Prüfbericht-Nr.: *Test report no.:*	CN23UGU9 (P15C-NFC) 001	**Auftrags-Nr.:** *Order no.:*	48215914	
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2023-02-17	
Auftraggeber: *Client:*	Dot Origin Ltd Unit 7 Coopers Place, Combe Lane, Wormley, Godalming, GU8 5SZ, UK			
Prüfgegenstand: *Test item:*	VTAP200ESS			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	VTAP200ESS			
Auftrags-Inhalt: *Order content:*	FCC Part 15C Test report (NFC)			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.225			
Wareneingangsdatum: *Date of sample receipt:*	2023-03-30			
Prüfmuster-Nr.: *Test sample no:*	A003445985-001			
Prüfzeitraum: *Testing period:*	2023-04-09 - 2023-04-12			
Ort der Prüfung: *Place of testing:*	EMC/RF Taipei Testing Site			
Prüflaboratorium: *Testing laboratory:*	Taipei Testing Laboratories			
Prüfergebnis*: *Test result*:*	Pass			

zusammengestellt von: *compiled by:*		**genehmigt von:** authorized by:	
Datum: *Date:* 2023-04-27	Ethan Shao	**Ausstellungsdatum:** *Issue date:* 2023-04-27	Brenda Chen
Stellung / *Position:*	Assistant Project Engineer	**Stellung** / *Position:*	Senior Project Manager

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*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.
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.
V05

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.225 (a)(b)(c)	Field Strength of Fundamental Emissions	Pass
5.1.3	15.225 (d)	Radiated Spurious Emissions	Pass
5.1.4	15.225 (e)	Frequency Stability	Pass
5.1.5	15.215 (c)	20 dB Bandwidth	Pass
5.1.5	2.1049	99% Occupied Bandwidth	Pass
5.2.1	15.207	Mains Conducted Emission	Pass

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN23UGU9 (P15C-NFC) 001	Original Release	2023-04-27

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:
Appendix A - Test Result of Radiated Emissions & Mains Conducted Emission
Appendix SP - Photographs of Test Setup
Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.225 FCC 47CFR Part 2: Subpart J Section 2.1049 ANSI C63.10:2013

1.2 Decision Rule of Conformity

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.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

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

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 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.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of k=2 to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a ready-to-use 13.56 MHz NFC reader that is designed for use in many application and especially those where reading virtual card, tickets and passed from mobile phone wallet apps via NFC is a requirement.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	VTAP200ESS
Type Identification	VTAP200ESS
FCC ID	2A282-VTAP200ESS

Technical Specification of EUT

Item	EUT information
Operating Frequency	13.56 MHz
Operation Voltage	12Vdc
Modulation	ASK
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.3

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 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 NFC reader. The NFC reader is permanently on.

Test Software	None.

The samples were used as follows:
A003445985-001
Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To				Description
	Radiated Spurious Emissions	Frequency Stability	20 dB Bandwidth	Mains Conducted Emission	
-	√	√	√	√	-

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on Y-plane.
2. "-" means no effect.

Radiated Spurious Emissions

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	13.56	13.56

Frequency Stability

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	13.56	13.56

20 dB Bandwidth

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	13.56	13.56

Mains Conducted Emission

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)
-	13.56	13.56

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Radiated Spurious Emissions	23.4-24.9 °C	61-63 %	Ray Huang
Frequency Stability	22.7-23.1 °C	55.3-60.9 %	Andy Chen
20 dB Bandwidth	22.7-23.1 °C	55.3-60.9 %	Andy Chen
Mains Conducted Emission	21.1-24.9 °C	51.7-54.9 %	Ray Huang

4.3 Special Accessories and Auxiliary Equipment

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

Accessory of EUT

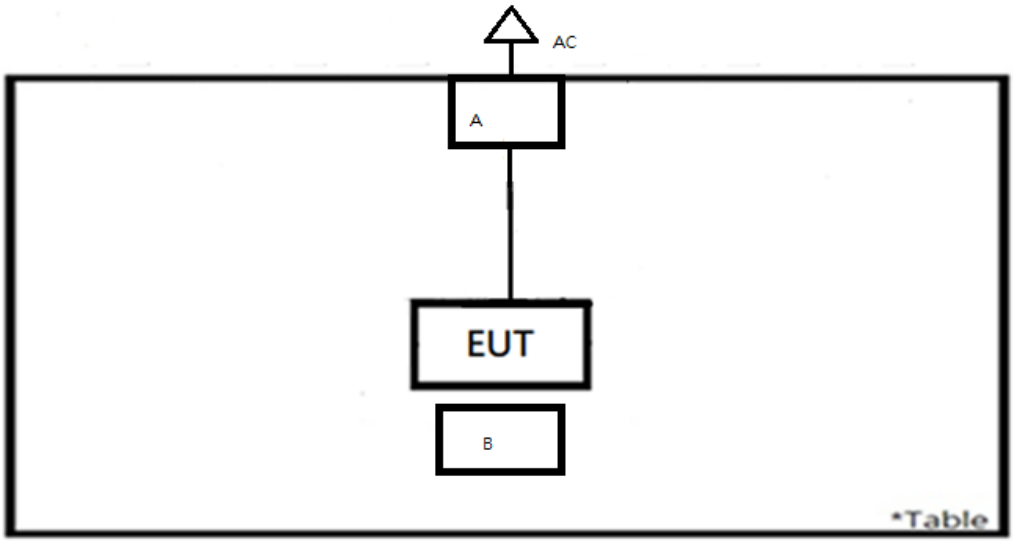
None.

Support Unit

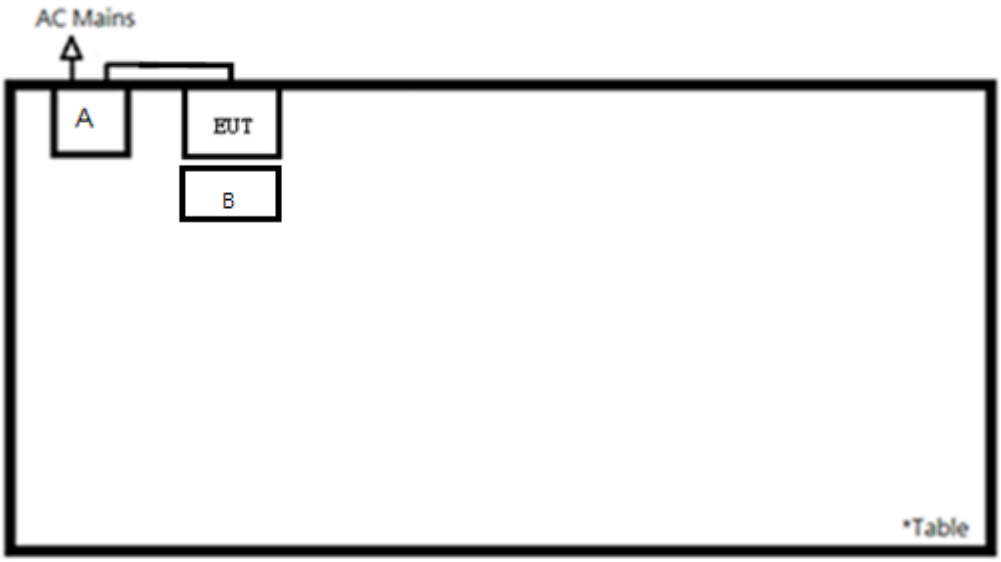
Radiated and Mains Conducted Tests				
No.	Description	Brand	Model	Remark
A	Switching Adapter	multicomp pro	DSA-12PFU-12	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1.0 A 150 cm non-shielded cable with core
				A003424337-008
B	NFC Card	Generic	Dot Origin-01	A003424337-003

4.4 Test Setup Diagram

<Radiated Spurious Emissions Mode>



<Mains Conducted Emission Mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

The antenna is a printed PCB trace 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.

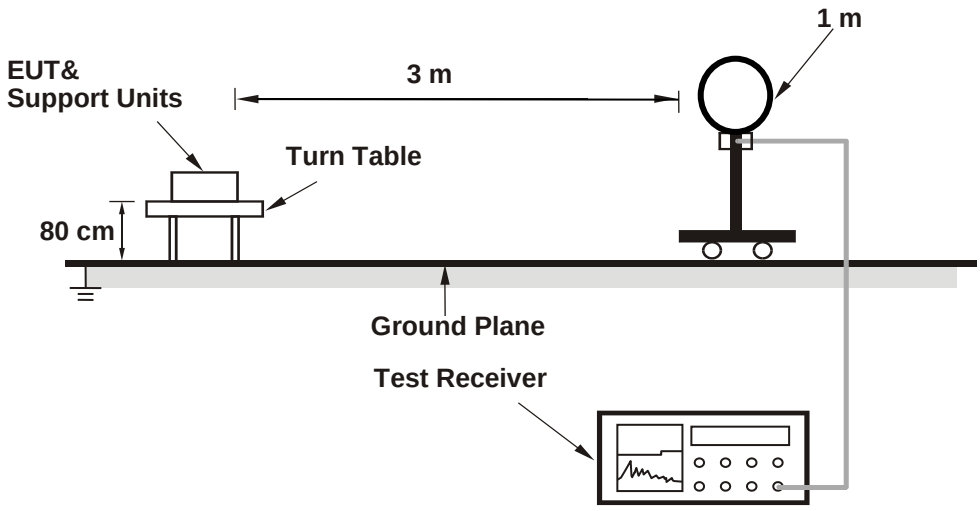
5.1.2 Field Strength of Fundamental Emissions

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.

Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Test Date: 2023/4/9 ~ 2023/4/12

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1GHz					
Signal Analyzer	R&S	FSV40	101509	2022/4/22	2023/4/21
Horn Antenna	ETS-Lindgren	3117	00218929	2022/12/8	2023/12/7
HF-AMP + AC source	EMCI	EMC051845SE	980633	2023/2/22	2024/2/21
HF-AMP + AC source	EMCI	EMC184045SE	980657	2023/2/16	2024/2/15
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2022/5/6	2023/5/5
30MHz-1GHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Bilog Antenna	SCHWARZBECK	VULB-9168	00949	2022/5/29	2023/5/28
LF-AMP	Agilent	8447D	2944A107722	2023/3/22	2024/3/20
Below 1GHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2023/1/4	2024/1/3

Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)
Limit at 30m = 15848 (uV/m)
**Limit at 3m = 20*log(15848)+40log(30m/3m) (dBuV/m)
= 84+40 (dBuV/m)
= 124 (dBuV/m)

Please refer to Appendix A.

5.1.3 Radiated Spurious Emissions

Limit

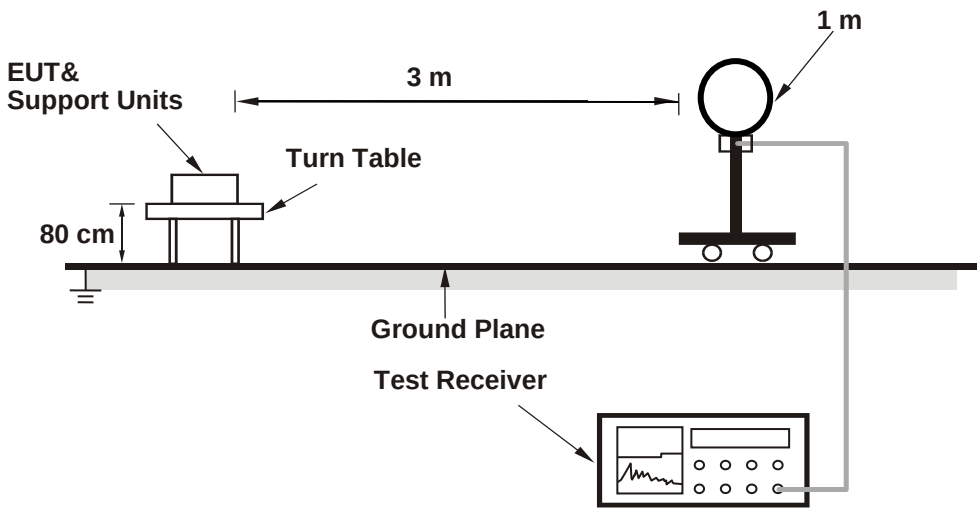
The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209 as below table:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

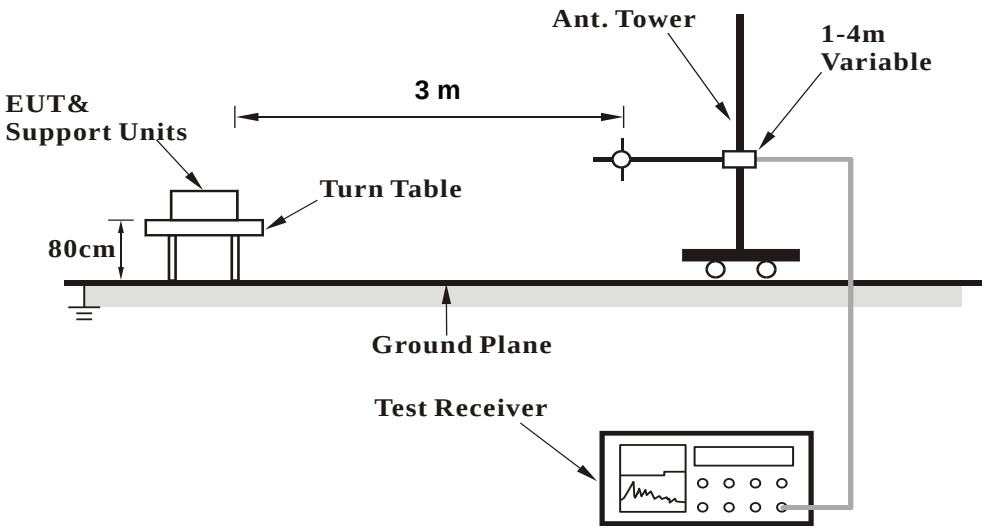
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Please refer to 5.1.2 Instruments

Test Procedures

For Radiated Emissions below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. 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 height of antenna 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.
3. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.

Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix A.

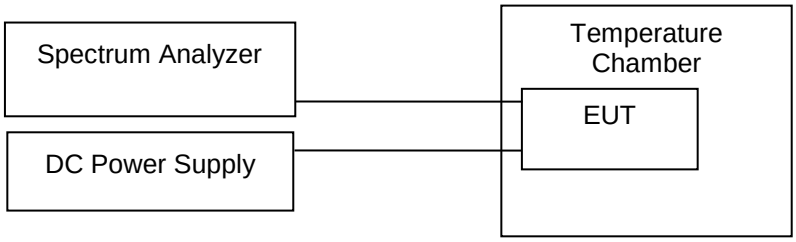
5.1.4 Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01 % of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/4/11	2023/4/11
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2022/4/15	2023/4/14	2023/4/11	2023/4/11

Test Procedures

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
b. Turned the EUT on and coupled its output to a spectrum analyzer.
c. Turned the EUT off and set the chamber to the highest temperature specified.
d. Allowed sufficient time (approximately 30 min) for the temperature of the chamber to stabilize then turned the EUT on and measured the operating frequency after 2, 5, and 10 minutes.
e. Repeated step b and c with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85 % to 115 % and the frequency record.

Test Result

Frequency (MHz):		13.56		V_{normal}: 12		V_{max}: 13.8		V_{min}: 10.2	
Condition		Test Time				Frequency Error (ppm)			
Extreme	Modulation Mode	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min
$T_{20°C}V_{max}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{20°C}V_{min}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{70°C}V_{nom}$	CW	13.56087	13.56087	13.56094	13.56101	64.01	64.01	69.40	74.71
$T_{60°C}V_{nom}$	CW	13.56084	13.56084	13.56087	13.56087	61.69	61.69	64.01	64.01
$T_{50°C}V_{nom}$	CW	13.56081	13.56081	13.56084	13.56084	59.99	59.99	61.69	61.69
$T_{40°C}V_{nom}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{30°C}V_{nom}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{20°C}V_{nom}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{10°C}V_{nom}$	CW	13.56080	13.56080	13.56080	13.56080	58.70	58.70	58.70	58.70
$T_{0°C}V_{nom}$	CW	13.56082	13.56082	13.56082	13.56082	60.57	60.57	60.57	60.57
$T_{-10°C}V_{nom}$	CW	13.56085	13.56085	13.56086	13.56085	62.44	62.42	63.18	62.83
$T_{-20°C}V_{nom}$	CW	13.56085	13.56085	13.56086	13.56085	62.44	62.42	63.18	62.83
$T_{-25°C}V_{nom}$	CW	13.56087	13.56087	13.56087	13.56087	64.01	64.01	64.01	64.01
Limit (ppm)		-				100			
Result		Pass							

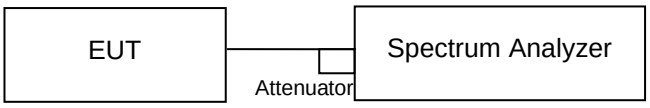
5.1.5 20 dB Bandwidth and 99% Occupied Bandwidth

Limit

The 20 dB bandwidth shall be specified in operating frequency band.

Kind of Test Site Shielded room

Test Setup



Test Instruments

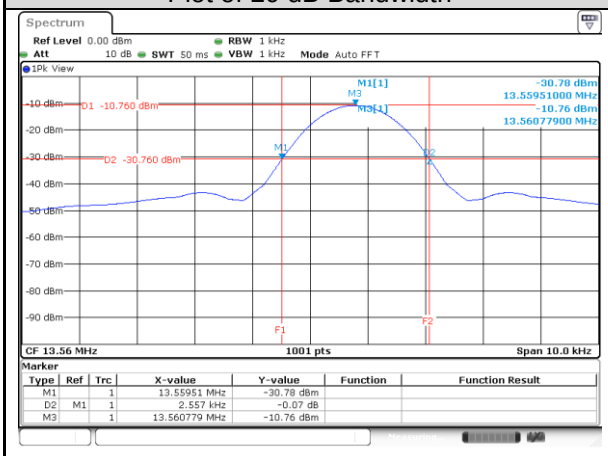
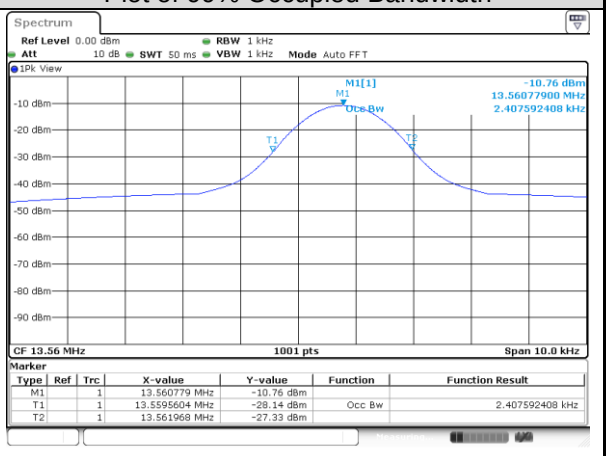
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/4/11	2023/4/11
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2022/4/15	2023/4/14	2023/4/11	2023/4/11

Test Procedure

<20 dB Bandwidth>
The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1 kHz RBW and 3 kHz VBW. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

<99% Occupied Bandwidth>
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

Test Results

Plot of 20 dB Bandwidth	Plot of 99% Occupied Bandwidth
	

5.2 Mains Emission

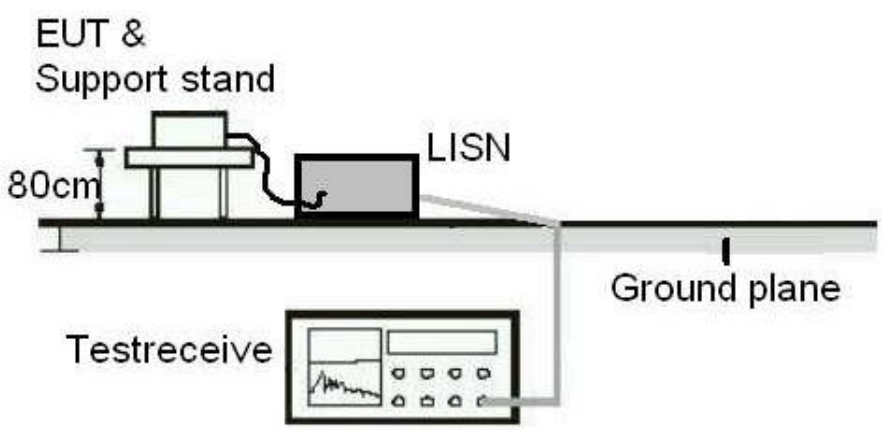
5.2.1 Mains Conducted Emission

Limit

Mains Conducted emissions as defined in §15.207 must comply with the mains conducted emission limits.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Test Date: 2023/4/12

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Two-Line V-Network	Rohde & Schwarz	ENV216	101938	2022/9/22	2023/9/21
EMI Test Receiver	R&S	ESCI	100797	2022/6/19	2023/6/18

Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

Test Results

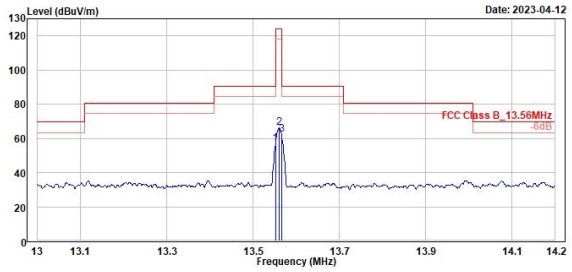
Please refer to Appendix A.

Appendix A: Test Results of Radiated Spurious Emissions

Fundamental Emissions

Open

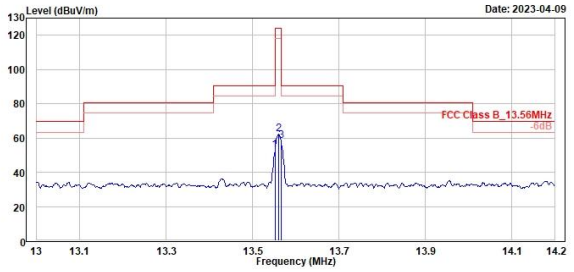
TÜV Rheinland Taiwan Ltd.
No. 458-18,Sec 2,Fenliao.,Linkou Dist.,New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	13.552	56.78	34.98	21.80	90.50	-33.72	100	181	QP	Vertical	
2	13.560	66.13	44.33	21.80	124.00	-57.87	100	181	Peak	Vertical	
3	13.566	62.35	40.55	21.80	124.00	-61.65	100	181	QP	Vertical	

Close

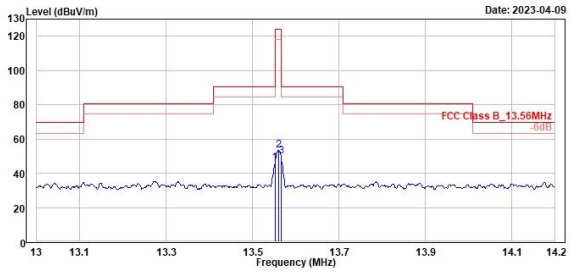
TÜV Rheinland Taiwan Ltd.
No. 458-18,Sec 2,Fenliao.,Linkou Dist.,New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	13.552	53.04	31.19	21.85	90.50	-37.46	100	92	QP	Close	
2	13.560	62.14	40.29	21.85	124.00	-61.86	100	84	Peak	Close	
3	13.566	58.53	36.68	21.85	124.00	-65.47	100	84	QP	Close	

Ground

TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Renliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322

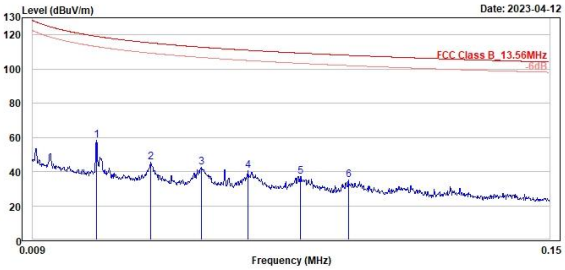


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	13.552	46.21	24.36	21.85	90.50	-44.29	100	334	QP	Ground	
2	13.560	53.55	31.70	21.85	124.00	-70.45	100	335	Peak	Ground	
3	13.566	49.78	27.93	21.85	124.00	-74.22	100	339	QP	Ground	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

9kHz~150kHz(Open)

TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.026	58.12	39.17	18.95	119.13	-61.01	100	98	Peak	Vertical	
2	0.041	45.55	26.40	19.15	115.28	-69.73	100	42	Peak	Vertical	
3	0.055	42.60	23.60	19.00	112.79	-70.19	100	122	Peak	Vertical	
4	0.068	40.33	21.63	18.70	110.99	-70.66	100	101	Peak	Vertical	
5	0.082	37.21	18.86	18.35	109.32	-72.11	100	209	Peak	Vertical	
6	0.095	34.87	16.82	18.05	108.03	-73.16	100	101	Peak	Vertical	

150kHz~30MHz(Open)

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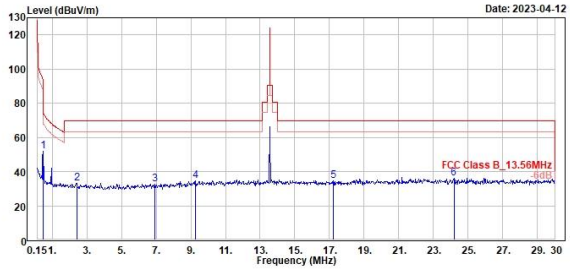
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322

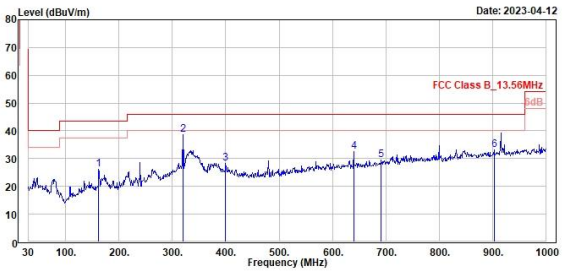


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.478	51.76	32.92	18.84	94.01	-42.25	100	189	Peak	Vertical	
2	2.419	33.03	13.56	19.47	69.50	-36.47	100	361	Peak	Vertical	
3	6.926	32.65	12.36	20.29	69.50	-36.85	100	219	Peak	Vertical	
4	9.284	34.36	13.10	21.26	69.50	-35.14	100	247	Peak	Vertical	
5	17.224	34.65	12.60	22.05	69.50	-34.85	100	322	Peak	Vertical	
6	24.179	36.22	13.94	22.28	69.50	-33.28	100	323	Peak	Vertical	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

Horizontal

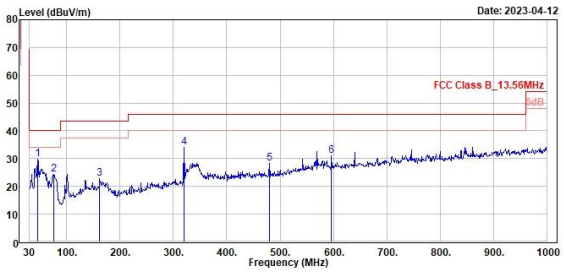
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	161.920	26.10	33.37	-7.27	43.50	-17.40	200	119	Peak	Horizontal	
2	320.030	38.65	44.92	-6.27	46.00	-7.35	100	212	Peak	Horizontal	
3	399.570	28.22	32.72	-4.50	46.00	-17.78	100	16	Peak	Horizontal	
4	640.130	32.46	32.54	-0.08	46.00	-13.54	124	360	Peak	Horizontal	
5	691.540	29.49	28.32	1.17	46.00	-16.51	300	11	Peak	Horizontal	
6	903.000	33.30	28.87	4.43	46.00	-12.70	200	69	Peak	Horizontal	

Vertical

TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



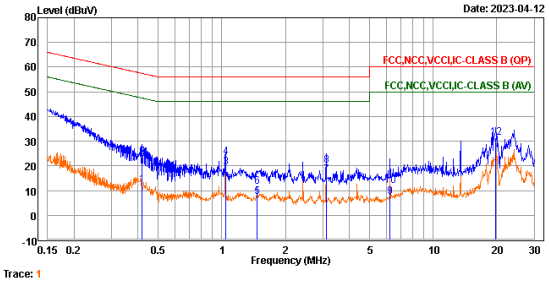
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	45.520	29.82	37.14	-7.32	40.00	-10.18	200	176	Peak	Vertical	
2	75.590	24.47	35.36	-10.89	40.00	-15.53	100	246	Peak	Vertical	
3	161.920	22.84	30.11	-7.27	43.50	-20.66	200	190	Peak	Vertical	
4	320.030	33.97	40.24	-6.27	46.00	-12.03	300	59	Peak	Vertical	
5	480.080	28.20	31.49	-3.29	46.00	-17.80	100	235	Peak	Vertical	
6	596.480	30.88	31.40	-0.52	46.00	-15.12	100	176	Peak	Vertical	

Mains Conducted Emission, Tx Mode, 150kHz ~ 30MHz

Worst Band

(Line)

TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322

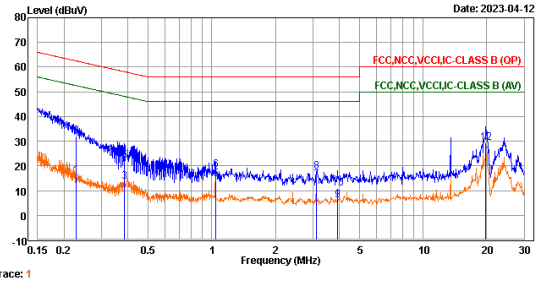


Trace: 1

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dBuV	dB	dBuV	dB			
1	0.42	12.14	2.46	9.68	47.47	-35.33	Average	line1	
2	0.42	23.42	13.74	9.68	57.47	-34.05	QP	line1	
3	1.04	19.57	9.88	9.69	46.00	-26.43	Average	line1	
4	1.04	23.58	13.89	9.69	56.00	-32.42	QP	line1	
5	1.46	7.55	-2.16	9.71	46.00	-38.45	Average	line1	
6	1.46	11.51	1.80	9.71	56.00	-44.49	QP	line1	
7	3.12	16.21	6.47	9.74	46.00	-29.79	Average	line1	
8	3.12	20.15	10.41	9.74	56.00	-35.85	QP	line1	
9	6.24	7.61	-2.16	9.77	50.00	-42.39	Average	line1	
10	6.24	11.89	2.12	9.77	60.00	-48.11	QP	line1	
11	19.74	25.03	15.22	9.81	50.00	-24.97	Average	line1	
12	19.74	31.53	21.72	9.81	60.00	-28.47	QP	line1	

(Neutral)

TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



Trace: 1

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dBuV	dB	dBuV	dB			
1	0.23	16.08	6.42	9.66	52.48	-36.40	Average	neutral	
2	0.23	32.17	22.51	9.66	62.48	-30.31	QP	neutral	
3	0.38	13.73	4.07	9.66	48.18	-34.45	Average	neutral	
4	0.38	24.33	14.67	9.66	58.18	-33.85	QP	neutral	
5	1.04	14.52	4.86	9.66	46.00	-31.48	Average	neutral	
6	1.04	18.45	8.79	9.66	56.00	-37.55	QP	neutral	
7	3.12	14.25	4.54	9.71	46.00	-31.75	Average	neutral	
8	3.12	17.84	8.13	9.71	56.00	-38.16	QP	neutral	
9	3.93	6.24	-3.48	9.72	46.00	-39.76	Average	neutral	
10	3.93	10.95	1.23	9.72	56.00	-45.05	QP	neutral	
11	19.74	23.97	14.10	9.87	50.00	-26.03	Average	neutral	
12	19.74	29.24	19.37	9.87	60.00	-30.76	QP	neutral	