FCC Test Report

APPLICANT : HMD global Oy EQUIPMENT : Mobile Phone

BRAND NAME : Nokia MODEL NAME : TA-1183

FCC ID : 2AJOTTA-1183

STANDARD : 47 CFR Part 15 Subpart B

CLASSIFICATION: Certification

The product was received on Apr. 24, 2019 and testing was completed on Apr. 29, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 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.



Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China

Sporton International (Kunshan) Inc.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC930509-05	Rev. 01	Initial issue of report	May 17, 2019

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description Limit		Result	Remark
					Under limit
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	4.34 dB at
					2.273 MHz
					Under limit
2.2	45.400	O Dadieted Foriacies	45 400 limita	PASS	3.47 dB at
3.2	15.109	Radiated Emission	< 15.109 limits		193.930 MHz
					for Quasi-Peak

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1. General Description

1.1. Applicant

HMD global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2. Manufacturer

HMD global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3. Product Feature of Equipment Under Test

Product Feature						
Equipment	Mobile Phone					
Brand Name	Nokia					
Model Name	TA-1183					
FCC ID	2AJOTTA-1183					
	WCDMA/HSPA/DC-HSDPA/HSPA+/LTE					
ELIT cupports Padios application	WLAN 2.4GHz 802.11b/g/n HT20					
EUT supports Radios application	Bluetooth BR / EDR / LE					
	FM Receiver and GNSS					
	Conduction:					
	352918100021481/352918100021499 for Sample 1					
IMEI Code	352918109900081/352918109900099 for Sample 2					
INIEI Code	Radiation:					
	352918100021366/352918100021374 for Sample 1					
	352918109900065/352918109900073 for Sample 2					
HW Version	DVT_0.2					
SW Version	00WW_0_095					
EUT Stage	Identical Prototype					

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Remark:

- 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- 2. There are two types of EUT, the differences of Memory/TP+LCD/Battery Cover/Front Camera/Rear Camera/Speaker/Receiver/MIC/Motor are different suppliers. According to the difference, we choose sample 1 to perform full test, sample 2 to verify the difference with the sample 1.

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1.4. Product Specification of Equipment Under Test

Standards-related Product Specification						
Standard	·					
	WCDMA Band V: 826.4 MHz ~ 846.6 MHz					
Tx Frequency	LTE Band 5 : 824.7 MHz ~ 848.3 MHz					
1x Frequency	LTE Band 41 : 2537.5 MHz ~ 2652.5 MHz					
	802.11b/g/n: 2412 MHz ~ 2462 MHz					
	Bluetooth: 2402 MHz ~ 2480 MHz					
	WCDMA Band V: 871.4 MHz ~ 891.6 MHz					
	LTE Band 5 : 869.7 MHz ~ 893.3 MHz					
D., F.,	LTE Band 41 : 2537.5 MHz ~ 2652.5 MHz					
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz					
	Bluetooth: 2402 MHz ~ 2480 MHz					
	GNSS : 1559 MHz ~ 1610 MHz FM : 87.5MHz ~ 108 MHz					
	WWAN : LOOP Antenna					
	WLAN: IFA Antenna					
Antonno Typo	Bluetooth : IFA Antenna					
Antenna Type	GNSS: IFA Antenna					
	FM : External Handset Antenna					
	WCDMA: BPSK (Uplink)					
	HSDPA/DC-HSDPA: QPSK (Uplink)					
	HSUPA : QPSK (Uplink)					
	HSPA+: 16QAM					
	DC-HSDPA: 64QAM					
	LTE: QPSK / 16QAM / 64QAM					
Type of Modulation	802.11b: DSSS (DBPSK / DQPSK / CCK)					
~	802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)					
	Bluetooth LE : GFSK					
	Bluetooth (1Mbps) : GFSK					
	Bluetooth (2Mbps) : π /4-DQPSK					
	Bluetooth (3Mbps) : 8-DPSK					
	GNSS: BPSK					
	FM					

1.5. Modification of EUT

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

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1.6. Test Location

Sporton International (Kunshan) Inc is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0).

Test Site	Sporton International (F	Sporton International (Kunshan) Inc.						
	No. 1098, Pengxi North	No. 1098, Pengxi North Road, Kunshan Economic Development Zone,						
Test Site Location	Jiangsu Province 215335, China							
rest Site Location	TEL: 86-512-57900158							
	FAX : 86-512-57900958							
	Sporton Site No.	FCC designation No.	FCC Test Firm Registration No.					
Test Site No.	CO01-KS	CN5013	630927					
	03CH02-KS	C143013	030927					

1.7. Applicable Standards

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

- 47 CFR Part 15 Subpart B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

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2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
	Mode 1: WCDMA Band V Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Rear) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
	Mode 2: LTE Band 5 Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Front) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
	Mode 3: WCDMA Band V Rx(Middle) + Bluetooth Idle + WLAN Idle(2.4G) + MPEG4 + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
AC Conducted	Mode 4: LTE Band 5 Rx(High) + Bluetooth Idle + WLAN Idle(2.4G) + FM Rx(98MHz) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
Emission	Mode 5: LTE Band 41 Rx + Bluetooth Idle + WLAN Idle(2.4G) + GNSS Rx + Earphone + USB Cable (Data Link with Notebook) + Battery 1 for Sample 1
	Mode 6: WCDMA Band V Rx(Middle) + Bluetooth Idle + WLAN Idle(2.4G) + MPEG4 + Earphone + USB Cable (Charging from Adapter) + Battery 2 for Sample 2
	Mode 7: WCDMA Band V Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Rear) + Earphone + USB Cable (Charging from Adapter) + Battery 2 for Sample 2
	Mode 8: WCDMA Band V Rx(Middle) + Bluetooth Idle + WLAN Idle(2.4G) + GNSS Rx + Earphone + USB Cable (Data Link with Notebook) + Battery 2 for Sample 2
	Mode 1: WCDMA Band V Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Rear) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
	Mode 2: LTE Band 5 Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Front) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
	Mode 3: WCDMA Band V Rx(Middle) + Bluetooth Idle + WLAN Idle(2.4G) + MPEG4 + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
Radiated Emissions	Mode 4: LTE Band 5 Rx(High) + Bluetooth Idle + WLAN Idle(2.4G) + FM Rx(98MHz) + Earphone + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
	Mode 5: LTE Band 41 Rx + Bluetooth Idle + WLAN Idle(2.4G) + GNSS Rx + Earphone + USB Cable (Data Link with Notebook) + Battery 1 for Sample 1
	Mode 6: LTE Band 41 Rx + Bluetooth Idle + WLAN Idle(2.4G) + GNSS Rx + Earphone + USB Cable (Data Link with Notebook) + Battery 2 for Sample 2
	Mode 7: LTE Band 5 Rx(Low) + Bluetooth Idle + WLAN Idle(2.4G) + Camera(Front) + Earphone + USB Cable (Charging from Adapter) + Battery 2 for Sample 2

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Remark:

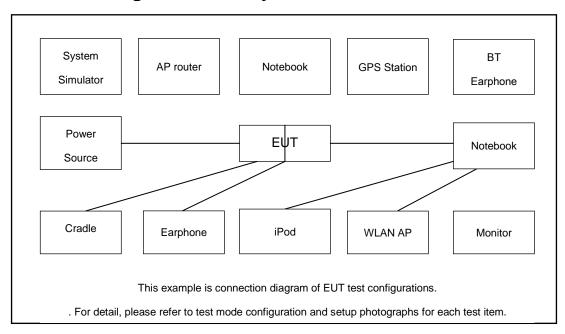
- 1. The worst case of AC is mode 3; only the test data of this mode is reported.
- 2. The worst case of RE is mode 5; only the test data of this mode is reported.
- Data Link with Notebook means data application transferred mode between EUT and Notebook.
- **4.** Pre-scanned Low/Middle/High channel for WCDMA/LTE Band V, FM Rx, the worst channel was recorded in this report.

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2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Vector Signal Generator	R&S	SMBV100A	258305	N/A	Unshielded,1.8m
3.	Signal Generator	R&S	GSS7000	NA	N/A	Unshielded,1.8m
4.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
5.	WLAN AP	TP-LINK	TL-WDR5600	N/A	N/A	Unshielded,1.8m
6.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
7.	Bluetooth Earphone	Lenovo	LYEJ02LM	N/A	N/A	N/A
8.	Notebook	Lenovo	G480	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
9.	Notebook	DELL	MT320	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
10.	SD Card	Kingston	8GB	N/A	N/A	N/A
11.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
12.	iPod	Apple	A1199	N/A	N/A	N/A

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2.4. EUT Operation Test Setup

The EUT was in WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

- 1. Data application is transferred between Notebook and EUT via USB cable.
- 2. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
- 3. Turn on camera to capture images.
- 4. Turn on MPEG4 function.
- 5. Turn on FM receiver function to make the EUT receive continuous signals from FM station

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3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

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.

<Class B Limit>

Frequency of emission	Conducted limit (dBuV)					
(MHz)	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.

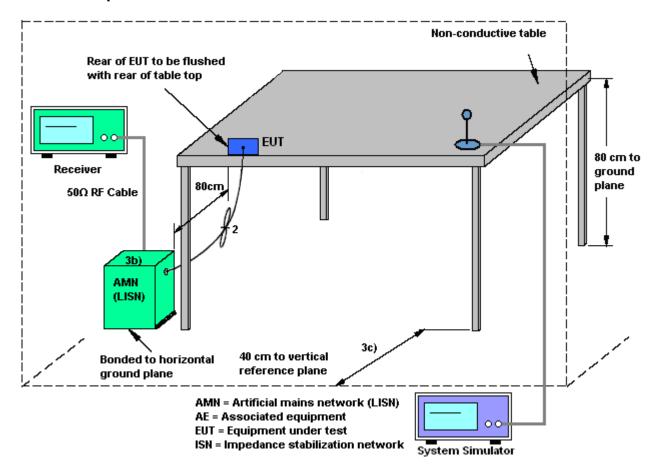
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room 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.

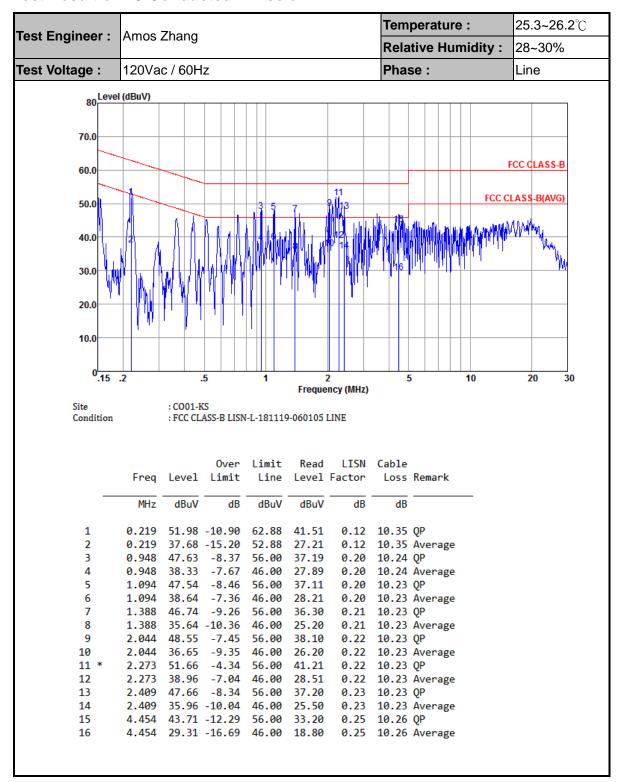
3.1.4 Test Setup



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3.1.5 Test Result of AC Conducted Emission



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Temperature: 25.3~26.2°C Test Engineer: Amos Zhang 28~30% **Relative Humidity:** Test Voltage: 120Vac / 60Hz Phase: Neutral 80 Level (dBuV) 70.0 FCC CLASS-B 60.0 FCC CLASS-B(AVG) 50.0 40.0 30.0 20.0 10.0 0.15 .2 30 Frequency (MHz) : CO01-KS Site Condition : FCC CLASS-B LISN-N-181119-060105 NEUTRAL Over Limit Read LISN Cable Limit Line Level Factor Loss Remark Level MHz dBuV dB dBuV dBuV dB dB 0.154 56.85 -8.93 65.78 46.20 0.18 10.47 OP 1 39.55 -16.23 55.78 28.90 0.18 10.47 Average 0.154 3 0.176 55.19 -9.49 64.68 44.59 0.18 10.42 QP 0.18 10.42 Average 4 0.176 36.79 -17.89 54.68 26.19 0.17 5 0.183 57.47 -6.86 64.33 46.90 10.40 QP 36.17 -18.16 54.33 25.60 0.17 10.40 Average 0.183 0.221 55.02 -7.77 62.79 44.50 0.17 10.35 QP 8 0.221 39.42 -13.37 52.79 28.90 0.17 10.35 Average 9 0.253 49.70 -11.94 61.64 39.20 0.17 10.33 QP 0.17 10.33 Average 10 0.253 31.10 -20.54 51.64 20.60 0.292 48.07 -12.39 60.46 37.60 0.16 10.31 QP 11 0.292 33.07 -17.39 50.46 22.60 0.16 10.31 Average 13 0.377 45.93 -12.41 58.34 35.49 0.16 10.28 QP 30.63 -17.71 48.34 20.19 14 0.377 0.16 10.28 Average 0.452 45.60 -11.25 56.85 35.20 15 0.15 10.25 QP 0.15 10.25 Average 0.452 26.00 -20.85 46.85 15.60 16 17 0.524 42.98 -13.02 56.00 32.59 0.15 10.24 OP 18 0.524 27.88 -18.12 46.00 17.49 0.15 10.24 Average 19 2.346 44.59 -11.41 56.00 34.20 0.16 10.23 QP 2.346 32.59 -13.41 46.00 22.20 20 0.16 10.23 Average

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3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency	Field Strength	Measurement Distance		
(MHz)	(microvolts/meter)	(meters)		
30 – 88	100	3		
88 – 216	150	3		
216 - 960	200	3		
Above 960	500	3		

3.2.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

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3.2.3. Test Procedures

- 1. The EUT was placed on a turntable with 0.8 meter above ground.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest radiation.
- 4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
- 5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
- 6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
- 7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
- 8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
- 9. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level

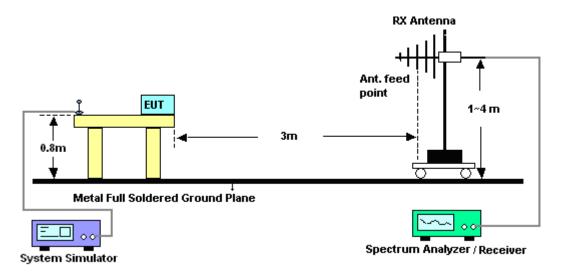
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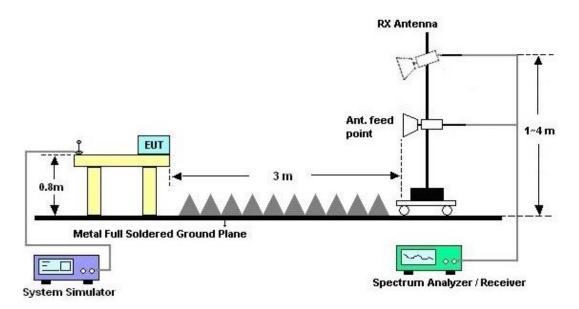
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3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

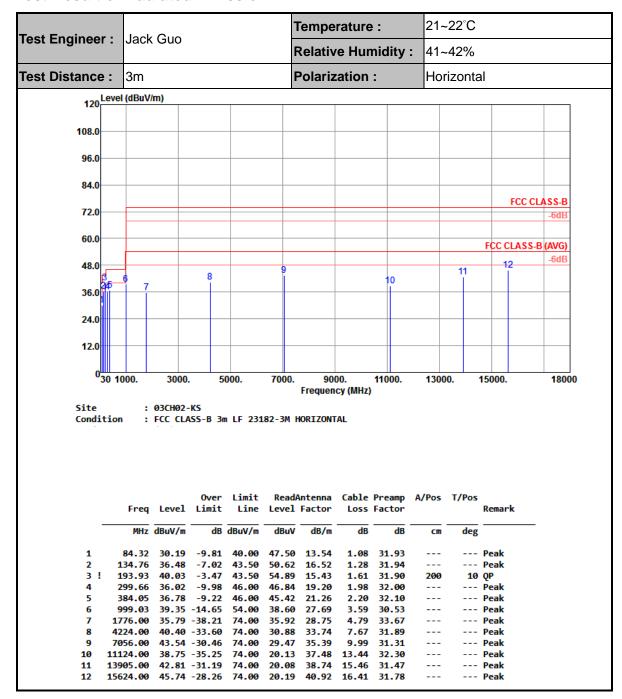


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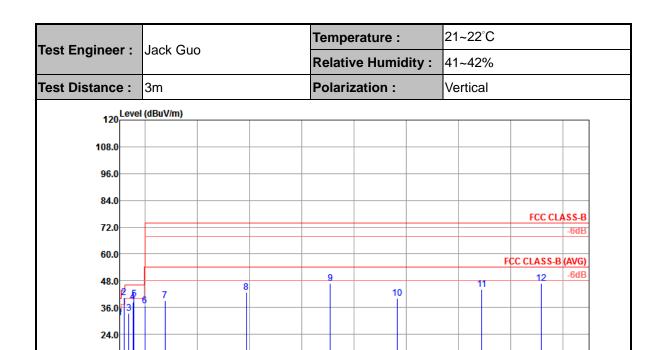
3.2.5. Test Result of Radiated Emission



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: 03CH02-KS Site

⁰30 1000.

12.0

: FCC CLASS-B 3m LF 23182-3M VERTICAL Condition

5000.

7000.

9000.

Frequency (MHz)

11000.

13000.

15000.

18000

3000.

			0ver	Limit	Read/	Antenna	Cable	Preamp	A/Pos	T/Pos	
	Freq	Level	Limit	Line	Level	Factor	Loss	Factor			Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	38.73	31.57	-8.43	40.00	44.16	18.66	0.71	31.96			Peak
2	! 193.93	40.41	-3.09	43.50	55.27	15.43	1.61	31.90	100	0	Peak
3	384.05	33.48	-12.52	46.00	42.12	21.26	2.20	32.10			Peak
4	533.43	38.43	-7.57	46.00	43.70	24.43	2.61	32.31			Peak
5	576.11	39.66	-6.34	46.00	44.57	24.79	2.68	32.38			Peak
6	997.09	36.83	-17.17	54.00	36.12	27.67	3.59	30.55			Peak
7	1768.00	38.99	-35.01	74.00	39.26	28.66	4.76	33.69			Peak
8	4880.00	42.74	-31.26	74.00	32.11	33.77	8.20	31.34			Peak
9	8088.00	46.64	-27.36	74.00	31.48	36.17	11.02	32.03			Peak
10	10665.00	40.07	-33.93	74.00	21.76	37.20	13.11	32.00			Peak
11	13896.00	44.19	-29.81	74.00	21.46	38.74	15.46	31.47			Peak
12	16164.00	46.72	-27.28	74.00	20.45	41.18	16.83	31.74			Peak

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4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 16, 2019	Apr. 29, 2019	Apr. 15, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Apr. 29, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Apr. 29, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Apr. 29, 2019	Oct. 11, 2019	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Ma x 30dBm	Aug. 06, 2018	Apr. 29, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 16, 2019	Apr. 29, 2019	Apr. 15, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Dec. 29, 2018	Apr. 29, 2019	Dec. 28, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Apr. 29, 2019	Jan. 26, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Apr. 29, 2019	Jan. 04, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Apr. 29, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5G Hz	Apr. 15, 2019	Apr. 29, 2019	Apr. 14, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18~40GHz	Jan. 14, 2019	Apr. 29, 2019	Jan. 13, 2020	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Apr. 29, 2019	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Apr. 29, 2019	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Apr. 29, 2019	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required

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5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	2.9 dB
of 95% (U = 2Uc(y))	2.9 UD

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	4.8 dB
of 95% (U = 2Uc(y))	4.0 UB

<u>Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	5.2 dB
of 95% (U = 2Uc(y))	3.2 UB

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