

FCC Test Report

Product Name	Mobile Data Terminal
Model No.	MT7030
FCC ID	2ABTU-MT7030

Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St., Neihu Dist., Taipei City, Taiwan

Date of Receipt	Mar. 31, 2020
Issued Date	Jul. 02, 2020
Report No.	2030836R-RFUSP17V01
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

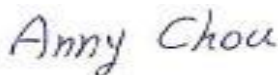
Issued Date: Jul. 02, 2020

Report No.: 2030836R-RFUSP17V01



Product Name	Mobile Data Terminal
Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St., Neihu Dist., Taipei City, Taiwan
Manufacturer	RuggON Corporation
Model No.	MT7030
FCC ID.	2ABTU-MT7030
EUT Rated Voltage	DC 9~36V
EUT Test Voltage	DC 24V
Trade Name	RuggON
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2018 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Senior Adm. Specialist / Anny Chou)

Tested By :



(Assistant Engineer / Trista Huang)

Approved By :



(Director / Vincent Lin)

Revision History

Report No.	Version	Description	Issued Date
2030836R-RFUSP17V01	V1.0	Initial issue of report.	2020-07-02

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Mobile Data Terminal
Trade Name	RuggON
Model No.	MT7030
FCC ID	2ABTU-MT7030
Contain FCC ID	2ABTU-MS01PRO
Frequency Range	13.56MHz
Modulation	ASK
USB Cable	Shielded, 2m

Frequency of Each Channel:

Channel	Frequency
Channel 1:	13.56 MHz

Note:

1. This device is an Mobile Data Terminal with a built-in 13.56MHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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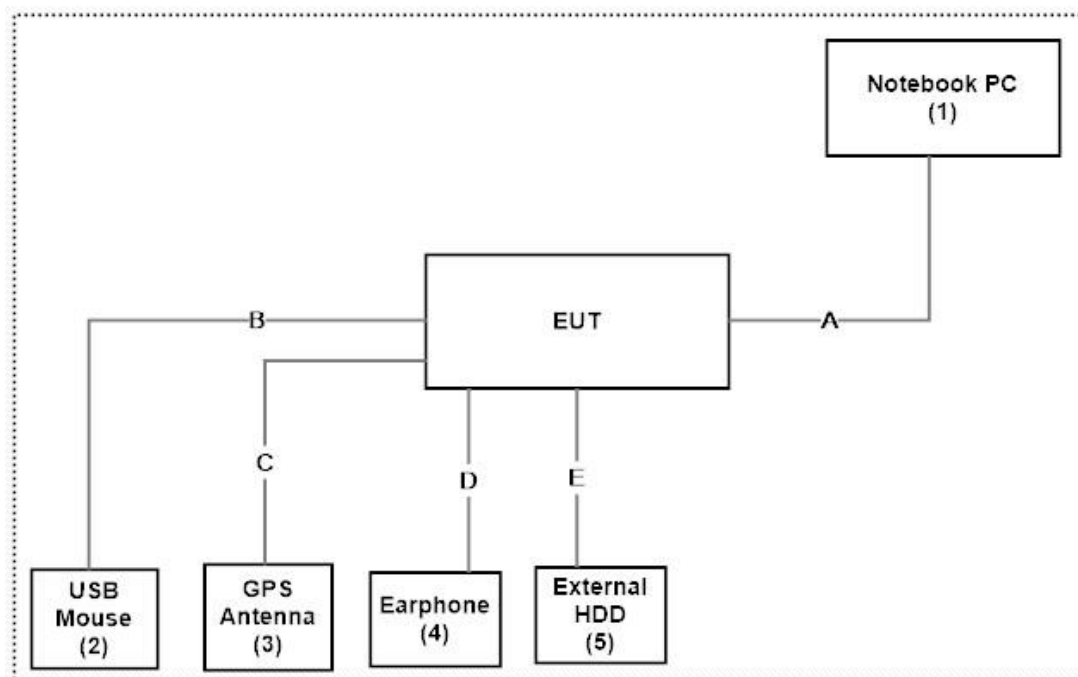
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Notebook PC	DELL	Latitude 5580	2HRD7H2	Non-shielded, 1.8m
(2)	USB Mouse	Dell	MS111-L	CN-09RRC7-44751-06T-0G73	N/A
(3)	GPS Antenna	N/A	SG-76G	N/A	N/A
(4)	Earphone	RONEVER	MOE241	N/A	N/A
(5)	External HDD	Transcend	TS1TSJ25H3B	F21786-0019	N/A

Signal Cable Type	Signal cable Description
A	Signal Cable
B	Signal Cable
C	Mouse Cable
D	Earphone Cable
E	USB Cable

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute "Turn on NFC" on the EUT.
- (3) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	23.2 °C
	Humidity (%RH)	10~90 %	61.5 %
Conductive	Temperature (°C)	10~40 °C	23.6 °C
	Humidity (%RH)	10~90 %	72.3 %

USA : FCC Registration Number: TW3023

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2020/04/06	2021/04/05
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/27	2020/11/26
	LISN	R&S	ENV216	101105	2020/04/27	2021/04/26
	LISN	R&S	ESH3-Z5	836679/014	2020/04/26	2021/04/25
	Coaxial Cable	DEKRA	RG 400	LC018-RG	2020/06/20	2021/06/19

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test SystemV9.0.5.

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Test Receiver	R&S	ESR7	101602	2019/12/16	2020/12/15
X	Signal Analyzer	R&S	FSV40	101869	2019/07/04	2020/07/03
X	Loop Antenna	Teseq	HLA6121	37133	2020/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
	Horn Antenna	ETS-LINDGREN	3117	00228113	2020/05/28	2021/05/27
	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
	Amplifier	EMCI	EMC051845SE	980632	2019/08/08	2020/08/07
	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
	Amplifier + Cable	EMCI	EMC184045SE	980369	2020/04/23	2021/04/22
	Bilog Antenna	Schaffner Chase	CBL6112B	2925	2020/02/20	2021/02/19
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2020/03/17	2021/03/16
	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

Note:

1. Loop Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Test SystemV1.1.

2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

± 2.26 dB

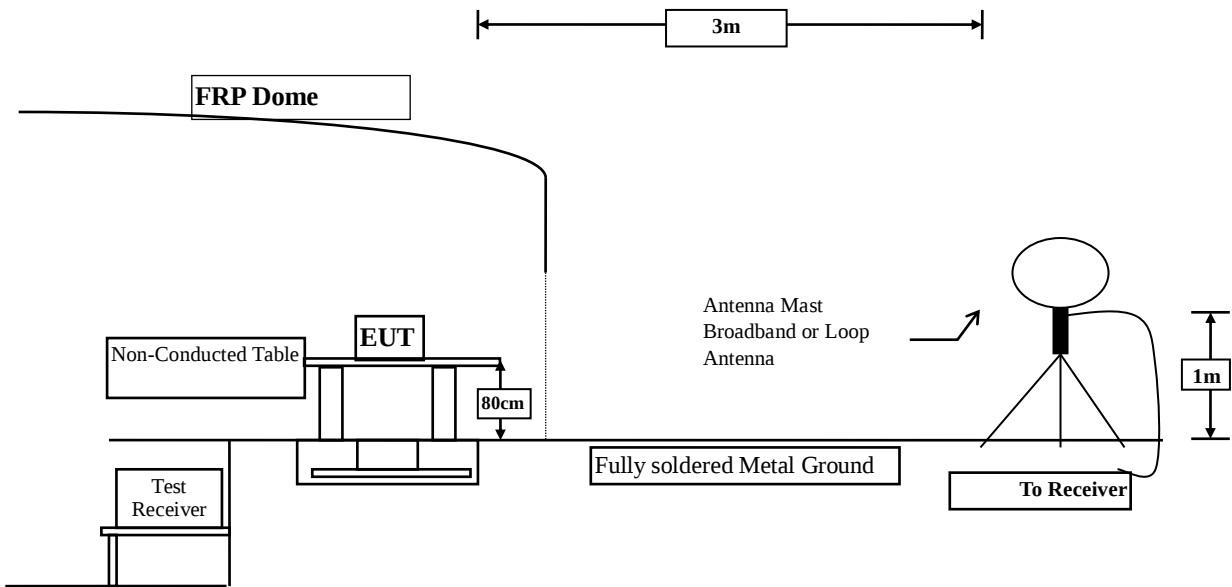
2.5. Test Result of Conducted Emission

Owing to the EUT use DC supply voltage, this test item is not performed.

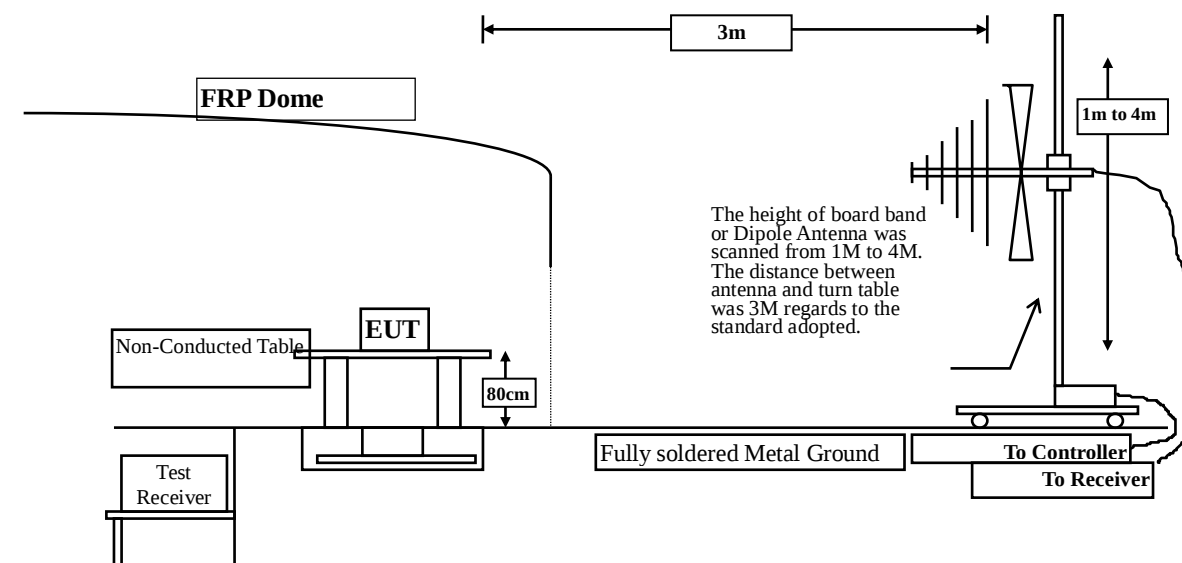
3. Radiated Emission

3.1. Test Setup

9kHz~30MHz



30MHz~1GHz



3.2. Limits

➤ Fundamental electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Fundamental Frequency MHz	Field strength of fundamental			
	uV/m	Distance (meter)	dBuV/m	Distance (meter)
13.553 – 13.567	15848	30	124	3
13.410 – 13.553 and 13.567 – 13.710	334	30	90.47	3
13.110 – 13.410 and 13.710 – 14.010	106	30	80.50	3
Outside of the 13.110 – 14.010	See 15.209 Limits			

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

Fundamental electric field strength:

The EUT and its simulators are placed on a turn table which is 1 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum electric field strength.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna which is 1 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

Spurious electric field strength:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C6310: 2013 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as

measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

The frequency range from 9kHz to 10th harmonics is checked.

3.4. Uncertainty

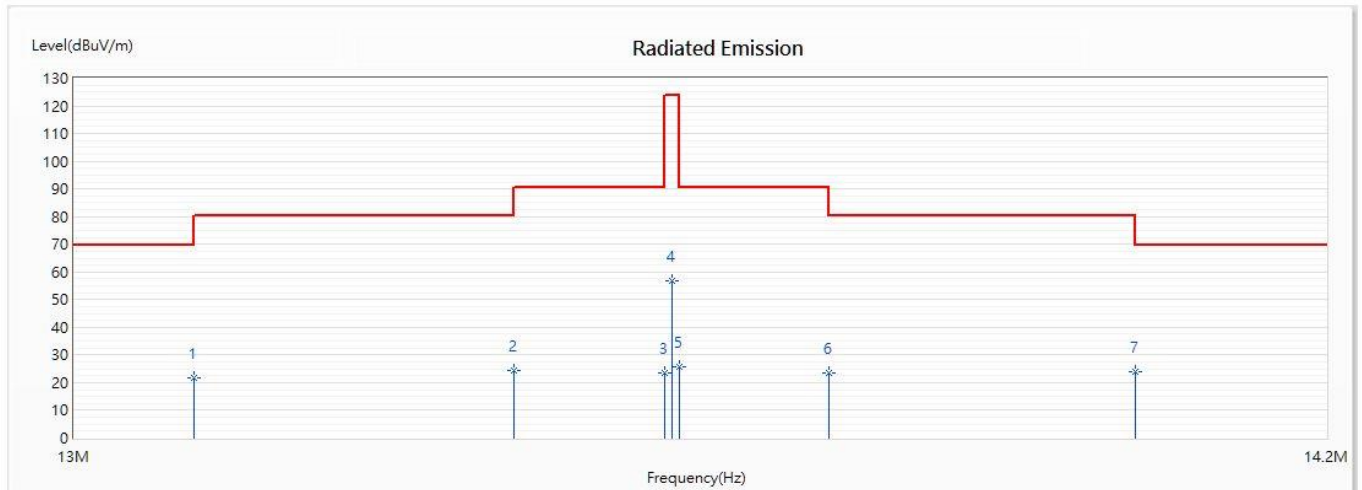
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

3.5. Test Result of Radiated Emission

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

HORIZONTAL - X



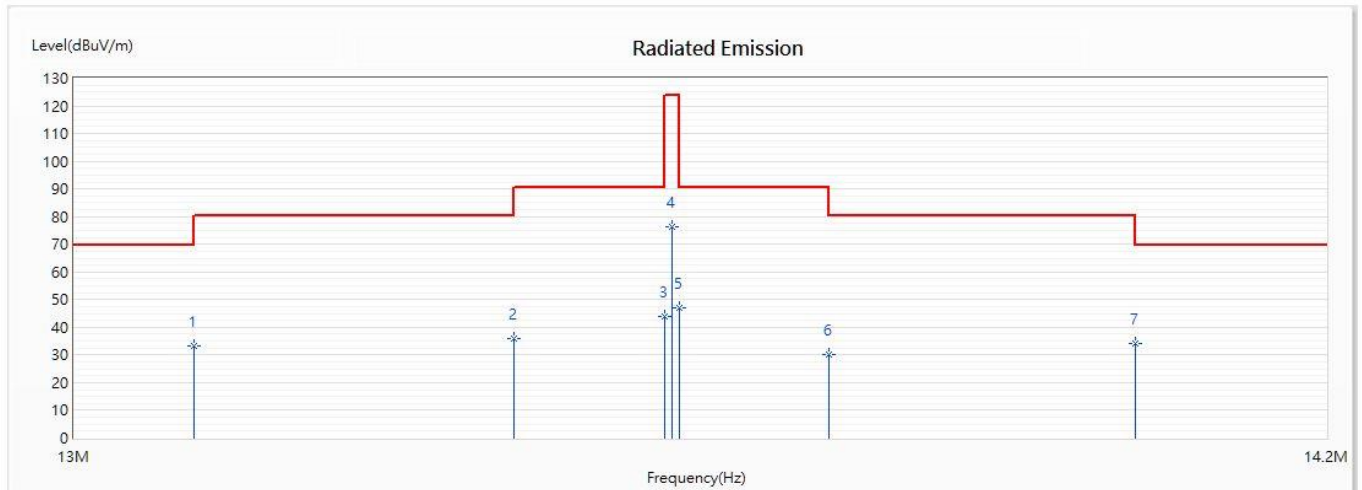
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	21.93	69.50	-47.57	0.24	21.69	QP
2	13.41	24.22	80.50	-56.28	2.52	21.70	QP
3	13.553	23.69	90.47	-66.78	1.98	21.71	QP
4	13.56	56.99	124.00	-67.01	35.28	21.71	QP
5	13.567	25.71	90.47	-64.76	4.00	21.71	QP
6	13.71	23.47	80.50	-57.03	1.76	21.71	QP
* 7	14.01	23.86	69.50	-45.64	2.14	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL - X

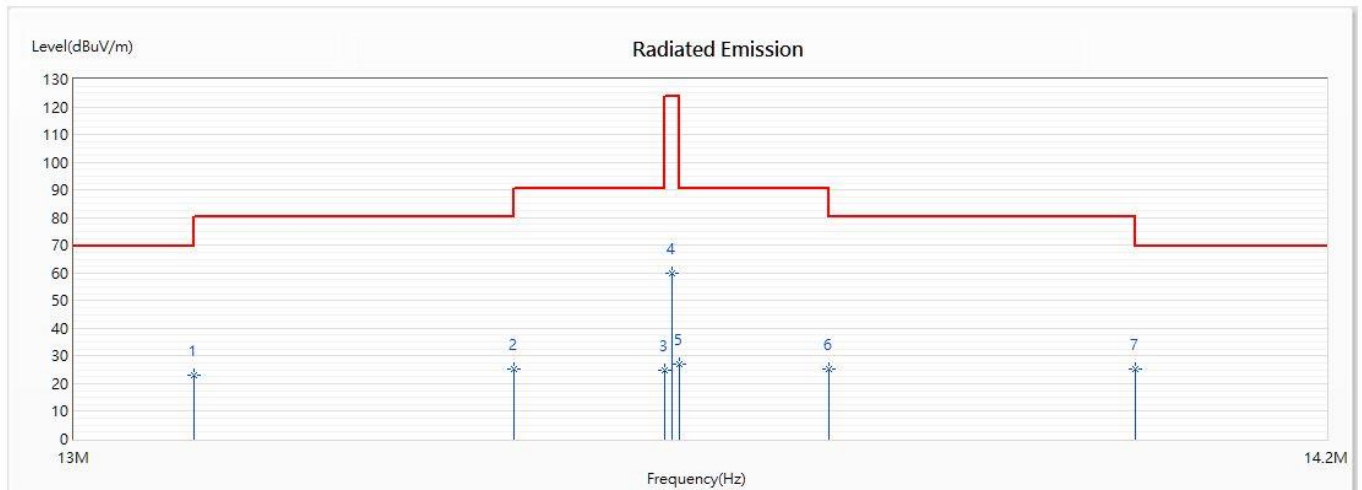


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	33.45	69.50	-36.05	11.76	21.69	QP
2	13.41	35.86	80.50	-44.64	14.16	21.70	QP
3	13.553	43.85	90.47	-46.62	22.14	21.71	QP
4	13.56	76.47	124.00	-47.53	54.76	21.71	QP
5	13.567	47.05	90.47	-43.42	25.34	21.71	QP
6	13.71	30.37	80.50	-50.13	8.66	21.71	QP
* 7	14.01	34.21	69.50	-35.29	12.49	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

HORIZONTAL - Y

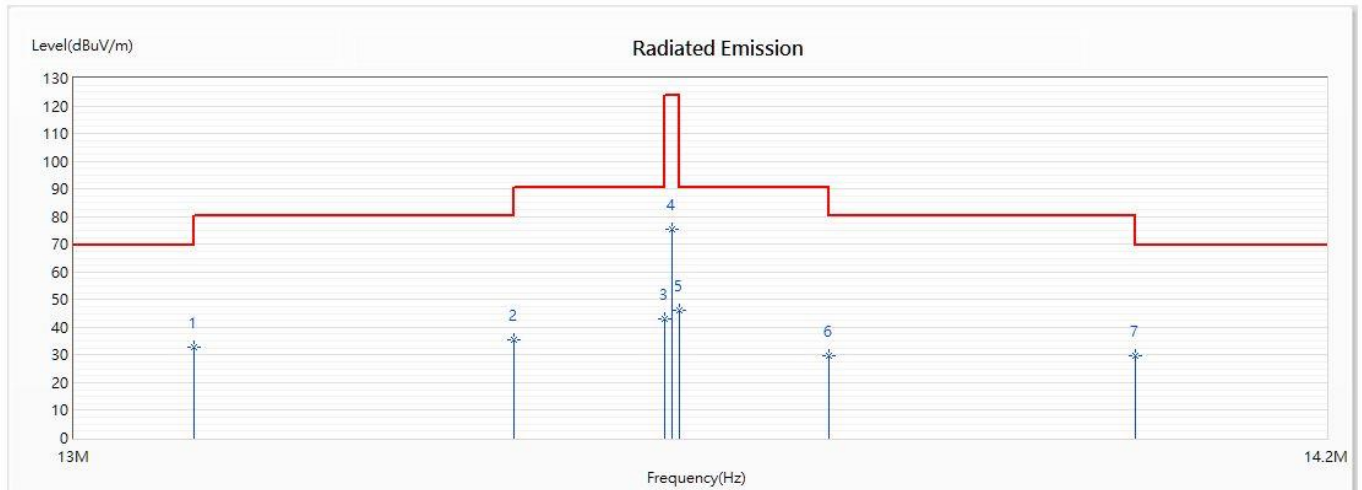
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	23.03	69.50	-46.47	1.34	21.69	QP
2	13.41	25.17	80.50	-55.33	3.47	21.70	QP
3	13.553	24.85	90.47	-65.62	3.14	21.71	QP
4	13.56	60.02	124.00	-63.98	38.31	21.71	QP
5	13.567	26.95	90.47	-63.52	5.24	21.71	QP
6	13.71	25.11	80.50	-55.39	3.40	21.71	QP
* 7	14.01	25.15	69.50	-44.35	3.43	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL - Y



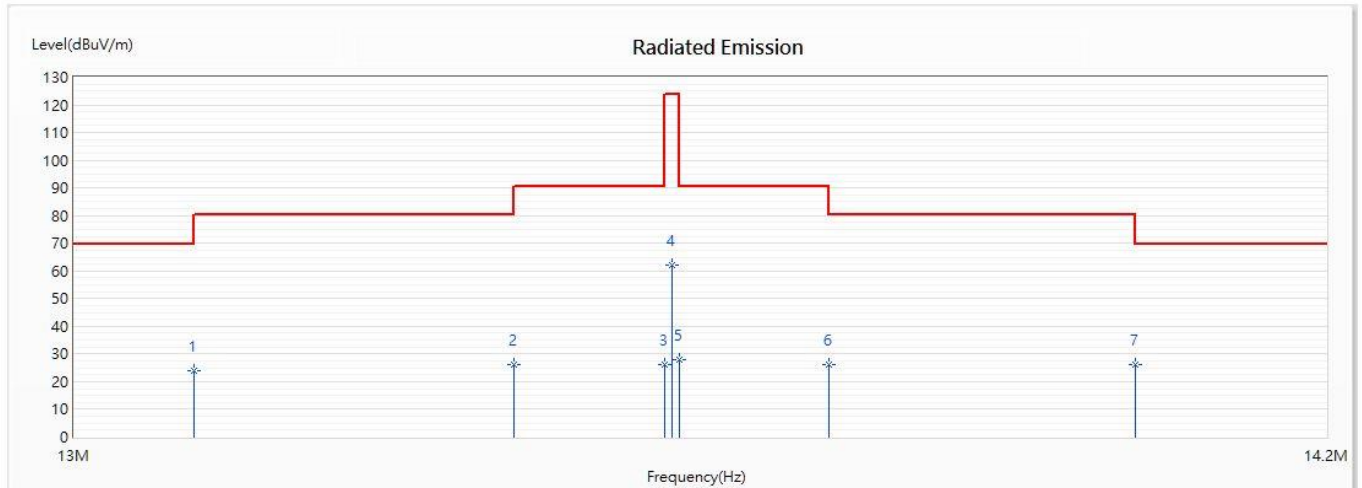
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	13.11	33.01	69.50	-36.49	11.32	21.69	QP
2	13.41	35.28	80.50	-45.22	13.58	21.70	QP
3	13.553	43.17	90.47	-47.30	21.46	21.71	QP
4	13.56	75.52	124.00	-48.48	53.81	21.71	QP
5	13.567	46.22	90.47	-44.25	24.51	21.71	QP
6	13.71	29.88	80.50	-50.62	8.17	21.71	QP
7	14.01	29.78	69.50	-39.72	8.06	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

HORIZONTAL - Z



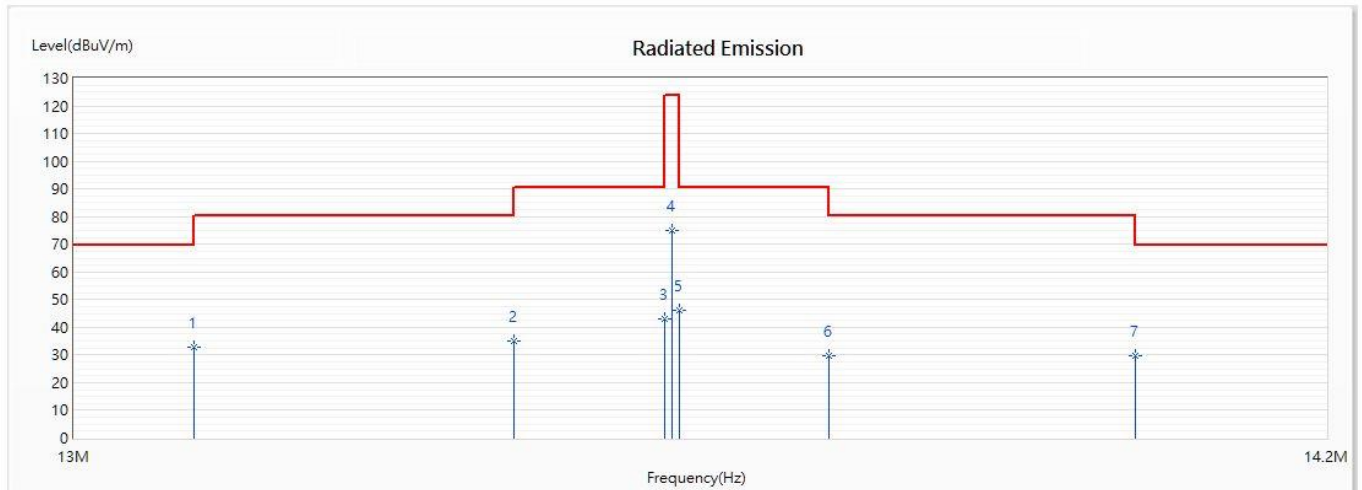
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	23.75	69.50	-45.75	2.06	21.69	QP
2	13.41	26.26	80.50	-54.24	4.56	21.70	QP
3	13.553	26.15	90.47	-64.32	4.44	21.71	QP
4	13.56	62.02	124.00	-61.98	40.31	21.71	QP
5	13.567	27.78	90.47	-62.69	6.07	21.71	QP
6	13.71	26.12	80.50	-54.38	4.41	21.71	QP
* 7	14.01	26.21	69.50	-43.29	4.49	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL - Z



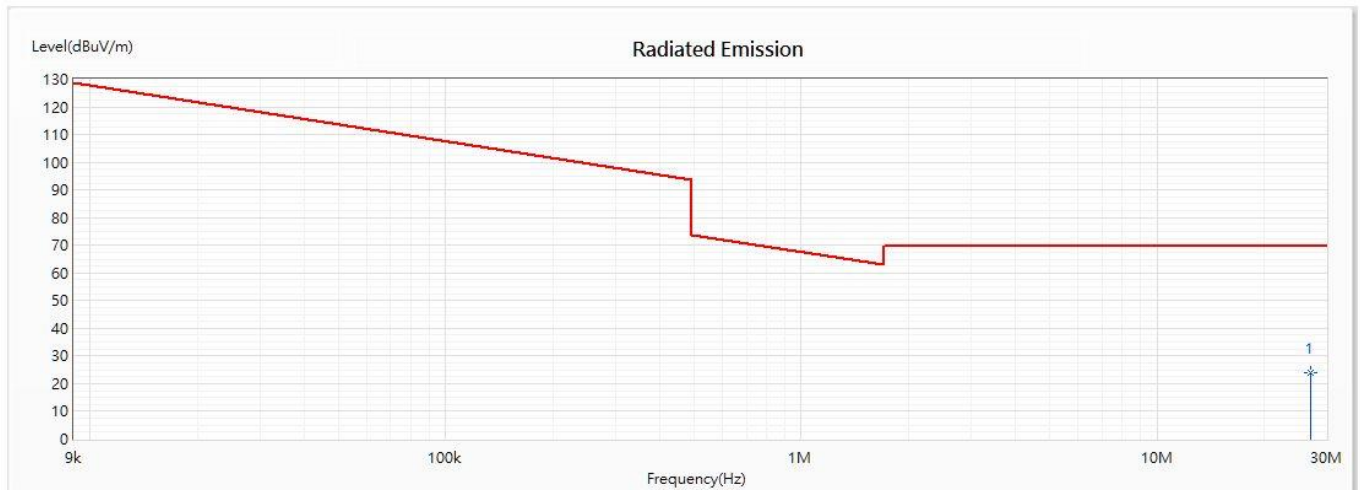
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	13.11	32.95	69.50	-36.55	11.26	21.69	QP
2	13.41	35.18	80.50	-45.32	13.48	21.70	QP
3	13.553	42.98	90.47	-47.49	21.27	21.71	QP
4	13.56	75.06	124.00	-48.94	53.35	21.71	QP
5	13.567	45.95	90.47	-44.52	24.24	21.71	QP
6	13.71	29.67	80.50	-50.83	7.96	21.71	QP
7	14.01	29.65	69.50	-39.85	7.93	21.72	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : General Radiated Emission Data (below 30MHz)
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

Horizontal



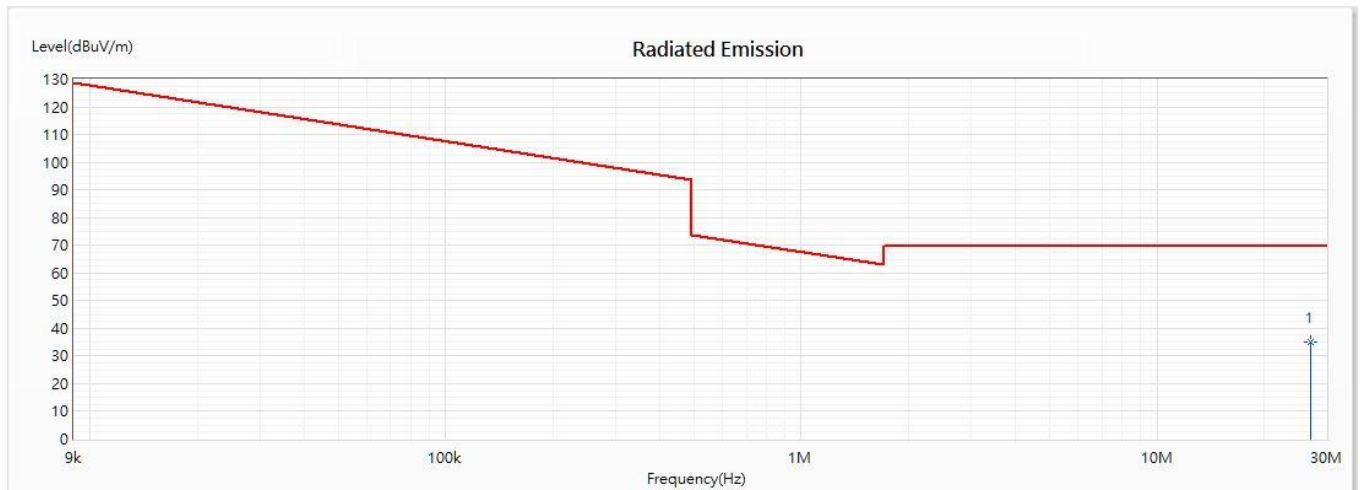
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	27.12	23.75	69.54	-45.79	1.85	21.90	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : General Radiated Emission Data (below 30MHz)
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL



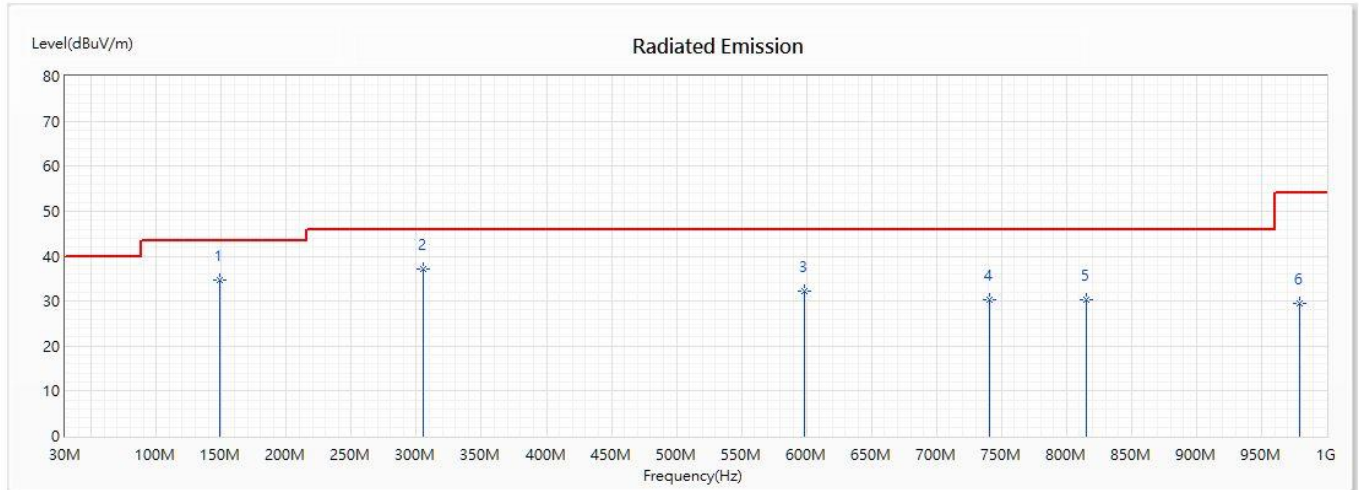
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	27.12	35.27	69.54	-34.27	13.37	21.90	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : General Radiated Emission Data (above 30MHz)
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

Horizontal



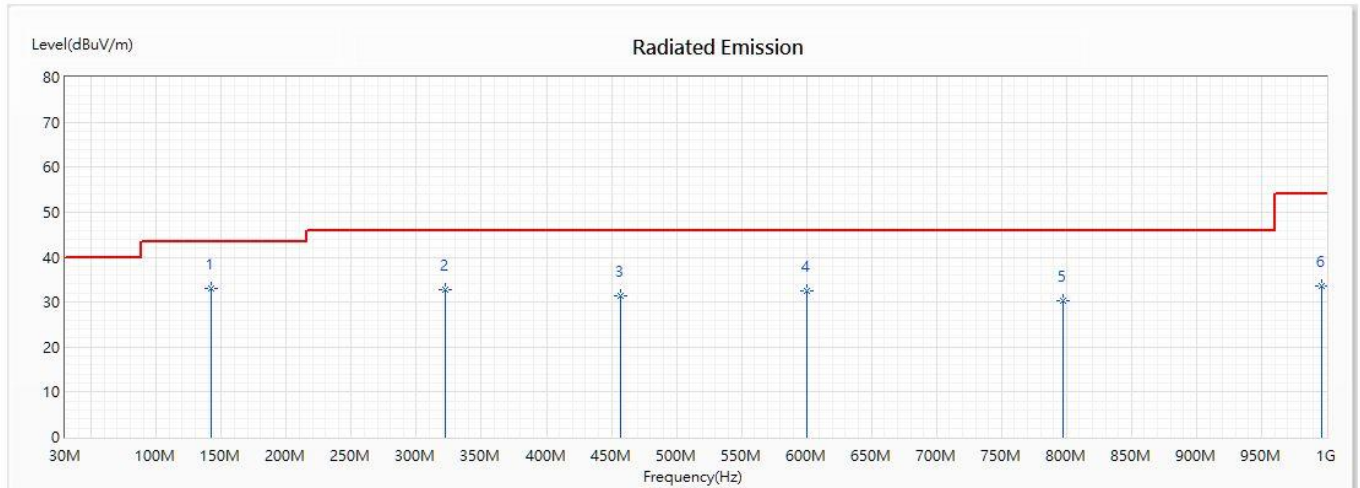
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	148.34	34.72	43.50	-8.78	47.45	-12.73	QP
2	305.48	37.03	46.00	-8.97	45.10	-8.07	QP
3	598.42	32.31	46.00	-13.69	32.53	-0.22	QP
4	741.01	30.32	46.00	-15.68	29.75	0.57	QP
5	815.7	30.28	46.00	-15.72	33.10	-2.82	QP
6	979.63	29.54	54.00	-24.46	31.13	-1.59	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Product : Mobile Data Terminal
 Test Item : General Radiated Emission Data (above 30MHz)
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL



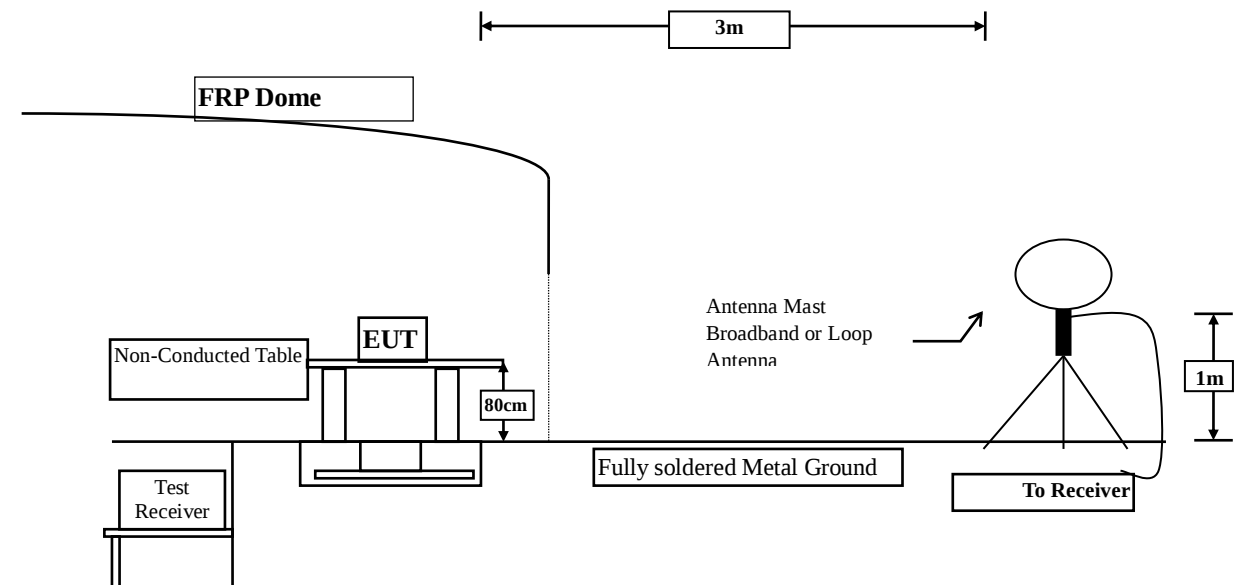
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	142.52	33.13	43.50	-10.37	44.49	-11.36	QP
2	321.97	32.73	46.00	-13.27	40.47	-7.74	QP
3	456.8	31.47	46.00	-14.53	35.50	-4.03	QP
4	600.36	32.57	46.00	-13.43	32.75	-0.18	QP
5	797.27	30.39	46.00	-15.61	33.04	-2.65	QP
6	996.12	33.72	54.00	-20.28	35.51	-1.79	QP

Remark:

1. "*" means this data is the worst emission level;
2. Emission Level=Reading Level + Correct Factor
(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

4. Band Edge

4.1. Test Setup



4.2. Limits

In any 9 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 9 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

4.4. Uncertainty

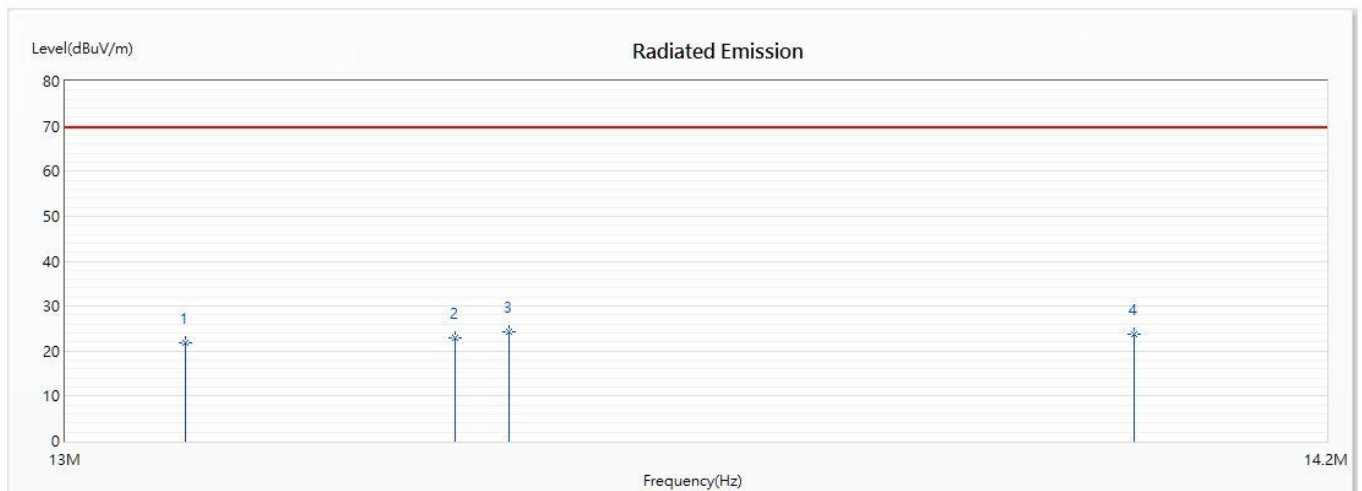
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Band Edge

Product : Mobile Data Terminal
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

HORIZONTAL



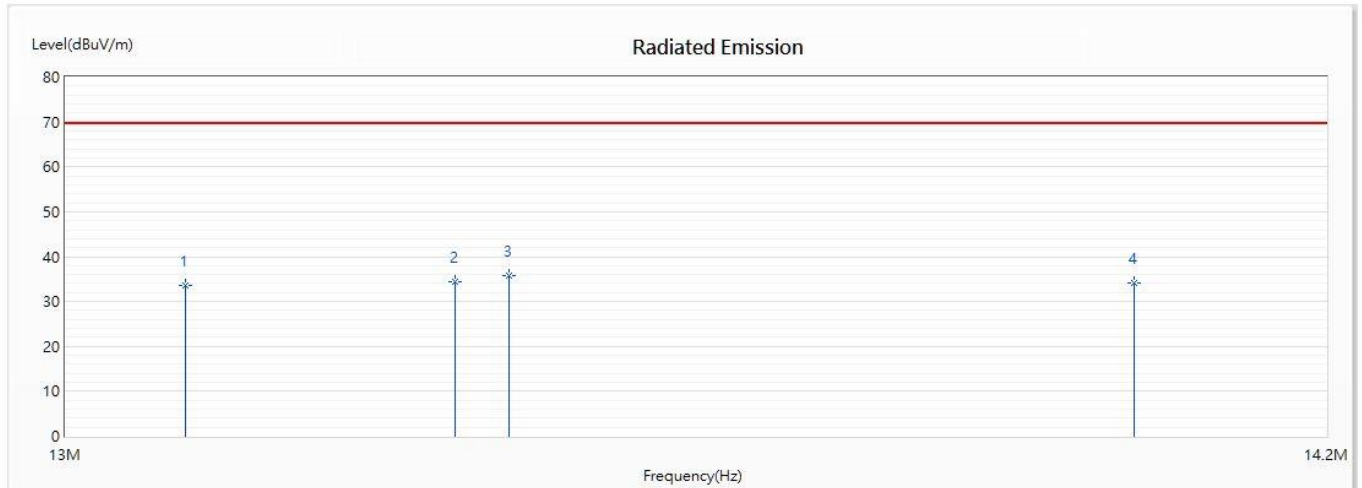
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	21.93	69.54	-47.61	0.24	21.69	QP
2	13.36	22.89	69.54	-46.65	1.19	21.70	QP
* 3	13.41	24.22	69.54	-45.32	2.52	21.70	QP
4	14.01	23.86	69.54	-45.68	2.14	21.72	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Mobile Data Terminal
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test date : 2020/05/29
 Test Mode : Mode 1: Transmit

VERTICAL



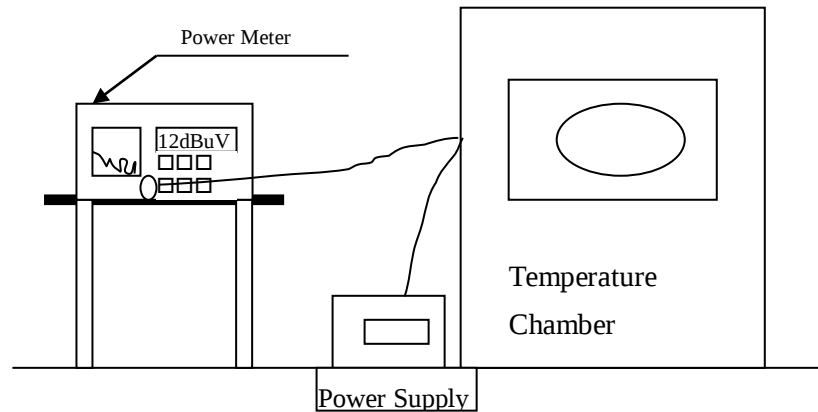
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	33.45	69.54	-36.09	11.76	21.69	QP
2	13.36	34.36	69.54	-35.18	12.66	21.70	QP
* 3	13.41	35.86	69.54	-33.68	14.16	21.70	QP
4	14.01	34.21	69.54	-35.33	12.49	21.72	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

5. Frequency Tolerance

5.1. Test Setup



5.2. Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

5.3. Test Procedure

The over operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.4. Uncertainty

± 283 Hz

5.5. Test Result of Frequency Stability

Product : Mobile Data Terminal
 Test Item : Frequency Tolerance
 Test Site : Temperature Chamber
 Test date : 2020/05/06
 Test Mode : Mode 1: Transmit

Temperature (°C)	Voltage (V)	Observe Time	Declared Frequency (MHz)	Read Frequency (MHz)	Tolerance (%)	Limit (%)
20	24	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.56000	0.000000	
		10mins	13.56	13.56020	0.001475	
20	27.6	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.56000	0.000000	
		10mins	13.56	13.56010	0.000737	
20	20.4	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.56010	0.000737	
		10mins	13.56	13.56100	0.007375	
50	24	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.55900	-0.007375	
		5mins	13.56	13.55905	-0.007006	
		10mins	13.56	13.55910	-0.006637	
40	24	start	13.56	13.55900	-0.007375	± 0.01 %
		2mins	13.56	13.55900	-0.007375	
		5mins	13.56	13.55905	-0.007006	
		10mins	13.56	13.55905	-0.007006	
30	24	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.56010	0.000737	
		10mins	13.56	13.56020	0.001475	

10	24	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.55900	-0.007375	
		10mins	13.56	13.56050	0.003687	
0	24	start	13.56	13.55900	-0.007375	± 0.01 %
		2mins	13.56	13.55900	-0.007375	
		5mins	13.56	13.55950	-0.003687	
		10mins	13.56	13.56020	0.001475	
-10	24	start	13.56	13.56050	0.003687	± 0.01 %
		2mins	13.56	13.56050	0.003687	
		5mins	13.56	13.56100	0.007375	
		10mins	13.56	13.56100	0.007375	
-20	24	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.55900	-0.007375	
		5mins	13.56	13.56100	0.007375	
		10mins	13.56	13.56100	0.007375	

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.