

Vpatch Cardio Pty Ltd.

TEST REPORT

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Radio Spectrum TEST REPORT

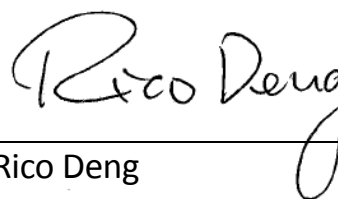
Applicant:	Vpatch Cardio Pty Ltd. Level 1, 1221 Toorak Road, Camberwell, Victoria, 3124, Australia.
Product:	WWAN Module
Model No.:	1003
Brand Name:	Vpatch
FCC ID:	2ARNZ-1003
Test Method/ Standard:	47 CFR FCC Part 22, 47 CFR FCC Part 24, 47 CFR FCC Part 2, ANSI/TIA-603-E KDB 971168 D01 Power Meas License Digital Systems v02r02
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Revision History

Report No.	Issue Date	Revision Summary
180800267TWN-001	Jan. 24, 2019	Original

Table of Contents

Summary of Test Data	4
1. General Information	5
1.1 Identification of the EUT	5
1.2 Antenna description	6
1.3 Operation mode	6
1.4 Applied test modes and channels	7
2. Output Power Measurement	8
2.1 Test conditions	8
2.2 Limit for output power measurement	8
2.3 Test procedure	8
2.3.1 Conducted power measurement	8
2.4 Test diagram	9
2.4.1 Conducted test setup	9
2.5 Test results	9
2.5.1 Conducted output power	9
2.5.2 Radiated output power	13
3. Radiated Emission Measurement	15
3.1 Test conditions	15
3.2 Limit for radiated emission measurement	15
3.3 Test procedure	15
3.4 Test diagram	16
3.5 Test configuration	16
3.5.1 Radiated emission from 9 kHz to 30MHz using Loop Antenna	16
3.5.2 Radiated emission below 1GHz using Bilog Antenna	17
3.5.3 Radiated emission above 1GHz using Horn Antenna	18
3.5.4 Radiated emission with Substitution Antenna	18
3.5 Test results	19
Appendix A: Test equipment list	29
Appendix B: Measurement Uncertainty	30

Summary of Test Data

Test Requirement	Applicable Rule	Limit	Result
Conducted Output Power	2.1046	Reporting Only	Pass
Effective Radiated Power	22.913(a)(2)	ERP < 7 Watts	Pass
Equivalent isotropic radiated power	24.232(c)	ERP < 2 Watts	Pass
Frequency Stability	2.1055 22.355 24.235 27.54	< 2.5 ppm / Within frequency range	Verified (Note1)
Occupied Bandwidth	2.1049 22.917(b) 24.238(a) 27.53(h)	Reporting Only	Verified (Note1)
Peak to average ratio	24.232(d)	< 13 dB	Verified (Note1)
Band Edge Measurements	2.1049 2.1051 22.917(a) 24.238(a) 27.53(g)	< 43+10log10(P[Watts])	Verified (Note1)
Conducted Spurious Emissions	2.1051 22.917(a) 24.238(a) 27.53(g)	< 43+10log10(P[Watts])	Verified (Note1)
Radiated Spurious Emissions	2.1053 22.917(a) 24.238(a) 27.53(g)	< 43+10log10(P[Watts])	Pass

Note:

- After evaluation, the certification is C2PC, Please refer to the report number: 1112FR12-02, dated Feb. 03, 2017.
- The test items in this report were conducted in Shenzhen UnionTrust Quality and Technology Co., Ltd. under Intertek's Recognized Testing Laboratory (RTL) program.

1. General Information

1.1 Identification of the EUT

Product:	WWAN Module			
Model No.:	1003			
Operating Frequency:	GPRS/EDGE 850: 824.2-848.8 MHz GPRS/EDGE 1900: 1850.2-1909.8 MHz WCDMA Band II: 1852.4-1907.6 MHz WCDMA Band V: 826.4-846.6 MHz			
Channel Number:	GPRS/EDGE 850: Channel 128(L) Channel 190(M) Channel 251(H) GPRS/EDGE 1900: Channel 512(L) Channel 661(M) Channel 810(H) WCDMA Band II: Channel 9262(L) Channel 9400(M) Channel 9538(H) WCDMA Band V: Channel 4132(L) Channel 4182(M) Channel 4233(H)			
Frequency of Each Channel:	GPRS/EDGE 850:	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
	GPRS/EDGE 1900:	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
	WCDMA Band II:	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz
	WCDMA Band V:	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz
Access scheme:	N/A			
Rated Power:	Li-ion Polymer Battery Pack; SNO-523450PC; 3.7V; 1000mAh			
Power Cord:	N/A			
Sample receiving date:	Dec. 12, 2018			
Sample condition:	Link			
Test Date(s):	Dec. 15, 2018 to Dec. 20, 2018			

1.2 Antenna description

Antenna 1

Antenna Gain	1.9 dBi max (850 Band), 3 dBi max (1900 Band)
Antenna Type	PCB antenna
Connector Type	PCB

Antenna 2

Antenna Gain	3.3 dBi max (2.4GHz ISM)
Antenna Type	PCB antenna
Connector Type	PCB

1.3 Operation mode

TX mode: EUT use 「CMW500」 entering LINK mode , and Touchscreen to change different channel and max power.

1.4 Applied test modes and channels

	Test items	Band	Test mode	Modulation	Coding Scheme/Subtest	Test Channel
Conducted	Max. Output Power	GSM 850	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	128/190/251
		GSM 1900	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	512/661/810
		WCDMA Band V	12.2kbps RMC	QPSK	-	4132/4182/4233
		WCDMA Band II	12.2kbps RMC	QPSK	-	9262/9400/9538
		HSDPA Band V	RMC + HSDPA	QPSK	1/2/3/4	4132/4182/4233
		HSDPA Band II	RMC + HSDPA	QPSK	1/2/3/4	9262/9400/9538
		HSPA Band V	RMC + HSPA	QPSK	1/2/3/4/5	4132/4182/4233
		HSPA Band II	RMC + HSPA	QPSK	1/2/3/4/5	9262/9400/9538
Radiated	E.I.R.P / E.R.P	GSM 850	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	128/190/251
		GSM 1900	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	512/661/810
		WCDMA Band V	12.2kbps RMC	QPSK	-	4132/4182/4233
		WCDMA Band II	12.2kbps RMC	QPSK	-	9262/9400/9538
		HSDPA Band V	RMC + HSDPA	QPSK	1	4132/4182/4233
		HSDPA Band II	RMC + HSDPA	QPSK	2	9262/9400/9538
		HSPA Band V	RMC + HSPA	QPSK	1	4132/4182/4233
		HSPA Band II	RMC + HSPA	QPSK	2	9262/9400/9538
	Radiated Spurious Emission	GSM 850	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	128/190/251
		GSM 1900	GPRS/EGPRS	GMSK/8PSK	CS-1,MCS5	512/661/810
		WCDMA Band V	12.2kbps RMC	QPSK	-	4132/4182/4233
		WCDMA Band II	12.2kbps RMC	QPSK	-	9262/9400/9538
		HSDPA Band V	RMC + HSDPA	QPSK	1	4132/4182/4233
		HSDPA Band II	RMC + HSDPA	QPSK	2	9262/9400/9538
		HSPA Band V	RMC + HSPA	QPSK	1	4132/4182/4233
		HSPA Band II	RMC + HSPA	QPSK	2	9262/9400/9538

2. Output Power Measurement

2.1 Test conditions

Temperature:	23	°C
Relative Humidity:	55	%
Atmospheric Pressure	998	hPa

2.2 Limit for output power measurement

§22.913(a)(2)

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

§24.232(c)

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

2.3 Test procedure

2.3.1 Conducted power measurement

1. The EUT was established communication with base station simulator and set up to transmit the maximum power.
2. Set the EUT to transmit at low, middle and high channel and record the power level on the base station simulator.
- 3, According to KDB 412172 D01 Power Approach

$$\text{ERP/EIRP} = P_T + G_T - L_c, \text{ ERP} = \text{EIRP} - 2.15,$$

where;

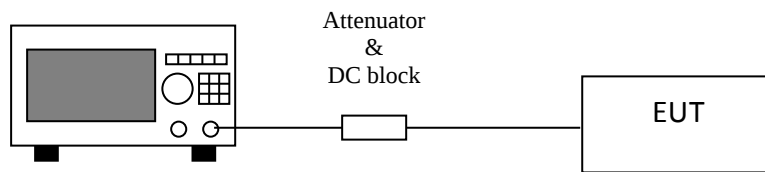
P_T = transmitter output power, in dBW, dBm

G_T = gain of the transmitting antenna, in dBi

L_c = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

2.4 Test diagram

2.4.1 Conducted test setup



Base station simulator

2.5 Test results

2.5.1 Conducted output power

Mode	Channel	Frequency	1 time slot	2 time slots
			Average(dBm)	Average(dBm)
GPRS	128	824.2	32.63	32.62
	190	836.6	32.56	32.55
	251	848.8	32.56	32.54
GPRS	512	1850.2	28.94	28.93
	661	1880.0	28.74	28.72
	810	1909.8	28.85	28.84

Mode	Channel	Frequency	1 time slot	2 time slots
			Average (dBm)	Average (dBm)
EGPRS	128	824.2	27.16	27.22
	190	836.6	27.05	27.07
	251	848.8	27.19	27.17
EGPRS	512	1850.2	25.25	25.21
	661	1880.0	25.05	25.18
	810	1909.8	25.12	25.08

Mode	Channel	Frequency	Average(dBm)
WCDMA Rel99 Band V	4132	826.4	23.89
	4182	836.4	23.79
	4233	846.6	23.82
WCDMA Rel99 Band II	9262	1850.2	23.64
	9400	1880.0	23.78
	9538	1909.8	23.52

Band	Subtest	Channel	Frequency	Average Power (dBm)
Band 5 HSDPA 850MHz	1	4132	826.4	23.43
		4182	836.4	23.20
		4233	846.6	23.28
	2	4132	826.4	22.42
		4182	836.4	22.25
		4233	846.6	22.31
	3	4132	826.4	22.15
		4182	836.4	22.03
		4232	846.6	22.00
	4	4132	826.4	21.91
		4182	836.4	21.85
		4233	846.6	21.84

Band	Subtest	Channel	Frequency	Average Power (dBm)
Band 2 HSDPA 1900MHz	1	9262	1852.4	23.17
		9400	1880	23.40
		9538	1907.6	23.15
	2	9262	1852.4	22.17
		9400	1880	22.35
		9538	1907.6	22.08
	3	9262	1852.4	21.88
		9400	1880	22.16
		9538	1907.6	21.82
	4	9262	1852.4	21.62
		9400	1880	21.93
		9538	1907.6	21.73

Band	Subtest	Channel	Frequency	Average Power (dBm)
Band 5 HSPA 850MHz	1	4132	826.4	21.70
		4182	836.4	21.71
		4233	846.6	21.74
	2	4132	826.4	20.44
		4182	836.4	20.41
		4233	846.6	20.40
	3	4132	826.4	21.15
		4182	836.4	21.11
		4233	846.6	21.13
	4	4132	826.4	20.58
		4182	836.4	20.57
		4233	846.6	20.55
	5	4132	826.4	22.01
		4182	836.4	21.73
		4233	846.6	21.76

Band	Subtest	Channel	Frequency	Average Power (dBm)
Band 2 HSPA 1900MHz	1	9262	1852.4	22.11
		9400	1880	22.36
		9538	1907.6	22.14
	2	9262	1852.4	20.03
		9400	1880	20.21
		9538	1907.6	20.11
	3	9262	1852.4	20.86
		9400	1880	21.11
		9538	1907.6	20.83
	4	9262	1852.4	20.24
		9400	1880	20.20
		9538	1907.6	20.23
	5	9262	1852.4	21.86
		9400	1880	22.13
		9538	1907.6	21.82

2.5.2 Radiated output power

Average E.R.P. for 850 Band

Mode	Channel	Frequency	Conducted Power (dBm)	Ant Gain (dBi)	ERP (dBm)
GPRS	128	824.2	32.63	1.9	32.38
	190	836.6	32.56	1.9	32.31
	251	848.8	32.56	1.9	32.31
EGPRS	128	824.2	27.16	1.9	26.91
	190	836.6	27.05	1.9	26.80
	251	848.8	27.19	1.9	26.94
WCDMA REL 99	4132	826.4	23.89	1.9	23.64
	4182	836.4	23.79	1.9	23.54
	4233	846.6	23.82	1.9	23.57
HSDPA REL 5	4132	826.4	23.43	1.9	23.18
	4182	836.4	23.20	1.9	22.95
	4233	846.6	23.28	1.9	23.03
HSPA REL 6	4132	826.4	21.70	1.9	21.45
	4182	836.4	21.71	1.9	21.46
	4233	846.6	21.74	1.9	21.49

Note: ERP = Conducted Power + Ant Gain(dBi) – 2.15

Average E.I.R.P. for 1900 Band

Mode	Channel	Frequency	Conducted (dBm)	Ant Gain (dBi)	EIRP
GPRS	512	1850.2	28.94	3	31.94
	661	1880.0	28.74	3	31.74
	810	1909.8	28.85	3	31.85
EGPRS	512	1850.2	25.25	3	28.25
	661	1880.0	25.05	3	28.05
	810	1909.8	25.12	3	28.12
WCDMA REL 99	9262	1850.2	23.64	3	26.64
	9400	1880	23.78	3	26.78
	9538	1909.8	23.52	3	26.52
HSDPA REL5	9262	1852.4	23.17	3	26.17
	9400	1880	23.40	3	26.40
	9538	1907.6	23.15	3	26.15
HSPA REL6	9262	1852.4	22.11	3	25.11
	9400	1880	22.36	3	25.36
	9538	1907.6	22.14	3	25.14

Note: EIRP = Conducted Power + Ant Gain(dBi)

3. Radiated Emission Measurement

3.1 Test conditions

Temperature:	25	°C
Relative Humidity:	57	%
Atmospheric Pressure	1008	hPa

3.2 Limit for radiated emission measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

3.3 Test procedure

1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.

2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the turn table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G

3. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P
power = E.I.P.R power - 2.15dBi.

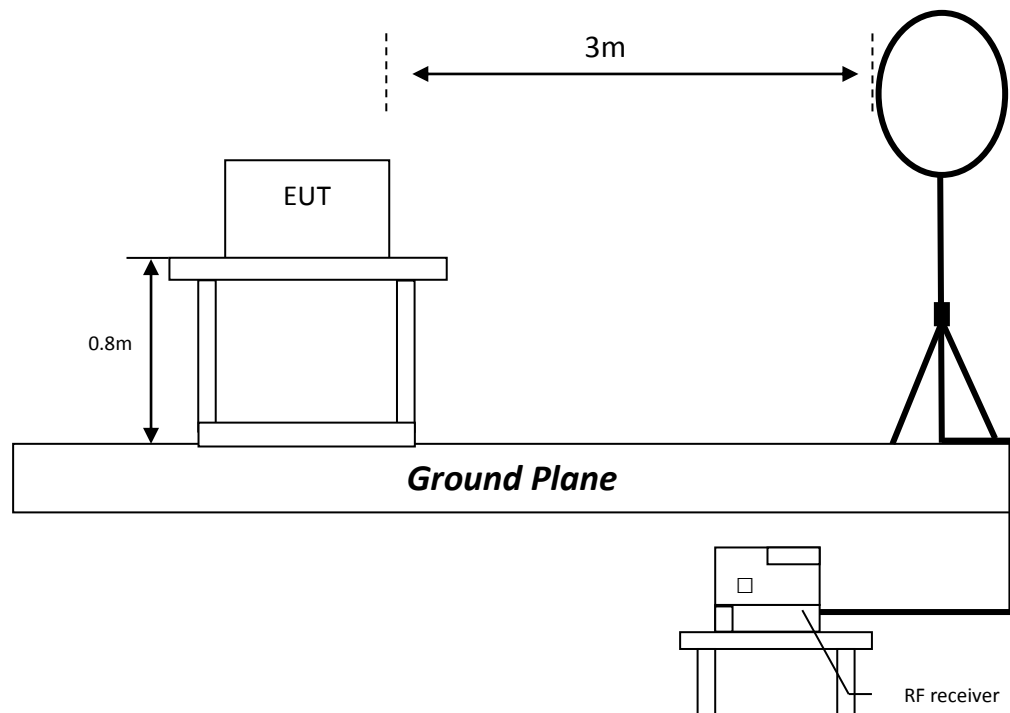
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.4 Test diagram

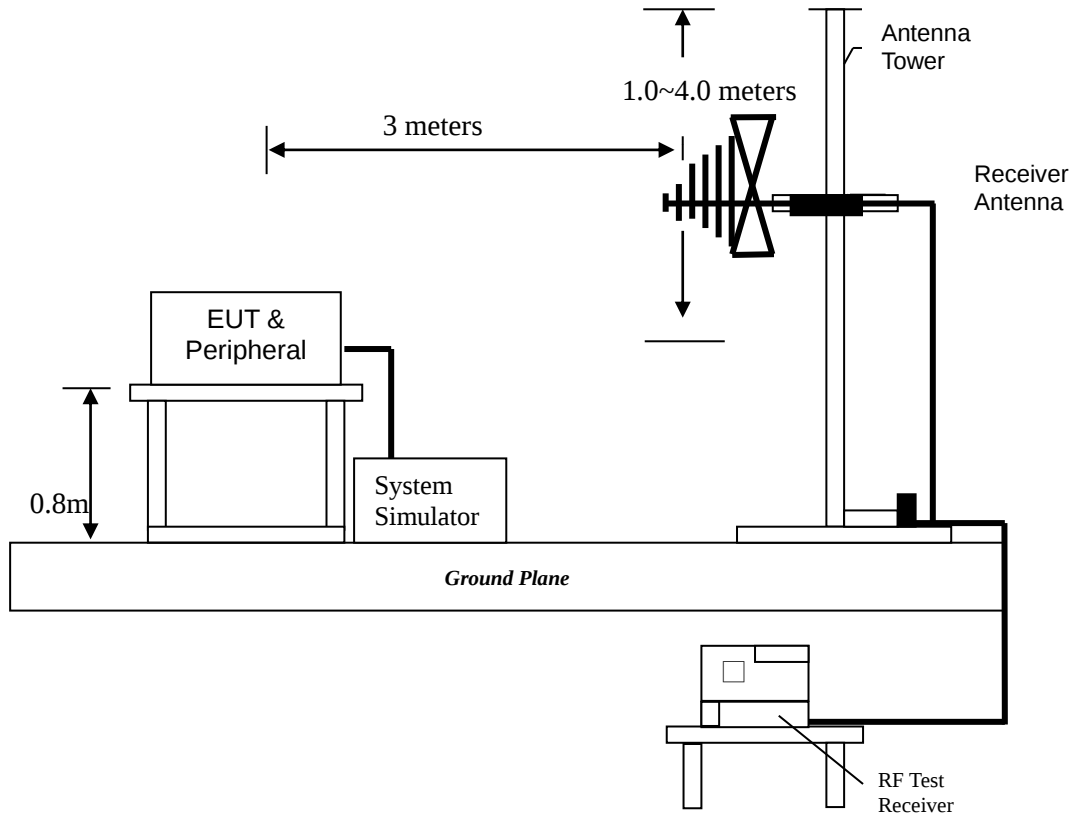
The EUT is investigated for X, Y and Z axis. The worst case was determined to be at X axis after the investigations. The final test data was executed under this configuration.

3.5 Test configuration

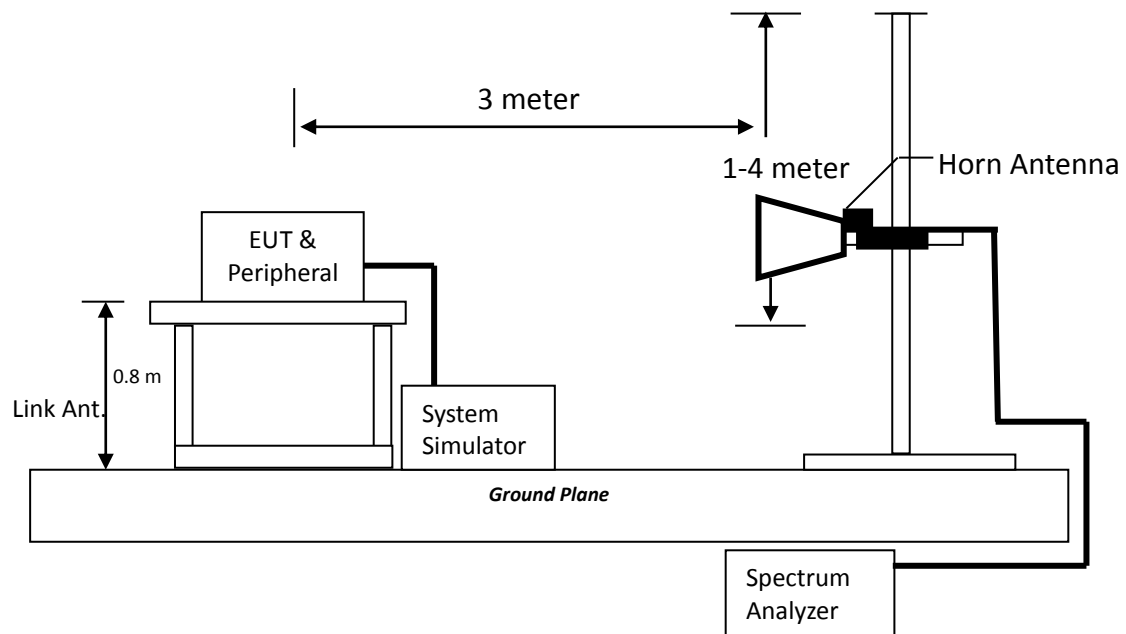
3.5.1 Radiated emission from 9 kHz to 30MHz using Loop Antenna



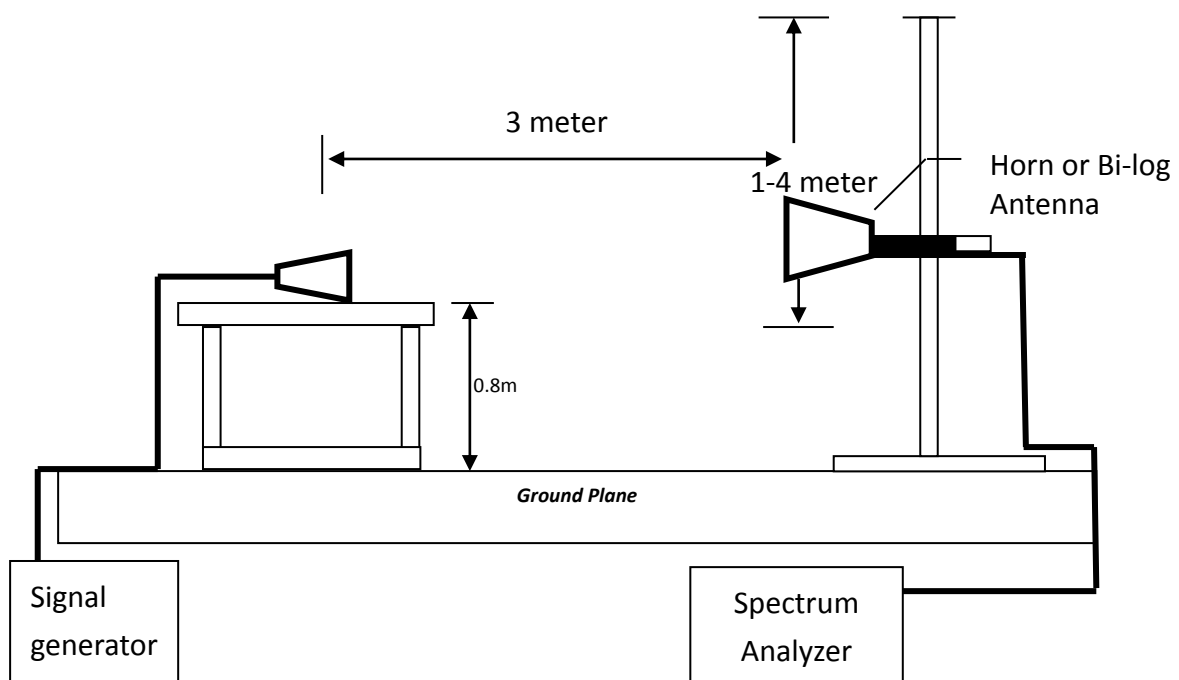
3.5.2 Radiated emission below 1GHz using Bilog Antenna



3.5.3 Radiated emission above 1GHz using Horn Antenna



3.5.4 Radiated emission with Substitution Antenna



3.5 Test results

850 Band

Radiated Emission Test Data (30 MHz to 1 GHz)

GPRS 850 1Tx-slot_Lowest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	121.462	-84.27	19.54	-64.73	-13.00	-51.73	Peak
2	409.651	-86.73	30.65	-56.08	-13.00	-43.08	Peak
3	558.079	-86.30	34.20	-52.10	-13.00	-39.10	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.708	-82.23	18.15	-64.08	-13.00	-51.08	Peak
2	122.319	-78.34	19.56	-58.78	-13.00	-45.78	Peak
3	660.602	-86.71	35.87	-50.84	-13.00	-37.84	Peak

GPRS 850 1Tx-slot_Middle Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	120.612	-84.00	19.51	-64.49	-13.00	-51.49	Peak
2	418.378	-85.38	30.86	-54.52	-13.00	-41.52	Peak
3	776.485	-86.21	37.15	-49.06	-13.00	-36.06	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.733	-83.84	18.57	-65.27	-13.00	-52.27	Peak
2	124.925	-75.64	19.62	-56.02	-13.00	-43.02	Peak
3	798.620	-85.52	37.50	-48.02	-13.00	-35.02	Peak

GPRS 850 1Tx-slot_Highest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	30.855	-89.52	27.21	-62.31	-13.00	-49.31	Peak
2	127.586	-85.96	19.68	-66.28	-13.00	-53.28	Peak
3	427.292	-86.72	31.28	-55.44	-13.00	-42.44	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.369	-84.37	17.86	-66.51	-13.00	-53.51	Peak
2	121.462	-77.29	19.54	-57.75	-13.00	-44.75	Peak
3	689.051	-86.89	36.02	-50.87	-13.00	-37.87	Peak

WCDMA Band V RMC 12.2Kbps_Lowest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	122.319	-84.13	19.56	-64.57	-13.00	-51.57	Peak
2	266.839	-86.42	23.81	-62.61	-13.00	-49.61	Peak
3	660.602	-86.47	35.87	-50.60	-13.00	-37.60	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.056	-81.94	18.44	-63.50	-13.00	-50.50	Peak
2	124.925	-76.73	19.62	-57.11	-13.00	-44.11	Peak
3	809.924	-85.76	37.59	-48.17	-13.00	-35.17	Peak

WCDMA Band V RMC 12.2Kbps_Middle Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	124.050	-85.43	19.60	-65.83	-13.00	-52.83	Peak
2	274.446	-86.76	24.04	-62.72	-13.00	-49.72	Peak
3	689.051	-85.79	36.02	-49.77	-13.00	-36.77	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.037	-81.67	18.00	-63.67	-13.00	-50.67	Peak
2	127.586	-75.38	19.68	-55.70	-13.00	-42.70	Peak
3	665.261	-86.62	35.88	-50.74	-13.00	-37.74	Peak

WCDMA Band V RMC 12.2Kbps_Highest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	313.648	-86.69	25.60	-61.09	-13.00	-48.09	Peak
2	442.572	-86.81	31.69	-55.12	-13.00	-42.12	Peak
3	628.894	-86.58	35.42	-51.16	-13.00	-38.16	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.708	-82.31	18.15	-64.16	-13.00	-51.16	Peak
2	123.181	-74.45	19.57	-54.88	-13.00	-41.88	Peak
3	804.252	-85.92	37.55	-48.37	-13.00	-35.37	Peak

Radiated Emission Test Data (Above 1GHz)

GPRS 850 1Tx-slot_Lowest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1648.400	-70.08	2.39	-67.69	-13.00	-54.69	Peak
2	2472.600	-75.41	9.16	-66.25	-13.00	-53.25	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1648.400	-70.19	4.03	-66.16	-13.00	-53.16	Peak
2	2472.600	-75.67	11.49	-64.18	-13.00	-51.18	Peak

GPRS 850 1Tx-slot_Middle Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-68.00	2.59	-65.41	-13.00	-52.41	Peak
2	2509.800	-75.26	9.17	-66.09	-13.00	-53.09	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-68.45	4.31	-64.14	-13.00	-51.14	Peak
2	2509.800	-75.54	11.46	-64.08	-13.00	-51.08	Peak

GPRS 850 1Tx-slot_Highest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.016	-67.57	2.75	-64.82	-13.00	-51.82	Peak
2	2546.400	-75.37	9.22	-66.15	-13.00	-53.15	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.016	-69.04	4.55	-64.49	-13.00	-51.49	Peak
2	2546.400	-76.31	11.45	-64.86	-13.00	-51.86	Peak

WCDMA Band V RMC 12.2Kbps_Lowest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-69.10	2.43	-66.67	-13.00	-53.67	Peak
2	2479.200	-75.58	9.16	-66.42	-13.00	-53.42	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-68.21	4.08	-64.13	-13.00	-51.13	Peak
2	2479.200	-74.70	11.48	-63.22	-13.00	-50.22	Peak

WCDMA Band V RMC 12.2Kbps_Middle Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1674.504	-65.89	2.59	-63.30	-13.00	-50.30	Peak
2	2509.200	-75.12	9.17	-65.95	-13.00	-52.95	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1674.504	-66.20	4.32	-61.88	-13.00	-48.88	Peak
2	2509.200	-75.04	11.46	-63.58	-13.00	-50.58	Peak

WCDMA Band V RMC 12.2Kbps_Highest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.016	-67.75	2.75	-65.00	-13.00	-52.00	Peak
2	2539.800	-75.82	9.22	-66.60	-13.00	-53.60	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.016	-68.07	4.55	-63.52	-13.00	-50.52	Peak
2	2539.800	-75.83	11.45	-64.38	-13.00	-51.38	Peak

1900 Band

Radiated Emission Test Data (30 MHz to 1 GHz)

GPRS 1900 1Tx-slot_Lowest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.703	-65.84	-11.11	-76.95	-13.00	-63.95	Peak
2	235.135	-65.46	-5.29	-70.75	-13.00	-57.75	Peak
3	379.178	-71.81	0.69	-71.12	-13.00	-58.12	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	66.371	-66.79	-11.58	-78.37	-13.00	-65.37	Peak
2	99.768	-67.01	-10.00	-77.01	-13.00	-64.01	Peak
3	498.730	-75.58	3.84	-71.74	-13.00	-58.74	Peak

GPRS 1900 1Tx-slot_Middle Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.703	-65.50	-11.11	-76.61	-13.00	-63.61	Peak
2	235.135	-65.08	-5.29	-70.37	-13.00	-57.37	Peak
3	679.435	-77.79	6.61	-71.18	-13.00	-58.18	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	64.532	-64.08	-11.61	-75.69	-13.00	-62.69	Peak
2	99.768	-60.41	-10.00	-70.41	-13.00	-57.41	Peak
3	833.013	-78.39	8.69	-69.70	-13.00	-56.70	Peak

GPRS 1900 1Tx-slot_Highest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.703	-65.89	-11.11	-77.00	-13.00	-64.00	Peak
2	235.135	-65.92	-5.29	-71.21	-13.00	-58.21	Peak
3	379.178	-71.58	0.69	-70.89	-13.00	-57.89	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	66.371	-65.92	-11.58	-77.50	-13.00	-64.50	Peak
2	100.471	-63.11	-9.97	-73.08	-13.00	-60.08	Peak
3	498.730	-75.29	3.84	-71.45	-13.00	-58.45	Peak

WCDMA Band II RMC 12.2Kbps_Lowest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	127.586	-60.39	-8.92	-69.31	-13.00	-56.31	Peak
2	190.441	-64.48	-6.49	-70.97	-13.00	-57.97	Peak
3	360.977	-71.75	-0.35	-72.10	-13.00	-59.10	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.095	-54.83	-9.97	-64.80	-13.00	-51.80	Peak
2	127.586	-48.92	-8.92	-57.84	-13.00	-44.84	Peak
3	186.468	-62.37	-6.67	-69.04	-13.00	-56.04	Peak

WCDMA Band II RMC 12.2Kbps_Middle Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	104.064	-60.68	-9.87	-70.55	-13.00	-57.55	Peak
2	122.319	-57.85	-9.06	-66.91	-13.00	-53.91	Peak
3	181.300	-64.04	-6.92	-70.96	-13.00	-57.96	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.708	-50.10	-10.67	-60.77	-13.00	-47.77	Peak
2	124.925	-47.17	-8.99	-56.16	-13.00	-43.16	Peak
3	171.389	-62.19	-7.30	-69.49	-13.00	-56.49	Peak

WCDMA Band II RMC 12.2Kbps_Highest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.733	-67.53	-10.25	-77.78	-13.00	-64.78	Peak
2	121.462	-56.07	-9.08	-65.15	-13.00	-52.15	Peak
3	190.441	-64.90	-6.49	-71.39	-13.00	-58.39	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.733	-52.70	-10.25	-62.95	-13.00	-49.95	Peak
2	121.462	-48.36	-9.08	-57.44	-13.00	-44.44	Peak
3	183.866	-61.23	-6.80	-68.03	-13.00	-55.03	Peak

Radiated Emission Test Data (Above 1GHz)

GPRS 1900 1Tx-slot_Lowest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3700.400	-72.88	13.77	-59.11	-13.00	-46.11	Peak
2	5550.600	-66.48	16.02	-50.46	-13.00	-37.46	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3700.400	-68.87	15.13	-53.74	-13.00	-40.74	Peak
2	5550.600	-68.01	16.91	-51.10	-13.00	-38.10	Peak

GPRS 1900 1Tx-slot_Middle Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-73.55	13.87	-59.68	-13.00	-46.68	Peak
2	5640.000	-67.55	16.10	-51.45	-13.00	-38.45	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-72.63	15.28	-57.35	-13.00	-44.35	Peak
2	5640.000	-68.01	16.97	-51.04	-13.00	-38.04	Peak

GPRS 1900 1Tx-slot_Highest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3819.600	-71.12	13.98	-57.14	-13.00	-44.14	Peak
2	5729.400	-66.36	16.37	-49.99	-13.00	-36.99	Peak

Vertical

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3819.600	-68.55	15.44	-53.11	-13.00	-40.11	Peak
2	5729.400	-66.42	17.23	-49.19	-13.00	-36.19	Peak

WCDMA Band II RMC 12.2Kbps_Lowest Channel

Horizontal

No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-72.33	13.78	-58.55	-13.00	-45.55	Peak
2	5557.200	-67.72	16.01	-51.71	-13.00	-38.71	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-72.17	15.14	-57.03	-13.00	-44.03	Peak
2	5557.200	-67.24	16.90	-50.34	-13.00	-37.34	Peak

WCDMA Band II RMC 12.2Kbps_Middle Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-72.94	13.87	-59.07	-13.00	-46.07	Peak
2	5640.000	-67.54	16.10	-51.44	-13.00	-38.44	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-72.43	15.28	-57.15	-13.00	-44.15	Peak
2	5640.000	-67.37	16.97	-50.40	-13.00	-37.40	Peak

WCDMA Band II RMC 12.2Kbps_Highest Channel							
Horizontal							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-69.38	13.97	-55.41	-13.00	-42.41	Peak
2	5722.800	-66.67	16.35	-50.32	-13.00	-37.32	Peak

Vertical							
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-69.82	15.43	-54.39	-13.00	-41.39	Peak
2	5722.800	-67.03	17.21	-49.82	-13.00	-36.82	Peak

Remark:

1) All tested is under the condition of the main wave is filtered out.

Appendix A: Test equipment list

Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☒	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 19, 2018	May 19, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
☒	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
☒	Horn Antenna	ETS-LINDGREN	3116C	00200180	May 20, 2018	May 20, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Dec. 08, 2018	Dec. 08, 2018
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Highpass Filter (1.2GHz~18GHz)	Micro-Tronics	HPM50108	G552	Nov. 29, 2018	Nov. 29, 2019
☒	Highpass Filter (3GHz~18GHz)	Micro-Tronics	HPM50117	G005	Nov. 29, 2018	Nov. 29, 2019
☒	Test Software	Audix	e3	Software Version: 9.160333		

Appendix B: Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radiated emission 9KHz-30MHz	± 4.9 dB
2	Radiated emission 30MHz-1GHz	± 4.7 dB
3	Radiated emission 1GHz-18GHz	± 5.1 dB
4	Radiated emission 18GHz-26GHz	± 5.2 dB
5	Radiated emission 26GHz-40GHz	± 5.2 dB