



FCC RADIO TEST REPORT

FCC ID : QYLEM7511F
Equipment : WWAN module
Brand Name : Getac
Model Name : EM7511
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1, Nangang
Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.
Standard : FCC 47 CFR Part 2, and 90(S)

The product was received on Sep. 19, 2018 and testing was started from Sep. 28, 2018 and completed on Oct. 17, 2018. We, SPORTON INTERNATIONAL INC., 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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.

Approved by: Joseph Lin

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
FG391803-52C	01	Initial issue of report	Oct. 24, 2018



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)
3.2	§2.1046 §90.635	Conducted Output Power	Pass
3.3	§2.1053 §90.691	Field Strength of Spurious Radiation	Pass

Reviewed by: Wii Chang

Report Producer: Polly Tsai



1 General Description

1.1 Feature of Equipment Under Test

WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, GNSS, and Digitizer

Product Specification subjective to this standard	
Installed into Tablet	Brand Name: Getac Model Name: F110
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS/Glonass : PATCH Antenna Digitizer: Loop Antenna

1.2 Modification of EUT

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

1.3 Testing Site

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
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.
	03CH10-HY

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



1.4 Applied Standards

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

- ♦ FCC 47 CFR Part 2, 90
- ♦ ANSI / TIA-603-E
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ Interim Guidance for Equipment Authorization of Devices with Channel Bandwidths Combined Across Two Contiguous Service Rule Allocations OET/Lab/EACB, June 6, 2013

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.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

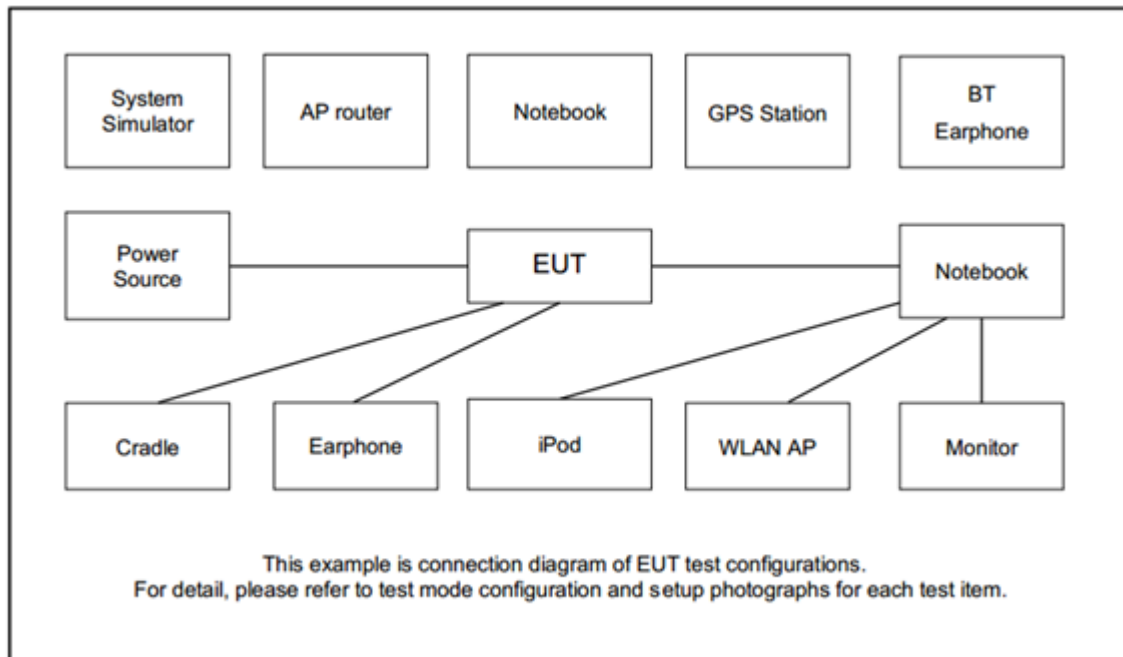
During all testing, EUT is in link mode with base station emulator at maximum power level.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

Conducted Test Cases	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	26	V	V	V	V	V	-	V	V	V	V	V	V	V	V	V
Radiated Spurious Emission	26	Worst Case												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. LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

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

2.4 Frequency List of Low/Middle/High Channels

LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26765	-	-
	Frequency	821.5	-	-
10	Channel	-	26740	-
	Frequency	-	819	-
5	Channel	26715	26740	26765
	Frequency	816.5	819	821.5
3	Channel	26705	26740	26775
	Frequency	815.5	819	822.5
1.4	Channel	26697	26740	26783
	Frequency	814.7	819	823.3

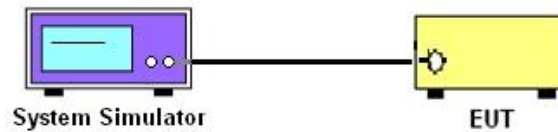
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power Measurement

3.2.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 Field Strength of Spurious Radiation Measurement

3.3.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

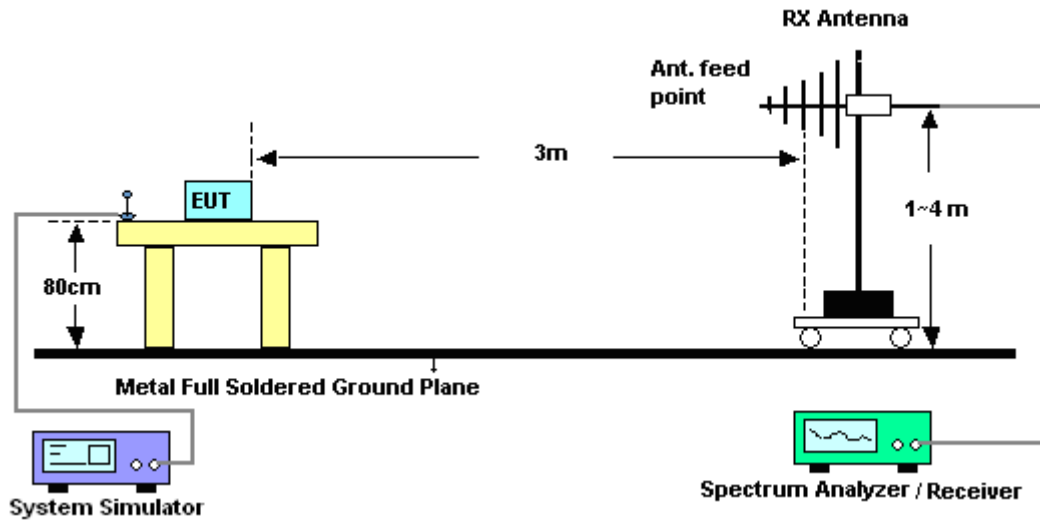
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log_{10}(P[\text{Watts}])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.3.2 Test Procedures

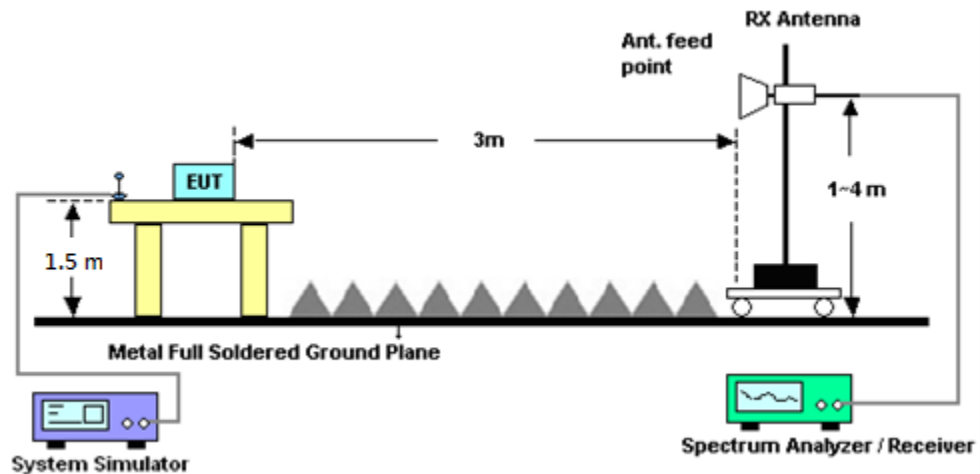
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
1. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
2. The table was rotated 360 degrees to determine the position of the highest spurious emission.
3. 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.
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
5. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
6. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
7. Taking the record of output power at antenna port.
8. Repeat step 7 to step 8 for another polarization.
9. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
10. $\text{ERP (dBm)} = \text{EIRP} - 2.15$
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
12. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)

3.3.3 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.3.4 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Radio Communication Analyzer	Anritsu	MT8821C	6201341950	-	Apr. 17, 2018	Sep. 28, 2018~ Oct. 12, 2018	Apr. 16, 2019	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Dec. 18, 2017	Oct. 09, 2018~ Oct. 17, 2018	Dec. 17, 2018	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Oct. 02, 2018	Oct. 09, 2018~ Oct. 17, 2018	Oct. 01, 2019	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Oct. 09, 2018~ Oct. 17, 2018	Nov. 26, 2018	Radiation (03CH10-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2017	Oct. 09, 2018~ Oct. 17, 2018	Oct. 18, 2018	Radiation (03CH10-HY)
Preamplifier	Keysight	83017A	MY53270078	1GHz~26.5GHz	Oct. 25, 2017	Oct. 09, 2018~ Oct. 17, 2018	Oct. 24, 2018	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 31, 2017	Oct. 09, 2018~ Oct. 17, 2018	Oct. 30, 2018	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Oct. 09, 2018~ Oct. 17, 2018	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Oct. 09, 2018~ Oct. 17, 2018	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Oct. 09, 2018~ Oct. 17, 2018	N/A	Radiation (03CH10-HY)
Filter	Wainwright	WHKX12-108 0-1200-1500-60SS	SN2	1.2G High Pass	Sep. 17, 2018	Oct. 09, 2018~ Oct. 17, 2018	Sep. 16, 2019	Radiation (03CH10-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000-60SS	SN3	2.7G High Pass	Sep. 17, 2018	Oct. 09, 2018~ Oct. 17, 2018	Sep. 16, 2019	Radiation (03CH10-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 22, 2018	Oct. 09, 2018~ Oct. 17, 2018	May 21, 2019	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 20, 2017	Oct. 09, 2018~ Oct. 17, 2018	Oct. 19, 2018	Radiation (03CH10-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.17
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.48
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.00
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.12	-	-
15	1	37		23.07	-	-
15	1	74		23.17	-	-
15	36	0		22.18	-	-
15	36	20		22.14	-	-
15	36	39		22.13	-	-
15	75	0		22.09	-	-
15	1	0	16-QAM	22.41	-	-
15	1	37		22.37	-	-
15	1	74		22.51	-	-
15	36	0		21.14	-	-
15	36	20		21.14	-	-
15	36	39		21.18	-	-
15	75	0		21.10	-	-
15	1	0	64-QAM	21.39	-	-
15	1	37		21.34	-	-
15	1	74		21.44	-	-
15	36	0		20.16	-	-
15	36	20		20.21	-	-
15	36	39		20.18	-	-
15	75	0		20.14	-	-
10	1	0	QPSK	-	23.11	-
10	1	25		-	23.13	-
10	1	49		-	23.11	-
10	25	0		-	22.23	-
10	25	12		-	22.22	-
10	25	25		-	22.18	-
10	50	0		-	22.18	-
10	1	0	16-QAM	-	22.38	-
10	1	25		-	22.44	-
10	1	49		-	22.40	-
10	25	0		-	21.21	-
10	25	12		-	21.20	-
10	25	25		-	21.18	-
10	50	0		-	21.21	-
10	1	0	64-QAM	-	21.30	-
10	1	25		-	21.32	-
10	1	49		-	21.28	-
10	25	0		-	20.22	-
10	25	12		-	20.23	-
10	25	25		-	20.16	-
10	50	0		-	20.21	-



LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.00	23.17	23.00
5	1	12		22.95	23.12	22.88
5	1	24		22.98	23.14	22.97
5	12	0		22.00	22.22	22.05
5	12	7		22.04	22.22	21.95
5	12	13		22.00	22.15	22.01
5	25	0		22.00	22.18	22.06
5	1	0	16-QAM	22.30	22.46	22.29
5	1	12		22.30	22.40	22.19
5	1	24		22.27	22.43	22.23
5	12	0		21.02	21.22	21.04
5	12	7		21.05	21.24	20.96
5	12	13		21.01	21.19	21.02
5	25	0		21.01	21.18	21.05
5	1	0	64-QAM	21.26	21.45	21.28
5	1	12		21.23	21.42	21.18
5	1	24		21.21	21.38	21.22
5	12	0		20.09	20.27	20.14
5	12	7		20.10	20.31	20.03
5	12	13		20.09	20.27	20.09
5	25	0		20.05	20.24	20.07
3	1	0	QPSK	23.10	23.16	22.99
3	1	8		23.09	23.10	23.05
3	1	14		23.07	23.12	23.05
3	8	0		22.13	22.14	22.01
3	8	4		22.15	22.17	22.15
3	8	7		22.11	22.14	22.13
3	15	0		22.12	22.15	22.09
3	1	0	16-QAM	22.39	22.40	22.27
3	1	8		22.38	22.43	22.33
3	1	14		22.42	22.37	22.33
3	8	0		21.18	21.24	21.08
3	8	4		21.19	21.23	21.22
3	8	7		21.16	21.22	21.18
3	15	0		21.13	21.21	21.17
3	1	0	64-QAM	21.28	21.35	21.19
3	1	8		21.29	21.33	21.25
3	1	14		21.33	21.33	21.26
3	8	0		20.16	20.22	20.08
3	8	4		20.19	20.25	20.18
3	8	7		20.17	20.17	20.13
3	15	0		20.16	20.19	20.13



LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.04	23.06	22.99
1.4	1	3		23.09	23.12	23.04
1.4	1	5		23.02	23.07	22.94
1.4	3	0		23.07	23.09	23.04
1.4	3	1		23.12	23.15	23.12
1.4	3	3		23.07	23.10	23.05
1.4	6	0		22.08	22.08	22.06
1.4	1	0	16-QAM	22.35	22.36	22.30
1.4	1	3		22.43	22.42	22.36
1.4	1	5		22.34	22.39	22.28
1.4	3	0		22.11	22.14	22.07
1.4	3	1		22.15	22.19	22.12
1.4	3	3		22.11	22.12	22.04
1.4	6	0		21.15	21.18	21.11
1.4	1	0	64-QAM	21.24	21.28	21.19
1.4	1	3		21.26	21.31	21.24
1.4	1	5		21.24	21.28	21.22
1.4	3	0		21.21	21.24	21.18
1.4	3	1		21.28	21.29	21.24
1.4	3	3		21.22	21.27	21.18
1.4	6	0		20.10	20.13	20.05



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 26

LTE Band 26 / 15MHz / 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	1656	-48.37	-13	-35.37	-56.94	-54.12	0.82	8.72	H
	2488	-40.63	-13	-27.63	-54.39	-48.21	1.05	10.78	H
	3316	-58.13	-13	-45.13	-73.71	-66.78	1.10	11.90	H
									H
									H
									H
									H
	1656	-50.56	-13	-37.56	-59.22	-56.31	0.82	8.72	V
	2488	-45.58	-13	-32.58	-59.26	-53.16	1.05	10.78	V
	3316	-57.43	-13	-44.43	-73.61	-66.08	1.10	11.90	V
									V
									V
									V
									V
									V

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