Prüfbericht-Nr.: *Test report no.:*	CN22HHXR (P15F-UWB) 001	**Auftrags-Nr.:** *Order no.*:	238543361	Seite 1 von 25 *Page 1 of 25*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2022-05-18	
Auftraggeber: *Client:*	GIPS Technology Co., Ltd., Rm. 2, 6F., No. 395, Sec. 1, Linsen Rd., East Dist., Tainan City 701024, Taiwan (R.O.C.)			
Prüfgegenstand: *Test item:*	UWB Tag - Badge Type			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	GT-130			
Auftrags-Inhalt: *Order content*:	FCC Part 15F Test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart F Section 15.517			

Wareneingangsdatum: *Date of sample receipt:*	2022-05-18
Prüfmuster-Nr.: *Test sample no:*	A003263120-001
Prüfzeitraum: *Testing period:*	2022-05-20 - 2022-06-30
Ort der Prüfung: *Place of testing:*	EMC/RF Taipei Testing Site
Prüflaboratorium: *Testing laboratory:*	Taipei Testing Laboratories
Prüfergebnis*: *Test result*:*	Pass

überprüft von: *compiled by:*		**genehmigt von:** authorized by:	
Datum: *Date:* 2022-07-05	Jack Wang	**Ausstellungsdatum:** *Issue date:* 2022-07-05	Ryan Chen
Stellung / *Position:*	Project Manager	**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*

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.517(c)(e),15.521(g)	EIRP	Pass
5.1.3	15.209,15.521(c)(d)(h),15.517(c)(d)	Radiated Spurious Emissions	Pass
5.1.4	15.503,15.521(e)	UWB 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.

Contents

HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN22HHXR (P15F-UWB) 001	Original Release	2022-07-05

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 F Section 15.517 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.: 226631
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
Radiated Emission (1 GHz ~ 18 GHz)	± 1.54 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.52 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a UWB Tag - Badge Type working at 3993.6MHz ~ 6489.6MHz with UWB function.
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	UWB Tag - Badge Type
Type Identification	GT-130
FCC ID	2A6S5-GT130

Technical Specification of EUT

Item	EUT information
Operating Frequency	3993.6, 4492.8, 6489.6 MHz
Operation Voltage	Battery 3.7 Vdc, USB 5 Vdc
Modulation	PAM
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 control it by the test command by the terminal.
This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	UWBTagBLEMonitor.exe

The samples were used as follows:
A003263120-001

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To				Description
	EIRP	Radiated Spurious Emissions	UWB 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 **Z-plane**.
2. "-" means no effect.

EIRP

☒ 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)
-	3993.6, 4492.8, 6489.6	3993.6, 4492.8, 6489.6

Radiated Spurious 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)
-	3993.6, 4492.8, 6489.6	3993.6, 4492.8, 6489.6

UWB 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)
-	3993.6, 4492.8, 6489.6	3993.6, 4492.8, 6489.6

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)
-	3993.6, 4492.8, 6489.6	4492.8

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Radiated Spurious Emissions	21.1-22.5 °C	59-62 %	Terry Chang
Field Strength of Fundamental Emissions	21.1-22.5 °C	59-62 %	Terry Chang
UWB Bandwidth	25.1 °C	60.2 %	Blake Wang
Mains Conducted Emission	21.9 °C	59 %	Ray Huang

4.3 Special Accessories and Auxiliary Equipment

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

Accessory of EUT

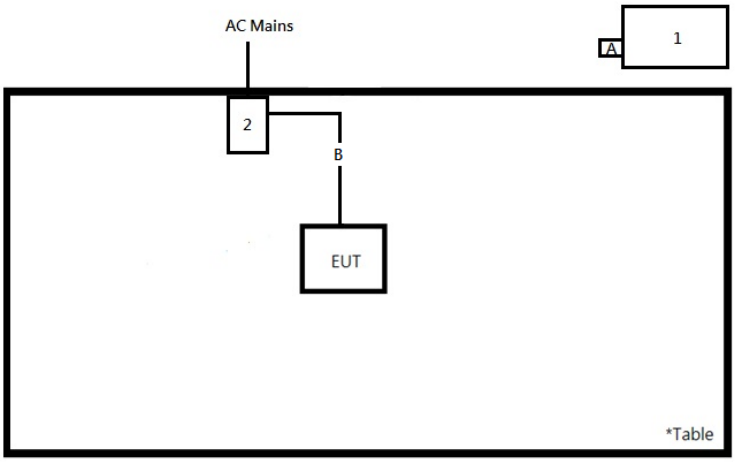
No.	Product	Brand	Model	Description
B	USB Cable	Lian Ji Technology Co., Ltd.	S959-04U60	--

Support Unit

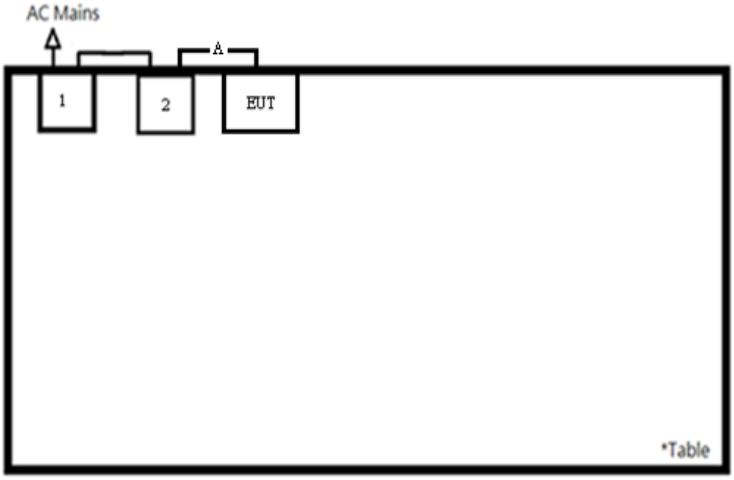
Support Unit								
No	Description	Brand	Model	S/N	Shielded	Ferrite Core (Qty)	Length (cm)	Remark
A	Fixture	NoRDIC	PCA10059	N/A	-	-	-	Radiated
1	NB	HP	15-da1046TX	CND911RJB	-	-	-	
2	Adaptor	SONY	ACUUD12	N/A	-	-	-	
A	Cable	Worldwide	Worldwide-01	N/A	NO	NO	100	Mains Conducted
1	Adaptor	HP	PPP009D	N/A	YES	NO	179	
2	Notebook	Lenovo	81BL	MP1DCD6Y	-	-	-	

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

According to the manufacturer declaration, the EUT has an antenna with a directional gain of -4.36 dBi (3993.6 MHz), -3.53 dBi (4492.8 MHz), and -1.41 dBi (6489.6 MHz). The antenna is chip antenna 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.

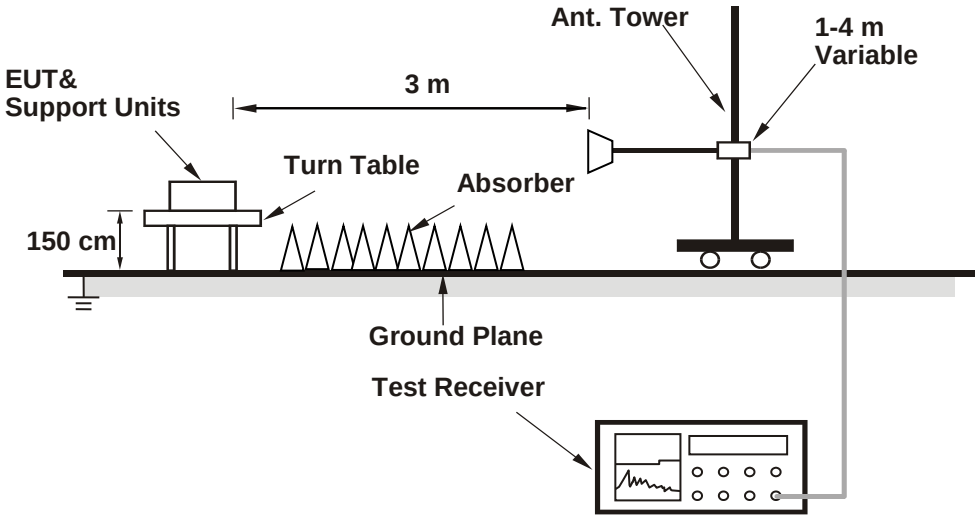
5.1.2 EIRP

Limit

15.517(c) There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in § 15.521.
15.521(g) When a peak measurement is required, it is acceptable to use a resolution bandwidth other than the 50 MHz specified in this subpart. This resolution bandwidth shall not be lower than 1 MHz or greater than 50 MHz, and the measurement shall be centered on the frequency at which the highest radiated emission occurs, fM. If a resolution bandwidth other than 50 MHz is employed, the peak EIRP limit shall be 20 log (RBW/50) dBm where RBW is the resolution bandwidth in megahertz that is employed. This may be converted to a peak field strength level at 3 meters using E(dBuV/m) = P(dBm EIRP) + 95.2. If RBW is greater than 3 MHz, the application for certification filed with the Commission must contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

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

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz					
Signal Analyzer	R&S	FSV40	101508	2022/4/13	2023/4/12
Horn Antenna	ETS-Lindgren	3117	00218930	2021/12/20	2022/12/19
HF-AMP + AC source	EMCI	EMC051845SE	980633	2022/2/16	2023/2/15
HF-AMP + AC source	EMCI	EMC184045SE	980657	2022/2/16	2023/2/15
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2022/3/29	2023/3/28
30 MHz ~ 1 GHz					
Receiver	R&S	ESR7	102109	2022/2/25	2023/2/24
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2022/4/6	2023/4/5
LF-AMP	Agilent	8447D	2944A107722	2022/3/22	2023/3/21
Below 30 MHz					
Receiver	R&S	ESR7	102109	2022/2/25	2023/2/24
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2021/12/8	2022/12/7

Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) or 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. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.
4. 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

Channel	Frequency (MHz)	Measured Field Strength (dBuV)	Limit (RBW 50MHz) (dBuV/m)	Correction factor (50MHz to 1MHz)	Limit (dBuV/m)	Margin (dB)	Results	Polar(H/V)
2	3993.6	52	95.2	-33.98	61.22	-9.22	Pass	H
	3993.6	49.51	95.2	-33.98	61.22	-11.71	Pass	V
3	4492.8	60.09	95.2	-33.98	61.22	-1.13	Pass	H
	4492.8	57.38	95.2	-33.98	61.22	-3.84	Pass	V
5	6489.6	58.28	95.2	-33.98	61.22	-2.94	Pass	H
	6489.6	54.8	95.2	-33.98	61.22	-6.42	Pass	V

Note:
1. BW correction factor = 20log(RBW/50MHz)
2. E(dBuV/m) = P(dBm EIRP) + 95.2

5.1.3 Radiated Spurious Emissions

Limit

The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in § 15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

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

Frequencies (MHz)	EIRP in dBm	Measurement Distance (meters)
960-1610	-75.3	3
1610-1990	-53.3	3
1990-3100	-51.3	3
3100-10600	-41.3	3
Above 10600	-51.3	3

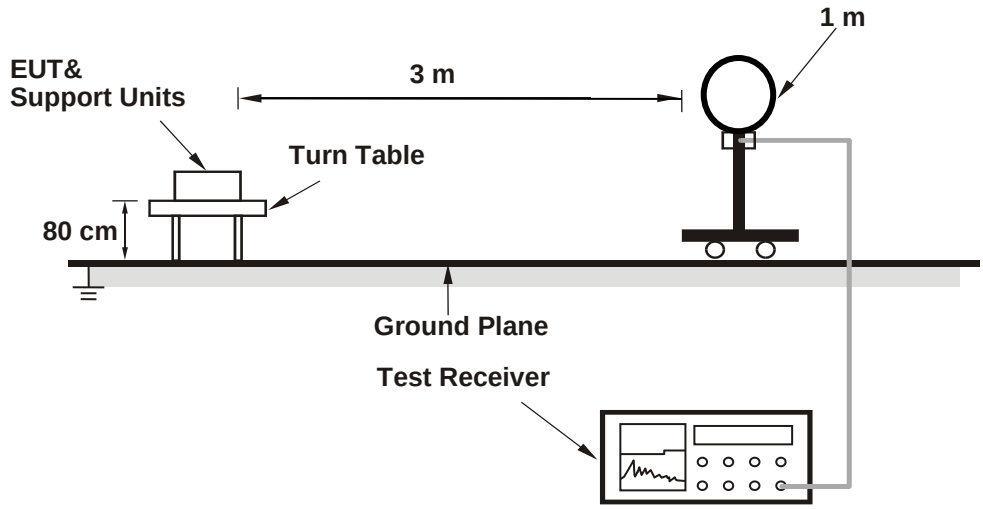
UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequencies (MHz)	EIRP in dBm	Measurement Distance (meters)
1164-1240	-85.3	3
1559-1610	-85.3	3

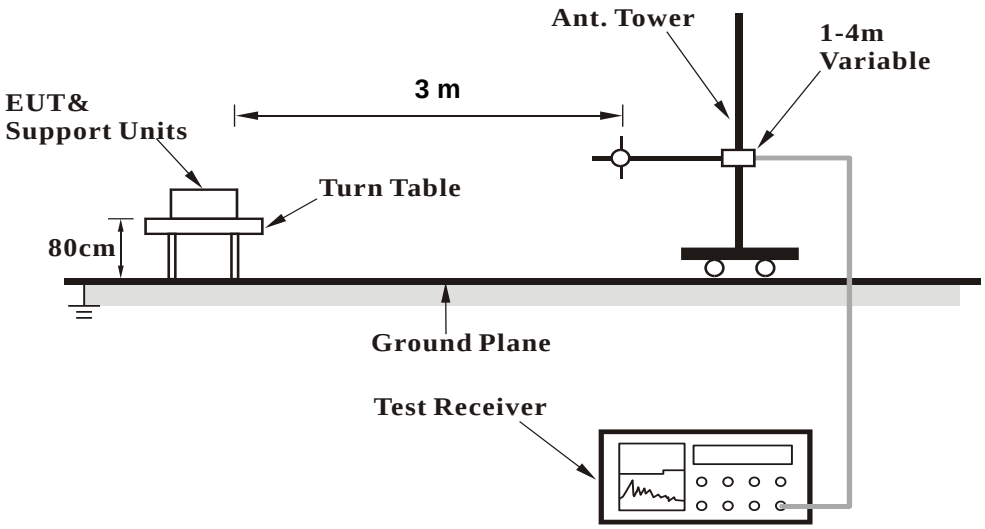
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

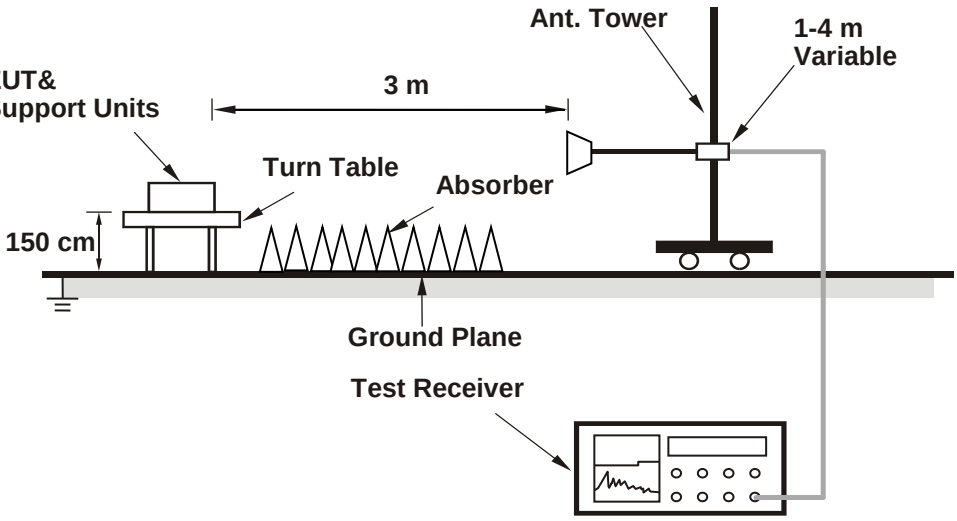
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emission above 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. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.
4. 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)
E(dBuV/m) = P(dBm EIRP) + 95.2

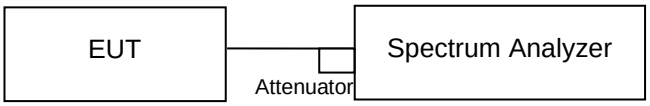
Please refer to Appendix A.

5.1.4 UWB Bandwidth

Limit The frequency at which the highest radiated emission occurs, fM, must be contained within the UWB bandwidth.

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	FSV40	101512	2022/02/24	2023/2/23	2022/5/20	2022/5/20

Test Procedure

The frequency at which the maximum power level is measured with the peak detector is designated fM. The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below fM, where the peak power falls by 10 dB relative to the level at fM, are designated as fH and fL, respectively:

a. For the lowest frequency bound fL, the emission is searched from a frequency lower than fM that has, by inspection, a peak power much lower than 10 dB less than the power at fM and increased toward fM until the peak power indicates 10 dB less than the power at fM. The frequency of that segment is recorded.

b. This process is repeated for the highest frequency bound fH, beginning at a frequency higher than fM that has, by inspection, a peak power much lower than 10 dB below the power at fM. The frequency of that segment is recorded.

c. The two recorded frequencies represent the highest fH and lowest fL bounds of the UWB transmission, and the −10 dB bandwidth (B − 10) is defined as (fH − fL).82 The center frequency (fc) is mathematically determined from (fH − fL) / 2.

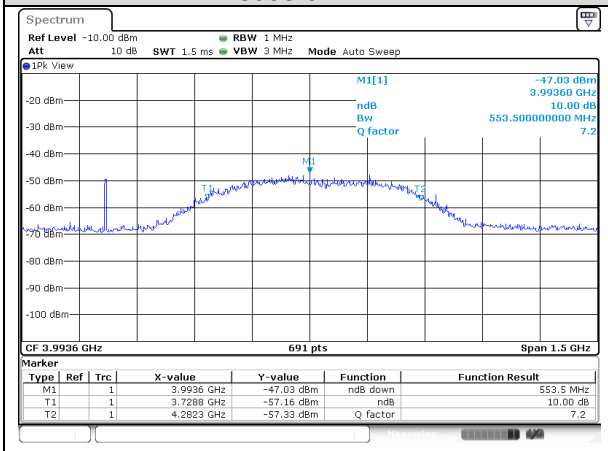
d. The fractional bandwidth is defined as 2(fH − fL) / (fH + fL).

e. Determine whether the −10 dB bandwidth (fH − fL) is ≥500 MHz, or whether the fractional bandwidth 2(fH − fL) / (fH + fL) is ≥0.2.

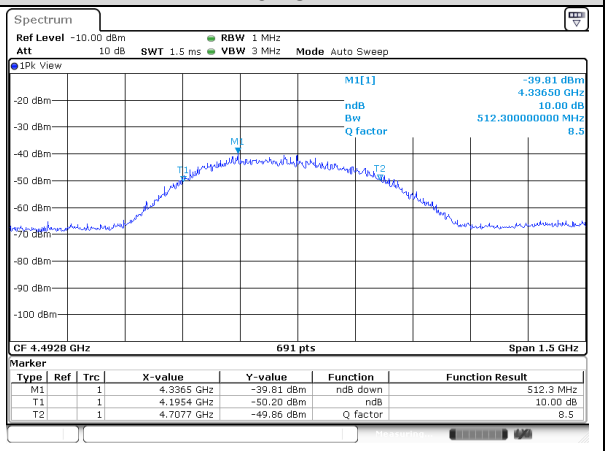
Test Results

Frequency (MHz)	FL (GHz)	FH (GHz)	10 dB Bandwidth (MHz)	Limit (MHz)	Result
3993.6	3.7288	4.2823	553.5	≥500	Pass
4492.8	4.1954	4.7077	512.3	≥500	Pass
6489.6	6.2226	6.7761	553.5	≥500	Pass

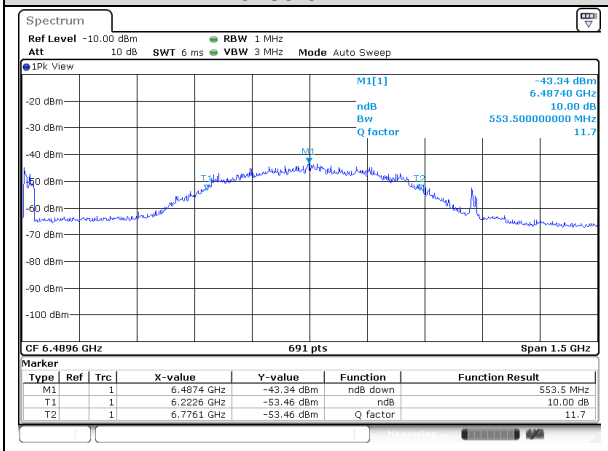
3993.6 MHz



4492.8 MHz



6489.6 MHz



5.2 Mains Emission

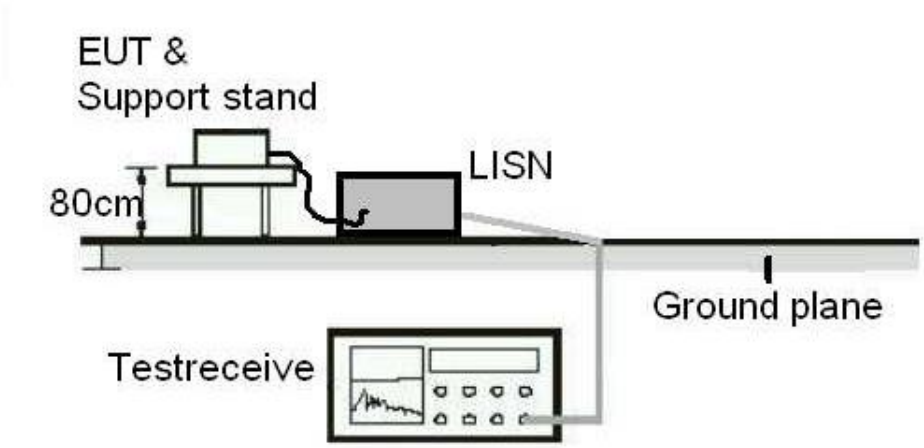
5.2.1 Mains Conducted Emission

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

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Two-Line V-Network	Rohde & Schwarz	ENV216	101938	2021/9/23	2022/9/22
EMI Test Receiver	R&S	ESCI	1816063	2021/11/15	2022/11/14

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

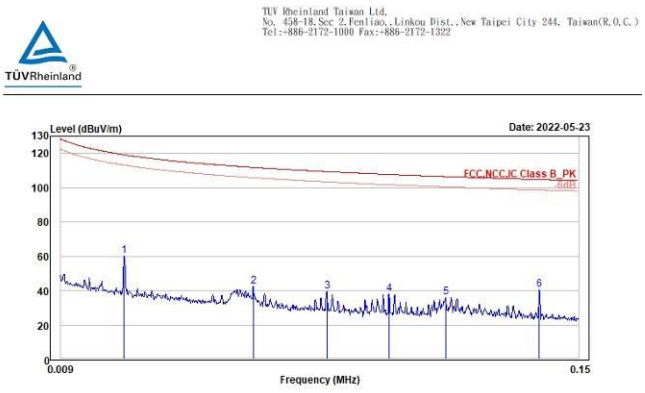
Please refer to Appendix A.

Appendix A: Test Results of Radiated Spurious Emissions & Mains Conducted Emission Test

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

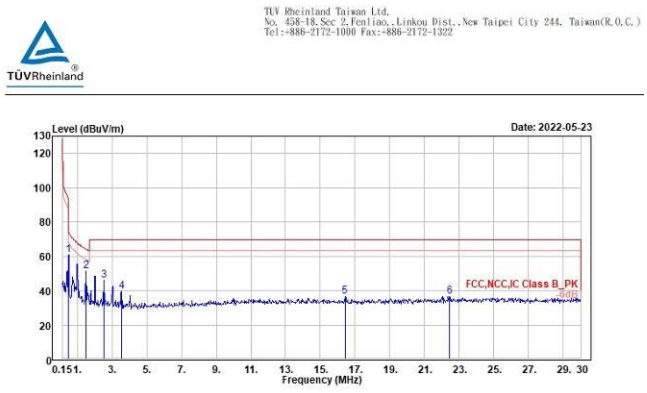
UWB

Low Channel (Open) 9kHz~150kHz



	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	0.03	60.23	41.05	19.18	119.18	-58.95	100	22	QP	Open	
2	0.06	42.64	23.58	19.06	111.82	-69.18	100	86	QP	Open	
3	0.08	39.72	21.10	18.62	109.37	-69.65	100	274	QP	Open	
4	0.10	38.27	20.01	18.26	107.74	-69.47	100	266	QP	Open	
5	0.11	36.30	18.03	18.27	106.48	-70.18	100	272	QP	Open	
6	0.14	40.66	22.30	18.36	104.72	-64.06	100	167	QP	Open	

Low Channel (Open) 150kHz~30MHz

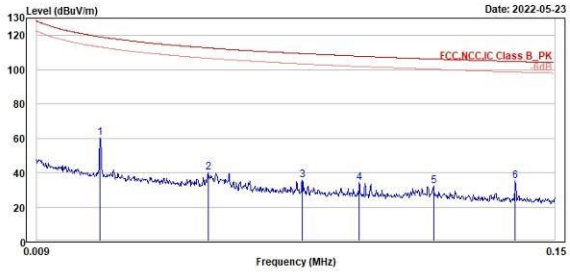


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.48	60.90	41.95	18.95	94.01	-33.11	100	163	QP	Open	
2	1.52	51.35	32.01	19.34	63.95	-12.60	100	172	QP	Open	
3	2.54	46.08	26.61	19.47	69.50	-23.42	100	166	QP	Open	
4	3.55	39.45	19.97	19.48	69.50	-30.05	100	155	QP	Open	
5	16.42	36.65	14.70	21.95	69.50	-32.85	100	175	QP	Open	
6	22.45	36.65	14.34	22.31	69.50	-32.85	100	335	QP	Open	

UWB

Low Channel (Close) 9kHz~150kHz

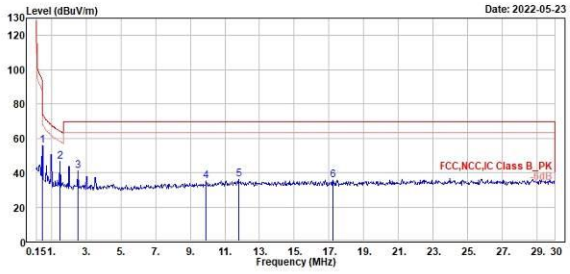
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	0.03	60.15	40.97	19.18	119.18	-59.03	100	19	QP	Close	
2	0.06	39.91	20.72	19.19	112.68	-72.77	100	126	QP	Close	
3	0.08	35.81	17.19	18.62	109.39	-73.58	100	8	QP	Close	
4	0.10	34.02	15.73	18.29	107.87	-73.85	100	226	QP	Close	
5	0.12	32.04	13.76	18.28	106.23	-74.19	100	210	QP	Close	
6	0.14	34.90	16.54	18.36	104.72	-69.82	100	123	QP	Close	

Low Channel (Close) 150kHz~30MHz

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



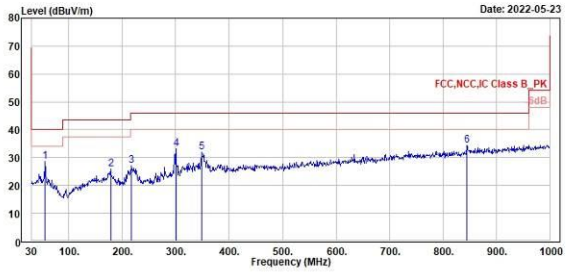
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.48	55.62	36.67	18.95	94.01	-38.39	100	128	QP	Close	
2	1.49	46.44	27.10	19.34	64.12	-17.68	100	119	QP	Close	
3	2.54	41.06	21.59	19.47	69.50	-28.44	100	122	QP	Close	
4	9.91	35.06	13.61	21.45	69.50	-34.44	100	71	QP	Close	
5	11.79	35.86	14.23	21.63	69.50	-33.64	100	75	QP	Close	
6	17.22	35.70	13.70	22.00	69.50	-33.80	100	192	QP	Close	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

UWB

Low Channel (Horizontal)

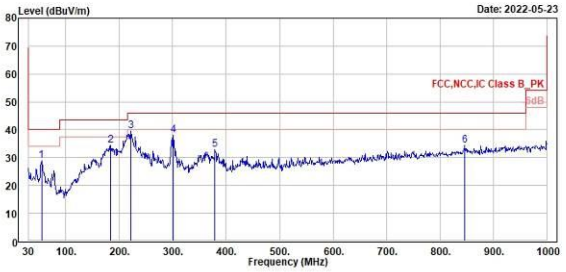
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	55.22	28.74	35.26	-6.52	40.00	-11.26	100	27	QP	Horizontal	
2	178.41	25.71	32.86	-7.15	43.50	-17.79	100	255	QP	Horizontal	
3	216.24	27.18	35.31	-8.13	46.00	-18.82	100	138	QP	Horizontal	
4	300.63	33.09	37.81	-4.72	46.00	-12.91	300	355	QP	Horizontal	
5	348.16	31.88	35.80	-3.92	46.00	-14.12	300	142	QP	Horizontal	
6	844.80	34.37	30.64	3.73	46.00	-11.63	100	133	QP	Horizontal	

Low Channel (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



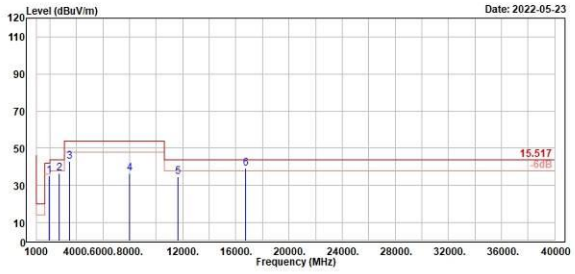
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	54.25	28.88	35.28	-6.40	40.00	-11.12	200	197	QP	Vertical	
2	183.26	34.31	42.10	-7.79	43.50	-9.19	100	131	QP	Vertical	
3	221.09	39.58	47.54	-7.96	46.00	-6.42	100	180	QP	Vertical	
4	300.63	38.10	42.82	-4.72	46.00	-7.90	100	42	QP	Vertical	
5	379.20	32.94	36.12	-3.18	46.00	-13.06	100	350	QP	Vertical	
6	846.74	34.35	30.61	3.74	46.00	-11.65	300	215	QP	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 40GHz

UWB

Low Channel (Horizontal)

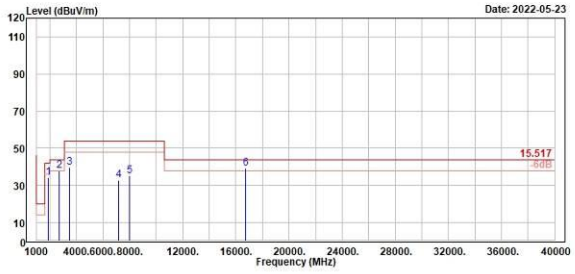
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1950.40	34.97	50.72	-15.75	42.00	-7.03	200	300	Average	Horizontal	
2	2737.60	36.41	50.02	-13.61	44.00	-7.59	100	112	Average	Horizontal	
3	3466.40	42.98	55.42	-12.44	54.00	-11.02	164	2	Average	Horizontal	
4	7984.82	36.67	43.41	-6.74	54.00	-17.33	300	209	Average	Horizontal	
5	11650.41	34.71	35.65	-0.94	44.00	-9.29	200	333	Average	Horizontal	
6 !	16712.35	39.21	32.64	6.57	44.00	-4.79	152	138	Average	Horizontal	

Low Channel (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

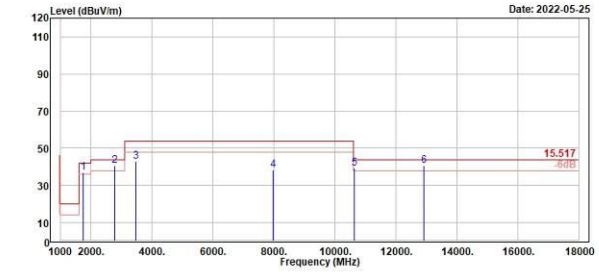


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1855.20	34.33	50.31	-15.98	42.00	-7.67	290	340	Average	Vertical	
2 !	2737.60	38.07	51.68	-13.61	44.00	-5.93	100	360	Average	Vertical	
3	3465.60	39.71	52.15	-12.44	54.00	-14.29	300	346	Average	Vertical	
4	7183.77	32.96	40.29	-7.33	54.00	-21.04	300	182	Average	Vertical	
5	7984.82	35.20	41.94	-6.74	54.00	-18.80	300	360	Average	Vertical	
6 !	16732.41	39.26	32.63	6.63	44.00	-4.74	153	360	Average	Vertical	

UWB

Middle Channel (Horizontal)

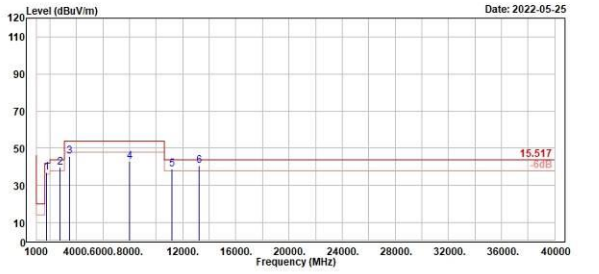
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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 !	1757.60	36.96	54.30	-17.34	42.00	-5.04	100	177	Average	Horizontal	
2 !	2760.80	40.44	53.97	-13.53	44.00	-3.56	100	127	Average	Horizontal	
3	3468.80	42.75	55.18	-12.43	54.00	-11.25	300	164	Average	Horizontal	
4	7977.90	38.37	45.12	-6.75	54.00	-15.63	110	360	Average	Horizontal	
5 !	10635.50	39.20	42.02	-2.82	44.00	-4.80	100	90	Average	Horizontal	
6 !	12922.40	40.62	39.77	0.85	44.00	-3.38	200	71	Average	Horizontal	

Middle Channel (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

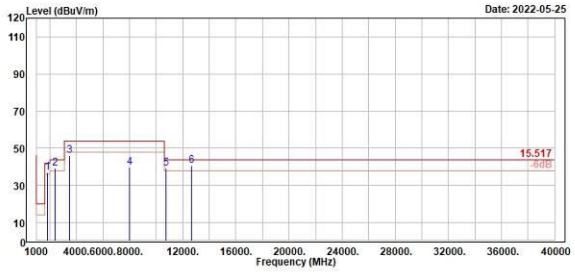


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1 !	1757.60	36.88	54.22	-17.34	42.00	-5.12	300	213	Average	Vertical	
2 !	2802.40	39.50	52.98	-13.48	44.00	-4.50	200	158	Average	Vertical	
3	3468.00	45.44	57.87	-12.43	54.00	-8.56	300	45	Average	Vertical	
4	7984.50	42.74	49.48	-6.74	54.00	-11.26	100	152	Average	Vertical	
5 !	11209.70	39.00	40.99	-1.99	44.00	-5.00	208	66	Average	Vertical	
6 !	13228.20	40.55	39.71	0.84	44.00	-3.45	100	164	Average	Vertical	

UWB

High Channel (Horizontal)

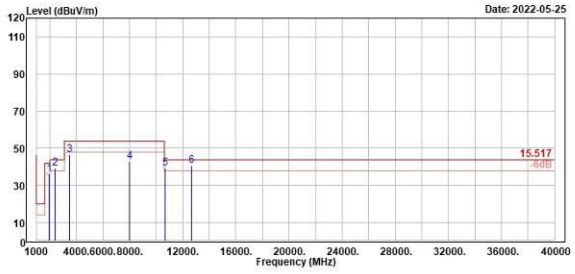
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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 !	1798.40	36.98	53.77	-16.79	42.00	-5.02	100	148	Average	Horizontal	
2 !	2369.60	39.19	53.37	-14.18	44.00	-4.81	200	135	Average	Horizontal	
3	3468.80	45.91	58.34	-12.43	54.00	-8.09	100	79	Average	Horizontal	
4	7985.60	39.69	46.43	-6.74	54.00	-14.31	251	318	Average	Horizontal	
5 !	10726.80	39.16	41.86	-2.70	44.00	-4.84	300	155	Average	Horizontal	
6 !	12669.40	40.71	40.20	0.51	44.00	-3.29	300	357	Average	Horizontal	

High Channel (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



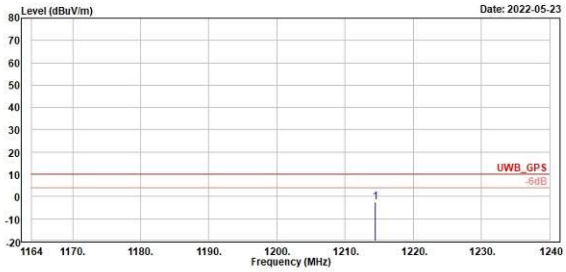
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1 !	1936.00	36.26	52.03	-15.77	42.00	-5.74	200	209	Average	Vertical	
2 !	2395.20	39.11	53.17	-14.06	44.00	-4.89	300	227	Average	Vertical	
3	3469.60	46.39	58.82	-12.43	54.00	-7.61	300	353	Average	Vertical	
4	7977.90	43.10	49.85	-6.75	54.00	-10.90	100	8	Average	Vertical	
5 !	10702.60	39.45	42.19	-2.74	44.00	-4.55	100	75	Average	Vertical	
6 !	12647.40	40.63	40.16	0.47	44.00	-3.37	295	351	Average	Vertical	

Spurious Emissions, Tx Mode, 1164MHz ~ 1240MHz

UWB

Low Channel (Horizontal)

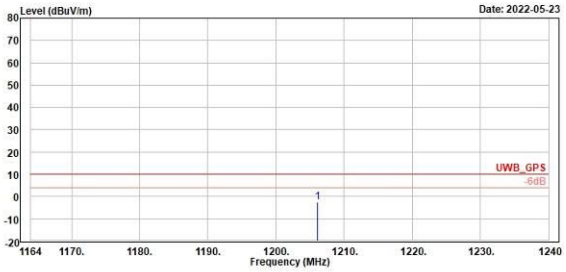
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1214.46	-2.32	16.74	-19.06	10.00	-12.32	270	64	Average	Horizontal	

Low Channel (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

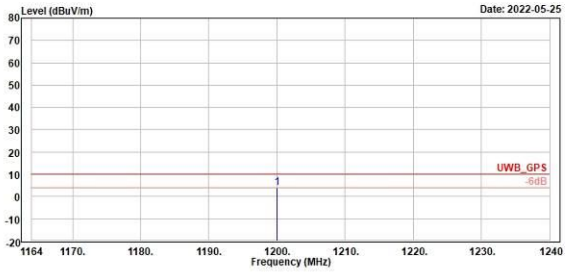


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1206.10	-2.60	16.42	-19.02	10.00	-12.60	100	9	Average	Vertical	

UWB

Middle Channel (Horizontal)

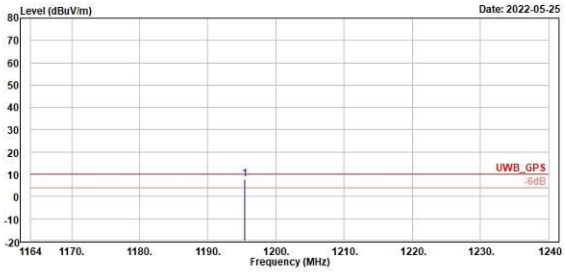
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1200.02	3.77	22.76	-18.99	10.00	-6.23	100	168	Average	Horizontal	

Middle Channel (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

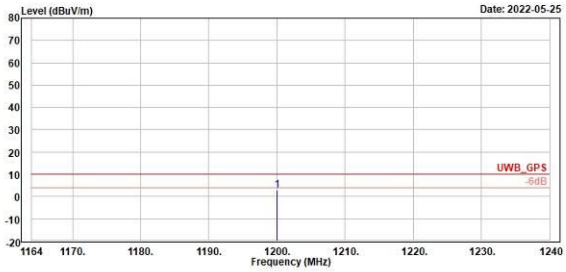


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1195.39	7.69	26.67	-18.98	10.00	-2.31	200	208	Average	Vertical	

UWB

High Channel (Horizontal)

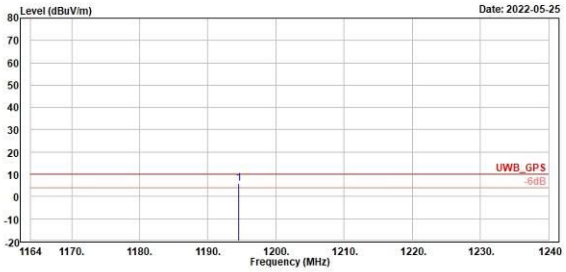
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1200.02	2.73	21.72	-18.99	10.00	-7.27	200	163	Peak	Horizontal	

High Channel (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



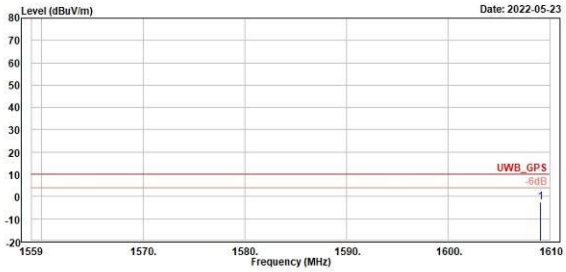
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1194.55	5.98	24.96	-18.98	10.00	-4.02	200	190	Peak	Vertical	

Spurious Emissions, Tx Mode, 1559MHz ~ 1610MHz

UWB

Low Channel (Horizontal)

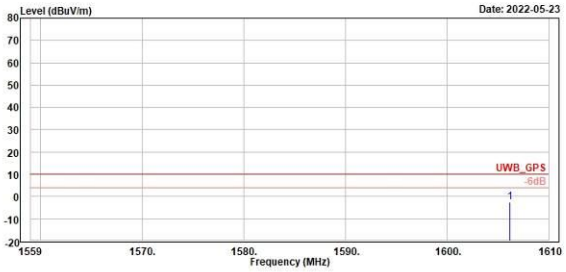
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1609.08	-2.37	16.32	-18.69	10.00	-12.37	300	190	Average	Horizontal	

Low Channel (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

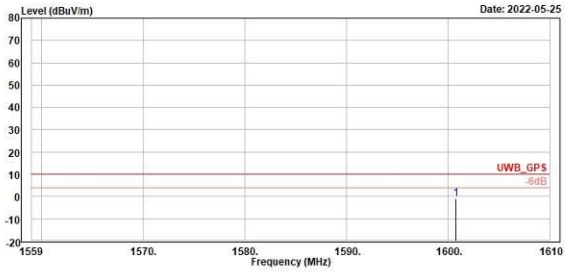


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1606.18	-2.53	16.22	-18.75	10.00	-12.53	200	145	Average	Vertical	

UWB

Middle Channel (Horizontal)

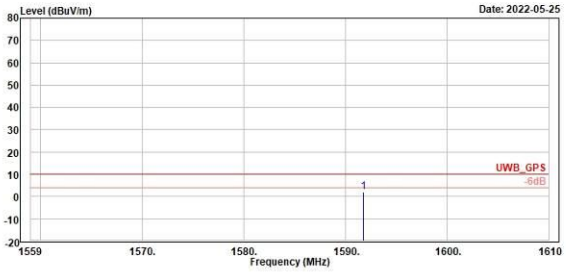
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1600.77	-0.92	17.92	-18.84	10.00	-10.92	200	240	Average	Horizontal	

Middle Channel (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

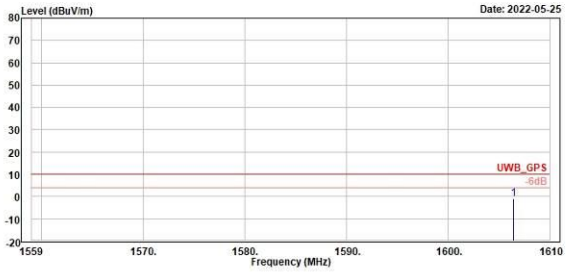


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1591.74	2.03	21.02	-18.99	10.00	-7.97	100	166	Average	Vertical	

UWB

High Channel (Horizontal)

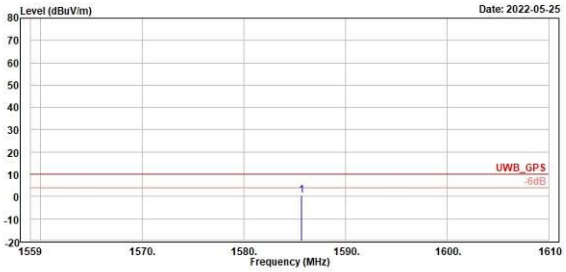
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	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	1606.43	-0.93	17.82	-18.75	10.00	-10.93	200	131	Peak	Horizontal	

High Channel (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



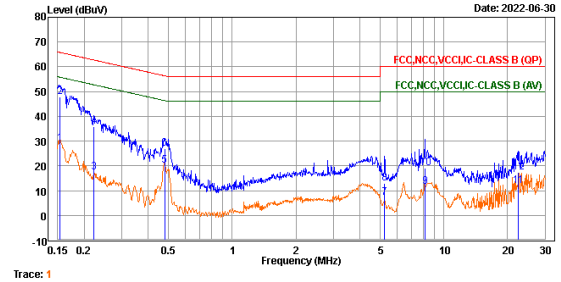
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1585.67	0.47	19.55	-19.08	10.00	-9.53	200	169	Peak	Vertical	

Mains Conducted Emission, TX 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

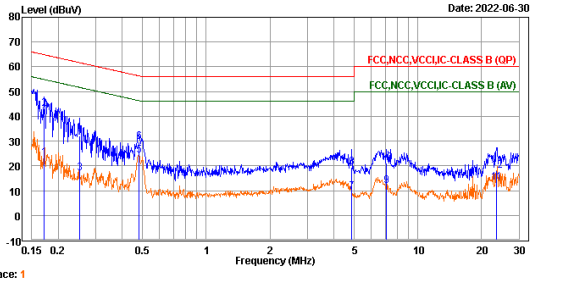


Trace: 1

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dBuV	dB	dBuV	dB			
1	0.15	29.04	19.43	9.61	55.83	-26.79	Average	line1	
2	0.15	47.67	38.06	9.61	65.83	-18.16	QP	line1	
3	0.22	17.28	7.67	9.61	52.73	-35.45	Average	line1	
4	0.22	35.86	26.25	9.61	62.73	-26.87	QP	line1	
5	0.48	20.03	10.41	9.62	46.35	-26.32	Average	line1	
6	0.48	26.97	17.35	9.62	56.35	-29.38	QP	line1	
7	5.24	6.98	-2.71	9.69	50.00	-43.02	Average	line1	
8	5.24	12.76	3.07	9.69	60.00	-47.24	QP	line1	
9	8.13	11.63	1.92	9.71	50.00	-38.37	Average	line1	
10	8.13	19.01	9.30	9.71	60.00	-40.99	QP	line1	
11	22.47	11.98	2.29	9.69	50.00	-38.02	Average	line1	
12	22.47	17.26	7.57	9.69	60.00	-42.74	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	0.17	23.16	13.57	9.59	54.88	-31.72	Average	neutral	
2	0.17	42.94	33.35	9.59	64.88	-21.94	QP	neutral	
3	0.25	17.04	7.45	9.59	51.69	-34.65	Average	neutral	
4	0.25	32.24	22.65	9.59	61.69	-29.45	QP	neutral	
5	0.48	24.07	14.47	9.60	46.31	-22.24	Average	neutral	
6	0.48	29.59	19.99	9.60	56.31	-26.72	QP	neutral	
7	4.86	9.53	-0.15	9.68	46.00	-36.47	Average	neutral	
8	4.86	19.41	9.73	9.68	56.00	-36.59	QP	neutral	
9	7.10	11.96	2.25	9.71	50.00	-38.04	Average	neutral	
10	7.10	21.16	11.45	9.71	60.00	-38.84	QP	neutral	
11	23.50	13.22	3.40	9.82	50.00	-36.78	Average	neutral	
12	23.50	18.11	8.29	9.82	60.00	-41.89	QP	neutral	