



Shenzhen Asia Test Technology Co., Ltd.

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FCC RADIO TEST REPORT

FCC ID: 2AEWXBUDIU-GPS

Product : budiu smart GPS chips

Trade Name : budiu

Model Name : Budiu 2.0 GPS

Serial Model : N/A

Prepared for

Beijing ANDL Technology Co., Ltd.
Room 202 BIFTPARK, No.2 East Yinghua Road, Chaoyang
District, Beijing, China

Prepared by

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Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 2 of 53 -

TEST RESULT CERTIFICATION

Applicant's name Beijing ANDL Technology Co., Ltd.

Address Room 202 BIFTPARK, No.2 East Yinghua Road, Chaoyang District, Beijing, China

Manufacture's Name ... Beijing ANDL Technology Co., Ltd.

Address Room 202 BIFTPARK, No.2 East Yinghua Road, Chaoyang District, Beijing, China

Product description

Product name budiu smart GPS chips

Model and/or type Budiu 2.0 GPS
reference

Additional Model N/A

Standards FCC Part15.247

Test procedure ANSI C63.4-2003

This device described above has been tested by ATT, 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 May 06, 2015 ~ May 13, 2015

Date of Issue May 13, 2015

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

Eric Wang

Reviewed
by:

Eric Wang
Project Leader

Jerry You

Jerry You
Laboratory
Supervisor

Approved by:

Jack Yu

Jack Yu
Technical Director



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 3 of 53 -

Table of Contents	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
3 . EMC EMISSION TEST	13
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 DEVIATION FROM TEST STANDARD	14
3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 RADIATED EMISSION LIMITS	17
3.2.2 TEST PROCEDURE	17
3.2.3 DEVIATION FROM TEST STANDARD	18
3.2.4 TEST SETUP	19
3.2.5 EUT OPERATING CONDITIONS	20
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	21
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	22
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	23
4 . POWER SPECTRAL DENSITY TEST	33
4.1 APPLIED PROCEDURES / LIMIT	33
4.1.1 TEST PROCEDURE	33
4.1.2 DEVIATION FROM STANDARD	33
4.1.3 TEST SETUP	33



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 4 of 53 -

Table of Contents	Page
4.1.4 EUT OPERATION CONDITIONS	33
4.1.5 TEST RESULTS	34
5 . BANDWIDTH TEST	38
5.1 APPLIED PROCEDURES / LIMIT	38
5.1.1 TEST PROCEDURE	38
5.1.2 EUT OPERATION CONDITIONS	38
5.1.3 TEST RESULTS	39
6 . PEAK OUTPUT POWER TEST	44
6.1 APPLIED PROCEDURES / LIMIT	44
6.1.1 TEST PROCEDURE	44
6.1.2 DEVIATION FROM STANDARD	44
6.1.3 TEST SETUP	45
6.1.4 EUT OPERATION CONDITIONS	45
6.1.5 TEST RESULTS	46
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	47
7.1 DEVIATION FROM STANDARD	47
7.2 TEST SETUP	47
7.3 EUT OPERATION CONDITIONS	47
7.4 TEST RESULTS	48
8 . ANTENNA REQUIREMENT	51
8.1 STANDARD REQUIREMENT	51
8.2 EUT ANTENNA	51
9 . EUT TEST PHOTO	52
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 5 of 53 -

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



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 6 of 53 -

1.1 TEST FACILITY

Asia Institute Technology (DongGuan) Limited

No. 22, JinQianLing Street 3, JiTiGang Village, Huang-Jiang Town, DongGuan, Guangdong, 523757 China

FCC Registration No.: 248337

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	$\pm 2\%$



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 7 of 53 -

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	budiu smart GPS chips	
Model Name	Budiu 2.0 GPS	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a budiu smart GPS chips	
	Operation Frequency:	802.11b/g: 2412~2462MHz
	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
	Number Of Channel	802.11b/g:11CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	802.11b: 8.39 dBm (Max. AV) 802.11g: 7.44 dBm (Max. AV)
	Antenna Gain (dBi)	0dbi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
	Channel List	
Ratings	Please refer to the Note 2.	
	5.0Vdc (for charge) 3.7Vdc (Li-ion battery)	
Adapter	Lenovo, M/N:LON19002000F, Input:100-240V, 50/60Hz, 1A, output:DC19V, 2A	
Battery	DC 3.7V, 330mAh	

Note:

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



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 8 of 53 -

2.

Channel List for 802.11b/g							
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		

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	ceramic chip	N/A	0	Wifi Antenna



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 9 of 53 -

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	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 3	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11

Note:

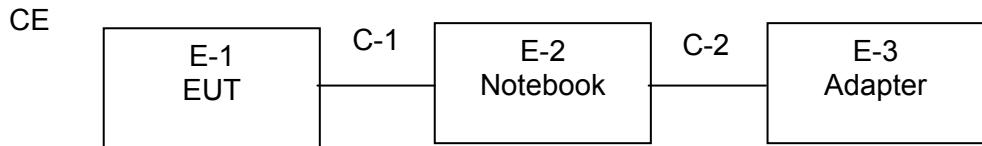
- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.
- (3) measurements are performed according to the KDB 558074 D01 DTS Meas Guidance v03r02
- (4) The relevant RF Conducted Measurement is performed by a temporary antenna connector, please refer to the Equipment List for the detail



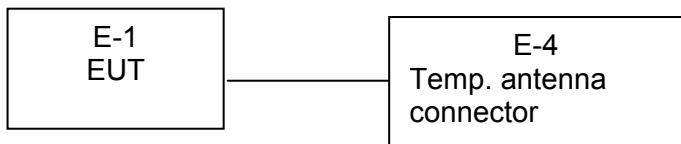
Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 10 of 53 -

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



RF conducted measurement





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 11 of 53 -

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	budiu smart GPS chips	budiu	Budiu 2.0 GPS	N/A	EUT
E-2	Notebook	Lenovo	LVM4423	N/A	
E-3	Adapter	Lenovo	LON19002000F	N/A	
E-4	Temp. antenna connector	DOKMA	KYS-0944	22550510	Impedance=50ohm cable loss=0.9db

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.4m	
C-2	NO	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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 12 of 53 -

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2014.06.07	2015.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.07	2015.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2014.06.07	2015.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	1 year
12	Power Meter	Anristu	ML2495A	1145054	2014.08.16	2015.08.15	1 year
13	Power Sensor	Anristu	MA2411B	1126096	2014.08.16	2015.08.15	1 year
14	Cable 1-26GHz	R&S	AIT-R02	201309R048	2014.06.08	2015.06.07	1 year
15	Cable 30-1000MHz	R&S	AIT-R01	201409R047	2014.06.08	2015.06.07	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	L.I.S.N.#1	Kyoritsu	KNW-242	8-837-4	2014.06.06	2015.06.05	1 year
2	L.I.S.N.#2	Kyoritsu	KNW-407	8-1789-4	2014.08.24	2015.08.23	1 year
3	EMI Measuring Receiver	R&S	ESCI	100124	2014.08.24	2015.08.23	1 year
4	Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.07	2015.06.06	1 year
5	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	2014.06.07	2015.06.06	1 year
6	UNIVERSAL RADIO COMMUNICATION	Rohde&Schwarz	CMU200	112064	2014.06.08	2015.06.07	1 year

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Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 13 of 53 -

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	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



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 14 of 53 -

3.1.2 TEST PROCEDURE

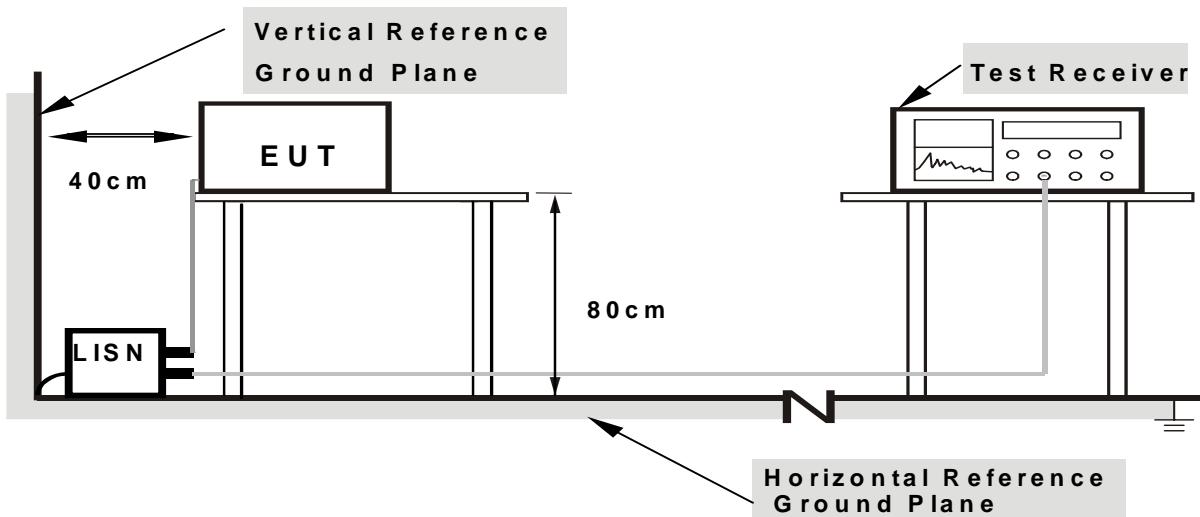
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. 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.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note: The device can be charged by using the AC adapter(JINLI, M/N:JZ05001000A, Input:100-240V, 50/60Hz, 0.6A, output:DC 5V, 1A) and the laptop, so these 2 charging conditions had been taken into the consideration during the AC power line conducted test. After evaluations, charging device through the laptop is the worstcase and only record the worst case here.

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 cm 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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 15 of 53 -

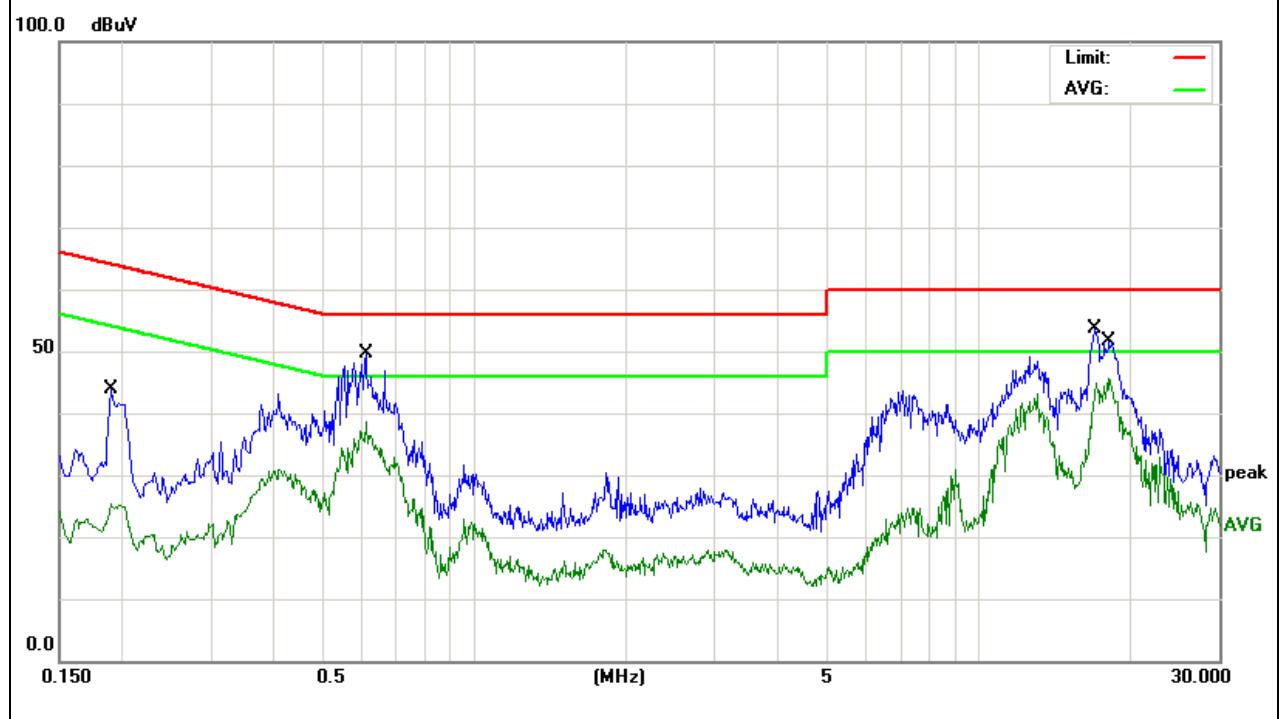
3.1.6 TEST RESULTS

EUT :	budiu smart GPS chips	Model Name. :	Budiu 2.0 GPS
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from PC AC 120V/60Hz	Test Mode :	Mode 3

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
						QP
0.19	33.53	10.4	43.93	64.03	-20.1	QP
0.1901	14.92	10.4	25.32	54.03	-28.71	AVG
0.6099	39.26	10.4	49.66	56	-6.34	QP
0.6099	28.13	10.4	38.53	46	-7.47	AVG
17.0418	42.88	10.74	53.62	60	-6.38	QP
18.0858	34.8	10.75	45.55	50	-4.45	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit





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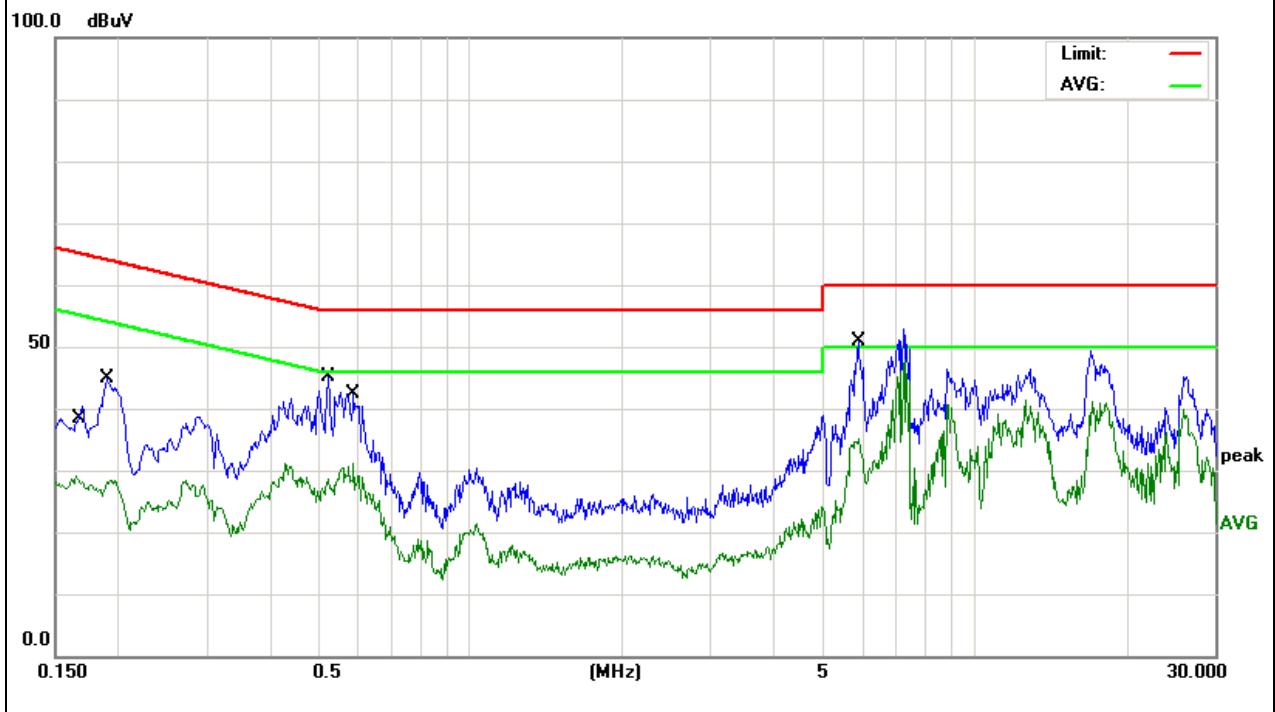
Report No. ATT-2015SZ0424046F2
- Page 16 of 53 -

EUT :	budiu smart GPS chips	Model Name. :	Budiu 2.0 GPS
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from PC AC 120V/60Hz	Test Mode :	Mode 3

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.165	18.58	10.45	29.03	55.2	-26.17	AVG
0.19	34.36	10.44	44.8	64.03	-19.23	QP
0.522	34.64	10.4	45.04	56	-10.96	QP
0.586	20.8	10.4	31.2	46	-14.8	AVG
5.8979	40.22	10.66	50.88	60	-9.12	QP
5.8979	24.37	10.66	35.03	50	-14.97	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 17 of 53 -

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

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 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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 18 of 53 -

- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

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

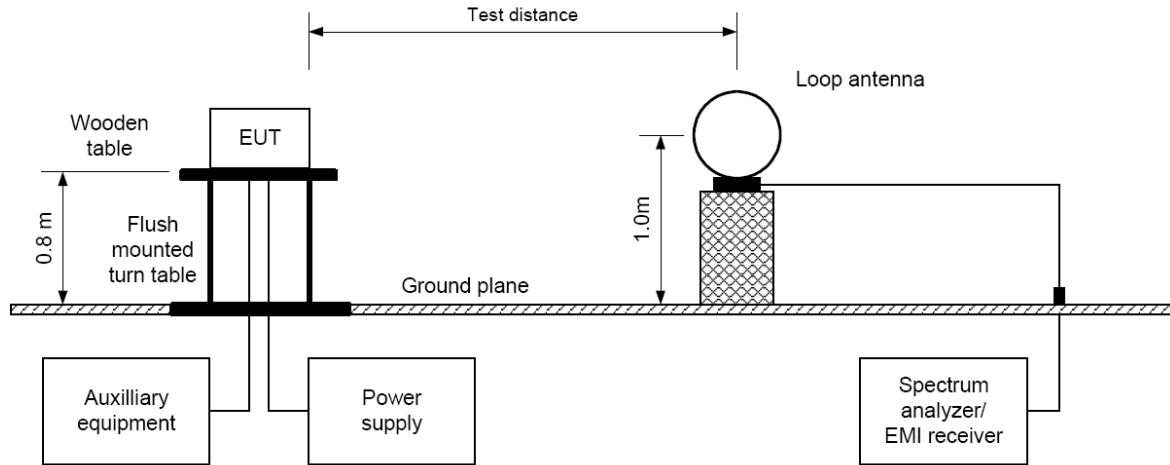
3.2.3 DEVIATION FROM TEST STANDARD

No deviation

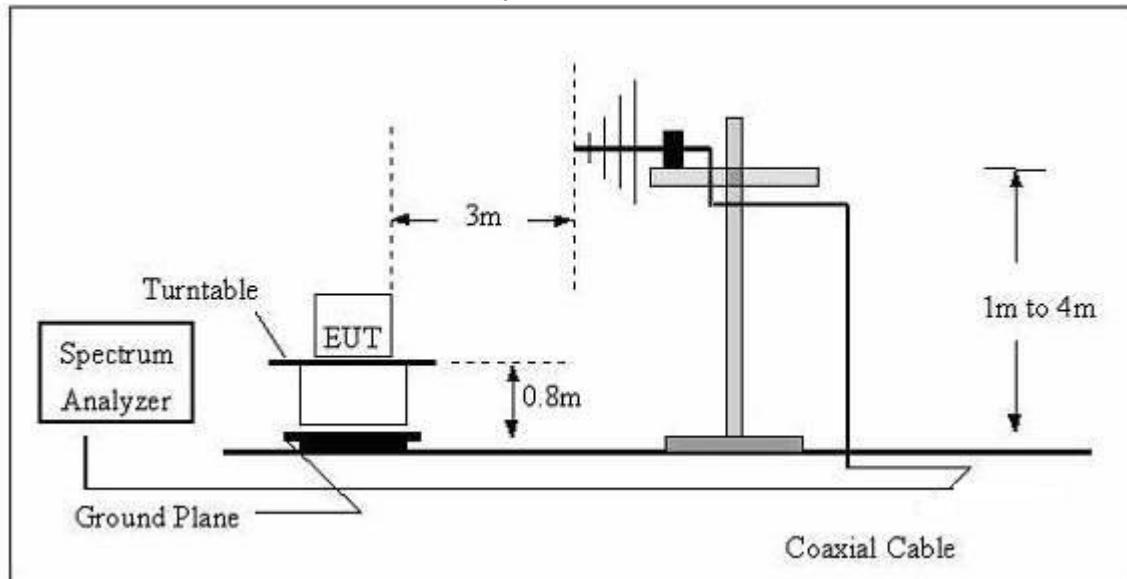


3.2.4 TEST SETUP

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



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

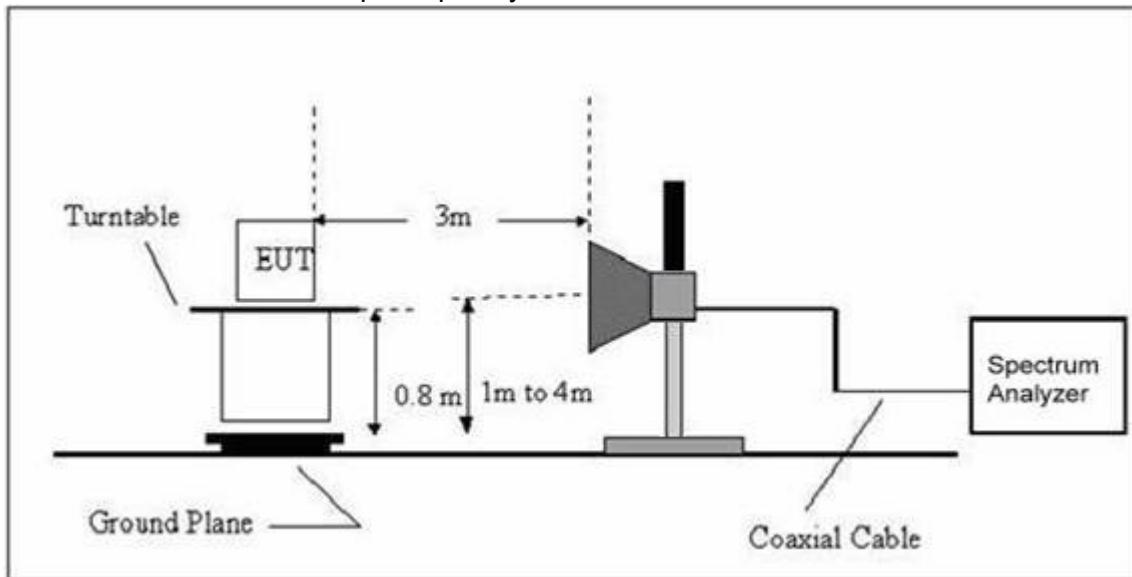




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 20 of 53 -

(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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 21 of 53 -

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	budiu smart GPS chips	Model Name. :	Budiu 2.0 GPS
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 = $40 \log (\text{specific distance}/\text{test distance})$ (dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 22 of 53 -

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	budiu smart GPS chips		Model Name :	Budiu 2.0 GPS		
Temperature :	20 °C		Relative Humidity :	48%		
Pressure:	1010 hPa		Test Voltage :	DC 3.7V		
Test Mode :	802.11B TX 2412					

Polarization	Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detect or Type	Comment
								Below 1G
Horizontal	34.46	23.63	9.35	32.98	40	-7.02	QP	
Horizontal	137.56	21.96	10.63	32.59	43.5	-10.91	QP	
Horizontal	235.74	22.75	12.46	35.21	46	-10.79	QP	
Horizontal	336.25	20.67	13.63	34.3	46	-11.7	QP	
Horizontal	398.72	20.62	15.63	36.25	46	-9.75	QP	
Horizontal	518.63	20.32	17.83	38.15	46	-7.85	QP	
Vertical	73.63	19.73	10.83	30.56	40	-9.44	QP	
Vertical	188.63	21.76	10.37	32.13	43.5	-11.37	QP	
Vertical	261.42	19.61	12.64	32.25	46	-13.75	QP	
Vertical	335.36	20.55	13.73	34.28	46	-11.72	QP	
Vertical	422.26	22.71	14.28	36.99	46	-9.01	QP	
Vertical	556.63	21.85	15.83	37.68	46	-8.32	QP	

Note: test perform on 802.11b/g mode, "802.11b TX2412" mode is the worst mode and has been reported.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 23 of 53 -

3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detect or Type	Comment
Low Channel (2412 MHz)-Above 1G							
4823.97	45.85	9.97	55.82	74	-18.18	Pk	Vertical
4823.97	34.74	9.97	44.71	54	-9.29	Av	Vertical
7236.31	43.37	12.35	55.72	74	-18.28	Pk	Vertical
7236.31	33.29	12.35	45.64	54	-8.36	Av	Vertical
4825.03	45.67	10.57	56.24	74	-17.76	Pk	Horizontal
4825.03	35.73	10.57	46.3	54	-7.7	Av	Horizontal
7236.06	42.16	12.35	54.51	74	-19.49	Pk	Horizontal
7236.06	32.66	12.35	45.01	54	-8.99	Av	Horizontal
Mid Channel (2437 MHz)-Above 1G							
4874.25	43.74	10.4	54.14	74	-19.86	Pk	Vertical
4874.25	32.63	10.4	43.03	54	-10.97	Av	Vertical
7311.19	45.73	12.75	58.48	74	-15.52	Pk	Vertical
7311.19	31.36	12.75	44.11	54	-9.89	Av	Vertical
4874.32	37.63	10.4	48.03	74	-25.97	Pk	Horizontal
4874.32	31.63	10.4	42.03	54	-11.97	Av	Horizontal
7311.30	43.63	12.75	56.38	74	-17.62	Pk	Horizontal
7311.30	32.66	12.75	45.41	54	-8.59	Av	Horizontal
High Channel (2462 MHz)- Above 1G							
4924.23	46.38	10.39	56.77	74	-17.23	Pk	Vertical
4924.23	34.19	10.39	44.58	54	-9.42	Av	Vertical
7386.17	44.86	12.68	57.54	74	-16.46	Pk	Vertical
7386.17	34.62	12.68	47.3	54	-6.7	Av	Vertical
4924.35	43.52	10.39	53.91	74	-20.09	Pk	Horizontal
4924.35	33.35	10.39	43.74	54	-10.26	Av	Horizontal
7386.12	40.63	12.68	53.31	74	-20.69	Pk	Horizontal
7386.12	29.63	12.68	42.31	54	-11.69	Av	Horizontal

Note: test perform on 802.11b/g mode, "802.11b" mode is the worst mode and has been reported. We test up to 26GHz, there is no detected above 8GHz

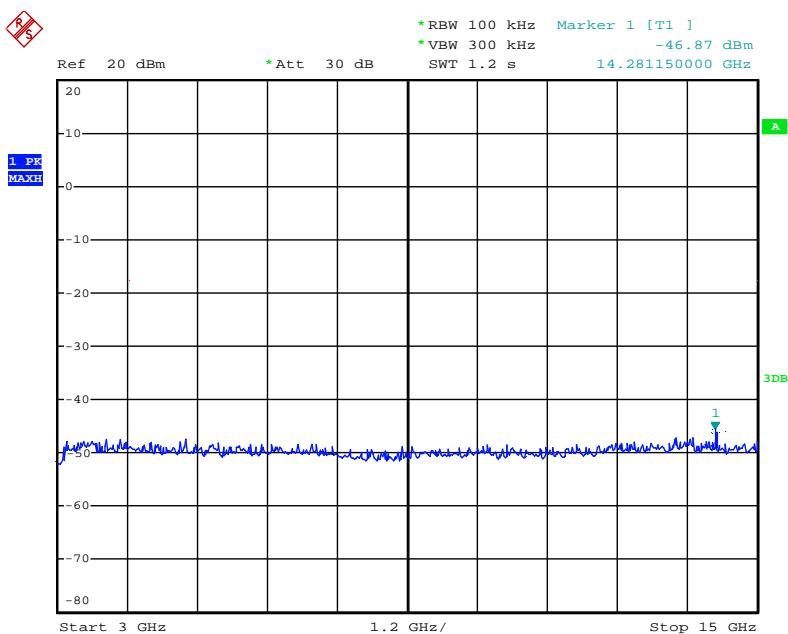
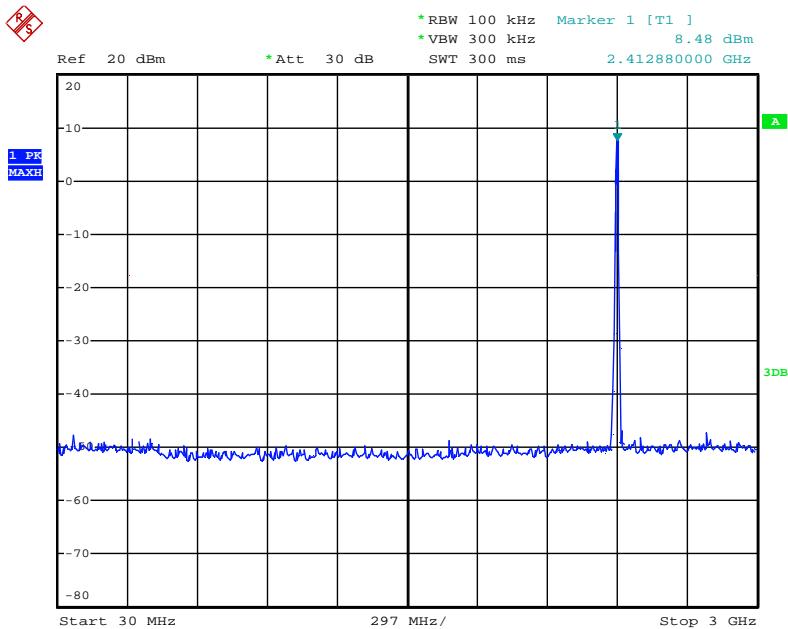


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 24 of 53 -

Conducted Spurious Emissions at Antenna Port:

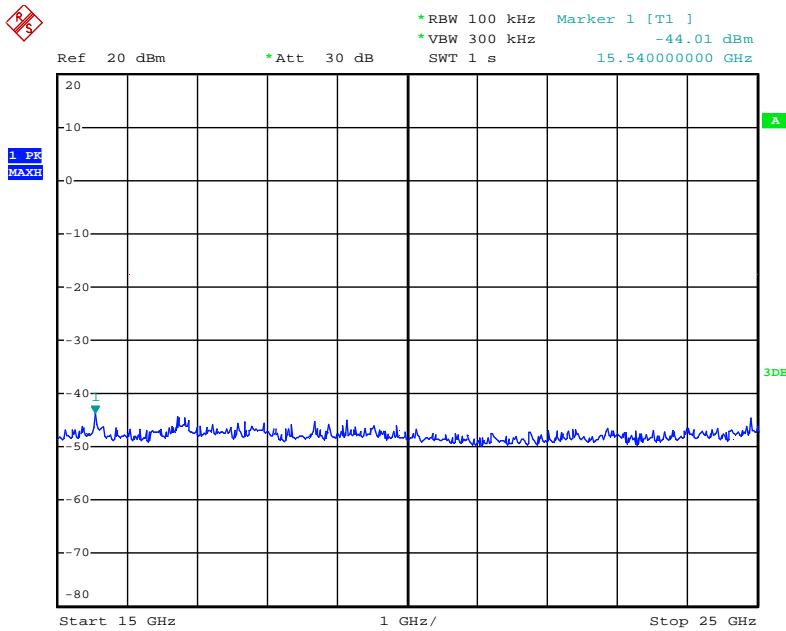
802.11b Low Channel



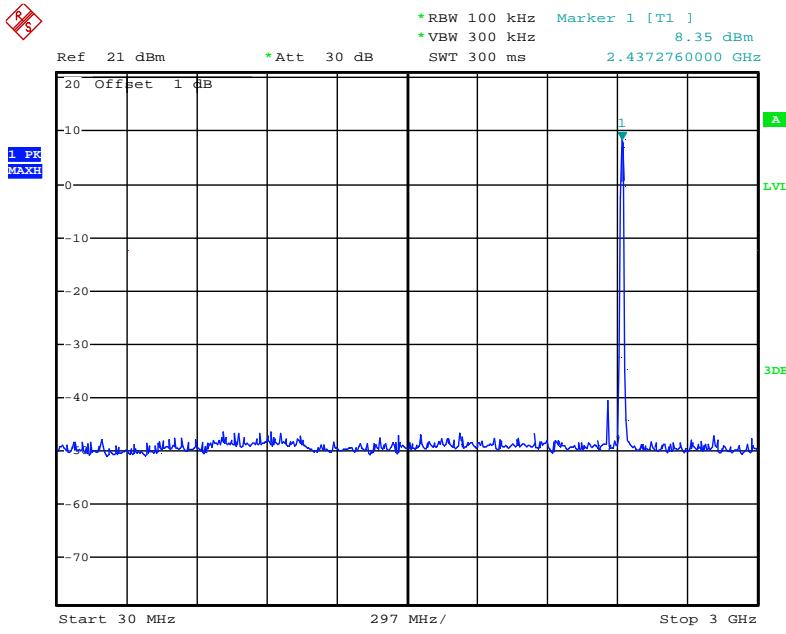


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 25 of 53 -



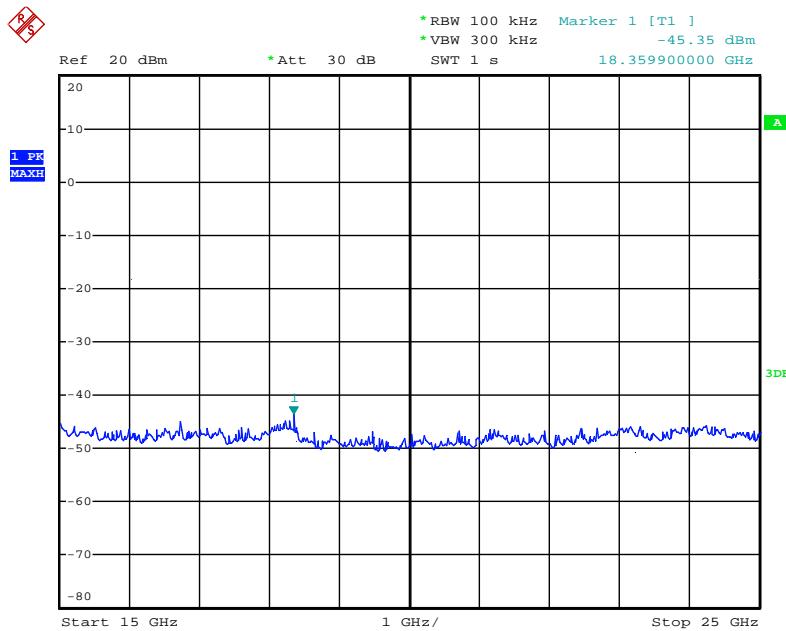
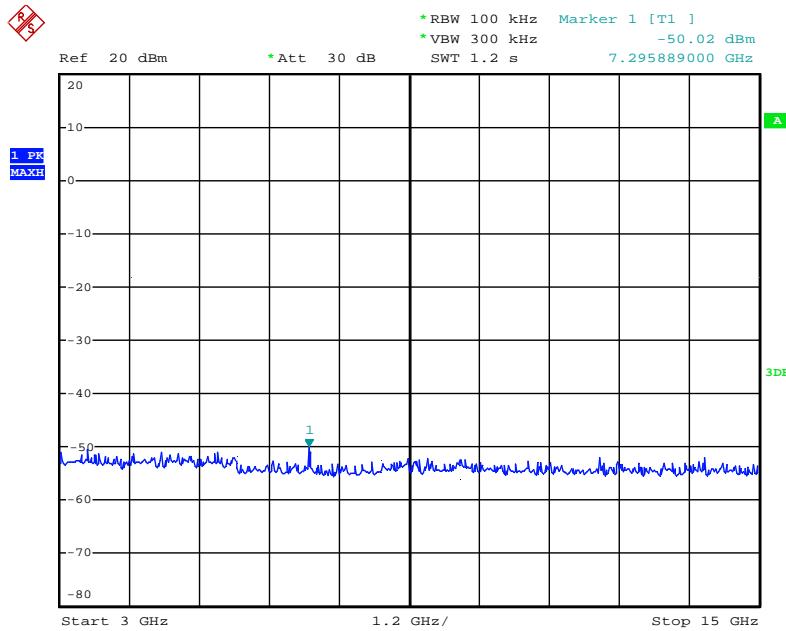
802.11b Middle Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 26 of 53 -

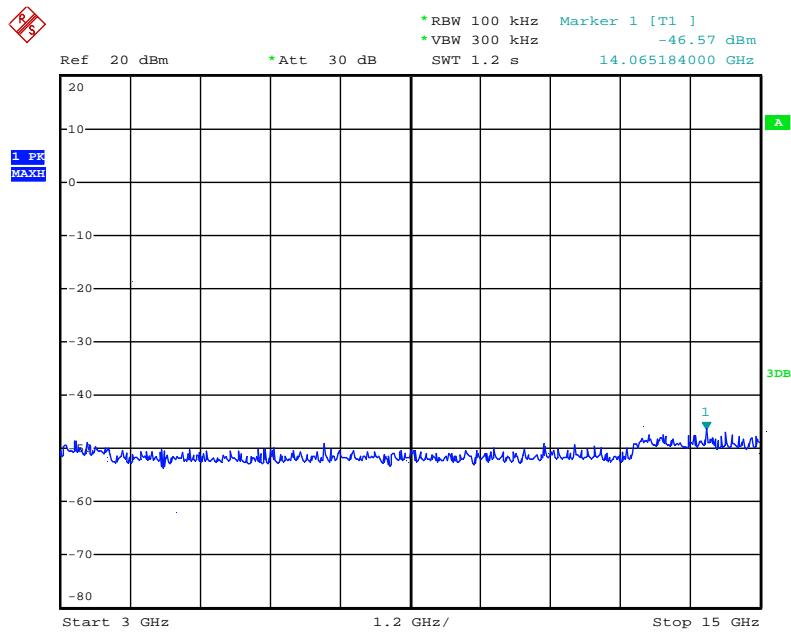
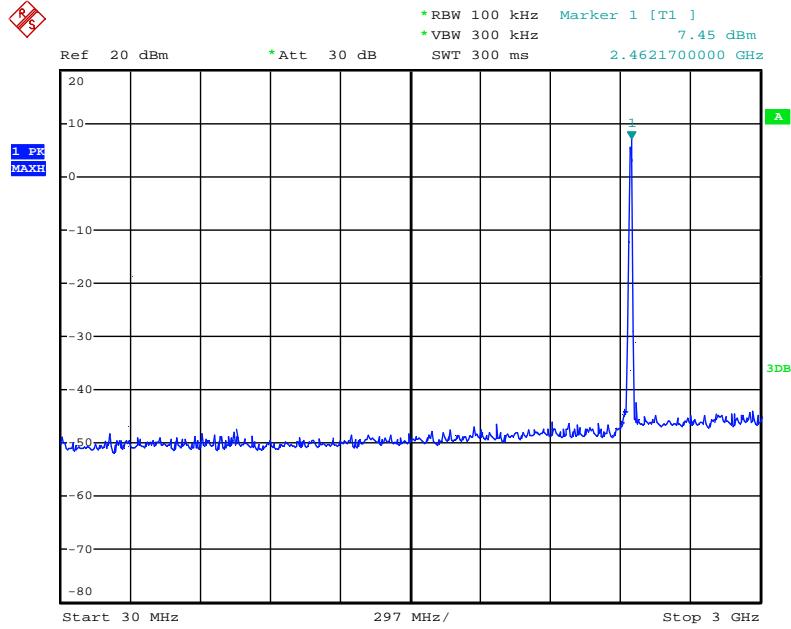




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 27 of 53 -

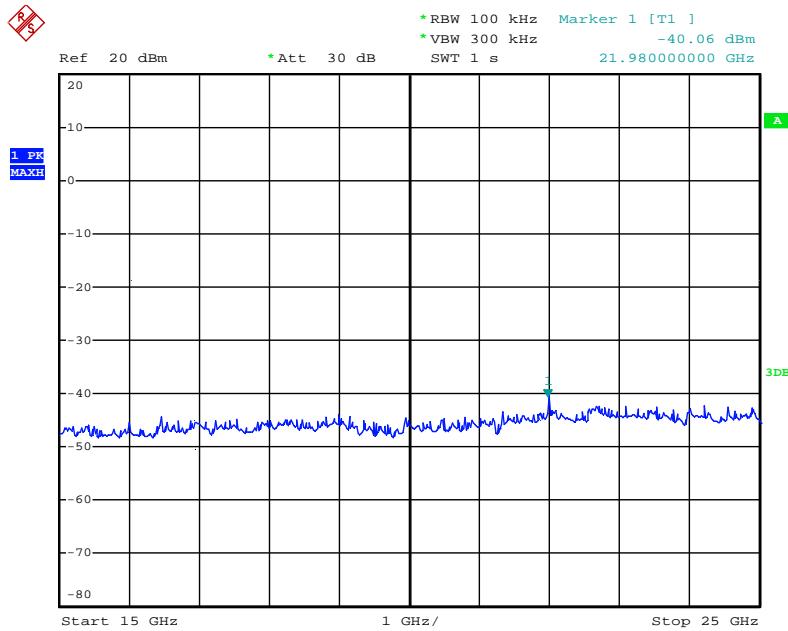
802.11b High Channel



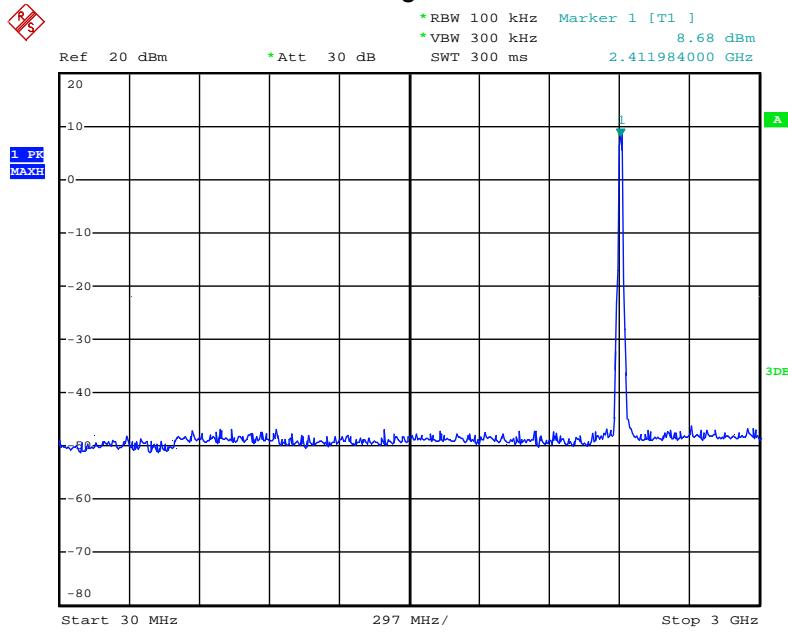


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 28 of 53 -



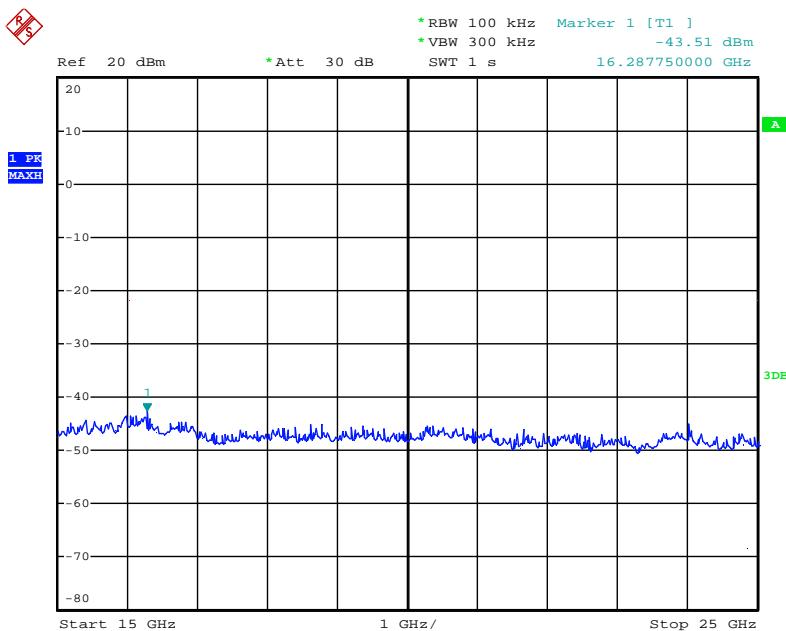
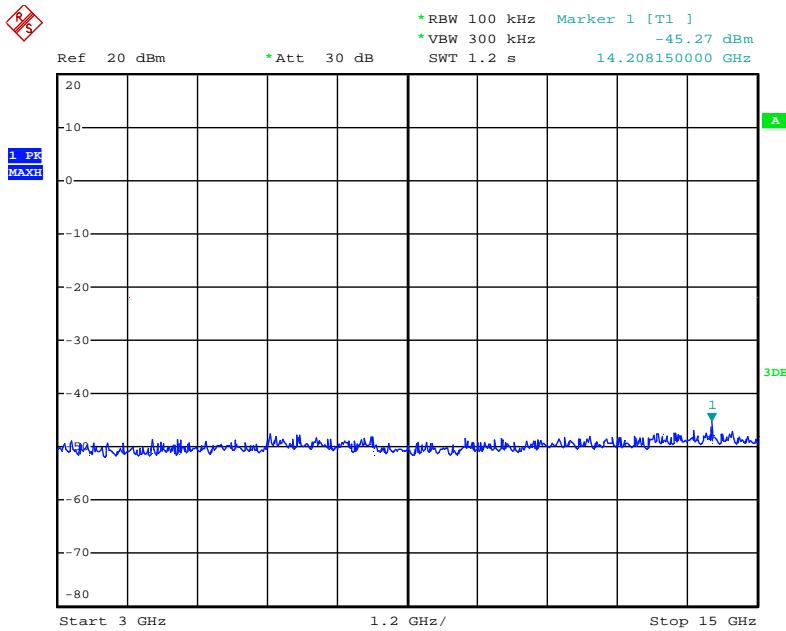
802.11g Low Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 29 of 53 -

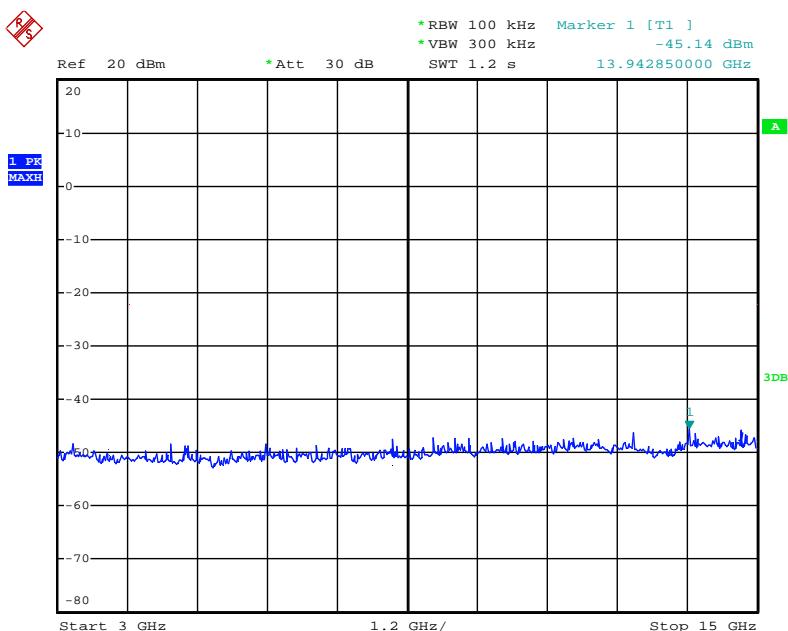
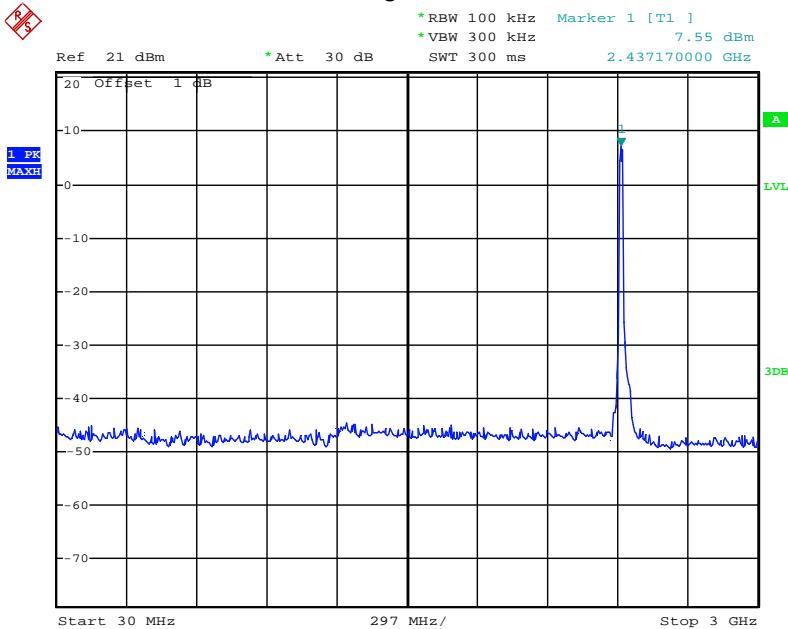




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 30 of 53 -

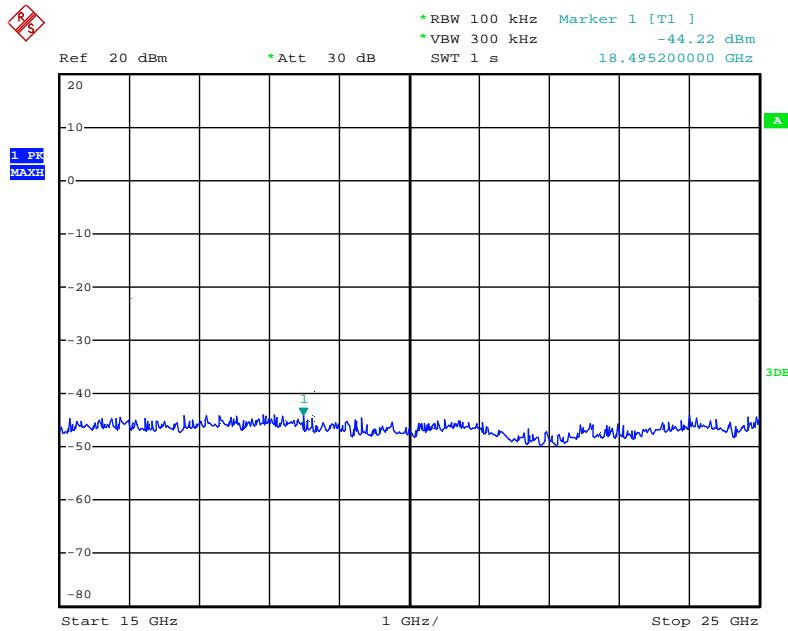
802.11g Middle Channel



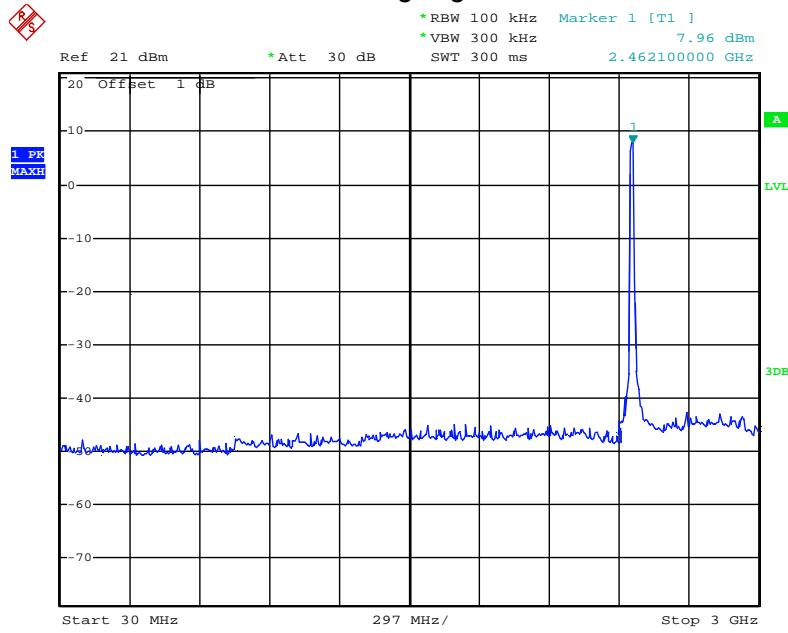


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 31 of 53 -



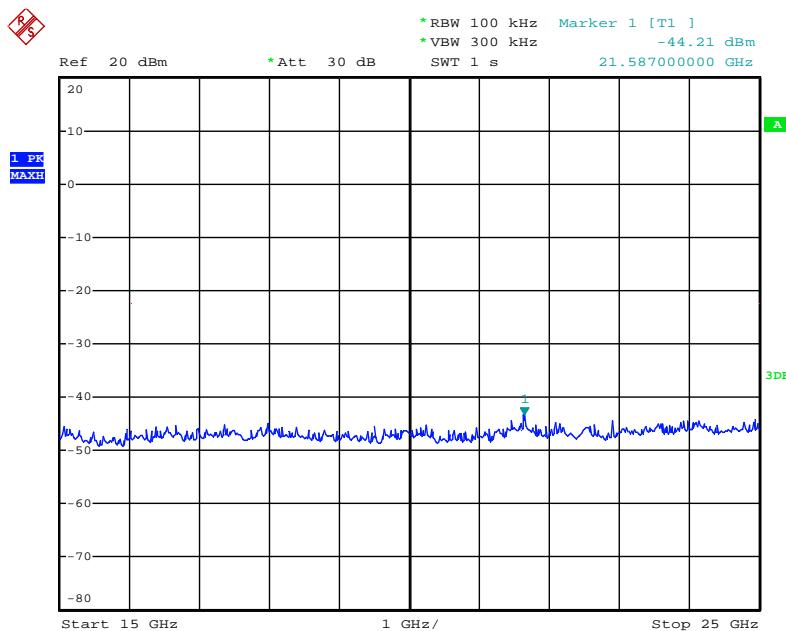
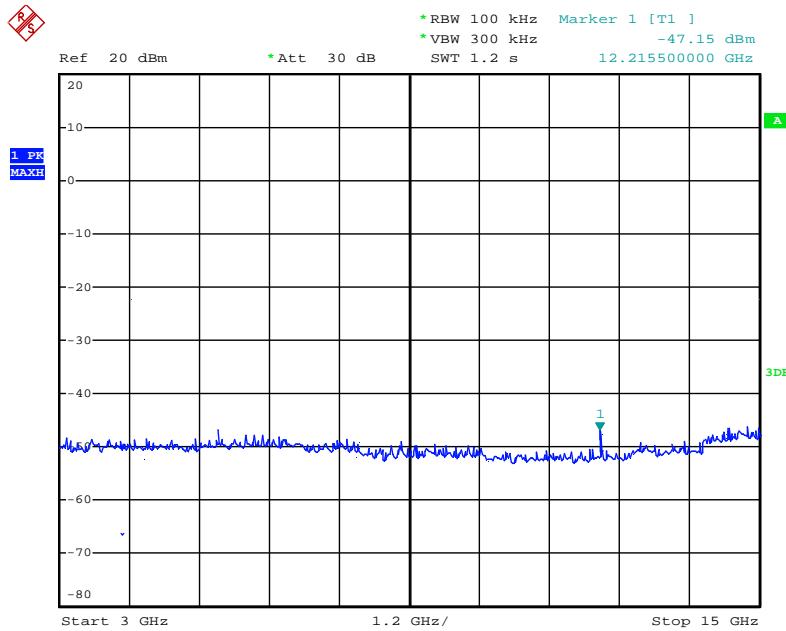
802.11g High Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 32 of 53 -





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 33 of 53 -

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. Set the RBW \geq 3 kHz.
4. Set the VBW \geq 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.
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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 34 of 53 -

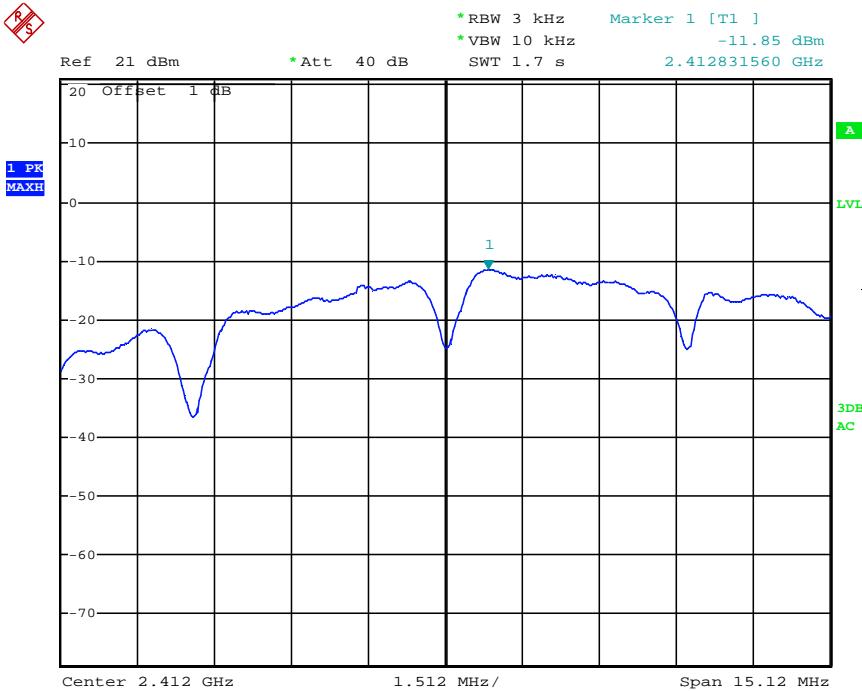
4.1.5 TEST RESULTS

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

Note: The relevant measured result has the offset with cable loss already.

Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-11.85	8	PASS
2437 MHz	-13.79	8	PASS
2462 MHz	-12.18	8	PASS

TX CH01

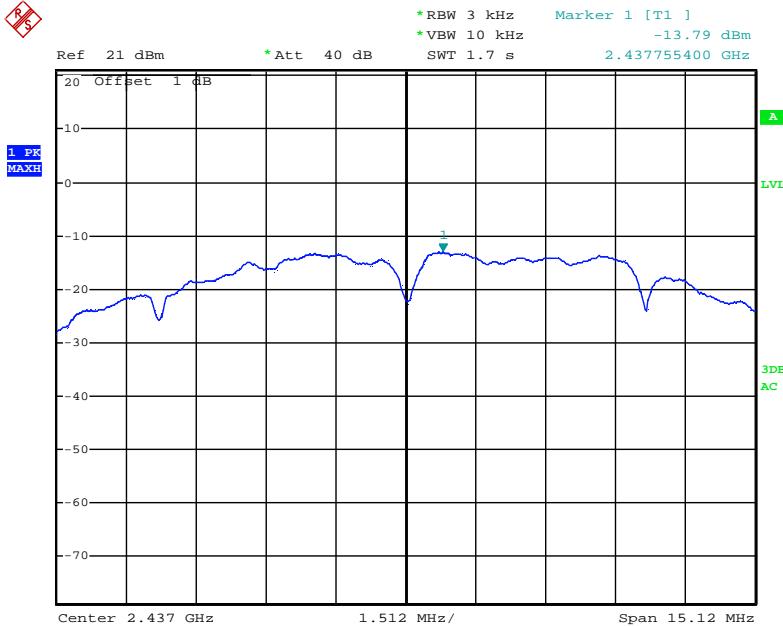




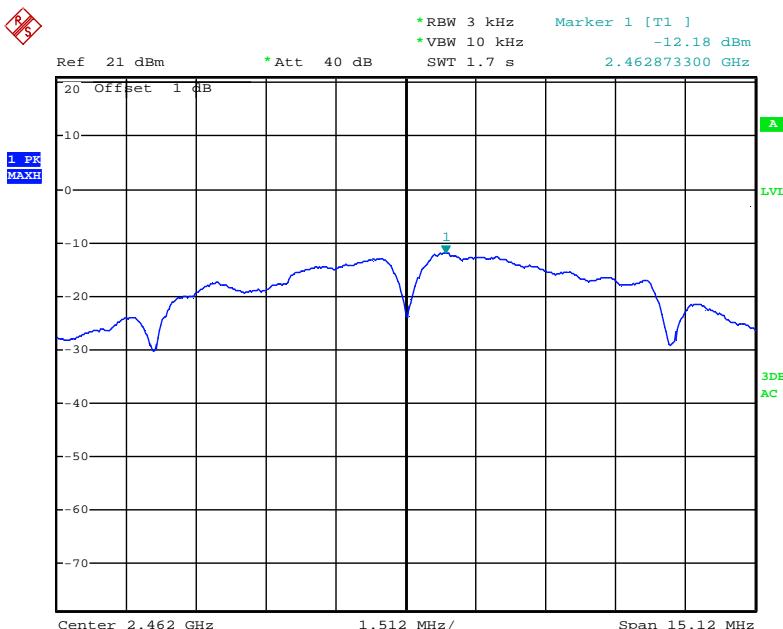
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Report No. ATT-2015SZ0424046F2
- Page 35 of 53 -

TX CH06



TX CH11





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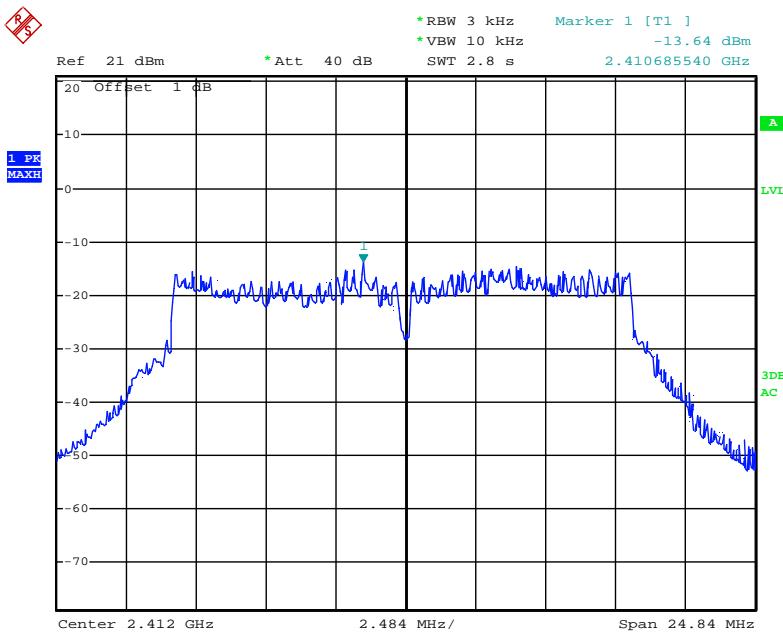
Report No. ATT-2015SZ0424046F2
- Page 36 of 53 -

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode /CH01, CH06, CH11		

Note: The relevant measured result has the offset with cable loss already.

Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-13.64	8	PASS
2437 MHz	-13.27	8	PASS
2462 MHz	-13.57	8	PASS

TX CH01

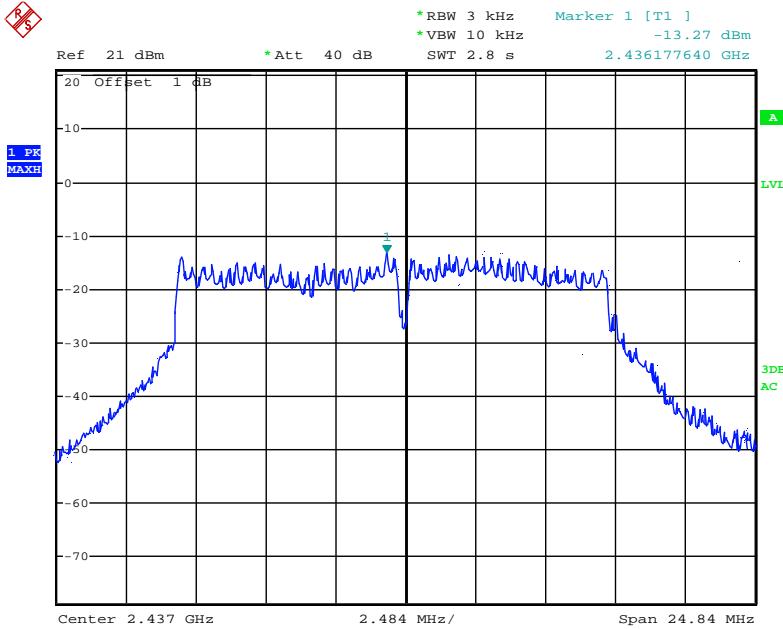




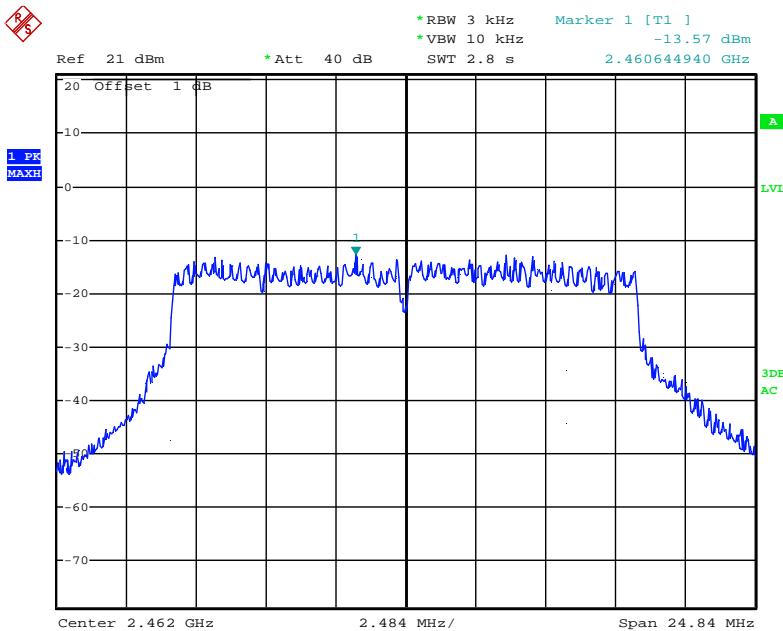
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Report No. ATT-2015SZ0424046F2
- Page 37 of 53 -

TX CH06



TX CH11





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 38 of 53 -

5. BANDWIDTH TEST

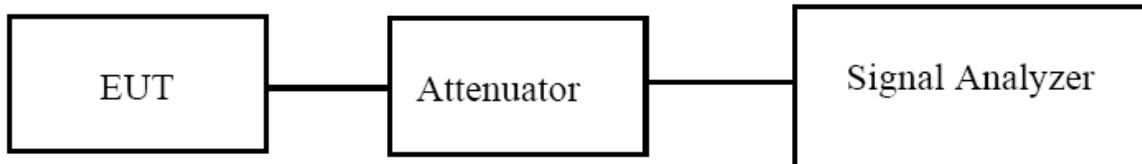
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

According to KDB 558074 D01 DTS Meas Guidance v03r02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



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.



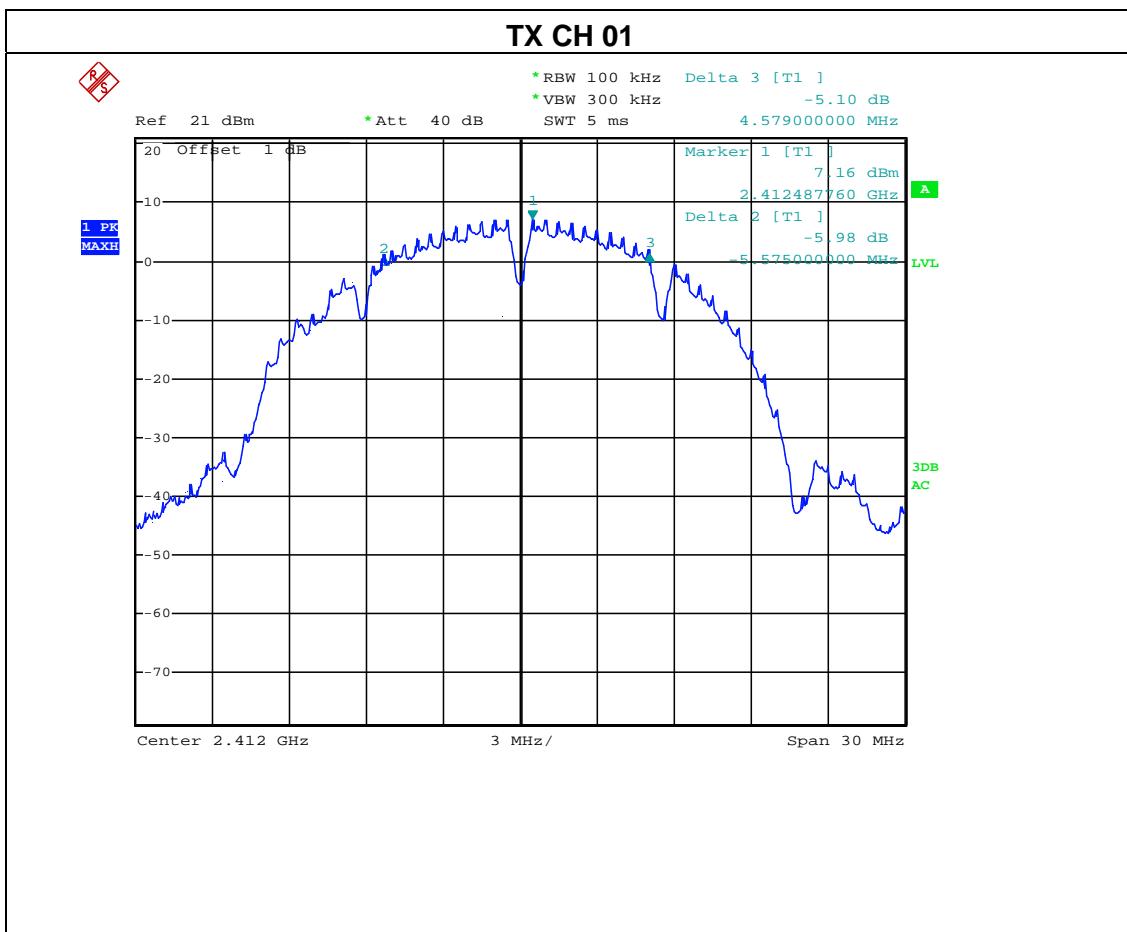
Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 39 of 53 -

5.1.3 TEST RESULTS

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

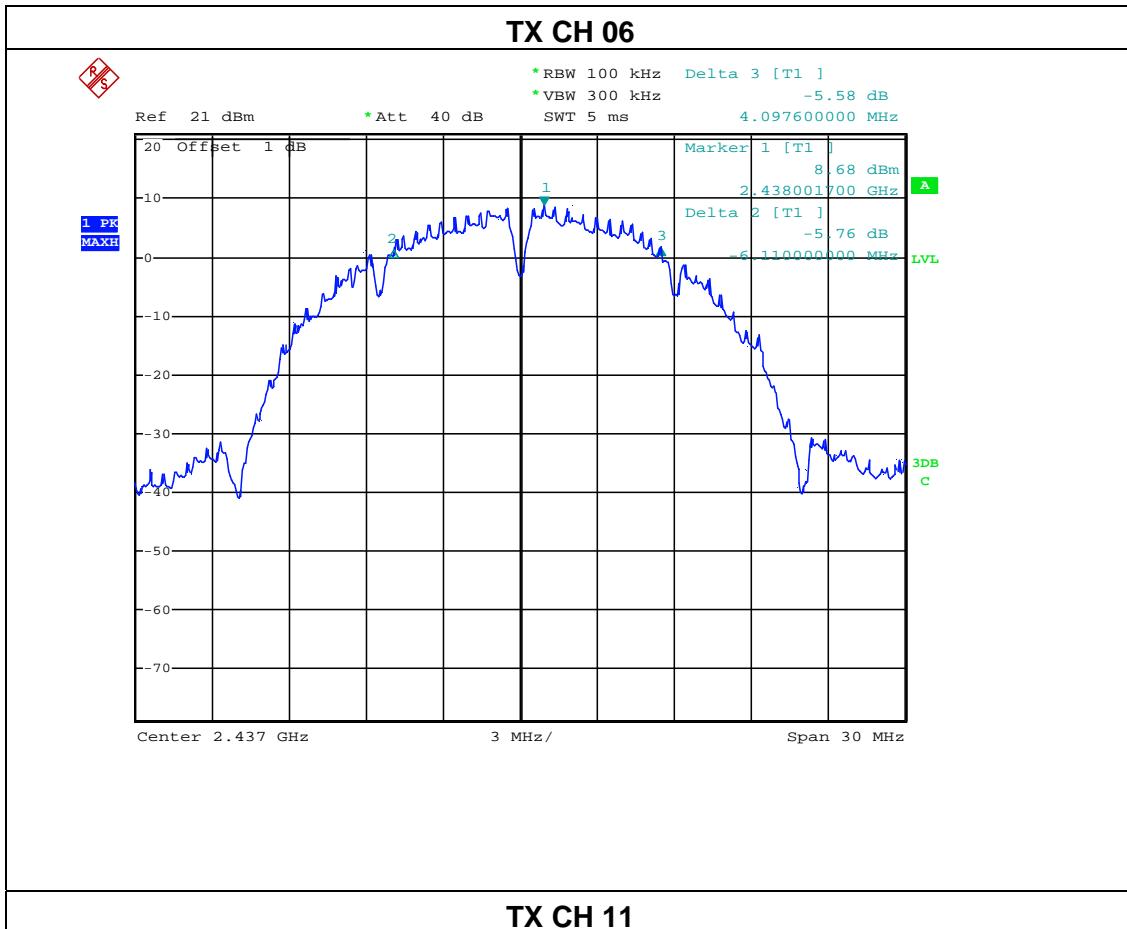
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.1450	500	Pass
Middle	2437	10.2076	500	Pass
High	2462	10.1420	500	Pass





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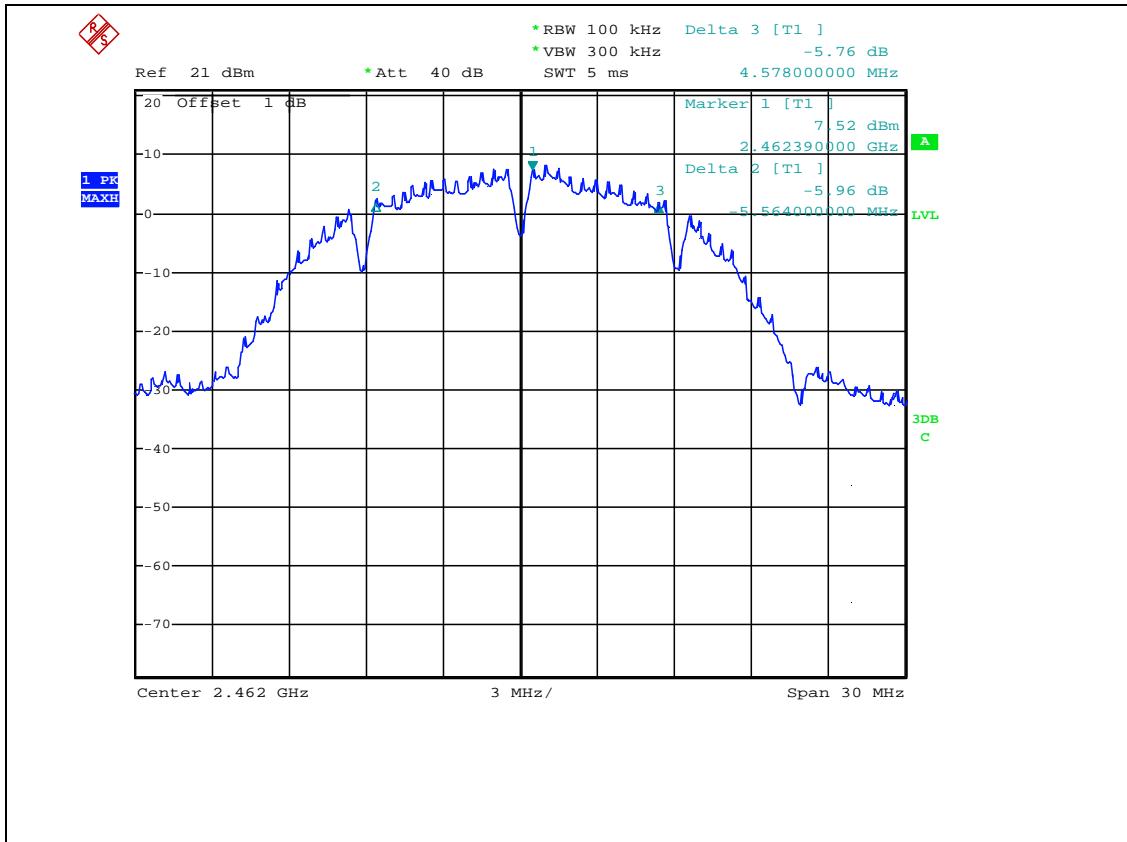
Report No. ATT-2015SZ0424046F2
- Page 40 of 53 -





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 41 of 53 -



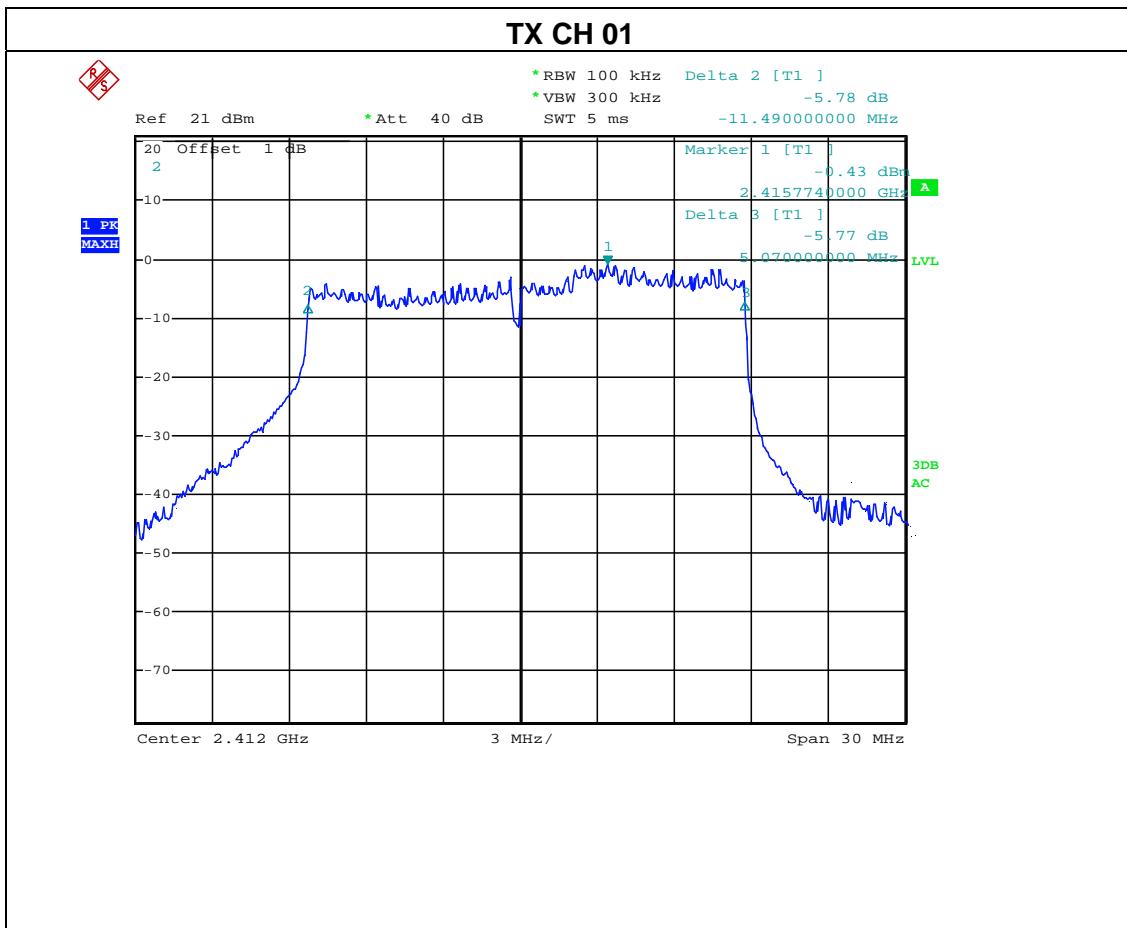


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 42 of 53 -

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode /CH01, CH06, CH11		

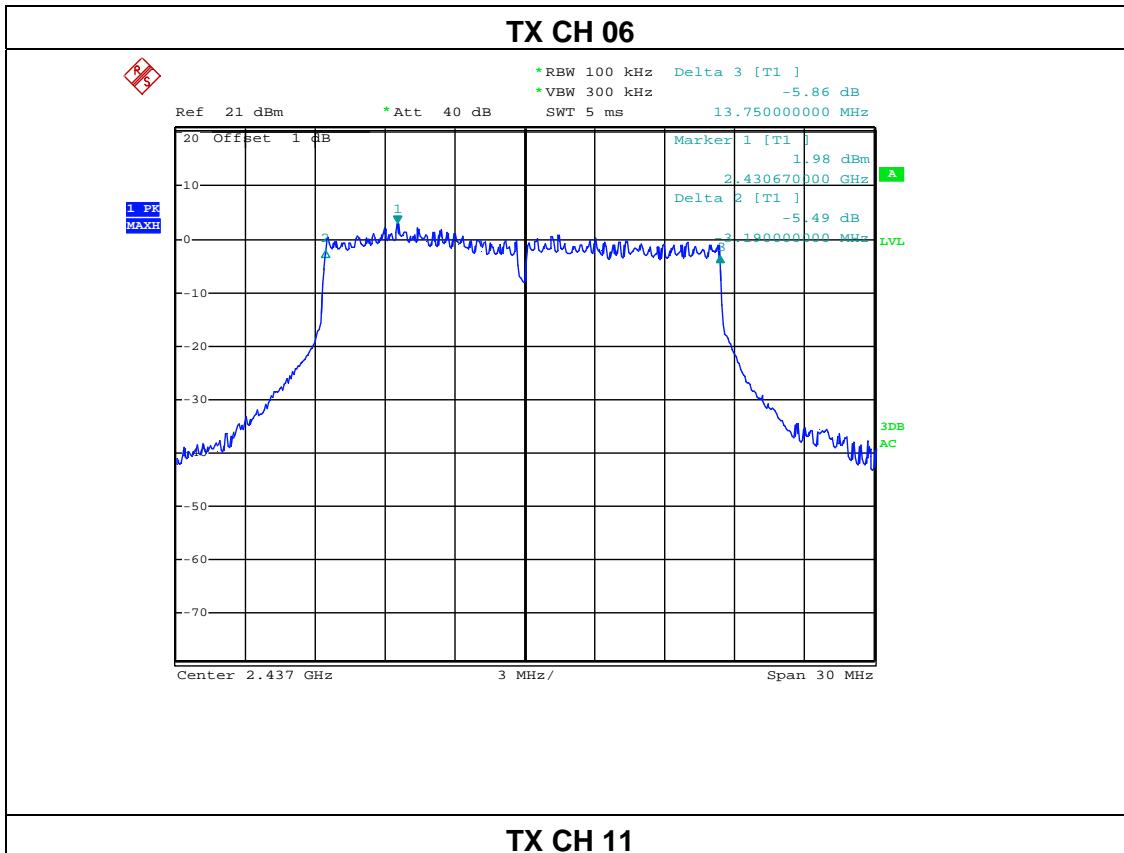
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.560	500	Pass
Middle	2437	16.940	500	Pass
High	2462	16.447	500	Pass





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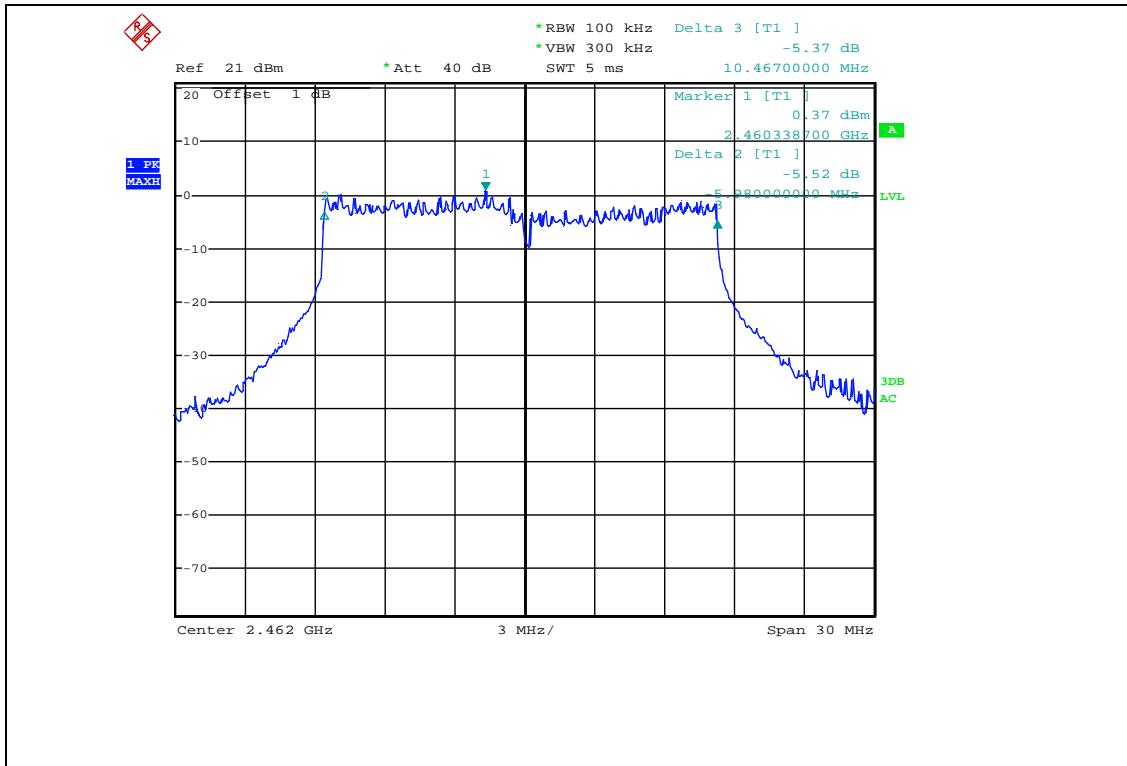
Report No. ATT-2015SZ0424046F2
- Page 43 of 53 -





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 44 of 53 -



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

- The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

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Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 45 of 53 -

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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 46 of 53 -

6.1.5 TEST RESULTS

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b/g Mode		

Test Channel	Frequency (MHz)	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(AV)	LIMIT (dBm)
		(dBm)	(dBm)	
802.11b				
CH01	2412	12.88	8.39	30
CH06	2437	12.74	8.32	30
CH11	2462	12.68	8.22	30
802.11g				
CH01	2412	12.26	7.28	30
CH06	2437	12.31	7.35	30
CH11	2462	12.48	7.44	30

Note: the highest AVG powers for:

802.11b: 1Mbps

802.11g: 6Mbps



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 47 of 53 -

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)).

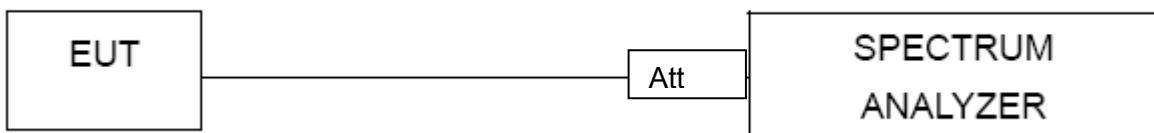
TEST PROCEDURE

- 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 1 MHz and VBW of spectrum analyzer to 3 MHz 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.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 48 of 53 -

7.4 TEST RESULTS

EUT :	budiu smart GPS chips	Model Name :	Budiu 2.0 GPS
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
802.11b			
Left-band	47.73	20	Pass
Right-band	45.60	20	Pass
802.11g			
Left-band	40.70	20	Pass
Right-band	41.12	20	Pass

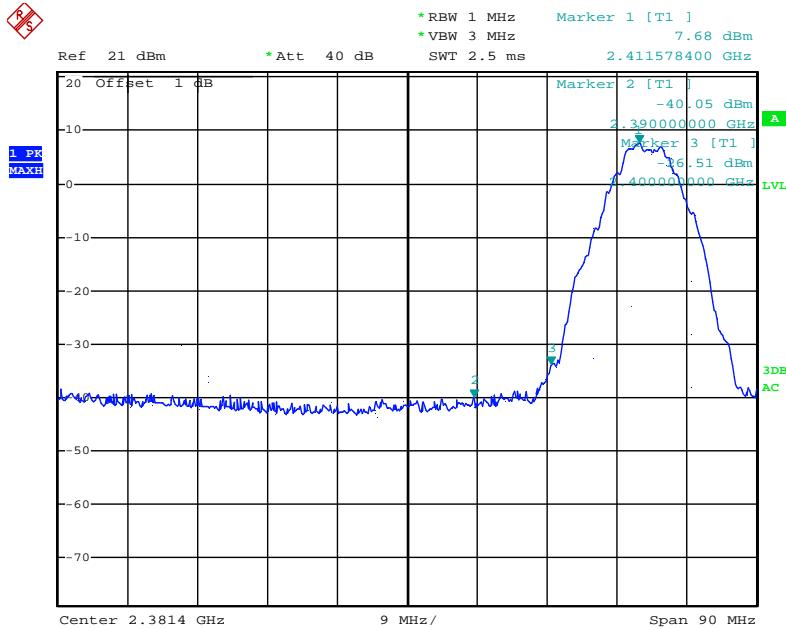
Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detect or Type	Comment		
802.11b									
2390	41.74	9.86	51.6	74	-22.4	Pk	Vertical		
2390	36.39	9.86	46.25	54	-7.75	Av	Vertical		
2483.5	42.62	10.14	52.76	74	-21.24	Pk	Vertical		
2483.5	37.74	10.14	47.88	54	-6.12	Av	Vertical		
802.11g									
2390	40.25	9.86	50.11	74	-23.89	Pk	Vertical		
2390	35.62	9.86	45.48	54	-8.52	Av	Vertical		
2483.5	39.84	10.14	49.98	74	-24.02	Pk	Vertical		
2483.5	31.63	10.14	41.77	54	-12.23	Av	Vertical		



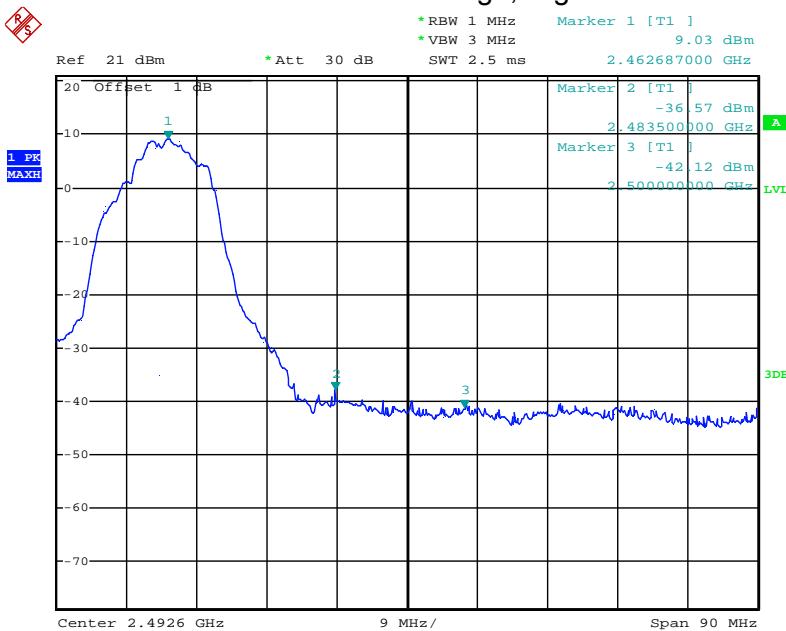
Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 49 of 53 -

802.11b: Band Edge, Left Side



802.11b: Band Edge, Right Side

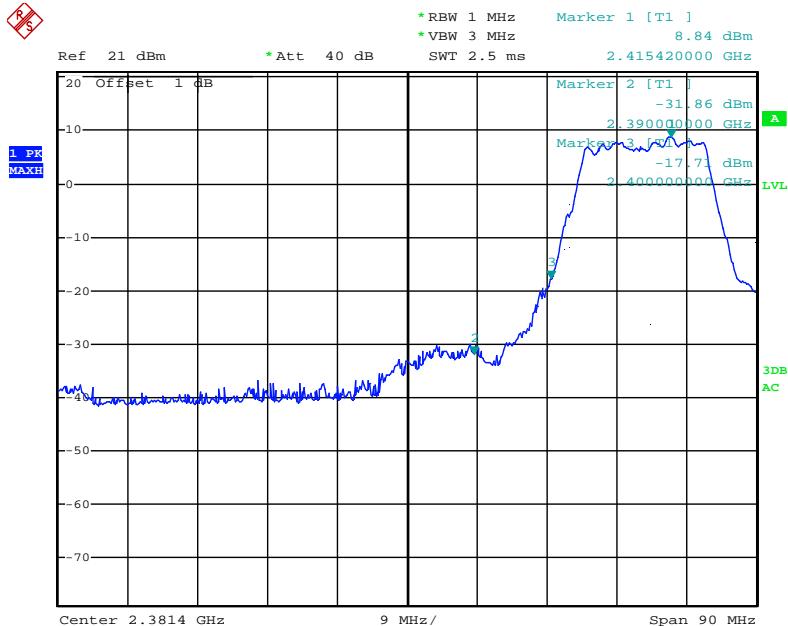




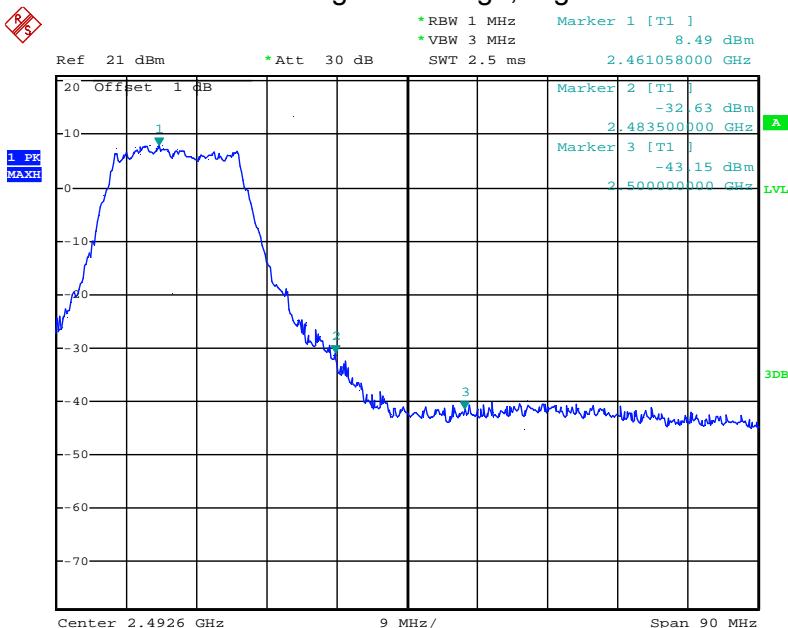
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Report No. ATT-2015SZ0424046F2
- Page 50 of 53 -

802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2015SZ0424046F2
- Page 51 of 53 -

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 PCB Antenna. It comply with the standard requirement.