

Prüfbericht-Nr.: <i>Test Report No.:</i>	50278818 001	Auftrags-Nr.: <i>Order No.:</i>	238108123	Seite 1 von 24 <i>Page 1 of 24</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	25-Jul-2019	
Auftraggeber: <i>Client:</i>	Siemens Healthcare Diagnostics Inc. 2 Edgewater Drive Norwood, MA 02062 USA			
Prüfgegenstand: <i>Test item:</i>	Mobile Computing Device			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	PD470SH-B, PD470SH-N			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C / Test report (NFC)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.225 FCC 47CFR Part 2: Subpart J Section 2.1093			
Wareneingangsdatum: <i>Date of receipt:</i>	30-Jul-2019	Refer to EUT photos.		
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000966214-002 A000966214-003			
Prüfzeitraum: <i>Testing period:</i>	01-Aug-2019 - 29-Aug-2019			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
29-Aug-2019 Mars Y. J. Lin / Project Engineer		29-Aug-2019 Arvin Ho/Vice General Manager		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
				Unterschrift <i>Signature</i>
Sonstiges / Other: PD470SH-B and PD470SH-N use the same motherboard and RF Chip, the difference between PD470SH-B and PD470SH-N is that PD470SH-B more than PD470SH-N a barcode scanner function, both models have been considered, only the worst mode is listed.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Passed

5.1.3 FREQUENCY STABILITY

RESULT: Passed

5.1.4 SPURIOUS EMISSION

RESULT: Passed

5.2.1 CONDUCTED EMISSIONS LINE AND NEUTRAL

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed

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1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation internal view
(File Name: 50278814, 50278816, 50278817, 50278818, 50278819 001 Appendix P)

Appendix D: Test Result of Radiated Emissions
(File Name: 50278818 001 Appendix D)

Test Specifications

The following standards were applied.

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.225 ANSI C63.10:2013 FCC 47CFR Part 2: Subpart J Section 2.1093 447498 D01 General RF Exposure Guidance v06

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC Registration No.: 180491
IC Canada Registration No.: 9465A
TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022



Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESR 7	101062	2018/10/01	2019/10/01
Spectrum Analyzer	Rohde & Schwarz	FSV-40	101514	2019/02/07	2020/02/07
Pre-Amplifier	Hewlett Packard	8447F	2805A03335	2019/08/22	2020/08/22
Pre-Amplifier	EM Electronics	EM01G18G	060558	2018/11/30	2019/11/30
Pre-Amplifier	EMC Instruments	EMC184045S E	980652	2019/02/25	2020/02/25
Bilog Antenna	TESEQ	CBL 6111D	29802	2019/08/22	2020/08/22
Horn Antenna	ETS-Lindgren	3117	00218931	2018/12/27	2019/12/27
Horn Antenna	Com-Power	AH-840	101029	2018/12/22	2019/12/22
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2019/07/11	2020/07/11
Test Software	Audix	e3	Ver. 9	N/A	N/A
Spectrum Analyzer	Agilent	N9010A	MY53470241	2019/06/17	2020/06/17
Power Meter	Anritu	ML2495A	1901008	2019/04/29	2020/04/29
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100797	2019/01/16	2020/01/16
Two-Line V-Network	Rohde & Schwarz	ENV216	101243	2019/06/23	2020/06/23
Telecom ISN 2 Line	Fischer Custom Communications	FCC-TLISN-T2-02-09	101169	2019/08/24	2020/08/24
Telecom ISN 4 Line	Fischer Custom Communications	FFCC-TLISN-T4-02-09	101168	2019/01/02	2020/01/02
Impedance Stabilization Network	TESEQ	ISN T800	51949	2019/02/20	2020/02/20

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ± 3 dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	± 1.5 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 °C
Humidity	± 10 %

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3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Mobile Computing Device that reads access codes from NFC, operating on 13.56 MHz. The scope of this test report is the 13.56 MHz inductive reader interfaces. For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Mobile Computing Device
Type Identification	PD470SH-B, PD470SH-N
Brand Name	Siemens Healthcare Diagnostics
FCC ID	2AUAM-PD470SH

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	13.56 MHz
Operation Voltage	5Vdc
Modulation	ASK and GFSK
Antenna Type	Printed Coil

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: The EUT has a serial interface which makes it possible to read data from the RFID reader. The RFID reader is permanently on.

The samples were used as follows:
Radiation: A000966214-002

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Kind of Equipment	Manufacturer	Model Name	S/N
Adapter	Topcom	TC-S300Q	T0119

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

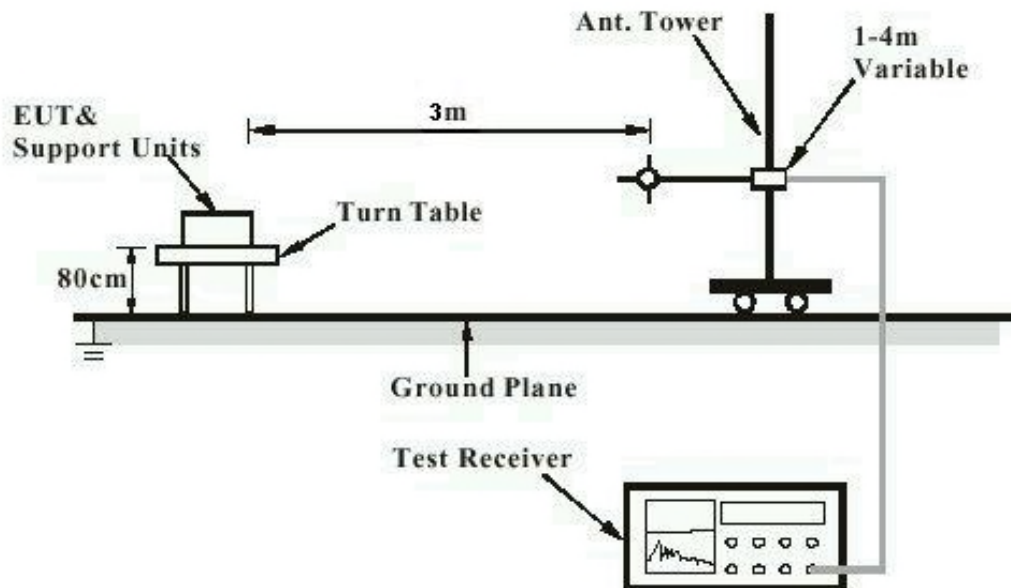
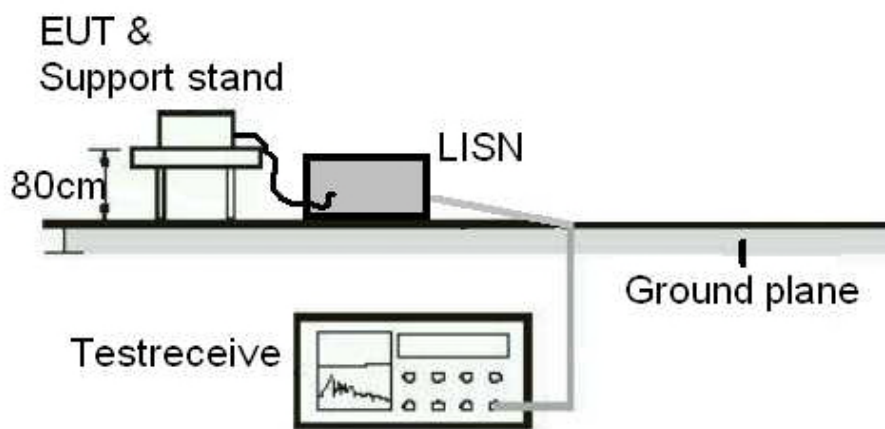


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Standard : Part 15.203

Requirement : use of approved antennas only

The antenna is connected with a proprietary connector with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Field strength of fundamental

RESULT:
Passed

Test standard : FCC Part 15. 225

Basic standard : ANSI C63.10:2013

Test setup

 Test Frequency : 13.56 MHz
 Operation Mode : A

 Ambient temperature : 20-24 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 6: Test result of Field strength of fundamental and modulation sidebands

Frequency (MHz)	Test Result		Detector	Limits (QP)		Pass/Fail
	dB μ V/m @3m	dB μ V/m @30m		dB μ V/m@3m	dB μ V/m@30m	
13.553	47.00	7.00	QP	90.47	50.47	Pass
13.560	51.84	11.84	QP	124.0	84.0	Pass
13.567	50.84	10.84	QP	90.47	50.47	Pass

For details refer to Appendix D.

5.1.3 Frequency Stability

RESULT:
Passed

Test standard : FCC Part 15. 225(e)

 Basic standard : ANSI C63.10:2013
 Kind of test site : Shielded room

Test setup

 Test Frequency : 13.56 MHz
 Operation Mode : A

 Ambient temperature : 20-24 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 7: Test result of Frequency Stability

Frequency Stability Measurement					
Fundamental frequency (MHz)	Temperature (°C)	Voltage	Measurement frequency (MHz)	Frequency Error (ppm)	Limit ±0.01%
13.56	-20	Normal	13.560520	38.35	±100ppm
	-10	Normal	13.560510	37.61	
	0	Normal	13.560510	37.61	
	10	Normal	13.560500	36.87	
	20	85%	13.560492	36.28	
	20	Normal	13.560490	36.14	
	20	115%	13.560490	36.14	
	30	Normal	13.560480	35.40	
	40	Normal	13.560460	33.92	
50	Normal	13.560450	33.19		

5.1.4 Spurious Emission

RESULT:**Passed**Test standard : FCC part 15.209
FCC part 15.225Basic standard : ANSI C63.10:2013
Limits : 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.RSS-210:
RSS-Gen general field strength limits for frequencies
outside the band 13.110-14.010 MHz.
Kind of test site : 3m Semi-Anechoic Chamber**Test setup**Operation mode : A
Ambient temperature : 20-24 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

5.2 Mains Conducted Emissions

5.2.1 Conducted Emissions Line and Neutral

RESULT:**Passed**

Test standard : FCC Part 15.207
FCC Part 15.107

Limits : Mains Conducted emissions as defined in
above test standards must comply with the
mains conducted emission limits specified.

Kind of test site : Shielded Room

Test setup

Operation mode : A

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Remark: For details refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

Test standard : FCC KDB Publication 447498 D01 Appendix C

The Power calculation formula is as follows:

$$EIRP = p_t \times g_t = (E \times d)^2 / 30$$

 p_t is the transmitter output power in watts g_t is the numeric gain of the transmitting antenna (dimensionless) E is the electric field strength in V/m d is the measurement distance in meters (m)

The electric field strength in V/m is 51.84dBuV/m@3m = 0.000391V/m@3m

The d is 3m

$$(0.000391 \times 3)^2 / 30 = 4.59E-8W = 4.59E-5mW$$

FCC:

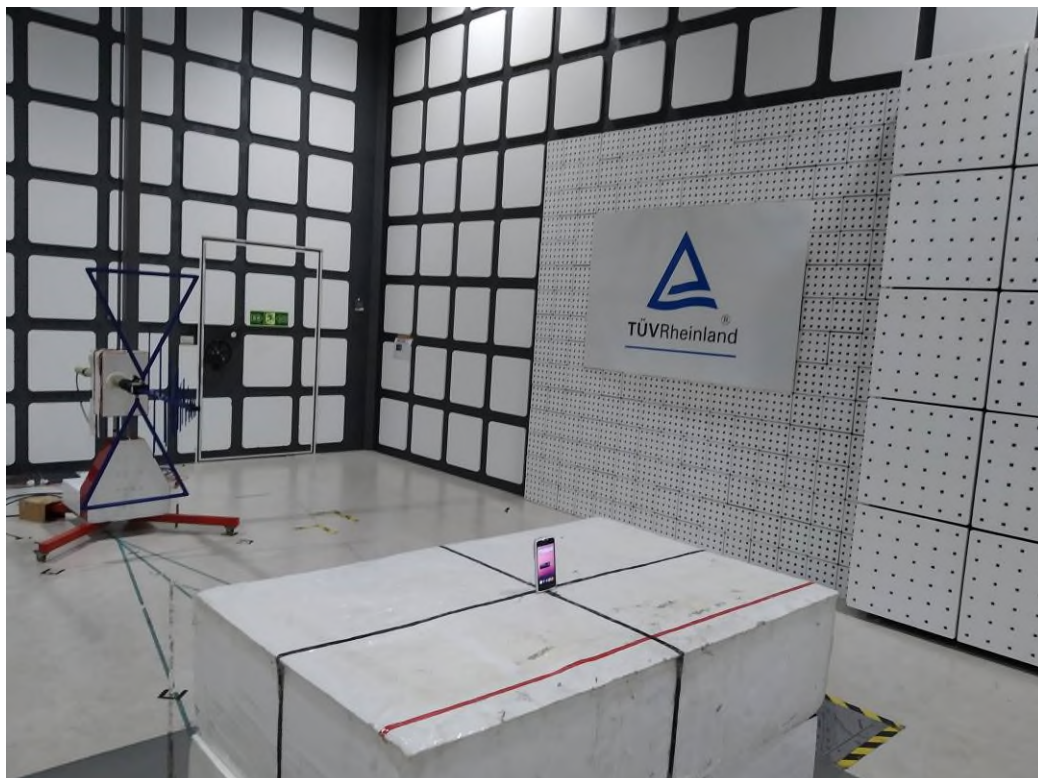
Since the transmitter's maximum peak output power is 4.59E-5mW is much less than the limit, the EUT is excluded from the SAR assessment according to FCC KDB publication 447498: Mobile Portable RF Exposure

7. Photographs of the Test Set-Up

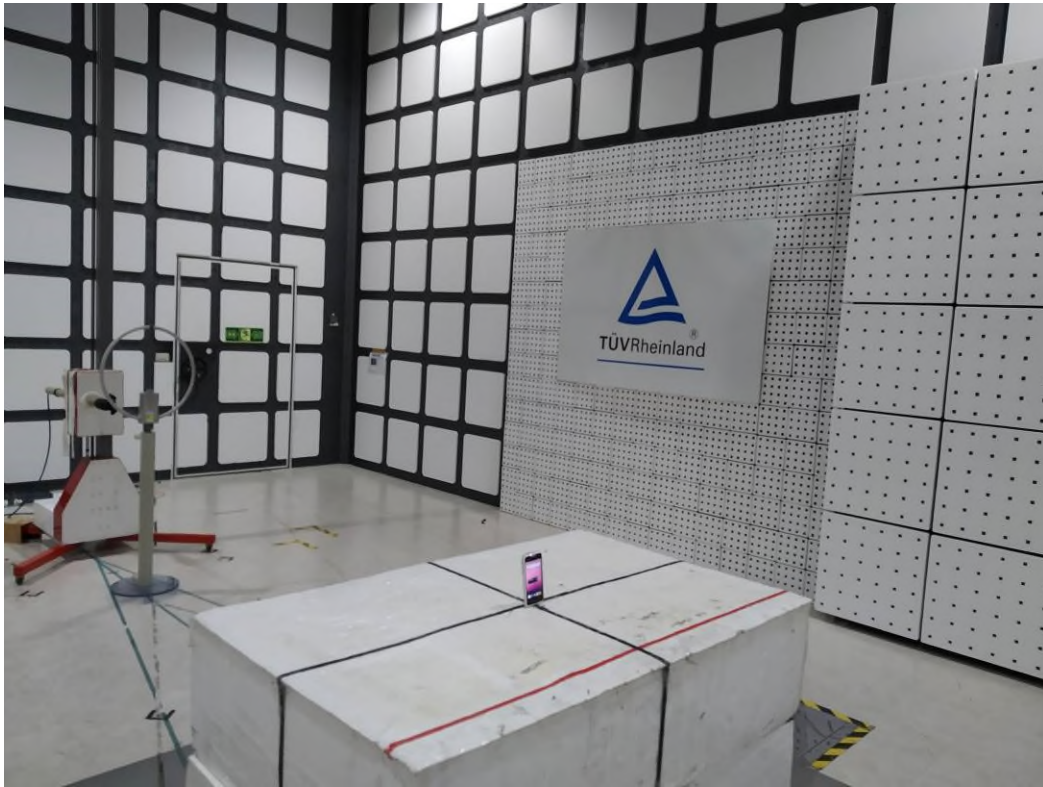
Photograph 1: Set-up for Radiated Emissions TX (Front View)



Photograph 2: Set-up for Radiated Emissions RX (Front View)



Photograph 3: Set-up for Radiated Emissions (Back View 1)



Photograph 4: Set-up for for AC Mains (Back)



Photograph 5: Set-up for for AC Mains (Front)



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