FCC RADIO TEST REPORT-WIFI

FCC ID:WGVHCS-1081

Product： E-ink Wireless Electronic Nameplate

Trade Name： TAIDEN

Model Name： HCS-1081

Serial Model： N/A

Report No.： NTEK-2015NT08072435F

Prepared for

TAIDEN INDUSTRIAL CO.,LTD.

6/F,BLOCK B, FUTURE PLAZA, 6060 QIAOXIANG Rd, NANSHAN DISTRICT, SHENZHEN, CHINA

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street
Bao'an District, Shenzhen P.R. China
Tel.: +86-0755-61156588 Fax.: +86-0755-61156599
Website:www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name ..... TAIDEN INDUSTRIAL CO.,LTD.

Address ..... 6/F , BLOCK B, FUTURE PLAZA, 6060 QIAOXIANG Rd, NANSHAN DISTRICT, SHENZHEN, CHINA

Manufacture's Name... TAIDEN INDUSTRIAL CO.,LTD.

Address ..... 6/F , BLOCK B, FUTURE PLAZA, 6060 QIAOXIANG Rd, NANSHAN DISTRICT, SHENZHEN, CHINA

Product description

Product name ..... E-ink Wireless Electronic Nameplate

Model and/or type reference HCS-1081

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.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test .....

Date (s) of performance of tests ..... 07 Aug. 2015 ~11 Sep. 2015

Date of Issue..... 11 Sep. 2015

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

Testing Engineer : Allen Liu

(Allen Liu)

Technical Manager : Brown Lu

(Brown Lu)

Authorized Signatory : Sam. Chen

(Sam Chen)

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
3 . EMC EMISSION TEST	13
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 DEVIATION FROM TEST STANDARD	14
3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	23
3.2.1 RADIATED EMISSION LIMITS	23
3.2.2 TEST PROCEDURE	24
3.2.3 DEVIATION FROM TEST STANDARD	24
3.2.4 TEST SETUP	25
3.2.5 EUT OPERATING CONDITIONS	26
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	27
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	28
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	30
4 . POWER SPECTRAL DENSITY TEST	31
4.1 APPLIED PROCEDURES / LIMIT	31
4.1.1 TEST PROCEDURE	31
4.1.2 DEVIATION FROM STANDARD	31
4.1.3 TEST SETUP	31
4.1.4 EUT OPERATION CONDITIONS	31
4.1.5 TEST RESULTS	32
5 . BANDWIDTH TEST	40
5.1 APPLIED PROCEDURES / LIMIT	40
5.1.1 TEST PROCEDURE	40

Table of Contents

	Page
TEST SETUP	40
5.1.2 EUT OPERATION CONDITIONS	40
5.1.3 TEST RESULTS	41
6 . PEAK OUTPUT POWER TEST	49
6.1 APPLIED PROCEDURES / LIMIT	49
6.1.1 TEST PROCEDURE	49
6.1.2 DEVIATION FROM STANDARD	49
6.1.3 TEST SETUP	49
6.1.4 EUT OPERATION CONDITIONS	49
6.1.5 TEST RESULTS	50
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	51
7.1 DEVIATION FROM STANDARD	51
7.2 TEST SETUP	51
7.3 EUT OPERATION CONDITIONS	51
7.4 TEST RESULTS	52
8 . ANTENNA REQUIREMENT	58
8.1 STANDARD REQUIREMENT	58
8.2 EUT ANTENNA	58
9 . EUT TEST PHOTO	59
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	

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

<table>
<tr><td>Equipment</td><td>E-ink Wireless Electronic Nameplate</td></tr>
<tr><td>Trade Name</td><td>TAIDEN</td></tr>
<tr><td>Model Name</td><td>HCS-1081</td></tr>
<tr><td>Serial Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is a E-ink Wireless Electronic Nameplate
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g/n(20MHz): 2412~2462MHz
802.11n(40MHz):2422~2452MHz</td></tr>
<tr><td>Modulation Type:</td><td>IEEE 802.11b :
DSSS (CCK, QPSK, DBPSK)
IEEE 802.11g/n (HT20/40) : OFDM (64QAM, 16QAM, QPSK, BPSK)</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>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</td></tr>
<tr><td>Number Of Channel</td><td>802.11b/g/n20MHz:11CH
802.11n40MHz:7CH</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>1.0 dbi</td></tr>
</table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Ratings</td><td>DC 3.7V</td></tr>
<tr><td>Adapter</td><td>Model:SK22G-0500200Z
Input: 100-240V~,50/60 Hz,0.35A MAX
Output: 5.0V⎓,2A</td></tr>
<tr><td>Battery</td><td>DC 3.7V ,2400mAh</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

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	FPCBAntenna	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	802.11n/20MHz CH1/ CH6/ CH11
Mode 4	802.11n/40MHz 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	802.11n/20MHz CH1/ CH6/ CH11
Mode 4	802.11n/40MHz CH3/ CH6/ CH9

Note:

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

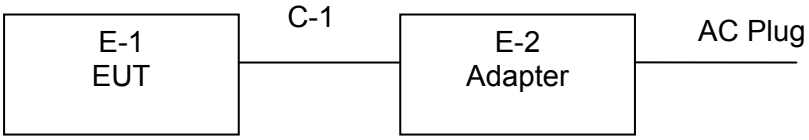
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

(3) EUT configured to transmit continuously:

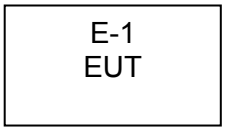
Operated Mode for Worst Duty Cycle	
Test Signal Duty Cycle (x)	Average correction factor (dB)
100% - IEEE 802.11b	0
100% - IEEE 802.11g	0
100% - IEEE 802.11n (HT20)	0
100% - IEEE 802.11n (HT40)	0

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	E-ink Wireless Electronic Nameplate	TAIDEN	HCS-1081	N/A	EUT
E-2	Adapter	N/A	SK22G-0500200Z	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.8m	

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	2015.07.06	2016.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2015.07.06	2016.07.05	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	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	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	2015.07.06	2016.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05	1 year
12	Test Cable	N/A	R-01	N/A	2015.07.06	2016.07.05	1 year
13	Test Cable	N/A	R-02	N/A	2015.06.07	2016.06.06	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	2015.08.24	2016.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2015.06.08	2016.06.07	1 year
7	Test Cable	N/A	C01	N/A	2015.06.08	2016.06.07	1 year
8	Test Cable	N/A	C02	N/A	2015.06.08	2016.06.07	1 year
9	Test Cable	N/A	C03	N/A	2015.06.08	2016.06.07	1 year

2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2014.08.24	2015.08.23	1 year

1	Attenuation	MCE	24-10-34	BN9258	2015.06.08	2016.06.07	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

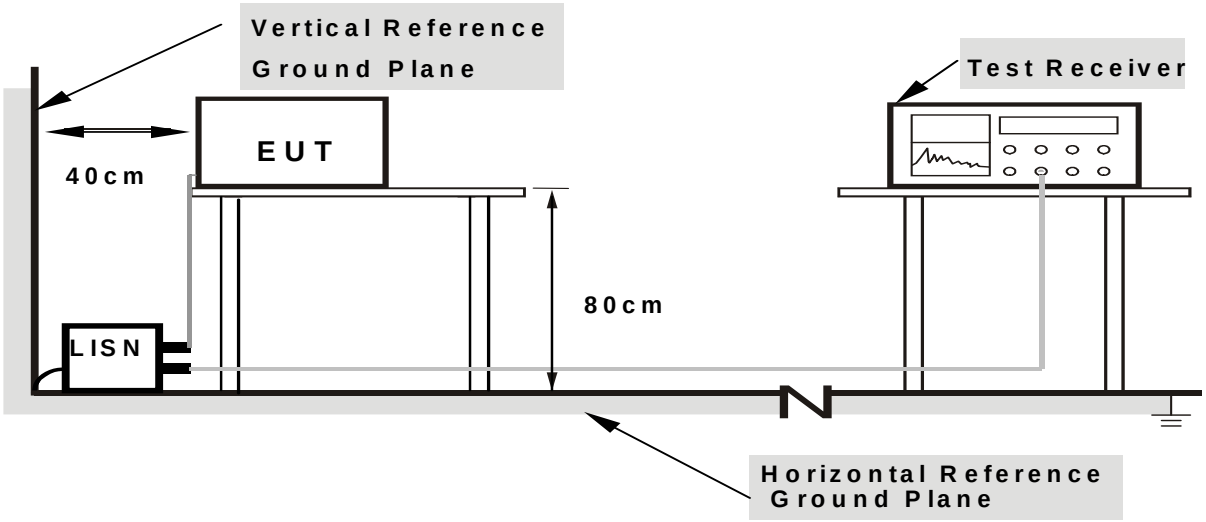
3.1.2 TEST PROCEDURE

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.

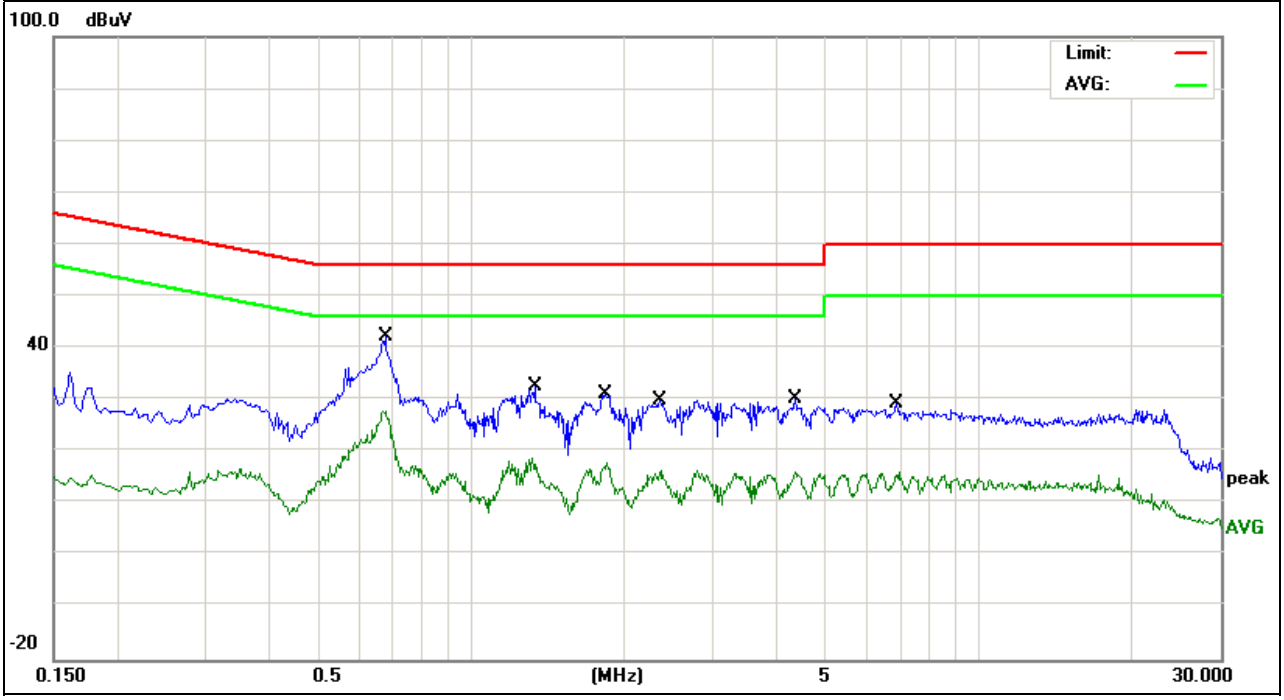
3.1.6 TEST RESULTS

EUT：	E-ink Wireless Electronic Nameplate	Model Name. ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V form Adapter AC 120V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.6780	32.52	9.78	42.30	56.00	-13.70	QP
0.6780	18.18	9.78	27.96	46.00	-18.04	AVG
1.3340	23.00	9.71	32.71	56.00	-23.29	QP
1.3340	7.39	9.71	17.10	46.00	-28.90	AVG
1.8380	21.55	9.66	31.21	56.00	-24.79	QP
1.8380	8.38	9.66	18.04	46.00	-27.96	AVG
2.3540	20.18	9.66	29.84	56.00	-26.16	QP
2.3540	6.81	9.66	16.47	46.00	-29.53	AVG
4.3459	20.60	9.70	30.30	56.00	-25.70	QP
4.3459	6.10	9.70	15.80	46.00	-30.20	AVG
6.9058	19.58	9.70	29.28	60.00	-30.72	QP
6.9058	6.35	9.70	16.05	50.00	-33.95	AVG

Remark:

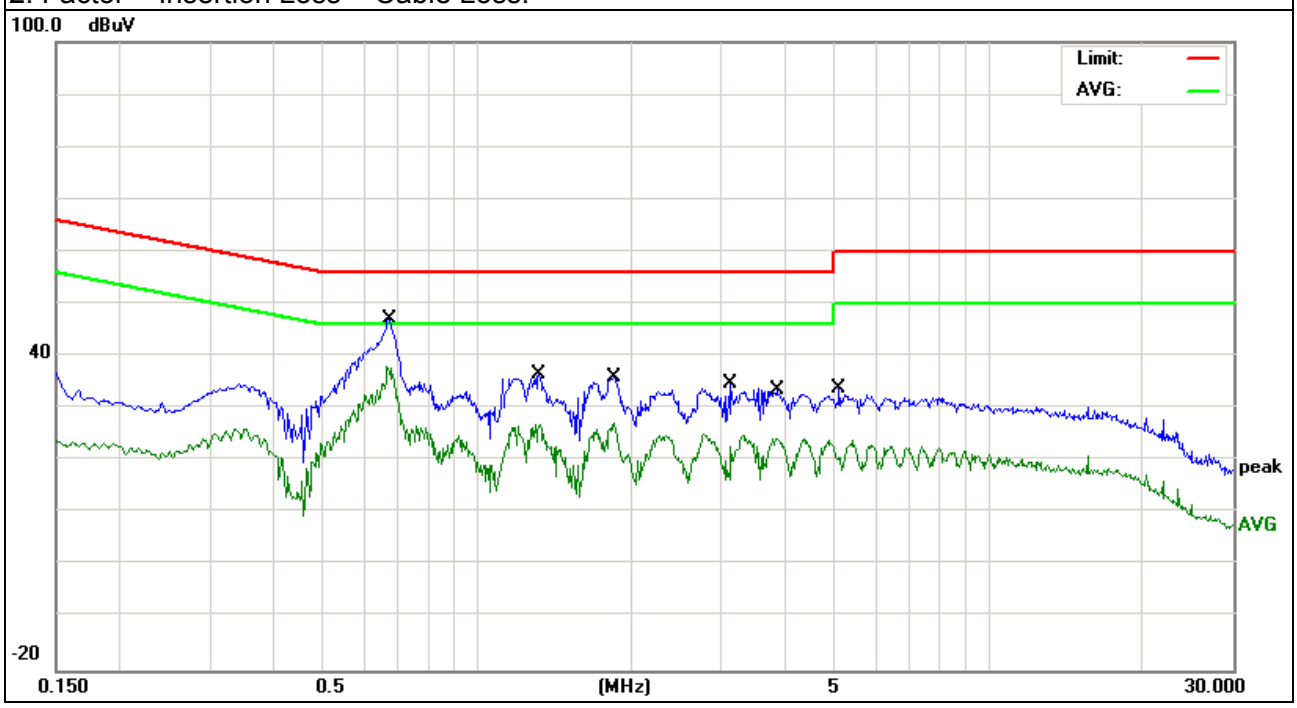
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	E-ink Wireless Electronic Nameplate	Model Name. ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V form Adapter AC 120V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.6740	37.40	9.78	47.18	56.00	-8.82	QP
0.6740	28.20	9.78	37.98	46.00	-8.02	AVG
1.3220	26.98	9.71	36.69	56.00	-19.31	QP
1.3220	17.37	9.71	27.08	46.00	-18.92	AVG
1.8500	26.39	9.66	36.05	56.00	-19.95	QP
1.8500	17.66	9.66	27.32	46.00	-18.68	AVG
3.1299	25.03	9.67	34.70	56.00	-21.30	QP
3.1299	12.94	9.67	22.61	46.00	-23.39	AVG
3.8500	23.91	9.70	33.61	56.00	-22.39	QP
3.8500	14.64	9.70	24.34	46.00	-21.66	AVG
5.1018	24.10	9.70	33.80	60.00	-26.20	QP
5.1018	14.20	9.70	23.90	50.00	-26.10	AVG

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

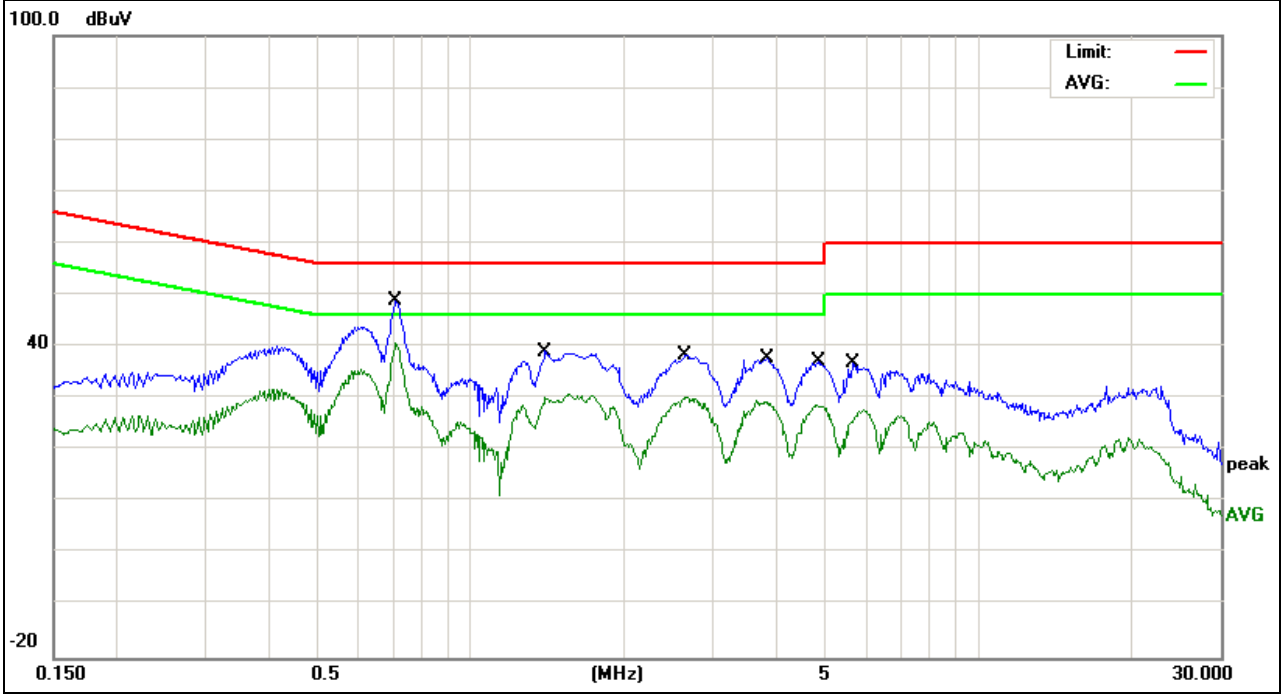


EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5.0V from adapter AC 240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.7099	39.06	9.78	48.84	56.00	-7.16	QP
0.7099	30.87	9.78	40.65	46.00	-5.35	AVG
1.4019	29.40	9.70	39.10	56.00	-16.90	QP
1.4019	20.41	9.70	30.11	46.00	-15.89	AVG
2.6499	28.74	9.66	38.40	56.00	-17.60	QP
2.6499	20.72	9.66	30.38	46.00	-15.62	AVG
3.8260	27.93	9.70	37.63	56.00	-18.37	QP
3.8260	19.84	9.70	29.54	46.00	-16.46	AVG
4.8459	27.57	9.70	37.27	56.00	-18.73	QP
4.8459	19.17	9.70	28.87	46.00	-17.13	AVG
5.6299	27.17	9.70	36.87	60.00	-23.13	QP
5.6299	18.29	9.70	27.99	50.00	-22.01	AVG

Remark:

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

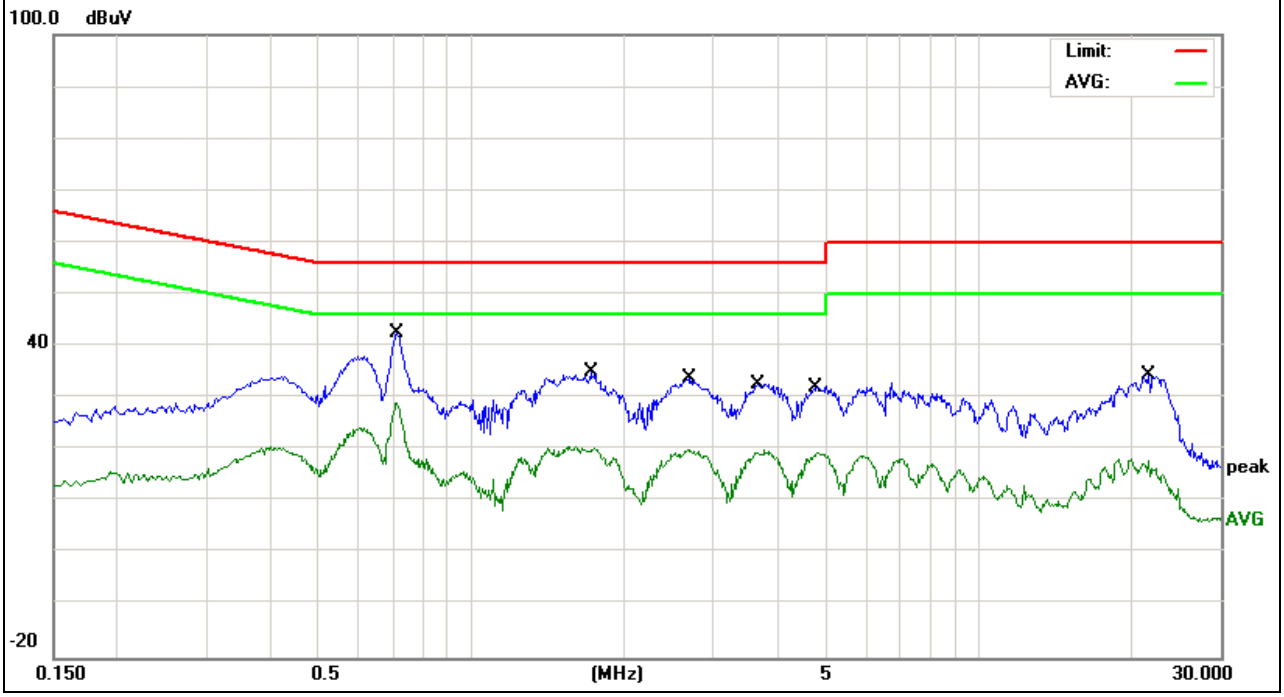


EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5.0V from adapter AC 240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.7139	32.84	9.78	42.62	56.00	-13.38	QP
0.7139	19.31	9.78	29.09	46.00	-16.91	AVG
1.7179	25.25	9.67	34.92	56.00	-21.08	QP
1.7179	11.13	9.67	20.80	46.00	-25.20	AVG
2.6819	24.11	9.66	33.77	56.00	-22.23	QP
2.6819	10.32	9.66	19.98	46.00	-26.02	AVG
3.6659	23.02	9.69	32.71	56.00	-23.29	QP
3.6659	10.27	9.69	19.96	46.00	-26.04	AVG
4.8178	22.54	9.70	32.24	56.00	-23.76	QP
4.8178	9.83	9.70	19.53	46.00	-26.47	AVG
21.6939	24.36	9.95	34.31	60.00	-25.69	QP
21.6939	8.32	9.95	18.27	50.00	-31.73	AVG

Remark:

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

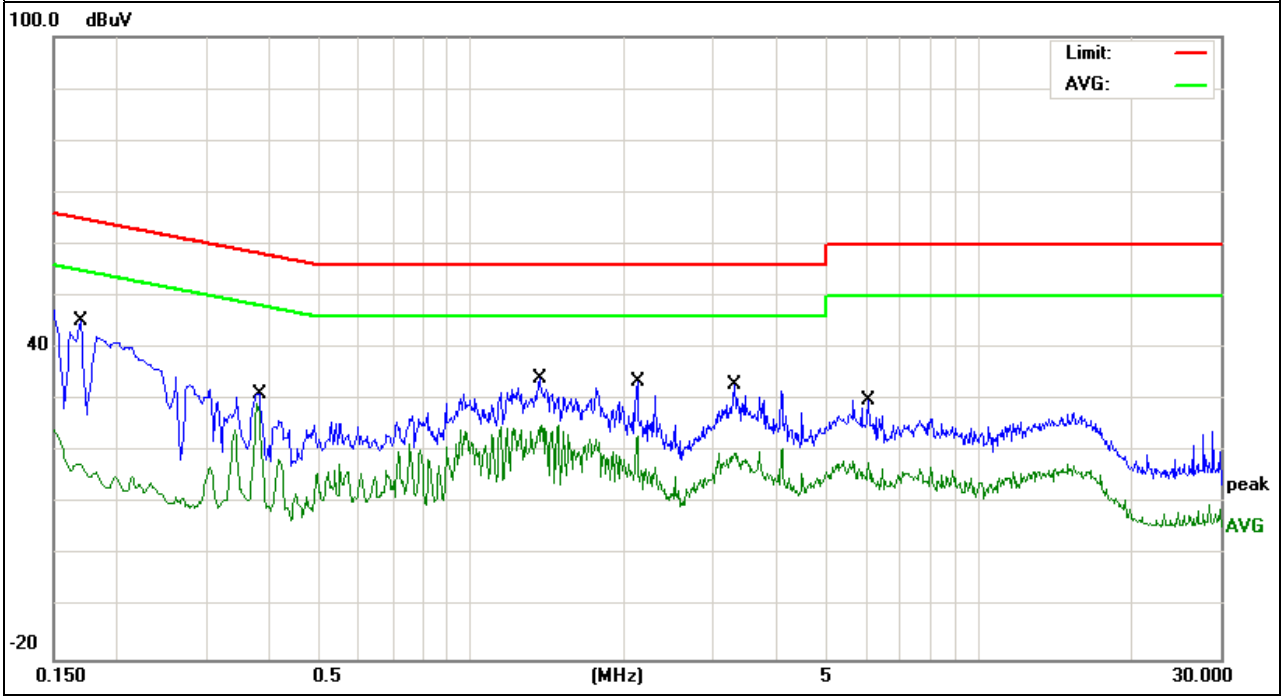


EUT：	E-ink Wireless Electronic Nameplate	Model Name. ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V form PC AC 120V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1700	35.52	9.62	45.14	64.96	-19.82	QP
0.1700	25.55	9.62	35.17	54.96	-19.79	AVG
0.3820	21.79	9.42	31.21	58.23	-27.02	QP
0.3820	16.05	9.42	25.47	48.23	-22.76	AVG
1.3660	24.42	9.70	34.12	56.00	-21.88	QP
1.3660	13.89	9.70	23.59	46.00	-22.41	AVG
2.1218	23.89	9.65	33.54	56.00	-22.46	QP
2.1218	16.79	9.65	26.44	46.00	-19.56	AVG
3.3060	23.31	9.68	32.99	56.00	-23.01	QP
3.3060	16.64	9.68	26.32	46.00	-19.68	AVG
6.0739	20.36	9.70	30.06	60.00	-29.94	QP
6.0739	12.88	9.70	22.58	50.00	-27.42	AVG

Remark:

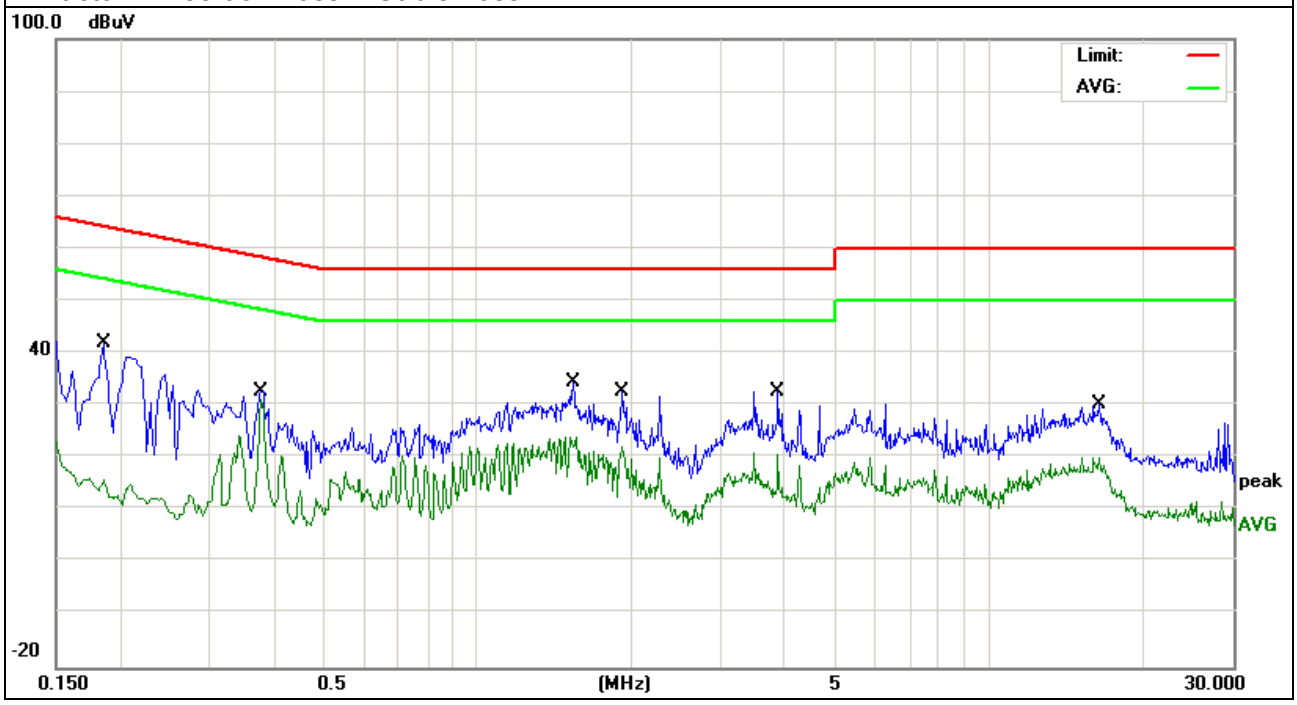
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	E-ink Wireless Electronic Nameplate	Model Name. ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V form PC AC 120V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1859	32.34	9.61	41.95	64.21	-22.26	QP
0.1859	22.41	9.61	32.02	54.21	-22.19	AVG
0.3780	23.19	9.44	32.63	58.32	-25.69	QP
0.3780	14.67	9.44	24.11	48.32	-24.21	AVG
1.5420	24.67	9.68	34.35	56.00	-21.65	QP
1.5420	14.01	9.68	23.69	46.00	-22.31	AVG
1.9216	22.88	9.66	32.54	56.00	-23.46	QP
1.9216	14.46	9.66	24.12	46.00	-21.88	AVG
3.8700	22.91	9.70	32.61	56.00	-23.39	QP
3.8700	13.99	9.70	23.69	46.00	-22.31	AVG
16.4139	20.40	9.85	30.25	60.00	-29.75	QP
16.4139	12.93	9.85	22.78	50.00	-27.22	AVG

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

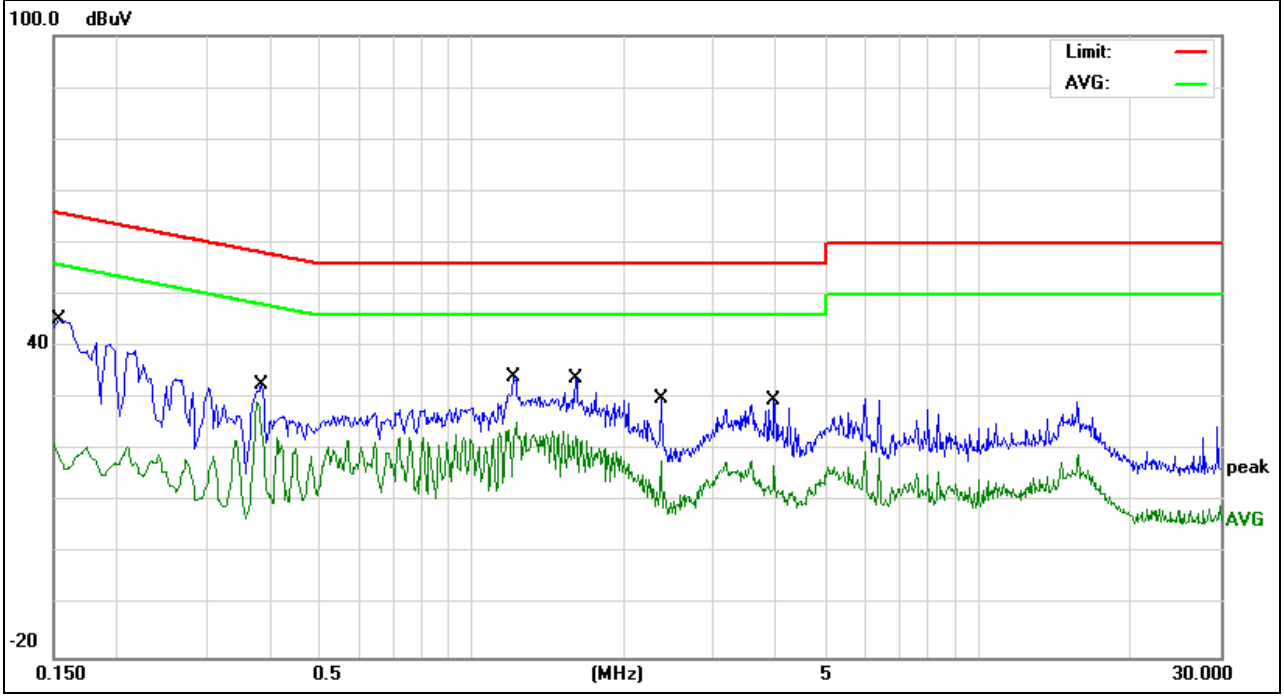


EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5.0V from PC AC 240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1539	35.54	9.60	45.14	65.78	-20.64	QP
0.1539	26.41	9.60	36.01	55.78	-19.77	AVG
0.3860	23.03	9.63	32.66	58.15	-25.49	QP
0.3860	15.58	9.63	25.21	48.15	-22.94	AVG
1.2096	24.63	9.60	34.23	56.00	-21.77	QP
1.2096	14.09	9.60	23.69	46.00	-22.31	AVG
1.6100	24.14	9.57	33.71	56.00	-22.29	QP
1.6100	14.61	9.57	24.18	46.00	-21.82	AVG
2.3780	20.42	9.53	29.95	56.00	-26.05	QP
2.3780	11.49	9.53	21.02	46.00	-24.98	AVG
3.9620	20.13	9.51	29.64	56.00	-26.36	QP
3.9620	13.71	9.51	23.22	46.00	-22.78	AVG

Remark:

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

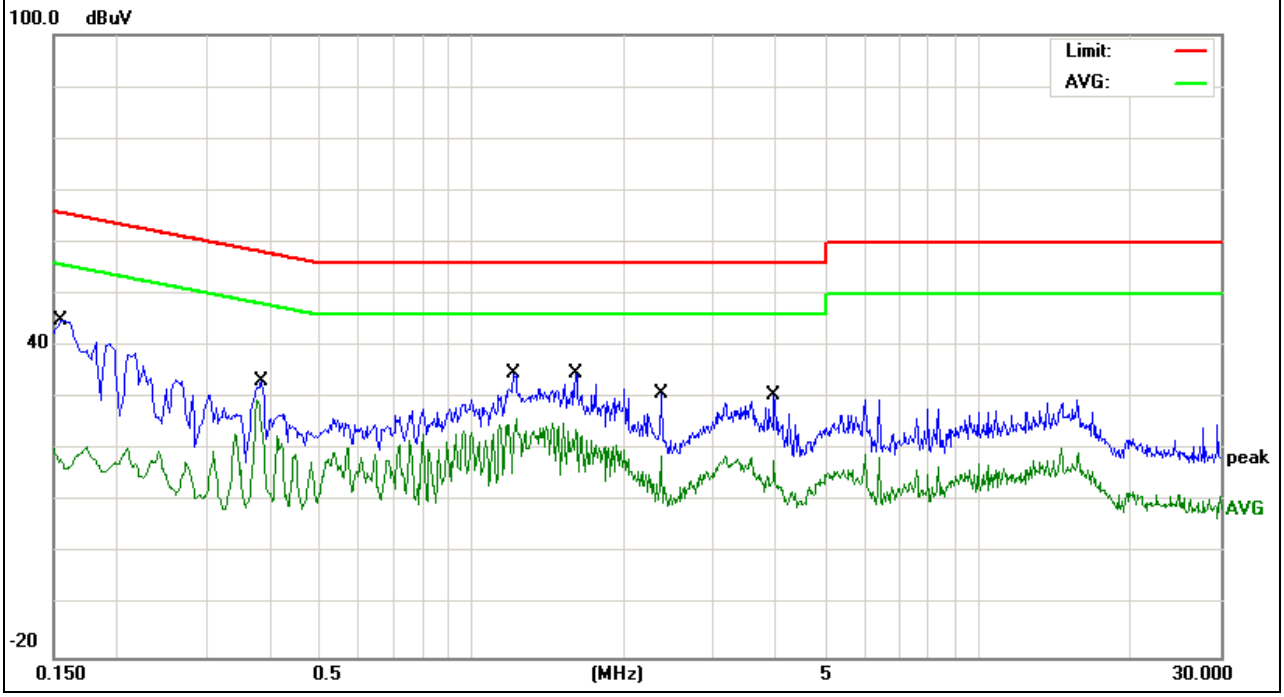


EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5.0V from PC AC 240V/60Hz	Test Mode：	Mode 5

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1547	35.46	9.60	45.06	65.74	-20.68	QP
0.1547	26.98	9.60	36.58	55.74	-19.16	AVG
0.3860	23.53	9.63	33.16	58.15	-24.99	QP
0.3860	16.02	9.63	25.65	48.15	-22.50	AVG
1.2096	25.13	9.60	34.73	56.00	-21.27	QP
1.2096	18.42	9.60	28.02	46.00	-17.98	AVG
1.6100	25.14	9.57	34.71	56.00	-21.29	QP
1.6100	17.54	9.57	27.11	46.00	-18.89	AVG
2.3780	21.42	9.53	30.95	56.00	-25.05	QP
2.3780	14.69	9.53	24.22	46.00	-21.78	AVG
3.9620	21.13	9.51	30.64	56.00	-25.36	QP
3.9620	14.18	9.51	23.69	46.00	-22.31	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)	Class B (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:

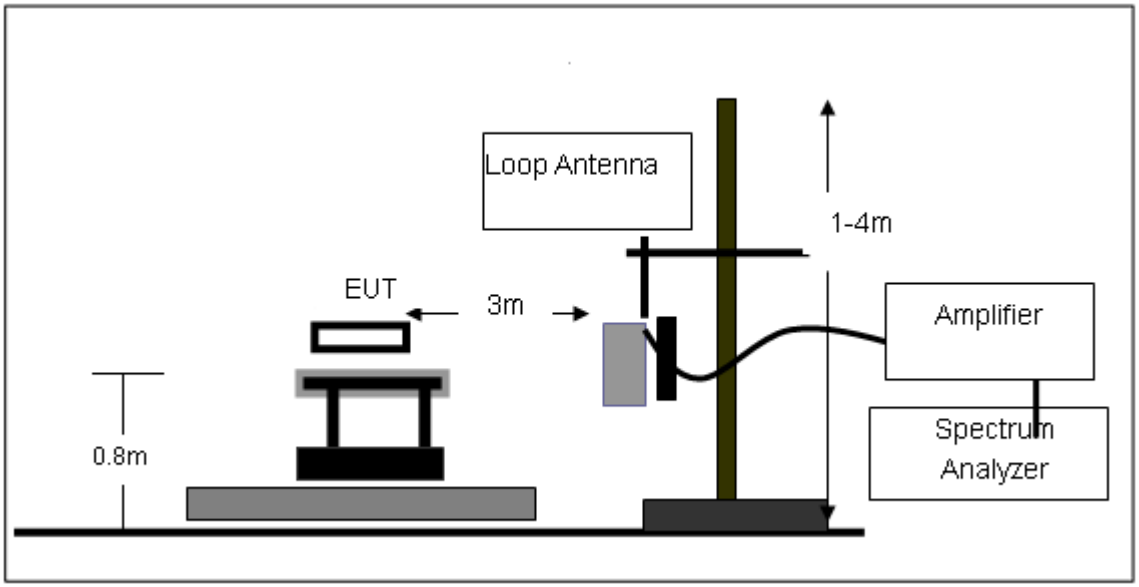
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Peak	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

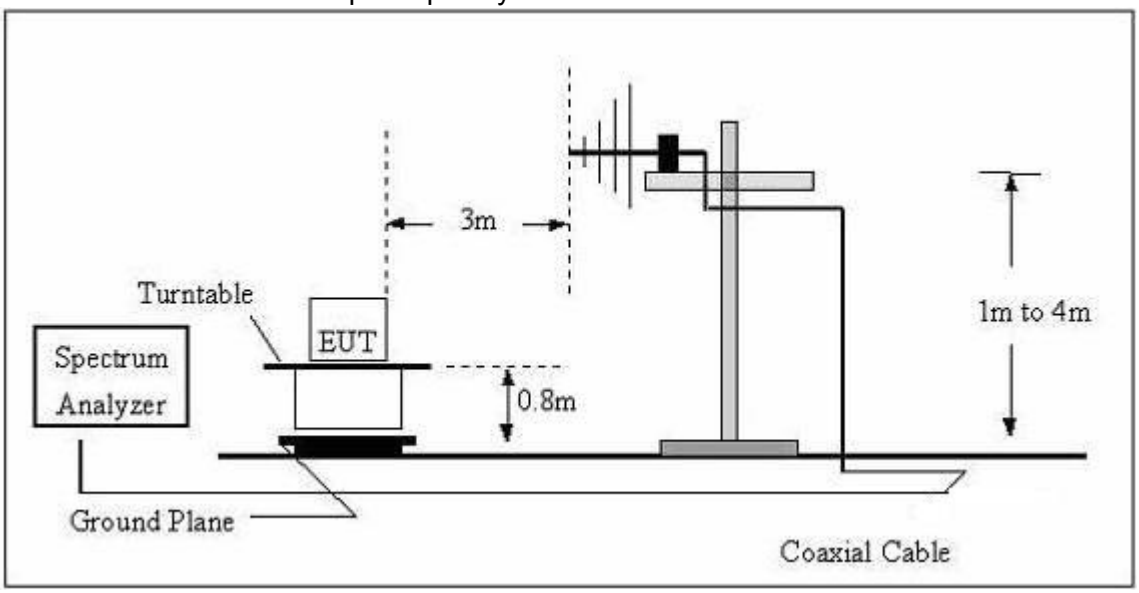
No deviation

3.2.4 TEST SETUP

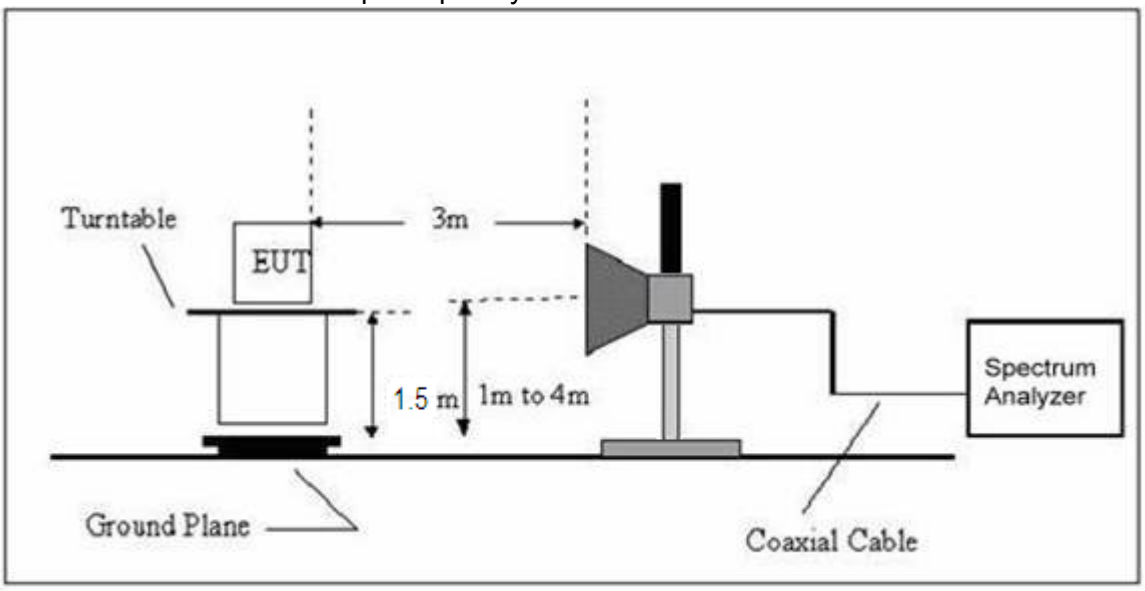
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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：	E-ink Wireless Electronic Nameplate	Model Name. ：	HCS-1081
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
--	--	--	--	P
--	--	--	--	P

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.

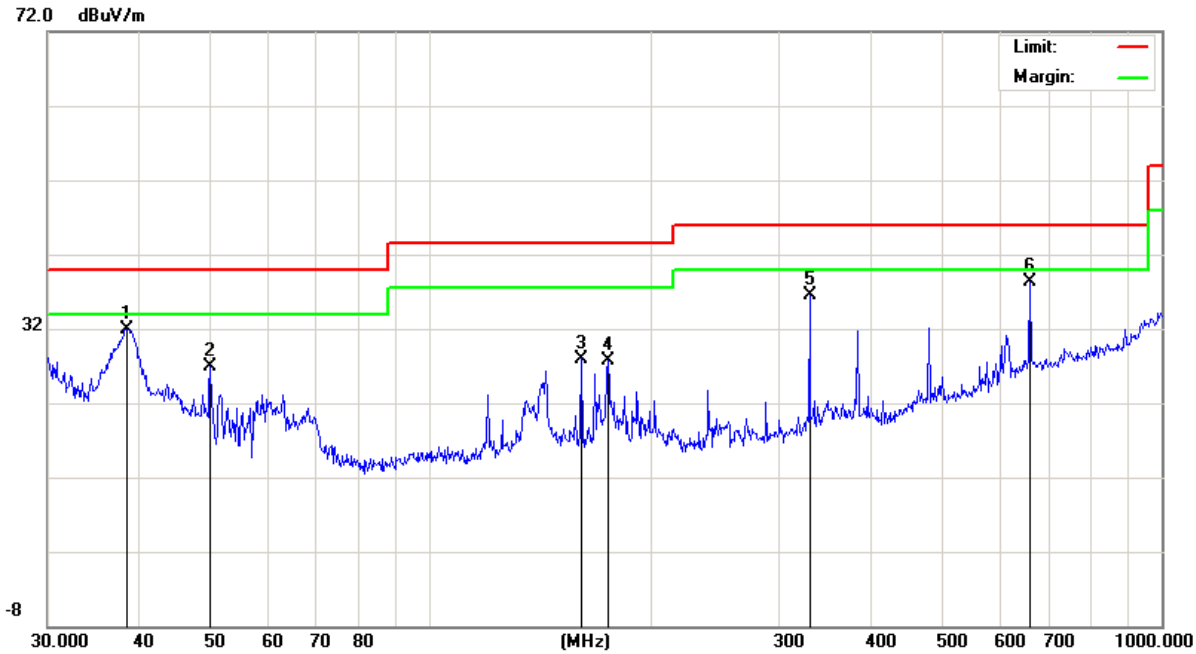
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
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	38.4809	16.52	15.45	31.97	40.00	-8.03	QP
V	50.0566	17.28	9.56	26.84	40.00	-13.16	QP
V	160.9088	16.51	11.49	28.00	43.50	-15.50	QP
V	175.0365	15.36	12.31	27.67	43.50	-15.83	QP
V	330.1949	22.92	13.65	36.57	46.00	-9.43	QP
V	661.1505	17.59	20.65	38.24	46.00	-7.76	QP

Remark:

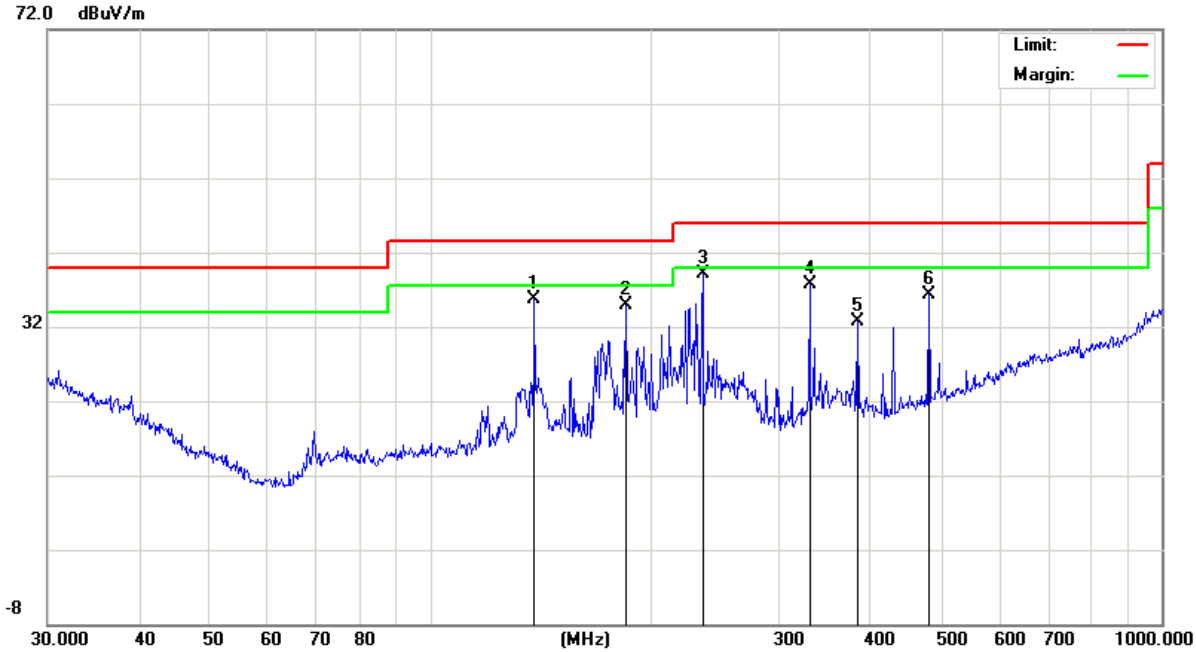
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	138.8735	24.72	11.00	35.72	43.50	-7.78	QP
H	185.1379	23.19	11.80	34.99	43.50	-8.51	QP
H	235.8164	28.24	10.77	39.01	46.00	-6.99	QP
H	330.1949	24.01	13.65	37.66	46.00	-8.34	QP
H	383.9318	17.85	14.90	32.75	46.00	-13.25	QP
H	480.5276	19.81	16.56	36.37	46.00	-9.63	QP

Remark:

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



3.2.8 TEST RESULTS (1GHZ~16GHZ)

EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark	Comment
Low Channel (2412 MHz)							
4826.332	51.6	10.44	61.25	74.00	-12.75	Pk	Vertical
4826.332	33.16	10.44	44.02	54.00	-9.98	Av	Vertical
7233.581	44.81	12.39	57.25	74.00	-16.75	Pk	Vertical
7233.581	29.09	12.39	40.36	54.00	-13.64	Av	Vertical
4820.025	53.35	10.44	62.02	74.00	-11.98	Pk	Horizontal
4820.025	32.07	10.44	41.69	54.00	-12.31	Av	Horizontal
7230.221	45.51	12.39	56.69	74.00	-17.31	Pk	Horizontal
7230.221	30.65	12.39	42.58	54.00	-11.42	Av	Horizontal
Middel Channel (2437 MHz)							
4875.363	51.01	10.40	62.03	74.00	-11.97	Pk	Vertical
4875.363	31.93	10.40	41.69	54.00	-12.31	Av	Vertical
7315.021	44.67	12.75	58.32	74.00	-15.68	Pk	Vertical
7315.021	27.66	12.75	39.25	54.00	-14.75	Av	Vertical
4870.047	51.78	10.40	61.57	74.00	-12.43	Pk	Horizontal
4870.047	33.01	10.40	42.64	54.00	-11.36	Av	Horizontal
7312.25	47.89	12.75	59.02	74.00	-14.98	Pk	Horizontal
7312.25	28.58	12.75	40.78	54.00	-13.22	Av	Horizontal
High Channel (2462 MHz)							
4925.363	50.95	10.39	60.32	74.00	-13.68	Pk	Vertical
4925.363	32.58	10.39	41.36	54.00	-12.64	Av	Vertical
7380.144	44.35	12.68	56.69	74.00	-17.31	Pk	Vertical
7380.144	27.99	12.68	39.58	54.00	-14.42	Av	Vertical
4922.585	50.98	10.39	62.01	74.00	-11.99	Pk	Horizontal
4922.585	33.08	10.39	42.58	54.00	-11.42	Av	Horizontal
7388.125	47.37	12.68	59.66	74.00	-14.34	Pk	Horizontal
7388.125	28.67	12.68	40.73	54.00	-13.27	Av	Horizontal

Note: 802.11b mode is worse case.

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

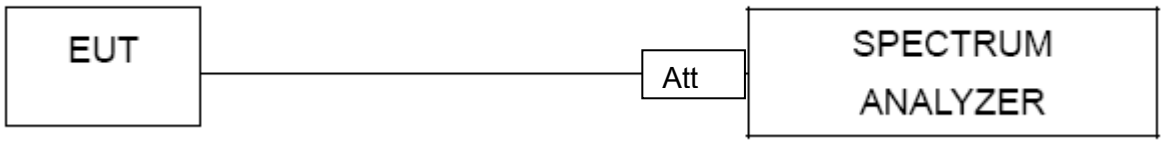
4.1.1 TEST PROCEDURE

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

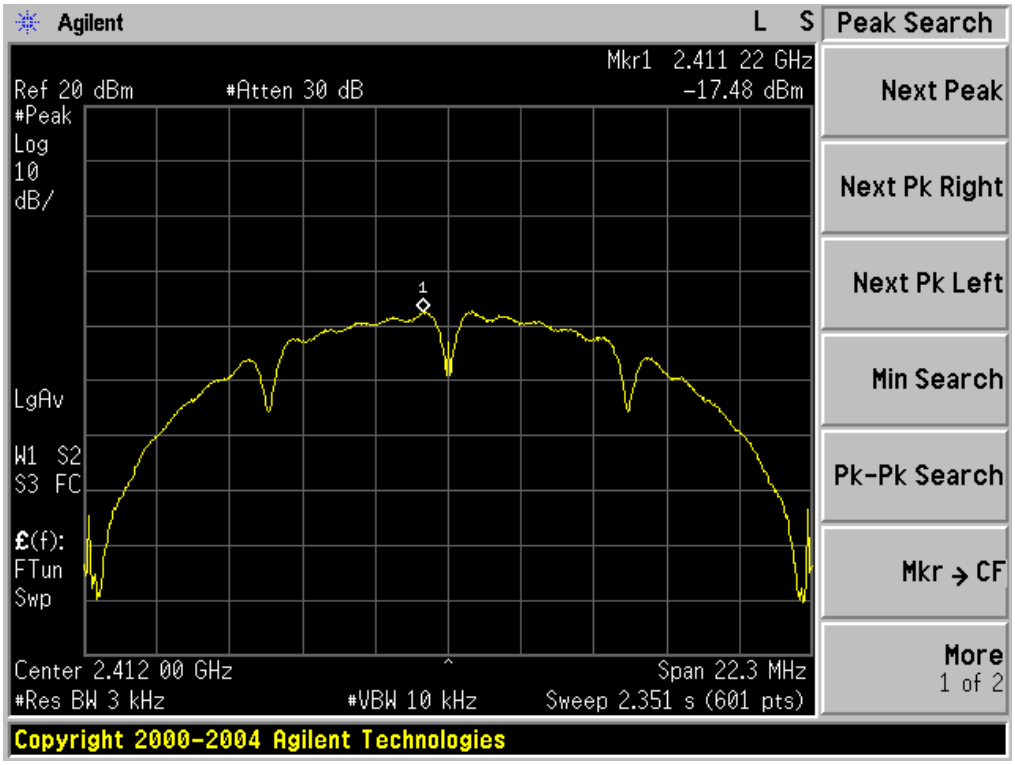
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

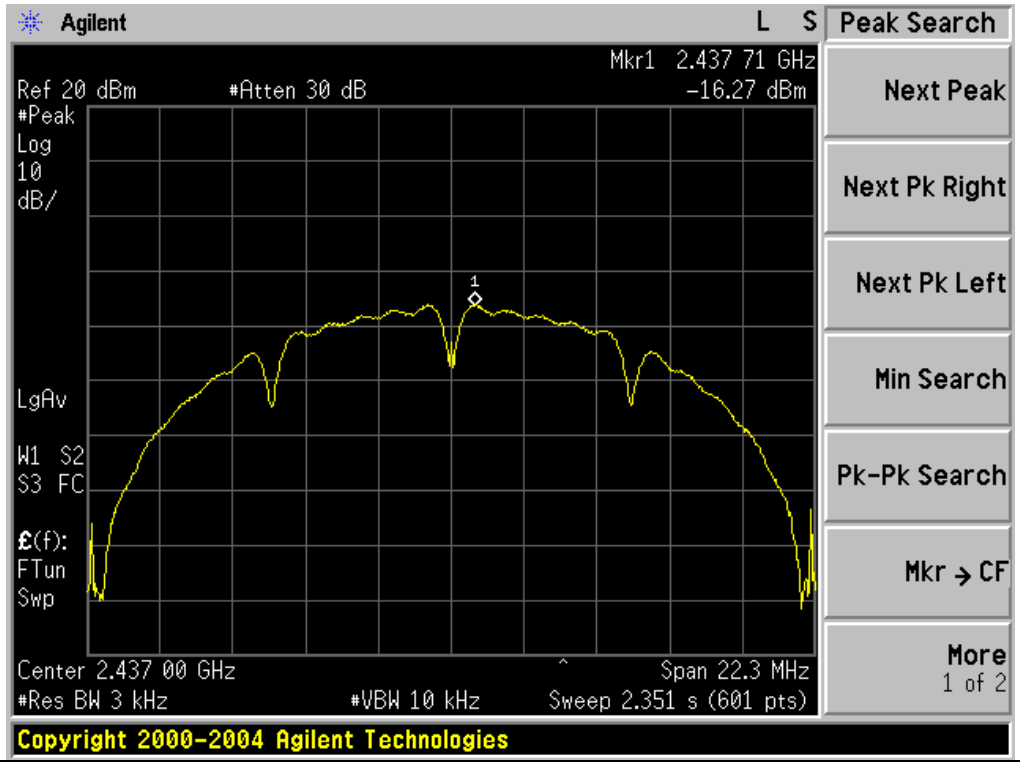
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-17.48	8	PASS
2437 MHz	-16.27	8	PASS
2462 MHz	-15.97	8	PASS

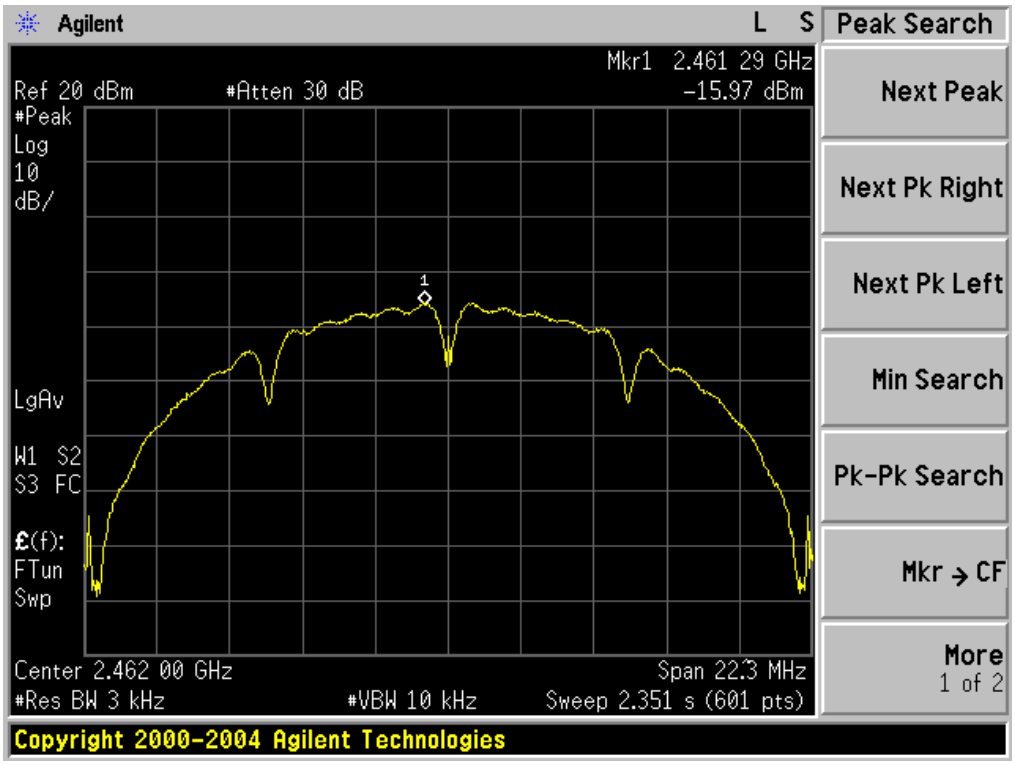
TX CH01



TX CH06



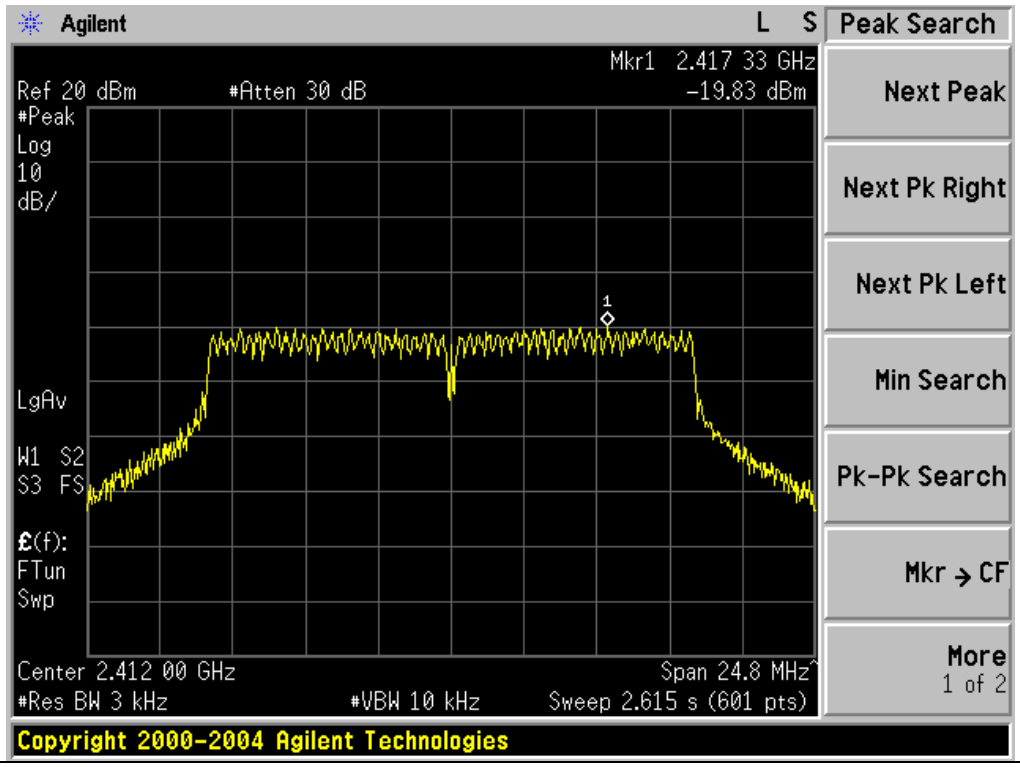
TX CH11



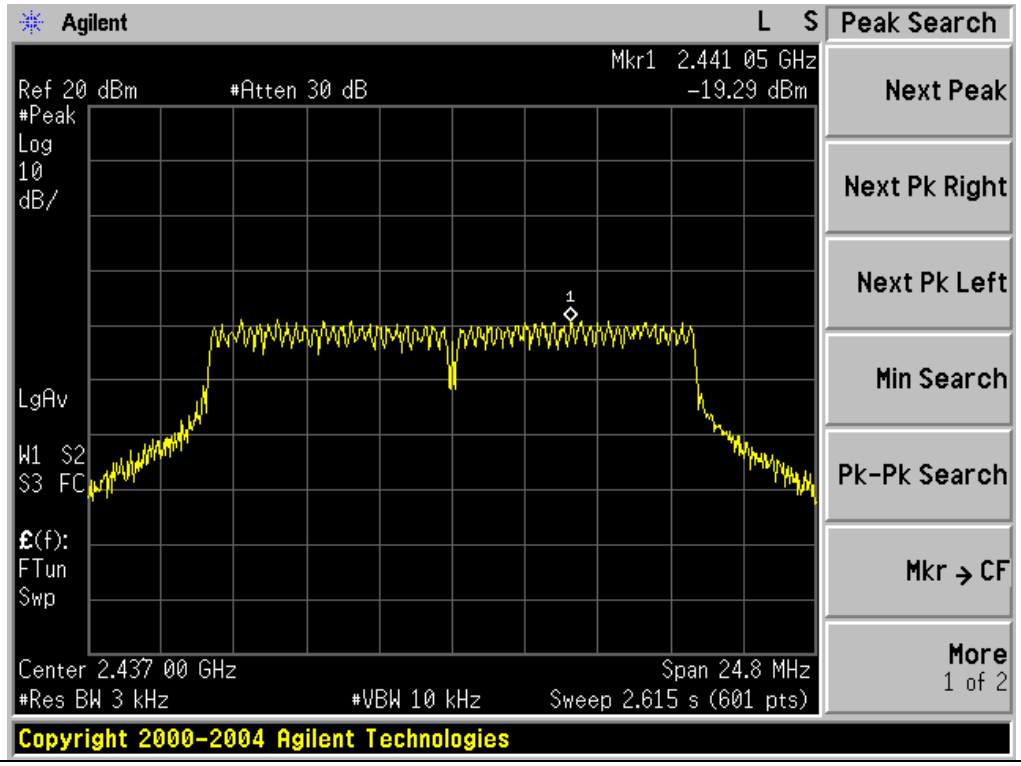
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-19.83	8	PASS
2437 MHz	-19.29	8	PASS
2462 MHz	-18.61	8	PASS

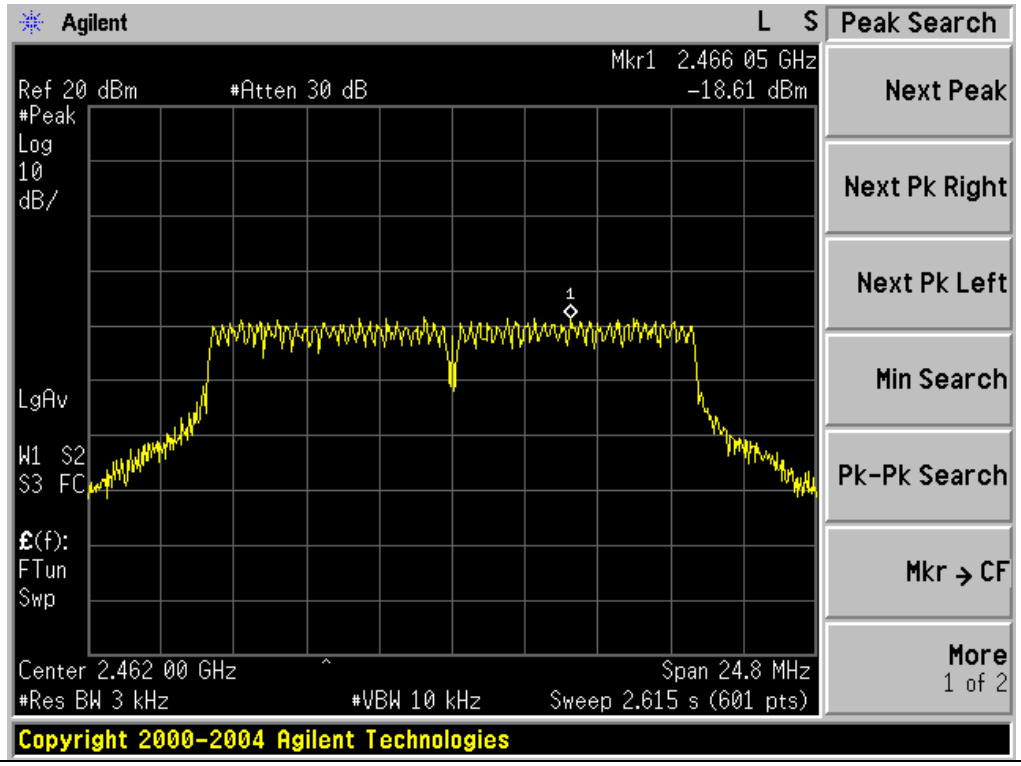
TX CH01



TX CH06



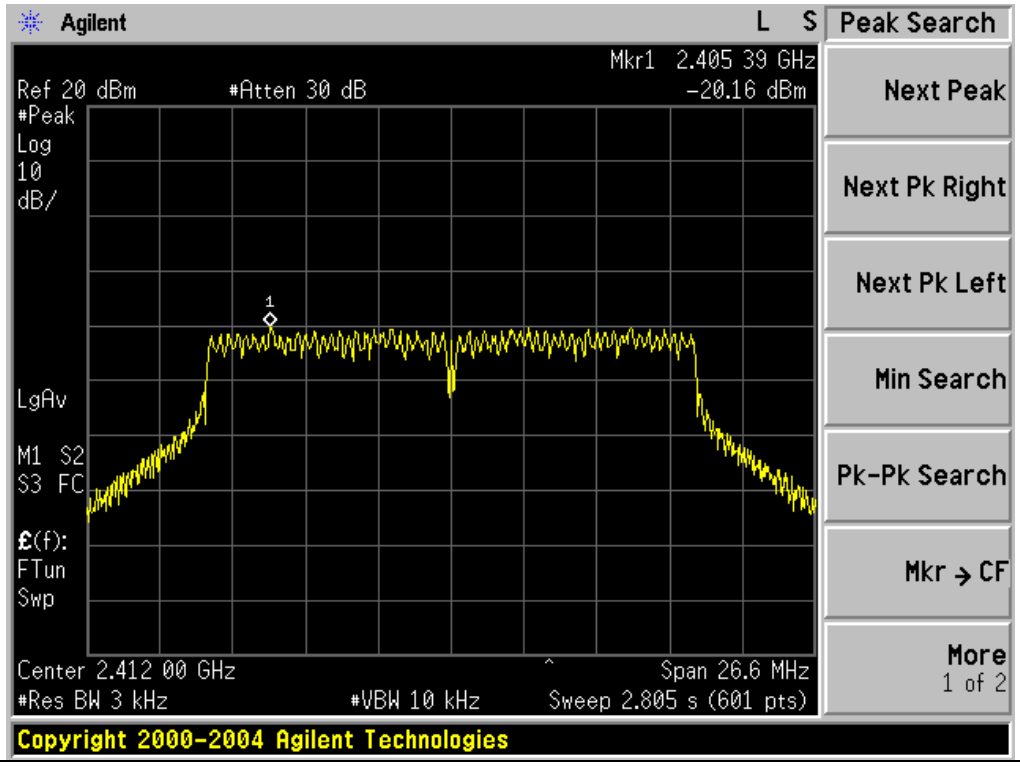
TX CH11



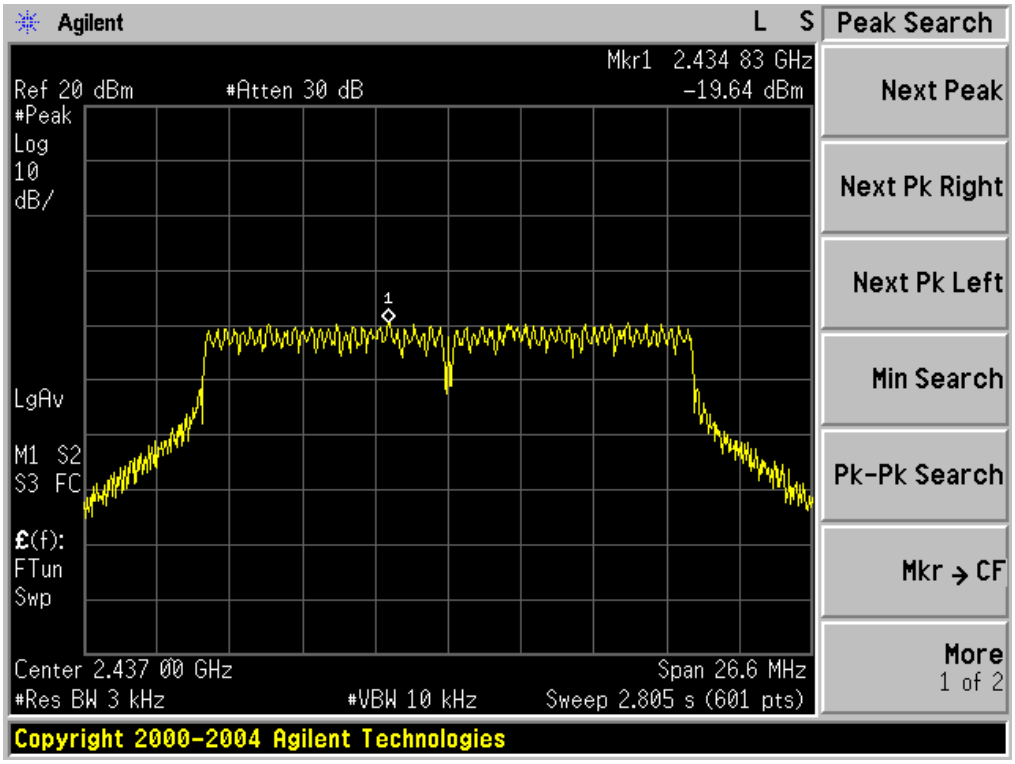
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(20M) /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-20.16	8	PASS
2437 MHz	-19.64	8	PASS
2462 MHz	-18.63	8	PASS

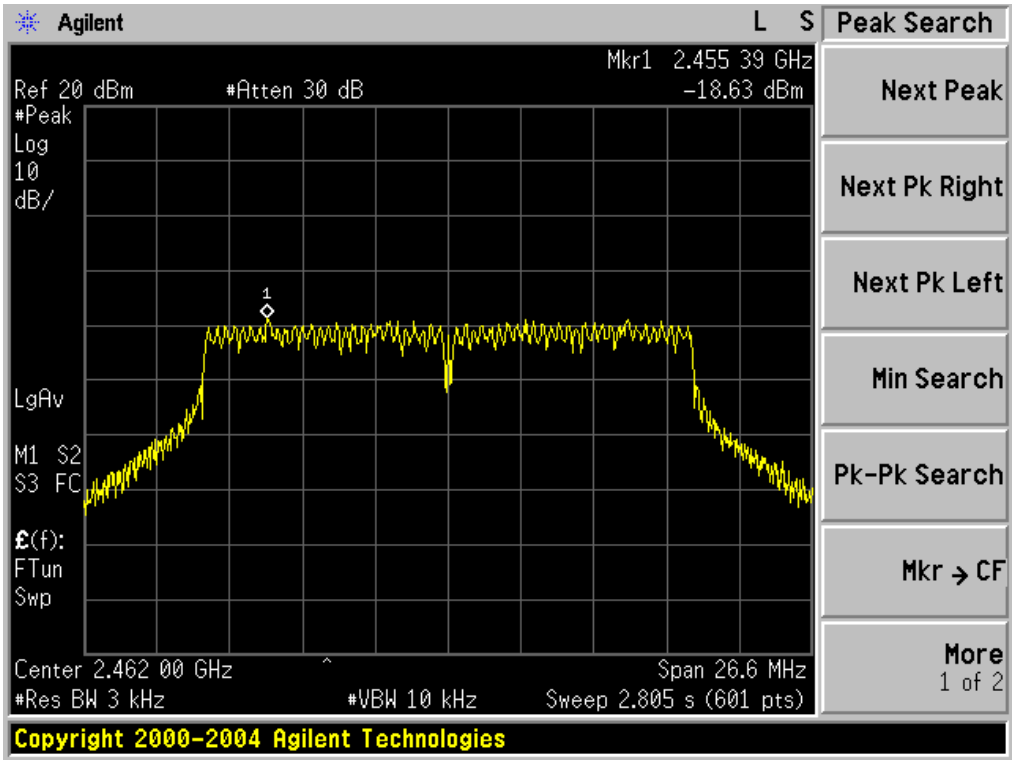
TX CH01



TX CH06



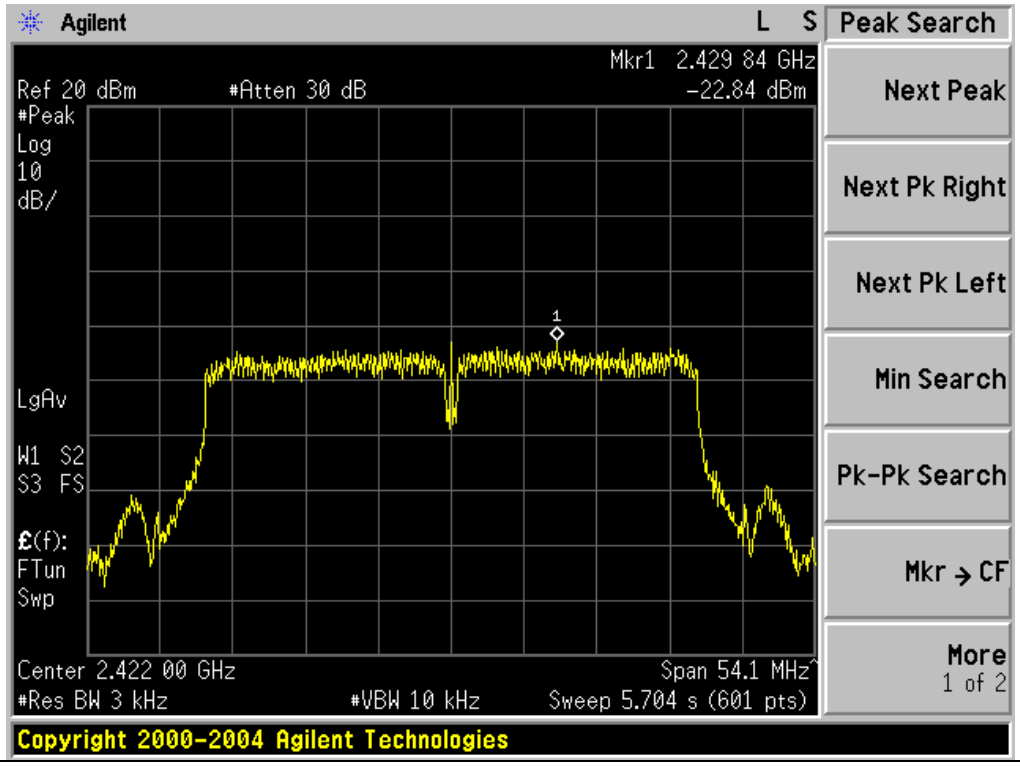
TX CH11



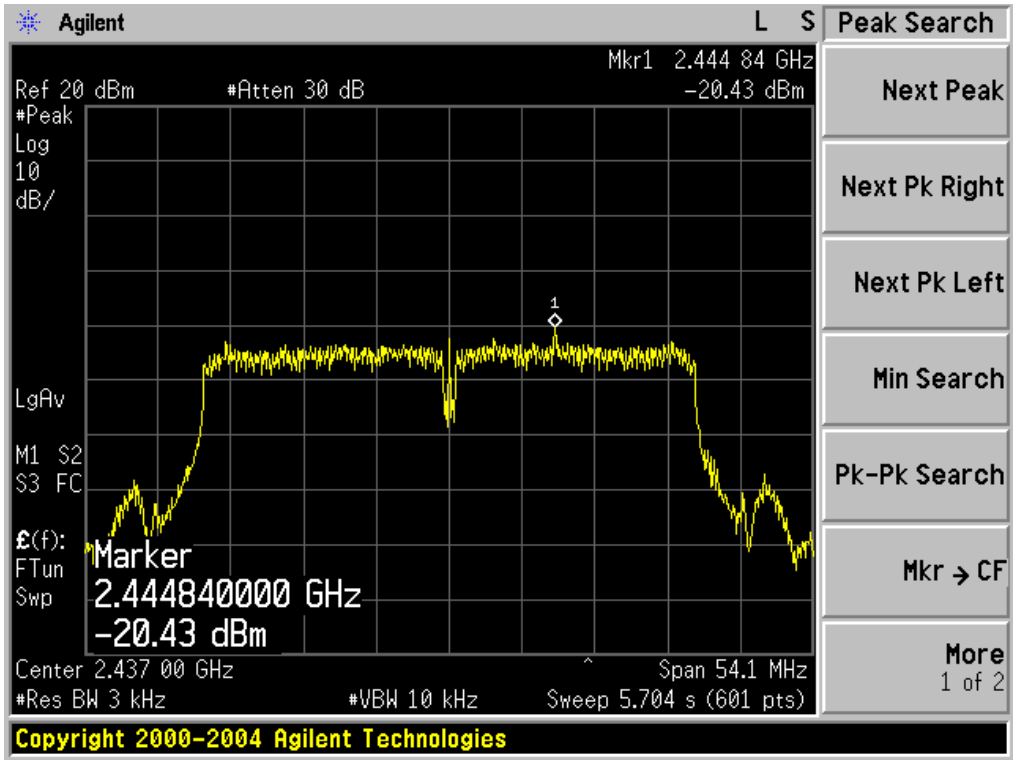
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(40M) /CH03, CH06, CH09		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2422 MHz	-22.84	8	PASS
2437 MHz	-20.43	8	PASS
2452 MHz	-21.60	8	PASS

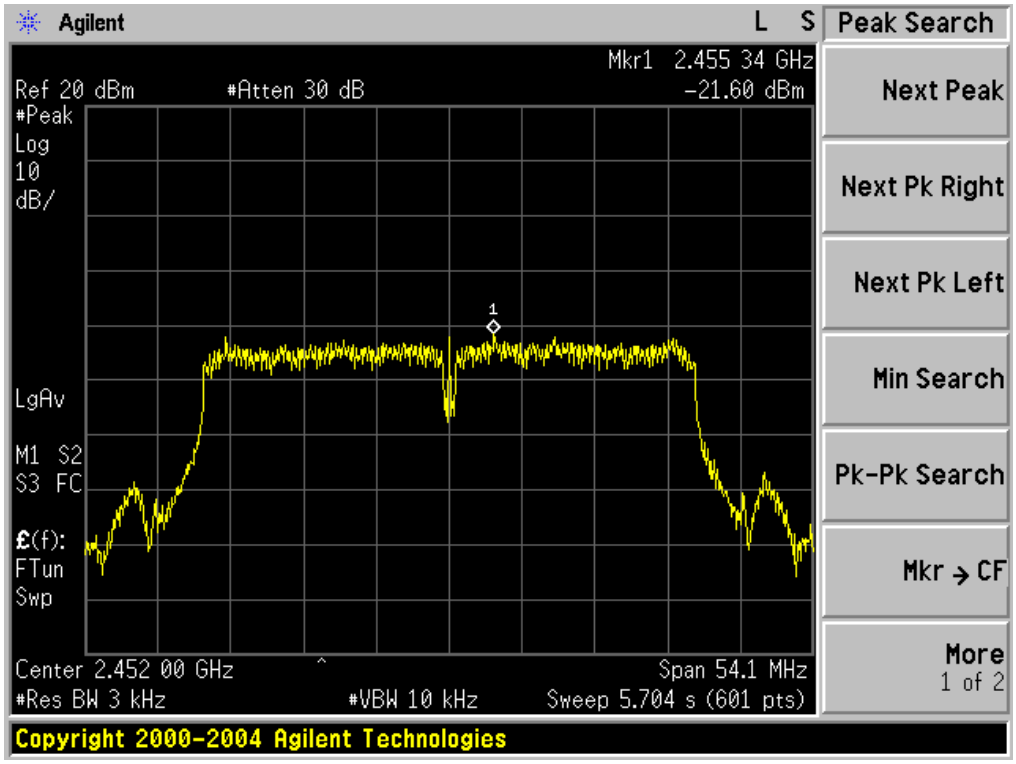
TX CH03



TX CH06



TX CH09



5. BANDWIDTH TEST

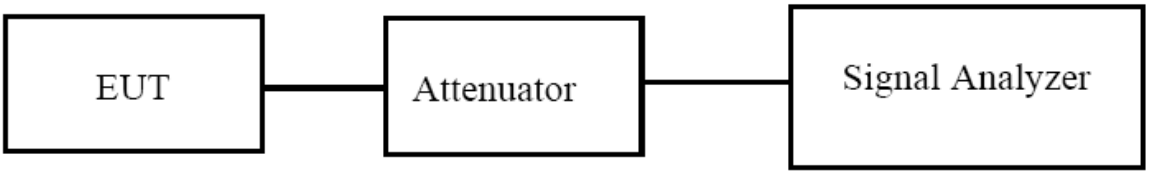
5.1 APPLIED PROCEDURES / LIMIT

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

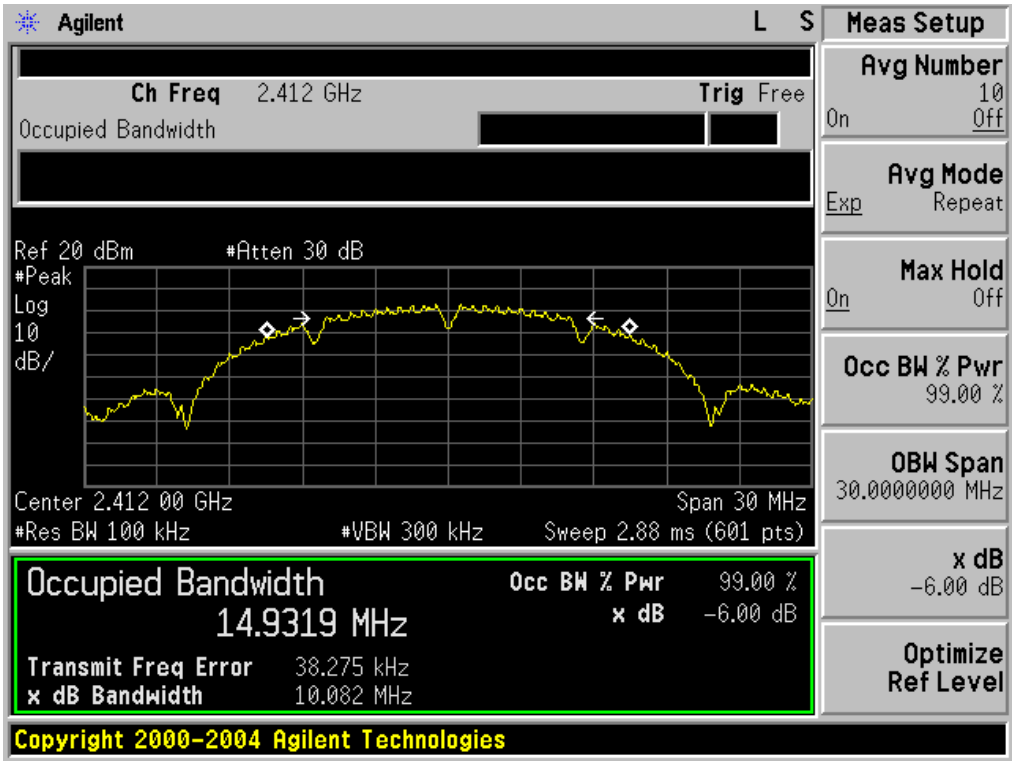
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.3 TEST RESULTS

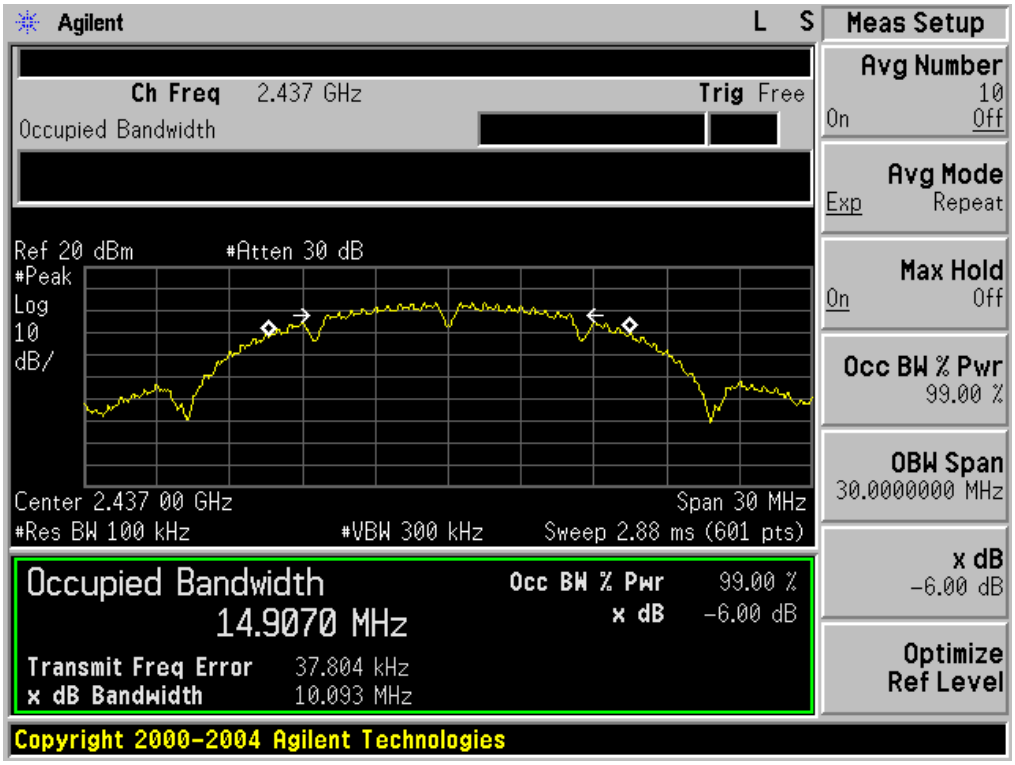
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.082	500	Pass
Middle	2437	10.093	500	Pass
High	2462	10.076	500	Pass

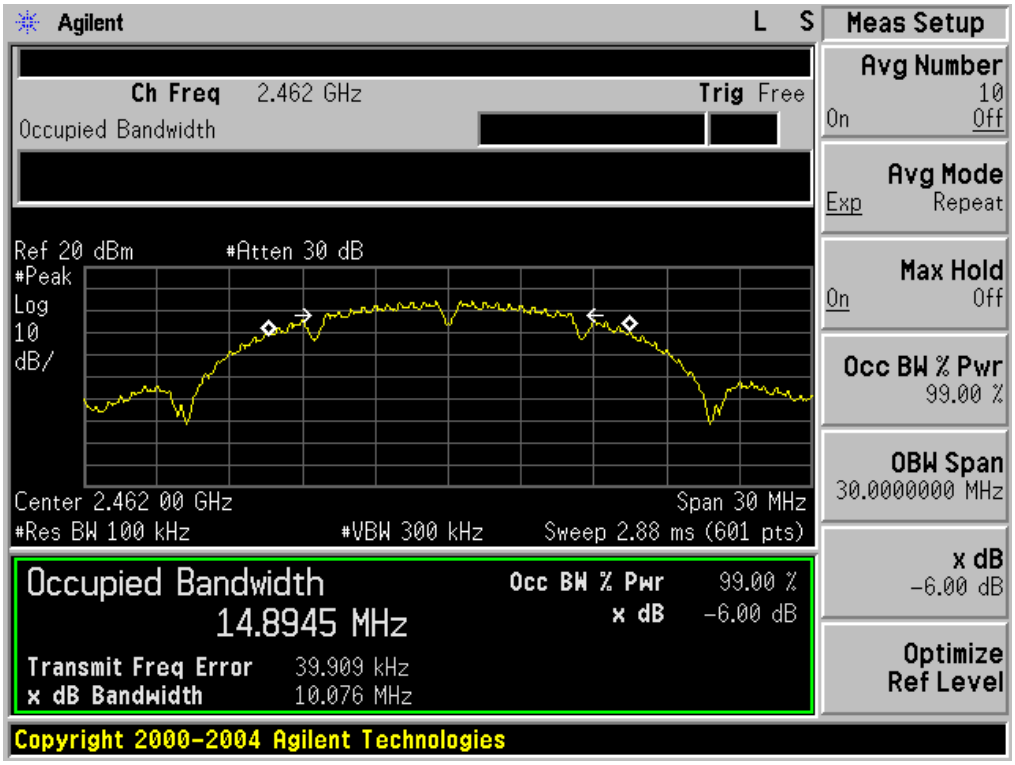
TX CH 01



TX CH 06



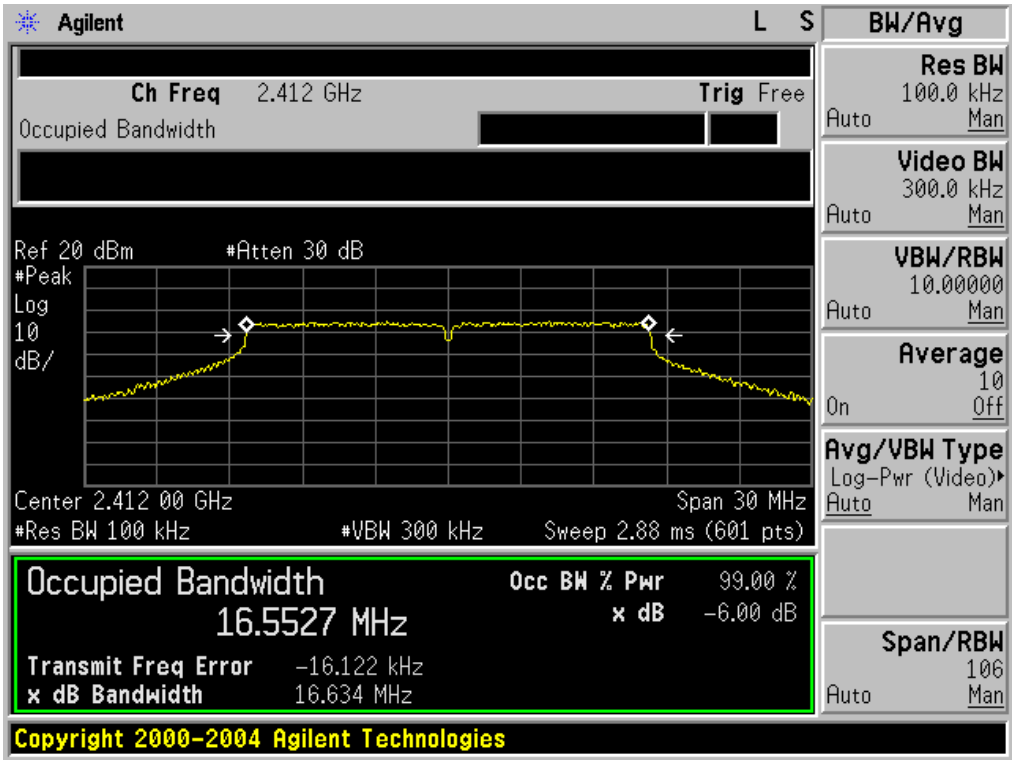
TX CH 11



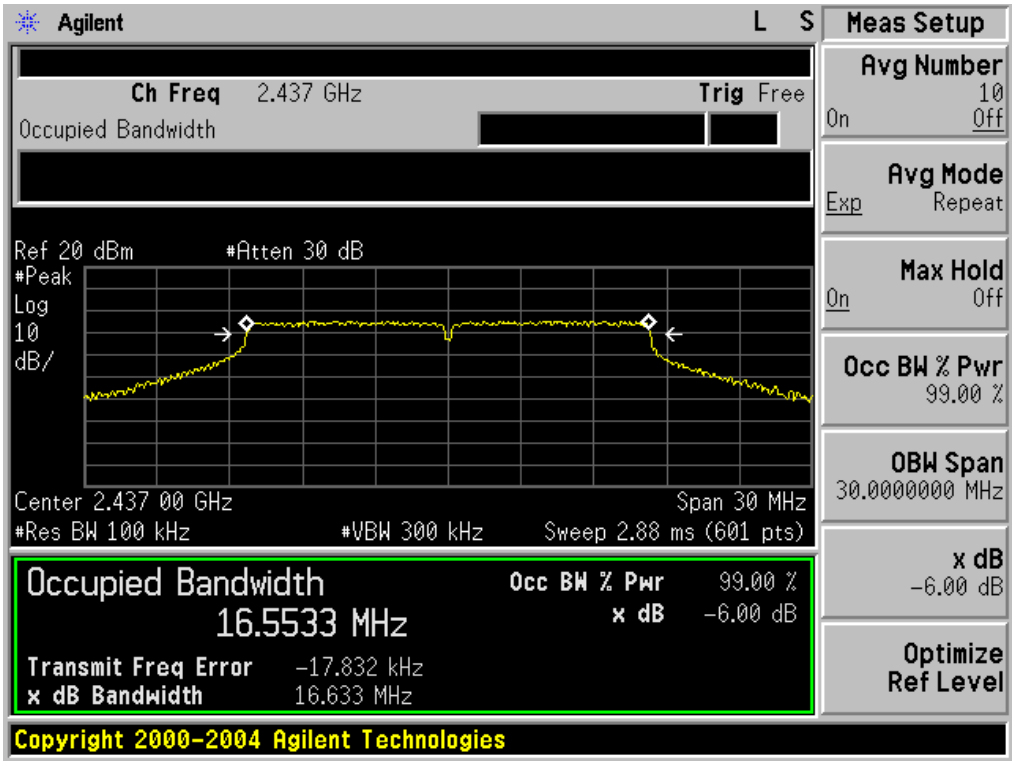
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.634	500	Pass
Middle	2437	16.633	500	Pass
High	2462	16.626	500	Pass

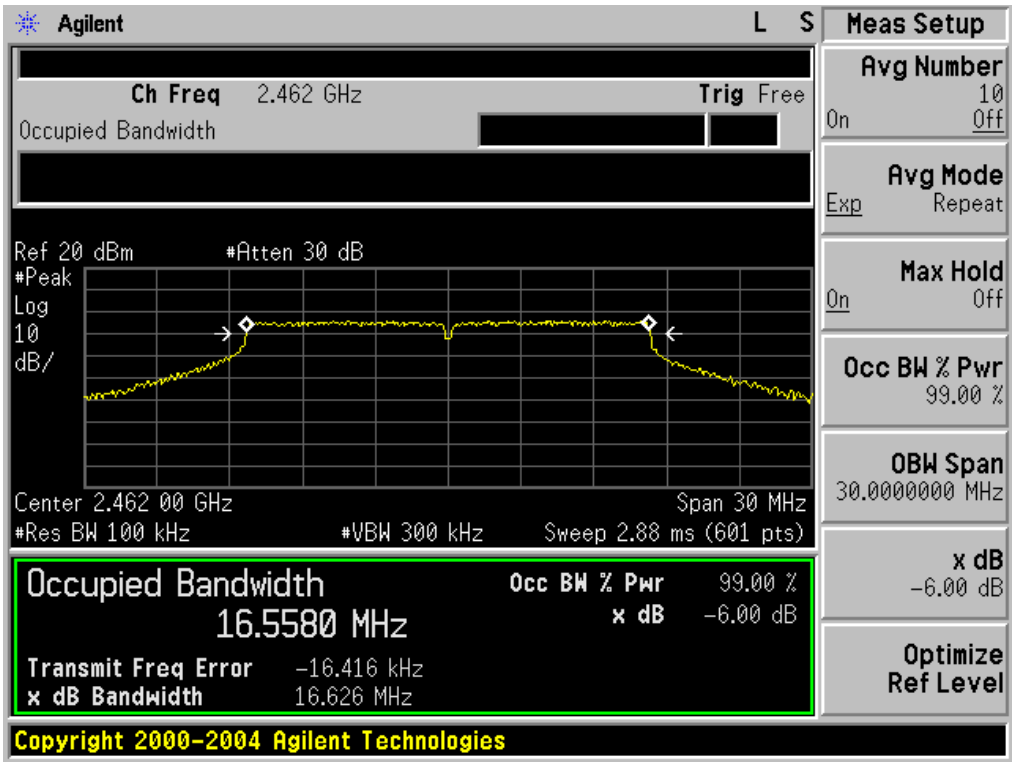
TX CH 01



TX CH 06



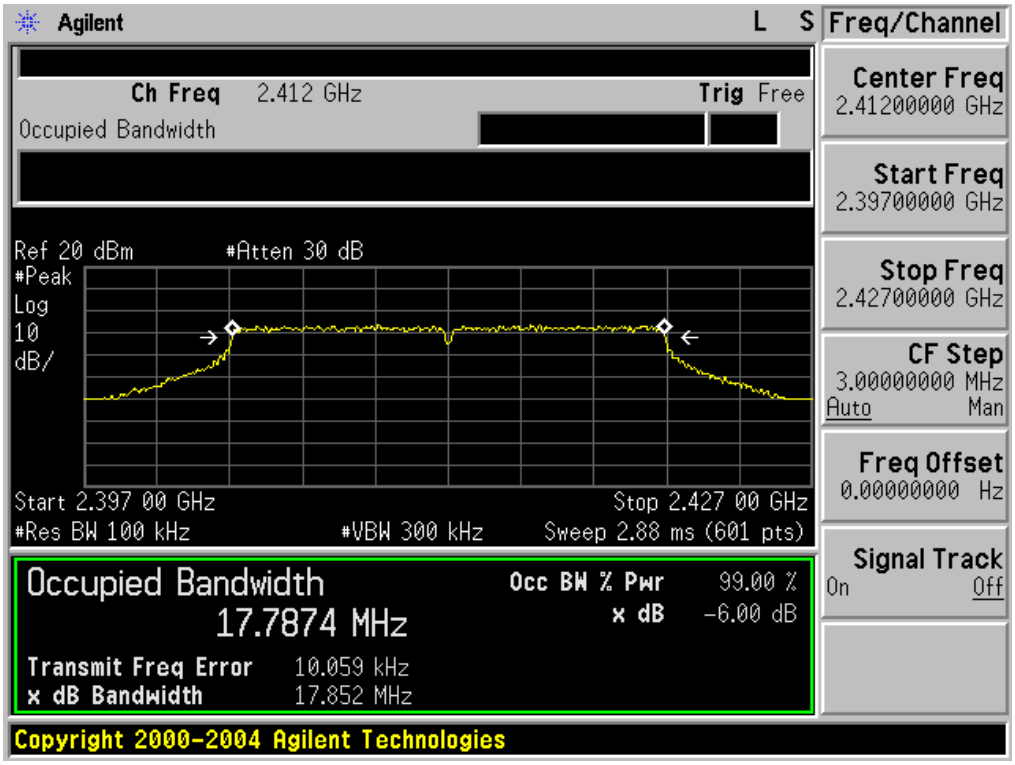
TX CH 11



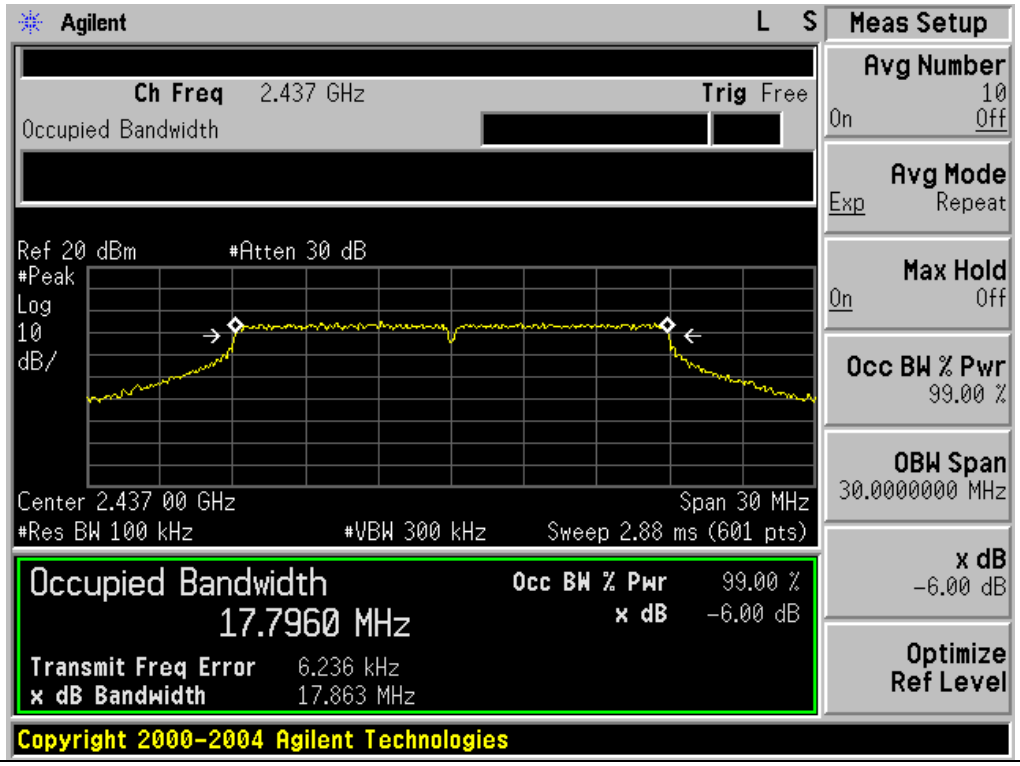
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(20M) /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.852	500	Pass
Middle	2437	17.863	500	Pass
High	2462	17.858	500	Pass

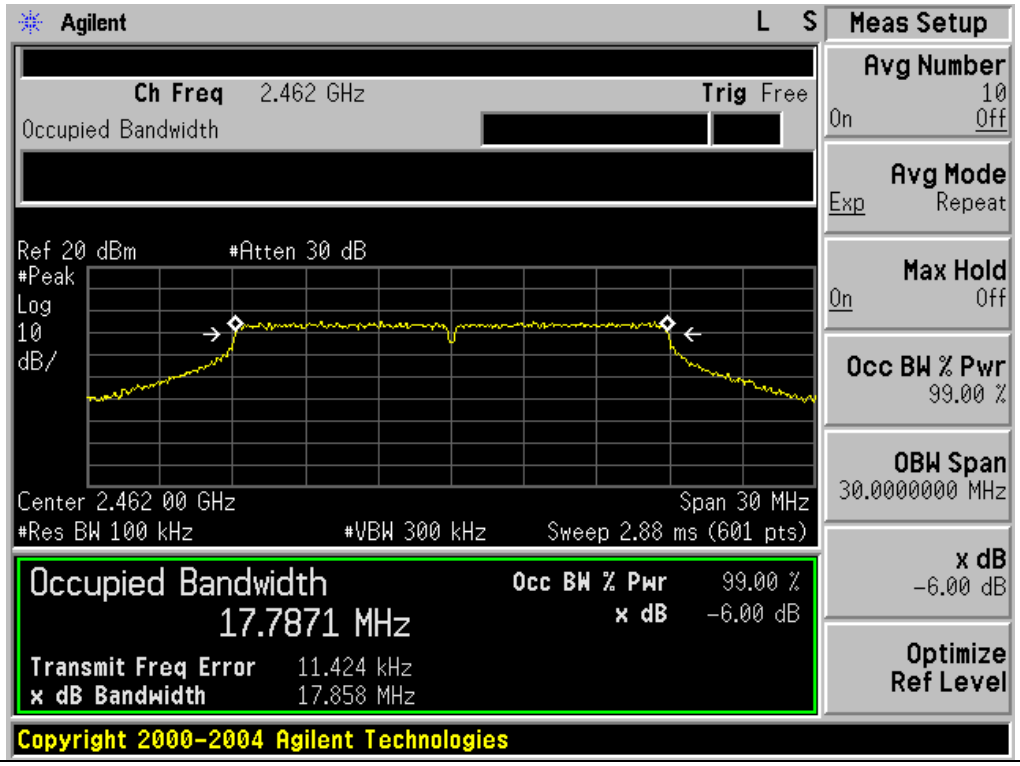
TX CH 01



TX CH 06



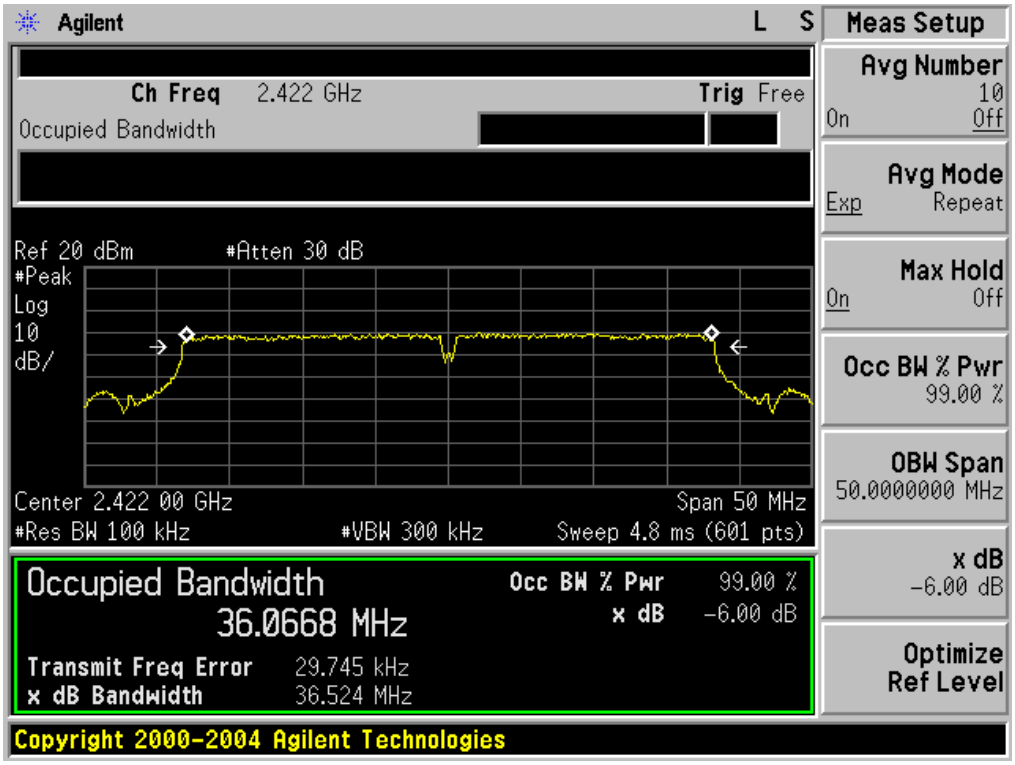
TX CH 11



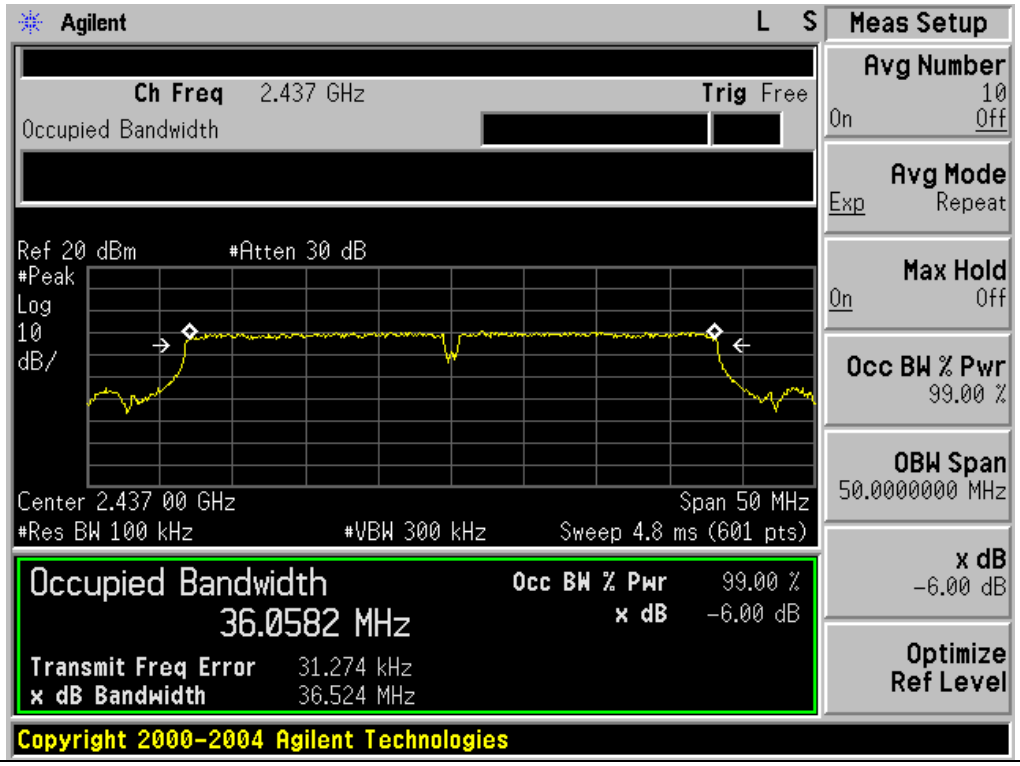
EUT：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX n Mode(40M) /CH03, CH06, CH09		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.524	500	Pass
Middle	2437	36.524	500	Pass
High	2452	36.548	500	Pass

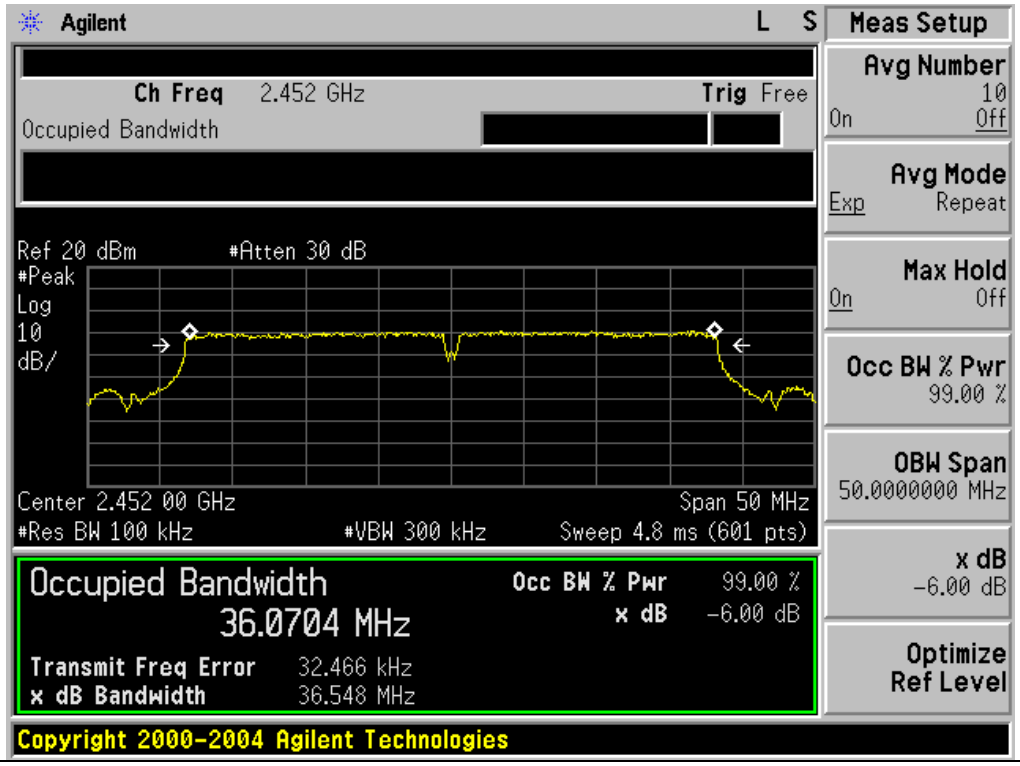
TX CH 03



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

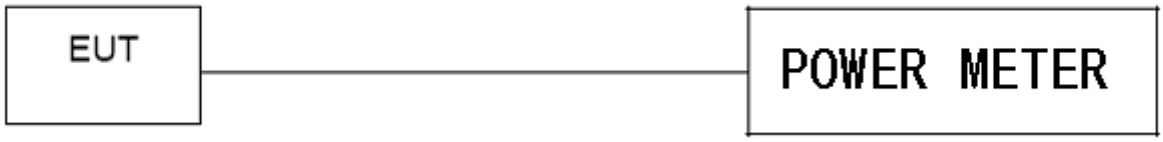
6.1.1 TEST PROCEDURE

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：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	TX b/g/n20/n40 Mode		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(AV)	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)
CH01	2412	13.21	9.36	30
CH06	2437	13.31	9.49	30
CH11	2462	13.02	9.22	30
TX 802.11g Mode				
CH01	2412	11.88	8.75	30
CH06	2437	11.69	8.56	30
CH11	2462	11.56	8.43	30
TX 802.11n-HT20 Mode				
CH01	2412	10.77	8.54	30
CH06	2437	10.89	8.66	30
CH11	2462	10.74	8.51	30
TX 802.11n-HT40 Mode				
CH03	2422	9.83	7.41	30
CH06	2437	9.54	7.12	30
CH09	2452	9.33	6.91	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)).

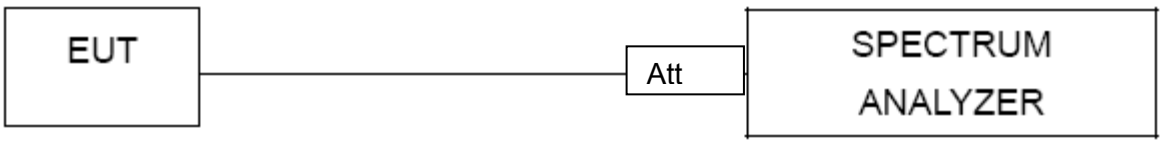
TEST PROCEDURE

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：	E-ink Wireless Electronic Nameplate	Model Name ：	HCS-1081
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.7V

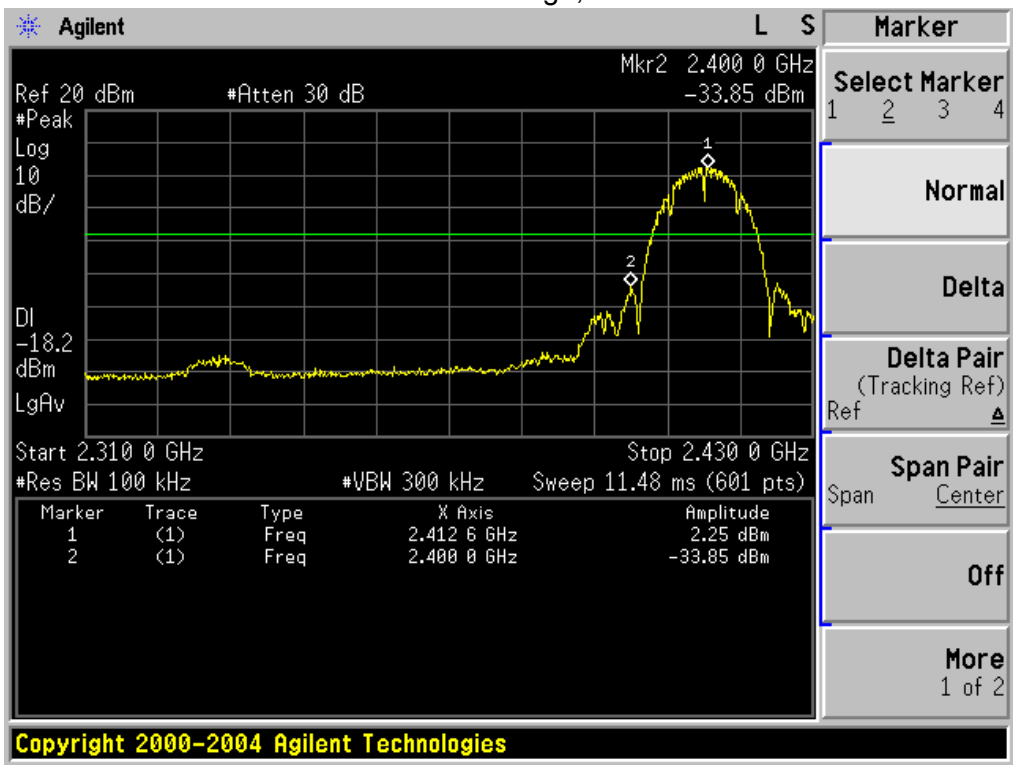
Frequency Band	Delta Peak to band emission (dBc)	＞Limit (dBc)	Result
802.11b			
2400	36.10	20	Pass
2483.5	59.35	20	Pass
802.11g			
2400	26.53	20	Pass
2483.5	44.80	20	Pass
802.11n20			
2400	27.02	20	Pass
2483.5	42.30	20	Pass
802.11n40			
2400	28.39	20	Pass
2483.5	36.44	20	Pass

Radiated band edge:

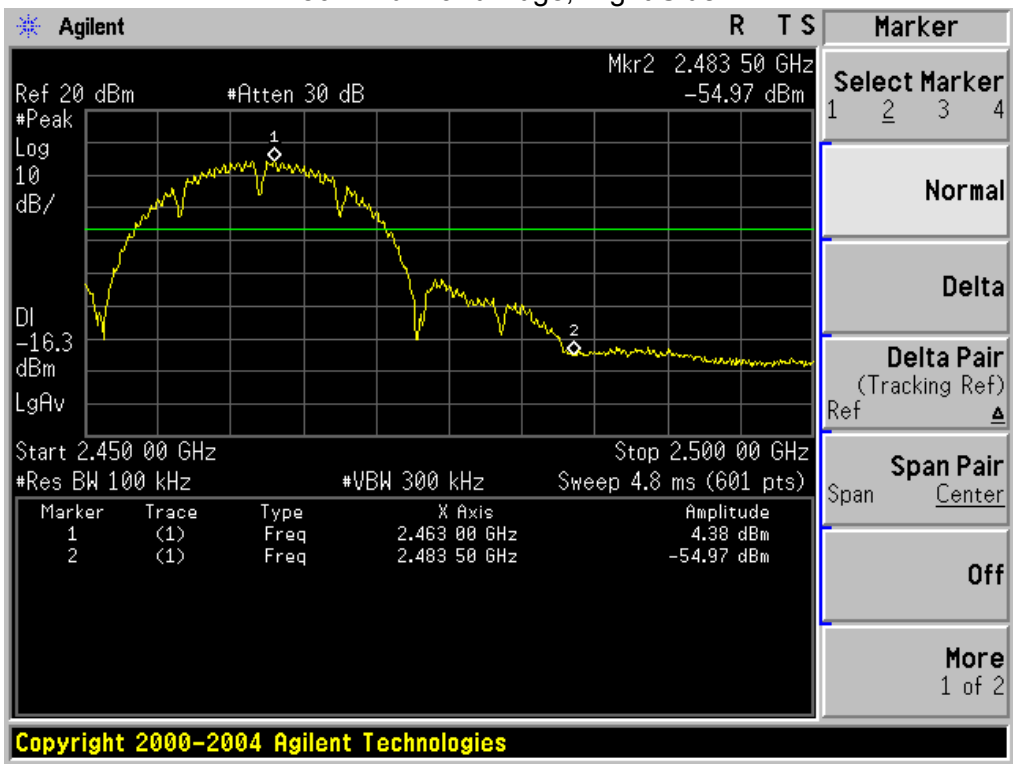
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b							
2390	58.67	-13.06	45.61	74	-28.39	peak	Vertical
2390	58.4	-13.06	45.34	74	-28.66	peak	Horizontal
2483.5	59.59	-12.78	46.81	74	-27.19	peak	Vertical
2483.5	59.61	-12.78	46.83	74	-27.17	peak	Horizontal
802.11g							
2390	58.25	-13.06	45.19	74	-28.81	peak	Vertical
2390	57.48	-13.06	44.42	74	-29.58	peak	Horizontal
2483.5	58.97	-12.78	46.19	74	-27.81	peak	Vertical
2483.5	59.36	-12.78	46.58	74	-27.42	peak	Horizontal
802.11n20							
2390	61.18	-13.06	48.12	74	-25.88	peak	Vertical
2390	60.96	-13.06	47.9	74	-26.10	peak	Horizontal
2483.5	61.1	-12.78	48.32	74	-25.68	peak	Vertical
2483.5	61.24	-12.78	48.46	74	-25.54	peak	Horizontal
802.11n40							
2390	61.94	-13.06	48.88	74	-25.12	peak	Vertical
2390	63.09	-13.06	50.03	74	-23.97	peak	Horizontal
2483.5	61.59	-12.78	48.81	74	-25.19	peak	Vertical
2483.5	61.56	-12.78	48.78	74	-25.22	peak	Horizontal

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

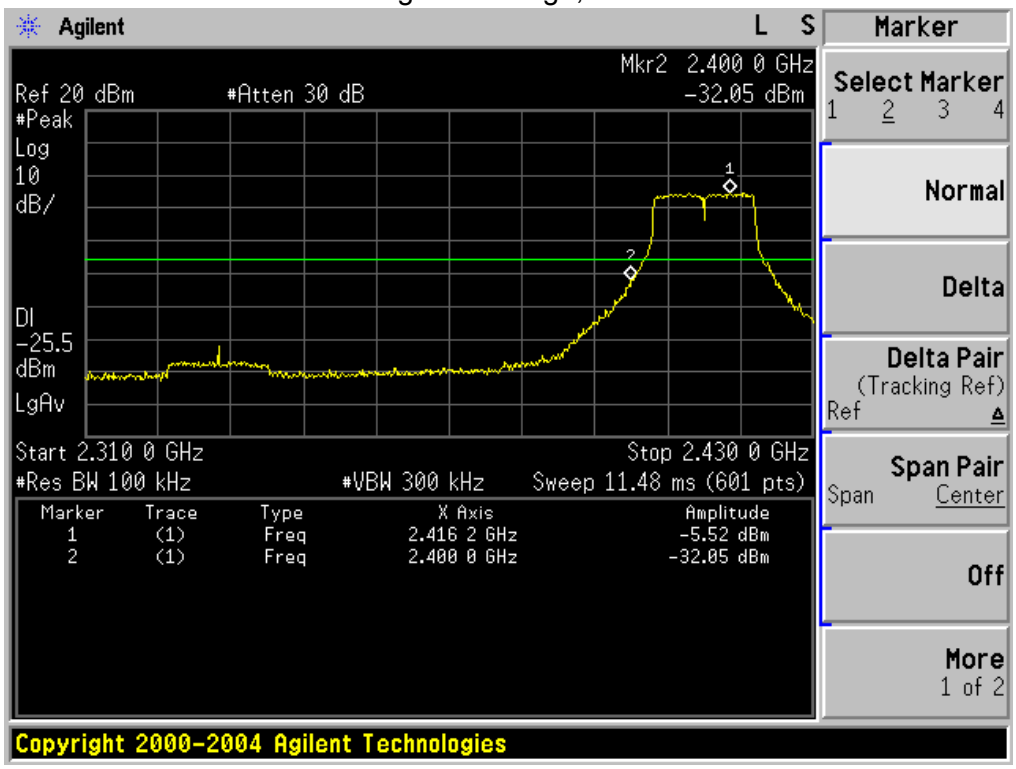
802.11b: Band Edge, Left Side



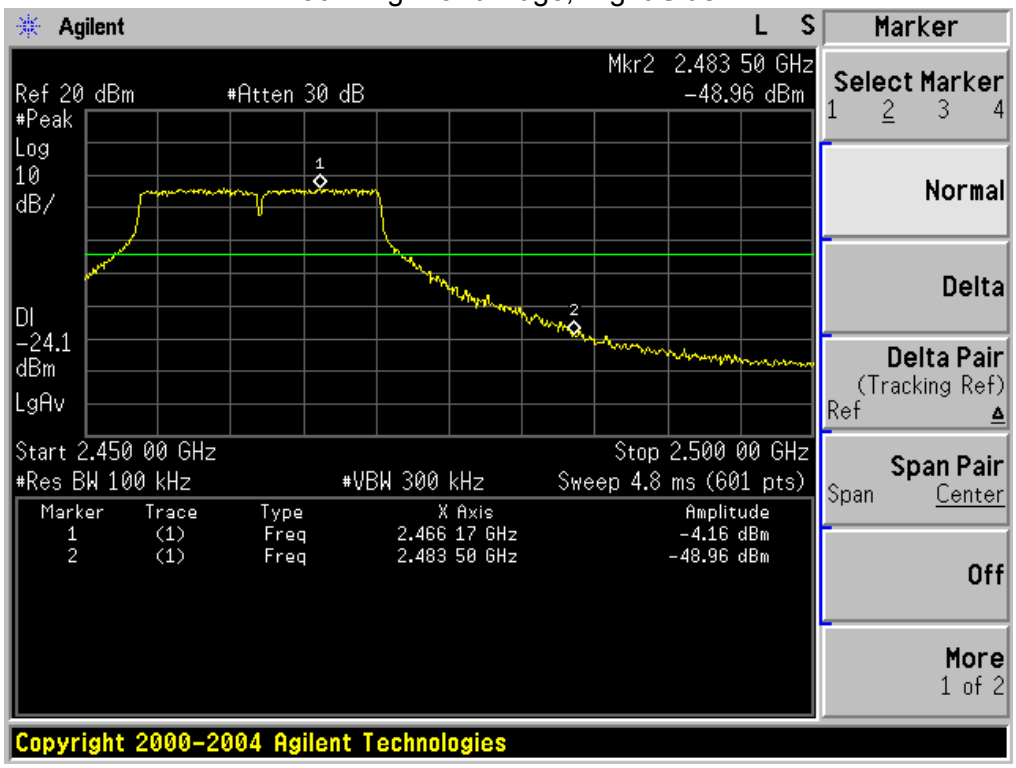
802.11b: Band Edge, Right Side



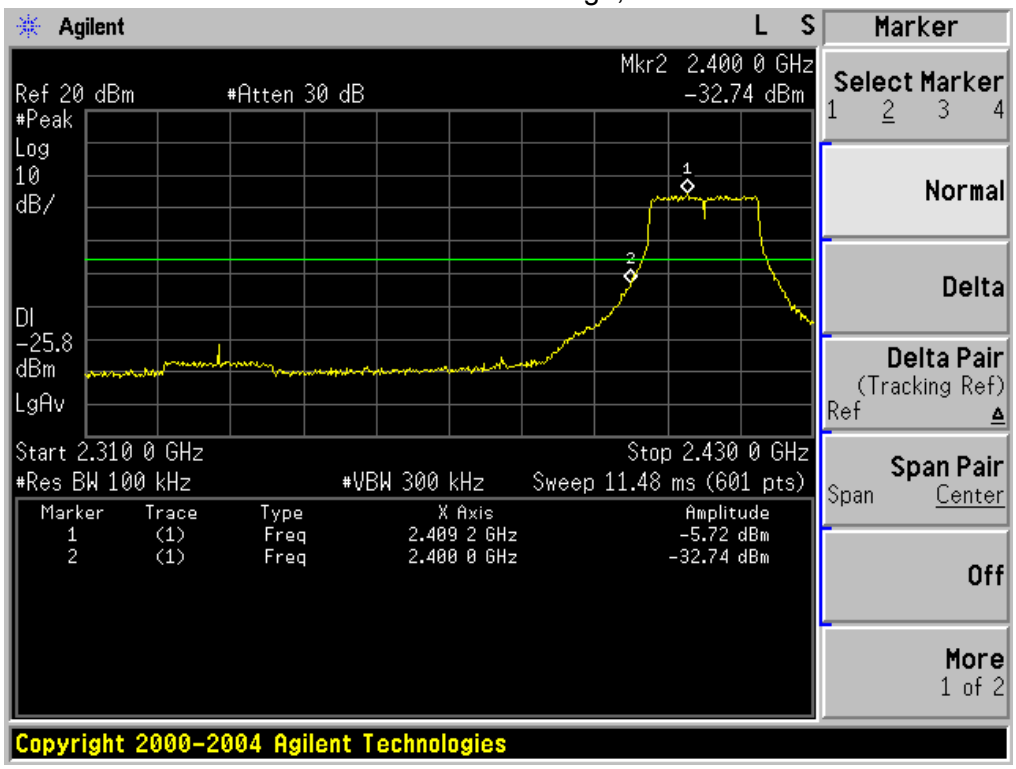
802.11g: Band Edge, Left Side



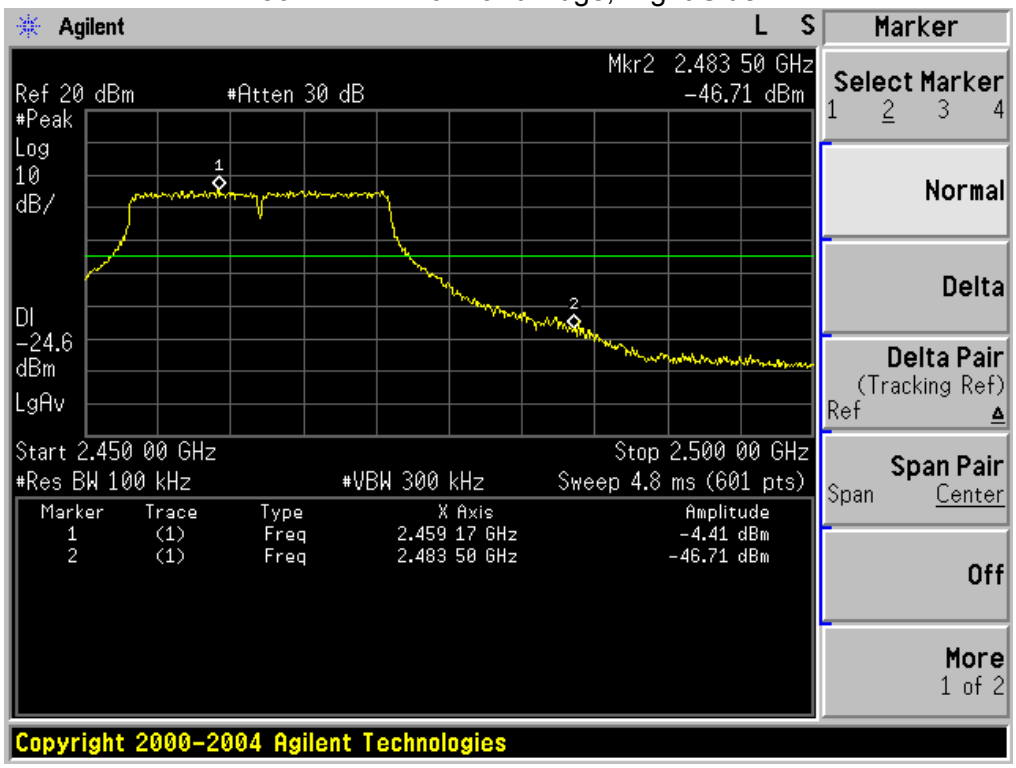
802.11g: Band Edge, Right Side



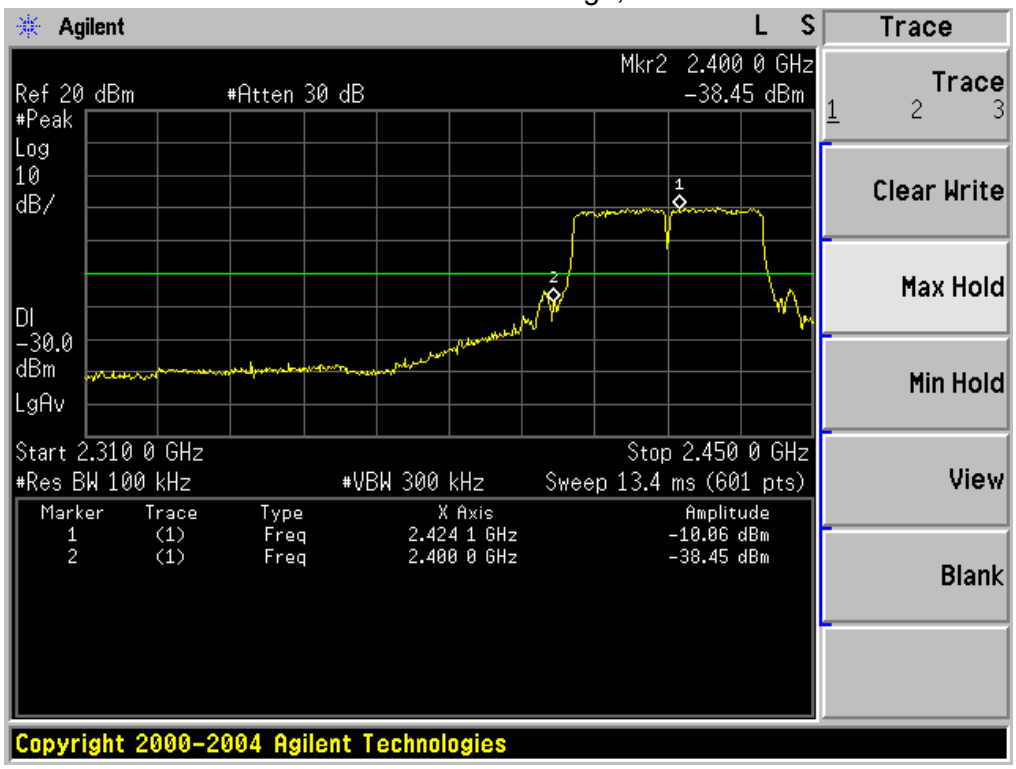
802.11n-HT20: Band Edge, Left Side



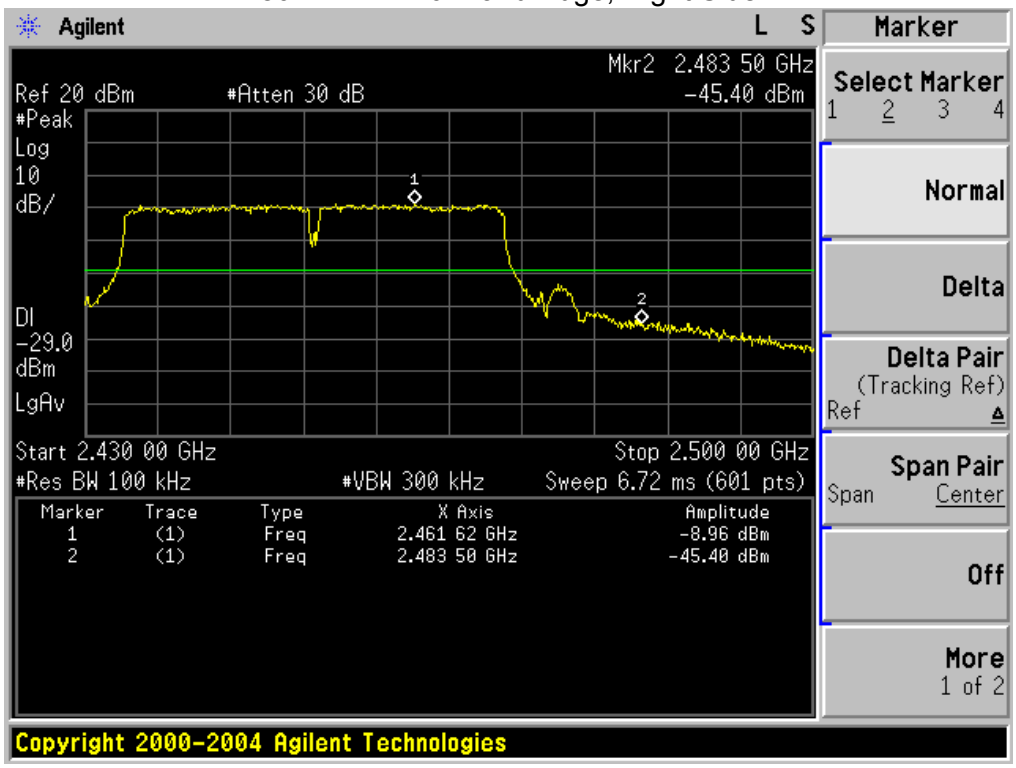
802.11n-HT20: Band Edge, Right Side



802.11n-HT40: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

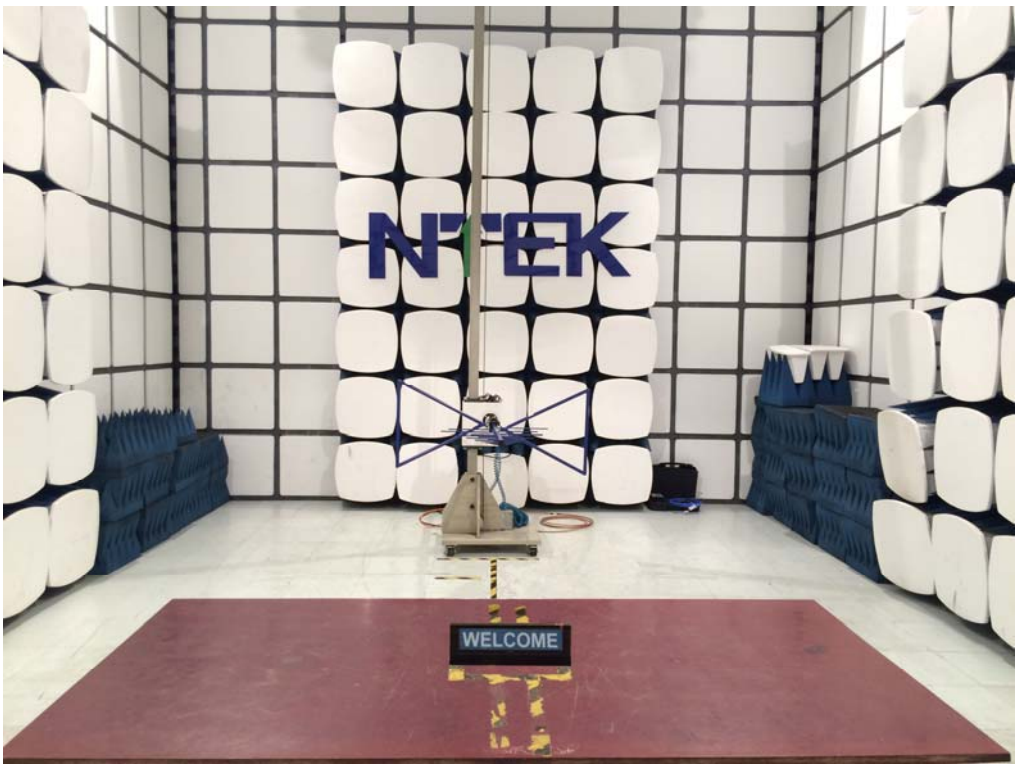
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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 Measurement Photos