FCC CO-LOCATION RADIO TEST REPORT

FCC ID	:	**ACJFZS1A20A**
Equipment	:	**Radio module**
Brand Name	:	**Panasonic**
Model Name	:	**WW18A**
Marketing Name	:	**WW18A**
Applicant	:	**Panasonic Corporation of North America Two Riverfront Plaza, 9th Floor, Newark, NJ 07102-5490**
Manufacturer	:	**Panasonic Mobile Communications Co., Ltd. 600 Saedo-cho, Tsuzuki-ku, Yokohama-city, Kanagawa 224-8539, Japan**
Standard	:	**FCC 47 CFR Part 2, 27**

The product was received on Oct. 26, 2020 and testing was started from Nov. 16, 2020 and completed on Nov. 27, 2020. 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 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 (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FG0D1135E	01	Initial issue of report	Dec. 28, 2020
FG0D1135E	02	1. Revise Accessories Information for Host 2. Revise Antenna gain	Jan. 07, 2021
FG0D1135E	03	Revise test band	Jan. 13, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1051 §27.53 (m)(4)	Radiated Spurious Emission (Band 41)	Pass	Under limit 5.53 dB at 12924.000 MHz

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: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE and GNSS.

Product Specification subjective to this standard	
Host 1	FZ-S1
Host 2	FZ-S1 with 2nd USB
Host 3	FZ-S1 with BCR Landscape and 2nd USB
Host 4	FZ-S1 with BCR Portrait
Host 5	FZ-S1 with BCR Landscape
Integrated the Host	Equipment: Tablet Computer Brand Name: Panasonic Model Name: FZ-S1 Marketing Name: FZ-S1 FCC ID: ACJFZS1A
Antenna Type for Host	WWAN: Loop Antenna GNSS : PIFA Antenna
Antenna Gain for Host	LTE Band 41: -0.15 dBi

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.
2. The device (Model: FZ-S1) has two SKU (w connector for Vehicle dock and w/o connector), all test items were performed with SKU (w connector for Vehicle dock).

Accessories Information for Host		
AC Adapter	**Brand Name**	Panasonic
	Model Name	FZ-AAE184EM
Standard Battery	**Brand Name**	Panasonic
	Model Name	FZ-VZSUT10U
Extend Battery	**Brand Name**	Panasonic
	Model Name	FZ-VZSUT11U

1.2 Modification of EUT

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

1.3 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 (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH15-HY
Test Engineer	Leo Lee, Mancy Chou, Bigshow Wang
Temperature	22.6~23.2℃
Relative Humidity	46~52%

FCC Designation No.: TW0007

1.4 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, 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

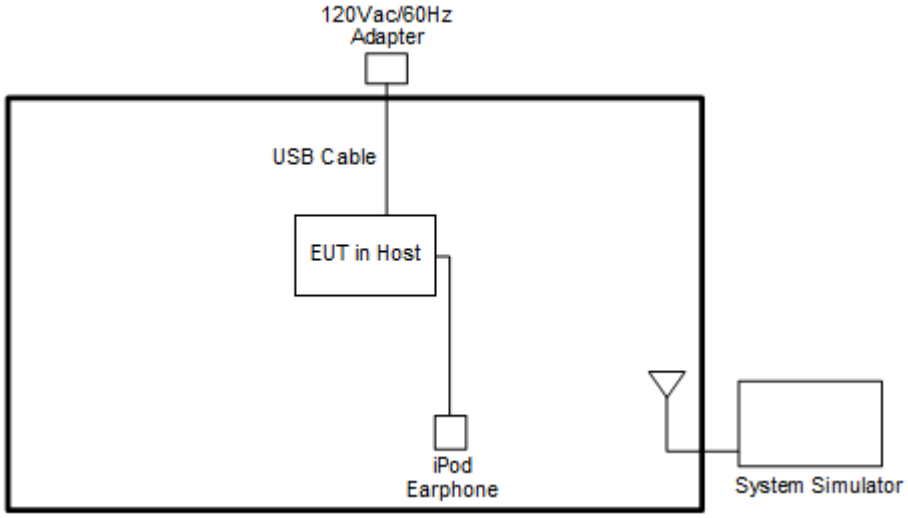
2.1 Test Mode

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 three orthogonal panels, X, Y, Z. The worst cases (Y plane) 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	41	-	-				v	v			v			v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. 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. 4. All the radiated test cases were performed with Battery 1 (FZ-VZSUT10U) and Host 1. 5. During the Radiated Spurious Emission test, the EUT turn on the WLAN function simultaneously.															

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.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
3.	Type-C USB Cable	LUXSHARE PRECISION LIMITED	L2UU3001-CS-R	N/A	N/A	N/A

2.4 Frequency List of Low/Middle/High Channels

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

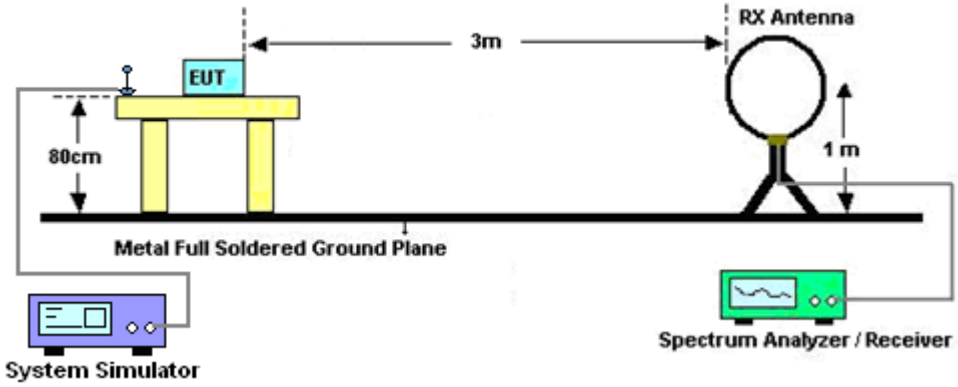
3 Radiated Test Items

3.1 Measuring Instruments

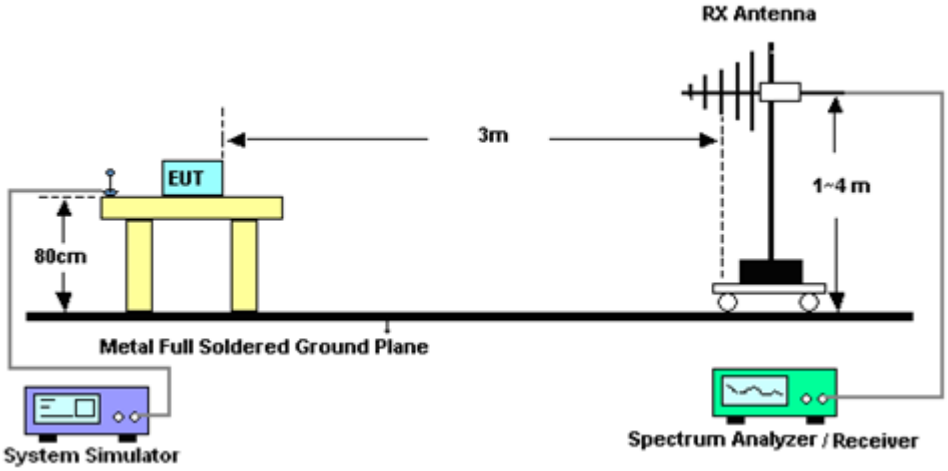
See list of measuring instruments of this test report.

3.1.1 Test Setup

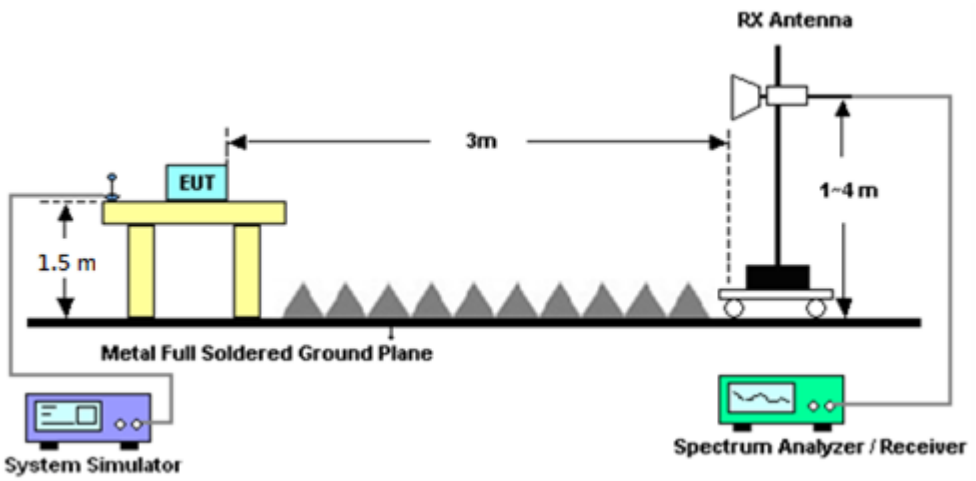
For radiated test below 30MHz



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 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.

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 + 10log(P)dB below the transmitter power P(Watts)

    For LTE Band 41

    The limit line is derived from 55 + 10log(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
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	37059 & 01	30MHz~1GHz	Oct. 11, 2020	Nov. 16, 2020~ Nov. 27, 2020	Oct. 10, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Feb. 09, 2020	Nov. 16, 2020~ Nov. 27, 2020	Feb. 08, 2021	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 27, 2019	Nov. 16, 2020~ Nov. 27, 2020	Dec. 26, 2020	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1-18GHz	Aug. 04, 2020	Nov. 16, 2020~ Nov. 27, 2020	Aug. 03, 2021	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Nov. 03, 2020	Nov. 16, 2020~ Nov. 27, 2020	Nov. 02, 2021	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 10, 2019	Nov. 16, 2020~ Nov. 27, 2020	Dec. 09, 2020	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 22, 2020	Nov. 16, 2020~ Nov. 27, 2020	May 21, 2021	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055006	1GHz~18GHz	May 07, 2020	Nov. 16, 2020~ Nov. 27, 2020	May 06, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 21, 2020	Nov. 16, 2020~ Nov. 27, 2020	Aug. 20, 2021	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Nov. 16, 2020~ Nov. 27, 2020	Dec. 12, 2020	Radiation (03CH15-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004845	10Hz~44GHz	Feb. 10, 2020	Nov. 16, 2020~ Nov. 27, 2020	Feb. 09, 2021	Radiation (03CH15-HY
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May 04, 2020	Nov. 16, 2020~ Nov. 27, 2020	May 03, 2021	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Nov. 16, 2020~ Nov. 27, 2020	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Nov. 16, 2020~ Nov. 27, 2020	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Nov. 16, 2020~ Nov. 27, 2020	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 14, 2020	Nov. 16, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4PE	30M-18G	Apr. 14, 2020	Nov. 16, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY37710/4	30M-18G	Apr. 17, 2020	Nov. 16, 2020	Apr. 16, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Nov. 16, 2020~ Nov. 27, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Nov. 16, 2020~ Nov. 27, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Nov. 16, 2020~ Nov. 27, 2020	Mar. 11, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4, MY9838/4PE,508405/2E	N/A	Nov. 16, 2020	Nov.17, 2020~ Nov. 27, 2020	Nov. 15, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN4	1.53G Low Pass	Jul. 03, 2020	Nov. 16, 2020~ Nov. 27, 2020	Jul. 02, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-1080-1200-15000-60ST	SN5	1.2GHz High Pass Filter	Jul. 01, 2020	Nov. 16, 2020~ Nov. 27, 2020	Jun. 30, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN4	3GHz High Pass Filter	Sep. 16, 2020	Nov. 16, 2020~ Nov. 27, 2020	Sep. 15, 2021	Radiation (03CH15-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Feb. 15, 2020	Nov. 16, 2020~ Nov. 27, 2020	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**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.31**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.92**

Appendix A. Test Results of Radiated Test

LTE Band 41 + 802.11b Ch06

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	-54.94	-25	-29.94	-49.16	-65.69	1.95	12.70	H
	7488	-42.42	-25	-17.42	-43.39	-51.56	2.17	11.31	H
	9990	-48.68	-25	-23.68	-51.73	-57.46	2.43	11.21	H
									H
									H
									H
	4992	-54.58	-25	-29.58	-48.93	-65.33	1.95	12.70	V
	7488	-44.33	-25	-19.33	-45.36	-53.47	2.17	11.31	V
	9990	-48.12	-25	-23.12	-50.5	-56.90	2.43	11.21	V
									V
									V
									V
Middle	5166	-54.32	-25	-29.32	-49.18	-65.25	1.97	12.90	H
	7752	-49.12	-25	-24.12	-49.76	-58.02	2.35	11.25	H
	10332	-47.93	-25	-22.93	-50.82	-56.43	2.57	11.07	H
									H
									H
									H
	5166	-54.95	-25	-29.95	-49.46	-65.88	1.97	12.90	V
	7752	-52.05	-25	-27.05	-52.8	-60.95	2.35	11.25	V
	10332	-48.12	-25	-23.12	-50.66	-56.62	2.57	11.07	V
									V
									V
									V

Highest	5340	-53.51	-25	-28.51	-48.43	-64.63	1.99	13.11	H
	8016	-49.36	-25	-24.36	-51.91	-58.04	2.52	11.19	H
	10683	-48.08	-25	-23.08	-51.03	-56.42	2.63	10.96	H
	13356	-33.84	-25	-8.84	-40.09	-44.12	2.84	13.12	H
									H
									H
									H
	5340	-53.82	-25	-28.82	-48.68	-64.94	1.99	13.11	V
	8016	-49.74	-25	-24.74	-52.13	-58.42	2.52	11.19	V
	10683	-47.17	-25	-22.17	-50.27	-55.51	2.63	10.96	V
	13356	-38.40	-25	-13.40	-43.76	-48.68	2.84	13.12	V
									V
									V
									V

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

LTE Band 41 + Bluetooth - LE Ch00

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	-52.87	-25	-27.87	-47.09	-63.62	1.95	12.70	H
	7488	-39.07	-25	-14.07	-40.04	-48.21	2.17	11.31	H
	9990	-47.04	-25	-22.04	-50.09	-55.82	2.43	11.21	H
	12483	-37.26	-25	-12.26	-41.35	-47.99	2.85	13.58	H
									H
									H
									H
	4992	-54.33	-25	-29.33	-48.68	-65.08	1.95	12.70	V
	7488	-39.62	-25	-14.62	-40.65	-48.76	2.17	11.31	V
	9990	-43.53	-25	-18.53	-45.91	-52.31	2.43	11.21	V
	12483	-40.93	-25	-15.93	-43.45	-51.66	2.85	13.58	V
									V
									V
									V
Middle	5166	-44.65	-25	-19.65	-49.44	-55.58	1.97	12.90	H
	7752	-40.24	-25	-15.24	-48.78	-49.14	2.35	11.25	H
	10332	-40.29	-25	-15.29	-50.68	-48.79	2.57	11.07	H
	12924	-30.53	-25	-5.53	-46.01	-41.21	2.75	13.43	H
									H
									H
									H
	5166	-44.70	-25	-19.70	-49.14	-55.63	1.97	12.90	V
	7752	-41.49	-25	-16.49	-50.14	-50.39	2.35	11.25	V
	10332	-39.94	-25	-14.94	-49.98	-48.44	2.57	11.07	V
	12924	-34.72	-25	-9.72	-48.96	-45.40	2.75	13.43	V
									V
									V
									V

Highest	5340	-53.20	-25	-28.20	-48.12	-64.32	1.99	13.11	H
	8016	-49.25	-25	-24.25	-51.8	-57.93	2.52	11.19	H
	10683	-48.60	-25	-23.60	-51.55	-56.94	2.63	10.96	H
	13356	-36.49	-25	-11.49	-42.74	-46.77	2.84	13.12	H
									H
									H
									H
	5340	-53.59	-25	-28.59	-48.45	-64.71	1.99	13.11	V
	8016	-49.61	-25	-24.61	-52	-58.29	2.52	11.19	V
	10683	-48.23	-25	-23.23	-51.33	-56.57	2.63	10.96	V
	13356	-39.67	-25	-14.67	-45.03	-49.95	2.84	13.12	V
									V
									V
									V

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

LTE Band 41 + 802.11ac VHT80 Ch106

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	4994	-51.95	-25	-26.95	-46.17	-62.70	1.95	12.70	H
	7491	-37.61	-25	-12.61	-38.59	-46.75	2.17	11.31	H
	9990	-46.13	-25	-21.13	-49.18	-54.91	2.43	11.21	H
	12483	-39.03	-25	-14.03	-43.12	-49.76	2.85	13.58	H
	14985	-39.70	-25	-14.70	-44.1	-49.35	3.03	12.68	H
	17478	-36.71	-25	-11.71	-51.72	-47.54	3.12	13.95	H
									H
	4994	-53.04	-25	-28.04	-47.39	-63.79	1.95	12.70	V
	7491	-40.34	-25	-15.34	-41.4	-49.48	2.17	11.31	V
	9990	-47.48	-25	-22.48	-49.86	-56.26	2.43	11.21	V
	12483	-45.00	-25	-20.00	-47.52	-55.73	2.85	13.58	V
	14985	-39.61	-25	-14.61	-45.09	-49.26	3.03	12.68	V
	17478	-36.01	-25	-11.01	-52.45	-46.84	3.12	13.95	V
									V
Middle	5168	-56.52	-25	-31.52	-52.46	-67.45	1.97	12.90	H
	7752	-48.31	-25	-23.31	-49.54	-57.21	2.35	11.25	H
	10332	-48.03	-25	-23.03	-51.9	-56.53	2.57	11.07	H
	12924	-40.28	-25	-15.28	-47.12	-50.96	2.75	13.43	H
									H
									H
									H
	5168	-57.63	-25	-32.63	-52.14	-68.56	1.97	12.90	V
	7752	-49.89	-25	-24.89	-50.64	-58.79	2.35	11.25	V
	10332	-48.97	-25	-23.97	-51.51	-57.47	2.57	11.07	V
	12924	-45.14	-25	-20.14	-49.7	-55.82	2.75	13.43	V
									V
									V
									V

Highest	5340	-51.76	-25	-26.76	-46.68	-62.88	1.99	13.11	H
	8010	-47.45	-25	-22.45	-50.01	-56.13	2.52	11.20	H
	10683	-47.53	-25	-22.53	-50.48	-55.87	2.63	10.96	H
	13356	-33.66	-25	-8.66	-39.91	-43.94	2.84	13.12	H
									H
									H
									H
	5340	-52.70	-25	-27.70	-47.56	-63.82	1.99	13.11	V
	8010	-49.03	-25	-24.03	-51.42	-57.71	2.52	11.20	V
	10683	-48.15	-25	-23.15	-51.25	-56.49	2.63	10.96	V
	13356	-35.21	-25	-10.21	-40.57	-45.49	2.84	13.12	V
									V
									V
									V

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