

APPLICATION FOR CERTIFICATION

On Behalf of

Wincor Nixdorf Pte. Ltd.

NFC/RFID Reader

Model No. : BA9x RFID/NFC

Brand : WINCOR NIXDORF

FCC ID : 2ACY3-WN-RFIDNFC-01

Prepared for

Wincor Nixdorf Pte. Ltd.

151 Lorong Chuan, New Tech Park #05-01A/B, Singapore 556741

Prepared by

Audix Technology (Wujiang) Co., Ltd. EMC Dept.

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Report Number : ACWE-F1408004

Date of Test : Aug.20~23, 2014

Date of Report : Spe.01, 2014

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TEST REPORT CERTIFICATION

Applicant : Wincor Nixdorf Pte. Ltd.
 Manufacturer : Wincor Nixdorf Pte. Ltd.
 EUT Description : NFC/RFID Reader
 FCC ID : 2ACY3-WN-RFIDNFC-01
 (A) Model No. : BA9x RFID/NFC
 (B) Brand : WINCOR NIXDORF
 (C) Power Supply : DC 5V, 250mA (Via POS Terminal)
 (D) Test Voltage : AC 120V, 60Hz

Applicable Standards:

FCC RULES AND REGULATIONS PART 15 SUBPART C, Oct. 2012
(FCC CFR 47 Part 15C, §15.207, §15.209, §15.215 and §15.225)
ANSI C63.4-2009

The device described above was tested by Audix Technology (Wujiang) Co., Ltd. EMC Dept. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C section 15.207, 15.209, 15.215&15.225 limits.

The measurement results are contained in this test report and Audix Technology (Wujiang) Co., Ltd. EMC Dept. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Wujiang) Co., Ltd. EMC Dept.

Date of Test: Aug.20~23, 2014

Date of Report: Spe.01,2014


Prepared by

:


 (Emma Hu/Assistant Administrator)


Reviewer

:


 (Danny Sun/ Section Manager)

Approved & Authorized Signer

:


 (Ken Lu/ Assistant General Manager)

1. SUMMARY OF MEASUREMENTS AND RESULTS

The EUT has been tested according to the applicable standards and test results are referred as below.

Description of Test Item	FCC Part Section	Results
Powerline Conducted Emission 150kHz-30MHz	15.207	PASS
In-Band Emission	15.225(a)(b)(c)	PASS
Out-of-Band Emission	15.225(d) 15.209	PASS
20 dB Bandwidth	15.215	PASS
Frequency Stability Tolerance	15.225(e)	PASS

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	NFC/RFID Reader
Model Number	:	BA9x RFID/NFC
Brand	:	Wincor Nixdorf Pte. Ltd.
Applicant	:	Wincor Nixdorf Pte. Ltd. 151 Lorong Chuan, New Tech Park #05-01A/B, Singapore 556741
Manufacturer	:	Wincor Nixdorf Pte. Ltd. 151 Lorong Chuan, New Tech Park #05-01A/B, Singapore 556741
Radio Technology	:	NFC
Operation Frequency	:	13.56MHz
Date of Receipt of Sample	:	Aug.12, 2014
Date of Test	:	Aug.20~23, 2014

2.2. Operating Condition of EUT

- 2.2.1. Set up the EUT as showed in respective block diagram of test setup.
- 2.2.2. Turn on the power of all equipment. The printer, keyboard and mouse are all stand by.
- 2.2.3. The EUT drives test software “HID Device Tester” to make the EUT operating normally.
- 2.2.4. The other peripheral devices are driven and operate in turn during all testing.

2.3. Tested Supporting System Details

2.3.1. USB Keyboard

Manufacturer	:	HP
Model Number	:	SK-2885
Serial Number	:	BAUJF0LJ60M1OG
Data Cable	:	Shielded, Undetachable, 1.8 m

2.3.2. USB Mouse

Manufacturer	:	Logitech
Model Number	:	M-SBM96B
Serial Number	:	LZ646AB
BSMI ID	:	T41126
Data Cable	:	Shielded, Undetachable, 1.5 m

2.3.3. POS Terminal

Manufacturer	:	WINCOR NIXDORF
Model Number	:	BEETEL/i8 Modular

BSMI Number : D31294
 AC Power Cord : Unshielded, Detachable, 1.8m

2.3.4. LCD Monitor

Manufacturer : DELL
 Model Number : S2409Wb
 Serial Number : CN-0W570D-74261-97G-2MAO
 BSMI Number : R3A002
 AC Power Cord : Unshielded, Detachable, 1.8m

2.4. Description of Test Facility

Name of Firm : **Audix Technology (Wujiang) Co., Ltd. EMC Dept.**

Site Location : No. 1289 Jiangxing East Road, the Eastern Part of Wujiang Economic Development Zone Jiangsu China 215200

Test Facilities : **No.1 10m semi-anechoic chamber
 No.1 Conducted Shielding Enclosure
 RF Fully Chamber**

NVLAP Lab Code : 200786-0
 (NVLAP is a NATA accredited body under Mutual Recognition Agreement)
 Valid until on Sep.30, 2014

2.5. Measurement Uncertainty

Test Item	Range Frequency	Uncertainty
Conducted Disturbance Measurement	0.15MHz ~ 30MHz	$\pm 2.48\text{dB}$
Radiated Disturbance Measurement (At 10m Chamber)	30MHz ~ 1000MHz	$\pm 3.35\text{dB}$ (Horizontal)
		$\pm 3.32\text{dB}$ (Vertical)

Remark: Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
20 dB Bandwidth	$\pm 83\text{kHz}$
Frequency Stability	$\pm 7 \times 10^{-8} \text{MHz}$

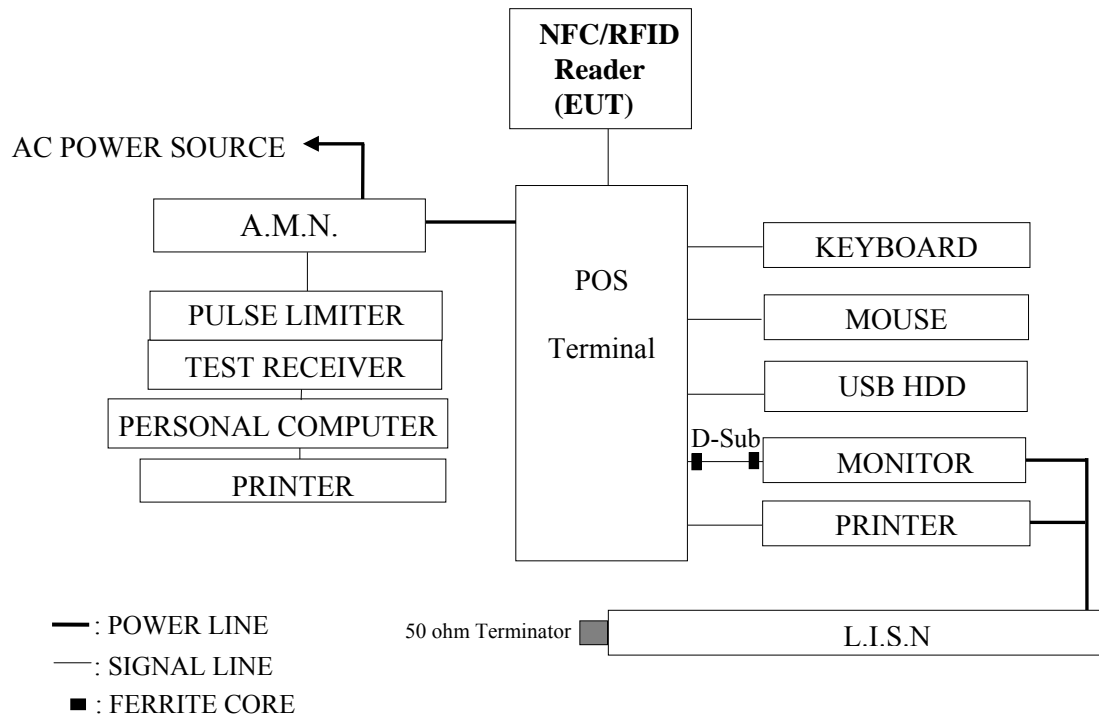
Remark: Uncertainty = $k_{uc}(y)$

3. CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R & S	ESCI	100839	2014-01-05	2015-01-04
2.	A.M.N.	Schwarzbeck	NNLK 8129	8129-164	2014-03-31	2015-03-30
3.	L.I.S.N	Kyoritsu	KNW-407	8-1793-3	2014-07-05	2015-07-04
4.	Pulse Limiter	R&S	ESH3-Z2	100605	2014-07-05	2015-07-04
5.	RF Cable	Harbour Industries	RG400	003	2014-03-24	2015-03-23

3.2. Block Diagram of Test Setup



3.3. Power line Conducted Emission Limit

3.3.1. Power line Conducted Emission Limit (FCC Part 15, Section 15.207, Class B)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark1: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2: The lower limit applies at the band edges.

3.4. Test Procedure

The measuring process is according to ANSI C63.4 and laboratory internal procedure TKC-301-004. (For FCC Part15 Subpart C)

In the conducted emission measurement, the EUT and all peripheral devices were set up on a non-metallic table which was 0.8 meters height above the ground plane, and 0.4 meters far away from the vertical plane. The EUT (installed in PC system) was powered by AC mains through Artificial Mains Network (A.M.N), other peripheral devices were powered by AC mains through the second Line Impedance Stabilization Network (L.I.S.N). For the measurement, the A.M.N measuring port was terminated by a 50Ω measuring equipment and the second L.I.S.N measuring port was terminated by a 50Ω resistive load. All measurements were done on the phase and neutral line of the EUT's power cord. All cables or wires placement were verified to find out the maximum emission.

The bandwidth of measuring receiver was set at 9 kHz.

The required frequency band (0.15 MHz ~ 30 MHz) was pre-scanned with peak detector, the final measurement was measured with quasi-peak detector and average detector. (If the average limit is met when using a quasi-peak detector, the average detector is necessary).

The emission level is calculated automatically by the test system which uses the following equation:

Emission level (dBμV) = Meter-Reading (dBμV) + A.M.N factor (dB) + Cable loss (dB).

(Cable loss include pulse limiter loss)

3.5. Conducted Emission Measurement Results

3.5.1. Conducted Emission Measurement Results (For FCC Part15 Subpart C)

PASSED.

(All the emissions not reported below are too low against the prescribed limits.)

EUT was performed during this section testing and all the test results are attached in next pages.

Test Date : Aug 20, 2014 Temperature : 23.8℃ Humidity : 60%

Mode	Test Condition	Reference Test Data No.	
		Neutral	Line
1	Operating	# 5	※# 6

NOTE 1 - '※' means the worst test mode.

NOTE 2- The worst emission is detected at 14.60 MHz with emission level of 54.60 dB (μV) and with QP detector (Limit is 60.00 dB (μV)), when the Line of the EUT is connected to AMN.

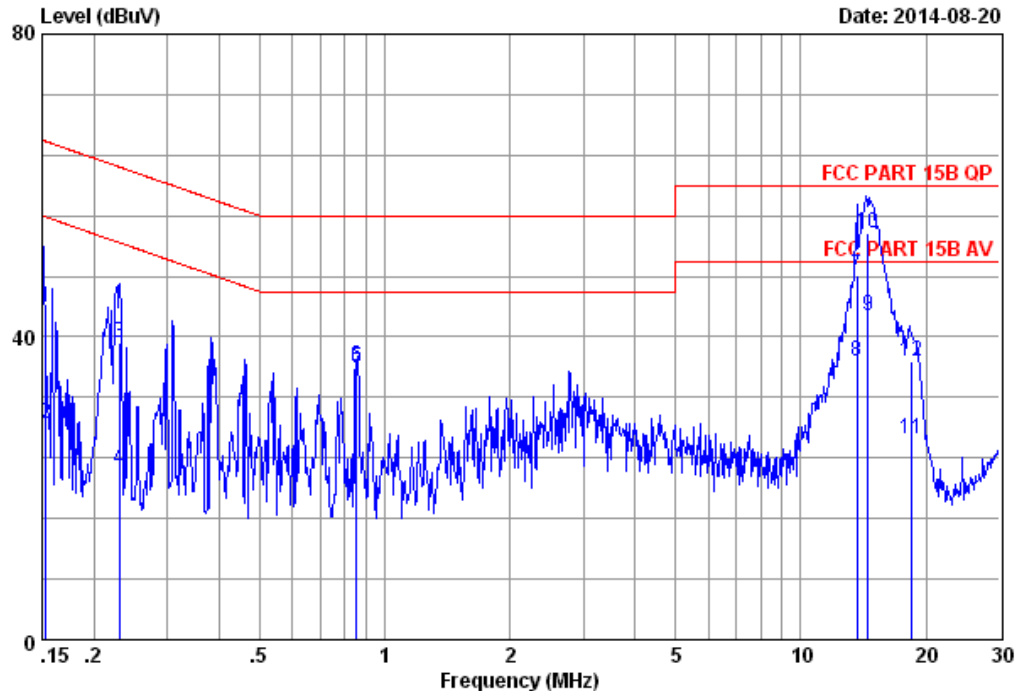


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Data: 5

File: E:\Test data & Report\2014 Test Data\Report\08\G1408012.EM6 (6)

Date: 2014-08-20



Site no. : No.2 Conducted shielding Enclosure Data no. : 5
AMN/LISN : NNLK8129-164-1403-N Phase : NEUTRAL
Limit : FCC PART 15B QP
Env. / Ins. : 23.8°C±60%/ESCI Engineer : KM Tong
EUT : NFC/RFID Reader
M/N : BA9xRFID/NFC
Power Rating : 120Vac/60Hz
Test mode : Operating
Memo :
:
:

		AMN	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)	
1	0.15	0.07	9.89	33.90	43.86	65.84	21.98	QP
2	0.15	0.07	9.89	18.60	28.56	55.84	27.28	Average
3	0.23	0.06	9.89	29.20	39.15	62.45	23.30	QP
4	0.23	0.06	9.89	12.50	22.45	52.45	30.00	Average
5	0.86	0.07	9.91	26.00	35.98	56.00	20.02	QP
6	0.86	0.07	9.91	26.20	36.18	46.00	9.82	Average
7	13.68	0.42	10.13	37.61	48.16	60.00	11.84	QP
8	13.68	0.42	10.13	26.21	36.76	50.00	13.24	Average
9	14.52	0.45	10.14	32.30	42.89	50.00	7.11	Average
10	14.52	0.45	10.14	43.10	53.69	60.00	6.31	QP
11	18.45	0.61	10.19	15.81	26.61	50.00	23.39	Average
12	18.45	0.61	10.19	25.91	36.71	60.00	23.29	QP

1. Emission Level = AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

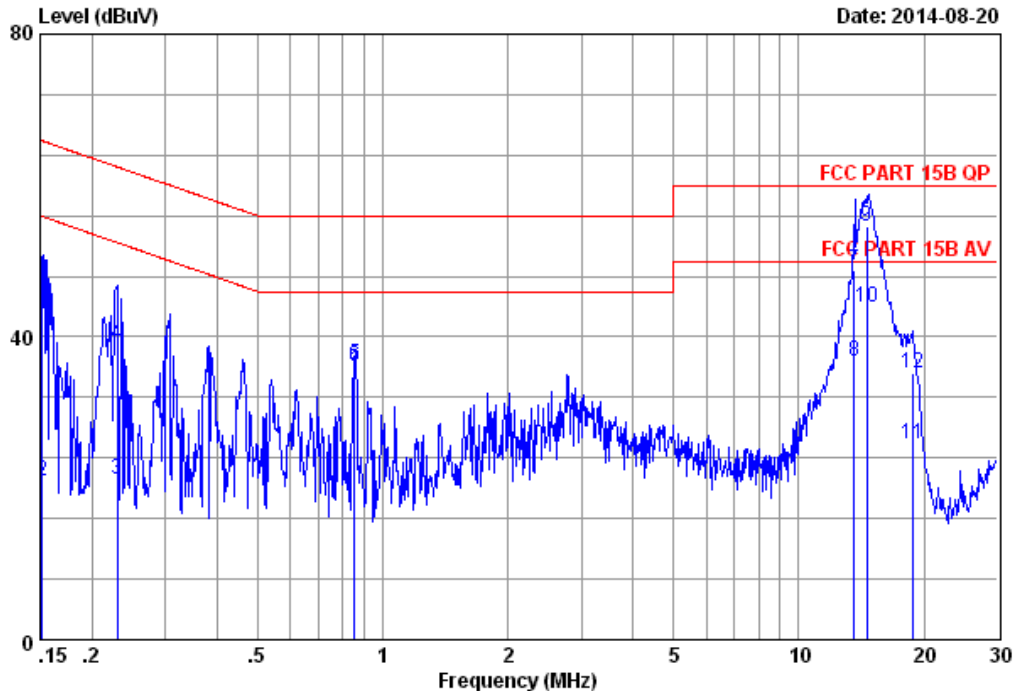


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Data: 6

File: E:\Test data & Report\2014 Test Data\Report\08\G1408012.EM6 (6)

Date: 2014-08-20



Site no. : No.2 Conducted shielding Enclosure Data no. : 6
AMN/LISN : NNLK8129-164-1403-L1 Phase : LINE
Limit : FCC PART 15B QP
Env. / Ins. : 23.8°C±60%/ESCI Engineer : KM Tong
EUT : NFC/RFID Reader
M/N : BA9xRFID/NFC
Power Rating : 120Vac/60Hz
Test mode : Operating
Memo :

		AMN	Cable		Emission			
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)		
1	0.15	0.07	9.89	33.70	43.66	65.89	22.23	QP
2	0.15	0.07	9.89	11.00	20.96	55.89	34.93	Average
3	0.23	0.06	9.89	11.20	21.15	52.45	31.30	Average
4	0.23	0.06	9.89	29.10	39.05	62.45	23.40	QP
5	0.86	0.07	9.91	26.30	36.28	46.00	9.72	Average
6	0.86	0.07	9.91	26.10	36.08	56.00	19.92	QP
7	13.61	0.42	10.13	38.21	48.76	60.00	11.24	QP
8	13.61	0.42	10.13	26.31	36.86	50.00	13.14	Average
9	14.60	0.46	10.15	43.99	54.60	60.00	5.40	QP
10	14.60	0.46	10.15	33.19	43.80	50.00	6.20	Average
11	18.81	0.66	10.20	14.90	25.76	50.00	24.24	Average
12	18.81	0.66	10.20	24.30	35.16	60.00	24.84	QP

1. Emission Level = AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED SPURIOUS EMISSION MEASUREMENT (IN-BAND)

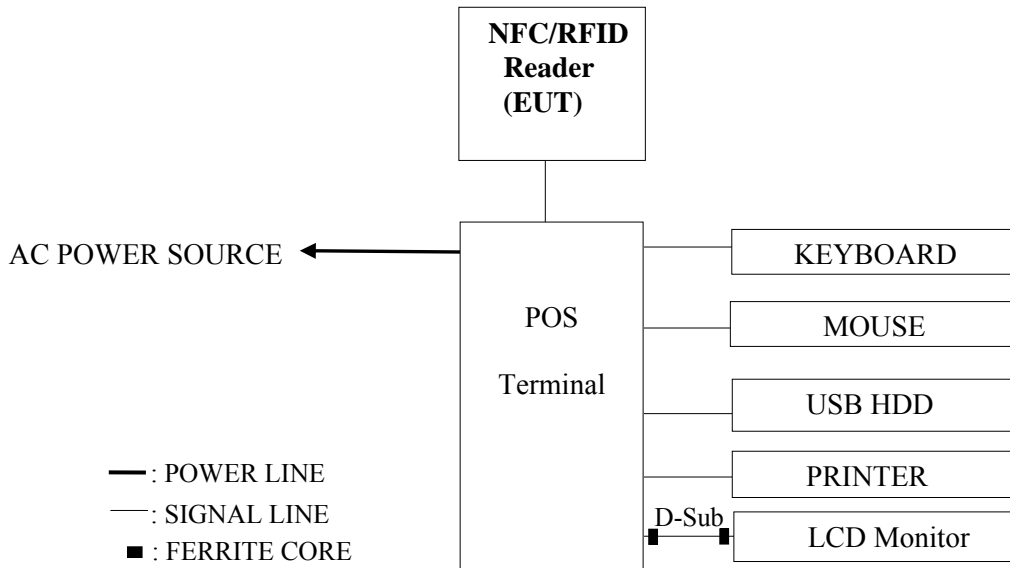
4.1. Test Equipment

The following test equipment was used during the radiated emission measurement:
At 10m Semi-Anechoic Chamber

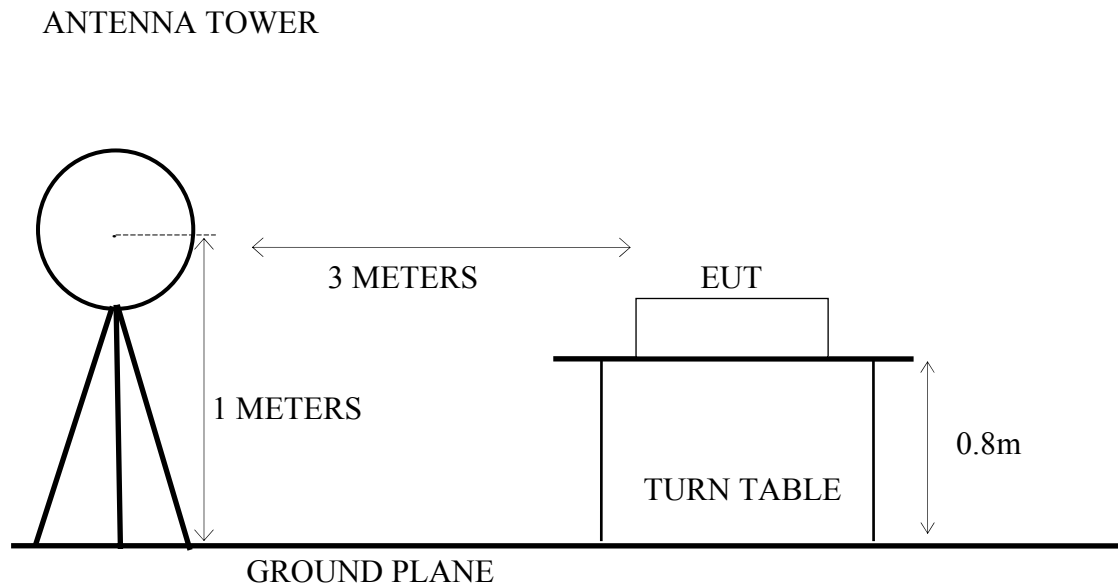
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45107030	2014-01-05	2015-01-04
2.	Loop Antenna	CHASE	HLA6120	1193	2014-04-23	2015-04-22

4.2. Block Diagram of Test Setup

4.2.1. Block Diagram of Test Setup between EUT and simulators



4.2.2. No. 1 10m Semi-Anechoic Chamber Setup Diagram (Test distance: 3m) for 9kHz-30MHz



4.3. In-Band Radiated Spurious Emission Limits

FCC Part15 C, section 15.225(a)(b)(c)

Fundamental Frequency (MHz)	Distance Meters(m)	Limit	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
13.553-13.567	30	15848	84
	3	1584890	124
13.410-13.553 and 13.567-13.710	30	334	50.50
	3	33381	90.50
13.110-13.410 and 13.710-14.010	30	106	40.5
	3	10592	80.5

Remark : (1) Emission level ($\text{dB}\mu\text{V/m}$) = $20 \log$ Emission level ($\mu\text{V/m}$)

(2) $15848\mu\text{V/m} = 84\text{dB}\mu\text{V/m} = 84 + 40\log(30\text{m}/3\text{m}) = 124\text{dB}\mu\text{V/m}$

$334\mu\text{V/m} = 50.5\text{dB}\mu\text{V/m} = 50.5 + 40\log(30\text{m}/3\text{m}) = 90.5\text{dB}\mu\text{V/m}$

$106\mu\text{V/m} = 40.5\text{dB}\mu\text{V/m} = 40.5 + 40\log(30\text{m}/3\text{m}) = 80.5\text{dB}\mu\text{V/m}$

4.4. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna fixed to 2 meters to find out the maximum emission level. Loop antenna was used as a receiving antenna. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2009 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 9kHz.

The frequency range from 30MHz to 1000MHz checked with Peak detector and all final readings of measurement were with Quasi-Peak detector at open area test site.

4.5. Assessment In All Three Orthogonal Planes

After assessment in all three orthogonal planes, the worst plane was recorded in this report.

4.6. Measurement Results

PASSED

(All the emissions not reported below are too low against the prescribed limits.)

Test Date : Aug.20, 2014

Temperature : 23.8℃

Humidity : 60%

Test Mode: Horizontal

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
13.26	20.27	0.47	26.85	47.59	80.50	32.91	QP
13.55	20.26	0.48	40.71	61.45	90.50	29.05	QP
13.56	20.26	0.48	45.17	65.91	90.50	24.59	QP
13.58	20.26	0.48	29.90	50.64	90.50	39.86	QP
13.81	20.25	0.48	27.90	48.63	80.50	31.87	QP

Test Mode: Vertical

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
13.26	20.27	0.47	27.59	48.33	80.50	32.17	QP
13.55	20.26	0.48	43.78	64.52	90.50	25.98	QP
13.56	20.26	0.48	48.29	69.03	90.50	21.47	QP
13.58	20.26	0.48	30.91	51.65	90.50	38.85	QP
13.81	20.25	0.48	27.72	48.45	80.50	32.05	QP

5. RADIATED SPURIOUS EMISSION MEASUREMENT (OUT-BAND)

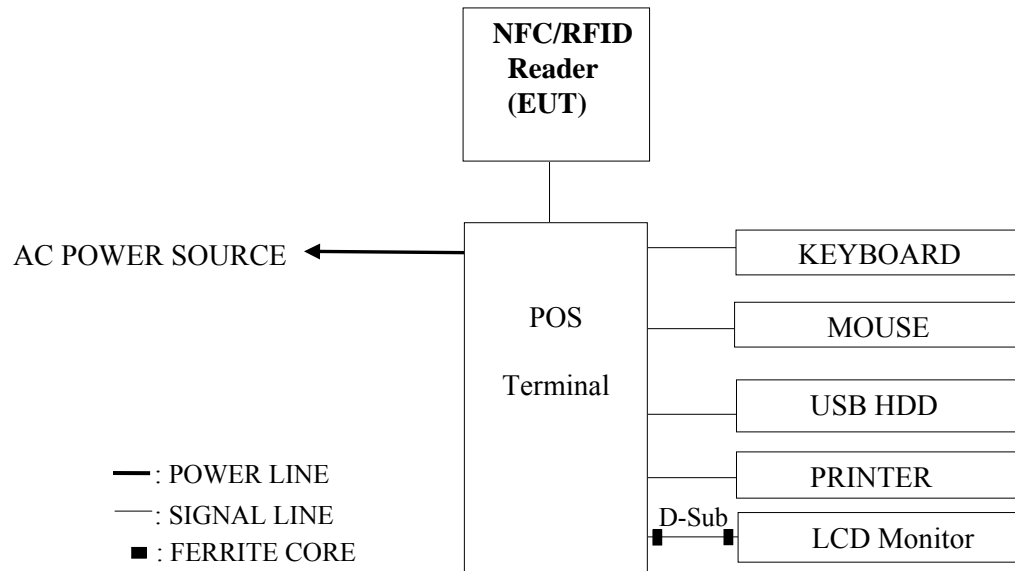
5.1. Test Equipment

The following test equipment was used during the radiated emission measurement:
At 10m Semi-Anechoic Chamber

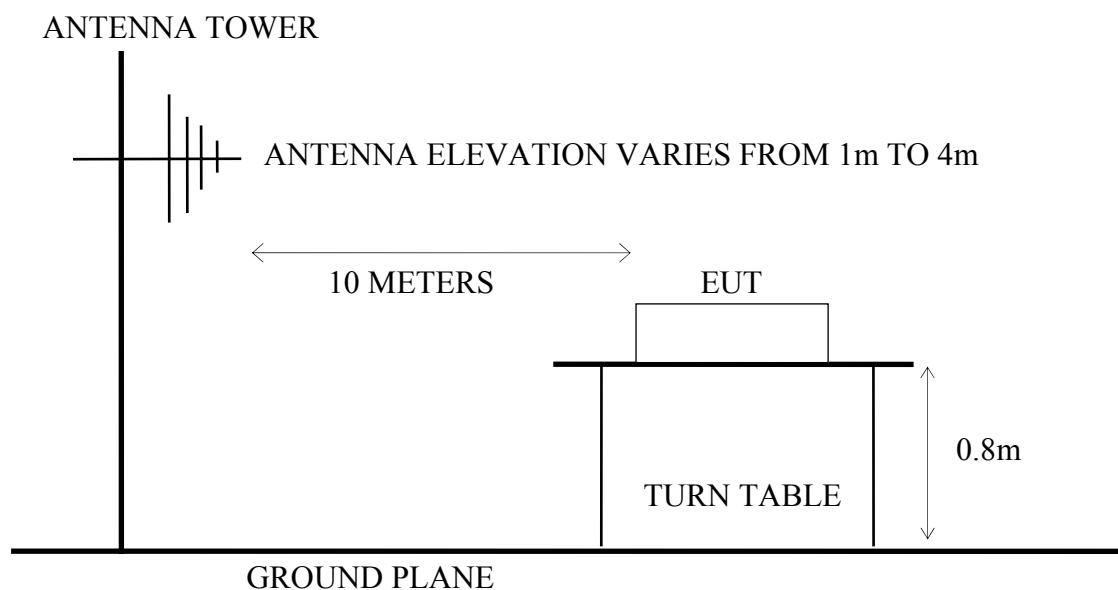
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45107028	2014-01-05	2015-01-04
2.	Spectrum Analyzer	Agilent	E7405A	MY45107030	2014-01-05	2015-01-04
3.	Pre-Amplifier	Agilent	8447D	2944A10923	2014-07-05	2015-07-04
4.	Pre-Amplifier	Agilent	8447D	2944A10922	2014-07-05	2015-07-04
5.	Bi-log Antenna (Horizontal)	Schaffner	CBL6112D	22252	2013-11-07	2014-11-06
6.	Bi-log Antenna (Vertical)	Schaffner	CBL6112D	22251	2014-04-09	2015-04-08
7.	Test Receiver	R&S	ESCI	100839	2014-01-05	2015-01-04
8.	RF SWITCH	AUDIX	R2S	20121102111250	2014-05-17	2015-05-16
9.	Microwave amplifier	Agilent	8449B	3008A02234	2014-01-05	2015-01-04
10.	RF Cable	Yuhang	CSYH	001	2014-05-20	2015-05-19
11.	RF Cable	Yuhang	CSYH	002	2014-05-20	2015-05-19
12.	RF Cable	Yuhang	CSYH	003	2014-05-20	2015-05-19
13.	RF Cable	Yuhang	CSYH	004	2014-05-20	2015-05-19
14.	RF Cable	Yuhang	CSYH	005	2014-05-20	2015-05-19
15.	RF Cable	Yuhang	CSYH	006	2014-05-20	2015-05-19
16.	RF Cable	Yuhang	CSYH	008	2014-05-20	2015-05-19
17.	RF Cable	Yuhang	CSYH	009	2014-05-20	2015-05-19

5.2. Block Diagram of Test Setup

5.2.1. Block Diagram of Test Setup between EUT and simulators



5.2.2. No. 1 10m Semi-Anechoic Chamber Setup Diagram (Test distance:10m) for 30-1000MHz



5.3. Radiated Emission Limits

5.3.1. Radiated Emission Limits (FCC Part15 C, section 15.209, CISPR22)

Frequency MHz	Distance Meters	Field Strengths Limits
		dB μ V/m
30 ~ 230	10	30.0
230 ~ 1000	10	37.0
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)

Remark : (1) Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
 (2) The tighter limit applies at the edge between two frequency bands.

5.4. Test Procedure

The measuring process is according to ANSI C63.4 and laboratory internal procedure TKC-301-001. (For FCC Part15 Subpart C)

In the radiated disturbance measurement, the EUT and all simulators were set up on a non-metallic turn table which was 0.8 meters above the ground plane. Measurement distance between EUT and receiving antennas was set at 10 meters at 30MHz~1000MHz and 3 meters at above 1GHz. The specified distance is the distance between the antennas and the closest periphery of EUT. During the radiated measurement, the EUT was rotated 360° and receiving antennas were moved from 1 ~ 4 meters for finding maximum emission. Two receiving antennas were used for both horizontal and vertical polarization detection for 30MHz~1GHz, One receiving antennas was used for both horizontal and vertical polarization detection for above 1GHz (the absorbing material was added when testing of above 1GHz was done). All cables or wires placement were verified to find out the maximum emission.

The bandwidth of measuring receiver (or spectrum analyzer) was set to:

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz
 RBW (1 MHz), VBW (1MHz) for Peak detector above 1GHz
 RBW (1 MHz), VBW (1MHz) for Peak detector above 1GHz

The required frequency band (30 MHz ~ 12000 MHz) was pre-scanned with peak detector; all final measurements were measured with quasi-peak detector below 1GHz, measured with average detector and peak detector above 1GHz.

The emission level is calculated automatically by the test system which uses the following equation :

1. For 30-1000MHz measurement:

$$\text{Emission Level (dB}\mu\text{V/m)} = \text{Meter-Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)}$$
2. For Above 1GHz measurement:

$$\text{Emission Level (dB}\mu\text{V/m)} = \text{Meter-Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Pre-amplifier factor (dB)}$$

5.5. Measurement Results

PASSED

(All the emissions not reported below are too low against the prescribed limits.)

Item	Test Mode	Reference Test Data No.	
		Horizontal	Vertical
1	Operating	# 1	# 2

NOTE 1 - 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 2 - The worst emission at horizontal polarization was detected at 120.04 MHz with emission level of 25.04 dB μ V/m (limit is 30.00 dB μ V/m), when the antenna was 2.1 m height and the turntable was at 178°. The worst emission at vertical polarization was detected at 310.33 MHz with emission level of 26.92 dB μ V/m (limit is 37.00 dB μ V/m), when the antenna was 1.2m height and the turntable was at 182°.

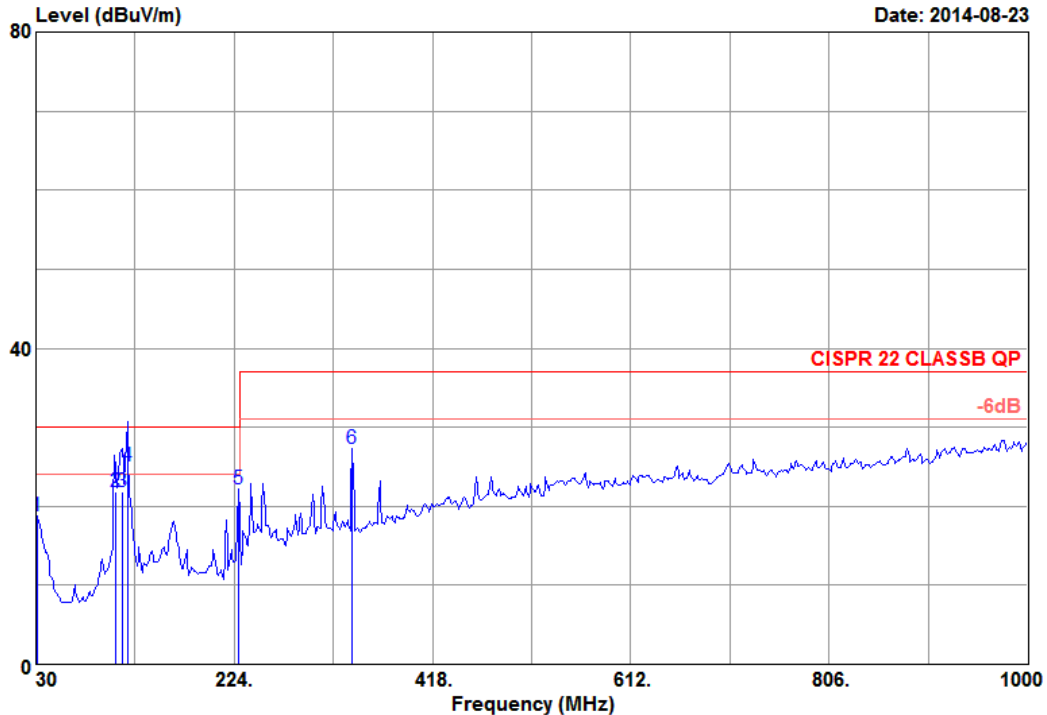


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Data: 1

File: G:\TEST DATA\2014\Report\08\G1408012.EM6 (18)

Date: 2014-08-23



Site No. : NO.1 10m Semi-Anechoic Chamber Data NO. : 1
Dis./Ant. : 10m . 6112D(52)-1310-H-10M Ant.pol : HORIZONTAL
Env./Ins. : 21.1°C 59%/ESCI Engineer : Kevin
EUT. : NFC/RFID Reader
M/N : BA9x RFID/NFC
Power Rating: 120Vac/60Hz
Test Mode : Operating
Memo :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	30.97	17.80	1.03	-0.12	18.71	30.00	11.29	QP
2	108.08	11.70	2.00	8.10	21.80	30.00	8.20	QP
3	114.52	11.92	1.94	8.01	21.87	30.00	8.13	QP
4	120.04	11.90	2.04	11.10	25.04	30.00	4.96	QP
5	227.88	9.90	2.84	9.48	22.22	30.00	7.78	QP
6	339.43	13.90	3.49	9.96	27.35	37.00	9.65	QP

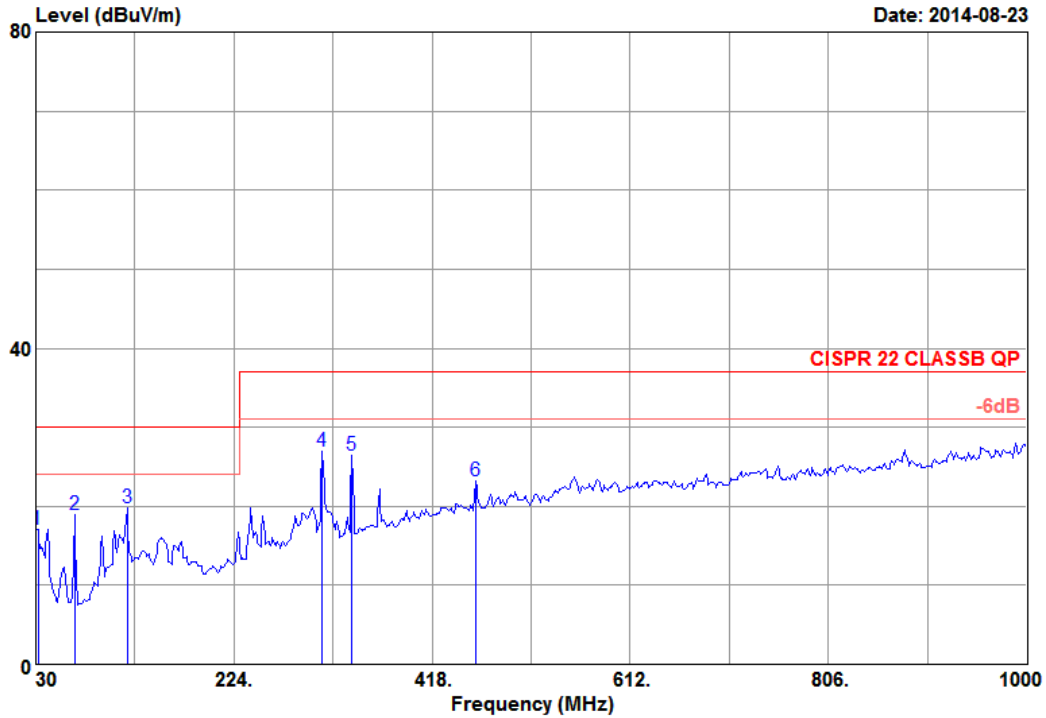
Remarks: 1.Emission Level= Antenna factor + Cable loss + Reading
2.The emission level that are 20dB below the official
limit are not reported



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Data: 2 File: G:\TEST DATA\2014\Report\08\G1408012.EM6 (18)

Date: 2014-08-23



Site No. : NO.1 10m Semi-Anechoic Chamber Data NO. : 2
Dis./Ant. : 10m . 6112D(51)-1404-V-10M Ant.pol : VERTICAL
Env./Ins. : 21.1°C 59%/ESCI Engineer : Kevin
EUT. : NFC/RFID Reader
M/N : BA9x RFID/NFC
Power Rating: 120Vac/60Hz
Test Mode : Operating
Memo :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	31.94	16.83	0.87	-0.55	17.15	30.00	12.85	QP
2	67.83	6.79	1.23	10.91	18.93	30.00	11.07	QP
3	119.24	12.20	1.67	5.97	19.84	30.00	10.16	QP
4	310.33	13.51	2.86	10.55	26.92	37.00	10.08	QP
5	339.43	13.99	3.03	9.41	26.43	37.00	10.57	QP
6	460.68	17.01	3.61	2.59	23.21	37.00	13.79	QP

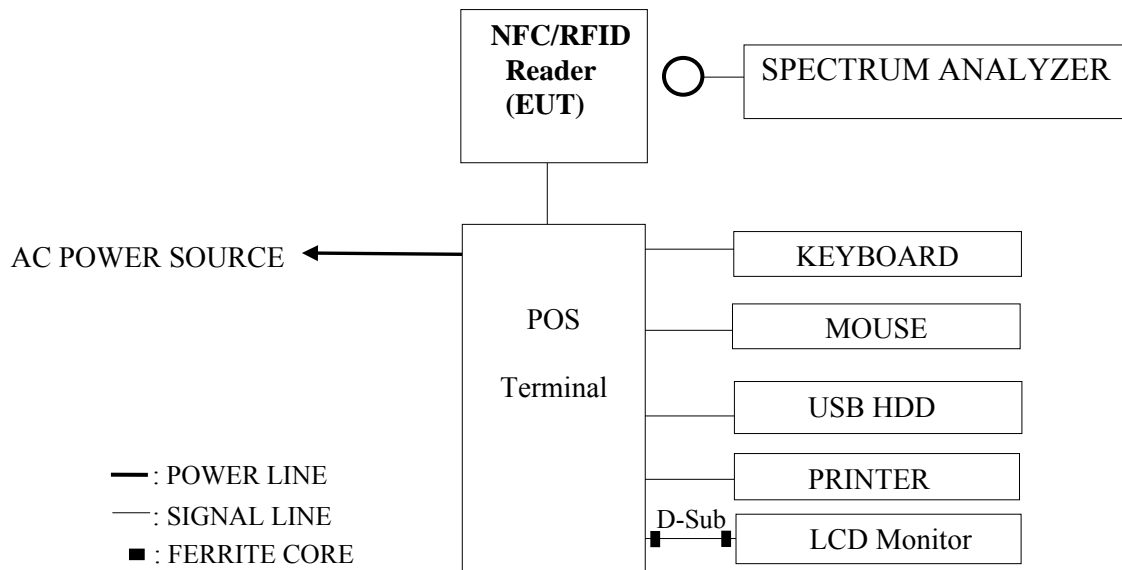
Remarks: 1.Emission Level= Antenna factor + Cable loss + Reading
2.The emission level that are 20dB below the official
limit are not reported

6. 20 dB BANDWIDTH MEASUREMENT

6.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	PXA signal analyzer	Agilent	N9030A	MY53120367	2014-06-23	2015-06-22

6.2. Block Diagram of Test Setup



6.3. Specification Limits (§15.215(c))

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

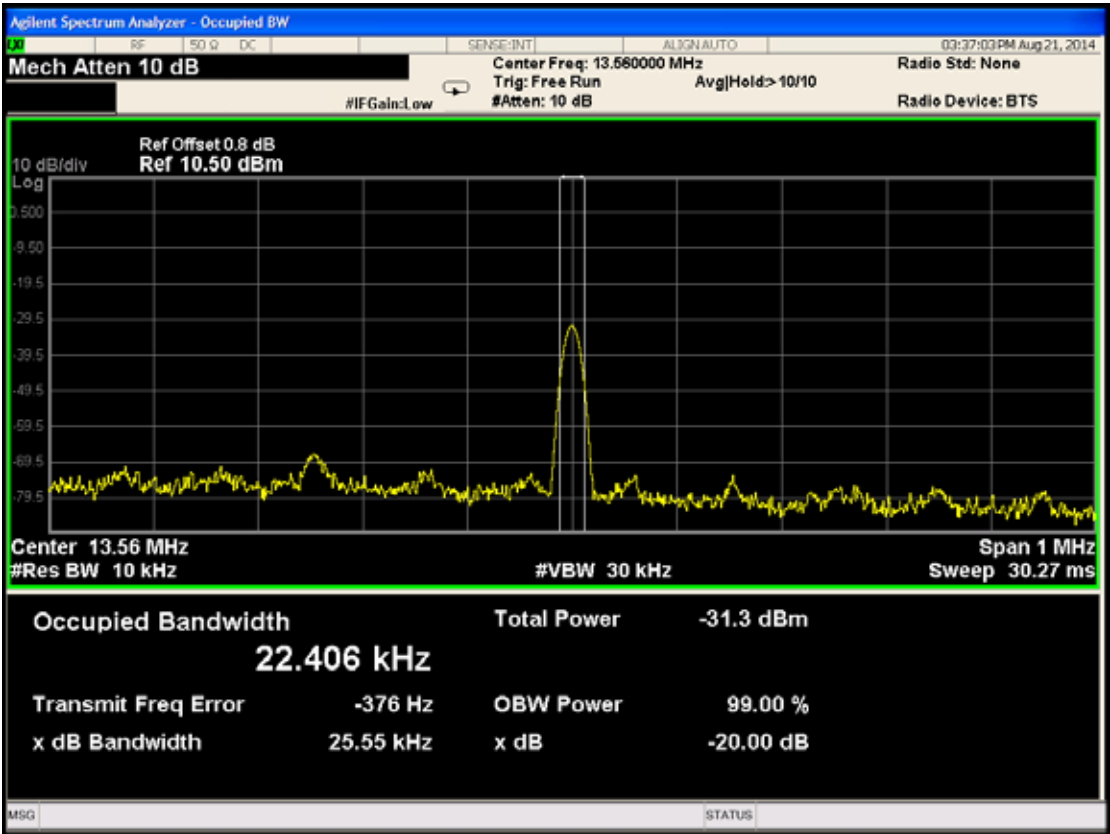
6.4. Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via receiver antenna placed near the EUT while the EUT is operating in transmission mode.

6.5. Test Results

PASSED. All the test results are attached in next pages.

Test Frequency	20dB Bandwidth
13.56MHz	25.55 kHz



7. DUTY CYCLE MEASUREMENT

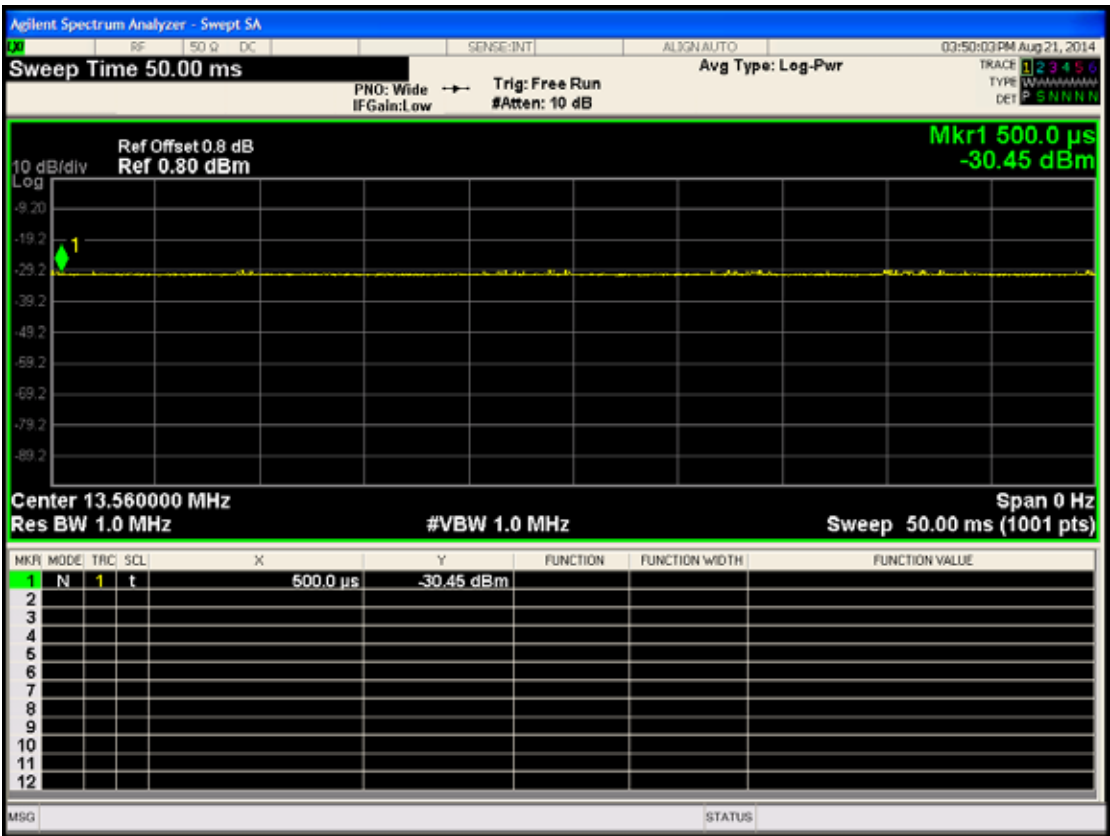
7.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	PXA signal analyzer	Agilent	N9030A	MY53120367	2014-06-23	2015-06-22

7.2. Block Diagram of Test Setup

Same as section 6.2.

7.3. Test Results



8. FREQUENCY STABILITY MEASUREMENT

8.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	PXA signal analyzer	Agilent	N9030A	MY53120367	2014-06-23	2015-06-22
2.	HP Series	Titech	MHQ-120 CLUB	A60614	2014-07-05	2015-07-04

8.2. Block Diagram of Test Setup

Same as section 6.2.

8.3. Specification Limits (§15.225(c))

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20degrees 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.

8.4. Test Procedure

The device operating in the 13.553-13.567MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20 degrees to +50degrees C at normal supply voltage.

8.5. Test Results

PASSED. All the test results are attached in next pages.

Test Mode: 2 Minute

Temperature (°C)	-20	-10	0	10	20	30	40	50
Voltage	DC 4.25V	DC 4.25V	DC 4.25V	DC 4.25V	DC 4.25V	DC 4.25V	DC 4.25V	DC 4.25V
Frequency (MHz)	13.5603	13.5601	13.5601	13.5600	13.5600	13.5600	13.5602	13.5602
Error(%)	0.00221	0.00073	0.00073	0	0	0	0.00147	0.00147

Test Mode: 5 Minute

Temperature (°C)	-20	-10	0	10	20	30	40	50
Voltage	DC 5V	DC 5V	DC 5V	DC 5V	DC 5V	DC 5V	DC 5V	DC 5V
Frequency (MHz)	13.5599	13.5601	13.5600	13.5600	13.5600	13.5601	13.5602	13.5602
Error(%)	-0.0007	0.00073	0	0	0	0.00073	0.00147	0.00147

Test Mode: 10 Minute

Temperature (°C)	-20	-10	0	10	20	30	40	50
Voltage	DC 5.75V	DC 5.75V	DC 5.75V	DC 5.75V	DC 5.75V	DC 5.75V	DC 5.75V	DC 5.75V
Frequency(MHz)	13.5602	13.5601	13.5600	13.5600	13.5600	13.5600	13.5601	13.5602
Error(%)	0.00147	0.00073	0	0	0	0	0.00073	0.00147

9. DEVIATION TO TEST SPECIFICATIONS

【NONE】