

TECHNICAL CONSULTING CO LTD



ISO/IEC17025Accredited Lab.

Report No.:  
File reference No.:

FCC 1405171-01  
2014-04-12

Applicant: Maysun Info Technology Co., Limited

Product: smartphone

Model No.: MID5502F, MID5502, MID5502D, MID5502E, Max5.5, CALYPSO- SY-SP55Q81, KUDU- SY-SP45Q41, WOXTER ZIELO S50

Trademark:



Test Standards: FCC Part 15 Subpart C: 2012 ANSI C63.4: 2009

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation of electromagnetic compatibility

Approved By

*Jack Chung*

Jack Chung  
Manager

Dated: April 12, 2014

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD**

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

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## Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

### **FCC-Registration No.: 899988**

The 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 our files. Registration No.:899988.

### **IC- Registration No.: IC5205A-02**

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD  
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.  
Telephone: (755) 83448688  
Fax: (755) 83442996

Site on File with the Federal Communications Commission – United States

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Maysun Info Technology Co., Limited  
Address: 10th floor, B10 Building, Lilang Industrial Zone, Buji Town, Longgang District, Shenzhen, China  
Telephone: --  
Fax: --

### 1.3 Description of EUT

Product:	smartphone
Manufacturer:	Maysun Info Technology Co., Limited
Address:	10th floor, B10 Building, Lilang Industrial Zone, Buji Town, Longgang District, Shenzhen, China
Brand Name:	
Model Number:	MID5502F
Additional Model Name	MID5502, MID5502D, MID5502E, Max5.5, CALYPSO- SY-SP55Q81, KUDU- SY-SP45Q41, WOXTER ZIELO S50
Additional Trade Name	
Type of Modulation	GFSK, JI/4QPSK, 8DPSK
Frequency range	2402-2480MHz
Number of Channel	79
Frequency Selection	By software

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Antenna type Integral Antenna used, the antenna gain is 1.62dBi  
EUT Power Rating Battery: 3.8V  
Charging Input: 5V  
Channel Separation 1MHz

1.4 Submitted Sample: 1 Sample

1.5 Test Duration:

2014-04-03 to 2014-04-12

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

*Terry Tang*

The sample tested by \_\_\_\_\_

Print Name: Terry Tang

### Models difference

Rating: 3.8V by Battery		
No.	Model No.	Trade Name
1	MID5502F	
2	MID5502	
3	MID5502D	
4	MID5502E	
5	Max5.5	
6	CALYPSO- SY-SP55Q81	
7	KUDU- SY-SP45Q41	
8	WOXTER ZIELO S50	

Note: All models are identical in circuitry and electrical, mechanical and physical construction, only different on model name, trade name, color and silk-screen.  
All tests carried out on MID5502F.

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2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

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## 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	CH00
Mode 2	CH39
Mode 3	CH78

For Conducted Emission	
Final Test Mode	Description
Mode 1	CH00

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78

Note:

- (1) *The measurements are performed at the highest, middle, lowest available channels.*
- (2) *The EUT use new battery.*
- (3) *The data rate were set in 1Mbps, 2 Mbps, 3 Mbps for radiated emission due to the highest RF output power.*
- (4) *Record the worst case of each test item in this report.*

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2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2013-08-23	2014-08-22
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2013-08-25	2014-08-24
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2013-08-23	2014-08-22
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2013-08-24	2014-08-23
System Controller	CT	SC100	-	--	--
Printer	EPSON	PHOTO EX3	CFNH234850	--	--
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2013-08-23	2014-08-22
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2013-08-23	2014-08-22
3m OATS	--	--	N/A	2013-08-22	2014-08-21
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2013-08-24	2014-08-23
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2013-08-24	2014-08-23
Power meter	Anritsu	ML2487A	6K00003613	2013-08-24	2014-08-23
Power sensor	Anritsu	MA2491A	32263	2013-08-24	2014-08-23
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2013-08-21	2014-08-20
LISN	AFJ	LS16C	10010947251	2013-08-21	2014-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22
9*6*6 Anechoic	--	--	N/A	2013-08-22	2014-08-21
EMI Test Receiver	RS	ESCS30	100139	2013-08-23	2014-08-22
LISN	AFJ	LS16C	10010947251	2013-08-23	2014-08-22
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22

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### 3.0 Technical Details

#### 3.1 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)(1)	Hopping Channel Separation	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(c)	Radiated Spurious Emission	PASS	
15.247(a)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(iii)	Dwell Time	PASS	
15.247(a)(1)	Bandwidth	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

#### 3.2 Test Standards

**FCC Part 15 Subpart & Subpart C, Paragraph 15.247**

#### 4.0 EUT Modification

**No modification by Shenzhen Timeway Technology Consulting Co., Ltd**

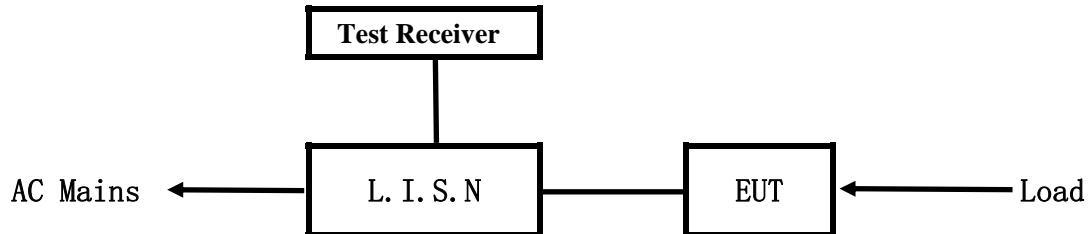
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## 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test



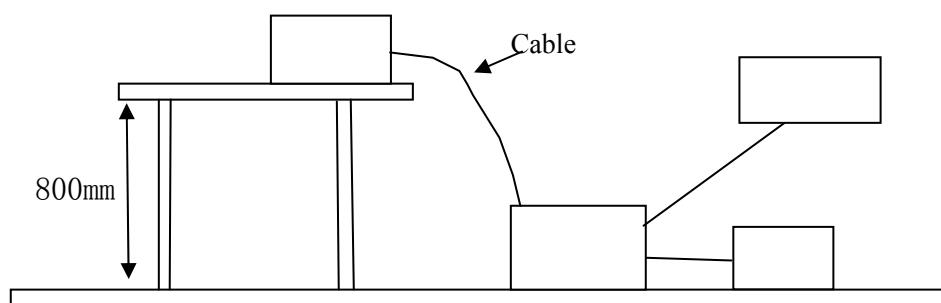
EUT: Equipment Under Test

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Test Voltage: 120V~60Hz

Block diagram of Test setup



### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

79 channels are provided to the EUT

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A. EUT

Device	Manufacturer	Model	FCC ID
smartphone	Maysun Info Technology Co., Limited	MID5502F, MID5502, MID5502D, MID5502E, Max5.5, CALYPSO- SY-SP55Q81, KUDU- SY-SP45Q41, WOXTER ZIELO S50	2AB8PMID5502F

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
--	--	--	--	--
--	--	--	--	--

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow  
B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.107 ,15.207

Frequency (MHz)	Class A Limits (dB $\mu$ V)		Class B Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

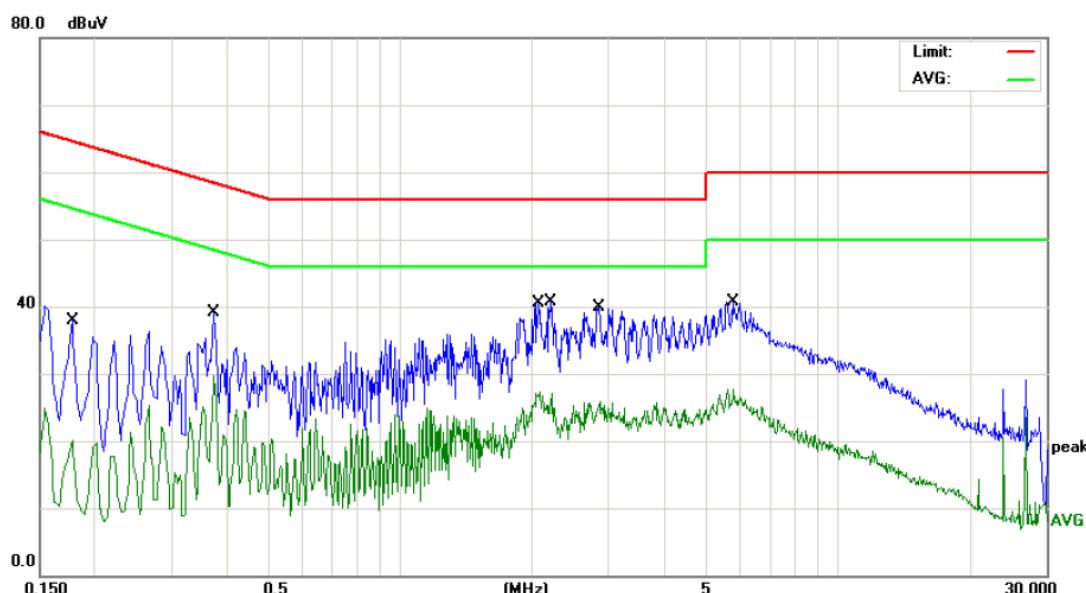
The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC5 V(Adapter Input AC 120V, 60Hz)	Test Mode:	Mode 1 with GFSK modulation
Test Date	April 8, 2014		



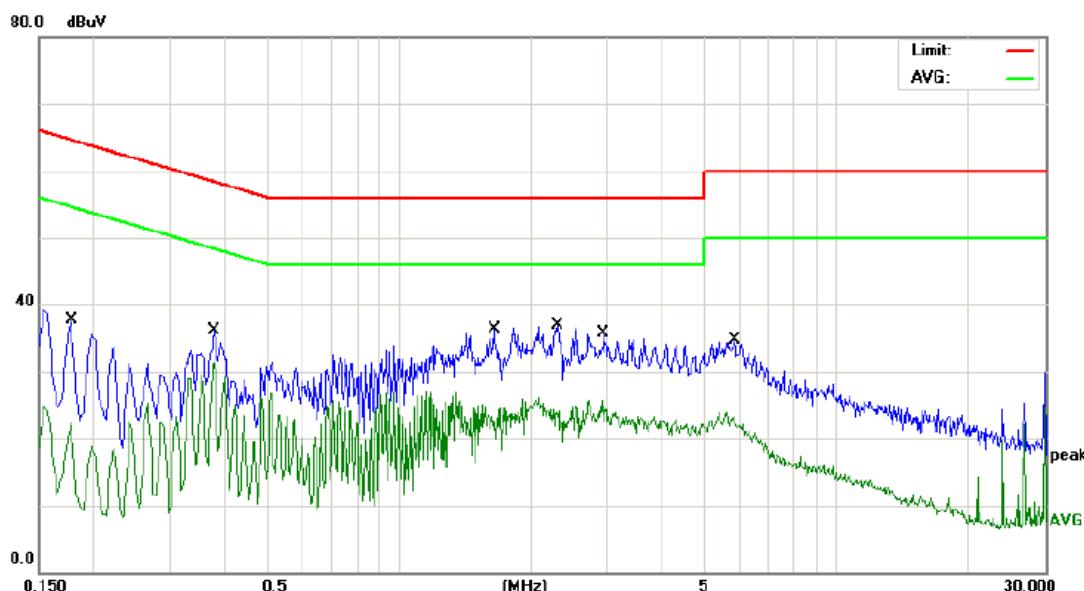
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB	dBuV	dBuV	dB
1		0.1780	27.58	10.37	37.95	64.57	-26.62 QP
2		0.1780	9.75	10.37	20.12	54.57	-34.45 AVG
3		0.3750	27.64	10.54	38.18	58.39	-20.21 QP
4		0.3750	18.67	10.54	29.21	48.39	-19.18 AVG
5		2.0740	29.86	10.71	40.57	56.00	-15.43 QP
6		2.0740	16.31	10.71	27.02	46.00	-18.98 AVG
7	*	2.2060	29.95	10.70	40.65	56.00	-15.35 QP
8		2.2060	15.62	10.70	26.32	46.00	-19.68 AVG
9		2.8460	29.29	10.68	39.97	56.00	-16.03 QP
10		2.8460	14.32	10.68	25.00	46.00	-21.00 AVG
11		5.7819	28.31	10.57	38.88	60.00	-21.12 QP
12		5.7819	17.22	10.57	27.79	50.00	-22.21 AVG

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Mode:	Mode 1 with GFSK modulation
Test Date	April 8, 2014		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB	dBuV	dBuV	dB
1		0.1787	25.10	10.36	35.46	64.54	-29.08 QP
2		0.1787	10.13	10.36	20.49	54.54	-34.05 AVG
3		0.3780	25.52	10.53	36.05	58.32	-22.27 QP
4 *		0.3780	20.69	10.53	31.22	48.32	-17.10 AVG
5		1.6580	23.49	10.73	34.22	56.00	-21.78 QP
6		1.6580	11.77	10.73	22.50	46.00	-23.50 AVG
7		2.2980	26.15	10.70	36.85	56.00	-19.15 QP
8		2.2980	12.51	10.70	23.21	46.00	-22.79 AVG
9		2.9340	25.11	10.68	35.79	56.00	-20.21 QP
10		2.9340	14.20	10.68	24.88	46.00	-21.12 AVG
11		5.8460	24.16	10.57	34.73	60.00	-25.27 QP
12		5.8460	12.13	10.57	22.70	50.00	-27.30 AVG

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## 6. RADIATED EMISSION MEASUREMENT

### 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)	Limit (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

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## 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 meters above 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; 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*

## DEVIATION FROM TEST STANDARD

No deviation

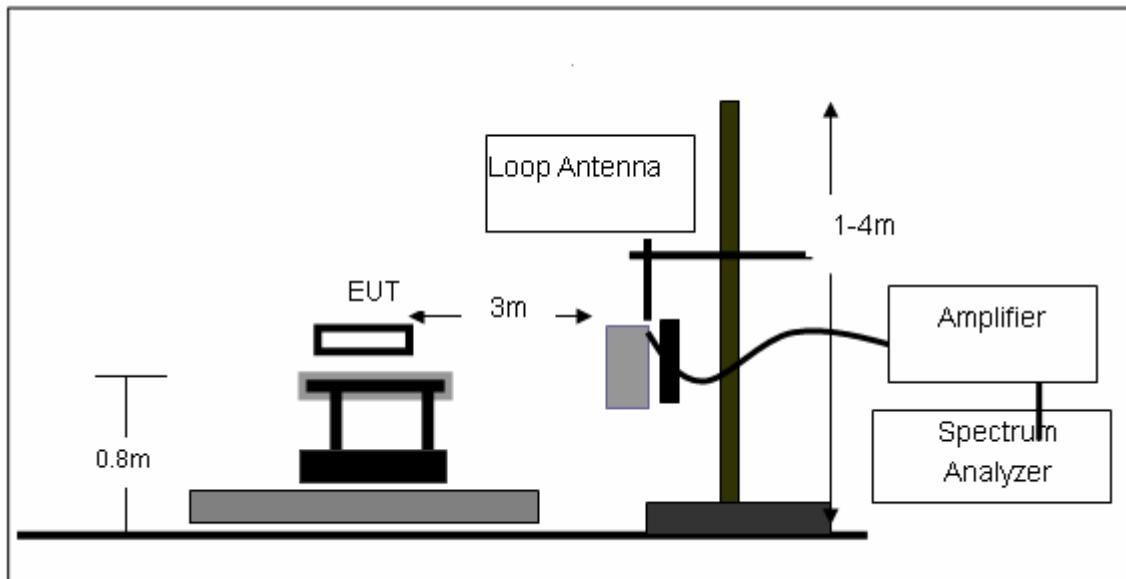
The report refers only to the sample tested and does not apply to the bulk.

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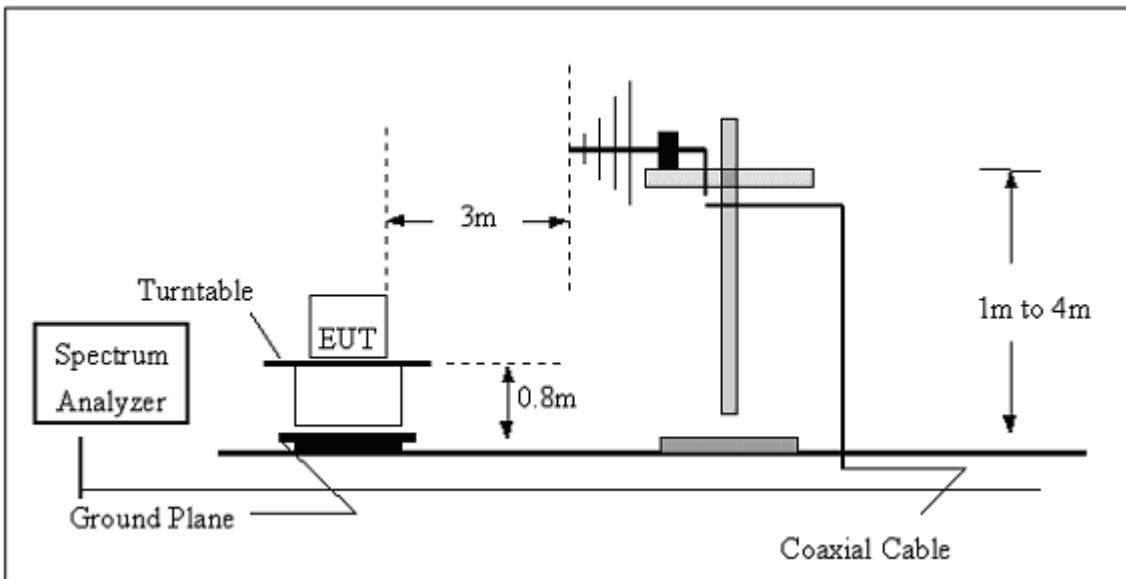
In the event of the improper use of the report. The Shenzhen Timeway Technology Consulting co .,Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

## TEST SETUP

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



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

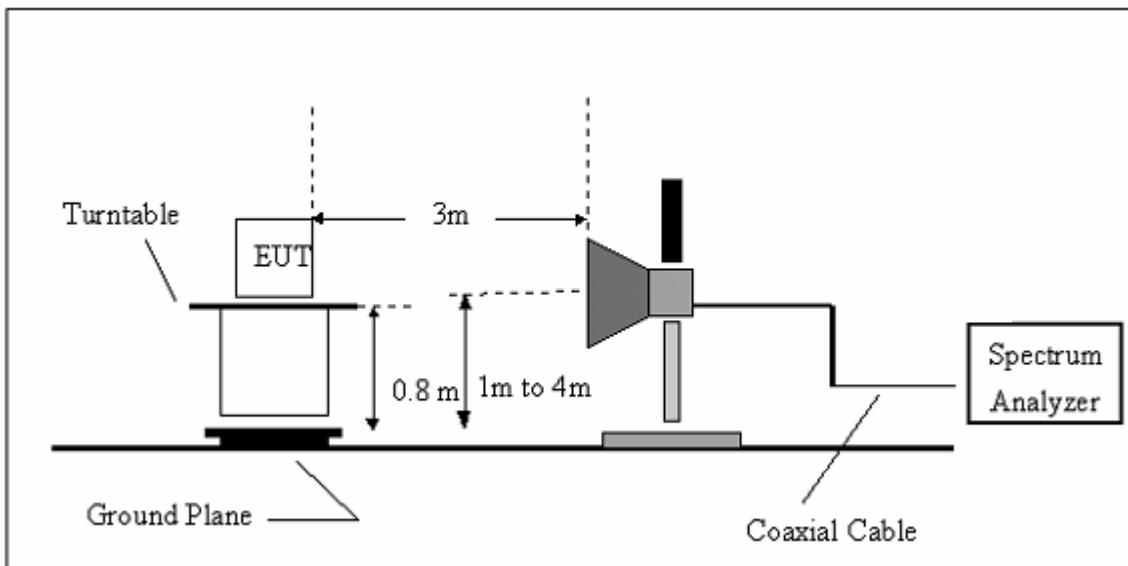


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(C) Radiated Emission Test-Up Frequency Above 1GHz



#### 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.

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## EST RESULTS (Below 30 MHz)

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	---
Test Voltage :	DC 5V(Adapter Input AC 120V, 60Hz)	Test Date	April 8, 2014
Test Mode :	Mode 1/ Mode 2/ Mode 3		

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

### NOTE:

No result in this part for margin above 20dB.

Distance extrapolation factor = $20 \log(\text{specific distance}/\text{test distance})$ (dB);

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

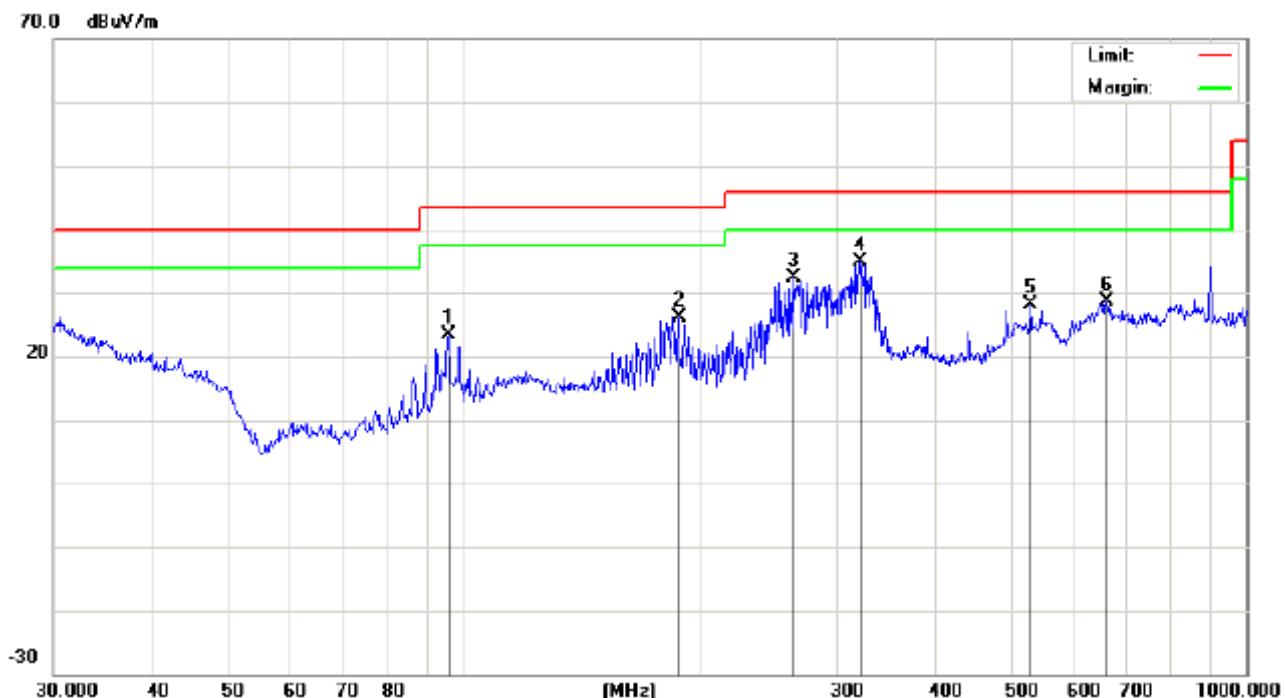
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## TEST RESULTS (Between 30M – 1000 MHz)

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Mode 1 with GFSK modulation		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree
1		95.7622	33.19	-9.70	23.49	43.50	-20.01	QP	100
2		188.4125	33.49	-7.38	26.11	43.50	-17.39	QP	100
3		264.7457	36.42	-3.95	32.47	46.00	-13.53	QP	100
4	*	322.1886	37.38	-2.42	34.96	46.00	-11.04	QP	100
5		530.1014	26.32	1.74	28.06	46.00	-17.94	QP	100
6		663.4729	23.28	5.47	28.75	46.00	-17.25	QP	100

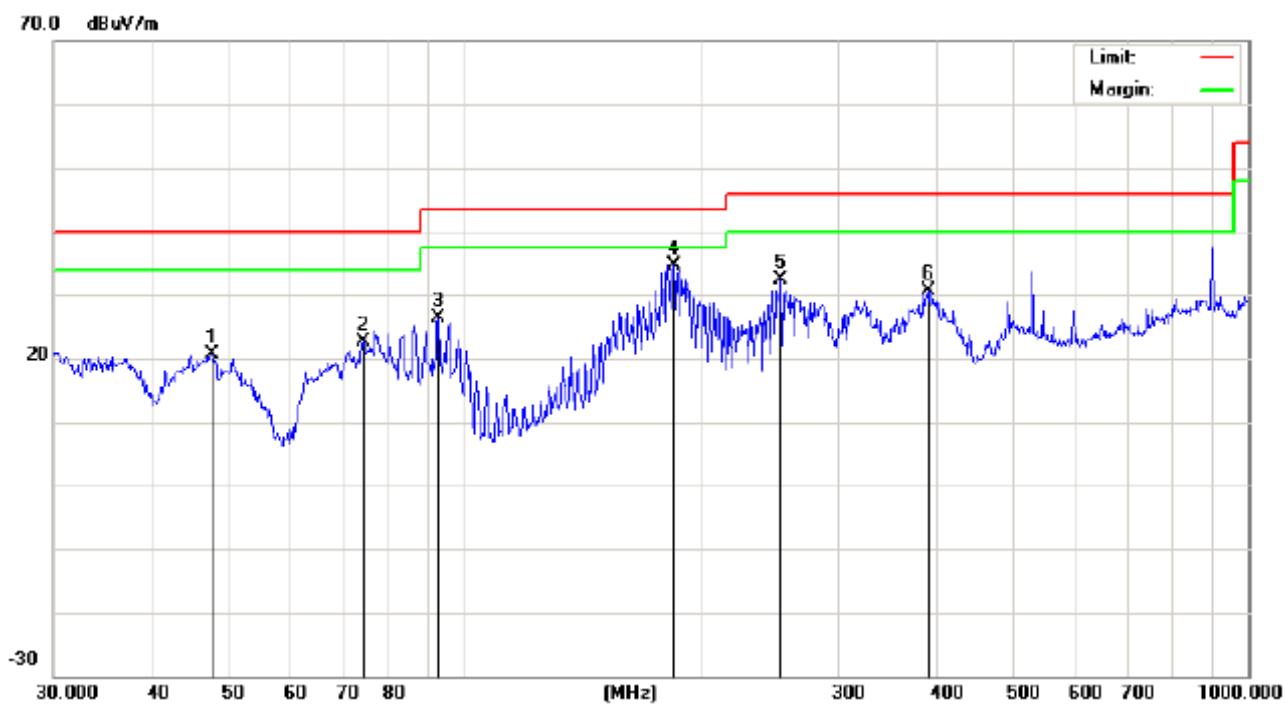
Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Mode 1 with GFSK modulation		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
			Level	Factor	ment					
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		47.8260	37.99	-17.48	20.51	40.00	-19.49	QP	100	0
2		74.3955	36.30	-13.65	22.65	40.00	-17.35	QP	100	360
3		92.7871	41.06	-14.70	26.36	43.50	-17.14	QP	100	0
4	*	185.1379	40.50	-5.80	34.70	43.50	-8.80	QP	100	360
5		253.8367	39.19	-6.76	32.43	46.00	-13.57	QP	100	0
6		390.7226	31.68	-1.13	30.55	46.00	-15.45	QP	100	360

Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

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## TEST RESULTS (From 1000 MHz to 25GHz)

Note: *the worst case is 1Mbps(GFSK)mode as result in this part.*

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2402MHz CH 00(1Mbps)
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date :	April 8, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		H/V	PK	AV	PK	AV	PK
4804	V	61.7	40.3	74	54	-12.3	-13.7
7206	V	65.2	46.2	74	54	-8.8	-7.8
4804	H	64.5	40.7	74	54	-9.5	-13.3
7206	H	68.0	43.5	74	54	-6.0	-10.5

### Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2441MHz CH 39 (1Mbps)
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date :	April 8, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		H/V	PK	AV	PK	AV	PK
4882	V	65.2	45.4	74	54	-8.8	-8.6
7323	V	65.1	41.1	74	54	-8.9	-12.9
9764	V	61.4	43.0	74	54	-12.6	-11.0
4882	H	67.5	44.1	74	54	-6.5	-9.9
7323	H	62.9	45.4	74	54	-11.1	-8.6
9764	H	61.5	46.5	74	54	-12.5	-7.5

Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2480MHz CH 78(1Mbps)
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		H/V	PK	AV	PK	AV	PK
4960	V	67.9	39.6	74	54	-6.1	-14.4
7440	V	58.2	47.3	74	54	-15.8	-6.7
4960	H	58.3	39.5	74	54	-15.7	-14.5
7440	H	61.7	44.7	74	54	-12.3	-9.3

Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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## 7 TEST RESULTS (Restricted Bands Requirements)

### Test result for 1Mbps Mode:

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2402MHz-1Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2378	61.1	-12.99	48.1	74	25.9	peak
2378	51.5	-12.99	38.5	54	15.5	AVG
2390	60.3	-12.99	47.3	74	26.7	peak
2390	52.2	-12.99	39.2	54	14.8	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2402MHz-1Mbps	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2373	65.0	-12.99	52.0	74	22.0	peak
2373	53.0	-12.99	40.0	54	14.0	AVG
2390	62.1	-12.99	49.1	74	24.9	peak
2390	51.7	-12.99	38.7	54	15.3	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2480MHz-1Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	64.8	-12.99	51.8	74	22.2	peak
2483.5	53.6	-12.99	40.6	54	13.4	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2480MHz-1Mbps	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	63.6	-12.99	50.6	74	23.4	peak
2483.5	50.2	-12.99	37.2	54	16.8	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
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**Test result for 3Mbps Mode:**

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2402MHz-3Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2381	60.8	-12.99	47.8	74	26.2	peak
2381	52.6	-12.99	39.6	54	14.4	AVG
2390	60.7	-12.99	47.7	74	26.3	peak
2390	51.6	-12.99	38.6	54	15.4	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2402MHz-3Mbps	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2376	64.3	-12.99	51.3	74	22.7	peak
2376	52.6	-12.99	39.6	54	14.4	AVG
2390	65.0	-12.99	52.0	74	22.0	peak
2390	54.1	-12.99	41.1	54	12.9	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2480MHz-3Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	63.5	-12.99	50.5	74	23.5	peak
2483.5	54.1	-12.99	41.1	54	12.9	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	TX /2480MHz-3Mbps	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	66.2	-12.99	53.2	74	20.8	peak
2483.5	53.5	-12.99	40.5	54	13.5	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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**Test result for hopping mode:**

EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	hopping mode	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2374	64.6	-12.99	51.6	74	22.4	peak
2374	52.3	-12.99	39.3	54	14.7	AVG
2390	60.2	-12.99	47.2	74	26.8	peak
2390	50.9	-12.99	37.9	54	16.1	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Hopping mode	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2381	63.6	-12.99	50.6	74	23.4	peak
2381	51.1	-12.99	38.1	54	15.9	AVG
2390	63.5	-12.99	50.5	74	23.5	peak
2390	54.3	-12.99	41.3	54	12.7	AVG

Remark:

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Hopping mode	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	63.0	-12.99	50.0	74	24.0	peak
2483.5	53.1	-12.99	40.1	54	13.9	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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EUT:	smartphone	Model Name :	MID5502F
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Hopping mode	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	60.8	-12.99	47.8	74	26.2	peak
2483.5	52.9	-12.99	39.9	54	14.1	AVG

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

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## 8. NUMBER OF HOPPING CHANNEL

### Applied procedures / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

## TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

## DEVIATION FROM STANDARD

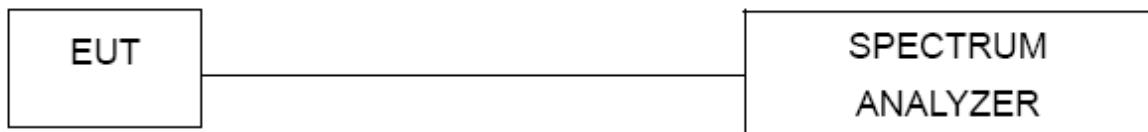
No deviation.

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## TEST SETUP



## 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.

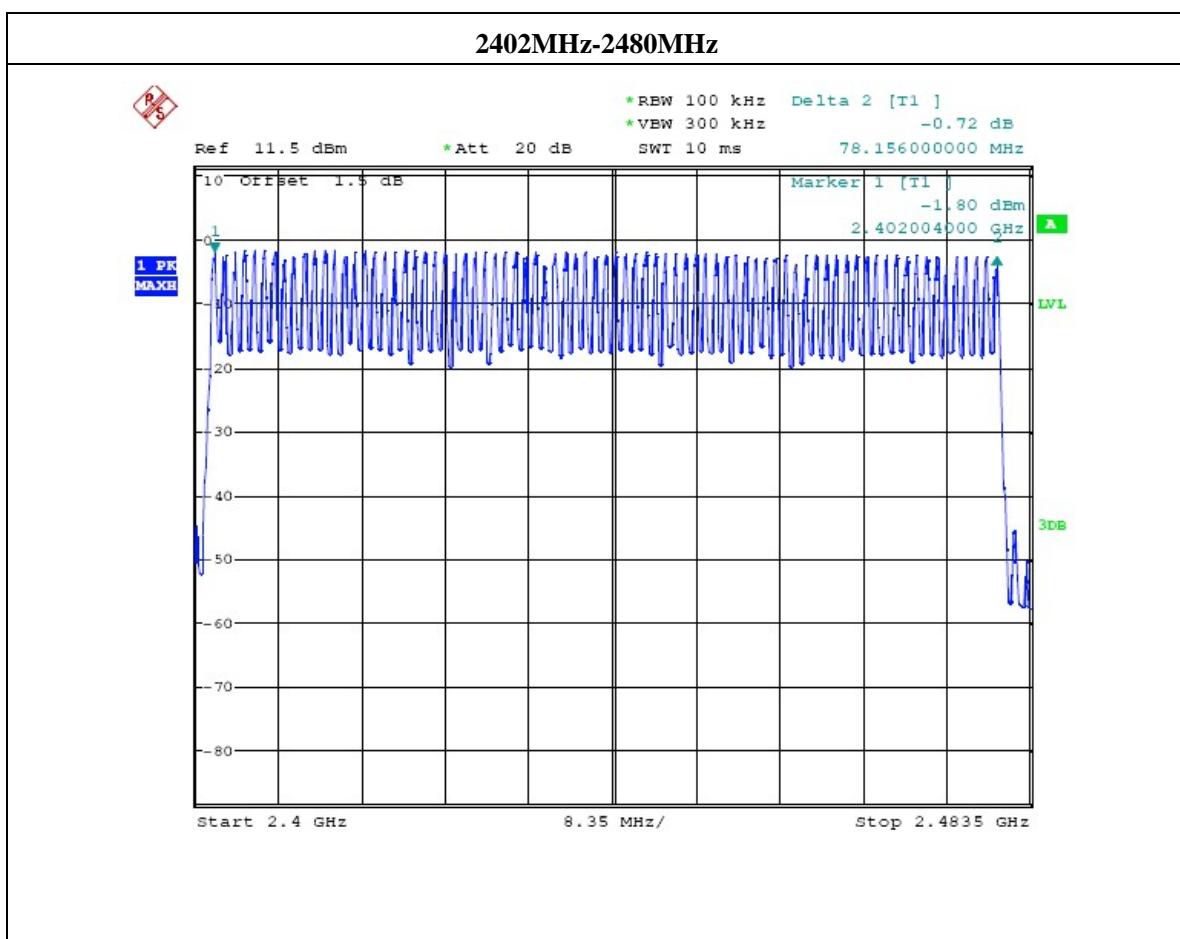
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## TEST RESULTS

EUT:	SMARTPHONE	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1015 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	Hopping Mode		
Number of Hopping Channel		79	



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## 9. AVERAGE TIME OF OCCUPANCY

### Applied procedures / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

### TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH1 Dwell time = Pulse time\*(1600/2/79)\*31.6S  
DH3 Dwell time = Pulse time\*(1600/4/79)\*31.6S  
DH5 Dwell time = Pulse time\*(1600/6/79)\*31.6S

### DEVIATION FROM STANDARD

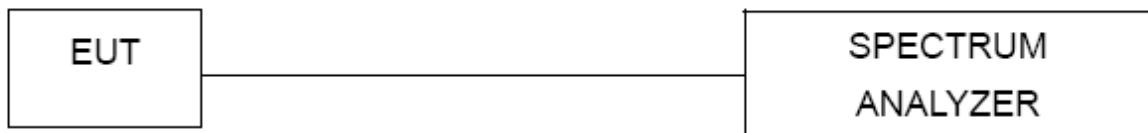
No deviation.

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## TEST SETUP



## 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.

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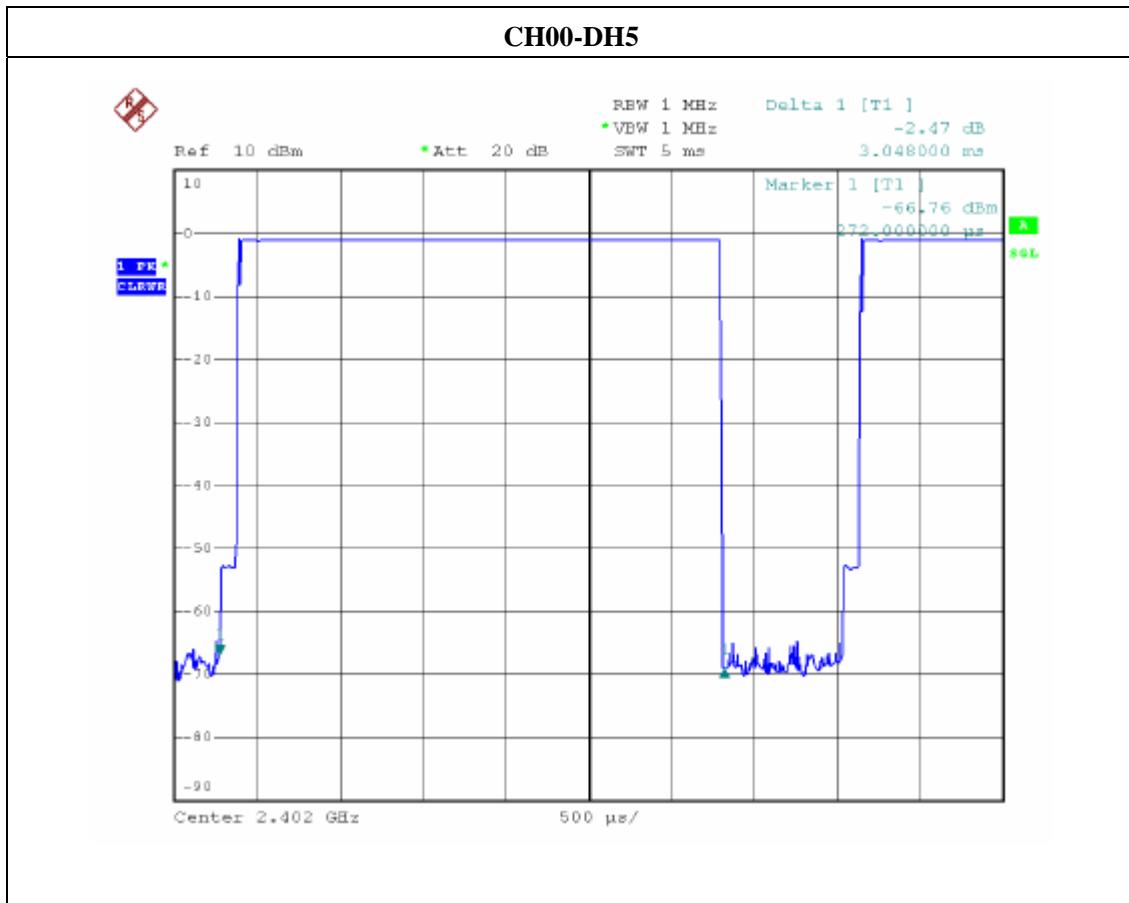
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## 1 TEST RESULTS

Note: *the worst case is DH-3Mbps as result in this part.*

EUT:	SMARTPHONE	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa		
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	DH5-3Mbps		

Data Packet	Frequency	Dwell Time (S)	Limits (S)
DH5	2402MHz	0.325	0.4
DH5	2441MHz	0.325	0.4
DH5	2480MHz	0.329	0.4

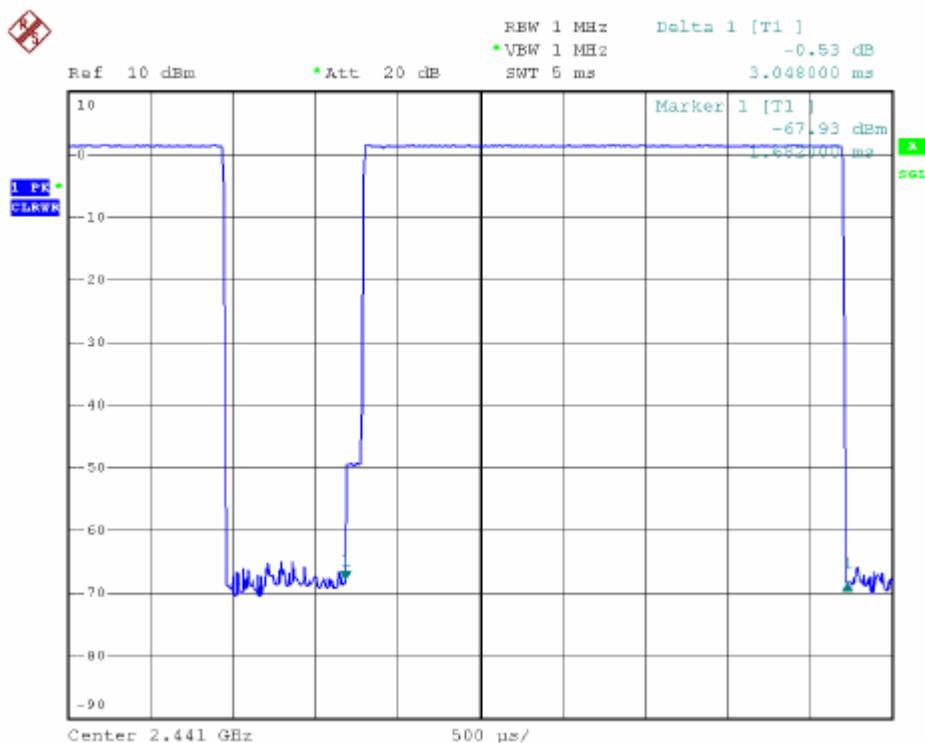


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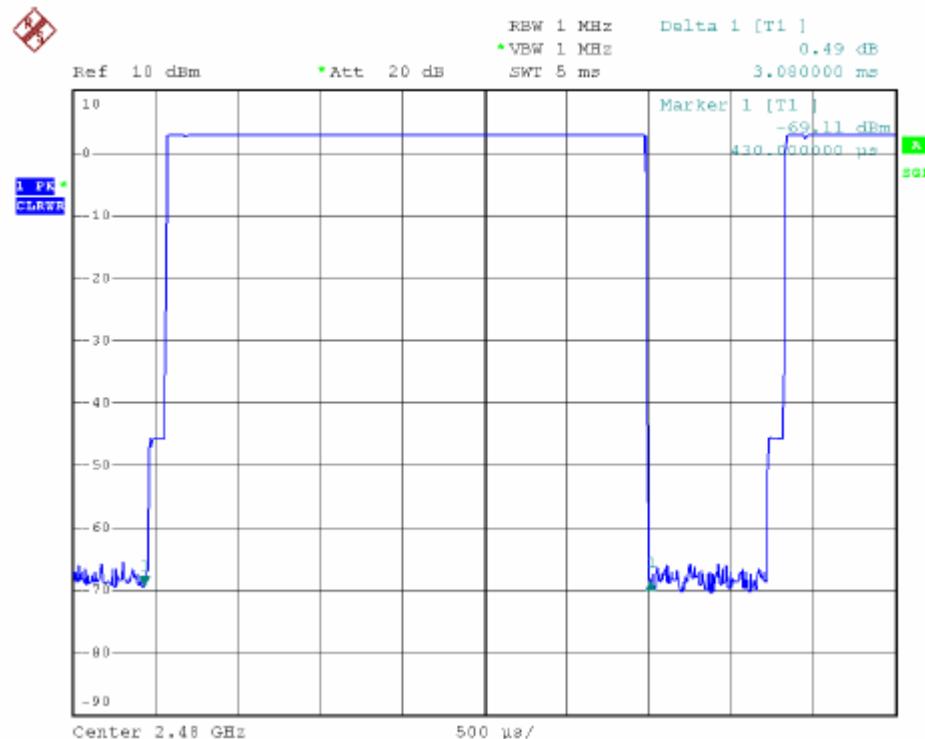
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**CH39-DH5**



**CH78-DH5**



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## 10. Hopping Channel Separation Measurement

### Applied procedures / LIMIT

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.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100 kHz (Channel Separation)
VB	300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

### 3 DEVIATION FROM STANDARD

No deviation.

### 4 TEST SETUP



### 5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

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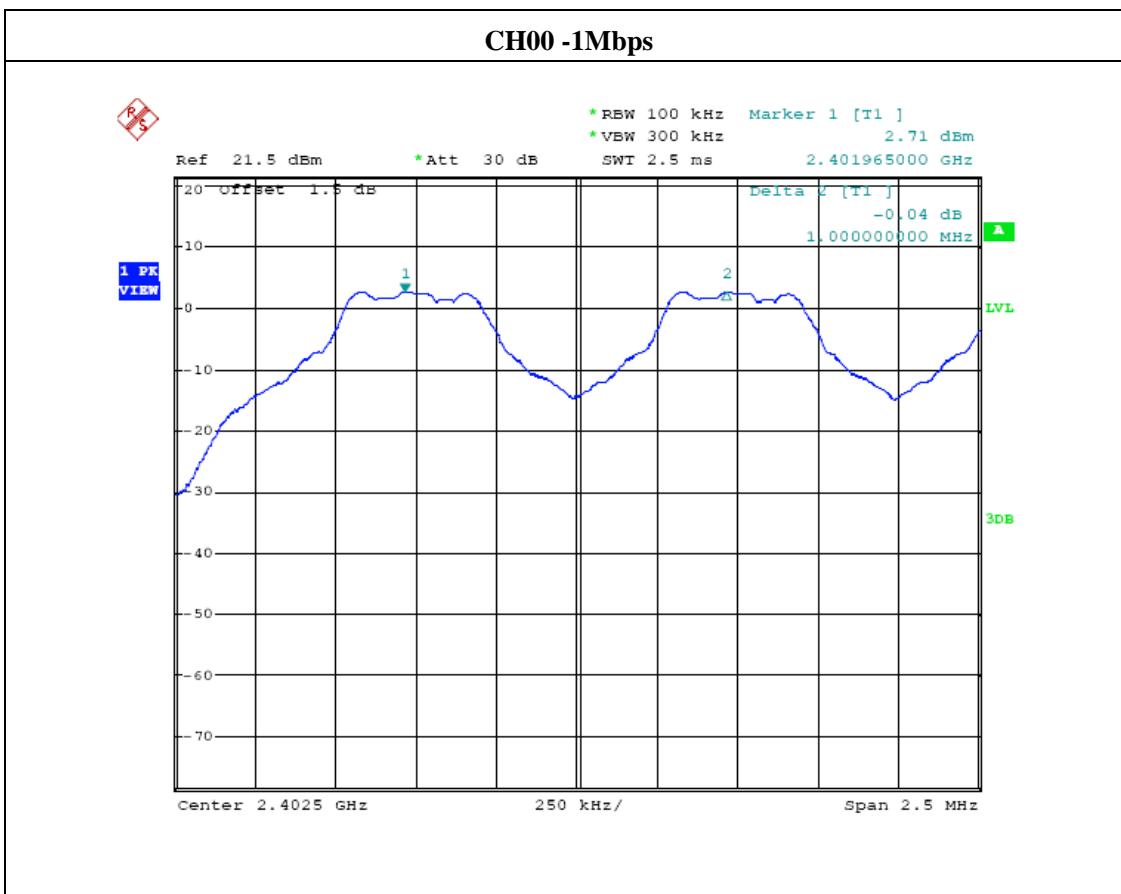
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## 6 TEST RESULTS

EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Result	Pass
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	CH00 / CH39 /CH78 (1Mbps Mode)		

Channel number	Channel frequency (MHz)	Separation Read value (KHz)	Separation limit 2/3 20db down BW(KHz)
00	2402	1000.00	>752
39	2441	1000.00	>744
78	2480	1000.00	>740

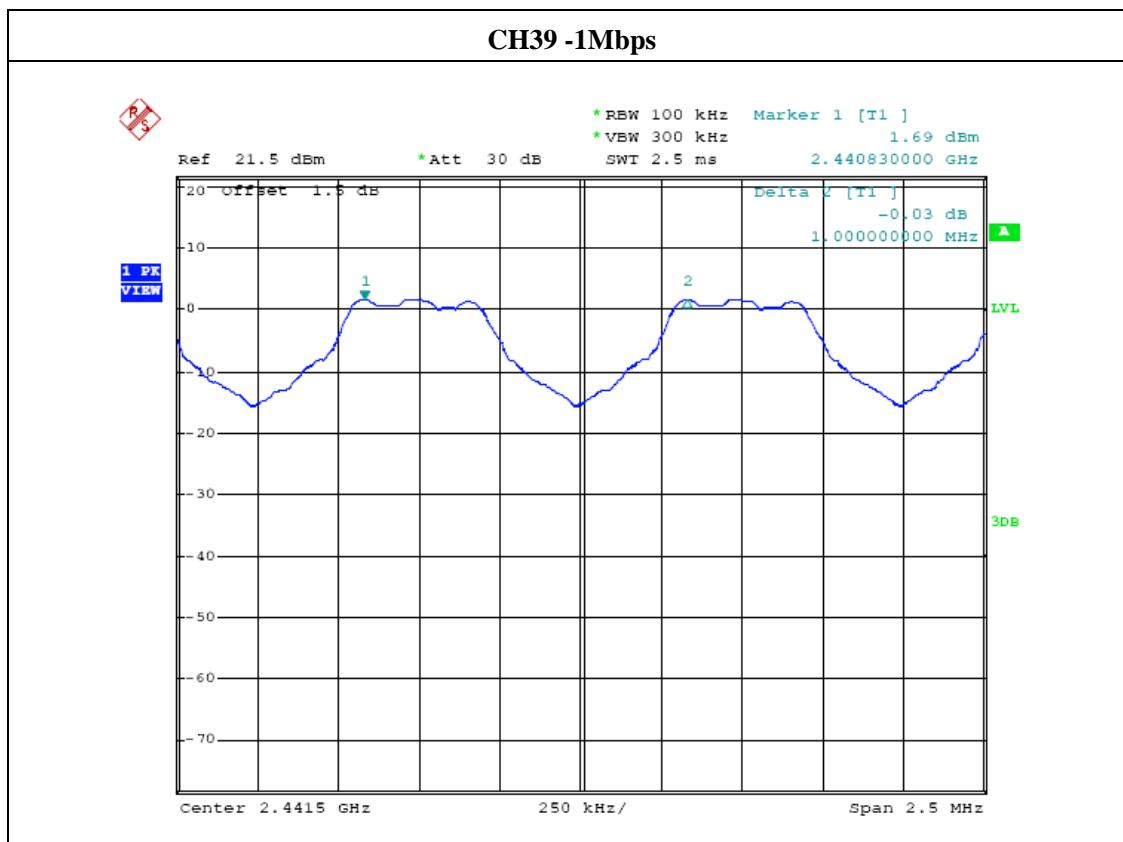
Note: 20db bandwith refer to section 6.1.5



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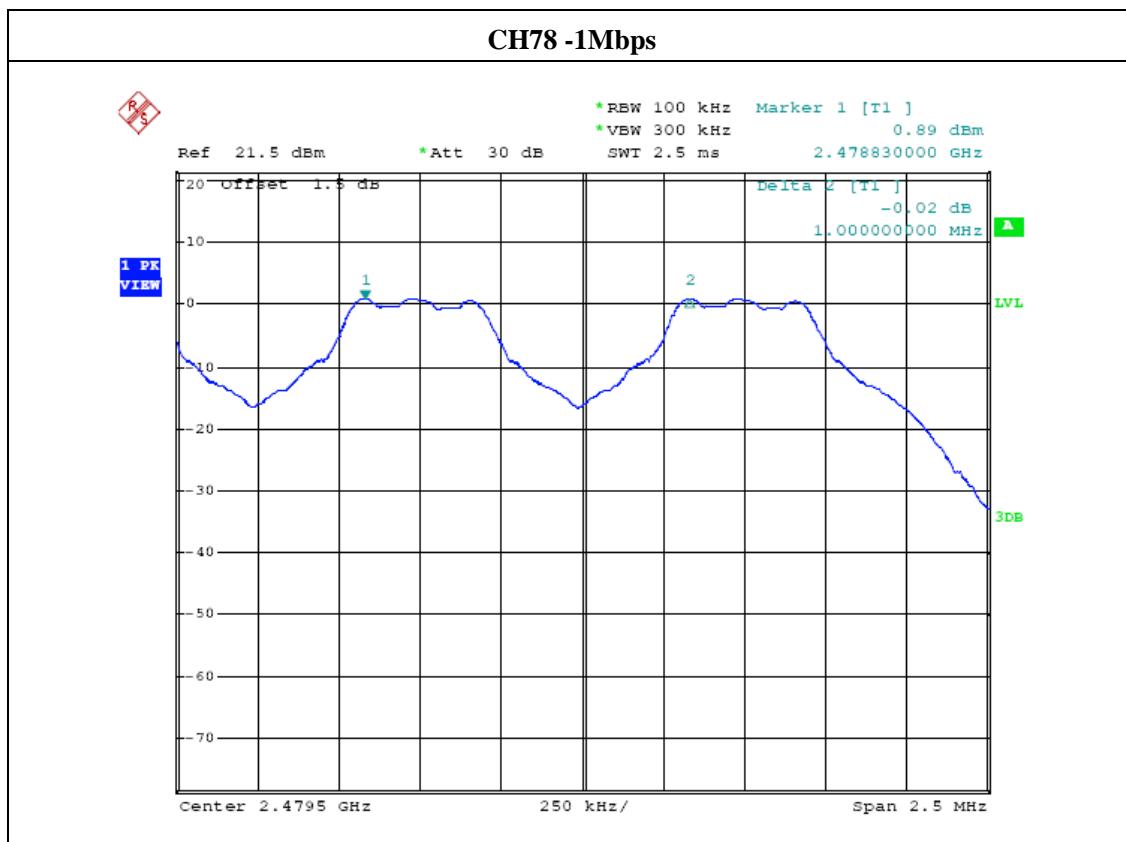
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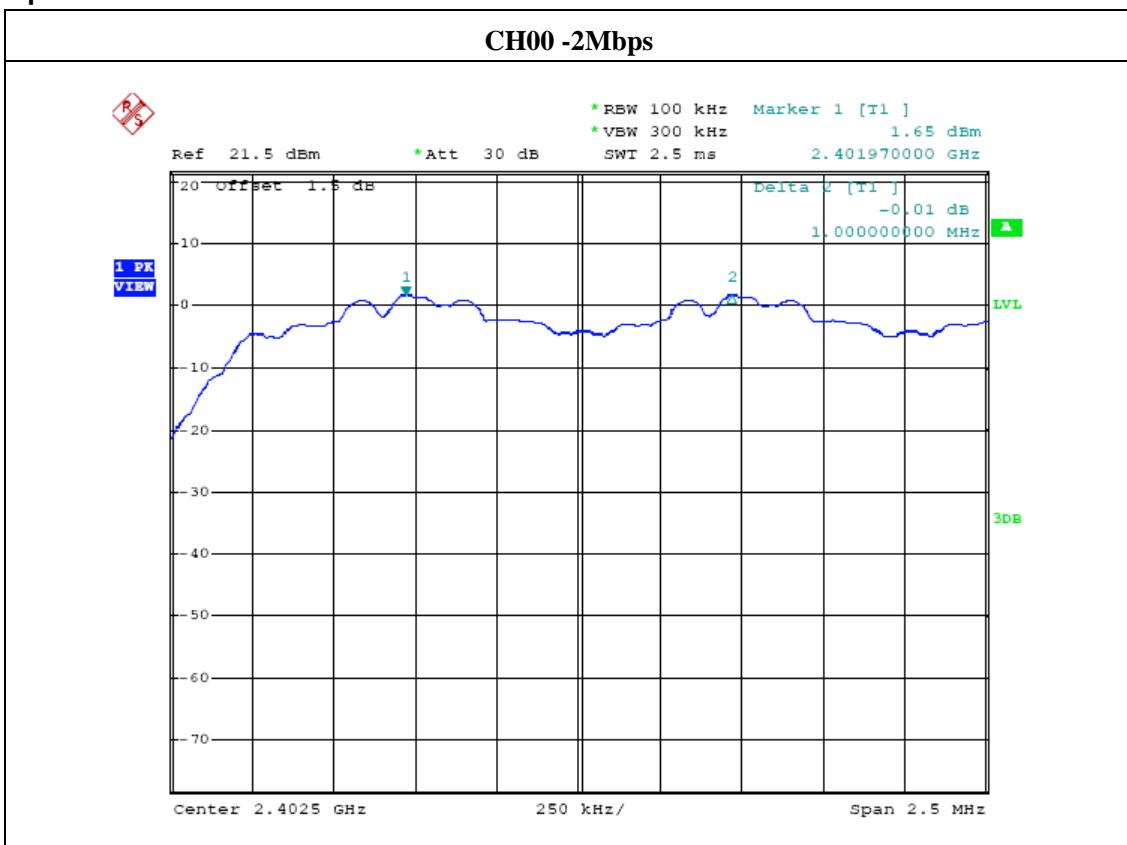
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Result	Pass
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	CH00 / CH39 /CH78 (2Mbps Mode)		

Channel number	Channel frequency (MHz)	Separation Read value (KHz)	Separation limit 2/3 20db down BW(KHz)
00	2402	1000.00	>952
39	2441	1000.00	>936
78	2480	1000.00	>924

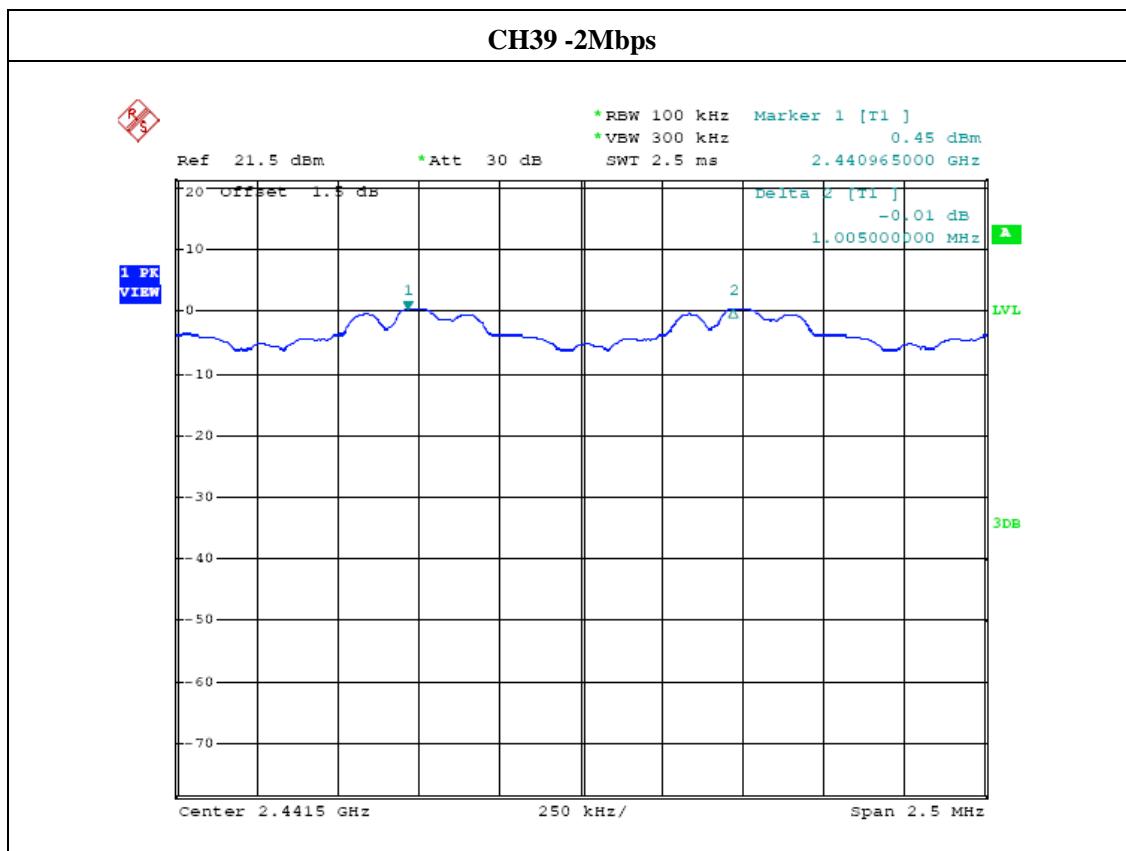
**Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth**



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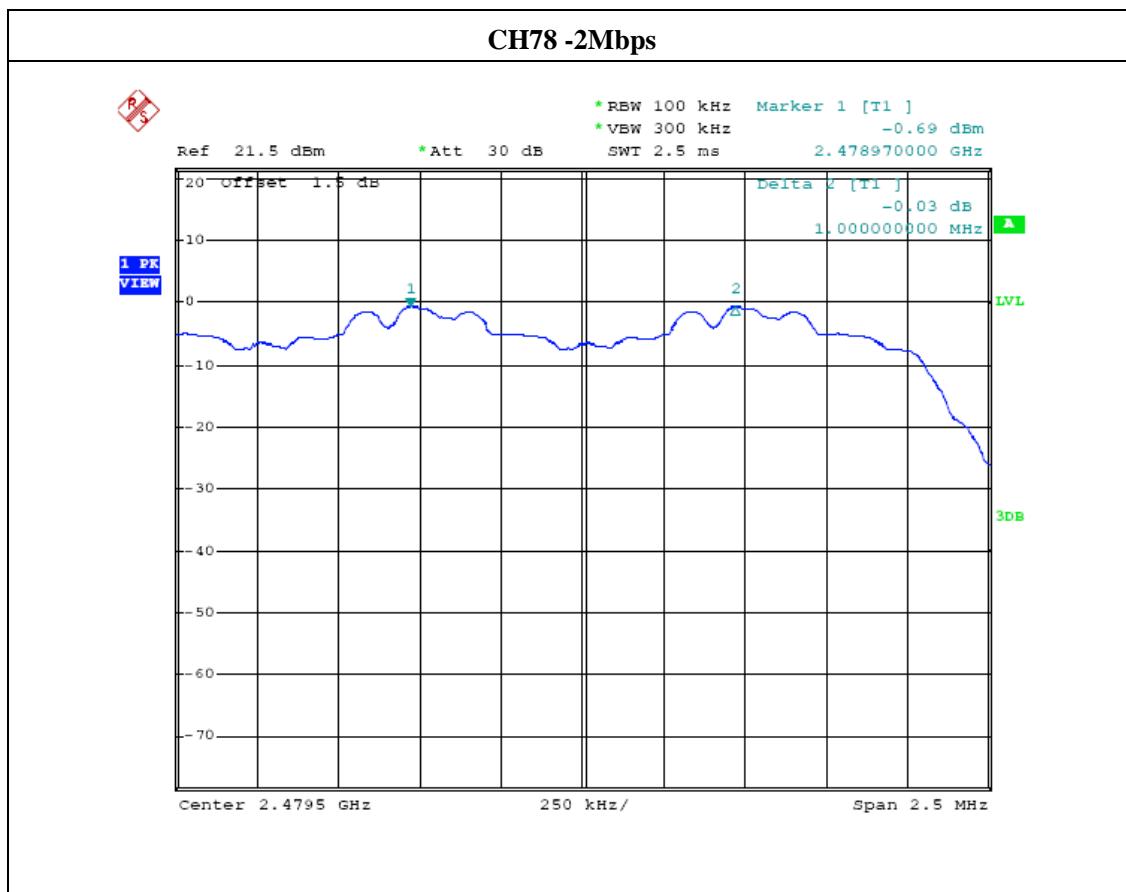
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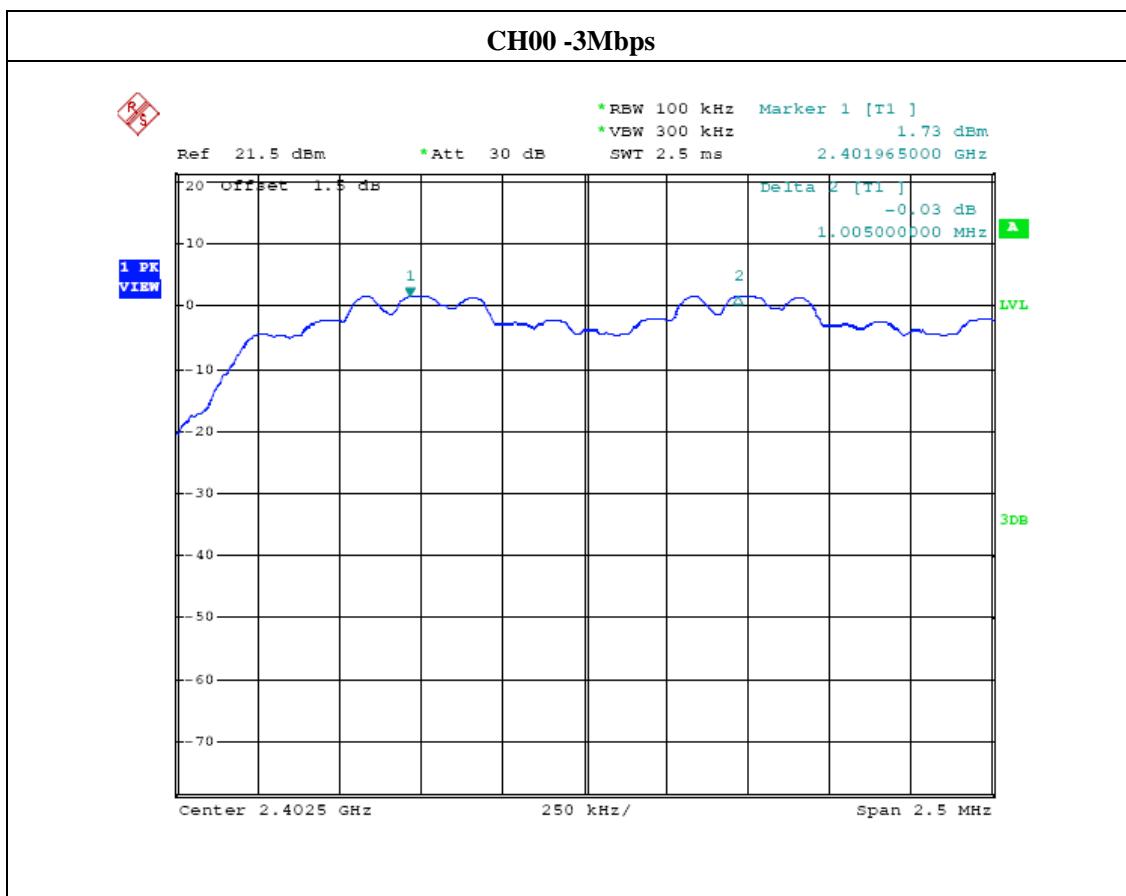
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Result	Pass
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014
Test Mode :	CH00 / CH39 /CH78 (3Mbps Mode)		

Channel number	Channel frequency (MHz)	Separation Read value (KHz)	Separation limit 2/3 20db down BW(KHz)
00	2402	1000.00	>936
39	2441	1000.00	>920
78	2480	1000.00	>904

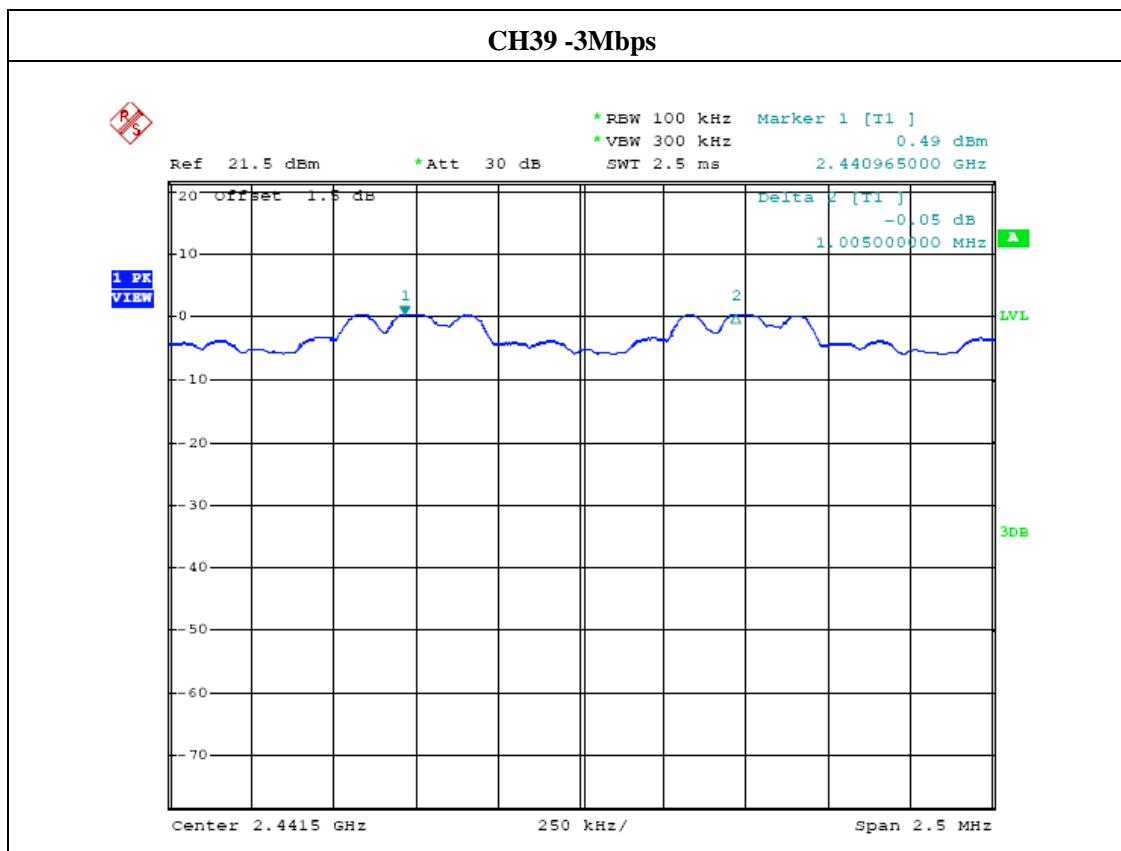
Note: 20db bandwidth refer to section 6.1.5



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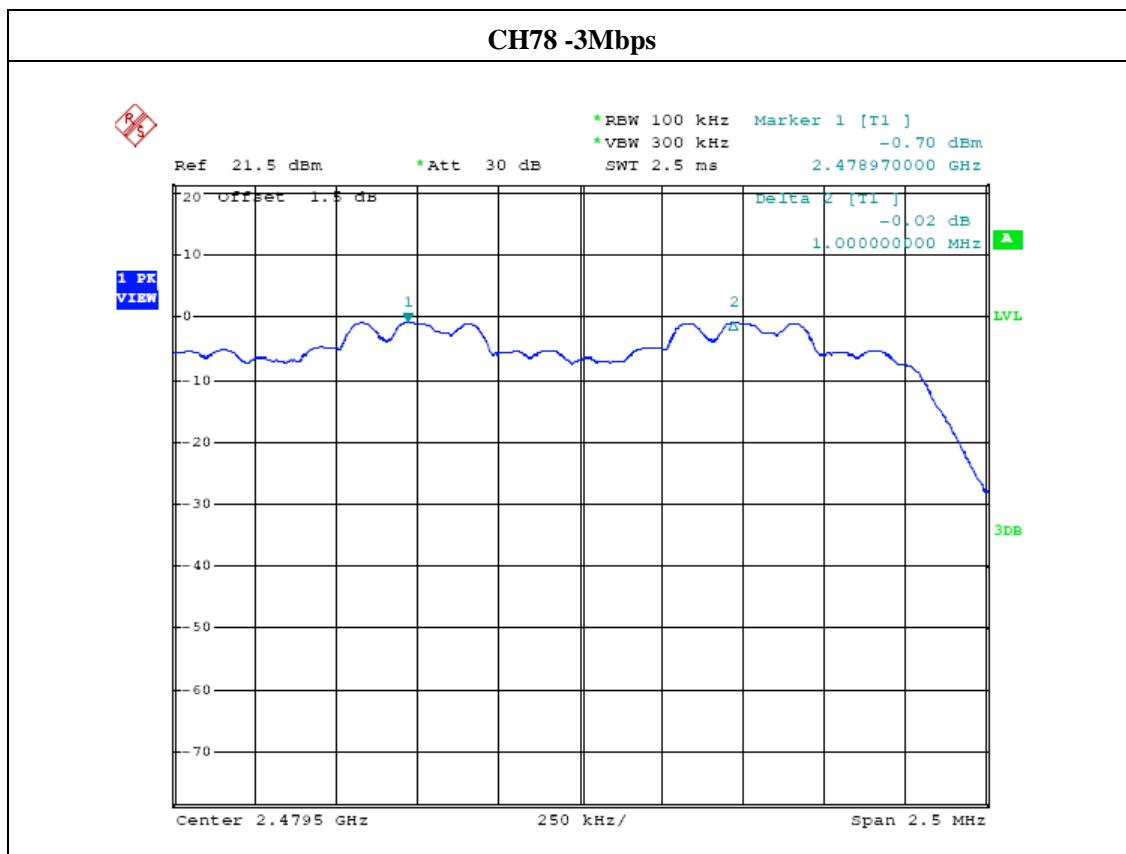
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## 11. BANDWIDTH TEST

### Applied procedures / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

### DEVIATION FROM STANDARD

No deviation.

### TEST SETUP



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## EUT OPERATION CONDITIONS

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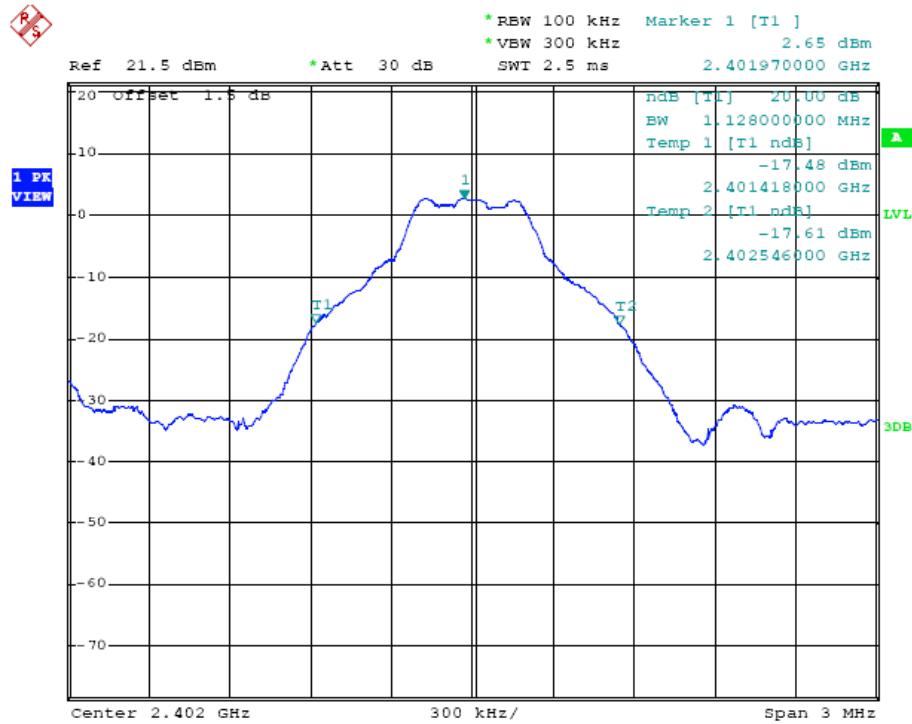
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## TEST RESULTS

EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/CH39/C78(1Mbps)
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	1128	PASS
2441 MHz	1116	PASS
2480 MHz	1110	PASS

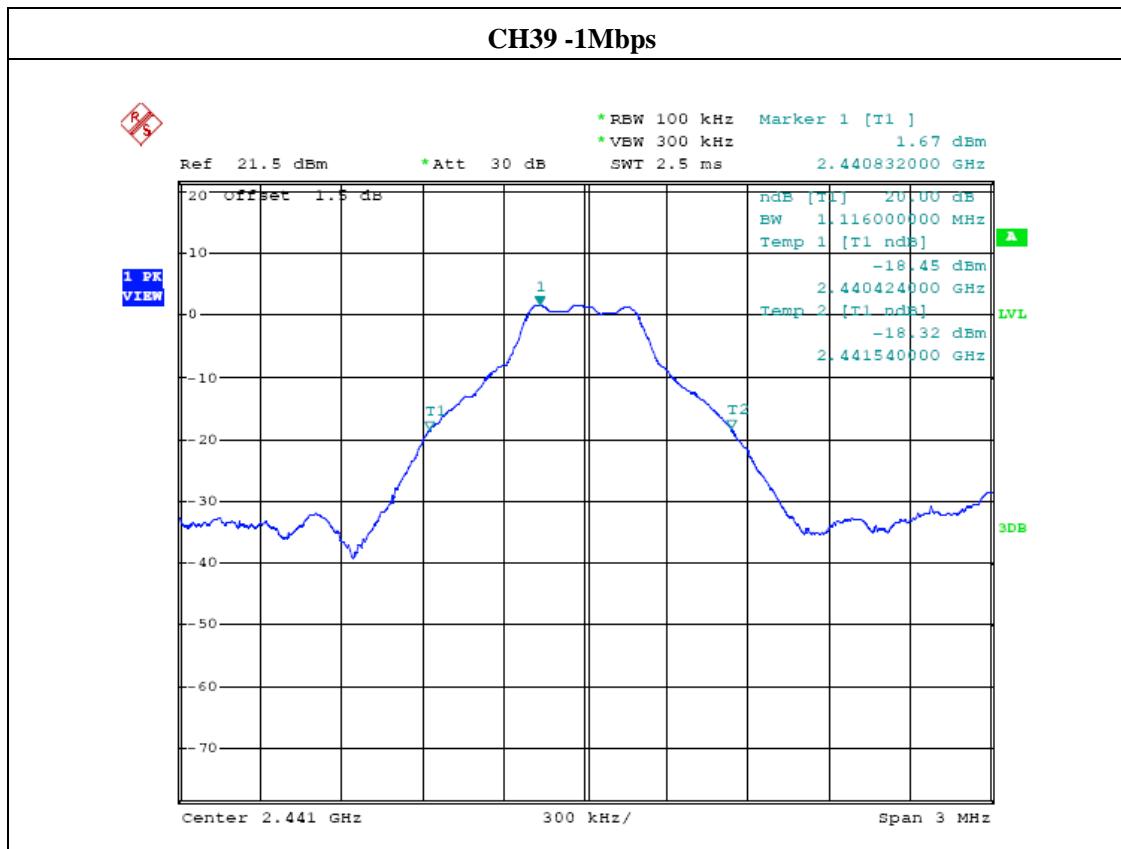
### CH00 -1Mbps



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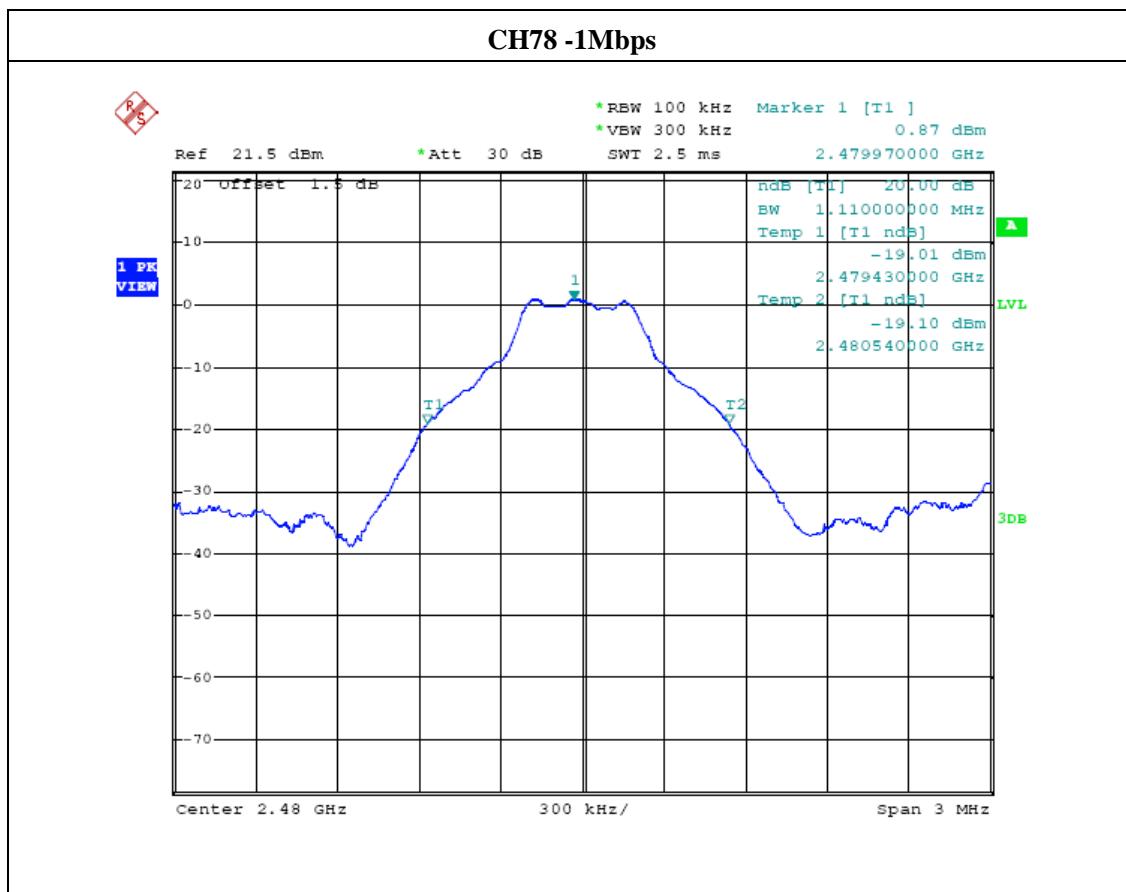
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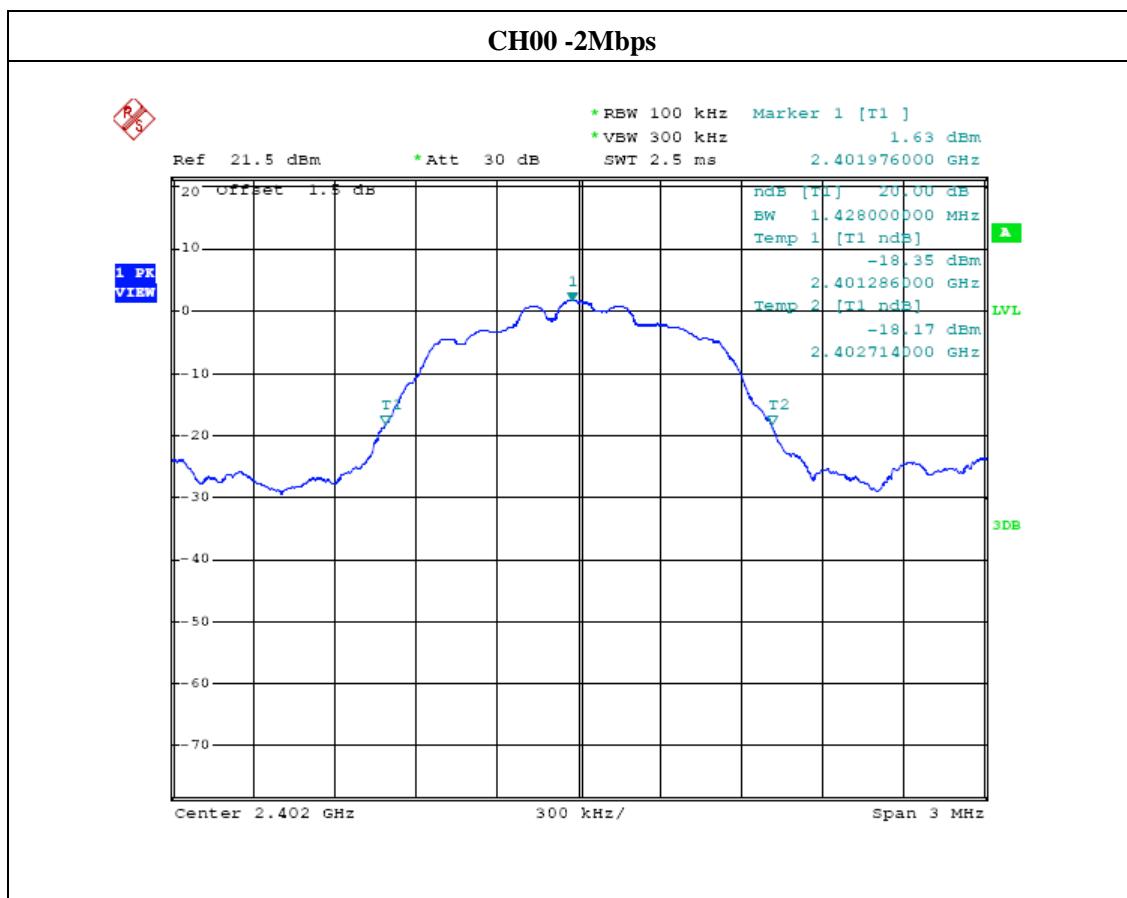
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/CH39/C78(2Mbps)
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014

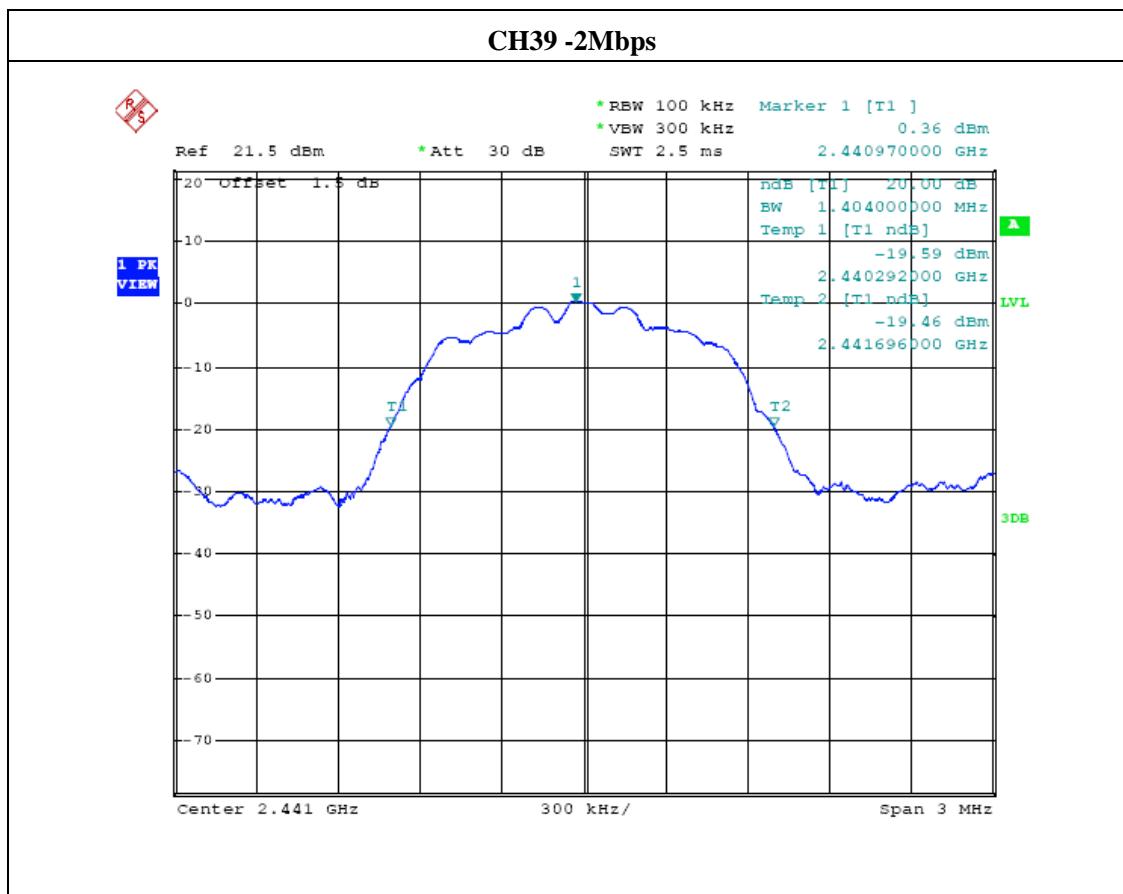
Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	1428	PASS
2441 MHz	1404	PASS
2480 MHz	1386	PASS



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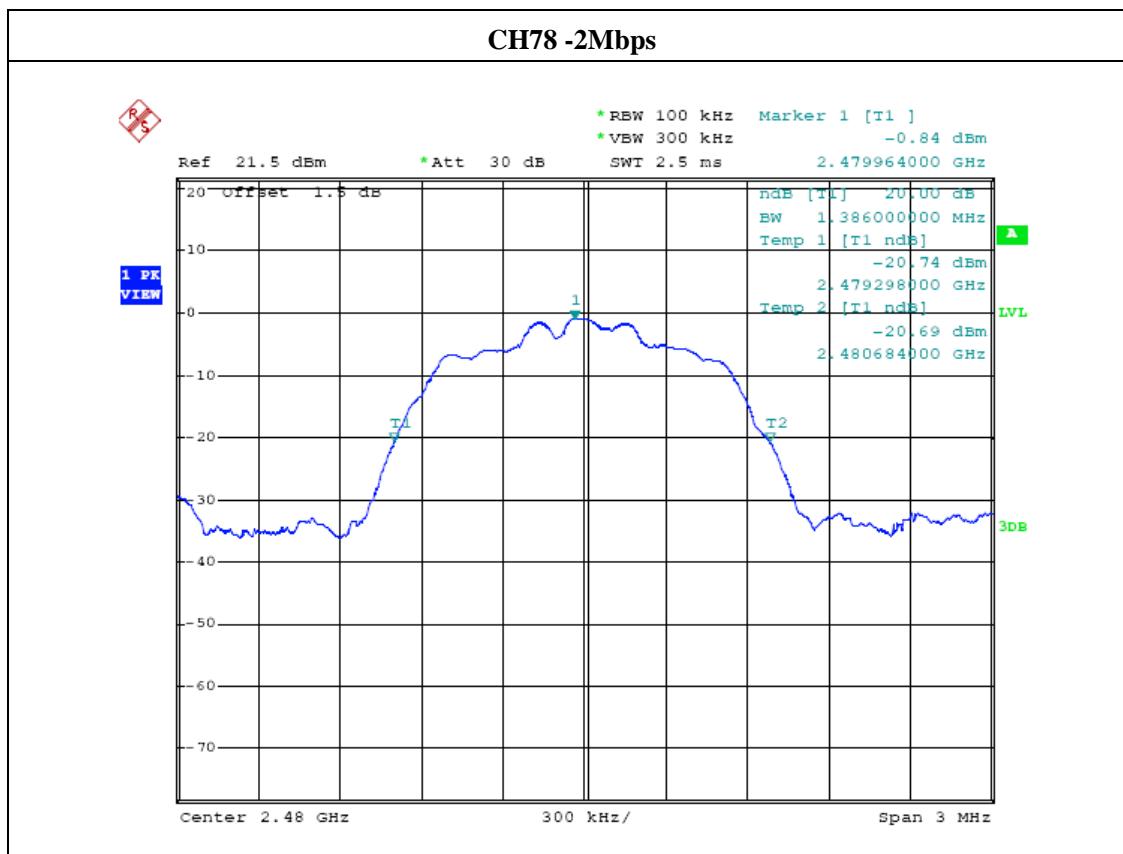
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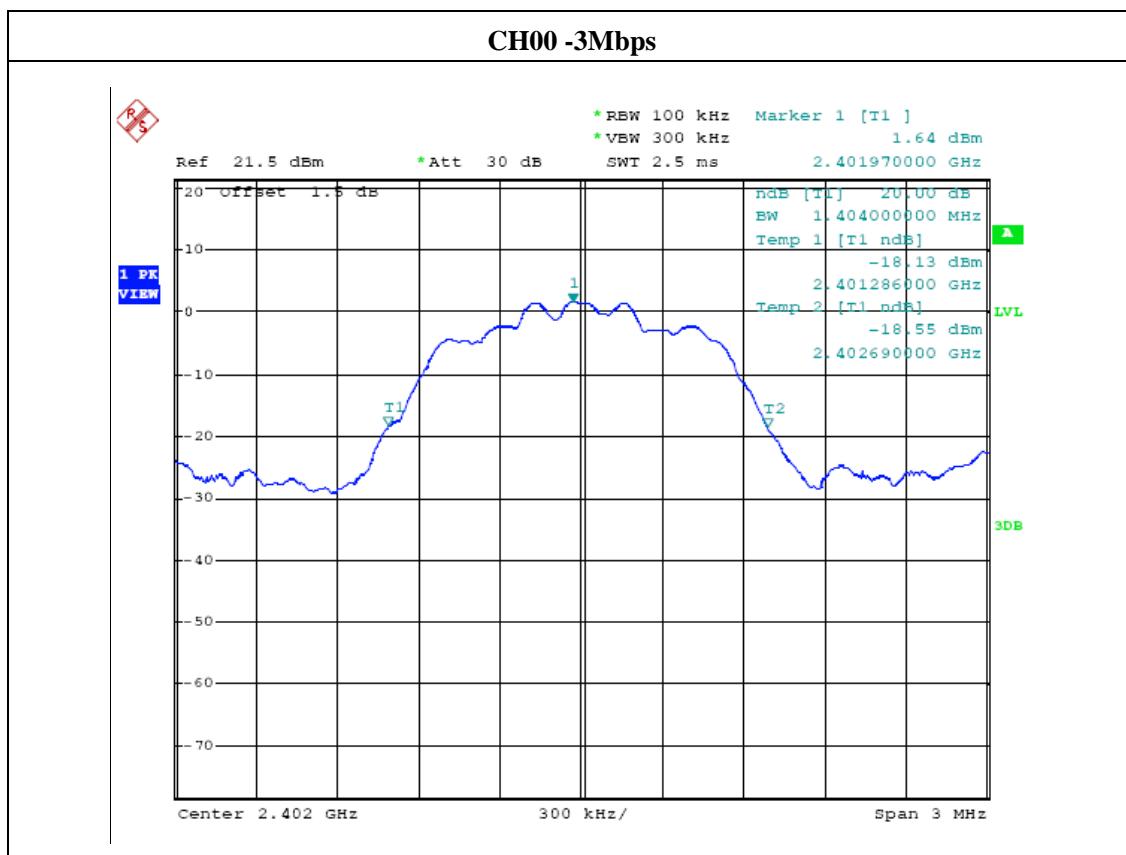
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EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/CH39/C78(3Mbps)
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014

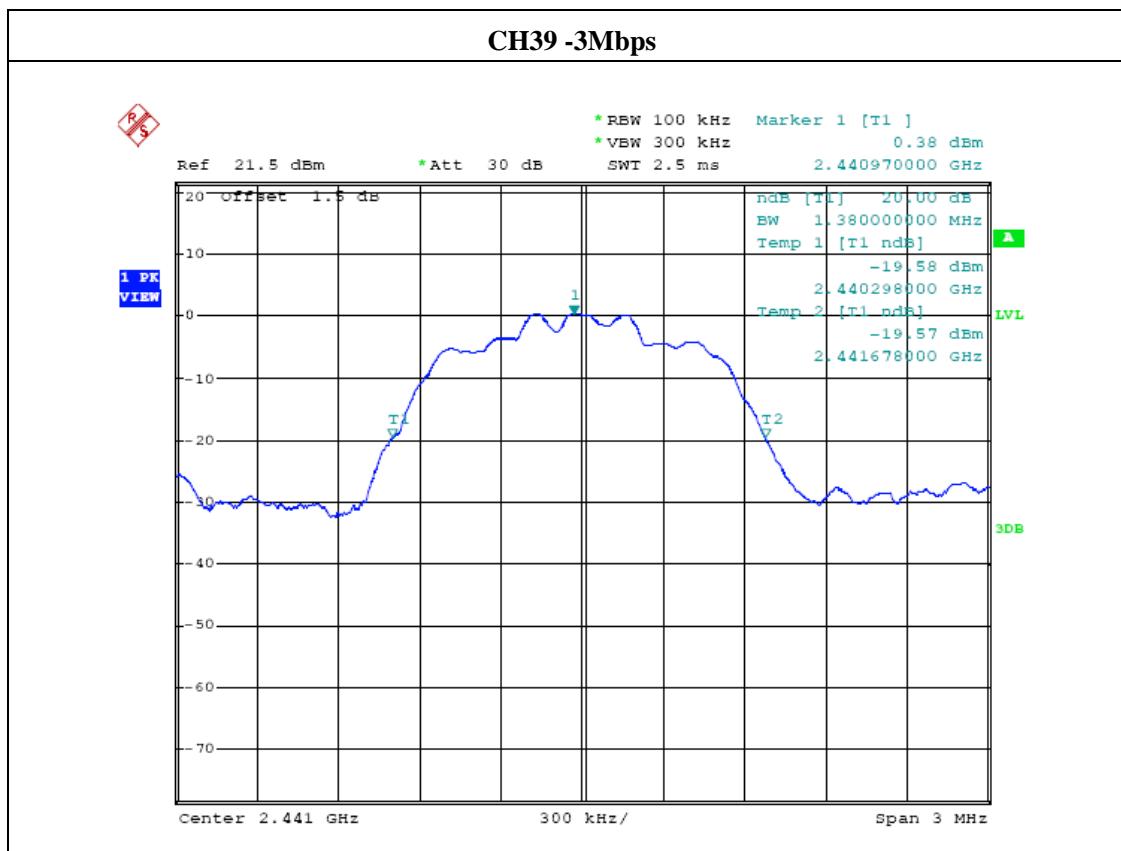
Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	1404	PASS
2441 MHz	1380	PASS
2480 MHz	1356	PASS



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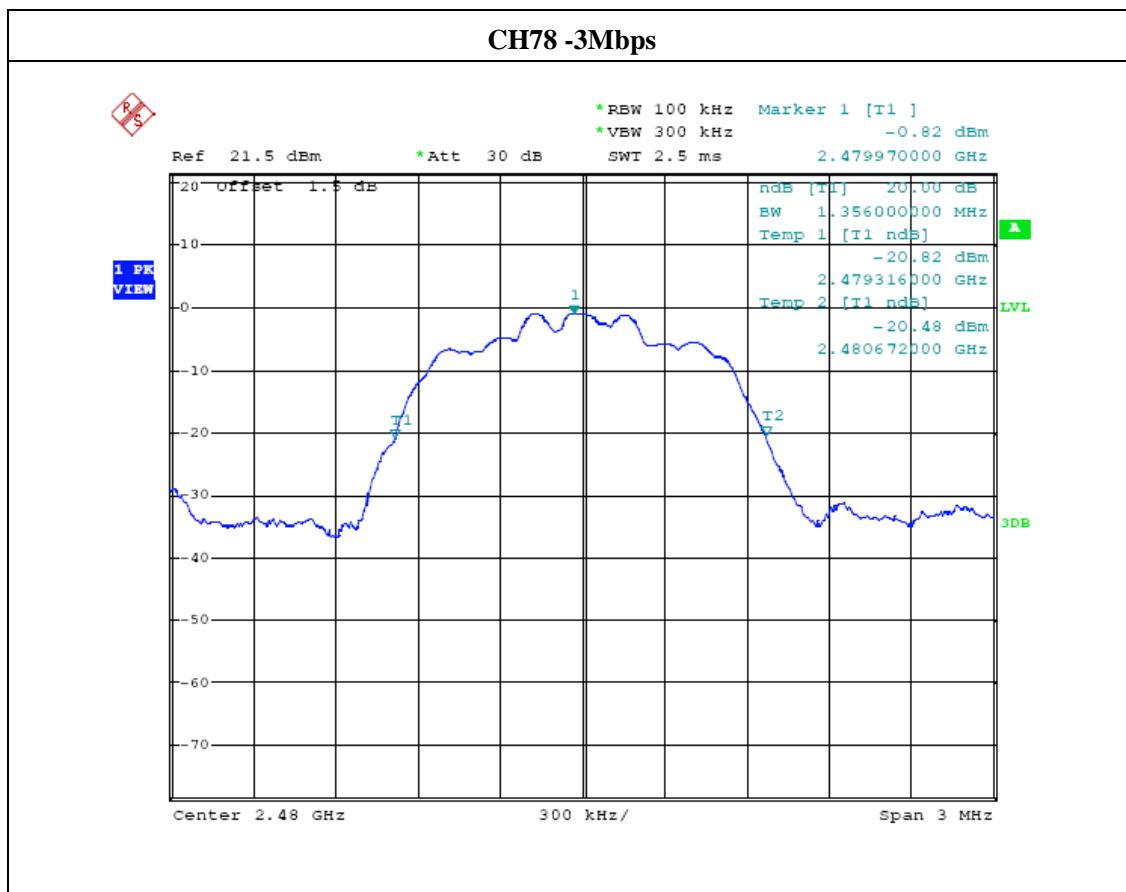
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## 12. PEAK OUTPUT POWER TEST

### Applied procedures / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(i)	Peak Output Power	0.125 w or 20.96dBm	2400-2483.5	PASS

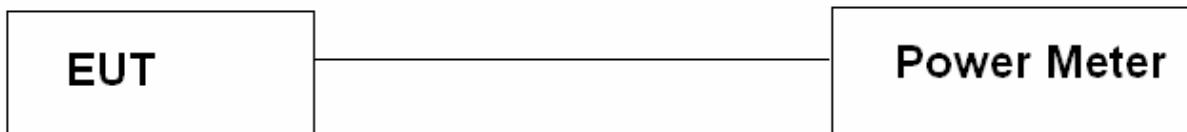
### TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- Setting :  $RBW \geq$  the 20 dB bandwidth of the emission being measured  
Span  $\geq$  approximately 3 times the 20 dB bandwidth, centered on a hopping channel  
 $VBW \geq RBW$   
Sweep = auto  
Detector function = peak  
Trace = max hold

### DEVIATION FROM STANDARD

No deviation.

### 7 TEST SETUP



### 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.

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## TEST RESULTS

EUT:	smartphone	Model Name :	MID5502F
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/ CH39 /CH78 (1M/2M/3Mbps Mode)
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Date	April 8, 2014

<b>1Mbps</b>				
Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT(dBm)	Result
CH00	2402	5.14	20.96	Pass
CH39	2441	5.26	20.96	Pass
CH78	2480	5.61	20.96	Pass

<b>2Mbps</b>				
Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT(dBm)	Result
CH00	2402	4.25	20.96	Pass
CH39	2441	4.31	20.96	Pass
CH78	2480	4.17	20.96	Pass

<b>3Mbps</b>				
Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT(dBm)	Result
CH00	2402	4.24	20.96	Pass
CH39	2441	4.21	20.96	Pass
CH78	2480	4.09	20.96	Pass

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## 13. Antenna Application

### Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247

FCC part 15C section 15.247 requirements: Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### Result

The EUT's antenna is integral antenna, The antenna's gain is 1.62 dBi and meets the requirement.

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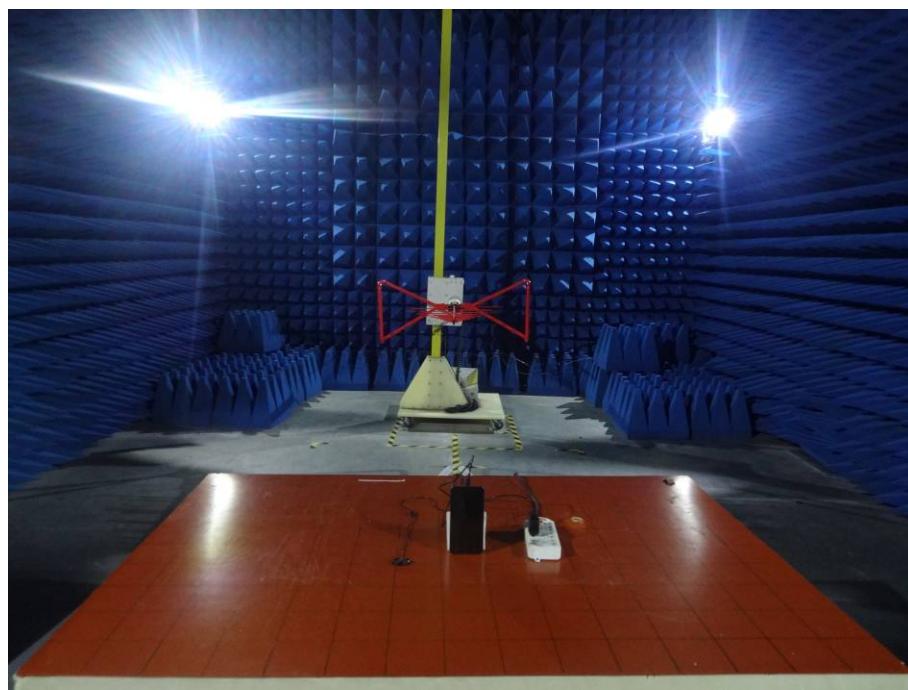
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#### 14. EUT TEST PHOTO

##### CONDUCTED EMISSION TEST



##### RADIATED EMISSION TEST



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## 15 PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



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Appearance photograph of EUT



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Appearance photograph of EUT



Appearance photograph of EUT



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Appearance photograph of EUT



Appearance photograph of EUT



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Internal photograph of EUT



Internal photograph of EUT



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Internal photograph of EUT



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Internal photograph of EUT



Internal photograph of EUT

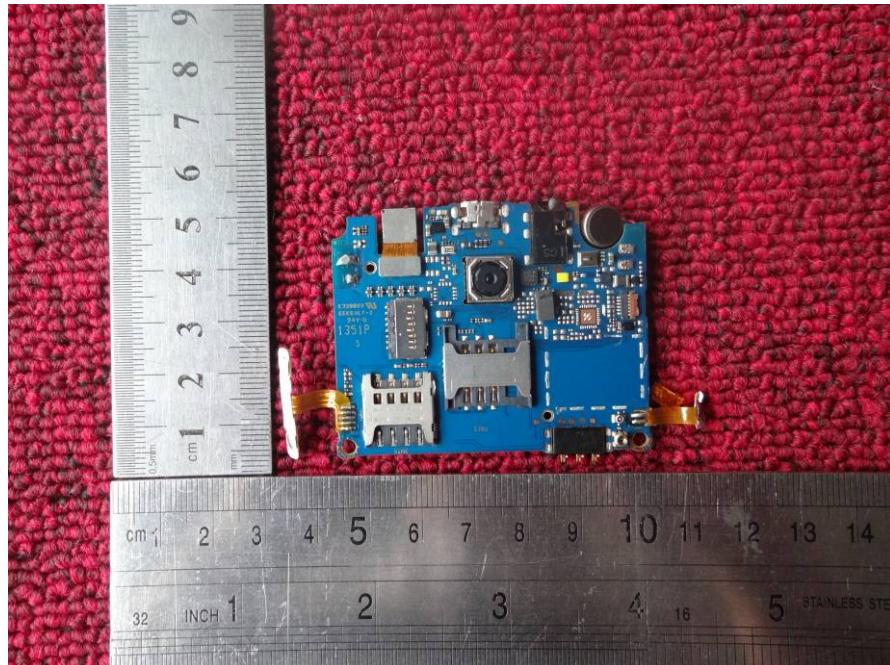


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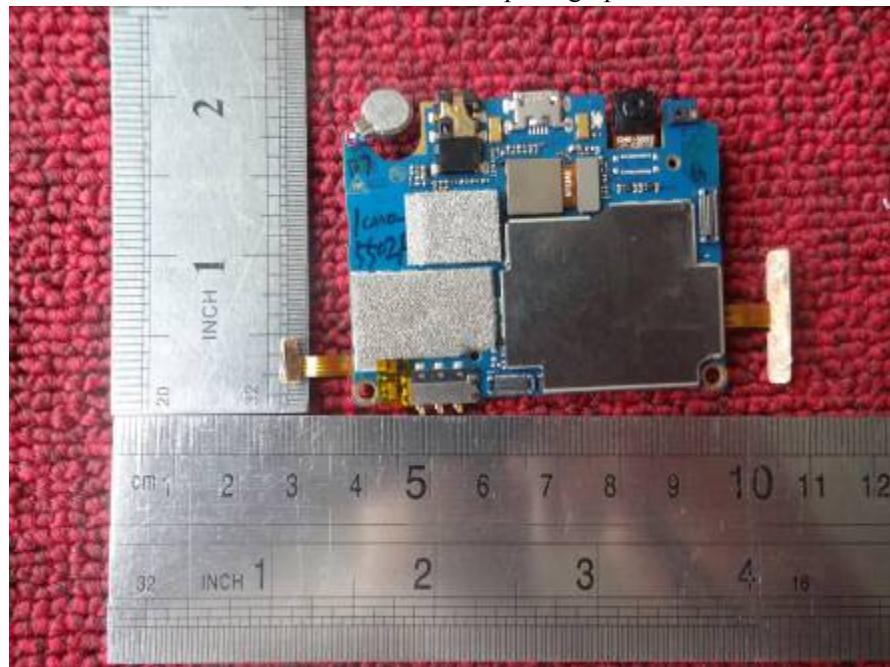
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Internal photograph of EUT



Internal photograph of EUT

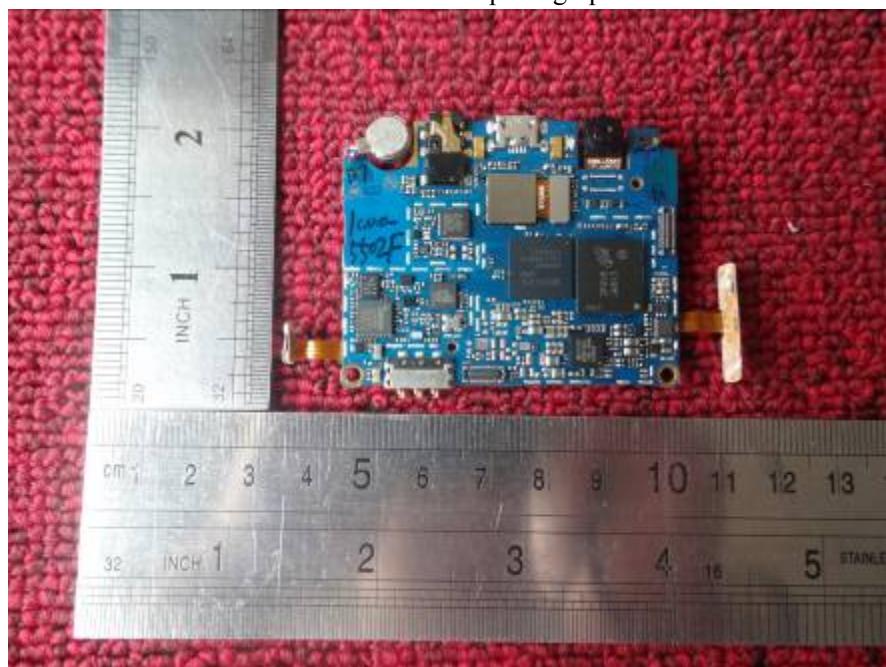


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Internal photograph of EUT



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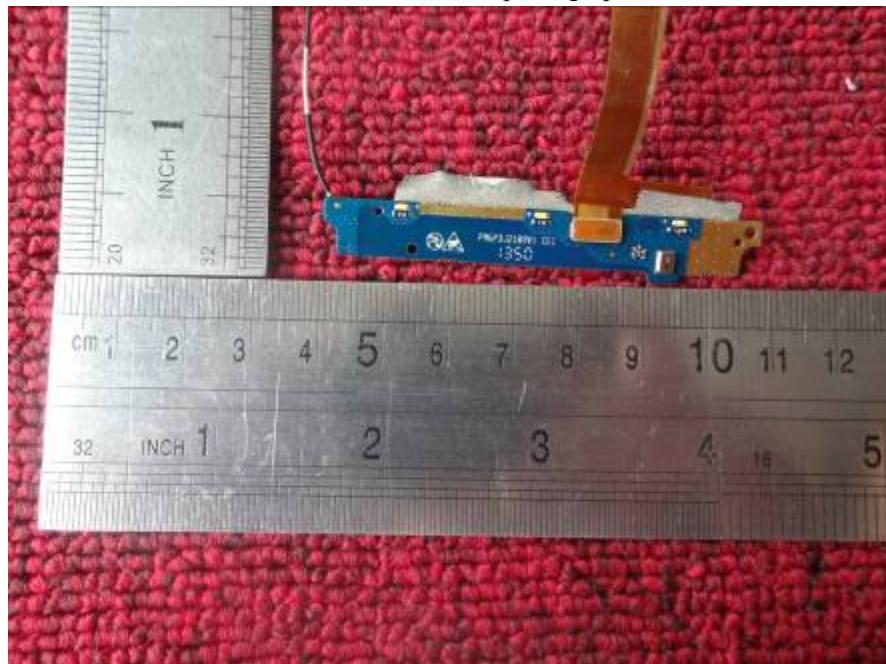


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Internal photograph of EUT



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