



ISO/IEC17025 Accredited Lab.

Report No.: FCC 1412155-01
File reference No.: 2014-12-23

Applicant: MADETRONICS LIMITED

Product: GSM Mobile Phone

Model No.: TITAN Q7

Trademark: MADETRONICS

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

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: Dec 23, 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.

Tel (+86 755)8344 8688 Fax (+86 755)8344 2996 Email:info@timewaytech.com



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: MADETRONICS LIMITED
Address: UNIT 5, 27/F., RICHMOND COMM. BLDG.,109 ARGYLE STREET, MONGKOK, KOWLOON HONG KONG
Telephone: --
Fax: --

1.3 Description of EUT

Product: GSM Mobile Phone
Manufacturer: MADETRONICS LIMITED
Address: UNIT 5, 27/F., RICHMOND COMM. BLDG.,109 ARGYLE STREET, MONGKOK, KOWLOON HONG KONG
Brand Name: MADETRONICS
Model Number: TITAN Q7
Hardware version: X1-MB-V2.0
Software version: X1_K100_V0_4
Type of Modulation: GFSK, 11/4D-QPSK, 8DPSK
Frequency range: 2402-2480MHz
Number of Channel: 79
Frequency Selection: By software
Antenna type: Integral Antenna used, the antenna gain is -1.5dBi
EUT Power Rating: Adapter : Y-801C
Input: AC 100-240V 50/60Hz 200mA
Output: DC 5V 0.5A

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Li-ion Battery: BL-5C
Voltage: 3.7V Capacity: 600mAh
Limited Charge Voltage: 4.2V
1MHz

Channel Separation

1.4 Submitted Sample: 1 Sample

1.5 Test Duration:
2014-11-20 to 2014-12-02

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



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	2014-08-22	2015-08-21
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2014-08-22	2015-08-21
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2014-08-22	2015-08-21
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2014-08-24	2015-08-23
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2014-08-22	2015-08-21
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2014-08-23	2015-08-22
System Controller	CT	SC100	-	--	--
Printer	EPSON	PHOTO EX3	CFNH234850	--	--
Computer	IBM	8434	IS8434KCE99B LXLO*	--	--
Loop Antenna	EMCO	6502	00042960	2014-08-22	2015-08-21
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2014-08-22	2015-08-21
3m OATS	--	--	N/A	2014-08-21	2015-08-20
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170265	2014-08-23	2015-08-22
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	2014-08-23	2015-08-22
Power meter	Anritsu	ML2487A	6K00003613	2014-08-23	2015-08-22
Power meter	Anritsu	MA2491A	32263	2014-08-23	2015-08-22
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2014-08-20	2015-08-19
LISN	AFJ	LS16C	10010947251	2014-08-20	2015-08-19
LISN(Three Phase)	Schwarebeck	NSLK 8126	8126453	2014-08-22	2015-08-21
9*6*6 Anechoic	--	--	N/A	2014-08-21	2015-08-20
EMI Test Receiver	RS	ESCS30	10039	2014-08-22	2015-08-21
RF Cable	H+S	--	--	2014-08-22	2015-08-21
Power sensor	Aglient	U2021XA	--	2014-08-19	2015-08-18

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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	

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

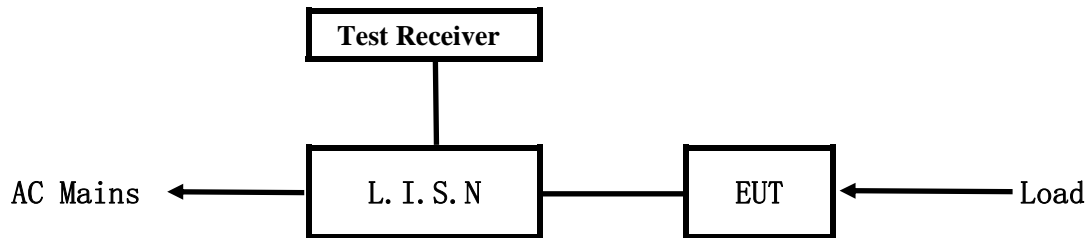
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5. Power Line Conducted Emission Test

5.1 Schematics of the test



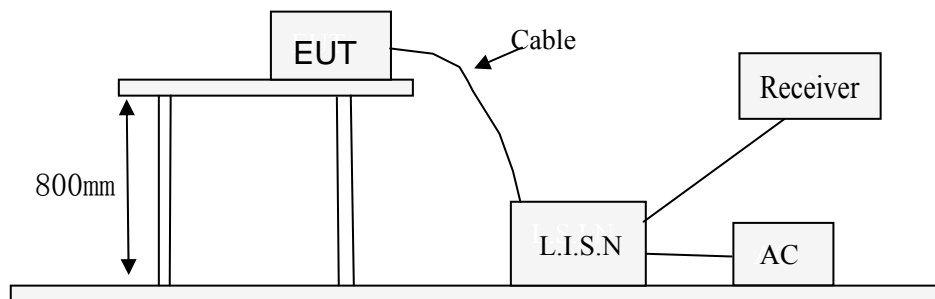
EUT: Equipment Under Test

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
GSM Mobile Phone	MADETRONICS LIMITED	TITAN Q7	2ADOQTITANQ7

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 μ V)		Class B Limits (dB μ 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.

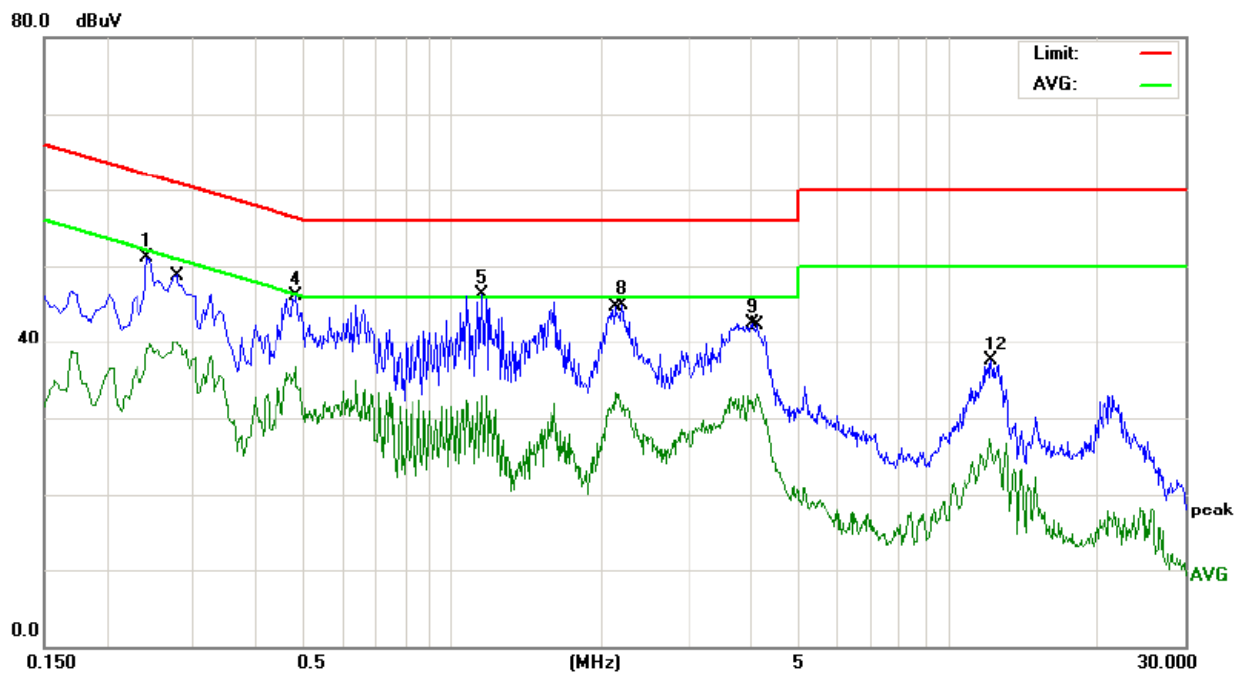
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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC5 V(Adapter Input AC 120V, 60Hz)	Test Mode:	Mode 1 with GFSK modulation
Test Date	November 21, 2014		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2420	40.56	10.45	51.01	62.02	-11.01	peak	
2		0.2740	29.62	10.56	40.18	50.99	-10.81	AVG	
3	*	0.4820	26.32	10.42	36.74	46.30	-9.56	AVG	
4		0.4860	35.74	10.41	46.15	56.24	-10.09	peak	
5		1.1420	35.53	10.74	46.27	56.00	-9.73	peak	
6		1.1420	22.21	10.74	32.95	46.00	-13.05	AVG	
7		2.1300	22.66	10.71	33.37	46.00	-12.63	AVG	
8		2.1900	34.12	10.71	44.83	56.00	-11.17	peak	
9		4.0300	31.85	10.64	42.49	56.00	-13.51	peak	
10		4.1099	22.38	10.63	33.01	46.00	-12.99	AVG	
11		12.1499	16.81	10.42	27.23	50.00	-22.77	AVG	
12		12.1979	27.11	10.42	37.53	60.00	-22.47	peak	

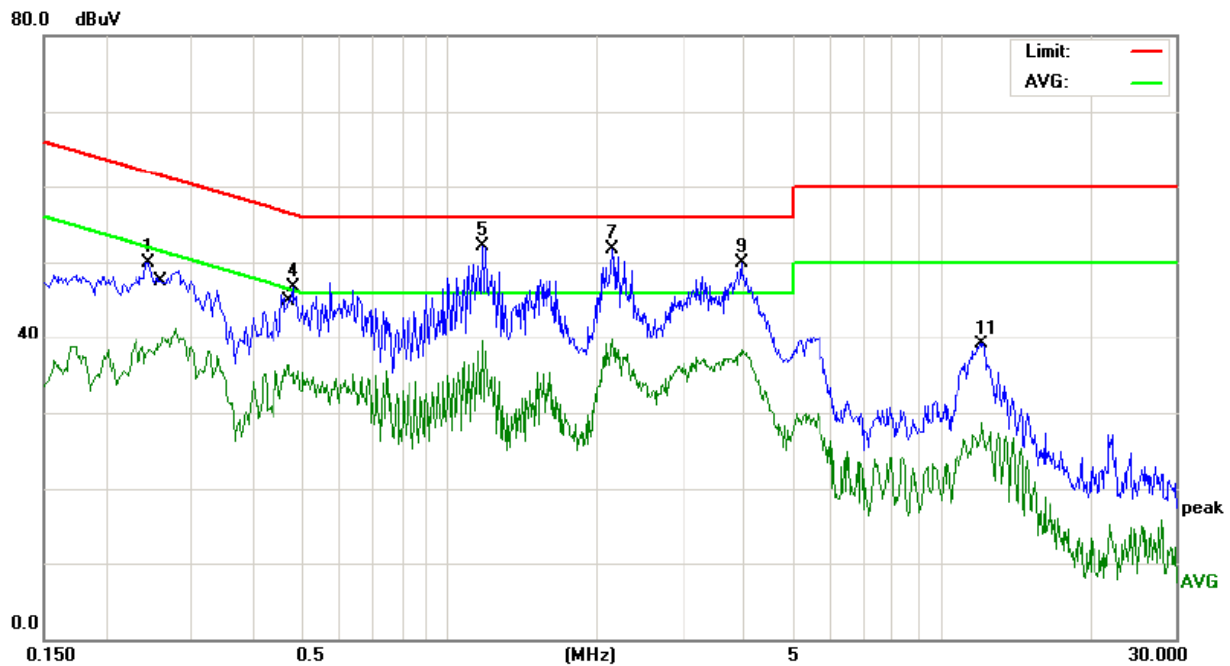
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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5 V(Adapter Input AC 120 V, 60 Hz)	Test Mode:	Mode 1 with GFSK modulation
Test Date	November 21, 2014		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2460	39.43	10.46	49.89	61.89	-12.00	peak	
2		0.2620	29.59	10.52	40.11	51.36	-11.25	AVG	
3		0.4700	25.82	10.43	36.25	46.51	-10.26	AVG	
4		0.4820	36.25	10.42	46.67	56.30	-9.63	peak	
5	*	1.1700	41.39	10.74	52.13	56.00	-3.87	peak	
6		1.1700	28.69	10.74	39.43	46.00	-6.57	AVG	
7		2.1538	41.04	10.71	51.75	56.00	-4.25	peak	
8		2.1538	29.09	10.71	39.80	46.00	-6.20	AVG	
9		3.9340	39.35	10.64	49.99	56.00	-6.01	peak	
10		3.9340	27.61	10.64	38.25	46.00	-7.75	AVG	
11		12.1499	28.73	10.42	39.15	60.00	-20.85	peak	
12		12.1499	18.21	10.42	28.63	50.00	-21.37	AVG	

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6.0 RADIATED EMISSION MEASUREMENT

6.1 Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micovolts/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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6.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- 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.
- 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.
- 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*

6.3 DEVIATION FROM TEST STANDARD

No deviation

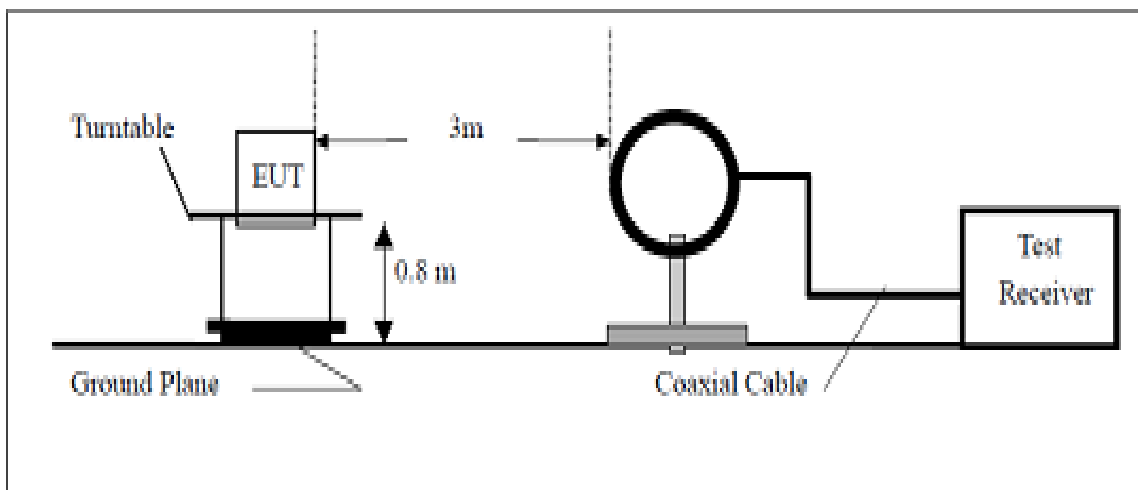
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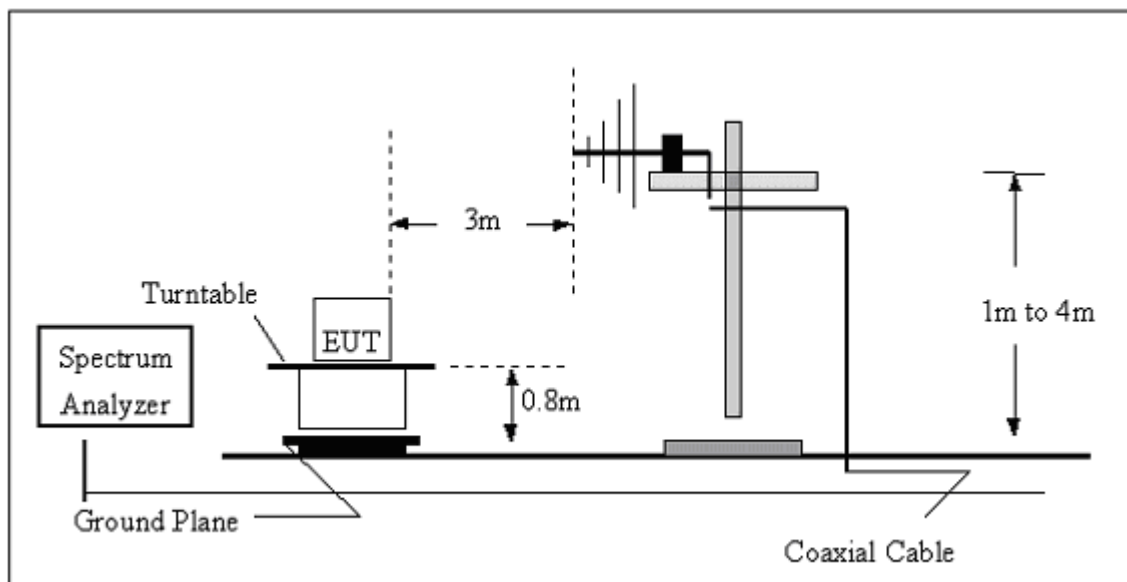
In the event of the improper use of the report, The Shenzhen Timeway Technology Consulting Co., Ltd. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

6.4 TEST SETUP

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



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

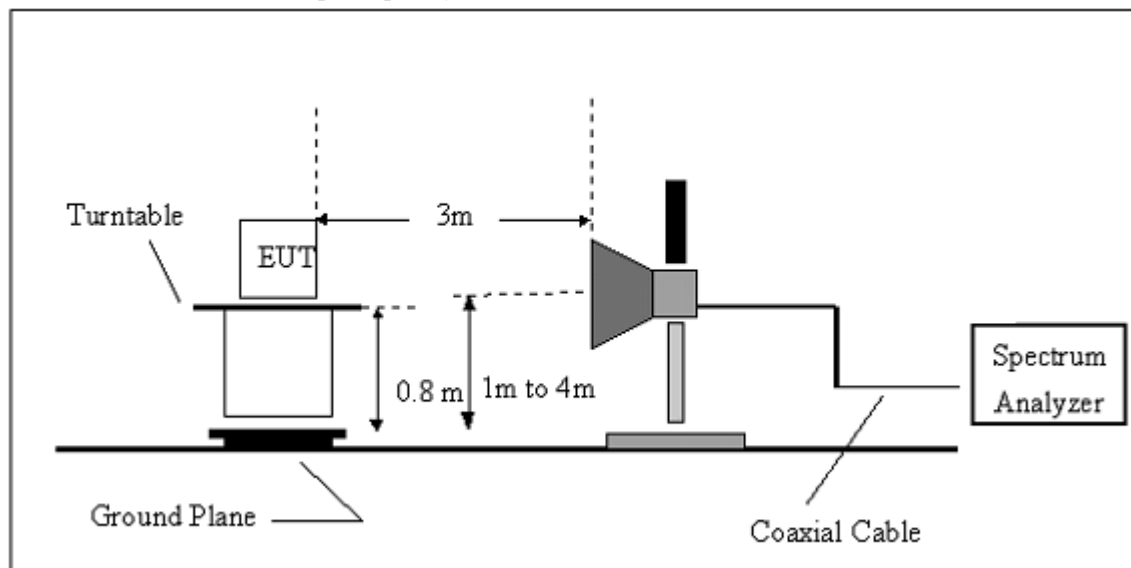


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(C) Radiated Emission Test-Up Frequency Above 1GHz



6.5 EUT OPERATING CONDITIONS

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

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6.6 Test Result (Below 30MHz)

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	---
Test Voltage :	DC 5V(Adapter Input AC 120V, 60Hz)	Test Date	November 21, 2014
Test Mode :	Mode 1/ Mode 2/ Mode 3		

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

NOTE:

No result in this part for margin above 20dB.

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

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.

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

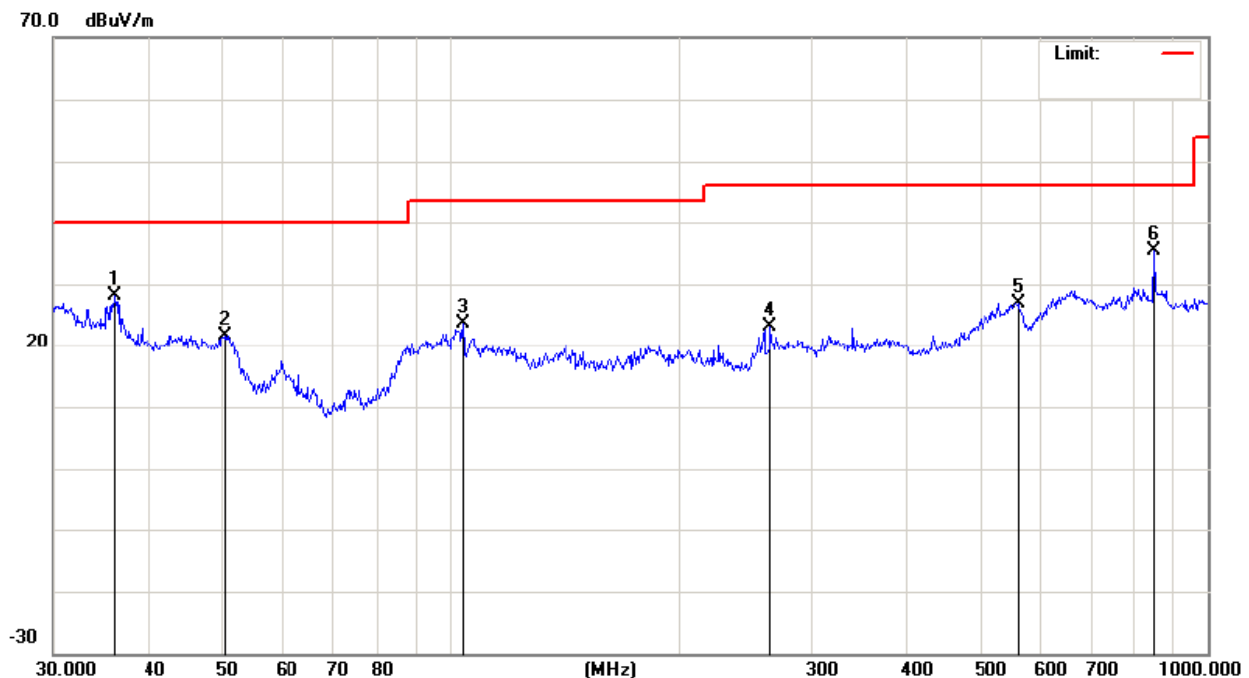
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Test Result (Between 30MHz-1000MHz)

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 21, 2014
Test Mode :	Mode 1 with GFSK modulation		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		36.1272	28.57	-0.34	28.23	40.00	-11.77	peak		
2		50.4089	29.28	-7.59	21.69	40.00	-18.31	peak		
3		104.1701	31.30	-7.55	23.75	43.50	-19.75	peak		
4		264.7457	27.14	-3.95	23.19	46.00	-22.81	peak		
5		562.6624	24.44	2.50	26.94	46.00	-19.06	peak		
6	*	851.0353	30.67	4.60	35.27	46.00	-10.73	peak		

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

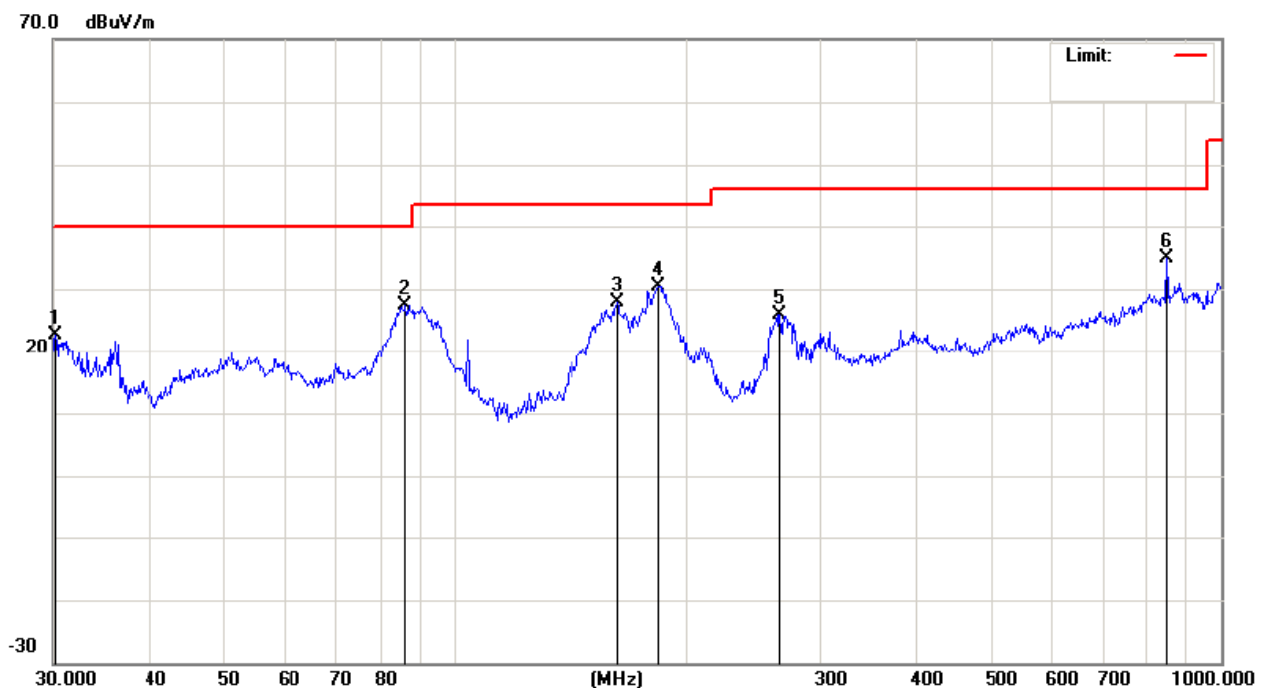
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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 21, 2014
Test Mode :	Mode 1 with GFSK modulation		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		30.2111	26.26	-3.69	22.57	40.00	-17.43	peak		
2		86.2001	40.38	-12.92	27.46	40.00	-12.54	peak		
3		163.1818	32.88	-4.95	27.93	43.50	-15.57	peak		
4		184.4898	36.27	-5.84	30.43	43.50	-13.07	peak		
5		265.6757	30.78	-4.80	25.98	46.00	-20.02	peak		
6	*	851.0353	29.13	5.67	34.80	46.00	-11.20	peak		

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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2402MHz CH 00(1Mbps)
Test Voltage :	A DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date :	November 21, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4804	V	59.6	46.9	74	54	-14.4	-7.1
7206	V	58.4	38.4	74	54	-15.6	-15.6
4804	H	58.6	39.5	74	54	-15.4	-14.5
7206	H	64.6	41.7	74	54	-9.4	-12.3

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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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2441MHz CH 39 (1Mbps)
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date :	November 21, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4882	V	63.5	39.1	74	54	-10.5	-14.9
7323	V	59.0	45.9	74	54	-15.0	-8.1
4882	H	67.7	46.2	74	54	-6.3	-7.8
7323	H	66.8	38.4	74	54	-7.2	-15.6

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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Mode :	TX 2480MHz CH 78(1Mbps)
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 21, 2014

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4960	V	62.2	41.1	74	54	-11.8	-12.9
7440	V	67.0	45.3	74	54	-7.0	-8.7
4960	H	65.7	45.6	74	54	-8.3	-8.4
7440	H	60.2	38.1	74	54	-13.8	-15.9

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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TEST RESULTS (Restricted Bands Requirements)

Test result for 1Mbps Mode:

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	TX /2402MHz-1Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2382	64.1	-12.99	51.1	74	22.9	peak
2382	55.9	-12.99	42.9	54	11.1	AVG
2390	61.0	-12.99	48.0	74	26.0	peak
2390	51.2	-12.99	38.3	54	15.7	AVG
<p>Remark:</p> <p>Factor = Antenna Factor + Cable Loss – Pre-amplifier.</p> <p>All the x/y/z orientation has been investigated, and only worst case is presented in this report.</p>						

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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	TX /2402MHz-1Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2376	62.3	-12.99	49.4	74	24.6	peak
2376	55.4	-12.99	42.4	54	11.6	AVG
2390	62.1	-12.99	49.1	74	24.9	peak
2390	55.1	-12.99	42.2	54	11.8	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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	TX /2480MHz-1Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	64.4	-12.99	51.4	74	22.6	peak
2483.5	52.6	-12.99	39.6	54	14.4	AVG

Remark:

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

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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	TX /2480MHz-1Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	64.7	-12.99	51.7	74	22.3	peak
2483.5	56.0	-12.99	43.0	54	11.0	AVG

Remark:

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

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Test result for 3Mbps Mode:

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	TX /2402MHz-3Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2387	60.3	-12.99	47.3	74	26.7	peak
2387	55.6	-12.99	42.6	54	11.4	AVG
2390	63.8	-12.99	50.8	74	23.2	peak
2390	56.2	-12.99	43.2	54	10.8	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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	TX /2402MHz-3Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2384	62.6	-12.99	49.6	74	24.4	peak
2384	57.4	-12.99	44.4	54	9.6	AVG
2390	60.1	-12.99	47.1	74	26.9	peak
2390	60.8	-12.99	47.8	54	6.2	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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	TX /2480MHz-3Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	62.3	-12.99	49.3	74	24.7	peak
2483.5	58.8	-12.99	45.9	54	8.1	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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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	TX /2480MHz-3Mbps		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	65.5	-12.99	52.5	74	21.5	peak
2483.5	59.1	-12.99	46.1	54	7.9	AVG

Remark:

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

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Test result for hopping mode:

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	hopping mode		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2381	62.2	-12.99	49.2	74	24.8	peak
2381	57.1	-12.99	44.1	54	9.9	AVG
2390	60.6	-12.99	47.6	74	26.4	peak
2390	59.5	-12.99	46.5	54	7.5	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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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	Hopping mode		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2378	63.3	-12.99	50.4	74	23.6	peak
2378	61.0	-12.99	48.0	54	6.0	AVG
2390	64.0	-12.99	51.0	74	23.0	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:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Vertical
Test Mode :	Hopping mode		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	65.7	-12.99	52.7	74	21.3	peak
2483.5	55.8	-12.99	42.8	54	11.2	AVG

Remark:

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

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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Date	November 21, 2014
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Polarization :	Horizontal
Test Mode :	Hopping mode		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	63.0	-12.99	50.0	74	24.0	peak
2483.5	56.0	-12.99	43.0	54	11.0	AVG

Remark:

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

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7.0 NUMBER OF HOPPING CHANNEL

7.1 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

7.2 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= 1000kHz, VBW=1000kHz, Sweep time = Auto.

7.3 DEVIATION FROM STANDARD

No deviation.



7.4 TEST SETUP



7.5 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.

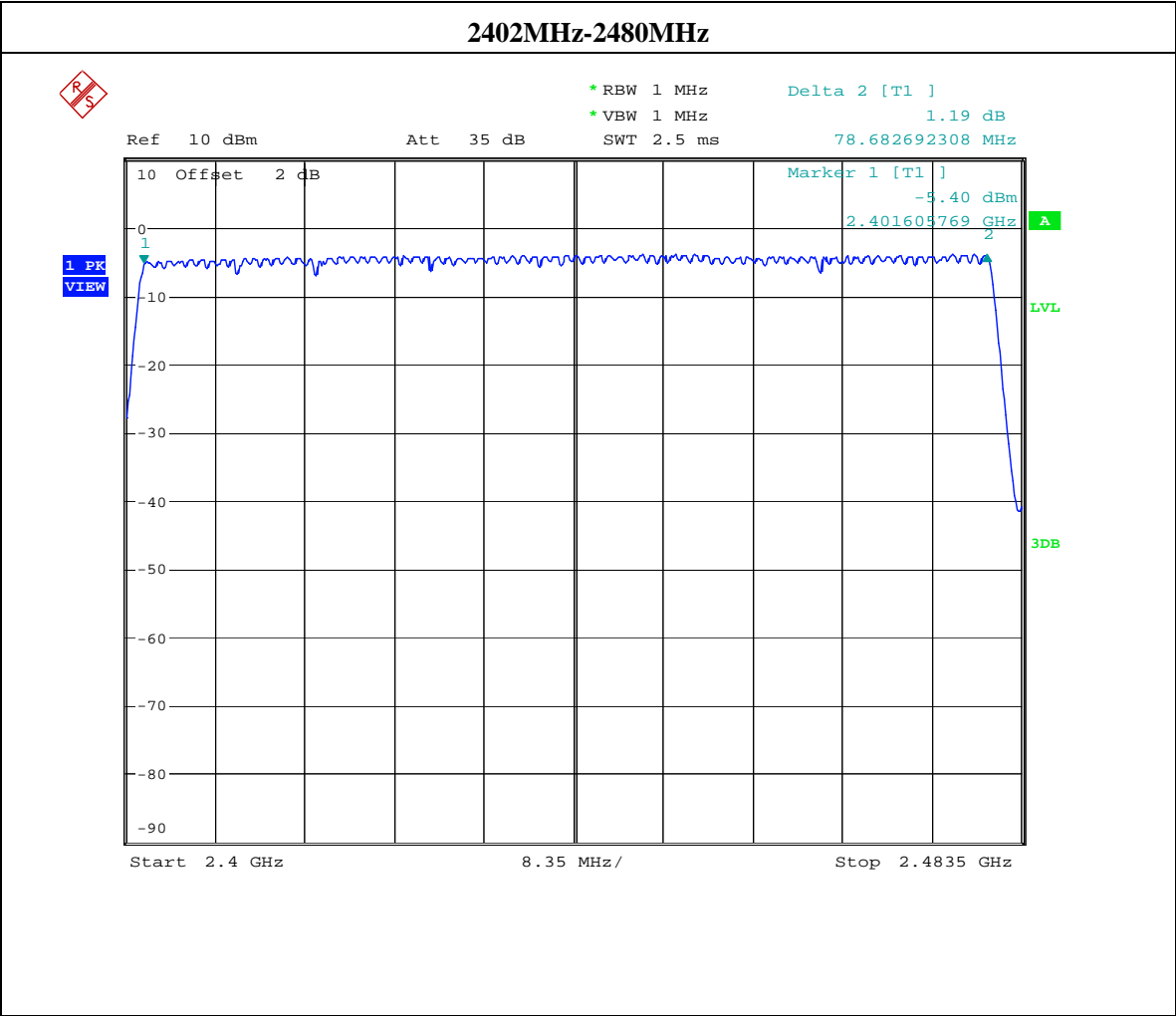
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7.6 Test Result

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1015 hPa		
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 24, 2014
Test Mode :	Hopping Mode		

Number of Hopping Channel	79
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8.0 AVERAGE TIME OF OCCUPANCY

8.1 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

8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

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8.4 TEST SETUP



8.5 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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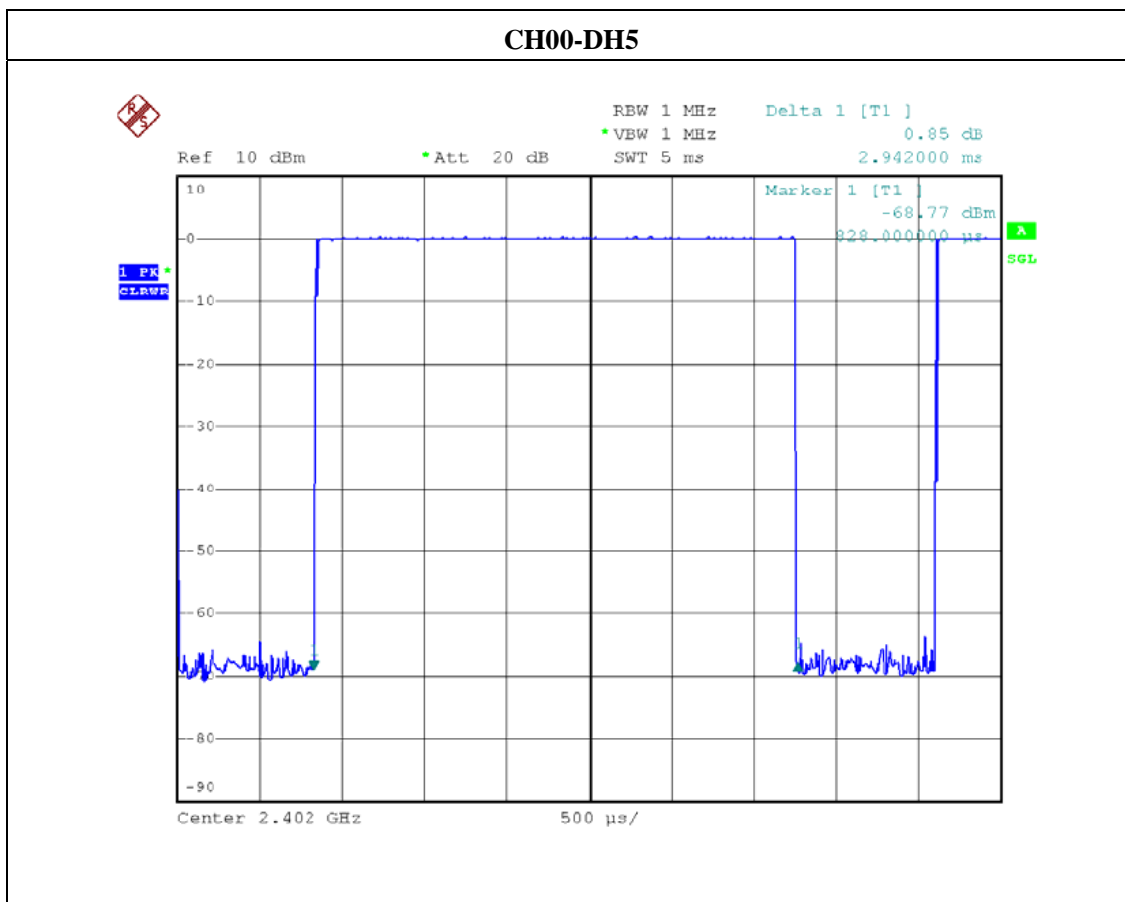


8.6 Test Result

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

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa		
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 24, 2014
Test Mode :	DH5-3Mbps		

Data Packet	Frequency	Dwell Time (S)	Limits (S)
DH5	2402MHz	0.314	0.4
DH5	2441MHz	0.313	0.4
DH5	2480MHz	0.315	0.4



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9.0 Hopping Channel Separation Measurement

9.1 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

9.2 TEST PROCEDURE

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

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

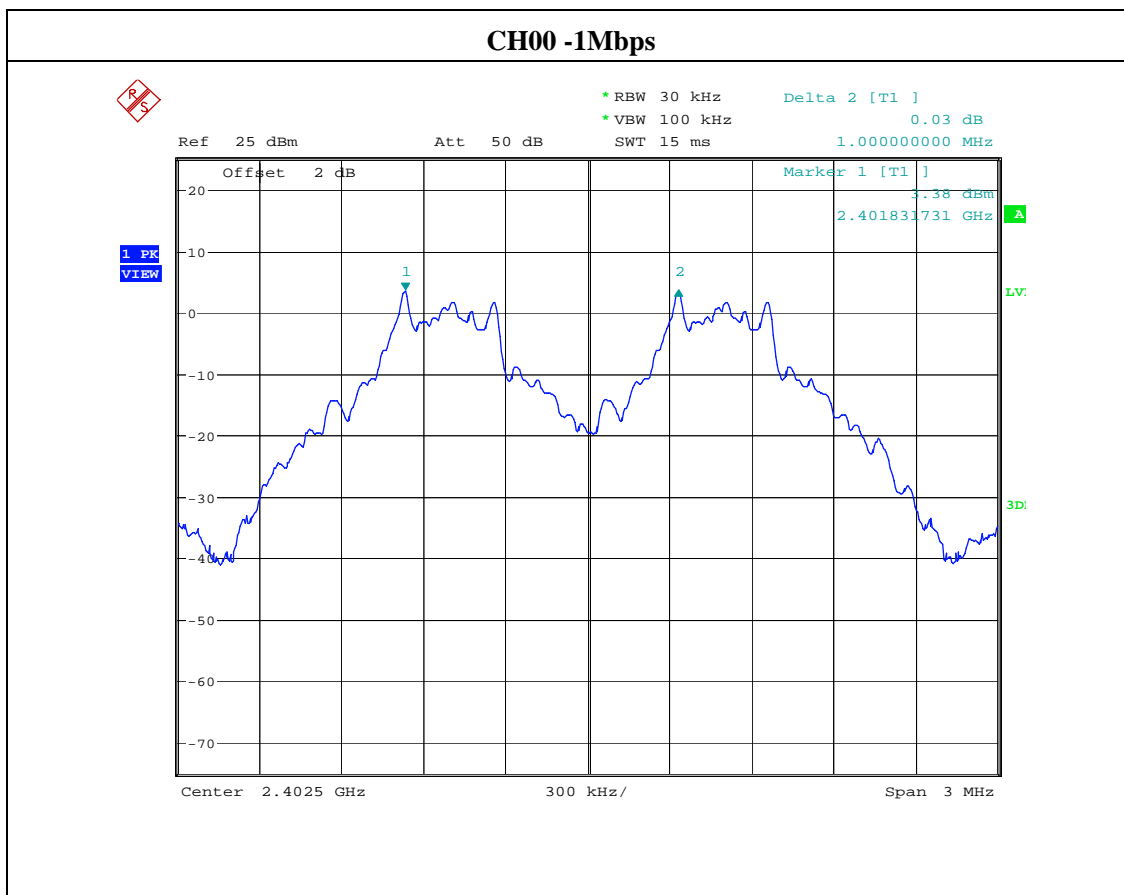


9.6 TEST RESULT

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Result	Pass
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 24, 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	>741.33
39	2441	1005	>741.33
78	2480	1005	>741.33

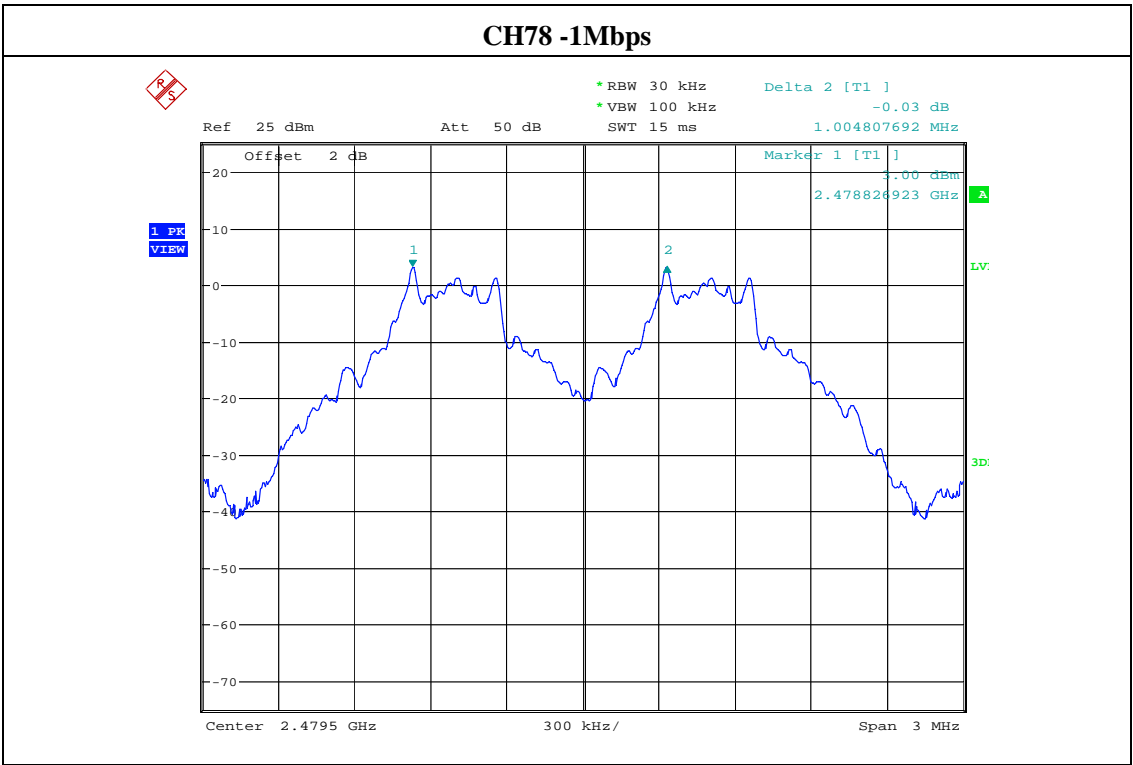
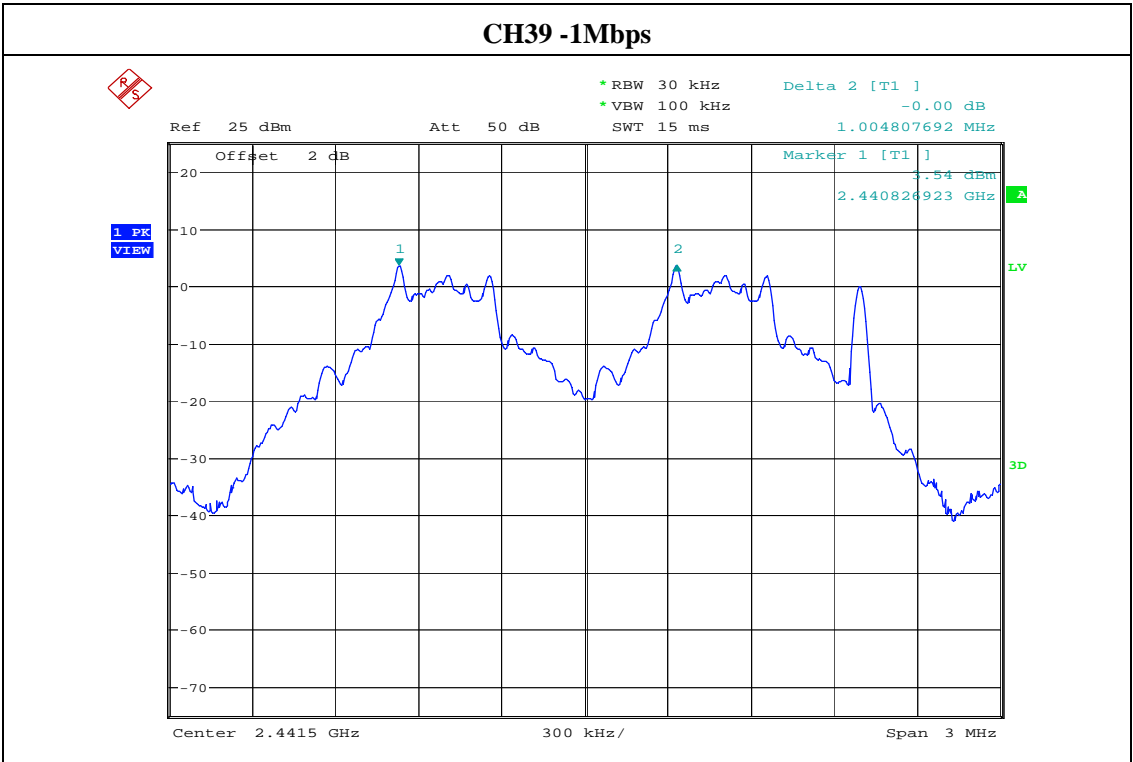
Note: 20db bandwidth refer to section 6.1.5



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10.0. BANDWIDTH TEST

10.1 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

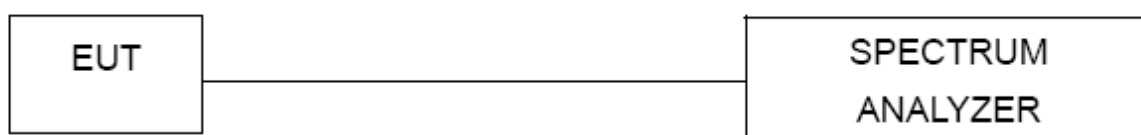
10.2 TEST PROCEDURE

- 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.

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



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10.5 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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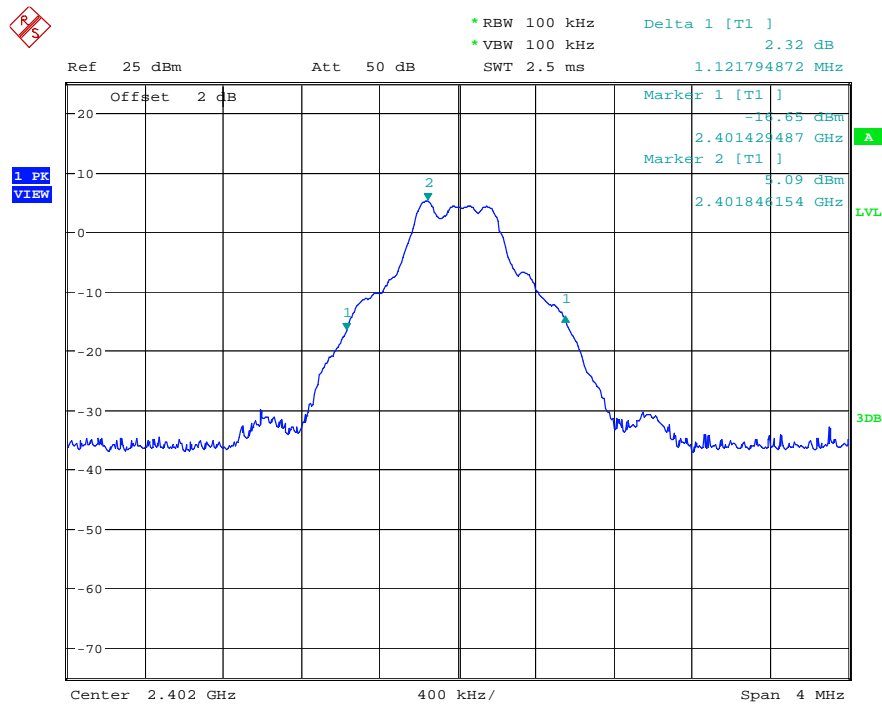


10.6 TEST RESULT

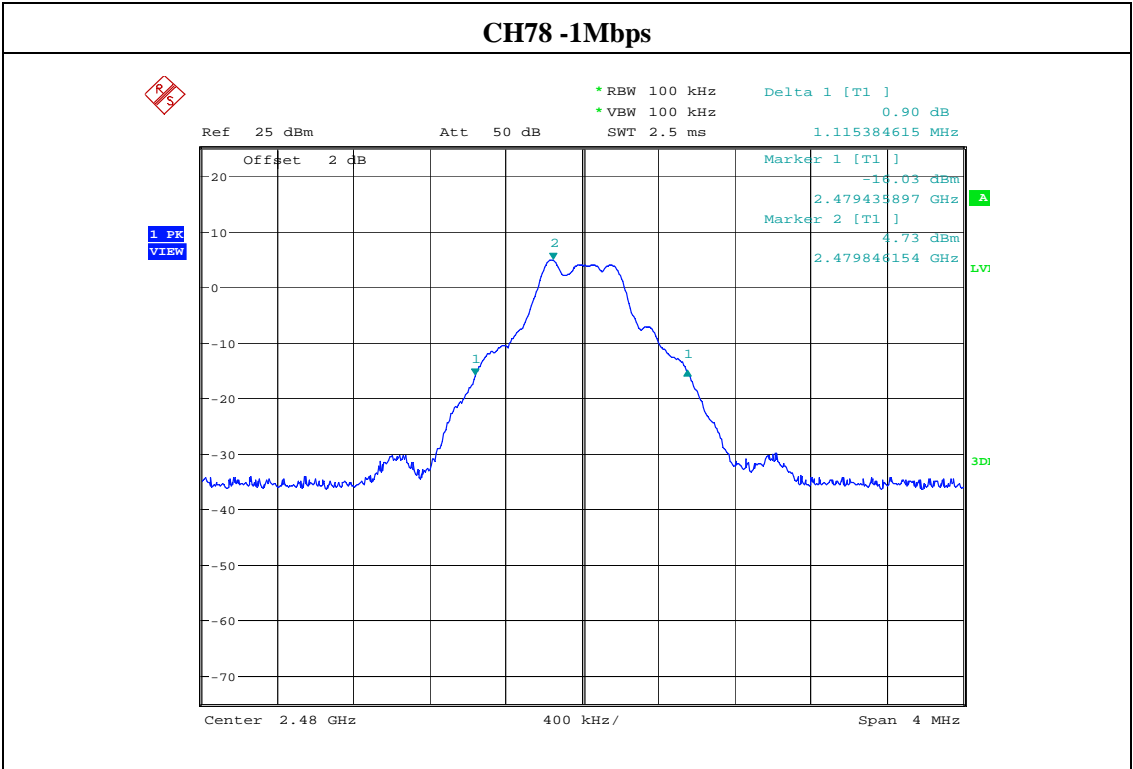
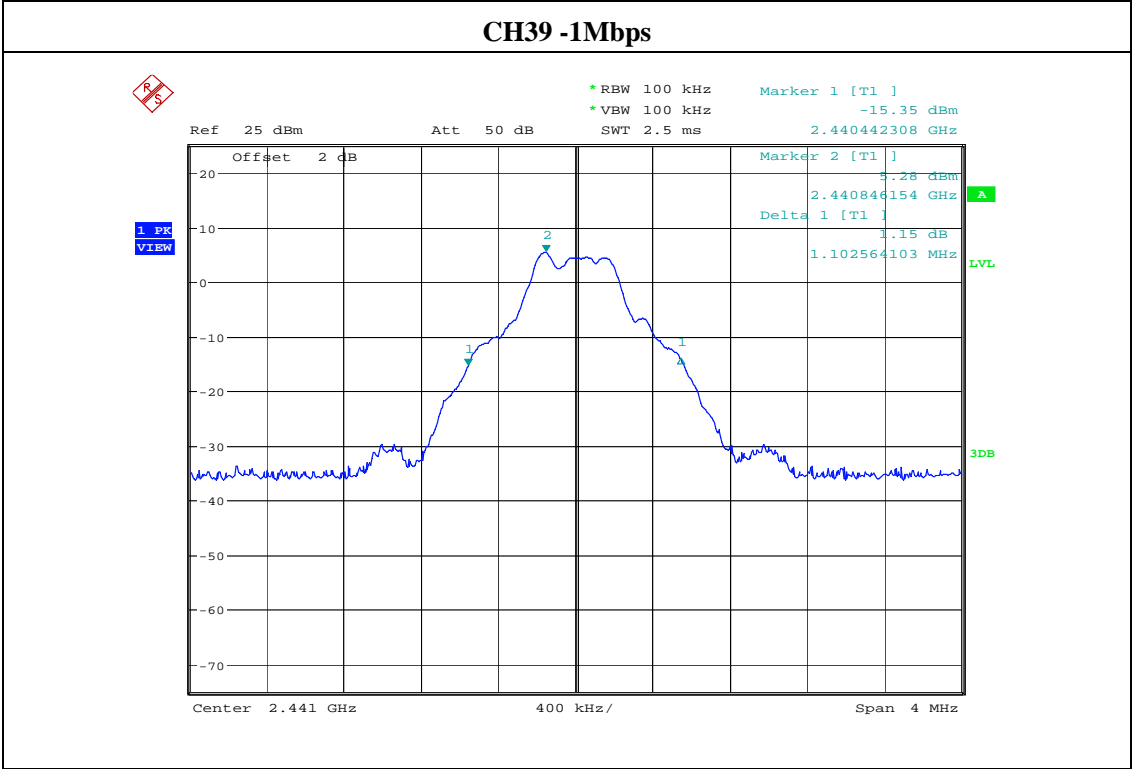
EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/CH39/C78(1Mbps)
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 24, 2014

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	1122	PASS
2441 MHz	1103	PASS
2480 MHz	1115	PASS

CH00 -1Mbps



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11.0 PEAK OUTPUT POWER TEST

11.1 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

11.2 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

11.3 ION FROM STANDARD

No deviation.

11.4 SETUP



11.5 PERATION 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.

11.6 EST RESULTS

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EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	CH00/ CH39 /CH78 (1M/2M/3Mbps Mode)
Test Voltage :	DC 3.7V Input AC 120 V, 60 Hz)	Test Date	November 24, 2014

1Mbps				
Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT(dBm)	Result
CH00	2402	5.76	20.96	Pass
CH39	2441	5.63	20.96	Pass
CH78	2480	5.48	20.96	Pass
2Mbps				
CH00	2402	5.12	20.96	Pass
CH39	2441	4.89	20.96	Pass
CH78	2480	4.75	20.96	Pass
3Mbps				
CH00	2402	4.61	20.96	Pass
CH39	2441	4.78	20.96	Pass
CH78	2480	4.56	20.96	Pass

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12.0. BAND-EDGE TEST

12.1 Applied procedures / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.205	Band-edge	Below -20dB of the highest emission (RBW=100KHz)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span	wide enough to capture the peak level of the emission operating on the channel closest to the band-edge
RB	$RBW \geq 1\%$ of the span
VB	$VBW \geq RBW$
Detector	Peak
Trace	Max hold
Sweep Time	Auto

12.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, VBW =100kHz($\geq 1\%$ of the span), RBW=100kHz, Sweep = auto Detector function = peak ,Trace = max hold
3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
4. Repeat above procedures until all frequencies measured were complete.

12.3 DEVIATION FROM STANDARD

No deviation.

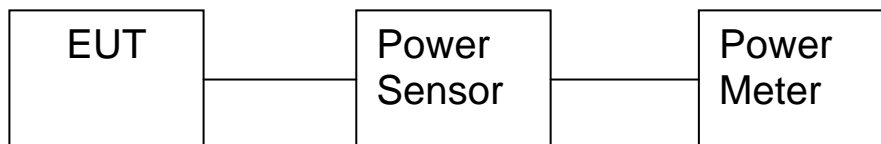
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12.4 TEST SETUP



12.5 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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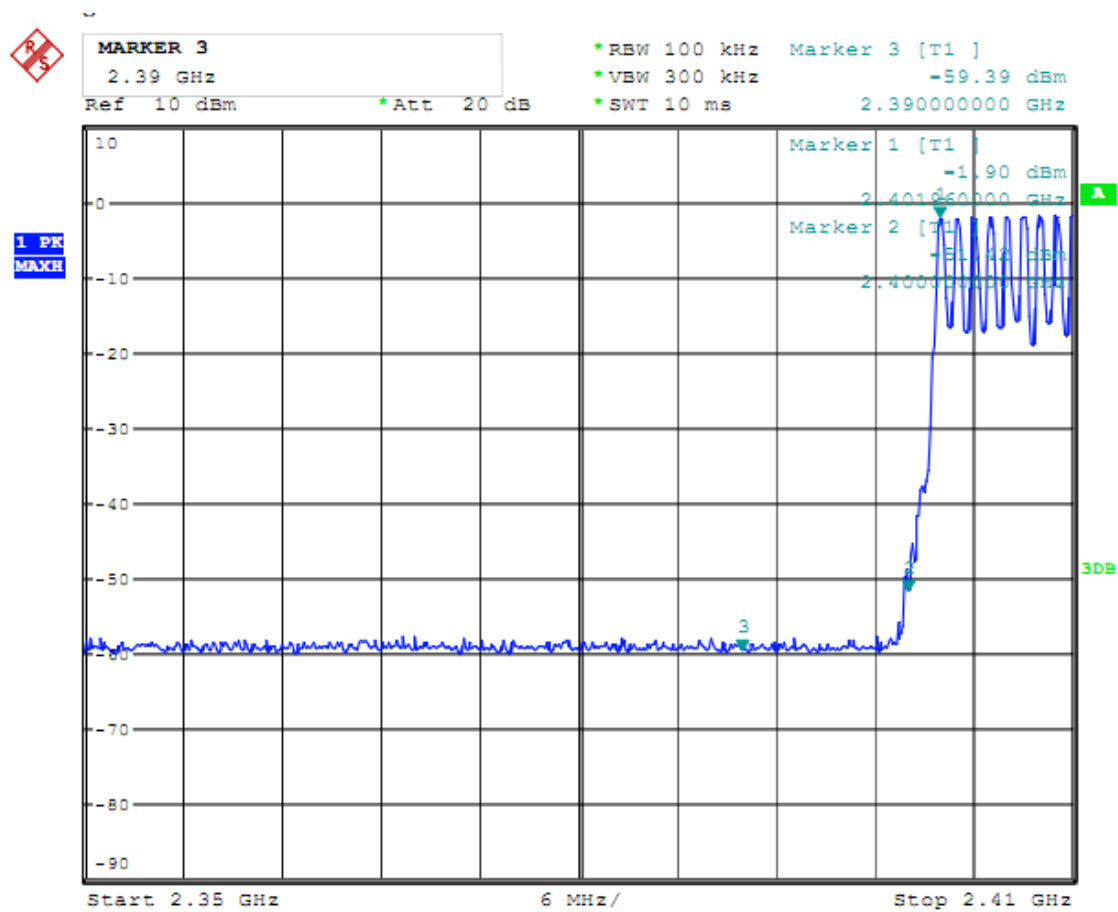
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12.6 TEST RESULT

EUT:	GSM Mobile Phone	Model Name :	TITAN Q7
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Mode :	Hopping(1Mbps)
Test Voltage :	DC 3.7V(Adapter Input AC 120 V, 60 Hz)	Test Date	November 24, 2014

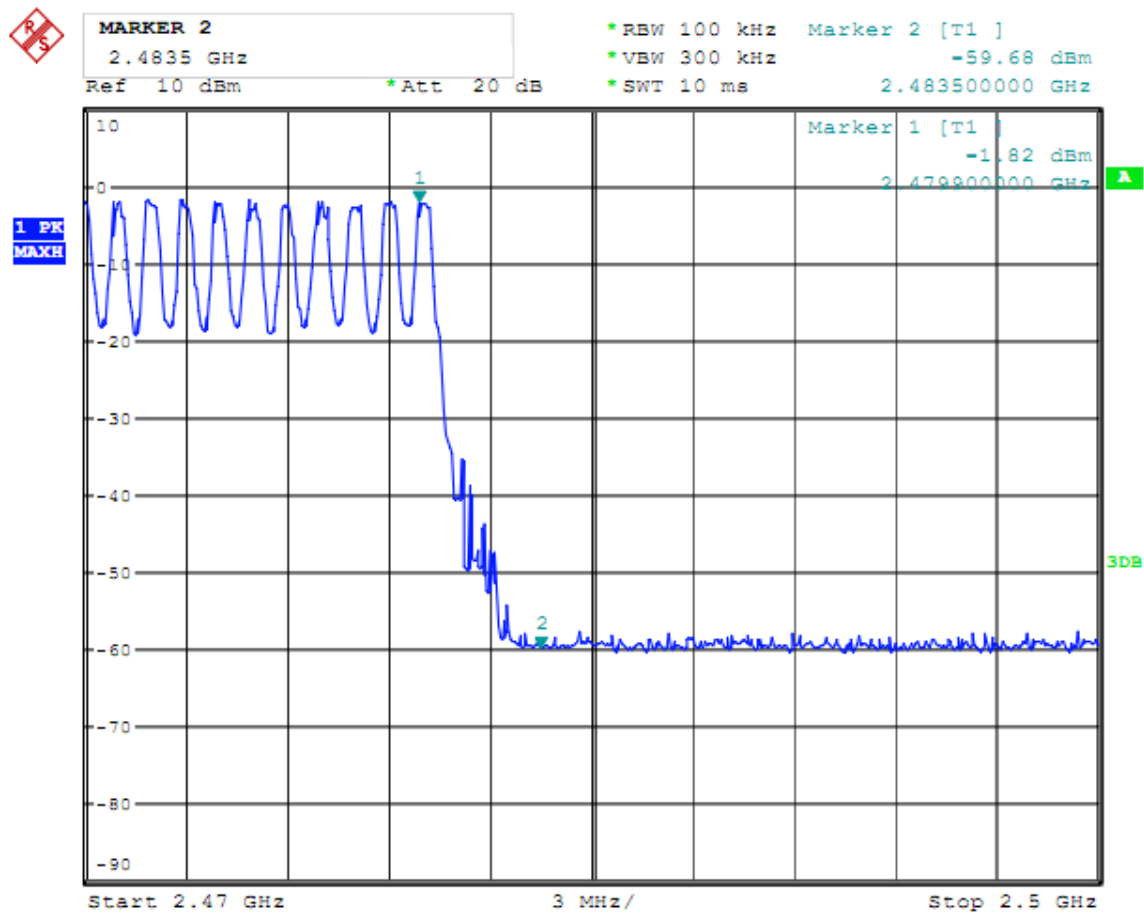
Low edge



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High edge



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13.0 Antenna Application

13.1 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.

13.2 Result

Integral Antenna Used, The Antenna's Gain is -1.5 dBi and meets the requirement.

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14. EUT TEST PHOTO

CONDUCTED EMISSION TEST

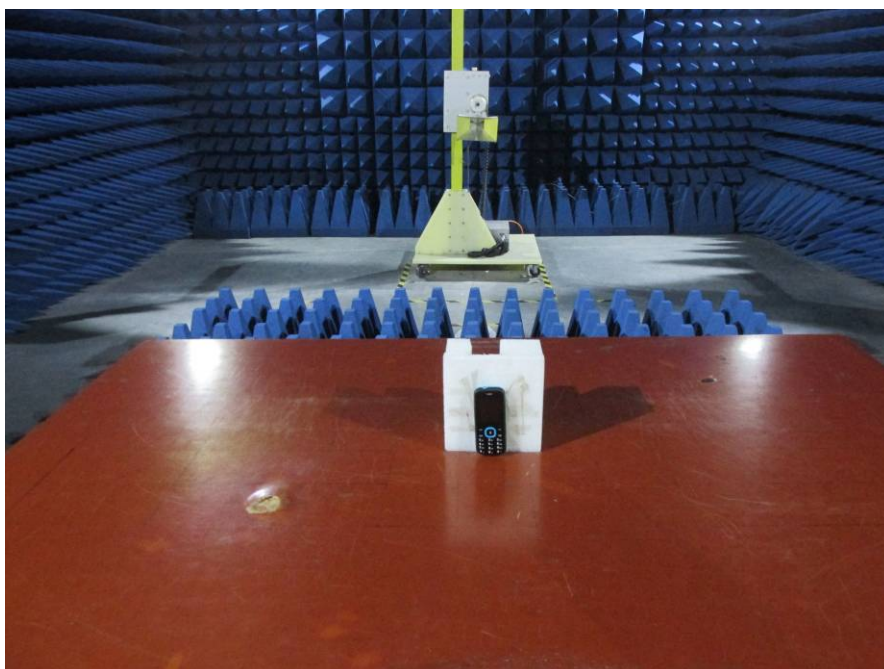
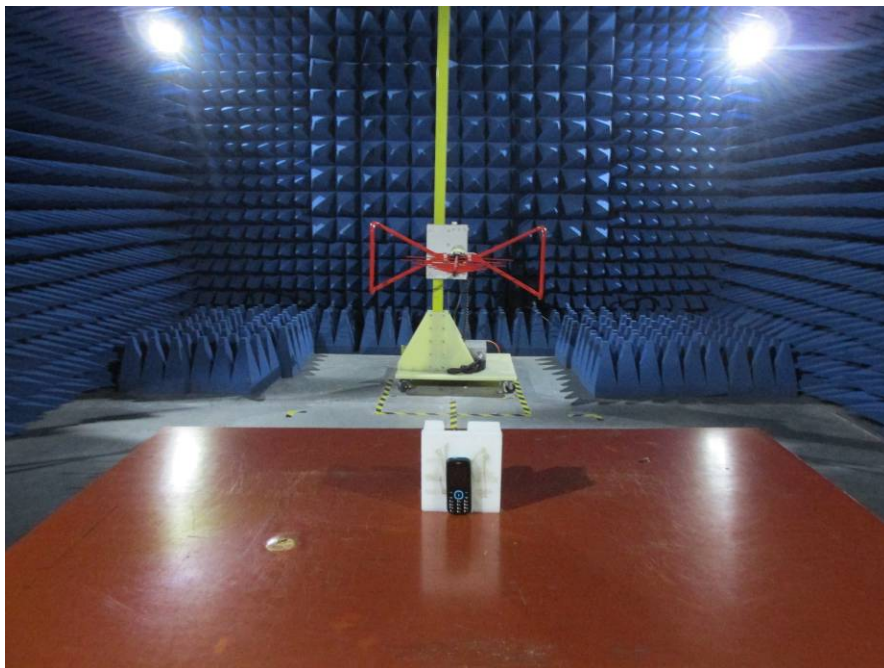


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RADIATED EMISSION TEST



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15. PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



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Appearance photograph of EUT



Appearance photograph of EUT



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Appearance photograph of EUT



Appearance photograph of EUT

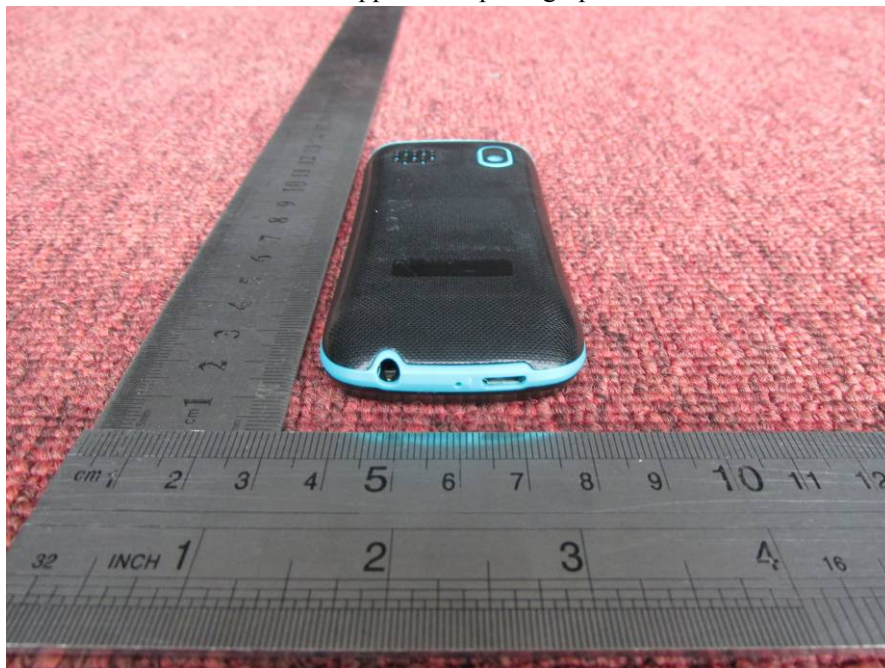


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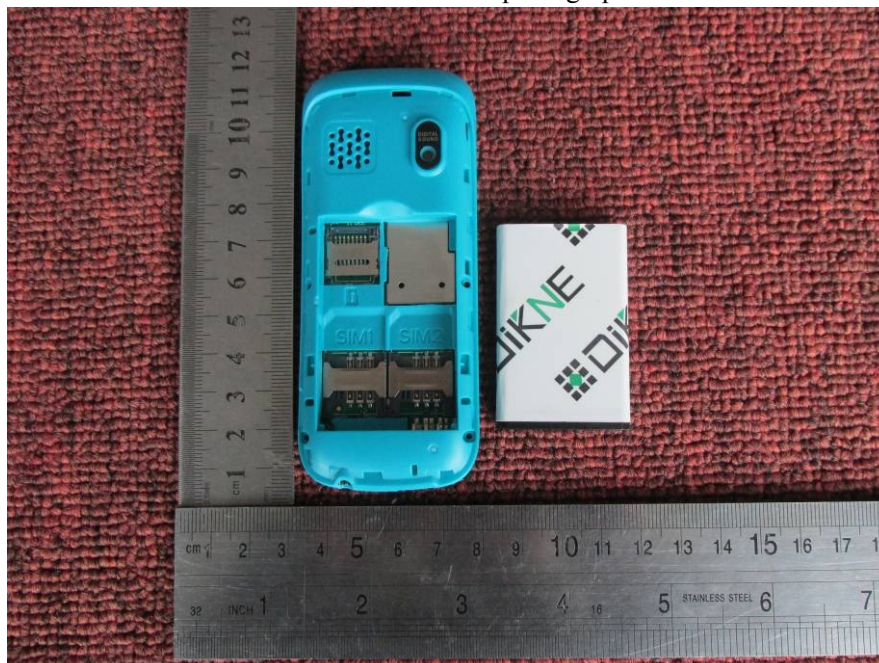
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Internal photograph of EUT



Internal photograph of EUT

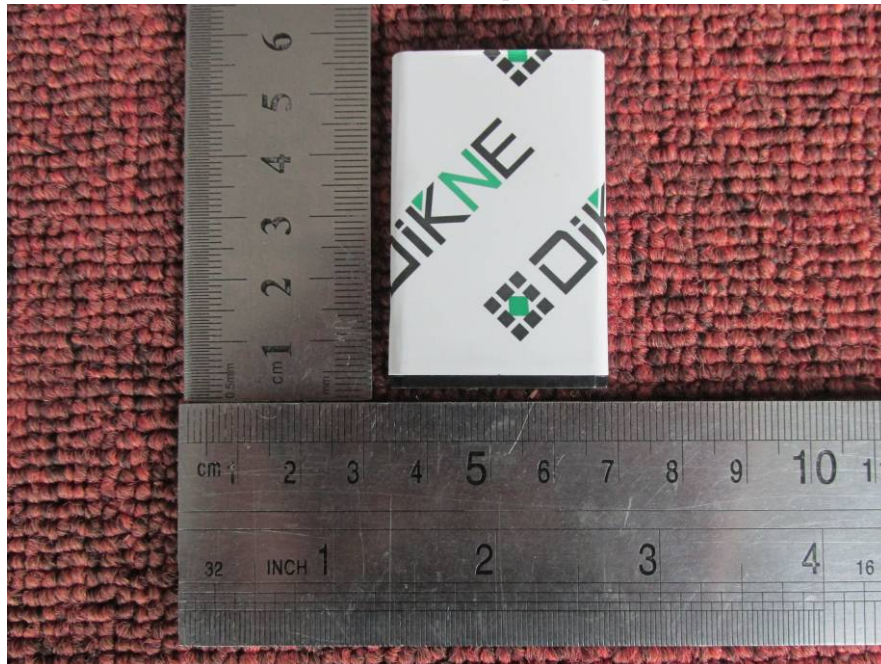


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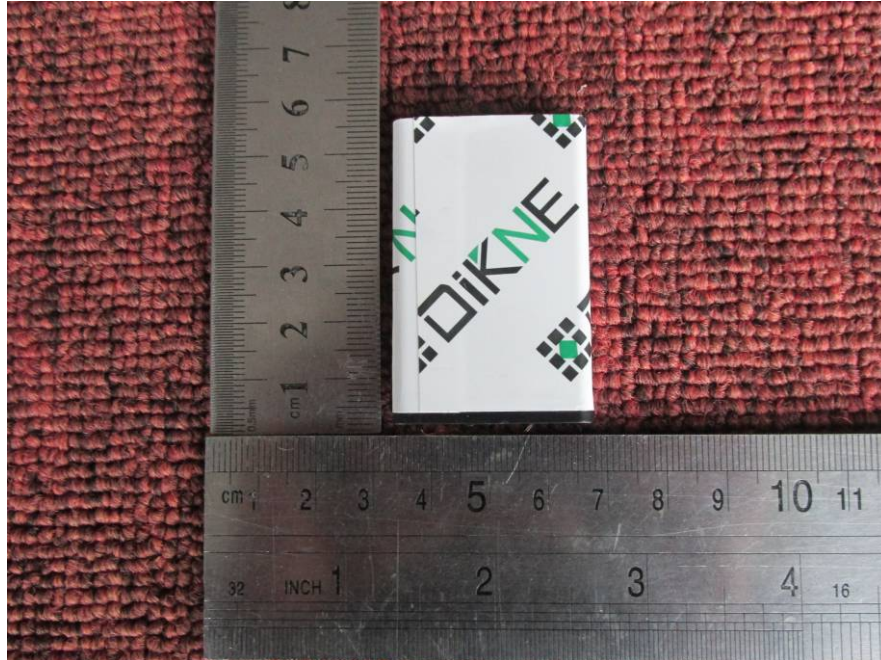
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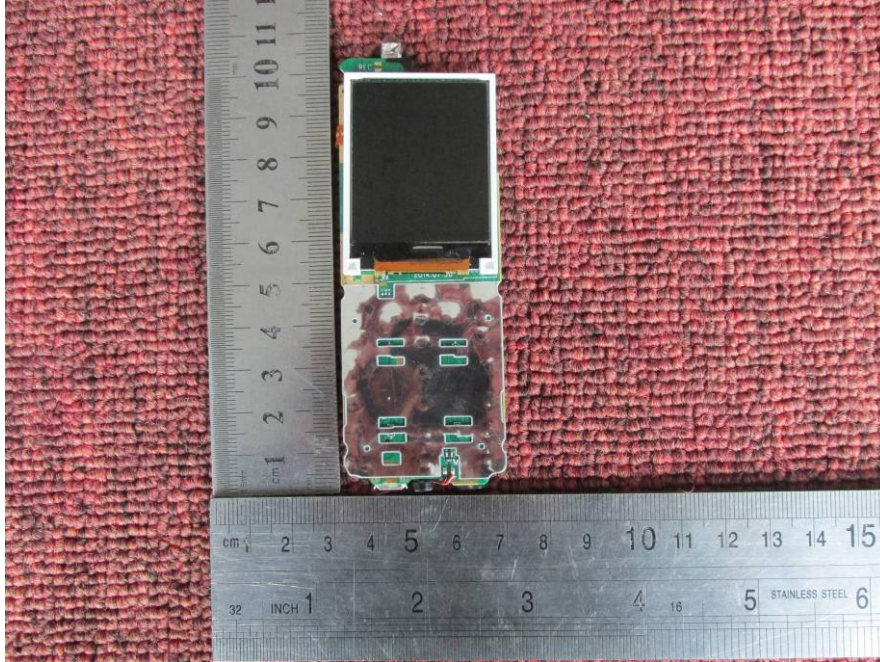


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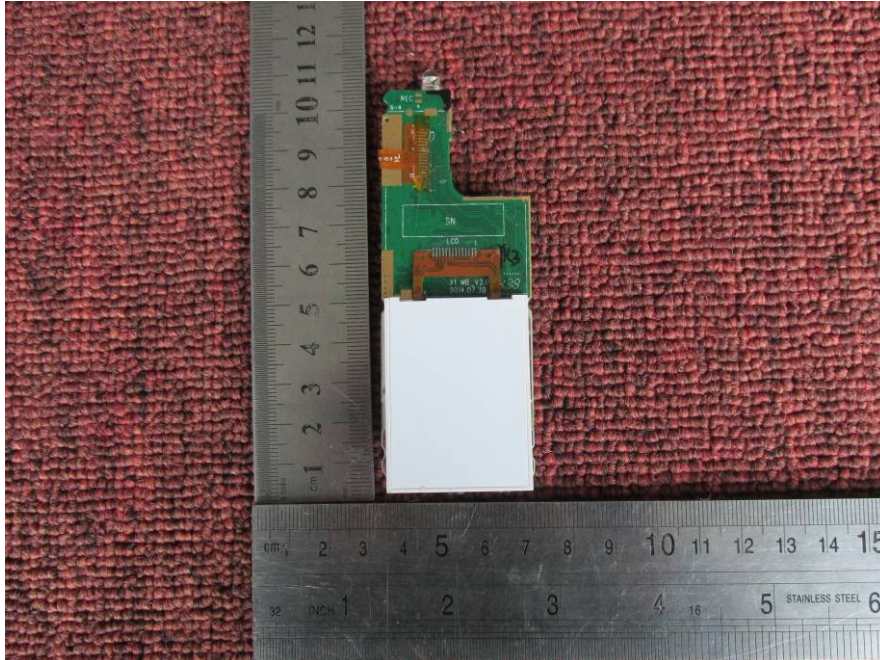
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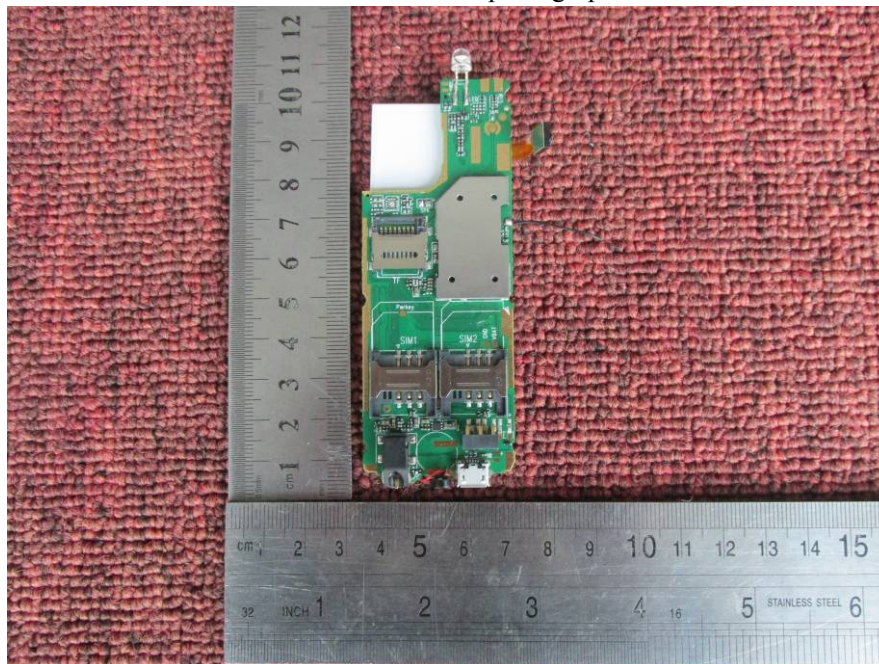


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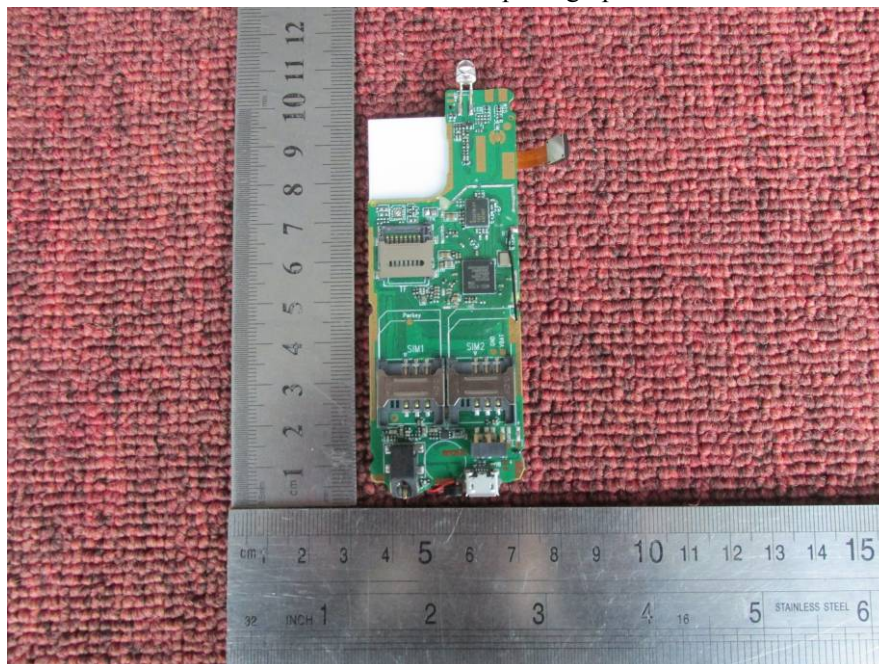
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