TEST REPORT

Applicant	Yardi Systems Inc.
Address	430 South Fairview Ave Goleta, CA 93117

FCC ID	2BAL9YDIZW
ISED Canada IC	30221-YDIZW
Product Description	IoT Hub
PMN Model/HVIN FVIN	RentCafe Home IQ Hub H4P3-TWC, H4P3-TW 7.19.3
Additional Models	See Section 3.1 for details
Date of tests	Sep 20 – 24, 2024
FCC Test Firm DN Canada CABID	US1028 US0106

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.249**
☒ **ISED Canada RSS-210 Issue 10 Annex B.10**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by	Approved by
Nisha Patel Wireless Engineer I	Yunus Faziloglu Wireless Manager
	
Report Issue Date: Oct 7, 2024	Issue Number: 1

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
1	Original release	Oct 7, 2024

1 SUMMARY OF TEST RESULTS

EUT was tested against the following requirements:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249), RSS-210				
STANDARD SECTION		TEST TYPE AND LIMIT	APPLICABLE	RESULT
47CFR15	RSS			
15.207	Gen 8.8	AC Power Line Conducted Emissions	Y	Pass
15.249 15.209	210 B.10 Gen 8.9	Radiated Spurious Emissions	Y	Pass

Note 1: This test report includes radiated spurious emissions and AC line conducted emission test data for Class II permissive change filing to a previously certified device in accordance with FCC KDB 178919 D01 Permissive Change Policy v06 and § 2.1043 of the FCC rules**.**

2 MEASUREMENT UNCERTAINTY

The listed uncertainties are the worst-case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results. Values for measurement uncertainty are calculated per ETSI TR 100 028 (2001).

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	IoT Hub
MODEL NO.	H4P3-TWC – LTE version H4P3-TW – Non-LTE version
NOMINAL VOLTAGE	12VDC via external power supply
MODULATION TYPES	FSK, GFSK
DATA RATES	9.6kbps (FSK), 40kbps (FSK), 100kbps (GFSK)
OPERATING FREQUENCY	908.4MHz (FSK), 916MHz (GFSK)
EUT Power Setting	0 (max setting)
ANTENNA TYPE	Surface-mount patch antenna with 0.3dBi peak gain

List of Models and Differences

Model	Description	Tested
H4P3-TW	Includes the following previously certified two radio modules FCC ID: 2ABCB-RPICM4, IC: 20953-RPICM4 FCC ID: 2BAL9YDITRZB, IC: 30221-YDITRZB	Y
H4P3-TWC	Same as H4P3-TW with a previously certified cellular modem and two extra antennas. FCC ID: XMR201807EG95NA, IC: 10224A-2018EG95NA Includes supporting components for the cellular modem on the base module PCBA	Y

Port Label	Port Type	No. of Ports	No. of populated	Cable type	Shielded	Ferrites	Length	Max Length
Power	DC Power	1	1	2-Wire	No	No	2m	2m
Ethernet	RJ45	1	1	Cat-6	No	No	5m	100m

Lowest frequency used/generated in the device: 32.768kHz

NOTES:

1. For a more detailed description of the EUT, please refer to the manufacturer's specifications or the user's manual.
2. For photos of the EUT, please refer to External and Internal Photos exhibits.

3.2 DESCRIPTION OF TEST MODES

EUT channel list:

CHANNEL	FREQ. (MHZ)
1	908.4
2	916

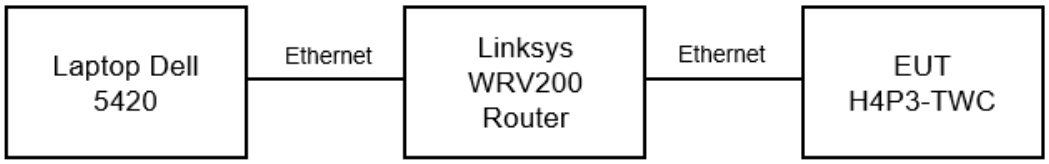
1 sample of both the LTE and non-LTE versions of the EUT was provided for testing. External control software was supplied by the customer to put the units into the required test modes. Two DC Power supplies (SWI25-12-N & SWI18-12-N) were supplied by the customer.
Previously certified radio modules referenced in “List of Models and Differences” section of this report, were installed in the device in idle condition during all the testing.

EUT configuration modes:

TEST MODE	Description
A	Continuous Transmit at 908.4MHz, FSK, 9.6kbps (100% Duty-cycle)
B	Continuous Transmit at 908.4MHz, FSK, 40kbps (100% Duty-cycle)
C	Continuous Transmit at 916MHz, GFSK, 100kbps (100% Duty-cycle)

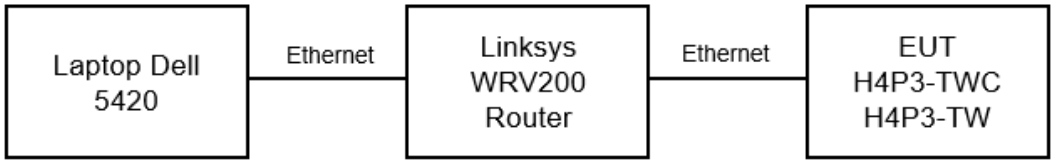
EUT SETUP BLOCK DIAGRAMS

Radiated Emissions EUT Setup



The laptop and Linksys Router were outside of the chamber during testing.

AC Line Conducted Emissions EUT Setup



Following channels/modes were selected for the applicable tests below.

TEST	TEST MODE	AVAILABLE CHANNELS	TESTED CHANNEL	MODULATION TYPE	DATA RATE (kbps)	Notes
RSE<30M	A	1&2	1	FSK	9.6	1,2,3,4
RSE<1G	A, B, C	1&2	1&2	FSK/GFSK	9.6, 40, 100	1,2,3
RSE≥1G	A, B, C	1&2	1&2	FSK/GFSK	9.6, 40, 100	1,2,3
PLCE	A	1&2	1	FSK	9.6	5

Notes:

1) All the final radiated emissions testing was performed on LTE version model, since it was identified as the worst-case model based on pre-scans.
2) For radiated emissions, EUT was positioned on X-axis only since this was identified as the worst-case orientation during original Z-wave certification testing. Please refer to the Radio Report EX0965-2.
3) For radiated emissions, EUT was tested only with the SWI25-12-N power supply since this was identified as the worst-case power supply during original Z-wave certification testing. Please refer to the Radio Report EX0965-2.
4) For radiated emissions, testing below 30MHz was limited to 1 channel and data rate since no emissions were detected in this range.
5) Both LTE and Non-LTE versions were tested only on 1 channel and data rate since emission profile remained similar between different transmit channels and data rates. Testing was performed only with SWI25-12-N power supply since it was identified as the worst-case power supply during original Z-wave certification testing. Please refer to the Radio Report EX0965-2.

RSE<30M: Radiated Spurious Emissions Below 30MHz
RSE<1G: Radiated Spurious Emissions Below 1GHz
RSE≥1G: Radiated Spurious Emissions Above 1GHz
PLCE: Power Line Conducted Emissions

TEST CONDITIONS:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY	DATE OF TEST
RE<1G	21.0°C, 58.0%, 1006mbar 20.9°C, 54.8%, 1010mbar 20.6°C, 50.9%, 1014mbar	12VDC	NP	9/20/2024 9/23/2024 9/24/2024
RE≥1G	20.9°C,54.8%, 1010mbar	12VDC	NP	9/23/2024
PLCE	20.6°C, 50.9%, 1014mbar	12VDC	NP	9/24/2024

3.3 MEASUREMENT PROCEDURES USED

All tests were performed in accordance with the following measurement procedures:

ANSI C63.10-2013

RSS-Gen Issue 5

3.4 DESCRIPTION OF SUPPORT EQUIPMENT

Support Equipment	Model #	Serial #
Laptop	Dell Latitude E6400	X463M A00
Dell AC Adapter	PA-1900-02D2	U7809
Linksys Power Adapter	AD 2/1A	RH48-1201000DU
Linksys Wireless Router	WRV200	MMH006806414

4 TEST RESULTS

4.1 AC LINE CONDUCTED EMISSIONS

4.1.1 LIMITS

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. Lower limit applies at the transition frequencies.

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

4.1.2 TEST EQUIPMENT USED

Rev. 9/25/2024								
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 1	719150		A-0015			III	NA	N/A
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-02	9kHz - 2GHz		C-S			II	1/26/2025	1/26/2024
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
20dB20W Attenuator(A#2499)	9KHz-4GHz	766-20	Narda	8710	2499	II	12/5/2024	12/5/2023
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
LISN Asset 2845	9KHz-30MHz	LI-220C	Com-Power	20070054	2708	I	3/15/2025	3/15/2024
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Gauss TDEMI Ultra 40	9kHz-40Ghz	TDEMI Ultra 40	Gauss	2305001	2712	1	7/23/2025	7/23/2024
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	12/15/2025	12/15/2022
Asset #2657		1235C97	Control Company	200435369	2657	I	8/18/2025	8/18/2022
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

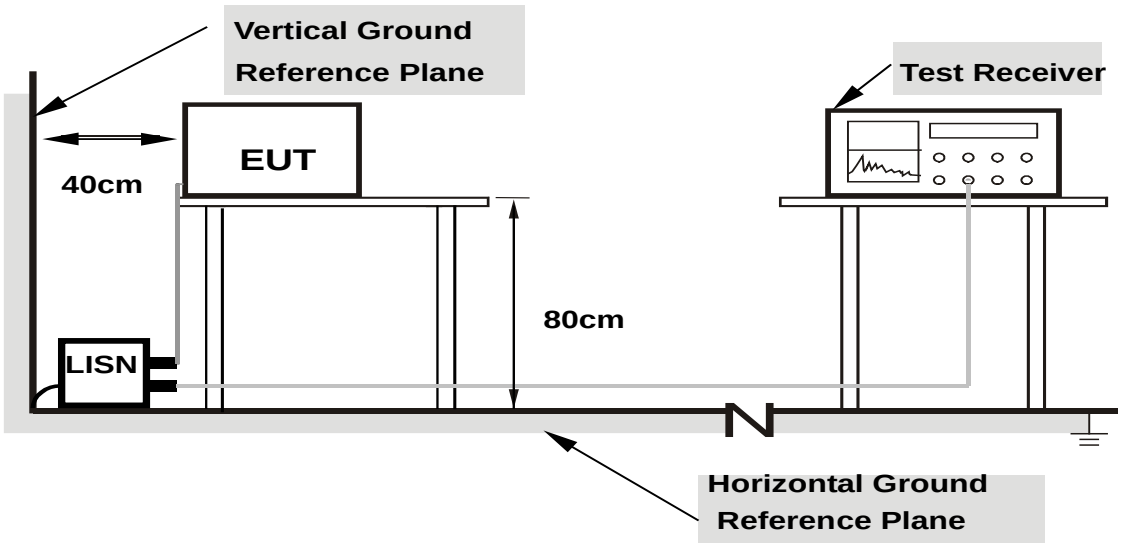
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded. RBW of 9kHz and VBW of 30kHz were used during measurement.

4.1.4 DEVIATIONS

No deviations from the standard.

4.1.5 TEST SETUP



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

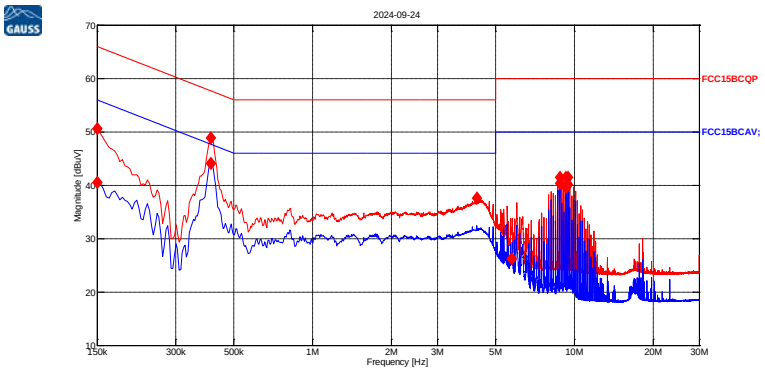
For the actual test configuration, please refer to Test Setup Photos exhibit.

4.1.6 EUT OPERATING CONDITIONS

EUT was operated according to manufacturer's specifications.

4.1.7 TEST RESULTS

LTE Version model with Power supply: SWI25-12-N
EUT Mode: 908.4MHz, 9.6kbps, FSK



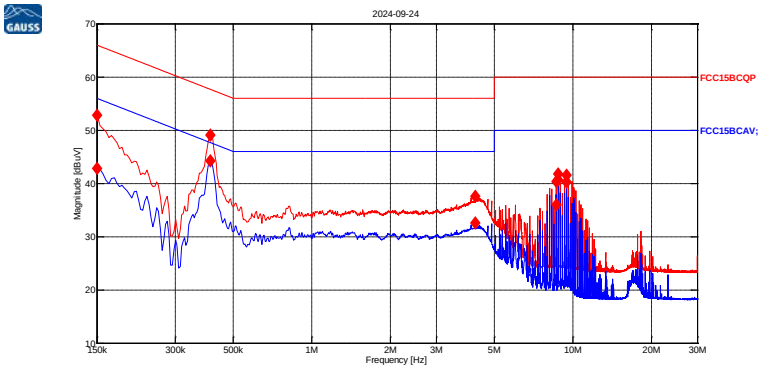
Scan1: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s QP, Att Auto, LISN-LISN_2845_Line-L

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	50.56	66.00	15.44	19.97	FCC15BCQP
408.658142 kHz	48.86	57.68	8.81	19.84	FCC15BCQP
4.23846741 MHz	37.58	56.00	18.42	20.00	FCC15BCQP
8.79836014 MHz	41.45	60.00	18.55	20.03	FCC15BCQP
9.28647308 MHz	41.50	60.00	18.50	20.02	FCC15BCQP
9.4491774 MHz	41.45	60.00	18.55	20.02	FCC15BCQP

Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s CAV, Att Auto, LISN-LISN_2845_Line-L

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	40.55	56.00	15.45	19.97	FCC15BCAV;
408.658142 kHz	44.10	47.68	3.57	19.84	FCC15BCAV;
5.76955673 MHz	26.20	50.00	23.80	20.02	FCC15BCAV;
8.79836014 MHz	40.36	50.00	9.64	20.03	FCC15BCAV;
9.28647308 MHz	39.61	50.00	10.39	20.02	FCC15BCAV;
9.4491774 MHz	40.14	50.00	9.86	20.02	FCC15BCAV;

Line, Plot and Data Table



Scan1: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s QP, Att AutodB, LISN-LISN_2845_Neutral-N

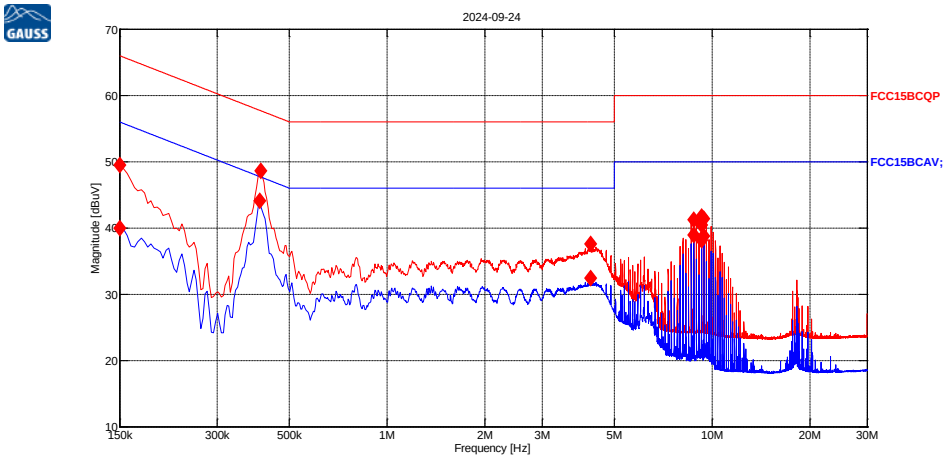
f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	52.82	66.00	13.18	19.98	FCC15BCQP
408.658142 kHz	49.10	57.68	8.57	19.86	FCC15BCQP
4.2342955 MHz	37.57	56.00	18.43	20.03	FCC15BCQP
8.63565582 MHz	40.39	60.00	19.61	20.08	FCC15BCQP
8.79418823 MHz	41.76	60.00	18.24	20.08	FCC15BCQP
9.44500549 MHz	41.57	60.00	18.43	20.07	FCC15BCQP

Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s CAV, Att AutodB, LISN-LISN_2845_Neutral-N

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	42.83	56.00	13.17	19.98	FCC15BCAV;
408.658142 kHz	44.25	47.68	3.43	19.86	FCC15BCAV;
4.2342955 MHz	32.55	46.00	13.45	20.03	FCC15BCAV;
8.63565582 MHz	35.98	50.00	14.02	20.08	FCC15BCAV;
8.79418823 MHz	40.65	50.00	9.35	20.08	FCC15BCAV;
9.44500549 MHz	40.30	50.00	9.70	20.07	FCC15BCAV;

Neutral, Plot and Data Table

Non- LTE Version model with Power supply: SWI25-12-N
EUT Mode: 908.4MHz, 9.6kbps, FSK



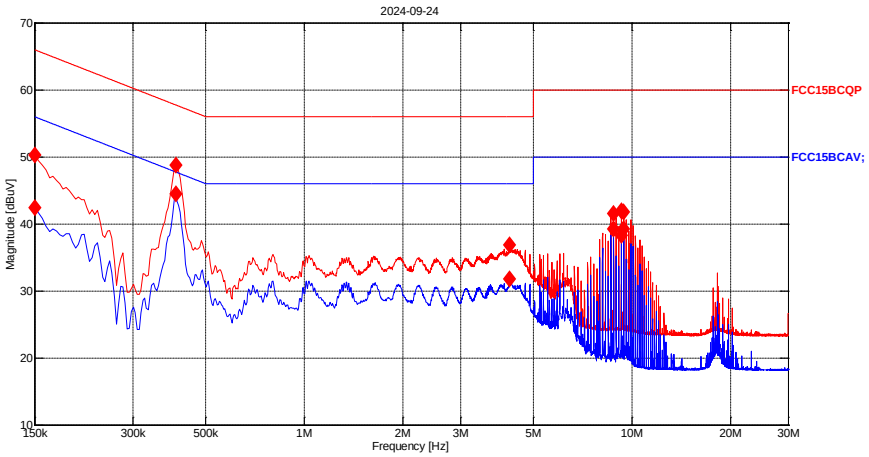
Scan1: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s QP, Att Auto, LISN-LISN_2845_Line-L

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	49.50	66.00	16.50	19.97	FCC15BCQP
408.658142 kHz	48.62	57.68	9.06	19.84	FCC15BCQP
4.2301236 MHz	37.61	56.00	18.39	20.00	FCC15BCQP
8.79001633 MHz	41.23	60.00	18.77	20.03	FCC15BCQP
9.27812927 MHz	40.41	60.00	19.59	20.02	FCC15BCQP
9.28230118 MHz	41.74	60.00	18.26	20.02	FCC15BCQP
9.44083359 MHz	41.42	60.00	18.58	20.02	FCC15BCQP

Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s CAV, Att Auto, LISN-LISN_2845_Line-L

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	40.00	56.00	16.00	19.97	FCC15BCAV;
404.486237 kHz	44.10	47.76	3.66	19.84	FCC15BCAV;
4.2301236 MHz	32.39	46.00	13.61	20.00	FCC15BCAV;
8.79001633 MHz	38.95	50.00	11.05	20.03	FCC15BCAV;
9.27812927 MHz	38.11	50.00	11.89	20.02	FCC15BCAV;
9.44083359 MHz	38.80	50.00	11.20	20.02	FCC15BCAV;

Line, Plot and Data Table



Scan1: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s QP, Att AutodB, LISN-LISN_2845_Neutral-N

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	50.27	66.00	15.73	19.98	FCC15BCQP
404.486237 kHz	48.80	57.76	8.96	19.86	FCC15BCQP
4.2301236 MHz	36.88	56.00	19.12	20.03	FCC15BCQP
8.79001633 MHz	41.54	60.00	18.46	20.08	FCC15BCQP
9.28230118 MHz	41.98	60.00	18.02	20.07	FCC15BCQP
9.44083359 MHz	41.77	60.00	18.23	20.07	FCC15BCQP

Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s CAV, Att AutodB, LISN-LISN_2845_Neutral-N

f	Mag [dBuV]	Limit	Diff	Trans	Name
150 kHz	42.42	56.00	13.58	19.98	FCC15BCAV;
404.486237 kHz	44.50	47.76	3.26	19.86	FCC15BCAV;
4.2301236 MHz	31.77	46.00	14.23	20.03	FCC15BCAV;
8.79001633 MHz	39.28	50.00	10.72	20.08	FCC15BCAV;
9.28230118 MHz	38.29	50.00	11.71	20.07	FCC15BCAV;
9.44083359 MHz	39.21	50.00	10.79	20.07	FCC15BCAV;

Neutral, Plot and Data Table

4.2 RADIATED SPURIOUS EMISSIONS

4.2.1 LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emissions limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. Lower limit applies at the transition frequencies.
2. As specified in 15.35(b), for frequencies above 1000MHz, field strength limits are based on the use of measurement instrumentation employing an average detector function. However, there is also a limit on the peak level of the emissions that is 20 dB above the maximum permitted average emission limit.
3. Limit conversion above 30MHz is done by using inverse linear distance extrapolation factor (20dB/decade) as allowed in FCC 15.31(f)(1).

   Limit(1m) = Limit(3m) + 20*log(3/1) = Limit(3m) + 9.5

   Limit(0.1m) = Limit(3m) + 20*log(3/0.1) = Limit(3m) + 29.5
4. Limit conversion below 30MHz is done by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as allowed in FCC 15.31(f)(2).

   Limit(3m) = Limit(30m) + 40*log(30/3) = Limit(30m) + 40

   Limit (3m) = Limit (300m) + 40*log(300/3) = Limit (300m) + 80
5. Adjusted Reading (dBuV/m) = Raw Reading (dBuV) + Transducer(Correction) Factor (dB/m)

   Transducer Factor (dB/m) = Antenna Factor (dB/m) – PreAmp Gain (dB) + Cable Loss (dB) + Filter Loss (dB)
6. RSS-GEN Table 6 H-field limits are 51.5dB lower than FCC 15.209(a) E-field limits. Measurements are performed in terms of magnetic field and converted to electric field using the free space impedance of 377Ω (E-field = H-field + 51.5). Therefore resulting pass/fail margin would be the same if an E-field reading is compared to an E-field limit or an H-field reading is compared to an H-field limit.

4.2.2 TEST EQUIPMENT USED

Rev. 9/25/2024								
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	9/19/2025	9/19/2024
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	9/19/2025	9/19/2024
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	9/19/2025	9/19/2024
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	9/19/2025	9/19/2024
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Gauss TDEMI Ultra 40	9kHz-40Ghz	TDEMI Ultra 40	Gauss	2305001	2712	1	7/23/2025	7/23/2024
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	10/2/2025	10/2/2023
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	3/27/2025	3/27/2023
2615 Active Loop Antenna	9KHz-30MHz	6502	EMCO	2049	2615	I	1/18/2025	1/18/2023
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2862 PA	9KHz-1GHz	310	SONOMA INSTRUMENT	185927		II	2/17/2025	2/17/2024
2130 BRF	9KHz-10GHz	BRM18770	Micro-Tronics	1	2130	II	4/22/2025	4/22/2024
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2054	9kHz - 18GHz		Florida RF			II	11/2/2024	11/2/2023
Asset #2595	9KHz-40GHz		Carlisle			II	2/17/2025	2/17/2024
Asset #2681	9KHz-18GHz		Pasternack			II	12/7/2024	12/7/2023
Asset 2868	9Khz-18GHz		Pasternack			II	3/28/2025	3/28/2024
Asset #3011	9KHz-18GHz		Pasternack			II	11/2/2024	11/2/2023
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Asset 2848		SD700	EXTECH	A.115171	2848	I	1/13/2025	1/13/2023
Asset #2847		1235C97	Control Company	200435382	2847	I	8/18/2025	8/18/2022
Asset #2654		1235C97	Control Company	200477432	2654	I	8/18/2025	8/18/2022
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber.

b. For below 30MHz, a loop antenna with its lowest point 1m above the ground was placed 3m away from the EUT and it was rotated 0 and 90 degrees around its vertical axis.

c. In 30MHz-1GHz range, a biconilog antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation.

d. In 1GHz-10GHz range, a horn antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation.

e. Following bandwidths were used during emissions testing:

Freq. (MHz)	RBW	VBW	Pre-scan	Final
0.009-0.15	200Hz	1kHz	Peak	Not required based on pre-scan data
0.15-30	9kHz	30kHz	Peak	Not required based on pre-scan data
30-1000	120kHz	300kHz	Peak	Quasi Peak
>1000	1MHz	3MHz	Peak	Peak Max Hold and RMS Power Avg (Max Hold)

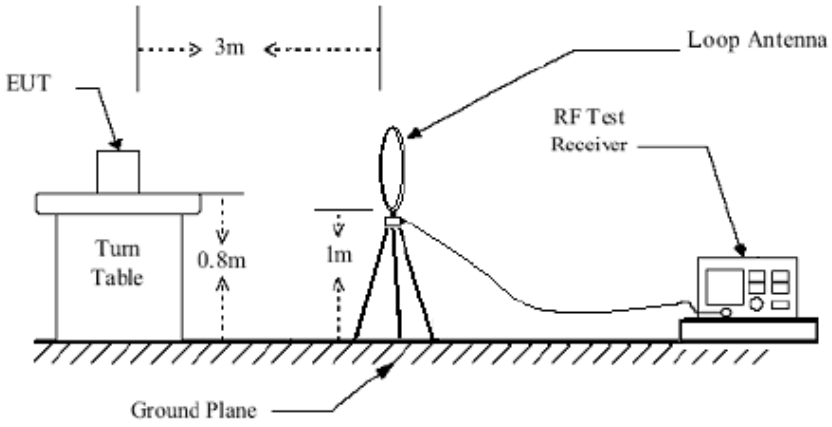
Per FCC §15.209(d), limits §15.209(a) are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. If peak measurements in these frequency bands were below the applicable limits, QPk and RMS measurements were not performed.

4.2.4 DEVIATIONS

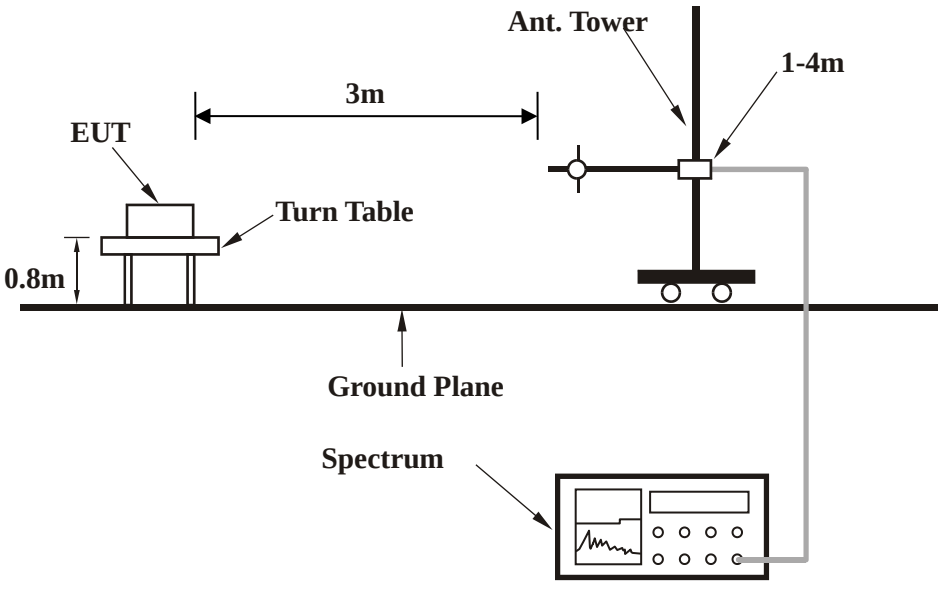
No deviations from the standard.

4.2.5 TEST SETUP

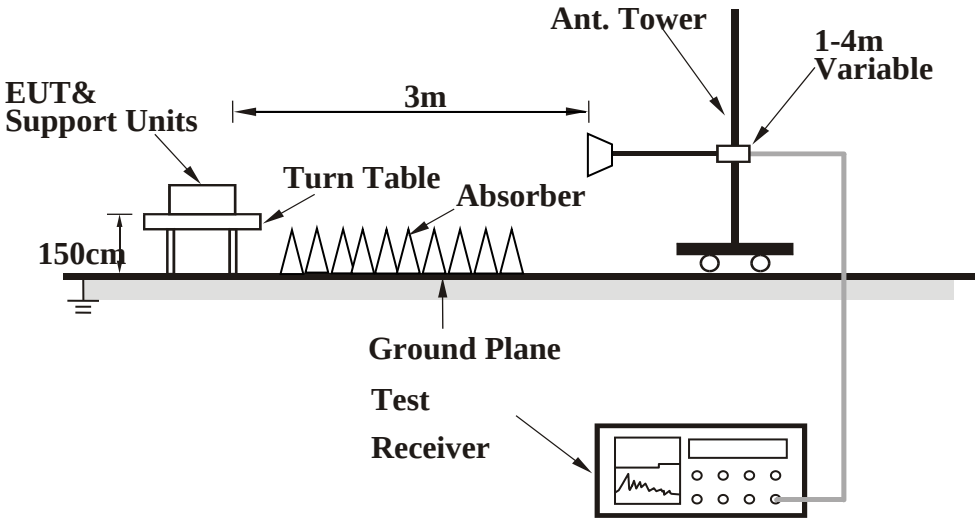
Below 30MHz Test Setup



30MHz - 1GHz Test Setup



1GHz – 10GHz Test Setup



Note: For the actual test configuration, please refer to the Test Setup Photos exhibit.

4.2.6 EUT OPERATING CONDITIONS

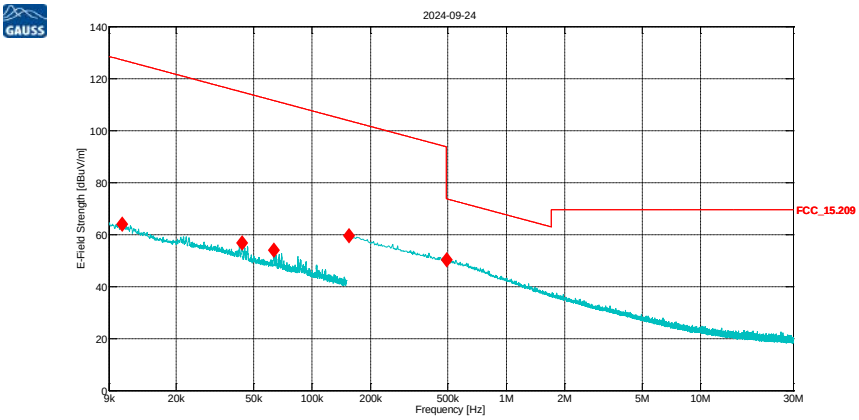
EUT was operated according to the manufacturer's specifications.

4.2.7 TEST RESULTS

Emissions below 30MHz

908.4MHz at 9.6kbps, FSK

No emissions within 10dB of the limit were identified in 9kHz-30MHz range.



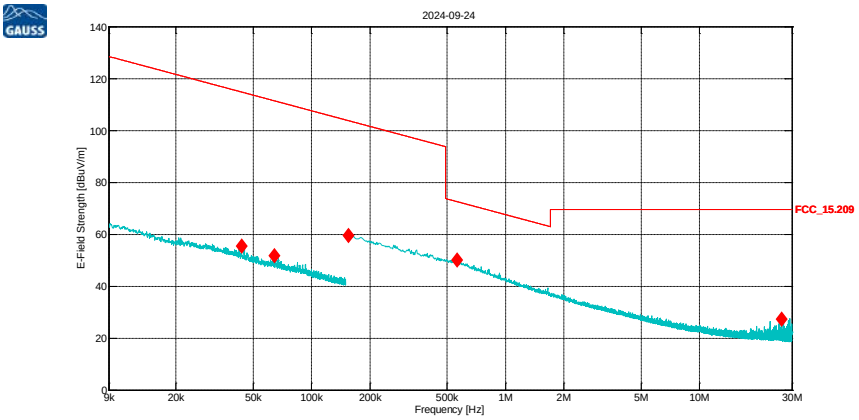
Scan1: 9.0 kHz, 100.0 Hz, 150.0 kHz; IF:200Hz, 100.0 ms MaxPeak, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Name
10.55 kHz	63.99	127.13	63.14	Parallel	100	66.743	18.34	FCC_15.209
43.55 kHz	56.67	114.82	58.15	Parallel	100	350.55	11.49	FCC_15.209
63.75 kHz	54.03	111.51	57.47	Parallel	100	348.411	10.68	FCC_15.209

Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 100.0 ms MaxPeak, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Name
155 kHz	59.62	103.79	44.17	Parallel	100	105.287	10.01	FCC_15.209
495 kHz	50.35	73.71	23.37	Parallel	100	292.354	10.09	FCC_15.209

9k-30MHz Parallel, Plot and Data Table



Scan1: 9.0 kHz, 100.0 Hz, 150.0 kHz; IF:200Hz, 100.0 ms MaxPeak, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Name
43.55 kHz	55.41	114.82	59.40	perpendicular	100	77.7	11.49	FCC_15.209
64.4 kHz	51.77	111.42	59.65	perpendicular	100	295.35	10.64	FCC_15.209

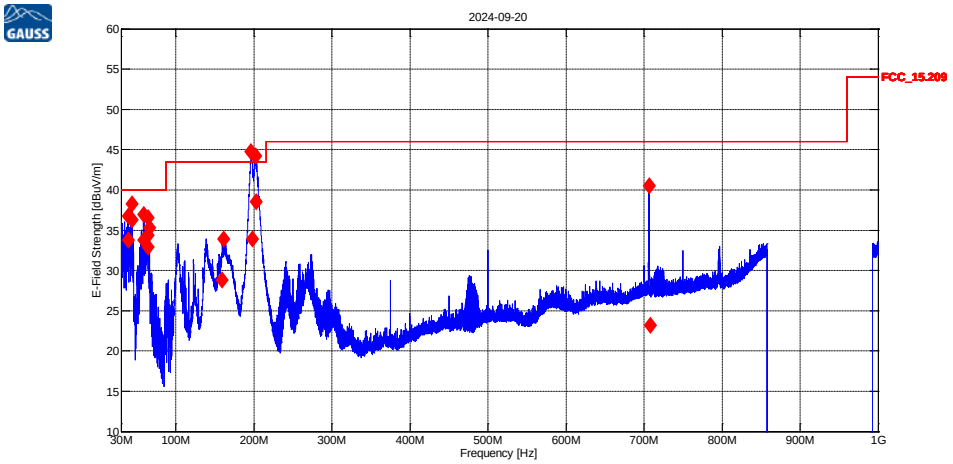
Scan2: 150.0 kHz, 5.0 kHz, 30.0 MHz; IF:9kHz, 100.0 ms MaxPeak, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Name
155 kHz	59.62	103.79	44.17	perpendicular	100	51.636	10.01	FCC_15.209
562.5 kHz	50.14	72.60	22.46	perpendicular	100	308.241	10.22	FCC_15.209
26.61 MHz	27.23	69.54	42.31	perpendicular	100	62.534	8.94	FCC_15.209

9k-30MHz Perpendicular, Plot and Data Table

Emissions in 30MHz-1GHz range

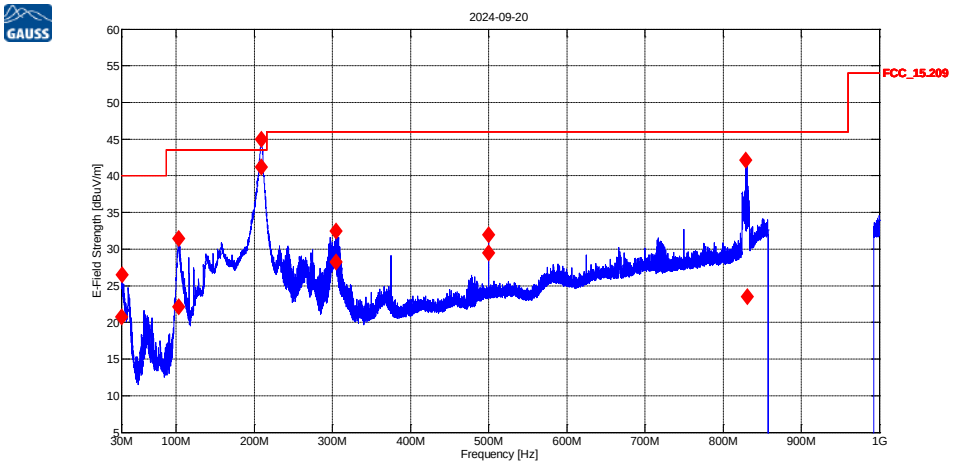
908.4MHz at 9.6kbps, FSK



Final 1: 37.4 MHz, 50.0 kHz, 708.6 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
38.925 MHz	33.78	40.00	6.22	V	83.24	100	-8.34	FCC_15.209
43.8 MHz	36.27	40.00	3.73	V	0	100	-11.48	FCC_15.209
58.725 MHz	33.76	40.00	6.24	V	120.64	100	-17.01	FCC_15.209
64.75 MHz	32.95	40.00	7.05	V	213.139	112.667	-16.63	FCC_15.209
64.775 MHz	34.35	40.00	5.65	V	259.019	100	-16.45	FCC_15.209
159.6 MHz	28.82	43.50	14.68	V	83.24	100	-11.14	FCC_15.209
198.5 MHz	33.93	43.50	9.57	V	153.299	100	-11.16	FCC_15.209
202.975 MHz	38.56	43.50	4.94	V	360	100	-10.05	FCC_15.209
708.025 MHz	23.20	46.00	22.80	V	0	150	-1.21	FCC_15.209

30-1000MHz Vertical, Plot and Data Table

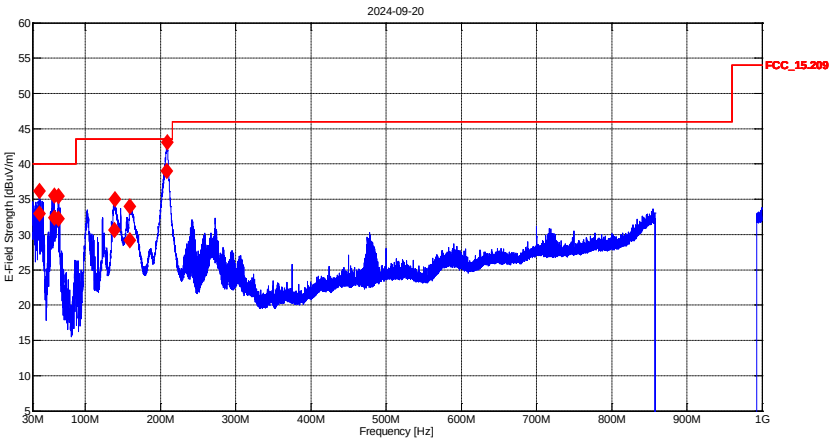


Final 1: 30.0 MHz, 50.0 kHz, 831.1 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
30.6 MHz	20.74	40.00	19.26	H	360	107.5	-2.91	FCC_15.209
103.275 MHz	22.11	43.50	21.39	H	8.642	313.2	-13.57	FCC_15.209
209.25 MHz	41.20	43.50	2.30	H	204.04	142	-12.56	FCC_15.209
305 MHz	28.28	46.00	17.72	H	266.72	100	-9.92	FCC_15.209
500 MHz	29.49	46.00	16.51	H	52.441	202.375	-4.51	FCC_15.209
831.075 MHz	23.55	46.00	22.45	H	293.042	100	1.24	FCC_15.209

30-1000MHz Horizontal, Plot and Data Table

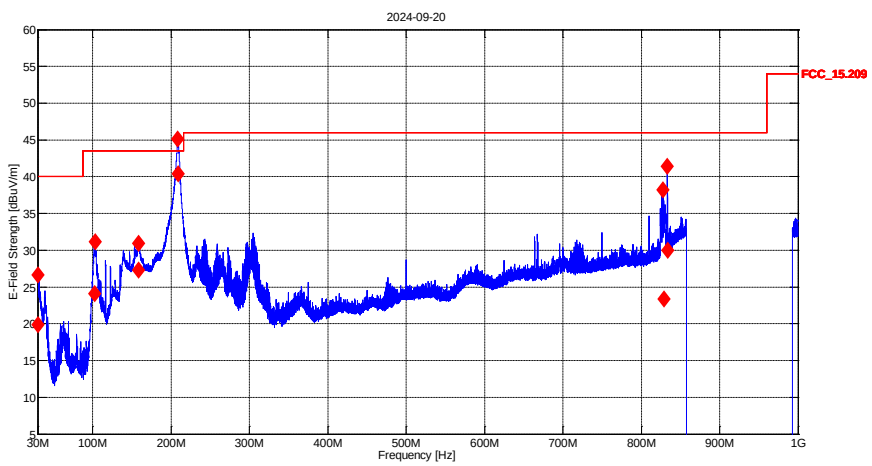
908.4MHz at 40kbps, FSK



Final 1: 36.9 MHz, 50.0 kHz, 210.9 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
38.925 MHz	33.00	40.00	7.00	V	307.652	100	-7.95	FCC_15.209
58.725 MHz	32.36	40.00	7.64	V	28.951	119	-17.01	FCC_15.209
64.8 MHz	32.22	40.00	7.78	V	321.902	100	-16.63	FCC_15.209
139 MHz	30.65	43.50	12.85	V	72.151	112.667	-10.17	FCC_15.209
159.6 MHz	29.17	43.50	14.33	V	89.8	100	-11.12	FCC_15.209
208.5 MHz	39.02	43.50	4.48	V	0	100	-12.55	FCC_15.209

30-1000MHz Vertical, Plot and Data Table

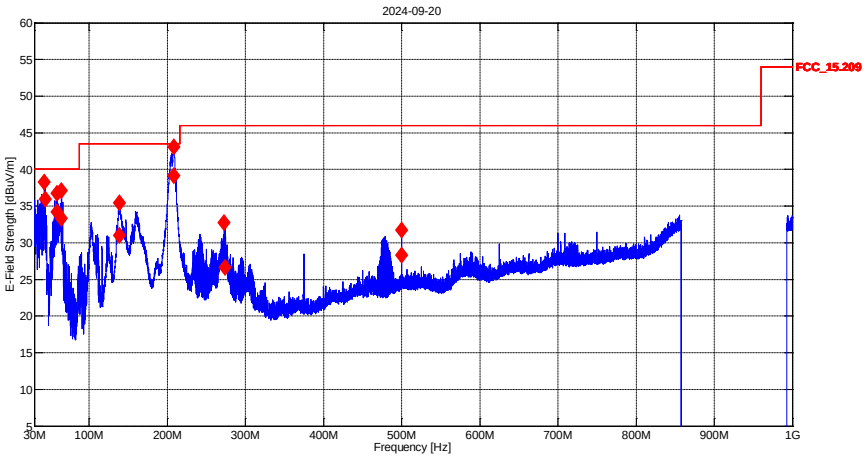


Final 1: 30.0 MHz, 50.0 kHz, 835.2 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
30.6 MHz	19.86	40.00	20.14	H	75.921	253.444	-2.91	FCC_15.209
102.775 MHz	24.13	43.50	19.37	H	180.64	334	-13.60	FCC_15.209
158.6 MHz	27.32	43.50	16.18	H	136.24	165	-11.12	FCC_15.209
209 MHz	40.40	43.50	3.10	H	0	161.25	-12.51	FCC_15.209
829 MHz	23.35	46.00	22.65	H	241.201	100	1.09	FCC_15.209
833.525 MHz	30.02	46.00	15.98	H	270.641	150	1.61	FCC_15.209

30-1000MHz Horizontal, Plot and Data Table

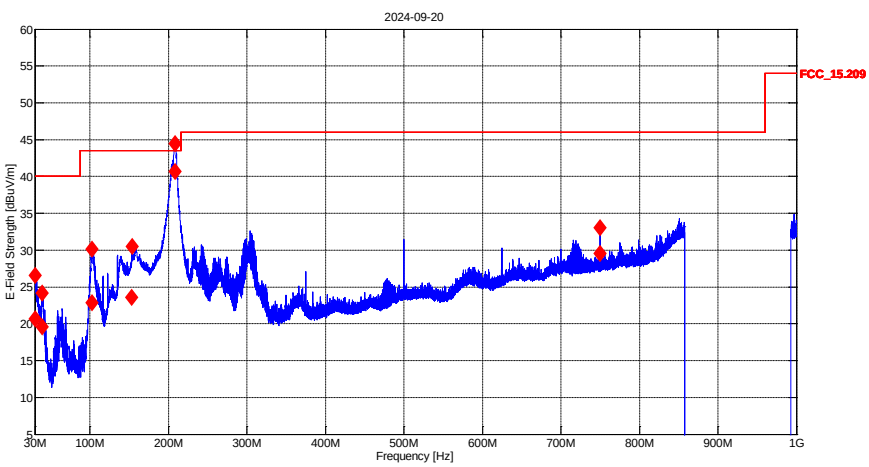
916MHz at 100kbps, GFSK



Final 1: 40.9 MHz, 50.0 kHz, 502.0 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
43.775 MHz	35.98	40.00	4.02	V	37.118	100	-10.81	FCC_15.209
58.725 MHz	34.21	40.00	5.79	V	96.99	119	-17.01	FCC_15.209
64.75 MHz	33.34	40.00	6.66	V	306.876	102.2	-16.63	FCC_15.209
139 MHz	31.01	43.50	12.49	V	71.117	100	-10.16	FCC_15.209
208.325 MHz	39.18	43.50	4.32	V	11.359	100	-12.50	FCC_15.209
274 MHz	26.64	46.00	19.36	V	130.556	180	-10.02	FCC_15.209
500 MHz	28.31	46.00	17.69	V	171.388	100	-4.51	FCC_15.209

30-1000MHz Vertical, Plot and Data Table



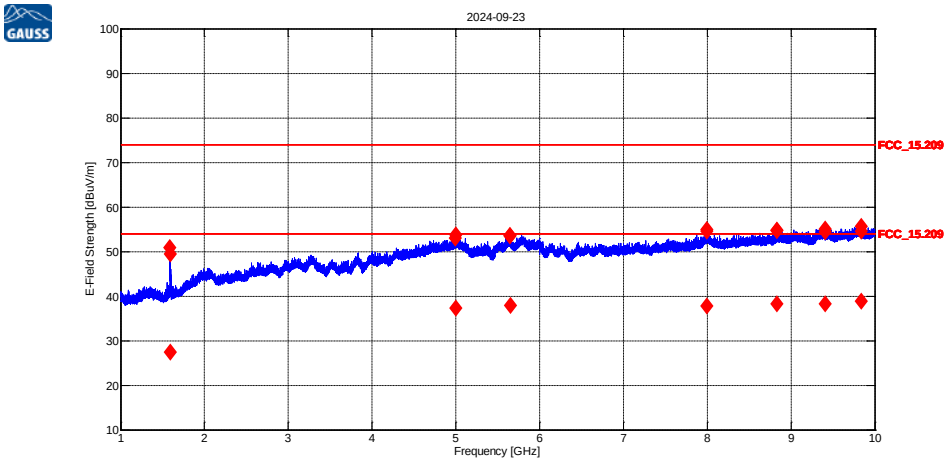
Final 1: 30.0 MHz, 50.0 kHz, 752.0 MHz; IF:120kHz, 200.0 ms QP, Att 10dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
30.6 MHz	20.65	40.00	19.35	H	337.339	100	-2.91	FCC_15.209
38.95 MHz	19.56	40.00	20.44	H	120.52	279	-7.95	FCC_15.209
102.7 MHz	22.85	43.50	20.65	H	181.259	290.1	-13.75	FCC_15.209
153.175 MHz	23.61	43.50	19.89	H	227.88	250	-11.01	FCC_15.209
208.725 MHz	40.65	43.50	2.85	H	0	134.5	-12.51	FCC_15.209
750 MHz	29.58	46.00	16.42	H	155.62	128.2	-1.04	FCC_15.209

30-1000MHz Horizontal, Plot and Data Table

Emissions above 1GHz

908.4MHz at 9.6kbps, FSK



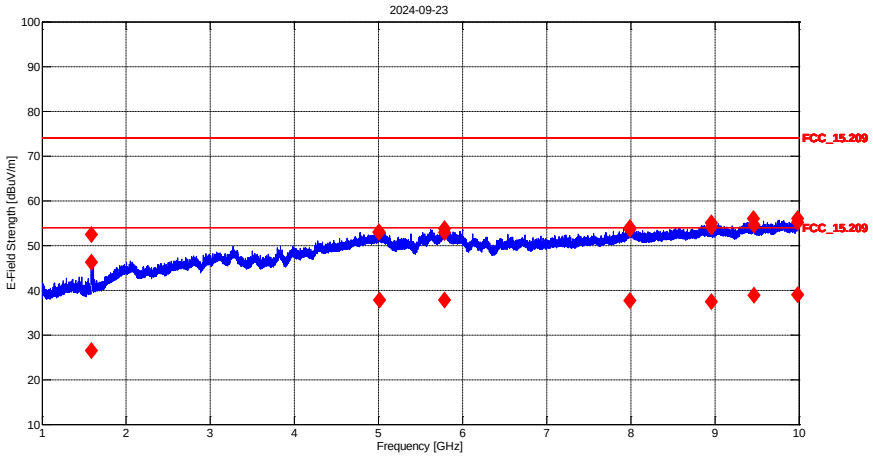
Final 1: 1.6 GHz, 50.0 kHz, 9.8 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.588 GHz	50.91	74.00	23.09	V	239.471	187.009	31.23	FCC_15.209
4.99575 GHz	52.99	74.00	21.01	V	188.608	134.546	39.64	FCC_15.209
5.64725 GHz	53.62	74.00	20.38	V	317.707	258.894	40.71	FCC_15.209
7.99775 GHz	54.56	74.00	19.44	V	92.728	145.013	43.16	FCC_15.209
8.833 GHz	54.76	74.00	19.24	V	360	318.607	43.86	FCC_15.209
9.4095 GHz	54.47	74.00	19.53	V	43.431	117.505	43.99	FCC_15.209
9.84025 GHz	54.64	74.00	19.36	V	43.431	194.137	44.85	FCC_15.209

Final 2: 1.6 GHz, 50.0 kHz, 9.8 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.592 GHz	27.49	54.00	26.51	V	239.471	235.412	31.23	FCC_15.209
4.99975 GHz	37.33	54.00	16.67	V	188.608	123.274	39.64	FCC_15.209
5.64925 GHz	37.96	54.00	16.04	V	317.707	229.452	40.71	FCC_15.209
7.9985 GHz	37.76	54.00	16.24	V	92.728	156.862	43.16	FCC_15.209
8.83425 GHz	38.22	54.00	15.78	V	360	200	43.86	FCC_15.209
9.41025 GHz	38.25	54.00	15.75	V	43.431	200	43.99	FCC_15.209
9.83825 GHz	38.86	54.00	15.14	V	43.431	107.756	44.85	FCC_15.209

1-10GHz Vertical, Plot and Data Table



Final 1: 1.6 GHz, 50.0 kHz, 10.0 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

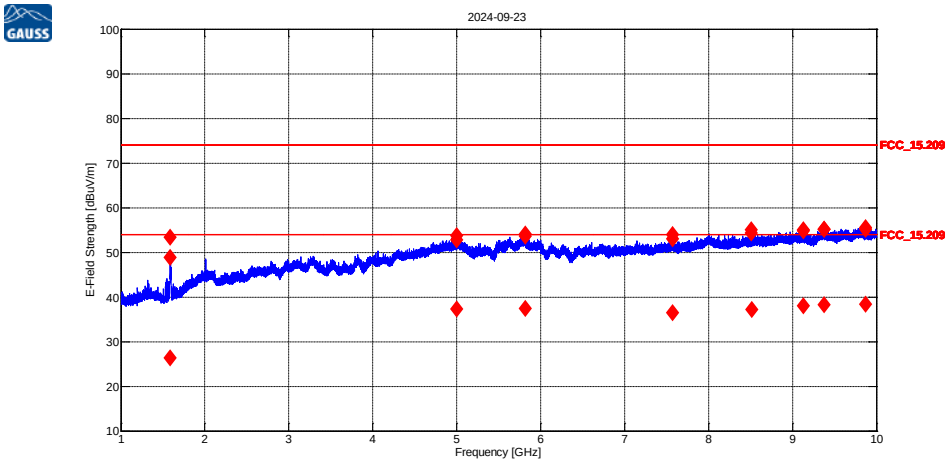
f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name	
1.584 GHz	52.48	74.00	21.52	H	147.094	286.526	31.21	FCC_15.209	
5.00825 GHz	52.94	74.00	21.06	H	67.589	115.469	39.62	FCC_15.209	
5.786 GHz	52.86	74.00	21.14	H	206.835	179.824	40.90	FCC_15.209	
7.98775 GHz	53.63	74.00	20.37	H	325.713	193.626	43.15	FCC_15.209	
8.95625 GHz	54.16	74.00	19.84	H	255.788	153.654	43.53	FCC_15.209	
9.463 GHz	54.57	74.00	19.43	H	226.696	134.431	43.87	FCC_15.209	
9.985 GHz	55.19	74.00	18.81	H	275.61	296.741	44.78	FCC_15.209	

Final 2: 1.6 GHz, 50.0 kHz, 10.0 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name	
1.5835 GHz	26.50	54.00	27.50	H	147.094	215.609	31.21	FCC_15.209	
5.011 GHz	37.76	54.00	16.24	H	67.589	100	39.62	FCC_15.209	
5.786 GHz	37.78	54.00	16.22	H	206.835	127.076	40.90	FCC_15.209	
7.98725 GHz	37.68	54.00	16.32	H	325.713	100	43.15	FCC_15.209	
8.955 GHz	37.40	54.00	16.60	H	255.788	173.027	43.53	FCC_15.209	
9.463 GHz	38.89	54.00	15.11	H	226.696	100	43.87	FCC_15.209	
9.98375 GHz	39.04	54.00	14.96	H	275.61	100	44.78	FCC_15.209	

1-10GHz Horizontal, Plot and Data Table

908.4MHz at 40kbps, FSK



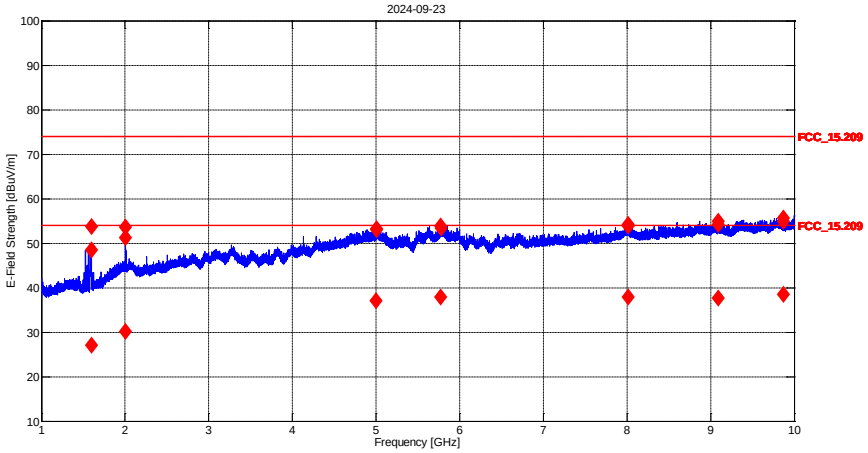
Final 1: 1.6 GHz, 50.0 kHz, 9.9 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.5835 GHz	53.42	74.00	20.58	V	53.826	185.659	31.22	FCC_15.209
4.999 GHz	52.80	74.00	21.20	V	344.185	100	39.64	FCC_15.209
5.81675 GHz	54.10	74.00	19.90	V	163.977	391.725	40.96	FCC_15.209
7.572 GHz	53.03	74.00	20.97	V	238.663	151.849	42.57	FCC_15.209
8.50975 GHz	55.01	74.00	18.99	V	65.45	125.369	43.24	FCC_15.209
9.13125 GHz	54.83	74.00	19.17	V	208.38	100	43.95	FCC_15.209
9.3755 GHz	55.20	74.00	18.80	V	89.943	172.136	44.00	FCC_15.209
9.87225 GHz	55.12	74.00	18.88	V	182.694	107.324	44.74	FCC_15.209

Final 2: 1.6 GHz, 50.0 kHz, 9.9 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.5835 GHz	26.43	54.00	27.57	V	53.826	185.659	31.22	FCC_15.209
5.00025 GHz	37.34	54.00	16.66	V	344.185	199.795	39.64	FCC_15.209
5.816 GHz	37.48	54.00	16.52	V	163.977	222.478	40.96	FCC_15.209
7.57 GHz	36.49	54.00	17.51	V	238.663	171.57	42.57	FCC_15.209
8.51225 GHz	37.22	54.00	16.78	V	65.45	100	43.24	FCC_15.209
9.13125 GHz	38.03	54.00	15.97	V	208.38	200	43.95	FCC_15.209
9.375 GHz	38.29	54.00	15.71	V	89.943	108.472	44.00	FCC_15.209
9.8715 GHz	38.43	54.00	15.57	V	182.694	172.651	44.74	FCC_15.209

1-10GHz Vertical, Plot and Data Table



Final 1: 1.6 GHz, 50.0 kHz, 9.9 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

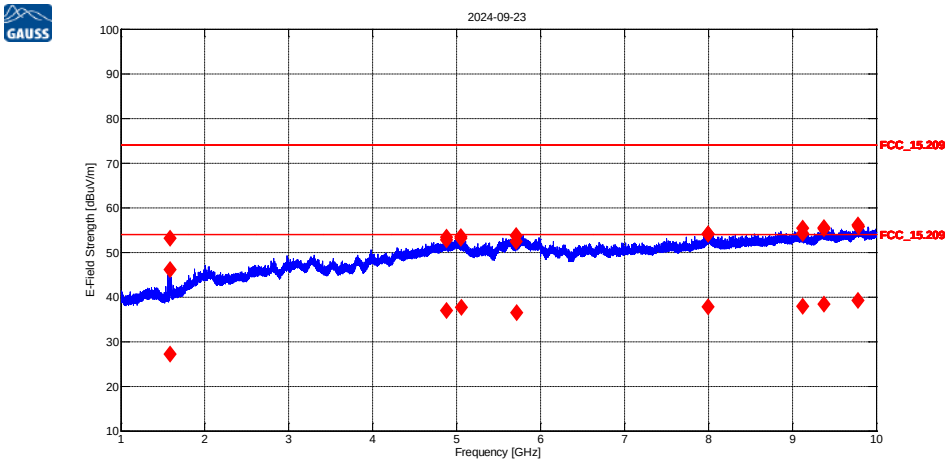
f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.598 GHz	53.70	74.00	20.30	H	327.551	119.251	31.27	FCC_15.209
2.00575 GHz	53.65	74.00	20.35	H	109.418	284.037	35.84	FCC_15.209
5.00375 GHz	53.02	74.00	20.98	H	320.838	139.305	39.63	FCC_15.209
5.77725 GHz	53.44	74.00	20.56	H	154.105	123.78	40.84	FCC_15.209
8.01725 GHz	53.93	74.00	20.07	H	360	360.454	43.18	FCC_15.209
9.09325 GHz	54.27	74.00	19.73	H	330.214	173.027	44.03	FCC_15.209
9.87025 GHz	54.96	74.00	19.04	H	290.591	144.033	44.73	FCC_15.209

Final 2: 1.6 GHz, 50.0 kHz, 9.9 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name	
1.6 GHz	27.09	54.00	26.91	H	327.551	119.251	31.27	FCC_15.209	
2.00575 GHz	30.20	54.00	23.80	H	109.418	243.608	35.84	FCC_15.209	
5.001 GHz	37.08	54.00	16.92	H	320.838	100	39.63	FCC_15.209	
5.7745 GHz	37.87	54.00	16.13	H	154.105	175.693	40.84	FCC_15.209	
8.01325 GHz	37.89	54.00	16.11	H	360	300	43.18	FCC_15.209	
9.092 GHz	37.73	54.00	16.27	H	330.214	200	44.03	FCC_15.209	
9.87025 GHz	38.56	54.00	15.44	H	290.591	108.923	44.73	FCC_15.209	

1-10GHz Horizontal, Plot and Data Table

916MHz at 100kbps, GFSK



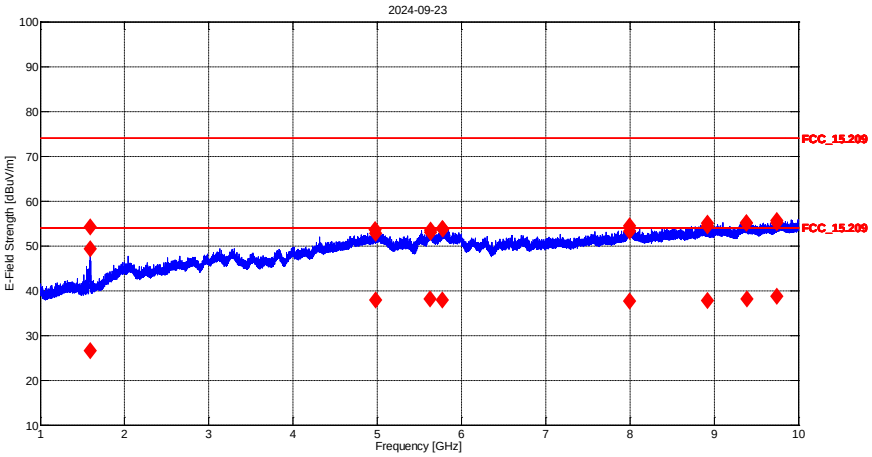
Final 1: 1.6 GHz, 50.0 kHz, 9.8 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.58275 GHz	53.16	74.00	20.84	V	242.743	288.927	31.21	FCC_15.209
4.88025 GHz	52.74	74.00	21.26	V	47.812	173.705	39.99	FCC_15.209
5.053 GHz	53.11	74.00	20.89	V	252.63	400.085	39.48	FCC_15.209
5.71 GHz	52.42	74.00	21.58	V	212.459	127.942	40.49	FCC_15.209
7.99575 GHz	54.14	74.00	19.86	V	79.037	152.466	43.15	FCC_15.209
9.124 GHz	54.19	74.00	19.81	V	60.474	100.131	44.00	FCC_15.209
9.37475 GHz	55.26	74.00	18.74	V	0	330.623	44.00	FCC_15.209
9.7855 GHz	55.78	74.00	18.22	V	347.529	137.085	44.84	FCC_15.209

Final 2: 1.6 GHz, 50.0 kHz, 9.8 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.5835 GHz	27.18	54.00	26.82	V	242.743	299.725	31.21	FCC_15.209
4.88225 GHz	36.93	54.00	17.07	V	47.812	103.957	39.99	FCC_15.209
5.05375 GHz	37.66	54.00	16.34	V	252.63	335.038	39.48	FCC_15.209
5.7125 GHz	36.44	54.00	17.56	V	212.459	100	40.49	FCC_15.209
7.99775 GHz	37.75	54.00	16.25	V	79.037	100	43.15	FCC_15.209
9.1245 GHz	37.87	54.00	16.13	V	60.474	200	44.00	FCC_15.209
9.3755 GHz	38.39	54.00	15.61	V	0	300	44.00	FCC_15.209
9.7815 GHz	39.22	54.00	14.78	V	347.529	200	44.84	FCC_15.209

1-10GHz Vertical, Plot and Data Table



Final 1: 1.6 GHz, 50.0 kHz, 9.7 GHz; IF:1MHz, 100.0 ms MaxPeak, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.5935 GHz	54.17	74.00	19.83	H	0	304.991	31.24	FCC_15.209
4.979 GHz	52.77	74.00	21.23	H	328.317	160.619	39.62	FCC_15.209
5.63125 GHz	53.01	74.00	20.99	H	281.347	100	40.77	FCC_15.209
5.776 GHz	53.80	74.00	20.20	H	18.156	127.854	40.83	FCC_15.209
7.993 GHz	53.31	74.00	20.69	H	173.1	146.323	43.15	FCC_15.209
8.917 GHz	54.47	74.00	19.53	H	303.914	120.681	43.49	FCC_15.209
9.38425 GHz	55.06	74.00	18.94	H	105.973	200.1	43.99	FCC_15.209
9.746 GHz	55.14	74.00	18.86	H	267.41	148.457	44.46	FCC_15.209

Final 2: 1.6 GHz, 50.0 kHz, 9.7 GHz; IF:1MHz, 100.0 ms RMS, Att 0dB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Angle [°]	Height [cm]	Trans	Name
1.5935 GHz	26.61	54.00	27.39	H	0	237.409	31.24	FCC_15.209
4.97775 GHz	37.86	54.00	16.14	H	328.317	100	39.62	FCC_15.209
5.629 GHz	38.21	54.00	15.79	H	281.347	192.526	40.77	FCC_15.209
5.77275 GHz	37.89	54.00	16.11	H	18.156	100.165	40.83	FCC_15.209
7.9965 GHz	37.72	54.00	16.28	H	173.1	100	43.15	FCC_15.209
8.92025 GHz	37.79	54.00	16.21	H	303.914	164.019	43.49	FCC_15.209
9.38625 GHz	38.20	54.00	15.80	H	105.973	108.923	43.99	FCC_15.209
9.74475 GHz	38.78	54.00	15.22	H	267.41	200	44.46	FCC_15.209

1-10GHz Horizontal, Plot and Data Table

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the Test Setup Photos exhibit.

6 APPENDIX A – MODIFICATIONS

No modifications were made to the EUT during testing.

---END OF REPORT---