



FCC RF TEST REPORT

Equipment : Video Doorbell Pro 2
Brand Name : Ring
Model Name : 5AT2S2
Applicant : Ring LLC
1523 26th St, Santa Monica, CA 90404, USA
Manufacturer : Goertek Inc.
No. 268 Dongfang Road High-Tech Industrial
Development District, Weifang Shandong, China
Standard : FCC Part 15 Subpart C §15.249

The product was received on Sep. 30, 2020 and testing was started from Oct. 15, 2020 and completed on Nov. 19, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures 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 of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR093009	01	Initial issue of report	Jan. 27, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.249(a) 15.249(d)	Field Strength of Fundamental and Radiated Spurious Emission	Pass	-
3.3	15.207	AC Conducted Emission	Pass	-
-	15.249(b)	Frequency Stability	Not Required	Note
3.4	15.203	Antenna Requirements	Pass	

Note: Only applicable to fixed point to point systems.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Yun Huang
Report Producer: Dara Chiu



1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, Lora, and 24G Radar

Antenna Type/Gain	WLAN2.4G: Loop Antenna with gain 2.46 dBi WLAN5G: Loop Antenna with gain 4.98 dBi Bluetooth: Loop Antenna with gain 1.75 dBi LoRa: IFA Antenna with gain -1.01 dBi 24GHz Radar: Patch Antenna with gain 2 dBi
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Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

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. EMC & Wireless Communications Laboratory	
Test Site Location	No.52 , Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH05-HY	CO05-HY
Test Engineer	Tommy Lee	Tom Lee
Temperature (°C)	22~24	24~26
Relative Humidity (%)	50~55	42~50

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory	
Test Site Location	No.58 , Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855	
Test Site No.	Sporton Site No.	
	03CH12-HY	03CH18-HY
Test Engineer	Jack Cheng	Eric Cheng
Temperature (°C)	20.8~26.8	24~25
Relative Humidity (%)	58.0~68.2	50~55

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

FCC designation No.: TW1190 and TW0007



1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.249
- ♦ ANSI C63.10-2013

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

- a. The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 5th harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower).
- b. AC power line Conducted Emission was tested under maximum output power.

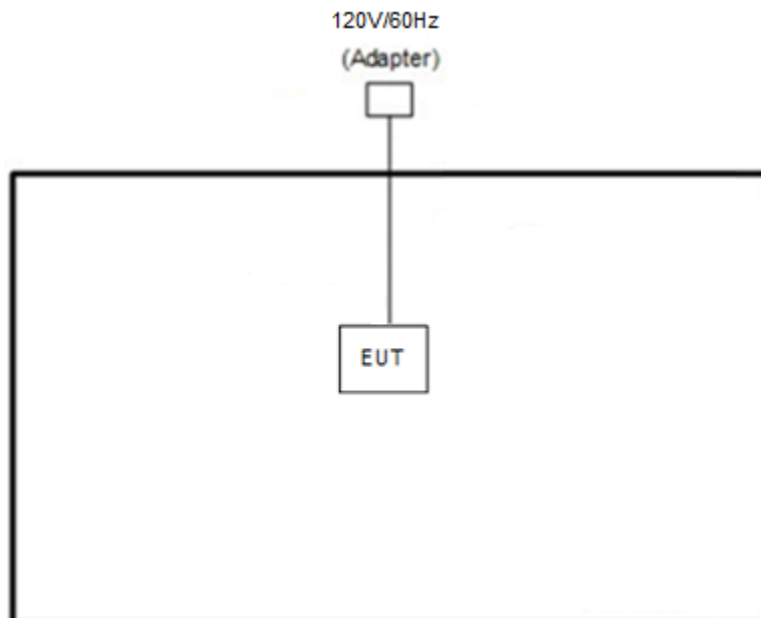
2.1 Carrier Frequency and Test Mode

Frequency Band	Frequency (MHz)	Modulation
24.05-24.25 GHz	24060	CW
24.05-24.25 GHz	24150	CW
24.05-24.25 GHz	24240	CW

Note: The 99%OBW is tested by using FMCW, and the rest of test cases use CW mode in accordance with FCC Part 15.31(c).

Test Cases	
AC Conducted Emission	Mode 1 :24G Radar TX + AC Power Cable

2.2 Connection Diagram of Test System





2.3 EUT Operation Test Setup

The RF test items, utility “Telnet” was installed in Notebook and connected to the EUT which was programmed in order to make the EUT get into the engineering modes for continuous transmitting signals.



3 Test Result

3.1 99% Bandwidth Measurement

3.1.1 Limit of 99% Bandwidth

For reference only.

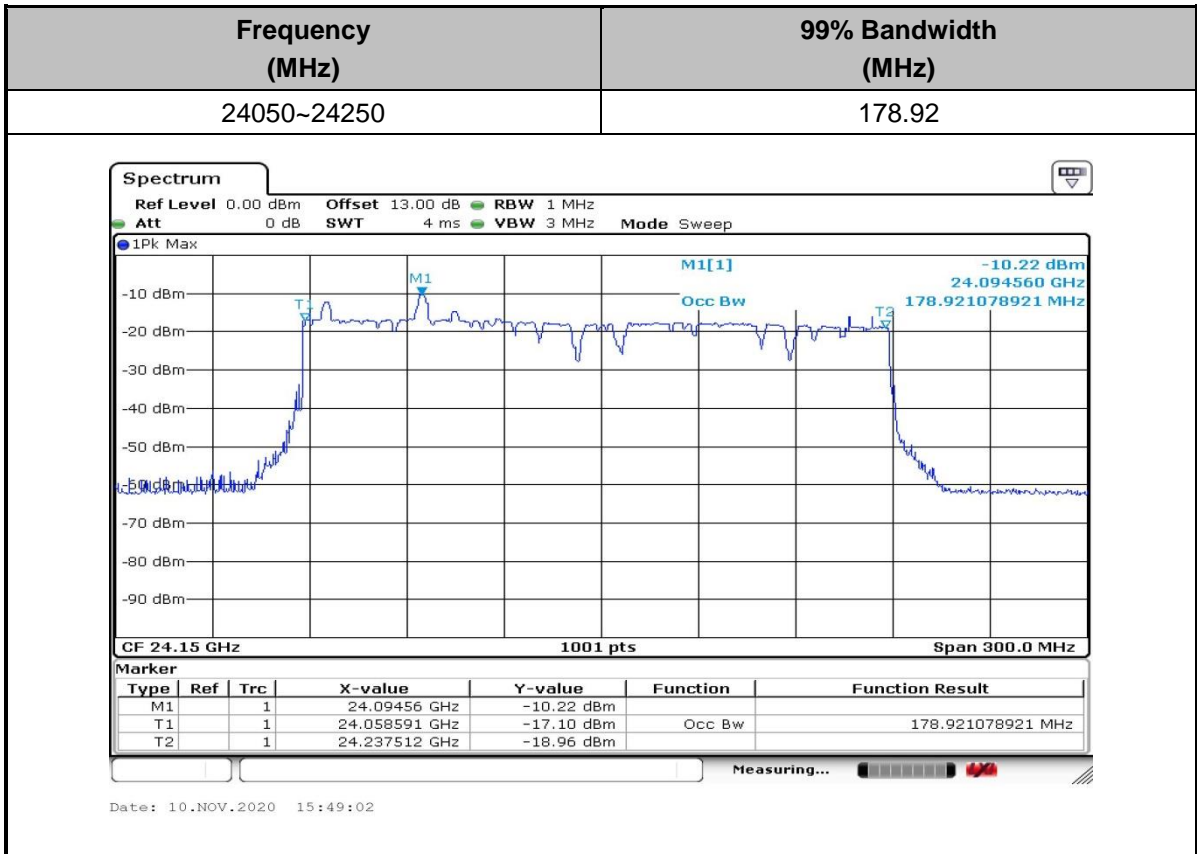
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3.
2. Enable the EUT transmit continuously under FMCW mode.
3. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) $\geq 3 * RBW$.
4. Measure and record the results in the test report.

3.1.4 Test Result of 99% Occupied Bandwidth



3.2 Field Strength of Fundamental/Harmonics and Radiated Spurious Emission Measurement

3.2.1 Limit

The field strength measured at 3 meters shall not exceed the limits in the following table:

Rules and specifications	FCC CFR 47 Part 15 section 15.249	
Description	Field strength of fundamental	
24.0~24.25 (GHz)	Field strength of fundamental (millivolts/meter) at 3m	Field strength of fundamental (dBµV/m) at 3m
Average limits	250	107.95
Peak limits	-	127.95
Description	Field strength of harmonics	
24.0~24.25 (GHz)	Field strength of harmonics (microvolts/meter) at 3m	Field strength of harmonics (dBµV/m) at 3m
Average limits	2500	67.95
Peak limits	-	87.95
Note: Above 18GHz, the distance correction factor is used, 18GHz to 90GHz : $20\log(1m/3m) = -9.54dB$; 90GHz – 100GHz: $20\log(0.5m/3m) = -15.56dB$.		

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation

Frequency (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

3.2.2 Measuring Instruments

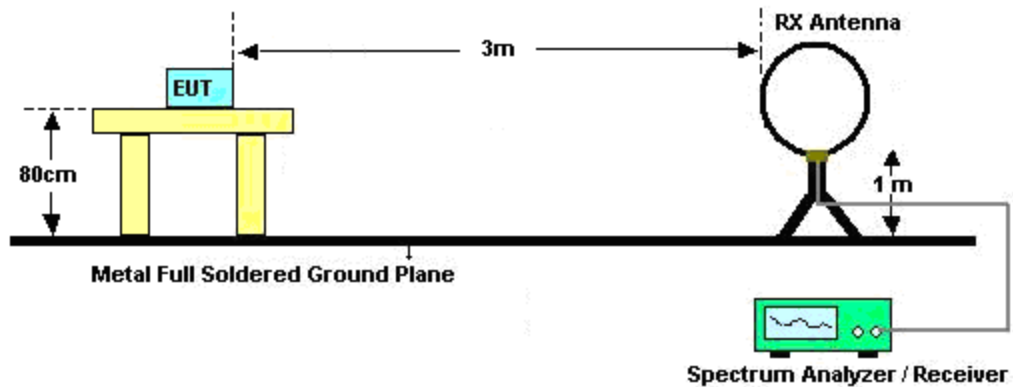
See list of measuring equipment of this test report.

3.2.3 Test Procedures

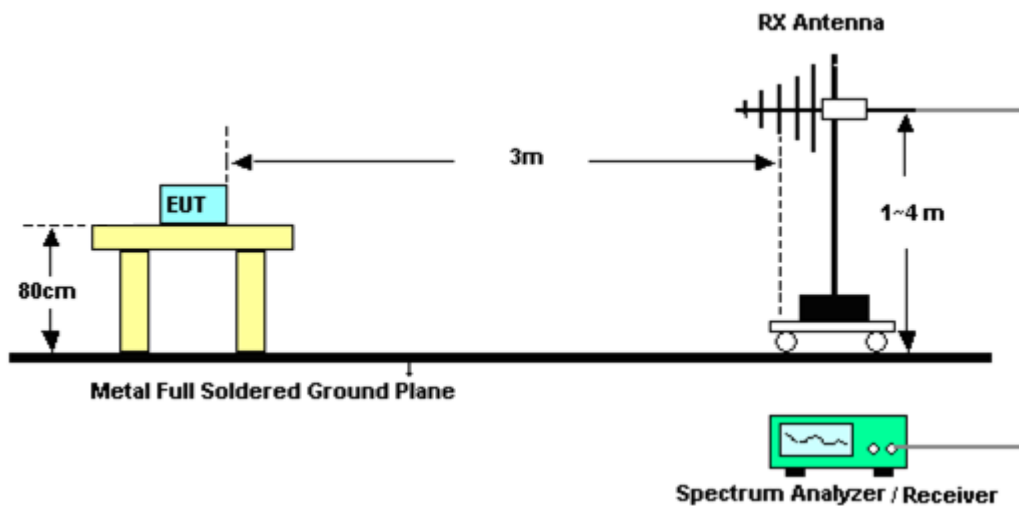
For emissions 9KHz to 40GHz, ANSI C63.10 Section 6.3 Radiated emissions testing follows, and for emissions 40GHz to 100GHz, ANSI C63.10 Section 9.8 and 9.9 radiated measurements follows. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and with 1.5 meter height for frequency above 1GHz, and was arranged test distance as shown in Section 3.4 Test Setup, respectively. For emissions, test results are attenuated more than 20 dB below the permissible value need not be reported in accordance with FCC Part 15.31(O).

3.2.4 Test Setup

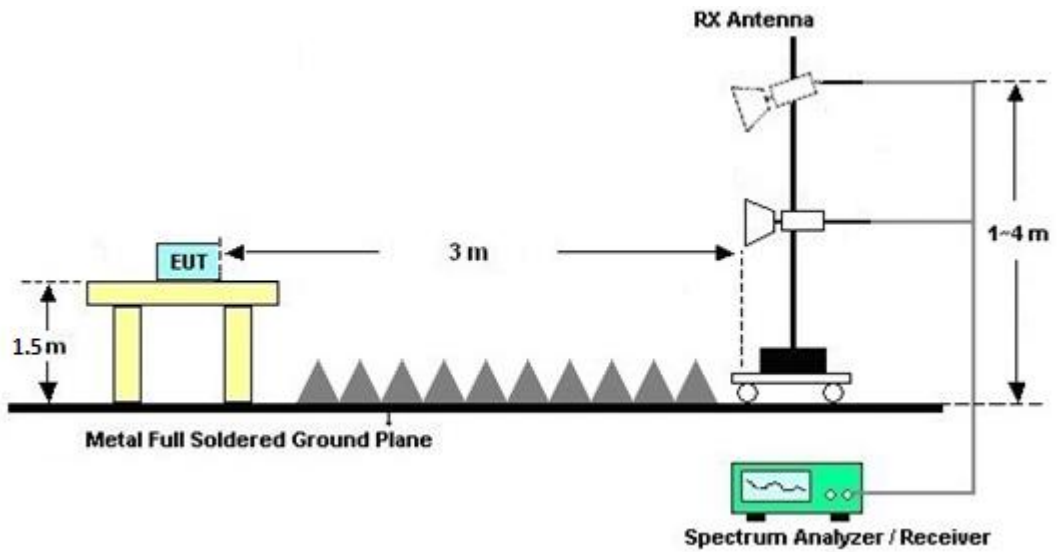
<For radiated emissions below 30MHz>



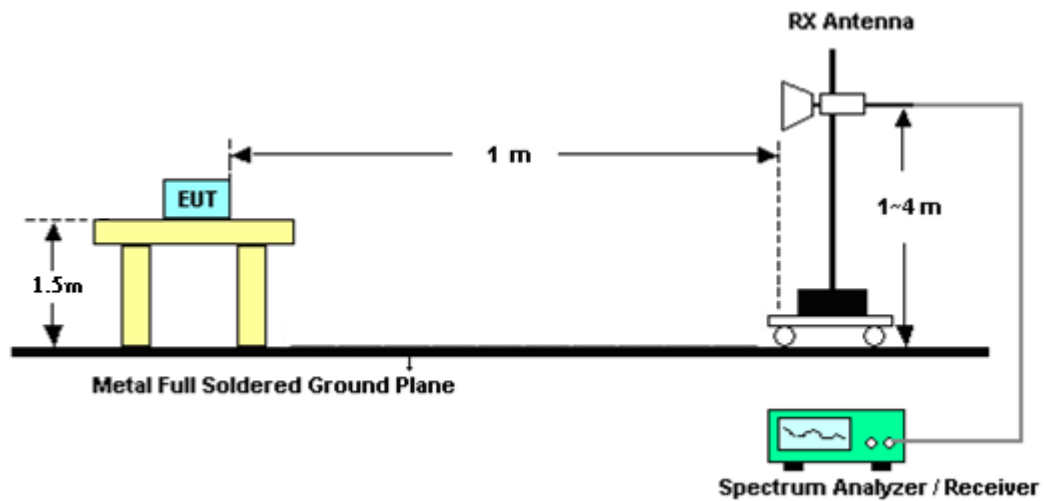
<For radiated emissions from 30MHz ~ 1GHz>



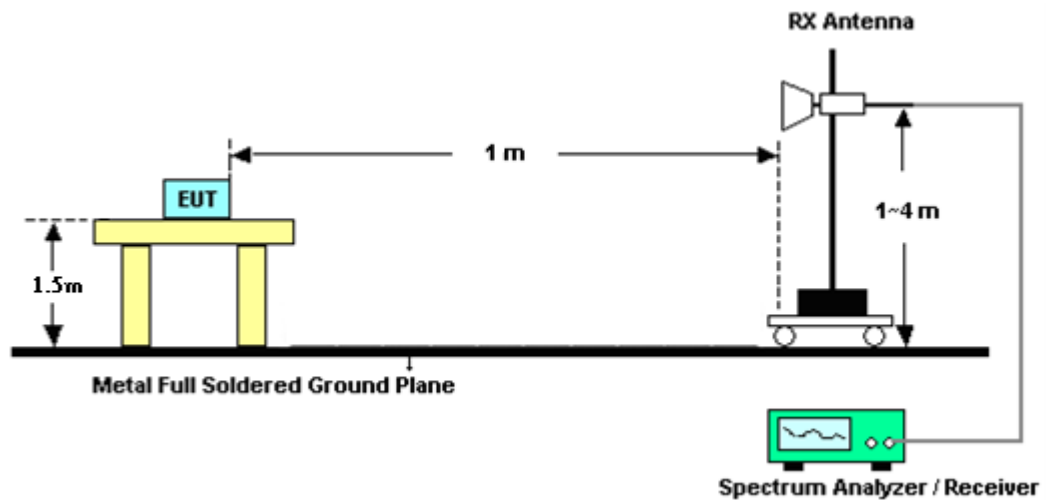
<For radiated emissions from 1 ~ 18GHz>



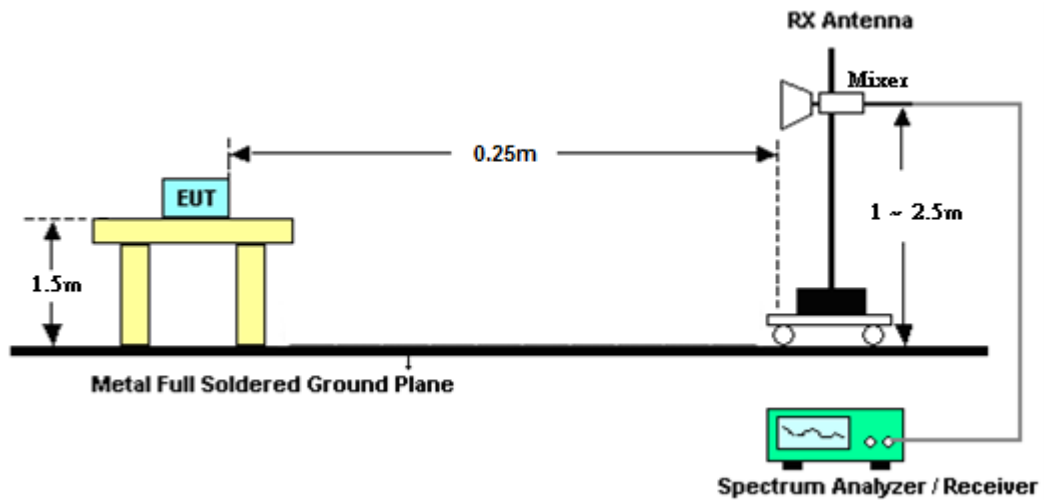
<For radiated emissions from 18 ~ 40GHz>



<For radiated emissions above 40 ~ 90GHz>



<For radiated emissions above 90 ~ 100GHz>



3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.2.6 Test Result of Field Strength of Fundamental and Radiated Spurious Emission

Please refer to Appendix A and B.



3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

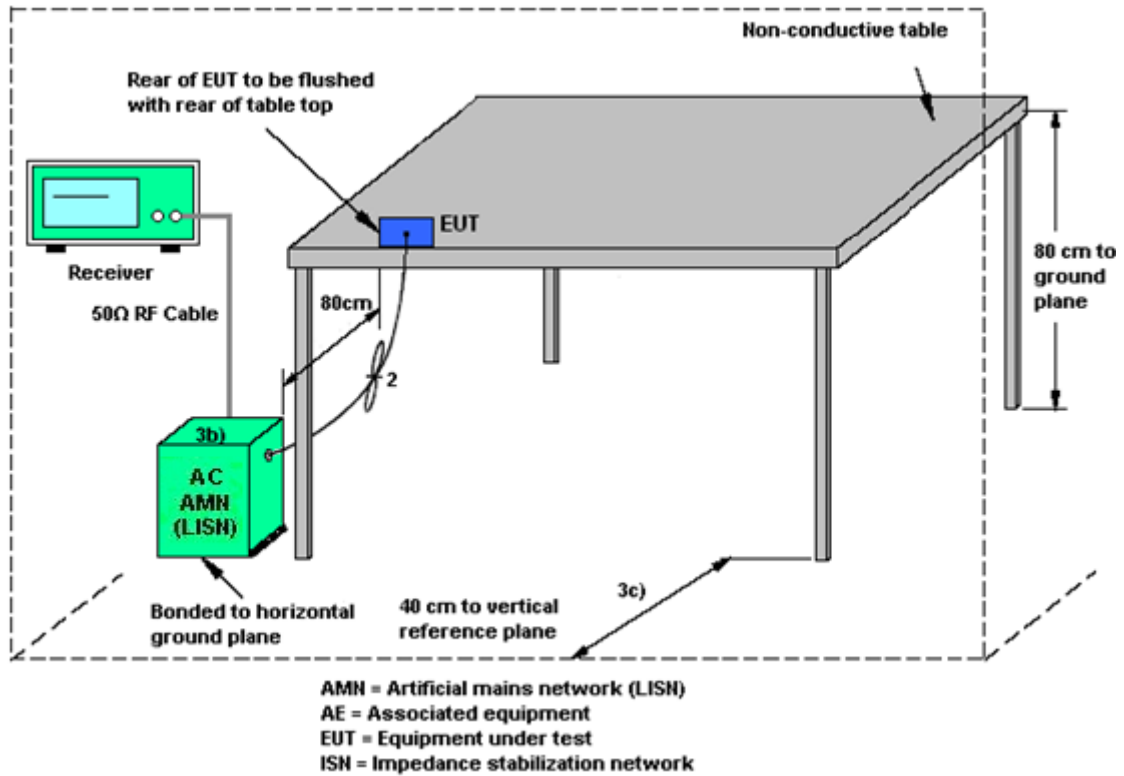
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

1. Connect EUT to the power mains through a line impedance stabilization network (LISN).
2. All the support units are connecting to the other LISN.
3. The LISN provides 50 ohm coupling impedance for the measuring instrument.
4. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

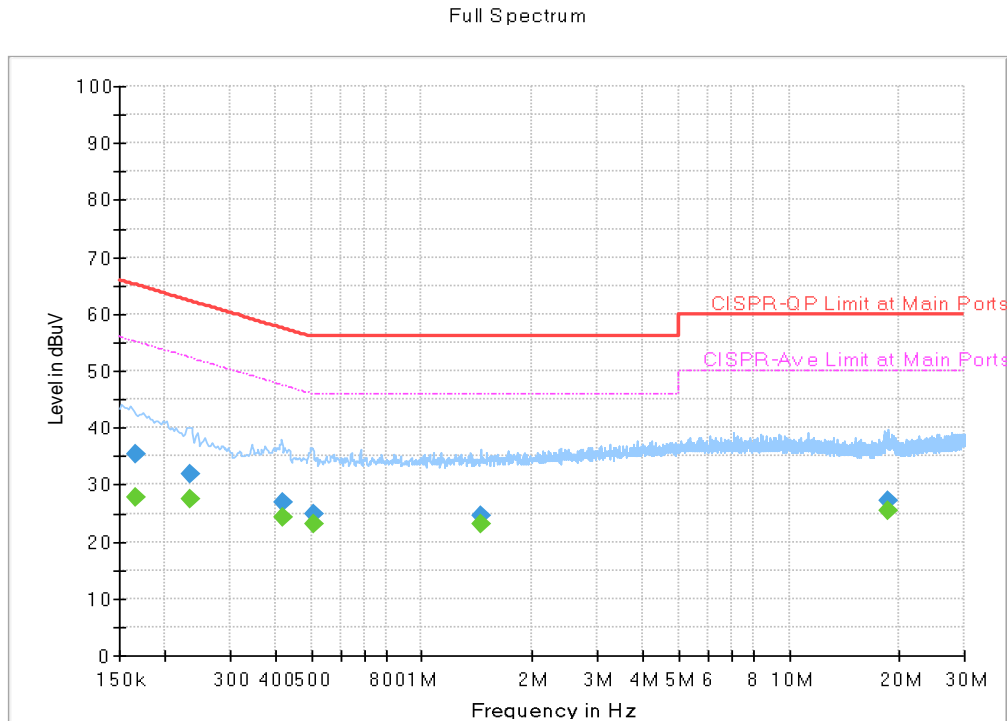
3.3.4 Test Setup





3.3.5 Test Result of AC Conducted Emission

Test Voltage :	120Vac / 60Hz	Phase :	Line
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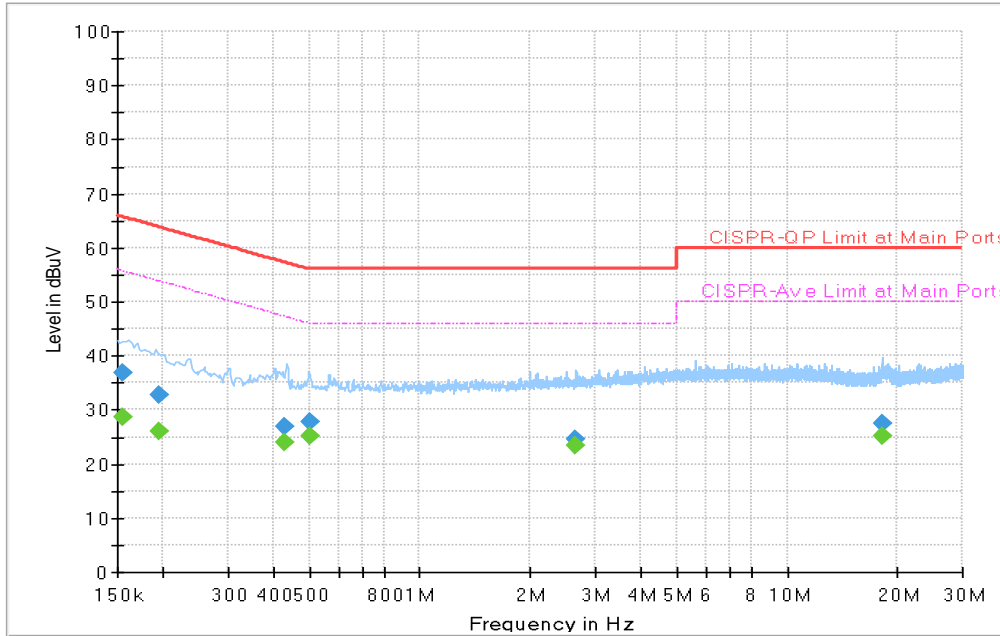
Final Result :

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.165750	---	27.77	55.17	27.40	L1	OFF	19.6
0.165750	35.31	---	65.17	29.86	L1	OFF	19.6
0.233160	---	27.50	52.34	24.84	L1	OFF	19.6
0.233160	31.84	---	62.34	30.50	L1	OFF	19.6
0.420000	---	24.13	47.45	23.32	L1	OFF	19.6
0.420000	26.94	---	57.45	30.51	L1	OFF	19.6
0.507750	---	23.20	46.00	22.80	L1	OFF	19.6
0.507750	24.84	---	56.00	31.16	L1	OFF	19.6
1.447440	---	23.02	46.00	22.98	L1	OFF	19.6
1.447440	24.46	---	56.00	31.54	L1	OFF	19.6
18.528000	---	25.44	50.00	24.56	L1	OFF	20.3
18.528000	27.33	---	60.00	32.67	L1	OFF	20.3



Test Voltage :	120Vac / 60Hz	Phase :	Neutral
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Full Spectrum



Final Result :

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	28.74	55.75	27.01	N	OFF	19.5
0.154500	36.75	---	65.75	29.00	N	OFF	19.5
0.195000	---	25.91	53.82	27.91	N	OFF	19.5
0.195000	32.69	---	63.82	31.13	N	OFF	19.5
0.429000	---	24.05	47.27	23.22	N	OFF	19.5
0.429000	26.77	---	57.27	30.50	N	OFF	19.5
0.501090	---	25.23	46.00	20.77	N	OFF	19.5
0.501090	27.83	---	56.00	28.17	N	OFF	19.5
2.658750	---	23.53	46.00	22.47	N	OFF	19.6
2.658750	24.69	---	56.00	31.31	N	OFF	19.6
18.174750	---	25.00	50.00	25.00	N	OFF	19.9
18.174750	27.40	---	60.00	32.60	N	OFF	19.9



3.4 Antenna Requirements

3.4.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.4.2 Antenna Connector Construction

Embedded in Antenna.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Dec. 26, 2019	Oct. 22, 2020 ~ Nov. 10, 2020	Dec. 25, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	41912 & 05	30MHz~1GHz	Feb. 09, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Feb. 08, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 14, 2019	Oct. 22, 2020 ~ Nov. 10, 2020	Nov. 13, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 22, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	May 21, 2021	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Mar. 24, 2021	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY57280120	1GHz~26.5GHz	Jul. 20, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Jul. 19, 2021	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Feb. 07, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Feb. 06, 2021	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 13, 2019	Oct. 22, 2020 ~ Nov. 10, 2020	Dec. 12, 2020	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Sep. 14, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Sep. 13, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Mar. 11, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 12, 2019	Oct. 22, 2020 ~ Nov. 10, 2020	Dec. 11, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 25, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 25, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	Jul. 27, 2020	Oct. 22, 2020 ~ Nov. 10, 2020	Jul. 26, 2021	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 22, 2020 ~ Nov. 10, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 22, 2020 ~ Nov. 10, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 22, 2020 ~ Nov. 10, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Oct. 22, 2020 ~ Nov. 10, 2020	N/A	Radiation (03CH12-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	103738	9kHz to 30GHz	May 14, 2020	Nov. 05, 2020 ~ Nov. 19, 2020	May 13, 2021	Radiation (03CH18-HY)
Harmonic Mixer	Rohde & Schwarz	RPG FS-Z140	101128	90GHz to 140GHz	Sep. 06, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Sep. 05, 2021	Radiation (03CH18-HY)
Harmonic Mixer	Rohde & Schwarz	RPG FS-Z60	100986	40GHz to 60GHz	Oct. 31, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Oct. 30, 2021	Radiation (03CH18-HY)
Harmonic Mixer	Rohde & Schwarz	FSZ-90	101811	60GHz to 90GHz	Jul. 16, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Jul. 15, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-EPRR00	784600034	60-90 GHz	Aug. 17, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 16, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-FPRR00	923800008	90-140 GHz	Aug. 17, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 16, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-UPRR00	923600007	40-60 GHz	Aug. 17, 2018	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 16, 2021	Radiation (03CH18-HY)
Solid State Amplifier	Quinstar	QLW-50754530-12	953600006	40-60 GHz	Aug. 20, 2020	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 19, 2021	Radiation (03CH18-HY)
Solid State Amplifier	Quinstar	QLW-40605030-00	953500005	50-75 GHz	Aug. 20, 2020	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 19, 2021	Radiation (03CH18-HY)
Solid State Amplifier	Quinstar	QLW-70905030-12	953700007	75-90 GHz	Aug. 20, 2020	Nov. 05, 2020 ~ Nov. 19, 2020	Aug. 19, 2021	Radiation (03CH18-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 24, 2020	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 15, 2019	Oct. 24, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 07, 2019	Oct. 24, 2020	Nov. 06, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 15, 2019	Oct. 24, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 24, 2020	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 02, 2020	Oct. 24, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 02, 2020	Oct. 24, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Nov. 10, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 15, 2019	Nov. 10, 2020	Nov. 14, 2020	Conducted (TH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	18GHz~40GHz	Nov. 26, 2019	Nov. 10, 2020	Nov. 25, 2020	Conducted (TH05-HY)



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.6
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9
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Uncertainty of Radiated Emission Measurement (40 GHz ~ 140 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8
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Appendix A. Radiated Spurious Emission

24GHz 24000~24250MHz

(Field strength of fundamental @ 3m)

24GHz	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.06GHz		23993.5	43.83	-30.17	74	45.97	38.5	12.66	53.3	150	0	P	H
	*	24059.5	96.38	-31.57	127.95	98.47	38.52	12.71	53.32	150	0	P	H
	*	24060	96.22	-11.73	107.95	98.31	38.52	12.71	53.32	150	194	A	H
		24965.5	43.96	-30.04	74	44.81	39.17	13.48	53.5	150	0	P	H
		23602	42.53	-31.47	74	44.59	38.66	12.58	53.3	150	0	P	V
	*	24059.5	84.96	-42.99	127.95	87.05	38.52	12.71	53.32	150	0	P	V
	*	24060	84.49	-23.46	107.95	87.58	38.52	11.71	53.32	150	169	A	V
		24455.5	42.88	-31.12	74	44.63	38.68	13.05	53.48	150	0	P	V
24.15GHz		23545	43.17	-30.83	74	45.23	38.68	12.56	53.3	150	0	P	H
	*	24150	96.78	-31.17	127.95	98.79	38.56	12.79	53.36	150	0	P	H
	*	24149.5	96.75	-11.20	107.95	98.76	38.56	12.79	53.36	150	139	A	H
		24871	43.51	-30.49	74	44.54	39.07	13.4	53.5	150	0	P	H
		23804.5	43.06	-30.94	74	45.16	38.58	12.62	53.3	150	0	P	V
	*	24150	85.19	-42.76	127.95	87.2	38.56	12.79	53.36	150	0	P	V
	*	24150	85.15	-22.80	107.95	87.16	38.56	12.79	53.36	150	143	A	V
		24847	43.6	-30.4	74	44.67	39.05	13.38	53.5	150	0	P	V



24GHz	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.24GHz		23531.5	42.79	-31.21	74	44.84	38.69	12.56	53.3	150	0	P	H
	*	24239.5	96.57	-31.38	127.95	98.51	38.6	12.86	53.4	150	0	P	H
	*	24239.5	96.31	-11.64	107.95	98.25	38.6	12.86	53.4	150	140	A	H
		24250.01	58.9	-15.1	74	60.83	38.6	12.87	53.4	150	0	P	H
		24250.01	50.9	-3.1	54	52.83	38.6	12.87	53.4	150	140	A	H
		23717.5	41.23	-32.77	74	43.32	38.61	12.6	53.3	150	0	P	V
	*	24239.5	83.57	-44.38	127.95	85.51	38.6	12.86	53.4	150	0	P	V
	*	24239.5	83.26	-24.69	107.95	85.2	38.6	12.86	53.4	150	168	A	V
		24250.01	43.95	-30.05	74	45.88	38.6	12.87	53.4	150	0	P	V
		24250.01	38.84	-15.16	54	40.77	38.6	12.87	53.4	150	168	A	V

Remark

1. No other spurious found.
2. All results are Pass against Peak and Average limit line.
3. The general radiated emission limits in §15.209 is lesser attenuation as limit.
4. The maximized peak level complies with the average limit, unnecessary to perform an average measurement



**24GHz 24000~24250MHz
(Radiated Spurious Emission @ 3m)**

24GHz	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.06GHz		18000	61.78	-12.22	74	46.82	50.1	21.56	56.7	100	0	P	H
		18000	50.96	-3.04	54	36	50.1	21.56	56.7	100	0	A	H
		39902	58.12	-15.88	74	46.64	45.74	20.2	54.46	150	0	P	H
		39902	49.49	-4.51	54	38.01	45.74	20.2	54.46	150	0	A	H
		18000	60.98	-13.02	74	46.02	50.1	21.56	56.7	100	0	P	V
		18000	50.85	-3.15	54	35.89	50.1	21.56	56.7	100	0	A	V
		39944	56.96	-17.04	74	45.39	45.72	20.24	54.39	150	0	P	V
		39944	49.19	-4.81	54	37.62	45.72	20.24	54.39	150	0	A	V
24.15GHz		18000	61.38	-12.62	74	46.42	50.1	21.56	56.7	100	0	P	H
		18000	50.93	-3.07	54	35.97	50.1	21.56	56.7	100	0	A	H
		39874	57.67	-16.33	74	46.24	45.75	20.18	54.5	150	0	P	H
		39874	47.63	-6.37	54	36.2	45.75	20.18	54.5	150	0	A	H
		18000	61.39	-12.61	74	46.43	50.1	21.56	56.7	100	0	P	V
		18000	50.95	-3.05	54	35.99	50.1	21.56	56.7	100	0	A	V
		39846	56.57	-17.43	74	45.21	45.76	20.15	54.55	150	0	P	V
		39846	48.66	-5.34	54	37.3	45.76	20.15	54.55	150	0	A	V
24.24GHz		18000	62.42	-11.58	74	47.46	50.1	21.56	56.7	100	0	P	H
		18000	50.36	-3.64	54	35.4	50.1	21.56	56.7	100	0	A	H
		39902	56.63	-17.37	74	45.15	45.74	20.2	54.46	150	0	P	H
		39902	49.25	-4.75	54	37.77	45.74	20.2	54.46	150	0	A	H
		18000	61.85	-12.15	74	46.89	50.1	21.56	56.7	100	0	P	V
		18000	50.37	-3.63	54	35.41	50.1	21.56	56.7	100	0	A	V
		39818	56.11	-17.89	74	44.8	45.77	20.13	54.59	150	0	P	V
		39818	49.11	-4.89	54	37.8	45.77	20.13	54.59	150	0	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are Pass against Peak and Average limit line. The general radiated emission limits in §15.209 is lesser attenuation as limit. The maximized peak level complies with the average limit, unnecessary to perform an average measurement 												



**24GHz 24000~24250MHz
(Radiated Spurious Emission & Harmonic @ 3m)**

24GHz	Note	Frequency (GHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.06GHz		48.12	49.64	-38.31	87.95	100	0	P	H
		48.12	43.38	-24.57	67.95	100	0	A	H
		49.58	49.83	-24.17	74	100	0	P	H
		49.58	42.94	-11.06	54	100	190	A	H
		72.18	55.65	-32.3	87.95	100	0	P	H
		72.18	50.96	-16.99	67.95	100	0	A	H
		73.64	55.41	-18.59	74	100	0	P	H
		73.64	49.75	-4.25	54	100	190	A	H
		96.24	46.66	-41.29	87.95	100	0	P	H
		96.24	39.21	-28.74	67.95	100	0	A	H
		48.12	54.08	-33.87	87.95	100	0	P	V
		48.12	49.45	-18.50	67.95	100	0	A	V
		49.58	53.59	-20.41	74	100	0	P	V
		49.58	48.64	-5.36	54	100	165	A	V
		72.18	55.48	-32.47	87.95	100	0	P	V
		72.18	49.85	-18.10	67.95	100	0	A	V
		73.64	54.41	-19.59	74	100	0	P	V
		73.64	49.24	-4.76	54	100	165	A	V
		96.24	46.68	-41.27	87.95	100	0	P	V
		96.24	40.03	-27.92	67.95	100	0	A	V
Remark	<ol style="list-style-type: none"> Except above, no other spurious found. All results are Pass against Peak and Average limit line. Test plots shown in the Annex B use closer distance and above final results are extrapolated to the distance specified by the limit, 3m, by offset with distance correction factor. The maximized peak level complies with the average limit, unnecessary to perform an average measurement 								



24GHz	Note	Frequency (GHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
24.15GHz		48.30	50.07	-37.88	87.95	100	0	P	H	
		48.30	42.72	-25.23	67.95	100	0	A	H	
		49.76	49.38	-24.62	74	100	0	P	H	
		49.76	42.52	-11.48	54	100	140	A	H	
		72.45	55.99	-31.96	87.95	100	0	P	H	
		72.45	50.84	-17.11	67.95	100	0	A	H	
		73.91	55.66	-18.34	74	100	140	P	H	
		73.91	49.7	-4.3	54	100	0	A	H	
		96.6	46.59	-41.36	87.95	100	0	P	H	
		96.6	39.32	-28.63	67.95	100	0	A	H	
			48.30	55.27	-32.68	87.95	100	0	P	V
			48.30	49.92	-18.03	67.95	100	0	A	V
			49.76	54.92	-19.08	74	100	0	P	V
			49.76	49.73	-4.27	54	100	135	A	V
			72.45	57	-30.95	87.95	100	0	P	V
			72.45	51.55	-16.4	67.95	100	0	A	V
			73.91	55.44	-18.56	74	100	0	P	V
			73.91	50.47	-3.53	54	100	135	A	V
			96.6	48.35	-39.60	87.95	100	0	P	V
			96.6	38.82	-29.13	67.95	100	0	A	V
Remark	<ol style="list-style-type: none"> Except above, no other spurious found. All results are Pass against Peak and Average limit line. Test plots shown in the Annex B use closer distance and above final results are extrapolated to the distance specified by the limit, 3m, by offset with distance correction factor. The maximized peak level complies with the average limit, unnecessary to perform an average measurement 									



24GHz	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.24GHz		48.48	47.49	-40.46	87.95	100	0	P	H
		48.48	43.73	-24.22	67.95	100	0	A	H
		49.94	46.53	-27.47	74	100	0	P	H
		49.94	43.57	-10.43	54	100	145	A	H
		72.72	56.66	-31.29	87.95	100	0	P	H
		72.72	49.23	-18.72	67.95	100	0	A	H
		74.18	54.16	-19.84	74	100	0	P	H
		74.18	47.72	-6.28	54	100	145	A	H
		96.96	45.9	-42.05	87.95	100	0	P	H
		96.96	38.86	-29.09	67.95	100	0	A	H
		48.48	55.04	-32.91	87.95	100	0	P	V
		48.48	50.72	-17.23	67.95	100	0	A	V
		49.94	53.55	-20.45	74	100	0	P	V
		49.94	49.15	-4.85	54	100	165	A	V
		72.72	57.86	-30.09	87.95	100	0	P	V
		72.72	52.92	-15.03	67.95	100	0	A	V
		74.18	56.74	-17.26	74	100	0	P	V
		74.18	50.44	-3.56	54	100	165	A	V
	96.96	45.96	-41.99	87.95	100	0	P	V	
	96.96	38.84	-29.11	67.95	100	0	A	V	
Remark	<ol style="list-style-type: none"> 1. Except above, no other spurious found. 2. All results are Pass against Peak and Average limit line. 3. Test plots shown in the Annex B use closer distance and above final results are extrapolated to the distance specified by the limit, 3m, by offset with distance correction factor. 4. The maximized peak level complies with the average limit, unnecessary to perform an average measurement 								



**Emission below 1GHz
24GHz (LF)**

24GHz	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.06GHz LF		81.41	29.85	-10.15	40	44.76	13.82	0.81	29.67	-	-	P	H
		125.06	27.28	-16.22	43.5	38.01	17.69	1.05	29.63	-	-	P	H
		256.98	36.29	-9.71	46	44.73	19.18	1.57	29.38	-	-	P	H
		467.47	33.07	-12.93	46	36.44	23.27	2.14	29.06	-	-	P	H
		710.94	37.48	-8.52	46	36.6	26.44	2.67	28.56	100	0	P	H
		964.11	36.57	-17.43	54	30.58	30.34	3.26	28.11	-	-	P	H
		30	30.12	-9.88	40	36.74	22.45	0.48	29.64	-	-	P	V
		103.72	25.23	-18.27	43.5	37.23	16.61	0.87	29.62	-	-	P	V
		265.71	30.17	-15.83	46	38.28	19.48	1.58	29.37	-	-	P	V
		467.47	29.19	-16.81	46	32.56	23.27	2.14	29.06	-	-	P	V
		729.37	36.48	-9.52	46	34.7	27.26	2.77	28.59	-	-	P	V
		890.39	38.65	-7.35	46	34.64	28.49	3.31	28.23	100	0	P	V
24.15GHz LF		81.41	29.85	-10.15	40	44.76	13.82	0.81	29.67	-	-	P	H
		125.06	27.28	-16.22	43.5	38.01	17.69	1.05	29.63	-	-	P	H
		256.98	36.29	-9.71	46	44.73	19.18	1.57	29.38	-	-	P	H
		467.47	33.07	-12.93	46	36.44	23.27	2.14	29.06	-	-	P	H
		710.94	37.48	-8.52	46	36.6	26.44	2.67	28.56	100	0	P	H
		964.11	36.57	-17.43	54	30.58	30.34	3.26	28.11	-	-	P	H
		30	30.12	-9.88	40	36.74	22.45	0.48	29.64	-	-	P	V
		103.72	25.23	-18.27	43.5	37.23	16.61	0.87	29.62	-	-	P	V
		265.71	30.17	-15.83	46	38.28	19.48	1.58	29.37	-	-	P	V
		467.47	29.19	-16.81	46	32.56	23.27	2.14	29.06	-	-	P	V
		729.37	36.48	-9.52	46	34.7	27.26	2.77	28.59	-	-	P	V
		890.39	38.65	-7.35	46	34.64	28.49	3.31	28.23	100	0	P	V



24GHz	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
24.24GHz LF		49.4	31.52	-8.48	40	45.57	15	0.54	29.61	-	-	P	H
		125.06	27.33	-16.17	43.5	38.06	17.69	1.05	29.63	-	-	P	H
		258.92	36.07	-9.93	46	44.18	19.49	1.58	29.38	-	-	P	H
		465.53	32.91	-13.09	46	36.3	23.25	2.14	29.06	-	-	P	H
		729.37	39.23	-6.77	46	37.45	27.26	2.77	28.59	100	0	P	H
		961.2	37.4	-16.6	54	31.33	30.43	3.25	28.11	-	-	P	H
		49.4	33.07	-6.93	40	47.12	15	0.54	29.61	100	0	P	V
		108.57	30.55	-12.95	43.5	42.22	16.88	0.92	29.62	-	-	P	V
		233.7	30.15	-15.85	46	41.6	16.31	1.49	29.43	-	-	P	V
		473.29	30.09	-15.91	46	33.35	23.35	2.14	29.04	-	-	P	V
		729.37	37.59	-8.41	46	35.81	27.26	2.77	28.59	-	-	P	V
		946.65	36.6	-9.4	46	31.19	29.86	3.21	28.14	-	-	P	V
	Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against limit line. The general radiated emission limits in §15.209 is lesser attenuation as limit. 											



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Level(dBμV/m) =
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



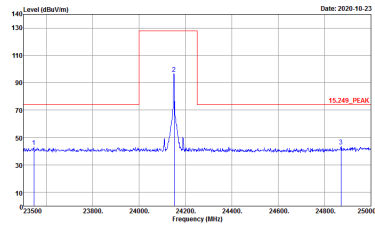
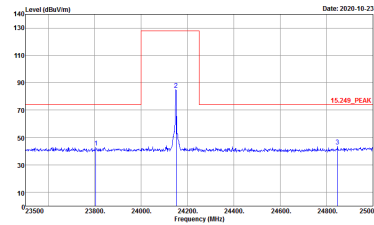
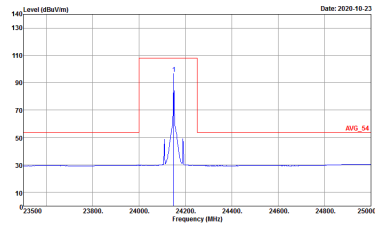
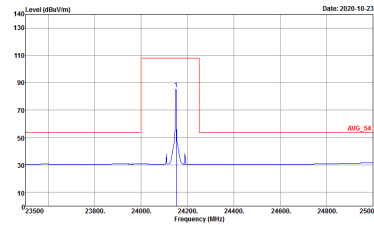
Appendix B. Radiated Spurious Emission Plots

24GHz 24000~24250MHz

Field strength of fundamental @ 3m

24GHz	Field strength of fundamental	
	Test frequency:24.06GHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>	<p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>
Avg.	<p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>	<p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>



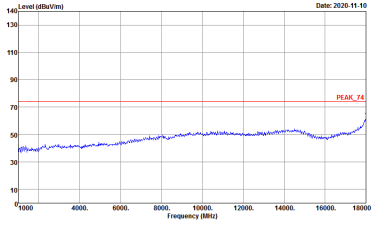
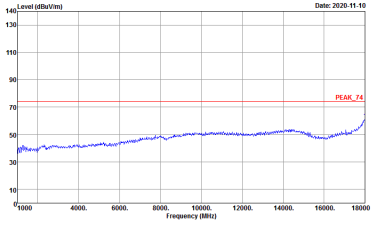
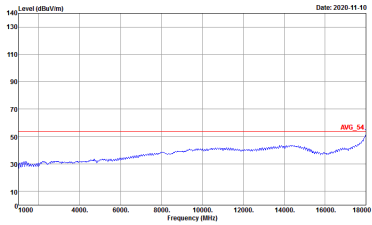
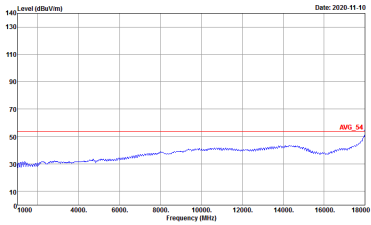
24GHz	Field strength of fundamental	
	Test frequency :24.15GHz	
	Horizontal	Vertical
Peak	 <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>
Avg.	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>



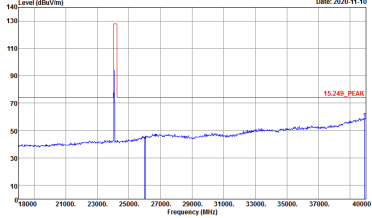
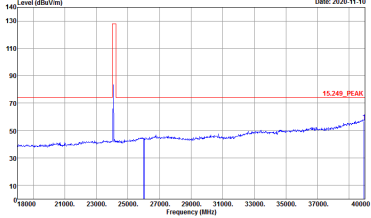
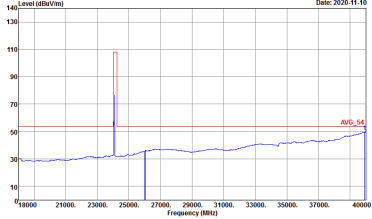

24GHz	Field strength of fundamental	
	Test frequency :24.24GHz	
	Horizontal	Vertical
Peak	<p>Date: 2020-10-23</p> <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>	<p>Date: 2020-10-23</p> <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 093009</p>
Avg.	<p>Date: 2020-10-23</p> <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 HORIZONTAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>	<p>Date: 2020-10-23</p> <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBH49170576 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak Project : 093009</p>



**24GHz 24000~24250MHz
(Radiated Spurious Emission & Harmonic @ 3m)**

24GHz	Test frequency :24.06GHz	
	1-18GHz	
	Horizontal	Vertical
Peak	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>
Avg.	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>

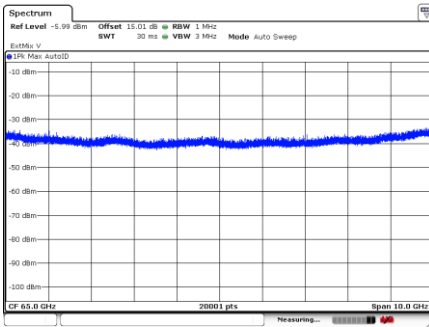
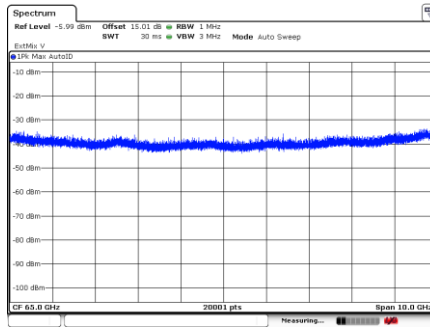
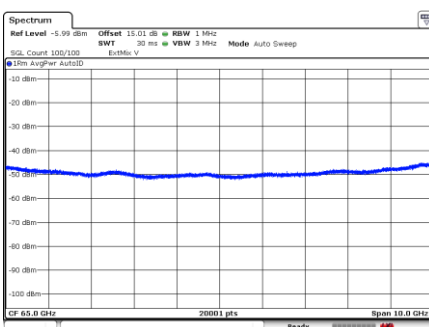
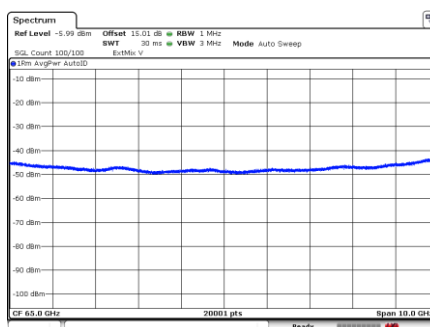


24GHz	Test frequency :24.06GHz	
18-40GHz		
Horizontal		Vertical
Peak	 <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009</p>
Avg.	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009</p>



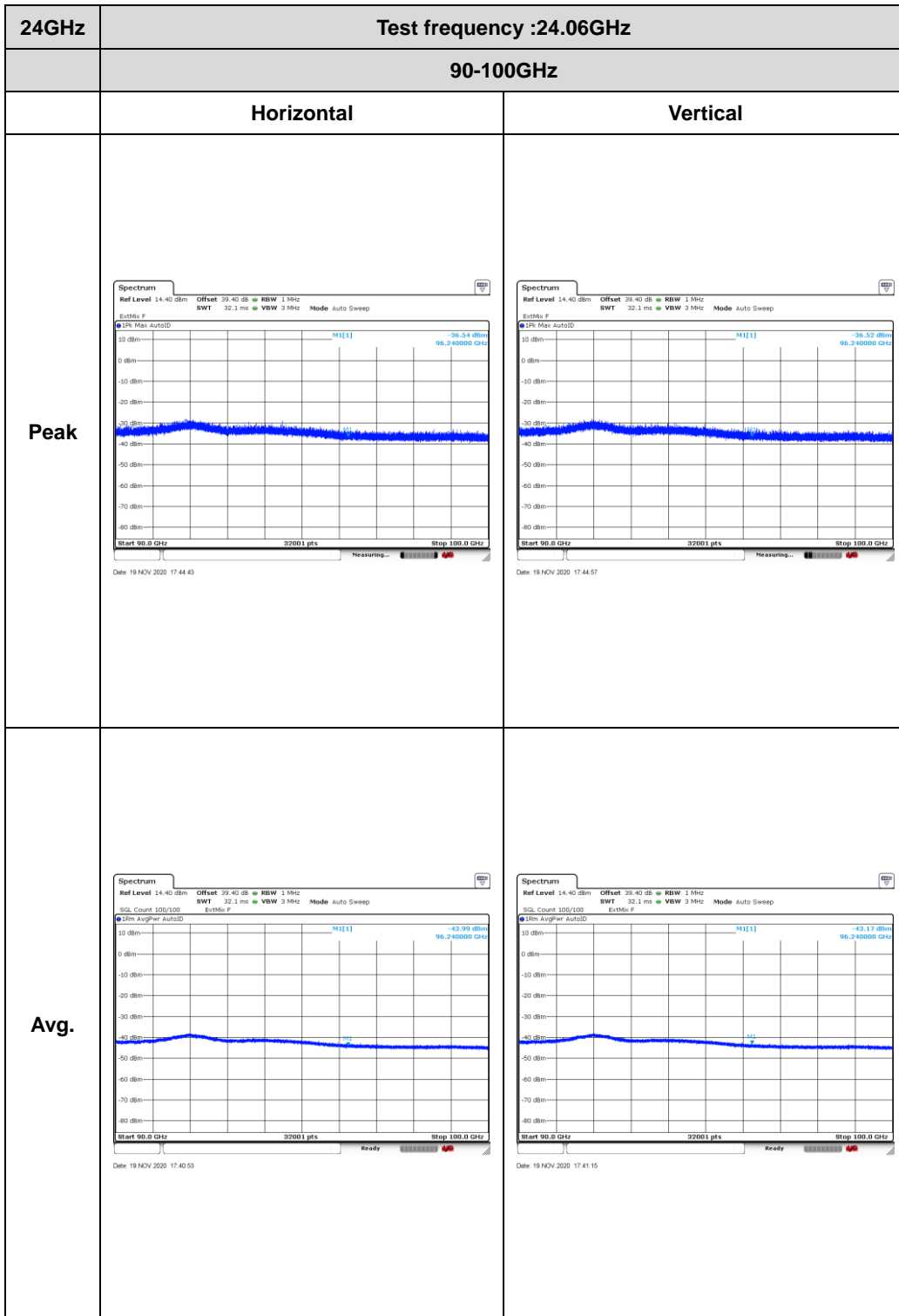
24GHz	Test frequency :24.06GHz	
	40-60GHz	
	Horizontal	Vertical
Peak.	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1PK Max AutoID N2[1] -45.41 dBm 49.577510 GHz N1[1] -45.60 dBm 48.117560 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 16:13:30</p>	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1PK Max AutoID N2[1] -41.65 dBm 49.577510 GHz N1[1] -41.16 dBm 48.117560 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 16:10:07</p>
Avg	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1Sm AvgPer AutoID N2[1] -52.36 dBm 49.577510 GHz N1[1] -51.86 dBm 48.117560 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 16:12:54</p>	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1Sm AvgPer AutoID N2[1] -56.60 dBm 49.577510 GHz N1[1] -45.79 dBm 48.117560 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 16:14:31</p>



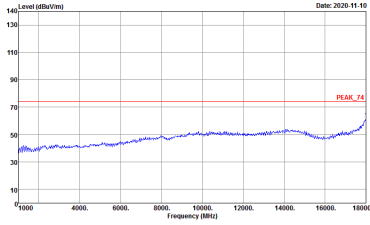
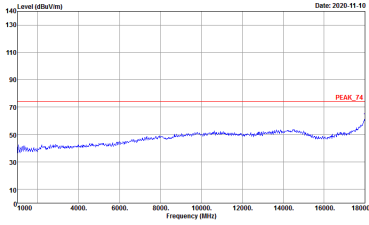
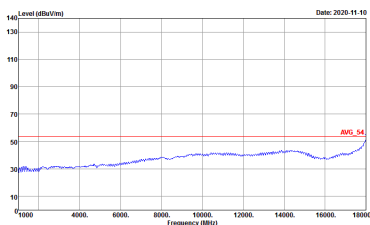
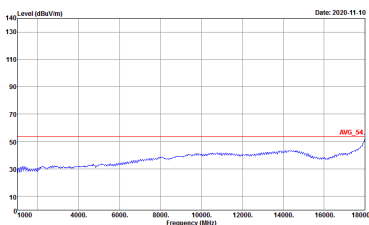
24GHz	Test frequency :24.06GHz	
	60-70GHz	
	Horizontal	Vertical
Peak	 <p>Spectrum Ref Level -5.99 dBm Offset 15.01 dB RBW 1 MHz SWT 30 ms VBW 3 MHz Mode Auto Sweep EVMs V 1Pk Max AutoID -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm -90 dBm -100 dBm CF 65.0 GHz 20001 pts Span 10.0 GHz Date: 19 NOV 2020 15:24:18</p>	 <p>Spectrum Ref Level -5.99 dBm Offset 15.01 dB RBW 1 MHz SWT 30 ms VBW 3 MHz Mode Auto Sweep EVMs V 1Pk Max AutoID -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm -90 dBm -100 dBm CF 65.0 GHz 20001 pts Span 10.0 GHz Date: 19 NOV 2020 15:24:38</p>
Avg	 <p>Spectrum Ref Level -5.99 dBm Offset 15.01 dB RBW 1 MHz SWT 30 ms VBW 3 MHz Mode Auto Sweep EVMs V 1Pm AvgPer AutoID -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm -90 dBm -100 dBm CF 65.0 GHz 20001 pts Ready Date: 19 NOV 2020 15:17:55</p>	 <p>Spectrum Ref Level -5.99 dBm Offset 15.01 dB RBW 1 MHz SWT 30 ms VBW 3 MHz Mode Auto Sweep EVMs V 1Pm AvgPer AutoID -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm -90 dBm -100 dBm CF 65.0 GHz 20001 pts Ready Date: 19 NOV 2020 15:18:45</p>



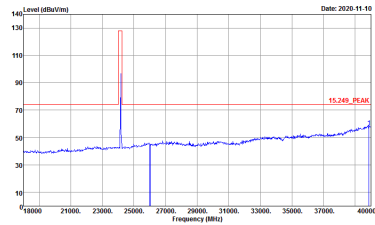
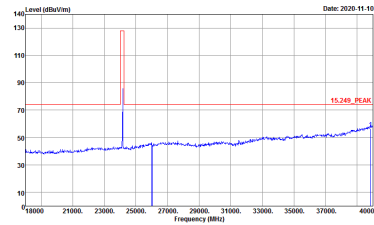
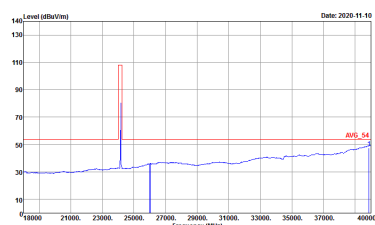
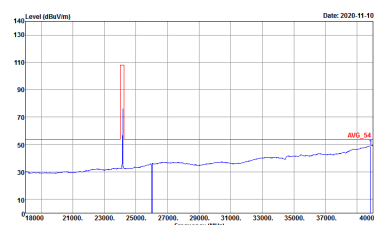
24GHz	Test frequency :24.06GHz																	
	70-90GHz																	
	Horizontal	Vertical																
Peak	<p>1PK Max AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-39.03 dBm</td></tr> <tr><td>70.636450 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-36.50 dBm</td></tr> <tr><td>72.176490 GHz</td><td></td></tr> </table> <p>Date: 19 NOV 2020 16:26:21</p>	N2[1]	-39.03 dBm	70.636450 GHz		N1[1]	-36.50 dBm	72.176490 GHz		<p>1PK Max AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-40.03 dBm</td></tr> <tr><td>70.636450 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-39.76 dBm</td></tr> <tr><td>72.176490 GHz</td><td></td></tr> </table> <p>Date: 19 NOV 2020 16:24:21</p>	N2[1]	-40.03 dBm	70.636450 GHz		N1[1]	-39.76 dBm	72.176490 GHz	
N2[1]	-39.03 dBm																	
70.636450 GHz																		
N1[1]	-36.50 dBm																	
72.176490 GHz																		
N2[1]	-40.03 dBm																	
70.636450 GHz																		
N1[1]	-39.76 dBm																	
72.176490 GHz																		
Avg.	<p>15m AvgPer AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-43.49 dBm</td></tr> <tr><td>70.636450 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-44.28 dBm</td></tr> <tr><td>72.176490 GHz</td><td></td></tr> </table> <p>Date: 19 NOV 2020 16:25:43</p>	N2[1]	-43.49 dBm	70.636450 GHz		N1[1]	-44.28 dBm	72.176490 GHz		<p>15m AvgPer AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-46.00 dBm</td></tr> <tr><td>70.636450 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-45.37 dBm</td></tr> <tr><td>72.176490 GHz</td><td></td></tr> </table> <p>Date: 19 NOV 2020 16:23:40</p>	N2[1]	-46.00 dBm	70.636450 GHz		N1[1]	-45.37 dBm	72.176490 GHz	
N2[1]	-43.49 dBm																	
70.636450 GHz																		
N1[1]	-44.28 dBm																	
72.176490 GHz																		
N2[1]	-46.00 dBm																	
70.636450 GHz																		
N1[1]	-45.37 dBm																	
72.176490 GHz																		





24GHz	Test frequency :24.15GHz	
	1-18GHz	
	Horizontal	Vertical
<p>Peak</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>
<p>Avg.</p>	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>

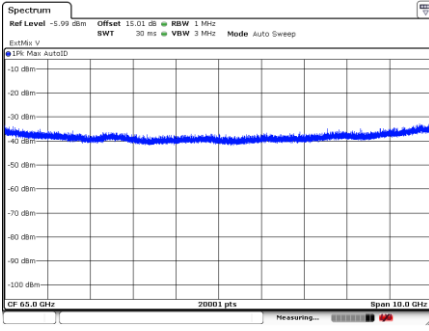
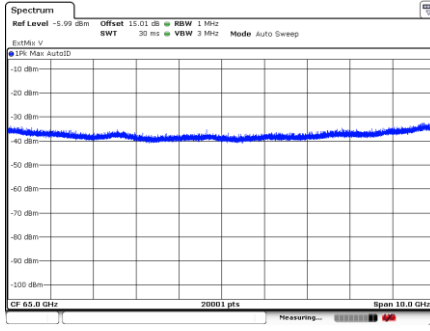
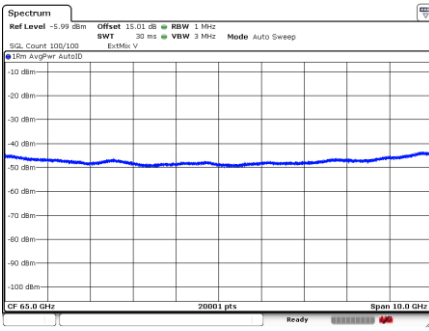
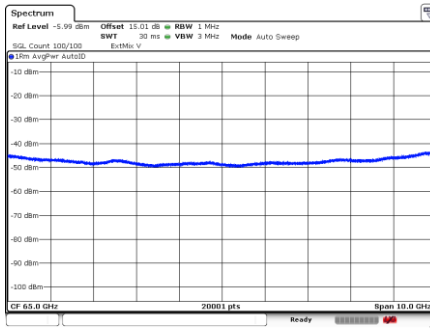


24GHz	Test frequency :24.15GHz	
	18-40GHz	
	Horizontal	Vertical
Peak	 <p> Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009 </p>	 <p> Site : 03CH2-HY Condition : 15.249_Peak 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009 </p>
Avg	 <p> Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009 </p>	 <p> Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009 </p>



24GHz	Test frequency :24.15GHz	
	40-60GHz	
	Horizontal	Vertical
Peak.	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1PK Max AutoID N1[1] -45.17 dBm N2[1] -45.86 dBm 49.757510 GHz 49.757510 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 15:55:14</p>	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 1PK Max AutoID N1[1] -45.97 dBm N2[1] -46.32 dBm 49.757510 GHz 49.757510 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 15:59:53</p>
Avg	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 15m AvgPer AutoID N1[1] -57.52 dBm N2[1] -52.72 dBm 49.757510 GHz 49.757510 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 15:52:42</p>	<p>Spectrum Ref Level -14.40 dBm Offset 10.60 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EutMa U 15m AvgPer AutoID N1[1] -45.52 dBm N2[1] -53.51 dBm 49.757510 GHz 49.757510 GHz CF 50.0 GHz 32001 pts Span 20.0 GHz Date: 19 NOV 2020 15:59:03</p>

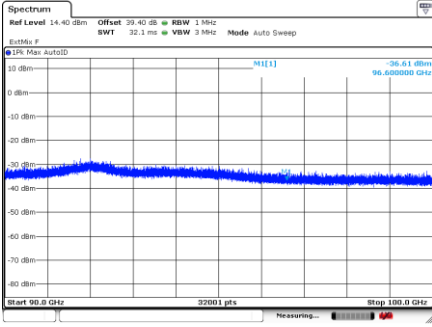
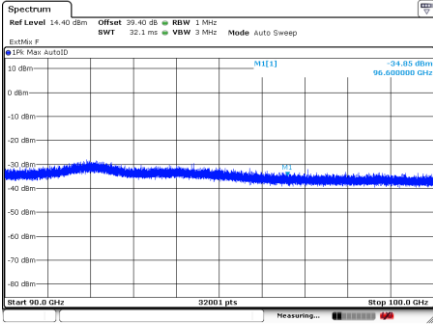
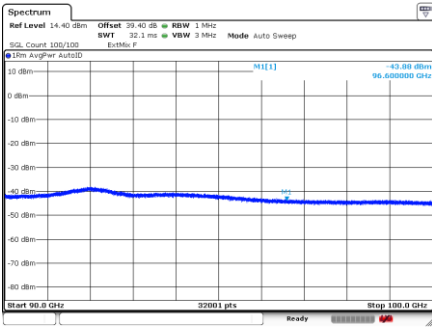
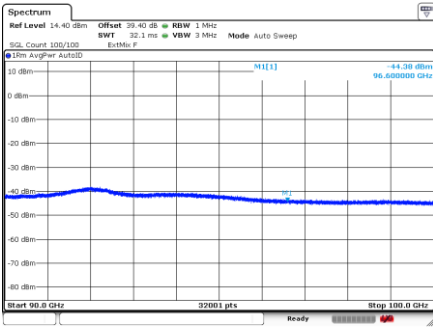


24GHz	Test frequency :24.15GHz	
	60-70GHz	
	Horizontal	Vertical
Peak	 <p>19K Max AutoID</p> <p>Date: 19 NOV 2020 15:25:21</p>	 <p>19K Max AutoID</p> <p>Date: 19 NOV 2020 15:27:58</p>
Avg	 <p>15m AvgPer AutoID</p> <p>Date: 19 NOV 2020 15:19:15</p>	 <p>15m AvgPer AutoID</p> <p>Date: 19 NOV 2020 15:22:12</p>

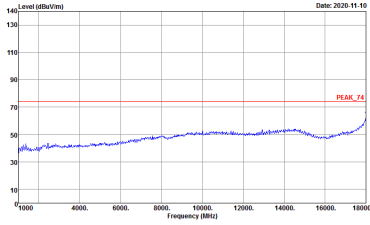
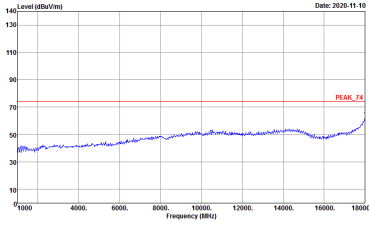
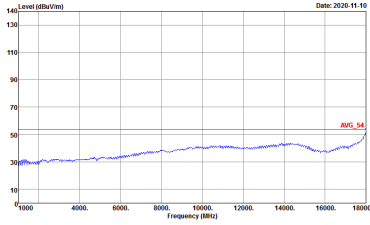
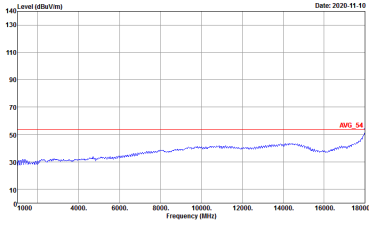


24GHz	Test frequency :24.15GHz																	
	70-90GHz																	
	Horizontal	Vertical																
Peak	<p>Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep</p> <p>1Pk Max AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-39.50 dBm</td></tr> <tr><td>70.906440 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-38.24 dBm</td></tr> <tr><td>72.446490 GHz</td><td></td></tr> </table> <p>Start 70.0 GHz 32001 pts Stop 90.0 GHz</p> <p>Date: 19 NOV 2020 16:31:14</p>	N2[1]	-39.50 dBm	70.906440 GHz		N1[1]	-38.24 dBm	72.446490 GHz		<p>Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep</p> <p>1Pk Max AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-39.50 dBm</td></tr> <tr><td>70.906440 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-38.24 dBm</td></tr> <tr><td>72.446490 GHz</td><td></td></tr> </table> <p>Start 70.0 GHz 32001 pts Stop 90.0 GHz</p> <p>Date: 19 NOV 2020 16:33:02</p>	N2[1]	-39.50 dBm	70.906440 GHz		N1[1]	-38.24 dBm	72.446490 GHz	
N2[1]	-39.50 dBm																	
70.906440 GHz																		
N1[1]	-38.24 dBm																	
72.446490 GHz																		
N2[1]	-39.50 dBm																	
70.906440 GHz																		
N1[1]	-38.24 dBm																	
72.446490 GHz																		
Avg.	<p>Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep</p> <p>1Sm AvgPer AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-43.54 dBm</td></tr> <tr><td>70.906440 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-41.40 dBm</td></tr> <tr><td>72.446490 GHz</td><td></td></tr> </table> <p>Start 70.0 GHz 32001 pts Stop 90.0 GHz</p> <p>Date: 19 NOV 2020 16:30:36</p>	N2[1]	-43.54 dBm	70.906440 GHz		N1[1]	-41.40 dBm	72.446490 GHz		<p>Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep</p> <p>1Sm AvgPer AutoID</p> <table border="1"> <tr><td>N2[1]</td><td>-41.77 dBm</td></tr> <tr><td>70.906440 GHz</td><td></td></tr> <tr><td>N1[1]</td><td>-43.69 dBm</td></tr> <tr><td>72.446490 GHz</td><td></td></tr> </table> <p>Start 70.0 GHz 32001 pts Stop 90.0 GHz</p> <p>Date: 19 NOV 2020 16:32:32</p>	N2[1]	-41.77 dBm	70.906440 GHz		N1[1]	-43.69 dBm	72.446490 GHz	
N2[1]	-43.54 dBm																	
70.906440 GHz																		
N1[1]	-41.40 dBm																	
72.446490 GHz																		
N2[1]	-41.77 dBm																	
70.906440 GHz																		
N1[1]	-43.69 dBm																	
72.446490 GHz																		

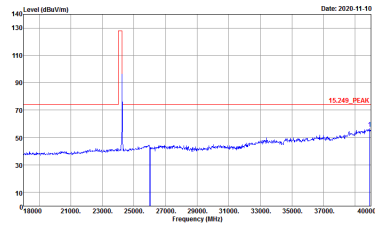
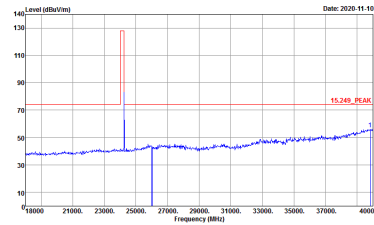
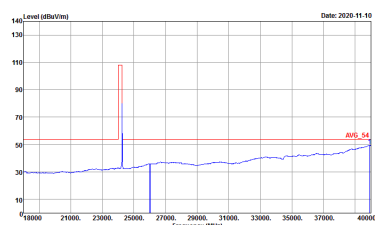
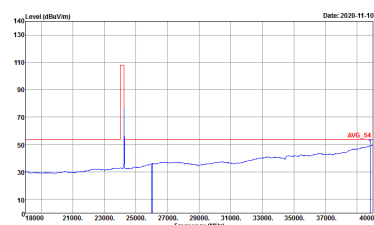


24GHz	Test frequency :24.15GHz	
	90-100GHz	
	Horizontal	Vertical
Peak	 <p>Spectrum Ref Level 14.40 dBm Offset 39.40 dB RBW 1 MHz SWT 32.1 ms VBW 3 MHz Mode Auto Sweep EVMs F 1Pk Max AutoID -36.61 dBm 96.608000 GHz Start 90.0 GHz 32001 pts Stop 100.0 GHz Date: 19 NOV 2020 17:44:15</p>	 <p>Spectrum Ref Level 14.40 dBm Offset 39.40 dB RBW 1 MHz SWT 32.1 ms VBW 3 MHz Mode Auto Sweep EVMs F 1Pk Max AutoID -34.85 dBm 96.608000 GHz Start 90.0 GHz 32001 pts Stop 100.0 GHz Date: 19 NOV 2020 17:43:52</p>
Avg.	 <p>Spectrum Ref Level 14.40 dBm Offset 39.40 dB RBW 1 MHz SWT 32.1 ms VBW 3 MHz Mode Auto Sweep EVMs F 15m AvgPer AutoID -43.88 dBm 96.608000 GHz Start 90.0 GHz 32001 pts Stop 100.0 GHz Date: 19 NOV 2020 17:41:41</p>	 <p>Spectrum Ref Level 14.40 dBm Offset 39.40 dB RBW 1 MHz SWT 32.1 ms VBW 3 MHz Mode Auto Sweep EVMs F 15m AvgPer AutoID -44.39 dBm 96.608000 GHz Start 90.0 GHz 32001 pts Stop 100.0 GHz Date: 19 NOV 2020 17:42:00</p>



24GHz	Test frequency :24.24GHz	
	1-18GHz	
	Horizontal	Vertical
<p>Peak</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>
<p>Avg.</p>	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 093009</p>



24GHz	Test frequency :24.24GHz	
	18-40GHz	
	Horizontal	Vertical
Peak	 <p>Site : 03CH2-HY Condition : 15.249_PEAK 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : 15.249_PEAK 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009</p>
Avg	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 HORIZONTAL Detector : Peak Project : 093009</p>	 <p>Site : 03CH2-HY Condition : AVG_54 1m SHF HORN BBHA9170576 VERTICAL Detector : Peak Project : 093009</p>



24GHz	Test frequency :24.24GHz	
	40-60GHz	
	Horizontal	Vertical
Peak.		
Avg		

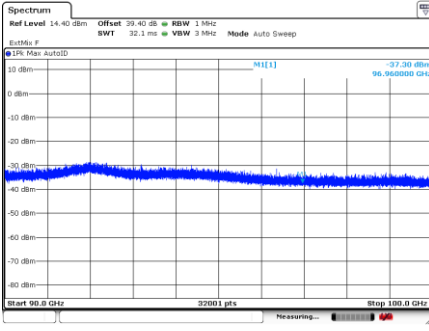
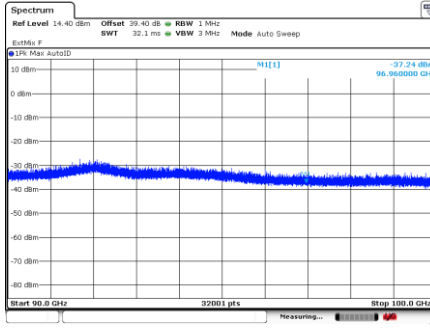
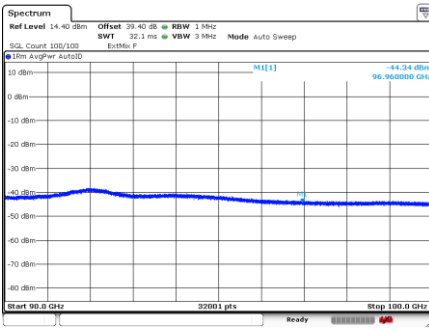
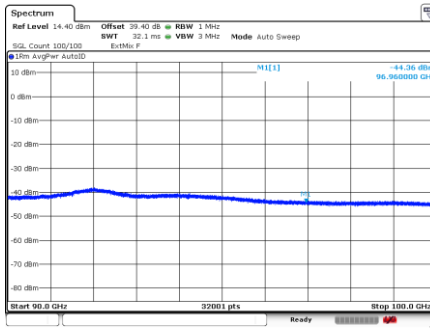


24GHz	Test frequency :24.24GHz	
	60-70GHz	
	Horizontal	Vertical
Peak		
Avg		



24GHz	Test frequency :24.24GHz	
	70-90GHz	
	Horizontal	Vertical
Peak	<p>Spectrum Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EstMa E 1Pk Max AutoID N2[1] -41.00 dBm 74.176430 GHz N1[1] -36.38 dBm 72.716480 GHz Start 70.0 GHz 32001 pts Stop 90.0 GHz Date: 19 NOV 2020 16:40:46</p>	<p>Spectrum Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EstMa E 1Pk Max AutoID N2[1] -38.50 dBm 74.176430 GHz N1[1] -37.28 dBm 72.716480 GHz Start 70.0 GHz 32001 pts Stop 90.0 GHz Date: 19 NOV 2020 16:38:29</p>
Avg.	<p>Spectrum Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EstMa E 1Pm AvgPer AutoID N2[1] -44.00 dBm 74.176430 GHz N1[1] -42.32 dBm 72.716480 GHz Start 70.0 GHz 32001 pts Stop 90.0 GHz Date: 19 NOV 2020 16:37:56</p>	<p>Spectrum Ref Level -2.40 dBm Offset 22.00 dB RBW 1 MHz SWT 60 ms VBW 3 MHz Mode Auto Sweep EstMa E 1Pm AvgPer AutoID N2[1] -47.52 dBm 74.176430 GHz N1[1] -46.01 dBm 72.716480 GHz Start 70.0 GHz 32001 pts Stop 90.0 GHz Date: 19 NOV 2020 16:40:20</p>



24GHz	Test frequency :24.24GHz	
	90-100GHz	
	Horizontal	Vertical
Peak		
Avg.		



Emission below 1GHz
24GHz

24GHz	24GHz	
	Test frequency :24.06GHz_LF	
	Horizontal	Vertical
QP / Peak	<p>Site : 03GH12-HY Condition : QP 3m S1LOG_15_41912 HORIZONTAL Detector : Peak Project : 093009</p>	<p>Site : 03GH12-HY Condition : QP 3m S1LOG_15_41912 VERTICAL Detector : Peak Project : 093009</p>



24GHz	24GHz	
	Test frequency :24.15GHz_LF	
	Horizontal	Vertical
QP / Peak	<p>Site : 03GHZ-HY Condition : QP 3m S11.06_15_41912 HORIZONTAL Detector : Peak Project : 093009</p>	<p>Site : 03GHZ-HY Condition : QP 3m S11.06_15_41912 VERTICAL Detector : Peak Project : 093009</p>



24GHz	24GHz	
	Test frequency :24.24GHz_LF	
	Horizontal	Vertical
QP / Peak	<p>Horizontal spectrum plot showing signal level (dBuV/m) vs Frequency (MHz). The plot includes a red line for the signal level and a blue line for the noise floor. The signal level is approximately 45 dBuV/m. The noise floor is approximately 30 dBuV/m. The plot includes a red 'QP' label at the top right. The x-axis ranges from 50 to 1000 MHz, and the y-axis ranges from 0 to 80 dBuV/m. The date is 2020-10-23.</p> <p>Site : 03GHZ-HY Condition : QP 3m BTL06_15_41912 HORIZONTAL Detector : Peak Project : 093009</p>	<p>Vertical spectrum plot showing signal level (dBuV/m) vs Frequency (MHz). The plot includes a red line for the signal level and a blue line for the noise floor. The signal level is approximately 45 dBuV/m. The noise floor is approximately 30 dBuV/m. The plot includes a red 'QP' label at the top right. The x-axis ranges from 50 to 1000 MHz, and the y-axis ranges from 0 to 80 dBuV/m. The date is 2020-10-23.</p> <p>Site : 03GHZ-HY Condition : QP 3m BTL06_15_41912 VERTICAL Detector : Peak Project : 093009</p>