

Variant FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : Vodafone Smart Tab 10
BRAND NAME : ZTE
MODEL NAME : Vodafone Smart Tab 10
FCC ID : Q78-V11A
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Oct. 18, 2011 and completely tested on Nov. 06, 2011. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Frequency Band Edges	≤ 20dBc	Pass	-
3.2	15.247(d)	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.19 dB at 2483.5 MHz
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Vodafone Smart Tab 10
Brand Name	ZTE
Model Name	Vodafone Smart Tab 10
FCC ID	Q78-V11A
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 17.19 dBm (0.052 W) 802.11g : 23.76 dBm (0.238 W) 802.11n (BW 20MHz) : 22.79 dBm (0.190 W)
Antenna Type	Fixed Internal Antenna with gain 0.1 dBi
HW Version	110403
SW Version	SmartTab10-MSM8260-V02c-Oct192011-Vodafone-DE
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

- For other wireless features of this EUT, test report will be issued separately.
- This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
- The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	03CH01-KS

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (Certification), recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	16.61	16.63	16.68	16.93
CH 06	2437 MHz	16.72	16.79	17.01	17.16
CH 11	2462 MHz	16.83	16.98	16.96	17.19

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	23.67	23.51	23.01	22.96	22.98	22.99	23.21	23.18
CH 06	2437 MHz	23.71	23.52	23.33	23.32	23.37	23.36	23.26	23.34
CH 11	2462 MHz	23.76	23.67	23.61	23.52	23.51	23.48	23.31	23.33

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0 6.5 Mbps	MCS=1 13 Mbps	MCS=2 19.5 Mbps	MCS=3 26 Mbps	MCS=4 39 Mbps	MCS=5 52 Mbps	MCS=6 58.5 Mbps	MCS=7 65 Mbps
CH 01	2412 MHz	22.51	22.37	22.31	22.21	22.33	22.13	22.22	22.34
CH 06	2437 MHz	22.56	22.53	22.37	22.45	22.41	22.34	22.46	22.47
CH 11	2462 MHz	22.79	22.67	22.59	22.63	22.61	22.49	22.46	22.61

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, and 6.5Mbps for 802.11n (BW 20MHz) for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.



2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

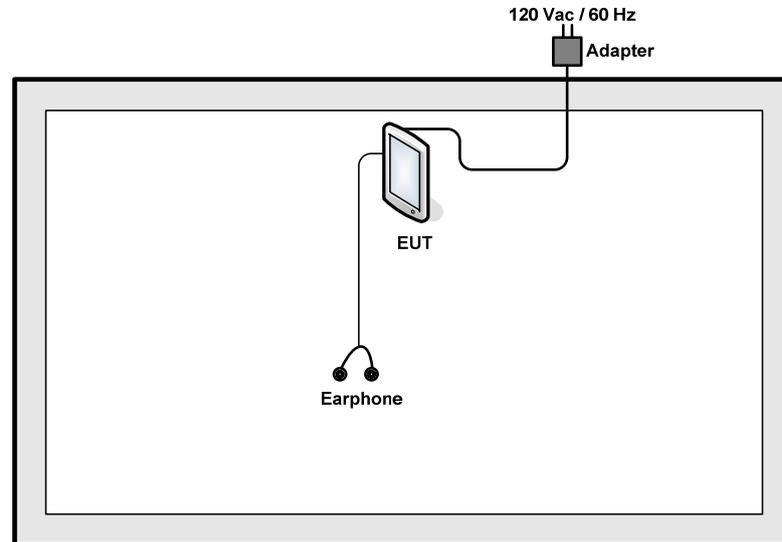
The following tables are showing the test modes as the worst cases (E2 plane) and recorded in this report.

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Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 2: 802.11g_CH11_2462 MHz Mode 3: 802.11n (BW 20M)_CH01_2412 MHz

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



2.4 RF Utility

The programmed RF utility, executed "cmd" command to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 Band Edges Measurement

3.1.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3.1.2 Measuring Instruments

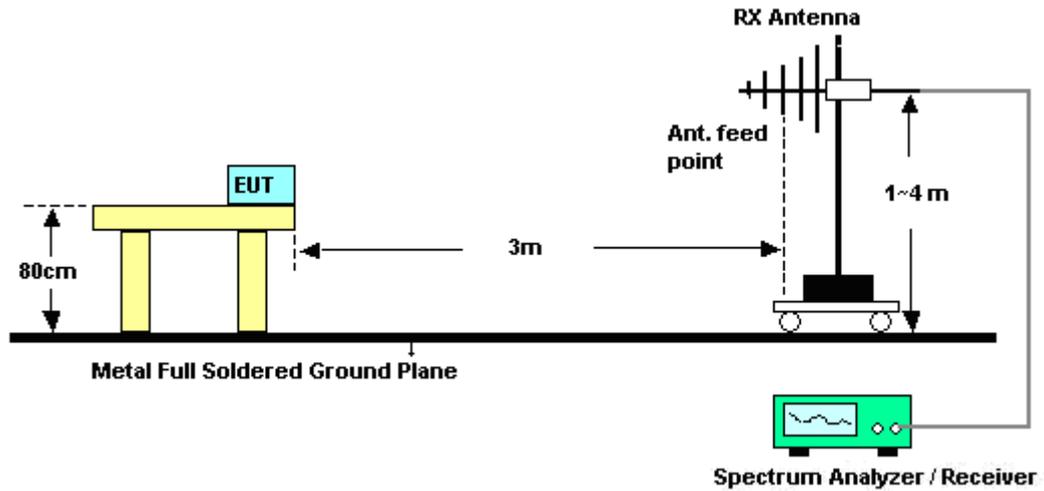
See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.1.4 Test Setup

<Radiated Band Edges>





3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~23°C
Test Band :	802.11b	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	49.79	-24.21	74	47.51	32.86	3.47	34.05	200	30	Peak
2390	38.88	-15.12	54	36.6	32.86	3.47	34.05	200	30	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	53.76	-20.24	74	51.48	32.86	3.47	34.05	100	181	Peak
2390	41.9	-12.1	54	39.62	32.86	3.47	34.05	100	181	Average

Test Mode :	Mode 2	Temperature :	22~23°C
Test Band :	802.11g	Relative Humidity :	41~42%
Test Channel :	11	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	61.91	-12.09	74	59.42	33.01	3.68	34.2	100	110	Peak
2483.5	51.81	-2.19	54	49.32	33.01	3.68	34.2	100	110	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.23	60.04	-13.96	74	57.55	33.01	3.68	34.2	100	66	Peak
2484.23	47.72	-6.28	54	45.23	33.01	3.68	34.2	100	66	Average



Test Mode :	Mode 3	Temperature :	22~23°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	41~42%
Test Channel :	01	Test Engineer :	Jack Li

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	60.72	-13.28	74	58.44	32.86	3.47	34.05	100	112	Peak
2390	49.07	-4.93	54	46.79	32.86	3.47	34.05	100	112	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	55.54	-18.46	74	53.26	32.86	3.47	34.05	100	121	Peak
2390	45.2	-8.8	54	42.92	32.86	3.47	34.05	100	121	Average

3.2 Radiated Emission Measurement

3.2.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.2.2 Measuring Instruments

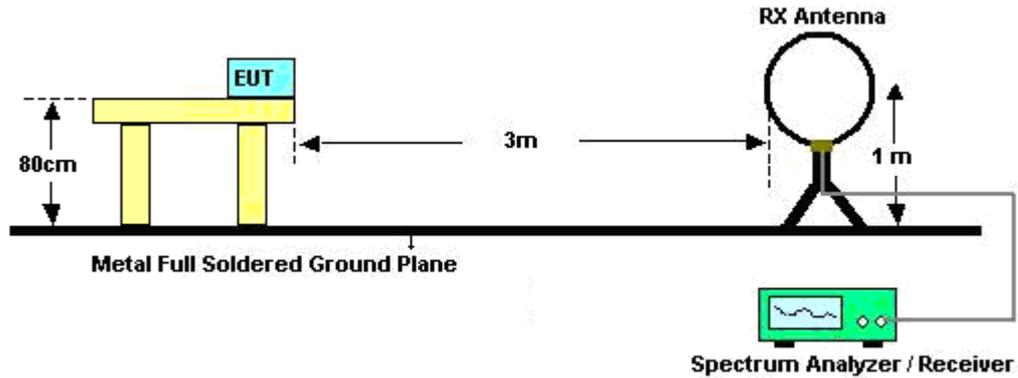
See list of measuring instruments of this test report.

3.2.3 Test Procedures

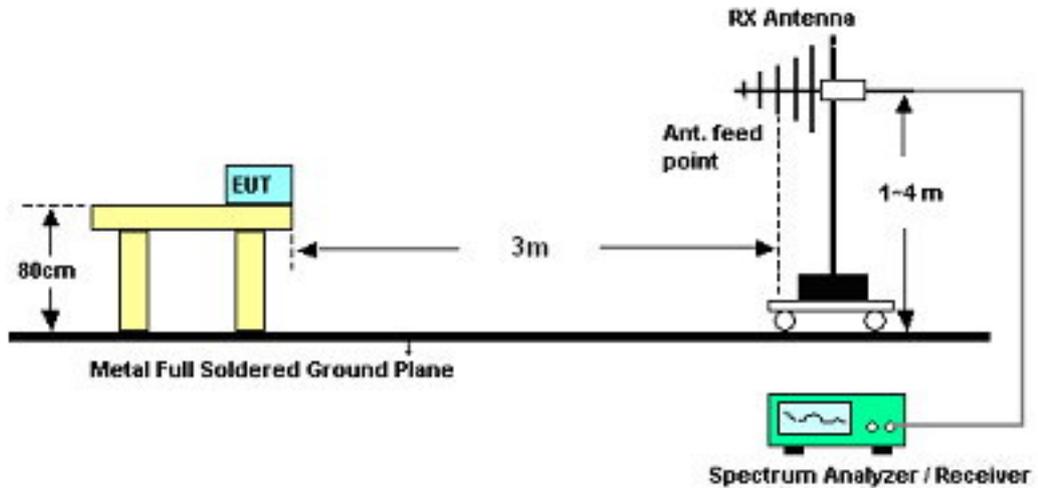
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
 Distance extrapolation factor = $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.2.4 Test Setup

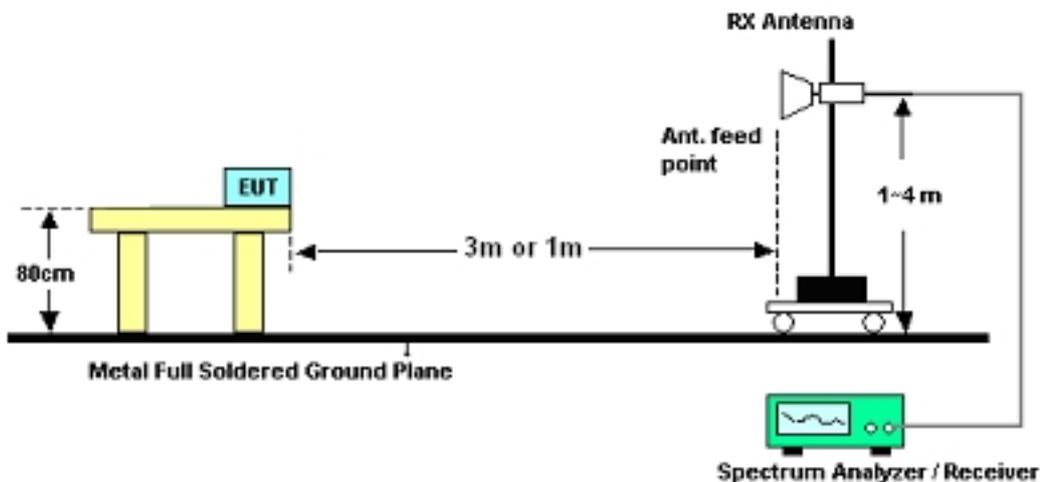
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Jack Li	Temperature :	22~23°C	
		Relative Humidity :	41~42%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that 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.



3.2.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
51.06	30.85	-9.15	40	53.49	7.21	0.28	30.13	103	349	Peak
112.08	28.58	-14.92	43.5	46.31	11.8	0.44	29.97	-	-	Peak
288.66	24.38	-21.62	46	40.78	12.84	0.71	29.95	-	-	Peak
548.5	32.99	-13.01	46	43.19	18.48	1	29.68	-	-	Peak
767.6	33.66	-12.34	46	42.12	19.89	1.2	29.55	-	-	Peak
944	29.94	-24.06	54	37.43	20.71	1.33	29.53	-	-	Peak
2390	49.79	-24.21	74	47.51	32.86	3.47	34.05	200	30	Peak
2390	38.88	-15.12	54	36.6	32.86	3.47	34.05	200	30	Average
2412	104.28	-	-	101.95	32.89	3.52	34.08	200	39	Peak
2412	100.54	-	-	98.21	32.89	3.52	34.08	200	39	Average
2490.69	52.77	-21.23	74	50.23	33.05	3.72	34.23	200	0	Peak
2490.69	43.04	-10.96	54	40.5	33.05	3.72	34.23	200	0	Average



Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
53.22	24.09	-15.91	40	47.13	6.8	0.29	30.13	-	-	Peak
75.9	19.91	-20.09	40	43.69	5.93	0.35	30.06	-	-	Peak
288.39	26.2	-19.8	46	42.62	12.82	0.71	29.95	-	-	Peak
305.6	30.33	-15.67	46	46.42	13.13	0.73	29.95	-	-	Peak
548.5	34.77	-11.23	46	44.97	18.48	1	29.68	-	-	Peak
767.6	40.07	-5.93	46	48.53	19.89	1.2	29.55	197	342	Peak
2390	53.76	-20.24	74	51.48	32.86	3.47	34.05	100	181	Peak
2390	41.9	-12.1	54	39.62	32.86	3.47	34.05	100	181	Average
2412	108.75	-	-	106.42	32.89	3.52	34.08	100	83	Peak
2412	104.42	-	-	102.09	32.89	3.52	34.08	100	83	Average
2491.26	56.66	-17.34	74	54.12	33.05	3.72	34.23	100	107	Peak
2491.26	47.82	-6.18	54	45.28	33.05	3.72	34.23	100	107	Average



Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
50.79	31.88	-8.12	40	54.33	7.4	0.28	30.13	167	339	Peak
111.81	29.38	-14.12	43.5	47.12	11.8	0.43	29.97	-	-	Peak
288.66	24.23	-21.77	46	40.63	12.84	0.71	29.95	-	-	Peak
548.5	33.72	-12.28	46	43.92	18.48	1	29.68	-	-	Peak
767.6	32.6	-13.4	46	41.06	19.89	1.2	29.55	-	-	Peak
873.3	28.94	-17.06	46	36.75	20.48	1.29	29.58	-	-	Peak
2385.43	55.97	-18.03	74	53.73	32.83	3.42	34.01	100	281	Peak
2385.43	45.02	-8.98	54	42.78	32.83	3.42	34.01	100	281	Average
2462	110.46	-	-	108.01	32.98	3.64	34.17	100	112	Peak
2462	98.4	-	-	95.95	32.98	3.64	34.17	100	112	Average
2483.5	61.91	-12.09	74	59.42	33.01	3.68	34.2	100	110	Peak
2483.5	51.81	-2.19	54	49.32	33.01	3.68	34.2	100	110	Average



Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
53.49	24.7	-15.3	40	47.74	6.8	0.29	30.13	-	-	Peak
182.82	20.69	-22.81	43.5	41.6	8.43	0.56	29.9	-	-	Peak
289.47	25.26	-20.74	46	41.66	12.84	0.71	29.95	-	-	Peak
512.1	33.94	-12.06	46	45.24	17.45	0.97	29.72	-	-	Peak
548.5	36.12	-9.88	46	46.32	18.48	1	29.68	-	-	Peak
767.6	41	-5	46	49.46	19.89	1.2	29.55	200	131	Peak
2380.87	52.22	-21.78	74	49.98	32.83	3.42	34.01	10	118	Peak
2380.87	39.86	-14.14	54	37.62	32.83	3.42	34.01	100	118	Average
2462	103.72	-	-	101.27	32.98	3.64	34.17	100	78	Peak
2462	93.29	-	-	90.84	32.98	3.64	34.17	100	78	Average
2484.23	60.04	-13.96	74	57.55	33.01	3.68	34.2	100	66	Peak
2484.23	47.72	-6.28	54	45.23	33.01	3.68	34.2	100	66	Average



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
51.33	32.9	-7.1	40	55.54	7.21	0.28	30.13	169	316	Peak
111	29.7	-13.8	43.5	47.44	11.8	0.43	29.97	-	-	Peak
288.66	24.07	-21.93	46	40.47	12.84	0.71	29.95	-	-	Peak
548.5	33.49	-12.51	46	43.69	18.48	1	29.68	-	-	Peak
767.6	33.16	-12.84	46	41.62	19.89	1.2	29.55	-	-	Peak
944	30.12	-23.88	54	37.61	20.71	1.33	29.53	-	-	Peak
2390	60.72	-13.28	74	58.44	32.86	3.47	34.05	100	112	Peak
2390	49.07	-4.93	54	46.79	32.86	3.47	34.05	100	112	Average
2412	110.72	-	-	108.39	32.89	3.52	34.08	100	109	Peak
2412	97.24	-	-	94.91	32.89	3.52	34.08	100	109	Average
2492.97	58.8	-15.2	74	56.26	33.05	3.72	34.23	100	206	Peak
2492.97	46.43	-7.57	54	43.89	33.05	3.72	34.23	100	206	Average



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	41~42%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
53.76	23.19	-16.81	40	46.23	6.8	0.29	30.13	-	-	Peak
110.73	21.06	-22.44	43.5	38.8	11.8	0.43	29.97	-	-	Peak
298.92	30.09	-15.91	46	46.33	12.99	0.72	29.95	-	-	Peak
512.1	33.98	-12.02	46	45.28	17.45	0.97	29.72	-	-	Peak
548.5	35.84	-10.16	46	46.04	18.48	1	29.68	-	-	Peak
767.6	38.04	-7.96	46	46.5	19.89	1.2	29.55	197	349	Peak
2390	55.54	-18.46	74	53.26	32.86	3.47	34.05	100	121	Peak
2390	45.2	-8.8	54	42.92	32.86	3.47	34.05	100	121	Average
2412	103.89	-	-	101.56	32.89	3.52	34.08	100	76	Peak
2412	90.26	-	-	87.93	32.89	3.52	34.08	100	76	Average
2491.07	53.66	-20.34	74	51.12	33.05	3.72	34.23	100	337	Peak
2491.07	40.9	-13.1	54	38.36	33.05	3.72	34.23	100	337	Average

3.3 Antenna Requirements

3.3.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.3.2 Antenna Connected Construction

The antennas type used in this product is Fixed Internal Antenna without connector and it is considered to meet antenna requirement.

3.3.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030D	E1884515	N/A	Aug. 23, 2011	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-9605 02	N/A	Jan. 17, 2011	Jan. 16, 2012	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 16, 2010	Nov. 15, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15 GHz ~40GHz	Oct. 11, 2011	Oct.10, 2012	Radiation (03CH01-KS)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP182402-01 as below.