Variant FCC Test Report

Report No.:	RF190111C05A-3
FCC ID:	HD5-CK65L0N
Test Model:	CK65L0N
Received Date:	Oct. 04, 2019
Test Date:	Oct. 23, 2019 ~ Oct. 24, 2019
Issued Date:	Nov. 06, 2019
Applicant:	Honeywell International Inc.
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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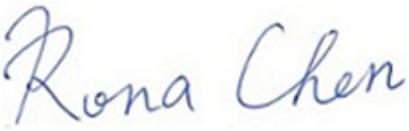
Release Control Record

Issue No.	Description	Date Issued
RF190111C05A-3	Original Release	Nov. 06, 2019

1 Certificate of Conformity

Product:	Mobile computer
Brand:	Honeywell
Test Model:	CK65L0N
Sample Status:	Engineering Sample
Applicant:	Honeywell International Inc.
Test Date:	Oct. 23, 2019 ~ Oct. 24, 2019
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.225) 47 CFR FCC Part 15, Subpart C (Section 15.215) ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Nov. 06, 2019

Rona Chen / Specialist

Approved by :  , **Date:** Nov. 06, 2019

Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	Conducted emission test	N/A	Without AC power port of the EUT.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -60.32 dB at 13.56 MHz.
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	Pass	Meet the requirement of limit.
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	Pass	Meet the requirement of limit.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass	Meet the requirement of limit. Minimum passing margin is -9.89 dB at 67.83 MHz.
15.225 (e)	The frequency tolerance	Pass	Meet the requirement of limit.
15.215 (c)	20 dB Bandwidth	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 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:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Mobile computer
Brand	Honeywell
Test Model	CK65L0N
Status of EUT	Engineering Sample
Power Supply Rating	3.6 Vdc or 3.7 Vdc (Battery)
Modulation Type	ASK
Data Rate	Type A: 106 kbit/s Type B: 106 kbit/s Type F: 212 kbit/s, 424 kbit/s Type V (ISO15693): 26.48 kbit/s
Operating Frequency	13.56 MHz
Field Strength (Maximum)	Type A: 61.9 dBuV/m (3m) Type B: 62.63 dBuV/m (3m) Type F: 63.68 dBuV/m (3m) Type V (ISO15693): 63.13 dBuV/m (3m)
Antenna Type	Loop Antenna
Accessory Device	Refer to Note
Data Cable Supplied	N/A
HW Version	3.1
HW P/N	DVT
SW Version	01.03.00.0686
SW P/N	88.00.00-DEBUG-(0327)

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF190111C05-5. The differences compared with original report are listed as below. Therefore, the EUT was re-tested and recorded in this report.
   - Add new scanner Gen 8, the Gen 8 is the next generation of the N6703 scanner.
   - Add Cold Storage.
   - Add Battery 2 for Cold Storage SKU.
   - NFC matching optimize.
   - Add Heater function.
   - Non-camera.
2. There're 4 configurations for the EUT listed as below.

Sample	Scanner	Keypad
A	GEN8	Alpha
B	GEN8	Large Numeric
B	EX20	Alpha
D	EX20	Num-F
*Above samples had been pre-tested, and the worst case was found on Sample A. Therefore, only Sample A was chosen as a representative for final test and recorded in the report.		

3. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery 1	Intermec Technologies	AB18	3.7 Vdc, 5.1 Ah, 18.9 Wh

	Corporation		
Battery 2	Honeywell	CK65-BTCS	3.6 Vdc, 5200 mAh, 18.7 Wh

4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

One channel was provided to this EUT:

Channel	Frequency (MHz)
1	13.56

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE	PLC	FS	EB	
-	√	-	√	√	Sample A

Where **RE:** Radiated Emission **PLC:** Power Line Conducted Emission
FS: Frequency Stability **EB:** 20 dB Bandwidth measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

Radiated Emission Test:

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

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

Frequency Stability:

☒ 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, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

20 dB 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, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE	25 deg. C, 65 % RH	3.6 Vdc	Tim Chen
FS	25 deg. C, 65 % RH	3.6 Vdc	Tim Chen
EB	25 deg. C, 68 % RH	3.6 Vdc	Tim Chen

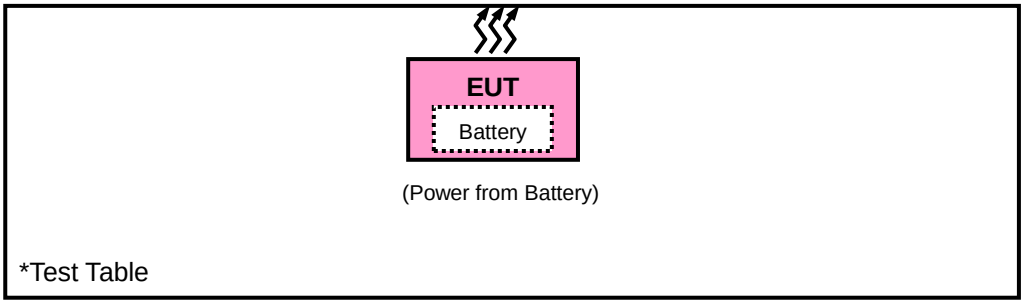
3.3 Description of Support Units

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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Battery 2	Honeywell	CK65-BTCS	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.225)
FCC Part 15, Subpart C (15.215)
KDB 414788 D01 Radiated Test Site v01r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

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.
d. The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209 as below table:

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.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
Loop Antenna	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier EMCI	EMC001340	980201	Oct. 14, 2019	Oct. 13, 2020
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 07, 2020
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 07, 2020
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 06, 2019	Sep. 05, 2020
DC Power Supply Topward	33010D	807748	NA	NA
Digital Multimeter Fluke	87-III	70360742	Jun. 27, 2019	Jun. 26, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

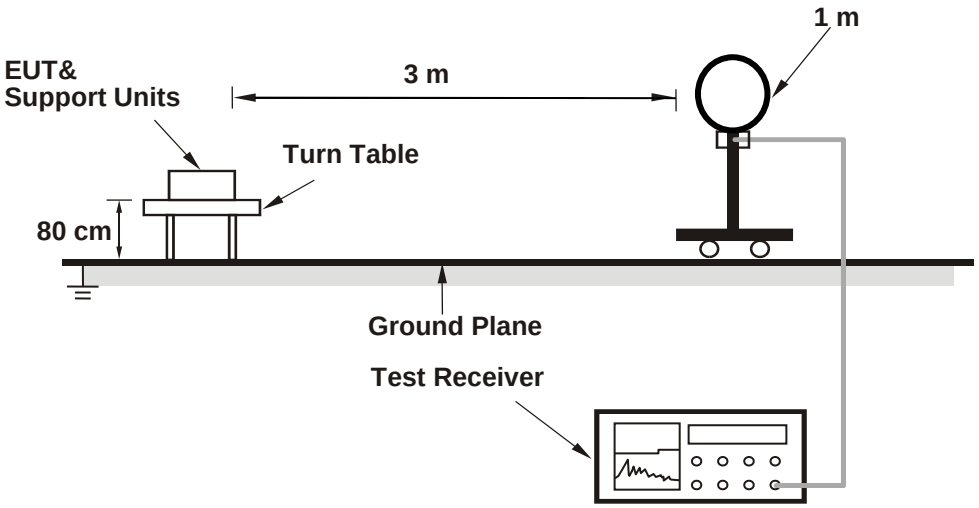
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

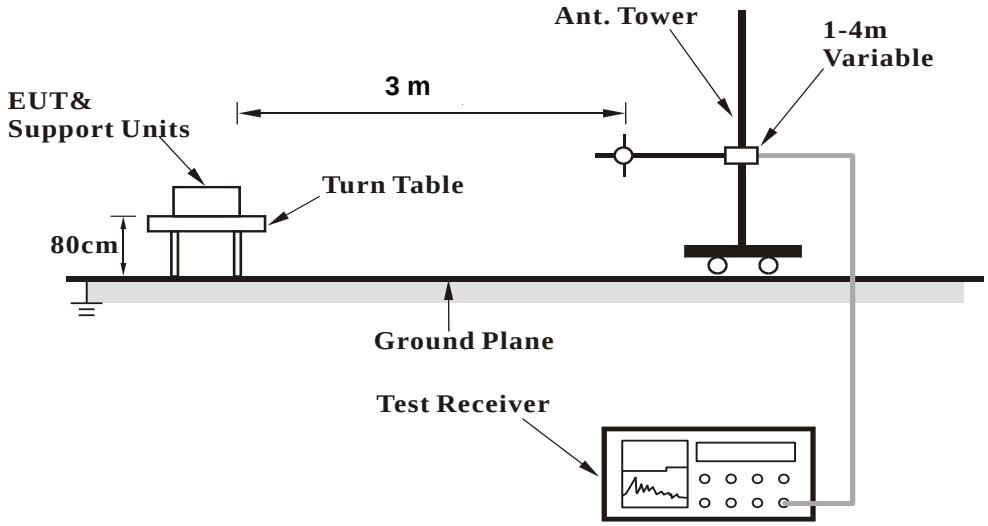
No deviation.

4.1.5 Test Set Up

<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

KDB 414788 OFS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

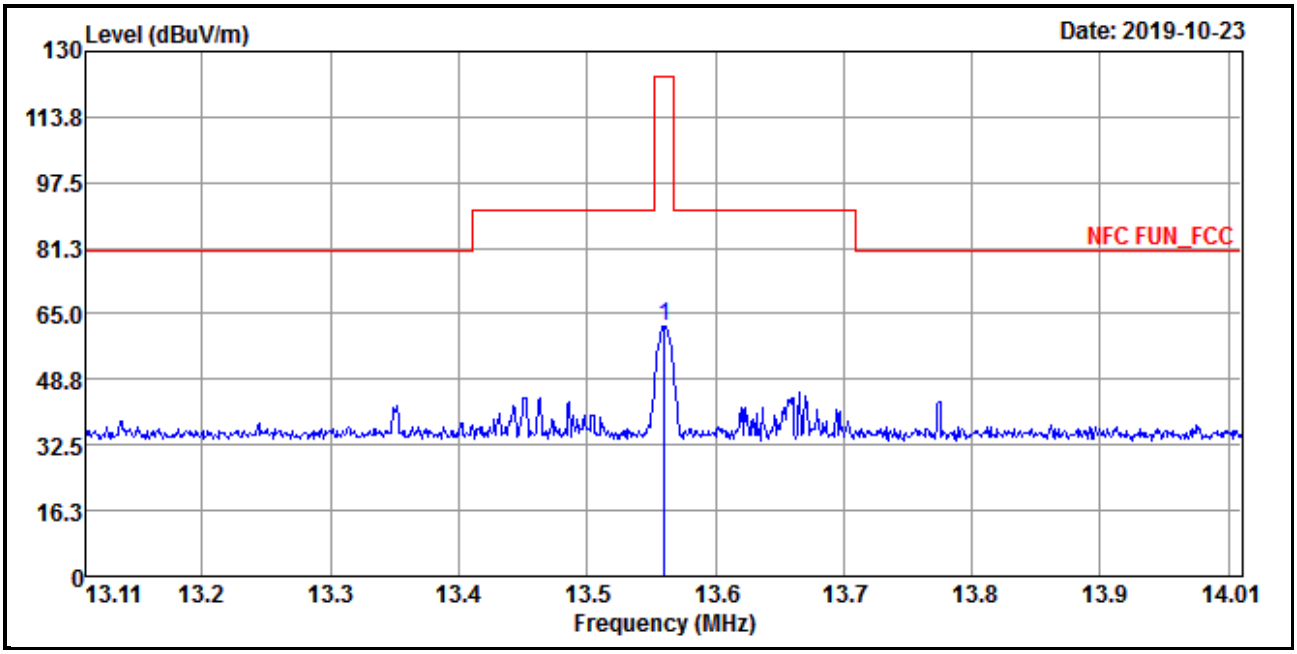
4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Type A

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	61.9	40.05	21.85	124	-62.1	100	0	QP

Remarks:

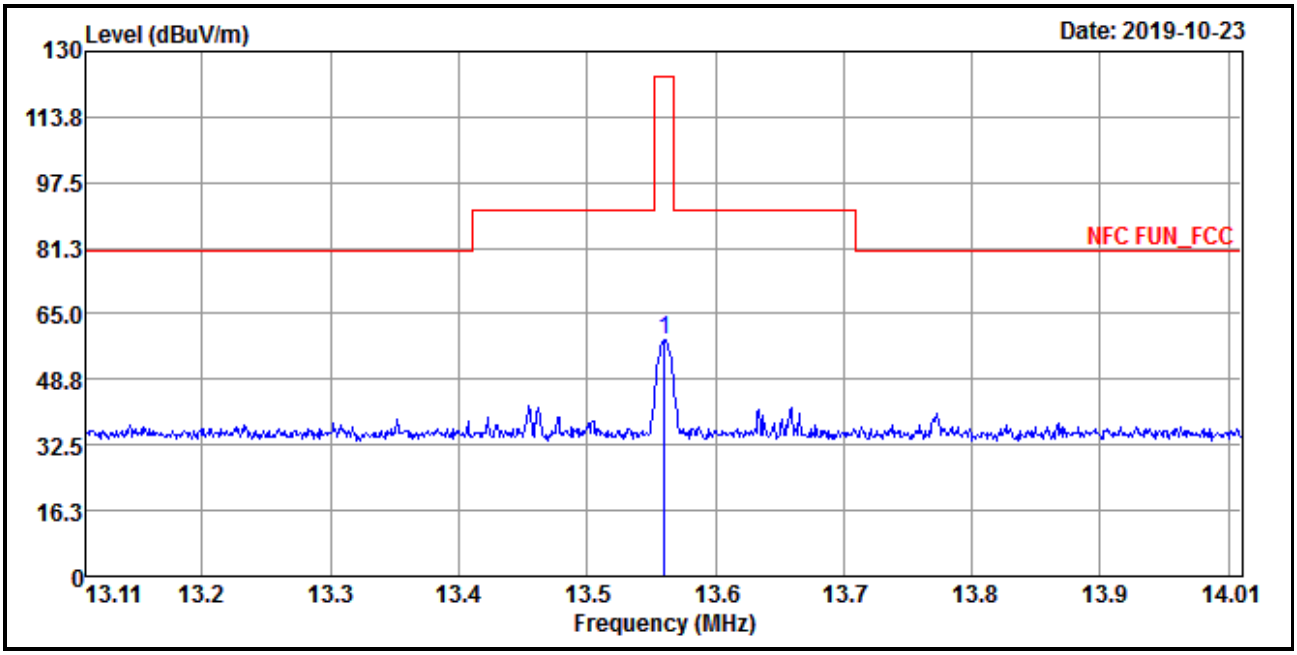
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	58.67	36.82	21.85	124	-65.33	100	360	QP

Remarks:

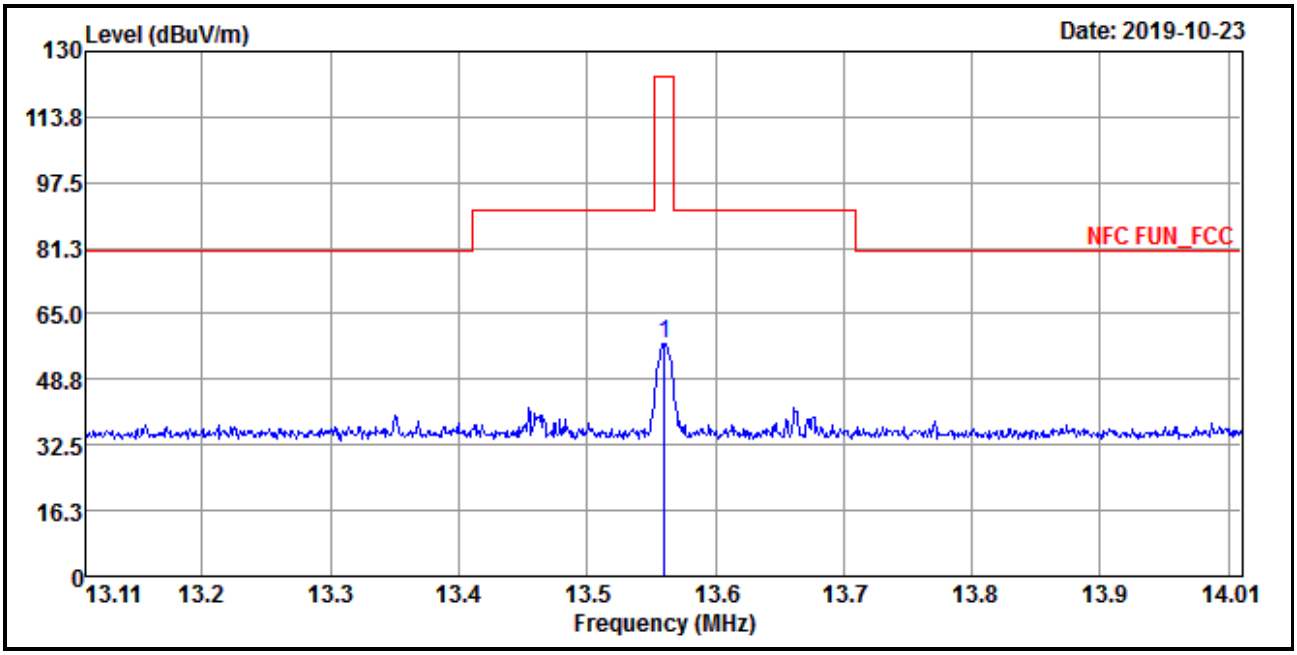
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	57.61	35.76	21.85	124	-66.39	100	0	QP

Remarks:

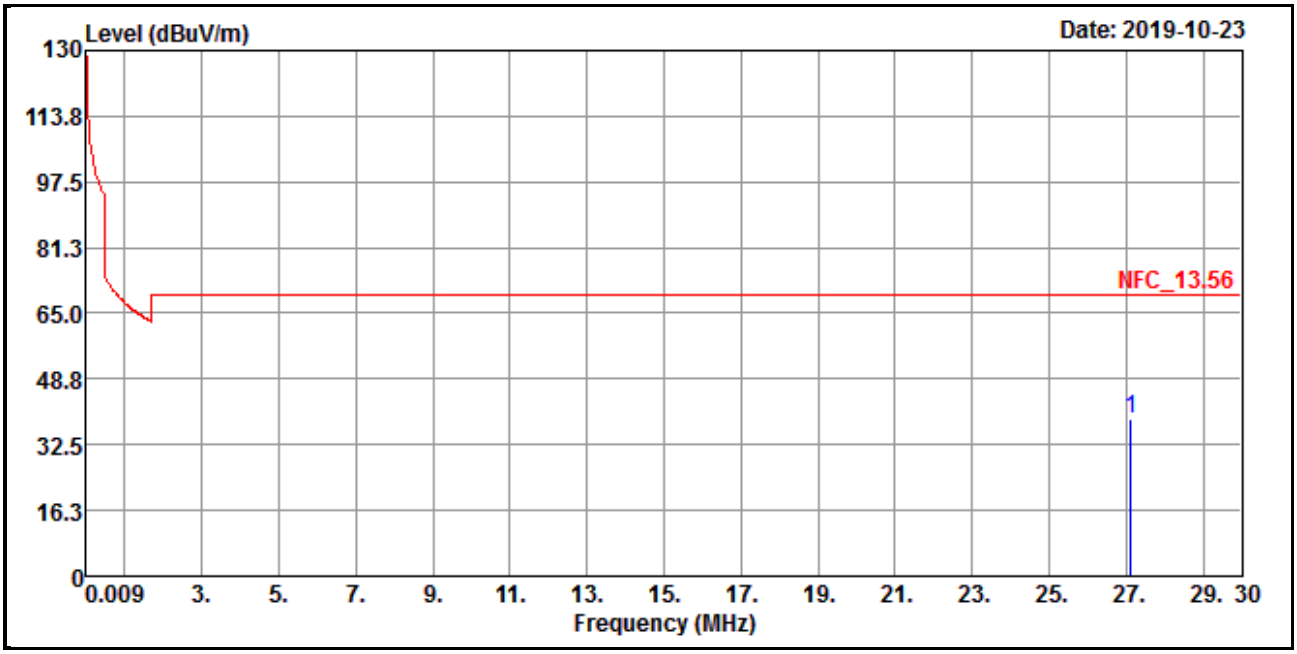
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



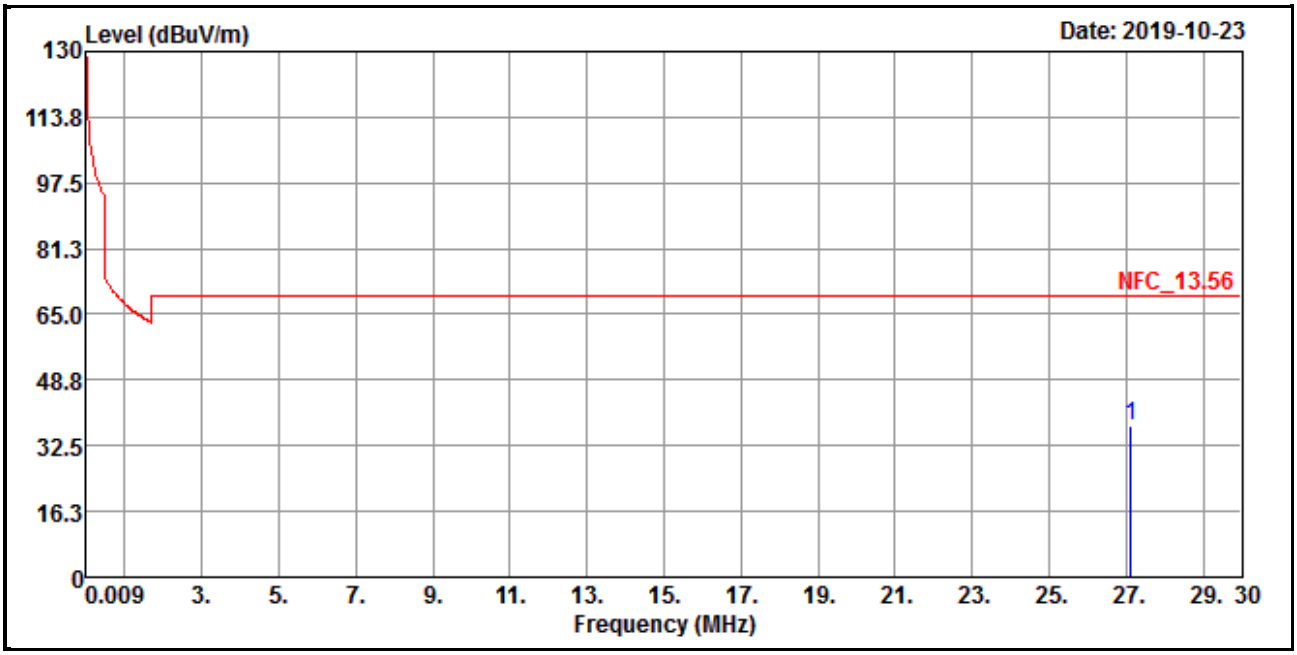
Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	38.62	16.46	22.16	69.54	-30.92	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)
= 29.54 dBuV/m 30m
= 29.54+20 log(30/3)^2 3m
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.63	15.47	22.16	69.54	-31.91	100	0	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)

2 The other emission levels were very low against the limit.

3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

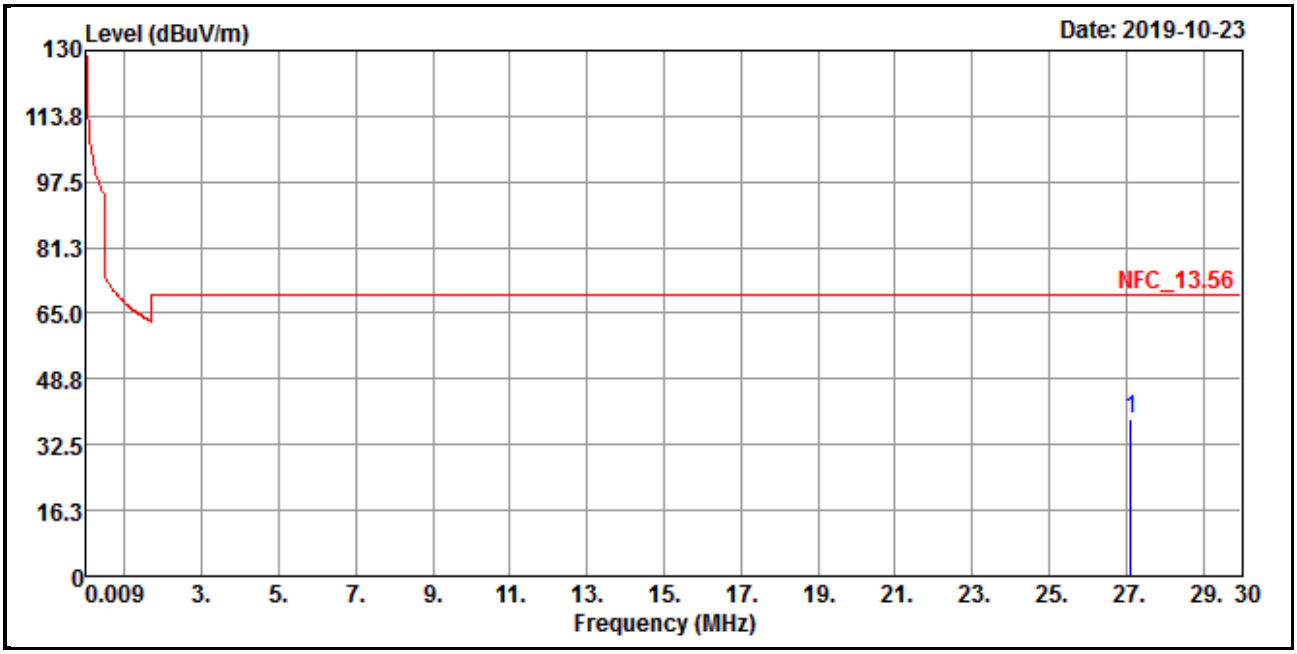
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

= 29.54 dBuV/m 30m

= 29.54+20 log$(30/3)^2$ 3m

= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	39.01	16.85	22.16	69.54	-30.53	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

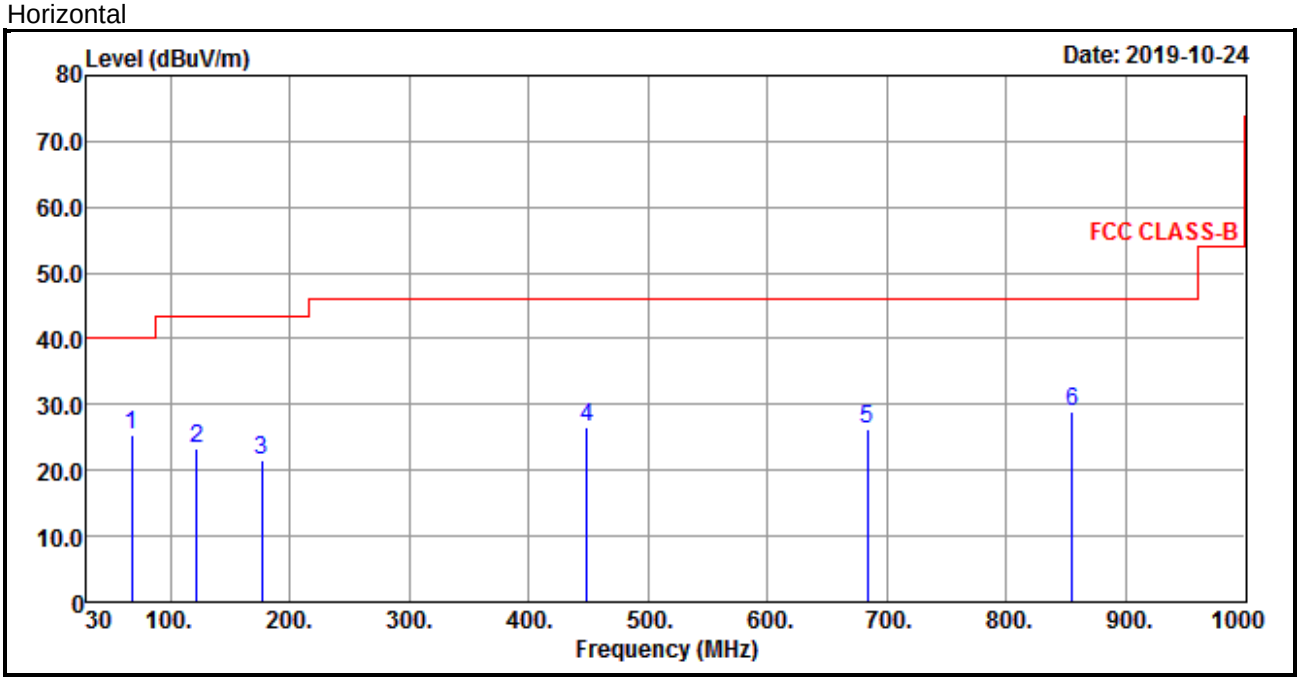
= 29.54 dBuV/m 30m

= 29.54+20 log(30/3)^2 3m

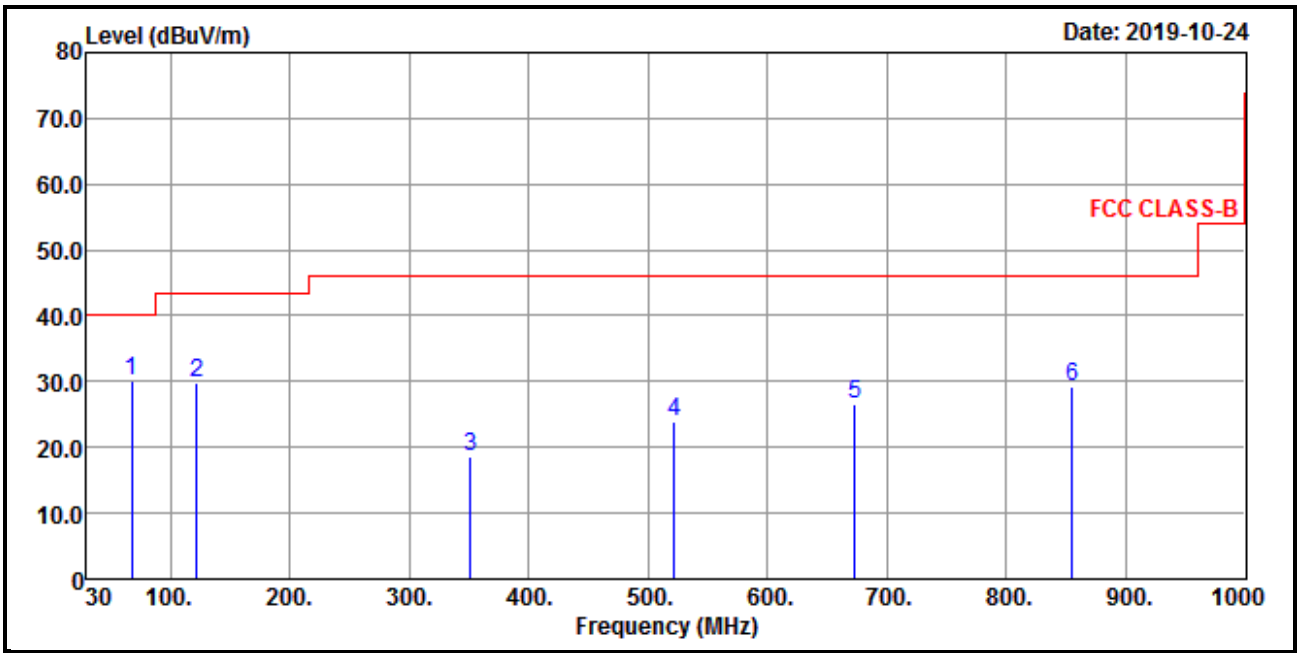
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 1000 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak or Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen

Horizontal



Vertical



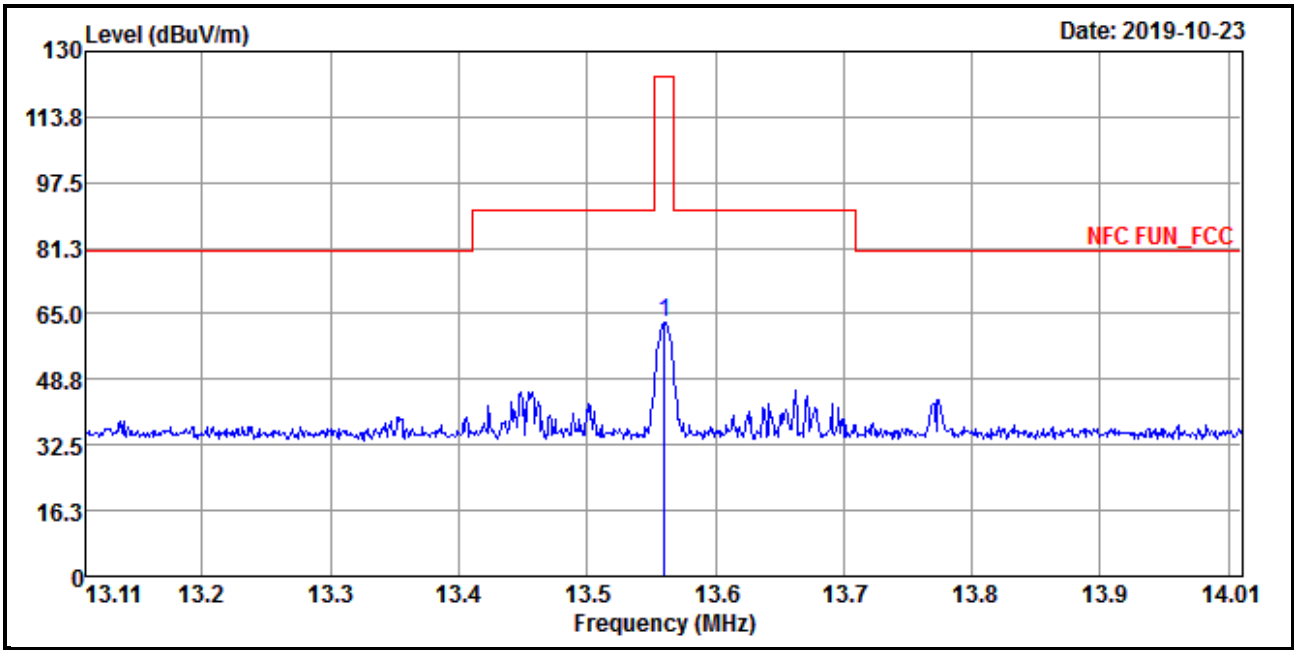
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	25.45	44.62	-19.17	40	-14.55	203	120	Peak
122.15	23.19	42.54	-19.35	43.5	-20.31	199	344	Peak
176.47	21.56	39.65	-18.09	43.5	-21.94	167	59	Peak
449.04	26.47	38.76	-12.29	46	-19.53	112	148	Peak
683.78	26.14	33.1	-6.96	46	-19.86	139	202	Peak
855.47	28.83	32.99	-4.16	46	-17.17	184	92	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	**30.11**	**49.28**	**-19.17**	**40**	**-9.89**	**103**	**125**	**Peak**
122.15	29.75	49.1	-19.35	43.5	-13.75	114	21	Peak
351.07	18.72	33.53	-14.81	46	-27.28	150	326	Peak
521.79	23.88	33.8	-9.92	46	-22.12	107	244	Peak
673.11	26.64	33.84	-7.2	46	-19.36	109	105	Peak
855.47	29.2	33.36	-4.16	46	-16.8	106	298	Peak

Remarks:

1. Emission Level = Read Level + Factor
2. Margin value = Emission level – Limit value.
3. The other emission levels were very low against the limit.
4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
   – Pre-Amplifier Factor (dB)

Type B

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	62.63	40.78	21.85	124	-61.37	100	0	QP

Remarks:

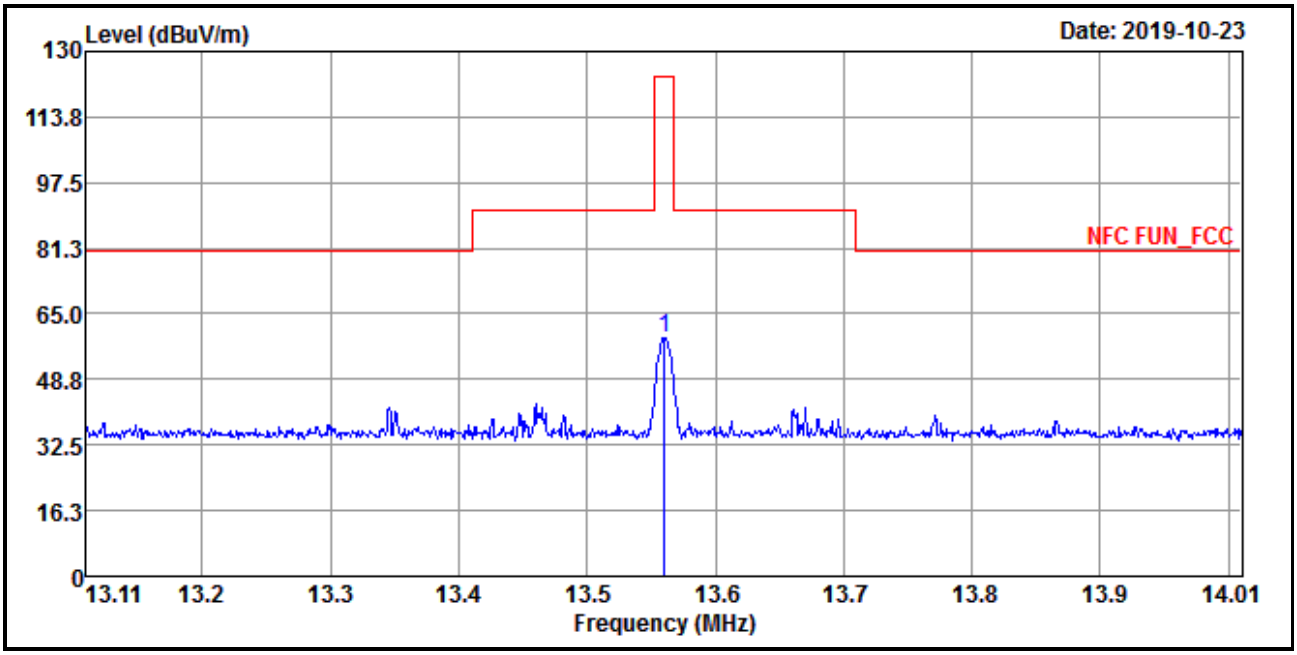
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	58.99	37.14	21.85	124	-65.01	100	360	QP

Remarks:

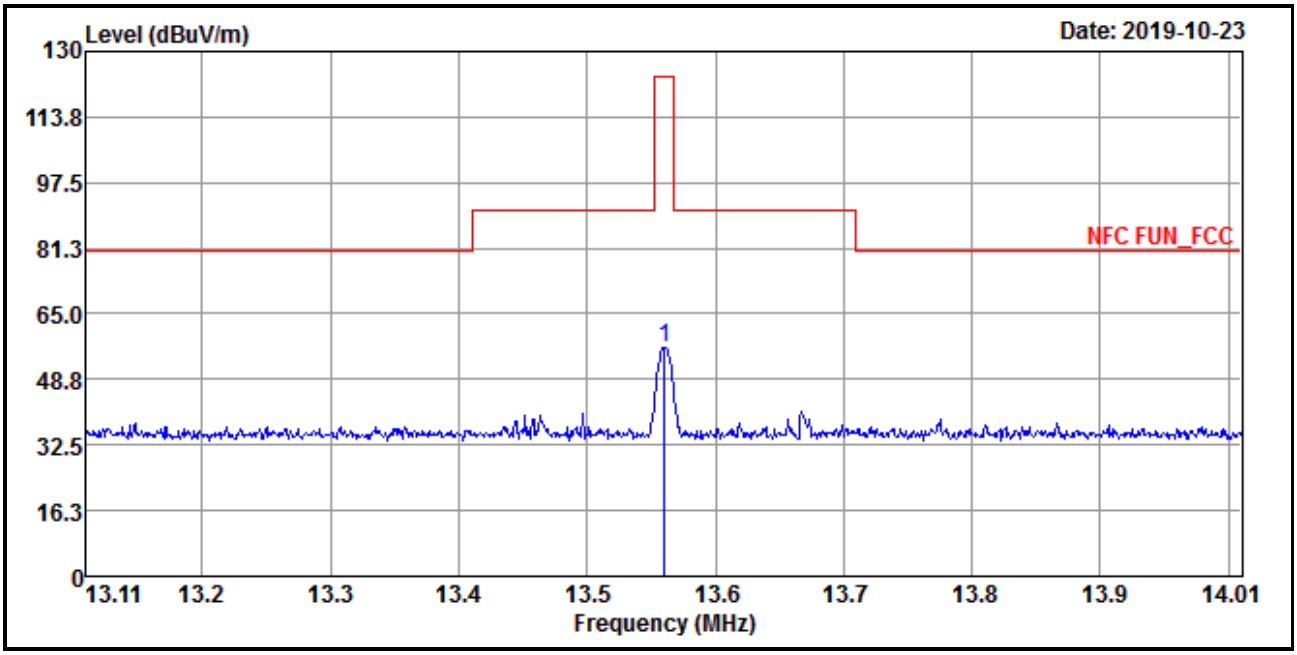
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	56.82	34.97	21.85	124	-67.18	100	0	QP

Remarks:

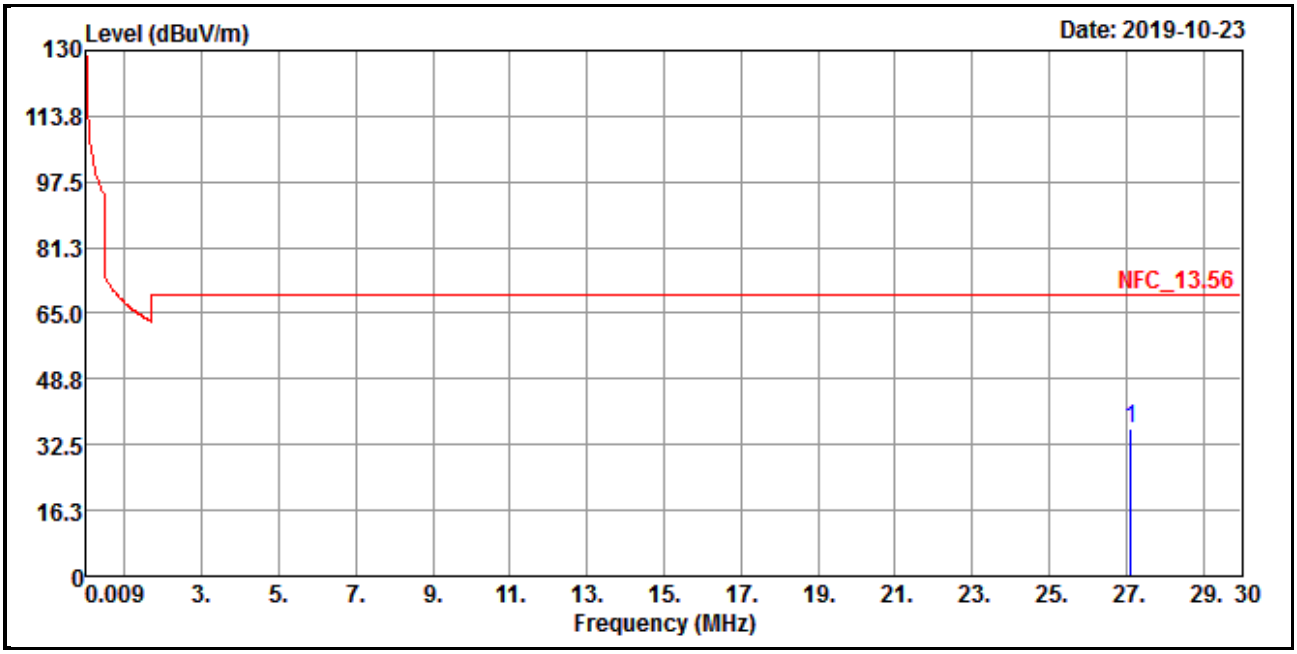
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



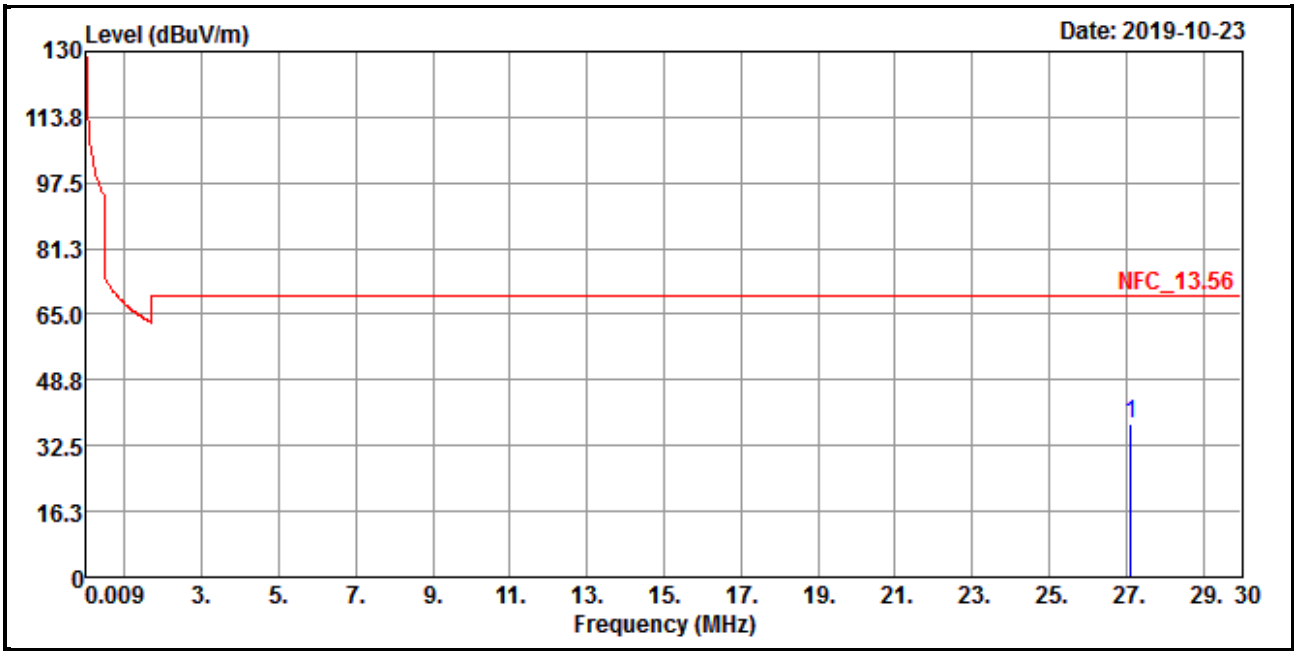
Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	36.68	14.52	22.16	69.54	-32.86	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)
= 29.54 dBuV/m 30m
= 29.54+20 log(30/3)^2 3m
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.86	15.7	22.16	69.54	-31.68	100	0	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)

2 The other emission levels were very low against the limit.

3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

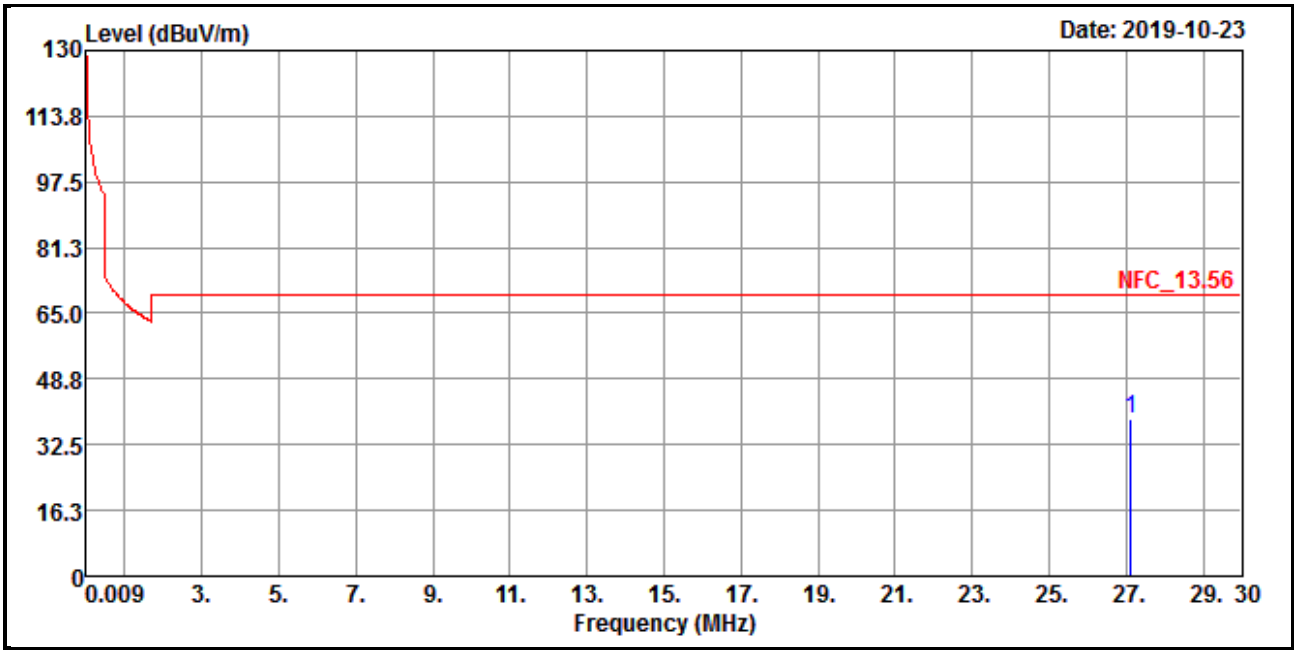
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

= 29.54 dBuV/m 30m

= 29.54+20 log$(30/3)^2$ 3m

= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	38.81	16.65	22.16	69.54	-30.73	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

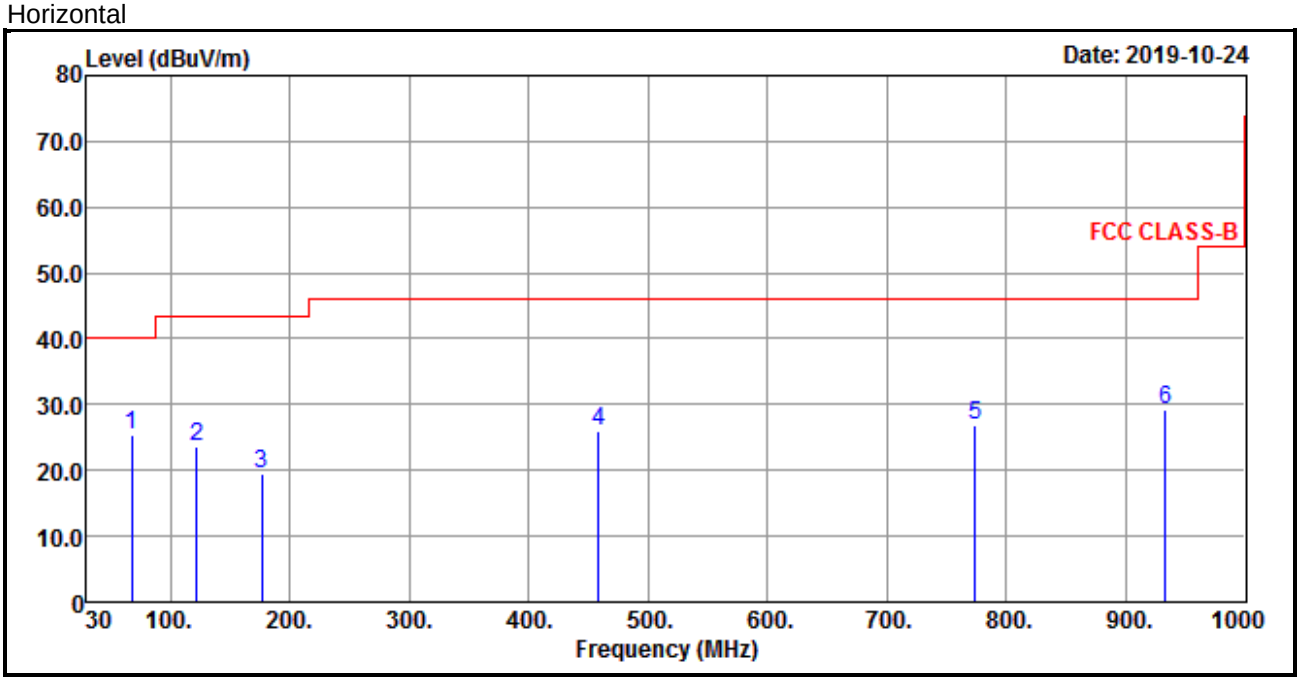
= 29.54 dBuV/m 30m

= 29.54+20 log$(30/3)^2$ 3m

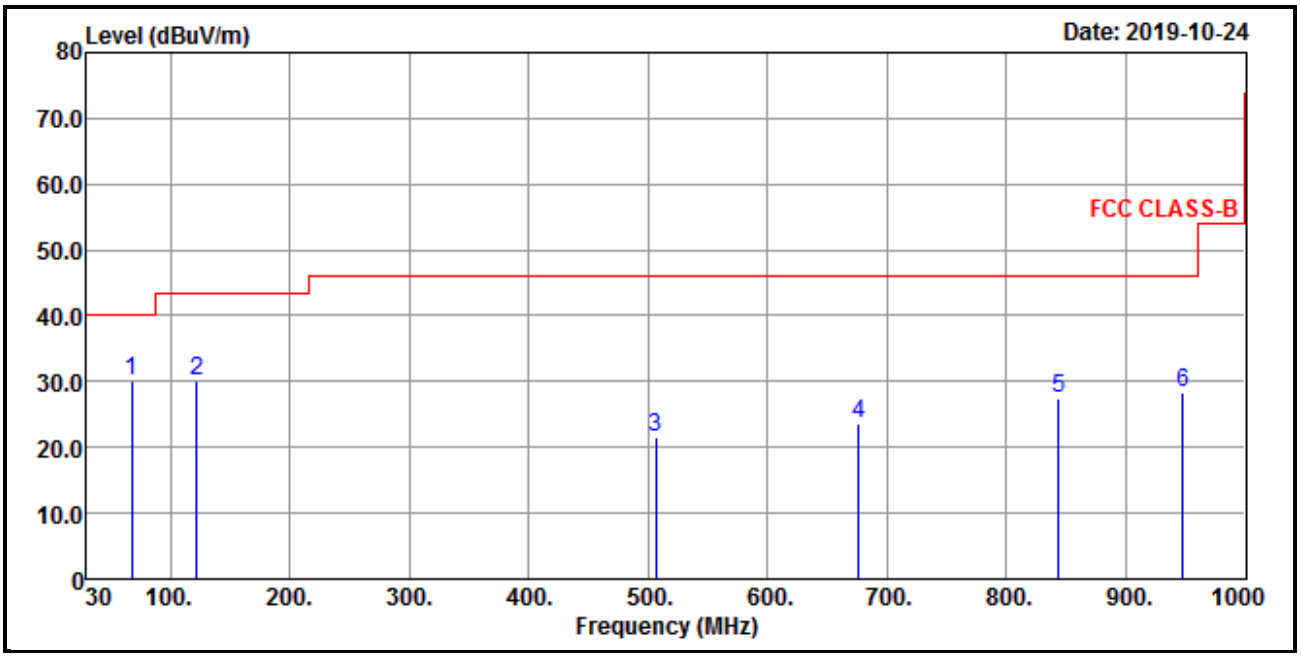
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 1000 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak or Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen

Horizontal



Vertical



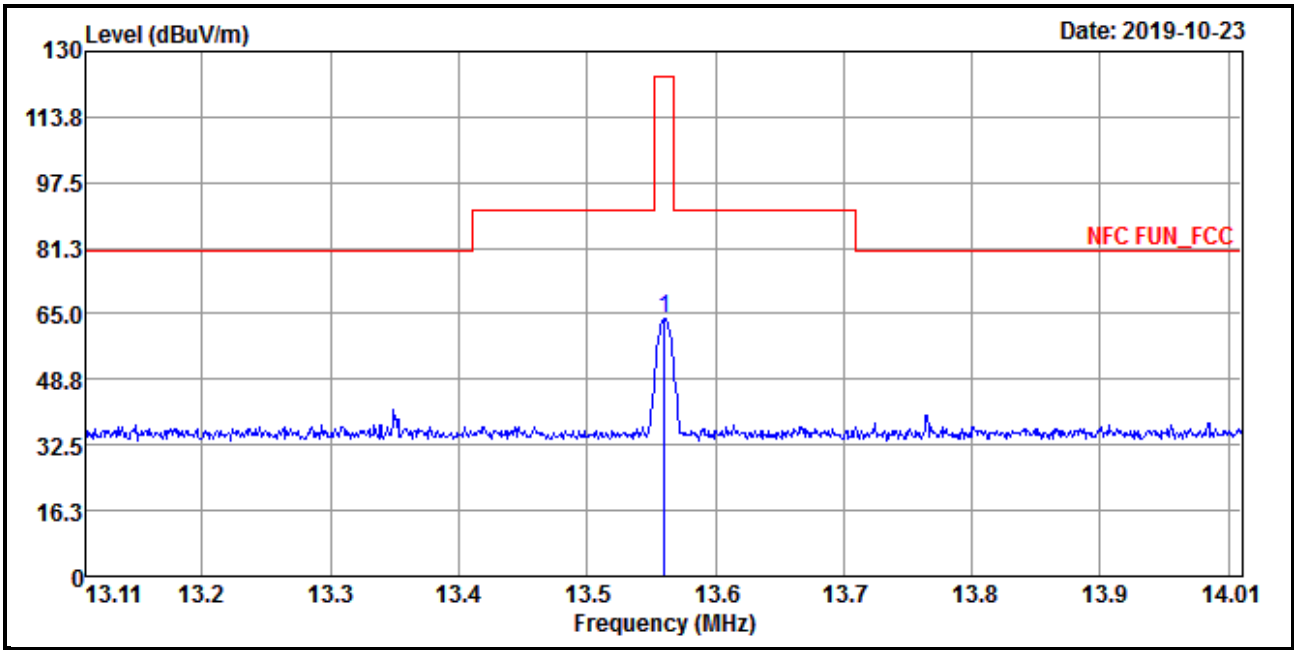
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	25.4	44.57	-19.17	40	-14.6	193	20	Peak
122.15	23.5	42.85	-19.35	43.5	-20	177	173	Peak
176.47	19.49	37.58	-18.09	43.5	-24.01	191	7	Peak
458.74	25.94	38.32	-12.38	46	-20.06	155	251	Peak
773.99	26.98	31.45	-4.47	46	-19.02	108	169	Peak
933.07	29.35	32.17	-2.82	46	-16.65	155	195	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	29.99	49.16	-19.17	40	-10.01	138	254	Peak
122.15	30.02	49.37	-19.35	43.5	-13.48	193	147	Peak
506.27	21.47	31.64	-10.17	46	-24.53	195	293	Peak
676.02	23.75	30.86	-7.11	46	-22.25	190	95	Peak
843.83	27.5	31.7	-4.2	46	-18.5	156	245	Peak
947.62	28.42	31.23	-2.81	46	-17.58	122	237	Peak

Remarks:

1. Emission Level = Read Level + Factor
2. Margin value = Emission level – Limit value.
3. The other emission levels were very low against the limit.
4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
   – Pre-Amplifier Factor (dB)

Type F

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	**63.68**	**41.83**	**21.85**	**124**	**-60.32**	**100**	**0**	**QP**

Remarks:

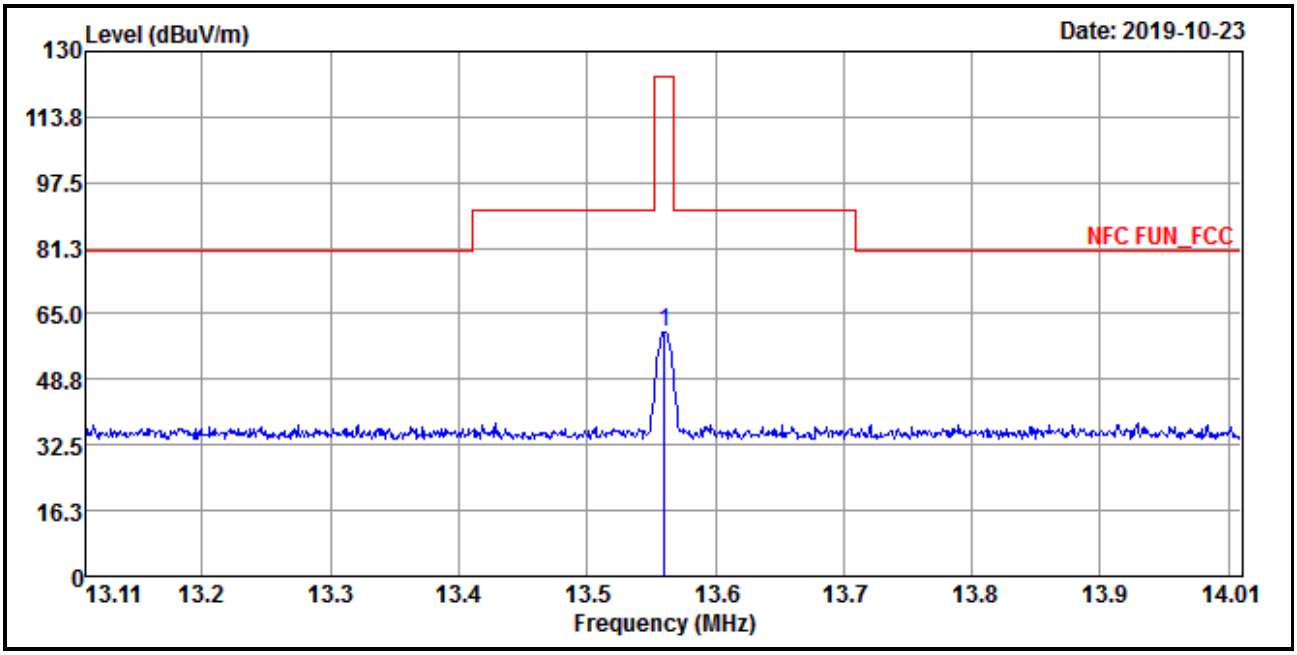
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	60.55	38.7	21.85	124	-63.45	100	360	QP

Remarks:

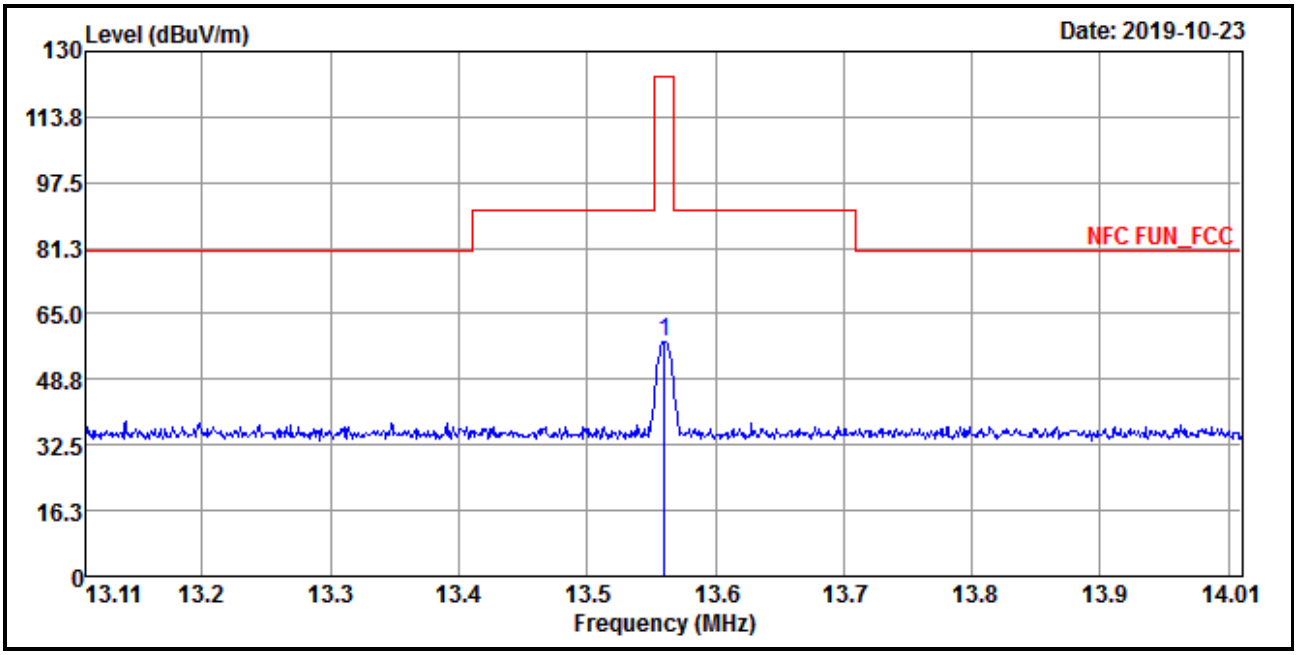
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	58.26	36.41	21.85	124	-65.74	100	0	QP

Remarks:

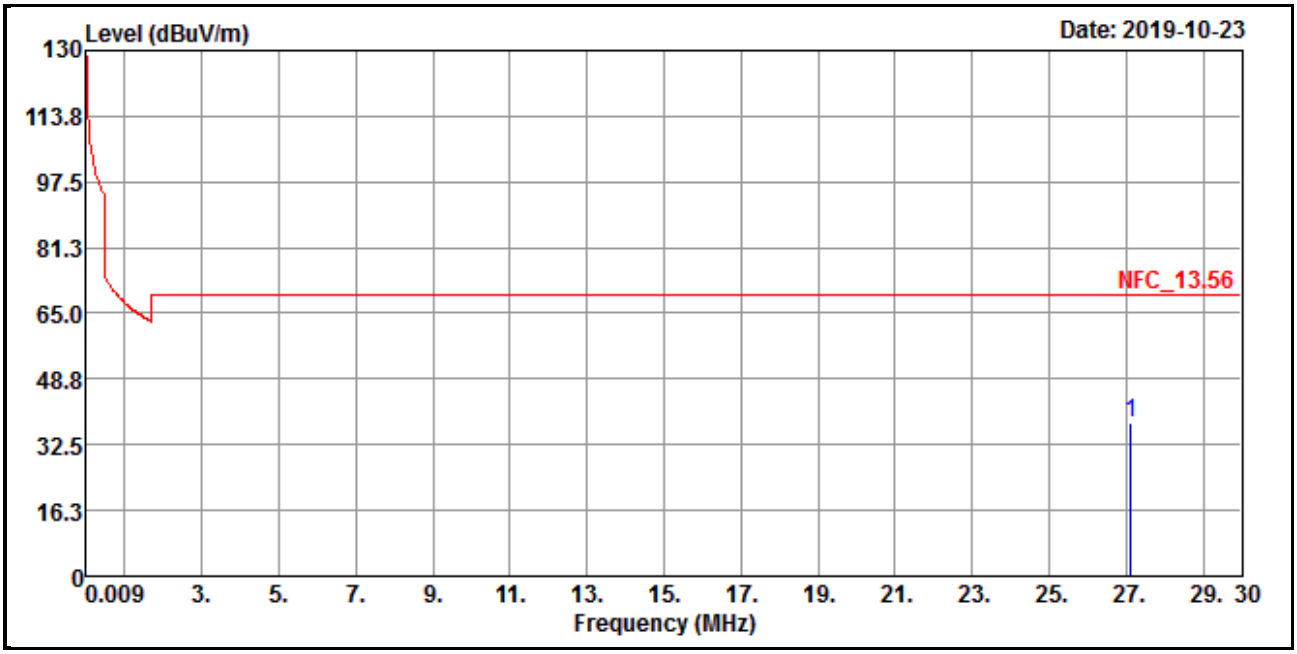
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



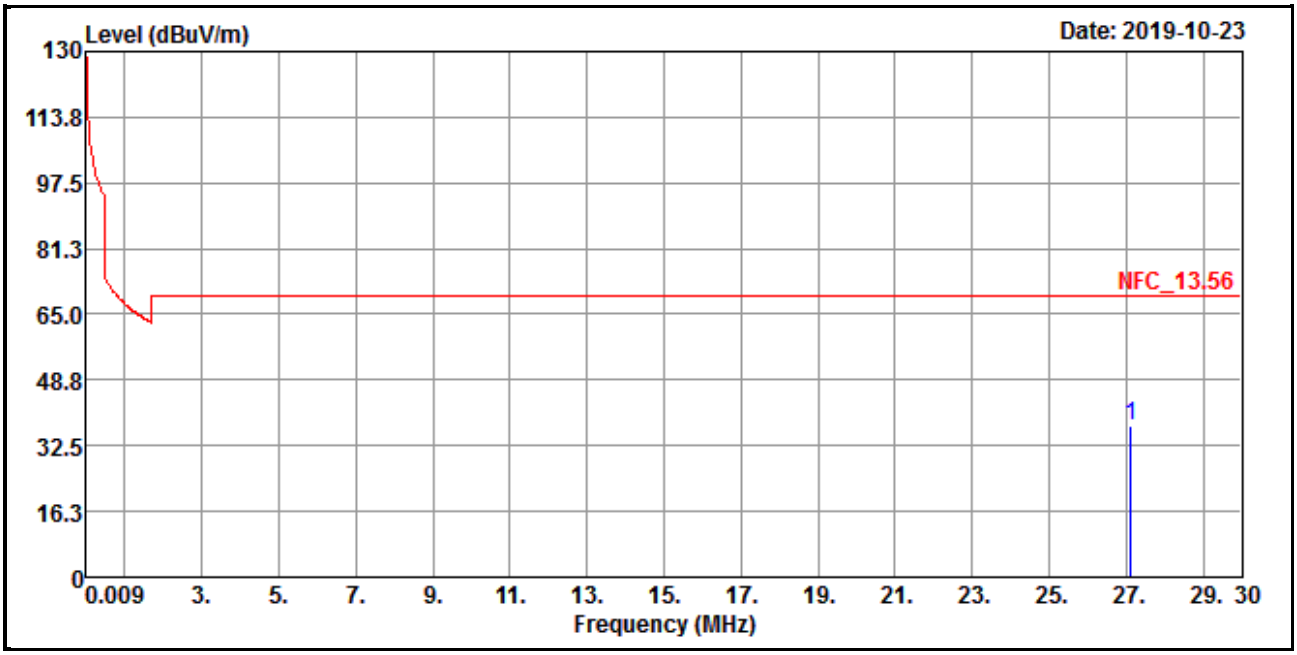
Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.73	15.57	22.16	69.54	-31.81	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)
= 29.54 dBuV/m 30m
= 29.54+20 log(30/3)^2 3m
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.49	15.33	22.16	69.54	-32.05	100	0	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)

2 The other emission levels were very low against the limit.

3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

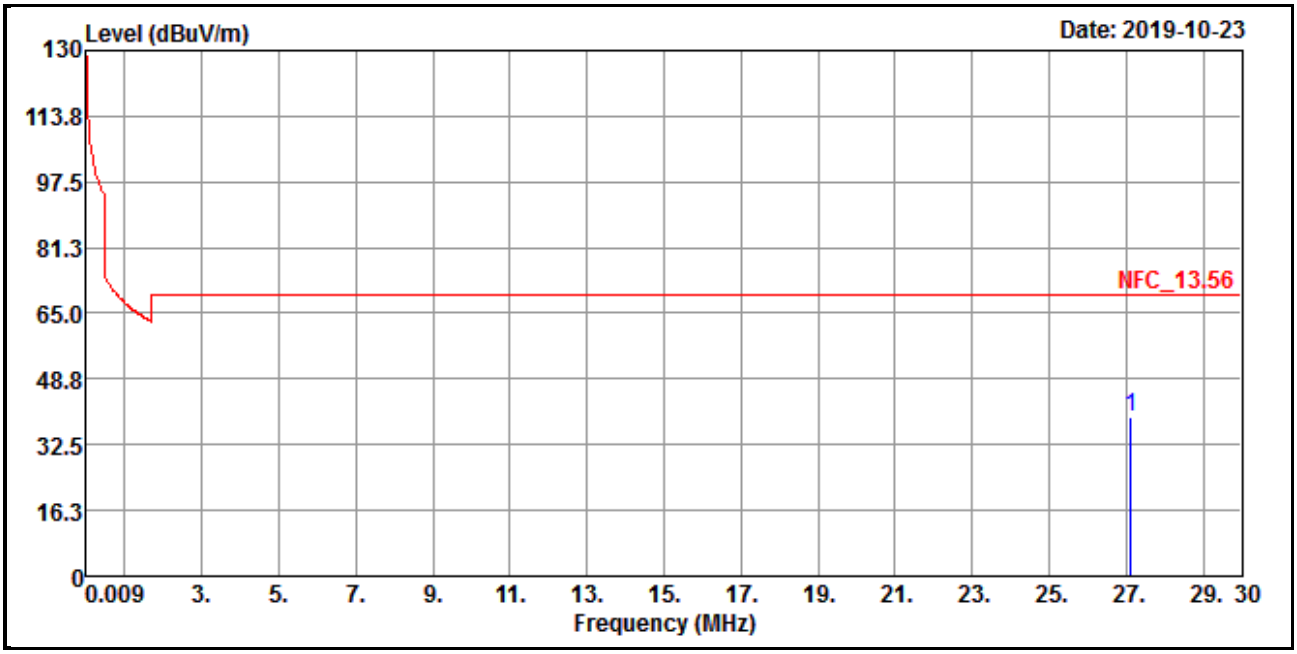
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

= 29.54 dBuV/m 30m

= 29.54+20 log$(30/3)^2$ 3m

= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	39.41	17.25	22.16	69.54	-30.13	100	360	QP

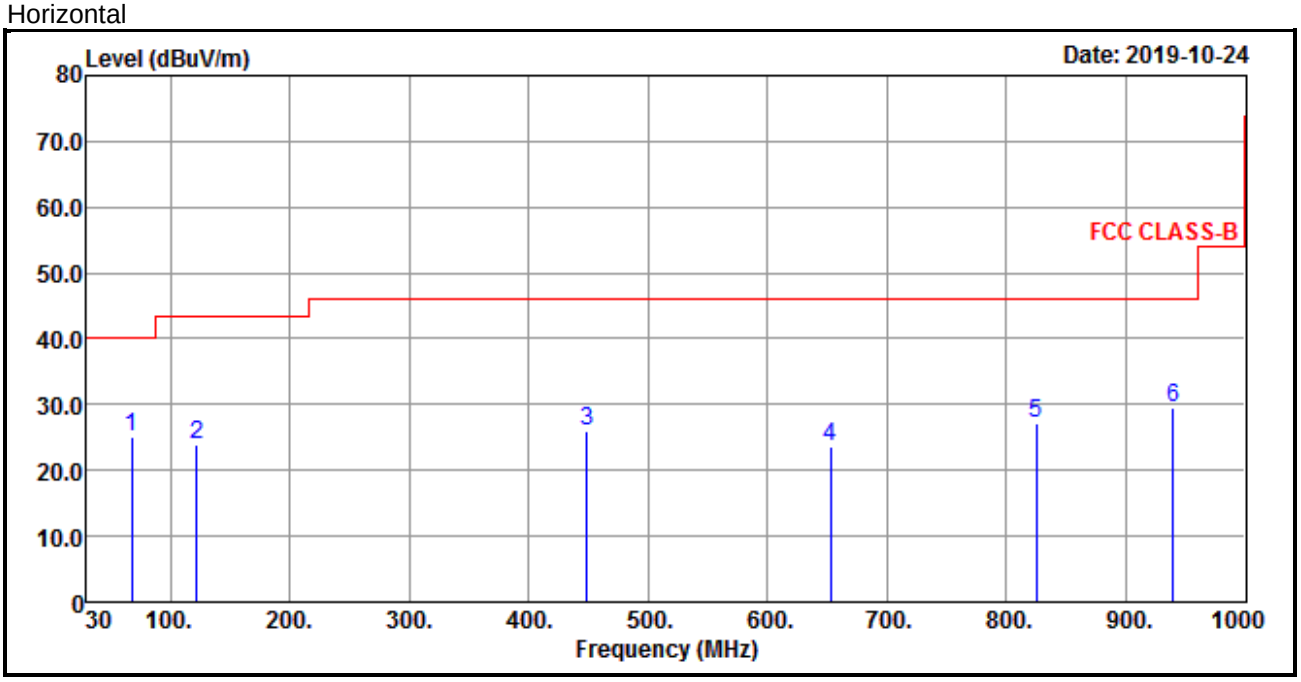
Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

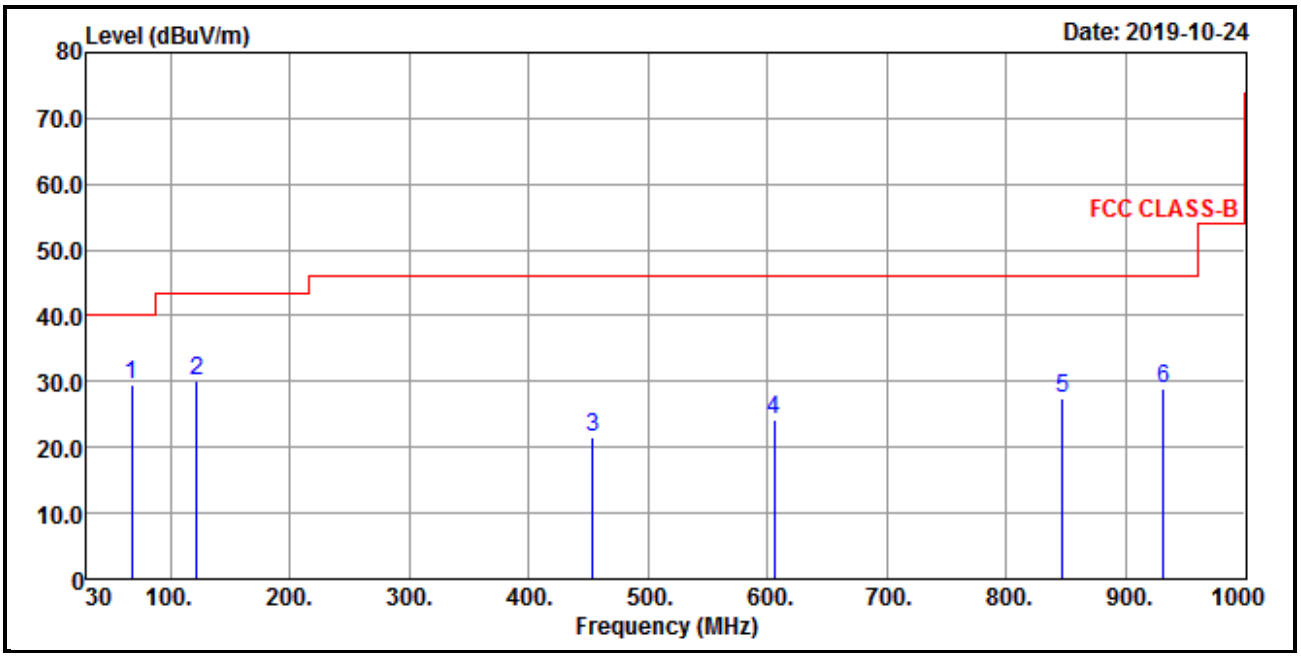
The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)
Example:
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)
= 29.54 dBuV/m 30m
= 29.54+20 log(30/3)^2 3m
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 1000 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak or Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen

Horizontal



Vertical



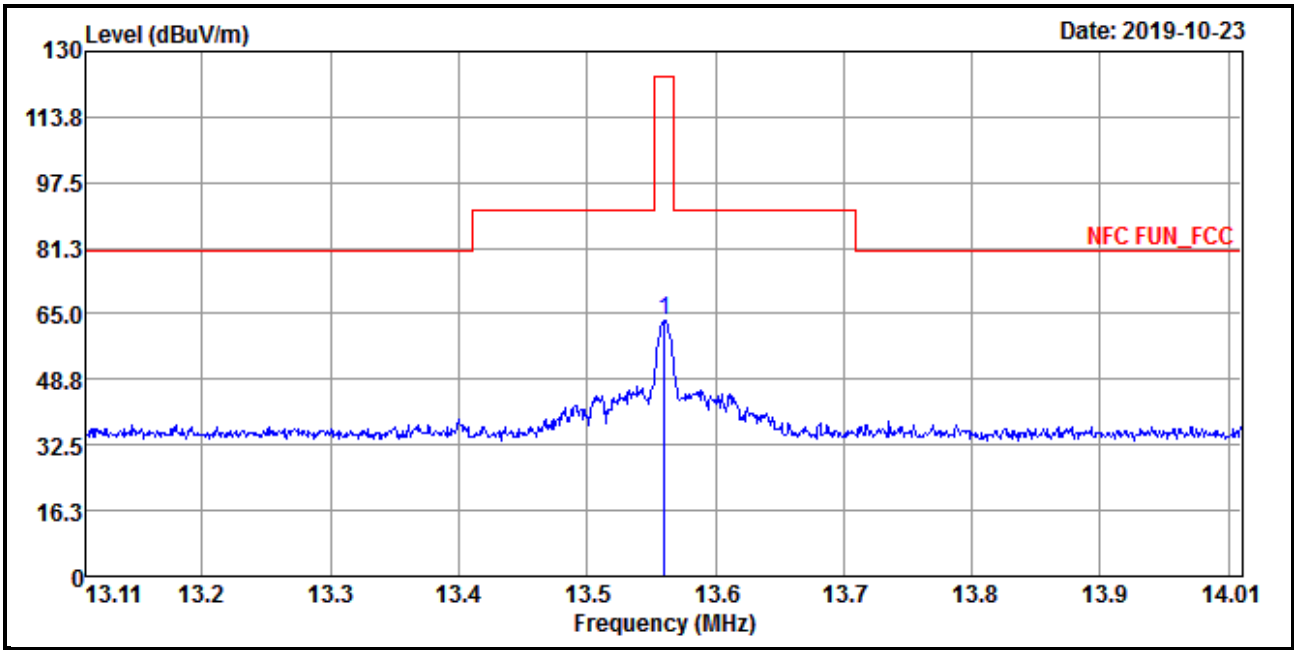
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	25.23	44.4	-19.17	40	-14.77	115	127	Peak
122.15	23.88	43.23	-19.35	43.5	-19.62	172	42	Peak
449.04	26.06	38.35	-12.29	46	-19.94	158	66	Peak
652.74	23.58	31.6	-8.02	46	-22.42	102	172	Peak
825.4	27.26	32.05	-4.79	46	-18.74	151	343	Peak
939.86	29.42	32.2	-2.78	46	-16.58	175	267	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	29.64	48.81	-19.17	40	-10.36	158	91	Peak
122.15	30.09	49.44	-19.35	43.5	-13.41	189	354	Peak
453.89	21.62	33.93	-12.31	46	-24.38	157	293	Peak
605.21	24.07	32.37	-8.3	46	-21.93	188	271	Peak
846.74	27.36	31.54	-4.18	46	-18.64	112	29	Peak
931.13	28.9	31.74	-2.84	46	-17.1	164	171	Peak

Remarks:

1. Emission Level = Read Level + Factor
2. Margin value = Emission level – Limit value.
3. The other emission levels were very low against the limit.
4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
   – Pre-Amplifier Factor (dB)

Type V (ISO15693)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	63.13	41.28	21.85	124	-60.87	100	0	QP

Remarks:

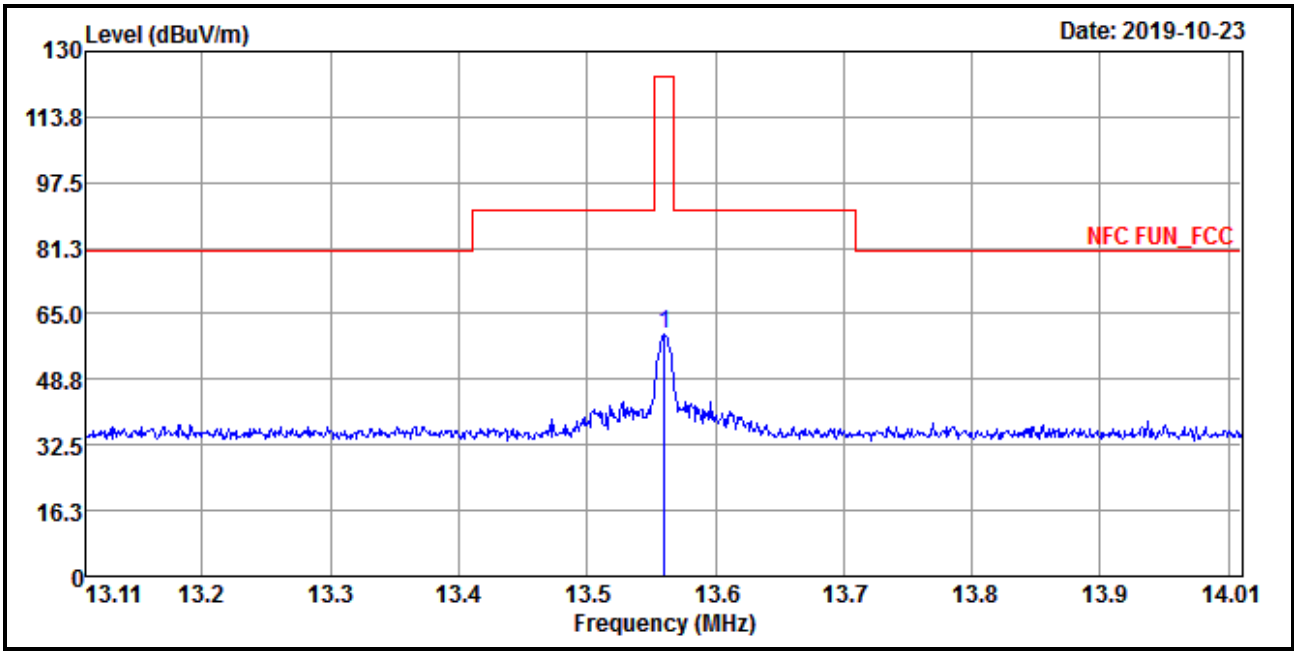
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	59.73	37.88	21.85	124	-64.27	100	360	QP

Remarks:

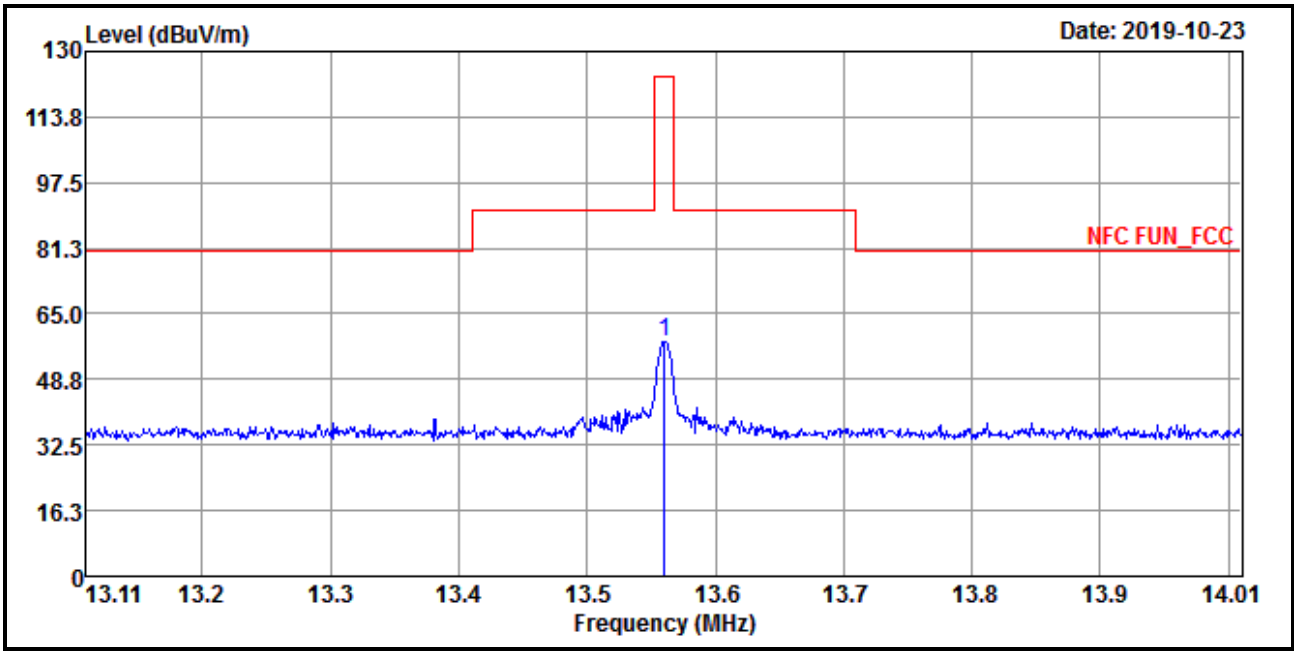
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
13.56	58.18	36.33	21.85	124	-65.82	100	0	QP

Remarks:

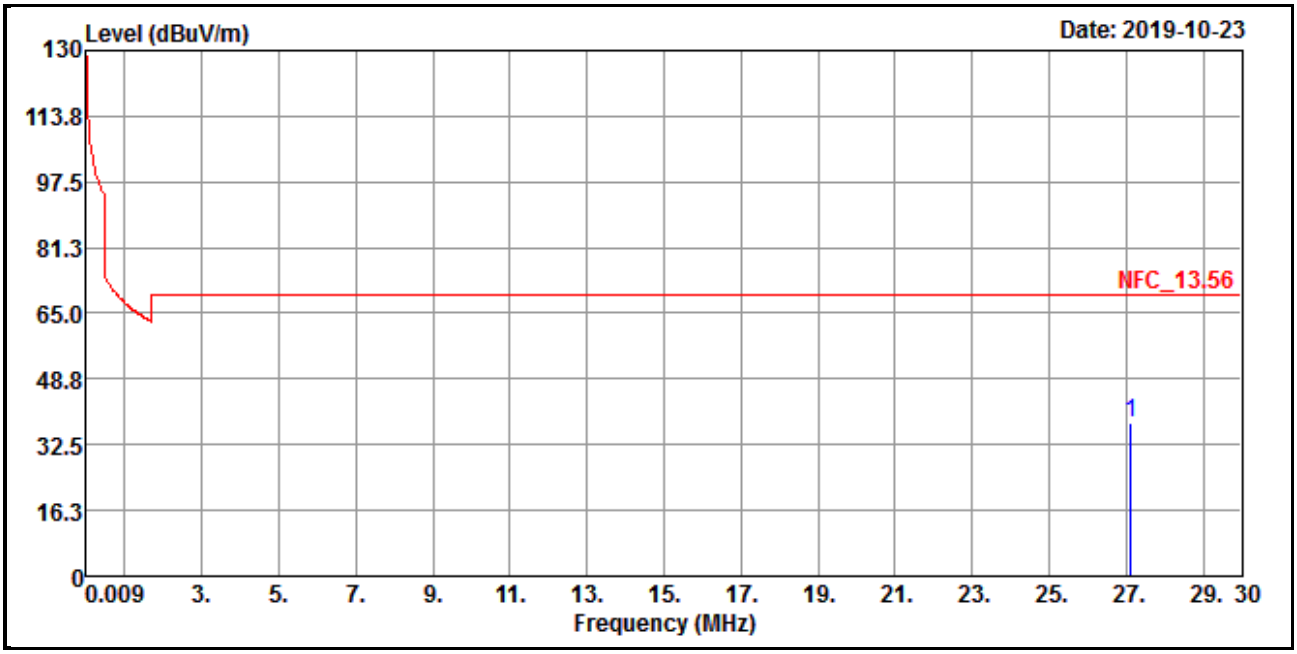
1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.
4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

13.56 MHz = 15848 uV/m 30m
= 84 dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124 dBuV/m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.76	15.64	22.12	69.54	-31.78	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

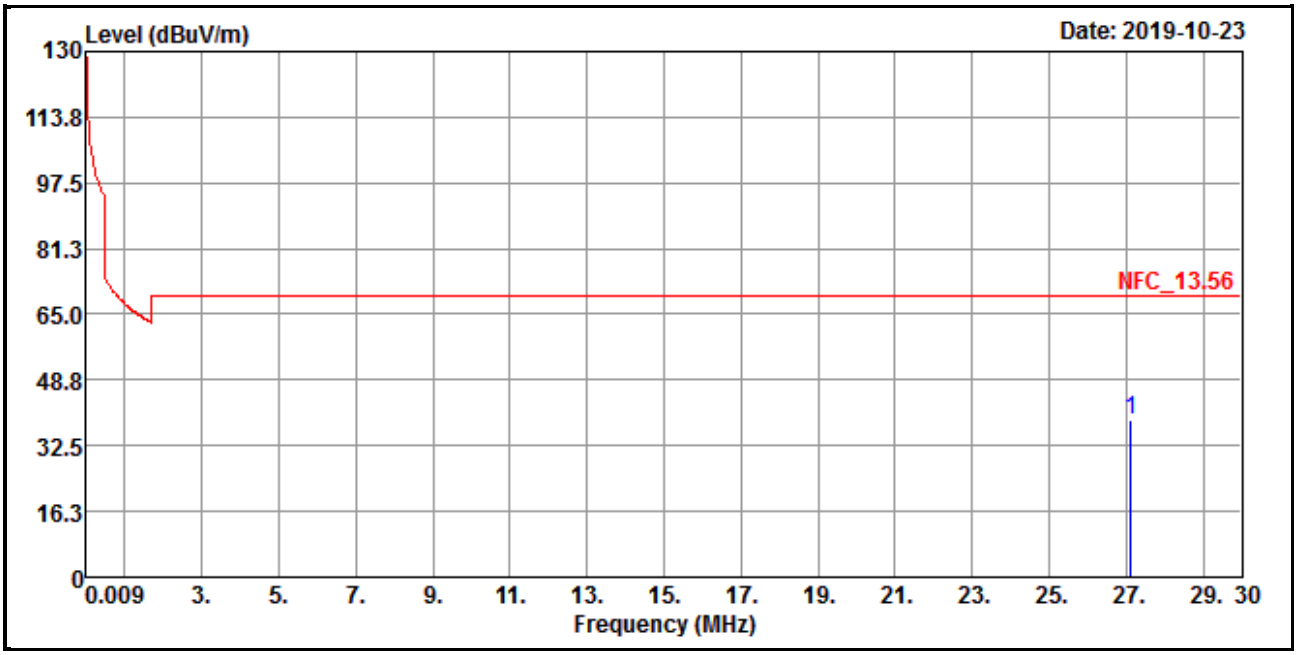
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

= 29.54 dBuV/m 30m

= 29.54+20 log(30/3)^2 3m

= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	39	16.88	22.12	69.54	-30.54	100	0	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)

2 The other emission levels were very low against the limit.

3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

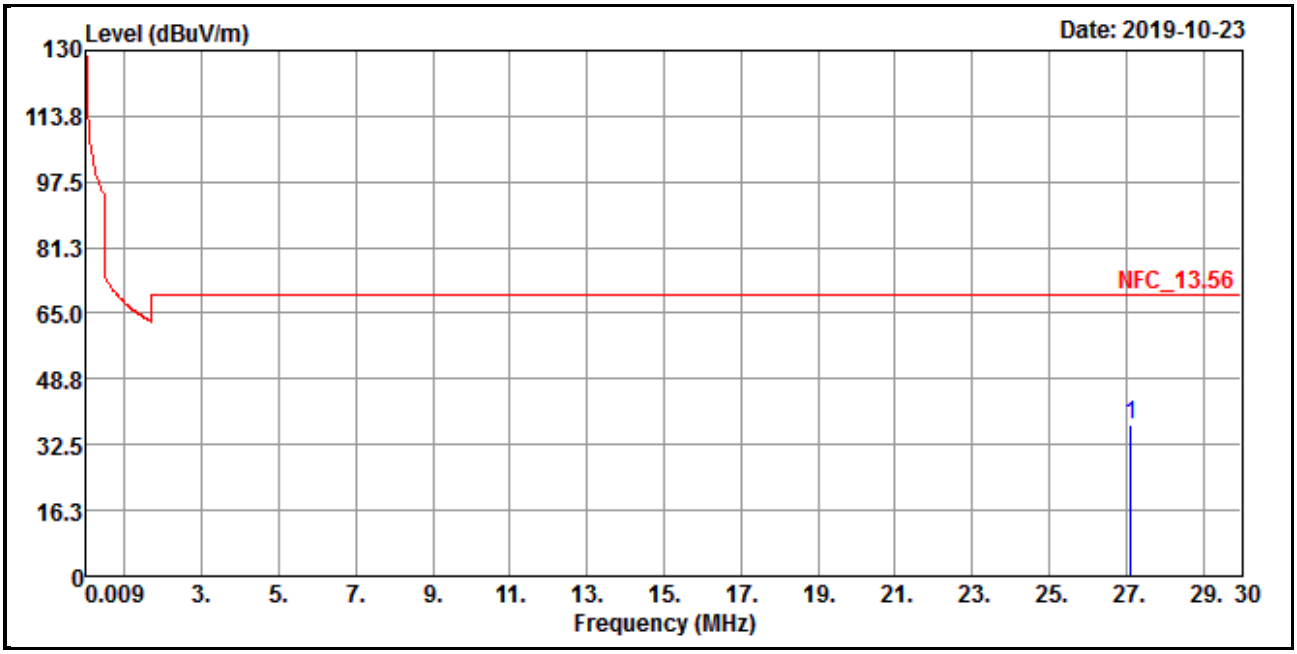
1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

= 29.54 dBuV/m 30m

= 29.54+20 log$(30/3)^2$ 3m

= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 30 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
27.12	37.27	15.15	22.12	69.54	-32.27	100	360	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
2. The other emission levels were very low against the limit.
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

1.705 MHz~30 MHz = 30 uV/m 30m (except 13.110MHz~14.010MHz)

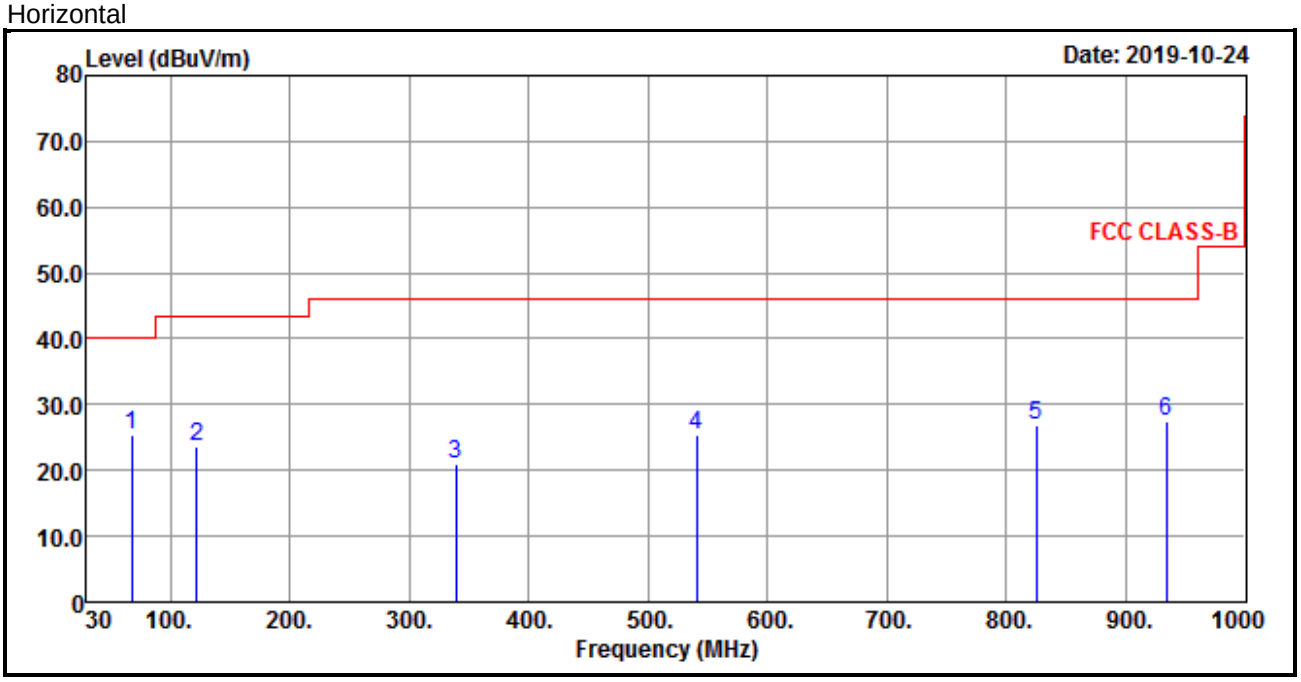
= 29.54 dBuV/m 30m

= 29.54+20 log(30/3)^2 3m

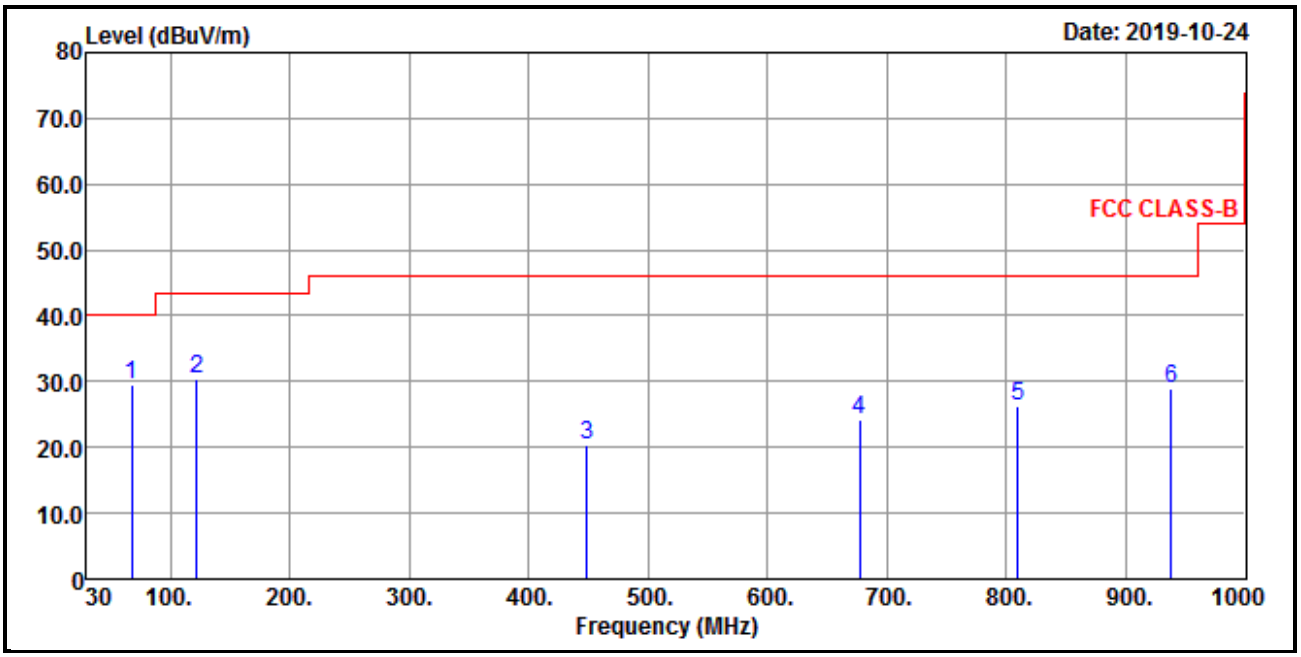
= 69.54 dBuV/m 3m

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**Frequency Range**	Below 1000 MHz
Input Power	120 Vac, 60 Hz	**Detector Function**	Quasi-Peak or Peak
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Tim Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	25.26	44.43	-19.17	40	-14.74	111	46	Peak
122.15	23.71	43.06	-19.35	43.5	-19.79	168	214	Peak
339.43	20.87	35.77	-14.9	46	-25.13	159	207	Peak
540.22	25.36	35.63	-10.27	46	-20.64	194	59	Peak
825.4	26.8	31.59	-4.79	46	-19.2	122	338	Peak
934.04	27.49	30.29	-2.8	46	-18.51	161	252	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
67.83	29.56	48.73	-19.17	40	-10.44	174	9	Peak
122.15	30.32	49.67	-19.35	43.5	-13.18	155	110	Peak
449.04	20.48	32.77	-12.29	46	-25.52	136	61	Peak
676.99	24.13	31.21	-7.08	46	-21.87	152	145	Peak
809.88	26.28	31.56	-5.28	46	-19.72	196	189	Peak
937.92	28.9	31.68	-2.78	46	-17.1	107	53	Peak

Remarks:

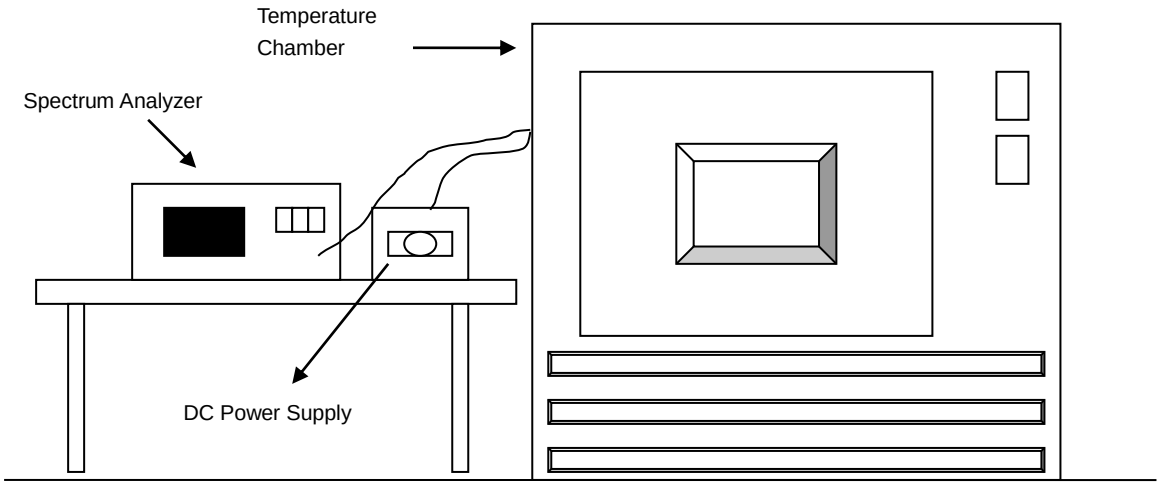
1. Emission Level = Read Level + Factor
2. Margin value = Emission level – Limit value.
3. The other emission levels were very low against the limit.
4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
   – Pre-Amplifier Factor (dB)

4.2 Frequency Stability

4.2.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01 % 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.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
b. Turned the EUT on and coupled its output to a spectrum analyzer.
c. Turned the EUT off and set the chamber to the highest temperature specified.
d. Allowed sufficient time (approximately 30 min) for the temperature of the chamber to stabilize then turned the EUT on and measured the operating frequency after 2, 5, and 10 minutes.
e. Repeated step c and d with the every 10 degrees reduction until the lowest temperature achieved.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85 % to 115 % and the frequency record.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

Type A

Frequency Stability Versus Temperature									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.6	13.55999	-0.00007	13.55998	-0.00015	13.55999	-0.00007	13.55999	-0.00007
40	3.6	13.55997	-0.00022	13.55996	-0.00029	13.55996	-0.00029	13.55996	-0.00029
30	3.6	13.56005	0.00037	13.56006	0.00044	13.56004	0.00029	13.56006	0.00044
20	3.6	13.55996	-0.00029	13.55997	-0.00022	13.55998	-0.00015	13.55996	-0.00029
10	3.6	13.56005	0.00037	13.56005	0.00037	13.56005	0.00037	13.56004	0.00029
0	3.6	13.56	0.00000	13.56	0.00000	13.55999	-0.00007	13.55999	-0.00007
-10	3.6	13.55996	-0.00029	13.55996	-0.00029	13.55997	-0.00022	13.55995	-0.00037
-20	3.6	13.55999	-0.00007	13.56	0.00000	13.56	0.00000	13.55999	-0.00007

Frequency Stability Versus Voltage									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.14	13.55996	-0.00029	13.55997	-0.00022	13.55998	-0.00015	13.55996	-0.00029
	3.6	13.55996	-0.00029	13.55997	-0.00022	13.55998	-0.00015	13.55996	-0.00029
	3.06	13.55996	-0.00029	13.55997	-0.00022	13.55998	-0.00015	13.55996	-0.00029

Type B

Frequency Stability Versus Temperature									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.6	13.55993	-0.00052	13.55994	-0.00044	13.55993	-0.00052	13.55994	-0.00044
40	3.6	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044
30	3.6	13.56005	0.00037	13.56006	0.00044	13.56005	0.00037	13.56005	0.00037
20	3.6	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029
10	3.6	13.56003	0.00022	13.56004	0.00029	13.56003	0.00022	13.56004	0.00029
0	3.6	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015
-10	3.6	13.56	0.00000	13.55999	-0.00007	13.56	0.00000	13.56	0.00000
-20	3.6	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044	13.55995	-0.00037

Frequency Stability Versus Voltage									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.14	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029
	3.6	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029
	3.06	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029

Type F

Frequency Stability Versus Temperature									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.6	13.56	0.00000	13.56001	0.00007	13.56001	0.00007	13.56001	0.00007
40	3.6	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037	13.55996	-0.00029
30	3.6	13.55994	-0.00044	13.55993	-0.00052	13.55994	-0.00044	13.55995	-0.00037
20	3.6	13.55996	-0.00029	13.55996	-0.00029	13.55997	-0.00022	13.55997	-0.00022
10	3.6	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037
0	3.6	13.56006	0.00044	13.56006	0.00044	13.56005	0.00037	13.56006	0.00044
-10	3.6	13.56004	0.00029	13.56006	0.00044	13.56004	0.00029	13.56006	0.00044
-20	3.6	13.56002	0.00015	13.56002	0.00015	13.56002	0.00015	13.56003	0.00022

Frequency Stability Versus Voltage									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.14	13.55996	-0.00029	13.55996	-0.00029	13.55997	-0.00022	13.55997	-0.00022
	3.6	13.55996	-0.00029	13.55996	-0.00029	13.55997	-0.00022	13.55997	-0.00022
	3.06	13.55996	-0.00029	13.55996	-0.00029	13.55997	-0.00022	13.55997	-0.00022

Type V (ISO15693)

Frequency Stability Versus Temperature									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.6	13.56007	0.00052	13.56007	0.00052	13.56007	0.00052	13.56007	0.00052
40	3.6	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044
30	3.6	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015
20	3.6	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044
10	3.6	13.55995	-0.00037	13.55994	-0.00044	13.55993	-0.00052	13.55995	-0.00037
0	3.6	13.56005	0.00037	13.56006	0.00044	13.56006	0.00044	13.56005	0.00037
-10	3.6	13.55997	-0.00022	13.55998	-0.00015	13.55998	-0.00015	13.55997	-0.00022
-20	3.6	13.55997	-0.00022	13.55996	-0.00029	13.55997	-0.00022	13.55997	-0.00022

Frequency Stability Versus Voltage									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.14	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044
	3.6	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044
	3.06	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044

4.3 20 dB Bandwidth

4.3.1 Limits of 20 dB Bandwidth Measurement

The 20 dB bandwidth shall be specified in operating frequency band.

4.3.2 Test Setup

Refer to section 4.1.5.

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1 kHz RBW and 3 kHz VBW. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

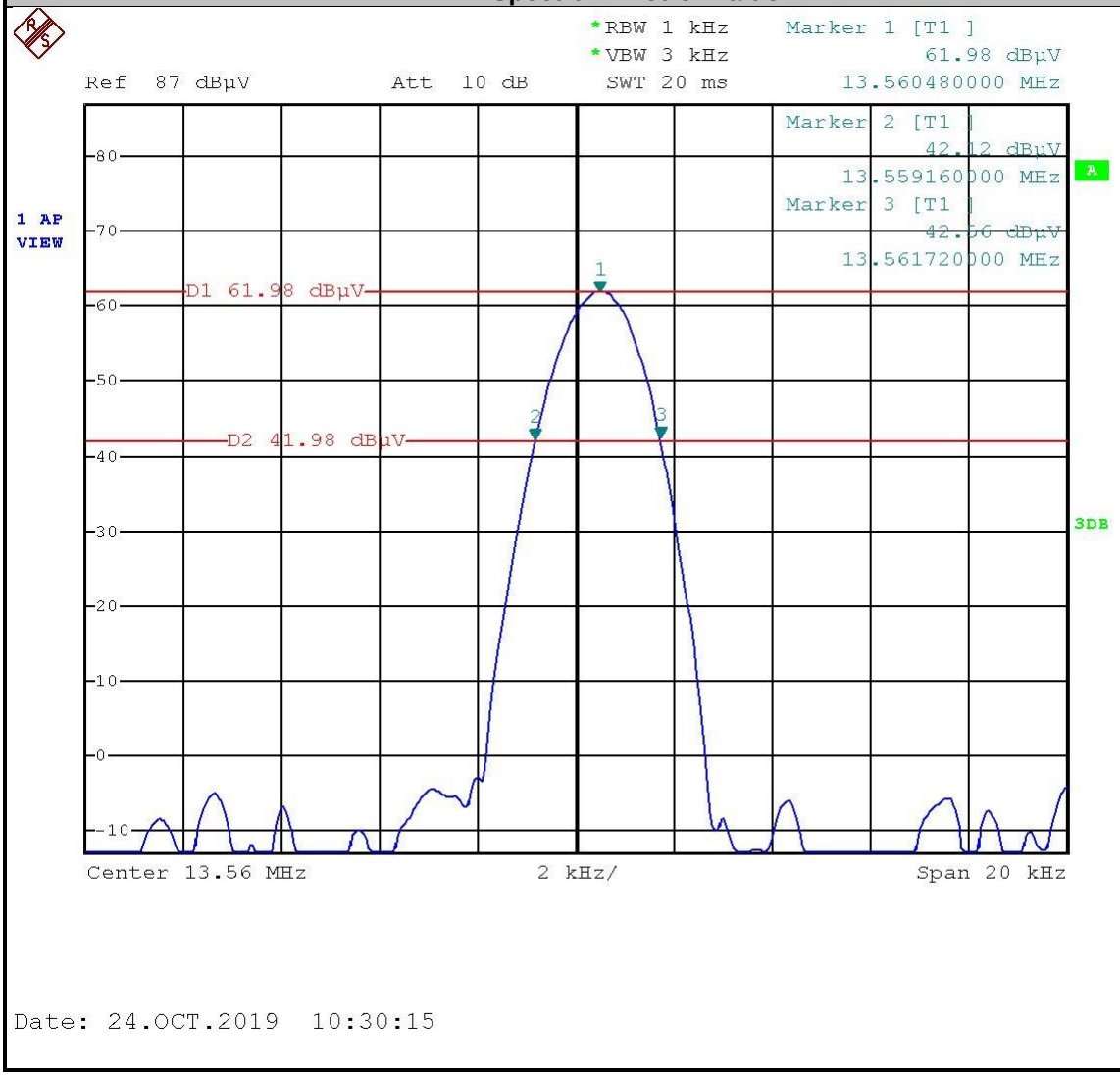
a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.3.7 Test Results

Type A

20 dBc Point (Low)	20 dBc Point (High)	Operating Frequency Band (MHz)	20 dBc Bandwidth (kHz)	Pass / Fail
13.559160000 MHz	13.561720000 MHz	13.553~13.567	2.59	Pass

Spectrum Plot Of Value

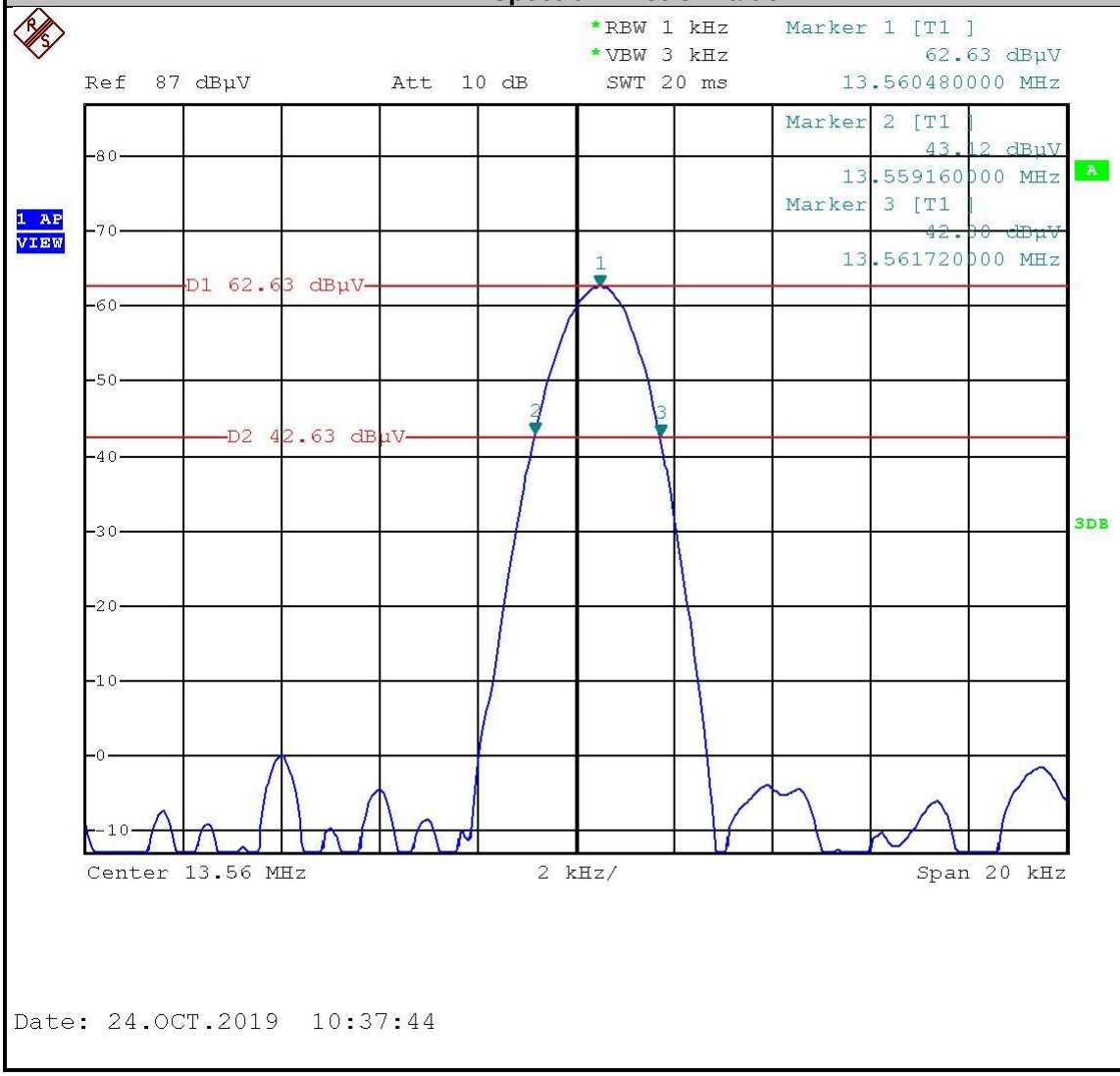


Note: The signal look like CW signal, so RBW can't be match 1~5 % OBW.

Type B

20 dBc Point (Low)	20 dBc Point (High)	Operating Frequency Band (MHz)	20 dBc Bandwidth (kHz)	Pass / Fail
13.559160000 MHz	13.561720000 MHz	13.553~13.567	2.56	Pass

Spectrum Plot Of Value

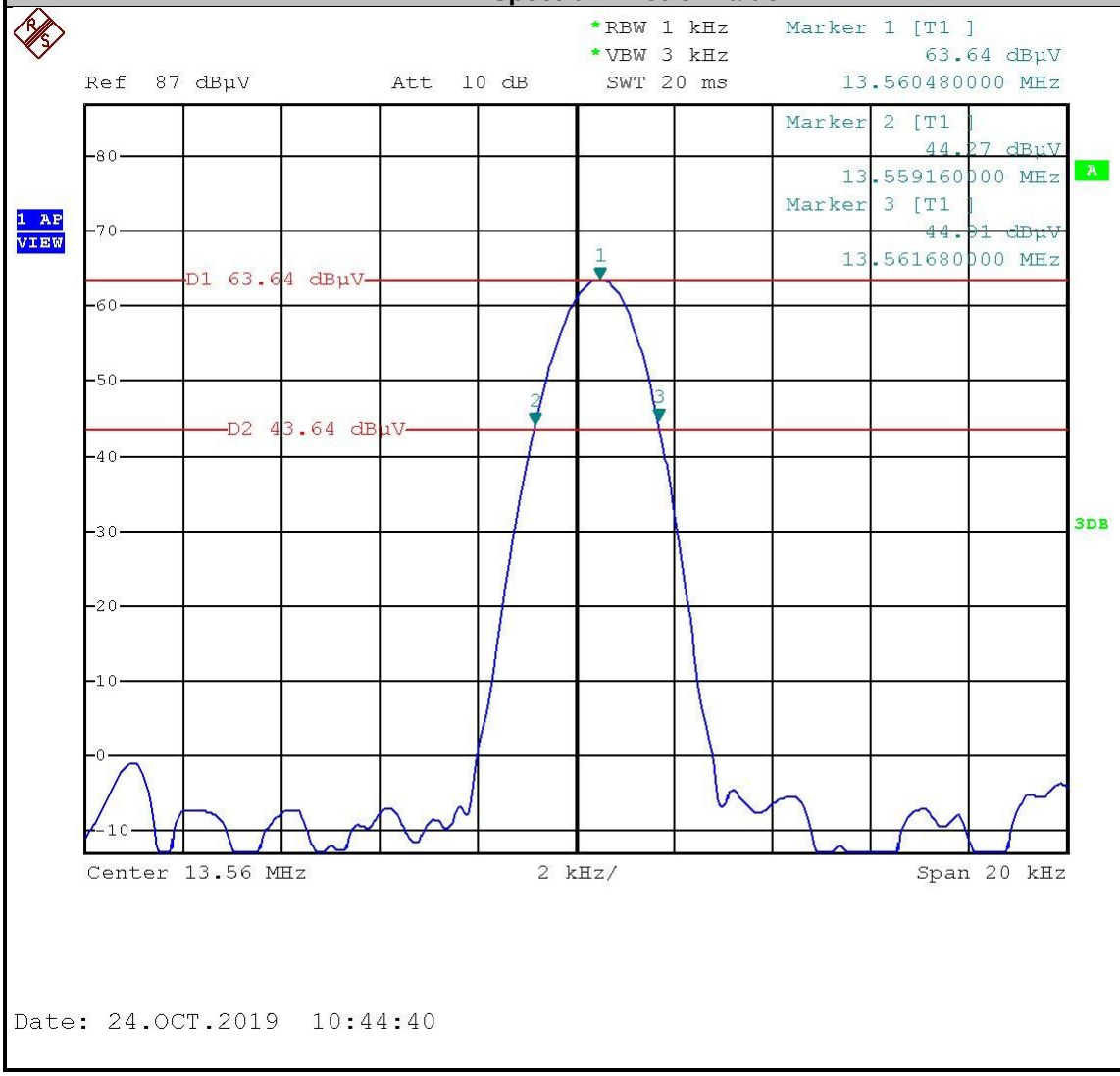


Note: The signal look like CW signal, so RBW can't be match 1~5 % OBW.

Type F

20 dBc Point (Low)	20 dBc Point (High)	Operating Frequency Band (MHz)	20 dBc Bandwidth (kHz)	Pass / Fail
13.559160000 MHz	13.561680000 MHz	13.553~13.567	2.52	Pass

Spectrum Plot Of Value

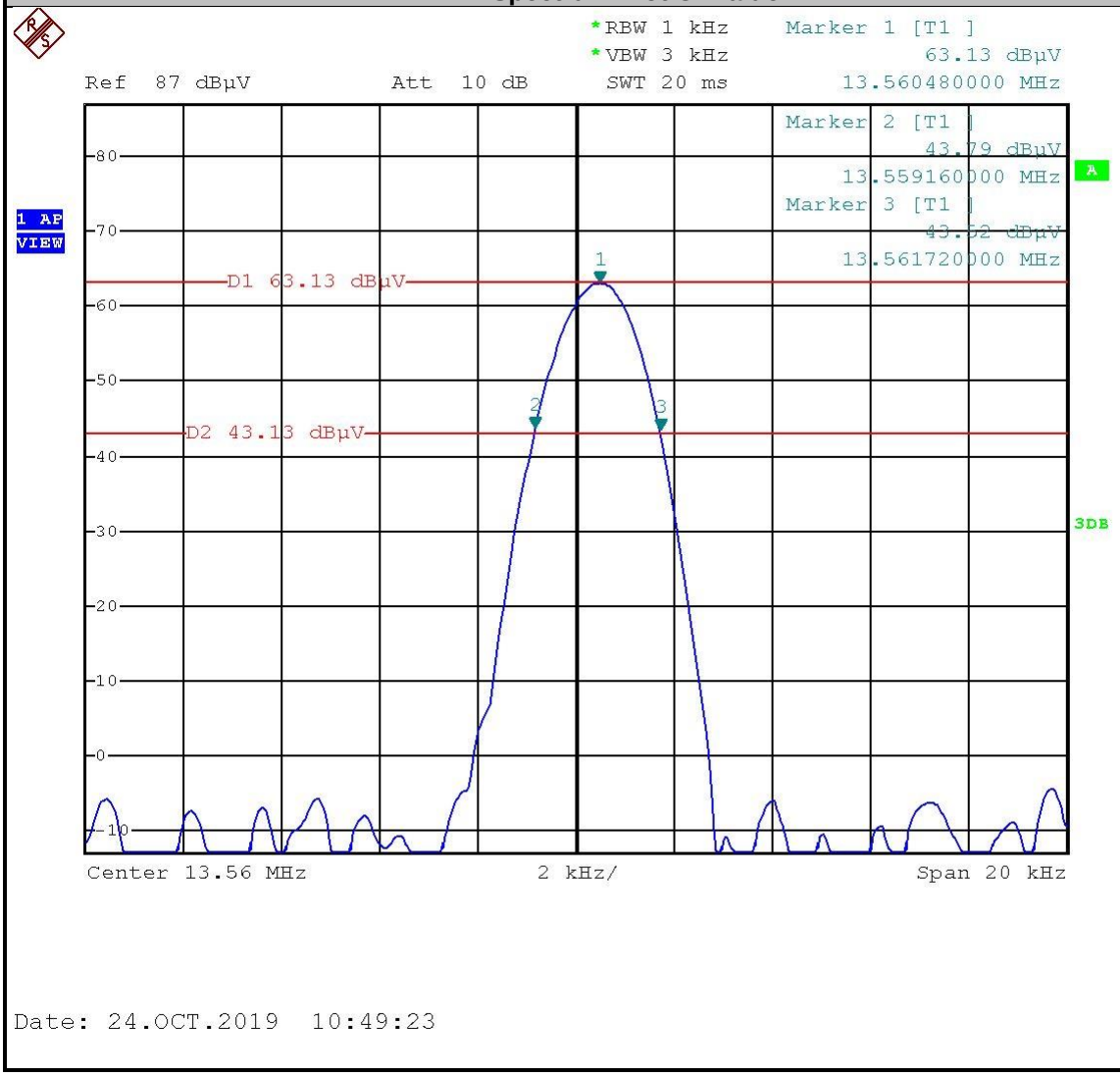


Note: The signal look like CW signal, so RBW can't be match 1~5 % OBW.

Type V (ISO15693)

20 dBc Point (Low)	20 dBc Point (High)	Operating Frequency Band (MHz)	20 dBc Bandwidth (kHz)	Pass / Fail
13.559160000 MHz	13.561720000 MHz	13.553~13.567	2.56	Pass

Spectrum Plot Of Value



Note: The signal look like CW signal, so RBW can't be match 1~5 % OBW.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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