FCC RF Test Report

APPLICANT	:	BlackBerry Ltd.
EQUIPMENT	:	GSM Quad-band/HSPA-UMTS Penta-band/ LTE Deca-band mobile phone
BRAND NAME	:	BlackBerry
MODEL NAME	:	BBA100-1
MARKETING NAME	:	DTEK60
FCC ID	:	L6ABBA1001
STANDARD	:	FCC Part 15 Subpart C §15.225
CLASSIFICATION	:	(DXX) Low Power Communication Device Transmitter

The product was received on Jul. 20, 2016 and testing was completed on Aug. 17, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

James Huang

Prepared by: James Huang / Manager

Jones Tsai

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR672002D	Rev. 01	Initial issue of report	Aug. 23, 2016

SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C / IC RSS-210 issue 8					
Part	**FCC Rule**	**IC Rule**	**Description of Test**	**Result**	**Under Limit**
2.4	15.207	RSS-GEN 8.8	AC Power Line Conducted Emissions	Complies	5.66 dB at 18.135MHz
3.4	2.1049	-	20dB Spectrum Bandwidth	Complies	-
3.4	-	RSS-GEN 6.6	99% OBW Spectrum Bandwidth	Complies	-
3.5	15.225(e)	A2.6	Frequency Stability	Complies	-
4.4	15.225(a)(b)(c)	A2.6	Field Strength of Fundamental Emissions	Complies	69.48 dB at 13.560 MHz
4.5	15.225(d) 15.209	A2.6	Radiated Emissions	Complies	10.81 dB at 30.000 MHz
-	15.203	-	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±5.7dB	Confidence levels of 95%

1. GENERAL INFORMATION

1.1 Applicant

BlackBerry Ltd.

2200 University Ave E., Waterloo, ON, CAN. N2K0A7

1.2 Manufacturer

TCL Communication Ltd

5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM Quad-band/HSPA-UMTS Penta-band/ LTE Deca-band mobile phone
Brand Name	BlackBerry
Model Name	BBA100-1
Marketing Name	DTEK60
FCC ID	L6ABBA1001
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/NFC/ WLAN 2.4GHz 802.11b/g/n HT20/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.2 LE
IMEI Code	Conducted: 004402243144338 Conduction: 004402243144346 Radiation: 004402243143991
HW Version	PIO
SW Version	AAF884
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	13.553 ~ 13.567MHz
Channel Number	1
20dBW	2.48 KHz
99%OBW	2.10 KHz
Antenna Type	Loop Antenna
Type of Modulation	ASK

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	N/A	**Model Name**	QC10US
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA/9Vdc, 1670mA		
	Manufacturer	BYD	**S/N**	CBA0060AGHC1
AC Adapter 2	**Brand Name**	N/A	**Model Name**	QC10EU
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA/9Vdc, 1670mA		
	Manufacturer	BYD	**S/N**	CBA0060AAHC1
AC Adapter 3	**Brand Name**	N/A	**Model Name**	QC10UK
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA/9Vdc, 1670mA		
	Manufacturer	BYD	**S/N**	CBA0060ABHC1
AC Adapter 4	**Brand Name**	N/A	**Model Name**	QC10AU
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc, 2000mA/9Vdc, 1670mA		
	Manufacturer	BYD	**S/N**	CBA0060ACHC1
Battery 1	**Brand Name**	N/A	**Model Name**	TLp030F2
	Power Rating	3.84Vdc, 3000mAh		
	Manufacturer	SCUD	**S/N**	CAC3000027C2
Battery 2	**Brand Name**	N/A	**Model Name**	TLp030F1
	Power Rating	3.84Vdc, 3000mAh		
	Manufacturer	BYD	**S/N**	CAC3000026C1
USB Cable	**Brand Name**	N/A	**Model Name**	CDA0000078CF
	Signal Line Type	1.00m shielded without core		
Earphone	**Brand Name**	N/A	**Model Name**	CCB0045A16C3
	Signal Line Type	1.24m non-shielded without core		

1.6 Modification of EUT

No modifications are made to the EUT during all test items.

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	CO01-KS
Test Engineer	Ivan Chen	Amos Zhang
Temperature	24~25℃	22~24℃
Relative Humidity	54~55%	44~47%

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978	
Test Site No.	Sporton Site No.	FCC/IC Registration No.
	03CH07-HY	TW1022/4086B
Test Engineer	Derreck Chen	
Temperature	27~28℃	
Relative Humidity	42~43%	

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.225
- ANSI C63.10-2013
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 4

1.9 Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

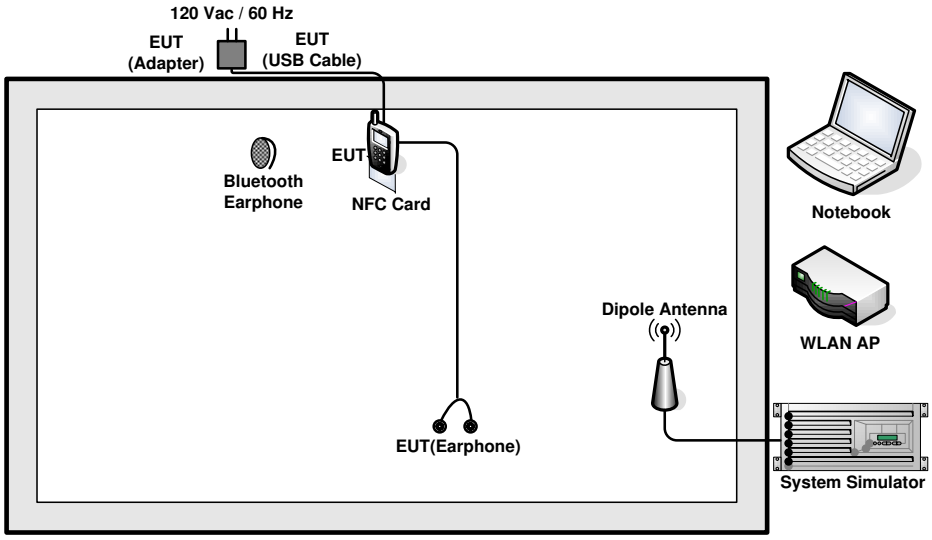
Test Items	
AC Power Line Conducted Emissions	Field Strength of Fundamental Emissions
20dB Spectrum Bandwidth	Frequency Stability
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

Note:

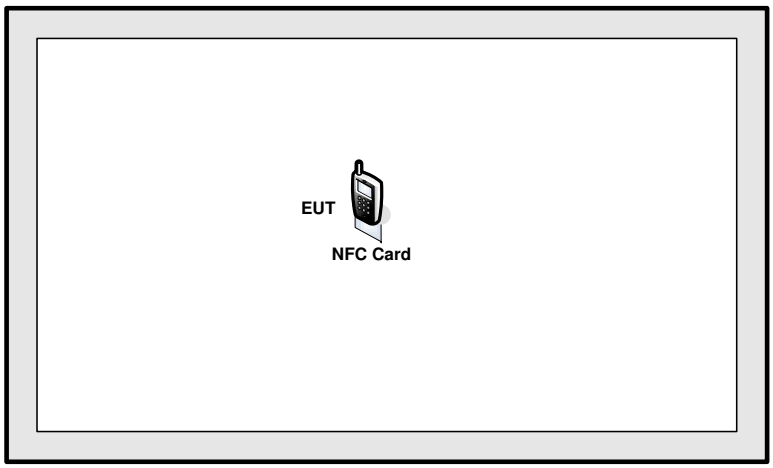
1. The EUT was programmed to be in continuously transmitting mode.
2. The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmit at 13.56MHz and is placed around 3 cm gap to the EUT.
3. The EUT pre-scanned in four NFC type, A, B, F, V. The worst type (type F) was recorded in this report.

1.10 Test Configurations

<AC Conducted Emissions>



< For Fundamental Emissions and Mask and Radiated Emissions Measurement >



1.11 Table for Supporting Units

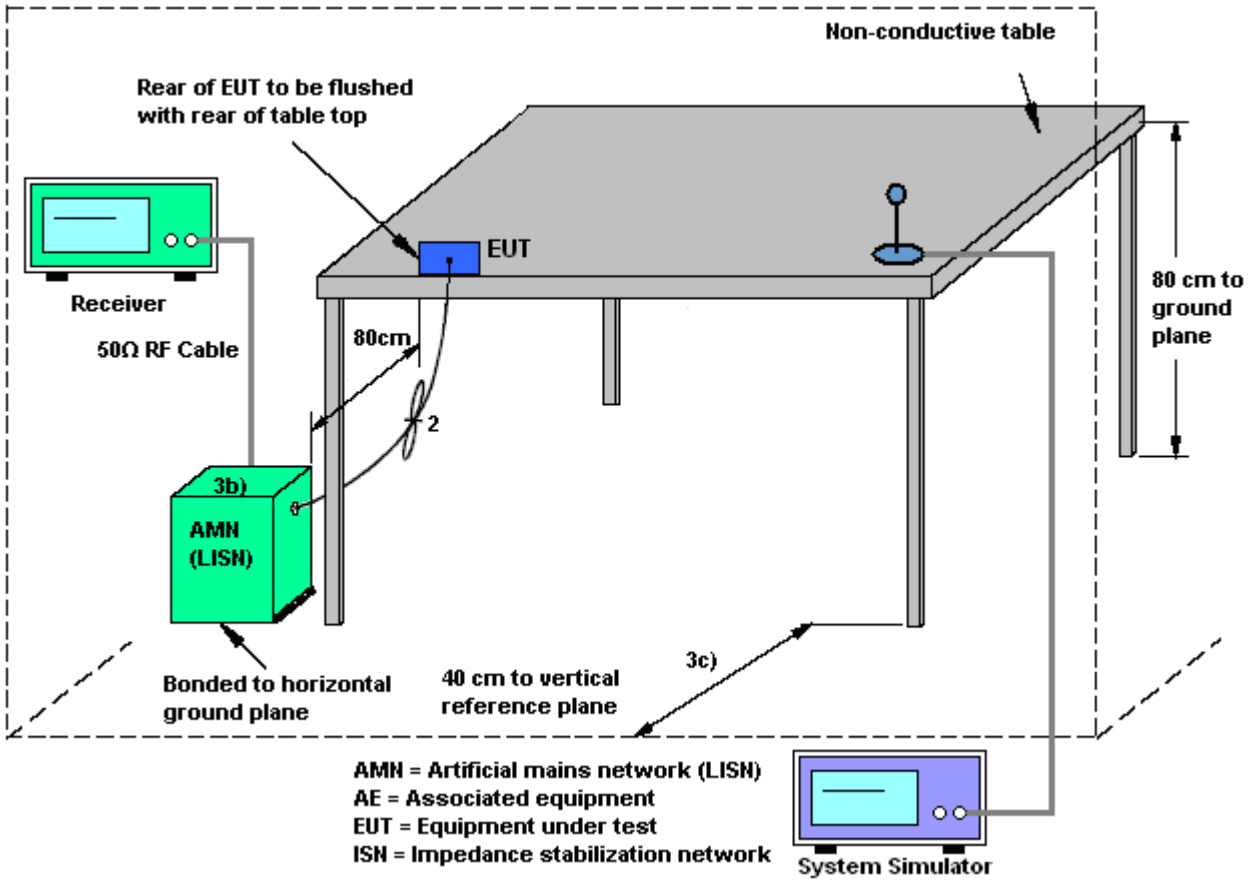
Support Unit	Manufacturer	Model	FCC ID
System Simulator	Anritus	MT8820C	N/A
WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11
Notebook	Lenovo	G480	N/A
Bluetooth Earphone	Nokia	BH-106	QTLBH-106
NFC Card	N/A	N/A	N/A

2. CONDUCTED EMISSION TEST

2.1 Measuring Instruments

See list of measuring instruments of this test report.

2.2 Test setup



2.3 Test Result of Conducted Emission Test

Please refer to Appendix A.

2.4 AC Power Line Conducted Emissions Measurement

2.4.1 Limit

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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.

2.4.2 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

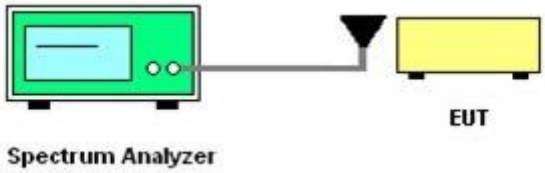
3. CONDUCTED TEST ITEMS

3.1 Measuring Instruments

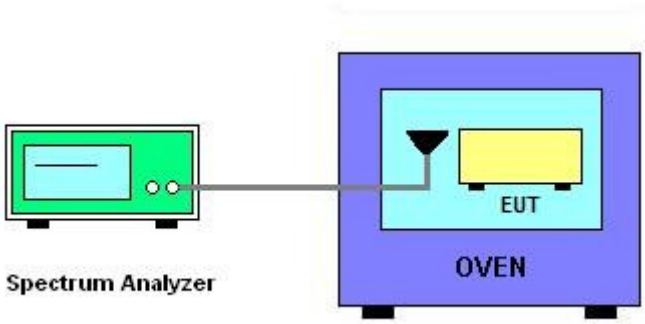
See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 20dB and 99% OBW Spectrum Bandwidth



3.2.2 Frequency Stability



3.3 Test Result of Conducted Test Items

Please refer to Appendix B.

3.4 20dB and 99% OBW Spectrum Bandwidth Measurement

3.4.1 Limit

Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

3.4.2 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. Measured the 99% OBW.

3.5 Frequency Stability Measurement

3.5.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

3.5.2 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT have transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The fc is declaring of channel frequency. Then the frequency error formula is $(fc-f)/fc \times 10^6$ ppm and the limit is less than ±100ppm.
6. Extreme temperature rule is -20°C~50°C.

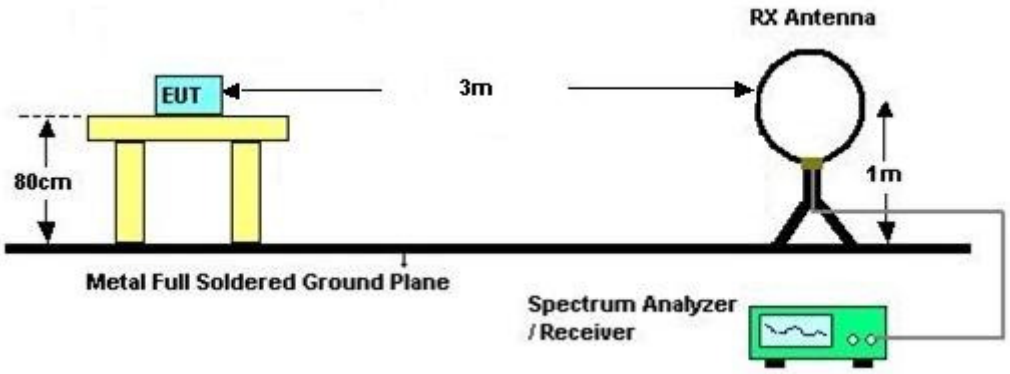
4. RADIATED TEST ITEMS

4.1 Measuring Instruments

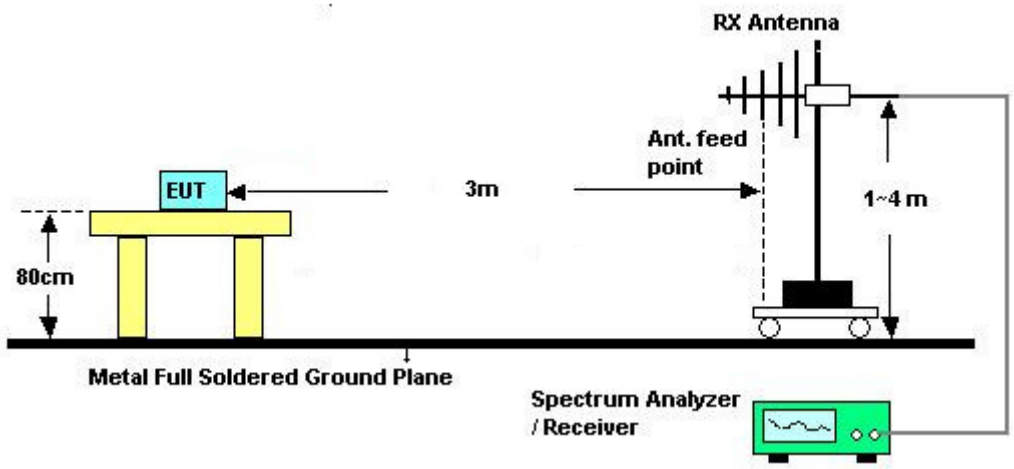
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated emissions below 30MHz



4.2.2 For radiated emissions above 30MHz



4.3 Test Result of Radiated Test Items

Please refer to Appendix C.

4.4 Field Strength of Fundamental Emissions and Mask Measurement

4.4.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225 IC RSS-210 A2.6			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength (μV/m) at 30m	Field Strength (dBμV/m) at 30m	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

4.4.2 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter 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 and all the supporting units. 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 with RBW set to 9kHz.

Note: Emission level (dBμV/m) = 20 log Emission level (μV/m).

4.5 Radiated Emissions Measurement

4.5.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength (μV/m)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2 Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

4.5.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
1. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
2. 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.
3. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
4. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
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. 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. Antenna Requirements

4.5.4 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

4.5.5 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

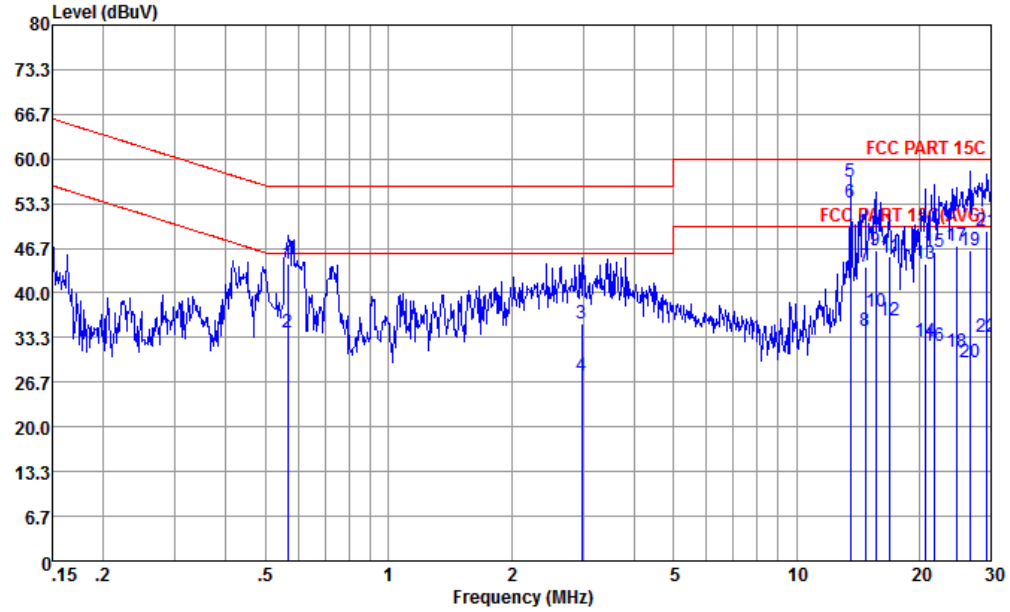
5. LIST OF MEASURING EQUIPMENT

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Oct. 24, 2015	Aug. 11, 2016	Oct. 23, 2016	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 24, 2015	Aug. 11, 2016	Oct. 23, 2016	Conducted (TH01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Aug. 11, 2016	Oct. 23, 2016	Conducted (TH01-KS)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Aug. 15, 2016	Sep. 01, 2016	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D	35419	30MHz to 1GHz	Jan. 13, 2016	Aug. 15, 2016	Jan. 12, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Mar. 18, 2016	Aug. 15, 2016	Mar. 17, 2017	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY54130085	20Hz ~ 8.4GHz	Nov. 04, 2015	Aug. 15, 2016	Nov. 03, 2016	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Feb. 27, 2016	Aug. 15, 2016	Feb. 26, 2017	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF780208368	Control Ant Mast	NCR	Aug. 15, 2016	NCR	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	NCR	Aug. 15, 2016	NCR	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	NCR	Aug. 15, 2016	NCR	Radiation (03CH07-HY)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 10, 2015	Aug. 17, 2016	Sep. 09, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 24, 2015	Aug. 17, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 24, 2015	Aug. 17, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Aug. 17, 2016	Oct. 23, 2016	Conduction (CO01-KS)

NCR: No Calibration Required

Appendix A. Test Results of Conducted Emission Test

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

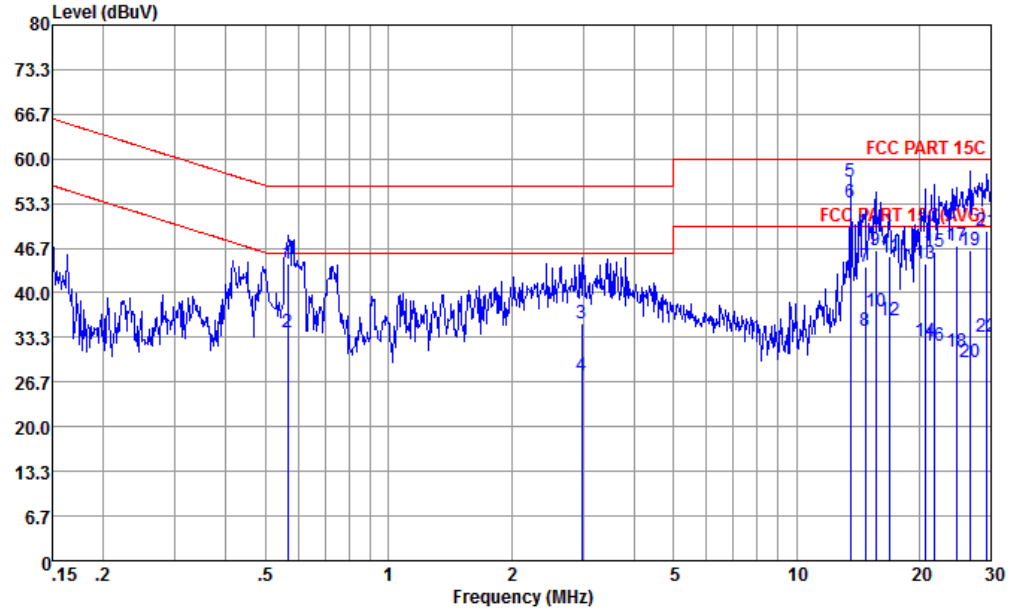
: 004402243144346 #15

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.567	44.29	-11.71	56.00	33.90	0.23	10.16	QP
2		0.567	34.19	-11.81	46.00	23.80	0.23	10.16	Average
3		2.978	35.54	-20.46	56.00	25.21	0.18	10.15	QP
4		2.978	27.64	-18.36	46.00	17.31	0.18	10.15	Average
5		13.560	56.71	-3.29	60.00	46.10	0.26	10.35	QP
6	*	13.560	53.41	3.41	50.00	42.80	0.26	10.35	Average
7		14.750	43.84	-16.16	60.00	33.20	0.26	10.38	QP
8		14.750	34.24	-15.76	50.00	23.60	0.26	10.38	Average
9		15.635	46.27	-13.73	60.00	35.60	0.26	10.41	QP
10		15.635	37.27	-12.73	50.00	26.60	0.26	10.41	Average
11		16.928	45.51	-14.49	60.00	34.81	0.26	10.44	QP
12		16.928	35.91	-14.09	50.00	25.21	0.26	10.44	Average
13		20.704	44.42	-15.58	60.00	33.60	0.26	10.56	QP
14		20.704	32.72	-17.28	50.00	21.90	0.26	10.56	Average
15		21.830	46.14	-13.86	60.00	35.30	0.25	10.59	QP
16		21.830	32.04	-17.96	50.00	21.20	0.25	10.59	Average
17		24.659	47.10	-12.90	60.00	36.20	0.22	10.68	QP

(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		

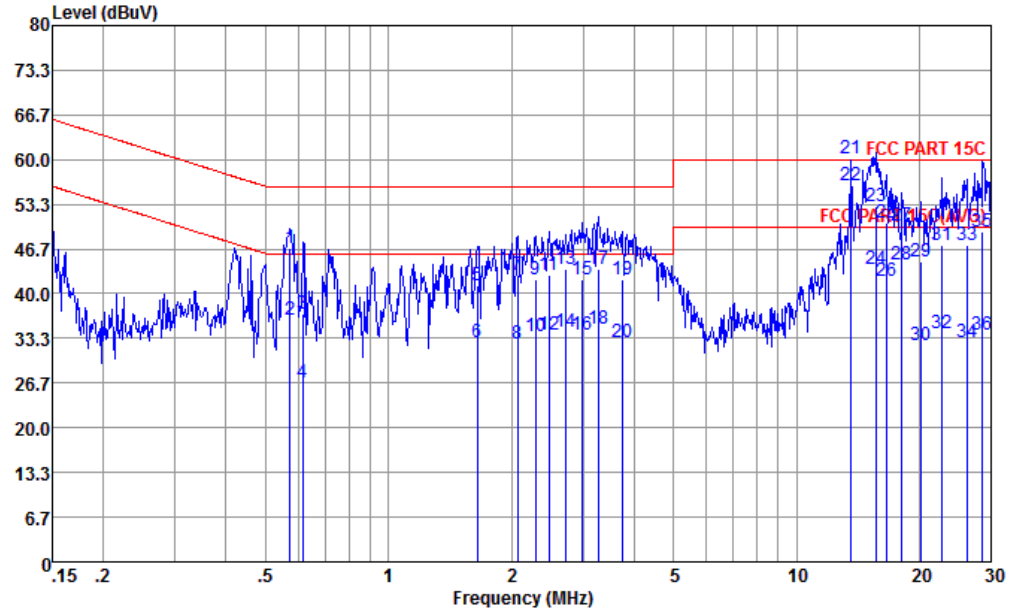


Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

: 004402243144346 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	24.659	31.10	-18.90	50.00	20.20	0.22	10.68	Average
19	26.699	46.27	-13.73	60.00	35.30	0.22	10.75	QP
20	26.699	29.57	-20.43	50.00	18.60	0.22	10.75	Average
21	29.371	49.27	-10.73	60.00	38.20	0.23	10.84	QP
22	29.371	33.37	-16.63	50.00	22.30	0.23	10.84	Average

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		

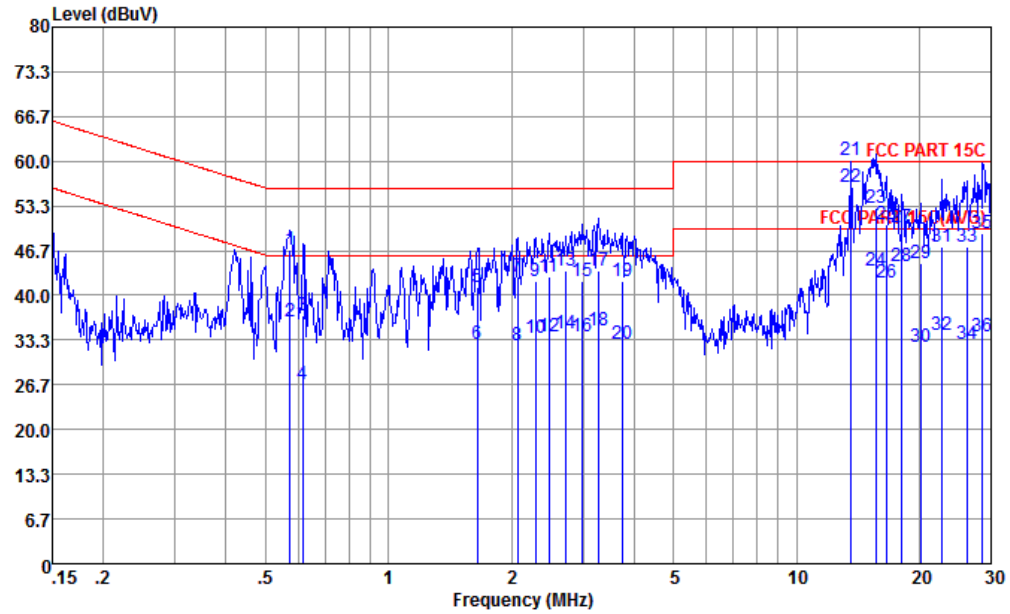


Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

: 004402243144346 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.573	46.69	-9.31	56.00	36.20	0.33	10.16	QP
2	0.573	36.09	-9.91	46.00	25.60	0.33	10.16	Average
3	0.617	37.09	-18.91	56.00	26.60	0.33	10.16	QP
4	0.617	26.69	-19.31	46.00	16.20	0.33	10.16	Average
5	1.654	41.12	-14.88	56.00	30.60	0.38	10.14	QP
6	1.654	32.72	-13.28	46.00	22.20	0.38	10.14	Average
7	2.077	42.72	-13.28	56.00	32.20	0.38	10.14	QP
8	2.077	32.62	-13.38	46.00	22.10	0.38	10.14	Average
9	2.297	42.12	-13.88	56.00	31.59	0.38	10.15	QP
10	2.297	33.72	-12.28	46.00	23.19	0.38	10.15	Average
11	2.474	42.72	-13.28	56.00	32.19	0.38	10.15	QP
12	2.474	33.82	-12.18	46.00	23.29	0.38	10.15	Average
13	2.721	43.72	-12.28	56.00	33.20	0.37	10.15	QP
14	2.721	34.42	-11.58	46.00	23.90	0.37	10.15	Average
15	2.978	42.13	-13.87	56.00	31.61	0.37	10.15	QP
16	2.978	33.83	-12.17	46.00	23.31	0.37	10.15	Average
17	3.276	43.73	-12.27	56.00	33.20	0.37	10.16	QP

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

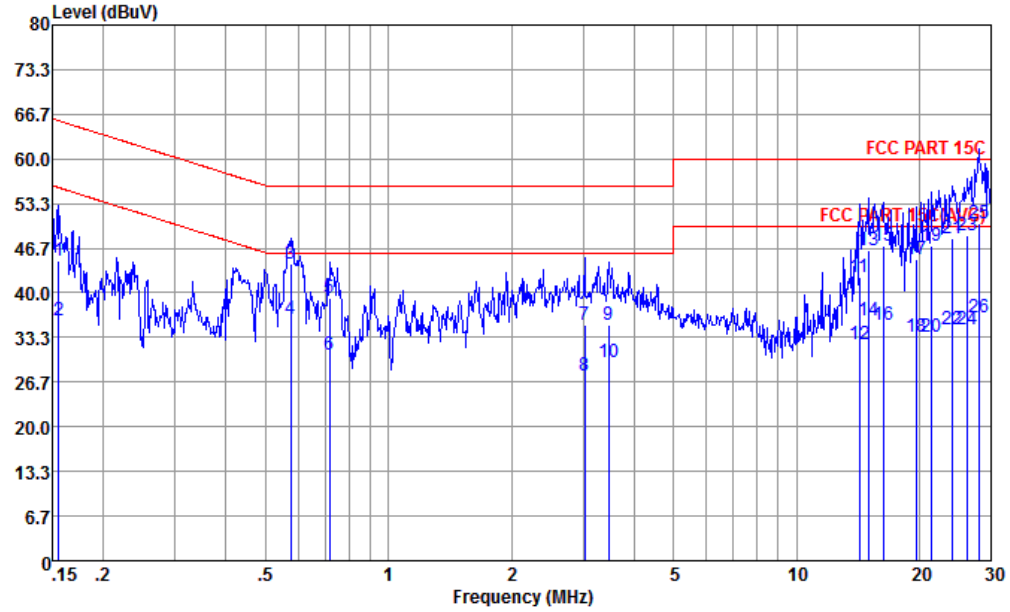
: 004402243144346 #15

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18		3.276	34.83	-11.17	46.00	24.30	0.37	10.16	Average
19		3.759	42.13	-13.87	56.00	31.60	0.37	10.16	QP
20		3.759	32.83	-13.17	46.00	22.30	0.37	10.16	Average
21	*	13.560	60.12	0.12	60.00	49.50	0.27	10.35	QP
22	*	13.560	56.12	6.12	50.00	45.50	0.27	10.35	Average
23		15.718	52.98	-7.02	60.00	42.30	0.27	10.41	QP
24		15.718	43.58	-6.42	50.00	32.90	0.27	10.41	Average
25		16.573	50.60	-9.40	60.00	39.91	0.26	10.43	QP
26		16.573	42.00	-8.00	50.00	31.31	0.26	10.43	Average
27		18.135	50.04	-9.96	60.00	39.30	0.26	10.48	QP
28		18.135	44.34	-5.66	50.00	33.60	0.26	10.48	Average
29		20.162	44.69	-15.31	60.00	33.90	0.25	10.54	QP
30		20.162	32.39	-17.61	50.00	21.60	0.25	10.54	Average
31		22.775	47.16	-12.84	60.00	36.30	0.24	10.62	QP
32		22.775	34.16	-15.84	50.00	23.30	0.24	10.62	Average
33		26.139	47.17	-12.83	60.00	36.20	0.24	10.73	QP
34		26.139	32.87	-17.13	50.00	21.90	0.24	10.73	Average
35		28.603	49.26	-10.74	60.00	38.20	0.24	10.82	QP
36		28.603	33.96	-16.04	50.00	22.90	0.24	10.82	Average

(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

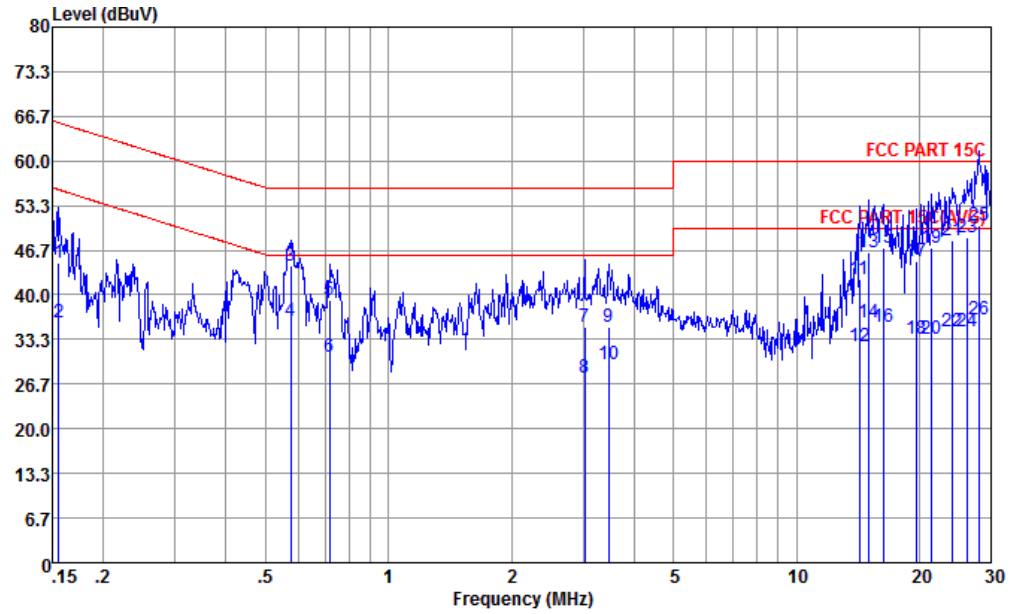
: 004402243144346 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.156	44.80	-20.89	65.69	34.20	0.49	10.11	QP
2	0.156	35.90	-19.79	55.69	25.30	0.49	10.11	Average
3	0.576	44.29	-11.71	56.00	33.90	0.23	10.16	QP
4	0.576	35.99	-10.01	46.00	25.60	0.23	10.16	Average
5	0.716	39.29	-16.71	56.00	28.90	0.24	10.15	QP
6	0.716	30.69	-15.31	46.00	20.30	0.24	10.15	Average
7	3.025	35.14	-20.86	56.00	24.81	0.18	10.15	QP
8	3.025	27.64	-18.36	46.00	17.31	0.18	10.15	Average
9	3.472	35.15	-20.85	56.00	24.80	0.19	10.16	QP
10	3.472	29.55	-16.45	46.00	19.20	0.19	10.16	Average
11	14.288	42.43	-17.57	60.00	31.80	0.26	10.37	QP
12	14.288	32.23	-17.77	50.00	21.60	0.26	10.37	Average
13	14.986	46.25	-13.75	60.00	35.60	0.26	10.39	QP
14	14.986	35.85	-14.15	50.00	25.20	0.26	10.39	Average
15	16.312	46.99	-13.01	60.00	36.30	0.26	10.43	QP
16	16.312	35.29	-14.71	50.00	24.60	0.26	10.43	Average
17	19.635	45.10	-14.90	60.00	34.30	0.27	10.53	QP

(2) with dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

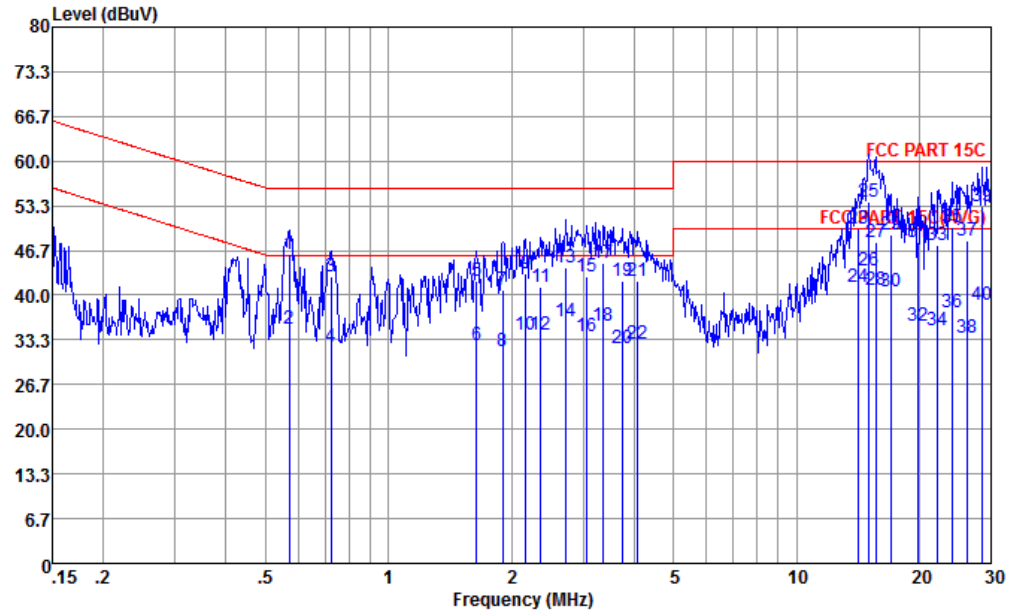
: 004402243144346 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18	19.635	33.40	-16.60	50.00	22.60	0.27	10.53	Average
19	21.486	47.04	-12.96	60.00	36.21	0.25	10.58	QP
20	21.486	33.44	-16.56	50.00	22.61	0.25	10.58	Average
21	24.142	48.19	-11.81	60.00	37.30	0.23	10.66	QP
22	24.142	34.49	-15.51	50.00	23.60	0.23	10.66	Average
23	26.278	48.56	-11.44	60.00	37.61	0.22	10.73	QP
24	26.278	34.56	-15.44	50.00	23.61	0.22	10.73	Average
25 *	28.003	50.32	-9.68	60.00	39.30	0.23	10.79	QP
26	28.003	36.22	-13.78	50.00	25.20	0.23	10.79	Average

(2) with dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

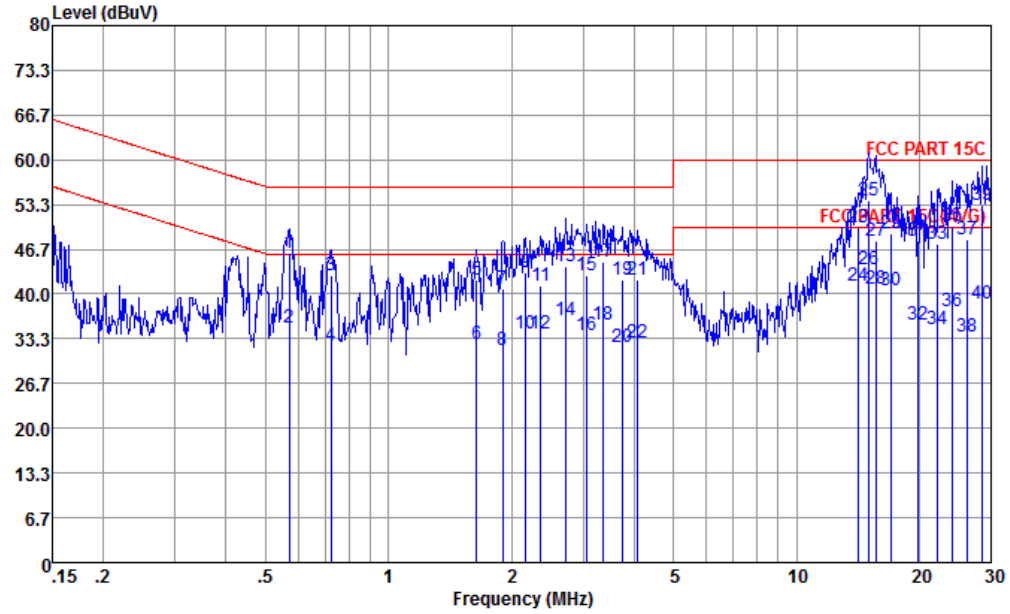
: 004402243144346 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.570	46.09	-9.91	56.00	35.60	0.33	10.16	QP
2	0.570	35.09	-10.91	46.00	24.60	0.33	10.16	Average
3	0.724	42.79	-13.21	56.00	32.30	0.34	10.15	QP
4	0.724	32.39	-13.61	46.00	21.90	0.34	10.15	Average
5	1.645	42.12	-13.88	56.00	31.60	0.38	10.14	QP
6	1.645	32.62	-13.38	46.00	22.10	0.38	10.14	Average
7	1.908	40.82	-15.18	56.00	30.30	0.38	10.14	QP
8	1.908	31.72	-14.28	46.00	21.20	0.38	10.14	Average
9	2.167	43.12	-12.88	56.00	32.60	0.38	10.14	QP
10	2.167	34.12	-11.88	46.00	23.60	0.38	10.14	Average
11	2.358	41.12	-14.88	56.00	30.59	0.38	10.15	QP
12	2.358	34.12	-11.88	46.00	23.59	0.38	10.15	Average
13	2.721	44.12	-11.88	56.00	33.60	0.37	10.15	QP
14	2.721	36.12	-9.88	46.00	25.60	0.37	10.15	Average
15	3.058	42.73	-13.27	56.00	32.21	0.37	10.15	QP
16	3.058	33.83	-12.17	46.00	23.31	0.37	10.15	Average
17	3.364	44.73	-11.27	56.00	34.20	0.37	10.16	QP

(2) with dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.

Test Mode :	NFC Tx	Test Voltage :	120Vac / 60Hz
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 2 + NFC Tx		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

: 004402243144346 #15

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
18		3.364	35.43	-10.57	46.00	24.90	0.37	10.16	Average
19		3.759	42.13	-13.87	56.00	31.60	0.37	10.16	QP
20		3.759	32.13	-13.87	46.00	21.60	0.37	10.16	Average
21		4.092	42.13	-13.87	56.00	31.60	0.36	10.17	QP
22		4.092	32.83	-13.17	46.00	22.30	0.36	10.17	Average
23		14.138	49.94	-10.06	60.00	39.30	0.27	10.37	QP
24		14.138	41.14	-8.86	50.00	30.50	0.27	10.37	Average
25	*	15.066	53.86	-6.14	60.00	43.20	0.27	10.39	QP
26		15.066	43.76	-6.24	50.00	33.10	0.27	10.39	Average
27		15.635	47.97	-12.03	60.00	37.29	0.27	10.41	QP
28		15.635	40.87	-9.13	50.00	30.19	0.27	10.41	Average
29		17.018	49.01	-10.99	60.00	38.30	0.26	10.45	QP
30		17.018	40.61	-9.39	50.00	29.90	0.26	10.45	Average
31		19.845	47.88	-12.12	60.00	37.10	0.25	10.53	QP
32		19.845	35.38	-14.62	50.00	24.60	0.25	10.53	Average
33		22.180	47.45	-12.55	60.00	36.60	0.25	10.60	QP
34		22.180	34.75	-15.25	50.00	23.90	0.25	10.60	Average
35		24.015	50.20	-9.80	60.00	39.30	0.24	10.66	QP
36		24.015	37.50	-12.50	50.00	26.60	0.24	10.66	Average
37		26.278	48.17	-11.83	60.00	37.20	0.24	10.73	QP
38		26.278	33.57	-16.43	50.00	22.60	0.24	10.73	Average
39		28.452	53.35	-6.65	60.00	42.30	0.24	10.81	QP
40		28.452	38.65	-11.35	50.00	27.60	0.24	10.81	Average

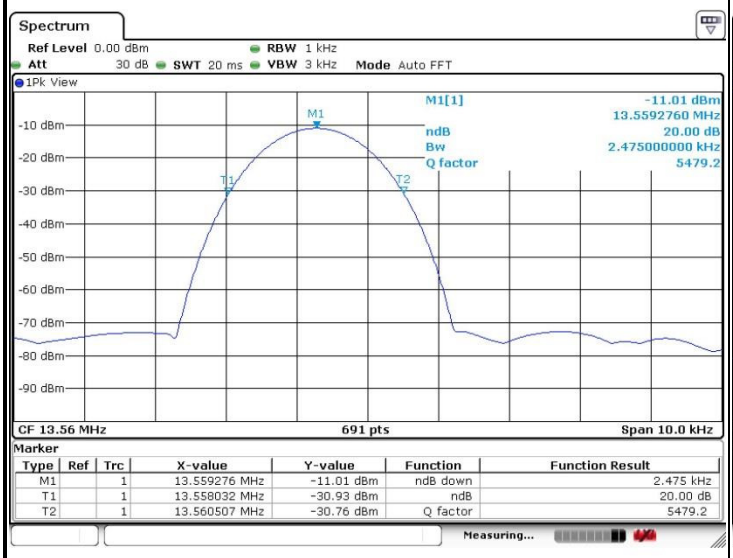
(2) with dummy load

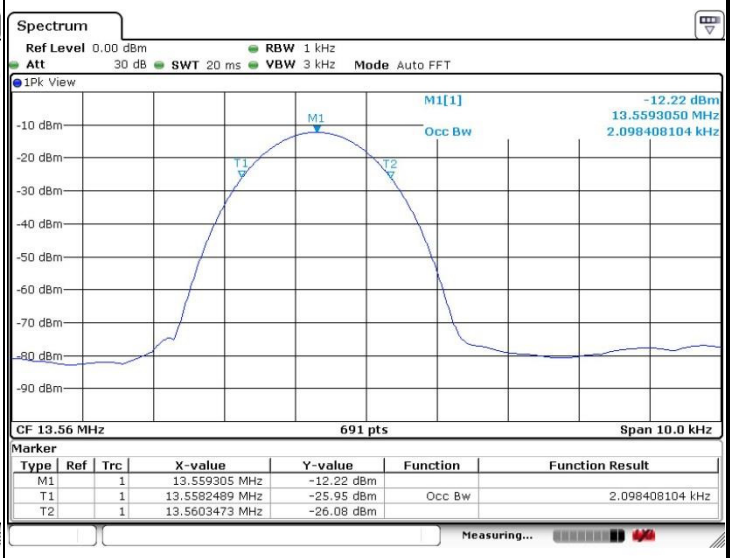
Remark: Only the fundamental NFC signal needs to be retested per C63.4.

Appendix B. Test Results of Conducted Test Items

B1. Test Result of 20dB Spectrum Bandwidth

Test mode	NFC Tx	Test Frequency (MHz)	13.56





20dB Bandwidth (kHz)	2.48	99% OccupiedBW(kHz)	2.10
Frequency range (MHz)	**f_L > 13.553**	13.558032	**Test Result**
	f_H < 13.567	13.560507	**Complies**

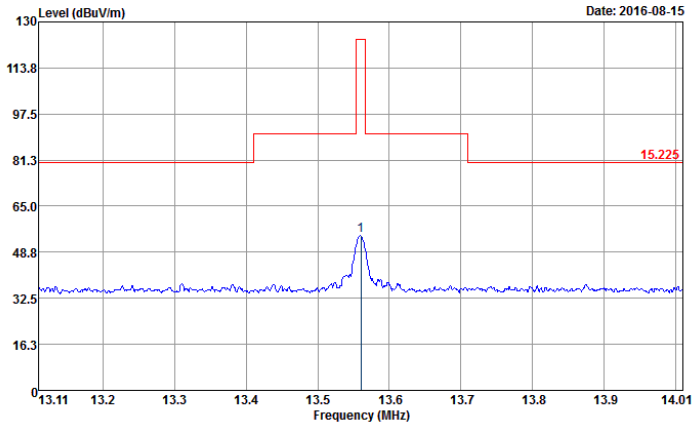
B2. Test Result of Frequency Stability

Voltage vs. Frequency Stability		Temperature vs. Frequency Stability	
Voltage (Vac)	**Measurement Frequency (MHz)**	**Temperature (℃)**	**Measurement Frequency (MHz)**
120	13.559270	-20	13.559364
102	13.559270	-10	13.559378
138	13.559270	0	13.559378
		10	13.559378
		20	13.559364
		30	13.559298
		40	13.559298
		50	13.559306
Max.Deviation (MHz)	-0.000730	**Max.Deviation (MHz)**	-0.000702
Max.Deviation (ppm)	-53.8348	**Max.Deviation (ppm)**	-51.7699
Limit	**FS < ±100 ppm**	**Limit**	**FS < ±100 ppm**
Test Result	**PASS**	**Test Result**	**PASS**

Appendix C. Test Results of Radiated Test Items

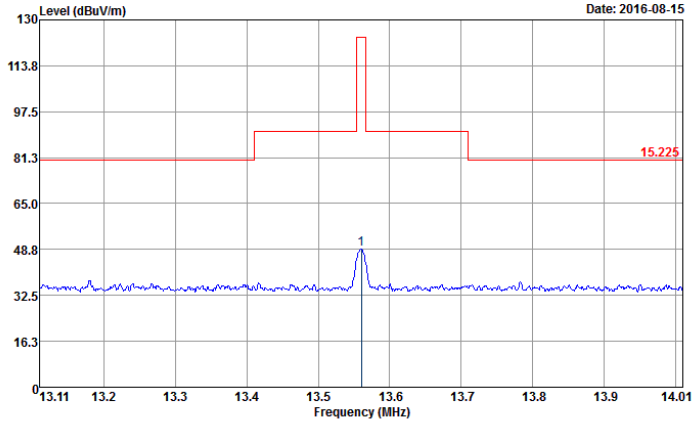
C1. Test Result of Field Strength of Fundamental Emissions

Test Mode :	NFC Tx	Test Frequency (MHz)	13.56



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(H) HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	13.56	54.52	-69.48	124.00	33.33	20.51	0.68	100	12	QP



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(V) VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	13.56	48.83	-75.17	124.00	27.64	20.51	0.68	100	299	QP

C2. Results of Radiated Emissions (9 kHz~30MHz)

Test Mode :	NFC Tx	Polarization :	Horizontal

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.05306	47.35	-65.76	113.11	27.47	19.2	0.68	-	-	Average
0.06819	44.2	-66.73	110.93	24.52	19	0.68	-	-	Average
0.0903	35.53	-72.96	108.49	16.05	18.8	0.68	-	-	QP
0.12912	41.33	-64.05	105.38	21.86	18.79	0.68	-	-	Average
0.19182	48.87	-53.08	101.95	29.43	18.76	0.68	-	-	Average
0.98566	37.18	-30.55	67.73	17.6	18.9	0.68	-	-	QP
12.56	36.68	-32.82	69.5	15.69	20.31	0.68	-	-	QP
23.974	39	-30.5	69.5	15.89	22.04	1.07	100	28	QP
27.7	38.77	-30.73	69.5	15.44	22.26	1.07	-	-	QP

Test Mode :	NFC Tx	Polarization :	Vertical

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.03996	47.3	-68.27	115.57	27.42	19.2	0.68	-	-	Average
0.07761	46.16	-63.65	109.81	26.48	19	0.68	-	-	Average
0.09236	34.46	-73.83	108.29	14.98	18.8	0.68	-	-	QP
0.1224	38.41	-67.44	105.85	18.94	18.79	0.68	-	-	Average
0.1687	45.5	-57.56	103.06	26.05	18.77	0.68	-	-	Average
0.50502	40.19	-33.35	73.54	20.89	18.62	0.68	-	-	QP
11.472	36.46	-33.04	69.5	15.69	20.09	0.68	-	-	QP
22.759	38.95	-30.55	69.5	15.91	21.97	1.07	-	-	QP
29.2	39.09	-30.41	69.5	15.67	22.35	1.07	100	47	QP

Note:

1. 13.56 MHz is fundamental signal which can be ignored.
2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
4. Limit line = specific limits (dBμV) + distance extrapolation factor.

C3. Results of Radiated Emissions (30MHz~1GHz)

Test Mode :	NFC Tx	Polarization :	Horizontal

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	29.19	-10.81	40	33.47	26	1.07	31.35	100	11	Peak
103.71	18.73	-24.77	43.5	31.94	16.76	1.55	31.52	-	-	Peak
212.79	20.19	-23.31	43.5	33.45	16.32	1.87	31.45	-	-	Peak
877.5	32.11	-13.89	46	29.62	28.87	4.17	30.55	-	-	Peak
910.4	33.05	-12.95	46	30.21	29.26	4.12	30.54	-	-	Peak
948.2	33.75	-12.25	46	30.03	30.18	4.07	30.53	-	-	Peak

Test Mode :	NFC Tx	Polarization :	Vertical

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	29.13	-10.87	40	33.41	26	1.07	31.35	100	56	Peak
79.68	20.63	-19.37	40	37.11	13.79	1.28	31.55	-	-	Peak
210.9	19.17	-24.33	43.5	32.46	16.3	1.87	31.46	-	-	Peak
874	32.74	-13.26	46	30.28	28.84	4.17	30.55	-	-	Peak
916	33.1	-12.9	46	30.14	29.38	4.12	30.54	-	-	Peak
941.2	33.23	-12.77	46	29.7	29.99	4.07	30.53	-	-	Peak

Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.