



FCC RF Test Report

APPLICANT : Emerson Digital Cold Chain, Inc
EQUIPMENT : GO Tracker 1.7
BRAND NAME : Emerson
MODEL NAME : GO Tracker 1.7
FCC ID : AMH101014
STANDARD : 47 CFR Part 2, and 90(S)
CLASSIFICATION : PCS Licensed Transmitter (PCB)
TEST DATE(S) : Aug. 10, 2021

We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

This product installed a RF module (Brand Name: Quectel, Model Name: BG95-M5, FCC ID: XMR202005BG95M5) during the test, only Conducted Power and RSE test items are tested in this report, all the other test results are referenced from the module RF report.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW172307	Rev. 01	Initial issue of report	Sep. 08, 2021

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting only	PASS	-
-	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	PASS	1
-	§2.1051 §90.691	Emission masks – In-band emissions	$< 50+10\log_{10}(P[\text{Watts}])$	PASS	1
-	§2.1051 §90.691	Emission masks – Out of band emissions	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	1
3.2	§2.1053 §90.691	Field Strength of Spurious Radiation	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 24.28 dB at 2444.250 MHz
-	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	$< 2.5 \text{ ppm}$	PASS	1

Remark 1:

All test results were leveraged from module RF report which can refer to Report No. R2005A0283-R3V1

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.



1 General Description

1.1 Applicant

Emerson Digital Cold Chain, Inc

7121 Fairway Drive Suite 400 Palm Beach Gardens Florida 33418 United States

1.2 Manufacturer

Queclink Wireless Solutions Co., Ltd.

No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	GO Tracker 1.7
Brand Name	Emerson
Model Name	GO Tracker 1.7
FCC ID	AMH101014
IMEI Code	Radiation: 866833040168840
HW Version	V1.03
SW Version	R00A02V10
EUT Stage	Production Unit

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

Product Specification subjective to this standard	
Tx Frequency	814 ~ 824 MHz
Rx Frequency	859 ~ 869 MHz
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz
Maximum Output Power to Antenna	21.28 dBm
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Maximum Conducted Power and Emission Designator

LTE Band 26		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Maximum Conducted power (W)
1.4	814.7 ~ 823.3	0.1279	0.1318
3	815.5 ~ 822.5	0.1279	0.1312
5	816.5 ~ 821.5	0.1197	0.1245
10	819.0	0.1199	0.1330
15	821.5	0.1208	0.1343

1.7 Testing Site

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a



1.9 Applied Standards

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

- ♦ 47 CFR Part 2, 90(S)
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

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

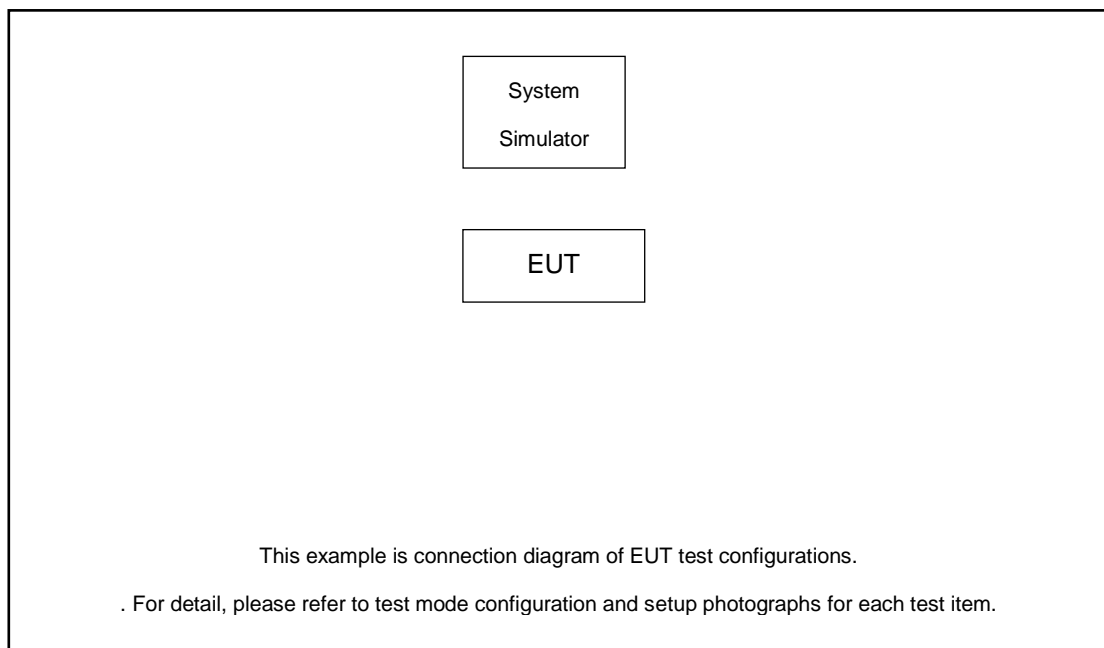
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

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

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM		1	Half	Full	L	M	H
Max. Output Power	26	v	v	v	v	v	-	v	v		v	-	v	v	v	v
Radiated Spurious Emission	26	Worst mode													v	
Note	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	MT8820C	N/A	N/A	Unshielded, 1.8 m

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 Test Result

3.1 Conducted Output Power Measurement

3.1.1 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.

3.1.2 Test Result of Conducted Output Power

Please refer to Appendix A.

3.2 Field Strength of Spurious Radiation Measurement

3.2.1 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.

3.2.2 Measuring Instruments

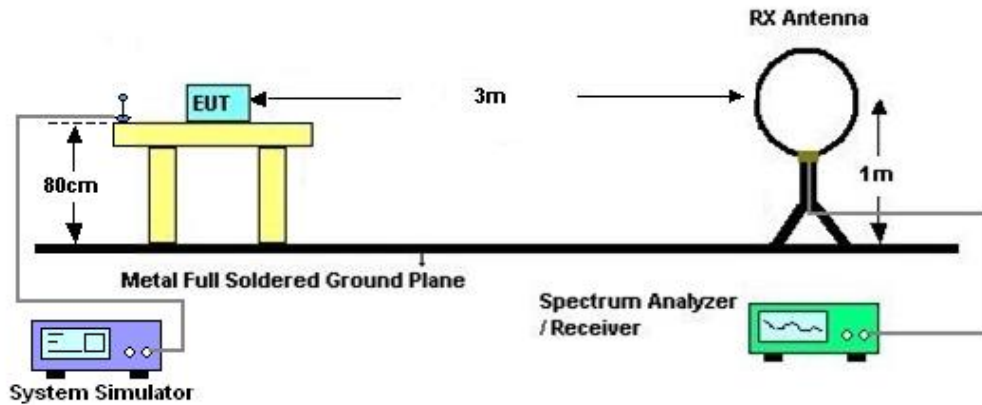
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

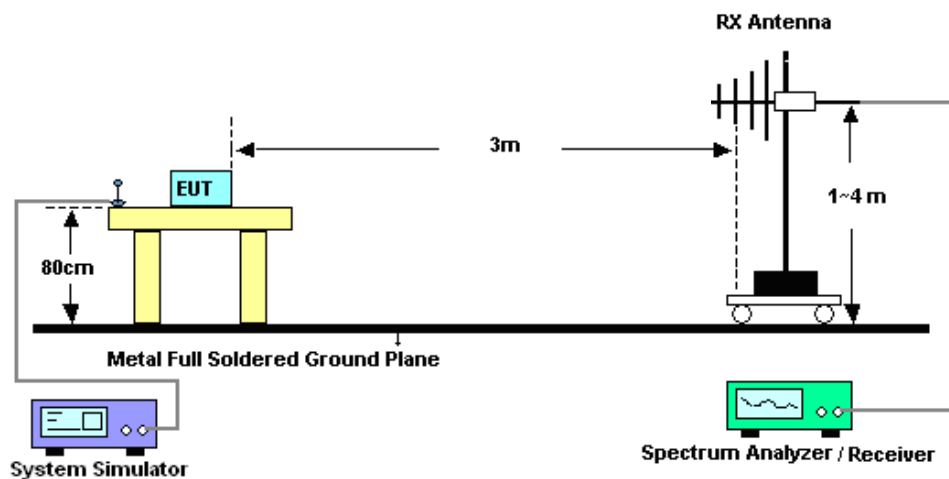
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position 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, Sweep = 500ms, 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. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
11. $\text{ERP (dBm)} = \text{EIRP} - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)

3.2.4 Test Setup

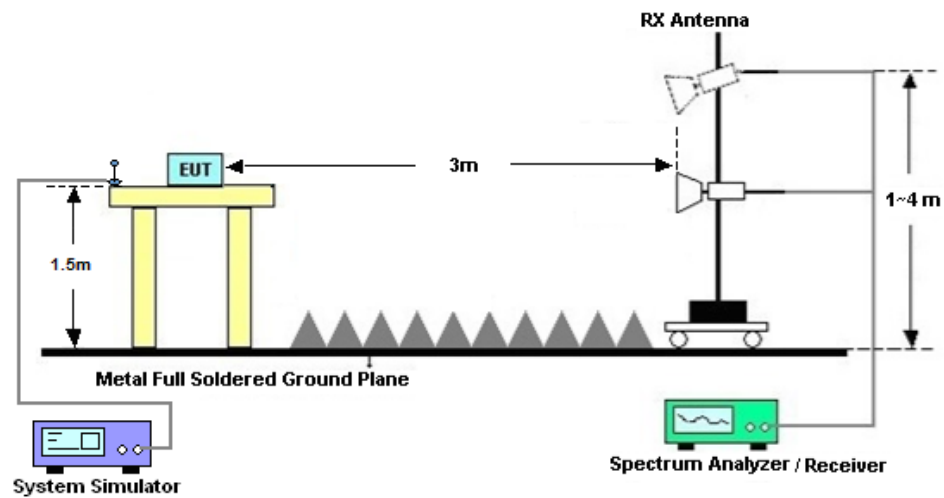
For radiated test from 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.2.5 Test Result of Field Strength of Spurious Radiated

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.

Please refer to Appendix B.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 14, 2021	Aug. 10, 2021	Jul. 13, 2022	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2021	Aug. 10, 2021	Jun. 21, 2022	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	Jul. 14, 2021	Aug. 10, 2021	Jul. 13, 2022	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 21, 2021	Aug. 10, 2021	Apr. 20, 2022	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Apr. 11, 2021	Aug. 10, 2021	Apr. 10, 2022	Radiation (03CH02-SZ)
LF Amplifier	Bur35407geon	BPA-530	102211	0.01~3000Mhz	Jul. 13, 2021	Aug. 10, 2021	Jul. 12, 2022	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 16, 2020	Aug. 10, 2021	Oct. 15, 2021	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 13, 2021	Aug. 10, 2021	Jul. 12, 2022	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Aug. 10, 2021	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Aug. 10, 2021	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Aug. 10, 2021	NCR	Radiation (03CH02-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.47dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.31dB
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----- THE END -----



Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power)

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				26765		
Frequency (MHz)				821.5		
15	QPSK	1	0	20.81		
15	QPSK	1	5	20.74		
15	QPSK	6	0	20.82		
15	16QAM	1	0	21.28		
15	16QAM	1	5	20.89		
15	16QAM	6	0	20.79		
Channel					26740	
Frequency (MHz)					819	
10	QPSK	1	0		20.79	
10	QPSK	1	5		20.69	
10	QPSK	6	0		20.52	
10	16QAM	1	0		21.24	
10	16QAM	1	5		21.00	
10	16QAM	6	0		20.81	
Channel				26715	26740	26765
Frequency (MHz)				816.5	819	821.5
5	QPSK	1	0	20.57	20.72	20.78
5	QPSK	1	5	20.62	20.75	20.71
5	QPSK	6	0	20.53	20.64	20.73
5	16QAM	1	0	20.95	20.69	20.74
5	16QAM	1	5	20.70	20.61	20.73
5	16QAM	6	0	20.67	20.58	20.77
Channel				26705	26740	26775
Frequency (MHz)				815.5	819	822.5
3	QPSK	1	0	20.80	20.75	21.07
3	QPSK	1	5	20.65	21.06	20.83



3	QPSK	6	0	20.56	21.00	20.65
3	16QAM	1	0	21.18	21.07	20.99
3	16QAM	1	5	20.93	20.51	20.53
3	16QAM	6	0	20.90	20.93	20.96
Channel				26697	26740	26783
Frequency (MHz)				814.7	819	823.3
1.4	QPSK	1	0	21.07	20.76	20.85
1.4	QPSK	1	5	20.92	20.87	20.67
1.4	QPSK	6	0	20.53	20.55	20.56
1.4	16QAM	1	0	21.05	20.75	21.07
1.4	16QAM	1	5	21.20	21.06	20.83
1.4	16QAM	6	0	21.17	21.00	20.65

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 26 / 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)
Middle	1633.5	-59.08	-13	-46.08	-67.69	-62.31	3.98	9.36	H
	2450.25	-51.85	-13	-38.85	-64.84	-55.40	4.85	10.55	H
	3267	-54.94	-13	-41.94	-70.15	-59.87	5.50	12.58	H
	1633.5	-54.11	-13	-41.11	-62.62	-57.34	3.98	9.36	V
	2450.25	-48.35	-13	-35.35	-61.32	-51.90	4.85	10.55	V
	3267	-58.71	-13	-45.71	-73.78	-63.64	5.50	12.58	V

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

LTE Band 26 / 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	1629	-52.55	-13	-39.55	-61.16	-55.78	3.98	9.36	H
	2443.5	-48.56	-13	-35.56	-61.55	-52.11	4.85	10.55	H
	3258	-57.21	-13	-44.21	-72.42	-62.14	5.50	12.58	H
	1629	-52.39	-13	-39.39	-60.90	-55.62	3.98	9.36	V
	2443.5	-46.97	-13	-33.97	-59.94	-50.52	4.85	10.55	V
	3258	-56.37	-13	-43.37	-71.44	-61.30	5.50	12.58	V

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

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	1629.50	-56.92	-13	-43.92	-65.53	-58.10	8.25	11.58	H
	2444.25	-37.28	-13	-24.28	-50.27	-36.68	10.45	12.00	H
	3259.00	-59.15	-13	-46.15	-74.36	-58.71	11.74	13.45	H
	1629.50	-57.89	-13	-44.89	-66.24	-59.07	8.25	11.58	V
	2444.25	-37.93	-13	-24.93	-50.97	-37.33	10.45	12.00	V
	3259.00	-59.36	-13	-46.36	-74.81	-58.92	11.74	13.45	V

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