FCC Radio Test Report

FCC ID: 2AJ9T-21202

Original Grant

Report No.	:	TB-FCC180635
Applicant	:	ZKTECO CO., LTD.
Equipment Under Test (EUT)		
EUT Name	:	RFID and QR Code Reader
Model No.	:	QR50BM
Series Model No.	:	QR50WM
Brand Name	:	----
Sample ID		TBBJ-20210427-17_01-1
Receipt Date	:	2021-05-25
Test Date	:	2021-05-25 to 2021-07-02
Issue Date	:	2021-07-02
Standards	:	FCC Part 15, Subpart C 15.225
Test Method	:	ANSI C63.10: 2013
Conclusions	:	**PASS**

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

Test/Witness Engineer	:	Camille Li
Engineer Supervisor	:	Ivan Su
Engineer Manager	:	Ray Lai

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, China
Tel: +86 75526509301 Fax: +86 75526509195

Contents

Revision History

Report No.	Version	Description	Issued Date
TB-FCC180635	Rev.01	Initial issue of report	2021-07-02

1. General Information about EUT

1.1 Client Information

Applicant	:	ZKTECO CO., LTD.
Address	:	No.32, Pingshan Industrial Avenue, Tangxia Town, Dongguan City, Guangdong Province, China 523728
Manufacturer	:	Guangdong ZK Radio Electronic Tech Co., Ltd
Address	:	4 / F, Gate 2, Building A, Zhongjin Industrial Park, South Pusha Road, Shahu Village, Tangxia Town, Dongguan City, China

1.2 General Description of EUT (Equipment Under Test)

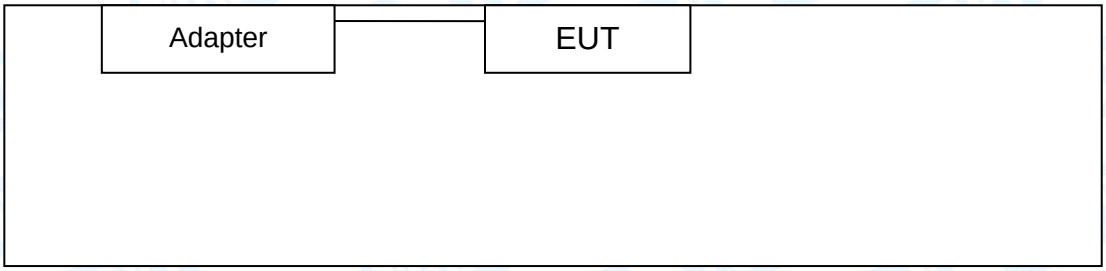
EUT Name	:	RFID and QR Code Reader	
Models No.	:	QR50BM, QR50WM	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name.	
Product Description	:	Operation Frequency:	NFC: 13.56MHz
		Antenna:	0dBi Coil Antenna
Power Rating	:	DC 12V USB 5V	
Software Version	:	V1.07	
Hardware Version	:	V1.00	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark: The antenna gain and the adapter provided by the applicant.			

Note:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3 Block Diagram Showing the Configuration of System Tested

Charging + TX Mode



1.4 Description of Support Units

The EUT has been test as an independent unit.

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

Pretest Mode	
Final Test Mode	**Description**
Mode 1	Charging + TX Mode
For Conducted Test	
Final Test Mode	**Description**
Mode 1	Charging + TX Mode
For Radiated Test	
Final Test Mode	**Description**
Mode 1	Charging + TX Mode
For Bandwidth Test	
Final Test Mode	**Description**
Mode 1	Charging + TX Mode

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: Transmitting mode.

(2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.

(3) The EUT is considered a portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF setting.

Test Software Version	N/A
Frequency	13.56 MHz
NFC	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025：2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351 Designation Number:CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

2. Test Summary

FCC Part 15 Subpart C(15.225)/RSS 210 Issue 9					
Standard Section		Test Item	Test Sample(s)	Judgment	Remark
FCC	IC				
15.207(a)	RSS-GEN 8.8	Conducted Emission	TBBJ-20210427-17_01-1	PASS	N/A
15.209(a)&15.225	RSS-Gen 8.9	Radiated emissions	TBBJ-20210427-17_01-1	PASS	N/A
15.225(a)	RSS 210 B.6	Fundamental field strength limit	TBBJ-20210427-17_01-1	PASS	N/A
15.225(e)	RSS 210 B.6	Fundamental frequency tolerance	TBBJ-20210427-17_01-1	PASS	N/A
15.225	RSS 210 B.6	Band edge compliance	TBBJ-20210427-17_01-1	PASS	N/A
15.215(c)	RSS Gen 4.6.1	Occupied bandwidth	TBBJ-20210427-17_01-1	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.					

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted Measurement	MTS-8310	MWRFtest	V2.0.0.0

4. Test Equipment

Conducted Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 06, 2020	Jul. 05, 2021
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 06, 2020	Jul. 05, 2021
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 06, 2020	Jul. 05, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 06, 2020	Jul. 05, 2021
Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.01, 2020	Feb. 28, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 07, 2020	Jul. 06, 2021
Pre-amplifier	Sonoma	310N	185903	Feb.25, 2021	Feb. 24, 2022
Pre-amplifier	HP	8449B	3008A00849	Feb.25, 2021	Feb. 24, 2022
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Feb.25, 2021	Feb. 24, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb.25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 11, 2020	Sep. 10, 2021
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 11, 2020	Sep. 10, 2021
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 11, 2020	Sep. 10, 2021
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 11, 2020	Sep. 10, 2021

5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1Test Standard

FCC Part 15.207
RSS-GEN 8.8

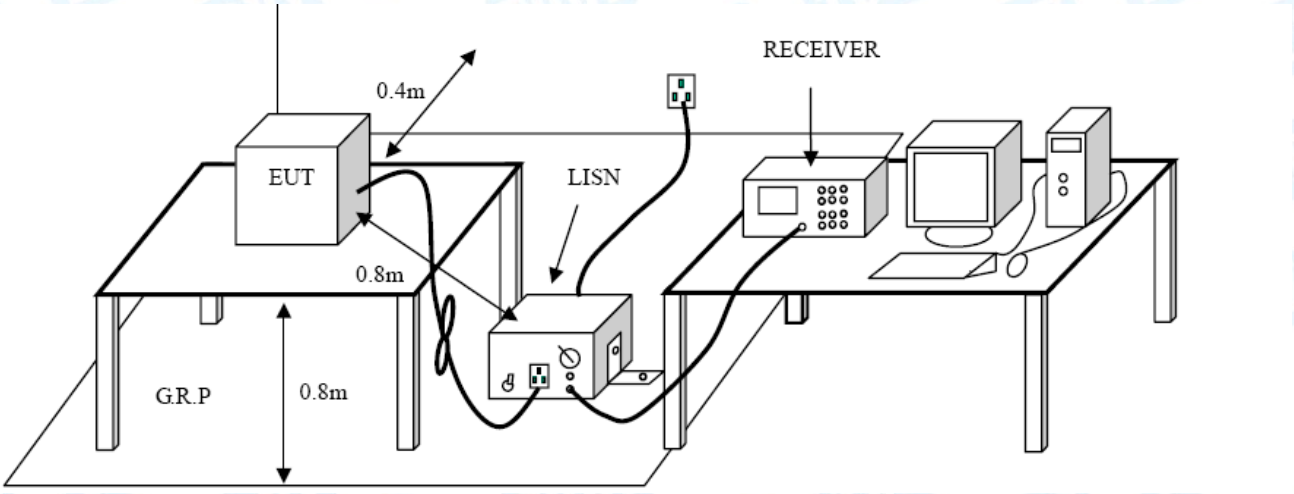
5.1.2 Test Limit

Conducted Emission Test Limit

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

Notes:
(1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequencies.
(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup



5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A.

6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard

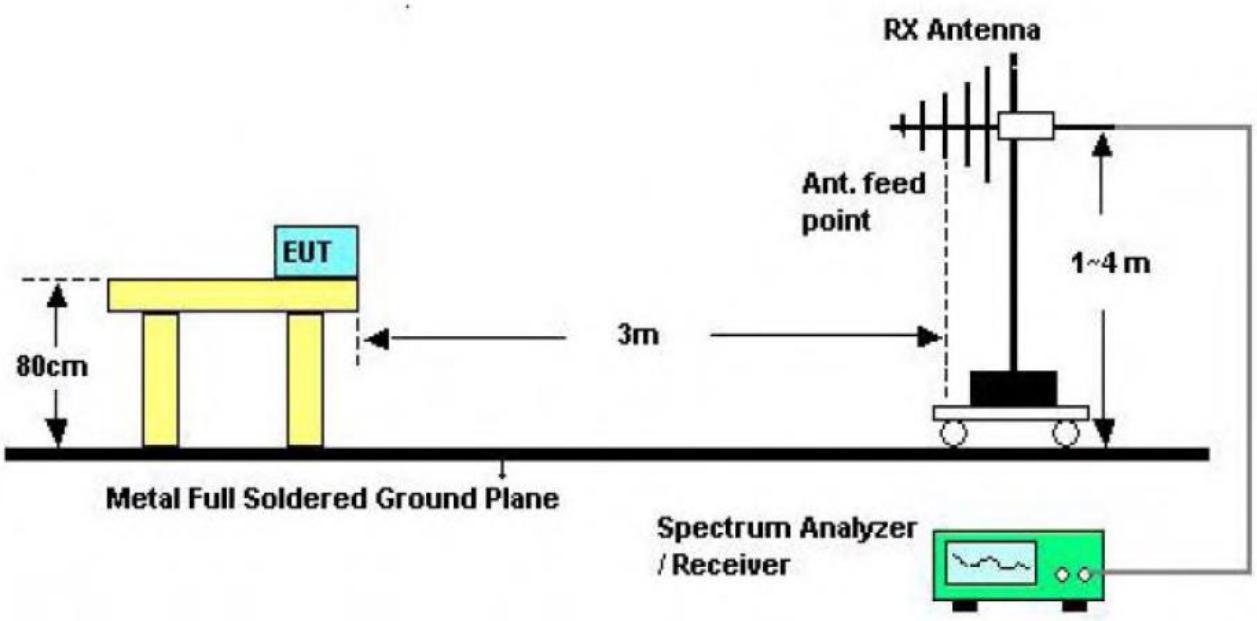
FCC Part 15.209(a)&15.225
RSS-GEN 8.8

6.1.2 Test Limit

Radiated Emission Limits (30MHz~1000MHz)

Frequency Range (MHz)	E-field Strength Limit @ 3m (mV/m)	E-field Strength Limit @ 3m (dBμV/m)	E-field Strength Limit @ 10m (dBμV/m)
30-88	100	40	30
88-216	150	43.5	33.5
216-960	200	46	36
960-1000	500	54	44

5.2 Test Setup



Below 1000MHz Test Setup

6.3 Test Procedure

(1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
(2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
(3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
(4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
(5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
(6) For the actual test configuration, please see the test setup photo.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Please refer to the Attachment B.

7. Electric Field Strength of Fundamental and Outside the Allocated bands

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC Part 15.225(a)
FCC Part 15.225
RSS 210 B.6

7.1.2 Test Limit

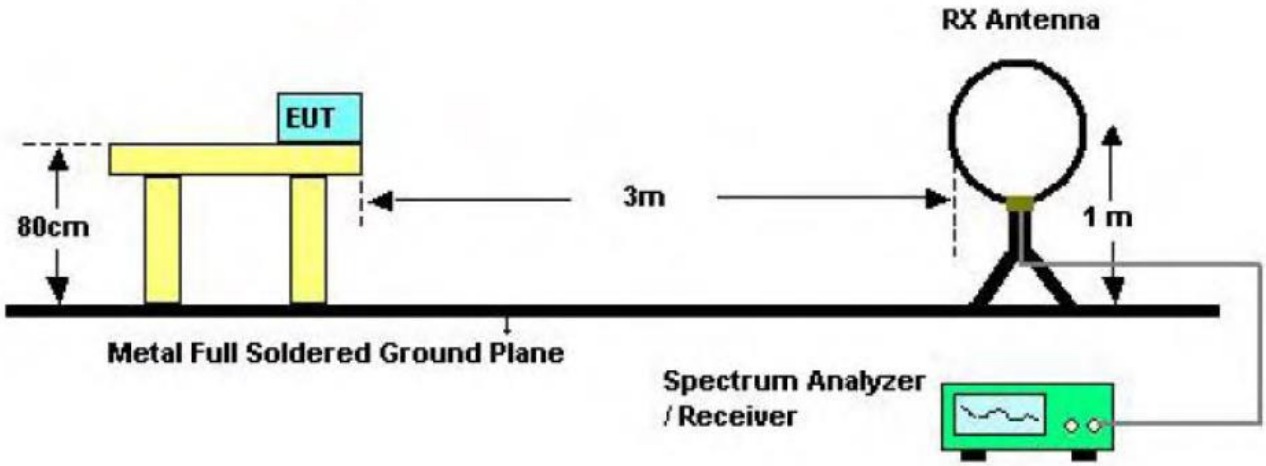
Electric Field Strength of Fundamental

Frequency Range (MHz)	E-field Strength Limit @ 30m (μV/m)	E-field Strength Limit @ 3m (dBμV/m)
0.009-0.490	2400/F(kHz)	129-94
0.490-1.705	24000/F(kHz)	74-63
1.705-30	30	70
Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula: $Extrapolation(dB) = 40\log_{10}(Measurement\ \ Distance/Specification\ \ Distance)$		

Outside the Allocated bands

Frequency Range (MHz)	E-field Strength Limit @ 30 m (μV/m)	E-field Strength Limit @ 3 m (dBμV/m)
13.560 ± 0.007	+15,848	124
13.410 to 13.553 13.567 to 13.710	+334	90
13.110 to 13.410 13.710 to 14.010	+106	81
Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula: $Extrapolation(dB) = 40\log_{10}(Measurement\ \ Distance/Specification\ \ Distance)$		

7.2 Test Setup



7.3 Test Procedure

The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

The measurement of EUT is carried out under the transmit state of NFC.

7.6 Test Data

Please refer to the Attachment C.

8. Occupied Bandwidth Test

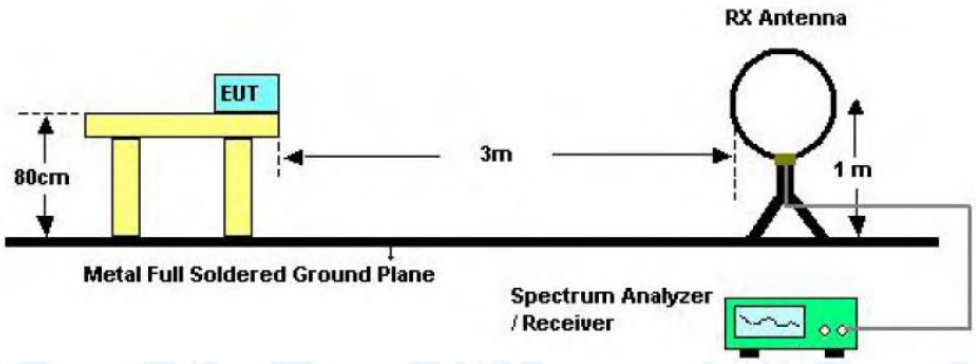
8.1 Test Standard and Limit

8.1.1 Test Standard

FCC Part 15.215 (c)

RSS-Gen 4.6.1

8.2 Test Setup



8.3 Test Procedure

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

1. RBW used in the range of 1% to 5% of the anticipated emission bandwidth
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max Hold.
5. Sweep = Auto couple.
6. Allow the trace to stabilize.
7. OBW 99% function of spectrum analyzer used

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

The measurement of EUT is carried out under the transmit state of NFC.

8.6 Test Data

Please refer to the Attachment D.

9. Fundamental Frequency Tolerance

9.1 Test Standard and Limit

9.1.1 Test Standard

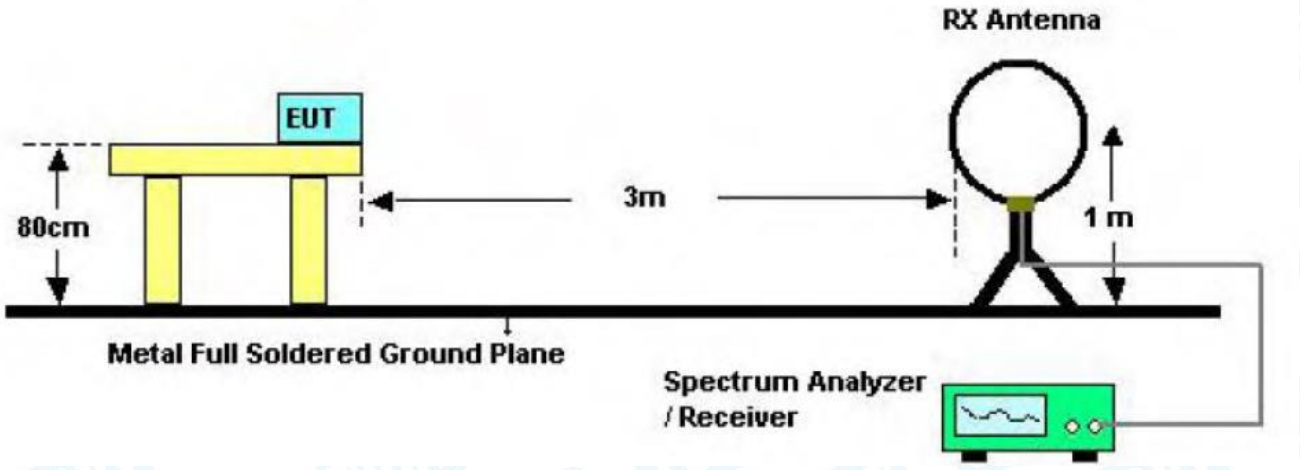
FCC Part 15.225 (e)

RSS 210 B.6

9.1.2 Test Limit

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

9.2 Test Setup



9.3 Test Procedure

The transmitter output signal was picked up by coil antenna connected to the frequency counter. The center frequency was measured with 30Hz RBW and 1kHz span. During the test, the EUT was placed in a thermal chamber until thermal balance and lasting appropriate time.

9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

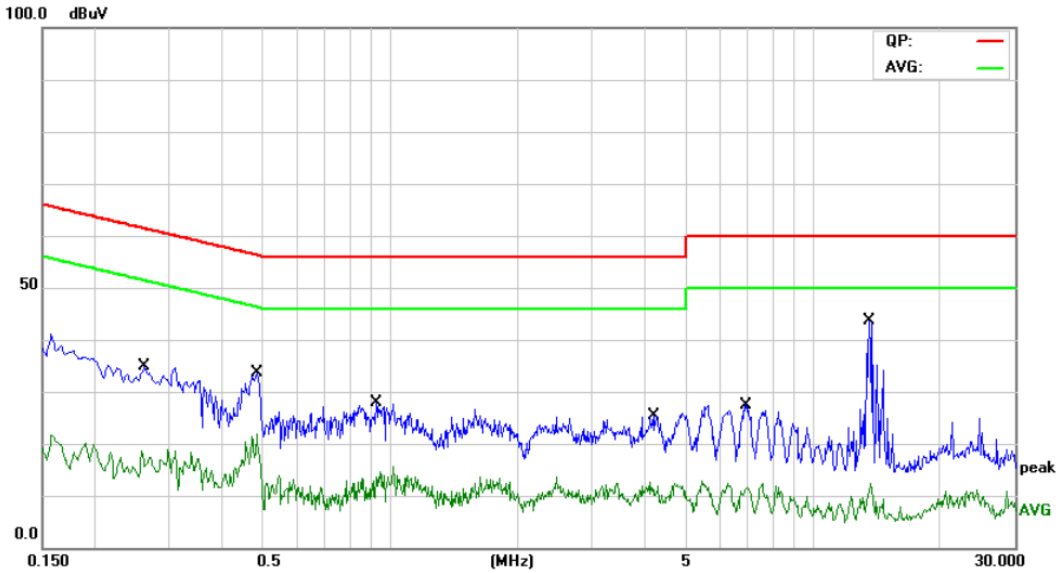
The EUT was set to continuously transmitting in the max power during the test.

9.6 Test Data

Please refer to the Attachment E.

Attachment A-- Conducted Emission Test Data

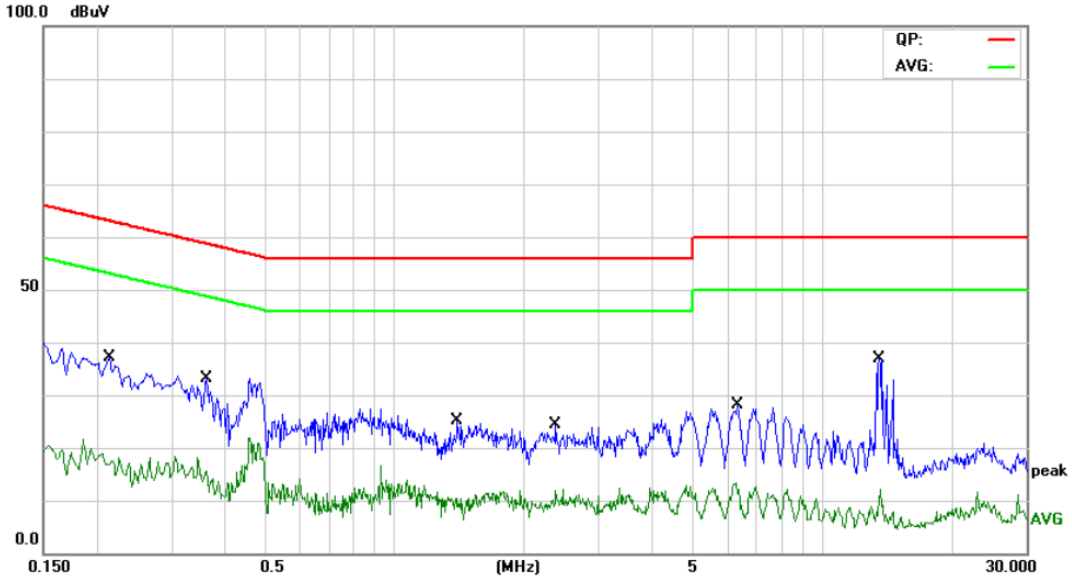
Temperature:	23.5℃	**Relative Humidity:**	45%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	TX Mode		
Remark:	Only worst case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2620	20.22	9.70	29.92	61.36	-31.44	QP
2		0.2620	5.43	9.70	15.13	51.36	-36.23	AVG
3	*	0.4860	20.59	9.70	30.29	56.24	-25.95	QP
4		0.4860	9.47	9.70	19.17	46.24	-27.07	AVG
5		0.9260	13.44	9.78	23.22	56.00	-32.78	QP
6		0.9260	2.67	9.78	12.45	46.00	-33.55	AVG
7		4.2140	10.28	9.90	20.18	56.00	-35.82	QP
8		4.2140	-0.44	9.90	9.46	46.00	-36.54	AVG
9		6.9260	12.78	9.80	22.58	60.00	-37.42	QP
10		6.9260	0.16	9.80	9.96	50.00	-40.04	AVG
11		13.5740	18.80	9.94	28.74	60.00	-31.26	QP
12		13.5740	-1.72	9.94	8.22	50.00	-41.78	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

Temperature:	23.5℃	**Relative Humidity:**	45%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	TX Mode		
Remark:	Only worst case is reported.		



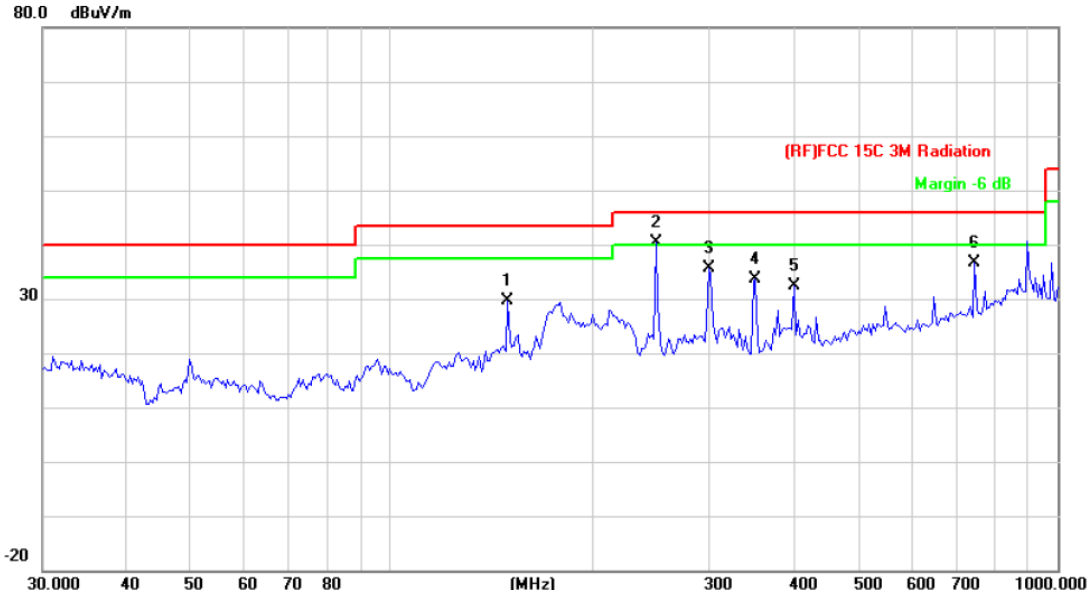
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2140	21.99	9.70	31.69	63.04	-31.35	QP
2		0.2140	5.67	9.70	15.37	53.04	-37.67	AVG
3	*	0.3620	17.67	9.70	27.37	58.68	-31.31	QP
4		0.3620	4.21	9.70	13.91	48.68	-34.77	AVG
5		1.3980	9.90	9.76	19.66	56.00	-36.34	QP
6		1.3980	-1.49	9.76	8.27	46.00	-37.73	AVG
7		2.3820	7.98	9.78	17.76	56.00	-38.24	QP
8		2.3820	-0.50	9.78	9.28	46.00	-36.72	AVG
9		6.3420	12.10	9.83	21.93	60.00	-38.07	QP
10		6.3420	-0.29	9.83	9.54	50.00	-40.46	AVG
11		13.5780	13.91	9.94	23.85	60.00	-36.15	QP
12		13.5780	-3.10	9.94	6.84	50.00	-43.16	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

Attachment B-- Radiated Emission Test Data

30MHz~1GHz

Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode		
Remark:	Only worst case is reported.		

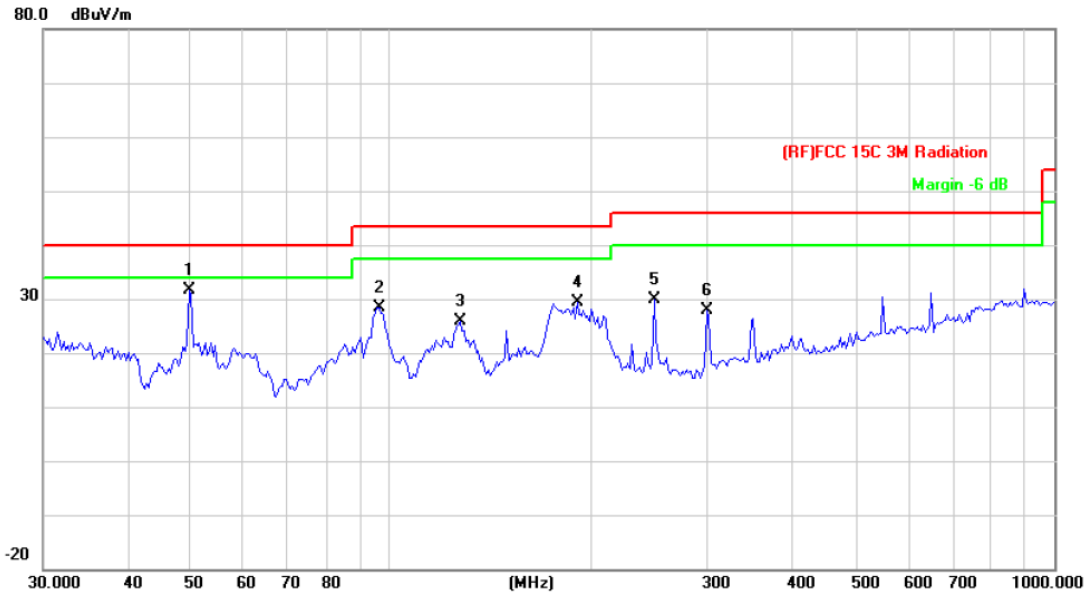


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		149.4857	51.06	-21.48	29.58	43.50	-13.92	peak
2	*	249.4250	57.40	-17.08	40.32	46.00	-5.68	peak
3		299.3158	51.55	-16.00	35.55	46.00	-10.45	peak
4		351.7078	47.91	-14.31	33.60	46.00	-12.40	peak
5		401.8385	44.34	-12.08	32.26	46.00	-13.74	peak
6		750.1082	42.96	-6.42	36.54	46.00	-9.46	peak

*:Maximum data x:Over limit !:over margin

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX Mode		
Remark:	Only worst case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	49.7068	54.77	-23.25	31.52	40.00	-8.48	peak
2		96.0986	50.54	-22.09	28.45	43.50	-15.05	peak
3		127.2176	48.22	-22.41	25.81	43.50	-17.69	peak
4		191.0738	49.17	-19.77	29.40	43.50	-14.10	peak
5		249.4250	47.07	-17.08	29.99	46.00	-16.01	peak
6		299.3158	43.96	-16.00	27.96	46.00	-18.04	peak

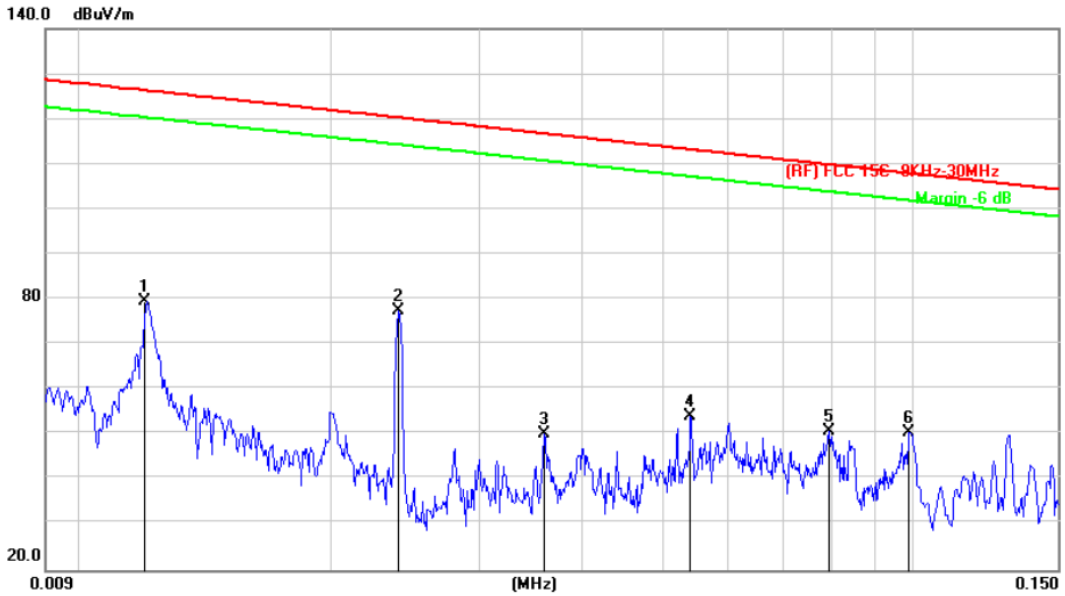
*:Maximum data x:Over limit !:over margin

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Attachment C--Electric Field Strength of Fundamental and Outside the Allocated bands

(1) Electric Field Strength of Fundamental

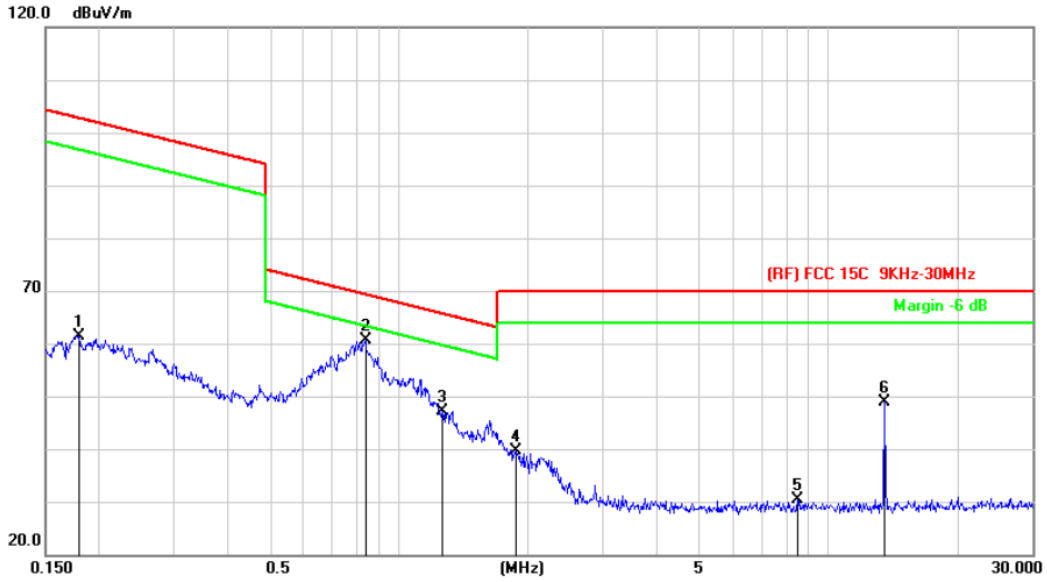
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Ant. 0°		
Test Mode:	TX Mode		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		0.0119	59.02	20.49	79.51	126.37	-46.86	peak
2	*	0.0240	56.95	20.43	77.38	120.26	-42.88	peak
3		0.0360	29.88	20.34	50.22	116.73	-66.51	peak
4		0.0540	33.85	20.28	54.13	113.20	-59.07	peak
5		0.0793	29.94	20.69	50.63	109.86	-59.23	peak
6		0.0991	29.71	20.85	50.56	107.92	-57.36	peak

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

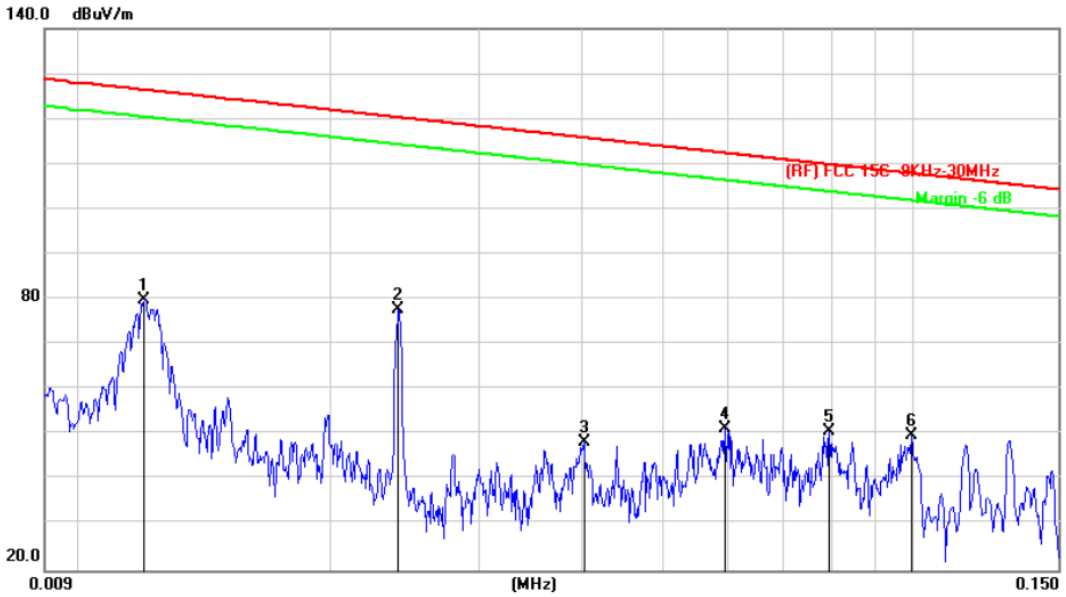
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Ant. 0°		
Test Mode:	TX Mode		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		0.1796	38.07	23.40	61.47	102.74	-41.27	peak
2	*	0.8349	40.01	20.73	60.74	69.30	-8.56	peak
3		1.2621	26.52	20.56	47.08	65.65	-18.57	peak
4		1.8680	19.25	20.46	39.71	70.00	-30.29	peak
5		8.5011	9.76	20.63	30.39	70.00	-39.61	peak
6		13.5600	28.81	20.10	48.91	70.00	-21.09	peak

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

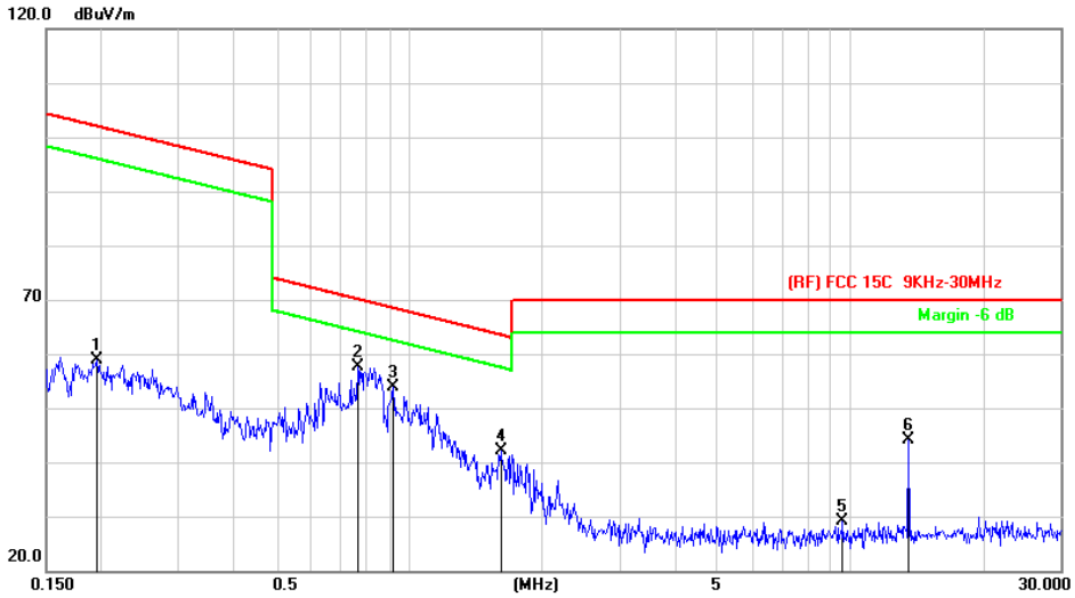
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Ant. 90°		
Test Mode:	TX Mode		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		0.0119	59.39	20.49	79.88	126.46	-46.58	peak
2	*	0.0240	57.42	20.43	77.85	120.34	-42.49	peak
3		0.0401	28.20	20.30	48.50	115.86	-67.36	peak
4		0.0594	30.98	20.39	51.37	112.42	-61.05	peak
5		0.0793	30.17	20.69	50.86	109.90	-59.04	peak
6		0.0998	28.92	20.85	49.77	107.89	-58.12	peak

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 120/60Hz		
Ant. Pol.	Ant. 90°		
Test Mode:	TX Mode		
Remark:	N/A		

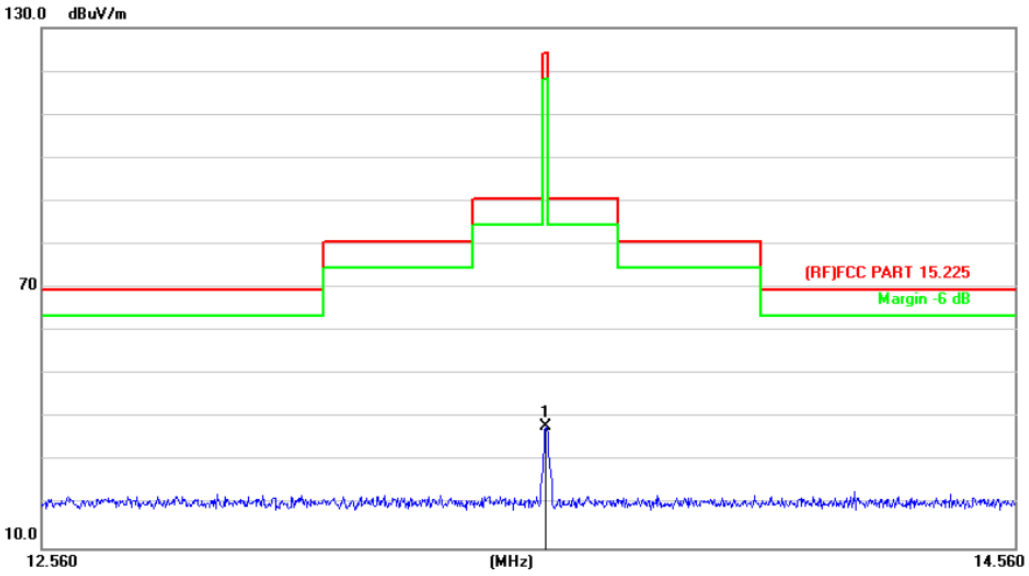


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		0.1955	36.02	22.85	58.87	102.00	-43.13	peak
2	*	0.7630	36.80	20.80	57.60	70.09	-12.49	peak
3		0.9184	33.28	20.66	53.94	68.46	-14.52	peak
4		1.6105	21.66	20.50	42.16	63.50	-21.34	peak
5		9.6028	8.44	20.59	29.03	70.00	-40.97	peak
6		13.5600	24.10	20.10	44.20	70.00	-25.80	peak

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

(2) Test Fundamental and Outside the Allocated bands

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Test Mode:	TX Mode		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	13.5600	17.82	20.10	37.92	124.00	-86.08	peak

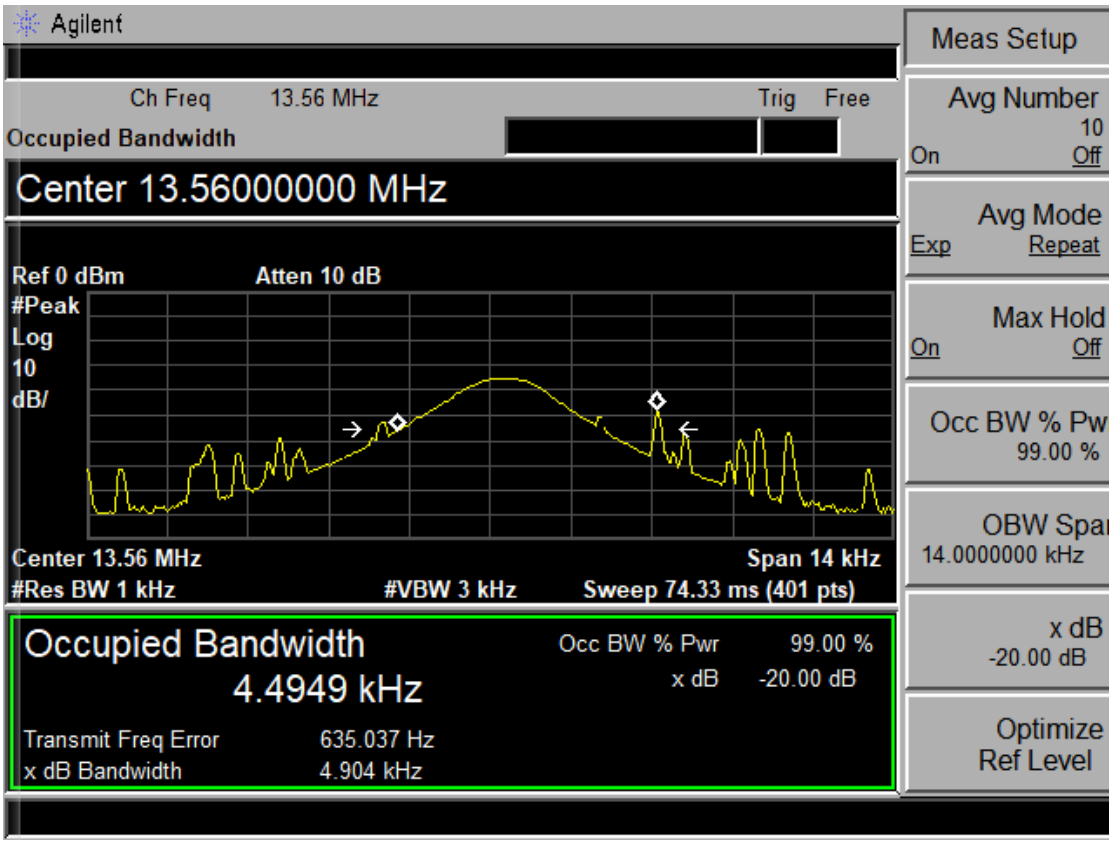
Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Attachment D-- Bandwidth Test Data

Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Test Mode:	TX Mode		

Channel Frequency(MHz)	99% Bandwidth(KHz)
13.56	4.4949

13.56 MHz



Attachment E--Fundamental Frequency Tolerance

Frequency Stability Versus Temperature			
Temperature(℃)	Power Supply(V)	Measured Frequency (MHz)	Frequency Drift %
50	DC 12V	13.560126	0.0000093
40		13.560230	0.0000170
30		13.560156	0.0000115
20		13.560458	0.0000338
10		13.560493	0.0000364
0		13.560467	0.0000344
-10		13.560438	0.0000323
-20		13.560432	0.0000319
Frequency Stability Versus Temperature			
Temperature(℃)	Power Supply(V)	Measured Frequency (MHz)	Frequency Drift %
20	DC 10.2	13.560438	0.0000323
	DC 12.0	13.560425	0.0000313
	DC 13.5	13.560411	0.0000303

-----END OF REPORT------