

TEST REPORT

Report Number: R14607588-E6

Applicant : AMANTYA TECHNOLOGIES PRIVATE LIMITED
12TH FLOOR, TOWER B, UNITECH CYBER PARK, SECTOR 39
GURUGRAM, INDIA 122003

Model : 5GTP202SSMECn256677

FCC ID : 2BASDAMTMEC20234

EUT Description : Single Cell High Capacity Sub6

Test Standard(s) : FCC CFR 47 Part 2, Part 22, Part 24, Part 27

Date Of Issue:

2023-08-09

Prepared by:

UL LLC.

12 Laboratory Drive

Research Triangle Park, NB 27518, U.S.A.

TEL: (919) 549-1400



Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-07-31	Initial Review	Noah Bennett
V2	2023-08-09	TCB Feedback Round 1 -Added Statement to section 8 clarifying calibration due dates.	Noah Bennett

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: AMANTYA TECHNOLOGIES PRIVATE LIMITED
12TH FLOOR, TOWER B, UNITECH CYBER PARK, SECTOR 39
GURUGRAM, INDIA 122003

EUT DESCRIPTION: Single Cell High Capacity Sub6

MODEL: 5GTP202SSMECn256677

SERIAL NUMBER: 02SS-5GSS-0007

SAMPLE RECEIPT DATE: 2023-05-02

DATE TESTED: 2023-07-18 to 2023-07-21

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC CFR 47 Part 22H, Part 24E, Part 27	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by a2La, NIST, or any agency of the U.S. government.

Approved & Released
For UL LLC By:



Dan Corona
Operations Manager
Consumer, Medical and IT Segment
UL LLC

Prepared By:



Noah Bennett
Engineer
Consumer, Medical, and IT Segment
UL LLC

Reviewed By:



Richard Lee
Staff Laboratory Engineer
Consumer, Medical and IT Segment
UL LLC

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL LLC. is only responsible for the validity of results after the integration of the data provided by the customer. Below is a list of the data provided by the customer:

1. Antenna Gain, colocation and Type (section 6.4)
2. Supported Modulations, Data-rates, BWs and RB configs (section 6.5)
3. Data Referencing (Section 7)
4. Power settings, target power, and UL/DL Modes (section 6.5)

Requirement Description	Band	Requirement Clause Number (FCC)	Result*	Remarks
Effective Radiated Power	n5	22.913 (a)(1)(i)	Complies	See Note 1.
Equivalent Isotropic Radiated Power	n2	24.232 (a) (2)	Complies	
	n66	27.50 (d) (2)	Complies	
	n77	27.50 (k) (2), (j) (2)	Complies	
Requirement Description	Requirement Clause Number (FCC)		Result*	Remarks
Occupied Bandwidth	2.1049		See Remarks	See Note 1.
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (n) (1), 27.53 (l) (1)			
Out of Band Emissions	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (n) (1), 27.53 (l) (1)			
Frequency Stability	2.1055, 22.355, 24.235, 27.54			
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5), 27.50 (k) (4), (j) (4)			
Field Strength of Spurious Radiation	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (n) (1), 27.53 (l) (1)		Complies	

Note 1: The purpose of this report is to show compliance of the EUT when installed with already certified SDRs installed. This report covers the MEC Base Station with the N310 SDR installed. The manufacturer has declared that the SDRs are programmed the same between all models. Therefore, full conducted output power was not taken. Power spot-checks were performed to verify compliance, see section 7.4 for results. It is the responsibility of the manufacturer to ensure the SDR is programed the same and maintains compliance to the FCC rules when installed in another model.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 24, Part 27
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#). Determining ERP and EIRP
- FCC KDB 484596 D01 Referencing Test Data v01

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	2180C	825374

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB): 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a Single Cell High Capacity Sub6 fixed station that has 1 SDR radio card installed, the N310 and. The N310 supports 4x4 MIMO Only.

6.2. MAXIMUM OUTPUT POWER

The purpose of this report is to show compliance of the EUT when installed with already certified SDRs installed. This report covers the MEC Base Station with the N310 SDR installed. The manufacturer has declared that the SDRs are programmed the same between all models. Therefore, full conducted output power was not taken. Power spot-checks were performed to verify compliance, see section 7.4 for results. It is the responsibility of the manufacturer to ensure the SDR is programed the same and maintains compliance to the FCC rules when installed in another model.

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version:

Operating System: Ubuntu 20.05.2

Kernel: Linux 5.4.0-56-lowlatency

Architecture: x86-64.

6.4. MAXIMUM ANTENNA GAIN

The antenna(s) gain, as provided by the manufacturer' are as follows:

Per manufacturer's declaration: Antenna is co-polarized and uncorrelated.

Uncorrelated Directional Gain= G_{ant}

G_{ant} : Gain of Individual Antennas (Same for Each Antenna)

WWAN Bands	Frequency range (MHz)	Antenna 1 Peak Gain (dBi)	Antenna 2 Peak Gain (dBi)	Antenna 3 Peak Gain (dBi)	Antenna 4 Peak Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
5G NR n2	1930-1990	5.2	5.2	5.2	5.2	5.2
5G NR n5	869-894	0.8	0.8	0.8	0.8	0.8
5G NR n66	2110-2200	4.2	4.2	4.2	4.2	4.2
5G NR n77	3700-3980	3.92	3.92	3.92	3.92	3.92

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following 5G NR bands:

Radio Card	Band	SCS	Modulations	Bandwidths	RB Configuration
N310	n2	15/30kHz	QPSK/16QAM/64QAM	10/20/40MHz	Full RB Only.
	n5			10/20MHz	
	n66			10/20/40MHz	
	n77			10/20/40/100MHz	

The EUT is a desktop device, transmit antennas orientation was investigated in 3 orientations, 0, 45 and 90 Degrees, all final testing is tested with antenna orientation as below as worst case:

- 5G NR n5 (Low Band): 90 degrees
- 5G NR n2 & n66 (Mid Band): 90 degrees
- 5G NR n77 (High Band): 0 degrees

Investigation on the N310 has been performed based upon conducted average output power to find the worst-case SCS and modulation modes. The following was found to be worst case. For Radiated Emissions, both QPSK and 16QAM modes were investigated, but only the worst-case mode is reported. Worst case emissions from 9kHz to 1Ghz, and Above 18Ghz were performed, and only the tests with emissions within 20dB of the limit are reported in section 9.2.

Radio Card	Band	Worst-Case SCS	Worst-Case Modulation	Worst-Case Bandwidth
N310	n2	15kHz	16QAM	10MHz
	n5			
	n66	30kHz	QPSK	20MHz
	n77		16QAM	

The Power settings used by the N310 and B210 are as follows:

Radio Card	Band	Frequency	sdrTx_Gain_dB	TxGain
N310	n2	1930-1990	55	800
	n5	869-894	35	800
	n66	2110-2200	60	1000
	n77	3700-3980	65	1000

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Keyboard	Logitech	YU0042	2250MR1881B8	-
Mouse	Logitech	M-U0026	2206HS094MV8	-
Monitor	ViewSonic	VS15562	NA	-
Support Laptop	Lenovo	Yoga 7	NA	-
Network Switch	Linksys	GS108	NA	-

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1-1 to 1-3	HS Ethernet	1	RJ45	Shielded	<3m	Connected to Network Switch
2-1 to 2-4	LS Ethernet	5	RF45	Shielded	<3m	2-1 Connected to Support Laptop outside of chamber. 2-2 thru 2-4 connected to network switch
3-1, 3-2	USB-A	2	USB	Shielded	<3m	Connected to keyboard and mouse.
4	HDMI	1	Display	Shielded	<3m	Used to populate monitor to internal EUT port.
5-1 to 5-3	AC Mains	1	NEMA Type B	Shielded	<3m	Used to power the device and related support equipment.

TEST SETUP

EUT is powered by AC/DC adapter, connected to support equipment. Test software exercise the radio to transmit.

See R1407588-EP3 for Setup Photos and Setup Diagram

7. REUSE OF TEST DATA

7.1. INTRODUCTION

According to the manufacturer, the Software Defined Radio card installed in this EUT are electrically identical to the same card installed in other variant EUTs. The enclosure and other components, such as power supply and CPU, may be different. This Model, FCC ID: 2BASDAMTMEC20234, known as MEC, has the SDR card 'N310' installed, and the FCC ID: 2BASDAMTBN20233, known as HC2, has the SDR card 'B210' and SDR card 'N310' installed. Since the manufacturer configures the SDR cards the same with the same power settings when installed in different enclosures, The HC2's conducted test data shall remain representative of the MEC so, MEC (this model) leverages conducted test data from HC2.

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

7.2. DEVICE DIFFERENCES

Difference between FCC ID: 2BASDAMTMEC20234, and FCC ID: 2BASDAMTBN20233:

According to the manufacturer, the SDR cards are electrically identical when installed in an end user device. Power settings, and configuration settings are programmed identically. Therefore, the following conducted licensed testing of licensed band for 2BASDAMTBN20233 can be re-used to 2BASDAMTMEC20234.

7.3. REFERENCE DETAIL

Equipment Class	Reference FCC ID	Report Title	Referenced Testing
Licensed (WWAN)	2BASDAMTBN20233	R14607588-E3 v1 FCC WWAN REPORT	N310 SDR - 5G NR n2, n5, n66, n77

*Notes:

1. Full radiated testing was done on all 5G NR Bands. Full Unintentional Emissions, and WWAN Rx testing was done on each EUT.
2. Conducted output power was spot-checked on the worst-case configuration per band to verify the EUT remained in tune-up. Power below is summed between chains on only 1 N310 SDR, and not both RF cards, since this EUT is to only have 1 N310 SDR installed.

7.4. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device 2BASDAMTMEC20234 for Conducted output power. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this service as shown in the summary.

2BASDAMTMEC20234 SPOT CHECK RESULTS						
Technology	RB/BW/SCS	Data Rate	Measured Frequency (MHz)	2BASDAMTBN20233 (HC2)	2BASDAMTMEC20234 (MEC)	Delta (dB) <+2dB
				Summed Conducted Output Power (dBm)	Summed Conducted Output Power (dBm)	Margin
5G FR1 n2	Full/10MHz/15kHz	16QAM	1935MHz	6.49	6.80	-0.31
5G FR1 n5			874MHz	-8.69	-8.70	0.01
5G FR1 n66	Full/10MHz/30kHz	QPSK	2115MHz	19.76	19.45	0.31
5G FR1 n77	Full/20MHz/30kHz	16QAM	3699.99MHz	13.73	12.86	0.87

8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Common Equipment				
	Conducted Room 2				
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	NA	NA
	Additional Equipment used				
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5008	2022-11-07	2023-11-07

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
30-1000 MHz					
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-23	2024-01-23
1-18 GHz					
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-04-06	2024-04-06
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-626	2022-07-11	2023-07-11
Gain-Loss Chains					
91974	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-16	2024-05-16
91976	Gain-loss string: 25-1000MHz	Various	Various	2023-05-16	2024-05-16
91979	Gain-loss string: 1-18GHz	Various	Various	2023-05-16	2024-05-16
135999	Gain-loss string: 18-40GHz	Various	Various	2023-05-16	2024-05-16
Receiver & Software					
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-02-02	2024-02-02
72823	Spectrum Analyzer	Agilent	E4446A	2022-06-30	2023-06-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
200539	Environmental Meter	Fisher Scientific	15-077-963 s/n 18474341	2022-10-05	2023-10-05
92492 (HPF012)	1GHz high-pass filter, 2W, Fhigh = 18GHz	Micro-Tronics	HPM18129	2023-02-15	2024-02-29
169109 (BRF012)	3.4-3.8GHz notch filter, 2W, Fhigh = 18GHz	Micro-Tronics	BRM50711-01	2023-02-15	2024-02-29
169108 (BRF010)	1.85-1.97GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50714-01	2023-02-15	2024-02-29
78368 (BRF006)	1.8-2.0GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50707-01	2023-02-15	2024-02-29

Notes

For tests involving equipment listed above that has a calibration due date during the testing period, the testing was completed before said due date.

9. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, We measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

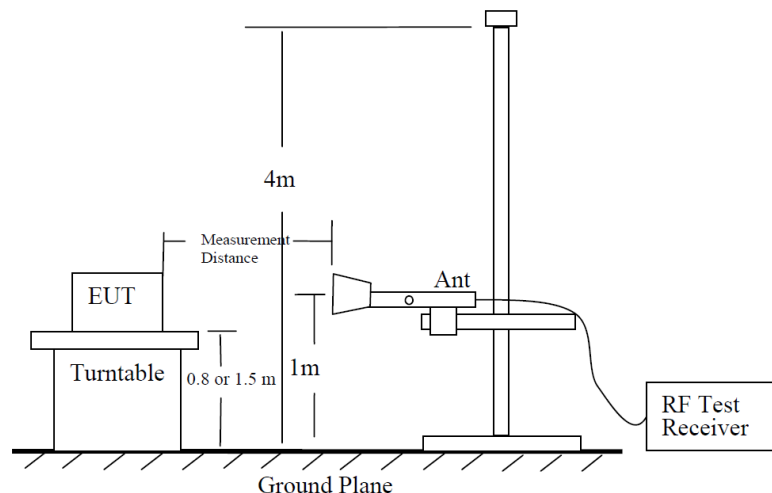


Figure 6 —Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

- a) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$.
- b) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$.
- c) $E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20\log(D) + 104.8$; where D is the measurement distance (in the far field region) in m.
- d) $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then $20 \cdot \log(3) = 9.5424$

Then, $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 9.5424 - 104.8 = E \text{ (dB}\mu\text{V/m)} - 95.2576$

Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

9.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r02

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz

RESULTS

Both QPSK and 16QAM modes are tested, and worst-case bandwidth and modulation are reported only.

9.1.1. 5G NR n2

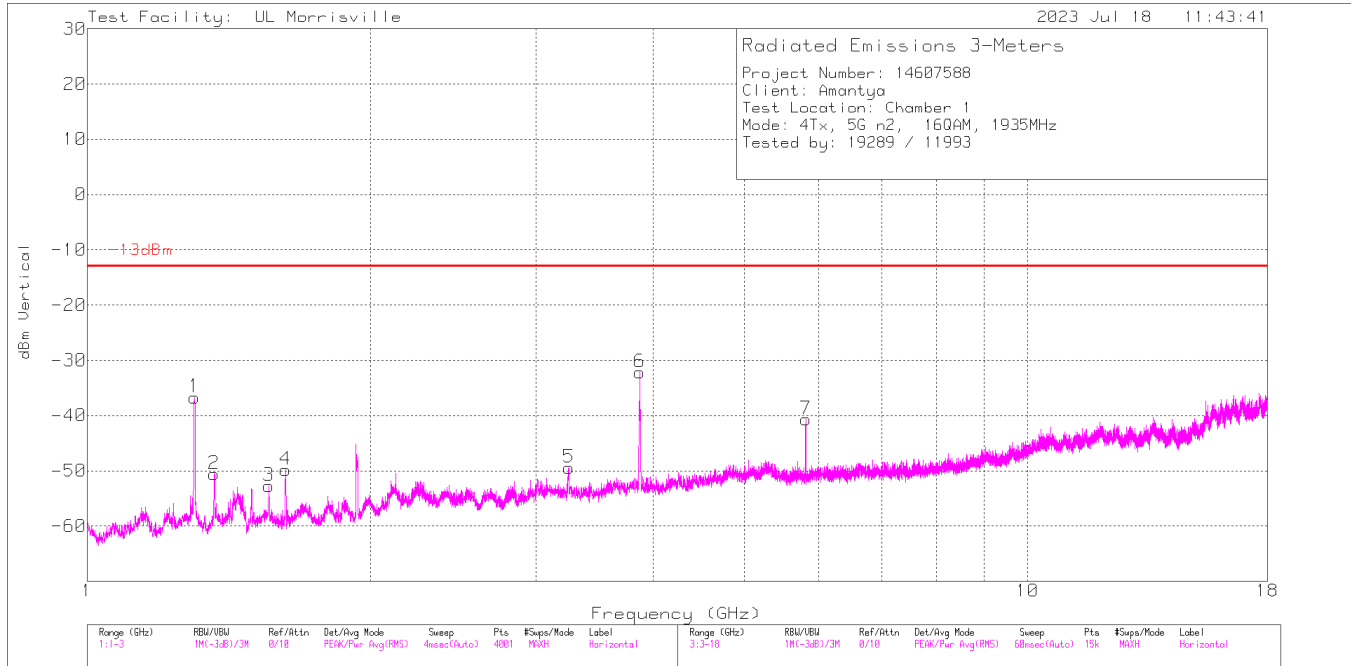
LIMITS

FCC: §24.238(a)

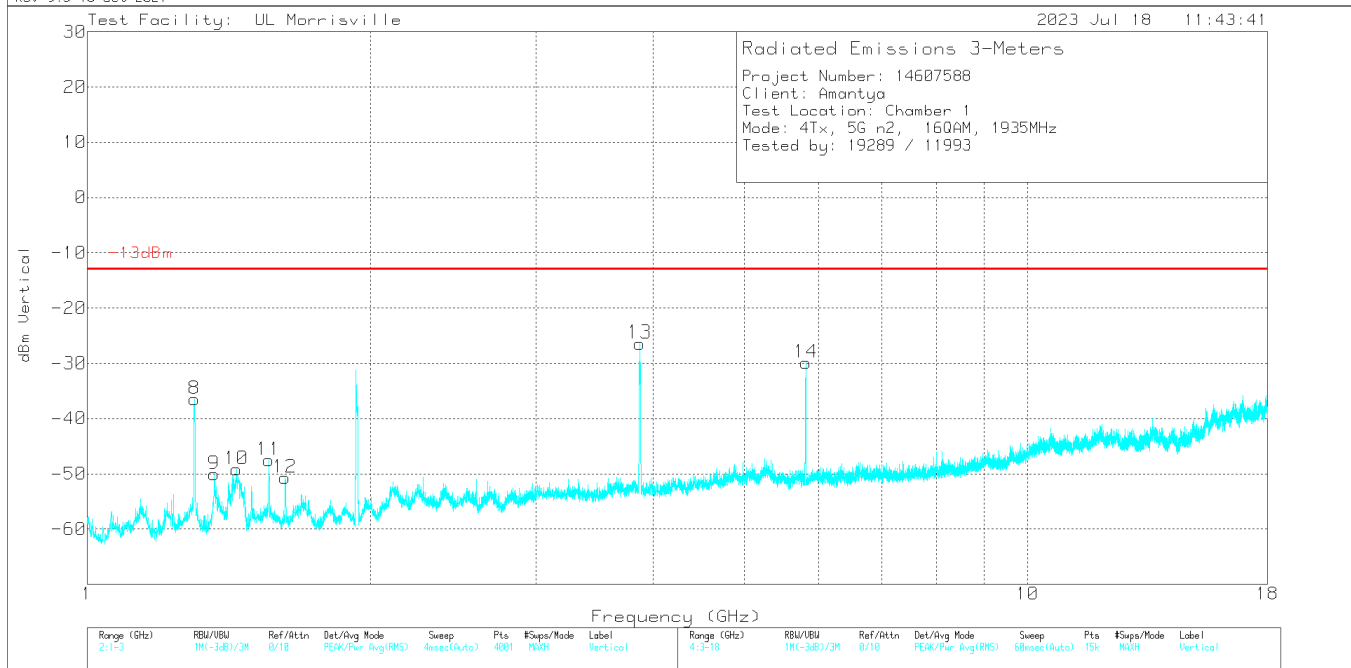
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

RESULTS

5G NR n2 16QAM (10.0MHz BANDWIDTH, LOW CHANNEL)



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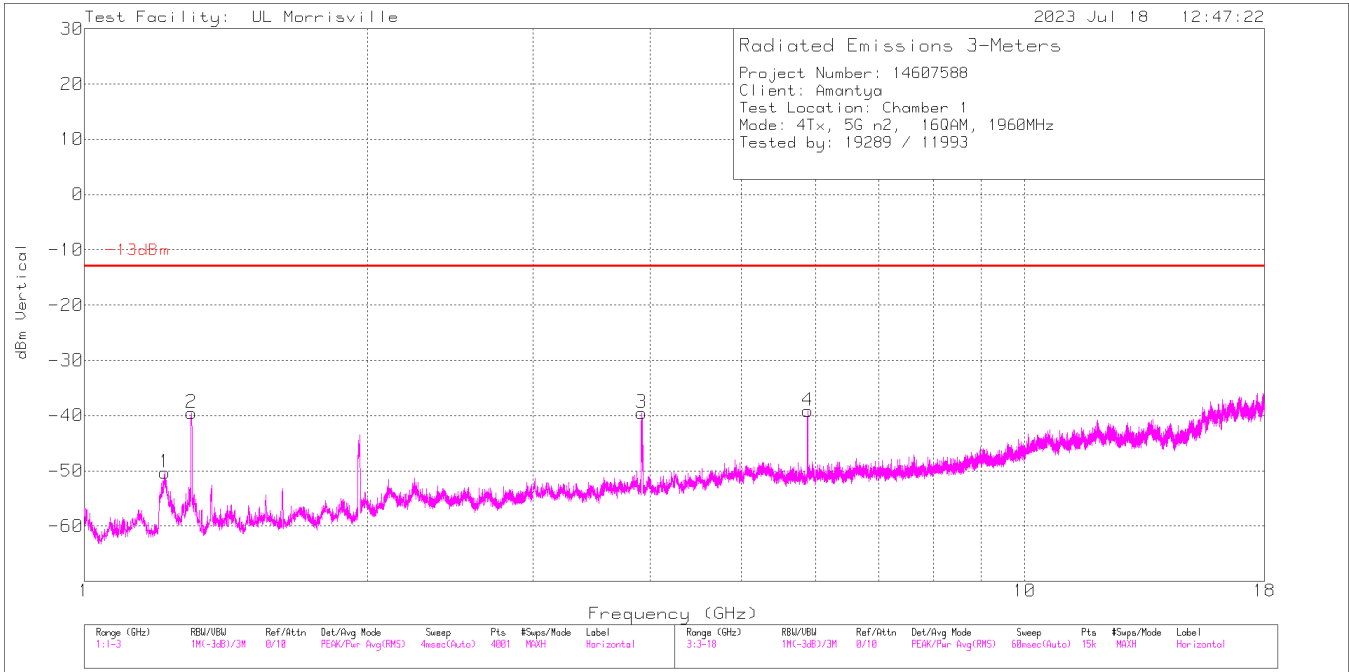


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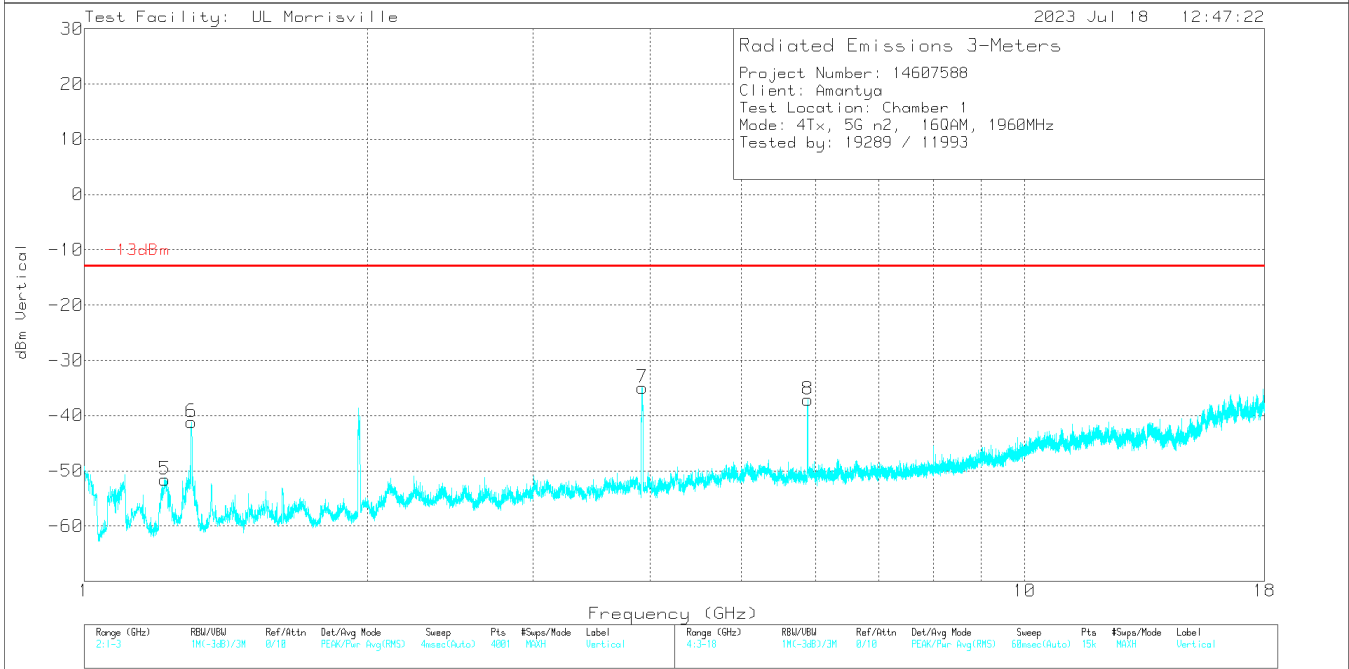
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	1.3	-41.21	Pk	28.9	-36.6	11.8	.6	-36.51	-13	-23.51	0-360	101	V
1	1.3005	-41.37	Pk	28.9	-36.6	11.8	.6	-36.67	-13	-23.67	0-360	101	H
9	1.364	-54.83	Pk	28.8	-36.3	11.8	.5	-50.03	-13	-37.03	0-360	200	V
2	1.365	-55.43	Pk	28.8	-36.3	11.8	.6	-50.53	-13	-37.53	0-360	200	H
10	1.4425	-53.62	Pk	28.2	-36.4	11.8	.9	-49.12	-13	-36.12	0-360	200	V
3	1.5595	-57.38	Pk	28	-36.2	11.8	1.1	-52.68	-13	-39.68	0-360	200	H
11	1.56	-52.08	Pk	28	-36.2	11.8	1	-47.48	-13	-34.48	0-360	200	V
12	1.624	-55.71	Pk	28.3	-36.3	11.8	1.2	-50.71	-13	-37.71	0-360	200	V
4	1.6245	-54.77	Pk	28.3	-36.3	11.8	1.2	-49.77	-13	-36.77	0-360	200	H
5	3.251	-61.61	Pk	32.8	-32.4	11.8	0	-49.41	-13	-36.41	0-360	200	H
6	3.87	-46.63	Pk	33.4	-30.7	11.8	0	-32.13	-13	-19.13	0-360	101	H
13	3.871	-40.89	Pk	33.4	-30.7	11.8	0	-26.39	-13	-13.39	0-360	200	V
7	5.809	-55.59	Pk	34.7	-31.6	11.8	0	-40.69	-13	-27.69	0-360	200	H
14	5.809	-44.83	Pk	34.7	-31.6	11.8	0	-29.93	-13	-16.93	0-360	101	V

Pk - Peak detector

5G NR n2 16QAM (10.0MHz BANDWIDTH, MID CHANNEL)



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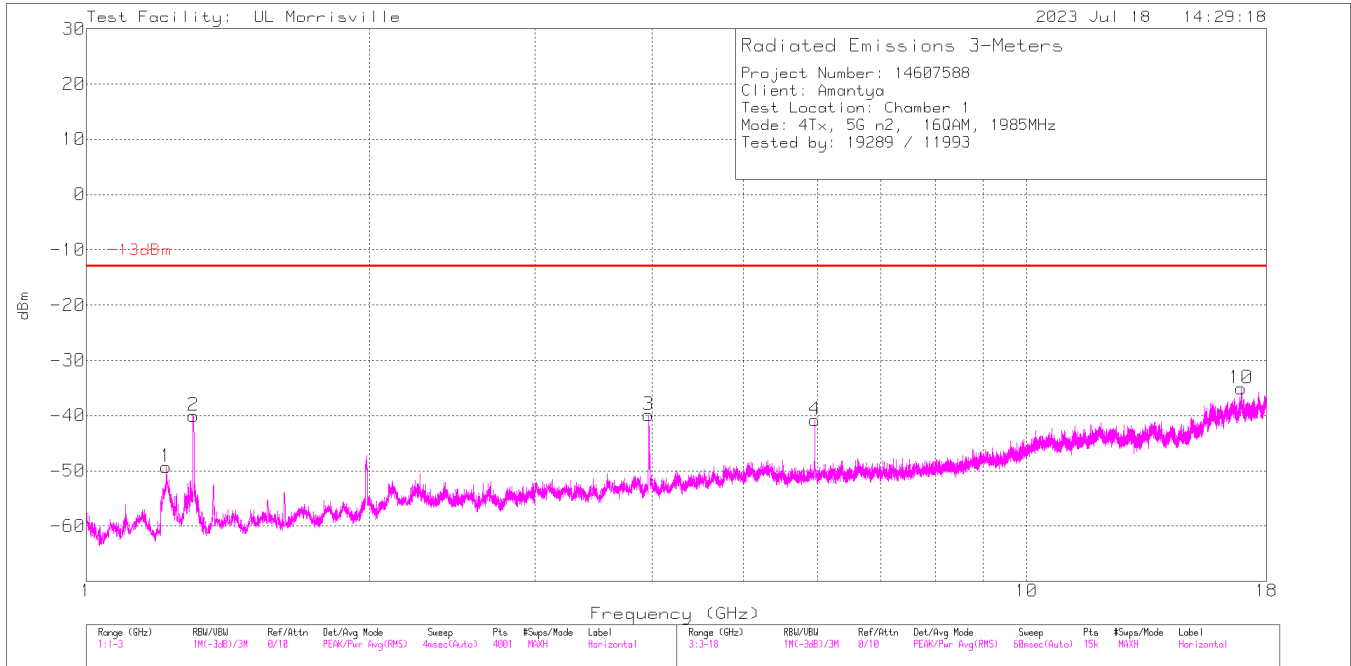


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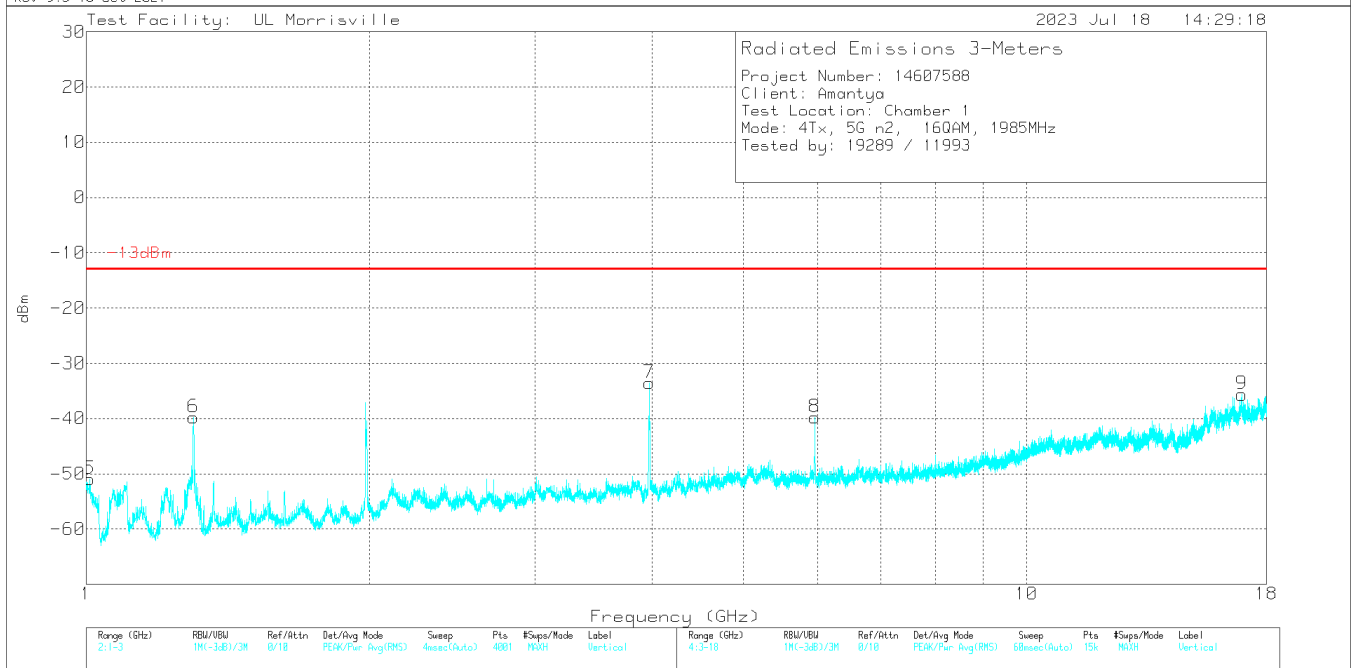
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.218	-55.45	Pk	28.5	-36.8	11.8	.4	-51.55	-13	-38.55	0-360	200	V
1	1.2185	-54.23	Pk	28.5	-36.8	11.8	.4	-50.33	-13	-37.33	0-360	101	H
2	1.3005	-44.18	Pk	28.9	-36.6	11.8	.6	-39.48	-13	-26.48	0-360	300	H
6	1.3005	-45.9	Pk	28.9	-36.6	11.8	.6	-41.2	-13	-28.2	0-360	300	V
3	3.916	-53.07	Pk	33.4	-31.7	11.8	0	-39.57	-13	-26.57	0-360	100	H
7	3.926	-48.76	Pk	33.4	-31.4	11.8	0	-34.96	-13	-21.96	0-360	300	V
4	5.884	-55.39	Pk	34.9	-30.5	11.8	0	-39.19	-13	-26.19	0-360	200	H
8	5.884	-53.35	Pk	34.9	-30.5	11.8	0	-37.15	-13	-24.15	0-360	200	V

Pk - Peak detector

5G NR n2 16QAM (10.0MHz BANDWIDTH, HIGH CHANNEL)



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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.009	-52.72	Pk	27.2	-37.5	11.8	.3	-50.92	-13	-37.92	0-360	200	V
1	1.2155	-53.15	Pk	28.5	-36.9	11.8	.4	-49.35	-13	-36.35	0-360	201	H
2	1.3	-44.71	Pk	28.9	-36.6	11.8	.6	-40.01	-13	-27.01	0-360	300	H
6	1.3	-44.52	Pk	28.9	-36.6	11.8	.6	-39.82	-13	-26.82	0-360	101	V
3	3.963	-53.57	Pk	33.4	-31.5	11.8	0	-39.87	-13	-26.87	0-360	100	H
7	3.97	-47.05	Pk	33.4	-31.7	11.8	0	-33.55	-13	-20.55	0-360	101	V
8	5.952	-57.08	Pk	35.1	-29.6	11.8	0	-39.78	-13	-26.78	0-360	300	V
4	5.956	-57.94	Pk	35.1	-29.8	11.8	0	-40.84	-13	-27.84	0-360	200	H
10	16.908	-65.79	Pk	41.8	-22.9	11.8	0	-35.09	-13	-22.09	0-360	100	H
9	16.94	-66.75	Pk	41.7	-22.4	11.8	0	-35.65	-13	-22.65	0-360	201	V

Pk - Peak detector

9.1.2. 5G NR n5

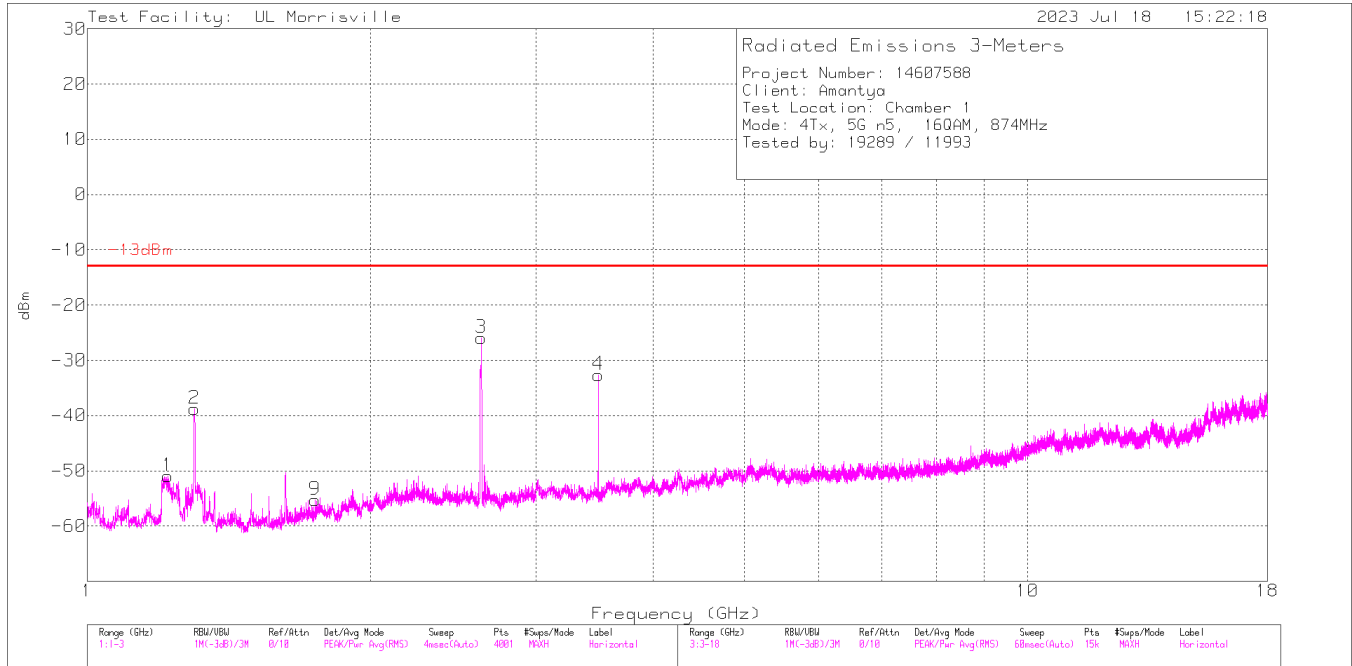
LIMITS

FCC: §22.917(a)

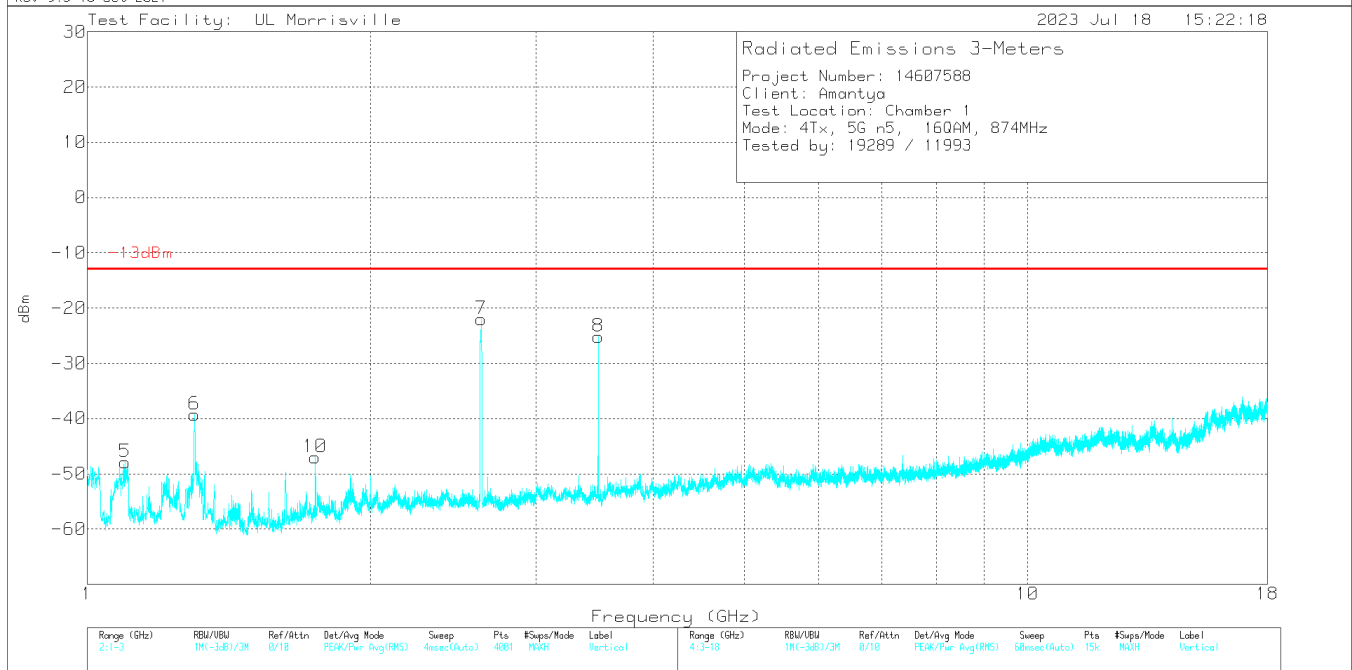
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

RESULTS

5G NR n5 16QAM (10.0MHz BANDWIDTH, LOW CHANNEL)



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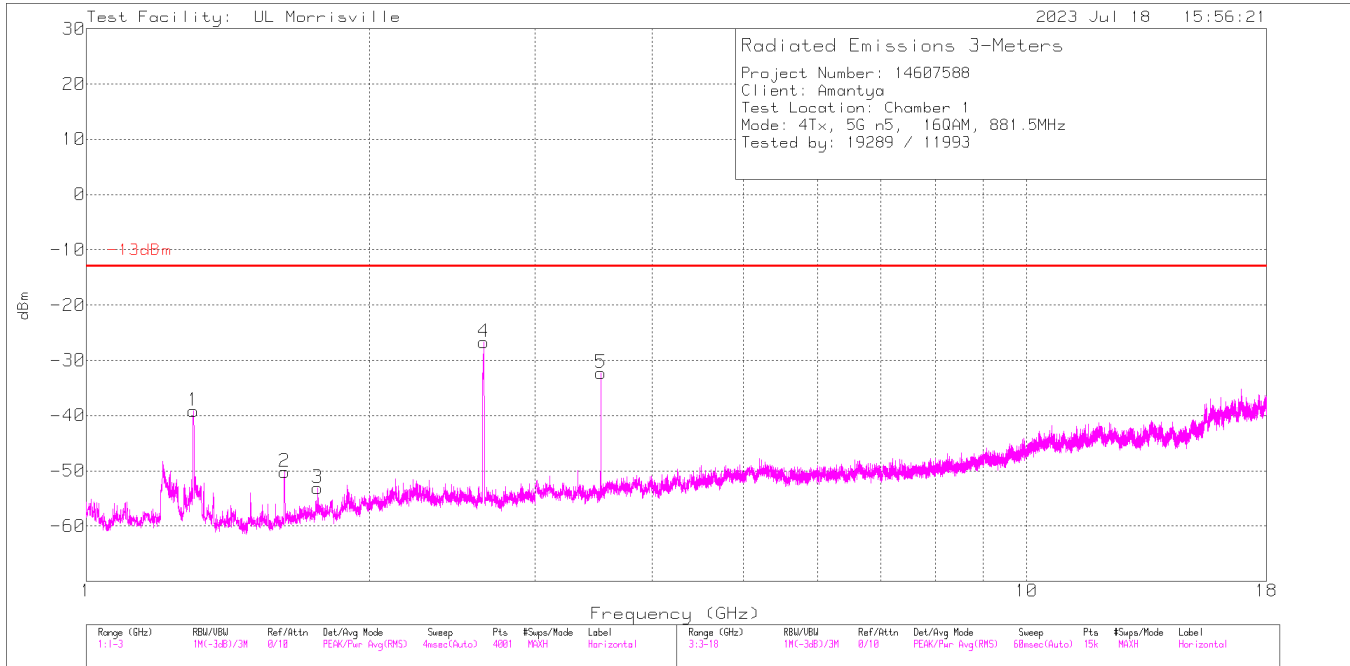


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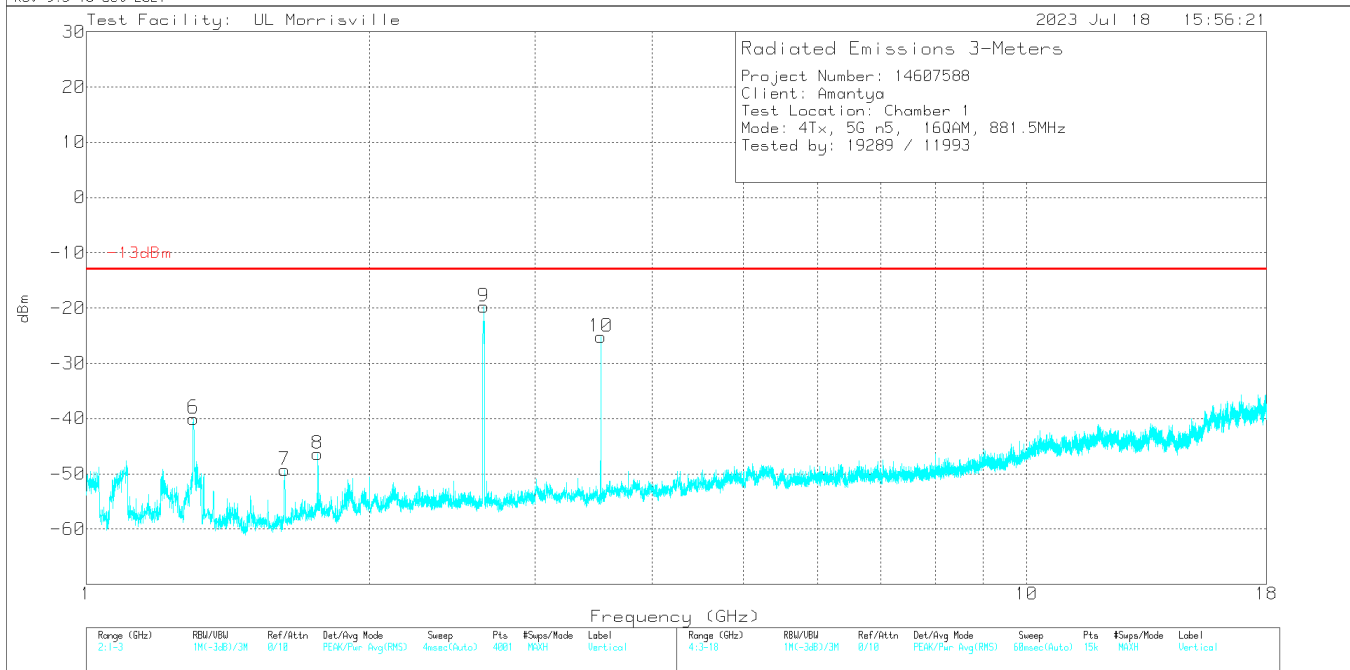
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.0975	-51.03	Pk	27.5	-37.2	11.8	1	-47.93	-13	-34.93	0-360	201	V
1	1.219	-55.04	Pk	28.5	-36.7	11.8	.5	-50.94	-13	-37.94	0-360	200	H
6	1.3	-43.9	Pk	28.9	-36.6	11.8	.5	-39.3	-13	-26.3	0-360	101	V
2	1.3005	-43.36	Pk	28.9	-36.6	11.8	.5	-38.76	-13	-25.76	0-360	101	H
9	1.748	-61.67	Pk	29.7	-35.6	11.8	.5	-55.27	-13	-42.27	0-360	101	H
10	1.748	-53.43	Pk	29.7	-35.6	11.8	.5	-47.03	-13	-34.03	0-360	201	V
3	2.626	-36.39	Pk	32.1	-33.9	11.8	.4	-25.99	-13	-12.99	0-360	300	H
7	2.6265	-32.54	Pk	32.1	-33.8	11.8	.4	-22.04	-13	-9.04	0-360	201	V
4	3.4955	-44.21	Pk	32.6	-32.8	11.8	0	-32.61	-13	-19.61	0-360	101	H
8	3.496	-36.76	Pk	32.6	-32.8	11.8	0	-25.16	-13	-12.16	0-360	300	V

Pk - Peak detector

5G NR n5 16QAM (10.0MHz BANDWIDTH, MID CHANNEL)



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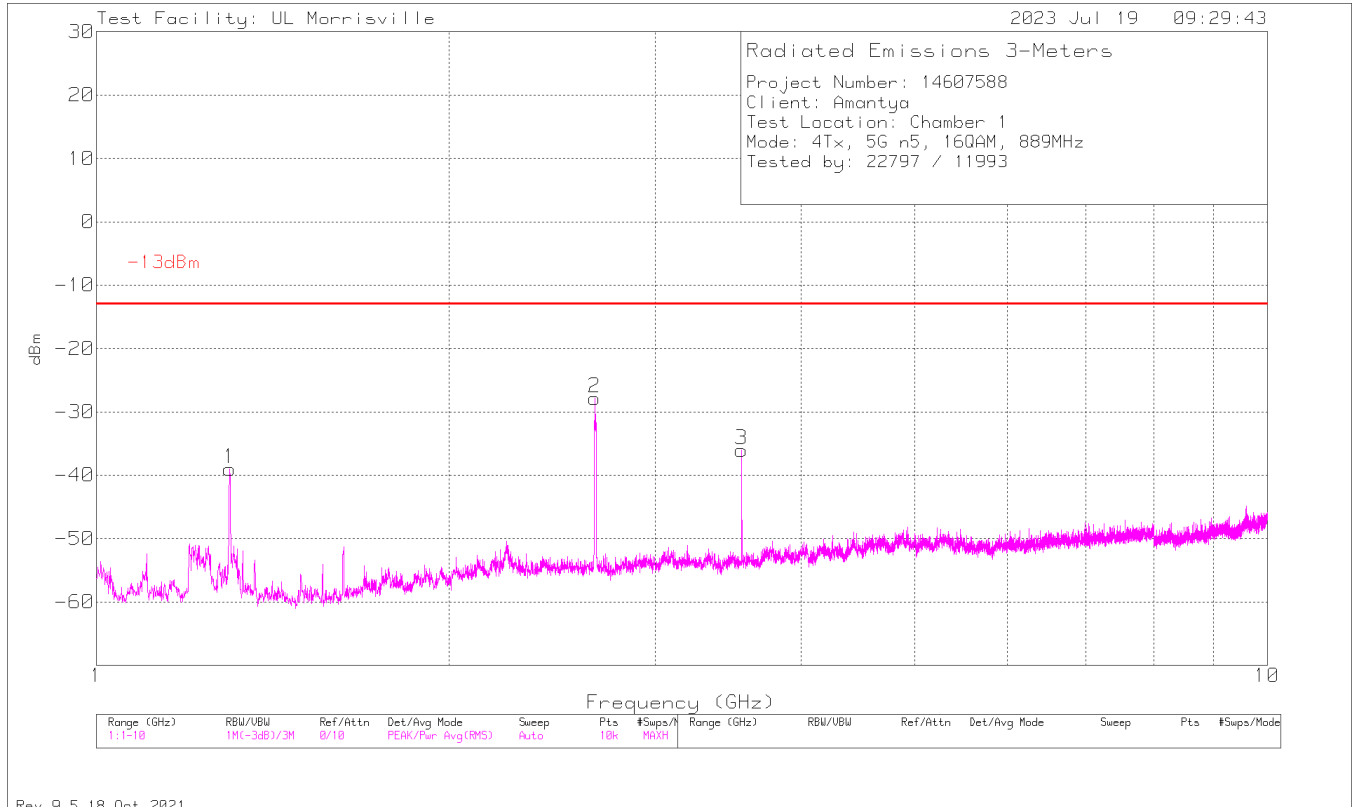


Rev 9.5 18 Oct 2021

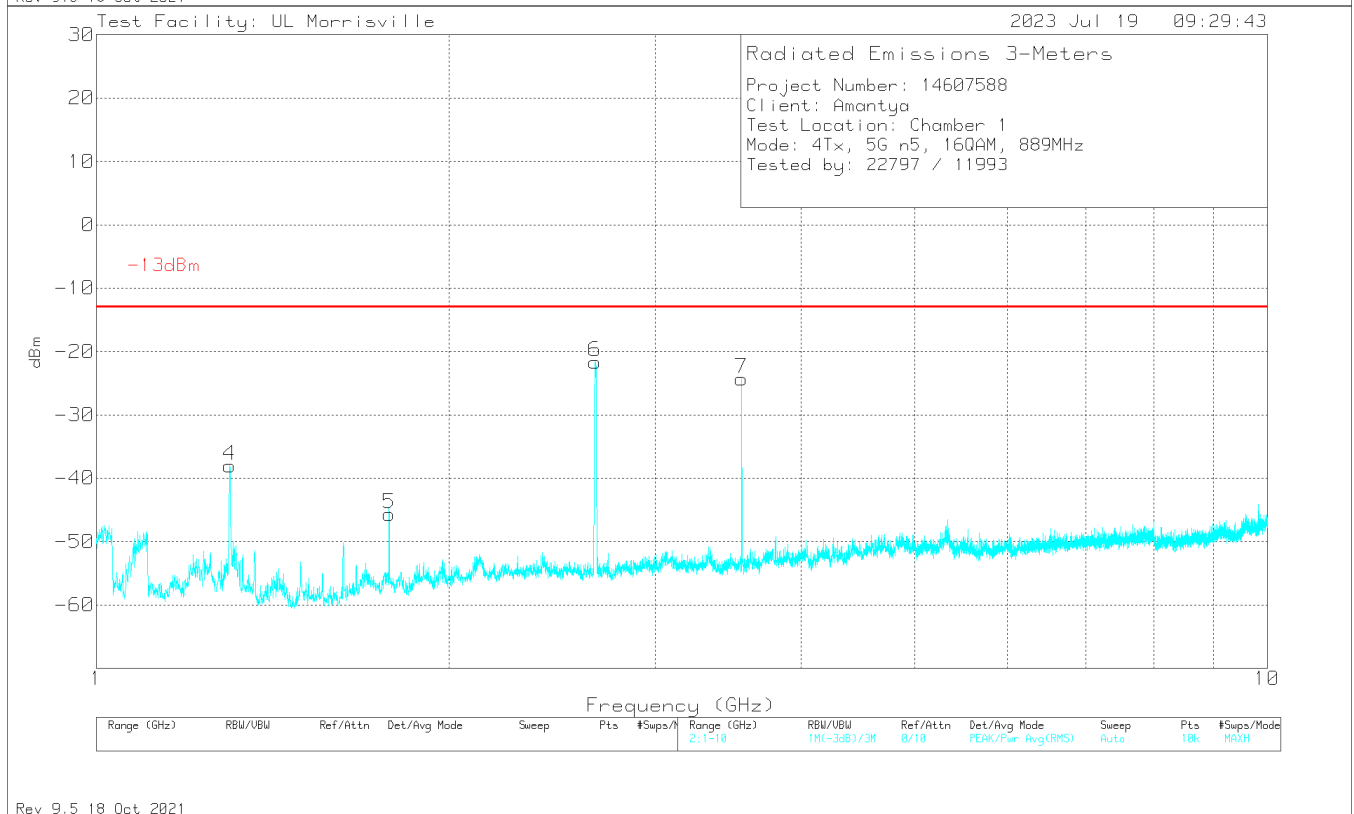
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.3	-43.76	Pk	28.9	-36.6	11.8	.5	-39.16	-13	-26.16	0-360	101	H
6	1.3	-44.57	Pk	28.9	-36.6	11.8	.5	-39.97	-13	-26.97	0-360	101	V
2	1.6245	-54.45	Pk	28.3	-36.3	11.8	.5	-50.15	-13	-37.15	0-360	101	H
7	1.6255	-53.62	Pk	28.3	-36.3	11.8	.5	-49.32	-13	-36.32	0-360	201	V
8	1.763	-52.98	Pk	29.8	-35.5	11.8	.5	-46.38	-13	-33.38	0-360	201	V
3	1.7635	-59.64	Pk	29.8	-35.5	11.8	.4	-53.14	-13	-40.14	0-360	300	H
4	2.649	-37.28	Pk	32.1	-33.7	11.8	.4	-26.68	-13	-13.68	0-360	300	H
9	2.649	-30.36	Pk	32.1	-33.7	11.8	.4	-19.76	-13	-6.76	0-360	101	V
5	3.526	-44	Pk	32.7	-32.8	11.8	0	-32.3	-13	-19.3	0-360	300	H
10	3.526	-36.86	Pk	32.7	-32.8	11.8	0	-25.16	-13	-12.16	0-360	300	V

Pk - Peak detector

5G NR n5 16QAM (10.0MHz BANDWIDTH, HIGH CHANNEL)



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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.2997	-43.59	Pk	28.9	-36.6	.5	11.8	-38.99	-13	-25.99	0-360	101	H
4	1.2997	-42.6	Pk	28.9	-36.6	.5	11.8	-38	-13	-25	0-360	200	V
5	1.7785	-52.48	Pk	30	-35.4	.4	11.8	-45.68	-13	-32.68	0-360	200	V
2	2.6641	-38.61	Pk	32	-33.4	.4	11.8	-27.81	-13	-14.81	0-360	300	H
6	2.6659	-32.23	Pk	32	-33.6	.4	11.8	-21.63	-13	-8.63	0-360	101	V
3	3.556	-48.75	Pk	32.8	-32.5	.6	11.8	-36.05	-13	-23.05	0-360	300	H
7	3.556	-37.03	Pk	32.8	-32.5	.6	11.8	-24.33	-13	-11.33	0-360	300	V

Pk - Peak detector

9.1.3. 5G NR n66

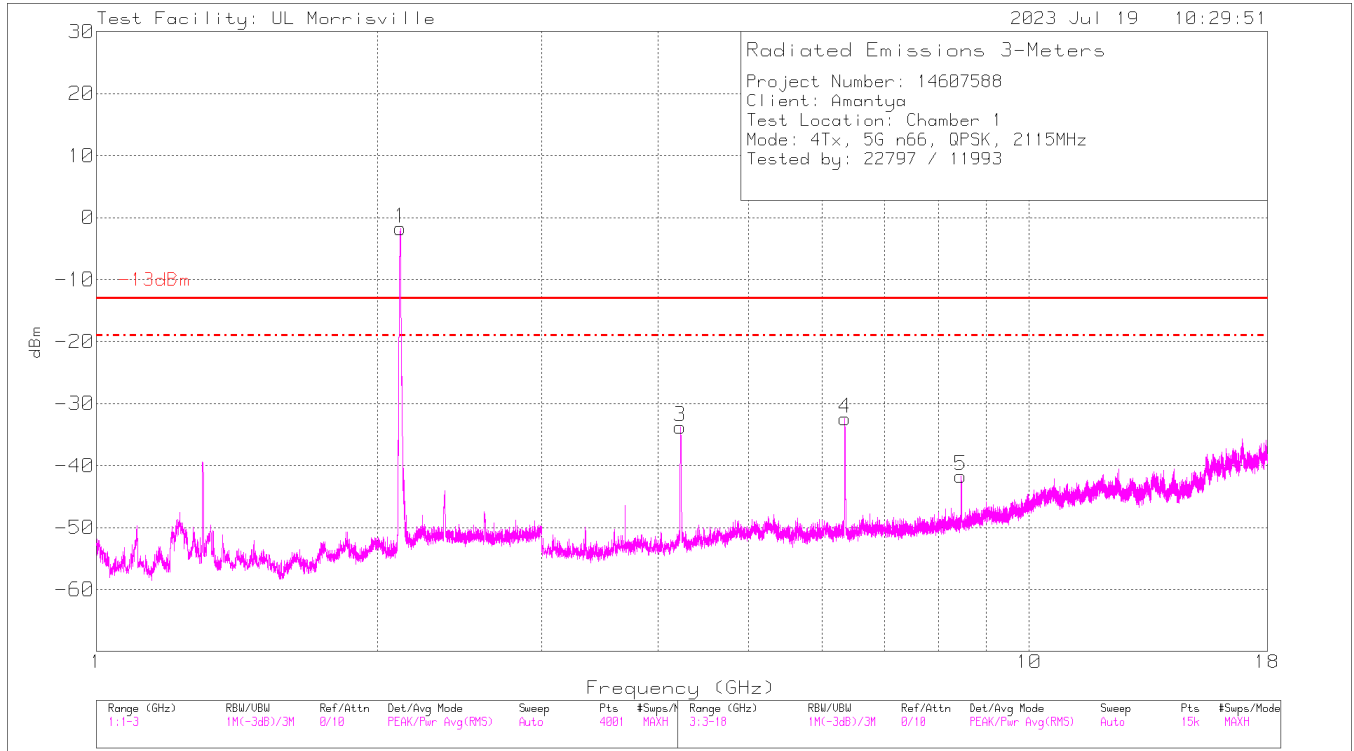
LIMITS

FCC: §27.53 (h)

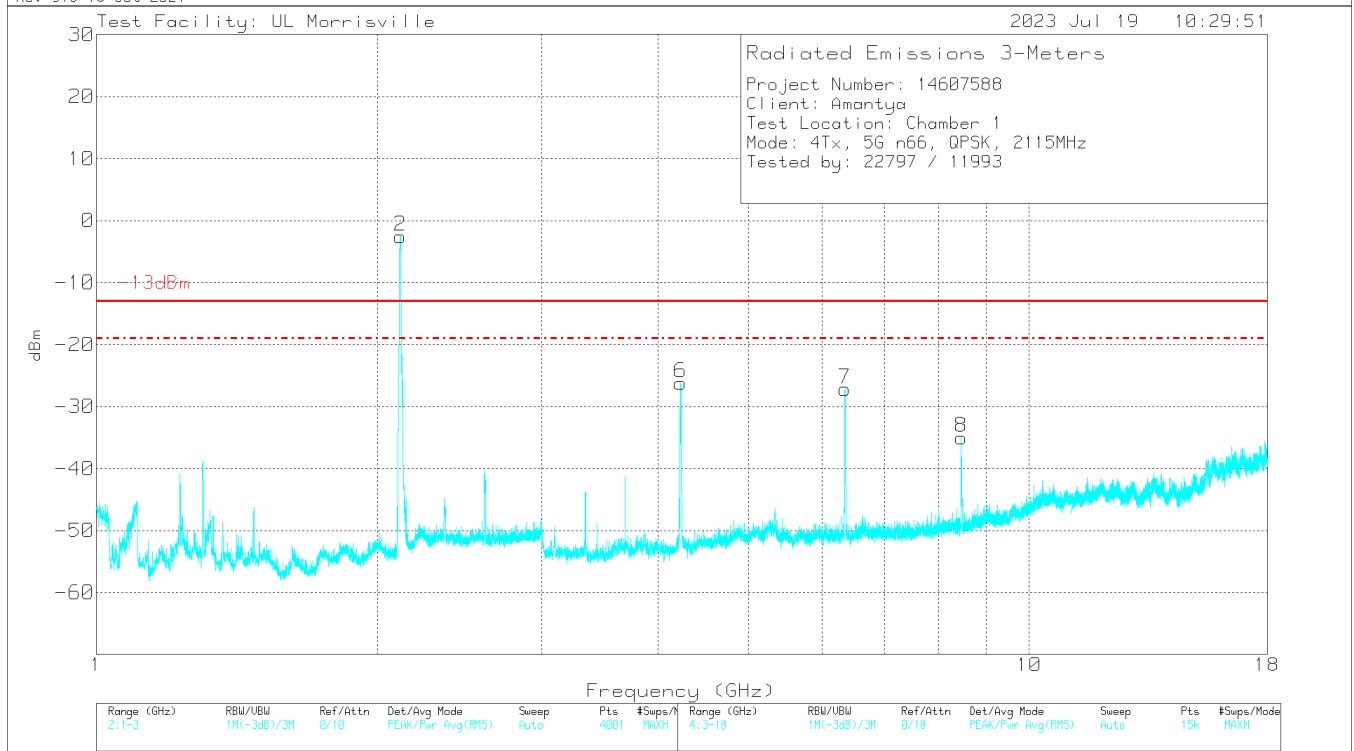
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

RESULTS

5G NR n66 QPSK (10.0MHz BANDWIDTH, LOW CHANNEL)



Rev 9.5 18 Oct 2021



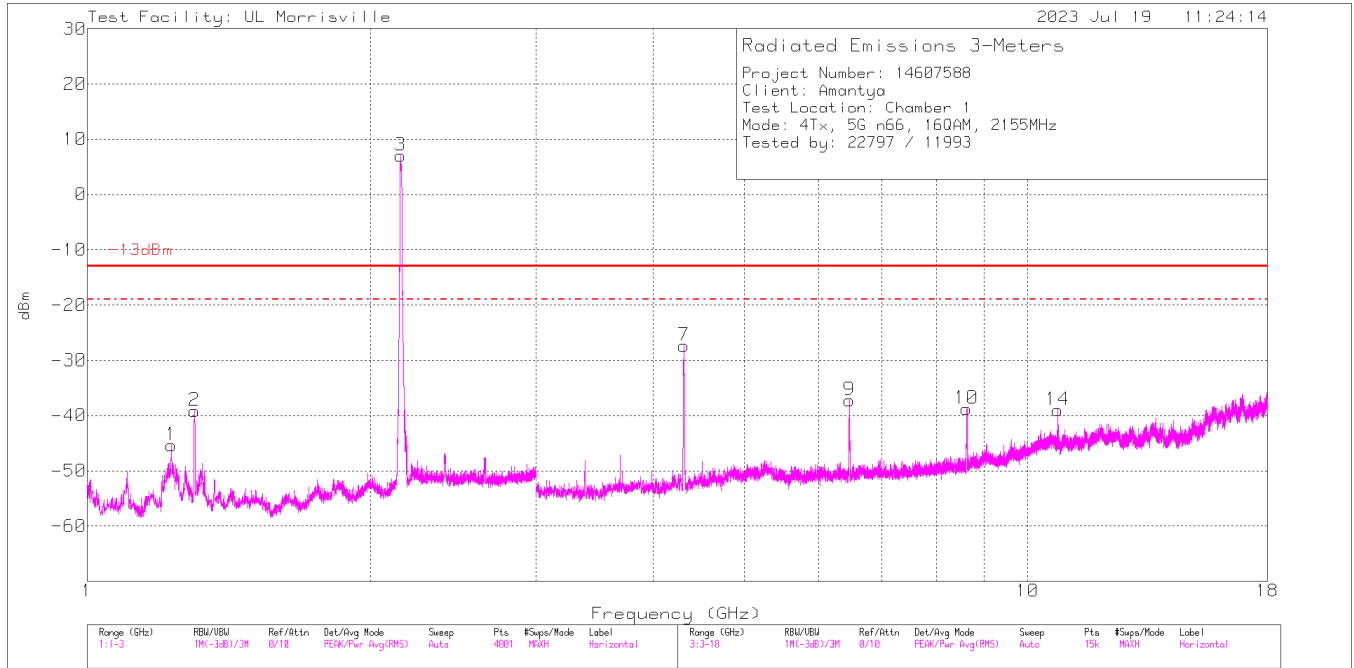
Rev 9.5 18 Oct 2021

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1 (DL)	2.1185	-23.1	Pk	31.6	-23.2	11.8	1.2	-1.7	-	-	0-360	100	H
2 (DL)	2.1185	-23.95	Pk	31.6	-23.2	11.8	1.2	-2.55	-	-	0-360	201	V
3	4.227	-48.73	Pk	33.4	-30.2	11.8	-	-33.73	-13	-20.73	0-360	101	H
6	4.23	-41.09	Pk	33.4	-30.3	11.8	-	-26.19	-13	-13.19	0-360	101	V
4	6.344	-50.24	Pk	35.5	-29.5	11.8	-	-32.44	-13	-19.44	0-360	101	H
7	6.345	-44.85	Pk	35.5	-29.6	11.8	-	-27.15	-13	-14.15	0-360	300	V
5	8.449	-60.17	Pk	35.8	-29.1	11.8	-	-41.67	-13	-28.67	0-360	200	H
8	8.456	-53.42	Pk	35.8	-29.2	11.8	-	-35.02	-13	-22.02	0-360	201	V
3	4.227	-48.73	Pk	33.4	-30.2	11.8	-	-33.73	-13	-20.73	0-360	101	H
6	4.23	-41.09	Pk	33.4	-30.3	11.8	-	-26.19	-13	-13.19	0-360	101	V

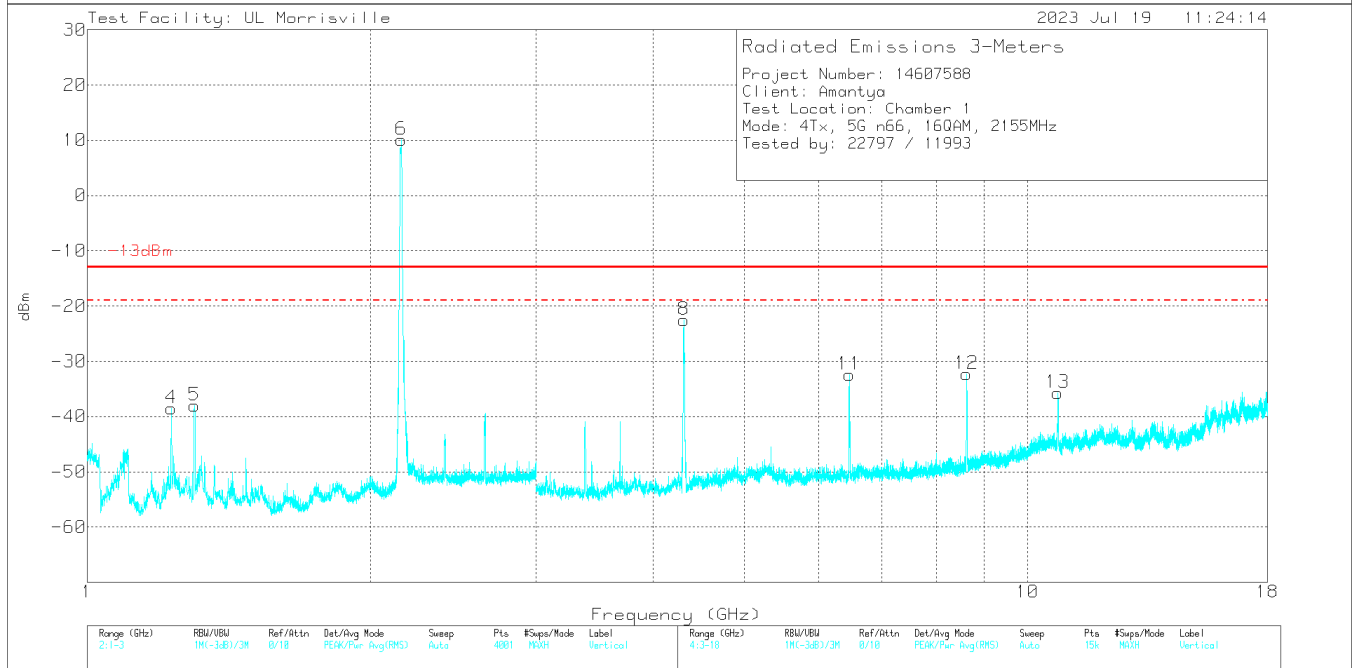
Pk - Peak detector

DL - EUT Fundamental

5G NR n66 QPSK (10.0MHz BANDWIDTH, MID CHANNEL)



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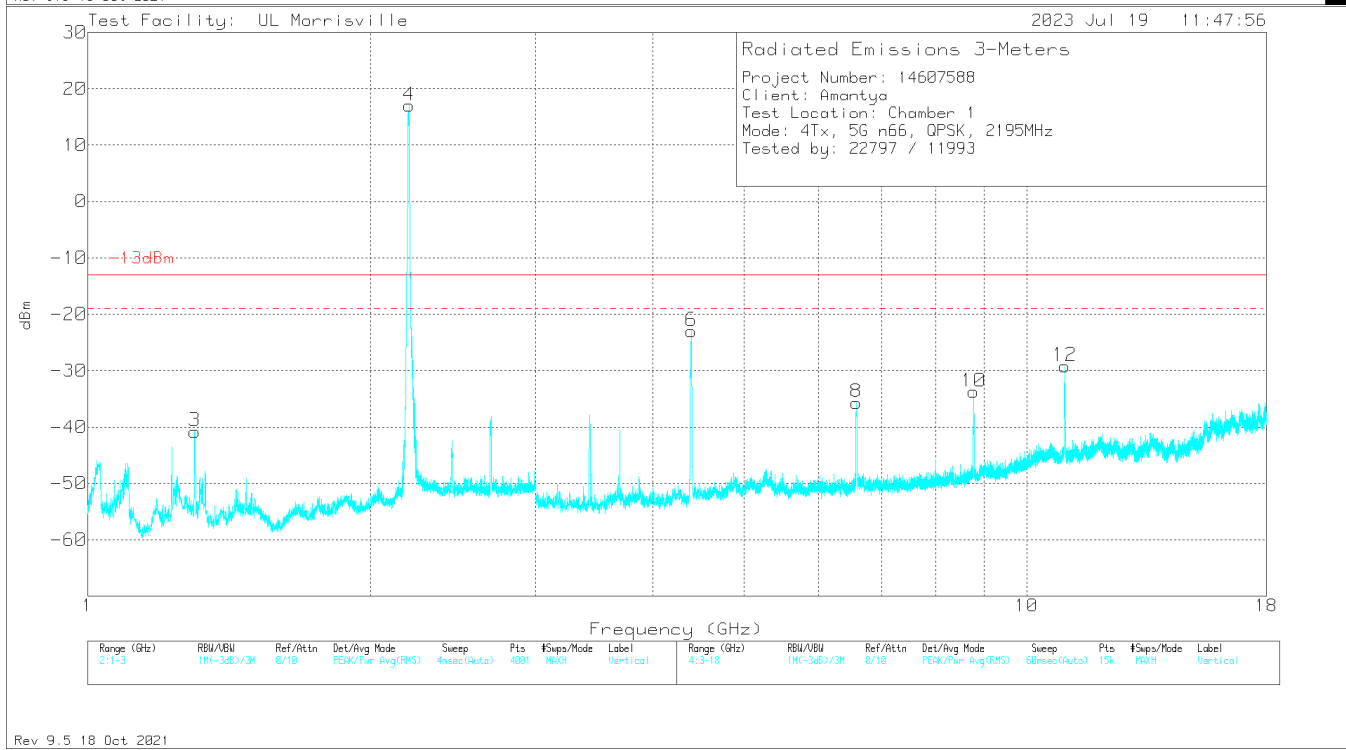
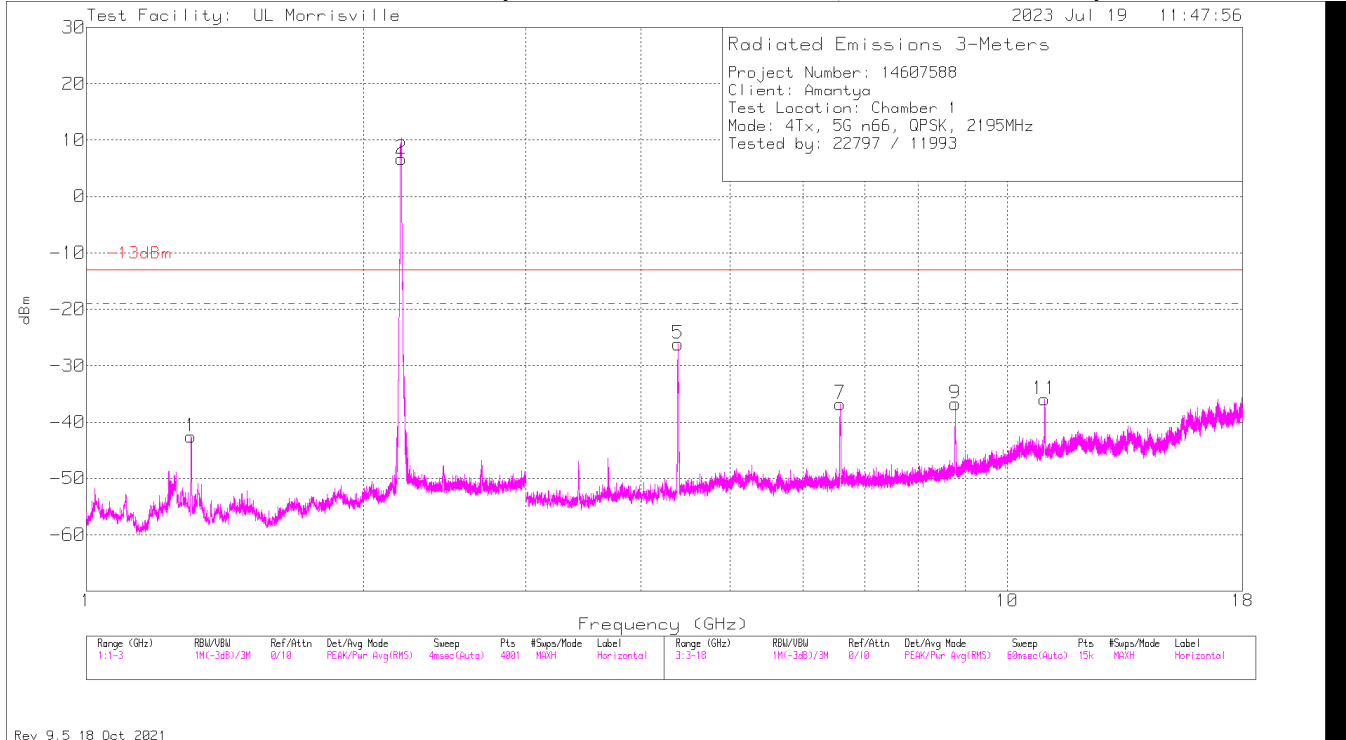
Rev 9.5 18 Oct 2021

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.2285	-62.31	Pk	28.6	-24.2	11.8	.8	-45.31	-13	-32.31	0-360	101	H
4	1.229	-55.56	Pk	28.6	-24.1	11.8	.8	-38.46	-13	-25.46	0-360	300	V
2	1.3005	-57.07	Pk	28.9	-23.6	11.8	.8	-39.17	-13	-26.17	0-360	101	H
5	1.3005	-55.86	Pk	28.9	-23.6	11.8	.8	-37.96	-13	-24.96	0-360	200	V
3 (DL)	2.1535	-14.41	Pk	31.7	-23.2	11.8	1.2	7.09	-	-	0-360	299	H
6 (DL)	2.158	-11.44	Pk	31.7	-23.2	11.8	1.2	10.06	-	-	0-360	300	V
7	4.31	-40.92	Pk	33.5	-31.7	11.8	-	-27.32	-13	-14.32	0-360	101	H
8	4.31	-36.09	Pk	33.5	-31.7	11.8	-	-22.49	-13	-9.49	0-360	299	V
9	6.464	-53.28	Pk	35.5	-31.3	11.8	-	-37.28	-13	-24.28	0-360	200	H
11	6.465	-48.38	Pk	35.5	-31.3	11.8	-	-32.38	-13	-19.38	0-360	200	V
10	8.621	-57.32	Pk	35.8	-29	11.8	-	-38.72	-13	-25.72	0-360	299	H
12	8.621	-50.89	Pk	35.8	-29	11.8	-	-32.29	-13	-19.29	0-360	200	V
13	10.775	-58.73	Pk	37.9	-26.7	11.8	-	-35.73	-13	-22.73	0-360	200	V
14	10.777	-61.88	Pk	37.9	-26.8	11.8	-	-38.98	-13	-25.98	0-360	200	H

Pk - Peak detector

DL – EUT Fundamental

5G NR n66 QPSK (10.0MHz BANDWIDTH, HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.2995	-60.39	Pk	28.9	-23.7	11.8	.8	-42.59	-13	-29.59	0-360	200	H
3	1.3	-58.55	Pk	28.9	-23.7	11.8	.8	-40.75	-13	-27.75	0-360	201	V
4 (DL)	2.1985	-4.59	Pk	31.8	-23.2	11.8	1.2	17.01	-	-	0-360	300	V
2 (DL)	2.199	-14.91	Pk	31.8	-23.2	11.8	1.2	6.69	-	-	0-360	300	H
5	4.388	-40.14	Pk	33.7	-31.5	11.8	-	-26.14	-13	-13.14	0-360	200	H
6	4.392	-37.08	Pk	33.7	-31.4	11.8	-	-22.98	-13	-9.98	0-360	101	V
8	6.583	-52.94	Pk	35.6	-30.1	11.8	-	-35.64	-13	-22.64	0-360	201	V
7	6.584	-54.11	Pk	35.6	-30.1	11.8	-	-36.81	-13	-23.81	0-360	299	H
9	8.78	-55.85	Pk	35.9	-28.6	11.8	-	-36.75	-13	-23.75	0-360	299	H
10	8.783	-52.91	Pk	35.9	-28.5	11.8	-	-33.71	-13	-20.71	0-360	101	V
11	10.981	-59.88	Pk	37.8	-25.7	11.8	-	-35.98	-13	-22.98	0-360	200	H
12	10.983	-52.98	Pk	37.8	-25.8	11.8	-	-29.18	-13	-16.18	0-360	300	V

Pk - Peak detector

DL - EUT Fundamental

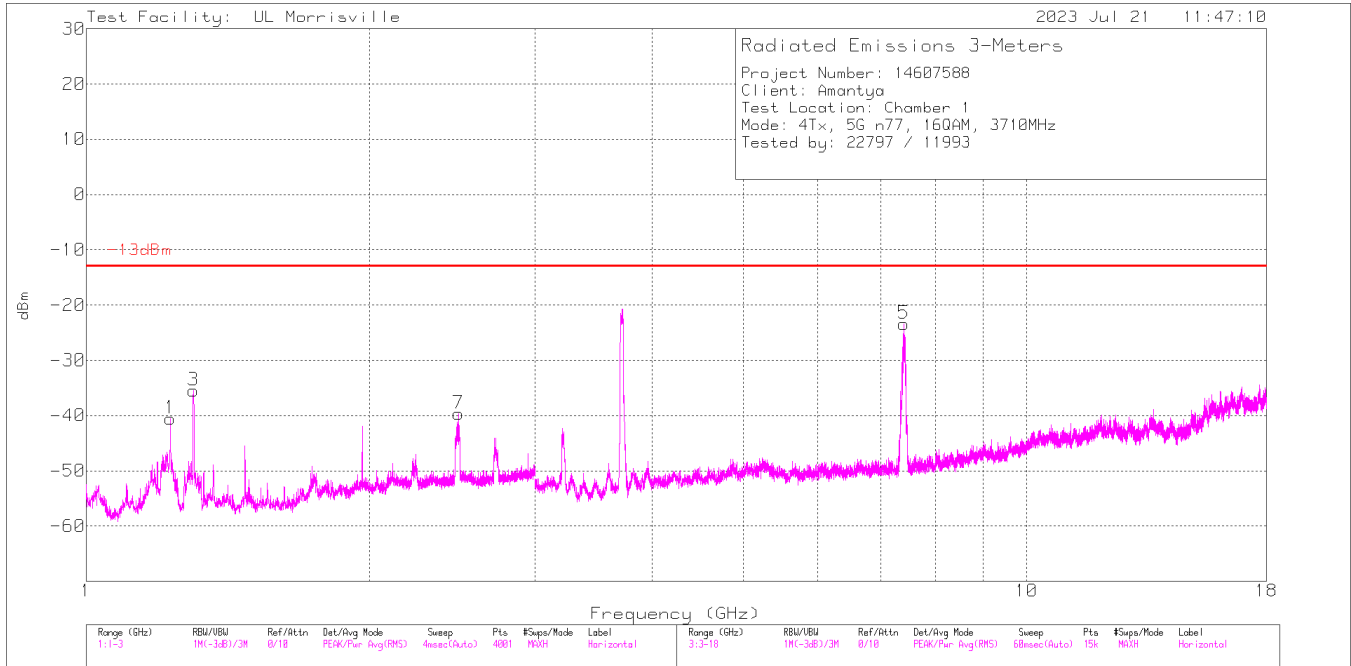
9.1.4. 5G NR n77

LIMITS

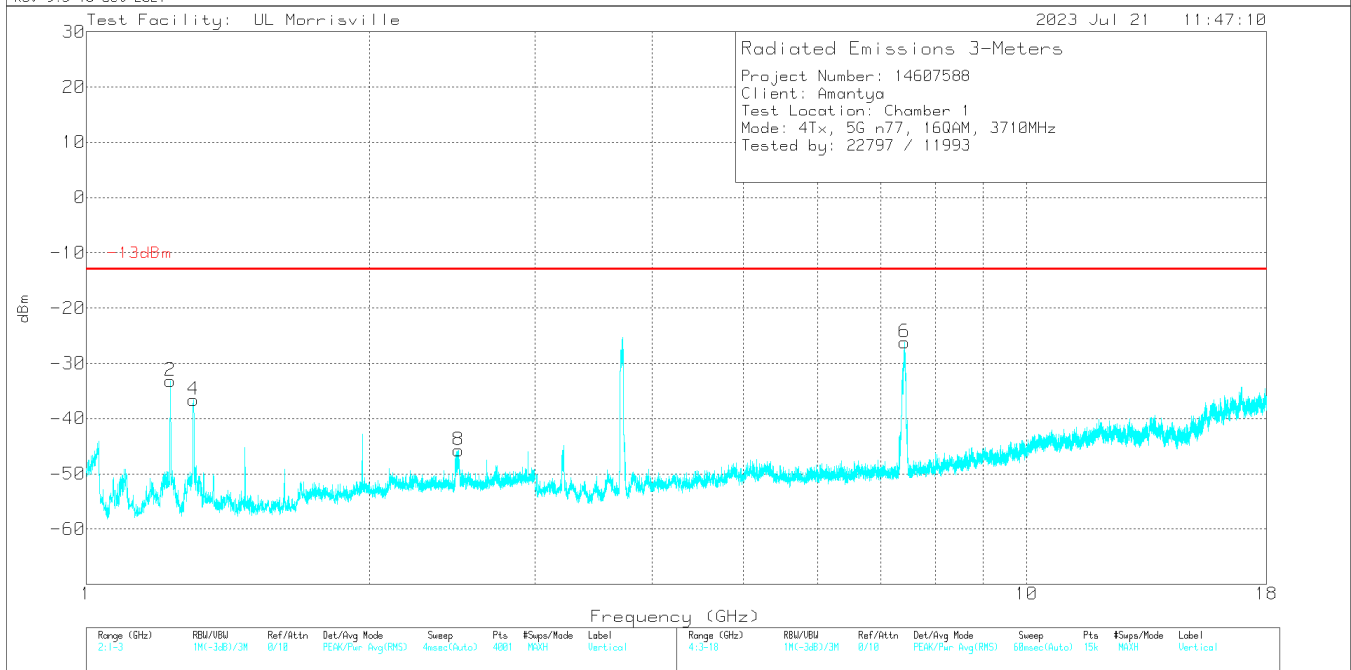
FCC: §27.53

(I) (1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (I)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5G NR n77 16QAM (20.0MHz BANDWIDTH, LOW CHANNEL)



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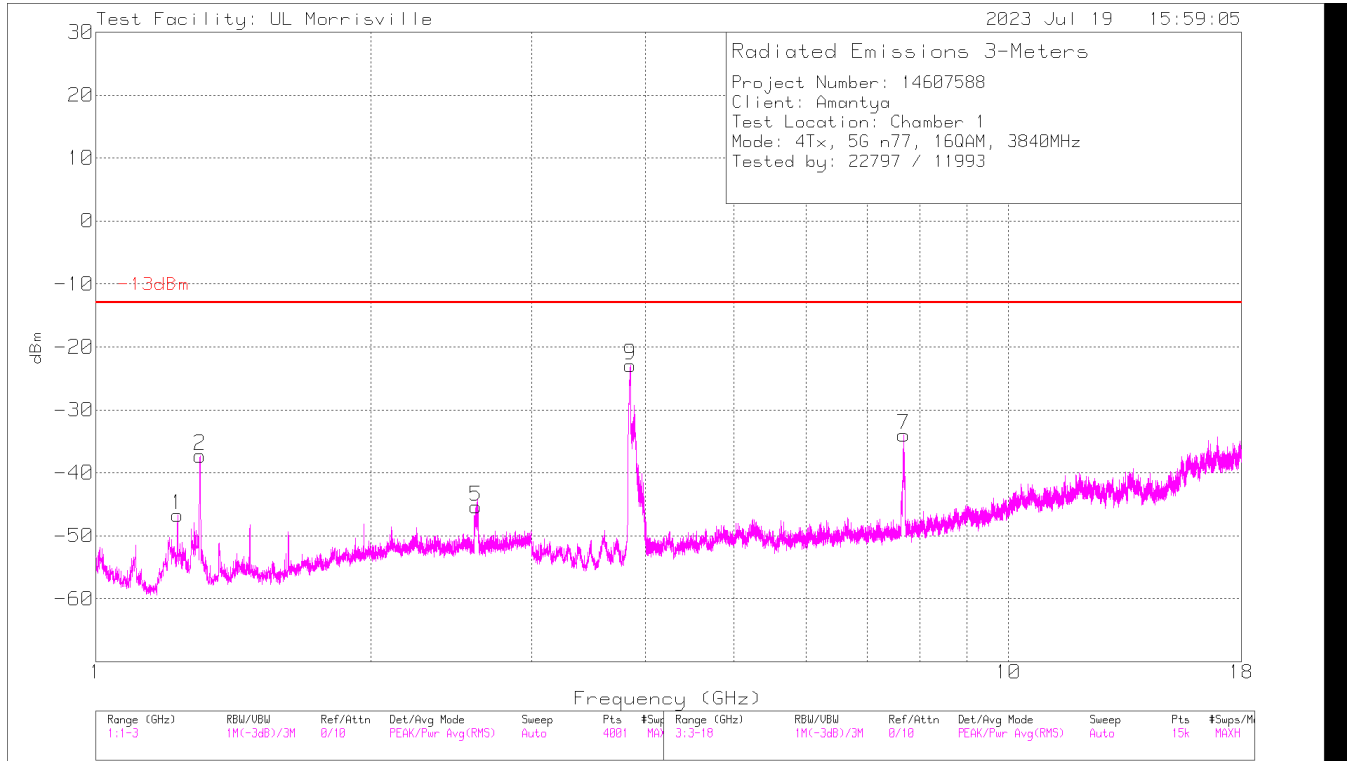


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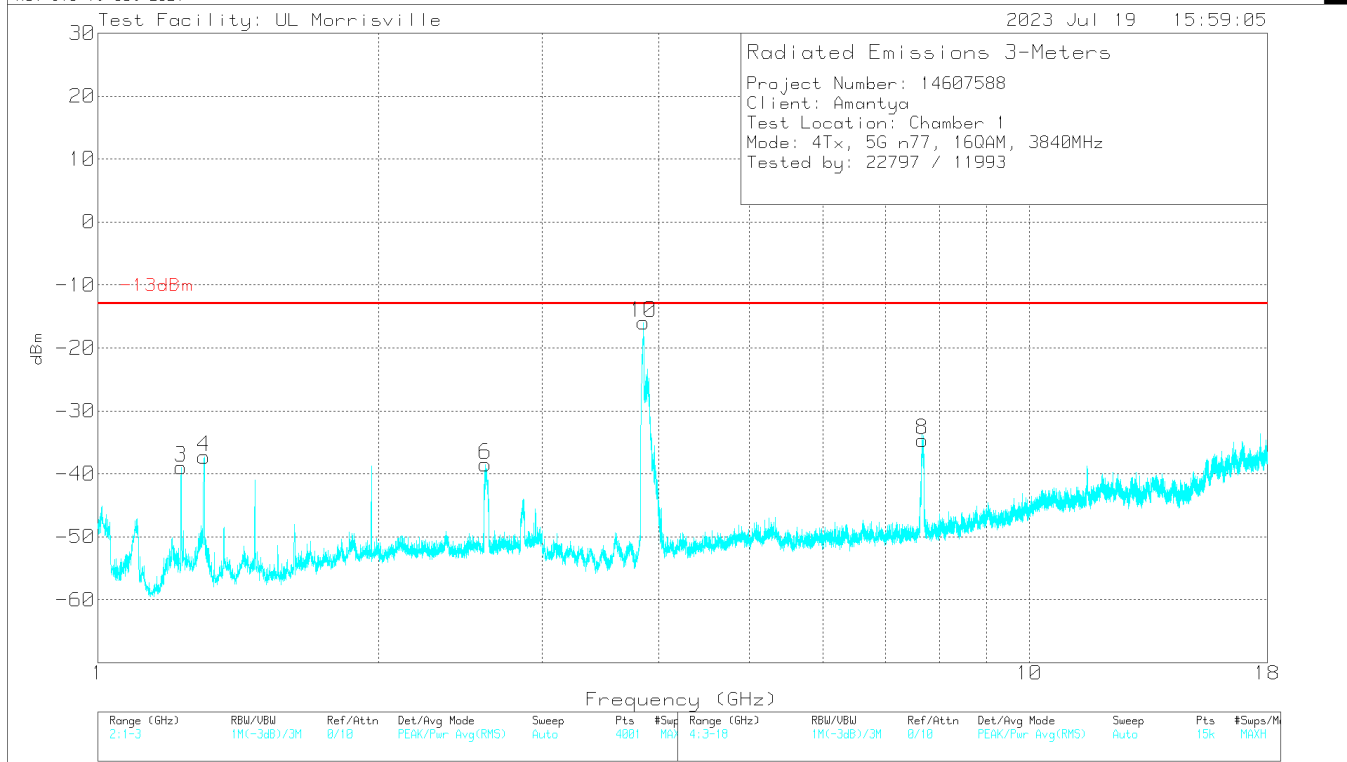
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.229	-57.24	Pk	28.6	-24.1	11.8	.4	-40.54	-13	-27.54	0-360	299	H
2	1.229	-49.9	Pk	28.6	-24.1	11.8	.4	-33.2	-13	-20.2	0-360	200	V
3	1.3005	-53.09	Pk	28.9	-23.6	11.8	.5	-35.49	-13	-22.49	0-360	200	H
4	1.3005	-54.24	Pk	28.9	-23.6	11.8	.5	-36.64	-13	-23.64	0-360	101	V
8	2.488	-67.09	Pk	32.3	-23.4	11.8	.7	-45.69	-13	-32.69	0-360	101	V
7	2.4895	-60.96	Pk	32.3	-23.5	11.8	.7	-39.66	-13	-26.66	0-360	101	H
5	7.406	-42.19	Pk	35.7	-29.4	11.8	.7	-23.39	-13	-10.39	0-360	101	H
6	7.415	-44.45	Pk	35.7	-29.9	11.8	.7	-26.15	-13	-13.15	0-360	300	V

Pk - Peak detector

5G NR n77 16QAM (20.0MHz BANDWIDTH, MID CHANNEL)



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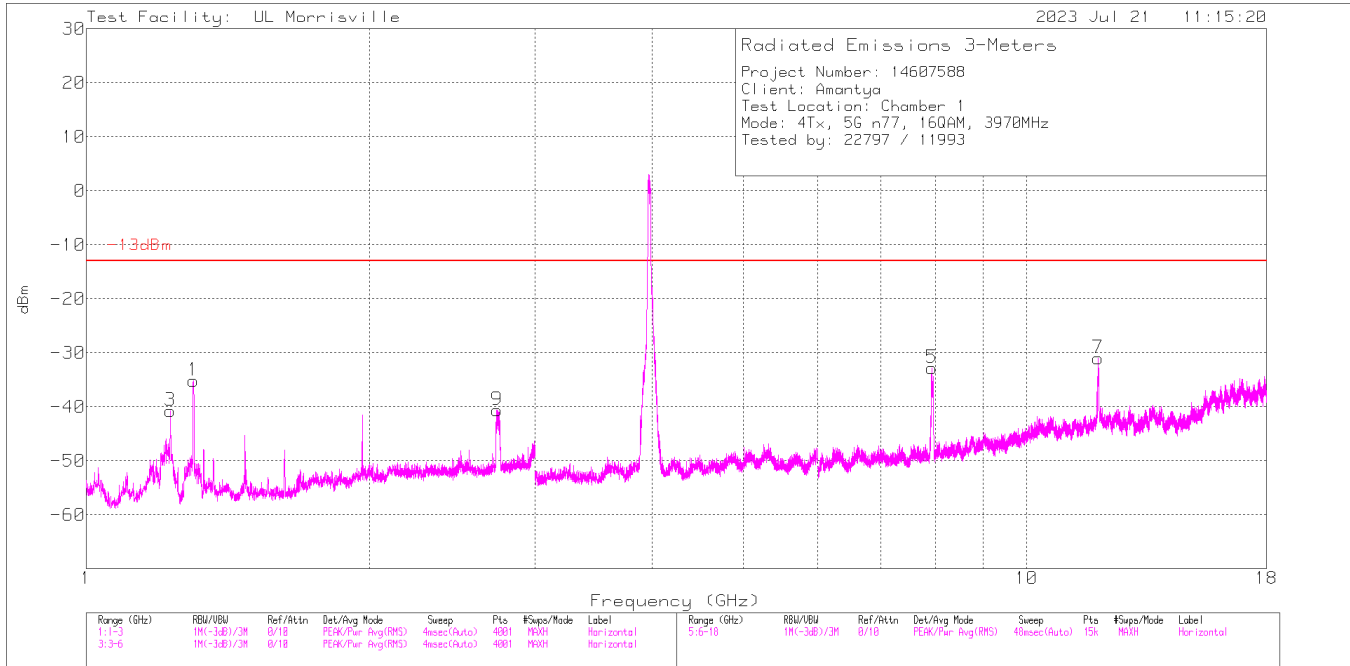


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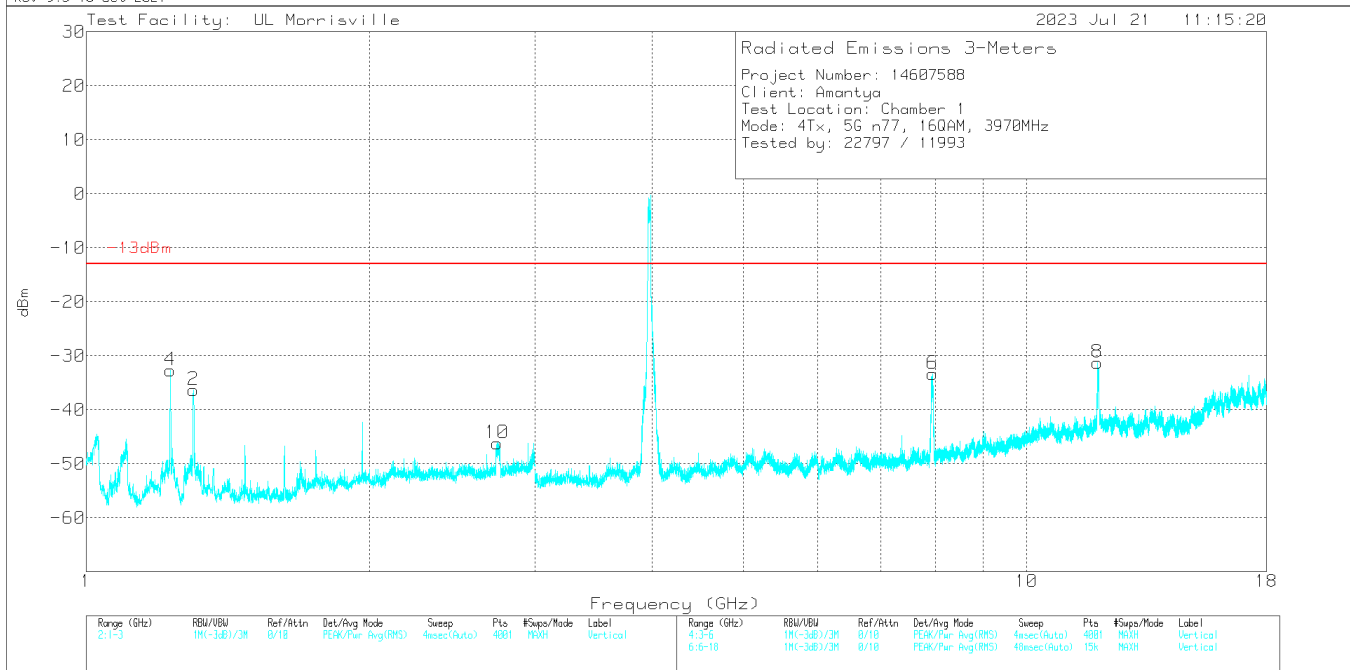
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.2285	-63.21	Pk	28.6	-24.2	11.8	.3	-46.71	-13	-33.71	0-360	300	H
3	1.229	-55.65	Pk	28.6	-24.1	11.8	.4	-38.95	-13	-25.95	0-360	300	V
2	1.3005	-54.87	Pk	28.9	-23.6	11.8	.5	-37.27	-13	-24.27	0-360	200	H
4	1.3005	-54.87	Pk	28.9	-23.6	11.8	.5	-37.27	-13	-24.27	0-360	200	V
6	2.6065	-59.99	Pk	32.2	-23.1	11.8	.6	-38.49	-13	-25.49	0-360	101	V
5	2.6085	-66.96	Pk	32.2	-23	11.8	.6	-45.36	-13	-32.36	0-360	300	H
10 (DL)	3.852	-31.04	Pk	33.4	-31.3	11.8	1.2	-15.94	-	-	0-360	300	V
9 (DL)	3.853	-37.98	Pk	33.4	-31.3	11.8	1.2	-22.88	-	-	0-360	101	H
8	7.678	-54.01	Pk	35.8	-28.9	11.8	.7	-34.61	-13	-21.61	0-360	101	V
7	7.681	-53.1	Pk	35.8	-29.2	11.8	.7	-34	-13	-21	0-360	101	H

Pk - Peak detector
 DL - EUT Fundamental

5G NR n77 16QAM (20.0MHz BANDWIDTH, HIGH CHANNEL)



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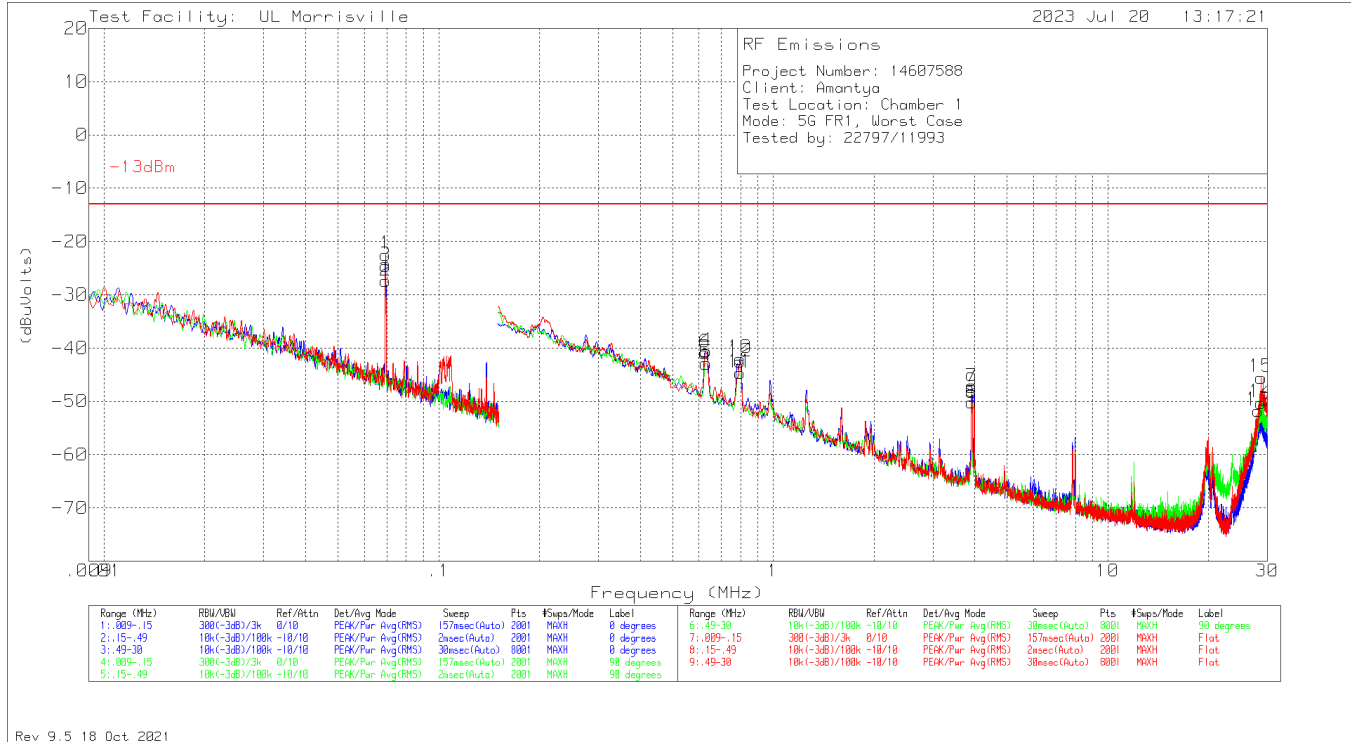
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	1.2285	-57.18	Pk	28.6	-24.2	11.8	.3	-40.68	-13	-27.68	0-360	299	H
4	1.229	-49.38	Pk	28.6	-24.1	11.8	.4	-32.68	-13	-19.68	0-360	201	V
1	1.2995	-52.68	Pk	28.9	-23.7	11.8	.5	-35.18	-13	-22.18	0-360	199	H
2	1.2995	-53.87	Pk	28.9	-23.7	11.8	.5	-36.37	-13	-23.37	0-360	101	V
10	2.7355	-67.74	Pk	32.1	-22.9	11.8	.6	-46.14	-13	-33.14	0-360	300	V
9	2.7375	-62.26	Pk	32.1	-22.8	11.8	.6	-40.56	-13	-27.56	0-360	101	H
5	7.9328	-52.04	Pk	35.8	-29.2	11.8	.8	-32.84	-13	-19.84	0-360	299	H
6	7.948	-52.67	Pk	35.8	-29	11.8	.7	-33.37	-13	-20.37	0-360	299	V
8	11.9072	-56	Pk	38.5	-26.4	11.8	.8	-31.3	-13	-18.3	0-360	299	V
7	11.9096	-55.67	Pk	38.5	-26.4	11.8	.8	-30.97	-13	-17.97	0-360	299	H

Pk - Peak detector

9.2. WORST CASE EMISSIONS

Worst case emissions from 9kHz to 1Ghz, and Above 18Ghz were performed, and only the tests with emissions within 20dB of the limit are reported in section 9.2.

9.2.1. Worst Case Mode



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Marker	Frequency (MHz)	Meter Reading (dBm)	Det	135144 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading (dBuVolts)	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.06935	-46.72	Pk	12.4	.1	11.8	-22.42	-13	-9.42	0-360	404	0 degs
2	.06935	-51.69	Pk	12.4	.1	11.8	-27.39	-13	-14.39	0-360	404	90 degs
3	.06935	-48.89	Pk	12.4	.1	11.8	-24.59	-13	-11.59	0-360	404	Flat
6	.62649	-65.07	Pk	12.2	.2	11.8	-40.87	-13	-27.87	0-360	404	Flat
4	.63018	-64.77	Pk	12.2	.2	11.8	-40.57	-13	-27.57	0-360	404	0 degs
5	.63018	-67.04	Pk	12.2	.2	11.8	-42.84	-13	-29.84	0-360	404	90 degs
10	.79619	-66.14	Pk	12.2	.2	11.8	-41.94	-13	-28.94	0-360	404	0 degs
11	.79619	-68.82	Pk	12.2	.2	11.8	-44.62	-13	-31.62	0-360	404	90 degs
12	.79619	-66.76	Pk	12.2	.2	11.8	-42.56	-13	-29.56	0-360	404	Flat
9	3.91708	-72.5	Pk	12.1	.4	11.8	-48.2	-13	-35.2	0-360	404	Flat
7	3.92077	-71.59	Pk	12.1	.4	11.8	-47.29	-13	-34.29	0-360	404	0 degs
8	3.92077	-74.49	Pk	12.1	.4	11.8	-50.19	-13	-37.19	0-360	404	90 degs
13	28.14274	-72.65	Pk	8	1.1	11.8	-51.75	-13	-38.75	0-360	404	0 degs
14	28.74036	-71.05	Pk	7.9	1.1	11.8	-50.25	-13	-37.25	0-360	404	90 degs
15	28.7625	-66.2	Pk	7.8	1.1	11.8	-45.5	-13	-32.5	0-360	404	Flat

Pk - Peak detector

10. SETUP PHOTOS

See R14607588-EP3 for Setup Photos.

END OF REPORT