FCC PART 15.247
TEST REPORT

For

SENWA MEXICO,S.A.DE C.V

CARRETERA MEXICO-TOLUCA No. 5324, INT. PLANTA BAJA COL. EL YAQUI, DELEGACION CUAJIMALPA DE MORELOS CIUDAD DE MEXICO, Mexico

FCC ID: 2AAA6-S130L

Report Type:	Product Type:
Original Report	Mobile Phone

Report Number:	RSZ180703002-00B
Report Date:	2018-08-01
Reviewed By:	Rocky Kang RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SENWA MEXICO,S.A.DE C.V's* product, model number: *S130L (FCC ID: 2AAA6-S130L)* or the "EUT" in this report was a *Mobile Phone,* which was measured approximately: 20 cm (L) * 13 cm (W) * 2.8 cm (H) for base, 20 cm (L) * 4.8 cm (W) * 2.4 cm (H) for handset, rated with input voltage: DC 3.7 V from battery or DC 5.0V from adapter.

Adapter Information:
Model: SENWAC07MA
Input: 100-240V ~ 50/60Hz, 0.15A
Output: 5V, 700 mA

**All measurement and test data in this report was gathered from production sample serial number: 180703002. (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-07-03.*

Objective

This test report is prepared on behalf of *SENWA MEXICO,S.A.DE C.V* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

Part 22H /24E PCB submissions with FCC ID: *2AAA6-S130L*.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.5dB
RF conducted test with spectrum		±1.5dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±3℃
Humidity		±6%
Supply voltages		±0.4%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

EUT Exercise Software

No exercise software was made to the EUT tested.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

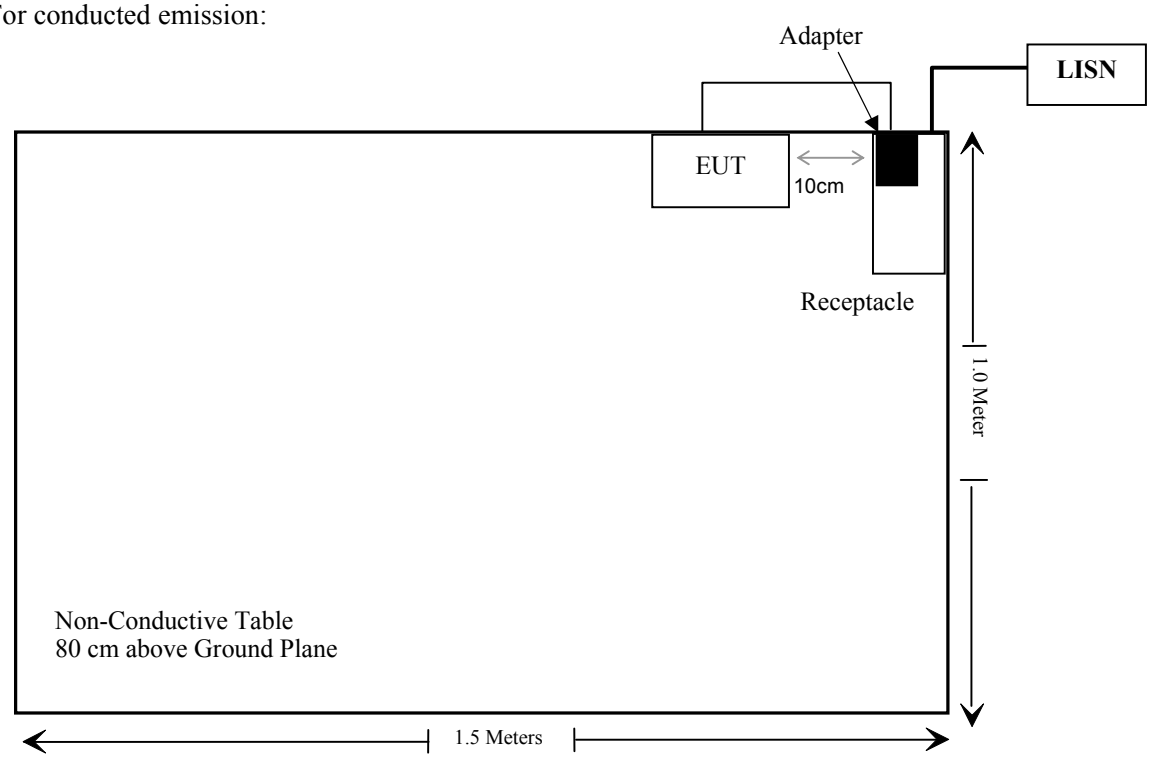
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Un-Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance*
§15.247(a)(1)	Channel Separation Test	Compliance*
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance*
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance*
§15.247(b)(1)	Peak Output Power Measurement	Compliance*
§15.247(d)	Band edges	Compliance*

Compliance*: The EUT is identical to a certified product (Model number: S130, FCC ID: 2AAA6-S130). The difference is the Wi-Fi module was removed by the manufacturer. These items can be referred to the application of FCC ID: 2AAA6-S130, approved on 2016-11-16.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2017-08-04	2018-08-04
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-21	2018-12-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2018-05-21	2018-11-19
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2018-05-12	2018-11-12
Radiated Emission Test					
A.H.System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-04-24	2019-04-24
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-05-21	2019-05-21
HP	Amplifier	HP8447E	1937A01046	2018-05-21	2018-11-19
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	1	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-05-22	2018-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03
Sinoscite	Notch Filter	BSF2402-2480MN-0898-001	N/A	2018-05-21	2019-05-21
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

For worst case:

Frequency (MHz)	Maximum Tune-up power		Calculated Distance (mm)	Calculated Value	Threshold (1-g SAR)	SAR Test Exclusion
	(dBm)	(mW)				
2480	-9.5	0.11	5	0.04	3.0	**Yes**

Result: No Standalone SAR test is required

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is 1.4 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

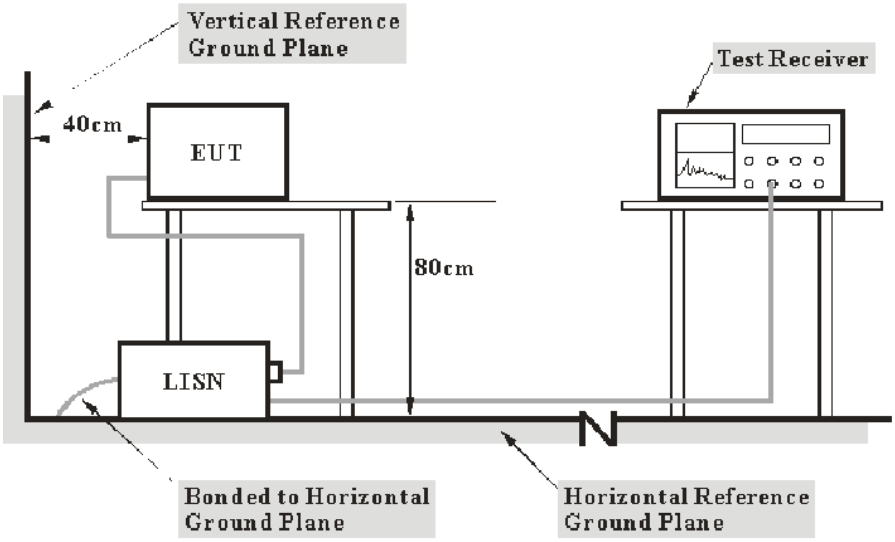
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

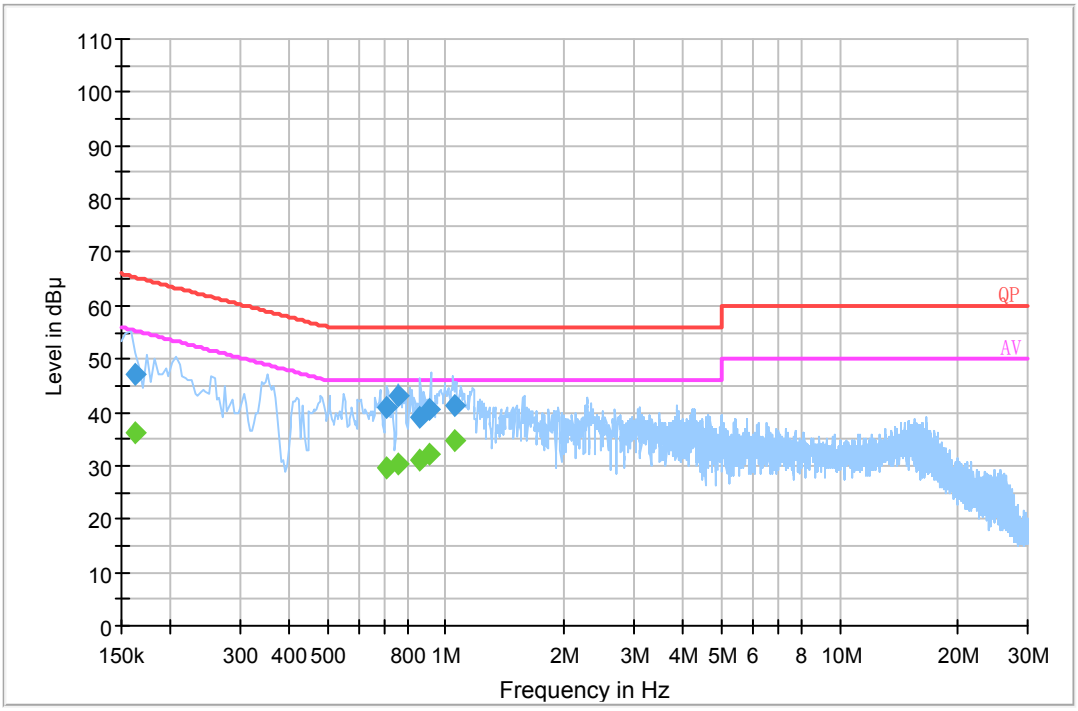
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Nancy Wang on 2018-07-08.

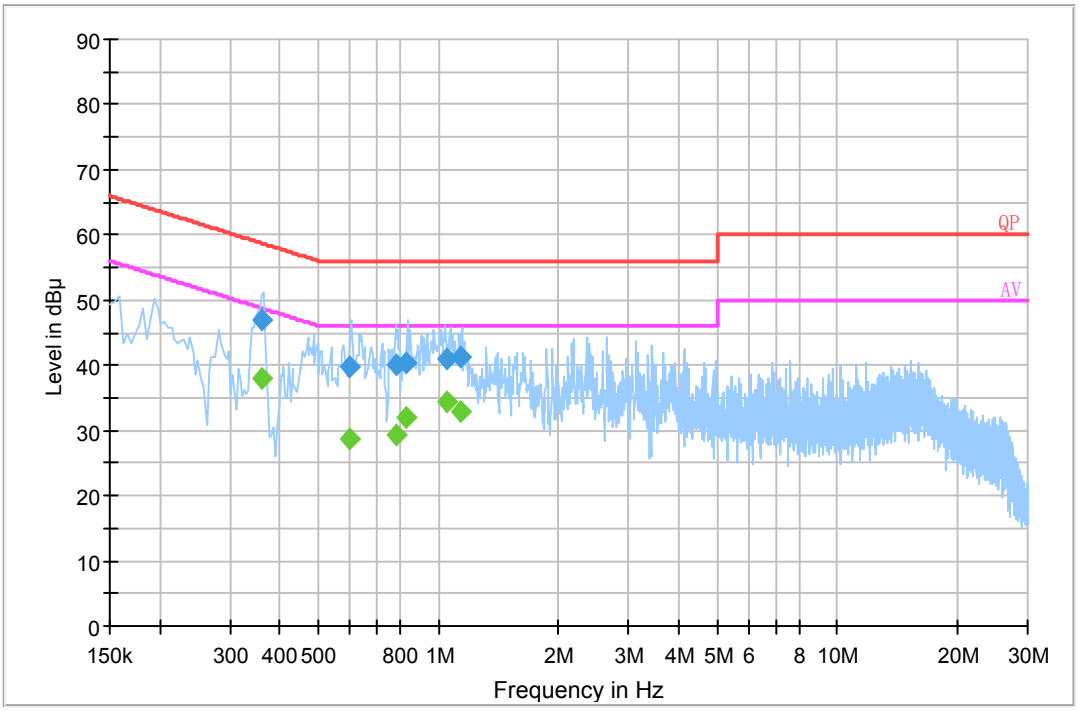
EUT operation mode: Transmitting & charging (the worst case is GFSK Mode, middle channel)

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.162500	47.3	20.1	65.3	18.0	QP
0.707350	40.8	19.9	56.0	15.2	QP
0.758690	43.1	19.9	56.0	12.9	QP
0.861070	38.9	20.0	56.0	17.1	QP
0.908290	40.6	20.0	56.0	15.4	QP
1.050370	41.4	20.0	56.0	14.6	QP
0.162500	36.1	20.1	55.3	19.2	Ave.
0.707350	29.6	19.9	46.0	16.4	Ave.
0.758690	30.5	19.9	46.0	15.5	Ave.
0.861070	31.2	20.0	46.0	14.8	Ave.
0.908290	32.1	20.0	46.0	13.9	Ave.
1.050370	34.7	20.0	46.0	11.3	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.360510	46.9	20.1	58.7	11.8	QP
0.600970	39.8	20.0	56.0	16.2	QP
0.786270	40.1	19.9	56.0	15.9	QP
0.833490	40.3	19.9	56.0	15.7	QP
1.046370	41.0	20.0	56.0	15.0	QP
1.140810	41.3	20.0	56.0	14.7	QP
0.360510	38.0	20.1	48.7	10.7	Ave.
0.600970	28.6	20.0	46.0	17.4	Ave.
0.786270	29.3	19.9	46.0	16.7	Ave.
0.833490	31.9	19.9	46.0	14.1	Ave.
1.046370	34.5	20.0	46.0	11.5	Ave.
1.140810	32.8	20.0	46.0	13.2	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

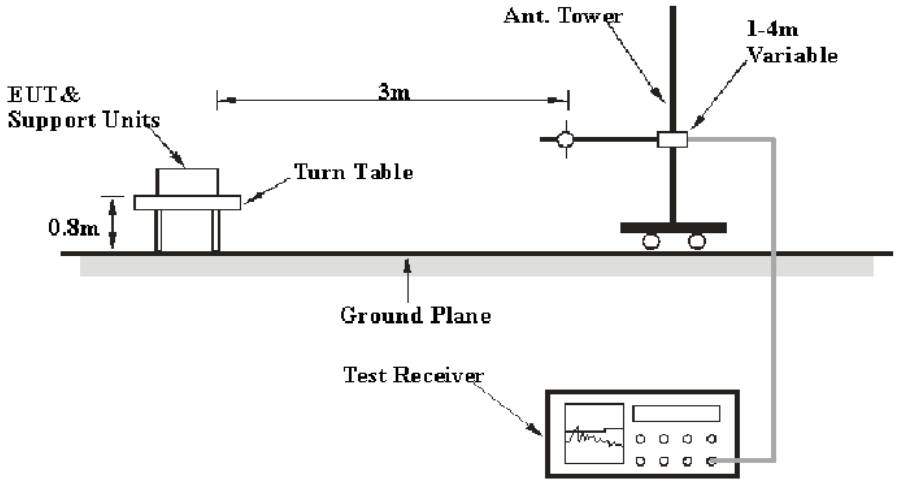
FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

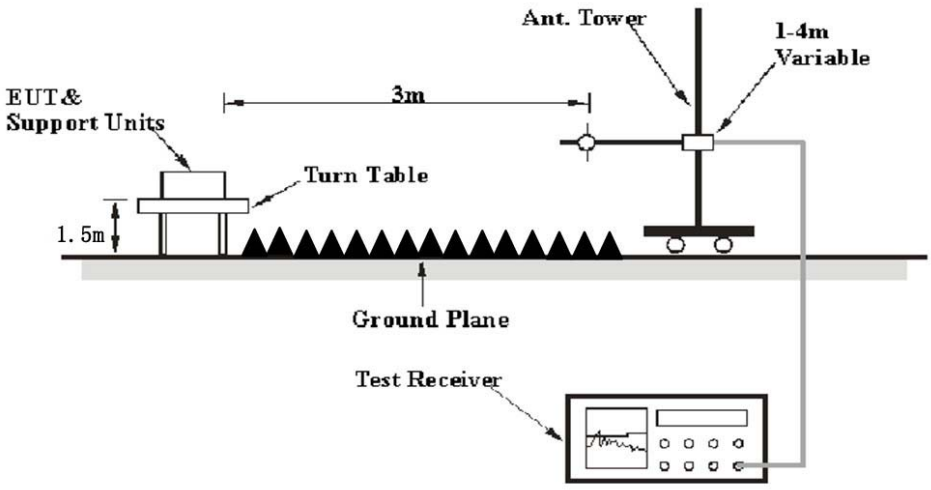
FCC §15.205; §15.209; §15.247(d)

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Average

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

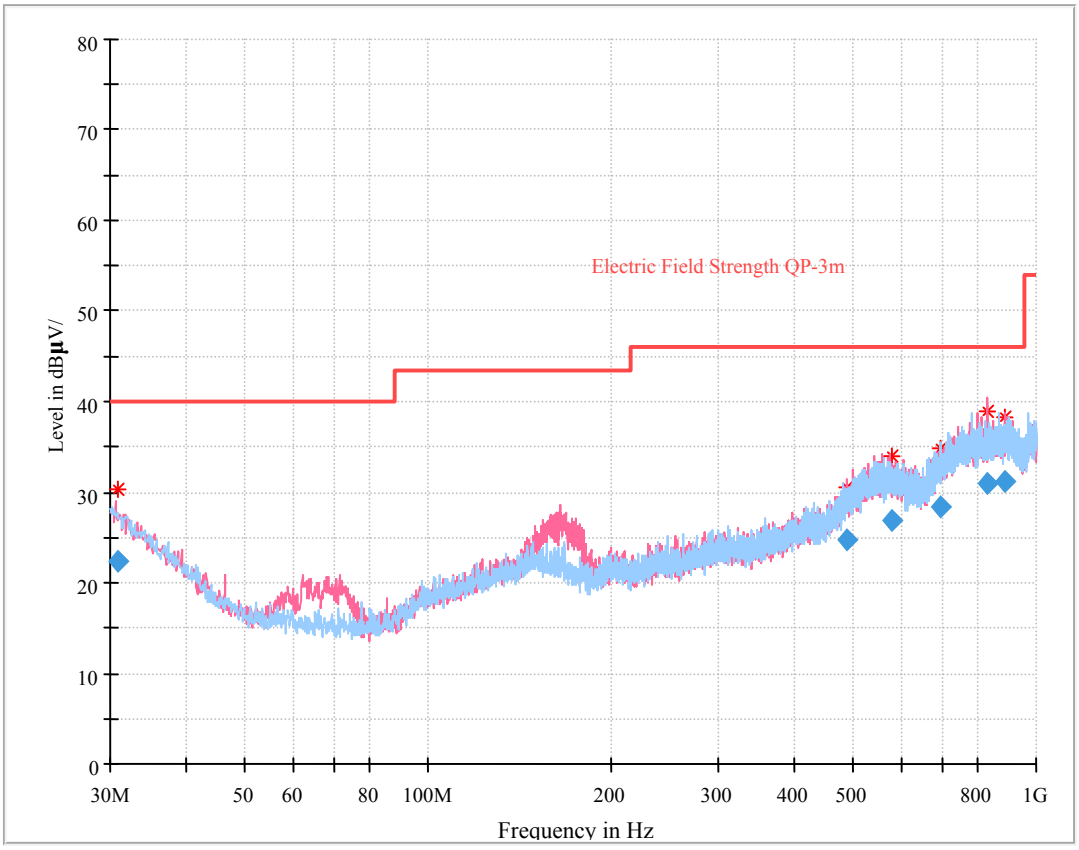
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2018-07-30.

EUT operation mode: Transmitting (*Scan with GFSK, π/4-DQPSK, 8-DPSK mode, the worst case is GFSK Mode*)

30 MHz~1 GHz: *(the worst case is GFSK Mode, High channel)*



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.880625	22.30	159.0	V	85.0	0.1	40.00	17.70
489.634750	24.78	272.0	V	256.0	2.7	46.00	21.22
577.093625	26.83	133.0	V	229.0	5.0	46.00	19.17
696.174375	28.44	333.0	H	341.0	6.7	46.00	17.56
831.382625	30.98	270.0	V	207.0	9.4	46.00	15.02
888.556125	31.22	203.0	V	194.0	10.1	46.00	14.78

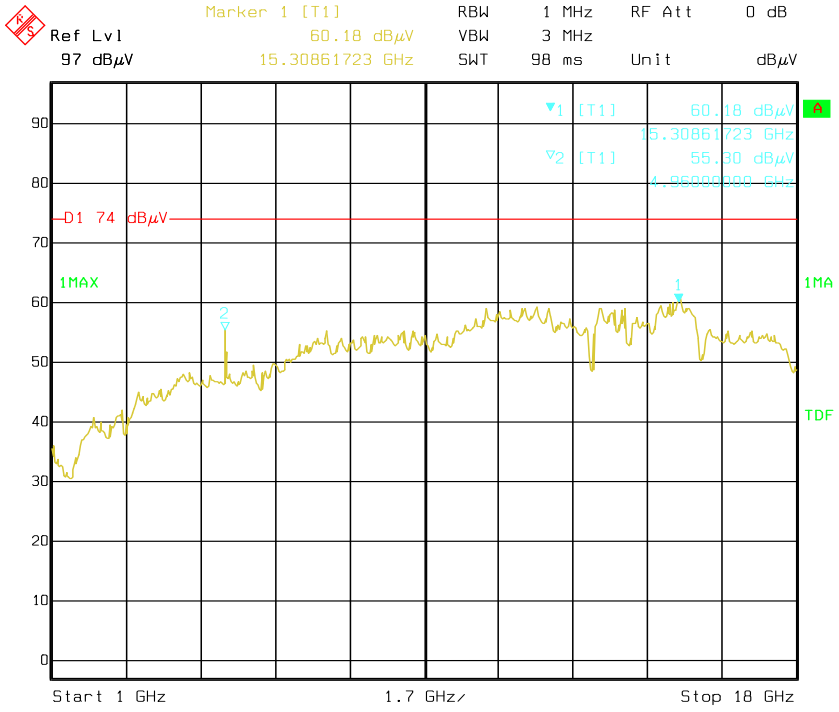
1 GHz - 25 GHz:

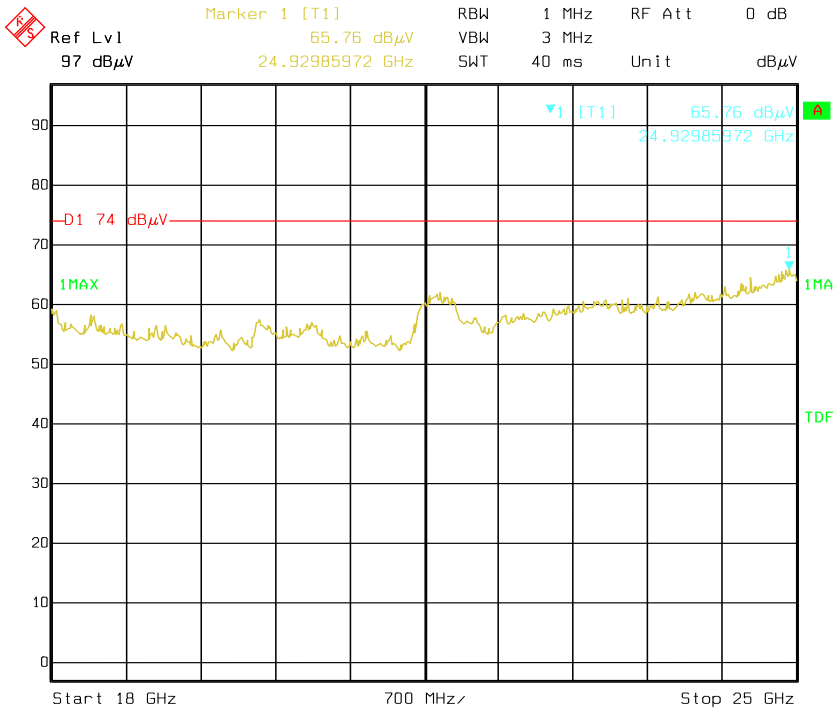
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
Low Channel (2402 MHz)									
2402.00	52.51	PK	191	2.3	H	33.92	86.43	/	/
2402.00	42.53	Ave.	191	2.3	H	33.92	76.45	/	/
2402.00	54.20	PK	96	1.8	V	33.92	88.12	/	/
2402.00	44.35	Ave.	96	1.8	V	33.92	78.27	/	/
2356.01	27.90	PK	351	1.8	V	33.92	61.82	74	12.18
2356.01	13.38	Ave.	351	1.8	V	33.92	47.30	54	6.70
2487.39	26.85	PK	174	1.5	V	34.08	60.93	74	13.07
2487.39	13.32	Ave.	174	1.5	V	34.08	47.40	54	6.60
4804.00	46.22	PK	37	2.5	V	5.84	52.06	74	21.94
4804.00	37.51	Ave.	37	2.5	V	5.84	43.35	54	10.65
Middle Channel (2441 MHz)									
2441.00	54.37	PK	221	2.1	H	33.92	88.29	/	/
2441.00	46.72	Ave.	221	2.1	H	33.92	80.64	/	/
2441.00	54.45	PK	262	2.3	V	33.92	88.37	/	/
2441.00	46.65	Ave.	262	2.3	V	33.92	80.57	/	/
4882.00	47.95	PK	317	1.0	V	6.21	54.16	74	19.84
4882.00	38.78	Ave.	317	1.0	V	6.21	44.99	54	9.01

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)				
High Channel (2480 MHz)									
2480.00	52.36	PK	246	1.1	H	34.08	86.44	/	/
2480.00	42.45	Ave.	246	1.1	H	34.08	76.53	/	/
2480.00	54.73	PK	118	2.2	V	34.08	88.81	/	/
2480.00	44.69	Ave.	254	2.0	V	34.08	78.77	/	/
2325.60	27.04	PK	356	1.6	V	33.83	60.87	74	13.13
2325.60	13.32	Ave.	356	1.6	V	33.83	47.15	54	6.85
2490.00	27.22	PK	78	1.7	V	34.08	61.30	74	12.70
2490.00	13.97	Ave.	78	1.7	V	34.08	48.05	54	5.95
4960.00	50.97	PK	219	1.8	V	7.82	58.79	74	15.21
4960.00	43.31	Ave.	219	1.8	V	7.82	51.13	54	2.87

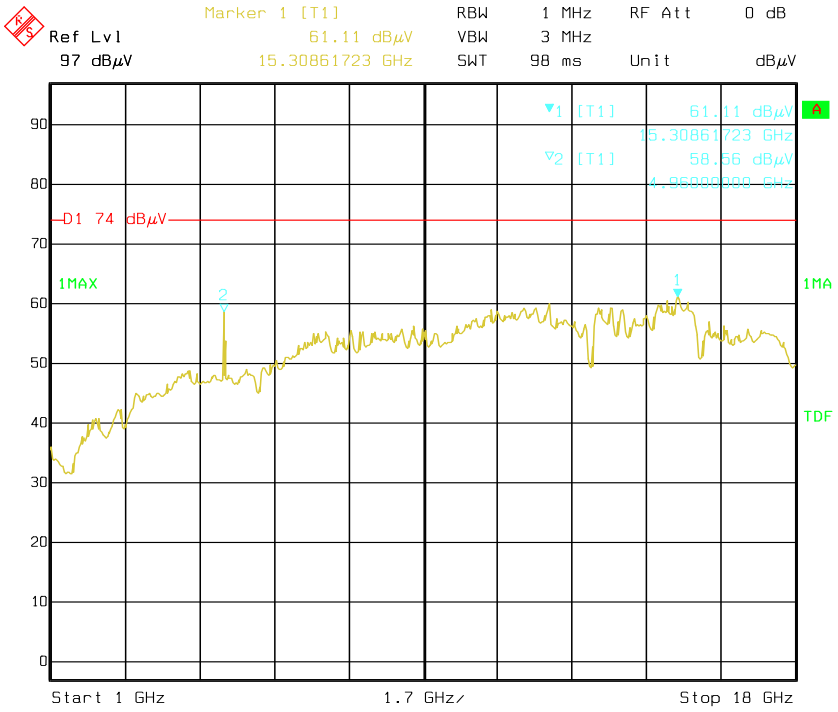
Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.
And for the pre-scan is performed with the 2400-2483.5MHz band filter.

Pre-scan with High channel Peak
Horizontal





Vertical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Ref Lvl
97 dBµV
61.11 dBµV
15.30861723 GHz
RBW 1 MHz
VBW 3 MHz
SWT 98 ms
RF Att 0 dB
Unit dBµV
▼1 [T1] 61.11 dBµV
15.30861723 GHz
▽2 [T1] 58.56 dBµV
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1MAX
1MA
TDF
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1.7 GHz/
Stop 18 GHz
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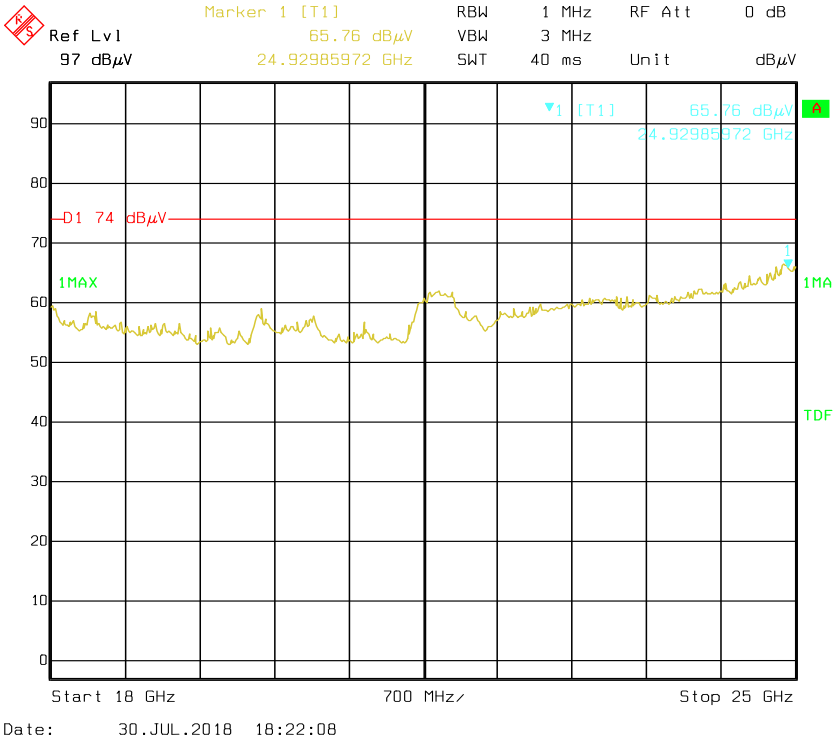
Marker 1 [T1]
Ref Lvl
97 dBµV
65.76 dBµV
24.92985972 GHz
RBW 1 MHz
VBW 3 MHz
SWT 40 ms
RF Att 0 dB
Unit dBµV
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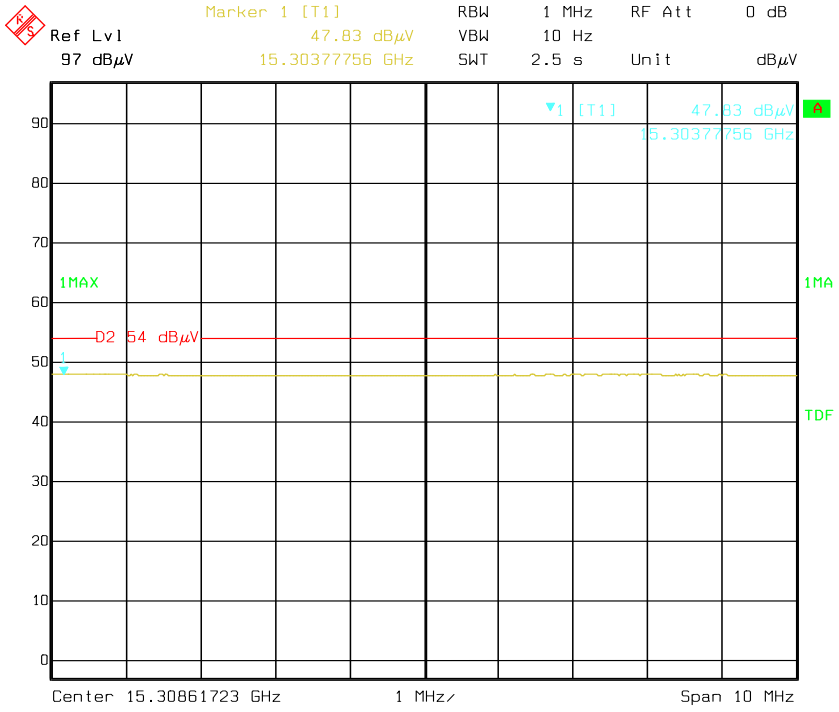
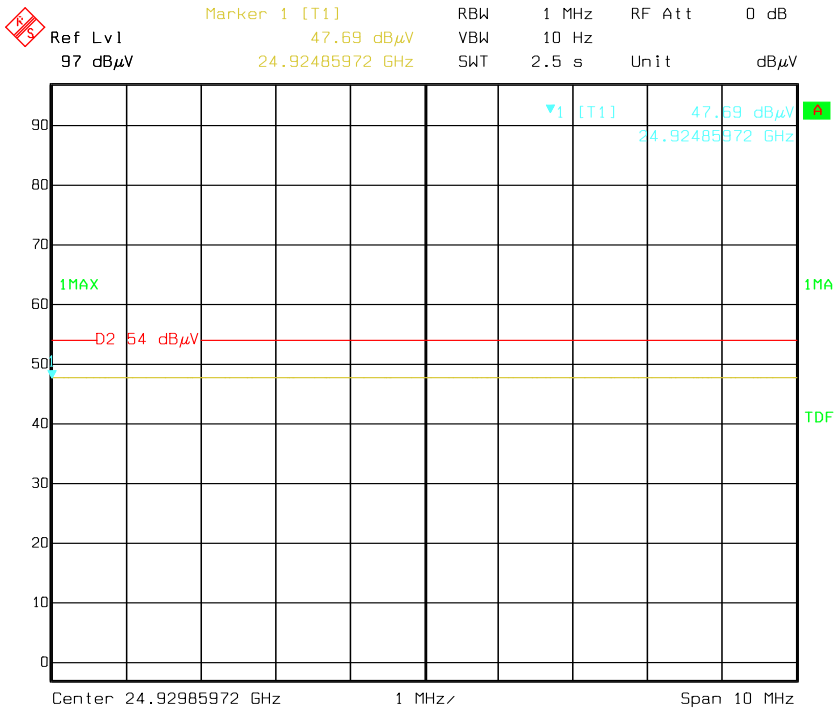
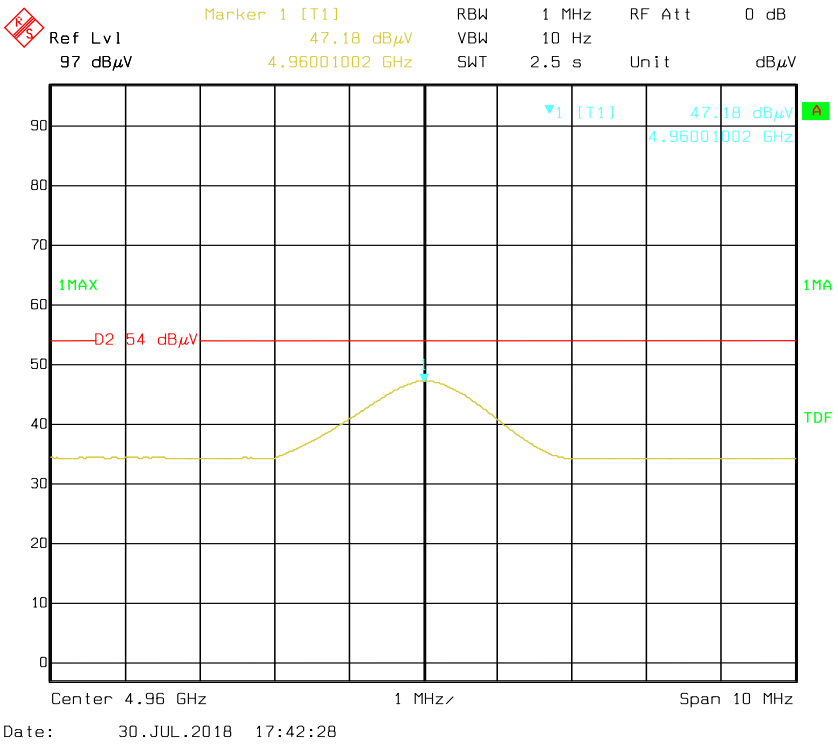
24.92985972 GHz
D1 74 dBµV
1MAX
1MA
TDF
Start 18 GHz
700 MHz/
Stop 25 GHz
Date: 30.JUL.2018 18:22:08

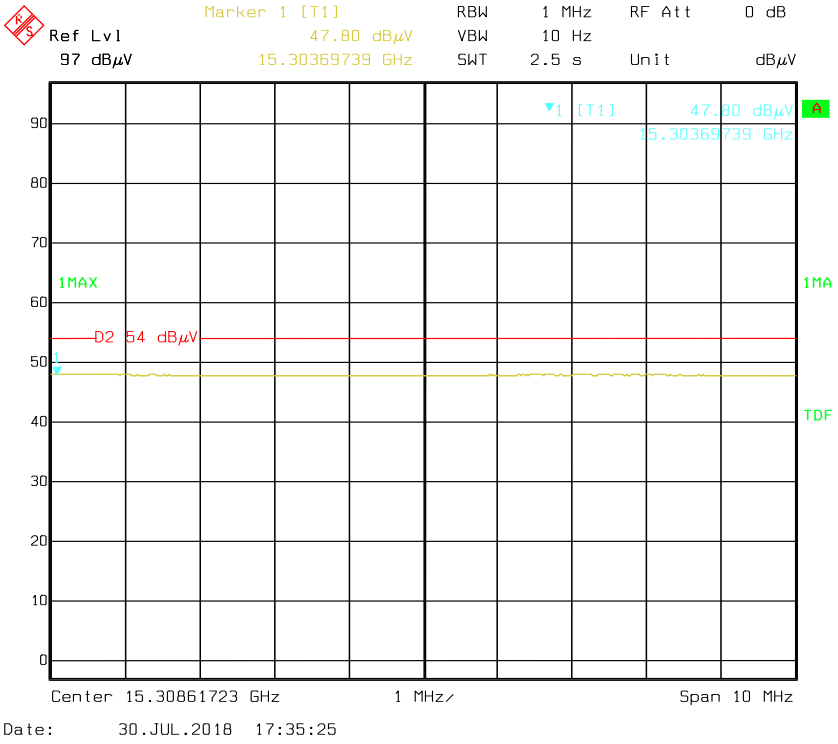
Pre-scan for Average
Horizontal

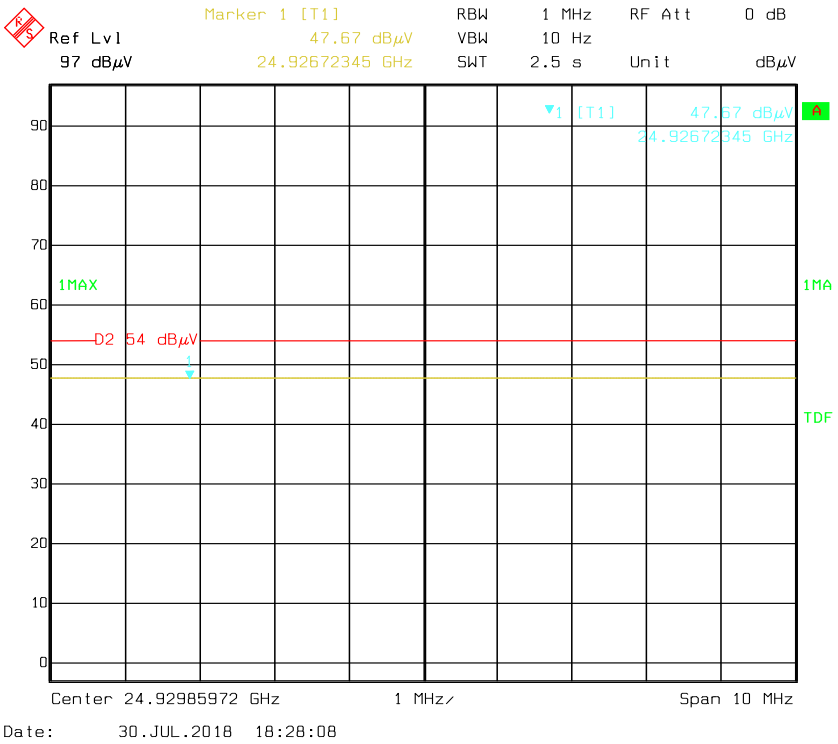


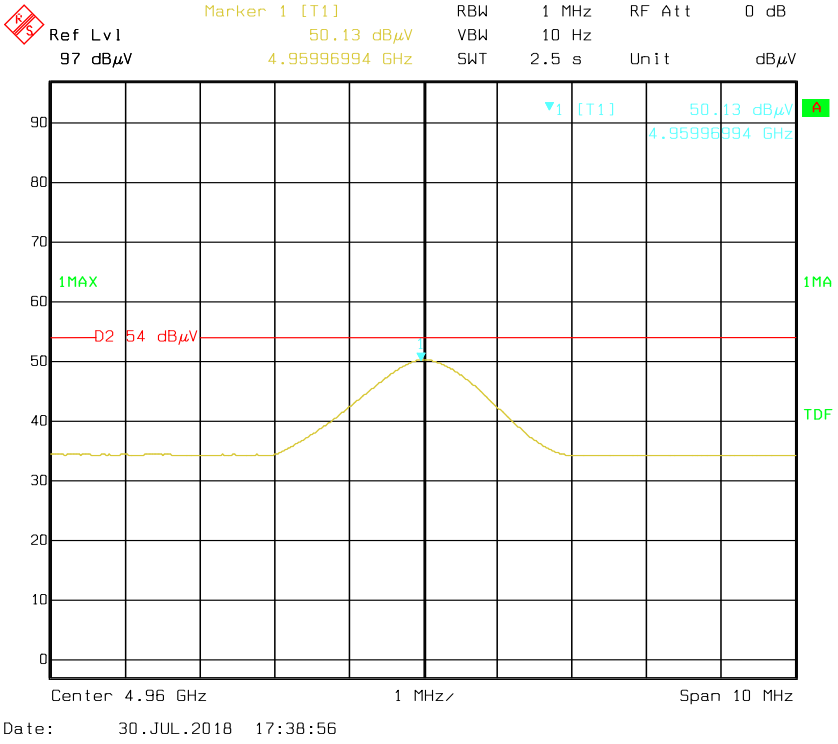



Marker 1 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
47.18 dBµV
VBW 10 Hz
97 dBµV
4.96001002 GHz
SWT 2.5 s
Unit dBµV
1 [T1] 47.18 dBµV
4.96001002 GHz
1MAX
1MA
D2 54 dBµV
TDF
Center 4.96 GHz
1 MHz/
Span 10 MHz
Date: 30.JUL.2018 17:42:28

Vertical


Marker 1 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
47.80 dBµV
VBW 10 Hz
97 dBµV
15.30369739 GHz
SWT 2.5 s
Unit dBµV
1 [T1] 47.80 dBµV
15.30369739 GHz
1MAX
1MA
D2 54 dBµV
TDF
Center 15.30861723 GHz
1 MHz/
Span 10 MHz
Date: 30.JUL.2018 17:35:25





******* END OF REPORT *******