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Report No. ATT-2014SZ1201017F
- Page 1 of 48 -

FCC RADIO TEST REPORT

FCC ID: YIZRE413

Product : Bluetooth Smart(Bluetooth activity tracker)

Trade Name : N/A

Model Name : RE413

RE40327,RT413,R413,Merc,Merc Pro,Rii413,

Serial Model : ZW-40327,ZW-M10,ZW-M10PRO,ZW-M20,ZW-
M30,ZW-M40,ZW-M50

Prepared for

ShenZhen Riitek Technology Co., Ltd

A1-4,A Zone,Baoyunda Logistic Center, Avenue Xixiang, BaoAn District,
Shenzhen, China

Prepared by

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Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 2 of 48 -

TEST RESULT CERTIFICATION

Applicant's name ShenZhen Riitek Technology Co., Ltd

Address A1-4,A Zone,Baoyunda Logistic Center, Avenue Xixiang, BaoAn District, Shenzhen, China

Manufacture's Name ShenZhen Riitek Technology Co., Ltd

Address A1-4,A Zone,Baoyunda Logistic Center, Avenue Xixiang, BaoAn District, Shenzhen, China

Product description

Product name Bluetooth Smart(Bluetooth activity tracker)

Model and/or type reference RE413

Serial Model RE40327,RT413,R413,Merc,Merc Pro,Rii413,ZW-40327,ZW-M10 ZW-M10PRO,ZW-M20,ZW-M30,ZW-M40,ZW-M50

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 Dec. 01 2014 ~Dec. 09 2014

Date of Issue Dec. 09 2014

Test Result **Pass**

Tested by: Eric Wang
Eric Wang

Reviewed by: Jerry You
Jerry You

Approved by: Jack Yu
Jack Yu

Project Leader

Laboratory Supervisor

Technical Director



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 3 of 48 -

	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		8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED		9
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)		10
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS		11
3 . EMC EMISSION TEST		12
3.1 CONDUCTED EMISSION MEASUREMENT		12
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS		12
3.1.2 TEST PROCEDURE		13
3.1.3 DEVIATION FROM TEST STANDARD		13
3.1.4 TEST SETUP		13
3.1.5 EUT OPERATING CONDITIONS		13
3.1.6 TEST RESULTS		14
3.2 RADIATED EMISSION MEASUREMENT		15
3.2.1 RADIATED EMISSION LIMITS		15
3.2.2 TEST PROCEDURE		16
3.2.3 DEVIATION FROM TEST STANDARD		16
3.2.4 TEST SETUP		17
3.2.5 EUT OPERATING CONDITIONS		18
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)		19
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)		20
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)		22
4 . POWER SPECTRAL DENSITY TEST		34
4.1 APPLIED PROCEDURES / LIMIT		34
4.1.1 TEST PROCEDURE		34
4.1.2 DEVIATION FROM STANDARD		34



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 4 of 48 -

Table of Contents	Page
4.1.3 TEST SETUP	34
4.1.4 EUT OPERATION CONDITIONS	34
4.1.5 TEST RESULTS	35
5 . BANDWIDTH TEST	37
5.1 APPLIED PROCEDURES / LIMIT	37
5.1.1 TEST PROCEDURE	37
5.1.2 EUT OPERATION CONDITIONS	37
5.1.3 TEST RESULTS	38
6 . PEAK OUTPUT POWER TEST	40
6.1 APPLIED PROCEDURES / LIMIT	40
6.1.1 TEST PROCEDURE	40
6.1.2 DEVIATION FROM STANDARD	40
6.1.3 TEST SETUP	40
6.1.4 EUT OPERATION CONDITIONS	40
6.1.5 TEST RESULTS	41
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	42
7.1 DEVIATION FROM STANDARD	42
7.2 TEST SETUP	43
7.3 EUT OPERATION CONDITIONS	43
7.4 TEST RESULTS	44
8 . ANTENNA REQUIREMENT	47
8.1 STANDARD REQUIREMENT	47
8.2 EUT ANTENNA	47
9 . EUT TEST PHOTO	48
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 5 of 48 -

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
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-2014SZ1201017F
- Page 6 of 48 -

1.1 TEST FACILITY

Shenzhen STONE Testing Technology Co.,Ltd.

Add.: F/6, Bldg.12, Zhongxing Industrial City, Chuangye Rd., Nanshan District Shenzhen P.R. China

FCC Registration No.: 323508; IC Registration No.: 11043A

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-2014SZ1201017F
- Page 7 of 48 -

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth Smart (Bluetooth activity tracker)	
Model Name	RE413	
Serial Model	RE40327,RT413,R413,Merc,Merc Pro,Rii413,ZW-40327,ZW-M10,ZW-M10PRO,ZW-M20,ZW-M30,ZW-M40,ZW-M50	
Model Difference	All models are identical except model name	
Product Description	The EUT is a Bluetooth Smart	
	Operation Frequency:	2402~2480MHz
	Modulation Type:	GFSK
	Bluetooth version:	4.0
	Bit Rate of Transmitter	1 Mbps
	Number Of Channel	40CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	0.193dBm AVG(99% duty cycle)
	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	Please refer to the Note 2.	
Ratings	DC 3V	
Adapter	N/A	
Battery	DC 3V	
Connecting I/O	Please refer to the User's Manual	

Note:

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

2.

Channel	Frequency (MHz)
00	2402
01	2404
.....
38	2478
39	2480

3.

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Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 8 of 48 -

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Chip antenna	N/A	0	BT 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	CH00
Mode 2	CH19
Mode 3	CH39
Mode 4	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH19
Mode 3	CH39
Mode 4	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. The EUT was programmed to be in continuously(99% duty cycle) transmitting mode.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 9 of 48 -

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

RE

E-1
EUT



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Report No. ATT-2014SZ1201017F
- Page 10 of 48 -

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	Bluetooth Smart	N/A	RE413	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

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-2014SZ1201017F
- Page 11 of 48 -

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	MY4510840	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	2013.12.22	2014.12.21	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	Test Receiver	R&S	FSU	550062	2014.06.07	2015.06.06	1 year
13	Cable 30-1000MHz	R&S	ATT-R01	201309R001	2014.06.08	2015.06.07	1 year
14	Cable 1-26.5GHz	R&S	ATT-R02	201309R048	2014.06.08	2015.06.07	1 year



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 12 of 48 -

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



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 13 of 48 -

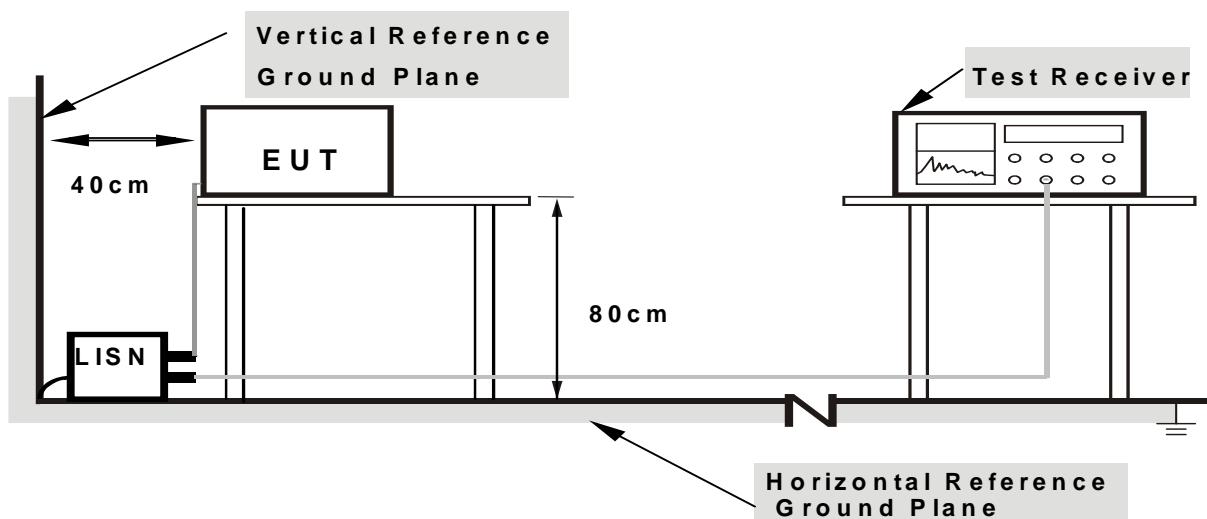
3.1.2 TEST PROCEDURE

- 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.

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-2014SZ1201017F
- Page 14 of 48 -

3.1.6 TEST RESULTS

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N/A
Test Voltage :	N/A	Test Mode :	N/A



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 15 of 48 -

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)&A8.5, then the 15.209(a) limit in the table below has to be followed.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

(1) 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



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 16 of 48 -

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.
- 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

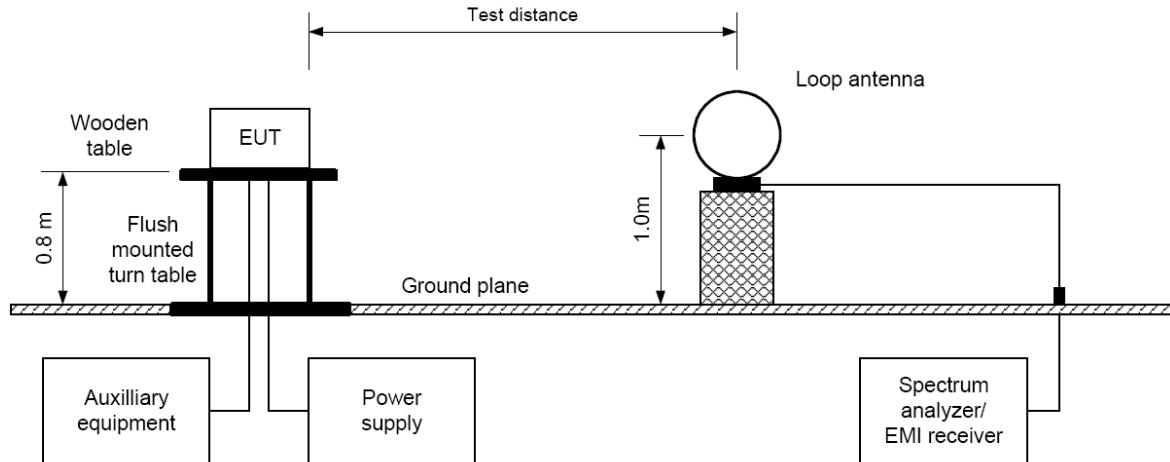


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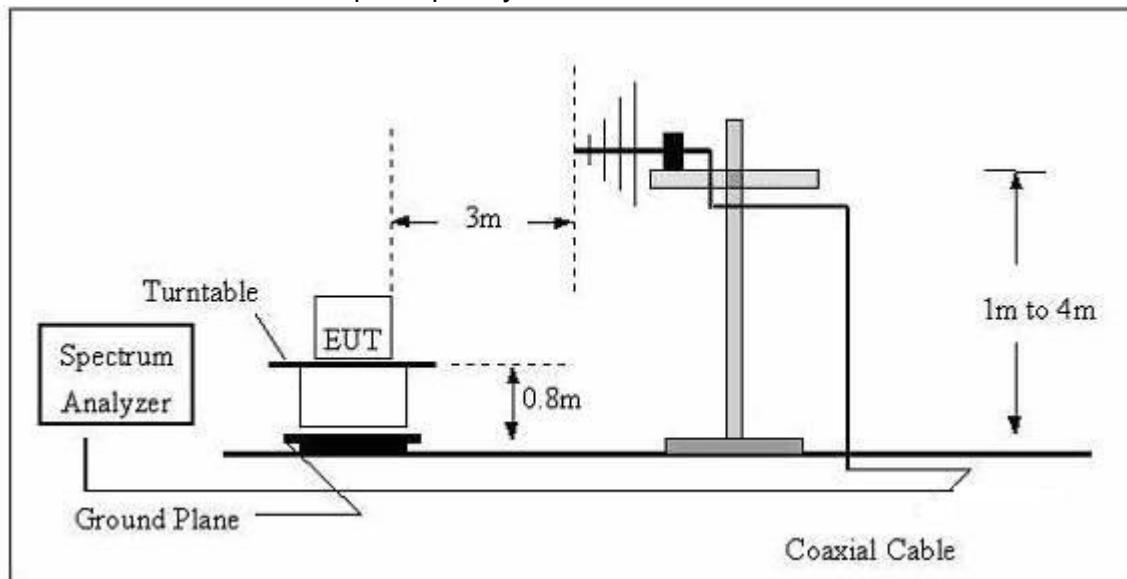
Report No. ATT-2014SZ1201017F
- Page 17 of 48 -

3.2.4 TEST SETUP

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



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

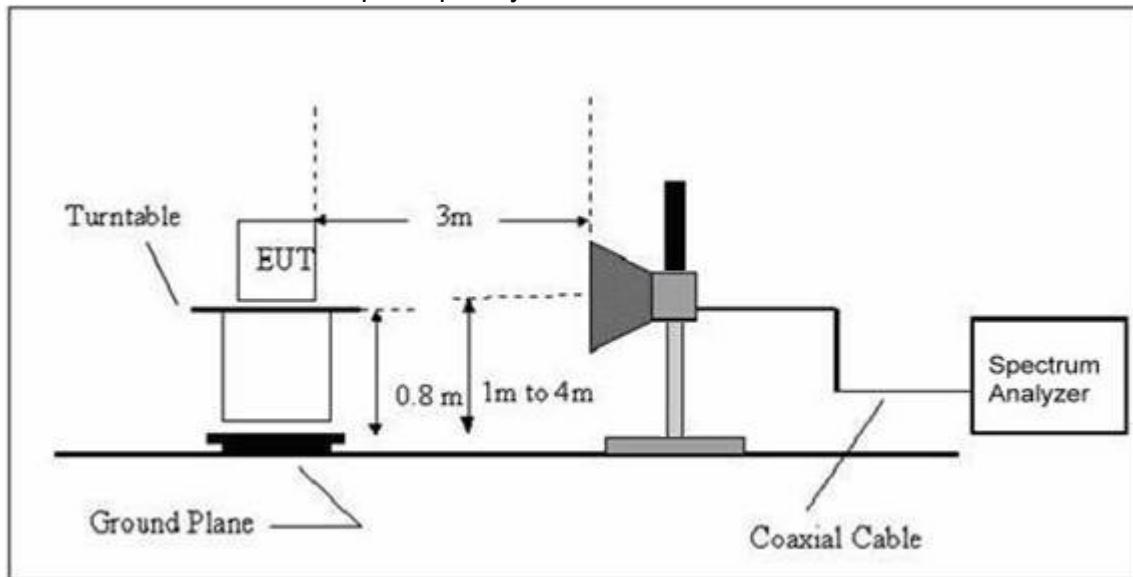




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 18 of 48 -

(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-2014SZ1201017F
- Page 19 of 48 -

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Bluetooth Smart	Model Name. :	RE413
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3V
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.



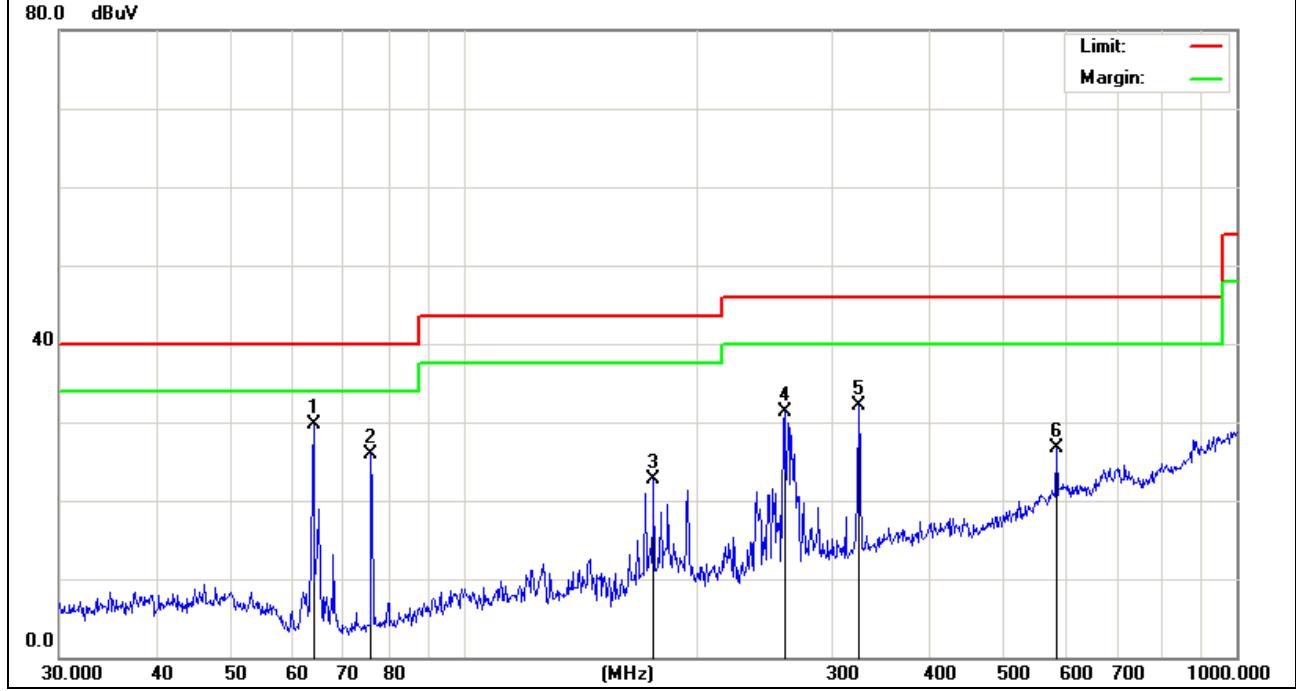
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Report No. ATT-2014SZ1201017F
- Page 20 of 48 -

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	H
Test Voltage :	DC 3V	Test Mode :	TX 2402

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
63.9827	47.39	-17.66	29.73	40	-10.27	QP
75.9771	44.87	-18.88	25.99	40	-14.01	QP
176.2684	35.09	-12.48	22.61	43.5	-20.89	QP
260.1444	42.06	-10.83	31.23	46	-14.77	QP
324.456	40.77	-8.75	32.02	46	-13.98	QP
584.7894	29.12	-2.41	26.71	46	-19.29	QP



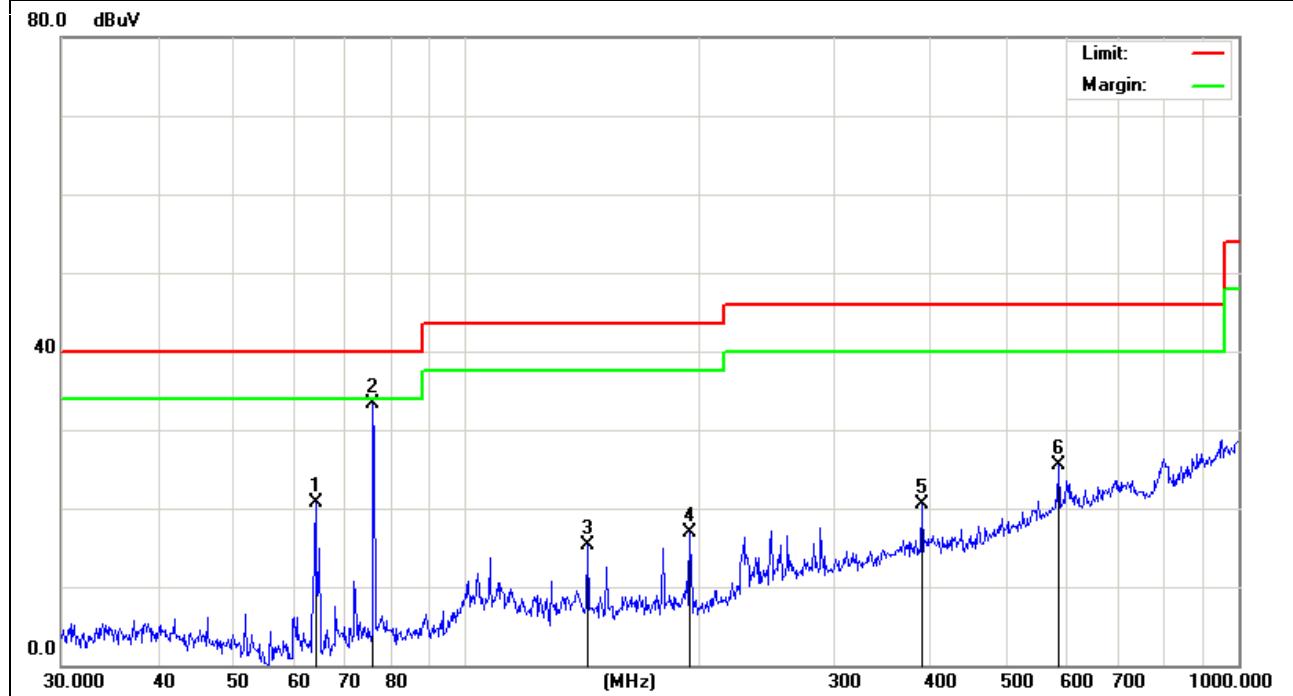


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Report No. ATT-2014SZ1201017F
- Page 21 of 48 -

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	V
Test Voltage :	DC 3V	Test Mode :	TX 2402

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
						QP
63.9827	47.39	-17.66	29.73	40	-10.27	QP
75.9771	52.42	-19.18	33.24	40	-6.76	QP
143.8293	31.19	-15.86	15.33	43.5	-28.17	QP
195.1365	31.57	-14.6	16.97	43.5	-26.53	QP
389.3548	27.89	-7.34	20.55	46	-25.45	QP
584.7894	28	-2.41	25.59	46	-20.41	QP



Note: "TX2402" mode is the worst mode.



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Report No. ATT-2014SZ1201017F
- Page 22 of 48 -

3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	H
Test Voltage :	DC 3V	Test Mode :	TX 2402

Note: no found above 18g, so test recorded up to 18g.





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Report No. ATT-2014SZ1201017F
- Page 23 of 48 -

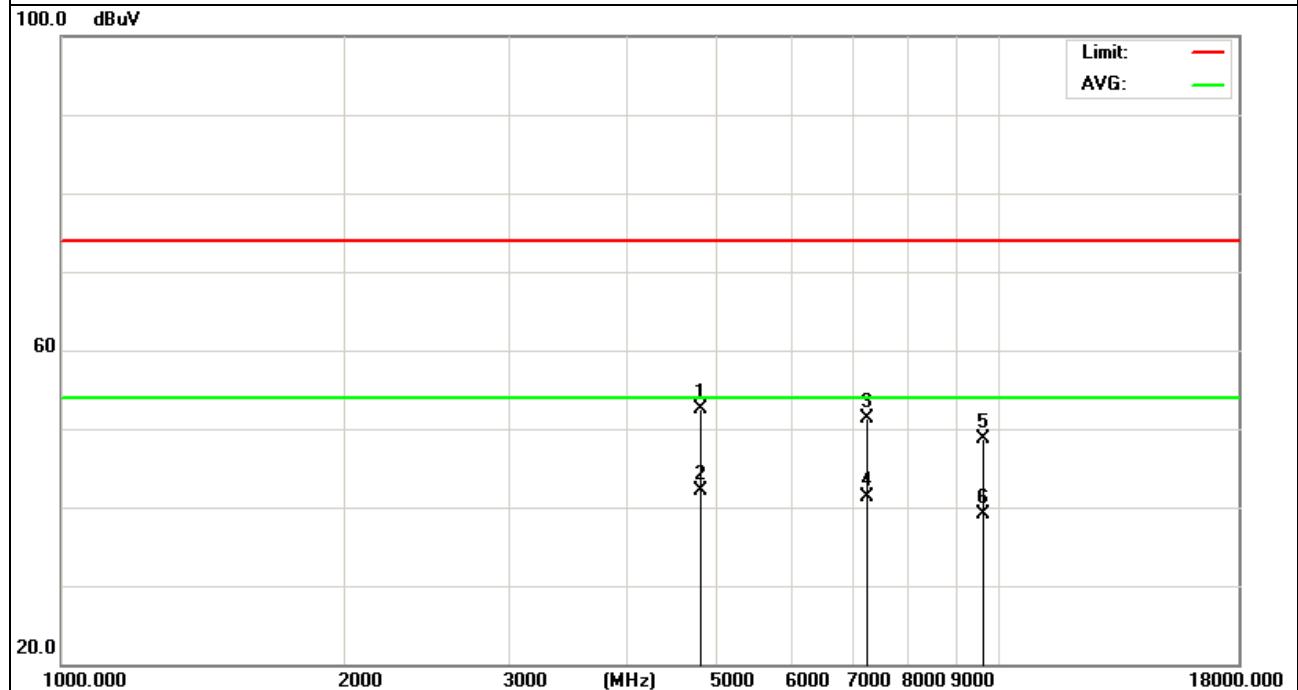
EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	V
Test Voltage :	DC 3V	Test Mode :	TX 2402

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
4804	47.39	5.06	52.45	74	-21.55	peak
4804	37.12	5.06	42.18	54	-11.82	AVG
7206	44.21	7.03	51.24	74	-22.76	peak
7206	34.35	7.03	41.38	54	-12.62	AVG
9608	38.12	10.63	48.75	74	-25.25	peak
9608	28.46	10.63	39.09	54	-14.91	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 24 of 48 -

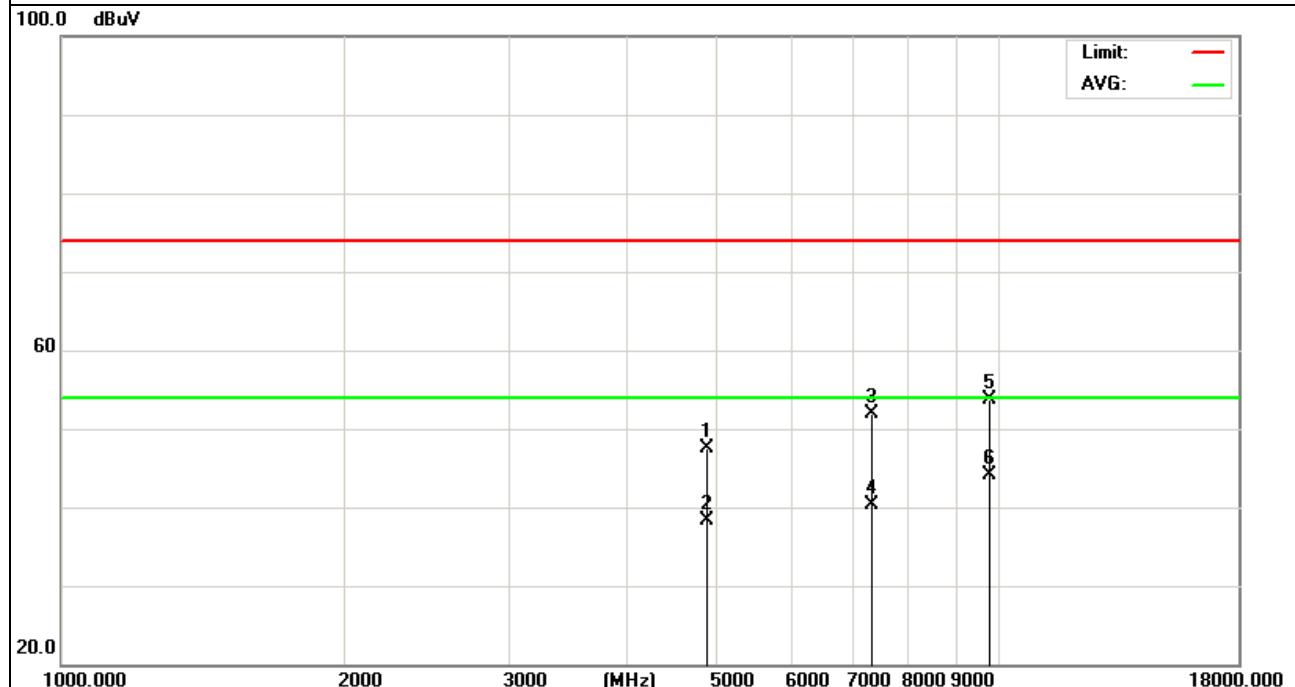
EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	H
Test Voltage :	DC 3V	Test Mode :	TX 2442

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
4884	42.28	5.14	47.42	74	-26.58	peak
4884	33.2	5.14	38.34	54	-15.66	AVG
7326	44.41	7.55	51.96	74	-22.04	peak
7326	32.8	7.55	40.35	54	-13.65	AVG
9768	42.35	11.4	53.75	74	-20.25	peak
9768	32.69	11.4	44.09	54	-9.91	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.



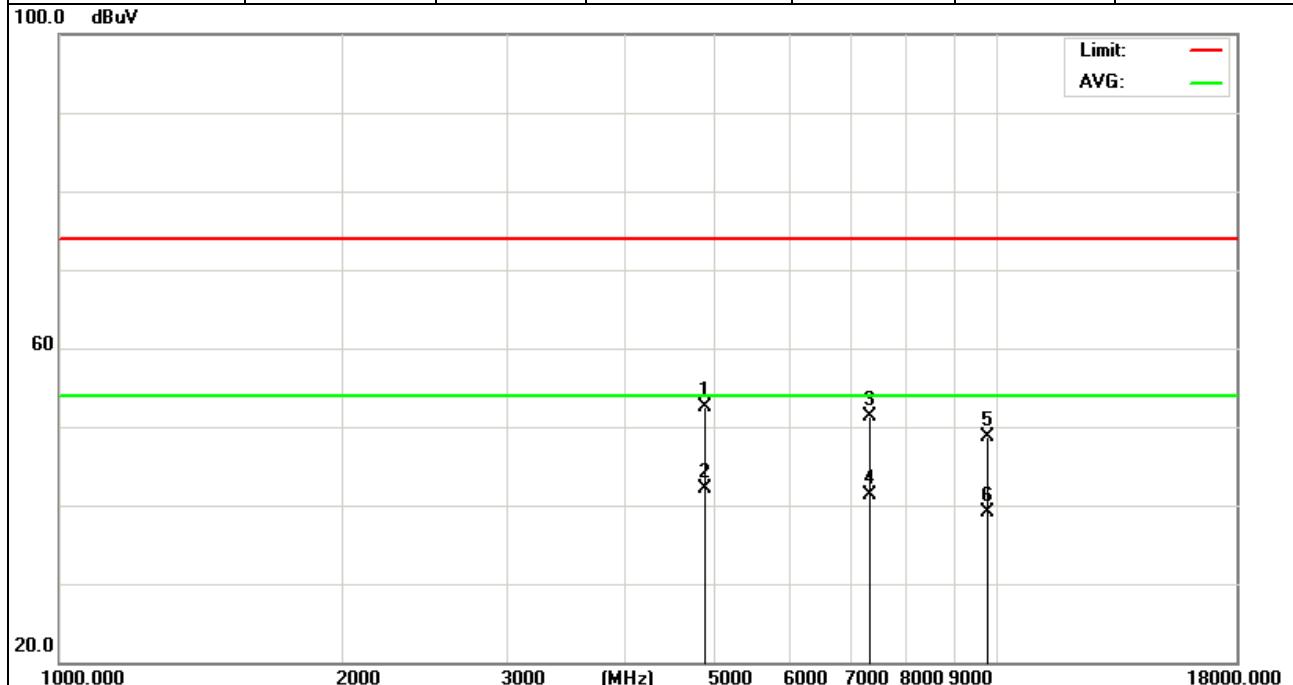


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 25 of 48 -

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	V
Test Voltage :	DC 3V	Test Mode :	TX 2442

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
4884	47.58	5.14	52.72	74	-21.28	peak
4884	36.74	5.14	41.88	54	-12.12	AVG
7326	43.12	7.55	50.67	74	-23.33	peak
7326	33.58	7.55	41.13	54	-12.87	AVG
9768	37.66	11.4	49.06	74	-24.94	peak
9768	27.48	11.4	38.88	54	-15.12	AVG





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 26 of 48 -

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	H
Test Voltage :	DC 3V	Test Mode :	TX 2480

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
4960	43.13	5.22	48.35	74	-25.65	
4960	34.58	5.22	39.8	54	-14.2	AVG
7440	40.2	8.06	48.26	74	-25.74	peak
7440	34.47	8.06	42.53	54	-11.47	AVG
9920	40.28	12.1	52.38	74	-21.62	peak
9920	29.09	12.1	41.19	54	-12.81	AVG



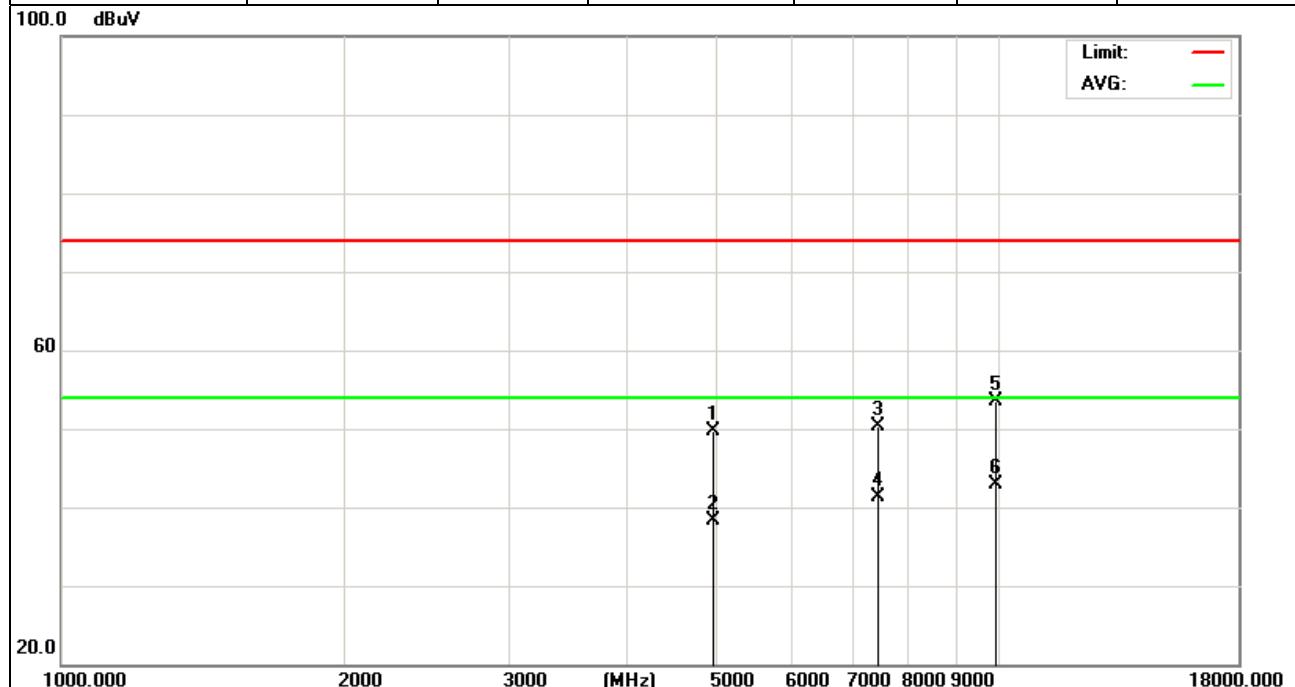


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 27 of 48 -

EUT :	Bluetooth Smart	Model Name. :	RE413
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Polarization :	V
Test Voltage :	DC 3V	Test Mode :	TX 2480

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector Type
4960	44.56	5.22	49.78	74	-24.22	
4960	33.12	5.22	38.34	54	-15.66	AVG
7440	42.24	8.06	50.3	74	-23.7	peak
7440	33.31	8.06	41.37	54	-12.63	AVG
9920	41.32	12.1	53.42	74	-20.58	peak
9920	30.76	12.1	42.86	54	-11.14	AVG



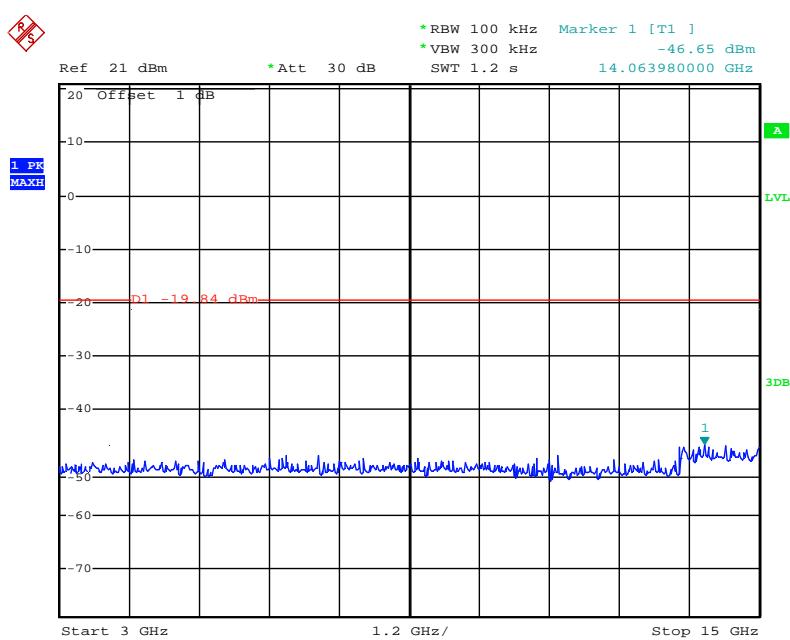
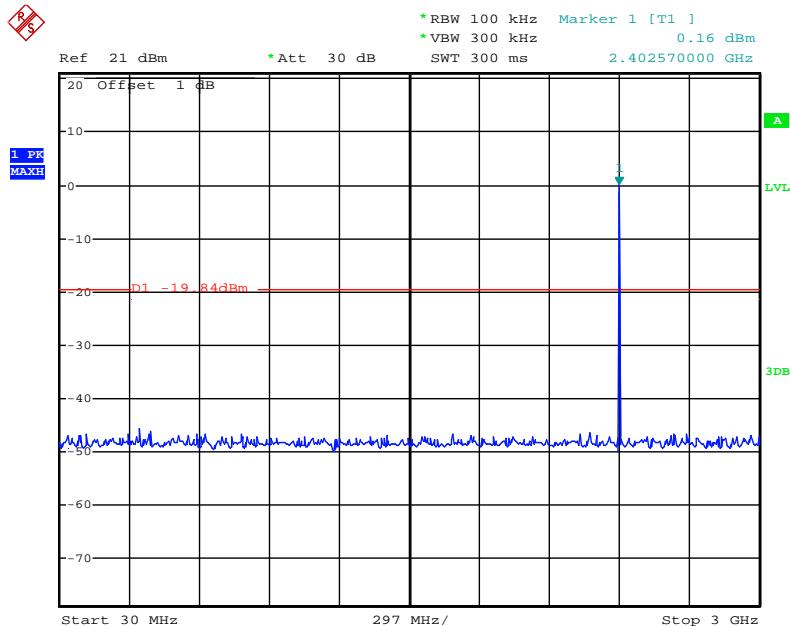


Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 28 of 48 -

Conducted Spurious Emissions at Antenna Port:

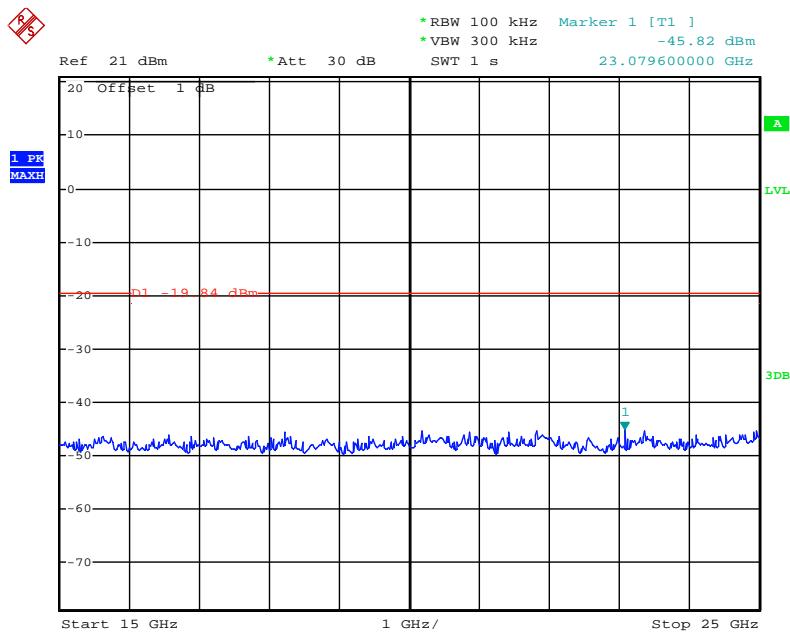
Low Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 29 of 48 -

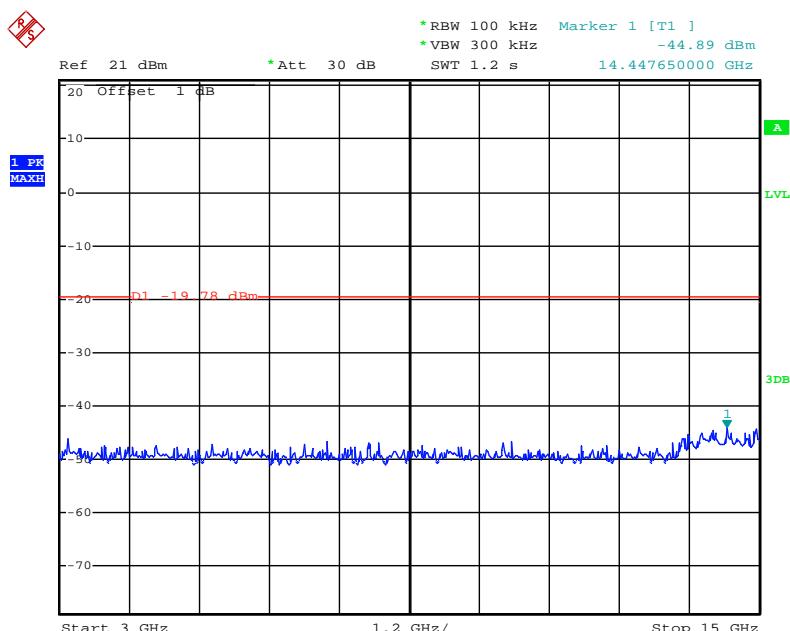
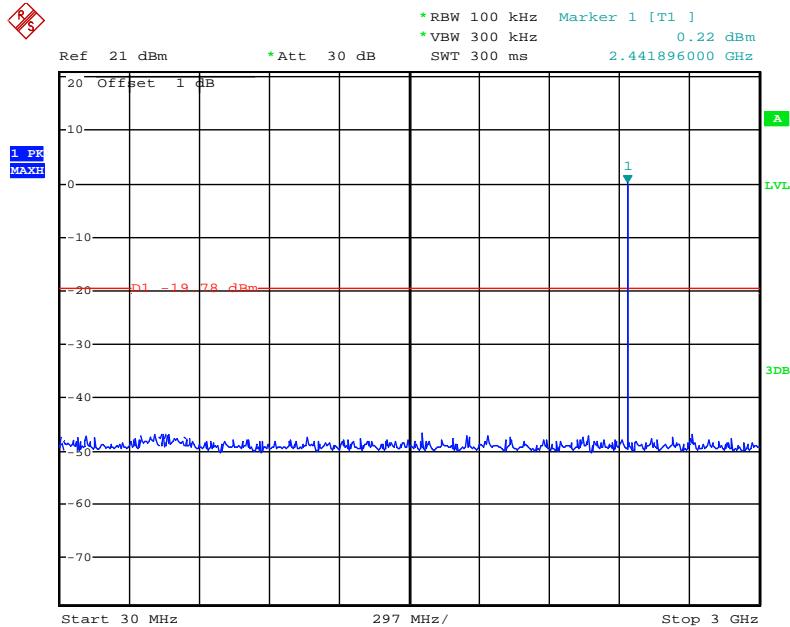




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 30 of 48 -

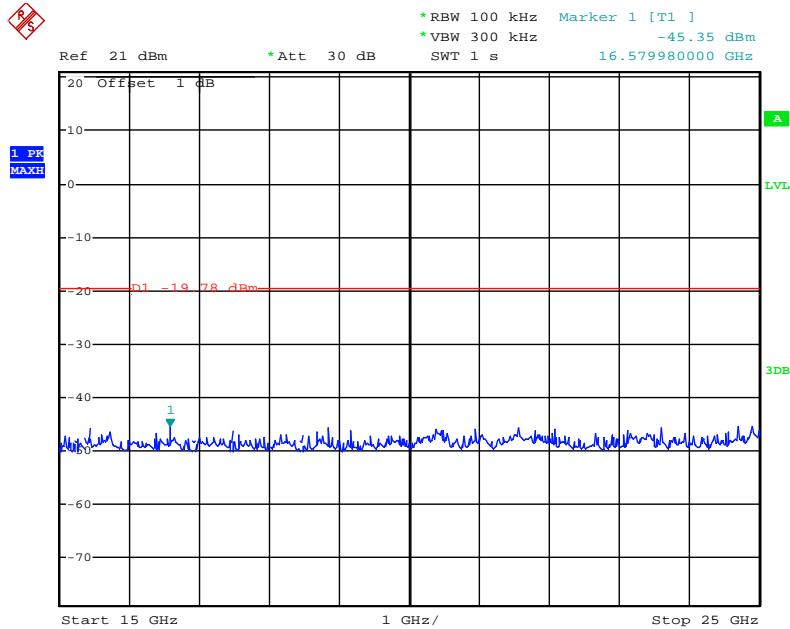
Middle Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 31 of 48 -

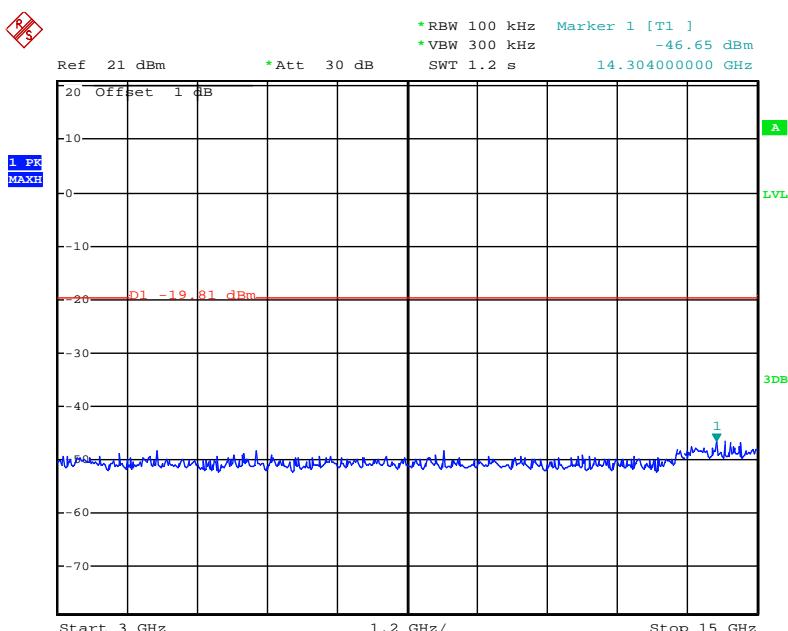
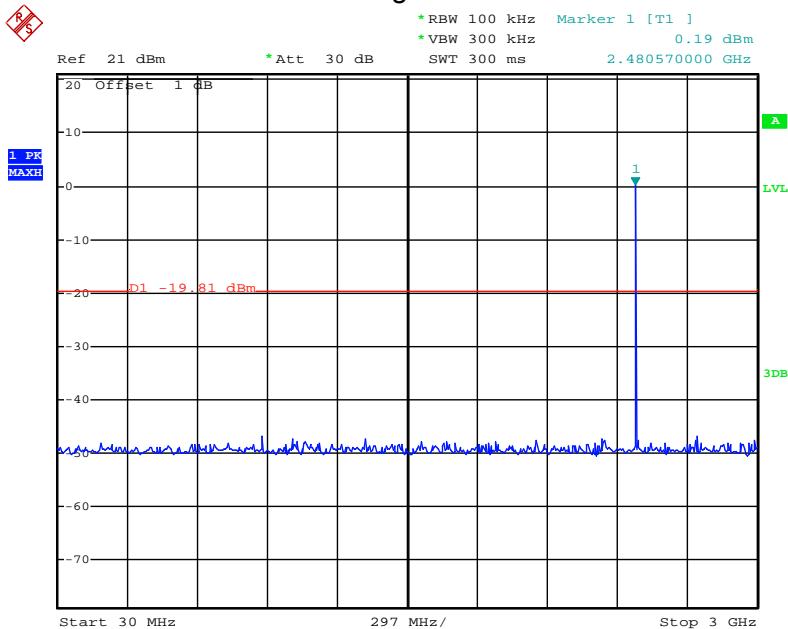




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 32 of 48 -

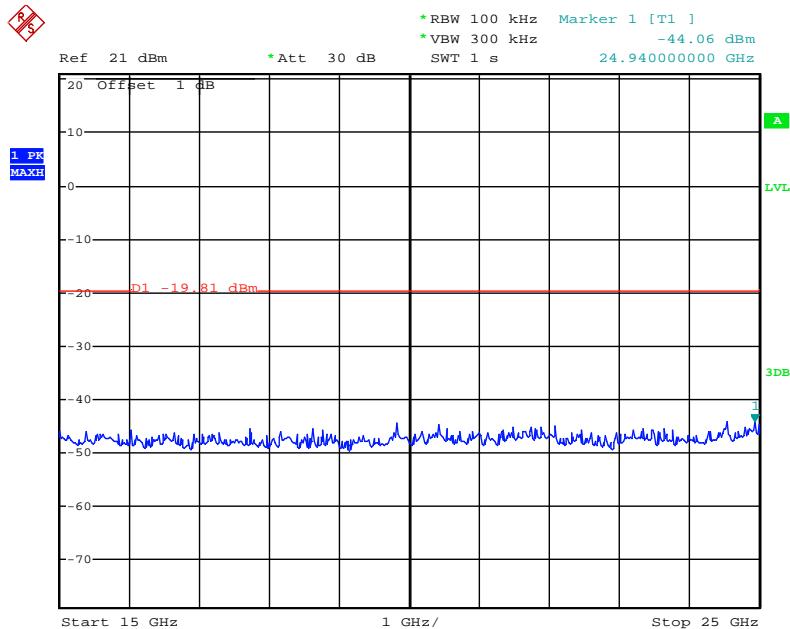
High Channel





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 33 of 48 -





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 34 of 48 -

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C&A8.2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247&A8.2	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

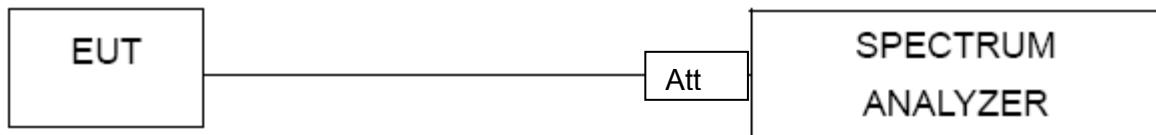
4.1.1 TEST PROCEDURE

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.



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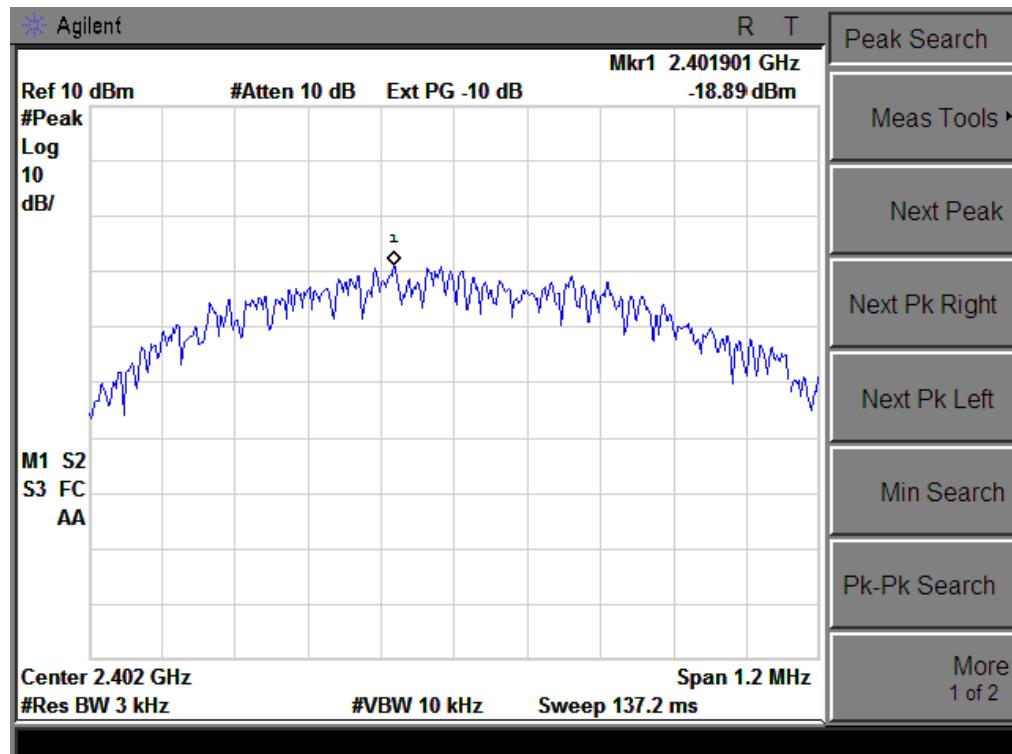
Report No. ATT-2014SZ1201017F
- Page 35 of 48 -

4.1.5 TEST RESULTS

EUT :	Bluetooth Smart	Model Name :	RE413
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3V
Test Mode :	TX Mode /CH00, CH19, CH39		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2402 MHz	-18.89	8	PASS
2440 MHz	-18.82	8	PASS
2480 MHz	-18.76	8	PASS

TX CH00

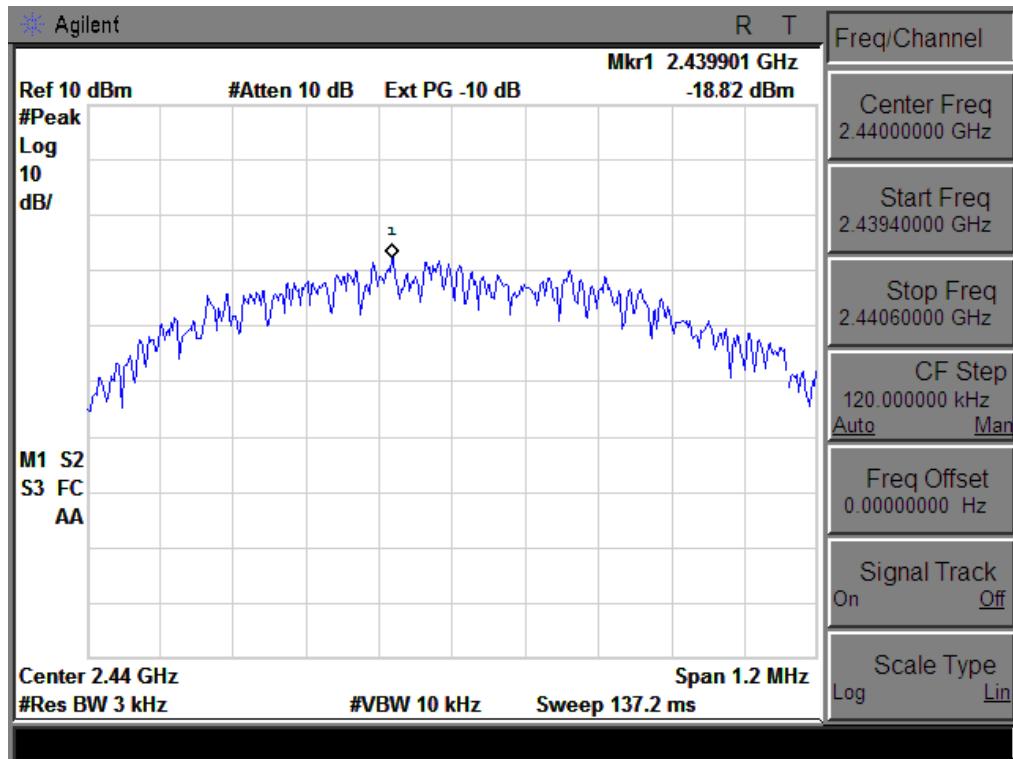




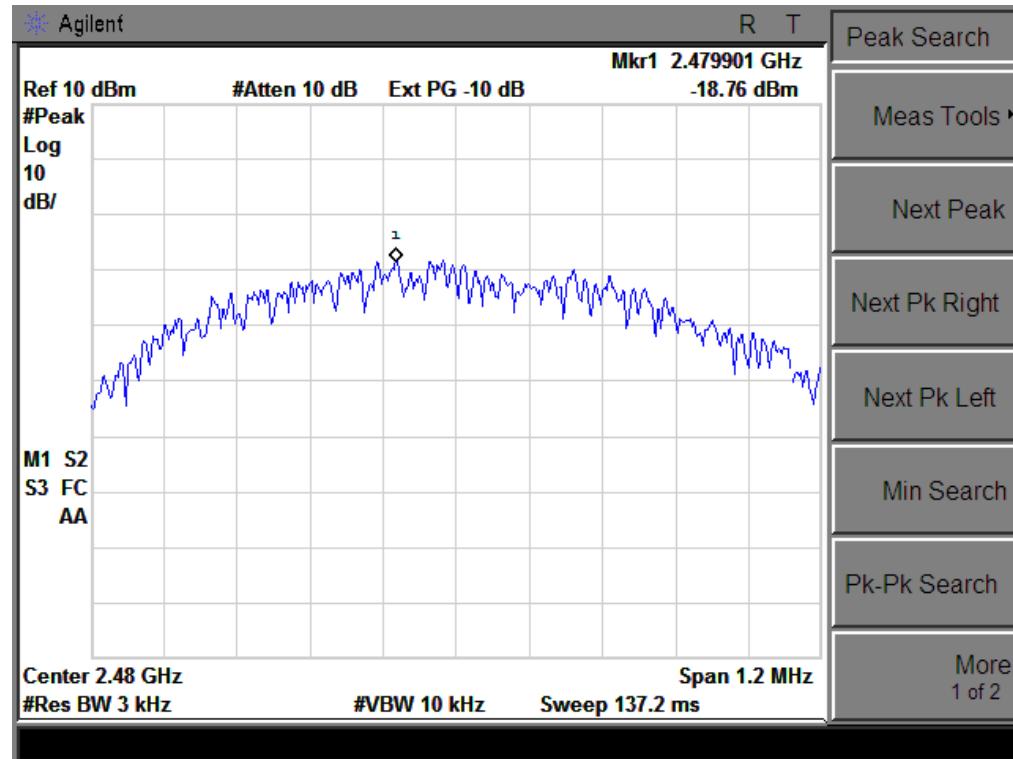
Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 36 of 48 -

TX CH19



TX CH39





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 37 of 48 -

5. BANDWIDTH TEST

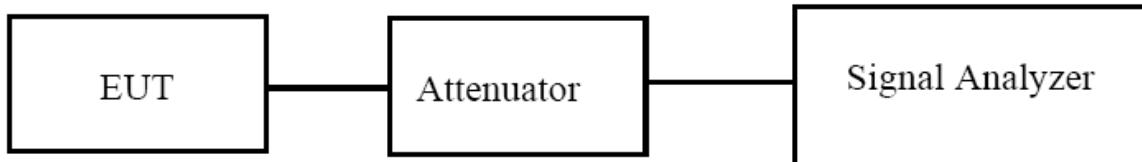
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C&A8.2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2) &A8.2	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

According to KDB 558074 D02 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.



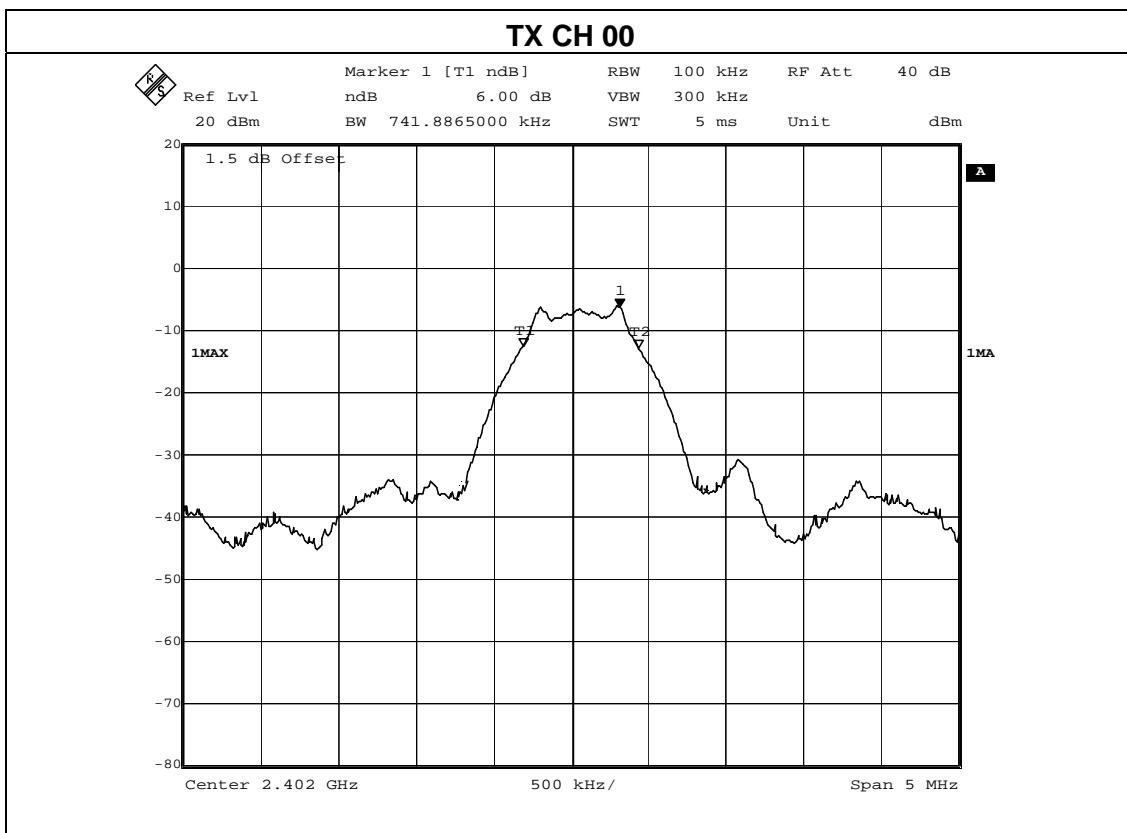
Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 38 of 48 -

5.1.3 TEST RESULTS

EUT :	Bluetooth Smart	Model Name :	RE413
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3V
Test Mode :	TX Mode /CH00, CH19, CH39		

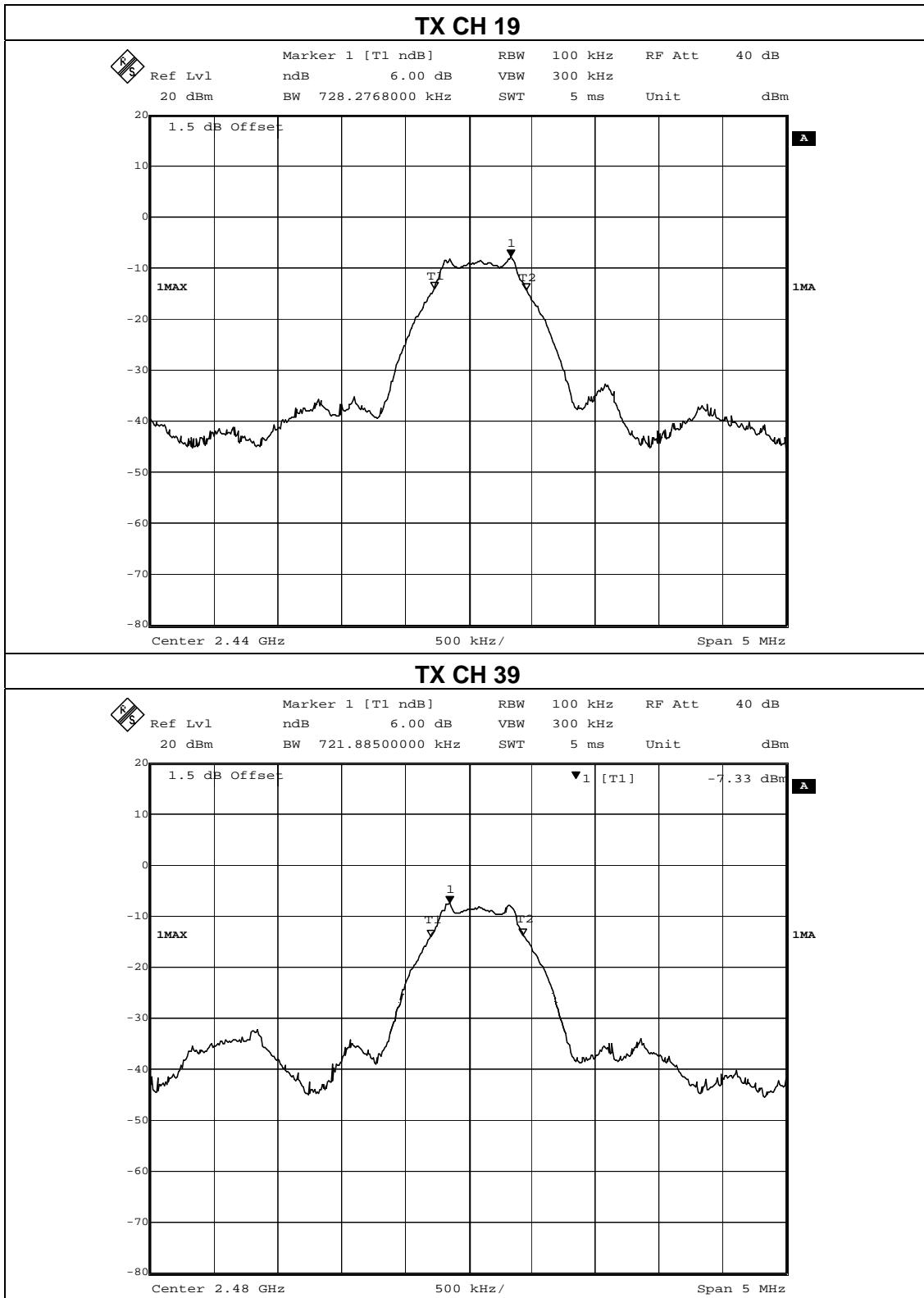
Channel	Frequency (MHz)	6dB bandwidth (kHz)	Limit (kHz)	Result
Low	2402	741.887	>500	Pass
Middle	2440	728.277	>500	Pass
High	2480	721.885	>500	Pass





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 39 of 48 -





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 40 of 48 -

6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C &A8.4				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) &A8.4	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.

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-2014SZ1201017F
- Page 41 of 48 -

6.1.5 TEST RESULTS

EUT :	Bluetooth Smart	Model Name :	RE413
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3V
Test Mode :	TX Mode		

TX Mode				
Test Channel	Frequency (MHz)	Maximum	Conducted Output Power (PK)	LIMIT
		(dBm)	(dBm)	(dBm)
CH00	2402	0.25		30
CH19	2440	0.28		30
CH39	2480	0.24		30



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 42 of 48 -

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)&A1.1 is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a)&A8.5, must also comply with the radiated emission limits specified in §15.209(a) &A1.1 (see §15.205(c)) &A8.5.

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

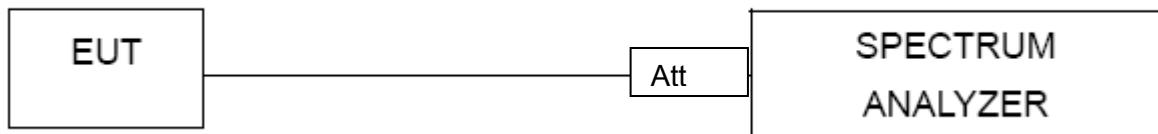
No deviation.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 43 of 48 -

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-2014SZ1201017F
- Page 44 of 48 -

7.4 TEST RESULTS

EUT :	Bluetooth Smart	Model Name :	RE413
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3V

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
Left-band	44.74	20	Pass
Right-band	45.44	20	Pass

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type	Comment
2390	63.42	-13.06	50.36	74	-23.64	peak	Vertical
2390	64.83	-13.06	51.77	74	-22.23	peak	Horizontal
2483.5	66.88	-12.78	54.1	74	-19.9	peak	Vertical
2483.5	55.33	-12.78	42.55	54	-11.45	AV	Vertical
2483.5	64.37	-12.78	51.59	74	-22.41	peak	Horizontal

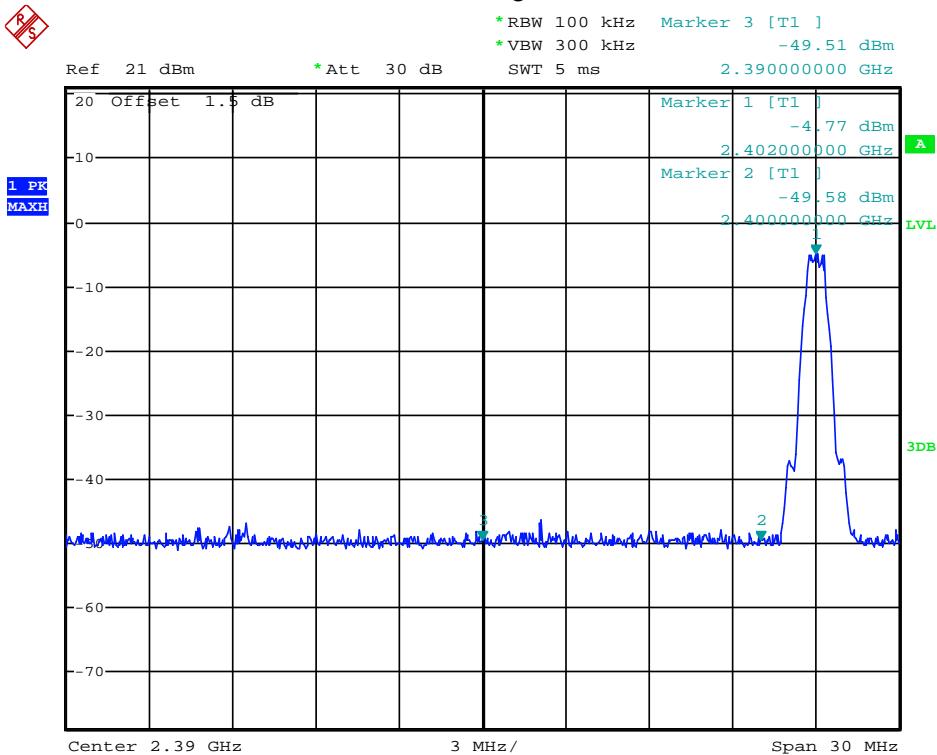
Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average not record.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 45 of 48 -

Band Edge, Left Side

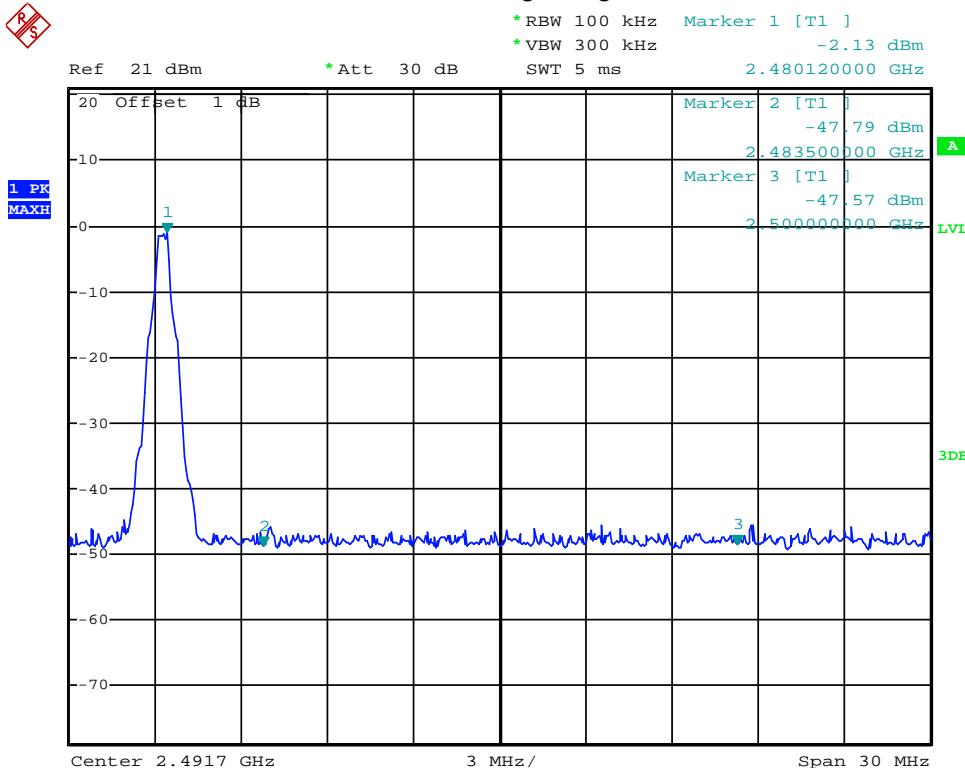




Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 46 of 48 -

Band Edge, Right Side





Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 47 of 48 -

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 Built-in antenna. It comply with the standard requirement.



Shenzhen Asia Test Technology Co., Ltd.

Report No. ATT-2014SZ1201017F
- Page 48 of 48 -

9. EUT TEST PHOTO

Radiated Measurement Photos

