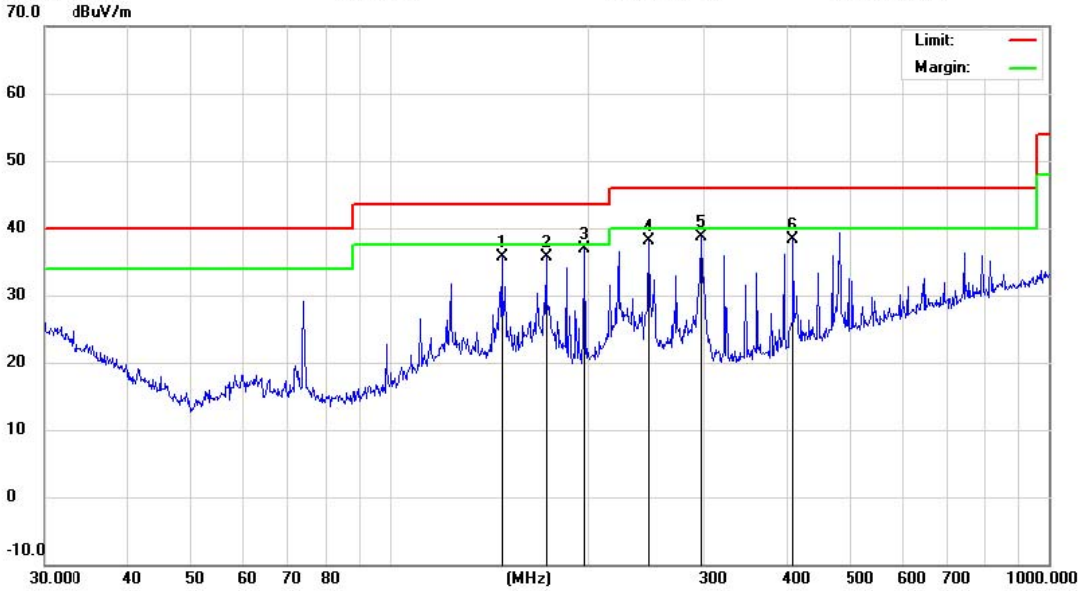
*:Maximum data x:Over limit !:over margin

Engineer Signature: John

Compliance Laboratory
Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park
Guangdong ,China
Tel: 0755-86026850 Fax: 0755-26013350

Radiated Emission Measurement

File :TNDT70 Data :#28 Date: 2015-1-8 Time: 12:21:17



Site Chamber #1 Polarization: *Horizontal* Temperature: 25.4
Limit: FCC Part15 B 3M Radiation Power: DC 5V by Car Charger Humidity: 53 %
EUT: RoadExplorer 70 Distance: 3m
M/N: RET70
Mode: WIFI+Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		148.4410	19.12	16.61	35.73	43.50	-7.77	QP			
2		173.2050	18.74	17.04	35.78	43.50	-7.72	QP			
3	*	197.8928	19.76	17.23	36.99	43.50	-6.51	QP			
4		247.6818	20.77	17.35	38.12	46.00	-7.88	QP			
5		297.2238	19.47	19.33	38.80	46.00	-7.20	QP			
6		408.9458	19.23	19.06	38.29	46.00	-7.71	QP			

*:Maximum data x:Over limit !:over margin

Engineer Signature: John

Above 1 GHz

Operation Mode:	TX/ IEEE 802.11b/CH Low	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4824	H	37.52	15.64	23.78	53.16	39.42	74.00	54.00	-14.58
N/A	H								
4824	V	37.05	15.62	24.01	52.67	39.63	74.00	54.00	-14.37
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11b/CH MID	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4874	H	35.10	14.02	23.78	49.12	37.80	74.00	54.00	-16.20
N/A	H								
4874	V	37.17	15.86	24.01	53.03	39.87	74.00	54.00	-14.13
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11b/CH High	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4924	H	36.03	13.78	23.78	49.82	37.56	74.00	54.00	-16.44
N/A	H								
4924	V	35.46	15.05	24.01	50.52	39.06	74.00	54.00	-14.94
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
   margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11g/CH Low	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4824	H	35.07	15.73	23.78	58.85	39.51	74.00	54.00	-14.49
N/A	H								
4824	V	37.23	15.71	24.01	61.24	39.72	74.00	54.00	-14.28
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
   margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11g/CH MID	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4874	H	35.63	14.44	23.78	59.41	38.22	74.00	54.00	-15.78
N/A	H								
4874	V	36.12	13.56	24.01	60.13	37.57	74.00	54.00	-16.43
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11g/CH High	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4924	H	34.64	15.28	23.78	58.42	39.06	74.00	54.00	-14.94
N/A	H								
4924	V	34.76	16.06	24.01	58.77	40.07	74.00	54.00	-13.93
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(20MHz)/CH Low	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4824	H	33.67	13.48	23.78	57.45	37.26	74.00	54.00	-16.74
N/A	H								
4824	V	35.45	14.54	24.01	59.46	38.55	74.00	54.00	-15.45
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(20MHz)/CH Mid	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4874	H	34.77	12.52	23.78	58.55	36.30	74.00	54.00	-17.70
N/A	H								
4874	V	34.04	14.23	24.01	58.05	38.24	74.00	54.00	-15.76
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

6 Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(20MHz)/CH High	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4924	H	33.49	12.10	23.78	57.27	35.88	74.00	54.00	-18.12
N/A	H								
4924	V	33.19	11.85	24.01	57.20	35.86	74.00	54.00	-18.14
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(40MHz)/CH Low	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4844	H	33.72	12.94	23.78	57.50	36.72	74.00	54.00	-17.28
N/A	H								
4844	V	34.16	12.96	24.01	58.17	36.97	74.00	54.00	-17.03
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(40MHz)/CH Mid	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4874	H	33.53	14.45	23.78	57.31	38.23	74.00	54.00	-15.77
N/A	H								
4874	V	34.54	13.10	24.01	58.55	37.11	74.00	54.00	-16.89
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

7 Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Operation Mode:	TX/ IEEE 802.11n(40MHz)/CH High	**Test Date:**	Jan. 08, 2015
Temperature:	26°C	**Tested by:**	Roy
Humidity:	70 % RH	**Polarity:**	Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4904	H	34.18	13.58	23.78	57.96	37.36	74.00	54.00	-16.64
N/A	H								
4904	V	35.76	13.56	24.01	59.77	37.57	74.00	54.00	-16.43
N/A	V								

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie:
margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

5.7 Conducted Spurious Emission

5.7.1 Definition

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

5.7.2 Test Configuration

5.7.3 Test Description

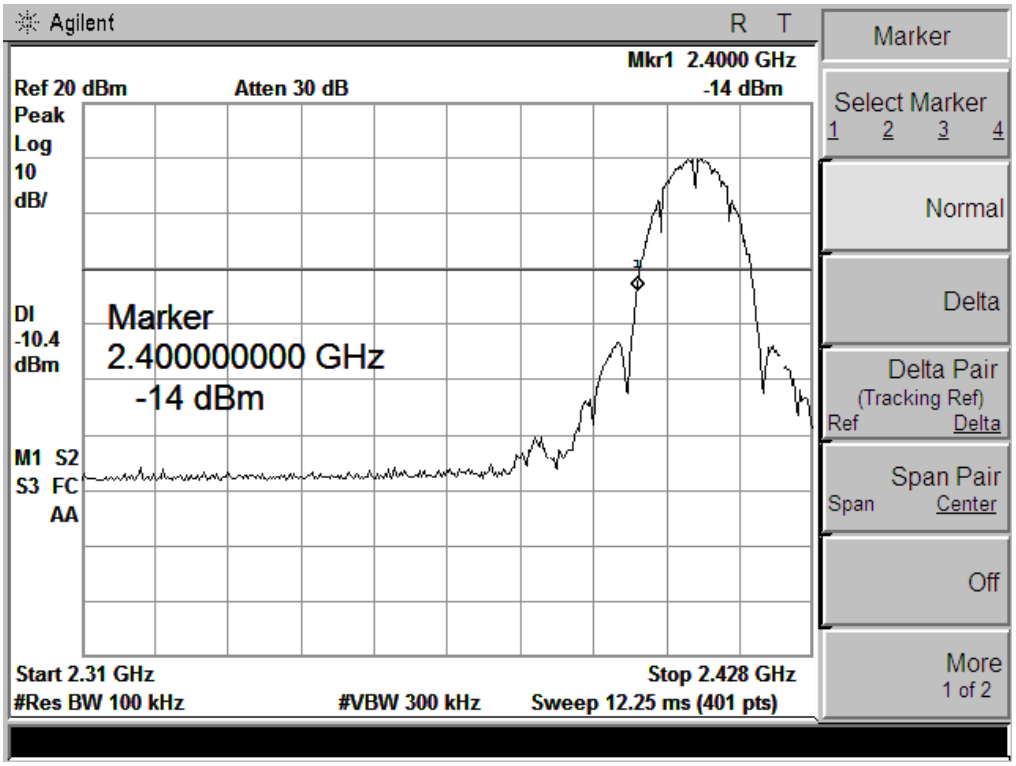
The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.

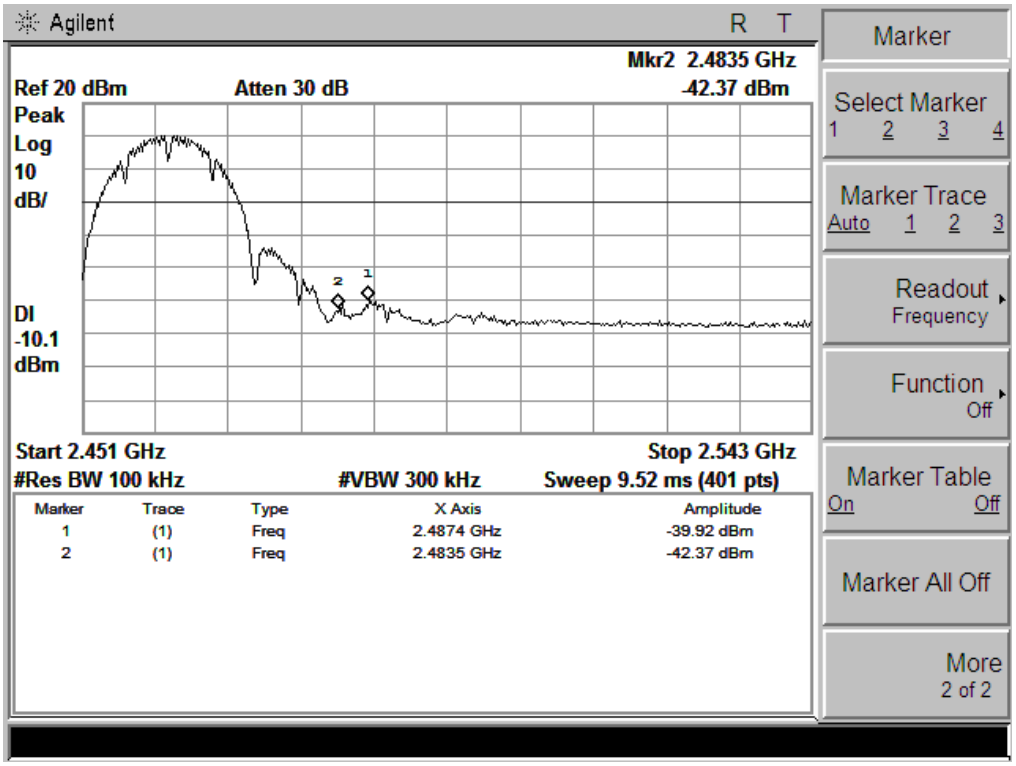
5.7.4 Test Result

The EUT operates at maximum output power mode. The lowest, and highest channels are selected to perform testing to verify the Conducted Spurious Emission of the Module.

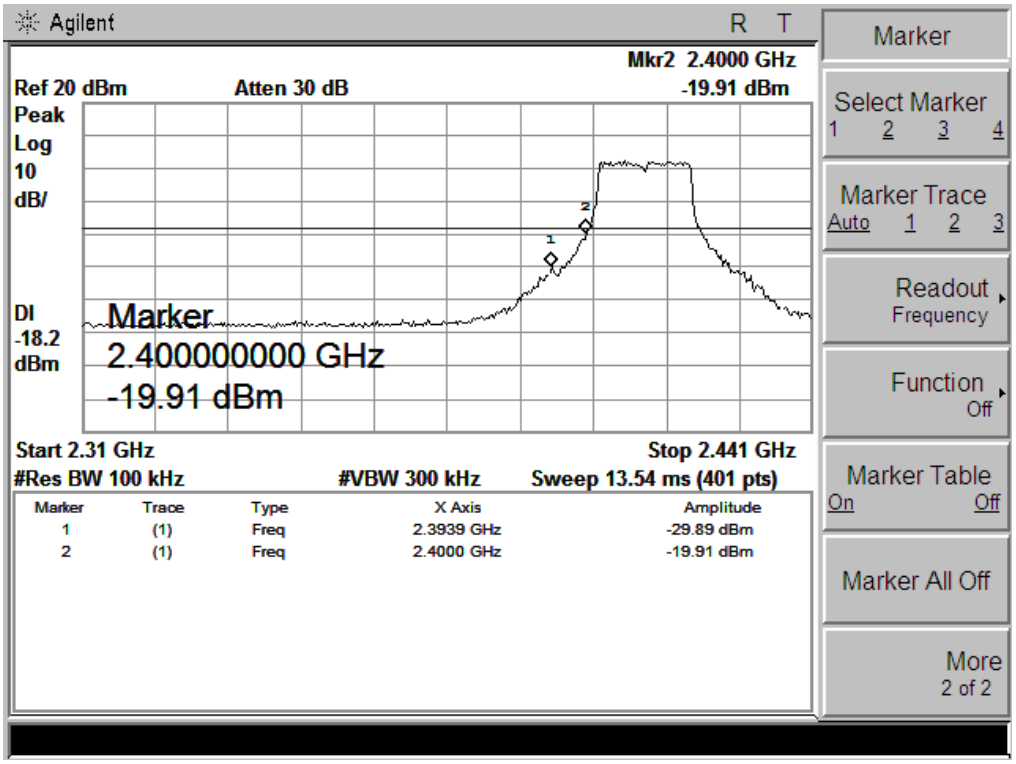
Test Plot:

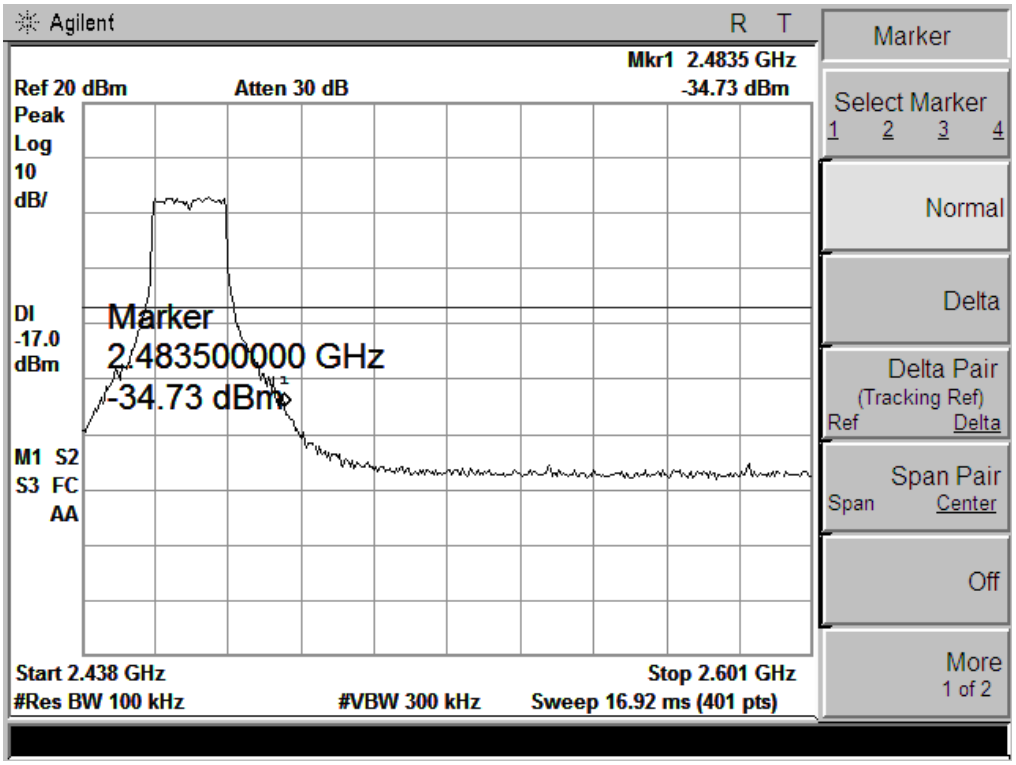
802.11b Model:



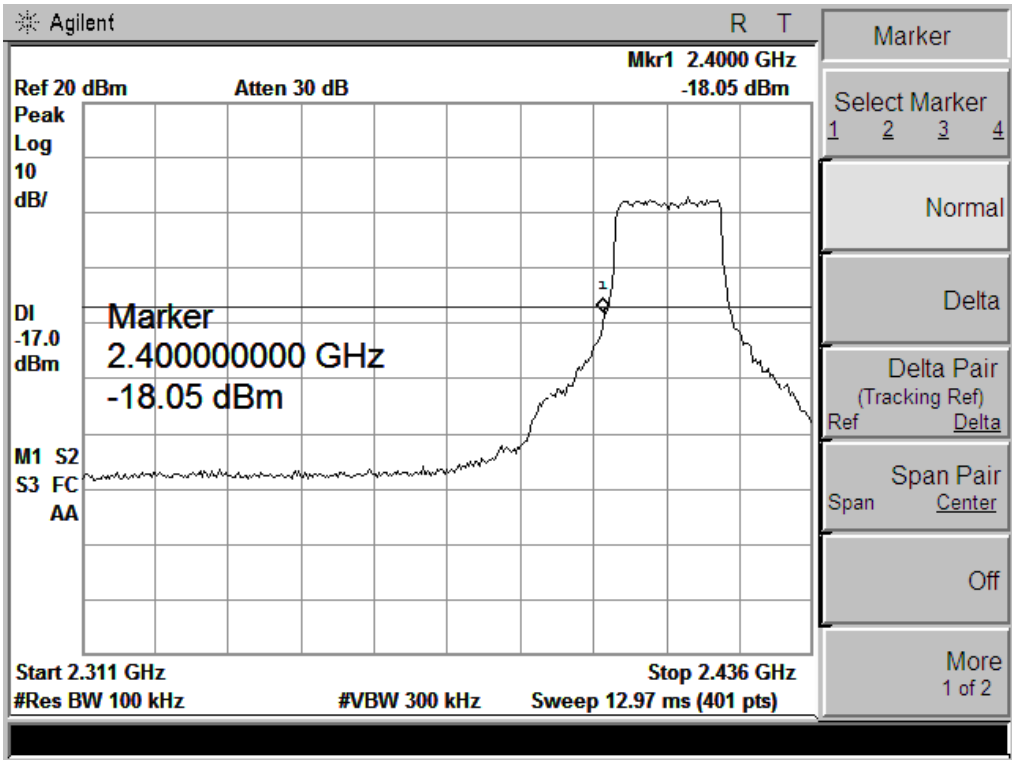


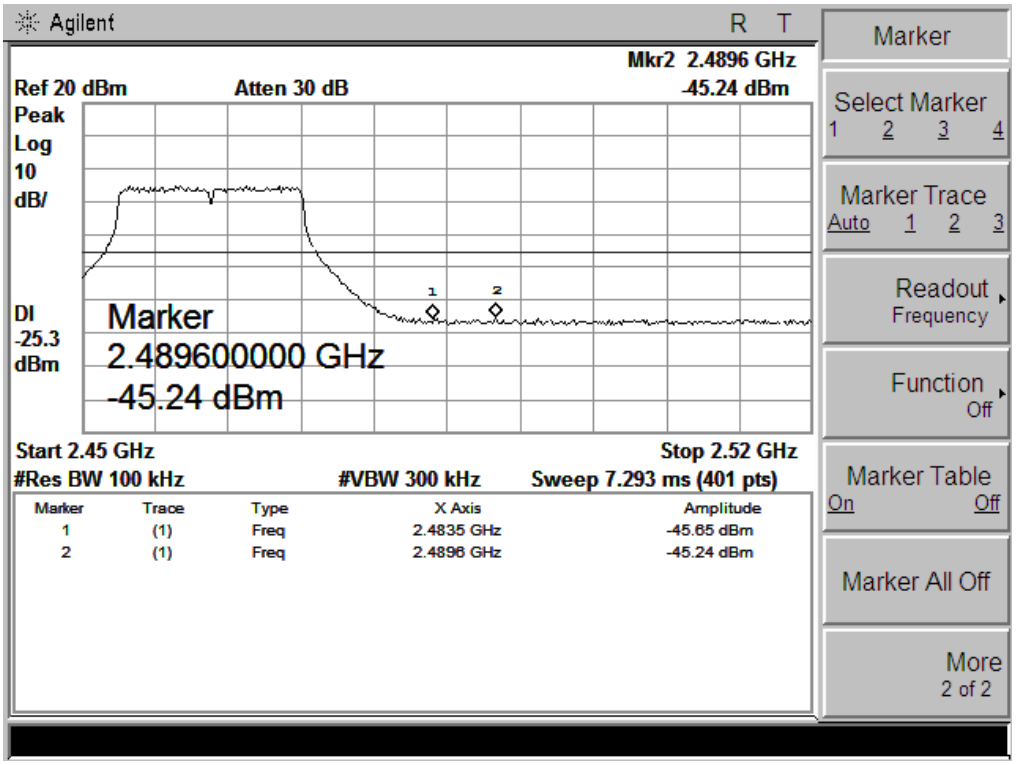
802.11g Model:



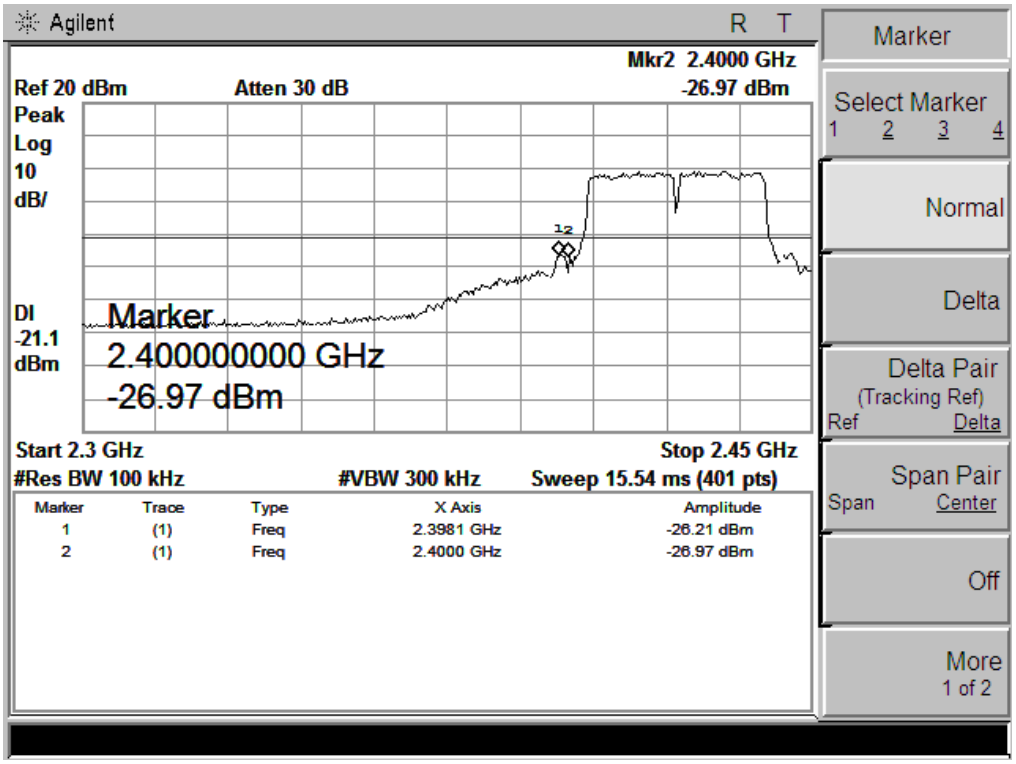


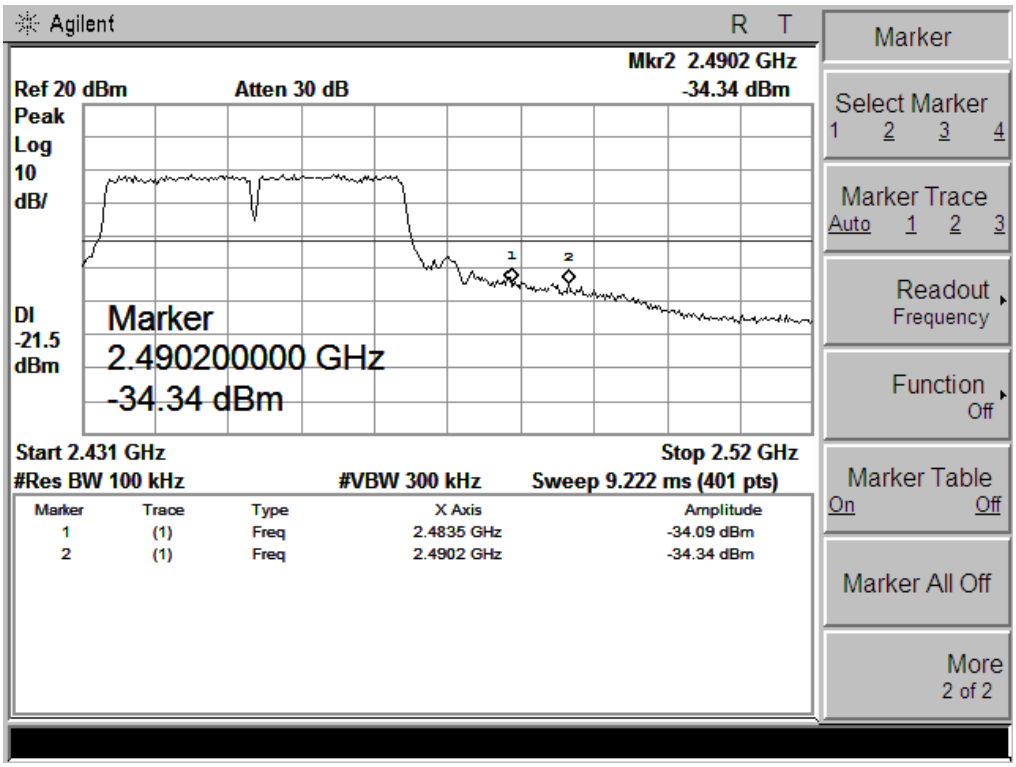
802.11n-HT20 Model:





802.11n-HT40 Model:





5.8 Antenna Requirement

5.8.1 Definition

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, An analysis of the EUT was performed to determine compliance with FCC Section 15.203. This section requires specific handling and control of antennas used for devices subject to regulations.

5.8.2 Evaluation Criteria

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

(a) Antenna must be permanently attached to the unit.

(b) Antenna must use a unique type of connector to attach to the EUT.

(c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

5.8.3 Evaluation Results

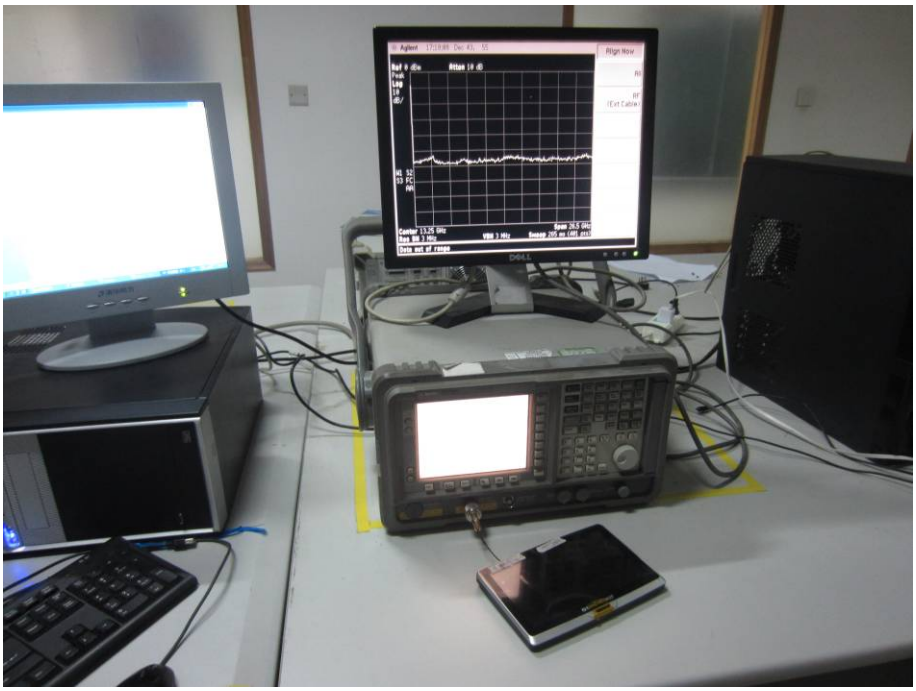
The antenna used in this product is PCB antenna. The antenna is permanently attached. It is inaccessible to the user.

The EUT is therefore compliant with the regulation.

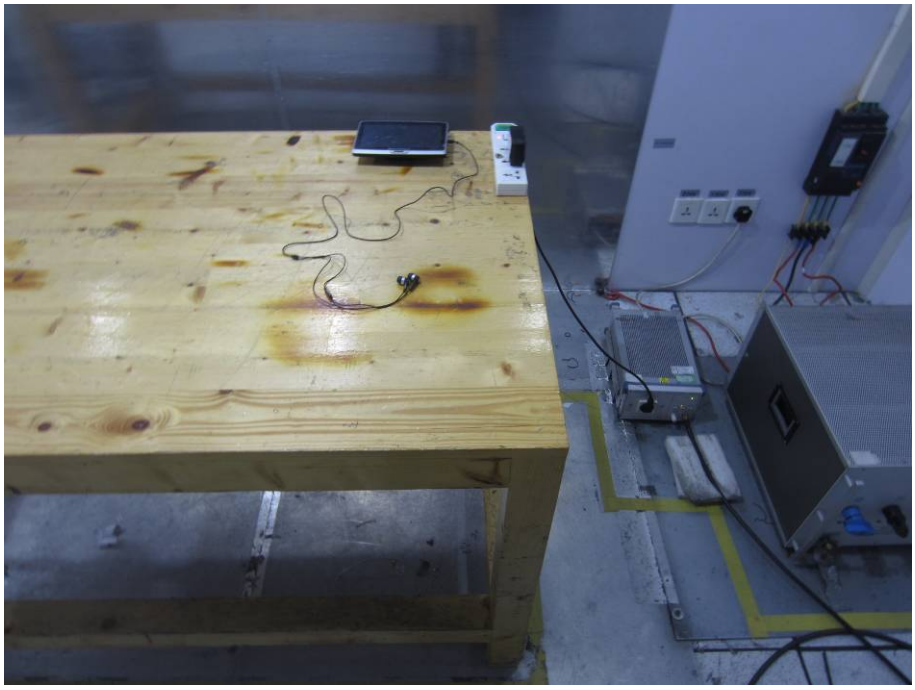
APPENDIX 1

PHOTOGRAPHS OF TEST SETUP

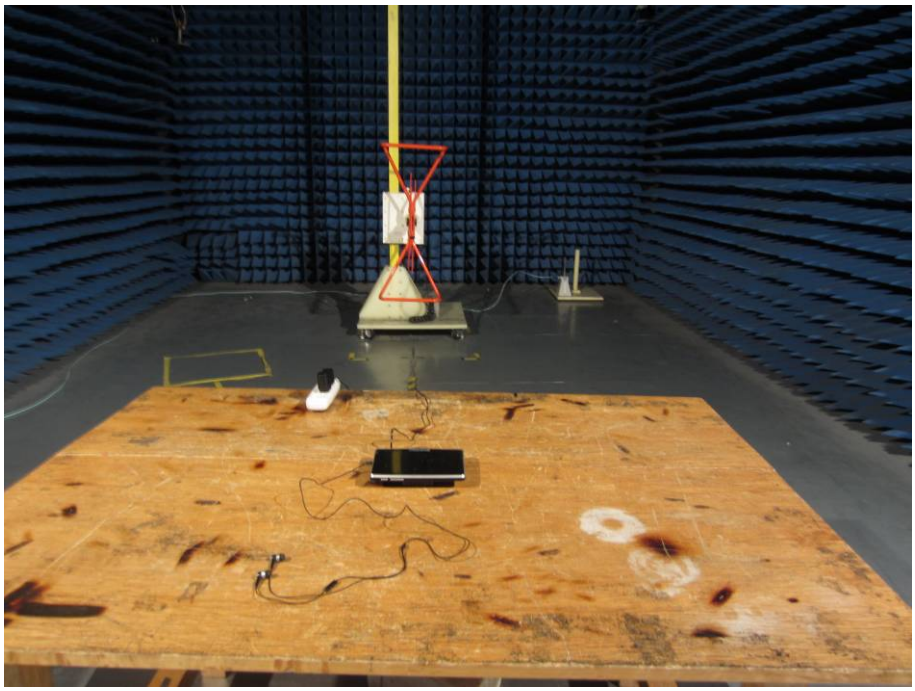
CONDUCTED TEST SETUP

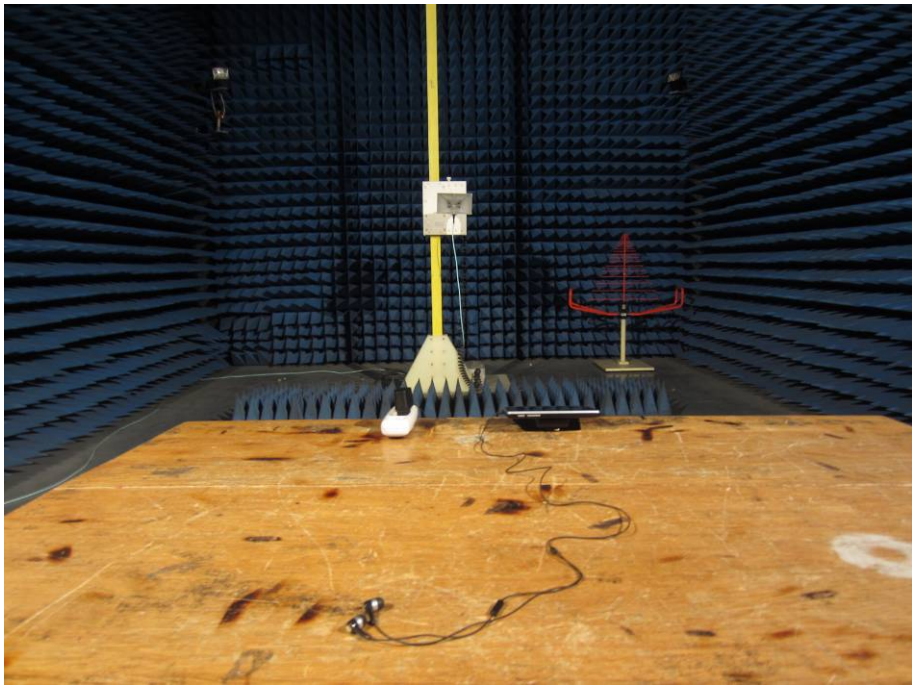


CE TEST SETUP



RE TEST SETUP





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