

FCC RADIO TEST REPORT

FCC ID:2AFA3RLTP4028

Product : smartphone

Trade Name : N/A

Model Name : RLTP4028-BLACK

Serial Model : V41

Report No. : ISOT15070054R4

Prepared for

Shenzhen Vastking Electronic Co.,LTD.
2/F, Building 6, ZhengZhong Industrial Park, Qiaotou Community,
Fuyong, Baoan, Shenzhen, China

Prepared by

Shenzhen ISOTek Standards Technical Services Co.,Ltd.
13/F, HuaFengRui Building, XinHu Rd., XiXiang, Bao'an
District,Shenzhen,China
Tel.: +86-755- 23087378 Fax.: +86-755-23087278
[Http://www.ISOTek.com.cn](http://www.ISOTek.com.cn)

TEST RESULT CERTIFICATION**Applicant's name** Shenzhen Vastking Electronic Co.,LTD.Address 2/F, Building 6, ZhengZhong Industrial Park, Qiaotou Community,
Fuyong, Baoan, Shenzhen, China**Manufacture's Name**... Shenzhen Vastking Electronic Co.,LTD.Address 2/F, Building 6, ZhengZhong Industrial Park, Qiaotou Community,
Fuyong, Baoan, Shenzhen, China**Product description**

Product name smartphone

Model and/or type RLTP4028-BLACK
reference

Serial Model V41

Standards FCC Part15.247 01 Oct. 2014

Test procedure ANSI C63.10-2013 and KDB 558074: D01V03R03

This device described above has been tested by ISOTek, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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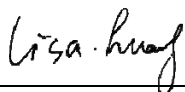
Date of Test

Date (s) of performance of tests 06 July. 2015 ~22 July. 2015

Date of Issue..... 22 July. 2015

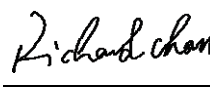
Test Result..... **Pass**

Compiled by:



Lisa Huang/ Project Engineer

Approved by:



Richard Chen/ Manager

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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)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	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

1.1 TEST FACILITY

Shenzhen ISOTek Standards Technical Services Co.,Ltd.

Add.: 13/F, HuaFengRui Building, XinHu Rd., XiXiang, Bao'an District,Shenzhen,China

FCC Registration No.: **918037**

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	smartphone	
Trade Name	N/A	
Model Name	RLTP4028-BLACK	
Serial Model	V41	
Model Difference	All the model are the same circuit and RF module, except the model name and colour.	
Product Description	Operation Frequency:	802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz):2422~2452MHz
	Modulation Type:	CCK/OFDM/DBPSK/DAPSK
	Bit Rate of Transmitter	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz/40MHz):150/144.44/130/117/115.56/104/86.67/78/52/6.5Mbps
	Number Of Channel	802.11b/g/n20MHz:11CH 802.11n40MHz:7CH
	Antenna Designation:	Please see Note 3.
	Antenna Gain (dBi)	1.0 dbi
Channel List	Please refer to the Note 2.	
Ratings	DC 3.7V	
Adapter	Input: 100-240V~, 50/60Hz, 0.15A Output: 5V---, 0.5A	
Battery	DC 3.7V ,1500mAh	
Connecting I/O Port(s)	Please refer to the User's Manual	
Hardware version:	MB0MBA4C1-1(WUZHU)	
Software version:	HQD_D133_271_0000_4.4.2_1.1_0721_T05	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

- 2.

Channel List for 802.11b/g/n(20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452		
04	2427	07	2442				
05	2432	08	2447				

- 3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	FPCB Antenna	N/A	1.0	Wifi Antenna

2.2 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	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n20 CH1/ CH6/ CH11
Mode 4	802.11n40 CH3/ CH6/ CH9
Mode 5	Link Mode

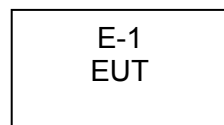
For Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n20 CH1/ CH6/ CH11
Mode 4	802.11n40 CH3/ CH6/ CH 9
Mode 5	Link Mode

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported(802.11b:1Mbps; 802.11g:6Mbps; 802.11n20:65Mbps, 802.11n40:130Mbps)
RF chipset Manufacture: Mediatech; version: ALPS.KK1.MP7.V1.22
Test program power setting: 18 level
- (3) EUT configured to transmit continuously:

Operated Mode for Worst Duty Cycle	
Test Signal Duty Cycle (x)	Average correction factor (dB)
100% - IEEE 802.11b	0
100% - IEEE 802.11g	0
100% - IEEE 802.11n (HT20)	0
100% - IEEE 802.11n (HT40)	0

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**Conducted Emission Test****Radiated Spurious Emission Test**

2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	smartphone	N/A	RLTP4028-BLACK	N/A	EUT
E-2	AC Adapter	N/A	K-150500500U1	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	0.8m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS**Radiation & other conducted test equipment**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4446A	US44300451	2015.07.06	2016.07.05	1 year
2	EMI Test Receiver	R&S	ESCI	101165	2015.07.06	2016.07.05	1 year
3	Loop Antenna	ARA	PLA - 1030/B	1029	2015.07.06	2016.07.05	1 year
4	Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2015.07.06	2016.07.05	1 year
5	Horn Antenna	Schwarzbeck	BBHA 9170	9170-182	2015.07.06	2016.07.05	1 year
6	Amplifier	Schwarzbeck	BBV9743	9743-019	2015.07.06	2016.07.05	1 year
7	Test Cable Below 1GHz	ATM	R-01	3564	2015.07.06	2016.07.05	1 year
8	Test Cable Above 1GHz	ATM	R-02	3565	2015.07.06	2016.07.05	1 year
9	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05	1 year
11	Horn Antenna	Sunol Sciences	DRH-118	A052604	2015.07.06	2016.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	LISN	messtec	AN3019	NO.1	Jul. 06, 2015	Jul. 05, 2016	1 year
2	LISN	SCHWARZBECK	NNLK 8129	8126466	Jul. 06, 2015	Jul. 05, 2016	1 year
3	Pulse Limiter	SCHWARZBECK	VTSD9596F	9618	Jul. 06, 2015	Jul. 05, 2016	1 year
4	EMI Test Receiver	R&S	ESCI	100843	Jul. 06, 2015	Jul. 05, 2016	1 year
5	Switch	Schwarzbeck	CX - 210	100196	Jul. 06, 2015	Jul. 05, 2016	1 year
6	Test Cable 9KHz-300MHz	ATM	C01	3566	Jul. 06, 2015	Jul. 05, 2016	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

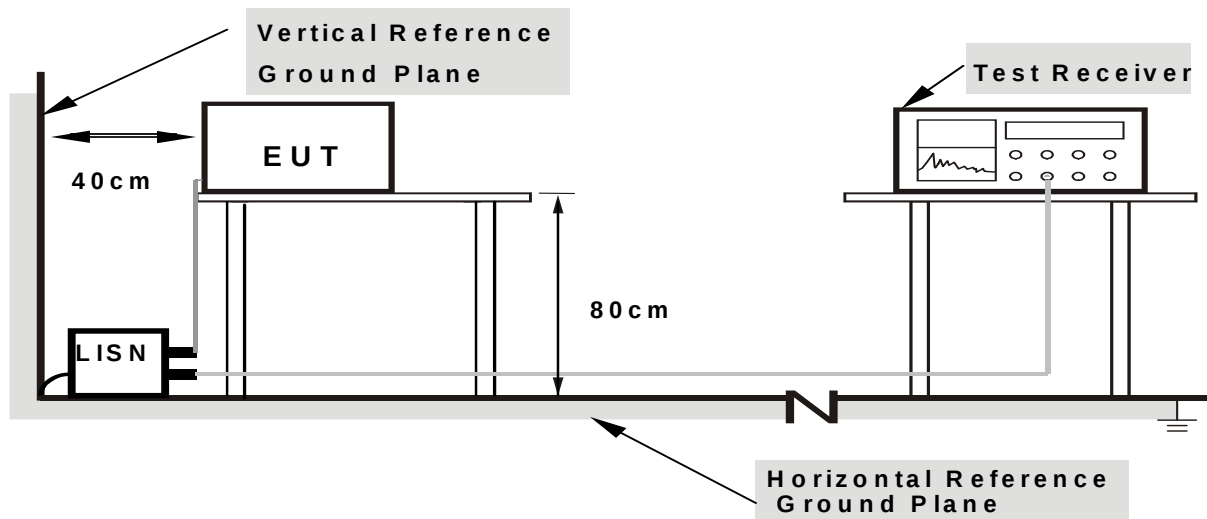
3.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

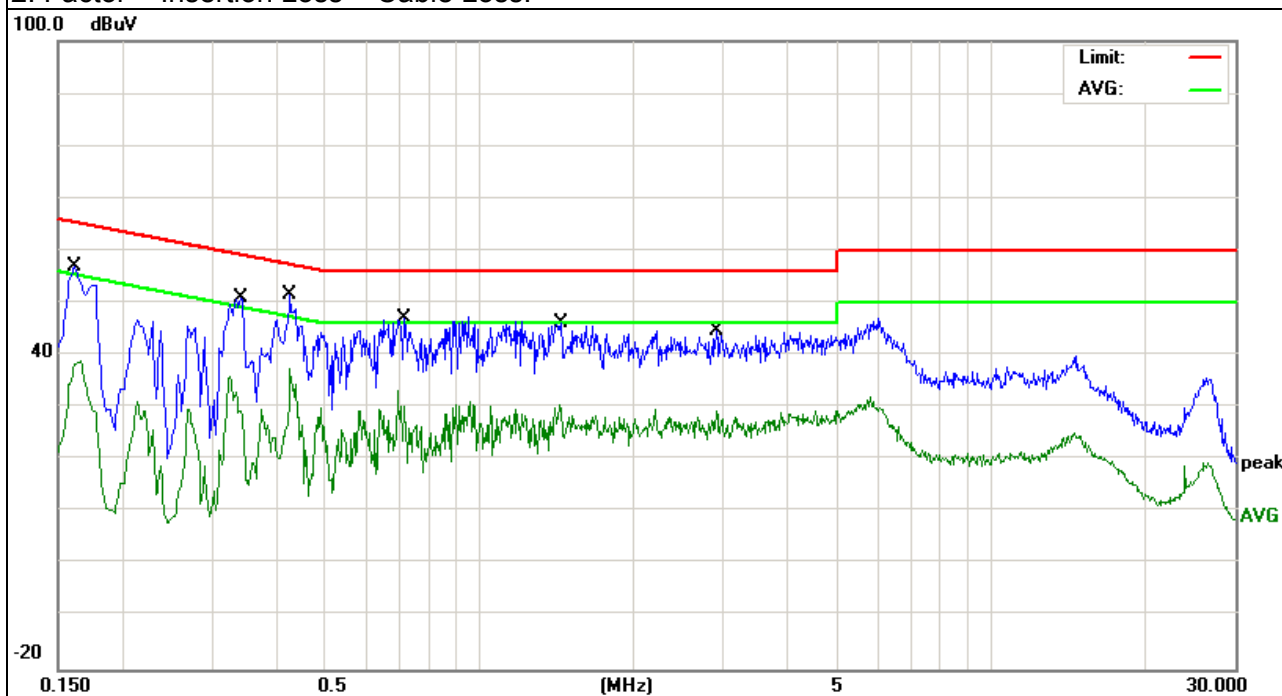
3.1.6 TEST RESULTS

EUT :	smartphone	Model Name. :	RLTP4028-BLACK
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1620	47.24	9.62	56.86	65.36	-8.50	QP
0.1620	29.23	9.62	38.85	55.36	-16.51	AVG
0.3420	41.50	9.58	51.08	59.15	-8.07	QP
0.3420	26.40	9.58	35.98	49.15	-13.17	AVG
0.4260	42.23	9.46	51.69	57.33	-5.64	QP
0.4260	27.98	9.46	37.44	47.33	-9.89	AVG
0.7140	37.13	9.78	46.91	56.00	-9.09	QP
0.7140	23.48	9.78	33.26	46.00	-12.74	AVG
1.4460	36.47	9.70	46.17	56.00	-9.83	QP
1.4460	20.79	9.70	30.49	46.00	-15.51	AVG
2.9060	34.86	9.67	44.53	56.00	-11.47	QP
2.9060	19.66	9.67	29.33	46.00	-16.67	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

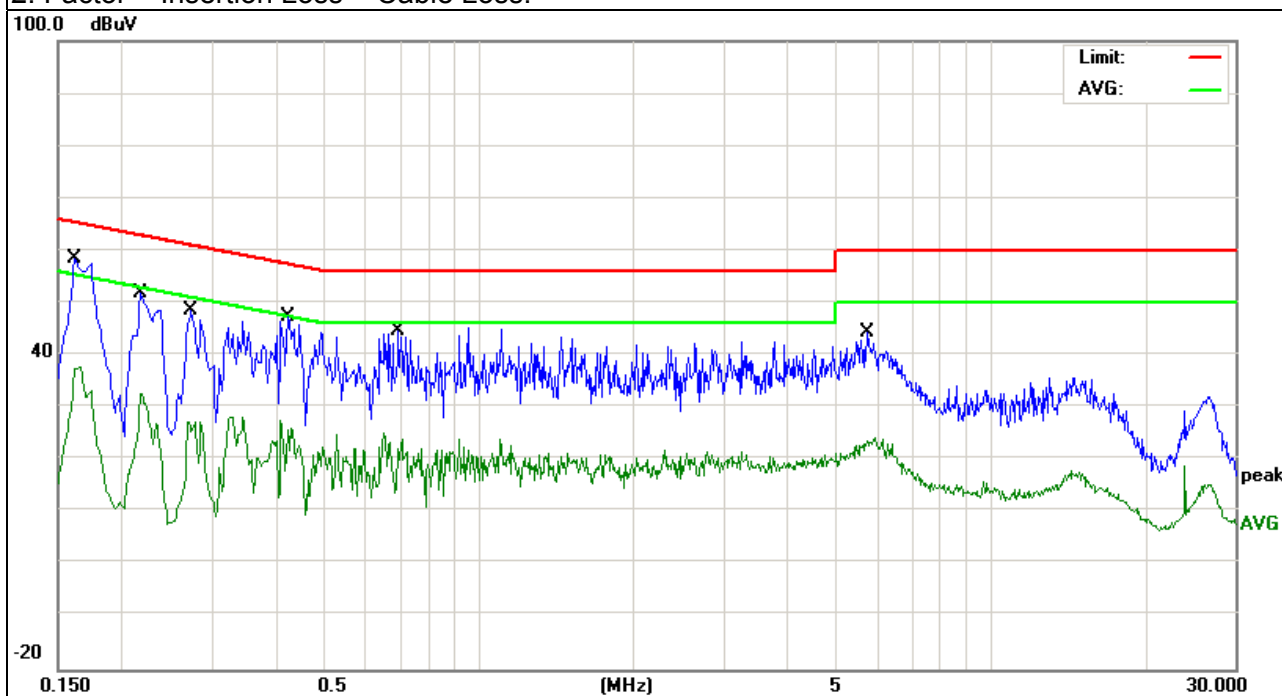


EUT :	smartphone	Model Name. :	RLTP4028-BLACK
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 5

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1620	48.97	9.60	58.57	65.36	-6.79	QP
0.1620	28.08	9.60	37.68	55.36	-17.68	AVG
0.2180	42.10	9.62	51.72	62.89	-11.17	QP
0.2180	23.12	9.62	32.74	52.89	-20.15	AVG
0.2740	38.90	9.61	48.51	60.99	-12.48	QP
0.2740	17.62	9.61	27.23	50.99	-23.76	AVG
0.4220	37.60	9.64	47.24	57.41	-10.17	QP
0.4220	17.88	9.64	27.52	47.41	-19.89	AVG
0.6940	35.07	9.64	44.71	56.00	-11.29	QP
0.6940	15.51	9.64	25.15	46.00	-20.85	AVG
5.7140	34.94	9.51	44.45	60.00	-15.55	QP
5.7140	14.66	9.51	24.17	50.00	-25.83	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 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 (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)	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

3.2.2 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 m for below 1GHz and 1.5m for above 1GHz 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 for below 1GHz and 1.5m for above 1GHz; 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:

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

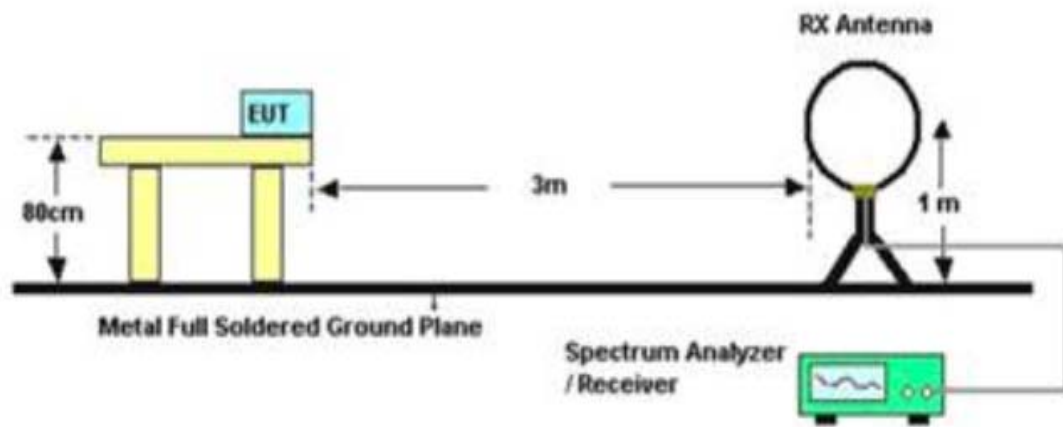
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

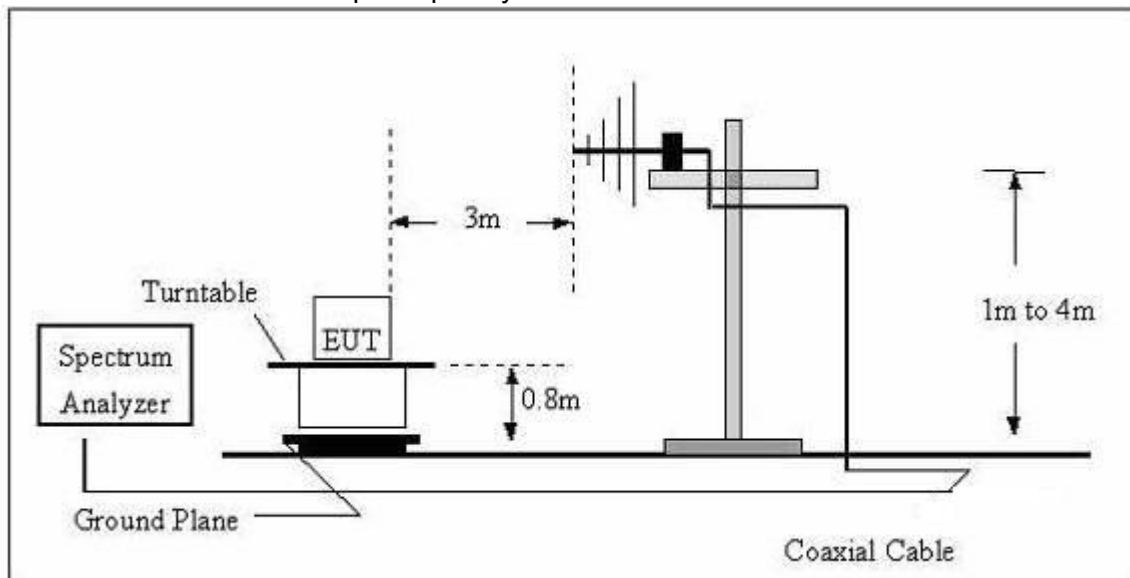
No deviation

3.2.4 TEST SETUP

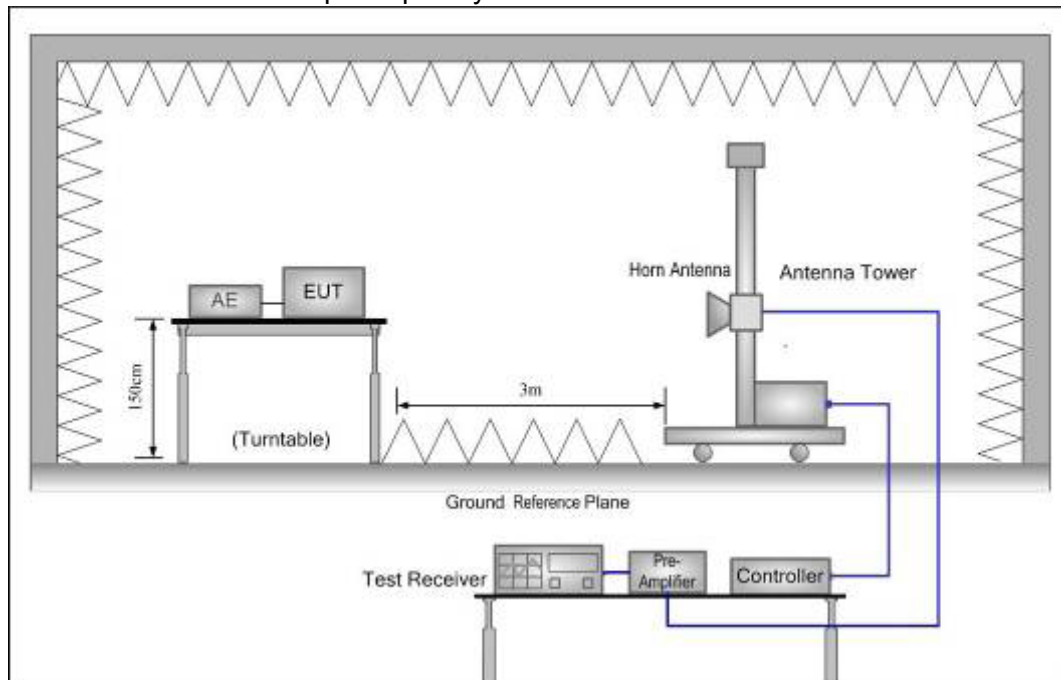
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 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.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	smartphone	Model Name. :	RLTP4028-BLACK
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX	Polarization :	--

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

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

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

"802.11b"(High CH) mode is the worst mode.

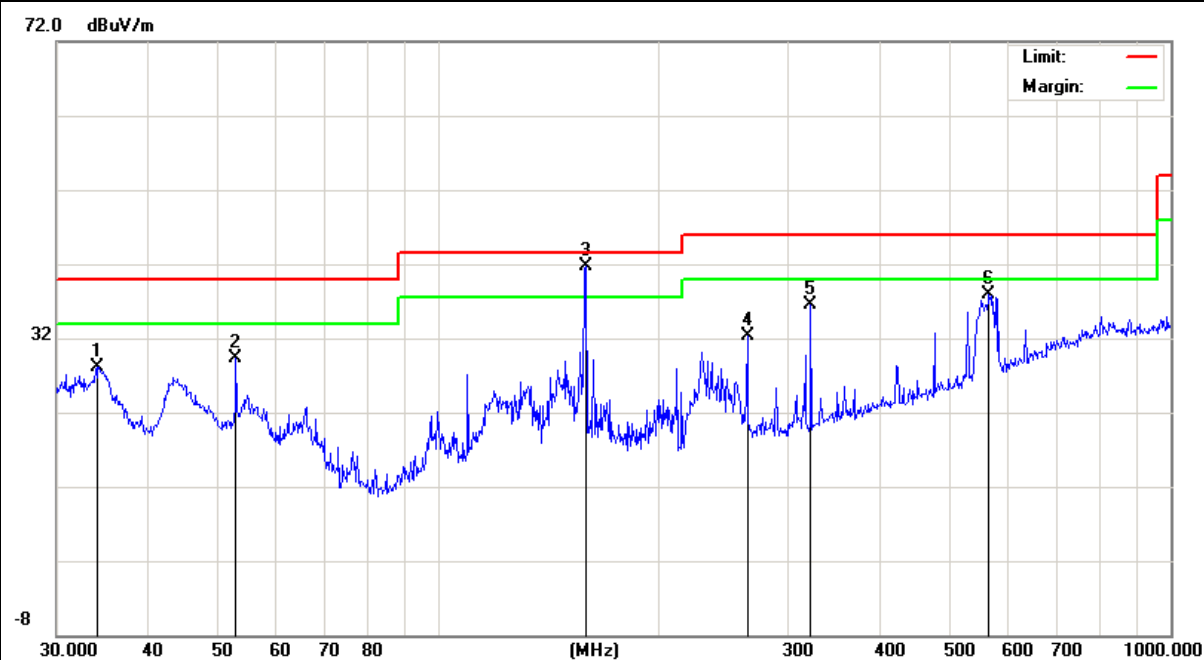
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	34.1561	11.01	17.15	28.16	40.00	-11.84	QP
V	52.7599	19.33	9.91	29.24	40.00	-10.76	QP
V	158.6676	31.28	10.47	41.75	43.50	-1.75	QP
V	263.8190	18.61	13.75	32.36	46.00	-13.64	QP
V	322.1886	21.42	15.08	36.50	46.00	-9.50	QP
V	564.6389	16.27	21.65	37.92	46.00	-8.08	QP

Remark:

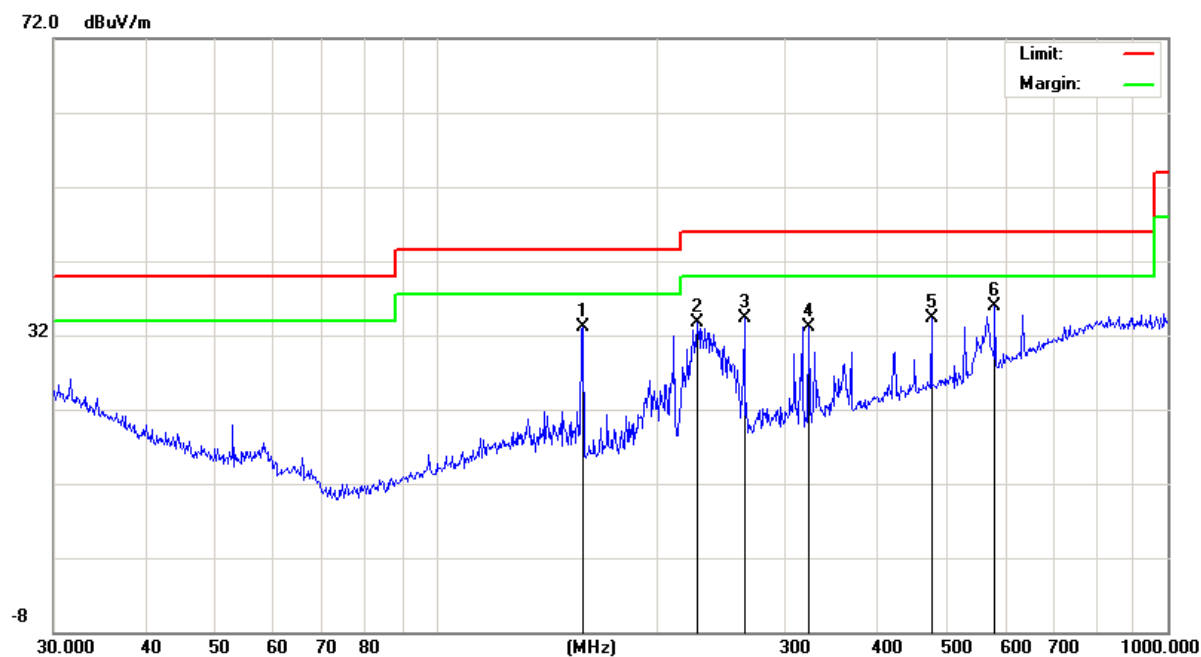
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	158.6677	22.63	10.47	33.10	43.50	-10.40	QP
H	227.6906	21.08	12.65	33.73	46.00	-12.27	QP
H	263.8190	20.59	13.75	34.34	46.00	-11.66	QP
H	323.3204	17.93	15.12	33.05	46.00	-12.95	QP
H	475.4990	14.40	19.81	34.21	46.00	-11.79	QP
H	580.7026	13.82	21.99	35.81	46.00	-10.19	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Note: "802.11b"(High CH) mode is the worst mode.

3.2.8 TEST RESULTS (1000-25000 MHZ)

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (2412 MHz)-Above 1G							
Vertical	4824.127	50.44	10.44	60.88	74.00	-13.12	Pk
Vertical	4824.127	34.65	10.44	45.09	54.00	-8.91	Av
Vertical	7236.281	45.63	12.39	58.02	74.00	-15.98	Pk
Vertical	7236.281	30.97	12.39	43.36	54.00	-10.64	Av
Horizontal	4824.309	52.11	10.44	62.55	74.00	-11.45	Pk
Horizontal	4824.309	33.52	10.44	43.96	54.00	-10.04	Av
Horizontal	7236.048	46.34	12.39	58.73	74.00	-15.27	Pk
Horizontal	7236.048	30.24	12.39	42.63	54.00	-11.37	Av
Mid Channel (2437 MHz)-Above 1G							
Vertical	4874.186	51.61	10.40	62.01	74.00	-11.99	Pk
Vertical	4874.186	32.07	10.40	42.47	54.00	-11.53	Av
Vertical	7311.219	46.97	12.75	59.72	74.00	-14.28	Pk
Vertical	7311.219	29.03	12.75	41.78	54.00	-12.22	Av
Horizontal	4874.104	51.84	10.40	62.24	74.00	-11.76	Pk
Horizontal	4874.104	32.25	10.40	42.65	54.00	-11.35	Av
Horizontal	7311.321	49.01	12.75	61.76	74.00	-12.24	Pk
Horizontal	7311.321	30.22	12.75	42.97	54.00	-11.03	Av
High Channel (2462 MHz)- Above 1G							
Vertical	4924.155	52.41	10.39	62.80	74.00	-11.20	Pk
Vertical	4924.155	33.94	10.39	44.33	54.00	-9.67	Av
Vertical	7386.107	47.02	12.68	59.70	74.00	-14.30	Pk
Vertical	7386.107	29.14	12.68	41.82	54.00	-12.18	Av
Horizontal	4924.193	51.91	10.39	62.30	74.00	-11.70	Pk
Horizontal	4924.193	32.54	10.39	42.93	54.00	-11.07	Av
Horizontal	7386.311	49.58	12.68	62.26	74.00	-11.74	Pk
Horizontal	7386.311	30.07	12.68	42.75	54.00	-11.25	Av

Note:"802.11b" mode is the worst mode.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. 3 kHz ≤Set the RBW≤100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



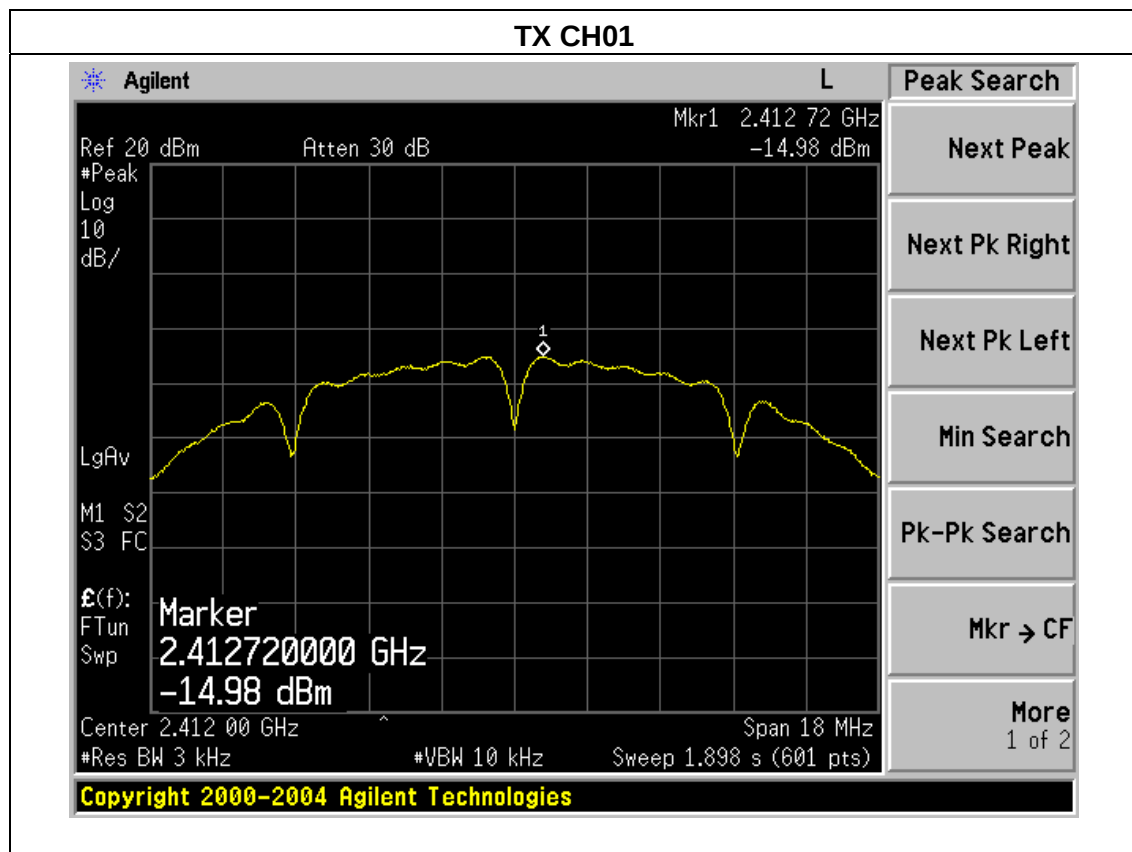
4.1.4 EUT OPERATION CONDITIONS

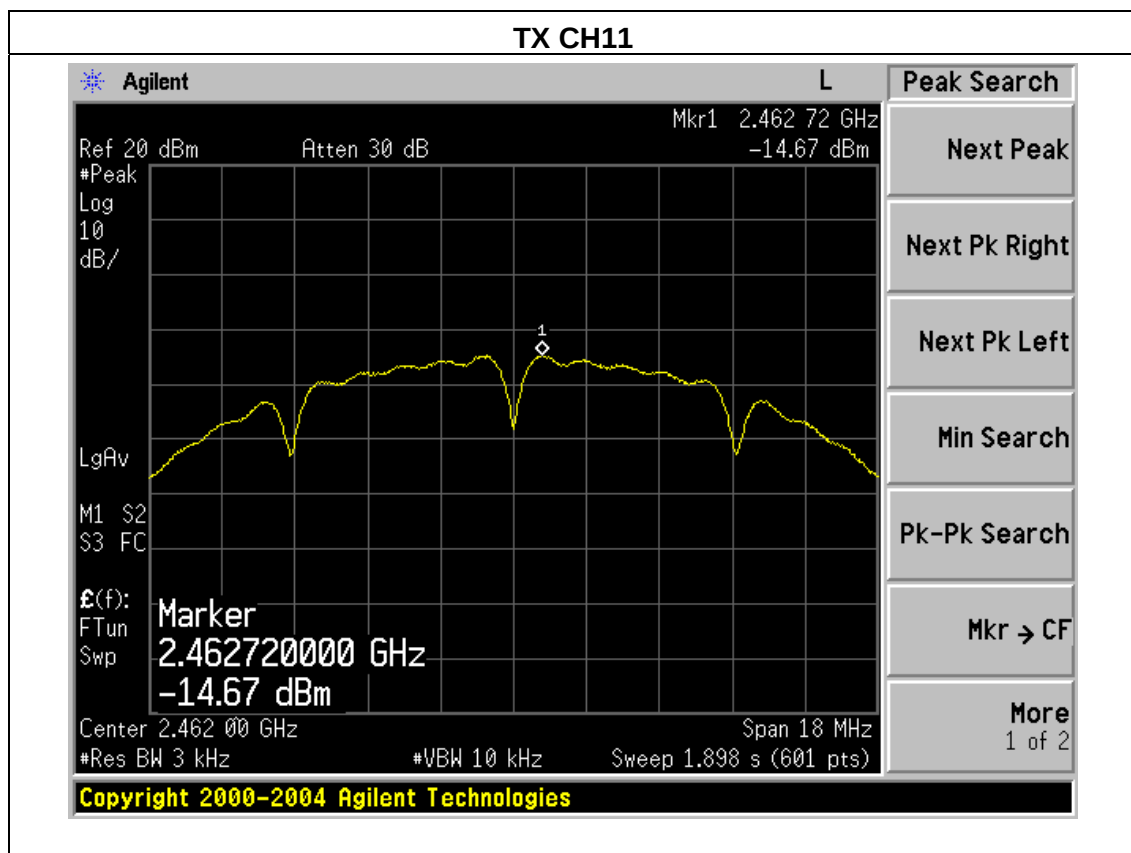
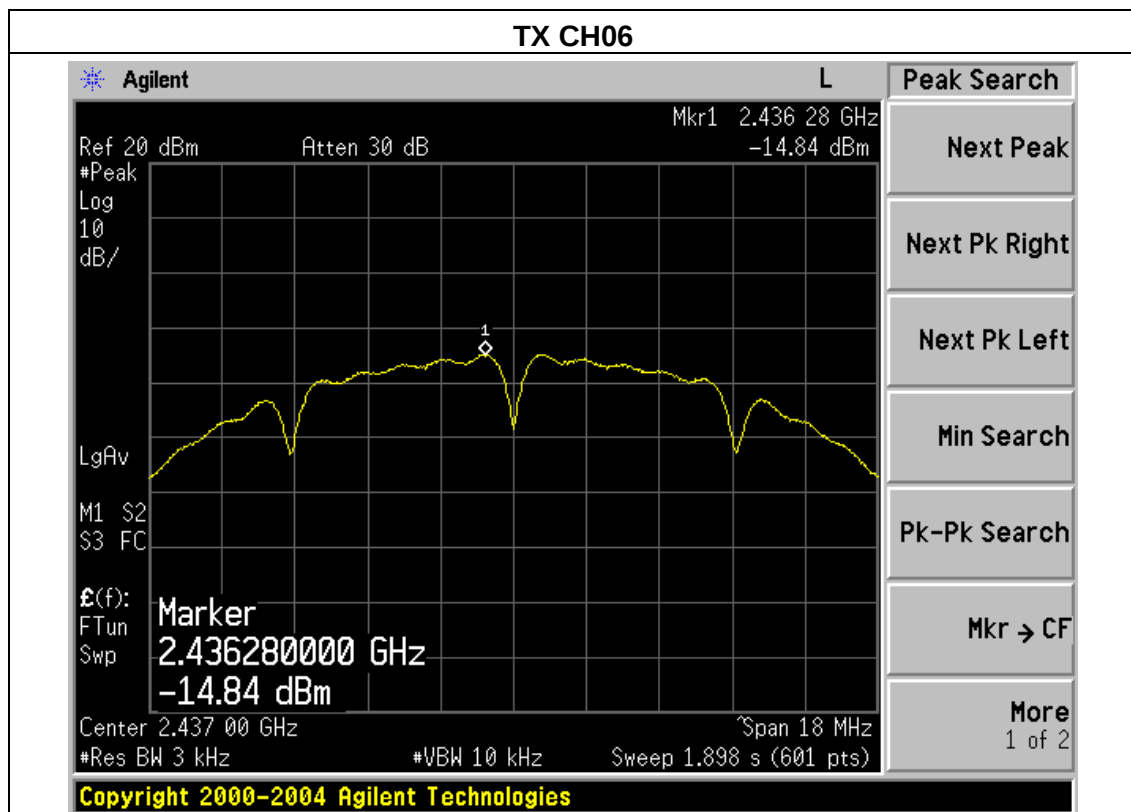
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

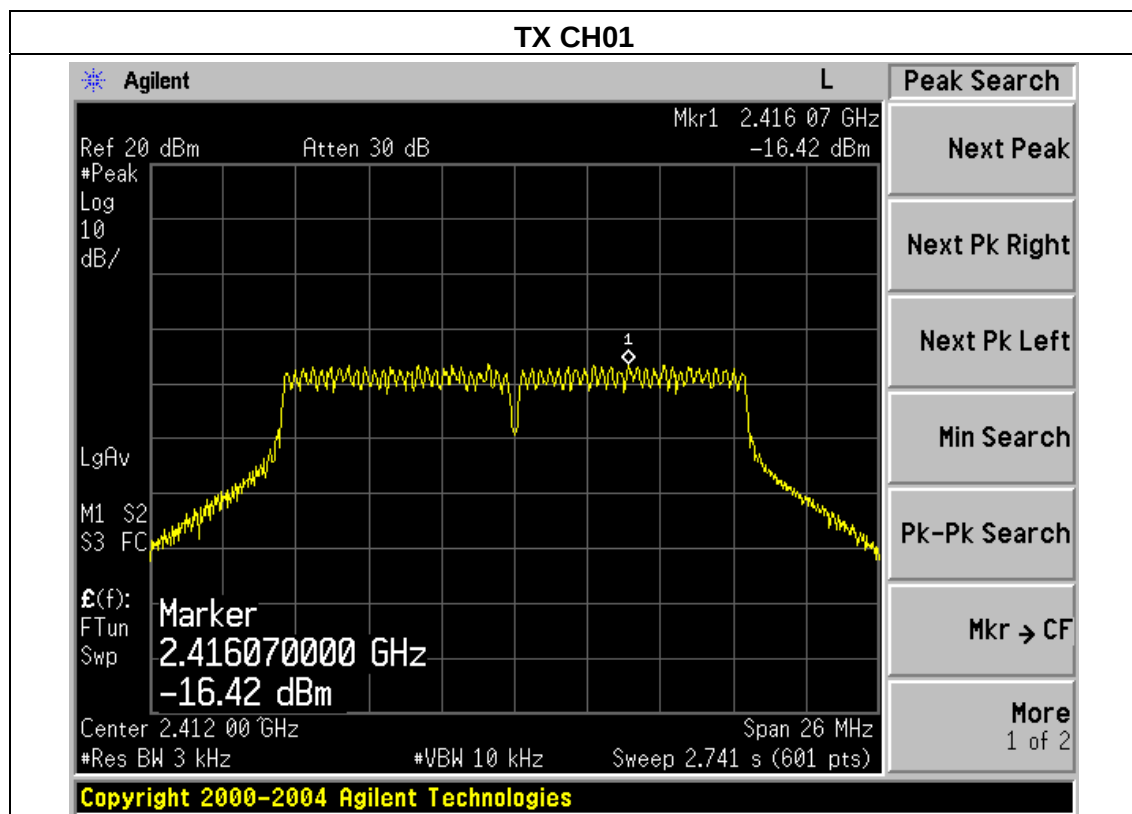
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-14.98	8	PASS
2437 MHz	-14.84	8	PASS
2462 MHz	-14.67	8	PASS

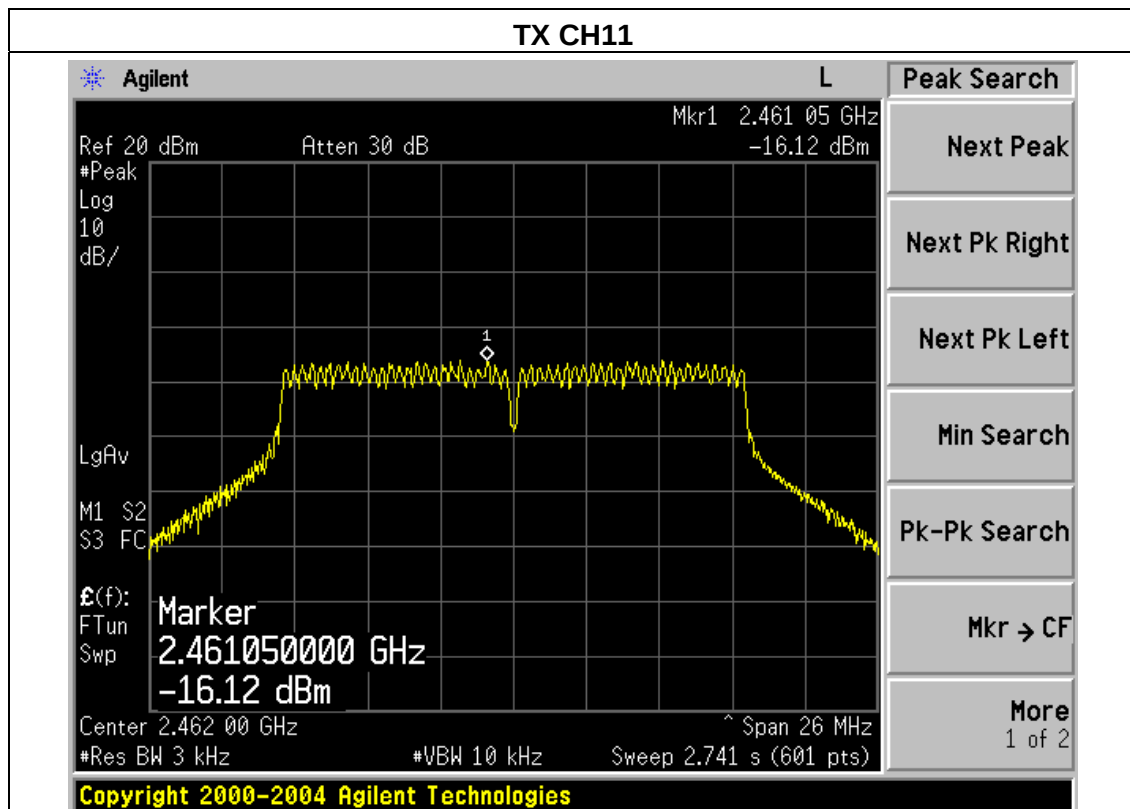
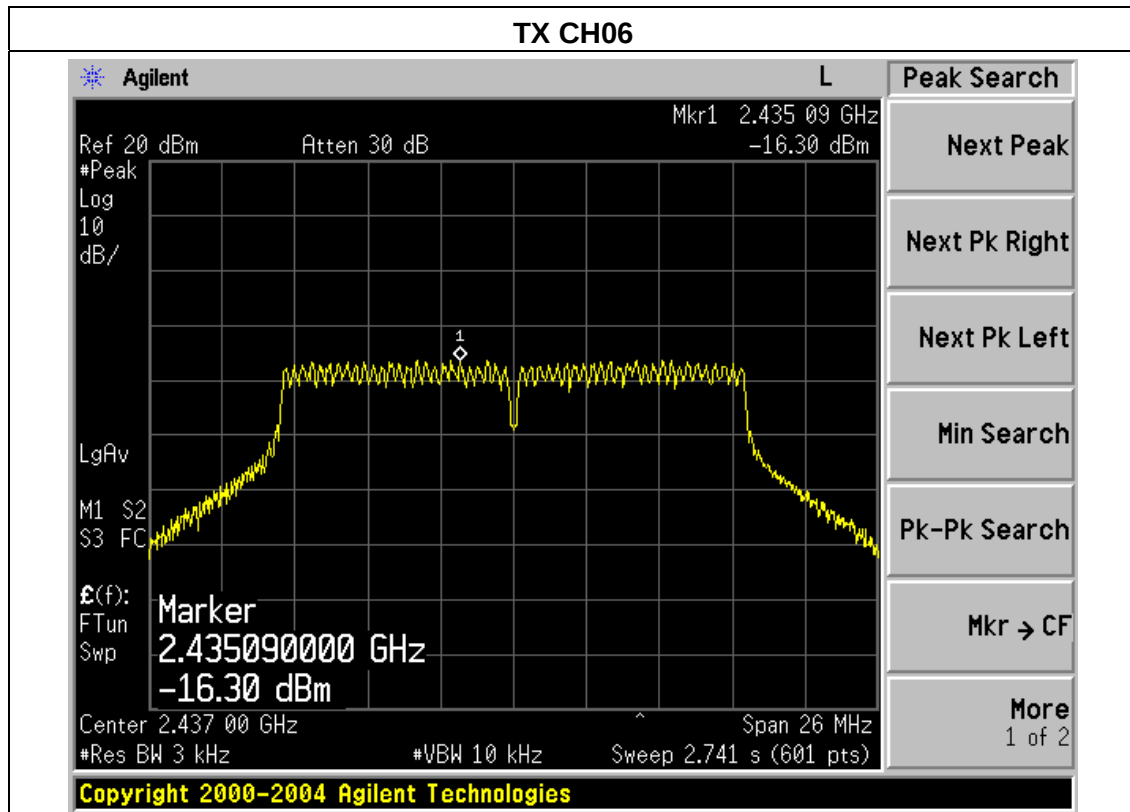




EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode /CH01, CH06, CH11		

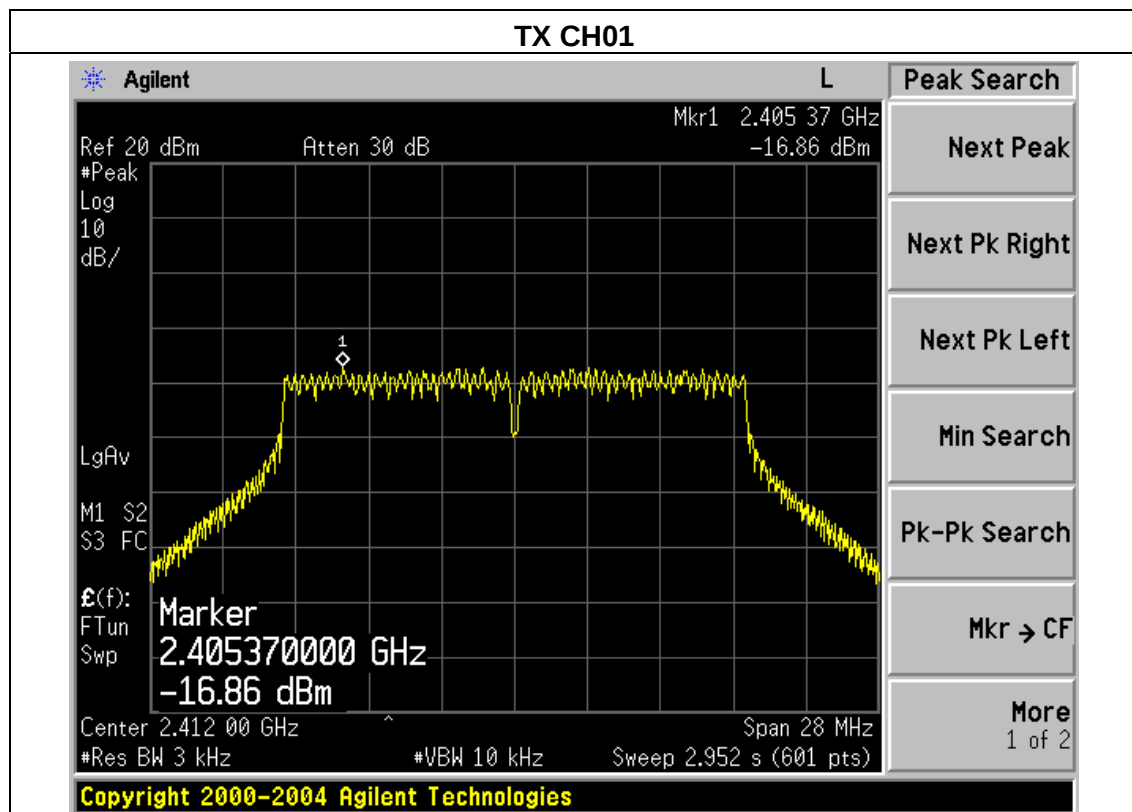
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-16.42	8	PASS
2437 MHz	-16.30	8	PASS
2462 MHz	-16.12	8	PASS

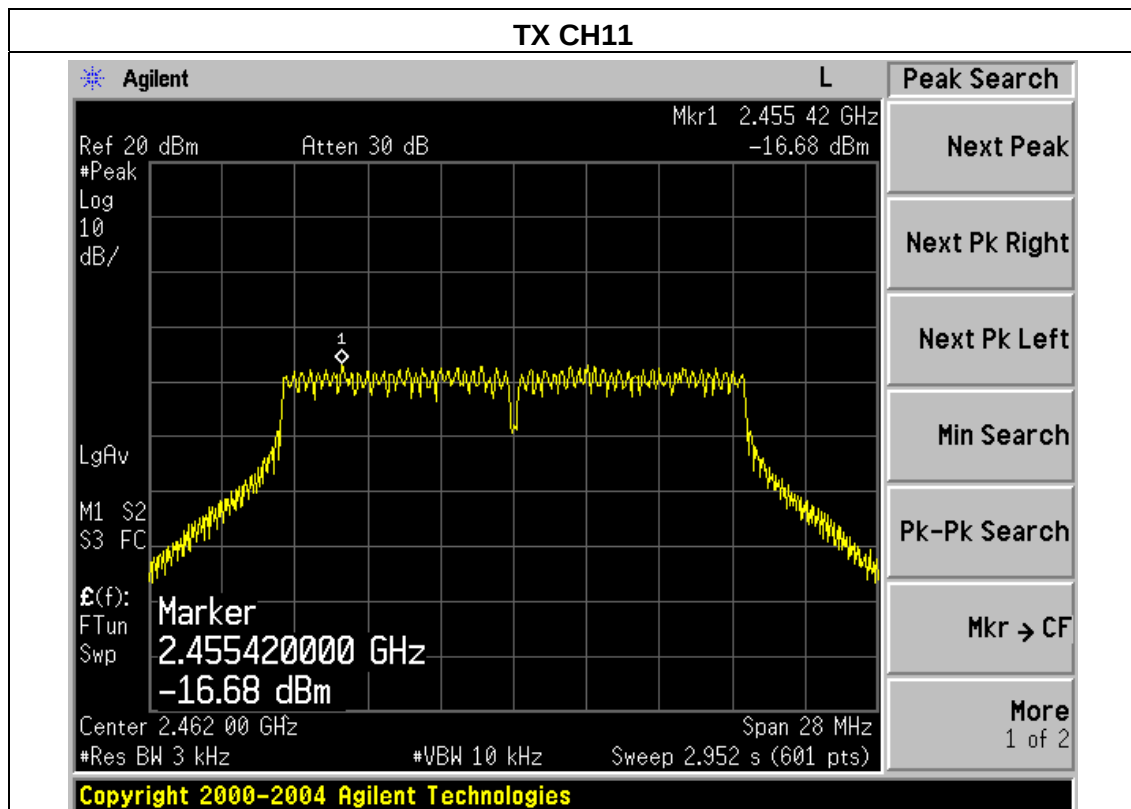
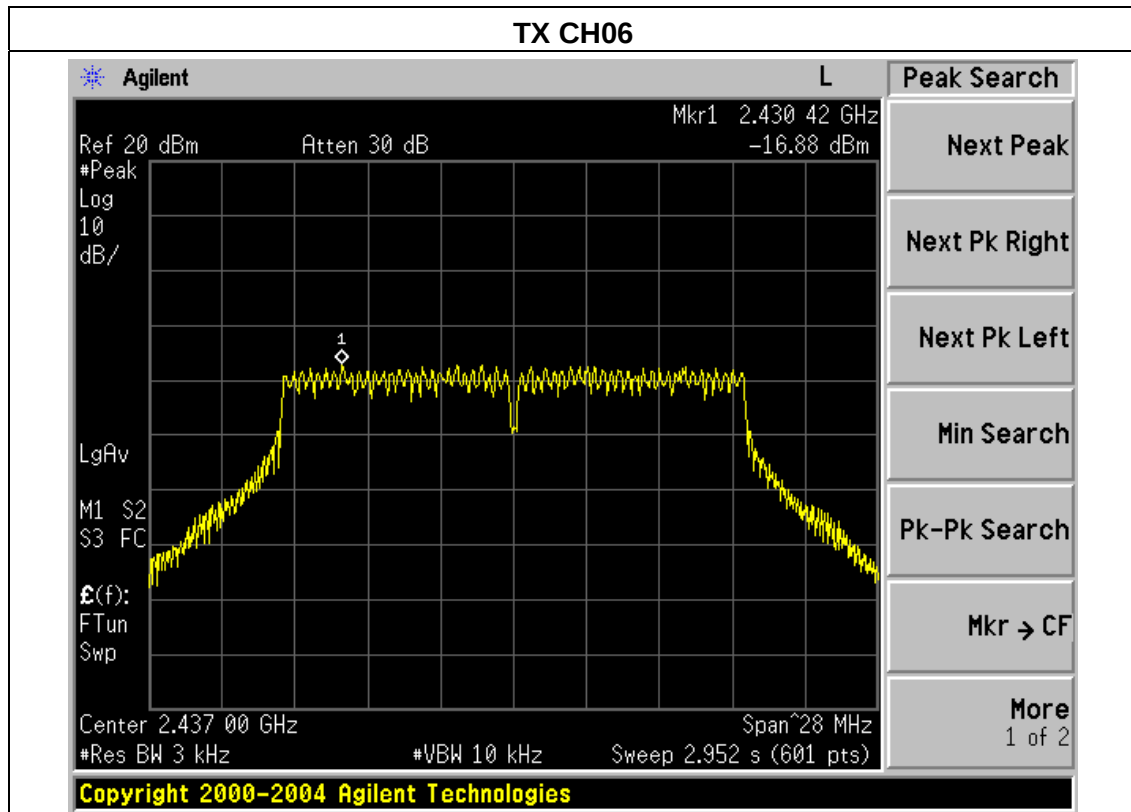




EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode (20MHz)/CH01, CH06, CH11		

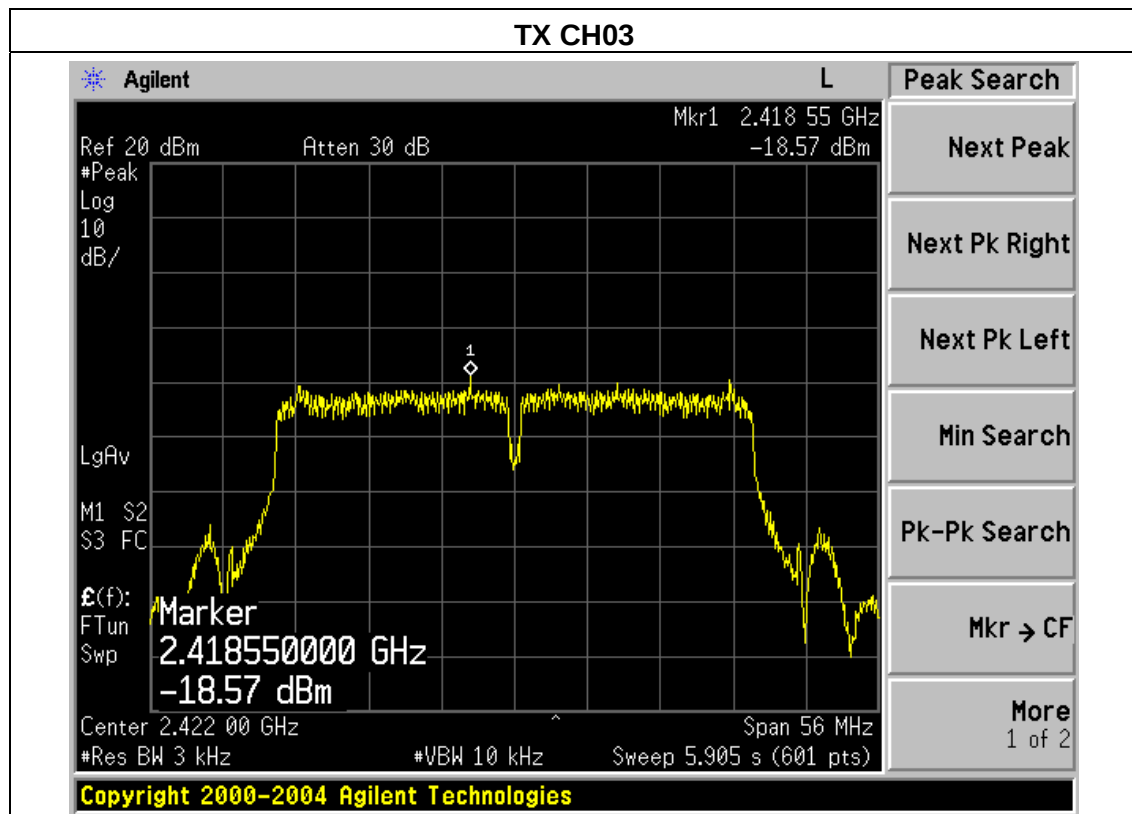
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-16.86	8	PASS
2437 MHz	-16.88	8	PASS
2462 MHz	-16.68	8	PASS



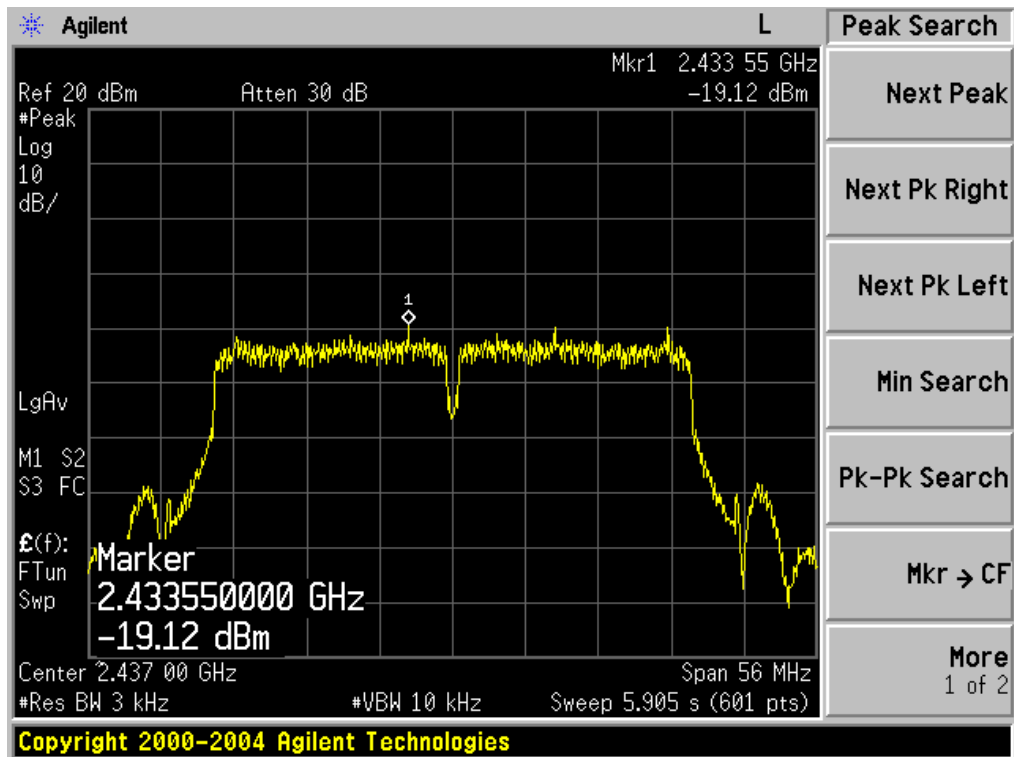


EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode (40MHz)/CH03, CH06, CH09		

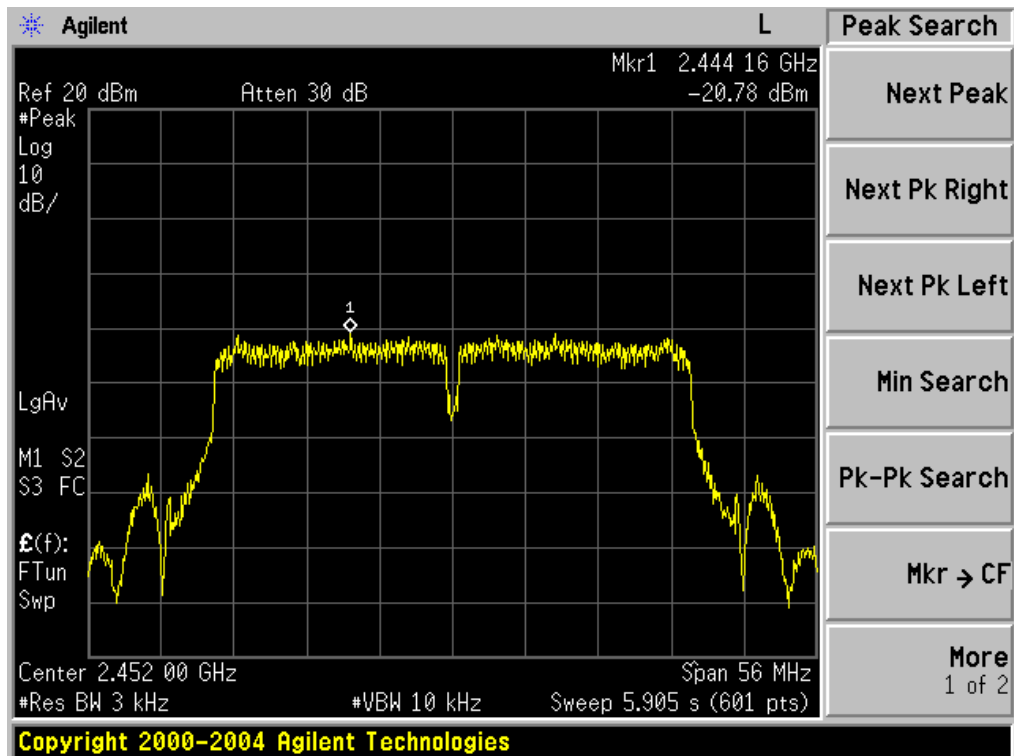
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2422 MHz	-18.57	8	PASS
2437 MHz	-19.12	8	PASS
2452 MHz	-20.78	8	PASS



TX CH06



TX CH09



5. BANDWIDTH TEST

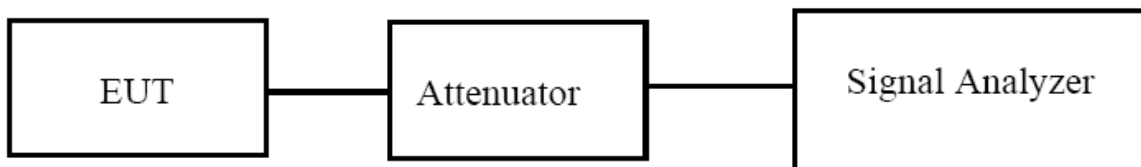
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



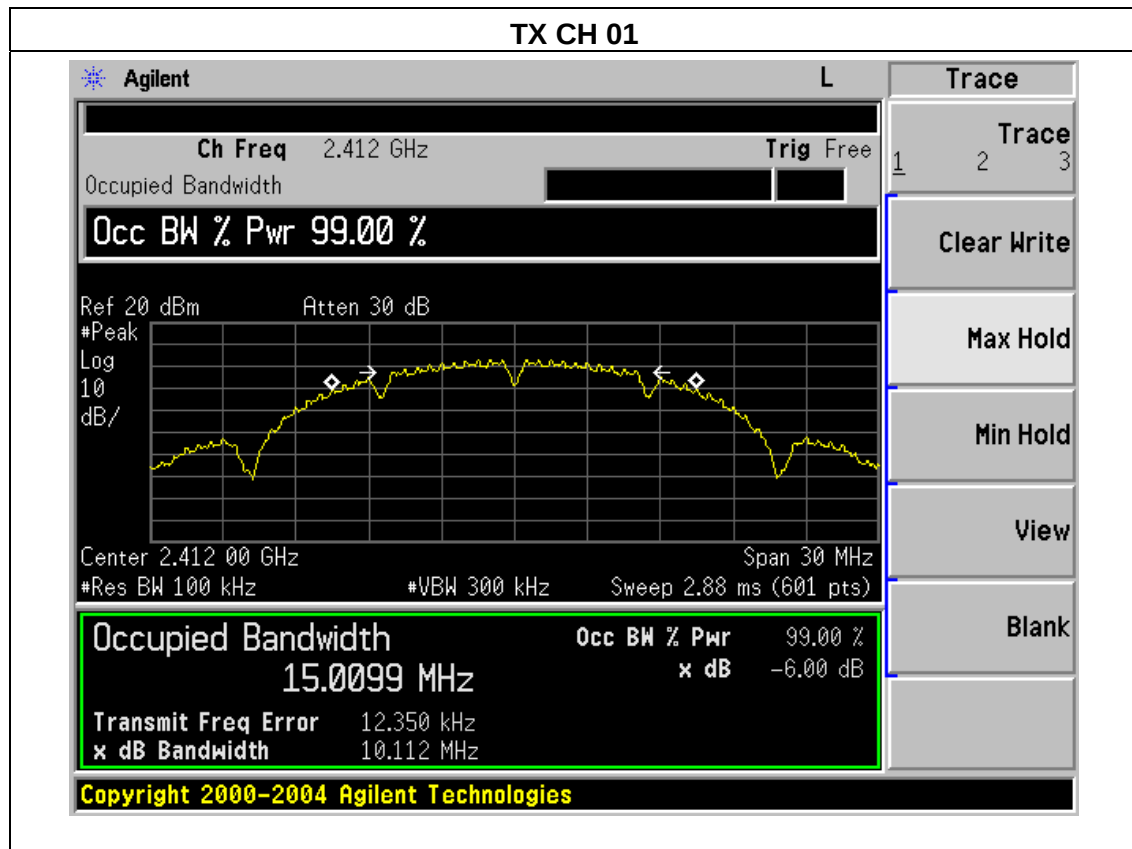
5.1.2 EUT OPERATION CONDITIONS

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.

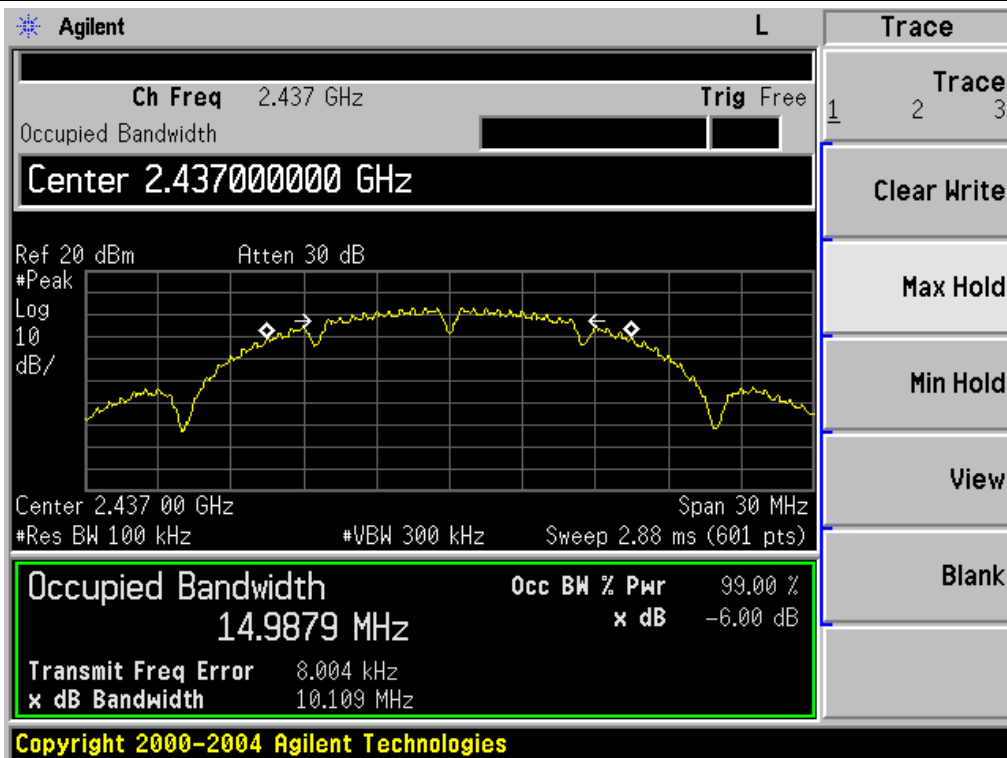
5.1.3 TEST RESULTS

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

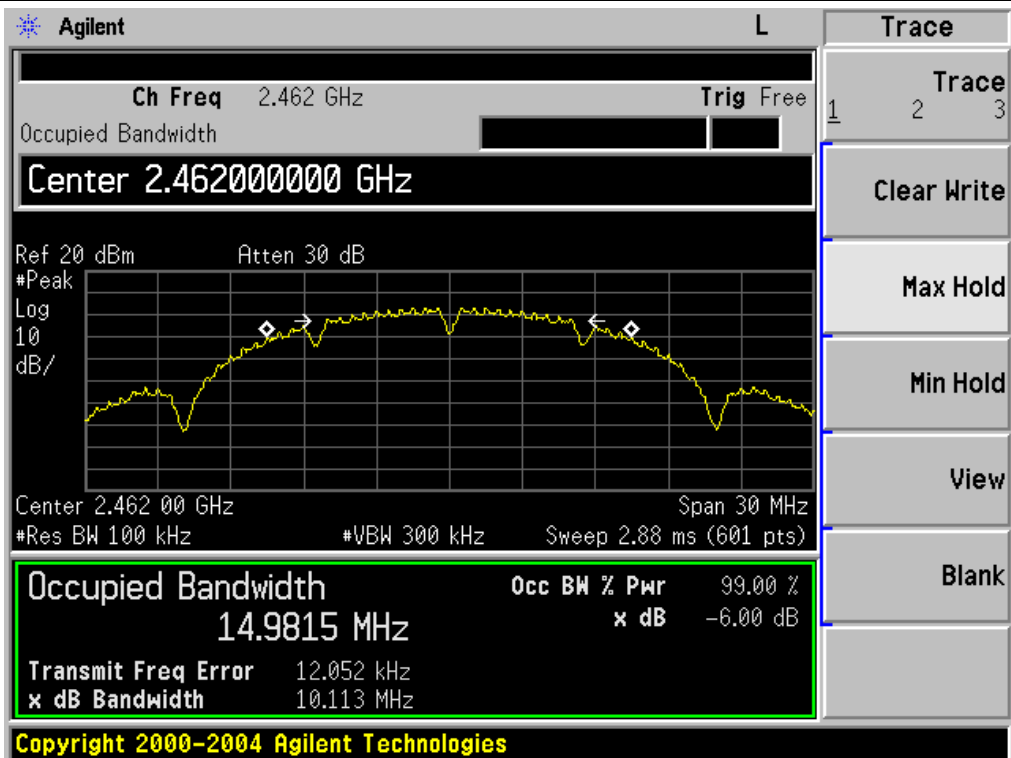
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.112	500	Pass
Middle	2437	10.109	500	Pass
High	2462	10.113	500	Pass



TX CH 06



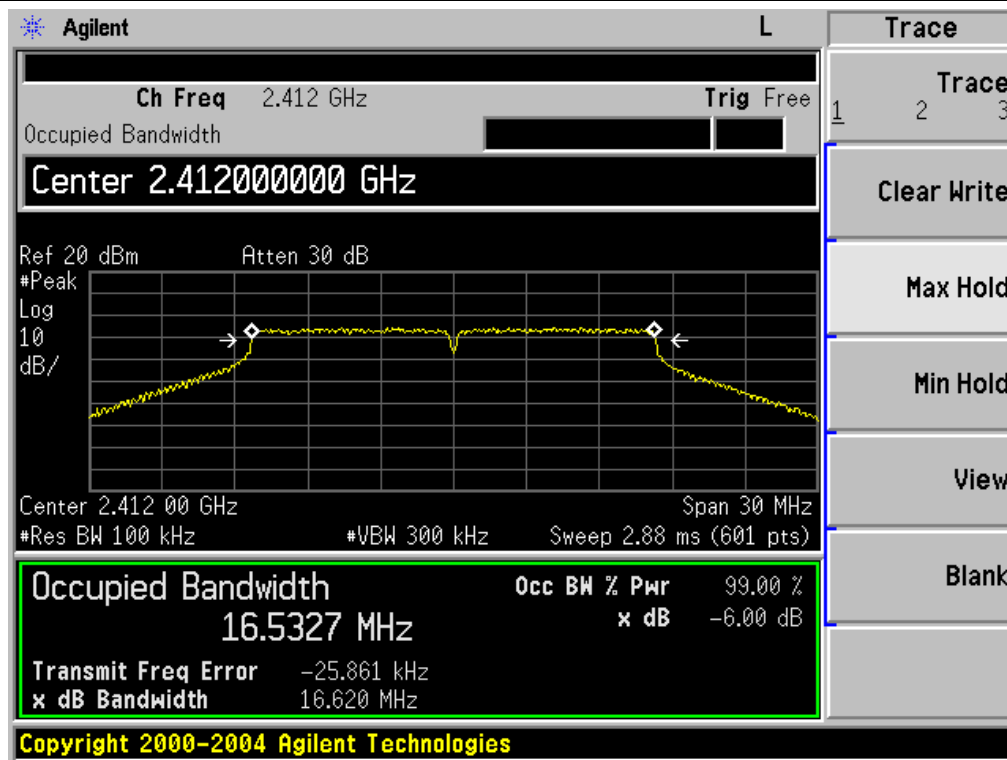
TX CH 11



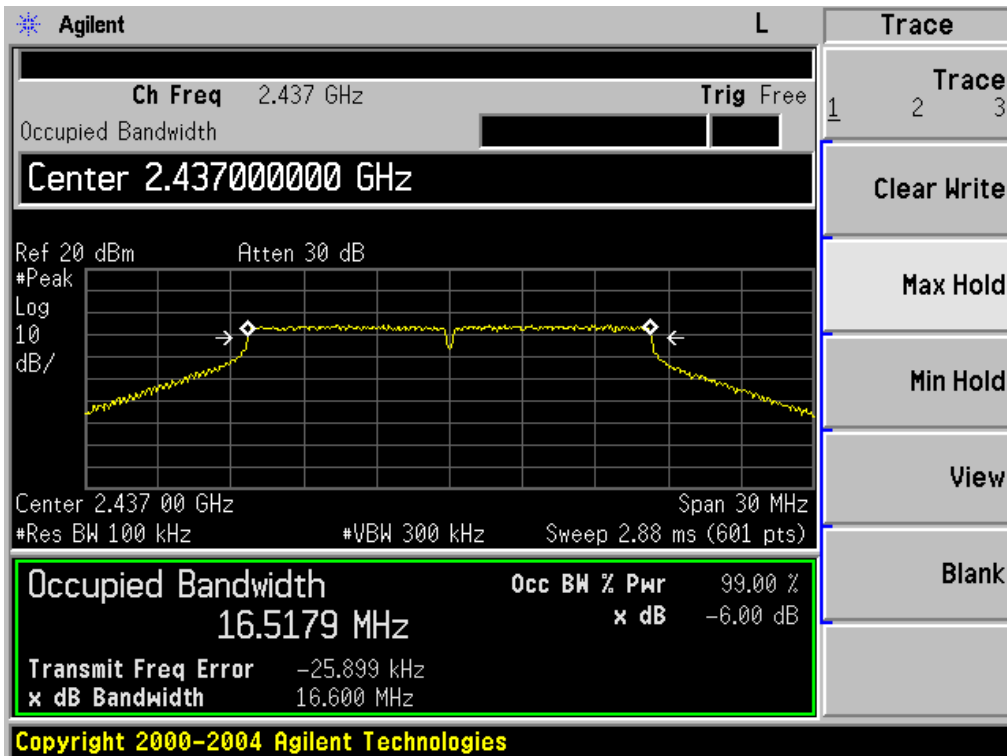
EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.620	500	Pass
Middle	2437	16.600	500	Pass
High	2462	16.621	500	Pass

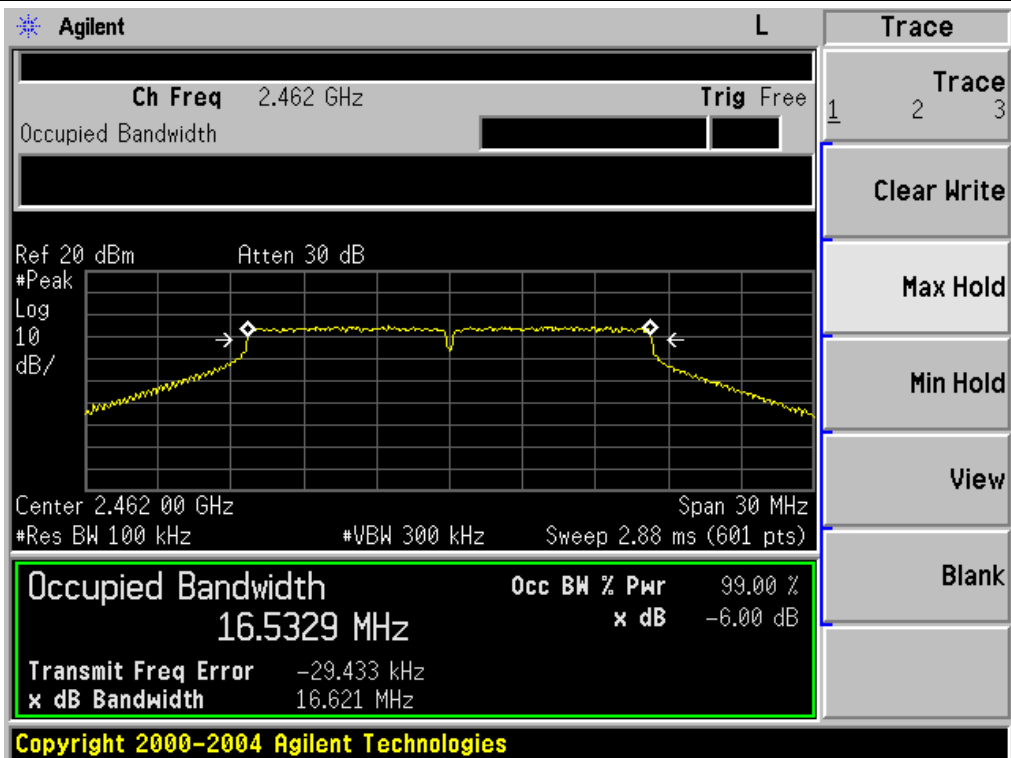
TX CH 01



TX CH 06



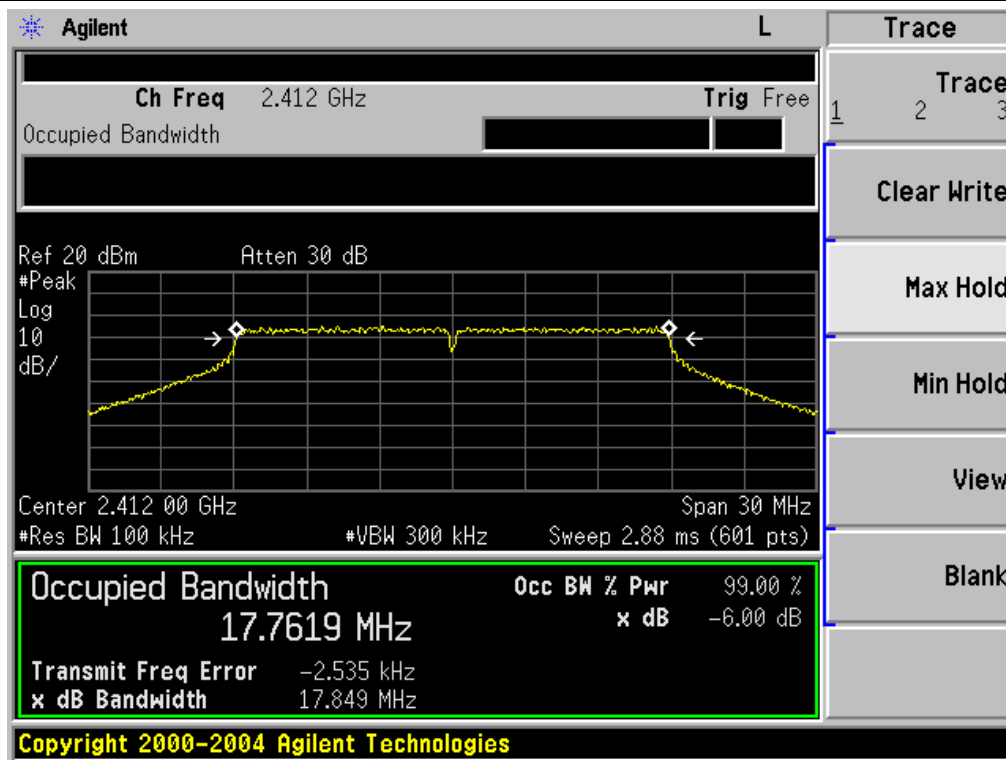
TX CH 11



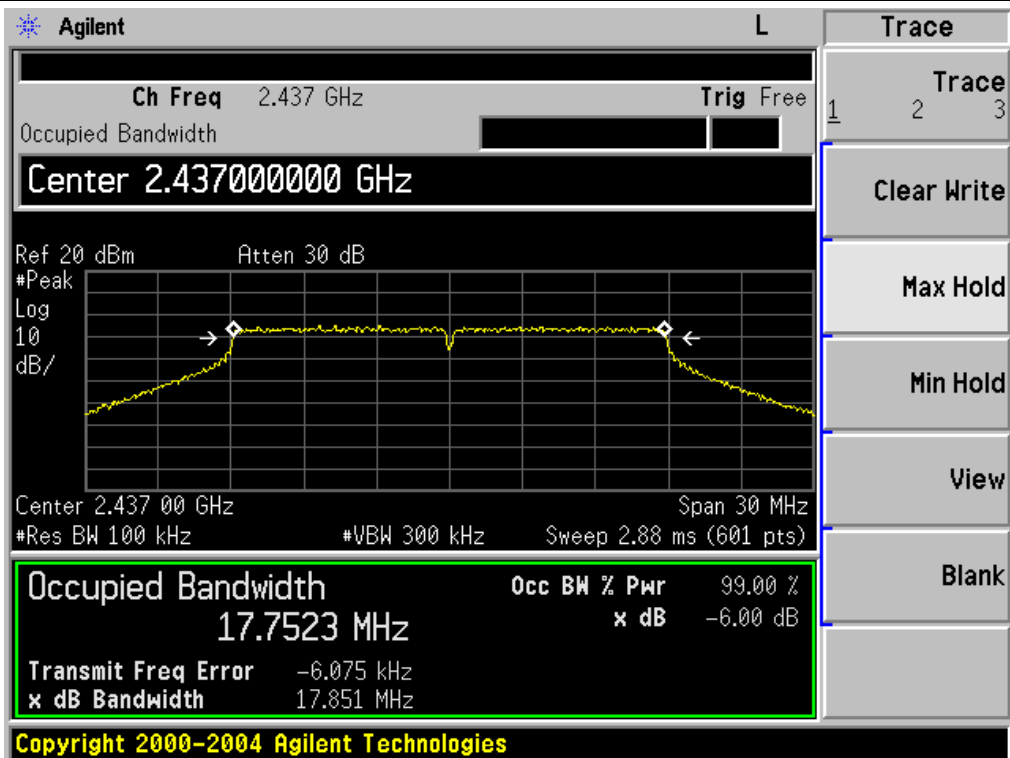
EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode(20M) /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.849	500	Pass
Middle	2437	17.851	500	Pass
High	2462	17.857	500	Pass

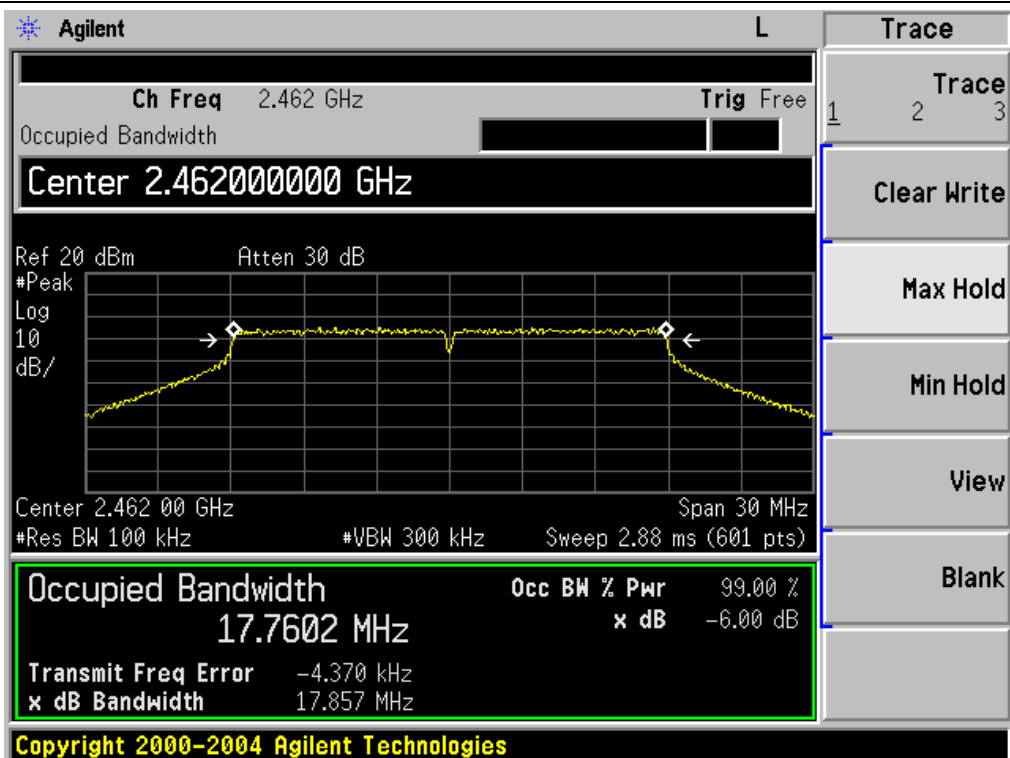
TX CH 01



TX CH 06

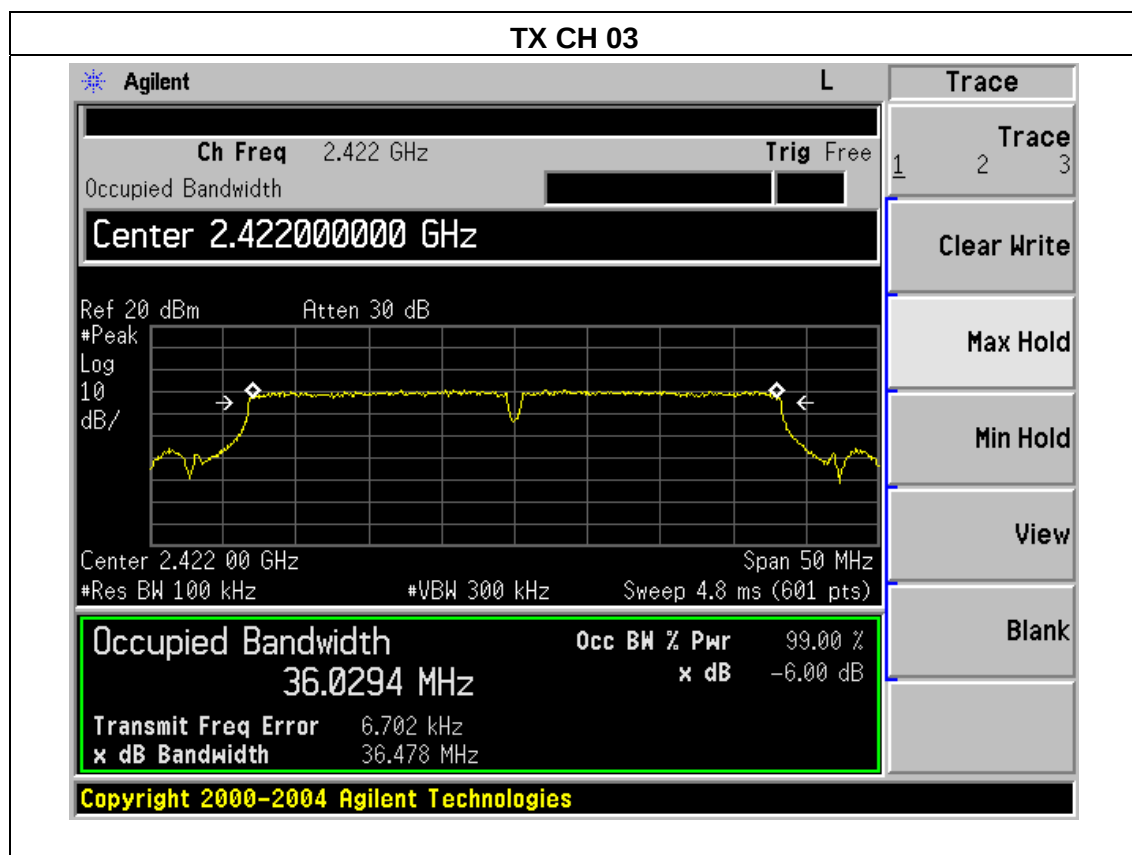


TX CH 11

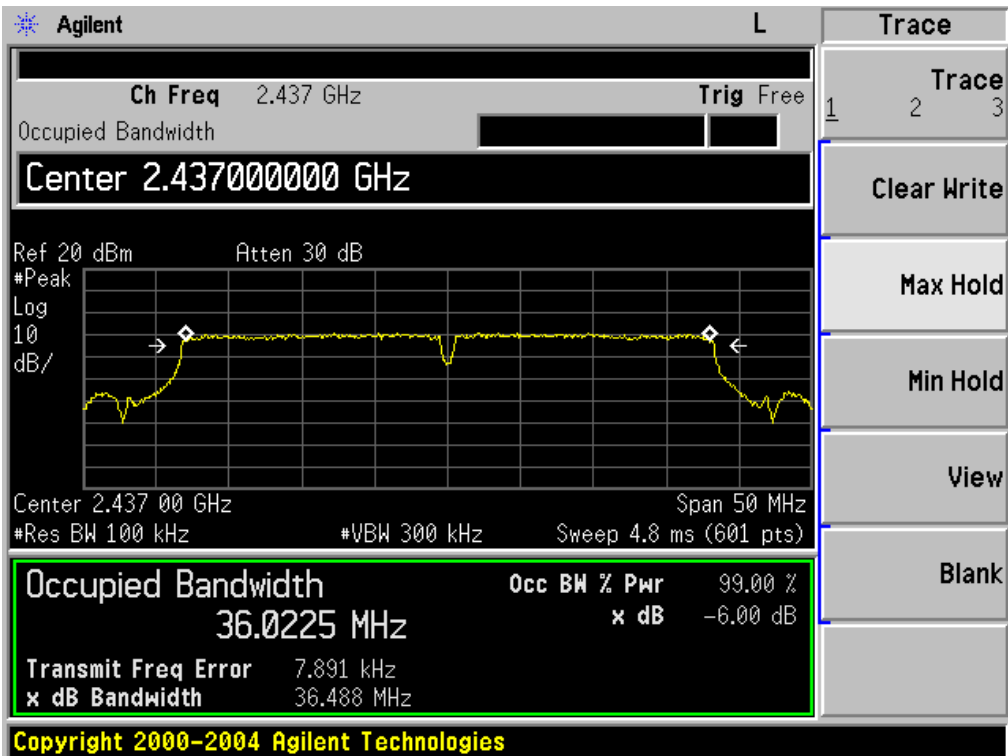


EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode(40M) /CH03, CH06, CH09		

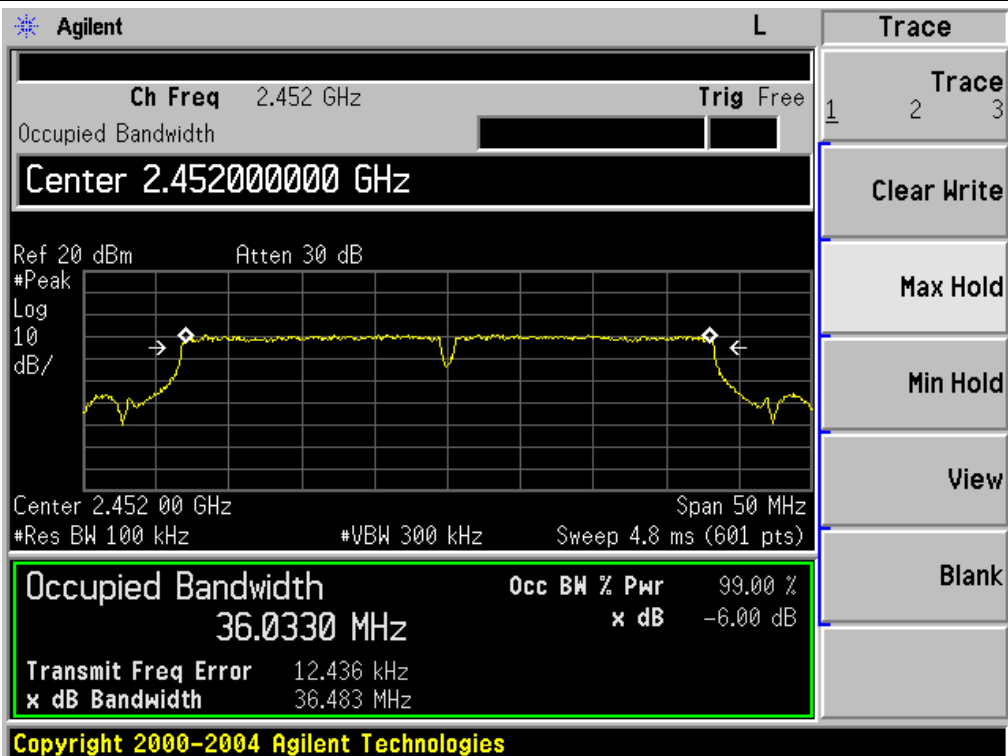
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.478	500	Pass
Middle	2437	36.488	500	Pass
High	2452	36.483	500	Pass



TX CH 06



TX CH 09



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

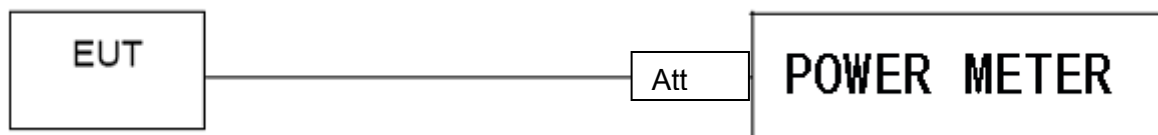
6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 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.

6.1.5 TEST RESULTS

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b/g/n(20M/40M) Mode		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Conducted Output Power (PK)	Maximum Conducted Output Power (AV)	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH01	2412	12.34	8.67	30
CH06	2437	12.65	8.41	30
CH11	2462	12.70	8.89	30
TX 802.11g Mode				
CH01	2412	10.97	7.19	30
CH06	2437	11.30	7.36	30
CH11	2462	11.24	7.78	30
TX 802.11n(20) Mode				
CH01	2412	10.02	7.15	30
CH06	2437	9.89	7.50	30
CH11	2462	10.12	7.33	30
TX 802.11n(40) Mode				
CH03	2422	9.26	6.77	30
CH06	2437	9.34	6.39	30
CH09	2452	8.97	6.44	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

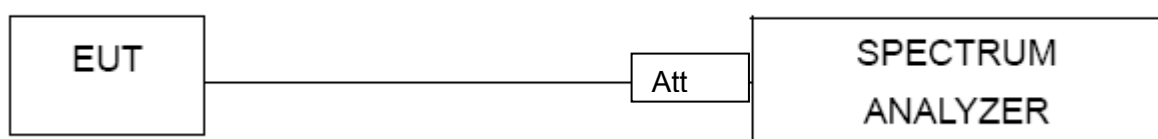
TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 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.

7.4 TEST RESULTS

EUT :	smartphone	Model Name :	RLTP4028-BLACK
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V

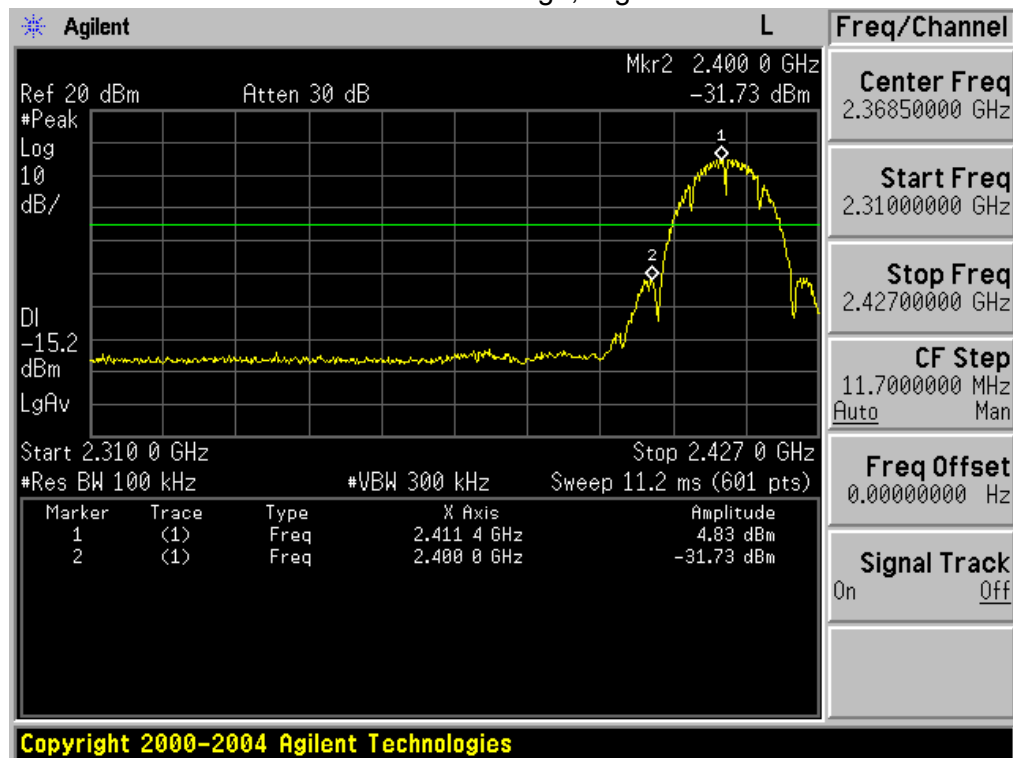
Frequency Band MHz	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
802.11b mode			
2400	36.56	20	Pass
2483.5	59.17	20	Pass
802.11g mode			
2400	26.85	20	Pass
2483.5	52.40	20	Pass
802.11n-HT20 mode			
2400	27.48	20	Pass
2483.5	53.17	20	Pass
802.11n-HT40 mode			
2400	29.92	20	Pass
2483.5	45.21	20	Pass

Radiated band edge:

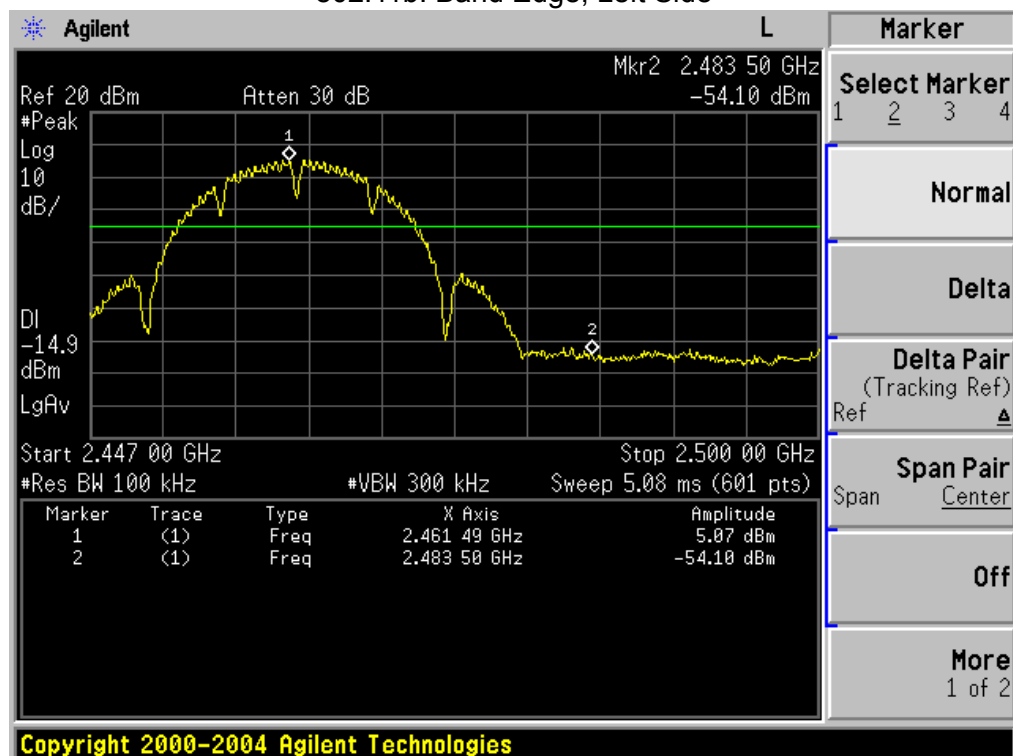
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Comment
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
802.11b							
2390	58.64	-13.06	45.58	74	-28.42	peak	Vertical
2390	58.1	-13.06	45.04	74	-28.96	peak	Horizontal
2483.5	60.31	-12.78	47.53	74	-26.47	peak	Vertical
2483.5	59.67	-12.78	46.89	74	-27.11	peak	Horizontal
802.11g							
2390	58.88	-13.06	45.82	74	-28.18	peak	Vertical
2390	58.12	-13.06	45.06	74	-28.94	peak	Horizontal
2483.5	59.21	-12.78	46.43	74	-27.57	peak	Vertical
2483.5	59.47	-12.78	46.69	74	-27.31	peak	Horizontal
802.11n (20)							
2390	60.34	-13.06	47.28	74	-26.72	peak	Vertical
2390	59.96	-13.06	46.9	74	-27.10	peak	Horizontal
2483.5	60.42	-12.78	47.64	74	-26.36	peak	Vertical
2483.5	60.06	-12.78	47.28	74	-26.72	peak	Horizontal
802.11n (40)							
2390	60.79	-13.06	47.73	74	-26.27	peak	Vertical
2390	61.52	-13.06	48.46	74	-25.54	peak	Horizontal
2483.5	61.84	-12.78	49.06	74	-24.94	peak	Vertical
2483.5	60.26	-12.78	47.48	74	-26.52	peak	Horizontal

Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average not record.

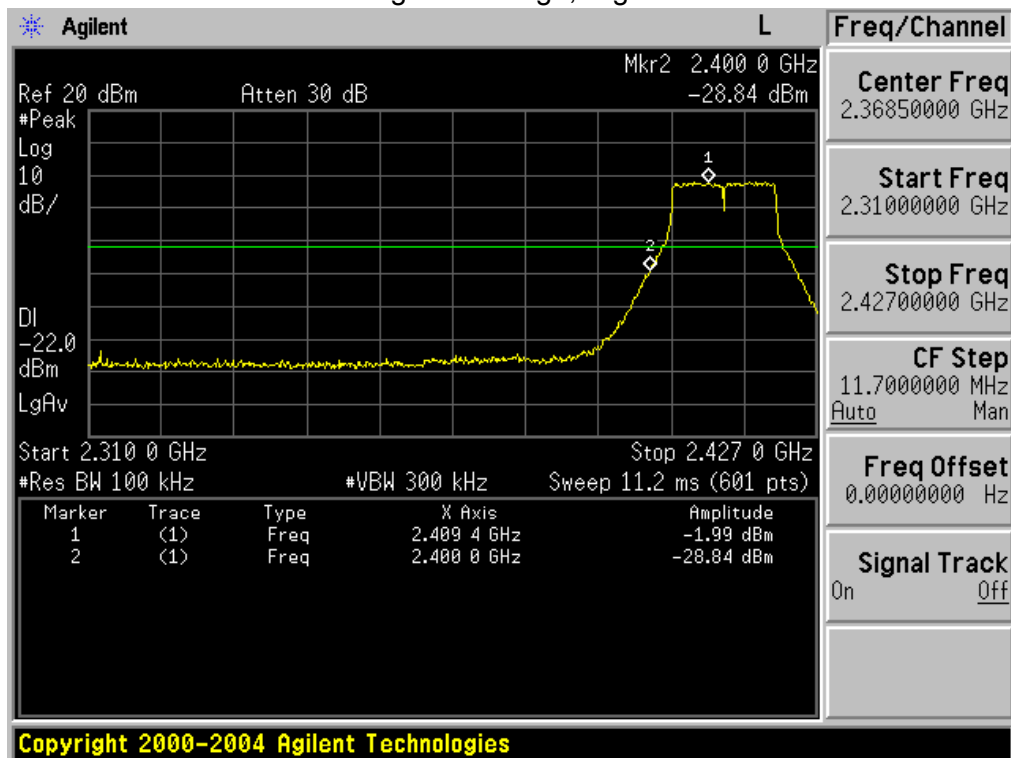
802.11b: Band Edge, Right Side



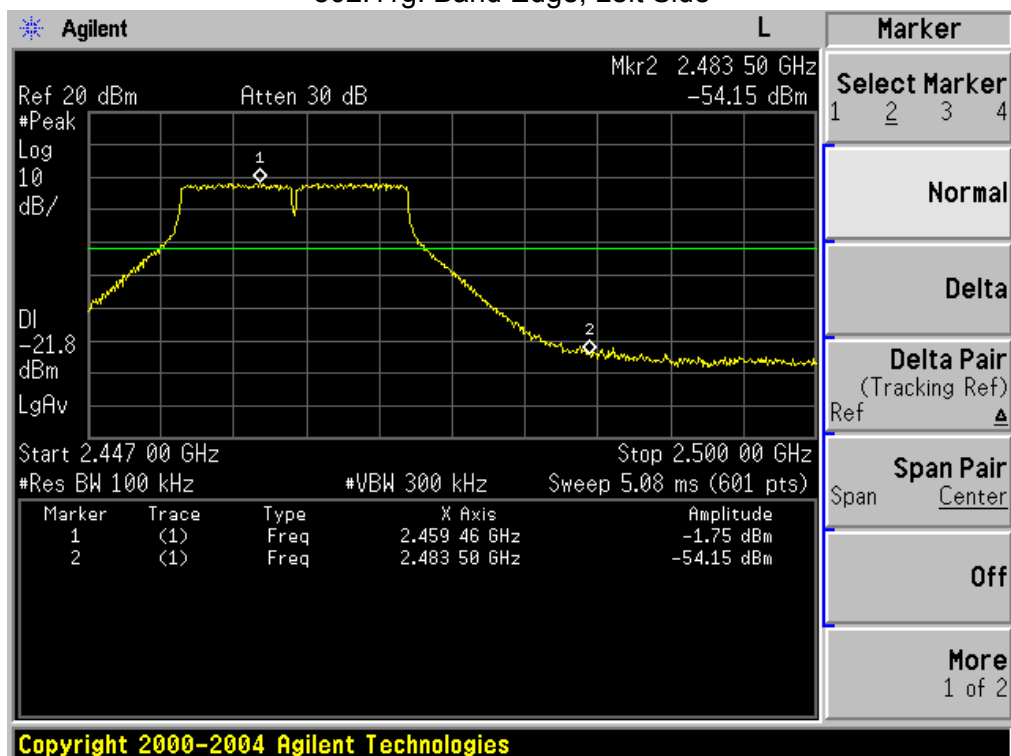
802.11b: Band Edge, Left Side



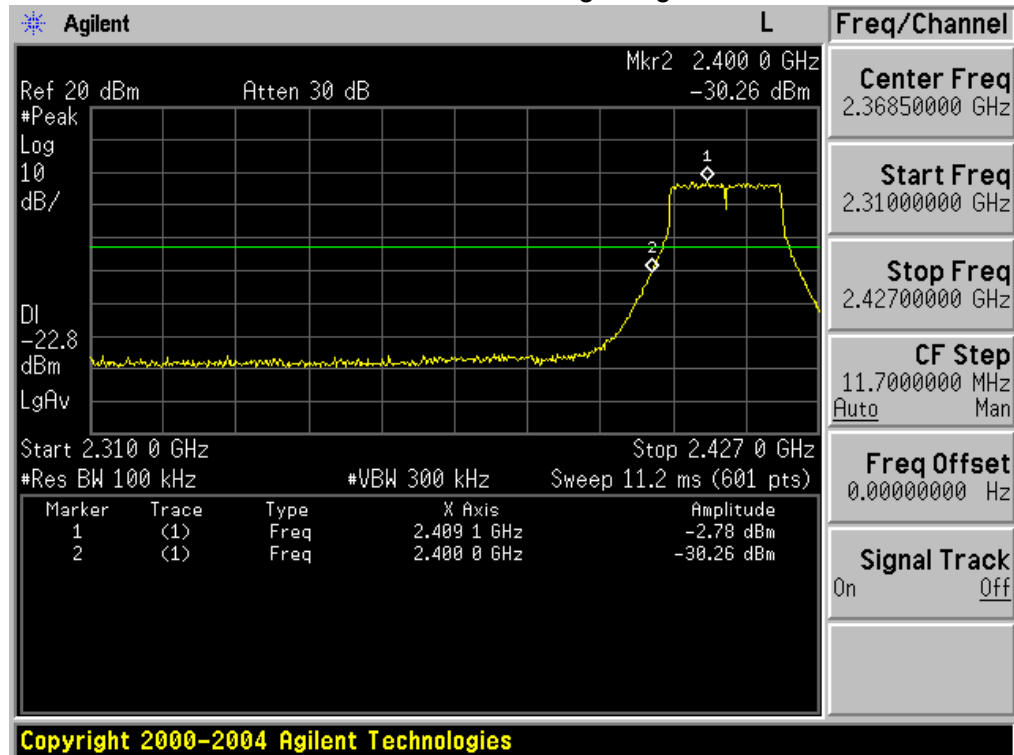
802.11g: Band Edge, Right Side



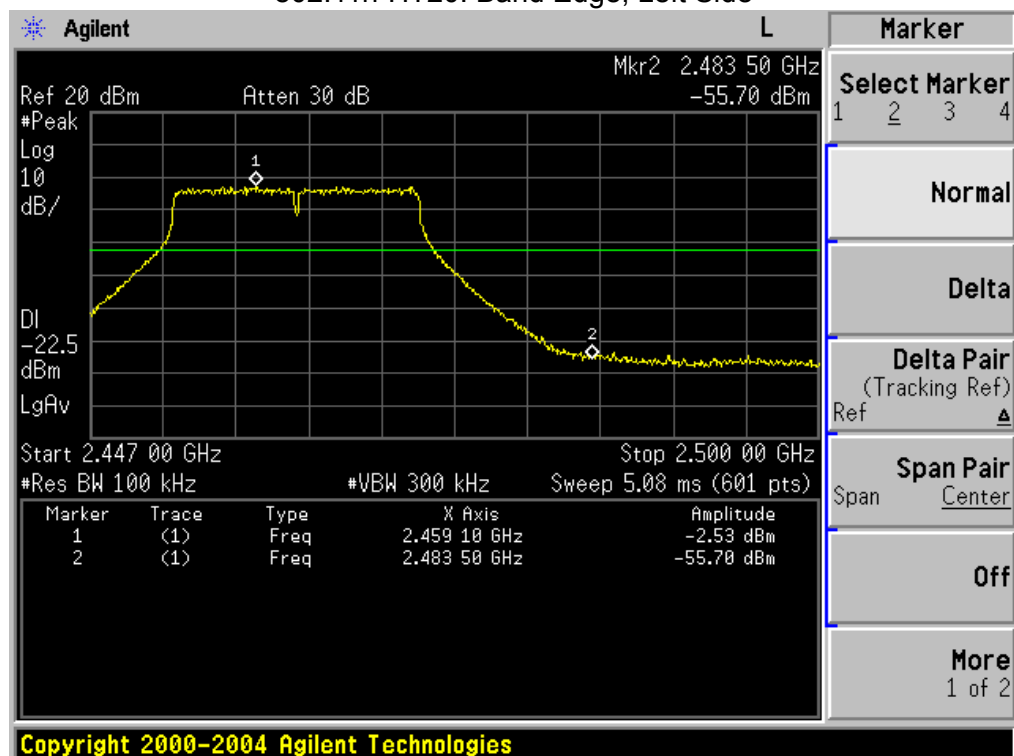
802.11g: Band Edge, Left Side



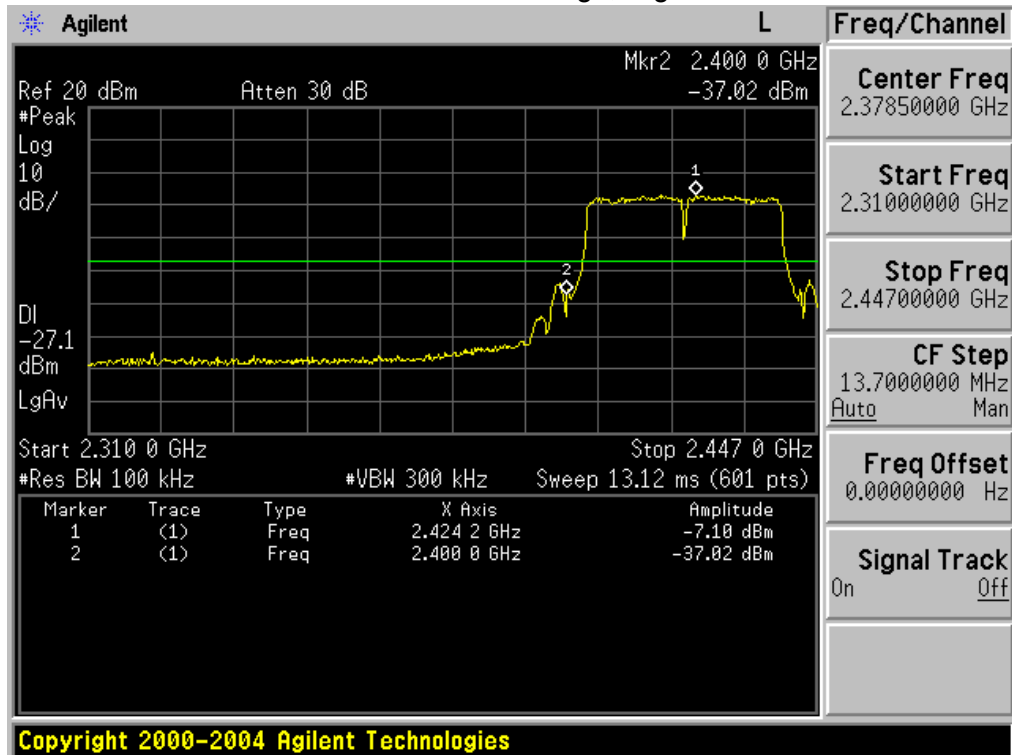
802.11n-HT20: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side



802.11n-HT40: Band Edge, Left Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

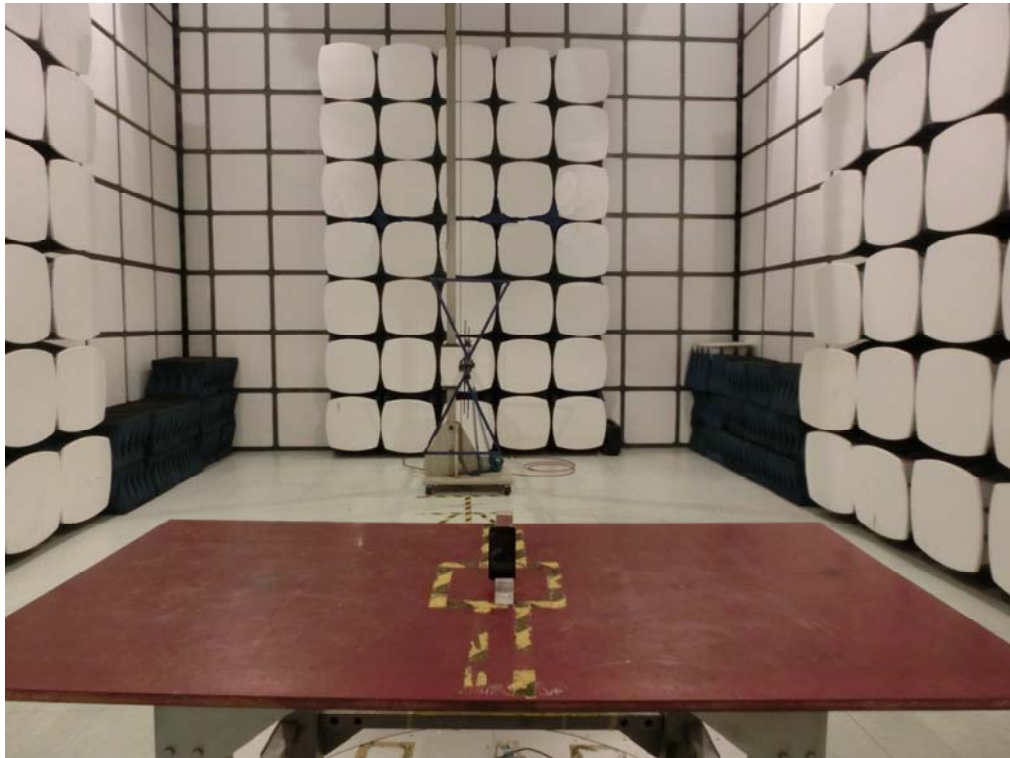
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.

9. EUT TEST PHOTO

Radiated Measurement Photos



CONDUCTED EMISSION Photos

