No.:
FCCSZ2025-0015-RF2

TEST REPORT

FCC ID	:	**2ASWYSOLARGUARDX110**
NAME OF SAMPLE	:	**Solar powered E-lock**
APPLICANT	:	**SHENZHEN TOPFLYtech CO., LIMITED**
CLASSIFICATION OF TEST	:	**N/A**

CVC Testing Technology (Shenzhen) Co., Ltd.

Applicant	**Name: SHENZHEN TOPFLYtech CO., LIMITED** **Address: Rm 409, Scientific Research Building, Tsinghua Hi-tech Park Hi-tech Industrial Nanshan District, Shenzhen, Guangdong, China**
Manufacturer	**Name: SHENZHEN TOPFLYtech CO., LIMITED** **Address: Rm 409, Scientific Research Building, Tsinghua Hi-tech Park Hi-tech Industrial Nanshan District, Shenzhen, Guangdong, China**
Equipment Under Test	**Product Name: Solar powered E-lock** **Model Name: SolarGuardX 110** **Brand Name: TOPFLYtech** **Serial NO.: N/A** **Sample NO.: 4-1**

Date of Receipt.	**Feb. 09, 2025**	Date of Testing	**Feb. 09, 2025 ～ Apr. 25, 2025**

Test Specification	**Test Result**
FCC Part 15, Subpart C, Section 15.225	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC **Issue Date: Apr. 25, 2025**

Compiled by:	Reviewed by:	Approved by:
Zhu Yulin Name Signature	**Mo Xianbiao** Name Signature	**Dong Sanbi** Name Signature

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCCSZ2025-0015-RF2	Original release	Apr. 25, 2025

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C Section 15.225			
FCC STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Line Conducted Emission	PASS	Meet the requirement of limit.
15.225 (a)&(b)&(c) 15.205	The field strength of Fundamental Emission	PASS	Meet the requirement of limit.
15.225 (d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.225 (e)	Frequency tolerance	PASS	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

1.1 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab of CVC Testing Technology (Shenzhen) Co., Ltd.

Address: No. 1301-14&16, Guanguang Road, Xinlan Community, Guanlan Subdistrict, Longhua District, Shenzhen, Guangdong, China

Post Code：518110 Tel：0755-23763060-8805
Fax：0755-23763060 E-mail：sz-kf@cvc.org.cn
FCC(Test firm designation number：CN1363)
IC(Test firm CAB identifier number：CN0137)
CNAS(Test firm designation number：L16091)

1.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Antenna Port Conducted Test					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 30	104408	1 year	2026/4/22
#3Shielding room	MORI	443	N/A	3 year	2026/5/16
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168778	1 year	2025/5/24
Analog signal Generator (100kHz ~ 40GHz)	Rohde&Schwarz	SMB 100A	181934	1 year	2026/4/22
Vector signal Generator (9kHz ~ 6GHz)	Rohde&Schwarz	SGT 100A	111724	1 year	2026/4/22
RF control unit(BT/WiFi)	Tonscend	JS0806-2-8CH	CS0300023	1 year	2026/4/22
Temperature and humidity meter	/	C193561457	C193561457	1 year	2026/4/28
Radiation Spurious Test - 3M Chamber #2					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	1 year	2026/4/22
EMI Test Receiver	Rohde&Schwarz	ESR3	102694	1 year	2025/5/24
Antenna(30MHz~1001MHz)	SCHWARZBECK	VULB 9168	01133	1 year	2026/1/22
Horn antenna(1GHz-18GHz)	ETS	3117	227611	1 year	2026/3/28
Horn antenna(18GHz-40GHz)	QMS	QMS-00880	22051	1 year	2026/3/21
3m anechoic chamber	MORI	966	CS0300011	3 year	2026/5/18
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	1 year	2026/4/22
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	1 year	2026/4/22
Preamplifier(10kHz-1GHz)	Rohde&Schwarz	SCU-01F	100299	1 year	2026/4/22
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2026/4/22
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100801	1 year	2026/4/22
Preamplifier(18GHz-40GHz)	Rohde&Schwarz	SCU-40A	101209	1 year	2026/4/22
Temperature and humidity meter	/	C193561517	C193561517	1 year	2026/4/28
Radiation Spurious Test - 3M Chamber #1					
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	1 year	2025/5/24
Loop antenna(8.3k~30MHz)	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2025/6/3
Antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	01132	1 year	2026/2/27
Horn antenna(1GHz-18GHz)	SCHWARZBECK	BBHA9120D	02793	1 year	2026/1/20
3m anechoic chamber	MORI	966	N/A	1 year	2026/5/18
Preamplifier(10kHz-1GHz)	Rohde&Schwarz	SCU-01F	100298	1 year	2026/4/22
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2026/4/22
Attenuator	/	SJ-5dB	607684	1 year	2026/2/27
#1 control room	MORI	433	/	1 year	2026/5/16
Temperature and humidity meter	/	C193561473	C193561473	1 year	2026/4/28
Conducted emission					
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2025/5/24
limiter(10 dB)	Rohde&Schwarz	VTSD 9561	01216	1 year	2026/4/22
Voltage probe	Rohde&Schwarz	CVP9222C	00028	1 year	2026/4/28
Current probe	Rohde&Schwarz	EZ-17	101442	1 year	2026/4/22
ISN network	Rohde&Schwarz	ENV 81	100401	1 year	2026/4/22
ISN network	Rohde&Schwarz	ENV 81 Cat6	101896	1 year	2026/4/22
#1Shielding room	MORI	854	N/A	3 year	2026/5/16
LISN	SCHWARZBECK	NSLK 8129	05021	1 year	2026/4/22
Temperature and humidity meter	/	C193561430	C193561430	1 year	2026/4/28

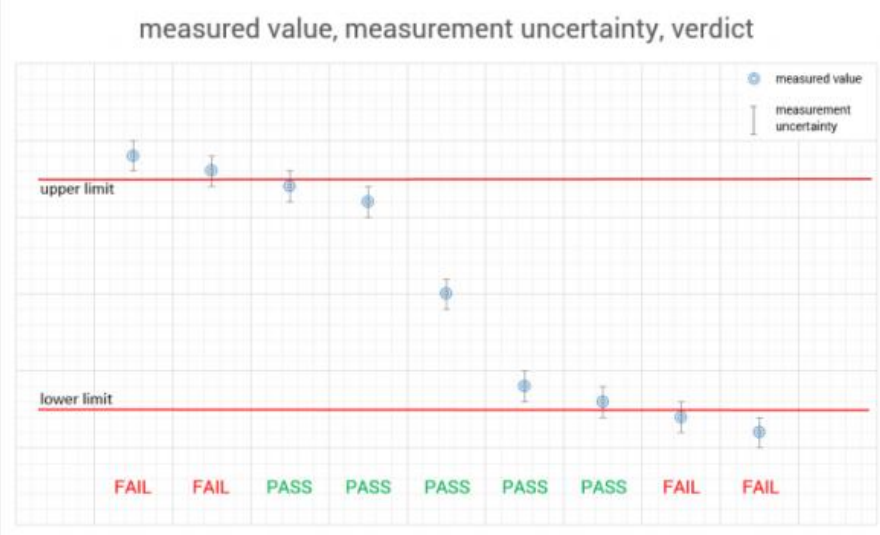
1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Measurement Uncertainty
1	Occupied Channel Bandwidth	±1.86 %
2	RF output power, conducted	±0.9 dB
3	Power Spectral Density, conducted	±0.8 dB
4	Conducted emission test	+/-2.7 dB
5	Radiated emission 9kHz-30MHz	+/-5.6 dB
	Radiated emission 30MHz-1GHz	+/-4.6 dB
	Radiated emission 1GHz-18GHz	+/-4.4 dB
	Radiated emission 18GHz-40GHz	+/-5.1 dB
6	Temperature	±0.73 °C
7	Humidity	±3.90 %
8	Supply voltages	±0.37 %
9	Time	±0.27 %
Remark: 95% Confidence Levels, k=2.		

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed.
The measurement uncertainty is mentioned in this test report, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT NAME	Solar powered E-lock
BRAND NAME	TOPFLYtech
MODEL NAME	SolarGuardX 110
ADDITIONAL MODEL	N/A
POWER SUPPLY	1. DC 5V from USB host 2. DC 3.6V from Li-Polymer battery
MODULATION TYPE	ASK
OPERATING FREQUENCY	13.56MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE (Remark 4/5)	Loop antenna
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	Single-ended charging cable, 60cm

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. EUT photo refer to the report (Report NO.: FCCSZ2024-0006-EUT).
4. Please refer to the antenna report.
5. Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

2.2 DESCRIPTION OF ACCESSORIES

N/A

2.3 OPERATING FREQUENCY

The EUT only have one channel.

CHANNEL	FREQUENCY (MHz)
1	13.56

2.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports
The worst case was found when positioned on X axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE	FT	PLC	BW	
A	√	√	√	√	NFC Link

Where **RE:** Radiated Emission **FT:** Frequency tolerance
PLC: Power Line Conducted Emission **BW:** 20dB Bandwidth

RADIATED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	TESTED FREQUENCY (MHZ)	MODULATION TYPE	AXIS
A	1	13.56	ASK	X
	1	13.56	ASK	Y
	1	13.56	ASK	Z

FREQUENCY TOLERANCE:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	TESTED FREQUENCY (MHZ)	MODULATION TYPE	AXIS
A	1	13.56	ASK	Y

POWER LINE CONDUCTED EMISSION TEST:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
A	NFC Link

20dB BANDWIDTH:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CHANNEL	TESTED FREQUENCY (MHZ)	MODULATION TYPE	AXIS
A	1	13.56	ASK	Y

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE	25.5deg. C, 56%RH	DC 5V from USB host	Liu Yuan
FT	25.5deg. C, 56%RH	DC 5V from USB host	Zhu Yulin
PLC	25.5deg. C, 56%RH	DC 5V from USB host	Zhu Yulin
BW	25.5deg. C, 56%RH	DC 5V from USB host	Zhu Yulin

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.225

ANSI C63.10-2020

All test items have been performed and recorded as per the above standards

2.6 DESCRIPTION OF SUPPORT UNITS

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.

Support Equipment					
NO	Description	Brand	Model No.	Serial Number	Supplied by
1	Adapter	Apple	A1443	N/A	Lab

Support Cable							
NO	Description	Quantity (Number)	Length (m)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	USB cable	1	0.8	No	No	N/A	Lab

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
NOTE: 1. The lower limit shall apply at the transition frequencies. NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

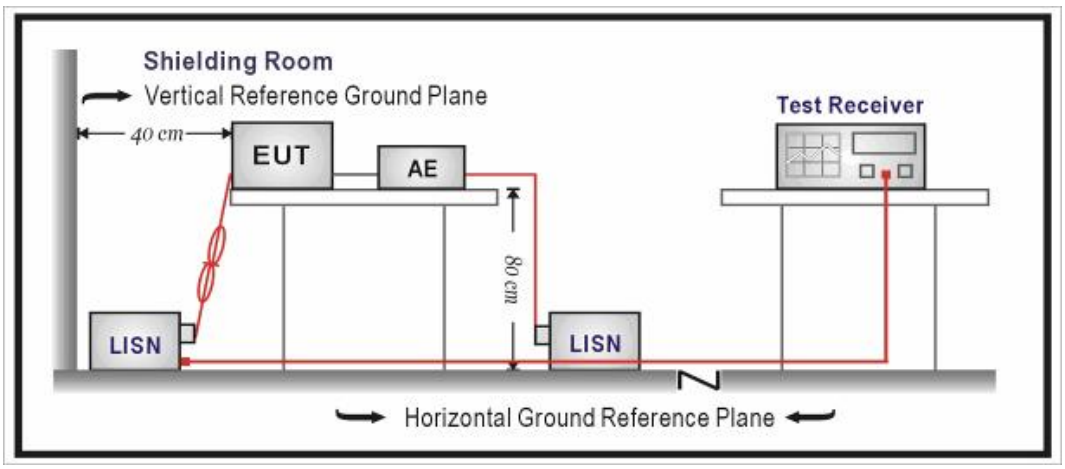
3.1.2 Test Procedures

a. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.The equipment under test shall be placed on a support of non-metallic material, the height of which shall be1.5m above the ground,

b. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

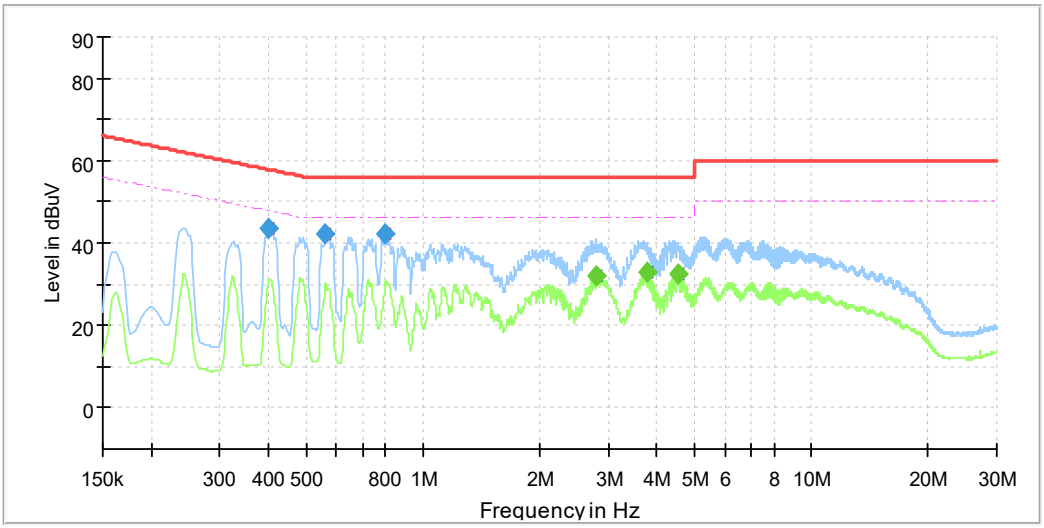
c. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test Results

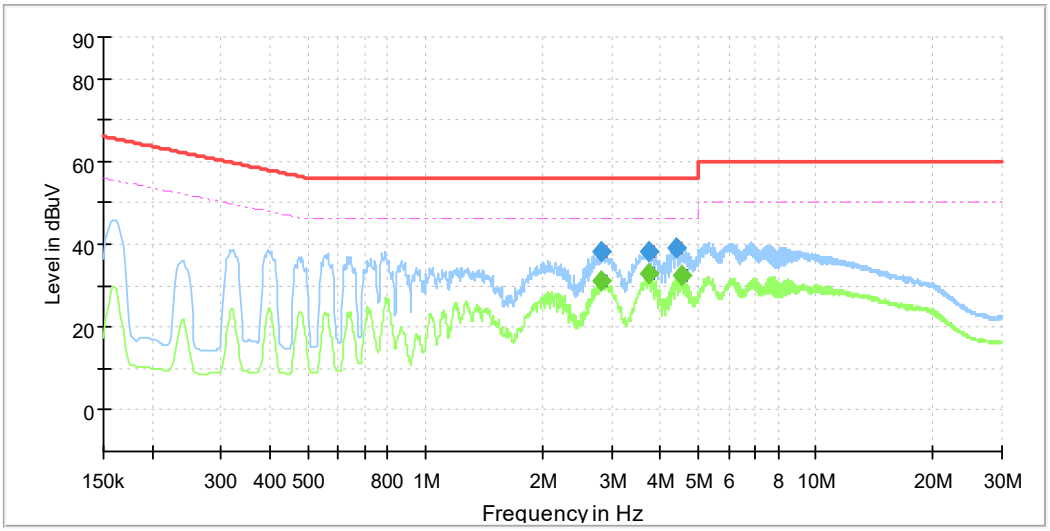
Test Mode	NFC Link	Frequency Range	150KHz ~ 30MHz
PHASE	Line (L)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.402	43.7	---	57.8	14.1	L	19.3
2	0.562	42.3	---	56.0	13.7	L	19.3
3	0.803	42.2	---	56.0	13.8	L	19.4
4	2.798	---	32.0	46.0	14.0	L	19.4
5	3.791	---	32.9	46.0	13.1	L	19.5
6	4.547	---	32.3	46.0	13.7	L	19.5

Remark: The emission levels of other frequencies were very low against the limit.

Test Mode	NFC Link	Frequency Range	150KHz ~ 30MHz
PHASE	Line (N)		



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	2.837	38.2	---	56.0	17.8	N	19.6
2	2.837	---	31.2	46.0	14.8	N	19.6
3	3.732	38.3	---	56.0	17.7	N	19.6
4	3.732	---	32.9	46.0	13.1	N	19.6
5	4.391	39.0	---	56.0	17.0	N	19.7
6	4.547	---	32.6	46.0	13.4	N	19.7

Remark: The emission levels of other frequencies were very low against the limit.

3.2 RADIATED EMISSIONS MEASUREMENT

3.2.1 Limits

(a)The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(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 at 30 meters.
(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 at 30 meters.

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
NOTE: 1. The lower limit shall apply at the transition frequencies. NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).		

3.2.2 Measurement procedure

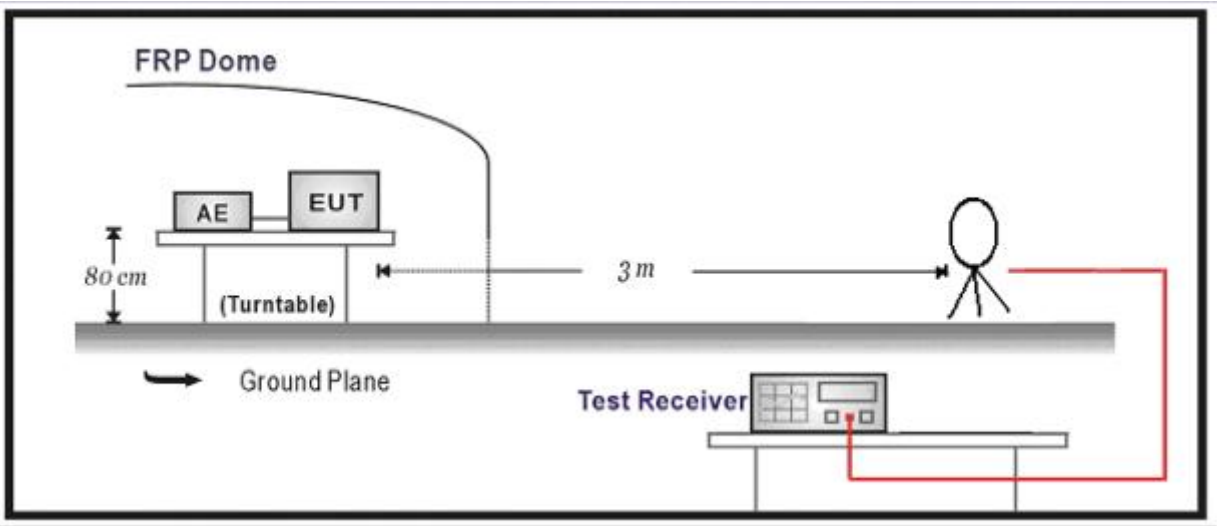
a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. For below 1GHz was used bilog antenna, and above 1GHz was used horn 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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

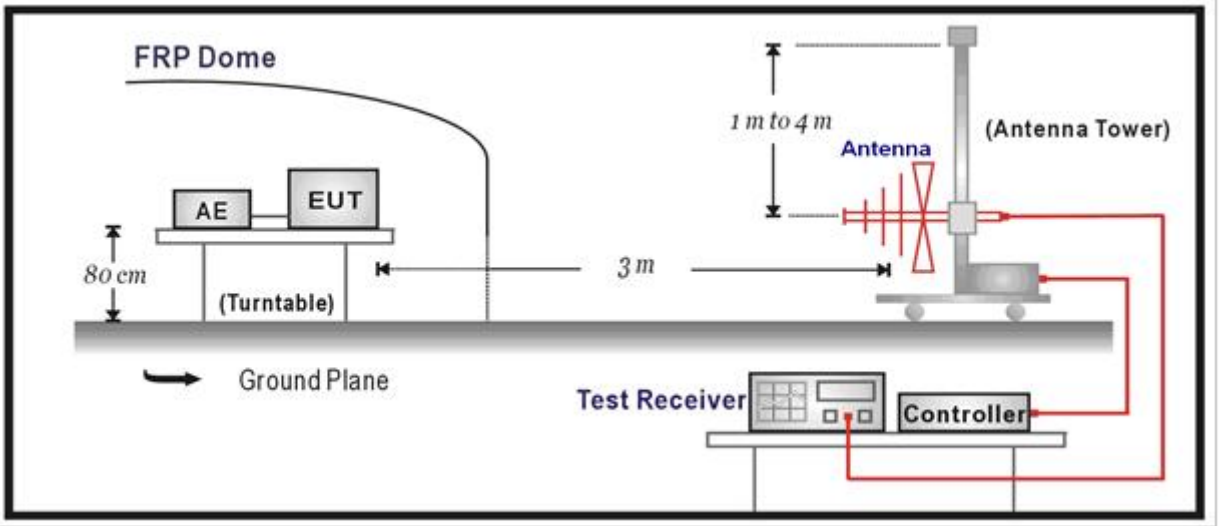
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

Below 30MHz Test Setup:



Below 1GHz Test Setup:

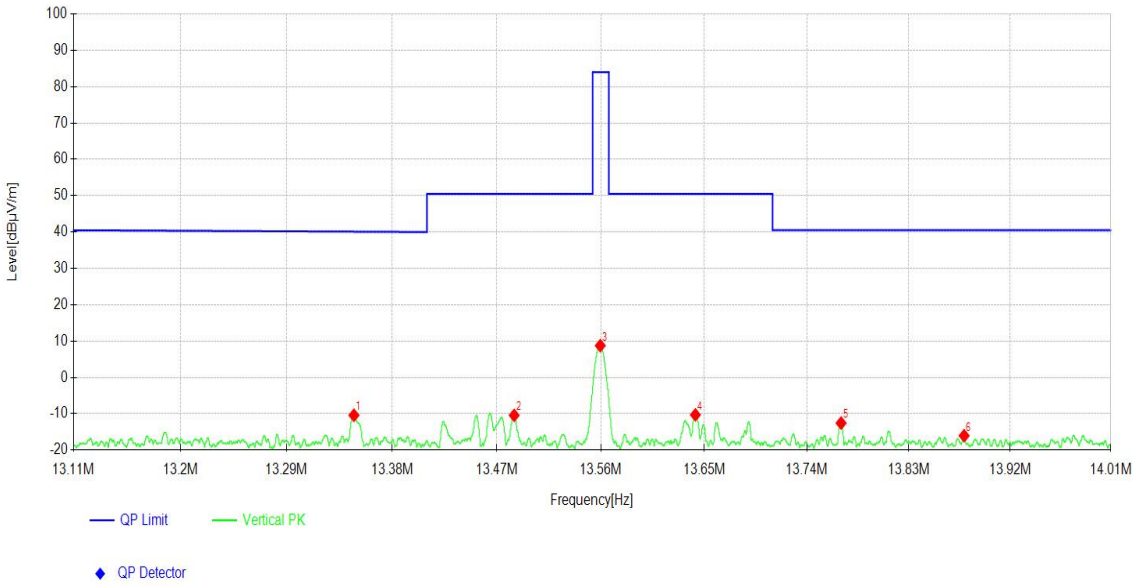


3.2.4 Test results

Result of The field strength of Fundamental Emission

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	13.11MHz ~ 14.01MHz	**Detector Function**	Quasi-Peak (QP)

X-Pol

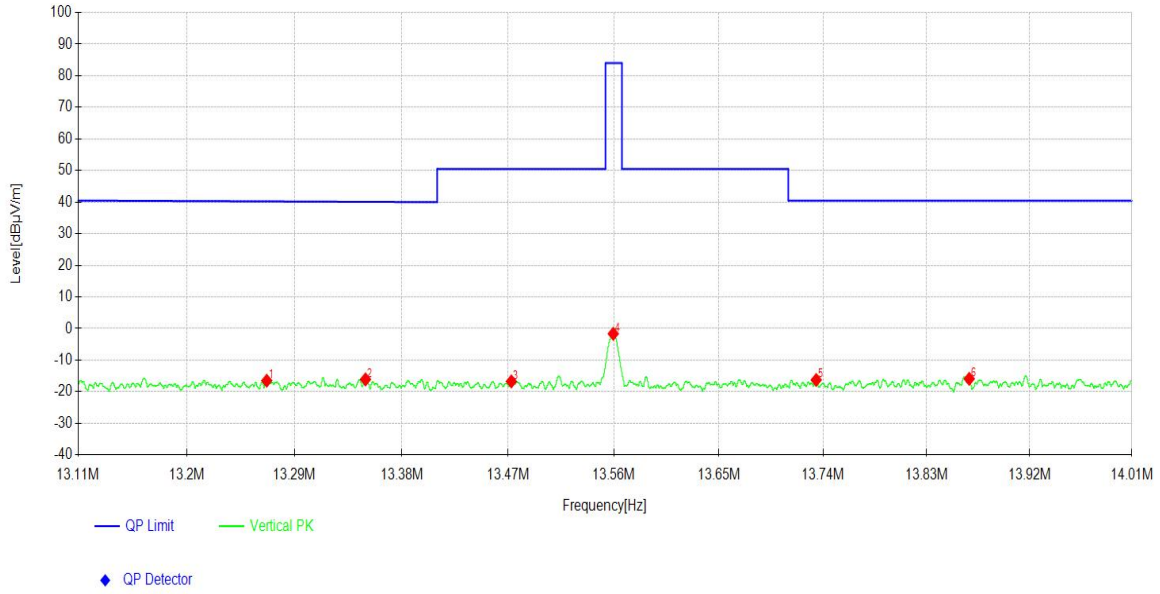


NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	13.347	9.51	-19.93	-10.42	50.52	100	340
2	13.485	9.48	-19.91	-10.43	60.93	100	20
3	**13.560**	**28.65**	**-19.90**	**8.75**	**75.25**	**100**	**300**
4	13.642	9.58	-19.88	-10.3	60.80	100	70
5	13.770	7.30	-19.86	-12.56	53.06	100	210
6	13.879	3.81	-19.85	-16.04	56.54	100	160

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	13.11MHz ~ 14.01MHz	**Detector Function**	Quasi-Peak (QP)

Y-Pol

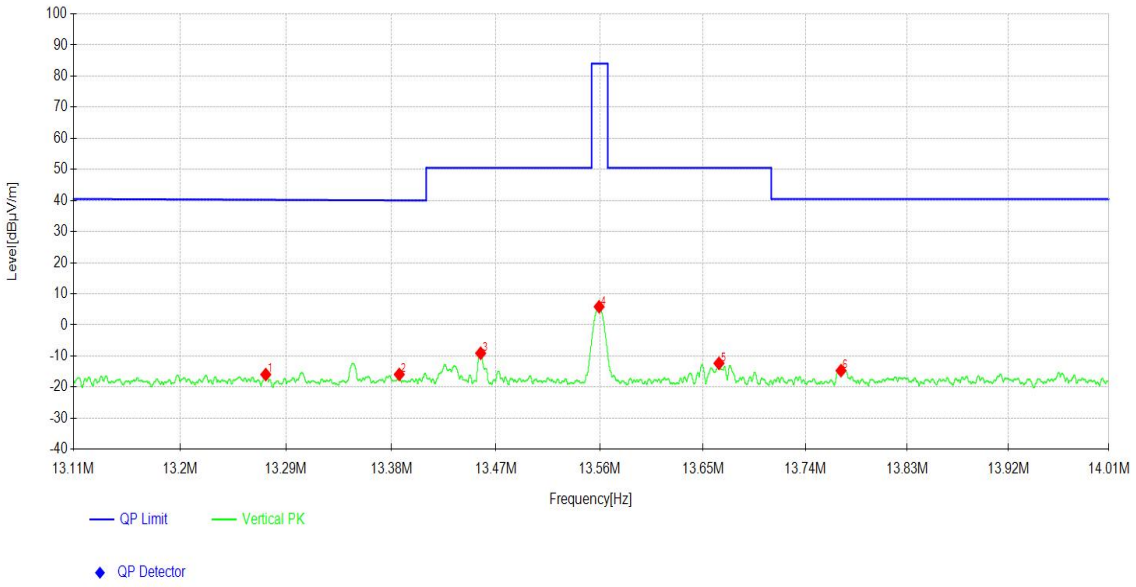


NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	13.267	3.45	-19.94	-16.49	56.73	100	60
2	13.350	3.83	-19.93	-16.10	56.20	100	150
3	13.473	3.17	-19.91	-16.74	67.24	100	330
4	13.560	18.24	-19.90	-1.66	85.66	100	80
5	13.734	3.60	-19.87	-16.27	56.77	100	230
6	13.867	3.94	-19.85	-15.91	56.41	100	350

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	13.11MHz ~ 14.01MHz	**Detector Function**	Quasi-Peak (QP)

Z-Pol



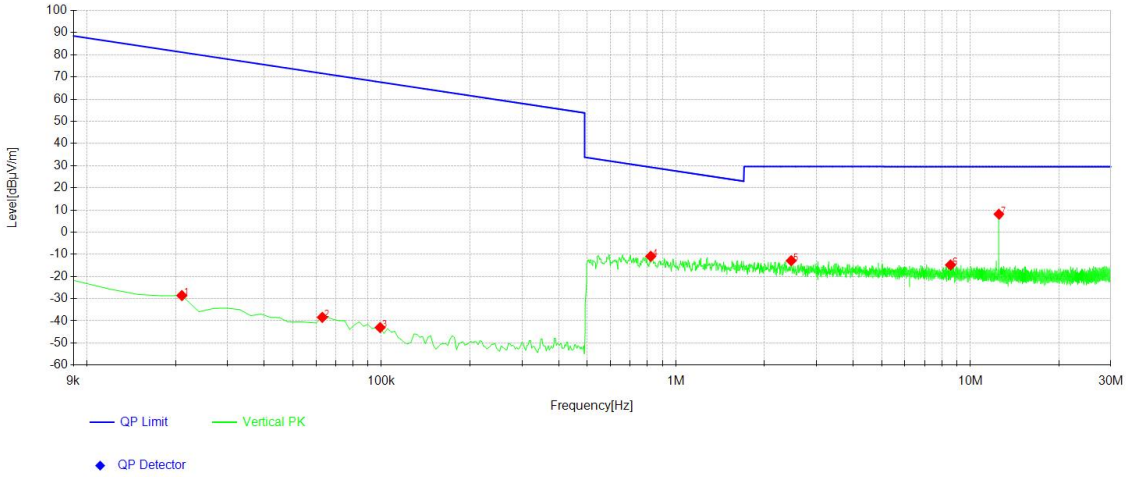
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	13.273	3.99	-19.94	-15.95	56.18	100	260
2	13.387	4.01	-19.92	-15.91	55.95	100	350
3	13.457	10.82	-19.91	-9.09	59.59	100	270
4	13.560	25.75	-19.90	5.85	78.15	100	240
5	13.664	7.54	-19.88	-12.34	62.84	100	270
6	13.771	5.18	-19.86	-14.68	55.18	100	270

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Result of Radiated Emissions(9kHz~30MHz)

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	9kHz ~ 30MHz	**Detector Function**	Quasi-Peak (QP)

X-Pol

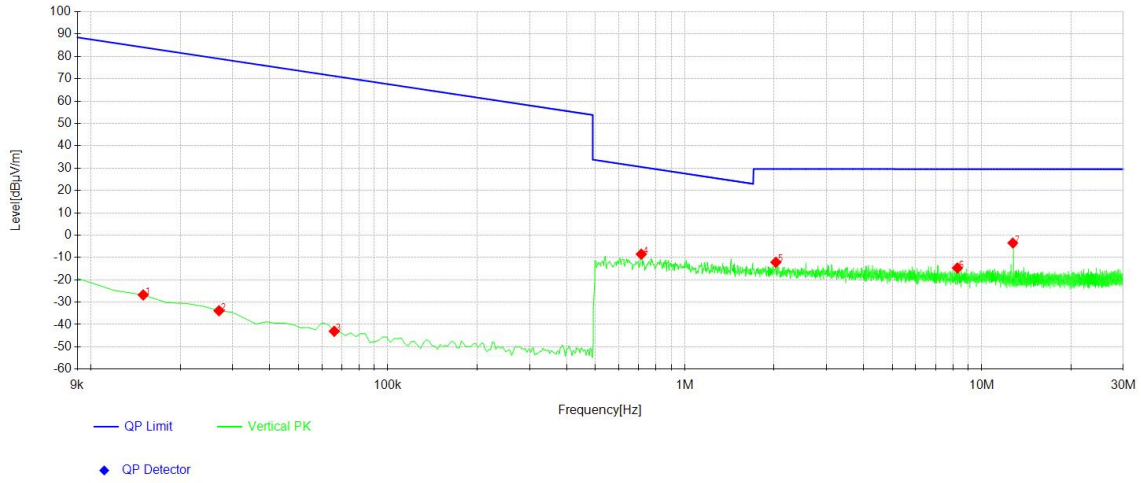


NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	0.021	30.71	-59.31	-28.6	109.76	100	10
2	0.063	20.77	-59.21	-38.44	110.06	100	150
3	0.099	16.31	-59.34	-43.03	110.72	100	10
4	0.822	8.12	-19.04	-10.92	40.22	100	280
5	2.466	6.19	-19.06	-12.87	42.44	100	320
6	8.569	4.66	-19.48	-14.82	44.37	100	360
7	13.560	27.90	-19.90	8.00	21.55	100	350

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	9kHz ~ 30MHz	**Detector Function**	Quasi-Peak (QP)

Y-Pol

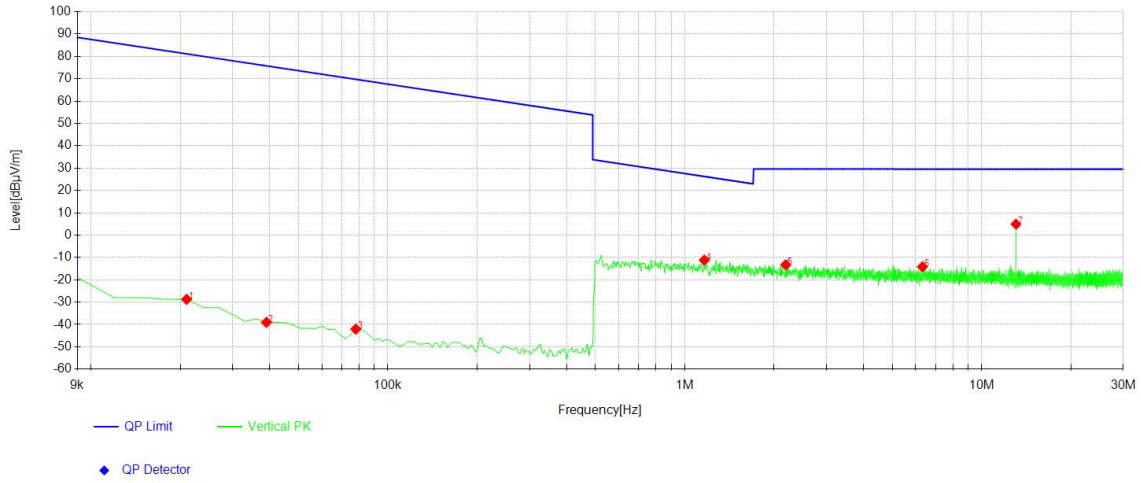


NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	0.012	34.79	-59.45	-24.66	110.68	100	2
2	0.084	14.90	-59.41	-44.51	113.63	100	348
3	0.216	11.36	-59.47	-48.11	109.03	100	3
4	1.230	8.71	-19.19	-10.48	36.27	100	302
5	2.690	6.37	-19.03	-12.66	42.23	100	158
6	5.153	5.64	-19.23	-13.59	43.15	100	170
7	13.560	17.72	-19.90	-2.18	19.35	100	120

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	9kHz ~ 30MHz	**Detector Function**	Quasi-Peak (QP)

Z-Pol



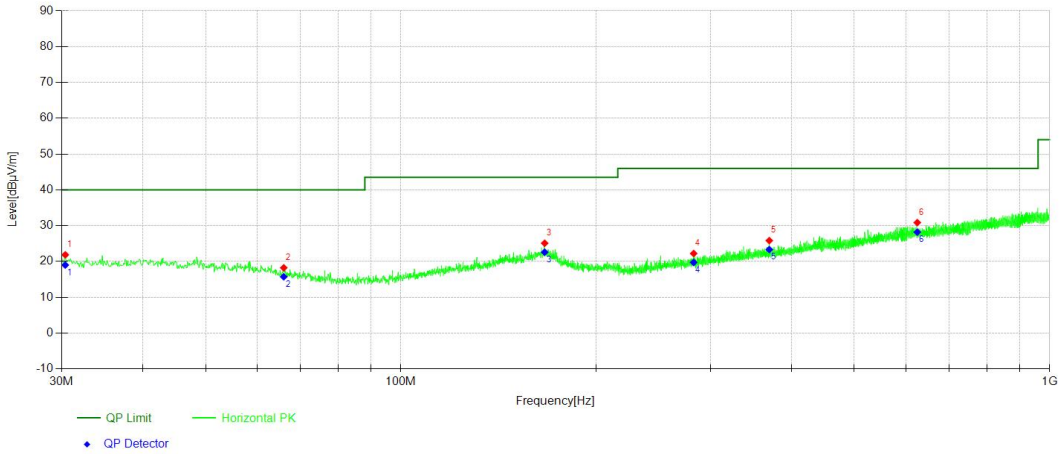
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]
1	0.021	30.58	-59.31	-18.32	109.89	100	70
2	0.039	20.11	-59.14	-39.48	114.81	100	340
3	0.078	17.29	-59.35	-45.87	111.82	100	320
4	1.164	7.99	-19.19	-9.83	37.47	100	30
5	2.190	5.78	-19.08	-12.19	42.87	100	110
6	6.320	5.14	-19.32	-13.33	43.74	100	70
7	13.560	26.26	-19.90	6.36	15.19	100	80

Remark: 1. Conversion factor to 30m has been added to the factor.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m)=Antenna Factor (dB/m) + Cable Factor (dB).
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Result of Radiated Emissions(30MHz~1GHz)

Worst Test Mode	NFC	Channel	13.56MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Horizontal

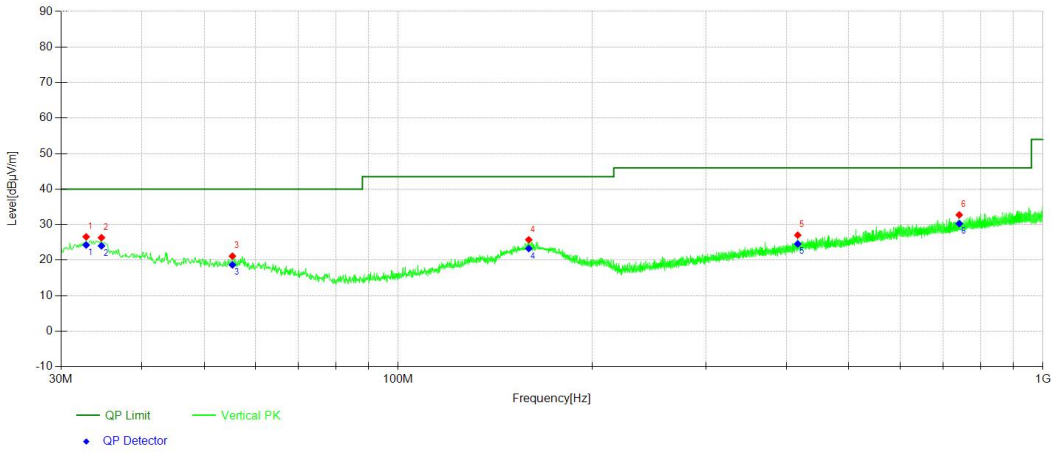


NO.	Freq. [MHz]	Level [dBµV/m]	Reading [dBµV]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	34.37	22.59	3.06	19.53	40.00	17.41	100	358
2	65.31	19.27	1.15	18.12	40.00	20.73	100	358
3	169.01	25.54	5.16	20.38	43.50	17.96	100	15
4	444.91	29.37	4.37	25.00	46.00	16.63	100	358
5	593.34	35.05	7.10	27.95	46.00	10.95	100	358
6	889.99	38.51	6.23	32.28	46.00	7.49	100	358

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Worst Test Mode	NFC	**Channel**	13.56MHz
Frequency Range	30MHz ~ 1GHz	**Detector Function**	Quasi-Peak (QP)

Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Reading [dBµV]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	32.81	26.58	7.1	19.460	40.00	13.42	100	29
2	34.66	26.34	6.8	19.550	40.00	13.66	200	358
3	55.32	21.14	1.7	19.420	40.00	18.86	200	242
4	159.41	25.74	4.6	21.140	43.50	17.76	100	149
5	416.58	27.05	3.0	24.100	46.00	18.95	200	84
6	741.66	32.75	2.3	30.420	46.00	13.25	100	227

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]
4. Emission level (dBuV/m) = 20 log Emission level (uV/m).

3.3 FREQUENCY TOLERANCE

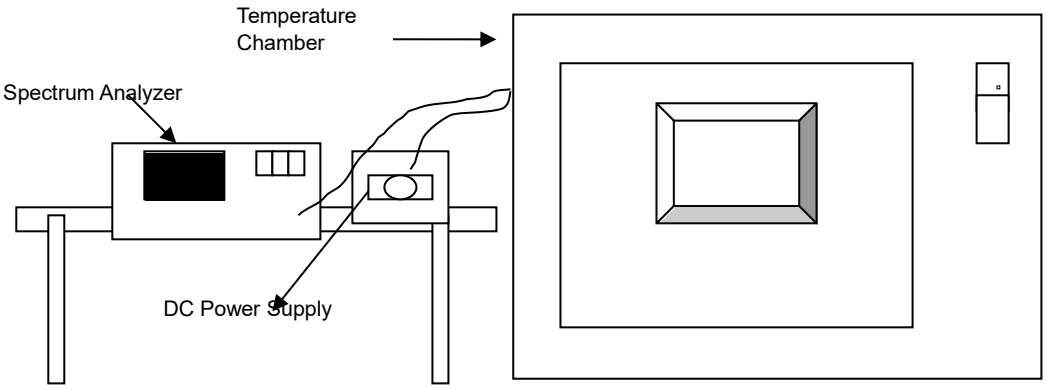
3.3.1 LIMIT OF FREQUENCY TOLERANCE

The frequency tolerance of the carrier signal shall be maintained within ±0.01% (100ppm) 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.

3.3.2 TEST PROCEDURES

Refer to ANSI C63.10-2020

3.3.3 TEST SETUP



3.3.4 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
TEMP. (℃)	POWER SUPPLY (V)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	5	13.55992	-5.90	13.55990	-7.37	13.55991	-6.64	13.55996	-2.95
40	5	13.55997	-2.21	13.55992	-5.90	13.55993	-5.16	13.55995	-3.69
30	5	13.55989	-8.11	13.55991	-6.64	13.55989	-8.11	13.55996	-2.95
20	5	13.55991	-6.64	13.55996	-2.95	13.55989	-8.11	13.55992	-5.90
10	5	13.55994	-4.42	13.55990	-7.37	13.55994	-4.42	13.55994	-4.42
0	5	13.55993	-5.16	13.55989	-8.11	13.55996	-2.95	13.55996	-2.95
-10	5	13.55994	-4.42	13.55989	-8.11	13.55995	-3.69	13.55993	-5.16
-20	5	13.55988	-8.85	13.55992	-5.90	13.55987	-9.59	13.55995	-3.69
20	4.5	13.55993	-5.16	13.55996	-2.95	13.55991	-6.64	13.55990	-7.37
	5.5	13.55995	-3.69	13.55991	-6.64	13.55990	-7.37	13.55987	-9.59

3.4 20dB BANDWIDTH

3.4.1 LIMITS OF 20dB BANDWIDTH

The 20dB bandwidth shall be specified in operating frequency band. (13.11MHz – 14.01MHz)

3.4.2 TEST PROCEDURE

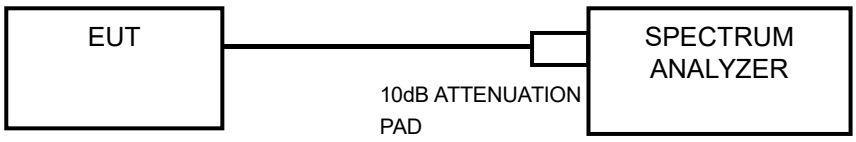
a. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

b. The resolution bandwidth of 1kHz and the video bandwidth of 3kHz were used.

c. Measured spectrum width with power higher than 20dB below carrier.

Note: Because the measured singal is CW or CW-like adjust the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately the RBW

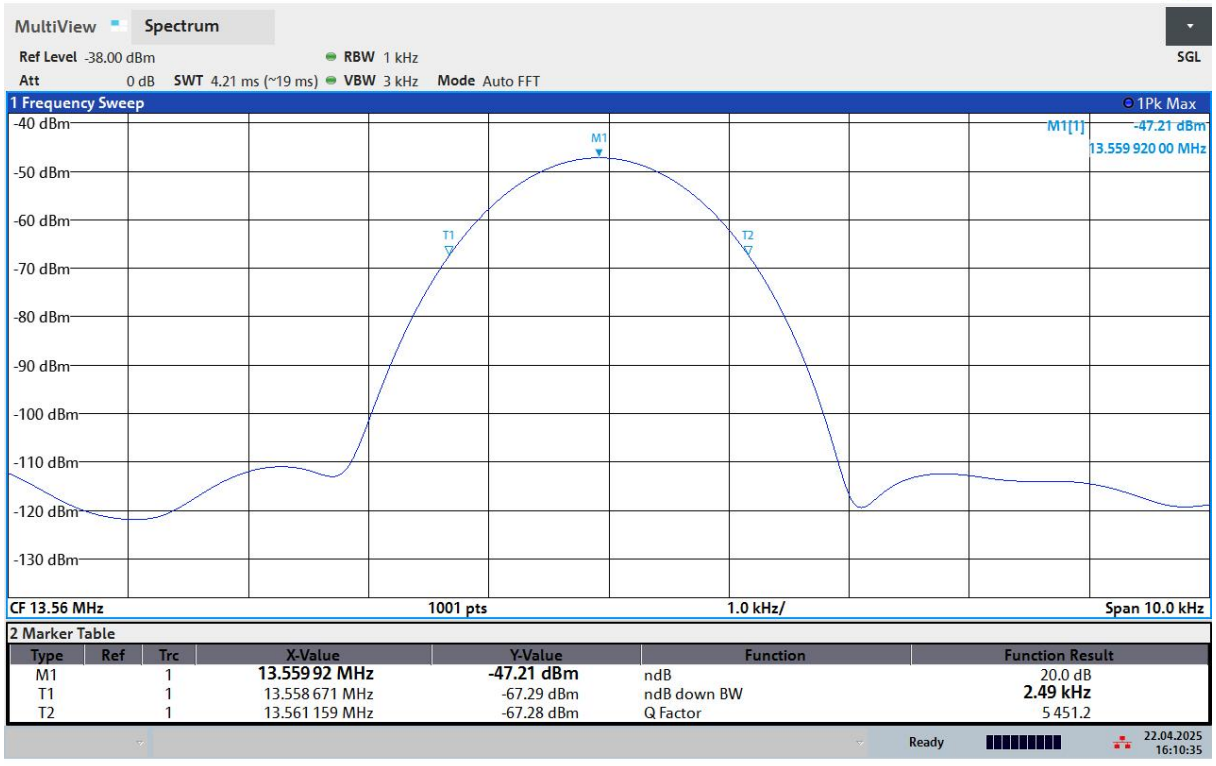
3.4.3 TEST SETUP



3.4.4 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
1	13.56	2.49

Lower & Upper Test Frequency Point (MHz)	Test Frequency (MHz)	P/F
Lower	13.5587	PASS
Upper	13.5612	PASS



4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).

5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

------ End of the Report ------

Important

(1) The test report is invalid without the official stamp of CVC;

(2) Any part photocopies of the test report are forbidden without the written permission from CVC;

(3) The test report is invalid without the signatures of Approval and Reviewer;

(4) The test report is invalid if altered;

(5) Objections to the test report must be submitted to CVC within 15 days.

(6) Generally, commission test is responsible for the tested samples only.

(7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

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