

FCC Test Report

Report No.: RFBCUG-WTW-P22010682B-6

FCC ID: B32UX7002

Model No.: UX700-WBU-2

Received Date: 2022/11/11

Test Date: 2022/12/12 ~ 2023/02/7

Issued Date: 2023/2/10

Applicant: Verifone, Inc.

Address: 1400 West Stanford Ranch Road Suite 150 Rocklin CA 95765 USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, TAIWAN

FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RFBCUG-WTW-P22010682B-6	Original release	2023/2/10

1. Certificate of Conformity

Product: Point of Sale Terminal

Brand: Verifone

Model No.: UX700-WBU-2

Sample Status: Engineering sample

Applicant: Verifone, Inc.

Test Date: 2022/12/12 ~ 2023/02/7

Standards: 47 CFR FCC Part 15, Subpart F
ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** 2023/2/10
Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** 2023/2/10
Jeremy Lin / Project Engineer

2. Summary of Test Results

47 CFR FCC Part 15, Subpart F			
Standard Section	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -19.51dB at 0.40180MHz.
15.209	Radiated Emissions at or Below 960 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -15.1dB at 544.52MHz.
15.517	Radiated emissions above 960 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -3.39dB at 7987.20MHz.
15.517	Occupied Bandwidth	Pass	Meet the requirement of limit.
15.517	Transmission Time	NA	Not applicable to Indoor UWB systems

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

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.99 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3. General Information

3.1 General Description of EUT

Product	Point of Sale Terminal
Brand	Verifone
Model No.	UX700-WBU-2
Status of EUT	Engineering sample
Power Supply Rating	9-43Vdc, 2.4A-0.5A
Modulation Type	BPM-BPSK
Modulation Technology	BPM-BPSK
Transfer Rate	6.8Mbps, 7.8Mbps, 27Mbps and 31.2Mbps
Operating Frequency	CH 5: F _L : 6.2049GHz, F _H : 6.7613GHz CH 9: F _M : 7.9882GHz, F _L : 7.7145GHz, F _H : 8.259GHz
Number of Channel	2
Output Power	CH 5: -12.58dBm (PK) CH 9: -12.69dBm (PK)
Antenna Type	Patch antenna with -0.50dBi gain
Antenna Connector	ipex MHF4 RF connector
Accessory Device	Refer to external photo
Cable Supplied	Refer to external photo

Note:

1. The accessory devices of EUT, please refer to external photo.
2. List of test command.

Channel	Frequency (MHz)	Payload	Test command
5	6489.6	2	A24_test_HPRF_Murata_ch5_Len2_20211125
		64	A24_test_HPRF_Murata_ch5_Len64_20211125
		127	A24_test_HPRF_Murata_ch5_Len127_20211125
		512	A24_test_HPRF_Murata_ch5_Len512_20211125
		1023	A24_test_HPRF_Murata_ch5_Len1023_20211125
9	7987.2	2	A24_test_HPRF_Murata_ch9_Len2_20211125
		64	A24_test_HPRF_Murata_ch9_Len64_20211125
		127	A24_test_HPRF_Murata_ch9_Len127_20211125
		512	A24_test_HPRF_Murata_ch9_Len512_20211125
		1023	A24_test_HPRF_Murata_ch9_Len1023_20211125

*After pre-test, Payload 127 was chosen for final test and present on this test report.

3. 2.4GHz & BT or 5GHz & BT technology can transmit at same time.
4. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

2 channels are provided for WSDs as below table:

Channel	Frequency (MHz)
5	6489.6
9	7987.2

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to					Description
	BW	RE<1G	RE≥1G	TT	PLC	
-	√	√	√	-	√	-

Where BW: Occupied Bandwidth

RE<1G: Radiated Emission below 960 MHz

RE≥1G: Radiated Emission above 960 MHz & Bandedge Measurement

PLC: Power Line Conducted Emission

TT: Transmission Time

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	5, 9	5, 9	BPM-BPSK

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	5, 9	5, 9	BPM-BPSK

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	5, 9	5	BPM-BPSK

Occupied Bandwidth Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	5, 9	5, 9	BPM-BPSK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Randy Wu
BW	23 deg. C, 66% RH	120Vac, 60Hz	Luis Lee

3.3 Duty cycle of test signal.

CH 5:

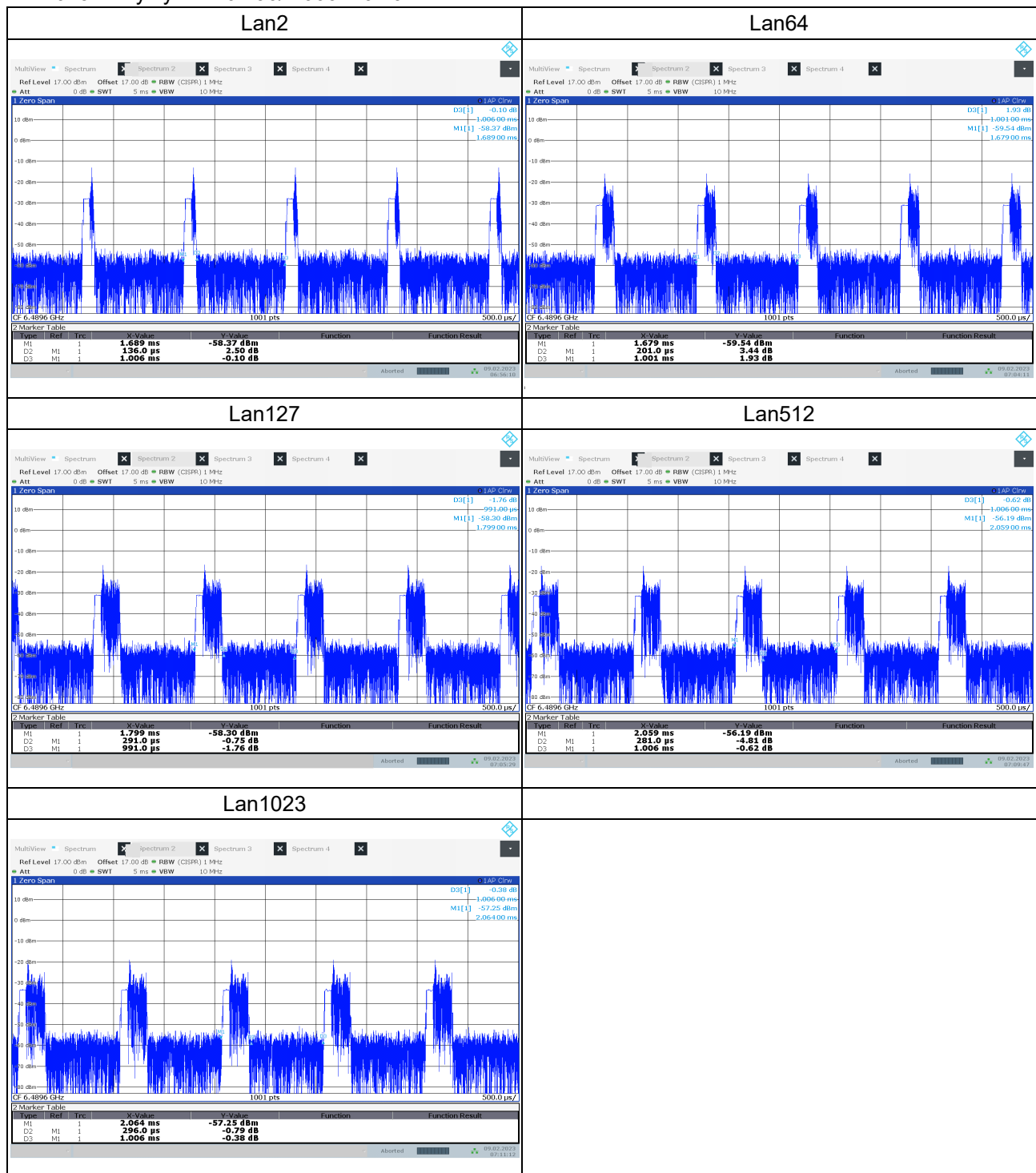
Len2: Duty cycle = $0.136/1.006 = 0.135$

Len64: Duty cycle = $0.201/1.001 = 0.201$

Len127: Duty cycle = $0.291/0.991 = 0.294$

Len512: Duty cycle = $0.281/1.006 = 0.279$

Len1023: Duty cycle = $0.296/1.006 = 0.294$



CH 9:

Len2: Duty cycle = $0.138/1.008 = 0.137$

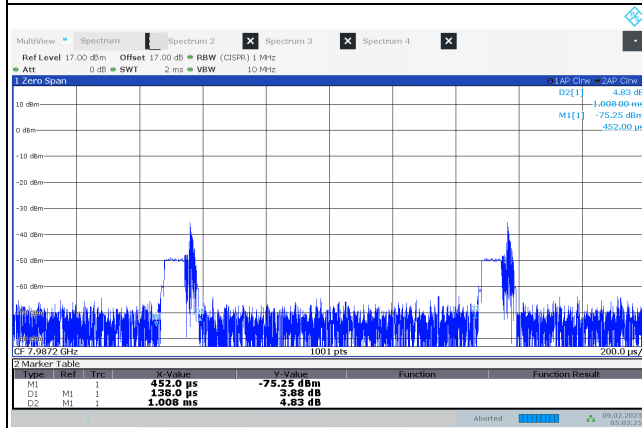
Len64: Duty cycle = $0.220/1.024 = 0.215$

Len127: Duty cycle = $0.284/1.008 = 0.282$

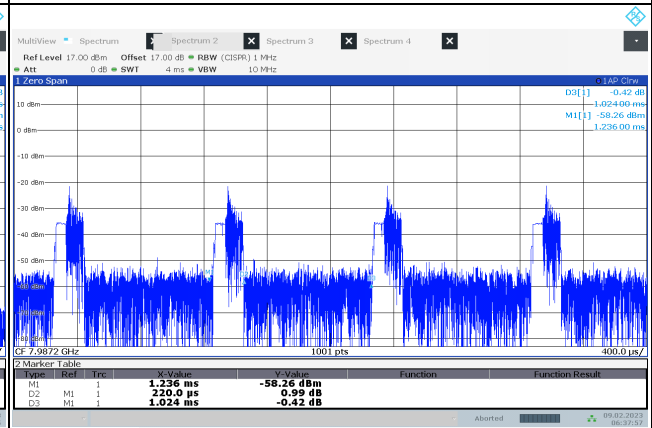
Len512: Duty cycle = $0.284/1.004 = 0.283$

Len1023: Duty cycle = $0.288/1.016 = 0.283$

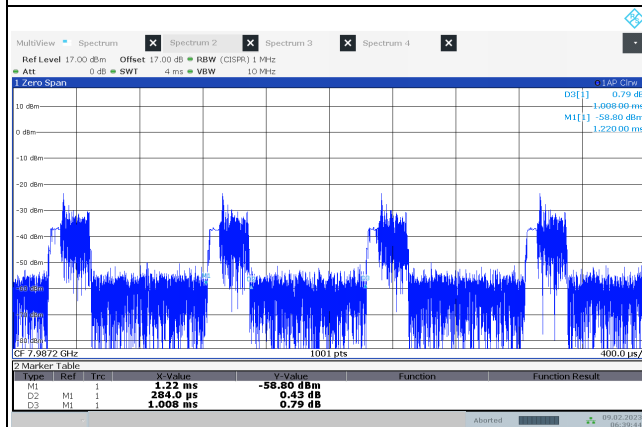
Lan2



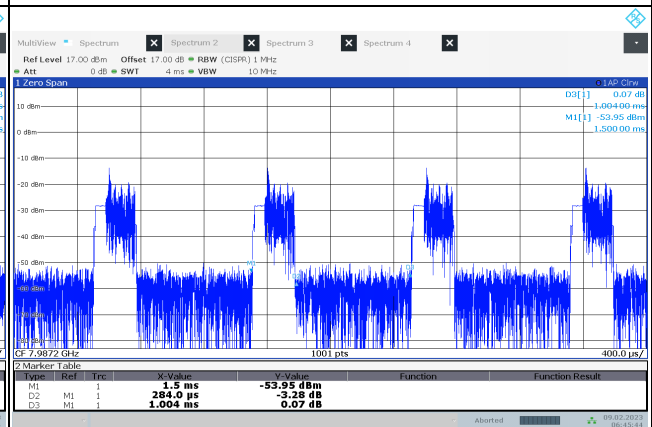
Lan64



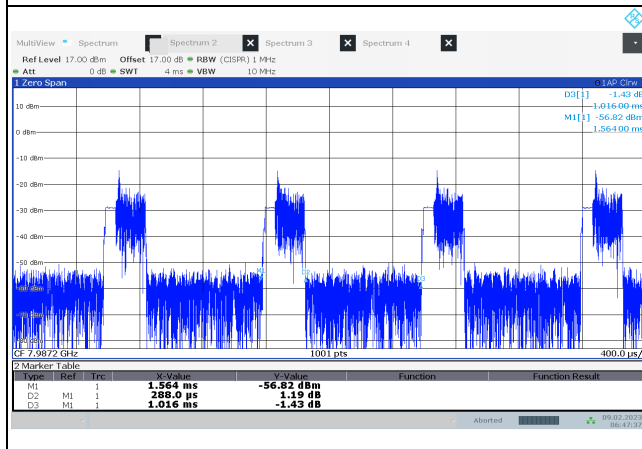
Lan127



Lan512



Lan1023



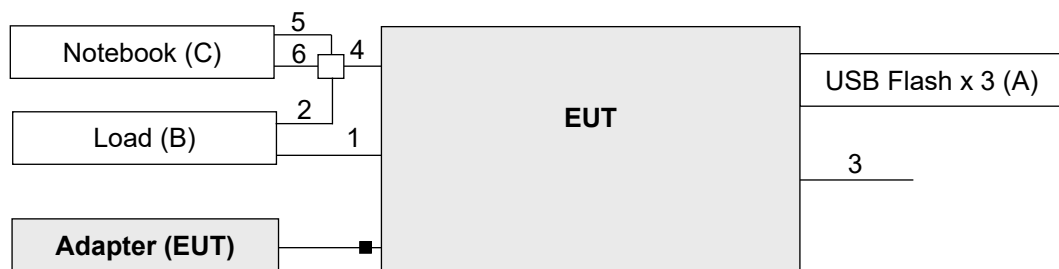
3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	USB Flash x 3	SanDisk	SDDDC3-032G	N/A	N/A	Provided by Lab
B	Load	N/A	N/A	N/A	N/A	Provided by Lab
C	Notebook	DELL	E5430	2RL3YW1	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	LAN Cable	3	1.5	N	0	RJ45, Cat5e
2	LAN Cable	1	1.5	N	0	RJ45, Cat5e
3	USB Cable	1	1.2	Y	0	-
4	RS-232 Cable	1	0.2	N	0	Provided by client
5	USB Cable	1	1.2	Y	0	-
6	RS-232 Cable	1	1.0	N	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standard:

47 CFR FCC Part 15, Subpart F

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4. Test Types and Results

4.1 Radiated Emissions

4.1.1 Limits of Radiated Emission Measurement - at or Below 960 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

Note:

1. The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average emissions detector.
2. The lower limit shall apply at the transition frequencies.
3. Emission level (dBuV/m) = 20 log Emission level (uV/m).
4. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, 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.

4.1.2 Limits of Radiated Emission Measurement - Above 960 MHz

Ground penetrating radars and wall imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

D-wall imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
Above 1990	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

Surveillance systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-53.3
1610-1990	-51.3
1990-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-63.3
1559-1610	-63.3

Medical imaging systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-65.3
1610-1990	-53.3
011990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-75.3
1559-1610	-75.3

Vehicular radar systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-22,000	-61.3
22,000-29,000	-41.3
29,000-31,000	-51.3
Above 31,000	-61.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Indoor UWB systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Hand held UWB systems

Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of 1 MHz (dBm)
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
Above 10600	-61.3
Frequency (MHz)	E.i.r.p. in a Resolution Bandwidth of of no less than 1 kHz (dBm)
1164-1240	-85.3
1559-1610	-85.3

Note:

1. Within the tables in §§15.509, 15.511, 15.513, 15.515, 15.517, and 15.519, the tighter emission limit applies at the band edges. Radiated emission levels at and below 960 MHz are based on measurements employing a CISPR quasi-peak detector. Radiated emission levels above 960 MHz are based on RMS average measurements over a 1 MHz resolution bandwidth. The RMS average measurement is based on the use of a spectrum analyzer with a resolution bandwidth of 1 MHz, an RMS detector, and a 1 millisecond or less averaging time. Unless otherwise stated, if pulse gating is employed where the transmitter is quiescent for intervals that are long compared to the nominal pulse repetition interval, measurements shall be made with the pulse train gated on. Alternative measurement procedures may be considered by the Commission.
2. 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 $E(\text{dBuV/m}) = P(\text{dBm EIRP}) + 95.2$. 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.
3. For vehicular radar systems: Following proper installation, vehicular radar systems shall attenuate any emissions within the 23.6-24.0 GHz band that appear 38 degrees or greater above the horizontal plane by 25 dB below the limit specified in paragraph (d) of this section. For equipment authorized, manufactured or imported on or after January 1, 2005, this level of attenuation shall be 25 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. For equipment authorized, manufactured or imported on or after January 1, 2010, this level of attenuation shall be 30 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. For equipment authorized, manufactured or imported on or after January 1, 2014, this level of attenuation shall be 35 dB for any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane. This level of attenuation can be achieved through the antenna directivity, through a reduction in output power or any other means.

4.2 Test Instruments

Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarbeck	VULB9168	9168-155	2022/10/21	2023/10/20
Loop Antenna EMCI	EM-6879	269	2022/9/19	2023/9/18
Loop Antenna TESEQ	HLA 6121	45745	2022/7/27	2023/7/26
Pre-amplifier EMCI	EMC001340	980201	2022/9/23	2023/9/22
Pre_Amplifier Agilent	8447D	2944A10631	2022/5/14	2023/5/13
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/1/15	2023/1/14
RF Coaxial Cable WOKEN	8D-FB	Cable-CH4-01	2022/7/9	2023/7/8
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101582	2022/4/13	2023/4/12
Test Receiver R&S	ESCI	100424	2021/12/30	2022/12/29
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2022/12/13

Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
Horn Antenna Schwarzbeck	9120D	9120D-408	2022/11/13	2023/11/12
	BBHA 9170	9170-480	2022/11/13	2023/11/12
Pre-Amplifier EMCI	EMC 184045	980116	2022/10/1	2023/9/30
Pre_Amplifier KEYSIGHT	83017A	MY53270295	2022/5/14	2023/5/13
RF cable HUBER+SUHNER	Sucoflex 104	MY 13380+295012/04	2022/5/14	2023/5/13
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2022/7/9	2023/7/8
	EMC102-KM-KM-3000	150929	2022/7/9	2023/7/8
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	2022/5/14	2023/5/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101582	2022/4/13	2023/4/12
Test Receiver R&S	ESCI	100424	2021/12/30	2022/12/29
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2022/12/12 ~ 2022/12/13

4.2.1 Test Procedures

For Radiated emission below 30MHz

- 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. Both X and Y axes 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 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

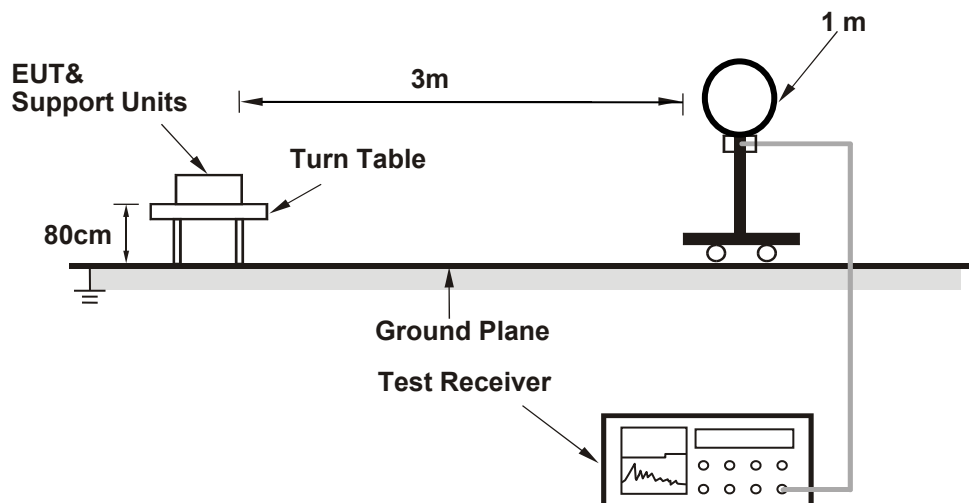
- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 960MHz) / 1.5 meters (for above 960MHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving 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 detects 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.

4.2.2 Deviation from Test Standard

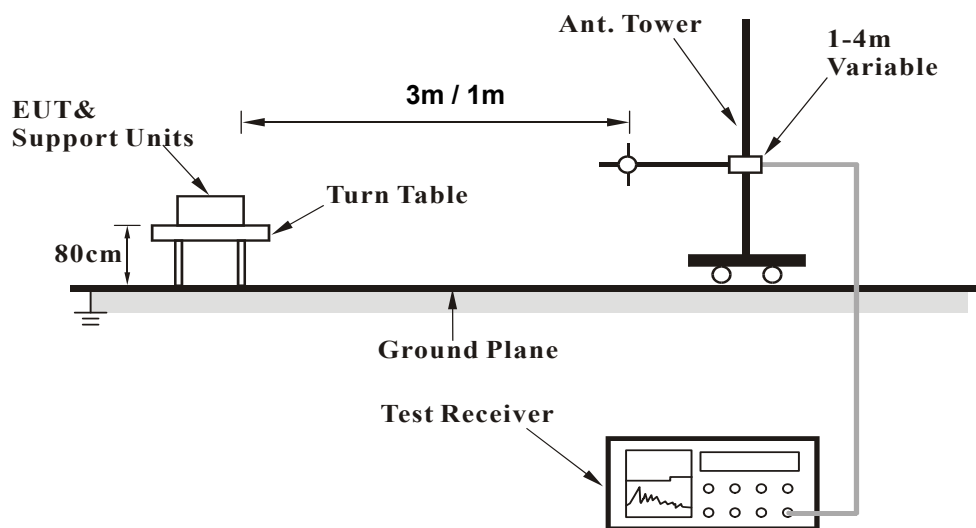
No deviation.

4.2.3 Test Setup

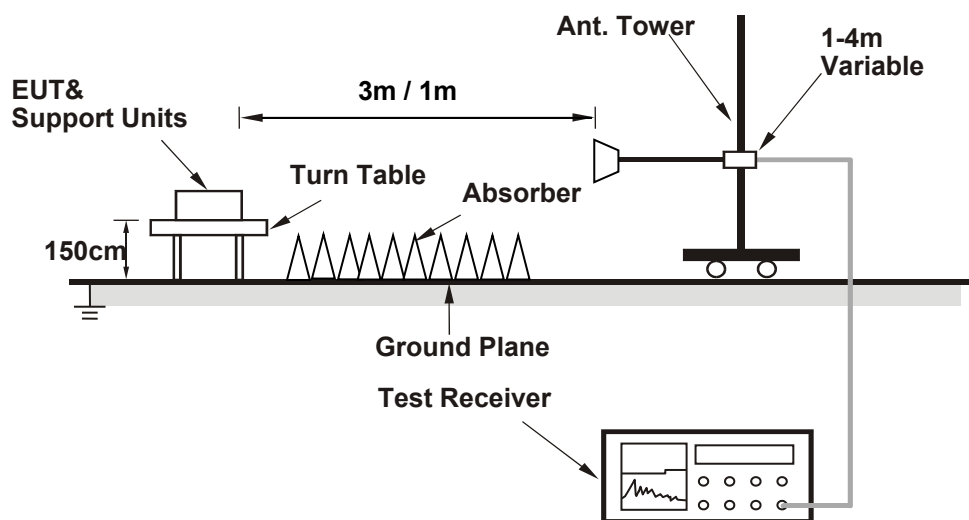
For Radiated emission below 30MHz



For Radiated emission 30MHz to 960MHz



For Radiated emission above 1GHz



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

4.2.4 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.5 Test Results

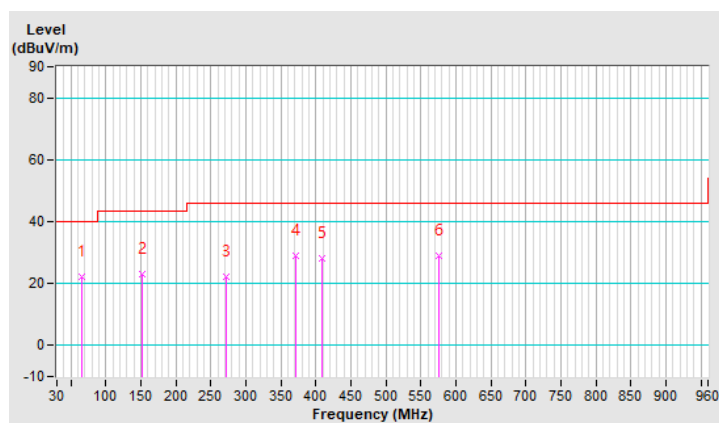
< 960MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	30MHz ~ 960MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.55	22.0 QP	40.0	-18.0	1.49 H	18	32.2	-10.2
2	152.30	23.1 QP	43.5	-20.4	1.00 H	195	31.7	-8.6
3	271.80	22.2 QP	46.0	-23.8	1.49 H	107	30.4	-8.2
4	371.61	29.0 QP	46.0	-17.0	1.99 H	83	35.1	-6.1
5	408.16	28.3 QP	46.0	-17.7	1.49 H	167	34.1	-5.8
6	575.45	29.1 QP	46.0	-16.9	1.49 H	4	31.8	-2.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

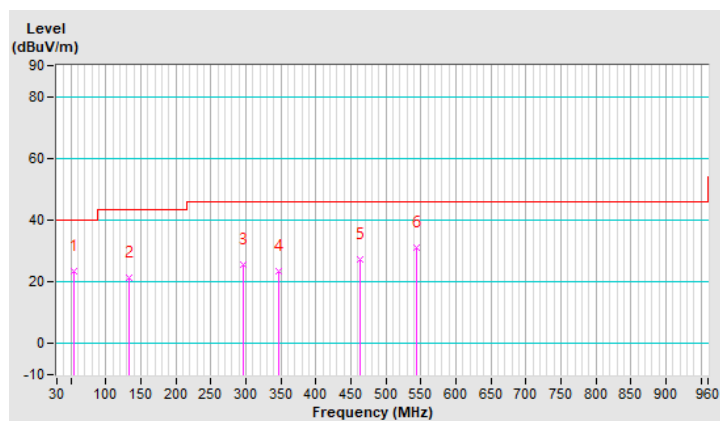


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	30MHz ~ 960MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	53.90	23.3 QP	40.0	-16.7	1.99 V	285	32.4	-9.1
2	134.03	21.5 QP	43.5	-22.0	1.99 V	2	31.1	-9.6
3	297.10	25.7 QP	46.0	-20.3	1.00 V	264	33.3	-7.6
4	347.71	23.4 QP	46.0	-22.6	1.00 V	242	30.1	-6.7
5	462.99	27.1 QP	46.0	-18.9	1.99 V	2	31.7	-4.6
6	544.52	30.9 QP	46.0	-15.1	1.99 V	2	34.4	-3.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

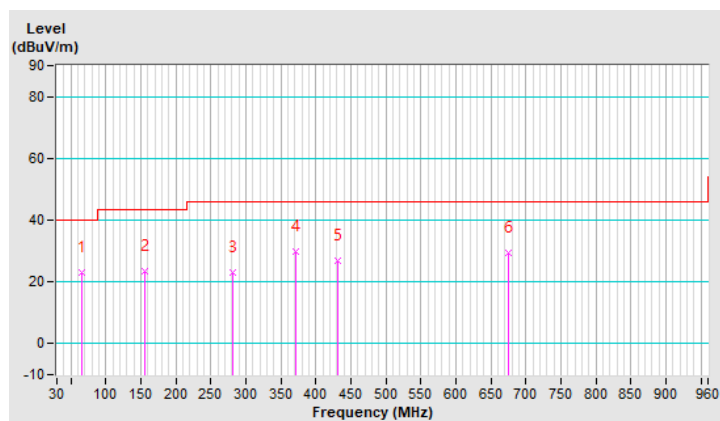


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	30MHz ~ 960MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.55	23.2 QP	40.0	-16.8	2.00 H	5	33.4	-10.2
2	156.52	23.4 QP	43.5	-20.1	2.00 H	313	31.9	-8.5
3	281.64	22.9 QP	46.0	-23.1	1.01 H	112	30.7	-7.8
4	371.61	30.0 QP	46.0	-16.0	1.01 H	179	36.1	-6.1
5	432.06	26.9 QP	46.0	-19.1	2.00 H	30	32.0	-5.1
6	675.26	29.4 QP	46.0	-16.6	1.51 H	294	30.1	-0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

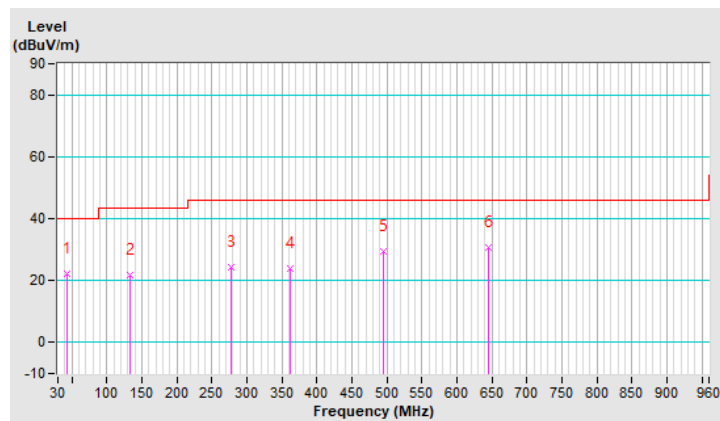


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	30MHz ~ 960MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.65	22.2 QP	40.0	-17.8	2.00 V	110	31.4	-9.2
2	132.62	21.9 QP	43.5	-21.6	1.01 V	18	31.6	-9.7
3	277.42	24.2 QP	46.0	-21.8	1.51 V	278	32.1	-7.9
4	361.77	23.8 QP	46.0	-22.2	1.01 V	184	30.1	-6.3
5	495.32	29.4 QP	46.0	-16.6	1.01 V	99	33.8	-4.4
6	644.33	30.7 QP	46.0	-15.3	2.00 V	31	31.6	-0.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



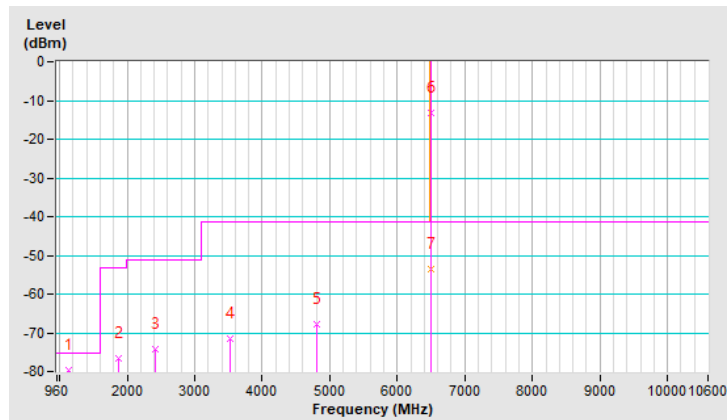
960-16000MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	960MHz ~ 10600MHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1143.16	-79.59 AV	-75.30	-4.29	1.52 H	133	29.94	-109.53
2	1866.16	-76.51 AV	-53.30	-23.21	1.99 H	174	28.75	-105.26
3	2425.28	-74.35 AV	-51.30	-23.05	1.62 H	148	27.10	-101.45
4	3524.24	-71.53 AV	-41.30	-30.23	1.88 H	163	27.12	-98.65
5	4806.36	-67.63 AV	-41.30	-26.33	1.85 H	146	25.27	-92.90
6	*6489.60	-13.16 PK	0.00	-13.16	1.45 H	139	76.60	-89.76
7	*6489.60	-53.69 AV	-41.30	-12.39	1.45 H	139	36.07	-89.76

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.
5. “ * “: Fundamental frequency.

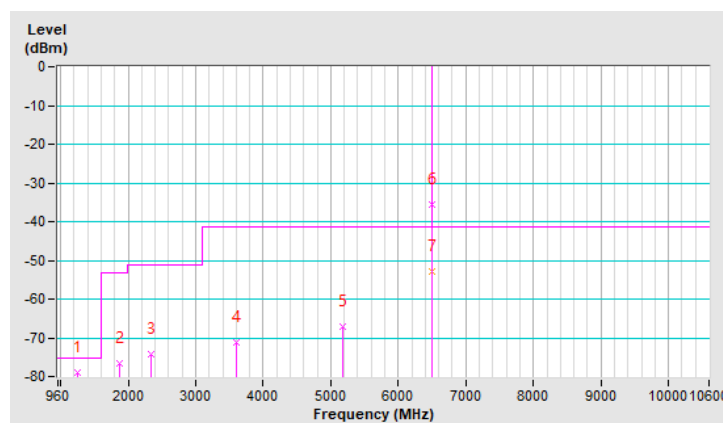


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	960MHz ~ 10600MHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1249.20	-78.97 AV	-75.30	-3.67	1.63 V	355	29.50	-108.47
2	1866.16	-76.65 AV	-53.30	-23.35	1.69 V	342	28.61	-105.26
3	2348.16	-74.31 AV	-51.30	-23.01	1.67 V	336	26.94	-101.25
4	3611.00	-71.24 AV	-41.30	-29.94	1.85 V	349	26.89	-98.13
5	5172.68	-67.09 AV	-41.30	-25.79	1.55 V	348	25.26	-92.35
6	*6489.60	-35.68 PK	0.00	-35.68	1.59 V	342	54.08	-89.76
7	*6489.60	-52.87 AV	-41.30	-11.57	1.59 V	342	36.89	-89.76

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)=20*log(1/3)= -9.54dB
4. Margin value = Emission Level – Limit value.
5. “ * “: Fundamental frequency.

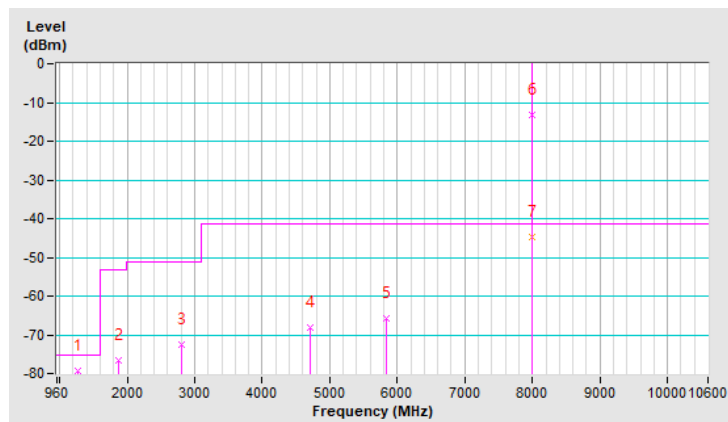


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	960MHz ~ 10600MHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1278.12	-79.26 AV	-75.30	-3.96	1.26 H	167	28.90	-108.16
2	1875.80	-76.53 AV	-53.30	-23.23	1.69 H	148	28.66	-105.19
3	2801.24	-72.67 AV	-51.30	-21.37	1.77 H	156	27.51	-100.18
4	4709.96	-68.16 AV	-41.30	-26.86	1.90 H	142	25.32	-93.48
5	5837.84	-65.91 AV	-41.30	-24.61	1.48 H	139	25.53	-91.44
6	*7987.20	-13.37 PK	0.00	-13.37	1.52 H	124	74.06	-87.43
7	*7987.20	-44.69 AV	-41.30	-3.39	1.52 H	124	42.74	-87.43

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.
5. “ * “: Fundamental frequency.

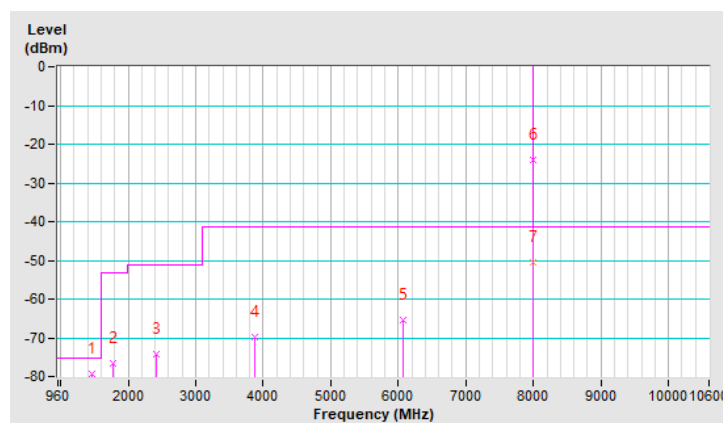


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	960MHz ~ 10600MHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1470.92	-79.21 AV	-75.30	-3.91	1.55 V	242	27.83	-107.04
2	1779.40	-76.77 AV	-53.30	-23.47	1.69 V	241	29.07	-105.84
3	2425.28	-74.32 AV	-51.30	-23.02	1.46 V	245	27.13	-101.45
4	3880.92	-69.77 AV	-41.30	-28.47	1.48 V	253	27.41	-97.18
5	6078.84	-65.27 AV	-41.30	-23.97	1.47 V	244	26.24	-91.51
6	*7987.20	-23.99 PK	0.00	-23.99	1.46 V	248	63.44	-87.43
7	*7987.20	-50.58 AV	-41.30	-9.28	1.46 V	248	36.85	-87.43

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)=20*log(1/3)= -9.54dB
4. Margin value = Emission Level – Limit value.
5. “ * “: Fundamental frequency.



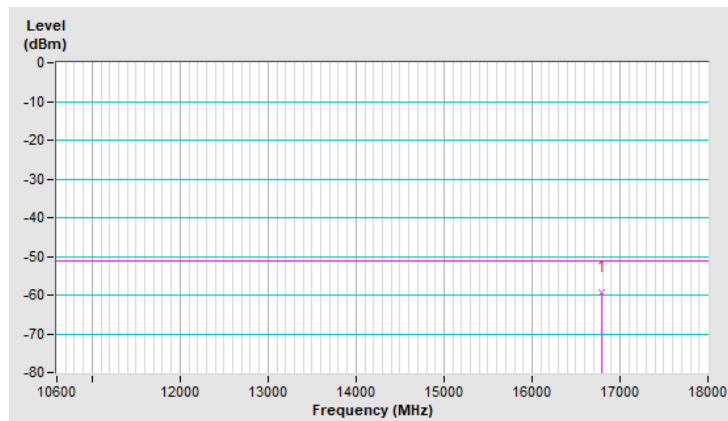
10600-18000MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	10600MHz ~ 18000MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	16796.76	-59.49 AV	-51.30	-8.19	1.85 H	236	21.13	-80.62

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

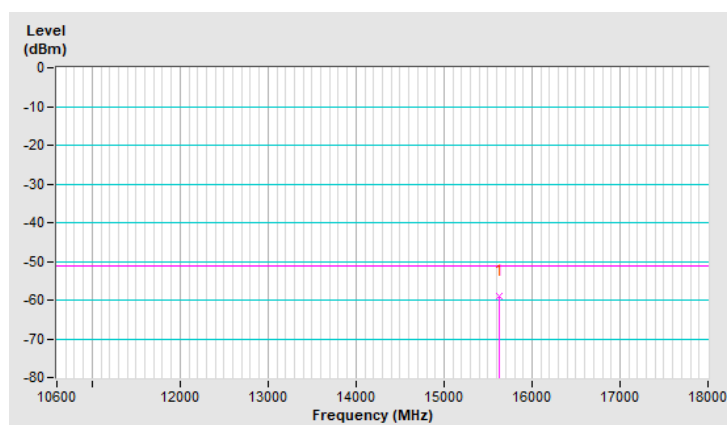


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	10600MHz ~ 18000MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	15625.34	-58.92 AV	-51.30	-7.62	1.69 V	203	24.24	-83.16

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

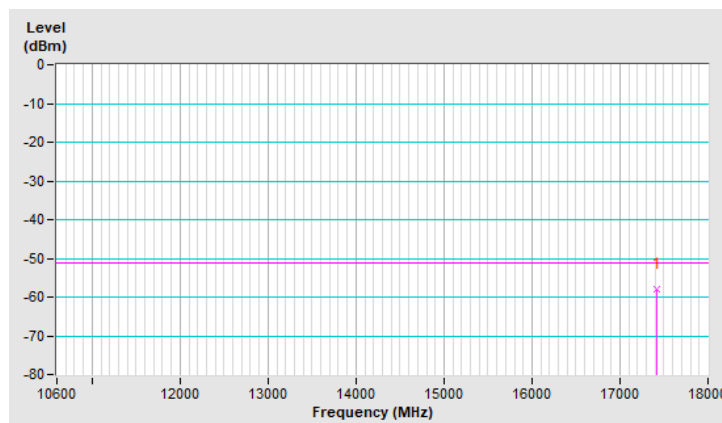


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	10600MHz ~ 18000MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	17421.87	-57.96 AV	-51.30	-6.66	2.10 H	153	20.18	-78.14

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

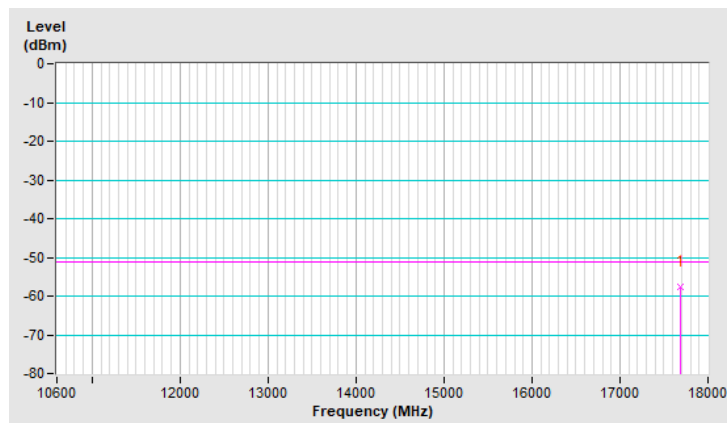


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	10600MHz ~ 18000MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	17691.97	-57.52 AV	-51.30	-6.22	1.76 V	144	19.32	-76.84

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



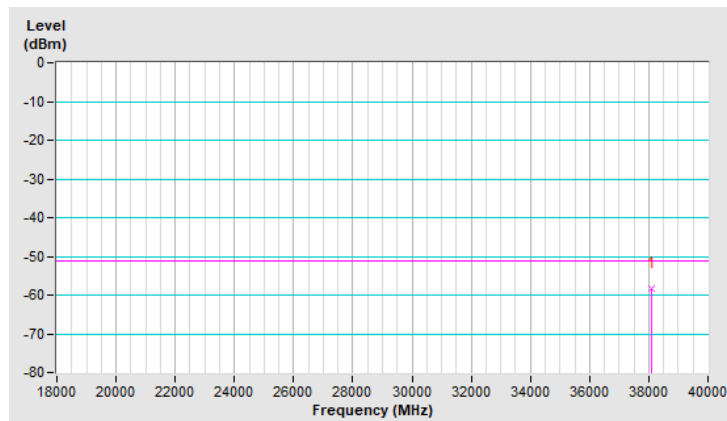
18000-40000MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	18000MHz ~ 40GHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	38073.90	-58.41 AV	-51.30	-7.11	1.52 H	223	44.04	-102.45

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

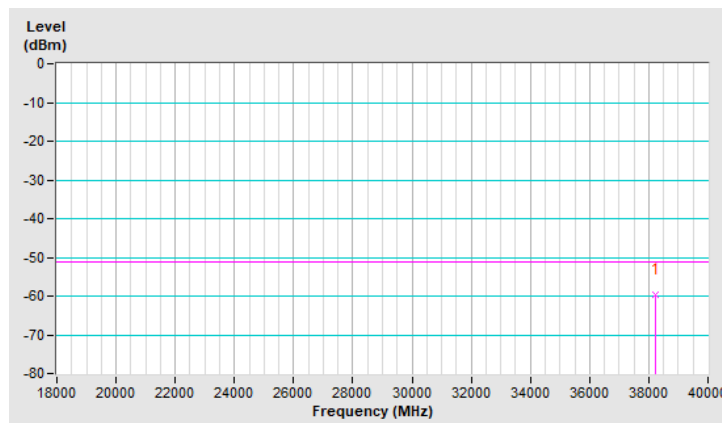


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	18000MHz ~ 40GHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	38209.75	-59.52 AV	-51.30	-8.22	2.31 V	158	43.98	-103.50

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

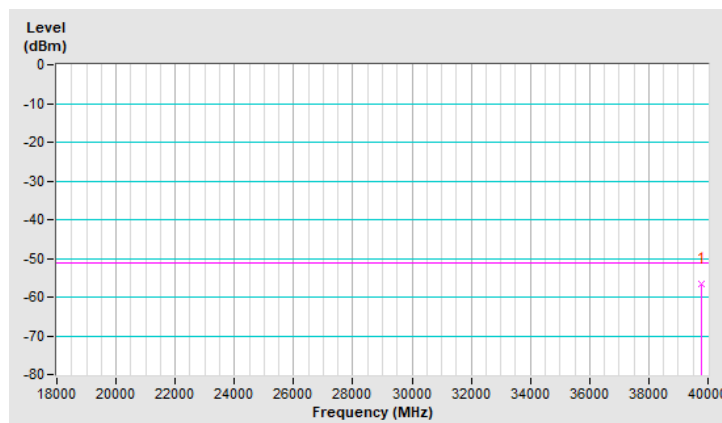


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	18000MHz ~ 40GHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	39769.55	-56.60 AV	-51.30	-5.30	1.88 H	172	45.38	-101.98

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

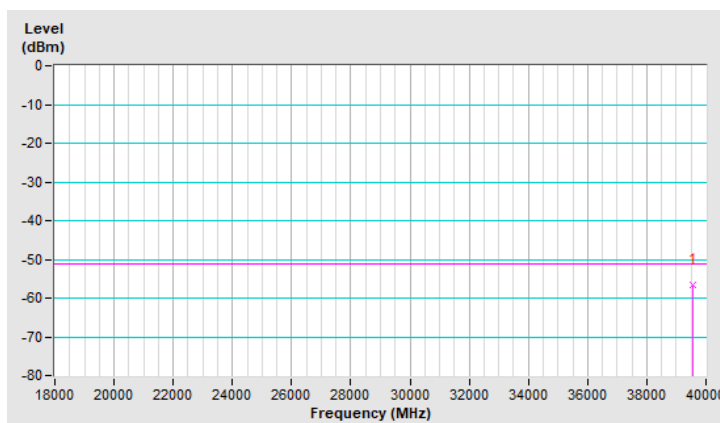


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	18000MHz ~ 40GHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	39554.50	-56.54 AV	-51.30	-5.24	2.63 V	149	44.83	-101.37

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



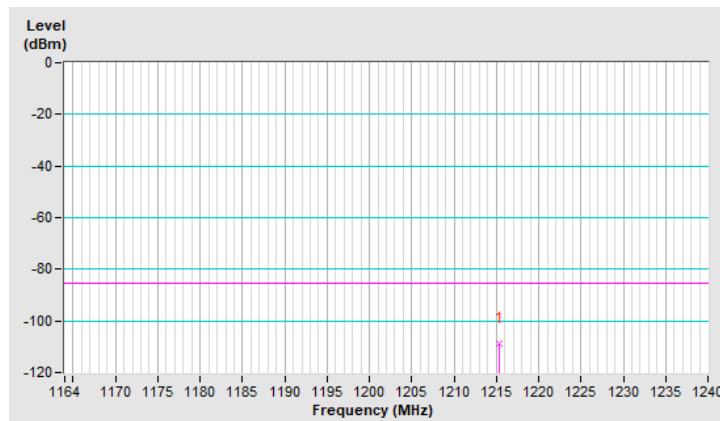
1164-1240MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	1164MHz ~ 1240MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1215.30	-108.59 AV	-85.30	-23.29	2.68 H	142	0.13	-108.72

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

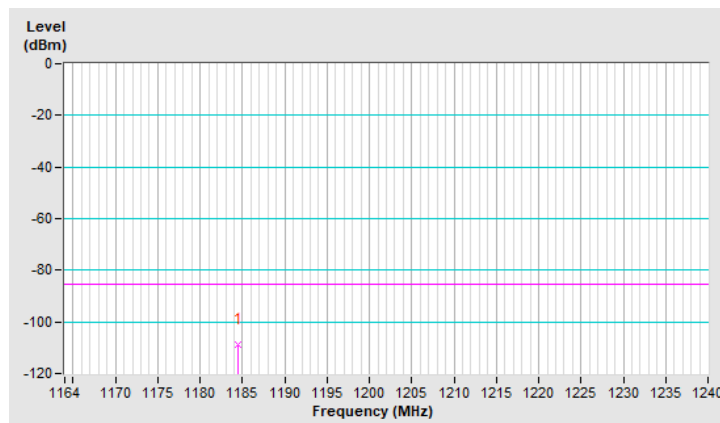


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	1164MHz ~ 1240MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1184.52	-108.69 AV	-85.30	-23.39	1.70 V	152	0.35	-109.04

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

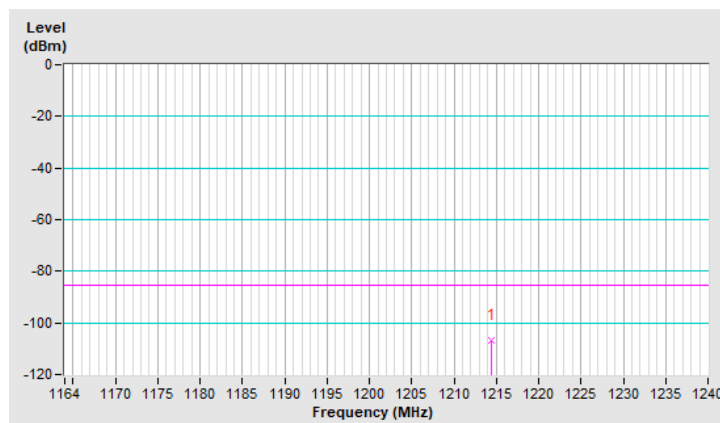


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	1164MHz ~ 1240MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1214.39	-106.96 AV	-85.30	-21.66	1.69 H	225	1.78	-108.74

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

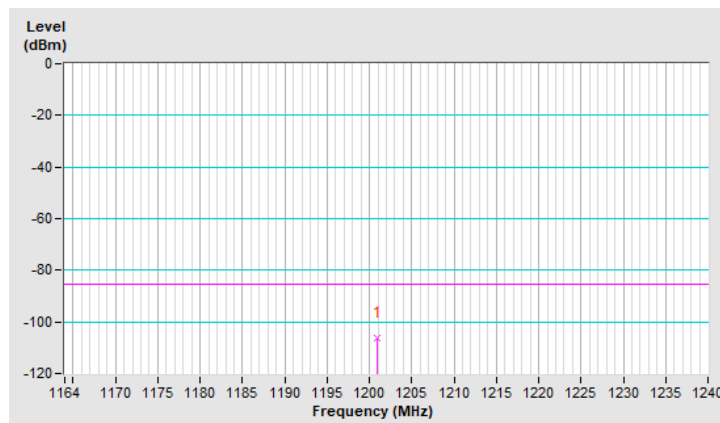


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	1164MHz ~ 1240MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1200.94	-106.48 AV	-85.30	-21.18	1.63 V	201	2.36	-108.84

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



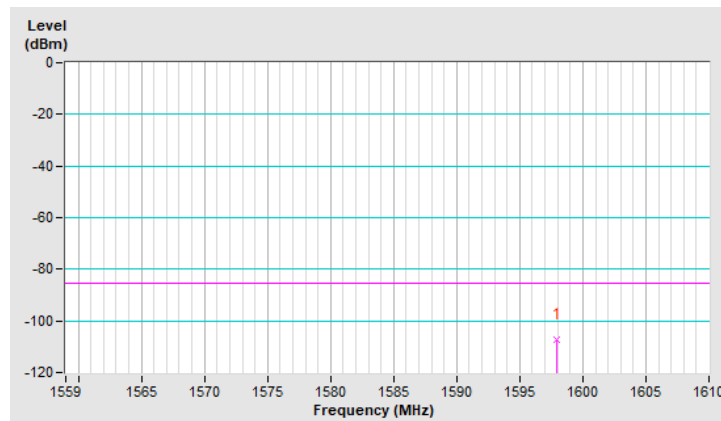
1559-1610 MHz

RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	1559MHz ~ 1610MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1597.91	-107.49 AV	-85.30	-22.19	1.69 H	220	-0.88	-106.61

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

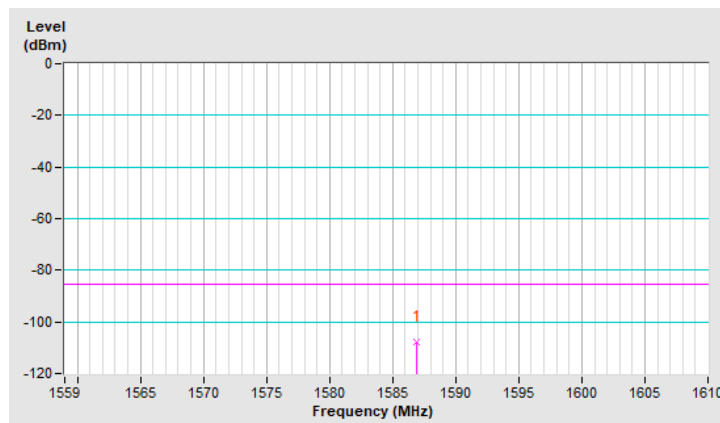


RF Mode	TX UWB	Channel	CH 5 : 6489.6 MHz
Frequency Range	1559MHz ~ 1610MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1586.90	-107.66 AV	-85.30	-22.36	2.31 V	185	-1.03	-106.63

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

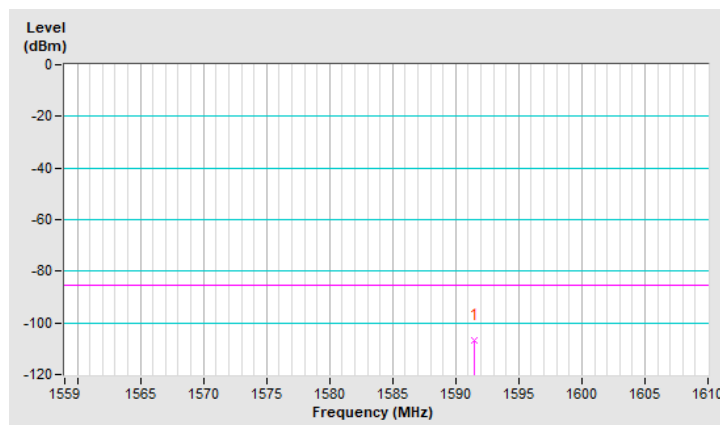


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	1559MHz ~ 1610MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Horizontal at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1591.44	-106.65 AV	-85.30	-21.35	2.31 H	142	-0.02	-106.63

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.

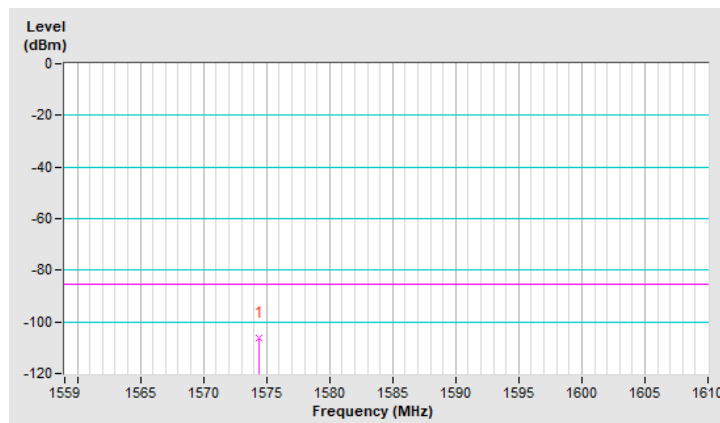


RF Mode	TX UWB	Channel	CH 9 : 7987.2 MHz
Frequency Range	1559MHz ~ 1610MHz	Detector Function	Average (AV)

Antenna Polarity & Test Distance: Vertical at 1 m								
No.	Freq. (MHz)	EIRP Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor
1	1574.40	-106.30 AV	-85.30	-21.00	1.76 V	142	0.35	-106.65

Remarks:

1. EIRP Emission Level(dBm) = Raw Value(dBuV/m) + Correction Factor.
2. Correction Factor = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)-1m to 3m Test distance Fact(dB) – 95.2 (field strength converted to EIRP at 3m).
3. Test distance at 1m, 1m to 3m Test distance Fact(dB)= $20 \cdot \log(1/3) = -9.54$ dB
4. Margin value = Emission Level – Limit value.



4.3 Conducted Emission Measurement

4.3.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.3.2 Test Instruments

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
LISN R&S	ESH3-Z5	100311	2022/9/12	2023/9/11
LISN ROHDE & SCHWARZ	ENV216	101826	2022/3/14	2023/3/13
Receiver R&S	ESCI	100412	2022/8/22	2023/8/21
RF Coaxial Cable WOKEN	5D-FB	Cable-cond1-01	2023/1/7	2024/1/6
Software BVADT	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2022/8/31	2023/8/30

Notes:

1. The test was performed in HY - Conduction 1.
2. Tested Date: 2023/2/7.

4.3.3 Test Procedures

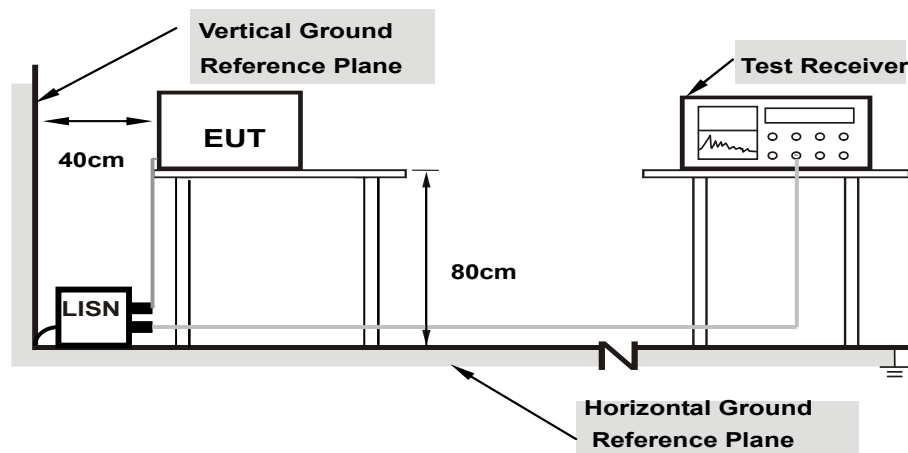
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.3.4 Deviation from Test Standard

No deviation.

4.3.5 Test Setup



- Note:**
- Support units were connected to second LISN.
 - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.3.6 EUT Operating Conditions

Same as 4.2.4.

4.3.7 Test Results

Worst-case data:

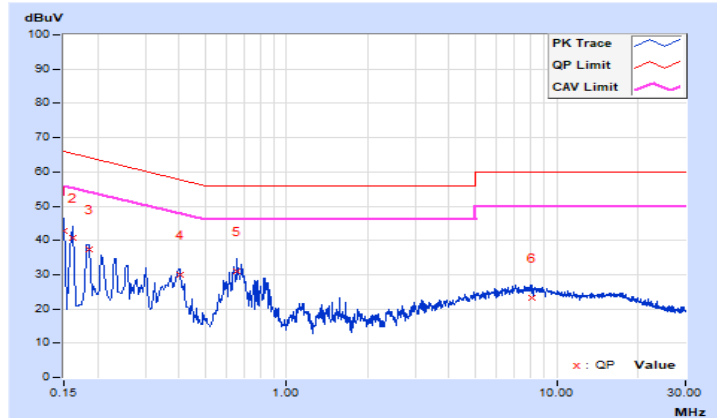
CH 5

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.64	33.20	17.24	42.84	26.88	66.00	56.00	-23.16	-29.12
2	0.16190	9.64	31.15	15.48	40.79	25.12	65.37	55.37	-24.58	-30.25
3	0.18519	9.65	27.68	14.56	37.33	24.21	64.25	54.25	-26.92	-30.04
4	0.40180	9.69	20.33	18.62	30.02	28.31	57.82	47.82	-27.80	-19.51
5	0.65800	9.70	21.17	15.21	30.87	24.91	56.00	46.00	-25.13	-21.09
6	8.05400	9.81	13.49	11.45	23.30	21.26	60.00	50.00	-36.70	-28.74

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

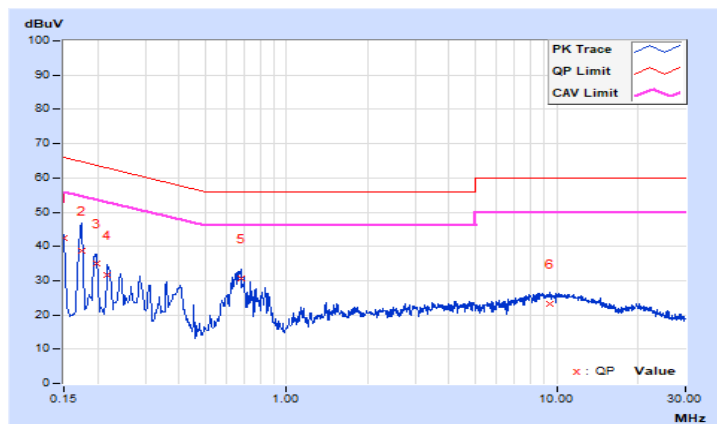


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.64	32.88	16.90	42.52	26.54	66.00	56.00	-23.48	-29.46
2	0.17384	9.65	29.19	14.63	38.84	24.28	64.77	54.77	-25.93	-30.49
3	0.19728	9.66	25.49	12.35	35.15	22.01	63.72	53.72	-28.57	-31.71
4	0.21800	9.66	21.94	10.13	31.60	19.79	62.89	52.89	-31.29	-33.10
5	0.67800	9.70	20.92	15.34	30.62	25.04	56.00	46.00	-25.38	-20.96
6	9.44600	9.82	13.32	10.86	23.14	20.68	60.00	50.00	-36.86	-29.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.4 Occupied Bandwidth Measurement

4.4.1 Limits of Transmitter Power and Power Spectral Density Measurement

	EUT Description	Limit
☐	Ground penetrating radars and wall imaging systems	Must be below 10.6 GHz
☐	D-wall imaging systems	Must be below 960 MHz or the center frequency, f_c , and the frequency at which the highest radiated emission occurs, f_m , must be contained between 1990 MHz and 10600 MHz
☐	Surveillance systems	Must be contained between 1990 MHz and 10,600 MHz
☐	Medical imaging systems	Must be contained between 3100 MHz and 10,600 MHz
☐	Vehicular radar systems	Shall be contained between 22 GHz and 29 GHz. In addition, the center frequency, f_c , and the frequency at which the highest level emission occurs, f_m , must be greater than 24.075 GHz
☒	Indoor UWB systems	Must be contained between 3100 MHz and 10,600 MHz
☐	Hand held UWB systems	Must be contained between 3100 MHz and 10,600 MHz

4.4.2 Test Setup

Same as 4.2.3

4.4.3 Test Instruments

Refer to section 4.2 to get information of above instrument.

4.4.4 Test Procedure

The frequency at which the maximum power level is measured with the peak detector is designated f_m . The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 50MHz resolution bandwidth and a video bandwidth of 50MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below f_m , where the peak power falls by 10 dB relative to the level at f_m , are designated as f_H and f_L , respectively.

4.4.5 Deviation from Test Standard

No deviation.

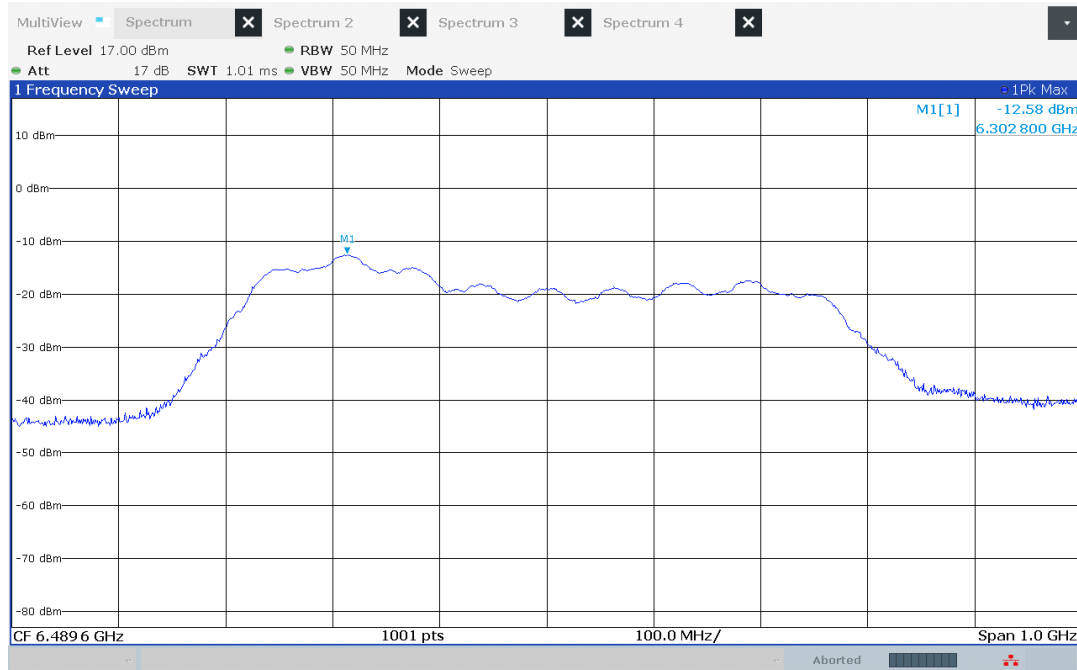
4.4.6 EUT Operating Conditions

Same as 4.2.4.

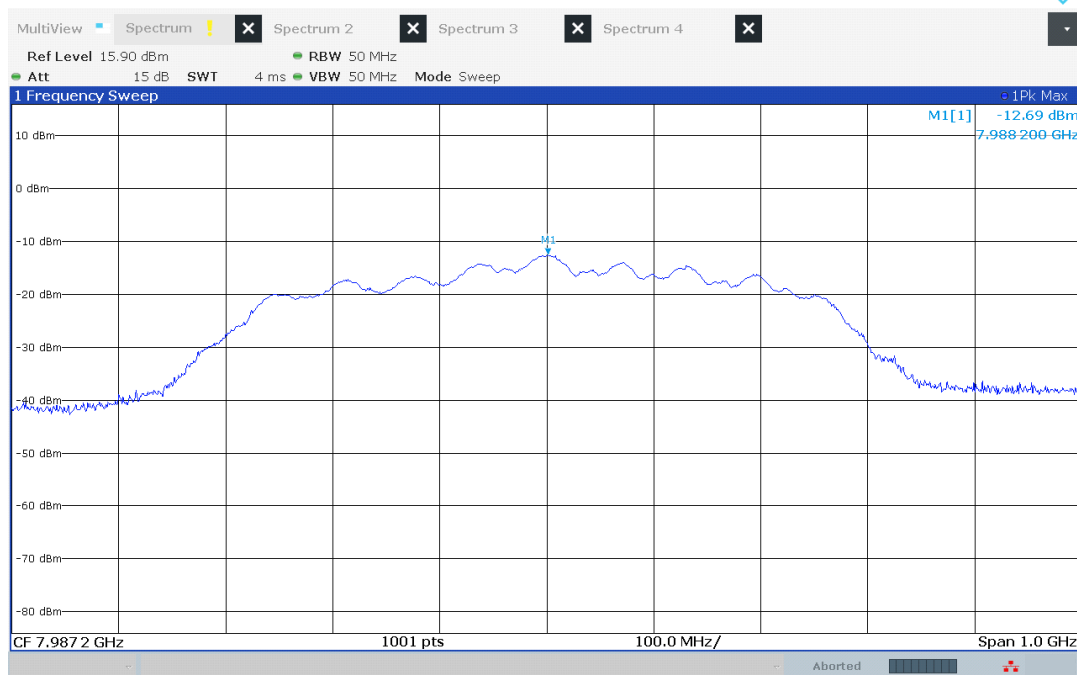
4.4.7 Test Results

Detector Function	Peak (PK)	Environmental Conditions	23 deg. C, 66% RH
Tested By	Luis Lee		

Channel	Frequency (MHz)	Len	Peak Power (dBm)	Antenna Polarity (H/V)	Antenna Height(m)	Table Angle (Degree)	Limit (dBm)	Pass/Fail
5	6489.6	2	-12.88	H	1.61	223	0.00	Pass
5	6489.6	64	-13.45	H	1.68	225	0.00	Pass
5	6489.6	127	-12.58	H	1.61	223	0.00	Pass
5	6489.6	512	-12.67	H	1.62	221	0.00	Pass
5	6489.6	1023	-13.22	H	1.68	226	0.00	Pass
9	7987.2	2	-14.24	H	1.48	343	0.00	Pass
9	7987.2	64	-15.39	H	1.46	345	0.00	Pass
9	7987.2	127	-12.69	H	1.47	345	0.00	Pass
9	7987.2	512	-17.01	H	1.46	342	0.00	Pass
9	7987.2	1023	-17.08	H	1.40	340	0.00	Pass



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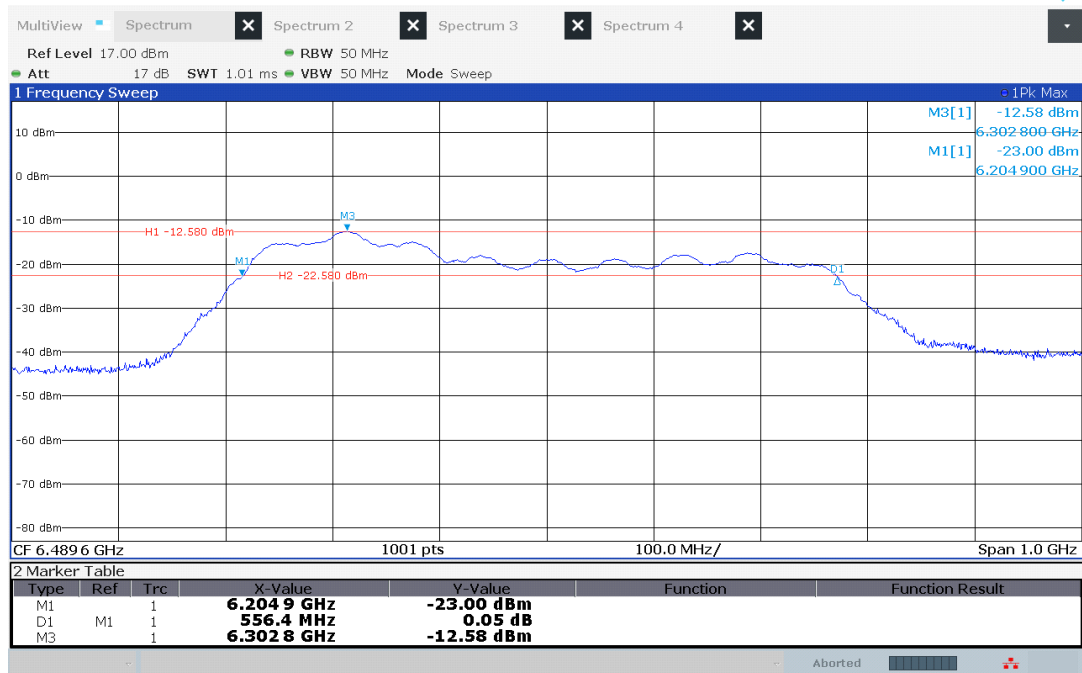


CH 9

10 dB Bandwidth

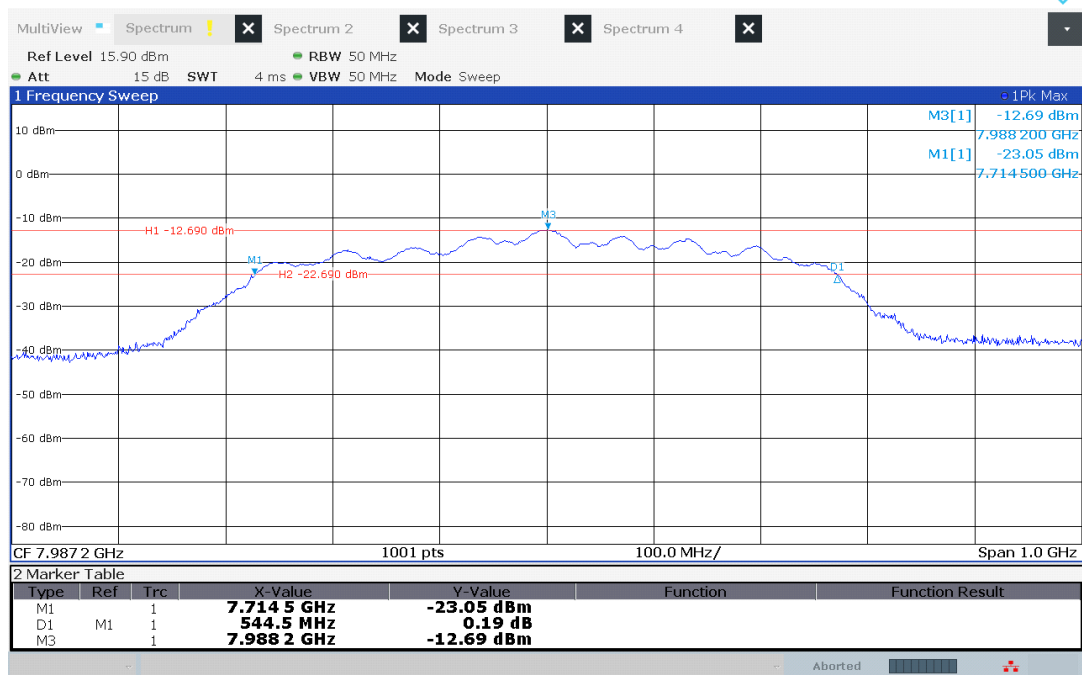
Tested By	Luis Lee	Environmental Conditions	23 deg. C, 66% RH
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Channel	Frequency (MHz)	Len	10dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
5	6489.60	127	556.40	500	Pass
9	7987.20	127	544.50	500	Pass



20:41:08 07.03.2023

CH 5



21:06:28 07.03.2023

CH 9

5.5 Transmission Time Measurement

4.5.1 Limits of Transmitter Emission Measurement

	EUT Description	Limit
☐	Ground penetrating radars and wall imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	D-wall imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	Surveillance systems	N/A
☐	Medical imaging systems	Shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.
☐	Vehicular radar systems	N/A
☒	Indoor UWB systems	N/A
☐	Hand held UWB systems	Shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

4.5.2 Test Setup

NA

4.5.3 Test Instruments

NA

4.5.4 Test Procedure

NA

4.5.5 Deviation from Test Standard

NA

4.5.6 EUT Operating Condition

NA

4.5.7 Test Results

Not applicable to Indoor UWB systems.

5. Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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