FCC RADIO TEST REPORT
FCC ID:2AEHF-SMART

Product：	NOBUX™ SMART PLUS-PRO
Trade Name：	NOBUX™
Model Name：	SMART PLUS-PRO
Serial Model：	N/A
Report No.：	NTEK-2015NT04131459F3

Prepared for

NOBUX, LLC

8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166, United States

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... NOBUX, LLC

Address..... 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166, United States

Manufacture's Name... NOBUX, LLC

Address..... 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166, United States

Product description

Product name..... NOBUX™ SMART PLUS-PRO

Model and/or type reference ..... SMART PLUS-PRO

Serial Model ..... N/A

Standards ..... FCC Part15.247 01 Oct. 2014

Test procedure ..... ANSI C63.10-2013 and KDB 558074: June 5, 2014

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

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Date of Test .....

Date (s) of performance of tests..... 13 Apr. 2015~11 Jun. 2015

Date of Issue ..... 11 Jun. 2015

Test Result..... **Pass**

Testing Engineer : Jason chen

(Jason Chen)

Technical Manager : Brown Lu

(Brown Lu)

Authorized Signatory : Bill

(Bill Yao)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd
Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.
FCC Registration No.:238937; IC Registration No.:9270A-1
CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	NOBUX™ SMART PLUS-PRO
Trade Name	NOBUX™
Model Name	SMART PLUS-PRO
Serial Model	N/A
Model Difference	N/A
Product Description	Operation Frequency: 802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz):2422~2452MHz Modulation Type: IEEE 802.11b : DSSS (CCK, QPSK, DBPSK) IEEE 802.11g/n (HT20/HT40) : OFDM (64QAM, 16QAM, QPSK, BPSK) Bit Rate of Transmitter 802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz/40MHz):150/144.44/130/117/115.56/104/86.67/78/52/6.5Mbps Number Of Channel 802.11b/g/n20MHz:11CH 802.11n40MHz:7CH Antenna Designation: Please see Note 3. Antenna Gain (dBi) 1.0 dbi
Channel List	Please refer to the Note 2.
Ratings	DC 3.7V
Adapter	Input: 100-240V~, 50/60Hz,150mA Output: 5.0V⎓, 500mA
Battery	DC 3.7V, 1400mAh
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.

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

Channel List for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452		
04	2427	07	2442				
05	2432	08	2447				

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	FPCB Antenna	N/A	1.0	Wifi Antenna

2.2 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.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n20 CH1/ CH6/ CH11
Mode 4	802.11n40 CH3/ CH6/ CH9
Mode 5	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n20 CH1/ CH6/ CH11
Mode 4	802.11n40 CH3/ CH6/ CH 9
Mode 5	Link Mode

Note:

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

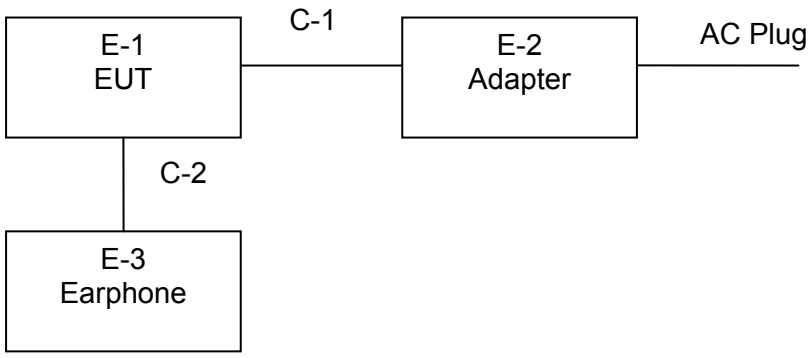
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

(3) EUT configured to transmit continuously:

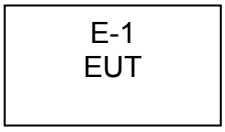
Operated Mode for Worst Duty Cycle	
Test Signal Duty Cycle (x)	Average correction factor (dB)
100% - IEEE 802.11b	0
100% - IEEE 802.11g	0
100% - IEEE 802.11n (HT20)	0
100% - IEEE 802.11n (HT40)	0

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	NOBUX™ SMART PLUS-PRO	NOBUX™	SMART PLUS-PRO	N/A	EUT
E-2	Adapter	N/A	N/A	N/A	
E-3	Earphone	N/A	2688	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2m	
C-2	NO	NO	1.0m	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	1 year
12	Test Cable	N/A	R-01	N/A	2014.07.06	2015.07.05	1 year
13	Test Cable	N/A	R-02	N/A	2014.07.06	2015.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2015.06.06	2016.06.05	1 year
2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2015.06.06	2016.06.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.06	2016.06.05	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.06	2016.06.05	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2015.06.06	2016.06.05	1 year

1	Attenuation	MCE	24-10-34	BN9258	2015.06.06	2016.06.05	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

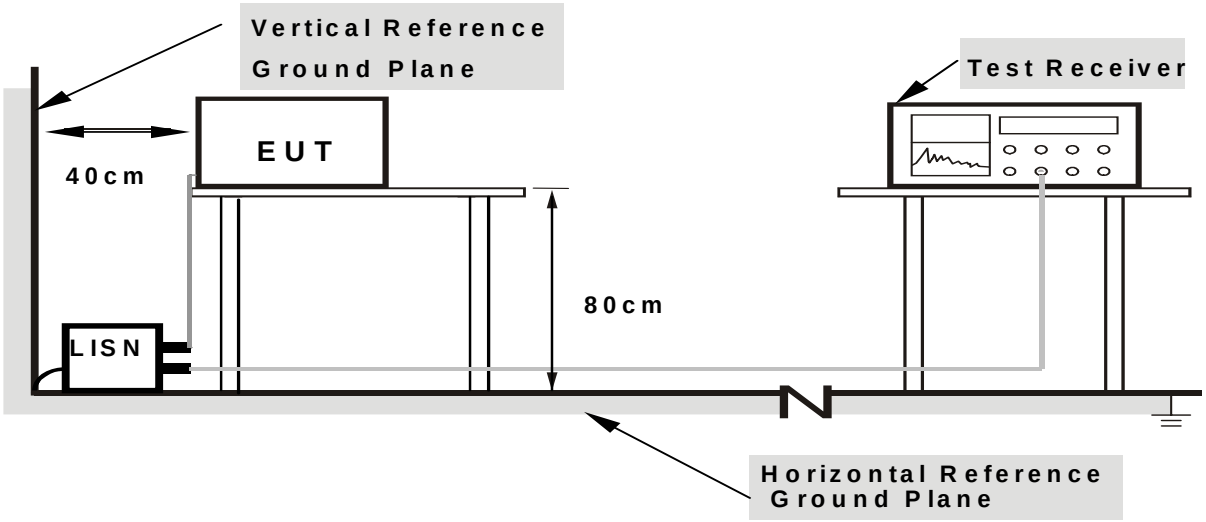
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

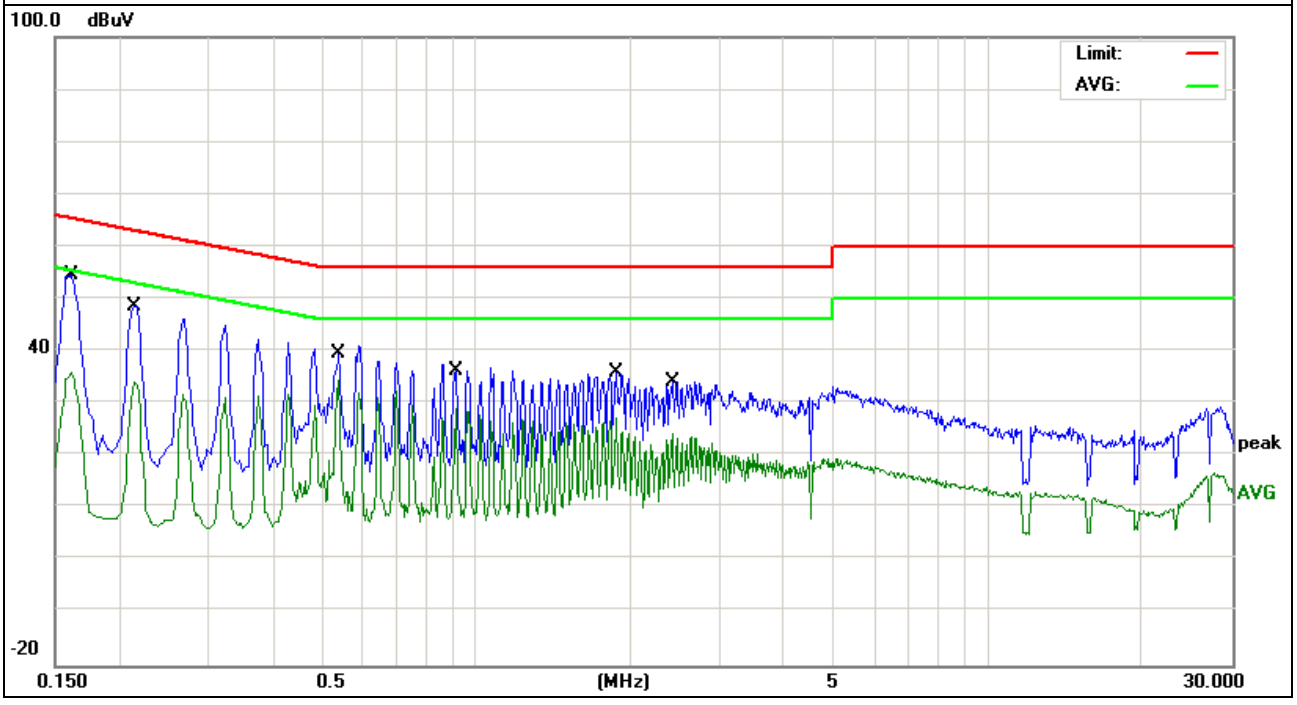
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1620	44.98	9.60	54.58	65.36	-10.78	QP
0.1620	26.37	9.60	35.97	55.36	-19.39	AVG
0.2139	39.17	9.49	48.66	63.05	-14.39	QP
0.2139	24.62	9.49	34.11	53.05	-18.94	AVG
0.5380	30.09	9.51	39.60	56.00	-16.40	QP
0.5380	24.85	9.51	34.36	46.00	-11.64	AVG
0.9140	25.93	9.53	35.46	56.00	-20.54	QP
0.9140	19.43	9.53	28.96	46.00	-17.04	AVG
1.8779	26.48	9.55	36.03	56.00	-19.97	QP
1.8779	17.75	9.55	27.30	46.00	-18.70	AVG
2.4140	24.71	9.56	34.27	56.00	-21.73	QP
2.4140	14.75	9.56	24.31	46.00	-21.69	AVG

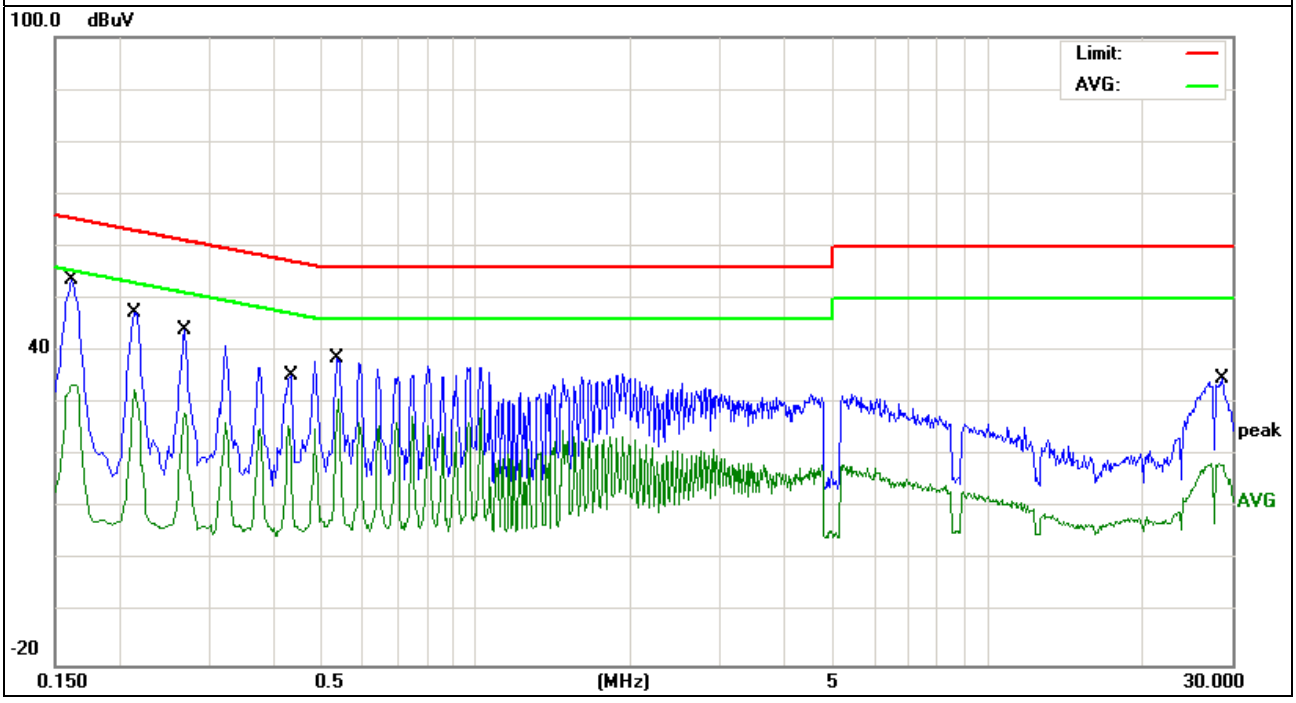
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1620	43.96	9.60	53.56	65.36	-11.80	QP
0.1620	23.92	9.60	33.52	55.36	-21.84	AVG
0.2139	37.82	9.49	47.31	63.05	-15.74	QP
0.2139	23.03	9.49	32.52	53.05	-20.53	AVG
0.2700	34.48	9.49	43.97	61.12	-17.15	QP
0.2700	18.53	9.49	28.02	51.12	-23.10	AVG
0.4299	25.03	9.51	34.54	57.25	-22.71	QP
0.4299	16.24	9.51	25.75	47.25	-21.50	AVG
0.5380	28.64	9.51	38.15	56.00	-17.85	QP
0.5380	21.26	9.51	30.77	46.00	-15.23	AVG
28.3060	23.02	10.10	33.12	60.00	-26.88	QP
28.3060	8.53	10.10	18.63	50.00	-31.37	AVG

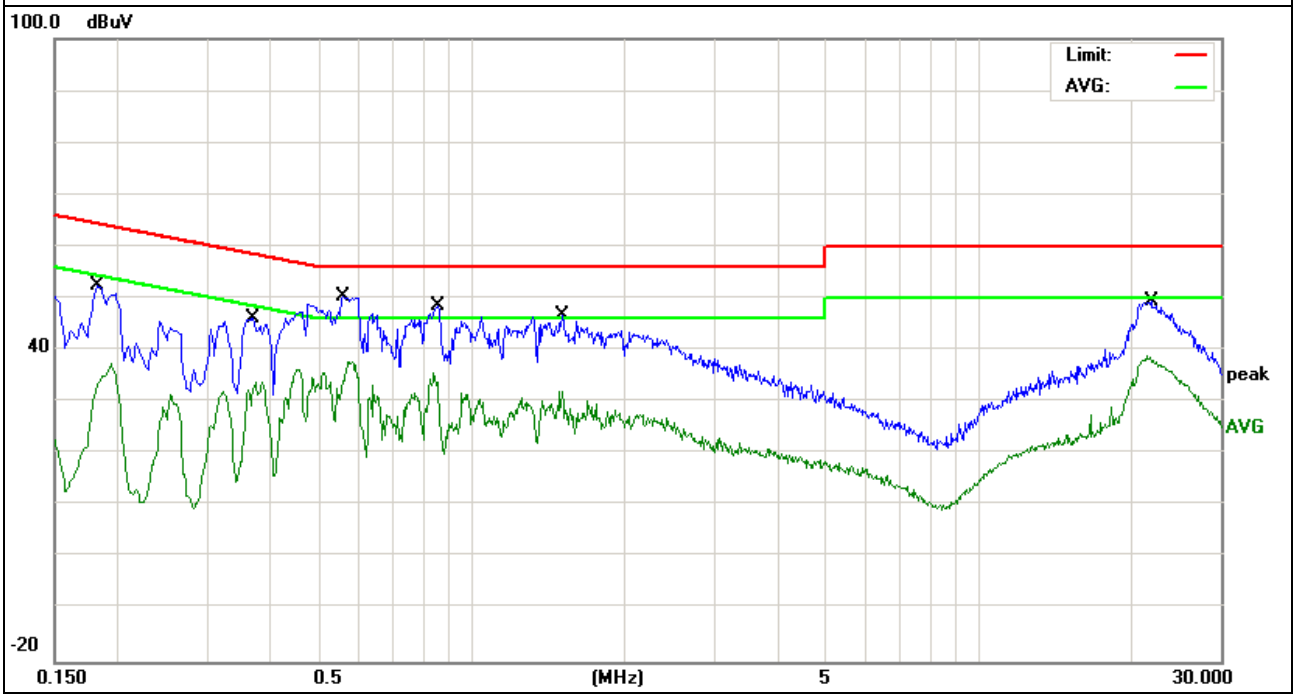
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1819	42.88	9.61	52.49	64.39	-11.90	QP
0.1819	27.96	9.61	37.57	54.39	-16.82	AVG
0.3700	36.72	9.47	46.19	58.50	-12.31	QP
0.3700	24.33	9.47	33.80	48.50	-14.70	AVG
0.5580	40.50	9.78	50.28	56.00	-5.72	QP
0.5580	27.94	9.78	37.72	46.00	-8.28	AVG
0.8580	38.77	9.75	48.52	56.00	-7.48	QP
0.8580	25.93	9.75	35.68	46.00	-10.32	AVG
1.5060	37.11	9.68	46.79	56.00	-9.21	QP
1.5060	22.33	9.68	32.01	46.00	-13.99	AVG
21.9220	39.62	9.96	49.58	60.00	-10.42	QP
21.9220	28.88	9.96	38.84	50.00	-11.16	AVG

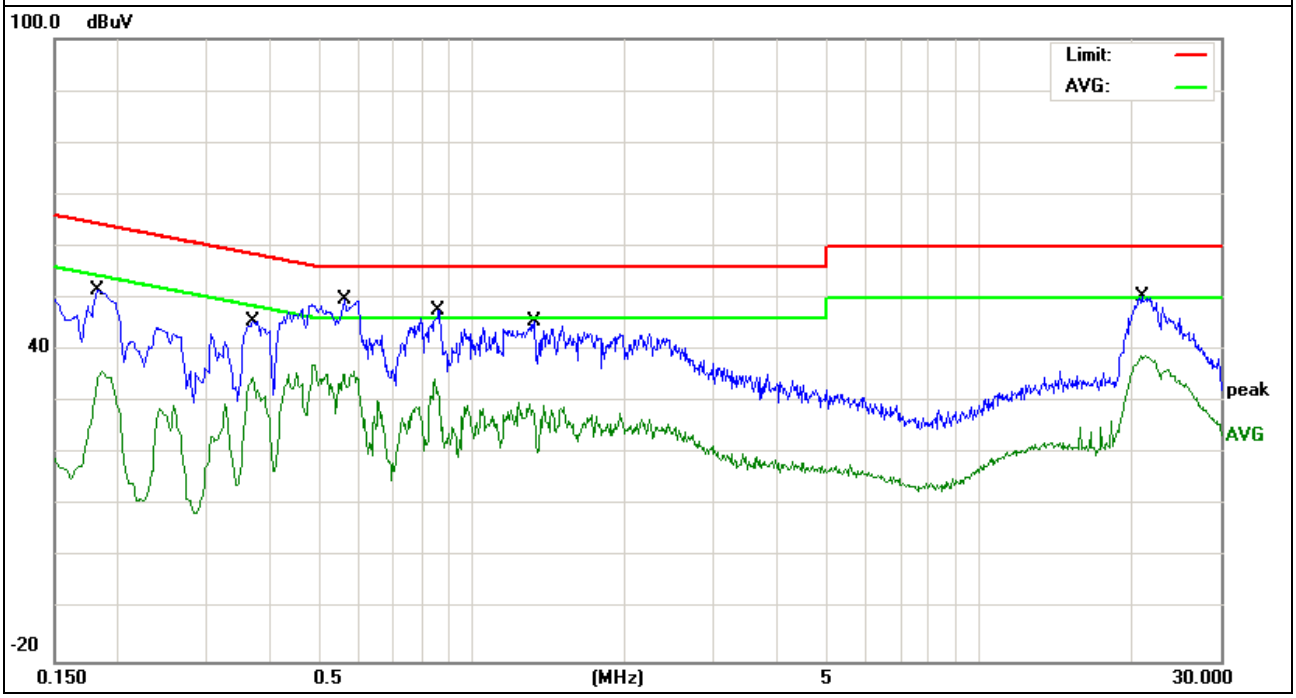
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1819	41.99	9.61	51.60	64.39	-12.79	QP
0.1819	26.48	9.61	36.09	54.39	-18.30	AVG
0.3700	36.00	9.63	45.63	58.50	-12.87	QP
0.3700	25.09	9.63	34.72	48.50	-13.78	AVG
0.5620	40.01	9.67	49.68	56.00	-6.32	QP
0.5620	26.21	9.67	35.88	46.00	-10.12	AVG
0.8580	38.09	9.63	47.72	56.00	-8.28	QP
0.8580	24.84	9.63	34.47	46.00	-11.53	AVG
1.3260	35.82	9.59	45.41	56.00	-10.59	QP
1.3260	20.31	9.59	29.90	46.00	-16.10	AVG
20.9940	40.61	9.86	50.47	60.00	-9.53	QP
20.9940	29.13	9.86	38.99	50.00	-11.01	AVG

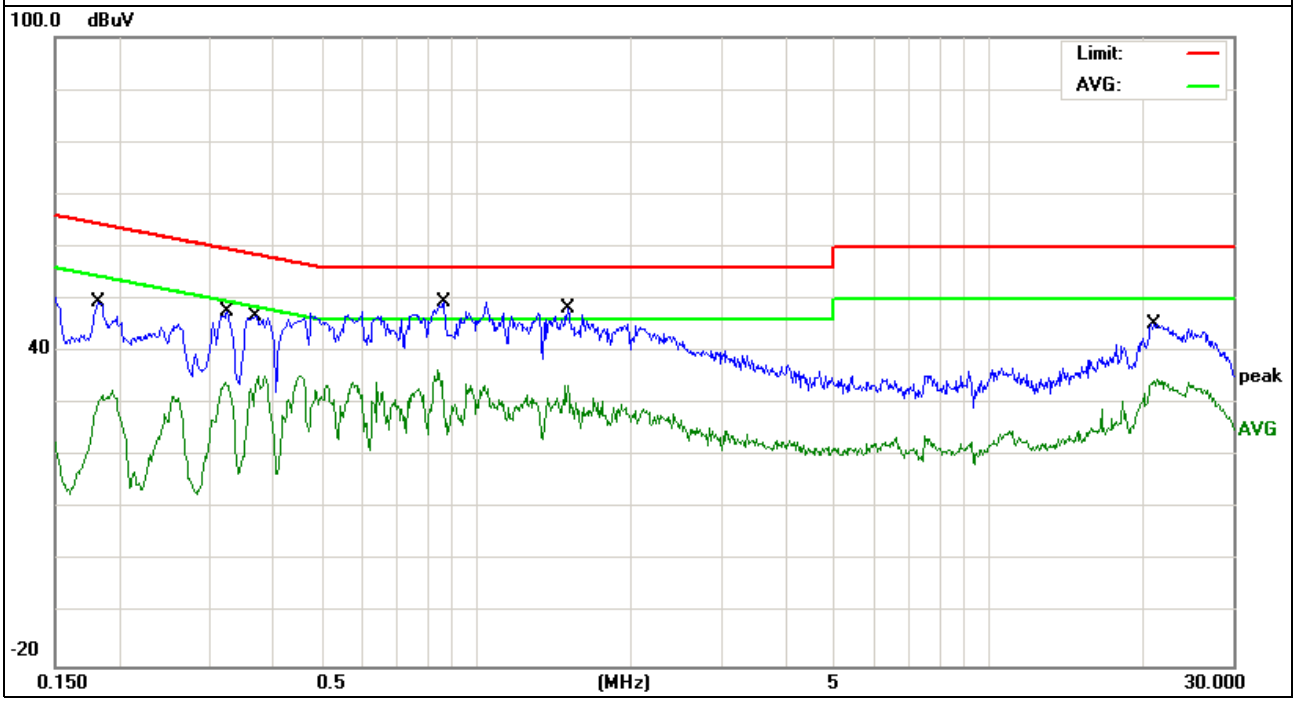
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From PC AC120V/60Hz	Test Mode：	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1819	39.88	9.61	49.49	64.39	-14.90	QP
0.1819	22.96	9.61	32.57	54.39	-21.82	AVG
0.3260	38.05	9.64	47.69	59.55	-11.86	QP
0.3260	24.54	9.64	34.18	49.55	-15.37	AVG
0.3699	37.22	9.47	46.69	58.50	-11.81	QP
0.3699	25.83	9.47	35.30	48.50	-13.20	AVG
0.8618	39.77	9.75	49.52	56.00	-6.48	QP
0.8618	26.93	9.75	36.68	46.00	-9.32	AVG
1.5060	38.61	9.68	48.29	56.00	-7.71	QP
1.5060	23.83	9.68	33.51	46.00	-12.49	AVG
21.0180	35.43	9.96	45.39	60.00	-14.61	QP
21.0180	24.72	9.96	34.68	50.00	-15.32	AVG

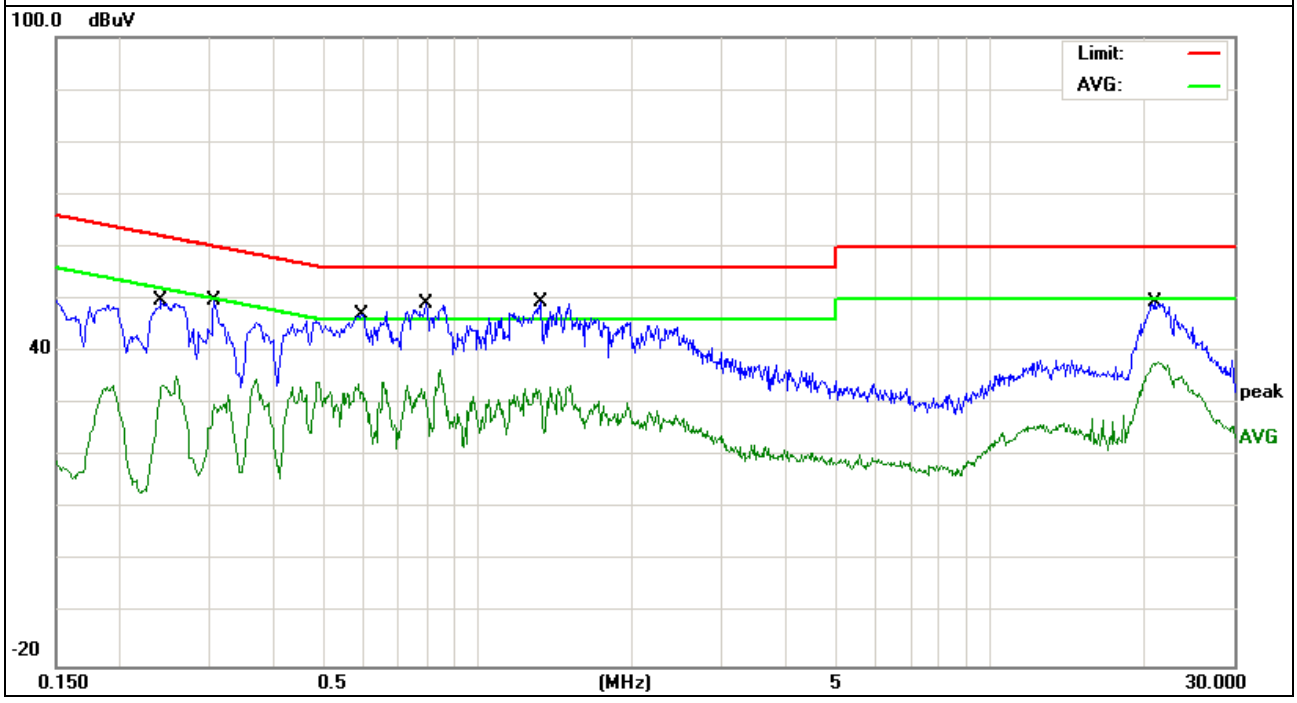
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From PC AC120V/60Hz	Test Mode：	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2403	40.07	9.61	49.68	62.08	-12.40	QP
0.2403	25.66	9.61	35.27	52.08	-16.81	AVG
0.3059	40.08	9.62	49.70	60.08	-10.38	QP
0.3059	22.03	9.62	31.65	50.08	-18.43	AVG
0.5936	37.44	9.66	47.10	56.00	-8.90	QP
0.5936	24.62	9.66	34.28	46.00	-11.72	AVG
0.7940	39.44	9.63	49.07	56.00	-6.93	QP
0.7940	26.84	9.63	36.47	46.00	-9.53	AVG
1.3260	39.82	9.59	49.41	56.00	-6.59	QP
1.3260	23.64	9.59	33.23	46.00	-12.77	AVG
20.9939	39.61	9.86	49.47	60.00	-10.53	QP
20.9939	28.13	9.86	37.99	50.00	-12.01	AVG

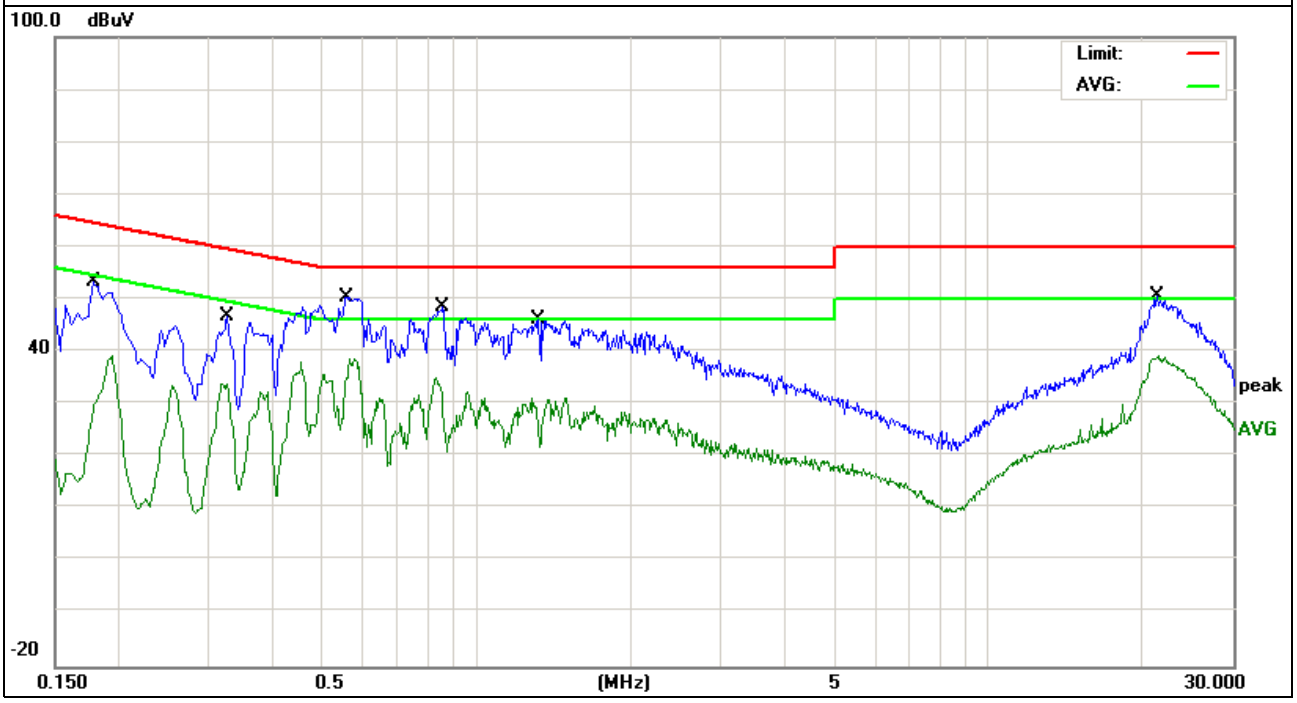
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From PC AC240V/60Hz	Test Mode：	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1780	43.63	9.62	53.25	64.57	-11.32	QP
0.1780	29.58	9.62	39.20	54.57	-15.37	AVG
0.3260	36.97	9.64	46.61	59.55	-12.94	QP
0.3260	24.34	9.64	33.98	49.55	-15.57	AVG
0.5580	40.65	9.78	50.43	56.00	-5.57	QP
0.5580	28.90	9.78	38.68	46.00	-7.32	AVG
0.8580	38.76	9.75	48.51	56.00	-7.49	QP
0.8580	25.34	9.75	35.09	46.00	-10.91	AVG
1.3220	36.29	9.71	46.00	56.00	-10.00	QP
1.3220	21.56	9.71	31.27	46.00	-14.73	AVG
21.2979	40.62	9.96	50.58	60.00	-9.42	QP
21.2979	29.17	9.96	39.13	50.00	-10.87	AVG

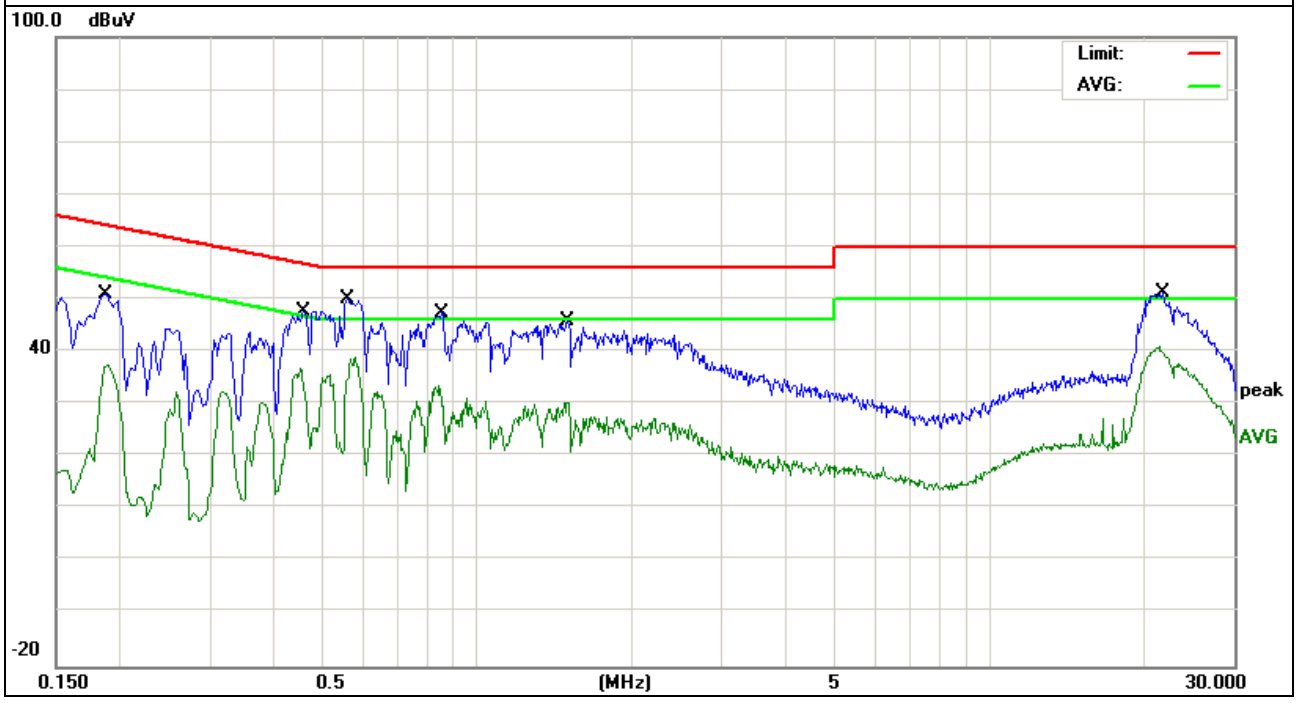
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From PC AC240V/60Hz	Test Mode：	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1900	41.39	9.61	51.00	64.03	-13.03	QP
0.1900	27.91	9.61	37.52	54.03	-16.51	AVG
0.4580	38.00	9.66	47.66	56.73	-9.07	QP
0.4580	27.17	9.66	36.83	46.73	-9.90	AVG
0.5580	40.26	9.67	49.93	56.00	-6.07	QP
0.5580	29.19	9.67	38.86	46.00	-7.14	AVG
0.8500	37.79	9.62	47.41	56.00	-8.59	QP
0.8500	23.93	9.62	33.55	46.00	-12.45	AVG
1.4980	36.40	9.58	45.98	56.00	-10.02	QP
1.4980	20.70	9.58	30.28	46.00	-15.72	AVG
21.7740	41.48	9.87	51.35	60.00	-8.65	QP
21.7740	31.31	9.87	41.18	50.00	-8.82	AVG

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	dBuV/m@at 3M	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

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

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

3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

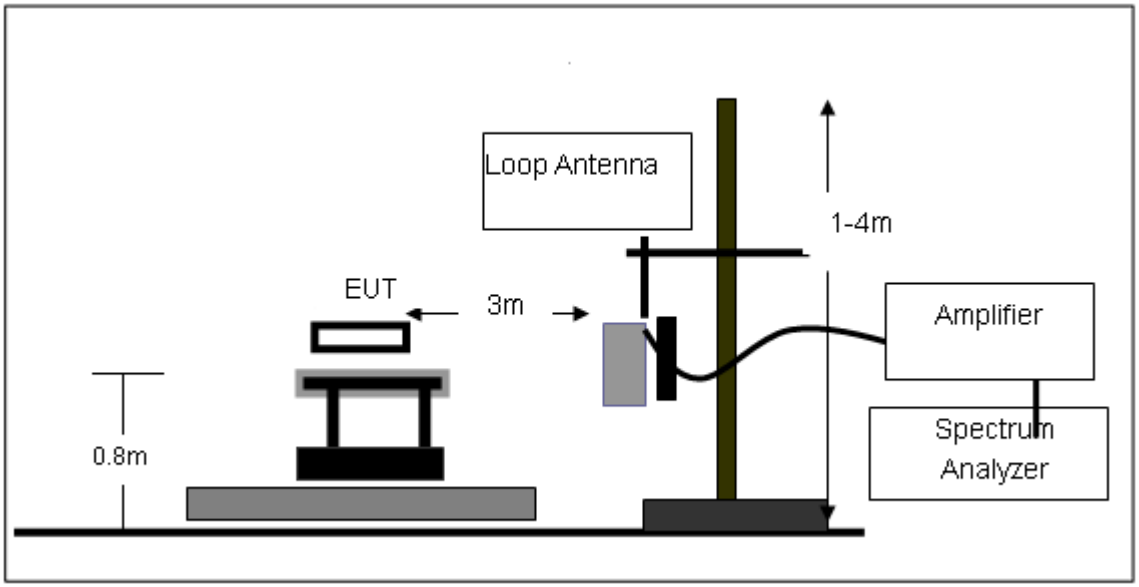
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

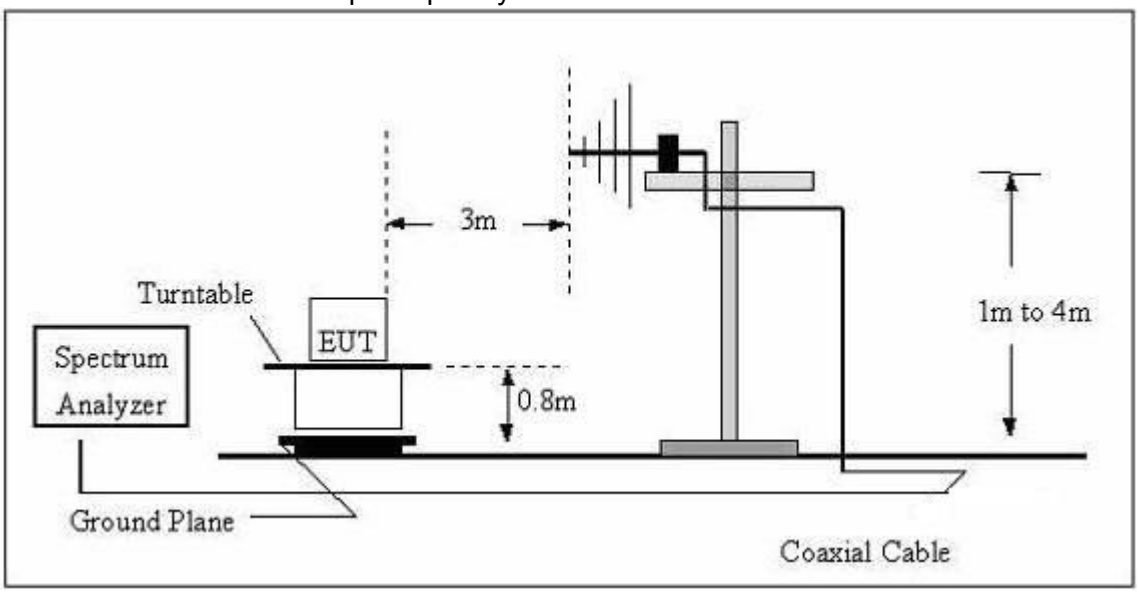
No deviation

3.2.4 TEST SETUP

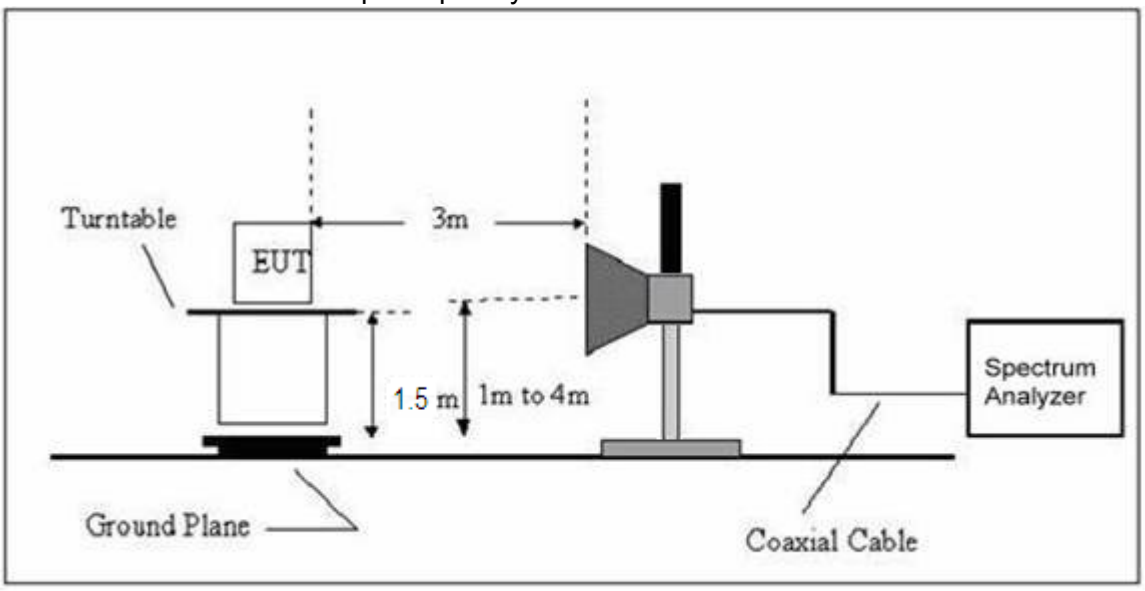
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT：	NOBUX™ SMART PLUS-PRO	Model Name. ：	SMART PLUS-PRO
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX	Polarization :	--

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

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 =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

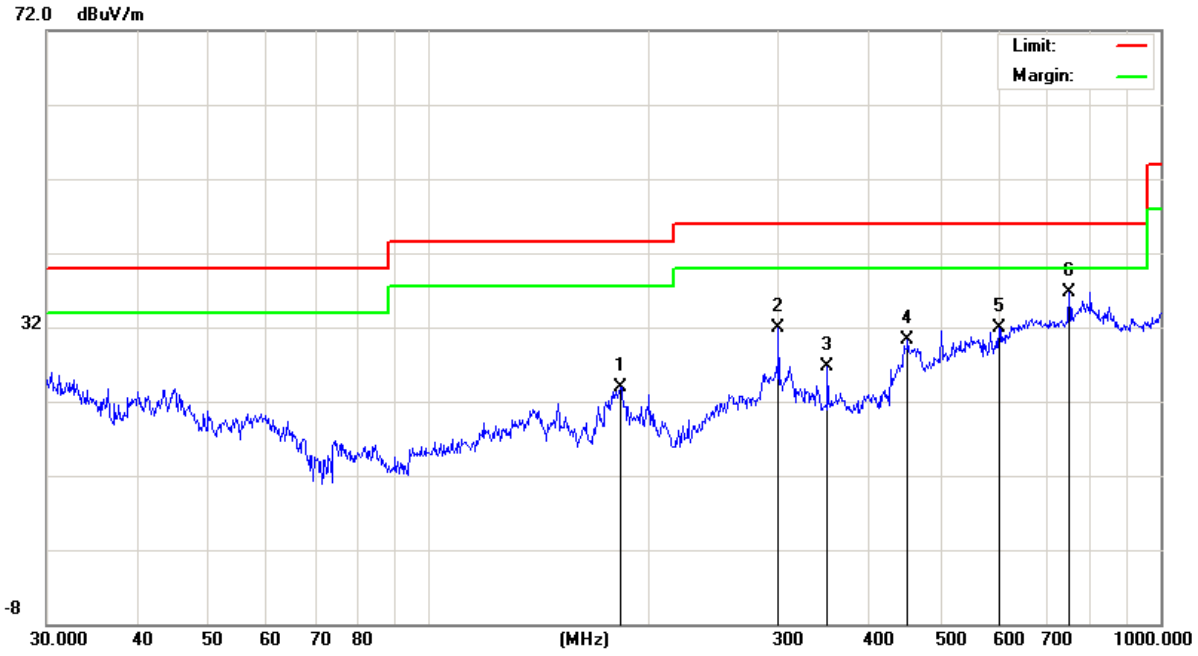
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	182.5592	13.32	10.64	23.96	43.50	-19.54	QP
V	300.3672	17.66	14.16	31.82	46.00	-14.18	QP
V	350.4768	10.37	16.26	26.63	46.00	-19.37	QP
V	451.1349	10.96	19.33	30.29	46.00	-15.71	QP
V	601.4265	9.41	22.44	31.85	46.00	-14.15	QP
V	750.1082	10.61	26.10	36.71	46.00	-9.29	QP

Remark:

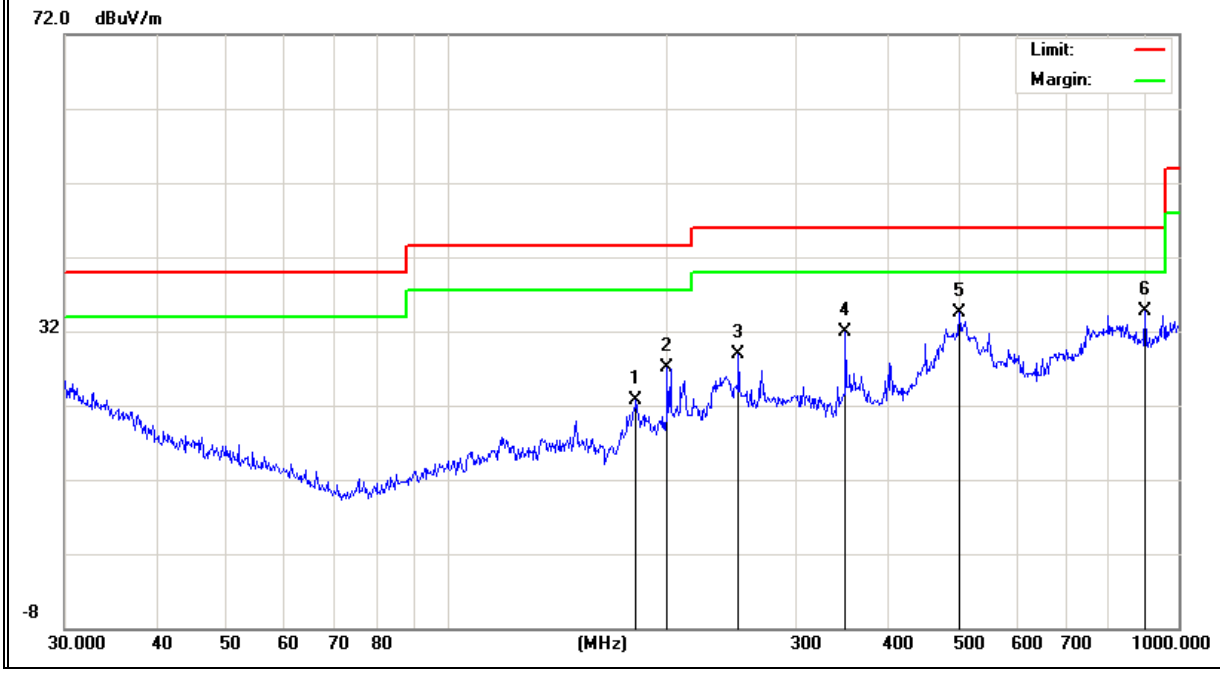
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	181.2834	11.99	10.64	22.63	43.50	-20.87	QP
H	199.9856	16.38	10.78	27.16	43.50	-16.34	QP
H	250.3009	15.39	13.59	28.98	46.00	-17.02	QP
H	350.4768	15.56	16.26	31.82	46.00	-14.18	QP
H	501.1788	14.11	20.32	34.43	46.00	-11.57	QP
H	900.1471	7.76	27.01	34.77	46.00	-11.23	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (2412 MHz)-Above 1G							
Vertical	4824.000	44.12	10.44	54.56	74	-19.44	Pk
Vertical	4824.000	27.67	10.44	38.11	54	-15.89	Av
Vertical	7236.000	35.57	12.39	47.96	74	-26.04	Pk
Horizontal	4824.000	43.68	10.44	54.12	74	-19.88	Av
Horizontal	4824.000	25.96	10.44	36.4	54	-17.6	Pk
Horizontal	7236.000	30.54	12.39	42.93	74	-31.07	Av
Mid Channel (2437 MHz)-Above 1G							
Vertical	4874.000	47.19	10.4	57.59	74	-16.41	Pk
Vertical	4874.000	31.66	10.4	42.06	54	-11.94	Av
Vertical	7311.000	35.71	12.75	48.46	74	-25.54	Pk
Horizontal	4874.000	45.36	10.4	55.76	74	-18.24	Av
Horizontal	4874.000	28.16	10.4	38.56	54	-15.44	Pk
Horizontal	7311.000	30.23	12.75	42.98	74	-31.02	Av
High Channel (2462 MHz)- Above 1G							
Vertical	4924.000	46.13	10.39	56.52	74	-17.48	Pk
Vertical	4924.000	32.41	10.39	42.8	54	-11.20	Av
Vertical	7386.000	33.24	12.68	45.92	74	-28.08	Pk
Horizontal	4924.000	44.16	10.39	54.55	74	-19.45	Av
Horizontal	4924.000	28.43	10.39	38.82	54	-15.18	Pk
Horizontal	7386.000	31.29	12.68	43.97	74	-30.03	Av

Note:”802.11b” mode is the worst mode. When PK value is lower than the Average value limit, average didn't record.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. 3 kHz ≤Set the RBW≤100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP

4.1.4 EUT OPERATION CONDITIONS

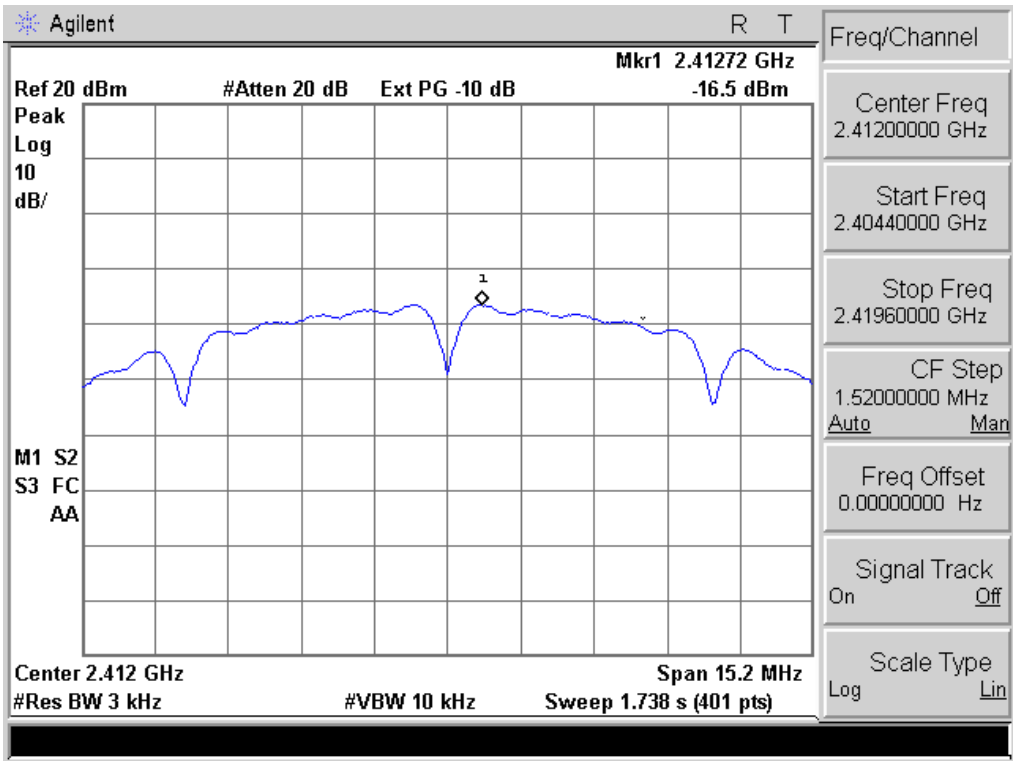
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

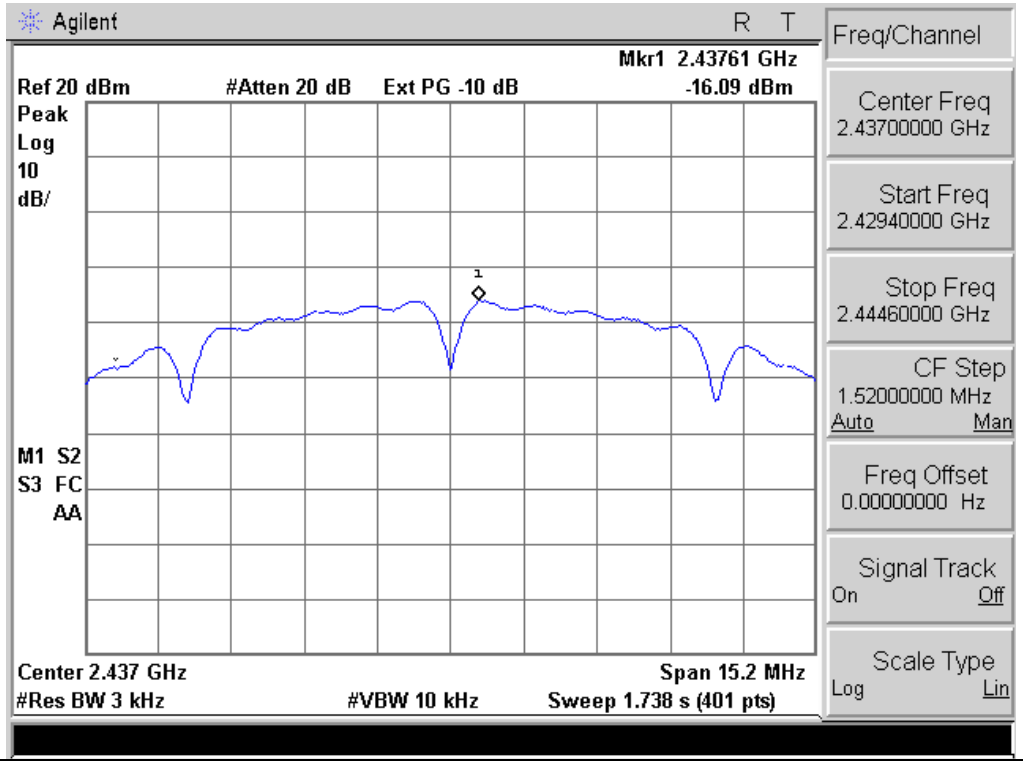
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-16.50	8	PASS
2437 MHz	-16.09	8	PASS
2462 MHz	-15.80	8	PASS

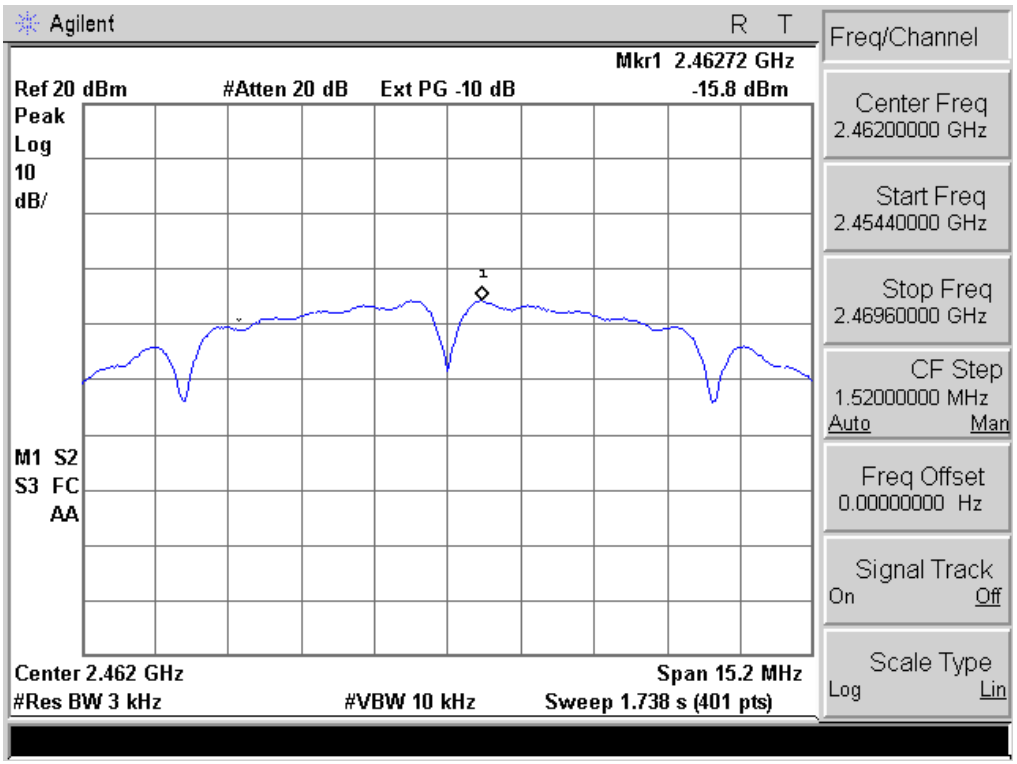
TX CH01



TX CH06



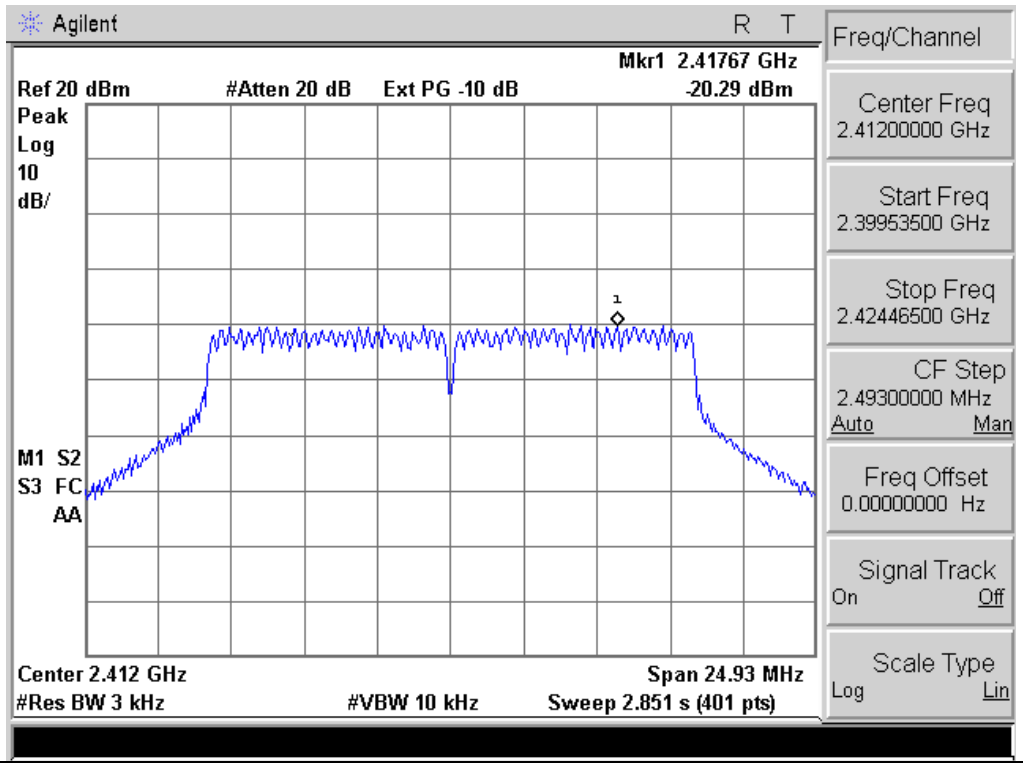
TX CH11



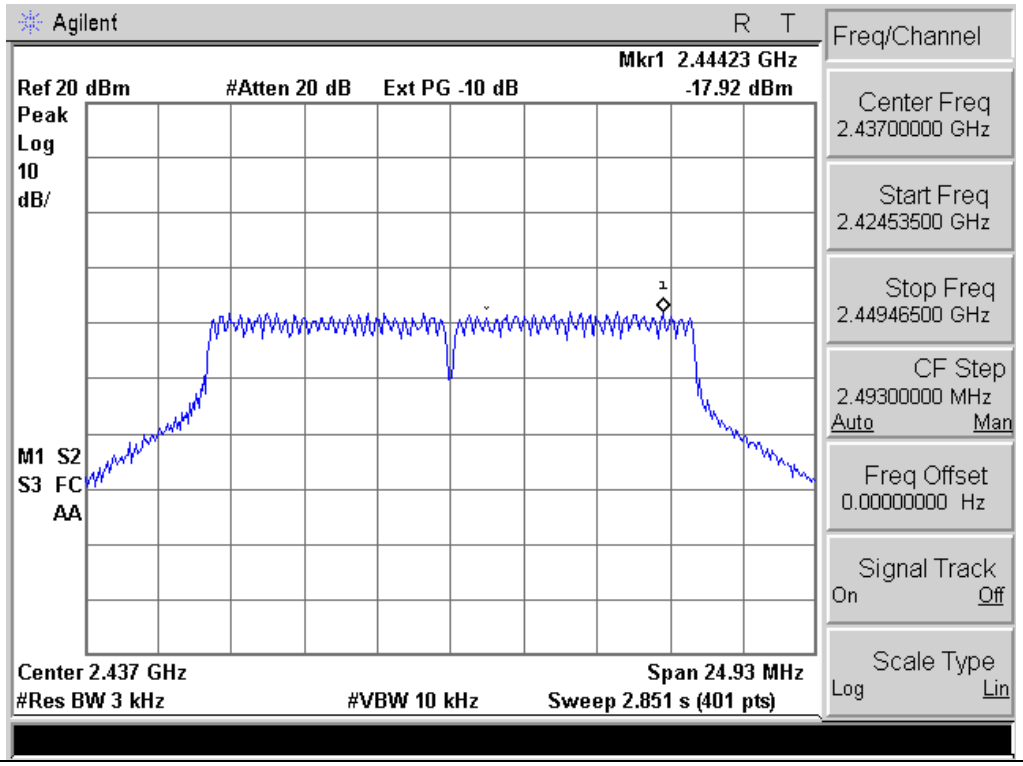
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-20.29	8	PASS
2437 MHz	-17.92	8	PASS
2462 MHz	-19.21	8	PASS

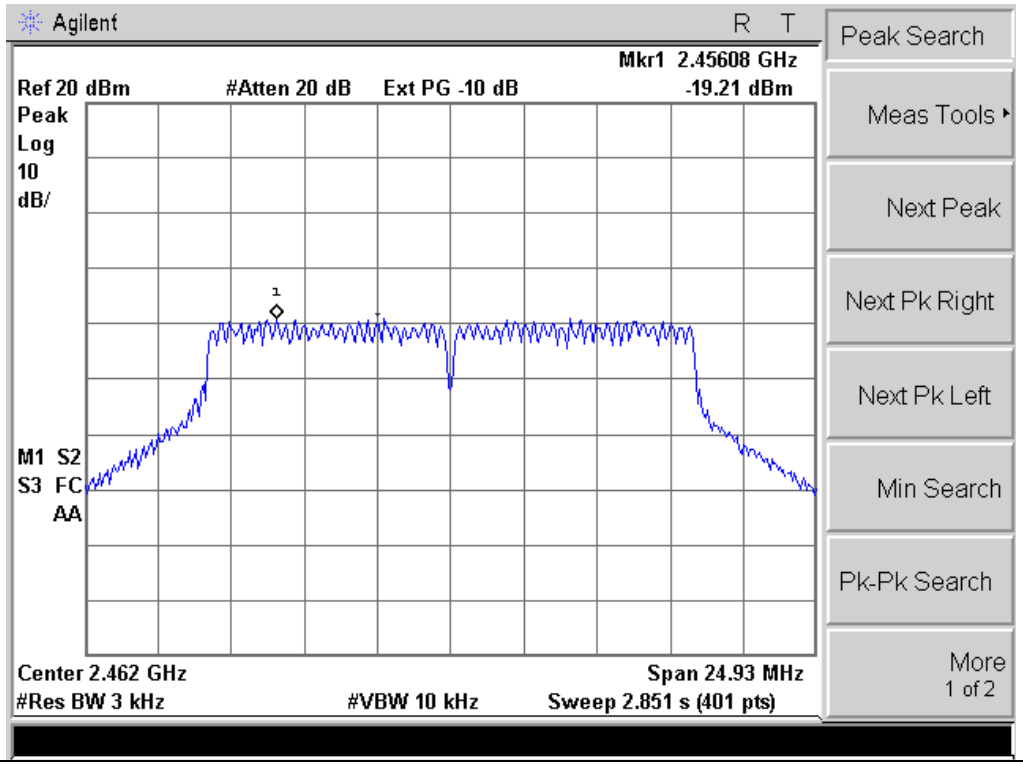
TX CH01



TX CH06



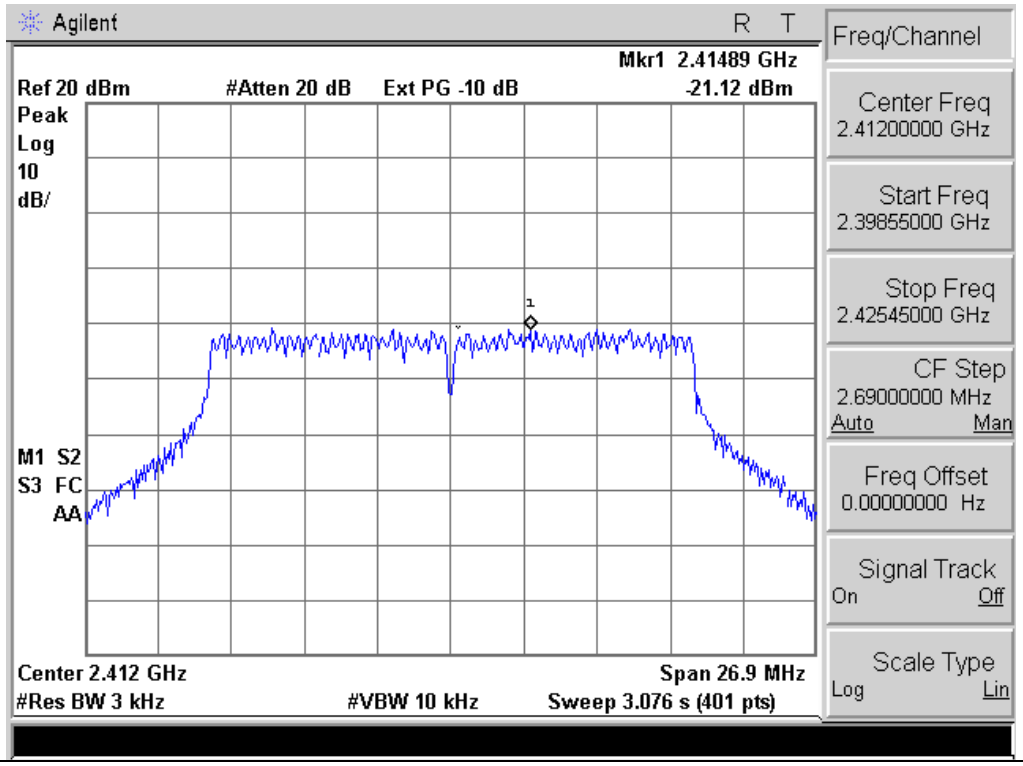
TX CH11



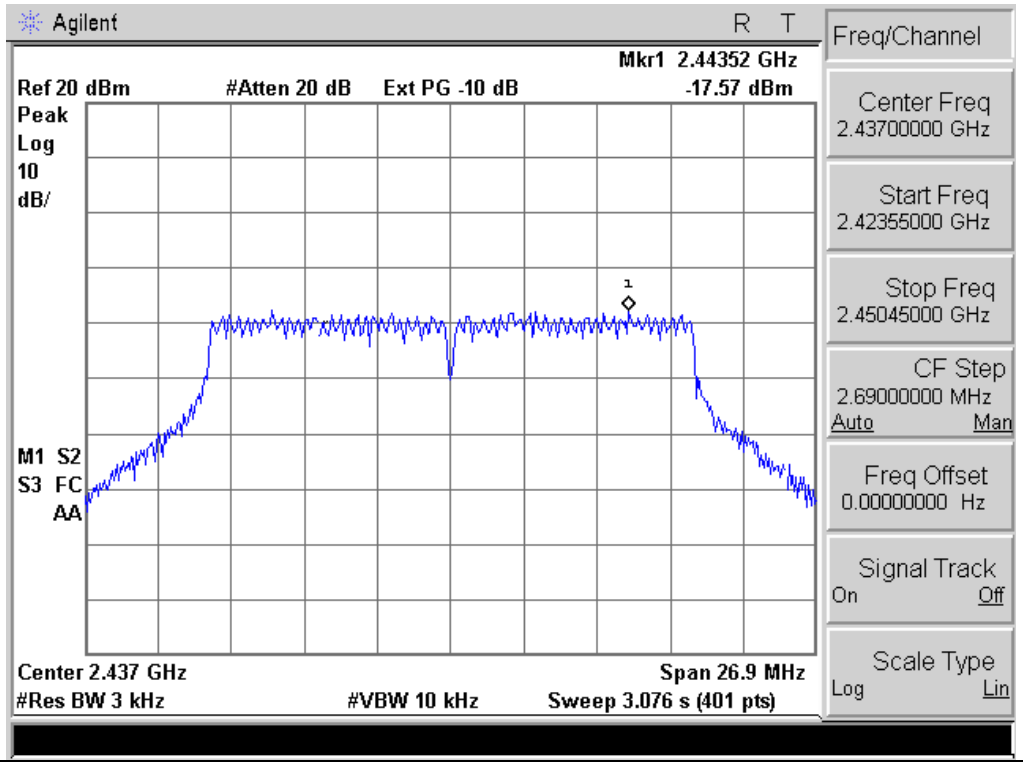
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode (20MHz)/CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-21.12	8	PASS
2437 MHz	-17.57	8	PASS
2462 MHz	-20.12	8	PASS

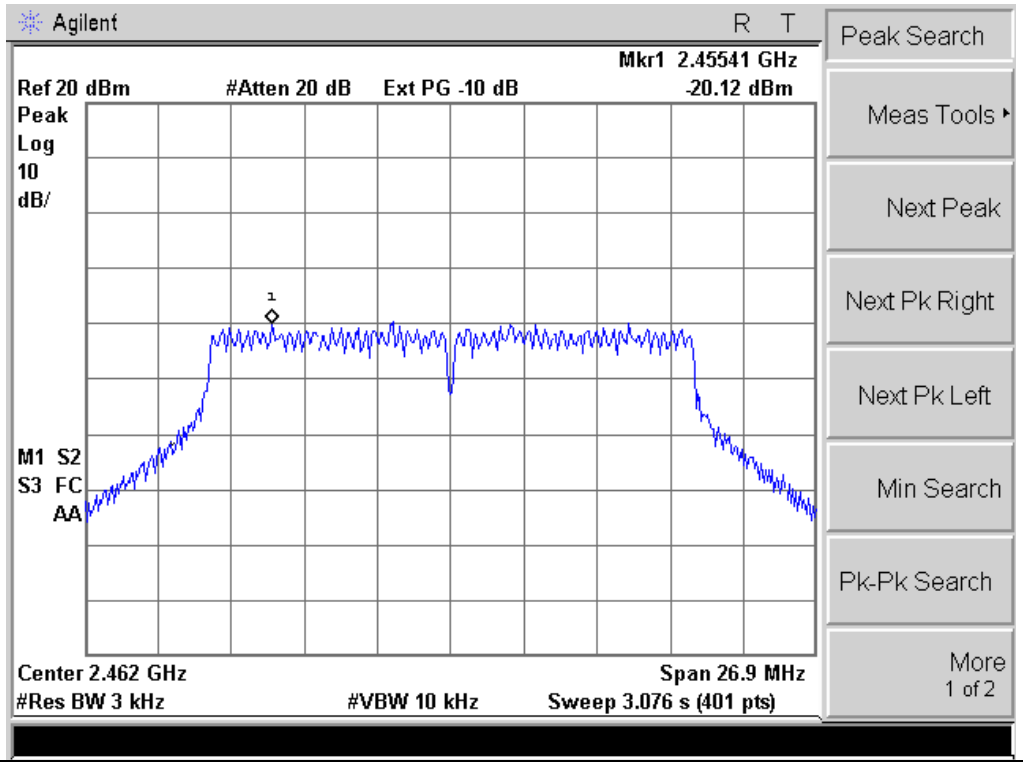
TX CH01



TX CH06



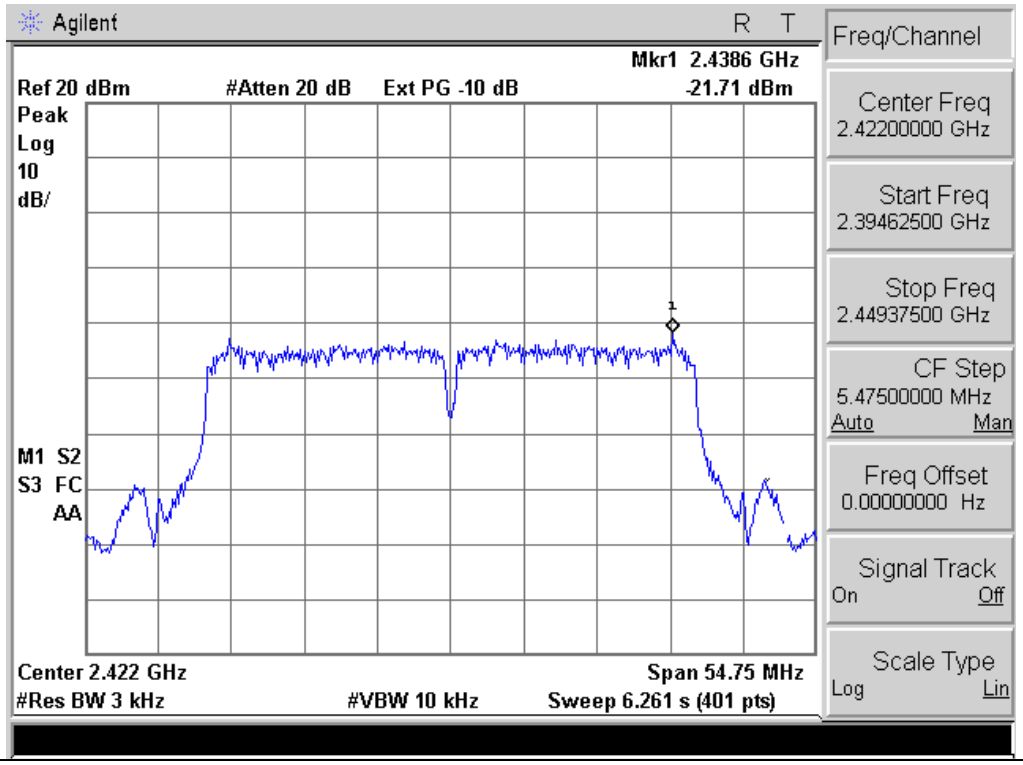
TX CH11



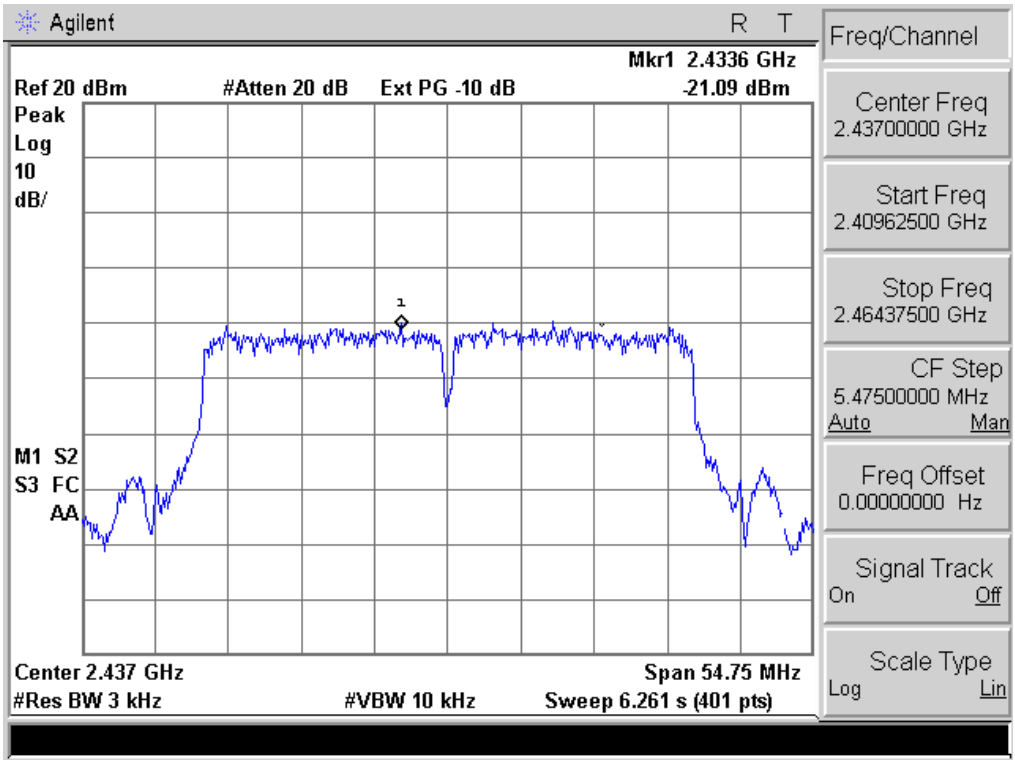
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode (40MHz)/CH03, CH06, CH09		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2422 MHz	-21.71	8	PASS
2437 MHz	-21.09	8	PASS
2452 MHz	-21.86	8	PASS

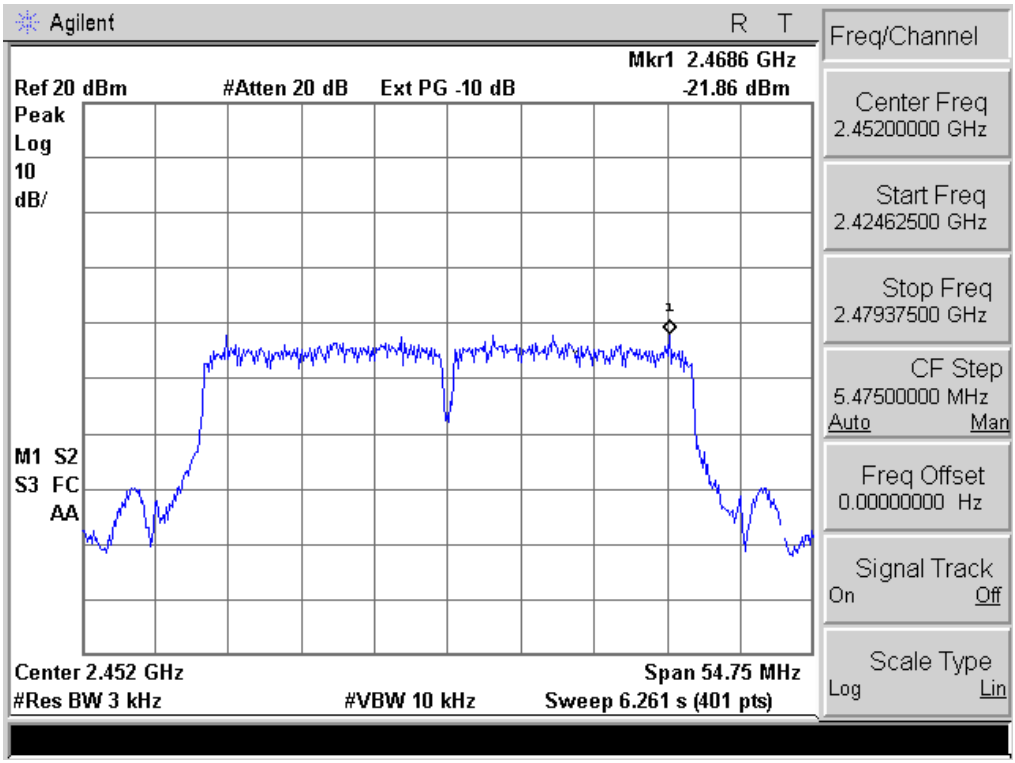
TX CH149



TX CH157



TX CH165



5. BANDWIDTH TEST

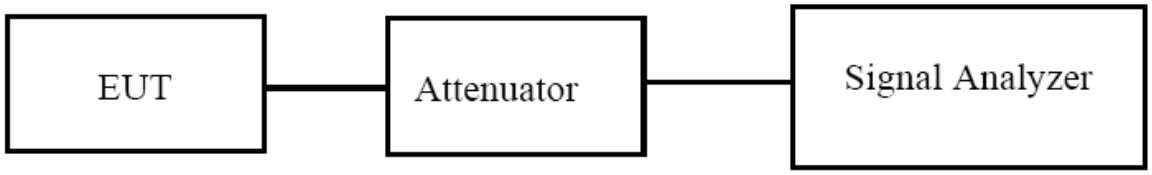
5.1 APPLIED PROCEDURES / LIMIT

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

5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



5.1.2 EUT OPERATION CONDITIONS

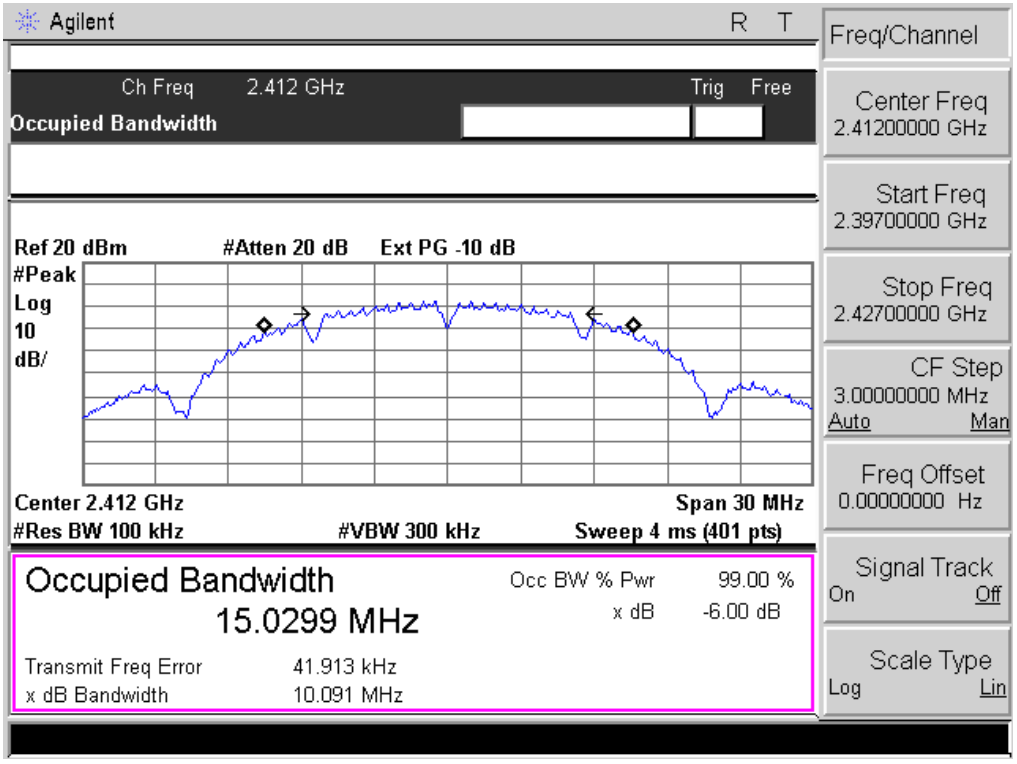
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.3 TEST RESULTS

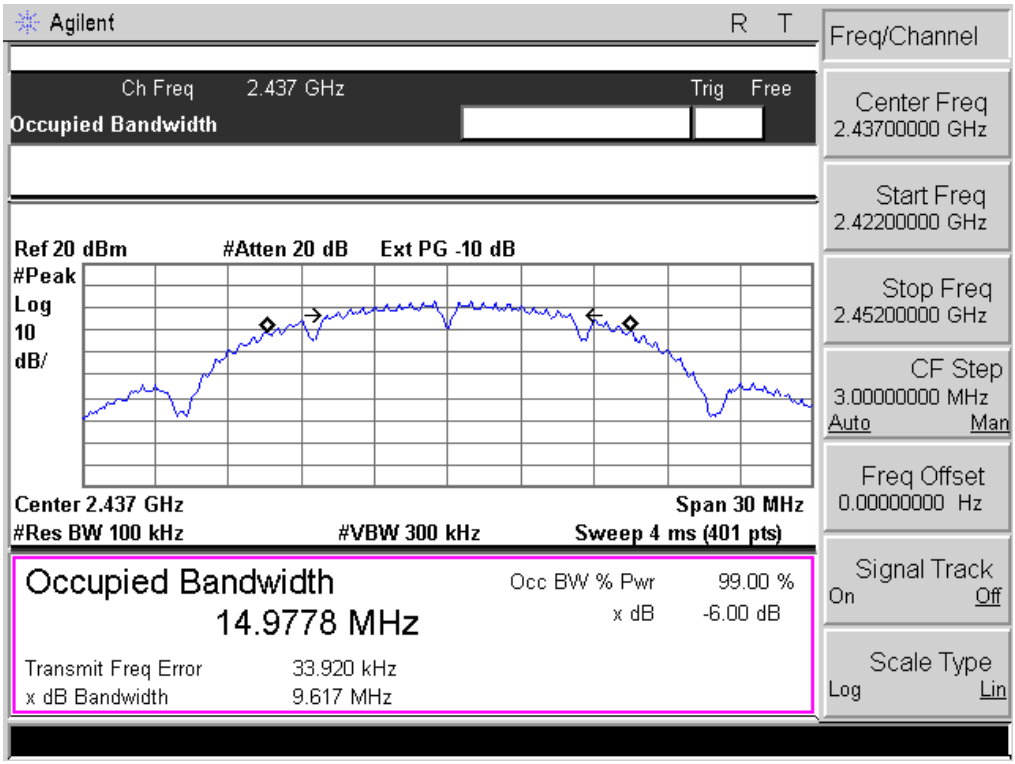
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.091	500	Pass
Middle	2437	9.617	500	Pass
High	2462	9.666	500	Pass

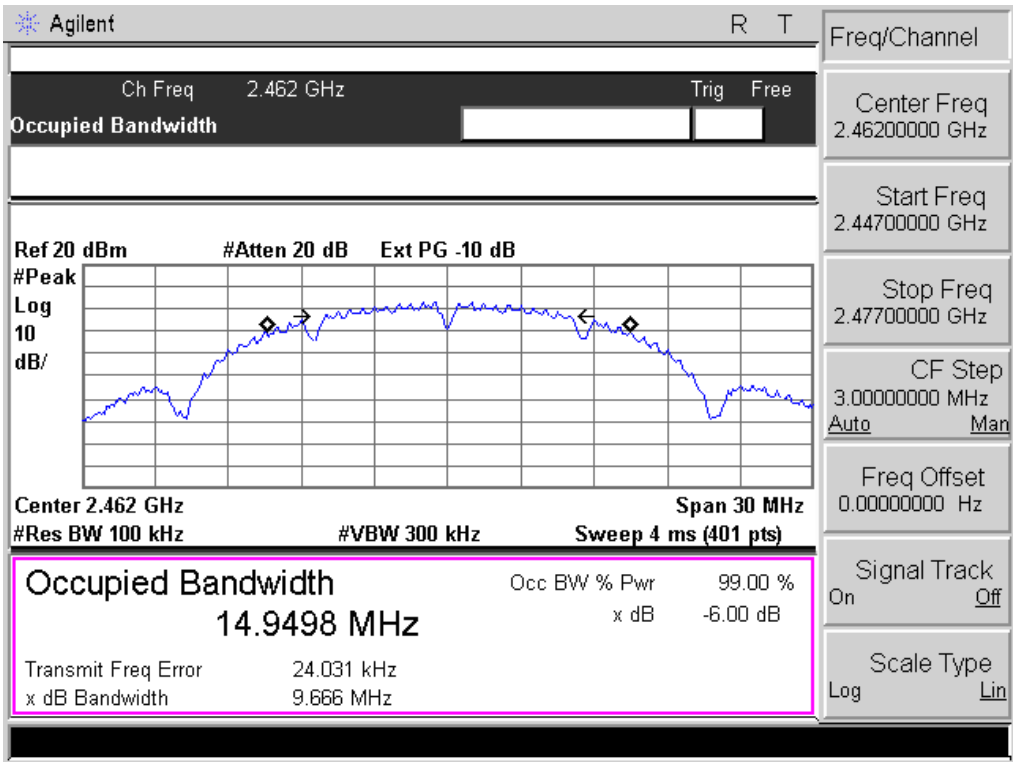
TX CH 01



TX CH 06



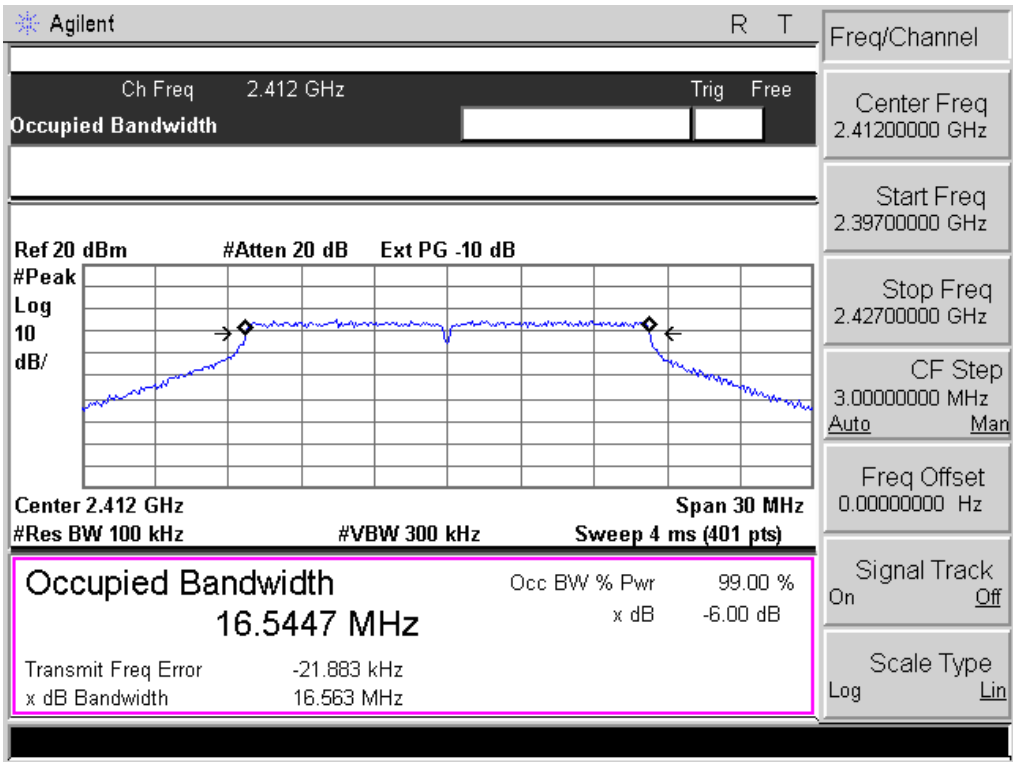
TX CH 11



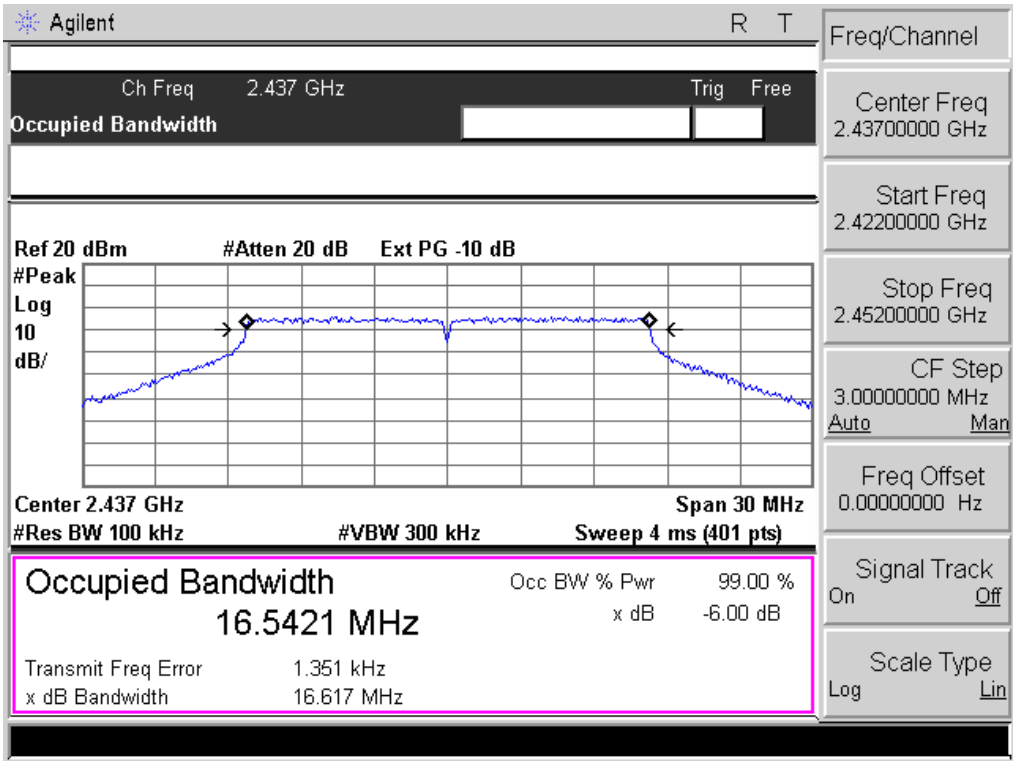
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.563	500	Pass
Middle	2437	16.617	500	Pass
High	2462	16.611	500	Pass

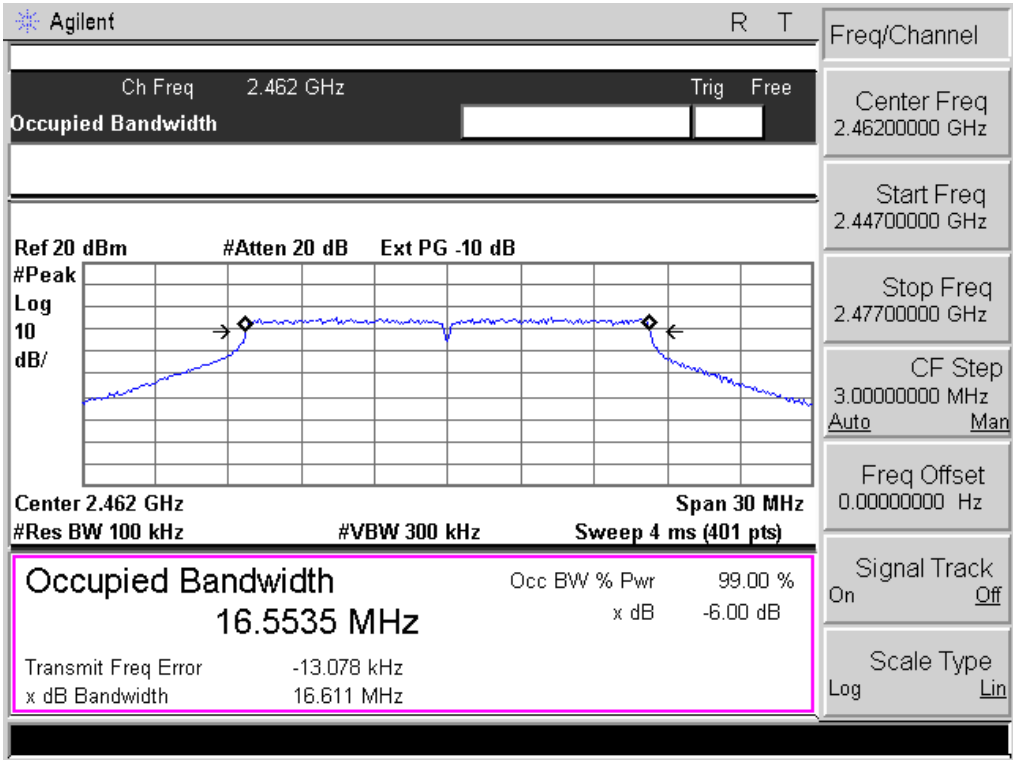
TX CH 01



TX CH 06



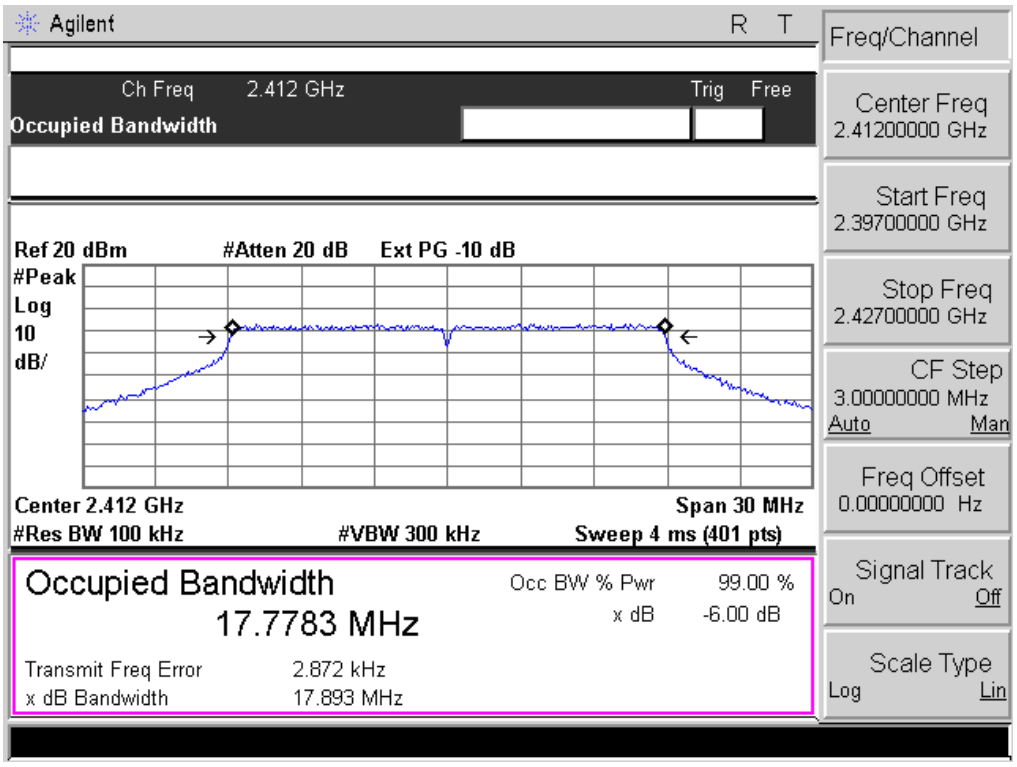
TX CH 11



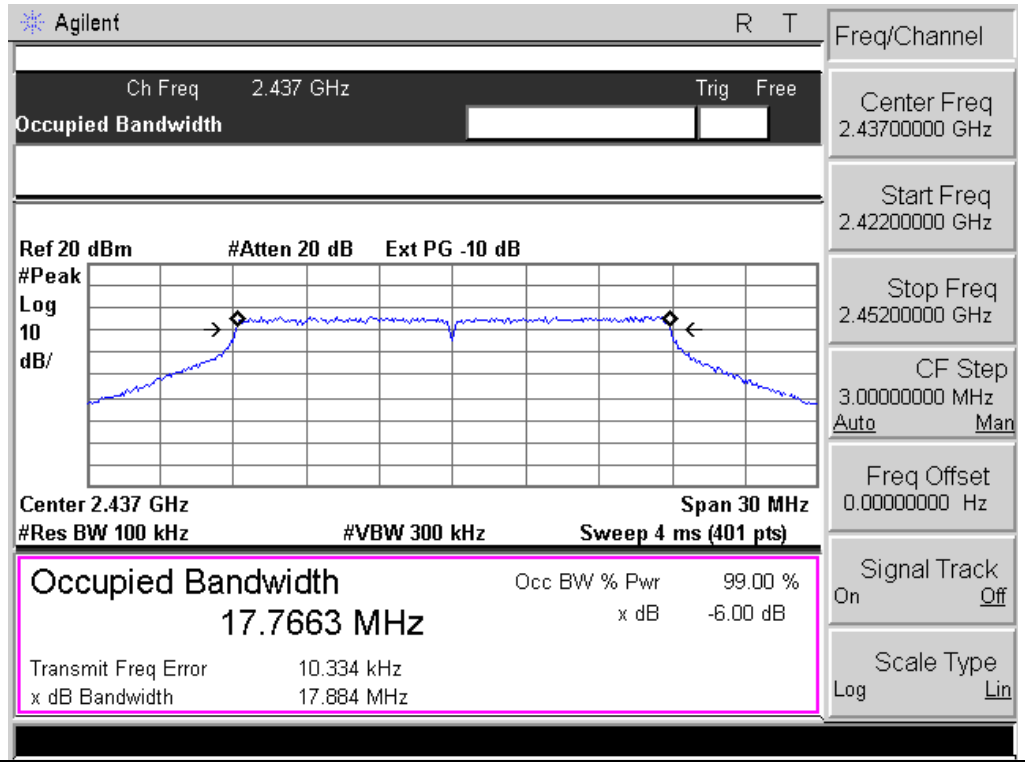
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(20M) /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.893	500	Pass
Middle	2437	17.884	500	Pass
High	2462	17.879	500	Pass

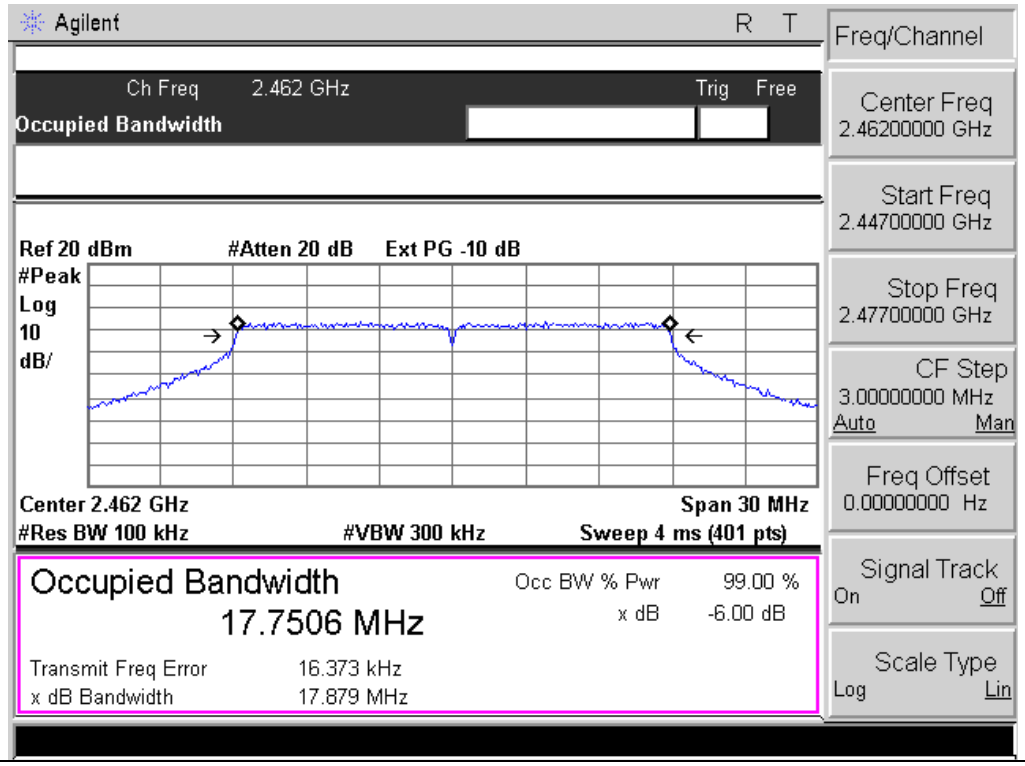
TX CH 01



TX CH 06



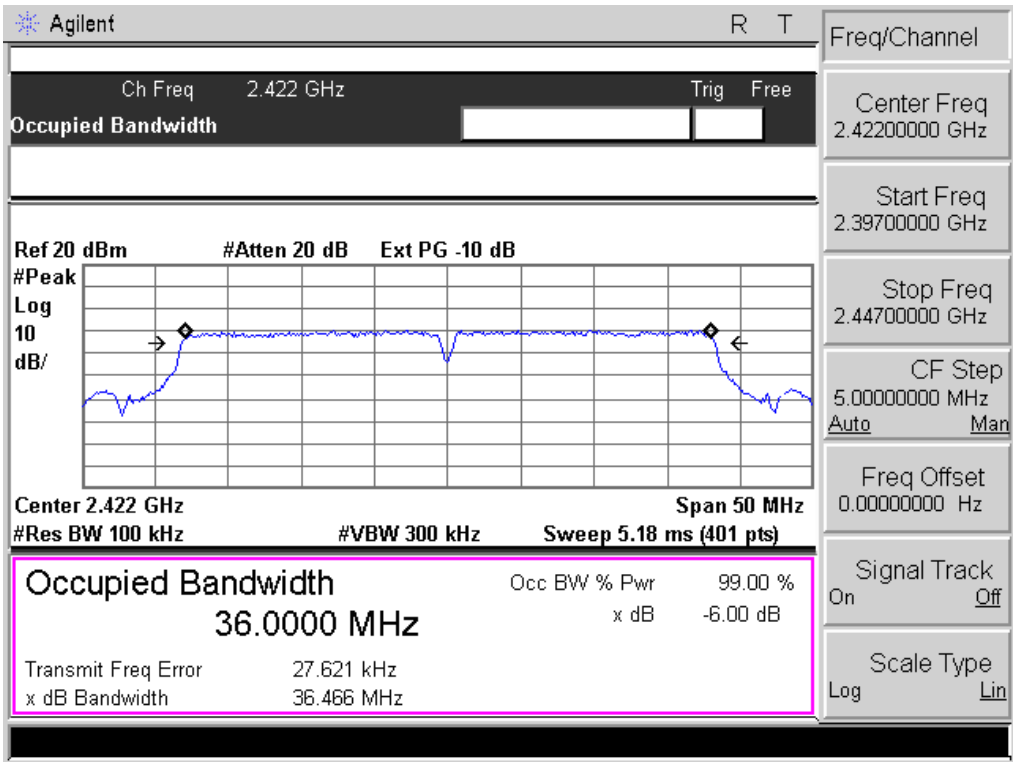
TX CH 11



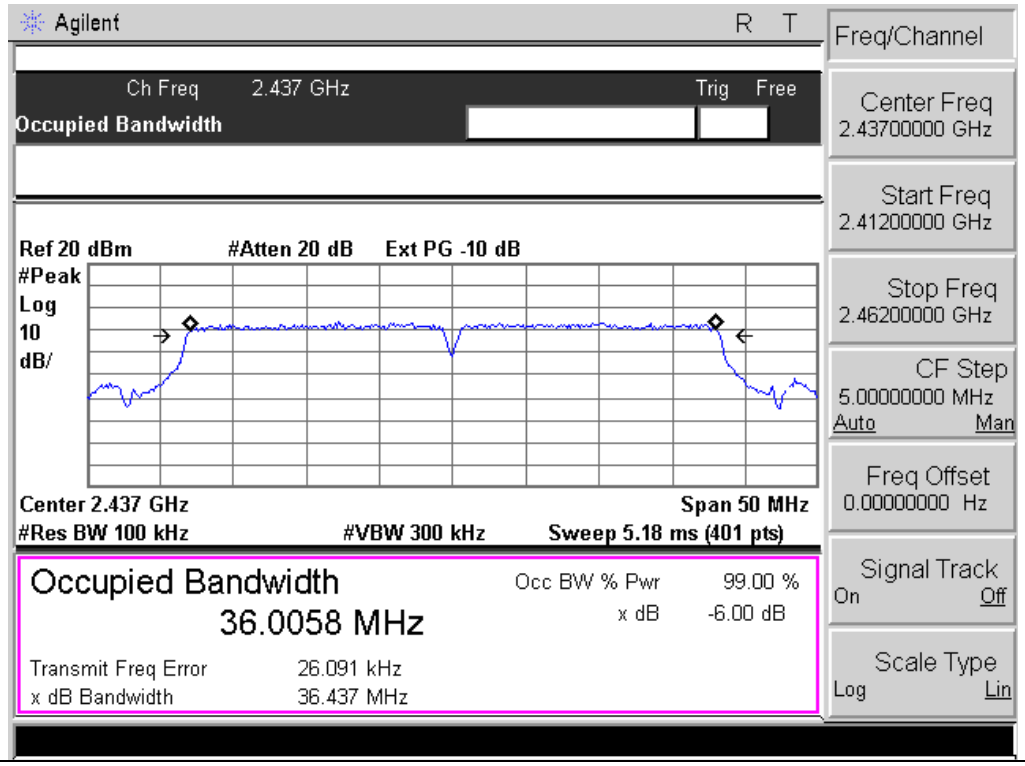
EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(40M) /CH03, CH06, CH09		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.466	500	Pass
Middle	2437	36.437	500	Pass
High	2452	36.498	500	Pass

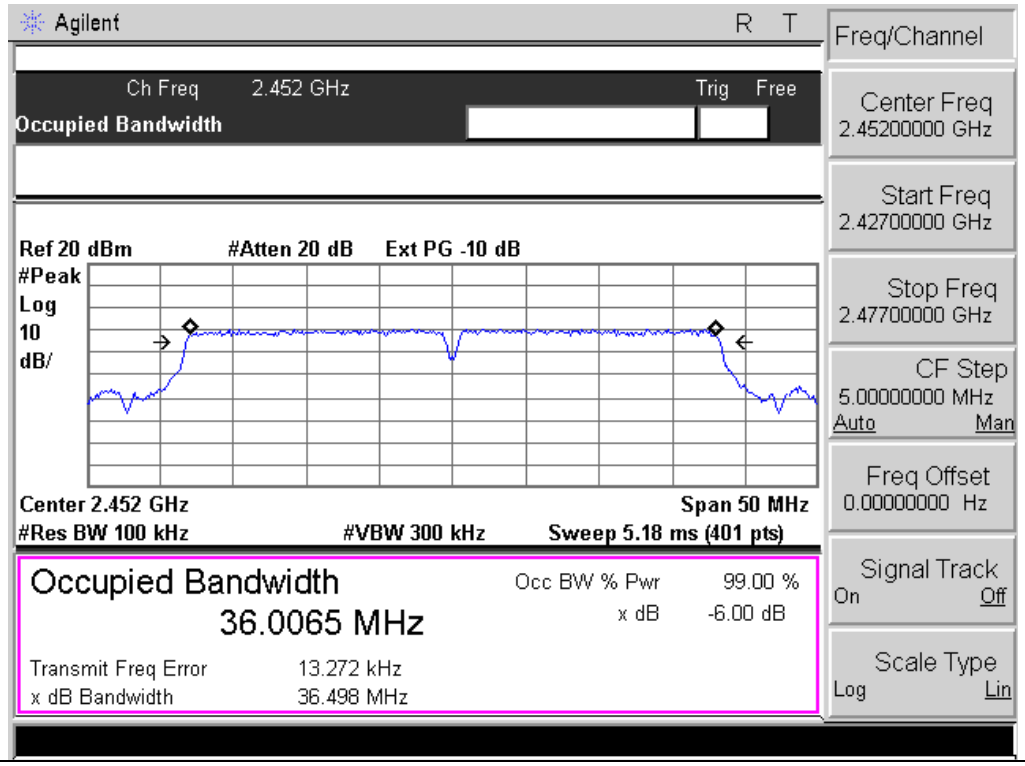
TX CH 03



TX CH 06



TX CH 09



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

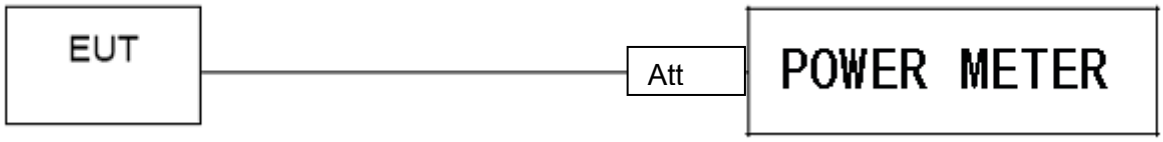
6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b/g/n(20M/40M) Mode		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Peak Conducted Output Power（PK）	Maximum Peak Conducted Output Power（AV）	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH01	2412	12.66	9.31	30
CH06	2437	12.98	9.51	30
CH11	2462	12.20	9.23	30
TX 802.11g Mode				
CH01	2412	11.23	8.14	30
CH06	2437	11.45	8.33	30
CH11	2462	11.89	8.26	30
TX 802.11n(20) Mode				
CH01	2412	10.32	7.08	30
CH06	2437	10.23	7.13	30
CH11	2462	10.46	7.02	30
TX 802.11n(40) Mode				
CH03	2422	9.49	6.53	30
CH06	2437	9.52	6.69	30
CH09	2452	9.75	6.87	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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)).

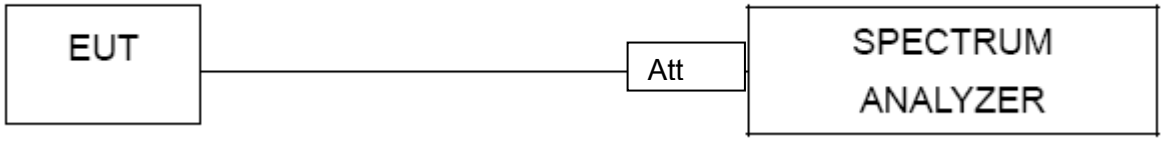
TEST PROCEDURE

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.4 TEST RESULTS

EUT：	NOBUX™ SMART PLUS-PRO	Model Name ：	SMART PLUS-PRO
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V

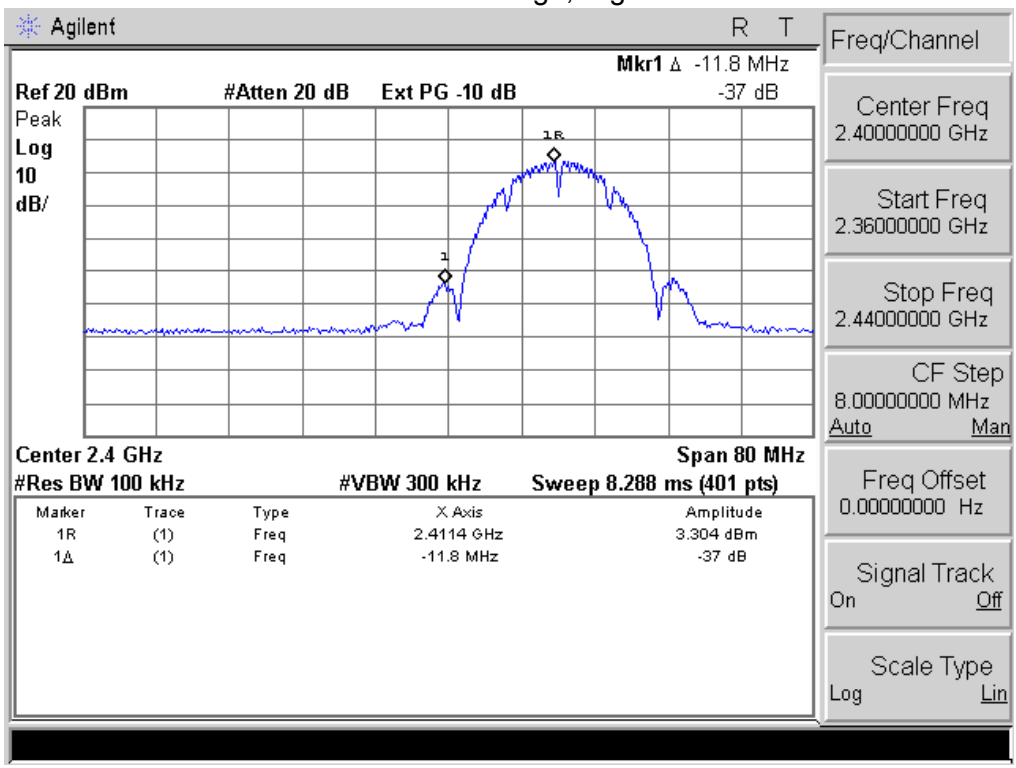
Frequency Band MHz	Delta Peak to band emission (dBc)	＞Limit (dBc)	Result
802.11b mode			
2400	37.00	20	Pass
2483.5	52.01	20	Pass
802.11g mode			
2400	28.39	20	Pass
2483.5	43.48	20	Pass
802.11n-HT20 mode			
2400	26.91	20	Pass
2483.5	42.51	20	Pass
802.11n-HT40 mode			
2400	26.56	20	Pass
2483.5	38.38	20	Pass

Radiated band edge:

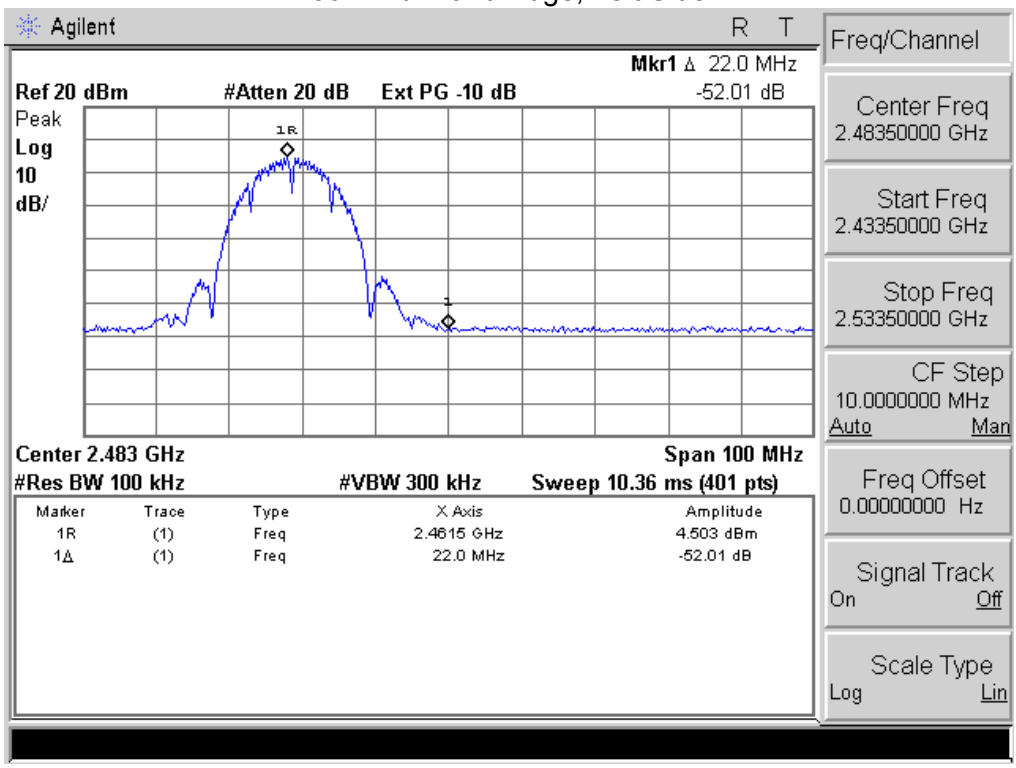
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b							
2390	66.61	-13.06	53.55	74	-20.45	peak	Vertical
2390	66.73	-13.06	53.67	74	-20.33	peak	Horizontal
2483.5	66.64	-12.78	53.86	74	-20.14	peak	Vertical
2483.5	66.41	-12.78	53.63	74	-20.37	peak	Horizontal
802.11g							
2390	63.42	-13.06	50.36	74	-23.64	peak	Vertical
2390	65.34	-13.06	52.28	74	-21.72	peak	Horizontal
2483.5	66.04	-12.78	53.26	74	-20.74	peak	Vertical
2483.5	63.57	-12.78	50.79	74	-23.21	peak	Horizontal
802.11n（20）							
2390	63.83	-13.06	53.77	74	-20.23	peak	Vertical
2390	64.14	-13.06	51.08	74	-22.92	peak	Horizontal
2483.5	63.43	-12.78	53.65	74	-20.35	peak	Vertical
2483.5	66.76	-12.78	53.98	74	-20.02	peak	Horizontal
802.11n（40）							
2390	66.41	-13.06	53.35	74	-20.65	peak	Vertical
2390	66.24	-13.06	53.18	74	-20.82	peak	Horizontal
2483.5	66.71	-12.78	53.93	74	-20.07	peak	Vertical
2483.5	65.84	-12.78	53.06	74	-20.94	peak	Horizontal

Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average not record.

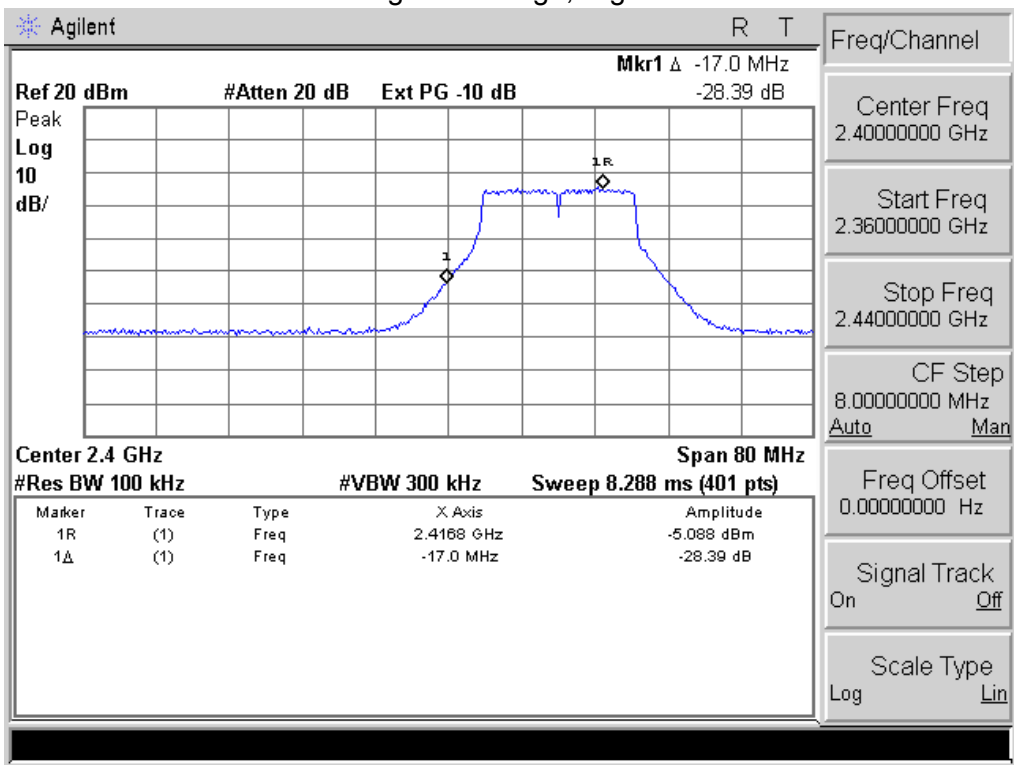
802.11b: Band Edge, Right Side



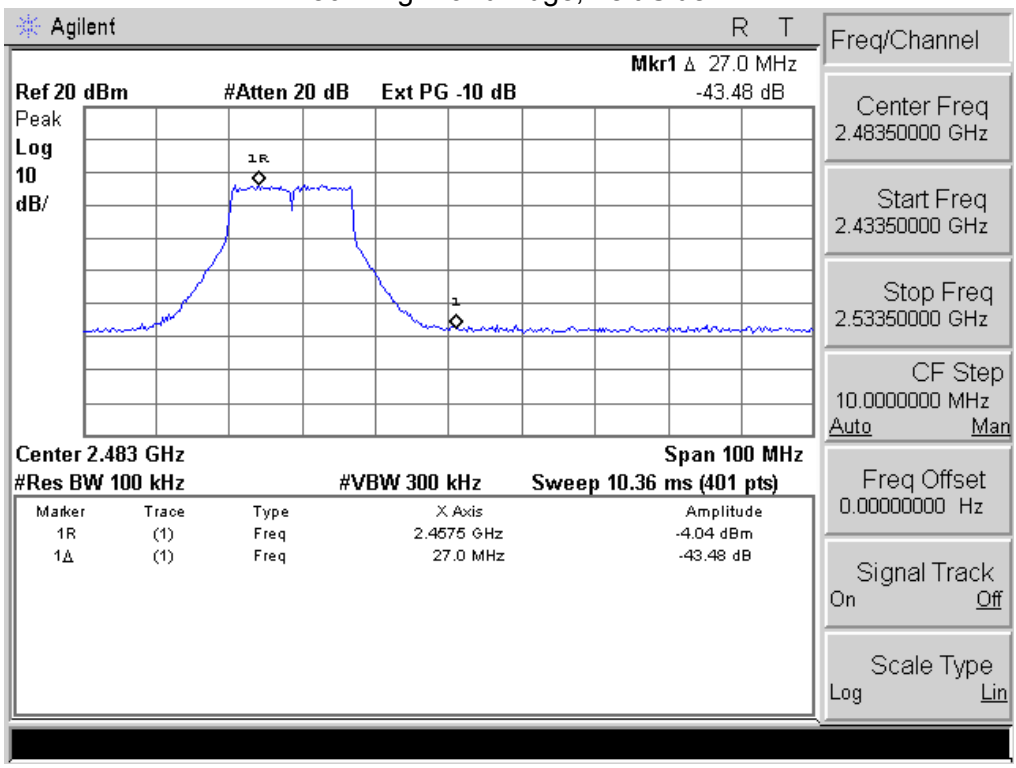
802.11b: Band Edge, Left Side



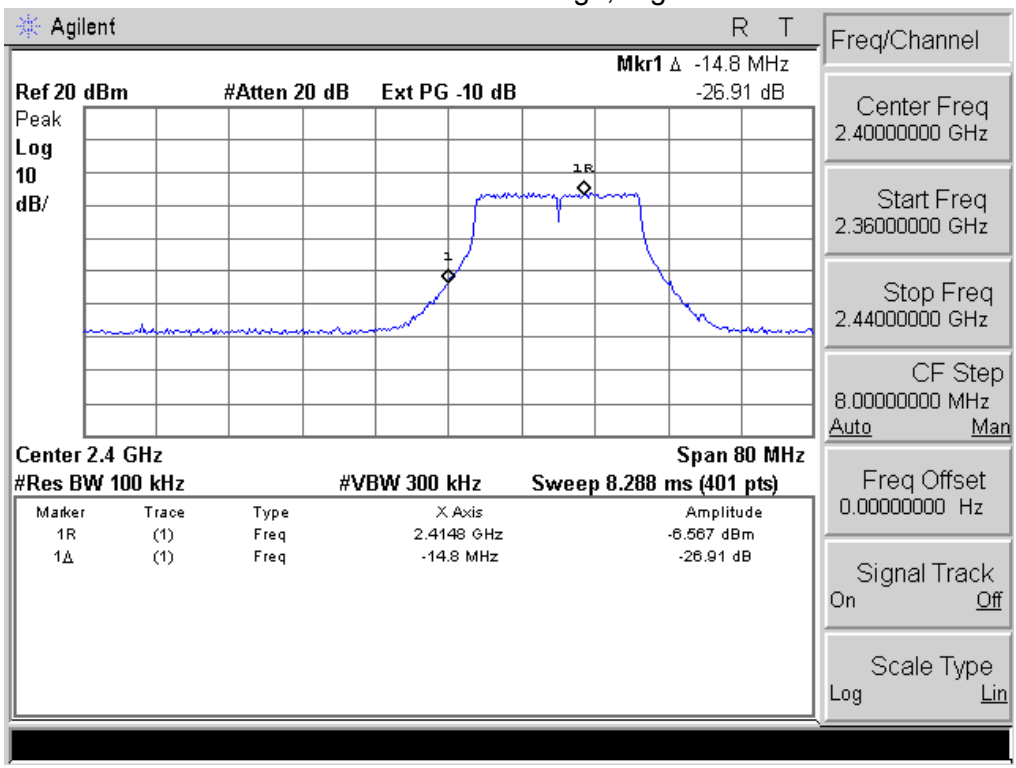
802.11g: Band Edge, Right Side



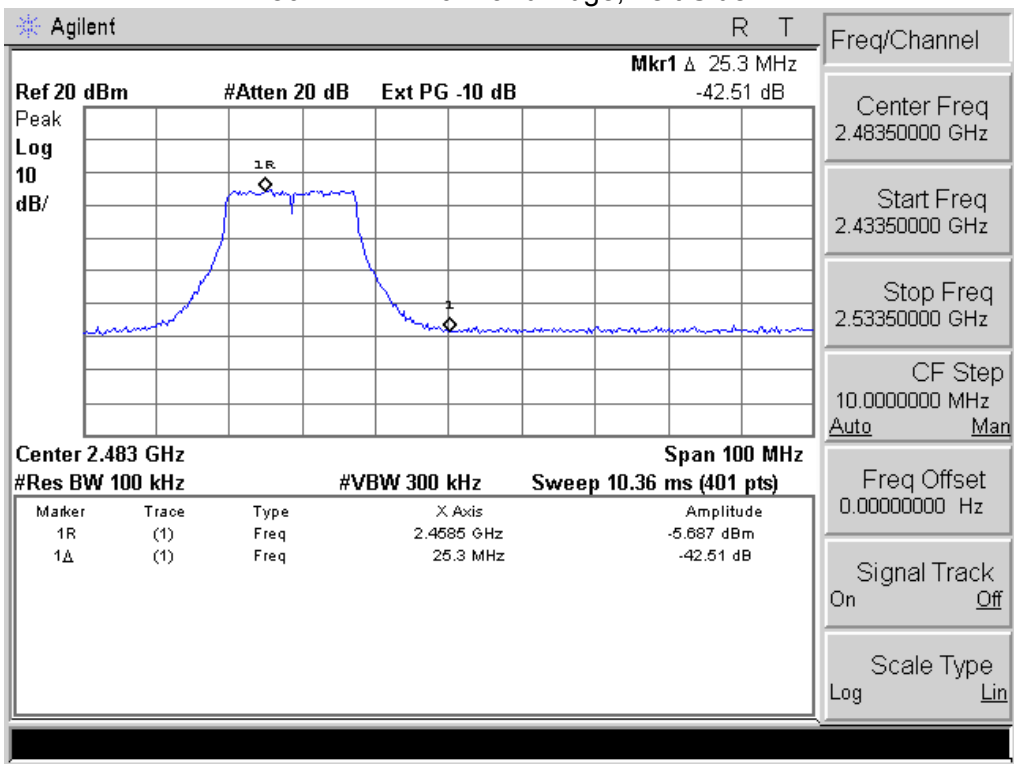
802.11g: Band Edge, Left Side



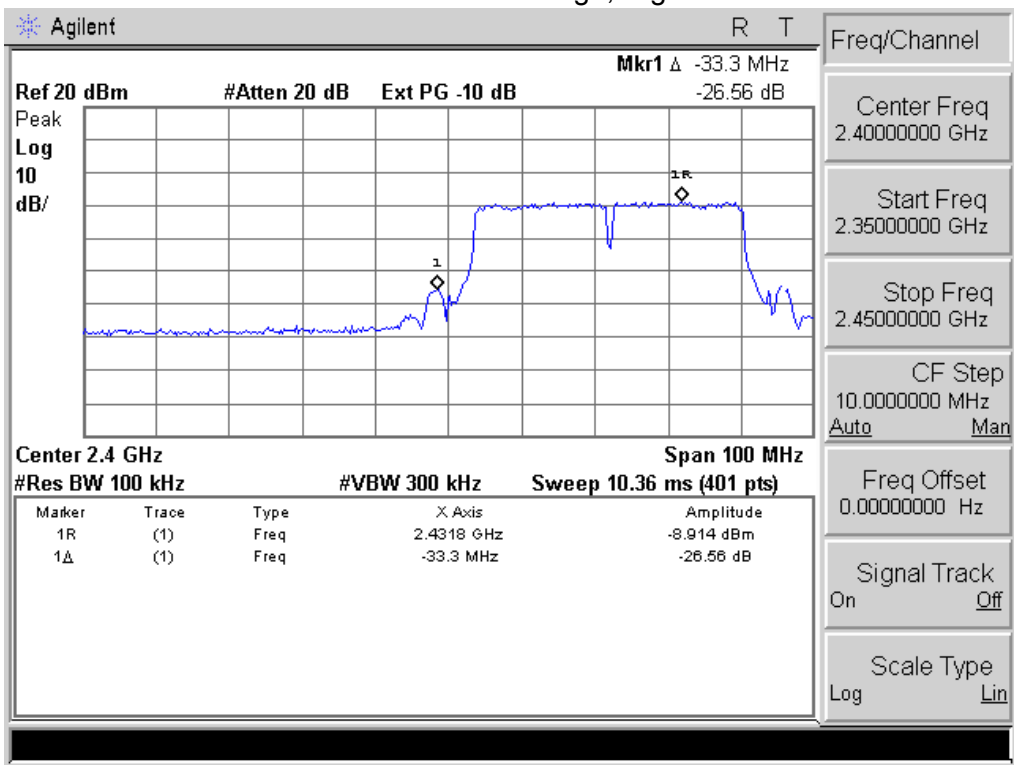
802.11n-HT20: Band Edge, Right Side



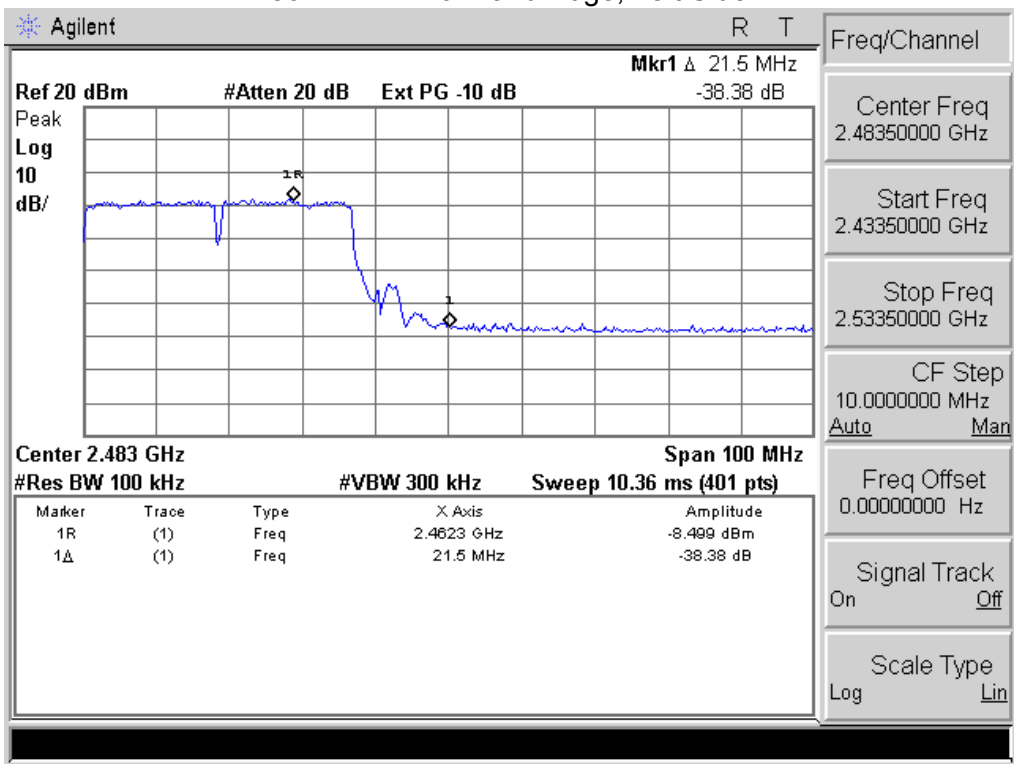
802.11n-HT20: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side



802.11n-HT40: Band Edge, Left Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

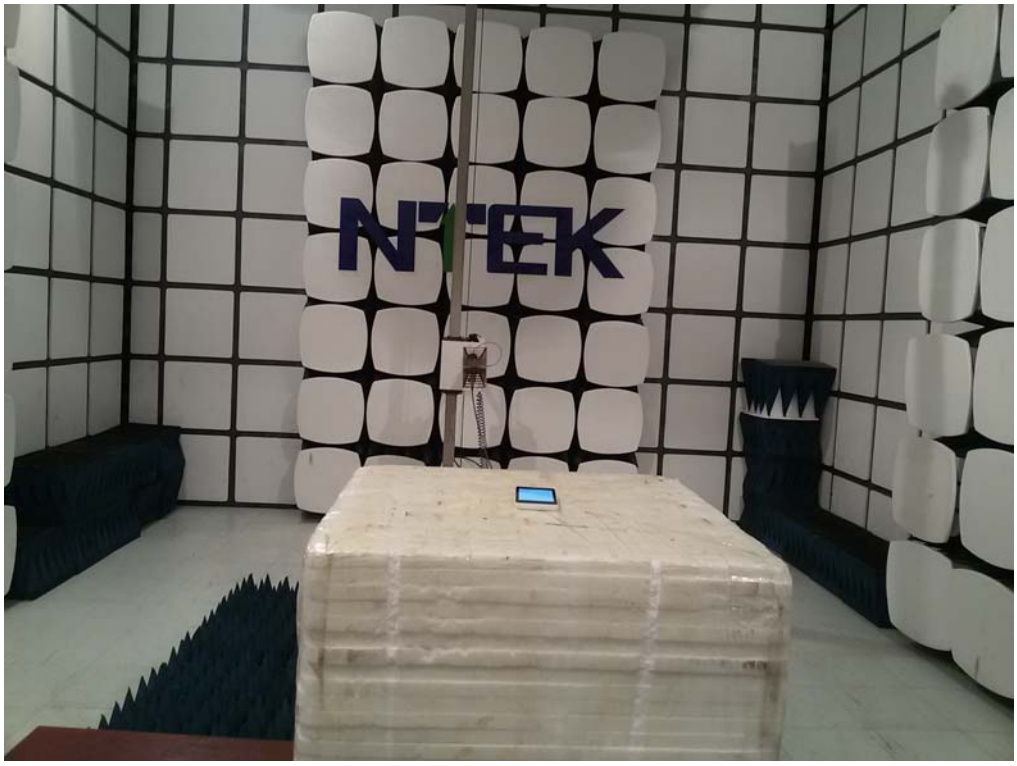
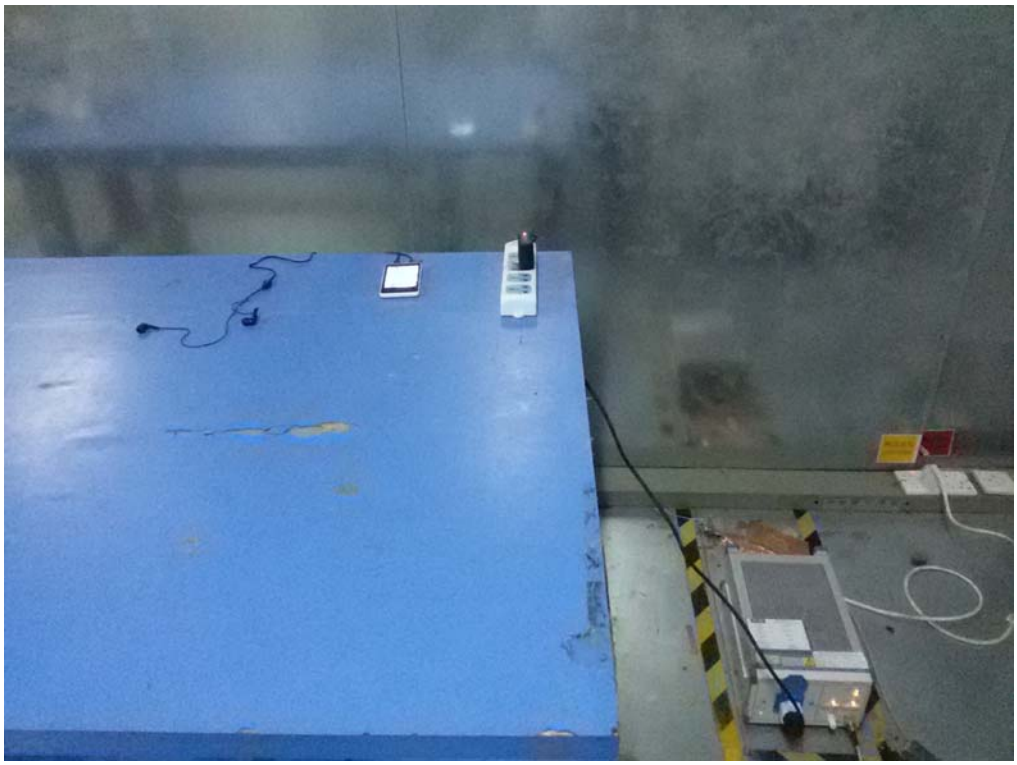
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.

9. EUT TEST PHOTO

Radiated Measurement Photos



CONDUCTED EMISSION Photos