
RF Test Report

Report No.: AGC00552191002EE14

PRODUCT DESIGNATION : Smart Phone

BRAND NAME : CUBOT

MODEL NAME : X20

APPLICANT : Shenzhen Huafurui Technology Co., Ltd.

DATE OF ISSUE : Oct. 23, 2019

STANDARD(S) : Final draft ETSI EN 303 345 V1.1.7 (2017-03)

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 23, 2019	Valid	Initial release



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1. TEST RESULT CERTIFICATION

Applicant	Shenzhen Huafurui Technology Co., Ltd.
Address	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen, P.R. China
Manufacturer	Shenzhen Huafurui Technology Co., Ltd.
Address	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen, P.R. China
Factory Name	Shenzhen Huafurui Technology Co., Ltd.
Address	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen, P.R. China
Product Designation	Smart Phone
Brand Name	CUBOT
Test Model	X20
Date of test	Oct. 14, 2019 to Oct. 22, 2019
Deviation	None
Test Result	Pass

The above equipment was tested by ATTESTATION OF GLOBAL COMPLIANCE (SHENZHEN) CO., LTD. for compliance with the requirements set forth in the European Standard ETSI EN 303 345. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

The test results of this report relate only to the tested sample identified in this report.

Prepared By Donjon Huang
Donjon Huang
(Project Engineer) Oct. 22, 2019

Reviewed By Max Zhang
Max Zhang
(Reviewer) Oct. 23, 2019

Approved By Forrest Lei
Forrest Lei
(Authorized Officer) Oct. 23, 2019

2. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

Hardware Version	E965_MAIN_PCB_V1.0
Software Version	CUBOT_X20_9071C-1_V01_20190920
modulation method	Frequency modulation, without RDS (FM)
frequency band	VHF band II: 87.5 MHz to 108 MHz
Antenna Type	Integral antenna Using earphone as antenna
Power Supply:	DC 3.85V

NOTE: For more information, please refer to User's Manual.

Test signal configurations are as bellow:

The generated FM signals (wanted and unwanted) and the blocking signal shall be in accordance with table The configuration is based on Recommendation ITU-R BS.641 [i.6].

Parameter	FM signals		AM signal
	Wanted	Unwanted	Blocking
Audio modulation	1 kHz tone	Weighted noise Recommendation ITU-R BS.559-2 [5], clause 1	1 kHz tone
	Band-limited to 15 kHz		
Other modulation parameters	±60,8 kHz peak deviation	32 kHz quasi-peak deviation (see note)	80 % depth
Pilot tone	None	None	

NOTE: This is equivalent to $19 / \sqrt{2} = 13,4$ kHz RMS deviation in the absence of pre-emphasis.

Test items and the results are as bellow:

Basic Standard	Test Type	Result
EN 303 345 Clause 4.2 Conformance requirements	4.2.4 Sensitivity	Pass
	4.2.5 Adjacent channel selectivity and blocking	Pass
	4.2.6 Unwanted emissions in the spurious domain	Pass

3. MEASUREMENT UNCERTAINTY

The Uncertainty Is Calculated Using The Methods Suggested In The “Guide To The Expression Of Uncertainty In Measurement” (Gum) Published By Iso.

- Uncertainty Of Sensitivity, $U_c = \pm 3.8 \text{ db}$
- Uncertainty Of Adjacent Channel Selectivity And Blocking, $U_c = \pm 3.8 \text{ db}$
- Uncertainty Of Radiated Emission, $U_c = \pm 3.2 \text{ db}$

4. DESCRIPTION OF TEST MODES

The EUT has been tested under Normal Operating and standby condition. No software used to control the EUT for staying in continuous receiving mode for testing.

5. TEST FACILITY

Test Site:	Attestation of Global Compliance (Shenzhen) Co., Ltd.
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao 'an District, Shenzhen, Guangdong, China



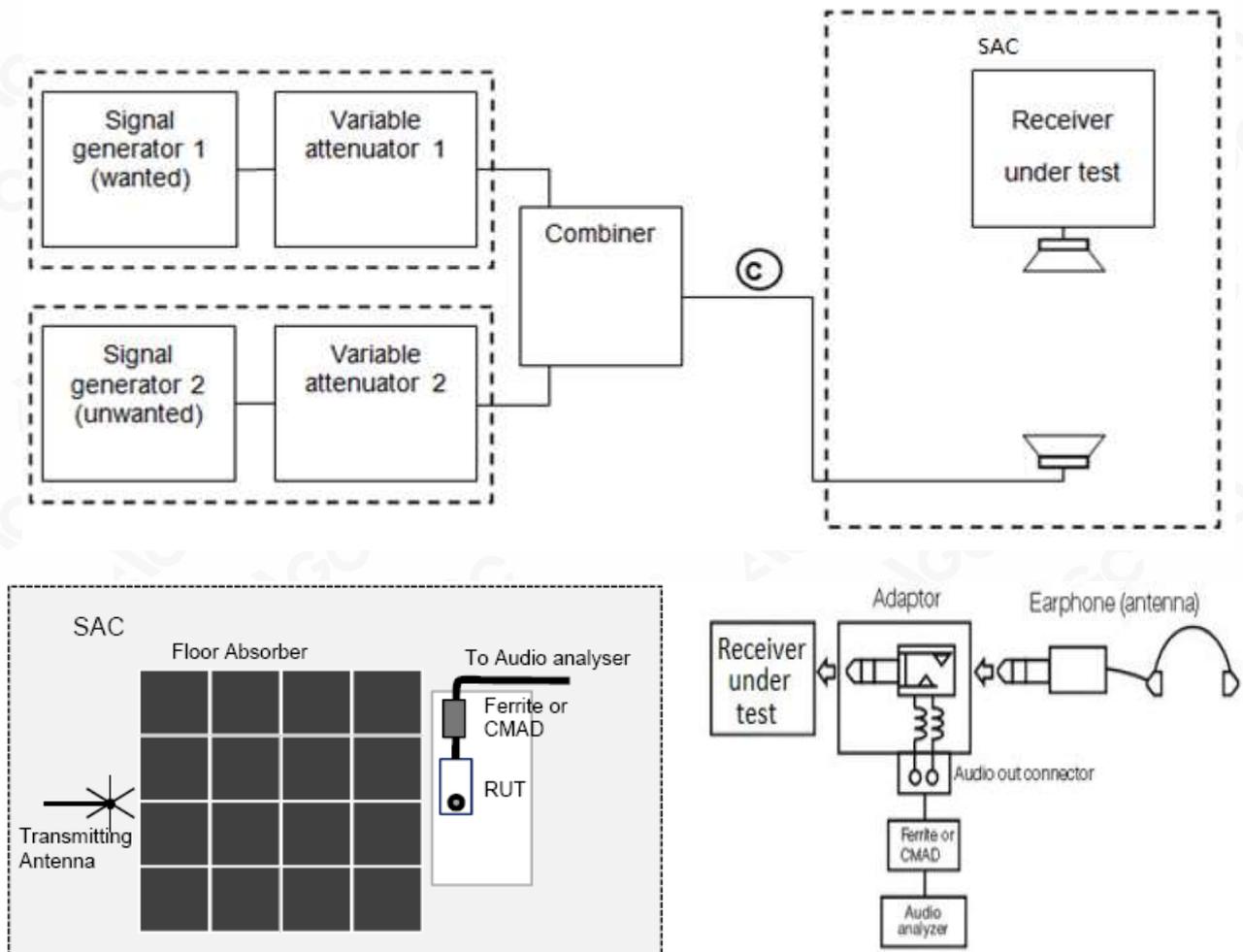
6. EN 303 345 REQUIREMENT

6.1 SENSITIVITY

6.1.1 MEASUREMENT EQUIPMENT USED:

Description	Manufacturer	Model No.	Calibration Date	Calibration Due.
MXG X-Series Vector Signal Generator	Agilent	N5182B	Sep. 09, 2019	Sep. 08, 2020
MXG X-Series Vector Signal Generator	Agilent	N5182A	Sep. 09, 2019	Sep. 08, 2020
Noise Signal Generator	Bejingdaming	DM8899A	July 30, 2019	July 29, 2020
RF Communication Test Set	HP	8920B	Nov.01, 2019	Oct. 31, 2020
Power divider(combiner)	Mini-Circuits	SF781901412	July 11, 2019	July 10, 2020

6.1.2 TEST SETUP:



6.1.3 TEST LIMITS:

Sensitivity requirements

Test	De-modulation	Tuned frequency band	Wanted signal centre frequency (MHz)	Required sensitivity limit	
				Conducted (dBm)	Radiated (dBµV/m)
1	AM	LF	0,216	-65	74
2		MF	0,999	-65	66
3		HF	9,9	-65	60
4	FM	VHF band II	98	-90	50 (see note 1)
5	DAB	VHF band III	202,928	-94	37 (see note 2)
6	DRM	LF	0,216	-101	58
7		MF	0,999	-101	52
8		HF1	4	-101	44
9		HF2	19	-101	40
10		VHF band I	65	-102	45
11		VHF band II	100	-102	46
12		VHF band III	200	-102	51

NOTE 1: For products with an integral antenna, the requirement is relaxed to 67 dBµV/m.
NOTE 2: For products with an integral antenna, the requirement is relaxed to 50 dBµV/m.

Impairment criteria for sensitivity tests

Demodulation	Impairment criteria
AM	SNR ≥ 28 dBQ ref 40 % AM
FM	SNR ≥ 40 dBQ ref ±60,8 kHz deviation; clean audio (see note 1)
DAB	Clean audio (see note 2)
DRM	Clean audio (see note 2)
NOTE 1: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).	
NOTE 2: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. muting, clicks, warbles or squeaks).	

6.1.4 TEST PROCEDURE:

- For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
- The 'unwanted' signal generator remains switched off for the duration of the test.
- The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified plus 30 dB.
- The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.

5. The level of the 'wanted' signal generator is adjusted to provide the level, as measured at ©
6. The audio output, measured using the measurement device, is recorded as the signal level, S.
7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
8. If the impairment criteria given are met then the receiver has passed the test.

6.1.5 TEST RESULTS:

FM VHF band II 98MHz			
Wanted Signal Level at © (dBµV/m)	SNR (dBQ)	Limit (dBQ)	Result
67	85	≥ 40	Pass



6.2 ADJACENT CHANNEL SELECTIVITY AND BLOCKING

6.2.1 MEASUREMENT EQUIPMENT USED:

Same as 6.1.1

6.2.2 TEST SETUP:

Same as 6.1.2

6.2.3 TEST LIMITS:

Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 1, 2, 3)	Unwanted frequency (blocking)
AM	LF	$\pm N \times 9$ kHz	± 90 kHz
	MF	$\pm N \times 9$ kHz	± 90 kHz
	HF	$\pm N \times 10$ kHz	± 100 kHz
FM	VHF band II	$\pm(N + 1) \times 100$ kHz	± 800 kHz
DAB	VHF band III	$\pm N \times 1\,712$ kHz	± 12 MHz
DRM	LF	$\pm N \times 9$ kHz	± 90 kHz
	MF	$\pm N \times 9$ kHz	± 90 kHz
	HF	$\pm N \times 10$ kHz	± 100 kHz
	VHF band I	$\pm N \times 100$ kHz	± 800 kHz
	VHF band II	$\pm N \times 100$ kHz	± 800 kHz
	VHF band III	$\pm N \times 100$ kHz	± 800 kHz

Impairment criteria for adjacent channel selectivity and blocking tests

Demodulation	Impairment criteria
AM	SNR ≥ 28 dBQ ref 40 % AM
FM	SNR ≥ 40 dBQ ref $\pm 60,8$ kHz deviation; clean audio (see note 1)
DAB	Clean audio (see note 2)
DRM	Clean audio (see note 2)
NOTE 1: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).	
NOTE 2: Clean audio is defined as 10 seconds of audio with no subjective impairments (e.g. muting, clicks, warbles or squeaks).	



Adjacent channel selectivity and blocking requirements

Test	De-modulation	Tuned frequency band	C Wanted signal centre frequency (MHz)	C Wanted signal level		Required I/C ratio (see notes 1 and 2)			
				Conducted (dBm)	Radiated (dBµV/m)	N = 1 (dB)	N = 2 (dB)	N = 3 (dB)	Blocking (dB)
1R	AM (built-in or integral antenna, see note 4)	LF	0,216	n/a	80	-30	10	20	20
2R		MF	0,999	n/a	72	-30	10	20	20
3R		HF	9,9	n/a	66	-30	10	20	20
1C	AM (external antenna)	LF	0,216	-59	n/a	-5	25	35	40
2C		MF	0,999	-59	n/a	-5	25	35	40
3C		HF	9,9	-59	n/a	-5	25	35	40
4R	FM (built-in or integral antenna, see note 4)	VHF band II	98	n/a	56 (see note 3)	-15	-3	8	20
4C		VHF band II	98	-84	n/a	3	17	30	30
5	DAB	VHF band III	202,928	-70	61	35	40	45	40
6	DRM	LF	0,216	-91	68	25	35	45	50
7		MF	0,999	-91	62	25	35	45	50
8		HF1	4	-91	54	25	35	45	50
9		HF2	19	-91	54	25	35	45	50
10		VHF band I	65	-91	50	35	40	45	50
11		VHF band II	100	-92	55	35	40	45	50
12		VHF band III	200	-92	61	35	40	45	50

NOTE 1: The frequency of the interferer shall be calculated using the channel spacing data in table 7 for each of the 6 defined adjacent channels N = {-3, -2, -1, +1, +2, +3} and the two blocking offsets. Each row of table 8 thus defines 8 individual tests.

NOTE 2: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level.

NOTE 3: The wanted signal level for receivers with integral antenna is 73 dBµV/m.

NOTE 4: The ACS and blocking requirements for AM and FM devices are currently separated into different limits for radiated and conducted testing methods. These limits are likely to be unified in a future revision of the present document. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

6.2.4 TEST PROCEDURE:

1. For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
2. The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified in above table, with the 'unwanted' generator switched off
3. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
4. The 'unwanted' signal generator is set to the required modulation method and test configuration as



specified. and to the frequency calculated from the wanted signal centre frequency and the required offset specified in above Table. The signal level is adjusted to provide the level, as measured at ©, specified in above Table, with the 'wanted' generator switched off. For the blocking test only, the audio modulation of the 'unwanted' signal shall be removed whilst measuring the level at ©.

5. The 'wanted' signal generator is switched back on.
6. The audio output, measured using the measurement device, is recorded as the signal level, S.
7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
8. If the impairment criteria given are met then the receiver has passed the test.

6.2.5 TEST RESULTS:

FM VHF band II 98MHz						
Adjacency	C Wanted signal level at © (dBµV/m)	I Unwanted Signal Level at © (dBµV/m)	Required I/C ratio (dB)	SNR (dBQ)	SNR Limit (dBQ)	Result
N = -1 97.9MHz	73	58	-15	85	≥ 40	Pass
N = +1 98.1 MHz	73	58	-15	85	≥ 40	Pass
N = -2 97.8 MHz	73	70	-3	85	≥ 40	Pass
N = +2 98.2 MHz	73	70	-3	85	≥ 40	Pass
N = -3 97.7 MHz	73	81	8	85	≥ 40	Pass
N = +3 98.3 MHz	73	81	8	85	≥ 40	Pass
Blocking 97.2 MHz	73	93	20	85	≥ 40	Pass
Blocking 98.8 MHz	73	93	20	85	≥ 40	Pass



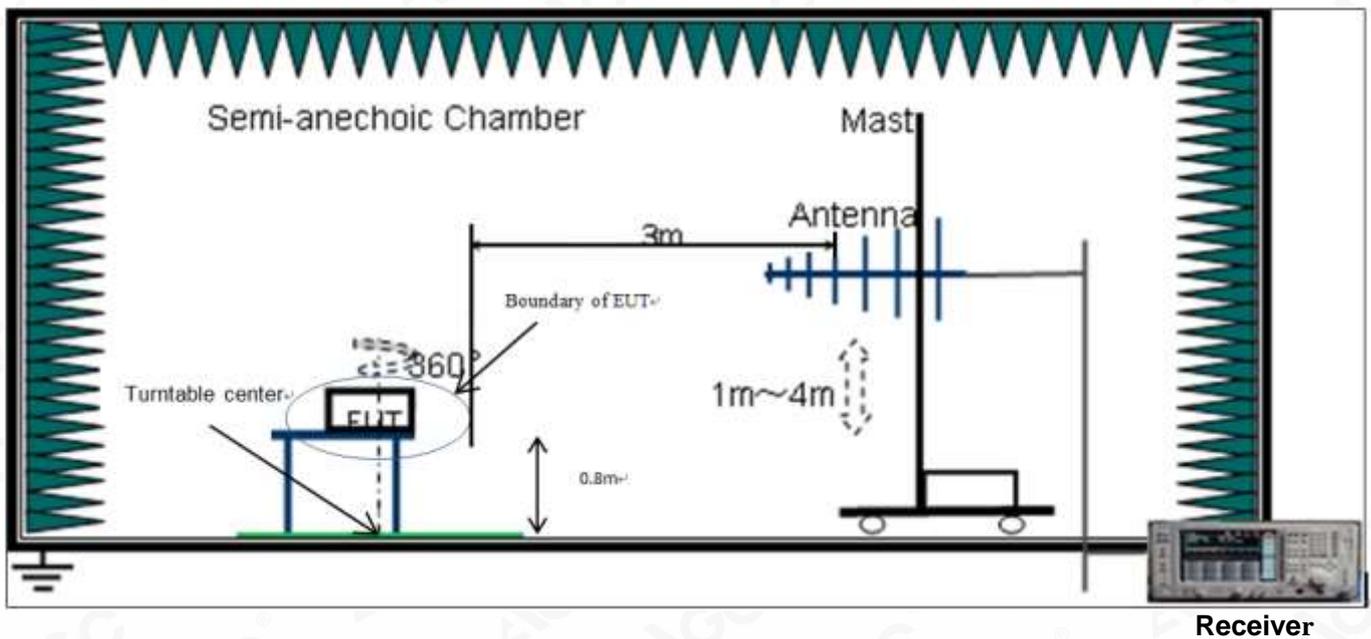
6.3 UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

6.3.1 MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	Calibration Date	Cal. Due
TEST RECEIVER	R&S	ESCI	June 12, 2019	June 11, 2020
ANTENNA	SCHWARZBECK	VULB9168	Mar.01,2018	Feb.28, 2020
Signal Generator	Aglient	N5182B	Sep. 09, 2019	Sep. 08, 2020

Remark: Each piece of equipment is scheduled for calibration once a year.

6.3.2 TEST SETUP:



6.3.3 TEST LIMITS:

Requirements for radiated emissions from FM receivers

Frequency range MHz	Measurement		Class B limit dB(μV/m)	
	Distance m	Detector type/ bandwidth	Fundamental	Harmonics
			OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)
30 – 230	10	Quasi peak/ 120 kHz	50	42
230 – 300				42
300 – 1 000				46
30 – 230	3		60	52
230 – 300				52
300 – 1 000				56

Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in the below table.

Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment

Frequency range MHz	Measurement		Class B limits dB(μV/m)
	Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
30 – 230	10	Quasi Peak / 120 kHz	30
230 – 1 000			37
30 – 230	3		40
230 – 1 000			47

Note: The above limit values refer to EN55032 Subclasses table A.4, table A.6

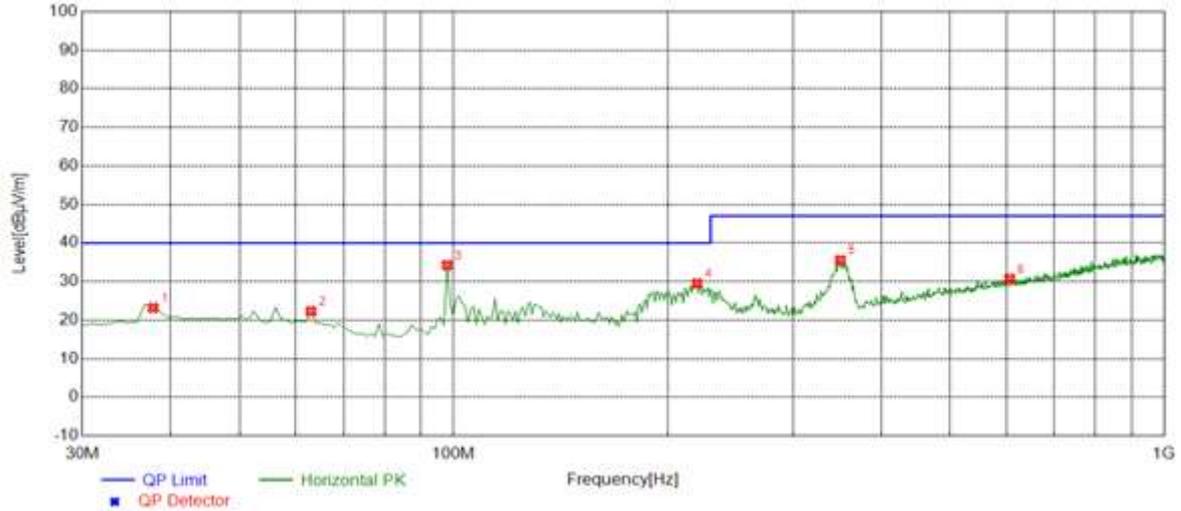
6.3.4 TEST PROCEDURE:

- (1). The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2). The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- (3). The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- (4). For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- (5). The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

6.3.5 TEST RESULT

FM 98MHz

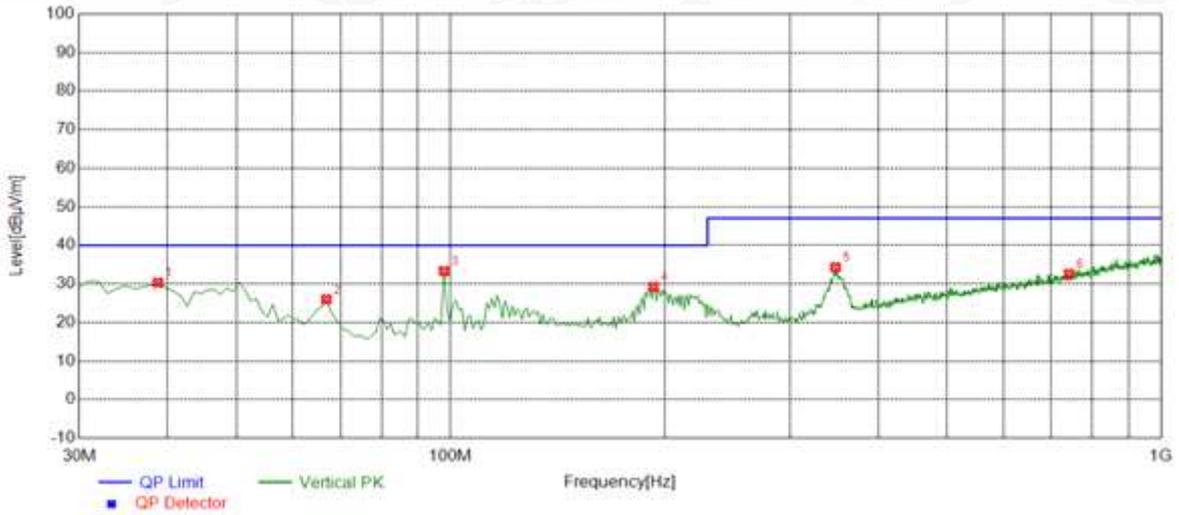
RADIATED EMISSION BELOW 1GHZ- HORIZONTAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7600	23.18	14.39	40.00	16.82	100	358	Horizontal
2	62.9800	22.27	13.42	40.00	17.73	100	127	Horizontal
3	97.9000	34.26	11.14	40.00	5.74	200	182	Horizontal
4	220.120	29.50	13.30	40.00	10.50	200	360	Horizontal
5	350.100	35.53	17.85	47.00	11.47	100	99	Horizontal
6	606.180	30.73	24.42	47.00	16.27	100	109	Horizontal



RADIATED EMISSION BELOW 1GHZ- VERTICAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	38.7300	30.30	14.63	40.00	9.70	100	357	Vertical
2	66.8600	25.95	12.76	40.00	14.05	100	303	Vertical
3	97.9000	33.34	11.14	40.00	6.66	100	4	Vertical
4	192.960	29.23	12.38	40.00	10.77	100	72	Vertical
5	348.160	34.30	17.78	47.00	12.70	100	26	Vertical
6	741.980	32.60	27.02	47.00	14.40	100	183	Vertical

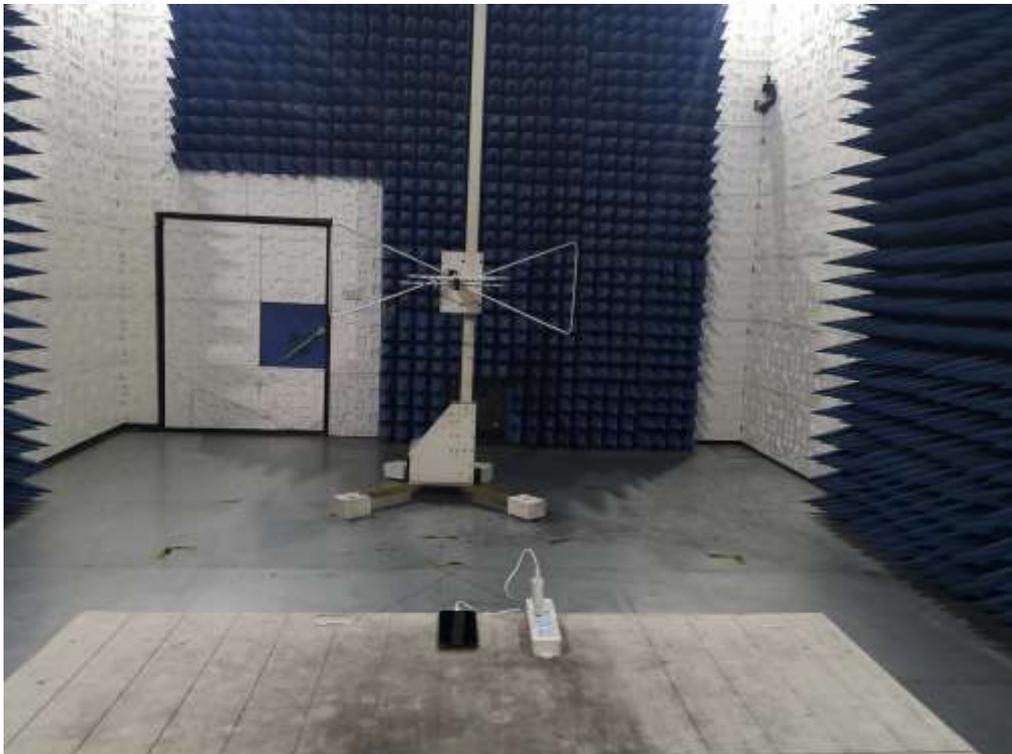


APPENDIX A PHOTOGRAPHS OF TEST SETUP

Sensitivity, Adjacent channel selectivity and blocking



Unwanted emission



----END OF REPORT----

