

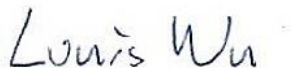


FCC RADIO TEST REPORT

FCC ID : 2BKML-FOXRADAR
Equipment : FoxRadar
Brand Name : FoxInsights
Model Name : FoxRadar-V1
Applicant : FoxInsights GmbH
Ridlerstr. 57 80339 Munich Germany
Manufacturer : FoxInsights GmbH
Ridlerstr. 57 80339 Munich Germany
Standard : FCC 47 CFR Part 15.255

The product was received on Oct. 04, 2024 and testing was performed from Oct. 22, 2024 to Nov. 25, 2024. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures ANSI C63.10-2020 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR492601A	01	Initial issue of report	Nov. 18, 2024
FR492601A	02	Revise Feature of Equipment Under Test and Transmit Spurious Emission Test Result This report is an updated version, replacing the report issued on Nov. 18, 2024	Nov. 21, 2024
FR492601A	03	Revise Section 2.1, 3.4, 3.7, 3.8, List of Measuring Equipment and Appendix A This report is an updated version, replacing the report issued on Nov. 21, 2024	Nov. 22, 2024
FR492601A	04	Revise Section 3.5 and List of Measuring Equipment This report is an updated version, replacing the report issued on Nov. 22, 2024	Nov. 26, 2024
FR492601A	05	Revise Section 1.4 This report is an updated version, replacing the report issued on Nov. 26, 2024	Nov. 26, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Limit	Result (PASS/FAIL)
3.3	§15.255(c)(3)	Duty Cycle	10% within 0.3 μ s Maximum pulse duration < 6 ns	Pass
3.4	§15.215(c) §15.255(c)(3)	Emission Bandwidth	Within 57 ~ 64 GHz	Pass
3.5	§15.255(c)(3)	EIRP Power	Refer to 15.255(c)(3)	Pass
3.6	§15.255(d)	Transmitter Spurious Emissions	Below 40GHz refer to 15.209 Above 40GHz: 90 pW/cm ² @ 3 m	Pass
3.7	§15.255(f)	Frequency Stability for Temperature & Voltage	Within 57 ~ 64 GHz	Pass
-	§15.207	AC Power Conducted Emission	§15.207	Not Required

Note: Not required means after assessing, test items are not necessary to carry out.

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang

Report Producer: Clio Lo

1 General Description

1.1 Feature of Equipment Under Test

Product Feature
General Specs GSM/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, and 60GHz.
Antenna Type WWAN: Surface Mount Device WLAN: PCB Antenna Bluetooth: PCB Antenna 60GHz: 2 embedded Dipole Antennas

Remark:

1. The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.
2. All measurements were performed radiated and therefore additional antenna gain documentation is not required.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH11-HY, 03CH18-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW3786

1.4 Applied Standards

- ♦ FCC 47 CFR Part 2, 15.255
- ♦ KDB 364244 D01 Meas 15.255 Radars v01 (April 16, 2024)
- ♦ ANSI C63.10-2020

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2 Test Configuration of Equipment Under Test

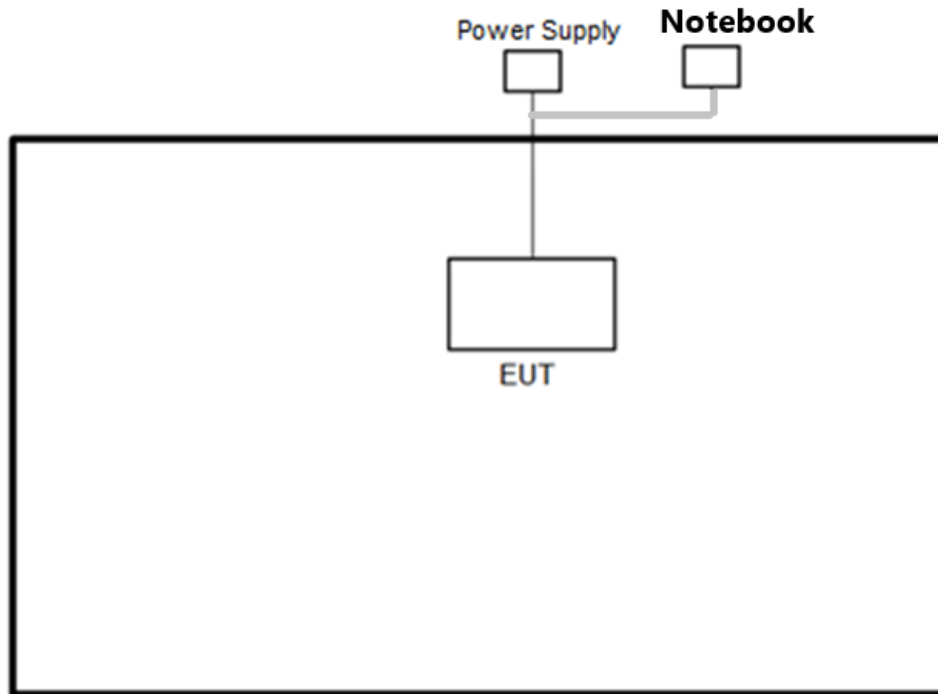
2.1 Test Mode

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

Frequency (GHz)	Modulation
57 - 64	Pulse Modulation

2.2 Connection Diagram of Test System

<60GHz Tx Mode>



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Power Supply	GW Instek	GPE-2323	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.4 Far Field Condition for Frequency above 18GHz

Horn Antenna	Frequency (GHz)	Antenna Dimension A (mm)	Wavelength (λ) (m)	Far field R (m) $\geq 2A^2 / \lambda$	Measurement Distance (D) (m)
BBHA 9170	18	60	0.0167	0.43	1
	40	60	0.0075	0.96	
QWH-UPRR00	40	48	0.0075	0.61	0.87
	57	48	0.0053	0.87	
QWH-VPRR00	57	38	0.0053	0.54	0.62
	65	38	0.0046	0.62	
QWH-EPRR00	60	31	0.0050	0.38	0.6
	90	31	0.0033	0.6	
QWH-FPRR00	90	21	0.0033	0.26	0.43
	140	21	0.0021	0.42	
QWH-GPRR00	140	14	0.0021	0.18	0.27
	200	14	0.0015	0.26	

Note: The measurement distance may be far than the measurement distance above.

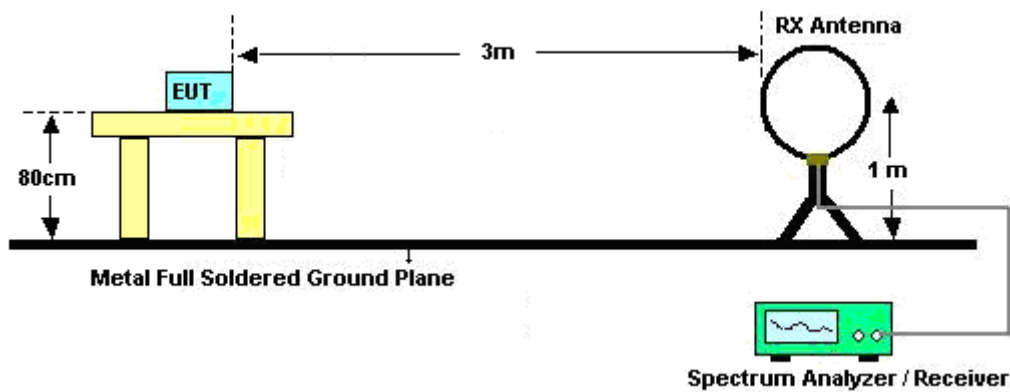
3 Radiated Test Items

3.1 Measuring Instruments

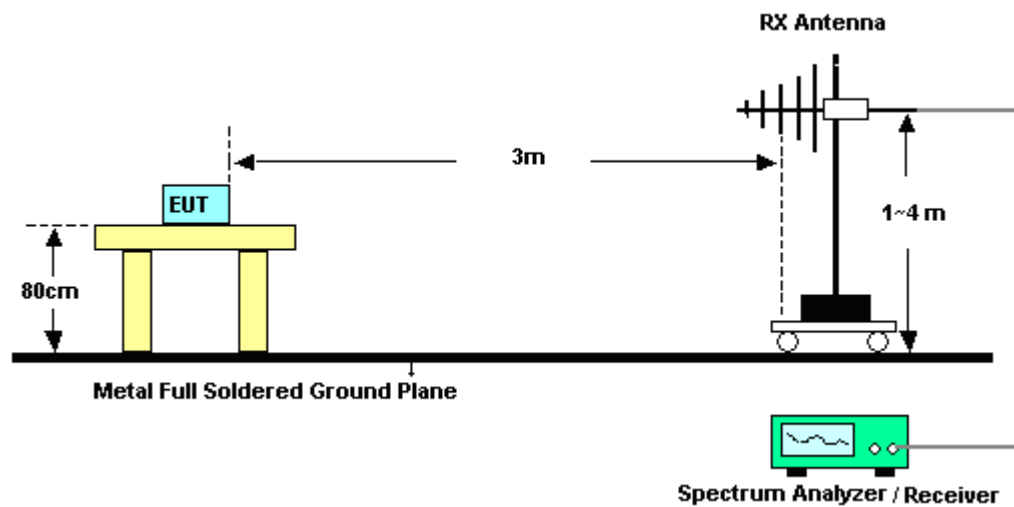
See list of measuring instruments of this test report.

3.2 Test Setup

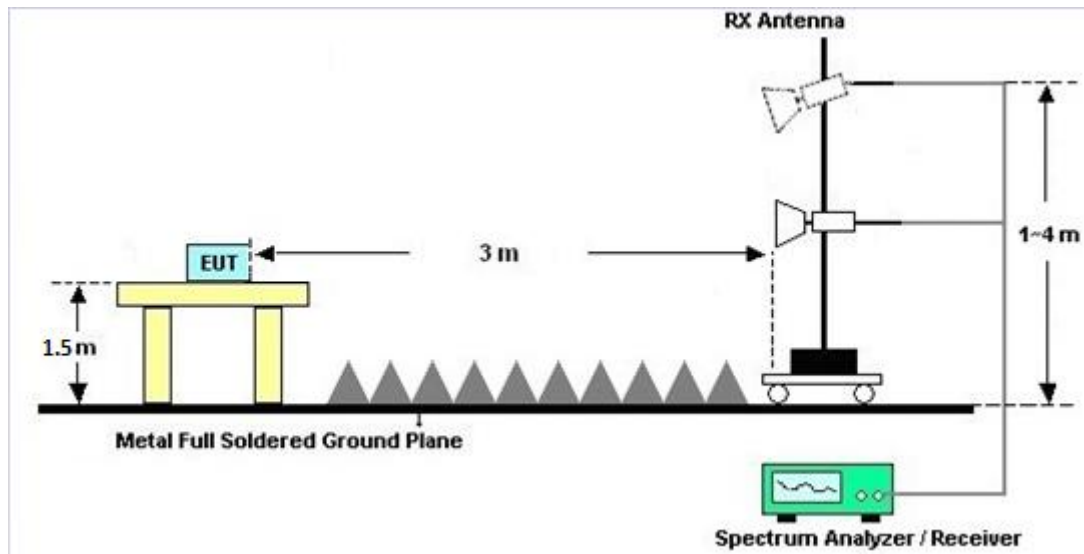
For radiated emissions from 9kHz to 30MHz



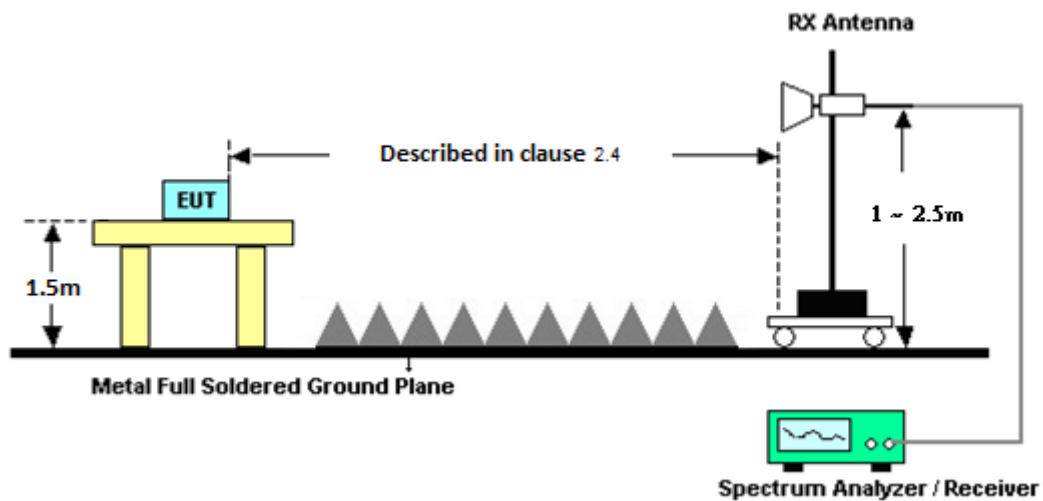
For radiated emissions from 30MHz to 1GHz



For radiated emissions 1GHz to 18GHz



For radiated emissions above 18GHz



3.3 Duty Cycle

3.3.1 Limit of Duty Cycle Measurement

For pulsed field disturbance sensors/radars operating in the 57-64 GHz band that have a maximum pulse duration of 6 ns, the average EIRP shall not exceed 13 dBm and the transmit duty cycle shall not exceed 10% during any 0.3 μ s time window.

3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

1. The testing follows ANSI C63.10-2020 Section 9.9.
2. Set the maximum power setting.
3. The EUT is placed on a turntable with 1.6 meter respectively above ground.
4. The EUT is set 0.62 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Use 50-75 GHz receiver antenna, pre-amp and digital storage oscilloscope (DSO).
6. The EUT is arranged to its worst case and then tune the antenna tower and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. Digital storage oscilloscope (DSO) adjust the length of time appropriately and confirm burst period, chirp width and chirp numbers.

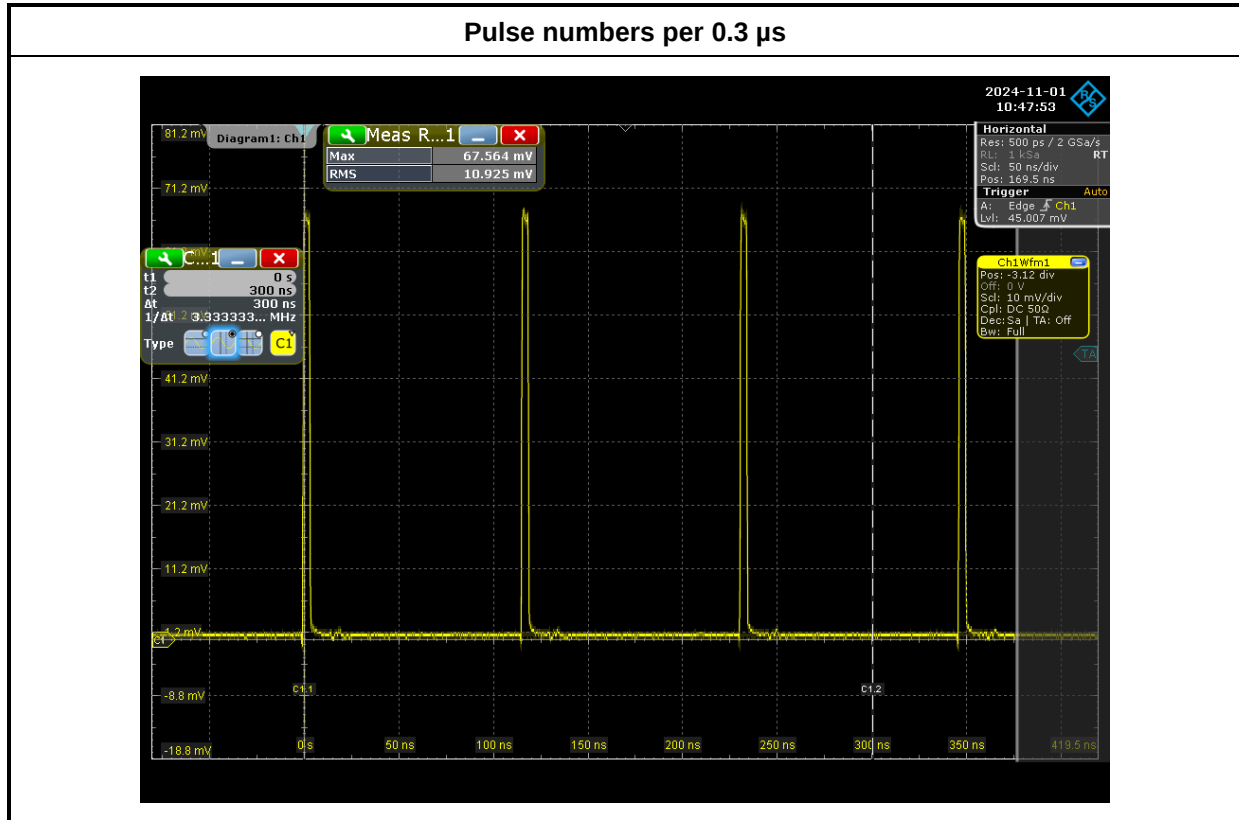
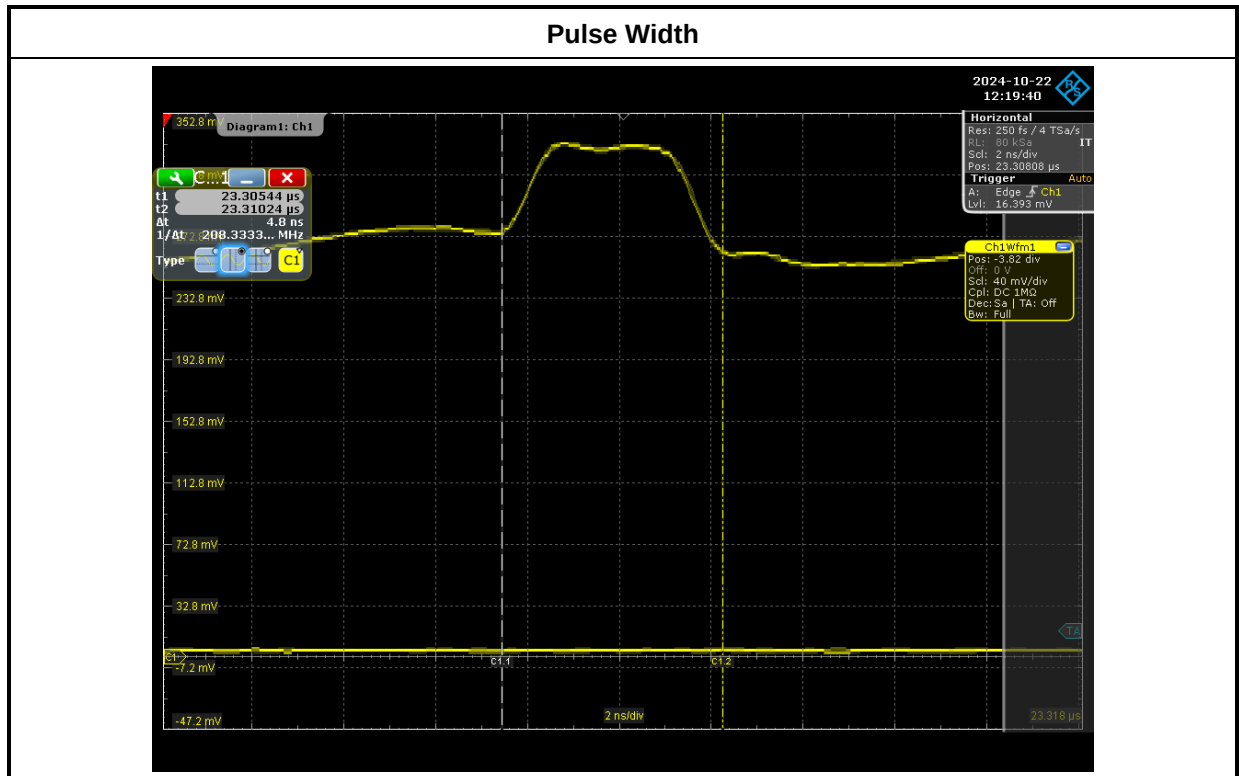
3.3.4 Test Results

Pulse numbers within 0.3 μ s	Pulse Width	Duty cycle within 0.3 μ s	Limit	Result	Duty cycle correction factor within 0.3 μ s
4	4.8 ns	6.4 %	10 %	Pass	-11.93 dB

Note:

1. Duty cycle = Pulse numbers (4) x Pulse Width (4.8 ns) / 0.3 μ s
2. Pulse Width per one pulse 4.8 ns < Maximum Pulse limit duration 6 ns.
3. Duty cycle correction factor = $10 \cdot \log(\text{Duty cycle})$

3.3.5 Test Plot





3.4 Emission Bandwidth

3.4.1 Limit of Emission Bandwidth Measurement

99% Occupied Bandwidth is for reporting only.

Limit for 20 dB Bandwidth: Per Part 15.215(c), the device shall operate in the 57 - 64 GHz band.

The emission bandwidth (EBW) is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least the specified amount below the maximum level of the modulated carrier.

Limit for 10 dB Bandwidth: The radar bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2020 Section 9.3 and 9.4.
2. Set the maximum power setting.
3. The EUT is placed on a turntable with 1.6 meter respectively above ground.
4. The EUT is set 0.62 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Use 50-75 GHz receiver antenna, mixer and spectrum analyzer.
6. The EUT is arranged to its worst case and then tune the antenna tower and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. For 20dB and 10dB Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 50 MHz and Video bandwidth (VBW) is set 80 MHz.
8. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 20 MHz and Video bandwidth (VBW) is set 60 MHz.
9. Measure and record the results in the test report.



3.4.4 Test Results

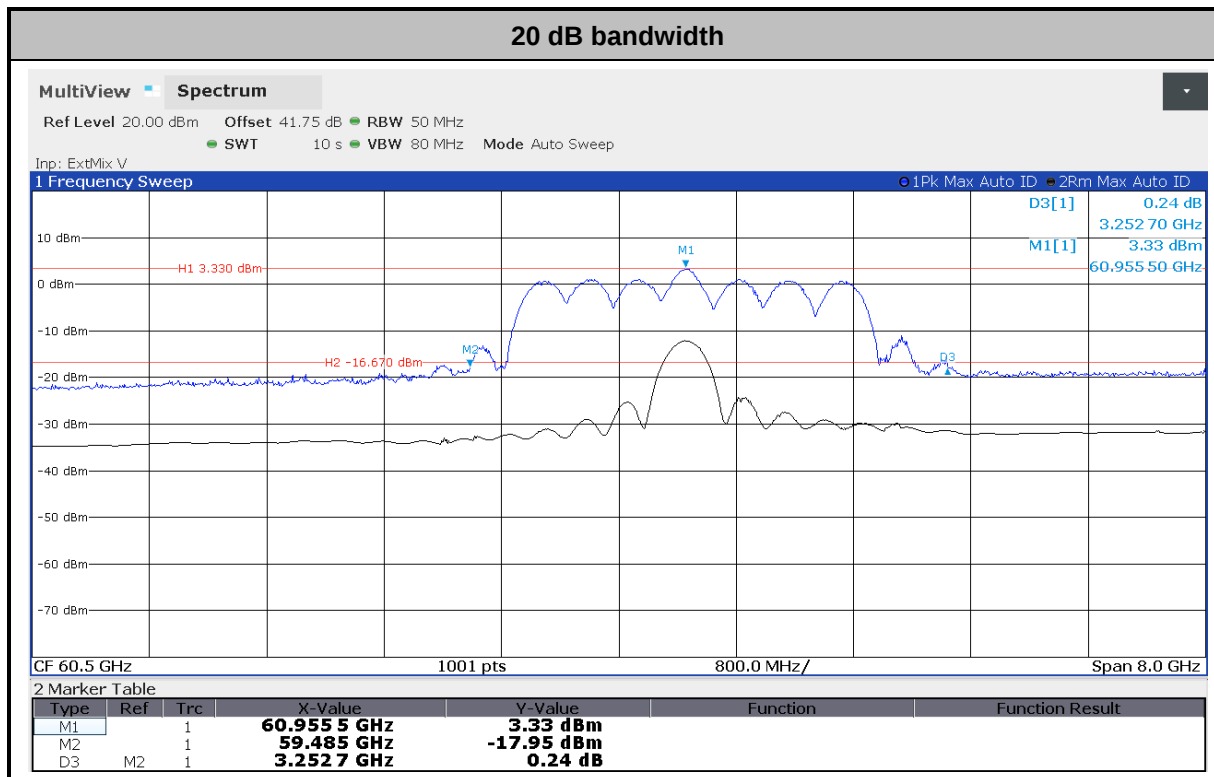
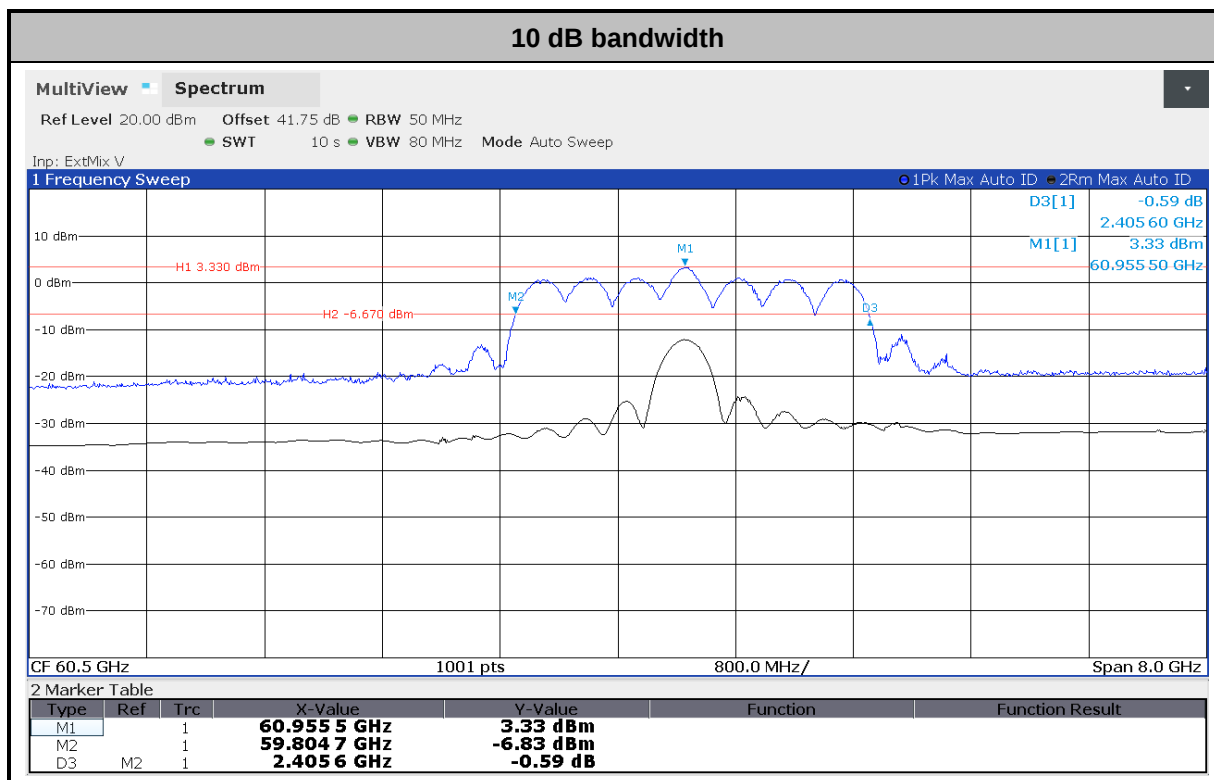
Temperature	20.6~24.3℃	Relative Humidity	53.1~65.7%
Test Engineer	Eric Jeng		

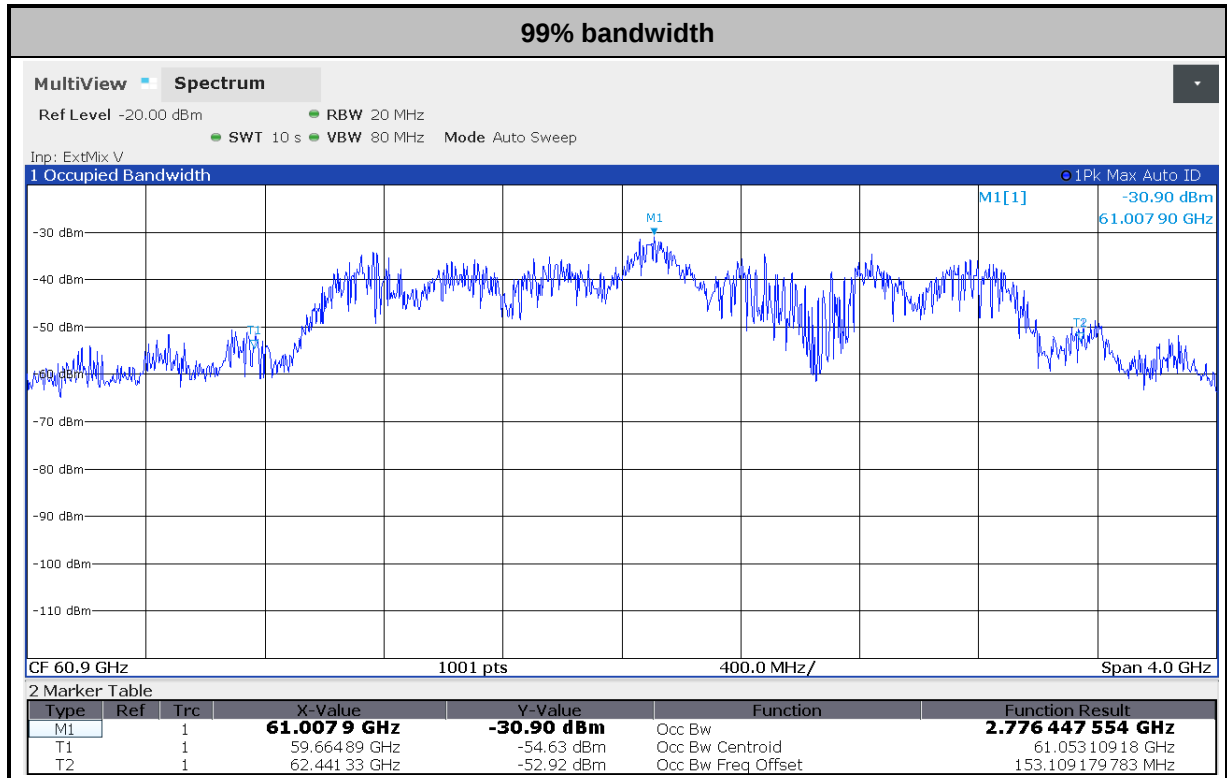
10dB Bandwidth				
Bandwidth (GHz)	Low Frequency (GHz)	High Frequency (GHz)	Limit	Result
2.4056	59.8047	62.2103	Within 57 ~ 64 GHz	Pass
20dB Bandwidth				
Bandwidth (GHz)	Low Frequency (GHz)	High Frequency (GHz)	Limit	Result
3.2527	59.4850	62.7377	Within 57 ~ 64 GHz	Pass

99% Occupied Bandwidth (GHz)	Limit (GHz)
2.7764	Report Only



3.4.5 Test Plots





3.5 EIRP Power Measurement

3.5.1 Limit of EIRP Power Measurement

EIRP Power within 0.3 μ s	Limit (dBm)
Peak EIRP Power	33
Average EIRP Power	13
Averaged integrated E.I.R.P. within 61.5 – 64 GHz	5

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

1. The testing follows ANSI C63.10-2020 Section 9.8.
2. Set the maximum power setting.
3. The EUT is placed on a turntable with 1.6 meter respectively above ground.
4. The EUT is set 0.62 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Use 50-75 GHz receiver antenna, mixer and spectrum analyzer.
6. The EUT is arranged to its worst case and then tune the antenna tower and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. The spectrum analyzer's resolution bandwidth (RBW) is set 50 MHz and Video bandwidth (VBW) is set 80 MHz.
8. Use mark Peak function to check result.
9. Measure and record the results in the test report.



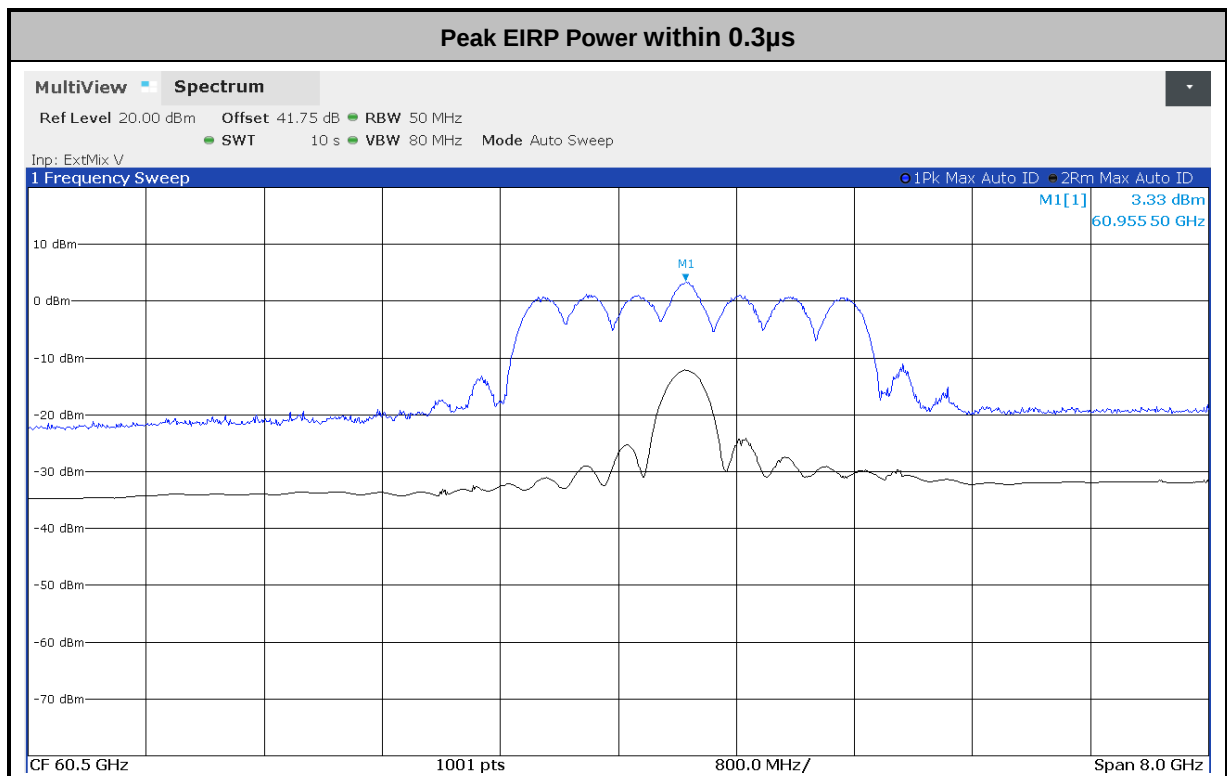
3.5.4 Test Results

Temperature	20.6~24.3℃		Relative Humidity	53.1~65.7%	
Test Engineer	Eric Jeng				
EIRP Power within 0.3μs					
Measurement	Measure Dist. (m)	Measure Ant Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
Peak EIRP	0.62	22.6	3.33	33	PASS
Average EIRP	-	-	-8.60	13	PASS

Note:

- Total path loss (dB) = Air loss - Measure Ant Gain (dBi) + Cable loss(dB)
Ex: Total path loss (dB) = 63.92 (dB) - 22.6 (dBi) + 0.43 (dB) = 41.75 (dB)
- Average EIRP (dBm) = Peak EIRP (dBm) + Duty cycle correction factor (dB)
- No additional measurements for the average integrated E.I.R.P. within 61.5 – 64 GHz as the full band Average EIRP is less than 5 dBm.

3.5.5 Test Plots



3.6 Transmit Spurious Emission

3.6.1 Limit of Radiated Spurious Emission

Frequency Range	Limit
Below 40GHz	Follow 15.209
Above 40GHz	90 pW/cm ² @ 3m (equivalent EIRP 102μW, -10dBm)
Note 1: For the applicable limit, see FCC 15.255 (d) Note 2: Spurious emissions shall not exceed the level of fundamental emission. Note 3: Per Part 15.215(c), the provisions in Part 15.35(b) and (c) that require emissions to be averaged over a 100 millisecond period and that limits the peak power to 20 dB above the average limit do not apply to devices operating under paragraphs Part 15.255(c)(2) and (3) of this section.	

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

The testing follows ANSI C63.10-2020 Section 9.10 and 9.11 and ANSI C63.10-2020 clause 4.1.5.2.8 and Annex L.

For above 40GHz emission:

$$\text{EIRP} = \text{Prx} - \text{Grx} + \text{Free space loss} = \text{Prx} - \text{Grx} + 20 \cdot \log(4 \pi d / \lambda) + \text{Path Loss}$$

Which

Prx = Read Level

Grx = Rx Antenna Gain

A distance factor is offset and formula is $20 \cdot \log(D1/D2)$

Which

D1 = Specification distance = 3m

D2 = Measurement distance

$$\text{Power Density (W/m}^2\text{)} = 10^{[(\text{EIRP}-30)/10]} / 4 \pi d$$

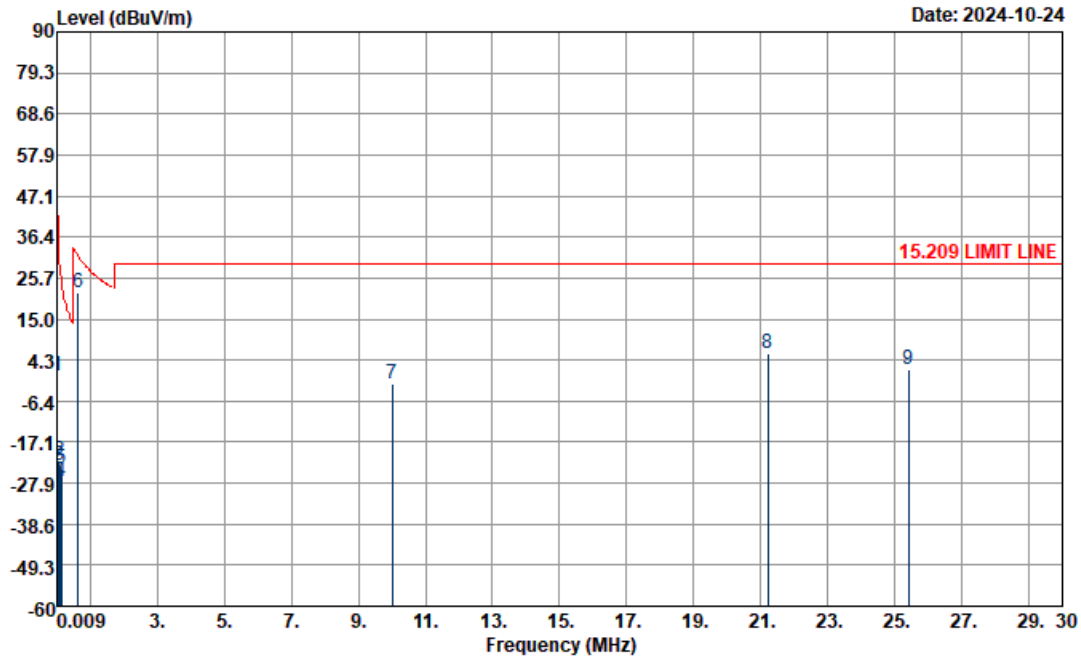
$$\text{Power Density (pW/cm}^2\text{)} = \text{Power Density (W/m}^2\text{)} * 10^{(-8)}$$



3.6.4 Test Result

<Below 30MHz>

Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	9KHz to 30MHz	Test Polarization	Horizontal
Remark	1. Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Cable Loss (dB) + Distance extrapolation factor (dB). 2. Distance extrapolation factor (dB) = 40 log (specific distance / test distance)		



Site : 03CH11-HY

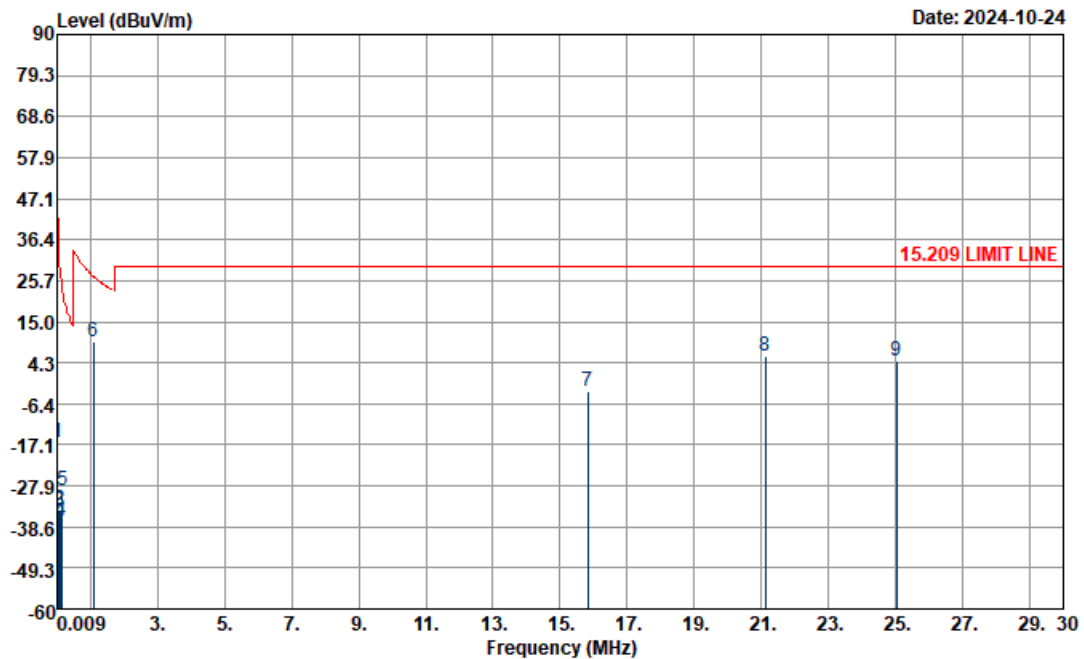
Condition : 15.209 LIMIT LINE 3m LOOP_100488_240829 HORIZONTAL

Project : 492601

Mark	Frequency (MHz)	Level (dBμV/m)	Distance extrapolation Factor (dB)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	0.01920	0.09	-80	-41.85	41.94	60.57	19.46	0.06	-	-	Average
2	0.06654	-22.10	-80	-53.24	31.14	39.64	18.19	0.07	-	-	Average
3	0.09638	-23.06	-80	-50.98	27.92	38.88	17.99	0.07	-	-	QP
4	0.14464	-27.30	-80	-51.70	24.40	34.40	18.23	0.07	-	-	Average
5	0.15000	-23.86	-80	-47.94	24.08	37.82	18.25	0.07	-	-	Average
6	0.64020	21.91	-40	-9.57	31.48	43.35	18.50	0.06	-	-	QP
7	10.01600	-2.00	-40	-31.50	29.50	17.39	20.50	0.11	-	-	QP
8	21.21100	5.88	-40	-23.62	29.50	24.00	21.78	0.10	-	-	QP
9	25.40500	1.87	-40	-27.63	29.50	18.96	22.80	0.11	-	-	QP



Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	9KHz to 30MHz	Test Polarization	Vertical
Remark	1. Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Cable Loss (dB) + Distance extrapolation factor (dB). 2. Distance extrapolation factor (dB) = 40 log (specific distance / test distance)		



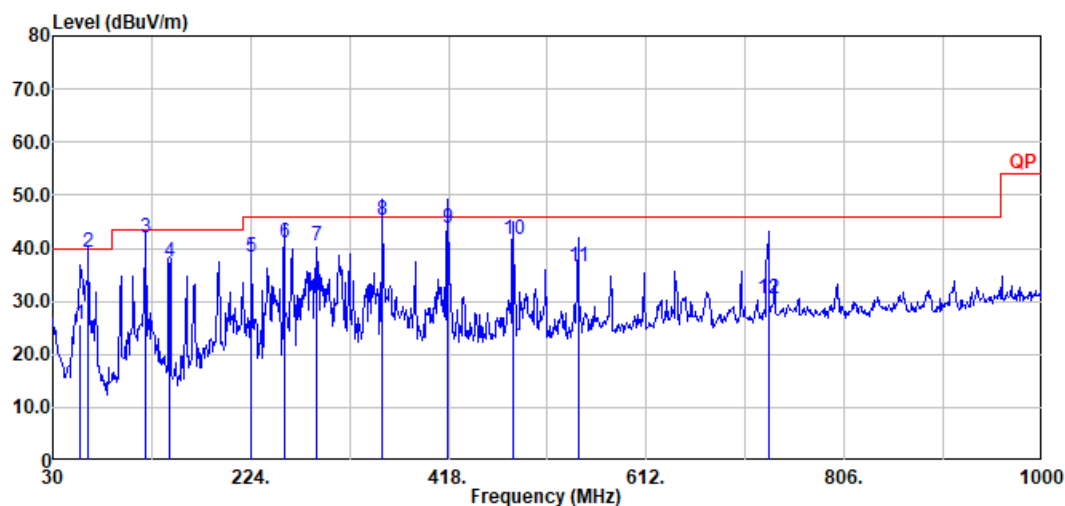
Site : 03CH11-HY
Condition : 15.209 LIMIT LINE 3m LOOP_100488_240829 VERTICAL
Project : 492601

Mark	Frequency (MHz)	Level (dBμV/m)	Distance extrapolation Factor (dB)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	0.01925	-16.48	-80	-58.4	41.9	44.0	19.46	0.06	-	-	Average
2	0.06654	-34.20	-80	-65.3	31.1	27.5	18.19	0.07	-	-	Average
3	0.09638	-34.35	-80	-62.3	27.9	27.6	17.99	0.07	-	-	QP
4	0.13916	-37.18	-80	-61.9	24.7	24.5	18.22	0.07	-	-	Average
5	0.15476	-29.19	-80	-53.0	23.8	32.5	18.26	0.07	-	-	Average
6	1.09100	9.97	-40	-16.9	26.9	31.3	18.60	0.06	-	-	QP
7	15.83200	-3.18	-40	-32.7	29.5	15.9	20.83	0.13	-	-	QP
8	21.12100	5.94	-40	-23.6	29.5	24.1	21.79	0.10	-	-	QP
9	25.02500	4.56	-40	-24.9	29.5	21.5	22.99	0.10	-	-	QP



<30MHz to 1GHz>

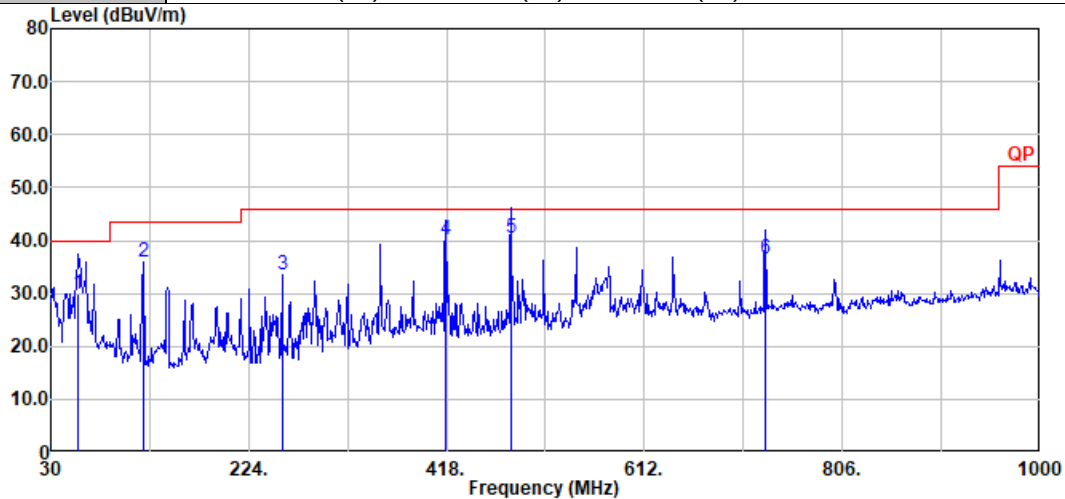
Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	30MHz to 1GHz	Test Polarization	Horizontal
Remark	1. Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) 2. Path Loss(dB) = Cable loss(dB) + Filter loss(dB)		



Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	57.16	25.68	-14.32	40.0	44.82	12.27	0.73	32.14	358	353	QP
2	64.92	39.36	-0.64	40.0	58.58	12.10	0.79	32.11	278	345	QP
3	120.21	42.04	-1.46	43.5	55.61	17.25	1.22	32.04	270	360	QP
4	144.46	37.30	-6.20	43.5	50.84	17.33	1.43	32.30	206	75	QP
5	224.97	38.42	-7.58	46.0	53.18	15.56	1.94	32.26	100	109	QP
6	256.98	41.21	-4.79	46.0	51.96	19.25	2.11	32.11	100	43	QP
7	288.99	40.60	-5.40	46.0	51.45	18.88	2.15	31.88	100	47	QP
8	353.01	45.39	-0.61	46.0	54.18	20.34	2.48	31.61	100	207	QP
9	417.03	43.69	-2.31	46.0	50.63	22.16	2.70	31.80	210	317	QP
10	481.05	41.74	-4.26	46.0	47.88	23.18	2.92	32.24	175	9	QP
11	545.07	36.52	-9.48	46.0	41.74	24.26	3.13	32.61	159	8	QP
12	731.31	30.43	-15.57	46.0	31.19	27.12	3.72	31.60	283	64	QP



Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	30MHz to 1GHz	Test Polarization	Vertical
Remark	1. Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) 2. Path Loss(dB) = Cable loss(dB) + Filter loss(dB)		

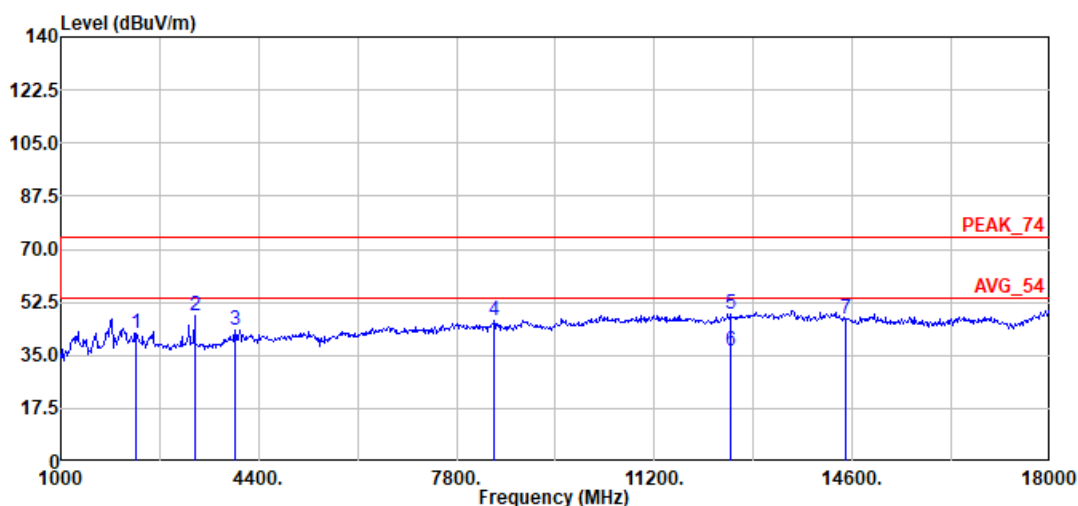


Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	57.16	30.00	-10.00	40.00	49.14	12.27	0.73	32.14	100	121	QP
2	120.21	35.96	-7.54	43.50	49.53	17.25	1.22	32.04	-	-	Peak
3	256.98	33.48	-12.52	46.00	44.23	19.25	2.11	32.11	-	-	Peak
4	417.03	40.27	-5.73	46.00	47.21	22.16	2.70	31.80	195	0	QP
5	481.05	40.36	-5.64	46.00	46.50	23.18	2.92	32.24	200	327	QP
6	730.34	36.62	-9.38	46.00	37.52	27.00	3.70	31.60	201	341	QP



<1GHz to 18GHz>

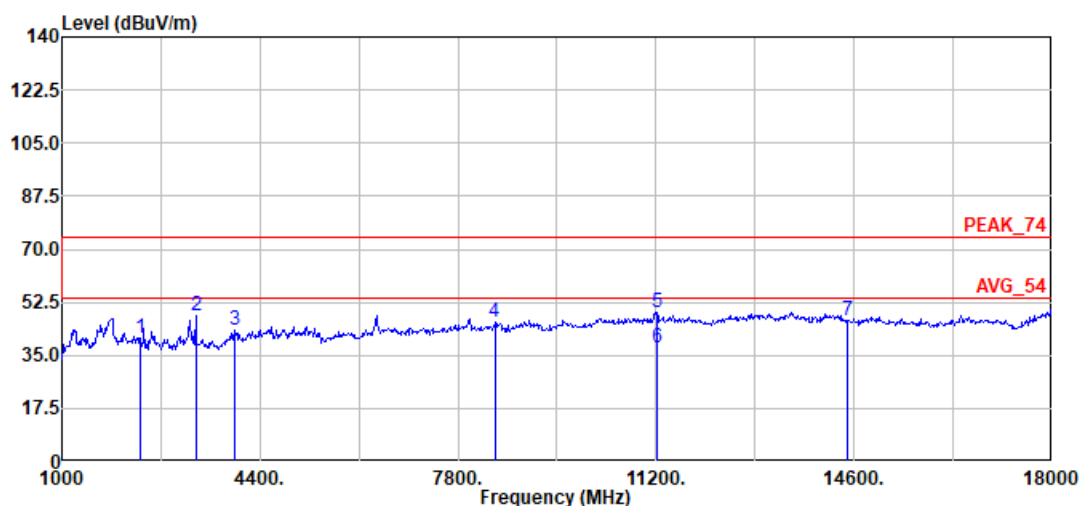
Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	1GHz to 18GHz	Test Polarization	Horizontal
Remark	1. Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) 2. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.		



Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	2292	42.12	-31.88	74	68.82	27.08	7.67	61.45	-	-	Peak
2	3295	47.92	-26.08	74	68.90	29.61	9.33	59.92	-	-	Peak
3	3992	43.52	-30.48	74	60.64	30.82	10.35	58.29	-	-	Peak
4	8446	46.49	-27.51	74	52.41	37.18	15.59	58.69	-	-	Peak
5	12509	48.75	-25.25	74	54.32	38.90	19.34	63.81	-	-	Peak
6	12509	36.56	-17.44	54	42.13	38.90	19.34	63.81	-	-	Average
7	14498	47.27	-26.73	74	49.28	40.39	20.68	63.08	-	-	Peak



Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	3m
Test Range	1GHz to 18GHz	Test Polarization	Vertical
Remark	- Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) - Path Loss(dB) = Cable loss(dB) + Filter loss(dB) - The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.		

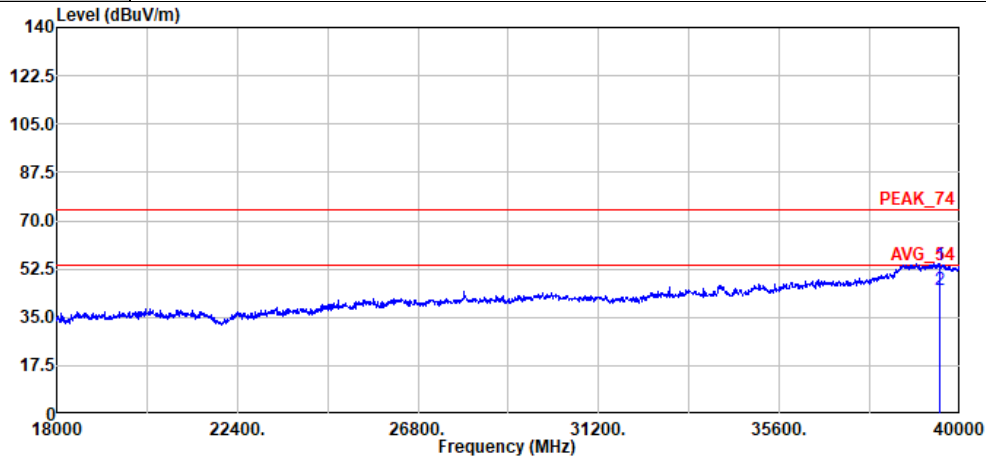


Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	2343	40.72	-33.28	74	67.22	27.13	7.72	61.35	-	-	Peak
2	3295	47.92	-26.08	74	68.90	29.61	9.33	59.92	-	-	Peak
3	3958	43.36	-30.64	74	60.52	30.88	10.33	58.37	-	-	Peak
4	8429	46.11	-27.89	74	52.11	37.12	15.58	58.70	-	-	Peak
5	11217	49.35	-24.65	74	54.36	38.77	17.96	61.74	-	-	Peak
6	11217	37.60	-16.40	54	42.61	38.77	17.96	61.74	-	-	Average
7	14481	46.71	-27.29	74	48.84	40.32	20.66	63.11	-	-	Peak

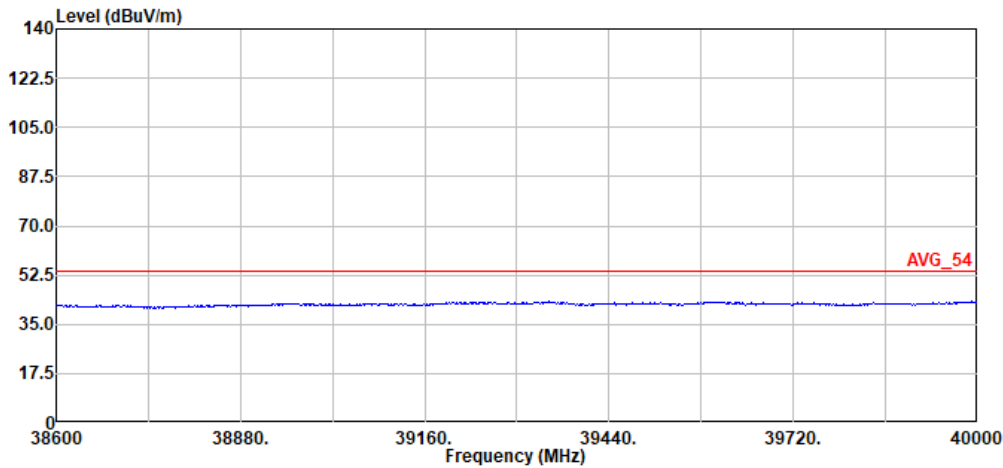


<18GHz to 40GHz>

Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	1m
Test Range	18GHz to 40GHz	Test Polarization	Horizontal
Remark	- Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) - Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Distance extrapolation factor (dB). - The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.		



Site : 03CH11-HY
Condition: PEAK_74 1m SHF_1224_240624 HORIZONTAL

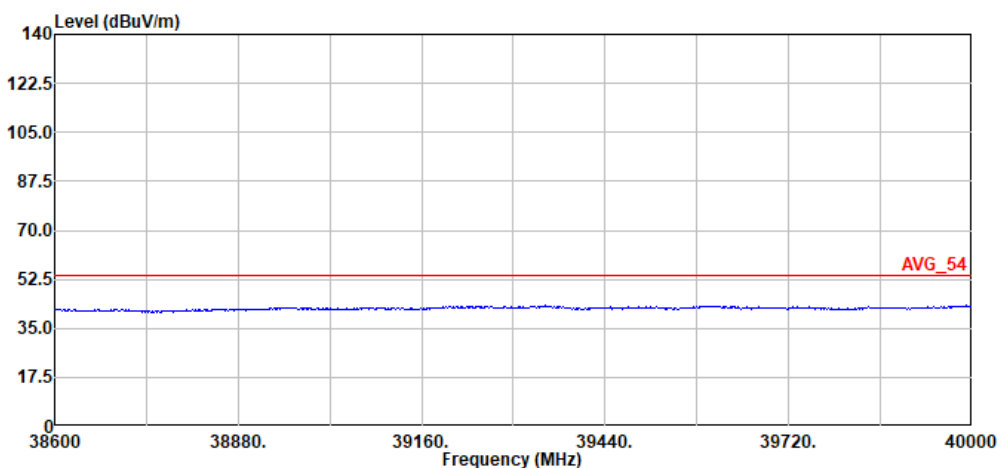
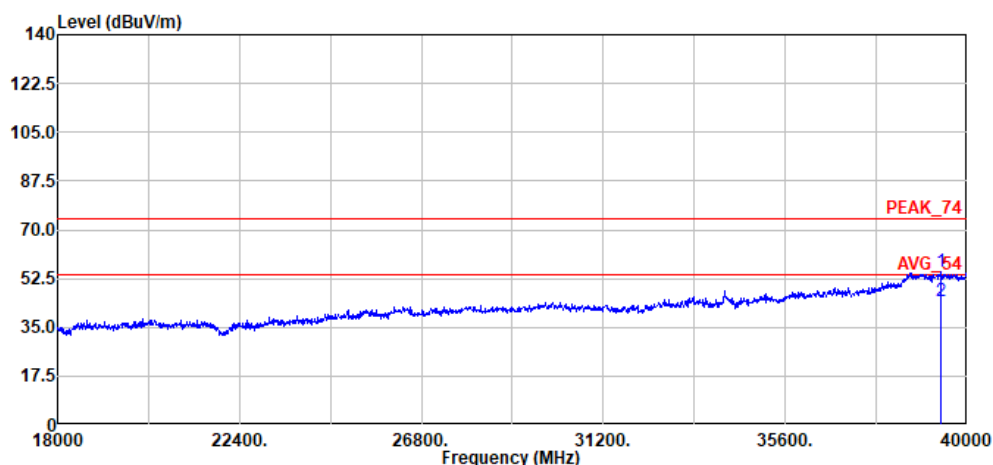


Site : 03CH11-HY
Condition: AVG_54 1m SHF_1224_240624 HORIZONTAL

Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	39492.17	53.86	-20.14	74	37.88	45.72	26.46	56.20	100	0	Peak
2	39492.17	44.97	-9.03	54	28.99	45.72	26.46	56.20	100	0	Average



Temperature	20.1 ~ 21.8℃	Relative Humidity	53.4 ~ 65.1%
Test Engineer	Fu Chen	Test Distance	1m
Test Range	18GHz to 40GHz	Test Polarization	Vertical
Remark	- Level (dBμV/m) = Read Level (dBμV) + Antenna Factor (dB) + Path Loss(dB) - Preamp Factor (dB) - Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Distance extrapolation factor (dB). - The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.		



Mark	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
1	39369.51	54.76	-19.24	74	39.01	45.43	26.6	56.28	100	0	Peak
2	39369.51	44.56	-9.44	54	28.81	45.43	26.6	56.28	100	0	Average



<40GHz to 200GHz>

Temperature	20.6~24.3°C	Relative Humidity	53.1~65.7%
Test Engineer	Eric Jeng	Test Range	40GHz to 200GHz

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
40 - 57	22.64	0.87	48.988	-94.59
EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm ²)	Limit (pW/cm ²)	Test Result
-50.45	3	0.007972	90	PASS

Note: Path Loss = 0.43 dB; the calculate of λ using 57GHz as f.

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
71 - 90	22.4	0.6	89.9955	-88.94
EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm ²)	Limit (pW/cm ²)	Test Result
-43.82	3	0.036690	90	PASS

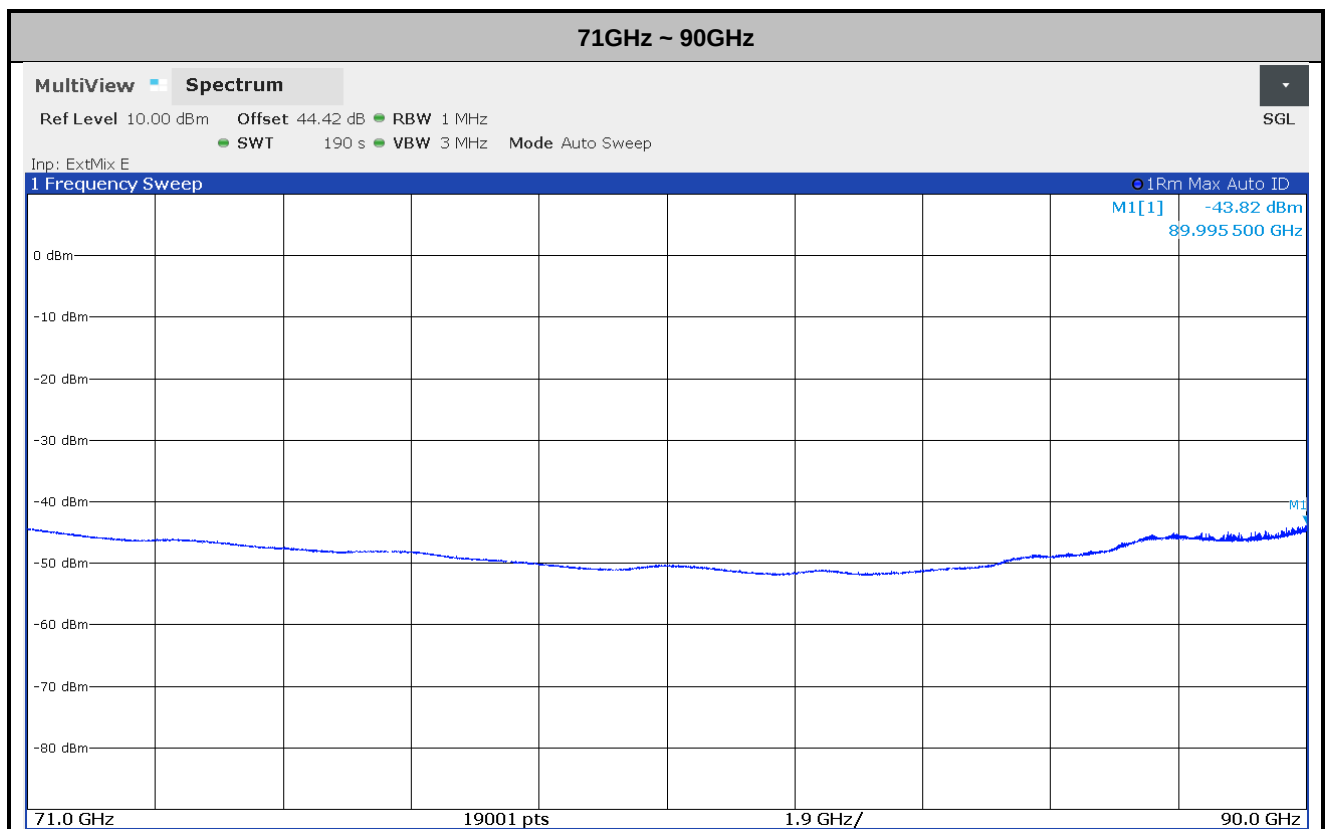
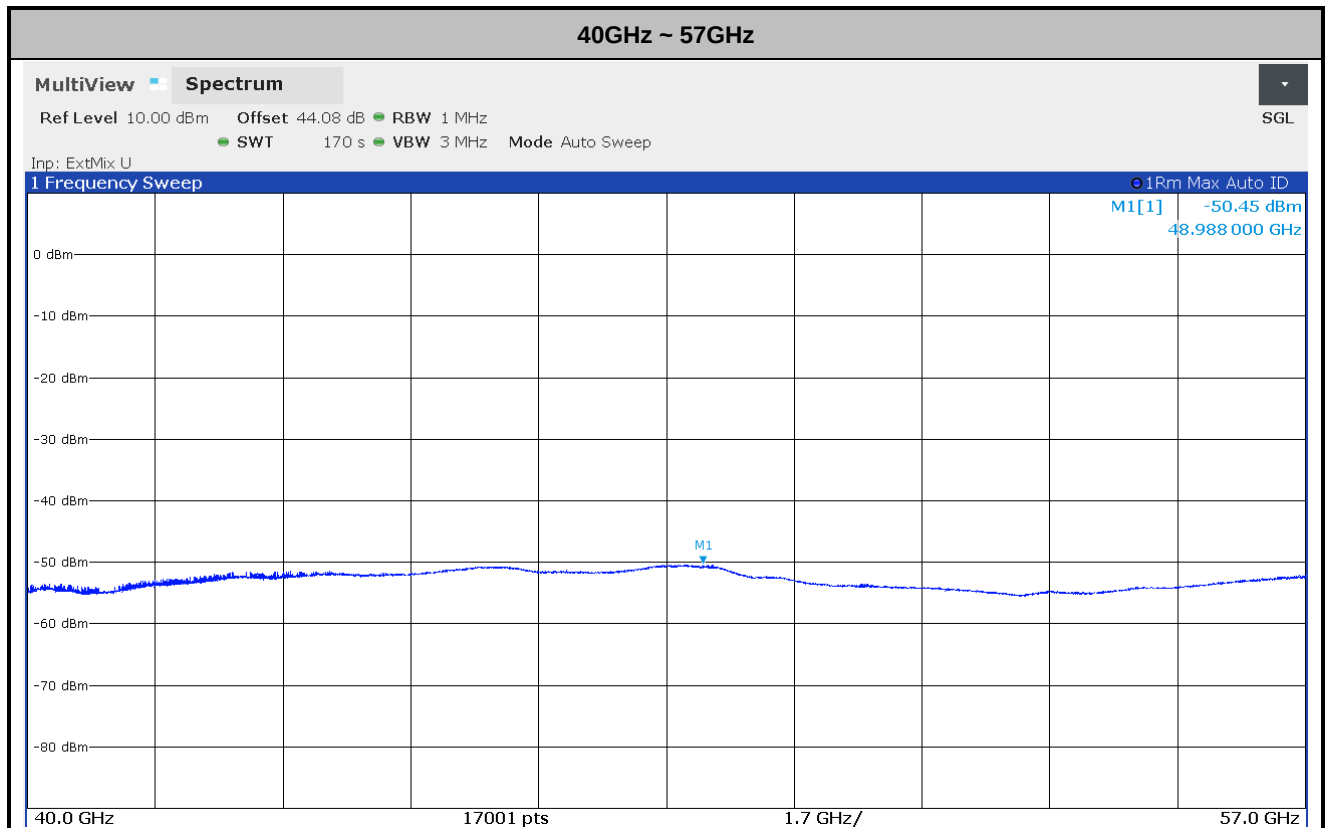
Note: Path Loss = 0.43 dB; the calculate of λ using 90GHz as f.

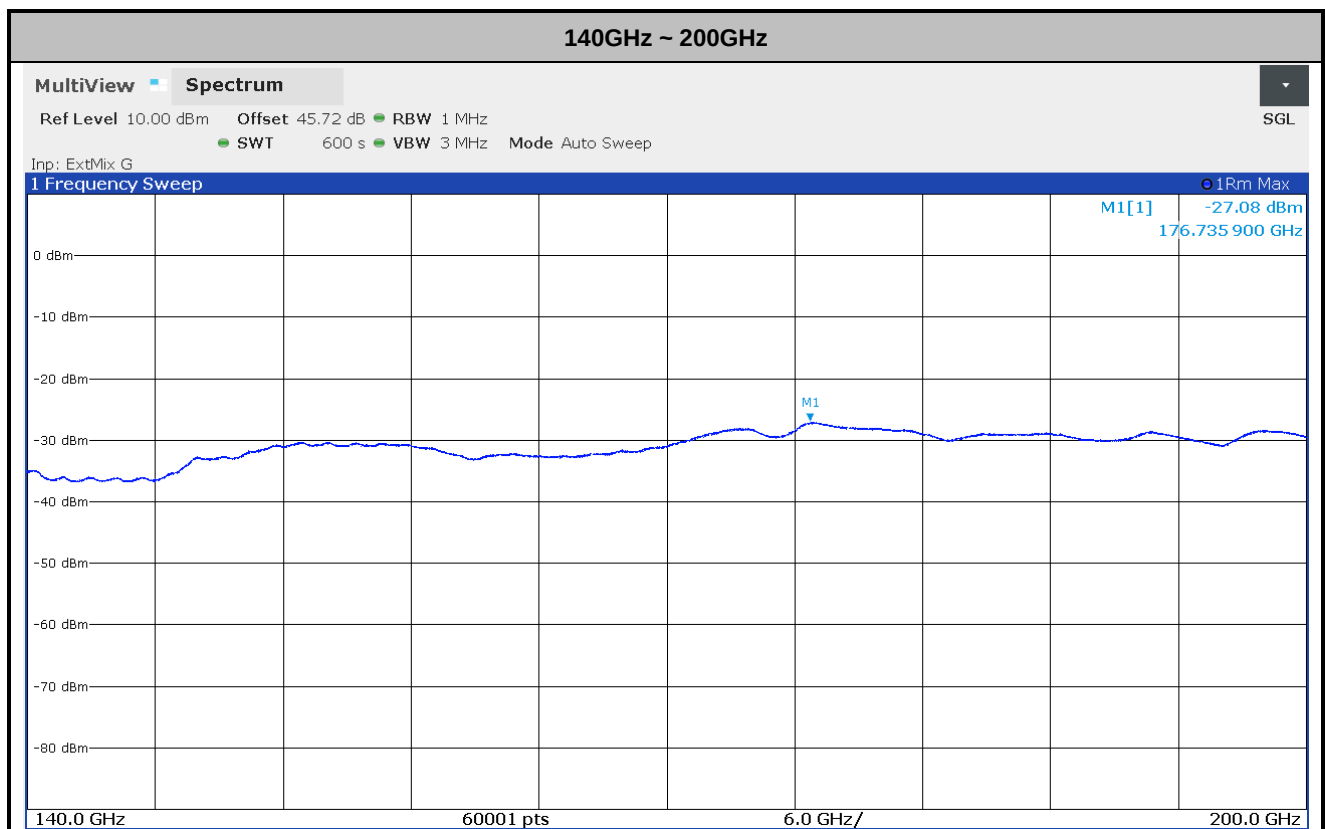
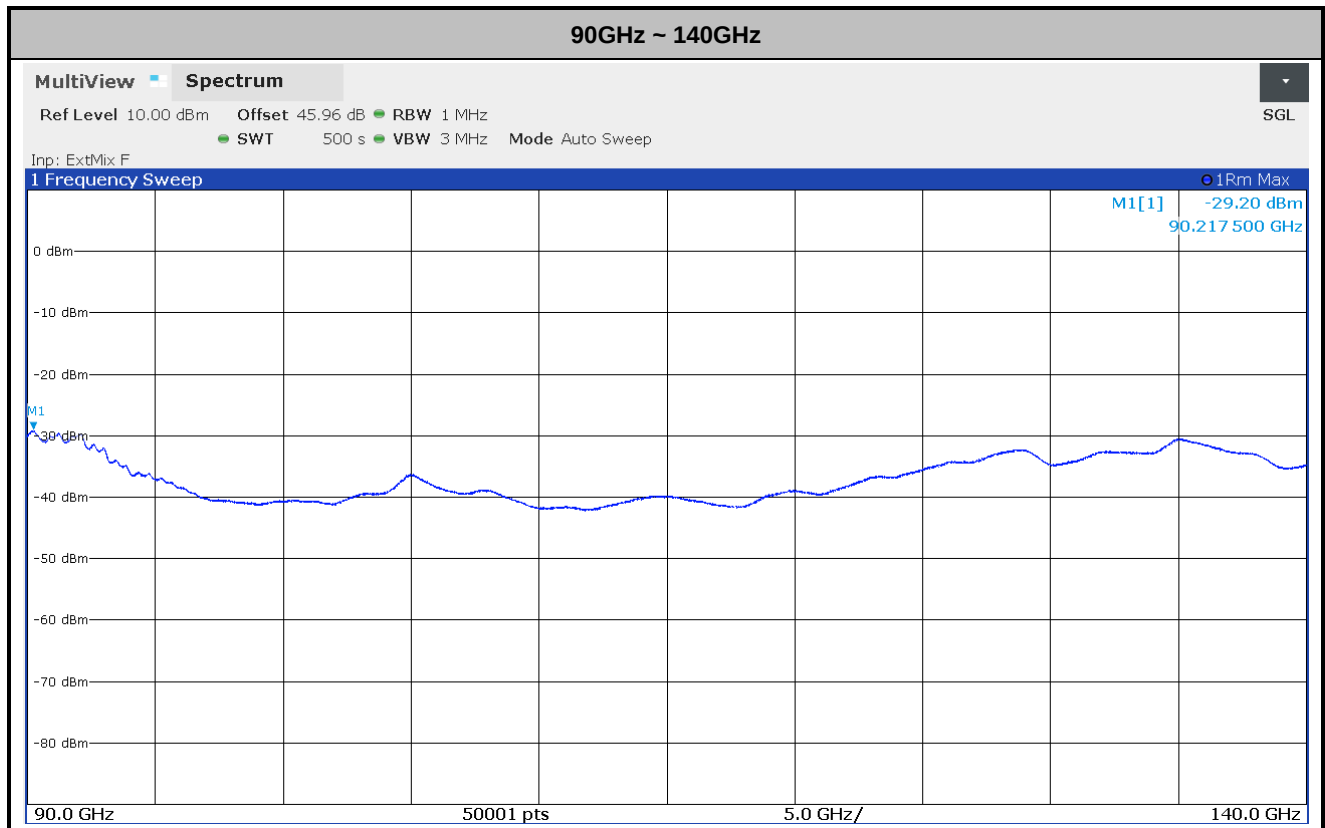
Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
90 - 140	22.4	0.43	90.2175	-75.26
EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm ²)	Limit (pW/cm ²)	Test Result
-29.20	3	1.063035	90	PASS

Note: Path Loss = 0.43 dB; the calculate of λ using 140GHz as f.

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
140 - 200	22.8	0.27	176.7359	-71.8
EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm ²)	Limit (pW/cm ²)	Test Result
-27.08	3	1.731999	90	PASS

Note: Path Loss = 0.43 dB; the calculate of λ using 200GHz as f.







3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency range, 57 GHz – 64 GHz.

3.7.2 Measuring Instruments

See list of measuring equipment of this test report.

3.7.3 Test Procedures

The testing follows ANSI C63.10-2020 Section 9.5.

3.7.4 Test Result

Test Engineer	Eric Jeng				
Test Temperature (°C)	Voltage (Volt)	Low Frequency (GHz)	High Frequency (GHz)	Limit	Result
50	4.5	59.5010	62.6738	Within 57 ~ 64 GHz	pass
40	4.5	59.5090	62.7537		
30	4.5	59.5010	62.6898		
20	4.5	59.4850	62.7378		
10	4.5	59.5010	62.7617		
0	4.5	59.5090	62.7537		
-10	4.5	59.5010	62.7138		
-20	4.5	59.5010	62.7218		
20	5.5	59.4930	62.7537		
20	2.9	59.5010	62.7617		

Note:

1. Normal Voltage =4.5 Vdc. ; Low Voltage =2.9 Vdc. ; Maximum Voltage =5.5 Vdc.
2. The frequency fundamental emissions stay within the operation band.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	41912 & 05	30MHz~1GHz	Feb. 04, 2024	Oct. 23, 2024~ Oct. 24, 2024	Feb. 03, 2025	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Aug. 29, 2024	Oct. 23, 2024~ Oct. 24, 2024	Aug. 28, 2025	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-01620	1GHz~18GHz	Aug. 28, 2024	Oct. 23, 2024~ Oct. 24, 2024	Aug. 27, 2025	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1224	18GHz~40GHz	Jun. 24, 2024	Oct. 23, 2024~ Oct. 24, 2024	Jun. 23, 2025	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 08, 2023	Oct. 23, 2024~ Oct. 24, 2024	Dec. 07, 2024	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055007	1GHz~18GHz	Jun. 13, 2024	Oct. 23, 2024~ Oct. 24, 2024	Jun. 12, 2025	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	May 27, 2024	Oct. 23, 2024~ Oct. 24, 2024	May 26, 2025	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 14, 2024	Oct. 23, 2024~ Oct. 24, 2024	Oct. 13, 2025	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY55420170	20MHz~8.4GHz	Jul. 19, 2024	Oct. 23, 2024~ Oct. 24, 2024	Jul. 18, 2025	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 23, 2024~ Oct. 24, 2024	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Oct. 23, 2024~ Oct. 24, 2024	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Oct. 23, 2024~ Oct. 24, 2024	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Oct. 23, 2024~ Oct. 24, 2024	N/A	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTM-303B	TP140325	N/A	Dec. 08, 2023	Oct. 23, 2024~ Oct. 24, 2024	Dec. 07, 2024	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804013/2	30M~40G	May 23, 2024	Oct. 23, 2024~ Oct. 24, 2024	May 22, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz~40GHz	Mar. 06, 2024	Oct. 23, 2024~ Oct. 24, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 06, 2024	Oct. 23, 2024~ Oct. 24, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	30M~40G	Mar. 06, 2024	Oct. 23, 2024~ Oct. 24, 2024	Mar. 05, 2025	Radiation (03CH11-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSW43	101456	2Hz to 43.5GHz	Feb. 19, 2024	Oct. 22, 2024~ Nov. 25, 2024	Feb. 18, 2025	Radiation (03CH18-HY)
Harmonic Mixer*	Rohde & Schwarz	RPG FS-Z60	101033	40GHz to 60GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Harmonic Mixer	Rohde & Schwarz	RPG FS-Z75	102042	50 GHz to 75 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Harmonic Mixer*	Rohde & Schwarz	FSZ-90	101867	60GHz to 90GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Harmonic Mixer*	Rohde & Schwarz	RPG FS-Z140	101130	90GHz to 140GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Harmonic Mixer	Rohde & Schwarz	RPG FS-Z220	101042	140GHz to 220GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-UPRR00	1410300003	40-60 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-VPRR00	1371800008	50-75 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-EPRR00	1372000000	60-90 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-FPRR00	1011500008	90-140 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-GPRR00	QWH-GPRR00-01	140-220 GHz	Jun. 27, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jun. 26, 2025	Radiation (03CH18-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801607/2	N/A	Nov. 28, 2023	Oct. 22, 2024~ Nov. 25, 2024	Nov. 27, 2024	Radiation (03CH18-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519231/2	N/A	Nov. 28, 2023	Oct. 22, 2024~ Nov. 25, 2024	Nov. 27, 2024	Radiation (03CH18-HY)
Detector	Quinstars	QEA-FBFBVP	2672009	50 ~ 75 GHz	Jul. 09, 2024	Oct. 22, 2024~ Nov. 25, 2024	Jul. 08, 2025	Radiation (03CH18-HY)
Oscilloscope	Rohde & Schwarz	RTO 1002	400025	600MHz, 10GSa/sec	Sep. 25, 2024	Oct. 22, 2024~ Nov. 25, 2024	Sep. 24, 2025	Radiation (03CH18-HY)
Thermal Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Oct. 08, 2024	Oct. 22, 2024~ Nov. 25, 2024	Oct. 07, 2025	Radiation (03CH18-HY)
AC Power Source	AC POWER	AFC-500W	F104070011	50Hz~60Hz	N/A	Oct. 22, 2024~ Nov. 25, 2024	N/A	Radiation (03CH18-HY)

Note: (*) Equipment manufacturer's Calibration Certificate.

5 Measurement Uncertainty

Test Item	Uncertainty
Radiated Emission Measurement (9 kHz ~ 30 MHz)	±3.3dB
Radiated Emission Measurement (30 MHz ~ 1000 MHz)	±6.4dB
Radiated Emission Measurement (1 GHz ~ 6 GHz)	±5.1dB
Radiated Emission Measurement (6 GHz ~ 18 GHz)	±5.3dB
Radiated Emission Measurement (18 GHz ~ 40 GHz)	±5.3dB
Radiated Emission Measurement (40 GHz ~ 140 GHz)	±5.59dB
Radiated Emission Measurement (140 GHz ~ 200 GHz)	±6.57dB
99% Occupied Bandwidth	±1.324 MHz
6dB Bandwidth	±0.676 MHz
Frequency Stability	±0.671 MHz
Temperature	±0.58 °C

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)