Shenzhen Huatongwei International Inspection Co., Ltd.
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TEST REPORT

Report Reference No. ..... :	**TRE1507013702**	R/C…….:15490
FCC ID ..... :	**2AB7X-CHC2X**	
Applicant's name ..... :	**BBPOS Limited**	
Address.....:	Room 1602, 16/F, Nina Tower, No. 8 YeungUk Road, Tsuen Wan, New Territories, Hong Kong	
Manufacturer.....:	BBPOS Limited	
Address.....:	Room 1602, 16/F, Nina Tower, No. 8 YeungUk Road, Tsuen Wan, New Territories, Hong Kong	
Test item description ..... :	Chipper 2X	
Trade Mark .....:	BBPOS	
Model/Type reference.....:	CHC2X	
Listed Model(s) .....:	CHC20	
Standard ..... :	**FCC CFR Title 47 Part 15 Subpart C Section 15.225**	
Date of receipt of test sample……..:	July 24, 2015	
Date of testing……:	Aug 4, 2015- Sep 25, 2015	
Date of issue……...:	Oct 15, 2015	
Result..... ……..:	**PASS**	

Compiled by (position+printedname+signature)...:	File administrators Candy Liu	Candy Liu
Supervised by (position+printedname+signature)....:	Project Engineer Lion Cai	Lion Cai
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans HU

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China

Contents

1. APPLICABLE STANDARDS ANDTEST DESCRIPTION

1.1. Applicable Standards

The tests were performed according to following standards:
FCC Rules Part 15.225:Operation within the band 13.110 – 14.010 MHz
ANSI C63.10-2013:AmericanNationalStandardforTestingUnlicensedWirelessDevices

1.2. Test Description

ReportSection	Test Item	FCC Rule	Result
4.1	Antenna requirement	15.203/15.247 (c)	Pass
4.2	Line Conducted Emission (AC Main)	15.207	N/A
4.3	Radiated Spurious Emission In-Band	15.225(a)(b)(c)	Pass
4.4	Radiated Spurious Emission Out-of-Band	15.225(d)/15.209	Pass
4.5	20dB Bandwidth	2.1049	Pass
4.6	Frequency Stability	15.225(e)	Pass

Remark: The measurement uncertainty is not included in the test result.

2. SUMMARY

2.1. Client Information

Applicant:	BBPOS Limited
Address:	Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road Tsuen Wan, N.T. HK
Manufacturer:	BBPOS Limited
Address:	Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road Tsuen Wan, N.T. HK

2.2. Product Description

Name of EUT	Chipper 2X
Trade Mark:	BBPOS
Model No.:	CHC2X
Listed Model(s):	CHC20
Power supply:	DC 3.7V From internal battery
Adapter information:	-
RFID	
Operation frequency:	13.56MHz
Modulation:	GFSK
Antenna type:	InternalAntenna
Antenna gain:	TBC

Note:
CHC2X adds NFC function based on CHC20, others are the same

2.3. Operation state

The engineering test program was provided and enabled to make EUT continuous transmitting.

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	PowerCable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming)
Address: Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225
Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 2243.01
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept 30, 2015.

FCC-Registration No.: 317478
Shenzhen Huatongwei International Inspection Co., Ltd. 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 our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI
The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Equipments Used during the Test

Conducted Emission (AC Main)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2014/11/01
2	EMI Test Receiver	Rohde&Schwarz	ESCI3	100038	2014/11/01
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2014/11/01
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2014/11/01
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2014/11/01
3	EMI TEST Software	Audix	E3	N/A	N/A
4	TURNTABLE	ETS	2088	2149	N/A
5	Triple-Loop Antenna	R&S	HM020	100004	N/A
6	ANTENNA MAST	ETS	2075	2346	N/A
7	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
8	HORNANTENNA	ShwarzBeck	9120D	1011	2014/11/01
9	Amplifer	Sonoma	310N	E009-13	2014/11/01
10	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2014/11/01
11	High pass filter	Compliance Direction systems	BSU-6	34202	2014/11/01
12	HORNANTENNA	ShwarzBeck	9120D	1012	2014/11/01
13	Amplifer	Compliance Direction systems	PAP1-4060	120	2014/11/01
14	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2014/11/01
15	TURNTABLE	MATURO	TT2.0	----	N/A
16	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
17	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2014/11/01
18	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2014/11/01

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2014/11/01
2	Power Meter	Anritsu	MA2411B	100258	2014/11/01

The Cal.Interval was one year

3.4. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
lative Humidity:	30~60
Air Pressure:	950~1050mba

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that theremay be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1"and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	MeasurementUncertainty
Transmitter power conducted	0.57 dB
Transmitter power Radiated	2.20 dB
Conducted spurious emission 9KHz-40 GHz	1.60 dB
Radiated spurious emission 9KHz-40 GHz	2.20 dB
Conducted Emission 9KHz-30MHz	3.39 dB
Radiated Emission 30~1000MHz	4.24 dB
Radiated Emissio 1~18GHz	5.16 dB
Radiated Emissio 18-40GHz	5.54 dB
Occupied Bandwidth	-

This uncertainty represents an expanded uncertainty expressed at approximately the 95 confidence level using a coverage factor of k=1.96.

4. TEST CONDITIONS AND RESULTS

4.1. Antenna requirement

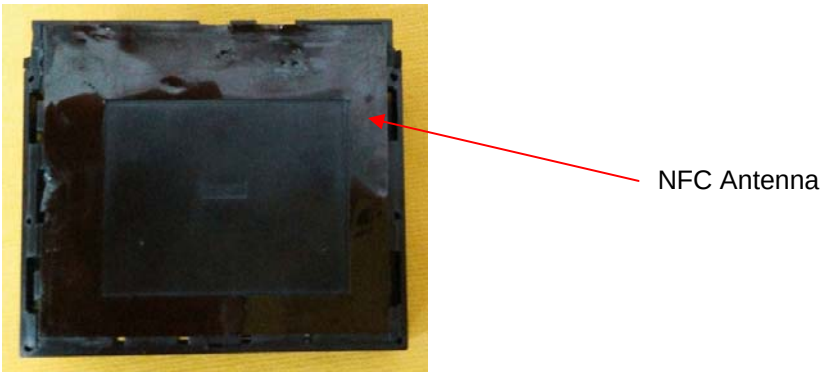
REQUIREMENT:

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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 anantenna 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.

TEST RESULTS

The antenna is internal antenna, the best case gain of the antenna is0dBi



4.2. Conducted Emission (AC Main)

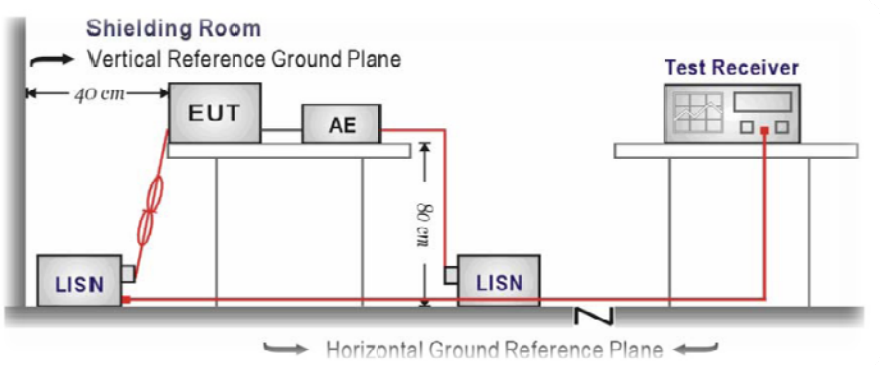
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



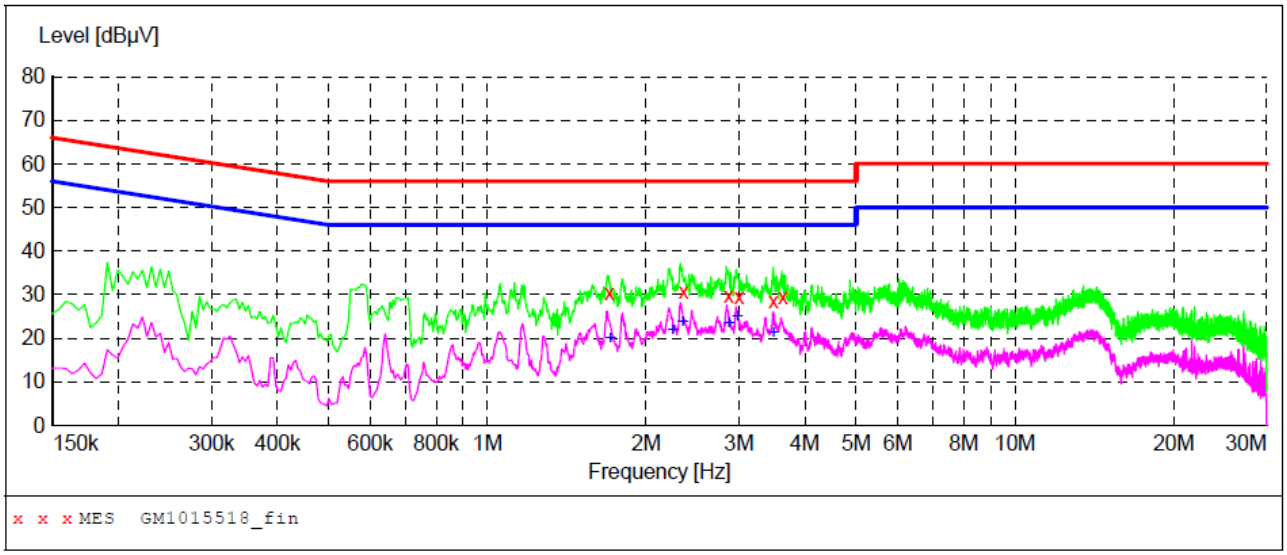
TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above theconducting ground plane. The vertical conducting plane was located 40 cm to the rear of theEUT. All other surfaces of EUT were at least 80 cm from any other grounded conductingsurface.
3. The EUT and simulators are connected to the main power through a line impedancestabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for themeasuring equipment.
4. The peripheral devices are also connected to the main power through aLISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor,was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were foldedback and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHzusing a receiver bandwidth of 9 kHz.

TEST RESULTS

☒ Passed ☐ Not Applicable

Test mode:	NFC operation mode	Test Phase:	L



MEASUREMENT RESULT: "GM1015518_fin"

10/15/2015 4:03PM

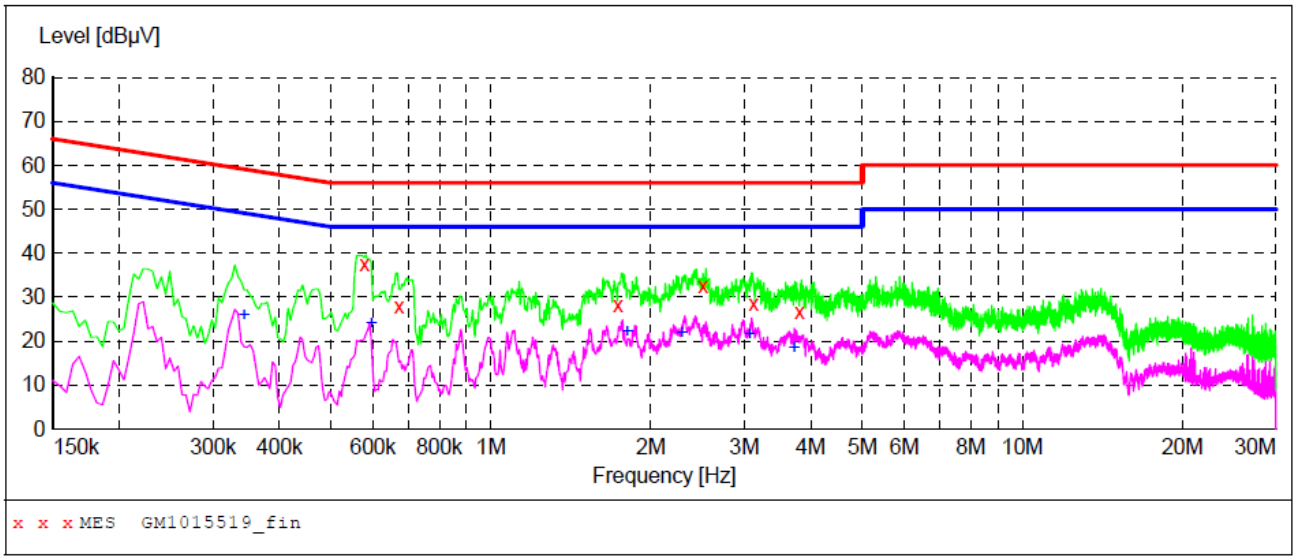
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.702500	30.30	10.2	56	25.7	QP	L1	GND
2.350500	30.50	10.3	56	25.5	QP	L1	GND
2.868000	29.80	10.3	56	26.2	QP	L1	GND
2.998500	29.60	10.3	56	26.4	QP	L1	GND
3.484500	28.60	10.3	56	27.4	QP	L1	GND
3.633000	29.30	10.3	56	26.7	QP	L1	GND

MEASUREMENT RESULT: "GM1015518_fin2"

10/15/2015 4:03PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.711500	20.20	10.2	46	25.8	AV	L1	GND
2.247000	22.00	10.2	46	24.0	AV	L1	GND
2.346000	23.80	10.3	46	22.2	AV	L1	GND
2.868000	23.60	10.3	46	22.4	AV	L1	GND
2.976000	25.20	10.3	46	20.8	AV	L1	GND
3.489000	21.20	10.3	46	24.8	AV	L1	GND

Test mode:	NFC operation mode	Test Phase:	N



MEASUREMENT RESULT: "GM1015519_fin"

10/15/2015 4:06PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.577500	37.60	10.2	56	18.4	QP	N	GND
0.672000	27.80	10.2	56	28.2	QP	N	GND
1.734000	28.20	10.2	56	27.8	QP	N	GND
2.508000	32.50	10.3	56	23.5	QP	N	GND
3.120000	28.40	10.3	56	27.6	QP	N	GND
3.804000	26.50	10.3	56	29.5	QP	N	GND

MEASUREMENT RESULT: "GM1015519_fin2"

10/15/2015 4:06PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.343500	26.00	10.2	49	23.1	AV	N	GND
0.595500	24.10	10.2	46	21.9	AV	N	GND
1.806000	22.20	10.2	46	23.8	AV	N	GND
2.287500	22.00	10.3	46	24.0	AV	N	GND
3.066000	21.60	10.3	46	24.4	AV	N	GND
3.718500	18.50	10.3	46	27.5	AV	N	GND

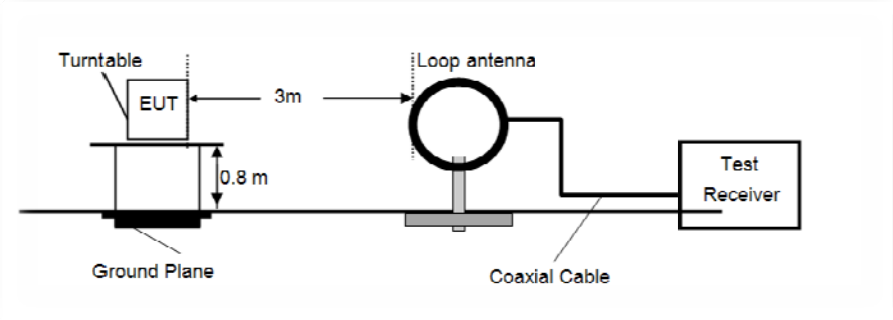
4.3. Radiated Spurious Emission In-Band

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.225(a) (b)(c)

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

TEST CONFIGURATION



TEST PROCEDURE

1. All measurements were performed using loop antenna. The antenna waspositioned in there orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.
2. The EUT was positioned in three orthogonal panes to determine the orientation resulting in the the worst case emissions.
3. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40dB/decade) as specified in Part15.31(f)(2). Extreapolation Factor $=20\log_{10}(30/3)^2=40$
4. The spectrum was investigated from 9KHz up to 30MHz using the loop antenna.
5. All measurements were recorded using the spectrum analyzer employing a quasi-peak detector.

TEST RESULTS

☒ Passed ☐ Not Applicable

Frequency (MHz)	Antenna Position	Read Level (dBuv)	AFCL (dB)	Level (dBuv/m@3m)	Limit	Margin (dB)
13.15	X	38.40	-6.14	32.26	80.51	-48.24
13.50	X	43.94	-6.39	37.55	90.47	-52.92
13.56	X	57.05	-6.56	50.49	124.00	-73.51
13.65	X	46.51	-6.64	39.87	90.47	-50.61
13.80	X	40.90	-6.77	34.13	80.51	-46.37
13.15	Y	42.15	-6.14	36.01	80.51	-44.50
13.50	Y	49.87	-6.39	43.48	90.47	-46.99
13.56	Y	61.94	-6.56	55.38	124.00	-68.62
13.65	Y	52.19	-6.64	45.55	90.47	-44.92
13.80	Y	45.34	-6.77	38.57	80.51	-41.94

Note:
1. The EUT was positioned in three orthogonal planes to determine the orientation resulting in the worst case emission.
2. AFCL (dB)=Antenna Factor + Cable Loss - Preamp Factor

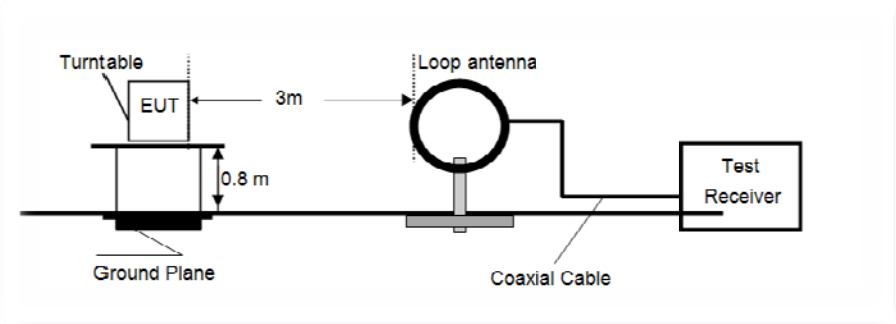
4.4. Radiated Spurious Emission Out-of-Band

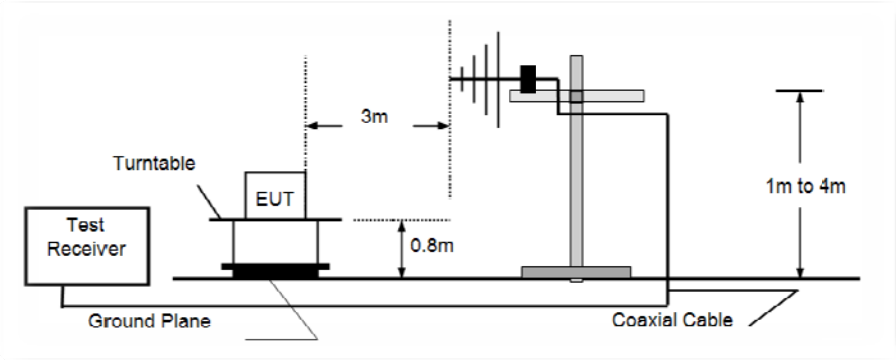
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209 and 15.225(d)

Frequency	Field Strength (uV/m)	Measured Distance (meters)
0.009-0.490MHz	2400/F(KHz)	300
0.490-1.705MHz	2400/F(KHz)	30
1.705-30MHz	30	30
30-88MHz	100	3
88-216MHz	150	3
216-960MHz	200	3
Above 960MHz	500	3

TEST CONFIGURATION





TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.225 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated360 degrees to determine the position of the maximum emission level.
3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
4. The EUT was tested from 9KHz up to the 1GHz excluding the band 13.110-14.01MHz. All measurments up to 960Mhz were recorded with a spectrum analyzer employing a quasi-peak detector.

TEST RESULTS

☒ Passed ☐ Not Applicable

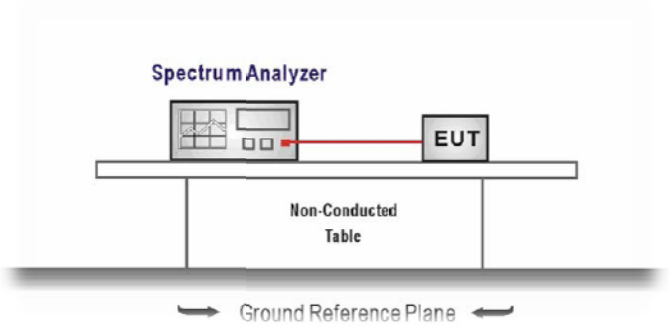
Frequency (MHz)	Antenna Position	Read Level (dBuv)	AFCL (dB)	Level (dBuv/m@3m)	Limit	Margin (dB)
40.68	H	38.40	-15.38	23.02	40.00	-16.98
54.24	H	40.94	-16.21	24.73	40.00	-15.27
162.72	H	47.05	-17.63	29.42	43.50	-14.08
203.40	H	42.51	-14.05	28.46	43.50	-15.04
339.00	H	40.90	-12.86	28.04	46.00	-17.96
40.68	V	42.15	-15.38	26.77	40.00	-13.23
54.24	V	43.87	-16.21	27.66	40.00	-12.34
162.72	V	45.94	-17.63	28.31	43.50	-15.19
203.40	V	44.19	-14.05	30.14	43.50	-13.36
339.00	V	43.34	-12.86	30.48	46.00	-15.52

4.5. 20dB bandwidth

LIMIT

FCC CFR Title 47 Part 2.1049

TEST CONFIGURATION



TEST PROCEDURE

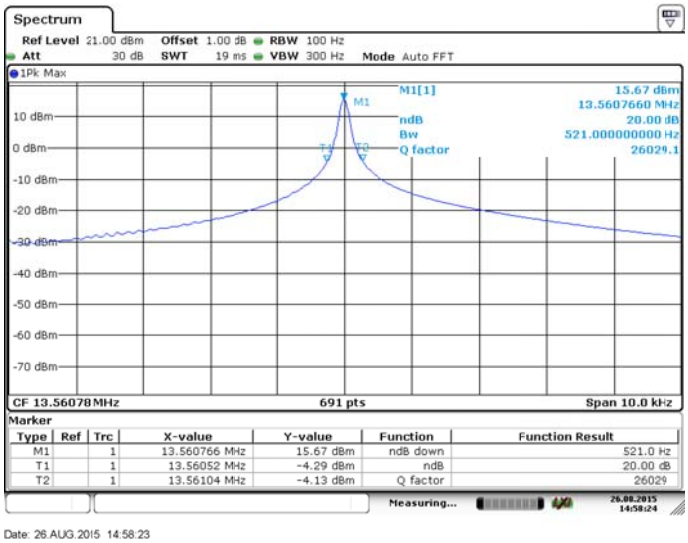
1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output andthe spectrum analyzer).
   Center Frequency =Center frequency
   RBW = 10 kHz, VBW ≥ 3 × RBW
   Sweep time= auto couple
   Detector = Peak
   Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission, andrecord the pertinent measurements.

TEST RESULTS

☒ Passed ☐ Not Applicable

Freuqency (MHz)	20dB Bandwidth(KHz)	Limit (KHz)	Result
13.56	521	-	Pass

Test plot as follows:

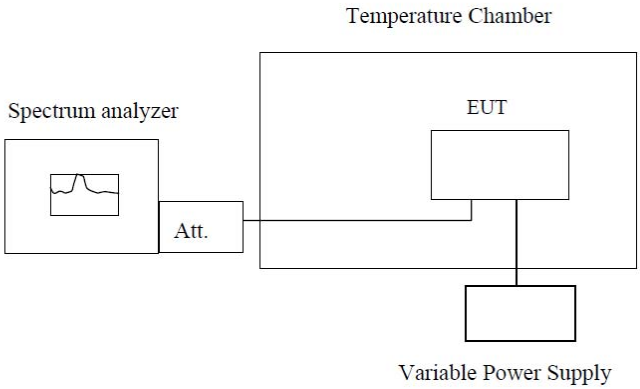


4.6. Frequency Stability

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.225(e):+/- 0.01

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

Frequency Stability VS Temperature

1. The EUT was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability VS Voltage

1. Set chamber temperature to 25℃. Use a variable DC power source topower the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW lowenough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specified extreme voltage variation (+/- 15) and endpoint, recordthe maximum frequency change.

TEST RESULTS

☒ Passed ☐ Not Applicable

Voltage (V)	Temperature (℃)	Test frequency (MHz)	Nominal Frquency (MHz)	Deviation (%)	Limit	Result
3.70	-20	13.560401	13.56	0.0030	+/- 0.01%	Pass
	-10	13.560493	13.56	0.0036		
	0	13.560503	13.56	0.0037		
	10	13.560683	13.56	0.0050		
	20	13.560766	13.56	0.0056		
	30	13.560524	13.56	0.0039		
	40	13.560596	13.56	0.0044		
	50	13.560638	13.56	0.0047		
Temperature (℃)	Voltage (V)	Test frequency (MHz)	Nominal Frquency (MHz)	Deviation (%)	Limit	Result
25	3.15	13.560419	13.56	0.0031	+/- 0.01%	Pass
	3.70	13.560766	13.56	0.0056		
	4.26	13.560732	13.56	0.0054		