



FCC RADIO TEST REPORT

FCC ID : 2AJN7-TP00128A
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00128A
Applicant : LC Future Center Limited Taiwan Branch
7F., No. 780, Bei'an Rd., Zhongshan Dist.,
Taipei City 104, Taiwan
Manufacturer : LCFC (HeFei) Electronics Technology Co., Ltd.
No. 3188-1, Yungu Road (Hefei Export
Processing Zone), Hefei Economics &
Technology Development Area, Anhui, CHINA
Standard : FCC 47 CFR Part 2, 22(H), 24(E), 27

Equipment: Quectel EM120R-GL tested inside of Lenovo Notebook Computer.

The product was received on Nov. 26, 2020 and testing was started from Dec. 25, 2020 and completed on Jan. 26, 2021. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan



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History of this test report

Report No.	Version	Description	Issued Date
FG0N2652B	01	Initial issue of report	Jan. 26, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	§2.1046	Conducted Output Power	-	See Note
	§22.913 (a)(2)	Effective Radiated Power (Band 5) (Band 26)	-	
	§27.50 (b)(10) §27.50 (c)(10)	Effective Radiated Power (Band 12) (Band 13)		
	§24.232 (c) §27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 2) (Band 25) (Band 7) (Band 38) (Band 41)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)		
-	§24.232 (d) §27.50 (d)(5)	Peak-to-Average Ratio		-
-	§2.1049	Occupied Bandwidth	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2)(4) §27.53 (g) §27.53 (h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	-	See Note
	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 7) (Band 38) (Band 41)		
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (g) §27.53 (h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	-	See Note
	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 7) (Band 38) (Band 41)		
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	-	See Note



Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1053 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (f) §27.53 (g) §27.53 (h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	Pass	Under limit 10.13 dB at 13356.000 MHz
	§2.1051 §27.53 (m)(4)	Radiated Spurious Emission (Band 7) (Band 38) (Band 41)		

Remark: The module (Model: EM120R-GL) makes no difference after verifying output power, this report reuses test data from the module report.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Amy Chen



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook Computer
Brand Name	Lenovo
Model Name	TP00128A
FCC ID	2AJN7-TP00128A
EUT supports Radios application	WCDMA/HSPA/LTE/GNSS/NFC/UWB
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Quectel EM120R-GL tested inside of Lenovo Notebook Computer.

WWAN Antenna Information				
Main Antenna	Manufacturer	Amphenol	Peak gain (dBi)	1.62
	Part number	TKC114-16-000-C	Type	PIFA

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.



1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7MHz ~ 1914.3 MHz LTE Band 26: 824.7MHz ~ 848.3 MHz LTE Band 38: 2572.5MHz ~ 2617.5MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz
Rx Frequency	LTE Band 2: 1930.7 MHz ~ 1989.3 MHz LTE Band 4: 2110.7 MHz ~ 2154.3 MHz LTE Band 5: 869.7 MHz ~ 893.3 MHz LTE Band 7: 2622.5MHz ~ 2687.5 MHz LTE Band 12: 729.7 MHz ~ 745.3 MHz LTE Band 13: 748.5 MHz ~ 753.5 MHz LTE Band 25: 1930.7MHz ~ 1994.3 MHz LTE Band 26: 869.7MHz ~ 893.3MHz LTE Band 38: 2572.5MHz ~ 2617.5MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 2110.7 MHz ~ 2199.3 MHz
Bandwidth	LTE Band 2: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5: 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7: 5MHz / 10MHz / 15MHz / 20MHz LTE Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13: 5MHz / 10MHz LTE Band 25: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 26: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz LTE Band 38: 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41: 5MHz / 10MHz / 15MHz / 20MHz LTE Band 66: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Type of Modulation	QPSK / 16QAM / 64QAM

1.3 Modification of EUT

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



1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58 , Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan
Test Site No.	Sporton Site No.
	03CH15-HY
Test Engineer	Leo Lee, Mancy Chou and Bigshow Wan
Temperature	22.6~23.2°C
Relative Humidity	47~53%

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

FCC Designation No.: TW0007

1.5 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.



2 Test Configuration of Equipment Under Test

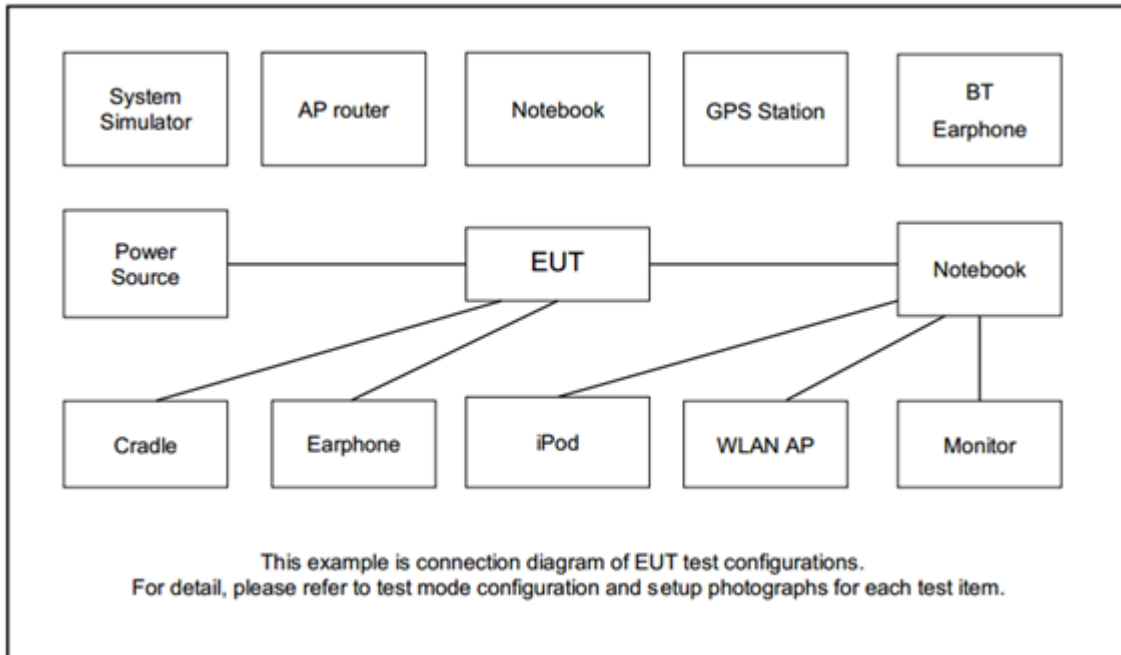
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in Tablet Type (three orthogonal panels, X, Y, Z) and Notebook Type. The worst cases (Notebook Type for LTE Band 25 ; X Plane for LTE Band 38, 41 ; Y Plane for LTE Band 7, 12, 13, 26 ; and Z Plane for LTE Band 66) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	7	-	-				v	v			v			v	v	v
	12				v	-	-	v			v			v	v	v
	13	-	-	v	v	-	-	v			v			v	v	v
	25						v	v			v			v	v	v
	26					v	-	v			v			v	v	v
	38	-	-				v	v			v			v	v	v
	41	-	-				v	v			v			v	v	v
	66						v	v			v			v	v	v
Remark	<ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
3.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A



2.4 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
	Frequency	704	707.5	711

LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 25 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	26140	26340	26590
	Frequency	1860	1880	1905

LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26865	26915	26965
	Frequency	831.5	836.5	841.5



LTE Band 38 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	37850	38000	38150
	Frequency	2580.0	2595.0	2610.0

LTE Band 41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Frequency	2506.0	2593.0	2680.0

LTE Band 66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	132072	132322	132572
	Frequency	1720	1745	1770

3 Radiated Test Items

3.1 Measuring Instruments

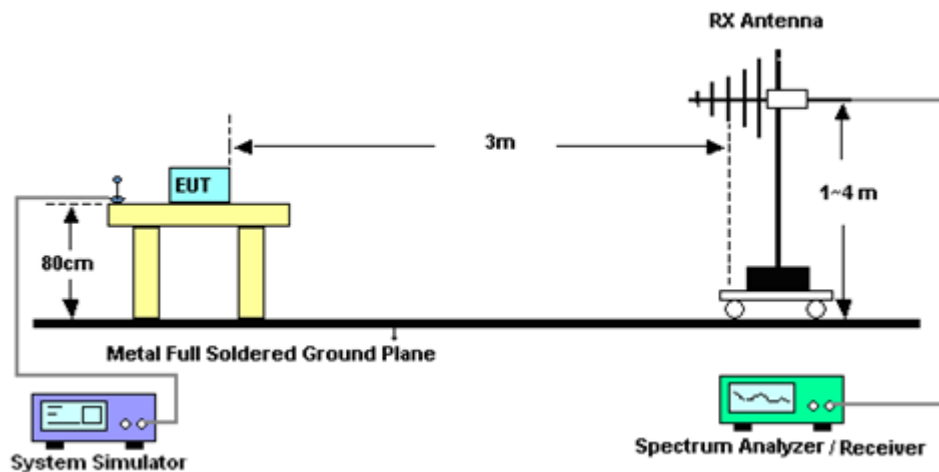
See list of measuring instruments of this test report.

3.1.1 Test Setup

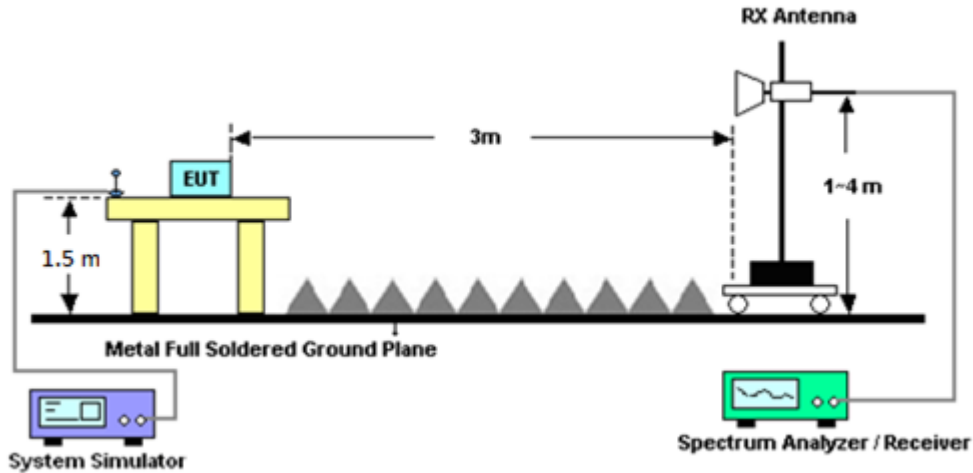
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.1.2 Test Result of Radiated Test

Please refer to Appendix A.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



3.2 Radiated Spurious Emission Measurement

3.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For LTE Band 7, 38, 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

For LTE Band 7, 38, 41

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

ERP (dBm) = EIRP - 2.15



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Dec. 25, 2020~ Jan. 26, 2021	Jul. 13, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01 N-06	37059 & 01	30MHz~1GHz	Oct. 11, 2020	Dec. 25, 2020~ Jan. 26, 2021	Oct. 10, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&0 0800N1D01N -06	41912 & 05	30MHz to 1GHz	Feb. 09, 2020	Dec. 25, 2020~ Jan. 26, 2021	Feb. 08, 2021	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 21, 2020	Dec. 25, 2020~ Jan. 26, 2021	Oct. 20, 2021	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-02114	1-18GHz	Aug. 04, 2020	Dec. 25, 2020~ Jan. 26, 2021	Aug. 03, 2021	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Nov. 03, 2020	Dec. 25, 2020~ Jan. 26, 2021	Nov. 02, 2021	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 11, 2020	Dec. 25, 2020~ Jan. 26, 2021	Dec. 10, 2021	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 22, 2020	Dec. 25, 2020~ Jan. 26, 2021	May 21, 2021	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03	171000180005 5006	1GHz~18GHz	May 07, 2020	Dec. 25, 2020~ Jan. 26, 2021	May 06, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 21, 2020	Dec. 25, 2020~ Jan. 26, 2021	Aug. 20, 2021	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 11, 2020	Dec. 25, 2020~ Jan. 26, 2021	Dec. 10, 2021	Radiation (03CH15-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz~44GHz	Feb. 10, 2020	Dec. 25, 2020~ Jan. 26, 2021	Feb. 09, 2021	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May 04, 2020	Dec. 25, 2020~ Jan. 26, 2021	May 03, 2021	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Dec. 25, 2020~ Jan. 26, 2021	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Dec. 25, 2020~ Jan. 26, 2021	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24 (k5)	RK-000451	N/A	N/A	Dec. 25, 2020~ Jan. 26, 2021	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 14, 2020	Dec. 25, 2020~ Jan. 26, 2021	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4PE	30M-18G	Apr. 14, 2020	Dec. 25, 2020~ Jan. 26, 2021	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY37710/4	30M-18G	Apr. 17, 2020	Dec. 25, 2020~ Jan. 26, 2021	Apr. 16, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Dec. 25, 2020~ Jan. 26, 2021	Feb. 24, 2021	Radiation (03CH15-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Dec. 25, 2020~ Jan. 26, 2021	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Dec. 25, 2020~ Jan. 26, 2021	Mar. 11, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1 530-8000-40 SS	SN4	1.53G Low Pass	Jul. 03, 2020	Dec. 25, 2020~ Jan. 26, 2021	Jul. 02, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-108 0-1200-15000 -60ST	SN5	1.2GHz High Pass Filter	Jul. 01, 2020	Dec. 25, 2020~ Jan. 26, 2021	Jun. 30, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60ST	SN4	3GHz High Pass Filter	Sep. 16, 2020	Dec. 25, 2020~ Jan. 26, 2021	Sep. 15, 2021	Radiation (03CH15-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Feb. 15, 2020	Dec. 25, 2020~ Jan. 26, 2021	Feb. 14, 2021	Radiation (03CH15-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.98
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.31
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.92
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Appendix A. Test Results of Radiated Test

LTE Band 26

LTE Band 26 / 15MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1649	-59.25	-13	-46.25	-71.22	-64.56	1.83	9.29	H
	2474	-47.88	-13	-34.88	-64.46	-54.13	2.25	10.64	H
	3299	-58.64	-13	-45.64	-77.34	-66.16	2.62	12.30	H
									H
									H
									H
	1649	-55.60	-13	-42.60	-68.03	-60.91	1.83	9.29	V
	2474	-44.07	-13	-31.07	-60.88	-50.32	2.25	10.64	V
	3299	-58.12	-13	-45.12	-77.23	-65.64	2.62	12.30	V
									V
									V
									V
Middle	1659	-60.21	-13	-47.21	-72.24	-65.57	1.84	9.35	H
	2489	-49.76	-13	-36.76	-66.45	-56.09	2.25	10.73	H
	3319	-58.50	-13	-45.50	-77.14	-66.17	2.63	12.45	H
									H
									H
									H
	1659	-58.25	-13	-45.25	-70.74	-63.61	1.84	9.35	V
	2489	-45.55	-13	-32.55	-62.36	-51.88	2.25	10.73	V
	3319	-58.11	-13	-45.11	-77.16	-65.78	2.63	12.45	V
									V
									V
									V



Highest	1669	-62.22	-13	-49.22	-74.37	-67.64	1.84	9.41	H
	2504	-47.95	-13	-34.95	-64.71	-54.34	2.26	10.80	H
	3339	-58.59	-13	-45.59	-77.19	-66.41	2.64	12.61	H
									H
									H
									H
	1669	-61.35	-13	-48.35	-73.97	-66.77	1.84	9.41	V
	2504	-48.10	-13	-35.10	-64.93	-54.49	2.26	10.80	V
	3339	-58.09	-13	-45.09	-77.08	-65.91	2.64	12.61	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 25

LTE Band 25 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3700	-54.22	-13	-41.22	-75.1	-63.85	2.77	12.40	H
	5555	-47.67	-13	-34.67	-72.69	-57.60	3.46	13.39	H
	7404	-47.01	-13	-34.01	-76.52	-54.21	3.98	11.18	H
									H
									H
									H
	3702	-54.67	-13	-41.67	-75.97	-64.31	2.77	12.40	V
	5555	-47.37	-13	-34.37	-72.47	-57.30	3.46	13.39	V
	7404	-46.68	-13	-33.68	-76.67	-53.88	3.98	11.18	V
									V
									V
									V
Middle	3742	-54.65	-13	-41.65	-75.68	-64.36	2.78	12.48	H
	5611	-47.05	-13	-34.05	-71.91	-56.92	3.48	13.34	H
	7484	-47.23	-13	-34.23	-76.74	-54.40	4.00	11.17	H
									H
									H
									H
	3742	-54.65	-13	-41.65	-76.08	-64.36	2.78	12.48	V
	5611	-47.84	-13	-34.84	-72.92	-57.71	3.48	13.34	V
	7484	-46.84	-13	-33.84	-76.73	-54.01	4.00	11.17	V
									V
									V
									V



Highest	3791	-52.88	-13	-39.88	-74.08	-62.51	2.79	12.42	H
	5688	-50.21	-13	-37.21	-75.48	-60.14	3.50	13.42	H
	7584	-47.24	-13	-34.24	-76.35	-54.55	4.03	11.34	H
									H
									H
									H
	3791	-53.61	-13	-40.61	-75.19	-63.24	2.79	12.42	V
	5688	-50.79	-13	-37.79	-76.29	-60.72	3.50	13.42	V
	7584	-46.82	-13	-33.82	-76.45	-54.13	4.03	11.34	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 12

LTE Band 12 / 10MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1399	-63.04	-13	-50.04	-74.33	-66.10	1.69	6.89	H
	2098	-61.41	-13	-48.41	-76.01	-66.70	2.08	9.52	H
	2800	-58.95	-13	-45.95	-76.53	-65.61	2.39	11.20	H
									H
									H
									H
	1400	-59.78	-13	-46.78	-71.27	-62.84	1.69	6.90	V
	2096	-59.75	-13	-46.75	-74.79	-65.06	2.07	9.53	V
	2800	-58.47	-13	-45.47	-76.31	-65.13	2.39	11.20	V
									V
									V
									V
Middle	1406	-62.64	-13	-49.64	-74.00	-65.75	1.69	6.95	H
	2109	-60.36	-13	-47.36	-75.09	-65.54	2.08	9.41	H
	2812	-58.94	-13	-45.94	-76.52	-65.59	2.40	11.20	H
									H
									H
									H
	1406	-60.06	-13	-47.06	-71.58	-63.17	1.69	6.95	V
	2109	-59.92	-13	-46.92	-75.14	-65.10	2.08	9.41	V
	2812	-58.66	-13	-45.66	-76.53	-65.31	2.40	11.20	V
									V
									V
									V



Highest	1413	-63.18	-13	-50.18	-74.62	-66.34	1.69	7.00	H
	2120	-60.00	-13	-47.00	-74.85	-65.06	2.09	9.30	H
	2824	-59.10	-13	-46.10	-76.68	-65.75	2.40	11.20	H
									H
									H
	1413	-59.12	-13	-46.12	-70.69	-62.28	1.69	7.00	V
	2119	-59.24	-13	-46.24	-74.59	-64.32	2.08	9.31	V
	2824	-58.54	-13	-45.54	-76.43	-65.19	2.40	11.20	V
									V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 13

LTE Band 13 / 5MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1552	-60.15	-13	-47.15	-72.17	-64.83	1.78	8.61	H
	2328	-57.30	-13	-44.30	-73.22	-62.64	2.18	9.67	H
	3112	-58.04	-13	-45.04	-76.38	-64.68	2.53	11.32	H
									H
									H
									H
	1552	-56.07	-13	-43.07	-68.17	-60.75	1.78	8.61	V
	2328	-56.17	-13	-43.17	-72.80	-61.51	2.18	9.67	V
	3109	-57.33	-13	-44.33	-76.20	-63.97	2.53	11.32	V
									V
									V
									V
Middle	1560	-60.09	-42.15	-17.94	-72.04	-64.82	1.78	8.66	H
	2336	-56.60	-13	-43.60	-72.53	-61.98	2.18	9.72	H
	3119	-57.93	-13	-44.93	-76.31	-64.58	2.54	11.34	H
									H
									H
									H
	1560	-57.57	-42.15	-15.42	-69.66	-62.30	1.78	8.66	V
	2339	-58.85	-13	-45.85	-75.49	-64.25	2.19	9.73	V
	3119	-57.42	-13	-44.42	-76.34	-64.07	2.54	11.34	V
									V
									V
									V



Highest	1560	-60.34	-42.15	-18.19	-72.29	-65.07	1.78	8.66	H
	2344	-55.36	-13	-42.36	-71.29	-60.79	2.19	9.76	H
	3129	-57.90	-13	-44.90	-76.36	-64.57	2.54	11.36	H
									H
									H
									H
	1560	-58.39	-42.15	-16.24	-70.48	-63.12	1.78	8.66	V
	2344	-55.93	-13	-42.93	-72.58	-61.36	2.19	9.76	V
	3129	-57.48	-13	-44.48	-76.46	-64.15	2.54	11.36	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 13 / 10MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1555	-61.32	-13	-48.32	-73.31	-66.02	1.78	8.63	H
	2336	-57.28	-13	-44.28	-73.21	-62.66	2.18	9.72	H
	3110	-57.87	-13	-44.87	-76.2	-64.51	2.53	11.32	H
									H
									H
									H
	1555	-55.36	-13	-42.36	-67.46	-60.06	1.78	8.63	V
	2336	-56.89	-13	-43.89	-73.53	-62.27	2.18	9.72	V
	3110	-57.56	-13	-44.56	-76.44	-64.20	2.53	11.32	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 66

LTE Band 66 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3420	-55.85	-13	-42.85	-75.27	-65.77	2.68	12.60	H
	5135	-40.12	-13	-27.12	-64.47	-49.24	3.32	12.44	H
	6844	-48.73	-13	-35.73	-76.79	-57.27	3.86	12.40	H
									H
									H
									H
	3420	-56.97	-13	-43.97	-76.76	-66.89	2.68	12.60	V
	5135	-46.63	-13	-33.63	-71.54	-55.75	3.32	12.44	V
	6844	-48.46	-13	-35.46	-76.88	-57.00	3.86	12.40	V
									V
									V
									V
Middle	3469	-56.73	-13	-43.73	-76.59	-66.55	2.71	12.52	H
	5205	-40.31	-13	-27.31	-64.9	-49.81	3.34	12.84	H
	6941	-47.42	-13	-34.42	-75.77	-55.53	3.89	12.00	H
									H
									H
									H
	3469	-56.62	-13	-43.62	-76.85	-66.44	2.71	12.52	V
	5205	-46.65	-13	-33.65	-71.72	-56.15	3.34	12.84	V
	6941	-47.46	-13	-34.46	-75.86	-55.57	3.89	12.00	V
									V
									V
									V



Highest	3525	-54.76	-13	-41.76	-75.01	-64.33	2.73	12.30	H
	5282	-41.40	-13	-28.40	-66.03	-51.36	3.37	13.33	H
	7046	-47.23	-13	-34.23	-75.8	-54.94	3.92	11.62	H
									H
									H
									H
									H
	3525	-53.92	-13	-40.92	-74.56	-63.49	2.73	12.30	V
	5282	-45.78	-13	-32.78	-70.76	-55.74	3.37	13.33	V
	7046	-47.29	-13	-34.29	-75.84	-55.00	3.92	11.62	V
									V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 7

LTE Band 7 / 20MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	5004	-58.66	-25	-33.66	-53.33	-67.97	3.27	12.58	H
	7506	-50.04	-25	-25.04	-52.52	-57.24	4.00	11.20	H
	10004	-57.48	-25	-32.48	-61.53	-64.02	4.67	11.21	H
	12505	-56.51	-25	-31.51	-60.44	-65.04	5.26	13.80	H
	15006	-56.37	-25	-31.37	-61.67	-62.76	5.86	12.25	H
	17505	-44.31	-25	-19.31	-61.8	-51.03	6.33	13.06	H
									H
	5004	-59.00	-25	-34.00	-54.35	-68.31	3.27	12.58	V
	7506	-48.93	-25	-23.93	-51.78	-56.13	4.00	11.20	V
	10004	-57.58	-25	-32.58	-61.39	-64.12	4.67	11.21	V
	12505	-56.41	-25	-31.41	-60.75	-64.94	5.26	13.80	V
	15006	-54.32	-25	-29.32	-61.47	-60.71	5.86	12.25	V
	17505	-46.15	-25	-21.15	-62.95	-52.87	6.33	13.06	V
									V
Middle	5052	-60.27	-25	-35.27	-55.11	-69.38	3.29	12.40	H
	7578	-51.23	-25	-26.23	-53.46	-58.51	4.03	11.31	H
	10104	-56.98	-25	-31.98	-61.17	-63.67	4.70	11.40	H
	12627	-51.44	-25	-26.44	-56.18	-59.87	5.29	13.73	H
	15156	-55.31	-25	-30.31	-60.6	-62.80	5.90	13.39	H
	17685	-43.66	-25	-18.66	-61.36	-48.84	6.34	11.52	H
									H
	5052	-60.49	-25	-35.49	-55.96	-69.60	3.29	12.40	V
	7578	-49.04	-25	-24.04	-51.77	-56.32	4.03	11.31	V
	10104	-57.41	-25	-32.41	-61.18	-64.10	4.70	11.40	V
	12627	-54.06	-25	-29.06	-58.72	-62.49	5.29	13.73	V
	15156	-55.10	-25	-30.10	-61.83	-62.59	5.90	13.39	V
	17685	-43.76	-25	-18.76	-61.88	-48.94	6.34	11.52	V
									V



Highest	5100	-60.27	-25	-35.27	-55.28	-69.26	3.31	12.30	H
	7650	-56.58	-25	-31.58	-58.84	-64.03	4.05	11.50	H
	10204	-56.20	-25	-31.20	-60.52	-62.76	4.73	11.29	H
	12753	-48.81	-25	-23.81	-54.36	-57.13	5.33	13.64	H
	15306	-57.18	-25	-32.18	-62.47	-65.77	5.93	14.52	H
	17856	-42.21	-25	-17.21	-60.11	-44.72	6.36	8.87	H
									H
	5100	-57.79	-25	-32.79	-53.38	-66.78	3.31	12.30	V
	7650	-53.38	-25	-28.38	-56.18	-60.83	4.05	11.50	V
	10204	-57.36	-25	-32.36	-61.09	-63.92	4.73	11.29	V
	12753	-51.45	-25	-26.45	-56.42	-59.77	5.33	13.64	V
	15306	-56.27	-25	-31.27	-62.57	-64.86	5.93	14.52	V
	17856	-41.72	-25	-16.72	-61.1	-44.23	6.36	8.87	V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 38

LTE Band 38 / 20MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	5142	-53.43	-25	-28.43	-77.8	-62.58	3.32	12.47	H
	7716	-46.80	-25	-21.80	-75.96	-54.42	4.08	11.70	H
	10287	-42.51	-25	-17.51	-76.56	-48.88	4.76	11.13	H
									H
									H
									H
	5142	-52.66	-25	-27.66	-77.58	-61.81	3.32	12.47	V
	7716	-45.94	-25	-20.94	-75.61	-53.56	4.08	11.70	V
	10287	-43.57	-25	-18.57	-76.88	-49.94	4.76	11.13	V
									V
									V
									V
Middle	5172	-53.18	-25	-28.18	-77.66	-62.48	3.33	12.63	H
	7758	-46.63	-25	-21.63	-75.82	-54.39	4.09	11.85	H
	10341	-42.47	-25	-17.47	-76.65	-48.59	4.77	10.90	H
									H
									H
									H
	5172	-52.37	-25	-27.37	-77.37	-61.67	3.33	12.63	V
	7758	-45.88	-25	-20.88	-75.58	-53.64	4.09	11.85	V
	10341	-43.11	-25	-18.11	-76.45	-49.23	4.77	10.90	V
									V
									V
									V



Highest	5202	-53.14	-25	-28.14	-77.73	-62.61	3.34	12.82	H
	7800	-46.79	-25	-21.79	-76.03	-54.28	4.11	11.60	H
	10404	-42.66	-25	-17.66	-77	-48.48	4.79	10.61	H
									H
									H
									H
	5202	-52.54	-25	-27.54	-77.62	-62.01	3.34	12.82	V
	7800	-46.19	-25	-21.19	-75.92	-53.68	4.11	11.60	V
	10404	-43.37	-25	-18.37	-76.75	-49.19	4.79	10.61	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 41

LTE Band 41 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	4992	-63.67	-25	-38.67	-5.32	-73.02	3.27	12.62	H
	7488	-57.75	-25	-32.75	-60.23	-64.93	4.00	11.18	H
	9900	-57.19	-25	-32.19	-61.27	-63.45	4.64	10.90	H
	12483	-56.07	-25	-31.07	-60.03	-64.58	5.26	13.77	H
									H
									H
									H
	4992	-61.81	-25	-36.81	-57.13	-71.16	3.27	12.62	V
	7488	-50.79	-25	-25.79	-53.64	-57.97	4.00	11.18	V
	9900	-57.30	-25	-32.30	-61.13	-63.56	4.64	10.90	V
	12483	-51.96	-25	-26.96	-56.31	-60.47	5.26	13.77	V
									V
									V
									V
Middle	5166	-60.88	-25	-35.88	-56.13	-70.15	3.33	12.60	H
	7752	-58.61	-25	-33.61	-61.11	-66.41	4.09	11.89	H
	10336	-55.80	-25	-30.80	-60.31	-61.95	4.77	10.92	H
	12924	-50.40	-25	-25.40	-57.06	-58.55	5.37	13.52	H
									H
									H
									H
	5166	-58.91	-25	-33.91	-54.68	-68.18	3.33	12.60	V
	7752	-54.96	-25	-29.96	-57.96	-62.76	4.09	11.89	V
	10336	-56.95	-25	-31.95	-60.62	-63.10	4.77	10.92	V
	12924	-43.93	-25	-18.93	-49.33	-52.08	5.37	13.52	V
									V
									V
									V



Highest	5340	-62.20	-25	-37.20	-57.57	-72.29	3.39	13.48	H
	8010	-53.54	-25	-28.54	-57.11	-60.20	4.18	10.84	H
	10684	-55.79	-25	-30.79	-60.51	-62.00	4.86	11.07	H
	13356	-44.08	-25	-19.08	-51.31	-51.93	5.44	13.29	H
									H
									H
									H
	5340	-60.86	-25	-35.86	-56.49	-70.95	3.39	13.48	V
	8010	-47.90	-25	-22.90	-51.59	-54.56	4.18	10.84	V
	10684	-56.61	-25	-31.61	-60.51	-62.82	4.86	11.07	V
	13356	-35.13	-25	-10.13	-40.96	-42.98	5.44	13.29	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 41(HPUE)

LTE Band 41 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	4992	-53.98	-25	-28.98	-77.81	-63.33	3.27	12.62	H
	7488	-47.27	-25	-22.27	-76.78	-54.45	4.00	11.18	H
	9990	-43.20	-25	-18.20	-76.56	-49.71	4.67	11.18	H
									H
									H
									H
	4992	-53.17	-25	-28.17	-77.67	-62.52	3.27	12.62	V
	7488	-47.01	-25	-22.01	-76.89	-54.19	4.00	11.18	V
	9990	-43.47	-25	-18.47	-76.58	-49.98	4.67	11.18	V
									V
									V
									V
Middle	5166	-52.59	-25	-27.59	-77.06	-61.86	3.33	12.60	H
	7752	-46.71	-25	-21.71	-75.9	-54.51	4.09	11.89	H
	10332	-41.96	-25	-16.96	-76.12	-48.13	4.77	10.94	H
									H
									H
									H
	5166	-52.29	-25	-27.29	-77.28	-61.56	3.33	12.60	V
	7752	-46.32	-25	-21.32	-76.01	-54.12	4.09	11.89	V
	10332	-42.42	-25	-17.42	-75.75	-48.59	4.77	10.94	V
									V
									V
									V



Highest	5345	-53.17	-25	-28.17	-77.81	-63.27	3.39	13.49	H
	8012	-45.33	-25	-20.33	-75.29	-52.00	4.18	10.85	H
	10688	-41.82	-25	-16.82	-76.29	-38.27	4.86	1.31	H
	13352	-37.46	-25	-12.46	-75.23	-45.32	5.44	13.30	H
									H
									H
									H
	5345	-52.65	-25	-27.65	-77.54	-62.75	3.39	13.49	V
	8012	-44.50	-25	-19.50	-74.58	-51.17	4.18	10.85	V
	10688	-42.66	-25	-17.66	-76.31	-39.11	4.86	1.31	V
	13352	-36.00	-25	-11.00	-72.37	-43.86	5.44	13.30	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.