FCC REPORT

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong

Equipment Under Test (EUT)

Product Name:	Product Selector Master Device
Model No.:	DTEX-PS-M(401-PSRM)
FCC ID:	2AB6Z-DTEX-PS-M
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	26 Mar., 2014
Date of Test:	27 Mar., to 11 Apr.,2014
Date of report issued:	14 Apr., 2014
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*14 Apr., 2014*	*Original*

Prepared By: Sera Xiang ***Date:*** *14 Apr., 2014*

Project Engineer

Check By: Aaron Fei ***Date:*** *14 Apr., 2014*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT comply with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong
Manufacturer/Factory:	HUNG WAI ELECTRONICS (HUIZHOU) LTD.
Address of Manufacturer/ Factory:	3rd floor, NO. 3, Minfeng Road, Huinan High and New Tchnology Industry Park, Huiao Avenue, Huizhou City, Guangdong

5.2 General Description of E.U.T.

Product Name:	Product Selector Master Device
Model No.:	DTEX-PS-M(401-PSRM)
Operation Frequency:	2440MHz
Channel numbers:	1
Modulation type:	GFSK
Antenna Type:	Integrated PCB antenna
Antenna gain:	0dBi
Power Supply:	DC 3.3V

5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation.

CCIS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	84.81	84.56	84.72

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”:
X axis (see the test setup photo)

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/VoC
XANTREX	DC Power Supply	HPD30-10	82189	VoC

5.5 Laboratory Facility

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

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing.The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District,Shenzhen, Guangdong,China
Tel:+86-755-23118282
Fax: +86-755-23116366

5.7 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	Aug. 09 2013	Aug. 09 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	June 16 2013	June 16 2014
3	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	June 09 2013	June 09 2014
4	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	June 09 2013	June 09 2014
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Coaxial Cable	CCIS	N/A	CCIS0016	Feb. 01 2014	Feb. 01 2015
7	Coaxial Cable	CCIS	N/A	CCIS0017	Feb. 01 2014	Feb. 01 2015
8	Coaxial cable	CCIS	N/A	CCIS0018	Feb. 01 2014	Feb. 01 2015
9	Coaxial Cable	CCIS	N/A	CCIS0019	Feb. 01 2014	Feb. 01 2015
10	Coaxial Cable	CCIS	N/A	CCIS0087	Feb. 01 2014	Feb. 01 2015
11	Amplifier(10KHz-1.3GHz)	HP	8447D	CCIS0003	Aug. 03 2013	Aug. 03 2014
12	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	Aug. 05 2013	Aug. 05 2014
13	Spectrum analyzer	Rohde & Schwarz	FSP	CCIS0023	June 22 2013	June 22 2014
14	EMI Test Receiver	Rohde & Schwarz	ECSI	CCIS0002	June16 2013	June 16 2014
15	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
16	Coaxial Cable	CCIS	N/A	CCIS0095	Feb. 01 2014	Feb. 01 2015
17	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Feb. 01 2014	Feb. 31 2015
18	Horn Antenna	ETS-LINDGREN	3160	GTS217	Feb. 30 2014	Feb. 29 2015

6 Test results and Measurement Data

6.1 Antenna requirement:

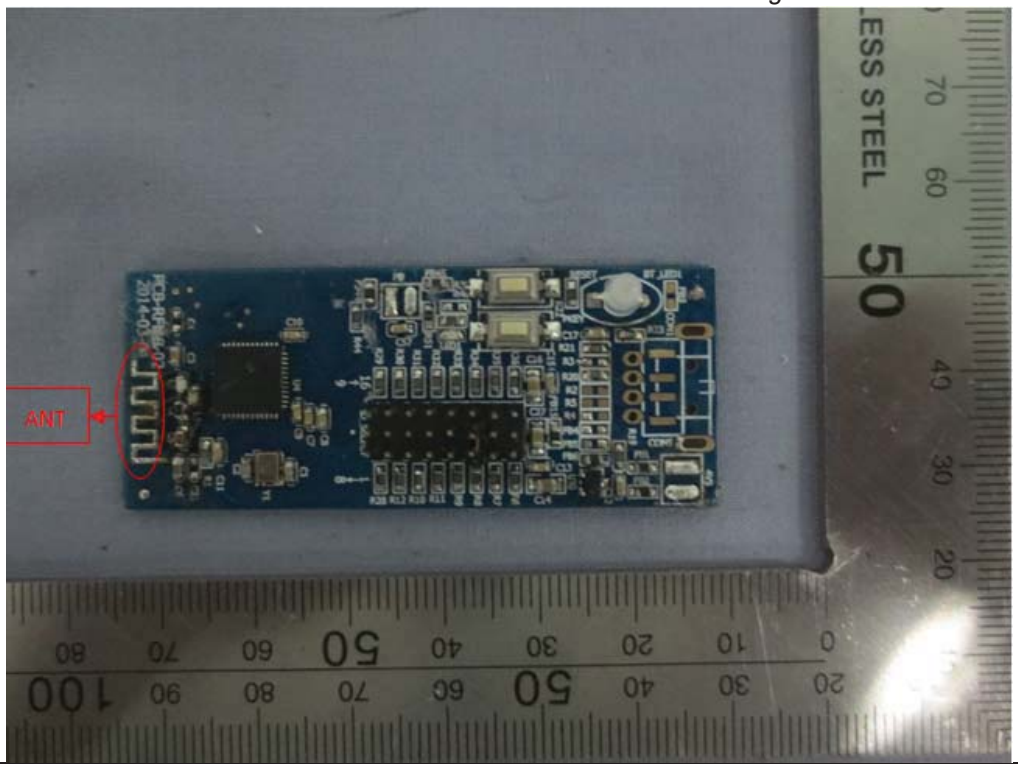
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

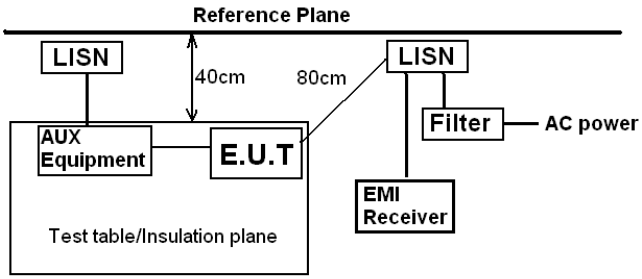
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:	

The antenna is PCB antenna which cannot detachable . The best case gain of the antenna is 0dBi.

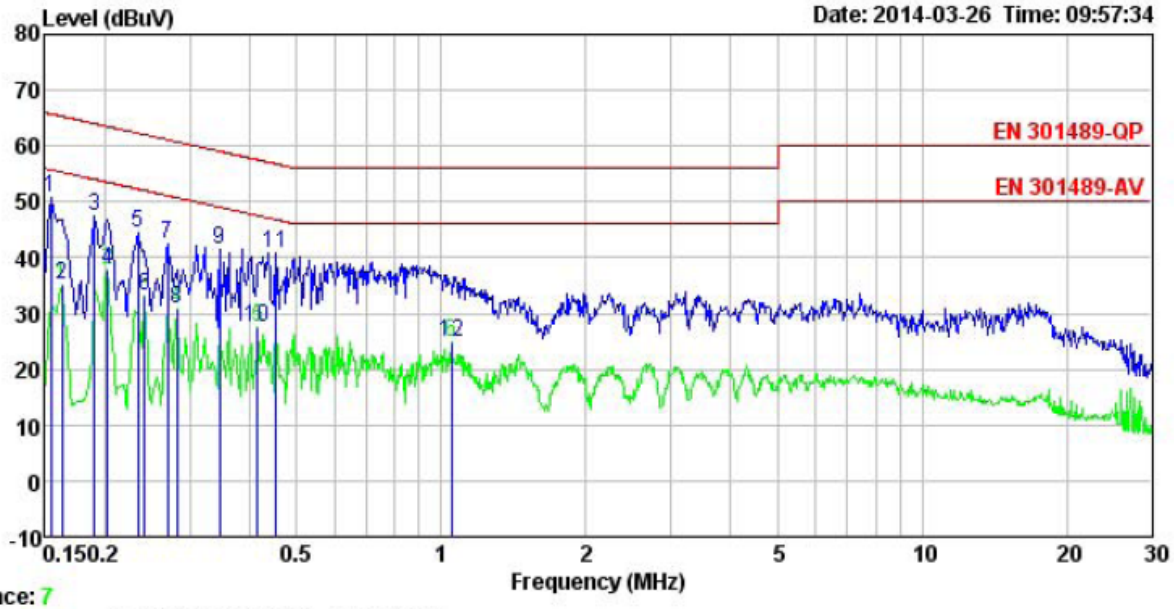


6.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.249 and 15.209
Test Method:	ANSI C63.4:2003
Test Frequency Range:	150 kHz to 30 MHz
Class / Severity:	Class B
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Measurement Record:	Uncertainty: 3.28 dB
Test Instruments:	Refer to section 5.7 for details
Test mode:	Transmitting mode
Test results:	Pass

Measurement Data

Line:

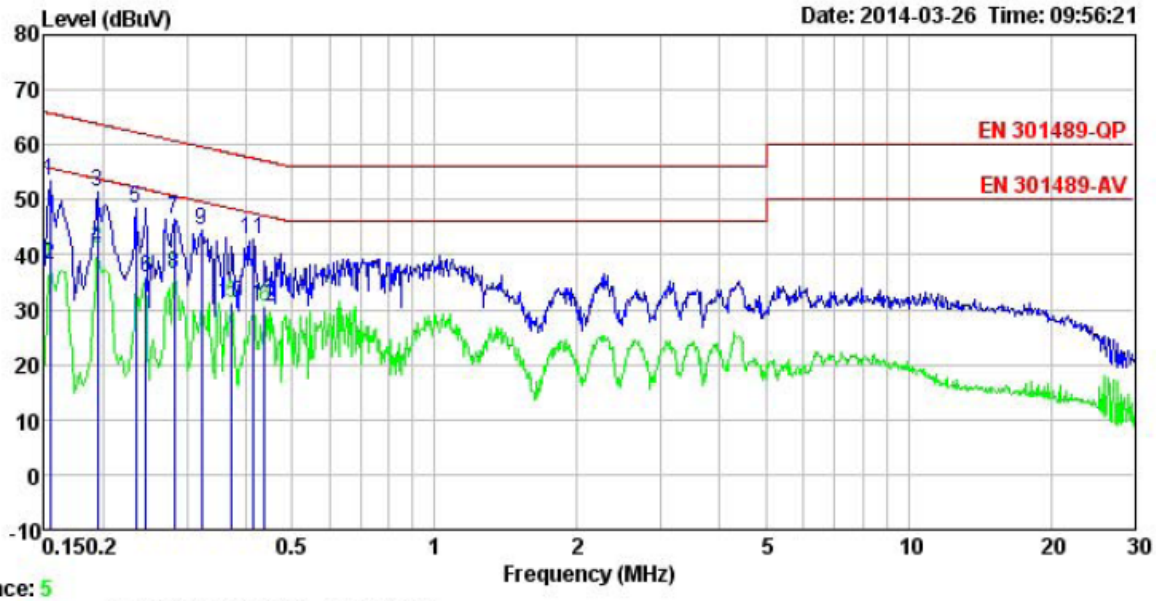


Trace: 7

Site : CCIS Conducted test Site
Condition : EN 301489-QP LISN LINE
Job. no : 170RF
EUT : selector master
Model : DTEX-PS-M
Test Mode : TX mode
Power Rating : DC 3.3V
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Aaron
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	39.78	0.27	10.78	50.83	65.78	-14.95	QP
2	0.162	23.97	0.27	10.77	35.01	55.34	-20.33	Average
3	0.190	36.52	0.28	10.76	47.56	64.02	-16.46	QP
4	0.202	26.89	0.28	10.76	37.93	53.54	-15.61	Average
5	0.234	33.57	0.27	10.75	44.59	62.30	-17.71	QP
6	0.242	22.16	0.27	10.75	33.18	52.04	-18.86	Average
7	0.270	31.49	0.27	10.75	42.51	61.12	-18.61	QP
8	0.282	19.94	0.26	10.74	30.94	50.76	-19.82	Average
9	0.346	30.60	0.27	10.73	41.60	59.05	-17.45	QP
10	0.415	16.45	0.28	10.73	27.46	47.55	-20.09	Average
11	0.454	29.86	0.29	10.74	40.89	56.80	-15.91	QP
12	1.049	13.81	0.25	10.88	24.94	46.00	-21.06	Average

Neutral:



Trace: 5

Site : CCIS Conducted test Site
Condition : EN 301489-QP LISN NEUTRAL
Job. no : 170RF
EUT : selector master
Model : DTEX-PS-M
Test Mode : TX mode
Power Rating : DC 3.3V
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Aaron
Remark :

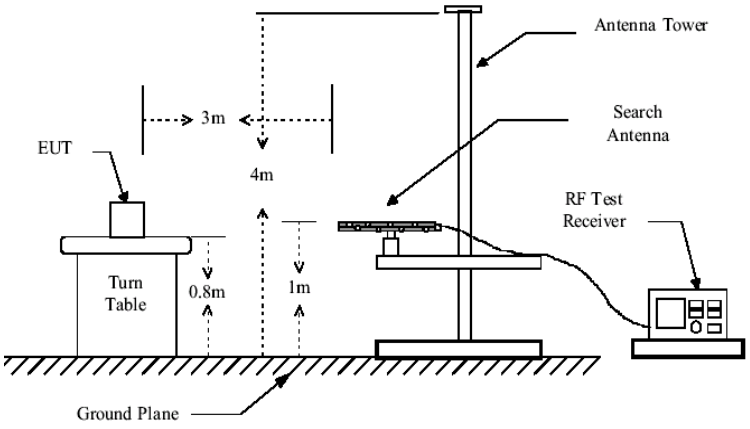
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	42.49	0.25	10.78	53.52	65.78	-12.26	QP
2	0.154	26.98	0.25	10.78	38.01	55.78	-17.77	Average
3	0.194	40.39	0.25	10.76	51.40	63.84	-12.44	QP
4	0.194	30.11	0.25	10.76	41.12	53.84	-12.72	Average
5	0.234	37.61	0.25	10.75	48.61	62.30	-13.69	QP
6	0.246	24.87	0.26	10.75	35.88	51.91	-16.03	Average
7	0.282	35.41	0.26	10.74	46.41	60.76	-14.35	QP
8	0.282	25.60	0.26	10.74	36.60	50.76	-14.16	Average
9	0.322	33.45	0.26	10.73	44.44	59.66	-15.22	QP
10	0.373	20.30	0.25	10.73	31.28	48.43	-17.15	Average
11	0.415	31.97	0.26	10.73	42.96	57.55	-14.59	QP
12	0.437	19.50	0.27	10.74	30.51	47.11	-16.60	Average

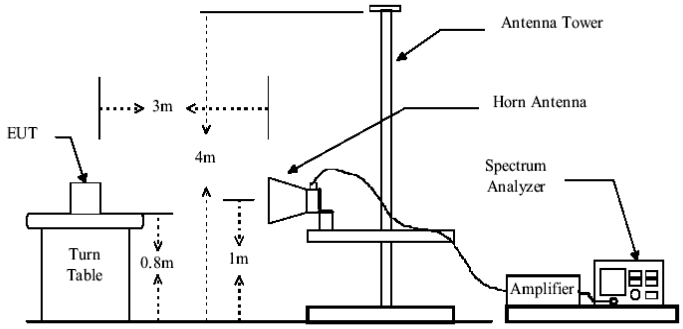
Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.3 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.249 and 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4:2003</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 25000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.00</td><td>Average Value</td></tr>
<tr><td>114.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(band edge)</td><td>Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td>Below 1GHz</td></tr>
</table>

<table>
<tr><td></td><td>


Above 1GHz


</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: 4.88 dB</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.7</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3</td></tr>
<tr><td>Test results:</td><td>Passed</td></tr>
</table>

Measurement Data as below:

6.3.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2440.00	85.99	27.46	5.69	34.90	84.24	114.00	-29.76	Horizontal
2440.00	86.56	27.46	5.69	34.90	84.81	114.00	-29.19	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2440.00	73.26	27.46	5.69	34.90	71.51	94.00	-22.49	Horizontal
2440.00	73.42	27.46	5.69	34.90	71.67	94.00	-22.33	Vertical

6.3.2 Spurious Emissions

30MHz~1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
40.14	27.85	13.58	1.22	27.27	15.38	40.00	-24.62	Vertical
127.22	38.00	9.32	2.25	29.58	19.99	43.50	-23.51	Vertical
319.94	33.09	13.33	3.00	29.54	19.88	46.00	-26.12	Vertical
345.60	38.45	14.20	3.08	29.66	26.07	46.00	-19.93	Vertical
417.64	37.26	15.43	3.12	30.13	25.68	46.00	-20.32	Vertical
318.82	39.91	13.33	3.00	29.53	26.71	46.00	-19.29	Horizontal
345.60	41.71	14.20	3.08	29.66	29.33	46.00	-16.67	Horizontal
417.64	37.65	15.43	3.12	30.13	26.07	46.00	-19.93	Horizontal
533.83	40.54	17.26	3.80	30.53	31.07	46.00	-14.93	Horizontal
668.14	37.27	18.69	3.97	30.59	29.34	46.00	-16.66	Horizontal

Above 1GHz

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	56.16	31.58	8.98	40.15	56.57	74.00	-17.43	Vertical
4880.00	51.75	31.58	8.98	40.15	52.16	74.00	-21.84	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	44.30	31.58	8.98	40.15	44.71	54.00	-9.24	Vertical
4880.00	38.56	31.58	8.98	40.15	38.97	54.00	-15.03	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.3.3 Band edge (Radiated Emission)

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	46.54	27.58	5.67	31.35	48.44	74.00	-25.56	Vertical
2390.00	46.26	27.58	5.67	31.35	48.16	74.00	-25.84	Horizontal
2400.00	46.83	27.58	5.67	31.35	48.73	74.00	-25.27	Vertical
2400.00	44.40	27.58	5.67	31.35	46.30	74.00	-27.70	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	35.79	27.58	5.67	31.35	37.69	54.00	-16.31	Vertical
2390.00	34.12	27.58	5.67	31.35	36.02	54.00	-17.98	Horizontal
2400.00	38.71	27.58	5.67	31.35	40.61	54.00	-13.39	Vertical
2400.00	33.25	27.58	5.67	31.35	35.15	54.00	-18.85	Horizontal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.00	27.52	5.70	37.26	43.96	74.00	-30.04	Vertical
2483.50	46.54	27.52	5.70	37.26	42.50	74.00	-31.50	Horizontal
2500.00	46.10	27.55	5.71	38.44	40.92	74.00	-33.08	Vertical
2500.00	45.91	27.55	5.71	38.44	40.73	74.00	-33.27	Horizontal

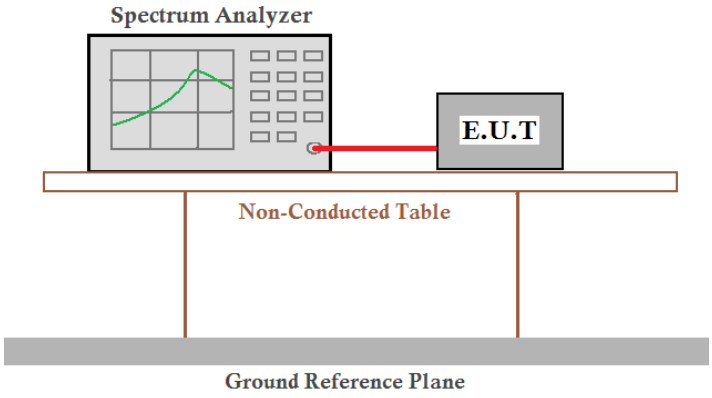
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.28	27.52	5.70	37.26	32.24	54.00	-21.76	Vertical
2483.50	33.90	27.52	5.70	37.26	29.86	54.00	-24.14	Horizontal
2500.00	36.70	27.55	5.71	38.44	31.52	54.00	-22.48	Vertical
2500.00	35.11	27.55	5.71	38.44	29.93	54.00	-24.07	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

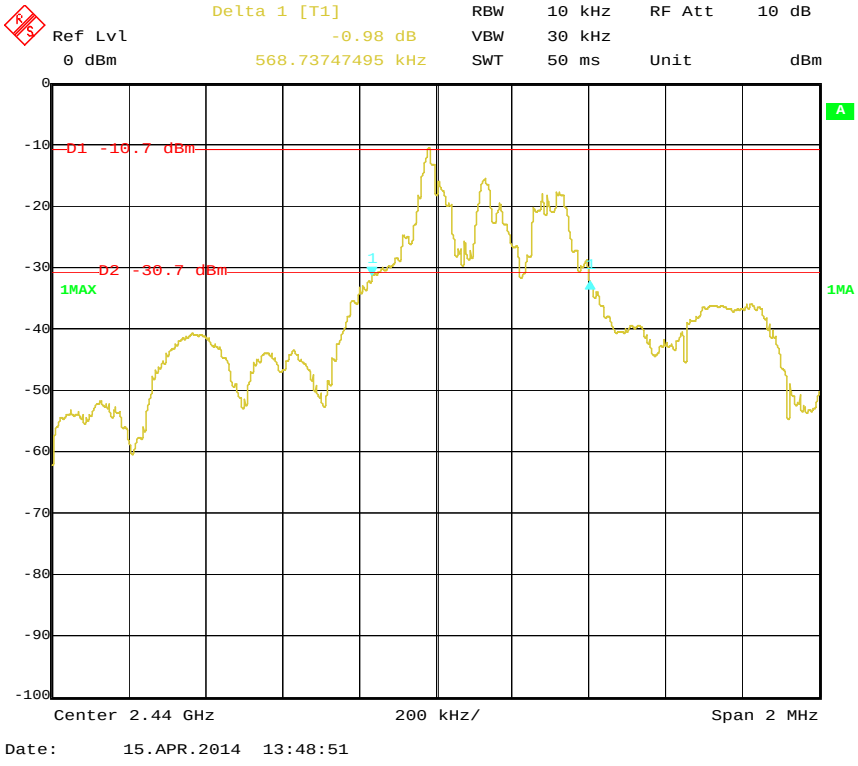
6.4 20dB Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW ≥1% of the 20 dB bandwidth, VBW ≥ VBW, detector: Peak
Limit:	Operation Frequency range 2400MHz-2483.5MHz
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Test channel	20dB bandwidth (MHz)	Results
2440MHz	0.568	Pass

Test plot as follows:


Delta 1 [T1]
-0.98 dB
568.73747495 kHz
RBW 10 kHz
VBW 30 kHz
SWT 50 ms
RF Att 10 dB
Unit dBm
Ref Lvl
0 dBm
D1 -10.7 dBm
D2 -30.7 dBm
1MAX
A
1MA
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 2.44 GHz
200 kHz/
Span 2 MHz
Date: 15.APR.2014 13:48:51