



FCC Test Report

FCC ID:2AG9W-DS152F

Product : Nano pc

Trade Name : N/A

Model Number : DS152F

Serial Model : DS162F, DS152C, DS132C, DS182C,
DS192C, DS122, DS155, DS165

Report No. : NTEK-2015NT12033368F4

Prepared for

SHENZHEN DSO MICROELECTRONICS.,LTD.
15F,Goldlonghua Plaza Commercial Building,longguan East RD,
No. 3 Longhua District,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

Applicant's name : SHENZHEN DSO MICROELECTRONICS.,LTD.
Address : 15F,Goldlonghua Plaza Commercial Building,longguan East RD,
 No. 3 Longhua District,Shenzhen,Guangdong,China.
Manufacturer's Name : SHENZHEN DSO MICROELECTRONICS.,LTD.
Address : 15F,Goldlonghua Plaza Commercial Building,longguan East RD,
 No. 3 Longhua District,Shenzhen,Guangdong,China.

Product description

Product name : Nano pc
Model and/or type reference : DS152F
 FCC Part15B:01 Oct.2015

Standards : ANSI C63.4:2014

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test

Date (s) of performance of tests : 03 Dec. 2015 ~06 Jan. 2016

Date of Issue..... : 06 Jan. 2016

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

Testing Engineer : Susan
 (Susan Su)

Technical Manager : Brown Lu
 (Brown Lu)

Authorized Signatory : Sam. Chen
 (Sam Chen)

Table of Contents	Page
1 . TEST SUMMARY	4
1.1 TEST FACILITY	5
1.2 MEASUREMENT UNCERTAINTY	5
2 . GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF TEST SETUP	8
2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	9
2.4 MEASUREMENT INSTRUMENTS LIST	10
3 . EMC EMISSION TEST	11
3.1 CONDUCTED EMISSION MEASUREMENT	11
3.1.1 POWER LINE CONDUCTED EMISSION	11
3.1.2 TEST PROCEDURE	12
3.1.3 TEST SETUP	12
3.1.4 EUT OPERATING CONDITIONS	12
3.1.5 TEST RESULTS	13
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	17
3.2.2 TEST PROCEDURE	17
3.2.3 TEST SETUP	18
3.2.4 TEST RESULTS	19
3.2.5 TEST RESULTS(1000~12400MHz)	21
4 . EUT TEST PHOTO	22

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B:2014 ANSI C63.4: 2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

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.

FCC Registration Number:238937; IC Registration Number:9270A-1

CNAS Registration Number:L5516

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** %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
NTEKC01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
NTEKA01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~12.5GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Nano pc	
Trade Name	N/A	
Model Name	DS152F	
Serial Model	DS162F, DS152C, DS132C, DS182C, DS192C, DS122, DS155, DS165	
Model Difference	All the model are the same circuit and RF module, except the model name and colour.	
Product Description	The EUT is a Nano pc	
	Connecting I/O port:	USB, DC in
	Operation Frequency:	BT:2402~2480 MHz WIFI:802.11b/g/n(20MHz): 2412~2462MHz
	Modulation Type:	BT(1Mbps): GFSK BT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8-DPSK IEEE 802.11b : DSSS (CCK, QPSK, DBPSK) IEEE 802.11g/n (HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Power Source	DC Voltage	
Adapter	Model: JK050300-S04US Input: 100-240V~, 50/60Hz, 0.5A Output: 5V---, 3000mA	
Battery	DC 3V, 210mAh	

2.1.1 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	Downloading Mode
Mode 2	GPS Mode
Mode 3	TF Card Playing Mode+Charging
Mode 4	Camera Mode

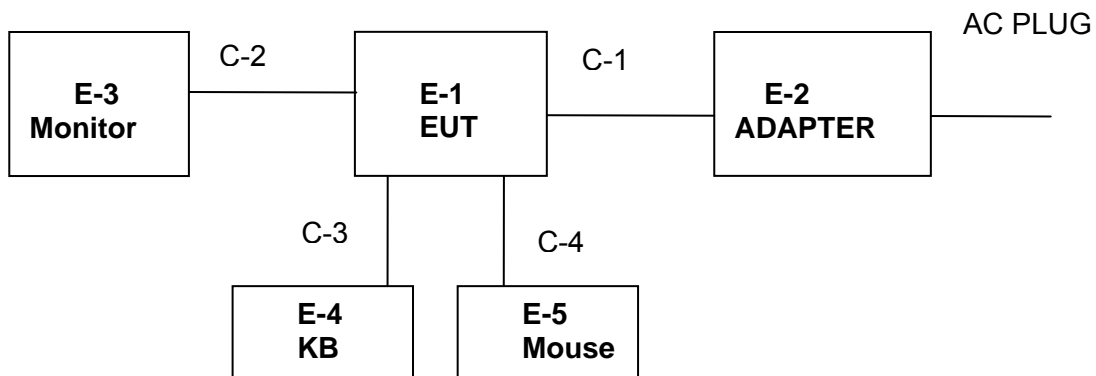
For Conducted Test	
Final Test Mode	Description
Mode 1	Downloading Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	Downloading Mode

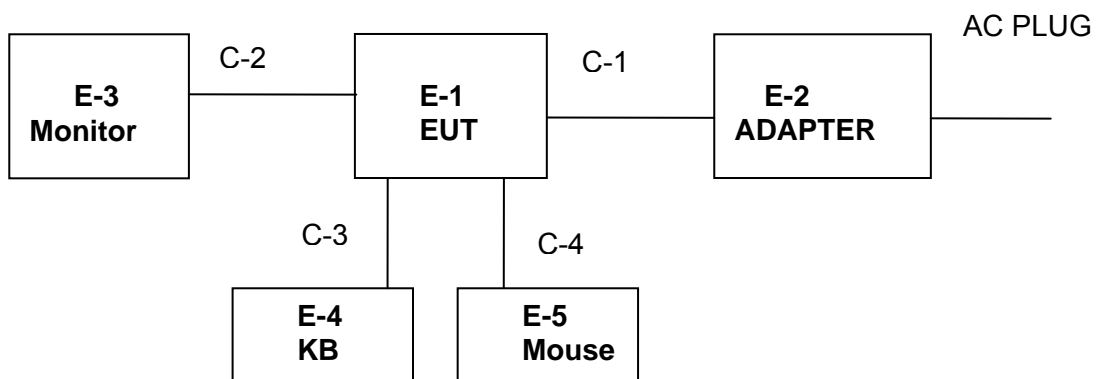
Note: Final Test Mode: Through Pre-scan, find the mode 1 is the worse case.
Only the worst case mode is recorded in the report.

2.2 DESCRIPTION OF TEST SETUP

RE



CE



2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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	Nano pc	N/A	DS152F	N/A	EUT
E-2	Printer	Canon	L11121E	LBP2900	
E-3	Personal computer	DELL	FT4Y23X	34413561645	
E-4	Monitor	DELL	IN2020MB	cn-0y6mhx-74261-11f-67es	
E-5	Keyboard	DELL	SK-8185	OY526KUS	
E-6	Mouse	DELL	MS111-P	cn-011d3v-71581-11e-1th7	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	Unshielded	NO	1.2m	Power Line
C-2	Metal wire	NO	1.0m	HDMI Line
C-3	Unshielded	NO	1.0m	PS2 Line
C-4	Unshielded	NO	1.0m	PS2 Line

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.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.4 MEASUREMENT INSTRUMENTS LIST

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	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	6200264416	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-10180	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
12	Test Cable	N/A	R-01	N/A	2015.07.06	2016.07.05	1 year
13	Test Cable	N/A	R-02	N/A	2015.07.06	2016.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	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
7	Test Cable	N/A	C01	N/A	2015.06.08	2016.06.07	1 year
8	Test Cable	N/A	C02	N/A	2015.06.08	2016.06.07	1 year
9	Test Cable	N/A	C03	N/A	2015.06.08	2016.06.07	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

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

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.

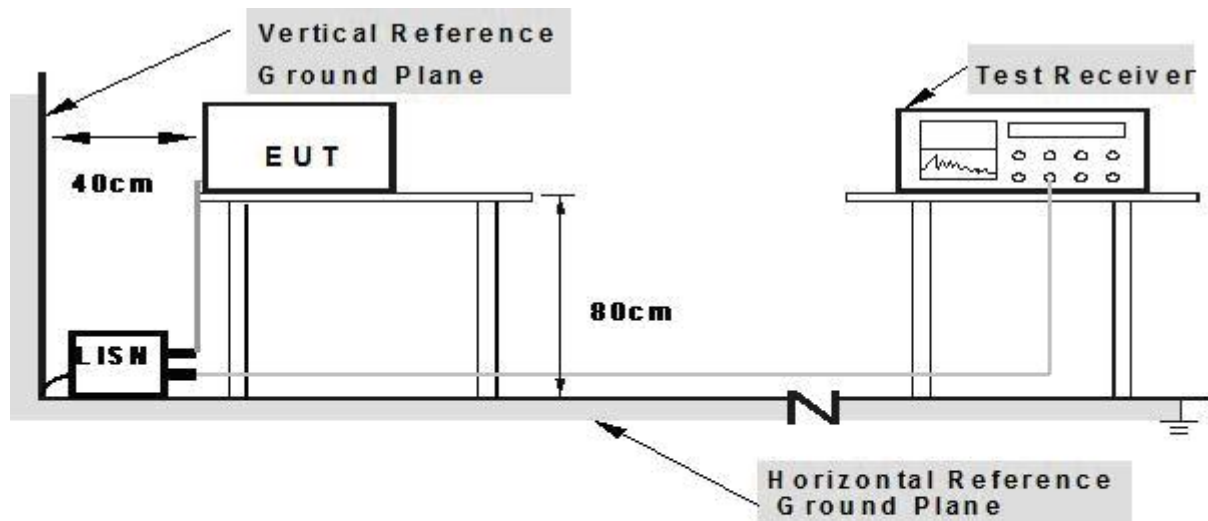
The following table is the setting of the receiver

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 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

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

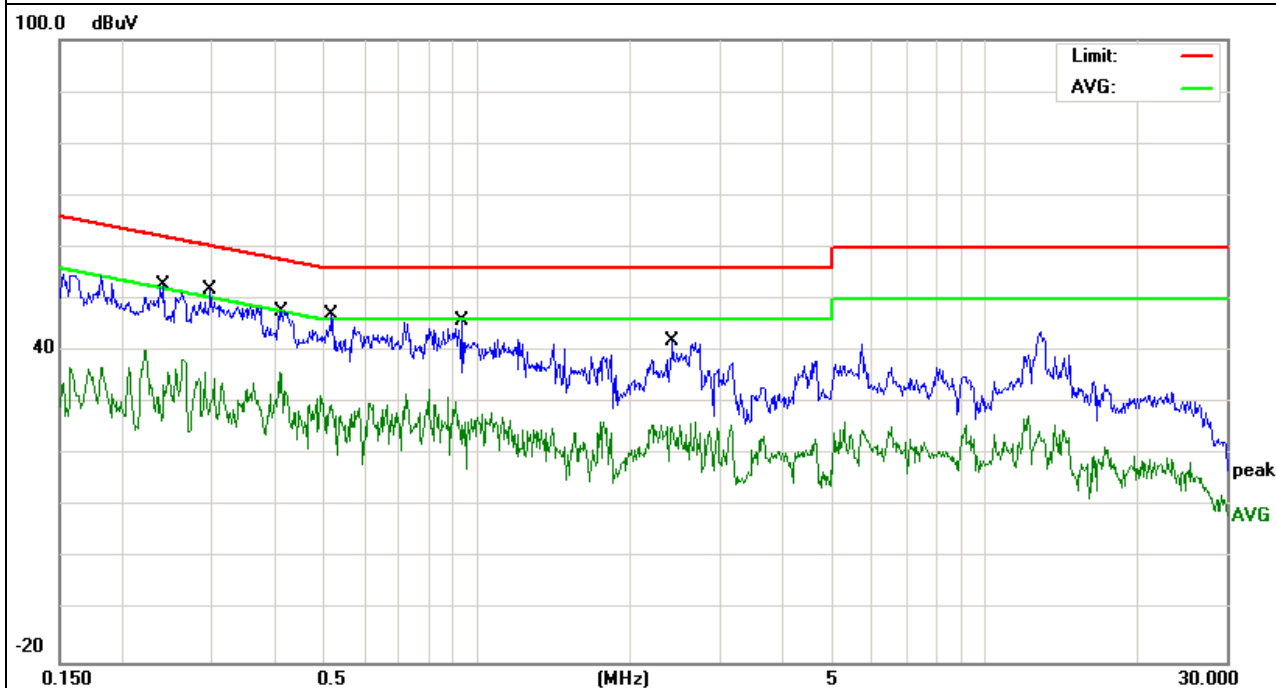
3.1.5 TEST RESULTS

EUT :	Nano pc	Model Name. :	DS152F
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Phase :	L
Test Voltage :	DC 5V From Adapter AC 120V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2403	43.40	9.50	52.90	62.08	-9.18	QP
0.2403	17.01	9.50	26.51	52.08	-25.57	AVG
0.2977	42.33	9.57	51.90	60.30	-8.40	QP
0.2977	20.28	9.57	29.85	50.30	-20.45	AVG
0.4102	38.60	9.20	47.80	57.64	-9.84	QP
0.4102	26.32	9.20	35.52	47.64	-12.12	AVG
0.5180	37.39	9.55	46.94	56.00	-9.06	QP
0.5180	15.82	9.55	25.37	46.00	-20.63	AVG
0.9375	36.41	9.56	45.97	56.00	-10.03	QP
0.9375	14.24	9.56	23.80	46.00	-22.20	AVG
2.4260	32.26	9.59	41.85	56.00	-14.15	QP
2.4260	15.03	9.59	24.62	46.00	-21.38	AVG

Remark:

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

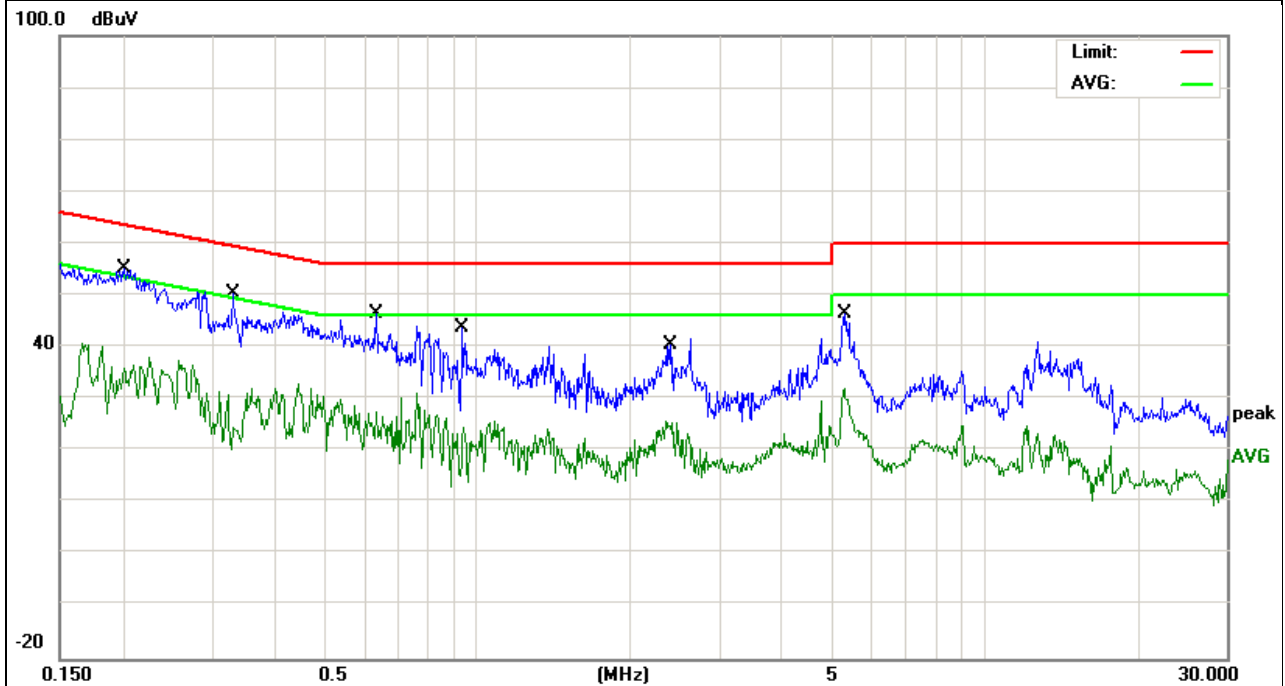


EUT :	Nano pc	Model Name. :	DS152F
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Phase :	N
Test Voltage :	DC 5V From Adapter AC 120V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2006	45.65	9.45	55.10	63.58	-8.48	QP
0.2006	23.85	9.45	33.30	53.58	-20.28	AVG
0.3300	40.97	9.45	50.42	59.45	-9.03	QP
0.3300	10.83	9.45	20.28	49.45	-29.17	AVG
0.6300	36.94	9.56	46.50	56.00	-9.50	QP
0.6300	18.04	9.56	27.60	46.00	-18.40	AVG
0.9340	34.29	9.56	43.85	56.00	-12.15	QP
0.9340	12.93	9.56	22.49	46.00	-23.51	AVG
2.4020	30.91	9.59	40.50	56.00	-15.50	QP
2.4020	15.29	9.59	24.88	46.00	-21.12	AVG
5.3059	36.62	9.68	46.30	60.00	-13.70	QP
5.3059	20.15	9.68	29.83	50.00	-20.17	AVG

Remark:

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

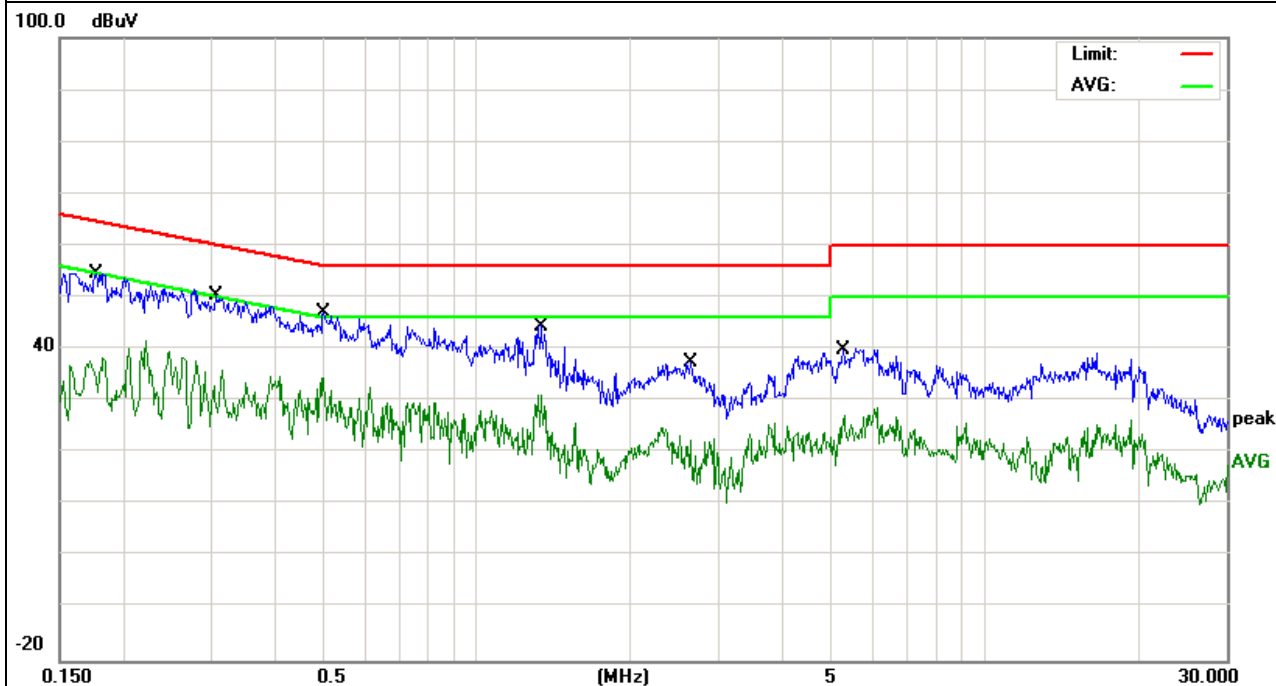


EUT :	Nano pc	Model Name. :	DS152F
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Phase :	L
Test Voltage :	DC 5V From Adapter AC 230V /50Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1766	45.03	9.47	54.50	64.64	-10.14	QP
0.1766	25.05	9.47	34.52	54.64	-20.12	AVG
0.3059	40.85	9.55	50.40	60.08	-9.68	QP
0.3059	20.74	9.55	30.29	50.08	-19.79	AVG
0.4979	37.66	9.54	47.20	56.03	-8.83	QP
0.4979	24.83	9.54	34.37	46.03	-11.66	AVG
1.3340	34.93	9.57	44.50	56.00	-11.50	QP
1.3340	15.49	9.57	25.06	46.00	-20.94	AVG
2.6259	27.90	9.60	37.50	56.00	-18.50	QP
2.6259	10.05	9.60	19.65	46.00	-26.35	AVG
5.2738	30.12	9.68	39.80	60.00	-20.20	QP
5.2738	16.81	9.68	26.49	50.00	-23.51	AVG

Remark:

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

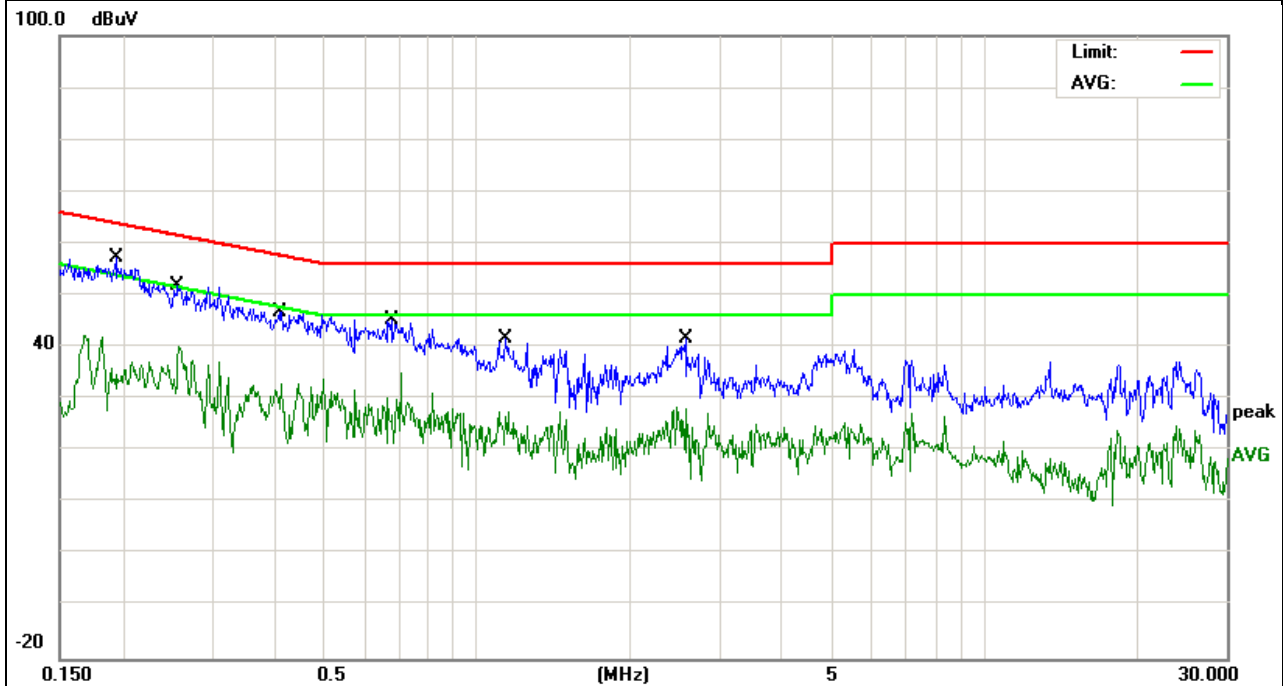


EUT :	Nano pc	Model Name. :	DS152F
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Phase :	N
Test Voltage :	DC 5V From Adapter AC 240V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1940	47.85	9.45	57.30	63.86	-6.56	QP
0.1940	24.54	9.45	33.99	53.86	-19.87	AVG
0.2560	42.38	9.52	51.90	61.56	-9.66	QP
0.2560	21.63	9.52	31.15	51.56	-20.41	AVG
0.4061	37.72	9.18	46.90	57.73	-10.83	QP
0.4061	19.01	9.18	28.19	47.73	-19.54	AVG
0.6780	35.83	9.57	45.40	56.00	-10.60	QP
0.6780	17.45	9.57	27.02	46.00	-18.98	AVG
1.1372	32.14	9.56	41.70	56.00	-14.30	QP
1.1372	17.07	9.56	26.63	46.00	-19.37	AVG
2.5779	32.00	9.60	41.60	56.00	-14.40	QP
2.5779	10.18	9.60	19.78	46.00	-26.22	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 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

Test Arrangement for Radiated Emissions up to 1 GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters 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.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.

Test Arrangement for Radiated Emissions above 1 GHz.

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

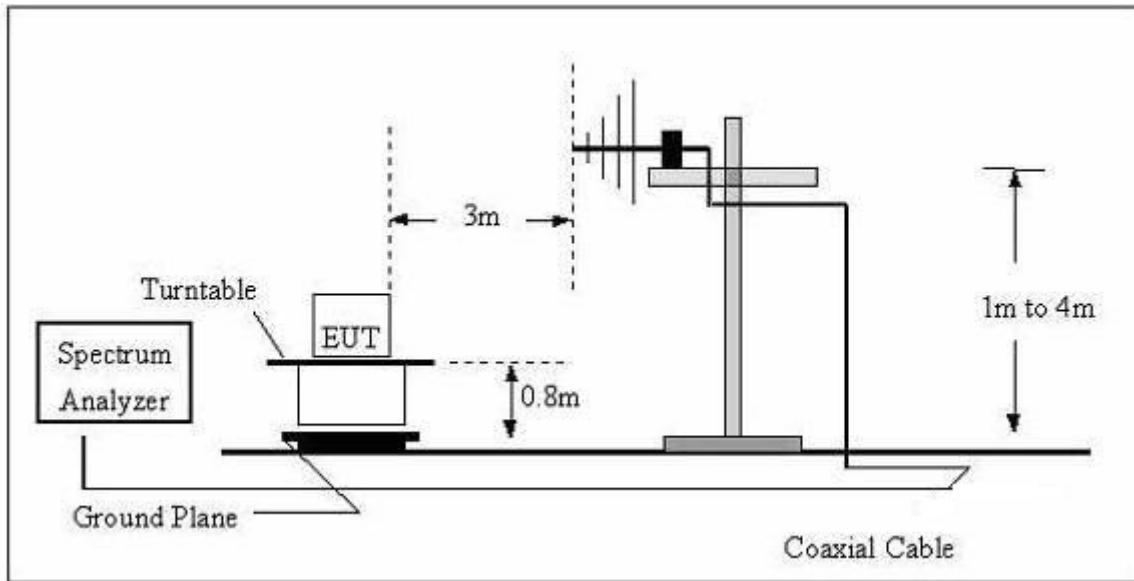
Note: For the hand-held device, the EUT should be measured for all 3 axes and only the worst case is recorded in the report

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

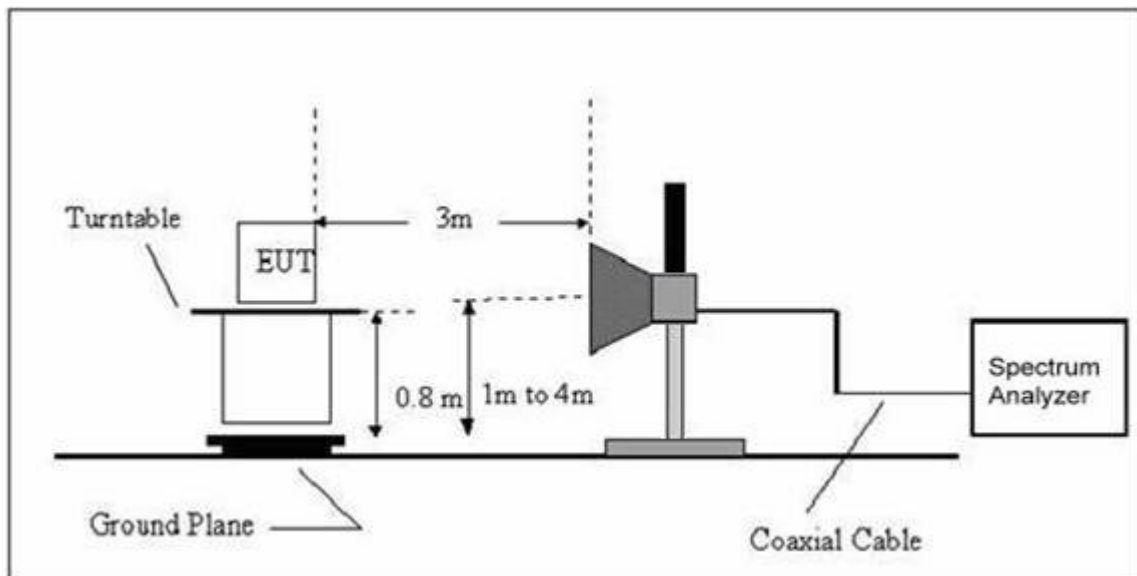
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Avg	1 MHz	10 Hz

3.2.3 TEST SETUP

For Radiated Emission 30~1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 TEST RESULTS

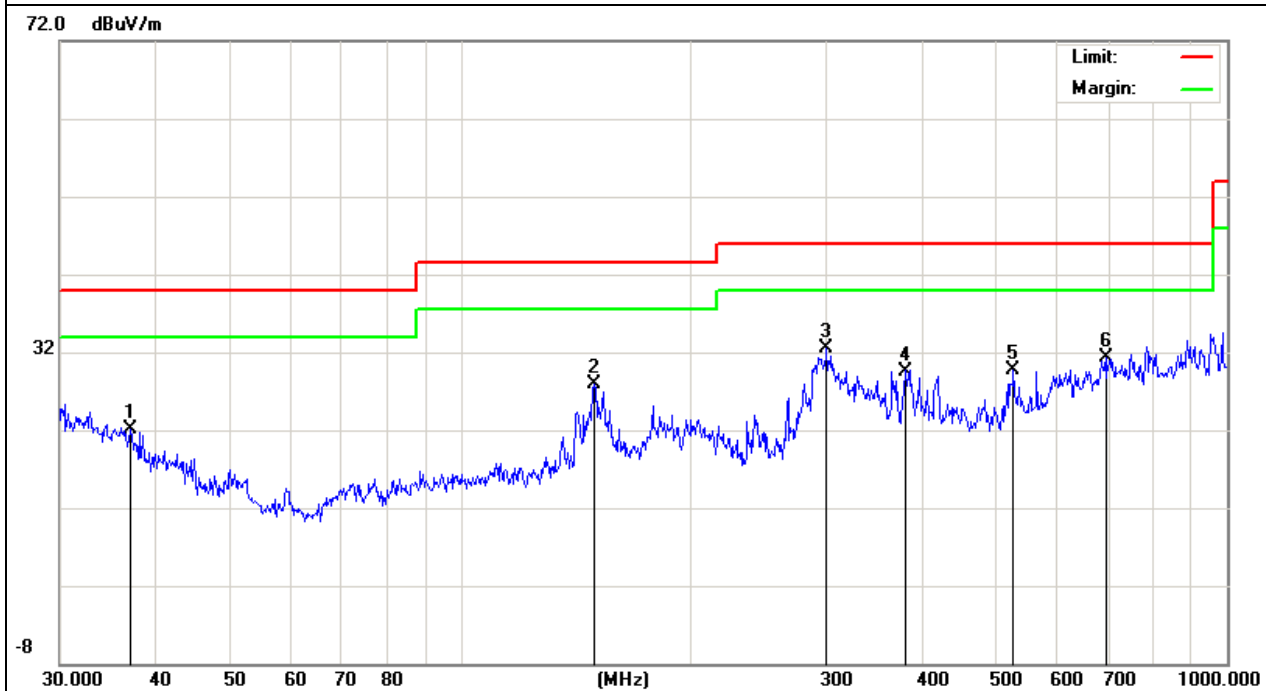
TEST RESULTS (30~1000 MHz)

EUT :	Nano pc	Model Name :	DS152F
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Polarization :	Horizontal
Test Power :	DC 5V From Adapter AC 120V/60Hz		

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Remark
37.1550	5.84	16.25	22.09	40.00	-17.91	QP
149.4857	16.24	11.66	27.90	43.50	-15.60	QP
300.3672	19.88	12.60	32.48	46.00	-13.52	QP
381.2485	14.63	14.97	29.60	46.00	-16.40	QP
526.3967	12.21	17.49	29.70	46.00	-16.30	QP
696.8567	10.36	21.04	31.40	46.00	-14.60	QP

Remark:

Factor = Antenna Factor + Cable Loss - Amplifier.

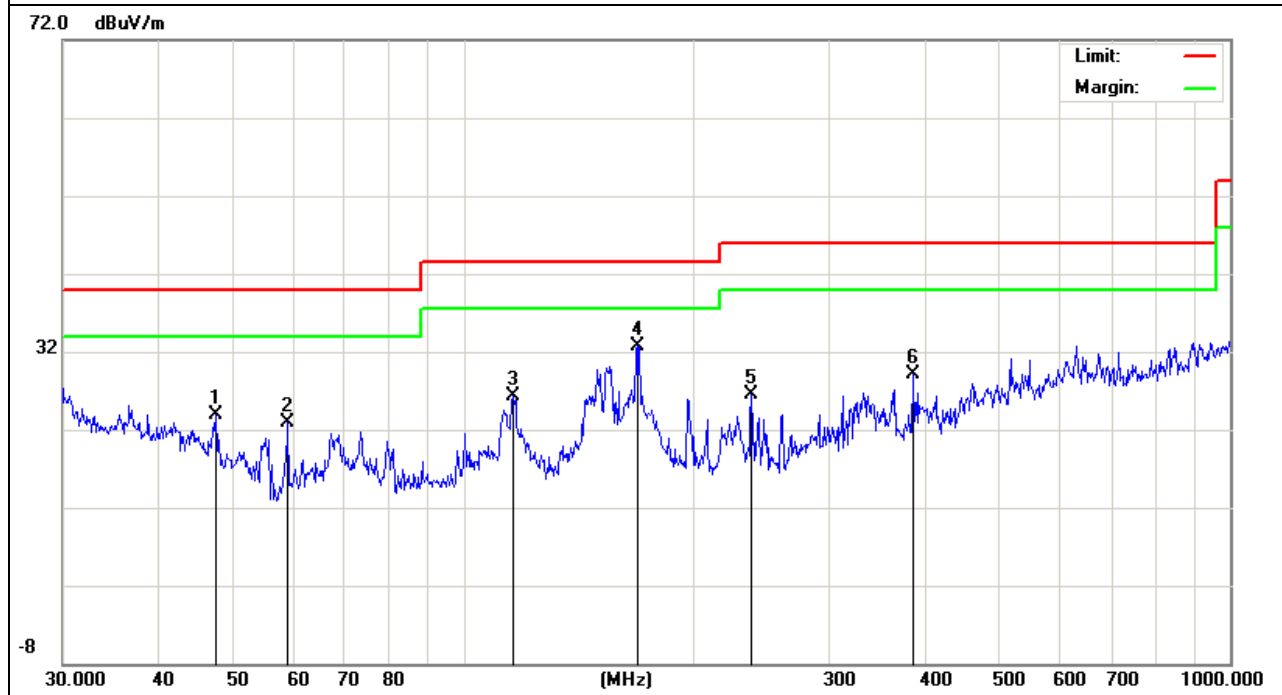


EUT :	Nano pc	Model Name :	DS152F
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2015-10-12
Test Mode :	Mode 1	Polarization :	Vertical
Test Power :	DC 5V From Adapter AC 120V/60Hz		

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Remark
47.4917	13.84	10.06	23.90	40.00	-16.10	QP
59.0251	16.77	6.16	22.93	40.00	-17.07	QP
116.1320	16.14	10.26	26.40	43.50	-17.10	QP
168.4138	20.50	12.30	32.80	43.50	-10.70	QP
237.4756	15.72	10.75	26.47	46.00	-19.53	QP
385.2805	14.18	14.87	29.05	46.00	-16.95	QP

Remark:

Factor = Antenna Factor + Cable Loss - Amplifier.



3.2.5 TEST RESULTS(1000~12400MHz)

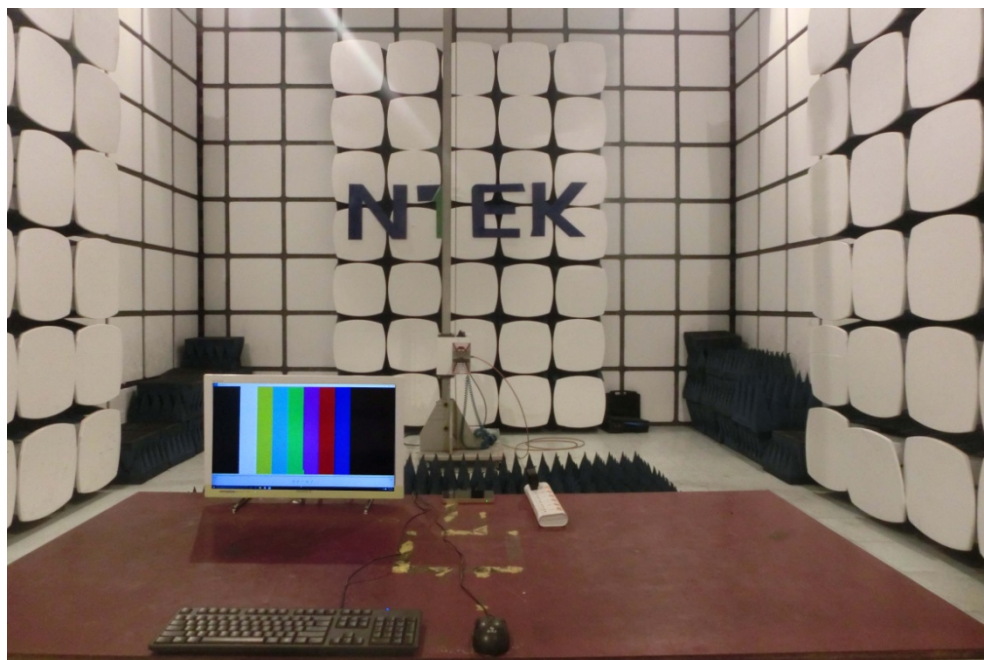
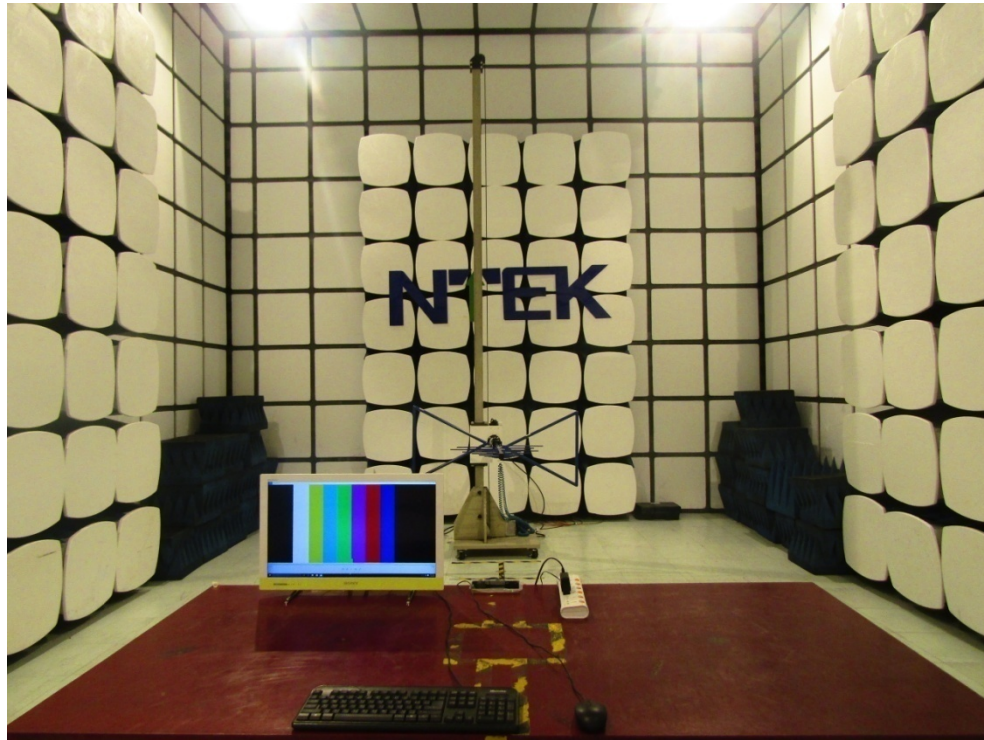
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	1579.168	61.02	-10.85	50.17	74	-23.83	peak
V	1579.168	44.56	-10.85	33.71	54	-20.29	AVG
V	1739.597	57.06	-10.09	46.97	74	-27.03	peak
V	1739.597	42.26	-10.09	32.17	54	-21.83	AVG
H	1570.703	58.70	-10.90	47.80	74	-26.20	peak
H	1570.703	42.92	-10.90	32.02	54	-21.98	AVG
H	1705.647	56.27	-10.23	46.04	74	-27.96	peak
H	1705.647	41.39	-10.23	31.16	54	-22.84	AVG

Remark:

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

4. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos

