

FCC Test Report

Part 15 subpart C

Client Information:

Applicant : Antec Inc.
Applicant add.: 9F., No. 179, Sec. 2, Tiding Blvd., Neihu District, Taipei City 114,
Taiwan

EUT Information:

EUT Name : Antec Mobile Products
Model No. : SP1
Brand Name : Antec
FCC ID : OU8-SP1

Prepared By:

Asia Institute Technology (Dongguan) Limited

Add. : No.6 Binhe Road, Tianxin Village, Huangjiang,
Dongguan, Guangdong, China.

Date of Receipt: Jul. 05, 2012

Date of Test: Jul. 06~Jul. 18, 2012

Date of Issue: Jul. 18, 2012

Test Result: **Pass**

Test procedure used: ANSI C63.4-2009

This device described above has been tested by Asia Institute Technology (Dongguan) Limited, 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.

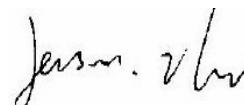
*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Reviewed by:



Seal.Chen

Approved by:



Jason.Zhu

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2 Test Summary

2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC Part 15 C:2008	Section 15.247(c)	PASS
Conduction Emissions	FCC Part 15 C:2008	Section 15.207(a)	PASS
Radiated Emissions	FCC Part 15 C:2008	Section 15.247(d)	PASS
Carrier Frequencies Separated	FCC Part 15 C:2008	Section 15.247(a)(1)	PASS
Hopping Channel Number	FCC Part 15 C:2008	Section 15.247(a)(1) (iii)	PASS
Dwell Time	FCC Part 15 C:2008	Section 15.247(a)(1) (iii)	PASS
Maximum Peak Output Power	FCC Part 15 C:2008	Section 15.247(b)	PASS
Band edge	FCC Part 15 C:2008	Section 15.247(d)	PASS
Conducted Spurious Emissions	FCC Part 15 C:2008	Section 15.247(d)	PASS

2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Levels have estimated based on ANSI C63.4:2009, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.57\text{dB}$

3 Test Facility

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

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dong guan) Limited have been registered by Federal Communications Commission (FCC) on Nov.20, 2009.

.Industry Canada(IC)-Registration No: IC6819A-1 & IC6819A-2

The 3m Semi-Anechoic Chamber and 3m/10m Open Area Test Site of Asia Institute Technology (Dongguan) Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Nov.07, 2010.

.VCCI- Registration No: 2705

The 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Jan.24, 2010 and Oct. 30, 2010. The Telecommunication Ports Conducted Disturbance Measurement of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Sep. 06, 2011.

.TUV Rhineland

Asia Institute Technology (Dongguan) Limited has been assessed on Dec.29, 2011 that it can carry out EMC tests by order and under supervision of TUV Rhineland.

.ITS- Registration No: TMPSHA031

Asia Institute Technology (Dongguan) Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Jul.22, 2011.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

4 General Information

4.1 General Description of EUT

Manufacturer:	DONGGUAN AIVTECH CO.,LTD
Manufacturer Address:	AIVtech Inductry Park No. 78 Wenquan South Road, ShiLong Town, Dongguan City, Guangdong
EUT Name:	Antec Mobile Products
Model No:	SP1
Operation frequency:	2402 MHz to 2480MHz
Channel Number:	79
Modulation Technology:	GFSK, $\pi/4$ DQPSK
AntennaType:	Copper pattern antenna
Antenna Gain:	max : 0.457dBi
Brand Name:	Antec
Serial No:	N/A
Power Supply Range:	DC 3.7V
Power Supply:	DC 3.7V from Battery
Power Cord:	N/A
Effective Isotropic Radiated Power(max):	1Mbps mode:4.93dBm 3Mbps mode:3.23dBm

Note:

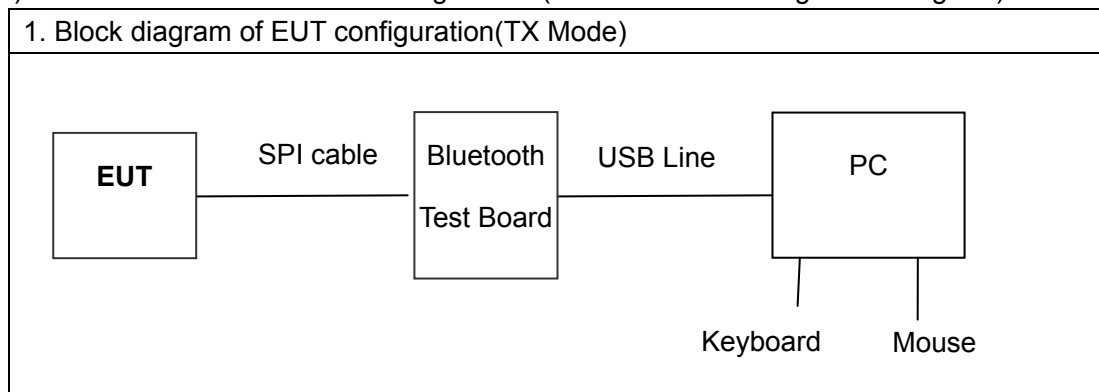
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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		

4.2 Description of Test conditions

- (1) EUT was tested in normal configuration (Please See following Block diagram)



- (2) E.U.T. test conditions:

15.31(e): For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

- (3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. If required reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

- (4) Frequency range of radiated measurements:

According to the 15.33, The test range will be up to the tenth harmonic of the highest fundamental frequency .

4.3 EUT Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	USB Line	Prototype	N/A	N/A	N/A	0.60m/ shielded/ Detachable
2	Audio Line	Prototype	N/A	N/A	N/A	0.60m/ shielded/ Detachable

4.4 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	Personal computer	H P	CE 、 FCC	DX2310	CNG8250MZ3	1.8m/unshielded /detachable	N/A
2	Keyboard	DELL	CE	SK-8115	CN-ONM432- 71616-81M-OLK B	N/A	1.5m/unshielded /undetachable
3	Mouse	Microsoft	CE	X800898	30603	N/A	1.5m/unshielded /undetachable

5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2011.10.16	2012.10.15
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2011.10.16	2012.10.15
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2011.09.08	2012.09.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2012.04.08	2013.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2012.07.15	2013.07.14
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2012.07.15	2013.07.14
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2011.09.08	2012.09.07
8	EMI Test Receiver	R&S	ESCI	100124	2011.12.29	2012.12.28
9	LISN	Kyoritsu	KNW-242	8-837-4	2012.04.08	2013.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2012.04.08	2013.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2011.09.08	2012.09.07
12	Loop Antenna	ARA	PLA-1030/B	1029	2012.03.19	2013.03.18
13	Power Meter	R&S	NRVS	101336	2012.04.08	2013.04.07

6 Test Result

6.1 Antenna Requirement

6.1.1 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.

15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

6.1.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement. Antenna gain is max 0.457 dBi from 2.4GHz to 2.5GHz.

6.2 Conduction Emissions Measurement

6.2.1 Applied procedures / Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

6.2.2 Test procedure

EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

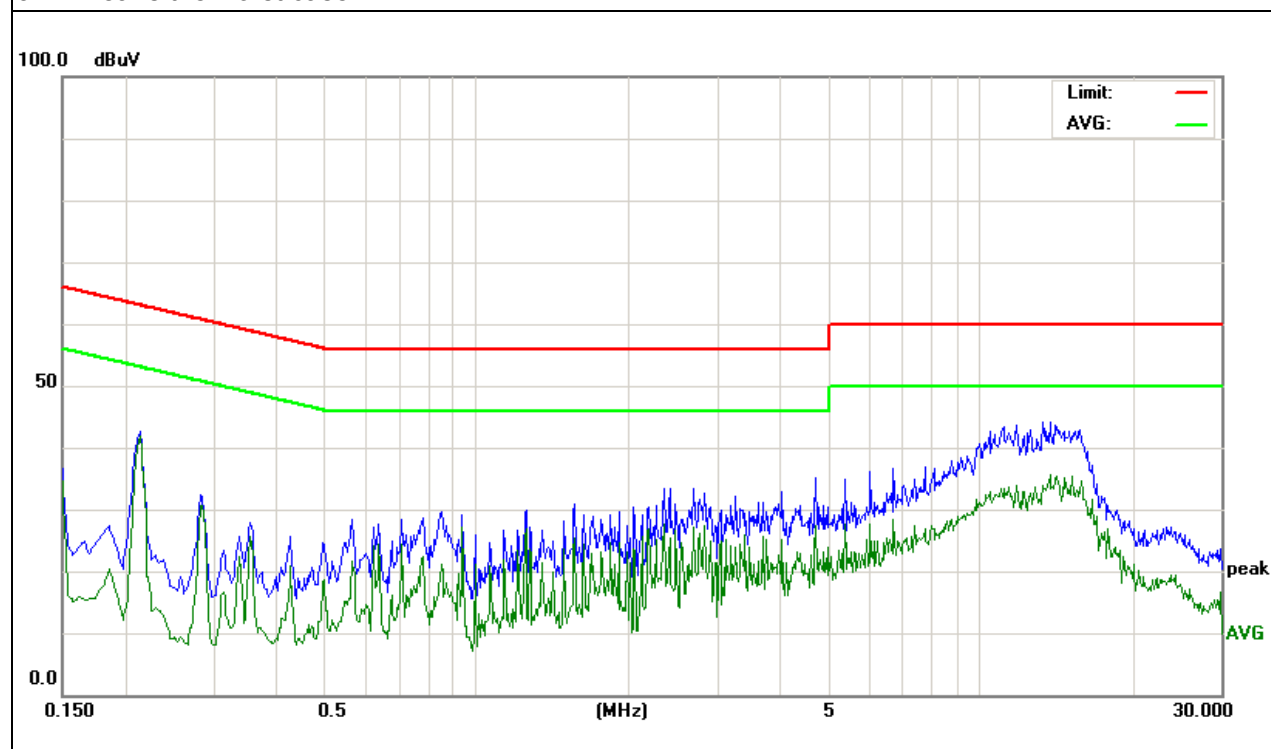
6.2.3 Test results

EUT:	Antec Mobile Products	Model Name. :	SP1
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date :	2012-07-13
Test Mode:	TX	Phase :	Line
Test Voltage :	DC 3.7V from battery		

Frequency (MHz)	Factor (dB)	Meter Reading (dBμV)		Emission Level (dBμV)		Limits (dBμV)		Margin (dB)	
		QP	Average	QP	Average	QP	Average	QP	Average
*0.2139	11.04	31.50	30.76	42.54	41.80	63.05	53.05	-20.51	-11.25
0.2816	10.78	21.68	19.90	32.46	30.68	60.77	50.77	-28.31	-20.09
0.9377	10.18	18.86	16.98	29.04	27.16	56.00	46.00	-26.96	-18.84
2.3540	10.17	23.17	17.44	33.34	27.61	56.00	46.00	-22.66	-18.39
9.2858	1.24	35.04	27.78	36.28	29.02	60.00	50.00	-23.72	-20.98
13.7538	1.35	42.78	34.31	44.13	35.66	60.00	50.00	-15.87	-14.34

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. '*' means the worst case

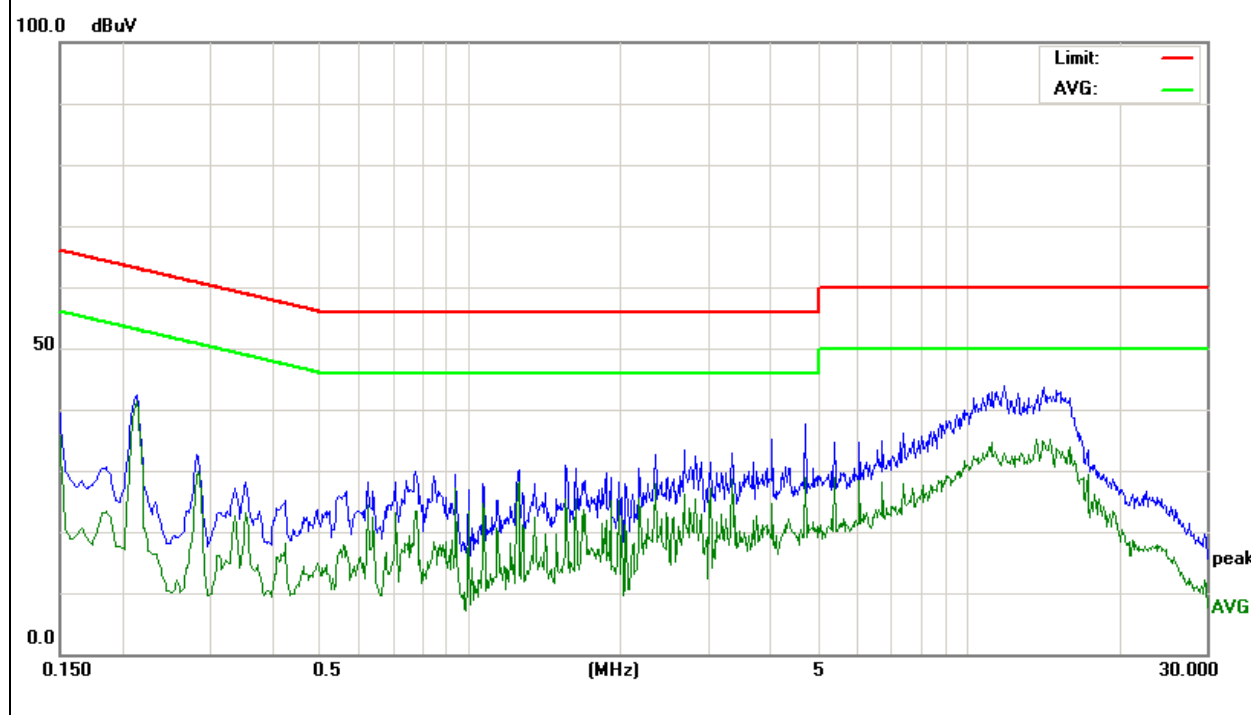


EUT:	Antec Mobile Products	Model Name. :	SP1
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date :	2012-07-13
Test Mode:	TX	Phase :	Neutral
Test Voltage :	DC 3.7V from battery		

Frequency	Factor	Meter Reading (dBμV)		Emission Level (dBμV)		Limits (dBμV)		Margin (dB)	
(MHz)	(dB)	QP	Average	QP	Average	QP	Average	QP	Average
*0.2139	11.04	31.39	30.32	42.43	41.36	63.05	53.05	-20.62	-11.69
0.6219	10.29	17.76	14.04	28.05	24.33	56.00	46.00	-27.95	-21.67
2.1819	10.17	20.30	15.18	30.47	25.35	56.00	46.00	-25.53	-20.65
4.7057	10.19	27.40	18.74	37.59	28.93	56.00	46.00	-18.41	-17.07
11.0899	1.33	41.60	33.37	42.93	34.70	60.00	50.00	-17.07	-15.30
14.5336	1.36	40.86	33.71	42.22	35.07	60.00	50.00	-17.78	-14.93

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. '*' means the worst case



6.3 Radiated Emissions Measurement

6.3.1 Applied procedures / Limit

15.247(d) 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009-0.49	$2400/F(\text{kHz})$		300
0.49-1.705	$24000/F(\text{kHz})$		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

6.3.2 Test procedure

EUT was placed upon a wooden test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

6.3.3 Test Result

There is not detected blow 30MHz.

EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	25 °C	Test Data	2012-07-15
Pressure:	1010 hPa	Relative Humidity:	60%
Test Mode :	TX	Test Voltage :	DC 3.7V from battery
Measurement Distance	3 m	Frenqucy Range	30MHz to 1GHz
RBW/VBW	100KHz / 300KHz for spectrum, RBW=120KHz for receiver.		

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
34.7601	27.43	-16.36	11.07	40.00	-28.93	QUASIPeAK
120.2766	43.63	-13.27	30.36	43.50	-13.14	QUASIPeAK
263.8190	37.17	-11.32	25.85	46.00	-20.15	QUASIPeAK
382.5878	40.65	-8.32	32.33	46.00	-13.67	QUASIPeAK
*432.5457	48.85	-8.44	40.41	46.00	-5.59	QUASIPeAK
958.7943	28.30	3.67	31.97	46.00	-14.03	QUASIPeAK

(b) Antenna polarization: vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
32.4059	30.41	-18.61	11.80	40.00	-28.20	QUASIPeAK
51.3004	27.47	-17.07	10.40	40.00	-29.60	QUASIPeAK
121.1230	31.94	-13.16	18.78	43.50	-24.72	QUASIPeAK
199.2855	29.53	-11.53	18.00	43.50	-25.50	QUASIPeAK
*434.0649	41.53	-8.49	33.04	46.00	-12.96	QUASIPeAK
958.7943	27.76	3.67	31.43	46.00	-14.57	QUASIPeAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	25 °C	Test Data	2012-07-15
Pressure:	1010 hPa	Relative Humidity:	60%
Test Mode :	1Mbps	Test Voltage :	DC 3.7V from battery
Measurement Distance	3 m	Frenqucy Range	1GHz to 18GHz
RBW/VBW	1MHz/1MHz for Peak, 1MHz/10Hz for Average.		

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
2400.000	43.78	-5.70	38.08	74.00	-35.92	PEAK
2400.000	37.92	-5.70	32.22	54.00	-21.78	AVERAGE
*4804.000	62.34	5.06	67.40	74.00	-6.60	PEAK
4804.000	38.66	5.06	43.72	54.00	-10.28	AVERAGE
7206.000	55.02	7.03	62.05	74.00	-11.95	PEAK
7206.000	31.17	7.03	38.20	54.00	-15.80	AVERAGE
9608.000	46.33	10.63	56.96	74.00	-17.04	PEAK
9608.000	22.51	10.63	33.14	54.00	-20.86	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
2400.000	43.32	-5.70	37.62	74.00	-36.38	PEAK
2400.000	37.19	-5.70	31.49	54.00	-22.51	AVERAGE
*4804.000	63.19	5.06	68.25	74.00	-5.75	PEAK
4804.000	39.12	5.06	44.18	54.00	-9.82	AVERAGE
7206.000	53.25	7.03	60.28	74.00	-13.72	PEAK
7206.000	30.11	7.03	37.14	54.00	-16.86	AVERAGE
9608.000	47.31	10.63	57.94	74.00	-16.06	PEAK
9608.000	24.22	10.63	34.85	54.00	-19.15	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Low Channel 00: 2402 MHz

Data rate: 1Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*4882.000	62.26	5.14	67.40	74.00	-6.60	PEAK
4882.000	38.58	5.14	43.72	54.00	-10.28	AVERAGE
7323.000	54.51	7.54	62.05	74.00	-11.95	PEAK
7323.000	30.66	7.54	38.20	54.00	-15.80	AVERAGE
9764.000	45.57	11.39	56.96	74.00	-17.04	PEAK
9764.000	21.75	11.39	33.14	54.00	-20.86	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*4882.000	63.26	5.14	68.40	74.00	-5.60	PEAK
4882.000	39.59	5.14	44.73	54.00	-9.27	AVERAGE
7323.000	55.91	7.54	63.45	74.00	-10.55	PEAK
7323.000	32.06	7.54	39.60	54.00	-14.40	AVERAGE
9764.000	46.57	11.39	57.96	74.00	-16.04	PEAK
9764.000	22.86	11.39	34.25	54.00	-19.75	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Middle Channel 39: 2441 MHz

Data rate: 1Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measure Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector Type
2483.500	47.52	-4.98	42.54	74.00	-31.46	PEAK
2483.500	41.18	-4.98	36.20	54.00	-17.80	AVERAGE
*4960.000	63.75	5.22	68.97	74.00	-5.03	PEAK
4960.000	39.11	5.22	44.33	54.00	-9.67	AVERAGE
7440.000	56.46	8.06	64.52	74.00	-9.48	PEAK
7440.000	31.86	8.06	39.92	54.00	-14.08	AVERAGE
9920.000	47.66	12.10	59.76	74.00	-14.24	PEAK
9920.000	23.57	12.10	35.67	54.00	-18.33	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measure Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector Type
2483.500	48.56	-4.98	43.58	74.00	-30.42	PEAK
2483.500	42.37	-4.98	37.39	54.00	-16.61	AVERAGE
*4960.000	64.33	5.22	69.55	74.00	-4.45	PEAK
4960.000	40.21	5.22	45.43	54.00	-8.57	AVERAGE
7440.000	57.33	8.06	65.39	74.00	-8.61	PEAK
7440.000	32.16	8.06	40.22	54.00	-13.78	AVERAGE
9920.000	49.00	12.10	61.10	74.00	-12.90	PEAK
9920.000	24.02	12.10	36.12	54.00	-17.88	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

High Channel 78: 2480 MHz

Data rate: 1Mbps

EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	25 °C	Test Data	2012-07-16
Pressure:	1010 hPa	Relative Humidity:	60%
Test Mode :	3Mbps	Test Voltage :	DC 3.7V from battery
Measurement Distance	3 m	Frenqucy Range	1GHz to 18GHz
RBW/VBW	1MHz/1MHz for Peak, 1MHz/10Hz for Average.		

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
2400.000	44.13	-5.70	38.43	74.00	-35.57	PEAK
2400.000	38.72	-5.70	33.02	54.00	-20.98	AVERAGE
*4804.000	63.52	5.06	68.58	74.00	-5.42	PEAK
4804.000	39.60	5.06	44.66	54.00	-9.34	AVERAGE
7206.000	54.92	7.03	61.95	74.00	-12.05	PEAK
7206.000	33.07	7.03	40.10	54.00	-13.90	AVERAGE
9608.000	45.53	10.63	56.16	74.00	-17.84	PEAK
9608.000	23.61	10.63	34.24	54.00	-19.76	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
2400.000	45.72	-5.70	40.02	74.00	-33.98	PEAK
2400.000	39.02	-5.70	33.32	54.00	-20.68	AVERAGE
*4804.000	62.88	5.06	67.94	74.00	-6.06	PEAK
4804.000	37.72	5.06	42.78	54.00	-11.22	AVERAGE
7206.000	55.33	7.03	62.36	74.00	-11.64	PEAK
7206.000	31.14	7.03	38.17	54.00	-15.83	AVERAGE
9608.000	46.92	10.63	57.55	74.00	-16.45	PEAK
9608.000	25.26	10.63	35.89	54.00	-18.11	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Low Channel 00: 2402 MHz

Data rate: 3Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*4882.000	63.17	5.14	68.31	74.00	-5.69	PEAK
4882.000	39.93	5.14	45.07	54.00	-8.93	AVERAGE
7323.000	55.56	7.54	63.10	74.00	-10.90	PEAK
7323.000	31.66	7.54	39.20	54.00	-14.80	AVERAGE
9764.000	47.60	11.39	58.99	74.00	-15.01	PEAK
9764.000	23.67	11.39	35.06	54.00	-18.94	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*4882.000	63.33	5.14	68.47	74.00	-5.53	PEAK
4882.000	39.76	5.14	44.90	54.00	-9.10	AVERAGE
7323.000	56.11	7.54	63.65	74.00	-10.35	PEAK
7323.000	31.86	7.54	39.40	54.00	-14.60	AVERAGE
9764.000	46.77	11.39	58.16	74.00	-15.84	PEAK
9764.000	22.72	11.39	34.11	54.00	-19.89	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Middle Channel 39: 2441 MHz

Data rate: 3Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measure Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector Type
2483.500	47.54	-4.98	42.56	74.00	-31.44	PEAK
2483.500	41.56	-4.98	36.58	54.00	-17.42	AVERAGE
*4960.000	62.69	5.22	67.91	74.00	-6.09	PEAK
4960.000	37.81	5.22	43.03	54.00	-10.97	AVERAGE
7440.000	55.24	8.06	63.30	74.00	-10.70	PEAK
7440.000	30.86	8.06	38.92	54.00	-15.08	AVERAGE
9920.000	46.98	12.10	59.08	74.00	-14.92	PEAK
9920.000	22.75	12.10	34.85	54.00	-19.15	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measure Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector Type
2483.500	45.56	-4.98	40.58	74.00	-33.42	PEAK
2483.500	39.67	-4.98	34.69	54.00	-19.31	AVERAGE
*4960.000	63.83	5.22	69.05	74.00	-4.95	PEAK
4960.000	38.91	5.22	44.13	54.00	-9.87	AVERAGE
7440.000	56.27	8.06	64.33	74.00	-9.67	PEAK
7440.000	31.38	8.06	39.44	54.00	-14.56	AVERAGE
9920.000	48.75	12.10	60.85	74.00	-13.15	PEAK
9920.000	22.69	12.10	34.79	54.00	-19.21	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

High Channel 78: 2480 MHz

Data rate: 3Mbps

6.3.4 TEST RESULTS (Restricted Bands Requirements)

EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	25 °C	Test Data	2012-07-15
Pressure:	1010 hPa	Relative Humidity:	60%
Test Mode :	TX 1Mbps\ 3Mbps	Test Voltage :	DC 3.7V from battery
Note:	1. The transmitter was setup to transmit at the lowest channel. Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel. Then the field strength was measured at 2483.5-2500 MHz.		

Test Mode	Ant.Pol. H/V	Freq. (MHz)	Reading		Ant/CF CF(dB)	Act		Limit	
			Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)
Data rate 1Mbps	V	2390.00	43.12	37.01	-5.79	37.33	31.22	74.00	54.00
	H	2390.00	43.24	37.54	-5.79	37.45	31.75	74.00	54.00
	V	2483.50	48.56	42.37	-4.98	43.58	37.39	74.00	54.00
	H	2483.50	47.52	41.18	-4.98	42.54	36.20	74.00	54.00
Data rate 3Mbps	V	2390.00	45.21	38.11	-5.79	39.42	32.32	74.00	54.00
	H	2390.00	43.55	38.21	-5.79	37.76	32.42	74.00	54.00
	V	2483.50	45.56	39.67	-4.98	40.58	34.69	74.00	54.00
	H	2483.50	47.54	41.56	-4.98	42.56	36.58	74.00	54.00

Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode.
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

6.4 BANDWIDTH TEST

6.4.1 Applied procedures / Limit

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

6.4.2 Test procedure

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

6.4.3 Deviation from standard

No deviation.

6.4.4 Test setup



6.4.5 Test results

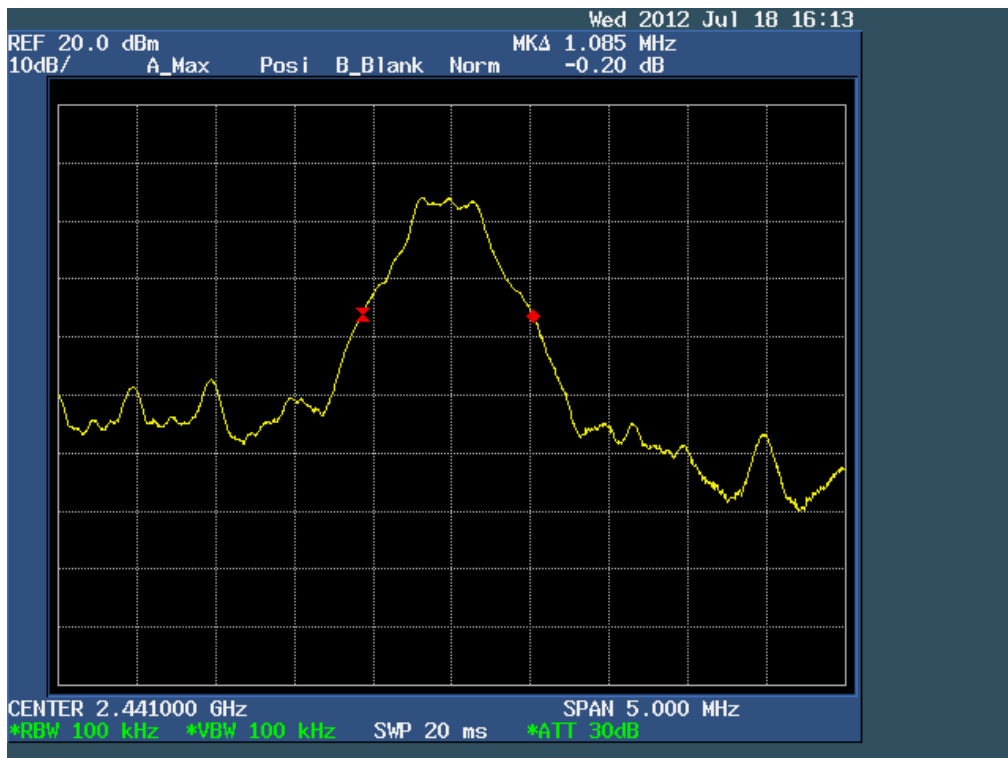
EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	26 °C	Relative Humidity:	53%
Pressure:	1010 hPa	Test Power :	DC 3.7V from battery
Test Mode :	TX 1Mbps\ 3Mbps		

Channel		Channel frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)	Conclusion
1Mbps	Low	2402	1095	N/A	Pass
	Middle	2441	1085	N/A	Pass
	High	2480	1080	N/A	Pass
3Mbps	Low	2402	3160	N/A	Pass
	Middle	2441	3160	N/A	Pass
	High	2480	3160	N/A	Pass

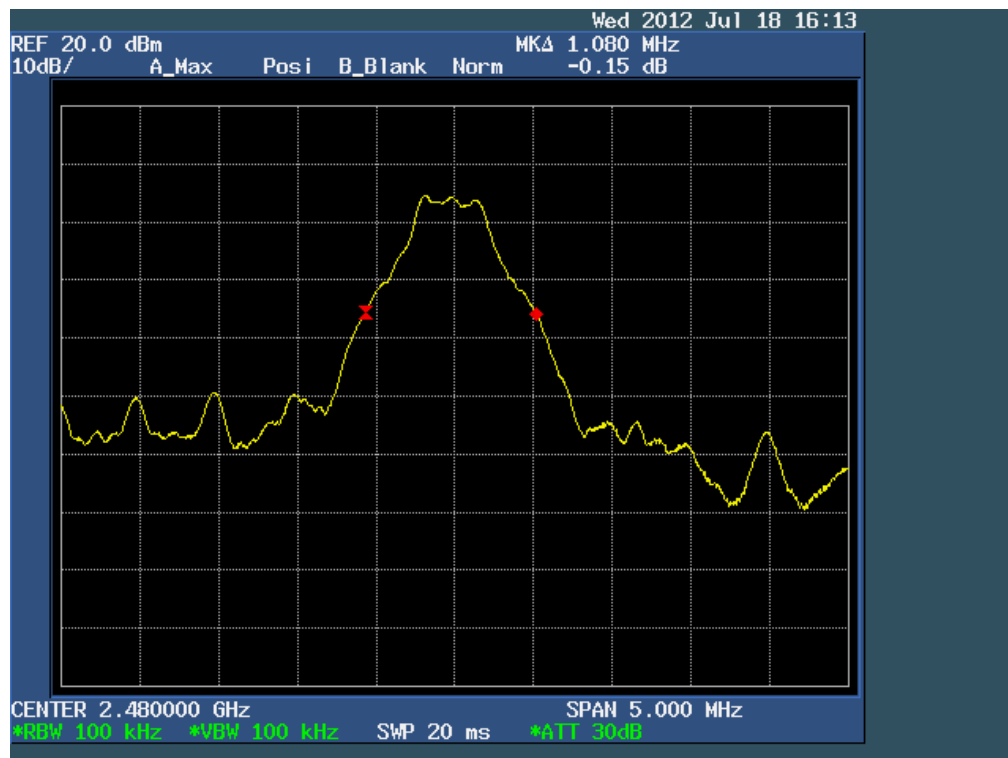
CH00-1Mbps



CH 39-1Mbps



CH 78-1Mbps



CH 00-3Mbps



CH 39-3Mbps



CH 78-3Mbps



6.5 Carrier Frequencies Separated

6.5.1 Applied procedures / Limit

15.247(a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

6.5.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=100kHz, VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak.
- (2) The EUT should be transmitting at its maximum data rate. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation.

6.5.3 Deviation from standard

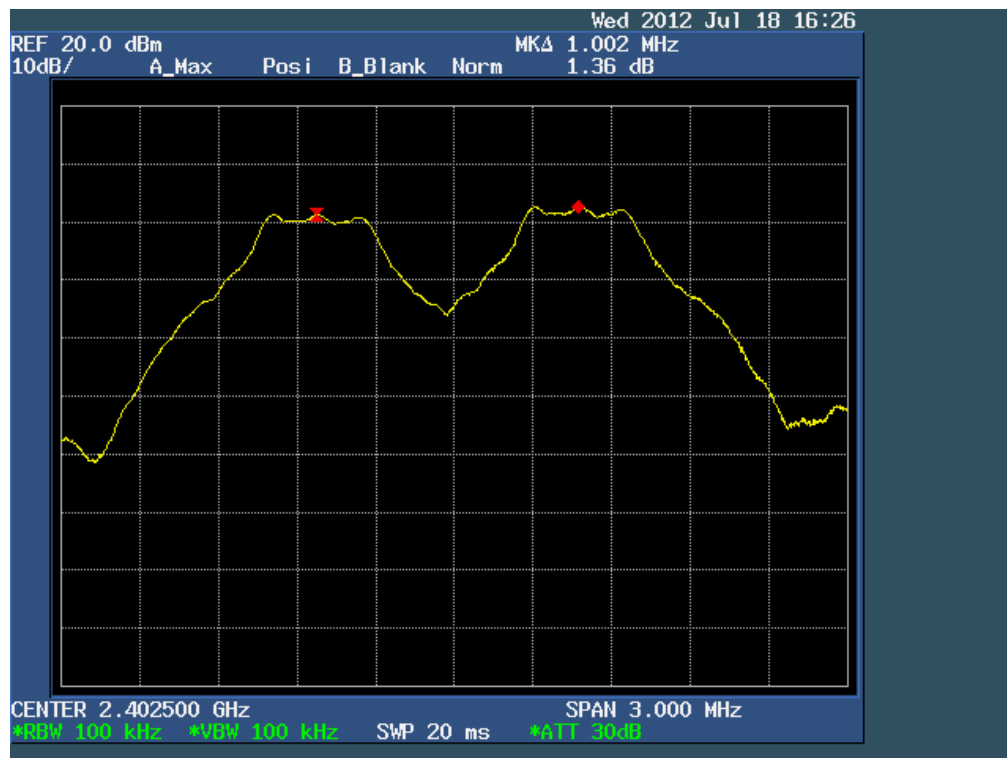
No deviation.

6.5.4 Test results

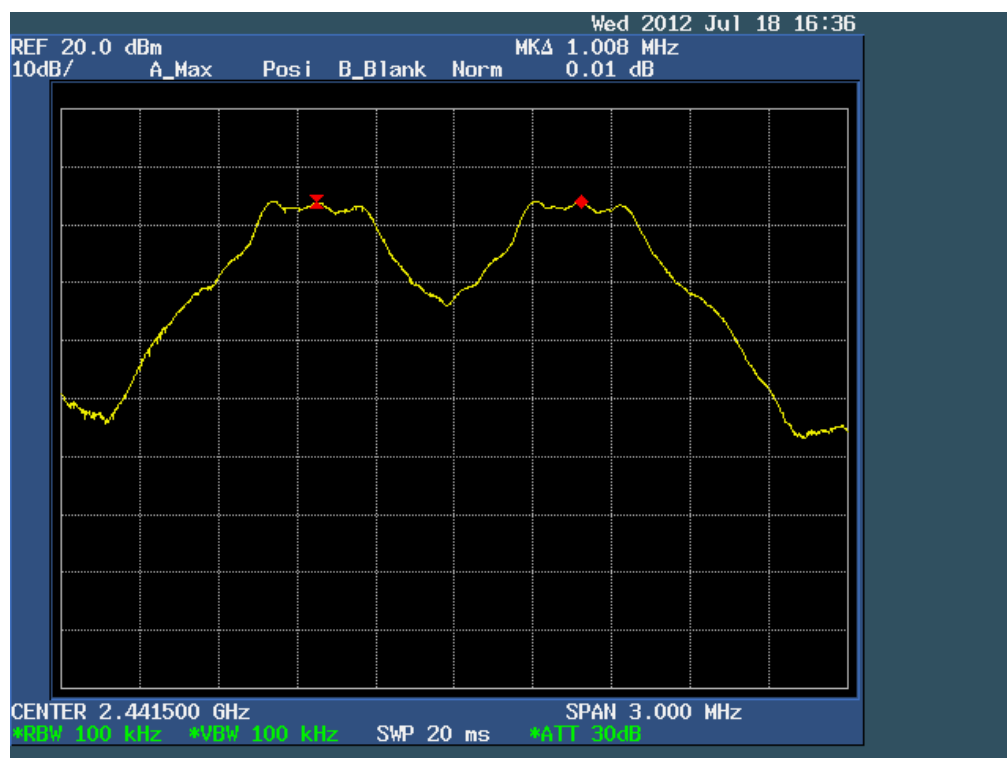
EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	22 °C	Relative Humidity:	53%
Pressure:	1010 hPa	Test Power :	DC 3.7V from battery
Test Mode :	TX 1Mbps\ 3Mbps		

Channel		Channel frequency (MHz)	Channel Separation (MHz)	Conclusion
1Mbps	Low	2402	1.002	Pass
	Middle	2441	1.008	Pass
	Highest	2480	1.005	Pass
3Mbps	Low	2402	1.005	Pass
	Middle	2441	1.005	Pass
	Highest	2480	1.005	Pass

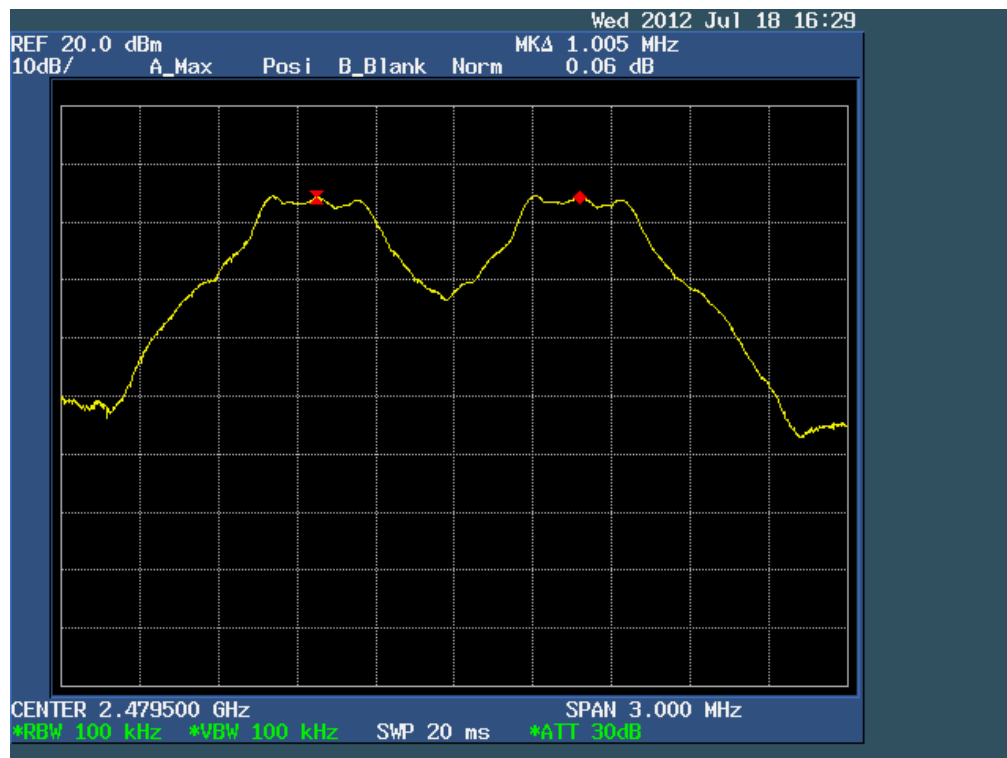
CH 00-1Mbps



CH 39-1Mbps



CH 78-1Mbps



CH 00-3Mbps



CH 39-3Mbps



CH 78-3Mbps



6.6 Hopping Channel Number

6.6.1 Applied procedures / Limit

15.247(a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

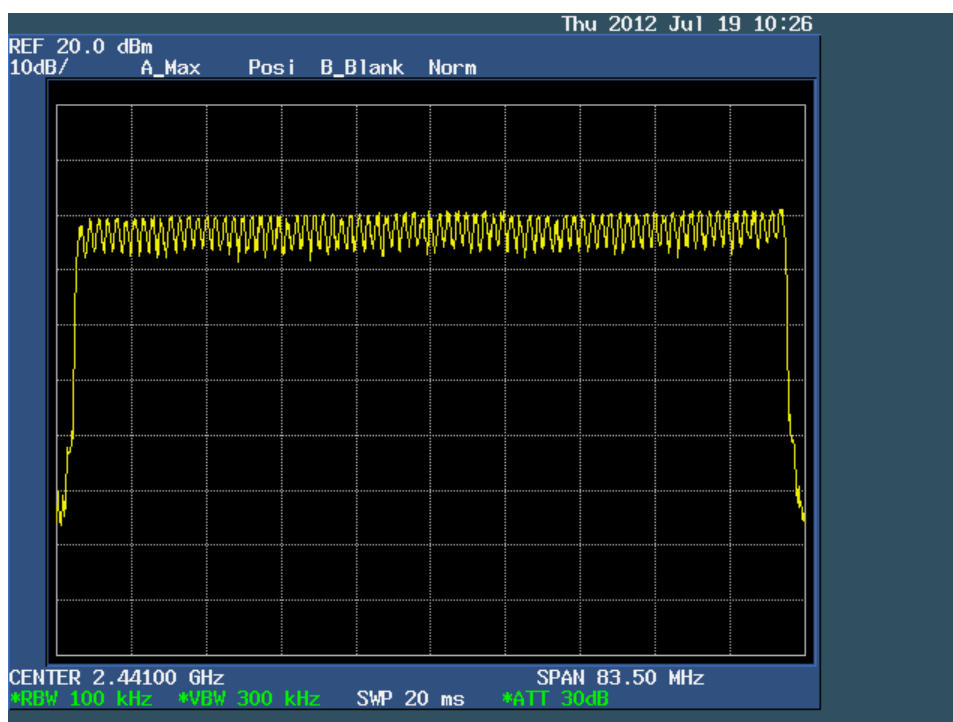
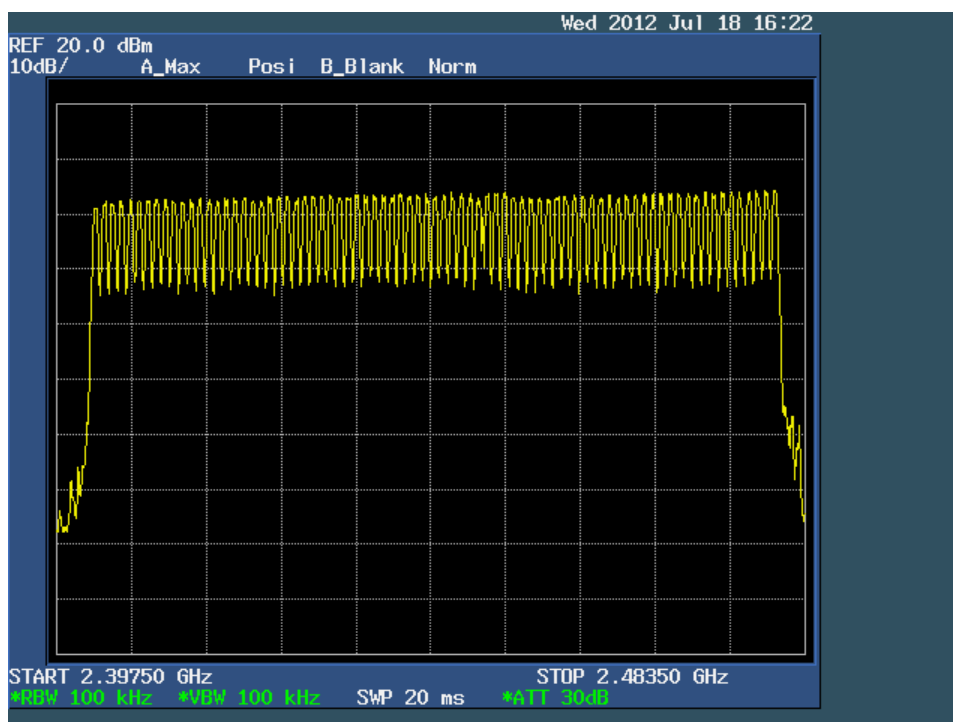
6.6.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer , set the Spectrum Analyzer as RBW=100kHz,VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak Trace=Maxhold.
- (2) The EUT should be have its hopping function enabled. Maxhold and record hopping channels It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

6.6.3 Test result

Hopping Channel Number result		
Operating Mode: 1Mbps\ 3Mbps Mode		Test date:2012-07-18
Result	Limit	Conclusion
79	15	Pass

EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	22 °C	Relative Humidity:	53%
Pressure:	1010 hPa	Test Power :	DC 3.7V from battery
Test Mode :	TX 1Mbps\ 3Mbps		



6.7 Dwell time

6.7.1 Applied procedures / Limit

15.247(a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

6.7.2 Test procedure

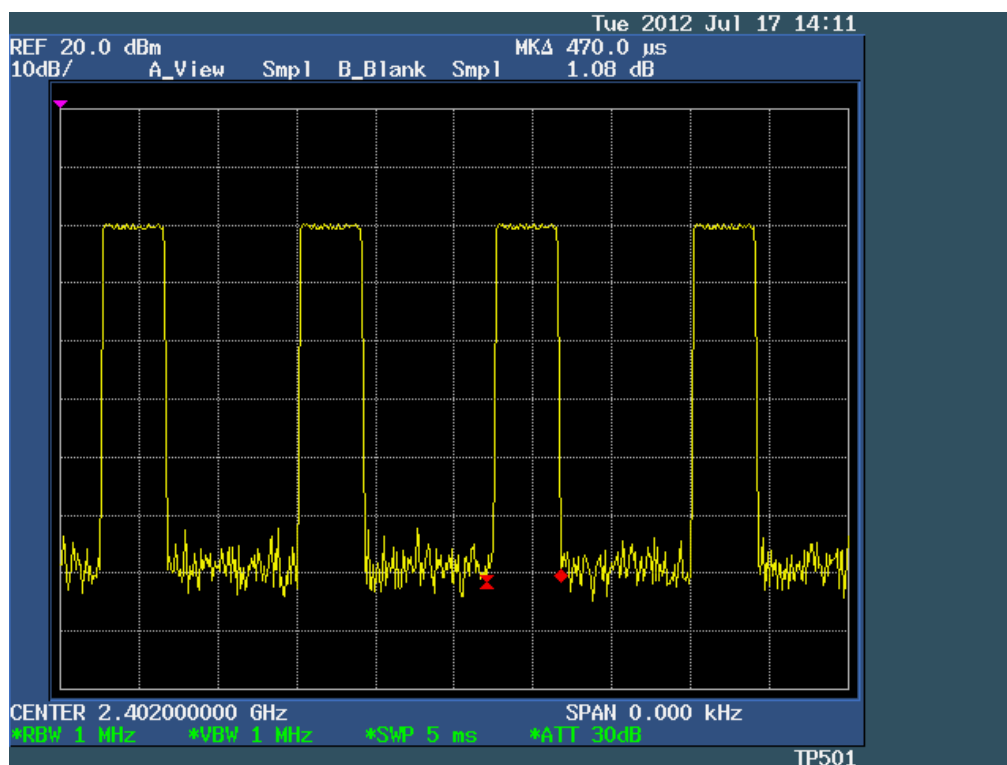
- (1) Place the EUT on the table in the chamber or connect the antenna port of the EUT to spectrum analyzer and set it in transmitting mode.
- (2) Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- (3) Use a video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for DH5, DH3 and DH1 packet transmitting.
- (8) Measure the maximum time duration of one single pulse.
- (9) A Period Time = $79 \times 0.4 = 31.6$ S
DH1 Time Slot: Reading * $(1600/2) \times 31.6/79$
DH3 Time Slot: Reading * $(1600/4) \times 31.6/79$
DH5 Time Slot: Reading * $(1600/6) \times 31.6/79$

6.7.3 Test result

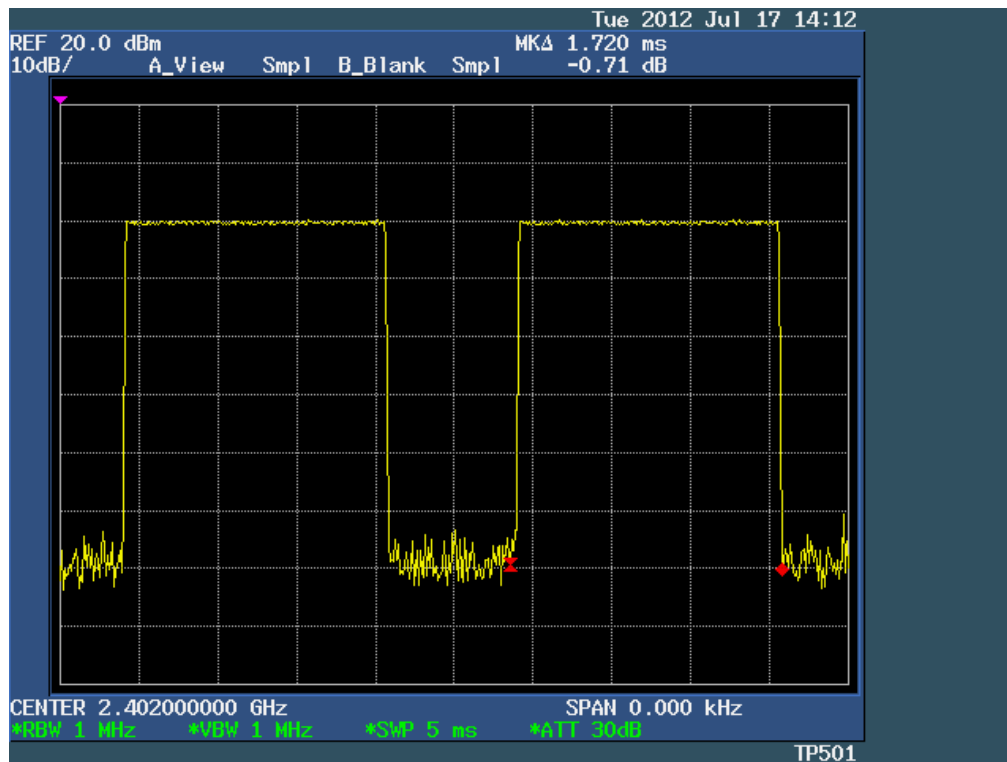
EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	22 °C	Relative Humidity:	53%
Pressure:	1010 hPa	Test Power :	DC 3.7V from battery
Test Mode :	CH00-DH1/DH3/DH5 (1Mbps Mode)		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH1	2402 MHz	0.470	0.1504	0.4000
DH3	2402 MHz	1.720	0.2752	0.4000
DH5	2402 MHz	2.950	0.3147	0.4000

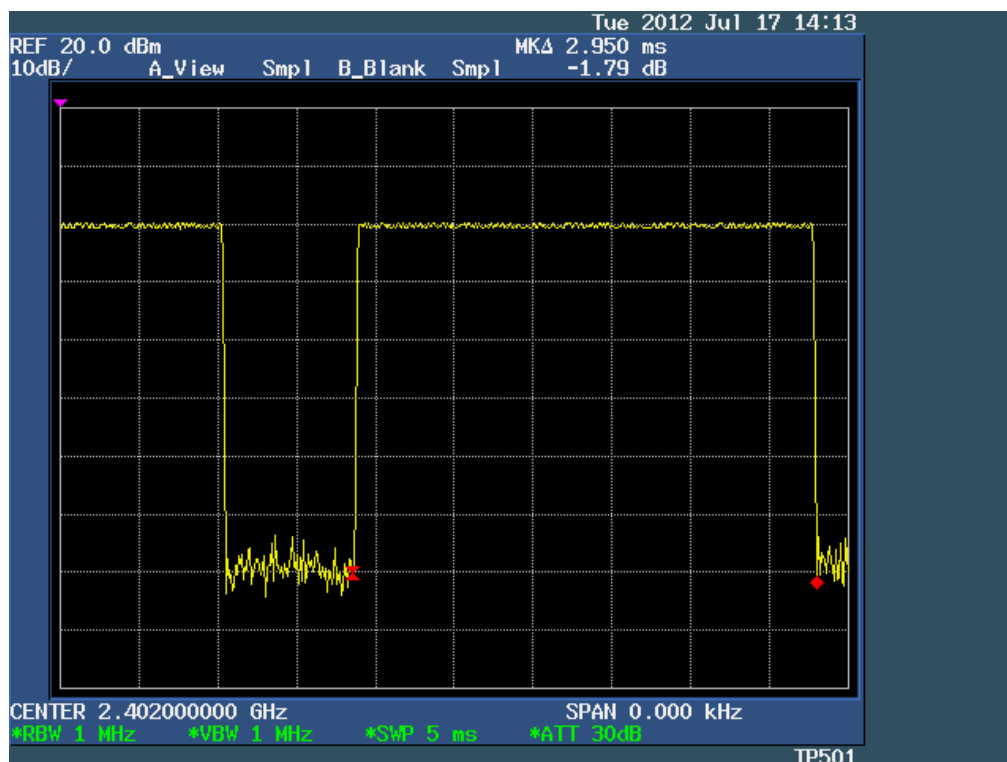
CH00-DH1



CH00-DH3



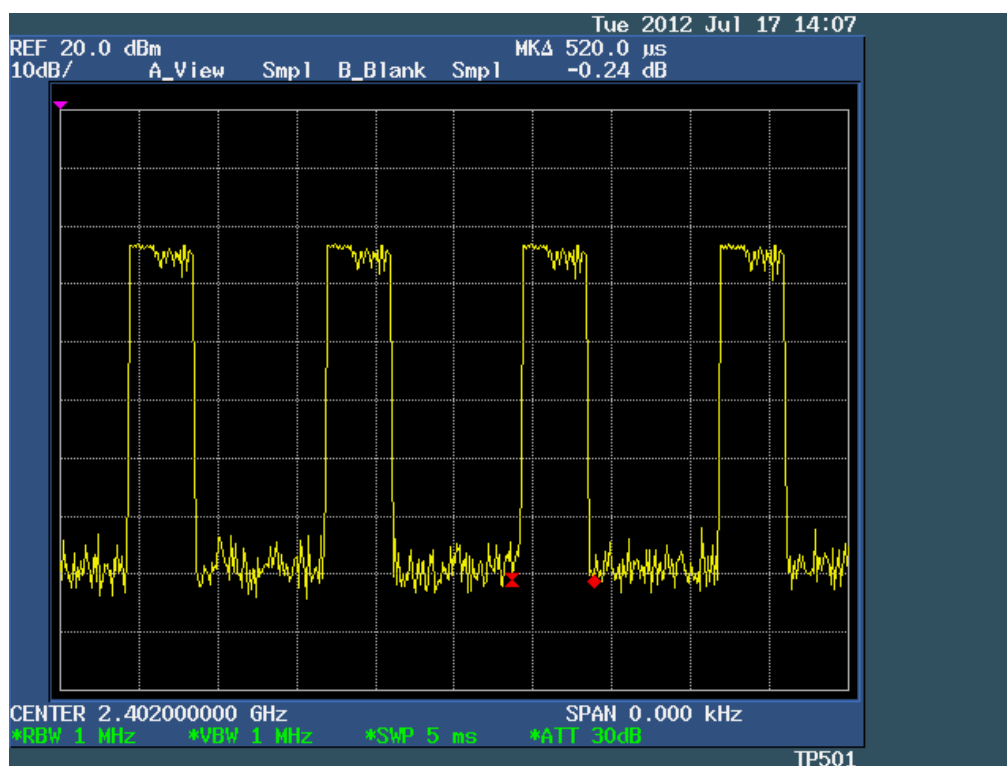
CH00-DH5



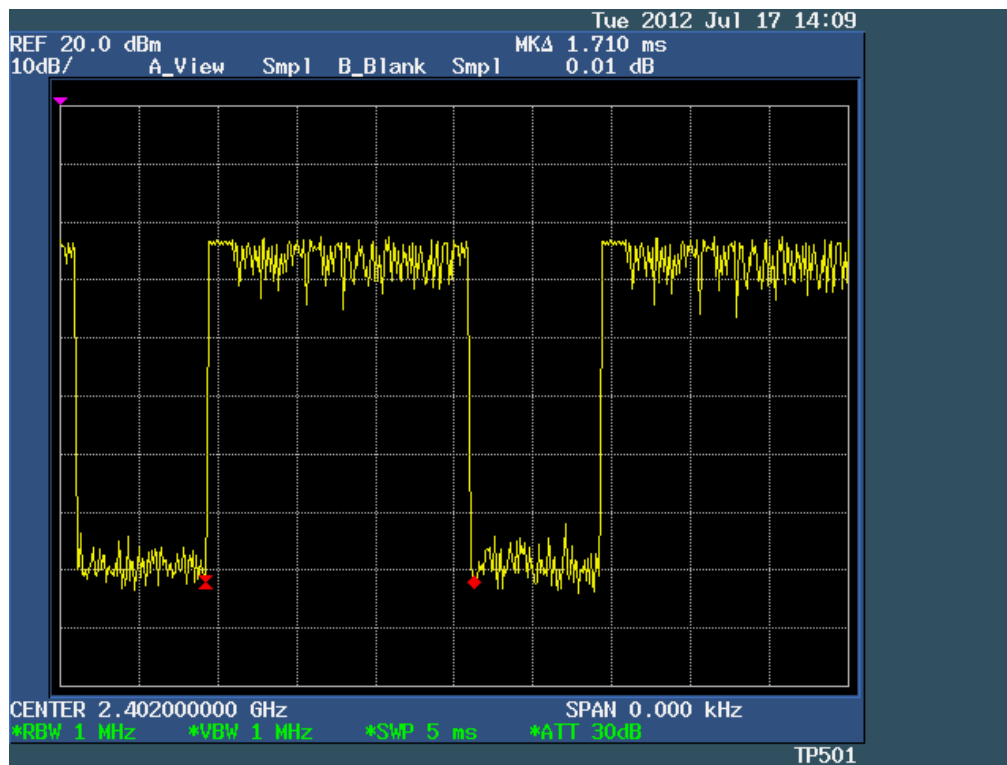
EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	22 °C	Relative Humidity:	53%
Pressure:	1010 hPa	Test Power :	DC 3.7V from battery
Test Mode :	CH00-DH1/DH3/DH5 (3Mbps Mode)		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH1	2402 MHz	0.520	0.1664	0.4000
DH3	2402 MHz	1.710	0.2736	0.4000
DH5	2402 MHz	2.980	0.3179	0.4000

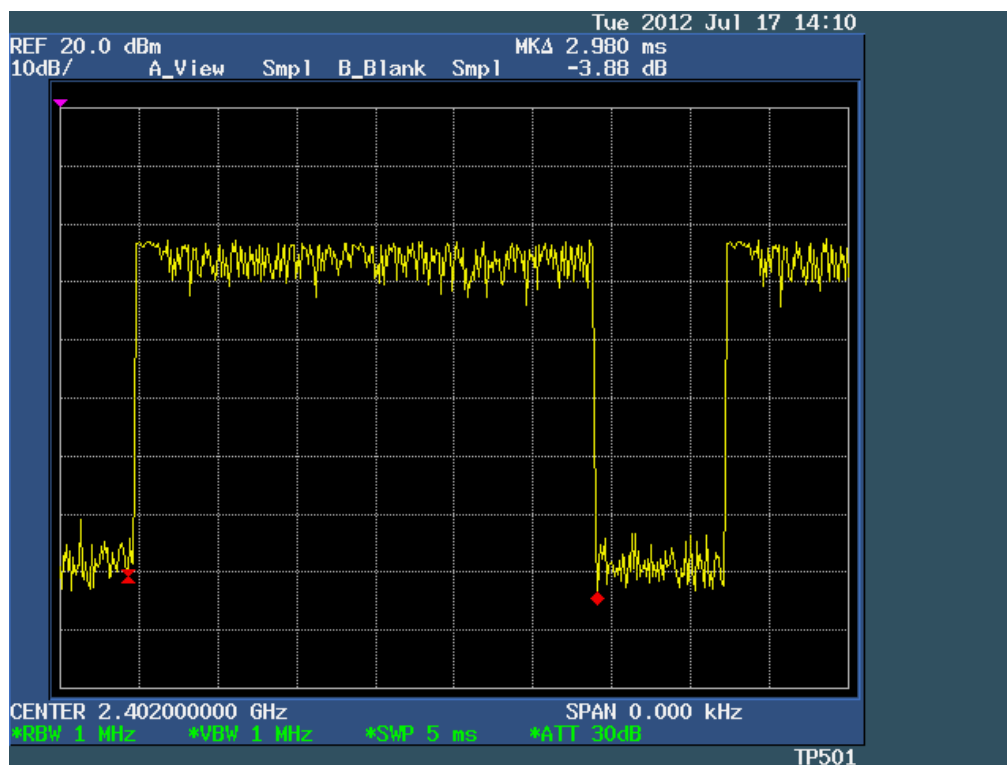
CH00-DH1



CH00-DH3



CH00-DH5



6.8 Maximum Peak Output Power

6.8.1 Applied procedures / Limit

15.247(b) (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

6.8.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=3MHz,VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak.
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation.

6.8.3 Deviation from standard

No deviation.

6.8.4 Test setup

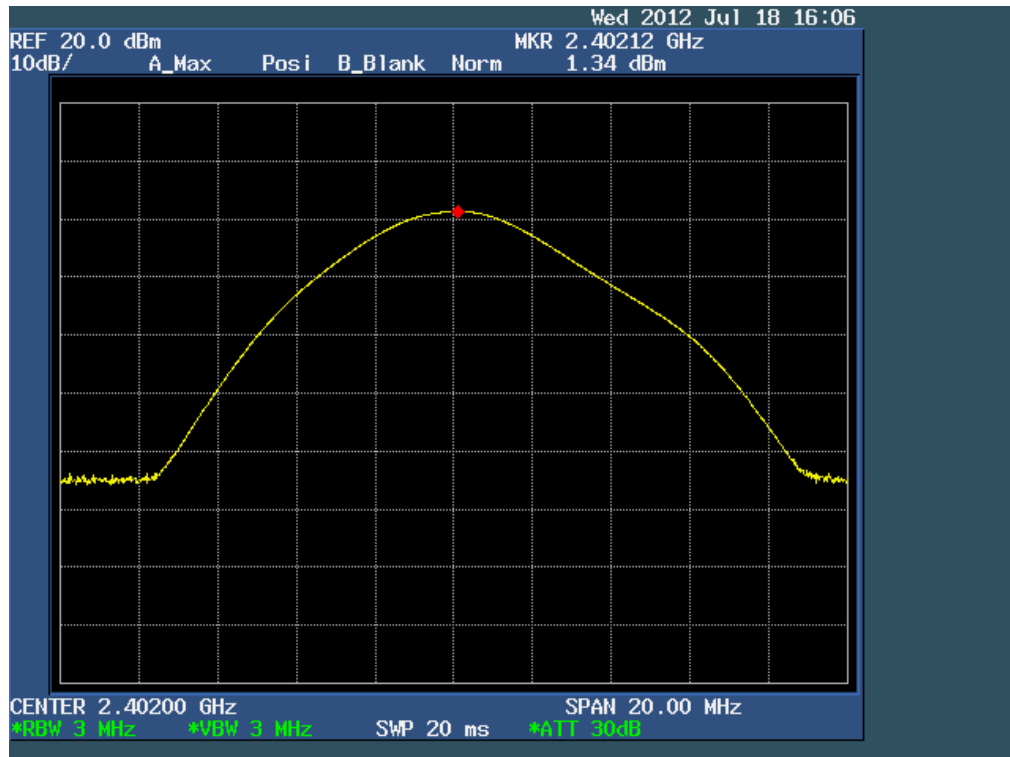


6.8.5 Test results

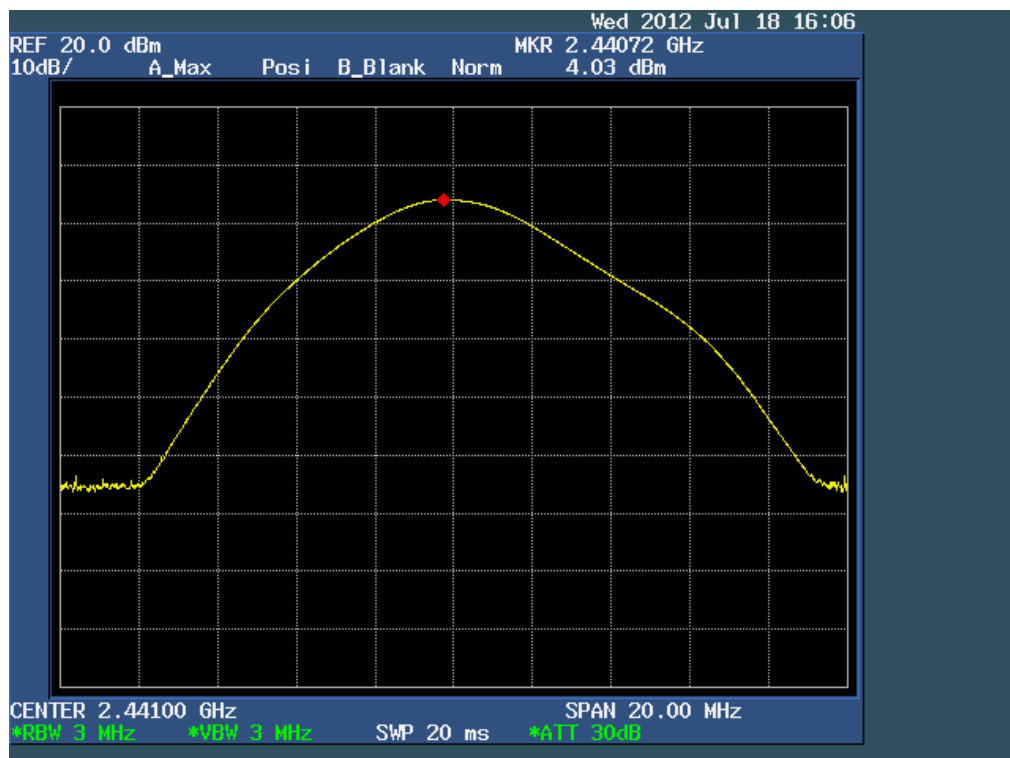
EUT:	Antec Mobile Products	Model Name :	SP1
Temperature:	22 °C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX		
Note: All the data rates have be tested and the worst-case as the table below.			

Test Mode	Frequency	Reading Power (dBm)	Cable Loss (dB)	Peak Output Power (dBm)	Limit (dBm)	Result
Data rate 1Mbps	2402 MHz	1.34	0.5	1.84	30	Pass
	2441 MHz	4.03	0.5	4.53	30	Pass
	2480 MHz	4.43	0.5	4.93	30	Pass
Data rate 3Mbps	2402 MHz	-0.38	0.5	0.12	30	Pass
	2441 MHz	2.24	0.5	2.74	30	Pass
	2480 MHz	2.73	0.5	3.23	30	Pass

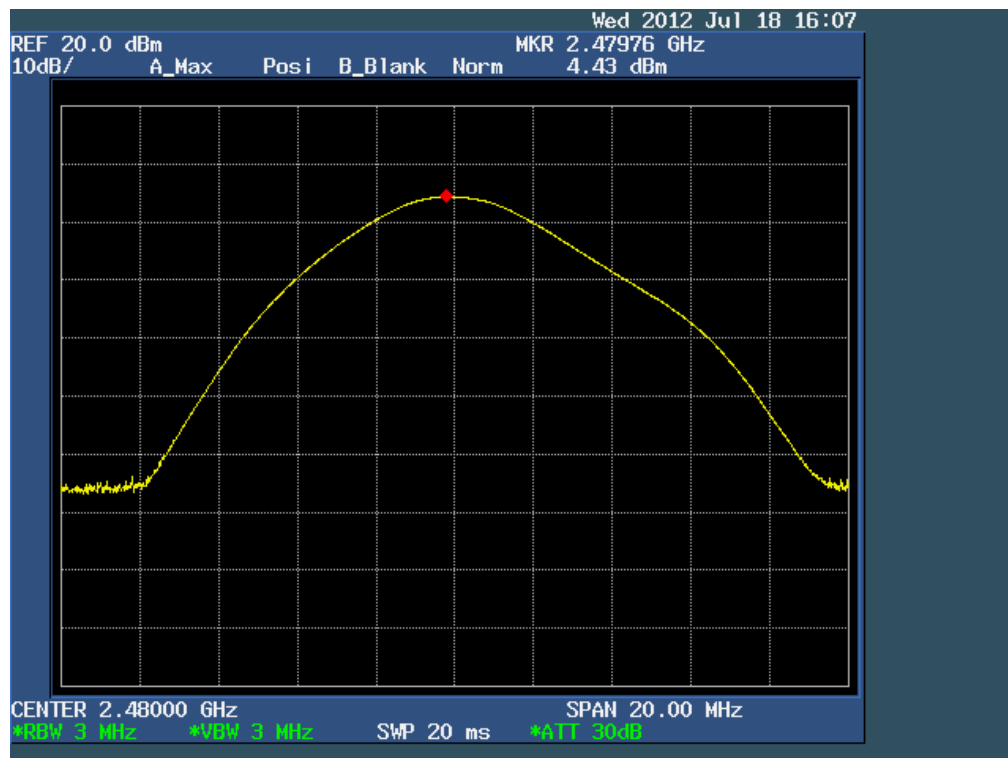
CH 00-1Mbps



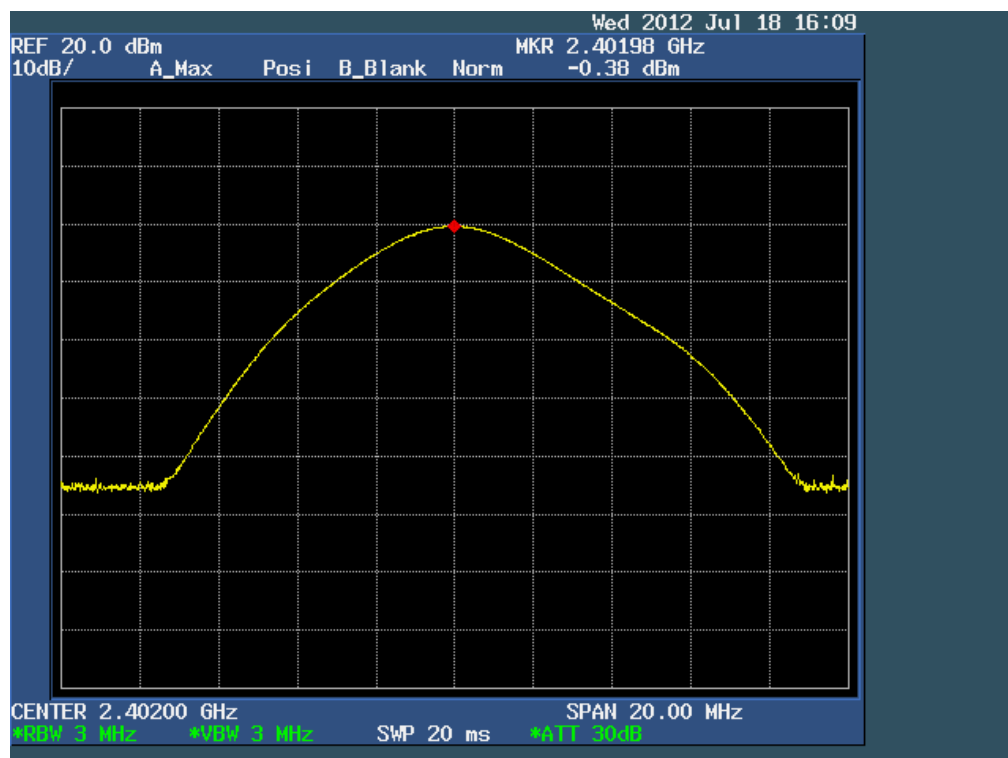
CH 39-1Mbps



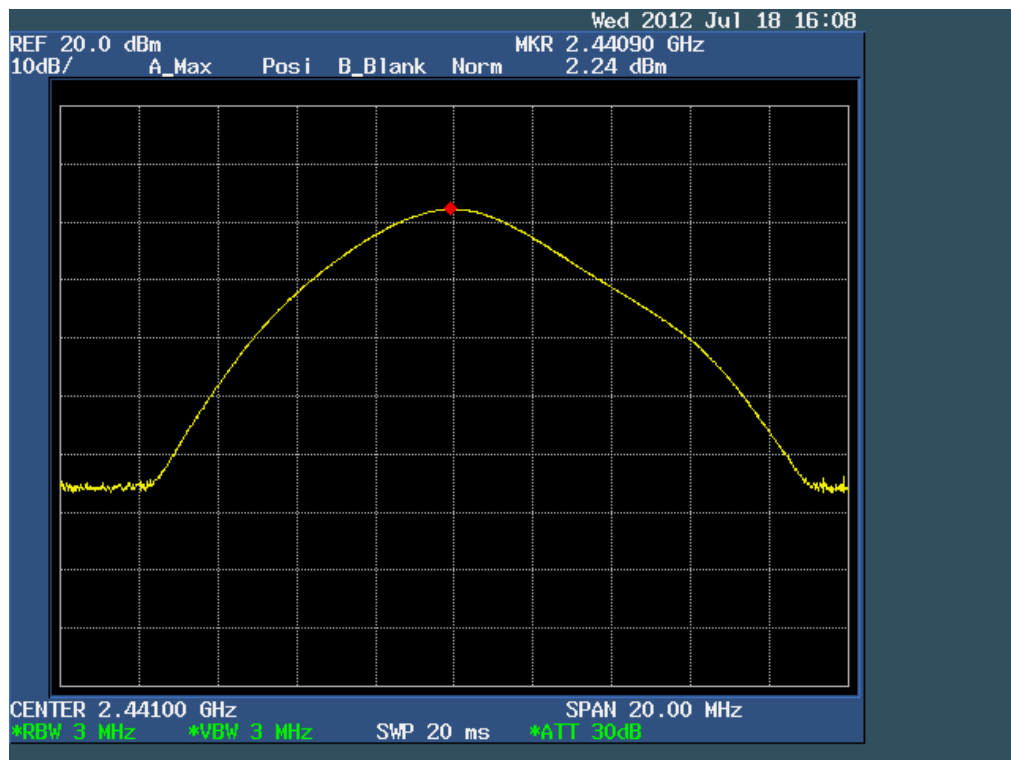
CH 78-1Mbps



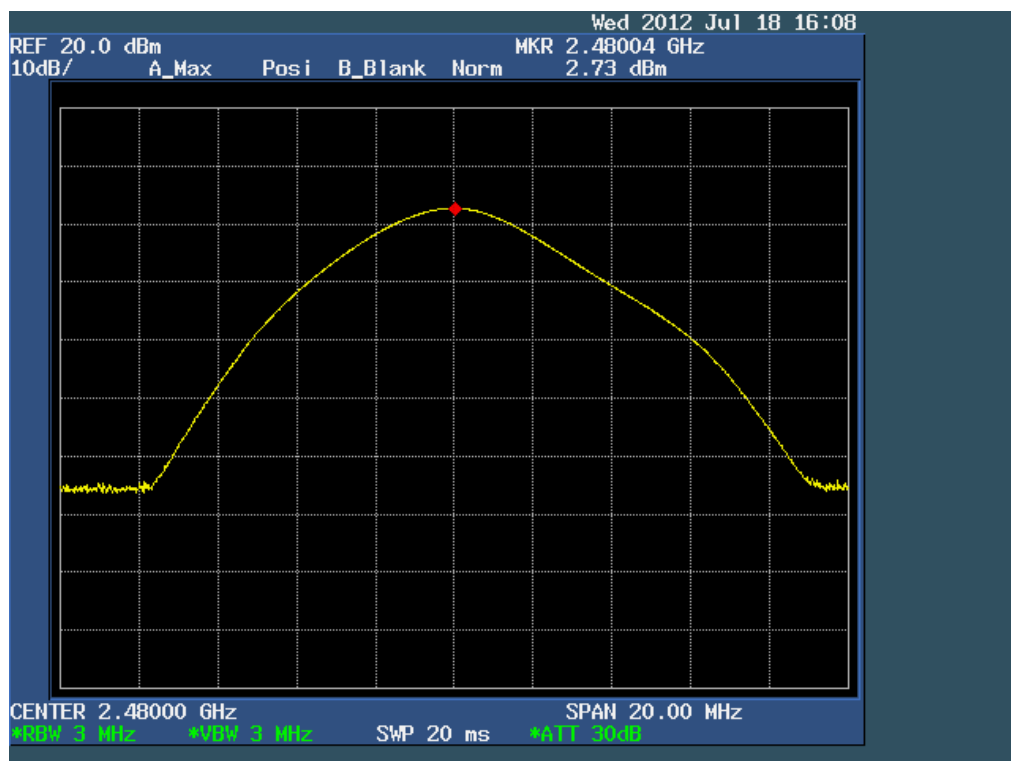
CH 00-3Mbps



CH 39-3Mbps



CH 78-3Mbps



6.9 Band edge

6.9.1 Applied procedures / Limit

15.247(d) 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

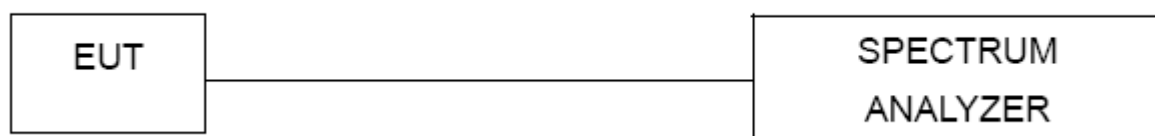
6.9.2 Test procedure

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW=100kHz, VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak.

6.9.3 Deviation from standard

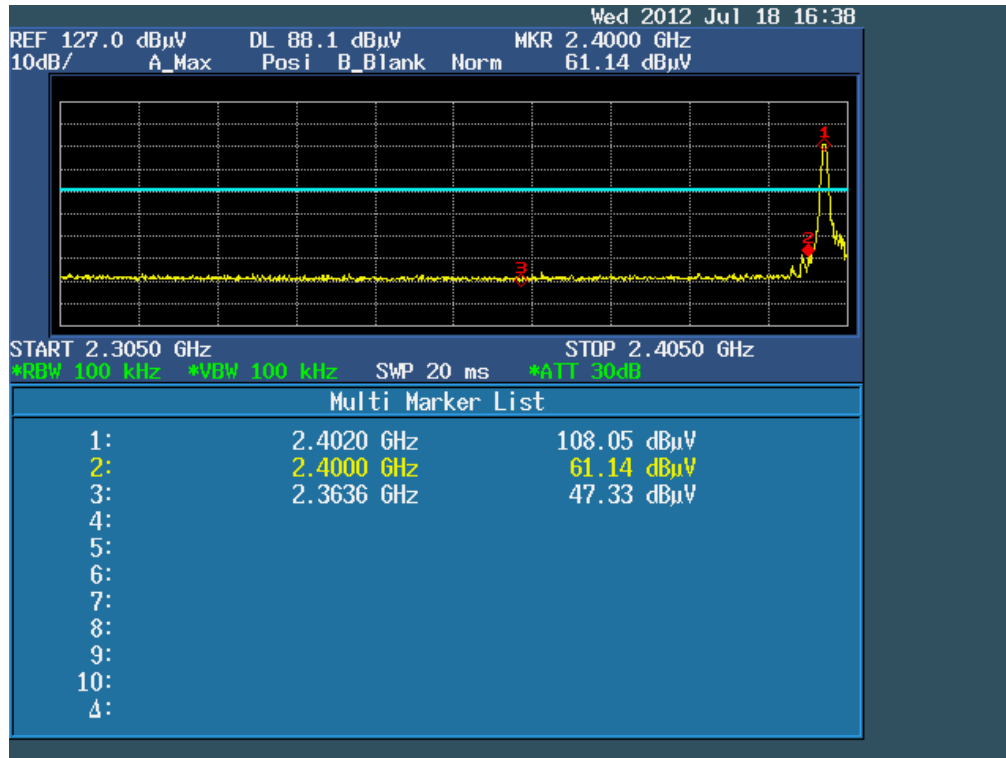
No deviation.

6.9.4 Test setup

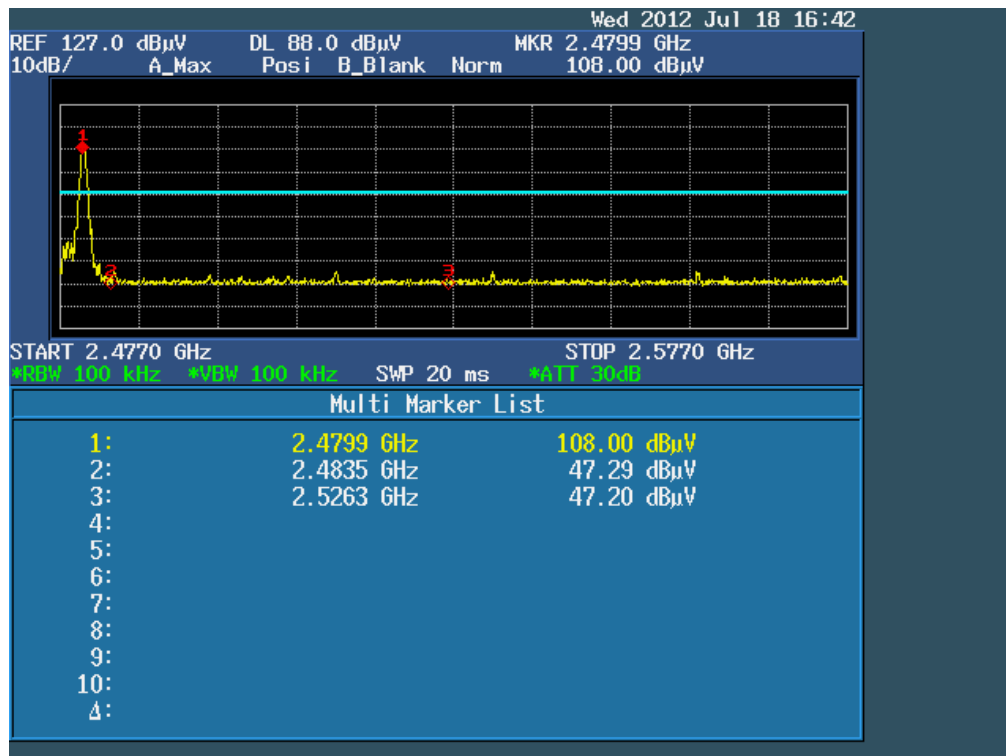


6.9.5 Test results

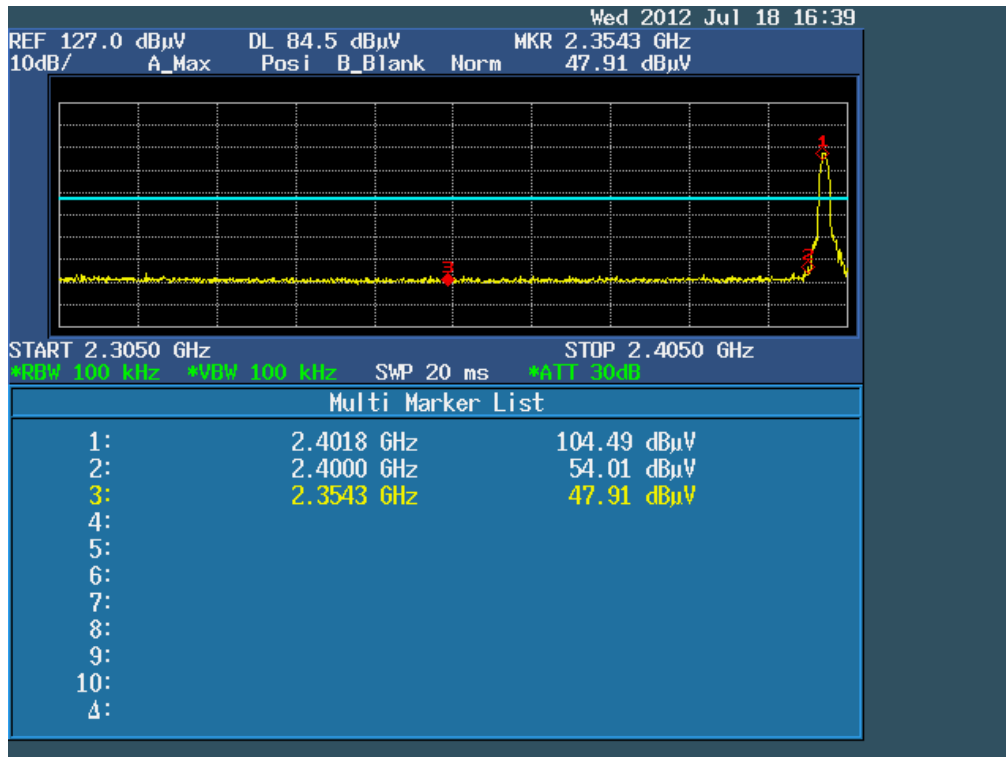
CH00 (Lower) Data rate 1Mbps



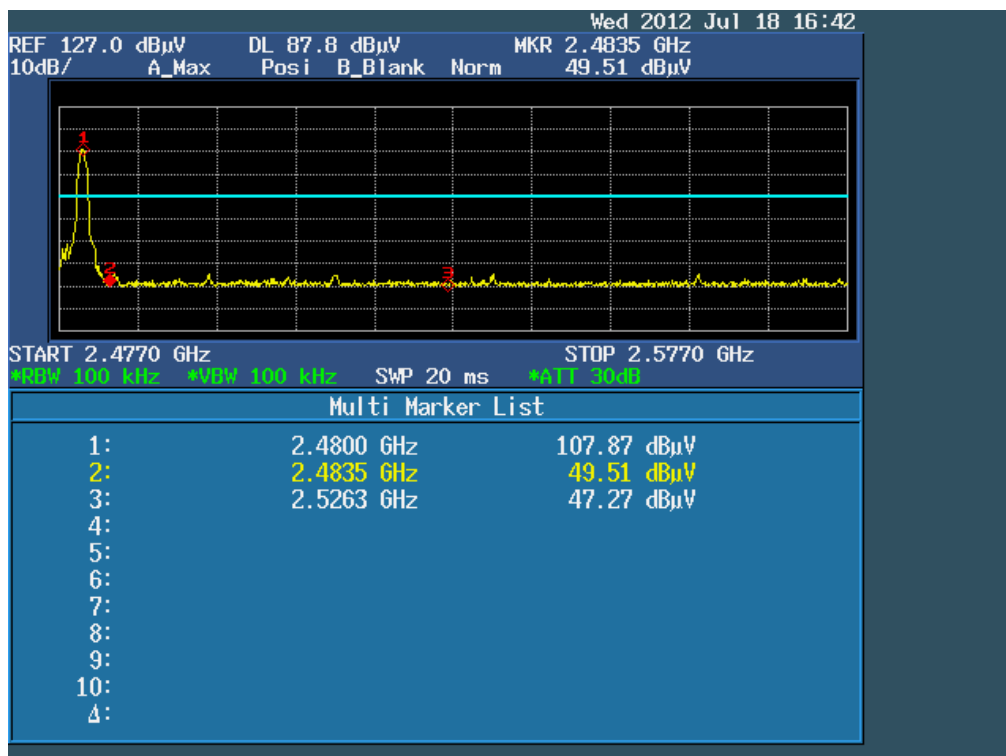
CH 78 (Upper) Data rate 1Mbps



CH00 (Lower) Data rate 3Mbps



CH 78 (Upper) Data rate 3Mbps



6.10 Conducted Spurious Emissions

6.10.1 Applied procedures / Limit

15.247(d) 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

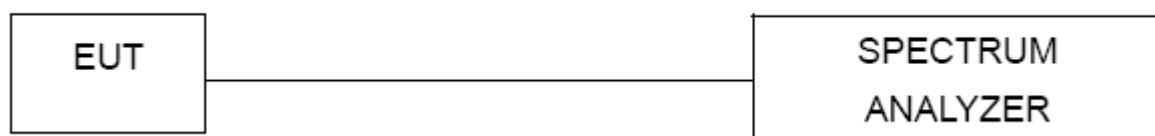
6.10.2 Test procedure

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW=100kHz, VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak.

6.10.3 Deviation from standard

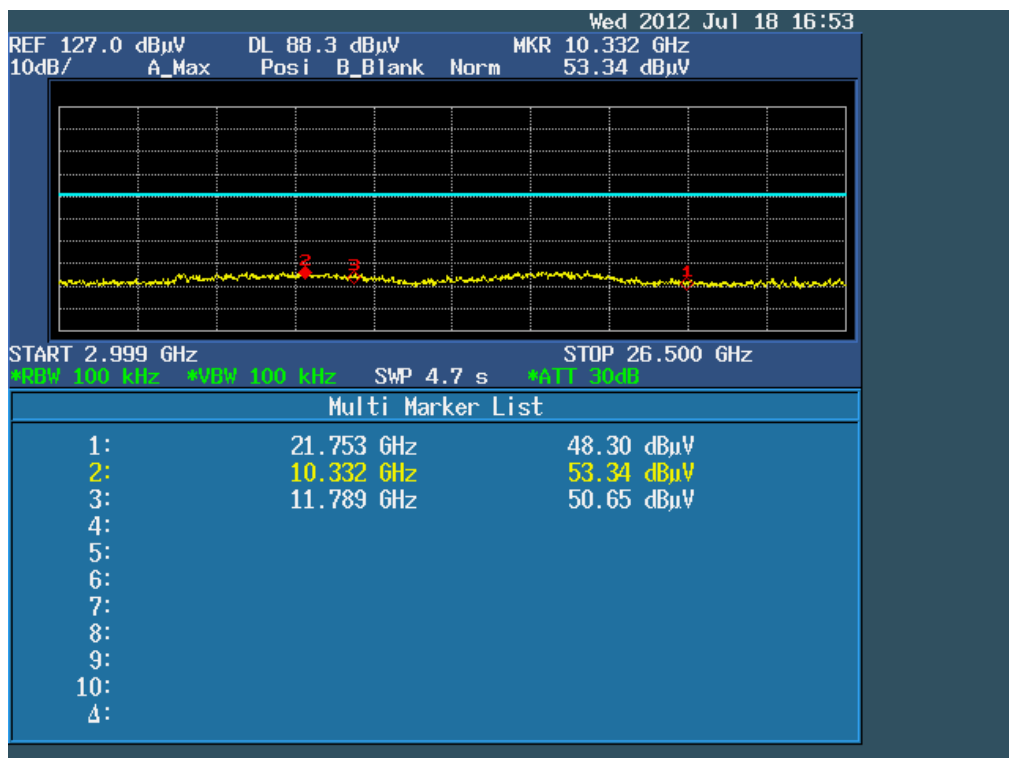
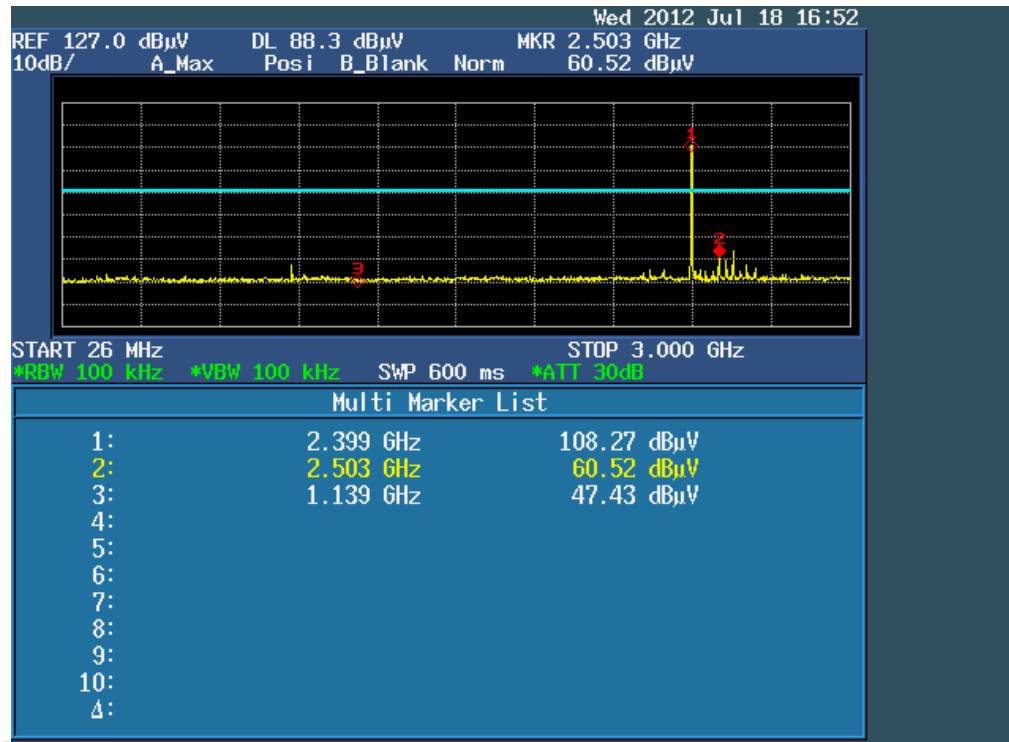
No deviation.

6.10.4 Test setup

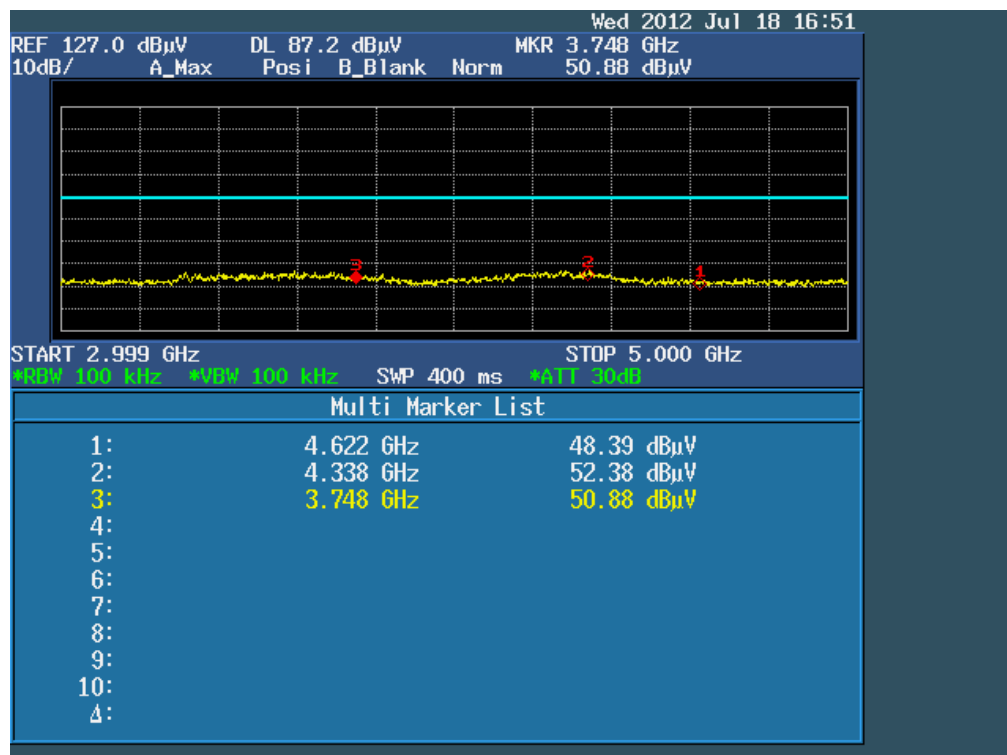
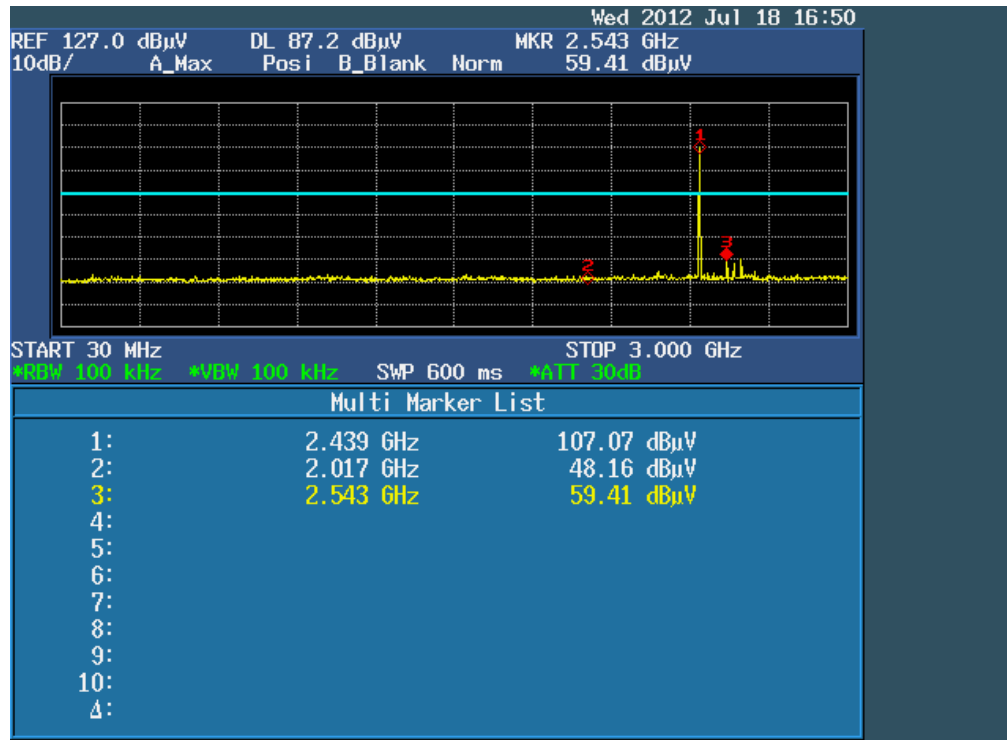


6.10.5 Test results

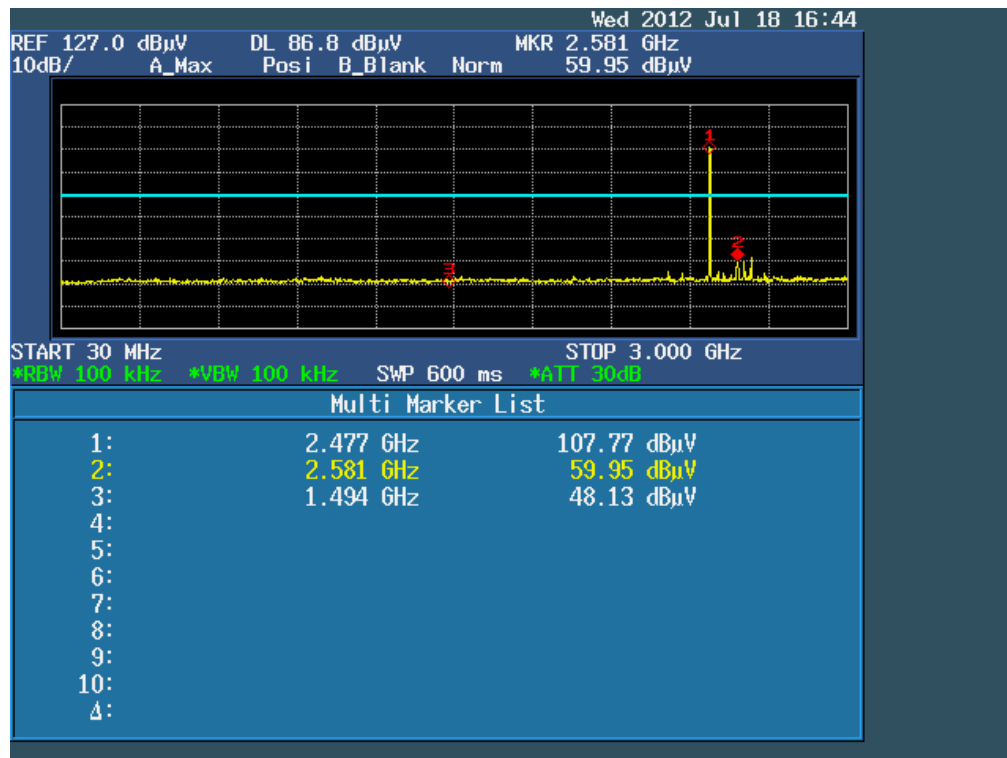
CH00 Data rate 1Mbps



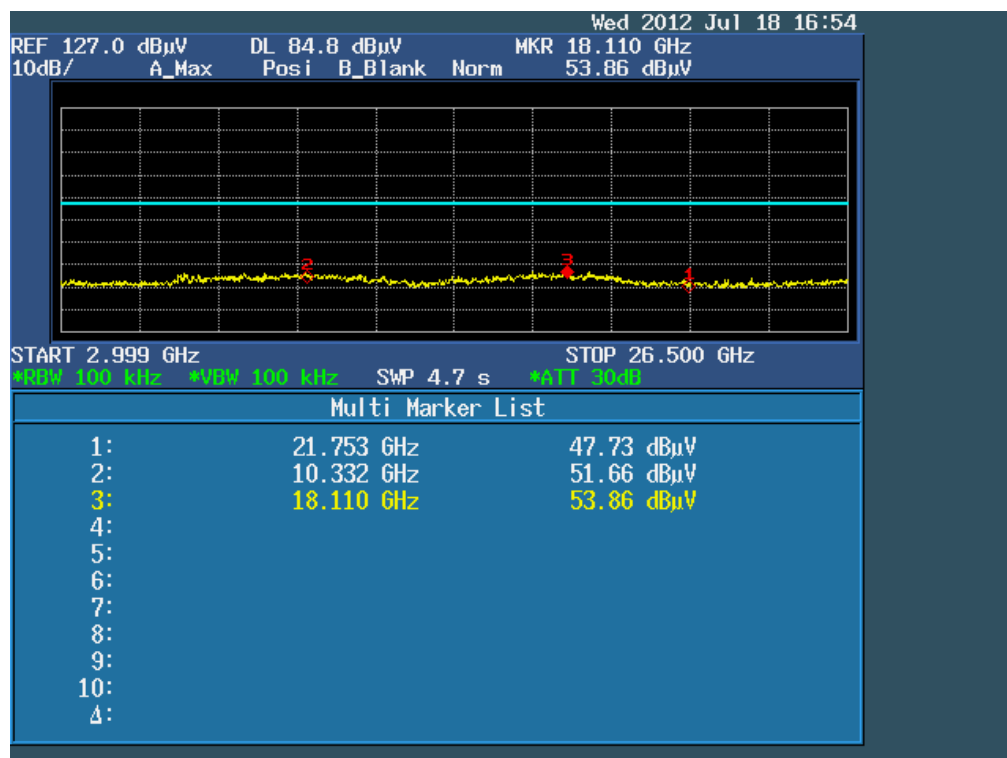
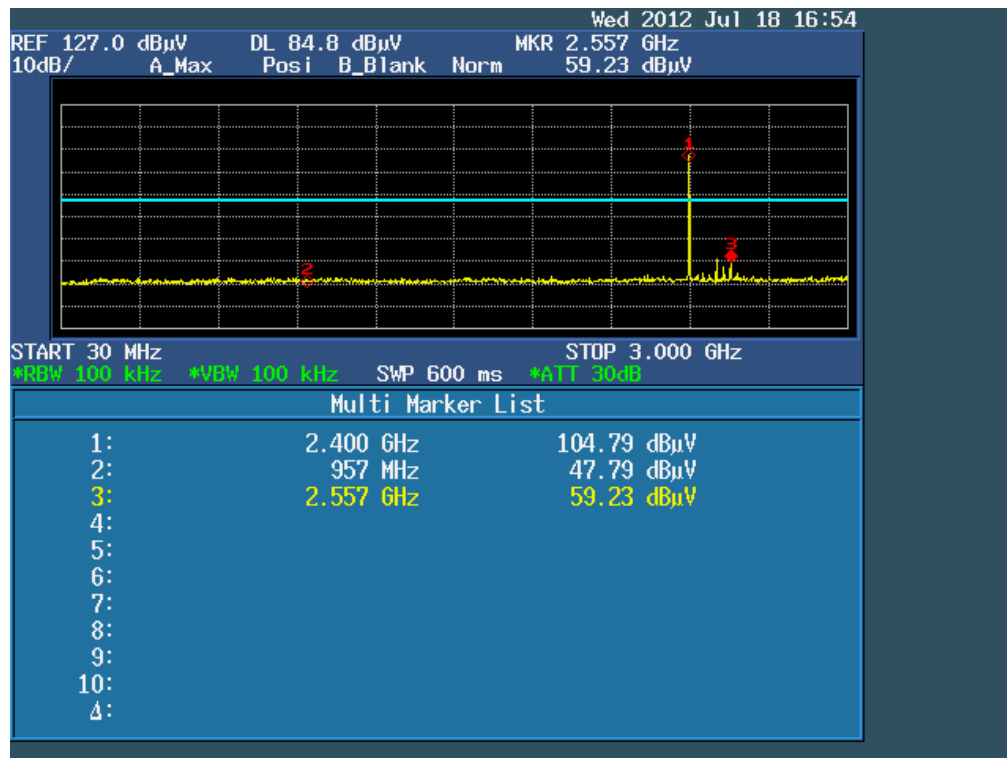
CH39 Data rate 1Mbps



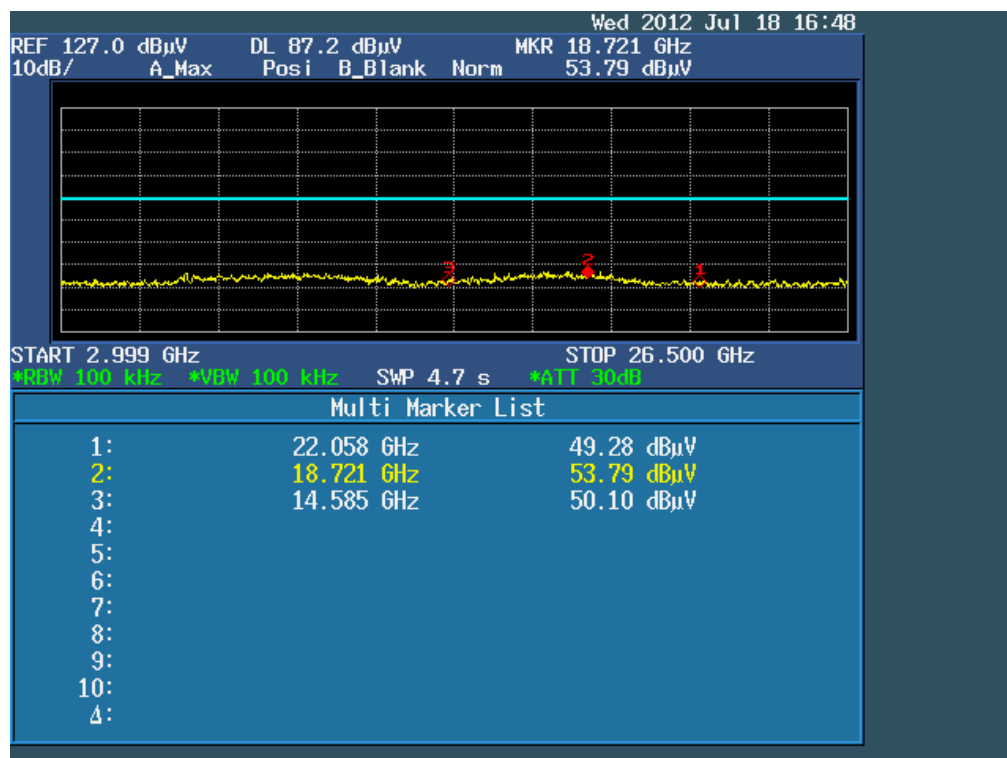
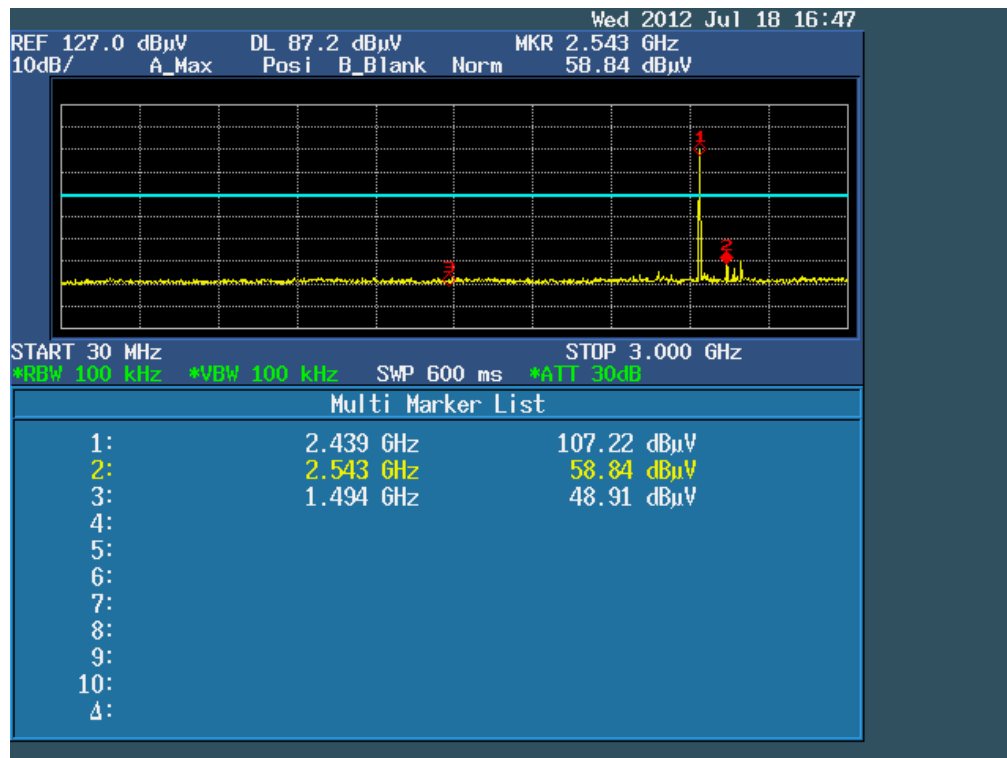
CH78 Data rate 1Mbps



CH00 Data rate 3Mbps



CH39 Data rate 3Mbps



CH78 Data rate 3Mbps

