



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

SHEM-TRF-001 Rev. 02 Sep01, 2023

Report No.: SHCR240400076401

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TEST REPORT

Application No.: SHCR2404000764HS
FCC ID: 2BG47XLY-9000
Applicant: Zephyrlock, LLC
Address of Applicant: 14 Finance Drive Danbury Connecticut United States 06810
Equipment Under Test (EUT):
EUT Name: HMI Touch Screen
Model No.: 9000
Standard(s) : 47 CFR Part 15, Subpart C 15.225
Date of Receipt: 2024-04-30
Date of Test: 2024-05-08 to 2024-05-23
Date of Issue: 2024-05-27

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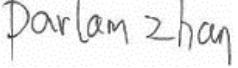
* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Revision Record			
Version	Description	Date	Remark
00	Original	2024-05-27	/

Authorized for issue by:			
Tested By		 Wade Zhang	
		Wade Zhang/Project Engineer	
Approved By		 Parlam Zhan	
		Parlam Zhan / Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.225	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.225	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth		ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Emission Mask		ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)	Pass*
Frequency tolerance		ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.225(e)	Pass
Radiated Emissions (9kHz-30MHz)		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass
Radiated Emissions (30MHz-1GHz)		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass

Note*: The test level of the fundamental signal is below the limit of general spurious emission, so the test item doesn't be performed.

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V
Test Voltage:	AC 120V 60Hz
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Antenna Type:	Loop Antenna
Number of Channels	1

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
AC-DC Converter	MORNSUN	LM150-20B12	-
DC Power adapter plate	-	-	-
NFC Card	-	-	-

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Occupied Bandwidth	3%
4	Conducted Spurious emissions	0.75dB
5	RF Radiated power	5.1dB (Below 1GHz) 5.9dB (Above 1GHz)
6	Radiated Spurious emission test	4.2dB (Below 30MHz) 4.5dB (30MHz-1GHz) 5.1dB (1GHz-6GHz) 5.4dB (6GHz-18GHz)
7	Temperature test	1°C
8	Humidity test	3%
9	Supply voltages	1.5%
10	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).
3. Sample source: sent by customer.

4.5 Test Facility

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

- **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

- **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

- **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 8617A

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2023-12-19	2024-12-18
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2023-12-19	2024-12-18
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2023-12-19	2024-12-18
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2023-09-03	2025-09-02
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2023-04-17	2025-04-16
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2023-09-03	2025-09-02
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2023-09-03	2025-09-02
Pre-Amplifier	HP	8447D	SHEM236-1	2023-12-19	2024-12-18
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2023-12-19	2024-12-18
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023-05-06	2026-05-05
RE test Cable	/	PT18-NMNM-10M	SHEM217-2	2023-12-19	2024-12-18
Test software	ESE	E3	Version: 6.111221a	/	/

Conducted Emissions at AC Mains Terminals (150kHz-30MHz)

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2023/12/19	2024/12/18
Line impedance stabilization network	SCHWARZBEC K	NSLK8127	SHEM061-1	2023/12/19	2024/12/18
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2023/12/19	2024/12/18
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2023/12/19	2024/12/18
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2023/12/19	2024/12/18
CE test Cable	/	/	SHEM172-1	2023/12/19	2024/12/18
Test Software	ESE	e3	Version: 6.191211	N/A	N/A

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is loop antenna and no consideration of replacement.

Antenna location: Refer to Internal photos

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

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.

7.1.1 E.U.T. Operation

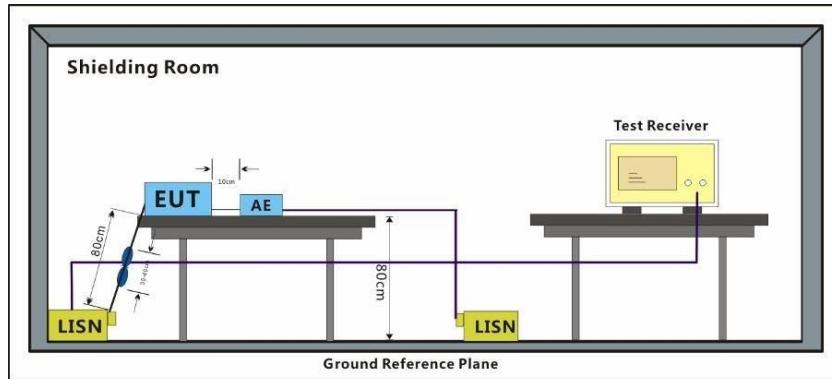
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

7.1.3 Test Setup Diagram

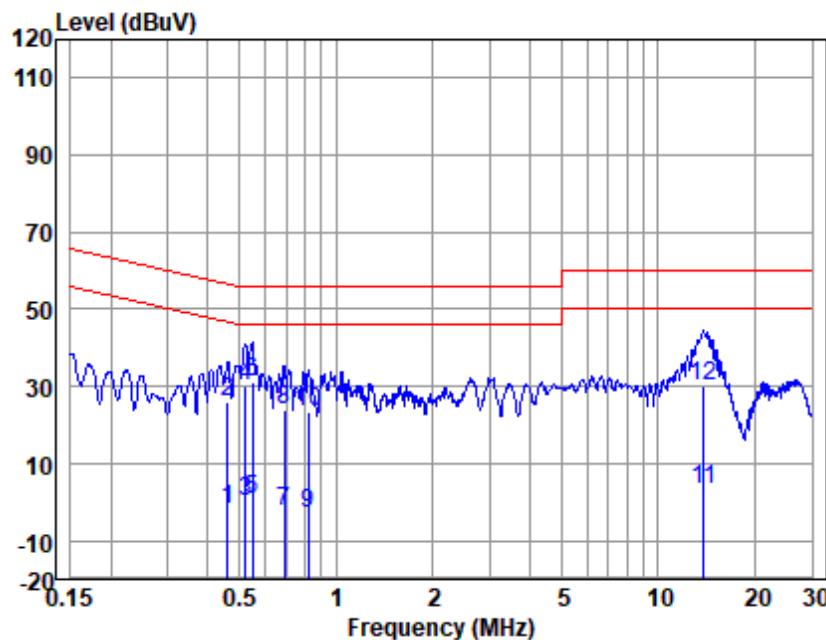


7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50 μ H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) 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,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 00; Line: Live line

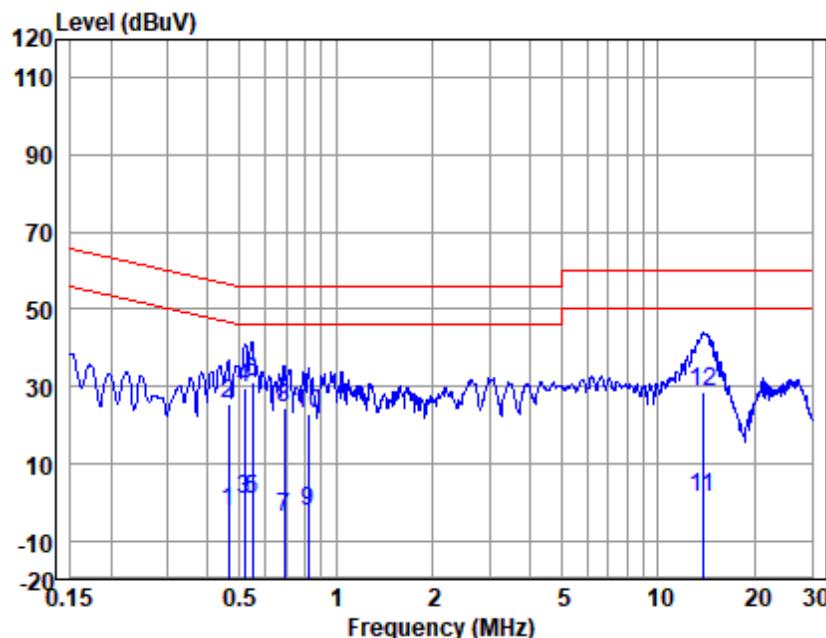


LISN : LINE
EUT/Project No : 0764HS
Test Mode : 00

Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Emission Limit (dBuV)	Over Limit (dB)	Remark
1 0.46	-11.83	0.23	9.90	-1.70	46.67	-48.37	Average
2 0.46	15.78	0.23	9.90	25.91	56.67	-30.76	QP
3 0.52	-9.80	0.20	9.90	0.30	46.00	-45.70	Average
4 0.52	20.15	0.20	9.90	30.25	56.00	-25.75	QP
5 0.55	-9.61	0.20	9.90	0.49	46.00	-45.51	Average
6 0.55	21.10	0.20	9.90	31.20	56.00	-24.80	QP
7 0.69	-12.41	0.20	9.90	-2.31	46.00	-48.31	Average
8 0.69	14.06	0.20	9.90	24.16	56.00	-31.84	QP
9 0.82	-12.98	0.20	9.94	-2.84	46.00	-48.84	Average
10 0.82	13.51	0.20	9.94	23.65	56.00	-32.35	QP
11 13.84	-7.69	0.50	10.46	3.27	50.00	-46.73	Average
12 13.84	19.00	0.50	10.46	29.96	60.00	-30.04	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

Test Mode: 00; Line: Neutral Line



LISN : NEUTRAL
EUT/Project No : 0764HS
Test Mode : 00

Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Emission Limit (dBuV)	Over Limit (dB)	Remark
1 0.46	-12.72	0.30	9.90	-2.52	46.63	-49.15	Average
2 0.46	15.05	0.30	9.90	25.25	56.63	-31.38	QP
3 0.52	-9.56	0.30	9.90	0.64	46.00	-45.36	Average
4 0.52	19.47	0.30	9.90	29.67	56.00	-26.33	QP
5 0.55	-9.58	0.30	9.90	0.62	46.00	-45.38	Average
6 0.55	20.98	0.30	9.90	31.18	56.00	-24.82	QP
7 0.69	-14.12	0.30	9.90	-3.92	46.00	-49.92	Average
8 0.69	14.39	0.30	9.90	24.59	56.00	-31.41	QP
9 0.82	-12.80	0.30	9.94	-2.56	46.00	-48.56	Average
10 0.82	12.89	0.30	9.94	23.13	56.00	-32.87	QP
11 13.77	-9.85	0.58	10.46	1.19	50.00	-48.81	Average
12 13.77	17.31	0.58	10.46	28.35	60.00	-31.65	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

7.2.1 E.U.T. Operation

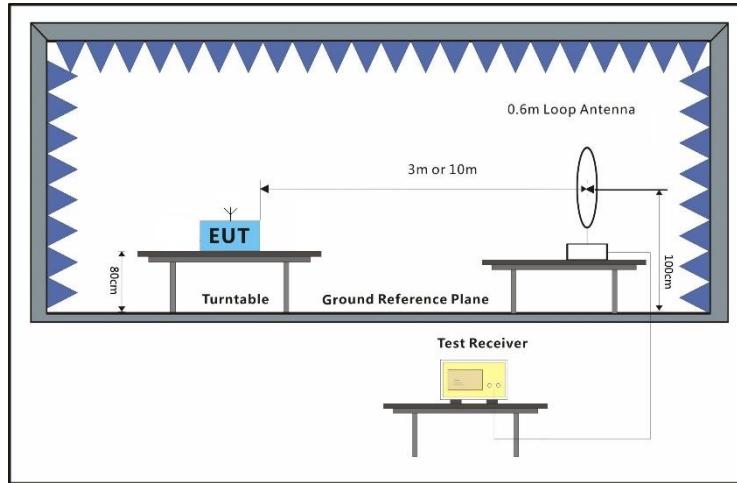
Operating Environment:

Temperature: 26.3 °C Humidity: 60.8 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

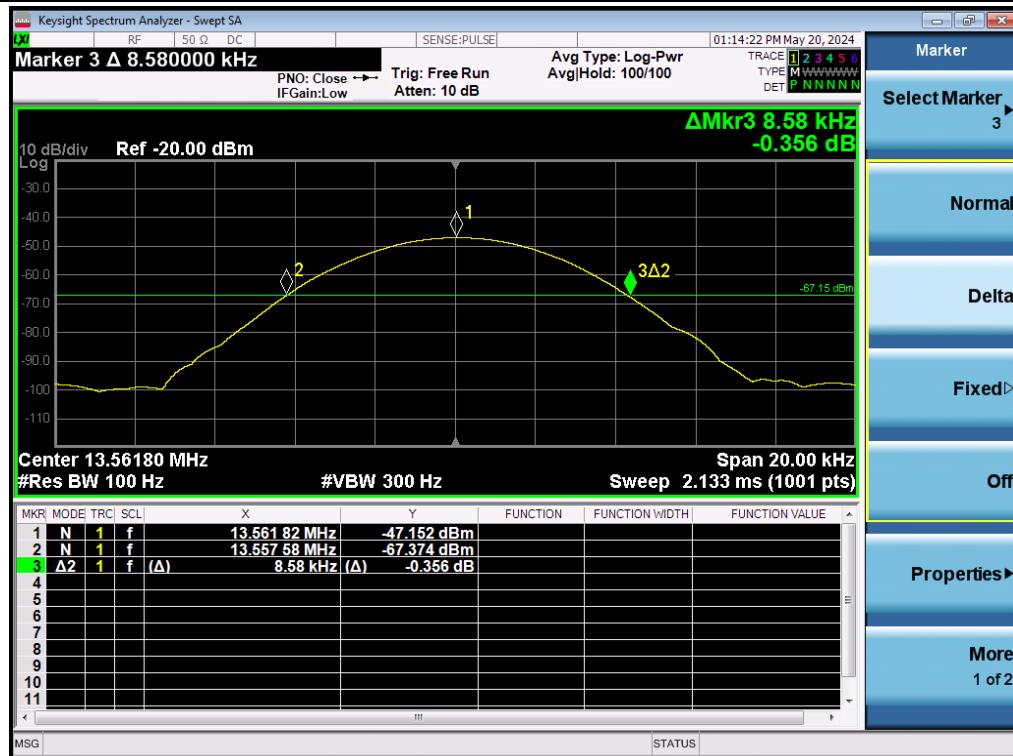
7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

20dB bandwidth (kHz)	F _L (MHz)	F _H (MHz)	Limit(MHz)	Result
8.58	13.55758	13.56616	13.110 – 14.010	Pass



7.3 Emission Mask

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)

Test Method: ANSI C63.10 (2013) Section 6.4

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Below 30MHz

The limit at 30m test distance is below:

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dB μ V/m

FS_{max} is the measured field strength, expressed in dB μ V/m

d_{measure} is the distance of the measurement point from the EUT

d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 84dB μ V/m at 30 meters.

7.3.1 E.U.T. Operation

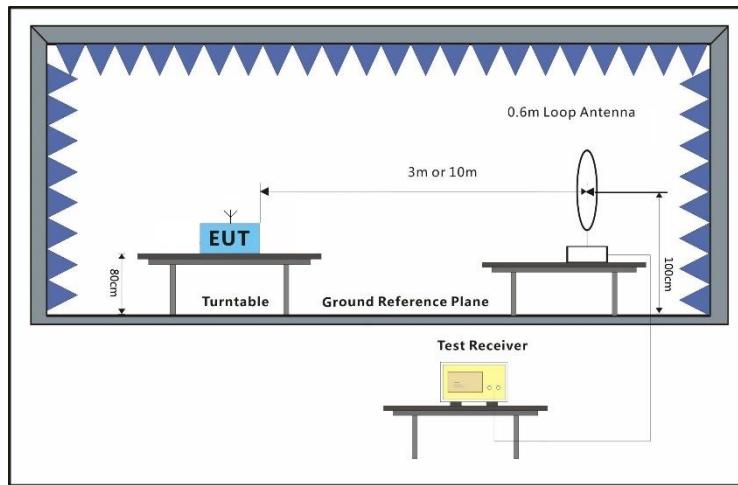
Operating Environment:

Temperature: 26.3 °C Humidity: 60.8 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Note: The test level of the fundamental signal is below the limit of general spurious emission, so the test item doesn't be performed.

7.4 Frequency tolerance

Test Requirement 47 CFR Part 15, Subpart C 15.225(e)
Test Method: ANSI C63.10 (2013) Section 6.8
Limit: 1.356kHz

7.4.1 E.U.T. Operation

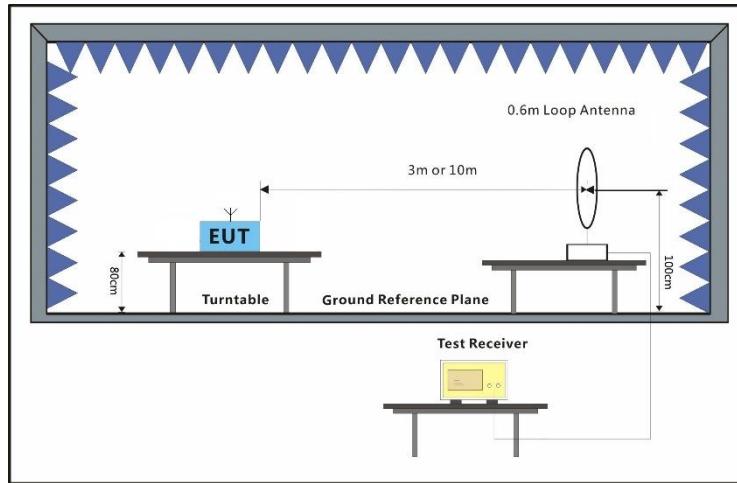
Operating Environment:

Temperature: 26.3 °C Humidity: 60.8 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.

Nominal Operation Frequency: 13.56MHz

Test Conditions		Test Result (MHz)	Deviation (kHz)	Limit (kHz)	Result
Temp (°C)	Volt (V DC)				
T _{nom} (-20)	V _{nom} (12)	13.56006	0.06	±0.01% (1.3560kHz)	Pass
T _{nom} (-10)	V _{nom} (12)	13.56005	0.05		Pass
T _{nom} (0)	V _{nom} (12)	13.56003	0.03		Pass
T _{nom} (10)	V _{nom} (12)	13.56004	0.04		Pass
T _{nom} (20)	V _{nom} (12)	13.56004	0.04		Pass
T _{nom} (30)	V _{nom} (12)	13.56005	0.05		Pass
T _{nom} (40)	V _{nom} (12)	13.56004	0.04		Pass
T _{nom} (50)	V _{nom} (12)	13.56003	0.03		Pass
T _{nom} (20)	V _{min} (10.2)	13.56006	0.06		Pass
	V _{max} (13.8)	13.56007	0.07		Pass

Note: Deviation (kHz) = (Test Result-13.56MHz)*1000

7.5 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dB μ V/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30

Note:

(1) For test distance other than what is specified, but fulfilling the requirements of section 15.31(f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

So the Distance Extrapolation Factor in dB is $40 * \log(DTEST / DSPEC)$ where DTEST = Test Distance and DSPEC = Specified Distance.

Field strength limit (dB μ V/m)@test distance = Field strength limit (dB μ V/m)@specified distance + Distance Extrapolation Factor

(2) The lower limit shall apply at the transition frequencies.

Below 30MHz

If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than $\lambda/2\pi$ and the limit distance is greater than $\lambda/2\pi$, the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the $\lambda/2\pi$ distance, and at a 20 dB/decade of distance rate beyond $\lambda/2\pi$. This shall be accomplished using Equation (2):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(near field)}/d_{(10m)}\} + 20\log\{d_{(30/300m)}/d_{(near field)}\} \quad (2)$$

If the single point measured is at a distance greater than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (3):

$$FS_{(10m)} = FS_{(30/300m)} + 20\log\{d_{(30/300m)}/d_{(10m)}\} \quad (3)$$

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(30/300m)}/d_{(10m)}\} \quad (4)$$

Remark:

$$d_{near field} = 47.77 / f_{MHz}$$

where f_{MHz} is the frequency of the emission being measured in MHz.

Remark:

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 Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dB μ V/m

FS_{max} is the measured field strength, expressed in dB μ V/m

d_{measure} is the distance of the measurement point from the EUT

d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 26.3 °C

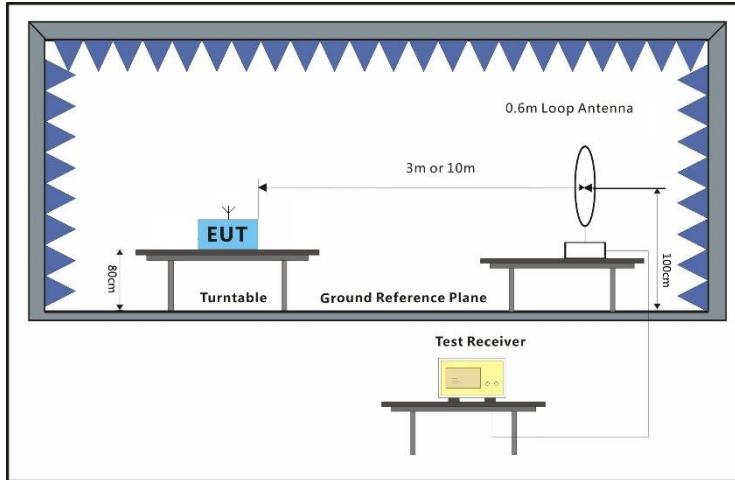
Humidity: 60.8 % RH

Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

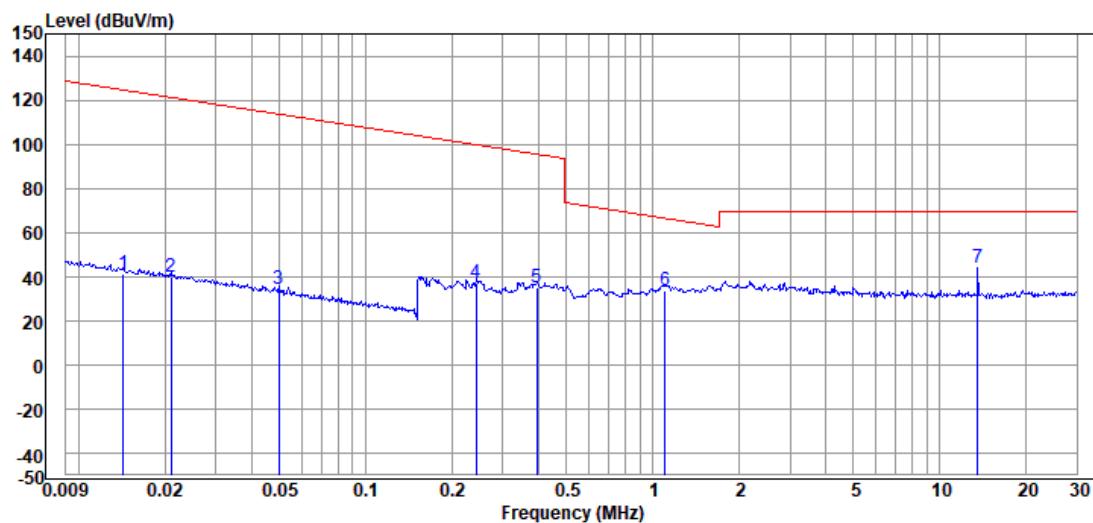
Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

7.5.3 Test Setup Diagram



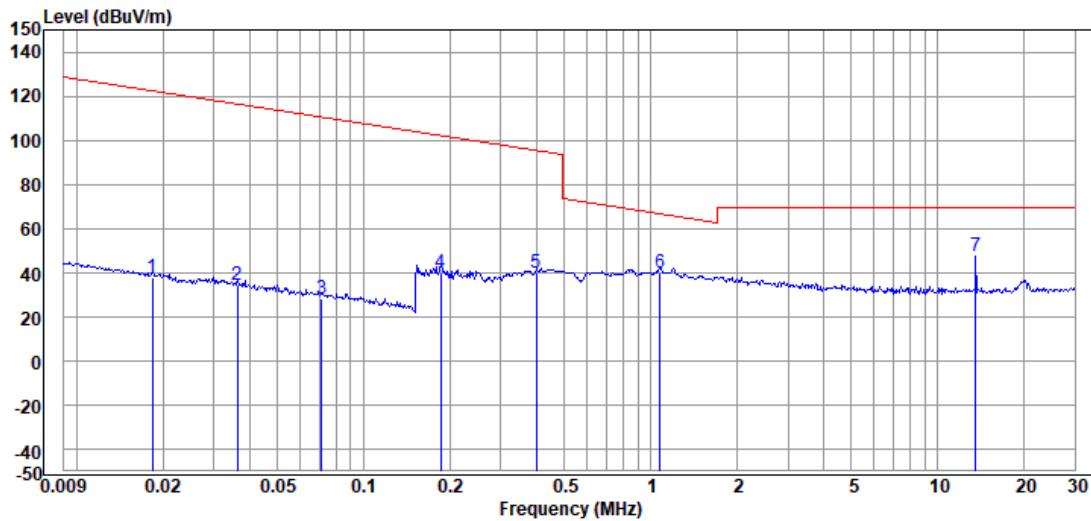
7.5.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Coaxial:

Item	Freq.	Read Level	Antenna Factor	Cable Loss	Result Level@3m	Result Level@S PEC	Limit Line@SP EC	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB/m)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.014	23.23	17.74	0.20	41.17	-38.83	44.49	-83.32	QP
2	0.021	22.25	17.49	0.20	39.94	-40.06	41.18	-81.24	QP
3	0.050	16.75	17.30	0.20	34.25	-45.75	33.64	-79.39	QP
4	0.242	20.20	17.20	0.20	37.60	-42.4	19.91	-62.31	QP
5	0.394	17.88	17.20	0.20	35.28	-44.72	15.68	-60.4	QP
6	1.105	16.34	17.51	0.20	34.05	-5.95	26.76	-32.71	QP
7	13.548	26.21	17.70	0.33	44.24	4.24	29.5	-25.26	Peak

Remark: Result Level= Read Level + Antenna Factor + Cable Loss

Coplanar:


Item	Freq.	Read Level	Antenna Factor	Cable Loss	Result Level@3m	Result Level@S PEC	Limit Line@SP EC	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB/m)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.018	20.02	17.56	0.20	37.78	-42.22	42.3	-84.52	QP
2	0.036	17.22	17.33	0.20	34.75	-45.25	36.39	-81.64	QP
3	0.071	10.85	17.29	0.20	28.34	-51.66	30.54	-82.2	QP
4	0.185	22.90	17.20	0.20	40.30	-39.7	22.23	-61.93	QP
5	0.398	22.36	17.20	0.20	39.76	-40.24	15.61	-55.85	QP
6	1.078	22.56	17.51	0.20	40.27	0.27	26.97	-26.7	QP
7	13.548	29.60	17.70	0.33	47.63	7.63	29.5	-21.87	Peak

Remark: Result Level= Read Level + Antenna Factor + Cable Loss

NOTE:

(1) For test distance other than what is specified, but fulfilling the requirements of section 15.31(f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

So the Distance Extrapolation Factor in dB is $40 \times \log(D_{TEST} / D_{SPEC})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

Field strength limit (dB μ V/m)@test distance= Field strength limit (dB μ V/m)@specified distance +Distance Extrapolation Factor

(2) The lower limit shall apply at the transition frequencies.

7.6 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 26.3 °C

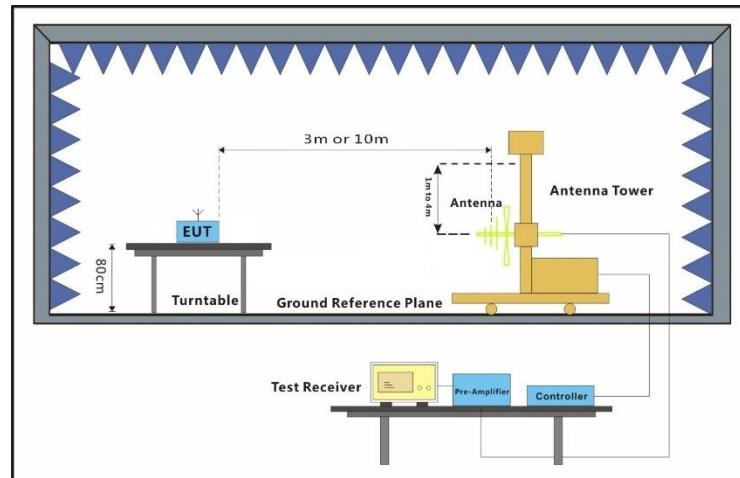
Humidity: 60.8 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT transmitting with modulation continuously.

7.6.3 Test Setup Diagram

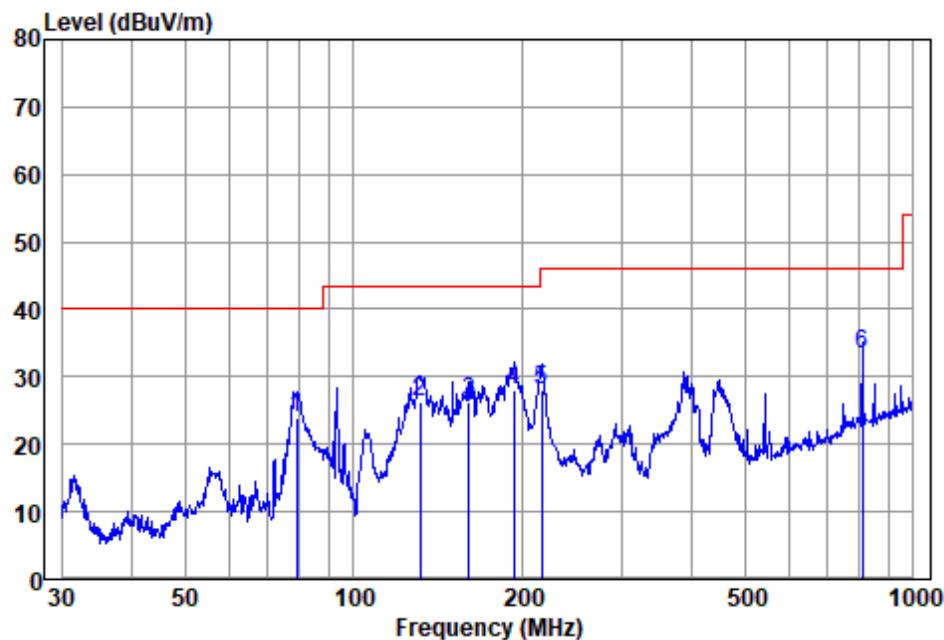


7.6.4 Measurement Procedure and Data

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Test Mode: 00; Polarity: Horizontal

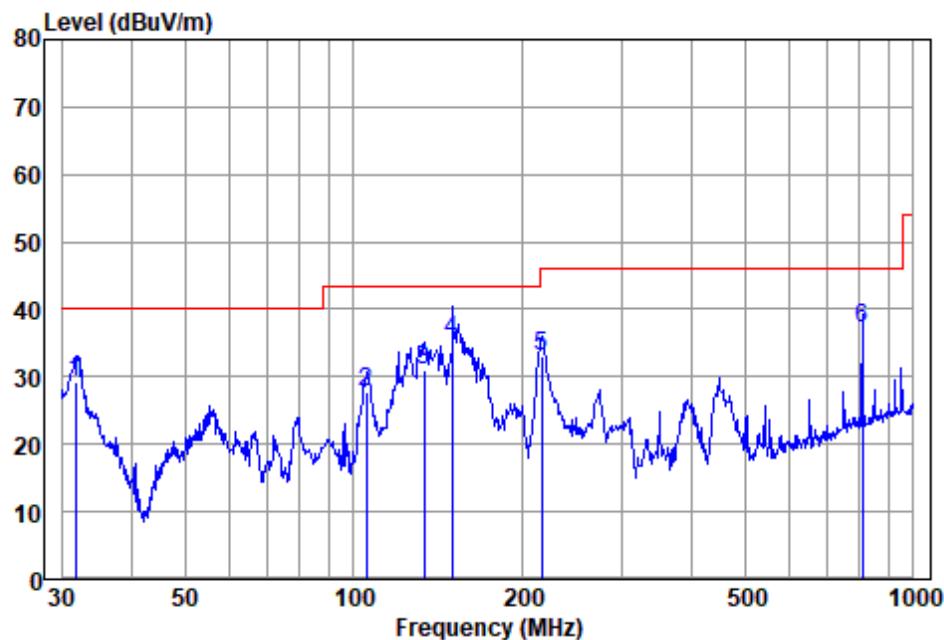


Antenna Polarity :HORIZONTAL
EUT/Project :0764HS
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	78.965	45.83	9.30	1.84	33.20	23.77	40.00	-16.23	QP
2	131.297	44.51	12.20	2.52	33.07	26.16	43.50	-17.34	QP
3	160.346	42.89	13.60	2.77	33.00	26.26	43.50	-17.24	QP
4	193.095	47.79	10.40	2.92	33.00	28.11	43.50	-15.39	QP
5	216.783	47.95	9.87	3.08	32.93	27.97	46.00	-18.03	QP
6	810.265	36.25	22.60	6.53	32.15	33.23	46.00	-12.77	QP

Note: Emission Level=Read Level+Antenna Factor+Cable loss+Preamp Factor

Test Mode: 00; Polarity: Vertical



Antenna Polarity : VERTICAL

EUT/Project : 0764HS

Test mode : 00

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	31.843	48.89	12.20	1.20	33.20	29.09	40.00	-10.91 QP
2	105.272	48.59	10.00	2.22	33.17	27.64	43.50	-15.86 QP
3	133.619	49.09	12.40	2.65	33.06	31.08	43.50	-12.42 QP
4	150.011	52.08	13.70	2.63	33.00	35.41	43.50	-8.09 QP
5	216.783	53.01	9.87	3.08	32.93	33.03	46.00	-12.97 QP
6	810.265	40.14	22.60	6.53	32.15	37.12	46.00	-8.88 QP

Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2404000764HS

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2404000764HS

- End of the Report -