EMC TEST REPORT

Applicant:	Radiolink Electronic Limited
Address of Applicant:	3/F, BLD2,KaiFeng Road 28#, ShangMeiLinFutian, ShenZhen, GuangDong, China
Manufacturer/ Factory:	Radiolink Electronic Limited
Address of Manufacturer/ Factory:	3/F, BLD2,KaiFeng Road 28#, ShangMeiLinFutian, ShenZhen, GuangDong, China

Equipment Under Test (EUT)

Product Name:	Receiver
Model No.:	R8EF, R8FM, R6FG, R6F, R7FG, R8F, R4FGM
Applicable standards:	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.1.1 (2017-02)
Date of sample receipt:	December 30, 2019
Date of Test:	December 31, 2019-January 10, 2020
Date of report issue:	January 10, 2020
Test Result :	PASS *

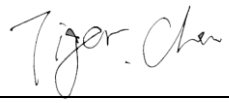
* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*January 10, 2020*	*Original*

Prepared By:  ***Date:*** *January 10, 2020*

Project Engineer

Check By:  ***Date:*** *January 10, 2020*

Reviewer

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4 Test Summary

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-17	ETSI EN301 489-1	Enclosure	Pass
Conducted Emission	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
Harmonic Current Emissions	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	N/A
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-17	EN 61000-4-2	Enclosure	Pass
Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	ETSI EN 301 489-17	EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients	ETSI EN 301 489-17	EN 61000-4-4	AC port	N/A
Surge Immunity	ETSI EN 301 489-17	EN 61000-4-5	AC port	N/A
Radio frequency, common mode	ETSI EN 301 489-17	EN 61000-4-6	AC port	N/A
Voltage Dips and Interruptions	ETSI EN 301 489-17	EN 61000-4-11	AC port	N/A

Remark:
Pass: The EUT complies with the essential requirements in the standard.
N/A: Not applicable.

5 General Information

5.1 General Description of EUT

Product Name:	Receiver
Model No.:	R8EF, R8FM, R6FG, R6F, R7FG, R8F, R4FGM
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are color and model name for commercial purpose.	
Operation Frequency:	2.4G ISM band(2400~2483.5MHz)
Antenna Type:	Integral Antenna
Antenna gain:	0dBi(Declared by applicant)
Power Supply:	DC 4.6-10V R8FM:DC 4.8V-6V

5.2 Operating Modes

Operating mode	Detail description
Receiving mode	Keep the EUT in receiving mode.

5.3 Description of Support Units

N/A

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.5 Test Location

RI test was performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

All other tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123- 128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

5.9 Monitoring of EUT for All Immunity Test

Visual:	Monitored the light of the EUT
Audio:	NA

6 Equipment Used during Test

Radiated Emission:

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

ESD						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	June. 26 2019	June. 25 2020
2	Thermo meter	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020

Radiated Immunity						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	2017-05-10	2020-05-09
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2019-04-01	2020-03-31
3	Stacked Log.-Per.-Broadband Antenna (70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
4	Signal Generator (9kHz-6GHz)	Rohde & Schwarz	SMB100A	SEM006-11	2019-04-01	2020-03-31
5	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	2019-09-24	2020-09-23
6	Broadband Amplifier(800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	2019-04-01	2020-03-31
7	Broadband Amplifier(2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	2019-04-12	2020-04-11
8	Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 EMC Requirements Specification in ETSI EN 301 489-17

7.1 EMI (Emission)

7.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489-17
Test Method:	ETSI EN 301 489-1 and EN55032
Test Frequency Range:	30MHz to 6GHz
Test site:	Measurement Distance: 3m

Receiver setup:

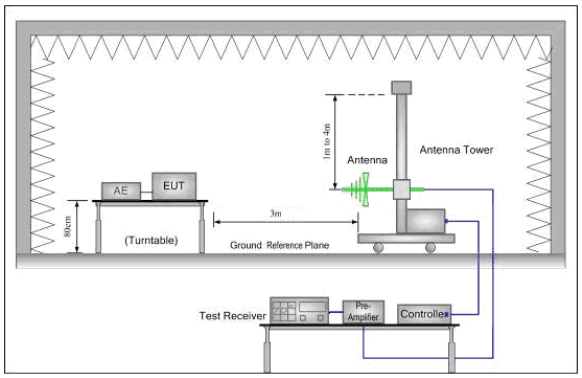
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

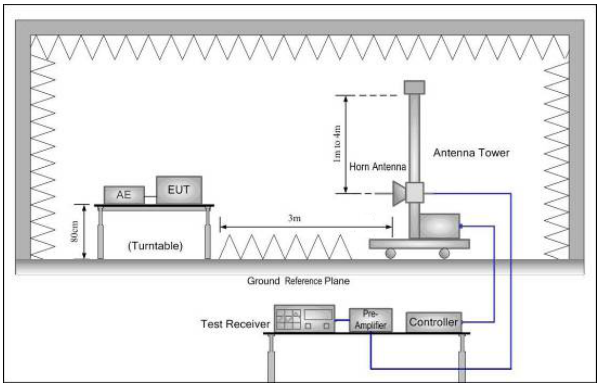
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-230MHz	40.00	Quasi-peak Value
230MHz-1GHz	47.00	Quasi-peak Value
1GHz-3GHz	50.00	Average Value
	70.00	Peak Value
3GHz-6GHz	54.00	Average Value
	74.00	Peak Value

Test setup:

Below 1GHz



Above 1GHz



Test Procedure:	■ **From 30MHz to 1GHz:** 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. ■ **Above 1GHz:** 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test environment:	Temp.: 25 °C | Humid.: 50% | Press.: 1 010mbar
Measurement Record:	Uncertainty: 3.8039dB （30MHz-200MHz） 3.9679dB （200MHz-1GHz） 4.29dB（1GHz-18GHz）
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details.
Test results:	Pass

Remark:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Measurement Data
Below 1GHz
Model No.: R8EF

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
30.00	46.13	11.20	0.55	35.00	22.88	40.00	-17.12	Vertical
36.00	42.79	11.52	0.62	35.42	19.51	40.00	-20.49	Vertical
96.10	39.26	11.65	1.16	36.69	15.38	40.00	-24.62	Vertical
167.82	41.85	8.46	1.67	37.18	14.80	40.00	-25.20	Vertical
324.46	37.34	14.07	2.49	37.45	16.45	47.00	-30.55	Vertical
463.97	42.77	16.65	3.15	37.51	25.06	47.00	-21.94	Vertical
30.32	40.61	11.21	0.55	35.02	17.35	40.00	-22.65	Horizontal
48.84	38.49	12.29	0.76	36.13	15.41	40.00	-24.59	Horizontal
104.54	34.74	11.68	1.23	36.76	10.89	40.00	-29.11	Horizontal
280.02	35.55	13.05	2.27	37.40	13.47	47.00	-33.53	Horizontal
622.89	35.00	19.52	3.81	37.56	20.77	47.00	-26.23	Horizontal
935.55	35.20	22.45	4.99	37.57	25.07	47.00	-21.93	Horizontal

Model No.: F4FGM

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
30.96	46.36	11.22	0.56	35.07	23.07	40.00	-16.93	Vertical
36.77	41.78	11.64	0.63	35.47	18.58	40.00	-21.42	Vertical
92.79	37.32	11.11	1.13	36.66	12.90	40.00	-27.10	Vertical
162.61	34.70	8.36	1.65	37.15	7.56	40.00	-32.44	Vertical
311.09	35.49	13.82	2.42	37.43	14.30	47.00	-32.70	Vertical
460.73	35.51	16.57	3.14	37.51	17.71	47.00	-29.29	Vertical
30.53	39.78	11.21	0.56	35.04	16.51	40.00	-23.49	Horizontal
47.16	38.94	12.27	0.74	36.04	15.91	40.00	-24.09	Horizontal
96.44	36.23	11.72	1.16	36.69	12.42	40.00	-27.58	Horizontal
292.06	35.30	13.38	2.32	37.41	13.59	47.00	-33.41	Horizontal
605.66	36.70	19.51	3.74	37.55	22.40	47.00	-24.60	Horizontal
916.07	35.20	22.35	4.91	37.58	24.88	47.00	-22.12	Horizontal

Model No.: R6FG

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
31.07	46.57	11.22	0.56	35.08	23.27	40.00	-16.73	Vertical
36.13	43.05	11.52	0.62	35.43	19.76	40.00	-20.24	Vertical
94.10	35.48	11.31	1.14	36.67	11.26	40.00	-28.74	Vertical
151.07	34.49	7.70	1.58	37.08	6.69	40.00	-33.31	Vertical
318.82	35.85	13.96	2.46	37.44	14.83	47.00	-32.17	Vertical
455.91	35.18	16.48	3.11	37.51	17.26	47.00	-29.74	Vertical
30.96	39.02	11.22	0.56	35.07	15.73	40.00	-24.27	Horizontal
48.33	39.12	12.29	0.75	36.10	16.06	40.00	-23.94	Horizontal
97.46	36.80	11.86	1.17	36.70	13.13	40.00	-26.87	Horizontal
289.00	34.94	13.31	2.31	37.41	13.15	47.00	-33.85	Horizontal
614.21	35.81	19.52	3.77	37.55	21.55	47.00	-25.45	Horizontal
872.18	35.97	22.06	4.74	37.61	25.16	47.00	-21.84	Horizontal

Model No.: R6F

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
30.64	46.75	11.22	0.56	35.05	23.48	40.00	-16.52	Vertical
36.51	44.44	11.61	0.62	35.45	21.22	40.00	-18.78	Vertical
95.43	36.45	11.52	1.16	36.68	12.45	40.00	-27.55	Vertical
165.49	35.63	8.41	1.66	37.16	8.54	40.00	-31.46	Vertical
312.18	35.87	13.85	2.42	37.43	14.71	47.00	-32.29	Vertical
475.50	36.35	16.85	3.21	37.51	18.90	47.00	-28.10	Vertical
30.85	39.56	11.22	0.56	35.06	16.28	40.00	-23.72	Horizontal
47.83	40.02	12.28	0.75	36.08	16.97	40.00	-23.03	Horizontal
99.53	35.11	12.13	1.19	36.72	11.71	40.00	-28.29	Horizontal
283.98	35.09	13.16	2.29	37.41	13.13	47.00	-33.87	Horizontal
607.79	35.65	19.51	3.75	37.55	21.36	47.00	-25.64	Horizontal
893.86	35.50	22.23	4.83	37.60	24.96	47.00	-22.04	Horizontal

Model No.: R7FG

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
31.96	44.94	11.24	0.57	35.15	21.60	40.00	-18.40	Vertical
37.03	43.85	11.70	0.63	35.49	20.69	40.00	-19.31	Vertical
93.77	35.14	11.25	1.14	36.67	10.86	40.00	-29.14	Vertical
162.04	34.74	8.34	1.64	37.14	7.58	40.00	-32.42	Vertical
316.59	35.62	13.93	2.45	37.44	14.56	47.00	-32.44	Vertical
468.88	35.10	16.73	3.18	37.51	17.50	47.00	-29.50	Vertical
30.85	39.56	11.22	0.56	35.06	16.28	40.00	-23.72	Horizontal
47.66	39.66	12.28	0.75	36.07	16.62	40.00	-23.38	Horizontal
98.49	36.61	12.00	1.18	36.71	13.08	40.00	-26.92	Horizontal
282.99	35.94	13.13	2.28	37.41	13.94	47.00	-33.06	Horizontal
612.06	34.99	19.51	3.76	37.55	20.71	47.00	-26.29	Horizontal
881.41	35.45	22.13	4.79	37.60	24.77	47.00	-22.23	Horizontal

Model No.: R8F

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
31.73	45.78	11.24	0.57	35.13	22.46	40.00	-17.54	Vertical
36.38	43.67	11.58	0.62	35.45	20.42	40.00	-19.58	Vertical
94.43	36.15	11.38	1.15	36.68	12.00	40.00	-28.00	Vertical
160.35	34.19	8.31	1.63	37.14	6.99	40.00	-33.01	Vertical
319.94	35.82	13.98	2.47	37.44	14.83	47.00	-32.17	Vertical
473.84	35.81	16.81	3.20	37.51	18.31	47.00	-28.69	Vertical
30.00	40.90	11.20	0.55	35.00	17.65	40.00	-22.35	Horizontal
47.33	38.86	12.28	0.74	36.05	15.83	40.00	-24.17	Horizontal
101.29	35.84	12.04	1.20	36.73	12.35	40.00	-27.65	Horizontal
286.98	35.15	13.24	2.30	37.41	13.28	47.00	-33.72	Horizontal
638.37	34.97	19.54	3.87	37.58	20.80	47.00	-26.20	Horizontal
906.48	35.55	22.32	4.88	37.59	25.16	47.00	-21.84	Horizontal

Model No.: R8FM

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
31.51	47.26	11.23	0.57	35.11	23.95	40.00	-16.05	Vertical
36.64	41.79	11.61	0.63	35.46	18.57	40.00	-21.43	Vertical
103.81	36.22	11.73	1.22	36.75	12.42	40.00	-27.58	Vertical
454.31	34.18	16.44	3.11	37.51	16.22	47.00	-30.78	Vertical
665.80	35.29	19.57	3.97	37.60	21.23	47.00	-25.77	Vertical
890.73	34.77	22.20	4.82	37.60	24.19	47.00	-22.81	Vertical
30.85	38.78	11.22	0.56	35.06	15.50	40.00	-24.50	Horizontal
49.36	38.09	12.29	0.77	36.15	15.00	40.00	-25.00	Horizontal
55.22	38.21	11.78	0.82	36.26	14.55	40.00	-25.45	Horizontal
99.53	35.50	12.13	1.19	36.72	12.10	40.00	-27.90	Horizontal
668.14	34.25	19.57	3.97	37.60	20.19	47.00	-26.81	Horizontal
827.49	35.09	21.64	4.57	37.61	23.69	47.00	-23.31	Horizontal

Above 1GHz

Model No.: R8EF

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1370.00	35.80	25.19	4.76	36.06	29.69	70.00	-40.31	Vertical
2280.00	35.96	27.13	6.14	36.76	32.47	70.00	-37.53	Vertical
3125.00	36.15	28.52	7.41	37.31	34.77	74.00	-39.23	Vertical
3960.00	32.04	29.50	8.68	37.40	32.82	74.00	-41.18	Vertical
4610.00	32.07	31.00	9.21	37.65	34.63	74.00	-39.37	Vertical
5710.00	30.95	32.10	10.06	36.78	36.33	74.00	-37.67	Vertical
1090.00	37.22	24.52	4.43	35.80	30.37	70.00	-39.63	Horizontal
2050.00	38.92	26.53	5.79	36.55	34.69	70.00	-35.31	Horizontal
3025.00	35.60	28.59	7.27	37.30	34.16	74.00	-39.84	Horizontal
4025.00	32.87	29.66	8.76	37.41	33.88	74.00	-40.12	Horizontal
4650.00	33.79	31.07	9.24	37.67	36.43	74.00	-37.57	Horizontal
5510.00	30.76	31.62	9.90	37.07	35.21	74.00	-38.79	Horizontal

Model No.: F4FGM

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1410.00	35.95	25.28	4.82	36.10	29.95	70.00	-40.05	Vertical
2240.00	37.88	27.02	6.08	36.72	34.26	70.00	-35.74	Vertical
3020.00	36.10	28.59	7.26	37.30	34.65	74.00	-39.35	Vertical
3690.00	35.73	28.79	8.27	37.37	35.42	74.00	-38.58	Vertical
4470.00	31.15	30.73	9.11	37.60	33.39	74.00	-40.61	Vertical
5540.00	31.55	31.70	9.93	37.02	36.16	74.00	-37.84	Vertical
1125.00	38.76	24.60	4.45	35.84	31.97	70.00	-38.03	Horizontal
1970.00	38.34	26.35	5.67	36.48	33.88	70.00	-36.12	Horizontal
3210.00	35.93	28.47	7.54	37.32	34.62	74.00	-39.38	Horizontal
4105.00	32.49	29.85	8.82	37.45	33.71	74.00	-40.29	Horizontal
4845.00	32.13	31.42	9.39	37.74	35.20	74.00	-38.80	Horizontal
5710.00	31.39	32.10	10.06	36.78	36.77	74.00	-37.23	Horizontal

Model No.: R6FG

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1395.00	36.28	25.25	4.79	36.08	30.24	70.00	-39.76	Vertical
2185.00	35.08	26.88	6.00	36.67	31.29	70.00	-38.71	Vertical
3300.00	35.82	28.42	7.68	37.33	34.59	74.00	-39.41	Vertical
4220.00	31.72	30.13	8.91	37.49	33.27	74.00	-40.73	Vertical
4715.00	33.23	31.19	9.29	37.70	36.01	74.00	-37.99	Vertical
5555.00	30.96	31.73	9.94	37.00	35.63	74.00	-38.37	Vertical
1195.00	36.50	24.77	4.51	35.91	29.87	70.00	-40.13	Horizontal
2120.00	35.00	26.71	5.89	36.61	30.99	70.00	-39.01	Horizontal
3010.00	36.30	28.59	7.24	37.30	34.83	74.00	-39.17	Horizontal
4145.00	31.96	29.95	8.85	37.46	33.30	74.00	-40.70	Horizontal
5055.00	31.29	31.69	9.55	37.71	34.82	74.00	-39.18	Horizontal
5655.00	33.07	31.97	10.02	36.87	38.19	74.00	-35.81	Horizontal

Model No.: R6F

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1255.00	36.89	24.91	4.59	35.96	30.43	70.00	-39.57	Vertical
2110.00	36.36	26.69	5.88	36.60	32.33	70.00	-37.67	Vertical
3175.00	35.91	28.50	7.48	37.32	34.57	74.00	-39.43	Vertical
4145.00	33.69	29.95	8.85	37.46	35.03	74.00	-38.97	Vertical
4690.00	32.01	31.14	9.27	37.69	34.73	74.00	-39.27	Vertical
5680.00	33.03	32.03	10.04	36.82	38.28	74.00	-35.72	Vertical
1230.00	36.57	24.85	4.56	35.94	30.04	70.00	-39.96	Horizontal
2005.00	36.44	26.41	5.72	36.51	32.06	70.00	-37.94	Horizontal
2840.00	36.13	28.31	6.98	37.19	34.23	70.00	-35.77	Horizontal
3750.00	32.67	28.95	8.36	37.38	32.60	74.00	-41.40	Horizontal
4545.00	30.34	30.88	9.16	37.63	32.75	74.00	-41.25	Horizontal
5295.00	31.10	31.64	9.74	37.36	35.12	74.00	-38.88	Horizontal

Model No.: R7FG

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1285.00	36.00	24.98	4.64	35.99	29.63	70.00	-40.37	Vertical
2215.00	35.13	26.96	6.04	36.70	31.43	70.00	-38.57	Vertical
3130.00	36.42	28.52	7.42	37.31	35.05	74.00	-38.95	Vertical
3905.00	31.84	29.35	8.59	37.39	32.39	74.00	-41.61	Vertical
4375.00	32.32	30.50	9.03	37.56	34.29	74.00	-39.71	Vertical
5585.00	32.42	31.80	9.97	36.96	37.23	74.00	-36.77	Vertical
1170.00	37.40	24.71	4.49	35.88	30.72	70.00	-39.28	Horizontal
2085.00	35.62	26.62	5.84	36.58	31.50	70.00	-38.50	Horizontal
3115.00	34.95	28.53	7.40	37.31	33.57	74.00	-40.43	Horizontal
3975.00	32.88	29.53	8.70	37.40	33.71	74.00	-40.29	Horizontal
4965.00	32.29	31.64	9.48	37.78	35.63	74.00	-38.37	Horizontal
5925.00	28.83	32.62	10.23	36.49	35.19	74.00	-38.81	Horizontal

Model No.: R8F

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1330.00	36.66	25.09	4.70	36.03	30.42	70.00	-39.58	Vertical
2115.00	36.93	26.70	5.88	36.61	32.90	70.00	-37.10	Vertical
3080.00	36.08	28.55	7.35	37.31	34.67	74.00	-39.33	Vertical
3965.00	32.96	29.51	8.69	37.40	33.76	74.00	-40.24	Vertical
4855.00	31.28	31.44	9.40	37.75	34.37	74.00	-39.63	Vertical
5820.00	30.29	32.37	10.15	36.64	36.17	74.00	-37.83	Vertical
1205.00	38.22	24.79	4.52	35.92	31.61	70.00	-38.39	Horizontal
2095.00	35.39	26.65	5.85	36.59	31.30	70.00	-38.70	Horizontal
3075.00	36.01	28.56	7.34	37.31	34.60	74.00	-39.40	Horizontal
3970.00	31.53	29.52	8.69	37.40	32.34	74.00	-41.66	Horizontal
5065.00	31.16	31.69	9.56	37.71	34.70	74.00	-39.30	Horizontal
5945.00	28.94	32.67	10.25	36.47	35.39	74.00	-38.61	Horizontal

Model No.: R8FM

Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1815.00	36.83	26.07	5.44	36.39	31.95	70.00	-38.05	Vertical
2805.00	35.98	28.25	6.93	37.17	33.99	70.00	-36.01	Vertical
3435.00	37.62	28.34	7.89	37.35	36.50	74.00	-37.50	Vertical
3965.00	32.47	29.51	8.69	37.40	33.27	74.00	-40.73	Vertical
4915.00	31.75	31.55	9.44	37.77	34.97	74.00	-39.03	Vertical
5505.00	29.48	31.61	9.89	37.07	33.91	74.00	-40.09	Vertical
2230.00	36.07	27.00	6.07	36.71	32.43	70.00	-37.57	Horizontal
2825.00	34.82	28.28	6.96	37.18	32.88	70.00	-37.12	Horizontal
3535.00	35.79	28.39	8.04	37.36	34.86	74.00	-39.14	Horizontal
4390.00	32.35	30.54	9.04	37.57	34.36	74.00	-39.64	Horizontal
4705.00	32.32	31.17	9.28	37.69	35.08	74.00	-38.92	Horizontal
5540.00	29.65	31.70	9.93	37.02	34.26	74.00	-39.74	Horizontal

Remark:

1. The EUT was test at 3m in field chamber.
2. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

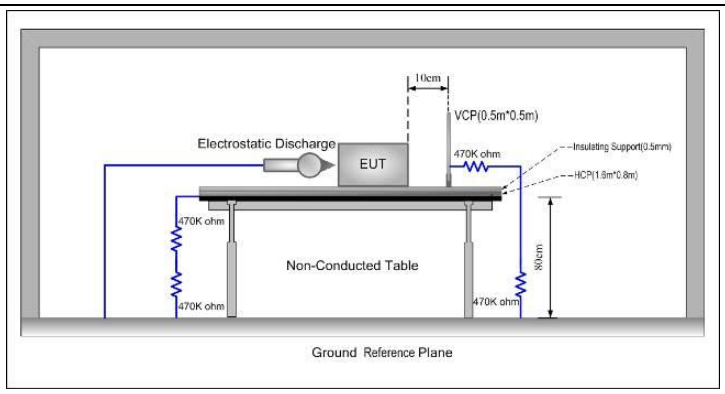
7.2 Immunity

Performance Criteria of ETSI EN 301 489-1, clause 6	
6.1 Performance criteria for continuous phenomena applied to transmitters and receivers	If no further details are given in the relevant part of ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply. During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.
6.2 Performance criteria for transient phenomena applied to transmitters and receivers	For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. For all other ports the following applies: • After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. • During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed. • If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

6.3 Performance criteria for equipment which does not provide a continuous communication link	For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account. The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.
6.4 Performance criteria for ancillary equipment tested on a stand alone basis	If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account. The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

Performance Criteria of ETSI EN 301 489-17, clause 6		
Criteria	During Test	After Test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).
Note 1:	Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.	
Note 2:	Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.	
Note 3:	No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.	

7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301489-17
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: ±4kV Air Discharge: ±2kV, ±4kV, ±8kV HCP/VCP: ±4kV
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 10 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	**Air discharge:** 1. The test was applied on non-conductive surfaces of EUT. 2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. 3. After each discharge, the discharge electrode was removed from the EUT. 4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 5. This procedure was repeated until all the air discharge completed **Contact Discharge:** 1. The test was applied on conductive surfaces of EUT. 2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. **Indirect discharge for horizontal coupling plane** 1. At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. 2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. 3. Consideration should be given to exposing all sides of the EUT.

	Indirect discharge for vertical coupling plane 1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. 2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. 3. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

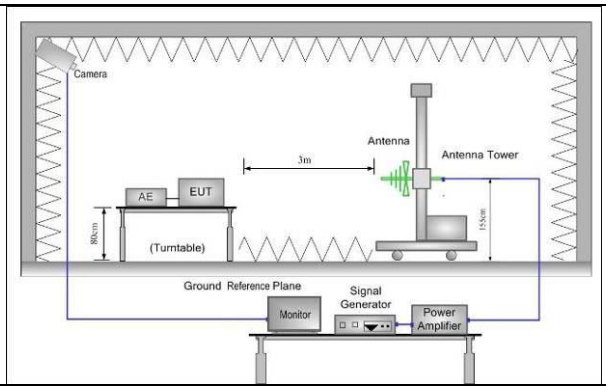
Measurement Record:

Test points:	I: NA II: All plastic seam			
Direct discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observations Performance**	**Result**
± 4	Contact	I	NA	NA
± 2, ± 4,± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

A: Normal performance within the specification limits.

7.2.2 Radiated Immunity

Test Requirement:	ETSI EN 301489-17
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 6GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary.Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test monitor:	**Traffic mode:**

	1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
	Idle mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

Measurement Record:

Frequency	Level	Modulation	Operating Mode	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment	All modes	V	Front	A
				H		A
				V	Rear	A
				H		A
				V	Left	A
				H		A
				V	Right	A
				H		A
				V	Top	A
				H		A
				V	Bottom	A
				H		A

Remarks:

A: normal performance within the specification limits

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details

------End------