

Test Report

FCC ID : ZXW-WF68

Date of issue: June 16, 2017

Report Number: MTi170817E132

Sample Description: Mobile Computer

Model(s): WF68, WF68S, WF88

Applicant: Widefly Ltd.

Address: Unit 205, 2/F, Lakeside 2, No.10 Science Park West Avenue, Hong Kong Science Park, Shatin, N.T., HONG KONG.

Date of Test: May 26, 2017 to June 16, 2017

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>



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Test Result Certification	
Applicant's name:	Widefly Ltd.
Address:	Unit 205, 2/F, Lakeside 2, No.10 Science Park West Avenue, Hong Kong Science Park, Shatin, N.T., HONG KONG.
Manufacture's Name:	Widefly Ltd.
Address:	Unit 205, 2/F, Lakeside 2, No.10 Science Park West Avenue, Hong Kong Science Park, Shatin, N.T., HONG KONG.
Product name:	Mobile Computer
Trademark:	WF68
Model name:	WF68S, WF88
Standards:	FCC Part15.225
Test procedure.....:	ANSI C63.10-2013

This device described above has been tested by Shenzhen Toby Technology Co., Ltd. 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.

Tested by:



Ace Chai

June 15, 2017

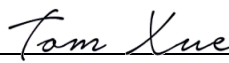
Reviewed by:



Smith Chen

June 16, 2017

Approved by:



Tom Xue

June 16, 2017

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Standard Section	Test Item	Judgment
15.203/15.225	Antenna Requirement	PASSED
15.207	Conducted Emission	PASSED
15.225	20dB Bandwidth	PASSED
15.225/15.209	Spurious Emission	PASSED
15.225	Frequency stability	PASSED
Remark: "N/A" is an abbreviation for Not Applicable.		

NOTE:

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

1.1 TEST FACILITY

Shenzhen Toby Technology Co., Ltd.

Add.: 10/F.,A Block, Jiada R&D Bldg., No.5 Songpingshan, Road, Science&Technology Park,
Shenzhen, 518057

FCC Registration No.:811562

1.2 MEASUREMENT UNCERTAINTY

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

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

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mobile Computer	
Trade Name	Widely	
Model Name	WF68	
Serial Model	WF68S, WF88	
Model Difference	N/A	
Product Description	The EUT is a Mobile Computer	
	Operation Frequency:	13.56MHz
	Modulation Type:	ASK
	Number Of Channel	1CH
	Antenna Designation:	Please see Note 3.
	Antenna Gain (dBi)	-0.76dbi
	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.	
Adapter	Model: TPA-46050200UU Input:100-240V~, 50/60Hz 0.3A Output:5V 2A	
Battery	Model:EU955164PV 3.8V 4600mAh	
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 List

Channel	Frequency (MHz)
1	13.56

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Integrated antenna	/	-0.76	NFC 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	NFC

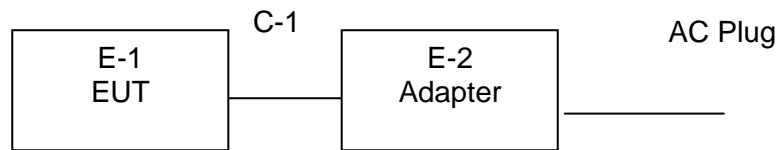
For Conducted Emission	
Final Test Mode	Description
Mode 1	NFC

For Radiated Emission	
Final Test Mode	Description
Mode 1	NFC

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

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



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	Rugged smartphone	DuraMobi	WF68	N/A	EUT
E-2	Adapter	N/A	TPA-46050200UU	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.0m	
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.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

For RF conducted test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Signal Analyzer	Agilent	N9010A	MY48030494	2017/11/4
4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063513	2017/11/4
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080019	2017/11/4
vector Signal Generator	Agilent	E4438C	US44271917	2017/11/4
vector Signal Generator	Agilent	E4438C	MY49070163	2017/11/4
Dc Power Supply	GW	GPR-6030D	/	2017/11/4
Temperature & Humidity Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2017/11/4
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	120909	2017/11/4

For Radiated test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Broadband TRILOG Antenna	Schwarabeck	VULB9163	9163-872	2017/11/14
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1145	2017/11/14
Amplifier	HP	8447D	3113A06150	2017/11/4
Amplifier	Agilent	8449B	3008A02400	2018/7/4
Test Receiver	Schwarabeck	ESPI7	100314	2017/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2017/11/4
Signal Generator	R&S	SMT 06	832080/007	2017/11/4

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

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

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

Note:

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

The following table is the setting of the receiver

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

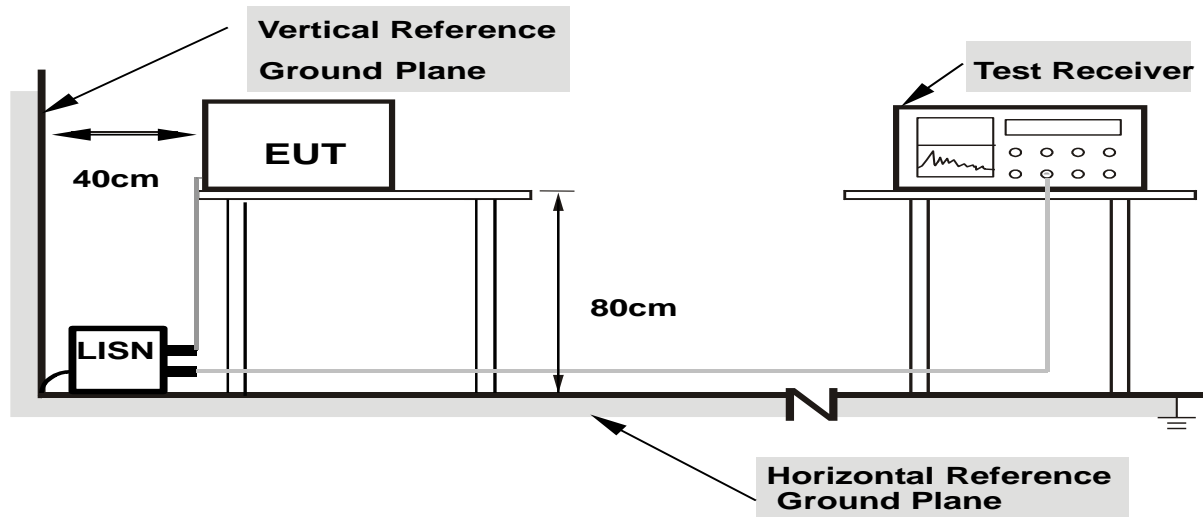
3.1.2 TEST PROCEDURE

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

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



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

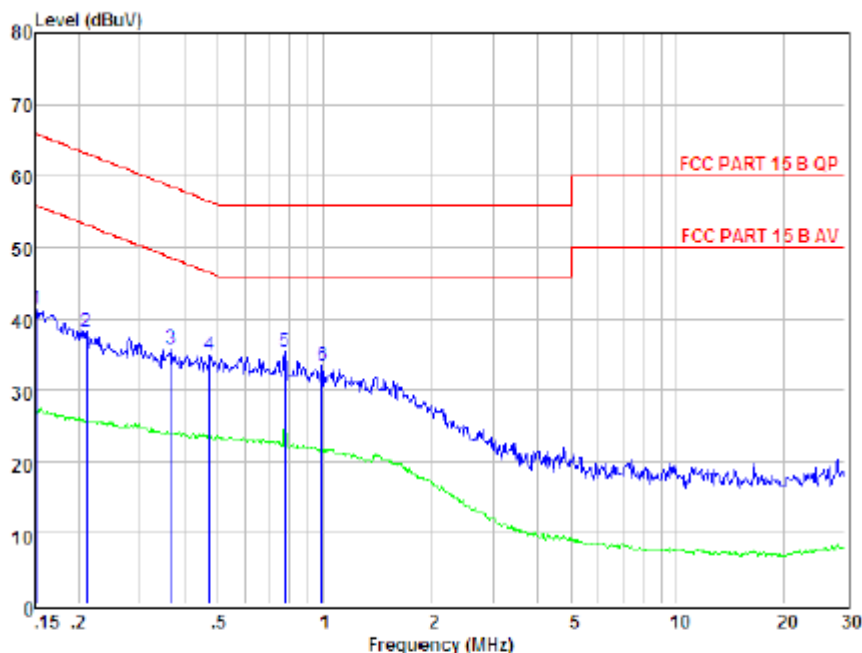
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

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

3.1.6 TEST RESULTS

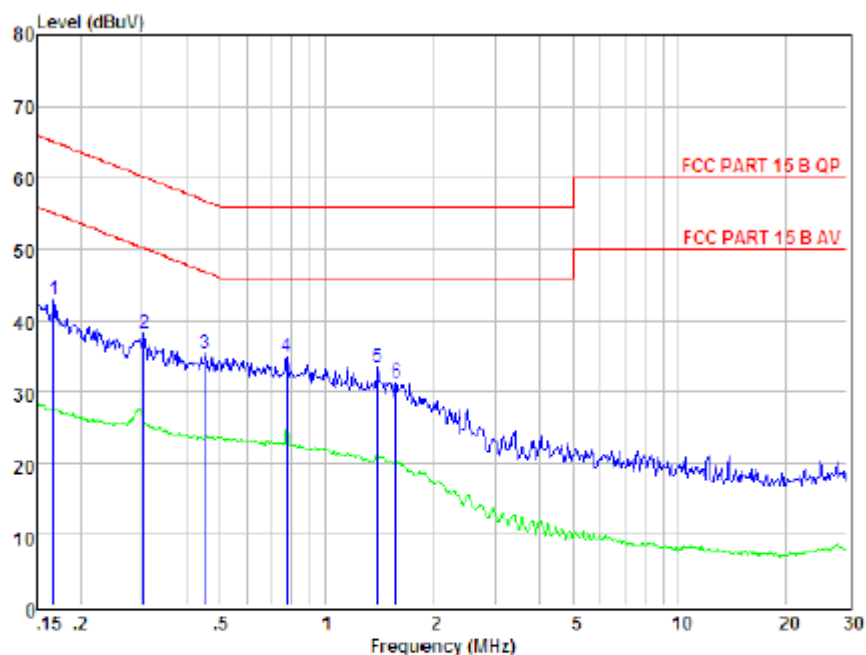
EUT :	Mobile Computer	Model Name. :	WF68
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5Vfrom adapter AC 120V/60Hz	Test Mode :	Mode 1



Condition : FCC PART 15 B QP				POL: LINE		Temp:	Hum:		
Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.152	31.51	0.03	-9.72	0.10	41.36	65.91	-24.55	QP
2	0.211	28.29	0.03	-9.72	0.10	38.14	63.18	-25.04	QP
3	0.367	25.87	0.03	-9.72	0.10	35.72	58.56	-22.84	QP
4	0.471	25.12	0.03	-9.72	0.10	34.97	56.49	-21.52	QP
5	0.775	25.53	0.00	-9.71	0.10	35.34	56.00	-20.66	QP
6	0.989	23.89	0.04	-9.71	0.10	33.54	56.00	-22.46	QP

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

EUT :	Mobile Computer	Model Name. :	WF68
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5Vfrom adapter AC 120V/60Hz	Test Mode :	Mode 1



Condition : FCC PART 15 B QP				POL: NEUTRAL			Temp:	Hum:	
Item	Freq	Read	LISN	Preamp	Cable	Level	Limit	Margin	Remark
	MHz	dBuV	Factor	Factor	Loss	dBuV	dBuV	dBuV	
			dB	dB	dB				
1	0.168	33.04	0.03	-9.72	0.10	42.89	65.08	-22.19	QP
2	0.303	28.30	0.03	-9.72	0.10	38.15	60.15	-22.00	QP
3	0.452	25.44	0.03	-9.72	0.10	35.29	56.85	-21.56	QP
4	0.775	25.18	0.00	-9.71	0.10	34.99	56.00	-21.01	QP
5	1.403	23.65	0.05	-9.71	0.10	33.51	56.00	-22.49	QP
6	1.585	21.35	0.05	-9.71	0.10	31.21	56.00	-24.79	QP

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

3.2 RADIATED EMISSION MEASUREMENT

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

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

Frequencies (MHz)	Field Strength (microvolts/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

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

Limit for FCC 15.225

Please see the section 15.225(b) and 15.225(c)

15.225(b): Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter (50.5dBuV/m) at 30 meters

15.225(c): Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter (40.5dBuV/m) at 30 meters

Note: 30m to 3m correction factor calculation:

$$40 * \log(30m/3m) = 40$$

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:

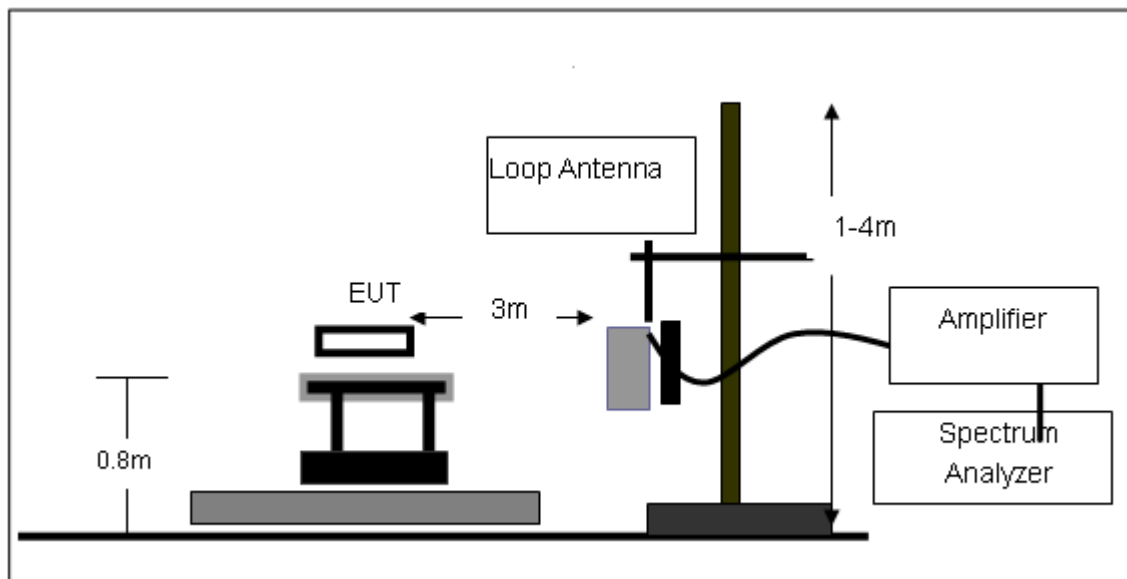
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

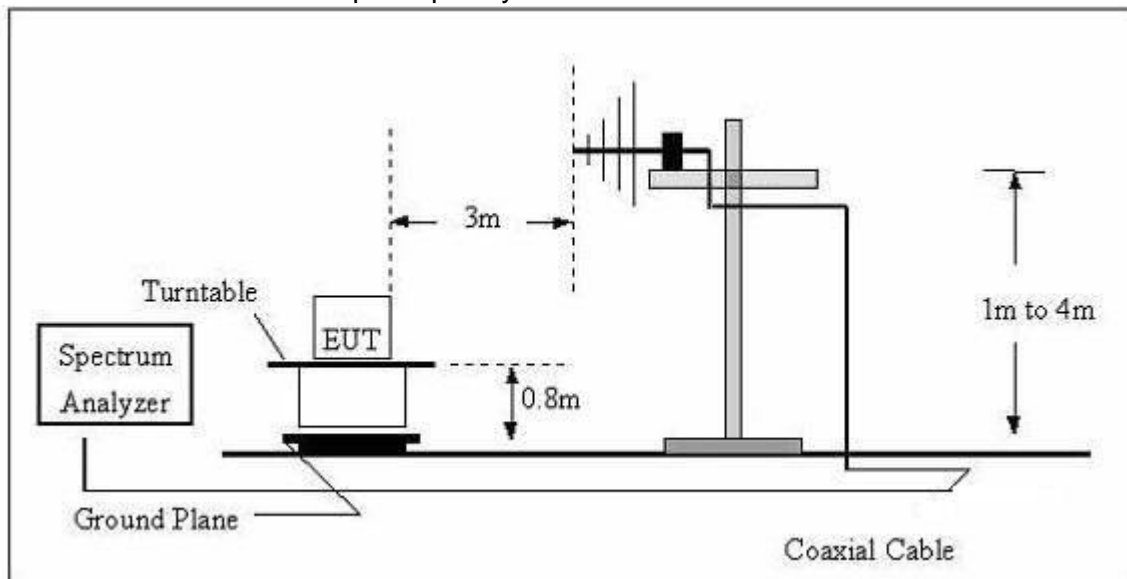
No deviation

3.2.4 TEST SETUP

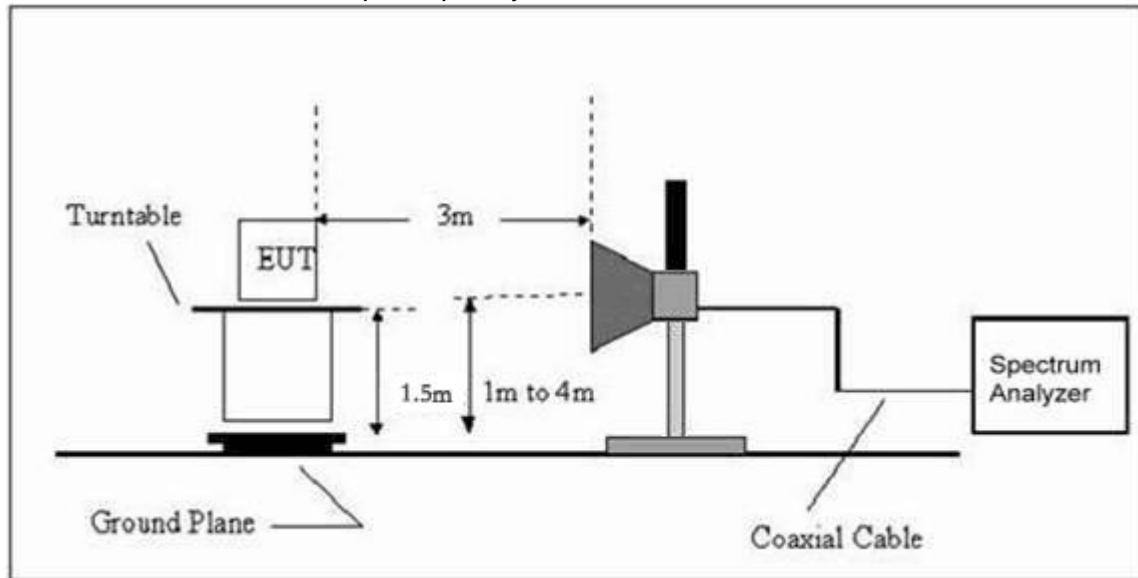
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 EUT OPERATING CONDITIONS

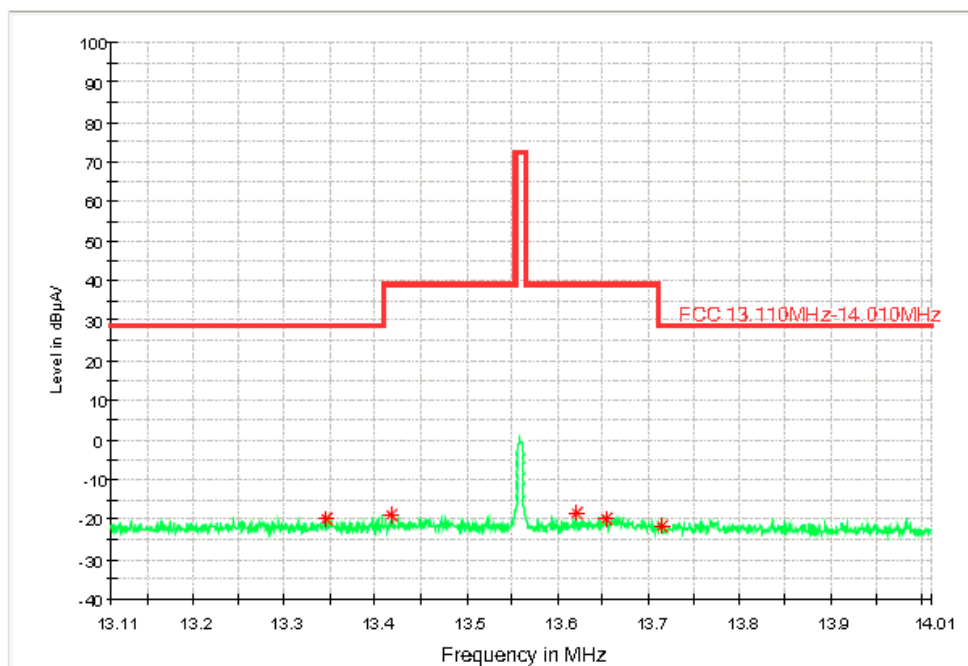
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Mobile Computer	Model Name. :	WF68
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 5Vfrom adapter AC 120V/60Hz
Test Mode :	TX	Polarization :	--

Radiated Emissions Result of Inside band (13.56MHZ)

Fre. MHz	Position H/V	Reading dBuV	Correct Factor dB	Measure Result dBuV/m	Limit dBuV/m	Margin dB
13.56	H	69.46(PK)	-13.72	55.74	124	43.15
13.56	H	55.16 (AV)	-13.72	41.44	104	35.36
--	--	--	--	--	--	--
13.56	V	59.47(PK)	-13.72	45.75	124	53.83
13.56	V	47.65(AV)	-13.72	33.93	104	46.08
--	--	--	--	--	--	--



Remark: --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+ Antenna Factor- Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

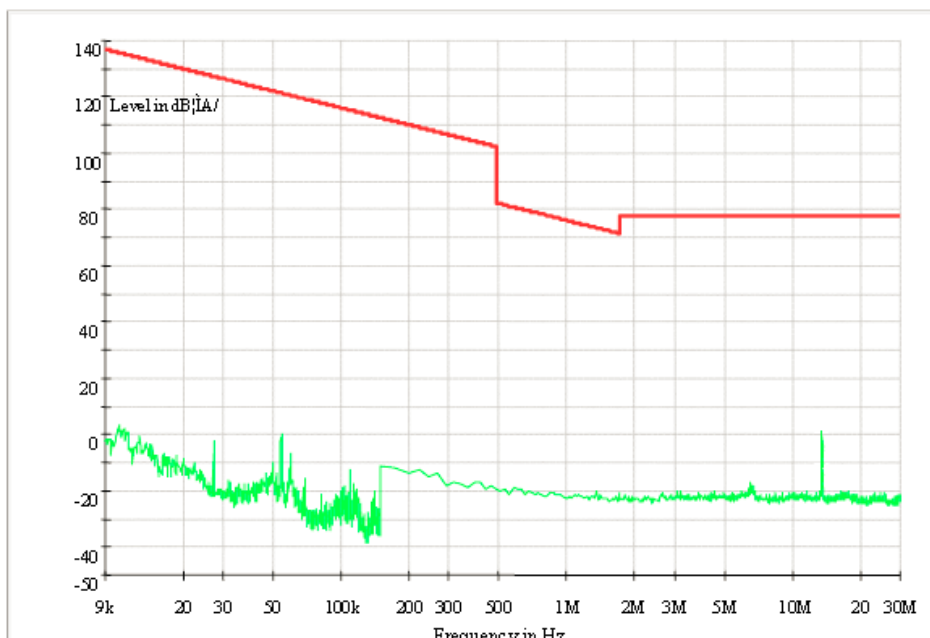
--Spectrum setting:

a. Peak setting RBW=10KHz, VBW=30KHz.

Factor between dBuA/m and dBuV/m is 51.5.

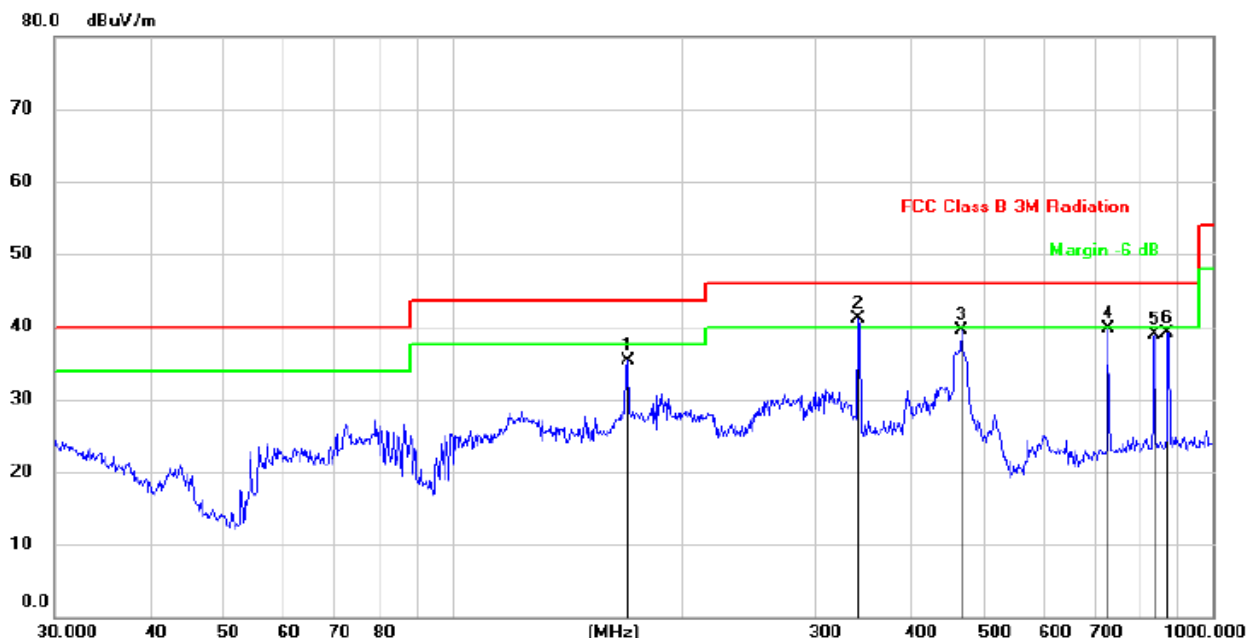
Freq. (MHz)	Position H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
13.110	H	Peak	42.46	-13.94	28.52	80.50	-51.98
13.410	H	Peak	43.59	-13.94	29.65	90.50	-60.85
13.553	H	Peak	42.43	-13.94	28.49	90.50	-62.01
13.567	H	Peak	45.76	-13.93	31.83	90.50	-58.67
13.710	H	Peak	43.39	-13.93	29.46	80.50	-51.04
14.010	H	Peak	44.45	-13.93	30.52	80.50	-49.98

Freq. (MHz)	Position H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
13.110	V	Peak	42.74	-13.94	28.80	69.5	-40.70
13.410	V	Peak	45.61	-13.94	31.67	80.5	-48.83
13.553	V	Peak	43.59	-13.94	29.65	90.5	-60.85
13.567	V	Peak	42.27	-13.94	28.33	90.5	-62.17
13.710	V	Peak	43.09	-13.93	29.16	80.5	-51.34
14.010	V	Peak	44.64	-13.93	30.71	69.5	-38.79



3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Mobile Computer	Model Name :	WF68
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX	Polarization:	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		170.1947	51.64	-16.41	35.23	43.50	-8.27	QP		
2	*	341.9786	50.77	-9.75	41.02	46.00	-4.98	QP		
3		467.2348	47.08	-7.55	39.53	46.00	-6.47	QP		
4		729.3582	43.44	-3.81	39.63	46.00	-6.37	QP		
5		839.1816	41.03	-2.20	38.83	46.00	-7.17	QP		
6		872.1832	40.77	-1.70	39.07	46.00	-6.93	QP		

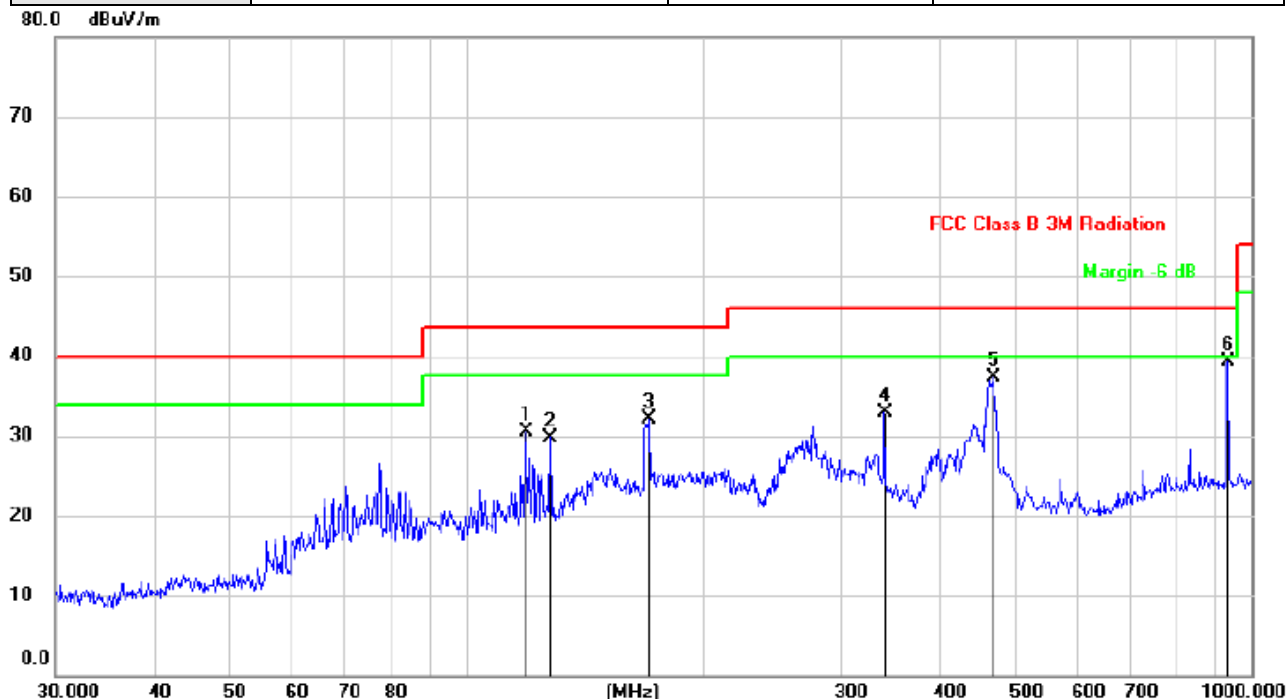
Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically

EUT :	Mobile Computer	Model Name :	WF68
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX	Polarization:	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		119.0180	46.39	-15.90	30.49	43.50	-13.01	QP		
2		128.1127	47.03	-17.23	29.80	43.50	-13.70	QP		
3		170.7923	48.55	-16.37	32.18	43.50	-11.32	QP		
4		340.7817	42.73	-9.77	32.96	46.00	-13.04	QP		
5		468.8761	44.90	-7.54	37.36	46.00	-8.64	QP		
6	*	932.2712	40.28	-0.98	39.30	46.00	-6.70	QP		

Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically

4. 20 DB OCCUPY BANDWIDTH

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.225) , Subpart C			
Section	Test Item	Limit	Result
15.225	20dB bandwidth	/	PASS

4.1.1 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Bandwidth: RBW=3 kHz, VBW=10 kHz, detector= Peak

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



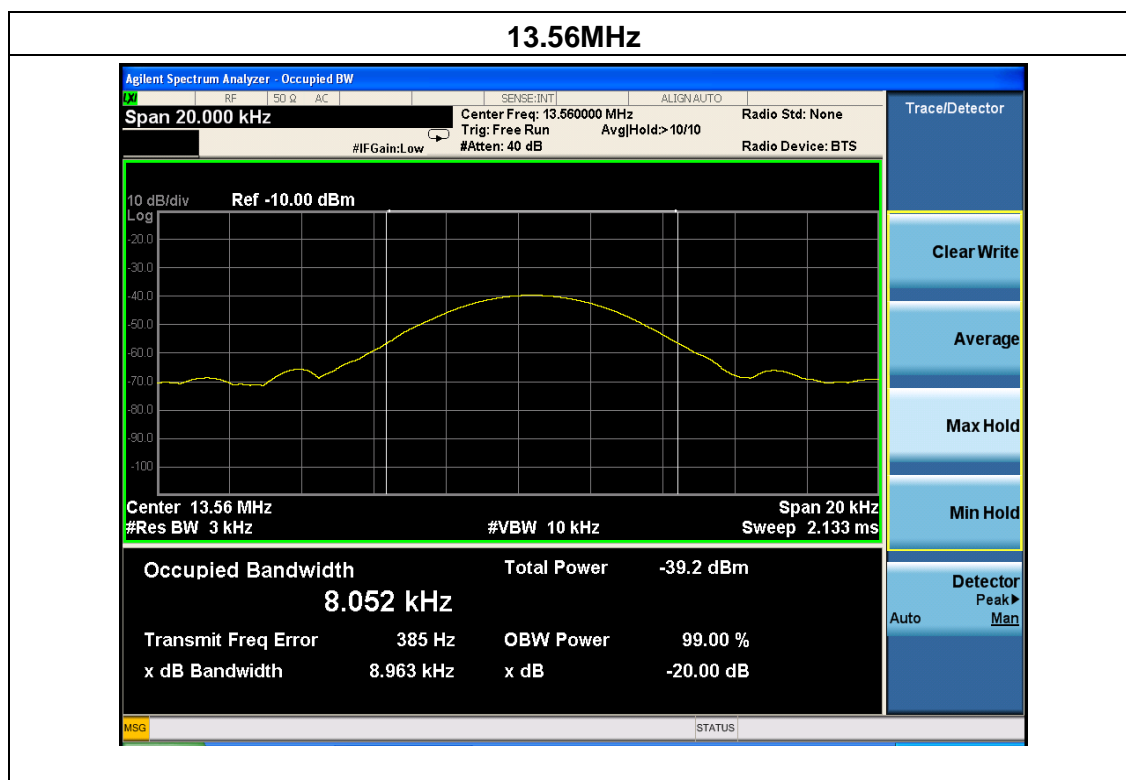
4.1.4 EUT OPERATION CONDITIONS

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 :	Mobile Computer	Model Name :	WF68
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	NFC		

Frequency	20dB Bandwidth (KHz)	Limit	Result
13.56 MHz	8.963	/	PASS



5. FREQUENCY STABILITY

5.1 APPLIED PROCEDURES / LIMIT

Please refer section 15.225e.

Regulation 15.225(e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ (± 100 ppm) of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

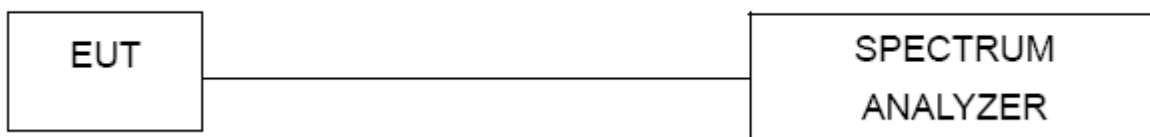
5.1.1 TEST PROCEDURE

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 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.

5.1.5 TEST RESULTS

EUT :	Mobile Computer	Model Name :	WF68
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	NFC		

Assigned Frequency(MHz): 13.56MHz Voltage: DC 5V from adapter				
Voltage	Temperature	Measured Frequency (MHz)	Frequency stability	Limit
Low AC 102V	+20°C	13.56072	0.00072	±100 ppm ±0.001356MHz
Normal AC 120V	-20°C	13.56069	0.00069	
	-10°C	13.55951	-0.00049	
	0°C	13.56042	0.00042	
	+10°C	13.55937	-0.00063	
	+20°C	13.56045	0.00045	
	+30°C	13.56061	0.00061	
	+40°C	13.55983	-0.00017	
	+50°C	13.55972	-0.00028	
High AC138V	+20°C	13.56058	0.00058	

6. ANTENNA REQUIREMENT

6.1 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.

6.2 EUT ANTENNA

The EUT antenna is Integrated antenna . It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

----End of Report----