

EMC TEST REPORT

Applicant: Radiolink Electronic Limited

Address of Applicant: 3/F, Building 2, Fuguo Industrial Park, Kaifeng Road,
Meilin, Shenzhen, Guangdong, China

Manufacturer: Radiolink Electronic Limited

Address of Manufacturer: 3/F, Building 2, Fuguo Industrial Park, Kaifeng Road,
Meilin, Shenzhen, Guangdong, China

Equipment Under Test (EUT)

Product Name: RadioLink RTK F9P

Model No.: RadioLink RTK F9P

Applicable standards: ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-19 V2.2.1 (2022-09)

Date of sample receipt: April 29, 2026

Date of Test: April 30, 2026-June 27, 2026

Date of report issue: June 27, 2026

Test Result : PASS *

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

Authorized Signature:

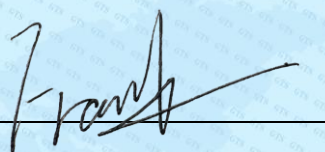
Robinson Luo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

2 Version

Version No.	Date	Description
00	June 27, 2026	Original

Tested By:

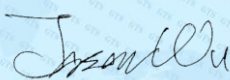


Date:

June 27, 2026

Test Engineer

Prepared By:

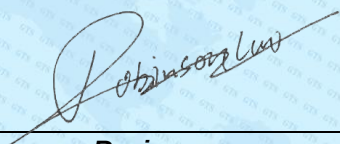


Date:

June 27, 2026

Project Engineer

Check By:



Date:

June 27, 2026

Reviewer

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4 Test Summary

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-1 ETSI EN 301 489-19 EN 55032	EN 55032	Enclosure	Pass
Conducted Emission		EN 55032	AC port	N/A
Harmonic Current Emissions		EN IEC 61000-3-2	AC port	N/A
Voltage Fluctuations and Flicker		EN 61000-3-3	AC port	N/A
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-1 ETSI EN 301 489-19 EN 55035	EN 61000-4-2	Enclosure	Pass
Radio frequency electromagnetic field (80MHz to 6000MHz)		EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients)		EN 61000-4-4	AC port	N/A
Surge Immunity		EN 61000-4-5	AC port	N/A
Radio frequency, common mode		EN 61000-4-6	AC port	N/A
Voltage Dips and Interruptions		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:	RadioLink RTK F9P
Model No.:	RadioLink RTK F9P
Receiver Frequency:	L1C: 1559-1610MHz L2C: 1215-1300 MHz L5: 1164-1215MHz
Antenna Type:	External Antenna
Antenna gain:	2.5dBi
Power Supply:	DC 4.5~6V

Disclaimer statement:

1. Antenna gain information provided by the customer, and the laboratory is not responsible for its authenticity.
2. The information in this section is provided by the applicant or manufacturer, GTS is not liable to the accuracy, suitability, reliability or/and integrity of the information.
3. Device have two antennas, both antenna has been test, only the worst-case test data provide in test report.

5.2 Operating Modes

Operating mode	Detail description
GNSS mode	Keep the EUT in GNSS receiving status

5.3 Description of Support Units

None.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: ● FCC—Registration No.: 381383 Designation Number: CN5029 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. ● ISED —Registration No.: 9079A CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing ● NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 Test Location

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:	Monitor the work status of the EUT
Audio:	N/A

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	Apr. 10, 2026	Apr. 09, 2027
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	Apr. 10, 2026	Apr. 09, 2027
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Apr. 11, 2026	Apr. 10, 2027
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 11, 2026	Apr. 10, 2027
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jul. 11, 2025	Jul 10, 2026
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.22, 2025	Nov.21, 2026
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 10, 2026	Apr. 09, 2027
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 10, 2026	Apr. 09, 2027
10	Horn Antenna (18GH-40GHz)	Schwarzbeck	BBHA 9170	GTS691	Apr. 11, 2026	Apr. 10, 2027
11	FSV-Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 10, 2026	Mar. 09, 2027
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 10, 2026	Apr. 09, 2027
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 24, 2025	Nov. 23, 2026
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 10, 2026	Apr. 09, 2027
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 13, 2026	Apr. 12, 2027
16	RE cable 1	GTS	N/A	GTS675	Jul. 11, 2025	Jul. 10, 2026
17	RE cable 2	GTS	N/A	GTS676	Jul. 11, 2025	Jul. 10, 2026
18	RE cable 3	GTS	N/A	GTS677	Jul. 11, 2025	Jul. 10, 2026
19	RE cable 4	GTS	N/A	GTS678	Jul. 11, 2025	Jul. 10, 2026
20	RE cable 5	GTS	N/A	GTS679	Jul. 11, 2025	Jul. 10, 2026
21	RE cable 6	GTS	N/A	GTS680	Jul. 11, 2025	Jul. 10, 2026
22	RE cable 7	GTS	N/A	GTS681	Jul. 11, 2025	Jul. 10, 2026
23	RE cable 8	GTS	N/A	GTS682	Jul. 11, 2025	Jul. 10, 2026
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Jun. 03, 2026	Jun. 02, 2027
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 10, 2026	Apr. 09, 2027
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 14, 2026	Apr. 13, 2027
6	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 11, 2026	Apr. 10, 2027
7	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 10, 2026	Apr. 09, 2027
8	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 10, 2026	Apr. 09, 2027
9	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 10, 2026	Apr. 09, 2027
10	EMI Test Software	AUDIX	E3-6.100622	GTS726	N/A	N/A
11	Current probe	CYBERTEK	EM5011	GTS698	Jan. 27, 2026	Jan. 26, 2027

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	LINCEL	ESD-203B	GTS645	Apr. 13, 2026	Apr. 12, 2027
2	Thermo meter	KTJ	TA328	GTS243	Apr. 13, 2026	Apr. 12, 2027

Conducted Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Signal Generator	ROHDE & SCHWARZ	SMB 100A	GTS553	Apr. 10, 2026	Apr. 09, 2027
2	CDN	LionCEL	CDN-M3-16	GTS554	Apr. 10, 2026	Apr. 09, 2027
3	CDN	CYBERTEK	EM 5070	GTS559	Apr. 10, 2026	Apr. 09, 2027
4	Power amplifier	rflight	NTWPA-00010475	GTS555	Apr. 10, 2026	Apr. 09, 2027
5	ATT	SUNWAVE	SJ-50-06DB	GTS556	Apr. 10, 2026	Apr. 09, 2027
6	Clamp	SCHAFFNER	KEMZ 801	GTS558	Apr. 10, 2026	Apr. 09, 2027
7	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 14, 2026	Apr. 13, 2027
8	CS Test software	EZ-CS	V3A1	GTS731	N/A	N/A

Harmonic/ Flicker						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Power Analyzer H/F	EMTEST	LFZ-1-16	GTS646	Apr. 10, 2026	Apr. 09, 2027
2	AC POWER SUPPLY	EMTEST	ACS500	GTS236	Apr. 10, 2026	Apr. 09, 2027
3	Thermo meter	JINCHUANG	GSP-8A	GTS639	Apr. 14, 2026	Apr. 13, 2027
4	Harmonics/Flicker Test software	HFA(16A) program	V1.0.0.14	GTS728	N/A	N/A

EFT, Surge, Voltage dips and Interruption						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	Apr. 10, 2026	Apr. 09, 2027
2	Clamp	EMTEST	HFK	GTS557	Apr. 10, 2026	Apr. 09, 2027
3	Thermo meter	JINCHUANG	GSP-8A	GTS639	Apr. 14, 2026	Apr. 13, 2027
4	EFT/SURGE/DipsTest software	iec control	5.0.9.0	GTS727	N/A	N/A

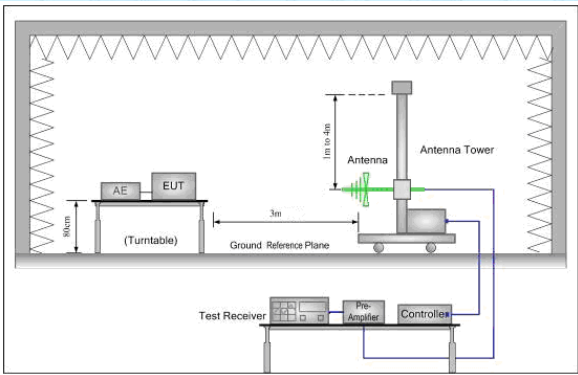
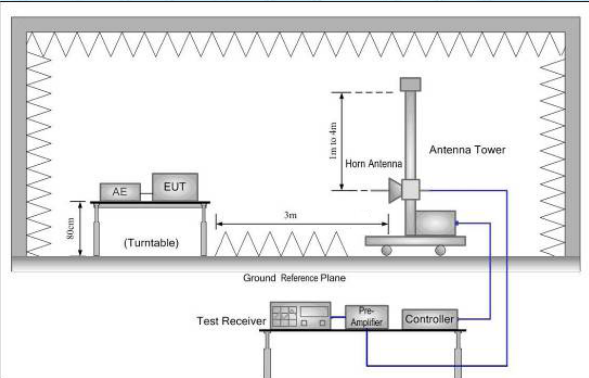
Radiated Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	May 08, 2025	May 07, 2030
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	Mar. 27, 2025	Mar. 26, 2026
3	Stacked 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	Mar. 27, 2025	Mar. 26, 2026
5	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	Sep. 20, 2025	Sep. 19, 2027
6	Broadband Amplifier(800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	Mar. 27, 2025	Mar. 26, 2026
7	Broadband Amplifier(2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	Apr. 06, 2025	Apr. 05, 2026
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	Barometer	KUMAO	SF132	GTS647	Jul. 16, 2025	Jul. 15, 2026

7 EMC Requirements Specification in ETSI EN 301 489-19

7.1 EMI (Emission)

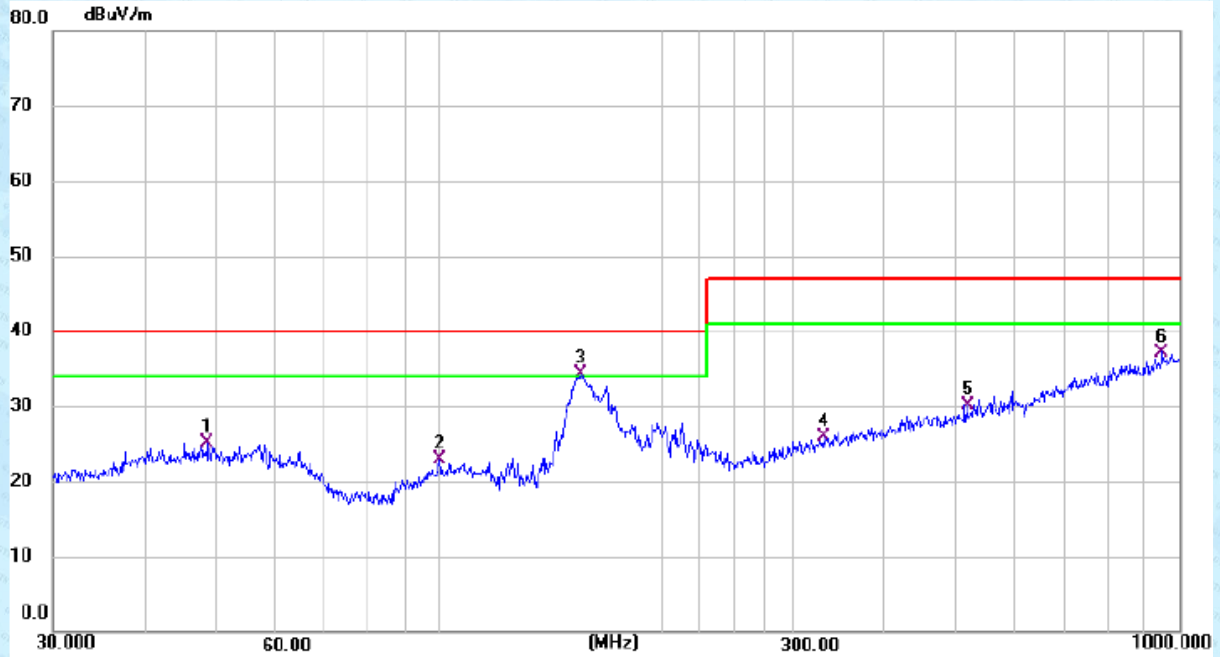
7.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489-19				
Test Method:	ETSI EN 301 489-1 and EN 55032				
Test Frequency Range:	30MHz to 6GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak AV	1MHz 1MHz	3MHz 3MHz	Peak Value 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				
					
Test setup:	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 0.1m 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, only show the worst case.					
Test results:	Pass					

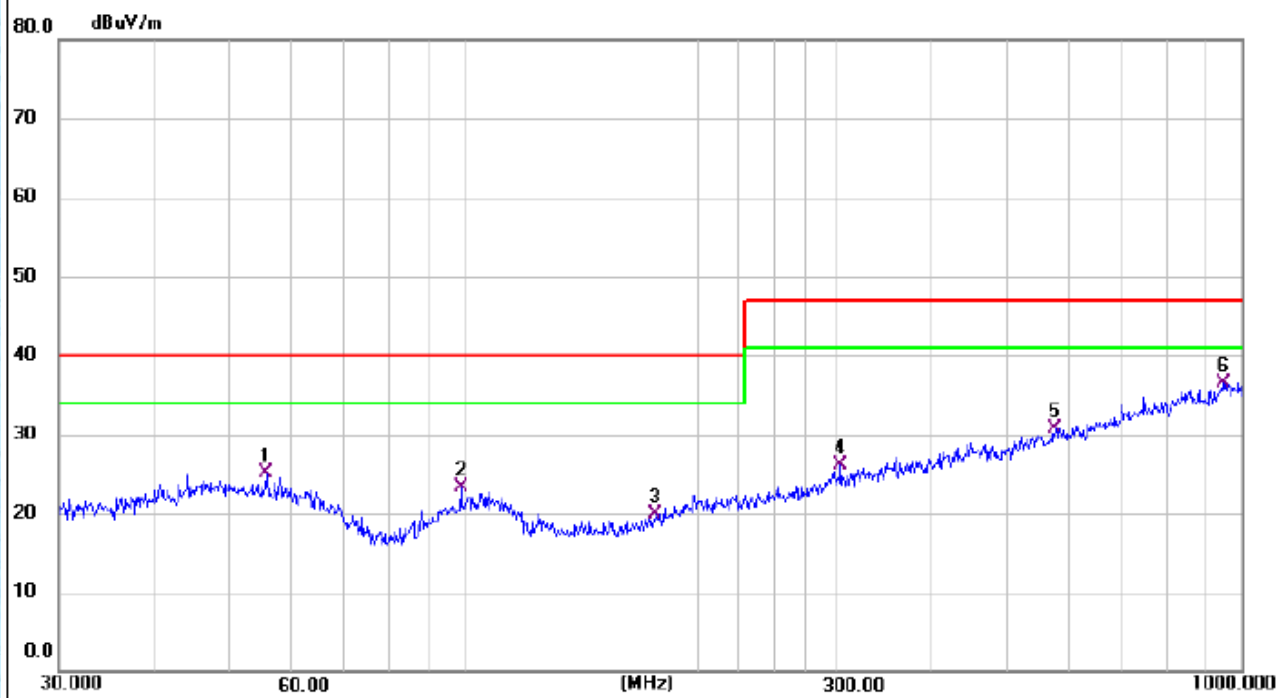
Measurement Data

Below 1GHz(Vertical)



Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
48.5019	5.52	19.59	25.11	40.00	-14.89	QP
99.8780	5.12	17.70	22.82	40.00	-17.18	QP
155.9100	19.56	14.66	34.22	40.00	-5.78	QP
330.1950	4.87	21.01	25.88	47.00	-21.12	QP
517.2480	5.72	24.48	30.20	47.00	-16.80	QP
948.7610	6.50	30.70	37.20	47.00	-9.80	QP

Below 1GHz(Horizontal)



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
55.6090	5.86	19.27	25.13	40.00	-14.87	QP
98.8330	5.59	17.65	23.24	40.00	-16.76	QP
176.2690	4.14	15.80	19.94	40.00	-20.06	QP
304.6099	5.70	20.36	26.06	47.00	-20.94	QP
576.6440	5.36	25.43	30.79	47.00	-16.21	QP
945.4400	5.78	30.63	36.41	47.00	-10.59	QP

Above 1GHz

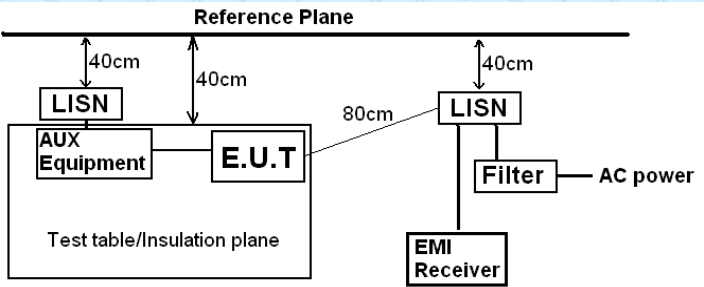
Peak measurement

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1270.00	48.88	24.33	2.18	39.31	36.08	70.00	-33.92	Vertical
2200.00	46.14	27.04	2.69	38.48	37.39	70.00	-32.61	Vertical
2645.00	46.27	27.75	3.13	38.60	38.55	70.00	-31.45	Vertical
3280.00	47.78	28.60	3.62	38.54	41.46	74.00	-32.54	Vertical
4030.00	43.89	29.35	3.93	38.21	38.96	74.00	-35.04	Vertical
4750.00	43.03	30.90	4.59	38.35	40.17	74.00	-33.83	Vertical
1970.00	46.82	26.65	2.53	38.42	37.58	70.00	-32.42	Horizontal
2385.00	47.17	27.26	2.89	38.55	38.77	70.00	-31.23	Horizontal
2905.00	46.85	28.37	3.32	38.60	39.94	70.00	-30.06	Horizontal
3285.00	46.58	28.60	3.62	38.54	40.26	74.00	-33.74	Horizontal
4290.00	43.75	29.82	4.18	38.26	39.49	74.00	-34.51	Horizontal
4790.00	43.42	31.01	4.60	38.36	40.67	74.00	-33.33	Horizontal

Notes:

1. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Level(dBuV/m)=Reading level(dBuV)+Antenna Factor(dB/m)+Cable Loss(dB)-Preamplifier Factor(dB)
2. The EUT was test at 3m in field chamber.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. 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.

7.1.2 Conducted Emissions

Test Requirement:	ETSI EN 301 489-19		
Test Method:	ETSI EN 301 489-1 and EN 55032		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	 Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. 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). 3. 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 EN 55032 Class B on conducted measurement.		
Test Instruments:	Temp.: 24 °C	Humid.: 51%	Press.: 1 010mbar
Measurement Record:	Uncertainty: 3.44dB		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.2 for details, only show the worst case.		
Test results:	N/A		

7.1.3 Harmonics Test Results

Test Requirement:	ETSI EN 301 489-1, EN IEC 61000-3-2
Test Method:	N/A: See Remark Below
Remark:	There is no need for Harmonics test to be performed on this product (rated power of 75 W or less) in accordance with EN IEC 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN IEC 61000-3-2 Which states: “For the following categories of equipment limits are not specified in this edition of the standard. Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”

7.1.4 Flicker Test Results

Test Requirement:	ETSI EN 301 489-1, EN 61000-3-3
Test Method:	EN 61000-3-3
Class/Severity:	Clause 5 of EN 61000-3-3
Measurement Time:	10 min
Detector:	As per EN 61000-3-3
Test Instruments:	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:	N/A

7.2 Immunity

Performance Criteria of ETSI EN 301 489-1, clause 6	
6.0 Introduction	The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests. For the purpose of the present document two categories of performance criteria apply: •Performance criteria for continuous phenomena. •Performance criteria for transient phenomena. NOTE: Normally, the performance criteria depends upon the type of radio equipment and/or its intended application. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment.
6.1 Performance criteria for continuous phenomena	During the test, the equipment shall: •continue to operate as intended; •not unintentionally transmit; •not unintentionally change its operating state; •not unintentionally change critical stored data.
6.2 Performance criteria for transient phenomena	For all ports and transient phenomena with the exception described below, the following applies: •The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. •After application of the transient phenomena, the equipment shall operate as intended. 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 otherwise restored. 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. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Performance Criteria of ETSI EN 301 489-19, clause 6

6.1 General performance criteria

The provisions of EN 301 489-1 [1], clause 6 shall not apply.
The applicable performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

6.2 Performance table

6.2.1 Performance criteria overview

An overview of the different performance criteria applicable to the EUT is given in table 2.

Table 2: Performance criteria

Criteria		
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.

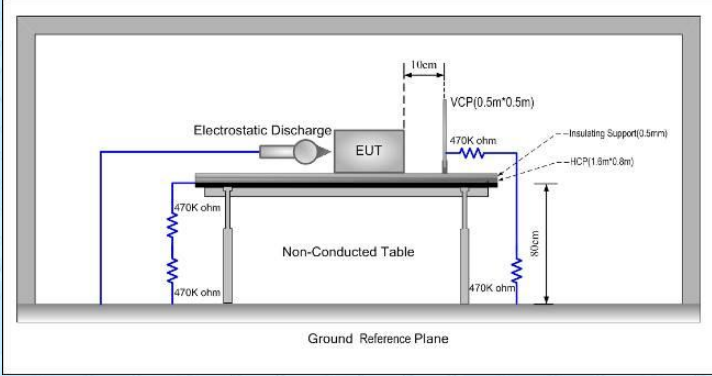
6.3 Performance criteria for Continuous phenomena

The performance criteria A shall apply.
Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.
Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

6.4 Performance criteria for Transient phenomena

The performance criteria B shall apply for transient phenomena, except for voltage dips greater than or equal to 100 ms, voltage interruptions of 5 000 ms duration, and surges of 10/700 μ s for which performance criteria C shall apply.
Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as result of the application of the test.
Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as result of the application of the test.

7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301489-19
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
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					

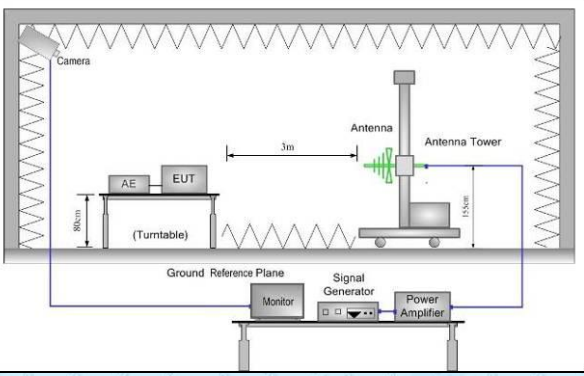
Measurement Record:

Test points:	I: All metallic parts			
	II: All plastic seams			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations Performance	Result
± 4	Contact	I	A	Pass
± 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 301489-19
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 6GHz
Test Level:	3V/m
Modulation:	80%, 1kHz&400Hz 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					

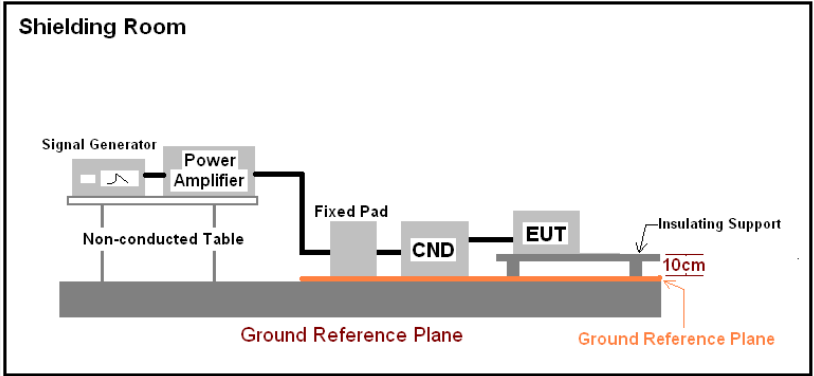
Measurement Record:

Frequency	Level	Modulation	Operating Mode	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1kHz&400Hz, 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

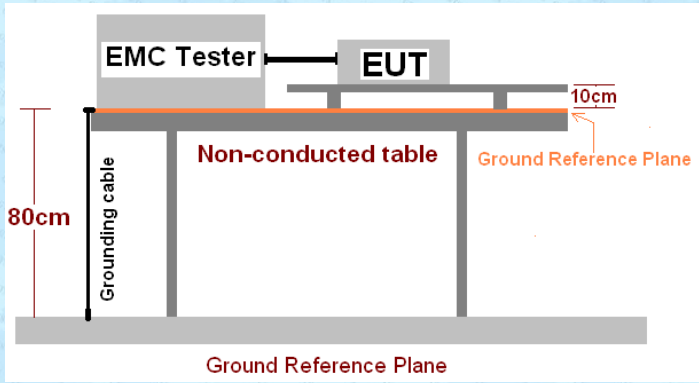
Remarks:

A: normal performance within the specification limits

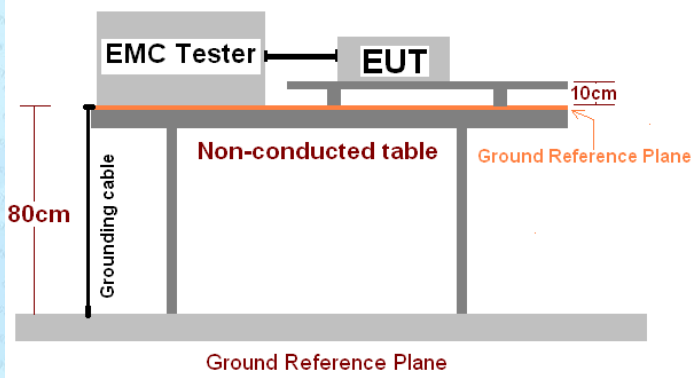
7.2.3 Radio frequency common mode

Test Requirement:	ETSI EN 301489-19					
Test Method:	EN 61000-4-6					
Frequency range:	0.15MHz to 80MHz					
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)					
Modulation:	80%, 1kHz&400Hz Amplitude Modulation					
Performance Criterion:	Criteria A					
Test setup:						
Test Procedure:	1. Let the EUT work in test mode and test it. 2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 3. The disturbance signal described below is injected to EUT through CDN. 4. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 5. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value. 6. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.					
Test environment:	Temp.:	24 $^{\circ}\text{C}$	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	N/A					

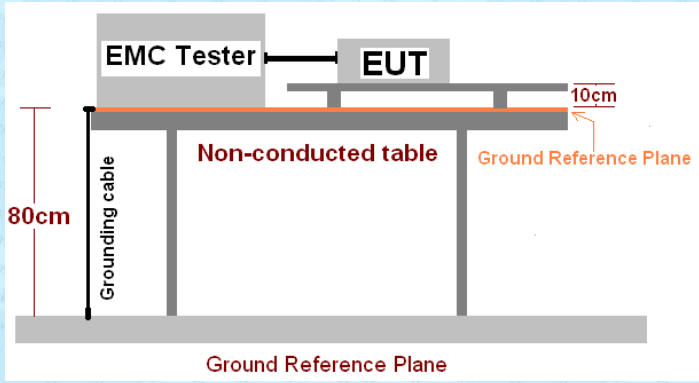
7.2.4 Electrical Fast Transients

Test Requirement:	ETSI EN 301489-19
Test Method:	EN 61000-4-4
Test Level:	1.0kV on AC port
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Performance Criterion:	B
Test setup:	 The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. Both are placed on a non-conducted table. A grounding cable is connected to the table, which is 80cm high. A ground reference plane is shown at the base of the table, and another is shown 10cm above the EUT. The EUT is also 10cm high.
Test Procedure:	1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 2. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. 3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. 4. The length of the signal and power lines between the coupling device and the EUT is 0.5m Test on Signal Ports, Telecommunication Ports and Control Ports: The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes. Test on power supply ports: 1. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. 2. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	N/A

7.2.5 Surge

Test Requirement:	ETSI EN 301489-19
Test Method:	ETSI EN 61000-4-5
Test Level:	$\pm 0.5, \pm 1\text{kV}$ line to line
Polarity:	Positive & Negative
Test Interval:	60s between each surge
No. of surges:	5 positive, 5 negative at $0^\circ, 90^\circ, 180^\circ, 270^\circ$.
Performance Criterion:	B
Test setup:	
Test Procedure:	1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. 2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. 3. Different phase angles are done individually. 4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	N/A

7.2.6 Voltage Dip and Voltage Interruptions

Test Requirement:	ETSI EN 301489-19
Test Method:	EN 61000-4-11
Test Level:	0% of VT(Supply Voltage) for 0.5 period 0% of VT(Supply Voltage) for 1.0 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
No. of Dips / Interruptions:	3 per Level
Performance Criterion:	0% VD, 0.5 period----Performance criterion: B 0% VD, 1 period----Performance criterion: B 70% VD, 25 period----Performance criterion: C 0% VI, 250 period----Performance criterion: C
Test setup:	 The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. The EUT is placed on a non-conducted table. A grounding cable is connected to the table, and a ground reference plane is indicated at a height of 80cm. The distance between the EUT and the ground reference plane is 10cm.
Test Procedure:	1>.The EUT and test generator were setup as shown on above setup photo. 2>.The interruptions are introduced at selected phase angles with specified duration. 3>.Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	N/A

8 Test Setup Photo

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

9 EUT Constructional Details

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

-----End-----