

FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : CDMA Tablet
BRAND NAME : ZTE
MODEL NAME : V55
FCC ID : Q78-V55
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Dec. 14, 2011 and completely tested on Dec. 26, 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(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
3.2	15.247(d)	Frequency Band Edges	≤ 20dBc	Pass	-
3.3	15.247(d)	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 9.52 dB at 832 MHz
3.4	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	CDMA Tablet
Brand Name	ZTE
Model Name	V55
FCC ID	Q78-V55
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 2.70 dBm (0.0019 W) Bluetooth EDR (2Mbps) : 2.37 dBm (0.0017 W) Bluetooth EDR (3Mbps) : 3.05 dBm (0.0020 W)
Antenna Type	PIFA Antenna with gain 2.2 dBi
HW Version	dq8B
SW Version	V55V1.1.0B08
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. 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 Public Notice DA 00-705
- ♦ 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.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT	FCC DoC	N/A	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

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

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	1.58 dBm	1.37 dBm	1.99 dBm
Ch39	2441MHz	2.41 dBm	2.18 dBm	2.83 dBm
Ch78	2480MHz	2.70 dBm	2.37 dBm	3.05 dBm

Remark:

1. The data rate was set in 3Mbps for all the test items 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: radiation (9 kHz 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.

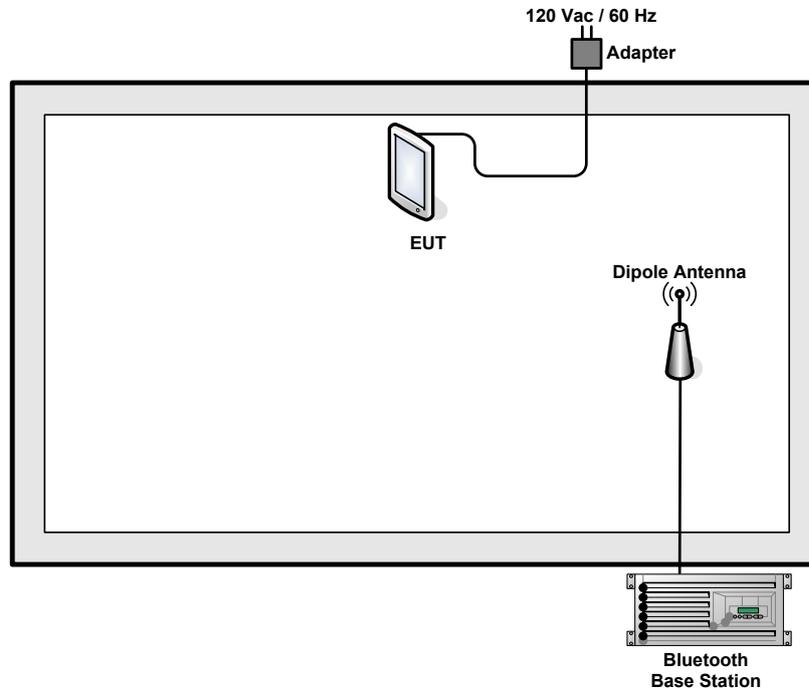
The following tables are showing the test modes as the worst cases (E1 plane) and recorded in this report.

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Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
Remark: For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, "ADB" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Peak Output Power Measurement

3.1.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

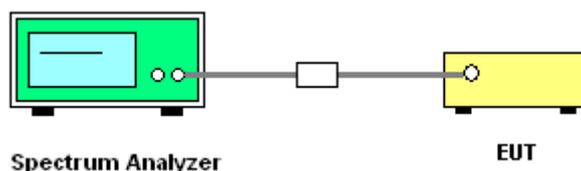
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

3.1.4 Test Setup



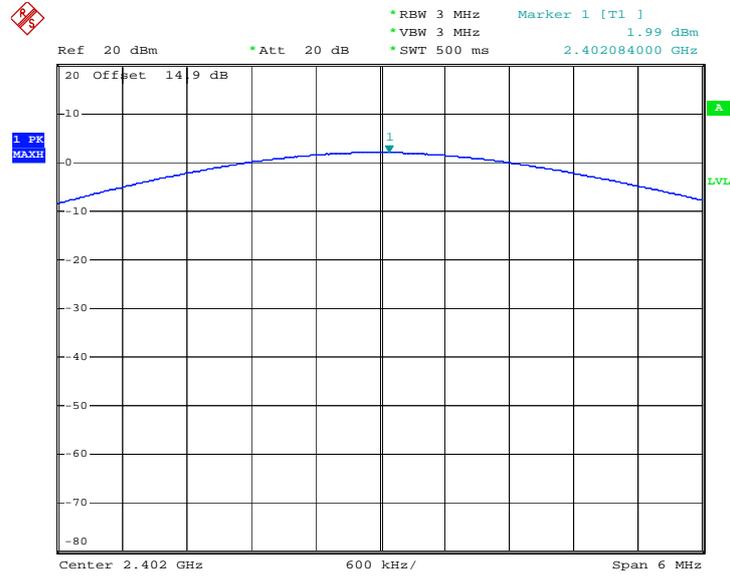
3.1.5 Test Result of Peak Output Power

Test Mode :	Mode 7, 8, 9	Temperature :	22~23°C
Test Engineer :	Fly Cheng	Relative Humidity :	43~45%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	1.99	20.97	Pass
39	2441	2.83	20.97	Pass
78	2480	3.05	20.97	Pass

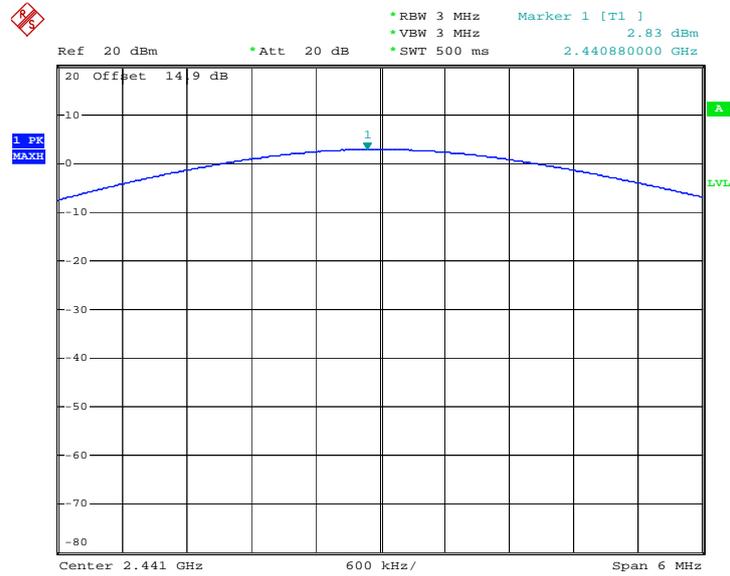


Peak Output Power Plot on Channel 00



Date: 13.DEC.2011 16:58:08

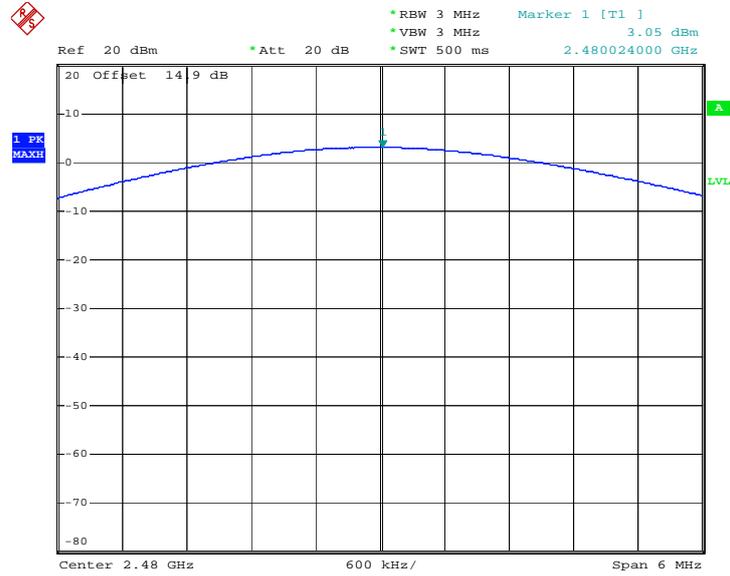
Peak Output Power Plot on Channel 39



Date: 13.DEC.2011 16:59:24



Peak Output Power Plot on Channel 78



Date: 13.DEC.2011 17:00:39



3.2 Band Edges Measurement

3.2.1 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. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.2.2 Measuring Instruments

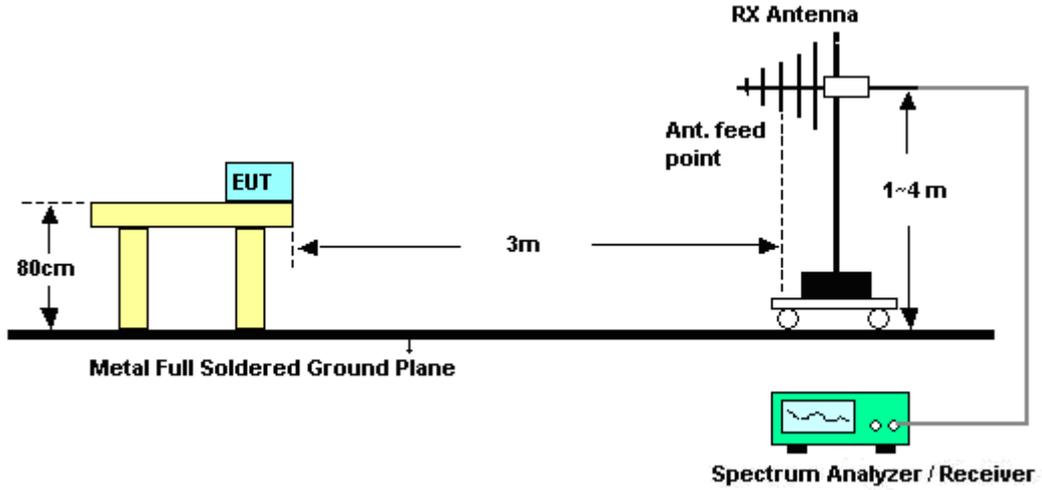
See list of measuring instruments of this test report.

3.2.3 Test Procedures

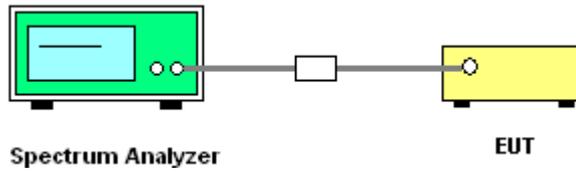
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz 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: Applies 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 = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. 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. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.2.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>





3.2.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
		Test Engineer :	Infi 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	47.6	-26.4	74	45.32	32.86	3.47	34.05	100	0	Peak
2390	32.84	-21.16	54	30.56	32.86	3.47	34.05	100	0	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	47.66	-26.34	74	45.38	32.86	3.47	34.05	100	0	Peak
2390	33.58	-20.42	54	31.3	32.86	3.47	34.05	100	0	Average



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
		Test Engineer :	Infi 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	42.39	-31.61	74	39.9	33.01	3.68	34.2	100	0	Peak
2483.5	29.6	-24.4	54	27.11	33.01	3.68	34.2	100	0	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	76.39	46.79	29.6	54	-24.4	Pass
Hopping Mode	76.39	47.09	29.3	54	-24.7	Pass

Note : Average result = Maximum field strength – Delta result

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
2483.5	42.07	-31.93	74	39.58	33.01	3.68	34.2	200	2	Peak
2483.5	30.49	-23.51	54	28	33.01	3.68	34.2	200	2	Average

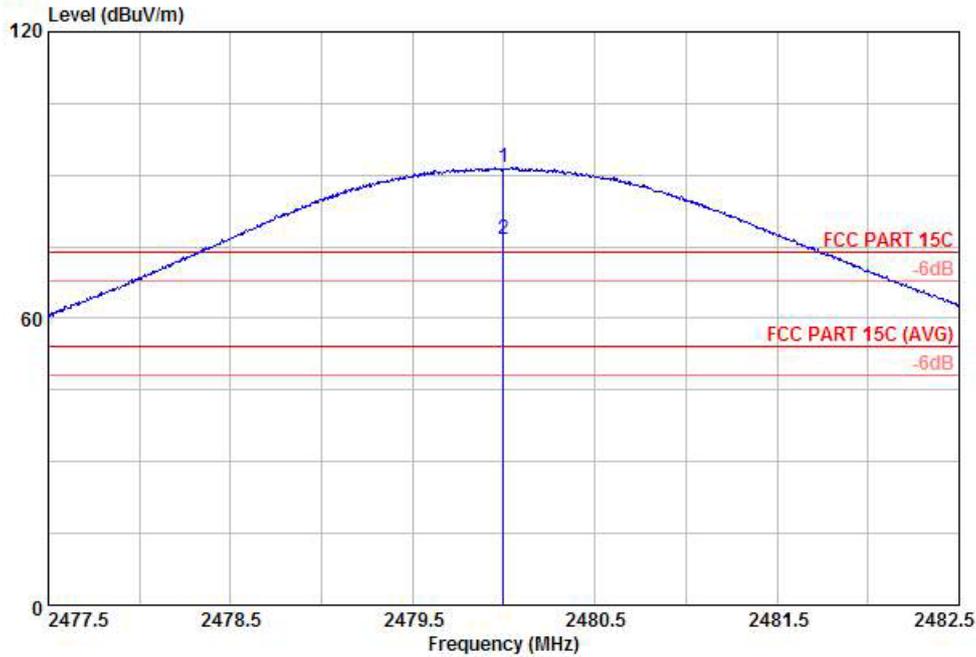
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	71.99	41.5	30.49	54	-23.51	Pass
Hopping Mode	71.99	41.83	30.16	54	-23.84	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal



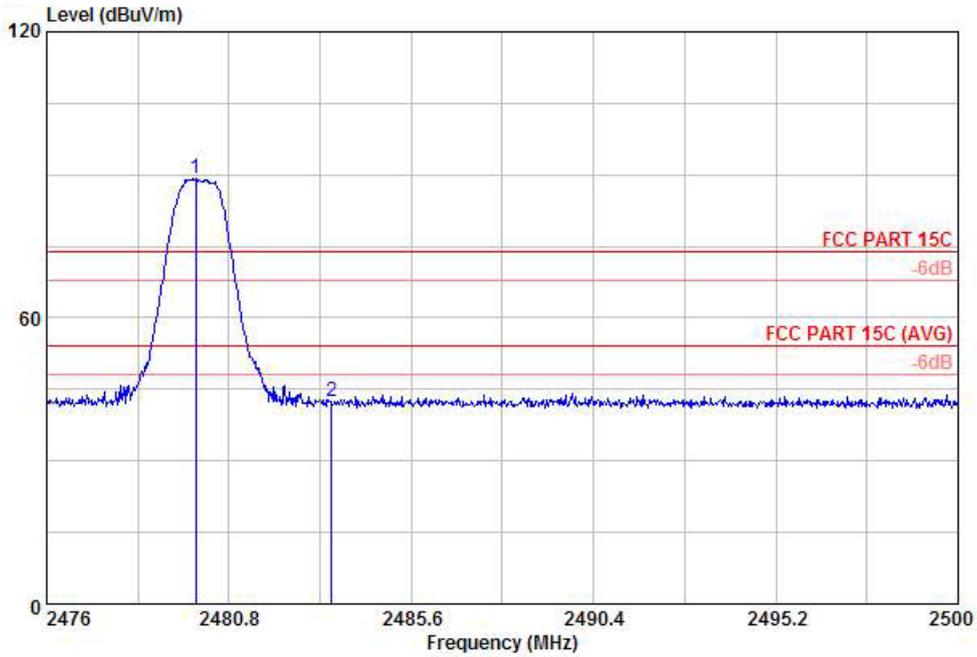
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANI-100803 HORIZONTAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.00	91.66	17.66	74.00	89.17	33.01	3.68	34.20	100	360 Peak
2 X	2480.00	76.39	22.39	54.00	73.90	33.01	3.68	34.20	100	360 Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal



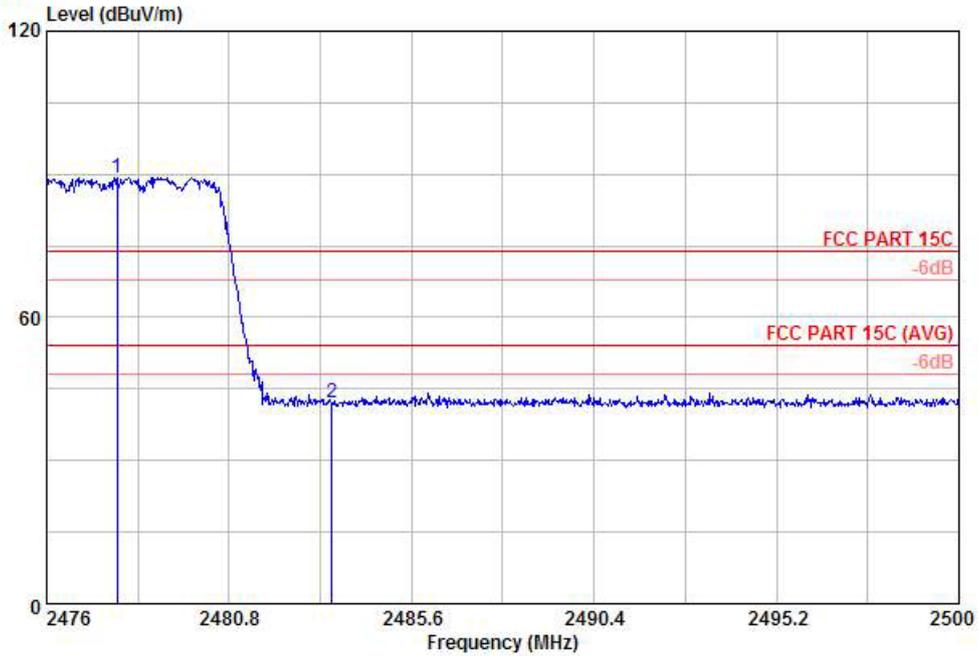
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table		
	MHz	dBuV/m	dB	dBuV/m	Level	Loss	Factor	Pos	Pos	Remark	
					Factor	Factor		cm	deg		
1 X	2479.94	89.18	15.18	74.00	86.69	33.01	3.68	34.20	---	---	Peak
2	2483.50	42.39	-31.61	74.00	39.90	33.01	3.68	34.20	---	---	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 46.79 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal



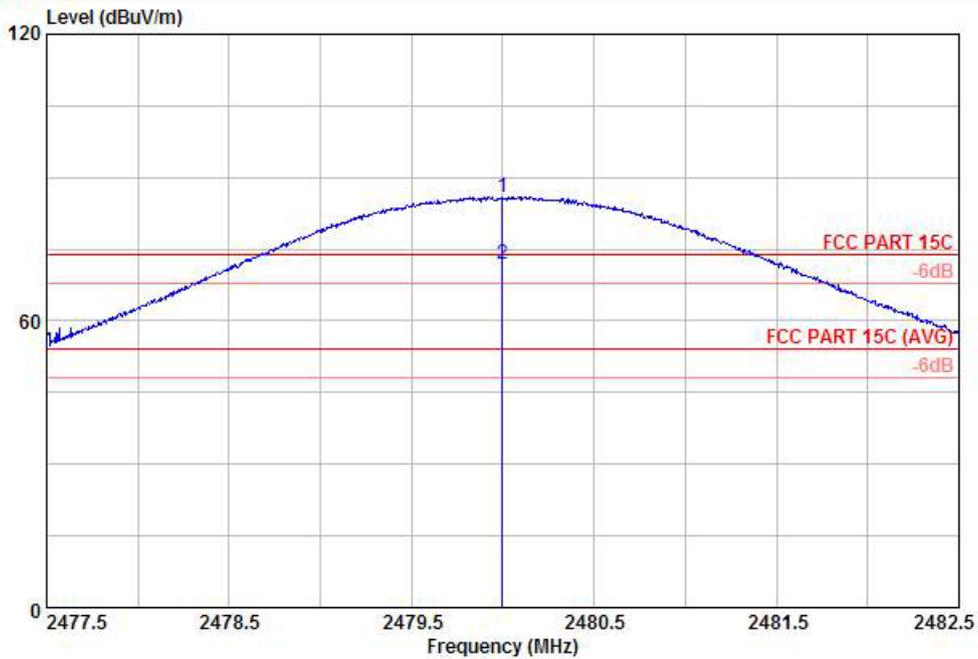
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	dB	dBuV/m	Level	Loss	Factor	Pos	Pos	Remark
					Factor			cm	deg	
1 X	2477.85	89.28	15.28	74.00	86.79	33.01	3.68	34.20	---	Peak
2	2483.50	42.19	-31.81	74.00	39.70	33.01	3.68	34.20	---	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 47.09 dB , Hopping Mode



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical



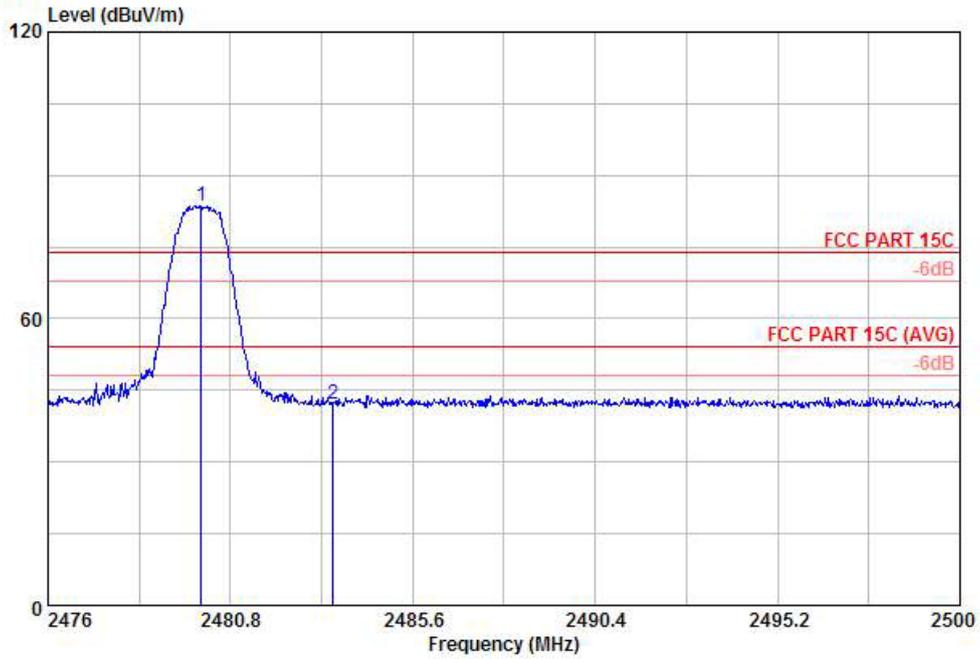
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.00	86.02	12.02	74.00	83.53	33.01	3.68	34.20	132	291 Peak
2 X	2480.00	71.99	17.99	54.00	69.50	33.01	3.68	34.20	132	291 Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical



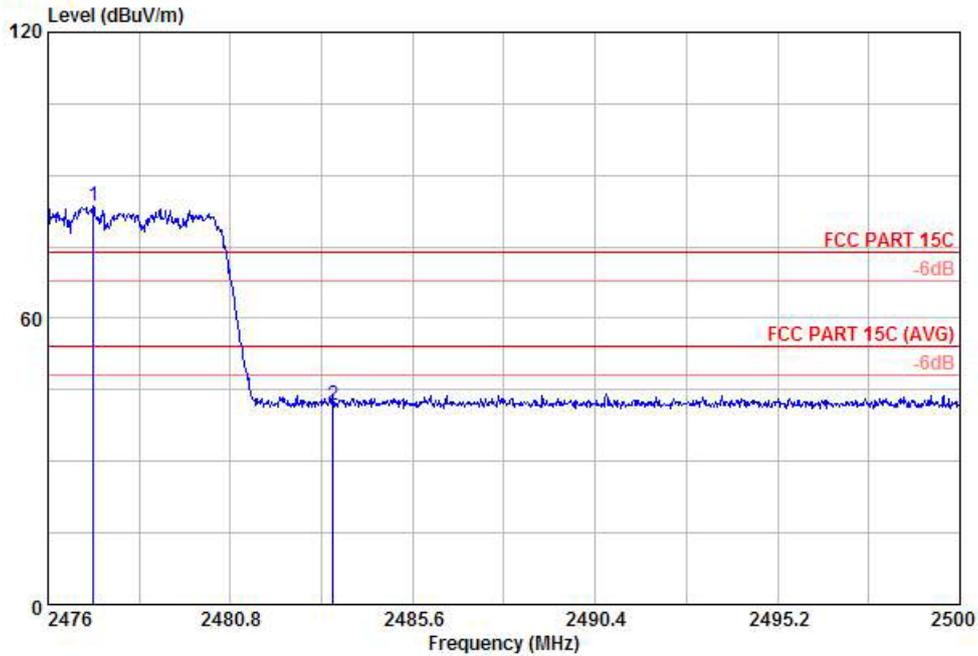
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANI-100803 VERTICAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.03	83.57	9.57	74.00	81.08	33.01	3.68	34.20	---	Peak
2	2483.50	42.07	-31.93	74.00	39.58	33.01	3.68	34.20	---	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 41.50 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical



Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANI-100803 VERTICAL
 Project : (FR) 172707-01
 Mode : mode 3
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2477.20	83.46	9.46	74.00	80.97	33.01	3.68	34.20	---	Peak
2	2483.50	41.63	-32.37	74.00	39.14	33.01	3.68	34.20	---	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 41.83 dB , Hopping Mode

3.3 Radiated Emission Measurement

3.3.1 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. 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

3.3.2 Measuring Instruments

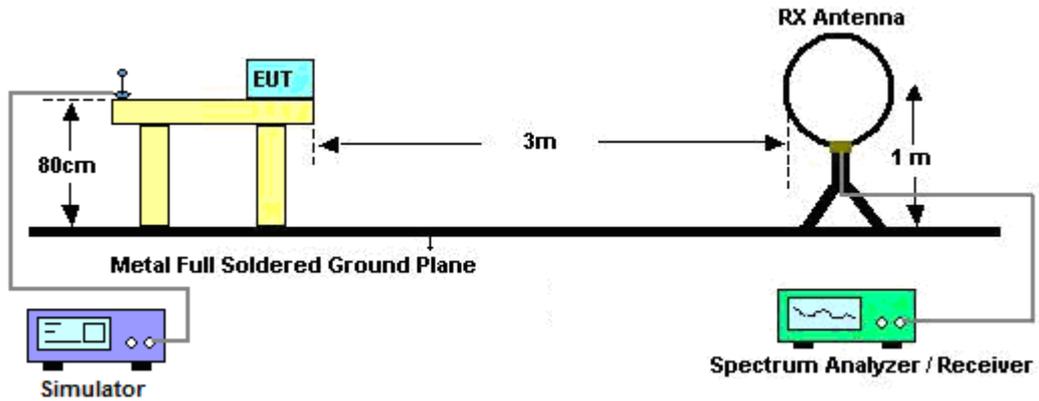
See list of measuring instruments of this test report.

3.3.3 Test Procedures

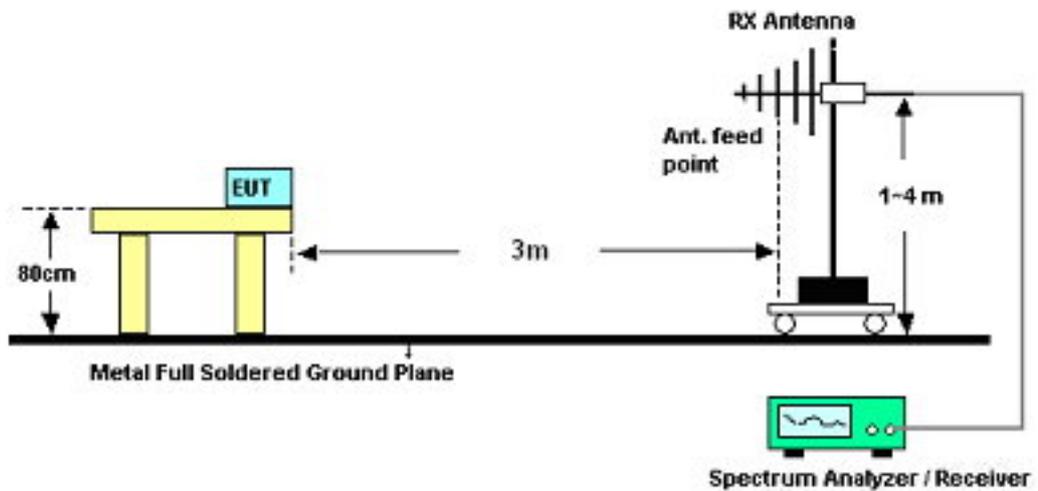
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector 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)
1. 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.
2. Measured average value for the peak value is greater than 54 dBuV/m

3.3.4 Test Setup

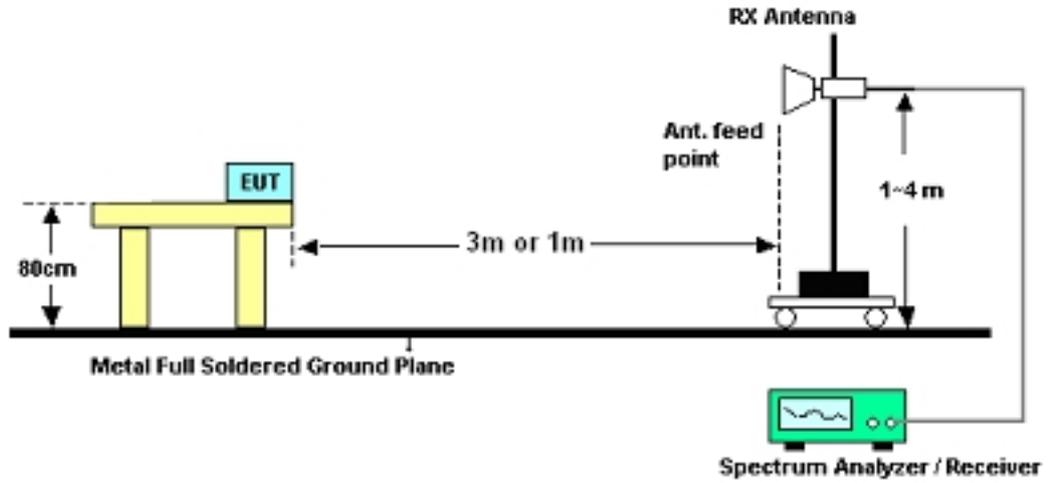
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Infi Li	Temperature :	21~22°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 = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.



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

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal
Remark :	2402 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
30.27	19.31	-20.69	40	31.13	18	0.26	30.08	-	-	Peak
153.12	22.52	-20.98	43.5	42.07	9.89	0.52	29.96	-	-	Peak
226.29	23.78	-22.22	46	42.5	10.59	0.63	29.94	-	-	Peak
561.8	27.07	-18.93	46	37.21	18.52	1.01	29.67	-	-	Peak
832	29.94	-16.06	46	38.01	20.3	1.27	29.64	-	-	Peak
915.3	36	-10	46	43.66	20.53	1.31	29.5	100	0	Peak
2390	47.6	-26.4	74	45.32	32.86	3.47	34.05	100	0	Peak
2390	32.84	-21.16	54	30.56	32.86	3.47	34.05	100	0	Average
2402	77.49	-	-	75.21	32.86	3.47	34.05	132	37	Average
2402	90.57	-	-	88.29	32.86	3.47	34.05	132	37	Peak
2483.5	47.73	-26.27	74	45.24	33.01	3.68	34.2	100	0	Peak
2483.5	33.89	-20.11	54	31.4	33.01	3.68	34.2	100	0	Average



Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical
Remark :	2402 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
44.04	28.36	-11.64	40	48.17	10.03	0.27	30.11	-	-	Peak
78.06	22.28	-17.72	40	45.64	6.34	0.35	30.05	-	-	Peak
140.43	23.36	-20.14	43.5	42.05	10.82	0.49	30	-	-	Peak
624.1	31.19	-14.81	46	41.01	18.73	1.08	29.63	-	-	Peak
727.7	30.15	-15.85	46	38.96	19.65	1.16	29.62	-	-	Peak
832	36.48	-9.52	46	44.55	20.3	1.27	29.64	100	0	Peak
2390	47.66	-26.34	74	45.38	32.86	3.47	34.05	100	0	Peak
2390	33.58	-20.42	54	31.3	32.86	3.47	34.05	100	0	Average
2402	73.87	-	-	71.59	32.86	3.47	34.05	100	40	Average
2402	88.21	-	-	85.93	32.86	3.47	34.05	100	40	Peak
2483.5	47.31	-26.69	74	44.82	33.01	3.68	34.2	100	0	Peak
2483.5	34.37	-19.63	54	31.88	33.01	3.68	34.2	100	0	Average



Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal
Remark :	2441 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
30.27	19.08	-20.92	40	30.9	18	0.26	30.08	-	-	Peak
153.12	23.34	-20.16	43.5	42.89	9.89	0.52	29.96	-	-	Peak
226.29	24.58	-21.42	46	43.3	10.59	0.63	29.94	-	-	Peak
519.8	30.26	-15.74	46	41.33	17.67	0.97	29.71	-	-	Peak
722.8	32.31	-13.69	46	41.25	19.56	1.15	29.65	100	0	Peak
832	31.52	-14.48	46	39.59	20.3	1.27	29.64	-	-	Peak
2390	47.17	-26.83	74	44.89	32.86	3.47	34.05	100	0	Peak
2390	33.17	-20.83	54	30.89	32.86	3.47	34.05	100	0	Average
2441	77.67	-	-	75.27	32.95	3.6	34.15	109	360	Average
2441	92.05	-	-	89.65	32.95	3.6	34.15	109	360	Peak
2483.5	47.1	-26.9	74	44.61	33.01	3.68	34.2	100	0	Peak
2483.5	33.69	-20.31	54	31.2	33.01	3.68	34.2	100	0	Average



Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical
Remark :	2441 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
44.31	27.88	-12.12	40	48.14	9.6	0.27	30.13	100	0	Peak
79.41	24.03	-15.97	40	47.25	6.47	0.35	30.04	-	-	Peak
118.02	24.84	-18.66	43.5	42.56	11.8	0.45	29.97	-	-	Peak
519.8	29.73	-16.27	46	40.8	17.67	0.97	29.71	-	-	Peak
827.8	33.74	-12.26	46	41.88	20.22	1.27	29.63	-	-	Peak
936.3	27.21	-18.79	46	34.75	20.67	1.32	29.53	-	-	Peak
2390	47.8	-26.2	74	45.52	32.86	3.47	34.05	100	0	Peak
2390	32.84	-21.16	54	30.56	32.86	3.47	34.05	100	0	Average
2441	74.62	-	-	72.22	32.95	3.6	34.15	114	329	Average
2441	89.03	-	-	86.63	32.95	3.6	34.15	114	329	Peak
2483.5	47.83	-26.17	74	45.34	33.01	3.68	34.2	100	0	Peak
2483.5	33.67	-20.33	54	31.18	33.01	3.68	34.2	100	0	Average



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Horizontal
Remark :	2480 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
30.27	18.92	-21.08	40	30.74	18	0.26	30.08	-	-	Peak
153.12	16.33	-27.17	43.5	35.88	9.89	0.52	29.96	-	-	Peak
226.29	23.49	-22.51	46	42.21	10.59	0.63	29.94	-	-	Peak
519.8	30.52	-15.48	46	41.59	17.67	0.97	29.71	-	-	Peak
722.8	29.89	-16.11	46	38.83	19.56	1.15	29.65	-	-	Peak
832	31.32	-14.68	46	39.39	20.3	1.27	29.64	100	0	Peak
2390	47.97	-26.03	74	45.69	32.86	3.47	34.05	100	0	Peak
2390	32.38	-21.62	54	30.1	32.86	3.47	34.05	100	0	Average
2480	76.39	-	-	73.9	33.01	3.68	34.2	100	360	Average
2480	91.66	-	-	89.17	33.01	3.68	34.2	100	360	Peak
2483.5	29.6	-24.4	54	27.11	33.01	3.68	34.2	100	0	Average
2483.5	42.39	-31.61	74	39.9	33.01	3.68	34.2	100	0	Peak



Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Infi Li	Polarization :	Vertical
Remark :	2480 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
44.85	29.38	-10.62	40	49.64	9.6	0.27	30.13	100	0	Peak
116.4	25.99	-17.51	43.5	43.72	11.8	0.44	29.97	-	-	Peak
143.94	27.53	-15.97	43.5	46.47	10.55	0.5	29.99	-	-	Peak
549.2	30.35	-15.65	46	40.55	18.48	1	29.68	-	-	Peak
827.8	34.74	-11.26	46	42.88	20.22	1.27	29.63	-	-	Peak
936.3	27.21	-18.79	46	34.75	20.67	1.32	29.53	-	-	Peak
2390	47.21	-26.79	74	44.93	32.86	3.47	34.05	100	0	Peak
2390	34.38	-19.62	54	32.1	32.86	3.47	34.05	100	0	Average
2480	71.99	-	-	69.5	33.01	3.68	34.2	132	291	Average
2480	86.02	-	-	83.53	33.01	3.68	34.2	132	291	Peak
2483.5	30.49	-23.51	54	28	33.01	3.68	34.2	200	2	Average
2483.5	42.07	-31.93	74	39.58	33.01	3.68	34.2	200	2	Peak



3.4 Antenna Requirements

3.4.1 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. 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.

3.4.2 Antenna Connected Construction

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

3.4.3 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	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Dec. 14, 2011	Jan. 06, 2012	Conducted (TH01-KS)
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 07, 2011	Dec. 14, 2011	Jan. 06, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030D	E1884515	N/A	Aug. 23, 2011	Dec. 14, 2011	Aug. 22, 2012	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Jan. 17, 2011	Dec. 14, 2011	Jan. 16, 2012	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Dec. 26, 2011	Nov. 08, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Dec. 26, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Dec. 26, 2011	Dec. 07, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/00	9 kHz~30 MHz	Jul. 28, 2011	Dec. 26, 2011	Jul. 27, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Dec. 26, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060029	9KHz to 2GHz	Jan. 10, 2011	Dec. 26, 2011	Jan. 10, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Dec. 26, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz-18GHz	Nov. 07, 2011	Dec. 26, 2011	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz -40GHz	Oct. 11, 2011	Dec. 26, 2011	Oct.10, 2012	Radiation (03CH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 18, 2011	Dec. 26, 2011	Aug. 17, 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 $Uc(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	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 $Uc(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP172707-01 as below.