

TEST REPORT

Applicant: GuangDong Unis Technology, Co. Ltd

Address of Applicant: No.1 Zheng An Road, West District, Zhongshan, Guangdong, China

Manufacturer: GuangDong Unis Technology, Co. Ltd

Address of Manufacturer: No.1 Zheng An Road, West District, Zhongshan, Guangdong, China

Equipment Under Test (EUT)

Product Name: Ticket Dome R GMP

Model No.: T-351

Trade Mark: N/A

FCC ID: 2AQKM-T-351

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.225

Date of sample receipt: Feb.20,2019

Date of Test: Feb.20,2019-Mar.18,2020

Date of report issued: Mar.18,2020

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue ink stamp from GTS Global United Technology Services Co., Ltd. is visible. The stamp contains the text "GTS", "GLOBAL TESTING", and "158015". Overlaid on the stamp is a handwritten signature in black ink, which appears to read "Robinson Lo".

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	Mar.18,2020	Original

Prepared By:

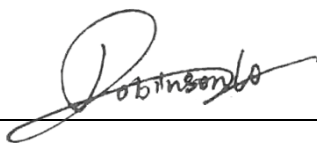


Date:

Mar.18,2020

Project Engineer

Check By:



Date:

Mar.18,2020

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field Strength of Fundamental Emissions and Mask Measurement	15.225(a)(b)(c)	Pass
Radiated Emission	15.225(d)&15.209	Pass
20dB Emission Bandwidth	15.225&15.215	Pass
Frequency Stability Measurement	15.225(e)	Pass

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Ticket Dome R GMP
Model No.:	T-351
Serial No.:	N/A
Test sample(s) ID:	GTS202003000040-1
Sample(s) Status	Engineered sample
Operation Frequency:	13.56MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	PCB ANT
Gain of Antenna 11 to Antenna 14 (for NFC Module 1):	Max. 0dBi each antenna
Gain of Antenna 21 to Antenna 24: (for NFC Module 2):	Max. 0dBi each antenna
Gain of Antenna 31 to Antenna 34: (for NFC Module 3):	Max. 0dBi each antenna
Gain of Antenna 41 to Antenna 44: (for NFC Module 4):	Max. 0dBi each antenna
Power supply:	AC 120V/60Hz
Note:	The EUT has 4 NFC Modules, each module has 4 antennas, totally 16 antennas.

5.2 Test mode

Transmitter mode	Keep the EUT in continuously transmitting.		
Pre-test mode.			
GTS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:			
Axis	X	Y	Z
Field Strength(dBuV/m)	86.23	86.53	86.45
Final Test Mode:			
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”: Y axis (see the test setup photo)			

5.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: • FCC —Registration No.: 381383 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383. • IC —Registration No.: 9079A The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A • NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0.
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5.4 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

7.1 Antenna requirement:

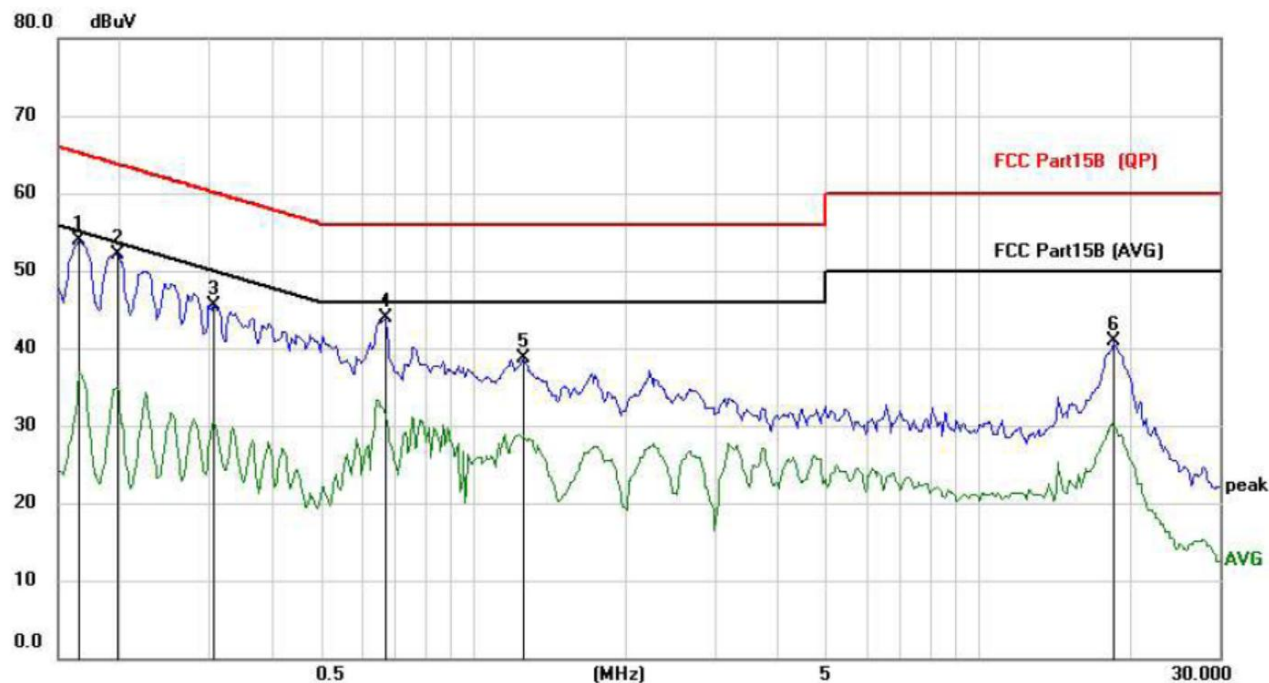
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
<i>The antenna is PCB antenna, the best case gain of the antenna is 0.0dBi, reference to the appendix II for details</i>	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207																			
Test Method:	ANSI C63.10:2013																			
Test Frequency Range:	150KHz to 30MHz																			
Class / Severity:	Class B																			
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																			
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * Decreases with the logarithm of the frequency.						Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																			
	Quasi-peak	Average																		
0.15-0.5	66 to 56*	56 to 46*																		
0.5-5	56	46																		
5-30	60	50																		
Test setup:	Reference Plane The diagram illustrates the test setup. A horizontal line at the top represents the Reference Plane. Below it, on the left, is a box labeled 'AUX Equipment' connected to a box labeled 'E.U.T'. A vertical double-headed arrow between the Reference Plane and the 'E.U.T' box is labeled '40cm'. To the right of the 'E.U.T' box, another vertical double-headed arrow extends from the Reference Plane down to a box labeled 'Filter', which is connected to 'AC power'. This second arrow is labeled '80cm'. Below the 'Filter' box is a box labeled 'EMI Receiver'. The 'AUX Equipment' and 'E.U.T' boxes are situated on a larger box labeled 'Test table/Insulation plane'. A 'LISN' box is connected to the 'E.U.T' box and the 'Reference Plane'. Another 'LISN' box is connected to the 'Filter' box and the 'Reference Plane'. <i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i>																			
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.																			
Test Instruments:	Refer to section 6.0 for details																			
Test mode:	Refer to section 5.2 for details																			
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar														
Test voltage:	AC 120V, 60Hz																			
Test results:	Pass																			

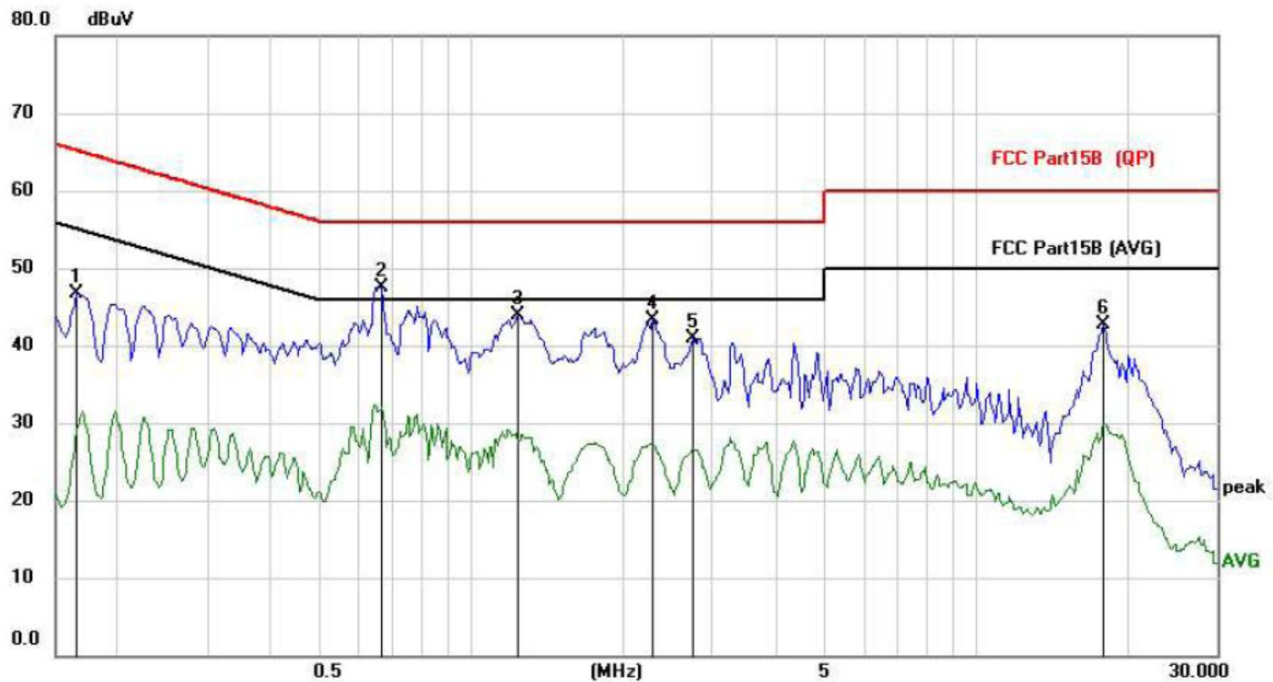
Measurement data:

Line:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1655	42.90	10.92	53.82	65.18	-11.36	peak
2		0.1968	41.19	10.92	52.11	63.74	-11.63	peak
3		0.3060	34.67	10.92	45.59	60.08	-14.49	peak
4		0.6687	32.96	10.92	43.88	56.00	-12.12	peak
5		1.2498	27.68	10.94	38.62	56.00	-17.38	peak
6		18.4908	29.28	11.61	40.89	60.00	-19.11	peak

Neutral:

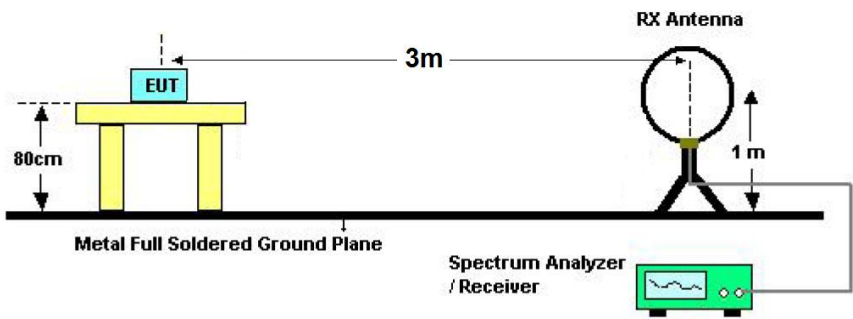


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1655	35.70	10.92	46.62	65.18	-18.56	peak
2	*	0.6648	36.59	10.92	47.51	56.00	-8.49	peak
3		1.2381	32.91	10.94	43.85	56.00	-12.15	peak
4		2.2950	32.34	10.98	43.32	56.00	-12.68	peak
5		2.7396	29.96	11.00	40.96	56.00	-15.04	peak
6		17.9019	31.05	11.59	42.64	60.00	-17.36	peak

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

7.3 Field Strength of Fundamental Emissions and Mask Measurement

Test Requirement:	FCC Part15 C Section 15.225(a)(b)(c)		
Test Method:	ANSI C63.10:2013		
Test site:	Measurement Distance: 3m		
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=Auto		
limit:	Frequency (MHz)	Field Strength (microvolts/meter) at 30m	Field Strength (dBuV/m) at 3m
	1.705~13.110	30	69.5
	13.110~13.410	106	80.5
	13.410~13.553	334	90.5
	13.553~13.567	15848	124.0
	13.567~13.710	334	90.5
	13.710~14.010	106	80.5
	14.010~30.000	30	69.5
Test setup:			
Test Procedure:	1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable. 2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation. 3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength. 4. For Fundamental emissions, use the receiver to measure QP reading. 5. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.		

	6. Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 1KHz for the band 13.553~13.567MHz.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

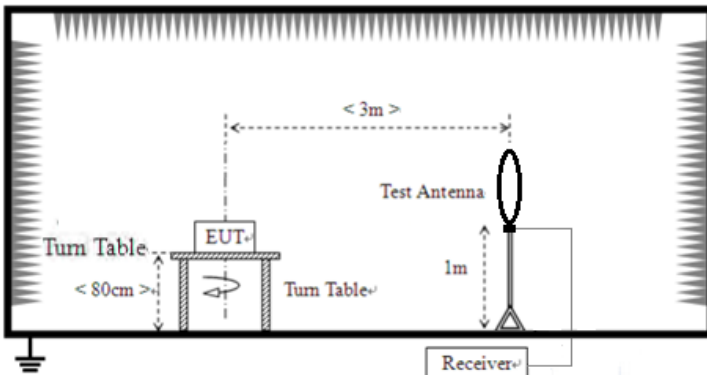
Frequency(MHz):			13.56				Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level	Detector	Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Correction Factor
1	13.15	39.06	PK	80.50	41.44	1.00 H	185	34.36	5.26	-0.56	4.70
2	13.55	48.88	PK	90.47	41.59	1.00 H	110	44.09	5.36	-0.57	4.79
3	13.56	85.42	PK	124.00	38.58	1.00 H	95	80.54	5.45	-0.57	4.88
4	13.57	49.02	PK	90.47	41.45	1.00 H	45	43.88	5.49	-0.35	5.14
5	13.75	39.86	PK	80.50	40.64	1.00 H	155	34.53	5.63	-0.30	5.33

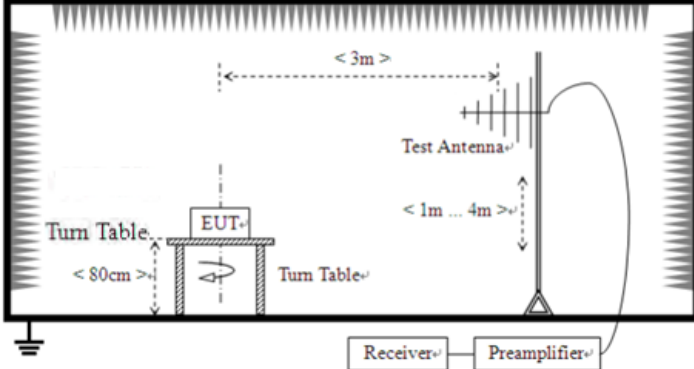
Frequency(MHz):			13.56				Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level	Detector	Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Correction Factor
1	13.15	41.06	PK	80.50	39.44	1.00 H	185	35.48	5.26	-0.56	4.70
2	13.55	49.62	PK	90.47	40.85	1.00 H	110	45.05	5.36	-0.57	4.79
3	13.56	86.53	PK	124.00	37.47	1.00 H	95	80.96	5.45	-0.57	4.88
4	13.57	49.98	PK	90.47	40.49	1.00 H	45	44.28	5.49	-0.35	5.14
5	13.75	40.84	PK	80.50	39.66	1.00 H	155	35.27	5.63	-0.30	5.33

REMARKS:

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

7.4 Radiated Emission

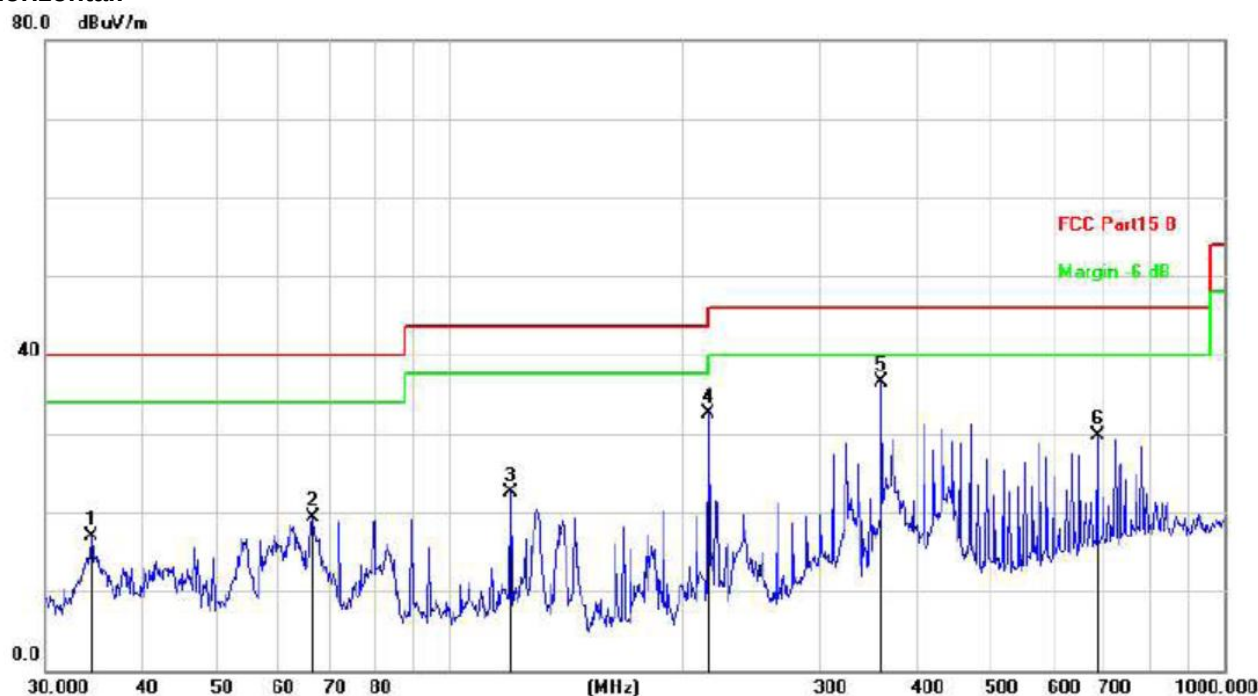
Test Requirement:	FCC Part15 C Section 15.225(d) and 15.209				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	9KHz to 1000MHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Limit:	All out of band emissions appearing in a restricted band as specified in Section 15.225 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.				
	Frequency (MHz)		Field strength (micorvolts/meter)		Measurement distance (meters)
	0.009~0.490		2400/F(KHz)		300
	0.490~1.705		24000/F(KHz)		30
	1.705~30		30		30
	30~88		100		3
	88~216		150		3
	216~960		200		3
	960~1000		500		3
	Test setup:	Below 30MHz			
					
Test setup:	Above 30MHz				

	
Test Procedure:	1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable. 2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation. 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization. 4. For each suspected emissions, the antenna tower was scan (from 1M to 4M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading. 5. Set the test-receiver system to Peak or CISPR quasi-peak detect function with specified bandwidth under maximum hold mode. 6. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. 7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Measurement data:

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

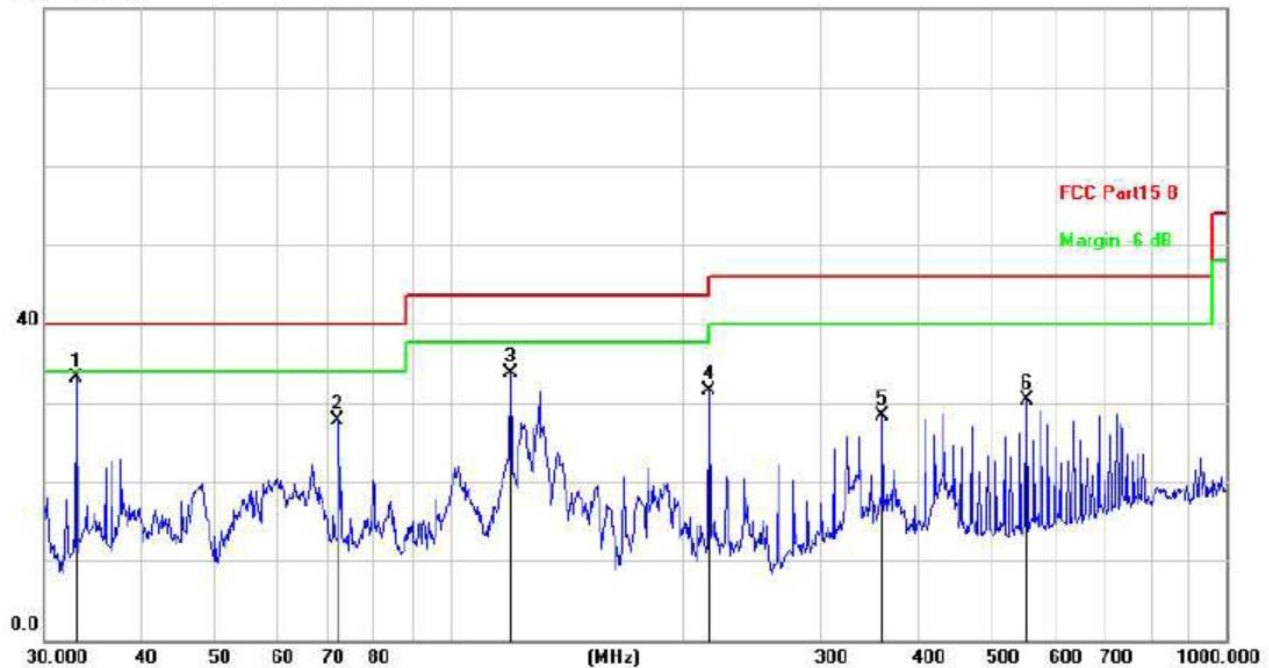
Horizontal:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dB/m	dB	
1		34.3964	35.24	-18.33	16.91	40.00	-23.09	peak
2		66.4989	38.88	-19.52	19.36	40.00	-20.64	peak
3		119.8556	42.41	-19.91	22.50	43.50	-21.00	peak
4		216.0240	51.98	-19.55	32.43	46.00	-13.57	peak
5	*	360.4476	54.26	-17.74	36.52	46.00	-9.48	peak
6		684.7454	41.75	-12.07	29.68	46.00	-16.32	peak

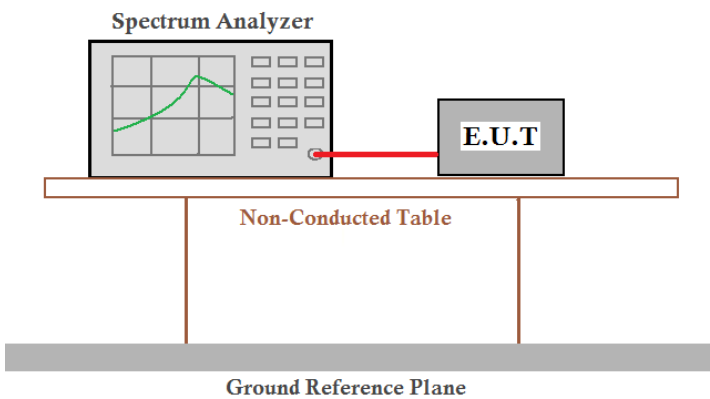
Vertical:

80.0 dBuV/m



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dB/m	dB	
1	*	32.9791	51.50	-18.41	33.09	40.00	-6.91	peak
2		71.8320	47.90	-20.10	27.80	40.00	-12.20	peak
3		119.8556	53.66	-19.91	33.75	43.50	-9.75	peak
4		216.0240	51.03	-19.55	31.48	46.00	-14.52	peak
5		360.4476	46.01	-17.74	28.27	46.00	-17.73	peak
6		552.8832	44.31	-13.97	30.34	46.00	-15.66	peak

7.5 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.225 and 15.215
Test Method:	ANSI C63.10:2013
Limit:	N/A
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data**Antenna 11;**

Test frequency (MHz)	20dB bandwidth (KHz)	Result
13.56	13.65	Pass

Antenna 12;

Test frequency (MHz)	20dB bandwidth (KHz)	Result
13.56	13.67	Pass

Antenna 13;

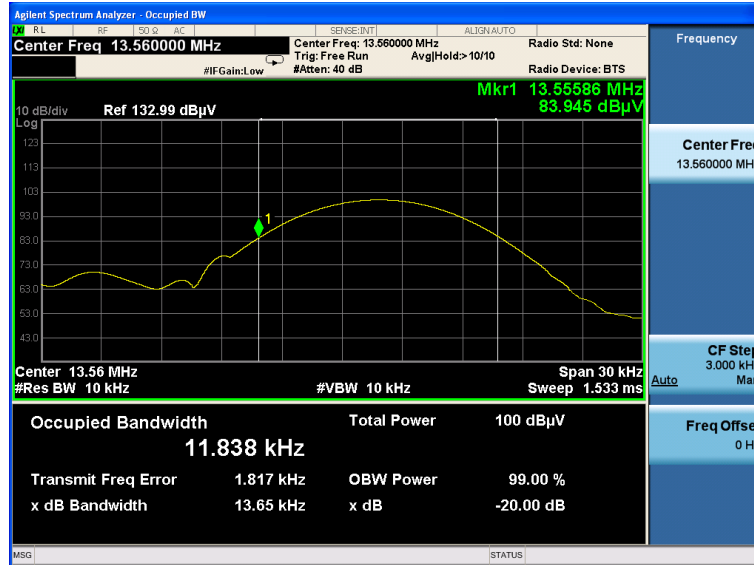
Test frequency (MHz)	20dB bandwidth (KHz)	Result
13.56	13.65	Pass

Antenna 14;

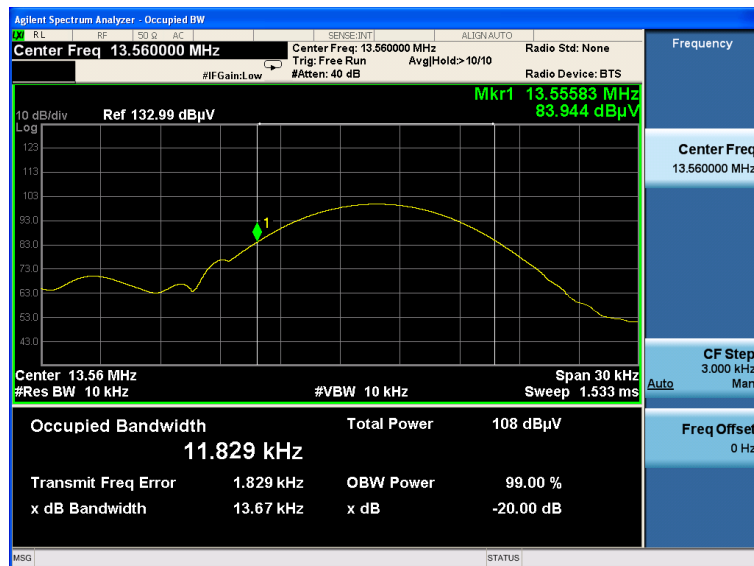
Test frequency (MHz)	20dB bandwidth (KHz)	Result
13.56	13.63	Pass

Note: Tests performed at each antennas, only report results at antenna 11 to antenna 14 of NFC module 1 as Typical representative results.

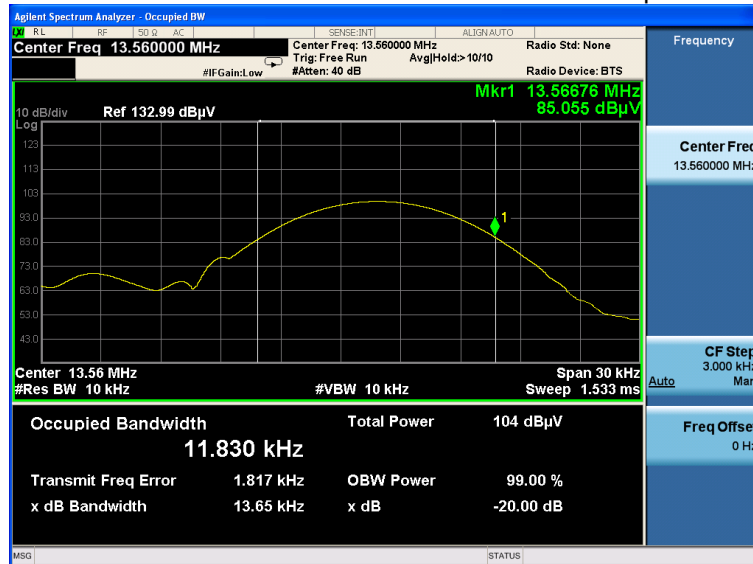
Test plot as follows:



Antenna 11



Antenna 12



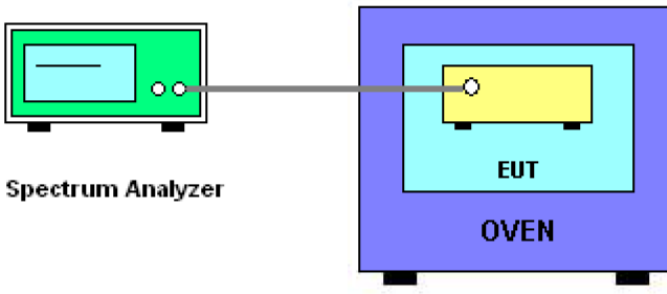
Antenna 13

3



Antenna 14

7.6 Frequency Stability Measurement

Test Requirement:	FCC Part15 C Section 15.225 (e)
Test Method:	ANSI C63.10: 2013
Receiver setup:	RBW=1KHz, VBW=1KHz, Sweep time=Auto
Limit:	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, 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.
Test setup:	 The diagram illustrates the test setup. On the left is a green box labeled 'Spectrum Analyzer'. A cable connects its antenna port to a yellow box labeled 'EUT' (Equipment Under Test). The 'EUT' is placed inside a blue box labeled 'OVEN'.
Test Procedure:	1. The transmitter output (antenna port) was connected to the spectrum analyzer. 2. EUT have transmitted absence of modulation signal and fixed channelize 3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. 4. Set RBW=1KHz, VBW=1KHz with peak detector and maxhold settings. 5. fc is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 100ppm. 6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value 7. Extreme temperature rule is -20°C ~50°C
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

For Antenna 11:

Reference Frequency: 13.56MHz (Limit: $\pm 0.01\%$)				
Voltage (V)	Temperature (°C)	Frequency (Hz)	Frequency Deviation(Hz)	Deviation (%)
120	+20(Ref)	13,560,005	6	0.00004425
	-20	13,560,007	7	0.00005162
	-10	13,560,005	5	0.00003687
	0	13,559,995	-5	-0.00003687
	+10	13,560,005	5	0.00003687
	+20	13,560,010	10	0.00007375
	+25	13,560,006	6	0.00004425
	+30	13,559,993	-7	-0.00005162
	+40	13,559,998	-2	-0.00001475
	+50	13,559,996	-4	-0.00002950
138	+20	13,560,009	9	0.00006637
End point 102	+20	13,560,006	6	0.00004425

For Antenna 12:

Reference Frequency: 13.56MHz (Limit: $\pm 0.01\%$)				
Voltage (V)	Temperature (°C)	Frequency (Hz)	Frequency Deviation(Hz)	Deviation (%)
120	+20(Ref)	13,560,002	2	0.00001475
	-20	13,560,006	6	0.00004425
	-10	13,560,007	7	0.00005162
	0	13,559,998	-2	-0.00001475
	+10	13,560,003	3	0.00002212
	+20	13,560,012	12	0.00008850
	+25	13,560,003	3	0.00002212
	+30	13,559,997	-3	-0.00002212
	+40	13,559,996	-4	-0.00002950
	+50	13,559,998	-2	-0.00001475
138	+20	13,560,007	7	0.00005162
End point 102	+20	13,560,005	5	0.00003687

For Antenna 13:

Reference Frequency: 13.56MHz (Limit: $\pm 0.01\%$)				
Voltage (V)	Temperature (°C)	Frequency (Hz)	Frequency Deviation(Hz)	Deviation (%)
120	+20(Ref)	13,559,993	-7	-0.00005162
	-20	13,559,996	-4	-0.00002950
	-10	13,559,993	-7	-0.00005162
	0	13,559,998	-2	-0.00001475
	+10	13,560,005	5	0.00003687
	+20	13,560,010	10	0.00007375
	+25	13,560,006	6	0.00004425
	+30	13,559,993	-7	-0.00005162
	+40	13,559,999	-1	-0.00000737
	+50	13,559,997	-3	-0.00002212
138	+20	13,560,006	6	0.00004425
End point 102	+20	13,560,003	3	0.00002212

For Antenna 14:

Reference Frequency: 13.56MHz (Limit: $\pm 0.01\%$)				
Voltage (V)	Temperature (°C)	Frequency (Hz)	Frequency Deviation(Hz)	Deviation (%)
120	+20(Ref)	13,560,008	8	0.00005900
	-20	13,559,997	3	0.00002212
	-10	13,560,006	6	0.00004425
	0	13,560,003	3	0.00002212
	+10	13,560,005	5	0.00003687
	+20	13,560,010	10	0.00007375
	+25	13,560,003	3	0.00002212
	+30	13,559,997	-3	-0.00002212
	+40	13,559,998	-2	-0.00001475
	+50	13,559,993	-7	-0.00005162
138	+20	13,560,005	5	0.00003687
End point 102	+20	13,559,996	-4	-0.00002950

Note: Tests performed at each antennas, only report results at antenna 11 to antenna 14 of NFC module 1 as Typical representative results.

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

----- End -----