

TEST REPORT

Application No.: SZEM1901010412CR
Applicant: Tech21 UK Ltd
Address of Applicant: Syd's Quay, Eel Pie Island, London, TW1 3DY, England
Manufacturer: Tech21 UK Ltd
Address of Manufacturer: Syd's Quay, Eel Pie Island, London, TW1 3DY, England
Factory: ShenZhen VLG wireless technology Co., Ltd
Address of Factory: 3-4F, 1st Bldg, 1st sub-park of Taohuayuan hi-tech park, Xixiang, Baoan, Shenzhen

Equipment Under Test (EUT):

EUT Name: Charge Pod
Model No.: T21-6998
Trade mark: Charge Pod
FCC ID: 2ASRZ-T21-6998
Standard(s) : 47 CFR Part 18
Date of Receipt: 2019-01-18
Date of Test: 2019-01-21 to 2019-01-30
Date of Issue: 2019-02-15

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



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Shenzhen Branch EMC Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.ssgroup.com.cn
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-02-15		Original

Authorized for issue by:			
			
		<hr/>	
		Bill Chen /Project Engineer	
			
		<hr/>	
		Eric Fu /Reviewer	



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2 Test Summary

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted disturbance	47 CFR Part 18	FCC MP-5	Part 18.307	Pass
Radiated emission	47 CFR Part 18	FCC MP-5	Part 18.305	Pass



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4 General Information

4.1 Details of E.U.T.

Power supply:	Output by cable:5V-3A/9V-2A/12V-1.5A MAX 18W Output by wireless:5V-1A/9V-1.1A MAX10W Rechargeable battery: DC 3.85V 18.86Wh(Charge by type C)
Cable:	Type C cable:100cm unshielded
Antenna Type:	Loop Antenna
Modulation Type:	Load Modulation
Operation Frequency:	112.66kHz to 204.34kHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	LeTV	EQ-248CN	16041847014
iPhone 8	Apple	A1863	F4GVQ656JC6D
Mobile Phone	SAMSUNG	SM-G9500	R28J9140LPB

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.75\text{dB}$
5	RF power density	$\pm 2.84\text{dB}$
6	Conducted Spurious emissions	$\pm 0.75\text{dB}$
7	RF Radiated power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
9	Temperature test	$\pm 1^\circ\text{C}$
10	Humidity test	$\pm 3\%$
11	Supply voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 Test Location

All tests were 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.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted disturbance					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2017-05-10	2020-05-09
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018-07-12	2019-07-11
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018-09-25	2019-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2018-04-02	2019-04-01
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018-04-02	2019-04-01

Radiated emission					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018-07-12	2019-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2018-04-02	2019-04-01
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2018-04-13	2019-04-12
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07



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6 Radio Spectrum Matter Test Results

6.1 Conducted disturbance

Test Requirement Part 18.307
Test Method: FCC MP-5
Limit:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.



6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.7 °C Humidity: 55 % RH Atmospheric Pressure: 1030 mbar

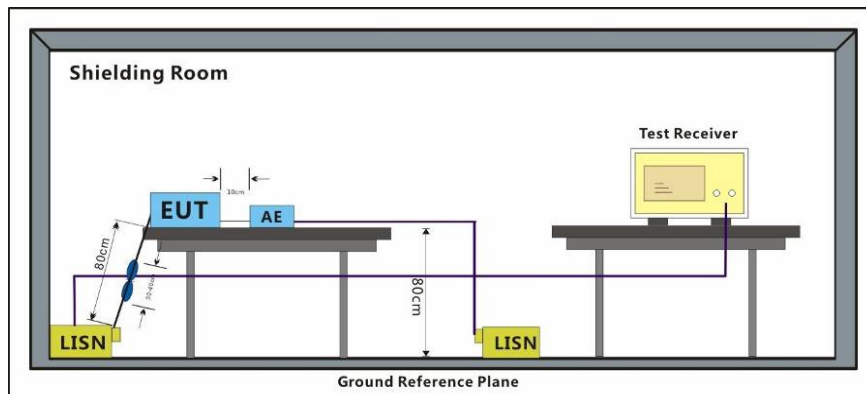
Pretest these modes to find the worst case: a: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(5W)

b: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(7.5W)

c: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(10W)

The worst case for final test: a: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(5W)

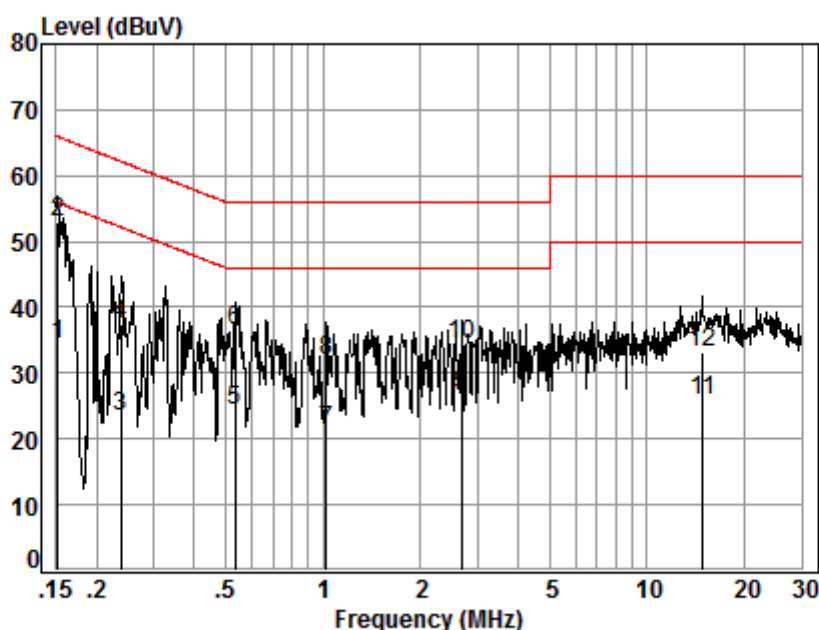
6.1.2 Test Setup Diagram



6.1.3 Measurement Procedure and Data



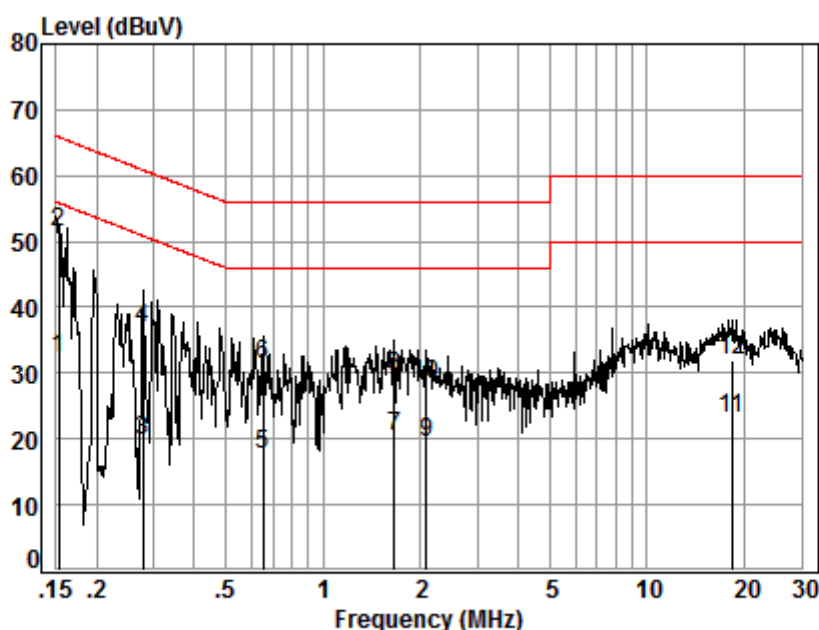
Mode: a; Line: Live Line



Site : Shielding Room
Condition: Line
Job No. : 10412CR
Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15	0.01	9.66	24.57	34.24	55.91	-21.67	Average
2	0.15	0.01	9.66	43.21	52.88	65.91	-13.03	QP
3	0.24	0.03	9.67	13.76	23.46	52.17	-28.71	Average
4	0.24	0.03	9.67	27.57	37.27	62.17	-24.90	QP
5	0.53	0.06	9.67	14.63	24.36	46.00	-21.64	Average
6	0.53	0.06	9.67	26.70	36.43	56.00	-19.57	QP
7	1.02	0.09	9.74	11.56	21.39	46.00	-24.61	Average
8	1.02	0.09	9.74	22.19	32.02	56.00	-23.98	QP
9	2.68	0.16	9.71	16.88	26.75	46.00	-19.25	Average
10	2.68	0.16	9.71	24.41	34.28	56.00	-21.72	QP
11	14.83	0.21	10.34	15.20	25.75	50.00	-24.25	Average
12	14.83	0.21	10.34	22.67	33.22	60.00	-26.78	QP

Mode: a; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 10412CR
Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15	0.01	9.63	22.53	32.17	55.87	-23.70	Average
2	0.15	0.01	9.63	41.70	51.34	65.87	-14.53	QP
3	0.28	0.04	9.64	10.06	19.74	50.85	-31.11	Average
4	0.28	0.04	9.64	27.04	36.72	60.85	-24.13	QP
5	0.65	0.07	9.65	7.79	17.51	46.00	-28.49	Average
6	0.65	0.07	9.65	21.53	31.25	56.00	-24.75	QP
7	1.65	0.14	9.70	10.53	20.37	46.00	-25.63	Average
8	1.65	0.14	9.70	19.60	29.44	56.00	-26.56	QP
9	2.09	0.16	9.69	9.58	19.43	46.00	-26.57	Average
10	2.09	0.16	9.69	18.46	28.31	56.00	-27.69	QP
11	18.33	0.23	10.18	12.68	23.09	50.00	-26.91	Average
12	18.33	0.23	10.18	21.38	31.79	60.00	-28.21	QP

6.2 Radiated emission

Test Requirement: Part 18.305
Test Method: FCC MP-5
Measurement Distance: 3m
Limit:

(b) The field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 $25 \times \text{SQRT}(\text{power}/500)$	300 ¹ 300
	Any non-ISM frequency	Below 500 500 or more	15 $15 \times \text{SQRT}(\text{power}/500)$	300 ¹ 300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 (²)	1,600 (²)
Medical diathermy	Any ISM frequency	Any	25	300
	Any non-ISM frequency	Any	15	300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) $2,400/\text{F}(\text{kHz}) \times \text{SQRT}(\text{power}/500)$	300 ³ 300
	490 to 1,600 kHz	Any	24,000/F(kHz)	30
	Above 1,600 kHz	Any	15	30
Induction cooking ranges	Below 90 kHz	Any	1,500	⁴ 30
	On or above 90 kHz	Any	300	⁴ 30

¹Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

²Reduced to the greatest extent possible.

³Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

⁴Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 51 % RH Atmospheric Pressure: 1020 mbar

Pretest these modes to find the worst case:

a: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(5W)

b: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(7.5W)

c: Wireless Charge+charge mode_Keep the EUT wireless charging and cable charge.(10W)

d: Wireless Charge mode_Keep the EUT wireless charging and cable charge.(5W)

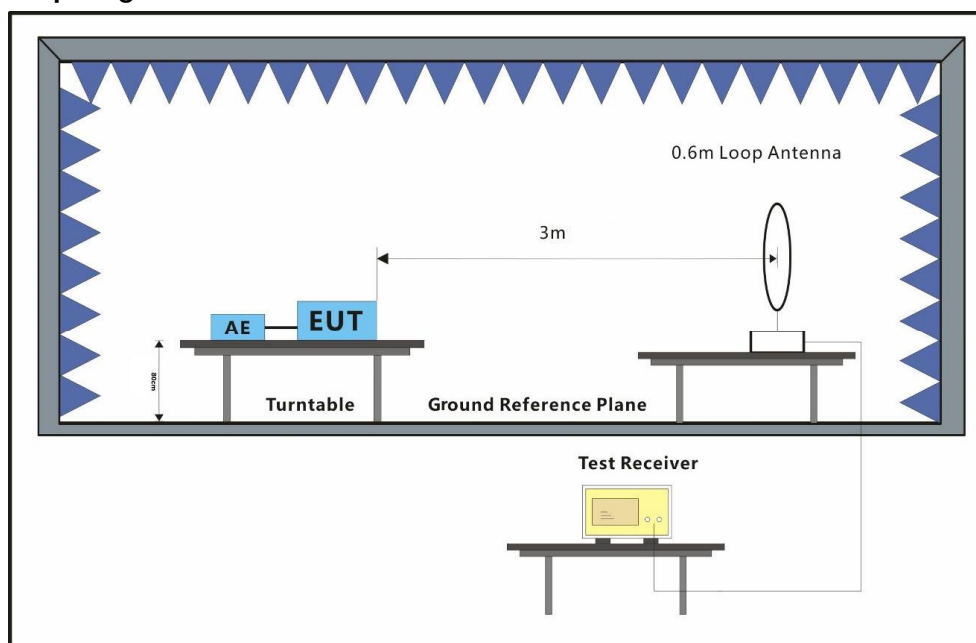
e: Wireless Charge mode_Keep the EUT wireless charging and cable charge.(7.5W)

f: Wireless Charge mode_Keep the EUT wireless charging and cable charge.(10W)

The worst case for final test:

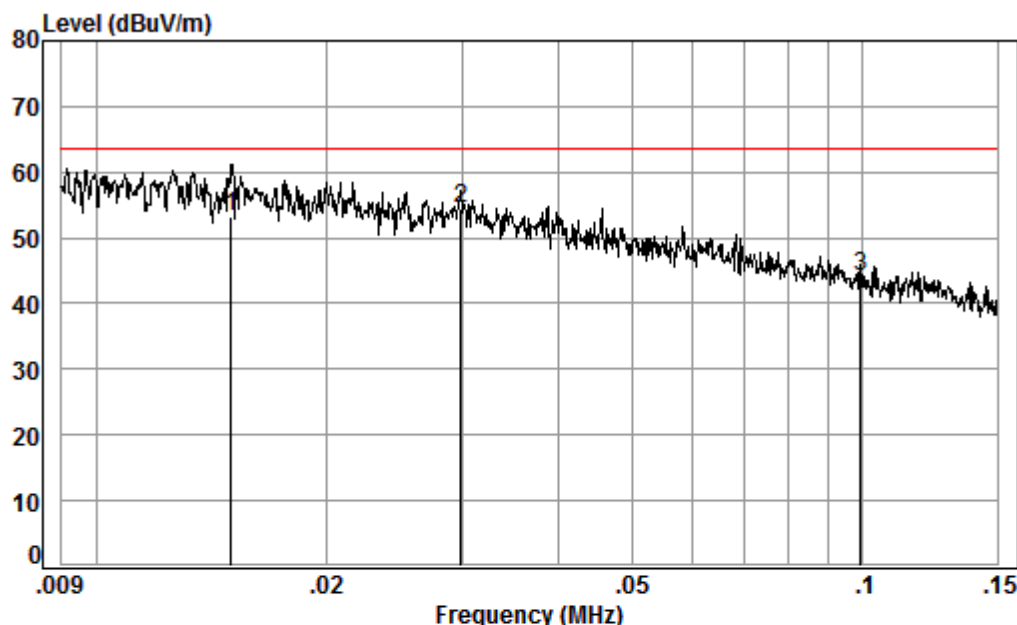
d: Wireless Charge mode_Keep the EUT wireless charging and cable charge.(5W)

6.2.2 Test Setup Diagram



6.2.3 Measurement Procedure and Data

9kHz-150kHz



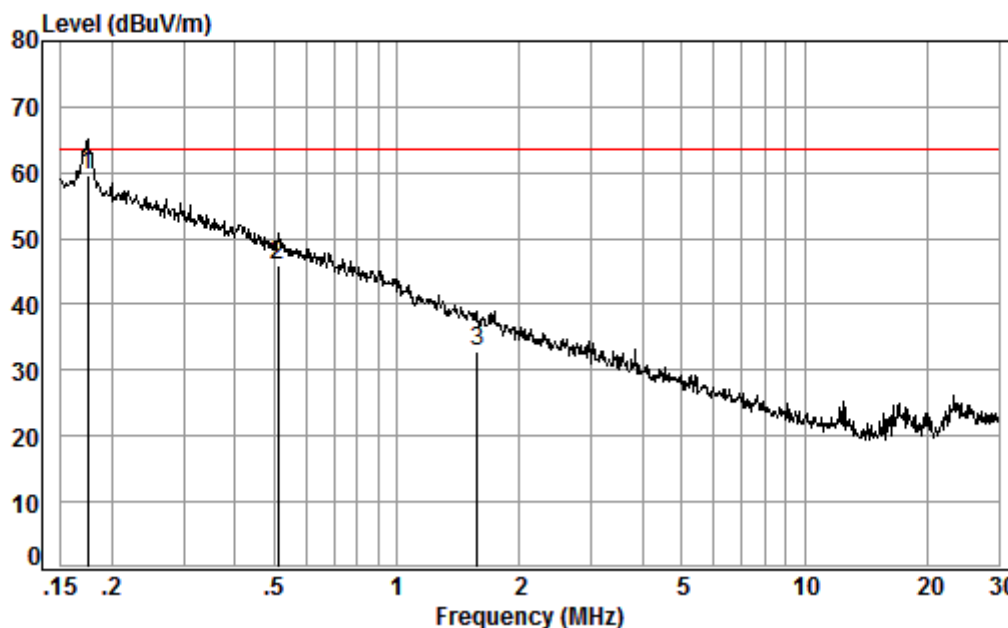
Condition: 3m

Job No. : 10412CR

Test Mode: d

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	0.25	16.79	31.62	67.72	53.14	63.52	-10.38	Average
2 pp	0.03	0.18	13.86	32.00	72.28	54.32	63.52	-9.20	Average
3	0.10	0.05	12.00	32.68	64.59	43.96	63.52	-19.56	Average

150kHz-30MHz



Condition: 3m

Job No. : 10412CR

Test Mode: d

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	0.17	0.07	11.79	32.67	80.50	59.69	63.52	-3.83	Average
2	0.51	0.11	11.71	32.66	66.69	45.85	63.52	-17.67	Average
3	1.58	0.30	12.07	32.65	53.17	32.89	63.52	-30.63	Average



7 Photographs

7.1 Test Setup

Refer to Setup Photos

7.2 EUT Constructional Details (EUT Photos)

Refer to EUT external and internal photos

- End of the Report -



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