

FCC RADIO TEST REPORT-BLE FCC ID:2AGUJ-BM5510

Product: Fingerprint smart terminal

Trade Name: A Aracek

Model Name: BM5510

Serial Model: BM5500, BM5520, BM5530, BM5510

Report No.: NTEK-2015NT1126170F2

Prepared for

ShenZhen Aratek Biometrics Technology Co.,Ltd.

2F,T2-A Building,ShenZhen Software Park,South Area,Hi-Tech
Park,ShenZhen,Guangdong,China

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen P.R. China

Tel.: +86-0755-61156588 Fax.: +86-0755-61156599 Website:www.ntek.org.cn



TEST RESULT CERTIFICATION

Report No.: NTEK-2015NT1126170F2

Address Manufacture's Name	2F,T2-A Building Park,ShenZhen ShenZhen Aratel 2F,T2-A Building	k Biometrics Technology Co.,Ltd. g,ShenZhen Software Park,South Area,Hi-Tech n,Guangdong,China k Biometrics Technology Co.,Ltd. g,ShenZhen Software Park,South Area,Hi-Tech n,Guangdong,China
Product description		
Product name	Fingerprint smart	t terminal
Model and/or type reference	BM5510	
Serial Model	BM5500, BM552	20, BM5530, BM5510
Standards	FCC Part15.247:	: 01 Oct. 2015
Test procedure	ANSI C63.10-20	13 and KDB 558074: June 5, 2014
	UT) is in compliar	sted by NTEK, and the test results show that the nce with the FCC requirements. And it is applicable only rt.
•		ot in full, without the written approval of NTEK, this TEK, personnel only, and shall be noted in the revision of
Date of Test	:	
		26 Nov. 2015 ~02 Dec. 2015
Date of Issue	:	02 Dec. 2015
Test Result	:	Pass
Testing	g Engineer :	Eileen Wu.
		(Eileen Liu)
Techni	cal Manager :	Brown Ln
		(Brown Lu)
Author	ized Signatory:	Sam. Chew
		(Sam Chen)

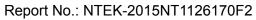
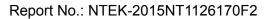




Table of Contents

	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 TESTER	D 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 3.1.3 DEVIATION FROM TEST STANDARD	14 14
3.1.3 DEVIATION FROM TEST STANDARD 3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	23
3.2.1 RADIATED EMISSION LIMITS	23
3.2.2 TEST PROCEDURE 3.2.3 DEVIATION FROM TEST STANDARD	24 24
3.2.4 TEST SETUP	24 25
3.2.5 EUT OPERATING CONDITIONS	26
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	27
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	28
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	30
4 . POWER SPECTRAL DENSITY TEST	31
4.1 APPLIED PROCEDURES / LIMIT	31
4.1.1 TEST PROCEDURE 4.1.2 DEVIATION FROM STANDARD	31 31
4.1.3 TEST SETUP	31 31
4.1.4 EUT OPERATION CONDITIONS	31
4.1.5 TEST RESULTS	32
5 . BANDWIDTH TEST	34
5.1 APPLIED PROCEDURES / LIMIT	34
5.1.1 TEST PROCEDURE	34





Гэ	h	ما	Λf	C_{Δ}	nto	nts
ıa	v	16	UI	CU	HE	III

rable of contents	Page
TEST SETUP 5.1.2 EUT OPERATION CONDITIONS 5.1.3 TEST RESULTS	34 34 35
6 . PEAK OUTPUT POWER TEST	37
6.1 APPLIED PROCEDURES / LIMIT	37
6.1.1 TEST PROCEDURE 6.1.2 DEVIATION FROM STANDARD 6.1.3 TEST SETUP 6.1.4 EUT OPERATION CONDITIONS 6.1.5 TEST RESULTS	37 37 37 37 38
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE 7.1 DEVIATION FROM STANDARD 7.2 TEST SETUP 7.3 EUT OPERATION CONDITIONS 7.4 TEST RESULTS	39 39 39 39 40
8 . ANTENNA REQUIREMENT	42
8.1 STANDARD REQUIREMENT	42
8.2 EUT ANTENNA	42
9 . EUT TEST PHOTO APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	43



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C				
Standard Section	Test Item	Judgment	Remark	
15.207	Conducted Emission	PASS		
15.247 (a)(2)	6dB Bandwidth	PASS		
15.247 (b)	Peak Output Power	PASS		
15.247 (c)	Radiated Spurious Emission	PASS		
15.247 (d)	Power Spectral Density	PASS		
15.205	Band Edge Emission	PASS		
15.203	Antenna Requirement	PASS		

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd

Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

Report No.: NTEK-2015NT1126170F2

FCC Registration No.:238937; IC Registration No.:9270A-1

CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Fingerprint smart tern	ninal	
Trade Name	₽ Δraιek		
Model Name	BM5510		
Serial Model	BM5500, BM5520, BI	M5530, BM5510	
Model Difference	except the model nan		
	The EUT is a Fingerp Operation Frequency:	2402~2480MHz	
	Modulation Type:	GFSK	
	Number Of Channel	40CH	
Product Description	Antenna Designation:	Please see Note 3.	
	Antenna Gain (dBi)	1.0dBi	
	Based on the application, features, or specification exh User's Manual, the EUT is considered as an ITE/Comp Device. More details of EUT technical specification, ple refer to the User's Manual.		
Channel List	Please refer to the Note 2.		
Ratings	DC 3.7V		
Adapter	Mode:K-E30502000U1 Input: 100-240V~, 50/60Hz, 0.35A Max Output: 5V===, 2000mA		
Battery	DC 3.7V, 10000mAh		
Connecting I/O Port(s)	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
Channer	Frequency (MHz)
00	2402
01	2404
•••••	
	·····.
•••	•••
38	2478
39	2480

Page 8 of 44

3

Table for Filed Antenna

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

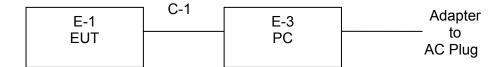


2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test 1



Conducted Emission Test 2



Radiated Spurious Emission Test

E-1 EUT



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	Fingerprint smart terminal	<i>A</i> ∆racek	BM5510	N/A	EUT
E-2	ADAPTER	N/A	BM5510	N/A	
E-3	PC	lenovo	Y43p	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2m	

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 <code>"Length_"</code> column.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibratio n period
1	Spectrum Analyzer	Agilent	E4407B	MY4510804 0	2015.07.06	2016.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2015.07.06	2016.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	620026441 6	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	EM	EM-AH-101 80	2011071402	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619. 05	2015.07.06	2016.07.05	1 year

Conduction Test equipment

00110	editadetion rest equipment							
Item	Kind of Equipment	Manufactu rer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period	
1	Test Receiver	R&S	ESCI	101160	2015.06.06	2016.06.05	1 year	
2	LISN	R&S	ENV216	101313	2015.08.24	2016.08.23	1 year	
3	LISN	EMCO	3816/2	00042990	2015.08.24	2016.08.23	1 year	
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year	
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06	1 year	
6	Absorbing clamp	R&S	MOS-21	100423	2015.06.08	2016.06.07	1 year	

_									
	1	Attenuation	MCE	24-10-34	BN9258	2015 06 08	2016 06 07	1 year	



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

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

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

Note:

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

The following table is the setting of the receiver

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



3.1.2 TEST PROCEDURE

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.

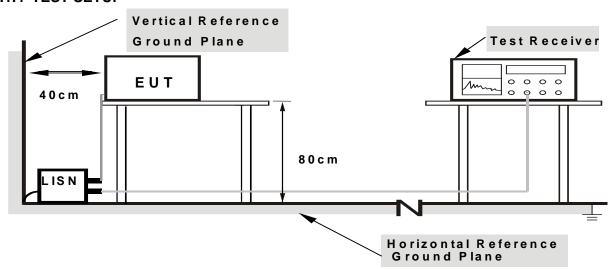
Report No.: NTEK-2015NT1126170F2

- 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 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

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



3.1.6 TEST RESULTS

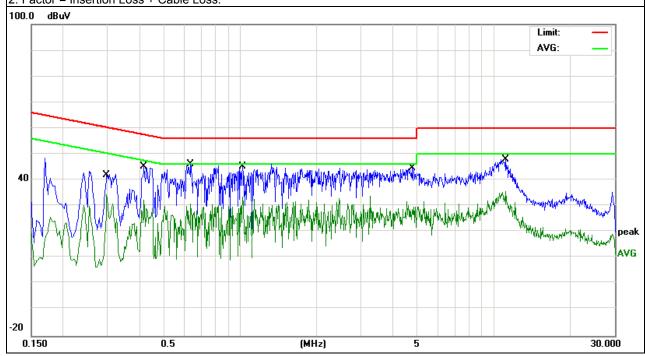
EUT:	Fingerprint smart terminal	Model Name. :	BM5510
Temperature:	26 ℃	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
TASI VOHADA .	DC 5.0V form Adapter AC 120V/60Hz	Test Mode:	Mode 4

Page 15 of 44

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.2979	32.91	9.44	42.35	60.30	-17.95	QP
0.2979	24.91	9.44	34.35	50.30	-15.95	AVG
0.4179	35.73	9.44	45.17	57.49	-12.32	QP
0.4179	22.93	9.44	32.37	47.49	-15.12	AVG
0.6380	36.70	9.44	46.14	56.00	-9.86	QP
0.6380	21.37	9.44	30.81	46.00	-15.19	AVG
1.0220	35.86	9.44	45.30	56.00	-10.70	QP
1.0220	24.01	9.44	33.45	46.00	-12.55	AVG
4.7499	35.27	9.48	44.75	56.00	-11.25	QP
4.7499	22.41	9.48	31.89	46.00	-14.11	AVG
11.1499	38.39	9.70	48.09	60.00	-11.91	QP
11.1499	26.08	9.70	35.78	50.00	-14.22	AVG

Remark:

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

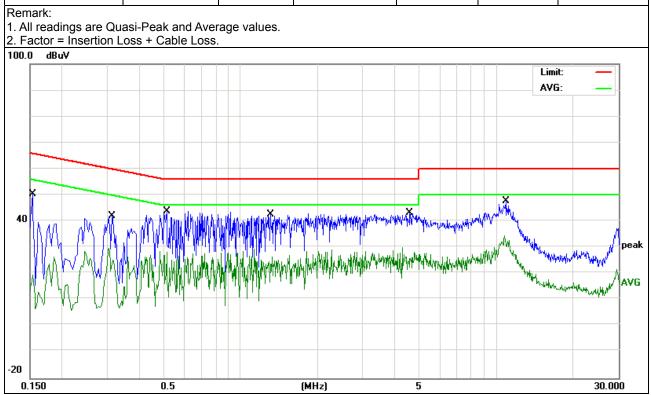




EUT:	Fingerprint smart terminal	Model Name. :	BM5510
Temperature :	26 ℃	Relative Humidity:	56%
Pressure :	1010hPa	Phase :	N
TIEST VOUZOE .	DC 5.0V form Adapter AC 120V/60Hz	Test Mode :	Mode 4

Page 16 of 44

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Domark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1539	40.98	9.46	50.44	65.78	-15.34	QP
0.1539	16.94	9.46	26.40	55.78	-29.38	AVG
0.3140	32.41	9.44	41.85	59.86	-18.01	QP
0.3140	20.22	9.44	29.66	49.86	-20.20	AVG
0.5140	34.27	9.46	43.73	56.00	-12.27	QP
0.5140	18.87	9.46	28.33	46.00	-17.67	AVG
1.3060	32.96	9.45	42.41	56.00	-13.59	QP
1.3060	20.02	9.45	29.47	46.00	-16.53	AVG
4.5777	33.63	9.48	43.11	56.00	-12.89	QP
4.5777	20.39	9.48	29.87	46.00	-16.13	AVG
10.8819	37.84	9.69	47.53	60.00	-12.47	QP
10.8819	24.65	9.69	34.34	50.00	-15.66	AVG





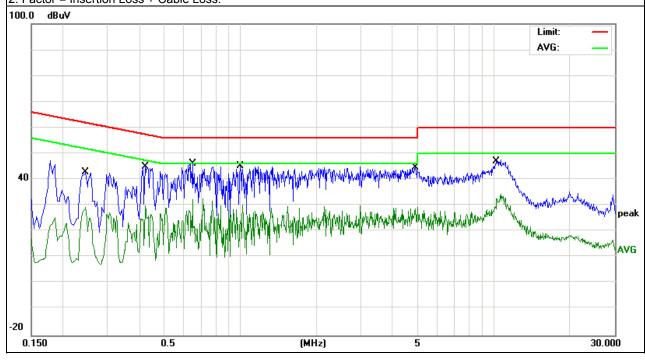
EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	L
	DC 5.0V from adapter AC 240V/60Hz	Test Mode:	Mode 4

Page 17 of 44

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.2459	33.32	9.50	42.82	61.89	-19.07	QP
0.2459	19.95	9.50	29.45	51.89	-22.44	AVG
0.4219	35.62	9.25	44.87	57.41	-12.54	QP
0.4219	20.57	9.25	29.82	47.41	-17.59	AVG
0.6500	36.55	9.57	46.12	56.00	-9.88	QP
0.6500	22.76	9.57	32.33	46.00	-13.67	AVG
1.0020	35.60	9.56	45.16	56.00	-10.84	QP
1.0020	20.60	9.56	30.16	46.00	-15.84	AVG
4.9019	34.88	9.68	44.56	56.00	-11.44	QP
4.9019	19.68	9.68	29.36	46.00	-16.64	AVG
10.1659	36.45	9.74	46.19	60.00	-13.81	QP
10.1659	24.65	9.74	34.39	50.00	-15.61	AVG

Remark:

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





Page 18 of 44

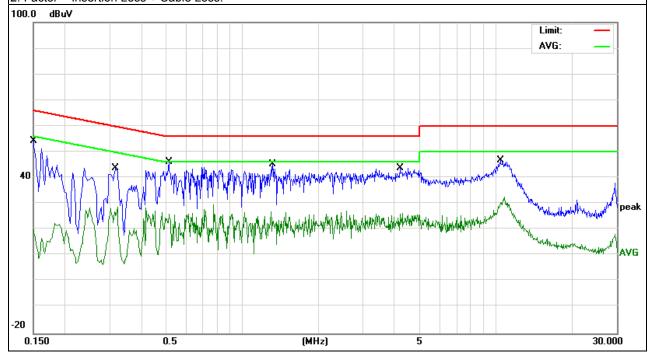
	-	_	
EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
TEST VOULAGE	DC 5.0V from adapter AC 240V/60Hz	Test Mode :	Mode 4

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Domork
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1500	44.64	9.49	54.13	65.99	-11.86	QP
0.1500	12.82	9.49	22.31	55.99	-33.68	AVG
0.3180	34.18	9.50	43.68	59.76	-16.08	QP
0.3180	19.22	9.50	28.72	49.76	-21.04	AVG
0.5140	36.51	9.55	46.06	56.00	-9.94	QP
0.5140	16.97	9.55	26.52	46.00	-19.48	AVG
1.3220	35.58	9.57	45.15	56.00	-10.85	QP
1.3220	17.43	9.57	27.00	46.00	-19.00	AVG
4.1939	34.14	9.66	43.80	56.00	-12.20	QP
4.1939	16.79	9.66	26.45	46.00	-19.55	AVG
10.4419	36.91	9.75	46.66	60.00	-13.34	QP
10.4419	22.95	9.75	32.70	50.00	-17.30	AVG

Remark:

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

2. Factor = Insertion Loss + Cable Loss.

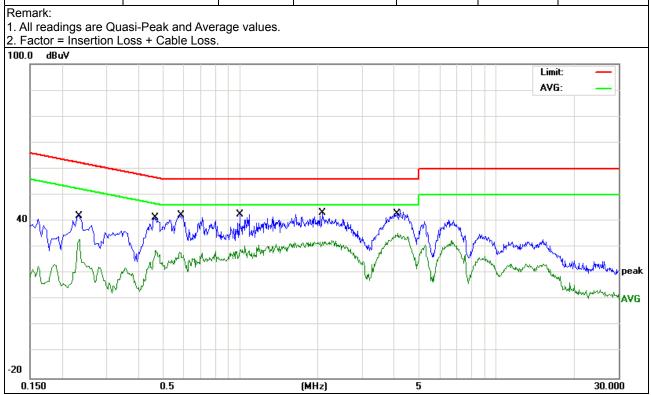




Page 19 of 44

EUT:	Fingerprint smart terminal	Model Name. :	BM5510
Temperature :	26 ℃	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
LIEST VOITAGE .	DC 5.0V form PC AC 120V/60Hz	Test Mode :	Mode 4

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Domark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.234	32.58	9.45	42.03	62.30	-20.27	QP
0.234	23.61	9.45	33.06	52.30	-19.24	AVG
0.466	32.03	9.45	41.48	56.58	-15.10	QP
0.466	19.21	9.45	28.66	46.58	-17.92	AVG
0.5859	32.84	9.45	42.29	56.00	-13.71	QP
0.5859	18.69	9.45	28.14	46.00	-17.86	AVG
0.994	33.07	9.44	42.51	56.00	-13.49	QP
0.994	21.00	9.44	30.44	46.00	-15.56	AVG
2.0899	33.64	9.46	43.10	56.00	-12.90	QP
2.0899	23.33	9.46	32.79	46.00	-13.21	AVG
4.1219	34.76	9.47	44.23	56.00	-11.77	QP
4.1219	25.80	9.47	35.27	46.00	-10.73	AVG

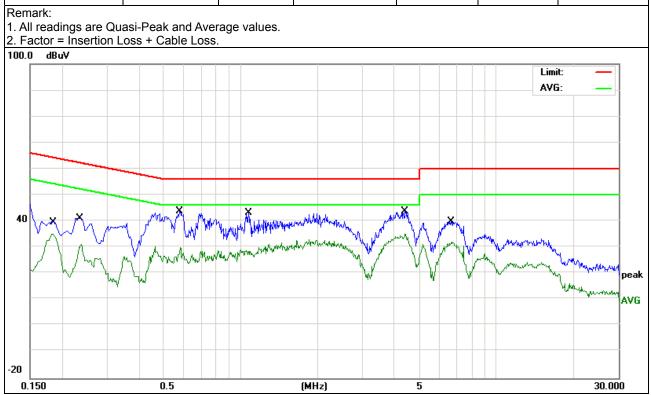




EUT:	Fingerprint smart terminal	Model Name. :	BM5510
Temperature :	26 ℃	Relative Humidity:	56%
Pressure :	1010hPa	Phase :	N
Liest Voltage :	DC 5.0V form PC AC 120V/60Hz	Test Mode :	Mode 4

Page 20 of 44

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1819	30.95	9.46	40.41	64.39	-23.98	QP
0.1819	25.58	9.46	35.04	54.39	-19.35	AVG
0.2379	31.72	9.45	41.17	62.17	-21.00	QP
0.2379	21.74	9.45	31.19	52.17	-20.98	AVG
0.5778	34.38	9.45	43.83	56.00	-12.17	QP
0.5778	20.46	9.45	29.91	46.00	-16.09	AVG
1.074	33.57	9.44	43.01	56.00	-12.99	QP
1.074	21.82	9.44	31.26	46.00	-14.74	AVG
4.3979	34.33	9.48	43.81	56.00	-12.19	QP
4.3979	25.47	9.48	34.95	46.00	-11.05	AVG
6.6699	30.30	9.51	39.81	60.00	-20.19	QP
6.6699	22.42	9.51	31.93	50.00	-18.07	AVG





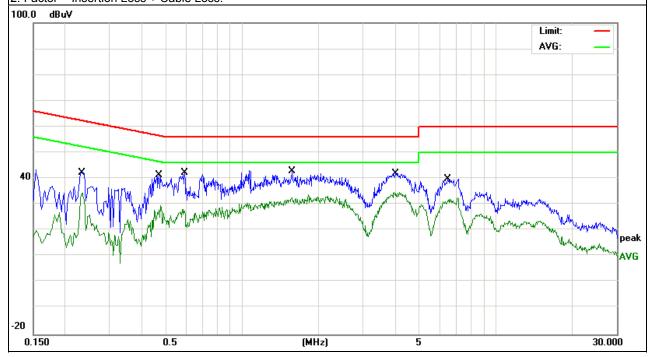
EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature:	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	L
LIAST VOITAGE	DC 5.0V from PC AC 240V/60Hz	Test Mode:	Mode 4

Page 21 of 44

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Damark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.2340	32.80	9.45	42.25	62.30	-20.05	QP
0.2340	25.10	9.45	34.55	52.30	-17.75	AVG
0.4698	31.94	9.45	41.39	56.52	-15.13	QP
0.4698	20.06	9.45	29.51	46.52	-17.01	AVG
0.5940	32.82	9.45	42.27	56.00	-13.73	QP
0.5940	18.71	9.45	28.16	46.00	-17.84	AVG
1.5700	33.35	9.45	42.80	56.00	-13.20	QP
1.5700	23.21	9.45	32.66	46.00	-13.34	AVG
3.9780	32.92	9.47	42.39	56.00	-13.61	QP
3.9780	25.31	9.47	34.78	46.00	-11.22	AVG
6.4818	30.41	9.50	39.91	60.00	-20.09	QP
6.4818	23.05	9.50	32.55	50.00	-17.45	AVG

Remark:

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





EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	N
LIEST VOITAGE .	DC 5.0V from PC AC 240V/60Hz	Test Mode :	Mode 4

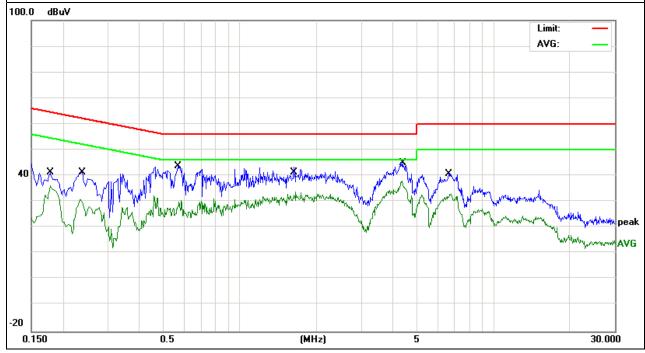
Page 22 of 44

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Damada
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.1779	32.01	9.46	41.47	64.58	-23.11	QP
0.1779	26.68	9.46	36.14	54.58	-18.44	AVG
0.2379	31.82	9.45	41.27	62.17	-20.90	QP
0.2379	21.28	9.45	30.73	52.17	-21.44	AVG
0.5699	34.41	9.45	43.86	56.00	-12.14	QP
0.5699	21.23	9.45	30.68	46.00	-15.32	AVG
1.6539	33.86	9.45	43.31	56.00	-12.69	QP
1.6539	24.32	9.45	33.77	46.00	-12.23	AVG
4.3499	35.89	9.48	45.37	56.00	-10.63	QP
4.3499	28.69	9.48	38.17	46.00	-7.83	AVG
6.7259	31.34	9.51	40.85	60.00	-19.15	QP
6.7259	23.48	9.51	32.99	50.00	-17.01	AVG

Remark:

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

2. Factor = Insertion Loss + Cable Loss.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

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

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(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 B (dBuV/m) (at 3M)		
	PEAK	AVERAGE	
Above 1000	74	54	

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting			
Attenuation	Auto			
Start Frequency	1000 MHz			
Stop Frequency	10th carrier harmonic			
RB / VB (emission in restricted	1 Mile / 1 Mile for Dook 1 Mile / 10/1-for Average			
band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average			

Receiver Parameter	Setting		
Attenuation	Auto		
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP		
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP		
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP		



3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

- b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

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

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

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth	
30 to 1000 QP		120 kHz	300 kHz	
	Peak	1 MHz	1 MHz	
Above 1000	Peak	1 MHz	10 Hz	

3.2.3 DEVIATION FROM TEST STANDARD

No deviation



3.2.4 TEST SETUP

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

Page 25 of 44

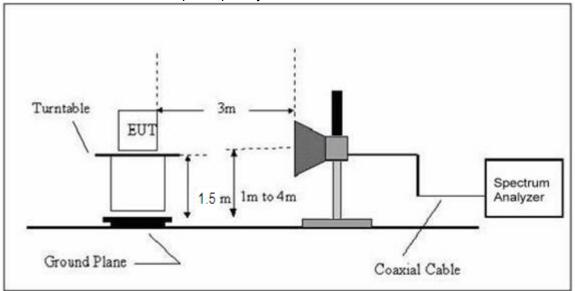


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



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

Page 26 of 44



3.2.5 EUT OPERATING CONDITIONS

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



3.2.6 TEST RESULTS (BETWEEN 9KHZ - 30 MHZ)

EUT:	Fingerprint smart terminal	Model Name. :	BM5510
Temperature:	20 ℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage:	DC 3.7V
Test Mode:	TX	Polarization :	

Report No.: NTEK-2015NT1126170F2

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				N/A
		1		N/A

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 (specific distance/test distance)(dB);

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



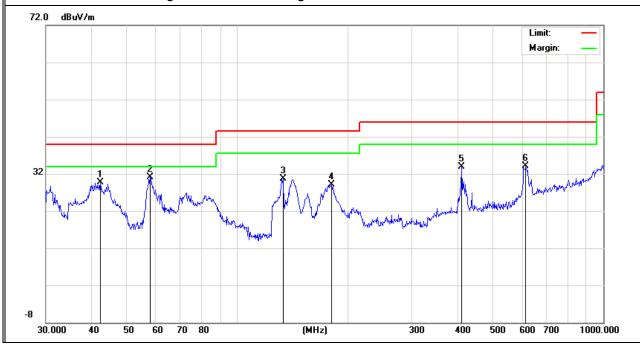
3.2.7 TEST RESULTS (BETWEEN 30MHZ - 1GHZ)

EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	20 ℃	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode:	TX-Mid CH		

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Remark
V	42.3021	16.34	13.35	29.69	40.00	-10.31	QP
V	57.7961	24.94	6.24	31.18	40.00	-8.82	QP
V	133.6184	19.80	10.95	30.75	43.50	-12.75	QP
V	181.2834	17.27	11.89	29.16	43.50	-14.34	QP
V	410.3824	19.12	14.70	33.82	46.00	-12.18	QP
V	614.2142	14.31	19.82	34.13	46.00	-11.87	QP

Remark:

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

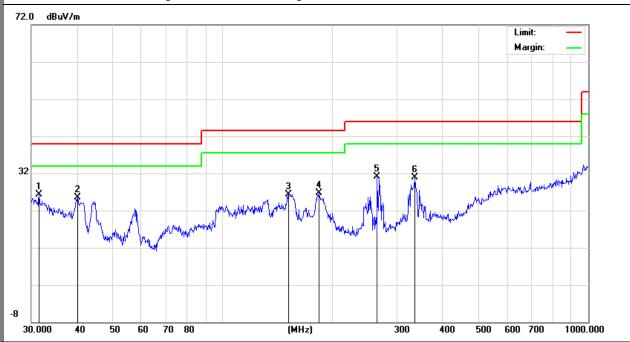




Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	rtornant
Н	31.5091	7.18	19.03	26.21	40.00	-13.79	peak
Н	40.1347	11.01	14.48	25.49	40.00	-14.51	peak
Н	151.5971	14.63	11.75	26.38	43.50	-17.12	peak
Н	183.2005	14.90	11.85	26.75	43.50	-16.75	peak
Н	264.7456	19.79	11.35	31.14	46.00	-14.86	peak
Н	336.0350	17.05	13.82	30.87	46.00	-15.13	peak

Remark:

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





3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature:	20 ℃	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage:	DC 3.7V
Test Mode:	TX		

Page 30 of 44

			Corrected				
Frequency (MHz)	Reading (dBµV)	Factor	Amplitude	Limit	Margin	Remark	Polar
(IVIFIZ)	(αδμν)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		(H/V)
		Low Cha	nnel (2402 MH	z)-Above 1G	;		
4804.102	60.23	-3.64	56.59	74.00	-17.41	Pk	Vertical
4804.102	39.47	-3.64	35.83	54.00	-18.17	AV	Vertical
7206.247	60.09	-0.95	59.14	74.00	-14.86	Pk	Vertical
7206.247	41.15	-0.95	40.20	54.00	-13.80	AV	Vertical
4804.332	63.52	-3.64	59.88	74.00	-14.12	Pk	Horizontal
4804.332	42.48	-3.64	38.84	54.00	-15.16	AV	Horizontal
7206.167	60.29	-0.95	59.34	74.00	-14.66	Pk	Horizontal
7206.167	41.11	-0.95	40.16	54.00	-13.84	AV	Horizontal
		Mid Cha	nnel (2440 MHz	z)-Above 1G			
4880.203	59.68	-3.68	56.00	74.00	-18.00	Pk	Vertical
4880.203	40.77	-3.68	37.09	54.00	-16.91	AV	Vertical
7320.158	59.85	-0.82	59.03	74.00	-14.97	Pk	Vertical
7320.158	41.16	-0.82	40.34	54.00	-13.66	AV	Vertical
4880.184	63.35	-3.68	59.67	74.00	-14.33	Pk	Horizontal
4880.184	41.04	-3.68	37.36	54.00	-16.64	AV	Horizontal
7320.349	60.29	-0.82	59.47	74.00	-14.53	Pk	Horizontal
7320.349	43.22	-0.82	42.40	54.00	-11.60	AV	Horizontal
		High Cha	nnel (2480MHz	z)- Above 1G	}		
4960.111	61.13	-3.59	57.54	74.00	-16.46	Pk	Vertical
4960.111	40.96	-3.59	37.37	54.00	-16.63	AV	Vertical
7440.195	60.03	-0.68	59.35	74.00	-14.65	Pk	Vertical
7440.195	47.41	-0.68	46.73	54.00	-7.27	AV	Vertical
4960.403	60.02	-3.59	56.43	74.00	-17.57	Pk	Horizontal
4960.403	42.46	-3.59	38.87	54.00	-15.13	AV	Horizontal
7440.106	59.65	-0.68	58.97	74.00	-15.03	Pk	Horizontal
7440.106	42.25	-0.68	41.57	54.00	-12.43	AV	Horizontal
Pemark:							

Remark:

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



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

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

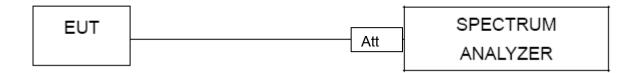
4.1.1 TEST PROCEDURE

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. 3 kHz ≤Set the RBW≤100 kHz.
- 4. Set the VBW \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 within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

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

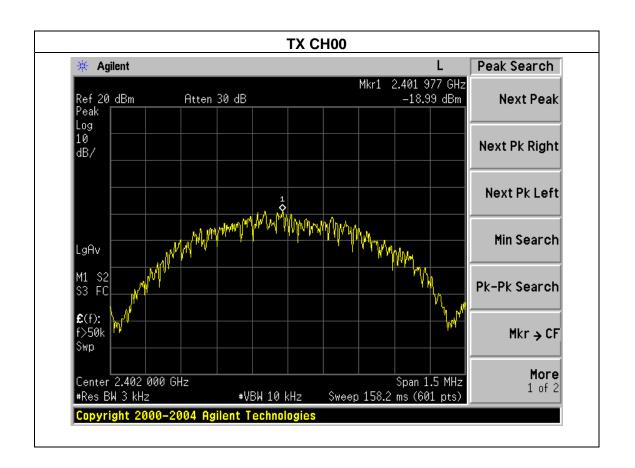


4.1.5 TEST RESULTS

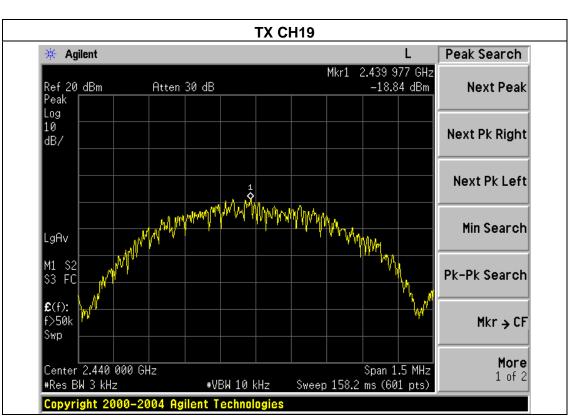
EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature:	25 ℃	Relative Humidity:	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode /CH00, CH19, CH39		

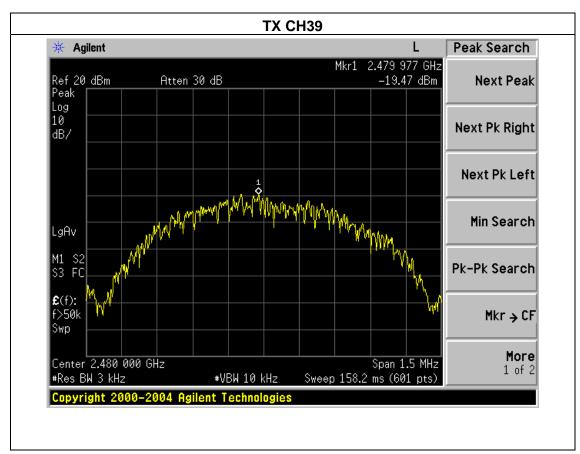
Page 32 of 44

Frequency	Power Density (dBm3KHz)	Limit (dBm3KHz)	Result
2402 MHz	-18.99	8	PASS
2440 MHz	-18.84	8	PASS
2480 MHz	-19.47	8	PASS











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

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

TEST SETUP



5.1.2 EUT OPERATION CONDITIONS

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

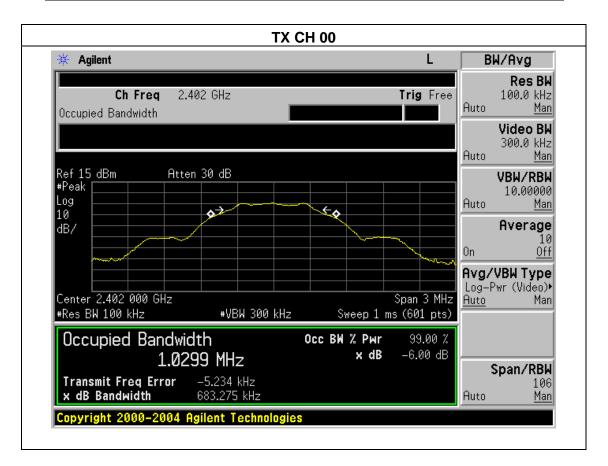


5.1.3 TEST RESULTS

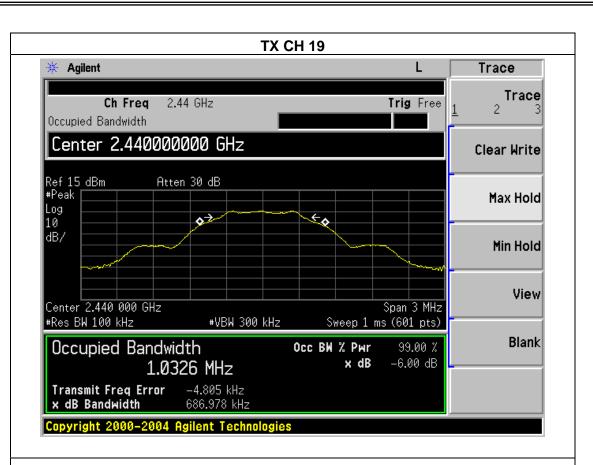
EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	25 ℃	Relative Humidity:	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode /CH00, CH19, CH39		

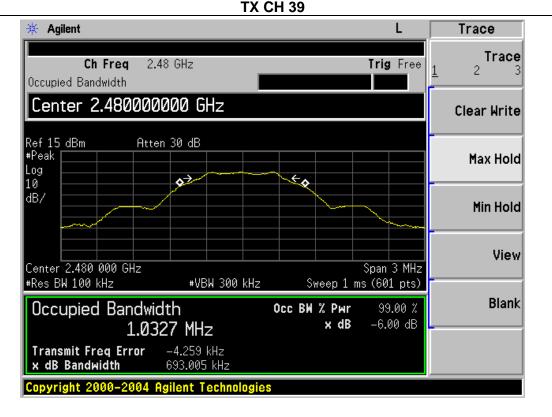
Page 35 of 44

Channel	Frequency (MHz)	6dB bandwidth (kHz)	Limit (kHz)	Result
Low	2402	683.275	500	Pass
Middle	2440	686.978	500	Pass
High	2480	693.005	500	Pass











6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

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

6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

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



6.1.5 TEST RESULTS

EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	25 ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode		

Test Frequency Channe		Maximum Conducted Output Power(PK)	LIMIT
	(MHz)	(dBm)	dBm
CH00	2402	-4.60	30
CH19	2440	-4.17	30
CH39	2480	-4.34	30



7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE APPLICABLE STANDARD

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

Report No.: NTEK-2015NT1126170F2

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 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

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



7.4 TEST RESULTS

EUT:	Fingerprint smart terminal	Model Name :	BM5510
Temperature :	25 ℃	Relative Humidity:	56%
Pressure:	1012 hPa	Test Voltage :	DC 3.7V

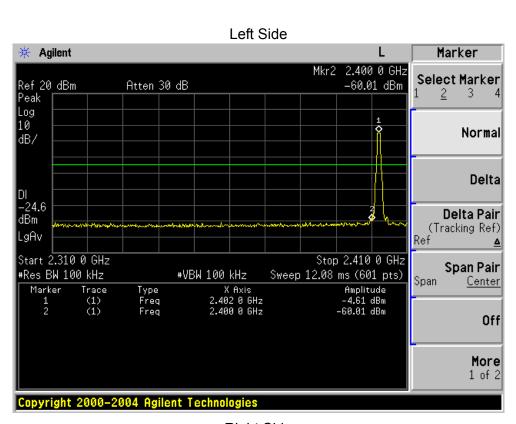
Frequency Band	requency Band Delta Peak to band emission (dBc)		Result
Left-band	55.40	20	Pass
Right-band	56.49	20	Pass

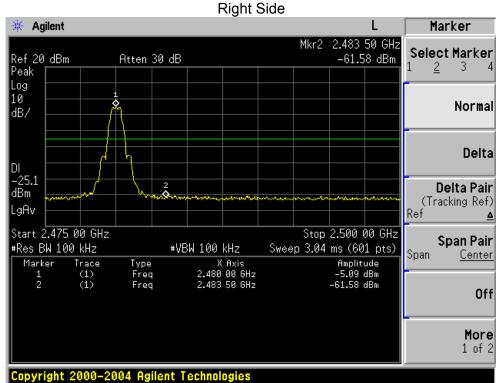
Radiated band edge:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	Comment
2390	59.89	-13.06	46.83	74	-27.17	peak	Vertical
2390	59.14	-13.06	46.08	74	-27.92	peak	Horizontal
2483.5	59.74	-12.78	46.96	74	-27.04	peak	Vertical
2483.5	60.02	-12.78	47.24	74	-26.76	peak	Horizontal

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









Report No.: NTEK-2015NT1126170F2

8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

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

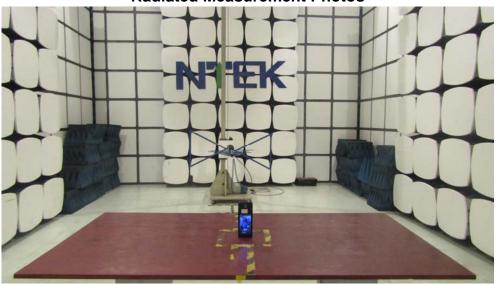
8.2 EUT ANTENNA

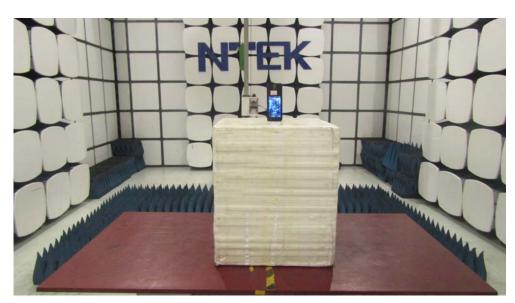
The EUT antenna is permanent attached antenna. It comply with the standard requiremer	The EU	T antenna is	permanent atta	ached antenna.	It comply	with the	standard re	eguirement
---	--------	--------------	----------------	----------------	-----------	----------	-------------	------------

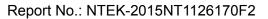


9. EUT TEST PHOTO











Conducted Measurement Photos



